

Botanical Society of the British Isles field meeting on the Cors Caron National Nature Reserve, July 2002  
(photo Liz Fleming-Williams)



# **Flora of Cardiganshire**

**A. O. Chater**

With contributions from

D. E. Allen, C. D. Preston and P. A. Smith

Prepared for publication by P. A. Smith

Aberystwyth, 2010

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## Preface

This Flora is an account of the higher plants of Cardiganshire (Vice-county 46) which is essentially the same as the modern county of Ceredigion. The only previous Flora of the county was published by J. H. Salter in 1935. It has a very brief introduction, and the species accounts mostly consist of just a few lines followed by a list of localities. It was based on Salter's own exploration of the county, which was remarkably thorough and which was written up very fully in his diaries. I have quoted freely from these, and hope I have thereby done more justice to his knowledge of the botany of the county than he himself did in his Flora.

The present Flora is taxonomic, floristic and historical in its concerns rather than ecological and phytosociological. The main emphasis is on the species accounts. Readers may well learn more about the county's woods by looking under *Quercus*, more about the salt marshes by looking under *Spartina*, more about the improved grasslands by looking under *Lolium*, and more about the lakes by looking under *Isoetes*, than they will by turning to the relevant habitat sections. The species accounts have been referenced as fully as possible, but in the introductory chapters on the history of recording, conservation, habitats, geology and climate, where a very wide range of often non-botanical sources has been used, only a few of the more generally helpful references have usually been cited.

Cardiganshire is notable in a wider context for many botanical matters which are dealt with in greater detail in this Flora. Edward Llwyd's ancestry was in the county and he botanised here on visits to his uncle. John Ray, greatest British botanist of his age, climbed Pumlumon. James Edward Smith, greatest British botanist of *his* age and founder of the Linnean Society, botanised at Hafod during his holidays there with Thomas Johnes, the farming and forestry pioneer who was the first to transform the uplands agriculturally. In the 20<sup>th</sup> century this upland improvement was made a national crusade by George Stapledon with his Cahn Hill Improvement Scheme on the former Hafod estate. Stapledon's Welsh Plant Breeding Station transformed grassland and cereal development with its 'S.23' Rye-grass and its Oat and Wheat varieties, work now continuing at its successor, IGER/IBERS. Early classic studies on salt marshes by Richard Henry Yapp, and on the raised bogs at Borth and Tregaron by Harry Godwin, put the county at the forefront of ecological and quaternary studies.

Unlike some recent county Floras that aim at giving a snapshot of the state of the species in a county, this one is more of a blurred time-exposure. I have attempted to give a picture of the current fortunes of the species, as well as a longer historical perspective where there is sufficient information to make this practicable and interesting. Lack of detailed recording in the past though usually makes this an unsatisfactory exercise. I have also attempted to put the botany in a human context, showing not only how the plant recorders but also the farmers and other landowners, the plant breeders, the academic researchers and the conservationists have related to the flora of the county.



## Acknowledgements

This Flora would have been inconceivable without the inspiration, services, contacts and expertise provided by the Botanical Society of the British Isles.

My knowledge of plants and vegetation in the field in the county has been made to a considerable and enjoyable extent in the company and instruction of, in roughly chronological order, my parents (EHC and MC, commemorated in the name *Ulmus chaterorum*), Bill Condry, D. Glyn Jones (with whom much of my basic exploration of the county was done, and who discovered many of the best sites), Adrian Fowles, Dafydd Davies, Lin Gander, Julian Woodman, Alan Hale, Paul Smith, Matt Sutton, Sam Bosanquet and John Poland. To my similarly enjoyable benefit David Allen spent five days each year for ten years recording *Rubus* with me, Roger Maskew has visited annually for many years to record *Rosa*, and other regular visiting friends



Bill Condry and D. Glyn Jones,  
Blaencletwr, July 1982



Alan Hale and *Rhynchospora fusca*,  
Cors Fochno SN620922, July 1997

have included Clive Jermy to record ferns and especially *Isoetes*, Richard Lansdown and Nick Stewart to record aquatics and Jim Bevan to record *Hieracium*. Numerous other less frequent but equally valued visitors have included Chris Preston, John Akeroyd, Peter Sell, Dick Brummitt, Ken Trewren, Sam Thomas, Anthony Pigott, David Pearman, Richard Pryce, Clive Stace, Tim Rich and Trevor Dines.

For help with computing I am especially grateful to Jim Bevan who started me off, to Alan Hale who kept me going, and to Paul Smith, Mila Teneva, Bob Ellis and Alex Lockton. The use of DMAP for Windows, created by Dr Alan Morton, is gratefully acknowledged. Inputting of the tetrad master cards to create the maps was done under the supervision of Alex Lockton and Sarah Whild by Ben Draper, Antigone Lockton, Dudley Martin, Heather Slade, Julian Thompson and Heather Webster; without their hard work there would be few maps in this Flora and I am very grateful to all of them.

Gwynn Ellis was the great encourager for myself and for all the other Welsh Vice-county Recorders, and was the ever-helpful liaison with the National Museum of Wales, a role taken over more recently and with equal helpfulness by George Hutchinson and Tim Rich. The collections in the Museum herbarium (NMW) underpin the taxonomy of this Flora and are vital to the understanding of the county's, as indeed the Welsh, flora.

Max Walters was the chief taxonomic mentor of my student days at Cambridge, and what knowledge I have of plants was immensely broadened by my 17 years working with him, Tom Tutin and others on *Flora europaea*. More recently Peter Sell, through innumerable discussions, mostly on the telephone, has



The faithful inputters, Julian Thompson, Heather Webster,  
Sarah Whild, Alex Lockton, Ben Draper, Heather Slade,  
Dudley Martin, (Antigone Lockton inset),  
Ynys-las, August 2004



George Hutchinson and Gwynn Ellis,  
Llyn Gynon, July 1989

generously kept me informed of his investigations into infraspecific variation, look-alikes and other concerns in the British flora and this has enabled me to look very much deeper into the Cardiganshire flora than would otherwise have been possible; he has been the major taxonomic stimulus. Clive Stace has been equally generous in keeping me abreast of recent taxonomic and nomenclatural changes and kindly gave me access to ed. 3 of his *Flora* before publication. A great deal of other taxonomic influence and help over the years has come in particular from Peter Benoit, Rose Murphy, Tim Rich and George Swan.

In recent years the main contributors of records have been Steve Chambers, whose critical eye and expertise have detected many new taxa in the county, Chris Forster Brown, who has explored in particular several sites difficult of access and made some startling finds, Matt Sutton who contributed a lot during his work on the Phase I and II teams with CCW, and the other helpful members of these teams, especially Peter Dalley, Jon Turner, Julian Woodman, Anne MacDonald (Moorby), Sarah Andrews, Dave Reed and Sam Bosanquet. Acknowledgement of these, and of all the other recorders and determiners of specimens whose work is the basis of this Flora, is indicated by the appearance of their initials throughout the species accounts. Innumerable farmers and other landowners and gardeners have told me of plants of interest and provided me with relevant information.

Apart from D. Glyn Jones, many others over the years at the NCC/CCW office have helped me greatly, including Chris Fuller, Roger Bray, Alan Hale, Andy Jones, Karen Heppingstall, Sue Byrne and Jenny Higgins and, on their reserves, John Davies, Paul Culyer, Mike Bailey, Justin Lyons and David Wheeler. In the Wildlife Trust, among many others Lin Gander and Lizzie Wilberforce have been especially helpful, as have Neil and Barbara Taylor and Richard Williams of the Shared Earth Trust at Denmark Farm, and Ian and Kathryn Callan at Winllan. John Valentine of IGER/IBERS has given me much information. My chief informants in Forest Enterprise have been Richard Thompson, Alec Dauncey and Michelle Bromley, and helpful contacts in the County Council have included Liz Allen, Paul Evans and Nigel Nicholas.

Penny Condry has acted as my hospitable informant in the north of the county, as have Geoff and Barbara Harrison and Lin Gander in the south. My neighbouring Vice-county Recorders have always been very supportive and I am especially indebted to Peter Benoit, Marjorie Wainwright, Kate Thorne, Mike Porter, Richard Pryce and Stephen Evans in this respect. Ray Woods has been a constant stimulus and source of information.



Peter Sell, Hafod, April 1978



S. P. Chambers, Cwmystwyth, March 1996



Philip Oswald, David Allen, Clive Lovatt, Henry Phythian-Adams and David Price have been founts of historical information about botanists, and Gilbert Clark has over many years shared his reminiscences of Salter with me.

Leon Mincher and Pete Bowers kindly provided me with copies of their invaluable theses. Caroline and Tim Palmer, Caroline Kerkham and Stephen Briggs, Ros Laidlaw and Penny David have provided much historical and botanical information on estates and gardens, as have Howard Ovens and John Corfield on conifers and other trees. Erwyd Howells has provided me with many useful references. Peter Walters Davies has helped with street trees and other matters. John Savidge and Andrew Agnew, both formerly of Aberystwyth University, have freely given of their knowledge of the local flora, as have Peter Davis, John Davies, Hywel Roderick, Annette Williamson, Roy Bamford and Red Liford. Others who have helped in a variety of ways include Philip Oswald, John Poland, Fred Rumsey, David Pearman, Mike Wilcox, Geoffrey Halliday, Bruce Tyler, Frances Evans, Liz Fleming-Williams, Gwyn Jones, Ann Daniels, Michael Freeman, Lionel Madden, Neil Weston, Ieuan Williams, Dorothy and Denys Evans and Jeremy and Gill Long. I am grateful to the library staff at the National Library of Wales, the Linnean Society of London, the Natural History Museum, London, the Royal Botanic Gardens, Kew, the herbarium staff at the latter institutions, the staff of the Ceredigion Archives, as well of course as those at the National Museum of Wales and at Aberystwyth University, for help with access and interpretation. The 'Herbaria@home' project and Tom Humphrey have recently provided details of and leads to many important specimens that I would otherwise have been unaware of.

I am grateful to Liz Fleming-Williams for her evocative frontispiece and cover photo, to the IBERS library at Gogerddan for the Stapledon portrait photo, to Philip Mould for the Brett painting photo, to Margaret Stace for the author's photo and to the other photographers acknowledged in the appropriate places.

Eric Clement has meticulously commented on all the species accounts, and Steve Chambers similarly read both these and the habitats chapter. Sam Bosanquet, Richard Hartnup, Chris Preston, Andy Jones and Julian Woodman have also read parts of the text. All have made helpful additions and saved me from numerous errors; those errors that remain are of course mine alone, as are all the opinions expressed in the Flora. David Allen, Chris Preston and Paul Smith are gratefully indicated as my co-authors in the appropriate places.

This Flora might never have been written had not Paul Smith been worried enough in 2003 about my lack of progress to appoint himself my line manager. Every County Flora writer should have one. His firm encouragement and practical help during the process of writing has been all-important, and he has more recently undertaken the immense task of formatting the Flora for the printer, acting as general editor and proof-reader, and has brought the whole project to completion.

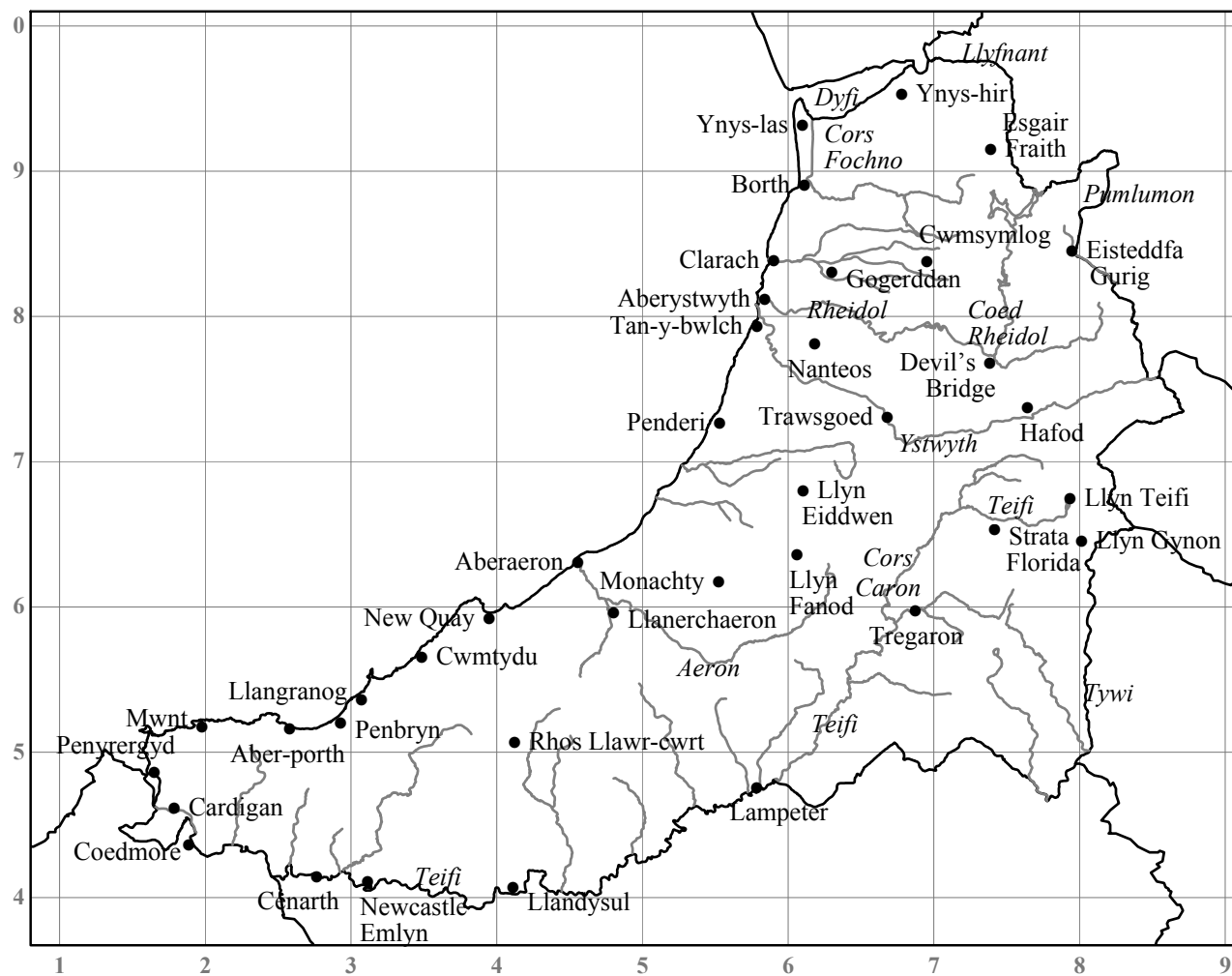


Chris Preston, August 1996

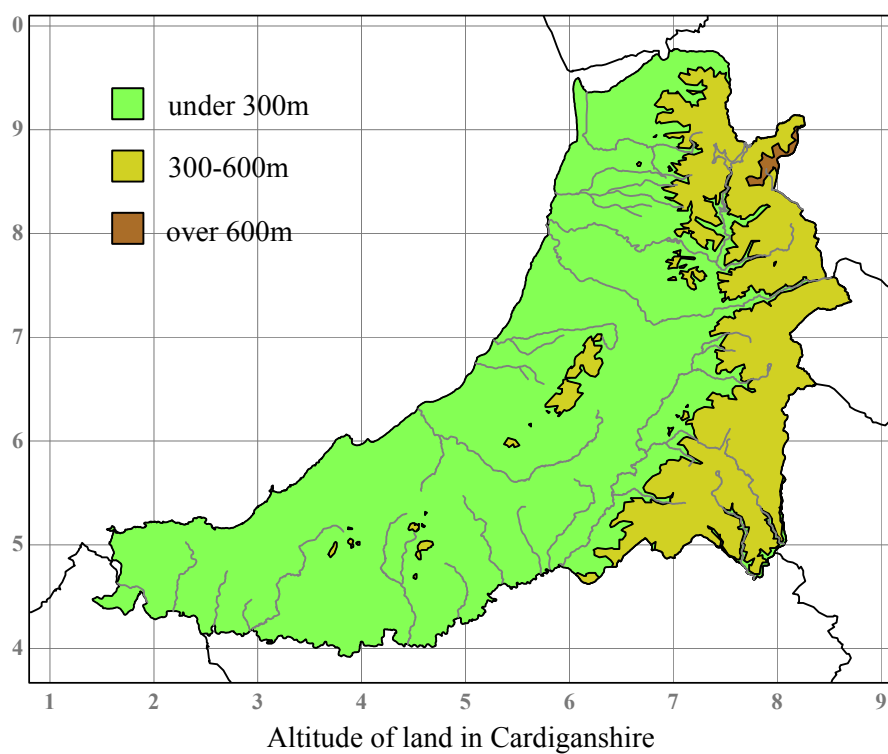


Paul Smith, July 2003





Map of towns and selected other frequently mentioned sites



Altitude of land in Cardiganshire





*Vaccinium oxycoccus* growing amongst *Polytrichum*, Cors Bwlch-y-Baedd





## 1. An introduction to Cardiganshire

### The natural landscape

Cardiganshire is enclosed by natural boundaries, the sea to the west, Pumlumon and the rest of the Cambrian Mountains to the east, and two rivers, the Dyfi and the lower reaches of the Teifi, to the north and the south. Only in the south-east corner does the county spill over the mountains to be bounded by the upper reaches of the Tywi. Down the middle of the county, between the upper Teifi and the sea, a broad ridge of high ground, known at its northern end as the Mynydd Bach, gradually diminishes south-westwards. In the northern third of the county, where two rivers, the Rheidol and Ystwyth, converge on Aberystwyth, there are deep, often wooded valleys running into the hills. Smaller, but equally wooded valleys run inland along much of the coast, and up the tributaries of the Teifi. The Dyfi estuary, and to a lesser extent the Teifi, have salt marshes and sand dunes. The rest of the coast is mostly a mixture of hard and soft rock cliffs, with a few shingle beaches, and there are two small cliff-girt islands, Ynys Lochdyn and Cardigan Island. Peatlands are a

View W from SN798893 to Hengwm  
Annedd, Pumlumon, August 1999



Autumn colours in Cwm Rhaiadr, view S to Pistyll y Llyn from SN752965, October 2003



Pendinaslochdyn and Llangranog Head, view NE from SN309542, September 2006

conspicuous feature of the county, from the vast raised bogs of Cors Fochno beside the Dyfi estuary, and Cors Caron astride the upper Teifi, to the blanket bogs of the uplands and the numerous valley mires that are especially characteristic on and around the central area of high ground.

### **The man-made landscape**

Although Man will have been in the area before the last ice age, there is virtually no evidence of his activities at this time. Parts at least of the county were re-colonised by c.8,000BP, after the retreat of the two glaciers, the Central Wales Ice Sheet and the Irish Sea Ice Sheet, that covered the north and east, and the south-west of the county respectively. A few Mesolithic sites indicate this occupation. Neolithic evidence is even scantier, but it is believed that the county had become significantly populated by then. Bronze Age sites by contrast occur in abundance throughout both the uplands and the lowlands, and woodland clearances will by that time have greatly modified the landscape. Iron Age sites are predominantly more lowland, and the 70 or so hill-forts include such spectacular ones as Pendinas, Y Gaer Fawr and Pen y Bannau. The Romans came about 75AD and constructed Sarn Helen, a still largely extant road leading up through the middle of the county. After their departure a century or so later, Ceredigion gradually emerged as a small kingdom, Christianity became dominant with St Padarn and St David as the most significant saints. Evidence for Viking invasions is minimal. Norman occupations began in the late 11<sup>th</sup> century, a marcher lordship was established in 1110, and Welsh rule was re-established in the 1130s chiefly under the princes of the house of Deheubarth. Most of the 30 or so Norman and Welsh castles that were built in the 12<sup>th</sup> century were of wood and only the mottes and other associated earthworks remain. After a long period of unrest, in 1284 Ceredigion became the county of Cardiganshire under Edward I, whose 1277 castle at Aberystwyth, the only substantial castle ruin in the county, was the southernmost of the ring of castles that he had built to contain Llywelyn ap Gruffydd in his Gwynedd stronghold.





In deepest south Cardiganshire, view SW down the Nant Iago valley from SN38444300, May 2008

The Cistercian abbey of Strata Florida was founded in 1164, and had as profound an effect on the countryside by the management of its extensive lands as the great secular estates had during the following centuries. These, such as Gogerddan, Hafod, Nanteos, Trawsgoed, Falcondale and Peterwell, were in decline by the end of the 19<sup>th</sup> century. Small independent farms took their place so that by 1970 Cardiganshire had, at nearly 70%, the highest percentage of owner-occupied land of any county in Britain, although many of these holdings were by then, and still are, becoming amalgamated. Because of this, many farms are no longer lived in by farmers. The uplands are now dominated by sheepwalks and the Forestry Commission's conifer plantations, and the lowlands by pastures grazed by Cattle, Sheep and Horses. Arable farming is now chiefly along the coast and in the south-west although it was formerly much more widespread. Few areas have become modern farming prairies, and, in the lowlands, hedges on banks, or earth banks with fences are still the predominant field boundaries, and in the uplands earth-and-stone banks or drystone walls. Organic farming is increasingly popular. Agri-environment schemes have begun to have a noticeable effect, especially in the overgrazed uplands. This predominantly man-made landscape, which has in fact changed less over the last few centuries than that of many other British counties, is the setting for this Flora.



The farmed and wooded lowlands, Cwm Hawen, Pontgarreg, view SSE from SN337544, May 1984

### **The human infrastructure**

The vice-county of Cardiganshire covers 179,986ha, and is the fifth largest of the thirteen in Wales. It almost exactly coincides with the modern county of Ceredigion, which had 74,941 inhabitants (somewhat inflated by university students) in 2001, making it the eighth in population of the vice-counties, and at 41 people per 1km<sup>2</sup> it is the ninth most densely populated. This equalled the population of 1871, when both agriculture and

lead mining were major employers, and was nearly half as much again as the low of 53,000 in 1951. Cardiganshire as the official name lasted from 1284 to 1974 when the county became part of Dyfed, and it separated again as Ceredigion in 1996. Aberystwyth with 11,607 inhabitants in 2001 is the biggest town, followed by Cardigan with 4,203, Lampeter with 2,894, Aberaeron with 1,520, Llandysul with 1,218 and Tregaron with 1,217. Some holiday villages on the coast such as Aber-porth with 2,485 and Borth with 1,523 have more inhabitants than the smaller towns. Aberaeron is an outstanding deliberately planned town chiefly of 1830-1870. Tregaron and Lampeter were the starting points for the main drovers' routes, taking livestock across to England and South Wales. The five major roads now entering the county come down the Dyfi, across the Pumlumon massif at Eisteddfa Gurig, and across the Teifi at Lampeter, Llandysul and Cardigan, but access before the early 19<sup>th</sup> century was difficult; there are fortunately so far no motorways. The former extensive railway system which reached the county in the 1860s is now reduced to one main line to Aberystwyth from the north, and two touristic narrow gauge lines. The once flourishing maritime tradition is now reduced to small-scale lobster and shellfish fishing, with touristic and leisure boating especially at the main harbours of Aberystwyth, Aberaeron, New Quay and Cardigan. Shipbuilding has continued only at Ynys-las. Tourism is perhaps now arguably more important economically than agriculture, and most of the coastal settlements have large caravan or chalet sites and a thriving tourist trade. In 2008 a continuous coast footpath was opened.

Away from the coast the most popular attractions include the waterfalls at Devil's Bridge and the Vale of Rheidol Railway, the National Trust mansion and grounds at Llanerchaeron, the falls of the Teifi at Cenarth, the Forestry Commission's Bwlch Nant-yr-Arian Visitor Centre with its Kite-feeding, and the Llywernog Silver-lead Mine Museum nearby. A woollen industry flourished at Tal-y-bont and in the Teifi valley but had mostly died out by the mid 20<sup>th</sup> century. Lead mining was a major industry in the north of the county until a century ago, and its remains in the form of spoil heaps, ruins and reservoirs characterise much of this area. More recent reservoirs for water supplies and electricity combine with these mine reservoirs greatly to outnumber the natural lakes. There are virtually no natural lakes in the lowlands. Wind farms are proliferating in the uplands more than in most of the rest of Britain, largely because there are no National Parks such as there are in four of the six adjacent vice-counties, and are destroying what remains of any sense of wilderness. The Glanyrafon industrial estate from the late 1970s outside Aberystwyth and the Ministry of Defence site at Aber-porth from 1939 are other major developments.



The industrialised uplands S of Cwmbwyno, view E from SN706801, August 2005

### Human culture

St David's College, Lampeter, founded in 1822, now the University of Wales, Lampeter, with over 1,000 students, is the oldest institute of higher education in England and Wales outside Oxford and Cambridge. The University College of Wales, Aberystwyth, founded in 1872, is now called now Aberystwyth University and has over 7,000 students. Combined with other institutions such as the National Library of Wales, theological and librarianship colleges, the Royal Commission on the Ancient and Historical Monuments of Wales and the Welsh Plant Breeding Station/IGER, these institutions have given the county and especially Aberystwyth a unique academic density; at one time in 2008 Aberystwyth, not a self-conscious "book town", had 14 bookshops, one to every 800 inhabitants. The Ceredigion Museum, founded in 1972, is in Aberystwyth. Although English is at present the dominant language, 68% of the population in 2001 had some knowledge of Welsh and 44% were fluent in it. Since 1945 the county has had Liberal/Liberal Democrat representation in Parliament, except for Labour in 1966-1974, and Plaid Cymru in 1992-2005. Both the Church in Wales and the nonconformist congregations are now in decline, but religion was a dominant influence for centuries. Daniel Rowland of Llangeitho made the county a centre of the Methodist revival in the 1730s. Another notable religious phenomenon was the Black Spot, Y Smotyn Du, the unique rural community of Unitarian congregations that grew out from Llwynrhydown. Cwm Cynfelin at Llangorwen had significant connections with the Oxford Movement. The early 13<sup>th</sup> century south doorway of Llanbadarn Fawr church and the slightly earlier west doorway of Strata Florida abbey are the finest ecclesiastical architectural features in the county.



The churches of Llanwenog, Llanfihangel-y-Creuddyn, Llanddewi-Brefi and St Mary's Cardigan also have many features of interest, along with several Victorian ones such as Butterfield's at Elerch, and the many fine chapels vary from Bethania at Cardigan to Y Drewnen at Cwm Cou. There are a hundred churches and twice that number of chapels in the county. J. P. Seddon's elaborate Old College building of 1864-1872 on Aberystwyth promenade is the outstanding Victorian building. Among the best houses are the late 17<sup>th</sup> century Plas y Wern at Llanarth, the Georgian Nanteos and John Nash's Llanerchaeron. Urdd Gobaith Cymru has its headquarters in Aberystwyth and its main camp at Llangranog. The Ceredigion Historical Society, founded as the Cardiganshire Antiquarian Society in 1909, publishes a journal *Ceredigion*.

The county has produced, or been home to for a significant part of their lives, many writers of distinction, from the greatest of medieval Welsh poets, Dafydd ap Gwilym, in the 14<sup>th</sup> century to poet/playwrights such as James Kitchener Davies near Tregaron and Saunders Lewis at Aberystwyth in the 20<sup>th</sup> century, the poet Gwenallt at Aberystwyth, and the Cilie family of country poets near Llangranog, as well as to writers in English such as Caradoc Evans at Rhydlewys and New Cross, Dylan Thomas at New Quay, R. S. Thomas at Eglwys Fach and Gillian Clarke, currently the National Poet of Wales, at Talgarreg. The visual arts have been less conspicuous, although John Elwyn and Mary Lloyd Jones are notable among the native painters. Composers include Joseph Parry, who wrote the hymn tune "Aberystwyth", Walford Davies, and Ian Parrott, whose opera *The black ram* concerns the downfall of Sir Herbert Lloyd of Peterwell near Lampeter. All in their time were professors of music at Aberystwyth. More generally, the inhabitants of the county are widely thought to have a characteristic type of personality. The Cardi is, by repute, independent, adept at dealing and extremely thrifty, with a good eye for livestock (especially Welsh cobs) at market. Certainly there are many, especially in what is left of the rural community, who conform to this type and it is likely that this personality is not just a product of the natural environment but has also had a considerable influence on it.

Many of the key books about the county will be found referred to in one way or another at appropriate places in this Flora, but here it should be said that Gerald Morgan's comprehensive and very readable *Ceredigion: a wealth of history* (2005) is strongly recommended as an introduction.



Coed Rheidol NNR from Bryn Bras, view S from SN749796, April 2005

## 2. History of recording and of relevant research and surveys

Most of the early plant records from the county were made by visitors from other parts of Britain. With the exception of the extremely proficient M. M. Atwood, who botanised here both as a resident and later as a visitor, it was not until the middle of the 19<sup>th</sup> century that any resident, the rather unreliable T. O. Morgan, made a substantial contribution, and it was only in the 1890s that the county acquired its first major resident botanist who became known beyond its borders, J. H. Salter. I have concentrated throughout this chapter especially on the local figures, and have also tried to give a brief indication of relevant work done at the University and other locally-based institutions. The only previous detailed account of the history of recording in the county is by Carter (1950a), in one of his series covering all the Welsh counties.

### Early visitors

**John Leland** (c.1506-1552) mentioned in his *Itinerary* the 39 Yews in Strata Florida churchyard which he saw on his tour of Wales in 1536-1539 (Smith 1906), and this is probably the earliest reliable plant record.

**John Ray** (1627-1705), the greatest British naturalist of his day, visited the county in 1662 with Francis Willughby on their way south through Wales (Raven 1942), but after the excitements of North Wales they seem to have found little of interest and recorded only *Antennaria dioica* “on the top of Plinlimmon-hill” on 4 June (Ray 1670); this remains the only record of it from Pumlumon.

**Edward Llwyd** (Lhwyd, Lhuyd) (1660-1709), polymath and Keeper of the Ashmolean Museum at Oxford, although born in Shropshire and spending much of his youth there with his father Edward Lloyd at Llanforda, was the illegitimate son of Bridget Pryse, of the Pryse family of Gogerddan, who lived with her father Thomas Pryse at Glanfred (Glanffraed) SN633877 in the Leri valley below Tal-y-bont. Bridget's brother, Walter Pryse, lived at Tyno-hir SN706981 just across the county boundary above Pont Llyfnant, and Llwyd botanised in the area, presumably on visits to his mother and uncle. A notebook in the British Library (BL Add. MS. 15070) contains records in Llwyd's hand of his botanical excursions in North Wales in or around 1682 (Chater 1983, 1984). It includes six species annotated as “The plants which I found at Plinlimmon”, probably in May 1682: *Selaginella selaginoides*, *Huperzia selago*, *Diphasiastrum alpinum*, *Saxifraga stellaris*, *Vaccinium vitis-idaea* and *Empetrum nigrum* (Llwyd used phrase names chiefly from Parkinson, Gerard and Ray). *Selaginella* is the one species never recorded there since. Another list, again probably in May 1682, gives nine “Plants found in the marshes below Tyno hir”: *Myrica gale*, *Drosera intermedia*, *Narthecium ossifragum*, *Cochlearia atlantica*, *Triglochin maritima*, *Andromeda polifolia*, *Samolus valerandi*, *Ranunculus sceleratus* and *Glaux maritima*. Whether these species were in Montgomeryshire, Merioneth or Cardiganshire must remain uncertain, but the nearest area of marsh to Tyno-hir, in the NE angle of the Llyfnant and the Dyfi, is in Montgomeryshire, and all these species occur there. He is perhaps less



Bust of Edward Llwyd (Lhuyd) by J. M. Morris, Centre for Advanced Welsh & Celtic Studies, Aberystwyth SN593816, April 2006



View N to Tyno-hir (centre) from above Caerhedyn SN707974, May 2007

likely to have crossed the Dyfi into Merioneth, but most of the species could well have occurred within 1.5km of Tyno-hir in Cardiganshire, and all occur within 4km today. In another list, dated 21 May 1682, primarily of plants from Aberdyfi in Merioneth, *Silene uniflora* is recorded “at ye Borth and Aberystwyth”, and *Mertensia maritima* may perhaps also be included in this annotation. Llwyd visited the county again at least in 1693 and 1697, but these visits were not primarily botanical. In 1696 he circulated a lengthy questionnaire to every parish in Wales requesting information on topography, history and antiquities, agriculture, and every branch of natural history. Seventeen Cardiganshire parishes responded, but, apart from details of crops grown, they provided little of botanical interest and none provided the localities of rare plants or the dried specimens that Llwyd requested. The project was never completed, and the returns were not published until 1909-1911 (Llwyd 1911).

The Revd **Littleton Brown** (1699-1749), from Bishops Castle in Shropshire, made a journey to Lampeter and St David's in May 1726, and in a letter to J. J. Dillenius, the Oxford botanist, reported several interesting plants, including *Cochlearia danica* on the walls of Tregaron church where it still grows, *Ceratocarpus claviculata* common on the thatch of houses in the upper part of the county, *Sedum anglicum* on rocks at Strata Florida and on walls at Cardigan, *Rubus idaeus* abundant on the roadsides, *Erodium moschatum* on rocks at Cardigan, and *Plantago maritima* on the shore facing Cardigan Island (Druce & Vines 1907).

### The 18<sup>th</sup> century tourists

From the 1770s onwards numerous travellers published accounts of their tours in Wales. A few of them included botanical observations which seem likely to be reliable, and one or two were good botanists, although several simply copied or distorted information from earlier authors. They often also gave valuable glimpses of the farming practices in the county, one of the earliest of these being **Henry Penruddocke Wyndham** (1736-1819) of Salisbury, topographer and later MP for Wiltshire, the two editions of whose *Tour* (1775, 1781) included descriptions of his journeys in 1774 and 1777 up the coast from Cardigan via Aberystwyth to the Dyfi, and up the Teifi to Lampeter and Strata Florida and on via Devil's Bridge to Aberystwyth. **Arthur Aikin** (1773-1854) was the first of these tour writers to give what seem to be entirely reliable records of noteworthy plants. After working for the Unitarian Ministry in Shrewsbury, in 1795 he became a professional writer, lecturer and traveller, and in July and August 1796 made a walking tour through North Wales and Shropshire with his brother and cousin, the results of which were published the following year (Aikin 1797). They entered the county at Glandyfi SN69Y and at Aberystwyth noted *Plantago coronopus*, *P. maritima*, *Triglochin maritima*, *Armeria*, *Glaucium*, *Cochlearia officinalis*, *Silene otites* and *Anthyllis vulneraria*. After an excursion to Devil's Bridge they went back north to Ynys-las SN69B where they saw *Galium verum*, *Calystegia soldanella* and *Leymus arenarius*, before taking the ferry to Aberdyfi.

The Revd **John Evans** (fl.1768-1815), born in Gloucestershire, visited North Wales, principally in 1798, with a view to collecting information for a *Flora cambrica*, and in 1803 he followed this up with a tour through South Wales, accompanied by friends. This was published the following year in the form of letters (Evans 1804), and the account gives an often detailed picture of the landscape and agriculture. They entered the county from the south at Cardigan, went up the Teifi valley to above Llandysul and then returned westwards and went up the coast to Aberystwyth. Much of the account of Aberystwyth is copied from Aikin, without acknowledgement, and the list of 14 plants “we principally found in the neighbourhood” are mostly copied from him too, including *Nymphaea alba* and *Mertensia* which the latter had only recorded from between Aberdyfi and Tywyn in Merioneth. Evans's only additional species are *Scilla verna* and *Euphorbia peplis*, and it is difficult to know how much credence to put on these, although the *Euphorbia* was reliably recorded there both earlier and later.

The party then went inland to Devil's Bridge and Hafod, and in the Teifi Pools area SN76Y commented on the swampy moors: “Many of these have been formed out of the waters by the carex caespitosa and scirpus caespitosus [*Trichophorum cespitosum*] spontaneously spreading their bushy roots and leaves, first forming footing for men and cattle; at length, by furnishing shelter for other plants, they turn the lake into a moor. Here are also swertia perennis, parnassia palustris, narthecium ossifragum, poa aquatica [*Glyceria maxima*], and aira [*Deschampsia*] caespitosa, with a viviparous panicle.” By the *Carex* he probably meant *C. nigra*. *Swertia perennis* does not grow in Britain, *Parnassia* has been seen only once, if at all, in the county, and *Glyceria maxima* is known only from a few lowland ponds and is perhaps an introduction. After visiting Strata Florida SN746657 they continued down the Teifi to Llanddewi-Brefi SN664553 and in the wet grasslands thereabouts recorded that “Fescua [*Glyceria*] fluitans, poa trivialis, poa praelonga, triticum [*Elytrigia*] repens, agrostis palustris [*stolonifera*], agrostis [*Mibora*] minima, aira [*Catabrosa*] aquatica, and alopecurus pratensis, flourish to a prodigious degree ...”. I do not know what *Poa praelonga* could be, *Mibora*



is impossible, and *Catabrosa* has not otherwise been recorded in the county. Leaving the county apparently in the direction of the Irfon valley for Llanwrtyd Wells, they passed the “forest of Roscole”. This was presumably Forest yr Esgob, the northern edge of which was in this area, and the following comment by Evans on the flora may perhaps, for what it is worth, refer to Cardiganshire: “At the entrance to the forest grow swertia perennis, alium boreale [presumably *Galium boreale*]; and Pomona seems to have taken up her residence; for besides the wild apple and several species of prunus, were in close assemblage ribes rubra, ribes grossularia [*R. uva-crispa*], rubus idæus, rubus chamæmorus, and beneath your feet, in great profusion, the humble, but not less delicate fragaria vesca.” *Galium boreale* and *Rubus chamaemorus* have not otherwise been recorded in the county.

These records are a baffling mish-mash, and it would be unwise to take any of them seriously. It is fortunate that Evans never wrote his intended *Flora cambrica*. As recounted by Davies (2007), Evans came in for fierce theological attacks in his own time in which his dubious botanical credentials were used by one opponent, Williams (1803), to discredit his support for the Methodists, and another wrote of his North Wales tour: “the tour undertaken principally with a view to botanical researches, discovers itself alike to be designed as a Treatise on the culture of a weed [i.e. Methodism], ten times more pernicious than the hyoscyamus or the atropa, which is none other than *Schism*.”

The Revd **Richard Warner** (1763-1857) of Bath, whose first curacy had been under William Gilpin, recorded *Rubus idaeus* and *Vaccinium uliginosum*, the latter obviously an error, in 1797 on the first of two visits to the county (Warner 1798).

### J. E. Smith and Hafod

In 1780 **Thomas Johnes** (1748-1816) of Croft Castle in Herefordshire and MP for the Cardigan Boroughs, and then for Radnorshire, inherited the Hafod Uchtryd estate near Cwmystwyth c.SN77L, and moved there in 1783. For the next thirty years he devoted himself largely to improving the house and estate, collecting manuscripts (including many of Edward Llwyd’s, subsequently destroyed in the Hafod fire of 1807) and running his own private press. His wide-ranging interests included agricultural improvement and forestry, and he had an intelligent interest in botany, corresponding with and having visits from many botanically minded friends. He received a great deal of advice and help from the Scottish agriculturist Dr James Anderson, employed a Scottish gardener James Todd, and published *A Cardiganshire landlord’s advice to his tenants* (1800a, b) in both English and Welsh. He was also very active in the Society for the Encouragement of Agri-



Thomas Johnes of Hafod, engraving  
after Thomas Stothard, c.1793



Mariamne Johnes, engraving after  
Thomas Stothard, c.1793





J. E. Smith by Francis Legatt  
Chantrey, 1828 (courtesy of the  
Linnean Society of London)

culture and Industry in Cardiganshire, founded in 1784. His wife Jane was interested enough in plants to have her own “American garden”, but it was their daughter **Mariamne Johnes** (1784-1811) who was the botanist. Apparently self-taught, she was said by the age of eleven to have identified most of the local flora with the help of Curtis’s *Flora londinensis* and J. E. Smith’s *English botany*, but unfortunately few actual records can be ascribed to her.

In 1793 Johnes made the acquaintance of **James Edward Smith** (1759-1828), the leading British botanist of his time, who had founded the Linnean Society in 1788. Johnes became a member in 1794 at Smith’s invitation, and in August 1795 Smith made the first of several visits to Hafod where he botanised with Mariamne. Smith returned to Hafod in August 1796, with his new wife, and again in October 1797, on both of which occasions Mariamne was ill, apparently with the spinal disease that she died of at the age of 27. There are in Smith’s herbarium (LINN) 43 specimens from Hafod, mostly of cryptogams. Excluding two garden plants, the vascular plants comprise *Solidago virgaurea* collected in the woods there in August 1795, *Gnaphalium sylvaticum* and *Hypericum maculatum* from the woods, and *Hieracium umbellatum* collected

“on the bridge at Hafod” added to the herbarium, and doubtless collected too, in that same month; *Oreopteris limbosperma* added in 1797; *Luzula pilosa* and *Salix aurita* added in 1798; *Potentilla erecta* collected by Mariamne, undated; *Pseudorchis albida*, undated; and *Vicia orobus* “Wild near Hafod!” collected by James Todd. This last was a teratological form found by Todd in 1799 and grown in the garden (see the species account below). Smith’s interest in Hafod culminated in his book *A tour to Hafod* (1810). It is lavishly illustrated with coloured aquatints by John “Warwick” Smith, and these, allowing for some degree of artist’s licence, along with J. E. Smith’s more reliable comments, give some idea of the state of the woodlands and other aspects of the vegetation in the Ystwyth and Rheidol valleys at this period. Like many other botanists, he remarks on the paucity of species because of the lack of limestone. He mentions again the *Vicia orobus*, as well as the *Pseudorchis*, the *Hypericum* (“grows copiously on the way to the kitchen garden”) and *Equisetum sylvaticum*. Further records of Smith’s from Hafod are given in Turner & Dillwyn (1805) in their list of 15 vascular plants for the county: *Avena fatua* at Hafod; *Myrrhis odorata* (as *Scandix odorata*) “Behind a farm house, about a mile West of Hafod”; *Luzula forsteri* “In a wood opposite the South front of Hafod House” (of particular interest, see the species account below); and *Spiraea salicifolia* “In a wood at Hafod, near a gate, in the Eastern approach to the House”. They attribute the *Pseudorchis* to Mariamne Johnes, while Smith (1830) attributed it to Todd. Smith also recorded several of these plants from here in his *English flora* and other works. (Turner & Dillwyn also gave an improbable record of *Rubia peregrina* from “Near the Devil’s Bridge” by J. Woods.)

A remarkable series of 34 pencil drawings of trees and landscapes at Hafod and elsewhere in the area was made by the Radnorshire artist Thomas Jones in 1786 (Hallett 1991). A selection of these was reproduced in Macve & Sclater (1996), and some of them show the Oaks in such detail that even lichens can be recognised (SPC pers. comm.). For further information on Johnes, J. E. Smith and Hafod see Inglis-Jones (1950), Moore-Colyer (1992), Kerkham (1991), the Smith correspondence at the Linnean Society, and innumerable other references.



Hafod, view NNE from SN757729, aquatint by  
J. C. Stadler after a watercolour of 1795 by John  
“Warwick” Smith (from Smith 1810)

### Early agricultural surveyors

Although not usually considered as plant recorders, the compilers of two of the early agricultural surveys covering the county provide a great deal of information for the botanist. **Thomas Lloyd** (1736-1807) of Bronwydd, Llangynllo SN354433 and the Revd **David Turnor** (c.1751-1799) who held several clerical positions in the county and built Wervilbrook, Llangranog SN348523, produced their *General view of the agriculture of the county of Cardigan* in 1794 “for the consideration of the Board of Agriculture and Internal Improvement”, describing the pasture plants, arable crops and hedging plants among much else. Turnor covered the northern and upland districts of the county, and Lloyd the southern and lowland. Their information sometimes needs to be interpreted in the light of an element of propaganda in their reports. Lloyd had been an active supporter, along with Thomas Johnes and others, of the county agricultural society from 1784 and like Johnes was one of the pioneers of the new agriculture (Baker-Jones 2005).

**Walter Davies (Gwallter Mechain)** (1761-1849), who lived chiefly in Denbighshire and Montgomeryshire, was a cleric, poet and antiquarian, and was commissioned to produce another survey, for the whole of Wales, by the Board of Agriculture, the relevant part of which, his *General view of the agriculture and domestic economy of South Wales*, was published in two volumes in 1815. Davies was helped on the ground in Cardiganshire to a small extent by the even greater polymath, **Edward Williams (Iolo Morganwg)** (1747-1826) of Flimston in Glamorgan, and also drew extensively on information from local correspondents. Davies’s own travels in the county are described in detail by Jones (2001), and much of the information he presented is detailed and localised and of great interest.

### The early 19th century

Turner & Dillwyn (1805), as mentioned above, gave 15 species for the county, all from authorities already mentioned (although their attribution of *Antennaria* from Pumlumon to Merrett rather than Ray would have infuriated the latter). The next list, in *The new botanist’s guide* (Watson 1835-1837), still recorded only 19 species from the county, the four additions, *Calystegia soldanella*, *Plantago maritima*, *Salsola kali* and *Euphorbia paralias* coming from a manuscript by W. H. Darby, of whom nothing else seems known. Meanwhile **Edward Forster** the younger (1765-1849) of Walthamstow, banker and distinguished botanist, visited the county in July and August 1805, recording (Forster 1805, and specimens in **BM**) *Trifolium scabrum*, *T. subterraneum*, *Erodium maritimum*, *Rosa pimpinellifolia* and *Geranium robertianum* subsp. *maritimum* at Aberystwyth, *Cystopteris fragilis*, *Narthecium*, *Pinguicula* and *Viola lutea* at Devil’s Bridge SN77N and *Phegopteris connectilis* and *Hypericum maculatum* at Hafod. At the Gyfarllwyd Falls SN742774 he collected the *Sedum* which J. E. Smith would later name after him.

The next figure of note was **Edwin Lees** (1800-1887) of Worcester, who began life as a stationer and bookseller, but sold up his business in 1835, moved to near Tewkesbury and thereafter devoted most of his energies to botany. He was in Cardiganshire at Aberystwyth, Devil’s Bridge and Pumlumon in 1837 and published lists of coast, bog and rock plants (Lees 1841), an account of the mountain plants (1838) and miscellaneous records (1837). More records, many anecdotes and much enjoyable description of the county and its flora are in *The botanical looker-out* (Lees 1841). He re-collected *Sedum forsterianum* from the Gyfarllwyd Falls and grew it in a pot in his garden, he recorded some 70 species altogether, including *Centunculus minimus* at Ynys-las, *Drosera intermedia* and *Andromeda* on Cors Fochno, *Wahlenbergia* on Pumlumon, *Cystopteris* on the Devil’s Bridge, and once had to spend half an hour chasing his drying-papers which had blown from the window of his lodgings around the streets of Aberystwyth. In 1843 and 1844 he made important *Rubus* collections in the N of the county.

**William Henry Purchas** (1823-1903) visited the county during September and October 1848, at which time he was working in the family wine business at Ross-on-Wye in Herefordshire. He sent an MS list to Watson (Purchas 1848) of 160 plants “noticed in the immediate neighbourhood of Aberystwith”, including a dozen from “the Sand Hills at Borth”. He later trained for the ministry, had incumbencies in Derbyshire, Gloucestershire and Staffordshire, was a founder member of the Woolhope Naturalists’ Field Club, a member of the Botanical Society of London, and wrote *The Flora of Herefordshire* with A. Ley in 1889. As with Lees’s lists, many in his 1848 one are first records and were published by Watson (1873-1874). Purchas was a friend of **Charles Cardale Babington** (1808-1895), who was born in Ludlow and became professor of Botany at Cambridge. He was a very active field botanist and visited the county at least three times. In 1848 he was at Cardigan, explored the Gwbert dunes SN14U, walked the 60km from Cardigan to Aberystwyth in two days, and then visited Devil’s Bridge by coach and walked back to Aberystwyth, making some notable *Rubus* collections. In 1859 he was in Cardigan again for a week, and in 1878 he was in Lampeter for five days, on both occasions attending meetings of the Cambrian Archaeological Association. His collections, except for *Rubus*, have not yet been methodically searched for specimens from these visits, but he collected

*Fumaria bastardii*, and Watson (1873) also credited him with recording *Hypericum maculatum* and *Linaria repens*.

**John Ball** (1818-1889), an Assistant Secretary of State for the Colonies and a very significant figure in the history of botany because of his support for the production of colonial Floras at Kew, visited Aberystwyth as part of a tour of South Wales in 1848. He recorded five species new for the county (Ball 1849) including *Vicia tetrasperma* and *Persicaria minor*, the latter the only record for the county apart from recent ones from Cors Caron and perhaps best considered unreliable. **William Bennett** (1804-1873), a wholesale tea-merchant in London and father of the botanists Alfred William and Edward Trusted Bennett, made a walking tour of North Wales to look at ferns in 1849 (Bennett 1849) and made a detour to Devil's Bridge on his way from Llangurig to Machynlleth. He noted a wall covered with *Phegopteris connectilis* by the road at Ysbyty Cynfyn SN753791, and remarked that *Oreopteris* was the commonest fern in the district. At the Devil's Bridge waterfalls he was irked at having to be accompanied by a guide from the hotel, but "We were satisfied with visiting one of the spots for *Hymenophyllum*, on the Hafod Arms side of the Mynach, which the guide .... said the Bishop of Winchester had pronounced to be the best fern of the district, and had called *Tunbridgense*, but upon examination we find to be *Wilsoni*. Probably both grow here." (The luckless bishop was **Charles Richard Sumner** (1790-1874), who collected orchids and created the gardens at Farnham Castle.)

### M. M. Atwood

**Martha Maria Atwood** (1808-1885), whose origins and activities have recently been elucidated by Clive Lovatt (2006, 2009), David Price and Henry Phythian-Adams (all pers. comm. and gratefully acknowledged), must count as the most competent of the at least partially resident botanists prior to Salter. Her mother Margaret was the daughter of the Revd Alban Thomas Jones Gwynne of Ty-glyn SN498599. He it was who founded the town of Aberaeron and built the quay there, and whose great-great-grandmother Mary Parry was the sister of Thomas Pryse, Edward Llwyd's grandfather. In 1808 Margaret married John Atwood, a Bristol ironmaster, and Martha Maria was born in Bristol in 1808. By 1814 the family had moved to Pengarreg, Aberaeron SN456627 where John became a farmer and general merchant. From at least 1836 Martha was collecting plants at Aberaeron (see for example under *Urtica urens* and *Persicaria bistorta*), but in 1840 her father and his second wife returned to Bristol, presumably taking Martha with them. By the early 1850s she had become very competent in several branches of botany and contributed to Swete's *Flora bristoliensis* of 1854 (she had been the discoverer of *Sorbus bristoliensis* in 1852), Wilson's *Bryologia britannica* of 1855 and Leighton's *Lichen-Flora of Great Britain* of 1871.

In June-August 1854 she was back in Cardiganshire and at least 70 of the vascular plants she collected on that occasion are now in **K** (Herb. Watson) while others, and probably what remains of her private herbarium, are in **BIRM**. Most are from sites along the coast from Clarach to Cardigan, but a concentration of specimens from Cringae-newydd, Blaenannerch SN251483, where she had distant family connections, and Nant-y-llan SN240483 nearby, suggests that she may have been based there. Otherwise from inland there are specimens only from Cenarth and Llangoedmor, and from Monachty SN504620 where a Gwynne cousin lived. Several other relatives were living at Aberaeron, Ty-glyn SN499599 and Ty-glyn Aeron SN502597. Among her more interesting specimens are *Melittis* from a wood near Aberaeron, *Orobancha rapum-genistae* from near Aberaeron, *Leonurus* from the garden at Cringae-newydd, *Polygonum raii* from Clarach, *Iris foetidissima* from the roadside a mile out of Cardigan where it still grows, and *Sedum*



M. M. Atwood, September 1856 (from *Bulletin of the Bristol Naturalists Society* 468 (2008) courtesy of Clive Lovatt)



*forsterianum* from a “hilly bank above Aberporth”, supporting the probability that the present populations in this area are native. Most remarkable are two rare apomicts, *Rubus hylonomus* from Monachty where it still grows in its only site in the county and which was not described until three years later, and *Hieracium rectulum*, endemic to Carmarthenshire and Cardiganshire and not described until 1910, from Aber-arth SN481636 where it still grew until recently. There are several specimens from “Bwlch Mountain”, which unfortunately cannot be localised; they include one of *Pseudorchis albida*, for which it would presumably be an otherwise unrecorded site.

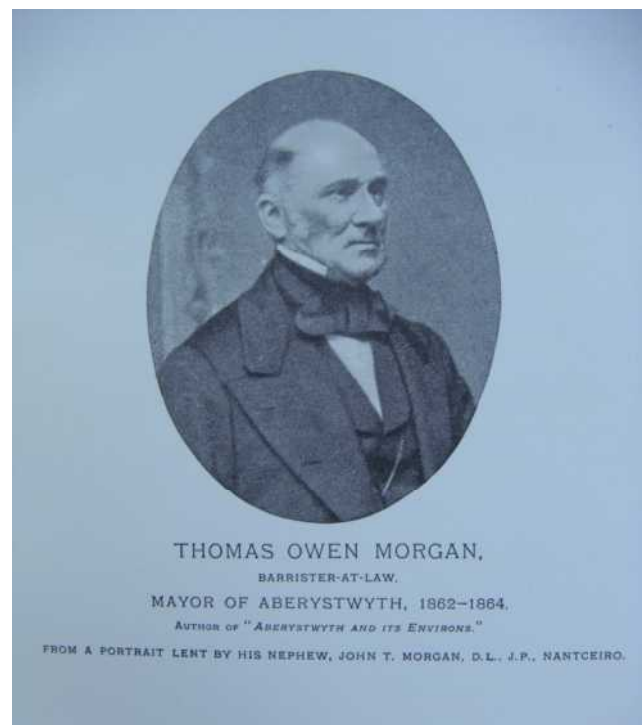
How Martha acquired her remarkable botanical proficiency is not known, and there are no known potential sources of encouragement at Aberaeron, or indeed anywhere else in the county, in the 1830s. Once at Bristol in the 1840s and 1850s she clearly had plenty of contacts, and she was a member of the Botanical Society of London and its successor bodies from 1852 or 1853 onwards. In her later years she lived at Bath and then at Worcester with her sisters where she died.

### T. O. Morgan and his *Flora*

Apart from Salter, **Thomas Owen Morgan** (1799–1878) was the only person to attempt a *Flora* of a substantial part of the county, yet the six versions that he published are a confusing mixture of apparently good, localised records, unlocalised but unexceptional records, and others ranging from the dubious to the impossible. In addition, there are a number of unexplained contradictions between the different versions. Although the detail gone into below may seem excessive, as he is the chief pre-Salter source of records for the county it is necessary to try to evaluate what he did.

Morgan was born at Aberystwyth and became a barrister-at-law, but there seems no evidence that he practised, at least in later life when he was botanically active. He was living at 10 Portland Street at the time of the 1851 and 1861 censuses, and at 25 Bridge Street at the 1871 census, and by which time he had married Jane Morris, 29 years his junior, who had been the lodging house keeper at his Portland Street address. He was a frequent contributor to *Archaeologia cambrensis* from 1851–1867, and was appointed joint secretary of the Powysland Club on its foundation in 1867. In 1862–1864 he was Mayor of Aberystwyth, and was also a JP and Deputy Lieutenant for Cardiganshire. When he died aged 79 in 1878 he was living at The Mount, Goginan, and was buried in Llanbadarn Fawr churchyard. His best known work was the *New guide to Aberystwith and its environs*, first published in 1848 and reaching its sixth and final edition in 1874. Each edition contained a version of his plant list, and in 1849 he published his most extended version as a separate work, *Flora cereticae superioris* (the only copy of which I have seen being in the Kew Herbarium library). Also of interest to us is *The Aberdovey guide, and hand-book* of 1863. He left no known herbarium, and seems to have contributed no records to anyone else’s publications and we do not know what his contemporaries thought of him as a botanist.

It is most convenient to start with the preface to the 1849 *Flora*, which is dated 27 September and states that “The survey of Plants of spontaneous growth, the result of which is now communicated to the Public, took place in the autumn of 1848, and the Spring and Summer of 1849, and includes a circuit of above 16 miles around Aberystwith. This district includes the upper part of the Vale of the Teifi, as far as Tregaron, with the Vales of the Ystwyth and the Rhydol; also, the Valleys of the Lery and the Llyfnant. It likewise comprehends the mountainous region of Plinlunon, and its subordinate ranges; the extensive turbary of Gorsfochno, with the Borth Sands, and the marshes of Towyn, in Merionethshire.” This last causes some problems for us. Morgan also writes: “The pleasing duty remains for the writer to acknowledge gratefully the assistance he has received from the Rev. Henry Roberts, of Snowhill, Worcestershire [in fact Gloucestershire], whose scientific knowledge of the subject in its most difficult branches, was always available; likewise to W. H. Purchas, Esq., of Ross, he begs to return thanks for similar kindness.” This is all



T. O. Morgan (from Evans 1902)



we know about his botanical contacts. As Purchas was at Aberystwyth in September and October 1848 (see above), his records could well have been made available to Morgan for the *Flora*, but presumably not for Morgan's list of plants in the first edition of his *Guide*, the preface of which is dated 12 August 1848. The *Flora* lists 455 species of vascular plants in tabular format, with columns for Class, Order, Botanical name, English name, Locality and Month of flowering, and the lists in the various editions of the *Guide* are similar but omit the Month.

The 1848 list in the *Guide* contains 72 species, few having localities. If they are Morgan's own records, then he must have started earlier than he says in the *Flora*. Many seem to be first records for the county, so probably are his own. Some, including the list of five *Plantago* species with the surprising *P. media*, were listed by Purchas as well, Morgan localising them to "Sands going to Aberdovey" although Purchas gave no localities. Did Morgan give his records to Purchas, or are the dates misleading? Several records in the 1848 list do not appear in later versions, notably *Cerastium alpinum* and *Actaea spicata*, both unlocalised and obvious errors; *Radiola*, from "Fields near Reservoir" SN586826, a species not recorded again from the Aberystwyth area, but quite plausible; *Viola lactea*, unlocalised, not recorded again until 1899 in the Aber-arth area, and best considered unreliable; *Glaucium corniculatum*, unlocalised, never otherwise reported, and uncertain at best; *Erodium moschatum*, *Cichorium intybus*, *Filago minima* and *Medicago sativa*, unlocalised but possible; and *Plantago media*, mentioned above and perhaps acceptable. The unlocalised record of *Chaenorhinum minus* is of interest as, if correct, it indicates that the species was here before the arrival of the railway. Whether he excluded these records from later versions because he considered them to be erroneous is unknown. Two of the few localities given are clearly erroneous, "Fields near Reservoir" for *Calystegia soldanella*, and "The woods about Castle Hill and other places" for *Viola lutea*; this latter is curious, as though he does not list *V. canina* from here, he does in the 1851 version and then gives *V. lutea* from the appropriate "Devil's Bridge road", indicating that the *V. canina* locality got given to *V. lutea* by an error in printing the tables (such errors seem to appear elsewhere later). In addition to this list in the 1848 *Guide*, Morgan also writes that *Mertensia* "is met with on the beach below Borth Sands"; if this is an original observation rather than a misquoting of Aikin (1797) or Evans (1804), it is of considerable interest. He also comments interestingly on *Crithmum* and *Ruppia*.

The 1849 *Flora* contains a great number of first county records, and almost all the records in it are localised. Some have otherwise never, or only dubiously or erroneously, been recorded and must be either rejected or considered dubious: *Salvia verbenaca* from Swyddffynnon; *Galium boreale* unlocalised; *Potamogeton gramineus* and *P. lucens* from "Pools out of Rhydol"; *Primula elatior* from Mabws; *Campanula glomerata* from "Porthmawr wood, Llannon"; *Cicuta virosa* (perhaps an error for *Oenanthe crocata* which he does not list) unlocalised; *Sium latifolium* from Clarach; *Apium repens* from "Ystwyth, near Glanyrafon"; *Clinopodium acinos* from Brynyrychain; *Sisymbrium irio* from Penglais; *Lotus angustissimus* from Borth; *Hypericum montanum* from "Higher part, Melindwr"; *Picris hieracioides* from Tan-y-bwlch; *Lemna trisulca* from Llanilar; *Zannichellia palustris* from Llanilar; and *Sedum rosea* from "Cwmrheidol". *Zostera marina* from "Seashore after storms" is plausible. Some localities are again absurd, such as *Samolus valerandi* from Llangwryfon, far inland, and *Schoenus nigricans* from Pumlumon. Yet very many of Morgan's more interesting records have been confirmed by later recorders, and much of what he wrote makes very good sense and is clearly of value in providing evidence of continuity, though it must be considered of less reliability for indicating change. For example, *Carduus nutans* is still behind the beach at Tan-y-bwlch SN580797, *Ligustrum vulgare* is still abundant on the sea cliffs at Wallog SN5987, *Origanum* is still in Cwm Rheidol SN714790, and *Trollius* is still near Parson's Bridge SN756789. His coastal records mostly seem especially reliable.

The plant list in the 1851 edition of the *Guide* has 121 species, but few novelties. *Nymphaea alba* from Llyn Penrhaiadr SN753932 was picked up by Salter (1935) who usually cited only the 1849 *Flora* and only rarely mentions the *Guide*; the record is plausible, but has never been confirmed. *Cakile* from Moelwyns SN69B is quite acceptable. The 1858 edition contains several records of interest. *Gentianella campestris* from "Devil's Bridge road" was taken up by Salter (1935) and is plausible, though it has not been seen in that area since. *Orobanche rapum-genistae* from Cwmnewydion c.SN67X-77C and Llanrhystud c.SN56J are equally plausible and the first records for the county. *Saxifraga aizoides* though is recorded from Garreg SN695970, and is repeated in the three later editions, but must be an error as it is unknown in mid Wales. The 1864 and 1869 editions add nothing new and reprint the list virtually unaltered, but the final, 1874, edition rearranges the list alphabetically with some disastrous consequences. The word "ditto" is reprinted regardless of the rearrangement, so many of the localities become nonsensical; presumably Morgan himself had little or no hand in this. There is just one addition, a new locality "Pierce-field, Aberystwyth" for *Osmunda*; this will

have been the site, destroyed c.1960, referred to by Salter (Wade 1952) as “Formerly side of a ditch below Pen Dinas, Aberystwyth” c.SN589798.

*The Aberdovey guide* of 1863 contains a list of 95 species, all localised. Five are given from Cardiganshire localities, three of these being reasonable: *Andromeda* from “Borth Marsh”, i.e. Cors Fochno, *Aster tripolium* from Garreg SN695970 and *Cochlearia officinalis* from the Leri bridge SN617931. But *Circaea alpina* from Borth is impossible on any count, and *Herminium monorchis* for the Llyfnant is incomprehensible.

One of the odder confusions in Morgan’s work involves *Trifolium* records. In all the editions of the *Guide*, *T. suffocatum* is given from Borth, but as Salter (1935) says: “Probably an error, but not impossible, as this species has occurred on Anglesey”. The 1849 *Flora* though does not give this species, but instead gives *T. subterraneum* from Borth (it has been recorded at Ynys-las since), and *T. subterraneum* does not appear in any edition of the *Guide*. If he was correcting himself in 1849, why did he not carry the correction on in the later editions of the *Guide*? As with so many instances in his publications, we must conclude that, although much of Morgan’s work is valuable, each record must be considered on its own merits and probabilities, and few if any of them should be taken on trust.

### The later 19<sup>th</sup> century

Records of various species by many visiting botanists were made throughout the later part of the century, mostly published in Watson (1873, 1883), Bennett (1905) and in the various Record Club and Exchange Club reports. Only the more substantial contributors are mentioned below.

**Worthington George Smith** (1835-1917) was a noted botanical and architectural illustrator as well as an active archaeologist. In August 1878 he took part in a Cambrian Archaeological Association meeting at Lampeter and wrote an entertaining and rather acerbic account of the excursions from a botanical point of view (Smith 1878). He described the Lampeter churchyard Yews, the abundance of *Linaria vulgaris*, *Eupatorium* and *Filipendula ulmaria* on the roadsides, of Houseleeks on the roofs, and other plants of interest. Eleven years later he was back making drawings in connection with the excavations of Strata Florida abbey.

**Henry Lewis Jones** (1857-1915) was born at Sheerness, the son the Revd Henry Jones, a Royal Navy chaplain. After attending Shrewsbury School, where he was already collecting plants, and Gonville and Caius College, Cambridge, where he took the Natural Sciences Tripos, he went to St Bartholomew’s Hospital, London, as an entrance scholar in 1879. In his later career at this hospital he became a leading figure in the application of electricity to medicine. He visited Cardiganshire in 1879 and published a list of 357 species seen by him there (*BRC rep.* 1879: 80-83 (1880)). No localities are included, but an indication is given of those species supported by specimens which he sent to the Botanical Record Club, most of which can be found in **BM**, **MANCH** and other herbaria. The 45 or so that were new county records are listed, and localised, elsewhere in the volume. In the volume for the following year there are seven more new records, and eleven others, suggesting that he might have made a second visit in 1880. He seems mostly to have botanised along the Teifi from Cardigan up to Llandysul, around Tregaron, on Pumlumon, and at Aberystwyth and Borth. Among his more interesting records are those of *Clematis vitalba* from “Hedges by road between Cenarth falls and Cardigan, in several places”, an early date for it to be widely naturalised there and raising the possibility that it might in fact be native, *Agrostemma githago* from cornfields at Aberystwyth, *Eleocharis quinqueflora* from “Marshes near the sea, Borth”, *Euphorbia paralias* from the dunes at the mouth of the Teifi, and all three Lycopods from Pumlumon.

The Revd **Augustin Ley** (1842-1911) was born in Hereford and was Vicar of St Weonards and then of Sellack, both in Herefordshire. In 1889 he published *The Flora of Herefordshire* with W. H. Purchas and was one of the best botanists of his day in Britain, an expert on *Sorbus* and other critical genera. His specimens are in **BM**, **BIRM** and other herbaria. He travelled widely, especially in Wales, and visited Cardiganshire on a number of occasions. On visits to the Machynlleth area of Montgomeryshire in 1860 and 1862 he collected specimens including *Stellaria nemorum* in Cwm Rhaiadr, perhaps actually meaning the Llyfnant, and must have been at least partly on the Cardiganshire side of the river. He was there again in 1875 when he was also on Pumlumon (*BLRC rep.* 1875: 100, 102 (1876)). As a result of visits to the N of the county, from the Dyfi down to Aberystwyth and Tregaron, in 1885, 1886 and 1887 he published an annotated list of 77 species (1887). Among his 19 species new for the county are *Saxifraga stellaris* from the rocks above Llyn Llygad Rheidol SN7987, *Rhynchospora fusca* from the “Dyfi Estuary marshes”, i.e. Cors Fochno SN69F, *Carex aquatilis* from Cors Caron SN66W, and *Hymenophyllum tunbrigense* from Devil’s Bridge, all still extant at these sites. Additional records by Ley are given elsewhere in the volume, including *Schoenus* from “Bogs, Dyfi estuary” and *Eleocharis acicularis* from “Mudflat, Borth”, the latter being the only record

for the county. He visited the SE of the county briefly in 1890, 1896 and 1897 when he collected *Epilobium ×schmidtianum* and various *Hieracia* in the Pysgotwr and Doethie valleys.

After T. O. Morgan, the next notable native botanist was **George Rees** (1866-1934). He was born at Llanybydder but the family moved in 1869 to Lampeter, where his father became a nurseryman. Largely self-taught, he moved to Aberystwyth at 18, and worked for the *Cambrian news* and studied languages and botany. His article "Botanical rambles about Aberystwyth" (Rees 1890) gives a vivid account of the local flora and many useful records (he does disconcertingly list *Cypripedium*, but this is his only obvious inaccuracy). Among his later botanical publications was an attractive textbook for schools, *Gwersi mewn llysieuog*, published at Aberystwyth in 1896. In 1899 he founded the *Welsh Gazette*, which over the years published many botanical articles including weekly "Nature notes" by Salter during the last decade of the latter's life. Among his more notable finds were *Silene conica* at Aberystwyth in 1903 and *Dianthus armeria* between Ciliau Aeron and Llwyncelyn in 1907 and 1927.

**Isaac Henry Burkill** (1870-1965) and **John Christopher Willis** (1868-1958), both of whom went on to become distinguished professional botanists and directors of tropical botanic gardens, visited the north of the county in August and September 1893, spending a week each at Devil's Bridge, Ponterwyd and Pontrhydfendigaid (Burkill & Willis 1894a, 1894b, Willis & Burkill 1895). They observed some 332 species, published an annotated list of 104 of them including 19 new county records, and by their estimate brought the county list up to 708 species. They recorded altitude limits of many species, foreshadowing Salter's (1928a) interest in this topic, and made very detailed observations on insect visitors and pollination of 13 species in the uplands. Their brief comments on the characteristics of the county's flora are the most pertinent until Salter's. They noted especially the absence in the area they covered of such plants as the *Papaver* species, *Ballota nigra*, *Petasites hybridus*, *Pulicaria dysenterica* and *Lamium album*, the rarity of *Leucanthemum vulgare* and the abundance of *Glebionis segetum*. Among their more interesting novelties were *Subularia*, *Littorella* and *Luronium* in various upland lakes, *Anaphalis* in Cwm Berwyn SN75I, and *Carex limosa* from Llantrisant SN77H (where it has not been recorded since). They noted the connection of inland populations of *Silene uniflora* with lead mines, the use of *Sempervivum tectorum* on cottage roofs to keep the slates in position, and commented on the occurrence of Birch branches in the peat deposits.

The Revd **Edward Shearburn Marshall** (1859-1929) was born in London, educated privately and then at Marlborough College and at Brasenose College, Oxford. He became curate of Witley in Surrey in 1884, vicar of Milford in Surrey in 1890, curate-in-charge of Lavington-cum-Graffham in Sussex in 1900, vicar of Keevil in Wiltshire in 1902, and rector of West Monckton in Somerset in 1904. Marshall was one of the most critical and productive of British amateur botanists. He spent four weeks at Aberaeron in August 1899, exploring the surrounding area by bicycle. He prefaced the publication of his findings in the following year (Marshall 1900) with an apology: "Throughout the weather was oppressively hot; also the roads were as a rule in poor order for bicycling, and very hilly: these combined causes prevented my search from being as wide or as thorough as I should have liked to make it." Nevertheless he made 66 new county records, including 13 in *Rubus* and three in *Euphrasia*, as well as such species as *Malva arborea*, *Radiola*, *Agrimonia procera*, *Chamaemelum nobile*, *Coelogyne viride* and *Carex laevigata*. He made

E. S. Marshall and his wife, 1915  
(from *BEC rep.* 1919)



interesting notes on another 50 or so species and the numerous collections he made are in CGE and elsewhere. He ranged inland as far as Llyn Fanod SN603643 and Bethania SN5763, along the coast from Aberaeron to New Quay, and explored the Monachty woods and around Llanerchaeron SN479601 and Henfynyw SN447612. His records from the now destroyed wet heaths and moorland between Aber-arth and Pennant SN46W, 56B, are especially valuable.

### J. H. Salter

**John Henry Salter** (1862-1942) is the dominant figure in the history of Cardiganshire botany. His Flora, his collections and his diaries are the chief source for our knowledge of the county's flora in the past. Although he held academic posts at the University College of Wales, Aberystwyth, for 17 years, his work on the flora was more like that of a dedicated amateur naturalist than of a university scientist. He himself, in a letter to A. A. Dallman near the end of his life in 1939, wrote with characteristic modesty: "I am a naturalist of the old school, knowing something of all branches and not being an authority upon any of them. At Ackworth in the 'seventies we were encouraged to take an interest in Natural History pursuits .... Show me a bird, butterfly, moth, beetle, land or fresh-water shell, flowering plant or fern and I can either name it or place it approximately. That is my limit as a naturalist. I am not up to present-day requirements. My ideas are mid-Victorian and my natural history diaries, covering 64 years, go back almost to that period."

Salter was born on 5 June 1862 at Westleton in Suffolk, the son of Quaker shopkeepers, William Henry and Lucy Salter. He had a brother, William, and a sister, Lucy Sophia. His father died when he was seven, the family moved to Yorkshire, and Salter went to the Quaker school at Ackworth where his mother took up a position as matron. He later studied botany at the Flounders Institute, and at Owens College at Manchester under W. C. Williamson, the palaeobotanist, and taught at Quaker schools at Lisburn in Northern Ireland, in Yorkshire and in Birmingham. In 1891 he was appointed assistant lecturer and demonstrator in biology at the UCW, Aberystwyth, arriving by train at 7pm on 22 September and taking rooms in Bryn-y-mor Terrace at the north end of the town. At 10 the next morning he began his indefatigable explorations of the county, walking north to Clarach and south to Allt Wen, recording plants, birds and the geological features, and kept this up for most of that first week until his teaching duties intervened.

The head of the Department of Biology and Geology at the time was J. R. Ainsworth Davis, who had come to Aberystwyth in 1883 and became Professor in 1895; he is perhaps chiefly remembered for his translation of Knuth's *Handbook of flower pollination* (1906-1909), but among his other publications was a standard text book *The flowering plant* (1890). When separate departments of zoology and botany were split off in 1896, Davis became Professor of Zoology and Salter became Lecturer in Botany. That year, Salter spent nine months at Bonn University doing research on the development of starch grains under the famous plant physiologist E. A. Strasburger, for which he got a DSc from London University. The drawings illustrating this work, which are of exceptional delicacy, are in the Hugh Owen Library at Aberystwyth University. His fellow workers at Bonn included V. H. Blackman, the plant physiologist, and A. F. W. Schimper, the phytogeographer. The following year he spent three months at Marburg University, also in Germany, working under A. Meyer on the interrelationship between algae and fungi in lichens.

In 1899 Salter was appointed the first Professor of Botany at Aberystwyth, but resigned in 1903 and became Lecturer in Bacteriology and Entomology in the Department of Agriculture, a post he held for at least two years. He had also been Curator of the University Museum since at least 1900, and he retained this presumably very undemanding post until 1908. This winding down of his academic career in his forties seems to have been partly due to his wife's health, but also probably to a disinclination for teaching and university life. He had married in 1899 Adah Sophia Freeman, the daughter of a Birmingham tea blender and Quaker, and moved to a semi-detached house on the N side of Caradog Road which they called Friedenheim (now called Brynllan). They had two sons, Arnold and Ronald. In 1905 they moved to Crugiau at Rhydyfelin SN591794, renting it from the university. Adah seems to have developed



J. H. Salter's house, formerly Friedenheim, in Caradog Road, Aberystwyth, view NW from SN59028177, May 2009

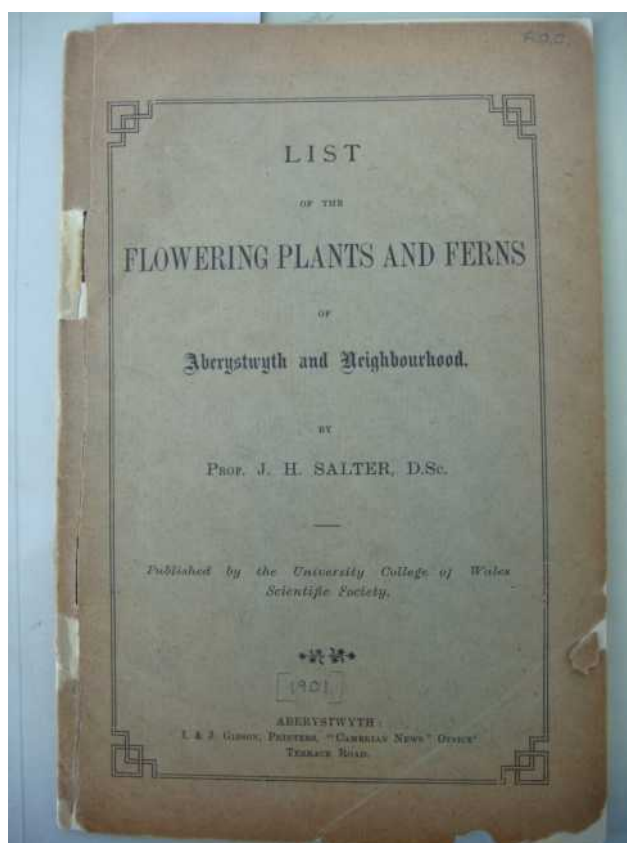


tuberculosis, and the family went to Teneriffe in December 1908 for her health, moving in February 1910 to south-west France, staying at a variety of health resorts including Arcachon, Bagnères-de-Bigorre and Capbreton, before returning to Britain to Verwood in Dorset where Adah died in 1917. It was to a large extent her money that had made retirement and their subsequent travels possible. Salter returned to Aberystwyth in 1923 where he lived at Fairview, Llanbadarn Fawr SN598810 in very active retirement for his remaining 19 years.

Something of Salter's university life during his first 17 years at Aberystwyth can be glimpsed from the *University College of Wales magazine* (later called the *Dragon*), but he makes virtually no reference to this activity in his Diary (see later). The Botany Department was on the top floor of the old university building on the Promenade. In December 1891 Salter, in an unsigned article "A call to the science student" in the *Magazine*, proposed the formation of a Scientific Society, and in October 1892 at a general meeting chaired by the Principal, the Society was formed and Ainsworth Davis elected as its president. Salter was on the committee, gave talks and demonstrations to it on a variety of subjects ranging from life in rock pools to birds' eggs and animalcules, and took part in the field meetings of its Natural History Section, although these were chiefly led by Ainsworth Davis. Accounts of these excursions, along with the elaborate College picnics, make fascinating reading. They went to such places as Llanilar, Bedd Taliesin, Hen Gaer near Gogerddan, and even as far afield as Cadair Idris, and were attended by 50 or 60 students (there were just over 300 at the University at this period). They seem not always to have been well-planned, and the report of one to Monks' Cave SN555744 said that "At the cave the tide was too high to let the party in, and it was too rough to allow a crew of energetic lady students, who had rowed down from Aberystwyth, to land." An excursion to Borth was similarly unexpectedly prevented by high tide from seeing the submerged forest. After only a year there were worries about the effects these excursions were having on student morals (well-founded, if the *Magazine* reports are accurate), and the Society was, for the purposes of field meetings, divided into male and female branches. Another year later the Society folded, the *Magazine* commenting that "It is whispered that the Society never recovered from the blow which was dealt it when the afternoon excursions lost the gracious presence of the ladies." Meanwhile two annual reports had been issued, containing much botanical information and a considerable number of plant records, clearly largely contributed by Salter though unsigned. One article by Salter (1892) in the *Magazine*, "Botanical rambles", gave an early overview of his botanising in the county.

The Scientific Society was re-founded at the end of 1898, with nearly 70 members and Salter as president. The committee included H. J. Fleure, the geographer and anthropologist, as secretary and O. T. Jones, the geologist. In 1900 it published Salter's bird list of the district, and probably in late 1901 (from internal evidence, comparing the latest dated entries with his Diary) his *List of the flowering plants and ferns of Aberystwyth and neighbourhood*, in many ways a precursor of his Flora of 1935. Salter gave his last presidential address in November 1905, on the general natural history of the district, and the following year R. H. Yapp, who had succeeded him as Professor of Botany in 1904, became president.

Most of what we know of Salter's activities in the county comes from his natural history diaries, the 24 volumes of which were given to the National Library of Wales after his death. He kept these diaries for 68 years, from the age of twelve. Those referring to Cardiganshire are NLW MSS14432B-14439B and 14444B-14451B. They are immensely readable, carefully composed, and often give vivid pictures of his days in the field. The handwriting of the later volumes becomes difficult to decipher but, if one reads them consecutively, the deterioration becomes easier to cope with. From internal evidence it is clear that he often wrote up the entries from field notes, which have disappeared, and he sometimes did not write up his outings until some days after the event. He frequently re-read the diaries, often



J. H. Salter's 1901 List

referring back to earlier entries, and he was fond of repeating walks or returning to the same localities on the same date in successive years. He carried on a considerable correspondence with other naturalists, and rather oddly often copied into his diary long extracts from their letters.

Phenology and the weather were major preoccupations, and he reacted to inclement weather as to a personal affront. At the end of June 1907, for example, he wrote that "Its 4 concluding days have been quite insufficient to save this month from being absolutely and easily the most dull, dismal, drenching June on record." Conversely, on 21 December, he wrote "The shortest day: hurrah!" He had a barometer, but he did not have a thermometer until 1907 at the earliest, which seems extraordinary for a science professor intent on recording the weather every day. Evidence from the Diaries suggests that he did not have OS one-inch maps until 1906, and some of his attempts to find out-of-the-way localities were therefore very hit-or-miss (he made three fruitless expeditions to try and find Llyn Conach SN740930 when the map would have led him to it straight away).

Egg-collecting and other aspects of ornithology occupied him for much of each spring, when he would go over to the Tywi valley for several days. He was obsessed with Ravens and Kites, and in 1903 initiated the Kite Protection Committee through the British Ornithologists' Club which ultimately led to the Red Kite revival in Wales. Salter administered the innovatory system whereby farmers or other landowners were paid a bounty for each successful rearing of Red Kites on their land. In the 1930s he similarly made annual payments to a roadman at Lovesgrove for allowing *Epipactis helleborine* to flower along his stretch of the roadside.

Salter's exploration of the county became increasingly methodical from 1903 as he became progressively more concerned to record its flora. He was an indefatigable walker, often covering 20 miles in a day and usually only mentioning the distance when it exceeded 30 miles. On one occasion he mentioned having walked 190 miles in the previous eight days. He would often take the train to Glandyfi, and walk back to Aberystwyth over Pumlumon, or take the train to Tregaron or Lampeter and walk back via Aberaeron or Llanrhystud. Occasionally he would spend several days or a week in distant parts of the county to cover more of the ground. Often he was out in company, but as his companions were mostly referred to only by one or more of their initials it is usually impossible to tell who they were.

In 1904, in a project reminiscent of Edward Llwyd's parochial questionnaires, he wrote to the headmasters of all or most of the county's schools asking them for lists of the plants in their neighbourhood. In some cases Salter followed this up with visits to identify collections they had made, or to be given conducted tours of their more interesting localities. The most helpful headmasters seem to have been E. Jones of Llangeitho SN619598, E. T. Thomas of Llechryd SN218437, D. E. Thomas of Sarnau SN315510, T. Richards of Devil's Bridge SN736764 and D. Williams of Aberaeron SN461625 (it is difficult to imagine a similar enterprise being successful today). Many areas were visited by Salter very regularly, especially Wallog and Clarach, Cwm Woods, the lower Rheidol valley and the coast south of Aberystwyth between Allt Wen and Llanrhystud, and further afield the Llynant, Cors Fochno and the Ynys-las dunes, Craig y Pistyll, Devil's Bridge and Coed Rheidol, the valleys above Strata Florida, Cors Caron, the coast at Llan-nnon and the Arth woods at Monachty. The diaries provide great detail on the changes in plant and bird life in these places both through the seasons and from year to year. First flowering dates are meticulously recorded. A flavour of his style can be had from parts of two entries. Of 19 June 1900, when he was in the Rheidol valley at Devil's Bridge, he wrote:

".... same precarious tracks as in '92. I got much the same plants as on that occasion; Woodruff, Welsh Poppy, Garlic, Arum, and the *Saxifraga granulata* which I specially wished to confirm. At one spot there was plenty of Oak Fern.... Was pleased to find *Saxifraga stellaris* [not seen exactly here since], a good clump of it, near the water's edge, only a hundred yards this side of where the Mynach comes in [SN739772]. Scrambled up, and on through the woods. Blue-bells still in plenty, Guelder Rose in fl. Came to a little marshy meadow with Globe Flower, Sweet-scented and Butterfly Orchis [both now gone], Bog Asphodel (not yet out), Butterwort and Sundew. Pearl-bordered were flying, and a Greasy Fritillary with them. Further on, in a similar spot, were several more Greasys, also large Skippers. The Cwm Vetch [*Vicia orobus*, still present] was here in quantity on the edge of a dry pasture [probably SN757789], - *Viola lutea* amongst the short grass, Dyer's Greenweed again. I crossed by the Parson's Bridge, and on along the old water leat to the jackdaw crag [SN752797]. Here I could not now find *Geum rivale*, but got *Cystopteris* [now gone], - lots of *Helix arbustorum*. Below in the bog, *E. tetralix*, and any amount of Cranberry. Now very dull, cool, with drizzling rain. I could not find *Sanguisorba*, but Sweet-scented Orchis [*Pseudorchis albida*, now gone] was here again. Bog Bean and the larger Red Rattle in wet places. Up through the valley of the mines. A. [his wife, known in the family for her skill at driving a carriage and pair] met me with the phaeton at the 8<sup>th</sup>. milestone [SN700809]."



*Saxifraga granulata*, “Nr Parson's Bridge”,  
SN749788, collected by J. H. Salter in 1930 (NMW)

best botanical find of the whole trip, *Sibthorpia europaea* [now gone, but still nearby] amongst mosses and ferns in a shady nook where water trickled from a tiny spout [SN38774617].”

Some of Salter's favourite sites have since disappeared, Clarach Bog SN591838 was drained by the mid 20<sup>th</sup> century, and Pwll Simon SN595804 (see picture overleaf) was finally destroyed by the Parc-llyn supermarkets before the end of the century, but many remain to be enjoyed much as he knew them.

Salter botanised extensively in Teneriffe during his stay there, and after his return published a paper “Regional distribution of the native flora of Teneriffe”, *Memoirs and proceedings of the Manchester Literary and Philosophical Society* **62**(8): 1-16 (1918). The mosses he collected there were written up by H. N. Dixon, “Teneriffe mosses,” *Journal of botany* **49**: 1-8 (1911), who named *Brachythecium salteri* Cardot & Dixon after him (it is unfortunately now sunk into *B. dieckii* Röhl). Although he botanised when he was in France, this was less productive. In Dorset on his return he made many useful records, published by E. F. Linton in



“Clarach bog”, view WNW  
from SN595833, postcard of c.1900

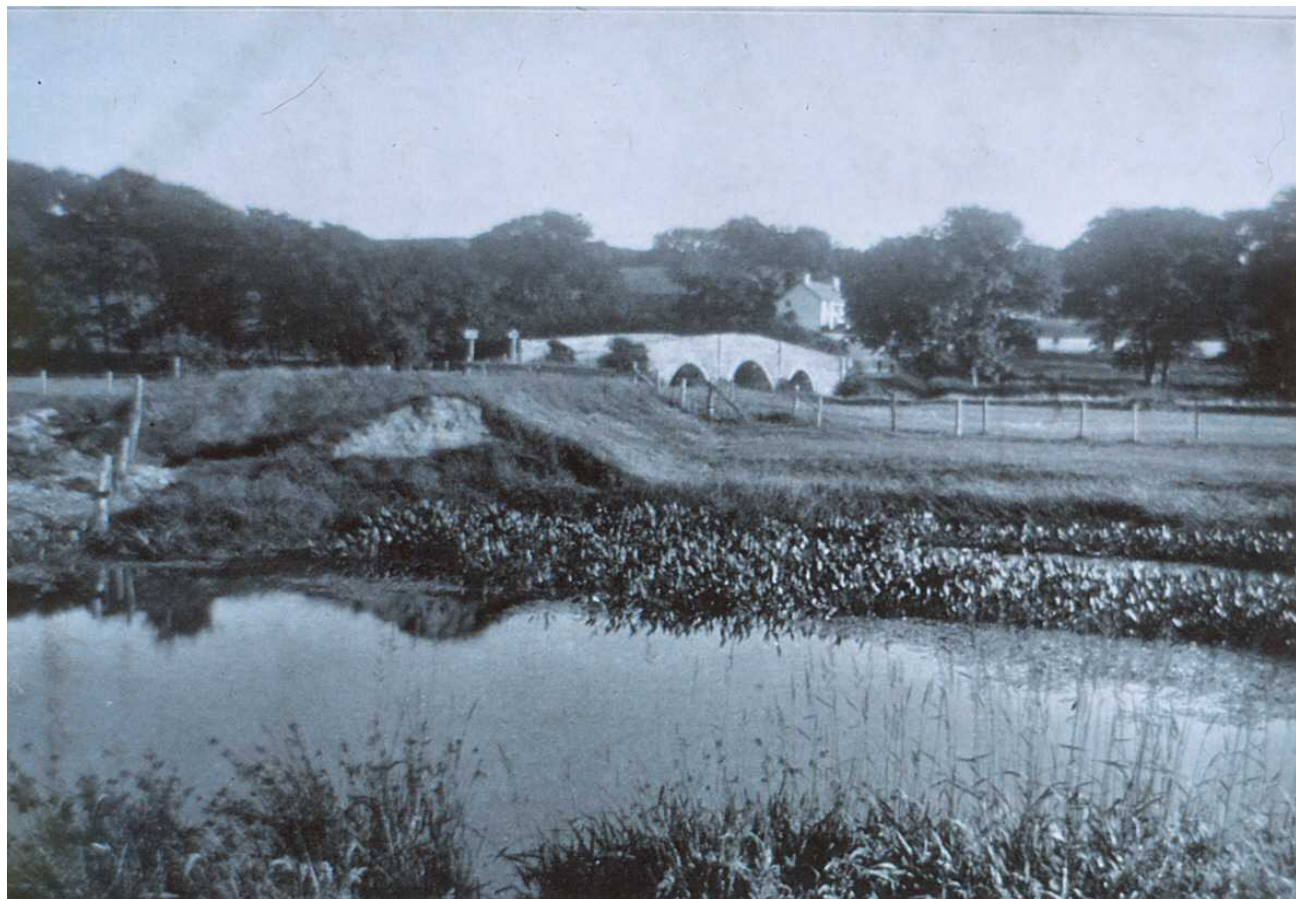


Site of the former “Clarach bog”, view  
WNW from SN595833, August 1991

In August 1907 he made a six-day walking tour in the south of the county, and when he wrote it up afterwards he described part of the second day, August 13:

“Came down to nicely planted grounds [SN445438] opposite Allt-yr-odyn House. Here wild raspberries were abundant, and I noted *Mentha rotundifolia* [*M. suaveolens*], apparently quite indigenous .... I followed up the Clettwr Fawr for a short distance. A woman was mixing ‘culm’ ....took the road up the valley of the Clettwr Fach, these brooks reminding me of the Hertfordshire streams .... Here as elsewhere *Hypericum calycinum* and *Spiraea salicifolia* occur as escapes .... past Rhyd-y-sais to Talgareg [SN426511], - a poor-looking village at the head-waters of the Clettwr with much bog and half-cultivated land [now the Rhos Llawr-cwrt NNR] around it, and behind it the great bare upland plateau, watershed of the Teifi and Aeron, to-day lying dark and dreary under a lowering sky .... On past Pisgah [SN414513], noting the beauty of the Tormentil flowering in tens of thousands by the road-side .... Then came [via Capel Cynon to] Ffos-trasol [SN373476] at the cross-roads. Seven martins nests on a house. Here I found *Calamintha clinopodium* [*Clinopodium vulgare*] .... down a steep lane to the Cerdin which I struck just below Dinas Cerdin, a fir-clad hill rising steeply from the stream with evident lines of entrenchment upon its summit. Here in the valley were green damp, shady lanes, keeping company with a rippling brook. Here occurred the





Pwll Simon, view SSE to Pont Pen-y-bont and Penparcau from SN594805, postcard of c.1900

his *Flora of Bournemouth. Appendix II* (1925). (Linton in his acknowledgements mistakenly thought that Salter was in practice as a doctor during his stay at Verwood.)

In August 1922 Salter returned to Aberystwyth with his son Ronald for a fortnight's househunting, and came back in April 1923 while his chosen house, Fairview, at Llanbadarn Fawr was made ready. On both occasions he stayed again at Crugiau, with the family of Abel E. Jones, Professor of Agriculture, and he moved into Fairview SN59808106 in September 1923. It is a two-storey house on the south-facing slope below the lane 100m WNW of the church, with a quite small garden below it. He lived there until his death, looked after by a housekeeper, Mrs Bickley, who must have been very tolerant of his unpredictable returns from outings (he not infrequently missed the last train from Trawsgoed, or the last bus from Llanrhytud, and had to walk the 12km home).

The Fairview garden was a major preoccupation, and he grew over 700 species from other parts of Britain and from all over the world, recording their first flowering dates each year and making herbarium specimens of them. At least one of his plants, a Mandrake, was moved to the garden of his friend W. Miall Jones at Glascoed, Piercefield Lane, Penparcau SN590797, after his death, and after Miall Jones's death in 1957 it was moved to the order beds in the University Botany Gardens at Penglais, where it unfortunately died out from neglect. Many species that escaped from Salter's garden can still be



Crugiau, Rhydyfelin, view SE up the Ystwyth from SN581799, July 2005

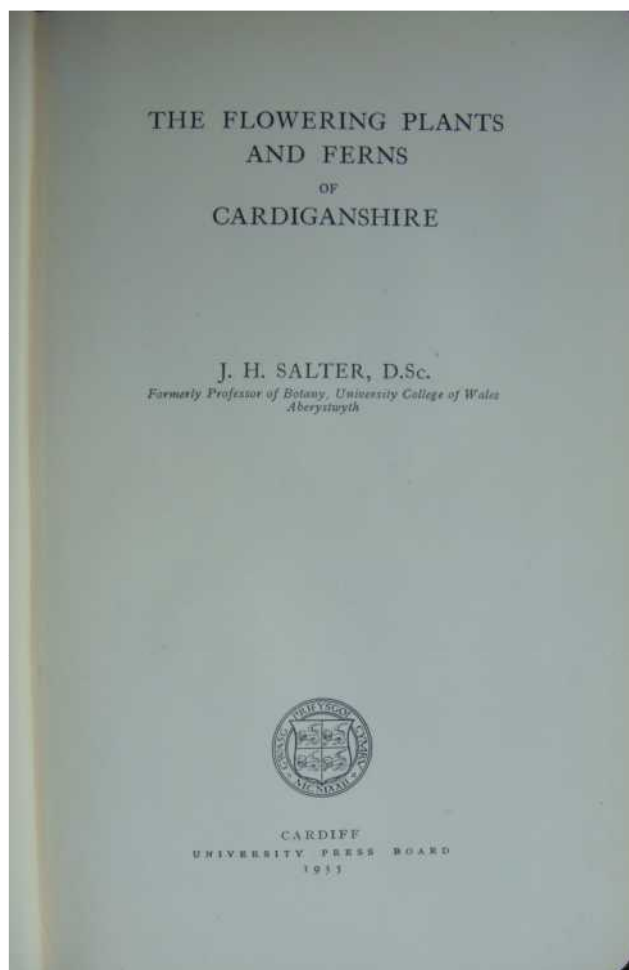


Fairview, J. H. Salter's house at Llanbadarn Fawr (far left, white), view NE from SN596808, March 2007

she who spurred him into writing up his county Flora, *The flowering plants and ferns of Cardiganshire*. This was published in 1935 by the University Press Board, Cardiff, but it also comprised Vol. 10 of the *Cardiganshire Antiquarian Society transactions*. The preface modestly states that "The present work makes no pretence to be a Flora of the county, but, a considerable amount of material relating to its flowering plants and ferns having accumulated, it appeared better to utilise this at once rather than to wait some years until the subject could be treated with a greater degree of fullness and finality. When this is attempted, these notes may find their place as contributions to a larger work." The lack of any proper account of the physical background and ecology is explained when he writes: "The general plan of a County Flora has been adhered to, while Dr. Newton's *Plant Distribution in the Aberystwyth District* treats the subject from the ecological standpoint." The Flora provides a few lines of general comment on each species, followed, except in the case of the commonest species, by a list of localities. There are two main problems in using this information. The records are usually undated and it is therefore only by reference to the Diaries or to his specimens that one can tell whether they refer, say, to the 1930s or to the 1890s. It is also often difficult to tell whether the lists of localities are meant to be complete or not. Sometimes it is obvious that they are, or that, as for example in the case of *Lotus corniculatus*, he is just listing localities that are at a significantly high altitude. It is difficult though to know what to make of the fact that he gives only three lowland sites for *L. uliginosus*, which he describes as frequent. For these reasons, it can be difficult to use his information to assess the distribution or abundance of species and to compare his data with today's. In the species accounts in the present work I have often tried to make such comparisons, using the Diaries as well as the Flora, but it can rarely be done with much confidence. Salter annotated a copy of the Flora, which is now at NMW and was used by Wade as the basis for his *Supplement* (1952). Salter published a number of mostly short botanical notes in the *North western*

found naturalised on the scrub slopes and lane-sides around it, including *Scrophularia scorodonia*, *Symphytum bulbosum*, *Veronica crista-galli*, *Papaver atlanticum*, *Geranium pyrenaicum* and *G. rotundifolium*. His exploration of the county continued after his return, with increasing thoroughness. In August 1926, for example, he spent four weeks in lodgings at the Howells's farm, Pantyffynnon, Llywernog SN73108062 in order to explore that part of the uplands more thoroughly

Salter was an extremely reticent author, the only work of his that was in any way expansive being a popular but infuriatingly generalised book *Bird life throughout the year* (1913). In 1928 Lily Newton came to Aberystwyth as a Lecturer in Botany and was appointed Professor in 1930 (see below), and it was



J. H. Salter's 1935 Flora





J. H. Salter on Cadair Idris (the dog not his)

above, he seems not to have had one-inch maps, at least not for use in the field, until 1906, judging from his Diary entry for 26 September 1903 he correctly knew at this period that Llyn Llygad Rheidol was at 1,750ft, and he would have known that the Pumlumon Fawr summit was at 2,468ft, so his estimates of altitudes in between were probably fairly good. Limits in the county for some 200 species can be got or deduced from his records.

Salter from time to time went out with visiting groups, for example he was on Cors Caron with Godwin's party in July 1936, and at Ynys-las and the Llyfnant with the British Ecological Society in July 1938. W. Miall Jones took him out by car occasionally, sometimes as far as Cardigan and Rhayader, as did his son Ronald when he visited, but he had no transport of his own and usually relied on trains and buses. I have two personal recollections of him. The first is of him sitting, very upright and silent, beside me in the dickie seat of my father's Clino car as we were giving him a lift home after meeting him by chance out in the country. The other is of visiting him at Fairview on 17 August 1941, when he received me in a kindly fashion and showed me his extensive egg collection.

In spite of a few episodes of poor health, Salter retained his energy into old age, and at 78 recorded a 17 mile walk to Llyn Crugniant SN754613. He was a tall, slight, quietly spoken, shy and retiring man, a Quaker, a vegetarian, a non-smoker and a teetotaler. In the 1930s he often took out with him one or other of two local schoolboy friends who were interested in natural history, sometimes using them to listen for Grasshopper Warblers or other birds he could no longer hear, to climb trees for nests, or to wade into swamps in search of plants. The late Ieuan Williams had many recollections of such walks. The as yet unpublished memoir by Gilbert Clark of his association with Salter provides the most vivid account of his character and activities in the field.

J. H. Salter and Ronald Salter, c.1940

*naturalist*. For the last ten years of his life he contributed, anonymously, weekly Nature Notes to the *Welsh gazette*, but these are mostly generalised observations and of no use as a source of records.

Along with phenology, one of Salter's chief botanical preoccupations was the altitudinal limits of species. He records them wherever possible in the Flora, and wrote a substantial paper on the subject (1928a). Here he explained that "In noting altitudes, the writer has made use of the contour-lines shown upon the Ordnance map, and it appeared that the subject would be most clearly presented by dealing with the flora of successive zones, each of 250 feet." The contours on the one-inch OS maps were at 100ft intervals during the 1890s and early 1900s, and at 50ft intervals during the 1920s and 1930s. Although, as suggested







J. H. Salter and Tim Bible, August 1940



Grave of J. H. Salter, Llanbadarn Fawr, Pendinas beyond, view SW from SN599811, March 2010

Towards the end of his life in 1942, Salter gave his herbarium and his insect collections to the National Museum of Wales at Cardiff. The 3,000 or so vascular plant specimens collected in the field, and the 700 or so from his garden, are thus incorporated in **NMW**. The field collections include c.350 from Cardiganshire. After his death his natural history diaries were given to the National Library of Wales by his son Ronald. He was found lying dead after a fall in his garden on 5 August 1942, never

having recovered properly from a prostate operation in March of that year, and he was buried close by in the new part of Llanbadarn Fawr churchyard, the service following the pattern of the Quaker Society of Friends. Among the obituaries was one in the *Welsh gazette* of 13 August, probably written either by Henry Rees, brother of the founder George Rees who had been a botanist and friend of Salter's, or by William Lewis, his co-manager and editor. An almost identical one appeared in the *Cambrian news* the following day. Both were followed by appreciations by Lily Newton. She also wrote the obituary in the *North western naturalist* 17: 265-270 (1942), where appreciations by three of his friends, the botanist and editor of this journal A. A. Dallman, the Aberdyfi naturalist E. H. T. Bible and the North Wales naturalist H. E. Forrest, were added. Dallman wrote that Salter had once remarked to him: "I feel sure that there are species in this county that I have not yet met with. I have in mind *Malaxis* [*Hammarbya*] *paludosa*, *Bartsia* [*Parentucellia*] *viscosa* and *Pinguicula lusitanica*. It would be a happy day for me if I could meet with any one of the three." The first two have now been found, and he would doubtless be equally happy at how many more species have since been discovered that he never saw.

### Other Aberystwyth University botanists

The great Oxford botanist **Arthur Harry Church** (1865-1937) had been a mature student at the University College at Aberystwyth in 1887-1891 where he was taught chiefly by J. R. Ainsworth Davis (see above). He co-edited the magazine *The student* in 1889 and lodged in Portland Street, and botanised in the district. Although he left just before Salter arrived, in 1894 he sent Salter a list of his more interesting finds (Diary 24.11.1894), including *Silybum marianum* as an escape in Llanbadarn Road, *Polygonum raii* at Clarach, *Pulmonaria officinalis* near Borth, and *Neottia ovata* in Cwm Woods.

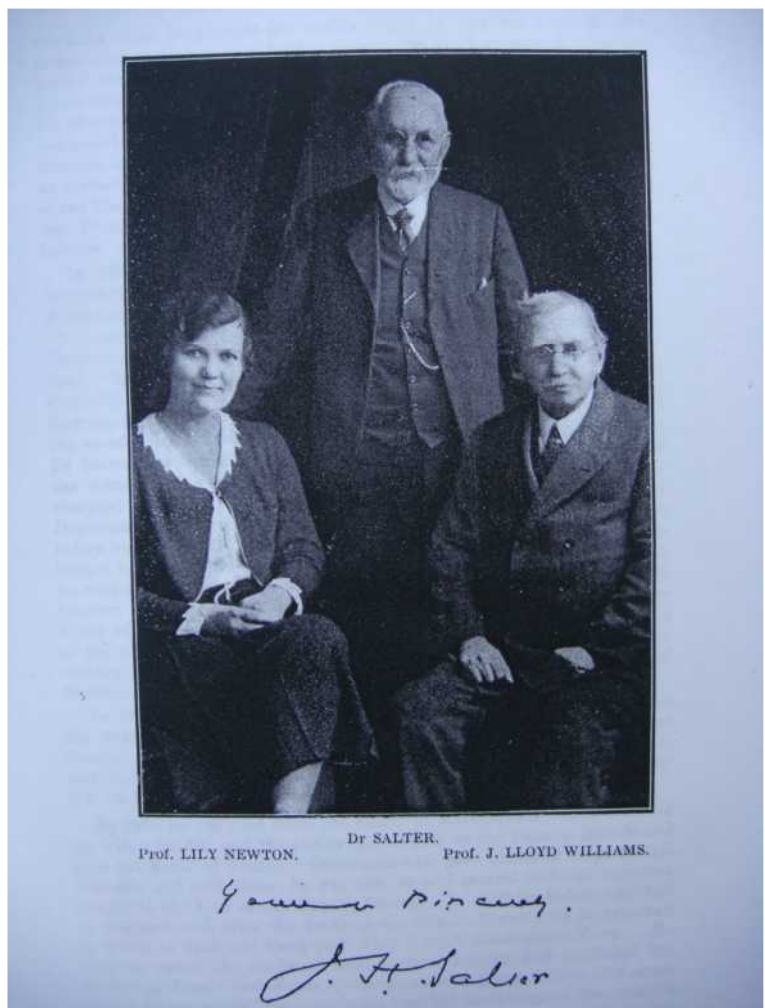
Many botanists who followed Salter at the university made use of the local environment for ecological research or recorded plants in the county. He was succeeded as Professor of Botany in 1904 by **Richard Henry Yapp** (1871-1929), probably scientifically the most distinguished occupant of the chair. Born at Orleton in Herefordshire and spending his student years at Cambridge, he had acquired a considerable reputation as an ecologist with his fenland studies and his recognition of the importance of stratification of stands of vegetation, and continued his work on Wicken Fen after he moved to Aberystwyth. He did much of his experimental work on *Filipendula ulmaria* and the xeromorphy of marsh plants at Aberystwyth (Yapp 1912), but his main new research was on the salt marshes of the Dyfi estuary (Yapp *et al.* 1916, Yapp & Johns 1917, Yapp 1922, 1923), describing the characteristic zonation and the formation of "pans", which very much

R. H. Yapp (from *Journal of ecology* 17)

put this area on the map so far as ecologists were concerned. The papers in collaboration with O. T. Jones and D. Johns laid the foundations for later studies of the Cors Fochno raised bog and the submerged forest. He wrote a brief but still very useful account of the flora of the county (Yapp 1911), including notes on the geographical elements and much ecological comment. He provided Salter with quite a few miscellaneous records from various parts of the county and some of his specimens are in **ABS** and **BIRM**. Yapp left in 1914 to take up the Chair of Botany at Queen's University, Belfast, but returned to the Dyfi in 1921, by which time he had moved to the Mason Chair of Botany at Birmingham, to investigate the changes in the salt marshes. It was then that he saw the *Spartina* that had just been planted and that was to interest later botanists at the university so much. Yapp's successor at Aberystwyth was **John Lloyd Williams** (1854-1945) who, in great contrast to Salter, contrived to retain his professorship until 1926 when he retired at the age of 71. Born at Llanrwst, he studied at the Normal College, Bangor, and at London University, becoming a lecturer in botany at the University College of North Wales, Bangor. His chief botanical interest was in marine algae, but he was an enthusiastic general field botanist, an influential teacher and a notable historian of Welsh music. Salter gave a few of his records in his Flora, and the most interesting ones he made were the first for the county of *Neottia nidus-avis* in Cwm Woods in 1921 and of *Asplenium septentrionale* near Devil's Bridge (Salter Diary 27.10.1924).

Lloyd Williams was succeeded by Wilfrid Robinson, a mycologist and marine algal physiologist who had appointed **Lily Newton** (1893-1981) to his staff in 1928. On Robinson's early death aged 45 in 1930, Newton was appointed to the chair and became the third consecutive marine algologist to head the department. She was best known for her *Handbook of British seaweeds* (1931). In 1933 she published a useful booklet, *Plant distribution in the Aberystwyth district*, with a preface by Salter. It was an expanded version of a chapter she had written the previous year for a souvenir book for a National Union of Teachers conference, and drew heavily on Salter's knowledge and on the work of R. H. Yapp, R. G. Stapledon and others. Newton collabo-

Three professors of botany at Aberystwyth  
(from *North western naturalist* 17: pl.6)



rated with Godwin in the publication of a paper on the submerged forest at Borth based on the work of the late F. N. Campbell James (née Vobes), and she later became involved with pollution problems in the Rheidol and the Ystwyth. In 1923 Lloyd Williams appointed another lower plant specialist, **Price Wallator Carter** (1898-1971), who had graduated at Aberystwyth, onto the staff. Carter put Welsh botanists in his debt by writing detailed accounts of the history of botanical exploration in all the Welsh counties. He also wrote a short history of the Department of Botany and useful general accounts of the flora and vegetation of Pumlumon, the Ynys-las dunes and Cors Fochno. **Edward Hubert Chater** (1902-1975) was appointed Lecturer in Physiology and Ecology in 1930. Born in London, he studied at University College there under F. W. Oliver, who aroused the interest in salt marshes which led to his main research in the county on the Dyfi estuary. Yapp's papers had been followed by others on the Dyfi by J. M. Lambert, R. M. Davies, F. J. Richards and others. Chater became especially interested in the ecology of *Spartina* there (and took Oliver to see the various forms of it on the Dyfi in October 1950), publishing on it in the 1950s and 1960s, partly in collaboration with H. Jones, also on the staff of the Department. Chater also became interested in the peat bogs and post-glacial history of the district, and after the Second World War was involved as supervisor and in other ways with many post-graduate projects of local interest including those of G. T. Goodman on *Eriophorum* especially on Rhos Rydd, J. B. Jones on Rhos Rydd and elsewhere, M. E. Davies on *Phragmites* autecology on Cors Fochno, R. T. Johnston on Cors Caron and Cors Fochno, D. D. Bartley who made many local records, including *Carex limosa* from Banc Ty-llwyd, and especially with P. D. Moore on post-glacial studies on Cors Fochno, along the Sarn Helen Roman road and at a number of sites in the Cardiganshire uplands. Chater became heavily involved in local conservation and his general interest in the flora of the county resulted in many new records. In his later years he made a point of collecting for NMW species unrepresented there for the county. Among other post-graduate students in the department was **Anthony David Bradshaw** (1926-2008), whose influential work on population biology of plants and on heavy metal tolerant races and the restoration of derelict and polluted sites began with his research here in 1947 on *Agrostis* from local lead mines.

After the retirement of Newton in 1958 and the appointment that year of **Philip Frank Wareing** (1914-1996) to the Chair of Botany, the Department moved up to new premises on Penglais and a great expansion took place. Wareing was a physiologist, but was very active and influential in local conservation matters, and a number of his specimens are in ABS. The main impact on recording the local flora was in the work of J. P. Savidge who was appointed in 1959, and A. D. Q. Agnew who was appointed in 1969. Savidge worked especially on *Callitriche*, on the inland races of *Silene uniflora* and other lead mine species, and on Cors Caron, and has had major interests in the relationship between plants and climate, and in historic gardens. He was BSBI Recorder for the county in 1974-1976, edited the *BSBI Welsh region bulletin* 1965-1969, and among his notable discoveries have been the first records for *Selaginella* and *Hammarbya*. Among his post-graduate students were M. G. Daker, who worked on the cytotaxonomy of *Fumaria*, and P. A. Lintin, who studied the *Dactylorhiza* populations at Ynys-las.

Agnew's work has been chiefly ecological, especially in relation to Ynys-las and Cors Fochno, and among the many projects on the latter site that he has supervised are those by F. M. Slater (1974) and A. D. Fox (1984). Agnew has also worked a great deal with the Wildlife Trust, and, with his late wife Shirley, a bryologist, has with great devotion ensured the continuing existence and curation of the Painter Herbarium, ABS (see below). M. Hildred Bigwood, for many years an assistant in the Botany Department and living at Llwyndu, Llanfihangfel-y-Creuddyn SN666765, also did much for the herbarium and made many interesting local records, notably of *Veronica crista-galli*. Continuing reliance on the local vegetation for teaching purposes is exemplified by D. R. Causton's use of E. A. Wolfenden's work on Coed Nant Llolwyn SN588772 in one of his textbooks (Causton 1988). The Botany Department, after many changes and a period as the Institute of Biological Science, was subsumed in 2008 into IBERS (see below).

In 1930 the Botany Department had acquired a small garden for teaching purposes beside the Chemistry Department (now the School of Art) on the Buarth, plants for it being obtained from Salter as well as from the University of Bristol. The weed flora here was recorded by Salter from time to time, and the now decorative gardens on this site have remained of interest with such species as *Trifolium subterraneum* and *Orobancha minor* being seen there in recent years. The later Botany Gardens and the development of the campus are described in another chapter.

**Thomas Alan Stephenson** (1898-1961) was born at Burnham-on-Sea in Somerset and first came to Aberystwyth in 1914. He became a student at the University College the next year, and, in spite of ill health and with the encouragement of the geographer and professor of zoology H. J. Fleure, he became a demonstrator in zoology and stayed on to do research until 1923. He then lectured in zoology at University College, London, took part in the Great Barrier Reef Expedition in 1928-1929, and then became Professor of



Zoology at Cape Town. He returned to Aberystwyth as Professor of Zoology in 1940 until his death in 1961. He was an outstanding artist. Although primarily a marine zoologist, the botanical enthusiasms and expertise of his father the Revd **Thomas Stephenson** (1865-1948), a Wesleyan minister born at Brackley in Northamptonshire, led him into the study of orchids. Thomas was a tutor at the Wesleyan Trinity College in Richmond, Surrey, where Thomas Alan spent his early childhood, and became a normal Wesleyan minister on the triennial circuit in 1904. This brought him to Aberystwyth in 1914 where the family stayed at the circuit manse, Epworth Villa in North Road, until 1919, the war prolonging the usual 3-year stint. Together and separately father and son published many papers on orchids, including much of interest on the Cardiganshire populations, and described *Dactylorhiza purpurella* new to science from the Clarach valley in 1920. The “Dr. Stephenson” who gave orchid and *Euphrasia* records to Salter on several occasions in 1942 was the father; although he spent most of his later years at Torquay where he was closely involved with W. Keble Martin & G. T. Fraser’s *Flora of Devon*, he was staying with his son at Aberystwyth from 1941 to 1944 and was Salter’s last botanical visitor six days before the latter died.

### **Aberystwyth University Herbarium (ABS)**

The early history of this herbarium has not been investigated. Presumably a herbarium formed part of the University Museum, of which Salter was Curator for some years until 1908. In September 1909 W. H. Painter (see above) presented an extensive collection of plants to the University, and this formed the basis of what became known as the Painter Herbarium (**ABS**). Although many more of Painter’s collections are in **BM**, **K** and elsewhere, some are in **ABS** (although apparently none from Cardiganshire), along with his numerous specimens from the Botanical Exchange Club. His friendship with Salter presumably prompted this gift, although Salter had left Aberystwyth by then. It is curious that Salter gave none of his own plants to the herbarium (except for a completely uncharacteristic decorative album of pressed flowers from Snowdonia and Scandinavia). The herbarium now contains just over 20,000 specimens, and recent collections from Cardiganshire include those by A. D. Q. and S. Agnew, J. P. Savidge, M. H. Bigwood, P. F. Wareing and various PhD and undergraduate students (the latter were at one stage required to collect 100 specimens as part of their course, but only some of these were considered worth incorporating). Earlier collections of local interest include that of M. L. Lewes (see below). It was curated for a time from 1959 by J. P. Savidge.

A. D. Q. and S. Agnew later took over the herbarium and recurated the whole collection into *Flora europaea* order. They estimated in 1998 that there were some 3,500 specimens from Wales, 9,000 from the rest of the British Isles, 6,000 from the rest of Europe, and 1,700 from the rest of the world. Nearly 60% of the British specimens were collected before 1900, and the great majority of these were exsiccatae from the exchange clubs. Nearly 80% of the Welsh specimens though were collected after 1900, and were not exsiccatae. The herbarium is now well housed by IBERS in the Edward Llwyd Building on the Penglais Campus. In 2007 it was photographed by T. Humphrey for the Herbaria@home web-based project and much of it is now on-line.

### **University Botany Gardens**

Although outside the scope of this Flora, the Botany Gardens at Plas Penglais, Aberystwyth SN593821 should be mentioned, especially as some of their plantings have overflowed into the adjacent wooded dingle. Its history is summarised by Fox (1981), and it is put in the general context of the Penglais estate and the campus by Palmer (2004) and Cadw (2002). In the 1930s there was a quarter acre garden by the Edward Davies Laboratories on the Buarth SN587815, but, in 1946 when the University bought the Penglais estate, D. Alban Davies, who put up the money for the purchase, urged that part of the grounds should become a Botany Garden. The first Head Gardener in 1947-1951 was H. Hart, from Edinburgh, and he and Professor L. Newton laid out a nursery, greenhouses and order beds. When P. F. Wareing became Professor of Botany in 1958, and B. S. O. Fox was appointed Curator of the Botany Gardens and College Grounds in 1960, a massive development programme began, the order beds were moved to their present position, a much bigger 2-acre nursery was established, and extensive and imaginative plantings took place throughout the Gardens and campus. Unfortunately, funding had to be diverted from the Gardens during the 1980s and 1990s, and, although the order beds still exist and are of considerable interest to the botanist, they are now only minimally maintained and the labels and very many of the plants are lost. The trees and shrubs are now the main features.

## Agriculture at the University and at the WPBS/IGER/IBERS

The University College appointed its first Lecturer in Agriculture in 1891, but from our point of view the most interesting event was the appointment in 1912 of **Reginald George Stapledon** (1882-1960) as Advisory Officer in Agricultural Botany. Born at Lakenham in Devon, getting a natural sciences degree at Cambridge, and working at the Royal Agricultural College at Cirencester, he became obsessed with the idea that Britain needed to become self-sufficient in agriculture, and that grassland improvement leading to productive agriculture was of the utmost importance for both the economic and the spiritual welfare of the country. This view was indeed to a great extent justified in the two World Wars, however much harm these improvements may have done ecologically and by way of leading the country into the current problems of subsidised farming. He was a complex character, visionary, immensely competent, charismatic and brilliantly capable of influencing policy-makers, and depressive. His job on arrival at Aberystwyth was to conduct the ecological part of a survey of the Aberystwyth hinterland, from the coast to Pumlumon. Although the project as a whole, which had been thought up by R. H. Yapp, O. T. Jones and C. Bryner Jones, Professor of Agriculture, was never completed because of the outbreak of war in 1914, Stapledon's map was and remains unique in its detail for that period and in its historical interest. In 1919 Stapledon was appointed Director of the new Welsh Plant Breeding Station (WPBS) that C. B. Jones and Stapledon had managed to get sited at Aberystwyth (in Alexandra Road), along with the Chair of Agricultural Botany which was created at the same time; he retained both posts until 1942. A site by the National Library was used for field trials, and in 1920 Frongoch Farm SN605826 was bought as the field station.

Relevant aspects of the work of the WPBS, which moved to Gogerddan SN629836 in 1950, changed into the Institute of Grassland and Environmental Research (IGER) in 1990, and acquired the Trawsgoed Farm in 1992, are mentioned in some detail in the appropriate places elsewhere in this Flora. The pasture grasses and cereal varieties it developed, with their familiar "S" numbers issued from the 1930s until the 1960s, and its work on the improvement of upland pastures, had an immense impact on the local vegetation and on the country as a whole, and made Aberystwyth a byword in agricultural matters. **Thomas James Jenkin** (1885-1965), who had earlier worked with Stapledon, joined that WPBS in 1920 and succeeded him as Director and Professor from 1942 until 1950. His most important work was in grass breeding and resulted in, among much else, the development of the Station's most famous product, 'S.23' Rye-grass. In the 1920s he also worked on 'Hen Gymro' Wheat. **Cecil Victor Boley Marquand** (1897-1943) was appointed to run the cereal department in 1919, and worked on the taxonomy of *Avena strigosa* and other Oats, and on Oat breeding, but left in 1922 for a job at Kew. He made a number of useful records during his time at Aberystwyth, including the first of *Noccaea caerulescens*, from the banks of the Ystwyth in 1923. He was succeeded by **Evan Thomas Jones** (1892-1985), whose work on Oat breeding became of immense significance both in Britain and abroad. He was Director of the WPBS from 1950-1958. **Rhys David Williams** (1889-1943) was appointed to run Frongoch Farm in 1919, and became the pioneer Clover geneticist and breeder. **Arthur Rhys Beddows** (1896-c.1988) worked on grass breeding for 39 years and wrote, among much else, Biological Flora accounts of *Dactylis glomerata*, *Holcus lanatus*, *Lolium perenne*



George Stapledon, by Allan Gwynne Jones  
(IBERS, copyright © the Estate of Allan Gwynne Jones/Bridgeman Art Library)



*Miscanthus × giganteus* biomass trials,  
ADAS, Llwynprenteg, Llanafan, view  
S from SN688716, November 2005



*Panicum virgatum* biomass trials, with  
John Valentine, IBERS, Gogerddan, view  
SW from SN624841, October 2009

and *L. multiflorum* and historical papers on agricultural grasses; he retired to Essex in 1961. There is a herbarium (WPBS) at Gogerddan of some 7,000 specimens, containing much experimental and some wild-collected material.

Stapledon began working in 1931 with G. L. Bennett Evans of Llangurig on improving the latter's hill land east of Pumlumon, and in 1932 appealed for funding for a hill land improvement demonstration site for the WPBS. The Cahn Hill Improvement Scheme, named after Sir Julian Cahn, the philanthropist who backed it, was started in 1933 with c.1,200ha of hill land leased from the Hafod estate mostly around Pwllpeiran SN77S (Griffith 1936, 1937), and, for good or ill, became the model for much of what happened to the uplands of the county, and of the rest of Wales, in succeeding decades. It was under the auspices of the Scheme that a complete survey of the agricultural land of Wales was carried out by W. Davies (Stapledon 1936). The Scheme was abandoned in 1947, and Pwllpeiran was taken over by the Ministry of Agriculture. Stapledon had left Aberystwyth in 1942 to direct the grassland research station at Drayton. In the words of Moore-Colyer (1997): "Few men have left a greater and more indelible mark on the land surface of Britain than Sir George Stapledon."

Much other work of interest to the Flora has come out of the WPBS and IGER (which on its merger with Aberystwyth University in 2008 became part of the Institute of Biological, Environmental and Rural Sciences, IBERS) in recent decades. Oat breeding continued under J. Valentine, including successful winter and naked varieties, Clover breeding continues, further Rye-grasses, including high sugar varieties, have been developed, and research on biomass using chiefly *Salix*, *Miscanthus*, *Phalaris* and *Panicum virgatum* has become important. Similar research on biomass on a smaller scale has been done at Pwllpeiran, now run by ADAS. The Welsh Agricultural College (WAC), later the Welsh Institute of Rural Sciences (WIRS), now the Institute of Rural Sciences and most recently a part of IBERS at the University, opened in 1970 and has been a further stimulus to botanical activity locally, especially in ecological genetics and grassland ecology under J. M. Warren. (Experienced botanists should be unfazed by these reorganisations and changes of name as they are very similar to the changes of circumscription and nomenclature they have to deal with in taxonomy.)

The organic movement has always been strongly supported in the county, and an early pioneer was Bessie Jones, wife of Professor Abel E. Jones, mentioned above, with whose family Salter lodged at Crugiau on his visits in 1922 and 1923. After her husband's death in 1924 she farmed Nantllan at Clarach SN596840 on what were effectively organic principles. Her daughter, Dinah Williams, under the additional influence of Lady Eve Balfour, joined the recently formed Soil Association in 1952 and her farm at Brynlllys, Dol-y-bont SN620887, became the first certified organic dairy farm in Britain. Dinah's daughter, Rachel Rowlands, founded the organic enterprise Rachel's Dairy there in 1984. Another notable figure in the organic movement, Patrick Holden, Director of the Soil Association, has been farming Bwlchwernen Fawr, Llwyn-y-groes SN600558 organically since 1973. The Organic Centre Wales at Aberystwyth University, founded in 2000, provides support for organic growers and farmers, and estimated that there were 5,906ha of land managed organically in the county in 2004, 10.3% of the Welsh total.



### Other early 20<sup>th</sup> century residents

Apart from the headmasters who made lists and collections for Salter, there were few significant resident botanists unconnected with the academic institutions in the county. George Rees has been mentioned above.

**Mary Louisa Lewes** (c.1878-1951) was born in Gibraltar, the daughter of Major Price Lewes, Adjutant of the Pembrokeshire Militia who bought Ty-glyn Aeron SN502597 in 1880. She ran the hospital at Aberaeron during the First World War, was a JP, and wrote books and articles on Welsh folklore (she was the sister of the much better-known author Evelyn Anna Lewes). In 1908 she began a collection of plants, chiefly from the Ty-glyn Aeron area and the south part of the county, which continued into the 1930s and which is now in ABS. Salter seems to have been unaware of her. The collection contains much of interest, and the labels often contain useful notes on the local frequency of the plants. Among the more notable species in it are *Saxifraga granulata* from Llanerchaeron, *Melittis* from Coed Cwm-du, *Verbena* from Ciliau Aeron, *Gentianella campestris* from near Llanrhystud, naturalised *Geranium phaeum* from near Ty-glyn Aeron and *Saxifraga cymbalaria* from Alltyrodyn. After Ty-glyn Aeron was sold in 1930, she moved to Cardigan; she died in 1951 aged 82 and is buried in the family enclosure in Trefilan churchyard.

**Mary Winifred ("Peggy") Challinor** (1906-1979), the wife of J. Challinor, lecturer in geology at the University College of Wales, Aberystwyth, made a collection of some 500 plants, mostly from Cardiganshire, in 1934 and 1935, which was acquired by NMW in 1992. A considerable proportion of the localities, including almost all of those for the less common species, are ones published by Salter either in his Flora of 1935 or in his earlier publications, and they provide useful confirmations when Salter specimens are not available. At the time she and her husband were living at 7 South Marine Terrace, Aberystwyth, but later moved to Broncastell, Capel Bangor SN652801; she is buried in the cemetery there. Although she was a personal friend of my family, we did not know of this serious botanical activity.

**William Miall Jones** (c.1872-1957), a prominent Aberystwyth chemist and a good general naturalist, was the son of James and Margaret Jones who farmed Tyllwyd, Llanfarian SN596774. His shop was at 33 Terrace Road, and in his later years he lived at Glascoed, Piercefield Lane, Penparcau SN589799. He was a friend of Salter and occasionally took him out in his car on ornithological or botanical expeditions. He knew the localities of many rarities, making valuable records of *Dianthus armeria*, *Gentianella campestris* and *Pseudorchis albida*, among others, and in the 1950s passed on some details of these to W. M. Condry and myself. Unfortunately he asked for his field notes to be destroyed after his death for fear that they would be misused.

Apart from Salter, several other people wrote regular nature notes in the local papers from which useful information can be gleaned, for example those



Grave of Mary Louisa Lewes in Trefilan churchyard, SN549571, April 2006



Glascoed, W. Miall Jones's house, Penparcau, view E from SN588798, March 1991

entitled "The Flora of Cardigan" by "A Lover of Wild Flowers" in *The Cardigan and Tivy-Side advertiser* in 1913.

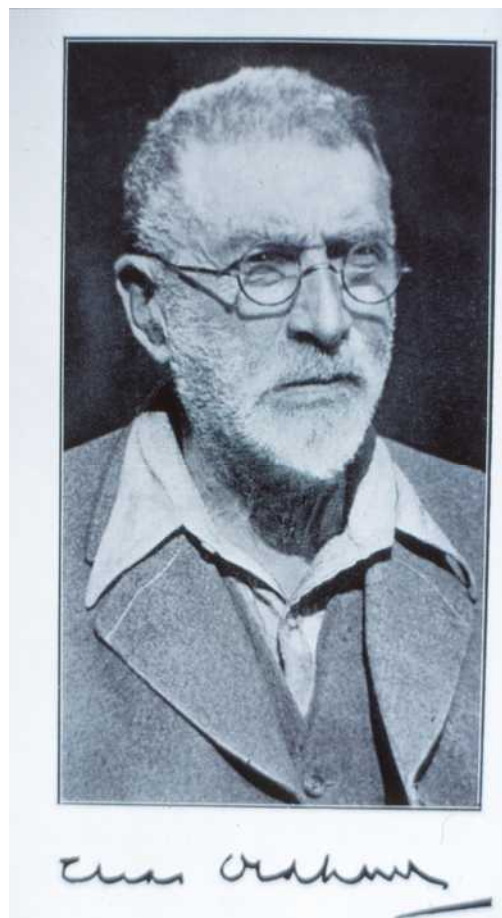
### Early 20<sup>th</sup> century visitors

One of the most significant visitors who botanised with Salter during the latter's first period at Aberystwyth was the Revd **William Hunt Painter** (1835-1910), born at Birmingham and Rector of Stirchley in Shropshire 1894-1909, and an important figure in Derbyshire, Staffordshire and Shropshire botany. He visited Cardiganshire on a number of occasions in the 1890s, had outings with Salter in 1903, 1904, 1905, 1906 and 1908, and worked especially on *Rubus* and on the bryophytes. He had a large herbarium, and many of his own collections are in **K** and **BM**. It was presumably his friendship with Salter that led him to give a large part of his collections to the University at Aberystwyth in 1909, the herbarium becoming known as the Painter Herbarium (**ABS**, see above). **Herbert William Pugsley** (1868-1947), an Admiralty civil servant and one of the great experts on critical groups of plants, visited Aberystwyth in June 1905, and besides noting *Drosera anglica*, *Dactylorhiza incarnata* and *Carex pallescens* new for the county (Pugsley 1906) looked at *Fumaria* and corresponded with Salter (Diary 12 & 18.10.1906). **Richard Francis Towndrow** (1845-1937), a Malvern grocer and active botanical recorder and collector, visited Aberystwyth in June 1906 and published a short note on the new and more interesting species he found (Towndrow 1907), including *Vulpia fasciculata*, *Trifolium ornithopodioides* and *Trisetum flavescens*. He too corresponded with Salter (Diary 24.2.1907). **Robert Braithwaite** (1824-1917), a Clapham physician and eminent bryologist, was credited with several records in Bennett *et al.* (1929) and in Druce (1932), but three of them, *Asperula cynanchica*, *Kickxia spuria* and *Epipactis palustris* were considered suspect by Salter (1935) and remain so, although the latter has since arrived. **William Charles Barton** (1874-1955), a schoolmaster and great expert on *Rubus*, collected the genus in the Llyfnant, Cwm Einion and elsewhere in the N of the county in 1923. **Francis Rilstone** (1881-1953), another schoolmaster *Rubus* expert, collected the genus in the Teifi valley in 1932.

**Charles Oldham** (1868-1942), who worked in an insurance company, lived chiefly in Hertfordshire and was a renowned ornithologist and conchologist, visited the south of the county several times in the 1920s and reported his finds to Salter (Diary 28.8.1924, 4.9.1924, 6.12.1924). Most notably he found *Melittis* in the woods in the Ceri valley, *Luronium* at Cors Caron and in Llyn Eiddwen and Llyn Fanod, *Ophrys apifera* and *Anacamptis pyramidalis* on the Penyrergyd dunes, and the latter and *Erodium moschatum* at Penbryn.

**John Arthur Webb** (1886-1991) was a Swansea schoolteacher who, from 1921 to 1956, collected specimens for **NMW** from all over Wales during his holidays and retirement. In collaboration with A. E. Wade he wrote drafts for several Welsh county Floras. He was closely involved with the Swansea Scientific and Field Naturalists' Society, and some of his Cardiganshire records were published in their *Proceedings*; he collected or recorded in the county in at least 1926, 1927 (during one of the Society's excursions to the Strata Florida area), 1930, 1939, 1948, 1951 and 1952.

**James Arden Whellan** (1915-1995) published an annotated list of species he recorded in south-west Wales in 1941, including c.150 species from the county (Whellan 1942). Most of his records were from the south-west of the county, but a few were from as far afield as Cors Fochno and Cors Caron, and he corresponded briefly with Salter about some of them. Specimens are at **NMW** and **K**. Among his notable first records were *Ranunculus tripartitus* from the coast between Aber-porth and Mwnt, *Avenula pubescens* from several coastal sites and *Viola reichenbachiana* in the Ceri valley. There are problems with some of his *Carex* records, discussed below under the relevant species, which he claimed had been checked by E. Nelmes. Whellan was a pest research entomologist based at Liverpool at this period, although he later worked in Southern Rhodesia, Malawi and Malaysia.



Charles Oldham (from *North western naturalist* 17: pl.3).



Many professional botanists had occasion to visit the county between the wars to work on taxonomic and ecological projects. C. E. Hubbard, the Kew grass expert, made a number of local records when visiting the WPBS. W. B. Turrill, another Kew botanist, and E. M. Marsden-Jones, who established the Potterne Experimental Station, visited on several occasions in the late 1920s and 1930s to collect material of Knapweeds and Bladder Campions that were used in their extensive experimental work on these groups, and descriptions of the populations in the county are included in their resulting publications (1954, 1957). Ecological work on the Dyfi salt marshes has been mentioned above, and in the late 1930s J. M. Lambert and M. R. Davies (1940) investigated the development of the sand dunes at Ynys-las. **Harry Godwin** (1901-1985) led two summer excursions from Cambridge in 1936 and 1937 to Cors Caron to investigate the surface ecology, the stratigraphy and the morphology of the raised bogs, choosing this site as it was a rare example relatively undisturbed by human activity. Some two dozen botanists took part, and two seminal papers resulted, Godwin & Mitchell (1938) and Godwin & Conway (1939); they demonstrated the nature of the regeneration complex, and found evidence for a general trend towards a drier, more continental climate. Godwin also worked on Cors Fochno, and was able to correlate the quaternary sequences there with those of the adjacent submerged forest (Godwin & Newton 1938, Godwin 1943). H. A. Hyde and A. E. Wade of the National Museum of Wales at Cardiff were among those taking part in the Cors Caron excursions, and both visited the county on other occasions and made occasional records. Both of course made immense contributions to our knowledge of the flora through their Museum publications, notably the various editions of *Welsh flowering plants*, *Welsh ferns* and *Welsh timber trees*.

### Later 20<sup>th</sup> century recording and research

For this recent period the account must of necessity be even more selective than for the earlier periods, but I hope it gives an indication of the range of recording and relevant research activity over the last half century.

After Salter, the best known naturalist in the county was **William Moreton Condry** (1918-1998). Born in Birmingham, and taking degrees in French, Latin and History at Birmingham, London and Aberystwyth, he began visiting the county by bicycle in the 1930s and moved to the area in 1946, living successively at Ponterwyd, Tal-y-bont, Glygyrog-ddu in Merioneth, Felin-y-cwm SN691948 in Cwm Einion and Ynys Edwin SN678962 on the Ynys-hir estate. He worked as a writer, a teacher and as an RSPB warden, and, although perhaps primarily an ornithologist, he was also a considerable botanist and ecologist, and his recording contributed extensively to our knowledge of the county's flora. His *Field notes* for the West Wales Field Society in the early 1950s are especially rewarding, and his *Natural history of Wales* (1981) and the autobiographical *Pathway to the wild* (1975) are among the most relevant of his many books. His records include *Crepis paludosa* from Cwm Einion. The 26 volumes of his natural history diaries are, like Salter's, now in NLW. His widow, Penny Condry, an equally observant and capable botanist, has also made many records including the first for the county of *Epilobium lanceolatum* in 1962 and of *Epipactis palustris* in 1964.

The local naturalists' trust, founded as the West Wales Field Society in 1946 and currently the **Wildlife Trust West and South Wales**, encouraged recording especially through its various newsletters,



Lin Gander and *Glebionis segetum*, Penparc sand quarry, view NW from SN204484, September 1993

annual reports and bulletins, and particularly through *Nature in Wales* which contained a regular section of plant records for much of its run. Its field meetings were often productive of records, and species lists exist for most of their reserves. Local officers, including L. R. Gander, D. K. Reed and L. Wilberforce have done valuable recording and monitoring. The Trust was involved in organising a Mid-Wales Metal Mines Survey in the early 1990s during which S. P. Chambers, J. A. Martin and R. J. Williams recorded at all the mine sites in the county, and found *Asplenium viride* new for the county at Esgair Fraith (Martin *et al.* 1994). The BSBI's Recorder is *de facto* the county plant recorder for the Trust.



Staff of successively the Nature Conservancy, Nature Conservancy Council and the **Countryside Council for Wales** have done a great deal of recording, and most of our knowledge of the habitats and plant communities in the county comes from their work. Both S. B. Evans and R. G. Woods worked in the county in the early 1970s, before moving to adjacent counties. D. Glyn Jones in the late 1970s and 1980s explored and recorded throughout much of the county, often in collaboration with me, and he and C. Fuller often brought in colleagues such as D. A. Wells who added to the records. They also had a large number of excellent site surveys done by R. M. Payne and N. R. Thomas. Comprehensive habitat surveys, sometimes commissioned from outside botanists, have been especially productive, including a survey of the whole coast in 1975 by A. Parker and C. W. Helliwell, a series of woodland surveys by R. Osborne in 1978, by R. J. Cooke and G. Saunders in 1988, and by A. D. Hale and R. Hughes in 1992, a survey of the management history of grassland SSSIs by J. P. Lyons and R. W. Jones in 1992, as well as ones of coastal heaths and of parts of the uplands. The field workers in the Phase I survey of the county, including P. Dalley, W. P. Taylor, A. Moorby, S. Morley, S. Andrews, A. Glaisher and especially M. D. Sutton in the south of the county, covered large areas of previously unbotanised country and contributed many good records. The Phase II lowland grassland survey under D. P. Stevens and T. H. Blackstock, besides employing P. Dalley, W. P. Taylor, D. K. Reed and M. D. Sutton, brought other good botanists into the county including J. P. Woodman, J. Turner, S. L. N. Smith, D. A. Guest and S. D. S. Bosanquet. This, and the subsequent Phase II lowland peatland survey under P. S. Jones and again involving D. K. Reed and S. D. S. Bosanquet as well as A. Turner among others, has resulted in a great influx of records and ecological information, with the rediscovery of *Gentianella campestris* and *Valeriana dioica* as particular highlights.



D. Glyn Jones, Derek Wells and *Vicia orobus*,  
Ty-mawr SN757789, June 1991



Nigel Holmes and Jon Turner,  
Lampeter, June 2005



Richard Lansdown in the Teifi explaining  
aquatics to an eager BSBI audience, June 2005

Other specialist recording projects included that of lakes in Wales by B. Seddon in 1961-1966 (Seddon 1964a, b, 1972). This covered ten of the county's lakes, and resulted, among many other records, in the finding of *Pilularia* in Llyn Gynon. The 1978 survey of the Afon Teifi and its tributaries by N. T. H. Holmes, and later surveys by him and others such as R. V. Lansdown and T. Pankhurst, drew attention to the exceptional interest of this catchment and produced first records of such species as *Rumex hydrolapathum* and *Scirpus sylvaticus*. N. F. Stewart has also visited on several occasions to survey aquatics. A survey of British Rail land in 1979 resulted in several records of *Poa angustifolia* new for the county (Sargent *et al.* 1986). Of outstanding interest was the Biological Survey of Common Land undertaken by the Rural Surveys Research Unit at Aberystwyth University, the recording for which in the county was done in the late 1980s chiefly by





Nick Stewart in Llyn Fanod, July 2007

sample recording scheme for the "00" 1km squares of Wales (the bottom left square in each hectad), as well as a concise Flora of Central Wales that was to comprise the whole of Cardiganshire, Montgomeryshire and Radnorshire as well as the north part of Breconshire; although neither came to fruition, both resulted in an increased interest in recording. R. G. Ellis, a native of Llanbadarn Fawr who read botany at Aberystwyth University, went to the National Museum of Wales at Cardiff in 1966. His most important work there was *Flowering plants of Wales* (Ellis 1983a), a vastly expanded new version of *Welsh flowering plants*. Whereas for the earlier work Hyde and Wade had largely relied on the resources of the Museum and its herbarium, and on their own knowledge, Ellis for his new work actively sought the cooperation of the BSBI's vice-county recorders, and indeed that of all active botanists in Wales, resident as well as visitors, and this was an immense stimulus to recording in this county as well



John Savidge, September 2009

I. S. Francis and N. Penford (Francis *et al.* 1990). It included detailed surveys, often with species lists, of the 126 commons that cover nearly 7% of the county.

Research on the quaternary, especially at Cors Caron, has continued, especially concerning the effects of Man's activities on the vegetation of the surrounding countryside. Apart from the work of Moore and Chater mentioned above, that of J. Turner of Cambridge University, of M. J. C. Walker and others at Lampeter University, and of P. D. M. Hughes and his colleagues at Southampton University has been of particular local relevance (see especially references in Walker & McCarroll 2001, and Hughes *et al.* 2007).

Much of the recording effort since the Second World War has been done under the auspices of the **BSBI**, whose Recorders for the county have been A. E. Wade 1949-1961, P. M. Benoit 1961-1973, J. P. Savidge who was the first resident Recorder 1974-1976, R. G. Ellis 1976-1977, and A. O. Chater since 1977. The records from the county for the first *Atlas* (Perring & Walters 1962), made in a rather piecemeal fashion by a combination of resident and visiting botanists, were coordinated by Wade. Benoit recorded chiefly in the Dyfi area, concentrating on Cors Fochno and Ynys-las. Savidge, apart from the work mentioned above, proposed in the mid-1960s a



Peter Benoit, May 2005



as in all the others. The published work provided far more accurate hectad maps than the 1962 *Atlas*, as well as a wealth of information on historic records. In connection with this project Ellis did much recording in the county, and over the years has also made many records around his native Llanbadarn Fawr.

The BSBI has organised numerous field meetings in the county, and these, along with references to published accounts of them, are listed at the end of this chapter. Special mention should be made of the week-



Ken Trewren and Clive Jermy, *Dryopteris affinis* morphotypes 'affinis', 'borreri', 'cambrensis', 'paleaceolobata' and 'robusta', roadside opposite Craig Golomenod SN73257202, August 2008



Clive Jermy, August 2003

long *Rubus* meeting based at Lampeter in July 1978, led by E. S. Eedes and A. Newton, which resulted in impressive coverage of much of the south of the county. Newton himself had made previous excursions to record *Rubus* in the county, especially in 1971 (Newton 1972), and for ten years from 1994 D. E. Allen visited me each summer to spend usually about a week recording the genus. J. Bevan made several visits in the 1990s to investigate *Hieracium*, R. Maskew has made many visits to record *Rosa*, A. C. Jermy has made many visits to study *Isoetes* and ferns, and many other specialists have made occasional visits. Otherwise my most regular botanical companions over the years in the field have included my parents E. H. and M. Chater, W. M. Condry, D. G. Jones, A. P. Fowles, D. Davies, J. P. Woodman, P. A. Smith, A. D. Hale, S. D. S. Bosanquet, M. D. Sutton, L. R. Gander, B. and G. Harrison and J. P. Poland. The list of those who have made records in the county in recent decades is long, but only S. P. Chambers has regularly submitted any quantity of records, and only M. D. Sutton has filled in more than the odd recording



Dafydd Davies, Llyn Du, view N from SN769611, July 1989



Mike Bailey and Adrian Fowles, Cors Fochno, March 1991

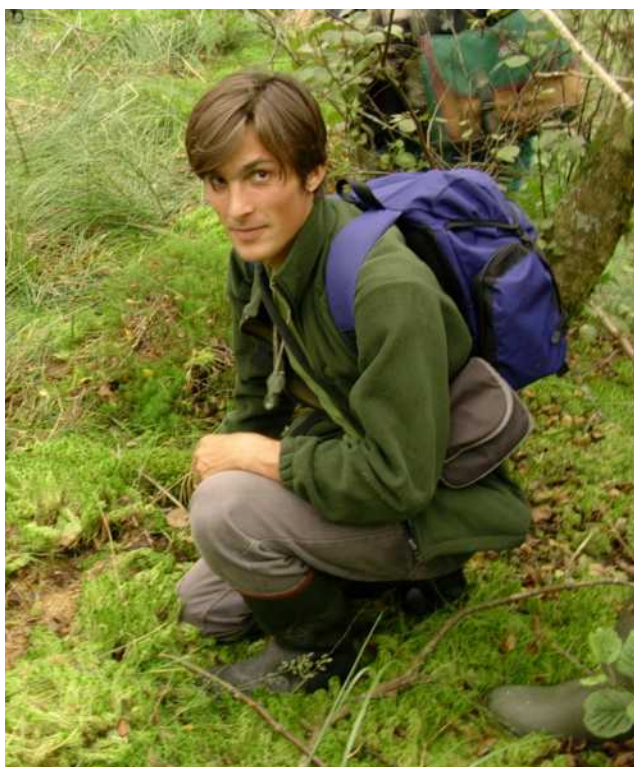


Matt Sutton, May 1999





Julian Woodman, Ty-mawr, Ysbyty Cynfyn,  
view E from SN75977919, August 2004



John Poland at Pont Einon on the Teifi,  
view S from SN671614, September 2006

Sam Bosanquet, August 2004

card. My own field work has been chiefly with a view to exploring as much of the county as possible, surveying particular sites and investigating infraspecific variation, critical groups, hybrids and introductions, rather than aiming at a complete tetrad recording coverage. Various projects sponsored by the BSBI have introduced an element of discipline into what I have done. These included the original Atlas Scheme 1954-1963, the Monitoring Scheme of 1987-1988, the Local Change Scheme of 2003-2004, Atlas 2000, Scarce Plants and the Threatened Plants Project.



(below) Paul Smith and Mila Teneva  
with *Galium aparine* 305cm tall,  
Rhos y Fforest SN618730, July 2007



(right) Dick Brummitt and Bill Condry,  
Ynys-hir, July 1996

(below) Andy Jones by the spring on the  
NW side of Pendinas SN58358084, May 2009



(above) Tim Rich, Ynys-las, May 2004

(left centre) Barbara and Geoff Harrison, April 2006

(left bottom) Justin Lyons and  
Annette Williamson, July 2006



(above) Trevor Dines, Pistyll y Llyn, August 1997

(right) Ray Woods, July 2009





(right above) Penny Condry, May 2000  
 (right) Chris Forster Brown, Rhyddnant, May 2004  
 (far right) Caroline Palmer, May 2009  
 (right below) Richard Pryce, July 2009





Field meetings by other societies have brought in a variety of experts, and those of the **British Pteridological Society** and the **Welsh Historic Gardens Trust** have been especially productive. In 2006 a local record centre, the **West Wales Biodiversity Information Centre**, covering Cardiganshire, Carmarthenshire and Pembrokeshire, was set up at Whitland, and has already organised several recording meetings in the county. If its aims are fulfilled, it will have a major impact on recording and the use of records here.

### BSBI field meetings

The references are to published accounts of the meetings which often provide a useful account of the areas concerned.

4-11.8.1956	Llandrindod Wells (and into SN76)	<i>Proc. BSBI</i> <b>2</b> : 416-418 (1957)
23-24.8.1958	Newcastle Emlyn	<i>Proc. BSBI</i> <b>3</b> : 463-464 (1960)
7.9.1963	Cors Fochno	<i>BSBI Welsh bull.</i> <b>1</b> : 10-11 (1964)
22.5.1966	Newcastle Emlyn	<i>BSBI Welsh bull.</i> <b>8</b> : 5 (1966)
25.9.1966	Aberystwyth area	<i>BSBI Welsh bull.</i> <b>9</b> : 7-8 (1966)
		<i>Proc. BSBI</i> <b>6</b> : 414-415 (1967)
22.4.1967	Upper Tywi	<i>BSBI Welsh bull.</i> <b>11</b> : 6 (1969)
2.9.1967	Dyfi estuary	<i>Proc. BSBI</i> <b>7</b> : 302 (1968)
8.9.1968	Bryn Bras and Cors Fochno	<i>BSBI Welsh bull.</i> <b>12</b> : 10 (1970)
30.8.1969	Camddwr valley, upper Tywi	<i>Watsonia</i> <b>8</b> : 188 (1970)
19.9.1971	Aberystwyth area	
21-24.7.1978	Lampeter and S of county ( <i>Rubus</i> )	<i>Watsonia</i> <b>13</b> : 85-86 (1980)
2.6.1979	Mwnt and Gwbert	<i>Watsonia</i> <b>13</b> : 254 (1981)
28.6.1981	Pumlumon	<i>Watsonia</i> <b>14</b> : 305 (1983)
31.7.1983	Llyfnant	<i>Watsonia</i> <b>15</b> : 299-300 (1985)
1.7.1984	Allt Rhyd-y-groes and Pysgotwr	
23.6.1985	Afon Soden	<i>BSBI news</i> <b>43</b> : 31 (1986)
19.7.1987	Ponterwyd	<i>BSBI news</i> <b>48</b> : 51 (1988)
17.7.1988	Talgarreg	<i>BSBI news</i> <b>52</b> : 44 (1989)



BSBI field meeting, Llyfnant, 31 July 1983



BSBI field meeting at Llyn Gynon, Gwynn Ellis, George Hutchinson, Nicky Penford (in boat), Ian Francis, Adrian Fowles, Dave Boyce, view E from SN795646, 15 July 1989

7.8.1988	Pumlumon	<i>BSBI news</i> <b>52</b> : 44 (1989)
15.7.1989	Llyn Gynon and Llyn Gorast	<i>BSBI news</i> <b>55</b> : 44-45 (1990)
14.7.1990	Ynys-las	<i>BSBI news</i> <b>58</b> : 54 (1991)
8.8.1992	Cors Caron	
14.8.1993	Mwnt	<i>BSBI news</i> <b>65</b> : 65-66 (1994)
30.7.1994	Lampeter and Llanfair Clydogau	<i>BSBI news</i> <b>69</b> : 69-70 (1995)
24.6.1995	Penyrergyd and Banc y Mwldan	<i>BSBI news</i> <b>71</b> : 61-62 (1996)
5.8.1995	Devil's Bridge	<i>BSBI news</i> <b>71</b> : 72 (1996)
10.8.1996	Teifi Pools	<i>BSBI news</i> <b>74</b> : 72 (1997)
12.7.1997	MoD Aber-porth	<i>BSBI news</i> <b>77</b> : 75 (1997)
15.8.1998	Esgair Fraith	<i>BSBI news</i> <b>82</b> : 64 (1999)
12.6.1999	Llangranog	<i>BSBI news</i> <b>83</b> : 58-59 (2000)
15.7.2000	Llyn Fanod and Llyn Eiddwen	<i>BSBI news</i> <b>86</b> : 75 (2001)
16.9.2000	Dyfi salt marshes	<i>BSBI news</i> <b>86</b> : 80 (2001)
14.7.2001	Cors Fochno	<i>BSBI news</i> <b>89</b> : 65 (2002)
13.7.2002	Cors Caron	<i>BSBI news</i> <b>92</b> : 59-60 (2003)
9.8.2003	MoD Aber-porth	<i>BSBI news</i> <b>95</b> : 77 (2004)
11.9.2004	Ynys-hir	<i>BSBI news</i> <b>98</b> : 69 (2005)
17-19.6.2005	Lampeter, Cors Caron, Teifi Pools	<i>BSBI news</i> <b>101</b> : 52-54 (2006)
5.8.2006	Llyn Gwngu	<i>BSBI news</i> <b>104</b> : 68 (2007)
5.4.2008	Allt Dderw, Gogerddan (conifers)	
5.7.2008	Penbryn	<i>BSBI news</i> <b>109</b> : 68-69 (2008)



### 3. Conservation

#### History of conservation

Although J. H. Salter took far-reaching practical steps towards the recovery and conservation of Red Kites in Wales, he did nothing comparable for plants. He occasionally noted the destruction of favourite sites in his Diary, for example the draining of the Clarach bog in 1941, but the only evidence of intervention is in his annual payment to the road man at Lovesgrove for not cutting the *Epipactis helleborine*. Formal conservation of sites in the county did not get under way until after his death, although some interest had been shown earlier in a few sites in the county. The Society for the Promotion of Nature Reserves included Cors Caron in its first list of nationally important sites as early as 1916, and in 1929 it listed Cors Fochno as the only site in south-west Wales proposed as a nature reserve; nothing came of these proposals at the time. Nothing came either of the listing of Pumlumon as a candidate in the Dower Report on National Parks in 1945.

In 1944 the Pembrokeshire Bird Protection Society under R. M. Lockley, who already had some control over Grassholm, Skomer and Skokholm, obtained a lease of Cardigan Island as its, and Cardiganshire's, first nature reserve. This Society was reconstituted into the West Wales Field Society the following year and became more involved with Cardiganshire affairs. Its proposal to set up a Nature Reserves Society for Wales was overtaken by the setting up of the Nature Conservancy's Committee for Wales in 1953. The Society became the **West Wales Naturalists Trust** in 1961, and in the 1960s set up several reserves in the county. Parts of Cors Fochno SN69 were purchased and leased in 1964 (to be sold on to the Nature Conservancy in 1973); Allt Crug Garn SN518617, a small area of mature heath, was leased in 1965; Rhos y Fforest SN617729, a small valley mire with *Hypericum undulatum*, was managed under an agreement formalised in 1966; Penderi SN552733, a fine windblown Oak wood and gullies on the sea cliffs, was purchased in 1966, and a further adjacent area was leased from 1977; and the Teifi Foreshore (later the Teifi Marshes) SN185455, covering much of the estuary, was leased in 1968. Further reserves were acquired in the 1970s, including the old estate woodlands of Coed Penglanowain SN610786 and Old Warren Hill SN613787 at Nanteos, the wooded dingle of Cwm Cletwr SN670920, the Pant Da plantation in Cwm Rheidol SN670788 with a view to returning it to Oak woodland, Rhos Glandenys SN538650 rhos pasture and perhaps most importantly the Rhos Glynrhelyg SN498514 rhos pasture and valley mire complex.



Penderi WTSWW Reserve, windblown Oak woods on cliff slopes,  
Penderi, view NNE from SN550732, May 1991



In the following decade reserves were established at the two natural lakes of Llyn Eiddwen SN606670 and Llyn Fanod SN604644, the upland blanket bog of Figyn Blaen Brefi SN717547, the neutral pastures of Caeau Llety-cybi SN603535, and the rhos pasture or valley mire sites of Rhos Pil-bach SN368529, Rhos Fullbrook SN667628 and Cors Gorsgoch SN482504, the wet heath at Comins Capel Betws SN615576, the disused railway cutting at Allt-fedw SN665730 and the extensive valley Oak woodland of Coed Simdde-lwyd in Cwm Rheidol SN720786. Coed Madie B. Goddard at Llechryd SN210437, a complex of pastures, woodland and stream gullies, and Cors Ian SN671695, an extensive valley mire, were acquired in 1990 and 1997 respectively. Meanwhile, further land was acquired by the Teifi



The enclosure at Rhos Pil-bach WTSWW Reserve, Lizzie Wilberforce, view SE from SN367529, June 2006

estuary, in both Ceredigion and Pembrokeshire, as the Teifi Marshes reserve, and, just inside the latter county, the Welsh Wildlife Centre was established. The trust successively became the West Wales Trust for Nature Conservation in 1984, the Dyfed Wildlife Trust, the Wildlife Trust West Wales, and most recently the **Wildlife Trust West and South Wales (WTSWW)**. Financial and other troubles in the 1990s curtailed the acquisition of new reserves, but the Trust seems now to be to some extent recovering. Management of most of its Ceredigion reserves under the successive Reserves Officers L. R. Gander, L. Wilberforce and E. Foot has however continued effectively, and, although these reserves were often acquired opportunistically, they reflect to a considerable extent the range of habitats in the county and include many of its best botanical sites.

As mentioned above, the **Nature Conservancy (NC)** set up its Committee for Wales in 1953, with M. C. F. Proctor as the Regional Officer for Wales. An office with a Regional Officer for South Wales, P. Walters Davies, was established in 1957 in the Zoology Department at Swansea university, and in 1966 at the urging of Prof. P. F. Wareing an office was established in the Inland Revenue premises in Terrace Road, Aberystwyth; this, with the agreement and encouragement of Prof. P. T. Thomas, moved to the WPBS at Gogerddan the following year. The next Regional Officer whose responsibilities included the county was R. P. Bray (who had been Deputy Regional officer since 1970) from 1973 until 1991. He was followed by C. Fuller (who had been Deputy Regional Officer since 1976) on the formation of the Countryside Council for Wales (see below) in 1991 until 1995, covering Dyfed-Powys, and who then became Area Officer for West Wales until 2000. P. Panting was appointed as Warden/Naturalist and, after working on Skomer, was based at Tregaron from the late 1950s. P. E. Davis was Assistant Regional Officer for Cardiganshire c.1970-1975, during which period he was helped locally on botanical matters by R. G. Woods and S. B. Evans. D. Glyn Jones then held the post from 1975 until 1993, when the post was split and S. Byrne became District Officer for South Ceredigion and K. Heppingstall for North Ceredigion. Shortly after this the present District Team was set up and now consists of S. Byrne, K. Heppingstall, J. Turner, J. Higgins and C. Sertorio.

Prior to 1957, scheduling of SSSIs in Wales was done from the NC office in London by V. Conway, who had worked with H. Godwin in the 1930s on Cors Caron. The raised bogs and associated areas of Cors Caron were notified as a Site of Special Scientific Interest (SSSI) in 1954, established as a National Nature Reserve (NNR) by agreement in 1955, and purchased in 1978. The Dyfi estuary was the other main focus of attention. Cors Fochno had been the subject of an Allotment Award in 1847, and problems of disputed and unknown ownership, common land rights, agricultural interests especially in the form of attempts at reclamation for Potato growing, and wildfowling, resulted in an immense amount of work both for NC staff and members of the Wildlife Trust, and for many years the bog was the main battleground for conservation in the county. The raised bog was notified as an SSSI in 1954, and most of it was declared a National Nature Reserve in 1972. Some of the plots were the subject of the first ever compulsory purchase order for an NNR, justified on scientific grounds and because no owners could be traced. Other areas including further parts of the raised bog, the Ynys-las dunes, the salt marshes and the Aberleri Fields were thereafter gradually acquired as component parts of the Dyfi NNR. The Ramsar Convention in 1977 listed the Dyfi estuary, including Cors Fochno, as one of thirteen wetlands of outstanding international importance in Britain, and in 2009 the Dyfi



D. A. Wells (deciding whether to recommend the site as a NNR), W. M. Condry, D. Glyn Jones, D. R. Saunders, S. Hill, Rhos Llawr-cwrt, July 1982

dingie; and Creigiau Aberarth - Morfa, sea cliffs of primarily geomorphological interest. Cardigan Island was notified in 1970, and the bog and fen areas at Ynys Eidiol adjacent to Cors Fochno in 1971 (grid references are given at the end of this chapter).

After extensive survey work in the late 1970s, notification started again in 1979 by D. Glyn Jones under R. P. Bray and later C. Fuller, and between 1979 and 1989 a total of 73 sites were notified. The most important group of these from the botanical point of view was the rhos pasture and valley mire sites such as Cae Ffos-yr-odyn, Cors Caranod, the Nant Cledlyn pingos, Rhos Bwlch-y-rhandir, Rhos Cilcennin, Rhos Esgairwen Fawr a Rhosgoch-fawr, Rhos Gellie, Rhos Glwydwern, Rhos Glyn-yr-helyg, Rhos Llawr-cwrt, Rhos Pil-bach a Pennar-fawr and Rhos Talglas. Rhos Bwlch-y-rhandir is also noteworthy as having the first SSSI management agreement in the county, negotiated in 1978; it was the subject of a seminal article in the *Farmers guardian* 16 April 1982 on "Conservation - partnerships in management", and was the first (and still one of the few) SSSI whose owner was provided with an illustrated site dossier, prepared by A. P. Fowles, which is still proudly shown to visitors. Individual SSSIs of exceptional botanical interest included the calcareous fens and flushes of Banc y Mwldan, the neutral pastures of Caeau Llety-Cybi, the Cwmsymlog lead mine and Hen Berth Fron-badarn a Phersondy, the first hedge SSSI in Wales. Rhos Llawr-cwrt was declared a NNR in 1986. In the same period further extensive upland areas were added, including Pumlumon, Pencarreg-gopa a Moel Hyrddod, Pencreigiau'r Llan, Llnoedd Ieuan and Bryn Bras, and some of the best ancient woodland sites in the county including Coed Allt Craig Arth, Coed Cwm Cletwr and Coedydd a Chorsydd Aber Teifi. Since 1979, a further 27 sites have been notified, mostly following the same pattern but including many river shingle sites on the Rheidol and Ystwyth, primarily of invertebrate importance but sometimes of considerable interest to the botanist, and more lead mines. The chief rhos and valley mire site to have been added was Rhos Talglas, and the upland hay meadows and pastures of Cae'r-meirch are the best remaining in the county. The exceptional series of weed-rich arable fields along the coast in the SW of the county, Caeau Crug Bychan, Tŷ Gwyn a Llwyn Ysgaw has recently added a new habitat to the SSSI schedule in the county. Two very extensive linear SSSIs have been created, both incorporating several previously notified sites, and both connected with Special Area for Conservation (SAC) designations. One covers the whole coast from Aber-arth to the Teifi. The other covers the Afon Teifi all the way from the estuary up to the Teifi Pools, as well as parts of eight of its tributaries in the county.



The Ty-gwyn arable fields SSSI from Foel y Mwnt, *Armeria* in flower, view E from SN193520, June 1996

Valley was declared as the first UNESCO Biosphere Reserve in Wales.

The other SSSIs in the first round of notification in 1954 were, apart from two geological ones, the extensive upland areas of Elenydd and Cwm Doethie (for primarily ornithological reasons); Coed Rheidol, the best known ancient woodland site in the county, which became a NNR in 1956; Cwm Llyfnant, by then a rather fragmentary ancient woodland; Figyn Blaen Brefi, an upland blanket bog of considerable ecological but little floristic interest; Llyn Fanod, one of the less oligotrophic lakes; and Maes Goleu, a nearby transition mire. The next sites were notified in 1967: Llyn Eiddwen, along with Llyn Fanod botanically one of the two best lakes in the county; Coed Nant Llwllyn, a wooded



The NC had become the Nature Conservancy Council (NCC) in 1973, and in 1991 the **Countryside Council for Wales** (CCW) was formed out of the NCC and the Countryside Commission, and moved into a purpose-built building at Plas Gogerddan. Among its many duties, it has been involved at various periods with agri-environment schemes such as the Habitat Scheme, Tir Cymen, Tir Gofal etc. These are beginning to have a noticeable effect on the general vegetation of many areas, particularly where Sheep-grazing has been reduced in the uplands, but there has to date been no comprehensive and available monitoring of any changes, and the schemes offer no permanent protection. They are no substitute for SSSIs and nature reserves (though the permanence of even these seems often in doubt).

At the end of 2008 there were 99 SSSIs covering 19,118.17ha, that is 10.62% of the total area of the Vice-county (the figure for Wales as a whole was 12%). In the late 1990s, c.84% of the native species of the county occurred in SSSIs and NNRs; this was about the same as the percentages in Radnorshire and Brecknock (R. G. Woods pers. comm.). It is probably a good deal higher now since the Teifi and coastal SSSIs have been added. So far as habitats are concerned, the coverage is fairly good, but there are still substantial areas of lowland semi-natural grassland and valley mire, several areas of ancient woodland, one or two lead mines and a good deal of the best upland moorland that still lack, but certainly merit, formal protection of any permanent kind.

The idea of a **County Rare Plant Register** was first suggested by D. Glyn Jones to me in 1978 as a convenient way of keeping track of the fortunes of the rarer species in the vice-county and as an aid in assessing the local significance of the sites we were surveying and attempting to conserve. The Register originally consisted of a documented list of all the species that occurred in three or fewer sites in the county, but as a result of discussions with R. G. Woods, NCC in Radnorshire, and S. B. Evans, NCC in Pembrokeshire, who were considering producing similar lists, those national rarities (species occurring in 100 or fewer hectads in Britain) not originally included were added. The first complete draft was compiled in January 1979, largely from my VC Recorder's files and with contributions from J. P. Savidge. Improvements were made to succeeding editions, especially resulting from the interest shown in the Register by D. A. Wells who refined some of the procedures and encouraged the production of similar lists in other vice-counties. In 1983 the Register was computerised at the UCW Aberystwyth by A. D. Fox, who also extensively added to and updated the Register and its associated rare species proformas. A. P. Fowles was similarly involved in the revisions and in the considerable improvements to the format and contents after 1985. For the 1995 edition the format was completely revised in consultation with A. D. Hale of CCW, who has carried out the data entry, sorting and production of all the later editions, now using Excel 2000 and distributed by CCW; the Register has also been put into the Mapinfo GIS and into Google Earth. Because of the exigencies of writing this Flora, the Register has not been updated since 2001 (Chater 2001a).

The **Forestry Commission** (FC) in the 1950s and 1960s in particular did an immense amount of damage to many habitats in the county, especially in the uplands, by insensitive draining and planting, often in defiance of objections by conservation organisations. The operations of the Economic Forestry Group (EFG), later Fountain Forestry, were often equally damaging, although on a smaller scale. Both organisations were sometimes guilty of planting where harvesting later proved uneconomic or even impossible, for example by the FC up the Nant Gau at Hafod, or by the EFG in the Llyfnant, so the damage cannot even now be undone; ironically, it was often these particular plantings that most upset conservationists. By the 1980s, when because of foreign imports timber production in



R. N. Thompson with *Populus nigra* subsp. *betulifolia* cuttings from Tan-llan at the FC office, Llanafan SN684719, May 1995



Britain was becoming increasingly uneconomic, the FC became progressively more concerned with amenity and conservation and the publicly acceptable management of its land. A “broadleaved policy” had been introduced in 1970, under which native woodland was not to be converted to conifers, and this applied to private woodlands after 1985.

Through the FC’s commercial wing, **Forest Enterprise** (FE), conservation became a major preoccupation, especially under its District Manager A. Dauncey who in 1992 set up one of their Forest District Environment Panels for Ceredigion. R. N. Thompson was appointed as a conservation officer shortly after, followed by M. Bromley in 1997, and during the next decade or so FE became a very effective force for conservation in the county. As they owned the land and had the workforce and funds, they were able to repair a good deal of the damage done in earlier decades by creating riparian zones free of conifers, removing ill-planted trees from bogs and other sensitive sites, and encouraging natural regeneration of native trees in felled conifer plantations. Good examples of riparian zones so created can be seen from the A44(T) on the slope across the Afon Tarenig SE of Eisteddfa Gurig c.SN8182, and the natural regeneration at Lodge Park SN665938 is equally conspicuous. Natural regeneration of conifers where forests have been felled has been encouraged in many sites, by timing the felling to coincide with fruiting, and a few sites are being allowed to develop to biological maturity with no intervention, fallen trees being left and natural regeneration allowed so that much more diverse canopy, shrub and ground layers are able to develop. Examples of the latter are at Coed Tyn-y-pwll, Cwm Einion SN686946, S of Llyn Berwyn SN741564 and around the bog 1km W of Blaendoethie SN733540.

Other forestry-related initiatives include **Coed Cymru**, launched in 1984, which acts largely as a referral agency, helping landowners of broadleaved woodland to seek advice on woodland management; by making such woodland profitable it has had a positive effect on the state of largely native woods. **Tir Coed**, established in 1999, involves local communities in woodland management and conservation; it has been especially active in the Ystwyth valley which also had its own **Ystwyth Valley Forest Initiative**. The **Tywi Wildwood** project was started in 2007 and involves a large area between Pontrhydfendigaid and the upper Tywi. Its aims include the restoration of ancient woodland and of upland bog and heath, as well as the creation of wet woodland and other habitats, with conifer plantations for timber as a secondary objective.

Various national charities have contributed in many important ways to plant conservation in the county. The **RSPB** owns the Ynys-hir reserve SN682963, which includes besides the woods, bogs salt marshes and other wetlands by the Dyfi, the Foel Fawr hillside SN692955 and ancient woodland in the Llyfnant SN720974. The **National Trust** (NT) properties include some of the best botanical coastal sites, notably at Caerllan SN357578, Lochtyn SN313552, Penbryn SN292524 and Mwnt SN193520, the very rich upland site at Bryn Bras SN745799, and the lowland Llanerchaeron estate SN480601. The **Woodland Trust** has acquired a series of sites, including the ancient woodland of Coed Allt Cefn Maesllan SN426581, the interesting secondary woodland of Coed Tyddyn Du SN271425 and the largely unwooded Gwaun Garthenor SN635557. **Plantlife** has been active in the county chiefly in connection with a site at Pendinas, Aberystwyth, where *Dianthus armeria* was known in the 1950s and recent attempts have been made to resurrect it from any seed bank that may survive by clearing and scarifying Gorse scrub; their local members have also taken part in various national surveys.

The **Ceredigion County Council** manages two Local Nature Reserves at Aberystwyth. Parc Natur Penglais SN587821-592821 consists of disused quarries and estate woodland. Pendinas & Tan-y-bwlch SN579806-588799 consists of shingle beach, estuary and salt marsh, hay meadow, scrub and pasture. Among various other sites it contributes to the sympathetic management of is the Welsh Water property of the Llanina Woods SN405597. The Council is involved with several Local Biodiversity Action Plans (LBAPs), and is lead partner for the Action Plan for roadside verges; as a result 24 stretches are now being more favourably managed. It is also involved in the selection and protection of Sites of Importance for Nature Conservation (SINCs), and when this process is in working order it should become a major component of the broad-brush



NT property, Mwnt, view NE  
from SN190517, August 2006



Parc Natur Penglais notice,  
Aberystwyth SN58778183, March 2006

conservation approach. Unfortunately, funding problems mean that the Council has been unable to contribute as much as it would like so far.

Several smaller bodies have had a considerable botanical impact in their own patches, for example the **Conservation Group at the MoD site, Aber-porth**, which was founded in 1981 and which has produced a site dossier containing a vast amount of botanical survey and other data (Edwards 2003), and the **Greener Aberystwyth Group (GAG)**, started in 2005, which is actively promoting the conservation and better management of the town's green spaces and street trees.

The local initiative that has had the greatest influence on conservation nationally as well as locally has been the **Shared Earth Trust**. In 1984 N. and B. C. Taylor, bought the 16ha Denmark Farm near Betws Bledrws SN586536, a very ordinary farm at 200m altitude where, during the preceding decade or so, conventional government-sponsored drainage, reseeding and tree-clearance had only partially succeeded in making it agriculturally viable, whilst at the same time largely destroying its wildlife interest. The Taylors determined to convert it into a nature reserve, to set up a conservation education centre there, to make it a site for research and monitoring of conservation methods, and to use it as a demonstration site for farmers and other landowners.



Pendinas and Tan-y-bwlch Local Nature Reserve notice, Aberystwyth, SN581804



Llanina Woods notice, SN405597



Barbara and Neil Taylor, 1995 (courtesy of Shared Earth Trust)



The Trust was established in 1987, and with support from almost all the major conservation bodies these objectives were met with remarkable rapidity. By sympathetic but largely non-interventionist management, including appropriate grazing, the breaking of drains, no use of “wild flower” seed or other introductions, hay-cutting but no mowing of rushes or spraying of docks or other uses of chemicals or fertilisers, and the construction of scrapes, the farm became not just an oasis of diversity in a largely depleted landscape, but more importantly a demonstration of what can be done in the wider landscape. Plant species in permanent quadrats in several of the enclosures doubled in five years, and birds, small mammals and insects equally thrived. In its heyday in the late 1990s, 39 primary schools in the area were sending their children there on a regular basis, and the long-term influence of this on the attitudes of future farmers will have been considerable. Imaginative seminars were held not only for obvious groups such as farmers, smallholders, National Trust wardens or Environment Agency staff, but also for others who have an indirect but nevertheless powerful influence on how their clients treat the environment such as bank managers, accountants and ministers of religion. Between 1996 and 2002 alone, people responsible for the management of over 400,000ha of the British countryside attended Denmark Farm. Since the departure of the Taylors in 2002, courses have continued, over a hundred local landowners have been involved in the Trust’s Ceredigion Biodiversity Enhancement Scheme, and the site remains as a reserve of considerable botanical interest with an exceptional record of detailed monitoring carried out by R. J. Williams and others. The progress of the Trust can be followed in its *Newsletter* from 1987 onwards and deserves to be written up in full.

Among many private initiatives the development of a nature reserve, occasionally open to the public, at **Winllan**, Talsarn SN567574 by I. W. and K. Callan (Callan 2003) is outstanding; over a period of 30 years their 1.6ha hay meadow, by dint of retaining regular traditional management, has developed into the best and richest in species in the county (see habitats chapter), and has now been given SSSI status.

A list of the 340 or so species comprising the county’s **axiophytes** can be found on the BSBI web site. These are species that may be considered important for conservation as they are characteristic of “good” habitats; they can be used in various ways to assess the interest or importance of particular sites.

Although there are now many examples of national and local organisations bridging conservation, amenity and local communities, all helping the cause, the outlook for science-based conservation itself is uncertain. While, for example, the increasing concentration on practical conservation and amenity by FC has done nothing but good for the land that it owns, the corresponding increased concentration on public amenity by CCW has at times seriously undermined science-based conservation. CCW alone among conservation bodies is, or was, in a position to work properly on the scientific aspects with government funding, but it seems no longer to be the independent adviser to the government that it was set up to be. As priorities are constantly changing, the situation may improve again, but long-term stability of conservation policies worked out and monitored by experienced scientists is what is really needed.

The permanent security of a network of representative key sites as nature reserves of some sort throughout the countryside is essential if biodiversity is to be conserved, as agri-environment and other generalised conservation schemes will have little chance of success without the reservoirs of species and genetic diversity surviving in these sites for them to draw on. The species that have naturally recolonised such sites as Denmark Farm and the Winllan hay meadow must have been available somewhere within seed-dispersal reach, but this is increasingly no longer the case.

As mentioned in the introduction to the chapter on habitats, only a minute fraction of the county is unmanaged by Man. Farmers and foresters have an understandable vested interest in managing the land. Conservationists are less understandably addicted to it and have a horror of letting nature have its own way, convinced that they know best what plant communities should be in any given site and fearful that with lack of management the biodiversity will decline and the habitats “degrade”. There is surely though room for leaving at least a few areas unmanaged, especially in the uplands, and recent proposals under CCW’s auspices to have just one substantial part of Pumlumon fenced off and ungrazed, allowing for unregulated plant succession and habitat evolution, are to be welcomed.



Ian (left) and Kathryn (right) Callan and visitors,  
Winllan hay meadow SN566572, July 2001

Sites that do not fit the normal criteria for conservation designation may still be of great botanical interest, and it may be argued that among the most valuable sites in the county are those that have been the subject of repeatable genetic and other research such as some of the lead mines with populations of metallophytes, and the sites with hybrid populations such as those of Marsh Orchids. Coastal sites containing variants with an Atlantic distribution are of particular importance, and Cardiganshire is among those areas of the Atlantic fringe having a responsibility in a national and even international context to investigate them further and conserve their genetic diversity.

### **Lists of formally conserved sites**

Grid references are of central points, except for linear or very large sites where the extremities are usually given. Dates are of notification, declaration or acquisition, unless otherwise stated.

### **Sites of Special Scientific Interest (SSSIs)**

This listing includes geological SSSIs, as these usually have at least some botanical interest. Sites now subsumed into others or denotified are retained in the list for interest, and given in *italics*. Where SSSIs extend into other counties, only the areas and grid references of the limits in VC 46 are given. A few historical acreages have not been traced. **SSSI (and NNR) status does not confer any public right of access.**

Aberarth - Carreg Wylan SSSI (part), SN479641-160485, 2002 (incl. part of Afon Teifi SSSI, and all of *Craig yr Adar SSSI*, *Cwm Byrlip a Creigiau Castell-bach SSSI*, *Creigiau Penbryn SSSI*, *RAE Aberporth Cliffs SSSI*, *Creigiau Mwnt SSSI*, *Creigiau Traeth y Mwnt SSSI* and *Pen yr Ergyd SSSI*), 802.02ha in VC 46  
Afon Rheidol ger Capel Bangor SSSI, SN653798, SN670783, SN684790, 1996, 82.48ha  
Afon Teifi SSSI (part), SN785675-158502, 1997 (incl. parts of Elenydd SSSI, *Cors Caron SSSI*, *Coedydd a Chorsydd Aberteifi SSSI* and *Pen yr Ergyd SSSI*, and all of *Netpool Wood SSSI*; part now in Aberarth - Carreg Wylan SSSI), 462.14ha in VC 46  
Allt Wen a Traeth Tanybwlech SSSI, SN572788-579807, 1954, 1982, 1989, 36.36ha  
Banc Llety-Spence SSSI, SN701833, 1986, 17.78ha  
Banc y Mwldan SSSI, SN198486, 1987, 20.15ha  
Banc-y-warren SSSI, SN205484, SN204475, 1990, 6.63ha  
Borth - Clarach SSSI, SN607889-586840, 2002 (incl. *Creigiau Glan-y-mor SSSI*), 86.12ha  
Bron Aberanerch SSSI, SN396459, 1988, 2.15ha  
Bryn Bras SSSI, SN744796, 1979, 74.54ha  
Cae Ffos-yr-odyn SSSI, SN626635, 1979, 0.61ha  
*Cae Heslop SSSI*, SN319414, 1985 (now in Old Cilgwyn and Cae Heslop SSSI), 2.2ha  
Cae Tŷ-hen SSSI, SN641893, 1979, 2.32ha  
Cae'r-meirch SSSI, SN753736, 1994, 85.55ha  
Caeau Ardwyn SSSI, SN491503, SN493503, 1988, 5.54ha  
Caeau Crug Bychan, Tŷ Gwyn a Llwyn Ysgaw SSSI, SN175515, SN197521, SN215521, 2004, 20.14ha  
Caeau Llety-Cybi SSSI, SN603535, 1981, 3.23ha  
*Cardigan Island SSSI*, SN160516, 1970 (denotified, but now in Aberarth - Carreg Wylan SSSI), 15ha  
Chwarel Ponterwyd SSSI, SN740808, 1992, 0.55ha  
Coed a Gweunydd Gilfach Gwyddil SSSI, SN616615, 1995, 11.76ha  
Coed Allt Craig Arth SSSI, SN495625, 1979, 56.58ha  
Coed Allt Lan-las SSSI, SN479605, 1979, 10.57ha  
Coed Cwm Cletwr SSSI, SN670919, 1979, 22.98ha  
Coed Cwm Einion SSSI, SN691947, 1998, 21.01ha  
Coed Mynachlog-fawr SSSI, SN744655, SN747649, 1982, 17.14ha  
Coed Nant Llwlwyn SSSI, SN588770, 1967, 5.52ha  
Coed Tyddyn-du SSSI, SN272426, 1981, 18.75ha  
Coed y Crychyd SSSI, SN640743, 1979, 9.98ha  
Coedydd a Cheunant Rheidol, SN748807-748765, SN737772-710782, SN717786, 1954, 1979, 1985, 1990, 229.19ha  
Coedydd a Chorsydd Aber Teifi SSSI, SN183458-212434, 1979, 1983, 1990 (part now in Afon Teifi SSSI), 45.08ha  
Comin Esgairmaen SSSI, SN652648, 1988, 23.50ha  
Comin Silian SSSI, SN565517, 1995, 39.11ha



Comins Capel Betws SSSI, SN617574, 1982, 14.17ha  
 Cors Afon Ddu SSSI, SN668942, 1988 (now in Dyfi SSSI), 2ha  
 Cors Bwlch-y-baedd SSSI, SN710700, 1979, 29.76ha  
 Cors Caranod SSSI, SN565647, 1979, 46.29ha  
 Cors Caron SSSI, SN690640, 1954, 1982, 1984, 1990 (part now in Afon Teifi SSSI), 804.91ha  
 Cors Fochno SSSI, SN630910, 1954 (now in Dyfi SSSI)  
 Cors Gorsgoch SSSI, SN482504, 1981, 26.52ha  
 Cors Llyn Farch a Llyn Fanod SSSI, SN599638, 1954, 1967, 1979 (incl. *Llyn Fanod SSSI*, *Maes Goleu SSSI*), 68.04ha  
 Cors Nantcwnlle SSSI, SN575599, 2000, 37.76ha  
 Cors Penbwlch SSSI, SN683686, 1979, 14.20ha  
 Cors y Sychnant SSSI, SN697691, 1979, 21.74ha  
*Craigyfulfran SSSI*, SN582828, 1954 (now in *Craigyfulfran & Clarach SSSI*)  
*Craigyfulfran & Clarach SSSI*, SN585834, 1954, 1988 (incl. *Craigyfulfran SSSI*), 24.70ha  
*Craigypistyll SSSI*, SN714857, 1979, 14.93ha  
*Craig yr Adar SSSI*, SN376599, 1979 (now in Aberarth - Carreg Wylan SSSI), 17ha  
 Creigiau Aberarth-Morfa SSSI, SN491649, 1967, 19.60ha  
 Creigiau Cwm-ceirw a Ffos-las (Morfa Bychan) SSSI, SN560763, 1989, 31.77ha  
*Creigiau Glan-y-mor SSSI*, SN585843, 1988 (now in Borth - Clarach SSSI), 2.8ha  
*Creigiau Mwnt SSSI*, SN200522, 1981 (now in Aberarth - Carreg Wylan SSSI), 4ha  
*Creigiau Penbryn SSSI*, SN286520, 1979 (now in Aberarth - Carreg Wylan SSSI), 22ha  
 Creigiau Pen-y-graig SSSI, SN552734, 1979, 1981, 22.98ha  
*Creigiau Traeth y Mwnt SSSI*, SN194519, 1989 (now in Aberarth - Carreg Wylan SSSI), 1.5ha  
*Cwm Byrllip a Chreigiau Castell Bach SSSI*, SN366578, 1988 (now in Aberarth - Carreg Wylan SSSI), 30ha  
 Cwm Doethie - Mynydd Mallaen SSSI (part), SN783576-777467, 1954, 1985, 2,686.06ha in VC 46  
 Cwm Llyfnant SSSI, SN719973, 1954, 1987, 77.32ha  
 Cwmsymlog SSSI, SN700837, 1988, 4.17ha  
*Dolau Hafod SSSI*, SN577579, 1985 (now in *Dolau Hafod a Winllan SSSI*), 4.65ha  
 Dolau Hafod a Winllan SSSI, SN566572, SN575579, SN576578, 1985, 2009 (incl. *Dolau Hafod SSSI*) 15.50ha  
 Dyfi SSSI (part), SN608949-618895-695977, 1954, 1979, 1985, 1989, 1995 (incl. *Cors Fochno SSSI*, *Ynys Eidiol - Ynys-hir SSSI*, *Cors Afon Ddu SSSI*, *Hen Afon Leri SSSI*), 2,589.08ha in VC 46  
 Elenydd SSSI (part), SN803772-809636, 1954, 1959, 1971, 1978, 1979, 1986, 1992 (part now in Afon Teifi SSSI), 7,337.47ha in VC 46  
*Falcondale Lake SSSI*, SN570499, 1981, 6ha (denotified 2006)  
 Ffordd Coed Dol-fawr SSSI, SN706794, 1989, 2.08ha  
 Figyn Blaen-brefi SSSI, SN717547, 1954, 38.92ha  
 Glanfedw SSSI, SN732759, 2002, 3.22ha  
 Glanrhocca SSSI, SN628543, 1998, 11.51ha  
 Gro Ty'n yr Helyg SSSI, SN595765, 2000, 1.92ha  
 Gro Ystwyth SSSI, SN650745, SN677715, SN685713, SN694717-724722, SN749728, SN763730, 1999, 59.06ha  
 Gwaun Garthenor a Llanio-isaf SSSI, SN636557, 1987, 18.66ha  
 Gwaun Pen-lan SSSI, SN204434, 1981, 1.85ha  
 Gwaun Troed-rhiw Seiri a Llyn Mynydd-gorddu SSSI, SN673859, 1982, 1986, 1988, 10.86ha  
 Gwaun Ystrad Caron SSSI, SN670594, 1981, 8.40ha  
 Gweunydd Pendinas SSSI, SN586807, 1981, 6.89ha  
*Hen Afon Leri SSSI*, SN608920, 1979 (now in Dyfi SSSI), 7ha  
 Hen Berth Fron-Badarn a Phersondy SSSI, SN632603, 1979, 220m length, 0.23ha  
 Llyn Eiddwen SSSI, SN607674, 1967, 1979, 118.74ha  
*Llyn Fanod SSSI*, SN603643, 1954 (now in Cors Llyn Farch a Llyn Fanod SSSI)  
 Llynoedd Ieuan SSSI, SN798810, 1979, 172.17ha  
*Maes Goleu SSSI*, SN596634, 1954 (now in Cors Llyn Farch a Llyn Fanod SSSI)  
 Mwyngloddfa Brynrafr SSSI, SN745879, 2002, 1.35ha  
 Mwyngloddfa Castell SSSI, SN773812, 1993, 4.05ha  
 Mwyngloddfa Cwmbrwyno SSSI, SN713805, 1998, 3.16ha  
 Mwyngloddfa Cwmystwyth SSSI, SN803746, 2000, 14.11ha

Mwyngloddfa Darren SSSI, SN680832, 2009, 5.60ha.  
 Mwyngloddfa Erglodd SSSI, SN657903, 2009, 2.95ha.  
 Mwyngloddfa Frongoch SSSI, SN723742, 2009, 0.24ha.  
 Mwyngloddfa Llechweddhelyg SSSI, SN683848, 2002, 0.25ha  
 Mwyngloddfa Llety Ifan Hen (Vaughan Mine) SSSI, SN694849, 1992, 1.21ha  
 Mwyngloddfa Nant-y-cagl (Eaglebrook Mine) SSSI, SN735892, 1992, 7.64ha  
 Nant Cledlyn Pingos SSSI, SN466477, SN472482, SN475481, 1983, 59.64ha  
*Netpool Wood SSSI*, SN170461, 1988 (now in Afon Teifi SSSI), 0.65ha  
 Old Cilgwyn and Cae Heslop SSSI, SN317414, 1993 (incl. *Cae Heslop SSSI*), 24.03ha  
 Parc-y-rhos SSSI, SN498495, 1979, 1.28ha  
 Parc Pont-faen SSSI, SN496592, 1979, 4.99ha  
 Pencarreg-gopa a Moel Hyrddod SSSI, SN714953, 1982, 199.53ha  
 Pencreigiau'r Llan SSSI, SN745945, 1988, 1989, 233.58ha  
*Pen yr Ergyd SSSI*, SN165488, 1981 (now in Aberarth - Carreg Wylan SSSI), 44.5ha  
 Pumlumon SSSI (part), SN818914-771848, 1979, 1983, 1984, 1986, 1,596.21ha in VC 46  
*RAE Aberporth Cliffs SSSI*, SN244526, 1982, 1986 (now in Aberarth - Carreg Wylan SSSI), 67.1ha  
 Rheidol Shingles and Backwaters SSSI, SN605804, SN617807, 1983, 1994, 63.25ha  
 Rhos Blaen Carrog SSSI, SN576725, SN575723, 1982, 1988, 1.79ha  
 Rhos Blaenclettwr SSSI, SN445529, 1989, 14.55ha  
 Rhos Bron-yr-helem SSSI, SN622572, 1987, 17.72ha  
 Rhos Bryn Hir SSSI, SN619579, 1989, 4.98ha  
 Rhos Bryn-wichell SSSI, SN618649, 1981, 3.96ha  
 Rhos Bwlch-y-rhandir SSSI, SN593733, 1979, 4.78ha  
 Rhos Cilcennin SSSI, SN527620, 1988, 17.89ha  
 Rhos Cross Inn SSSI, SN620732, SN618729, 1980, 1983, 1991, 2.21ha  
 Rhos Cwmsaeson SSSI, SN461586, 1987, 10.90ha  
 Rhos Esgairwen-fawr a Rhosgoch-fawr SSSI, SN452535, SN452537, SN455536, 1981, 14.21ha  
 Rhos Fullbrook SSSI, SN666628, 1981, 2.17ha  
 Rhos Gargoed SSSI, SN758668, 1981, 3.38ha  
 Rhos Gellie SSSI, SN380535, 1988, 30.35ha  
 Rhos Glwydwern SSSI, SN498505, 1979, 7.95ha  
 Rhos Glyn-yr-helyg SSSI, SN498514, 1979, 14.99ha  
 Rhos Llawr-cwrt SSSI, SN411499, SN420495, 1979, 1984, 1987, 1995, 46.13ha  
 Rhos Pil-bach a Pennar-fawr SSSI, SN369532, 1979, 27.40ha  
 Rhos-rydd SSSI, SN573740, SN567738, 1987, 48.33ha  
 Rhos Talglas a Chors yr Hafod SSSI, SN554634, 1994, 2000, 53.60ha  
 Traeth Llanon SSSI, SN509673, 1990, 27.03ha  
*Ynys Eidiol - Ynys-hir SSSI*, SN676957, 1971, 1979, 1981 (now in Dyfi SSSI), 93ha

### National Nature Reserves

Allt Rhyd y Groes (part) SN761483, 1968, 1983, 0.87ha in VC 46  
 Coed Rheidol SN754800-754795, 748793-742773, 738772-731774, 730780-709781, 722784-713790, 1956, 1957, 1958, 1960, 1961, 1992, 1994, 165.91ha  
 Coedmor SN192448-212434, 1991, 1996, 32.35ha  
 Cors Caron SN711673-671614, 1955, 1957, 1964, 1981, 974.58ha  
 Dyfi (part) SN695976-597945-619899, 1969, 1972, 1980, 1983, 1992, 1,668.98ha in VC 46  
 Llyn Eiddwen SN606670, 1996, 11.53ha  
 Rhos Llawr-cwrt SN411499, SN420495, SN411502, 1986, 1992, 58.73ha  
 Claerwen (part) SN818709-811702, 828672, 1994, 3.88ha in VC 46

### Wildlife Trust reserves

Former reserves are given in italics. A few dates and historical acreages can no longer be traced.

Aberstringell Limekilns SN519684, leased 1994, 0.63ha  
*Allt Brynarth*, SN675712, leased, relinquished 1999, 0.75ha  
 Allt Crug Garn, SN518617, leased 1965, purchased 1986, 0.38ha  
*Allt Fedw Cutting*, SN665730, donated 1982, sold 2002



Allt Pen-cnwc, SN519556, leased 1988, purchased 1992, 4.4ha  
 Caeau Llety-Cybi, SN603535, purchased 1981, 3.1ha (SSSI)  
 Cardigan Island, SN160515, leased 1944, purchased 1963, 15.6ha (SSSI)  
 Coed Cwm-Du, SN309429, leased 1981, now relinquished, 26ha  
 Coed Madie B. Goddard, SN210437, purchased 1990 and 1993, 15.6ha  
 Coed Penglanowen, SN611786, purchased 1978, 5.3ha  
 Coed Simdde Lwyd, SN717786, purchased 1980 etc., 36.3ha (NNR)  
 Comins Capel Betws, SN615576, agreement 1981, now relinquished, 7ha (SSSI)  
 Cors Gorsgoch, SN482504, agreement 1984, relinquished c.1999, 16.4ha (SSSI)  
 Cors Ian, SN671696, agreement 1997, donated 2003, 15.4ha  
 Cors y Sychnant, SN698688, agreement, relinquished 2000, 2.97ha (SSSI)  
 Cwm Clettwr, SN666920, agreement 1978, leased 1998, 16.4ha, formerly larger (SSSI)  
 Figyn Blaen Brefi, SN717547, agreement 1981, relinquished 1999, 45ha (SSSI)  
 Grogwynion, SN687714-718722, leased 1991, relinquished c.2000, c.35ha (SSSI)  
 Llyn Eiddwen, SN606674, part leased, part purchased 1982 and 1983, 55.2ha (NNR)  
 Llyn Fanod, SN604644, purchased 1983, 0.2ha (SSSI)  
 Old Warren Hill, SN613787, purchased 1973, 8.3ha  
 Pant Da, SN670790, donated 1976, 4.0ha  
 Penderi Cliffs, SN552733, part purchased 1966, part leased 1977 and 1981, 12.5ha (SSSI)  
 Rhos Fullbrook, SN667628, purchased 1983, 2.2ha (SSSI)  
 Rhos Glandenys SN538650, purchased 1989, 2.4ha  
 Rhos Glynrhelyg, SN498514, purchased 1979, 15.0ha (SSSI)  
 Rhos Pil-Bach a Phennar Fawr, SN368529, purchased 1982, 27.4ha (SSSI)  
 Rhos-y-Fforest, SN617729, agreement 1966, 0.75ha (SSSI)  
 Teifi Marshes/Teifi Foreshore, SN185455, leased and purchased 1968, c.60ha in VC 46 (SSSI, part is NNR)

### **RSPB reserve**

Ynys-hir, SN682961, 600.31ha, 1969 etc. (parts are SSSI and NNR)

### **National Trust properties**

Bryn Bras, SN745797, 34.22ha (part is SSSI)  
 Cei Newydd to Cwmtudu (Coybal, Pottre and Llwynwermod, Pen-y-graig and Caerllan, Penparc) SN379601-349572, 74.92ha (parts are SSSI)  
 Henllan Falls SN360403, 6.06ha (part is SSSI)  
 Llanerchaeron SN481602, 240.48ha (part is SSSI)  
 Mwnt (Llwynysgaw, Nant-bach, Mwnt, Clos-y-graig) SN220515-186516, 102.09ha (parts are SSSI)  
 Mynachdy'r Graig SN560745, 61.35ha  
 Penbryn (Llanborth and Ty Hen) SN294521, 38.23ha (parts are SSSI)  
 Lochtyn SN314554, 77.32ha (part is SSSI)

### **Woodland Trust reserves**

Coed Allt Cefn Maesllan, Llanarth, SN426581, 10.64ha  
 Coed Allt Goch, Pysgah, SN673772, 3.88ha  
 Coed Creuddyn, Falcondale, SN564494, 3.93ha  
 Coed Geufron, Penparcau, SN601801, 9.67ha  
 Coed Nant y Berws, Ysbyty Ystwyth, SN736718, 3.07ha  
 Coed Tyddyn Du, Cenarth, SN271425, 18.73ha (SSSI)  
 Coed y Bobol, Devil's Bridge, SN735762, 6.82ha  
 Coed y Crychydd, Llanilar, SN641741, 9.77ha (SSSI)  
 Coed y Foel, Llandysul, SN428426, 23.43ha  
 Coed y Mwldan, Cardigan, SN176461, 0.75ha  
 Waun Garthenor, Llanio, SN634558, 7.73ha (SSSI)

### **Local Nature Reserves**

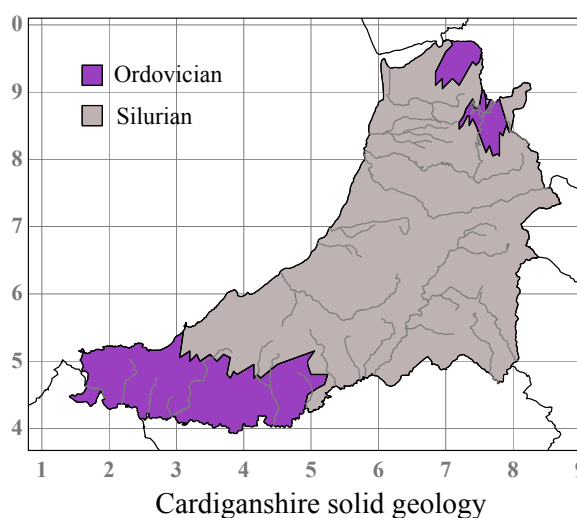
Parc Natur Penglais, Aberystwyth, SN588821, 1995, 12ha  
 Pen Dinas & Tanybwllch, Aberystwyth, SN583802, 1999, 40ha (part is SSSI)

## 4. Geology and soils

Although the bedrock of the county consists entirely of generally base-poor Ordovician and Silurian shales, grits and mudstones, and most of the vegetation reflects this, there are surprisingly many sites, related to mineralisation and other features, where calcicole plants occur. Similarly, while there are extensive superficial deposits of peat and much of the glacial till is base-poor, there is also a great deal of more or less calcareous till and smaller amounts of calcareous deltaic sands that greatly enrich the flora. This brief account of the geology attempts to show how it explains aspects of plant distribution in the county. A more extensive and very readable introductory account of the geology can be found in James (2002), and of the orefield in Mason *et al.* (2007). Among the key recent texts recommended for the botanist are those accompanying the British Geological Survey maps of the county (Cave & Hains 1986, Davies *et al.* 1997, 2003, 2006a, b), as well as Bowen (1994), Campbell & Bowen (1989) and Walker & McCarroll (2001) and, for soils, Rudeforth (1970, 1994), Rudeforth *et al.* (1984) and Bradley (1980).

### Solid geology

The Cardiganshire rocks were laid down in the sea in the Welsh Basin between *c.*440 and 420 million years ago, and essentially consist of fine-grained shales or mudstones derived from mud or silt, and coarser grits and sandstones derived from sand. These mud and sand sediments were themselves derived by erosion from earlier rock formations, and were avalanched at intervals from unstable accumulations in the shallow waters of the sea. The resulting turbidity currents carried the sediments deeper, each avalanching forming a new deposit on the sea floor; the alternately layered mudstones and sandstones formed in this way are known as turbidites, each sequence of layers representing one turbidity current which may have occurred on average every 60 years or so. The earlier sediments in the Ordovician and lower Silurian came largely from the Midland Basin to the east, and the later ones from the south-west. At the



the end of the Silurian some 400 million years ago the Welsh Basin became uplifted during the Caledonian Orogeny as a result of collision between the Laurentian and Avalonian tectonic plates, and the major faults, folds and cleavages that are such a conspicuous feature of the county's rocks were chiefly created at this time. Further upliftings, deformations and erosions took place during the Acadian Orogeny in the Devonian and perhaps during the Variscan Orogeny in the late Carboniferous and early Permian. Erosion of this uplifted and inverted Welsh Basin then resulted in the older **Ordovician** rocks becoming exposed over what is at the present time the highest part of the county, around Pumlumon, surrounded by the younger **Silurian** strata. During a submergence period in the Cretaceous, chalk is believed to have been deposited over the area, but this will have been completely eroded away as a result of being uplifted as a dome some six million years ago.

Between the end of the Silurian, however, and the earliest relics of the Pleistocene ice ages in the county there is a gap of nearly 400 million years from which no deposits survive. By the end of this period the basic landforms of the area had come into existence, interpreted by some as a series of four main plateaux (as it appears to the eye from many vantage points). The main drainage system will also have been created during this period, either during erosion of the presumed Cretaceous chalk dome that may have covered the county, explaining a perceived radial pattern of the main rivers, or more probably during and after an uplift very much later, in the Tertiary, which would give a better explanation of the predominantly west-flowing rivers.



Anticline in the Ordovician, Craig y March, Pumlumon, view SW from SN807883, June 1977



There is in general no obvious difference between the vegetation of the Ordovician and Silurian areas of the county, and one cannot for example tell from the flora to which formation a cliff one is botanising on belongs. There are though strata near the base of the Silurian which support a distinctly calcicolous flora that can be followed in three main areas: around the Pumlumon massif, around the extensive Ordovician outcrop NW of there, and in the Llyn Brianne area at the SE corner of the county. These strata appear to be chiefly in the **Cwmere Formation**, comprising predominantly thinly bedded turbidite mudstones, and their outcropping is usually extremely localised. Where they outcrop in the wooded, steep-sided valleys of the Llyfnant SN79D, E, Melindwr SN6996, Einion SN69X and Cletwr SN69Q, R, in the NW of the county, *Stellaria nemorum* subsp. *montana*, *Crepis paludosa*, *Tilia cordata* and *Euonymus europaeus* for example occur. A very small outcrop below Castell Grogwynion on the N side of the Ystwyth valley SN719722 has *Origanum vulgare* and *Tilia cordata*. Where they outcrop in the upland cliffs at Craig y Pistyll SN712856 on the W side of the Pumlumon massif, *Sedum forsterianum*, *Hieracium lasiophyllum* and *Origanum vulgare* occur, and on an outcrop further east by the Nant Cwta SN803834 there is *Rubus saxatilis*. The flora is not obviously affected in this way where the Cwmere Formation is at the surface in the SW of the county, even where the strata outcrop on the coastal cliffs.

In the Rheidol gorge both above and below Devil's Bridge SN77N, P, there is very striking evidence of other base-rich strata, in slightly younger Silurian rocks of the **Devil's Bridge Formation**. *Origanum*



Cliffs in the Cwmere formation, Craig y Pistyll, view NE from SN712855, May 1976



Cliffs in the Nant Brianne Formation, Craig Clungwyn, view W from SN778472, July 1979

*vulgare*, *Rubus saxatilis*, *Euonymus europaeus*, *Sedum forsterianum* and *Gymnocarpium dryopteris* occur here, and *Melica nutans* and *Thalictrum minus* grow on one small cliff. At the SE corner of the county by Llyn Brianne, the base-rich strata occur in other slightly younger Silurian rocks, in the **Nant Brianne Formation**, comprising thinly bedded turbidite mudstones and sandstones. Notable outcrops occur by the Nant Brianne itself SN783496, and at Dyrus Du SN805514, Pen Rhiwbie SN7847, Craig Ddu SN768484 and Craig Clungwyn SN777472. *Sedum forsterianum*, *S. telephium*, *Mycelis muralis*, *Rubus saxatilis*, *Tilia cordata* and *Origanum vulgare* are among the calcicoles there. An outcrop further up the Tywi valley in the still younger **Caerau Mudstones Formation** 800m SSW of Dolgoch SN801554 has *Rubus saxatilis*. The exact factors in all these strata that allow such calcicoles to grow on them rather than on the surrounding rocks have not been investigated, but must chiefly involve the proportions and nature of the carbonates in them.

Only one outcrop in the Ordovician, Graig Las SN797875, a low cliff of mudstones in the **Drosgol Formation** to the east of Llyn Llygad Rheidol on Pumlumon, is obviously base-rich and has the only extant colony of *Saxifraga hypnoides* in the county.

The other feature of the solid geology of the county that is of greatest interest to the botanist involves the mineralised faults or lodes. Although there is a certain amount of NNE-SSW faulting, the main faults run roughly ENE-WSW, and the mineralisation is almost confined to the latter. It occurred over a period of some 170 million years, from the Middle Devonian to the Permian, mostly in the north, and its human consequences are highly visible in the remains of the 200 or so mineral mines in this area. What the botanical consequences were before these lodes were mined is uncertain, as virtually none of them can now be seen at the surface in an undisturbed state, but mining has exposed and brought to the surface quantities of minerals that have often profoundly modified the vegetation. The mineral deposits in the lodes originated from hot groundwater fluids, probably often highly saline, containing leached elements from rocks at great depth. Forced up into faults and fissures by combinations of pressures from seismic movements and high temperatures, dissolved minerals crystallised out as the fluids cooled and the pressure was released. The metallic ores thus formed that were worth mining were most importantly galena (lead ore), sphalerite (zinc ore), chalcopryrite (copper ore) and silver-rich tetrahedrite (silver ore). The non-ore component, known as gangue, was chiefly quartz, but other minerals included marcasite, ferroan-dolomite and calcite. The metallic minerals are mostly toxic and their contamination of spoil heaps, and the dispersal of this spoil by wind and water erosion, and by human agency, has resulted in many areas being devoid of plant growth or in their being colonised by metal-resistant strains of such species as *Agrostis capillaris* and *Silene uniflora* that have evolved at these sites. Marcasite or iron sulphide, which on weathering gives rise to acidic pollution, is responsible for the spectacular ochre colour of the spoil at the Cwmrheidol mine SN730783 from one of whose adits metal-polluted water emerges at pH2.6. The strongly calcareous ferroan-dolomite is abundant in some lodes and is probably the chief reason for the occurrence of calcicoles at a number of the mines (apart from the effects of lime mortar from the ruins), while calcite is much less common. Ferroan-dolomite is especially abundant at Esgair Fraith mine



Cliffs and screes of the Aberystwyth Grits, Allt Wen, view ESE from 574791, March 1984



Ferroan-dolomite (brown) among mine spoil and walls, Hafan lead mine and incline, view E from SN73008796, April 2006



SN740911, the only site in the county for the calcicole fern *Asplenium viride*, whilst *Botrychium lunaria* and *Linum catharticum* are also abundant there. Yet at the Hafan mine SN729879 an even greater abundance of this mineral (the conspicuous dark brown drystone walling half way up the incline is made of it) has had no effect on the higher plants. Much remains to be discovered about the effects of these minerals on the flora.

Youngest of all the Silurian rocks in the county are the **Aberystwyth Grits**, famously well-exposed along much of the coast from just south of Borth to about Cwmttydu SN58Z-35N. Consisting of alternating layers of turbidite mudstones and sandstones, they are generally acidic and it is the varied ways in which the formation weathers, largely depending on the folding, that affects the vegetation of the cliff slopes. Where scree occurs, as on Allt Wen south of Aberystwyth SN57U, and on New Quay Head SN3860, *Calluna* and *Erica cinerea* heath is often developed, and similar vegetation occurs in places along the Ordovician cliffs west of Llangranog SN25W, 35B. On the vertical sea cliffs *Asplenium marinum* occurs equally on both formations, as do calcicoles such as *Euonymus europaeus* in some of the gullies, although whether this is due to the nature of the rock or other factors is uncertain.

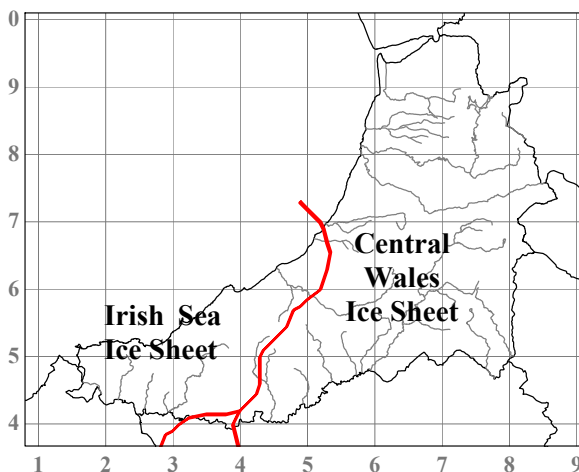
The shattered rock outcrops and block screes along the summit ridges of Pumlumon and elsewhere in the uplands are of uncertain age. They are generally assumed to have eroded to more or less their present form during periglacial conditions after the melting of the Central Wales Ice Sheet, and to have continued eroding by frost action since; there is no obvious botanical evidence to support suggestions that there may have been nunataks, sites that remained free from ice above the ice sheet.

### Superficial deposits

Although the processes described above created the main structure of the county, it was during the glaciations of the last two million years that the extensive erosions and depositions took place that created the main details of the present landscape, the last glaciation, in the Late Devensian, being the most significant. This reached its maximum some 20,000 years ago, when most the area was covered by two converging sheets of ice, the **Central Wales Ice Sheet** that spread west and south-west from the Pumlumon area and the **Irish Sea Ice Sheet** that flowed southwards to cover the south-west of the county from about Llanrhystud southwards. (A pre-Late Devensian glaciation, of uncertain date, caused by an earlier advance of the Irish Sea Ice Sheet has been identified as responsible for certain features in the south-west of the county.) For the botanist, it is of particular interest that the till deposited from the Central Wales Ice Sheet is acidic, while that from the Irish Sea Ice Sheet is somewhat calcareous. The former consists chiefly of clasts from the local acidic Ordovician and Silurian bedrock in a non-calcareous clay matrix; it covers considerable areas of the county roughly east of a line from about Llanrhystud SN56J via Mydroilyn and Pont-sian to just W of Llandysul SN44A, although there is a considerable area of overlap west of this line where the origin of the till is mixed or uncertain, and it may be that the two ice sheets in places were not in fact coeval. The till from the Irish Sea Ice



Shattered rocks, N side of Pumlumon Fach, view NNE from SN786876, July 1980



Postulated boundaries of the two ice sheets, and thus of the till derived from each (various sources)



Deformation in Irish Sea Ice Sheet till, Traeth y Mwnt, view NE from SN193518, April 2007

Sheet by contrast contains a wide variety of erratic clasts brought down from further north in Britain, including Scottish granites, Snowdonian and Lake District volcanic rocks, Carboniferous limestones, red Permian-Triassic sandstones and Cretaceous flints, and its higher pH is chiefly due to shell material in the clay matrix acquired from local marine sediments; it covers large areas roughly west of the line from Llanrhystud via Mydroilyn and Pont-sian to Llandyfrïog SN34F. In the Teifi valley itself the two ice sheets were separated by lake water between Llandysul and Llandyfrïog.

The advancing Irish Sea Ice Sheet dammed the mouth of the Teifi valley and thus created a large pro-glacial lake known to geologists as Llyn Teifi, confusingly a homonym of the present lake at the source of the river. The largely calcareous sand deposits around Penparc north of Cardigan SN14Z, 24E, where they are extensively quarried, are variously interpreted as deltaic in origin or as meltwater sedimentary deposits left when the glacier retreated; the fens along the east bank of the Afon Mwldan derive their calcareous nature and hence their rich flora from water draining through these sands. Other smaller glacial lakes, formed mostly between the two ice sheets, have left similar but less calcareous deposits near Talgarreg SN45A and near Rhydownen, SN44M. Glaciolacustrine deposits of clay laid down in the pro-glacial Llyn Teifi cover considerable areas, notably on the higher ground in the bend of the Teifi at Coedmore near Cilgerran.

Melting of the ice was completed by about 14,500 years ago, but periglacial conditions still modified the landscape for a further 4,500 years, after which erosion and alluvial deposition by the river systems were the main formative influences. The modern soils were formed then, extensive peat deposits developed both over the uplands and in many of the valleys in the lowlands, and the detailed landscape that we know now was largely created.

Glacial till now covers perhaps about a fifth of the county. As mentioned above, the till from the two ice sheets tends to support rather contrasting vegetation, although in both cases it is generally of a somewhat wetland nature. That from the Central Wales Ice Sheet, which covers many areas in the north and east, for example between Tal-y-bont and Capel Bangor, or around the Dinas Reservoir on the upper Rheidol SN7482, or in the Camddwr valley SN7756 where the till was excavated as clay for the construction of the core of the Llyn Brianne dam, tends to support species with the same acidity preferences as those on the surrounding areas devoid of till. That from the Irish Sea Ice Sheet in the south-west of the county, on the other hand,



Incised meanders, probably caused by glacial meltwater erosion, Rheidol valley below Ponterwyd, view N from SN75007975, April 2005





Post-glacial erosion by the Nant Bwa-drain  
of the glaciated Rheidol valley, view NE  
from SN707784, March 1986

basin mires where these have not been drained; these depressions formed by the collapse of ground-ice mounds have, for the last 30 or 40 years, usually been interpreted as pingos, and are mostly referred to as such for convenience in this Flora because such an important and characteristic botanical habitat requires a simple name. Pingos are periglacial mounds formed by the development of a lens-shaped core of ice beneath the permafrost; when they melt as a result of amelioration of the climate they collapse to form a usually circular crater-like, water-filled basin surrounded by the debris from the top of the mound. Fen or basin mire then develops in the basin, and the origin and history of the pingo can be elucidated from the structure of the rampart and from the peat deposits inside. There have though been several different interpretations of these structures in recent years, and most recently those in the Cledlyn and Hirwaun valleys have been interpreted as esker-like subglacial ridges of till formed beneath the Irish Sea Ice Sheet during the retreat of the ice. The ridges or ramparts, presumably where the till is less leached, are often dry and quite base-rich, with such species as *Botrychium lunaria*, *Gymnadenia borealis*, *Coeloglossum* and *Leontodon hispidus*. Other ridges and mounds are more acidic and support a wet heath flora with *Calluna*, *Erica tetralix*, *Salix repens* and *Genista anglica*. On slight slopes a *Molinia* sward is often present, and *Molinia* tussock fen occurs in wetter areas over slowly moving groundwater. The basin mires in the circular pingo-like features often have *Sphagnum* with *Eriophorum angustifolium*, *E. vaginatum*, *Vaccinium oxycoccos*, *Hypericum elodes* etc., and a marginal zone with *Juncus effusus* and *Dryopteris carthusiana*. The fen communities in the features with a through-put of water are very varied, and altogether these complex rhos sites are some of the most rewarding botanical sites in the county.



Pingo basin, Rhos Llawr-cwrt NNR,  
view E from SN409499, July 1987

## Soils

Ombrogenous peat has formed blanket bogs over much of the uplands in the last c.8,000 years, chiefly in the northern and eastern parts of the county as well as on the Mynydd Bach. Ombrogenous peat has also formed raised bogs in two main areas, Cors Fochno (Borth Bog) SN69 alongside the Dyfi estuary and Cors Caron (Tregaron Bog) SN66, 76, in the upper Teifi valley. Elsewhere most of the peat is partly soligenous and partly ombrogenous, in valley bogs and on flushed slopes throughout the county.

Apart from peats, the raw soils of the area that lack a permanent, closed vegetation cover are chiefly the sands of the dunes and other sites along the coast, the screes and exposed ridges that occur chiefly along the coast and in the uplands, coastal shingles, alluvial shingles and gravels in the main river valleys, and estuarine muds of the Dyfi and Teifi. Calcareous sandy soils, **Sand-pararendzinas**, have developed on the dunes and other sandy tracts at the two extremities of the county and at the few sandy sites in between.

greatly modifies the vegetation in this respect. Near the coast, for example at Cei Bach SN45E and at Aber-porth SN259514, and inland over large areas, for example around Oakford SN45N, P, north and north-east of Plwmp SN35R, and along Heol y Bowls SN24T, it can usually be picked out by the abundance of such comparative calcicoles as *Juncus inflexus*, *Senecio erucifolius* and *Equisetum telmateia*.

On the glacial till, particularly at around 100-250m altitude in this south-west part of Cardigan-shire, a 'complex microtopography' has developed that is characteristic of, and easily seen on, many of the rhos pasture SSSIs and NNRs such as Rhos Llawr-cwrt SN44E, 45A, and Rhos Glynyrhelyg SN45V. Among its features are curved or circular ridges, up to 100m or more across, enclosing fens or

**Ranker** soils, apart from acidic Sand-rankers on the more leached parts of the dunes, are in our area mostly rather shallow non-calcareous soils on rock or till, drought-prone and especially characteristic of the coastal slopes and the uplands, usually occupying small areas; where they are thin and overlying rock, and usually of the Powys series, they can be dominated by *Ulex gallii* and *Erica cinerea*, or they can be some of the parched soils of the coastal slopes where winter annuals flourish. **Brown Sands** are confined to the sand deposits around Penparc north of Cardigan. **Brown Earths** are the dominant well-draining loamy soils over most of the agricultural lowlands, varying from comparatively thin soils on steep slopes to the deeper soils of the Denbigh series that support many of the better pastures and arable farmscapes. The Rheidol series occurs on terrace gravels in the main river valleys, and also comprises the fertile “Barley tract” at the mouth of the Wyre SN56J and between the Peris and Cledan at Llan-non SN56D where the medieval field system of slangs still survives. **Brown Alluvial Soils**, chiefly of the Clwyd series, are the deep, silty soils especially well-developed in the lower Ystwyth and Rheidol valleys, the middle part of the Aeron valley and much of the Teifi valley, and are well-drained though liable to flooding.

Much pasture is also on less well-drained gleyed soils, however, in which seasonal waterlogging results in the reduction of iron compounds by micro-organisms under anaerobic conditions, leading to a grey or mottled subsoil where the resulting ferrous compounds are re-deposited. There are two main sorts of surface-water gley soils. **Stagnogley Soils**, chiefly of the Cegin series, are often formed on the till deposits, while in the SW of the county there are clayey Stagnogley soils belonging to the Foggathorpe series which are the dominant soils of the plateau woods around Coedmore SN14W, X, 24B, C, and the extensive secondary woodland at Coed Tyddyn-du, N of Cenarth SN24R. **Stagnohumic Gley Soils**, with an organic, often peaty accumulation on the surface, are especially characteristic of the middle altitudes on gentle slopes, for example around the Mynydd Bach and the western slopes of the Cambrian Mountains foothills where they are mostly of the Wilcocks (formerly Ynys) series, as well as on many of the rhos sites.

The groundwater gley soils, whose waterlogging comes chiefly from groundwater, include the **Alluvial Gley Soils** which are widespread in the main valleys and are even more liable to flooding than the Brown Alluvial soils and so are suitable only for pasture; they are chiefly of the Conway series. **Humic Gley Soils**, chiefly of the Freni series, are characteristic of the rhos pastures in the county and form a major component of the mosaic of soils that determines the vegetation of these sites. **Sandy Gley Soils**, apart from small areas in the Ynys-las dune slacks, comprise the Blackwood series and are confined to the Mwldan valley north of Cardigan SN14Z, 24D, where calcareous flushes are developed in the Brown Sands; they support the richest fen vegetation in the county.

Podzols are soils in which acids released from the surface humus layer leach iron and aluminium which are carried down to form an iron-enriched layer in the subsoil; this is generally highly visible as a reddish-brown horizon or even as an iron pan. They occur chiefly in the uplands, the better-draining **Brown Podzolic Soils** being the favoured



Podzol profile exposed in Sheep nest (ruler 15cm), 1km WSW of Ponterwyd, SN737803, August 1999

soils for much of the conifer plantations, especially Larch. The Manod series is the main soil of the *ffridd* slopes and of much of the sheepwalks, dominated by *Agrostis capillaris* and *Festuca ovina*, and often colonised by Bracken. **Humic Brown Podzolic Soils** of the Parc series, similar to the Manod series but with a humose topsoil, cover several of the low hilltops in the south of the county such as Blaen Cribor SN4048, Gernos Mountain SN34N and the high ground 2km north of Ffostrasol SN34U; they formerly supported extensive heathland, most of which has now been destroyed. **Stagnopodzols**, largely of the Hafren and Hiraethog series, seasonally waterlogged below as well as leached from above, are formed mostly at higher altitudes in the areas of highest rainfall and on the upper plateaux can be dominated by *Nardus* or *Calluna*, and have often been afforested with Sitka Spruce; they, and to a much lesser extent the Stagnohumic Gley Soils, were the target of much of Stapledon’s hill land improvement scheme in the 1930s.

### Pre-history of the vegetation

Moore (1994) gave an excellent and fully referenced account of the Late-glacial and Post-glacial history of the vegetation of the county and it would be superfluous to attempt to repeat it here. More recent information and references can conveniently be found in Walker & McCarroll (2001) and Hughes *et al.* (2007).



## 5. Climate and weather

The climate of Cardiganshire is in general mild, wet and windy, lacking extremes of any kind. Being on the west coast of Britain the general characteristics are Oceanic, and as the coast runs virtually the whole length of the county and the general contours of the higher ground run parallel to this coast, the various climatic zones tend to follow the same pattern, being generally governed by proximity to the sea and altitude. The main interruptions to this pattern are caused by the somewhat isolated massif of the Mynydd Bach near the middle of the county, by the low ground of the Teifi valley along the south and south-east borders, and to a more limited extent by the other main east-south-east to west-north-west river valleys.

The official Meteorological Office sources provide most of the weather statistics, and Smith (1976) puts the county into a national context as well as providing much detail. An engaging account of the climate and weather in the Borth area in the north of the county was provided by Taylor (1986), and much information on the climate of the Ynys-las dunes is given by Savidge (1976b).

### Temperature

The growing season for grass, when the mean monthly temperature is over 5.6°C, is about 330 days in the Cardigan area, about 290 days at Aberystwyth, and drops to about 200 days or less in the uplands. With this growing season generally starting before the end of February and not ending until mid December along the coast in the south-west of the county, communities of winter annuals and spring ephemerals can be a major feature. July and August are the warmest months, with a mean of about 15°C in the lowlands, and January and February the coldest, with a lowland mean of about 4.5°C. The accumulated temperature above 5.6°C, which gives an indication of the warmth of the environment during the growing season, varies from the 1,925-1,650 band along the coast and lowlands and up the Teifi valley to Cors Caron, to the 1,100-825 band from Pumlumon down to the high ground south-east of Llanddewi-Brefi. Frost occurrence varies greatly with the local topography, but air frosts (in 1971-2000) at Aber-porth SN244516 occurred on average on 18.3 days, and only from November to April, with the maximum occurrences being in January and February, each with an average of 5.6 days; at Trawsgoed SN673741, 12km inland, they occurred on average on 48.2 days, from September to June, with a maximum in January of 9.8 days.



Ice mounds at *Hammarbya* site, Cwm Ystwyth, view SSE from SN819750, February 1986

The lower Teifi valley up to about Llandysul has a milder and drier climate than any other inland part of the county, and several species with a south-western distribution in Britain reach their northern limit here. *Sibthorpia europaea* reaches Cwmhyar SN34X, *Melittis melissophyllum* reaches Cwm Cou SN34B, and the moss *Cryphaea lamyana* reaches Llandysul SN44A. *Rubus melanoderms*, a thermophilous and southern species, reaches just to a S-facing rocky slope W of Cenarth SN24L. The 1,450 isotherm of median accumulated temperature above 0°C (day degrees) reaches up the Teifi nearly to Llandysul.

### Precipitation

Rainfall is generally highest from October to January, with (in 1971-2000) an average annual total of 870mm at Aber-porth and 1,213mm at Trawsgoed. In the uplands it can be much higher, and at Pwllpeiran SN775745, 21km inland, at 300m altitude it averages 1,700mm, and at 600m altitude 2,250mm. In the Teifi valley the 1,200mm average annual rainfall isohyet extends up as far as Lampeter, so that it is the driest inland part of the county, but in the Aeron valley this isohyet extends only up to Ystrad



Temporary streams after heavy rain, Cwm Ystwyth, view SSE from SN800744, 27 December 1995

Aeron, and in the Ystwyth and Rheidol valleys only up to Abermagwr and Capel Bangor. At both Aber-porth and Trawsgoed, April, May and July were easily the driest months, with only about half the rainfall of the wettest months. Soil moisture status is of great importance for the vegetation cover, and the conventional measure of potential soil water deficit is calculated by subtracting the potential transpiration from the average rainfall; where rainfall exceeds transpiration, the moisture deficit becomes less and the soils become more saturated, and predictably this deficit decreases eastwards and south-eastwards away from the coast and into the uplands.

Snow lay at Aber-porth at 09.00hrs on average on only four days a year in 1961-1990, and still for less than five days at Aberystwyth.

### Sunshine

Sunshine (in 1971-2000) averaged 1,544 hours a year at Aber-porth and 1,213 at Trawsgoed. May and June are the sunniest months, with (in 1941-1970) 4.9 and 5.4 hours a day on average respectively in the uplands, and 6.7 and 7 in the lowlands. December is the least sunny, with 1 hour a day on average in the uplands, and 1.5 in the lowlands.

### Wind

Winds are generally from the south-west, but there is enormous variation both seasonally and from place to place. At Aber-porth, for example, southerly winds predominate over the year, and there is usually a particularly high incidence of winds from the south and south-south-east in January and October, but from the north-west in April. At Aberystwyth, south-westerly or west-south-westerly winds predominate, and such winds tend to bring rain more than those from the east. Windblown trees and bushes are a familiar feature of the more exposed parts of the county. Although such trees can give an indication of the predominant wind direction, they are affected differently by wind at different stages of their seasonal growth cycles, and especially by the winds that are salt-laden and that may occur at only particular times of year. D. Thomas (1958) studied wind deformation of Hawthorns along 4km of the Melindwr valley SN670904 to 710813, centred on Goginan, and used the results to devise his widely adopted classification for recording five different classes of deformation of trees, and hence of exposure to wind.

Deformation can also sometimes indicate how winds have changed over the life of a tree. It sometimes varies strikingly within a small area, and for example around Pendinas SN584802, a 126m isolated hill at Aberystwyth, it covers all points of the compass. T. M. Thomas (1973) gives much information on the matter, and showed that for this county, as for most of Wales, the dominant orientation was from the west-south-west. He made sample surveys of a range of species in three parts of the county, on the coast around Morfa Mawr c.SN5065, inland on the west slope of the



Windblown *Crataegus monogyna*, Mynachdy'r-graig, view N from SN558747, June 1981



Wind-sculpted *Prunus spinosa* thickets on the coast below Grogall, view S from SN37375945, September 2004



Mynydd Bach at c.SN5966, and to the lee of the Mynydd Bach at c.SN6464. He noted that “central Cardiganshire was the only area in [Wales] containing an inland tract showing a notable persistence of deformation along axes from the west or west-northwest sector”, the last of his three areas showing this clearly. The coastal sample showed deformation from the west to west-south-west, and the remaining one showed it from the west. T. M. Thomas also suggested that around Aber-porth, where tree deformation is more from the south-west than from the southerly direction expected from the prevailing winds, “the more occasional strong to gale force on-shore winds have been responsible for a much greater distortion in tree growth than the dominant fresh southerlies having an appreciable land track.”

It took a geologist to point out another curious effect of wind on plants, in this case on dispersal of wind-borne seeds. In explanation of the westward spread of Scots Pine across Cors Fochno SN6391, Yapp *et al.* (1916) cited O. T. Jones who had noticed that lead-polluted dust from the spoil heaps of the mines was mainly carried to the south-west, not to the north-east as one would expect from the prevailing wind direction. Jones realised that this was because the north-easterly winds were drier than the moisture-laden south-westerlies, and so were more likely to raise the dust, and commented that it would be in similar dry easterly winds that the Pine cones would open and shed their seeds. The strength and often the coldness of the down-valley winds coming through the Dyfi gap are a notorious feature of the northern edge of the county, especially in anticyclonic conditions in winter and spring.

### Extreme events

Storms, floods, heavy prolonged snowfalls or frosts and droughts can have a very conspicuous though often short-term effect on the vegetation, while the changing frequency of such events can have a much more profound effect. The vegetation of the coastal slopes, pre-adapted though it may be to the maritime environment, can be extensively set back and even destroyed in storms by the effects of salt and battering, so that plant communities in such places can change radically from year to year. Floods in the main river valleys regularly set back the natural succession on shingle beaches, but they also control or enable the dispersal of many species such as *Rorippa islandica*, *Ficaria verna* subsp. *verna* and *Impatiens glandulifera*. The hard winter of 1987/88 had a dramatic effect on the vegetation of the uplands, in particular on *Ulex gallii* which has still not fully recovered in some areas. Miles (1959) described the effects of the prolonged 1959 drought in woodlands and on the Pumlumon uplands. During the even worse drought of summer 1976 many trees and other plants, including notably *Sorbus aucuparia*, even small trees of *Quercus petraea*, *Calluna* and *Erica cinerea* bushes, and ferns such as *Polypodium* spp. and *Asplenium trichomanes* died especially in the uplands. The great south-easterly gale of 13 December 1981 blew down a vast number of mature trees and bushes, the effect perhaps exacerbated by the trees not being prepared for such winds from that direction.

### Climate change and phenology

Two of Salter's main botanical preoccupations have potential for climate change investigations. His phenological observations, records of the flowering dates of many hundreds of species over several decades, deserve to be analysed and repeated and would then be of immediate relevance. His altitude records may, in the longer term, help to indicate whether the limits of various species have changed in relation to climate.

Salter's Natural History Diaries (NLW MSS 14432B-14439B and 14444B-14451B ) contain a vast amount of Cardiganshire data on phenology spanning 50 years from 1892 to 1908 and 1922 to 1942. His



Droughted *Quercus petraea* and *Sorbus aucuparia*, Coed Rheidol, view E from SN754796, September 1976



Oaks uprooted by gale of 13 December 1981, Coed Llechwedd-einion,  
Llyfnant, view SW from SN741964, 13 March 1982

observations often require some special consideration to interpret, as the simple mention of a species name frequently means that it was flowering, rather than a species of interest for some other reason. He also frequently recorded leafing dates of trees. At the end of the final volume of his diaries some of this information is summarised. A list of some 690 species gives the dates in 1941 when they came into flower in his garden at Fairview, Llanbadarn Fawr SN598810 from 12 January to 28 November, with a second part running backwards from 2 July to 16 May. A table gives the first flowering dates for 32 mostly wild species from 1924 to 1942, as well as the leafing dates for Sycamore, Horse Chestnut, Ash and Oak (misleadingly titled “Flowering”). Many or most of these records can be found also as part of the normal Diary entries. Altogether Salter’s phenological records, which cover other groups as well, notably birds and insects, must comprise one of the biggest such data sets in existence.

So many non-native “look-alike” taxa (Sell 2007) have been introduced since Salter’s time though, that it may sometimes be difficult to make direct comparisons. To take obvious examples, Daffodils flowering in January will probably be ‘Rijnveld’s Early Sensation’, and not ones that Salter knew, and early Hawthorns could be any of several recent introductions used in hedges. More subtly, many early or late flowering variants of such plants as *Centaurea nigra* or *Achillea millefolium* will probably not have been here either in his day.

The difficulties of identifying and interpreting the various factors indicating climate change are such that it is impossible to relate them concisely to local conditions. Instead, it is perhaps more useful to detail some observed changes in the plants of the county that may be related to long-term variations of climate. The lack of detailed distribution records from the past makes it impossible to be certain of anything other than either very conspicuous or very small scale changes. It is difficult to separate climatic factors from natural spread in the case of alien species that are increasing in the county, and even in the case of increasing natives it may sometimes, as in the case for example of *Cerastium glomeratum*, be uncertain whether a different genotype may be involved.

*Cochlearia danica*, a member of the Oceanic Temperate element that one would expect to benefit from a reduction of frosts, is a native obviously increasing in two different habitats, town pavements and rural roadside banks, for whose increase no other obvious reason can be found. *Valerianella carinata*, a member of the European Southern-temperate element, is apparently spreading, whereas the ecologically similar *V. locusta*, of the European Temperate element, is not. In a detailed repeat survey of the street flora of



Aberystwyth (Chater *et al.* 2000), a rise of about 1°C in July and August maximum temperatures between 1964-1973 and 1990-1999 was suggested as a contributory factor in the increase of species in the Southern floristic elements such as the Euro-Siberian Southern-temperate *Cardamine hirsuta*, the European Southern-temperate *Sagina maritima*, and the Submediterranean-Subatlantic *Parietaria judaica*, and the decrease of northern species such as the Circumpolar-Boreo-temperate *Athyrium filix-femina* and *Veronica serpyllifolia*, and the Eurasian Wide-temperate *Ranunculus acris*.

Changes in behaviour of certain species may also be indicative. *Euonymus japonicus* has been flowering and fruiting with increasing abundance over the last decade, whereas it was scarcely ever seen to do so before. A few winter annuals have recently been noticed flowering in autumn, for example *Trifolium ornithopodioides*, though whether this is the normal genotype able to do so because of climate change, or a different one becoming commoner because of it, one cannot easily tell.

## 6. Plant habitats

The following accounts of the main plant habitats in the county vary greatly in style and aim simply at drawing attention to the ways in which each habitat is likely to be of interest to the botanist. Thus the sections on woodland and crop husbandry, for example, have a strong historical bias, that on upland cliffs is concerned mostly with rarer species, those on churchyards and old estates are more touristic, and that on grasslands is more concerned with plant communities. Except for acting as signposts in some of the accounts, the National Vegetation Classification (NVC) communities have not been much cited in this Flora. As the NVC is at present constituted, it is not as appealing to the taxonomist or to the botanist interested in genetic variation as it is to the ecologist or plant sociologist. NVC surveys, although they are of great value to conservationists and phytosociologists as a tool for describing vegetation, and although they often do describe transitional habitats and anomalous communities, can sometimes ignore them, as well as areas that are too small or complex to be adequately described under the system, and it is often such areas where the greatest diversity of species is to be found. Oversimplistic interpretation and usage of the NVC, especially by conservationists, can also be damaging in management terms. Cardiganshire was less well represented in the original sampling on which the NVC was based than most of the other Welsh counties, as indeed was Wales in relation to the rest of Britain. Since then, NCC/CCW surveys in the county using the NVC have in particular covered lowland grasslands, lowland peatlands and woodlands in great detail, and the interested reader should go to these for proper phytosociological information. Recent coverage of lowland peatlands has been more extensive than that in other parts of Wales, largely because of the great diversity of lowland poor fens in the county.

Tansley (1949), in a passage drawn to my attention by Peter Sell, wrote: “We very often suspect that it is the existence of different ecotypes of a species which accounts for its various behaviour in different habitats, but there can be no certainty and no real advance in knowledge till each case has been properly investigated; and this means a great deal of laborious cultural and genetical work. The fruitful investigations of Professor Stapledon’s staff at Aberystwyth on genetically distinct ecotypes of pasture grasses and clovers are examples of what I mean, and valuable work of the same kind is being done at Kew and at Potterne by Dr Turrill, Mr Marsden Jones and others. What is wanted now is a joining of hands between the students of ecology proper, who come mainly from the universities, and the genetical taxonomists. The field is enormous and scarcely more than its fringes have been touched.” This unfortunately remains true 60 years later, and the NVC, and other major projects such as the Biological Flora of the British Isles largely ignore infraspecific variation of all sorts.

Scarcely a habitat in the county is in any sense free from continuing modification by Man and his followers, chiefly farmers, foresters, conservationists, Sheep, Cattle, Horses and Rabbits. Even our salt marshes are Sheep-grazed, our dunes Rabbit-ridden, our Oak woodlands coppiced, our rivers polluted or regulated and our lakes mostly dammed or stocked with fish. This is the norm in Britain, and these modifications both deplete and enrich the flora in very complex ways. Perhaps a few cliffs and screes on the coast and in the uplands, a few wooded stream ravines and parts of our raised bogs have gone almost their own way over the last few thousand years, apart from atmospheric pollution, but they comprise only a minute fraction of the landscape.

### Woodlands and trees

#### Native woodlands

The most recent inventory of woodland in the county (FC 2004), covering woods over 2ha, estimated 26,884ha of all types, i.e. 15% of the total area of the county. As 60% of this was conifers, and as a great deal more of the woodland originated as broad-leaved plantation, probably not much more than 5% of the county is unplanted, semi-natural or natural woodland, or perhaps up to 7% if smaller woods are included. Natural secondary woodland, that has developed in recent times by invasion of unwooded land, is probably only a very small, though interesting element of this. How much of the county’s woodland can be considered ancient, according to the conventional definitions, is discussed later. The most useful relevant historical accounts are Linnard (2000) and Mincher (1986), the latter providing an immense amount of detail on history and management, including nine case studies of individual woods. NCC and CCW have commissioned several extensive surveys of the county’s woods, Cooke & Saunders (1989) in particular providing a great deal of detail on the NVC communities represented, and Lister & Whitbread (1987) covering ancient





Cwm Rheidol, W part of Coed Rheidol NNR Oak woods in distance, FC Larch plantations on right, view SE from SN705795, August and November 1989

woodland. Jones *et al.* (2003) estimated 3,700ha of upland Oak woodland in the county, 1,000ha of upland mixed Ash woodland, 460ha of wet woodland and 400ha of lowland mixed deciduous woodland.

Woods of *Quercus petraea* (Sessile Oak) are the most familiar and extensive over the county, clothing steep, free-draining slopes on leached, acidic soils from the coast up to 350m altitude. Most have been clear-felled at various times, especially during the two World Wars, and thus consist largely of even-aged coppice growth, and most are grazed, especially by Sheep, to varying degrees. Deer fortunately are not yet numerous enough to have any significant impact in the county except for a small area near Cardigan. These woods are therefore generally lacking in variety, in richness of species and in regeneration. *Betula* spp. are usually the only other trees. The shrub layer is usually sparse, with occasional *Sorbus aucuparia* and *Crataegus monogyna*. *Vaccinium myrtillus* and *Calluna vulgaris* are frequent. The ground layer is usually dominated by *Deschampsia flexuosa*, *Anthoxanthum*, *Luzula sylvatica* and bryophytes. *Blechnum* and *Dryopteris dilatata*



*Quercus petraea* saplings,  
Coed Simdde-lwyd c.SN717786, April 2007

are the chief ferns. Where the soil is slightly deeper, on less steep slopes, there is often a shrub layer of *Corylus* and *Ilex*, with *Lonicera* and *Rubus* spp., and a ground flora of *Holcus mollis* and *Hyacinthoides*.

**Coed Simdde-lwyd** SN715787 is a good example, and from much of it Sheep have recently been excluded so that *Vaccinium*, sometimes up to 1.5m tall, and *Calluna* are dominant and Oak seedlings can be very abundant; where trees have fallen, where clearings have been made to encourage regeneration, and among Bracken fringing the lower margin of the wood, these seedlings are readily growing to maturity. In woods where the slopes are flushed, or where there is slight mineral enrichment, *Fraxinus* usually forms conspicuous strips, and *Ulmus scabra* often occurs. In these areas *Stellaria holostea*, *Silene dioica*, *Geranium robertianum*,

*Anemone nemorosa*, *Lysimachia nemorum*, *Veronica montana*, *Circaea lutetiana*, *Chrysosplenium oppositifolium* and *Poa trivialis* are characteristic. In many of the slightly more base-rich areas, especially on drift soils, species frequently associated with *Fraxinus* include *Mercurialis perennis*, *Sanicula europaea*, *Brachypodium sylvaticum* and *Polystichum setiferum*. A series of woodland sites, usually where there are cliffs or steep slopes and mostly on rocks of the Cwmere Formation near the base of the Silurian strata (discussed in detail in the geology section), contain a number of locally uncommon species, often calcicoles, such as *Tilia cordata*, *Circaea ×intermedia*, *Stellaria nemorum* subsp. *montana*, *Lamiastrum galeobdolon* subsp. *montanum*, *Festuca altissima*, *Meconopsis cambrica*, *Euphorbia amygdaloides*, *Sedum forsterianum*, *Origanum vulgare*, *Gymnocarpium dryopteris*, *Hymenophyllum tunbrigense* and *Dryopteris aemula*. Such sites include notably parts of the **Llyfnant** SN79D, I, the **Melindwr** valley SN696960, **Cwm Einion** SN69X,





(left) Coed Rheidol Oak woods and Gyfarllwyd Falls, view N from SN742773, April 1978  
 (centre) Ancient woodland with *Ulmus scabra* in Gwenffrwd valley, view SW from SN595598, October 1984  
 (right) Ancient woodland in Coed Cwm Cletwr, view E from SN672919, April 1991

**Cwm Cletwr** SN69Q, R, and **Coed Rheidol** SN77I, N, P. At one site in the latter *Thalictrum minus* and *Melica nutans* have their only occurrence in the county. Further S extensive predominantly *Quercus petraea* woodland with similar richer areas occurs in the **Gwenffrwd** valley SN55Z-56V, in the **Marchnant** valley SN65D and in many of the Teifi woods.

Woodland annuals are represented in the county chiefly by *Veronica hederifolia* subsp. *lucorum* which is often extremely abundant in spring in most of the damper and more fertile woods, and by *Moehringia trinervia* which is frequent usually in well-drained more fertile woods. *Ceratocarpus claviculata*, largely a woodland plant in much of Britain, is more characteristic here of scrub and Bracken communities.

The clear-fell coppicing of much of the native woodland, so destructive of its structure and ground flora, not to mention the epiphytic bryophytes and lichens, was prompted especially by the urgent requirements of lead mining in earlier centuries, and the need for pit props in the two World Wars. More traditional and sustainable coppicing was used for the production of tan-bark and for charcoal. Lewis (1969) shows nine former tanneries in the county, and Cellan parish alone contained 20 tanners in 1696. Charcoal burning continued in a small way until the 1950s. Physical remains of these activities can be seen in many woods, for example Coed Simdde-lwyd, including charcoal hearths and timber chutes where trunks were dragged down the slopes.

An exceptional record of what was probably native oak woodland as it appeared in the 1780s is in the drawings by Thomas Jones made on the Hafod



The Raven Falls, Cwm Einion, view SSE from SN69309460, October 2004



Coed Cwm Cletwr, view ESE from SN668922, February 2010



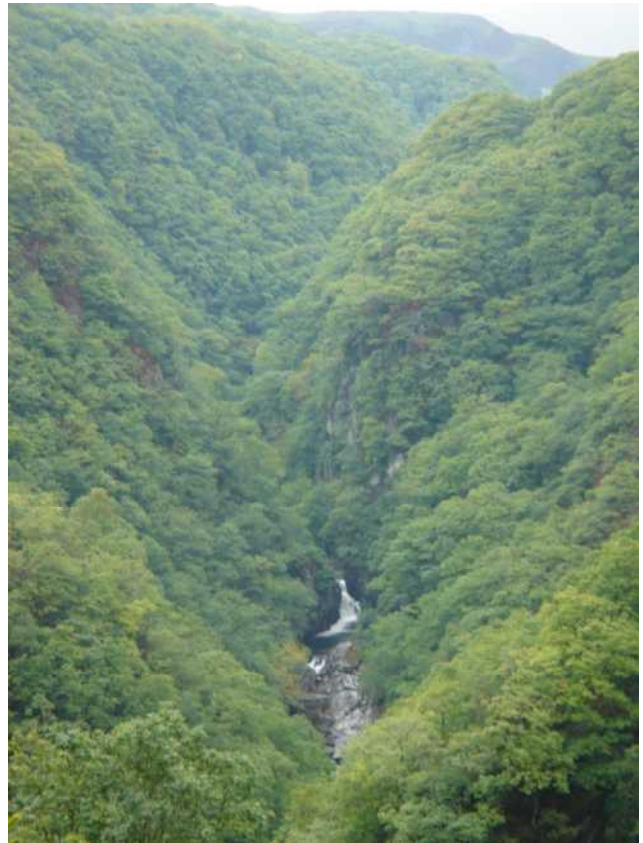


Denuded slopes by iron-smelting furnace,  
Furnace, view S from SN685952, 1913  
etching from J. G. Wood, *The rivers of Wales*

estate, reproduced and described in Hallett (1991) and Macve & Sclater (1996); individual trees, gnarled, twisted, often apparently coppiced and some with a heavy growth of *Lobaria* and Ivy on the trunks, are shown in remarkable detail.

Whether the few large old Oak woods that appear never to have been coppiced are plantations or ancient is usually uncertain. Good examples are **Coed y Crychdydd** near Llanilar SN641742, **Coed Mynachlog-fawr** at Strata Florida SN743654, **Allt Lan-las** at Llanerchaeron SN478604, and the **Coedmore** woods on the Teifi SN14W, X. The latter were thought by F. Rose on lichenological evidence to have been originally wood pasture. Coed y Crychdydd's history and structure is discussed by Mincher (1986), and the present mostly even-aged trees seem likely to have been planted (Meyrick 1810). Coed Mynachlog-fawr too has the appearance of having developed from wood pasture, but its history has yet to be worked out; it contains comparatively few Oaks of no great age, all probably Sessile Oak. Allt Lan-las, largely on a very steep slope and fairly even-aged, is probably replanted ancient woodland; it is mostly Sessile Oak, with a shrub layer containing *Corylus*, *Ilex* and *Euonymus europaeus*. **Allt Hengeraint** SN470604 nearby, along with Allt Lan-las described by Salter (Diary 28.4.1926) as "much the finest [Oak wood] in the county", was probably similar but has since been replanted and largely coniferised.

Allt Lan-las, Llanerchaeron, view E  
from SN47686049, May 2006



Gyfarllwyd Falls in Coed Rheidol, Devil's  
Bridge, view N from SN741770, May 2007





The Oak woods on the cliff slopes on the coast are a striking feature of the county, the best examples being at **Penderi** SN553738-548729, 10km S of Aberystwyth, and from **Cribach Bay** to **Craig y Filain** on the MoD site, Aberporth SN252520-238523, although smaller fragments occur elsewhere. They are mostly of *Q. petraea*, although there are a few trees of *Q. robur* and there is some evidence of hybridisation. Many of the trees have unusually large, fleshy leaves. They are windblown, very stunted and probably of great age, with the main trunks and branches parallel with the slope; in one place on the MoD site they are so pressed to the ground that one can walk over the canopy. In a few places there are trees of *Fraxinus*, *Sorbus torminalis*, *Populus tremula* and *Tilia cordata*.



Oakwood on sea cliffs, Penderi, view N from SN551732, April 2005

The shrub layer can include *Prunus spinosa*, *Corylus*, *Crataegus*, *Rubus* spp., *Lonicera*, *Ligustrum vulgare* and *Euonymus europaeus*, the latter forming a substantial thicket in one place. Where Sheep are excluded, as is mostly the case in these coastal woods, the ground flora is rich, with *Hyacinthoides*, *Ficaria verna* subsp. *fertilis*, *Stellaria holostea*, *Silene dioica*, *Adoxa*, *Mercurialis perennis*, etc. The very stunted growth of the trees makes it difficult to tell how much coppicing has taken place in the past, but probably some areas have been coppiced and some have not, and the history of these woods is largely unknown. In a few very exposed places inland similar stunted, windblown Oaks form small areas of woodland, notably by the Nant Bwa-drain waterfall in Coed Simdde-lwyd SN714790.

Birch woods are mostly either secondary on heath and moorland, or develop where Oak woodland or conifers have been felled. FC policy has encouraged the development of secondary Birch woods in many places, for example **Lodge Park** SN665936. Both *Betula pendula* and *B. pubescens* occur, the former the commoner, and *B. celtiberica*, apparently native, is also frequent in many woods. **Coed Mynachlog-fawr** SN743654, mentioned above, contains Birches that mostly defy identification. They are as abundant in the wetter areas where *Alnus glutinosa* is dominant as in the drier parts, and have various combinations of the characters of *B. pendula* and *B. pubescens*, but there are also



Dwarf Oaks by Nant Bwa-drain waterfall, Cwm Rheidol, view NE from SN709786, August 2009



Birch and Alder woodland with Bracken, Berthgoed, view SSW from SN768656, July 1978



a few *B. celtiberica*, and, inexplicably for such a remote site, at least one tree of *B. litwinowii* and one that is very similar to *B. japonica*. *B. litwinowii* is also in the secondary Birch woodland at the N edge of Cors Fochno SN637924.

*Alnus glutinosa*, common in the wetter parts of many Oak woods, forms pure stands of carr on many flushed slopes especially in the upland valleys. Good examples are in the Llyfnant, for example by **Allt-ddu** SN713973 where, as is usual, the trees have been coppiced in the past for clog-making, and near **Berthgoed**, Strata Florida SN762654 where huge maiden trees survive. Alder carr is frequent on the flood plains of the main rivers, often associated with backwaters and ox-bows. A most unusual one is the estuarine Alder carr on **Rosehill Marsh** in the Teifi estuary SN189454; until the *Phytophthora* Alder disease partially killed most of the trees, and Brambles and Blackthorn invaded, the ground flora was dominated by sparse *Phragmites* and was the only site in the county for *Carex punctata*.

*Ulmus* woods are few and are discussed separately in the account of that genus. *Sorbus torminalis* occurs mostly as small suckering stands in a few apparently ancient woods. *Populus tremula* also forms small stands in a few ancient woods, but is more common as an invader of fields and in planted copses. *Tilia cordata* nowhere occurs as more than scattered trees, mostly along streamsides in ancient woods.

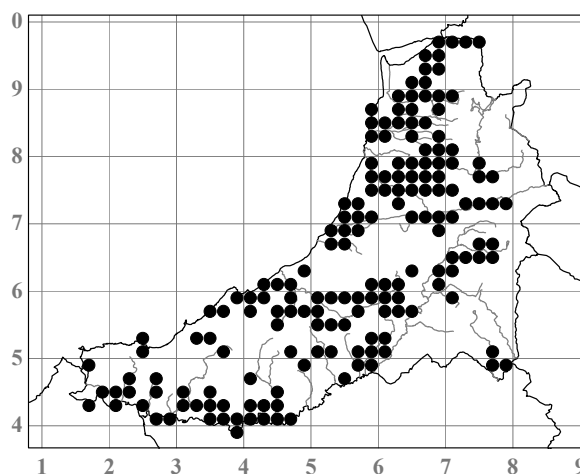
Most woods in the lowlands contain varying amounts of *Acer pseudoplatanus*, but in areas of more or less unmodified ancient woodland it is usually rare and the trees are not conspicuously old. Quite a few pure Sycamore woods occur, mostly having developed by invasion of felled woodland. Sycamore, Ash, the Birches and Beech are the most prolifically self-seeding broadleaved trees in the county.

The most extensive area of natural secondary woodland in the county is **Coed Tyddyn-du** near Cenarth SN272426, where, for largely legal reasons but also because of drainage problems and difficulties of access, an area of pastures on somewhat waterlogged drift soils was left abandoned throughout the 20<sup>th</sup> century. It belonged to the Blaenpant estate until c.1914. There are also small areas of older Oak woodland adjacent, and the enclosure boundaries carry old Oaks and other trees that will have been the source for much of what has seeded in. The dominant secondary growth is Ash and *Betula pubescens*, with much Sycamore, and frequent and increasing Oak in the drier parts where there is a good shrub layer of Hazel and Hawthorn with some Holly; in the wettest parts there is some Alder and abundant *Salix cinerea*. The ground flora is varied and rich, with much *Brachypodium sylvaticum*, *Holcus mollis*, *Sanicula europaea*, *Circaea lutetiana*, *Geum urbanum*, *Filipendula ulmaria*, *Lysimachia nemorum*, *Neottia ovata*, *Carex sylvatica*, etc. Several of the enclosures are still open in the middle, and all stages of succession to woodland can be seen. The site is now in the hands of the Woodland Trust and it and its history are discussed in detail by Mincher (1986). Most natural secondary woodland in the county is attached or very close to existing ancient or planted woodland, and unattached secondary woods probably occur only where Birch has seeded onto bogs or moorland. The case of *Pinus sylvestris* on Cors Fochno is discussed under that species.

**Ancient woodland** has been conventionally defined as woodland that has been in continuous existence for several centuries, usually since c.1600 or c.1700, but for convenience woodland that was shown on the first edition of the OS one-inch maps (dating from the 1830s in Cardiganshire) is usually considered ancient unless it is obviously a plantation. It is such woodland that is shown on the accompanying tetrad map. Lister & Whitbread (1987) give the best available account of it in the county, using the first edition of the OS maps as their basis. They estimated that 9% of the county consisted of woods over 2ha in size (using the FC 1947-1949 figures



Secondary woodland at Coed Tyddyn-du, view SE from SN266427, March 2007



Tetrads containing ancient woodland

extrapolated to 1981, and very different from the 1998 FC figures); about 23% of this was ancient, and some 50% of this 23% had been replanted. 53% of the ancient woodland existing in 1900 had been lost by 1986. It is thus a decreasing and, by definition, an unrecoverable resource.

**Indicator species** have been used in many parts of Britain as a short cut to identifying ancient woodlands, but they are probably impossible to apply in Cardiganshire as in most of West Wales. Trying to identify ancient woodland in this way in the county is a fruitless exercise. Rackham (2006) gives a summary list of the most used indicator species covering many parts of Britain, and considering his top eleven species (listed here in decreasing order of usage) one can say of them in the county:

*Melica nutans* occurs in only one site, undoubtedly ancient woodland, but occurrence in just one site is unreliable.

*Galium odoratum*, while often occurring in ancient woodland, appears to be at least as often a naturalised garden escape there as a native, and the same confusion applies in other woods.

*Anemone nemorosa* is very common on hedgebanks, and is in secondary as well as in ancient woodland, on Bracken-covered slopes that have not been wooded for at least two centuries, and even occurs in *Molinia* bogs.

*Luzula pilosa* is common in ancient Oak woodland, and in conifer or other plantations replacing Oak woodland where, as at Hafod, it can flourish for two centuries or more, and it also grows on some of the heathy, treeless coastal slopes.

*Sorbus torminalis* is mostly on rocky bluffs and cliffs in ancient woodland, including fragmentary woodland on the sea cliffs, and also occurs in a few hedges, some of which appear unconnected with woodland.

Both varieties of *Melampyrum pratense* occur widely on upland heaths and on heathy banks both in the open and in conifer plantations, as well as in ancient Oak woodland.

*Milium effusum* occurs in probably planted, mixed estate woodland at Lovesgrove, on hedgebanks and in scrub on the drift soils in the SW of the county, as well as in various ancient woods and replanted ancient woods.

*Tilia cordata* is chiefly by streams in ancient woodland, but is also by streams and on cliffs in unwooded sites in the uplands, and is in hedges in several places and is occasionally planted in woodland.

*Adoxa moschatellina* is often on hedgebanks in areas unwooded for two centuries or more, and occurs in several mixed estate woods that are almost certainly planted, and in several graveyards, as well as in the usually more fertile Ash/Oak woodlands.

*Euphorbia amygdaloides* is commoner on cliffs, both on the coast and inland, than in ancient woodland.

*Paris quadrifolia* was recorded from only one site, where it was probably a relic of ancient woodland.

Admittedly most of these habitats that are not now ancient woodland might once have been, but then so might most of our countryside long enough ago. Similar objections can be made if one tries to apply to Cardiganshire most of the 36 indicator species suggested by Buchanan & Fuller (1980) for Pembrokeshire.

Ancient woodland in Cardiganshire is often poorer in species than other woods because of over-grazing, repeated clear felling and lack of, or bad, management; if it is richer in species and of more interest, that is usually because it is on uncultivable land and has a greater variety of habitats such as stream ravines, cliffs and screes and flushes than other woods. Our *Melica nutans*, *Sorbus torminalis* and *Euphorbia amygdaloides* for example grow chiefly on cliffs and in ravines, and it is probably more the presence of these ungrazed and unchanging habitats rather than of any ancient woodland containing them that determines their distribution.

Mincher (1986) summarises the considerable evidence that sustainable woodland management was very often not a feature of woods in the county in the past. Evidence from pollen analysis (Moore & Chater 1969a) and eye-witness accounts by Leland (Smith 1906) in the 1530s in the Strata Florida and Cwm Ystwyth areas point to the actual destruction and not just the coppicing or clear felling of woodland, Cistercian agricultural expansion and later lead-mining being among the reasons why many areas were denuded (Lewis 1969). Similar mismanagement continued, and Lloyd & Turnor (1794) wrote that "the country has but little wood and that bit is daily lessening, and what is left is much neglected". Mincher (1986) describes how this criticism of woodland owners was deliberately softened by Davies (1815), although it is from the latter that some interesting details on woodland management in the county at this period can be obtained.

## Plantations for timber

The early history of tree plantations in the county has not been investigated in detail, and it is not until the late 18<sup>th</sup> century that documentary evidence is readily available. The early maps, including those of the first



edition one-inch of the Ordnance Survey of the 1830s, are somewhat deficient and often inconsistent in their depiction of woodland in general, and it is in very many cases impossible on present evidence to tell which of our extant woods are ancient woodland, replanted ancient woodland, natural secondary woodland or plantations on unwooded ground. Davies (1815) and some of the early writers of tours mention plantations, one of the earliest being Wyndham (1781) who, approaching Tal-y-bont from the south in 1774 or 1777 was “agreeably surprised with the refreshing view of a very extensive and flourishing plantation of firs, which covered the steep declivities of two hills, near the house of a Mr. Price”. This was probably the plantation mentioned by Davies (1815): “Near Tal-Bont, and adjoining Gallt y Grug lead-mines [SN652894], are extensive copses of oak belonging to M. Pryse [of Gogerddan] ... intermixed with rows of Scotch pines of from ten to twenty years’ growth. The woodman, finding the pines oppressing, and even smothering the oak, instead of cutting them all down for railing and building stuff &c. lopped off the lateral branches, as we were informed, in March last.” Plantings of 1793 recorded nearby at Lodge Park SN663936 (Moore-Colyer 1998b), comprised 36,500 Oaks, 7,000 Ashes and 2,500 Scots Pines. Also in 1793 on this estate, close by Gogerddan SN629836 itself, 3,700 Oaks, 900 Ashes and 800 Firs were planted (Moore-Colyer 1998b). Jenkins (in Edlin 1959) mentions that there was extensive tree-planting on this estate by Pryse Pryse about 1807, and that a woodman was employed at a yearly salary of £50. Some of the woods shown on an estate plan of 1836 (Palmer 2004) will have been these plantations, and while the one N of the mansion is still partly intact, Allt Dderw to the S, described by Salter (Diary 15.6.1924) as “by far the finest oak-wood in this neighbourhood”, has been largely coniferised by the FC and used as an arboretum. There was also extensive early tree-planting on the Trawsgoed estate, and the stands of very large Oaks in Waun Gwinau and elsewhere on level ground near the mansion SN67R, not felled and coniferised until the 1940s, will also have been plantations.

The Cardigan Agricultural Society, founded in 1784, awarded premiums for tree-planting. Davies (1815) mentions extensive plantings of between 40,000 and 100,000 trees on each of the estates of Castle Hill SN625746, Mabws SN565686, Ty-glyn SN498599, Llanerchaeron SN479602, Gernos SN366452 and others, as well as a “great number” of smaller plantings. On the Peterwell and Millfield estate at Lampeter, half of which was in Cardiganshire, 395,000 trees of Oak, Ash, Larch, Scots Pine, Beech and Elm were planted. Davies describes a 100 acre plantation on this estate N of the Teifi at Lampeter where “Mr. Davis has also enclosed open copse-woods of oak ... all fenced with a foss and mound, planted on the top with quicks, which are “frithed” or guarded on the outside by a hedge of wattled trowse. In the plantations, the oaks are set at proper distances among pines and larches; the latter to encourage the growth of the oak until they become an encumbrance: they are then to be felled, that the oak may grow more freely by the extension of their branches”; but this sounds more like management of existing woodland rather than a new plantation. A major supplier of trees for these plantations at this time was Hindes’s nursery at Felindre just outside the county in Carmarthenshire, and Davies gives his stock in trade as 2,640,700 trees: i.e. 500,000 Oak, 360,000 Ash, 500,000 Scots Pines, 500,000 Larch, and various others such as 5,000 Horse Chestnut, 200 Plane, 50,000 Beech, 5,000 Lime and 3,000 Black Poplar; where did these trees originate from, and what taxa were they exactly? Even around 1800, vast numbers of both native and alien tree species of uncertain provenance were thus being introduced into the Cardiganshire countryside.

The most ambitious and best documented tree plantings that we know of were done by Thomas Johnes, owner of the **Hafod** estate c.SN77L, R, etc., from 1780 to 1816. According to Davies (1815), Johnes planted almost four million trees between 1796 and 1813 alone, and the total will have been nearer five million, covering probably 400 to 500ha (Linnard 1970). Much information on Johnes’s plantings can be found in Warner (1800), Malkin (1804), Linnard (1970, 2000) and Moore-Colyer (1992), among others. Johnes’s motives were partly to create a Picturesque landscape in what he perceived as a largely barren upland valley,



Beech plantation of c.1800 (centre) and mid-20th century FC conifer plantations at Hafod, view SW from SN756736, October 2004



*Fagus sylvatica*, relics of Thomas Johnes's plantings,  
Hafod, view W from SN772730, April 1978

but also to produce saleable timber. Oaks were extensively used, 10,000 saplings for example in the twelve months from October 1797, and the following winter 22ha were planted with acorns; in the following seven years, 922,000 Oaks were raised and planted out. Larch, *Larix decidua* at this period, was the other most used tree, over two million being planted as two-year old seedlings on the upper parts of the hills. Beech, Ash, Alder, Elm, Birch, Mountain Ash and Norway Spruce were among others used. Larch and Beech grew best. The only significant plantations from this period surviving on the Hafod estate are those of Beech, the best being near The Arch at SN762758 and 768758 (the latter at 400m altitude).

Smaller stands of the Beeches survive elsewhere, notably along the S side of the Ystwyth from Coed Dolchenog SN783734 to Allt Dihanog SN759727. Whether any original Larch plantations survive is unlikely. The fine Larch plantations at Devil's Bridge must be later than Johnes, and the long-dead Larch stumps covering extensive areas on Lan Fraith SN780730 and other hilltops on the estate are also doubtless later, though perhaps on areas that Johnes planted originally with Larch; a few obviously very old living trees do remain there. A Larch plantation at 350m altitude and 115 years old still existed during the 1914-1918 war (Steven 1927), and this could well have been on Lan Fraith. Most of the Hafod plantations were felled in the later 19<sup>th</sup> and early 20<sup>th</sup> centuries, and were replanted with conifers by the FC from the 1950s.

Johnes grew most of his Oak saplings and much of his Larch in the Hafod nursery. Where the seed originated is mostly not known although "stocks of the less common species were apparently bought in from nurserymen in Liverpool and Scotland" (Moore-Colyer 1992); Johnes had a Scottish gardener, James Todd. Warner (1800) relates that in 1797 Johnes planted 300,000 Larches from his nursery and 50,000 "Birches and mountain ash, collected from the woods"; the remainder, 200,000 Larches, 1,000 Birches, 17,700 Alders, 2,000 Mountain Ash and 4,000 Beeches came from Scotland. It is therefore impossible on present evidence to tell how much of the small areas of woodland consisting of species native to the district that now exist at Hafod is really native and of local stock, and how much was originally planted or descended from stock from England or Scotland. Are the various surviving areas of coppiced Sessile Oaks relics of pre-Johnes natural woodland or the remains of plantations? Thomas Jones's 1786 drawings (Macve & Sclater 1996) and lichenological evidence suggest that there was such natural woodland at least in the ravines (SPC pers. comm.). Whether the obviously naturally seeded and unplanted Sessile Oaks, Wych Elms, Birches, Small-leaved Limes and Rowans around the estate are of stock native to the area or descendants of imported trees is equally in doubt.

Plantations continued throughout the 19<sup>th</sup> century all over the county, especially on the larger estates, but their history has not been investigated in much detail. For example, in the mixed broadleaved plantations made during the early or middle part of the century in the Clarach valley, *Quercus cerris*, *Castanea sativa* and even *Robinia pseudoacacia* were major components, as in Coed Wallog SN596860, Cribin Llwyd SN595844 and Coed Porthangel SN610845. Cwm Woods SN597834-609835 was described by Salter when he first visited it in 1891 (Diary 25.9.1891, 4.10.1891, 6.11.1891, etc.) as "mostly larch and fir" and as "carefully planted" with Beech, Horse Chestnut, Lime, Ash, Norway Maple, Rowan, Sycamore, Common Whitebeam, etc. Even in as upland an area as Angler's Retreat SN7492 on the Gogerddan estate, at the same altitude as Johnes's highest Beeches, conifer plantations, though probably for shelter rather than for timber, were being made at the end of the 19<sup>th</sup> century.

**The Forestry Commission** was established in 1919, and their plantings in the county began in 1929 or 1930. The various FC censuses (FC 1928 [covering 1924], 1953 [covering 1947-1949], 1970 [covering 1965-1967], 1983 [covering 1983], 1985 [covering 1978-1982], 2004 [covering 1998]) and the very helpful interpretations of these inconsistent and confusing documents by Mincher (1986), can be used to follow their progress. In summary, in 1924 before the FC started here only 891ha or 17% of the total woodland and scrub in the county was coniferous high forest; by 1947-1949 it was 2,321ha or 30%, by 1979-1982 it was 12,880ha or 74%, and by 1998 it was 16,879ha (the percentage then was uncertain as the FC's method of measuring



total woodland had changed, but it must certainly have increased). In 1998 the FC owned 53% of the woodland in the county, and 83% of this was standing conifers and thus plantation, and only 34% of the woodland in other ownership was standing conifers; in total, 16,157ha or 60% of all the woodland in the county was standing conifers, and this, by definition a minimum for the amount of plantations in the countryside, gives an indication of their importance.

According to Mincher (1986) the earliest FC plantings in the county were in Cwm Einion c.SN69X, 79B, G, and by the Afon Tarenig c.SN88A, B in 1929. Edlin (1975) mentions that they planted *Picea sitchensis* in the Ystwyth Forest SN67V-77F in 1930, when the FC also planted it in the Rheidol Forest around Nantyrarian c.SN78A. Since then, *P. sitchensis* has always been the most favoured tree for plantations, both FC and private. By 1947-1949 it covered 1,038ha, by 1983 it covered 8,253ha, and by 1998 it covered 11,508ha and comprised 75% of all the conifers in the county. It grows well on damp, acid, peaty soils. Most of the plantings were in the 1950s and 1960s, chiefly on the upland sheepwalks and blanket bogs, but also often on felled woodland on the valley slopes. *Pseudotsuga menziesii* also began to be planted in the 1930s, with peaks of planting in the 1950s and 1990s, 130ha existing in 1947-1949, 617ha in 1983 and 976ha in 1998; it was used in more sheltered sites chiefly in the deeper valleys. *Larix kaempferi* too was planted in the 1930s, and the oldest extant plantation, on Banc Cwm-isaf near Cwmsymlog SN684840, dates from 1934 and is now being preserved for long-term data-gathering. *L. kaempferi* increased from 330ha in 1947-1949 to 1,225ha in 1983 and to 2,144ha in 1998. *L. decidua* was grown in small amounts, and, while there are many plantations of *L. ×marschlii* probably also planted here from the 1930s, it was mostly not differentiated from *L. kaempferi* in the statistics. *Picea abies*, planted since the 1930s, chiefly in damp, low-lying sites, has steadily decreased in comparison with *P. sitchensis*. The most important Pine has been *Pinus contorta*, used on exposed sites in the uplands on thin, poor soils or on deep peat; planted mostly between 1950 and 1980, there were only 18ha in 1947-1949, but 678ha in 1983 and only 7ha more by 1998. *P. nigra* and *P. sylvestris* have been planted to a much lesser extent, as have a wide variety of other conifers. *Tsuga heterophylla* is of some importance ecologically, as it self-seeds more readily than any other conifer in the county, and was often under-planted in Oak woodland where it was rapidly able to become dominant in the canopy; first used by FC in the 1930s, there were less than 12ha by 1947-1949 but the obvious great increase since cannot be quantified as it has been mostly lumped in "other conifers" in the censuses.



FC conifer plantations in the landscape,  
view W down the Nant Gau to Pwll Peiran  
from SN786705, July 1981

Census year:	1947-9	1983	1998
Species			
<i>Larix decidua</i>	185	249	24
<i>L. kaempferi</i>	330	1,225	2,144
<i>Picea abies</i>	515	899	876
<i>P. sitchensis</i>	1,038	8,253	11,508
<i>Pinus contorta</i>	18	678	685
<i>P. sylvestris</i>	140	220	240

Hectares under each species in three FC censuses of woodlands

*Pinus peuce*, known to be resistant to heavy metal toxicity, was planted by the FC at several of the lead mine sites such as Ystrad Einion SN707938 and Esgair Fraith/Esgair Hir SN7391-7491. *P. mugo* subsp. *uncinata* was sometimes planted along the windward edges of exposed upland plantations to deflect the prevailing winds upwards, as at the latter site.

The 410ha of *Fagus sylvatica* estimated in the county in 1998 must all have been plantation. In some places, as in Cwm Woods SN600833, on the Hafod estate as mentioned above, and at Henllan on the Teifi SN360403, these resemble fine stands of native trees, but many of the more recent Beech plantations have been disastrously unmanaged and are in urgent need of thinning; the same complaint was made in 1815 (Davies 1815) about the Beech plantations at Lodge Park. Beech regenerates prolifically both in plantations and in mixed semi-natural woodland. *Quercus rubra* is not separated from native Oaks in the statistics, but

significant plantations of it were made by the FC starting in the 1950s, and these are a conspicuous feature of the landscape especially in the Leri valley below Tal-y-bont SN68P, in Cwm Rheidol SN7377 and in the Ystwyth valley SN77A, F, G, L, where it was often used as a decorative screen for conifer plantings. The 768ha of *Acer pseudoplatanus*, the remaining alien in the 1998 statistics with a significant coverage, will have been largely self-sown rather than planted. *Nothofagus alpina* has been grown in a few places in small stands, as has *N. obliqua* in a few trial plots. Various cultivars of Poplars were planted by the FC, chiefly experimentally from the late 1940s at Trawsgoed c.SN664726, and though well-grown they have mostly not yet been harvested. More recent Poplar plantings in the uplands have largely failed. Details of all these can be found in the species accounts.

The vast amount of conifer planting in the uplands has had complex ecological effects, but there has been little precise monitoring. Preparatory drainage and ridging and furrowing especially of blanket bog, quite apart from the subsequent planting, caused gross changes in the hydrology and soils, and the loss of many plant communities and species. Even where plantations have more recently been removed these scars will be semi-permanent. Fencing of the plantations to exclude Sheep has by contrast allowed many previously inhibited species to thrive, especially in areas within the fences that have been left unplanted, such as firebreaks and rides, tracksides, rocky knolls, cliff slopes, streambanks and the wetter bogs. Lycopods and dwarf shrubs including Heathers and *Empetrum* have conspicuously benefited in this way. In the steeper ravines which even the FC hesitated to plant up, where Oaks and other native trees may have been left in a narrow strip alongside the streams, the sheltering effect of the surrounding conifers has often so affected and ameliorated the microclimate that an unusual abundance of uncommon species such as *Hymenophyllum* spp., *Gymnocarpium dryopteris*, *Rubus saxatilis*, *Trollius*, etc. have been able to flourish and spread. There are good examples of this along the W side of Llyn Brianne, in Cwm Einion, in the Llynfnant and elsewhere. The valley of the Afon Lluestgota around and below the Esgair Fraith lead mine, partially left unplanted and with some self-sown trees, is visually and botanically one of the more attractive sites in the uplands. The deliberate creation of riparian zones, by the felling of ill-positioned trees since the 1980s has had a beneficial effect in a few places but, in general, the ground flora of the upland evergreen conifer monocultures is very poor or even non-existent. Larch plantations, though deciduous, are largely on dry, acidic, sloping sites so their ground flora is almost as poor, usually dominated by *Deschampsia flexuosa* and *Dryopteris* spp.



Ungrazed *Erica cinerea*, *Vaccinium myrtillus* and *Calluna* on unplanted ridge in FC plantation, Pen y Graig-ddu, view SSE from SN711822, July 1977



View ESE down the valley of the Afon Lluestgota at Esgair Fraith lead mine SN742911, August 2005



Barren interior of conifer plantation, Y Garn SN454491, July 1976



In the lowlands, coniferous afforestation has had even fewer benefits for the vegetation, and, as most of the plantings have replaced existing, often ancient woodland, or old, well-established plantations, much harm has been done. There are usually fewer ungrazed but unplanted areas connected with such lowland afforestation. The ground vegetation, if any, is often dominated by *Dryopteris dilatata*, with abundant *Oxalis acetosella*, and *Chrysosplenium oppositifolium* in wetter areas. When these plantations are felled, colonisation of the coniferous leaf litter forming a thick covering on the soil is often by such plants as *Carex pilulifera*, *Luzula multiflora*, *Chamerion*, *Digitalis* and *Rubus* spp.; many of these sites though are among the richest in *Rubus* species in the county.

Broadleaved deciduous plantations, in so far as they can be distinguished historically from replanted ancient woodland, have among the richest ground vegetation of any woods in the county. Among the reasons for this are probably the ease with which many woodland species are able to colonise new sites in this Atlantic climate (the same factor that makes it difficult to identify ancient woodland indicators in the county), and the fact that these plantations are usually and deliberately on the better and more base-rich soils.

### Trees of estates and gardens

Many of the old estates and larger gardens in the county contain specimen trees or groups of trees of interest, either for their size and age or for their rarity; many of these sites, if not of open access, are at least occasionally opened to the public. Palmer (2004) describes 31 of them, based on the work of the Ceredigion branch of the Welsh Historic Gardens Trust, and gives a good deal of the historical background. Cadw (2002) describes eleven sites in great detail and gives them a national status as “Gardens & Parks of Special Historic Interest”. Most of the trees mentioned below are included in greater detail in the species accounts, and in this section only a few of the sites of special interest for their trees are briefly highlighted, working N to S through the county.

Many fine trees can be seen at **Glandyfi Castle** SN692967, including ones of *Fagus sylvatica*, *Abies alba*, *Pinus sylvestris* and a *Castanea sativa* planted in the early 19<sup>th</sup> century, probably by George Jeffreys who built the castle, several *Fraxinus ornus* and a good *Quercus cerris*; later plantings include an interesting collection of *Chamaecyparis lawsoniana* cultivars and a *Metasequoia*. **Ynys-hir** SN682959 has in its gardens the biggest *Pinus nigra* and *Abies nordmanniana* in the county, and elsewhere on the old estate a fine *Tilia cordata*, four fine *T. platyphyllos* and a picturesque planting of *Pinus sylvestris* on the Domen Las motte overlooking the estuary. **Lodge Park** SN663936, now managed by the FC, has a magnificent *Araucaria*, the biggest in the county, along with the biggest *Pseudotsuga menziesii* and the tallest *Picea abies*. **Plas Gogerddan** SN629836, formerly the seat of the Pryse family and latterly the home of the WPBS and then IGER/IBERS, has a fine grove of *Pseudotsuga menziesii* var. *menziesii*, as well as a tree each of var. *glauca* and var. *caesia* on the lawn E of the mansion, several *Cryptomeria japonica* ‘Elegans’ and many other good trees in the mansion grounds and adjacent woodlands, and the FC arboretum described separately below is nearby. By this estate’s fishing lodge at 400m altitude, **Angler’s Retreat** SN746922, four *Picea mariana* survive among relics of late 19<sup>th</sup> century plantings, along with several *Pinus mugo* subsp. *mugo*. On the lawn of **Plas Cwmcynfelin** SN603834 are a well-formed *Quercus cerris* and a *Cedrus libani*, probably planted by the Williams family in the early 19<sup>th</sup> century, and a later *Sequoiadendron giganteum*.



Glandyfi Castle grounds, *Metasequoia* centre right, view E from SN692966, June 2008



Late 19th century Gogerddan estate conifer plantings at Angler’s Retreat, and late 1960s FC plantings, view E from c.SN740922, April 1973





*Cedrus libani* and *Quercus cerris*, Plas Cwmcynfelin, view E from SN60308340, September 2007

At Aberystwyth the University's **Penglais** estate and campus SN594822 contain a great number of interesting trees, which B. S. O. Fox, Curator of the Botany Gardens, largely selected and supervised the planting of in the 1960s and 1970s under overall schemes by the Percy Thomas Partnership, their advisers J. Ingleby and B. Colvin, and with help from P. F. Wareing, J. P. Savidge and other botanists on the staff. The accession books survive and to some extent individual trees can be dated and located. The Botany Gardens' trees have been ignored for this Flora, but adjacent to it in the Penglais dingle the trees include fine specimens of *Alnus rubra*, *Quercus suber*, *Corylus colurna*, *Nothofagus dombeyi* and *Metasequoia*. In the woods above Plas Penglais as well as in the wood at the SE corner of the campus at least 42 species of *Eucalyptus* were planted, many of which survive along with numerous other unusual species. The main University campus is extremely rewarding for the botanist, with many hundreds of species of trees and shrubs. The campus at **Llanbadarn Fawr** SN604811 was developed slightly later and the plantings there, also of considerable interest, were supervised by A. Rogers. Nearby, the grounds of **Bronpadarn** SN602810 contain fine specimens of *Trachycarpus fortunei* and two *Ginkgo biloba*.

**Nanteos** SN620786 has the biggest *Cedrus libani* in the county, by the walled garden ESE of the mansion, the biggest



*Sequoiadendron* 42m tall, Coed Penglanowain, Nanteos, view SW from SN610789, January 2010



single-trunked *Fagus sylvatica*, and, in Coed Penglanowain a *Sequoiadendron* that is the tallest tree in the county, as well as the biggest *Abies alba* and *Picea abies*. *Sequoiadendron* is very prominent too at **Abermad** SN600760 where several are strikingly set in the middle of fields; a curiosity here is a couple of examples of twin-planting, a *Quercus petraea* with a *Q. ×turneri*, and a *Fraxinus excelsior* with an *Acer pseudoplatanus*. Continuing up the Ystwyth valley, the view of **Trawsgoed** and **Birchgrove** SN670731 from the NW is one of the best planted treescapes in the county, and the mansion grounds include many of the finest individual trees. They were surveyed and measured by A. F. Mitchell in 1969, and again by C. D. Palmer and A. O. Chater in 1994. Several trees have plaques commemorating their planting by royalty and others. A short but magnificent avenue of Oaks runs SSE from the mansion, and a longer avenue of conifers running WSW contains fine trees of *Araucaria* and terminates with a spectacular *Fagus sylvatica* 'Pendula'. The *Calocedrus decurrens* is the biggest in the county. There is a long *Tilia ×europaea* avenue to the NW, and fine trees are scattered in the surrounding fields, including the biggest Oak in the county at the SE corner of the Roman fort, the biggest *Castanea sativa* at Dolgwybedin, many *Sequoiadendron*, and the two biggest *Populus nigra* subsp. *betulifolia* towering over the road at Wenallt. At **Hafod** SN77R the many clumps of Beeches are probably the only remnants of Thomas Johnes's decorative plantings of around 1800, as opposed to his extensive plantations for timber. Both of the biggest Beeches in the county are here, but were probably created by bunch-planting and consist of multiple trunks. There is however a single *Pinus sylvestris* at Devil's Bridge SN74297685 that is probably a relic of Johnes's planting. Later 19<sup>th</sup> century trees at Hafod include two *Sequoiadendron* finely positioned in the open near the mansion site, several impressive examples of *Chamaecyparis lawsoniana* 'Erecta', and, until recently, a *Cedrus libani* on Middle Hill and a *Ginkgo* in Mariamne's Garden.



The grounds of Trawsgoed, Oak avenue,  
view E from SN671730, May 2008



The grounds of Trawsgoed, view  
E from SN670730, May 2008

Further south, **Mabws Hall** SN565685 has many good trees, including a magnificent *Castanea sativa*. **Monachty** SN504620, seat of the Gwynne family in the 19<sup>th</sup> century when much of the planting on the estate took place, is outstanding for its *Quercus cerris* trees, including the biggest in the county, and also has the biggest *Cedrus deodara* and *C. atlantica* along with other big trees of these species, the biggest extant *Ulmus vegeta*, and several *Robinia pseudoacacia*, *Castanea sativa*, etc.

In the Aeron valley, **Llanerchaeron** SN479601 has fine Limes and Beeches, some of them bunch-planted, and Oaks, as well as a magnificent *Platanus ×hispanica*, the biggest in the county, on the lawn of Aber-mydr cottage. (An additional interest here is the extensive outdoor fernery, containing native species and thought possibly to date from as far back as at least the early 19<sup>th</sup> century and to be perhaps the oldest surviving one in Britain (Rickard 2007)). **Ty-glyn** SN498599 has a good range of trees, including the biggest *Sequoia sempervirens*, fine Beeches, several *Sequoiadendron*, an impressive *Buxus sempervirens* hedge and, until recently, a *Sciadopitys verticillata*. Continuing up the Aeron, **Brynog** SN529575 has the biggest *Thujaopsis dolabrata* and exceptional *Sequoiadendron* trees, and **Llanllyr** SN543559 has many interesting trees including good *Ulmus vegeta* and *U. scabra* 'Horizontalis', *Juglans regia* and the biggest *Alnus glutinosa*, though whether this last is wild or planted is uncertain. The avenue leading to **Abermeurig House** SN564564 had until recently the biggest *Ulmus vegeta*.

Many estates and gardens up the Teifi valley are of interest. The *Quercus cerris* in **Cardigan Castle** grounds SN178459 is one of the most impressive trees in the county, with huge boughs sweeping down over the terraces. At **Coedmore** SN194436 a *Cephalotaxus fortunei* surprisingly grows in the old Beech plantings.

**Llwynduris** SN239433 is notable for its *Quercus suber*, and also has *Thuja* and a good *Quercus ilex*. **Blaenpant** SN253443 has a group of *Acer palmatum*, big *A. campestre* trees and a selection of Elms, among other good trees. The grounds of **Cilgwyn** SN312409 contain numerous good conifers. Adjacent at **Old Cilgwyn** there is a great range of interesting trees, the many recent plantings include a considerable range of Rhododendrons, and there are fine old Oaks in the pastures and a *Liriodendron tulipifera* down the valley. **Alltyrodyn** SN449443 has the biggest *Abies procera* and many other fine conifers, especially fine Beeches, four *Abies nordmanniana* by the Afon Cletwr, and across the valley a *Calocedrus* and a spectacularly multi-trunked *Thuja*. An early reference to *Abies alba* having been clearly planted for decoration on the estate is given by Fenton (1917), who in 1804 saw ones that had been planted by David Lloyd of Alltyrodyn on the Tomen Rhyd-Owen Norman motte SN443447; two that are still there now may be relics of that planting. **Highmead** SN501431 was famed for its tree-plantings in the early 19<sup>th</sup> century, and the later plantings that survive are still of great interest. On the slope below the mansion the well-spaced Limes include fine specimens of *T. ×europaea* ‘Pallida’, *T. ×euchlora*, a *T. tomentosa* that is probably the rare ‘Orbicularis’, and a *T. platyphyllos* ‘Laciniata’. The gardens contain a *Ginkgo*, a *Thuja*, a delightful *Tsuga canadensis* ‘Pendula’, as well as thickets of several Bamboo species run wild, and *Trachycarpus fortunei* on the terrace. Among the few remains of the plantings at **Llanfechan** SN516454 are several big *Aesculus hippocastanum*, one of which is spectacularly contorted, *Castanea sativa*, Limes and fine Oaks. At **Peterwell** SN570477 all that remains is the avenue of Limes, the finest in the county, with 51 trees, mostly *T. ×europaea* ‘Pallida’, probably planted in the 18<sup>th</sup> century. **Falcondale** SN565491 has a fine *Calocedrus* and many conifer cultivars. The University campus at **Lampeter** SN579483 has among many other trees fine specimens of *Quercus cerris* and *Q. petraea*, two big *Populus ×canadensis* ‘Robusta’ and several *Salix ×sepulcralis* and *S. daphnoides* by the Afon Dulas. Although its mansion is gone, **Derry Ormond** SN591523 park retains a few old *Fagus sylvatica* and other trees, and a variety of exotics in the overgrown shrubberies. All signs of **Foelallt**, near Llanddewi-Brefi SN670550 have also now gone except for traces of the garden and a few old trees including a *Cedrus libani*.

### Trees of churchyards and other graveyards

Many of our churchyards contain noteworthy trees, almost all of them probably planted. Yews are the most important and conspicuous, and the churchyard ones are treated in detail in the species account and not mentioned here. There are rarely other trees of any great age. Beeches, Limes, Sycamores, Ashes, Wych Elms, Hollies, Birches, various Cherries, Portuguese Laurels, Cherry Laurels, Scots Pines, Corsican Pines, Silver Firs, Norway Spruces and various Cypresses are the most commonly planted; Oaks are much rarer. Nonconformist chapel graveyards have, apart from Irish Yews, usually far fewer trees than the churchyards, but favour the Laurels and smaller evergreen conifers such as the *Chamaecyparis pisifera* cultivars ‘Squarrosa’ and ‘Plumosa’ and various *C. lawsoniana* cultivars; there are *Thuja* trees in the chapel graveyards at **Salem** SN669843, **Blaenannerch** SN247491 and **Waunifor** SN465414.

Ignoring Yews, some of the churchyards of interest for their trees are listed here, from north to south:

**Eglwys Fach** SN685955 has a good selection of conifers including a well-shaped *Picea sitchensis*, *P. abies*, *Cupressus macrocarpa*, *Chamaecyparis pisifera* ‘Squarrosa’, *C. lawsoniana* and *Tsuga heterophylla*. **Llandre** SN623869 is notable for its old Beeches which give the steeply sloping churchyard a quite unique character. **Llanbadarn Fawr** SN599810 has the only Glastonbury Thorn, *Crataegus monogyna* ‘Biflora’. The six *Abies* trees on the river bank at **Llany-chaiarn** SN585786 have so far defied identification. **Eglwys Newydd** SN768737 has a very fine *Acer pseudoplatanus* and a spectacularly burred *Quercus petraea*. **Llanfihangel-y-Creuddyn** SN665760 has a *Platycladus orientalis* by the stream and a *Chamaecyparis pisifera* that, unusually, is not one of the cultivars, as well as a big *Fraxinus excelsior*. **Strata Florida** SN746657 has a huge *Fraxinus* stool, a fine *Fagus sylvatica* ‘Purpurea’, two *Tilia*



Beeches in Llandre churchyard, view  
S from SN623869, April 1983



*platyphyllos* and a row of *Pseudotsuga menziesii*. The fine *Pinus nigra* trees at **Llanrhystud** SN537696 add greatly to the setting of the church in the landscape of the valley. **Llanerchaeron** SN477604 has big Limes and the second biggest of the four *Picea smithiana* in the county. **Llanfihangel Ystrad** SN524562 has among its conifers a *Cedrus deodara*, an *Abies alba*, a *Tsuga heterophylla*, an *Araucaria* and a probable *Xanthocyparis nootkatensis*. **Dihewyd** SN484562 has seven *Abies nordmanniana*, one *Abies alba* and another that appears intermediate. **Llanddewi-Brefi** SN664553 has various Pines and Firs, and two *Xanthocyparis nootkatensis*. **Betws Ifan** SN302477 has a row of Beeches that is a major feature of the village landscape. St Mary's, **Cardigan** SN181460 has trees of *Cedrus atlantica*, *Abies grandis*, various Cypresses and a *Salix ×sepulchralis*, but none very large.

### Individual planted trees in the wider countryside

Innumerable trees have been planted by farmers and other landowners as eyecatchers in their own right or to diversify the landscape, but it is often impossible to distinguish those that were self-sown and allowed to grow from those that were deliberately planted. Ashes and Sycamores mark many upland farms. Many *Populus ×canadensis* 'Serotina', mostly planted in the early 20<sup>th</sup> century, are now magnificent and conspicuous landmarks. Individual Pines have often been sited with a view to providing a focus for a view. The long line of Beeches on the high ridge above Blaenclettwr SN440536, though doubtless planted originally for shelter, enlivens the view from vantage points throughout the county.

### FC arboretum and trial plots

In 1956 the FC established an arboretum in **Allt Dderw, Gogerddan** SN630833 as part of their Rheidol Forest. Covering c.3ha, it was probably designed by F. Field and was planted up over the next twelve years. A total of 171 plantings were made, comprising 70 species of conifer and 51 species of broadleaves, each planting usually consisting of a group of 4-10 trees. Lists and maps of the plantings have survived, and in 1992-1996 I revised these, checking the identifications, measuring the trees, and marking which trees had survived. W. A. Cadman, in the 1950s a senior officer of the FC in Wales, wrote (in Edlin 1959): "A large arboretum has recently been planted at Gogerddan. This is handy to Aberystwyth, and will become of great scientific interest in the future." Unfortunately the FC rapidly lost interest in it, in the 1980s they drove a road through it destroying many of the plantings, and by the early 1990s it was very overgrown, many trees had fallen or died, and much of it was difficult of access. R. N. Thompson and M. Bromley among others attempted to get the FC to take it in hand and restore it as a public asset, but so far very little has been done and it remains a wilderness.

The survivors are 53 species of conifer and 31 species of broadleaves. Some of the former are rare in cultivation, notably *Pinus banksiana*, *P. densiflora*, *P. monticola*, *P. muricata*, *P. parviflora*, *P. resinosa* and *P. sabiniana*. Most of the conifers commonly planted for forestry elsewhere in the county have grown predictably well, but a number of others, never grown here on a large scale, have done equally well, including *Abies amabilis*, *A. concolor*, *A. veitchii*, *Picea glauca*, *P. orientalis*, *P. rubens* and *Pinus ponderosa*. Unfortunately most of the labels have long since disappeared, *Picea abies* was later extensively and confusingly planted for unknown reasons among the specimen trees in parts of the arboretum, and Sycamores and Rhododendrons have invaded. Nevertheless, it is still of great interest to the botanist, and I have included its trees in the species accounts in this Flora.

Above this arboretum is an interesting area where the FC trialled *Picea sitchensis* of differing provenances. Among other trial plots in the county, three in the uplands at **Castell** SN738907, at **Bryn Gwyn** SN745866, and at **Banc Creignant-mawr** SN735818, dating from the 1950s and 1960s contain many unusual species and, though now neglected, are well worth visiting. At Castell there are plantations of *Araucaria araucana* and *Abies amabilis*, and rarities such as *Abies firma* and *Tsuga mertensiana*. Bryn Gwyn has rare Spruces including *Picea glehnii*, *P. spinulosa* and *P. ×lutzii*, while Banc Creignant-mawr has *P. schrenkiana*, *P. glehnii* and *P. omorika* along with the frequently trialled *P. engelmannii*. These plantings are also included in the species accounts in this Flora.



FC trial plot, Bryn-gwyn, view SE  
from SN744866, April 2006

## Street and other amenity trees

The main settlements all have street trees of interest, as well as trees in their squares, public gardens and other amenity areas, and most have some degree of individuality in the species planted. Aberaeron is striking for its Hawthorns and Horse-chestnuts, Lampeter for its Maples, Penparcau for its Cherries, Aberystwyth for its Whitebeams and Rowans. There is a tendency for the more recent plantings to be of fast-growing, short-lived trees such as Birches, Cherries and Whitebeams, rather than long-lived trees such as the Elms that used to be a conspicuous feature of the Aberystwyth streets in the early part of the 20<sup>th</sup> century. Trees such as Horse-chestnuts and Oaks, old trees of which characterise Alexandra Road, Aberystwyth, seem no longer to be being planted for the future.

The street trees of **Aberystwyth** c.SN58V and its suburbs have been mapped and identified in recent years by PWD and AOC, and their well-being and replacements are being addressed by, among others, the Greener Aberystwyth Group (GAG). The various Whitebeam cultivars in North Parade are led by a spectacular *Sorbus thibetica* 'John Mitchell' at the W end. The upper part of Portland Street has fastigate *Prunus ×schmittii* and the lower part has fastigate *Sorbus aucuparia* 'Sheerwater Seedling'. Plas Crug has many species. Around the new Welsh Assembly building nearby, among the predominantly foreign tree and shrub species and cultivars planted, it is claimed, "to significantly enhance the biodiversity and potential of the site", are specimens of the remarkably fastigate *Quercus robur* 'Koster'. At **Penparcau** c.SN590802 the Japanese Cherries include, besides garish specimens of *Prunus serrulata* 'Kanzan', several 'Ukon', a 'Pink Perfection' and a 'Kursar'; a striking tree of the latter, the earliest to flower of all the street trees, is by the Cambrian Printers in **Llanbadarn Fawr** SN600807. The **Glanvraffon** industrial estate c.SN610803 has much of interest, including a good range of Birches, decorative Apples and Alders.

Most of the great variety of Hawthorns at **Aberaeron** SN46L, R, can be found in the Chalybeate Gardens, in Alban Square, by the harbour and in Penmaesglas. *Aesculus hippocastanum*, its cultivar 'Baumannii', *A. carnea* and *A. ×plantierensis* are by the harbour. **Lampeter** c.SN575482 has cultivars of *Acer platanoides*, *A. saccharinum* and *A. cappadocica* in Peterwell Terrace. The centre of **Cardigan** is generally devoid of street trees, but the Victoria Gardens SN182465 have an unusually short-leaved *Cedrus atlantica*, and there are trees of interest in Gwbert Road, Bro Teifi, Maes yr Haf and especially by Theatr Hafran.

## Scrub

Most scrub in the county is a transitional habitat, occurring on abandoned pastures, at wood margins and at the edges of bogs and other wetlands. *Ulex europaeus* scrub is extensive and widespread on hillsides and on the coastal slopes where the land is too steep for grazing, and it is often burnt, deliberately or accidentally, and regenerates rapidly by sprouting or from seed. It is often mixed with *U. gallii*, and a characteristic associate is *Ceratocarpus claviculata*, very sensitive to grazing and flourishing even in the densest Gorse thickets. Gorse was often used for hedging, and doubtless often spread out to form scrub from this source. There is an extensive area of *U. europaeus* scrub on the upper part of the sand dunes at Penyrergyd SN14U, land that has presumably never been much managed; much of this Gorse has recently been experimentally cleared by CCW in the hope that a more varied dune flora will develop. *Prunus spinosa* scrub, invading pastures by suckering, is widespread. *Crataegus monogyna* is less often dominant in scrub, and usually seeds in rather than suckers. It is a conspicuous feature with Bracken on the ramparts of the Iron Age camps. *Rubus* spp. scrub is very widespread, on under-grazed pastures, at wood edges, in felled woodland and woodland clearings. *Rosa* spp., growing in scrub as opposed to hedges, are a comparatively rare feature in the county. On the coastal slopes what appears to be a climax scrub often covers large areas; it is usually dominated by *Prunus spinosa*, with varying amounts of *Ligustrum vulgare*, *Corylus avellana*, *Rubus* spp., *Crataegus monogyna*, *Lonicera periclymenum*, *Tamus communis*, etc. Pure *Corylus* scrub occurs chiefly on some of the coastal slopes, as in Cribach Bay on the MoD site, Aberporth SN250521, and on valley sides in the uplands, for example near Ystumtuen SN738784, 1km S of Ysbyty Ystwyth SN728705 and by the Afon Pysgotwr



Unintentional scrub management: Gorse fire on Pendinas, view SE from SN579806, 1 June 2007



Fawr SN734516; at these latter sites it is mostly Sheep-grazed and does not regenerate. Suckering colonies of *Rosa spinosissima* form dense scrub on the sand dunes and cliff slopes in many places. *Salix cinerea* and *S. aurita* are frequent colonists of wet heath and bogs, and both, and their hybrid, form extensive areas of carr in most of the valley mires in the county.

## Heaths

Jones *et al.* (2003) estimated 820ha of lowland heathland in the county, made up of 410ha of dry, acid heath, 280ha of wet heath, and a notional heathland half of the 460ha of grass/heath mosaic. The 3,500ha of upland heath comprised 2,100ha of dry, acid heath, 240ha of wet heath, and a notional half of the 2,400ha of grass/heath mosaic.

### Maritime heath

Apart from very small areas of *Calluna* heath on degraded sand dune on parts of the Borth golf course SN6091, most of the maritime heath is on thin, well-drained, acidic soils on the cliff slopes. In some areas, such as the W slope of **Pendinaslochdyn** SN314548 where there is little or no grazing, there is a dense dwarf shrub heath of *Ulex gallii*, *Erica cinerea* and *Calluna*, extremely colourful when in flower in late summer, and in other areas, for example at **New Quay Head** SN383603, tall *Calluna* heath has developed on scree. These heaths, though subject to much salt spray, are virtually identical to many upland heaths apart from the absence of *Vaccinium myrtillus*. On even more exposed and often grazed slopes a more diverse community with more obvious maritime influence has developed. Dwarfed *Calluna*, *Scilla verna*, *Serratula tinctoria* var. *reducta*, *Succisa pratensis* var. *arenaria*, *Betonica officinalis* var. *nana*, *Dactylis glomerata* var. *collina* and *Danthonia* are common constituents; in some places, for example just E of **Mwnt** SN1952-2052 where such heath has spread onto long-abandoned fields from the steeper slopes below, *Scilla verna* provides a spectacular display in May while the other species tend to be most colourful in late summer. On the MoD site, Aber-porth SN246525, the presence of an arable weed seed bank shows that some at least of the maritime heath has developed in the last 70 years on former arable fields whose banks are still extant (Chater 1982a). Other good examples of maritime heath are on **Allt Wen** SN57U, at **Pen Peles** SN25B where *Viola lactea* occurs, above **Craig y Filain** on the MoD site, Aber-porth SN25G, where *V. lactea* again occurs, and at **Gwbirt** SN15Q (though the heath here has been much reduced in recent decades). Jones *et al.* (2003) estimated a total of 60ha of “coastal heath” in the county, plus a notional heathland half of the 23ha of the coastal grass/heath mosaic.



*Ulex gallii* and *Erica cinerea* heath,  
Pendinaslochdyn, Llangranog, view SW  
from SN314548, July 1989

### Lowland wet heath

Away from the immediate coast, there are substantial areas of the very characteristic Oceanic habitat of lowland wet heath. A very artificial habitat, maintained in the past by grazing and burning, extensive areas of it, especially in the S of the county, were lost during the 20<sup>th</sup> century. The coincidence map of heathland species (Map 11, p154) shows the ghost pattern of former heaths here and elsewhere in the lowlands,



Relic heath vegetation on ridgeway banks N of Blaencathal, view S from SN456471, June 2008



*Erica tetralix*, *Ulex gallii* and *Molinia* wet heath, Comins Capel Betws, view SE from SN61655737, September 1982

where relic plants remain on the field banks. Some of the best remaining sites are **Comins Capel Betws** SN616573, **Rhos Cilcennin** SN528622, SE of **Cross Inn** SN56L and **Pantyrhedydd Common** at Blaen Cribor SN401482. These are on fairly level ground with impeded drainage and thin peaty soils, *Calluna* and *Erica tetralix* are the dominant dwarf shrubs, *Ulex gallii* and *Genista anglica* are often present, *Trichophorum germanicum*, *Juncus squarrosus*, *Polygala serpyllifolia* and *Potentilla erecta* are among the frequent herbs, and the heath often grades into *Molinia* and valley mire. Parts of the extensive and varied **Rhos Gellie** SN35R, W, are very similar to the St David's heaths in Pembrokeshire, with *Molinia*, *Carex pulicaris*, *C. hostiana*, *Succisa*, *Ulex gallii*, *Calluna* and *Erica tetralix*.

A good example of the effect of the abandonment of management can be seen at **Aber-arth Common** SN479622, where regular burning and grazing by encamped gypsies used to maintain a fine wet heath community until the mid 20<sup>th</sup> century, slight remnants of which can still be seen among the scrub and woodland that has developed since the gypsies stopped using the site (there was a later small burn in 1979). At **Rhos Cwmsaeson** SN461587 wet heath became overgrown in the 1990s through lack of grazing, but, after a fire in 1994, *Viola lactea* reappeared and since then grazing has begun to restore the heath. Small areas of wet heath are a regular component of the mosaic of habitats comprising most of the areas of rhos pasture in the county. Much information on the vegetation and management of lowland wet heaths can be found in Evans (1989), and Prosser & Wallace (2002) describe a dozen of the sites.



Aber-arth Common wet heath, view NE from SN479622, July 1981

### Inland and upland dry heaths

On acidic, leached soils, mostly on well-drained slopes, heathland dominated usually by varying combinations of *Calluna*, *Ulex gallii* and *Vaccinium myrtillus* has developed. In the lowlands it is generally only in small areas, on rocky slopes where grazing and pasture improvement are impractical. Of particular interest, though more important for lichens and invertebrates than for vascular plants, are the shingle heaths on the flood plains of the Rheidol and Ystwyth, most easily seen between **Tynbedw** SN696716 and **Grogwynion** SN720721 on the latter river. Heavy metal pollution from the lead mines upstream is believed to have inhibited the establishment of deep-rooted trees, so allowing the heath to remain as a climax community. Extensive stands of *Calluna* on the drier ridges, recently partly devastated by Heather Beetle, alternate with areas of *Molinia*. In barer areas of shingle *Festuca ovina* and *F. lemanii* can be abundant, with *Jasione montana* var. *litoralis* and *Silene uniflora* as characteristic associates.



Intensive Sheep grazing prevents the development of heath over much of the uplands, but the rapidity with which it can develop under the right conditions can be seen where sheepwalks have been fenced off for FC plantations. The same can be seen where roadside slopes have been fenced, for example by the A44(T) at Nantyrarian SN715810 and near Eisteddfa Gurig SN7983. Much research has in recent decades been done by ADAS at Pwllpeiran on the restoration of Heather moorland in the uplands, ironically reversing the decades of research started there by Stapledon in the 1930s that did so much towards converting this heath to grass-dominated sheepwalk in the first place. Among many areas of *Calluna*-dominated heath, the N side of **Glog** at Cwmystwyth SN792745 and the ridges E of **Ystumtuen** SN77P are especially fine. At a number of sites, for example **Padell Nant Wyddon** SN785832, steep slopes are dominated by *Ulex gallii* and *Erica tetralix*. Much lead mine spoil, such as that at Cwmsymlog c.SN700837, is dominated by *Calluna* heath.



Upland heath with *Ulex gallii* and *Erica tetralix*, Padell Nant Wyddon, view W from SN784833, August 2006

The Sheep-free rides, roadsides and occasionally very steep unplanted slopes within FC areas often contain exceptionally tall heath where *Calluna* and *Vaccinium myrtillus* have been growing unchecked for many decades. *Lycopodium clavatum* often grows well on the ungrazed roadsides. The SE facing slope E of **Craig y Pistyll** SN716857, dominated by *Ulex gallii*, *Erica cinerea* and *Calluna* is very similar to that on the coast at Pendinaslochdyn. *Carex binervis*, *C. pilulifera*, *Deschampsia flexuosa*, *Potentilla erecta*, *Polygala serpyllifolia* and *Agrostis vinealis* are very common in these upland heaths. Some quite heavily grazed N facing slopes, for example in **Cwm Berwyn** SN7158, are dominated by *Vaccinium myrtillus*, which survives in over-grazed heath much longer than *Calluna* and is usually the first dwarf shrub to become conspicuous when grazing is relaxed. *Vaccinium vitis-idaea* and *Empetrum nigrum* occasionally occur, but are more characteristic of blanket bog communities. These dry heaths of the uplands grade into the dwarf shrub communities of blanket bog which are much more widespread and extensive. Deliberate burning in the uplands is usually of *Molinia* and the only dry heath that is now at all regularly burnt is probably where *Ulex gallii* is abundant. *U. gallii* is also set back severely by hard frosts.

## Grasslands

### Lowland grasslands

Most of the lowlands consists of grassland variously managed for grazing by Sheep, Cattle and Horses and, increasingly, for silage. Hay meadows are now few and decreasing. The amount of lowland grassland ploughed and reseeded in recent decades vastly exceeds that which has retained a rich variety of species under grazing alone. Grass and other herbage seed of non-local origin has been sown in huge quantity over at least the last two centuries and, as in many other habitats, it is now impossible to gauge what may or may not be of native stock.

The liming and fertilising of pastures has over the centuries had a profound effect on the plant communities, but, again, it is usually impossible to tell exactly how much they have been modified in this way. Animal manure has always been used, and more recently slurry has led to gross eutrophication. Jack (1988) describes the early use of chemical fertilisers, which in medieval times in Cardiganshire were chiefly calcareous marl and calcareous sea sand. The main source is the 16<sup>th</sup> century antiquary George Owen's 1599 *Treatise of marle*, along with his account of it in the *Description of Pembrokeshire* (Owen 1892). He described "clay marle" as occurring in a dozen or so parishes in Cardiganshire in the SW of the county and recognised that it was of marine origin: "The opinion of the Countrie people where this Marle is founde is that it is the fattnes of the Earthe gathered at Noes flood ..... it is verie like to be true, for wheresoever the same is founde, it is loppie [loose] and covered with sande gravell and round peblestones such as you shall find at the sea side verie plaine, appearing that the stones hath ben worne by the sea or some swift river. Also in the harte of the Marle is founde diverse sortes of shells, of fishe, as Cogle shells, Muskell shells, and such like, some altogether rotten & some yet unrotted ..... and this seaven or eight myles from the sea so that it is verie probable, that the same came into these places at the tyme of the great and generall flood." This marl,

which is the somewhat calcareous Irish Sea Ice Sheet till (see the geology chapter), was described by Owen with reasonable accuracy as occurring north to Aber-porth and up the Teifi to Newcastle Emlyn. It was dug from marl pits and spread on fallow fields and leys and its long-term benefits were recognised in the saying that a countryman used “Sande for himself, Lyme for his sonne, and Marle for his graunde child”. Davies (1815), by whose time this had become “lime for yourself, and marl for your son”, gives more detail on its use in the county, especially as a cheap alternative to lime, and describes a marl pit at Llwynduris Farm SN237434.



Limekiln on sea cliffs, Morfa Bychan, view NNE from SN567777, May 1998

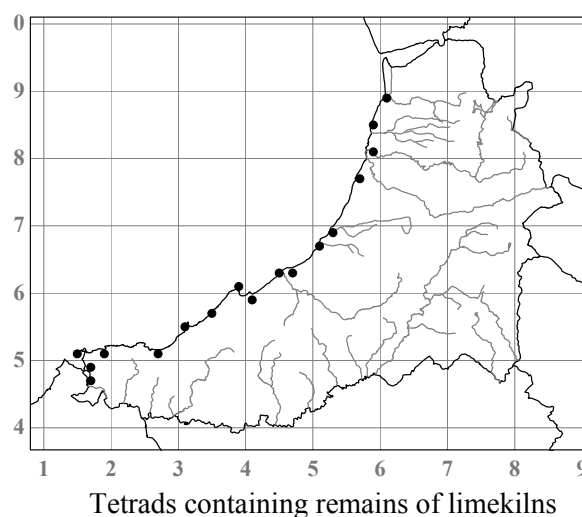


Aberstringell limekilns, view NNE to Llanrhystud from SN519684, February 1995

There seems to be little or no evidence for the use of lime in Wales before the 16<sup>th</sup> century. Moore-Colyer (1988, 1990) mentions that from the late 17<sup>th</sup> to the mid 18<sup>th</sup> centuries the leases at Trawsgoed c.SN67R required deliveries of lime to the home farm, and then describes in detail the uses and trade in lime in the 18<sup>th</sup> and 19<sup>th</sup> centuries. Cardiganshire had to rely entirely on imported limestone, most of it coming from S Pembrokeshire to the kilns along the coast. The lime was spread on pastures as well as ploughed fields in the summer. Not only must this liming itself have had a great effect on the vegetation, but the pH of the surroundings of the kilns was clearly raised and this is often reflected in the species present, for example *Trisetum flavescens* at several of the coastal sites. To what extent farmers inland cut costs by using “sodkilns” for burning limestone on the farm is uncertain, but here too the limestone will have had its effects. Ground limestone too has been widely used, up until the present. Sea sand was widely used on pastures as well as arable fields, and provided the more calcareous sorts were used it was, for coastal areas, a cheap substitute for lime (Davies 1815). Seaweed too was widely used. The coral-like fragments sometimes seen nowadays spread on pastures are the calcareous fertiliser maerl, coralline algae damagingly dredged from the sea bed and usually coming from Cornwall. From the early 20<sup>th</sup> century, basic slag, a phosphatic waste product of steel-making, was almost universally used on the county’s pastures, and it and the recent more sophisticated chemical fertilisers have to varying degrees often effectively obliterated the effect of the local geology on the vegetation.

A remarkable series of elaborate experiments by Chippindale & Milton (1934, and, in less detail, Milton 1936) involved germinating the seeds from under a variety of pasture types in the Aberystwyth district, grassland never cultivated, pasture more than 50 years old, pasture formerly arable, and hay meadows grazed in autumn and winter. In the marsh below Frongoch Farm SN608828 for example, that had never been cultivated, the seed bank contained such species as *Leucanthemum vulgare*, *Scutellaria minor*, *Anagallis tenella* and *Wahlenbergia*. Other sites of course gave a wealth of arable weeds.

**Rhos pastures**, the equivalent of “culm grasslands” as these habitats are known in some other areas, are a major feature of the county and have been especially targeted for conservation by NCC/CCW and the Wildlife Trust. Rhos pasture sites typically consist of a mixture of neutral and acidic dry grassland, marshy and sedge-rich grassland and wet heath (dealt with separately in the relevant sections), they often have areas





of fen and bog, and they often have abundant non-tussocky *Molinia* in the sward that is probably mostly subsp. *caerulea*; they are often on periglacial deposits such as pingo sites, and their consequent varied and uneven topography contributes to their floristic richness. In this respect, as indeed in others, they can be seen as the grassland equivalent of ancient woodland.

### Lowland dry grasslands

Although much of the lowlands of the county consists of recently reseeded pastures and silage fields, more semi-natural grassland survives than in many parts of Britain.

The most widespread currently sown grassland community in the lowlands is dominated by various cultivars of *Lolium perenne*, *L. ×boucheanum* and *L. multiflorum*, usually with cultivars of *Trifolium repens*, and often with other grasses such as *Phleum pratense* and *Poa trivialis* (MG7). Conspicuous annual weeds include *Cerastium glomeratum*, *Stellaria media*, *Poa annua* and *Capsella bursa-pastoris*. These leys are extensively used for silage, and are grazed later in the year. Most of the permanent pasture in the county, which can in time develop from this community, is dominated by *Lolium perenne* with varying amounts of *Cynosurus cristatus*, *Agrostis capillaris*, *Anthoxanthum odoratum*, *Festuca rubra*, *Plantago lanceolata*, etc. and very few annuals (MG6). *Cerastium fontanum* (instead of *C. glomeratum*), *Bellis perennis*, *Ranunculus acris* and *Achillea millefolium* are characteristic, and *Cirsium arvense* and *Senecio jacobaea* can become abundant and require controlling. Most of the dominant grasses and clovers in even the semi-natural pastures are probably not native to the county but are derived from cultivars sown over the last two or three centuries.

Most of the unimproved herb-rich neutral grasslands of particular interest to the botanist have as their most abundant grasses *Festuca rubra*, *Agrostis capillaris* and *Cynosurus cristatus*, with *Lotus corniculatus*, *Trifolium pratense*, *T. repens* and *Centaurea nigra* among the characteristic herbs (MG5). There are many variants of this community, some of which in the county are not yet described by the NVC. They can be managed both as pasture and for hay. Hay meadows are rather few in the county, even in the lowlands, and are a still-decreasing feature. A good example is on the SW side of **Pendinas** SN581804, where the meadow



Reseeded pastures, Coed-parc, Dulas valley, view SW from SN586512, March 1983



Felin-y-mor hay meadow, Aberystwyth, view S from SN581804, May 1992



Meadow on coastal slope W of Tynbwllch, Llanddeiniol, view W from SN55597326, July 2008

includes locally abundant *Trisetum flavescens* and *Rhinanthus minor*. Even more outstanding is the 1.6ha meadow at **Winllan**, Trefilan SN566572, regularly managed for a hay crop for over 30 years since it was acquired as an over-grazed, species-poor *Lolium*-dominated pasture. During this period it has developed an extremely rich flora. The site becomes flooded at least once a year. The hay is usually cut in early July, with Sheep-grazing of the aftermath. *Bromus racemosus*, rare in the county, is now abundant among the more usual grasses such as *Festuca rubra*, *Anthoxanthum*, *Holcus lanatus*, *Cynosurus*, *Alopecurus pratensis* and

*Bromus hordeaceus*. *Centaurea nigra*, *Lathyrus pratensis*, *Euphrasia arctica* subsp. *borealis*, *Ranunculus acris*, *Vicia cracca*, *Leucanthemum vulgare*, *Filipendula ulmaria* and *Rhinanthus minor* are among the herbs, and *Sanguisorba officinalis* has notably increased in abundance in recent years. *Lotus corniculatus* is interestingly absent. *Platanthera chlorantha* first appeared as a single plant in 1990 and now numbers several hundreds, and there is a bewildering swarm of *Dactylorhiza praetermissa*, *D. purpurella*, *D. maculata*, *D. fuchsii* and their hybrids.

The pastures of this community are extremely varied and often very species-rich. **Caeau Llety-cybi** SN603535 is a fine example with dry slopes covered with an abundance of *Leontodon hispidus*, *Lotus corniculatus*, *Centaurea nigra*, *Platanthera chlorantha*, *Pimpinella saxifraga*, *Potentilla erecta*, etc., with the rare *Euphrasia officinalis* subsp. *monticola* as well as subsp. *pratensis*. **Cae Heslop** SN318413 has fine populations of *Orchis mascula* and *Primula veris*.

On many of the rhos pasture sites, especially on soils derived from the Irish Sea Ice Sheet till (which in general is more calcareous than the till from the Central Wales Ice Sheet), there are areas of uneven topography, often involving pingo ramparts, where such species as *Vicia orobus*, *Gymnadenia borealis*, *Sanguisorba officinalis*, *Centaurea nigra*, *Potentilla erecta*, *Genista tinctoria*, *Serratula tinctoria*, *Betonica officinalis*, *Succisa pratensis*, *Salix repens*, *Carex pallescens*, *Botrychium lunaria*, etc. grow in the drier parts of the site, with *Agrostis capillaris*, *Anthoxanthum*, *Festuca ovina*, etc. as the dominant grasses, and the community merges into fen in the flushed depressions and into wet heath on some of the ridges. In places on more acidic soils *Succisa* can become abundant, and *Pedicularis sylvatica*, *Lathyrus linifolius*, *Dactylorhiza maculata*, *Danthonia decumbens*, *Festuca rubra*, etc. are common. These communities form part of the dense mosaic on various WTSWW reserves such as **Rhos Glynrhelyg**, **Rhos Pil-bach**, **Rhos Fullbrook** and on the **Rhos Llawr-cwrt NNR**, and in most of the rhos pasture SSSIs. They can also be found in many of the churchyards and chapel graveyards such as those where *Anacamptis morio* grows.



Winllan hay meadow being mown,  
view S from SN566572, 25 June 1996



*Primula veris* and *Orchis mascula*,  
Cae Heslop, view SE from SN318414, May 1983

The calcicole grasses *Avenula pubescens*, *Briza media* and *Trisetum flavescens* sometimes occur, the first chiefly on the coast where, as well as in dune pasture at **Ynys-las** SN608936, it can be abundant on some of the ungrazed slopes on the Irish Sea till, growing with *Arrhenatherum*, *Heracleum sphondylium* and a wide variety of other species. *Briza* and *Trisetum* are often in churchyards, and *Briza* is in many of the drier neutral or slightly base-rich pastures, with *Trisetum* more in the hay meadows.

Damp, slightly waterlogged grasslands are often dominated by coarse grasses such as *Deschampsia cespitosa* subsp. *cespitosa* and *Holcus lanatus* (MG9), with abundant *Arrhenatherum* and *Dactylis* where there is little grazing, and sometimes *Centaurea nigra*. *Arrhenatherum* is often dominant in ungrazed drier sites (MG1), with abundant *Heracleum sphondylium*, *Rumex obtusifolius* and other large herbs, *Dactylis* is again abundant, and *Epilobium hirsutum* colonies are often present.



Many of the more acidic grassland communities make a substantial contribution to the vegetation of the lowlands. Those on slopes with dry, shallow soils, usually well-grazed and with a short, often open turf, are frequently dominated by *Festuca ovina* and *Agrostis capillaris* (U1), with *Rumex acetosella*, *Sedum anglicum*, *Aira praecox* and many other ephemerals such as *Aphanes australis*, *Ornithopus perpusillus* and *Cerastium diffusum*. On parts of the coast, for example along the clifftops between Borth and Wallog SN58X, Y, Z, and at Mwnt SN15W, this community can be very rich in species, with in places such uncommon plants as *Moenchia erecta*, *Filago vulgaris*, *Erodium maritimum* and *Bromus hordeaceus* subsp. *ferronii*.

Species-poor grassland dominated by *Deschampsia flexuosa* (U2) usually occurs in small areas, but can cover extensive tracts of felled woodland as a transitional community, usually with *Galium saxatile* and often with much *Carex pilulifera*. Inland, and especially towards the uplands, grassland dominated by *Agrostis capillaris*, *Festuca ovina* and *Anthoxanthum*, with abundant *Galium saxatile* (U4) often occurs, and can even be found in churchyards such as Gwnnws SN685695 and Llangybi SN608531. *Nardus* grasslands (U5) are present in the lowlands usually only in small areas, and where they do occur they tend to merge into heathy communities. These last two communities are regular constituents of the more acidic parts of the rhos pasture sites.

Bracken is a prominent feature of much of the county, not only in the uplands, and Bracken-dominated areas, although mostly deplored by farmers and conservationists, can be of considerable interest. They may well also have a wider significance as carbon sinks and in the balance of other chemical elements in the soil (see discussion in Marrs *et al.* 2007). On many of the deeper soils on the coastal slopes where Bracken is dominant, there is usually less effort made to control it than inland, and it usually supports a rich flora, especially of spring-flowering species which react to the Bracken cover developing in late spring much as though it were woodland; to what extent such sites are woodland relics is very uncertain. *Ficaria verna* subsp. *fertilis*, *Hyacinthoides non-scripta*, *Oxalis acetosella* and *Viola riviniana* can be abundant, *Orchis mascula* is often present, non-woodland species include *Potentilla erecta*, *Luzula campestris* and *Carex caryophyllaea*, and the main grasses are usually *Anthoxanthum*, *Agrostis capillaris* and *Festuca ovina*. In the more sheltered and ungrazed parts of the slopes this can merge into a more maritime community (MC12). Inland Bracken-dominated areas are usually less rich in species, but in addition to the same grasses usually have *Galium saxatile*, *Carex pilulifera*, etc. (U20).



Slangs on Morfa Esgob, Llan-non,  
view E from SN512669, December 1973



Spring flora in coastal Bracken colony  
(*Mercurialis perennis*, *Hyacinthoides*, *Ficaria verna*), Cwm Cilfforch SN442618, May 2004

At Llan-non c.SN510671 an area of c.50ha known as Morfa Esgob is the largest surviving area in Wales of medieval strip cultivation, the hundred or so long, narrow slangs or lleiniau being mostly now pasture and exhibiting a great variety of grassland types. Eight of the forms of *Convolvulus arvensis* grow here, and two of the slangs contain *Galium album*.

### Lowland wet grasslands and fens

Vast areas of the county on waterlogged or flushed soils consist of acidic, species-poor and often reseeded pasture with varying abundance of *Juncus effusus* and a grass sward typically of *Lolium perenne*, *Holcus lanatus*, *Poa trivialis* and *Agrostis stolonifera*, with generally few herbs such as *Trifolium repens* and *Cardamine pratensis* (MG10), a desert for the botanist except where, as on the Irish Sea till in the SW of the county *Juncus inflexus* replaces *J. effusus* and such species as *Senecio aquaticus* and *Iris pseudacorus* become abundant. But there are also many areas of marshy pasture of great interest and richness, often comprising parts of the rhos pasture sites or associated with valley mires.



Rhos pasture at Blaenclettwr,  
view NW from SN447528, May 1988

The presence of *Juncus acutiflorus* on flushed areas of slopes and around the edges of valley mires generally indicates the much more species-rich marshy grassland community (M23) that is a regular component of rhos pasture sites. *Holcus lanatus*, *Agrostis canina*, *Galium palustre* subsp. *tetraploideum*, *Lotus uliginosus*, *Myosotis secunda*, *Cerastium fontanum*, *Ranunculus acris*, *R. repens*, *R. flammula*, *Cirsium palustre*, *Silene flos-cuculi*, etc. are common, and other species, several with an Oceanic distribution, include *Carum verticillatum*, *Scutellaria minor*, *Hydrocotyle vulgaris*, *Viola palustris* and *Epilobium palustre*. *Carum* can be in spectacular abundance in some sites in the middle and SE of the county, for example NE of Rhydowen SN44N, T, and E of Llanybi SN65B, G, H. *Hypericum undulatum* occurs in this community in a few sites between the Ystwyth and Wyre valleys such as **Rhos y Fforest** SN618729. *Juncus subnodulosus*, characteristic of more mesotrophic conditions, is very rare in the county, occurring at only four sites around **Cors Fochno**. A tall-herb fen community dominated by *Filipendula ulmaria* (M27) rather than by *Juncus*, characteristic of less grazed and more waterlogged sites, is very common and is especially associated with the valley mires, and usually has some *Valeriana officinalis*, *Angelica sylvestris*, *Eupatorium cannabinum*, *Rumex acetosa*, etc.

Most of the areas dominated by *Molinia* in the lowlands are species-poor and acidic, with *Potentilla erecta* and rather few other species (M25). They are on flushed slopes and around the valley mires, and are



Rhos pasture on ridge-and-furrow,  
Llain-las, Comins Capel Betws,  
view SW from SN61625718, June 1980



Rhos pasture at Esgairwen-fach,  
view SW from SN453538, June 1988

especially extensive around the raised bogs of **Cors Caron**. *Erica tetralix* and *Calluna* sometimes occur, as well as *Juncus acutiflorus*, *Succisa*, *Carum*, etc. The *Molinia* is generally tussocky and probably mostly subsp. *arundinacea*, but the potentially interesting matter of the phytosociology of the subspecies has been scarcely investigated. Slightly less acidic and drier *Molinia*-dominated areas, usually grazed and then sward-forming rather than tussocky, and probably mostly subsp. *caerulea*, are richer in species and sometimes have *Cirsium dissectum* colonies (M24), and are very characteristic of rhos pasture sites. Sedges here include *Carex hostiana*, *C. viridula* subsp. *oedocarpa*, *C. pulicaris* and *C. panicea*, and orchids



*Lythrum salicaria* and *Filipendula ulmaria* in fen at  
Dolau Aeron, view SE from SN58955815, August 1979



include *Dactylorhiza praetermissa*, *D. purpurella* and *D. maculata*. Good examples can be seen at the **Rhos Pil-bach** SN367529 and **Rhos Glynyrhelyg** SN498514 WTSWW Reserves and at the **Rhos Llaur-cwrt NNR** SN416500. Base-rich flushes in some of these sites can have *Carex viridula* subsp. *brachyrrhyncha* and intermediates to subsp. *oedocarpa*, *C. dioica*, *Eriophorum latifolium*, *Eleocharis quinqueflora*, *Triglochin palustris*, etc. (M10). Fens along the banks of the **Afon Mwldan** SN14Y, Z, 24E, enriched by seepages from the nearby calcareous deltaic sands, have extensive stands of *Carex acutiformis* on some of the slopes, and on level areas there is calcareous fen with *Gymnadenia densiflora*, *Epipactis palustris*, *Briza media*, *Eriophorum latifolium*, *Carex viridula* subsp. *brachyrrhyncha*, *C. paniculata*, *Galium uliginosum*, a *Euphrasia* that resembles *E. pseudokernerii* forma *elongata*, a *Luzula multiflora* resembling subsp. *hibernica*, and sparse *Phragmites*. Expected species absent from here include *Valeriana dioica* and *Cladium mariscus*, both very rare in the county and known from only one site each, but these Mwldan fens are nevertheless botanically the richest in the county. They are seriously threatened though by invasion of *Carex paniculata*.

On the flood plains of the major rivers, and most extensively along the Teifi, the pastures often consist largely of *Agrostis stolonifera*, *Festuca rubra* and *Lolium perenne*, with *Potentilla anserina* abundant (MG11), and this is the community in which the seasonally flooded hollows occur where *Rorippa islandica* is such a characteristic species. Under brackish influence, this community can merge into salt marsh, and along the Dyfi and the tidal reaches of the Teifi coarse forms of *Schedonorus arundinaceus* can be abundant (MG12) along with *Elytrigia repens* and sometimes *Carex otrubae* and *C. distans*. Inland the more regularly flooded pastures have areas dominated by *Agrostis stolonifera* and *Alopecurus geniculatus* (MG13).



Fen by Afon Mwldan SN1948, *Gymnadenia densiflora*, *Epipactis palustris*, *Briza media*, *Phragmites*, etc., July 2005



*Dactylorhiza maculata* site by Sarn Helen, view E from SN641583, December 1986 (summer view on p.746)



*Briza media*, *Epipactis palustris*, *Eriophorum latifolium*, *Gymnadenia densiflora* in fen by the Afon Mwldan, SN1948, July 1986

## Upland and montane grasslands

As well as having been probably largely created by Man in the first place our upland grasslands have been repeatedly and grossly modified by him in recent centuries. Sheep grazing has over vast areas created what Salter despairingly described as “brown paper country”, although as a result of the improvement schemes initiated by Stapledon much of it it could now better be described as “green paper country”. The same bodies that converted moorland and bog to grassland are now attempting to reverse the process. Equally vast areas have been converted to conifer plantations.

The extensive areas of upland grassy sheepwalk, mostly on thin, leached, acidic soils, that have not been reseeded, are largely dominated by *Festuca ovina*, *Agrostis capillaris* and *Galium saxatile* (U4), with *Nardus stricta* dominant often in more heavily grazed areas (U5). *Potentilla erecta*, *Polygala serpyllifolia* and *Carex pilulifera* are common associates. Where the soil becomes more peaty, *Juncus squarrosus* and *Luzula multiflora* (U6) can mark a transition to blanket bog, and where there is less grazing there can be transition to upland heath. *Luzula sylvatica* can be dominant (U16), not only on Sheep-free ledges but also on some of the open slopes. *Juncus effusus* occurs where there is slight flushing. Still acidic but slightly more mineral-rich grassland can be quite rich in species and can for example have colonies of *Viola lutea*, especially where there is less grazing pressure. On steep slopes in gullies and alongside streams *Oreopteris limbosperma* can be very abundant, with *Blechnum spicant* and *Dryopteris* spp. (U19). Bracken is dominant in some areas (U20) up to around 400-470m altitude. On the Claerddu stream just above Claerddu itself SN79236867 at 435m altitude, a couple of square metres of damp rocky bank is the only Sheep-free refuge in this extensive area of “brown paper country”, where *Alchemilla glabra* and *Sanguisorba officinalis* among other species have been able to thrive since at least 1898 when Salter first found them there (Diary 8.6.1898, 22.7.1902, 22.9.1904, etc.).



Salter's “brown paper country”, sheepwalk near Teifi Pools, view E from c.SN780683, September 1991



Sheep-free bit of streambank with *Alchemilla glabra*, Claerddu, view NW from SN79236867, July 1989



Reseeded upland pasture by Pond Rhosrydd, view N from SN706765, April 2008

*Lycopodium clavatum*, readily dislodged even though not eaten by Sheep, is largely confined to ungrazed sites in FC land and to some of the steepest, less heavily grazed slopes such as one below **Craig Ysbio** SN782831 where it grows alongside the other two Clubmosses. *Diphasiastrum alpinum*, neither eaten nor so readily dislodged, is exceptionally abundant on parts of the summit ridges of **Pumlumon Fawr**, probably because of the grazing pressure, and *Huperzia selago*, freely reproducing by bulbils, can also be abundant here. *Salix herbacea* is extremely rare, growing only at one site near the top and here too is a substantial area with abundant *Carex bigelowii*, its southernmost site in Britain. There is very little dry base-rich grassland in the uplands (CG10), but, in a few sites such as the S facing slopes of **Cwm Pemprys**



View N from SN819886, Pumlumon  
summit ridge, April 1974

SN711944, near **Craig Clungwyn** SN779470-782470  
and below **Craig Clogan** in Cwm Berwyn SN727580,  
*Thymus polytrichus* grows with *Festuca ovina* and  
*Galium saxatile*, and *Alchemilla filicaulis* subsp.  
*vestita* is additionally at the latter.

The improved and reseeded pastures in the  
uplands, which have steadily increased in area  
especially since the 1930s when the Cahn Hill  
Improvement Scheme was launched (Griffith 1936,  
1937), are generally dominated by *Lolium perenne*,  
*Agrostis capillaris* and *Cynosurus cristatus* (**MG6**,  
**MG7**). They readily become invaded by *Juncus*  
*effusus*, *Rumex obtusifolius*, *Cirsium vulgare* and  
*C. palustre*, with the var. *ferox* of the latter being one  
of the few unusual taxa. Of particular interest is a  
paper by Milton (1936) on the viable seed bank in  
upland pastures, the sampling for which included  
four sites in the county, and a later paper (1939) on  
the seed bank at different altitudes on Pumlumon.

Few upland meadows are still managed for  
hay, and some outstanding ones (mostly **MG5**), such  
as those below **Berthgoed**, Strata Florida SN764655,  
and near **Nant-Ilwyd**, Soar y Mynydd SN789524,  
that were still very species-rich in the 1970s, have  
been lost to reseedling or over-grazing in recent  
decades. Among the best that remain are those at  
**Cae'r-meirch**, c.SN756740 where such species as  
*Platanthera chlorantha*, *Gymnadenia borealis*,  
*Sanguisorba officinalis*, *Euphrasia arctica* subsp.  
*borealis* and *E. officinalis* subsp. *pratensis* occur. At  
**Ty-mawr**, Ysbyty Cynfyn SN757789 *Trollius*, *Vicia*  
*orobus* and *Euphrasia officinalis* subsp. *monticola*,  
as well as subsp. *pratensis*, are found.



Upland hay meadow, Berthgoed,  
view SE from SN76406557, July 1978



Upland sheepwalk raided by Rooks, view E  
to Llyn Gynon from SN791646, July 1998



Flushes and upland calcicolous grassland  
at E end of Craig Clogan, Cwm Berwyn,  
view NE from SN726579, October 2007

Antscape E of Cae'r-meirch, Hafod,  
view W from SN762737, May 2004







(above left) Hay meadow 700m N of Ystumtuen, view WNW from SN734793, July 1983

(above centre) Upland hay meadow, Cwmystwyth, SN77927365, August 1978

(above right) Upland hay meadow, Cae'r-meirch, view SSW from SN752737, July 1996



Upland hay meadow, Nant-llwyd, view SW from SN790524, July 1984





Cors Fochno, view W from SN654907, February 2010

## Peatlands

### Lowland peatlands

As blanket bog is virtually confined to the uplands, the ombrogenous bog features of the lowlands are chiefly the great raised bogs of Cors Fochno and Cors Caron. These are probably the most studied habitats in the county and can only be briefly described here. **Cors Fochno** (Borth Bog) SN69F, G, K, part of the Dyfi NNR, is one of the best-preserved raised bogs in lowland Britain, covering some 550ha and virtually at sea level. Key references include Godwin & Newton (1938), Godwin (1943), Slater (1972, 1974), Fox (1984) and see Walker & McCarroll (2001). The central rather low dome, which reaches c.6m above sea level, has a characteristic hummock and hollow surface structure. Along with the all-important *Sphagnum* species and other mosses, the hummocks are dominated by *Calluna* and *Myrica*, and the hollows have *Eriophorum angustifolium*, *Rhynchospora alba*, *Andromeda*, *Vaccinium oxycoccos*, *Drosera anglica*, *D. intermedia*, *Narthecium*, *Erica tetralix*, etc. *Eriophorum vaginatum* and *Trichophorum ×foersteri* are very abundant especially towards the margins. Apart from occasional burning, the dome is largely unmodified. Around the dome though there has been a great deal of peat-cutting with a few open pools,

*Nymphaea alba* in bog pool, Cors Fochno  
(engraving by F. W. Heyl in D. Jones 1887)







but these have generally been lost to *Sphagnum* and *Eriophorum* and overgrown by *Molinia*, *Phragmites* or *Myrica*. *Trichophorum germanicum* can be abundant, and *Drosera anglica*, *D. intermedia* and *Rhynchospora fusca* occur in some of the cuttings, chiefly where they have been recently re-wetted, and in peaty scrapes that have been created especially for dragonflies. *Osmunda*, *Dryopteris carthusiana* and *D. ×deweveri* are abundant chiefly where there is carr, and are now increasing. Towards the W side there is a transition to slightly brackish conditions where *Juncus subnodulosus*, *J. maritimus*, *Schoenus nigricans*, and, formerly, *Blysmus rufus* occur. The amount of tidal inundation, as well as the water table of the whole complex, has been determined to some extent by management of the ditches and the construction of bunds. Around the raised bog and elsewhere along the Dyfi are areas of further bog, fen and carr, notable interesting sites being **Ynys Edwin bog** SN676961 with *Myrica*, *Osmunda* and *Andromeda*, **Ynys Eidiol Common** SN673951 with *Juncus maritimus* growing out of *Sphagnum*, and *J. subnodulosus*, and the **Taliesin carr** SN652912 with fine stands of *Osmunda* and *Carex paniculata*.

**Cors Caron** (Tregaron Bog) SN671613-710670 is an immensely complex site comprising three raised bogs (West Bog, South East Bog and North East Bog), the Afon Teifi with its associated lagoons, swamps, fens and flood-plain grasslands flowing between them, and extensive peripheral areas of bog, fen and carr, in all covering over 800ha in the upper part of the Teifi valley. Key references include Godwin & Mitchell (1938), Godwin & Conway (1939), Hughes *et al.* (2007), Savidge & Hardy (1985), and see Walker & McCarroll (2001). Some 60 NVC communities have been recorded. The domes of the three bogs were largely intact until the beginning of the 20<sup>th</sup> century, but over the next half century their fringes were much modified by peat cutting, more so than the dome of Cors Fochno, and there is currently much concern that the Cors Caron bogs are drying out. The West Bog



*Carex paniculata* and *Caltha palustris*, Taliesin  
*Salix cinerea* carr SN653913, April 1978





Cors Caron, West Bog on left, South-east Bog

is the best preserved, and again has a hummock and hollow surface, but it strikingly differs from Cors Fochno in the almost complete absence of *Myrica* and in the presence of frequent *Empetrum nigrum* (absent from Cors Fochno); there are also a few bushes of *Betula pubescens* subsp. *tortuosa*. As well as drying out, its surface has become more hummocky and *Calluna* and *Eriophorum vaginatum* have become more abundant since the 1930s. *Molinia*, probably all subsp. *arundinacea*, has also become more widespread even on the dome, and is dominant and tussocky in the rand community all around, where among the more interesting features is a colony of *Vaccinium ×intermedium*. On Cors Caron as a whole the range of *Molinia*-dominated communities is outstanding. At the N end of the West Bog “Godwin’s lagg” SN685646 is the only comparatively undisturbed stretch of lagg vegetation surviving, a wet and varied habitat with a great range of species including *Carex paniculata*, *C. pulicaris*, *C. limosa*, *C. hostiana*, *C. rostrata*, *Andromeda*, *Salix repens*, *Drosera anglica*, *D. intermedia*, *Rhynchospora alba*, etc. As at Cors Fochno, the *Trichophorum* on the dome is *T. ×foersteri*, and it is also in the lagg. NE of the raised bogs is an area of great complexity, variously modified in places by drainage, peat cutting, grazing and scrub encroachment, and of special interest here are areas of swampy fen with *Sanguisorba officinalis* and *Salix repens* var. *fusca*.

There are numerous other lowland bogs in the county, variously modified by drainage and peat cutting, and with many different communities and rich in species. Some are part of valley mire complexes, while others are more in the nature of basin mires. Good examples include **Cors Bwlch-y-baedd** SN710700, a large valley mire with *Andromeda* and *Carex limosa*; **Cors y Sychnant** SN697691, nearby at lower altitude, is a valley mire notable as the only site apart from Cors Fochno that has any abundance of *Myrica*; **Cors Nantcwnlle** SN575599, very cut over but with extensive bog pool vegetation developing to bog via transition



Cors Nantcwnlle with *Osmunda* clumps,  
view E from SN574598, June 1999



Cors Bwlch-y-baedd valley mire,  
view ESE from SN710702, February 2008



on right, view NE from SN661614, January 2010

mire, has an outstanding display of *Osmunda* clumps; **Cors Caranod** SN565647 is an apparently domed bog with *Andromeda*, and is surrounded by heath; and other smaller ones in this latter area include those at **Rhos Cilcennin** SN527620 and **Rhos Talglas** SN554634. On the Mynydd Bach there are several places where extensive areas of bog and swamp have developed quite recently. At the SW end of **Llyn Eiddwen** SN604667 the castle folly was still on an island as recently as the 1950s but is now connected to the shore by an extensive swamp and transition mire. **Cors Llyn Farch** SN595634 still had a significant lake well into the 19<sup>th</sup> century, but is now the best example of a transition mire, as well as one of the wildest and least managed sites in the county, with much *Carex rostrata*, swards of *Polytrichum* and *Eriophorum vaginatum*, and it is also acquiring characteristic species such as *Vaccinium oxycoccos*. The nearby **Gors Goch** SN597649, apparently a small raised bog with only its edges cut for peat, showing hummock and pool structure, with *Andromeda*, *Empetrum*, *Trichophorum × foersteri* and *Rhynchospora alba*, awaits further investigation.



Encroaching swamp at S end of Llyn Eiddwen, view ENE from SN60386677, April 2008



Cors Llyn Farch, ungrazed transition mire, view SW from SN60176383, July 2005

Between the Ystwyth and Wyre valleys there is a group of valley mires unusually close to the sea at c.150m altitude, the best of them is **Rhos-Rydd** SN574744, a complex system of mires with *Andromeda*. Also in this area a small basin mire at **Banc Ty-llwyd** SN601774 has a large population of *Carex limosa*, which is also present in the valley mire of **Rhos Bwlchyrhandir** SN593733; the latter site is an excellent example of a valley mire complex, with among other features *Cirsium dissectum* in sedge-rich grassland and *Hypericum undulatum* in fenny areas. The *Hypericum* is notably confined to this part of the county. South of the Aeron, a group of much-modified valley mires includes one at **Blaencanog-fach** SN487582 rapidly becoming overgrown by woodland, where *Cladium* grows in its only site in the county along with *Carex pseudocyperus*.



Small basin mires occur in several places around Oakford, for example near Lluest SN465589 and near Oakleigh SN444571.

**Cors Gorsgoch** SN482504 is in part a valley mire with basin mires as well as fen and carr communities. **Rhos Glwydwern** SN498505, **Rhos Glynyrhelyg** SN496514, **Rhos Llawr-cwrt** SN416500 and the upper **Nant Cledlyn** valley SN44T, U, are predominantly rhos pasture sites that contain excellent small basin mires in pingos dominated by *Sphagnum* spp. and usually with *Vaccinium oxycoccos*, *Eriophorum angustifolium*, *E. vaginatum*, *Menyanthes*, *Comarum palustre*, *Narthecium*, etc. All these sites are among the series of SSSIs and/or WTSWW reserves. A few very isolated basin mires in the south of the county are in kettle holes, for example a large one near Llangybi SN610528, mostly now Alder carr and much modified, and a very small one at Rhydcaradog SN470416 that used to contain *Andromeda* but is now completely overgrown by carr.



Cors Gorsgoch valley mire, *Valeriana officinalis*, *Menyanthes*, *Silene flos-cuculi*, etc., view NW from SN481503, July 2004



The future Rhos Llawr-cwrt NNR, view E from SN401499, May 1973



Rhos Llawr-cwrt NNR, view E from SN401499, May 1984

### Upland peatlands and flushes

Blanket bog covers vast areas of the uplands, much of it very species-poor and dominated by *Molinia* tussocks with occasional *Potentilla erecta*. *Erica tetralix*, *Trichophorum germanicum*, *Eriophorum vaginatum* and *Juncus squarrosus* form extensive wet heath, often intermixed with *Molinia* and *Festuca ovina* and less common species such as *Andromeda*. Drier areas can have abundant *Calluna*, and *Neottia cordata* sometimes occurs, as on the fine areas of such blanket bog on **Pen Creigiau'r Llan** SN79M and on the slopes NE of **Bryn Garw** SN87D. Wetter parts with bog pools and flushes often have dominant *Eriophorum angustifolium* or *Carex rostrata*, and in a few places, notably by the source of the Afon Tywi, *Carex lasiocarpa* is dominant. These pools and flushes also have much *Narthecium*, *Potamogeton polygonifolius*, *Hypericum elodes*, *Menyanthes*, *Carex echinata*, *C. canescens*, *C. viridula* subsp. *oedocarpa*, *C. panicea*, *Galium palustre* subsp.



Blanket bog and Llyn Fyrddon-fawr, view ENE from Carn yr Hyrddod SN791704, July 1981



Eroded blanket bog, view WSW from c.SN820892 to summit of Pumlumon Fawr, April 1974



Eroding blanket bog, Figyn Blaen Brefi, view W from SN718544, July 1987

*palustre*, etc., and in a few places *Rhynchospora alba*. *Carex magellanica* reaches its southern limit in Britain here in and around acidic bog pools on level areas of blanket bog. Blanket peat at the N side of **Llyn Gynon** SN800650 was used for pollen analysis by Moore & Chater (1969b) and has revealed the Post-glacial vegetational history of the area.

Upland blanket bog is growing in some areas, especially in the north of the county, and deteriorating in others. The two processes can sometimes be seen very close together, as above **Craig Ysbio** SN780832 where just SW of an area of eroding peat hags is an actively growing bog with *Andromeda* and *Carex magellanica*. Erosion is often exacerbated by the action of Sheep, and this is well demonstrated for example 2.5km SW of Strata Florida SN783632 where a FC fence keeps the Sheep off half of an extensive area of peat hags. The eroding blanket bog of **Figyn Blaen Brefi** SN717547 was described by Davies (1945). Jones *et al.* (2003) estimated 2,500ha of unmodified upland blanket bog in the county, and a further 5,300ha that was modified.

Upland flushes that are somewhat enriched by minerals, whether in blanket bog or on heathy or grassy slopes, are favourite sites for the botanist. *Pinguicula vulgaris*, *Carex pulicaris*, *C. hostiana*, *C. ×fulva*, *Huperzia selago* and *Euphrasia scottica* are common, and in a few sites *Carex dioica*, *Eleocharis quinqueflora*, *Selaginella* and *Galium uliginosum* are among the rarities, with *Hammarbya* in some of the more acidic flushes. Particularly good areas for such upland flushes include **Bryn Bras** SN7479, around **Llyn Gwngu** SN87G and along the **Camddwr** SN75S, W, V. One wonders what effect the sending of flocks of Geese to the remote Llyn Gwngu for summer grazing from Tynewydd and Ty-mawr farms will have had on the vegetation there (Howells 2005).



Gors Lwyd, view WSW from SN859753, February 1986



Gors Lwyd, view WSW from SN859753, December 1982



Gors Lwyd, view WSW from SN859753, July 2001



Valley mires in the uplands often contain extensive areas of *Carex rostrata*, and where there are slightly more mesotrophic conditions *Juncus acutiflorus* can dominate. *Phragmites* is very rare. *Carex paniculata* can be abundant, especially where there are springheads or along the central watercourses. Other characteristic species include *Dryopteris carthusiana* as well as *D. dilatata*, *Comarum palustre*, *Carex nigra*, *Ranunculus flammula*, *Galium palustre* subsp. *tetraploideum* and *Caltha palustris*. Good examples are at the headwaters of the **Afon Mwyro** SN76W, X, of the **Groes Fawr** SN75J, P, and of the **Afon Pysgotwr** SN75F.

The watershed bog of **Gors Lwyd** SN858753 at 390m altitude on the county boundary has areas of fen with *Phragmites* and a great abundance of *Carex lasiocarpa*, as well as extensive eroding peat hags with *Andromeda* and depressions dominated by *Rhynchospora alba* and *Eriophorum angustifolium*. It is a key site in the investigation of the county's vegetational history from Late-glacial times (Moore & Chater 1969b, Moore 1970, Slater 1976), having developed from a shallow lake on till from the Central Wales Ice Sheet.

## Aquatic habitats

### Lakes, ponds and reservoirs

The county is well provided with still waters of all sorts in the uplands. In the lowlands there are no sizeable natural lakes and only a few large artificial ones, although there are innumerable small, mostly artificial ponds. Of the 26 lakes shown on the Singer/Cary 1-inch map of 1803, only one, Llyn Maesllyn at 170m, was below 300m altitude. The same 26 were shown on the 1<sup>st</sup> edition of the 1-inch OS maps in the 1830s, with one more, Llyn Frongoch at 285m, a reservoir constructed in 1834, being added. With this last exception all seem to have been natural, undammed lakes. Two of them, **Llyn Farch** SN595636 at 310m, and **Llyn yr Helygen** SN830739 at 500m, have since got overgrown and lost their open water and become transition mires or bogs, while a third, **Llyn Rhuddnant** SN806783 at 455m, has virtually gone. (The only other still water bodies on the 1<sup>st</sup> edition OS maps are the small artificial lakes on the Nanteos and Llanerchaeron estates, and some bog pools on Cors Fochno.) Of the 23 that remain out of the original 26, eight have since been enlarged by dams, so there are now only 15 entirely natural lakes left in the county (listed in decreasing order of altitude):

Llyn Du SN799698, 535m	Llyn y Gorlan SN785668, 435m
Llyn Du SN769613, 510m	Llyn Hir SN790679, 435m
Llyn Crugnant SN754612, 505m	Llyn Gwngu SN839729, 435m
Llyn Moel-y-llyn SN712915, 505m	Llyn Gynon SN798649, 425m
Llyn y Fign SN812704, 475m	Llyn Fanod SN603644, 310m
Llyn Gorast SN792631, 455m	Llyn Eiddwen SN606668, 300m
Llyn Bach SN789668, 445m	Llyn Maesllyn SN693628, 170m
Llyn Berwyn SN744571, 435m	

The eight enlarged ones are:

Llyn Fyrddon-fach SN797701, 540m	Llyn Llygad Rheidol SN792876, 510m
Llynnoedd Ieuan W lake SN795815, 530m	Llyn Egnant SN791668, 425m
Llynnoedd Ieuan middle lake SN799816, 525m	Llyn Penrhiaidr SN752932, 415m
Llyn Fyrddon-fawr SN801707, 515m	Llyn Teifi SN780672, 405m

The remaining 40 or so water bodies large enough to be thought of as lakes are reservoirs constructed after 1830, mostly in connection with the lead mines.

The chief botanical survey of lakes in the county was by Seddon (1964a, b, 1972) in 1961-1966 who covered ten of them: Llyn Craigypistyll, Llyn Pendam (Cwmsymlog Reservoir), Llynnoedd Ieuan middle lake, Llyn Gwngu, Llyn Egnant, Llyn Gynon, Llyn Eiddwen, Llyn Fanod, Llyn Crugnant and Llyn Maesllyn; the first two were 19<sup>th</sup> century reservoirs. Many contract surveys have covered others, and much work has been done on the acidification of some of them. I have compiled dated lists of species of all the lakes and most of the more interesting ponds (146 altogether) which were contributed especially to Preston & Croft (1997). James (2001) gives a very useful overview of the lakes in the county.

A few of the upland lakes such as **Llyn Moel-y-llyn** SN712915, **Llyn Du** SN769613 and **Llyn Fyrddon-fach** SN797701 along with many of the smaller mine reservoirs and bog pools are dystrophic, extremely poor in nutrients, acidic and virtually devoid of higher plants except for a marginal fringe of *Juncus kochii*, *J. effusus*, *Eriophorum angustifolium*, *Carex nigra* and occasionally a little *C. rostrata* and *Glyceria fluitans*. Where there is heavy metal pollution, as in some of the mine reservoirs, they can be virtually devoid



Llyn Hir with Llyn y Gorlan beyond, view S from SN791680, August 2007

of even marginal aquatics. Most of the lakes and reservoirs are oligotrophic, still acidic but slightly less poor in nutrients, with a sparse vegetation of such species as *Potamogeton polygonifolius*, *Equisetum fluviatile*, *Callitriche brutia* var. *hamulata*, *Ranunculus flammula*, *Sparganium angustifolium*, *Myriophyllum alterniflorum*, *Lobelia*, *Littorella*, *Utricularia minor*, *Isoetes lacustris* and *I. echinospora*. Good examples are **Llyn Pen Rhaiadr** SN752932, **Llyn Nantycagl** SN729904, the three **Llynnoedd Ieuan** SN7981,



*Luronium*, *Lobelia* and *Callitriche platycarpa* in Llyn Gynon, view S from SN799650, August 1984



Clive Jermy in Llyn Pendam, view E from SN707837, September 2007





Llyn Gynon, view NNE from SN794639, July 1989



*Callitriche brutia* var. *hamulata*, *Nuphar lutea*  
and *Carex rostrata*, Llyn y Figyn,  
view N from SN812703, July 1989

**Llyn Craigypistyll** SN718856, **Llyn Pendam** SN709839 and **Llyn Berwyn** SN744571. **Llyn Gynon** SN798649, **Llyn Hir** SN790679 and a few others also have *Subularia* and *Luronium*, and *Pilularia* has been found in the former.

The most interesting lakes botanically tend to be the ones that are still oligotrophic but somewhat tending to mesotrophic, notably the two on the Mynydd Bach, **Llyn Eiddwen** SN605668 and **Llyn Fanod** SN603644 which have between them, in addition to the above species (except for *Pilularia*), *Potamogeton natans*, *P. berchtoldii*, *Nuphar lutea*, *Nymphaea alba* and *Elatine hexandra*. Llyn Fanod is the more mesotrophic of the two. Some of these upland lakes, chiefly those that are undammed, have developed marginal swamp, notably **Llyn Gwngu** SN839729 where *Carex lasiocarpa* and *Phragmites* occur, **Llyn y Ffign** SN812704, Llyn Eiddwen and Llyn Fanod at their S ends, and **Llyn Gorast** SN792631 where *Carex limosa* grows and *Phragmites* is spreading over the lake. The Mynydd Bach lakes show very well the development from lakes to mires, Llyn Fanod having only a small area of marginal swamp, Llyn Eiddwen gradually becoming overgrown by the extensive swamp and fen at its SW end, and **Llyn Farch** SN595636 having become the best example of a transition mire in the county.



View ESE from c.SN832732 to Llyn Gwngu, May 1975

The substrate of the upland lakes varies from peat and hard rock, both often rather devoid of vegetation, to muds, gravels and shales, often very mixed and productive of a range of species. Often the sides are steep peat banks, there are few cliffs along the shores, and apart from the swamps many have gently sloping shorelines with mud and gravel where *Littorella* can be dominant just in and out of the water, and *Lobelia*, *Subularia* and *Isoetes* can grow in the shallows. *Luronium*, *Sparganium angustifolium*, *Potamogeton natans* and the Water-lilies tend to be in deeper water. In the undammed lakes the water level tends to drop only in exceptional summers, but in some of the dammed lakes and reservoirs it can fluctuate widely. **Llyn Teifi**, where the dam was built in 1963 and raised in 1998, is the best example: the vegetation especially at the dam end varies enormously from year to year, and in the draw-down zone acres of *Luronium* are sometimes exposed and flower, but at other times this species remains deeply submerged as a vegetative lawn and is hard to see at all, and the two *Isoetes* species vary enormously in their relative proportions and abundance.

The depth and frequency of the draw-down in the major modern upland reservoirs of **Nant-y-moch** SN754862 and **Dinas** SN744821, opened in 1964, **Claerwen** SN834655, opened in 1952, and **Llyn Brianne** SN790485, opened in 1972, as well as their acidity and poor nutrient status, probably explains why they have remained for the most part very devoid of true submerged or floating aquatics. They do though have an interesting shore flora along the muddier stretches of their draw-down zones comprising such species as *Eleocharis palustris*, *Juncus kochii*, *Callitriche stagnalis*, *C. brutia* var. *brutia*, *Plantago major* subsp. *intermedia* var. *sinuata*, *Gnaphalium uliginosum*, creeping forms of *Ranunculus flammula*, etc. Fishing interests have led to considerable management of some of the lakes, Llyn Pendam, Llyn Hir and Llyn Berwyn in particular having been regularly limed, although this appears to have had remarkably little effect on the vegetation.

**Llyn Maesllyn** SN693628, unusual in being a kettle-hole as well as in its low altitude of only 170m, is a more or less mesotrophic natural lake which has become somewhat eutrophicated in recent years, and has or until recently had a rich flora including *Potamogeton obtusifolius*, *P. berchtoldii*, *Ceratophyllum demersum*, *Elatine hexandra*, *Littorella*, *Nuphar lutea*, and both *Carex acuta* and *C. aquatilis* in the marginal swamp.

Of the few sizeable 19<sup>th</sup> century artificial lowland lakes, the mid-century **Falcondale Lake** SN569498 is the biggest, and has extensive marginal swamp, much of which consists of *Glyceria maxima*, possibly originally planted; *Myriophyllum spicatum*, *M. alterniflorum*, *Potamogeton obtusifolius* and *P. natans* have all occurred, but in spite of having until recently been an SSSI it has become rather eutrophicated and several of its aquatics have been lost. **Nanteos Pool** SN615783, though smaller, is another estate lake, probably of the early years of the 19<sup>th</sup> century, mesotrophic and containing *Potamogeton natans*, *P. berchtoldii*, *Sparganium erectum*, *S. emersum*, *Callitriche brutia* var. *hamulata* and

*Glyceria maxima* and *Lythrum salicaria*,  
Falcondale lake, view ENE  
from SN56904980, August 1978



*Nymphaea alba* and *Nuphar lutea*, Llyn Fanod,  
view NE from SN601641, July 2007







Nanteos lake, view S from SN616784, June 2006

*C. stagnalis*, but it also has introduced species such as *Sagittaria*, *Nuphar lutea*, *Elodea canadensis* and *E. nuttallii*. The biggest recent lowland lake is at **Pant**, Llanddewi-Brefi SN660563, constructed c.1967 and with abundant *Elatine hexandra* and *Potamogeton berchtoldii*, as well as *P. obtusifolius*, *Callitriche brutia* var. *hamulata*, *Lythrum portula* and *Ranunculus flammula*, but it has no floating and very few emergent plants except for *Eleocharis palustris*.

The **Cwm Rheidol Reservoir** SN695795, which commenced operation in 1961 and is more a widening of the river than a lake, has acquired a dense population of *Isoetes echinospora*, revealed when it was drained in 1991, and also *Littorella*, *Isolepis fluitans* and several other aquatics. The gravel pits at **Glanrhyd-ty-noeth** SN6678 further down the river, started in 1968, already have *Isoetes echinospora* too, as well as *Elatine hexandra*, *Myriophyllum alterniflorum*, *Potamogeton berchtoldii*, *P. obtusifolius*, *P. natans* and *Ranunculus peltatus* among others. An unusual upland water body is the borrow pit 2km NNW of Soar y Mynydd SN772565 at 355m altitude, where clay was extracted for the Llyn Brianne dam in the late 1960s; its rich flora includes *Elatine hexandra*, *Potamogeton natans*, *P. berchtoldii* and *Sparganium angustifolium*.

A large number, probably some hundreds, of mostly small ponds have been constructed in recent decades for conservation or amenity reasons, greatly outnumbering the old farm ponds that have survived. They are often planted up with aquatics not native to the county, or have acquired them by natural dispersal from other plantings, and *Myriophyllum aquaticum*, *Crassula helmsii*, *Nymphoides peltata*, *Elodea canadensis*, *E. nuttallii*, *Lagarosiphon major*, *Lemna minuta* and *Azolla filiculoides* are all now becoming widespread. Many small ponds in the



Gravel pits at Glanrhyd-ty-noeth, view W from SN667786, April 1978

lowlands, both old and new, have a dozen or more true aquatics, *Ranunculus peltatus*, *R. omiophyllus*, *R. hederaceus*, *R. flammula*, *Callitriche stagnalis*, *C. brutia* var. *hamulata* and var. *brutia*, *Lythrum portula*, *Apium nodiflorum*, *Glyceria fluitans*, *G. declinata*, *Lemna minor*, *Potamogeton natans*, *P. berchtoldii*, *Alisma plantago-aquatica*, *Eleocharis palustris*, *Carex rostrata* and *Typha latifolia* being among the commoner species. Ponds on the floodplains of the rivers, most frequent by the Teifi although there are also a few by the Rheidol and Ystwyth, are usually derived from ox-bows or backwaters and frequently have a very rich aquatic and swamp flora including such species as *Rumex hydrolapathum*, *Carex aquatilis*, *C. vesicaria*, *Schoenoplectus lacustris* and *Potamogeton ×olivaceus*. Ephemeral pools here usually have no proper aquatic flora and generally contain *Persicaria hydropiper*, *Gnaphalium uliginosum*, *Rorippa islandica*, *Agrostis stolonifera*, *Bidens* spp., *Potentilla anserina*, etc.

Brackish ponds and even ditches are rare and largely confined to the Dyfi area. They are characterised by *Potamogeton pectinatus*, which occurs in abundance for example in the best of them, **Moel Ynys Pool** SN607923 along with *P. pusillus*, *P. natans*, *Phragmites*, *Typha latifolia*, *Schoenoplectus tabernaemontani*, *Bolboschoenus maritimus*, *Lemna minor*, *Baldellia ranunculoides*, *Myriophyllum spicatum*, *Callitriche obtusangula* and *Ranunculus baudotii*. More strongly brackish pools closer to the estuary contain *Ruppia maritima*, although several of these have recently become overgrown by *Phragmites*. Borrow-pits dug in the peat on the **Aberleri Fields** SN69A, B, and elsewhere in the last 20 years have been colonised by such species as *Potamogeton pectinatus*, *P. pusillus*, *P. polygonifolius*, *Isolepis fluitans*, *Schoenoplectus tabernaemontani*, *Bolboschoenus maritimus*, *Phragmites*, *Lemna minor*, *Myriophyllum alterniflorum*, *Utricularia australis*, *Callitriche stagnalis*, *C. brutia* var. *hamulata* and *Apium inundatum*, and the ditches around these Aberleri Fields have been allowed to become subject to brackish incursions.

Ephemeral pools in the lowlands with any characteristic vegetation, apart from those in the dune slacks at Ynys-las and on the river floodplains, are not a feature of the county, and those that do occur usually have *Callitriche stagnalis*, *Glyceria declinata* and *Ranunculus omiophyllus*, but few other species.

### Rivers, streams, ditches and swamps

There are four main rivers in the county, the Rheidol, Ystwyth, Aeron and Teifi. The **Rheidol** is one of the fastest rivers in Britain, markedly divided into a turbulent, rocky upper half largely devoid of higher plants, and a slower, often meandering lower half that has, after recovery from a long period of pollution from the the lead mines, become well vegetated; its flow is regulated in connection with a hydro-electric scheme, and it flows through three recently constructed reservoirs. The

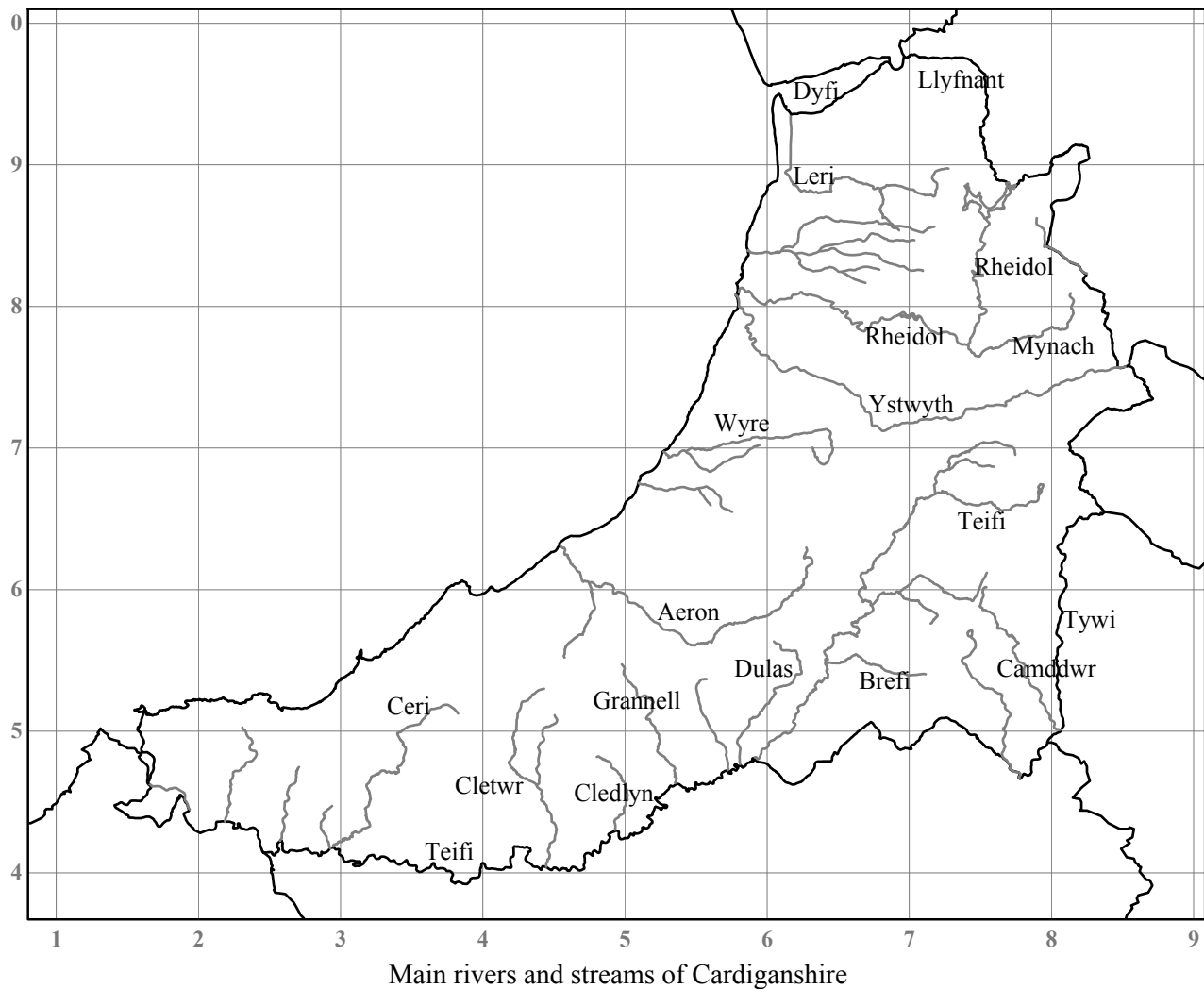
**Ystwyth** is similarly but less extremely divided, and partly because of a longer period of mine pollution and partly because of its stonier substrate it remains less well vegetated than the Rheidol; several stretches of it have been straightened and diverted. The **Aeron**, much

smaller and the only one whose source is below 300m, in Llyn Eiddwen, is a gentler river throughout, meandering in places especially on the slower middle reaches; although it has been unaffected by mining and is polluted only by the usual agricultural run-offs and occasional incidents at the Felin-fach factory site, and has been straightened for only a few kilometres, it has a surprisingly poor aquatic flora. The **Teifi** is by far the most interesting. It is an upside-down river as Holmes (1983) first pointed out, its upper part (after a short, fast, rocky stretch) meandering and slow as it flows through Cors Caron, and much of its lower part rapid and rocky, the exact opposite of the Rheidol and of most other rivers in Britain. Only a few of its upper tributaries have been polluted by mine workings, and no significant straightening has occurred except for a small stretch in Cors Caron. It is well-vegetated for much of its length, and unlike the other three rivers has many tributaries (25, of which 19 are in Cardiganshire) which are also of botanical interest; but because these tributaries are short (none more than 20% of the main river's length), none of them has as much influence on the ecology and flora of the rest of the river as does the Cors Caron section.



The silty water of the Ystwyth and the peaty water of the Rheidol, Aberystwyth harbour, view SSE from SN57918084, September 2004





The headwaters of the three larger rivers are acidic and dystrophic or oligotrophic, arising in peaty or rocky substrates and almost devoid of any aquatic higher plants other than *Juncus kochii* and *Potamogeton polygonifolius*. *Callitriche brutia* var. *hamulata* is usually the next species to be found downriver. In the main course of the Rheidol, *Ranunculus peltatus* does not appear until well down in the lowlands, and the few other submerged or floating, as opposed to emergent, aquatics occur chiefly in the lowest few kilometers. The backwaters here have many aquatics and good areas of marginal swamp. In the Ystwyth *R. penicillatus* subsp. *penicillatus* is slowly spreading upstream as the pollution clears, and there is generally very little aquatic vegetation. In the Aeron this *Ranunculus* is largely confined to the slower-flowing middle reaches of the river.



The upper Teifi in Cors Caron, *Nuphar lutea*,  
view N from SN674616, July 2006



The lower Teifi above Cenarth bridge,  
view E from SN269416, September 2009



Rheidol backwater with *Iris pseudacorus* and *Ranunculus peltatus*,  
Lovesgrove, view SW from SN619810, June 1978

Once the Teifi reaches Cors Caron and begins its somewhat meandering course through the fens and raised bogs, the combination of the acidic, nutrient-poor water, the varied substrate of peat and alluvial deposits, and the mesotrophic, often swampy nature of the marginal habitats and banks, results in a rich and varied flora. Besides *Callitriche brutia* var. *hamulata*, *C. stagnalis* and *C. obtusangula*, the latter unusual at this high altitude of 160m, *Ranunculus penicillatus* subsp. *penicillatus* becomes abundant, and *Myriophyllum alterniflorum*, *Potamogeton natans*, *Nuphar lutea*, *Luronium natans* and other species occur. *Carex aquatilis*, remarkably abundant all down the river although almost at its S limit in Britain here, *C. vesicaria*, *C. rostrata*, *Schoenoplectus lacustris*, *Phalaris arundinacea*, *Sparganium erectum* and *S. emersum* are major features of the marginal swamp fringing much of the river and of the back waters and ox-bows. *Apium inundatum* is a feature of some of the gravelly shallows, and some of the muddy bays where the river widens and which usually dry out in the summer have *Elatine hexandra*, *Callitriche brutia* var. *brutia*, *Lythrum portula*, *Persicaria minor*, etc. Although many of these species continue down the river, *Ranunculus penicillatus* remains the most abundant submerged or floating aquatic for most of the rest of its course. A curious feature is the presence of *Potamogeton* × *olivaceus* in the river from Llanybydder downwards, even though neither of its parents has been recorded in the catchment, and of *P.* × *sparganiifolius*, one of whose parents, *P. gramineus*, also does not occur. The only significant alien aquatics in the Teifi are *Elodea canadensis* and *E. nuttallii*, both of which occur chiefly from Lampeter downwards although



Rocky bank of the Teifi below Cenarth bridge,  
view ENE from SN268415, October 2005



neither is ever very abundant. *Rumex hydrolapathum*, perhaps originally an introduction, is in many of the marginal swamps and backwaters. In its lower part the river flows through no fewer than nine rocky gorges (James 2001) and some of the riverside rocks, for example at Cenarth and below Llandysul, are among the more interesting botanical sites in the county. After the river emerges from its final gorge at Cilgerran, the Teifi Marshes abut it on the S side. This area has become increasingly dominated by *Phragmites* swamp in recent decades, and is bisected by the disused railway embankment.

The most calcareous of the Teifi tributaries is the Cych, outside the county on the Pembrokeshire/Carmarthenshire border, but its influence is perhaps indicated in the main river by the record of *Ranunculus penicillatus* subsp. *pseudofluitans* from near the Cych confluence, although this has also been recorded from the Teifi itself near Henllan and from the Dulas, one of the more richly vegetated tributaries. The Cletwr is of particular interest. Like the Teifi itself, its slow, meandering, silty reaches are in the upper part, especially where it runs through Cors y Cletwr, and the fast, rocky stretches are in the lower part. The whole of the Teifi and ten of its tributaries (nine in the county, plus the Cych) comprise an SSSI and SAC, and, chiefly since Holmes's pioneering work, a great deal has been written about the river and its ecology.

Although the **Leri** is mostly either fast-flowing, or canalised in its lower reaches and largely devoid of aquatics, the old course of the river SN607922-609910 through the golf course at Ynys-las where it used to flow to the sea, now contains a variety of swamp communities dominated by *Phragmites*, *Typha latifolia*, *Schoenoplectus tabernaemontani* and *Iris pseudacorus*, with *Baldellia*, *Caltha*, *Oenanthe lachenalii* and interesting communities transitional to the adjacent sandy pasture.



Hen Afon Leri SSSI, Ynys-las,  
view SE from SN608922, April 1990

Freshwater ditches are generally confined to a few areas in the lower parts of the main river valleys and around the two big raised bogs. Around Cors Fochno SN69 a well-maintained system of ditches is richly vegetated, *Callitriche obtusangula*, *C. brutia* var. *hamulata*, *C. platycarpa*, *Lemna minor* and *Utricularia australis* are abundant, *U. minor*, *Potamogeton natans*, *P. polygonifolius* and *P. pusillus* also occur, and *Azolla* is a periodically abundant recent introduction. *Phragmites*, *Sparganium erectum*, *Lythrum salicaria*, *Bidens cernua* and *Typha latifolia* are among the common emergents. A smaller ditch system in the lower Clarach valley c.SN58W-68B has also been invaded by *Azolla*, along with *Lemna minuta*. The ditches in the lower Rheidol valley, including those on the outskirts of Aberystwyth, have mostly been disturbed and eutrophicated; the most interesting is the ditch along the S side of the Glanyrafon industrial estate SN6080 although this is now more of a swamp with *Carex riparia* and *C. vesicaria*. In the Aeron valley there is a ditch system below Talsarn SN55I, but this is of little interest. Around Cors Caron SN66-76 the ditches have much the same vegetation as the meandering Teifi itself there. Lower down the Teifi few ditches occur, even in the Teifi Marshes.

Swamps in the county are chiefly marginal to the lakes and to the slower flowing stretches of the rivers, often occupying ox-bows and backwaters, and they comprise elements of transition mires and often grade into fens. In these contexts they have been largely covered in the habitat accounts above. Adjacent to the Dyfi and Teifi estuaries there are also extensive *Phragmites* swamps, managed and extended by the conservation organisations particularly for ornithological reasons. *Cladium* and *Carex pseudocyperus*, dominant in swamp communities in other parts of Britain, are very rare and occur rather in fens in the county. *Glyceria maxima* is probably not native. Brackish swamps by the two main estuaries, where they are not dominated by *Phragmites*, are usually dominated by *Bolboschoenus maritimus* or *Schoenoplectus tabernaemontani*.



*Phragmites* swamp, West Marsh, Ynys-hir RSPB  
Reserve, view SE from SN674954, January 2006

## River shingle

Although much of the river shingle by the Rheidol, Ystwyth and Teifi is covered and stabilised by *Molinia* or heath, and has been described in the section on heaths, a great deal remains largely open, subject to regular disturbance by flooding, and by braiding in the case of the Ystwyth in particular, and has a characteristic transient flora. Heavy metal pollution from the lead mines has also kept much of the shingle along the Rheidol and Ystwyth free from colonisation, where resistant forms of *Silene uniflora* are a conspicuous feature. Annuals such as *Persicaria hydropiper*, *P. maculosa*, *P. lapathifolia*, *Spergula arvensis*, *Gnaphalium uliginosum*, *Stellaria media* and others, characteristically arable weeds, are common, and perennials such as *Centaurea nigra* (often surprisingly abundant or even dominant), *Galium palustre* and *Trifolium repens* become established for short periods. *Rumex acetosella* with its long rhizome-like roots often acts as a binder of the finer substrates. *Impatiens glandulifera* has spread to shingle beaches on all four rivers. *Rorippa palustris* and *R. sylvestris* are common along the lower reaches of the Teifi. (*R. islandica*, while undoubtedly dependent on the river for much of its dispersal, is usually by pools and in hollows on the flood plain and is very rarely on the shingle.)



The braiding Afon Ystwyth, Grogwynion, view ENE from SN701717, October 2003



The braiding Afon Ystwyth at Grogwynion, view WSW from SN72007246, October 1978

## Upland cliffs

This favoured habitat for the botanist is well represented in the county and some of the cliffs are surprisingly rich in interesting species in spite of the absence of the more extensive and more obviously base-rich strata found further north and south in Wales. The chapter on geology explains much of the background.

The cliffs by **Pistyll y Llyn** SN753942 at the head of the Llyfnant on the N border of the county are dry and acidic Silurian and have few species of interest, although there is a small colony of *Hieracium argenteum* and a little *Hymenophyllum wilsonii*. On the Ordovician Pumlumon massif too the cliffs are generally acidic and disappointing. Salter recorded *Saxifraga hypnoides* on **Llest y Graig** SN802890 in Cwm Gwerin, but it has not been found there since and the cliffs seem unsuitably dry and are poor in species. The spectacular cliffs of **Craig y March** SN806881 at the head of this valley have little of interest except for *Hieracium lasiophyllum* and the altitude limit for *Hyacinthoides non-scripta*. The low W-facing cliffs above **Llyn Llygad Rheidol** SN797875 are wet in places and have the only extant colony of *Saxifraga hypnoides* in the county, as well as abundant *S. stellaris*; the N-facing cliffs SN793873 have *S. stellaris* on a number of ledges, and in one damp gully, almost the only place out of reach of Sheep, there is a rich vegetation including *Geum rivale*. *Festuca vivipara* and *Dryopteris oreades* grow on many of the Pumlumon cliffs. Although containing no uncommon species, the low W-facing cliffs at the head of the **Nant y Moch** SN784862 are quite rich and provide the altitude limit in the county for a number of species.

Further west, at the Silurian-Ordovician boundary in the Cyneiniog valley, the dry S-facing cliffs above the **Hafan** incline SN729879 have the highest *Quercus petraea* in the county, at 370m, but though the presence of base-rich ferroan-dolomite is reflected in the bryophytes, no such evidence is forthcoming from the higher plants. Further down the valley, the N-facing cliffs of **Craig yr Allt-ddu** SN723876 are damper and also have calcicole bryophytes, but nothing among the higher plants more suggestive than *Alchemilla glabra*, *Hymenophyllum wilsonii*, *Carex pulicaris* and *Phegopteris connectilis*. The largely inaccessible S-facing precipice of **Craig y Pistyll** SN712856 shows better the base-rich nature of rocks in this part of the





Cliffs above Llyn Llygad Rheidol, Pumlumon,  
view S from SN790877, July 1980

Cwmere Formation in the Silurian and has *Sedum forsterianum*, *Euphorbia amygdaloides*, *Hieracium lasiophyllum* and an as yet unreached and unidentified *Rosa*. **Pen y Graig-ddu** SN707820, conspicuous from the A44(T) road, is too dry and acidic to be of any interest.

The low cliffs by the **Nant Cwta** SN803834, SE of Eisteddfa Gurig, on the Castell fault, again in the Cwmere Formation, have a small colony of the calcicole *Rubus saxatilis*, but with no more significant associates than *Phegopteris* and *Pinguicula vulgaris*. South from here, the Silurian Devil's Bridge Formation cliffs by the waterfall at the head of the Afon Merin 1km N of **Blaenmyherin** SN797807 have *Geum rivale*, *Hymenophyllum wilsonii*, *Dryopteris oreades*, *Valeriana officinalis*, *Cystopteris fragilis* and are notable for their Hawkweeds. There are extensive similar cliffs too in



Pistyll y Llyn, Cwm Rhaiadr,  
view S from SN754944, July 1997



Craig y Pistyll, view NE from SN710853, May 1976



the **Nant Rhuddnant** ravine SN797784, mostly dry and acidic with much *Dryopteris oreades*, but also with a few damp gullies containing *Meconopsis cambrica*, *Polystichum aculeatum*, *Asplenium trichomanes* subsp. *trichomanes*, *Hymenophyllum wilsonii*, *Phegopteris*, etc.

The **Cwm Ystwyth** cliffs are Silurian and mostly poor in species, and much of the valley is occupied by the lead mine SN804748, whose S-facing cliffs are mostly very dry and acidic and have little other than *Asplenium septentrionale* and *Silene uniflora*. The unmined cliffs elsewhere in this part of the valley have a slightly richer flora and such species as *Valeriana officinalis* and *Primula vulgaris* grow on several of them. **Graig Ddu** SN810738 also has *Alchemilla glabra*, *Hymenophyllum wilsonii* and *Phegopteris*, while the **Nant y Cae Isaf** ravine SN819746 has a strikingly base-rich section with *Sanicula europaea*, *Mercurialis perennis*, *Galium odoratum* and *Geum rivale*. Further up the valley above Blaen-y-cwm, the low cliffs by the infant Ystwyth SN841755 have quite a rich flora including *Trollius europaeus*.

The Cwm Berwyn cliffs are mostly very dry and acidic, except for parts of **Craig Clogan** SN726582, but even here there is little of interest in the few damper gullies. To the east though, some of the cliffs of the Silurian Nant Brianne formation in the upper Tywi and Pysgotwr valleys are very rewarding. Those by the **Nant Cwm-du** SN801554, S of Dolgoch, have a colony of *Rubus saxatilis*, as well as *Populus tremula*, *Geum rivale* and *Valeriana officinalis*. *Rubus saxatilis* is again on E-facing cliffs in conifer forest 4km S of here near **Dyrys Du** SN805514, with *Sedum telephium*, *Sanguisorba officinalis* and *Viburnum opulus*, and it has also been recorded by the **Nant Brianne** SN783496 where *Trollius*, *Gymnocarpium dryopteris*, *Phegopteris*, *Hymenophyllum wilsonii*, *Geum rivale* and *Equisetum sylvaticum* grow too. Below Llyn Brianne, the mostly dry E- and S-facing cliffs below **Pen Rhiwbie** SN7847 have *Hieracium lasiophyllum*, *Mycelis muralis*, *Sedum telephium*, *Hymenophyllum wilsonii* and *Phegopteris*.



Upland cliffs, head of Afon Myherin, view N from SN79758069, May 2004



Graig Ddu, Cwm Ystwyth, view SSW from SN814748, August 2006

The cliffs in stream ravines in the Doethie valley have little of interest, except for a few trees of *Tilia cordata*, and these and the more extensive cliffs above the Afon Pysgotwr-fawr are generally dry and acidic. Below its confluence with the Doethie, two cliffs, both in the Nant Brianne Formation again, are outstanding. The S-facing **Craig Clungwyn** SN777472 has *Hieracium lasiophyllum*, and *Leucanthemum vulgare* picks out the more base-rich area with *Sedum forsterianum*, *S. telephium*, *Origanum vulgare*, stunted *Tilia cordata*, *Thymus polytrichus* and *Carlina vulgaris*. **Craig Ddu** SN768484, smaller and 1km to the NW, is SW-facing and has the same species with the exception of *Origanum*, and has also *Polystichum aculeatum* and *Asplenium trichomanes* subsp. *trichomanes*, all within a very restricted area; the gametophyte of *Trichomanes* is here too in a remarkably exposed W-facing cavity in the cliff.





Craig Clungwyn, view E from SN773471, July 1984

*Sedum forsterianum* and *Leucanthemum vulgare*,  
Craig Clungwyn SN774472, July 1979



Craig Ddu, Cwm Doethie, view NE from SN766482, September 2008



## Maritime habitats

### Sea cliffs, screes and the exposed coastal slopes

Most of the coastline faces west or north and is of hard rock cliffs, but c.12km are soft rock cliffs or slopes of till, and about the same length is low-lying coast with sand or shingle. On the hard rock cliffs *Asplenium marinum* is often found low down under overhangs or in crevices, and *Silene uniflora*, *Plantago maritima*, *P. coronopus*, *Armeria maritima*, *Tripleurospermum maritimum* subsp. *maritimum*, *Spergularia rupicola*, *Beta vulgaris* subsp. *maritima* and *Crithmum* are often in crevices on the vertical faces. Where there are waterfalls over the vertical cliffs there is in several places the odd sight of persistent *Lemna minor* colonies within the spray zone. On ledges and higher on the cliffs additional common species include *Festuca rubra* subsp. *junceae*, *Cochlearia officinalis*, *C. danica*, *Jasione montana* var. *latifolia*, *Sedum anglicum*, *Anthyllis vulneraria* and *Hedera hibernica*. Rarities include *Euphorbia portlandica*, *Orobanche hederaceae*, *Euphorbia amygdaloides*, *Rubia tinctoria*, *Limonium transcanalis*, *L. cambrense* and *Hieracium rectulum*. *Malva arborea* may be native on some of the cliffs in the SW. Among the best cliff sites are those at the N end of **Cei Bach** SN417600, at **Traeth Penbryn** SN287521 and at **Gwbert** SN160500-161512.



View N from Craig y Gwbert SN158502  
to Cardigan Island, July 1997



View NE to Castell Bach and New Quay  
Head from SN357578, April 1995

Scree slopes, especially in the north where the rock is more shaley resulting in a very unstable substrate, for example on **Allt Wen** SN5779, often have little vegetation, but in places, where the rock is harder and more stable, block scree occurs, as on **New Quay Head** SN3860, and *Calluna* and *Hedera* can be dominant. Where the cliff slopes are more fertile and vegetated, often with some flushing, a great range of species and communities occurs, scrub of *Quercus*, *Prunus spinosa*, *Ligustrum vulgare* or *Salix cinerea* can dominate, and rarities such as *Lathyrus sylvestris*, *Vicia sylvatica* and *Sedum forsterianum* can be found. The MoD site, **Aber-porth** SN238523-255520 and NE of **Llangranog** SN3154 are two of many such good areas.

The soft rock cliffs, as they are constantly eroding, have a mostly sparse flora, but *Tussilago farfara*, *Eupatorium cannabinum*, *Plantago coronopus*, *Tripleurospermum maritimum* subsp. *maritimum* and



Carreg y Ty, with Llangranog Head beyond,  
view NNE from SN300534, May 1990



Sea cliffs at Traeth Penbryn,  
view ENE from SN286520, June 2008





Cliff slope, New Quay Head, with *Hyacinthoides non-scripta*, *Ulex europaeus* and *Calluna*, view E from SN381603, June 1979

*Leucanthemum vulgare* are among the common species that often maintain a hold even on the drier, more pebbly cliffs. Where the till is wet and slumping down onto the shore, for example at **Clogfryn** SN444622, at **Cei Bach** SN413598 or at **Aber-porth** SN260514, there is often a rich flora including such species as *Equisetum telmateia*, *Centaureum erythraea*, *Pulicaria dysenterica*, *Isolepis cernua*, *Scrophularia auriculata* and *Carex flacca*, many of them calcicoles and usually none of them exclusively maritime. In a few places there are *Phragmites* thickets on such till.

Fringing the exposed clifftops in many places, for example S of **Borth** SN600882 and at **Gwbert** SN1650, a turf of *Armeria*, *Plantago coronopus*, *P. maritima*, *Cerastium diffusum*, *Veronica arvensis*, *Sedum anglicum*, *Festuca rubra*, *Dactylis glomerata* var. *collina*, *Bromus hordeaceus* subsp. *ferronii*, etc., often heavily Rabbit-grazed, has developed. Where this is low down within the spray zone the turf is often more open and *Sagina maritima*, *S. apetala*, *Cochlearia danica*, *Aira praecox* and *Catapodium maritimum* sometimes



View SSW from SN374595 over Traeth y Coybal to Penmoelciliau and Ynys Lochtyn, September 2004



Spring flora on Penhuwryn, Aberystwyth harbour, view NNE from SN57988070, May 2004



Winter annuals (*Sagina maritima* var. *prostrata*, *S. apetala* var. *patula*, *Cerastium diffusum*) and *Plantago coronopus*, Llangranog Head SN31325520, December 2003

occur as well, for example at **Wallog** SN590857, at **Craig Caerllan** SN356578 and at **Llangranog Head** SN313552, and on higher clifftops *Moenchia erecta*, *Ornithopus perpusillus*, *Aphanes australis* and other winter annuals are found. On thin soils on the exposed clifftops in the SW of the county *Scilla verna* can be spectacularly abundant, while on deeper soils on the slopes *Hyacinthoides non-scripta* can be equally so.





*Scilla verna*, *Sagina subulata*, *Plantago coronopus*, etc., clifftop on Llangranog Head SN31225520, May 2008



Ynys Lochtyn, view NNE from SN314554, May 2008

The steep, rocky slopes with thin, summer-droughted soils in many places along the coast, especially in the SW of the county, such as by the mouth of the Afon Drywi SN426607 and at Carreg Wynt SN233520, have a great variety of grassland and other communities. The outstanding site is the steep south slope of **Foel y Mwnt** SN193520, one of the very few examples of a S-facing coastal slope in the county, where on thin, summer-droughted soil with rock outcrops, among patches of *Festuca ovina*, *Agrostis capillaris*, *Poa humilis* and *Dactylis glomerata* var. *collina* turf, the abundant winter annuals include *Erodium maritimum*, *Filago vulgaris*, *Anagallis arvensis*, *Aphanes australis*, *Trifolium scabrum*, *T. striatum*, *Ornithopus perpusillus*, *Veronica arvensis* var. *nana*, *Myosotis discolor*, *M. arvensis*, *Cerastium diffusum*, *Aira caryophyllea* and *A. praecox*.

The many coastal variants, often of an Atlantic distribution, that are found along the cliff slopes make this general habitat one of the most interesting in the county from the point of view of genetic variation and conservation. Most of

(right) *Sedum anglicum* on droughted cliff slope, Carreg Wynt, view W from SN233520, June 1977



(below) Droughted coastal slope at mouth of Afon Drywi SN426607, *Thymus*, *Sedum anglicum*, *Jasione*, *Rumex acetosa* subsp. *biformis*, June 2004



(below) Droughted S slope of Foel y Mwnt, view ESE from SN193520, August 2006





them require further study, and include:

*Achillea millefolium* var. *compacta*  
*Betonica officinalis* var. *arenaria*  
*Bromus hordeaceus* subsp. *ferronii*  
*Cirsium arvense* var. *maritimum*  
*Dactylis glomerata* var. *collina*  
*Daucus carota* subsp. *gummifer*  
*D. carota* subsp. *carota* var. *nana*  
*Centaurea nigra* subsp. *rivularis*  
*C. debeauxii* subsp. *nemoralis* var. *minima*  
*C. debeauxii* subsp. *thuillieri* var. *thuillieri*  
*Festuca rubra* subsp. *junceae*  
*Genista tinctoria* subsp. *littoralis*  
*Jasione montana* var. *latifolia*  
*Leontodon saxatilis* var. *arenaria*  
*Leucanthemum vulgare* cf. var. *nanum*

*Lotus corniculatus* var. *carnosus*  
*L. corniculatus* var. *crassifolius*  
*L. corniculatus* var. *hirsutus*  
*Pimpinella saxifraga* var. *ovata*  
*Rumex acetosa* subsp. *biformis*  
*Sagina apetala* var. *patula*  
*S. maritima* var. *prostrata*  
*S. maritima* var. *elongata*  
*Senecio erucifolius* var. *viridulus*  
*Serratula tinctoria* var. *reducta*  
*Sonchus asper* var. *sabulosus*  
*S. oleraceus* var. *littoralis*  
*Succisa pratensis* var. *arenaria*  
*Veronica arvensis* var. *nana*

### Cardigan Island

Apart from Ynys Lochtyr SN314555, which is scarcely more than an extension of the adjacent mainland habitat, Cardigan Island SN160517 is the only significant island in the county. It covers 15ha, rises to 52m altitude, is 130m from the mainland at the mouth of the Teifi estuary, and is a Wildlife Trust reserve. Bewers (2005) gives all the available information on its history, and see also Condry (1961). A probably Norse name, Hastiholm, was used for it in 1268, and there is a reference to it being used for pasture as early as 1299. From the 18<sup>th</sup> century, records show that grazing on the island was chiefly by Sheep, with Cattle at times. Plough furrows covering the E half are of unknown age, possibly medieval or even earlier, and the dominant *Lolium perenne* covering this area is thought to have been sown in the 1930s (its relation to the plough furrows is uncertain). Soay Sheep were introduced in the 1930s, but have recently dwindled to extinction. Rabbits have not been reported with any certainty, but Brown Rats from a shipwreck in 1934 are thought to have precipitated much of the obvious soil erosion; they were exterminated in the late 1960s.

Floristically it is one of the poorest areas in the county, only 80 species having been recorded, but a spectacular swathe of *Hyacinthoides non-scripta* covers the E

*Hyacinthoides non-scripta* and Soay

Sheep, E side of Cardigan Island,  
 view NE from SN162517, June 1983



View W to Cardigan Island from  
 c.SN180518, April 1976



Pond on Cardigan Island, with Lin Gander,  
 view ENE from SN156515, April 1994

part in May, the broad-leaved, fleshy coastal form, growing through a dense mattress of *Lolium* and *Festuca rubra* litter. In the W half, *Festuca rubra* and *Dactylis glomerata* var. *collina* dominate on thinner soils, around the edges of the island *Malva arborea* and *Tripleurospermum maritimum* subsp. *maritimum* occur, and in one gully on the N side there is a small colony of *Scilla verna*.

### Coastal shingle

Although shingle beaches have developed along the rocky shores of much of the coastline, it is only in the extreme N and S and in a few of the places where drift and alluvial deposits replace hard rock cliffs that significant shingle communities have developed. These are chiefly for 5km at **Ynys-las** and **Borth** SN603940-607889, for c.500m at **Tan-y-bwlch**, Aberystwyth SN580803, for c.1km at **Llanrhystud** SN524691, and for c.1.5km at **Aberaeron** SN465635-458632 and SN453628. At Ynys-las and Borth there is much sand with the shingle and this is a major influence on the species composition. In the past Aberystwyth held two contrasting records for shingle species, as it was the most northerly site in the world for *Euphorbia peplis* and the most southerly in the Old World for *Mertensia*, but both are long gone.



Shingle beach with *Senecio viscosus* and *Rumex crispus* var. *littoreus*, E of Aberaeron, view E from SN463634, October 2006



Vegetated sandy shingle at Borth, view N from SN607903, September 2007

*Atriplex glabriuscula*, *A. ×gustafssoniana* and *A. prostrata* are the commonest species on the seaward slopes of the shingle beaches, and are liable to appear not only on these main beaches but anywhere where there is shingle. Among the more interesting elements on the main beaches are good colonies of *Rumex crispus* subsp. *littoreus*, *Polygonum raii*, *P. littorale*, *Glaucium flavum*, *Silene uniflora*, *Beta vulgaris* subsp. *maritima*, *Geranium robertianum* subsp. *maritimum*, *Sonchus arvensis* var. *maritimus*, *Galium aparine* var. *marinum*, *Solanum dulcamara* var. *marina*, *Crithmum* and a shingle form of *Senecio viscosus*. *Raphanus raphanistrum* subsp. *maritimus* is very rare, and there is only one plant of *Crambe*, recently arrived at Ynys-las. These beaches have, especially on their landward slopes, often become more vegetated and stabilised by grasses such as *Festuca rubra* and *Poa humilis*, and many species not specifically coastal such as *Sedum acre*, *Viola riviniana* and *Thymus polytrichus* occur. The ancient prostrate *Prunus spinosa* on Tan-y-bwlch beach is a remarkable feature.

### Dunes and sandy foreshores

Sand dunes are well-developed at Ynys-las at the northern and at Penyrergyd at the southern extremity of the county, and



Prostrate *Prunus spinosa*, Tan-y-bwlch beach, view S from SN58008050, August 2007





Ynys-las dunes from above Aberdyfi, view S from SN614966, December 2009

there is a small dune at Penbryn. Sandy foreshores which have not developed into dunes occur chiefly at Clarach, at Tan-y-bwlch and to a very small extent at Tresaith. In two places, Penbryn and Mwnt, sand blown up onto the till cliffs has formed substantial perched dunes, and above Penyrergyd the dunes extend inland for some distance up the till on the hillside. Jones *et al.* (2003) estimated 120ha of total dune habitats in the county.

The **Ynys-las dunes** SN69B, C, cover some 60ha and are a NNR and a major visitor attraction, with a Visitor Centre, boardwalks, extensive slacks and blow-outs, and merge into a golf course to the south. Much has been written about them, and the best source of information on their history and ecology and for further references is Watkin (1976). The dunes have probably developed only since medieval times, and during the last century or more there has been a rapid extension northwards and westwards, partly stimulated by the



Ynys-las Dunes NNR, view S from  
SN605937, April 2009



Recently formed NE dune at Ynys-las,  
view N from SN609944, August 2009

construction of sea defences to the south, and new slacks as well as dunes have developed. Most recently a new area of dune has developed just east of the north tip of the system. During the Second World War the dunes, along with much of the estuary, were occupied by the army, and the construction of concrete roads during that period has had some effect on the slacks. As a comparatively young dune system, still in active development, the vegetation is constantly changing, and over the last century or so a number of species such as *Inula conyza*, *Erigeron acris* and *Centaureum littorale* have gone, and many others have come, including *Epipactis palustris*, *Ophrys apifera* and *Spiranthes spiralis*. The dunes are heavily Rabbit-grazed.

*Cakile maritima*, *Atriplex glabriuscula*, *A. ×gustafssoniana*, *A. prostrata* and *Salsola kali* are the main annuals of the lower levels of the sandy shore at Ynys-las, while *Ammophila*, *Elytrigia juncea* and more rarely *Leymus arenarius* form the embryo dunes. Other species along the seaward edge, often where there is some shingle, include *Euphorbia paralias*, *Carex arenaria*, *Sedum acre*, *Plantago coronopus*, *Cochlearia danica*, *Senecio vulgaris* var. *crassifolius*, *S. jacobaea*, *Leontodon saxatilis* var. *arenarius*, *Anagallis arvensis*, etc. Where the dunes have developed and are at least slightly more stable but are still termed mobile dunes, among the *Ammophila* other grasses including *Festuca rubra* and *F. arenaria* occur and *Carex arenaria* can be abundant. Winter annuals and spring ephemerals are abundant especially at the edges of the seaward slacks



*Ononis repens* and *Thymus* on the Ynys-las dunes SN610940, July 1983

and on more or less stabilised, often mossy slopes, and include *Erophila verna*, *E. glabrescens*, *Saxifraga tridactylites*, *Cerastium diffusum* var. *diffusum* and var. *glabrum*, *C. semidecandrum*, *Myosotis ramosissima*, *Arenaria serpyllifolia* subsp. *serpyllifolia* and subsp. *lloydii*, *A. leptoclados*, *Veronica arvensis*, *Valerianella locusta* subsp. *dunensis*, *Vulpia fasciculata*, *Phleum arenarium* and *Aira praecox*. The semi-consolidated and mature dunes contain a large number of characteristic species, including many of those already mentioned as well as *Cynoglossum*, *Viola canina*, *Ononis repens*, *Thymus polytrichus*, *Chamerion angustifolium* colonies, *Lotus corniculatus* especially var. *hirsutus*, *Geranium molle* var. *arenarium*, *Erodium cicutarium*, *Galium verum* subsp. *maritimum*, *Trifolium dubium*, *T. arvense*, *Sedum acre*, *Centaureum erythraea*, *Catapodium rigidum*, and many others. *Euphorbia portlandica* becomes as frequent as *E. paralias* on the landward slopes, and *Ranunculus bulbosus* var. *bulbosus* is abundant especially along paths. *Taraxacum oxoniense* is the commonest of many Dandelions. *Stellaria pallida* is abundant in Rabbit-scrapes. There are extensive thickets of *Rosa spinosissima*, and *Rubus caesius* is abundant in places. Rarities include *Erodium lebelii*, *Erophila majuscula* and *Blackstonia*. *Ophrys apifera* and *Spiranthes spiralis* too are rare, but *Anacamptis pyramidalis* can be frequent on parts of the dunes. To the south, the dunes merge into sandy pastures and a golf course, and on the latter there remains a very small area of dune heath with *Calluna*. *Avenula pubescens* is locally abundant.



Ynys-las is the only one of the dune systems that has dune slacks, and here there are many in various stages of development, the larger ones are regularly flooded in winter, and some have substantial areas of scrub with *Salix cinerea* and *S. repens* var. *argentea*. *Schoenus nigricans* is dominant in one area, and *Juncus maritimus* and *Phragmites* in several places. The orchid populations are spectacular and include especially large colonies of *Epipactis palustris*, *Dactylorhiza*

Flooded slack W of road, Ynys-las dunes, view E to Foel Goch from SN608938, 24 December 1979



*incarnata* subsp. *coccinea* and *D. purpurella* var. *cambrensis*, along with many other taxa including numerous hybrids. *Equisetum variegatum*, *Ophio-glossum vulgatum*, *Sagina nodosa*, *Trifolium fragiferum*, *Anagallis tenella*, *Glaux maritima*, *Potentilla anserina*, *Samolus valerandi*, *Galium palustre*, *Mentha aquatica*, *Eleocharis quinqueflora*, *Carex viridula* subsp. *viridula*, *C. nigra* var. *stolonifera*, *C. flacca* and *Agrostis stolonifera* var. *maritima* are characteristic of the slacks. The big slack E of the road was excavated in 1995 and turned into a seasonal pool, chiefly to try and eradicate *Crassula helmsii* (which survived and is still present), and this now contains a very rich flora including *Baldellia ranunculoides*, *Ranunculus baudotii*, *R. trichophyllus*, *Myosotis laxa*, *Schoenoplectus tabernaemontani*, *Eleocharis palustris* and *E. uniglumis*.

The very small area of dune at **Penbryn** SN292524 is dominated by *Ammophila*, and paradoxically the fringe of *Leymus arenarius* here was not the pioneer as would be expected of this species but a very recent arrival. *Calystegia soldanella* is abundant, and where the sand has blown up onto the cliffs *Anacamptis pyramidalis* grows. Sand has also blown up the stream valley and into the woodland and scrub, creating an unusual habitat; *Carex arenaria*, *Avenula pubescens* and *Pimpinella saxifraga* var. *ovata* are here. The perched *Ammophila* dunes at **Mwnt** SN194519 are generally rather stable, though eroding at the cliff edge, and more like dune grassland with abundant *Briza media*, *Avenula pubescens* and *Festuca rubra*. Further back from the cliff here there is extensive sandy pasture with such species as *Spiranthes spiralis*, *Daucus carota* var. *nana*, *Centaurea debeauxii* subsp. *nemoralis*, *C. scabiosa* and *Heracleum sphondylium*.



Ynys-las Dunes NNR, view WSW over the main slack W of the road from SN609938, April 2009



Dune at Traeth Penbryn, view N from SN293523, June 2004



Sandy pasture, with *Pulicaria*, *Centaurea debeauxii*, *Daucus carota* var. *nana*, *Pteridium*, Mwnt, view NW from SN19615196, August 2004

The **Penyrrgyd dunes** SN1648, in spite of being largely occupied by a caravan site, very disturbed, and eroding rapidly, are extremely rich in species and comprise part of an SSSI and SAC. Inland where the sand covers drift slopes, the dunes merge into scrub and a golf course as well as into sandy arable and pasture fields. There is now, because of the erosion, scarcely any foredune left, but among the *Ammophila* at the base of the shingle spit *Anacamptis pyramidalis*, *Ophrys apifera*, *Calystegia soldanella*, *Ononis repens*, *Viola canina*, *Euphorbia paralias*, *Eryngium maritimum* and *Festuca arenaria* occur or have occurred recently. The sandy cliff along the estuary edge of the dunes has a great range of species, both native and alien, and a very extensive colony of *Oenothera stricta* is a feature of the site. Rabbit-grazed areas of turf and banks in the dunes, especially the little lawns around the caravans, have many spring ephemerals such as *Vicia lathyroides*, *Saxifraga tridactylites*, *Myosotis ramosissima*, *Cerastium diffusum*, *Trifolium arvense*, *T. scabrum*, *T. striatum*, *T. micranthum*, *T. ornithopodioides*, *Erophila verna*, etc. Other species of these dunes that are local in the county include *Carduus tenuiflorus*, *Catapodium rigidum* and *Anchusa arvensis*. *Ulex europaeus*

scrub covers much of the upper part of the dunes, and has been removed by CCW for conservation purposes over large areas and the resulting rather acidic bare sand allowed to recolonise. In places here, and in a sandy field and on paths by chalets, *Hypochaeris glabra* is locally abundant. There is a surprisingly low overlap in species between the Penyrergyd dunes and those at Ynys-las, at least partly explained by the more acidic nature of parts of Penyrergyd, the presence there of flushed areas on the slopes where the effect of the somewhat calcareous till can be felt, and the absence of dune slacks. A count in 1985 showed that Penyrergyd had 168 species, 72 of which, i.e. 43%, were not at Ynys-las; Ynys-las, nearly ten times bigger, had 254 species, 156 of which, i.e. 61%, were not at Penyrergyd. Even if only native species are considered, 56, i.e. 34%, of those at Penyrergyd did not occur at Ynys-las.

*Honckenya* and *Elytrigia juncea* are the main sand-binders on the sandy foreshore at **Clarach** SN586839, where there is also a small colony of *Raphanus raphanistrum* subsp. *maritimus*, but this site has lost many species over the last century because of holiday development. At **Tan-y-bwlch** c. SN580800 the vegetation is much better developed, and *Eryngium maritimum* is on the seaward slope with *Honckenya* and *Elytrigia juncea*. *E. repens* forms a sward with *Festuca rubra* on the level areas where *Ononis repens* subsp. *maritima*, *Centaurea debeauxii* var. *nemoralis* and var. *minima*, *Achillea millefolium* var. *compacta*, *Calystegia soldanella* and *Carex hirta* are abundant, and *Polygonum raii* occurs on areas of bare sand. Where the sand spreads over the adjacent pasture *Glaucium*, *Malva neglecta* and *Carduus nutans* are abundant.



Forward edge of Penyrergyd dunes, with *Oenothera stricta*, *Anacamptis pyramidalis* and *Ononis repens*, view W from SN160485, July 1986



*Polygonum raii*, *Tripleurospermum maritimum* subsp. *maritimum*, *Eryngium maritimum*, *Cakile*, Tan-y-bwlch beach, Aberystwyth, view S from SN58008000, September 2006



Sand blown over pasture from Tan-y-bwlch beach, Aberystwyth, view NE from SN579799, April 1990

### Salt marshes

As with the sand dunes, the two main areas of salt marsh are in the Dyfi and Teifi estuaries, with small areas at Clarach, in the Rheidol and Ystwyth estuaries, and in Aberaeron harbour. There are also a few minute areas of salt marsh on ledges on the sea cliffs in the SW of the county. Jones *et al.* (2003) estimated a total of 360ha of salt marsh in the county.

The **Dyfi salt marshes** SN69 are the site of the classic ecological studies by Yapp *et al.* (1916,

Fragmentary salt marsh on sea cliffs, Gwbert, view N from SN160507, July 1983







Dyfi estuary and Bryndyfi mine reservoirs, view WNW from SN690936, May 1975

1917), and much has been written on them since (see Watkin 1976 and the references therein). They have been grossly modified by two main human actions, the construction of an early 19<sup>th</sup> century embankment and the introduction of *Spartina* in 1920, the latter compounded by disturbance during the military occupation in the Second World War. They are grazed by Sheep and Cattle, and by flocks of Greater Canada Geese and the Greenland race of Greater White-fronted Geese. The estuary has a bewildering range of conservation designations, including SSSI, NNR, Ramsar site, listing by the EU Habitats Directive, Special Protection Area, UNESCO Biosphere Reserve and RSPB Reserve.

Most of the usual features of salt marsh zonation can be seen, the lower mudflats having *Salicornia* spp., *Suaeda maritima* in most of its varieties, *Spergularia media*, and *Aster tripolium* var. *tripolium* and var. *flosculosus*, and the upper, more stabilised zones being variously dominated by *Puccinellia maritima*, *Juncus gerardii*, *Festuca rubra* subsp. *litoralis*, *Agrostis stolonifera* var. *marina* and *Juncus maritimus*, with *Armeria*, *Glaux* and *Triglochin maritima* often abundant. *Spartina anglica* covers huge areas and *S. ×townsendii* is also



*Spartina* at the Cletwr mouth, Dyfi estuary, view NW from SN645941, December 1983

present. A distinctive feature is the absence of any *Limonium* and of native *Atriplex portulacoides*, although the latter was planted in 1939 and is still spreading. *Elytrigia atherica* is also absent. *Parapholis strigosa* and *Puccinellia distans* are both rare, the latter possibly only an introduction. *Zannichellia* is absent, and *Ruppia maritima* is confined to a few brackish pools and pans. Among *Juncus maritimus* in the upper marsh, *Oenanthe lachenalii*, *Cochlearia atlantica*, *Spergularia marina*, *Scorzoneroideis autumnalis* var. *autumnalis* and var. *salina*, *Carex distans* and *C. otrubae* are characteristic species, and *Atriplex longipes* is a rarity. *Bolboschoenus maritimus* is dominant especially in hollows and by ditches behind the sea wall, as is *Phragmites* and, less commonly, *Schoenoplectus tabernaemontani*. Along the canalised tidal reaches of the Leri and Cletwr are narrow strips of salt marsh with *Rumex crispus* subsp. *uliginosus*, those along the latter river especially being heavily grazed. In the past, an area at the S end of Cors Fochno subject to brackish incursions contained *Blymus rufus* (Slater 1978), and similar incursions now being allowed into the Aberleri Fields are leading to the development of brackish marsh there (Bailey 2005).

The small 300m strip of salt marsh up the **Rheidol estuary** SN584812 is dominated by *Festuca rubra* subsp. *litoralis* and *Puccinellia maritima*, but has little else apart from *Juncus gerardii*, *Carex otrubae*, *Plantago maritima*, *Triglochin maritima*, *Cochlearia atlantica* and naturalised *Aster* spp.; it and a small area of similar salt marsh in The Gap SN581813 are the only remnants of a much larger salt marsh that existed in the harbour until construction of the Marina in 1994. The **Ystwyth estuary** SN580805 salt marsh is even more fragmentary and poorly developed, with only a few stands of *Juncus maritimus*, some areas of *Festuca rubra* subsp. *litoralis* and such species as *Juncus gerardii*, *Atriplex littoralis* and *Cochlearia atlantica*. A pasture E of the estuary here SN581801 has been becoming progressively more saline in recent decades and has some development of pans, and *Juncus gerardii*, *J. ranarius*, *Armeria* and *Spergularia marina* are becoming abundant. A much larger area of c.4ha behind the S end of Tan-y-bwlch beach has at the same time been turning into salt marsh, although recent drainage has largely reversed the process; *Juncus gerardii*, *Puccinellia distans* (rather than *P. maritima*), *Glaux*, *Agrostis stolonifera* var. *marina*, *Spergularia marina* and *Potentilla*



Salt marsh with *Spartina*, Dyfi estuary opposite Ynys-hir, view SSE from c.SN675970, September 1968 (photo EHC)



Rheidol estuary, view SE from SN58428120, June 2004



Developing salt marsh, Felin-y-mor, Ystwyth estuary, view W from SN58368017, March 2010



Fragmentary salt marsh in The Gap, Aberystwyth harbour, view N from SN58098120, July 2007





*Spartina anglica* in salt marsh, Teifi estuary,  
view N from SN16864769, August 2004

*Spartina anglica* is locally abundant but has not had anything like as dominating an effect as on the Dyfi. *Elytrigia atherica* is by contrast abundant at the top of the marsh, and *E. ×drucei* is also here. *Puccinellia distans* has not been seen. *Apium graveolens*, not known from the Dyfi, is at the up-river end of the estuary, as is *Atriplex longipes*. Extensive beds of *Bolboschoenus* and *Phragmites* are also here and there are transitions of decreasing salinity into the Teifi Marshes; as by the Dyfi, an embankment, this time for the railway in 1885, has had a considerable effect on the ecology. In the estuary channels beside the estuarine Alder carr on Rosehill Marsh SN189453 a number of curious enlarged, fleshy forms of *Juncus articulatus*, *Silene flos-cuculi*, *Plantago major*, *Caltha palustris*, etc. occur, presumably affected by the salinity.

## Synanthropic habitats

### Crop husbandry

Although there may well have been some form of early crop husbandry in the Mesolithic and Neolithic, the first scant indications of arable activity in the county come from cereal pollen in peat from c.4,500BP in the early Bronze Age (Moore 1994, Briggs 1994), suggesting a shifting pattern of agriculture in the uplands. Grains of Barley and of Emmer Wheat have been found in a Bronze Age burial, also of c.4,500BP, near Plas Gogerddan in the lowlands (Murphy 1992). What little evidence there is, suggests that the pastoral element may have been more important than the arable element in the farming economy in the county during both the Iron Age and the Roman period (Davies & Hogg 1994, Davies 1994). The first pollen of Rye, introduced to Britain by the Romans, was found in peat of that period on Pumlumon SN798858 (Moore & Chater 1969b) within 4.5km of the Roman fort at Cae Gaer. The pollen record of cereals indicates varying amounts of arable farming throughout the early historical period, and in general supports the available documentary evidence in the later periods. There was, for example, “a setback in arable expansion in the later Middle Ages which could reflect the combined effects of the Black Death and the repercussions of Owain Glyndwr’s rebellion” (Moore 1994), and an overall peak during the Napoleonic Wars around 1800 when arable farming extended ever further into the uplands, followed by a decline throughout the rest of the 19<sup>th</sup> and through the 20<sup>th</sup> century. The Cistercians of Strata Florida abbey perhaps farmed some 2,500ha of arable at the end of the 13<sup>th</sup> century, maybe half of which will have been in Cardiganshire (Robinson 2007).

Specific historical information on exactly what crops were grown where and when is slow to emerge, but among the early mentions is one from 1326 in the *Black book of St. David’s* (Willis-Bund 1902) when Wheat, Rye, Oats, Barley, Beans and Peas were required to be sown on the Bishop of St David’s land at Llandygydd c.SN24L. Lhwyd (1911), records the crops grown around 1697 in several parishes, such as Rye, Oats, Barley and a very little Wheat at Llanfair Clydogau c.SN65F; Rye, Oats, “great and small barley” and a little Wheat and Peas at Llanfihangel Ystrad c.SN55I; and Oats, Rye, Barley and some Wheat at Gwnnws c.SN66Z. The Clarach valley was famous for its fertility in bearing Barley around 1700 (Emery 1984). Lewis Morris in 1755 described farmers in the uplands in the north of the county growing “small oats” for bread and straw for their Cattle in the winter, as well as Rye (Emery 1967). When Lloyd & Turnor (1794)

*anserina* have all been dominant or abundant. Another similar development has occurred in pasture behind the shingle beach S of **Llanrhystud** SN523687 where again *Puccinellia distans* has become dominant and *Spergularia marina* is abundant. In the 1980s the very small area of salt marsh in **Aberaeron harbour** SN457628 was dominated by *Puccinellia maritima* and *Festuca rubra* subsp. *litoralis*, with *Cochlearia atlantica*, *Spergularia media*, *Sagina maritima*, etc., but it has since been largely destroyed and has only partly regenerated.

The **Teifi estuary** salt marshes SN167482-189453 comprise on the Cardiganshire side only a rather narrow and interrupted zone, although quite rich in species. Most of the same communities and species occur as on the Dyfi, and

gave the first overview of agriculture in the county, Barley and Oats were the chief cereals, with a lesser amount of Wheat. Rye was grown in considerable quantity, on its own in the uplands and mixed with Wheat in parts of the lowlands. Potatoes and Peas were widely cultivated, and to a lesser extent Turnips, which the tenant farmers were very reluctant to grow even well into the next century (Colyer 1983). Buckwheat was grown in places. Lloyd & Turnor describe the methods of farming in some detail, but a very great deal more is given by Davies (1815) and references to his information are frequently given below in the species accounts.

At about this time acreage returns for the county become available (Williams 1950) and their accuracy has been assessed by Thomas (1960) who concluded that, even if some of the returns were inaccurate, the relative proportions of the different crops were likely to be reasonably reliable. In 1801, of the 15,933ha recorded as arable, 49% comprised Oats, 34% Barley, 7% Wheat, 4% Potatoes, 4% Peas, 2% Rye, 1% Turnips or Rape, and 0.1% Beans. Oats was the predominant crop inland and in the uplands, Barley being especially grown in the coastal zone in the south, while Wheat was scattered throughout (Thomas 1963). Proportions remained much the same throughout the 19<sup>th</sup> century, and by 1911-1913 (Ashby & Evans 1944) tillage covered 37,938ha, including 46% Oats, 24% Barley and 9% Wheat. Oats held their own as the dominant crop until the 1960s, and in 1939 the 29,590ha of arable included 58% Oats, only 12% Barley and 1.5% Wheat. By 1988 the total arable was down to 5,529ha, including only 2% Oats, 72% Barley and 1.5% Wheat, 87% of the Barley being spring-sown. Barley has always been mostly spring-sown, while Wheat has always been mostly autumn-sown. At the beginning of the 20<sup>th</sup> century tillage of all sorts covered 15% of the county, rose briefly to 21% in the Second World War, but had fallen to 3% by the end of the century (Bateman 1998). During the same period Sheep numbers increased by 275%, dairy cows and heifers by 133% and other Cattle by 49%.

Land use in the county is now overwhelmingly pastoral. It is only in the coastal part of the south-west of the county that arable fields are a major feature of the landscape. Quite often, especially in the north where there are so few of them, there is a strong tendency for the same fields to be arable year after year, with no intervening fallow or grass leys. The availability of subsidies has led to a good deal of diversification. Maize for fodder has been increasingly grown in recent decades especially in the Cardigan area, and has been creeping steadily northwards. Triticale has scarcely been grown commercially. Oilseed Rape is uncommon, and grown chiefly in the lower Teifi valley. Flax and Hemp have been grown for fibre in a few places. Field Peas, usually mixed with Barley, are occasionally grown for fodder, as is Common Vetch (*Vicia sativa* subsp. *sativa*) in a very few places. The arable options under agri-environment schemes, in particular Tir Gofal, have recently improved weed diversity by encouraging many farmers for example to grow unsprayed root crops, to grow unsprayed cereals, to leave winter stubble, or to plough but leave fallow the field margins, although the option of growing cereals undersown for winter pasture is obviously bad for arable weeds. Tir Gofal has also had an option for “wildlife cover crops”, so that fields have been sown with Rape, Quinoa, Kale, Sunflowers, Millet and other cereals, etc., providing food for a wide range of birds and other animals, as well as much of interest for botanists.

### Arable weeds

Early information on arable weeds in the county is sparse, and mostly in the form of individual records of species. *Glebionis segetum* for example was recorded as an abundant weed, especially of upland fields, from the mid-19<sup>th</sup> century until the Second World War (Purchas 1848, Burkill & Willis 1894, Salter 1935, Webb 1941). Salter mentions fields yellow with it in the early 1900s, but this is a rare sight today. Salter also noted such finds as *Galeopsis speciosa* and *Misopates orontium* in “weedy patches of oats and potatoes on one of the rocky knolls” near Hen-hafod SN69S (Diary 21.7.1904), but rarely gave any impression of what sort of weed communities there were. Walking from New Quay Head to Cwm Tudu though in



Weedy Barley crop, Dolgoy, Pontgarreg, view S from SN346545, September 1992





*Glebionis segetum* in Barley field, Penparc, view W from SN204488, July 1986

1894 (Diary 27.8.1894) he noted “Borders of cornfields yielded Viper’s Bugloss [*Echium vulgare*], Agrimony [*Agrimonia* sp.], Corn Bluebottle [*Centaurea cyanus*], *Lamium amplexicaule*”, and the following day, walking from Aber-porth to Mwnt, he remarked: “I have nowhere before seen so much arable land in the county; hence the chance was exceptionally good for corn-field weeds. I noted *Ranunculus parviflorus*, *Filago germanica* [*F. vulgaris*], *Lepidium campestre*, *Euphorbia exigua* and *Papaver Argemone* ...”

By a fortunate chance, the artist John Brett while on holiday at Aber-porth in 1891 did an oil painting, “Summer on the cliffs” (Sumner 2001, Wilson & King 2003), showing a Barley field which, from its height above the sea, was probably on the headland where the MoD site now is, SN25L. Among the weeds he depicted appear to be *Centaurea scabiosa*, *Senecio jacobaea*, *Cirsium arvense*, *Tripleurospermum maritimum*



*Summer on the cliffs* by John Brett, 38 × 76cm, 1891 (Copyright © Philip Mould Ltd.)

subsp. *inodorum*, *Sonchus arvensis* and perhaps *Reseda luteola*. Before this headland was taken over by the MoD in 1939, arable fields reached right to the clifftop. They are thought to have been last ploughed in 1936, at which time the old Welsh Black Oat ‘Ceirch-du-bach’ was the main crop (Edwards 2003). In 1978 a cable trench 2m deep was dug through one of these old fields SN246525, which by then had developed into coastal heath with *Calluna*, *Erica cinerea*, *Serratula*, *Avenula pubescens*, etc., and the following summer the resulting 2m wide strip of disturbed soil was yellow with *Glebionis segetum* and had 20 other arable weed species, all derived from the seed bank formed 42 or more years earlier when it was arable (Chater 1982a):

<i>Anagallis arvensis</i>	<i>Fumaria bastardii</i>	<i>Scleranthus annuus</i>
<i>Aphanes arvensis</i>	<i>Juncus bufonius</i>	<i>Sherardia arvensis</i>
<i>Cardamine flexuosa</i>	<i>Papaver dubium</i>	<i>Senecio sylvaticus</i>
<i>Chenopodium album</i>	<i>Persicaria lapathifolia</i>	<i>S. vulgaris</i>
<i>Euphorbia exigua</i>	<i>P. maculosa</i>	<i>Spergula arvensis</i>
<i>E. helioscopia</i>	<i>Polygonum aviculare</i> sens. lat.	<i>Stellaria media</i>
<i>Fallopia convolvulus</i>	<i>Raphanus raphanistrum</i>	

Further W along the coast, between Pen-y-graig and Gwbert, exceptionally rich weed communities still exist in the arable fields. The crops here have recently been chiefly spring Barley, Fodder Beet and Potatoes, but there is also strip cultivation of vegetables for the local market and occasional crops of spring Wheat, Flax and Peas. Three groups of these fields around Mwnt (see picture p.42) now comprise the **Caeau Crug Bychan, Ty Gwyn a Llwyn Ysgaw SSSI** SN218519-173513 on account of their arable weeds, the richest group being at Ty-gwyn. Among the more interesting species recorded here over the last 20 years have been:

<i>Anchusa arvensis</i>	<i>Kickxia elatine</i>	<i>Scleranthus annuus</i>
<i>Bromus commutatus</i> var. <i>pubens</i>	<i>Lamium amplexicaule</i>	<i>Silene gallica</i>
<i>Euphorbia exigua</i>	<i>L. hybridum</i>	<i>Stachys arvensis</i>
<i>Fumaria bastardii</i>	<i>Misopates orontium</i>	<i>Trifolium subterraneum</i>
<i>F. capreolata</i>	<i>Polygonum rurivagum</i>	<i>Valerianella dentata</i>
<i>Glebionis segetum</i>	<i>Ranunculus parviflorus</i>	

In total some 83 species counting as arable weeds have been recorded from these fields, giving them an Important Arable Plant Areas (IAPA) score of 73 (Byfield & Wilson 2005). The fields are also mentioned in Wilson & King (2003). Wilson (2005) has written: “It is thought that these arable fields around Mwnt have one of the richest surviving floras of any comparable area in Britain.... The criteria for selecting IAPAs state that sites on sands and freely-draining acidic soils that score more than 70 are of European importance, and on this basis, the fields at Mwnt are outstanding.”

In the same part of the county, crops of Maize grown for fodder, which have been fertilised with slurry and on which herbicides have not been used, have had a weed flora of considerable interest. A large form of *Solanum nigrum* is sometimes dominant, and both *Amaranthus ×ozanonii* and *Datura stramonium* have been frequent; these late-fruited weeds have flourished here as the Maize is not harvested until October or November. Unfortunately most of the other Maize fields in the county are largely weed-free because of herbicides.

That a buried seed bank of arable weeds persists over many parts of the county is shown by the frequency with which such weed species appear when disturbance from road widening schemes, house-building, pipe-laying, etc. cuts into former arable fields. *Glebionis segetum*, *Stachys arvensis*, *Kickxia elatine* and *Fumaria* spp. regularly appear in such situations (although in road-widening schemes the picture is often completely distorted by the misguided use of “wild flower” seed-mixes). Chippindale & Milton (1934), and Milton (1936) in less detail, showed the presence of viable seed of many arable weeds under different types of pasture in the Aberystwyth district, including *Fallopia convolvulus* and *Euphorbia helioscopia* in a field that had been under pasture for over 50 years. Agri-environment schemes encourage arable options (see above) to be sited in fields that were formerly arable, for practical as well as conservation reasons, and it is mostly on Tir Gofal farms now that one occasionally sees Barley or Wheat fields yellow with Corn Marigolds; they were not so rare in the 1970s and 1980s. Poppies have never been prominent as arable weeds in the county, Burkill & Willis (1894a) seeing none during their extensive botanising in the middle of the county in 1893. Salter (1935) said that *Papaver rhoeas* is never seen in cornfields and that *P. dubium*, which he says is the Poppy of cornfields, is rather scarce; the only recent record of the latter among cereals is from a Barley field in 1993.

In the uplands one still finds occasional weed-rich fields, usually now of Turnips rather than Oats, and good seed banks. For example, at Tan-y-graig near Devil’s Bridge SN730758, where Salter noted *Galeopsis speciosa* as an abundant weed in Oats in 1922 and 1926, this species was present again in 1995 when the field



was ploughed for Turnips, growing with *Spergula arvensis*, *Persicaria maculosa*, *Fumaria muralis* subsp. *boraei*, *Fallopia convolvulus*, *Sinapis arvensis* and 15 other weed species.

The comments on the history and effects of liming and fertilizing in the section on grasslands are of course equally relevant to arable weeds. Here it is worth adding that Davies (1815) mentioned the value of calcareous sea sand as well as lime in reducing *Glebionis segetum* and other weeds.

### Churchyard and other graveyard grasslands

There are c.100 churchyards and over 200 chapel graveyards and cemeteries in the county, and complete surveys were done of the churchyards in the 1970s and 1980s, partly in connection with a nationwide churchyard survey by the BSBI and RSN (Chater 1982b, 1984b, 1985a, 1986a, 1994). Most of the chapel graveyards have been recorded as well, to varying degrees of completeness. These sites tend to have disproportionately rich floras for their size, for example **Henllan** churchyard SN354402 at 0.2ha, one of the smallest, having 124 species of higher plants, and **Lampeter** churchyard SN575483, at 1.5ha the second largest, having 151. The churchyards average 0.4ha in size, and contain on average 90 species. About a third of them were judged to have semi-natural grassland of significant local interest, and the following list of ecological indicator species, showing the number (conveniently equalling the percentage) of churchyards that they occur in out of the total of 100, suggests something of their importance:

<i>Hypochaeris radicata</i>	93	<i>Carex caryophyllea</i>	13
<i>Centaurea nigra</i>	85	<i>Ajuga reptans</i>	11
<i>Lotus corniculatus</i>	68	<i>Pimpinella saxifraga</i>	10
<i>Hyacinthoides non-scripta</i>	66	<i>Trisetum flavescens</i>	10
<i>Conopodium majus</i>	47	<i>Succisa pratensis</i>	8
<i>Cardamine pratensis</i>	45	<i>Galium album</i>	7
<i>Leontodon hispidus</i>	35	<i>Briza media</i>	5
<i>Brachypodium sylvaticum</i>	26	<i>Bromospis ramosa</i>	4
<i>Danthonia decumbens</i>	13	<i>Allium ursinum</i>	3

Most of these churchyards, and many of the chapel graveyards (which tend to date from after 1810), were taken into care before modern agricultural practices depleted the species richness and altered the nature of most of our grasslands. In particular, extensions to the churchyards that were incorporated in the 19<sup>th</sup> and early 20<sup>th</sup> centuries from permanent pasture, tend to be among the best-preserved relics of semi-natural grassland that we have; they are often at least in part still undisturbed by burials, have never been fertilised or even grazed, and their only management has been mowing and, at least until recently, the removal of the cuttings as hay. What effect the change from pasture grazing to churchyard mowing will have had is uncertain, but, surprisingly, in most cases the churchyard grassland is more like grazed pasture than hay meadow. Grazing in churchyards was probably uncommon through much of the 19<sup>th</sup> and 20<sup>th</sup> centuries, and was actually



*Smyrniurn* in Penbryn churchyard,  
view E from SN293521, April 1974



Blaenwenen chapel graveyard,  
SN243466, July 1980



Graveyard management: (left) Sheep at Llanychaiarn church, view N from SN585786, December 1984; (right) Goat at Penmorfa chapel, view S from SN304522, May 1992

prohibited by the Church in Wales during much of the 20<sup>th</sup> century, but is now allowed again and is being used in a few places. The medieval parts of churchyards, and other parts that have been used for burials, often repeatedly, will have been enriched and made more calcareous both by human remains and in some cases by plaster from stone-framed graves and tombs that are a common feature of many of the county's graveyards. Nevertheless, quite how the graveyards came to be so rich in species, and in calcicoles in particular, remains uncertain.

It has been suggested that graveyards may usually have been sited on deeper soils for ease of burying, and that these pastures on deep soils would have been among the first to have been improved if they had not been protected in this way, but there is no information on the species richness of such grasslands in the past, especially in the pre-Salter era. Furthermore, in the uplands at least, graveyards were often deliberately sited off the rare areas of agriculturally valuable deep soil (at Ystumtuen dynamite was used to make graves as the rock was so near the surface). Many of the interesting species may have come into graveyards by unknown means of natural dispersal, and thrived there because of the management regime, because of the enrichment by burials, or conversely because of the paucity of nutrients in the relics of permanent pasture, in a way that would not have been possible for them in the inimical farmed landscape outside.

A striking feature of the graveyards is the disproportionately numerous occurrences of various calcicoles in them. For example, *Galium album* is known from seven graveyards, but from only 13 other sites; *Trisetum flavescens* from ten, with 27 other sites; *Briza media* from five, with 27 other sites; *Knautia arvensis* from six, with 36 other sites; *Clinopodium ascendens* is only known from **Llangoedmore** churchyard SN199458, and *Plantago media* only from Bethany chapel graveyard, **Ciliau Aeron** SN498584. No calcifuge species show this pattern. *Anacamptis morio* has all its bigger populations and 99% or more of its plants in the six graveyards where it occurs, with only eleven other sites; **Bryngwenith** chapel graveyard SN341434 has some 13,000 plants of it.



*Galium album* in Llanddeiniol churchyard, SN560721, July 1977

Fine spoil from the lead mines was widely used in the N of the county to put on graves as a weed-suppressant, and resistant forms of *Silene uniflora*, as well as of *Agrostis capillaris* and perhaps other grasses, were introduced with it and the *Silene* has been recorded from a dozen graveyards.

Non-native species are frequent in graveyards for obvious reasons, but again the proportions are sometimes surprising. *Filipendula vulgaris*, assumed to be only naturalised in the county, is recorded from 21 graveyards, but from only three other sites, and *Fragaria moschata* from six graveyards and 19 other sites. The former was doubtless originally introduced as an attractive sweet-scented and decorative plant, but this does not apply to the latter. *Pilosella aurantiaca* subsp. *carpathicola* is in almost every graveyard, but rarely





*Narcissus pseudonarcissus* subsp. *pseudonarcissus*,  
Penrhyn-coch churchyard, view  
W from SN643841, March 2004



Gwenlli churchyard, *Orchis mascula*,  
view SW from SN392534, May 2004

elsewhere. Rarities include *Luzula luzuloides* in **Maestir** churchyard SN554493, *Poa chaixii* there too and in **Llanfihangel Ystrad** churchyard SN524562, and *Leucojum aestivum* in **Llanychaiarn** churchyard SN585786. Graveyards also contain a great range of Daffodil species and cultivars, and *Narcissus obvallaris* grows in at least 23 of them; **Penrhyn-coch** SN643841, **Tremain** SN235486 and **Capel Blaen-y-waun** SN161448 are among the more interesting of these.

Of the many graveyards worth visiting, some already mentioned, only a few can be highlighted here. **Gwenlli** churchyard SN392535, only 0.1ha, has 89 species, including four Orchids, *Dactylorhiza maculata*, *D. fuchsii*, *Neottia ovata* and *Orchis mascula*, eight ferns, *Carex pulicaris*, *Knautia arvensis* and *Linum catharticum*, as well as *Ornithogalum angustifolium*, *Narcissus obvallaris* and many other naturalised species of interest. St Mary's churchyard, **Lampeter** SN575483, 1.5ha, with 151 species, well-stocked with good Yews, is of special interest for the area of very calcicolous grassland S of the nave, where the former church used to be and thus probably enriched by mortar; *Brachypodium pinnatum*, *Briza media* and *Trisetum flavescens* all grow together here as they do nowhere else in the county. **Eglwys Newydd** churchyard SN768737, 0.7ha, with 125 species, has *Hieracium grandidens* abundant on its walls and graves, *Galium album* has been there recently, and there is a good display of *Hyacinthoides non-scripta*



Capel Rhiwbwys graveyard, *Anacamptis morio*,  
view W from SN545692, May 2004



Llanina churchyard with *Hyacinthoides non-scripta* and *Primula veris*, view  
NW from SN404598, May 2001



Llanina churchyard with *Hyacinthoides non-scripta*,  
view NNE from SN404598, May 2001





*Leucanthemum vulgare* and *Leontodon hispidus* in Gartheli churchyard, view S from SN586567, June 1978

in the NE extension, and clumps of *Rubus plicatus*, as well as fine trees (Chater 1985a). **Capel Rhiwbwys**, Llanrhystud SN546692, has a large population of *Anacamptis morio*, as well as some *Trisetum flavescens*, *Knautia arvensis*, *Neottia ovata* and *Primula*  $\times$  *polyantha* and its parents. **Llanina** churchyard SN404598 has again *Primula*  $\times$  *polyantha* and its parents and *Neottia ovata*, and also *Medicago arabica*, a carpet of *Hyacinthoides non-scripta*, and is one of the best for its range of *Narcissus* taxa. **Gartheli** churchyard SN586567, 0.3ha, with 96 species, is a good example of the typical three ages of a graveyard. Below the 1875 church, replacing at least two earlier ones, is species-poor mown grassland where there were presumably unmarked early burials. Above the church, among the 19<sup>th</sup> and 20<sup>th</sup> century graves, is a great variety of vegetation and species, but no room for any well-developed grassland communities. The upper third of the graveyard was added c.1910 and contains what is presumably a relic of the pasture it was once part of, dominated by *Danthonia*, *Anthoxanthum*, *Agrostis capillaris*, and *Festuca rubra*, with *Carex caryophyllaea*, *Leontodon hispidus*, *Leucanthemum vulgare*, etc., now being invaded by Bracken. **Llanilar** SN624751, **Llanddeiniol** SN561721, **Llan-geitho** SN621601, **Silian** SN572513 and **Llanwnen** SN533473 churchyards, and **Blaenwenen** chapel graveyard SN242466, are among the best of the others. The display of *Narcissus obvallaris* in **Capel Blaen-y-waun** graveyard, St Dogmaels SN161448 is outstanding. The *Cochlearia danica* known since 1726 at **Tregaron** church SN680597 is described in detail in the species account. Yews, a major feature of many churchyards, are also described in the species account, and other trees planted in graveyards are discussed in an earlier section.

Management of the graveyards is an ongoing problem, and both church and chapel authorities have found it increas-



Llanfihangel-y-Creuddyn churchyard after weedkiller, SN665760, June 1977



ingly difficult to get them properly cut in recent decades. Clearance and reseedling schemes have at various times destroyed all or parts of the interest of many churchyards, among those more recently affected being St Michael's Aberystwyth, Llanbadarn Fawr, Nantcwnlle, Tregaron and Holy Cross Llechryd. Llanfihangel-y-Creuddyn was sprayed throughout with paraquat in 1977 and has never fully recovered. Most graveyards though have retained much of their interest.

### Roadside and field banks and verges

Roadside banks and verges are perhaps the habitat where the general public, and perhaps even recording botanists, most often see the local flora, and a high proportion of the county's species must occur on them. The Ceredigion County Council now has 24 roadside reserves designated under its LBAP programme.

There are 2,245km of road in the county, and thus, excluding built-up areas etc., probably at least 4,000km of roadside banks or verges. Most of the roads in the county are bordered by banks, often with hedges, but there are comparatively few significantly wide flat verges of botanical interest. Roadside ditches are even less common, and have been increasingly piped or culverted in recent times. The vegetation of the banks is very dependent on the management regime. In the past the influence of roadmen, who managed their own stretches of road in individual ways, must have greatly determined their varied species composition and merits investigation.

The change in the second half of the 20<sup>th</sup> century from hand cutting to machine mowing will have resulted in many changes which can also only be guessed at. It has been obvious though in recent decades that close mowing and shaving of many banks has opened up the vegetation cover, created bare areas and even erosion in places, and allowed various species to seed in in quantity. The spectacular abundance of *Hypochaeris radicata*, often accompanied by *Sedum anglicum* and *Jasione montana*, especially in the middle of the county, is a consequence of this. Early cutting in May, while sometimes causing public outrage by removing the flowering spikes of *Orchis mascula*, can lead to even more colourful displays in July and August of such late flowerers as *Betonica officinalis*, *Linaria vulgaris* and *Campanula rotundifolia*. Of the three familiar roadside umbellifers, *Anthriscus sylvestris*, *Chaerophyllum temulum* and *Torilis japonica*, only the first is usually abundant enough to make a significant display. On the drier, stonier



*Pimpinella saxifraga*, *Campanula rotundifolia*, etc., roadside bank above Borth, view NNE from SN604877, August 2007



NE bank of minor road on N side of Gernos Mountain, view NE from SN358468, July 1982



Roadside bank with *Jasione*, *Hypochaeris radicata*, *Digitalis*, etc., Brynhoffnant SN3352, July 1986



banks the shiny leaves of *Umbilicus rupestris* are a characteristic sight in winter, and, on the more fertile soils in the middle and south, *Geranium lucidum*, which has spread greatly since Salter's day, is often conspicuous.

The very recent and rapid spread of the Oceanic Temperate annual *Cochlearia danica* on roadside banks, chiefly along the A487(T), may be partly due to salting, partly due to shaving of the banks allowing it to seed in, but probably chiefly for climatic reasons. The use of salt on these roads has not increased, and it is significant that *C. officinalis*, a Circumpolar Wide-boreal perennial species, though long present on roadside banks at Blaenannerch, has scarcely spread in recent decades. On some road verges in the uplands, as by the A44(T) above Cwmbrwyno SN78A and further east towards Eisteddfa Gurig SN78W, a conspicuous zone of *Atriplex prostrata* and *Juncus bufonius* occurs where the soil meets the tarmac, and winter salt is more likely to be a factor at this altitude of 300-400m. *Scorzoneroidea autumnalis* var. *coronopifolia* grows in colourful abundance along numerous verges and along the roadside banks especially in the uplands, lower down on the banks and flowering slightly later than *Hypochaeris*.

In many areas where former heath has been converted into pasture, for example on Gernos Mountain SN3546, the roadside and field banks are the only refuge for *Vaccinium myrtillus*, *Calluna* and other heathland species, and would become reservoirs for recolonisation if the land ever reverted. A curious feature is the presence of colonies of *Phalaris arundinacea* on a number of dry roadside banks, and no other wetland species behaves here in this way. Five of the 20 sites in the county for *Galium album* are on roadside banks, and other local rarities confined to or disproportionately occurring on banks include *Knautia arvensis* and *Hieracium rectulum*. Species uncommon in natural habitats in the county that are common on roadside banks, where they have probably spread from garden populations, include *Sedum telephium*, *Petasites hybridus*, *Galium odoratum* and *Meconopsis cambrica*. British natives probably not native in the county that are largely confined to the roadsides and adjacent banks include *Crepis biennis* and *Thalictrum flavum*.

Many naturalised aliens are either confined to roadsides, such as *Valeriana phu*, or are especially common on them, such as *Petasites fragrans*, *Narcissus obvallaris*, *Lunaria annua*, *Hesperis matronalis*, *Polygonatum multiflorum*, *P. ×hybridum*, *Aquilegia vulgaris*, *Tanacetum vulgare*, *T. parthenium* and *Cerastium tomentosum*. The banks around many of the villages such as Cribyn, Cwrtnewydd, Pontsian, Capel Dewi, Tregroes, Llandygwydd, Llechryd and others in the S of the county are for this reason among the most colourful and interesting, but the approaches to other villages and towns have often recently been marred by mass plantings of garish Daffodil cultivars.

The County Council has for some years had a spraying regime to eradicate the numerous roadside colonies of *Fallopia japonica*. When roads are widened or re-routed, the new verges often sprout arable weeds that have come from the seed banks of former arable fields on the site. At other times, fortunately rather rarely in this county, for example by the A44(T) at Lovesgrove in 1992, seed-mixes have apparently



*Sedum anglicum* and *Umbilicus* on stone/earth  
N bank of B4571, Adpar SN317423, June 1991



Roadside bank with *Malva moschata* and  
*Leucanthemum vulgare*, view ENE to Rosehill,  
Felin-wynt from SN204501, July 1992



introduced such species as *Thlaspi arvense* and *Erysimum cheiranthoides*, and without knowledge of the history of such species in the county it can be difficult to judge their significance. Suspect variants such as large late-flowering *Centaurea nigra* and large early-flowering *Achillea millefolium* are often other indications of “wild-flower” seed-mixes of dubious foreign origin having been used.

## Hedges

Hedges are a conspicuous feature of the lowlands, and even of parts of the uplands up to c.300m altitude, throughout the county. While it seems likely that much of the county was hedged in the Middle Ages, it is mostly not until the estate maps of the late 18<sup>th</sup> century that it is possible to be certain that boundaries on maps or mentioned in documents are hedges rather than just banks or fences (the word hedge was commonly used to mean a bank, a “quick hedge” was a hedge in our sense, and the word fence could cover any sort of physical boundary including a hedge). Judging from the limited areas covered by these maps, on which hedges are usually shown as rows of little bushes, they were almost as extensive two centuries or so ago as they are today, with many lost and many added since, but this may be misleading as the maps will mostly have covered only the better managed estates. To what extent the Parliamentary enclosures of the early 19<sup>th</sup> century, which affected some 15 parishes, involved hedges rather than just banks is unknown.

Lloyd & Turnor (1794) described most of the lowlands as enclosed but gave no detail on hedges. Davies (1815) though gave some 50 pages on the planting, maintenance and different styles of hedges in South Wales, going into enormous detail about the tree and shrub species used, as well as enumerating and commenting on other species that come in of their own accord. While little of the information is actually localised to Cardiganshire, it is clear that Hawthorn, Blackthorn and Hazel were staples, and Crab Apple (“... care should be taken to collect the seed from the true wild crab tree, and not from the mongrel half-apple trees without spines”) was given equal prominence, as was, surprisingly, Elder. Davies describes a Holly hedge “On Peterwell demesne, on the banks of the Teivy [c.SN54T] ... that had been extended nearly its whole length by many successions of layers; the shoots, as they grew to a proper size, being regularly layed in the direction of the fence, until the whole was completed.” He quotes a correspondent as saying that “In places exposed to the western and south-western sea winds, such as the coasts of Cardiganshire and Pembrokeshire; I have seen nothing planted with success for fences, beside the humble furze”, and another: “On the west of Cardiganshire, in a quickset hedge of seven or eight years standing, in a full sea exposure, observed among



The hedged landscape, Dyffryn Aeron, view SW from SN557578, May 1973



*Ulex europaeus* hedge by B4337 at Pontrhydsaeson,  
view S from SN543633, April 2008

neglected, being permitted to run up from 15 to 20 feet high, and in some places much more.” New hedges could be made by raising the bushes from seed in nurseries and transplanting them at 2-5 years old. The alternative was to form the hedge of “staggards, called by some Welsh quicksets; which are sizeable bushes of hawthorn, blackthorn, hazel, briers, &c. grubbed up in copses, useless hedges, &c.; carried to the spot, trimmed and set in their proper situations.” Davies’s information suggests that when a mixture of species was planted, the material was predominately of local, often wild origin, and that for the better quality hedges, probably those dominated by only one or a few species, much of the material came from nurseries, either belonging to estates or farms, or commercial ones of which increasing numbers were being established, especially in the Teifi valley. This of course has implications both for any attempts to date hedges by their composition, and for any discussion of the nativeness, local or national, of the plants used. Thomas Johnes (1800a) advised his tenants on the Hafod estate SN77 to plant “the elder for a fence, as no animal will browse it. Willow-stakes and cropped elder will make an excellent fence.”

A rare description of the actual planting of hedges in the early 20th century in the middle of the county is in the autobiographical poem “Sŵn y gwynt sy’n chwythu” by James Kitchener Davies. He recalls his father planting particular hedges at Llain, 2.5km WNW of Tregaron SN655604, alternating three Hawthorns with one Beech (“tair draenen wen a ffawydden”) along the tops of the banks, and being told how his grandfather had planted other hedges, setting Wild Plums here and there in them (“... a gosod eirin-pêr yma a thraw yn y perthi.”) These actual hedges, mostly now very overgrown, can still be seen as they were described (Chater 1985b). Hedges of this type, Hawthorn to make them stockproof, with Beech at intervals to provide shelter and shade, are very common in the middle of the county as well as in the uplands, and many can be seen for example along the A485 road between Bronnant and Tyncelyn SN66M. The various styles

the sets a few birches, brown willows, elders, and furzes, to be the least affected.” (He does elsewhere discuss the differences between Gorse or Western Gorse at length, but does not indicate which was meant in these cases). Gorse hedges are often mentioned over the next century or so, and many can still be seen today.

As today, the South Wales hedges were managed by laying, often termed plashing or pleaching, or by just trimming, and Davies says: “... this practice of plashing and *trimming* hedges now extends into [Pembrokeshire] and Cardiganshire, especially adjoining public roads and near mansion-houses.” In describing the state of the hedges in general, he says that in many areas, including the Teifi valley, “fences are commonly of very luxuriant growth, and frequently too much



Beech and Hawthorn hedge between  
Cae Troi and Cae Cwteri, Llain, view  
NNW from SN65556035, December 1983



Ruin of Llain and its hedges, view SE  
from SN65456040, December 1983



and management techniques of hedges in Wales, including some observations on Cardiganshire, can be found in Scourfield (1977).

Between 1974 and 1979, I carried out a survey of *c.* 750 hedges in the county, using a conventional recording card, scoring for free-standing woody species in up to five 30m lengths per hedge, 2,223 such lengths being recorded in total. The dominant species, woody climbers, standard trees, ground flora of interest, and a dozen physical characteristics were also recorded for each hedge. About 60% were chosen to represent the variety of hedges throughout the county. The remainder were chosen from areas where estate and tithe maps enabled something of the history of the hedges to be at least partially worked out to as far back as the 1780s; in these cases every hedge in the area was surveyed. In the 1970s a simplistic interpretation of the Hooper Hedge Hypothesis (that hedges added one species for each century of their age) had achieved the status of folklore, most of the landowners I approached being aware of it, and one purpose of the survey was to test its validity in the county. Some analysis of the results has been carried out but much more could still be done. The information on the recording cards was put into a computerised database by Andrew Jones who analysed it in various ways, although the results have not been published; copies are held at IGER/IBERS and CCW, and the cards and maps are at CCW with copies in NLW.

In the 750 hedges, the commoner free-standing woody species, with the percentage of hedges in which they occurred, were:

<i>Crataegus monogyna</i>	90	<i>Quercus robur</i>	28	<i>Alnus glutinosa</i>	13
<i>Corylus avellana</i>	74	<i>Betula pubescens</i>	23	<i>Sambucus nigra</i>	9
<i>Prunus spinosa</i>	68	<i>Acer pseudoplatanus</i>	22	<i>Salix aurita</i>	9
<i>Sorbus aucuparia</i>	46	<i>Quercus petraea</i>	21	<i>Betula pendula</i>	8
<i>Fraxinus excelsior</i>	42	<i>Fagus sylvatica</i>	15	<i>Malus sylvestris</i>	6
<i>Salix cinerea</i>	39	<i>Ilex aquifolium</i>	14	<i>Viburnum opulus</i>	2

42 other free-standing woody species occurred in less than 1% of the hedges.

Of other woody species, *Rubus fruticosus* agg. were in 92%, *Hedera hibernica* in 79%, *Rosa canina* sens. lat. in 56%, *Lonicera periclymenum* in 46% and *Rosa arvensis* in 25%. *Crataegus*, *Corylus* and *Prunus* were the only common dominants (but see later for *Laburnum*). The mean number of free-standing woody species per hedge was 6.1, generally greater than is found in eastern England (Pollard *et al.* 1974), in spite of the absence of calcicoles, and similar to that recorded in Shropshire (Cameron & Pannet 1980).

In three areas near Llangeitho in the upper Aeron valley where 1791 estate maps were available, 272 hedges were surveyed. The 170 shown on the 1791 maps, and thus probably over 200 years old, averaged 7.4 species per standard 30m length, while the 102 not shown on the 1791 maps, and thus definitely less than 200 years old, averaged 7.7 species (Chater 1985b, 1994). The younger hedges were richer, and, as is often the case in western and northern Britain, several times richer than the eastern England dating hypothesis would lead one to expect. Without knowing the detailed history of individual hedges, it is impossible to generalise, but explanations could be that the younger hedges were planted with a greater number of species, the older hedges could have been at some stage more overgrown and so lost species through competition, or through lack of management younger hedges could have become gappy and the gaps been planted up with a variety of species. The fact that a hedge is shown as a hedge on an old map does not of course necessarily mean that it has been a hedge continuously ever since.



Anciently layed Beeches in a hedge between Cae Troi and Cae Cwteri, Llain, view N from SN655604, December 1983



Anciently layed Beech hedge, Brynwernen, view N from SN696577, July 2008



Anciently layered Ash in roadside hedge, Cwmnewydion-uchaf, view ENE from SN711743, April 2008



Hedge of standard and clipped Beech by the A458 S of Bronnant, Blaenpennal, view N from SN644653, November 2007

Almost all hedges in the county are on banks. A considerable proportion show signs of having been layed in the past (81% of the sample of 750), but only 2% appeared to have been layed within the previous ten years; since then, however, there has been something of a revival of hedge-laying, encouraged by the Young Farmers' Clubs and conservation organisations. Many hedges though are overgrown and unmanaged, or reduced to just a row of trees with no stock-proof qualities at all (61% showed no sign of having been managed at all in the previous decade). Standard trees are common (recorded in 52% of the sample).

It has recently become fashionable to double-fence hedges, both as a conservation measure and to save trouble in keeping them stock-proof, but while this protects the bank and enables the hedge to thicken up, it results in the long term in a degeneration of the structure of the hedge and in a serious depletion of the diversity of plant species on the sides of the banks by shading; it is no substitute for careful laying and regular appropriate trimming. The recent government hedgerow regulations, administered by the County Council, do much to protect our hedges that are such a feature of the landscape and that are integral to the botanical diversity of the county. They are also subject to the environmental cross-compliance rules under the European Union Single Farm Payment Scheme. New hedges are chiefly seen where roads have been widened, and are usually of Hawthorn, more often than not alien taxa of Hawthorn that flower and leaf earlier than the native bushes. Alien Hawthorns though seem to have been being planted here for many decades, and Beech and Laburnum are the other most frequent alien species.

Species such as *Hyacinthoides non-scripta*, *Mercurialis perennis*, *Anemone nemorosa* and *Adoxa moschatellina*, regarded as ancient woodland indicators in some parts of Britain and thus as indicators of assarted hedgerows (those carved out of woodland), are often found in hedges in the county that are demonstrably less than two centuries old, created where there were not even banks or any sort of boundary before and that have not been adjacent to woodland. Colonisation of hedges by these species is clearly as easy here as is that of secondary woodland and plantations.

Laburnum hedges are a major feature of the landscape of the SW of the county, and they are described in detail in the species accounts (and see Chater 1998a). They are in many ways our most interesting hedges, but as they tend to be rather uniform, few were included in the 1970s survey and they do not appear in the statistics. Among other non-native species of shrubs, *Prunus cerasus* hedges have been planted in a number of sites, as have hedges of several species of *Spiraea*.

One result of the hedge survey was the notification in 1979 of the first hedge SSSI in Wales, **Hen Berth Fron-Badarn a Phersondy SSSI**, 200m SW of



Hen Berth Fron-Badarn a Phersondy, view N from SN633604, June 1996





Hen Berth Fron-Badarn a Phersondy SSSI,  
view NE at SN63306035, May 1975

Llanbadarn Odwyn church SN633603. Part of it is on a massive curved bank 120m long and contains the remarkable total of 21 free-standing woody species, averaging 13.5 per 30m length. There are no dominants, and the species are so mixed that two bushes of the same species are scarcely ever in contact. The bank borders glebe land, the church is dedicated to the 7<sup>th</sup> century St Padarn, and a Roman road and an Iron Age camp are nearby. The age of the bank is unknown, but could well be 600 or 700 years, maybe much more; it is certainly there on a 1791 map. The credulous may be tempted to translate the 13.5 species into 1,350 years and arrive exactly at St Padarn, but whatever its age the hedge is the richest and one of the most interesting so far known in the county. The remaining 100m, the NW part, is in contrast much less rich, with an average of 7.6 species per 30m length and only 12 species altogether, and is dominated by *Prunus spinosa*; it was not there in 1791. Alex Preston of CCW made a detailed plan of the hedge in 1996, showing the position of every constituent bush, an invaluable baseline for future surveys, and the following year CCW grant-aided the expert laying of the whole hedge.

## Walls

Drystone walls are widespread especially in the uplands, and it is only when they are packed with earth, or have greatly decayed, that they support any significant vegetation. *Asplenium septentrionale* finds its main habitat in such earthy walls, often associated with lead mines, and *Blechnum*, *Deschampsia flexuosa*, *Vaccinium myrtillus*, etc. are frequent colonisers. In the lowlands, earth-packed walls are a favoured habitat for such species as *Asplenium adiantum-nigrum* and *Umbilicus*.

In the predominantly acidic environment of the county though, it is mortared walls that often provide the only base-rich conditions in a locality. The extreme variations in the flora of such walls must largely be governed by the nature of the mortar (or cement) and by the extent of its decay; the walls of ruined buildings, especially in the uplands, are usually surprisingly devoid of vegetation except for mosses. *Asplenium ceterach* and *A. ruta-muraria* are virtually confined in the county to mortared walls, and several other ferns including *Cystopteris* and



Hen Berth Fron-Badarn a Phersondy,  
NW section being layed, view E  
from SN63256045, March 1997



Hen Berth Fron-Badarn a Phersondy SSSI  
after the previous laying, view ENE  
from SN63286038, June 1978



Overgrown hedges giving way to  
drystone walls above, view NNE  
from SN622480, Cellan, August 1974

*Asplenium trichomanes* subsp. *quadrivalens* are commonest on them; *A. septentrionale* is on mortared walls too, but presumably only on the less calcareous ones. *Mycelis muralis*, *Parietaria* and *Poa compressa* are rare natives especially characteristic of walls. Among the commoner aliens, *Cymbalaria muralis*, *Pseudofumaria lutea*, *Antirrhinum majus*, *Centranthus ruber*, *Erysimum cheiri*, *Sedum rupestre*, *Campanula portenschlagiana* and *C. poscharskyana* are conspicuous wall plants, and the rarer ones include *Aubrieta deltoidea*, *Hieracium grandidens*, *Erinus alpinus*, *Cymbalaria pallida* and *Chiastophyllum oppositifolium*. Retaining walls usually have a very different flora from free-standing ones, as they are less likely to dry out. The ancient walls of historic architectural sites such as Strata Florida abbey and some of the older churches have a precarious flora often affected by restoration, although the *Cochlearia danica* on Tregaron church has persisted for nearly three centuries. *Asplenium marinum* is abundant in several places on both the 13th and 19th century walls of Aberystwyth castle, but has been greatly depleted by recent insensitive repointing and is anyway susceptible to hard winters here.



Wall flora by Holy Trinity church, Aberystwyth, view NW from SN58738168, May 2009

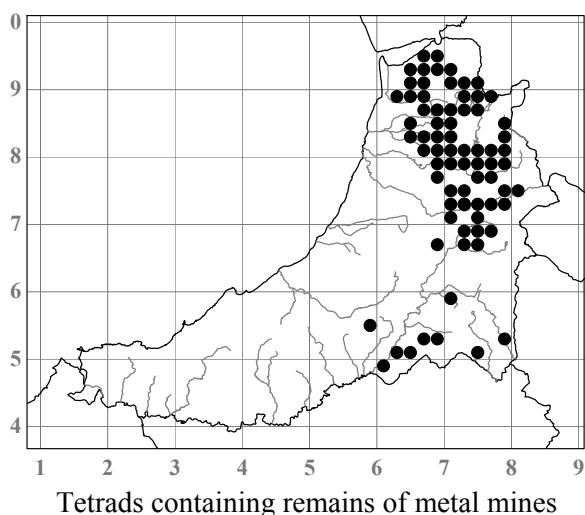


Aberystwyth castle grounds, view WSW from the tower of St Michael's church SN580816, August 1983

### Metal mines

Recent excavations at Copper Hill, Cwm Ystwyth SN81167522 by the Early Mines Research Group (Timberlake 2003) have indicated that opencast workings for copper took place here in the early Bronze Age, c.4,000BP. Indications of Roman workings have been found elsewhere in the county, and mining was well under way in the 16<sup>th</sup> century. Investment by the Society of Mines Royal in the 1580s and the arrival of Hugh Myddelton in 1617 greatly increased the activity, and throughout the 17<sup>th</sup> and 18<sup>th</sup> centuries mining activity, chiefly for lead and silver, fluctuated in intensity. Mining continued through the 19<sup>th</sup> century, chiefly for lead, with zinc largely replacing copper, reaching its greatest intensity around 1870. Thereafter it declined rapidly, few working mines were left by 1920, the last underground work ceased in 1939, and the final activity was an attempt to rework spoil heaps for lead and zinc at Esgair Mwyn SN755692 in the late 1940s.

There are more than 200 mine sites in the county, chiefly in the uplands in the north, and an immense literature on their history and remains. Bick (1993) is one of the best sources of information. Most are of



Temple mine and Coed Rheidol, view N from SN749791, postcard of early 20th century





Bronze Age mine workings (centre top) on Copper Hill, Cwm Ystwyth, view E from SN80787510, February 2005

little interest for their higher plants, but two, Esgair Fraith SN740911 and Cwmsymlog SN700837 are among the most interesting botanical sites in the county, and some 20 or more others are well worth a visit by the botanist. In the early 1990s a biological survey of the mid-Wales mines, including all the Cardiganshire ones, was commissioned by CCW from the Dyfed Wildlife Trust, the chief surveyors being J. A. Martin, S. P. Chambers, D. K. Reed and R. J. Williams (Martin *et al.* 1994). Among earlier surveys, Sellers & Baker (1988) covered five mines in the county, and several individual mines have been the subject of contract surveys by NCC or CCW. A great deal of work has been done on the effects of the heavy metals on plants on the county's mines, including the evolution of resistant races, chiefly by

Bradshaw on *Agrostis capillaris* (1952, 1958, 1959a, 1959b), and by Baker on *Silene uniflora* (1974, 1978, Baker & Dalby 1980). The mines used for this research, including Cwmerfyn SN696828, Frongoch SN722744 and Grogwynion SN714723 should be considered as having considerable potential as ongoing laboratories for this kind of investigation.

The floristic poverty of the majority of mine sites is due partly to the comparatively recent quarrying of rock surfaces, to the quantity of soil-less spoil, and to the toxicity of the heavy metals still present in the spoil and around the sites. Conversely, the interest and richness of other mine sites is caused by the presence of the mine remains with their mortar-rich ruined walls, the variety of other habitats such as wheel-pits, opencast workings and reservoirs, the presence of often calcareous gangue minerals such as dolomite associated with the ore veins, and the toxicity of the heavy metals giving advantage to resistant races and species over the normal genotypes of the area.

The only native species confined to the mine habitat in the county are the calcicoles *Asplenium viride*, at Esgair Fraith SN741912, growing on both mortared walls and inaccessible native rock, and *Gymnocarpium robertianum*, at Mynach Vale SN772775, growing on mortared ruins and spoil. To what extent calcicoles such as these and many others are at these mines because of calcareous minerals, notably the ferroan-dolomite, associated with the ore veins, and to what extent it is because of the mortar from the ruins, is uncertain, but the fact that such species occur at the mines rather than at the countless mortar-rich ruins of farms and houses throughout the county strongly suggests the former must be a significant factor. Yet the presence of calcareous minerals is no guarantee of higher plant interest: the Hafan mine SN728879 has immense amounts of ferroan-dolomite in the spoil, and it is even used to make walls there, but there are absolutely no calcicolous higher plants, even though calcicolous bryophytes such as *Distichium inclinatum* occur at the site.

The lead mine, heavy metal resistant populations of *Agrostis capillaris* and *Silene uniflora* are discussed at length under the species, as is the occurrence of the other most interesting plant of the Cardiganshire mines, *Asplenium septentrionale*. Although the latter is not confined to the mines, most of its populations occur on and around them, and they have been increasing steadily for at least the last 50 years. The reasons for its association with mines are uncertain, but it seems to favour dark-coloured rock and earthy walls at a certain stage of decay, as well as decaying mortared walls, and the open, strongly insolated habitats seem to favour it.

A system of leats was constructed, chiefly in the 19<sup>th</sup> century, to bring water to the mines. The longest, from Llyn Conach to Cwmerfyn, was some 28km long and supplied ten mines and at least 40 waterwheels, and the length of the leats must have amounted to several hundred kilometres altogether. Unfortunately, although Salter would have been familiar with many of them, neither he nor anyone else mentioned whether they had an aquatic flora, and none of them now still acts as a conduit for flowing water.

A few of the more interesting mines can be briefly described. **Cwmsymlog** mine c.SN700837 was worked from at least the late 16<sup>th</sup> century, at first by German miners. Its heyday began in the 1620s under Myddelton, followed by Thomas Bushell, Humphrey Mackworth, William Waller and others into the 18<sup>th</sup>

century, it thrived until the 1860s, but after a slow decline it ceased altogether in 1901. It was one of the biggest and most productive in the county, mostly of lead and silver. Even in its last 46 years, 24,460 tons of lead ore and 415,850oz of silver were produced, and much more must have been produced previously although there are no records. The site is an SSSI, and the botanical interest is chiefly in the abundance of *Asplenium septentrionale*, of which there were 1,578 clumps in 2005, probably more than in any other site in Britain, and in the presence of various calcicoles, notably *Botrychium lunaria* and *Trisetum flavescens*, a large population of *Silene uniflora*, extensive areas of *Calluna* heath, a reservoir with *Utricularia minor*, and *Cystopteris fragilis*, *Asplenium ceterach*, *Polystichum aculeatum* and many other ferns on the old mortared walls. The W part of the mine has been reclaimed to pasture.

Mining began on Carberry Pryse's land at **Esgair Hir** SN735912 in the 1690s, and the site is of special historical interest as Pryse was able to use the occasion successfully to challenge the Crown's monopoly on mineral deposits throughout the kingdom. It and the botanically much more interesting **Esgair Fraith** mine c.SN740911, at 400m altitude and 500m to the east, were extravagantly promoted as "The Welsh Potosi" by Humphrey Mackworth and William Waller on behalf of the Company of Mine Adventurers, and probably some 4,000 tons of lead ore were extracted before 1708. Operations on a small scale continued intermittently until the 1840s, when both mines were more extensively developed. Esgair Fraith began producing copper in the 1860s and its output after that of 2,690 tons of copper ore made it the only significant copper mine in mid-Wales. It had closed completely by 1908.

Esgair Fraith mine has been considerably affected by FC road building and afforestation, but a great deal of interest remains. Quartz predominates in the ore vein at Esgair Hir, but at Esgair Fraith it is the calcareous ferroan-dolomite that predominates and, along with mortar from the ruins, is largely responsible for the presence of species such as *Asplenium viride*, *Botrychium lunaria* and *Linum catharticum*. *Ophioglossum vulgatum* is abundant in rough grassland on some of the spoil, and both *Equisetum ×dycei* and *Silene uniflora × vulgaris* occur (though none of the parents of these two hybrids are still present). *Lycopodium clavatum* and *Diphasiastrum alpinum* occur on heathy banks, *Cryptogramma* grows in a small quarry, and nearby in the same mine complex *Polystichum ×bicknellii* and its parents grow in a wheelpit, *Cystopteris fragilis* grows on the ruins of the barracks, and *Isoetes ×hickeyi* and its parents grow in the Llyn Nantycagl reservoir. Altogether 34 species and hybrids of ferns and fern allies have been seen here, and it is one of the most rewarding sites in the county for the botanist.

**Mynach Vale** mine SN772775 (also called De Broke or Ty-gwyn) was started in 1849 and had closed by 1887, producing only 1,022 tons of lead ore in its last 15 years. Although small and, until recently, hidden in the conifer plantations of the Rhuddnant valley, it has the only population of *Gymnocarpium robertianum* in the county, as well as two other striking rarities, *Euphrasia pseudokernerii* and *Hieracium sparsifolium*, and another calcicole, *Polystichum aculeatum*. Although **Cwmystwyth** mine c.SN805745 is the largest in the county, covering 100ha or more and dominating the landscape of the upper Ystwyth valley, and has as long a history as any, it has very little higher plant interest. The complete absence of calcicoles suggests that this is because of the lack of any base-rich rock. *Asplenium septentrionale* occurs in a few places, *Silene uniflora*



Cwmsymlog lead mine, view W from SN70058375, October 2004



Cwmsymlog lead mine notice, SN700837, 2008





Cwmystwyth lead mine, Copper Hill on left, view NE from SN803742, June 1993

grows by the waterfalls, and *Cryptogramma* grows on one area of scree. Although such species as *Alchemilla glabra*, *Valeriana officinalis* and *Primula vulgaris* grow on other sites nearby, even these are quite absent from the mine area. **Cwmerfyn** SN696828 and **Cwm Sebon** SN684830 mines, dating from the early 17<sup>th</sup> century and productive of lead, silver and copper as well as a little zinc, have been largely reclaimed or otherwise destroyed, but are still of interest for their populations not only of *Silene uniflora* but also of *S. vulgaris* and their hybrid, and *Noccaea caerulescens* occurred here in the past. **Goginan** mine SN690818 has been completely destroyed by reclamation, but contained



Cwmerfyn mine, view ENE from SN689828, April 1974



Cwm Rheidol lead mine, view N from SN728778, August 1999



Goginan lead mine before reclamation,  
view S from SN691818, April 1988

*Silene uniflora* and was the only site in the county for *Minuartia verna*. **Cwm Rheidol** mine SN730783 is remarkable for its thriving colony of *Helleborus foetidus* on dry, S-facing, heavily polluted spoil; the various calcicoles on an area of recently imported limestone chippings by the road cannot be considered an integral part of the mine flora.

The effects of the mines on the rivers and their vegetation has been profound and much studied. The Ystwyth, and to a lesser extent the Rheidol, were heavily polluted. Others, such as the Nant Silo, a tributary of the Afon Clarach, and the headwaters of the Teifi were also affected, but in the latter case the filtering effect of the Cors Caron bogs saved the

lower parts of the river from serious pollution. Newton (1944) summarised the early work on these problems, and later (1959) described work on the Rheidol in some detail. Jones (1955a) gave a useful summary of the botanical evidence for the recovery of the Rheidol. Lead and zinc sulphates were the main pollutants, and the use of Cornish ore-crushing techniques and their associated slime pits was especially deleterious. The effects of the pollution were noted by the Rivers Pollution Commissioners as long ago as the 1870s in the Dyfi, Clarach, Rheidol and Ystwyth valleys.

Although the Rheidol was still largely devoid of aquatic life until about 1920, with the cessation of mining its improvement was rapid. Already by the 1930s parts of the river had become well vegetated, and it appeared to have completely recovered by the 1950s, apart from occasional residual pollution from the Cwm Rheidol mine which still continues. The Ystwyth, polluted especially by zinc, remained completely devoid of higher plants until at least 1940, and, although it gradually became vegetated from the lower reaches upwards over the following decades, it still has only a rather sparse flora for much of its length. The banks of this river were also heavily polluted, and for considerable stretches even in the lower reaches they were vegetated by little other than *Molinia* and *Luzula sylvatica*. The heavy metal resistant *Noccaea caerulea* was known from a number of sites along the lower 15km of the river from the 1920s into the 1980s, but declined thereafter and was last seen in 2004. Pollution of the Marchnant, a tributary of the upper Teifi, from the Esgair Mwyn mine continued into the 1930s, and the Nant Silo, a tributary of the Afon Clarach, similarly remained especially badly polluted. Many of the reservoirs in or close to the mine sites are heavily polluted and remain largely devoid of higher plants, with *Juncus kochii* and *Glyceria fluitans* the only two aquatics likely to be seen.

Toxic material washed down the rivers and deposited for some depth in the river shingles and gravels, in the Ystwyth valley in particular, has had a major effect on the colonisation of the flood plains, inhibiting the growth of deep-rooted trees and favouring the development of shingle heath and *Molinia* as a climax vegetation. Most of these sites along the Ystwyth and Rheidol comprise SSSIs, and although of extreme ecological interest are more important for their lichens and invertebrates than for their higher plants. Human movement of toxic spoil from the mines, as when it has been used on graves (see the section on graveyards) or for roadmaking by the FC and others, can have a striking effect on the plants present.

## Quarries

Because of the general acidity of the rock, the innumerable building- and road-stone quarries in the county are mostly of little botanical interest. The largest, both still active, are the **Hendre Quarry** above Ystrad Meurig SN720696 and the **Cwrt Newydd Quarries** SN490484. The ancient **Pwntan Quarry** above Tan-y-groes SN291493 has an overgrown “hills-and-hole” aspect, with small pools, and those above **Llanddewi-Brefi** SN663542 are largely bare but have a good population of *Hieracium rectulum*.

There are several late 19<sup>th</sup> century slate quarries in the N of the county (Richards 2007), notably at **Cymerau** SN698961, with extensive spoil heaps, and at **Tyn-y-garth** SN692946, overgrown and wooded. The **Ponterwyd** or **Pentalwr Quarry** SN740809, where poor quality slate was extracted probably in the 1880s, is the only site in the county where *Asplenium ceterach* has been found growing on solid rock, even though there are no other calcicoles present and the rock is the basal arenaceous beds of the Devil’s Bridge





Sand quarries at Penparc, view S  
from SN204487, April 2007



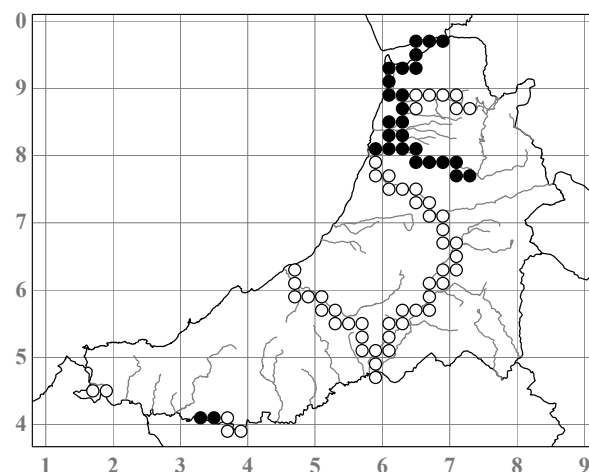
Weed flora in Penparc sand quarry, *Tripleurospermum maritimum* subsp. *inodorum*, *Glebionis*, *Papaver dubium*, etc., SN202485, August 2005

Formation of the Silurian. The only other slate quarries are the **Rosehill Quarries** by the Teifi estuary SN192448, worked from before 1820 until perhaps the early 20<sup>th</sup> century; they were less extensively worked than the Cilgerran Quarries across the river in Pembrokeshire and are now heavily wooded, and contain most notably *Hieracium eminentiforme*.

Of other kinds of quarries, the Cardigan Sand and Gravel Company's quarries at **Penparc** SN202485 are by far the most interesting. The calcareous sands, of deltaic origin in a late Devensian lake filling the lower Teifi valley, are quarried over a large area, and the constant disturbances, the moving around of usable and unusable deposits and the removal of topsoil in preparation for extraction ensure a plentiful supply of open sandy ground for colonisation. It is one of the most species-rich sites in the county, with abundant *Scleranthus annuus*, *Filago minima*, *Anchusa arvensis*, *Silene gallica*, *Erodium cicutarium*, *Sherardia arvensis*, etc. Many parts, especially where the underlying till is exposed, are wet and there are usually several pools with pH *c.* 8.5. Other, much more acidic gravel quarries include an active one near **Tregaron** SN668580, and a disused heathy one at **Wstrws** SN386501.

### Railways

Railways are important as routes and means for the introduction and spread of species, and they have also created considerable stretches of new habitat in the countryside. Seven separate episodes of railway construction have occurred in the county. In 1863-1864 the still active line from Machynlleth to Aberystwyth was opened and became part of the **Cambrian Railways**, skirting the Dyfi estuary where it largely follows a pre-existing early 19<sup>th</sup> century embankment. In 1867 the **Manchester and Milford Railway Company** opened the line from Carmarthen via Lampeter to Aberystwyth, crossing part of Cors Caron and descending the Ystwyth valley; this line was finally closed in 1967. The narrow-gauge **Plynlimon and Hafan Tramway**, running from Llandre on the Machynlleth line to the Hafan quarry 10km to the east, was opened in 1897 and closed two years later, and seems to have had no discernable botanical consequences. The narrow-gauge **Vale of Rheidol Railway** from Aberystwyth to Devil's Bridge was opened in 1902, and is still running. In 1885 the **Whitland and Cardigan Railway** was opened to Cardigan, only the final kilometre being within the county although this short stretch remains of great botanical interest; it closed in 1963. In 1895 a line was opened from Pencader to Newcastle Emlyn, entering the county at Pont Alltycafán and running down the Teifi valley for 6km before leaving it again at Llandyfrïog; this closed in 1973, but a stretch at Henllan was reopened as a tourist attraction in 1986. In 1911 the railway from Lampeter to Aberaeron was opened, leaving the



Tetrads containing railways, black  
dots current, open circles disused

The narrow-gauge **Vale of Rheidol Railway** from Aberystwyth to Devil's Bridge was opened in 1902, and is still running. In 1885 the **Whitland and Cardigan Railway** was opened to Cardigan, only the final kilometre being within the county although this short stretch remains of great botanical interest; it closed in 1963. In 1895 a line was opened from Pencader to Newcastle Emlyn, entering the county at Pont Alltycafán and running down the Teifi valley for 6km before leaving it again at Llandyfrïog; this closed in 1973, but a stretch at Henllan was reopened as a tourist attraction in 1986. In 1911 the railway from Lampeter to Aberaeron was opened, leaving the

Aberystwyth line 2km N of Lampeter and crossing over to the Aeron valley; the part from Felin-fach to Aberaeron closed in 1965, and the remainder closed in 1973.

That best known railway adventive, *Senecio squalidus*, was first recorded in the county at Cardigan in 1917 (Kent 1963, also covering its history throughout Wales). Salter (1935) remarked that it first appeared at Aberystwyth after the Great Western Railway Company took over the Cambrian Railways, which was in 1922, and he recorded it up the Vale of Rheidol Railway in 1926 and at Glandyfi on the Machynlleth line in 1926. It has never been abundant in the county though, and now is only reliably to be seen along part of the railway embankment by the Dyfi and by the level crossings in Llanbadarn Fawr; almost all its records have been associated with the railways. *Vulpia myuros* is the most abundant adventive to be almost exclusively associated with the railways in the county, having been first recorded in 1956 at Aberystwyth station and having managed to colonise widely before the main closures took place. The spread of *Rubus tuberculatus* seems, at least in some areas, to have coincided with the development of the railways.

Sargent *et al.* (1986), as a result of a nation-wide survey of British Rail land in 1979, reported *Poa angustifolia* from four sites along the Aberystwyth-Machynlleth line and by the Vale of Rheidol line, and it has not been seen elsewhere. The few other species recorded only from the railways include *Carex spicata*, *Hieracium asperatum* and *Epilobium lanceolatum*. A number of other species would appear to have arrived along the railways and subsequently spread more widely, including *Lathyrus nissolia*, *Senecio viscosus*, *Hirschfeldia incana* and *Conyza canadensis*. Species such as *Erophila verna*, *Saxifraga tridactylites* and *Trifolium arvense*, generally found on coastal sand and shingle in the county, find railway ballast congenial. *Chaenorrhinum minus* and *Linaria repens* are also very characteristic of ballast. Management of the working railways is chiefly by herbicide spraying of the ballast, which usually results in some sparse residual vegetation of interest along the verges. Trees and scrub along the verges, and on the embankments and cuttings, are cut down regularly, again keeping the habitat open. Few stretches are officially accessible, but the footpath from Glandyfi to Dovey Junction station SN6997 gives close, eye-level viewing of the ballast and rocky embankment with native and alien species such as *Poa compressa*, *P. angustifolia*, *Chaenorrhinum minus*, *Senecio squalidus*, *Sedum forsterianum* and *S. rupestre*, often changing from year to year. The track is also closely visible by the Leri bridge SN616929 where the footpath crosses.

The closed lines are often readily accessible and of considerable interest, especially the old Carmarthen line around Llanilar station SN627753 and where it crosses Cors Caron SN76D-66V. Stretches at Trawsgoed were for a time a Wildlife Trust reserve, but much of the line now in the Ystwyth valley has become a Sustrans cycle track and this should ensure some sort of continuity of open habitat, although tarmac has unfortunately been used along considerable stretches. Much of the Aberaeron line is either obliterated or so shaded by trees that there is little railway vegetation left, and the same is true of most of the Newcastle Emlyn line, although a shaded cutting on it has a thriving population of *Sibthorpia*. The short stretch of old railway embankment across the Teifi Marshes WTSWW reserve at Cardigan SN1845, now kept open as a path and Sustrans cycle track, has several local rarities including *Brachypodium pinnatum*, *Crepis biennis*, *Lathyrus nissolia* and *Rosa stylosa*.

### Towns, villages and tips

Aberystwyth, Cardigan, Lampeter, Aberaeron, Llandysul and Tregaron are the largest settlements and the only towns in the county. Their street trees are mentioned in another section, but all have considerable botanical interest in other ways in their native and alien floras. The plants of the pavements and other public places in central **Aberystwyth** SN5881 have been recorded over many years, and Chater (1974) and Chater *et al.* (2000) have described their change over 25 years in detail. A total of 165 species was recorded, 130 being native in the county. As might be expected of such a managed and precarious habitat, there is considerable turnover of species, 41 of those recorded in 1970-1973 were not refound in 1998-1999, while in the latter survey 57 were recorded that had not been seen in the earlier one. From a phytogeographical point of view, there was a distinct shift towards species of a more southerly distribution with an increase in the proportion of



Disused railway at Abermachnog, Teifi valley, view WNW from SN374403, August 1984



species associated with drier, warmer and lighter conditions. Thus species such as *Athyrium filix-femina*, *Veronica serpyllifolia* and *Ranunculus acris* were lost, and *Cardamine hirsuta*, *Sagina maritima* and *Parietaria judaica* were gained. No convincing correlation with actual climatic records was detected though. *Cochlearia danica* and *Cardamine hirsuta* increased strikingly, and the former has continued to spread on the streets since 1999, perhaps because being chiefly an early-fruiting annual it escapes the weedkiller that has been much used since the first survey. Aliens that have increased greatly include *Buddleja davidii*, *Centranthus ruber* and *Cymbalaria muralis*. The persistence of some plants in unlikely sites in the town is remarkable, the annual *Solanum nigrum* appearing around a doorstep under a Pigeon roost in Cambrian Place for at least 20 years, *S. dulcamara* has been on a free-standing mortared wall in Moor Lane for at least 40 years, and *Viola riviniana* has been on a pavement edge in Portland Street for at least 45 years. Open cellar-wells and cellars covered by iron gratings on the pavements are often of great interest, and rarities in them in Aberystwyth include *Cyrtomium falcatum* in Laura Place and *Tradescantia fluminensis* in King Street.

Casuals have always been frequent in the towns for obvious reasons, and Salter recorded many especially at the Aberystwyth rubbish-tip which in his day was N of the railway just beyond Plas Crug SN591811 and between the railway and the Afon Rheidol opposite and W of here; the latter area later became allotments until the 1960s, and part of it is still waste ground rich in aliens, especially *Aster* spp. Tipping was started around the SW side of Pendinas SN583799 in the 1950s, and this site became a rich source of aliens, at its best in the 1980s and 1990s when it was being used more for soil and rubble and was being landscaped, and before it was abandoned after 2000. A small tip at Blaendolau SN600804 was of interest in the 1960s and 1970s, when *Veronica crista-galli* was found there. Among other profitable rubbish-tips have been those at Borth SN612892 and near Penparc SN203482.

Bird-seed aliens have become more conspicuous in Aberystwyth in recent years, especially around the bus and railway stations and the Marina, including *Echinochloa crus-galli*, *E. colona*, *Digitaria ciliaris*, *D. sanguinalis*, etc. Demolition sites have produced unexpected rarities, such as Seilo chapel, Aberystwyth, where *Hyoscyamus niger* and *Ambrosia artemisiifolia* appeared in 1996. When the new Ysgol Penweddig SN595811 was built c.2000, topsoil for landscaping around the car parks was brought in from a Sugar Beet residue lagoon near Kidderminster and among species unknown as natives in the county that appeared there were *Rumex maritimus*, *Myosoton aquaticum* and *Veronica catenata*.

**Aberaeron** SN46 aliens include *Lepidium draba*, known there since 1888. At **Cardigan** SN178461 *Verbascum lychnitis* and *V. pulverulentum* have occurred, the latter at least having come from East Anglia on farm implements stored on the site, and the cattle market SN180458 has produced many records including the first for the county of *Lactuca serriola*.

Landfill sites and other rubble and soil dumps throughout the county provide numerous records, perhaps the most outstanding being at the **Ynys-las boatyard** SN616933 where soil and rubble from a wide catchment have resulted in *Senecio inaequidens*, *Lactuca serriola*, *Thlaspi arvense*, *Chenopodium murale*, *Solanum physalifolium* and a large number of other unusual aliens and natives appearing in recent years.



Aberystwyth, with Pendinas (with monument) on left and Allt Wen (left of centre in the distance), view S from Constitution Hill SN584826, April 2009

## 7. Two botanical tours

Although parts of both tours can be done by public transport, they are perforce designed to be done by car or bicycle. Both start at Aberystwyth, and each is too long to be done properly in a single day. Further details of most of the sites and species can be found in the habitats and species accounts chapters.

### A tree tour up the Ystwyth valley

Many of the county's best trees can be seen on a trip up the Ystwyth valley from Aberystwyth, with a few diversions along the way. *Populus nigra* subsp. *betulifolia* is especially well represented, and the first good planted trees, seven of them, can be seen near the Penweddig School, the best being two by the old gasworks site SN59478097. A possibly native one can be seen nearby on the steep rocky river bank across the tidal stretch of the Rheidol opposite the Police Station SN58528105. Crossing over to the Ystwyth, at Penparcau one can divert along the B4340 up the Paith valley to Nanteos, where the tallest tree in the county, a *Sequoiadendron giganteum*, can be seen in the Wildlife Trust reserve at Coed Penglanowen SN61097859, along with the biggest *Abies alba* and several other fine specimens. Behind the mansion, now a hotel, is the biggest *Fagus sylvatica*, and by the walled garden the biggest *Cedrus libani* and *Liriodendron tulipifera*, the latter sadly broken. There are nearly a hundred old Oaks in the pastures across the valley, accessible by public path from the road above. Back to Penparcau and along the A487(T) to just beyond Llanfarian, another fine planted *Populus nigra* subsp. *betulifolia* can be sighted across a field by the pond at Aberllolwyn SN58707728. Back into the village and then up the Ystwyth along the A485 one passes the Aber-mad estate where many trees were planted in the 1870s, including several *Sequoiadendron* in the middle of fields. Down the lane at SN597763 is a small *Metasequoia* planted by W. A. Cadman in the 1950s. At Llanilar the road up the valley continues as the B4575.

The Trawsgoed estate SN670730 seen from a distance has the finest coniferscape in the county, dominated by fine *Sequoiadendron* trees and many others in the private grounds. Parking at SN667728 and walking back across the river bridge, turning left and then right there is a varied group of conifers and then a fine middle-aged avenue of *Tilia × europaea*. This leads to public paths across farmland c. SN677734 where there are many old Oaks. From an older but scrappy *Tilia* avenue on the B4340 a path leads to the river SN67157255 by the champion Oak in the county, a magnificent *Quercus petraea*. From the car park a wide range of *Populus* cultivars including 'Gelrica', 'Robusta', 'Casale 78' and 'Balsam Spire', planted by the FC, can be seen to the S in Black Covert SN668725, and a row of fine 'Marilandica' is below the old railway line at SN665728. Overhanging the road by the entrance to Birchgrove are three *Quercus × crenata*.

Another diversion, this time NW along the B4340 and then up the minor road along the Afon Llanfihangel gives one views of the two more or less definitely native *Populus nigra* subsp. *betulifolia*, one some way off showing above a copse by the stream below Llwyn-brain at SN65357629, the other just below the road at Tan-llan SN65807627. A little further on, in Llanfihangel-y-Creuddyn churchyard SN665760 is a tree of the uncommon *Platycladus orientalis*, and a *Chamaecyparis pisifera* that is unusually not one of the cultivars. Back to Trawsgoed and on along the B4340 one passes under a pair of huge *Populus nigra* subsp. *betulifolia* at Wenallt SN67467184, and just beyond on the left there is a view up a field to a wonderfully picturesque *Castanea sativa* SN681715, still just alive, that is the county champion. S of the river here by the public footpath are more fine Oaks, and a hedge line of old *Carpinus betulus*.

Diverting yet again from the Ystwyth, the B4340 leads to Ystrad Meurig, just beyond which on the right behind the hedge at SN70766742 one can see the sprouting hollow stump of an immense *Fraxinus excelsior*. At Pontrhydfendigaid a minor road leads to Strata Florida where in the churchyard at SN746657 by the abbey ruins are two ancient *Taxus baccata*, the NE one a sliver of a once big trunk, the other a much-tidied more complete tree, both competing for the honour of having the poet Dafydd ap Gwilym buried beneath them; if he is here at all, he is more likely to be beneath the former. A little way further up the Teifi valley, on open access land near Berthgoed at SN763653, are a few ancient and impressive uncoppiced *Alnus glutinosa* trees. S of the abbey, along the public footpath through Coed Mynachlog-fawr SN744653 a great range of puzzling *Betula* trees can be seen, including *B. litwinowii*, *B. japonica* and *B. celtiberica*. The Ystwyth can be reached again via the B4343 to Pontrhyd-y-groes, and thence it is a short way up to the car park at Eglwys Newydd church SN768736 for an exploration of the Hafod estate, where Thomas Johnes made vast plantations around 1800. Many of his *Fagus sylvatica* trees have survived massive further plantings by the FC in the latter half of the 20<sup>th</sup> century, including a huge bunch-planted one across the river in Allt Dihanog SN75997273, and others on Middle Hill and elsewhere. The *Taxus* trees in the churchyard are worth inspecting.



The return to Aberystwyth can be made via The Arch SN765756, where there are many more of Johnes's *Fagus sylvatica* trees surviving, especially at SN768758 and 763758. Down at Devil's Bridge two trees of another Beech, *F. orientalis*, can be seen by the entrance to the Woodlands caravan park SN74447723. In the wood by the Mynach stream SN74297685 above the bridges is the sole remaining *Pinus sylvestris* of Johnes's plantings of c.1800, 120 annual rings of one of its former companions having been counted by Salter in 1935. The view up the Rheidol valley from the terrace in front of the hotel SN741770 past a conspicuous *Picea glauca* encompasses parts of the Coed Rheidol NNR, one of the best *Quercus petraea* woodlands in the county.

### Ferns and fern allies in the north

This tour, chiefly of woodlands and lead mines, allows one to see almost all the taxa of ferns and fern allies in the county. Starting in Aberystwyth, *Asplenium marinum* can be seen in abundance on several of the old castle walls SN579814, especially in one of the chambers just N of the Great Gate. *Cyrtomium falcatum* grows nearby in a cellar well in Laura Place. Leaving the town northwards by the A487(T) and turning left along the B4572 one can park at SN602832, whence along the path leading NW through Cwm Woods a number of members of the *Dryopteris affinis* group can be found, including 'affinis', 'borreri', 'foliosa', a 'golden-scaled borreri', 'robusta', 'paleaceolobata' and 'insolens'.

Back to the A487(T), and turn right for Penrhyn-coch. Careful navigation can then lead one to the Cwmsymlog lead mine SN700837. After Esgair Fraith, to be visited later, this is the best mine for ferns in the county. In and around a wheelpit at the E end, *Asplenium septentrionale* and *Cystopteris fragilis* are abundant, the former is also abundant on decaying earth/stone banks stretching W all along the N side of the mine site, and the latter is unusually luxuriant on many of the mortared walls. *Asplenium ceterach* var. *crenatum* and var. *ceterach* are on the W wall of the lane between the houses, and *Botrychium* has been seen on a mortar-rich mound S of Plas y Wigwam and elsewhere to the W. *Polystichum aculeatum* is in a small cutting up to the SW at SN69698357. One can then either walk E up a rough track, or go back along the road and turn sharp right at SN657840, to reach Llyn Pendam SN709839, a mine reservoir where *Isoetes echinospora*, *I. lacustris* and *I. ×hickeyi* have been recorded. In the heathy area of felled plantation on the NW side of the reservoir there are a few plants of *Dryopteris aemula*. Further careful navigation takes one to Ponterwyd SN748808, where one turns left along the A44(T) and takes the second road left which leads into the hills and over the Nant-y-moch Reservoir dam. At Eaglebrook lead mine SN736892 *Ophioglossum* grows near the road, and many other ferns, as well as an unusual multi-coned form of *Equisetum arvense*, grow on the spoil heaps to the W. Further on there is ample parking above Llyn Nant-y-cagl SN730902, another mine reservoir where both species of *Isoetes* have been recorded, and where *I. ×hickeyi* grows in fairly deep water at the NE corner.

At SN723909 a rough but motorable track on the right leads E to the Esgair Hir lead mine SN734912 where one can park. Around this mine complex, including Esgair Fraith and Llyn Nant-y-cagl, a remarkable total of 34 taxa of ferns and fern allies can with luck be seen. At SN733913 on the walls of a shaft and wheelpit there are *Asplenium ruta-muraria* and *A. trichomanes* subsp. *quadrivalens*. Through the gate and down the track to the scant ruins of Esgair Fraith mine at SN740911, *Dryopteris ×complexa* nothosubsp. *complexa*, *D. oreades*, *D. filix-mas*, *Oreopteris* and *Huperzia* can be found on the stream banks. There is a large colony of *Equisetum ×dycei* on stony spoil near the stream but neither parent, and elsewhere nearby *Ophioglossum vulgatum* is abundant and there are several colonies of *Botrychium*. A bit further E in wet *Molinia* tussock fen, *Dryopteris ×deweveri* grows with its parents, and just beyond are small, easily damaged colonies of *Diphasiatrum alpinum* and *Lycopodium clavatum* among the *Calluna*. On the walls of a wheelpit above the track here there is *Asplenium viride* and *A. adiantum-nigrum*, the former also growing in a few other places around this mine, its only Cardiganshire locality. There is one plant of *Cryptogramma* in a small quarry, but to see it properly the dam of Llyn Conach SN739926 should be visited by going back along the rough track and turning right at the top of the hill. Below the rough road at SN727910 on the way back to the metalled road, the somewhat dangerous easterly of two wheelpits should be inspected as it contains *Polystichum ×bicknellii* and its parents. Beyond, on the ruins of the old mine barracks, there is *Cystopteris fragilis*.

Continuing W along the metalled road one comes down to Tal-y-bont, and turning right along the A487(T) one reaches Tre'r-ddol SN659922. Here there is a path up the S side of Cwm Cletwr through fern-rich ancient woodland c.SN663920, with *Dryopteris affinis* 'affinis', 'borreri', 'insolens', and 'robusta', the *Trichomanes* gametophyte in cavities in the rock outcrops, and both species of *Hymenophyllum* further up at c.SN668919. Further up still beyond the end of the path one plant of *Dryopteris aemula* grows on a cliff, and *Equisetum sylvaticum* is on the streambank. A diversion from Tre'r-ddol along the B4353 to Cors Fochno at

SN636926 enables one to see *Osmunda* growing by a straight N-S ditch leading from the bog. *Azolla* sometimes occurs in the ditch alongside the road here, and in the *Betula/Salix* scrub E of the track here on Llancynfelyn Common there is abundant *Dryopteris*  $\times$  *deweeveri* along with both parents. Stopping at SN651924 on the way back to the A487(T), *Polypodium*  $\times$  *mantonii* can conveniently be seen with its parents on the roadside bank.

Turning left along the A487(T) one reaches Furnace SN684951 and can turn right up Cwm Einion to the picnic site just short of Ty'n-y-cwm at SN69919429. A striking black-scaled morphotype of *Dryopteris affinis* grows 100m up a track opposite, and other morphotypes in this lower part of the valley include 'borreri', 'insolens', 'paleaceolobata' and 'robusta'. Walking back down the road, the *Trichomanes* gametophyte can again be seen in a few rock cavities, and *Hymenophyllum tunbrigense* grows on low cliffs in the partly felled conifer plantations above the road where Forest Enterprise in the 1990s sheltered it with roofs of Larch branches to offset the effects of the felling. *Dryopteris aemula* grows in several places, for example by a ride in the conifers at SN69259442. Returning down to Furnace and across to the Ynys-hir RSPB reserve car park unusually fine clumps of *Dryopteris*, including *D. cambrensis* and *D. complexa* nothosubsp. *complexa*, can be seen close by to the N at SN681961, along the rocky lane that leads through the woodland towards Ynys Edwin. If one ventures up the fern-rich Llyfnant at the N boundary of the county, it is best to approach it by turning right off the A487(T) at SN728997 and parking near Glasbwl SN738975. Walking W along the narrow road one can see *Hymenophyllum wilsonii* on wet rocks, at SN72739751 *D. affinis* 'convexa' grows between the road and the river, and *D. cambrensis* is generally the commonest member of the group in the valley.

The common ferns of the county can be seen at many sites along this route, and the above account mostly makes mention only of selected and locally more notable taxa.



## 8. Phytogeographical and ecological relationships of native species

By C. D. Preston, A. O. Chater & P. A. Smith

### Introduction

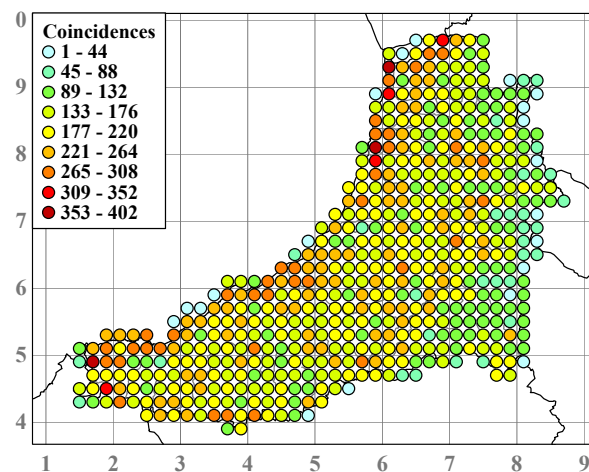
This analysis is based on 748 species considered to be native to Cardiganshire. The species concept here is rather broader than that adopted elsewhere in the Flora, and is closer to that of Stace (1997, 2010) than to that of Sell & Murrell (1997-2009). This is partly for pragmatic reasons, as the available codified attributes relate to the *New atlas* (Preston *et al.* 2002) which follows Stace's taxonomy. However, it is also true that in phytogeographical analyses a broad species concept is often preferable, as the characteristics of the European range of taxa such as *Rubus fruticosus* and *Ulmus minor* can be codified, whereas it is difficult to say anything meaningful in the present context about the very restricted ranges of their segregates (which are often believed to be endemic to Britain, and which are discussed in detail in the accounts of the relevant genera). Like *Rubus fruticosus*, *Hieracium* and *Taraxacum* have been treated here as the aggregate species *Hieracium murorum* agg. and *Taraxacum officinale* agg., although *Hieracium* encompasses too great a range of taxa for the aggregate to be ecologically meaningful.

Decisions about the native status of species in Cardiganshire follow the assessments made in this Flora, although these are often somewhat more qualified in the species accounts. The county list has been compared to that for Wales and for the British Isles as a whole. We have been guided by the information on native status presented in the *New atlas* (Preston *et al.* 2002) in drawing up the latter two lists. There are also inevitably problems in drawing up a list of the native species in Wales, as there are some species for which the editors of the *New atlas* were unable to map the precise native range within the British Isles. In deciding on these cases we have used the rather sparse published information in local Floras to make what is at best a rather rough-and-ready decision. Thus we have in particular included *Reseda lutea* and *Ribes rubrum* in the list of Welsh native species, but excluded *Humulus lupulus*, *Myosotis sylvatica* and *Symphytum officinale*.

We distinguish the **representation** of groups of species in the county (the proportion of the Welsh and British species of the group on the county list) from the **frequency** within the county, using the number of tetrads in which the species has been recorded as a native in Cardiganshire, irrespective of date class, as our measure of frequency; the total number of tetrads with botanical records is 528. Decisions on the native range of some controversial species within the county, such as *Malva arborea* and *Prunus avium*, have been based on what is said in the species accounts, and are inevitably sometimes somewhat arbitrary. Tetrad totals have had to be estimated for taxa such as *Ulmus minor* and members of the *Polygonum aviculare* group which do not correspond to those recognised elsewhere in this Flora.

An "all native species" tetrad coincidence map, showing the total numbers of species in each tetrad, is given here so that the following maps can conveniently be compared with it. As explained elsewhere, there will have been some bias towards recording in tetrads with more interesting semi-natural habitats and species-rich sites, and tetrad recording was not the primary aim during the Flora project, but internal evidence (including the coherent patterns shown on the other maps presented in this chapter) suggests that this is unlikely to have significantly affected the overall analysis presented here.

Ecological and phytogeographical attributes are taken, unless otherwise stated, from the electronic version of PLANTATT (Hill *et al.* 2004), whose codes are given in the map captions. The floristic elements discussed are those of Preston & Hill (1997), but with the Oceanic element divided into Oceanic and Hyperoceanic as in Hill & Preston (1998) and Preston & Hill (1999).



Map 1: Coincidence map of native species

### The wider distribution of Cardiganshire's plants

#### Occurrence in major biomes

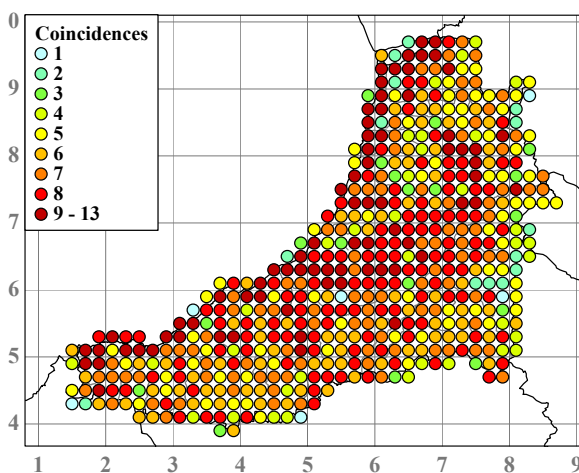
Table 1 indicates the broad latitudinal distribution of Cardiganshire species in the northern hemisphere. As is the case in much of Britain, the largest group of species are those of the **Temperate** zone, plants of the broad-

leaved forest zone. Only in northern and western Scotland are these outnumbered by the **Boreo-temperate** species, those plants which occur in both the broad-leaved forest zone and the coniferous forest zone to the north. In Cardiganshire the number of Boreo-temperate species is not much greater than that of **Southern-temperate** species, plants which extend from the Temperate into the Mediterranean zones. This indicates that the phytogeography of the county is intermediate between that of southern England (where Southern-temperate plants are the second largest group) and northern England and lowland Scotland (where Boreo-temperate species outnumber them). It is, however, interesting that there is a higher representation of Boreo-temperate species in the county than of the other two groups, and the Boreo-temperate plants are more frequent.

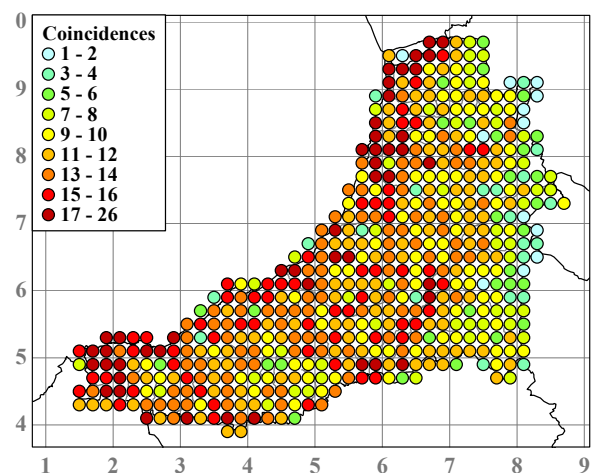
	Total	Arctic-montane	Boreo-arctic Montane	Boreo-montane	Wide-boreal	Wide-temperate	Boreo-temperate	Temperate	Southern-temperate	Med-Atlantic	Unclassified
No. Cards spp.	748	4	10	35	16	28	165	307	143	37	3
% Cards flora	100	0.5	1	5	2	4	22	41	19	5	0.5
Mean number tetrads	127	12	48	41	213	211	165	131	104	36	149
Cards spp. as % Welsh total	70	18	45	63	89	93	81	69	78	46	60
Cards spp. as % British Isles total	53	5	26	32	84	90	74	56	61	32	33
No. Cards declining spp.	32	0	0	2	0	2	6	16	5	1	0
No. Cards extinct spp.	25	0	1	3	0	0	6	10	4	1	0
Declining spp. as % Cards total	4	0	0	6	0	7	4	5	4	3	0
Extinctions as % Cards total	3	0	10	9	0	0	4	3	3	3	0
Total Welsh spp.	1065	22	22	56	18	30	203	445	184	80	5
Total British spp.	1410	82	39	111	19	31	223	544	236	116	9
Sum of Cards tetrad records	95243	47	475	1450	3409	5920	27145	40195	14822	1334	446

Table 1: Major biome categories

Two small groups of species have especially extensive world distributions, the **Wide-boreal** (which extends from the Arctic to the Temperate zones) and the **Wide-temperate** (from the Boreal to the Southern zones). These are very common in Britain and the groups are well-represented in Cardiganshire and characteristically frequent there. Species of the Wide-boreal group (Map 2) are very frequent over most of the county, but are slightly better represented in the uplands than the average indicated by the “all species” map. By contrast, the Wide-temperate group (Map 3) is less well-represented in the uplands and is concentrated more in the main valleys. The most frequent species of all, *Agrostis capillaris*, is in this group.



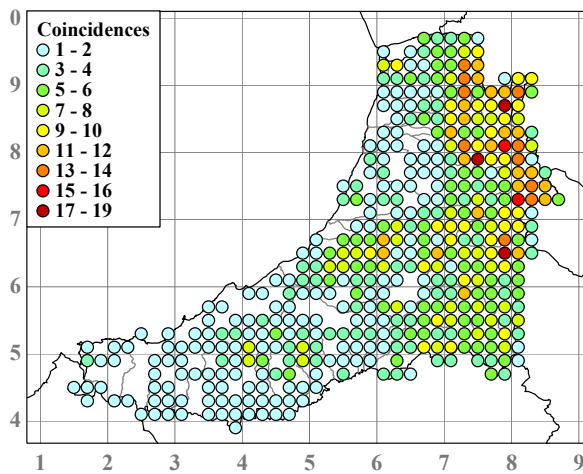
Map 2: Coincidence map of Wide-boreal (34-36) natives



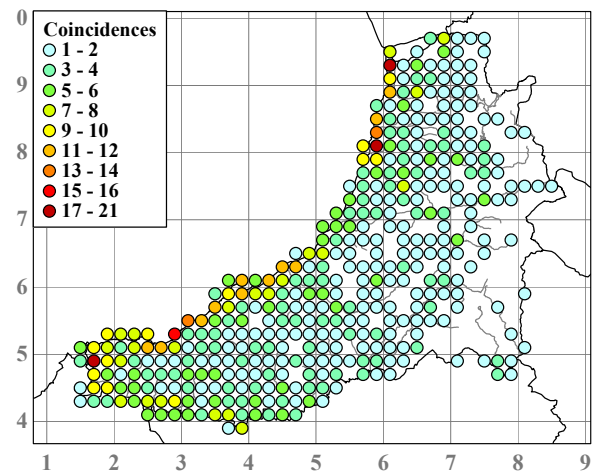
Map 3: Coincidence map of Wide-temperate (61-66) natives

The northern groups (**Arctic-montane**, **Boreo-arctic Montane** and **Boreal-montane**) are poorly represented in the county, and are, as might be expected, concentrated in the uplands and on the two great raised bogs, Cors Fochno and Cors Caron (Map 4). The more northerly the group the smaller the proportion of Welsh and British species present. The county lies outside the range of most of these species in the British Isles (Preston *et al.*, 2002, Figs 6.7, 6.8, 6.10). These groups are also rare within the county, indicating a





Map 4: Coincidence map of natives in the three northern groups (13-36, 21-26, 41-46)



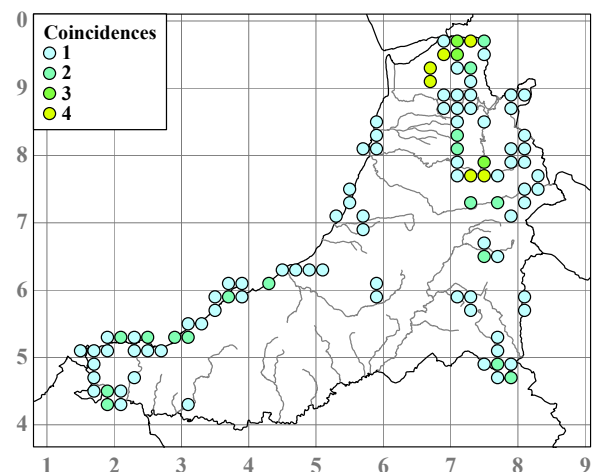
Map 5: Coincidence map of Mediterranean-Atlantic (91-92) natives

general trend in most of the analyses presented here for groups that are well-represented on the county list to be more frequent within the county than the less well-represented groups. There are only four Arctic-montane species in Cardiganshire. *Carex bigelowii* occurs as only two colonies, and *Salix herbacea* as only two plants. *Saxifraga stellaris*, although it is mostly restricted to a few mountain cliffs, seems more adapted to the area as it also spreads down the Rheidol valley on riverside rocks. *Diphysastrum alpinum* is abundant on the highest summits and ridges, and is also somewhat of a colonist of lead mine and quarry sites at lower altitudes.

**Mediterranean-Atlantic** species (Map 5) are as poorly represented as the Boreo-arctic species and almost as rare in the county. The 37 species are almost equally split between those with strictly Mediterranean-Atlantic distributions (18) and those with Submediterranean-Subatlantic ranges (19). Many of these species, particularly in the former group, are restricted to coastal habitats, for example *Crithmum maritimum* and *Glaucium flavum*, although others are more widespread, for example *Fumaria bastardi* and *Polystichum setiferum*. The most frequent is *Umbilicus rupestris*, one of the most characteristic species of SW Britain. The low proportion of Mediterranean-Atlantic species does not seem to reflect simply the latitude of the county, as national coincidence maps (Preston *et al.*, 2002, Figs 6.15-17) show conspicuous concentrations on the coasts of both South and North Wales, with fewer species along the coast of N Pembrokeshire and Cardiganshire. The absence of species of this group such as *Asplenium obovatum* and *Atriplex portulacoides* is unexplained, especially as the former grows immediately north of the northern county boundary and the latter flourishes quite well as an introduction. Others such as *Adiantum capillus-veneris* and *Inula crithmoides* are most obviously absent because of the lack of limestone and the almost complete lack of S-facing coast.

### Eastern limit categories

The most striking feature of Table 2, which divides the species into groups based on their longitudinal ranges, is that the two groups with the smallest proportion of Welsh and British species in the county are the **Hyperoceanic** (Map 6) and **Oceanic** species (Map 7), plants of the **Atlantic** zone; they are also the least frequent. This initially seems to be rather paradoxical for a western county that is capable of supporting a full set of the Hyperoceanic filmy ferns *Hymenophyllum tunbrigense*, *H. wilsonii* and *Trichomanes speciosum*. One reason seems to be that vascular plants with Hyperoceanic ranges (species restricted to the Atlantic fringe of Europe) are not, unlike many Hyperoceanic bryophytes and the filmy ferns, dependent on highly humid habitats. They are often coastal species of open sites such as *Centaurium scilloides*, *Rumex rupestris* and *Trifolium occidentale* (all absent from the county), and *Spergularia rupicola* which does occur. The coincidence map (Map 6) of the five species shows that they



Map 6: Coincidence map of Hyperoceanic natives

	Total	Hyper-oceanic	Oceanic	Suboceanic	European	Euro Siberian	Eurasian	Circumpolar	Unclassified
No. Cards spp.	748	5	64	78	266	148	62	122	3
% Cards flora	100	0.5	9	10	36	20	8	16	0.5
Mean number tetrads	127	29	72	107	134	144	158	122	149
Cards spp. as % Welsh total	70	56	55	70	73	74	76	68	60
Cards spp. as % British Isles total	53	29	34	58	56	60	64	49	33
No. Cards declining spp.	32	0	4	0	16	4	4	4	0
No. Cards extinct spp.	25	0	1	5	12	3	1	3	0
Declining spp. as % Cards total	4	0	6	0	6	3	6	3	0
Extinctions as % Cards total	3	0	2	6	5	2	2	2	0
Total Welsh spp.	1065	9	116	111	364	199	82	179	5
Total British spp.	1410	17	187	134	471	247	97	248	9
Sum of Cards tetrad records	95243	144	4582	8371	35751	21321	9805	14823	446

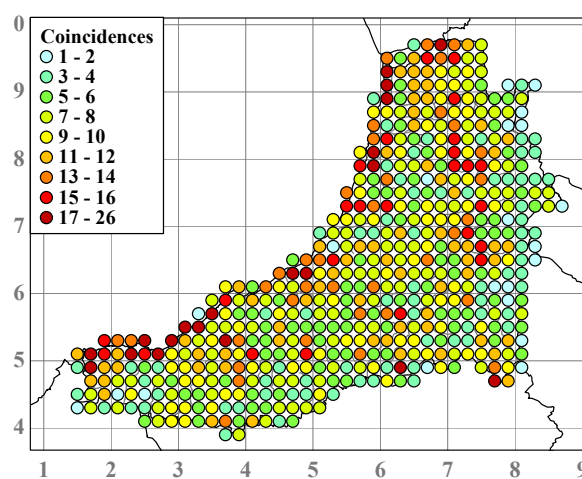
Table 2: Eastern limit categories

are predominantly either coastal (*Spergularia rupicola* and *Trichomanes*) or characteristic of the humid ancient woodland of the inner valleys and upland ravines (all the filmy ferns and *Dryopteris aemula*). The Oceanic species (Map 7) are more widespread in western Europe and not necessarily western in their British ranges; they occur in a wide range of habitats, including for example calcareous grassland, and those with Mediterranean-Atlantic ranges may even be confined to seasonally droughted sites, for example *Scilla autumnalis* (which does not occur in the county). There is therefore no particular reason to expect a high proportion of this element in Cardiganshire. The map is similar to the map of all native species, although there is an increased concentration of species along the coast.

The more widespread Eastern Limit categories are rather similar in their representation and frequency and their coincidence maps also show much the same pattern as the “all native species” one; from a Cardiganshire perspective it seems to matter little whether the distribution of a species extends east to the Urals, the Altai or the Pacific. The slightly lower representation of **Circumpolar** species reflects the fact that many species with Circumpolar ranges have Arctic, Boreo-arctic or Boreal ranges.

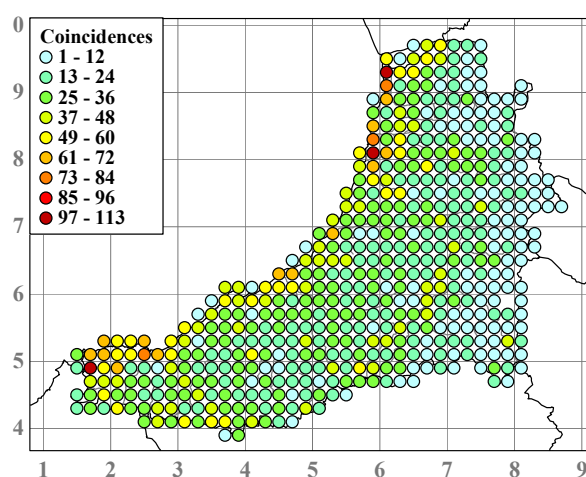
### Species at their northern and southern limits

It is intriguing that the two coastal shingle species now extinct in the county, *Euphorbia peplis* and *Mertensia maritima*, reached their northern limit in the world and their southern limit in Europe respectively at Aberystwyth, the former a Mediterranean-Atlantic species and the latter a European Boreo-arctic Montane species. The Oceanic Temperate *Sibthorpia europaea* and the European Temperate *Melittis melissophyllum* reach their northern limits in Britain in the county, the former going slightly further north in Ireland, and the latter going further north further east in Europe. Three predominantly upland species, the Circumpolar Boreal-montane *Carex magellanica* and *Subularia aquatica* and the European Arctic-montane *Saxifraga stellaris*, reach their southern limits in Britain here, although all go further south in Europe. Two other species just exceed the county in their European latitudinal limits, the Oceanic Southern-temperate *Hypericum undulatum* reaching its northern limit at Arthog in Merioneth, and the Circumpolar Boreo-arctic Montane *Carex aquatilis* reaching its southern limit at the Talley Lakes in Carmarthenshire.

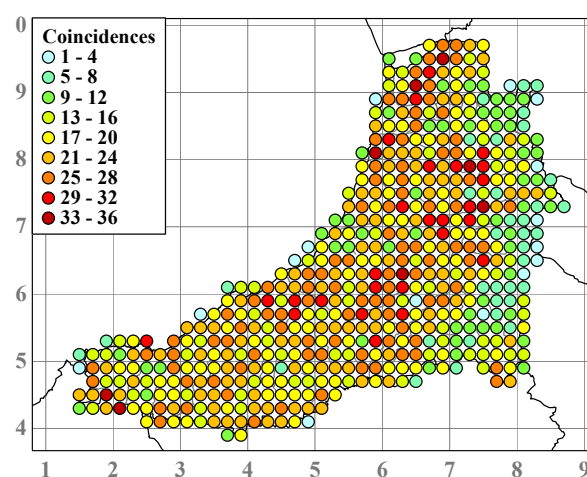


Map 7: Coincidence map of  
Oceanic (21, 41, 51, 61, 71, 81) natives





Map 8: Coincidence map of annual natives (a)



Map 9: Coincidence map of woody perennial natives (w)

### Life-forms

Simple life-forms of the Cardiganshire species are shown in Table 3; these are based on the primary form of perennation listed by Hill *et al.* (2004) combined, for perennials, with the woodiness categories. **Annuals** (Map 8) appear to be well-represented in the county but are less frequent than the other groups, a departure from the normal pattern where the well-represented groups are also the most frequent. They are best represented and more frequent along the coast and in the SW corner of the county, and less represented in the uplands than the generality of species, probably because of the milder climate, the greater amount of open, unstable habitat and arable cultivation in the former areas. The greater frequency of **Woody perennials** (Map 9) perhaps reflects their frequent and conspicuous occurrence as dominants, whether in woodland with for example *Betula* and *Quercus* spp., scrub with *Prunus spinosa* or *Ulex europaeus*, or heathland with *Calluna vulgaris* and *Vaccinium myrtillus*. The range of many trees and shrubs has been greatly extended by planting, although in some cases this may have done no more than partially compensate for losses in earlier phases of clearance. In many cases in our analysis total tetrad occurrences of trees and shrubs have been used as it is not now possible to distinguish native and introduced occurrences.

	Total	Annuals	Biennials	Herbaceous perennials	Semi-woody and woody perennials
No. Cards spp.	748	162	33	481	72
% Cards flora	100	22	4	64	10
Mean number tetrads	127	81	119	138	162
Cards spp. as % Welsh total	70	77	67	69	67
Cards spp. as % British Isles total	53	60	54	52	47
No. Cards declining spp.	32	9	2	18	3
No. Cards extinct spp.	25	6	4	14	1
Declining spp. as % Cards total	4	6	6	4	4
Extinctions as % Cards total	3	4	12	3	1
Total Welsh spp.	1065	210	49	699	107
Total British spp.	1410	268	61	928	153
Sum of Cards tetrad records	95243	13067	3914	66574	11688

Table 3: Life-forms

### Broad habitats

The occurrence of species in Broad Habitats is summarised in Table 4. A species can be allocated to more than one habitat, but no more than four; most are allocated to one or two (see Hill *et al.* 2004). The most frequent species in the county are those of **Neutral and improved grassland**, followed by those of **Built-up areas**. The group of species of built-up areas is a small one and it is not surprising, as they are native species, that they also occur in other habitats. It is their versatility rather than their love of urban sites that gives them the high mean tetrad total. Habitats whose species are under-represented in Cardiganshire include the rocky coast, calcareous grassland, inland rock and especially montane habitats. The absence of calcareous grassland

Habitat	Woodland	Heathland	Acid grassland	Neutral and improved grassland	Calcareous grassland	Fen, marsh and swamp	Bogs	Aquatic
BAP Broad habitats	1, 2	10	8	5, 6	7	11	12	13, 14
No. Cards spp.	146	42	51	112	92	155	28	107
Mean number tetrads	165	137	161	211	97	132	158	107
Cards spp. as % Welsh total	73	75	81	78	60	82	85	66
Cards spp. as % British Isles total	60	54	63	70	46	64	68	54
No. Cards declining spp.	2	4	2	5	9	4	1	3
No. Cards extinct spp.	2	2	3	0	4	0	0	5
Declining spp. as % Cards total	1	10	4	4	10	3	4	3
Extinctions as % Cards total	1	5	6	0	4	0	0	5
Total Welsh spp.	201	56	63	144	154	189	33	161
Total British spp.	245	78	81	159	202	242	41	200
Sum of Cards tetrad records	24075	5737	8201	23606	8935	20525	4422	11501

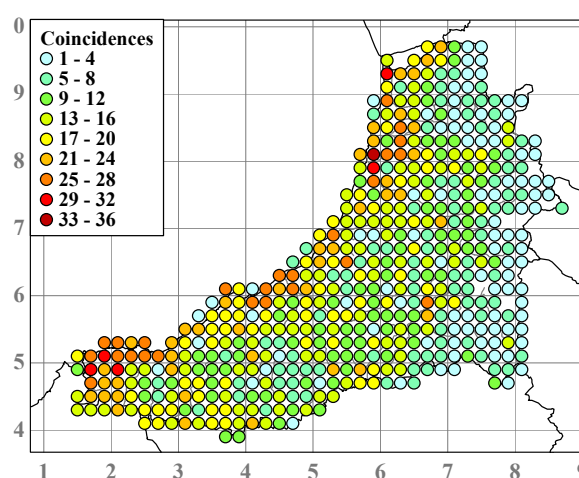
(cont.)

Habitat	Montane	Inland rock	Rocky coast	Supralittoral sediment <sup>1</sup>	Littoral and sublittoral sediment <sup>2</sup>	Cultivated ground	Boundary and linear features	Built-up areas
BAP Broad habitats	15	16	18	19	21, 23	4	3	17
No. Cards spp.	16	111	20	51	34	38	155	30
Mean number tetrads	28	118	41	41	29	158	159	176
Cards spp. as % Welsh total	41	61	59	76	69	90	73	86
Cards spp. as % British Isles total	16	45	36	53	58	75	64	83
No. Cards declining spp.	1	7	0	1	1	4	10	1
No. Cards extinct spp.	0	5	1	3	2	1	4	1
Declining spp. as % Cards total	4	6	0	2	3	11	6	3
Extinctions as % Cards total	0	5	5	6	6	3	3	3
Total Welsh spp.	39	183	34	67	49	42	212	35
Total British spp.	101	246	56	96	59	51	244	36
Sum of Cards tetrad records	450	13079	818	2077	994	5990	24711	5279

<sup>1</sup> strandline, shingle, dunes; <sup>2</sup> saltmarsh, sea

Table 4: Broad habitats

and montane species simply reflects the geology and topography of the county. Many of the species of **Coastal rocks** which occur only elsewhere in Wales are plants of warm coastal sites, for example *Aster linosyris*, *Inula crithmoides*, *Ononis reclinata*, and the county has very little S-facing coast; the county's proportion is also reduced by the presence on the Welsh list of four *Limonium* microspecies recorded from Pembrokeshire but not from Cardiganshire, which has only equivalents of *L. procerum* and *L. britannicum*. A large number of species are associated with **Inland rock** in Wales. The species of this habitat missing from the county include many species in the northern phytogeographical elements such as *Arabidopsis petraea*, *Oxyria digyna* and *Woodsia* spp., and some more thermophilic plants such as *Hornungia petraea*, *Potentilla rupestris* and *Veronica spicata*, the latter growing just across the

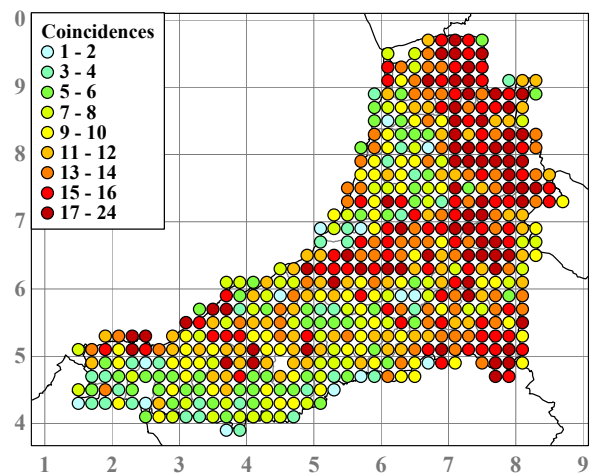


Map 10: Coincidence map of natives of cultivated ground (BH4)

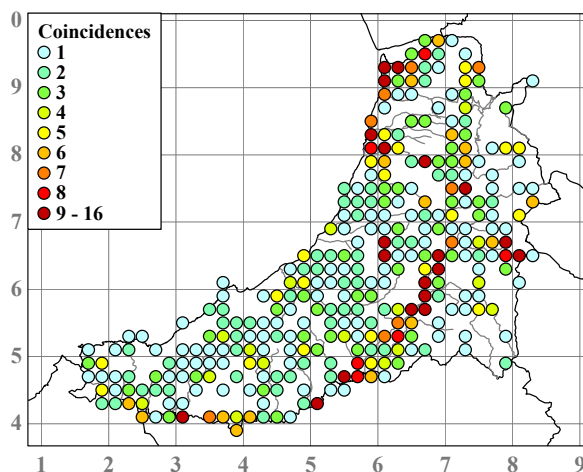


border on S-facing rocks at Aberdyfi in Merioneth. Those of **Cultivated ground** (BH4, Map 10) are the best represented in comparison with Wales as a whole, and reflect the very rich arable weed flora in the SW of the county as well as elsewhere along the coast. The coincidence map of **Heathland** species (BH10, Map 11), which comprise three quarters of the Welsh species but only just over half of the British ones, shows the former extent of heaths rather than the present distribution, as in very many areas of pasture, that were once heaths, relic populations of heathland species survive on the field banks. The coincidence map of species of **Standing waters** (BH13, Map 12) picks out, as well as the lakes and reservoirs, the importance of the “back-to-front” nature of the Afon Teifi with the slow-flowing meanders and lagoons in its upper half. The map for **Running waters** (BH14, Map 13) indicates the importance of the multitude of small streams throughout the county, the larger rivers, apart from the Teifi and the lower Rheidol, being comparatively poor in aquatics.

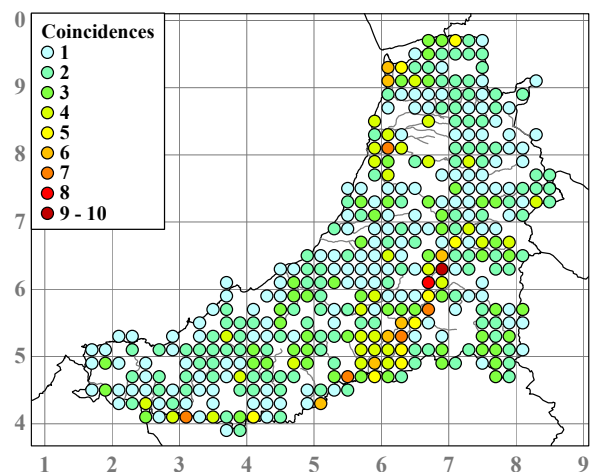
Looking in more detail at the relationship between the representation of species in each Broad Habitat and their frequency, the Habitats seem to fall into three groups: those with few species and where the species are infrequent (bottom left in Fig. 1); those with few species but where the species are frequent (top left); and those with many species, where the species are frequent (right). It is questionable whether the neutral and improved grassland habitat is a fourth group. It is particularly notable that there are no habitat types with many but infrequent species. Some of this may reflect local conditions in Cardiganshire, while it remains to be seen whether the general pattern holds for vice-counties throughout Britain.



Map 11: Coincidence map of natives of heathland (BH10)



Map 12: Coincidence map of natives of standing waters (BH13)



Map 13: Coincidence map of natives of running waters (BH14)

The habitats with few, infrequent species, montane, rocky coast, supralittoral and littoral/sublittoral, are those where the habitats themselves have a small extent in Cardiganshire (montane here refers to a true montane habitat, whereas much of the uplands come into one of the grassland broad habitats).

The habitats with few but frequent species are species-poor habitats covering wide areas, bogs, built-up areas, cultivated ground, heathland, acid grassland (as a consequence of defining much of the uplands as acidic grassland, this is one of the habitats in this group). These are habitats over which the botanist tends to pass quickly.

The habitats with many, frequent species, calcareous grassland, aquatic, inland rock, woodland, fen marsh & swamp, boundary & linear features, are those which are more varied, and hence contain more niches for more species. Calcareous grassland species are limited by the lack of calcicolous habitats in Cardiganshire, which helps to explain why this broad habitat is not even more diverse. Neutral grassland contains the most frequent species on average, and still has relatively many species.

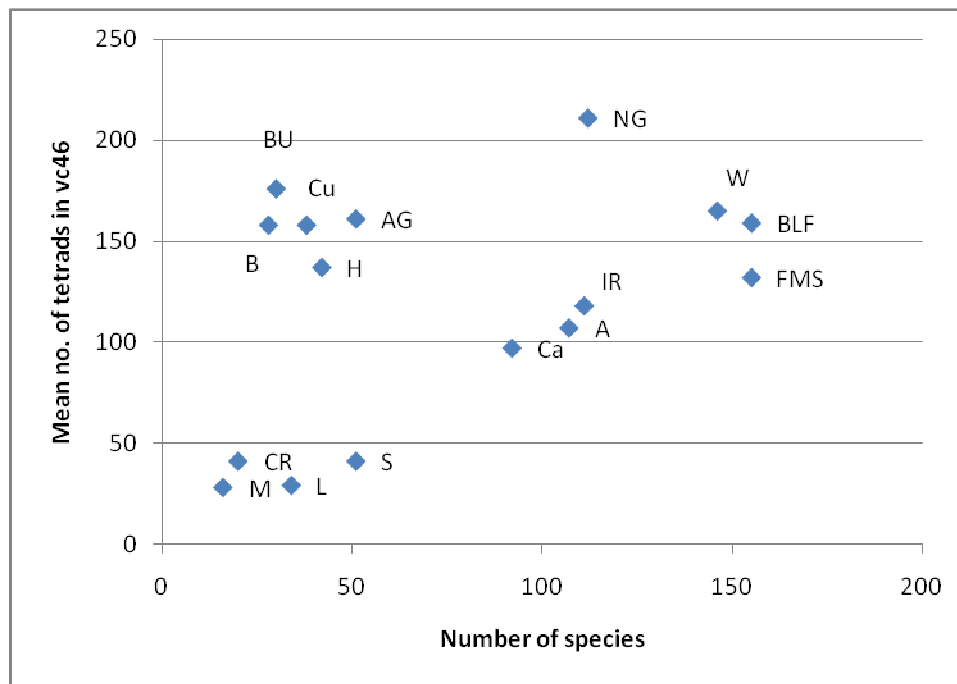


Fig. 1: Scatterplot of numbers of species against the average number of tetrads in Cardiganshire where those species have been recorded, for broad habitat types (A - aquatic, AG - acid grassland, B - bogs, BLF - boundary and linear features, BU - built-up areas, Ca - calcareous grassland, CR - rocky coast, Cu - cultivated ground, FMS - fen, marsh and swamp, H - heathland, IR - inland rock, L - littoral and sublittoral sediment, M - montane, NG - neutral and improved grassland, S - supralittoral sediment, W - woodland).

### Ellenberg's indicator values

#### Shade tolerance (Ellenberg L)

The shade tolerance of species is measured by Ellenberg L values, and these range from L = 1 for plants of deep shade (a group which is not represented in Britain) to L = 9 (plants found mostly in full light). There is little consistent pattern in the representation of Welsh and British species in the county across this spectrum (Table 5), but the rather small number of shade plants (L = 2-3) and the much larger group of species of open habitats (L = 8-9) are much less frequent than the species of middling light intensities. The most striking feature of the Table is the fact that almost all the extinct species, variable though they are in other respects, are plants of open habitats.

		Ellenberg L values									
	Total	1	2	3	4	5	6	7	8	9	?
No. Cards spp.	748	0	2	6	39	50	86	290	216	58	1
% Cards flora	100	0	<1	1	5	7	11	39	29	8	<1
Mean number tetrads	127	-	20	48	104	206	197	158	77	15	305
Cards spp. as % Welsh total	70	-	100	55	76	68	77	73	69	57	100
Cards spp. as % British Isles total	53	-	50	40	65	54	61	60	49	35	25
No. Cards declining spp.	32	0	0	0	0	2	3	16	10	1	0
No. Cards extinct spp.	25	0	0	1	0	1	0	9	11	3	0
Declining spp. as % Cards total	4	-	0	0	0	4	3	6	5	2	0
Extinctions as % Cards total	3	-	0	17	0	2	0	3	5	5	0
Total Welsh spp.	1065	0	2	11	51	73	112	399	314	102	1
Total British spp.	1410	0	4	15	60	92	142	484	444	165	4
Sum of tetrad records	95243	0	40	290	4059	10305	16931	45747	16701	865	305

Table 5: Shade tolerance (Ellenberg L); ? denotes unclassified



### Moisture requirements (Ellenberg F)

Ellenberg F values for more or less terrestrial plants range from F = 1 for indicators of extreme dryness to F = 9 for plants of wet sites where soils are often saturated; aquatics are denoted by F = 10 (shallow-water sites which may dry out for long periods), 11 (emergents or floating species) or 12 (submerged plants). The Cardiganshire spectrum is given in Table 6. Species of dry soils (F = 2-3) are under-represented as would be expected. Submerged aquatics (12) are under-represented probably partly because of the sparsity of lowland lakes in the county, and a rather wider group of dry-soil species (F = 2-4) and aquatics (F = 11-12) are less frequent in the county than the species of more mesic habitats.

		Ellenberg F values												
	Total	1	2	3	4	5	6	7	8	9	10	11	12	?
No. Cards spp.	748	0	4	36	118	191	115	70	89	55	37	17	15	1
% Cards flora	100	-	1	5	16	26	15	9	12	7	5	2	2	<1
Mean number tetrads	127	-	98	41	82	163	182	129	125	119	95	45	20	305
Cards spp. as % Welsh total	70	-	33	48	67	74	79	75	77	74	73	65	41	100
Cards spp. as % British Isles total	53	-	20	30	51	58	64	58	58	47	64	57	32	25
No. Cards declining spp.	32	0	1	1	13	4	7	2	1	0	0	2	1	0
No. Cards extinct spp.	25	0	0	2	5	5	4	3	2	0	2	1	1	0
Declining spp. as % Cards total	4	0	25	3	11	2	6	3	1	0	0	12	7	0
Extinctions as % Cards total	3	-	0	6	4	3	3	4	2	0	5	6	7	0
Total Welsh spp.	1065	0	12	75	176	259	146	93	115	74	51	26	37	1
Total British spp.	1410	3	20	121	230	327	180	120	154	116	58	30	47	4
Sum of Cards tetrad records	95243	-	393	1470	9669	31154	20975	9027	11100	6546	3528	771	305	305

Table 6: Moisture requirements (Ellenberg F); ? denotes unclassified

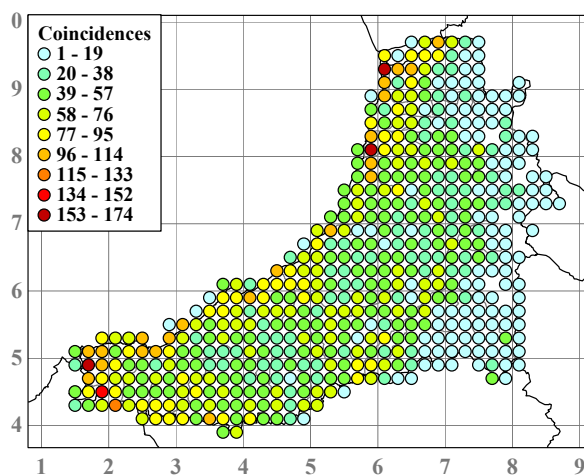
### pH requirements (Ellenberg R)

Ellenberg R values are low for plants of acid soils; they range from R = 1 for those of extremely acidic sites through R = 7 for plants of circumneutral soils to R = 9 for those of calcareous sites. Most Cardiganshire species are characteristic of moderately to strongly acidic sites (R = 2-6) and these are the most frequent groups within the county (Table 7). **Calcicoles** (R = 8) are poorly represented and infrequent and are

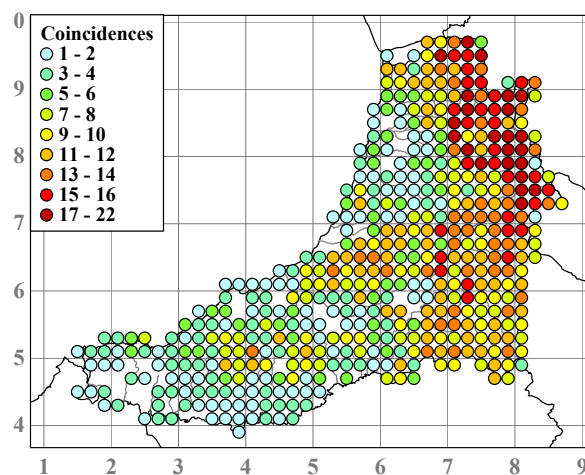
		Ellenberg R values									
	Total	1	2	3	4	5	6	7	8	9	?
No. Cards spp.	748	2	33	30	63	106	197	256	60	0	1
% Cards flora	100	0.5	4.5	4	8.5	14	26	34	8	0	0.5
Mean number tetrads	127	43	108	241	192	165	154	89	24	-	305
Cards spp. as % Welsh total	70	50	89	88	81	79	81	66	44	0	100
Cards spp. as % British Isles total	53	20	69	56	55	60	69	53	28	0	25
No. Cards declining spp.	32	0	1	2	3	2	9	11	4	0	0
No. Cards extinct spp.	25	0	2	1	2	2	5	9	4	0	0
Declining spp. as % Cards total	4	4	3	7	5	2	5	4	7	-	0
Extinctions as % Cards total	3	0	6	3	3	2	3	4	7	-	0
Total Welsh spp.	1065	4	37	34	78	135	244	389	137	6	1
Total British spp.	1410	10	48	54	114	178	286	480	217	19	4
Sum of tetrad records	95243	85	3571	7222	12078	17479	30299	22763	1441	0	305

Table 7: pH requirements (Ellenberg R); ? denotes unclassified

concentrated along the coast, where sand dunes are the richest sites, and in the two main towns, Aberystwyth and Cardigan, where mortared walls support such local rarities as *Parietaria judaica*. Lead mines provide the only sites for a few more species in this group such as *Asplenium viride* and *Gymnocarpium robertianum*. The coincidence map (Map 14) of species of circumneutral soils (R = 7) combined with strict calcicoles (R = 8) shows the coastal bias, and some concentration in the main river valleys. The most exacting calcicoles (R = 9) are absent as would be expected from the solid geology. **Extreme calcifuges** (R = 1) are also rare, represented only by *Andromeda polifolia* and *Lycopodium clavatum*, but like the strict calcicoles this is a small group of species in Wales and in the British Isles as a whole. The coincidence map of extreme and strong calcifuges (R = 1-2, Map 15) shows a very strong bias as expected to the uplands, to the blanket and raised bogs and a complete absence from much of the SW of the county where the calcareous till of the Irish Sea Ice Sheet prevails.



Map 14: Coincidence map of native species of circumneutral soils and strict calcicoles ( $R = 7-8$ )



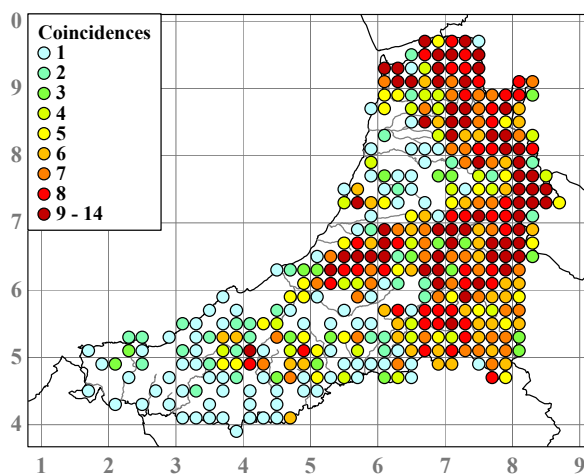
Map 15: Coincidence map of strong to extreme calcifuge natives ( $R = 1-2$ )

### Nutrient requirements (Ellenberg N)

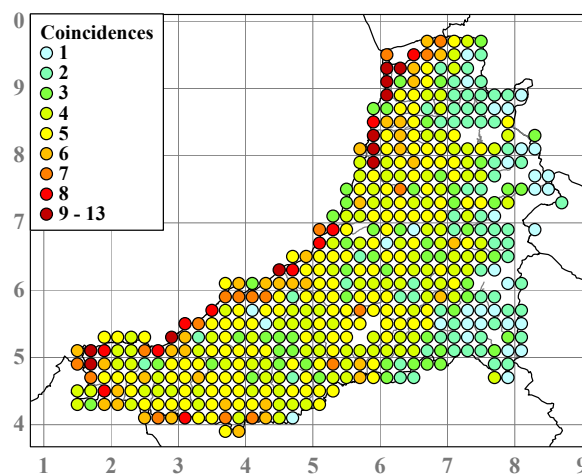
Ellenberg N values range from  $N = 1$  for plants of extremely infertile sites to  $N = 9$  for those of extremely rich soils. The Cardiganshire spectrum (Table 8) is not particularly illuminating. Plants of the most infertile sites ( $N = 1$ , Map 16) are less well represented in the county than the rest of the flora and are infrequent here, and predictably the distribution is very similar to that of the strong calcifuges. As is often the case elsewhere in Britain (Preston 2000, Walker & Preston 2006), the extinctions in the county are concentrated in the less

	Total	Ellenberg N values									
		1	2	3	4	5	6	7	8	9	?
No. Cards spp.	748	24	118	124	115	139	128	79	18	2	1
% Cards flora	100	3	16	17	15	19	17	11	2	<1	<1
Mean number tetrads	127	85	119	105	158	129	138	129	87	212	305
Cards spp. as % Welsh total	70	50	66	68	79	71	74	72	64	100	100
Cards spp. as % British Isles total	53	30	40	51	60	58	65	65	55	100	25
No. Cards declining spp.	32	0	8	2	10	3	4	3	2	0	0
No. Cards extinct spp.	25	2	4	7	2	6	2	1	0	1	0
Declining spp. as % Cards total	4	0	7	2	9	2	3	4	11	0	0
Extinctions as % Cards total	3	8	3	6	2	4	2	1	0	50	0
Total Welsh spp.	1065	48	180	182	146	196	173	109	28	2	1
Total British spp.	1410	81	298	243	192	238	198	121	33	2	4
Sum of tetrad records	95243	2033	14022	13040	18163	17862	17669	10155	1570	424	305

Table 8: Nutrient requirements (Ellenberg N); ? denotes unclassified



Map 16: Coincidence map of natives of the most infertile sites ( $N = 1$ )



Map 17: Coincidence map of natives of the most fertile sites ( $N = 8-9$ )



nutrient-rich half of the spectrum ( $N = 2-5$ ). Species of the most fertile sites ( $N = 8-9$ , Map 17) are predictably concentrated along the coast and in the main settlements, and only *Rumex obtusifolius* and *Urtica dioica* are common in the generally nutrient-poor uplands.

### Conclusions from the analyses

One common theme of the above analyses is the absence in Cardiganshire of species with extreme rather than middling requirements. The low representation of Arctic, Boreal, Mediterranean-Atlantic, Hyperoceanic and Oceanic floristic elements has been noted, as has the small number of species of dry soils, extremely acidic and nutrient-poor soils and submerged aquatics. Very few species reach their distributional limits in the county. Few analyses such as that presented here are available for other vice-counties, so it is difficult to know how typical Cardiganshire is. The proportion of species in the extreme phytogeographical and altitudinal groups is compared to the other Welsh vice-counties, and to those in SW England, later in this chapter. There are almost always fewer species in extreme than in middling phytogeographical, edaphic or ecological groups, and these are usually rarer than the middling species, so one would expect a reduced representation of these minority groups in many areas. In addition to the position of Cardiganshire in the middle British latitudes, constantly recurring factors are the absence of limestone rock and the almost complete absence of S-facing coast. This probably not only restricts the number of calcicoles but also of other thermophilic species in the more southern phytogeographical groups. We have discussed evidence that the Cardiganshire coast is poorer in southern species than that of either North or South Wales. The fact that the highest mountain, Pumlumon Fawr, reaches only 752m, is clearly another limiting factor; the upland but not montane areas of mid Wales are notoriously species-poor and appear as areas of reduced biodiversity for native species and, more markedly, for archaeophytes and neophytes on national as well as the Cardiganshire coincidence maps for vascular plants (Preston *et al.*, 2002, Figs 6.1-4), and often for other groups too. These factors help explain E. S. Marshall's (1900) disdainful view, quoted with apparent approval and applied to the whole county by Salter (1935), that the middle part of Cardiganshire was "botanically remarkable rather from the absence of many species common elsewhere than from the presence of many interesting or rare ones".

### Comparisons with neighbouring counties

The following comments on the differences between the Cardiganshire (VC 46) flora and those of the six adjacent vice-counties take into account only native species that have been recorded since 1970, excluding *Rubus*, *Hieracium* and *Taraxacum*. The lists prepared by Quentin Groom for the BSBI website, based on Stace *et al.* (2003), made it easier than might otherwise have been the case to produce the approximate statistics given below, in which we have updated the information and also attempted to allow for the considerable problems and differences of opinion in deciding which species are native rather than archaeophyte or neophyte in the various VCs. A comparison of the relative abundances, of the differing habitat preferences of the species, and of the distributions of their infraspecific taxa would be of equal or greater interest but is beyond the scope of this Flora and in any case the necessary data are not available. The same of course applies to all the archaeophytes and neophytes. Among the species found most regularly in the adjacent counties, for which suitable habitats seem to be available and that could well be found in VC 46 in future, are *Asplenium obovatum*, *Chrysosplenium alternifolium*, *Typha angustifolia* and *Veronica spicata*. *Rumex rupestris* may well have been overlooked, and in view of the recent arrival of *Crambe maritima*, it is possible that *Juncus acutus* may appear. Of several marsh species curiously lacking from mid West Wales, *Catabrosa aquatica*, *Veronica catenata* and *V. anagallis-aquatica* ought perhaps to occur. Salter once said (Newton *et al.* 1942) that he felt sure that *Hammarbya paludosa*, *Parentucellia viscosa* and *Pinguicula lusitanica* were in the county, although he had not met with them; the first two have indeed been found since, but in the south of the county where the *Pinguicula* might occur, the few possible habitats have probably more recently all been destroyed.

### Merioneth (VC 48)

Among the c.60 species missing from VC 46 the most obvious are those characteristic of calcareous mountain rocks, notably *Saxifraga oppositifolia*, *Oxyria digyna*, *Sedum rosea*, *Euphrasia cambrica*, *E. rivularis*, *Saussurea alpina* and *Galium boreale*. Other calcicoles missing include *Arabis hirsuta*, *Dianthus deltoides*, *Helianthemum nummularium*, *Geranium sanguineum*, *Teesdalia nudicaulis*, *Cruciata laevipes* and *Gymnadenia conopsea*. The comparative lack of calcareous conditions in VC 46 goes some way to explain these absences, but it should be noted that we do have very comparable species such as *Saxifraga hypnoides*, *Thalictrum minus* and *Melica nutans*, as well as several lowland calcicoles such as *Poterium sanguisorba*

subsp. *sanguisorba* and *Brachypodium pinnatum* that VC 48 actually lacks. It is less easy to suggest reasons for the differences in salt marsh and sand dune habitats, although the main dune systems in VC 48 are older and larger. In VC 46 there are no salt marsh *Limonium* species, no *Sarcocornia perennis*, *Eleocharis parvula*, *Juncus acutus*, *Ruppia cirrhosa* or native *Atriplex portulacoides*, but there are *Atriplex longipes* and *Salicornia emerici* which are lacking in VC 48. The VC 46 dunes lack *Epipactis phyllanthes*, *Centaureum littorale* and *Pyrola rotundifolia*, but in contrast do have *Erophila majuscula* and *Festuca arenaria*. Missing aquatic and marsh plants in VC 46 include *Lathyrus palustris*, *Oenanthe fistulosa*, *Hippuris vulgaris*, *Pilularia globulifera*, *Sparganium natans*, *Eleocharis acicularis*, *Cyperus longus*, *Potamogeton praelongus*, *P. perfoliatus* and *P. alpinus*, and missing ones in VC 48 include *Ranunculus penicillatus*, *R. tripartitus*, *Ceratophyllum demersum*, *Spirodela polyrhiza*, *Potamogeton obtusifolius*, *Cladium mariscus*, *Carex acutiformis* and *Glyceria notata*. The absences from VC 46 of *Asplenium obovatum*, for which plenty of suitable habitats are available, and which occurs as close as Aberdyfi (and Strumble Head in VC 45), and of *Veronica spicata* which also occurs at Aberdyfi, are surprising.

So far as geographical elements are concerned, VC 48 has, along with VC 42, seven Arctic-montane species that VC 46 lacks, predictably more than any other neighbouring VC (VC 44 has four, VC 45 one, *Sedum rosea*, and the others none). The numbers are the same for the Boreal-montane element, except that VC 44 has three. VC 48 has the lowest numbers of the Temperate, Southern-temperate and Mediterranean element species that VC 46 lacks, 23, four and seven respectively, although surprisingly VC 42 has exactly the same numbers of species that VC 46 lacks in these elements. Along with VC 42, VC 48 has also the lowest numbers of European and Eurosiberian species that VC 46 lacks. There is one Hyperoceanic species in VC 48 that VC 46 lacks, *Limosella australis* (although there is some doubt about its nativeness (PMB & RAJ pers. comm.)), but there are seven Oceanic species, all of which are coastal, lacking in VC 46.

Altogether a roughly equivalent number of species present in VC 46 are missing from VC 48, and apart from those mentioned above most are probably explained by the relative lack of such habitats in VC 48 as lowland pasture and fen (for *Gymnadenia densiflora*) and wet heath (for *Viola lactea*), and presumably the fact that it is beyond the northern climatic limit of others such as *Melittis melissophyllum* and *Sibthorpia europaea*. The absence of *Gymnadenia borealis*, for which VC 48 would seem especially suited, is surprising and it may perhaps be detected there in future.

### Montgomeryshire (VC 47)

Of the *c.*90 species in VC 47 that are not in VC 46 the great majority are predictably ones with a calcicole tendency such as *Campanula latifolia*, *C. trachelium*, *Cruciata laevipes*, *Gentianella amarella*, *Geranium pratense*, *G. sanguineum*, *Gymnadenia conopsea*, *Hypericum montanum*, *Silene viscaria*, *Potentilla rupestris*, *P. argentea*, *Rhamnus cathartica*, *Cornus sanguinea*, *Clematis vitalba* and several *Sorbus* species, and many of these are confined to the Breidden and Llanymynech dolerite and limestone outcrops in the east of the county. Another major group comprises the aquatics predominantly of the Montgomery canal, such as *Callitriche hermaphrodita*, *Berula erecta*, *Lemna gibba*, *L. trisulca*, *Potamogeton praelongus*, *P. friesii*, *P. compressus*, *P. crispus* and *Zannichellia palustris*; canals and other calcareous or more or less eutrophic still waters are absent from VC 46. *Cardamine amara* and *C. impatiens* are species entirely absent from West Wales.

VC 47 has more species of the Temperate element that VC 46 lacks than any of the other neighbouring VCs, and fewer Boreo-temperate and Mediterranean species than any other (three and seven respectively), and predictably it has, along with VC 43, fewer Oceanic and Circumpolar species that VC 46 lacks.

Of the *c.*110 species in VC 46 missing from VC 47 the majority are equally predictably coastal and halophytes, in spite of the fact that the west tip of the county includes part of the Dyfi salt marshes. There are a few calcicoles of dry grassland surprisingly missing from VC 47 such as *Plantago media*, and a few species of base-rich flushes and fens such as *Eriophorum latifolium* and *Cladium mariscus*. The absence of *Schoenoplectus lacustris* is most surprising. Southern species such as *Sibthorpia europaea* and *Melittis melissophyllum* are again missing. The raised bog species *Rhynchospora fusca* and *Drosera anglica* are predictably absent.

### Radnorshire (VC 43)

Of the *c.*75 species in VC 43 but not in VC 46, most are the same calcicoles as were mentioned for VC 47, or aquatics that occur in the nutrient-rich rivers Ithon and lower Wye such as *Potamogeton crispus* and *P. perfoliatus*, or that occur in the various still waters that are more nutrient-rich or more calcareous than the VC 46 ones, such as *Ranunculus circinatus*, *Lemna trisulca*, *Typha angustifolia*, *Potamogeton praelongus* and



*Zannichellia palustris*. Shallow seasonal pools in VC 43, now generally lacking in VC 46 although more occurred in the past, have *Pilularia globulifera* and *Catabrosa aquatica*. Many of the same calcicoles as in VC 47 occur, and *Prunus padus* is a frequent tree surprisingly now probably absent as a native from VC46. *Chrysosplenium alternifolium*, widespread in the south-east of VC 43, as in the east of VC 47, is largely absent from West Wales, like the *Cardamine* species mentioned above.

So far as geographical elements are concerned, the discrepancies with VC 43 follow much the same pattern as with VC 47.

Of the c.170 species in VC 46 missing from VC 43, the great majority are coastal, and others equally predictably include those of mountain rocks and raised bogs (Rhosgoch being much smaller than the raised bogs in VC 46). *Cladium mariscus*, *Carex pseudocyperus* and *Schoenoplectus lacustris* would seem to have suitable habitats in VC 43, but all are generally absent from inland mid-Wales. The Oceanic species *Dryopteris aemula* and *Hymenophyllum tunbrigense* are absent.

### Breconshire (VC 42)

Of the c.105 species in VC 42 but not in VC 46 it is again the calcicoles and aquatics that comprise the most obvious groups. *Cardamine impatiens*, *Myosoton aquaticum*, *Carex disticha*, *C. elata*, *Catabrosa aquatica* and *Pilularia globulifera* are others. *Veronica catenata* and *V. anagallis-aquatica*, curiously absent from mid West Wales, although present and extending westwards in the north and south and widespread in Ireland, are conspicuous absentees from VC 46. *Fagus sylvatica* and *Tilia platyphyllos* are native in VC 42 but not in VC 46. Other missing, chiefly woodland species include *Chrysosplenium alternifolium*.

As mentioned above, VC 42 has, along with VC 48, more Arctic-montane and Boreal-montane species that VC 46 lacks than any of the other VCs. Also along with VC 48 it has the fewest European and Eurosiberian species that VC 46 lacks.

The c.105 species in VC 46 that are not in VC 42 are again mostly coastal or calcicole. Several upland species such as *Carex bigelowii*, *C. magellanica*, *Saxifraga stellaris* and *Selaginella selaginoides* have reached their southern limit in the mountains of VC 46. Several species of raised bogs such as *Drosera anglica* and *Rhynchospora fusca* are absent, as well as a few lake species such as *Lobelia dortmanna* and *Subularia aquatica*, the latter having reached its southern limit in Britain in VC 46.

### Carmarthenshire (VC 44)

Of the c.100 species in VC 44 but not in VC 46, species with a calcicole tendency again predominate. Coastal species include *Alopecurus bulbosus*, *Althaea officinalis*, *Salicornia pusilla*, *Liparis loeselii*, *Atriplex portulacoides*, *Hordeum marinum*, *Inula crithmoides*, *Juncus acutus*, *Limonium vulgare* and *Artemisia maritima*; the first four do not anyway reach as far north on the west coast of Britain as VC 46, but there seems no obvious reason why the remainder should not occur. Notable fen species include *Lathyrus palustris*, *Ranunculus lingua*, *Oenanthe fistulosa*, *Veronica catenata*, *V. anagallis-aquatica* and *Thelypteris palustris*, and aquatics include *Potamogeton alpinus*, *P. coloratus*, *P. crispus*, *P. gramineus*, *P. lucens*, *P. perfoliatus*, *Lemna gibba*, *L. trisulca*, *Berula erecta*, *Ceratophyllum submersum*, *Zannichellia palustris*, *Ranunculus circinatus*, *Sparganium natans*, *Hippuris vulgaris* and *Hydrocharis morsus-ranae*. The few upland species missing from VC 46 include *Euphrasia rivularis*, *Galium boreale*, *Dryopteris expansa* and *Sedum rosea*. Species of damp woodland include *Chrysosplenium alternifolium*.

VC 44 has, along with VC 45, the largest numbers of Southern-temperate and Mediterranean species that VC 46 lacks, and also the largest number of Eurosiberian and, along with VC 47, European species that we lack.

Only c.55 species are in VC 46 and not in VC 44. Again, some of these such as *Saxifraga stellaris*, *Carex bigelowii*, *C. magellanica* and *Selaginella selaginoides* would be beyond their southern limit. The paucity of upland lakes excludes *Sparganium angustifolium*, *Lobelia dortmanna*, *Subularia aquatica* and *Isoetes lacustris*. The absence of *Hypericum undulatum* on the one hand and *Festuca altissima* on the other, both of which might otherwise be expected, presumably reflects the exact balance between Oceanic and Temperate in the Flora of VC 44.

### Pembrokeshire (VC 45)

Geographically and climatically VC 45 is perhaps the most closely related of the adjacent counties, and although many of the c.100 of its species that are missing from VC 46 are the familiar calcicoles and aquatics, the differences emphasise the phytogeographical relations of the two counties well, with the more extreme Oceanic and Atlantic character of VC 45 being the most prominent feature. Both have for example the

Oceanic Temperate species *Sibthorpia europaea* and *Viola lactea* as well as the Hyperoceanic *Spergularia rupicola*, *Dryopteris aemula*, *Trichomanes speciosum*, *Hymenophyllum tunbrigense* and *H. wilsonii*; VC 46 lacks *Limonium humile*, *Pinguicula lusitanica* and *Salicornia pusilla* and the Hyperoceanic *Rumex rupestris*, but VC 45 lacks none of the 29 species in this category that VC 46 has, with the possible exception of the ill-understood *Festuca lemanii*. Similarly in the Oceanic Southern-temperate element, the two counties have the same eleven species including *Hypericum undulatum*, *Ranunculus tripartitus* and *Euphorbia portlandica*, but VC 45 famously has in addition the Hyperoceanic *Centaureum scilloides*, and it lacks none that VC 46 has. Of the Mediterranean-Atlantic species, both counties have 17 species in common, but VC 45 has *Adiantum capillus-veneris*, *Asplenium obovatum*, *Atriplex portulacoides*, *Inula crithmoides*, *Juncus acutus*, *Ononis reclinata* and *Parapholis incurva* that VC 46 lacks, and again lacks none that VC 46 has.

VC 46 has altogether *c.*80 species that are not in VC 45, the great majority being upland species and aquatics of upland lakes, and it is predictably the Boreal elements that VC 45 especially lacks; those that are neither strictly upland nor aquatic and that one might have expected to occur include *Atriplex longipes*, *Pseudorchis albida*, *Puccinellia distans*, *Gymnocarpium dryopteris*, *Trollius europaeus*, *Vicia lathyroides* and *Viola lutea* (the last two having been recorded in the past though).

### Extreme phytogeographical and ecological groups in SW England and Wales

We have compared the number of species in the more extreme phytogeographical and ecological groups with the number in 18 other vice-counties in SW England and Wales. The counties are listed in Table 9. The species' data for the other counties are those mapped for the *New atlas*, and thus may differ slightly from those used above in the comparison with the neighbouring Welsh counties. Decisions on native status follow the *New atlas*.

vc	vc name	area (km <sup>2</sup> )	coastal?	Chalk/limestone?	maximum altitude (m)
1	W Cornwall	1278	Yes	No	312
2	E Cornwall	2291	Yes	No	420
3	S Devon	3627	Yes	Yes	603
4	N Devon	3156	Yes	No	621
5	S Somerset	2043	Yes	Yes	519
6	N Somerset	2241	Yes	Yes	325
35	Mons.	1445	Yes	Yes	679
41	Glam.	2173	Yes	Yes	600
42	Brecs.	1914	No	Yes	886
43	Rads.	1216	No	No	660
44	Carms.	2436	Yes	Yes	781
45	Pembs.	1619	Yes	Yes	536
<b>46</b>	<b>Cards.</b>	<b>1800</b>	<b>Yes</b>	<b>No</b>	<b>752</b>
47	Monts.	2055	No	Yes	827
48	Merioneth	1766	Yes	Yes	905
49	Caerns.	1499	Yes	Yes	1085
50	Denbs.	1847	Yes	Yes	830
51	Flints.	577	Yes	Yes	554
52	Anglesey	744	Yes	Yes	220

Table 9: Summary information on the vice-counties in SW England and Wales

The results in Table 10 show that only the two counties with land over 900m, Merionethshire and Carnarvonshire, have an appreciable number of Arctic-montane species. The total of Boreo-arctic and Boreal species is relatively high in Cardiganshire, which has therefore the third highest representation of northern species (Table 11). It is the best county for strong calcifuges and has an average representation of Hyperoceanic species, but the Mediterranean-Atlantic total is low and the total for strong calcicoles is very low. Nevertheless, when the mean rank of the county is calculated it is, with Merioneth, placed in fourth position.



vc	vc name	Arctic	Boreo-arctic	Boreal	Northern	Med-Atlantic	Hyper-oceanic	Strong calcifuge (R1-2)	Strong calcicole (R8-9)
1	W Cornwall		2	6	8	69	9	27	69
2	E Cornwall		5	9	14	64	8	27	70
3	S Devon		7	16	23	79	7	32	110
4	N Devon		6	13	19	63	6	31	82
5	S Somerset	1	5	14	20	61	3	31	93
6	N Somerset	1	5	16	22	69	1	20	125
35	Mons.		3	12	15	39	1	19	85
41	Glam.	1	8	29	38	67	8	28	109
42	Brecs.	4	9	29	42	22	3	26	55
43	Rads.	1	6	28	35	21	2	28	42
44	Carms.	3	9	25	37	49	5	28	79
45	Pembs.	1	7	14	22	50	7	25	83
<b>46</b>	<b>Cards.</b>	<b>4</b>	<b>10</b>	<b>35</b>	<b>49</b>	<b>37</b>	<b>5</b>	<b>37</b>	<b>60</b>
47	Monts.	2	7	34	43	23	4	31	52
48	Merioneth	13	10	40	63	33	6	36	56
49	Caerns.	22	20	44	86	57	6	36	96
50	Denbs.	3	10	31	44	42	3	26	84
51	Flints.		6	23	29	41	1	20	83
52	Anglesey		7	23	30	46	7	26	75

Table 10: The number of native species in certain phytogeographical and ecological groups in the vice-counties in SW England and Wales. The 'Northern' phytogeographical group includes Arctic-montane, Boreo-arctic Montane and Boreal-montane species. The Mediterranean-Atlantic category includes Submediterranean-Subatlantic species.

Northern	Mediterranean-Atlantic	Hyperoceanic	Strong calcifuge (R1-2)	Strong calcicole (R8-9)	Mean rank
Caerns. (1)	S Devon (1)	W Cornwall (1)	<b>Cards. (1)</b>	N Somerset (1)	Caerns. (1)
Merioneth (2)	N Somerset (2=)	E Cornwall (2=)	Caerns. (2=)	S Devon (2)	S Devon (2)
<b>Cards. (3)</b>	W Cornwall (2=)	Glam. (2=)	Merioneth (2=)	Glam. (3)	Glam. (3)
Denbs. (4)	Glam. (4)	Anglesey (4=)	S Devon (4)	Caerns. (4)	<b>Cards. (4=)</b>
Monts. (5)	E Cornwall (5)	Pembs. (4=)	Monts. (5=)	S Somerset (5)	Merioneth (4=)
Brecs. (6)	N Devon (6)	S Devon (4=)	N Devon (5=)	Mons. (6)	N Devon (6)
Glam. (7)	S Somerset (7)	Caerns. (7=)	S Somerset (5=)	Denbs. (7)	S Somerset (7)
Carms. (8)	Caerns. (8)	Merioneth (7=)	Carms. (8=)	Flints. (8=)	W Cornwall (8)
Rads. (9)	Pembs. (9)	N Devon (7=)	Glam. (8=)	Pembs. (8=)	Carms. (9)
Anglesey (10)	Carms. (10)	<b>Cards. (10=)</b>	Rads. (8=)	N Devon (10)	E Cornwall (10)
Flints. (11)	Anglesey (11)	Carms. (10=)	E Cornwall (11=)	Carms. (11)	Denbs. (11)
S Devon (12)	Denbs. (12)	Monts. (12)	W Cornwall (11=)	Anglesey (12)	Anglesey (12=)
N Somerset (13=)	Flints. (13)	Brecs. (13=)	Anglesey (13=)	E Cornwall (13)	Pembs. (12=)
Pembs. (13=)	Mons. (14)	Denbs. (13=)	Brecs. (13=)	W Cornwall (14)	N Somerset (14)
S Somerset (15)	<b>Cards. (15)</b>	S Somerset (13=)	Denbs. (13=)	<b>Cards. (15)</b>	Monts. (15)
N Devon (16)	Merioneth (16)	Rads. (16)	Pembs. (16)	Merioneth (16)	Flints. (16)
Mons. (17)	Monts. (17)	Flints. (17=)	Flints. (17=)	Brecs. (17)	Brecs. (17)
E Cornwall (18)	Brecs. (18)	Mons. (17=)	N Somerset (17=)	Monts. (18)	Rads. (18)
W Cornwall (19)	Rads. (19)	N Somerset (17=)	Mons. (19)	Rads. (19)	Mons. (19)

Table 11: Vice-counties in SW England and Wales ranked by the presence of certain phytogeographical and ecological groups. The 'Northern' phytogeographical group includes Arctic-montane, Boreo-arctic Montane and Boreal-montane species. In each column, the vice-county with most species in the group is placed at the top of the list, and its position indicated in brackets. In the final column, the vice-counties are ranked by the mean position in the preceding columns.

## 9. Altitude limits

A. O. Chater & P. A. Smith

The highest point in the county is the summit of Pumlumon Fawr at 752m, and a substantial proportion of the county is upland at over 300m (see map p.viii). Salter (1928a) took a particular interest in the altitudinal distribution of plants in mid-Wales, and there has recently been a revival of interest in the matter (Halliday 1997, Preston *et al.* 2002, Pearman & Corner 2009). During the present Flora project an attempt was made to record the upper limits for all those taxa that reached 300m altitude or more. The table in Appendix 3 lists these limits, as well as those earlier, pre-1950 limits that are available. The following analysis uses the maximum altitude recorded irrespective of date class and, breaking up the data into 50m bands, omits those taxa whose limit is not above 300m. As in the phytogeographical chapter, the analysis for convenience follows the taxonomy of Stace (1997, 2010), omitting hybrids, segregates of *Hieracium murorum* agg., *Rubus fruticosus* agg. and *Taraxacum officinale* agg., hybrids and infraspecific taxa, although other taxa recognised in the present Flora may be mentioned in the discussion. Native or alien status categories are those in PLANTATT (Hill *et al.* 2004), which closely follows those in the *New atlas* (Preston *et al.* 2002). Lower limits were not in general recorded, so no proper comments can be made about species confined to the higher altitudes. It must be understood that, except where otherwise stated, it is only upper limits, and what can be deduced from them, that is being discussed, and not what species are actually present in the various altitudinal bands, something that has not in itself been specifically recorded.

Altitude range (m)	All species			Annuals			
	Natives	Archaeo- phytes	Neo- phytes	Total	Natives	Archaeo- phytes	Neo- phytes
701-750	36	0	0	1	1	0	0
651-700	13	0	1	0	0	0	0
601-650	31	0	1	1	1	0	0
551-600	30	0	0	5	5	0	0
501-550	58	0	1	7	7	0	0
451-500	51	2	5	11	8	1	2
401-450	88	9	14	34	26	5	3
351-400	31	7	8	9	6	2	1
301-350	56	4	23	14	10	3	1
<b>Total over 300m</b>	<b>394</b>	<b>22</b>	<b>53</b>	<b>82</b>	<b>64</b>	<b>11</b>	<b>7</b>
As % of all natives		2.9	7	10.9	8.5		
As % of natives over 300m		5.5	13.4	20.8	16.2		
<b>0-750</b>	<b>748</b>	<b>117</b>	<b>200</b>	<b>163</b>			
<b>% occurring over 300m</b>	<b>53.2</b>	<b>18.8</b>	<b>26.5</b>	<b>39.2</b>			
As % of all natives		15.6	26.7	21.7			

Table 12: Species reaching their altitude limit in altitude bands above 300m. Note that this shows specifically species *reaching their altitudinal limit*, and not species *present* in each altitude band.

Table 12 summarises some of the available data. It is surprising, especially for a county with so much coastal habitat, that more than half, 53%, of the native species occur at over 300m. Table 13 and Fig. 2 show how the species reaching their altitudinal limits are divided amongst the major biomes. There is a general decrease in the overall number of species reaching their limit as altitude increases. As might be expected, the proportion of species' limits in the more northerly of the major biomes increases with altitude, and those in the Southern temperate, Mediterranean-Atlantic and Temperate ones decrease. A similar analysis by eastern limit category (Table 14, Fig. 3) shows an increasing proportion of Circumpolar species' limits with altitude, though perhaps the most striking feature is that there is a small proportion of the higher limits represented by species in the Hyperoceanic, Oceanic and Suboceanic categories.

Only just under a fifth, 18%, of the county's archaeophytes occur at over 300m; this is in part presumably a reflection of the comparative lack of human activity, but maybe is not entirely explained by this as the uplands were extensively occupied in the period when archaeophytes were being introduced. They may have been better represented when there was more arable cultivation in the uplands, and fewer Sheep, and some, such as *Glebionis segetum*, were certainly more frequent even in Salter's day than they are now. *Capsella bursa-pastoris* reaches 480m and is the highest annual archaeophyte, the other annual archaeophytes represented being *Geranium dissectum* (up to 435m), *Myosotis arvensis* and *Vicia sativa* subsp. *segetalis* (up



Altitude limit (m)	Arctic-montane	Boreo-arctic montane	Boreo-montane	Wide-boreal	Boreal-montane	Boreo-temperate	Wide-temperate	Temperate	Southern-temperate	Med-atlantic
300					1	14	4	30	12	
350				1	3	10	1	18	6	2
400				2	3	17	3	35	19	3
450		1	1	1	1	16	2	24	7	1
500		1			6	21	2	18	6	1
550			1	1	5	8	2	13	4	
600			2	4	19	1	6	2		
650	1		2		4		6			
700	2	1	1		7	1	5			
750	1	4		2	5	3	3		2	

Table 13: Number of species by major biome reaching their altitudinal limits in VC 46, in 50m bands. Note that this shows specifically species *reaching their altitudinal limit*, and not species *present* in each altitude band.

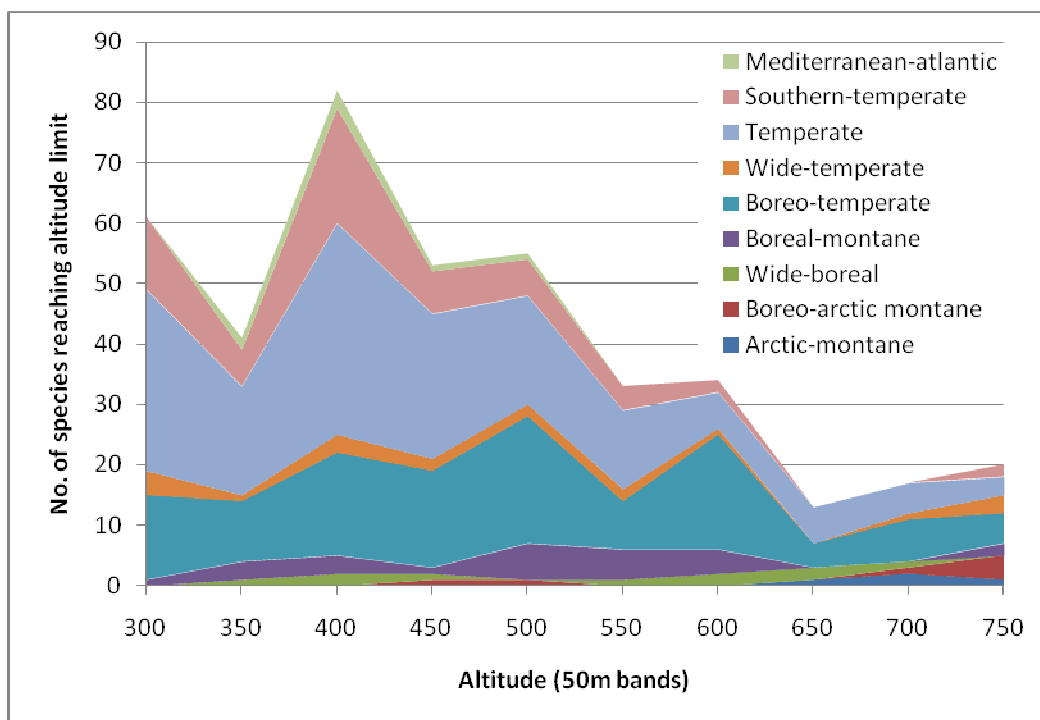


Fig. 2: Composition by major biome of species reaching their altitudinal limits in VC 46, in 50m bands. Note that this shows specifically species *reaching their altitudinal limit*, and not species *present* in each altitude band.

to 415m), *Glebionis segetum* and *Lamium purpureum* (up to 410m), *Tripleurospermum maritimum* subsp. *inodorum* (up to 380m), *Reseda luteola* (up to 375m), *Urtica urens* (up to 355m), *Euphorbia peplus* (up to 325m), *Raphanus raphanistrum* (up to 310m), and *Fallopia convolvulus* (up to 305m). The remaining (non-annual) archaeophytes over 300m have been *Tanacetum parthenium* (up to 480m), *Aegopodium podagraria* and *Linaria repens* (up to 415m), and *Artemisia vulgaris* and *Silene latifolia* (up to 410m), *Salix viminalis* and *Artemisia absinthium* (up to 375m), *Prunus domestica* (up to 360m), *Sedum album* (up to 355m), and *Salix alba* (up to 345m).

Neophytes, excluding planted trees and shrubs but including those that are regenerating by seed or vegetatively, are also few in the uplands, only 53, that is 26% of the total in the county, having been recorded at over 300m. *Picea sitchensis* is regenerating from seed at 660m (it is planted up to 670m), and *Pinus contorta* at 520m (planted up to 540m), otherwise the only neophyte, indeed the only non-native, above 500m is *Epilobium brunnescens*, which is so well established in natural habitats even at this altitude as to appear to be a native. Apart from regenerating forestry trees, the only other well-established neophytes that are at all frequent in the uplands are *Rhododendron ponticum* (up to 450m), *Juncus tenuis* (up to 440m) and *Lolium multiflorum* (up to 385m). In the case of *Acer pseudoplatanus* (certainly self-sown up to 360m but planted up

Altitude limit (m)	Hyper-oceanic	Oceanic	Sub-oceanic	European	Euro-siberian	Eurasian	Circum-polar
300	1	5	4	24	13	7	7
350	1	2	6	13	9	6	4
400		6	6	34	15	7	14
450		3	5	23	5	6	11
500		3	7	12	18	1	14
550		3	2	13	3	3	9
600	1	1	5	9	6	5	7
650		1	1	4	2		5
700		1	1	8	2	1	4
750			2	5	5	1	7

Table 14: Number of species by eastern limit categories reaching their altitudinal limits in VC 46, in 50m bands. Note that this shows specifically species *reaching their altitudinal limit*, and not species *present* in each altitude band.

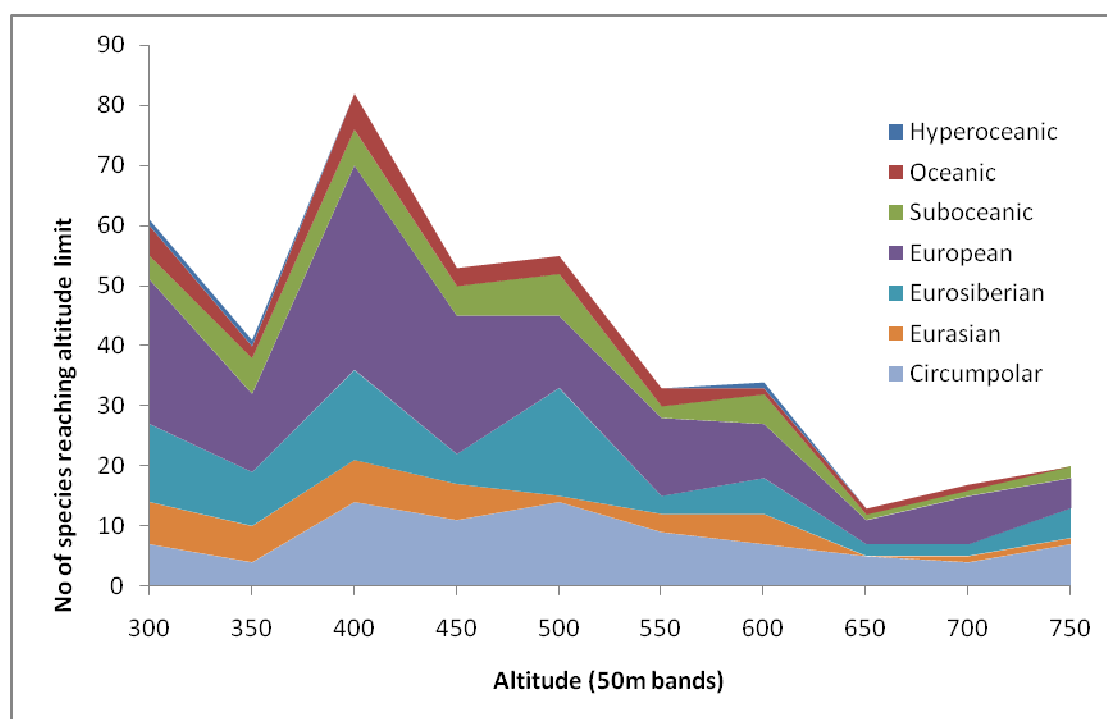


Fig. 3: Composition by eastern limit category of species reaching their altitudinal limits in vc46, in 50m bands. Note that this shows specifically species *reaching their altitudinal limit*, and not species *present* in each altitude band.

to 415m) it is often impossible to distinguish planted from self-sown trees, as it is with individual trees of *Pinus sylvestris* and *Larix decidua*.

39% of the county's native annuals occur at over 300m. This seems a surprisingly high proportion, and although data are unavailable to support the impression, annuals seem to be very infrequent in the uplands even though they are well represented in the number of species. They would be expected in open habitats, but screes, eroding streamside slopes, lake shores and river gravels and shingle in the uplands are conspicuously lacking in annuals. A significant component is however formed by the *Euphrasia* species which are adapted to closed habitats. It is only in synanthropic habitats such as tracksides, road verges and waste ground by habitations that annuals are at all common, and the almost ubiquitous Sheep nests, although often a good bryophyte habitat, tend to be quite devoid of higher plants. The highest 14 annuals are all natives, *Poa annua* predictably reaching the top. Going down, there are no other annuals for more than 100m until *Euphrasia scottica* appears at 640m (altogether seven species and five hybrids of *Euphrasia* occur at over 300m). *Capsella* is the highest archaeophyte annual, and *Lepidium didymum* the highest neophyte annual.

Of the 1301 taxa recorded as reaching 300m or more in Britain and Ireland, the altitude limits for 161 have been recorded from Cardiganshire (BSBI website June 2009).



## 10. Extinct, declining and increasing species

### Extinct natives

Cardiganshire is fortunate in that extinction has not been a major feature of its recent floristic history. The following table (Table 15) summarises the available information. There are many problems in compiling such a list and it is often a matter of subjective judgement whether a species really is extinct. *Pseudorchis albida*, for example, has not been seen since 1965 at one of its two post-1950 sites but, as it was previously seen at the same site only in 1892 and 1925, it would be unwise to declare it extinct there and it would be even more unwise to say it was extinct at its other site where it was seen only in the early 1800s and in 1981; the failure to record it is not because of lack of searching. Two species, *Valeriana dioica* and *Viola reichenbachiana*, thought until recently to be extinct, have been refound. On the other hand, *Gentianella campestris*, a plant one would expect to be visible if it was still present, has been searched for at great length at the site where it was last seen as recently as 2001, and can reasonably be assumed to be extinct there and in the county as a whole. It is also sometimes difficult to tell whether a species was ever truly native in the county, *Marrubium vulgare* being a good example; it could have been native on geographical grounds, but Salter's (1935) opinion was that it was not, and at its only recent site it was certainly not.

Species (bold names are significant extinctions)	Total tetrads in all date classes	Date of latest record at the qualifying status	Native (N) or archaeophyte (AR)	Comments on causes of extinction or reason for insignificance	National change factor (Braithwaite <i>et al.</i> 2006) of signifi- cant cases only	National change index (Hill <i>et al.</i> 2004) of significant cases only
<b>Agrostemma githago</b>	7	1941	AR	Later records as casual		-0.75
<b>Arabis hirsuta</b>	3	c.1880s	N	Later unlocalised 1950s record.	-50	-1.02
<i>Arctium lappa</i> subsp. <i>lappa</i>	1	1992	AR	Casual only		
<i>Artemisia maritima</i>	2	pre-1935	N	Introduced only		
<b>Blysmus rufus</b>	1	c.1973	N	Habitat has changed		-0.53
<i>Bupleurum rotundifolium</i>	1	1906	AR	Casual only		
<b>Carex punctata</b>	1	1994	N	Habitat has changed		0.15
<b>Centaurium littorale</b>	1	1931	N			0.03
<b>Cephalanthera longifolia</b>	1	1985	N	Habitat has changed		-0.77
<b>Chamaemelum nobile</b>	2	1924	N			-0.92
<b>Chenopodium bonus- henricus</b>	11	1987	AR		-33	-1.79
<i>Chenopodium urbicum</i>	1	1930s	AR	Status uncertain		
<b>Cuscuta epithymum</b>	8	2003	N			-1.28
<b>Dianthus armeria</b>	2	c.1955	N	Habitat has changed		-1.31
<b>Eleocharis acicularis</b>	1	c.1886	N			-0.11
<b>Euphorbia peplis</b>	1	c.1800	N			-1.49
<b>Festuca filiformis</b>	1	1981	N	Site destroyed	12	
<b>Fumaria muralis</b> subsp. <b>muralis</b>	2	1922	N			
<b>Gentianella campestris</b>	12	2001	N		-9	-1.28
<b>Gnaphalium sylvaticum</b>	2	1928	N		-17	-2.65
<i>Imperatoria ostruthium</i>	1	1941	AR	Casual only		
<b>Inula conyzae</b>	2	1984	N		-27	-0.15
<i>Lepidium campestre</i>	2	1958	AR	Status and/or identity uncertain		
<i>Marrubium vulgare</i>	11	2000	N	Casual only		
<b>Mertensia maritima</b>	1	c.1850	N			-0.53
<b>Minuartia verna</b>	1	c.1979	N	Site destroyed		-0.42

<i>Nasturtium microphyllum</i>	2	pre-1968	N	Unlocalised records only		
<b>Noccaea caerulescens</b>	8	2004	N	Habitat has changed		0.01
<i>Onopordum acanthium</i>	3	1894	AR	Casual only		
<b>Paris quadrifolia</b>	1	1974	N			-0.68
<b>Persicaria mitis</b>	1	1930	N			-0.90
<b>Petroselinum segetum</b>	1	1941	N		34	0.12
<b>Pilularia globulifera</b>	2	1964	N			-0.03
<b>Potamogeton perfoliatus</b>	2	1934	N		-19	
<b>Ranunculus aquatilis</b>	1	1979	N			
<b>Ranunculus arvensis</b>	1	1905	AR			-3.77
<i>Ranunculus fluitans</i>	2	c.1928	N	Identity uncertain		
<i>Scandix pecten-veneris</i>	2	1941	AR	Probably casual only		
<i>Silene conica</i>	1	1903	N	Casual only		
<i>Silene otites</i>	1	1796	N	Casual only		
<b>Teesdalia nudicaulis</b>	1	1904	N	Habitat destroyed		-0.81
<b>Viscum album</b>	1	1985	N		41	0.97

Table 15: Extinct natives and archaeophytes

Taking the 21 “significant extinctions” since 1900 in Table 15, based on the criteria adopted by Walker (2003) which exclude the usual critical species, Cardiganshire has lost native species at a rate of only 0.19 per year; the rates over roughly the same period in the 25 vice-counties and other comparable areas covered by Walker ranged from 0.25 (Northumberland) to 0.84 (Middlesex). Walker’s British average was c.0.5, and his northern and western counties averaged slightly lower at c.0.4. Cardiganshire has undoubtedly maintained its native species better than most of the rest of Britain, although comparable figures for other counties on the Atlantic fringe, apart from Cornwall whose rate was 0.36, have yet to be calculated; the only other Welsh vice-county calculated is Carmarthenshire whose rate was 0.22 (RDP pers. comm.).

Since recording began, Cardiganshire has lost only 25 native species, that is 3% of the total, comparable to Carmarthenshire’s 2.9% (RDP pers. comm.). On the other hand, Bedfordshire and Northamptonshire have each lost 11% (Walker & Preston 2006), Cambridgeshire has lost 13% and Middlesex 18% (Preston 2000). Walker & Preston’s findings suggest that habitat destruction and eutrophication are the main causes of extinctions in lowland England, and the comparative unimportance of these two in Cardiganshire may go some way to explaining the county’s good record, although real evidence would be difficult to find. Has conservation activity reduced the rate of extinction? It would be nice to think so, but this would be equally hard to prove.

Of the natives here considered to have become extinct, three have gone because their sites have been destroyed, the field where *Teesdalia nudicaulis* grew having been built over, the part of the churchyard where *Festuca filiformis* grew having been lost to road-widening, and the lead mine where *Minuartia verna* grew having been reclaimed. Four have obviously gone because their habitat has changed, the part of Cors Fochno where *Blysmus rufus* grew having become more rank and its salinity at least for a time lessened, the site for *Carex punctata* having become overgrown after its shading Alders succumbed to the Alder *Phytophthora* disease, the site for *Cephalanthera longifolia* having become overgrown when its shading Pines were felled, and the site for *Dianthus armeria* having become more overgrown by Gorse. *Noccaea caerulescens* has probably succumbed to the effects of reduction of heavy metal pollution in the Afon Ystwyth.

*Euphorbia peplis* has been extinct in Britain since 1965, and *Mertensia maritima*, for which Aberystwyth was its most southerly site, has been retreating northwards in Britain for the last two centuries. The one subspecies in Table 15, *Fumaria muralis* subsp. *muralis*, was only recorded in the county twice and is now extinct throughout Britain. Two species of the Ynys-las dunes, *Centaureum littorale* and *Inula conyzae*, have gone for unknown reasons, perhaps because of the same sort of successional habitat change that allowed such species as *Epipactis palustris* and *Ophrys apifera* to arrive there.

*Eleocharis acicularis*, *Paris quadrifolia*, *Persicaria mitis* and *Ranunculus aquatilis*, and *Viscum album* as a native, were only ever known from single sites and clearly had a precarious hold in the county. We are left without any clear explanations for the disappearance of *Arabis hirsuta*, *Chamaemelum nobile*, *Cuscuta epithymum*, *Gentianella campestris*, *Gnaphalium sylvaticum*, *Petroselinum segetum*, *Pilularia globulifera* and *Potamogeton perfoliatus*. The *Arabis*, *Chamaemelum*, *Gnaphalium*, *Petroselinum* and *Potamogeton* were lost between 65 and 120 years ago, the *Cuscuta* and *Gentianella* were lost very recently, and *Pilularia* could well still be in its last known site, Llyn Gynon.



The extinct species are found across the phytogeographical spectrum, as indeed they are in the various Broad Habitats. Five of the extinctions were annuals, *Cuscuta epithymum*, *Euphorbia peplis*, *Fumaria muralis* subsp. *muralis*, *Persicaria mitis* and *Teesdalia nudicaulis*, but none was an arable weed in the county.

### Extinct archaeophytes

Only three of the archaeophytes (as defined in Preston *et al.* 2002, 2004) that were probably ever well-established in the county have become extinct. The most significant are *Agrostemma githago* and *Ranunculus arvensis*, which used to be arable weeds, the former being now effectively extinct throughout Britain as an arable weed, and the latter having dramatically declined (Preston *et al.* 2002). How well *Chenopodium bonus-henricus* was ever established in the county is uncertain, and it has declined over Britain as a whole.

### Declining natives

Because of the lack of any previous detailed account of the distribution of the county's plants, let alone of any earlier tetrad maps, estimates of decline have to rely on anecdotal evidence from earlier authors, chiefly Salter. This evidence is usually very difficult to interpret as is made clear in many of the species accounts in this Flora. As explained elsewhere, it is generally unwise to take the different date classes of the records on the tetrad maps as either positive or negative evidence for decline because localised old records are few, and the lack of recorders has meant that some sites, including species-rich ones, have not been re-recorded since 1986. The supposed declining species are arranged here (Table 16) in two groups, those for whose decline the evidence is reasonably definite, and those where the evidence is more circumstantial but on balance is considered to be reasonably convincing.

Only one of the natives in the three northern phytogeographical groups (Arctic-montane, Boreo-arctic Montane and Boreal-montane), *Trollius europaeus*, has certainly declined, and none in the Wide-boreal group have. The same applies in the second list, *Viola lutea* being in the Boreal-montane group like *Trollius*, and again there are none in the Wide-boreal group. Two species in each group are Southern-temperate, *Filago vulgaris* and *Silene vulgaris*, and *Sherardia arvensis* and *Spiranthes spiralis*. *Torilis nodosa* in the Mediterranean-Atlantic group is the most southerly species to have declined. Two Wide-temperate species, *Ruppia maritima* and *Spergula arvensis*, have probably, but less obviously, declined. So far as Eastern limit categories are concerned, declining species occur over most of the range. As with extinction, there seems little evidence that climatic preference has been a significant factor in decline, and in many cases there is some other more or less obvious alternative explanation.

Several species such as *Antennaria dioica*, *Melittis melissophyllum* and *Torilis nodosa* must be considered on the verge of extinction, as they have gradually become rarer and are now confined to a few or single sites; although recorded from 19 sites in the past, *Antennaria* now exists as only two plants in a single site, *Melittis* as a very few plants in one site, and the *Torilis* exists in only two sites, one threatened by scrub development and the other paradoxically dependent on herbicide treatment of grass verges at the MoD site, Aberporth. The latter two species may have some resilience through their seed banks, but *Antennaria* seems to lack this reserve. *Salix herbacea*, on the other hand, seems to have survived in a single site for over a century and was never any more widespread, and although this species, like *Antennaria*, exists as only two individuals, it has probably not declined over the last century and there is no reason to consider that it is on the way out.

*Antennaria dioica* may reasonably be assumed to have declined because of both overgrazing and undergrazing of its habitats, and has suffered the most obvious decline of any of the county's rarer species. *Genista anglica* and *Viola lactea* have suffered from the destruction of lowland wet heath, but still thrive, especially in protected sites, and if *Serratula tinctoria* has declined it is probably largely for the same reason. *Aethusa cynapium*, *Filago vulgaris*, *Mentha arvensis*, *Scleranthus annuus* and, to a lesser extent, *Sherardia arvensis* and *Spergula arvensis* are surprisingly the only native arable weeds to have declined, but while there is now much less arable than in the past, a good deal remains and weed species regularly appear from the seed bank and get recorded in sites that are no longer arable. Part of the decline of *Nymphaea alba* can be attributed to the loss through natural succession of much of the open water on the Cors Fochno raised bog. Of the other two declining aquatics, *Utricularia minor* has probably suffered from drainage of its sites as well as from the cessation of peat cutting, which often created open pools, and *Ruppia maritima* has probably been affected by the spread of *Spartina* in the Dyfi salt marshes. *Gymnadenia conopsea* sens. lat., and less definitely *Viola lutea* and *Wahlenbergia hederacea*, have probably declined as a result of gradual attrition of their habitats, chiefly the reseeding of upland pastures and drainage of damp grassland respectively.

	Total tetrads in all date classes	Phytogeo- graphical element	National change factor (Braithwaite <i>et al.</i> 2006)	National change index (Hill <i>et al.</i> 2004)
<b>Decline certain</b>				
<i>Aethusa cynapium</i>	37	73	0	-0.41
<i>Alchemilla glabra</i>	25	53	-30	
<i>Antennaria dioica</i>	19	55	3	-0.88
<i>Berberis vulgaris</i>	29	73	13	-0.61
<i>Bromus commutatus</i>	4	73	47	1.07
<i>Clinopodium vulgare</i>	25	76	-3	-0.67
<i>Filago vulgaris</i>	7	83	51	-1.20
<i>Genista anglica</i>	36	71	0	-1.09
<i>Gymnadenia conopsea</i> sens. lat.	17	55	3	-0.76
<i>Knautia arvensis</i>	41	74	-19	-0.88
<i>Melittis melissophyllum</i>	4	73		-0.47
<i>Mentha arvensis</i>	17	56	-26	-1.30
<i>Nymphaea alba</i>	7	73	24	1.02
<i>Scleranthus annuus</i>	19	73	-16	-2.68
<i>Sedum acre</i>	8	73	3	-0.24
<i>Silene vulgaris</i>	34	85	-36	-1.26
<i>Tanacetum vulgare</i>	53	55	2	-0.23
<i>Torilis nodosa</i>	7	91	66	-0.36
<i>Trollius europaeus</i>	27	43	-28	-0.73
<i>Utricularia minor</i>	39	56	17	0.20
<i>Viola lactea</i>	4	71		-1.08
<b>Decline probable</b>				
<i>Barbarea vulgaris</i>	14	74	3	-0.02
<i>Echium vulgare</i>	14	74	15	-0.24
<i>Genista tinctoria</i>	47	73	-26	-0.77
<i>Geranium columbinum</i>	54	73	3	-0.34
<i>Prunus padus</i>	3	55	32	0.58
<i>Ruppia maritima</i>	6	66		-0.34
<i>Serratula tinctoria</i>	87	73	13	-0.21
<i>Sherardia arvensis</i>	36	83	39	-0.94
<i>Spergula arvensis</i>	160	64	-9	-2.30
<i>Spiranthes spiralis</i>	13	83		-0.95
<i>Valerianella locusta</i>	38	73	8	-0.11
<i>Viola lutea</i>	58	43	-59	-0.69
<i>Wahlenbergia hederacea</i>	121	81	22	-0.30

Table 16: Declining natives

In most of the other cases, it is less easy to suggest causes of decline. Several with a quite wide habitat and geographical range, *Alchemilla glabra*, *Clinopodium vulgare*, *Geranium columbinum*, *Knautia arvensis*, *Silene vulgaris* and *Trollius europaeus* seem to be declining, perhaps for a variety of reasons as there seems no one obvious explanation. The apparent decline of *Valerianella locusta* may be an artefact of recording, because of the mistaken identification of *V. carinata*. The marked decline of *Tanacetum vulgare* is especially puzzling, however; whether it was truly native anywhere in the county may be disputed, but it seems not to appear now in new sites and so may be unable to compensate for casual destruction of its usually roadside habitats. The decline of *Berberis vulgaris*, always confined to hedges, is similarly puzzling, as it seems to have occurred well after the main extermination program of the species took place. Most of the remaining species only ever occurred in a few sites, and their decline is probably not very significant.

It will be seen from the table that only four of the declining species contradict their national change index. *Nymphaea alba* and *Utricularia minor*, as discussed above, have been subject to particular local conditions. *Bromus commutatus* and *Prunus padus* have always been too rare for any conclusions to be drawn.



### Declining archaeophytes

The most definite evidence of decline among archaeophytes is of the arable weeds *Centaurea cyanus*, *Galeopsis speciosa*, *Silene gallica*, *Thlaspi arvense* and *Valerianella dentata*. This is in contrast to the situation of the native ones mentioned above, although it is in line with the national trend. Another small group that appears probably to have declined is the cottage garden escapes or relics, perhaps less often grown now and lost through natural attrition, chiefly *Artemisia absinthium*, *Chenopodium bonus-henricus*, *Inula helenium* and *Sambucus ebulus*. An apparent decline of others such as *Ballota nigra*, *Hyoscyamus niger*, *Malva neglecta*, *Verbena officinalis* and *Helminthotheca echioides* is illusory as their well-established populations tend to be long-lasting and it is the normal turnover of their casual occurrences that gives the impression of loss.

### Increasing natives

Estimates of increase in the county are subject to the same constraints as those of decrease, with the proviso that most of the apparent increases are probably artefacts of the increased amount of recording; a few comments can safely be made though on two dozen or so species that do appear to have increased (Table 16). The following account ignores increases resulting from such obvious human activities as the sowing of agricultural grasses and tree planting, both often of alien races, and the reclamation of wetlands, and ignores species whose increase is due primarily to natural succession, for example some plants of the evolving dunes and dune slacks. It can be assumed that natives confined to artificial habitats, or that grow in them as well as in semi-natural habitats, will have benefited too from the activities of Man. Ferns such as *Asplenium ceterach*, unknown on unmodified natural rock outcrops, will probably have arrived and increased in the

	Phytogeographical element (Hill <i>et al.</i> 2004)	Ellenberg nitrogen value (N)	National change factor (Braithwaite <i>et al.</i> 2006)	National change index (Hill <i>et al.</i> 2004)
<i>Asplenium septentrionale</i>	73	2		-0.08
<i>Carduus nutans</i>	74	5	-6	-0.15
<i>Cerastium glomeratum</i>	74	5	60	1.44
<i>Ceratophyllum demersum</i>	86	7	20	0.87
<i>Chamerion angustifolium</i>	56	5	-17	-0.01
<i>Cochlearia danica</i>	71	5	76	3.31
<i>Elatine hexandra</i>	73	4		1.07
<i>Epipactis palustris</i>	74	3		-0.39
<i>Festuca arundinacea</i>	84	6	30	1.71
<i>Filago minima</i>	73	2	3	-0.91
<i>Geranium lucidum</i>	92	6	41	1.42
<i>Helictotrichon pubescens</i>	73	3	-23	0.35
<i>Hyacinthoides non-scripta</i>	71	6	-13	-0.41
<i>Ophioglossum vulgatum</i>	76	3	-1	
<i>Ornithopus perpusillus</i>	72	3	-6	-0.18
<i>Pteridium aquilinum</i>	76	3	-21	-0.71
<i>Puccinellia distans</i>	54	7	74	3.02
<i>Ficaria verna</i> subsp. <i>verna</i>	83	6		
<i>Ranunculus penicillatus</i>	73	5		
<i>Rorippa islandica</i>	44	6		
<i>Sagina maritima</i>	83	4	12	-0.08
<i>Scrophularia auriculata</i>	82	7	16	-0.21
<i>Solanum nigrum</i>	85	8	42	0.44
<i>Trifolium ornithopodioides</i>	82	3		0.42
<i>Trisetum flavescens</i>	73	4	2	-0.13
<i>Typha latifolia</i>	86	7	30	1.01
<i>Vulpia bromoides</i>	92	3	32	0.18

Table 17: Increasing natives

county as a result of the building of mortared walls, although there is no real evidence of this. *Asplenium septentrionale* is also unknown on unmodified rock, but has demonstrably increased with the development, or at least the decline, of lead mines, and *Ophioglossum vulgatum* has spread onto contaminated spoil. Many aquatics must obviously have increased as a result of the construction of lead mine reservoirs and more recently of conservation-inspired ponds. Species such as *Spergularia rubra*, *Ornithopus perpusillus* and *Filago minima* have increased on the comparatively recent FC roads. Just as agricultural drainage and reseeded have caused the decline of some species, they will have resulted in the incidental increase of others, such as *Cerastium glomeratum*. Just as reduction of grazing will have contributed to the decline of *Antennaria dioica*, it will have led to the increase of *Ulex europaeus*; the increasing species are usually of course now the commoner ones and are of less interest to conservationists and even to many botanists.

Several of the increasing natives are characteristic of moderately to extremely fertile sites (N = 5-9) and fairly certainly reflect the increasing nitrification of agricultural land, although this has probably not been as severe as in many other parts of Britain. *Cerastium glomeratum* and *Carduus nutans* have increased conspicuously in reseeded pasture, *Solanum nigrum* has increased greatly even in the last 20 years, and *Festuca arundinacea*, as well as having been sown in the past, has recently increased greatly on roadside verges. *Typha latifolia*, and to a lesser extent *Ceratophyllum demersum*, are increasing rapidly in aquatic habitats, perhaps primarily because of eutrophication. *Puccinellia distans*, although a rare species in the county, is demonstrably increasing, but in coastal habitats rather than along roadsides where it is so conspicuously increasing, like *Cochlearia danica*, in Britain as a whole. *Scrophularia auriculata* and *Rorippa islandica* have spread into synanthropic habitats in recent decades, the latter less strikingly than in Carmarthenshire though. The recent rapid spread of *Ficaria verna* subsp. *verna* around Aberystwyth may perhaps reflect eutrophication, but its spread down the Teifi is less easily explained.

Climatic change with fewer frosts, rather than nitrification, may more likely be the explanation for one of the most conspicuous increases in the county since Salter's day, that of *Geranium lucidum*; as it is virtually confined to the artificial habitat of roadside hedgebanks it gives the impression of being an invasive alien rather than a native, and although it is slightly nitrophilous, considering its habitat and the fact that it is a Submediterranean-Subatlantic species, climate change is the more likely explanation, even if it was a recent arrival. *Cochlearia danica*, an Oceanic Temperate species, undoubtedly native in its core habitat along the coast, is also spreading along roadside banks, more likely too because of similar climate changes than of highway salting which has not increased. Another Submediterranean-Subatlantic species, though of very dry habitats, *Vulpia bromoides*, is probably increasing, as is the Suboceanic Southern-temperate *Trifolium ornithopodioides*. *Hyacinthoides non-scripta*, another Oceanic Temperate species, is conspicuously increasing in grassland especially near the coast.

A variety of other reasons may explain increases. *Ranunculus penicillatus* has increased in the Ystwyth for the same reason that *Noccaea caerulea* has become extinct, the decrease in heavy metal pollution. Salter (1935) noted the spread of *Chamerion angustifolium*, and it has probably continued to increase because of disturbance due to road building and forestry, especially in the uplands; it may well be an alien North American genotype that is spreading. *Pteridium aquilinum*, as is indicated in the species account, has been shown to have increased in at least part of the county during the 20<sup>th</sup> century at nearly twice the national average rate, presumably because of increase in Sheep numbers. *Elatine hexandra* seems to have recently spread into old as well as new water bodies, perhaps because of their increased silting-up caused by soil erosion. But some apparent increases are not easy to explain. Two species of semi-natural grassland that has escaped any increase in fertility, *Avenula pubescens* and *Trisetum flavescens*, the former having increased in Britain as a whole, seem more common than in Salter's day, and *Sagina maritima* seems to have spread into synanthropic sites, all three for unknown reasons. The *Trisetum* and *Sagina* have decreased nationally. Some of the other cases where the county changes contradict the national change index (Table 16) appear to be because of particular local conditions mentioned above, such as the increases of *Asplenium septentrionale* and *Ophioglossum* on lead mines, or *Filago minima* and *Chamerion* on FC and other new upland roadsides.

### Increasing archaeophytes

Few archaeophytes seem to have increased conspicuously since recording began, but *Sedum album* has spread greatly in line with the national trend, doubtless for climatic reasons as it is a Submediterranean-Subatlantic species. *Vulpia myuros* has spread along the railway system to which it is virtually confined (and at a county level is really a neophyte). *Chaenorrhinum minus*, which was in Salter's day also primarily a railway plant, has since spread quite widely to other habitats. There is some evidence that *Avena fatua* may have become a more frequent arable weed over recent decades. *Valerianella carinata* seems fairly certainly to be increasing.



The increase of a few other species such as *Euphorbia lathyris* and *Papaver somniferum* is entirely of casual occurrences.

### Increasing neophytes

Several of the most widely feared invasive aliens are well-established and spreading in the county, although the early history of their arrival and spread is poorly, if at all, documented. *Fallopia japonica* is ubiquitous, and is established at up to 415m altitude; it is being spread by County Council workmen, among others, as fast as they are controlling it, but apart from some extensive riverbank colonies it has perhaps not had too much impact on natural communities. *F. sachalinensis* and *Persicaria wallichii* are quite widespread but restricted in their spread. *Rhododendron ponticum* is aggressively invasive chiefly in the Llyfnant and in some estate woodlands such as those at Ynys-hir, and eradication has been attempted mostly by the RSPB. *Cotoneaster* species are nowhere significantly spreading, but *Buddleja davidii* seems to have the potential of invading scrub rapidly and of becoming a conspicuous coloniser. *Rubus armeniacus* 'Himalayan Giant' is spreading less rapidly than in many other parts of Britain, probably for climatic reasons. Apart from *Acer pseudoplatanus*, the most invasive of the neophyte trees is perhaps *Tsuga heterophylla*, whose fast growth and evergreen habit make it a potential threat to native woodland.

*Rosa rugosa*, though uncommon in the county, has spread deleteriously on the shingle at Tan-y-bwlch beach and merits clearance as much as any of our aliens. *Impatiens glandulifera* has become very abundant in recent decades along the lower reaches of the Teifi and Aeron, and so far to a lesser extent along the Leri, Rheidol and Ystwyth as well as several lowland streams, and is becoming established in several places at over 300m altitude. The giant *Heracleum* species have scarcely spread outside farmyards. *Lamium galeobdolon* subsp. *argentatum* has been a major coloniser of woodland, but mostly alongside roads and gardens, and is apparently spreading only vegetatively. *Geum macrophyllum* though is spreading rapidly by seed in similar habitats and may well be more damaging in the long run. In the uplands *Epilobium brunnescens* behaves politely like a native in natural open habitats, as well as more like an alien along FC verges and roadsides, where *Juncus tenuis* has also spread. *Epilobium ciliatum* must be one of the commonest neophytes in the county, and certainly the one that most pollutes the native gene pool by hybridisation, but as it is small and never a dominant, and nothing can be done about it, it escapes the disapproval that is heaped on so many of the others.

Some of the invasive aquatics such as *Azolla*, *Elodea canadensis* and *E. nuttallii*, tend to come and go, and have not achieved the permanent dominance that had been expected of them. *Lemna minuta* though is spreading rapidly and apparently permanently, probably helped by its frost-resistance. *Crassula helmsii* has resisted extermination wherever that has been tried, but is nowhere very extensive although it has the potential to be so in the Ynys-las dune slacks. *Myriophyllum aquaticum* and *Lagarosiphon* are still at an early stage of invasion.

Most other of the numerous increasing neophyte species appear not to be potentially invasive of natural or semi-natural habitats. For example *Allium triquetrum* is spreading rapidly but chiefly along road verges and banks around Aberystwyth. *Crococmia ×crococmiiflora* establishes itself where it is dumped, but does not significantly spread. It is the largely unnoticed neophyte infraspecific variants of native species that are much more significant. Much of the *Trifolium repens* and *T. pratense*, and a high proportion of the pasture grasses, consist of neophyte genotypes, let alone the alien *Lolium multiflorum* itself and its hybrids. To what extent the neophyte taxa of *Crataegus*, *Betula*, *Acer*, *Viburnum*, etc. are self-sown as opposed to planted is uncertain, but they and many other alien trees and shrubs are becoming more and more common in the countryside.

### Translocations and "wild flower" seeding

General human activity has increasingly so confused the natural gene pool, ecology and distribution of the county's plants that the effect of deliberate translocations for botanical reasons in the wild will have been comparatively insignificant, except perhaps in the case of a few local rarities. Only a very few involving such species are known to have been carried out, some for scientific or sentimental reasons, and a few for more practical purposes. More details of the examples mentioned here will be found in the relevant species accounts.

An early instance was of the archaeophyte *Hyoscyamus niger* being sown at Clarach c.1890 to provide teaching material for the University, and Salter recorded sowing it there again in 1926. In the 1940s *Hippuris vulgaris* was flourishing in a small reservoir at Rhydyfelin where it too had been planted to provide material for teaching. *Spartina anglica* and probably *S. ×townsendii* were planted in the Dyfi estuary in 1920 in a deliberate attempt to reclaim the mud flats, with great success. *Atriplex portulacoides* was also planted in

the Dyfi salt marshes, in 1939, but in order to see whether this missing member of the county's flora would grow there, which it has done, although not as prolifically as the *Spartina*. *Zostera marina* was planted in Aberystwyth harbour in the 1950s for similar reasons, but with no success. Plantings of *Frangula alnus* to attract Brimstone butterflies at the RSPB reserve at Ynys-hir, as well as along roads and rides in various FC plantations, can be difficult to tell from native populations, unless they are of the alien var. *latifolia*.

Aquatic and swamp species are often introduced for decoration or to "improve" the habitat, for example *Glyceria maxima* at all or most of its sites, and *Carex riparia* at Ynys-hir in 1972. Sentimental translocations, because they are rarely recorded, are potentially more confusing for the botanist (but then "why should not botanists be confused?", as Samuel Butler responded when he was told that this would be the effect of his scattering seeds from France along English roadsides). When I was listing plants in a wooded dingle near Llan-non in 1995, a lady living nearby explained to me that when she moved there from Newcastle Emlyn she had missed a number of favourite plants, and that the *Anemone nemorosa*, *Mercurialis perennis* and *Sanicula europaea*, among others, that I was assuming were native in the dingle, had been brought by her from her old neighbourhood. A. P. Conolly has noted several instances of the archaeophyte *Lamium album* being translocated in Wales for similar reasons, and this may be commoner practice than we realise, and may well involve rarer species too.

"Wild flower" seed-mixes have fortunately been seldom used on roadside verges in the county where the adage "better to allow seeding in than seeding out" is usually respected, but they are quite often used on private land. "Wild flower seed" from unreliable and even sometimes from supposedly reliable sources, often sown on amenity areas and in fashionable "wild flower meadows" is a major source of alien species and variants, and though of interest to the botanist it is not good for the local native gene pool. Even CCW's "wild flower meadow" by its former office at Plas Gogerddan, created with a commercial seed mix in 1991, contains a fascinating array of alien taxa related to *Achillea millefolium*, *Centaurea nigra*, *Galium verum*, *Malva moschata*, *Primula veris*, etc. In 2009 seeding hay from here was taken to re-vegetate the Iron Age camp at Coed Allt Fedw, Trawsgoed SN661728 on FC land where Gorse had been cleared, thus introducing these taxa into the wider countryside (*Cambrian news* 11.2.2010).



## 11. Commentaries on the species accounts

### Relative taxonomies

The taxonomy of the British flora is constantly changing, rarely more rapidly than at the present time. In general for the arrangement and delimitation of families and genera in the species accounts in this Flora I have followed Stace (2010), who has in turn largely followed the classification of families known as APG III that is likely to be the one most widely adopted for at least the immediate future. For infraspecific taxa I have usually followed Sell & Murrell (1997-2009), while for species I have sometimes followed one, sometimes the other, according to my own experience or judgement. Occasionally though I have followed some quite different taxonomy that seemed more workable. In general at the infraspecific levels I have split rather than lumped, as it is of course easier for the author to split and the reader to lump, if they so wish, than vice versa. In other parts of this Flora it has on a few occasions been necessary to follow a different taxonomy from that in the species accounts in order to correlate with available information. In particular, in the phytogeography chapter, the taxonomy of the *New atlas* (Preston *et al.* 2002) has been adopted so that the wealth of parameters presented in PLANTATT (Hill *et al.* 2004) can be used for analysis. Such analyses are of great interest, but they would be impossible on present information if all the segregates and infraspecific taxa recognised in the species accounts were to be taken into account. We fondly think that taxonomy, like nomenclature, ought to be building towards stability on a secure basis, but it is often hard to believe that it really is and we can only make do with what we have available at the present.

### Native/alien status

Although it is reasonable to assign status as native, archaeophyte or neophyte to plant taxa at a national level (Preston *et al.* 2002, 2004), it can be very difficult to do so at a vice-county level. A **native** is a plant that arrived in Britain without the intervention of Man, either intentionally or unintentionally, having come from an area in which it is native, or that has evolved *de novo* in Britain. An **alien** is a plant brought to Britain by Man, either intentionally or unintentionally, or one that has arrived without Man's intervention from an area in which it is an alien. An **archaeophyte** is a plant brought to Britain by Man, either intentionally or unintentionally, and that became naturalised here between the start of the Neolithic c.4000BC and 1500AD (**naturalised** meaning present in the wild for some years, say five, and reproducing vegetatively or by seed). A **neophyte** is a plant that was introduced, intentionally or unintentionally, by Man after 1500AD, or that was present before then but only as a casual and naturalised now only because it was re-introduced subsequently. A **casual** is a plant whose presence is dependent on constant re-introduction and that does not persist in the wild for more than a few years, say five. Archaeophytes, because of their long association with Man, are often among our most interesting plants.

Some examples illustrate what we can or cannot tell of the status of various species in Cardiganshire. *Alnus glutinosa* is clearly a native from the palaeobotanical record, although it has been widely planted in recent times, often as var. *macrocarpa* which is probably not native in the county. *Fallopia japonica* is clearly a neophyte from the historical record. *Smyrnium olusatrum*, introduced by the Romans and an archaeophyte in Britain, is strikingly absent from those parts of the county properly occupied by the Romans, and anyway was not recorded until the 19<sup>th</sup> century; I am not aware of any archaeological evidence and it is presumably impossible to tell when and how it first got here. Might *Senecio vulgaris* var. *vulgaris* be an archaeophyte, and var. *crassifolius* be the true native, judging by their habitat preferences of synanthropic sites and sand dunes respectively?

*Asplenium ruta-muraria* and *A. ceterach* are considered native in Britain, but are virtually confined to mortared walls in the county, more so in fact than definite neophytes such as *Antirrhinum majus* and *Cymbalaria muralis*. There are no records to prove that they were present here before 1500 and they are certainly entirely reliant on Man-made habitats. Whether they were accidentally brought in to the county by Man, or their spores blew in unaided can never be told. At a county level, what is their status? Other aspects of the behaviour of a species can raise similar doubts. *Geranium lucidum*, considered native in Britain, was rare in the county in Salter's day but has spread with suspicious speed and is still confined to roadside sites, behaving just like an invasive synanthropic alien. In a case such as *Meconopsis cambrica* it seems reasonable to decide in which sites it is native and in which it is an escape from cultivation, but it is less easy, and probably impossible with, for example, *Sedum telephium*, and quite impossible with such species as *Galium odoratum* and *Malva arborea*. Some species not likely to have spread from cultivation such as *Hyacinthoides non-scripta* or *Mercurialis perennis*, are common in many hedgerbanks constructed in the 18<sup>th</sup> and 19<sup>th</sup> centuries on open pasture and must have spread into this habitat, but presumably from nearby native

populations and not perhaps from outside the county as *Asplenium ruta-muraria* and *A. ceterach* seem likely to have done.

In some species, such as *Poterium sanguisorba* (and the *Alnus* mentioned above), one segregate is clearly native and the other a neophyte. In others, such as *Senecio vulgaris* and *Ranunculus bulbosus*, less generally recognised segregates may show the same pattern. In the case of morphologically indistinguishable but genetically and physiologically different races, such as one gets with heavy metal resistant races of *Agrostis capillaris* on the lead mines, the pattern will probably never be fully understood as it can be detected only by laborious individual experiments. Many or most of the pasture grass and clover populations in the county are, or are derived from, genotypes introduced from other parts of Britain or from elsewhere in the world.

In the species accounts in this Flora, I have commented in many cases on the nativeness or otherwise of the taxa in the county, but decisions on the matter have often been subjective or impossible in the absence of any real evidence; I have always mentioned if a species is considered an archaeophyte in Britain (Preston *et al.* 2004). Elsewhere, for example in the chapter on phytogeography, it has sometimes been necessary for the purposes of the various analyses to make more definite decisions on native/alien status, or simply to follow the *New atlas* (Preston *et al.* 2002).

### Tree measurements and aging

Measurements of girth and height of trees are given in many cases in the species accounts, partly for their intrinsic interest and partly to encourage re-measuring of the same trees in the future. The maximum measurements for most species are given, usually at the end of each account, and a summary is provided in Appendix 1. The usual conventions have been followed (Johnson 2003), girth being taken at 1.5m above ground level; where this would be misleading, the height at which it was taken is given, usually the narrowest point within reach of the ground. Much more attention has been given to girth than to height, as the latter is often less easy to measure and, in a windswept county such as this, is likely to be much more affected by local exposure or situation.

There is much interest in the age of big trees. The rule of thumb that most trees growing in the open increase in girth by about 2.5cm a year probably holds good as a broad generality; trees in dense shade in a wood, in exposed coastal situations or at high altitudes grow much more slowly. Poplars and many conifers grow much more quickly. Yews mostly grow more slowly, and much more slowly with age. There have been various attempts to precisify the calculations with formulae for particular species (eg. White 1994), but so many allowances have to be made for local conditions, and there is so much demonstrable variation, that I have refrained from attempting to give ages for trees in this Flora except where the annual rings have been counted or the date of planting is known. Appendix 2 gives a summary of such available information, and indicates how much variation there is in growth rates. Repeat measurements given in some of the species accounts also give an indication of growth rates.

There are many other pitfalls in aging trees. Sometimes, as with the biggest Beeches at Hafod, they were bunch-planted to give a quick impression of age; whether this was done with Yews in the county is uncertain, and probably only DNA analysis of the trees in Llandre churchyard for example would determine whether they are the separate parts of one very ancient tree or a broken-up bunch-planted one. A tree now in the open may have had woodland around it when young, or vice versa, so distorting its expected growth rate. A tree for which one has a planting date may have been replaced at a much later date. Even when a tree is felled, the annual rings may be difficult to count, and, especially with Yews, the trunk may be hollow and it is unsafe to extrapolate from a countable part of the radius as the growth rates change so much with age. As Hagender (2007) indicates, it is not reliable to measure a Yew and calculate its age by any formula; although graphs can be used to age substantial populations (which we do not have in Cardiganshire), any individual Yew can deviate enormously from the average. The same applies to other species. The histograms I give in the account of Oaks in what appear to be even-aged populations, which may or may not be the case but looks likely, probably indicate the ranges of girths possible in trees of the same age.

### Interpretation of the maps

The accompanying coincidence map of all the species (overleaf) gives an idea of the coverage achieved, and while this coverage is enough to give a generally valid picture of the distributions, it makes no pretence to be anywhere near complete. The maps of nearly ubiquitous species such as *Agrostis capillaris* or *Urtica dioica* also give an idea of the coverage. A good deal of deliberate tetrad recording has been done, but it has not been the major aim of this Flora project. An understandable concentration on interesting sites and habitats



means that the distributions of the rarer species are probably fairly accurate, while those of the commoner ones are often undoubtedly somewhat incomplete.

The maps in this Flora cannot in general be used to measure decrease or increase of taxa over time. Because so many old records cannot be localised with enough certainty, and because there has been such an increase in recording in recent decades, the maps rarely give much idea of decrease, and because of the way in which the symbols are used, with the more recent records over-riding any older ones, they can unfortunately give no idea of increase. In only a few cases, such as *Antennaria dioica* or *Gentianella campestris*, where there are unusually detailed old records, is decrease as obviously apparent from the maps as it is from the actual records. In other cases, for example *Vicia orobus*, there are more post-1950, and indeed post-1970 records, than pre-1950 or pre-1970 ones, but it is very unlikely to have really increased.

Because of the pattern of recording, the two more recent date classes sometimes give a spurious impression of decline. This is especially so in the case of the Holmes records of aquatics along the Teifi in the 1970s, as if this survey were to be repeated now, all or most of his records could probably be updated. The maps of taxa such as the *Dactylorhiza* species, in particular of *D. fuchsii*, appear to show a decline that may be largely an artefact of the shortness of the season when identification is easy. Other maps, such as that of *Equisetum palustre*, can also suggest decreases that are unlikely to be real. In the case of *Hieracium*, an inordinate amount of the recording was done between 1970 and 1986 and the apparent decrease is certainly very misleading.

It should be noted that the term “sites” in the text refers to a restricted locality, more than one of which may occur in a tetrad, so that, for example, a taxon said to occur in ten sites may show only six tetrads on the map; conversely, one site may overlap into two or more tetrads.

### Vice-county boundary

The Vice-county system divides Britain into a series of stable units of generally similar size, and is widely used for the purposes of biological recording. In Wales these units are roughly equivalent to the modern counties, but their boundaries were based on the county boundaries of the 1850s and are never changed. This Flora is of the Vice-county of Cardiganshire, and so omits that part of modern Ceredigion W of the Teifi estuary and NW of St Dogmaels which is in the Vice-county of Pembrokeshire. This, and the six other places where there are similar but very small differences between the Vice-county and the modern county, are shown on the maps in Fig. 5. The neighbouring vice-counties are shown in Fig. 4.

At the mouth of the Teifi estuary, the partially vegetated shingle spit at the SW corner of the Penyr-ergydd dunes has extended in recent decades south-westwards across the VC boundary, so that the tip of the spit is now in VC 45, Pembrokeshire (see Fig. 6). I have nevertheless considered this area of  $c.20 \times 20$  m to be *de facto* part of Cardiganshire, and its inclusion in the Flora makes no significant difference.

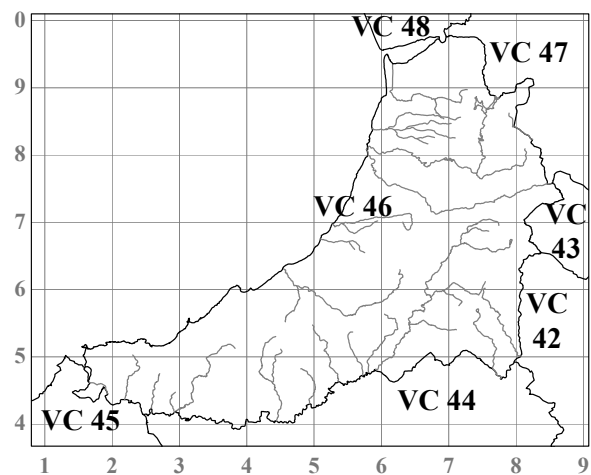
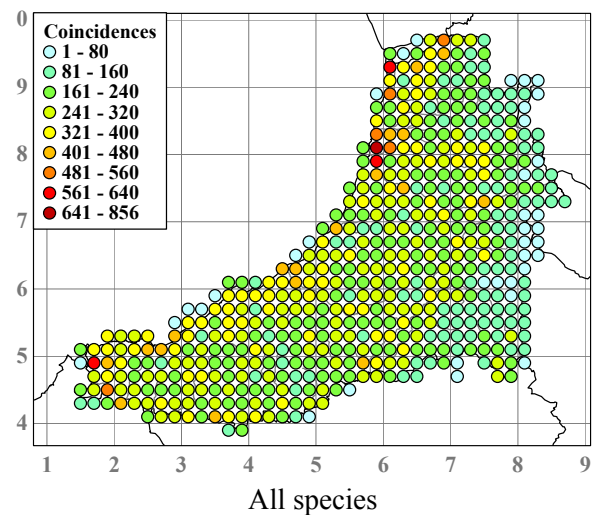
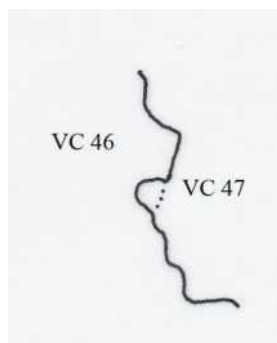
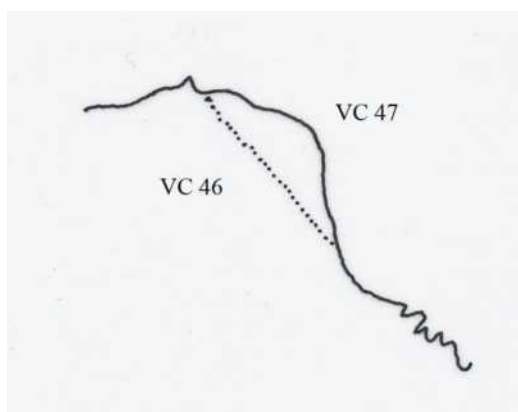


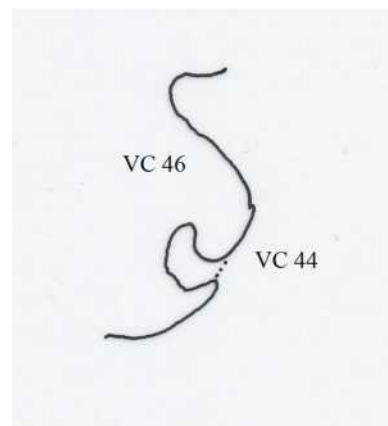
Fig. 4: Vice-counties adjoining Cardiganshire



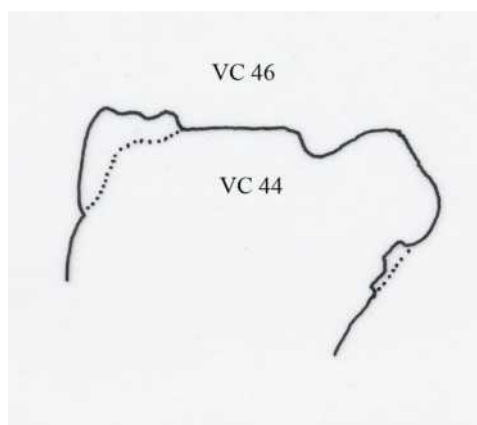
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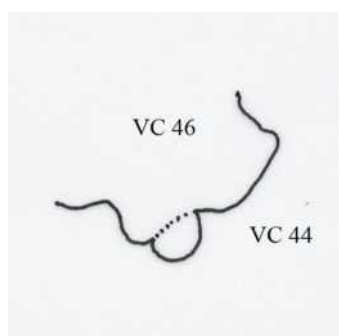
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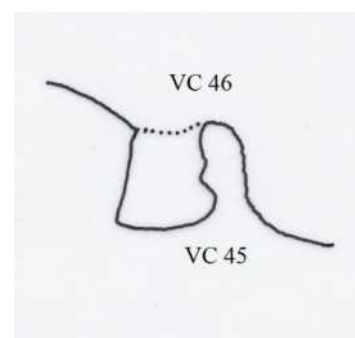
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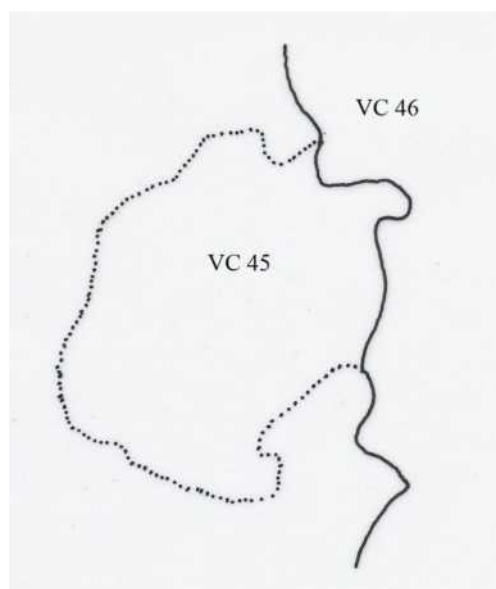
SN422418 and SN432414  
1:25,000



SN253413  
1:25,000



SN226433  
1:25,000



SN153470  
1:50,000

Fig. 5: Sites where the VC 46 county boundary (thick lines) differs from the modern administrative county boundary (dotted lines)



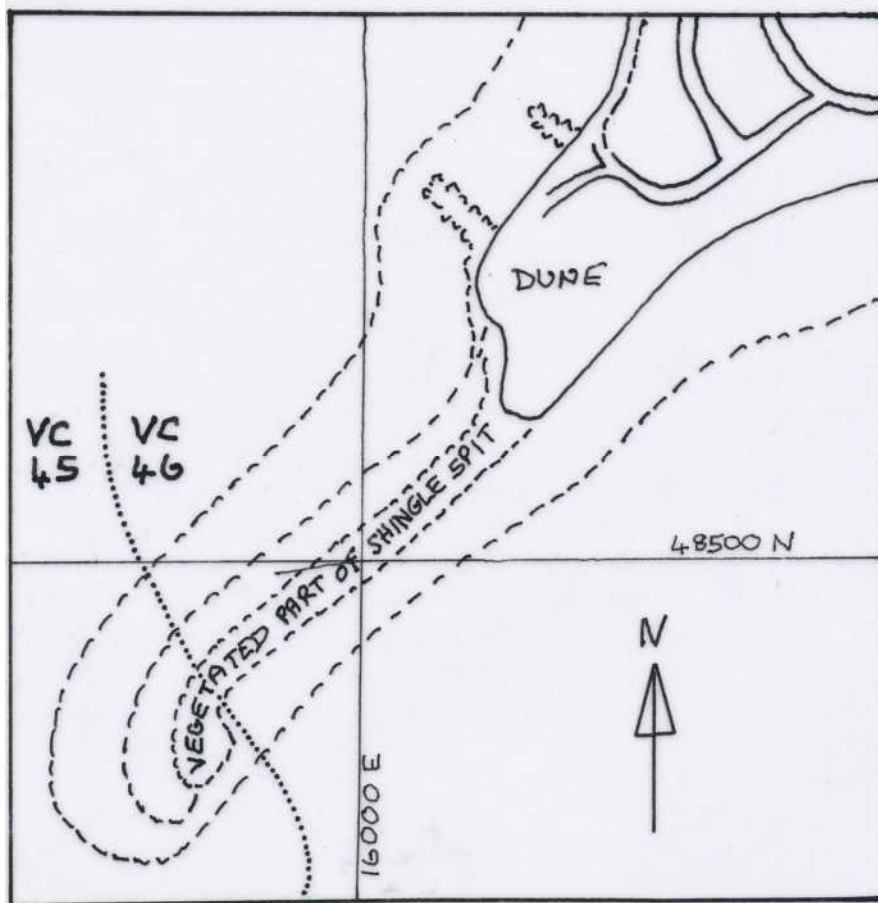


Fig. 6: VC boundary at the Penyrergyd shingle spit SN160485, 2009, 1:2,000

### Place names

Wmffre (2004) provides a magnificent amount of information on the place names in the county, and discusses many that have or may have with varying degrees of probability been derived from plant names. Only some of the more interesting and definite of these have been included in this Flora, and such words as Afallen (Apple), Banadl (Broom), Bedwen (Birch), Brwynen (Rush), Celyn (Holly), Cerdinen (Rowan), Collen (Hazel), Derwen (Oak), Draenen (Thorn), Eithinen (Gorse), Grug (Heather), Gwernen (Alder), Helygen (Willow), Meillionen (Clover), Onnen (Ash) and Rhedynen (Bracken) are too common as elements in names to be mentioned here.

### Folk medicine and folklore

Most of the references to folk medicines in the county in Allen & Hatfield (2004) cited here were taken from a survey carried out by A. Williams in 1977-1989. I have added some possibly less genuinely folk ones from personal contacts and other published sources, and have ignored the vast amount of unsourced information of general Welsh application.

### Diseases, teratology, etc.

Fungal diseases, galls and leaf mines are occasionally mentioned when they are particularly conspicuous, or when their occurrence in the county can be related to some major national spread. A few teratological specimens are illustrated for purely decorative reasons.

## 12. Abbreviations of recorders and determiners cited in the Flora

Names in italics are of determiners and referees rather than of cited field recorders. Many other recorders of course also acted as determiners or referees.

AB	A. Busby	BHo	B. Hopkins	DGr	D. Green
ABGA	A.B.G. Averis	BI	B. Ing	DHK	D.H. Kent
ABP	A.B. Pinkard	BJ	B. Jonsell	DJMcC	<i>D.J. McCosh</i>
AC	<i>A. Culham</i>	BL	B. Lloyd	DJPB	D.J.P. Barker
ACJ	A.C. Jermy	BM	<i>B. Matfield</i>	DKR	D.K. Reed
ACL	<i>A.C. Leslie</i>	BS	B. Seddon	DLK	D.L. Kelly
ACP	A.C. Pigott	BSc	B. Scotter	DMcC	<i>D. McClintock</i>
ACW	A.C. Williamson	BSW	<i>B.S. Wurzell</i>	DMM	<i>D.M. Moore</i>
ADB	A.D. Bradshaw	BTS	<i>B.T. Styles</i>	DOB	D.O. Baylis
ADF	A.D. Fox	BW	B. Wootton	DP	D. Powell
ADH	A.D. Hale	CAS	C.A. Stace	DPS	D.P. Stevens
ADQA	A.D.Q. Agnew	CASm	C.A. Small	DPSp	D.P. Spicer
AE	A. Enoch	CB	C. Bott	DRGH	D.R.G. Haigh
AEW	A.E. Wade	CBa	C. Bannister	DRL	D.R. Lloyd
AFM	A.F. Mitchell	CC	C. Chatters	DRMcK	<i>D.R. McKean</i>
AGB	A.G. Bates	CCB	C.C. Babington	DT	D. Thomas
AHB	A.H. Burt	CDP	C.D. Preston	DW	D. Williams
AHC	A.H. Church	CDPa	C.D. Palmer	DWB	D.W. Bloodworth
AID	<i>A.I. Denholm</i>	CDPi	<i>C.D. Pigott</i>	DWe	D. Welch
AJ	A. Jones	CE	C. Evans	EBB	E.B. Bishop
AJB	A.J. Barker	CEH	C.E. Hubbard	EBBe	E.B. Benson
AJC	<i>A.J. Coombes</i>	CF	C. Fuller	EBL	E. Boyes Lee
AJR	<i>A.J. Richards</i>	CJH	<i>C.J. Humphries</i>	EC	E. Cloutman
AJS	A.J. Silverside	CM	C. Moscrop	ECN	<i>E.C. Nelson</i>
AJW	<i>A.J. Wilmott</i>	CMFB	C.M. Forster Brown	ECW	<i>E.C. Wallace</i>
AKKAAI-B	<i>A.-K.K.A. Al-Bermani</i>	CMM	C.M. Mockridge	EEJ	E.E. Jones
AL	A. Ley	CMO	C.M. Overton	EF	E. Forster
ALP	<i>A.L. Primavesi</i>	CN	C. Newbold	EG	E. Greenwood
AM	A. Moorby	CO	C. Oldham	EGD	E.G. Davies
AMcGS	A.McG. Stirling	CRB	C.R. Boon	EGV	E.G. Verge
AMe	<i>A. Melderis</i>	CRF-J	C.R. Fraser-Jenkins	EHC	E.H. Chater
AMP	<i>A.M. Paul</i>	CS	<i>C. Stapleton</i>	EJC	<i>E.J. Clement</i>
AN	A. Newton	CSa	C. Sargent	EJMcD	E.J. McDonnell
ANB	A.N. Barnard	CTG	C.T. Guile	EJT	E.J. Thomas
ANGF	A.N.G. Fordham	CVBM	C.V.B. Marquand	EKW	E.K. Winterhalder
AO	A. Orange	CW	<i>C. West</i>	EL	E. Lees
AOC	A.O. Chater	CWH	C.W. Helliwell	EMF-W	E.M. Fleming-Williams
AP	A. Parry	DAP	D.A. Pearman	EMM-J	E.M. Marsden-Jones
APa	A. Parker	DAR	D.A. Ratcliffe	EN	E. Nelmes
APC	A.P. Conolly	DAS	D.A. Simpson	EP	E. Pratt
APF	A.P. Fowles	DAW	D.A. Wells	ER	<i>E. Rozins</i>
APo	A. Polkey	DAWe	<i>D.A. Webb</i>	ES	E. Straker
ARP	A.R. Parquer	DB	D. Broughton	ESE	E.S. Edees
ASL	A.S. Lewis	DCB	D.C. Boyce	ESG	<i>E.S. Gregory</i>
ATJ	A.T. Jones	DCL	D.C. Lang	ESM	E.S. Marshall
AW	A. Wilson	DD	D. Davies	ETT	E.T. Thomas
AWM	A.W. Morris	DDB	D.D. Bartley	EWBHM-R	E.W.B.H. Milne-Redhead
BAM	<i>B.A. Miles</i>	DEA	D.E. Allen	FCJ	F. Campbell James
BES	<i>B.E. Smythies</i>	DEdeV	D.E. de Vesian	FD	F. Druce
BF	B. Fox	DEG	D.E. Green	FE	F. Evans
BH	B. Harrison	DET	D.E. Thomas	FH	F. Horsman
BHa	<i>B. Harold</i>	DG	D. Guest		
		DGJ	D. Glyn Jones		



FHP	F.H. Perring	IKM	I.K. Morgan	JWH	J.W. Harvey
FJR	F.J. Rumsey	IMC	I.M. Cross	JWL	J.W. Long
FK	F. Krahulec	IMV	I.M. Vaughan	JWMcI	J.W. McIntosh
FMS	F.M. Slater	IS	I. Smith	KA	<i>K. Ashburner</i>
FN	F. Newbery	ISF	I.S. Francis	KAH	K.A. Humphries
FR	F. Rose	IT	I. Tillotson	KAP	K.A. Pryce
FRi	F. Rilstone	IW	I. Weston	KC	K. Callan
FS	F. Smith	IWC	I.W. Callan	KCa	K. Catley
FWT	F.W. Thompson	JA	J. Allwood	KD	K. Dale
GCD	G.C. Druce	JAC	<i>J.A. Crabbe</i>	KH	K. Heppingstall
GCES	G.C.E. Scudder	JAG	J.A. Green	KHo	K. Hopkins
GD	G. Driver	JAM	J.A. Martin	KL	K. Lewis
GDK	<i>G.D. Kitchener</i>	JAW	J.A. Whellan	KNAA	K.N.A. Alexander
GDR	<i>G.D. Rowley</i>	JAWe	J.A. Webb	KP	K. Pollock
GEW	G.E. Wickens	JB	J. Bevan	KPe	K. Perry
GGG	<i>G.G. Graham</i>	JBa	J. Ball	KR	<i>K. Rostański</i>
GH	G. Harrison	JCB	<i>J.C. Bowra</i>	KTo	K. Towers
GHa	G. Halliday	JCW	J.C. Willis	KT	K. Trewren
GHu	G. Hutchinson	JE	J. Evans	LC	L. Carvalho
GJ	G. Jones	JED	<i>J.E. Dandy</i>	LCu	L. Cumming
GKW	G.K. Watson	JEDa	J.E. Davies	LMS	<i>L.M. Spalton</i>
GL	G. Long	JEGG	J.E.G. Good	LN	L. Newton
GM	G. Murrell	JEH	J.E. Halfhide	LRG	L.R. Gander
GME	G.M. Evans	JEL	J.E. Lousley	LW	L. Wilberforce
GMK	G.M. Kay	JF	J. Fryer	MB	M. Bailey
GO	G. Owen	JFH	J.F. Hall	MBr	M. Bromley
GP	G. Powell	JGW	J.G. Williams	MC	M. Chater
GR	G. Rees	JH	J. Hedger	MCH	M.C. Holland
GRW	G.R. Willan	JHi	J. Higgins	MD	M. Dean
GS	G. Saunders	JHu	J. Hunt	MDS	M.D. Sutton
GT	<i>G. Taylor</i>	JK	<i>J. Kirschner</i>	ME	M. Evans
GTG	G.T. Goodman	JL	J. Lewis	MED	M.E. Davies
GW	G. Williams	JLW	J. Lloyd Williams	MEI	M. Elliott
GWS	G.W. Sandys	JM	J. Moore	MFW	<i>M.F. Watson</i>
HAH	H.A. Hyde	JMC	<i>J.M. Camus</i>	MGD	<i>M.G. Daker</i>
HAMcA	<i>H.A. McAllister</i>	JML	J.M. Lambert	MGS	<i>M.G. Shivas</i>
HB	H. Bailey	JND	J.N. Davies	MH	M. Heath
HC	H. Clarke	JOM	J.O. Mountford	MHB	M.H. Bigwood
HG	H. Godwin	JP	J. Percival	MJ	M. Johnes
HJ	H. Jones	JPB	J.P. Bailey	MJG	M.J. Godfery
HJMB	H.J.M. Bowen	JPC	J.P. Curtis	MJS	<i>M.J. Southam</i>
HJR	H.J. Riddelsdell	JPL	J.P. Lyons	MJW	<i>M.J. Wilkinson</i>
HLJ	H. Lewis Jones	JPP	J.P. Poland	MK	M. Kerr
HM	H. Moseley	JPS	J.P. Savidge	MLL	M.L. Lewes
HMM	H.M. Montford	JPW	J.P. Woodman	MMA	M.M. Atwood
HMR	H.M. Rickard	JRA	J.R. Akeroyd	MNL	M.N. Lawley
HMV	H.M. Vaughan	JRAb	J.R. Abbott	MP	M. Porter
HO	H. Ovens	JRE	<i>J.R. Edmondson</i>	MPa	M. Patterson
HW	H. Williams	JRG	J.R. Gates	MPo	M. Podsiedlik
HWP	H.W. Pugsley	JRP	J.R. Palmer	MRD	M.R. Davies
IAW	I.A. Williams	JS	J. Stacey	MSP	<i>M.S. Porter</i>
ID	I. Davies	JSa	J. Sawtschuk	MT	M. Teneva
IF-W	I. Fleming-Williams	JSp	J. Spikes	MW	M. Wainwright
IH	I. Henning	JT	J. Turner	MWa	M. Walter
IHB	I.H. Burkill	JTh	J. Thomas	NFS	N.F. Stewart
IJB	I.J. Bennallick	JTi	J. Timberlake	NG	N. Gale
IKF	<i>I.K. Ferguson</i>	JV	J. Valentine	NJ	N. Jones

NKBR	<i>N.K.B. Robson</i>	RFJ	<i>R.F. John</i>	SME	S.M. Edwards
NP	N. Penford	RFT	R.F. Towndrow	SMW	S.M. Walters
NRT	N.R. Thomas	RFU	R.F. Uglow	SPC	S.P. Chambers
NT	N. Taylor	RG	R. Griffiths	TA	T. Allenby
NTHH	N.T.H. Holmes	RGE	R.G. Ellis	TAC	<i>T.A. Cope</i>
PA	P. Amies	RGL	R.G. Liford	TAL	T.A. Lovering
PAS	P.A. Smith	RGW	R.G. Woods	TAS	T.A. Stephenson
PAW	P.A. Wolseley	RH	R. Hooper	TAWD	T.A.W. Davis
PB	P. Bullard	RHR	R.H. Roberts	TBR	<i>T.B. Ryves</i>
PBu	P. Burnham	RHY	R.H. Yapp	TCGR	T.C.G. Rich
PCh	P. Challinor	RJC	R.J. Cooke	TD	T. Doidge
PCH	P.C. Hall	RJG	<i>R.J. Gornall</i>	TDD	T.D. Dines
PCu	P. Culyer	RJM	<i>R.J. Murphy</i>	TDP	<i>T.D. Pennington</i>
PD	P. Dalley	RJP	R.J. Pankhurst	TG	T. Goss
PDM	P.D. Moore	RJW	R.J. Williams	TGT	<i>T.G. Tutin</i>
PDS	P.D. Sell	RJWi	R.J. Wistow	THB	T.H. Blackstock
PED	P.E. Davis	RKB	R.K. Brummitt	TJE	T.J. Evans
PFY	<i>P.F. Yeo</i>	RL	R. Laidlaw	TP	T. Pankhurst
PGB	P.G. Barnes	RLa	R. Lawton	TR	T. Rhodes
PH	P. Hampson	RLe	R. Lewis	TS	T. Stephenson
PHO	P.H. Oswald	RM	R. Maskew	TT	T. Teearu
PHR	<i>P.H. Raven</i>	RMa	R. Mackechnie	TTE	<i>T.T. Elkington</i>
PJA	<i>P.J. Acock</i>	RMe	R. Meade	TWB	T.W. Barker
PJOT	<i>P.J.O. Trist</i>	RMel	R. Melville	VE	V.G. Ellis
PJP	P.J. Panting	RMP	<i>R.M. Payne</i>	VL	V. Lewis
PJW	P.J. Wilson	RMW	R.M. Walls	VMC	V.M. Conway
PM	P. MacPherson	RNT	R.N. Thompson	WAS	W.A. Sledge
PMB	P.M. Benoit	RO	R. Osborne	WASt	W.A. Strange
PMH	P.M. Hall	RP	R. Payne	WB	W. Bleeker
PMS	<i>P.M. Smith</i>	RPB	R.P. Bray	WBT	W.B. Turrill
PMSt	P.M. Stirling	RR	R. Richards	WCB	W.C. Barton
PS	P. Saunders	RST	R.S. Thomas	WED	W.E. Davey
PSC	P.S. Condry	RVL	R.V. Lansdown	WF	W. Fojt
PSG	<i>P.S. Green</i>	RWD	R.W. David	WGGL	W.G.G. Loyn
PSJ	P.S. Jones	SA	S. Andrews	WGS	W.G. Smith
PT	<i>P. Taylor</i>	SAF	<i>S.A. Filfilan</i>	WHD	W.H. Darby
PWC	P.W. Carter	SAR	<i>S.A. Renvoize</i>	WHP	W.H. Painter
PWD	P. Walters Davies	SB	S. Byrne	WMC	W.M. Condry
PWR	P.W. Richards	SBE	S.B. Evans	WMcC	W. McCarthy
QONK	<i>Q.O.N. Kay</i>	SCH	S.C. Holland	WMJ	W. Miall Jones
RAJ	R.A. Jones	SCS	S.C. Shaw	WMR	<i>W.M. Rogers</i>
RAS	R.A. Spencer	SCW	S.C. Watkins	WOF	<i>W.O. Focke</i>
RB	R. Bamford	SDSB	S.D.S. Bosanquet	WPH	<i>W. P. Hiern</i>
RBi	R. Birch	SG	S. Glinski	WPT	W.P. Taylor
RBo	R. Bowen	SJT	S.J. Thomas	WRR	W.R. Roberts
RDM	<i>R.D. Meikle</i>	SK	S. Kington	WTS	<i>W.T. Stearn</i>
RDP	R.D. Pryce	SLNS	S.L.N. Smith	WWB	W.W. Boucher
RDR	<i>R.D. Randall</i>	SM	S. Morley		



### 13. Species Accounts

#### Explanatory notes

**Geographical coverage** is of the Watsonian Vice-county 46, Cardiganshire, which, apart from a small area west of the Teifi below Cardigan and a few minute areas further up the river and one on a tributary of the Rheidol, corresponds with the present county of Ceredigion (see p.176).

**Species coverage** is of all native and alien vascular plant species that occur in the wild or in other generally accessible places. Crop plants and forestally planted trees are covered as far as possible. Street trees and trees and shrubs planted in the wild or in public places are also generally included (though I have favoured some groups such as Poplar cultivars and Japanese Flowering Cherries, and have rather ignored others such as Apples and Cypressess). Trees and to some extent shrubs in estates and the larger gardens that may at least occasionally be opened to the public are mostly included, and I have rather taken the stance of the 18<sup>th</sup> century travellers in hoping that landowners with interesting trees may be proud enough of them to allow petitioning and well-behaved botanists and other visitors to inspect them. Most of the sites mentioned are of course on private land and require the owners' permission to visit.

**Nomenclature and taxonomy** generally follow Stace (2010), but in many cases, particularly for infraspecific taxa, I have preferred to follow Sell & Murrell (1997-2009) and I have occasionally followed some other authority (see section on "Relative taxonomies" p.174).

**Synonyms** have been given only to make clear what any generally unfamiliar names not in the above refer to; all names used by Salter have been included, as well as others of importance that have been used in the published records and other literature on the county.

**Vernacular names** are taken from the list of recommended English names on the BSBI website, from Stace (2010) and from the list of Welsh names in Bebb-Jones *et al.* (2003). English names for taxa not covered by the former have been taken from other sources, chiefly Sell & Murrell (1997-2009) and Johnson (2003), and are given in brackets. A selected few additional Welsh names that can be reasonably confidently applied to particular taxa recognised in this Flora, given for the county by Awbery (1995), are also added in brackets.

**Localities** are generally listed from north to south, except when, as in the case of many aliens or rarities, it is more interesting to list them chronologically.

**Grid references** follow place names, without a comma, and are given as accurately as possible, and may be in the form SN58 (the 10km square), SN58V (the tetrad or 2 × 2km square), SN5881 (the 1km square), or SN591808 (the 100m square); it can be assumed that all grid references for pre-1950 records have been retrospectively created by me from all the available information, and thus for example many given for localities in Salter's Flora have been derived from the greater detail given in his diaries. The whole county is within the 100 × 100km square SN. The tetrad lettering follows the standard convention (right). It should be noted that sites are not equivalent to tetrads; there may be more than one site in a tetrad, and one site may overlap two or more tetrads.

E	J	P	U	Z
D	I	N	T	Y
C	H	M	S	X
B	G	L	R	W
A	F	K	Q	V

**Dates not in brackets** in the text normally refer to the date(s) of the record(s); it can usually be assumed that where a recent date is given, there is no reason to believe that the plant is not still present, and only if it is clearly stated can it be assumed that it has disappeared. General statements in the present tense can, depending on context and unless otherwise qualified, normally be taken to refer to the period from 1987 to 2009.

**Dates in brackets** refer to references (see References and Bibliography).

**Initials in brackets** but not in bold type refer to recorders or to those who have determined or confirmed the material (see p.179); all records without any such initials are by the author, A. O. Chater. An ampersand is used when recorders were together, for example (SPC & AOC), and a semi-colon when they recorded separately on separate occasions (SPC; AOC). The names of the following recorders are given unabbreviated, as are a very few others who have made only single, mostly early records: Littleton Brown, Llwyd (Edward Llwyd or Lhuyd), Morgan (T. O. Morgan), Purchas (W. H. Purchas), Ray (J. Ray), Salter (J. H. Salter), Smith (J. E. Smith).

**Acronyms in bold type** refer to herbaria (see Kent & Allen 1984), and indicate that voucher specimens are, or, in the case of some recent collections, will be at the end of this project, found in that herbarium (mostly that of the National Museum Wales, **NMW**). Such vouchers are usually cited only for the more critical or less common species or where it may be helpful for the reader to know where an identification can be checked. A great deal more material from the county can of course be found in these and other herbaria.

<b>ABS</b>	Aberystwyth University, IBERS
<b>BIRM</b>	University of Birmingham, School of Biosciences
<b>BM</b>	Natural History Museum, London
<b>CGE</b>	University of Cambridge, Department of Plant Sciences
<b>E</b>	Royal Botanic Garden, Edinburgh
<b>Herb.</b>	Personal herbarium
<b>K</b>	Royal Botanic Gardens, Kew
<b>LANC</b>	Lancaster University, Department of Biological Sciences
<b>LINN</b>	Linnean Society of London
<b>LTR</b>	University of Leicester, Department of Biology
<b>MANCH</b>	Manchester Museum
<b>NMW</b>	National Museum Wales, Cardiff
<b>OXF</b>	University of Oxford, Department of Plant Sciences
<b>RNG</b>	University of Reading, School of Plant Sciences
<b>SHYB</b>	Shrewsbury School, Biology Department
<b>WOS</b>	Worcester City Museum and Art Gallery
<b>WPBS</b>	Aberystwyth University, Plas Gogerddan, WPBS/IBERS

**Dimensions** of leaves, etc. are given in the form: 20-30 × 5-7cm, length preceding width.

**Colours** are sometimes described using the *RHS colour chart*, 2001, in the form: RHS182A.

**Quotations**, in inverted commas, are reproduced in the form of the originals, and variant place names, spelling errors, etc. are only corrected, in square brackets, where they might cause confusion.

**First records** are usually given, where possible, for aliens, but not for natives unless they are especially rare or when there is some other particular reason. As the early lists, notably those in Morgan (1848-1874), are either so unreliable or contain so many unlocalised records, there usually seemed little point in trying to highlight the earliest.

**Dates of introduction** to Britain are given for alien trees and shrubs, taken from standard sources such as Bean (1976-1998) and Johnson (2003).

**Maximum dimensions** in the county of trees are given, like everything else in the Flora, simply to the best of my present knowledge. The usual conventions are followed, girth being measured at 1.5m from the ground, unless this is impossible or misleading (see above). Appendix 1 acts as an index to these details.

**Altitude limits**, rounded down to the nearest 5m, are given for as many of the species as possible that ascend to 300m or more. They were one of Salter's particular interests (1928a) and, partly for this reason, and partly in case there are signs of any change, pre- and post-1950 measurements are given separately. Lower limits are occasionally given where they are of special interest. The table in Appendix 3 acts as an index to the upper limits, greater details of which can be found in the relevant species accounts.

**Maps** are based on tetrad (2 × 2km square, see above) records and were created using Dr Alan Morton's DMAP for Windows. They are in general given only for taxa that occur in too many tetrads to be listed in the text. **Black** symbols indicate 1987-2009 records, **grey** symbols 1970-1986 records, and **white** symbols pre-1970 records. Unless otherwise stated, **circles** indicate native status; **triangles** indicate alien status, which may be archaeophyte or neophyte, naturalised, casual or self-sown (but not just planted); and **squares** indicate just planted status, neither self-sown nor naturalised, and can generally be assumed to be all post-1986. In some cases where the status of some or many of the records is impossible to judge, circles may include planted or naturalised occurrences, or triangles may include just planted occurrences, but this is always indicated in the text. Old records are normally only mapped if they can confidently be assigned to a particular tetrad, and many are therefore missing from the maps; Salter in particular often gave such generalised localities as "Ceri valley", which could be in any of twelve tetrads so the record in such a case is unmappable. Where a good guess can be made, however, a question mark (always referring to a pre-1970



record) is placed in the tetrad. In any one tetrad, more recent records naturally replace older ones. Maps are labelled only when the taxon involved is not obvious from the map's position, or when some explanation of the content is needed that is not given in the text.

	Native (unless otherwise stated in the text)	Alien (naturalised, casual or self-sown, unless otherwise stated in the text)	Planted, but not self-sown or naturalised	Approximate tetrad
1987-2009	●	▲	■	
1970-1986	○	△		
pre-1970	○	△		?

Key to symbols on maps

**Illustrations** are chiefly of species in their habitats, or just of their habitats, often showing the plants under conditions of stress of weather or climate that may affect their distribution, or showing unusual or local features of the species. Close-ups of healthy plants in flower tend to be similar in all counties and are readily available elsewhere.

#### Miscellaneous abbreviations

ADAS	Agricultural Development and Advisory Service	NNR	National Nature Reserve
<i>BEC rep.</i>	Botanical Exchange Club reports	NT	National Trust
BP	before present	OS	Ordnance Survey
<i>BLRC rep.</i>	Botanical Locality Record Club reports	<i>Proc. BSBI</i>	Proceedings of the Botanical Society of the British Isles
BPS	British Pteridological Society	RHS	Royal Horticultural Society
BRC	Biological Records Centre	RSNC	Royal Society for Nature Conservation
<i>BRC rep.</i>	Botanical Record Club reports	RSPB	Royal Society for the Protection of Birds
BSBI	Botanical Society of the British Isles	S	South
C	central	SAC	Special Area of Conservation
CCW	Countryside Council for Wales	Salter Diary	J. H. Salter's ms. natural history diaries, NLW MSS14432B-14451B
DWT	Dyfed Wildlife Trust	SSSI	Site of Special Scientific Interest
E	East	subsp.	subspecies
FC	Forestry Commission	UCW	University College of Wales
FE	Forest Enterprise	UWIST	University of Wales Institute of Science and Technology
Herb.	Herbarium	var.	variety
IBERS	Institute of Biological, Environmental and Rural Sciences	VC	Vice-county
IGER	Institute of Grassland and Environmental Research	W	West
<i>J. bot.</i>	Journal of botany	WAC	Welsh Agricultural College
LBAP	Local Biodiversity Action Plan	WIRS	Welsh Institute of Rural Sciences
MAFF	Ministry of Agriculture, Fisheries and Food	WPBS	Welsh Plant Breeding Station
MoD	Ministry of Defence	WTSWW	Wildlife Trust of South and West Wales
N	North	WTWW	Wildlife Trust West Wales
NCC	Nature Conservancy Council		
NLW	National Library of Wales		

## PTERIDOPHYTES - Ferns and Fern Allies

### LYCOPHYTES - Clubmosses and Quillworts

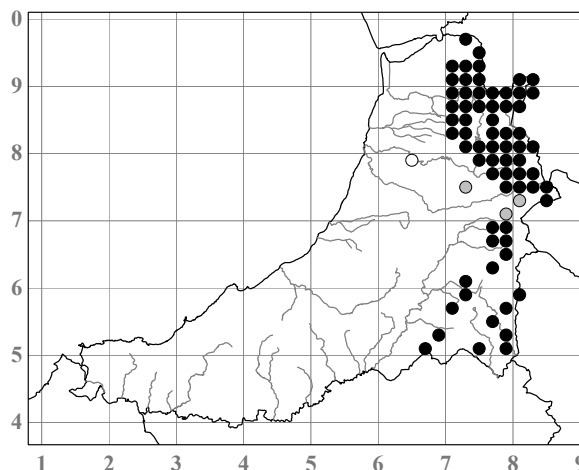
#### LYCOPODIACEAE

**Huperzia selago** (L.) Bernh. ex Schrank & Mart. (*Lycopodium selago* L.) - Fir Clubmoss - Cnwp-fwsogl Mawr

Frequent in many places in the uplands, on heathy slopes, by peaty flushes, on usually damp rock ledges, in screes and on thin peaty soils on the summit ridges. It is especially abundant on the eroded areas on the summit ridges of Pumlumon SN88D, E, etc., 2003, where reproduction is by the abundant bulbils; in spite of repeated searching, I have never found gametophytes. In exposed situations the larger plants are easily uprooted by the wind, if not by Sheep, and the best colonies are found on sheltered ledges and in screes. In several places, as at Esgair Fraith lead mine SN741911, 2004, it grows in shallow streams.

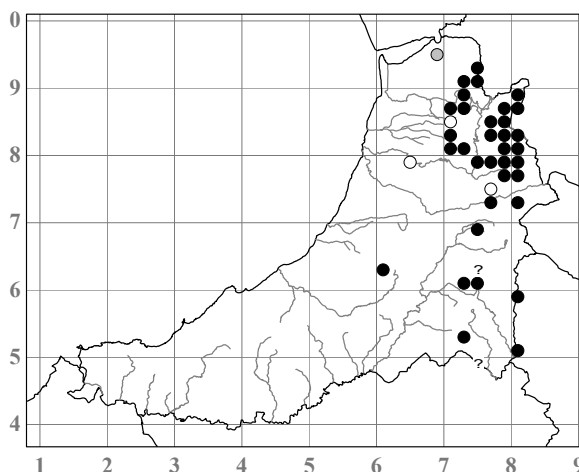
As *Muscus abietiformis*, Llwyd recorded it as one of “the plants I found at Plinlimmon” in 1682 (Chater 1984a), and other early recorders include Forster (1805) who saw it “at the sides of a mountain near Steddfa-gerrig”, i.e. Pumlumon, and Lees who described it as “Covering the banks of the turbaries on Plinlimmon. August 1837” (1838) and as “Very abundant on Plinlimmon” (1841). The lowest altitudes recorded are 65m, “at Lletty-bach (facing north), at 210ft”, presumably SN659784, 1894 (Burkill & Willis 1894); and 230m, 400m ESE of Bryn-bras farm SN750798, 1994 (AOC & JPW). Altitude limit 750m, summit of Pumlumon Fawr SN789869, 1894 (Burkill & Willis 1894); 2002, ditto.

*Huperzia selago* on summit ridge of Pumlumon SN797871, August 2007



**Lycopodium clavatum** L. - Stag's-horn Clubmoss - Cnwp-fwsogl Corn Carw

An occasional plant of grassy and heathy places in the uplands, requiring short turf or open ground yet intolerant of too much grazing. While it may well have declined considerably because of grassland improvement schemes and afforestation, it has at the same time benefited to some extent both from the disturbance of road-making and quarrying and from the protection from grazing provided by the FC. The earliest record is by Edward Llwyd in 1682 as “*Muscus clavatus fol. cupressi*”, one of “the plants I found at Plinlimmon.” Lees (1838) described it as “Covering the banks of the turbaries on Plinlimmon, August 1837” and (1841) as “Very abundant on Plinlimmon”. Burkill & Willis (1894) described it as “common ..... most frequently about the top limit of the bracken..... [*Huperzia*] and *L. clavatum* were seen at Lletty-bach [SN6578] (facing north), at 210ft. [65m] ..... *L. clavatum* was not observed above 1680ft. [510m], but probably may be found at greater







*Lycopodium clavatum*, Cors Llyn Farch  
SN60046369, July 2005

measured  $20 \times 6\text{m}$  in 2005. Among the many FC areas where it seems to have either appeared or become more abundant in recent decades are the Esgair Fraith lead mine SN7391-7491, 1991-2004, where at least five colonies are spreading; and on steep heathy or rocky banks beside FC roads and in quarries as at Nantsyddion SN773790, 1992-2002, Coed Bwlchgwallter SN770720, 1994 (SPC), by the Hirnant SN800583, 1999 (AOC & JPW) and 300m W of Llether SN72105397, 2009 (AE). Allen & Hatfield (2004) refer to Cardiganshire records of its folk use for probably kidney and throat complaints. Altitude limit 510m (Burkill & Willis 1894, see above); 690m, scattered plants in *Nardus/Festuca ovina* grassland 400m S of Pen Lluest-y-garn, Pumlumon SN80038622, 2002.

***Diphasiastrum alpinum* (L.) Holub (*Lycopodium alpinum* L.) - Alpine Clubmoss - Cnwpl-fwsogl Alpaidd**

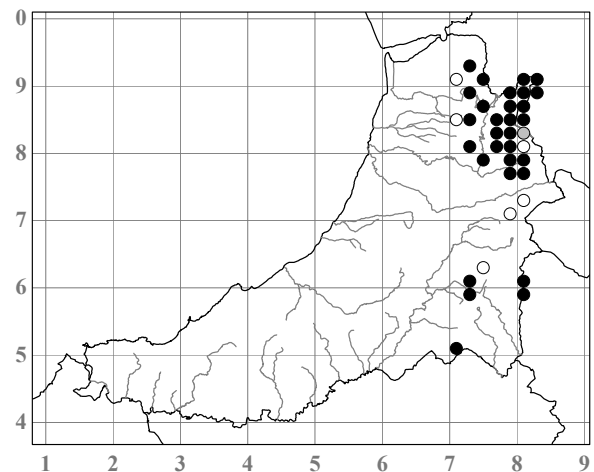
Locally abundant on the summits and higher slopes of most of the main mountains, and lower down in dry heathy areas where there is a delicate balance between little grazing pressure and lack of competition from

heights.” Salter (1935) did not indicate how common it was, and listed a dozen sites, including one near Lampeter “as low as 480 feet [145m]. W. E. Davey.” The lowest altitude it has been seen at since 1950 was at 220m, on a heathy bluff by a FC road in Cwm Einion SN695941, 1983. There is no unambiguous evidence of any overall change in its frequency over the last century or so. The most extensive recent populations have been on a steep E-facing heathy slope at Craig Ysbio SN782831, 1988-2006; on the N slope of Drybedd SN775834, 1993; and on the NE-facing steep heathy slope on Bryn Bras SN750798, 1901 (Salter Diary 22.6.1901) - 2005. There is only one small outlier away from the main uplands, on the Mynydd Bach in ungrazed *Calluna* heath at Cors Llyn Farch SN60046369, 1983 (DGJ), where a small colony has been increasing in size and

taller species. The largest and densest populations are along the very exposed ridge of Pumlumon between the main summit SN7886 and Pen Pumlumon Arwystli SN8188, where crescentic and “fairy ring” shaped colonies cover large areas. The first record was by Forster (1805) “at the sides of a mountain near Steddfa-gerrig”, and Lees (1838) said it was “Covering the banks of the turbaries on Plinlimmon.” It still occurs in most of the places where Salter knew it, and has recently colonised several lead mine and quarry sites such as the Carn Owen quarry SN73148802, 1987-2003, the FC quarry by the Hirnant SN800583, 1999 (JPW &



Advancing edge of *Diphasiastrum* colony,  
Pumlumon SN800863, August 2007



AOC) and the Eaglebrook mine SN73708924, 2004 (SDSB, TAL & AOC). Its lowest altitude was recorded by Salter (1935) as 215m (700ft) on the NE-facing slope of Bryn Bras SN750798, and it was seen there at 230m in 1994 (AOC & JPW). Altitude limit 750m, by Pumlumon Fawr summit SN789869 (Salter 1935); 740m, ditto, 2002.

## SELAGINELLACEAE

### ***Selaginella selaginoides* (L.) P. Beauv. - Lesser Clubmoss - Cnwp-fwsogl Bach**

Reaching its S limit in Britain in Cardiganshire, and occurring in five sites, often in abundance, in somewhat base-rich flushes in the valleys of the Camddwr and the Doethie and their tributaries in the SE of the county. It was first found in several flushes on Banc Hendre'r-dail SN7951 in 1968 (JPS) - 1988; there were plans c.1970 by the WWNT and NCC to move some of these plants higher up the hillside to escape the flooding of Llyn Brianne, but in the event this did not prove to be necessary. In flushes on the E bank of the Camddwr, 300m ESE of Soar y Mynydd SN787531, many hundreds of spikes were seen in 1988 (AOC & DD), but by 2004 only three were seen and in 2008 only two; the reason for the apparent decline was not obvious. Several hundred plants occur in flushes with pH6.4 along 300m of the S side of the stream W of Nant-y-graig, 1.2km NNW of Soar y Mynydd c.SN776542, 1995-2002, and it is abundant on the steep, flushed ENE-facing slope above the Camddwr 1.6km NNW of Soar y Mynydd SN777547, 1998 (AOC & JPW). It is also frequent in two flushes on the S-facing slope in the valley of the Nant y Rhiw, a Doethie tributary at SN75675346 and 75815352, 2002 (SDSB & GSM). Edward Llwyd (Chater 1984a) recorded *Muscus polyspermos*, presumably this species, as one of "the plants I found at Plinlimmon" in 1682, but there has been no record of it in that area since. *Selaginella* remains were found by Moore (1970) in Late-glacial deposits at Gors Lwyd SN858750, some 20km N of its present occurrences. Altitude limit 390m, 1.6km NNW of Soar y Mynydd SN777547, 1998 (AOC & JPW).

### ***Selaginella kraussiana* (Kunze) A. Braun - Krauss's Clubmoss - Cnwp-fwsogl Krauss**

Abundantly naturalised in a lawn at Plas Gogerddan, E of the mansion SN630838, 1975 (RGW) - 2005. Native of Tropical and South Africa and the Azores.

## ISOETACEAE

### ***Isoetes* L.**

The two species of Quillwort were not separated in the county until 1950, and the earlier records by Salter and others of *I. lacustris* may have referred to either this or *I. echinospora*. It is unsafe to identify the species on vegetative characters alone, and the sculpturing on the megaspores must always be examined. Even then, distinguishing between the two can be difficult, and not only because of the presence of hybrids. The local populations have been investigated especially in collaboration with A. C. Jermy, and voucher material has been collected from many of them. A total of 30 water bodies have contained Quillworts, and in twelve of these both species have been found. There is no obvious ecological difference between the two species in the county, both occurring in some of the most oligotrophic as well as in the more mesotrophic water bodies. Both occur with more or less equal frequency in entirely natural as opposed to dammed or artificial lakes and reservoirs. Both are commoner on stony or gravelly substrates than on peaty or silty ones, and while there is often no clear difference in the depth at which they grow, in most lakes where they grow together it is *I. lacustris* that grows deeper. As the plants often occur in deep water and sampling has of necessity been partial and occasional, the history of each species in a site is usually uncertain. In two natural lakes though it seems certain that the species present has changed, in both cases *I. lacustris* replacing *I. echinospora*. In Llyn Berwyn SN744571 *I. echinospora* was very abundant in 1990 (BM) but had been replaced by equally abundant *I. lacustris* and possible hybrids by



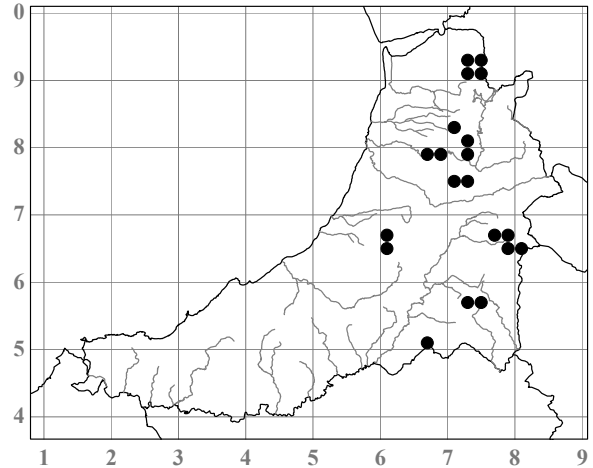
*Isoetes echinospora* (left), *I. lacustris* (right) and *Luronium* in flower, Llyn Teifi, SN780672, July 1989



2000 (**BM**, AOC & RDP) – 2007 (**BM**, AOC & ACJ); liming of this lake (which is completely surrounded by conifer plantations and which had lost most of its fish and flora) to improve the fishing had been going on since well before 1990. In Llyn Gynon SN7964-8064, in open moorland where there has been no interference, *I. echinospora* was recorded in 1964 (Seddon 1972), 1984 (**BM**) and 1989, but in 1998 (**BM**, AOC & JPW) only *I. lacustris* could be found. In Llyn Pendam SN707837 where both species and their hybrid were present in 1997, only *I. echinospora* could be found in 2007 (**BM**, AOC & ACJ) and 2008. In the other ten sites where both occur they have either coexisted for several decades, or their history is uncertain.

#### ***Isoetes echinospora* Durieu - Spring Quillwort - Gwair Merllyn Bach**

First recorded in 1950 from Llyn Dwfn ["Bwfa"] SN739926 (GEW, Wade 1952, Hyde & Wade 1969), *I. echinospora* has now been recorded from 26 lakes and reservoirs, and from 12 of these *I. lacustris* has also been reliably recorded. *I. echinospora* is perhaps the more invasive species as it is the one that was present in 1990 in a gravel pit dug out in 1969 at Glanrhyd-ty-noeth, Capel Bangor SN665785 (**NMW**), and when the Cwm Rheidol Reservoir SN695795 was drained in 1991 a dense 2 acre lawn of young plants of it developed on the bare mud (**NMW**). It seems to have arrived in Llyn Frongoch SN722751 between 1989 and 1995, in which latter year it was abundant in the SE bay, and in Llyn Conach SN740928 between 2001 and 2006, when a very few plants were seen at the SE corner (**NMW**, AOC & JPW). In Llyn Fanod SN604644 it unusually generally grows in deeper water than *I. lacustris*, 1989 (**BM**), but the two are often mixed together. Altitude limit 435m, Llyn Hir and Llyn y Gorlan SN76Y, 1989 (**BM**); Llyn Berwyn SN744571, 1990 (**BM**).

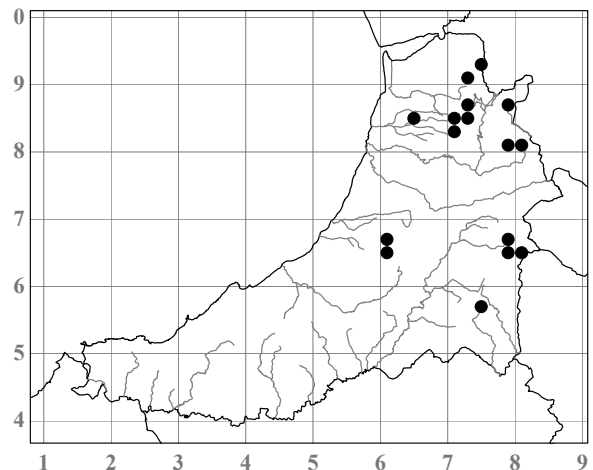


#### ***Isoetes* × *hickeyi* W. C. Taylor & Luebke (*I. echinospora* × *lacustris*)**

Plants collected by ACJ & AOC from Llyn Pendam SN709839 in 1997 at 345m altitude, Llyn Nantycagl SN73039047 in 1998 at 395m altitude, and Llyn Fanod SN60416433 in 1998 at 310m altitude, suspected of being this hybrid, have been confirmed by chromosome counts of  $2n = 66$  by D. Britton (all **BM** and **Herb. D. Britton**). In all cases both parents were also present, and the hybrid plants tended to be very large. All were near the NE corner of the lakes, suggesting that prevailing winds could have caused an accumulation of spores of the parents there. Plants similar in appearance to the confirmed hybrid were especially frequent in Llyn Nantycagl. Suspected but unconfirmed hybrids were also found in Llyn Berwyn SN742570 in 2000 (**BM**, AOC & RDP) but were not refound here in 2007 (ACJ & AOC).

#### ***Isoetes lacustris* L. - Quillwort - Gwair Merllyn**

Recorded from 18 lakes and reservoirs, in 12 of which *I. echinospora* has also been recorded. Populations vary greatly in gross morphology as well as in the ornamentation and size of the megaspores, both within and between lakes. In Llyn Fanod SN604643 in 1998 (ACJ & AOC), for example, plants in the bay on the SE side (where *I. echinospora* and *I. ×hickeyi* also occurred) were unusually small, with slender, wiry leaves, some nearer the NE end of the lake had much longer, thicker but more flaccid leaves, and further SW most plants were more normal. *I. lacustris* often grows much larger than *I. echinospora*, and strikingly huge specimens have been found in the W lake of Llynnoedd Ieuan SN795812, 1997 (ACJ & AOC) and, of both species, in Llyn Teifi SN780672, 1989 (**BM**). Altitude limit 530m, W lake of Llynnoedd Ieuan SN795812, 1993 (**NMW**).

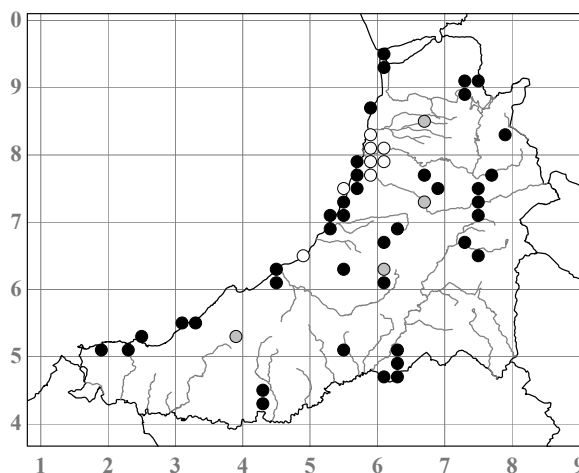


## EUSPORANGIATE FERNS - Adder's-tongues and Moonworts

### OPHIOGLOSSACEAE

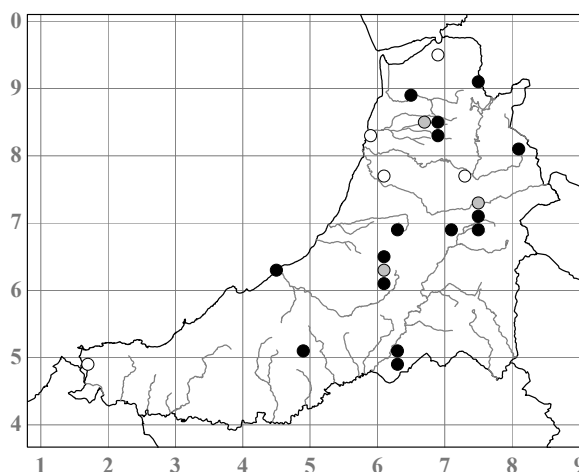
#### **Ophioglossum vulgatum** L. - Adder's-tongue - Tafod y Neidr

Although uncommon, Adder's-tongue occurs in a remarkably wide range of habitats throughout the county. Most often found in unimproved neutral pastures, its other sites include dune slacks at Ynyslas SN69B, C, 1956-2005; *Molinia* tussock mire on peat at the NW edge of Cors Fochno SN61969210, 1997 (NMW, conf. ACJ), where the abundant fronds were paired and only 5-6cm tall, though with 14-21 pairs of sporangia; trampled patches of turf on St David's Wharf, Aberystwyth harbour SN580809, 1953-1957; *Phragmites* marsh below Pendinas SN582800, 1944 (MC) - 1957; rock ledges in the spray zone on the sea cliffs on Allt Wen SN57407895, 1984-1991; ballast of the disused railway at Trawsgoed c.SN664732, c.1978 (JPS); upland acidic *Festuca ovina*/*Agrostis capillaris* grassland on the Mynydd Bach SN636690, 1994 (SM); slumping till above the seashore at Clogfryn SN44546217, 2003 (SPC); closely sheep-grazed clifftop turf on thin soil on Llangranog Head SN31455528, 2003; and recently reseeded pasture on the coastal slope SSW of Trwyn Crou SN330552, 1997 (JPW & AOC). It occurs, often in abundance, at several lead mines, where it seems to be an increasing arrival and colonist, for example at Esgair Fraith SN7391-7491, 1990-2005, where there are several very large colonies; at Eaglebrook SN73698921, where the colony was 2 × 0.5m with 45 fronds in 1988 and 2 × 1.5m with 153 fronds in 2003; by a trial adit near Cwmergyr SN786821, 1993 (SPC); at Mynach Vale SN772775, 1999 (MBr); and at Glog Fach SN746709, 1993 (SPC). Salter (1935), although he listed only ten sites, said that it was common but easily overlooked. It has been recorded from about 60 sites since 1950. Altitude limit 410m, Esgair Fraith lead mine SN740911, 1990-2007.



#### **Botrychium lunaria** (L.) Sw. - Moonwort - Lloer-redynen

An uncommon plant of short or open turf on unshaded ground, usually on neutral or more basic soils, but avoiding the clays. Less characteristic habitats include improved upland sheepwalk near Llynnoedd Ieuan SN804814, 1998 (JT) and on the Mynydd Bach SN620691, 1994 (SM), and in heathy vegetation on slumping coastal clay at Clogfryn SN44546218, 2003 (SPC). It has colonised lead mine spoil at three sites, sometimes in abundance: at Cwmsymlog SN698838 etc., 1982-2003 (AGB; AOC) where a maximum of 154 spikes was recorded in 1989 (APF); at Esgair Fraith SN740912, 1990-2003; and at Glog Fach SN746708, 1993 (SPC). Numbers at most sites vary greatly from year to year. Altitude limit 530m, Llynnoedd Ieuan SN804814, 1998 (JT).





# CALAMOPHYTES - Horsetails

## EQUISETACEAE

### ***Equisetum variegatum*** Schleich. ex F. Weber & D. Mohr - Variegated Horsetail - Marchrawnen Fraith

First recorded, as var. *arenarium*, in 1925 “near Borth” (Powell 1926). Salter failed to find it until 1933 when he saw it at Moel Ynys Pool SN607923, probably the same site (Diary 5.8.1925, 11.9.1926, 26.7.1927, 11.7.1933), so it is safe to assume that it was then in small quantity and had only recently arrived. In 1938 Salter (Diary 10.7.1938) recorded it in abundance in the main slack SN608938, and it remains abundant in most of the slacks in these dunes, chiefly in areas that are flooded in winter, 2005. The only other site in the county was at Penyrergyd SN162492, where it was first recorded by Salter “in plenty in one spot” in 1938 (Diary 9.7.1938) on “Boulder clay under the cliffs” (Wade 1952). This is on sloping sandy clay where the dunes meet the hard rock cliffs, and it was abundant in an area 15 × 30m here as recently as 1987 (NMW), but seems since to have disappeared, perhaps because of the coast protection works. All plants are of the prostrate var. *arenarium* Newman, which is best included in var. ***variegatum***.

### ***Equisetum fluviatile*** L. (*E. limosum* L.) - Water Horsetail - Marchrawnen y Dŵr

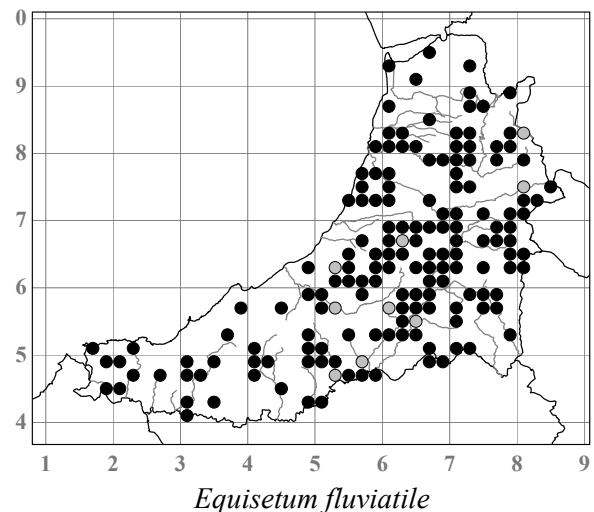
A frequent plant of all but the most acidic mires, lakes, backwaters and ditches, often forming dense stands in open water. The only site where it has been seen in fast-flowing water is in the Afon Rheidol 100m upstream of Gamlyn Bridge SN68147912, 2004 (NMW), where there is a colony 30m long both in the water and on the bank. Altitude limit 500m, Llyn Isaf SN802758, Salter (1935); 525m, middle lake, Llynnoedd Ieuan SN799816, 1993.

### ***Equisetum* × *litorale*** Kühlew. ex Rupr. (*E. arvense* × *fluviatile*)

Recorded from six sites, at all of which it forms extensive colonies, but certainly under-recorded: among *Molinia* and *Juncus maritimus* in dune slack, Ynys-las SN608938, 1997 (SPC); road verge by ditch, Glanwern, Borth SN612888, 2002; *Phragmites* marsh by disused railway, Felin y Mor SN581801, 1991 (NMW) - 2005 (AOC & SDSB); along gravelly hedgebank of lay-by on B4342, 150m E of Hafod, Bwlch-Illan SN574578, 2004 (AOC & RM); junction of fen and pasture, Llwyn-llwyd, Penparc SN201488, 1991; and disturbed clay ground by stream, Ferwig SN182494, 1995. (A record for SN69 in Jermy *et al.* (1978) was an error.)

### ***Equisetum* × *dycei*** C. N. Page (*E. fluviatile* × *palustre*)

Known from only three sites, and first recorded in 1994 when a colony 14 × 2-7m was found on bare peaty mud on the recently drained floor of Bog Pond SN732824 (BM, NMW, conf. ACJ). In 1996 two colonies 5 × 3m and 6 × 1m, 4m apart, were found in shallow water at the N end of Llyn Eiddwen SN60786724 (ACJ & AOC). Also in 1996 a colony



*Equisetum fluviatile*



*Equisetum* × *dycei*, Esgair Fraith lead mine, view S from SN74019114, June 2009

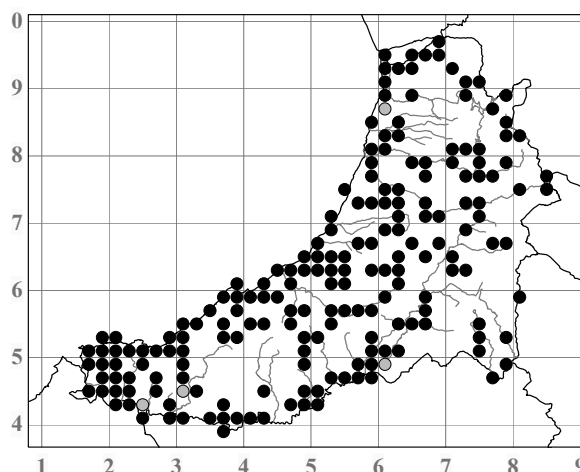
10 × 3m was found on damp, shaly spoil (clearly somewhat toxic as it was otherwise virtually unvegetated) at the Esgair Fraith lead mine SN74019114 (**BM**, **NMW**, **AOC** & **CDP**, conf. **ACJ**). By 2005 this colony was 15 × 5m, and by 2008 it was 19 × 5m, with a smaller colony 5 × 2.5m, 23m to the NW. Salter (1935) recorded *E. palustre* from here, and, as neither parent is now to be found anywhere near this site, it is possible that he mistook the hybrid for it, or of course it may have been one of the original parents. Altitude limit 405m, at this last site.

### **Equisetum arvense** L. - Field Horsetail - Marchrawnen yr Ardir

A frequent plant of a wide range of habitats both wet and dry, but always well-drained or where there is movement of water. It occurs on roadsides, railway ballast, lead mine sites, graveyards, waste ground, slumping till slopes on the coast, streambanks, flushes, fens (even in quite swampy areas), dune slacks, pastures and as a weed in arable fields. The cones are rather seldom noticed except in open habitats such as railways, waste ground and slumping till. Plants in a colony 20 × 5m at the edge of a spoil tip at the Eaglebrook lead mine SN73558927, at 370m altitude, 2003 (**NMW**) have cones on the green stems which are also often densely branched and slender, resembling those from sand dunes illustrated in Page (1997, p.442). Altitude limit 435m, trackside ditch 400m W of Eisteddfa Gurig SN79398408, 2007 (**AOC** & **CRB**).



*Equisetum arvense* in the Plas Crug cemetery, SN591812, April 2009



### **Equisetum ×rothmaleri** C. N. Page (*E. arvense* × *palustre*)

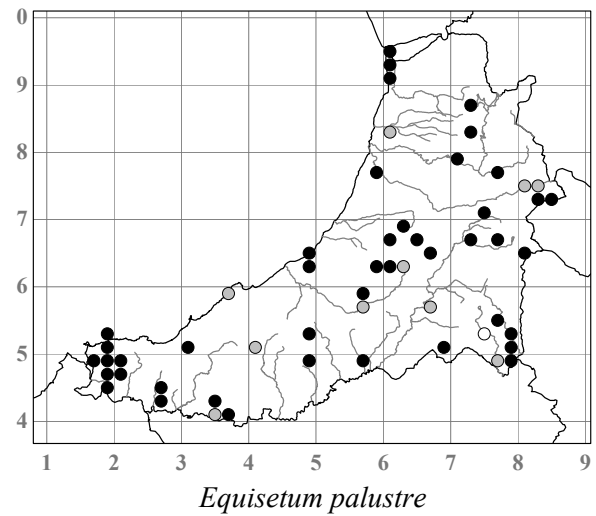
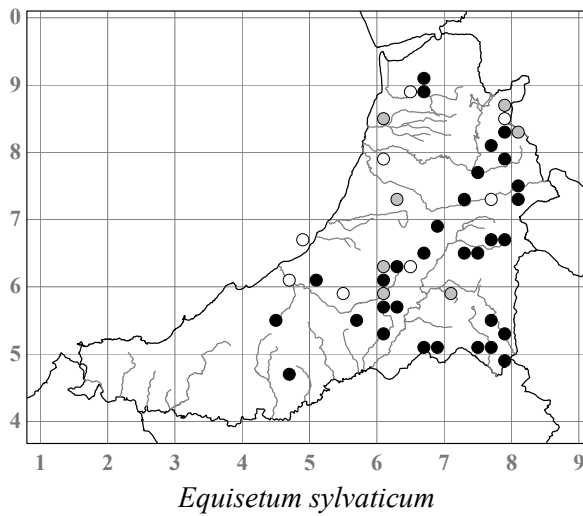
Recently recorded from two sites, although the identifications have not been accepted by PJA and further investigation is required. Abundant in sandy, calcareous pasture 100m SE of Mwnt church SN19605200, 2004 (**NMW**, conf. **TDD**); and a few plants, among *E. palustre* co-dominant with *Molinia* and sparse *E. arvense*, on outwash silt and gravel below the spoil heaps of Glog Fawr lead mine SN744708, 2004 (**NMW**, **AOC** & **JPW**, conf. **TDD**) at 330m altitude. Plants perhaps of this hybrid have also been found in a colony of *E. arvense* on wet drift above the sea beach at Traeth y Coybal SN37235931, 2004 (**NMW**, **AOC** & **PAS**).

### **Equisetum sylvaticum** L. - Wood Horsetail - Marchrawnen y Coed

An occasional plant of damp, ungrazed, often shaded, often rather mineral-rich sites, in flushes in valley mires, in Alder carr and other wet woodlands, in tall herb vegetation on streambanks, in stream ravines and on wet cliffs in the uplands. It usually forms rather distinct and dense colonies. Although usually absent from the more acidic sites, it occurs in *Eriophorum vaginatum* / *E. angustifolium* / *Erica tetralix*-dominated blanket bog 1km SE of Fuchsgau SN773801, at 370m altitude, 1993. It is completely absent from the clay soils in the SW of the county. The earliest record is a 1798 J. E. Smith specimen from “Hafod - By the dripping rock beyond Tyloge [Dologau] bridge” SN7773 (**LINN**, Herb. Smith), and it is also mentioned here in Smith



(1810, 1830). Altitude limit 580m, above Llyn Llygad Rheidol SN7987, Salter (Wade 1952); 610m, flush above Llyn Llygad Rheidol SN79608735, 1980.



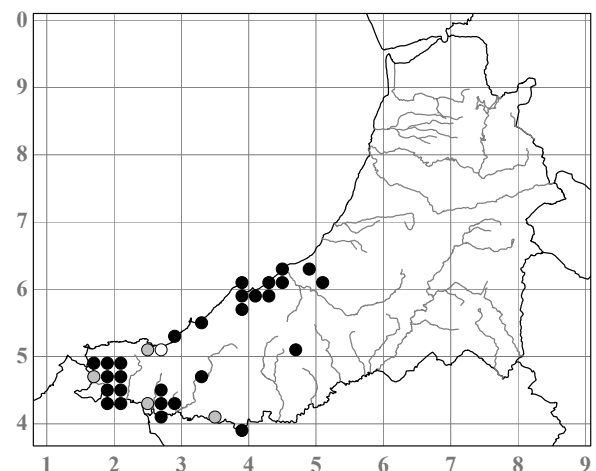
### ***Equisetum palustre* L. - Marsh Horsetail - Marchrawnen y Cysgod**

An occasional plant of the more mesotrophic wetlands, in marshy pastures, flushes, at the edges of lakes, on streambanks, slumping clay slopes on the coast, in dune slacks and on lead mine sites. Occasionally it can be very abundant, as on outwash gravel from the spoil heaps at Glog Fawr lead mine SN744708, 1993-2004 (NMW, AOC & JPW), where it was co-dominant with *Molinia* over *c.*2 acres, or in damp, rough grassland by Moel Ynys Pool SN60789238, 1994 (AOC & KH) - 2005, where it was locally dominant, or on bare mud in the drained Bog Pond SN732824, 1994, where it was one of the main colonisers. A colony of var. **polystachyum** Weigel, with the branches terminated by cones, was found on a disturbed clayey bank by the calcareous flushes along the Afon Mwldan SN195483, 1999 (**Herb. SPC**, SPC). Altitude limit 320m, Ty'n-y-cornel SN751534 (Salter 1935); 470m, flushes in blanket bog 1.3km ENE of Llyn Gwngu SN851737, 1997 (AOC & JPW).

### ***Equisetum telmateia* Ehrh. (*E. maximum* auct.) - Great Horsetail - Marchrawnen Fawr**



Largely restricted to the somewhat calcareous Irish Sea Ice Sheet drift soils of the SW of the county, where it is locally abundant and often dominant in damp woodland, in damp pastures, on the slumping clay slopes on the coast and on flushed slopes and in



*Equisetum telmateia* and *Leucanthemum vulgare* on drift slope on sea cliffs SW of Gilfach yr Halen SN429609, July 1983

fens. It is locally abundant on disturbed ground in the sand quarries at Penparc SN201481, 1986, and is in small quantity on the Penyrergyd dunes SN162486, 1978. The furthest NE it occurs is under Ash trees and conifers in the Nant Erthig dingle at Monachty SN501619, 1992. A teratological form showing spiral torsion of the stems was found by the Afon Mwldan near Penparc SN195484 in 2004 (NMW, SDSB & AOC).

## LEPTOSPORANGIATE FERNS - True Ferns

### OSMUNDACEAE

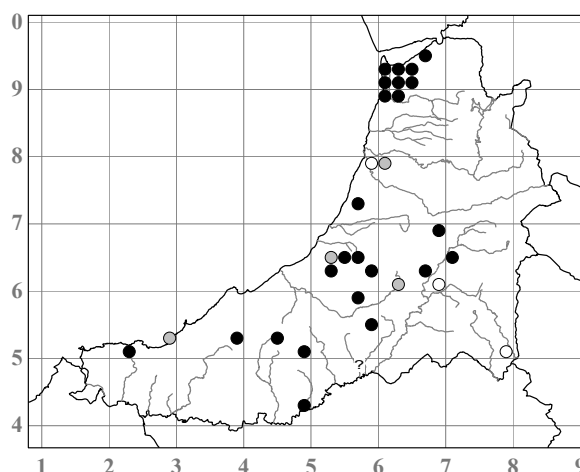
#### *Osmunda regalis* L. - Royal Fern - Rhedynen Gyfrdwy

Generally a rare fern in the county, but locally abundant around Cors Fochno and in a few of the larger valley mires, and isolated clumps occur in a number of other valley mires, in a few heath and carr sites, and on the sea cliffs. The earliest records are from Cors Fochno SN69 by Lees (1842) and Morgan (1858). Salter records seeing it there in many diary entries from 1892 to 1935, but always only a few plants, although in his Flora (1935) he wrote "Having been removed wholesale from Borth Bog [Cors Fochno] to the gardens of the surrounding villages, one now rarely sees a plant of any size, though quite small ones are frequent". In 1904 (Diary 7.7.1904) he "Saw a fellow bringing a quantity of roots of *Osmunda* off the bog". Ancient plants, doubtless from this source, can still be seen in gardens in Tal-y-bont SN654893, 2007, Tre Taliesin SN657914, 2007, and Aberystwyth SN588818, 2007. By the 1950s it seemed to be increasing on Cors Fochno. In 1955 there were many large clumps in the Taliesin *Salix* carr SN650909, although by 1962 only *c.*5 were still there, and in 1956 it was frequent on the bog in the E part of Llancynfelin Common *c.*SN639920. Since then, doubtless helped by the designation of much of the area as NNR and SSSI, it has increased greatly and occurs from ditches 500m E of Borth church SN617897, 1990, and Morfa Borth SN613910, 1991, in the W to Ynys-hir SN676954, 2004, in the E, in many places in great abundance.

On Cors Caron it was first recorded by Salter in 1892 (Diary 8.6.1892), and then many times thereafter, but with even fewer plants than on Cors Fochno. In the 1950s one clump was known at the S side of the South-east Bog *c.*SN680617 (PJP). Several small, poorly growing clumps were known near the middle of the West Bog *c.*SN678632 in 1967-1985 (PED; JPS), and more recently in 1999 on the W side of the West Bog SN677636 (PCu). There were *c.*50 plants on the part of the bog E of the railway N of Allt Ddu SN705642 in 1993 (JPL).

The only other early records were from Piercefield, Penparcau *c.*SN589798 by Morgan (1874), the same site given by Salter (Wade 1952) as "Formerly side of a ditch below Pendinas, Aberystwyth"; and a report in Salter (1935) of it from "a bog near Falcondale, Lampeter" *c.*SN54U. Morgan's (1858) record from Morben SN711993 refers to Montgomeryshire.

It is surprising that Salter did not find *Osmunda* elsewhere, as it has since his day been recorded from about 20 sites, many of which he was familiar with. It is a difficult plant to miss, so it may well have increased. Outstanding sites for it are the extensive swampy mire of Cors Llyn Farch SN596635 where *c.*50 clumps were counted in 1956 and *c.*30 in 1995 (SPC); and the valley mire 1km NNW of Bwlch-Ilan SN576599 where 21 clumps were counted in 1987 (APF) and where they are now perhaps the biggest in the county, 2003. On the coast it occurs as single clumps in a wet gully below Mwnt-fawr SN22585198,



*Osmunda* on the sea cliffs  
E of Pen Peles, view E  
from SN225519, June 1980



1980-1998 (AOC & JPW); and 7m up on the sea cliff N of Penbryn SN297531, 1982 (HB). The only upland site was in a damp hollow in rocks by the Camddwr 2.5km SSE of Soar y Mynydd c.SN798511 where one stunted plant was found c.1969 (DD); though above the level of Llyn Brianne it has not been refound.

In a few sites it may be naturalised, notably on a shaded cliff by the Teifi at Rhuddlan SN495429 where it was first seen in 1995 and where 21 small clumps were counted in 2000, along with a large clump on the river bank 50m S; only 400m away there are several large, presumably planted clumps in an overgrown ornamental pond in the Highmead grounds SN499431, 1985-2002.

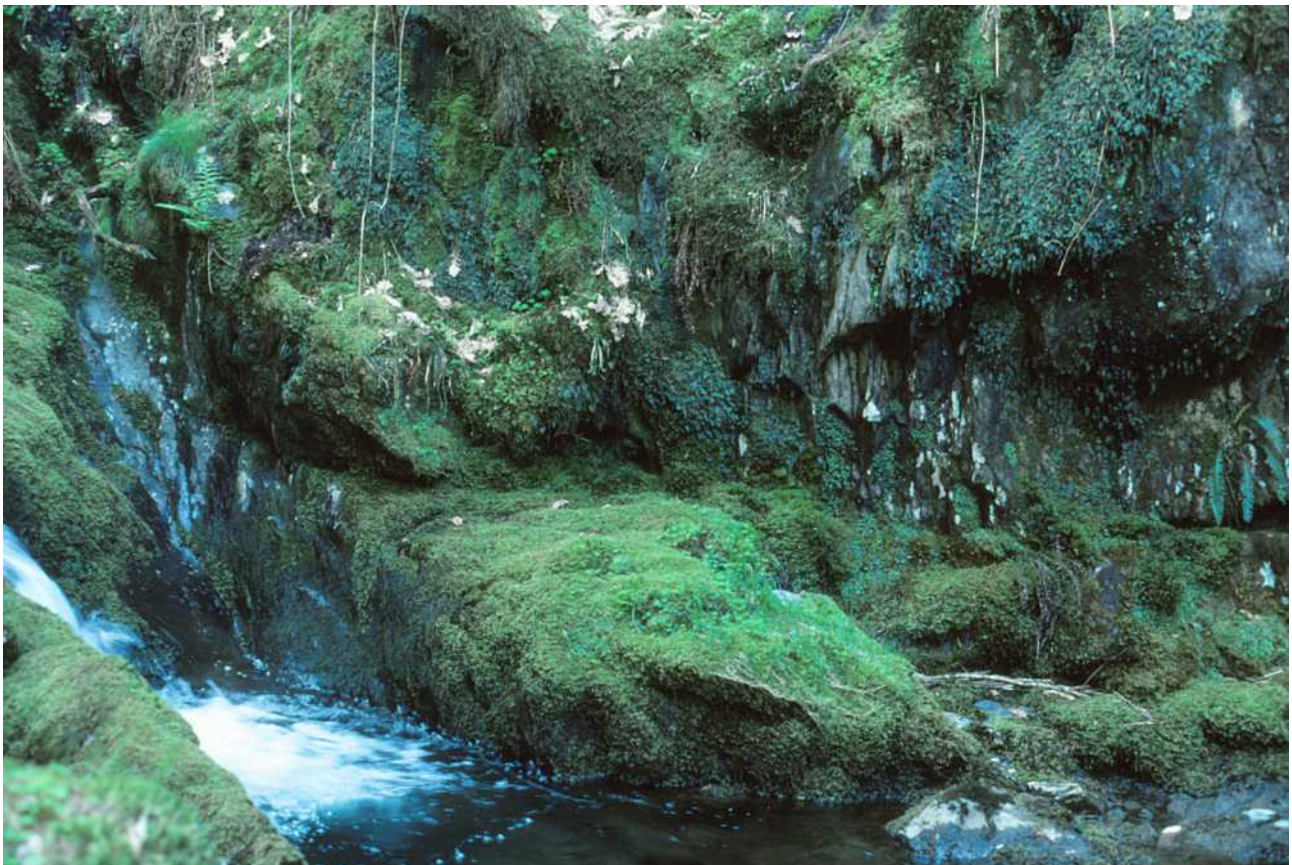
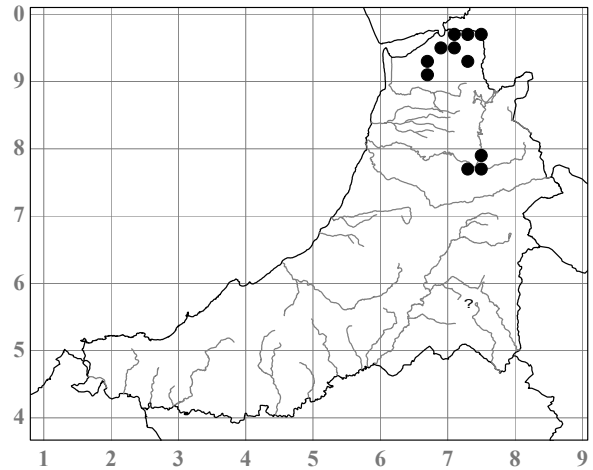
Altitude limit c.300m, 2.5km SSE of Soar y Mynydd c.SN798511, c.1969 (DD).

## HYMENOPHYLLACEAE

### *Hymenophyllum tunbrigense* (L.) Sm. - Tunbridge Filmy-fern - Rhedynach Teneuwe Tunbridge

First recorded by Ley at Devil's Bridge SN7477 in 1886 (Ley, *BEC Rep.* **1884-6**: 149 (1887)) and again there in the early 1930s (PWC in Salter 1935), and from "Nant Berwyn above Tregaron" c.SN76E in 1937 (NMW, PMH & WAS), this uncommon fern seems never to have been seen by Salter himself in the county. It occurs on damp, shaded rocks by the Llyfnant stream at SN719975, 1991, and at SN747970, 1999 (SPC), and by the Nant Cefn-coch SN739968, 1976 (DAR & RGW) - 2007, as well as in deep cavities in block scree high above the Llyfnant on Tarren Tyn-y-maen SN722971, 1977-2003; the latter is its habitat in some of its Snowdonia sites. In Cwm Einion SN69X-79H, where it was first recorded in 1944 (NMW, PWR) -

2006, it occurs in abundance both on low cliffs and on mossy boulders and slopes, under both conifers and broadleaves as well as in the open; in one site here where it occurred in abundance along 100m of cliff

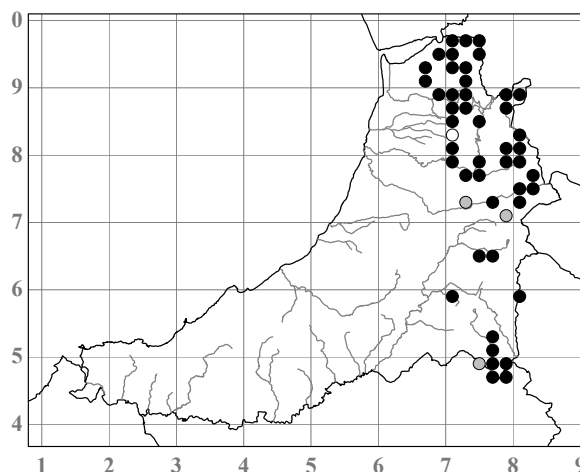


*Hymenophyllum tunbrigense* (bluish green), Nant Cefn-coch, Llyfnant, view SW from SN739968, May 1991

SN694942, when the Larches sheltering the colony were felled in the early 1990s the FC erected shelters of branches in a successful attempt to maintain the humidity and conserve the population. In Cwm Pemprys it occurs on rocks both in woodland and in the open SN712941 and SN720939, 2007 (SDSB & AOC). In Cwm Cletwr SN669920-672920, 1978 (NMW) - 2003, it occurs with *H. wilsonii* on mossy rocks in Oak woodland on the N-facing slope in an unusually open situation; a valuable photographic survey of the dozen colonies here was made in 1990 for the DWT by the Aderyn Survey Team. It is in several places in Coed Rheidol from Derwen SN732774, 1958 (ANB & BI) - 1998 (AGBA) to just N of the Nant Tyn-llwyn SN745782 (PAW) and is especially abundant by the Mynach and Afon Tuen waterfalls. The only record S of here is the Nant Berwyn one of 1937 mentioned above.

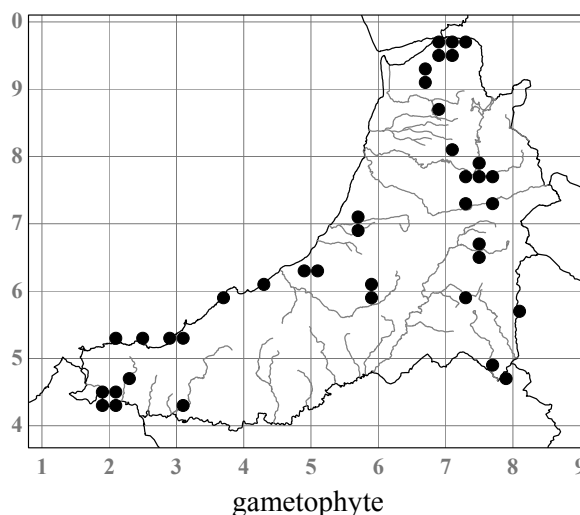
***Hymenophyllum wilsonii* Hook. (*H. peltatum* auct.) - Wilson's Filmy-fern - Rhedynach Teneuwe Wilson**

First recorded by Lees in 1837 (Lees 1838), who later (1842) recounted the occasion: "I gathered the dark and sad looking *Hymenophyllum Wilsoni* in considerable plenty, a few years ago, on the rocks that overhang the romantic Rhyddol, on the opposite side of the appalling bridge of Pont Bren" i.e. Parson's Bridge SN748790. It is frequent but always rather local on damp rocks, screes and moss cushions in shaded and usually wooded localities in the inner valleys, but is often in more open sites on cliffs and streamside rocks in the uplands. It often suffers badly from drought, especially in open sites, but seems to have considerable powers of recovery. Altitude limit c.610m ("about 2,000ft."), above Llyn Llygad Rheidol, Pumlumon SN7987, 1903 (Salter Diary 26.9.1903); 530m, Craig y March, Pumlumon SN806881, 2002.



***Trichomanes speciosum* Willd. - Killarney Fern - Rhedynen Cilarne**

The gametophyte of this Hyperoceanic fern is widespread throughout the county in suitable habitats from almost sea level to well into the uplands. It grows in fairly dry cavities and crevices and under overhangs in wooded valleys or rocky ravines, always on rock, usually far enough in to be too dark to see without a torch, and usually further in than the most dark-tolerant bryophytes. Near the coast it can grow more in the open, and for example in woodland at Penbryn SN294522 mats of it up to 40 × 20cm grew in full daylight on vertical cliffs, 1994, and it is in almost as open conditions near the mouth of the Afon Soden SN363581, 1998 (AOC & JPW) where it is not even in woodland, though shaded by Bracken in summer. Its sites are usually very sheltered, but even in the uplands a few sites are very exposed, as on Craig Ddu, Cwm Doethie SN768485, 1992, where it grows in a cleft on a bare, unshaded W-facing cliff at 320m altitude. It has not been seen in any artificial cavities or in any quarried or mined rock, even though it will grow in natural cavities quite close to mine adits or to other suitable looking artificial habitats. It is also rare in screes, although the first record was from moss-covered boulder scree in the Llyfnant SN719975, 1991 (ACJ & AOC). There is some evidence that it may have decreased at some sites in recent years. In one part of Cwm Einion SN694943 in 2005 it was refound in only three of eleven cavities that it had been found in during the period 1993-2000, and in these it was in very much smaller quantity; a distinct but lesser decrease was noted in parts of Cwm Cletwr SN664920 over the same period, and the big colonies in the open at Penbryn in 1994, mentioned above, could not be refound in 2005. Altitude limit 330m, SW-facing cavity in rocks by Nant yr Helm, 550m SSW of Nantystalwyn SN80175707, 1997.





Development of sporophytes has not been seen at any of the gametophyte colonies in the county, and only one site for the sporophyte is known, near Devil's Bridge SN77, 1961 (NMW, NJ) - 2007. In 1978 this colony, on a wet cliff overhung by a curtain of Ivy, was 5m wide and 1m deep, with *c.*550 fronds a few of which were fertile. In 1986 *c.*790 fronds were estimated, in 1992 *c.*1,030, with about 10% fertile, and in 1994 *c.*1,050. The increase in number of fronds has not been accompanied by an increase in the size of the colony. Frost damage is sometimes obvious, and frost or age results in *c.*15% of fronds being dead or dying at any one time. In 1992 another very small colony with four fronds was seen 4m away, but whether grown from spores or a detached rhizome is uncertain; the gametophyte has not been found nearer than 200m from these sporophyte colonies, which are in a much wetter habitat than the gametophyte favours.



*Trichomanes speciosum*, near Devil's Bridge, March 2007

## MARSILIACEAE

### *Pilularia globulifera* L. - Pillwort - Pelenlllys Gronynnog

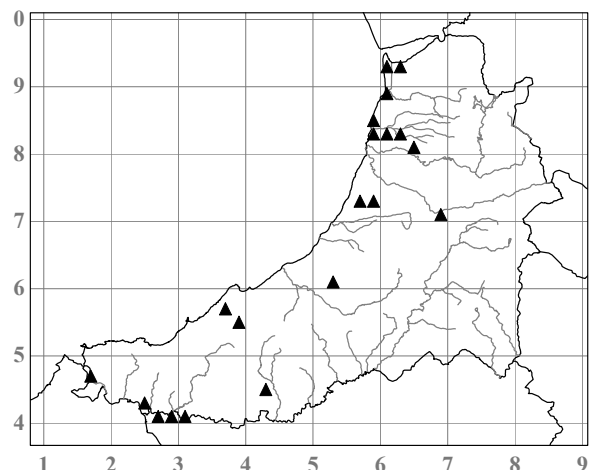
Only recorded from two sites in the county, and it has not now been seen for over 40 years. In 1928 Salter (Diary 9.7.1928) wrote: "Mr Geo. Rees sent me a specimen of *Pilularia*, found July 7<sup>th</sup> on almost the same spot where I found it on July 9<sup>th</sup> 1915, above Llanddewi Aberarth" (the 1915 find must refer to Rees, as Salter was abroad then). In his Flora (1935) Salter wrote: "I have received specimens from Mr. George Rees from a Cardiganshire locality described as being 'between Aber Arth and the Aeron valley'." There is no specimen from here in NMW. The locality best fitting both descriptions would be Aber-arth Common SN479623, now almost completely overgrown and unsuitable, or perhaps a marshy area around SN491613. Pwll y Brawd SN491640, then a marshy pool but in the opposite direction from Aber Arth, is another possibility, but is no longer suitable.

On 10 July 1964 a non-fruiting specimen was collected in "Llyn Gynon mixed with *Juncus bulbosus* var. *confervaceus* in 2ft. water" (NMW, BS), and Seddon later said (*in litt.* 1978) that he used a grapnel from a boat and recorded in his field notes "*Juncus* ... forms dense swards locally in 1'6" - 2'0" water ... the water level was judged to be 6" below normal ... In washing out *Juncus* ... (i.e. a mass retrieved on the grapnel) discovered some *Pilularia* mixed with it". The site is at SN7964-8064, at 425m altitude, and although *Pilularia* may well still be there, repeated searches have failed to reveal it.

## SALVINIACEAE

### *Azolla filiculoides* Lam. - Water Fern - Rhedynen y Dwr

This commonly grown floating aquatic, native of tropical America, is apparently a very recent arrival as a naturalised plant and is now well established. It was first recorded in May 1993 in ditches at Llangorwen SN603838 (NMW, SPC), and by the end of that summer it had spread throughout the ditch system in this valley from SN608839 down as far as Clarach SN587840, and was still abundant there in 2005. In 1995 it was found in abundance in several ditches by the B4353, E of the Leri at Ynys-las SN619930 (MB), and by 2000 it had spread S to a lagoon by the Leri SN616922 (CMFB & TAL) and N to the ditch behind the estuary wall SN620935. In



both these areas the population varies greatly from year to year. Also in 1993 it was found dominating a fish pond at Pentre'r-bryn, Synod Inn SN392550 (NMW, RJW), and in 1994 and 1995 it was found in several "wild garden" ponds throughout the county (JND; AOC). In 1996 it was abundant in a ditch at Capel Bangor SN648802, and in 1999 it was abundant in a stream and pond in the FC plantation at Coed Tynbedw SN692712. In 2000 it was abundant in the Teifi from Newcastle Emlyn SN314407 to below Cenarth SN256421, and it remains well established there, 2005.

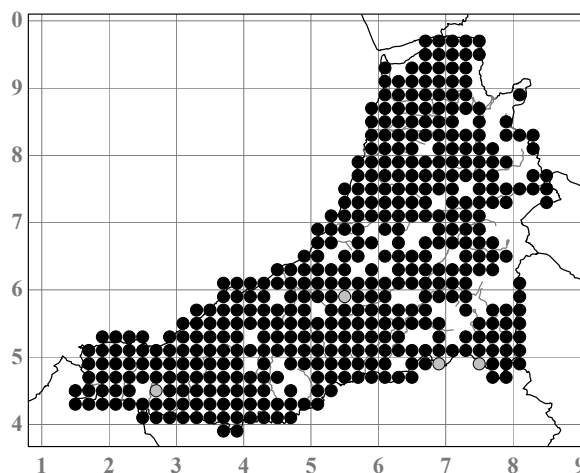
## DENNSTAEDTIACEAE

### ***Pteridium aquilinum* (L.) Kuhn subsp. *aquilinum*** - Bracken - Rhedynen Ungoes

Commonest along the coastal slopes and on the ffridd slopes at the edges of the uplands, and frequently abundant on the steeper valley slopes and in neglected pastures and woodlands elsewhere throughout the county. It is largely confined to dry, rather fertile soils on sloping sites, and the saying "Aur dan y rhedyn, arian dan yr eithin, newyn dan y grub [Gold under Bracken, silver under Gorse, famine under Heather]" is often quoted locally. Although usually deplored by conservationists as well as farmers, on the coastal slopes in particular Bracken colonies support a very rich spring flora similar to that of the native woodlands. "Bracken rings" are often seen, spreading out clonally and hollow in the centre. In many years spores are never seen, or occur only locally, for example in 2001 when colonies at Penbryn SN2952 were fertile but none were seen elsewhere, but in some years they are abundantly produced, for example in 1994, 1995, 2005 and 2006 when many colonies throughout the county were fertile. It is occasionally found on brick walls, as in North Parade, Aberystwyth SN58528178, c.1960-1973. There has been widespread use of herbicides to kill Bracken in recent decades, and aerial spraying of Asulam part-funded through ESA schemes has exterminated it from large areas of some of the inland valleys. It has also been controlled by regular cutting and by ploughing; Sheep have little effect on it, but heavy Cattle grazing and poaching can reduce it considerably. In the past it was used for thatching (William 1995) and for bedding (for example Salter Diary 2.7.1938).

Moore & Chater (1969a) noted an increase of Bracken in the Cardiganshire uplands coinciding with the Bronze Age clearance of woodland. The work of J. A. Taylor and his students at the University on the environmental problems of Bracken made Aberystwyth something of a centre for such studies, and Bracken has been shown to have encroached in an area of 6.39km<sup>2</sup> in N Cardiganshire between 1913 and 1976 at an annual rate of 1.191% (Dowrick 1976, cited in Smith & Taylor 1994), nearly twice the national average. However, the latest Countryside Survey (Smart *et al.* 2009) showed a significant decrease in the area of Bracken dominance in Wales as a whole over the period 1998-2007.

In the SE of the county, for example in the Camddwr valley SN75S, T, Bracken extends up to c.400m, in the Strata Florida area it reaches 450m on Lan Fawr SN784654, 1994, and further N it goes slightly higher: altitude limit 455m ("Our top limit for the bracken is at 1500ft. [455m]; the mean of readings at 13 different places, mostly facing south, is 1270ft. [385m]", Burkill & Willis (1894)); 470m, WSW-facing slope of Craig yr Eglwys, Cwm Gwerin, Pumlumon SN80238957, 2008; 470m, S facing slope of Ffrwd yr Ydfran, Cwm Ystwyth SN82327635, 2008.



Bracken rings at Morfa Mawr, view SE from SN500657, August 1987





Altitude limit of Bracken at 470m  
on Craig yr Eglwys, Pumlumon, view  
NE from SN800892, September 2008

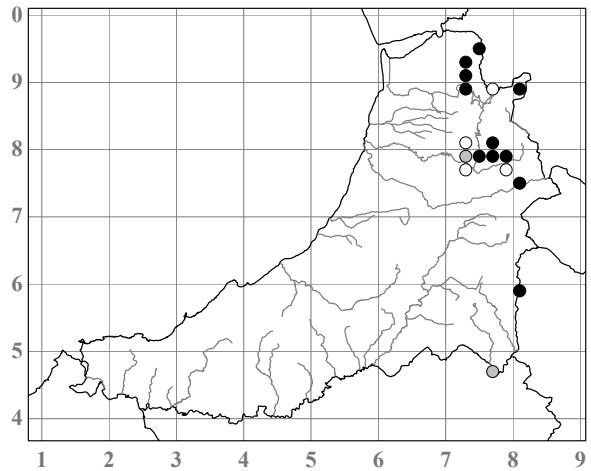


Altitude limit of Bracken at 470m at  
Ffrwd yr Ydfran, Cwm Ystwyth, view  
NNW from SN832752, October 2008

## PTERIDACEAE

### ***Cryptogramma crispa* (L.) R. Br. ex Hook. - Parsley Fern - Rhedynen Bersli**

The first record was by Ley, who collected it from a wall at Maesnant, Pumlumon SN78U in 1886 (**BIRM**, AL). Salter knew it from only four sites, and it seems to have spread significantly since his day having been seen at 14 sites in the last 25 years. Most are on unstable E or N facing screes and quarried rock in Silurian strata, all in the N of the county. Salter's first record was in 1904 in a wall at Pantyffynnon, which he called "Howells' farm", Llywernog SN73108062 (1935, Diary 5.6.1904) and he saw it again there in 1926 (Diary 29.8.1926). Salter next found it on a roadside wall near Devil's Bridge in 1908 (JHS & WHP, Diary 3.7.1908), by implication the same site that was reported to him in 1928 (AP, Diary 21.11.1928) which was a wall near "Adler's house", Brynamlwg SN729764; it has not been reported there since. In 1932 Salter found a plant by the cairn on Pen-y-garn SN798770 (Diary 28.6.1932), but it had gone before 1950. In or before 1939 he found one plant in the Rhuddnant valley (Diary 25.7.1939), and in 1940 he found an apparently different plant on the N side of the valley which has not been seen since; in 1984 a clump 25 × 15cm was found on very unstable slatey scree on the S side of this valley SN79957835 (AOC, WMC & DGJ), probably Salter's 1932 plant, and by 1996 this had expanded to 70 × 50cm, with two small outliers 1.5m away (AOC & PAS). It was known in a roadside wall 1km S of Llywernog SN731795 from 1946 to 1983. A single plant was known on another very unstable scree on the E side of Hen Rhiw SN74037967 from c.1970 (JPS) until 1997 (AOC & EMF-W); it was then not seen, in spite of repeated searches, until 2004 when the same plant was refound, very etiolated, having been hidden under the mobile slates for seven years. It can clearly be a difficult species to monitor.



*Cryptogramma crispa* plant having  
reappeared after 7 years under scree, Hen  
Rhiw, SN74037967, September 2004

Its main site in the county is another very similar unstable E-facing scree 1.5km ESE of Ponterwyd SN760801, where over 600 clumps were found in 2005. Further scree sites have been 600m E of this last site SN766799, one plant, 1987 (APF), not refound in 2005; Cwm Rhaiadr c.SN752945, five plants, 1997 (AOC & TDD); and Graig Goch, Cwm Ystwyth SN803742, one plant, 1993 (DKR). On quarry spoil it occurs at the Whitestone Quarry, Cerrig yr Hafan SN73318872, one plant unchanged from 1987 to 2003; on quarried rock faces it occurs at Esgair Fraith SN73809130, two plants, 1992 (SPC) - 2005, and at a FC roadside 700m NNW of Nantystalwyn SN802582, 1999 (JPW & AOC). There is one plant on a ruined wall at the Barracks N of Llyn Nant-y-cagl SN72959089, 2003. The only plant on a natural, unquarried rock exposure is by Pistyll y Llyn SN753942, 1990. A thriving population on the scree-like stone dam of Llyn Dwfn SN739926 had 23 clumps in 1990, 24 in 1997 and 82 in 2006 (AOC & JPW). Altitude limit 610m, Pen-y-garn SN798770, 1932 (Salter Diary 28.6.1932); 550m, one plant on a scree-like slope, perhaps of lead mine spoil, by the Nant Gelligogau, Pumlumon SN814898, 1989.



*Cryptogramma crispera* on scree 800m E of Brynchwyth SN760802, August 2005

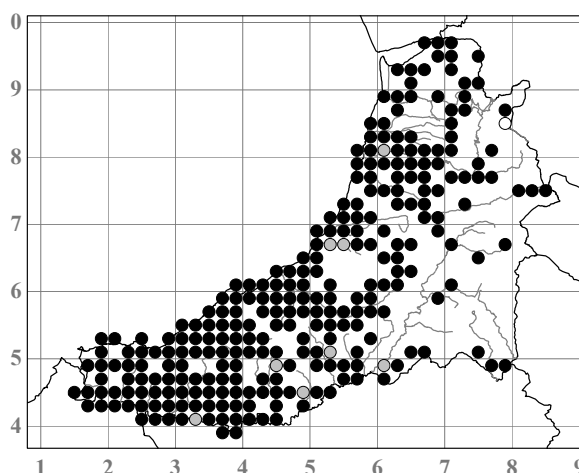


*Cryptogramma* clumps on dam of Llyn Dwfn, view SW from SN739926, August 2001

## ASPLENIACEAE

***Asplenium scolopendrium* L. (*Phyllitis scolopendrium* (L.) Newman, *Scolopendrium vulgare* Sm.)** - Hart's-tongue - Tafod yr Hydd

Frequent in damp, shaded, usually somewhat base-rich habitats, especially on mortared walls, in wooded ravines, and in crevices and under overhangs of cliffs and earth banks. It can be very abundant on clay soils in woodlands near the coast, for example in secondary woodland 600m S of Llanina church SN405593, 1993-2005, where it is dominant over several acres. It is salt-tolerant and often occurs in gullies and crevices on the sea cliffs. In the uplands it is largely confined to old walls and lead mine ruins. In towns and on roadsides it is often in drains and culverts. Whether it has recently increased in the county as it has nationally (Braithwaite *et al.* 2006) is uncertain. Wild colonies sometimes contain unusually large proportions of teratological forms equivalent to well-known cultivars, for example colonies on the



roadside hedgebank at Glanpaith SN605789, 1956-2005, and in a gully on the sea cliffs 1.7km NNE of Morfa Bychan SN571785, 2001, contain many branched fronds as in '**Ramosum**'; and colonies on shaded streambanks by the Afon Aeron at Llanerchaeron SN479602, 2006 (NMW), by the Afon Cwerchyr at Maesllyn SN365440, 1999, and by the Afon Cerdin below Bargoed bridge SN38774613, 1999, contain many plants with strongly wavy-margined fronds as in '**Undulatum**'. A self-sown plant high up on a wall in Grays Inn Road, Aberystwyth SN58388157, 2008, was '**Cristatum**' (det. HMR). Altitude limit 350m (Salter 1935); 520m, upper wheelpit of the Pumlumon lead mine SN795857, 1963.





*Asplenium scolopendrium* 'Cristatum',  
Grays Inn Road, Aberystwyth  
SN58388157, April 2008

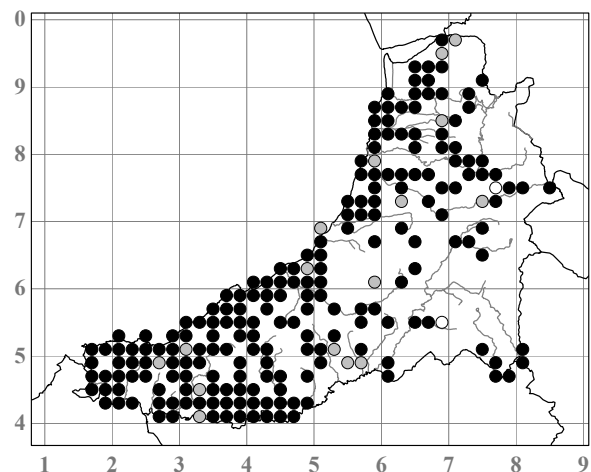
*Asplenium scolopendrium* dominant in  
Coed Llanina, SN405593, April 2007

### ***Asplenium adiantum-nigrum* L. - Black Spleenwort - Duegredynen Goesddu**

Widespread on mortared walls, ruins, hedgebanks and especially on stony earth banks, and occasionally on cliffs and other outcrops. 37% of churchyards have it on their walls. As Salter (1935) comments, it is chiefly in the coastal district and the lowlands. Altitude limit 300m, Craig Ifan, Cwm Brefi SN682545 (Salter 1935); 430m, on a mortared wall of the lead mine ruins on Copper Hill, Cwm Ystwyth SN811753, 2005.

[*Asplenium obovatum* Viv. subsp. *lanceolatum* (Fiori)  
P. Silva - Lanceolate Spleenwort - Duegredynen Hirgul

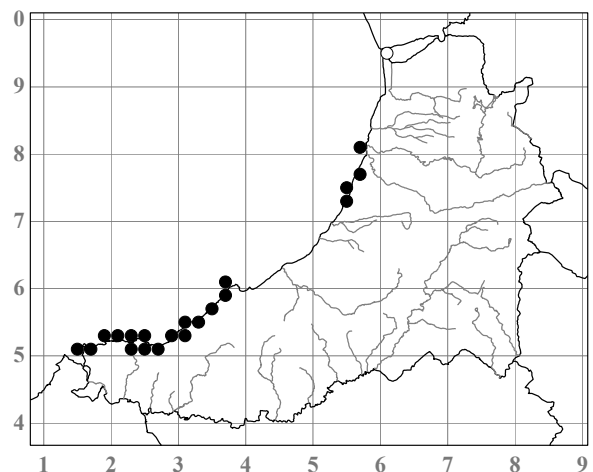
Recorded in error in Hyde & Wade (1969) and as a field record from Pumlumon SN78, 1957 at BRC. It is surprising that this species, which occurs at Aberdyfi on the Silurian to the north and at Strumble Head on igneous rocks (and formerly on walls at Cemmaes Head) to the south, does not occur in the county.]



*Asplenium adiantum-nigrum*

### ***Asplenium marinum* L. - Sea Spleenwort - Duegredynen Arfor**

Frequent along the coast in the Aberystwyth to Llanrhystud area and from New Quay southwards, in crevices and under overhangs on the sea cliffs within the spray zone. The only place where it grows away from the cliffs is Aberystwyth Castle, where it occurs on the mortared walls of the ruins in several places, especially at the W side of the N tower SN579814. The population on the castle varies greatly in numbers, with for example 22 separate plants in 1978, 12 in 1979, 3 in 1980 (these lows followed hard winters), 13 in 1986, 70 in 1995, 137 in 1997, 312 in 2000, and 200 in 2004 (this abrupt decline followed insensitive repointing of parts of the walls in 2003); except for this particular decline, there has been a strong upward trend at this site over the last 20 years. In 1956 a single plant was found on the Ynys-las dunes SN607940.



### ***Asplenium trichomanes* L. - Maidenhair Spleenwort - Duegredynen Gwallt y Forwyn**

Subsp. ***quadrivalens*** D. E. Mey.

One of the commonest plants on mortared walls of all sorts throughout the county, on railway ballast, in quarries and on lead mine spoil, but also occurring quite often on more or less acidic rock outcrops as at Bryn Bras SN751797, 1994 (AOC & JPW) - 2005, S of Llyn Brianne SN784478, 1997, or by the Teifi above Cenarth bridge SN273416, 1998, sites where one would rather expect subsp. *trichomanes*. 58% of churchyards have it on their walls. There are a few clumps on the older sand dunes at Ynys-las SN608939, 2003. Altitude limit 530m, acidic Ordovician cliffs at Craig y March, Pumlumon SN806881, 2002 (NMW), with exospores 37-42µm.

Subsp. ***trichomanes***

Quite frequent on rock outcrops, chiefly in the uplands and in damp and shaded sites. Although usually on the more acidic outcrops, it also occurs in more base-rich sites, for example with *Origanum* and *Tilia cordata* near Pontrhyd-y-groes SN719722, 1987 (NMW, conf. JMC), and with *Origanum* and *Sedum forsterianum* in Coed Rheidol SN745782, 1998 (AOC & PCu). The two subspecies have not been found growing together. Altitude limit 470m, acidic Ordovician cliffs at Lluet y Graig SN801891, 1992, with exospores 26-33µm (only 1 km from the highest site for subsp. *quadrivalens*).

[*Asplenium* × *alternifolium* Wulfen (*A. septentrionale* × *trichomanes*)

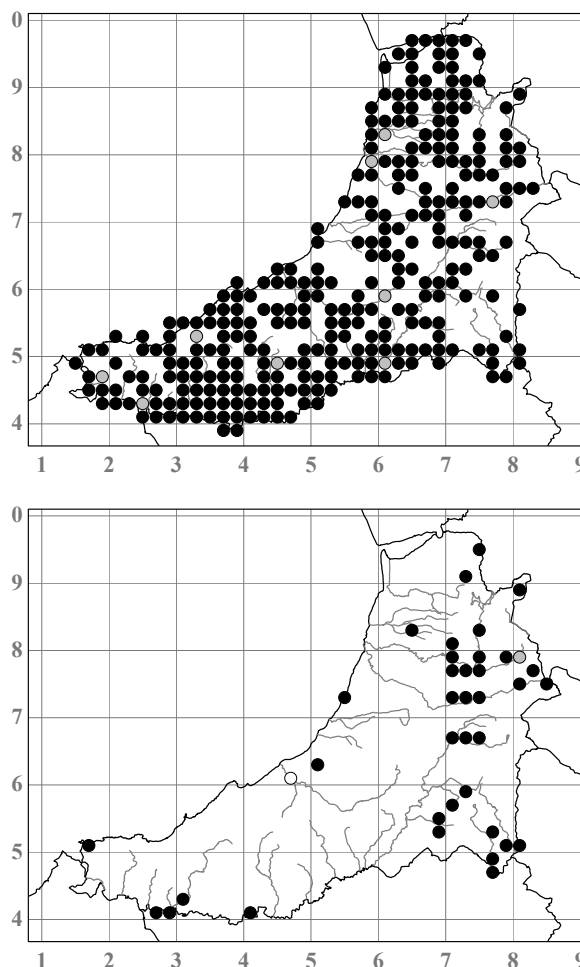
Reported from the Ystumtuen lead mine SN737788 (Johnson 1978, Johnson *et al.* 1978), but in error (M. S. Johnson *in litt.* 1980).]

### ***Asplenium viride* Huds. - Green Spleenwort - Duegredynen Werdd**

This distinctly calcicole species is known only from Esgair Fraith lead mine c.SN741912, where it was first found in 1992 (SPC & JAM) and where it seems to be increasing. At its main site on the mortared walls inside a wheelpit there were 14 plants in 1992, 28 in 1997 and 79 in 2002. It also grows on crumbly rock exposures inside two vertical shafts nearby SN73949135, on decayed masonry inside another, and on a ruined mortared wall. It appears to be increasing in the shafts too, but these colonies are inaccessible and uncountable. (There is an unconfirmed 1956 field record from SN78 at BRC.) Altitude limit 410m, Esgair Fraith SN741912, 2003.



*Asplenium viride* and *Trentepohlia* in wheelpit, Esgair Fraith lead mine SN743911, January 2008





***Asplenium ruta-muraria* L.** - Wall-rue - Duegredynen y Muriau

Common on mortared walls and ruins. Although Salter says "On rocks, bridges and old walls", I have never seen it on natural rock. It seems very particular about the walls it favours, presumably related to the type of mortar. 63% of churchyards have it on their walls. It is salt-tolerant, growing on the seaward walls of Aberystwyth castle SN579815, 2005, and on masonry by the mouth of the Ystwyth estuary SN57988061, 2005 (SDSB & AOC). Altitude limit 460m, ruins of Esgair Hir lead mine SN733912, 2002.

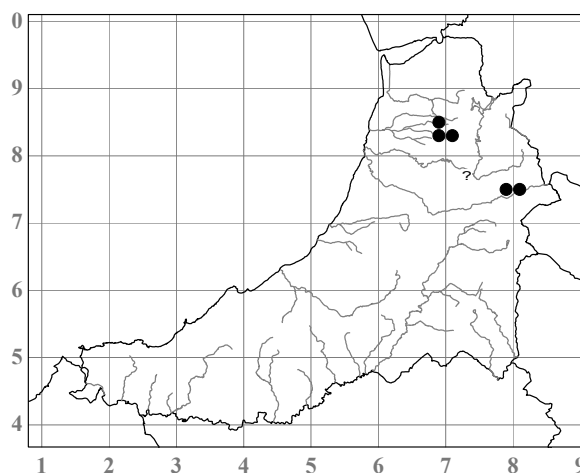
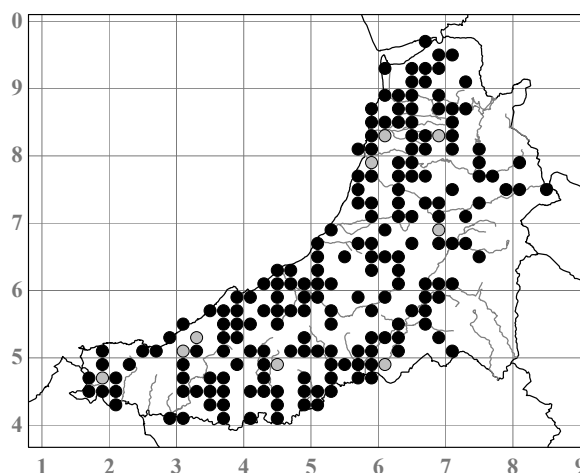
***Asplenium septentrionale* (L.) Hoffm.** - Forked Spleenwort - Duegredynen Fforchog

One of the most abundant and historically interesting of the Nationally Scarce species in the county. Salter recorded it from only three sites, and it is now known from half a dozen more, chiefly lead mines and often in great quantity; it must be assumed to be increasing quite rapidly. The first record was from Devil's Bridge c.SN77I in or before 1924 (JLW, Salter Diary 27.10.1924). In 1926 (Diary 11.12.1926) Salter described following JLW's directions and finding "about six good tufts of it, in a piece of dry walling beside the high road", although in his Flora (1935) he described it as "About a dozen plants on rock beside the main road". Salter next found it luxuriant on a roadside wall ¼ mile before Pentrebriwnant (the name by which he knew Cwmystwyth) coming from Devil's Bridge, i.e. at c.SN780742 (Diary, 23.7.1929), although it was destroyed by road-widening almost immediately after (Diary 12.7.1930). He then found "a strong colony ..... on the wall close to the bridge" at Cwmystwyth (Diary 23.6.1934), where it still flourishes on walls throughout the W part of the village SN784742, 2005. In 1980 it was found, close to Salter's 1929 site, on an earthy retaining roadside wall near Gwarallt SN780741 (PSC & WMC), where it still grows, 2008.

The first lead mine records were at Cwmystwyth SN80767507 in 1950 when 6 plants were found on a wall, and in 1955 when it was abundant in a worked gully at SN80357482. It was found abundantly on earthy walls and in a wheelpit at the Cwmsymlog mine SN698838-702838 in 1977, on a ruin at the Ceunant mine SN707825 in 1989 (DGJ), and on a decayed wall at the Llechweddhelyg mine SN68428480 in 1992 (JAM). The fern must presumably have been present at some or all of these sites a good deal earlier than these records indicate, and it is still present at all of them, 2005.

A count of all known colonies in 1991 showed a total of 1,602 clumps in the county (110 at Cwmystwyth mine, 190 in Cwmystwyth village, 1,238 at Cwmsymlog mine, 12 at Gwarallt, 4 at Ceunant). In 2005 a recount of the same sites (AOC & PAS) showed 2,150 clumps (172 at Cwmystwyth mine, 366 in Cwmystwyth village, 1,578 at Cwmsymlog, 18 at Gwarallt, 16 at Ceunant), an increase of 548 or 34%; in addition there was the Llechweddhelyg site, with an increase from one clump in 1992 to three in 2005, and three new sites at the Cwmystwyth mine with a total of 89 clumps, making the 2005 total for the county 2,242. The rate of increase at one of the Cwmystwyth mine sites, the S-facing, partly mortared, curved retaining wall of an ore bin by Jackilas's Adit SN80767507, is indicated by counts of 6 clumps in 1950, 62 in 1991 and 79 in 2005.

The commonest habitat is decayed, earthy, exposed S facing stone walls, often of dark-coloured stone, but it also grows on mortared walls as in a wheelpit and on the N side of the garden wall of Plas y Wigwam at Cwmsymlog, and in Cwmystwyth village. Shading seems to have less effect on colonies than might be expected, and in mixed woodland at the W end of Cwmsymlog SN68968395, of three clumps seen in 1991 on a very shaded wheelpit wall two were still present in 1993. On a 100m long S-facing retaining stone and earth wall at SN69608382 there were c.800 clumps in 1991, mostly on stretches unshaded by Gorse; in 2005 there were 1,150 clumps, and although c.40m of the Gorse had been cut in recent years to conserve the fern, the





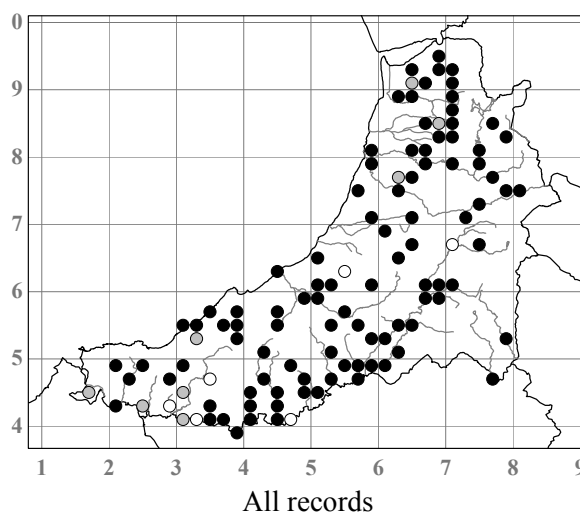
*Asplenium septentrionale* on roadside wall, Gwarallt, Cwmystwyth, view W from SN780741, June 2008

increase seemed to have been mostly on those stretches that were still Gorse-shaded and where, in February, the clumps were much more luxuriant and the fronds less shrivelled than those in the open. On the other hand, on a wheelpit wall at SN69408384, where conifers had greatly increased the shade since 1991 when there were 53 clumps, there were only 19 in 2005. Apart from Salter's ambiguous reference to the habitat of the first record as being on rock, the only occurrences on natural rock have been on quarried or mined surfaces, as in opencast gullies at the Cwmsymlog and Cwmystwyth mines. Altitude limit 335m, Cwmystwyth mine SN807750, 1991.

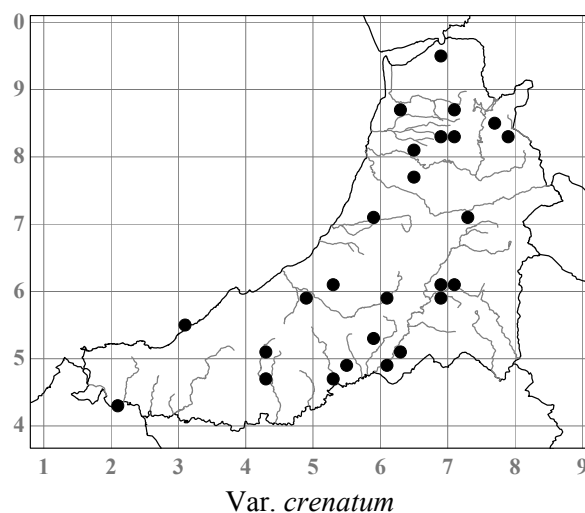
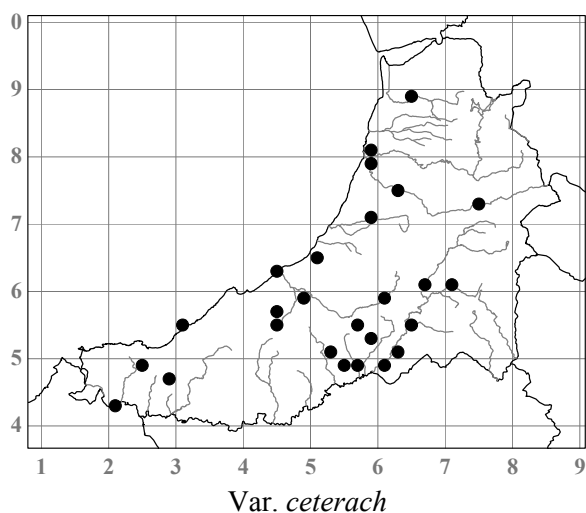
***Asplenium ceterach* L. (*Ceterach officinarum* Willd.) - Rustyback - Duegredynen Gefngoch**

Occasional on mortared walls throughout the county, usually abundant where it is established but of unpredictable distribution. It is especially common on lead mine ruins, where it also occurs on mortar-rich rubble. 19% of churchyards have it on their walls. At Llwyn-llwyd SN201487 a few plants grow on a sandy stone bank, 1994 (AOC & JPW). The only site where it has been seen on natural rock is the Ponterwyd Quarry SN740808, 1988 (AOC & APF), where it surprisingly grew on the cut face of the acidic Silurian shaly slate but had gone by 2007.

Var. **ceterach** and var. **crenatum** (T. Moore) T. Moore, usually larger and with crenate leaf-lobes, are both more or less equally common (Chater 2009b). As the maps show, var. *crenatum* is somewhat more northern and eastern in distribution; the







average altitude of 28 colonies is 148m, while the average for 31 colonies of var. *ceterach* is 107m. Of 50 populations examined in 2005-2008, four consisted more or less entirely of intermediates, three consisted of one variety along with intermediates, seven contained both varieties, and the remaining 39 consisted of one variety only. Most of the six containing both varieties had no intermediates, suggesting perhaps that there had been separate colonisations by the two. Altitude limit (var. *crenatum*) 420m, ruin of Blaenpeithnant, Pumlumon SN76998424, 2005 (AOC & PAS).



*Asplenium ceterach* var. *ceterach*,  
Capel Vicar chapel yard SN452563,  
May 2008 (NMW)

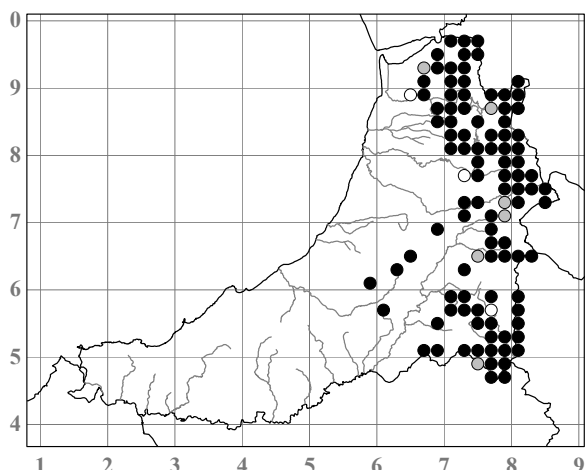
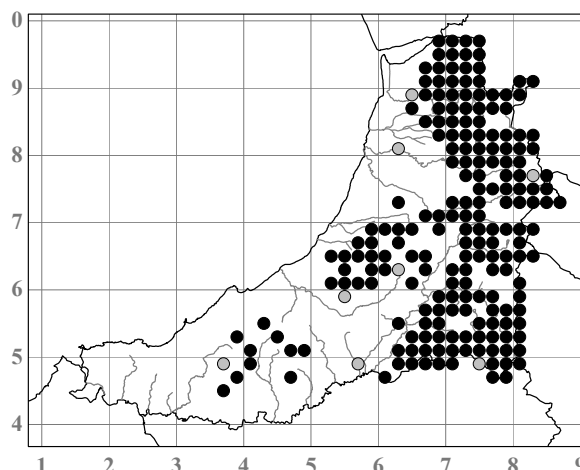


*Asplenium ceterach* var. *crenatum*,  
Ysbyty Ystwyth churchyard SN732715,  
April 2008 (NMW)

## THELYPTERIDACEAE

***Phegopteris connectilis*** (Michx.) Watt (*Polypodium phegopteris* L.) - Beech Fern - Rhedynen Gornio

An occasional fern of damp, sheltered and usually shaded, more or less vertical rocks and earthy banks, and under overhangs, chiefly in stream ravines and gullies and on N-facing cliffs in the uplands. In the lowlands it is largely confined to steep-sided wooded valleys, only occasionally growing in more open places in woodland, and reaches its lowest altitude at 30m in the Llyfnant valley near Allt-ddu SN715975, 1997. It is entirely absent from the coastal zone. In its upland sites it is often the only at all unusual species present, presumably indicating some very slight base enrichment. Altitude limit 670m, Pumlumon SN7987 (Salter Diary 19.8.1926, 1935); 680m, N-facing rocks 300m N of Pumlumon Fawr summit SN790872, 2002.

*Phegopteris connectilis**Oreopteris limbosperma****Oreopteris limbosperma*** (All.) Holub (*Lastrea oreopteris* (Ehrh.) Bory) - Lemon-scented Fern - Rhedynen Bêr y Mynydd

Common throughout the uplands, especially in sheltered, damp sites along streamsides, on rocky slopes, in moorland, woodland, hedgebanks and marshes. It becomes very rare in the lowlands and is virtually absent from the coastal zone, even from the Cors Fochno area. The nearest it gets to the sea is 4km away, on heathy banks at Rhos Glandenyys, Nebo SN538650, 1990. There is however an 1854 specimen labelled "bank nr. Llanddewy Aberarth" c.SN4763 (K, Herb. Watson, MMA) which could have been much nearer, possibly on the heathy Aber-arth Common c.SN479625. Altitude limit 580m, rocks above Llyn Llygad Rheidol, Pumlumon SN794873, 2002.

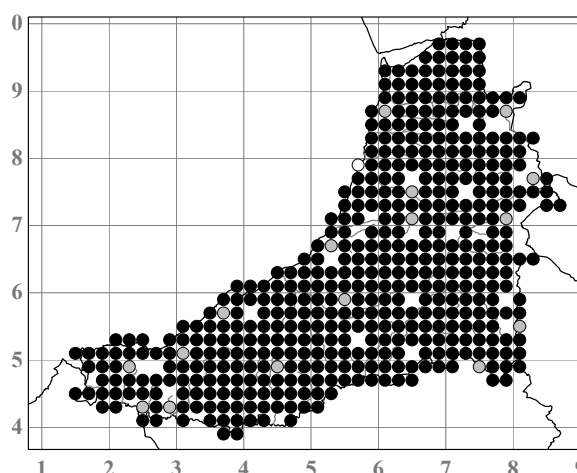
## WOODSIACEAE

***Athyrium filix-femina*** (L.) Roth - Lady-fern - Rhedynen Fair

Common throughout the county in hedgebanks, damp woods, fens, streamsides and other usually damp and shaded habitats. It is somewhat salt-tolerant and occurs on the masonry walls in the harbours at Aberystwyth SN681813, 1976-2005, and Aberaeron SN457629, 1994-2005, and also occurs on flushed slopes and in gullies on the sea cliffs. Altitude limit 560m, Rhos y Garn SN797766, 2002.

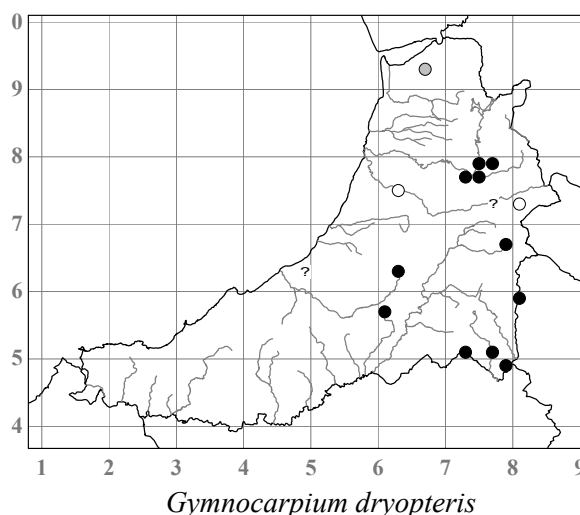
***Gymnocarpium dryopteris*** (L.) Newman (*Polypodium dryopteris* L.) - Oak Fern - Rhedynen Dridarn

An uncommon fern of damp slopes and cliffs in steep-sided valleys in remnants of ancient woodland, largely confined to the N of the county. It has been recorded from Cwm Cletwr SN670920, 1978 (WMC

*Athyrium filix-femina*



in *W.W.N.T.Bulletin* **22**: [2] (1978)) - 1980 (ADF); from Coed Rheidol in several places from opposite Bryn Bras SN75307950 to just W of the Mynach confluence SN739791, 1849 (Morgan 1849) - 2005 (SDSB; PAS & AOC); "... in the grounds of Hafod" c.SN77R, 1805 (Forster 1805); from Graig Ddu, Cwm Ystwyth c.SN8173, 1930 (Salter Diary 12.7.1930); from the Castle Hill dingle, Llanilar c.SN6274 (Salter 1935); from the Monachty dingle c.SN46W, 1899 (Marshall 1900); from the Aeron valley above Pont Gou SN631635, 1997 (AOC & MDS); and from the Nant y March dingle SN604574-606577, 1978-1995. In the upper Tywi area it has been recorded from the Hirnant ravine SN804581, 1999 (AOC & JPW); from the Nant Brianne ravine SN783496, 1985 (AOC & DD) - 1999; from a Hazel thicket by the Pysgotwr Fawr SN734515, 1995 (AOC & PAS); from the Nant Cnwch-gwyn ravine SN761516, 1995 (JPW & AOC); and from the Nant Lletygleision ravine SN796495, 1960s (DD), now under Llyn Brianne. Altitude limit 405m, abundant in the crevices of the drystone sloping dam of Llyn Teifi SN780674, 1990 (NMW) - 2009 (RGL).

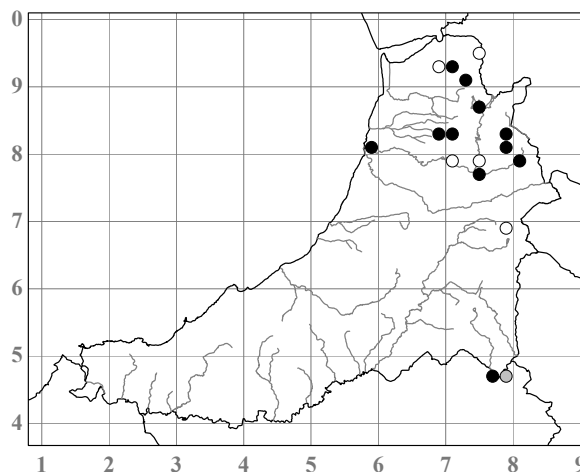


### ***Gymnocarpium robertianum* (Hoffm.) Newman - Limestone Fern - Rhedynen y Calchfaen**

Known only from the Mynach Vale lead mine SN772775, 1993 (NMW, DKR) - 2004, where in 1993 there was a colony of c.350 fronds on an overgrown rubble mound (pH8.1), and four more colonies of c.30, 20, 10 and 2 fronds on a bank, a wall and an area of spoil nearby. The mine was worked only from 1878 to 1884, and for the last 40 years or so has been surrounded by FC conifer plantations which have recently been partly cleared. The site is 55km from the next nearest for the species at Carreg yr Ogof in Carmarthenshire.

### ***Cystopteris fragilis* (L.) Bernh. - Brittle Bladder-fern - Ffiolredynen Frau**

An uncommon fern of old walls and sheltered rocks in the uplands, first recorded by Forster (1805) from Devil's Bridge c.SN7477. Lees (1841) also recorded it here "On the Devil's Bridge [SN74157701] and neighbouring walls, plentiful", and, although it has long gone from the bridges themselves, it is abundant on the retaining wall of the terrace opposite the hotel SN74087707, 2005. It is recorded from five lead mine ruins: Bryndyfi SN683934, 1966; Esgair Hir barracks SN729908, 1992 (SPC, JAM & AOC) - 2008; Cwmsymlog SN702838 etc., 1977-2008, where among other sites it is very abundant and increasing in a wheelpit and on mortared walls, and within five years of the breaking open of a large underground chamber it had colonised the mortared walls inside; the very manganese-rich Camddwr-mawr lead mine SN75118767, 2002; and Esgairlle, Cwmergyr SN791827, 1988-2008. It is abundant on old walls at Blaenmyherin farm SN800796, 1991-2003. On natural rock Salter knew it at Pistyll y Llyn SN7594 (Diary 19.6.1904, 11.10.1906); on the N-facing cliffs at Bryn Bras SN752798 (Diary 19.6.1900); and by the waterfalls at the head of the Afon Myherin (24.7.1903) where it still occurs at SN798806, 1994 (AOC & JB). The only other records are from Cnapyn Melyn SN7747, 1972, and from rocks near Troedrhiwruddwen SN772475, 1973 (both IMV *in litt.* 1978, and perhaps representing the same site). In 2008 it was found in the masonry alcove of the well in Llanbadarn Road, Aberystwyth SN59528124 (MPo). Altitude limit 415m, Esgair Hir barracks SN729908, 2003.



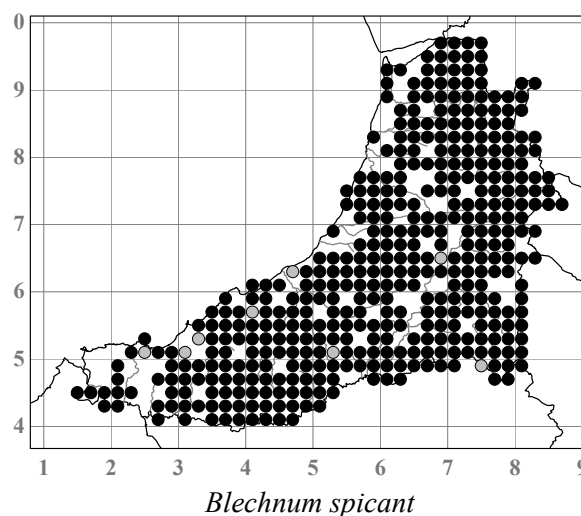
## BLECHNACEAE

**Blechnum spicant** (L.) Roth - Hard-fern - Gwibredynen

Common on the drier and more acidic soils in hedgebanks, woods, heaths, streamsides, rock outcrops and, as it is tolerant of shade, often even in conifer plantations. It is perhaps less common on the coastal slopes, and more common at middle altitudes and in the uplands. Altitude limit c.610m ("about 2,000ft."), Pumlumon, Salter (1935); 730m, 100m N of Pumlumon Fawr summit SN789870, 2003 (SDSB & AOC).

**Blechnum cordatum** (Desv.) Hieron. - Chilean Hard-fern - Gwibredynen Chile

Naturalised only in woodland in the Penglais dingle, Aberystwyth SN59388205, 2004, where a colony 7 × 5m is probably derived from a throw-out from the adjacent University Botany Gardens. Native of temperate South America.



## ONOCLEACEAE

**Matteuccia struthiopteris** (L.) Tod. - Ostrich Fern - Rhedynen Estrys

Abundantly naturalised over an area 15 × 7m in damp estate woodland 200m E of Plas Gogerddan SN63168380, 2003 (NMW). Native of Europe and Asia.

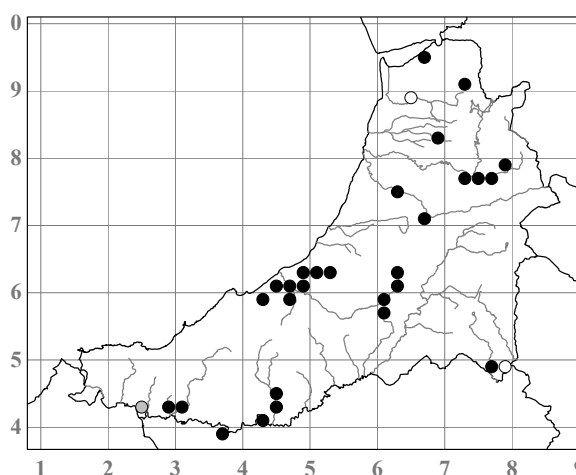
**Onoclea sensibilis** L. - Sensitive Fern - Rhedynen Leiniog

A specimen seen in estate woodland by the drive at Plas Einion, Furnace SN683949, 1982-1986 (BM, RAS, det. JMC) was presumably planted. Native of North America and E Asia.

## DRYOPTERIDACEAE

**Polystichum aculeatum** (L.) Roth - Hard Shield-fern - Gwrychredynen Galed

An occasional fern of the more base-rich soils of the S part of the county and on a few of the slightly base-rich outcrops at the base of the Silurian in the inner valleys. N of the Rheidol it is absent from natural habitats, but a clump planted on the site of the old copper mine trial in Coed Penrhyn-mawr SN679957 in 1975 by WMC was still present in 2004, and it occurs on the mortared walls in a wheelpit at Esgair Hir lead mine SN72809102, 1992 (SPC & JAM) - 2005, and in a wheelpit at Cwmsymlog mine SN69698357, 1993 (NMW, AOC & EC) - 2008 (AOC & MPo). In the Rheidol valley it grows on the base-rich rocks in Coed Rheidol W of the river SN743778, 1958 (NMW, WMC) - 1988 (NMW, RJC & GS), by the Gyfarllwyd Falls SN742775, 1998-2004, by the Mynach Falls SN741772, 1991 (NMW) - 1998, and at Derwen SN7377, 1926 (Salter Diary 11.8.1926) and in Allt Boeth opposite here SN739773, 2007 (SPC & CMFB). Up the Rhuddnant valley it is on old walls at Mynach Vale lead mine SN772775, 1993 (AOC & SPC) - 2005 and on rocks by the stream at SN799786, 1984 (NMW, AOC, WMC & DGJ) and at SN79497825, 2004. The only other upland sites are on the base-rich rocks by the Nant Brianne SN7849, 1963 (ABS, MHB) - 1968 (ABS, JPS) and on Craig Ddu by the Afon Doethie SN768484, 1992 (NMW) - 1998. Lowland sites where it is especially abundant include the





*Polystichum ×bicknellii* (plant in centre)  
with *P. aculeatum* (foreground, both  
sides) in wheelpit, Esgair Hir leadmine,  
view E from SN72809102, June 2009

disused railway cutting at Allt Brynarth SN676711, 1993-2004, and the grounds of Llanerchaeron SN479601, 1995-2005. It occurs in the wooded dingles of the Arth and Llethi, as well as further inland up the Aeron and Teifi valleys. Altitude limit 420m, wheelpit, Esgair Hir mine SN72809102, 1992-2005.

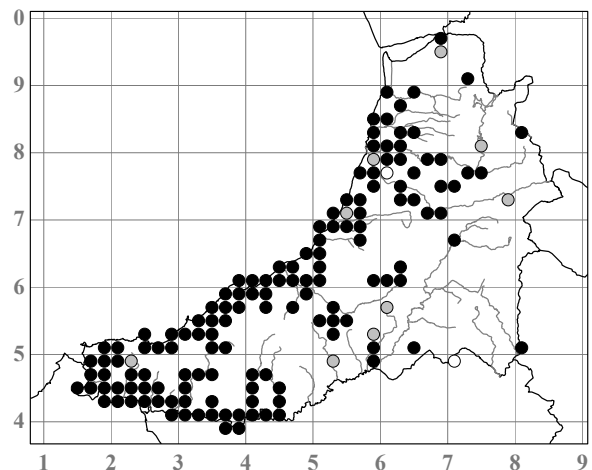
***Polystichum ×bicknellii*** (H. Christ) Hahne  
(*P. aculeatum* × *setiferum*)

First found in 1993 as one plant growing with both parents in a wheelpit at Esgair Hir lead mine SN72809102 at 420m altitude, 1993 (**Herb. SPC**, SPC, conf. AMP) - 2005. One plant was found with the parents in Allt Boeth in the Rheidol gorge SN739773, 2007 (SPC & CMFB). Three plants were found on a pathside bank S of the Afon Aeron at Llanerchaeron SN479603, with *P. setiferum* and near to plants of *P. aculeatum*, and two more plants were in woodland N of the Aeron nearby SN480604, 1998 (SPC, conf. AMP).



***Polystichum setiferum*** (Forssk.) T. Moore ex Woyn. (*P. angulare* (Willd.) C. Presl) - Soft Shield-fern - Gwrychredynen Feddal

Although said by Salter (1935) to be “In similar localities and equally frequent” as *P. aculeatum*, it is certainly now very much commoner and more widespread; it is generally characteristic of the coastal zone and the main valleys and becomes rare in the uplands. It is frequent on shaded hedgebanks and in woodland apparently wherever the soil is even slightly base-rich and more fertile, and it occasionally grows on mortared walls. On the more base-rich drift soils of some of the coastal dingles and wooded slopes it can be very abundant, as at Llanina SN4059, 1957-2005, and above the E bay at Aberporth SN259513, 1983-2005. Altitude limit 480m, rocks by stream by FC road, Peraidd Fynydd SN809821, 1996.



**Cyrtomium falcatum** (L. f.) C. Presl - House Holly-fern - Gwrychredynen-y-celyn y Tŷ

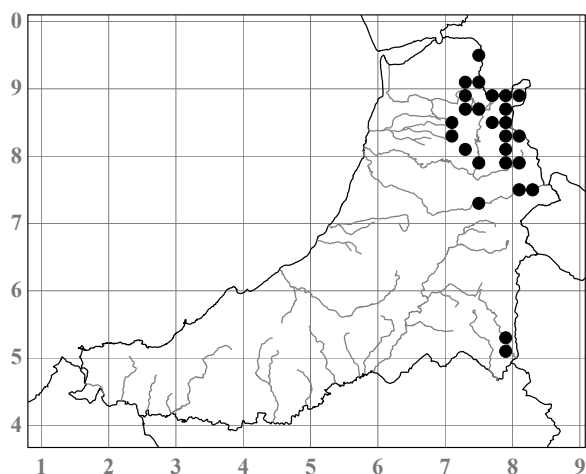
There is a well-naturalised colony varying from two to ten clumps on the retaining walls of a cellar well in Laura Place, Aberystwyth SN58128161, 1998-2008 (NMW, conf. FJR 2005). This species, native of E Asia, is less hardy than the more widely naturalised *C. fortunei*.

**Dryopteris oreades** Fomin - Mountain Male-fern - Marchredynen y Mynydd

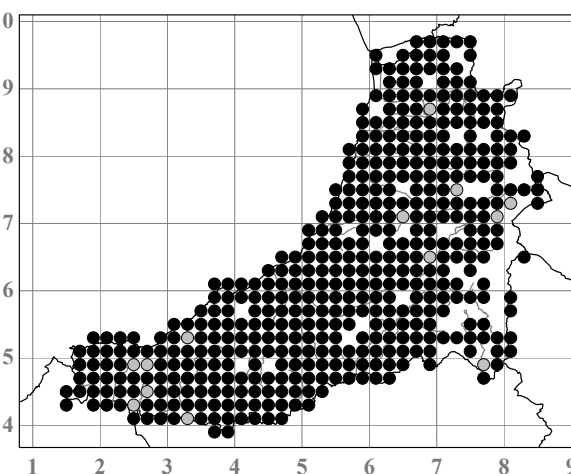
An uncommon but perhaps under-recorded fern of cliffs, screes, rocky slopes, lead mine ruins and streambanks in the uplands. It is locally abundant in the rocky parts of the Rhuddnant gorge SN797782 etc., 1996 (NMW, AOC & PAS, conf. ACP & ACJ) but elsewhere is usually in small quantity as isolated many-crowned clumps. Its lowest altitude record is at 180m, on a roadside cliff 700m ENE of Pont Rhyd-y-groes SN747730, 1996 (ACP, ACJ & AOC), and all but one of the remainder are over 300m although it does not go as high as *D. filix-mas*. Altitude limit 550m, above Llyn Llygad Rheidol SN790875, 1997 (NMW, TDD & AOC, conf. ACJ).

**Dryopteris** × **mantoniae** Fraser-Jenk. & Corley (*D. filix-mas* × *oreades*)

Recorded from only one site, a mixed colony with *D. filix-mas* on the walls of the disused Bwlch-glas lead mine SN710877, at 220m altitude, 1994 (NMW, SPC, conf. HVC) - 2005 (SDSB & AOC).



*Dryopteris oreades*



*Dryopteris filix-mas*



*Cyrtomium falcatum*, Laura Place, Aberystwyth, SN58108160, April 2006

**Dryopteris filix-mas** (L.) Schott (*Lastrea filix-mas* (L.) C. Presl) - Male-fern - Marchredynen Cyffredin

Common throughout the county in woodlands of all sorts, on hedgebanks and walls, on open grassy slopes and heaths, on screes and cliffs, largely confined to dry and well-drained sites and absent from mires. It is salt-tolerant and often occurs on sea cliffs in the spray zone, and is generally much commoner along the coast than the *D. affinis* group. In the uplands it tends to be confined to cliffs and screes, and is common on lead mine and other ruins. Altitude limit 670m, Pumlumon SN7987, Salter (1935, Diary 19.8.1926); 650m, Pen Cerrig Tewion, Pumlumon SN798882, 2001.

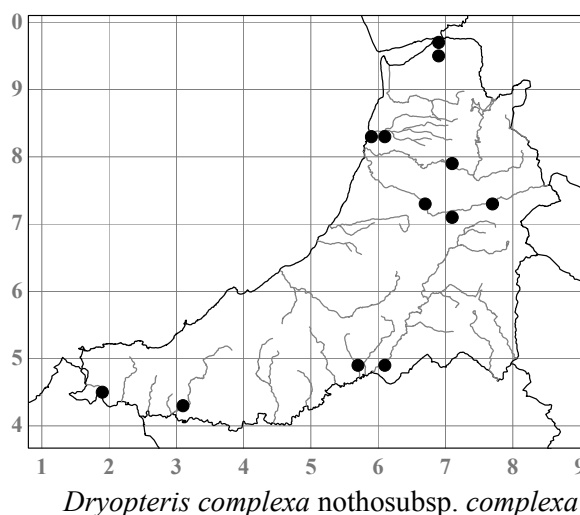


**Dryopteris × complexa** Fraser-Jenk. nothosubsp. **complexa** (*D. affinis* subsp. *affinis* × *felix-mas*)

Recorded from 14 sites throughout the county, from mixed woodland by the Afon Einion at Furnace SN68489520 in the N (NMW), to a roadside bank 1km SSW of Cellan SN61444800 in the SE, and to the wooded ravine of Cwm Du, Coedmore SN19484438 in the SW, all 2005 (KT, SJT & AOC). Altitude limit 410m, streambank, Esgair Fraith lead mine SN73979115, 2003 (SJT & KT).

**Dryopteris affinis** subsp. **paleaceolobata** × **felix-mas**

A plant on an overgrown quarry slope in mixed woodland S of the road by the Afon Ystwyth 1.3km ENE of Pont Llanafan SN70007172, 2005 (NMW, KT, SJT & AOC) - 2008 (KT, ACJ & AOC) with completely abortive spores is considered to be this hybrid by KT, subsp. *paleaceolobata* being the only subspecies of *D. affinis* present at the site.

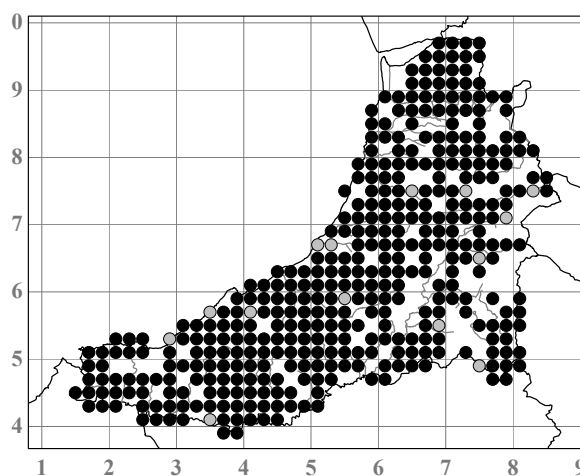
**Dryopteris × critica** (Fraser-Jenk.) Fraser-Jenk. (*D. borrieri* × *felix-mas*)

Recorded only three times, from the wooded ravine of the Llyfnant 300m SW of Cwmrhaidr SN752960, 1997 (NMW, TDD & AOC, det. KT), in mixed woodland between the Afon Ystwyth and the road 1.3km ENE of Pont Llanafan SN70007176, 2008 (KT, ACJ & AOC), and from *Quercus petraea* woodland in Coed Cwm-du, Cwm Cou SN30904283, 2005 (NMW, KT, SJT & AOC).

**Dryopteris affinis** group

Members of this group are common throughout the county in woods, scrub and heaths, and on rocky hillsides, cliffs, streamsides and hedgebanks. They often grow with *D. filix-mas*, but equally often only one or the other is found, for no obvious ecological reasons. The *D. affinis* group though seems less common along the coast, as noted for example in Cornwall (French *et al.* 1999).

There have been several taxonomies for this problematical group, which consists of a series of apogamous diploids and triploids derived from hybridisation between *D. oreades*, a hypothetical “pure” *D. affinis* ancestor and *D. caucasica* (a species from the Black Sea region which is one of the parents of the allotetraploid *D. filix-mas*), and I have followed Fraser-Jenkins (2007) for the formal taxa. I have arranged under the species the various informal “morphotypes” proposed by Jermy & Camus (1991), with the addition of further morphotypes recognised by A. C. Pigott (1997) and by K. Trewren. These morphotypes, which are in fact distinctive apogamous taxa, are, like the clones of *Ulmus* and *Populus* and the species of *Rubus* and *Hieracium*, the recognisably distinct entities that one sees in the field and that can be reliably recorded by someone with sufficient knowledge and experience, and I have accepted and used below only records made or confirmed by one or other of these two experts. Many of the records were made on two days of excursions in the N of the county with A. C. Pigott and A. C. Jermy in October 1996, and on five days of excursions throughout the county with K. Trewren and S. J. Thomas in July 2005 (Chater 2006). Most of the morphotypes must obviously be very much more abundant than these few confirmed records indicate. Especially good sites for seeing a wide variety of them include the Llyfnant SN79D and I, Cwm Woods c.SN600834 and the Ystwyth valley from Pont Llanafan to Pontrhyd-y-groes SN695716-738720.



***Dryopteris affinis* (Lowe) Fraser-Jenk. - Scaly Male-fern - Marchredynen Euraid**

Widespread especially in the uplands and common on banks, open slopes, screes and streamsides, but perhaps less common in the lowlands and in woodland than *D. borrieri*.

**Subsp. *affinis***

Morphotype '**affinis**': 66 records, about half of them from woodland of various sorts and the rest from banks, open hillsides, rocky streamsides and cliffs. It is for example especially well-developed and abundant on clay soil in open woodland by the Trawsgoed reservoir SN660726, 1996 (ACP, ACJ & AOC) and on heathy banks at Blaencribor SN404483, 1996 (NMW, det. ACP). Altitude limit 590m, cliffs above Llyn Llygad Rheidol, Pumlumon SN79468732, 2003 (NMW, det. KT).



*Dryopteris affinis* 'black-scaled *affinis*', Cwm Einion SN69919429, July 2005

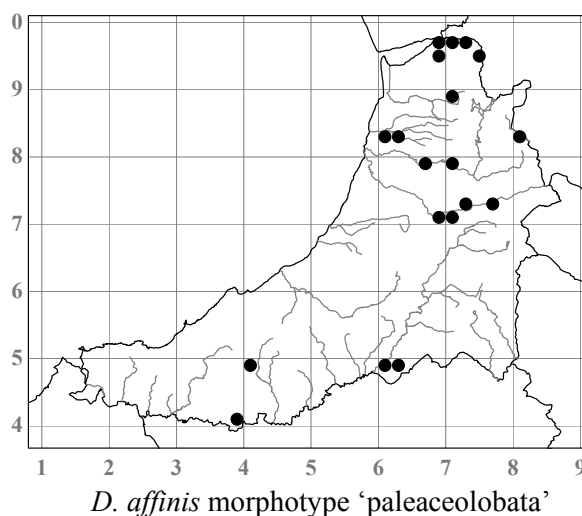
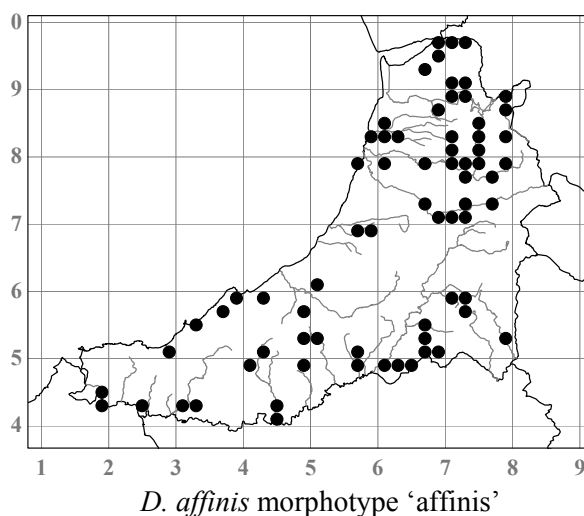
Four other distinctive morphotypes have been noted:

A '**black-scaled *affinis***' grows in mixed woodland in Cwn Einion SN69919429, on the roadside 1.1km W of Glasbwl, Llyfnant SN72639730, and on the roadside bank in Upper Forest, Lampeter SN57504965, all 2005 (NMW, KT, SJT & AOC). It matures earlier than any other morphotype in the county except for 'paleaceo-lobata', and similar plants have been seen in SW Ireland and in Merioneth.

A '**ginger-scaled *affinis***', rather similar to *D. affinis* subsp. *kerryensis* from SW Ireland, seen at two sites: in estate woodland 400m N of Plas Gogerddan SN627839, 2006 (NMW, ACP & AOC); and by the FC road N of Dol-fawr in Cwm Rheidol SN70387954, 2006 (NMW, ACP & AOC).

An '***affinis* with strongly toothed pinnules**', ten clumps of which grow in and around the rock cutting in woodland just W of Cae'r-berllan, Ynys-hir SN68259633, 2005 (NMW, KT, SJT & AOC), is probably just a local form but is very distinctive.

An '***affinis* with the base of the frond truncate**', found at four sites: on a roadside bank under Beeches, Clarach valley SN597835, 1996 (NMW, det. KT); in a Sycamore wood 1km SW of Llan-granog SN308534, 1997 (NMW, det. KT); in mixed estate woodland E of Gwernant Home Farm, Troed-yr-aur SN337460, 1997 (NMW, det. KT); and in *Quercus petraea* woodland, Coed Cwm-du, Cwm Cou SN30934290, 2005 (NMW, KT, SJT & AOC).





Subsp. **paleaceolobata** (T. Moore) Fraser-Jenk.

Morphotype '**paleaceolobata**': 20 records, mostly from the N of the county. It seems to grow best on rocks, whether in woodland or in the open, and there are abundant especially fine plants on roadside rocks under Beeches 1.3km ENE of Pont Llanafan SN700717, 1996 (ACP, ACJ & AOC) - 2005 (KT, SJT & AOC), and on the open scree slopes by Pistyll y Llyn SN751947, 1996 (NMW, AOC & TDD, det. ACP). A plant from Cwm Woods SN60068328, 2005 (NMW, KT, SJT & AOC) was found to have  $2n = 82$ . Altitude limit 450m, damp gully by the Nant Garw-mawr SN809821, 1996 (NMW, det. ACP & ACJ).

Morphotype '**convexa**': recorded under trees by the Llyfnant stream 1km W of Glasbwl SN72739751-73009745, 1996 (ACP, ACJ & AOC) - 2005 (KT, SJT & AOC) when *c.*50 clumps were seen; it appears very distinct from the '**paleaceolobata**' growing nearby, although it has been suspected of having been confused with that morphotype and of not being a distinct entity. A different form of '**convexa**', with paler green, broader fronds, similar to the form in Yorkshire (KT), was seen at two sites in the SE of the county: along the roadside bank in Upper Forest, Lampeter SN57414977, 2005 (NMW, KT, SJT & AOC), where it is abundant and was found to have  $2n = 82$ ; and on a heathy roadside bank at 350m altitude, 4km E of Cellan SN64634829, 2005 (KT, SJT & AOC).

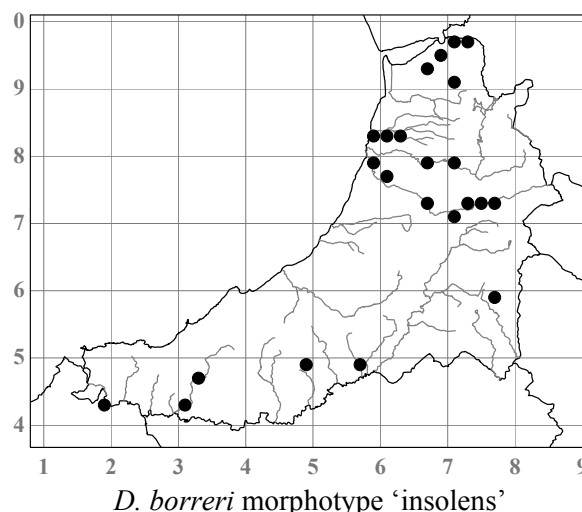
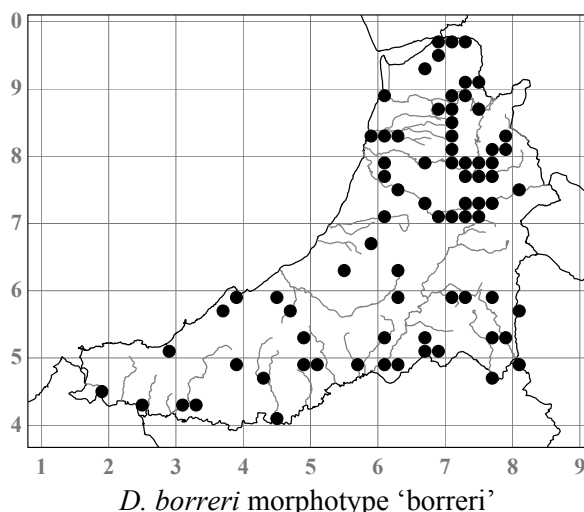


*Dryopteris affinis* '**convexa**', Llyfnant  
SN72739751, July 2005

**Dryopteris borrieri** (Newman) Newman ex Oberh. & Tavel - Borrer's Male-fern

The commonest of the species and very widespread, but perhaps more often in woodland and certainly the most frequent in conifer plantations and the least frequent in the open upland sites.

Morphotype '**borrieri**': 73 records, 46 of which are from woodland and the rest from streamsides, hedgebanks, lead mines and other open sites. There are especially fine and abundant plants in ancient woodland in Coed Cwm Cletwr SN664920, 1996 (ACP, ACJ & AOC). At Esgair Fraith it grows with '**affinis**' in the open on a stream bank SN739911 at 410m altitude, 2003 (KT & BPS Field Meeting). A puzzling plant on the streambank by the Furnace mill SN68519514 (NMW, KT, SJT & AOC) was assumed to be this morphotype after being found to have  $2n = 123$  (KT). Altitude limit 430m, rocks by Afon Merin 1.1km N of Blaenmyherin SN79798068, 2003 (NMW, AOC & PAS, det. KT).



Morphotype '**insolens**': 25 records, all but three of them from woodland, where it usually occurs in small numbers, for example in estate woods in Cwm Woods SN599835, 1996 (ACP, ACJ & AOC), in Llechwedd Dyrys, Nanteos SN616779, 1996 (NMW, ACP, ACJ & AOC) - 2008, and at Hafod SN761730, 2005 (KT, SJT & AOC). At Esgair Fraith lead mine it grows by a ruin at 410m altitude in the open SN74019119, 2003 (KT & BPS Field Meeting). It seems rare in the S of the county but has for example been found in the *Quercus petraea* woodland in Coed Cwm-du, Cwm Cou SN30984292, 2005 (KT, SJT & AOC), and in mixed woodland at Coedmore SN196438, 1996 (NMW, det. ACP & ACJ). A few plants resembling it in the

wooded ravine just S of Cwm Du, Coedmore SN19484438, 2005, were considered by KT to be intermediate with morphotype 'robusta'. Similar intermediates were seen in two sites in the N of the county. Altitude limit 470m, SW-facing cliffs, Cerrig Maesycawnau SN769587, 1994 (NMW, det. ACP & ACJ).

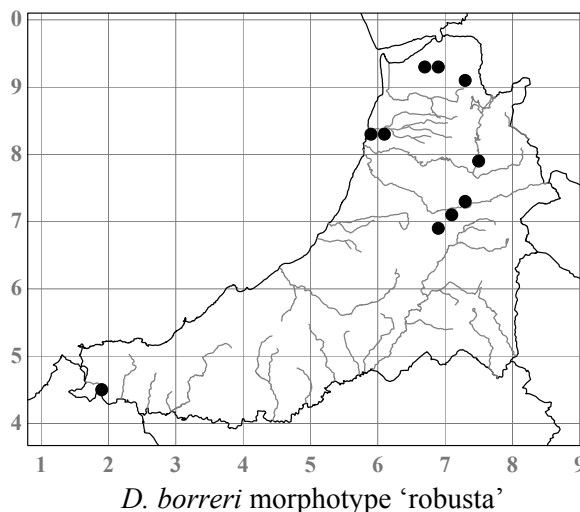
Morphotype '**robusta**': eight records, all but one in woodland, and nowhere is it abundant. Sites include Cwm Woods SN599835, 1996 (ACP, ACJ & AOC) - 2005 (KT, SJT & AOC) where there are a few widely scattered plants; ancient woodland in Coed Cwm Cletwr SN664920, 1996 (ACP, ACJ & AOC) where there are a few plants with abundant 'borreri'; and *Quercus petraea* woodland at Coed Cwm-du, Coedmore SN19614451, 2005 (KT, SJT & AOC) where it is equally sparse and where plants intermediate with 'insolens' were seen.

Morphotype '**foliosa**': recorded only from the mixed deciduous woodland of Cwm Woods SN601832, 2005 (NMW, KT, SJT & AOC).

A '**golden-scaled borreri**' is frequent in Cwm Woods SN599833-601832, 2005 (KT, SJT & AOC) and clumps were seen on the streambank at the confluence of the Nant y Castell and Nant Cefn-coch, Llyfnant SN73899700, 2003 (NMW, conf. KT), at Esgair Fraith lead mine SN739911-740912, 2008 (KT, ACJ & AOC), in the Ystwyth valley SN732720, 2008 (KT, ACJ & AOC), and in a roadside hedge-bank 500m ENE of Falcondale Lake SN57465016, 2003 (NMW, KT, SJT & AOC).

A '**dark-scaled borreri with the frond tapering to the base**', probably just a very local form, grows in a roadside hedge 900m NNE of Llwynpïod Farm, Cardigan SN183483, 2003 (NMW, AOC & RM, det. KT).

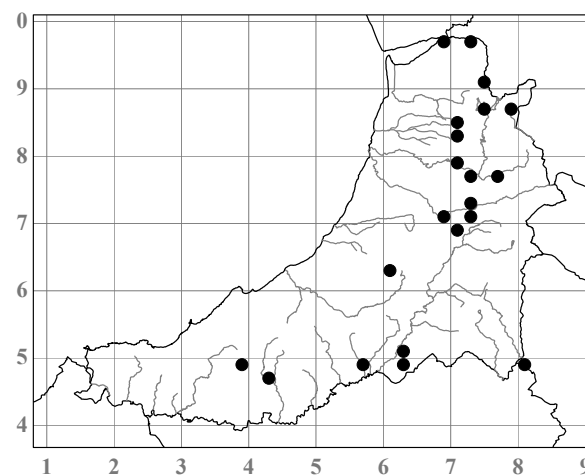
A '**borreri with prominent sharp-toothed pinnules**', a huge clump of which grows on a roadside bank 2km SE of Llanfair Clydogau SN63575015, 2005 (KT, SJT & AOC).



### **Dryopteris cambrensis** (Fraser-Jenk.) Beitel & W. R. Buck - Narrow Male-fern

The least common of the species, and, although it occurs in a range of habitats, it is most characteristic of the uplands and inland valleys, where it grows chiefly on open, often rocky slopes. Altitude limit 510m, Llyn Llygad Rheidol dam SN791878, 2002.

Morphotype '**cambrensis**': 20 records, only five from woodland and mostly from rocky slopes, cliffs and lead mines. It is the most abundant *D. affinis* group morphotype in the lower Llyfnant and is especially fine and abundant on the rocky slope above the road 1.2km W of Glasbwl SN725974, 1996 (ACP, ACJ & AOC) - 2005 (KT, SJT & AOC). Altitude limit 405m, mortared wall, Esgair Fraith lead mine SN740911, 1996 (NMW, det. ACP & ACJ).

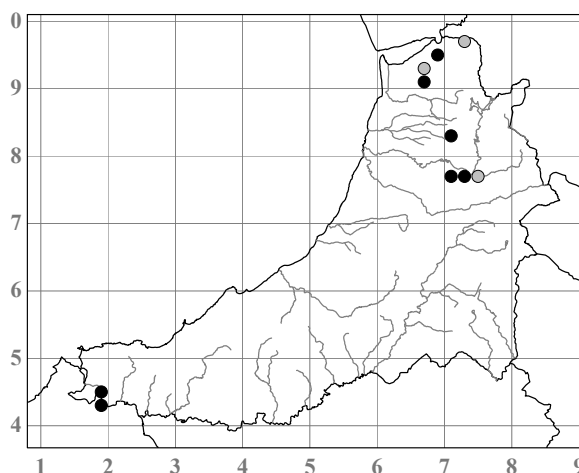


### **Dryopteris aemula** (Aiton) Kuntze - Hay-scented Buckler-fern - Marchredynen Bêr

First recorded for the county from by the Raven Falls, Cwm Einion SN69309454 in 1953 (NMW, FR), and a dozen or so plants can usually still be found there, 2005; a few plants also grow under conifers further up the slope SN69259442, 2004. It occurs in several other of the steep-sided, humid valleys that have relics of ancient woodland, and usually grows in spacious areas with a high tree canopy. In Cwm Castell c.SN7397 it was seen in 1976 but not since (DAR & RGW). In Cwm Cletwr a plant was found in the lower part of the valley SN664920 in 1974 (BM, PMB), and several young plants were here in 1978, and in 1999 a plant was found higher up the valley SN672919 (AOC, RB & LRG); Salter may well have unknowingly seen it here as he writes of Cwm Cletwr (Diary 8.5.1895): "There is no more charming little valley in these hills ..... hundreds of fern-fronds unfurling, hay-scented." In the Rheidol valley by the Devil's Bridge falls c.SN742772 five plants were seen in 1978 (RHR) but have not been seen since; further down the valley in

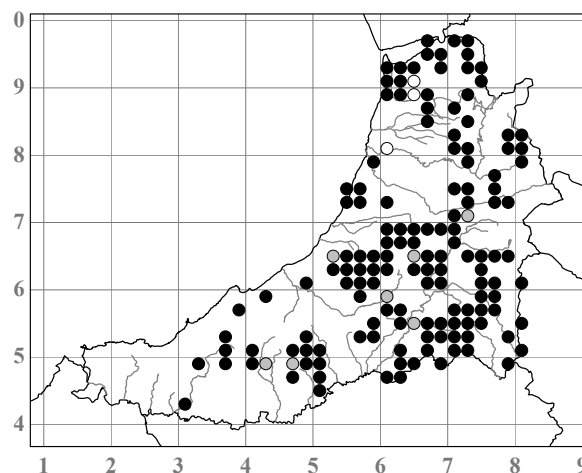


1998 a few plants were seen at Derwen SN73587735 and Allt Ddu SN71957787 (ABGA), and in 2007 six plants were seen in Allt Boeth SN736774 across the river (SPC). The only large population in the county is in the Teifi gorge near Coedmore, in the stream gully S of Cwm Du SN194444, where it was first found in 1981 (DAR). 57 plants were present in 1983, and *c.*50 in 2005 (KT, SJT & AOC), and a single plant by the path in Cwm Du itself has looked the same from 1981 to 2005. In 1994 *c.*6 plants were found on pathside banks near Coedmore mansion SN194436 (SPC, AOC & ADH). The only notably different habitat is by Llyn Pendam SN70708390, where two plants were found in 2000-2002 (NMW, AOC & JPW, conf. ACJ) on an open, heathy S-facing slope where conifers had been felled *c.*1990; this is its altitude limit, 350m.



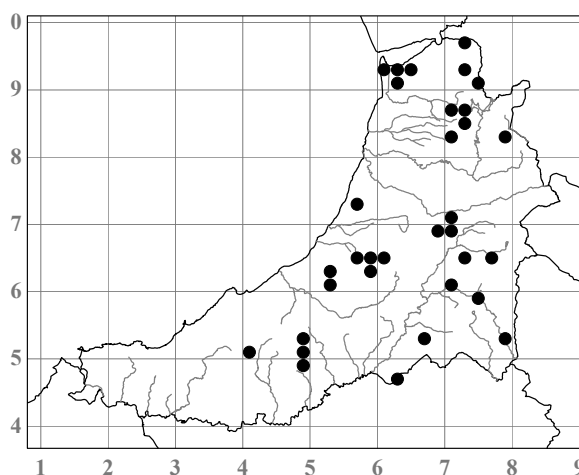
***Dryopteris carthusiana* (Vill.) H. P. Fuchs (*Lastrea spinulosa* C. Presl) - Narrow Buckler-fern - Marchredynen Gul**

Frequent in all but the most acidic mires, but especially characteristic and abundant in the lowland or middle altitude valley mires. At Cors Fochno SN69 and Cors Caron SN66-76 it occurs chiefly around the edges of the raised bogs and in the cut-over and more mesotrophic areas, and in the small basin mires at pingo sites elsewhere in the county it is often abundant around the margins. In the uplands it is often found, though usually in small quantity, in blanket bogs, frequently amongst *Molinia*. It occurs often in *Salix* or *Alnus* carr in mires or on flushed slopes, and in peaty places in conifer plantations. In drier woodland it is very rare, but in Coed Nant-yberws SN73697186, 1980 (NMW) a few plants were found on moss-covered boulder scree under *Quercus petraea*, and in the Marchnant valley SN605577, 1985 (NMW, IKM, conf. CRF-J) four plants were recorded in acidic Oak woodland. Altitude limit 540m, damp ride in conifer plantation E of Llynnoedd Ieuan SN802819, 1996 (ACJ & AOC).



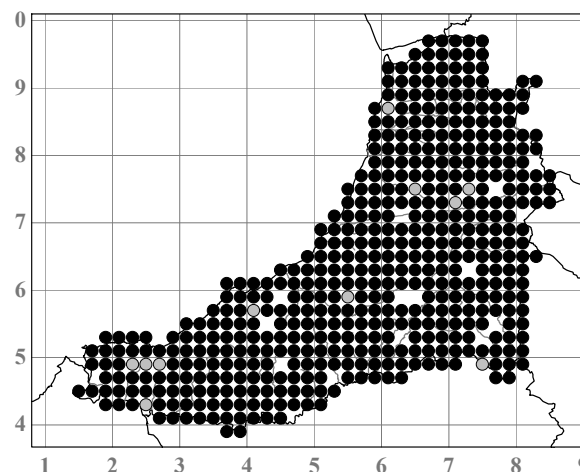
***Dryopteris* × *deweveri* (J. T. Jansen) Wacht. (*D. carthusiana* × *dilatata*)**

First recorded from Cors Fochno SN69 where it was “frequent with, and apparently outnumbering, both parents” in 1963 (*Proc. BSBI* 5: 346 (1964), PMB, conf. SW). It is still present in abundance there, especially in *Salix* carr near Rock House SN642922, 1998-2005. It is widespread at least in the N of the county in sites where the parents grow together. It is probably very under-recorded, but in several places where the parents are abundant together over large areas it does not occur, as on the blanket mire of Cors Pwllbadell SN586655, 1996 (AOC & ACJ). Altitude limit 500m, low mounds in eroding blanket bog above Padell Nant-Wyddon, Pumlumon SN78018323, 2006 (SDSB & AOC).



***Dryopteris dilatata* (Hoffm.) A. Gray (*Lastrea dilatata* (Hoffm.) C. Presl) - Broad Buckler-fern - Marchredynen Lydan**

Common throughout the county in a wide range of habitats including woodlands, mires, heaths, rocks, banks and streamsides, from the coastal slopes to the summits where it is usually confined to screes and rock crevices. It is sometimes the dominant or only species in the deep shade of conifer plantations. Plants with long rhizomes have been noted in dry Oak woodland in two places, in Coed Nantyerws and in Coed Cwm Cletwr, SN664920, 1996 (ACJ, ACP & AOC). Altitude limit 670m, above Llyn Llygad Rheidol “to quite 2,200ft”, Salter (Diary 26.9.1903, 5.9.1932, 1935); 750m, Pumlumon Fawr summit rocks SN78978692, 2002.



[*Dryopteris expansa* (C. Presl) Fraser-Jenk. & Jermy - Northern Buckler-fern - Marchredynen y Gogledd  
Erroneously recorded from Cwm Ystwyth in 1981 (*Watsonia* 14: 187 (1982)).]

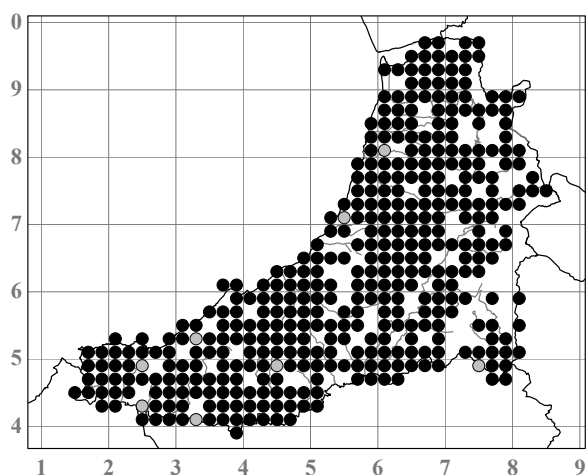
## POLYPODIACEAE

### ***Polypodium* L.**

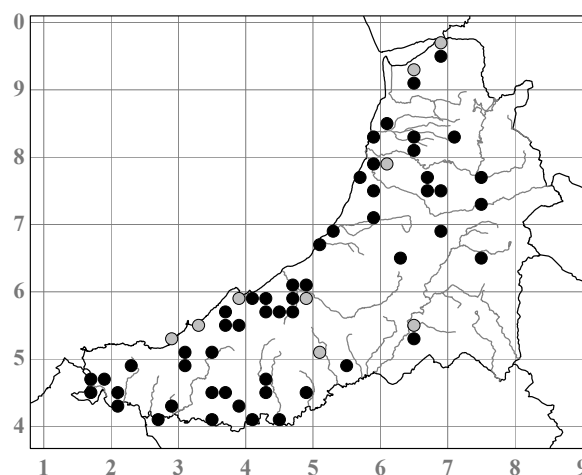
A great number of specimens were identified or confirmed over the years by the late R. H. Roberts.

#### ***Polypodium vulgare* L. - Polypody - Llawredynen Gyffredin**

A very common fern of both drystone and mortared walls, hedgebanks, rock outcrops and screes, as an epiphyte especially on Oaks but also on Beech and many other trees, on the ground in woods and on open slopes, on mature dunes and even occasionally on moss or sedge tussocks in bogs. Salter (Diary 8.5.1897) recorded it (or perhaps *P. interjectum*) on the Ynys-las dunes SN69B, remarking “strange habitat for a fern!” Altitude limit c.610m (“to about 2,000ft.”), Pumlumon, Salter (Diary 26.9.1903, 1935); 560m, W-facing cliff at the head of the Nant y Moch SN784862, 2002 (AOC & PAS).



*Polypodium vulgare*



*Polypodium ×mantoniae*

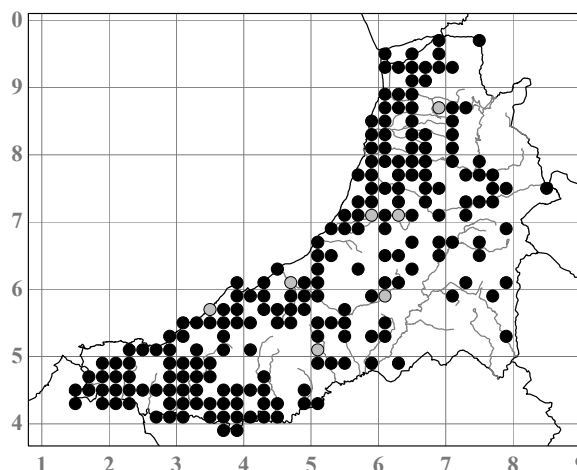
#### ***Polypodium ×mantoniae* Rothm. ex U. Schneid. (*P. interjectum* × *vulgare*)**

A frequent hybrid, usually forming dense and extensive colonies on hedgebanks, but occasionally on mortared walls, exposed banks or on rocky, wooded slopes. The first record was from a shaded roadside bank 450m E of Penbryn church SN298520, 1983 (NMW, det. RHR) and it has since been found in about 65 sites. In a few places, for example on a roadside bank 1km E of Llangranog SN325543, 1983 (NMW) and on a laneside bank by Llanrhystud vicarage SN538698, 1985 (NMW) the specimens were considered by Roberts to be perhaps back-crosses as they showed a higher than usual spore fertility. The highest altitude it has been found at was 250m, on a roadside bank near Devil's Bridge SN743766, 1999.



**Polypodium interjectum** Shivas - Intermediate Polypody - Llawredynen Ganolig

A common fern of mortared walls, hedgebanks, as an epiphyte especially on Oaks, and occasionally on wooded and rocky slopes, and on older, well-vegetated sand dunes. It is by no means restricted to obviously base-rich habitats. The first record was from a roadside hedgebank near Cardigan SN165443, 1962 (**BM**, TAWD, det. ACJ & JAC). It usually forms dense, discrete colonies, and often grows close to *P. vulgare*. Both species occur on the Ynys-las dunes SN607939 etc., 1993-2005. There are good populations on the old walls of Strata Florida abbey SN747658, 1984 (**NMW**, det. RHR) - 2005. '**Bifidum**' was collected from near Newcastle Emlyn bridge SN309409 in 1998 (HMR). Altitude limit 440m, mortared wall of Sheep pens, Claerddu SN792686, 1989.

**Polypodium** × **shivasiae** Rothm. (*P. cambricum* × *interjectum*)

In spite of repeated searches, only one plant has been found, growing amongst abundant *P. cambricum* and a few *P. interjectum*, on the S wall of Cardigan churchyard SN18044601 in 1998 (**NMW**, conf. ACJ).

**Polypodium cambricum** L. (*P. australe* Fée) - Southern Polypody - Llawredynen Gymraeg

Known only from old mortared walls in Cardigan town where it is locally abundant in tetrads SN14S, T, X and Y, where it was first found in 1961 (**NMW**, PMB, conf. MGS, *Proc. BSBI* 5: 126 (1963), *Nature in Wales* 9: 2, 43, 145 (1964-1965)). There were several other collections soon after, including one located at SN177461 in the middle of the town (**BM**, TAWD, det. RHR). It was later found on five walls in 1979, and on 21 in 1983 when a total of c.17,000 fronds with sori were counted, certainly representing a real increase. The best populations are on the S wall of the churchyard SN18044601, 1980-2005, and the total area of the town occupied was bounded by SN18084648-17604605-18204610.

A plant of one of the '**Cambricum**' group of cultivars found "high up on a steep bank by the main road ... at the foot of an old stone wall" at Llanafan, 1965 and 1967 (**NMW**, JRG), probably from Wenallt SN674718 or Dolgwibedyn SN683714, had small fronds with lacerate, acute pinnae and was presumably a garden escape.



*Polypodium cambricum* on S wall of Cardigan churchyard, view W from SN18044601, December 1980

**GYMNOSPERMS** - Conifers**GINKGOACEAE****Ginkgo biloba** L. - Maidenhair-tree

A tree in Mariamne's Garden at Hafod SN764732 was still alive and 9m tall, though leaning steeply, in 1975, but had died by 1981 and was then sawn up by the FC and sections of it sold in aid of the Naturalists' Trust; the strongly fluted trunk was 95cm girth at 1.5m up, with 118 annual rings ( $\pm 10\%$ , counted by P. Gasson of the RBG, Kew), so it had probably been planted by

John Waddingham who owned the estate in 1864-1892 (Chater 1999). Other trees include one 240cm girth and 15m tall in 1994, in The Woodlands garden, Bryn-y-mor Road, Aberystwyth SN58608260; a small tree 20cm girth and 5m tall in 2006 on the University campus, Penglais SN59748158; two trees, the larger 289cm girth and 15m tall in 2005, at Bronpadarn, Llanbadarn Fawr SN602810; a tree 99cm girth and 11m tall in 1996, at the NW corner of Nanteos mansion SN61997864; three trees, the W-most 240cm girth and 22m tall in 2006, the middle one 307cm girth and 22m tall in 2006, and the E-most 245cm girth and leaning strongly in 2006, in the shrubbery S of the walled garden at Nanteos SN621785; and a tree 216cm girth (but double-trunked) and 12m tall in 2002, just E of the walled garden at Highmead SN50104290. Native of China and introduced to Britain in 1758. Maximum 307cm girth, 22m tall, as above.

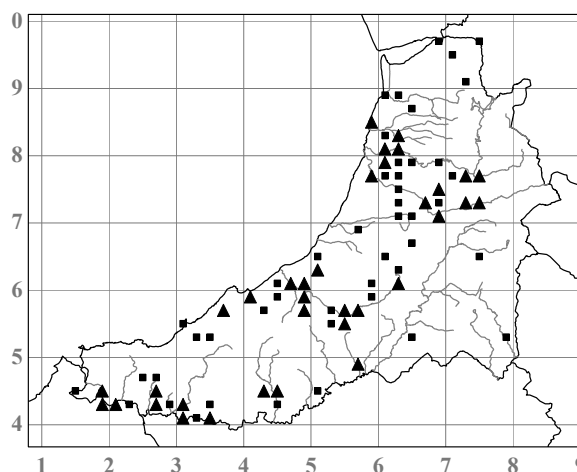
## PINACEAE

### **Abies alba** Mill. - European Silver-fir - Ffynidwydden Arian

Native of Europe, introduced to Britain in 1603. Commonly planted for ornament in estate woodlands, churchyards and gardens, less often in shelter belts and scarcely ever forestally, and most trees are mature or senescent. It self-seeds abundantly in woodland.

Two trees in the small wooded enclosure by the Norman motte of Tomen Rhyd-Owen SN443447 were 236cm girth and 25m tall, and 301cm girth and 24m tall in 2007, and could possibly be from the early instance of planting recorded by Fenton (1917) when in 1804 he was shown “a most beautiful Tumulus situated on the South side of the River near a fordable place, called Tommen Rhyd Owen. Mr. Lloyd [of Alltyrolyn] has planted it with silver fir. I longed to have had Mr. Cunnington there to have got into its bowels.”

Maximum 443cm girth, 39m tall, 2002, Coed Penglanowain SN609786; there are three especially fine trees here altogether. Salter though (Diary 17.9.1930) recorded that “Just above Pant Dafydd [SN348436] two great Silver Firs stand beside the lane. The larger one is an immense tree, with trunk 20 feet [610cm] round at five feet from the ground”. These trees were felled some decades ago by “Ben Mawr”, a local dealer. Altitude limit (planted) 440m, FC trial plots, Castell SN738908, where trees planted in 1956 were only 57cm girth and c.12m tall in 1992.



### **Abies amabilis** Douglas ex Forbes - (Pacific Silver-fir)

Of the conifers trialled by the FC in the county but never grown commercially, *A. amabilis* was probably the most promising. The largest of many trees planted in 1956 in FC trial plots at Castell SN738908 at 440m altitude was 85cm girth and 14m tall in 1992, and 136cm girth and 23m tall in 2006 (AOC & RAJ); they are generally growing well in spite of lack of thinning. The largest of five remaining trees planted in 1968 at Bryn Gwyn, W of the Nant y Moch Reservoir SN745865 at 380m altitude was 1.5m tall in 1992, and 36cm girth and 5m tall in 2006; all appear very healthy. One of eight fine trees planted in 1959 in the FC Arboretum, Gogerddan SN631833 was 125cm girth and 15m tall in 1993. Self-sown plants have not been seen. Native of W North America, introduced to Britain in 1830.

### **Abies balsamea** (L.) Mill. - (Balsam Fir)

Twenty five plants of this rarely grown conifer, under the name of ‘Balm of Gilead Fir’, were included in an order for 8,500 trees sent from the Felindre nursery in Carmarthenshire to James Morgan of Maesnewydd, Tal-y-bont SN646879 in 1809 (Lloyd 2000). Their fate is unknown, but the species, native of North America and introduced to Britain in 1697, was notorious for its poor performance here.

### **Abies cephalonica** Loudon - Greek Fir

The only trees noted are three, one being 43cm girth and 5m tall in 1995, planted on the University campus, Penglais SN59908165. Native of Greece, introduced to Britain in 1824.



**Abies concolor** (Gordon) Hildebr. var. **lowiana** (Gordon) Lemmon - Colorado White-fir

Native of W North America and introduced to Britain in 1851. There are two small FC plantations for timber in Coed Tynbedw SN691709 and 691712, planted *c.* 1960, 105cm girth, 12m tall etc., 1994. There is a shelter belt of *c.* 25 trees at Troedrhiw-goch SN765809, 94cm girth, 12m tall etc., 1996; four trees in a copse near Glennydd SN759815, 90cm girth, 10m tall etc., 1996; and seven groups of trees in the FC Arboretum, Gogerddan SN633834, 130cm girth, 13m tall etc., 1993, planted in 1956-1959. It has not been seen self-sown. Both the northern and southern forms are represented.

**Abies delavayi** Franch. - Delavay's Silver-fir

Three trees, one being 96cm girth and 12m tall in 1993, very poorly grown, in the FC Arboretum, Gogerddan SN631833 were planted in 1959. Native of China and introduced to Britain in 1911.

**Abies firma** Siebold & Zucc. - Momi Fir

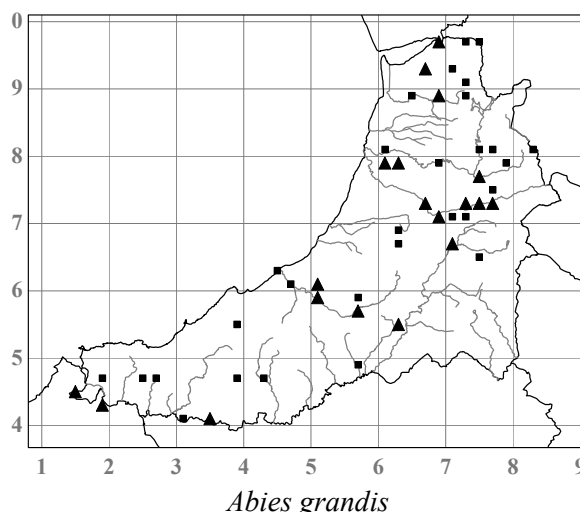
Only three planted trees of this species, native of Japan and introduced to Britain in 1861, have been noted in the county. One, 51cm girth and 8m tall in 2005, is in mixed FC woodland, Ty'n-y-garth, Cwm Einion SN69009464. One, planted in 1965, 126cm girth and broken off at 5m up, 1991, is in the FC Arboretum, Gogerddan SN630833. The sole surviving tree of several planted in 1956 in the FC trial plots at Castell SN738908 at 440m altitude was a well-shaped tree but only 45cm girth and 8m tall in 2006 (AOC & RAJ).

**Abies grandis** (Douglas ex D. Don) Lindl. - Giant Fir - Ffynidwydden Fawr

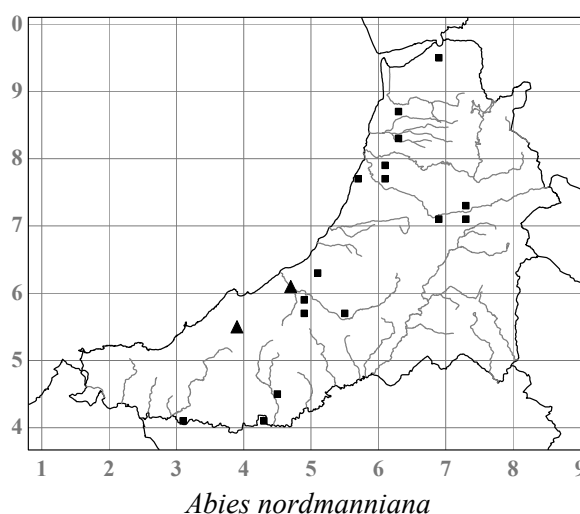
There have been many FC plantations for timber in the last 50 years, and it is occasionally planted in estate woodlands and in the open for decoration. It regenerates abundantly in woodlands and on roadsides. Native of W North America and introduced to Britain in 1832. Maximum 243cm girth, 1992, Ystrad Einion SN707939.

**Abies koreana** Wilson - Korean Fir

Native of Korea, introduced to Britain in 1913. Four trees, one being 52cm girth and 8m tall in 1992, with abundant cones, in the FC Arboretum, Gogerddan SN633834 were planted in 1961.

**Abies nordmanniana** (Steven) Spach - Caucasian Fir - Ffynidwydden y Cawcasws

Native of SW Asia and introduced to Britain in 1848. There are a very few FC plantations for timber, as at Coed Tynbedw SN691709, 2004, and Allt Wig-wen SN474607, 2003. It was grown for Christmas trees at Pontrhyd-y-groes SN737721 in the 1990s, and is occasionally grown in estate woodlands and parks, and for decoration in large gardens. Seen regenerating only in estate woodland at Llanerchaeron SN47976018, 1996 (SPC) and in a felled plantation near Synod Inn SN385546, 1998. Maximum 313cm girth, 31m tall, 2004, Ynys-hir SN68339582.

**Abies pinsapo** Boiss. - Spanish Fir

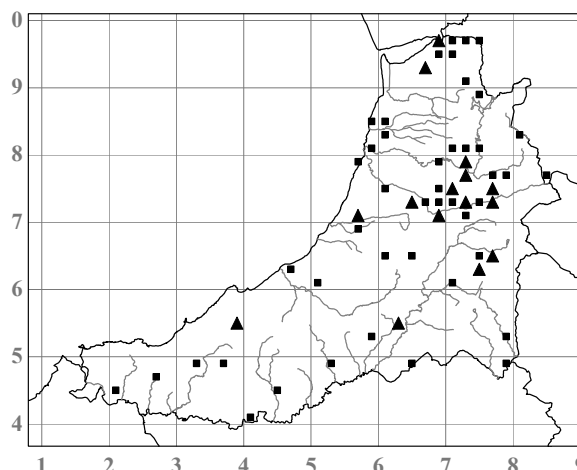
There is a good tree 316cm girth and 25m tall, 2004, at the S end of the Ynys-hir gardens SN68349582. Eight trees in the FC Arboretum at Gogerddan labelled as *A. pinsapo* on the original plan are not this species. Native of S Spain and introduced to Britain in 1839.

### ***Abies procera* Rehder - Noble Fir - Ffynidwydden Urddasol**

Native of W North America and introduced to Britain in 1830. There are many FC plantations for timber, with licensed collecting of branches for Christmas decoration. It was grown for Christmas trees in the 1990s at Pontrhyd-y-groes SN737721 and Glasbwl SN739974, and is sometimes planted as isolated trees for decoration in estate woodlands and parks. It regenerates in many plantations and on FC roadsides. Maximum 351cm girth and 26m tall, 1994, 372cm girth and 30m tall, 2004, estate woodland 200m ESE of Alltyrodyn SN45204418. Altitude limit (planted) 540m, Pen y Garn SN794774, 1991; (self-sown) 350m, FC plantation 2km SE of Strata Florida SN761643, 1992.



Regenerating *Abies procera*, with Matt Sutton, Allt Dihanog, Hafod, view W from SN759727, January 2006



### ***Abies veitchii* Lindl. - Veitch's Silver-fir**

Several groups of trees, maximum 122cm girth and 16m tall in 1993, in the FC Arboretum, Gogerddan SN630833 were planted in 1956. Native of Japan and introduced to Britain in 1879.

***Abies cilicica*** (Antoine & Kotschy) Carrière, ***A. homolepis*** Siebold & Zucc., ***A. lasiocarpa*** (Hook.) Nutt., ***A. magnifica*** Murray and ***A. sachalinensis*** Masters were all planted in the FC Arboretum, Gogerddan SN630833 in 1956-1967 but had died before 1993.

### ***Pseudotsuga menziesii* (Mirb.) Franco - Douglas Fir - Ffynidwydden Douglas**

Widely planted for forestry and ornament and often self-sown. Douglas Fir was introduced into Britain in 1827 from North America, and first planted in Wales in 1840 at Penrhyn Castle, Gwynedd. It grows best in sheltered, comparatively frost-free sites on fertile, well-drained soils as it is near its climatic limits in this area, and the best plantations are consequently mostly in the deeper valleys. Although small-scale private plantations had begun in the late 19<sup>th</sup> century, planting by the FC began in the 1930s. By 1947-1949 there were 323 acres (130ha) in the county (FC 1953), rising to 617ha by 1983 (FC 1983) and 976ha by 1998 (FC 2004), the peaks of



Ancient *Pseudotsuga menziesii*, Lodge Park, view N from SN662934, March 2005



planting being in the 1950s and 1990s. Natural regeneration occurs chiefly at the edges of plantations and on FC roadside slopes. There are many magnificent trees in estate woodlands and grounds, perhaps the best group being of 15 trees just E of Plas Gogerddan SN630836, where the largest was 317cm girth and 32m tall in 2005, but those at Ynys-hir SN683958, Nanteos c.SN6178, Aber-mad SN600760, Trawsgoed SN67R, Monachty SN5061, Ty-glyn c.SN499599 and Cilgwyn c.SN313410 are also fine. Individual trees of interest include a huge relic on the Hafod estate, 700m E of Pont Rhyd-y-groes SN74897287 which was 372cm girth in 1982, 382cm girth in 1991, and 418cm girth and 29m tall in 2004. Maximum 528cm girth and 21m tall in 1992 (broken at the top and with epiphytic *Rhododendrons* on the upper branches), and 541cm girth and 21m tall in 2005 (the epiphytes gone), in estate woodland 100m SW of Lodge Park SN662935; 352cm girth and 36m tall in 2004, 150m NNE of Ynys-hir SN68309601. Altitude limit (planted) 360m, FC plantations by Cae Gaer reservoir SN821816, 1986; (regenerating) 350m, FC plantation 2km SE of Strata Florida SN761643, 1992.

Most of our trees are var. **menziesii**, from the Pacific coast of North America. There is a tree of var. **glauca** (Mayr) Franco (Rocky Mountain Douglas Fir) from the Rocky Mountain region inland, on the lawn E of Plas Gogerddan mansion SN63138373, 156cm girth and 18m tall in 2008. Another tree, N of this one on the lawn, with exactly the same dimensions, is var. **caesia** (Schwer.) Franco (Fraser River Douglas Fir) from the N Rocky Mountain region.

***Tsuga canadensis* (L.) Carrière** - Eastern Hemlock-spruce

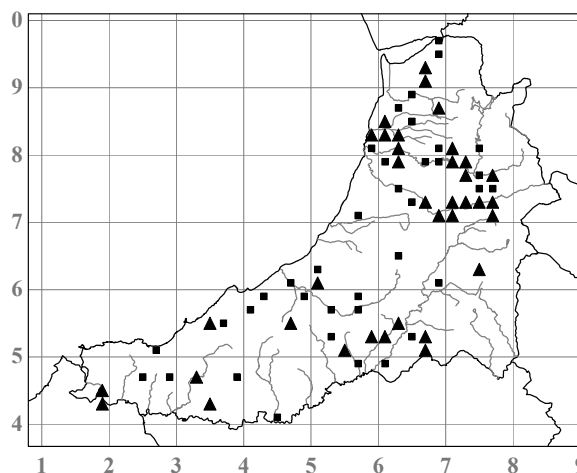
Introduced into Britain from E North America in 1736. There are trees planted in 1956 in the FC trial plots at Castell SN739903, at 410m altitude. Seedlings have not been found. A small specimen of the umbrella-shaped '**Pendula**' in the grounds 200m WSW of Highmead SN499431 was 130cm girth and 3m tall in 1992.



*Tsuga canadensis* 'Pendula' and Margaret Chater, Highmead SN499431, June 1985

***Tsuga heterophylla* (Raf.) Sarg.** - Western Hemlock-spruce - Sbriwsen-hemlog y Gorllewin

Introduced into Britain from W North America in 1851. It has been widely planted by the FC in the county for timber, especially in more sheltered and damper sites, and as it is tolerant of shade it has also been much used for underplanting Oak woods. It spreads by seed more abundantly than any other conifer here, not only in open sites such as clearings and FC roadsides and on river shingle, but even in dense deciduous woodland. Multi-aged stands from natural regeneration can be seen at many sites, for example in the Ystwyth valley at Grogwynion SN718720, 2005. FC planting began on a small scale in the 1930s and there were only 12 acres (5ha) in pure and mixed stands by 1947-1949 (FC 1953). Later censuses include it in "other conifers", but



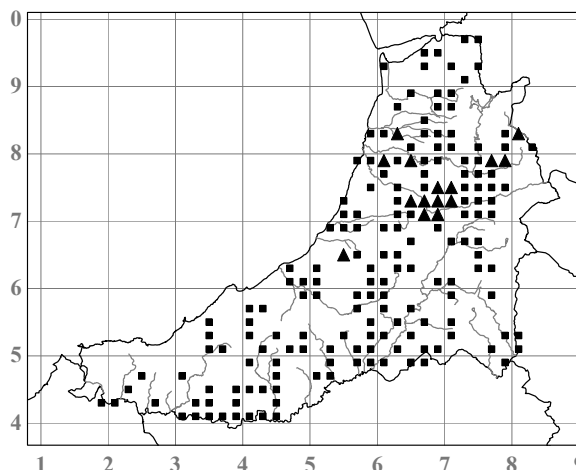
there must be well over 100ha now. It is also occasionally planted for ornament in large gardens, in estate woodland, and in amenity sites and graveyards. Of six trees (No.87) planted in 1958 in the FC Arboretum, Gogerddan SN630832, the larger of the two surviving was 138cm girth and 16m tall in 1993. Maximum 308cm girth, 19m tall, 1994, at the SW end of the avenue, Trawsgoed SN66887293. Altitude limit (planted and self-sown) 380m, a small plantation among Sitka Spruce, Coed Bwlchgwallter, Hafod SN765715, 1991.

### ***Tsuga mertensiana* (Bong.) Carrière - (Mountain Hemlock)**

Introduced into Britain in 1854 from W North America. Experimental plantings in 1959 in the FC trial plots at Castell SN738908 at 440m altitude resulted in bushes that were only 2-4m tall by 1992. Of ten trees (No.118) planted in 1959 in the FC Arboretum at Gogerddan SN633834, the tallest of the poorly shaped eight survivors was 10m tall in 1992; six others (No.161) planted in 1956 had all gone.

### ***Picea abies* (L.) H. Karst. - Norway Spruce - Sbrwisen Norway**

Widely planted both for ornament, especially in old estate woodlands, and for timber, but less extensively than *P. sitchensis* and much less frequently regenerating. It is native of Europe and has long been grown in Britain. In the late 18<sup>th</sup> century (Moore-Colyer 1992) it was planted on a small scale on the Hafod estate c.SN77R. There are many old trees on other estates such as Lodge Park, where a row of 14 magnificent trees running N-S just W of the A487(T) road at SN666937 were 192-319cm girth and 30-35m tall in 1993, and the only six left were 254-332cm girth and 35-39m tall in 2005; by the Afon Peithyll 700m WSW of Plas Gogerddan SN622833 the largest tree was 171cm girth and 23m tall in 1993; and at Nanteos, where in Coed Penglanowain the largest trees were 315cm girth and 30m tall in 1992 at SN61127859, and 336cm girth and 26m tall in 1992 at SN61107859. Old plantings probably from the late 19<sup>th</sup> century (Salter Diary 10.8.1927), including shelter belts, around the Gogerddan estate house at Angler's Retreat (Llyn Plas-y-mynydd) c.SN744925 at 395-405m altitude mostly died long ago, and the remaining trees were only 70-177cm girth and 7-11m tall in 1992. A tree in a wooded enclosure at Tomen Rhyd-Owen SN443447, 246cm girth and 23m tall in 2007, may possibly be from a planting of c.1800 (see under *Abies alba*). There is a fallen but thriving tree of 'Pendula', 168cm girth and c.24m tall in 2005, on Old Warren Hill, Nanteos SN61607870 (SPC).



Plantations for timber have always been on a smaller scale than those of *P. sitchensis*, at least since the 1930s, but it has often been preferred for low-lying, wet sites. In 1947-1949 (FC 1953) they amounted to 1,273 acres (515ha), about half the area under *P. sitchensis*, in 1983 (FC 1983) they amounted to 899ha, about one ninth, and by 1998 (FC 2004) to 876ha, about one thirteenth. Locally grown saplings were sold in Aberystwyth as Christmas trees in the 1990s.

Regeneration is very local, but can be abundant as for example near Brynafan SN701729-698728, 1993 (AOC & RNT); in Coed Alltfedw, Trawsgoed SN662732, 1992; and W of Cors Caranod SN554646, 1997. Maximum 336cm girth, 26m tall, 1992, Coed Penglanowain SN61127859; 332cm girth, 39m tall, 2005, Lodge Park SN66639385. Altitude limit (planted) 420m, 1km N of Blaenmyherin SN798806, 1991; (regenerating) 325m, S facing afforested slope 1.5km W of Blaenmyherin SN785795, 1993 (AOC & RNT).

### ***Picea asperata* Mast. - Dragon Spruce**

Of ten trees (No.166) planted in 1967 in the FC Arboretum, Gogerddan SN630832, only two were left, the larger being 24cm girth and 4m tall, in 1993. Seven others planted here in 1957 had all gone. Native of W China and introduced to Britain in 1910.

### ***Picea brachytyla* (Franch.) Pritz. - (Sargent Spruce)**

Of five trees (No.30) planted in 1956 in the FC Arboretum, Gogerddan SN630832, only three were left, the largest 103cm girth and 11m tall, in 1993. Native of Burma and W China, introduced to Britain in 1901.



**Picea breweriana** S. Watson - Brewer Spruce

One tree planted in 1990 in the Trawsgoed grounds SN67017297 was 58cm girth and 4m tall in 2008. Native of Oregon and California, introduced to Britain in 1897.

**Picea engelmannii** (Parry) Engelm. - Engelmann Spruce - Sbrüwsen Engelmann

Planted experimentally in several FC areas, but it has never grown well in the county and has not been seen to regenerate. Native of W North America, it was introduced to Britain in the early 19<sup>th</sup> century. Trees planted c.1955, along with *P. glauca*, at Nantyrarian SN719821 were only 4-7m tall in 1992, and those in an extensive plantation of 1956 on Banc Creignant Mawr SN735818 similarly failed and were only 4-10m tall in 2006 and largely moribund. Of six trees (No.74) planted in 1956 in the FC Arboretum, Gogerddan SN630832, only three were left, the largest 77cm girth and 10m tall, in 1993. There was c.1ha of *P. engelmannii*, planted c.1956, SW of Esgair Fraith SN739910, but the trees were only 2-8m tall in 1992. Trees of varying provenance planted in 1967-1969 in trial plots at Bryn Gwyn, W of the Nant y Moch Reservoir SN745865 at 380m altitude, were only 4-5m tall in 1992, and 5-12m tall and 40-65cm girth in 2006. There are many trees, 6-8m tall in 1992, by the FC picnic site 300m NNW of Pwllpeiran SN774748, and there are several blocks of trees, 5-8m tall in 1993, above the FC road in Coed Bwlchgwallter, Hafod SN770717. All our trees are probably forma *glauca* Beissn. Altitude limit (planted) 450m, WSW of Esgair Fraith SN739910, 1992.



Failed crop of *Picea engelmannii*, Banc Creignant Mawr, SN735819, April 2006

**Picea glauca** (Moench) Voss - White Spruce - Sbrüwsen Wen

Planted experimentally in most of the same FC areas as *P. engelmannii* and growing no better. It is native of N North America, and was introduced to Britain in the late 17<sup>th</sup> century. Trees planted c.1955 at Nantyrarian SN719821 were 4-5m tall in 1992, and the largest of those planted in 1956 on Banc Creignant Mawr SN735818 was 52cm girth and 8m tall in 1992. In the four groups planted in 1956 in the FC Arboretum, Gogerddan SN630832, the largest tree was 97cm girth and 14m tall in 1993. The largest of several trees at the Pwllpeiran picnic site SN774748 was 56cm girth and 12m tall in 1992. At Castell SN738908 and nearby, at 440m altitude, *P. glauca* was planted in rows in and at the edges of *P. sitchensis* plantations, and these trees were c.60cm girth and 6-10m tall in 1992. By the headwaters of the Afon Dulas, 5km E of Llanddewi-Brefi SN712541, 1992, there is a large plantation of trees, much less well grown than the contemporaneous *P. sitchensis* around it. On the NNE facing slope of Bryn Gwyn, W of the Nant y Moch Reservoir SN745865 at 380m altitude, trees planted in trial plots in 1967 averaged c.40cm girth and 5-6m tall in 1992, and c.47cm girth and 6-10m tall in 2006, including some in plots labelled *P. albertiana*. Maximum a conspicuous tree on the terrace below the Hafod Arms Hotel, Devil's Bridge SN74107707, 168cm girth and 18m tall in 1992 (NMW). Altitude limit (planted) 450m, WSW of Esgair Fraith SN737910, 1992 (NMW).

**Picea ×lutzii** Little (*P. glauca* × *sitchensis*)

First found in Alaska in 1950, seed of this hybrid was brought to Britain in 1962. The largest of many trees in trial plots planted by the FC in 1969 on the NNE facing slope of Bryn Gwyn, W of the Nant y Moch Reservoir SN745865 at 380m altitude was 5m tall in 1992, and 13m tall and 84cm girth in 2006, and most were healthier and larger than the adjacent *P. glauca*.

**Picea glehnii** (Schmidt) Mast. - Sakhalin Spruce

The largest of several healthy trees, presumably planted with the surrounding plantations in 1956, on Banc Creignant Mawr SN735818 at 340m altitude, was 12m tall and 76cm girth in 2006. The largest surviving tree of many in trial plots planted by the FC in 1968 on the NNE facing slope of Bryn Gwyn, W of the Nant y Moch Reservoir SN745865 at 380m altitude, was 4m tall in 1992, and 9m tall and 57cm girth in 2006; all are very healthy, with dense foliage. Native of E Asia and introduced to Britain in 1877.

***Picea jezoensis*** (Siebold & Zucc.) Carrière - Yezo Spruce

Four trees (No.70) planted in 1956 in the FC Arboretum, Gogerddan SN631833, had all gone by 1993. Native of Japan, introduced to Britain in 1879.

***Picea koyamai*** Shiras. - (Koyama's Spruce)

Ten trees (No.142) planted in 1961 in the FC Arboretum, Gogerddan SN631833, had all gone by 1993. Native of Japan, introduced to Britain in 1914.

***Picea mariana*** (Mill.) Britton, Sterns & Poggenb. - Black Spruce

Native of North America and introduced to Britain in 1700 where it is rather rarely planted. There are four trees, probably planted in the late 19<sup>th</sup> century, on the slope N of Llyn Plas-y-mynydd, near the Gogerddan estate house of Angler's Retreat at 405m altitude. The larger of two just N of the W end of the lake SN74429237 was 99cm girth and 12m tall, and the smaller 71cm girth and 12m tall, in 1992 (NMW, conf. HO). The two other trees, just N of the house SN74609232, were 71cm girth and broken off at 4m up, and 61cm girth and stunted and only 4m tall, in 1992. Of 14 trees (No.53) planted in 1956 in the FC Arboretum, Gogerddan SN631833, the largest of the three left was 49cm girth and 7m tall in 1993.



*Picea mariana* at Angler's Retreat, view W from SN744923, October 1992

***Picea omorika*** (Pančić) Purk. - Serbian Spruce - Sbrwisen Serbia

Trialled by FC in several places, but never growing very well or achieving the narrowly conical shape characteristic of this species. Trees in the trial plots at Castell SN738908 at 440m altitude, planted in 1956, were the best grown and were c.75cm girth in 1992. A 1.4ha plot planted in 1956 on Banc Creignant Mawr SN736818 at 350m altitude had trees averaging 70cm girth and 12m tall in 2006, while a 1.2ha plot planted in 1958 at Llechwedd Gwinau SN721822 at 360m altitude had trees 65-85cm girth and 12-14m tall in 1992. A few trees at the FC Pwllpeiran picnic site SN774748 at 290m altitude were about the same size as the latter in 1992. It is native of the upper Drina valley on the Serbia/Bosnia border, and was introduced to Britain in 1889.

***Picea orientalis*** (L.) Link - Oriental Spruce

Rarely planted, and only for ornament. There are several trees planted at the FC Pwllpeiran picnic site SN775747, the largest 162cm girth and 10m tall in 1992; and one tree, planted just W of the walled garden at Ty-glyn, Ciliau Aeron SN49675991, 102cm girth and 10m tall in 1992. In the FC Arboretum, Gogerddan SN631832, of one group of 6 trees (No.69) planted in 1956 the largest of four remaining was 101cm girth and 12m tall in 1993, and of another group of nine trees (No.47) planted the same year the largest of the eight remaining was 112cm girth and 10m tall in 1992. Native of SW Asia and introduced to Britain in 1839.

***Picea pungens*** Engelm. - Colorado Spruce

Grown mostly for ornament, but not very successful in the county and most specimens are poorly developed. A tree in the grounds NE of Plas Gogerddan SN631837 was 99cm girth in 1992; and trees in the Trawsgoed grounds SN67207299 were 45cm girth and 6m tall (No.0415), and 12m tall (No.0412), in 1994 (AOC & CDPa). The many trees in a mixed plantation at the FC Pwllpeiran picnic site SN774748 were poorly grown and only 6-12m tall in 1992. A spindly tree 165cm girth in a copse 350m S of Old Cilgwyn SN31534146 is 'Glauca', as is a tree planted in 1977 (from seed sown in 1974) by the buildings on the NW side of Trawsgoed mansion SN66947315 that was 24cm girth and 3m tall in 1994. This was also the cultivar extensively grown for Christmas trees at Ysbyty Ystwyth SN729712 in the 1990s. Native of North America and introduced to Britain before 1875.



***Picea rubens* Sarg. - (Red Spruce)**

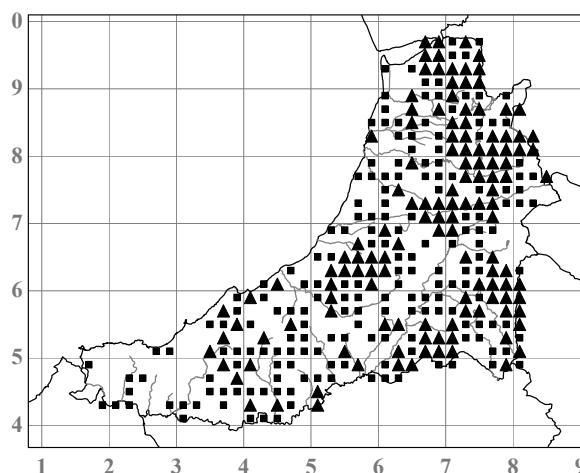
Of six trees (No.13) planted in 1956 in the FC Arboretum, Gogerddan SN630832 all had survived and the largest was 79cm girth in 1992. Native of E North America and introduced to Britain in 1755.

***Picea schrenkiana* Fisch. & C. A. Mey. - (Schrenk's Spruce)**

The largest of several trees, presumably planted in 1956 as a trial along with other Spruces, on Banc Creignant Mawr SN73508183 at 350m altitude was 9m tall and 68cm girth in 1996; they are poorly grown, though slightly better than the adjacent *P. engelmannii*. A rarely grown tree, native of C Asia and introduced to Britain in 1877.

***Picea sitchensis* (Bong.) Carrière - Sitka Spruce - Sbrwisen Sitca**

Planted over vast areas chiefly in the uplands and in the middle of the county, and commonly regenerating. Native of coastal W North America and introduced to Britain in 1831, Sitka Spruce was trialled by the newly created FC in the 1920s for its economic timber potential and was found to thrive in a wet, oceanic climate on acid, peaty soils in exposed upland situations. In 1930 the FC made the first plantations of it in the county in the Ystwyth Forest, S of the river between Llanafan Bridge and Ysbyty Ystwyth SN67V-77F (Edlin 1975); Salter (Diary 13.3.1934-3.4.1940) charted the progress of these Spruces from 4-5ft tall in 1934 to 15-20ft in 1940. Also in 1930 the FC planted them in the Rheidol



Variation in *Picea sitchensis*, FC plantation 2.5km ENE of The Arch, view E from SN786771, August 2005



Forest around Nantyrarian c.SN78A. By 1947-1949 there were 2,566 acres (1,038ha) of Sitka Spruce in the county, including both FC and private plantations, twice as much as Norway Spruce and twice as much as all the Larches together (FC 1953). By 1983 there were 8,253ha (FC 1983), and by 1998 there were 11,508 ha, thirteen times as much as Norway Spruce and comprising three quarters of all the conifer plantation in the county (FC 2004), the greatest amount of planting having been in the 1950s and early 1960s. The land planted was mostly upland sheepwalks and former woodlands on the valley slopes. There is great morphological variation in the trees planted, and experiments with trees from different provenances were carried out by the FC in the 1960s in several places, including Castell SN738908, and Allt Dderw near the FC Arboretum, Gogerddan SN634832. From c.1990 regeneration as an alternative to replanting has often been encouraged by the FC, by carefully timing the felling, for example 1.2km N of The Arch SN766767, 1993, and at the head of Cwm Einion SN730927, 1993; otherwise regeneration is very often seen alongside FC roads, in fenced-off ungrazed strips alongside public roads and in other open areas. Self-sown trees are often seen far from plantations, for example on open moorland at Cefn Croes SN819809 at 540m altitude, 350m from the nearest trees, 1993; on the high cliffs of Pumlumon, most surprisingly at 660m above Llyn Llygad Rheidol SN793871, 2002, at least 2km from the nearest trees; and a curious conical Sheep-grazed tree only 60cm tall on a scree 350m NE of Penyrhenrhiw, Bryn Bras SN74247953, 2004 (AOC & SDSB).



*Picea sitchensis* 334cm girth, Cwmpenllydan, view SE from SN716761, April 2008

*Picea sitchensis* at its altitude limit, 670m, with Paul Smith, S side of Y Garn, view SE from SN77698502, August 2005



Sheep-grazed self-sown *Picea sitchensis* and Sam Bosanquet, Bryn Bras, view N from SN74247953, September 2004



Sitka Spruce has been planted for ornament in many places in the county, in estates, large gardens, graveyards and amenity areas, but there are few outstanding specimen trees. A shapely one in Eglwys-fach churchyard SN686955 was 277cm girth and 24m tall in 2005. One of the larger trees in Cefn Dyrys wood on the Hafod estate SN750738 was 310cm girth in 1996. A tree at Falcondale SN54U was 328cm girth in 1948 (Hyde 1977). One on the roadside 200m N of Abermeurig House SN56385670 was 262cm girth and 25m tall in 1993. There are good trees in the Alltyrodyn grounds SN449443, the largest 258cm girth and 24m tall in 1994. Maximum 334cm girth, 32m tall, a fine tree in an exposed situation at 290m altitude, just W of Cwmpenllydan, Brynafan SN71667308, 2008. Altitude limit (planted) 670m, S slope of Y Garn SN77698502,

1990-2005 (AOC & PAS), where the uppermost trees are stunted and only c.2m tall; (self-sown) 660m, above Llyn Llygad Rheidol, Pumlumon SN793871, 2002.

### ***Picea smithiana* (Wall.) Boiss. - Morinda Spruce**

Native of the Himalaya and introduced to Britain in 1818, it has been rarely planted in the county and none of the four recorded trees is very shapely. There is a tree 241cm girth and 19m tall, 1993, in Llanerchaeron churchyard SN477603, and another 132cm girth and 15m tall, N of the pond in the mansion grounds there SN482600, 1999 (AOC, CDPa & RL). A straggly tree in the Bryngolau Plantation on the Alltyrodyn estate, SN445438 was 227cm girth and 19m tall in 1994. All ten trees (No.134) planted in 1961 in the FC Arboretum, Gogerddan SN630833 had gone by 1993. Maximum a tree 249cm girth, 16m tall, 1993, on the lawn in front of Lodge Park SN66229357.

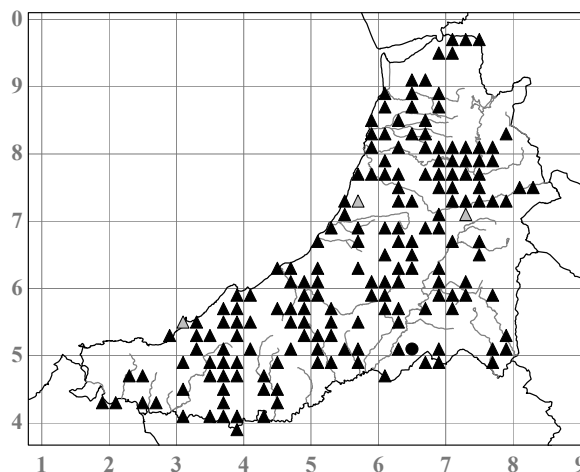
### ***Picea spinulosa* (Griff.) Henry - (Sikkim Spruce)**

Of six trees planted in a small copse 250m W of Ynys Edwin, Ynys-hir SN675962, the largest was 160cm girth and 20m tall in 1996 (AOC & WMC); the copse was felled in 2005. In a trial plot planted by the FC in 1969 on the NNE facing slope of Bryn Gwyn, W of the Nant y Moch reservoir SN745865 at 380m altitude, the few remaining trees were poorly grown and only c.2.5m tall in 1992, and in 2006 the largest was 7m tall and 39cm girth. Native of the Himalaya and introduced to Britain in the 1870s.

### ***Larix decidua* Mill. - European Larch - Llarwydden Ewrop**

Planted both for decoration and for timber throughout the county, although, because of its susceptibility to canker, *L. kaempferi* and *L. ×marschlinsii* have been increasingly preferred during the last century or so and the FC planted no *L. decidua* after the 1950s. Well over half of the four million or more trees of all sorts planted by Thomas Johnes on the Hafod estate c.SN77L in 1779-1813 were Larch (Davies 1815, Linnard 1970, 2000, Moore-Colyer 1992). They were mostly grown from seed in the Hafod nursery and planted out at two years old, and were probably amongst the earliest plantings of Larch in the county. Much detail was given by Malkin (1804). In c.1917, in one sample plot of 115-year-old trees here at 350m altitude, the mean height was 22m (Steven 1927, Hyde 1977). Johnes preferentially planted Larch on the thin soils of the hilltops, and many of the ancient stumps in the hill pastures on the estate are perhaps their remains. Most were felled during the First World War, and whether any of the original Johnes Larches are still alive is uncertain; on Lan Fraith SN780730, at 330-370m altitude (perhaps the 350m site mentioned above), the irregularly spaced long-dead stumps and standing skeletal trees are mostly 150-200cm girth, and mostly have 2-4 trunks, one of which had 56 annual rings, and another 76, in 2005. On the S side of this hill SN77937287 are five living trees, the largest 204cm girth, 14m tall, 2005, branched at 3m up into several trunks, 2005 (AOC & PAS), but whether these are contemporary with the dead stumps, or indeed with Johnes's planting, is unknown.

The best existing plantations are those in the sheltered valley at Devil's Bridge SN77I, N, where just W of the falls the well-spaced trees were 25-30m tall and c.120-220cm girth in 2008, and two felled trees, both with c.120 annual rings, were 194cm and 222cm girth (AOC & JPP). Regeneration is frequent, but not as common as in *L. kaempferi*. In the case of the numerous solitary trees in woods and elsewhere in the open country it is usually impossible to tell whether they are planted or self-sown. It is native of Europe and has been grown in Britain since the early 17<sup>th</sup> century. A remarkable tree bearing some two dozen huge witches' brooms, in the garden of Mount Pleasant, Goginan SN689811, 2008, where T. O. Morgan died in 1878, is known locally as "The Dish-mop Tree" (E. P. Vivash pers. comm.). A tree 15m tall, 140cm girth, 2000, by the ruin of Penparc, Llanerchaeron SN474606, is probably 'Pendula'. The maps of the *Larix* taxa make no attempt to separate self-sown from planted trees, partly because young specimens of the latter can be hard to identify, and partly because it is so often impossible, except when they are in plantations, to tell which trees were planted and which were self-sown. Maximum 279cm girth and 19m tall in 1994, 295cm girth and 19m





tall in 2005, on the streambank 600m ESE of Moelgolomen SN69958705; 209cm girth, 29m tall, 1992, Devil's Bridge SN740771. Altitude limit (planted) 400m, Nant-y-maen SN763585, 1982.



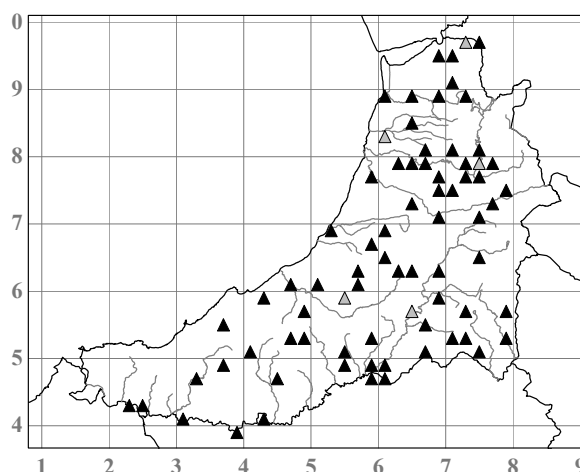
*Larix decidua* on S side of Cefn Coch, view SSE from SN786729, August 2005

***Larix ×marschlinsii* Coaz (*L. decidua* × *kaempferi*) - Hybrid Larch - Llarwydden Groesryw**

Widely planted for timber in recent decades by the FC and others, both deliberately as pure stands and more often mixed, perhaps accidentally, with Japanese or European Larch. Self-sown saplings and quite mature trees often occur, apparently both from existing hybrid parents and arising *de novo*. Maximum 275cm girth (at 50cm up), 13m tall, SW side of Lan Fraith, Hafod SN77787288, at 310m altitude, 2005 (NMW, AOC & PAS); this tree looks about a century old, and as this hybrid first arose *c.*1900 in Scotland, but was rarely planted elsewhere for some decades, it would be of considerable interest to know its exact age and history. Altitude limit (planted and self-sown) 320m, Coed Bwlchgwallter, Hafod SN763725, 1991.



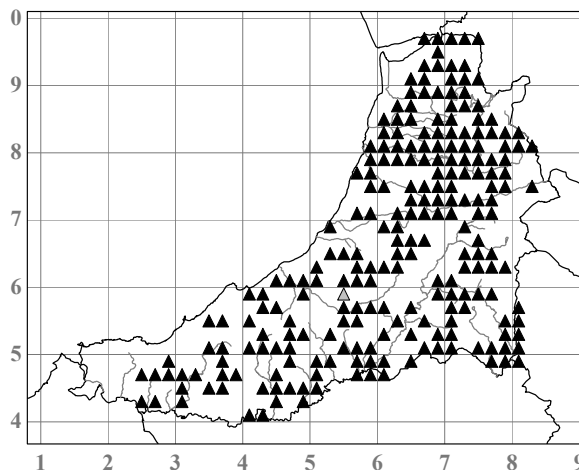
*Larix ×marschlinsii* on SW side of Lan Fraith, view S from SN77787288, August 2005





**Larix kaempferi** (Lamb.) Carrière - Japanese Larch - Llarwydden Japan

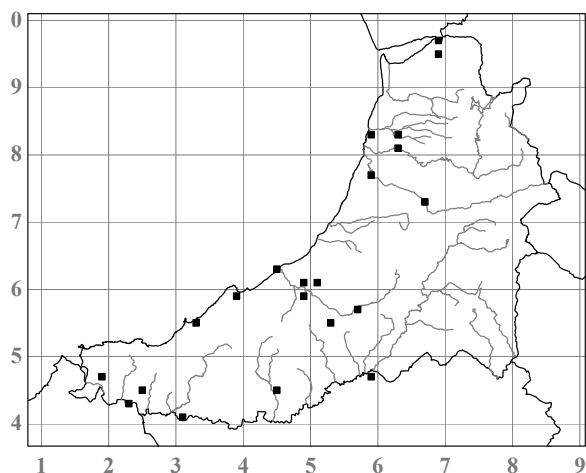
Native of Japan, introduced to Britain in 1861, and very extensively planted for timber by the FC and others, especially in the last 50 years or so, throughout the county, and often for decoration or amenity. It self-sows abundantly, especially on disturbed ground alongside FC roads. By 1950 there was nearly twice as much Japanese as European Larch in pure stands of over 2ha in the county (330 as against 185 ha) (FC 1953); by 1983 the proportion of Japanese (plus Hybrid) Larch had risen to nearly five times as much (1,225 as against 249ha) (FC 1983), and by 1998 it had risen to 90 times as much (24 as against 2,144 ha) (FC 2004). The oldest surviving FC plantation is the one planted in 1934 on the steep S-facing slope of Banc Cwm-isaf, Cwm-symlog c.SN684840, where one of the largest trees was 162cm girth and 26m tall in 2004; part of this plantation is now being preserved for long term data-gathering. Salter, when walking here in 1939, had written (Diary 13.12.1939) that "The vast afforestation plantations on the slope above Cwm Symlog appear to be all Japanese Larch". Maximum 200cm girth, 20m tall, 2005, grounds of Llwynceilyn, Glandyfi SN69129629. Altitude limit (planted and self-sown) 480m, FC plantation NE of The Arch c.SN787772, 1991; (planted) 500m, FC plantation, Ceunant Du, Pumlumon SN777837, 1993.

**Larix sibirica** Ledeb. - (Siberian Larch)

Planted in the FC Arboretum, Gogerddan SN630832 in 1963 (as *L. russica* (Endl.) Sabine ex Trautv.) but now gone. Native of NE Europe and Asia, introduced to Britain in 1806.

**Cedrus atlantica** (Endl.) Carrière - Atlas Cedar - Cedrwydden yr Atlas

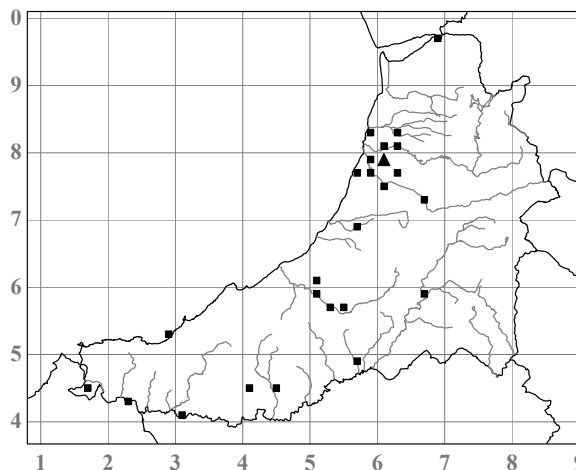
Native of the Atlas Mountains of North Africa and introduced to Britain in 1841. Frequently planted in parks and gardens, usually as 'Glauca', but never seen self-sown. There are especially fine trees at Trawsgoed c.SN671728, 1994. A tree planted here at SN67067300 in 1935 was 271cm girth and 19m tall in 1994 (AOC & CDPa). Six trees planted in 1956 in the FC Arboretum at Gogerddan SN630832 varied from 210cm girth and 13m tall to 63cm girth and 14m tall in 1993. Particularly large trees include those at Pen-y-lan, SN23614381, 369cm girth, 22m tall, 1996, the foliage not glaucous; at Lovesgrove SN62958167, 338cm girth, 23m tall, 1991, scarcely glaucous; at Ynys-hir SN68329582, 325cm girth, 2004; and among three trees at Cilgwyn SN312409 one was 311cm girth (at 75cm up) and 13m tall in 1994. A curious tree in Victoria Gardens, Cardigan SN182465, with a low, rounded canopy and unusually short leaves was confirmed as *C. atlantica* by D. Green 2001. Maximum 405cm girth, 17m tall, on the lawn just SW of the mansion, Monachty SN504619, 1992, 'Glauca'.



*Cedrus atlantica* 405cm girth, Monachty, view W from SN504619, May 2009

### ***Cedrus deodara* (Roxb. ex D. Don) G. Don - Deodar - Cedrwydden Ddeodar**

Native of the Himalaya and introduced to Britain in 1831. Frequently planted in parks and gardens and occasionally in estate woodland and copses. There is one clearly self-sown tree, in the wood above the drive W of Nanteos mansion SN61677847, 1982, that was 60cm girth and 15m tall in 1996 (AOC & CDPa); it was growing beside a much older tree which has now gone. Among the largest trees are three at Pen-y-lan SN23494387, the best being 332cm girth, 24m tall, 1996; one in a copse just W of Plas Gogerddan SN628836, 327cm girth, 19m tall, 1992; and a fine tree in Llanfihangel Ystrad churchyard SN524562, 316cm girth, 1992. There are three large trees at Monachty SN504619, all in rather poor health: one on the lawn E of the mansion was 324cm girth, 14m tall, in 1992; one in woodland 170m WSW of the mansion was 330cm girth, 22m tall, in 1992; and one NE of the drive 150m WSW of the mansion, the largest in the county, was 354cm girth, 17m tall, in 2002. 'Aurea', 5m tall, 2005, has been planted in the grounds of Llwynceilyn, Glandyfi SN68919617.



### ***Cedrus libani* A. Rich. - Cedar-of-Lebanon - Cedrwydden Libanus**

Native of the Lebanon and introduced to Britain in the 17<sup>th</sup> century. Rarely planted, but there are eight significant specimens. Salter mentions a "very fine Cedar of Lebanon in the shrubbery" at Hafod in 1902 (Diary 5.4.1902) and a "big Cedar of Lebanon" in the Adam and Eve garden SN766731 there in 1938 (Diary 29.4.1938). These may refer to the same tree, which is now gone, and the only one remaining at Hafod is on the slope 250m E of the mansion SN760731, 430cm girth (at 1m up) in 1982, 433cm in 1987, 454cm and 12m tall in 2005, but dead by 2007. Macve (2004) says that this tree was planted by Thomas Johnes, and that Loudon mentions one having been planted, but in view of Salter's reports it must be uncertain which tree was involved. A tree was planted nearer the mansion site SN75967323 in c.2004. A tree on the lawn at Plas Cwmcynfelin SN603834 was 592cm girth and 24m tall in 1991, and 593cm girth in 2002. One in woodland just ESE of Castle Hill, Llanilar SN625746 was 405cm girth in 1992, and a tree by the Afon Cletwr at Alltrodyn SN44824410 was 158cm girth and 14m tall in 1992. There are two trees on the site of the demolished Foelallt mansion at Llanddewi-Brefi SN67235480, the E one 300cm girth and 12m tall in 1993, dead but said locally to have been female, and the W one 384cm girth and 18m tall in 1993, healthy and said to be male; they are improbably said locally to have been brought from America and planted by Harriet Beecher Stowe's grandmother, Mary Roberts, who had lived at Foelallt and emigrated to New Haven, Connecticut, in 1736. A more certain report of origin is that the tree in the field SE of Trawsgoed mansion SN67207298, 574cm girth and 17m tall in 1994 (AOC & CDPa), was the one known to have been planted here by Queen Victoria in 1880 (D. Morley pers. comm. 1994). Maximum 630cm girth in 1995 (AOC, RL & CDPa), 656cm girth in 2006, a magnificent tree just SE of the walled garden, Nanteos SN62247854.



Dying *Cedrus libani*, Middle Hill, Hafod, view N from SN760731, December 2006



***Pinus attenuata* Lemmon - (Knobcone Pine)**

Native of W North America and introduced to Britain, where it is rather rarely planted, in 1847. There are three young trees in the Trawsgoed grounds SN670731, 65-74cm girth and 6-7m tall in 1994 (AOC & CDPa). Three trees (No.76) planted in 1957 in the FC Arboretum, Gogerddan SN631833, had all gone by 1993.

***Pinus banksiana* Lamb. - Jack Pine**

Native of Canada and the NE USA and introduced to Britain, where it is rarely planted, in the early 18<sup>th</sup> century. Of six trees (No.32) planted in 1956 in the FC Arboretum, Gogerddan SN630832, the largest of the three remaining was 83cm girth and 7m tall in 1992 (NMW).

***Pinus cembra* L. - Arolla Pine**

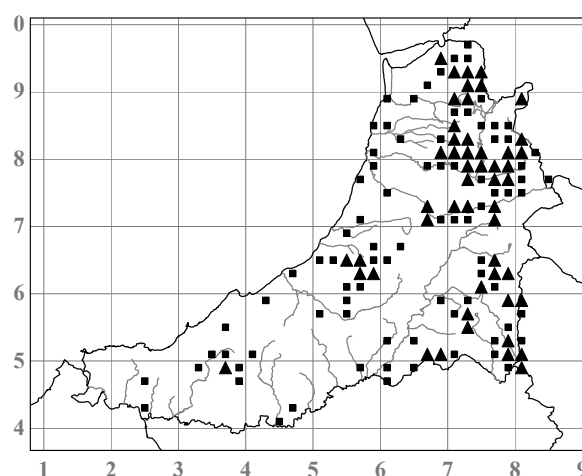
Ten trees (No.143) planted in 1961 in the FC Arboretum, Gogerddan SN631833, had all gone by 1993. Native of the Alps and Carpathians and introduced to Britain in 1746.

***Pinus contorta* Douglas ex Loudon - Lodgepole Pine, Shore Pine - Pinwydden Gamfrig**

Widely planted for forestry, chiefly in the uplands on poorer, thinner soils, on deeper peat and in more exposed sites than Sitka Spruce can tolerate. It has often been planted on rocky ridges in the Spruce forests where it can form impenetrable thickets of bent and low-growing trunks. Seed was first brought to Britain from North America in 1851, but the species was not used in forestry until about 1930. Var. *contorta*, Shore Pine, a predominantly coastal variety, was the first to be used, but although large tracts were planted with it, and it was considered to be especially useful in suppressing Heather, seed from different provenances produced variously bent and spindly growth and many or most of the later plantings were of the inland var. *latifolia* (Engelm.)

Critchf., Lodgepole Pine. By 1947-1949 (FC 1953) 44 acres (18ha) in the county had been planted with *P. contorta* and by 1983 (FC 1983) this had risen to 678ha and by 1998 (FC 2004) to 685ha, the peak period for planting having been 1950-1980. Almost all was done by the FC, with a negligible amount by private forestry, and planting of the species has now virtually ceased. Many or most of the plantations, especially in the uplands, seem to be of var. *contorta*, but identification of the varieties is not easy and has mostly not been attempted. In Black Covert, Trawsgoed c.SN673720, 1993 (NMW) at least three distinct variants could be recognised that do not correspond with the described varieties, as well as trees of fairly typical var. *contorta* and var. *latifolia*. Of six trees (No.106) of var. *latifolia* planted in 1959 in the FC Arboretum, Gogerddan SN631833, the three remaining were c.8m tall in 1993.

Regeneration from seed is abundant in and around many of the plantations, especially along rides and on the verges and banks of FC roads, and these self-sown trees often bear cones when only 1.5-2m tall, for example in the Afon Cyneiniog valley SN719889, 1983. A remarkable, apparently self-sown wind-blown tree with the lower 4m of the trunk straight and c.80cm girth, growing in a deep rock crevice on Craig yr Eglwys, Pumlumon SN800895, at 430m altitude, 1999-2008, was strikingly depicted and eulogised in Jones (2003). *P. contorta* was grown for Christmas trees at Ysbyty Ystwyth SN729712 in the early 1990s.



*Pinus contorta* on Craig yr Eglwys, Pumlumon, view W from SN800895, August 1999

Altitude limit (planted) 540m, NE of Llynnoedd Ieuan SN801819, 1993; (self-sown) 520m, FC plantation NE of Llyn Crugnant SN759617, 1993.

***Pinus densiflora* Siebold & Zucc. - Japanese Pine**

Native of E Asia and introduced to Britain, where it is seldom planted, in 1861. Of ten trees (No.131) planted in 1960 in the FC Arboretum, Gogerddan SN630832, only one half-dead tree c.8m tall was surviving in 1993.

***Pinus jeffreyi* Murray - Jeffrey's Pine**

Of six trees (No.20) planted in 1956 in the FC Arboretum, Gogerddan SN630832, all had gone by 1993. Native of W North America and introduced to Britain in 1853.

***Pinus lambertiana* Douglas - (Sugar Pine)**

Native of W North America and introduced to Britain, where it is prone to blister rust and rarely planted, in 1827. Of nine trees (No.60) planted in 1956 in the FC Arboretum, Gogerddan SN631833, all had gone by 1993.

***Pinus monticola* Douglas - (Western White Pine)**

Native of W North America and introduced to Britain, where it is prone to blister rust and very rarely planted, in 1831. Of six trees planted in 1956 in the FC Arboretum, Gogerddan SN630832, the three remaining were 99cm girth and 12m tall, 97cm girth and 12m tall, and 84cm girth and 10m tall, in 1992.

***Pinus mugo* Turra**

Subsp. **mugo** - Dwarf Mountain-pine - Pinwydden y Mynydd

Introduced to Britain in 1779, the shrubby Dwarf Mountain-pine from the Alps and the mountains of S Europe was planted by the Gogerddan estate fishing lodge of Angler's Retreat at Llyn Plas-y-mynydd SN746923 at 400m altitude, probably in the late 19<sup>th</sup> century. The seven trees here in 1992 (NMW, conf. HO) had decumbent trunks 4-9m long, with a vertical height of 4-5m; they had looked very similar in 1952 (WMC). Of nine trees (No.59) planted in 1956 in the FC Arboretum, Gogerddan SN631833, the five left were multi-trunked and c.6m tall in 1993.

*Pinus mugo* subsp. *mugo*, Angler's Retreat,  
view NE from SN746923, August 2006



Subsp. **uncinata** (Mill.) Domin (*Pinus uncinata* Mill.) - (Mountain-pine)

Being often only a semi-erect tree and grading into the shrubby subsp. *mugo*, the Mountain-pine has sometimes been planted by the FC along the edges of exposed plantations to deflect the prevailing winds before they reach the main crop, as in the case of the shelter belt 10m wide that they planted in 1956 along the windward W edge of the forest at Esgair Hir lead mine SN734911, the trees being 4-6m tall in 2004. Other plantings include ones of 1956 along the crests of ridges in the forest 400m ENE of Esgair Fraith mine SN745912 at 450m altitude, where the trees were 8-10m tall in 1992; a 2ha plantation of 1958 on the E side of Bryn Llychese SN830807, where the trees were c.6m tall in 1993 (NMW); and a plantation of 1955 on the windward crest of the ridge 800m N of Bwlch Nantyrarian SN719821, where the trees were 4-6m tall in 1992. Various trial plots S of Esgair Fraith c.SN738908 planted in 1956 contained trees c.50cm girth and 6-7m tall in 1992. No regeneration of either subspecies has been seen. Altitude limit (planted) 450m, as above.

***Pinus muricata* D. Don - Bishop Pine**

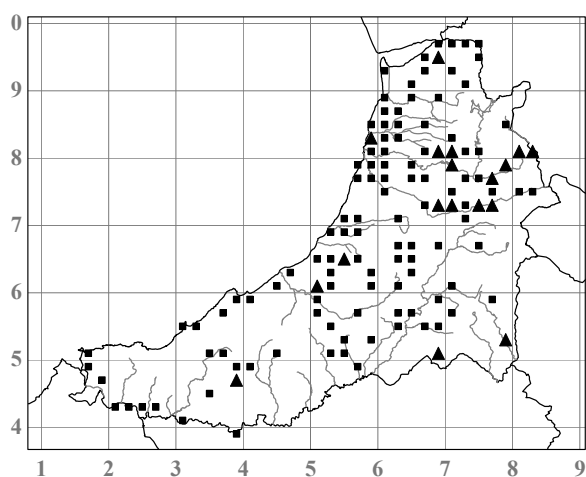
Native of California and introduced to Britain in 1846. Of ten trees (No.132) planted in 1960 in the FC Arboretum, Gogerddan SN630832, three were left, the S tree of these being 199cm girth (at 50cm up) and 15m tall, and the N tree being 134cm girth and 12m tall, in 1992 (NMW); the 18 trees (No.164) in another planting here in 1966 had all gone by 1993. It has more recently been widely planted in the upper part of the



University campus, Penglais, Aberystwyth SN598817, where the trees were c.80-100cm girth and 10-12m tall in 1995.

***Pinus nigra* J. F. Arnold - Austrian Pine, Corsican Pine - Pinwydden Awstria, Pinwydden Corsica**

Widely planted for ornament in estate woodlands, gardens and grounds, graveyards, in shelter belts, on roadsides and in amenity areas. The different variants are often difficult to identify and I have not recorded them separately. In general, the Austrian Pine, subsp. **nigra** (native of C & SE Europe, introduced to Britain in 1835), is the one most often grown for ornament in the county, while the Corsican Pine, subsp. **laricio** Maire (native of the C Mediterranean, introduced in 1759) seems to be the one most used for forestry and is the name generally used in the FC statistics and maps. A planting of 500 of the latter was recorded on the Cymerau estate c.SN69Y-79D in 1939 (Gordon 1939), but FC plantings seem not to have started until about 1950. None were recorded in the 1947-1949 survey (FC 1953) although among the 170ha recorded in the 1983 survey, 18ha were planted in the 1941-1950 period (FC 1983). By 1998 (FC 2004) this had risen to 89ha, all planted in the 1951-1960 period; this seems a gross underestimate of what appears a much more widely planted tree. Use of the two subspecies can be well seen at Banc Ty-llwyd above Llanfarian, where the old ornamental trees around the farm, including the landmark tree on the skyline at SN60187724 (see picture p.244), 230cm girth in 2004, were Austrian, while the younger trees in the plantations below were Corsican. Plantations in the county were mostly on well-drained slopes at medium altitudes, but planting of it for timber now seems to have ceased. Regeneration by seed is not common. *P. nigra* was planted for Christmas trees at Ysbyty Ystwyth SN77F in the 1990s. Maximum a fine tree of subsp. *nigra* in the grounds of Ynys-hir Hall SN68309596, 395cm girth (at 50cm up) and 25m tall in 1993, 425cm girth (at 50cm up) and 28m tall in 2004. Altitude limit (planted and self-sown) 500m, FC plantation 800m ENE of Bryn Llychese SN832810, 1993.



*Pinus nigra* 425cm girth, Ynys-hir Hall Hotel gardens, view NE from SN68289597, March 2008

***Pinus parviflora* Siebold & Zucc. - Japanese White-pine**

Of eight trees (No.58) planted in 1956 in the FC Arboretum, Gogerddan SN631833, the four left were squat trees c.6m tall in 1993 (NMW), with abundant cones; they appeared to be one of the garden cultivars of the species, which is native of Japan and was introduced to Britain in 1861.

***Pinus peuce* Griseb. - Macedonian Pine - Pinwydden Macedonia**

A most attractive conifer, native of the Balkans and introduced to Britain in 1864, but grown in the county only in a few small plantations, notably on lead mine sites as it is known to withstand pollution. There are several areas of it at the edge of FC plantations connecting the Esgair Hir and Esgair Fraith mines SN738912, 1991-2008, with at least one self-sown tree c.6 years old in 2008, and there is a trial plot of it planted in 1956

nearby at Castell SN738908 where the trees were *c.*85cm girth and *c.*14m tall in 1992. At Ystrad Einion mine SN707938, 1992-2005, trees cover about an acre, and there were five self-sown trees here 4-10 years old in 1999. There are mature but stunted trees planted around spoil heaps NE of Dol-fawr, Cwm Rheidol SN706795, 1992. Away from mines, there is a single tree, 56cm girth and 10m tall 1993, in mixed FC woodland in Coed Pantglas-mawr, Tre'r-ddôl SN66139252; and a 2 acre plantation of trees, averaging 125cm girth in 1996, on the slope of the Afon Cloigen valley, 2km ESE of Ffostrasol SN394471. Of ten trees (No.111) planted in 1959 in the FC Arboretum, Gogerddan SN631833, the largest of the five left was 108cm girth and 11m tall in 1993. Maximum 150cm girth, Esgair Fraith SN738912, 2008. Altitude limit (planted) 440m, Castell SN738908, 1992.

#### ***Pinus pinaster* Aiton - Maritime Pine - Pinwydden Arfor**

Native of the Mediterranean and grown in Britain since the 16<sup>th</sup> century. About a dozen trees, one of the largest 139cm girth and 13m tall in 1995, are planted alongside the A487(T) road on the University campus, Penglais, Aberystwyth SN596819; and one, 75cm girth and 7m tall in 2005, is at the Dan-y-coed entrance to Parc Natur Penglais SN59168205. Of ten trees (No.145) planted in 1961 in the FC Arboretum, Gogerddan SN631833, the better of the only two left was 109cm girth and 8m tall in 1993. All these trees produce abundant cones. A large, well-formed tree in Llangorwen churchyard SN603838 blew down in 1990 (CDPa). Maximum 145cm girth, 19m tall, 1996, the largest of several trees in a copse 250m W of Ynys Edwin, Eglwys Fach SN675962, but felled in 2005.

#### ***Pinus ponderosa* Douglas - Western Yellow-pine - Pinwydden Gochfrig**

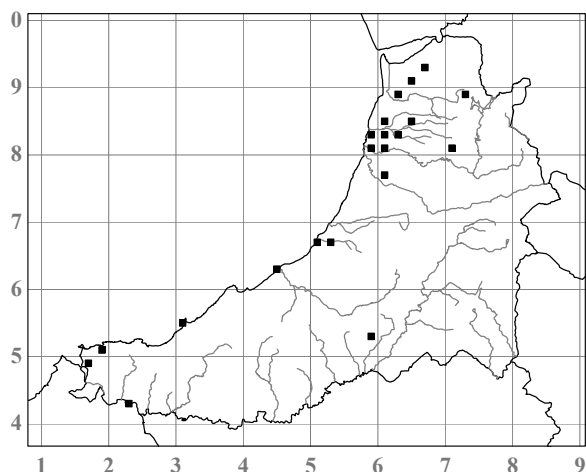
Native of W North America and introduced to Britain in 1827. Unusually there is a 2 acre plantation of this normally only ornamental tree on the SW facing slope in Cwm Rheidol 500m ENE of the reservoir dam SN699797, most trees being 35-65cm girth, but the largest 94cm girth and 15m tall, 1993 (SPC). Otherwise it is only in the FC Arboretum, Gogerddan SN631833, where of 12 trees (No.34) planted in 1956 the largest of six left was 112cm girth and 14m tall in 1993, and where of ten trees (No.108) planted in 1959 the larger of the only two left was 87cm girth and 12m tall in 1993.

#### ***Pinus pungens* Lamb. - (Hickory Pine)**

Native of E North America and introduced to Britain, where it is very rarely planted, in 1804. All six trees (No.105) planted in 1959 in the FC Arboretum, Gogerddan SN631833, had gone by 1993.

#### ***Pinus radiata* D. Don - Monterey Pine - Pinwydden Monterey**

Native of California and introduced to Britain in 1833. The shelter belts and groups of Monterey Pine are a conspicuous feature of several places along the Cardiganshire coast, and it has been planted for timber on a small scale both near the coast and inland. The older shelter belts include ones W of the crossroads at Llangorwen SN600839, 1992-2008, where the largest tree was 320cm girth and 24m tall in 2004; several around Llan-non SN522678-516674, 1960-2008; and at Nant-y-crou, Mwnt SN183510, 1988. Plantations include one of *c.*2ha below the A487(T) road SW of Taliesin SN654909, 1992-2008; the NW part of Coed



*Pinus radiata*, Brynawelon, Llan-non, view NE from SN52056780, February 2005

Porthangel NE of Llangorwen SN610845, 1991-2004; and in Coed Tyllwyd, Llanfarian SN600771, 1995-2004.

In the wild, this Pine relies on fire to open the cones and release the seeds, and at Pen y Graig-ddu, E of Goginan SN707818, the FC plantation was largely destroyed by fire in early 2003 and many scorched cones were lying on the slope; no seedlings though were found here two years later and the cones seemed not to have contained viable seed. The only apparently self-sown trees recorded are three, *c.*10 years old, in a shelter belt of the species above Penparcau Road, Aberystwyth SN586808, 2007 (RAJ) with another close by near the top of Pendinas SN584803. Most trees in the county have abundant cones and appear to grow fast. A tree felled in 1992 on the University campus, Penglais, Aberystwyth SN593821, was 255cm girth but had only 27 annual rings, and another at SN597816 was 215cm girth with 36 annual rings. In one of the groups, of eight trees (No.126) planted in 1959, in the FC Arboretum, Gogerddan SN631833, the largest of the three left was 246cm girth and 18m tall in 1993. Maximum 334cm girth, 25m tall, 2005, SE side of the A487(T) just SW of Gwynfryn, Llan-non SN521678; another here 389cm girth at 50cm up, but double-trunked above this. Altitude limit (planted) 320m, in a 0.1ha FC plantation planted in 1958, Cwm Twrch, Cyneiniog SN725885, 1992.

### ***Pinus resinosa* Aiton - (Red Pine)**

Native of NE North America and introduced to Britain, where it is rarely planted and does not grow well, in 1756. The only trees seen in the county were in the FC Arboretum, Gogerddan SN631832, where of three trees (No.33) planted in 1956 the only one left was 77cm girth and 7m tall in 1993, and where of four trees (No.35) also planted in 1956 the two left were 66cm girth and 8m tall, and 61cm girth and 8m tall, in 1993. Two other groups (Nos.57 and 72) planted in the same year had gone by 1993.

### ***Pinus rigida* Mill. - (Northern Pitch Pine)**

Native of E North America and introduced to Britain, where it is rarely planted, in the early 18<sup>th</sup> century. There is a small tree in the upper part of the University campus, Penglais, Aberystwyth SN59908165, 2.5m tall in 1995.

### ***Pinus sabineana* Douglas - (Digger Pine)**

A delicately beautiful tree, native of California and introduced to Britain, where it is very rarely planted, in 1832. Of eight trees (No.32) planted in 1956 in the FC Arboretum, Gogerddan SN630832, the only one left was 83cm girth and 11m tall in 1992 (**NMW**). Another group of five trees (No.77) had gone by that year.

### ***Pinus strobus* L. - Weymouth Pine - Pinwydden Wen**

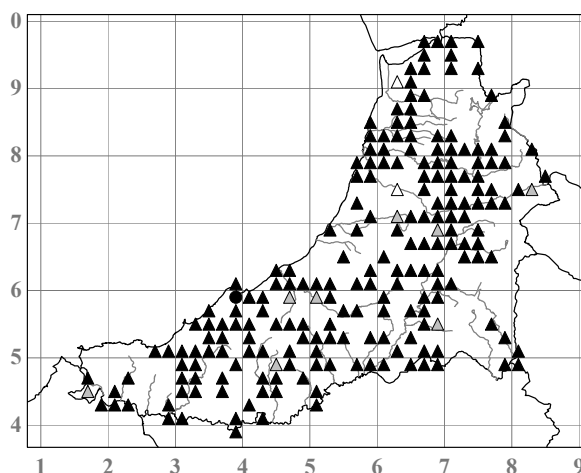
The Weymouth Pine was introduced to Britain from E North America in 1605 and was widely planted both for amenity and timber, but was badly affected by blister rust. There is a record of 25 trees from a Carmarthenshire nursery being invoiced to Maesnewydd, Tal-y-bont SN646879 in 1809 (Lloyd 2000). Two were ordered by the Nanteos estate from Bristol in 1832 (Palmer 2004), and a tree in the pasture below Rookery Wood there SN61677816, 245cm girth and *c.*13m tall in 1991 (**NMW**), is presumably one of these. A tree on the Trawsgoed estate by the old Ystwyth ford SN66627323 was 193cm girth in 1992, and a younger tree by the Nant Einion at Capel Dewi SN45394271 was 90cm girth in 2001 (GH & AOC). It has been widely planted on the University campus, Penglais, Aberystwyth SN597815, where the trees averaged about 130cm girth and 12m tall in 1995. Of those in a FC trial plot at Castell SN738908 at 440m altitude, planted in 1956, only two trees *c.*8m tall remained in 1992. Maximum 245cm girth, *c.*13m tall, as above. Altitude limit (planted) 440m, as above.

### ***Pinus sylvestris* L. - Scots Pine - Pinwydden yr Alban**

Although native Scots Pine is known to have survived in the county to *c.*6,000BP in the Atlantic period on the coast, for example at Ynys-las and Clarach, and probably also in the uplands on Pumlumon, it is generally assumed to have then died out (Moore 1994). The stumps of such trees can be seen in the "submerged forest" on the shore at Ynys-las SN604928 (see picture overleaf). R. H. Yapp (Yapp *et al.* 1916) described a discontinuous belt of Scots Pines growing and regenerating across Cors Fochno from its E edge westwards to Llwyn y Garreg SN623916, and remarked that "it would be interesting to know whether or not the living pine trees found on the moor today are the lineal descendants of the ancient pines of the buried forest. The possibility of such a continuity cannot be ruled out on *a priori* grounds.... The point is merely mentioned as



one worth investigating.” These trees still survive, though they are now confined to a few acres at the E edge of the bog SN640915 where there are *c.*40 mature trees with cones, the largest 181cm girth, 11m tall, 2005, along with abundant seedlings and saplings of all ages extending from the carr for 100m or so westwards onto the bog. This is the only place in the county where there is a healthy, regenerating population of Scots Pine, and it certainly has the appearance of a natural, native stand. Modern methods of DNA or isozyme analysis could perhaps now answer Yapp’s point. (Linnard (2000) seems to imply that Godwin believed that a stock of native Pine might have persisted here, but this is perhaps a confusion as Godwin himself (1975) made it clear that he considered there was no definite evidence for such survival. See also the comments of W. B. Yapp (1962) on this matter.)



Uncertainty over the meaning of “firs” in the early sources means that it is not clear when the early plantings of Scots Pine took place in the county. Davies (1815) mentions that “Near Tal-Bont, and adjoining the Gallt y Crug lead-mines [Allt y Crib SN652894], are extensive copses of oak belonging to Mr. Pryse [of Gogerddan] ... intermixed with rows of Scotch pines of from ten to twenty years’ growth. The woodman, finding the pines oppressing, and even smothering the oak, instead of cutting them all down for railing and building stuff &c. lopped off the lateral branches, as we were informed, in March last.” Whether these relate to the “firs” seen here by Wyndham (1781) in 1774 or 1777 is uncertain: “As we approached Tal y Bont [from the S] we were agreeably surprised with the refreshing view of a very extensive and flourishing plantation of firs, which covered the steep declivities of two hills, near the house of a Mr. Price.” Davies (1815) also wrote that “We found self-sown pines also at Llidiardau [SN639744]” and “The Scots pine is the only tree of the evergreen genus (firs and pines) that propagates itself by seed from its cones in this district, and that indeed in very few places”. He reported that Scots pine was among trees planted on the Peterwell estate at Lampeter *c.*SN54U in 1811, and, commenting on their susceptibility to sea winds, that “in the



*Pinus sylvestris* spreading westwards onto Cors Fochno, view SE from SN638916, August 1991

plantations about Wervil Brook [SN348523] ... the Scotch pines in the western rows are of a tawny complexion; whilst other trees, especially exposed, maintain their verdure.”

In 1925 Salter (Diary 5.5.1925) recorded that he “Went a little way up the Mynach [from Devil’s Bridge] past the group of half a dozen big pines [SN74297685]... One of the pines, which had fallen, appeared from the rings to be about 120 years old, no doubt dating from the original planting of the Hafod estate”, and of the surviving trees here in 1993 one was 338cm girth and 25m tall, and another 324cm girth and 23m tall; in 2005 the one surviving tree was 330cm girth and 26m tall. Scots Pine though does not figure in the various lists available of trees planted on this estate by Johnes, suggesting that he did not plant it on a large scale and that this particular group was planted for decoration rather than for timber.



The “submerged forest” on the shore at Ynys-las, view S from c.SN605918, April 2007

The sole remaining *Pinus sylvestris* of Thomas Johnes’s plantings, Devil’s Bridge, view NE from SN74297685, March 2005



Scots Pine featured in the early FC plantations, but as it suffered from exposure in the uplands and from salt winds on the coast, they too never used it to any great extent. In 1947-1949 (FC 1953) there were 346 acres (140ha) of plantation in the county, a third of them private, in 1983 this had risen only to 220ha (FC 1983), and by 1998 (FC 2004) to 240ha, there having been a resurgence in planting in the 1990s. Of six trees planted in 1959 in the FC Arboretum, Gogerddan SN631833, the largest was 121cm girth and 13m tall in 1993. It is often found self-sown around plantations and from isolated trees.

There are very many trees in estate woodlands, gardens and grounds, in graveyards and planted elsewhere for ornament throughout the county. Especially good specimens can be seen at Glandyfi Castle SN691965, where the largest was 326cm girth and 24m tall in 1994 (AOC & WMC); at Cwmcoedwig, Llanfarian SN587778, 352cm girth in 1991 but somewhat buttressed; at Abermeurig House where the biggest in the copse NE of the walled garden SN564565 was 281cm girth and 23m tall in 1993; 400m NNE of Nantbyrchaf, Tyn-y-graig SN712711, 297cm girth and 19m tall in 1993; and at Alltyrodyn SN44904430 where the largest, 100m NW of the mansion, was 280cm girth and 21m tall in 2001. Of two stunted trees probably planted in the late 19<sup>th</sup> century at the Gogerddan estate fishing lodge, Angler’s Retreat SN744924, at 410m altitude, the larger was 136cm girth and 7m tall in 1992. Many of the trees in estate woodlands and elsewhere planted a century or more ago are now dead or dying. As in most parts of the country, “fine Scotch firs which are said to have been planted in the eighteenth century by Welsh Jacobites” have been rumoured, in our case at Green Grove SN519574 (Lewes 1922), but these particular trees no longer exist. Maximum 338cm girth, 22m tall, Devil’s Bridge SN74297685, 1993. Altitude limit (planted) 440m, on ridge at top of conifer plantation, Esgair Foel-ddu, Cwm Einion SN71289227, 1991.



***Pinus tabuliformis* Carrière - (Chinese Red Pine)**

Native of China and introduced to Britain, where it is very rarely grown, in 1862. All ten trees (No.144) planted in 1961 in the FC Arboretum, Gogerddan SN631833, had gone by 1993.

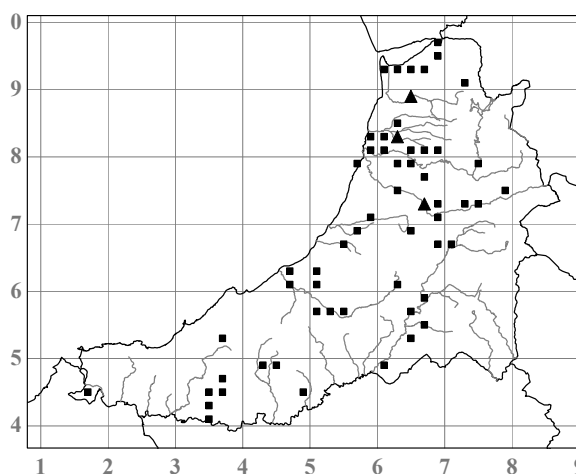
***Pinus wallichiana* A. B. Jacks. (*P. griffithii* McClell.) - Bhutan Pine - Pinwydden Bhwtan**

Native of the Himalaya and introduced to Britain in 1823. Of three trees planted in the Trawsgoed grounds, one (No.0409) at SN67097304, measured by Mitchell (1972) as 250cm girth and 23m tall in 1969, was 278cm girth and 28m tall in 2008; another nearby was 50cm girth and 5m tall in 1994; and the third (No.0528) at SN67097294 was 212cm girth and 18m tall in 1994. Of six trees (No.19) planted in 1956 in the FC Arboretum, Gogerddan SN630832, the only one left in 1993 was a poor specimen 8m tall, and of three (No.171) planted there also in 1956 all had gone by 1993. The FC trial plot at Castell SN738908 at 460m altitude planted in 1956 consisted only of dead trees 2-3m tall in 1992. Maximum 278cm girth, 28m tall, as above.

## ARAUCARIACEAE

***Araucaria araucana* (Molina) K. Koch - Monkey-puzzle - Cas gan Fwnci**

A frequently planted tree in gardens, parks, graveyards and estate woodlands, native of Chile and Argentina and introduced to Britain in 1795. To give a more adequate impression of their impact on the landscape, the map shows conspicuous trees in gardens as well as those qualifying under the usual criteria for this Flora. There is an FC trial plot planted in 1956 at Castell SN738908 at 440m altitude, with very healthy trees, the largest only 53cm girth and 11m tall in 2006 (AOC & RAJ). Seedlings have been seen on the disused railway at Trawsgoed SN6672, 1994 (JPS) from the big trees in the mansion gardens 400m away; in Allt y Crib SN650892, 1993-2008 (JAM, AOC) where a solitary sapling grew from 15 to only 20cm tall in 15 years, the seed presumably having come from the pair of male and female trees at Coetmor 200m away; and in the Plas Gogerddan grounds SN62988363, 2007 (AOC, ADH & RAJ), where a sapling 50cm tall will have originated from the male and female trees close by. The many fine trees at Trawsgoed included one just E of the tennis court SN67057290, 290cm girth, 16m tall; a male in the avenue SN66967298, 288cm girth, 17m tall; and two numbered trees in the avenue at SN66907295 (No.0500), 264cm girth and 19m tall, and at SN66907297, female (No. 0528), 250cm girth and 15m tall; all 1994 (AOC & CDPa). The tree in Plwmp chapel graveyard SN366523 was 106cm girth and 10m tall in 1994, and 125cm girth and 10m tall in 2005, but was felled in 2008. Maximum 298cm girth and 20m tall in 1992, and 307cm girth and 22m tall in 2005, Lodge Park SN662935, a fine tree.



## PODOCARPACEAE

***Podocarpus salignus* D. Don - (Willow Podocarp)**

Native of Chile and introduced to Britain, where it is rarely planted, in 1853. There is a tree, 60cm girth (at 1m up) and 7m tall in 2001, by the car park at the SE corner of the University campus, Penglais, Aberystwyth SN59678147.

## SCIADOPITYACEAE

***Sciadopitys verticillata* (Thunb.) Siebold & Zucc. - Umbrella-pine**

Rarely planted, and only two trees have been seen. One, 124cm girth and 10m tall in 1992 (NMW), grew in the grounds of Ty-glyn, Ciliau Aeron SN498598, but fell in 2000. The other, 2.5m tall in 2003, is in the grounds of Old Cilgwyn SN31674178. Native of Japan and introduced to Britain in 1853.



## TAXACEAE

**Taxus baccata** L. - Yew - Ywen

Although Yew is frequent throughout the lowlands, not only in churchyards and in estates and gardens where it has obviously been planted, but also in hedges and woodlands where it is often obviously bird-sown, it is uncertain to what extent it may be native in the county; because of the impossibility of deciding on the status of most of the occurrences it is mapped as native. Nowhere though is there anything approaching a Yew wood. Salter (1935) wrote: "Chiefly in churchyards. No appearance of being native", so maybe it has increased in hedges and woods since his time. Seedlings though have rarely been recorded. Many ancient and impressive trees occur, chiefly in churchyards rather than in Nonconformist chapel graveyards where the Yews, if there are any, are usually 'Fastigiata' (described below). Most of the old estates have good, but not outstandingly large, trees. In the following account the most interesting of the churchyard trees are described in alphabetical order of sites, followed by other notable trees arranged under river catchments. I have discussed the possible ages of some of these trees in the introduction. Yews have always had a remarkably stimulating effect on the imagination, and the Cardiganshire ones are no exception. Even more than Oaks, they have inspired conjecture and poetry over the last six centuries.

**Churchyard Yews:**

**Eglwys Fach** SN685955. The westernmost and biggest of the Yews shading the path to the church is a male tree, 372cm girth in 1992.

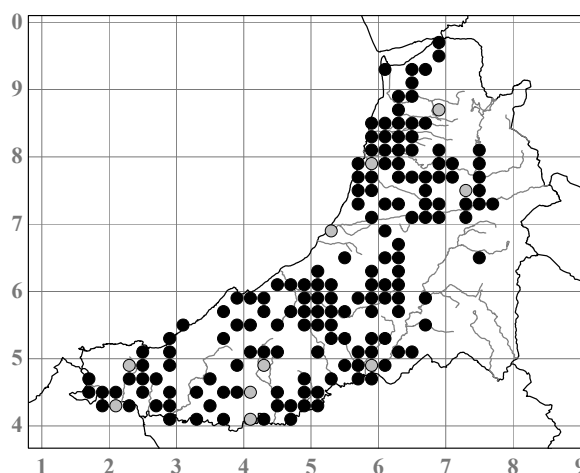
**Eglwys Newydd** or **Hafod** SN768737. There are six Yews here, the girths of the largest in 1983 being: SE of chancel, 309cm (at narrowest point); S of chancel on slope, 412cm (at 1m up); and SW of chancel, 664cm girth (at ground level), with two trunks above which were 404cm and 430cm girth. The similarity of girths of these four trees strongly suggests that this last pair represents two fused, rather than one split trunk, and that all were probably planted at about the same time, perhaps when the church was founded in 1620.

**Gartheli** SN586567. Evans (1903) wrote of this church that "At the end of the eighteenth century the building was in ruins, so much so as to be unsuitable for marriages to be solemnized in it, and accordingly they took place in the graveyard under the wide branches of the old yew which still flourishes, and is as full of life as ever." This tree, on a walled mound SE of the chancel, was 333cm girth in 1980, but was said to be in poor health and was cut down in 1985, when a piece of the hollow trunk 6cm thick, 5cm in from the outside, had 136 annual rings. A replacement was planted SSW of the porch in 1985.



Yew in Gartheli churchyard, felled in 1985,  
view E from SN586567, July 1984

**Lampeter** SN575483. Fenton (1917) wrote in 1804 that "in the churchyard, which is large there are a few very old yew trees", and Meyrick (1810) wrote that the churchyard was "plentifully supplied with the venerable yew." Smith (1878) visited the church "to see the great Yews" and said that "The two Yews are of considerable size, but hardly comparable with others in the Principality", and illustrated "the one on the right of the footpath from the town. When I visited it, all the lower boughs were hung with pickaxes, shovels, rakes, trestles, ladders, &c., reminding the spectator of heathen fetish worship." Cornish (1946) mentions the churchyard Yews here. There are now 14 substantial trees in the churchyard, five male and nine female. The largest is the middle one in a row of three S of the church nave, a female, 497cm girth and 15m tall in 2006; the S-most tree E of the main path near the S gate, a male, was 325cm girth (at 1m up) in 1983, and 372cm



girth (at 1m up) and 13m tall in 2006. It is curious that Smith mentioned only “two Yews” as several others are now almost as big as the two measured above.

**Llanafan** SN685721. Meyrick (1810) wrote that “An avenue of yew trees leads directly to this [south] transept from the entrance of the church-yard.” It was still there a century later when Horsfall-Turner (1903) described the church as “hidden by a dozen yew trees of finest growth, forming an avenue to the door and shading the grassy mounds; one of them measures over five yards [455cm] around,” and Evans (1903) wrote that “An avenue of ten yews leads directly to this [south] transept door from the entrance to the churchyard; and two other yews - the ages of which can be counted by centuries - stand faithful guardians of the Bonsall and other graves in this secluded God’s acre.” Cornish (1946) mentioned the Revd J. Aubrey (vicar of Strata Florida at the time) reporting “Very fine yews” here. Evans’s two yews remain, one as a hollow, partly burnt stump beside the Bonsall graves E of the church that in 1978 was 440cm girth (at 30cm up), with a piece 10.4cm in radial thickness having 98 annual rings. The other is a multi-trunked female tree on a mound NE of the chancel that, assuming it is all one tree, was c.750cm girth at soil level and 8m tall in 2005. The only others present now, probably too small to be relics of the avenue, a male S of the nave and a female SW of the porch, were 188cm girth (at soil level) and 8m tall, in 2005, and 171cm girth and 7m tall in 2005, respectively.

**Llanbadarn Fawr** SN599810. In 1985 there were 32 Yews in the old part of the churchyard, 191-340cm girth, all perhaps planted at about the same time and giving it a character unique in the county. Three of the trees were felled that year. Another was blown down in 2002, and its solid trunk 175cm girth had 104 annual rings, making it the only dated Yew in the county. The three biggest remaining trees, measured in 1985, are one on the N side of the path 28m W of the SE lychgate, male, 340cm girth; the NW-most tree NW of the church, male, 335cm girth; and one S of the path 25m W of the SE lychgate, female, 310cm girth.

**Llandre or Llanfihangel-geneu’r-glyn** SN623869. Lees (1878) in discussing the growth of Yews wrote that “in Wales, especially near the coast, this division of the old bole of the tree is very remarkable, for an extremely aged Yew in the churchyard of Llanvihangel-Generglyn, Cardiganshire, shows the original bole divided into twelve distinctly separated pieces to the ground, and thus a considerable space is taken up.” What remains of this tree now are three trunks on a slight mound just NE of the church which, if they are the relics of a single tree, must represent a former trunk of some 900-1,200cm girth, 2005 (AOC & JPW). That all three are female supports this view, but it is not impossible that Lees’s twelve trunks could have been originally planted to make a ring, or that they were bunch-planted to grow together to form in time an apparent single trunk. In 1967 the largest and only satisfactorily measurable trunk was c.300cm girth at the base. In 2002 the Conservation Foundation put a plaque by the tree, estimating its age at 2,000 years.

**Llanerchaeron** SN477603. There are four sizeable trees here, all measured in 1993. The one N of the W end of the church was 430cm girth and 14m tall; the one SW of the church was 340cm girth (at the base) and 9m tall; the one S of the W end of the church was 278cm girth (at the base) and 7m tall; and the one S of the porch was 414cm girth (at the base) and 9m tall.

**Llanfair Clydogau** SN625513. Horsfall-Turner (1903) described the church as “almost overtopped by the branches of a venerable yew of seven or eight yards [640-730cm] circumference, built around the base with rough masonry.” This female tree, still surrounded by its retaining wall and in fine health, was 693cm girth (at the base) in 1980 and 714cm (at the base) in 2004 (and 774cm girth at 1.5m up where it is branched into two), and has the greatest girth of any single, intact trunk of Yew in the county. In 1933 heavy snow broke many of the branches and the tree was tidied up by the local blacksmith who reputedly took more wood from it than he should have.

**Llanfihangel-y-Creuddyn** SN665760. Two of the six Yews here, both on mounds, are sizeable. The one S of the church was 483cm girth (at soil level) and 11m tall in 1992, and the one SW of the porch was 494cm girth (at soil level) and 13m tall in 1992. The small, clipped, barrel-shaped tree at the NE corner is usually home to a colony of Garden Snails *Helix aspersa* (as is also the tree on the Ynys-las dunes, below).

**Llanfihangel Ystrad** (Ystrad Aeron) SN524562. The remains of a female tree E of the church consist of two anciently sawn-off fragments of the original



Yew in Llanfihangel Ystrad churchyard, view SW from SN52475622, April 2006



trunk and vigorous new growth, comprising about half the circumference of what was presumably once a single trunk; these remains were 924cm girth (at soil level) in 2006, so the tree must once have been among the biggest in the county. The lesser remains of another tree, also re-growing vigorously, are ESE of the church.

**Llangeitho** SN620601. One of the best groups of Yews in the county. Lowe (1897) listed four trees here, giving *inter al.* the girths at 3ft up and heights (originally in feet): 426cm, 15m, “Hollow, holding ton of coal for church purposes”; 488cm, 17m, “Hollow”; 426cm, 16m, “Hollow”; 488cm, 16m, “Not hollow; but shoots from ground.” Evans (1903) independently mentioned the coal store: “One word as to the yews. They are of great girth, so much so that in the hollow trunk of one of them, a wooden house with door exist[s], in which more than a ton of coals is kept for the winter use of the church! This too, with apparently no damage to the noble tree, which flourishes, with its comrade in luxuriance and beauty; ornaments befitting the sacred place wherein they have braved the storms of many centuries.” Lowe’s four trees are still alive, and when measured in 1997 were: NE tree, 484cm girth (at 15cm up) or 551cm girth (at 1.5m up), female; NW tree, 423cm girth, female; middle W tree, 582cm girth (at 30cm up), male; SW tree, 448cm, male, hollow, presumably the coal tree as for many decades until c.1990 it had a door fitted and was used to house the sexton’s tools.

**Llangoedmor** SN199457. Vaughan (1926), remembering his childhood in the 1870s, described the “solitary yew of immense age and girth” in the open churchyard here. It still stands, a male tree SE of the church, 571cm girth (at the base) and 16m tall in 2005.

**Silian** SN571512. Three separate trunks on a slight mound S of the church are presumably the remains of a single tree that would have been at least 780cm girth, now healthy and 14m tall, 2006.

**Strata Florida** or **Ystrad Fflur** SN746658. There are innumerable references to the Yew trees in this churchyard because Dafydd ap Gwilym, the greatest poet of medieval Wales who died in about 1370, is reputed to have been buried here under a Yew. His contemporary, Gruffydd Gryg, wrote a poem addressing the Yew tree above Dafydd’s grave, which begins: “Yr ywen i oreuwas, /Ger mur Ystrad Fflur a’i phlas; /Da Duw wrthyd, gwynfyd gwŷdd, /Dy dyfu yn dŷ Dafydd [Yew for the best lad, by the wall of Ystrad Fflur and its mansion; God was good to you, the bliss of the tree, for you to grow into a house for Dafydd].”

John Leland in his itinerary of Wales in 1536-1539 remarked on the great size of the churchyard and wrote that “In it be xxxix great hue trees” (Smith 1906). Meyrick (1810) firmly qualified this, on what evidence is unknown, writing that “Four and twenty yew trees were once standing in it, though Leland says thirty-nine, of which but few remain, and tradition says, that Davydd ab Gwilym is buried under one of them.” Roberts (1848) bemoaned with obvious relish that “The thirty-nine great yew trees, seen by Leland, are so reduced in number as to be seen like the last of a once flourishing and noble race, mourning in their own decay over the magnificence of the past and the desolation of the present.”

George Borrow (1862) in his narrative of a walk through Wales in 1854 wrote: “I would give something, said I, to know whereabouts in this neighbourhood Ab Gwilym lies. That, however, is a secret that no one can reveal to me. At length I came to a yew-tree which stood just by the northern wall which is at a slight distance from the Teivi. It was one of two trees, both of the same species, which stood in the churchyard, and appeared to be the oldest of the two. Who knows, said I, but this is the tree that was planted over Ab Gwilym’s grave, and to which Gruffydd Gryg wrote an ode? I looked at it attentively, and thought that there

was just a possibility of its being the identical tree. If it was, however, the benison of Gruffydd Gryg had not had exactly the effect which he intended, for either lightning or the force of wind had splitten off a considerable part of the head and trunk, so that though one part of it looked strong and blooming, the other was white and spectral ... Taking off my hat I knelt down and kissed its root, repeating lines from Gruffydd Gryg, with which I blended some of my own in order to accommodate what I said to present circumstances ...”



The two Yew trees in Strata Florida churchyard, the more complete one on the left, view NNE from SN74656578, May 2005



There are still two Yews in the churchyard. Borrow's one, near the N edge NE of the church, although a healthy tree with a well-formed canopy, has a flattened trunk *c.*125cm across, 1983, that is clearly just part of the circumference of a once much larger trunk; it was called Dafydd ap Gwilym's Yew into the early 20<sup>th</sup> century, labelled as such on several picture postcards and other illustrations. More recently though, perhaps because less of Borrow's tree now remains, the Yew just N of the church is generally known as Dafydd's, with a plaque and many mentions and illustrations in guide books and elsewhere. This tree, a female, is on a square mound enclosed by a mortared wall, and in 1983 the trunk consisted of two large fragments of one hollow trunk, separated at soil level but united at 1.5m up, with the SE half of the original trunk missing; extrapolation of the girth at soil level indicated that it must have been 680-750cm. After being badly damaged in a storm in 2002 most of the side boughs were lopped and much of the shell of the trunk cut away; a sawn section of the shell of the main trunk 14cm thick had 66 annual rings, one 9.6cm thick had 66, one 15.5cm thick had 83, and one 15.3cm thick had 126. Two of the side boughs sawn off close to the trunk had 114 and 207 rings. It should be added that scholarly opinion is divided as to whether Dafydd was in fact buried here, or at Talley in Carmarthenshire, and even whether Gruffud Gryg's poem, the start of the story, may perhaps have been written as a mock elegy some time before Dafydd died.

**Trefilan** SN549571. The "venerable yew" mentioned here by Horsfall-Turner (1903) still stands, a male tree 540cm girth and 13m tall in 1993, 530cm girth (at soil level) and 16m tall in 2006, on a mound SE of the church, along with a much smaller one NW of the church.

### Trees outside churchyards:

**Dyfi catchment.** A striking landmark on the Ynys-las dunes SN60649396 is a windblown male Yew, described in 1974 (PFW, *BSBI News* 3(2): 19-20 (1974)) as being "five feet [1.5m] long, three feet [0.9m] tall with a flat top some three feet wide inclining away from the coast at an angle of 15-20°. Every shoot above the main plateau of foliage had been salt-scorched." In 2001 it was 4m long and 1.5m tall. It offers a rare refuge in this inhospitable site for a large colony of the Garden Snail *Helix aspersa*.

**Wallog catchment.** There is a group of five trees by the former fishpond at the bottom of Coed Wallog SN597859, 1985 (APF) - 2005, the largest *c.*300cm girth in 1997 (AOC & JPW).

**Clarach catchment.** Williams (1866) fancifully wrote of the Nant Silo valley near Penrhyn-coch: "There is in this valley a farm called Cwmbwa, on which are found the remains of yew trees: there is one solitary yew now left. This will in a measure account for this valley being so well protected by two Forts or Encampments ... as it is well known the yew tree furnished bows for the ancient Britons", and David Jenkins (1992) who was born in 1912 wrote "'Cae Ywen' [c.SN647838] oedd yr enw llafar ar y cae a orwedd rhwng ffermdy Cwmbwa a Phenyberth. Yn fy llencyndod mi glywais aml hynafgwr yn tystio ei fod yn cofio coeden ywen yn tyfu ym môn un o gloddiau'r cae hwn, ac ar gorn hynny tybient fod yno unwaith fynwent ['Yew Field' was the aural name of the field between the farmhouse of Cwmbwa and Penyberth. In my youth I heard many an old man bear witness that he remembered a yew tree growing in one of the hedgebanks of this field, on the strength of which they were of the opinion that it had once been a graveyard]." See Wmffre (2004) for evidence suggesting that Cwmbwa may be derived from a 14<sup>th</sup> century personal name (Y Bwa Bach, mentioned by Dafydd ap Gwilym) rather than from *bwa* meaning a bow. No Yew is now there.

**Aeron catchment.** The finest non-churchyard Yew in the county is a male tree in the hedge between the ruin of Pantybeudy, Llangeitho, SN63006077 and the field to the S which is named "Caer Ywen" on the 1791 plans of the Llanfair Clydogau and Llanddewi-Brefi estates (NLW); it was measured as 549cm girth (at 1m up) in both 1978 and 1998, and 554cm girth (at the narrowest point) in 2005 (T. Hills, [www.ancient-yew.org](http://www.ancient-yew.org)) and appears to have been anciently pollarded at 2m up. In a square walled enclosure in the village square at Llangeitho SN619597 are five trunks, all male and all part of a former single tree planted "some years ago by Mr. E. B. Lawrence, a land owner in the parish" marking the site of the former Capel Gwynfil (Evans 1903; see also Wmffre 2004 p.600 for other references).

**Teifi catchment.** There are two trees in the Rectory garden at Betws Bledrws SN596519, strikingly different in their foliage, both unusually having been allowed to grow unpruned and with all their widely spreading



Windblown Yew on Ynys-las dunes, view SE from SN60649396, February 1996



Yew by ruin of Pantybeudy, view N  
from SN63006076, December 1977



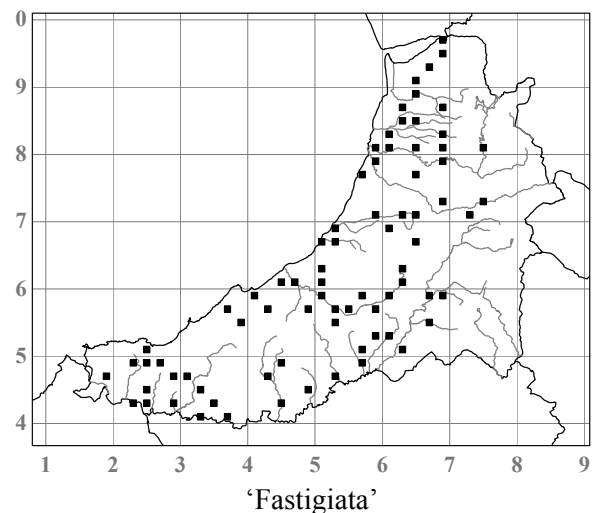
Decorated *Cephalotaxus fortunei*, Coedmore,  
view NW at SN19334368, September 2005

branches intact: one was 415cm girth at the base, with a canopy spread of 22m, in 2008; the other had multiple trunks, several of them decumbent and layered, and a canopy spread of 17m.

That there was once a big tree at Argoed-fawr, Tregaron SN678589, unusually with Nonconformist associations, is attested by J. S. James, *Hanes y Bedyddwyr* 3: 411 (1903). He quotes a correspondent writing in 1900 to the effect that 120 years earlier there were walls of an old Baptist chapel (by tradition established by Vavasor Powell, presumably on one of his visits to the county in the 1650s), standing in the yard here and that “Mae ywen wrth dalcen yr hen adfail [A Yew is by the gable of the old ruin]”. Horsfall-Turner (1903) perhaps implies that the Yew was there first, invoking “the days when Vavasor Powell preached and founded the Baptist Chapel near the yew-tree of Argoed”, as does Rees (1936) in writing of the 1890s when “Many were the surmises concerning the ruinous walls at Argoed, and an ancient yew tree casting its shadow over the ruined pile, seemed to express ‘The place thou standest on is holy ground’.” The tree has long since gone.

#### ‘Fastigiata’

Raised in Ireland in the 18<sup>th</sup> century, the Irish Yew was not generally available in Britain until about 1818. It is common in graveyards throughout the county, and there are a few trees in estate grounds and woodlands; all are female, and the tree has to be propagated by cuttings. Other cultivars occur, including ones with variously yellowish foliage, but they have not been investigated.



#### *Cephalotaxus fortunei* Hook. - Chinese Plum-yew

There is a single specimen of this conifer, very rarely planted in Wales, in mixed estate woodland 250m NW of Coedmore mansion SN19334368. The species is very slow-growing in Britain, and as this one has been badly lopped in the past, it is impossible to guess when it was planted. In 1994 it was



2.4m tall and had several main stems; in 2005 the stems had reduced to one, 20cm girth, and the tree was 3.5m tall and growing strongly. It is regularly decorated with silver paper and baubles by local children. Native of N China, introduced to Britain in 1849.

## CUPRESSACEAE

### ***Taxodium distichum* (L.) Rich. - Swamp Cypress**

Rather rarely planted and usually not growing well in the county, but there is a very fine tree, 397cm girth and 23m tall in 2005, in the grounds of Plas Llangoedmor SN19734590. Of nine trees (No.14) planted in 1956 in the FC Arboretum at Gogerddan SN630832 the only surviving one was 49cm girth and 7m tall in 1993. There are three very bushy trees *c.*4m tall in the Co-op car park at Lampeter SN58094775, 2004. A tree in the grounds of Llwyncelyn, Glandyfi SN69129629 was 35cm girth and 7m tall in 2004. Native of SE North America and introduced to Britain in *c.*1640.

### ***Sequoia sempervirens* (D. Don) Endl. - Coastal Redwood - Cochwydden California**

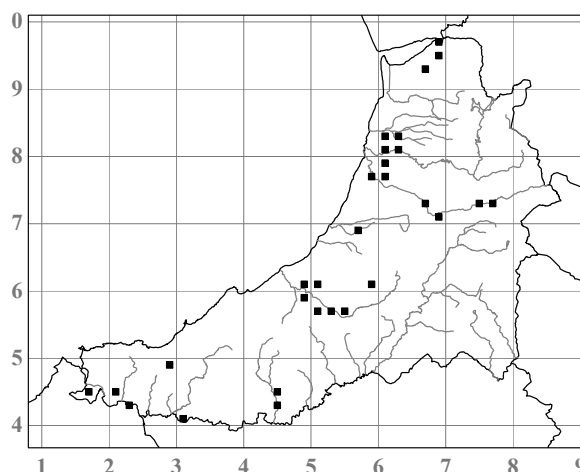
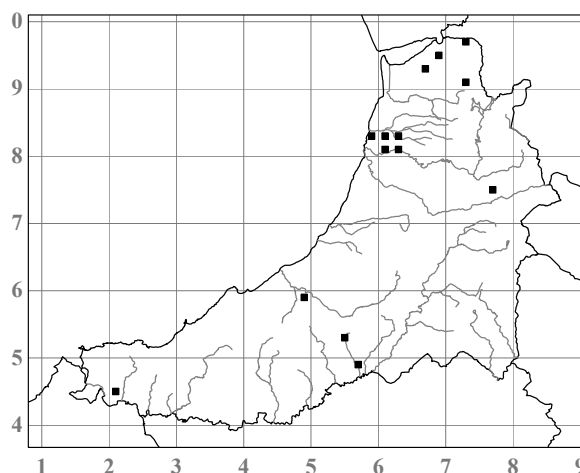
Native of California and introduced to Britain in 1843. Coastal Redwoods have been planted for ornament in several estates and amenity areas, and on a small scale experimentally for timber in a few FC and private plantations. It frequently spreads by suckers, but only in mixed FC woodland 150m W of Ty'n-y-garth, Cwm Einion SN689946, have apparently self-sown trees, *c.*4m tall in 1991, been seen. The largest of *c.*120 trees in an FC plantation in Pantcoch Wood, Lodge Park SN666936 was 223cm girth and 22m tall in 2005, and the largest of *c.*60 nearby in Pantglas-mawr Wood SN665929 was 231cm girth and 23m tall in 2005. The largest of *c.*50 trees in mixed estate woodland in Coed Rhyd-tir, SSW of Bow Street SN619834 was 252cm girth and 23m tall in 2005. Of six trees (No.56) planted in the FC Arboretum, Gogerddan SN630832, the largest of five left was 210cm girth and 21m tall in 1992; and of another group of six (No.38), the largest of four left was 178cm girth and 19m tall in 1992. Several trees, *c.*100cm girth and *c.*12m tall in 1992, were by the FC picnic area just N of Pwll Peiran SN775747. Two 1956 FC trial plots at Castell SN7390, at 410-440m altitude, largely failed, with the few surviving trees poorly grown, 1992.

Of individual trees, a broken one, 156cm girth and 16m tall 1993, is in the grounds of Nantcaerio, Llanbadarn Fawr SN614808; the larger of two planted in 1963 in the Penglais dingle below the University Botany Gardens, Aberystwyth SN593820, was 301cm girth and 25m tall in 2004; and there is a tree in estate woodland at Falcondale SN563491, 1998. Maximum 439cm girth, 27m tall, 2005, in the grounds of Ty-glyn, Ciliau Aeron SN498598.

### ***Sequoiadendron giganteum* (Lindl.) Buchholz - Wellingtonia - Welingtonia**

Native of California and introduced to Britain in 1853. Almost every estate and country house in the county has one or more Wellingtonias, and they are a major feature of the landscape. No self-sown trees have been seen. Of six trees (No.39) planted in 1956 in the FC Arboretum, Gogerddan SN630832, the largest of three left was 114cm girth and 19m tall in 1993.

Only a selection of the larger or more conspicuous trees can be mentioned. A tree below the drive at Glandyfi Castle SN690964 was 531cm girth and 26m tall in 1995 (AOC & WMC). The larger of two at the entrance to Plas Einion, Furnace SN68309490, was 547cm girth and 36m tall in 2005.







*Sequoiadendron* at Aber-mad, *Pinus nigra* subsp. *nigra* solitary on ridge in distance with subsp. *laricio* plantation below, view N from SN59807600, April 2006

One by the lawn at Plas Cwmcynfelin SN603834 was 522cm girth and only 20m tall in 1991. The trees at Aber-mad were planted in the 1870s (Palmer 2004), and three of them are strikingly sited in the middle of fields; the largest, E of the mansion SN601760, was 544cm girth and 30m tall in 1991. Trawsgoed and Birchgrove have many fine trees, many of them over 600cm girth and including the county maximum girth (see below). Of two magnificently sited trees at Hafod, the one on the slope 200m ENE of the mansion site SN76127333 was 573cm girth and 22m tall (but the top broken) in 2005, and the one 200m SW at SN75747310 was 532cm girth and 28m tall in 1991, and 565cm girth and 29m tall in 2005. Among several fine trees at Brynog, Ystrad Aeron, one in the pasture 170m S of the mansion SN529572 was 600cm girth and 32m tall in 1992; it has a huge horizontal bough at 12m up, bending up vertically at the end. Two trees at the S end of the avenue here SN523565 were 633cm girth and 32m tall (the SE tree), and 571cm girth and 26m tall (the NW tree, broken at the top), in 1992; these trees were said locally to have been planted in c.1854, the avenue having been planted during the Crimean War. The S-most and largest of four roadside trees at Ty-glyn, Ciliau Aeron SN499598 was 613cm girth in 1992, and 662cm girth and 22m tall in 2005. A tree in the detached pleasure grounds 600m SW of Alltyrodyn SN445438 was 625cm girth and 32m tall in 1994.

A big tree at Fronfraith SN616818 was struck by lightning in 1991, exploded and collapsed into a heap of pulpy fragments (DOB, pers. comm.), as usually happens with Wellingtonias. Maximum 720cm girth, 26m tall, 1991, the S tree flanking the Birchgrove drive SN665730; 720cm girth, 36m tall, 1994, one of five fine trees just inside the S gate at Trawsgoed SN67207270; 648cm girth, 38m tall, 1992, and 678cm girth, 42m tall (the tallest tree of any sort in the county), 2002, S of the stream in Coed Penglanowain, Nanteos SN61097859.

### ***Metasequoia glyptostroboides* Hu & W. C. Cheng - Dawn Redwood**

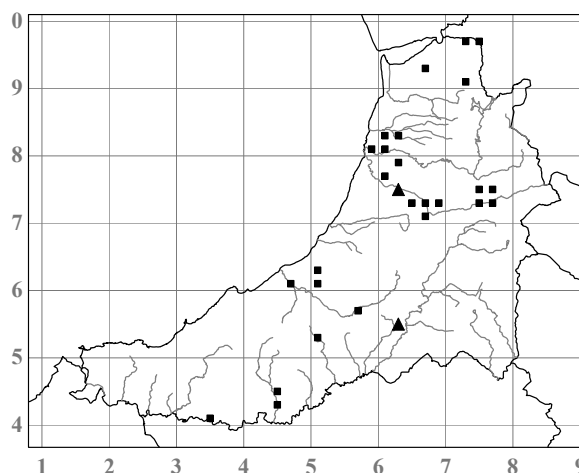
Previously known only as a fossil, this tree was first seen living in China in 1941 and was introduced to Britain in 1948. 18 trees have been noted, all in the N of the county, but none seem yet to have flowered. One in the grounds of Glandyfi Castle SN692966 was 117cm girth and 11m tall in 1994 (AOC & WMC), and 173cm girth and 16m tall in 2005 (AOC & PSC). Nine were planted in the FC Arboretum at Gogerddan SN630832 in 1956, and of the five remaining in 1993 the largest was 50cm in girth and 14m tall. Nearby, of three trees planted by the FC 400m E of Plas Gogerddan SN63388377 the N one was 151cm girth and 17m tall, the middle one was double-trunked and 16m tall, and the S one was 201cm girth and 19m tall in 2004. The westerly and larger of two trees planted in 1961 in the Penglais dingle by the University Botany Gardens, Aberystwyth SN59328200, was 189cm in girth and 17m tall in 1995, and 240cm girth and 22m tall in 2004; the easterly tree was 219cm girth and 21m tall in 2004. A tree by the lane to Y Felin, Aber-mad SN59747637, planted by W. A. Cadman, was 101cm in girth and 10m tall in 1992, and 169cm girth and 14m tall in 2006. The biggest of four trees in a row in the Trawsgoed grounds SN67007298, described in 1969 as "recent" and 2.5m tall (AFM), was 183cm girth and 19m tall in 2008. Two trees recently planted in an exposed site on the N side of the Afon Ystwyth 200m E of the Grogwynion footbridge SN716721 were growing well and 3m tall in 2008. Maximum 240cm girth, 22m tall, Penglais dingle SN59328200, 2004.

### ***Cryptomeria japonica* (L. f.) D. Don - Japanese Red-cedar - Cochwydden Japan**

Frequently planted on estates, both in the open and in woodland, in graveyards and in amenity areas and occasionally forestally for timber; native of Japan, and introduced to Britain in 1842. Definite self-sown plants have been seen only in plantations by the Nant Adal at Castle Hill, Llanilar SN624747, 1992, and in

Cockshead Wood SN630554, 1986. Other conspicuous plantations include ones near The Arch SN763758, near Hafod SN749728 and 767729, and in Allt Hengeraint SN470605. Of nine trees (No.46) in the FC Arboretum at Plas Gogerddan SN630832 planted in 1956 the largest was 179cm girth and 18m tall in 1993. Maximum 290cm girth, 29m tall, Trawsgoed c.SN671730, 1969 (AFM “very fine”); 338cm girth, 30m tall (No.0408), Trawsgoed SN67127302, 2008, maybe the same tree. Altitude limit (planted) 410m, FC experimental plot 1km E of Llyn Nant-y-cagl SN739903, 1992.

‘*Elegans*’ is occasionally grown in estates, large gardens and graveyards where it forms grotesque shapes in shrubberies and on lawns, as in Coed Penrhyn-mawr, Ynys-hir SN68109628, 1998, at Trawsgoed SN66977298, 1994, and at Cilgwyn SN313409, 1994. The best display was an avenue of ten trees at Plas Gogerddan SN63108376, 1992, but these have since been reduced to three and somewhat tamed by pruning, the largest 102cm girth in 2005.



### ***Cupressus arizonica* Greene var. *glabra* (Sudw.) Little (*C. glabra* Sudw.) - Rough-barked Arizona Cypress**

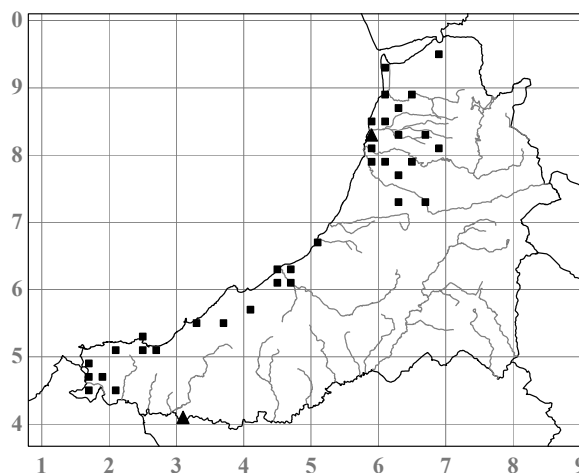
There are two trees in the Trawsgoed grounds, one at SN67077300, 72cm girth and 10m tall, the other at SN66977283, 128cm girth and 13m tall in 1994 (AOC & CDPa); the latter is presumably the tree measured by Mitchell as 97cm girth and 13m tall in 1969 (Mitchell 1972). The only others noted are two by the drive at Monachty SN50356199, the larger 71cm girth and c.8m tall in 1992. Native of Arizona, introduced to Britain in 1907.

### ***Cupressus dupreziana* A. Camus - (Saharan Cypress)**

There is a specimen of this very rarely planted tree in the grounds of Coetmor, Tal-y-bont SN652892, 2006 (HO). Native of Algeria and only recently introduced to Britain.

### ***Cupressus macrocarpa* Hartw. ex Gordon - Monterey Cypress - Cypreswydden Monterey**

Commonly planted, especially near the coast, in estates, along roadsides, often as shelter belts, and in graveyards, amenity areas and occasionally in woodland. Self-sown saplings have been seen only in the Bryn-y-mor Road dingle, Aberystwyth SN586825, 1994, and at Old Cilgwyn SN31554199, 1992. At the former site there is a big tree 402cm girth (at 40cm up) and 23m tall, and another recently blown down that was 27m tall, 1994. There are two trees of ‘*Lutea*’ in the Trawsgoed grounds SN66987291, one (No.0518) 236cm girth and 17m tall, the other 17m tall, 1994 (AOC & CDPa), and this cultivar is probably elsewhere too. Trees vary greatly in habit. There were two contrasting trees by the Eisteddfod stone circle at Cardigan SN18704680, 1992, one 361cm girth and c.19m tall, with a tall trunk and suberect branches, the other 387cm girth and c.12m tall, with a squat trunk and horizontal branches; the latter was felled in 2003. Native of California, introduced to Britain c.1838. Maximum 424cm girth, 27m tall, Old Cilgwyn SN31554199, 2003; 209cm girth, 29m tall, N side of Penglais dingle, Aberystwyth SN59448200, 2004. A broken tree with a trunk 472cm girth, but possibly double-trunked, was by the drive at Nanteos SN61857857, 1991.



### ***Cupressus sempervirens* L. - Italian Cypress**

There are three trees planted on the University campus, Aberystwyth SN597815, 88cm girth and 10m tall etc. in 1995, and one in the grounds of Llwynycelyn, Glandyfi SN689961, 4m tall in 2007. Native from the E Mediterranean to Iran, grown in Britain since at least the 16<sup>th</sup> century.

×**Cuprocyparis leylandii** (A. B. Jacks. & Dallim.) Farjon (×*Cupressocyparis leylandii* (A. B. Jacks. & Dallim.) Dallim.; *Cupressus macrocarpa* × *Xanthocyparis nootkatensis*) - Leyland Cypress - Cypreswydden Leyland

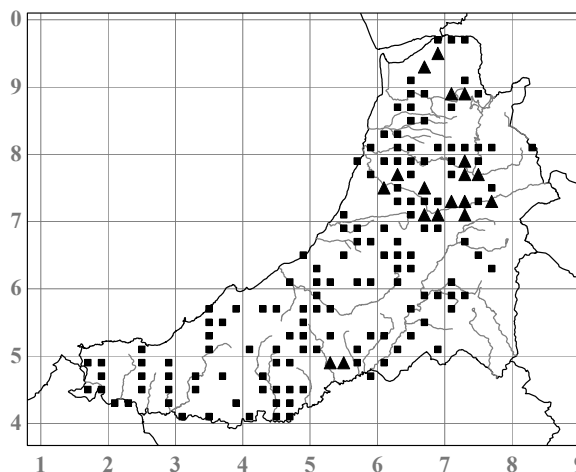
This hybrid of garden origin is frequently planted in estates, usually as single trees or in hedges and shelter belts, in amenity areas, graveyards and large gardens. “The Leyland Cypress Tree Nursery” at Cwmere SN683884 provided much material both locally and beyond from 1962 to 1978. Trees in the FC trial plots at 440m altitude at Castell SN738909, planted in 1956, although healthy and dense, were only 60-70cm girth in 1992. ‘**Leighton Green**’ and ‘**Haggerston Grey**’ seem equally commonly planted, and ‘**Naylor’s Blue**’ is in a few places. Maximum (‘Leighton Green’) 231cm girth, Old Cilgwyn SN31534146, 1992. Altitude limit (planted) 450m, FC trial plot 1km E of Llyn Nant-y-cagl SN740904, 1992.

**Xanthocyparis nootkatensis** (D. Don) Farjon & D. K. Harder (*Chamaecyparis nootkatensis* (D. Don) Spach) - Nootka Cypress - Cypreswydden Nootka

Native of W North America and introduced to Britain in 1854. Rarely planted in the county, and not noticed self-sown. There are five trees in the Trawsgoed grounds, one of which, at SN66907293, by the rotunda at the end of the avenue, was 327cm girth and 19m tall in 1994 (AOC & CDPa) and is probably the tree measured by Mitchell in 1969 as 226cm girth and 19m tall. There is another tree, 245cm girth and 24m tall in 1991, at the edge of Abermagwr Wood SN66717317 nearby. Two trees in Llanddewi-Brefi churchyard SN663553 were both 157cm girth and 12m tall in 1993, and there is a tree probably of this species in Llanfihangel Ystrad churchyard SN524562, 1992. Maximum 356cm girth, 18m tall (No.0534), Trawsgoed SN66977297, 1994 (AOC & CDPa).

**Chamaecyparis lawsoniana** (A. Murray bis) Parl. - Lawson’s Cypress - Cypreswydden Lawson

Native of W North America, introduced to Britain in 1854. Very commonly planted for decoration and shelter on roadsides, in grounds and estate woodlands, graveyards, amenity areas and shelter belts. It is also grown for timber, by the FC and others, alone or in mixed plantations, as in several places in Cwm Woods SN605834 etc., on the Hafod estate, and around Trawsgoed and Strata Florida, and is often planted by FC for shelter along the edges of plantations. It is self-sown, often abundantly, in many places, especially along the verges and banks of FC roads. Maximum 397cm girth (at 50cm up, the largest of four trunks), 21m tall, Trawsgoed grounds SN66907292, 1994 (AOC & CDPa); 167cm girth, 24m tall, Trawsgoed, by the Tennis Court c. SN670729, 1969 (AFM). Altitude limit 410m, FC trial plots, Castell SN739903, 1992 (planted in 1956); (self-sown) 330m, ledge by waterfall, Afon Cyneiniog SN71988958, 1997.



Many cultivars are grown but are often difficult to identify with certainty and hence few have been recorded; Trawsgoed and Glandyfi Castle have the best collections. None have been noticed self-sown. The following are the main ones, excluding very recent plantings: ‘**Erecta Viridis**’ is the commonest, and is especially popular in graveyards although fine trees can also be seen on estates such as Hafod and Trawsgoed. At Hafod the northerly two of three trees at the E end of the kitchen garden SN758730 were 201cm girth and 23m tall in 1991, 232cm girth and 23m tall in 2005 (N tree), and 196cm girth and 20m tall in 1991, and 215cm girth and 23m tall in 2005 (S tree). Maximum 380cm girth, 23m tall, Trawsgoed grounds SN67037288, 1994 (AOC & CDPa). ‘**Allumii**’ is planted at Trawsgoed SN67017299 and 67007295 where there are several trees 12-14m tall, and at SN67007303 there is a hedge 10m tall, 1994 (AOC & CDPa); a tree at Alltyrolyn SN45004420 was 9m tall in 1994. There is a fine ‘**Columnaris**’ 184cm girth, 21m tall, at Glandyfi Castle SN69229665. ‘**Glauca**’ is planted at Trawsgoed SN66937314 (No.0314), 126m girth and 12m tall, and another at SN67157294, 342cm girth (at 1m up) and 20m tall, both 1994 (AOC & CDPa); this old cultivar is not often seen. Trees probably of ‘**Triomf van Boskoop**’ are at Trawsgoed SN66977298, 155cm girth and 18m tall, and 170cm girth and 18m tall, 1994 (AOC & CDPa); and at Falcondale SN565491, where of two trees N of the house the larger was 215cm girth and 20m tall in 1993. There is a tree probably of ‘**Aurea**’ at Glandyfi Castle SN693966, 120cm girth, 10m tall, 1993 (AOC & WMC). ‘**Filiformis**’ is in the Birchgrove grounds SN66607303, 1991. There are several trees of ‘**Lutea**’ planted at Trawsgoed and Mitchell measured



a “good tree” 113cm girth, 19m tall, by the Tennis Court c.SN670729 in 1969; the largest there now, presumably a different tree, at SN67017291 (No.0465), was measured as 251cm girth and 19m tall in 1994 (AOC & CDPa).

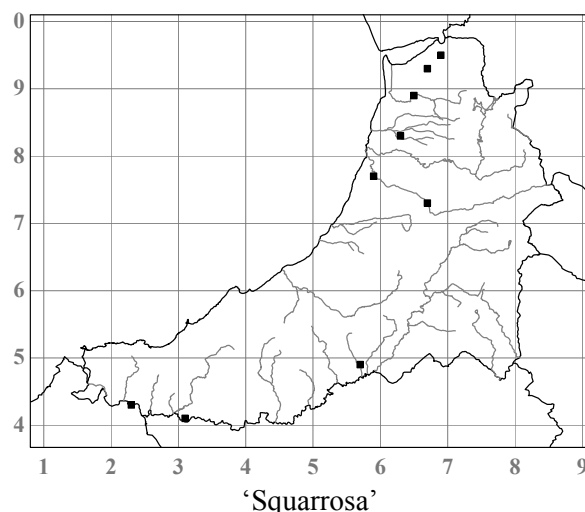
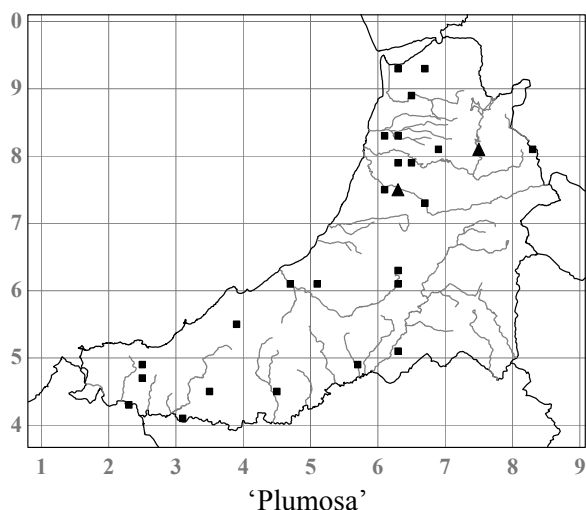
### ***Chamaecyparis obtusa* (Siebold & Zucc.) Endl. - Hinoki Cypress**

Native of Japan and introduced to Britain in 1861; rarely planted in the county, and not noticed self-sown. The largest of six trees (No.29), planted in 1956 in the FC Arboretum at Gogerddan SN630832 was 116cm girth and 12m tall in 1993. There is a tree near the South Lodge at Alltyrodyn SN45254411, 64cm girth, 9m tall, 1994; one by the lawn at Llwynduris SN239432, 167cm girth (the larger of two trunks), 14m tall, the maximum, 1994; and one in woodland 200m E of Henllan bridge SN358401, 116cm girth, 15m tall, 1993.

At Trawsgoed by the tennis court SN67057290 there is a good tree of ‘**Crippsii**’ measured in 1969 by Mitchell as 86cm girth and 10m tall, which in 1994 was 141cm girth and 16m tall (AOC & CDPa). By the water garden there SN67037300 is a bush of ‘**Nana Gracilis**’ 4m tall, 1994 (AOC & CDPa).

### ***Chamaecyparis pisifera* (Siebold & Zucc.) Siebold & Zucc. - Sawara Cypress - Cypreswydden Sawara**

Native of Japan and introduced to Britain in 1861. Almost always planted in the county as one of the many cultivars, but there is a specimen of the typical tree in Llanfihangel-y-Creuddyn churchyard SN665760, 128cm girth, 13m tall, 2004; and one just W of the walled garden at Ty-glyn SN49675991, 82cm girth, 10m tall, 1992 (NMW). Trawsgoed has a particularly good selection of the cultivars. ‘**Plumosa**’ is popular in graveyards but is also frequently planted in estate woods, shrubberies, roadsides and in hedges. It is occasionally self-sown, as on the masonry of the old bridge at Ponterwyd SN748808, 1999, or established from throw-outs, as at the old station yard, Llanilar SN626753, 1991. Maximum 236cm girth, 15m tall (No.0473), 1994, S of the tennis court at Trawsgoed SN67017288 (AOC & CDPa), probably the tree



measured by Mitchell in 1969 as 197cm girth and 14m tall. Altitude limit (planted) 355m, by fishing hut, Cae Gaer SN821816, 1993. ‘**Squarrosa**’ is not as popular either in graveyards or in estates as ‘**Plumosa**’, except at Trawsgoed where, of many trees, one at the end of the avenue SN66897292 with a broken top, measured in 1969 by Mitchell as 147cm girth and 14m tall, was 173cm girth and 14m tall in 1994 (AOC & CDPa). Maximum 298cm girth (at 1m up on the largest of three trunks), 19m tall, W of the tennis court, Trawsgoed SN66957297, 1994 (AOC & CDPa). ‘**Plumosa Aurea**’ is rarely planted, but there are two trees in a Tal-y-bont chapel graveyard SN655895, 1993 (NMW), and Mitchell measured a tree by the tennis court at Trawsgoed SN669729 in 1969 as 157cm girth and 15m tall. ‘**Filifera**’ is also rarely planted, but there is a tree just W of the walled garden at Ty-glyn, Ciliau Aeron SN49675991, 75cm girth, 7m tall, 1992, and three in the Trawsgoed grounds. These latter were measured by Mitchell in 1969 as 86cm girth, 11m tall, and described as “crowded”; 136cm girth, 13m tall; and 170cm (at 60cm up), 14m tall. In 1994 when these three trees were re-measured, one E of the tennis court SN67087290 was 12m tall (with five trunks); the two others, SW of the tennis court SN67007290, were 150cm girth, 13m tall (No.0458) and 197cm girth, 15m tall (No. 0459) (AOC & CDPa).

**Platycladus orientalis** (L.) Franco (*Thuja orientalis* L.) - Chinese Thuja

A planted tree at Trawsgoed c.SN670730 measured by Mitchell in 1969 as 119cm girth and 12m tall, was not refound in 1994. The only tree seen since is one planted on the retaining bank by the stream in Llanfihangel-y-Creuddyn churchyard SN665760, 187cm girth (at ground level) and 12m tall in 2004. Originating from China where it is known only in cultivation and introduced to Britain in 1952.

**Thuja occidentalis** L. - Northern White-cedar

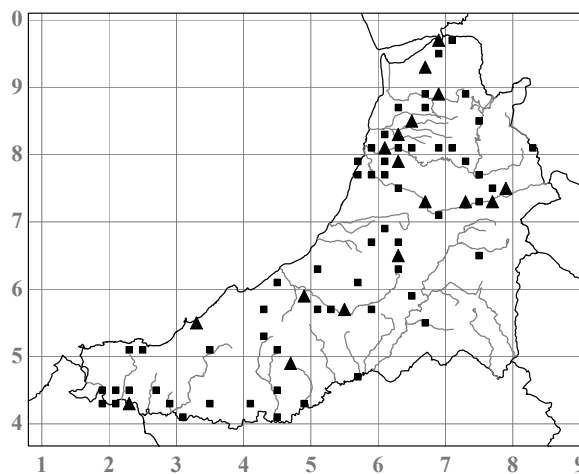
The first tree to be introduced from North America to Britain, in the 16<sup>th</sup> century. A tree 220cm girth and 19m tall at the end of the avenue Trawsgoed c.SN669730, measured by Mitchell (1969, 1972) was thought by him to be “Superb, best known!”, but he later agreed that it was only a form of *T. plicata* (HO pers. comm.). Two others he measured there were 89cm girth and 12m tall, and 14m tall. Three, considered by HO to be hybrids with *T. plicata*, were present in 1994 (AOC, HO & CDPa): one at SN66977292, W of the tennis court, 70cm girth, 9m tall; one at SN66987297, NW of the tennis court, 80cm girth; and the third nearby at SN66077298, 9m tall and 5-trunked. There is also a hedge, 7m tall in 1994, SW of the mansion, and a tree of ‘**Rheingold**’, 5m tall in 1994, NW of the mansion. A few trees have been noted elsewhere, one in Llanddewi-Brefi churchyard SN663553, 138cm girth and 11m tall in 1993; five trees along the E edge of Dihewyd churchyard SN484562, 1996; and trees in a copse at Llundain-fach SN559567, 1996.



*Platycladus orientalis*, Llanfihangel y Creuddyn churchyard, view S from SN66507602, February 2005

**Thuja plicata** Donn ex D. Don - Western Red-cedar - Cedrwydden Goch

Native of W North America and introduced to Britain in 1853, and widely grown in the county for ornament or shelter in grounds and estates and occasionally for timber. It frequently self-seeds. Plantations by the FC and private forestry seem to have been only after the 1950s, but have since been quite extensive, for example near Brwyno SN712966, 1992, in Coed yr Arch SN763758, 1981, and in the Ystwyth valley c.SN694716, 1982. The Trawsgoed grounds c.SN670728 have many of the best trees in the county, Mitchell (1969), when he measured a dozen here 333-396cm girth and 23-29m tall, commented that “The Thujas are a remarkable series of fine boles.” In 1994 (AOC, HO & CDPa) the dozen largest, probably the same trees, were 358-500cm girth and 24-31m tall, and the measurements of some of the numbered smaller trees here were: No.0555: 190cm girth, 19m tall; No.0556: 170cm girth, 21m tall; No.0557: 286cm girth, 23m tall; and No.612/3: 304cm girth, 21m tall. Birchgrove SN665730 has equally fine though fewer trees, one by the road having a huge bole 563cm girth in 1991 and 3-lobed in cross-section.



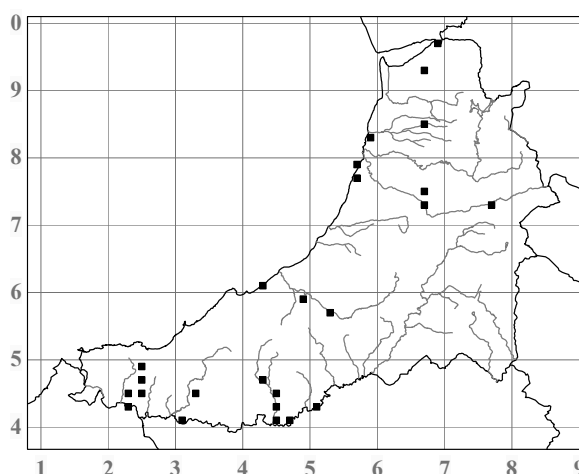
Other good trees include several at Lodge Park SN662934, the largest 200m SSW of the house being 334cm girth and 21m tall in 1992; a tree just N of the drive 30m W of Pont Dologau, Hafod SN77047336, 310cm girth and 28m tall in 1991, 347cm girth and 30m tall in 2004, and a fallen tree here presumably of the same age had 91-92 annual rings in 1994 (K. Little); one by the Nant Camel at Ty-glyn, Ciliau Aeron

SN498598 that was 396cm girth in 1992; and one by the main gate into Blaenwern, Llanarth SN42355645 that was 463cm girth (at 50cm up, very buttressed) in 2004. A striking tree on the SW side of the road 300m SSW of Trawsgoed mansion SN66917278 was 357cm girth and 31m tall in 2005, with four other trunks around the main one (the largest 232cm girth) having arisen from decumbent branches, a common feature of the species. Of the five trees in the Vicarage garden, Devil's Bridge SN74247681, the three that have single trunks were 282cm girth and 19m tall (the S tree), 254cm girth and 18m tall (the middle tree), and 246cm girth and 18m tall, in 1992; all are believed to have been planted in the 1890s when the house was built. Of six trees (No.85) planted in 1958 in the FC Arboretum at Gogerddan SN630832 the largest was 137cm girth and 15m tall in 1993.

Cultivars have not been properly investigated, but there are three trees of '**Zebrina**', 177cm, 168cm and 153cm girth in 1992, by the stream 350m S of Old Cilgwyn SN31534146 (NMW). Maximum 500cm girth, 31m tall, 1994, Trawsgoed grounds SN66907290; 354cm girth, 36m tall, 2005, in woodland 20m SE of Pont Hopcyns, Trawsgoed SN67267255. Altitude limit (planted) 355m, by fishing hut, Cae Gaer reservoir SN821816, 1993.

### **Thujopsis dolabrata** (L. f.) Siebold & Zucc. - Hiba

Introduced into Britain from Japan in 1853, and planted in at least five graveyards and in many estates in the county. Many of the trees are multi-trunked, and among the most impressive is one in the Bryngolau Plantation, 600m SW of Alltyrodyn SN445438, which in 1994 was 16m tall and had 16 trunks, the largest of which was 87cm girth, ten more trunks having been cut away. Two trees in Mariamne's Garden at Hafod SN763731 were 104 and 77cm girth in 1989, 112 and 81cm in 1991, and 122 and 87cm in 1997. '**Variegata**' is an unstable cultivar, but two trees at Trawsgoed retain their variegation: one W of the tennis court SN66947294 was 14m tall in 1969 (Mitchell 1969), and 16m tall, with 4 trunks, in 1994; the other, in the rotunda at the SW end of the avenue SN66907298, was 17m tall in 1969 (Mitchell 1969) and 18m tall, with c.30 trunks, in 1994. Maximum 264cm girth (at 30cm up), 13m tall, 1992, 50m SSW of Brynog mansion SN52935736.



### **Juniperus** L.

Several species and many cultivars, such as **J. procumbens** Miq., **J. sabina** L., **J. squamata** Lamb. and **J. virginiana** L., as well as those mentioned below, are grown in amenity sites around supermarkets and car parks, as well as on the University campus, Aberystwyth, but have not been studied in detail.

### **Juniperus chinensis** L. - Chinese Juniper

A "huge bush" of '**Albospica**' ('Albovariegata') in the Trawsgoed grounds c.SN670730, was measured by Mitchell (1972) in 1969 as 97cm girth and 11m tall, and in 1982 as 116cm girth and 13m tall (Johnson 2003). The species is native of China and Japan, and was introduced to Britain in 1804.

### **Juniperus communis** L. - Juniper - Merywen

There are two trees of '**Hibernica**' 4m and 5m tall, 1994 (AOC & CDPa) in the Trawsgoed grounds SN67007300. Post-1950 field records at BRC of it as a native for SN69, 75, 77 and 79, and a 1935 literature record there for SN78, must be errors.

### **Juniperus recurva** Buch.-Ham. ex D. Don var. **coxii** (Jacks.) Melville - Himalayan Juniper

A tree in the Trawsgoed grounds SN66977296 measured by Mitchell in 1969 as 60cm girth and 9m tall (1972), was 130cm girth and 11m tall in 1994 (AOC & CDPa). The variety is native of Burma and was introduced to Britain in 1920.



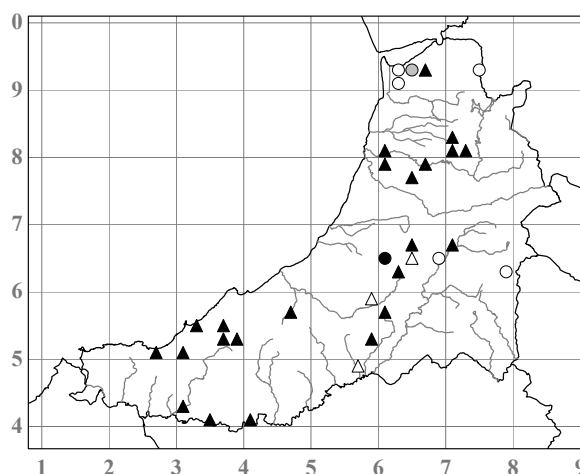
**Calocedrus decurrens** (Torr.) Florin - Californian Incense-cedar

Rarely planted, only four trees having been noted. The biggest is a fine tree at Trawsgoed SN67087296, 325cm girth and 21m tall in 1969 (AFM), and 414cm girth (at 65cm up) and 22m tall in 2008. One at Falcondale SN565491 was 317cm girth (at 50cm up) and 21m tall in 1993 (NMW). The other two are at Alltrodyn, where one by the Afon Cletwr SN44824410 was 191cm girth and 17m tall in 1994 (it was blown down in 2005), and the other in the plantations opposite at SN44734400 was 213cm girth and 21m tall in 1994. Native of W North America, and introduced to Britain in 1853.

**ANGIOSPERMS - Flowering Plants****PRE-DICOTS - Primitive Angiosperms****NYMPHAEACEAE****Nymphaea alba** L. subsp. **alba** - White Water-lily - Alaw

Much rarer as a native than *Nuphar* and now confined to a single site, but much more often planted and naturalised. A record for the Aberystwyth neighbourhood in Evans (1804) is probably a misquotation of an Aikin record for Aberdyfi. Morgan (1851, 1874) gave it for Llyn Penrhaiadr SN753932, but it has not been recorded there since. Dora Jones ("Gwynfryn") (Jones 1866, 1887), in an account of what is demonstrably Cors Fochno c.SN69F, wrote that in the "still black pools, there is the queen of all the flowers. Floating amongst her broad green leaves, the alabaster cups to the blue sky there are the water-lilies. Thousands of them, the lovely flowers, opening their beautiful buds upon the water, where no one ever sees them, and no-one

knew of their existence, till one famous and memorable day I and all the dogs came upon them ... The lovely white flowers!" In the later version of the account (Jones 1887) an engraving by F. W. Heyl, presumably done from imagination, shows the scene (see p.92). Salter saw it here in 1897 (Diary 1.5.1897), and in his Flora (1935) gave only a 1932 (FCJ) record of it from Cors Fochno: "Ditch on Borth Bog in abundance", probably the ditch full of flowering *Nymphaea* a photo of which is given in Newton (1933a); it was thus presumably very restricted on the bog in his time. ADF (*in litt.* 1983) wrote: "I have seen photos taken c.1941 which show the ditch at the top of Llancynfelin Common from c.SN633920-637918 absolutely full of *Nymphaea*", probably the same ditch again, and ADF himself was the last to see it on the bog, in an old peat cutting with *Schoenoplectus* and *Typha* at c.SN640920 in 1983.



*Nymphaea alba* on Llyn Fanod,  
view N from SN601641, August 1996

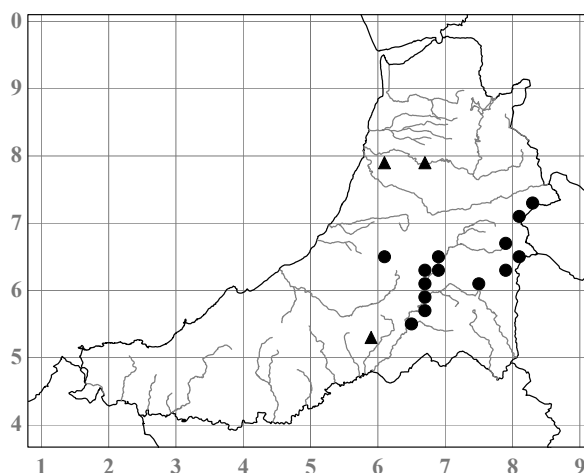
*Nymphaea* was first recorded from Llyn Fanod SN601641 in 1899 (Marshall 1900), and it is still abundant there, 2005, growing mixed with *Nuphar* at the SW end of the lake. Salter (1935, Diary 27.8.1938) recorded it from the outflow stream of Llyn Gorast SN791630 in 1930 and 1938. The only other record of it presumably as a native was from the Afon Teifi on Cors Caron, where the ditch from Maeslwad joins the river c.SN696644, c.1939 (WGGL, ms. project for Tregaron County School).

The earliest of many records of it as an introduction was by Salter from the pond in the Falcondale grounds SN570490 in 1927 (Diary 25.6.1927). Many of the

naturalised plants in the county have reddish flowers and probably represent cultivars in the *N. ×marliacea* Lat.-Marl. aggregate. Altitude limit 455m, Llyn Gorast SN791630, 1938 (Salter Diary 27.8.1938); 310m, Llyn Fanod SN601641, 2005.

***Nuphar lutea* (L.) Sm. - Yellow Water-lily - Lili'r Dŵr Felen**

Undoubtedly native in seven of the upland lakes, and in the Afon Teifi and its associated streams and ditches from Cors Caron c.SN66W, 1849 (Morgan 1849) - 2005, down to Pont Gogoyan SN6454, 2004 (DB & RR), including Llyn Maesllyn SN693627, 1905 (Salter Diary 15.6.1905) - 2004. The lakes vary from oligotrophic Llyn y Gorlan SN785668, 1892 (Salter Diary 23.6.1892) - 2004 to the less oligotrophic Llyn Fanod SN602642, 1899 (Marshall 1900) - 2004, and the others it is in are Llyn Gwngu SN839729, 1924 (Salter Diary 23.7.1924) - 1997; Llyn y Figyn SN812704, 1928 (Salter Diary 28.7.1928) - 1989; Llyn Gorast SN792631, 1924 (Salter Diary 12.7.1924) - 2004 (AOC & PAS); Llyn Crugnant SN754613, 1924 (Salter Diary 28.6.1924) - 1993; and Llyn Gynon where it is only in the outflow stream SN804646, 1924 (Salter Diary 12.7.1924) - 2003. It is remarkable that all these lakes are entirely natural and that *Nuphar* is absent from all the upland reservoirs and from all those lakes that have had their water levels raised by dams. Being prone to damage by wave action, in the larger lakes it is confined to the more sheltered S and W sides. In addition it is in three lowland estate ponds to which it was probably originally introduced, at Glanrheidol SN662793, 1849 (Morgan 1849) - 1992; at Nanteos SN615784, 1939 (WGGL) - 2004; and at Derry Ormond SN592521, 1925 (Salter Diary 30.5.1925) - 1993. Altitude limit 505m, 1924-1993, Llyn Crugnant (see above).



*Nuphar lutea* on Llyn y Gorlan, view NE from SN786668, July 1989

**WINTERACEAE**

***Drimys winteri* J. R. Forst. & G. Forst. - Winter's Bark**

A fine, tall tree 57cm girth and 16m tall, 2008, in the wood above the drive at Glandyfi Castle SN691965. Native of the Andes, introduced to Britain in 1827.

**SAURURACEAE**

***Houttuynia cordata* Thunb. - Fish-plant**

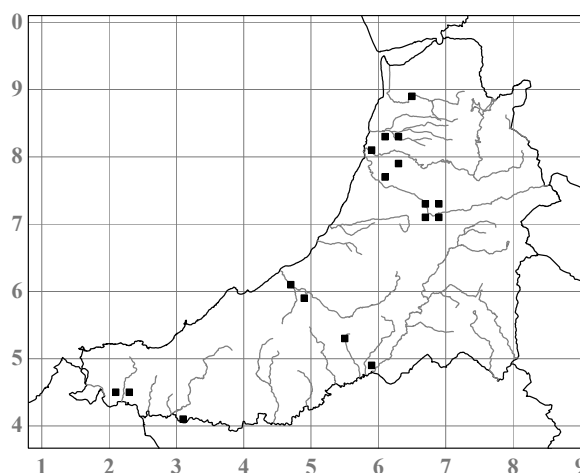
Naturalised down a small stream along a little-used footpath in woodland below a cottage, Llwyn-teg, 2km ESE of Brynhofnant SN35205048, 2008 (NMW) and, surprisingly for a common ground-cover plant, very rarely escaped elsewhere in Britain. Native of E Asia.

**MAGNOLIACEAE**

***Liriodendron tulipifera* L. - Tulip-tree**

Native of E North America and introduced to Britain in the 17<sup>th</sup> century. Occasionally planted in estate woods and parkland and in large gardens, and rarely in wilder situations, although there is a fine, very floriferous tree, 263cm girth in 1991, 292cm girth and 24m tall in 2002, in the valley below Old Cilgwyn SN315412, and c.10 trees averaging c.70cm girth and 15m tall in 1992 (NMW) - 2008 were planted by the FC at the edge of a

conifer plantation by the A482 at Allt Hengeraint SN470604. A rather spindly tree on the lawn at Plas Cwmcynfelin SN60358343, 232cm girth in 2003, may be too small to be the “big Tulip-tree” seen there by Salter in 1929 (Diary 23.4.1929). A tree at Trawsgoed SN67067300 planted in 1954 was 143cm girth and 16m tall in 1994 (AOC & CDPa) and 198cm girth and 23m tall in 2008. A very big tree in the grounds of Aber-mad SN60067604 known in the 1940s died c.1960. Maximum 483cm girth, a broken tree branched into three and cut off at 2-3m up, E of the walled garden, Nanteos SN622785, 1996 (CDPa & RL; AOC); this is presumably the tree seen by Salter in 1907 (Diary 14.4.1907).



### **Magnolia acuminata** L. - Cucumber-tree

A planted tree 203cm in girth (at 1m up) and 12m tall in 1987, in the walled garden at Hafod SN757730 (**BM**, CK & AOC, *Western Mail* 26.5.1988), was 223cm in girth and 18m tall in 1998, 242cm girth and 18m tall in 2005 and 251cm girth and 18m tall in 2009. Native of E North America and introduced to Britain in 1736.

## **LAURACEAE**

### **Laurus nobilis** L. - Bay - Llawrwydden

Rarely planted in public places, but among a few bushes in graveyards is one in Llangynllo churchyard SN352439, 1983. There are two big, multi-trunked bushes in the grounds of Plas Dolau, 2km E of Llanbadarn Fawr SN622813, 2005. Scattered bushes in mixed scrubby woodland just NW of Maes-y-pwll, New Quay SN39125955, 2001, probably include some that are bird-sown. Native of the Mediterranean and grown in Britain since at least the 16<sup>th</sup> century.

## **EU-DICOTS - True Dicotyledons**

### **CERATOPHYLLACEAE**

#### **Ceratophyllum demersum** L. - Rigid Hornwort - Cynddail Caled

Although a very rare plant in W Wales, *C. demersum* is probably native in the natural lake of Llyn Maesllyn SN693628, where it was first found in 1956 (**NMW**) and where there were no other aliens; then, and in 1983, it was in very small quantity, but since then, as a result of gradual eutrophication, it has become very abundant, 1995. It is grown in garden and farm ponds, and it is often difficult to define where it is effectively naturalised, although it is reasonably so in field ponds E of Cefn Hendre Farm SN607819, 2003, and N of Clogfryn SN449624, 1996-2003 (AOC & SPC). It is uncertain whether it is native or naturalised in the brackish ditch behind the sea bank along the Dyfi estuary WNW of Ynys-las Farm SN618935-621935, 2001-2008, where when it was first seen it was growing with *Azolla*, and in a swampy ox-bow of the Teifi W of Alltybwla SN256422, 2000 (**NMW**) where it grows with *Elodea nuttallii*; at neither site was it seen on many earlier visits. It has not been seen to flower in the county.

### **PAPAVERACEAE**

#### **Papaver pseudoorientale** (Fedde) Medw. - Oriental Poppy - Llygad y Bwgan

One large plant, with bracts and with the usual blotched petals, occurred as a casual on a disturbed roadside at Ffynnon Caradog SN619831 in 1992 (**NMW**). Native of SW Asia.

#### **Papaver orientale** L.

A naturalised clump in a sandy pasture at the Ynys-las T-junction SN608924, 1992-1999 (AOC, SPC), but now destroyed, was this species, lacking bracts and with unblotched petals. Native of SW Asia.

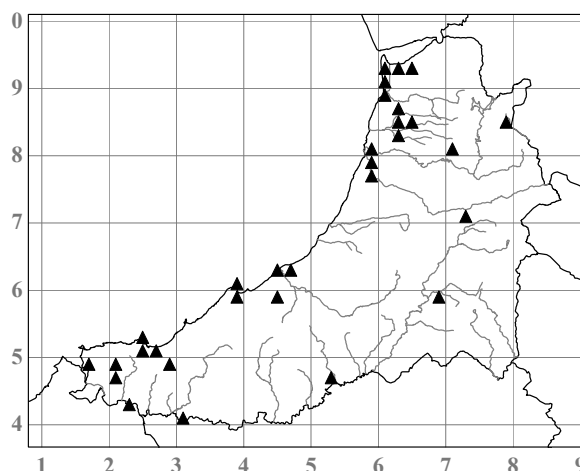


**Papaver atlanticum** (Ball) Coss. - Atlas Poppy - Pabi'r Atlas

Long-established around the church hall W of Llanbadarn Fawr church SN598810, 1979 (NMW, RGE) - 2005, clearly originating from Salter's garden immediately above, where he grew it, as a 1940 specimen (NMW, det. AOC) indicates. The only other record is of one plant on the site of the demolished Seilo Chapel, Queens Road, Aberystwyth SN586818 in 1996 (SPC). Native of Morocco.

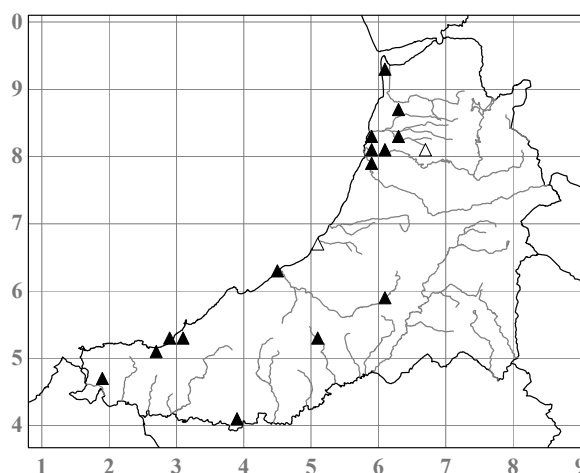
**Papaver somniferum** L subsp. **somniferum** - Opium Poppy - Llysiau Cwsg

First recorded in 1976, from waste ground at Borth SN69A (JEH), the Opium Poppy is now a frequent archaeophyte casual throughout the lowlands on waste ground, tips, disturbed roadsides, building sites, quarries and sand dunes. Long-persistent colonies occur in a few places, for example at the edge of the Penyrergyd dunes SN164485, 1991-2005. The plants seen usually have pink or mauve flowers, and are mostly *flore pleno*. Altitude limit 410m, waste ground, Eisteddfa Gurig SN797840, 1993 (SPC). Native of SW Asia.



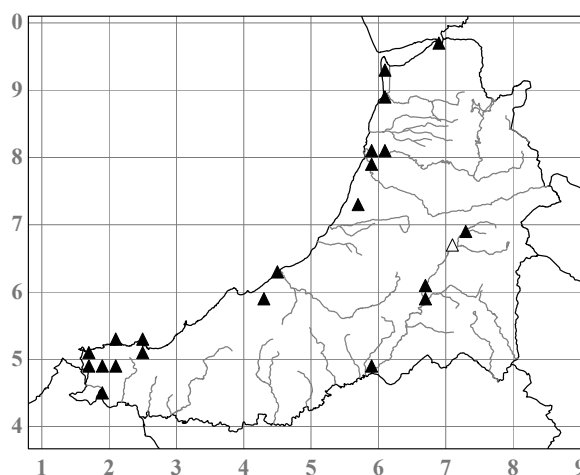
**Papaver rhoeas** L. - Common Poppy - Pabi Coch (Ysgallen Sidan)

Never a frequent plant, Salter (1935) saying of it: "Never seen in cornfields. In this county of rare occurrence and only as a casual, about waste ground, rubbish-tips and on railway ballast." He saw it at only three sites, at Llan-non SN56D in 1904 (Diary 16.7.1904), by the railway at Ynys-las c.SN69B in 1905 (Diary 23.6.1905), and by the railway at Glanyrafon SN6180 in 1925 (Diary 14.6.1925). Morgan (1949) recorded it, probably mistakenly for *P. dubium*, from cornfields, Rees (1890) recorded it from Rhydyfelin SN57Z, and Burkill & Willis (1894) did not mention it. It has certainly become commoner more recently and has been seen at about 20 sites since 1970 on waste ground, tips, disturbed roadsides, building sites and farmyards, but still never in arable fields. On disturbed ground at the old allotment (formerly rubbish-tip) site by the Afon Rheidol at Aberystwyth SN589810 in 1990-1992, **Shirley Poppies** (NMW) grew with normal *P. rhoeas*, and they also grew on waste ground by the Ynys-las boatbuilding yard SN616933 in 2007 (NMW).



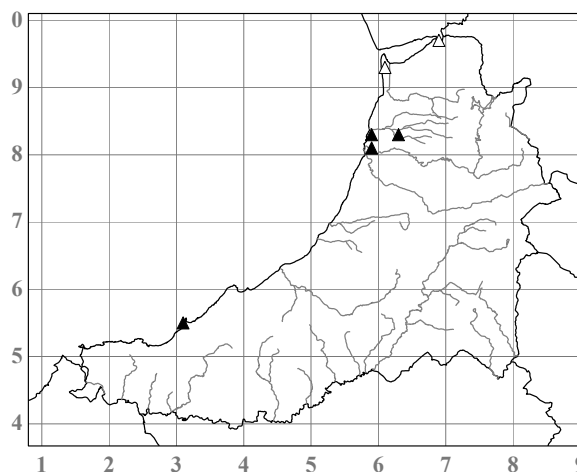
**Papaver dubium** L. (*P. lamottei* Boreau) - Long-headed Poppy - Pabi Hirben

Not common, but this archaeophyte is the most frequent of the smaller-flowered Poppies in the county, occurring on waste ground, tips, building sites, disturbed roadsides, quarries and railway ballast. There is only one recent record of it as an arable weed, in a barley field near Penparc SN202487 in 1993 (AOC & CDP). Jones (1880) wrote that "The *Papaver Lamottei* is the only form of *P. dubium* I have seen in Carmarthen or in Cardigan. Poppies are rather scarce in both counties; in each case I found them on hedges near the sea, with white juice". Salter (1935), on the other hand, said of *P. dubium* "The form which occurs is the var. *Lecoqii* Lamotte", i.e. the plant with yellow juice, and he apparently never recorded *P. dubium*.



**Papaver lecoqii** Lamotte (*P. dubium* subsp. *lecoqii* (Lamotte) Syme) - Yellow-juiced Poppy

Now a rare archaeophyte in the county, appearing only as a casual on waste ground, building sites and disturbed roadsides. It occasionally occurs with *P. dubium*, flowering conspicuously earlier than that species, for example where both were in abundance on a building site at Parc-y-llyn, Aberystwyth SN592809 in 2004. If Salter was correct (see above), it was commoner in the past, and he said of it: "This is the poppy of Cardiganshire corn-fields, where, however, it is rather scarce." As well as in cornfields he saw it alongside the railway from the Ynys-las sawmills SN617931 (Diary 21.6.1907) to Glandyfi c.SN69Y (1935).

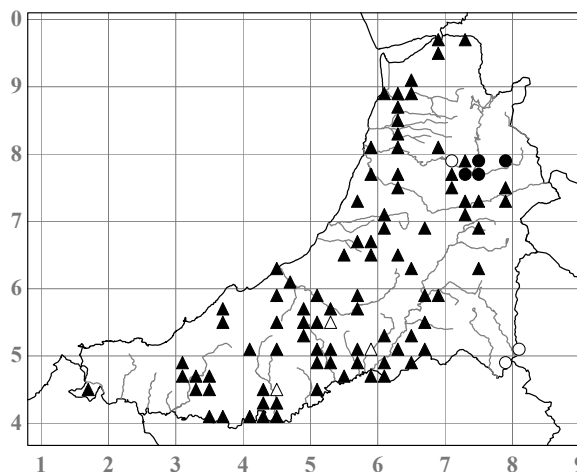


**Papaver argemone** L. - Prickly Poppy - Pabi Pen-wrychog

An archaeophyte, first recorded in 1894 by Salter (Diary 16.7.1904) as a cornfield weed between Aber-porth and Mwnt SN25, and then in 1901 (Salter 1901) and 1907 (Diary 21.6.1907) at the Plas Crug level crossing, Aberystwyth SN590811. The only subsequent record was in 1976 from a car park in Skinner Street, Aberystwyth SN58678174 (JEH).

**Meconopsis cambrica** (L.) Vig. - Welsh Poppy - Pabi Cymreig

Native in a very few sites, but widely naturalised from gardens. As a native it grows on damp, shaded rocks by streams and on damp, wooded screes, and the main population is in Coed Rheidol, with many colonies from opposite Temple Mine SN74957920 down to Derwen SN735773 which have been variously recorded from 1886 (**BIRM**, AL) to 2005 (AOC & PAS; SDSB). Morgan (1849) recorded it from further down the valley, "Bwa Drain - Cwm Rheidol (scarce)", presumably meaning the waterfalls at SN714790, a suitable site although it has not been seen there since. There is a colony in the Rhuddnant gorge SN79707830, presumably the one seen by Burkill & Willis (**CGE**, 1894) in 1893, and by Salter in 1904 (Diary 11.6.1904) and 1936 (Diary 13.4.1936); this had 13 plants in 2004 (SDSB, CMFB & AOC). In the Tywi valley Salter recorded it near Bwlch-y-ffin SN7948 in 1893 (Diary 22.5.1893, 1935), and the only later record from this area was from the Camddwr gorge just above its confluence with the Tywi c.SN802501 in c.1968 (DD), now under the Llyn Brianne reservoir. A plant on the rocky, wooded bank of the Llyfnant SN730974 in 1990 was a recent arrival and looked native, but was probably seeded from a garden upstream at Glasbwl, and the record from Castell Allt-goch near Lampeter SN5950 (WED) in Salter (1935) will probably also have been of an escape.



As an escape it occurs on roadside hedgebanks, woods, river banks, river shingle, waste ground and tips, chiefly near settlements. Many of these non-native plants have parts or all of the petals orange and are 'Aurantiaca'. Apart from the one record mentioned above in Salter, there are no mentions of it as an escape before 1978, and although as a popular garden ornamental it may be supposed to have been as commonly naturalised in the past as it is now, there is no evidence to support this view.

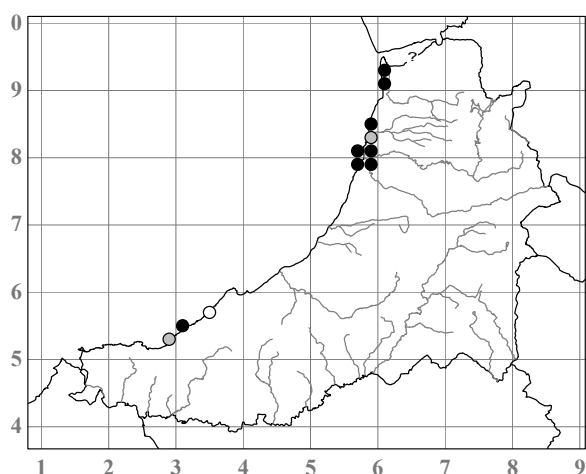
Altitude limit (native) 380m, Rhuddnant SN79707830, 1904 (Salter Diary 11.6.2004) - 2004; (naturalised, 'Aurantiaca') 410m, tip by FC road 300m N of Llyn y Gwaith SN673510, 1996.

[*Glaucium corniculatum* (L.) Rudolph – Red Horned-poppy

Native of S Europe and recorded, without locality, as *G. phoeniceum*, by Morgan (1848). It seems unlikely to have been misidentified, but must remain as one of the many uncertainties among his records.]

### ***Glaucium flavum* Crantz - Yellow Horned-poppy - Pabi Corniog Melyn**

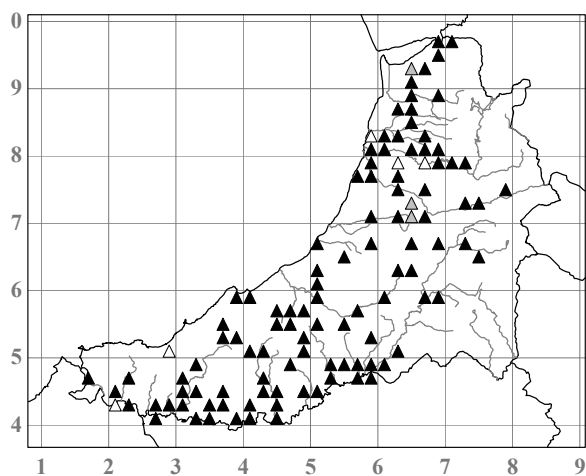
This striking plant of shingle, sands and screes along the coast was first recorded at Aberystwyth by Aikin (1797), then by Evans (1804), Lees (1837, 1841) who said that “It is frequent along this coast, from Swansea to Aberystwith”, Morgan (1848) and Purchas (1848). It was said by Rees (1890) to be “fast becoming a rarity at this [Aberystwyth], as well as at other watering places”, and Salter (1935) said it was in “few localities and decreasing”, but these claims seem to have been misinterpretations of natural variations in abundance that still occur. It was seen “in fair quantity” on railway ballast somewhere NE of the Cletwr c.SN6494 in 1931 (Salter Diary 10.10.1931); at Ynys-las and Borth SN69A & B, 1935 (Salter Diary 1.6.1935) - 2007; at Wallog SN58X, 1892 (Salter Diary 11.6.1892) - 2007; at Clarach SN5883, 1891 (Salter Diary 23.9.1891) - 1956; and from Constitution Hill, Aberystwyth SN583826 where it grows up to 40m above the sea, 2006 (SDSB) to Allt Wen SN573788, 1797-2007. Further S it seems to have been unable to establish itself and only single plants have been recorded, at Cwmtudu SN3557 in 1924 (Salter Diary 16.9.1924), at Llangranog Head SN313551 in 1987 (WMC & AOC), and at Penbryn SN288521 in 1976.



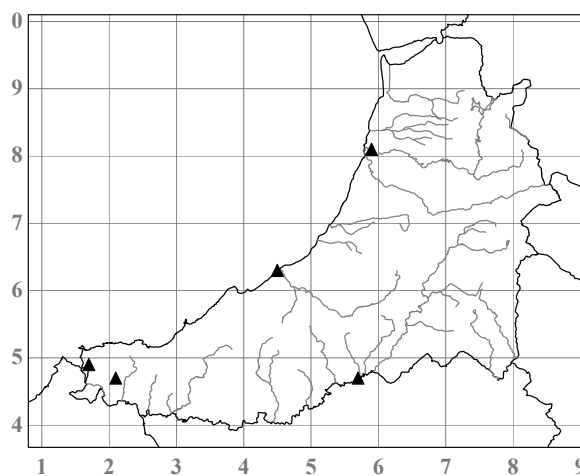
*Glaucium flavum*, Tan-y-bwlch beach,  
view SSW from SN57958058, June 2004

### ***Chelidonium majus* L. - Greater Celandine - Llysiau'r Wennol**

A frequent archaeophyte throughout the lowlands on hedgebanks, walls, road verges and waste ground, almost always near houses and often persisting by old cottage sites where it was presumably grown for its medicinal qualities. A large plant growing on the bank of the Nant Lluet in a marshy sheepwalk above Pontrhydfendigaid SN733671, 200m altitude, 1990, was a rare record in a “wild” situation. It was first recorded in Morgan (1849) from the “End of Clarach lane” c.SN5883.



*Chelidonium majus*



*Eschscholzia californica*

### ***Eschscholzia californica* Cham. - Californian Poppy - Pabi Califfornia**

A rare casual on tips, roadsides and river shingle, and regularly appearing and naturalised in abundance only on the sandy slope above the beach below caravans just E of the Yacht Club, Penyrergyd SN164485, 1994-



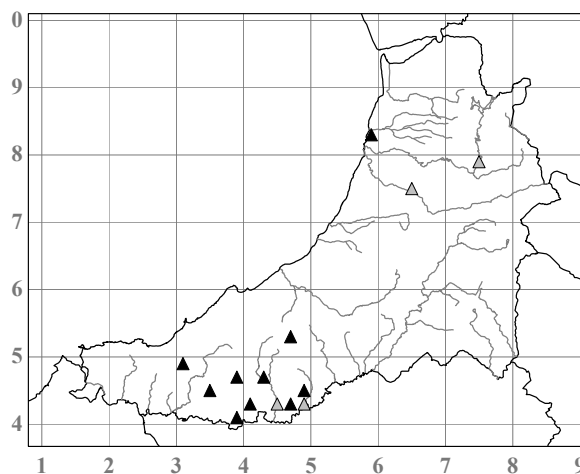
2003 (AOC & JPW) where 100 or more plants usually occur each year. A smaller perhaps naturalised population occurs in Penparc chapel graveyard SN211478, 2000-2005. Native of SW North America.

***Dicentra formosa* (Haw.) Walp. - Bleeding-heart - Calon Waedlyd**

Occasionally naturalised and often forming extensive colonies in woodland, scrub and on roadside banks, sometimes by old cottage sites, near villages or in estate woodland, chiefly in the S of the county. The first record was of two colonies  $4 \times 4$  and  $4 \times 2$  m by a ruined cottage at the N end of Allt Henbant-fawr, Capel Dewi SN44954335, 1978 (NMW). Some of the colonies may prove to be of *D. eximia*, but a colony in the Penglais dingle, Aberystwyth SN594821, 2006 (NMW) is certainly *D. formosa*.

***Dicentra eximia* (Ker Gawl.) Torr. - Turkey-corn**

A hedgebank colony  $2 \times 3$  m by Moelcwm-mawr, 2km SSE of Mydroilyn SN465537, 1988 (NMW) is almost certainly referable to this species, and it is probable that others of the colonies named *D. formosa* in the county are in fact either of this species or of its hybrid with *D. formosa* (see Stace 2010). Native of W North America.



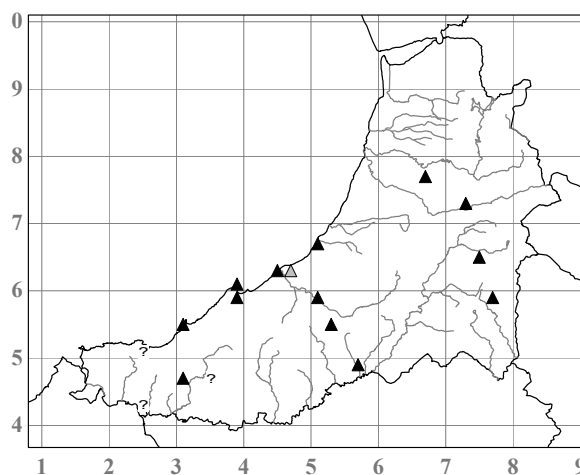
*Dicentra formosa*

***Lamprocapnos spectabilis* (L.) Fukuhara (*Dicentra spectabilis* (L.) Lem.) - Asian Bleeding-heart**

Recorded only once, as a casual on tipped soil in the Wstrws quarry SN386502, 1999 (NMW). Native of E Asia.

***Pseudofumaria lutea* (L.) Borkh. (*Corydalis lutea* (L.) DC.) - Yellow Corydalis - Mwg-y-ddaear Melyn**

Occasionally naturalised on old mortared walls in towns and villages, and abundant in a few sites, for example around Great Abbey Farm, Strata Florida SN746656, 2001, and in the SE part of New Quay c.SN389596, 1948 (Webb 1952) - 2004. The earliest record was from the Llandygydd district c.SN24L in 1905 (ETT, Salter Diary 22.9.1905). Native of the Alps. Altitude limit 400m, on rubble heap and on walls around farmyard, Nant-y-maen SN762584, 1994.



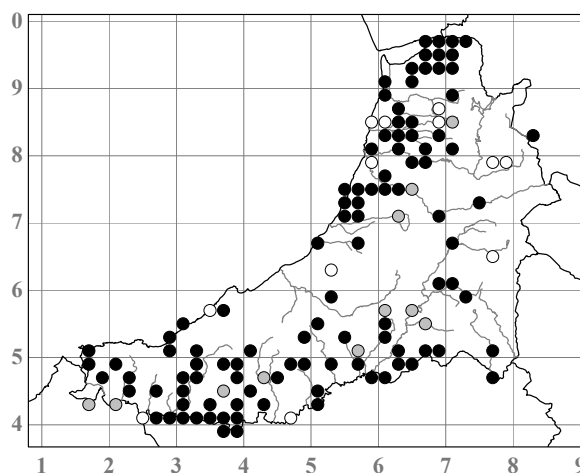
*Pseudofumaria lutea*

***Pseudofumaria alba* (Mill.) Lidén subsp. *alba* - Pale Corydalis - Mwg-y-ddaear Gwelw**

Recorded in 2009 from the top of the wall surrounding the Hafod walled garden SN75747301 (RGW & EMF-W). Native of SE Europe.

***Ceratocapnos claviculata* (L.) Lidén (*Corydalis claviculata* (L.) DC.) - Climbing Corydalis - Mwg-y-ddaear Dringol**

Chiefly confined to the lowlands where it is frequent, although it is absent from most of the more fertile or base-rich soils and is commonest on the drier coastal slopes. It grows among Bracken and Gorse or other scrub where it is protected from grazing and disturbance, in block screes, in hedgebanks, in usually dry, ungrazed woods, in Bramble patches and occasionally in marshes. It can become very abundant in felled



*Ceratocapnos claviculata*

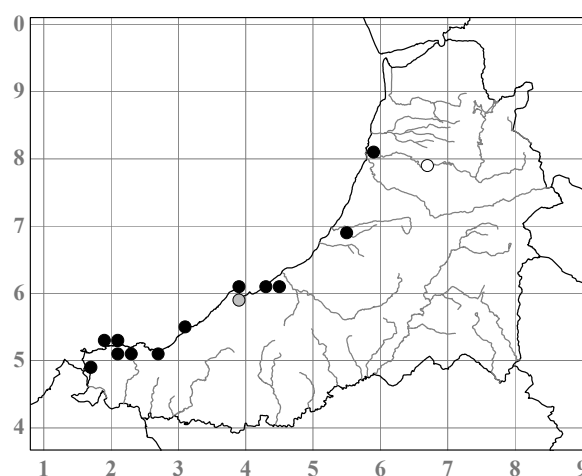
conifer plantations, but there is no indication of any general increase as there seems to be nationally (Braithwaite *et al.* 2006), Salter (1935) having described it as “Common and generally distributed, except in the mountain district.” The earliest record is by Littleton Brown who reported it in May 1726 as “*Fumaria alba latifolia* common on ye thatch of their houses in ye upper parts of Cardiganshire” (Druce & Vines 1907). Altitude limit 340m, Bramble patch on roadside verge by conifers 2km SE of Llanfair Clydogau SN641490, 1997; 340m, felled conifer plantation by Afon Tarenig SN823820, 1993; 340m, among Bracken on N slope of Pencarreg Gopa SN718951, 1994 (AOC & LRG).

### **Fumaria L.**

This account generally follows the taxonomy of Sell (1989a, 1998), which follows closely that of Pugsley (1912); as Sell remarks, it is often easier to identify specimens to varietal or subspecific level than to work out which species they belong to. Salter submitted specimens to Pugsley for identification, and Pugsley himself recorded several species when he visited the county in 1906. M. G. Daker did his PhD on the cytology of the genus at Aberystwyth in the early 1960s.

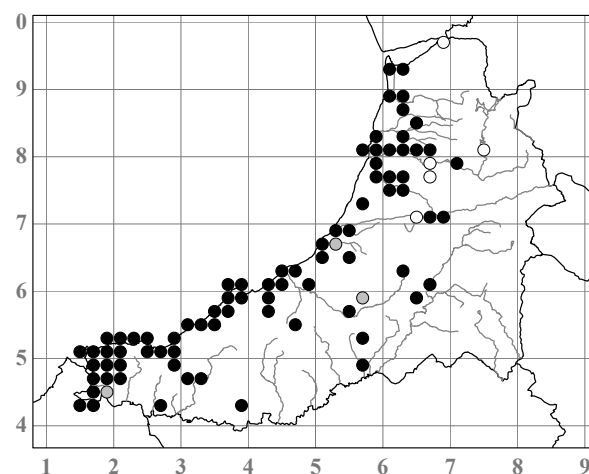
### **Fumaria capreolata** L. subsp. **babingtonii** (Pugsley) P. D. Sell - White Ramping-fumitory - Mwg-y-ddaear Gwyn

An uncommon plant of hedgebanks, scrub, arable fields and disturbed ground along the coast chiefly in the SW part of the county, long-persistent in most of its localities. Records by Burkill & Willis (1894) from several inland sites in the N of the county are, as Salter (1935) suggests, best doubted, except for a recently confirmed one from Tyllwyd-isaf, Aberffwrdd SN673781, 1893 (CGE, IHB & JCW, conf. PDS). Painter recorded it “Near Aberystwyth” (Salter 1935) and is likely to have been correct, and it was seen as a weed among amenity planting at Parc-y-llyn, Aberystwyth SN593805 in 2000 (RBi, conf. AOC).

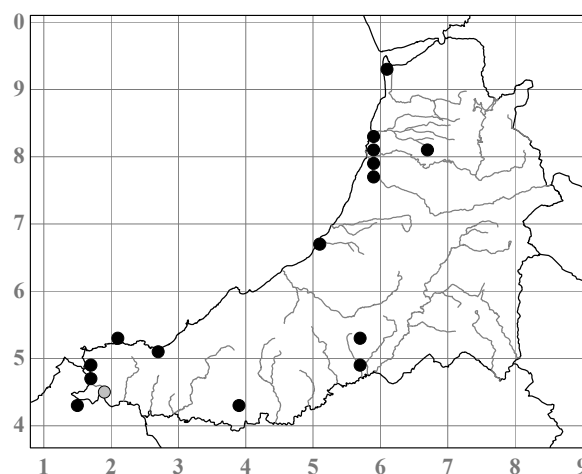


### **Fumaria bastardi** Boreau - Tall Ramping-fumitory - Mwg-y-ddaear Grymus

Var. **bastardi** (*F. confusa* Boreau), with the wings of the upper petal pale, is the second most frequent taxon of *Fumaria* in the county and a common plant of hedgebanks, reconstructed road verges, waste ground and tips, and a weed of arable fields and gardens. As Salter (1935) remarked, “it tends to appear wherever the ground is disturbed, as in digging the foundations for a house.” It occurs especially along the coast and in the lowlands in the S part of the county, and has not been seen at over 210m altitude. The earliest record is by Babington from Aberystwyth c.SN58V in 1848 (CGE, conf. PDS), and the next by Ley from Glandyfi SN69Y in 1886 (BM, *BEC Rep.* 1884-6: 147 (1887), Pugsley 1912). Painter needlessly doubted its occurrence (Salter Diary 7.7.1906), and Pugsley himself wrote to Salter in 1906 (Diary 18.10.1906) saying



Var. *bastardi*



Var. *hibernica*

"*Fumaria confusa* may still stand for Cardiganshire and Aberystwyth as I saw it growing with *F. Boraiei* close to the town" and later published the record (1912). Our plants have the corolla pale flesh-pink, RHS62B-68C, like those in Cornwall, and much paler than many in Carmarthenshire.

Var. **hibernica** (Pugsley ex Praeger) Pugsley, with the wings of the upper petal blackish, is occasionally found in similar places to var. *bastardii*, sometimes growing with it. The earliest record is from a Barley field near Coedmore SN191441, 1975 (CGE, det. PDS).

### **Fumaria muralis** Sond. ex W. D. J. Koch - Common Ramping-fumitory - Mwg-y-ddae'r Amrywiol

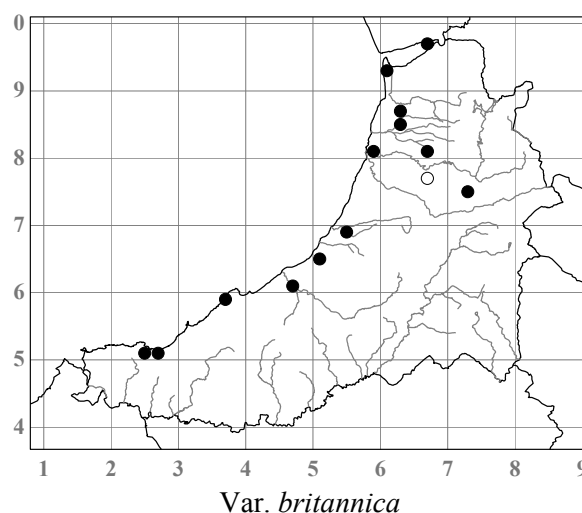
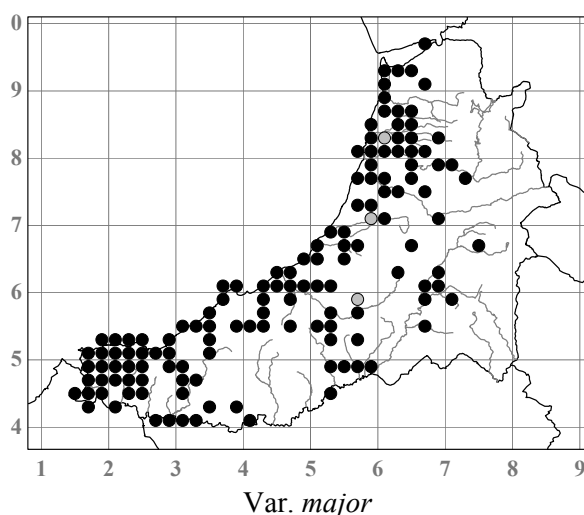
Recent work by RJM indicates that many specimens of this species do not fit neatly into any of the infraspecific taxa and the following account must be considered as provisional.

#### Subsp. **boraiei** (Jord.) Pugsley

The earliest record for the subspecies is the specimen of var. *britannica* collected by Burkill & Willis in 1893 (see below). Marshall (1900) recorded it from Aberaeron SN46 in 1899. Both Painter and Pugsley recorded it in 1906, the former at Llandre SN68I (NMW, Salter 1935) and the latter at Aberystwyth c.SN58V (Salter Diary 12.10.1906, Pugsley 1912).

#### Var. **major** (Boreau) P. D. Sell

This robust variety, with short bracts, large sepals and large, deep-coloured flowers is the most frequent taxon of *Fumaria* in the county and is a common plant of hedgebanks, gardens, arable fields, shingle beaches, waste ground and disturbed sites throughout the lowlands.

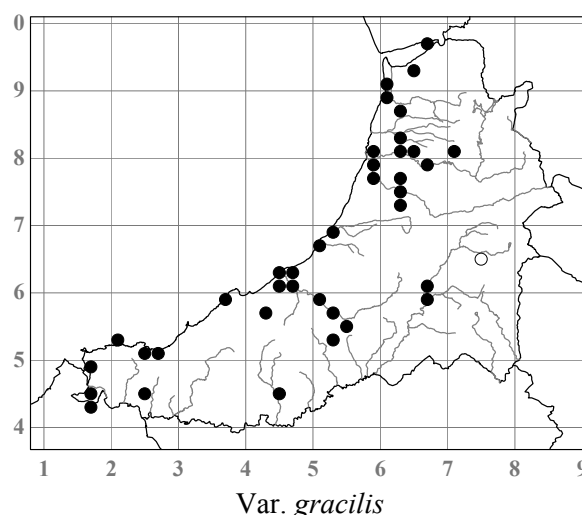


#### Var. **britannica** Pugsley

This slender variety, with short bracts, small sepals and pale flowers is an uncommon plant of hedgebanks, arable fields, disturbed ground and gardens. The earliest record is from near the Henffordd Arms (now the Halfway Inn), Pysgah SN674776, 1893 (CGE, IHB & JCW, det. PDS), and a recent one is from a disturbed hedgebank at Dolgwarthog, Aberaeron SN462613, 1991 (NMW, det. RJM). Altitude limit 300m, Turnip field 1.5km SW of Devil's Bridge SN730759, 1995.

#### Var. **gracilis** Pugsley (var. *muraliformis* auct., non Clavel)

This more slender variety, with long bracts, large sepals and pale flowers is not as frequent as var. *major*, but appears to be widespread in similar situations, sometimes growing with it, and often not easy to differentiate from it. The earliest records are by Painter in 1906 from Capel Bangor c.SN68K (NMW, Salter 1935), although the identity of the specimen is considered uncertain by RJM; from between Llandre and Dol-y-bont SN68I (Salter 1935); and by Riddelsdell, undated, from Strata Florida SN76M (Salter 1935). A recent record is from Llanbadarn Fawr churchyard SN599810, 2009 (NMW, conf. RJM).





Subsp. **muralis**Var. **muralis**

A specimen collected as *F. boraei* from a roadside at Newcastle Emlyn c.SN34A in 1879 (HLJ, *BEC Rep.* 1879: 52, 89 (1880); 1880: 131 (1882)) was redetermined by C. C. Babington as “This is *muralis*. C.C.B.” Salter (1935) wrote: “I have a specimen, which Mr. Pugsley has seen, roadside near Aberlloflyn (Llanfarian) [SN5877], 1922”; there is no specimen in Salter’s herbarium however. These are the only certain records for the county of this subspecies (and presumably of var. *muralis*), which is probably now extinct in Britain. Marshall (1900) recorded it from “New Quay; in several places about Aberayron” in 1899, but as Salter (1935) surmised he was probably in error.

[Var. *decipiens* Pugsley

This variety, which is somewhat intermediate between subsp. *muralis* var. *muralis* and subsp. *boraei* var. *britannica*, was recorded from Cardigan in 1935 (JEL, Wade 1952), but requires confirmation.]

**Fumaria officinalis** L. - Common Fumitory - Mwg-y-ddaear CyffredinSubsp. **officinalis** var. **officinalis**

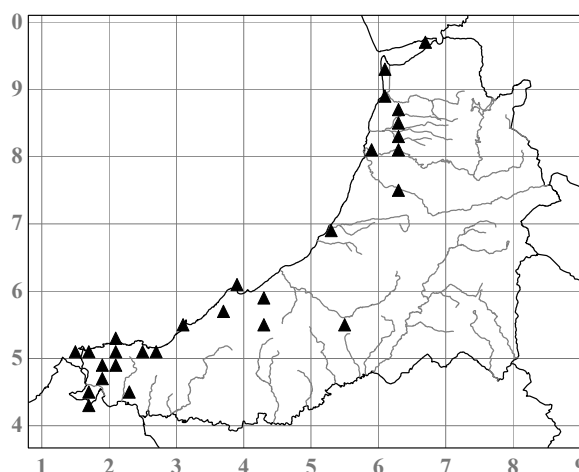
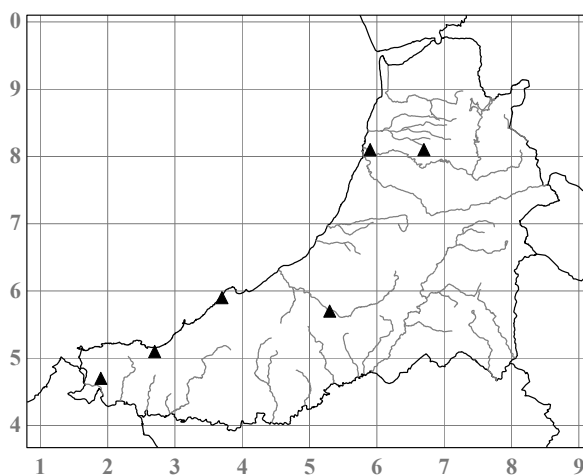
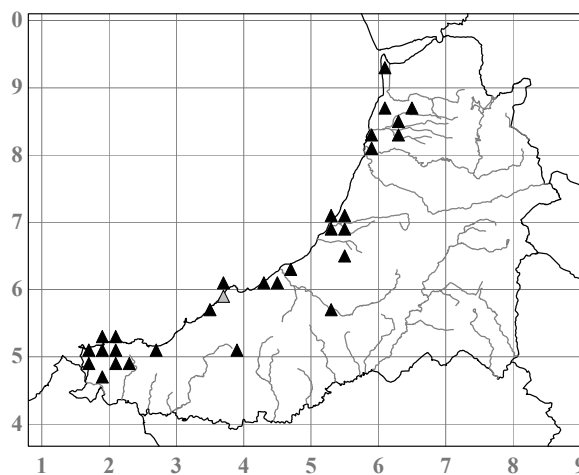
A frequent archaeophyte weed of disturbed ground, gardens and arable fields in the lowlands, especially in the coastal and SW parts of the county, but only rarely in hedgebanks.

Subsp. **wirtgenii** (W. D. J. Koch) Arcang. var. **wirtgenii**

Almost as frequent as subsp. *officinalis*, and with no clear difference in ecology. First recorded in 1987 from the University Chemistry Dept. gardens, Aberystwyth SN588815.

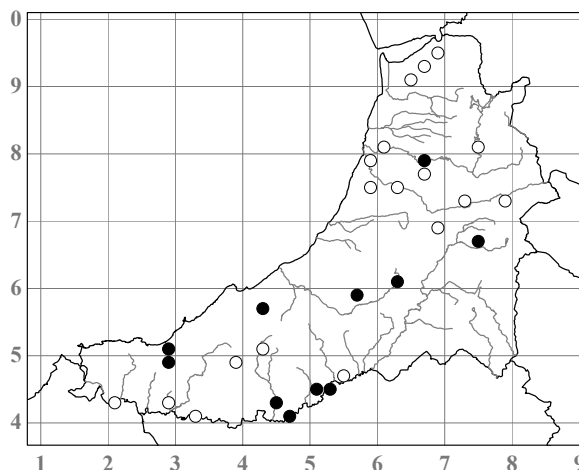
Subsp. **wirtgenii** var. **minor** W. D. J. Koch

This variety, with pale flowers and obreniform fruits retuse at the apex and wider than long (whereas var. *wirtgenii* has deeper-coloured flowers and orbicular fruits rounded at the apex) has been recorded from a few sites on disturbed ground, and was abundant in scrub on a roadside bank at Tresaith SN279514 in 1996. The earliest record was in 1985 from a disturbed trackside between Byrlip and Coybal SN369584 (CGE, JRA & CDP, det. PDS).

Subsp. *officinalis* var. *officinalis*Subsp. *wirtgenii* var. *minor*Subsp. *wirtgenii* var. *wirtgenii***BERBERIDACEAE****Berberis vulgaris** L. - Barberry - Pren Melyn

Recorded by Salter from 1892 to 1940 at about 28 sites throughout the county, but, as it has been seen at only eight sites since, it must be assumed to have decreased considerably. It may have been extirpated as part of control measures for the Wheat rust, of which it is the alternate host, although nationally most of this seems to have been done earlier in the 19<sup>th</sup> century. The extant sites are all in hedges, and the largest populations are of

abundant bushes along 30m of hedge at Nantcwnlle SN577585, 1980 (MC & AOC) - 2004, and 30m of hedge SE of Llanfechan SN519452, 1998 (MP & AOC). There are two short lengths of 7m and 4m in a roadside hedge near Ty-hen, Penbryn SN289516, 1995. The other sites, each with just one or a few bushes, are in a roadside hedge at Capel Bangor SN661792, 2000 (SPC); along the access lane to Y Glyn, Llangetho SN626602, 2004 (AOC & RM), where Salter had seen bushes in 1906 (Diary 5.9.1906); by a field gate in a roadside hedge 100m SW of Llanarth church SN42205768, 2006 (SDSB & AOC); along 5m of a laneside hedge near Tan-y-groes SN28124898, 1997; along a 3m stretch and a 2m stretch of the hedgebank of the lane to Waunifor chapel SN46544140, 2006 (BH, GH & AOC); and in the chapel graveyard hedge at Capel Dewi SN449423, 2000 (NMW, BH & GH). Whether it is truly native at any of these sites is doubtful. Altitude limit 305m, colony 5m long in roadside hedge, Ffair-rhos SN74856772, 1998.



**Berberis thunbergii** DC. - Thunberg's Barberry - Pren Melyn Thunberg

There are relic plantings in estate woodlands at Deri Ormond SN591523, 1993, and at Alltyrodyn SN452441, 2001 (NMW, AOC, BH & GH). '*Atropurpurea*' is occasionally used for amenity hedging. Native of Japan, introduced to Britain c.1875.

**Berberis aggregata** C. K. Schneid. - Clustered Barberry - Pren Melyn Clystyrog

Recorded only once, as a relic planted bush in estate woodland at Deri Ormond SN591523, 1993 (NMW). Native of China, introduced to Britain in 1908.

**Berberis julianae** C. K. Schneid. - Chinese Barberry - Pren Melyn Tsieina

Planted in Capel y Bryn graveyard, Cwrtnewydd, SN491476, 2001. Native of China, introduced to Britain in 1900.

**Berberis darwinii** Hook. - Darwin's Barberry - Pren Melyn Darwin

Presumed self-sown bushes, usually accompanied by relic plantings, have been recorded in scrub below Fairview, Llanbadarn Fawr SN598810, 1999 (AOC; SPC); in a roadside hedge at Ffos-y-ffin SN445605, 1995; in Pennant chapel graveyard SN512631, 1997; and in a copse in Cwm Mabws SN54926920, 2002 (NMW). Native of Chile and Argentina, introduced to Britain in 1849.

**Berberis ×stenophylla** Lindl. (*B. darwinii* × *empetrifolia* Lam.) - Hedge Barberry - Pren Melyn Culddail

Originally planted and now naturalised by suckering along a roadside hedgebank at Carreg-y-dôll, 2.3km WSW of Trefenter SN58706762, 2008; at Gwynfryn, Llanarth SN422573, 1999 (NMW); along a laneside hedgebank at Aberaeron SN45996188, 1999; and along 12m of roadside hedgebank by Pantyrerod SN43516036, 2007 (NMW, JPP & AOC). Of garden origin c.1860.

**Mahonia aquifolium** (Pursh) Nutt. (*Berberis aquifolium* Pursh) - Oregon-grape - Mahonia Dail Celynnog

Described by Salter (1935) as "Frequently naturalised in woods, Gogerddan, etc.", and recorded by him in Coed Wallog SN597859 in 1893 (Diary 14.4.1893) where it was still present in 1997 (NMW, AOC & JPW). It is also naturalised, chiefly by suckering, on a streambank in Coed Pwll-crwn, Gogerddan SN621836, 1998; in estate woodland at Lovesgrove SN629816, 1983; in Flat Covert, Nanteos SN628785, 2001; in a hedgebank in Llanfihangel Ystrad churchyard SN524562, 1994-2004; along a roadside hedgebank opposite Bwlchbychan SN480434, 2001 (NMW); and in Netpool Wood, Cardigan SN170461, 1982-2002. Native of W North America and introduced to Britain in 1823.

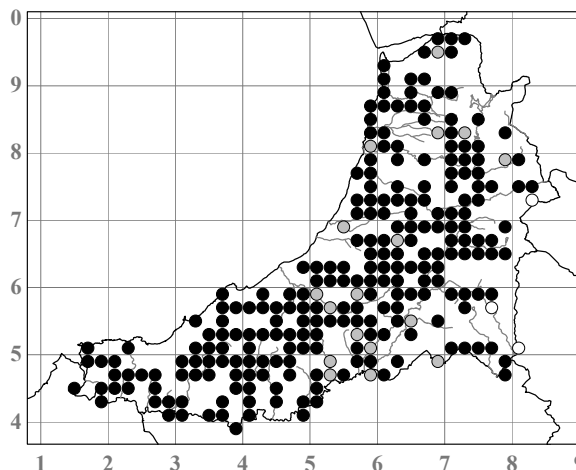
### ***Epimedium alpinum* L. - Barrenwort**

Recorded by Salter sometime between 1935 and 1942, in the annotated copy of his Flora in NMW, naturalised at Castle Hill, Llanilar SN6274, presumably in the estate woodland there; the record was missed by Wade (1952). There is no specimen, and it has not been recorded since. Native of S Europe.

## **RANUNCULACEAE**

### ***Caltha palustris* L. - Marsh-marigold - Gold y Gors (Blodyn y Gors, Blodyn y Waun)**

Frequent in wet places, especially in winter-flooded hollows in Alder and *Salix* carr and other woodlands. It also occurs in marshes and swamps and less often in unshaded sites such as wet pastures and muddy streambanks. It is rare in the uplands, but does occur in a few places in the more mesotrophic parts of bogs, for example E of Claerddu SN794686, at 425m altitude, 2002 (NMW), and at the head of the Afon Pysgotwr Fach SN720509, at 350m, 2002 (NMW) where Salter (1935) knew it. Salter (Diary 17.7.1934, 1935) said that upland populations above Llyn Gwngu c.SN8372 (NMW) and around other upland lakes did not flower at all but appeared to increase by offsets, and he took such plants to be var. *minor* DC. But at these upland sites where it has been seen in recent years the plants flower well and the stems are not rooting at the nodes, although they do at many of the lowland ones, for example at Cors Caron SN709663, 2002 (NMW) and at Old Cilgwyn SN31504108, 2002 (NMW). Plants with overlapping petals are rather commoner than ones with the petals separated, but they often grow together, and both often root at the nodes. A very large, fleshy form occurs along the tidal creek-sides in the Teifi estuary by Rosehill Marsh SN189454, 1994-2004. Altitude limit 455m, above Llyn Gwngu c.SN8373, 1934 (Salter Diary 17.7.1934, 1935); 425m, E of Claerddu SN794686, 2002.

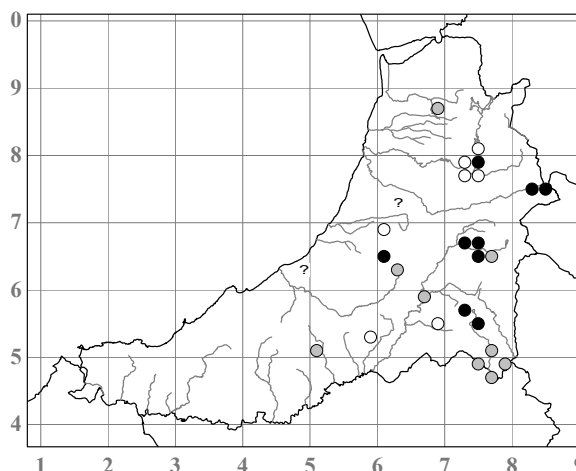


### ***Trollius europaeus* L. - Globeflower - Cronnell (Melyn Wŷ)**

A rare plant of usually shaded river and stream banks, damp places in the more fertile woodlands and hay meadows, chiefly in the uplands and absent from the SW part of the county. Salter knew it from at least 16 sites, and it seems to have gone from six of these by 1975. Since 1975 it has been seen at 17 sites, and seems to have gone from at least three in recent years; six others have not been recently revisited. There has probably been a real decline, which is surprising in view of the diversity of habitats it grows in and the fact that the sites from which it has gone seem not to have changed significantly. It must have decreased considerably in the Rheidol valley around Devil's Bridge SN77N where Salter saw it in abundance in 1892 (Diary 21.6.1892): "A little clearing amongst the larches presented a glorious sight brightened by hundreds of the golden globes of *Trollius*." At most of its sites now it is in very small quantity, and quite often does not flower. The largest population is in and around the edges of a hay meadow at Ty-mawr, Ysbyty Cynfyn



*Trollius* in Ty-mawr hay meadow, view  
NNE from SN756789, June 1991





SN756789, 1985 (DGJ) - 2007, where for many years *Trollius* flowers have been picked to decorate the nearby church for a countryside festival, a tradition that has helped ensure its survival. Altitude limit 350m, tributary ravine by the Doethie Fach, 1.2km NNE of Ty'n-y-cornel SN755546, 1995 (AOC & JPW).

**Helleborus foetidus** L. - Stinking Hellebore - Crafanc-yr-arth Ddrewllyd

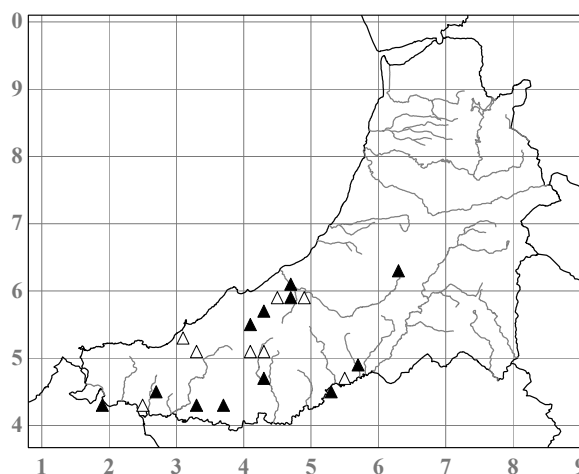
Salter (Diary 25.4.1904) recorded "one plant growing as an escape" in the woods near Llanerchaeron c.SN4860, but omitted it from his Flora (1935) probably because he had confused it with *H. viridis* which he later recorded there. The next record was in 1976 when c.12 plants were found naturalised on a remarkably uncongenial, bare, dry, unstable, S-facing spoil heap of the Cwm Rheidol lead mine SN73007830 (JEGG); there were c.30 plants here in 1989, 19 plants and c.25 seedlings in 1992 (AOC, SPC & JAM), and by 2005 the colony had moved 30m E to where the slope was partially vegetated and more stable and consisted of 30 plants and c.40 seedlings (AOC & JPW). The only other large colony has been of c.15 plants in scrub on the disused railway at Tyllwyd, Llanfarian SN59427748, 1999 (SPC) which had increased to c.50 plants by 2005; there are records of single clumps either self-sown or established from throw-outs further NW on the railway here SN591779, 1993 (SPC). It has also been recorded in small quantity in estate woodland 100m W of Plas Penglais, Aberystwyth SN59318217, 1993, and on a steep roadside slope at Llanafan SN688726, 1994. It is curious that *H. foetidus* is confined to the N of the county, and *H. viridis* to the S.



*Helleborus foetidus*, Cwm Rheidol lead mine, view NW from SN73007830, February 2005

**Helleborus viridis** L. subsp. **occidentalis** (Reut.) Schiffn. - Green Hellebore - Crafanc-yr-arth Werdd

There are well-naturalised colonies in a dozen or so sites in the SW half of the county, in woodland and pasture, usually by old cottage sites and sometimes clearly spreading by seed. Salter gave records for about ten sites, the earliest being "Talgarreg, about ¼ mile from nearest house in rather boggy field" c.SN45F (DT, Diary 17.5.1904), but at none of these is it still known. Whellan collected it from a "Small copse between Synod & Llanarth" in 1941 (NMW) and this must be the roadside copse at Llwynwernau SN41375566 where it is still present, 1996 (AOC & JB) - 2006. The best colony is in the copse below Pen-parc, Llanerchaeron SN47496057, where there were c.60 clumps in 1994 (AOC & WMC), as well as several in the woodland above at SN47496069 where it was first noted in 1988 (APF & GRS); this is certainly the site where Salter recorded it repeatedly, for example in 1907 (Diary 16.5.1907) "in corner of a deserted orchard", in 1925 (Diary 21.3.1925) "near ruined cottage ... I believe this to be the very spot where I saw it on May 16<sup>th</sup>. 1907", and in 1936 (Diary 11.4.1936) when he recorded it as "abundant".



**Helleborus orientalis** Lam. subsp. **abchasicus** (A. Braun) B. Mathew - Lenten-rose - Crafant-y-arth y Grawys

A large clump was established from a throw-out by the Falcondale drive in a conifer plantation SN564495, 1995 (NMW), but was lost a few years later when the conifers were removed. There are two small clumps in a copse by a quarry 150m SE of Pontsian crossroads SN43994601, 2005. Native of the Caucasus.

**Eranthis hyemalis** (L.) Salisb. - Winter Aconite - Bleidd-dag y Gaeaf

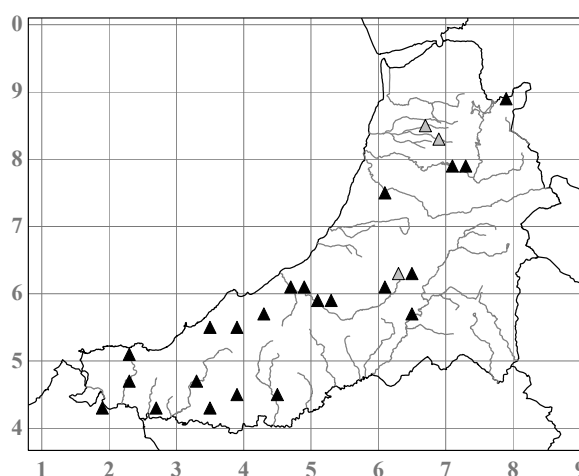
Naturalised in one site, with *Crocus tommasinianus* in lawns on the WIRS campus, Llanbadarn Fawr SN602811, 1994 (SPC), but since destroyed. Native of S Europe.

**Nigella damascena** L. - Love-in-a-mist - Glas y Niwl

A rare casual, seen only in 1993 when c.35 plants grew from garden rubbish on a hedgebank at Drefnewydd, Aberaeron SN46266327 (NMW), and in 2000 when one plant appeared on the Ael-y-bryn drive verge, Capel Bangor SN657803 (SPC). Native of the Mediterranean.

**Aconitum napellus** L. subsp. **napellus** (*A. anglicum* Stapf) - Monk's-hood - Cwrcwll y Mynach (Moses Bach yn y Cawell, Blodau Arch Noa)

Occasionally naturalised on hedgebanks or in woodland, mostly near houses or old garden sites. Altitude limit 375m, by Hengwm Annedd ruin SN797893, 1940 (Salter Diary 2.7.1940) and still there in 2008; this remote upland smallholding was abandoned in 1935, and the Monkshood will have been planted here by Sarah Jane Morgan before this date (Howells 2005). Native probably only in SW England and S Wales.



**Consolida ajacis** (L.) Schur - Larkspur - Troed yr Ehedydd

Recorded only once, as a casual on the disused part of the Pendinas rubbish-tip SN584798, 1991 (NMW); the flowers were pink, with a white spur. Native of the Mediterranean.

**Xanthorhiza simplicissima** Marshall - (Yellowroot)

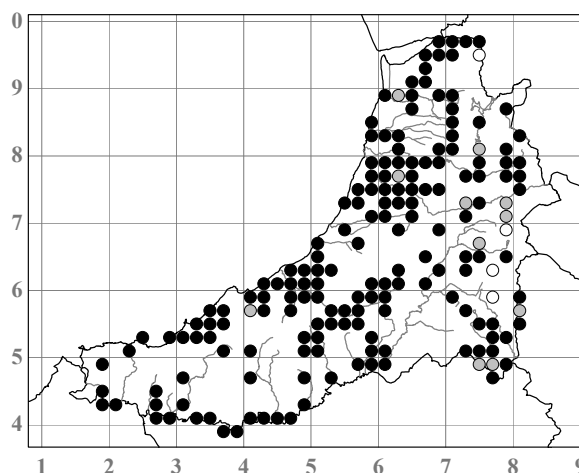
There is a colony of this dwarf shrub from E North America, suckering for 12m along the bank of the boundary ditch at the E edge of the Ynys-hir grounds, Eglwys-fach SN68389606, 1999 (NMW, LTR, AOC & PSC) - 2005; it had spread in recent decades from a now lost colony some metres away across a path.

[*Actaea spicata* L. - Baneberry - Llysiau Cristoffis

Listed by Morgan (1848) presumably in error.]

**Anemone nemorosa** L. - Wood Anemone - Blodyn y Gwynt

Frequent in the more fertile woodlands, hedgebanks, streamsides, graveyards, under Bracken especially on the coastal slopes, and on upland cliffs. Most unusually it is abundant over several acres on lightly grazed *Molinia* tussocks and in fenny pasture at the S end of Cors Caron SN672615, 1996-2005 (see overleaf). Corolla colour is very variable, and blue and pinkish-purple forms occur. Altitude limit 610m, Pumlumon c.SN7987, pre-1935 (Salter 1935); 550m, wet cliffs at the head of the Nant y Moch, Pumlumon SN784862, 1990.







*Anemone nemorosa* on *Molinia* tussocks, Cors Caron, view N from SN673615, May 1996

**Anemone blanda** Schott & Kotschy - Balkan Anemone - Blodyn-y-gwynt y Balcanau

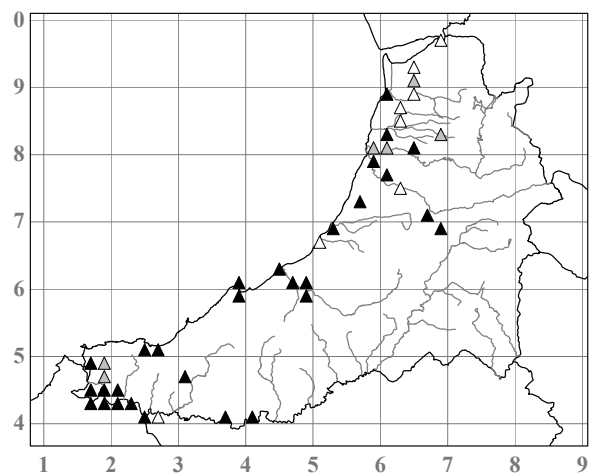
Naturalised on the bank of the Afon Wyre 400m ENE of Llanrhystud church SN54136980, 2005 (NMW), probably from a garden throw-out. Native of SE Europe and Turkey.

**Anemone ×hybrida** Paxton (*A. hupehensis* (Lemoine) Lemoine × *vitifolia* Buch.-Ham. ex DC.) - Japanese Anemone - Blodyn-y-gwynt Japaneaidd

This hybrid of garden origin is well-established in a retaining wall below houses at Llangranog SN31505405, 1994-2004 (AOC & JPW).

**Clematis vitalba** L. - Traveller's-joy - Barf yr Hen Ŵr

Widely naturalised, especially in the lower Teifi valley and on the drift soils along the coast in the SW of the county, in scrub, woods, hedges, graveyards, on old walls and railway banks. As early as 1879 (BM, HLJ) it was noted in "Hedges by road side between Cenarth falls and Cardigan, in several places". Salter recorded it in 13 sites. It was recorded at Cardigan Castle grounds SN178459 in 1930 by Webb (1931) and again by him in 1952 (NMW, var. *integrata*) when he described it as very abundant, and the grounds were still over-run with it in 2003. There are extensive swathes of it on the Penyrergyd dunes SN162486, 2003, and in places in the Coedmore woods SN197431 etc., 2003. It has always been assumed, by Salter (1935) and others, to be not native in the county, though it could be argued that it might be in some of the Teifi woods. Both var. *integrata* DC., with entire leaflets, and var. *vitalba* occur.



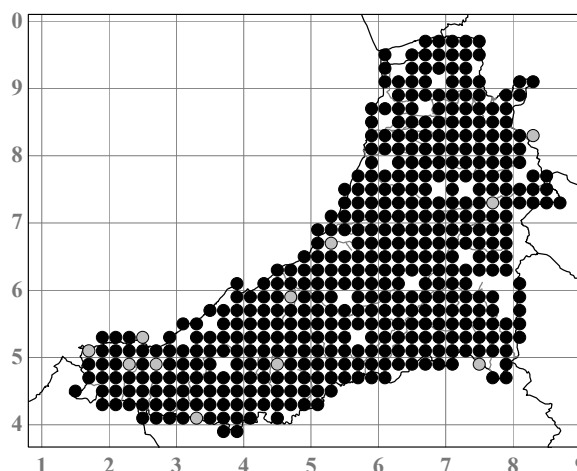


## Ranunculus L.

### Subgen. *Ranunculus*

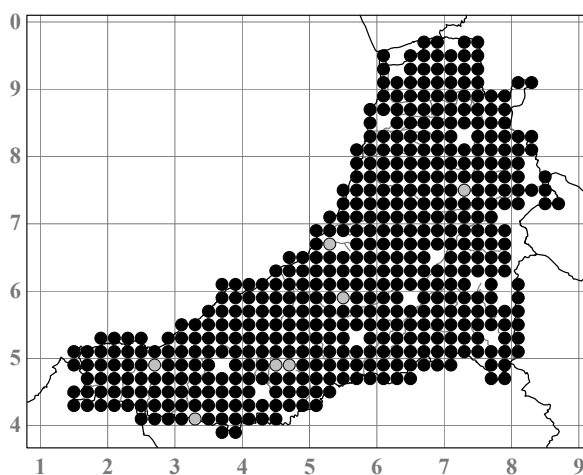
#### *Ranunculus acris* L. - Meadow Buttercup - Blodyn Ymenyn

A common plant of pastures, hay meadows, stream-sides, open woodland and scrub, road verges and other grassy places, usually avoiding very dry sites. It is also common in marshy pastures and even fens, and in the uplands it is especially characteristic of flushes and wet rock ledges and ravines. There is great morphological variation, and plants from upland flushes tend to be small and with deeply dissected leaves, for example W of Llyn Gwngu SN837729, 2002 (NMW). Plants from *Molinia* tussock mire 2km NE of Nant-y-maen SN776598, 1994 (NMW) were by contrast *c.*80cm tall and had exceptionally few, long, slender leaf segments. Most plants are var. **acris**. Robust plants on roadside verges with dense long hairs and wide leaf-lobes match var. **villosus** (Drabble) S. M. Coles, for example at Llanfarian SN589775, 1998 (SPC). Altitude limit 610m, above Llyn Llygad Rheidol, Pumlumon SN7987 (Salter Diary 26.9.1903, 1930); 640m, ditto SN79368723, 2002.

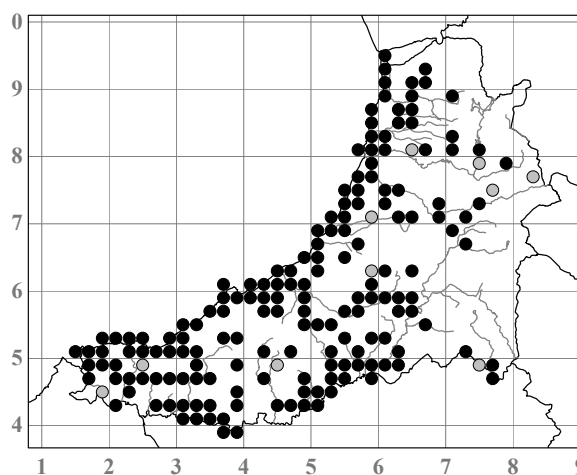


#### *Ranunculus repens* L. - Creeping Buttercup - Blodyn-y-menyn Ymlusgol

A common plant of damp pastures, wet woodland, streamsides, field margins, road verges, waste and disturbed ground and gardens, especially on heavy soils and tolerating shade. It does not appear to be very salt-tolerant here, and becomes uncommon in the uplands except in flushes and on disturbed ground. Altitude limit 550m, ruins of Pumlumon lead mine SN795857, 2002.



*Ranunculus repens*



*Ranunculus bulbosus*

#### *Ranunculus bulbosus* L. - Bulbous Buttercup - Blodyn-y-menyn Bondew

A common plant of well-drained, mesotrophic, grazed pastures, road verges and pathsides, dune grassland, vegetated shingle, cliff slopes on the coast, graveyards and lawns. It is most abundant near the coast and becomes rare in the uplands. Most of the coastal and many of the inland populations in the county are var. **bulbosus** (var. *dunensis* Druce), with patent, dense hairs on the petioles and the lower parts of the stems. Plants on the coast, for example on the dunes and golf course at Ynys-las SN69A, B, C, 1984 (NMW, det. PDS) - 2006, and on the dunes at Penyrergyd SN1648, 1991 (NMW), as well as on clifftop and other coastal grassland in many places, for example W of Tynbwllch, Llanddeiniol SN555733, 1991 (NMW), at Clogfryn SN445621, 1985 (JRA & CDP), and at Cwm Tudu SN356576, 1985 (JRA & CDP), tend to be more extreme in this character, and often to be of a dwarfer habit than those inland. Var. **albinaevus** (Jord.) Druce, with

fewer, appressed hairs, is the commoner inland variety, but the two often grow together and there are usually intermediates in these populations, as there are in the coastal ones too.

**Ranunculus sardous** Crantz - Hairy Buttercup - Blodyn-ymenyn Blewog

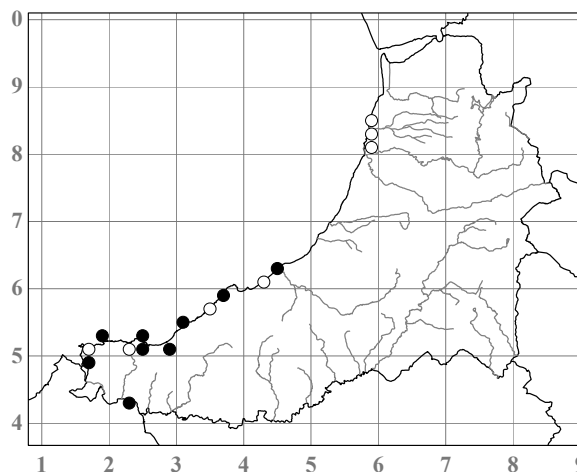
A rare annual, with persistent populations only at Ynys-las in the extreme N and at Gwbert and Penparc in the extreme S of the county. Although described by Salter (1935) as “A not uncommon cornfield weed”, he only gave five localities for it and mentions no other sightings in his diary. All his records are pre-1906. Apart from an unlocalised 1950s record from SN46 (Mr & Mrs Glover), it was not recorded again until the 1990s, and only one of these recent records is from an arable field; there is no clear evidence of any change, except in habitat. Salter (Diary 21.7.1904, 1935) recorded it from by Ynys-las Station, and it was refound there, in a pasture 100m SE of the Leri bridge SN619930 in 1993 (NMW) - 2005, and in a pasture just W of the Leri SN615933 in 1996 (NMW). Salter’s other records were from Constitution Hill, Aberystwyth SN58W in 1894 (Diary 17.5.1894), from near Llanrhystud SN56J in 1904 (Diary 16.7.1904), from Cwm Tydu SN35N in 1894 (Diary 13.5.1894), and a report from the Llechryd area c.SN24B (ETT, Diary 15.9.1905). The other recent sightings have been as a casual in a reseeded verge by the roundabout in Llanbadarn Road, Aberystwyth SN59568121, 2004 (NMW); abundant in a paddock by Crugmore Farm, Penparc SN206472, 1993 (NMW); abundant in a dry, sandy pasture 200m SSW of Towyn Farm, Gwbert SN16304983, 1991 (NMW); in flowerbeds and a lawn above the road at Penyrergyd SN16474860, 2000 (AOC & DGJ); at the edge of a silage field 500m S of Nantyferwig SN169476, 2002 (AOC & MDS); and frequent throughout a harvested Oat crop in an adjacent field here SN16924775, 2005 (NMW). All the specimens seen in fruit had well-developed tubercles and are var. **tuberculatus** Čelak.



*Ranunculus bulbosus* var. *bulbosus* following paths on Ynys-las dunes SN69, 1961 (photo E. H. Chater)

**Ranunculus parviflorus** L. - Small-flowered Buttercup - Blodyn-ymenyn Mân-flodeuog

A rare annual of summer-droughted soils on field margins, tracksides, Rabbit warrens and disturbed ground along the coast. The furthest inland it has been seen is in a pasture at Frongoch farm, Llechryd SN22394374, 2008 (AOC & LRG). Salter (1935, Wade 1952) described it as less frequent than *R. sardous* and listed only eight sites, and there were two records in the 1950s. It was then unrecorded until 1992, since when it has been seen at eight sites in the SW half of the county, so there is no evidence of any significant change in frequency. At least two of the old records were from cornfields, but none of the recent ones have been from any sort of arable habitat. Its current strongholds are in a Rabbit warren at Clogfryn SN446621, 1995 (JPW & AOC) - 2004, where at least 900 plants were seen in 1996; and on the MoD site, Aber-porth SN25K, L, 1992-2001, where plants regularly appear in several different areas after disturbance.



**Ranunculus arvensis** L. - Corn Buttercup - Blodyn-ymenyn yr Ŷd

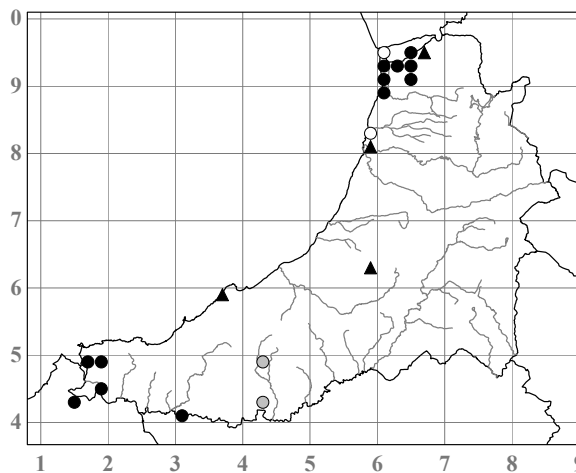
An archaeophyte, listed in Morgan (1849) for the Aberystwyth neighbourhood but without a detailed locality. The only localised record was by Salter in 1905 (Diary 7.6.1905, 1930) who recorded it as a casual in his walled garden at Crugia, Rhydyfelin SN591793.

**Ranunculus auricomus** L. - Goldilocks Buttercup - Blodyn-ymenyn Peneuraid

A very rare plant in West Wales, known in the county only from the woodlands on clay soils at Llechryd and Coedmore. It was first recorded in 1983, 500m W of Llechryd SN212437 (SBE) when several hundred plants or clumps were found along *c.*70m of the roadside banks under trees; in 2003 *c.*150 plants were counted along 1.2km of this roadside from SN20034397 to 21254375 (NMW, CGE). In 1985 a colony 15 × 3m was found by an old cottage site 200m NW of Coedmore SN193436, reduced to only three plants by 2003 and gone by 2005; in 2007 a colony of six plants was found nearby on the drive verge 250m NNE of Coedmore SN19624367 (AOC & JPP). In 1994 a colony 4.9 × 2m was found by a stream gully in the woods 600m W of Llechryd Bridge SN21054327 (AOC & LRG), and *c.*15 plants were counted here in 2003. In 2003 *c.*13 plants were found in an area 1 × 1m on the Teifi bank 260m downstream of the confluence with the Cwm Du stream SN19284465 (SDSB & AOC). Whether these plants belong to one of the named or about to be named apomictic species, or awaits describing, is unfortunately not known.

**Ranunculus sceleratus** L. - Celery-leaved Buttercup - Crafan yr Eryr

Largely confined to the marshes around the Dyfi SN69 and Teifi SN14 estuaries, where it grows in often brackish ditches, pools and muddy places. Elsewhere it has been recorded by an ox-bow of the Teifi at Newcastle Emlyn SN31714090, 2003, and by ponds SW of Brynllynan, Ferwig *c.*SN184482, 1995. The remaining recent records were of it as a casual or persisting for a few years around farmyards, slurry pits, cattle drinking troughs and reseeded verges. Morgan (1849) recorded it from Clarach *c.*SN5883, but it has not been seen there since. Salter (1935) knew it only from the N of the county, but its abundance in the Teifi marshes SN14X, 1985-2004, and elsewhere by the Teifi estuary is unlikely to have been the result of recent spread. The map distinguishes casual records from established ones. Altitude limit 315m, in a slurry pit 200m E of Maes-y-ffynnon, Penuwch SN59206312, 1996.

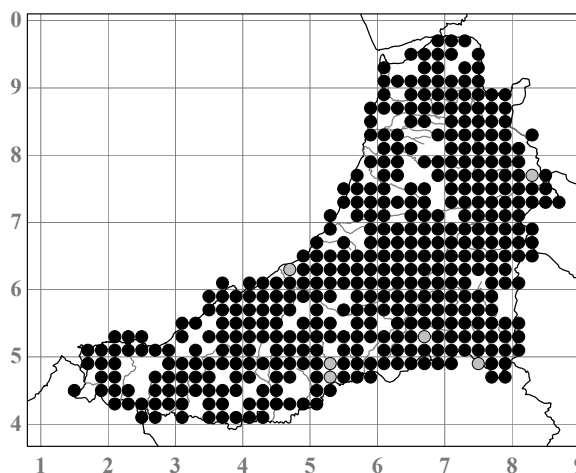


**Ranunculus lingua** L. - Greater Spearwort - Llafnlys Mawr

Planted and naturalised in the leat and ditches around Felin Rhiwbren SN474578, 1988, and planted or accidentally introduced in a few wildlife gardens, for example at Winllan SN567575, 1984-2004, and by the CCW office, Plas Gogerddan SN628834, 1994. It is native elsewhere in Britain.

**Ranunculus flammula** L. subsp. **flammula** - Lesser Spearwort - Llafnlys Bach

A frequent plant of marshes, lakesides, riverbanks, ditches, flushes, dune slacks and wet woodland. It occurs from streambanks on the sea cliffs to peaty pools and flushes in the uplands, and is extremely variable. Var. **major** Schult., sometimes mistaken for *R. lingua*, has been recorded in several marshy sites in the Teifi valley: at the Hafod-wen meadow, Coedmore SN20284299, 1984; in a woodland pond 350m SE of Tyddyn-du, Cenarth SN27214268, 1991 (NMW); and in an ox-bow of the Afon Ceri 800m NNE of Felin Geri SN30804263, 2002 (NMW). Var. **tenuifolius** Wallr. (var. *radicans* Nolte), apparently a phenotype with no genetic basis (Padmore 1957), was recorded from the shore of Llyn Maesllyn SN693628 by Ley (1887) and from the shores of several upland lakes by Burkill & Willis (1894), and Salter said that it occurred “on the stony margin of the ‘llynys’ at 1,250-1,500ft. [380-455m]”; it has more recently also become frequent in the draw-down zone of the upland reservoirs, for example by the Nant-y-moch Reservoir SN750877, 2002 (NMW). Altitude limit





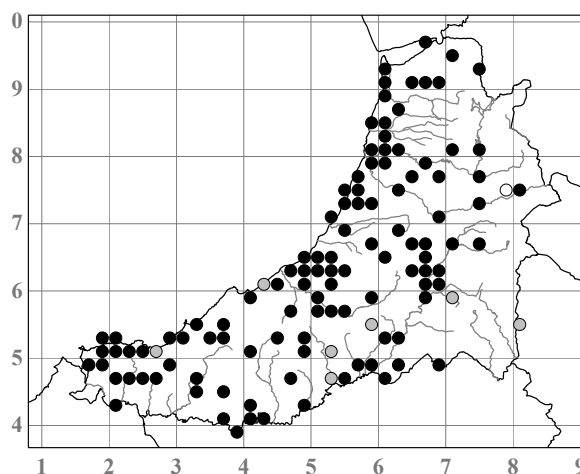
580m, above Llyn Llygad Rheidol, Pumlumon SN7987, Salter (Wade 1952); 540m, W slope of Trawsallt SN777706, 1999.

Subgen. **Batrachium** (DC.) A. Gray

Problems of identification mean that many of the early records of the aquatic species are unreliable. Salter (1935) wrote that most of his specimens had been determined by J. Groves, but did not specify which these were, and remarked that further study was required. The situation has not recently become any easier as Lansdown (2007) has shown that in the River Itchen in Hampshire the populations of these plants “probably represent a complex of stable clones derived through intra-specific hybridisation between polyploids and now usually reproduce and disperse by vegetative means”, and that such a situation may be the norm for river populations. In the absence of any detailed investigation of what we really have in the county in the light of these comments, a conventional account of the taxa is given here using the taxonomy of Stace (1997).

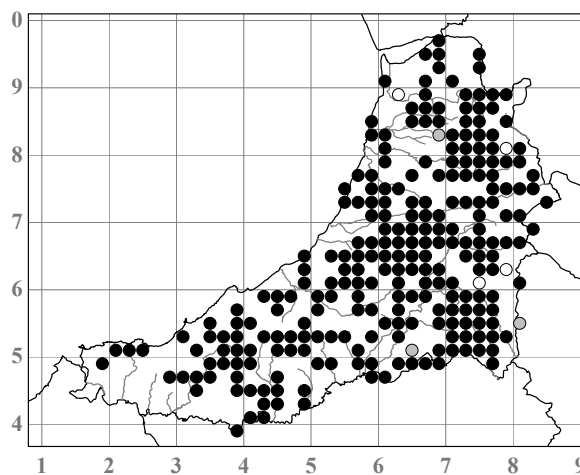
**Ranunculus hederaceus** L. - Ivy-leaved Crowfoot - Crafac-y-frân Dail Eiddew

An occasional winter annual or perennial of springs, muddy hollows and flushes, poached wet places, streamsides, pond margins and wet tracksides. It is distinctly less common than *R. omiophyllus*, rarely grows with it, and is usually in more mineral-rich and less peaty places, and is more confined to the lowlands and the coastal zone. Willis & Burkill (1895) surprisingly recorded it as abundant in the Pumlumon uplands, and certainly meant this species rather than *R. omiophyllus* as they say it had very small flowers 5mm in diameter; they observed no insect visitors. Altitude limit 390m, NE corner of Llyn Plas-y-mynydd SN749923, 1990.



**Ranunculus omiophyllus** Ten. (*R. lenormandii* F. W. Schultz) - Round-leaved Crowfoot - Crafac-y-frân y Rhostir

A common winter annual or perennial in all sorts of wet places, in springs, ditches, poached marshy pastures, streamsides and pond margins, peaty places, quarries, lead mine sites and especially flooded tracks. It is very much commoner in the uplands and away from the coast than *R. hederaceus*, even though on a European scale it has a more westerly distribution. Altitude limit c.610m (“almost to 2,000ft.”), Pumlumon (Salter 1935); 545m, pool on Banc Llwyd-mawr, Cwm Ystwyth SN825770, 1991.



**Ranunculus ×novae-forestae** S. D. Webster

(*R. omiophyllus* × *tripartitus*) - New Forest Crowfoot - Crafac-y-frân y New Forest

Seen in only one site, with abundant *R. omiophyllus* and a few plants of *R. tripartitus*, in muddy runnels in a marsh 200m SSE of Glasfryn, Felin-wynt SN22205020, 1999 (NMW, conf. NTHH). The plants were variable, with the receptacles varying from glabrous to setose, the petals from 4.5mm to 6mm, and the pollen 35% to 100% good. The following year, when the *R. tripartitus* had disappeared, very few plants were seen, and it has not been seen since.

**Ranunculus tripartitus** DC. (*R. lutarius* (Revel) Bouvet) - Three-lobed Crowfoot - Crafac-y-frân Dridarn

This Nationally Endangered species has been seen only twice in the county. Whellan (1942) found it “In a small pool on the cliffs between Aberporth and Mwnt” c.SN25B or G, in 1941 (NMW); the exact site is unknown, and there are now few suitable pools or flushes on this stretch of coast. In 1999 a few plants were

found in muddy runnels in a marsh 200m SSE of Glasfryn, Felin-wynt SN22205020 (NMW, conf. NTHH), growing with a few *R. ×novae-forestae* and abundant *R. omiophyllus*; the runnels, connected with a farm water supply, had recently been cleared out, and in the following years, as the vegetation closed in, *R. tripartitus* was not seen again, although dormant seed doubtless remains.

***Ranunculus peltatus*** Schrank - Pond Water-crow-foot - Crafaenc-y-frân y Llyn

An uncommon aquatic, growing in a few ponds, one river and four streams. It was first recorded by the Rheidol “in a pool on Llanbadarn flats” SN58V or 68A in 1909 (ABS, RHY) and remains frequent there in the river and in its associated backwaters and ponds from Capel Bangor SN653794, 1979 (NMW, det. NTHH) - 1992, down to Pont Pen-y-bont SN594803, 1979-2005. A striking photograph in the *Cambrian news* 13.4.1933 shows a dense mass of flowering Water-crowfoot, presumably this species, in the Rheidol “within earshot of Aberystwyth”, taken in late June 1931 and suggesting that it was then more prolific than one ever sees nowadays in this river. In the Afon Wyre it has been recorded from Argoed SN609707, 1999, down to Llanrhystud SN538695, 1987 (NMW). It is absent from the Teifi, but occurs in three of its tributaries: in the Afon Cletwr it has been seen in abundance in the meanders below Talgarreg SN420495, 1994 (NMW);

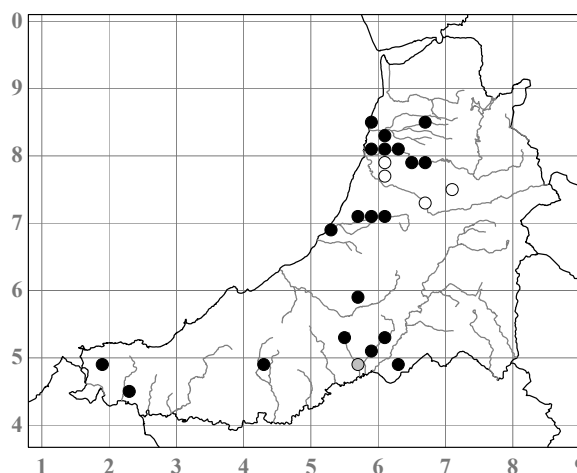


*Ranunculus tripartitus* site, Felin-wynt, view NE from SN22205020, March 2000



*Ranunculus peltatus* in Rheidol backwater, view NE from SN618809, June 2001

in the Afon Dulas from Llangybi SN605528, 1993 (NMW, det. SDW) down to Betws Bledrws SN596514, 1993 (NMW, det. SDW); and in the Ffrwd Cynon 2km ESE of Cellan SN630480, 1997 (JPW & AOC). Specimens from the Aeron at Winllan, Talsarn SN567573, 1992 (NMW), growing with normal *R. penicillatus* subsp. *penicillatus*, were considered by SDW to be closer to *R. peltatus* than to that taxon in their leaf characters, but remain undetermined. Still water sites range from a pond on the coastal slope near Wallog SN590850, 1993 (NMW) to the Mynydd Gorddu lead mine reservoir near Elerch SN673859, 1997. A record from “Borth marshes” SN69 by Ley (1887) is probably best ignored.



[*Ranunculus peltatus* × *trichophyllus*

A specimen from the Afon Cletwr meanders S of Talgarreg SN423485, 1978 (NMW), was considered by CDCK to be a hybrid of *R. peltatus*, possibly with *R. trichophyllus* as the other parent, but as the latter does not occur in this part of the county its identity remains uncertain.]

**Ranunculus baudotii** Godr. - Brackish Water-crowfoot - Crafant-y-frân y Morfa

Recorded only from slightly brackish pools and ditches around the Dyfi estuary. Salter (1935) recorded it from a pool in the old course of the Afon Leri at Aberleri SN609918 where he had seen it before 1932 (NMW, Diary 16.6.1932, when he wrote that it was gone from here); and from pools by Ynys-las Farm SN625933 where he saw it in 1934 (NMW): “Here the white-flowered buttercup which I had seen from the train proved to be *R. Baudotii* in great quantity” (Diary 26.6.1934). It has since been seen in the flooded slack E of the road in the Ynys-las dunes SN610939, 2005 (NMW) where it grows mixed with *R. trichophyllus*; in Moel Ynys Pool SN607922, 1987 (JRA & CDP, CGE, det. SDW: “The species this plant resembles most closely is *R. baudotii* but the achenes are hairy.”) - 1994 (AOC & KH, NMW); in peaty depressions in the Aberleri Fields SN612916, 1996 (AOC & RB); and in the ditch alongside the road at the S end of Borth SN609889, 1989 (NMW, det. SDW).

**Ranunculus aquatilis** L. (*R. heterophyllus* Weber) - Common Water-crowfoot - Crafant-y-frân y Dŵr

Recorded several times in the county, but confirmed only once and never refound: in the Rheidol near Pont Pen-y-bont SN594803, 1979 (TR, det. NTHH). Rees (1890) had recorded it near here “in and near isolated shallow pools”, and Morgan (1849) had recorded it from the “Old course of Lery” SN69A, B, and (1851) from “Shallow lakes”, but these records may refer to any aquatic species. Salter (1935) gave unconfirmed records from a “Stream by Tregaron Bog” c.SN66 or 76, 1909 (RHY) and “In a tributary of the Teifi, near Lampeter” SN54 (DRL). A specimen from the reservoir pool 500m W of Trawsgoed station SN661726, 1956 (NMW) was considered by NTHH to be “Inconclusive - I think *R. aquatilis*.”

**Ranunculus trichophyllus** Chaix - Thread-leaved Water-crowfoot - Crafant-y-frân Feinddail

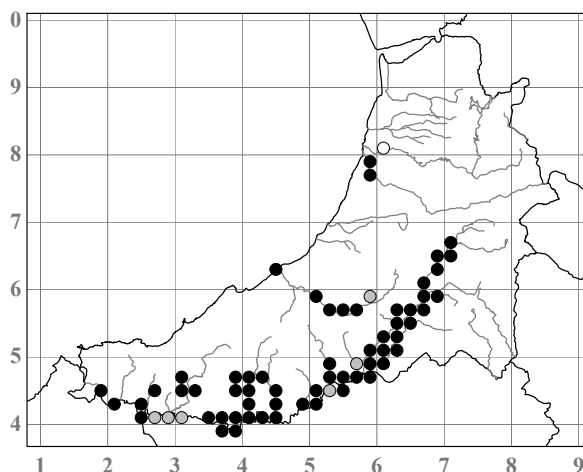
Formerly confined to the Moel Ynys Pool SN606923, and to ditches and pools on the old course of the Afon Leri c.SN608918 and in the Ynys-las dunes c.SN608937, 1924 (Salter Diary 13.5.1924) - 2005 (NMW), but in 1997 it was frequent in peaty scrapes on the Aberleri fields SN611919 where the water table had been raised. It is unpredictable in its appearance, and sometimes survives the drying-out of its sites as a terrestrial form.

**Ranunculus penicillatus** (Dumort.) Bab. - Stream Water-crowfoot - Crafant-y-frân y Nant

Subsp. **penicillatus** (*R. pseudofluitans* sensu Salter, pro parte)

Now confined to the Ystwyth, the Aeron and the Teifi and its tributaries, but reliably recorded in the past from the Rheidol at Llanbadarn Fawr c.SN68A, 1906 (WHP, BM, det. SDW) and from “Ditches and pools in connection with the Rheidol” at Aberystwyth, probably the same area, 1924 (Salter, NMW, det. SDW). Salter’s (1935) records from the Wyre and the Aeron are unconfirmed. It first appeared in the Ystwyth in the





mid 1970s, as the heavy metal pollution decreased, and was collected opposite Tan-y-bwlch SN585795 in 1978 (NMW, det. CDKC) and at Llanychaiarn Bridge SN588787 in 1979 (TR, det. NTHH) and remains frequent in this lower part of the river, 2005. It has been recorded in the Aeron in many places from Winllan SN570576, 1990 (KD) down past Abermeurig SN563567, 1993 (NMW, conf. SDW) to Aberaeron SN457625, 1993.

In the Teifi it has been recorded all down the river from Cors Caron SN707664, 1994, to Coedmore SN201428, 1978 (NTHH) and Cwm Du SN14X, 1996, as well as in at least eight of its tributaries: the Nant Bryn-maen's tributary at SN633570, 1997; the Dulas SN608532, 1978 (NTHH), to SN581477, 1994; the Grannell SN523491, 1978 (NTHH) to SN534473, 1978 (NTHH) - 1999; the Chwerchyr SN355419, 1996; the Cerdin SN391459, 1984 (NMW, conf. SDW), to SN416419, 1996; the Ceri's tributary at SN315467, 1997, and down the Ceri from SN321453, 1997, to SN295408, 1978 (NTHH); the Cletwr SN419479, 2000 (NMW), to SN450435, 1998 (NMW), and its tributary, the Einon at SN454426, 2007; and the Hirwaun SN262457, 2001. It forms extensive stands in many stretches of the Teifi and spectacular displays of it in flower in late May and June can readily be seen from many of the bridges. The *R. penicillatus* communities in the Teifi and its tributaries were one of the main features leading to it being designated as a Special Area for Conservation, and several detailed surveys have been done on the distribution and health of its colonies there.



*Ranunculus penicillatus* subsp. *penicillatus* in the Afon Teifi, Pont Llanfair, SN622513, May 1989

Subsp. **pseudofluitans** (Syme) S. D. Webster (*R. pseudofluitans* sensu Salter, pro parte)

Characteristic of more base-rich waters, this subspecies is known from the Cych, the Teifi tributary outside the county. In the Teifi itself in the county it has been seen only near the Cych confluence within 500m of SN255414, 1980 (NTHH) and from 1.5km upstream of Henllan Bridge SN371404, 1986 (NMW, conf. SDW). It has also been seen in the Dulas at Llangybi SN605528, 1993 (NMW, det. SDW), growing with *R. peltatus*. It has not been refound at these sites though, and may only be a fugitive member of our flora. Lansdown (2007) comments that these populations and others of *R. penicillatus* in the Teifi, which produce only capillary leaves, may in fact all be subsp. *penicillatus*; as both *R. peltatus* and *R. aquatilis* appear sometimes to do this, there seems no reason why subsp. *penicillatus* should not too, thus incidentally obviating the distinction between it and subsp. *pseudofluitans*.

[*Ranunculus fluitans* Lam. - River Water-crowfoot - Crafan-y-frân yr Afon

Recorded only from Cors Caron, first by Ley (1887) whose record was confirmed by W. H. Pearsall (Salter 1935), and again by Webb (1928) who described it as abundant at the N end of the bog c.SN76C, D. Both records require modern confirmation. A record from Borth by Morgan (1863) must be considered even more unreliable.]

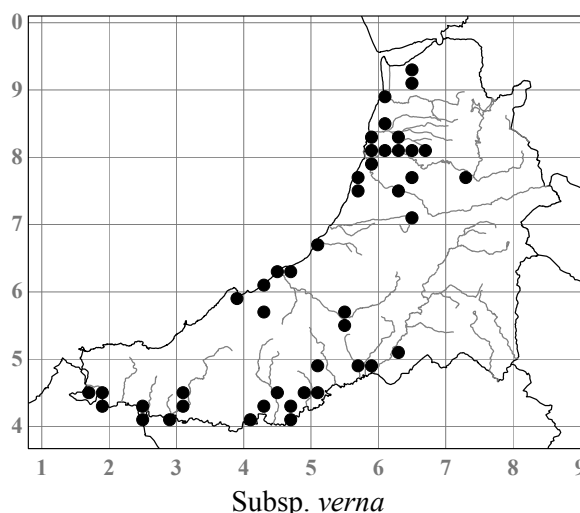
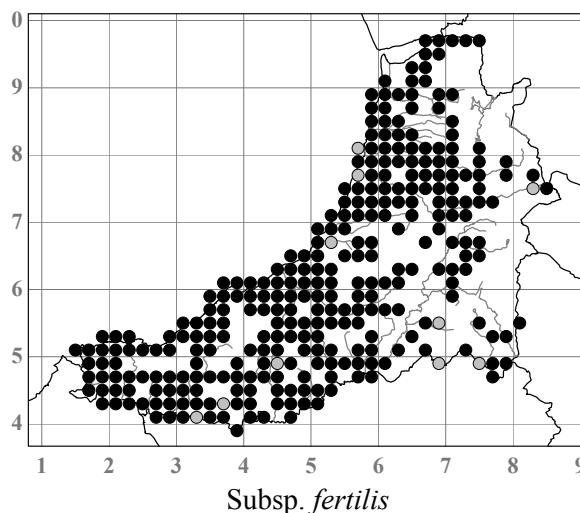
**Ficaria verna** Huds. (*Ranunculus ficaria* L.) - Lesser Celandine - Llygad Ebrill (Milfyw, Dail y Peils, Blodau Menyn)

Subsp. **fertilis** (A. R. Clapham ex Laegaard) Stace (*Ranunculus ficaria* L. subsp. *ficaria*)

A common and often abundant plant of shaded hedgebanks, woodlands, road verges and streambanks, usually on the more fertile soils. It is also abundant on the coastal slopes where Bracken shades the ground later in the year, as well as in similar sites inland, and can be common as a garden weed and in mown areas such as graveyards, but becomes rare or absent in the uplands. Subsp. *fertilis* has undoubtedly increased in abundance, especially in its grassland, woodland and garden sites, since c.1995 or 2000, but the reason for this is unknown. It often grows with subsp. *verna*, but the hybrid has not been seen although large-flowered plants with varying degrees of sterility often occur, for example in Plas Crug, Aberystwyth SN59108117, 2003, where plants had only 20% good seed and 40% good pollen (NMW). There is great variation, and colonies differing conspicuously in the colour, maculation, tothing and size of the leaves can be seen in many areas. A colony of plants with almost white flowers (not just faded), var. **albiflora** (Druce) ined., was recorded from a road verge near Capel Bangor SN656810, 2000-2007 (SPC). Altitude limit c.310m, Salter (1935); 350m, flush among *Molinia* tussocks by the Nant Cwm-du, upper Tywi valley SN80025547, 1996.

Subsp. **verna** (*Ranunculus ficaria* L. subsp. *bulbilifer* Lambinon)

This subspecies with bulbils in the leaf axils is a frequent plant of road verges, hedgebanks, river and stream banks, shrubberies and gardens. It is rare in natural woodland and other wild sites, and is quite absent from the coastal slopes, and appears to be much less of a native than subsp. *fertilis*. It was first recorded in 1971 on a roadside verge at Tre'r-ddol SN658924 (NMW, PMB), having clearly been overlooked as it must have been quite widespread before. It has though increased enormously in some areas in the last decade or so. Around Llanbadarn Fawr and parts of Aberystwyth SN58V, 68A, it must have increased a thousandfold between 1995 and 2005; this was certainly not an effect of increased



*Ficaria verna* subsp. *verna* (left) and subsp. *fertilis* (right), Pont Pen-y-bont SN59458035, April 2006

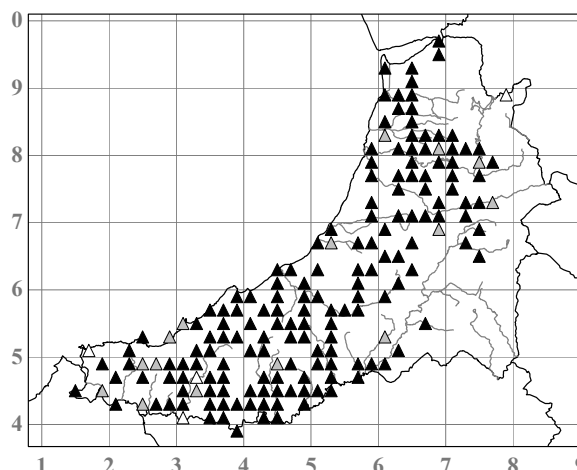


*Ficaria verna* subsp. *verna*, Bryn-y-mor dingle, Aberystwyth, SN58808268, April 2006

awareness by recorders. It also seems to have spread extensively down the Teifi and at least some of its tributary valleys in the same period. There is considerable clonal variation, but all colonies in the county seem to have large, evenly green and rather matt leaves and the subspecies can usually be recognised at a distance. A colony on streambanks at the head of Cwm Padarn, Llanbadarn Fawr SN60358173, and further down this stream, 1990-2005 (NMW) often flowers as early as November, has exceptionally large leaves and flowers, has only c.55% good pollen and fails to set seed; it is doubtless the clone recorded by Salter as flowering near here in November 1927 by Glanyrafon Bridge ('Factory Bridge') SN610804 (Diary 13.11.1927), and in November 1938 at Pen-y-bont SN594802 (Diary 22.11.1938).

#### ***Aquilegia vulgaris* L. - Columbine - Troed y Golomen**

Described by Salter (1935) as one of the commonest escapes, and this is still the case. It is common throughout the lowlands on roadside hedgebanks, graveyards, waste ground, and less often in woodland, pastures and on streambanks. Flowers of all colours occur, and although it has been found in quite wild sites on the sea cliffs, for example at Penbryn SN28655203, 1976, and on the Ynys-las dunes SN69B, 1980-2005 (SPC, AOC), it is unlikely to be native anywhere in the county as it is elsewhere in Britain. It has not been noted from over 260m altitude, except for relic plants in the old garden of Hengwm Annedd SN796893, abandoned in 1935, at 375m in 1940 (Salter Diary 2.7.1940).



#### ***Thalictrum flavum* L. - Common Meadow-rue - Arianlllys**

First recorded in 1904, when Salter (Diary 15.4.1904 wrote that "Mr. Geo. Rees tells me that the Meadow Rue (*Thalictrum*) grows in a field on the roadside between Glandovey and Tre'rddol, somewhere near the 11<sup>th</sup> milestone from Ab'th, and on the right hand side as you go from town". In 1905 (Diary 23.6.1905) he "found the gate just inside which grows *Thalictrum flavum*", and in 1925 (Diary 29.8.1925) he "Was pleased to find *Thalictrum flavum* in plenty, in the same field as formerly" (having failed to find it earlier in the year). The next year (Diary 8.5.1926) he noted that it "has now extended out of the field on to the bank by the road side", and in 1933 (Diary 8.9.1933) he "found it still abundantly established just inside the gate about 80 yards on the Machynlleth side of the milestone." It is still abundant along c.30m on both sides of the hedge here SN67629428, 2005 (CGE), but is no longer away from the hedge in the field which has been reseeded several times since Salter's day. In 1979 a patch 2 × 1m was found 2km away, in the roadside hedge and verge at the NW corner of the Eglwys Fach old vicarage garden SN68559562 (WMC), where it still thrives, 2007 (CGE). Although these plants have something of the inflorescence structure of *T. speciosissimum* L. the shape and venation of the leaflets, and the green, not glaucous colour, indicates that they are the native species, though whether it is truly native in either of these localities is unlikely. The only other colony, probably also introduced, is one c.10m long on the W side of the disused railway across the Teifi Marshes, Cardigan SN186454, 1997 (HW) - 2008.

#### ***Thalictrum minus* L. - Lesser Meadow-rue - Arianlllys Bach**

Known only as a single, weak, non-flowering plant in a crevice of a deeply shaded cliff in Allt Boeth, an Ash/Oak woodland on the N bank of the Afon Rheidol, 400m downstream of the Mynach confluence SN73707733, 2006 (CMFB); growing with *Melica nutans*, *Euphorbia amygdaloides* and other calcicoles, it is undoubtedly native in this remote and undisturbed site which is on the Devil's Bridge Formation of the Silurian. The plant is too poor to tell what segregate it belongs to. Salter (1935) reported seeing *T. minus* in a garden at Ponterwyd SN78K and thought that it was "not likely to have been brought from any distance"; whether this was *T. flexuosum* or the true *T. minus* must remain uncertain. The record of *T. minus* in Morgan (1849) from Cwmgraig doubtless refers to Cwm Gau Graig on Cadair Idris in Merioneth where it still occurs as a native.



***Thalictrum flexuosum* Bernh. (*T. minus* auct., non L.)**

This commonly cultivated member of the *T. minus* group, native of Europe, is naturalised at nine sites, on roadside banks and verges, and in Gwenlli churchyard SN392535, 1996-2005 (CGE, det. PDS), probably mostly deriving from throw-outs. It was first noted at Penbont Rhydybeddau SN67688360, 1992 (NMW) - 2005 (CGE, det. PDS), where a colony 3 × 1m grows on the shaded roadside verge.

**PLATANACEAE**

***Platanus ×hispanica* Mill. ex Münchh. (*P. occidentalis* L. × *orientalis*)** - London Plane - Planwydden Llundain

Rarely planted, in estates, on roadsides and as a street tree. A tree 282cm girth, 1996, is in estate woodland above the drive at Nanteos SN61897857 (AOC & CDPa); one, 308cm girth and 17m tall in 1992, is just W of Brynog SN52925742; one, 245cm girth in 1993, is by the Nant Creuddyn bridge at the S end of the Falcondale drive SN57114828; and one, 272cm girth in 1997, is in the pasture 300m NE of Highmead SN504434. There are roadside trees at Pont Llolwyn, Llanfarian SN590774, 1996 (SPC) - 2008, and at Llanllyr SN544560, 1996-2008. Five street trees, 80-143cm girth in 2004 (AOC & PWD), are in St David's Road and Cae'r-gog, Aberystwyth SN591818, and one is in Alban Square, Aberaeron SN45976280, 2002. Whether London Plane is a hybrid, and if so what its origin is, are uncertain and controversial matters. Maximum a magnificent tree, anciently pollarded, 485cm girth (at 1m up) and 22m tall in 1993, 525cm girth (at 1m up) and 24m tall in 2004, at Abermydr on the Llanerchaeron estate SN475604.

***Platanus orientalis* L.** - Oriental Plane

There is a spindly tree, 33cm girth and 7m tall in 2004, planted in the Penglais dingle, Aberystwyth SN59348200, and a spreading tree, 3m tall in 2004, planted further E at Pentre Jane Morgan SN59758212. Native of SE Europe and grown in Britain since the early 16<sup>th</sup> century.

**BUXACEAE**

***Buxus sempervirens* L.** - Box - Pren Bocs

A frequent relic, and sometimes spreading by layering, in estate woodlands and by old cottage sites, and commonly planted in graveyards. Definite self-sown plants have not been found. There must have once been an unusually good tree at Nantyrnnon SN664777 as Salter made a diversion to see it on a walk back from the Teifi Pools (Diary 1.6.1904). Maximum 124cm girth, by ruined cottage, Capel Dewi SN446412, 1995. Altitude limit (as a relic) 330m, hedge remnant in pasture above Cwmsymlog lead mine, SN70088391, 2004.

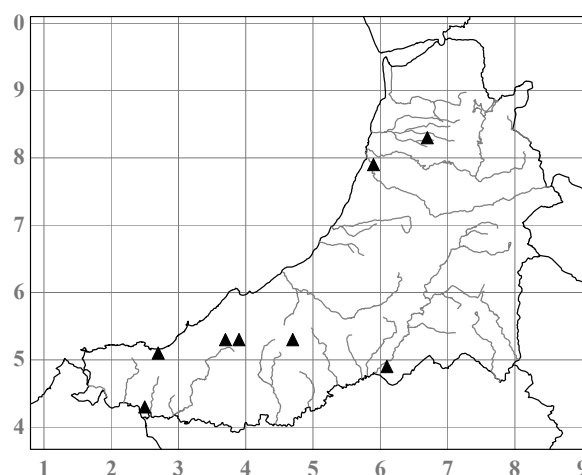
***Buxus balearica* Lam.** - Balearic Box

Two bushes of this large-leaved Box with distinctive fruits, whether relics or self-sown is uncertain, are in estate woodland, Plas Penglais, Aberystwyth SN59518220, 2003 (NMW) - 2008. Native of the W Mediterranean, introduced to Britain in the late 18<sup>th</sup> century.

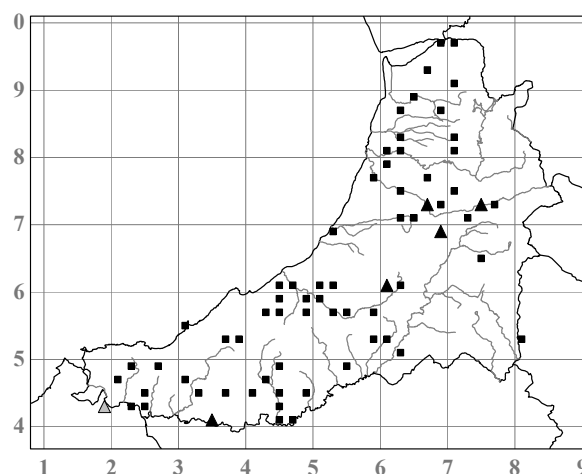
**GUNNERACEAE**

***Gunnera tinctoria* (Molina) Mirb.** - Giant-rhubarb - Rheonllys Mawr

Often planted in large gardens and occasionally in wild places, but apparently spreading by seed in only four sites: in scrub by a pond in pastures 300m E of Pen-y-graig, Felin-wynt SN222517, 1994; in *Salix cinerea*



*Thalictrum flexuosum*



*Buxus sempervirens*

carr by the bridge at Glandulas SN313475, 1997; by the Nant Cledlyn below Aber SN47944824, 2008 (NMW); and around a long-abandoned artificial pond, Feli Geri, Cwm-cou SN300421, 2000 (AOC & LRG). Native of W South America.

## PAEONIACEAE

***Paeonia officinalis* L.** - Garden Peony - Rhosyn-y-mynydd y Gerddi (Rhosyn y Grog, Peiam, Pion, Pompei)

Occasionally planted in graveyards, for example at Capel y Bryn, Cwrtnewydd SN491476, 2001, and appearing naturalised at least in Capel Rhiwbwys graveyard, Llanrhystud SN546692, 1997-2004, and in Capel Crugiau graveyard, Plwmp SN365524, 1999-2004; it is also in a copse by a quarry 150m SE of Pontsian crossroads, SN43994601, 2005, where it was probably planted. Native of S Europe.

## HAMAMELIDACEAE

***Liquidambar styraciflua* L.** - (Sweet Gum)

A tree on the front lawn in the Trawsgoed grounds SN67117307, 185cm girth and 10m tall in 1994 (AOC & CDPa), fell in 2008. Native of Central and SE North America, introduced to Britain in 1681.

## CERCIDIPHYLLACEAE

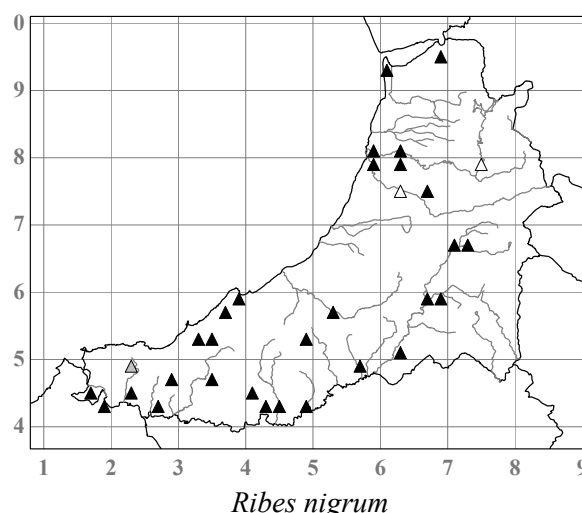
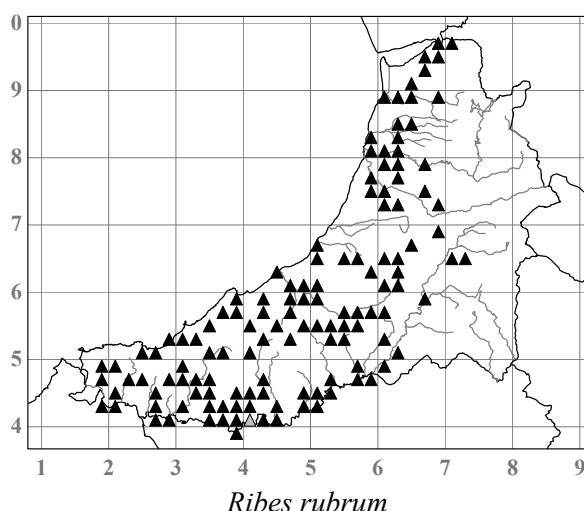
***Cercidiphyllum japonicum* Siebold & Zucc.** - Katsura

Planted in the estate woodland at Ynys-hir SN681963 in the 1930s by W. H. Mappin, but gone before 1990 (WMC pers. comm.). There are two planted bushes in the University estate woodland 150m ENE of Plas Penglais, Aberystwyth SN59578229, 2002, and one on the University campus SN59738155, 2006. Native of China and Japan, introduced to Britain in 1865.

## GROSSULARIACEAE

***Ribes rubrum* L.** - Red Currant - Llwyn Cwrens Coch

Frequently naturalised in scrub and woodland and by old cottage sites, often in wet places and on river banks, and commoner and more often obviously bird-sown than *R. nigrum*. Doubtfully native anywhere in the county, as in Britain as a whole.

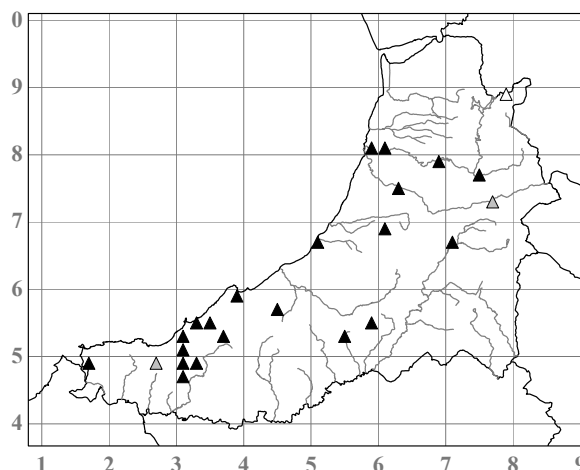


***Ribes nigrum* L.** - Black Currant - Llwyn Cwrens Duon

Occasionally naturalised in scrub and woodland and by old cottage sites, the most extensive colonies being in Alder carr and other wet woodlands. The earliest record is by Morgan (1849) from Castle Hill, Llanilar SN6274, and Salter (1935) described all three edible species as frequent escapes or relics. It has been grown commercially on a small scale, 0.4ha in 1988 (Anon. 1988).

**Ribes sanguineum** Pursh - Flowering Currant - Llwyn Cwrens Blodeuog (Y Gyrensen Goch, Y Goeden Goch)

Native of W North America. Occasionally planted in hedges and a relic by old cottage sites, and sometimes occurring in scrub and on stream banks where it may be derived from throw-outs or perhaps be self-sown. Definitely bird-sown bushes are very rarely seen, for example on a laneside wall at Llan-non SN512674, 1996. The map covers both planted and self-sown occurrences. Former owners of Ddol Farm, Plwmp SN35R planted unusually large numbers in the hedges there, where they are a striking sight in early spring, 1992-2008. Altitude limit (as a relic) 375m, Hengwm Annedd, Pumlumon SN797893, 1940 (Salter Diary 2.7.1940).

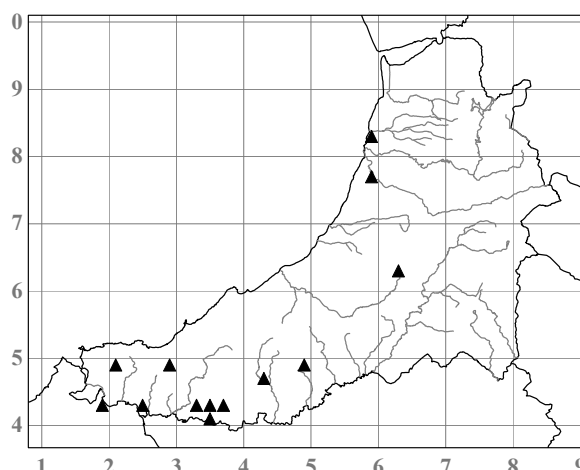


**Ribes odoratum** H. L. Wendl. - Buffalo Currant - Llwyn Cwrens Persawrus

Two bushes of this yellow-flowered species, native of North America, in the roadside hedge 150m S of the Penllwyn crossroads, Capel Bangor SN652801, 2000 (NMW, SPC) - 2007, appear to be bird-sown.

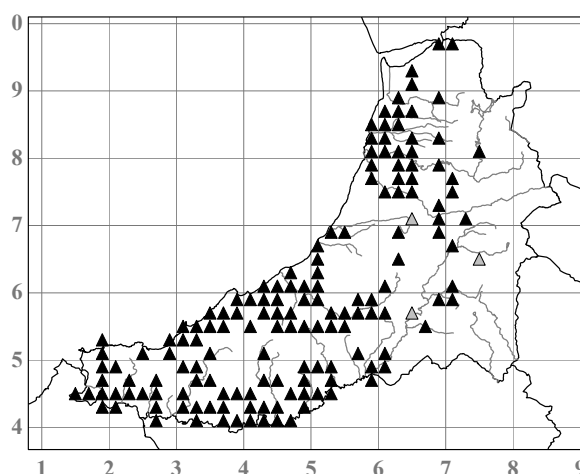
**Ribes alpinum** L. - Mountain Currant - Llwyn Cwrens y Mynydd

Rather rarely planted and naturalised in hedges and woodlands and by old cottage sites. Salter (1935) recorded it from the Ty-llwyd estate woods, Tan-y-groes SN284484, where it was still abundant in 1997-2004. In a few places, for example at Rhydy-pandy SN63496223, 1997-2001, and by the lane to Pantgwenith SN339434, 1996-2001, it is the dominant shrub in hedges. At these sites, and at the others where inflorescences have been seen, the bushes are entirely female. A bush in scrub by the Nant Llolwyn, 50m below the Chancery footbridge SN582765, 1991 (NMW) - 2005, well away from habitation, was presumably bird-sown. It is native in parts of England.



**Ribes uva-crispa** L. (*R. grossularia* L.) - Gooseberry - Eirinen Fair

Frequently naturalised in hedges, woodland and scrub, and first recorded by Morgan (1849) from Castle Hill, Llanilar SN6274. There is great variation in spininess, hairiness and flower colour; fruits are rarely seen, perhaps because they are eaten by birds when still unripe, and it may be that most of the occurrences are of bird-sown cultivated forms from gardens. Unusually extensive thickets occur by an old cottage site in the Nant Fothau valley SN355562, 1995 (SPC). It has been grown commercially on a small scale, 0.8ha in 1988 (Anon. 1988), and as "pick your own" in a few places, such as Penbanc, Capel Dewi SN451436 in the 1980s.



**Ribes divaricatum** Douglas - Coastal Gooseberry

There are two relic bushes of this native of W North America in a long-abandoned overgrown orchard at Gilfach-yr-Halen SN43646124, and several presumably bird-sown bushes in hedges and scrub nearby, 2003-2006 (NMW, AOC & PAS).



## SAXIFRAGACEAE

**Bergenia crassifolia** (L.) Fritsch - Elephant-ears - Clustiau Eliffant (Clust yr Hwch)

Naturalised in scrub on the bank of the Afon Arth in Aber-arth village SN479639, 1998, presumably from a throw-out. Native of Siberia.

**Bergenia** × **schmidtii** (Regel) Silva Tar. (*B. ciliata* (Haw.) Sternb. × *crassifolia*)

Established at the edge of scrub on a grass slope SSW of New Quay lifeboat station SN38995979, 2007 (AOC & JPP). Of garden origin.

**Saxifraga cymbalaria** L. var. **huetiana** (Boiss.) Engl. & Irmsch. - Celandine Saxifrage - Tomaen Arenddail

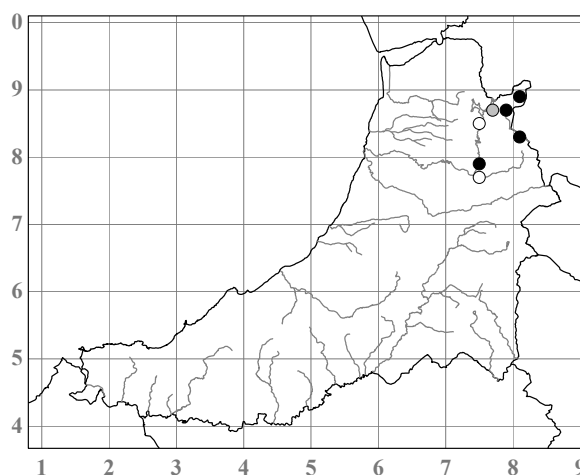
Naturalised in the grounds of Alltyrodyn, Capel Dewi, where it was first recorded as “Found on wall at Alltyrodyn” c.1921 (ABS, MLL, det. AOC & ADQA in 1999). In 1992 it was seen on a ledge under the drive bridge just NW of the Home Farm there SN44844439 (GH), and in 2001-2008 several colonies were found on the walls of the walled garden nearby SN44814440 (GH, BH & AOC). This subspecies is native of SW Asia.



*Saxifraga cymbalaria*, Alltyrodyn walled garden, view NE from SN44804440, May 2005

**Saxifraga stellaris** L. - Starry Saxifrage - Tomaen Serennog

This arctic-montane species reaches its S limit in Britain in the county. It was first recorded in 1682 on Pumlumon by Edward Llwyd (Chater 1984a), and then on the rocks above Llyn Llygad Rheidol SN7987 there in 1837 by Lees (1838). Ley collected it at this latter site and near the Maesnant SN78T or Y in 1886 (BIRM); Salter (Diary 30.5.1894) saw it both above Llyn Llygad Rheidol and by the Peithnant where it joins the Rheidol c.SN754844, and saw it repeatedly at this latter site until 1926 (Diary 22.8.1926). It has been seen more recently on the wetter cliffs above Llyn Llygad Rheidol 1959-2004; by the Nant Felen in Cwm Gwerin SN807889, 1904 (Salter Diary 8.6.1904) - 1999 (AOC & PAS); on wet cliffs at the head of the Nant y Moch SN784862, 1990-2002 (AOC & PAS); by the Maesnant SN775879, 1959-1977; and on rocks by the Afon Tarenig 500m SE of Eisteddfa Gurig SN80188392-80428381, 2006 (SDSB & AOC). It has also been seen in several places down the Rheidol between Ponterwyd and Devil's Bridge, in at least some of which it was probably only transient, having been washed down as seed or rosettes from higher up. Salter saw “two or three plants” below Bryn Bras SN7579 in 1935 (Diary 16.8.1935, Wade 1952). It is abundant on flat rocks by the river 120m below the confluence with the Nant Tyn-llwyn SN74457800, 1978 (AOC, WMC & DGJ) - 1998 (AOC & PCu). This is probably its current S limit, but in 1900 Salter (Diary 19.6.1900) saw “a good clump of it, near the water's edge” c.100m below the confluence with the Mynach SN740772, at only 85m altitude. Altitude limit 670m, rocks above Llyn Llygad Rheidol SN7987, 1903 (Salter Diary 26.9.1903, 1935); 660m, ditto, 2002.



*Saxifraga stellaris*

**Saxifraga** × **urbium** D. A. Webb (*S. spathularis* × *umbrosa* L.; *S. umbrosa* sensu Salter, non L.) – London-pride - Balchder Llundain (Stôl y Frenhines, Crib Ceiliog)

Frequently naturalised on roadside banks, in graveyards, in estate woodlands, on old cottage sites, on waste ground and in scrub. It is perhaps commoner than in Salter's day as he described it as “Occasionally

naturalised” and gave only six sites (1935, Wade 1952). The earliest record seems to be from a roadside bank between Mydroilyn and Cribyn in 1928 (Salter Diary 19.5.1928), perhaps 150m ESE of Blaen Parc SN478531, where a large colony still grows, 1976-2008. Good seed has not been found on any colonies in the county.

***Saxifraga spathularis* Brot. - St Patrick's-cabbage - Tomaen Padrig**

Recorded naturalised only from mixed woodland in the grounds of Plas Einion, Furnace SN684948, 1991 (NMW).

[*Saxifraga* *×polita* (Haw.) Link (*S. hirsuta* L. *×* *spathularis*) - False Londonpride - Balchder Llundain Ffug

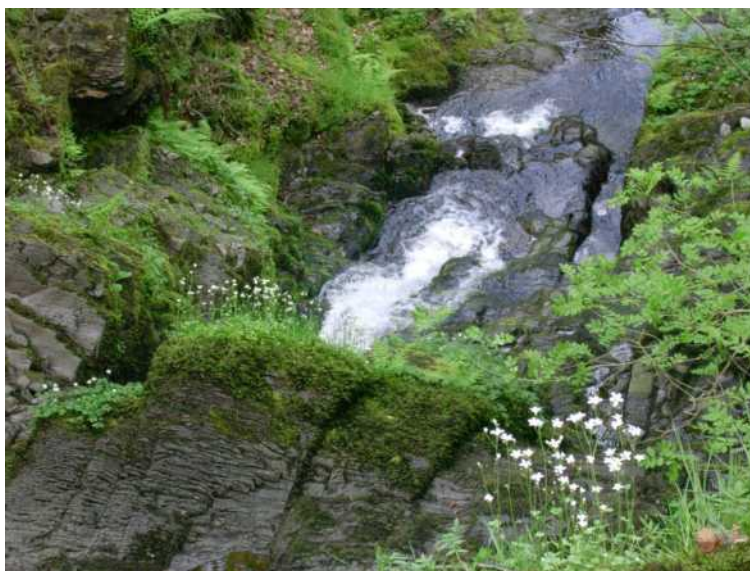
Ellis (1983a) gives a record from Aberystwyth, c.1920, in H. Drinkwater's unpublished ms. *Catalogue of drawings* in NMW, but this reference has not been traced.]

[*Saxifraga azoides* L. - Yellow Saxifrage - Tomaen Melyn y Mynydd

Improbably recorded from Garreg, Glandyfi SN696970 by Morgan (1858), and repeated in the next two editions of his *Guide*.]

***Saxifraga granulata* L. - Meadow Saxifrage - Tomaen y Gweunydd**

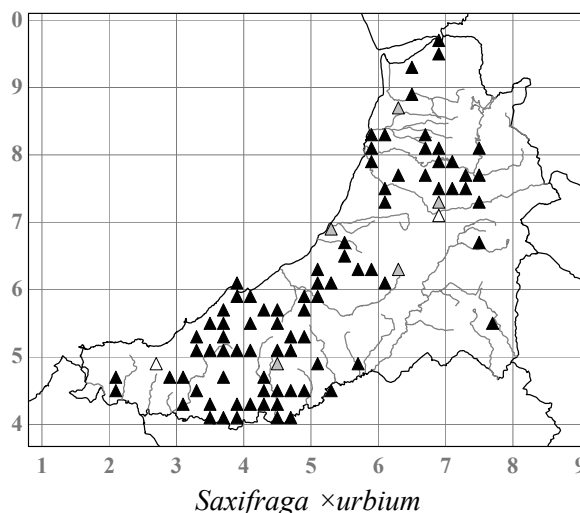
Recorded from three sites, but apparently now gone from one of these. Salter saw it at Devil's Bridge by the tributary stream of the Rheidol just below the Mynach in 1892 and 1900 (Diary 21.6.1892, 19.6.1900, 1935) where one large patch was again seen at the confluence of this stream with the Rheidol SN73957727 in 2005 (AOC & PAS). Salter saw it 2km further up the Rheidol by the waterfall of the Nant Ysbyty Cynfyn below Parson's Bridge SN749788 in 1904 (Diary 16.6.1904), and several times again until 1930 (NMW, Diary 3.6.1930); it is still present there on rocks in and beside the waterfall, 2005 (AOC & PAS), and in 1992 (AOC; JEDa) it was seen on both banks of the Rheidol for 400m downstream from there. These sites are all in the Coed Rheidol *Quercus petraea* woods. In 1907 Salter (Diary 16.5.1907) found one plant by “the pretty rustic bridge” at Llanerchaeron which was at SN479602 but has long gone, and in c.1908 it was “Found growing under the trees in the grounds at Llanayron” (ABS, MLL), presumably the same site; it has not been recorded there since, and Salter, perhaps because he decided it was cultivated or an escape, did not give this site in his Flora (1935).



*Saxifraga granulata*, Nant Ysbyty Cynfyn waterfall, SN74907888, May 2005

***Saxifraga hypnoides* L. - Mossy Saxifrage - Tomaen Llydandroed**

First recorded as “one very big cushion” on wet W-facing rocks above Llyn Llygad Rheidol, Pumlumon Fawr SN79708750, at 600m altitude, in 1903 by Salter (Diary 26.9.1903), where presumably the same cushion c.150 × 60cm, with two small outliers, still grows, 2003 (AOC & SDSB). Salter also saw it 1.5km NNE of here on the cliffs of Lluet y Graig SN803889 in 1904 (Diary 8.6.1904) “out of reach”, but there are no later records from this site. The only other record of it as a native is from by a small stream 900m SW of the



summit of Pumlumon Fawr SN783863, 1980 (NCC Wales Field Unit), but repeated attempts to refind it there have failed.

*S. hypnoides*, including one or more of its cultivars, is naturalised in a number of graveyards, as well as in Ash scrub on the sand dunes at Penyrergyd SN161487, 1979 (NMW, RGE) - 1988.

### ***Saxifraga* × *arendsii* hybrids**

Plants belonging to this taxonomically difficult group of garden hybrids have been recorded twice, both times derived from throw-outs. A well-established colony on the edge of a shaft at Bwlch lead mine, 1km SE of Cwmerfyn SN701823, 1993 (LTR, SPC, det. RJG) was destroyed the next year by mine reclamation. A plant at the entrance to Coed Dolgoed, 1km ESE of Pontrhydfendigaid SN738659, 1998 (SPC) was a short-lived casual.

### ***Saxifraga tridactylites* L. - Rue-leaved Saxifrage - Tomaen Tribys**

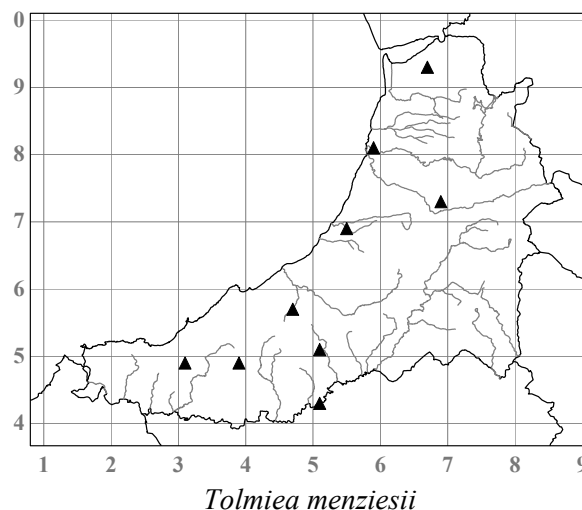
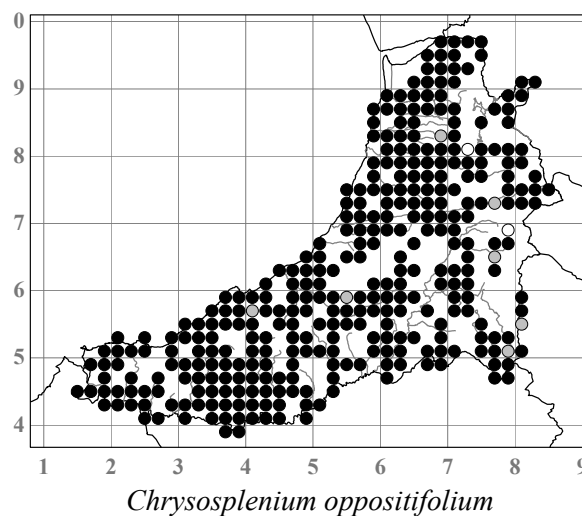
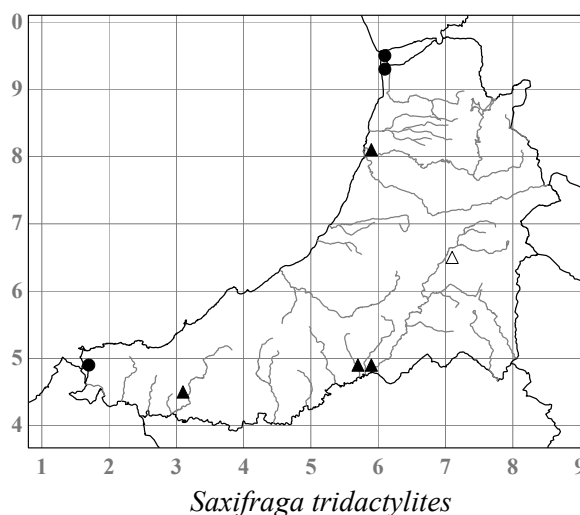
Locally abundant on the dunes at Ynys-las SN69B, C, 2008, where it was first recorded in 1955 and noted in 1966 as becoming very abundant; Salter (1935) had commented on its absence there. It was first recorded on the dunes at Towyn Warren, Gwbert SN14U in 1941 (Whellan 1942) as “plentiful”, and is still on the Penyrergyd dunes there 1976-2008. The St Dogmaels record mentioned by Salter (DT, Diary 3.6.1904, 1935) was presumably from the Poppit dunes in VC 45. As an accidental introduction, *S. tridactylites* has been recorded from railway ballast 700m SSE of Aberystwyth station SN591810, 1990 (SPC); from a cinder path by the disused railway between Strata Florida Station and Allt-ddu SN76C, 1954 (GCES); from flat roofs and pathsides on the Lampeter University campus SN579483-580483, 2005 (AOC & IJB); and growing abundantly in moss on the vertical wall of an old barn in Dolgôch farmyard, Brongest SN31774467, 2005 (SDSB & AOC).

### ***Chrysosplenium oppositifolium* L. - Opposite-leaved Golden-saxifrage - Eglyn Cyferbynddail**

Common in all sorts of damp, shaded sites, and in the uplands frequently in flushes in the open. It is especially common on streamsides, in wet woodland, around springs, on wet cliffs and in marshes, frequently forming large patches. Altitude limit 610m, wet rocks at the *Saxifraga hypnoides* site above Llyn Llygad Rheidol SN797875, 1903 (Salter Diary 26.9.1903); 660m, flush by stream above Llyn Llygad Rheidol SN797873, 2003.

### ***Tolmiea menziesii* (Pursh) Torr. & A. Gray - Pick-a-back-plant - Crydllys (Ar Lin Mam)**

Native of W North America, and recorded naturalised in nine sites in the lowlands on shaded streambanks, in damp woodland and on roadside hedgebanks. The first record was of two colonies each  $c.2 \times 1$ m, 10m apart, on damp rocks by the Afon Mydr 400m E of Felin Rhiwbren SN476579, 1988 (NMW, AOC & MC) - 1996, and others include a colony  $4 \times 3$ m in *Salix*/Alder carr by the





Afon Cerdin 100m NNE of Blaencerdin-fawr SN38694909, 1996 (NMW), and a colony 1 × 0.5m on the Teifi bank in Sandbanks Wood, Highmead SN50454280, 1997 (NMW, AOC & JPW).

**Tellima grandiflora** (Pursh) Douglas ex Lindl. - Fringecups - Clychau'r Clawdd

First recorded as well-naturalised on a shaded roadside bank at Blaenpant, Dihewyd SN491556 in 1999 (NMW), the only further records are from the streambank 100m W of Llanfihangel-y-Creuddyn church SN66407602, 1999, from 600m further down the same stream at Tan-llan SN65807629, 2008 (AOC, PAS & MT), from a grave enclosure in Llangwryfon old churchyard SN596705, 2002, and from a roadside hedgebank near Llwyncolfa Coed, Tyncelyn SN64396302, 2008. Native of W North America.

## CRASSULACEAE

**Crassula tillaea** Lest.-Garl. (*Tillaea muscosa* L.) - Mossy Stonecrop - Corchwyn Mwsoglog

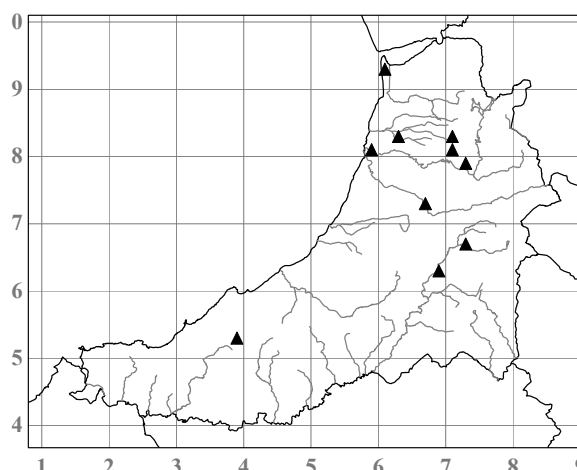
A copy of Salter (1935) in private hands that once belonged to Watkin Williams of Aberystwyth University, later Professor of Agricultural Botany at Reading University, contains his annotation "*Tillaea muscosa*. Ynyslas 12.4.1947" c.SN69B; although there is no further information on the discovery, there is no reason to doubt this record of such a distinctive plant. Native in S England and East Anglia, it has recently been spreading to sandy coastal sites and will have been a casual at Ynys-las, and was perhaps brought here by the military vehicles that used the dunes during the Second World War. This is the earliest record from Wales.

**Crassula helmsii** (Kirk) Cockayne - New Zealand Pigmyweed - Corchwyn Seland Newydd

This invasive aquatic alien, native of New Zealand, was first recorded in the wild in Britain in 1956 and appears to spread entirely vegetatively. The first record for the county was from the Ynys-las Dunes NNR, in a small artificial pool in the slack E of the road SN611938 in 1986 (NMW, MW). It had clearly been dumped there. In 1987 the NCC began trying to control it with Roundup and Midstream, and by covering it with black polythene, and seemed to have eradicated it by the following year. Several patches though reappeared in 1990, and it spread rapidly in spite of repeated spraying. In 1995 the whole area and its surroundings were excavated and made into a shallow seasonal pool, the vegetation and upper layers of substrate being buried off-site.

No *Crassula* was then seen until 1998, when a small patch was found W of the road and removed, but in 1999 it reappeared by the excavated area and, in spite of further repeated spraying, increased steadily and remains scattered throughout the pool, 2007.

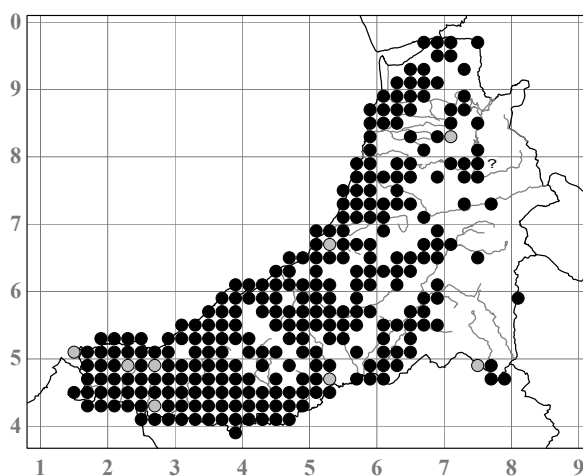
There have been a number of records from garden, estate and farm ponds since, the first being in a pond in the grounds of Plas Gogerddan SN630837 in 1989 (NMW, ATJ) - 2004 (SPC) and in ponds at Ffynnonberw, Synod Inn SN381538 in 1990. NCC/CCW has continued to be haunted by it, as it appeared in the pond at their Plas Gogerddan office SN628834 in 1994, and was found in a large lagoon, excavated c.1991, on the Cors Caron NNR SN688625 in 2000. In 1997 there was a dense growth in a pond in the FC plantation at Black Covert, Trawsgoed SN668726. In 2004 it was dominant in a pond made c.1990 near Nantyrarian SN714813. It has persisted and spread in two upland sites: among *Juncus effusus* on the E shore of Llyn yr Oerfa SN72897987 at 325m altitude, a colony 3m long in 1997 (AOC & RAJ) had extended to 24m by 2001, and was the same size in 2005; it was dumped under *Salix* bushes at the E corner of Llyn Pendam SN709839 in 1998, along with *Myriophyllum aquaticum* and *Elodea nuttallii* both of which were successfully eradicated that year (AOC & ACJ), and remains there in spite of repeated efforts to remove it, 2008. This last is at 345m, its altitude limit.



**Umbilicus rupestris** (Salisb.) Dandy (*Cotyledon umbilicus* auct.) - Navelwort - Deilen Gron (Dail Ceiniog, Llysiau'r Geiniog, Teisen Geiniog, Ceiniogau)

A common plant of crevices in rocks or on cliff ledges, usually where they are at least slightly base-rich, of mossy screes especially on the coastal slopes, and of the sides of both earth and stone banks and of mortared

walls. Extensive and dense colonies often occur on steep earthy roadside banks where the leaves conspicuously catch the light in winter. It occasionally grows between the root buttresses or in the branch axils of Ash or Oak trees. It is salt-tolerant, and is especially abundant on the S cliffs of Cardigan Island c.SN1551 and 1651, 1977. As a folk medicine it was successfully used to treat ringworm c.1920 at Chancery SN582765 (KAH pers. comm.); as an ointment mixed with lard and brimstone, to treat chilblains, in the N of the county; and as a poultice mixed with grease to draw out pus, in the S of the county (Jones 1980, referring to late 1970s interviews, and see Allen & Hatfield 2004). Altitude limit 410m (Salter 1935); 440m, crevices in cliffs, Carn Owen quarry SN73208813, 2005 (AOC & SDSB).



*Umbilicus rupestris* on droughted cliff slope, Carreg Wynt, SN233520, June 1977



*Umbilicus rupestris* on roadside bank, Llanfarian, view SW from SN586775, December 1984



**Chiastophyllum oppositifolium** (Ledeb.ex Nordm.) A. Berger - Lamb's-tail

Otherwise naturalised in Britain only on an old wall at Bodnant in Denbighshire, this broad-leaved Stonecrop with drooping, yellow inflorescences is abundantly naturalised (a total of *c.*360 inflorescences) along 30m of the outside of the old mortared wall of the walled garden at Ynys-hir, Eglwys-fach SN68169581, 2004 (NMW) - 2008. Native of the Caucasus.

**Sempervivum tectorum** L. - House-leek - Llysiau Pen Tai (Llysiau'r Dom, Dail y Llygad, Erlllys)

At one time apparently common on roofs, but now rarely seen. The earliest record was from a "Housetop, Mill Lane", Aberystwyth SN583814, by Morgan (1849). Smith (1878) wrote that in the Lampeter area "The Houseleek was on every roof", and Burkill & Willis (1894), referring to the N half of the county, wrote that "This is frequently planted on cottages to help in maintaining the slates in position; only in such places, frequently in ruins, we saw it". Salter (1935) described it as "Frequent on roofs of cottages and sheds", but the only three mentions in his Diary (12.7.1905, 24.4.1907, 15.4.1924) are all of it on the same shed E of Ysbyty Cynfyn SN77P or U. A. E. Jones (*Folk life* 18: 59 (1980)) reported it having been used as an eye ointment and for earache in the county.

Recent records have been from the roof of a farmyard outbuilding at Bank Green Grove, Ystrad Aeron SN511565, 1977; on Cellan churchyard wall SN613498, 1978; and on an old mortared wall by playing fields at Llandysul SN416404, 1991. The only site where it looked properly naturalised was at Cwmsymlog lead mine, where there were *c.*12 rosettes on a ruined mortared wall 30m WNW of the chimney SN69928373, 1991; and three big colonies, each with many rosettes, on a drystone wall by the house at the NE corner of this mine SN70208383, 1991. Native of C & S Europe. Altitude limit *c.*305m "up to 1,000ft." (Salter 1935); 320m, recently planted on walltop, Nant-y-graig ruin SN779542, 1995.

[*Sedum rosea* (L.) Scop. (*S. rhodiola* DC.) - Roseroot - Pren y Ddannoedd]

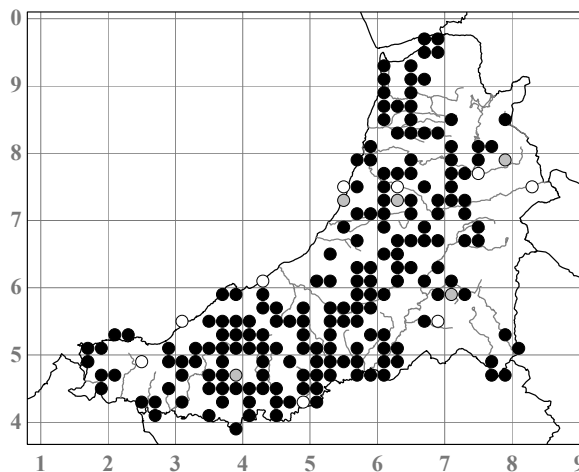
Erroneously recorded from Cwm Rheidol by Morgan (1849). Salter (Diary 27.8.1904) wrote hopefully that in the ravine below Llyn Rhuddnant *c.*SN800785 "A big tuft of *Sedum*, far out of reach, was I quite believe *rhodiola*", and he had a similar experience on the cliffs near Dolgoch on the Tywi SN8056 (Diary 15.8.1928) with a plant that turned out to be *S. telephium*.]

**Sedum spectabile** Boreau × **telephium** - Autumn Stonecrop

'Herbstfreude' ('Autumn Joy') is naturalised from relics or throw-outs in scrub at Brynarth-bach, 3.5km S of Trawsgoed SN669695, 1998-2005. *S. spectabile* is native of E Asia.

**Sedum telephium** L. (*S. purpureum* auct.) - Orpine - Canewin

An occasional plant of upland cliffs and stream ravines, chiefly on the slightly more base-rich strata, on rocks and streamsides in woodlands, and on some of the sea cliffs; it is presumably native in most of these habitats. Especially good populations are on Craig y Pistyll SN713856, 1894 (Salter Diary 25.4.1894) - 2003 (AOC & SDSB), and on Craig Clogan, Cwm Berwyn SN726582, 1931 (Salter Diary 2.5.1931) - 2003 (AOC & SDSB). It is also frequent on roadside banks, on waste ground, in graveyards and at old cottage sites and around villages where it may sometimes be an escape or derived from throw-outs, but the map makes no attempt to distinguish any differences in status. In so far as the two subspecies can be distinguished, all the populations in the county that have been investigated, both native and naturalised, seem to be of subsp. **fabaria** (W. D. J. Koch) Syme. Altitude limit 380m, "Nant Berwyn" SN75E or J (Salter 1935); 390m, Rhuddnant gorge SN799786, 1984 (AOC, WMC & DGJ).





***Sedum spurium*** M. Bieb. (*S. stoloniferum* auct., non S. G. Gmel.) - Caucasian-stonecrop - Briweg y Cawcasws

Occasionally naturalised on roadside banks, old walls, riverbanks, rock outcrops, waste ground and in graveyards. Salter (1935, Wade 1952) gave six localities, and DMcC (*Wild Flower Magazine* **340**: 26 (1964)) mentions seeing it in several of these as well as in other sites. Native of SW Asia.

***Sedum stoloniferum*** S. G. Gmel. - Lesser Caucasian-stonecrop - Briweg-y-Cawcasws Fach

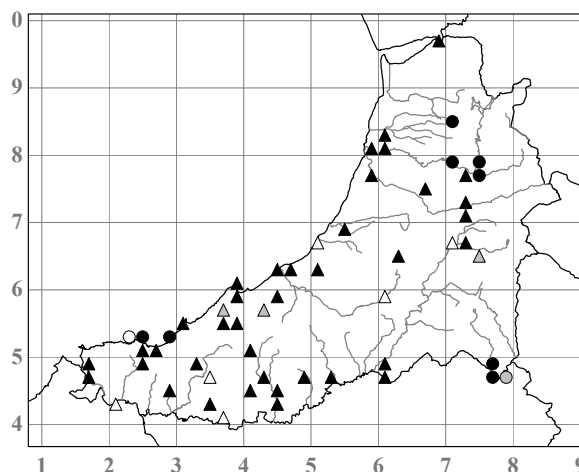
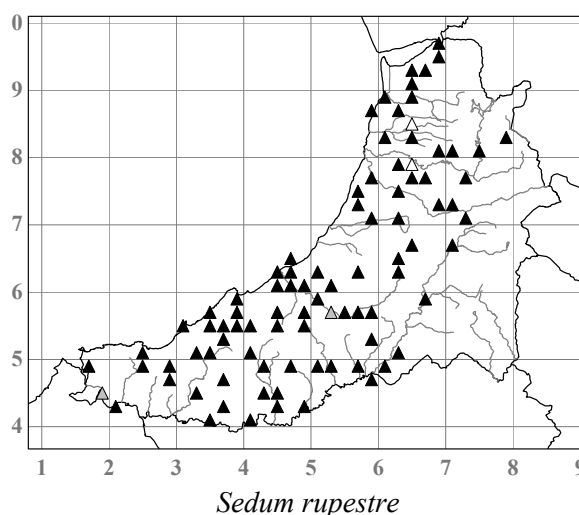
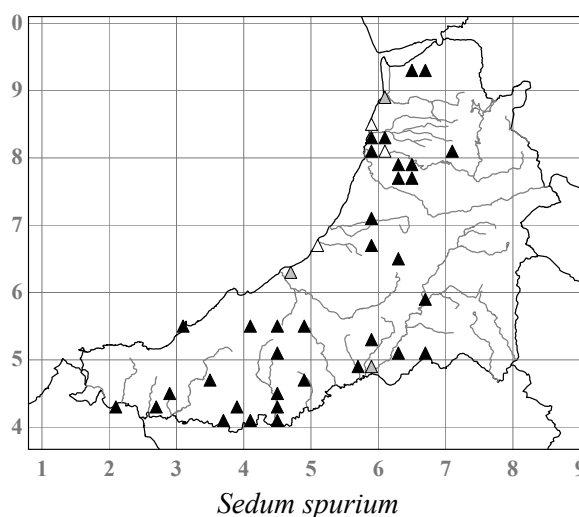
Formerly confused with *S. spurium*, and recorded as naturalised from only two sites: on the shaded S bank of the Afon Ffynnon-Ddewi just below Llwyn-dafydd road bridge SN370554, 1998; and on the E hedgebank of the road 300m ENE of Capel Dewi church SN453426, 1999. Native of SW Asia.

***Sedum rupestre*** L. (*S. reflexum* L.) - Reflexed Stonecrop - Briweg Felen

Frequently naturalised on old, especially mortared walls, hedgebanks and waste ground and in graveyards. The earliest record was from old houses at Llanbadarn Fawr c.SN5981 (Morgan 1849), and Salter (1935) gave eleven sites. Native of Europe and SW Asia. Altitude limit 360m, slope below the A44(T) road in conifer forest, Cwm Ergyr SN795830, 1987-2004.

***Sedum forsterianum*** Sm. (*S. rupestre* auct., non L.) - Rock Stonecrop - Briweg Gymreig

Rare as a native and largely confined to the more base-rich outcrops near the base of the Silurian strata. It was described new to science from the county by J. E. Smith (1808) who wrote that it was "Gathered in 1806, by E. Forster junior Esq., on a rock at the fall of the Rhydoll, near the Devil's-bridge, Cardiganshire. The root brought from thence flowered this year, in the month of July, in Mr. Forster's garden, to whom we are obliged for specimens, as well as for the detection of this new species, hitherto confounded with *S. rupestre* ..." Forster in fact collected it in 1805, as his notebook entry (1805) shows: "... on a rock near the fall of the Rhydoll near Devils Bridge Cardiganshire 1805". The type specimen is in LINN (Herb. Smith), labelled "Edward Forster's garden, Walthamstow. July 1807. - root brought from below the Devil's Bridge." Lees (1841) collected it from the same spot in 1837. The site is on a wide rock ledge above the E side of the big pool below the Gyfarllwyd Falls SN74237744. It was reported again there in 1958 (ANB & BI), and in 1991 the colony was 2 × 1m, on a horizontal rock surface. By 2001 (AOC & PAS) the area had become overgrown by Brambles and other vegetation and the colony was only 0.5 × 0.4m and confined to the vertical edge of the rock. By 2003 only a few stems remained, and in 2005 none could be seen. There has been confusion about exactly where Forster collected the plant. Salter (NMW, Diary 5.9.1905, 1935) and Roberts (1964), who consulted neither Forster's nor Smith's writings, mistakenly assumed that it was in the ravine of the Nant Bwa-drain SN714790 because this was near the Rheidol Falls SN710789 (known as Ffrwd-ddu until the late



19<sup>th</sup> century, see Morgan 1848, Wmffre 2005). That Forster's and Smith's "fall of the Rhydoll" or "Rhydol" was in fact the Gyfarllwyd Falls is clear from their accounts of the find-spot and from the aquatint in Smith (1810). Newton (1999) described finding the plant in what he assumed was the type locality, but this was clearly at SN745783 (see below), further N than the true one.



*Sedum forsterianum*, J. E. Smith,  
*English botany* 26: t.1802 (1808)

The other inland native sites for *S. forsterianum* are at Craig y Pistyll SN713856, 1894 (Salter Diary 25.4.1894) - 1988, but perhaps since gone; rock outcrops on both sides of the river in Coed Rheidol SN745783, 1978-2005, and on the N side below the Mynach confluence SN740773, 2005 (CMFB); on rocks and screes by and to the E of the waterfall of the Nant Bwa-drain, Cwm Rheidol SN714790, 1905 (Salter Diary 5.9.1905) - 2005, the best population in the county; on Craig Ddu, above the Doethie-Pysgotwr confluence SN769483, 1978-1998; on Craig Clungwyn, above the Pysgotwr-Tywi confluence SN778472, 1979 (AOC *et al.*) - 2005 (SPC); and "low down by the Tywi, near the ruin of Penrhiwbie" c.SN785478, 1972 (IMV *in litt.*).



Type locality of *Sedum forsterianum*, the  
Gyfarllwyd Falls ("Fall of the Rhydol"), view N from  
SN742774, aquatint by J.C. Stadler after c.1795  
watercolour by J. "Warwick" Smith (Smith 1810)

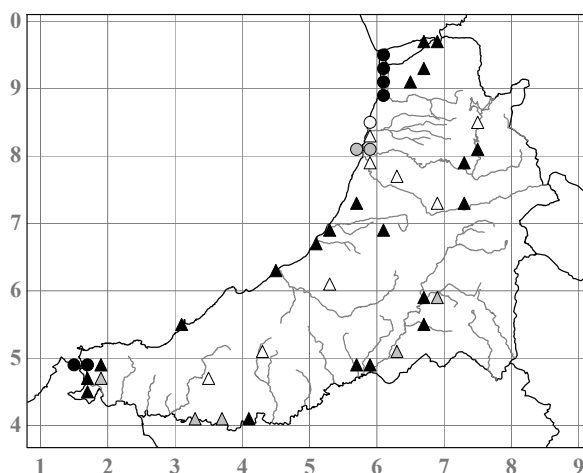
Type locality of *Sedum forsterianum*  
(right foreground), Gyfarllwyd Falls, view  
N from SN74217750, September 2003



There are two coastal sites. It is abundant on cliffs and screes above the bay just NE of Traeth Penbryn SN296528, 1981 (PB) - 2000 (AOC & MDS). It was collected on a "hilly bank above Aber-porth" in 1854, MMA (K, Herb. Watson, det. AOC), in 1941 it was recorded nearby from Craig y Filain SN238522 (Whellan 1942), and it now occurs in abundance on the cliffs and screes of Cribach Bay SN2552, 1981-2005, as well as on road verges and disturbed ground in many places in the MoD site here; that there is a record from here as early as 1854 suggests that it is probably native on these cliffs and slopes.

*S. forsterianum* is also an occasional escape, on walls and hedgebanks, in graveyards, on railway ballast and on lead mine spoil. No attempt has been made to distinguish the poorly differentiated subsp. *elegans* (Lej.) E. F. Warb. Altitude limit 330m, Craig y Pistyll SN713856, 1894 (Salter Diary 25.4.1894) - 1988.

### ***Sedum acre* L. - Biting Stonecrop - Briweg Boeth**



Locally abundant and native on sand dunes and on sandy shingle on the coast at Borth and Ynys-las SN68E, SN69A-C, 1901 (Salter Diary 15.6.1901) - 2007, and at Penyrergyd SN14U, pre-1935 (Salter 1935) - 2007. Formerly it also occurred on the beaches at Clarach SN5883, 1907 (Salter Diary 22.6.1907) and Tan-y-bwlch SN579807-580801, 1908 (Salter Diary 20.6.1908) - 1978, and it has probably generally decreased somewhat in native sites since Salter's time. Along the coast as well as inland it is also an occasional plant of old mortared walls, slate roofs, pavements, railway ballast and waste ground where it is presumably introduced or escaped. There have been especially conspicuous and persistent colonies on the roof of the Old Bakery and nearby buildings at Llan-non SN515670, c.1970-2008. Allen & Hatfield (2004) refer to a folk use of it in the county as an ointment for shingles. Altitude limit 340m, Blaencamddwr ruin, Mynydd Bach SN61826832, 1998. (The 380m record in Salter (1935) referred to Montgomeryshire.)



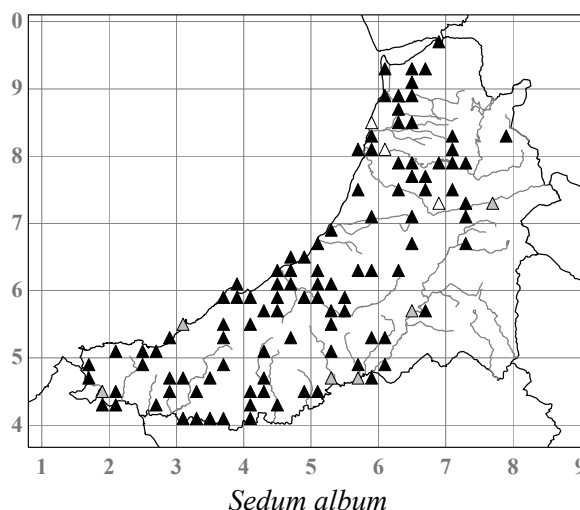
*Sedum acre* on old bakery roof, Llanon, view W from SN51466692, June 2009

### ***Sedum sexangulare* L. - Tasteless Stonecrop - Briweg Ddi-flas**

Well-naturalised on gravelly ground and graves in at least two graveyards, at Bwlchfyadfa chapel SN438495, 1980-2005, and at Capel Dewi church SN452425, 1998-2005. Native of Europe.

### ***Sedum album* L. - White Stonecrop - Briweg Wen**

An archaeophyte of old mortared walls, roofs, graveyards especially on gravel-covered graves, roadside banks, railway ballast, lead mine spoil, waste ground and sand dunes. As Salter (1935) described it as rare, and gave only three sites, it has presumably increased greatly in line with the national trend (Pearman *et al.* 2002). It seems to be less obviously calcicole in the county than *S. acre*. The earliest record was from a roof at Llechryd c. SN2143 in 1879 (HLJ, *BEC Rep.* 1879: 78 (1880)). It sometimes grows mixed with *S. anglicum* on rocky roadside slopes (SPC pers. comm.). The living "*Sedum* roofs" on the visitor centre at Nantyrarian



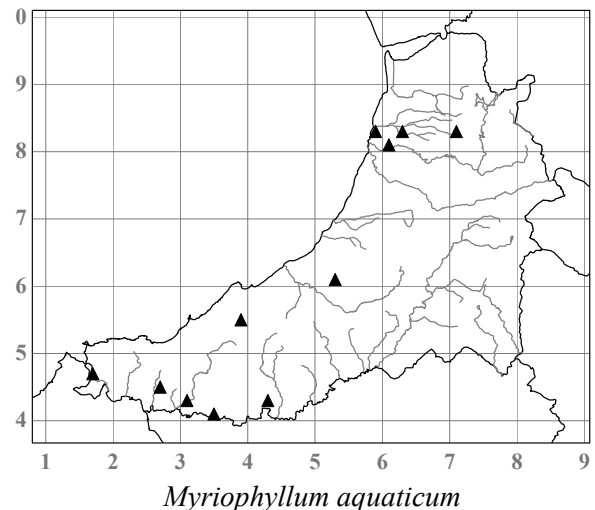
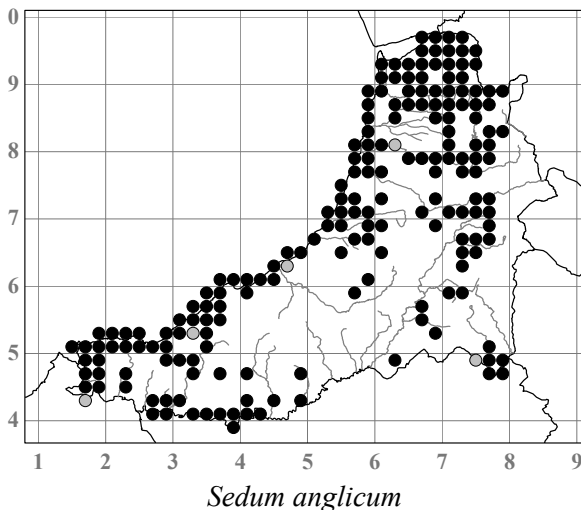


*Sedum* roof with *S. album* etc.,  
Nantyrarian visitor centre  
SN71858139, August 2005

SN718813, made in 2004, were largely of this species, with some *S. acre* and *S. spurium*, as were the ones of 2005 at the Aber-porth Technology Park SN246494. Altitude limit 355m, slope below lay-by on A44(T), Cwmergyr SN794831, 1987. Native of Europe.

***Sedum anglicum* Huds. - English Stonecrop - Briweg y Cerrig**

A common calcifuge plant of rocks, screes, dry banks and chiefly drystone walls from the coast well into the uplands. Although very characteristic of dry, exposed outcrops in the sheepwalks, growing with *Rumex acetosella*, it is absent from the higher ridges and summits, as it is from much of the central part of the county where rock outcrops are rare. It is still abundant on the rocks by Aberystwyth castle SN579815 where Lees (1841) reported it in 1841, and on rock outcrops at Strata Florida SN7465 and on walls at Cardigan c. SN1745 where Littleton Brown (Druce & Vines 1907) reported it in 1726. Altitude limit 545m, rocks near the summit of Drosgol SN760878, 2002.



## HALORAGACEAE

***Myriophyllum aquaticum* (Vell.) Verdc. - Parrot's-feather - Pluen Parot**

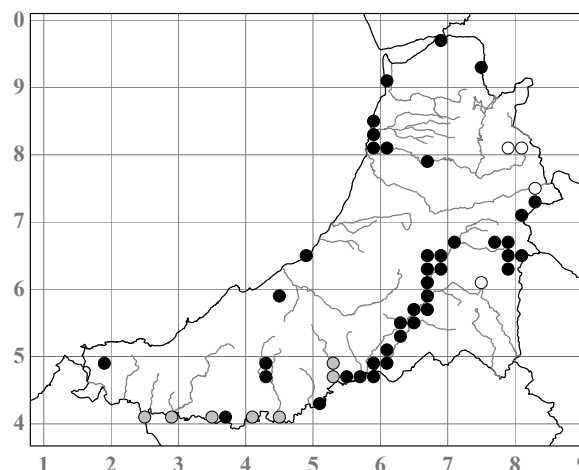
Native of South America and a recently arrived garden and aquarium aquatic, first found naturalised in Britain in 1960 in Surrey, and in Wales in 1975 in Glamorgan. In 1993 it was found in a fishpond at Llain-wen, Synod Inn SN39255508 (NMW), and is now known from a dozen ponds and ditches widely scattered through the county. Altitude limit 345m, persisting for at least two years at the E margin of Llyn Pendam SN709839 where it was dumped in 1998, but gone from here by 2004.

***Myriophyllum spicatum* L. - Spiked Water-milfoil - Myrdd-ddail Ysbigog**

Recorded from Llyn Maesllyn SN693628 probably in 1937 (HAH, Wade 1952), but only *M. alterniflorum* has been seen there since so, as with other early ones, the record may well be unreliable. The only confirmed records, three of which may be of native populations, are from Ynys-las, where it occurred in the Moel Ynys Pool SN607923, 1955-1998, in a pool in the dune slack E of the road SN611939, 1986-2000 (SPC), where it was probably originally dumped from a garden pond, and in small quantity in the peaty but slightly brackish borrow pit at the E side of the Aberleri Fields SN615916, 1993; and from Falcondale Lake SN568498, 1978-1987. The two Ynys-las pools are rather calcareous, and Falcondale Lake is one of the less oligotrophic and more mesotrophic in the county.

**Myriophyllum alterniflorum** DC. - Alternate Water-milfoil - Myrdd-ddail Blodau Bob yn Ail

Problems of identification, as Salter (1935) recognised, mean that the identity of most of his and the other early recorders' records are uncertain, although most will presumably have been of this species. It is abundant in the lower parts of the Rheidol and its backwaters from Glanrhyd-ty-noeth SN668788, 1991, down to below Pont Pen-y-bont SN592805, 1981-2005, as well as down the Teifi for most of its length and in at least three of its tributaries, the Nant Bryn-maen SN639557, 1996, the Cletwr SN421492, 1984-1994, and the Grannell SN531477, 1980 (AOC & DGJ). It is scattered in a few lakes and ponds throughout the county, even in some of the most oligotrophic ones, and extends well into the uplands. Altitude limit 525m, Llynnoedd Ieuan middle lake SN799818-800818, 1926 (Salter Diary 28.8.1926) - 1961 (Seddon 1972).



**VITACEAE**

**Vitis vinifera** L. - Grape-vine - Gwinwydden

Although vines were grown in enclosed vineries in the walled gardens of many estates in the county, including Nanteos and Hafod, outdoor vineyards seem not to have been started, at least in recent times, until the 1960s. Dr G. I. Thomas established the first substantial one, at Wern Deg, 3km ESE of New Quay SN416589 in 1968, and within a few years this had just over a thousand vines, the varieties being the white 'Müller-Thurgau' and 'Seyve Villard', and the grapes were taken to the winery at the Three Choirs Vineyard in Gloucestershire for processing. Although now much reduced, this vineyard still produced a usable crop in 2006. Another, but much smaller vineyard of 195 vines including 'Madeleine Angevine', 'Seyve Villard' and 'Müller-Thurgau', was also established in 1968 on a borrowed part of the S-facing Pendre garden, Hafod SN762734 at 200m altitude by T. F. Higgins of Birmingham, but it produced no grapes; he later planted a very small vineyard nearby at his own house, Smith's Cottage SN74457289 at 155m altitude on a S-facing wooded slope. This did produce enough grapes to make wine and was in use for c.20 years; the remains can still be seen by the roadside, with one vine bearing fruit on the house front, 2009. A small vineyard was started at Llanrhystud SN537698 in 1973 by R. Sherwood again using 'Madeleine Angevine', 'Müller-Thurgau' and 'Seyve Villard', but it never flourished and became neglected in the early 1990s and has since become derelict and overgrown, 2005. Another small one at Landring, Rhydlewis SN352472 in 2004 had 150 vines of 'Madeleine Angevine', 'Seyval Blanc' and the red 'Triomphe d'Alsace', and a small one at Bryn-bach, Synod Inn SN387548 in c.2002 used the same three varieties but had a very poor crop and



*Vitis vinifera*, Smith's Cottage,  
Pontrhyd-y-groes, view N from  
SN744728, July 2008



Double Guyot training system at the  
Ffynnon-las vineyard, Aberaeron,  
view NE from SN459619, March 2009

was soon abandoned. Pearkes (1973) records a small vineyard of 175 vines, 'Müller-Thurgau', 'Seibel' and 'Seyve Villard', planted by Mrs M. Manooch in 1966 near Llandysul, but this has not been traced.

The most productive was the Ffynnon Las vineyard, Aberaeron SN458618, surprisingly on an ENE facing slope, established in 1988 by M. L. Lewis. The grapes were taken to the Three Choirs Vineyard in Gloucestershire along with those from Wern Deg for processing, and the resulting medium dry white table wine was widely marketed in and around Cardiganshire. 'Madeleine Angevine', 'Reichensteiner', 'Schönberger' and 'Seyval Blanc' were used, c.1,600 vines being grown on the Double Guyot training system. 1,750 bottles were produced in 1994, a maximum of 2,500 in 2006, but there were then very poor harvests resulting in only 700 in 2007 and 300 in 2008, when the vineyard closed. A medium sweet dessert wine, Ffynnon Las Late Harvest, with Spanish Reserve Muscadet grapes being added, was also produced there each year in small quantity and was processed and bottled on the estate, as was a red wine made partly from 'Triomphe d'Alsace' and 'Brant', a very hardy Canadian variety of hybrid origin.

The only record of *Vitis* in the wild is of a presumably bird- or animal-sown plant sprawling over an area 7 × 5m in scrub SW of the Afon Rheidol, 500m NW of Pont Pen-y-bont, Penparcau SN590806, 1992 (NMW).

### **Parthenocissus quinquefolia** (L.) Planch. - Virginia-creeper - Dringwr Fflamgoch

First recorded in 1956 from Aberystwyth SN58 (HJMB, field record at BRC), Virginia-creeper is an occasional garden relic that sometimes roots from the stems and has become well-naturalised along 25m of roadside hedgebank 300m from the beach on the S side of the Clarach valley SN591836, 1996-2005; along a similar stretch of hedgebank by the B4353 at Llandre SN626865, 1995-2005; covering an area 30 × 15m in a disused quarry at the bottom of Bryn-y-mor Road, Aberystwyth SN58458250, 2005 (NMW); by a lane at Llanrhystud SN538698, 1995; along a hedge by Blaen-llan, Coed-y-bryn SN355443, 2008; and by the B4459 near Capel Dewi SN453431, 2004 (AOC, BH & GH). Native of E North America.

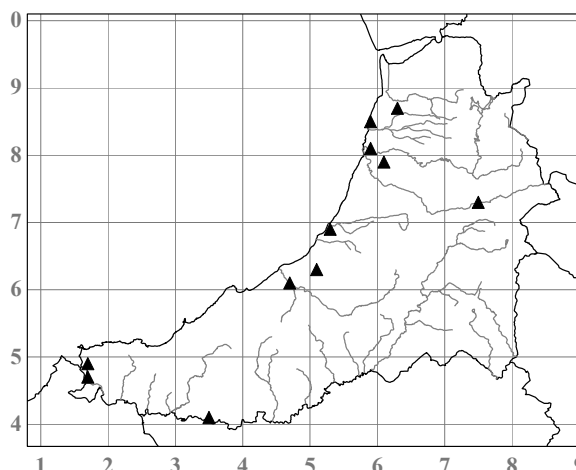
### **Parthenocissus vitacea** (Knerr) Hitchc. (*P. inserta* auct., non (A.Kern.) Fritsch) - False Virginia-creeper - Dringwr Fflamgoch Ffug

Recorded only as a garden relic on a decaying wall at Penyrangor, Aberystwyth SN582810 in 1995 (SPC), but since destroyed; and far from gardens in *Salix cinerea* carr by the road at Llancynfelyn Common, Cors Fochno SN64209233, 2006 (NMW) where it was perhaps bird-sown. Native of North America.

## **FABACEAE**

### **Robinia pseudoacacia** L. - False-acacia - Coeg-acasia

Planted for timber in a few woods, and in a few places for ornament on roadsides and in old estates. It has spread by suckers, especially in woods where it has been coppiced, but has not been seen self-sown. Its abundance in Cribin Llwyd wood, Llangorwen SN596846, 1992-2005, may date from William Cobbett's advocacy of it in the 1820s, and there are also trees in the estate woodland at Llanerchaeron SN479601, 1999. Many trees were planted by the FC at Hafod SN753730, 1997. One of two conspicuous and in some years prolifically flowering trees by the railway bridge at Dol-y-bont SN623879 was 174cm girth and 19m tall in 1992. Salter (1938) commented on the irregular flowering of trees in the district, knowing only one that flowered every year and saying that in 1937 at least that tree had flowered three times. Native of E North America and long grown in Britain. Maximum 299cm girth, 1992, in the pasture SE of the walled garden, Monachty SN50156203.



### **Phaseolus vulgaris** L. - French Bean - Ffeuen Ffrengig

French Beans have been grown commercially on a very small scale in the county, for example 0.02 acres on three farms in the Aberystwyth district in 1931-1932 (Smith 1935), and 0.1ha in the whole county in 1988



(Anon. 1988). Kidney Beans were also grown, with 0.75 acres on 20 farms in the Aberystwyth district in 1931-1932 (Smith 1935).

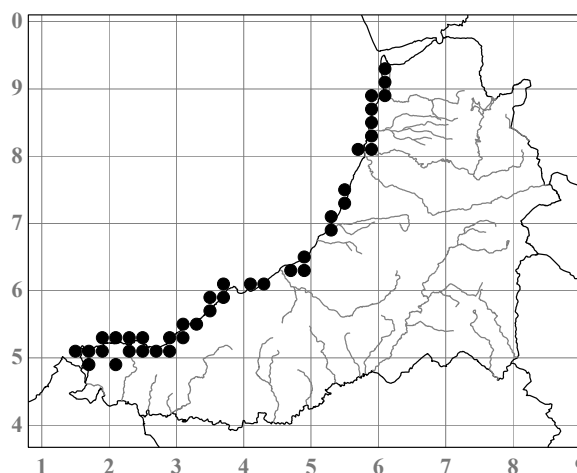
### **Onobrychis viciifolia** Scop. - Sainfoin - Y Godog

In 1697 John Parry, the Archdeacon of Cardigan, wrote to Oxford for Sainfoin seed to grow as a trial crop, and asked for advice on its cultivation (Emery 1984). Wmffre (2004, p. 107) cites a 1787 field name "Park St Sifoin" close to Betws Ifan church SN301478 where Sainfoin must have been cultivated. Wyndham (1781), describing his ride from Cilgerran to Lampeter up the Teifi valley, wrote that "we had the pleasure of observing a few fields, of sainfoin and clover, flourishing tolerably well" in cultivated fields, apparently those that had been "strongly limed and well dressed." Davies (1815) included a report from his co-surveyor Edward Williams (Iolo Morganwg) that he had seen crops of Sainfoin in Cardiganshire that, although growing on fertile, deep, well-drained soil, could not be compared to those growing elsewhere on calcareous soils. These crops will all have been of subsp. **viciifolia**. Davies also says that "A plant, called by the Welsh 'Gwyg bendigaid,' is a wild sainfoin, growing naturally on the uplands adjoining the Vale of Teivy ..."; what this can have been is a puzzle, but the main Welsh dictionary, *Geiriadur Pryfysgol Cymru*, accepts this meaning of the Welsh name. Sainfoin then seems to have been unmentioned in the county apart from one unlocalised record of it is as a casual in the 1950s from SN58 (field record at BRC).

### **Anthyllis vulneraria** L. - Kidney Vetch - Plucen Felen

Common in rocky and grassy places along the coast, almost always within 100m of the sea. It is frequent on railway ballast between Borth and Ynys-las SN69A, B, and on waste ground there. The only inland record is from the NW corner of the Penparc sand quarries SN201486, 2002. Populations fluctuate in numbers greatly from year to year, and in the amount of flowering even more so.

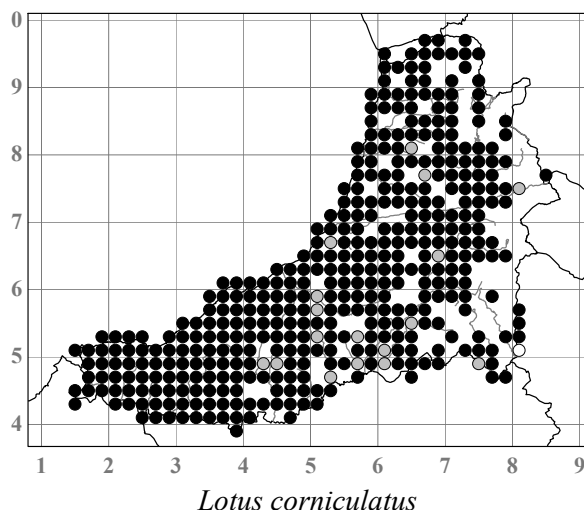
All our plants are generally referable to subsp. **vulneraria** var. **langei** Jalas, but most of the larger populations contain at least a few plants with patent stem hairs, a few with shorter stem branches and a few lacking anthocyanin, thus more or less fitting the description of subsp. **corbierei** (C. E. Salmon & Travis) Cullen or appearing intermediate with var. **vulneraria**, for example those at Pen Peles SN216522, 1994 (AOC & SPC, NMW, det. JRA as intermediate between vars. **langei** and **vulneraria**), and at Cribach Bay SN250523, 1994 (NMW, det. JRA as subsp. **vulneraria** approaching subsp. **corbierei**). Rich (2001, 2006) considered that the existence of such polymorphic populations, among other factors, showed that subsp. **corbierei** was not recognisable as a subspecies and should be sunk into subsp. **vulneraria**. Cullen, however considers that subsp. **corbierei** is closer to subsp. **hispidissima** (Sagorski) Cullen from the E Mediterranean than to subsp. **vulneraria**, and it seems best to continue considering our plants as var. **langei** with some individuals approaching subsp. **corbierei**. Var. **langei** is considered to be intermediate between subsp. **vulneraria** var. **vulneraria** and subsp. **iberica** (W. Becker) Cullen from W Europe, and forms stable populations.



### **Lotus corniculatus** L. - Common Bird's-foot-trefoil - Pysen y Ceirw (Troed y Deryn, Gwinedd y Gath, Ffa'r Ieir, Bara Can y Defaid)

Common in all but the more acidic semi-natural well-drained pastures and hay meadows, on rocky slopes, on banks and verges, on dunes, vegetated shingle and the coastal slopes, in graveyards, an abundant colonist of shaly roadside slopes and often of waste ground. Davies (1969, see also Charlton 1973) investigated the possibilities for using this and *L. uliginosus* varieties from a wide range of sources for pasture improvement, using three plots at 230-400m altitude in the county, but concluded that, unlike for example in Scotland where they could be an alternative to White Clover, they were of no value here. There is great variation, especially in plants from coastal habitats, and the following mostly coastal varieties are reasonably distinctive:

Var. **corniculatus** occurs in virtually all habitats from the exposed coast to the uplands. Altitude limit c.610m, above Llyn Llygad Rheidol, Pumlumon SN7987 (Salter Diary 26.9.1903, 1935), but more likely in error for *L. uliginosus*; 415m, roadside verge, Eisteddfa Gurig SN798840, 2002.



*Lotus corniculatus* var. *corniculatus*,  
Cae'r-meirch upland pasture,  
view SW from SN753737, June 1996

Var. **carnosus** Hartm. occurs in many places along the coast at the top of sea beaches, chiefly on rocks, for example at Carreg y Ty bay SN30115350, 2003 (NMW, AOC & SPC) and on the cliffs at Traeth Penbryn SN290522, 2008, on vegetated shingle such as at the back of the beach NE of Aberaeron SN461634, 2003 (NMW), and on slumping till as at Traeth y Coybal SN37205924, 2003 (NMW), as well as among *Festuca rubra* at the top of salt marshes such as those in the Ystwyth estuary SN579805, 2000 (NMW), and in dune slacks at Ynys-las SN609937, 2000 (NMW).

Var. **crassifolius** Pers. is frequent all along the coast, on sand dunes, on vegetated shingle as at Borth SN608901, 2002 (NMW), on sandy banks, on cliff ledges, for example at Pen-y-gloyn SN449625, 2000 (NMW) and on grassy slopes close to the sea and more or less within the spray zone. As "var. *microphyllus* Meyer" it was recorded in 1891 from the South Beach, Aberystwyth SN58Q (WHP, Salter 1935).

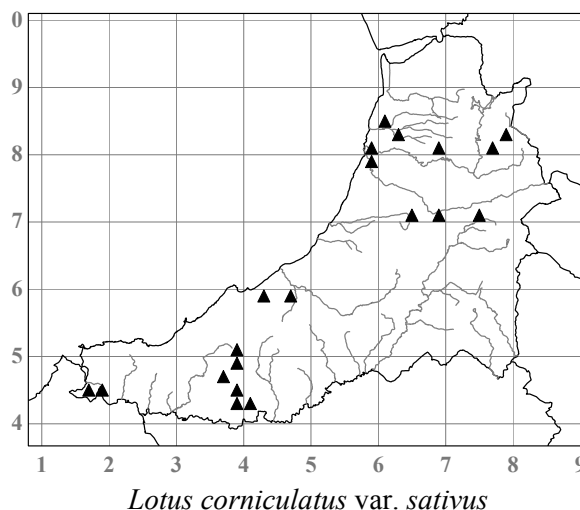
Var. **hirsutus** W. D. J. Koch is occasional along the coast on sand dunes, for example at Ynys-las SN608937, 1994-2004, where it is more abundant than var. *crassifolius*, on vegetated shingle, on grassy and rocky slopes such as Foel y Mwnt SN192520, 1994 (NMW), on screes as at Cribach Bay SN249522, 2000 (NMW), and on rock ledges as at Gwbert SN161509, 1994 (NMW, CGE, PDS, GM & AOC). As "var. *villosus*" it was recorded from Constitution Hill, Aberystwyth SN5882 by Morgan (1849).

Var. **norvegicus** Žertová: a plant with leaflets *c.* 3 times as long as wide, matching exactly material in CGE named as this variety by Žertová (*fide* PDS), was found by the FC road in Coed Maenarthur FC forest SN721722, 2000 (CGE, AOC & JB); it was presumably an introduction, and is native to C and N Europe where it grows at the edges of conifer forests.

Var. **sativus** Hyl. has been widely sown in seed mixes on new road verges and slopes, lead mine reclamation sites and other reseeded places, and is often persistent and becomes naturalised even in the uplands. It was first noted in 1990 dominant over several acres of the reclaimed Goginan mine SN690816 (NMW) and was still there in quantity in 2007 (SPC), and then on the A44(T) road verge



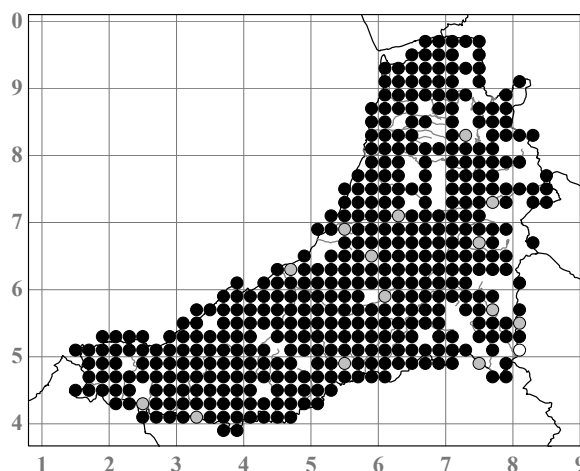
*Lotus corniculatus* var. *crassifolius*,  
Tan-y-bwlch beach, view NNE  
from SN579798, May 2009



1.5km SSW of Eisteddfa Gurig SN789829 where it was sown in 1991 and is still present in 2005 (NMW). In 2008 it was abundant all along the recently widened A486 road for 10km N from Llandysul. Altitude limit 360m, reseeded slope 2km E of Ysbyty Ystwyth SN750711, 1999-2004.

**Lotus uliginosus** Schkuhr (*L. pedunculatus* auct., non Cav.) - Greater Bird's-foot-trefoil - Pysen-y-ceirw Fawr

A common plant of a wide range of damp or wet habitats, especially rhos pastures, fens, wet woodland, streambanks, ditches and hay meadows. It also grows in quite dry and neutral pastures where it is usually much commoner than *L. corniculatus*, and in scrub especially in tall vegetation. It is also generally the commoner species in the uplands, where it will grow in quite acidic mires, and it also often occurs in slightly brackish marshes along the coast. Var. **uliginosus** is the common form. Var. **vestitus** (Lange) Hansen, with a generally more western distribution in Europe, is rather more frequent near the coast and less common in the uplands, but is generally distributed and shows no clear ecological preferences. Altitude limit c.350m ("to between 1,250 and 1,500ft.") (Salter 1935); 560m, flushed slope at the head of the Nant y Moch SN784862, 2002 (AOC & PAS).

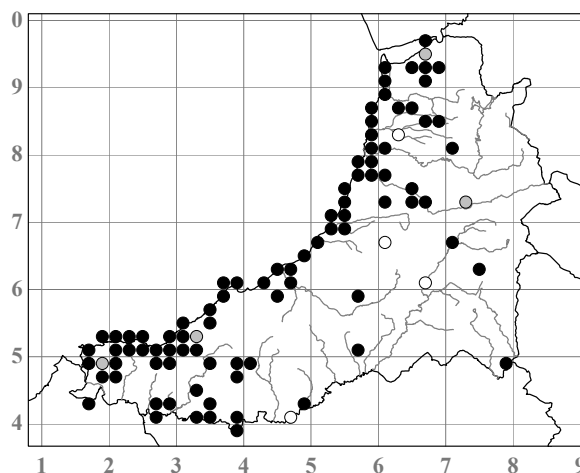


[*Lotus angustissimus* L. - Slender Bird's-foot-trefoil - Pysen-y-ceirw Eiddil

Erroneously recorded by Morgan (1849) from Borth.]

**Ornithopus perpusillus** L. - Bird's-foot - Troed yr Aderyn

A frequent winter annual of thin soils on rocky slopes and in dry pastures, heaths and sandy places along the coast, becoming very abundant on parched ground after dry summers and rapidly colonising burnt areas. A variety with the normally white parts of the corolla yellow was found on Pendinas, Aberystwyth SN5880 in 1962 (MC, *Nature in Wales* 8: 71 (1962)). It is uncommon inland, but occurs at such places as the Llanerch lead mine, Elerch SN694856, 1992; a rocky laneside below Cwm-brwyno SN70218140, 2003; up the Ystwyth valley on a dry pasture slope at Llanddwy SN651747, 1993; on a scree in the Cerdin valley SN388478, 1991; on anthills in Nantcwnlle churchyard SN576586, 1999; on a rocky bank below Silian churchyard SN571512, 1999; and in several places up the lower Teifi valley as far as the slopes of Crug y Whil SN48604240, 1991. Salter's furthest inland sites were at Strata Florida station SN711671 (1935) - 2003; the roadside just N of Tregaron SN66Q (Diary 5.9.1906); near Llyn Eiddwen SN66D (1935); Silian, perhaps the same site as the 1999 one above (1935); and Llanllwni on the Teifi SN44Q (1935). It appeared inland as an abundant colonist in a reseeded pasture at Castell Grogwynion SN722726 in 1978, and since then on several FC road verges, for example W of Llyn Brianne SN783495 in 1999. Altitude limit 385m, FC road verge 400m S of Hafod-newydd, Strata Florida SN756635, 2008 (NMW).



**Vicia orobus** DC. (*Orobis sylvaticus* L.) - Wood Bitter-vetch - Ffachysen Chwerw

A decreasing species in Britain whose main stronghold is down the middle of Wales. In Cardiganshire it occurs in dry, unimproved, species-rich pastures and hay meadows, on grassy and often rocky banks and slopes at the edges of fields and on roadsides and streambanks. Its extant sites in the county are all between 140 and 340m altitude. Nowadays at least it is commoner around the edges of pastures than in them, and it is intolerant of both overgrazing and, in the longer term, undergrazing. At Nant-llwyd, Soar y Mynydd SN7852,

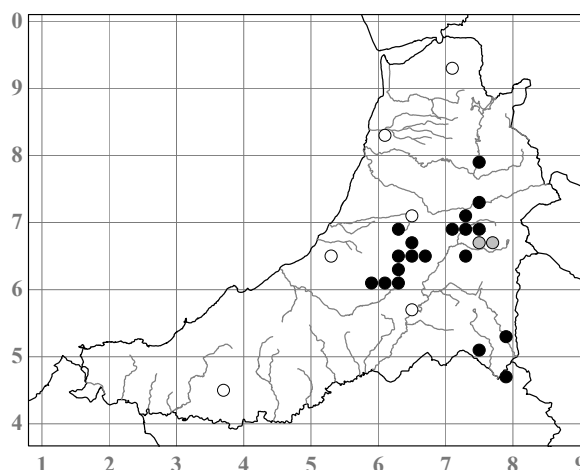


for example, it was frequent in the hay meadows in 1984, but decreased rapidly and largely disappeared during the 1990s when they became more intensively Sheep grazed; it was also abundant and formed large bushes on the slope below, but gradually decreased there too as the slope became overgrown by Bracken and Hawthorn.

Although the map suggests a contraction of range, and it has undoubtedly become less abundant in at least some of its sites, it was recorded from 16 tetrads (altogether 23 sites) before 1950, and from 23 tetrads (altogether 36 sites) since 1950; it is difficult to demonstrate any real change in distribution or abundance when there have been obvious changes in recording effort. The only evidence is perhaps anecdotal, and in 1932, for example, Salter (Diary 28.6.1932) recorded, when walking from Devil's Bridge to Ponterwyd, "leaving the road at the pasture field which was gaily carpeted with *Vicia orobus*, acres of it, to hunt for insects in the swampy mead...."; such a spectacle cannot be seen today, and at its main site in this area it is now confined to the rough margins and adjacent banks around a hay meadow at Ty-mawr SN758789, 1987 (APF) - 2006, perhaps the very field that Salter described.

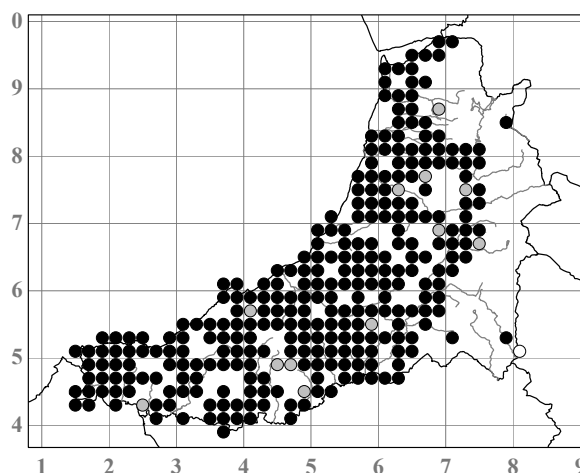
The earliest record is of a teratological form found near Hafod c.SN77L in 1799 (J. Todd, LINN, Herb. Smith 1221.17), about which Smith wrote (1810, and 1829 quoted below): " $\beta$  is a truly wonderful variety, found by Mr. Todd, gardener to the late Mr. Johnes, on a hill near Hafod, Cardiganshire, bearing nothing but large, ovate, simple *leaves*, five times the size of the usual *leaflets*, but like them in texture, veins, &c. *Stipules* rather smaller than usual. Rabbits are extremely fond of this variety, which, when transplanted into the garden, grew luxuriantly, increasing greatly by the *roots*, but could by no management be made to blossom. The *stems* are much more slender than in the common state of the plant."

Altitude limit 340m, hay meadow, Nant-llwyd SN788527, 1984.



### ***Vicia cracca* L. - Tufted Vetch - Ffachbysen y Berth**

Common throughout the lowlands in hay meadows, lightly grazed or rank, unimproved, dry or marshy pastures and scrub, on hedgebanks, and on the coastal slopes and sand dunes. It is also an occasional weed of cereal fields, and Salter (1935) mentioned it in Oat and Potato fields in the uplands. There is great variation in hairiness, leaflet shape and flower colour and size, but all plants seem referable to var. **cracca**. Dwarf or prostrate plants on the most exposed grassy slopes on the coast, for example on Carreg y Ty, Llangranog SN300537, 1997 (AOC & PAS), and on Ynys Lochtyr SN314555, 1999 (NMW, MNL), often have very dense inflorescences with unusually deep violet-purple flowers. Large plants with similarly coloured but bigger flowers grew from a seed-mix on an Environment Agency flood embankment at the Glanyrafon Industrial Estate, Llanbadarn Fawr SN613804 in 2002 (NMW), and plants with similarly coloured but small flowers grew on a reseeded trunk road verge at Rhyd, Llwynycelyn SN43905940 in 2003 (NMW). Altitude limit 415m, roadside bank, Eisteddfa Gurig SN798840, 2002.



### ***Vicia sylvatica* L. - Wood Vetch - Ffachbysen y Coed**

A rare plant chiefly of the sea cliffs, where it sometimes occurs in spectacular abundance. It was first found by Salter where the Nant y Grogall falls to the sea, 1.5km WSW of New Quay SN37305935, in 1902 (Diary 9.7.1902, 7.8.1937) - 1987 (APF). He next saw it in a gully at Penderi SN552733 in 1906-1928 (Diary 6.10.1906, 18.4.1923, etc.), where it was again seen in 1982 (ADQA & APF). In 1925-1937 (Diary 15.5.1926, 7.5.1926, 14.5.1937) Salter saw it in several places in the wooded dingle of the Afon Arth, including by the ruin at SN495624, but it has not been recorded there since and this was its only inland site. It

was found on the cliffs S of Borth SN597878 in 1964 (RST; WMC) and several colonies were seen again there on shaly scree in 1994 (RGL) and 1996 (AOC & PA). It occurs in great abundance on the rocky slopes and scrub in Cribach Bay on the MoD site, Aber-porth SN250522-251519, 1981 (AOC *et al.*) - 2005, the largest colony being 60 × 20m. There are several small colonies on the cliff slope between Llangranog beach and the next bay NE, SN311543, 1999 (AOC *et al.*).

***Vicia villosa* Roth - Fodder Vetch - Ffacbysen y Tir Âr**

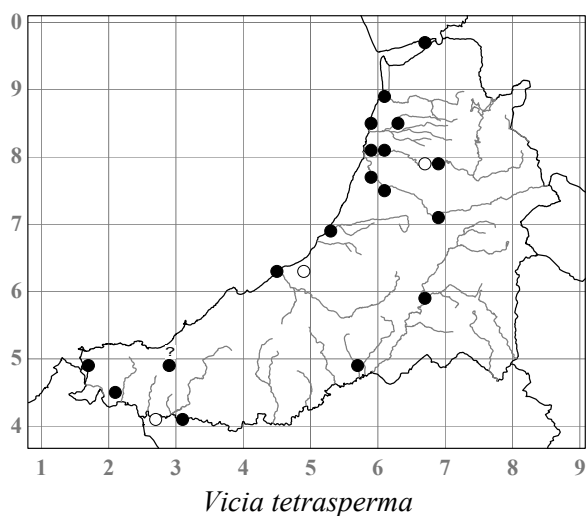
Recorded only once, as a casual from a cornfield at Pant Glas in 1893 (Burkill & Willis 1894), though which of many places with this name was meant is unknown.

***Vicia hirsuta* (L.) Gray - Hairy Tare - Ffacbysen Flewog**

An occasional annual, on dry, well-drained sites especially among tall vegetation, on roadside banks and verges including FC road verges, pathsides, railway ballast, waste ground, in hedgebanks, scrub and rank pastures. At least in the Aberystwyth district it has two generations each year, the second one flowering well into the autumn, SN580809, SN581805, etc., 2006-2009. It scarcely gets into the upland valleys, and the highest it has been seen is 270m altitude, on lead mine remains at Cwmerfyn SN701822, 2000.

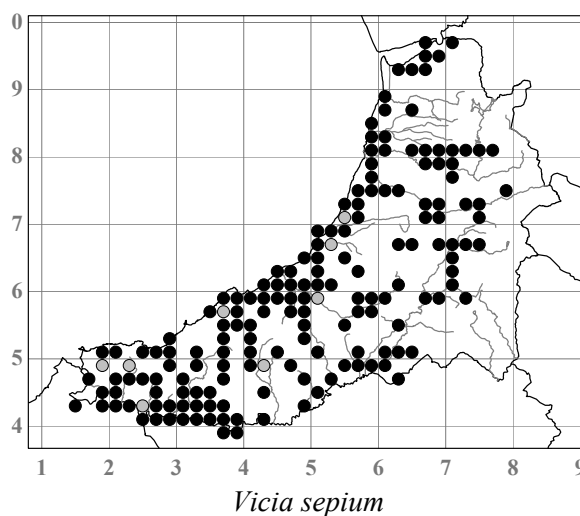
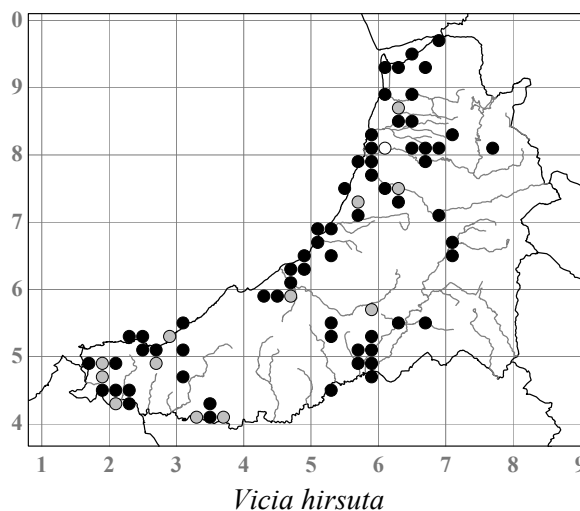
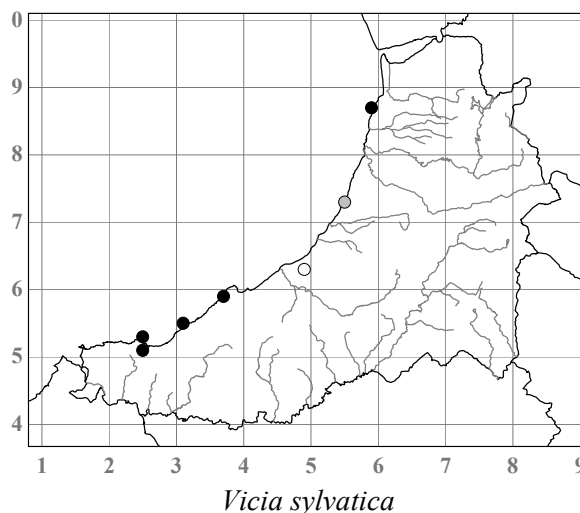
***Vicia tetrasperma* (L.) Schreb. - Smooth Tare - Ffacbysen Lefn**

An uncommon plant of exactly the same habitats as *V. hirsuta*, but especially characteristic of disused and overgrown railway ballast, and less frequent, as Salter (1935) remarked, and perhaps more confined to the coastal fringe than that species.



***Vicia sepium* L. - Bush Vetch - Ffacbysen y Cloddiau**

Frequent on roadside verges and hedgebanks, in scrub, wood margins and open woodland, but rare in pastures and generally confined to the lowlands. It is usually among tall vegetation and in some shade. There is considerable variation in leaflet shape. Plants with white flowers and completely lacking anthocyanin were



seen in a roadside hedgebank 100m SSE of Penbryn church SN294520, 1996 (AOC & JPW). Altitude limit 355m, roadside verge 1km N of Cwmystwyth SN78307515, 2008.

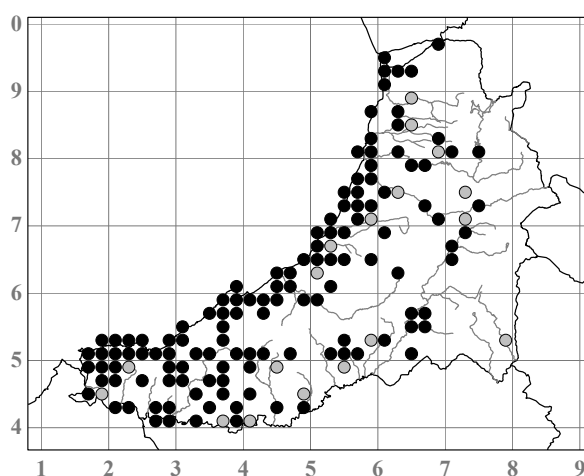
### ***Vicia sativa* L.**

Subsp. **nigra** (L.) Ehrh. (*V. angustifolia* L. var. *angustifolia*) - Narrow-leaved Vetch

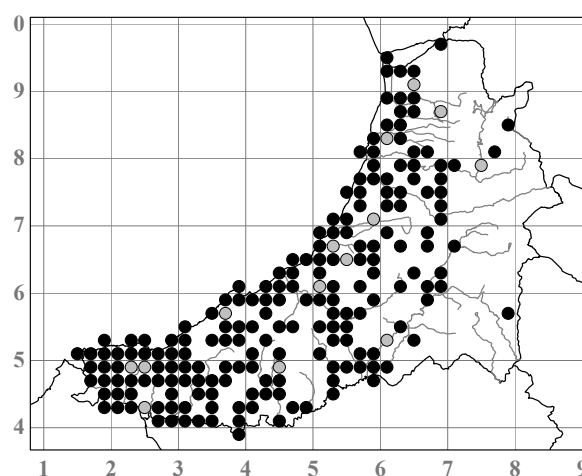
A native subspecies, frequent throughout the lowlands in dry, open habitats, usually in short turf on well-grazed or droughted slopes, on banks, heaths, sand dunes, tracksides, railway ballast, and especially common on the coastal slopes. It does also sometimes grow in tall vegetation, and is very variable in habit, leaf shape and flower colour. On the disused railway just S of Ystradmeurig SN710669, 2002 (NMW), for example, c.30% of plants had pale purplish-pink flowers RHSN81C, while the remainder had them bright purplish-pink RHS71A-B, with no intermediates. A similar mixed population is on a sandy laneside at Penyrergyd SN168490, 1998 (NMW). Subsp. *nigra* often grades into subsp. *segetalis* and the characters of the two can appear in various combinations.

Subsp. **bobartii** (E. Forst.) P. D. Sell (*V. angustifolia* var. *bobartii* (E. Forst.) W. D. J. Koch)

Some of the material recorded as subsp. *nigra* is probably this native subspecies, which was first noted by Whellan from Cwm-cou SN24V, W (Wade 1952), but apart from specimens from tracksides on the MoD site, Aber-porth SN239523, 2005 (NMW) and SN248524, 2008, it has not been separated recently.



*Vicia sativa* subsp. *nigra*



*Vicia sativa* subsp. *segetalis*

Subsp. **segetalis** (Thuill.) Gaudin - Common Vetch - Ffachysen

An archaeophyte, common throughout the lowlands in pastures, hay meadows, hedgebanks, road verges, scrub, waste ground and the margins of arable fields. It is rarely found in such dry and unmodified natural habitats as sand dunes and cliff slopes where subsp. *nigra* often occurs. It was probably originally introduced to Britain for fodder, but to what extent the “vetches” formerly cultivated in the county were this subspecies rather than subsp. *sativa* is uncertain. Variation in all characters is considerable. Altitude limit 415m, roadside verge, Eisteddfa Gurig SN798840, 2002.

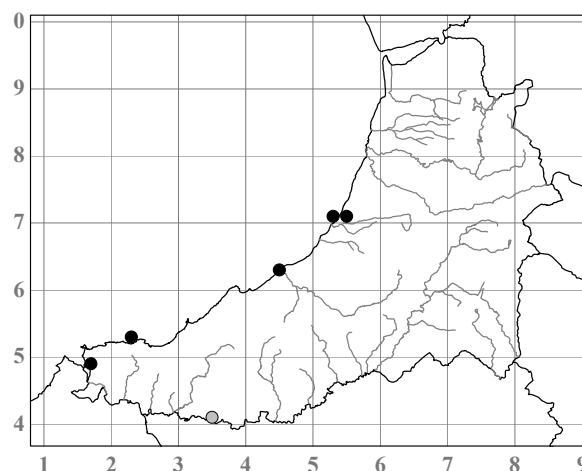
Subsp. **sativa** - Cultivated Vetch - Pupysen

An archaeophyte, widely cultivated in the past in Britain for fodder, and probably at least some of the older records of “*V. sativa*” refer to casual or naturalised occurrences of this subspecies rather than of subsp. *segetalis*. The only definite records are of one plant on a recently reseeded road embankment at Pont Glanryafon, Llanbadarn Fawr SN60998056 in 1994 (SPC), and of mixed crops of it with Fodder Peas, Two-rowed Barley etc. N of Llwyniorwerth Uchaf, Capel Bangor SN64838198 in 2003 (NMW, SPC), in Capel Bangor N of the A44(T) road SN65708022 in 2006 (SPC) and below Ffynnon Caradog SN619830 in 2008 (SPC). Much of the early cultivation too of Vetches was probably as a mixed crop like this, but details are hard to come by. Lloyd & Turnor (1894) mention them being grown as part of a rotation in the lowlands of the county, and say that in the uplands “Turnips, vetches and other meliorating crops are not common”, and the later agricultural statistics mostly do not separate them from various other green fodder crops. Vetches, of either subspecies, were probably never a significant crop in the county.



**Vicia lathyroides** L. - Spring Vetch - Ffachysen y Gwanwyn

A rare annual of sand dunes and sandy turf, dry, closely grazed pastures, rock outcrops and disturbed shaly ground mostly along the coast. Although it occurs in several places on the Penyrergyd dunes SN1648, 1941 (Whellan 1942) - 2008, it has not been reliably recorded from Ynys-las. The only well-inland record is from a rock outcrop by the footpath 400m S of Cae-crwd, Henllan SN352408, 1985-1986, but this site became overgrown soon after. It has been found growing with *Echium vulgare* on an inland-facing slope above the trunk road just N of Llanrhystud SN541700, 1997 (SPC). The earliest record was in 1918 by H. Clarke (*BEC Rep.* 5: 376 (1919)) from Cardigan, doubtless meaning Penyrergyd, and Salter first saw it in 1938 (Diary 9.7.1938, Wade 1952) on “the moister boulder clay”, an unusual habitat, under the cliffs there, SN14U.

**Vicia lutea** L. - Yellow-vetch - Ffachysen Felen

A rare native annual of coastal habitats in other parts of Britain, but only a casual in the county and recorded only twice: at Llanbadarn c.SN58V or 68A in 1936 (NMW, Salter in Wade 1952); and on a building site 250m SW of the Cross Inn crossroads, New Quay SN388571 in 1991 (NMW).

[*Vicia bithynica* (L.) L. - Bithynian Vetch - Ffachysen Ruddlas

There is an erroneous 1965 field record at BRC from SN76.]

**Vicia faba** L. - Broad Bean - Ffeuen y Gerddi

Field Beans, var. **equina** Pers. (for feeding to stock) or Broad Beans, var. **faba** (for human consumption) have never been cultivated on a large scale in the county. An early reference of 1326 in the *Black book of St. David's* (Willis-Bund 1902) is to Beans being required to be sown at 7 bushels per acre on the Lord's demesne at Llandygwydd c.SN24L. Davies (1815), saying that few Beans were grown, described how “in Cardiganshire fields of potatoes were observed, with early beans, mazagon, &c. dibbled into the potatoe rows; the tap-root of the beans not incommoding the potatoe bulbs, a double crop is obtained with very little additional labour. This practice is observable along the western coasts of Wales, on both sides of the Dovey.” (Mazagon or Mazagan was a formerly widely cultivated small type of Broad Bean from Morocco.) In the 1930s very small amounts of Broad Beans were grown commercially (Smith 1935), and in 1988 only 2.5ha of Field Beans and 0.3ha of Broad Beans were grown commercially (Anon. 1988). *V. faba* is rare as a casual, single plants having been seen in riverbank scrub by allotments at Penparcau SN589807 in 1992, on a disused part of the Pendinas rubbish-tip SN584799 in 1995, and on a footpath verge at Penyrangor, Aberystwyth SN580806 in 1997. Of uncertain origin.

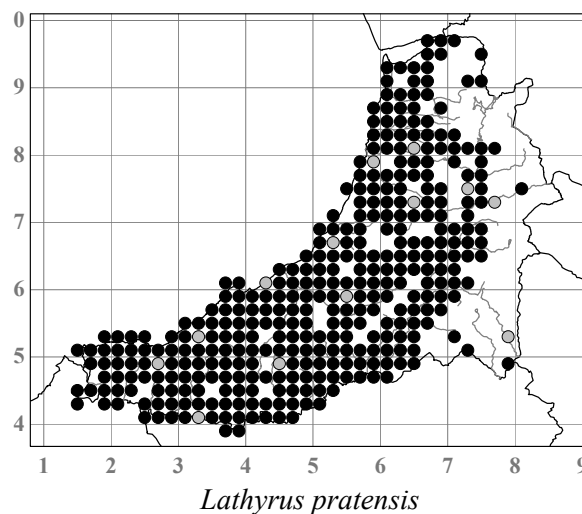
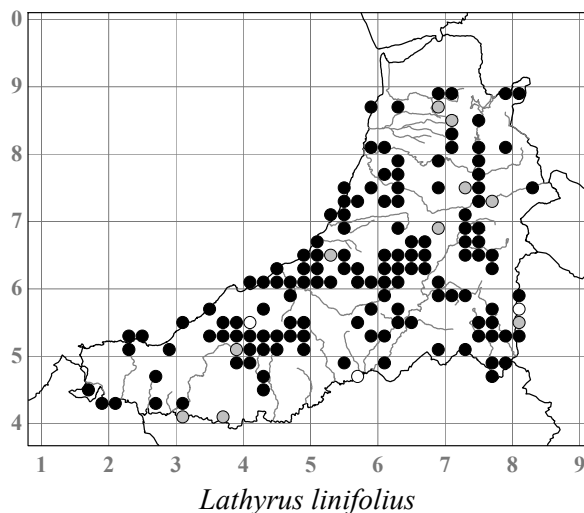
**Lens culinaris** Medik. - Lentil - Corbysen

A single plant was found in 1991 on disturbed ground on the disused part of the rubbish-tip below Pendinas, Aberystwyth SN584798 (NMW).

**Lathyrus linifolius** (Reichard) Bässler (*L. montanus* Bernh.) - Bitter-vetch - Ytbysen y Coed

A frequent plant of unimproved grassland, heaths, banks, Bracken slopes, rock ledges and occasionally in scrub or woodland, and especially characteristic of the rhos pastures, coastal slopes and upland hay meadows. It is generally absent from closely grazed grasslands, and in the uplands, apart from the hay meadows, it is usually confined to streamsides and rocky places. Var. **varifolius** (Martrin-Donos) P. D. Sell is the commonest variety. Var. **linifolius** (var. *tenuifolius* (Roth) F. Hanb.), first noted in 1906 from the Aberystwyth district (Towndrow 1907) is occasional in a wide variety of habitats, usually with var. *varifolius*, for example on a heathy roadside bank 200m ENE of Pantycetris, Talgarreg SN40655120, 2003 (NMW), and on a Bracken slope 400m WSW of Llangranog church SN312539, 2002 (NMW). Var. **montanus** (Bernh.) Bässler is less common, and occurs in woods, for example in the Coedmore ancient woodland 1.3km WSW of

Llechryd SN20624302, 2003-2008 (NMW), and on hedgebanks, for example by Tanyralltuchaf, 2km NE of Tregaron SN698605, 1998 (NMW) where it occurs along c.200m of the roadside bank. Altitude limit 380-455m ("to between 1,250 and 1,500ft."), (Salter 1935); 480m, waterfall at the head of the Afon Merin SN797807, 1988.



### ***Lathyrus pratensis* L. - Meadow Vetchling - Ytbysen y Ddôl**

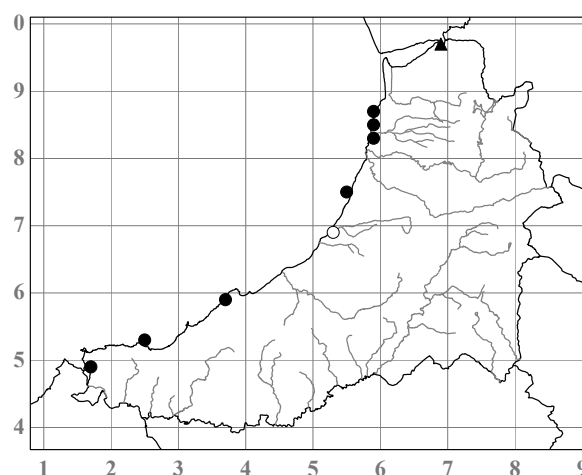
A common plant of pastures, hay meadows, graveyards, hedgebanks and scrub, usually in fairly tall or ungrazed vegetation and absent from shaded and disturbed sites. It is common on the coastal slopes but becomes rare in the uplands. Variable in corolla-size and in hairiness of stems and leaves. Var. **velutinus** DC. seems to be the commonest variety, but glabrous plants, var. **pratensis**, occasionally occur and there is every intermediate. Var. *speciosus* (Druce) Druce has not been seen. Altitude limit 360m, damp road verge by the Nant y Bryn, 6km E of Llanddewi-Brefi SN718530, 2008.

### ***Lathyrus grandiflorus* Sm. - Two-flowered Everlasting-pea - Ytbysen Fythol Fawr-flodeuog**

Naturalised in the hedge between a field and the A487(T) road, 400m SSW of Pen-y-garn Chapel, Bow Street SN62508515, 2004 (NMW); and in the roadside hedge at Clogfryn, Aberaeron SN44866200, 2006 (NMW). Native of SE Europe.

### ***Lathyrus sylvestris* L. - Narrow-leaved Everlasting-pea - Ytbysen Fythol Gulddail**

In scattered localities along the coast, mostly in gullies or among scrub on screes on the cliff slopes. Salter himself (1935) saw it at only three sites, none of them N of Aberystwyth where it is now known from four sites; as he knew these cliffs very well these sites may be genuinely new. It is still abundant around Monk's Cave SN5574, 2004, where he first saw it in 1892 (Diary 18.6.1892), and the other main colonies are around Cribach Bay, Aber-porth SN2552, 1975 (CWH) - 2004. There is one record, of a single large plant, from the *Ammophila* dunes at Penyrergyd SN160487, 1975 (APa). Most of these records are of var. **sylvestris**. A colony on the railway embankment and in adjacent scrub at Glandyfi SN696971, 1982-2004 (NMW) is var. **latifolius** Peterm. and is probably an introduction.



### ***Lathyrus latifolius* L. - Broad-leaved Everlasting-pea - Ytbysen Fythol Lydanddail**

A rare introduction but sometimes very persistent and drought-resistant. It was first recorded on a roadside bank on Felin-y-mor Road, Aberystwyth SN580806 in 1995 (SPC) and was still there in 2008 (SPC), and it has persisted for at least nine years on a walltop at Penllwyn chapel, Capel Bangor SN65288034, 1999-2008

(SPC). It is well-naturalised on a roadside bank at Penparc SN209483, 1999 (SPC). A naturalised colony among *Ammophila* on the roadside bank at the N end of the Ynys-las dunes SN61089408, 2005 (NMW) is var. **latifolius**. Several large bushes well-naturalised by the footpath 350m SW of Grogall, New Quay SN37355928, 1999-2004 (NMW) are var. **rotundifolius** Rchb. Native of Europe and N Africa.

### **Lathyrus nissolia** L. - Grass Vetchling - Ytbysen Feinddail

Naturalised for many years in two places on railway embankments. On the active line along the Dyfi estuary opposite Ynys Edwin, Eglwys Fach SN676965, it was found along a 50m length in 1968 (WMC), and had extended to 140m by 1972, 200m by 1993 and 400m by 1995. On the disused line over the Teifi Marshes, Cardigan SN186455, more than 100 plants were found in 1976 (MP, TAWD & SBE, *Nature in Wales* **15**: 147 (1977)), and 213 were counted in 1995 (DKR). The only other records are of a single plant on a bank by the Glanrhyd-ty-noeth gravel pits, Capel Bangor SN667785, 1994 (RGL), and of a colony 100m long on the SE verge of the A487(T) road SW of the Llwynycelyn crossroads SN440595, 2001-2005 (NMW); this verge had been reseeded c.1987.

### **Pisum sativum** L.

Peas have been grown both for fodder and for human consumption from early times in the county. It is often unclear which variety is being referred to, but most early references seem to be to Fodder Peas and are given thus below.

#### Var. **arvense** (L.) Poir. - (Fodder Pea)

In 1326 in the *Black book of St. David's* (Willis-Bund 1902) Peas were required to be sown at 3½ bushels an acre on the Lord's demesne at Llandygwydd c.SN24L. Small amounts of Peas were reported to Llwyd (Lhwyd 1911) as being grown in Llanfihangel Ystrad c.SN55I and Trefilan c.SN55N parishes in c.1697. Lloyd and Turnor (1794) said that "The pea commonly cultivated is of a very inferior sort. It is a small hog pea, not at all productive. Though sown early in February, it seldom ripens till late in September." Davies (1815) gives a great deal of interesting detail about Pea cultivation in the county, notably "*Pys llwydon bach* - a brownish clay-coloured small pea, with black eyes, peculiar to Cardiganshire, and some parts of the adjacent counties of Pembroke and Caermarthen ... This pea is sown with oats (*hairy*) and both cut for hay in July." This cultivar has presumably long gone. Davies also mentions "*Pys brychion* - the partridge, or brown-grey pease. This was introduced into Cardiganshire by Mr. Peter Lloyd, a North Wales farmer, who rented the demesne of Gogerddan; and afterwards by Scots farmers [presumably James Anderson], brought over by Mr. Johnes, on the Hafod estate. 'They produce a haulmy smothering crop, but not so productive of pods as the clays.' " Johnes (1800a) described "pease" as naturally "the succeeding crop to wheat, as a meliorater of the ground... The crops are very uncertain from the dampness of the ground." Field Peas are still grown for fodder, increasingly so in the last decade and especially in the S of the county, usually mixed with Barley. Casual plants from these crops have occasionally been recorded in farmyards and field margins.

#### Var. **sativum** - Garden Pea - Pysen yr Ardd

Davies (1815) had reported to him under "*White boiling peas*" that "On the western coasts, white pease in favourable years are very profitable, affording 20 to 25, and sometimes more bushels per acre. The soils, in many parts of Pembroke and Cardigan, are very proper for them; but, owing to the humidity of the climate, are in many cases precarious, subject to run into haulm, and pod but very little; often ripen not till very late, and sometimes never." A good deal of Peas were grown during the 19<sup>th</sup> century, for example 439 acres in 1868 (Anon. 1869). Smith (1935) recorded that 51 farms in the Aberystwyth district were growing a total of 12 acres (5ha) of Peas for sale. Small-scale commercial cultivation continues, and in 1988 (Anon. 1988) 0.3ha of fresh Peas were grown, along with an uncertain amount among the 31ha grown for harvesting dry for both human and stock food. Several casual records from Aberystwyth streets SN58V in 1997-2000 were probably of var. *sativum*.

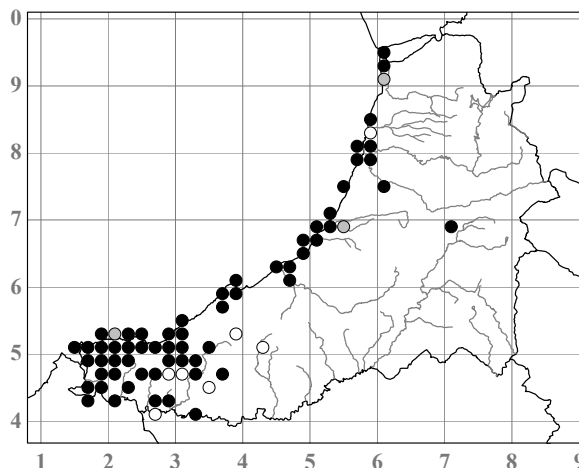
### **Ononis spinosa** L. - Spiny Restharrow - Tagaradr Pigog

There are only two records for the county, the first, from Aberystwyth castle grounds SN579815 (Rees 1890) being unreliable. The other, an unlocalised record from SN15 in 1958 (BRC field card) by PCH who knew the species well and also ticked off *O. repens*, is more likely to be correct.



**Ononis repens** L. - Common Restharrow - Tagaradr

An occasional plant of dry pastures, banks, rocky slopes, sand dunes, the backs of sea beaches, graveyards and railway ballast. It is largely confined to the coastal zone, but occurs inland in a few areas, up the Ystwyth valley in a steep pasture opposite Llanilar SN61457555, 1995 (JPL) and in a pasture at Hafodygofaint-uchaf above Ty'n-graig SN703691, 1997 (MDS) at 280m altitude; and especially up the Teifi catchment in scattered pastures as far inland as 500m ESE of Dolau, Llandyfrïog SN338412, 1997 (MDS) and Brynhelyg, Ffostrasol SN362468, 1996 (MDS). Var. **horrida** Lange, with the stems variously spiny, has been seen at the Penyrergyd dunes SN164485, 1994 (AOC & JPW), and on the sandy slope of Banc y Warren, Penparc SN203477, 1991, but may often have been overlooked. Densely hairy and glandular plants but with ascending to erect stems from the sandy, landward side of Tan-y-bwlch beach SN579798, 1996 (CGE, NMW) have been determined as subsp. *maritima* (Dumort.) Asch. & Graebn. by PDS in 1997 but seem not to be this, and similar plants occur on the Aberystwyth castle ruins SN579815, 2003 (NMW), on the sandy slopes at Mwnt SN194519, 1996 (CGE, NMW), on the sea cliffs on till at Gwbert SN159501, 2003 (NMW, AOC & SPC) and elsewhere on the coast. Many of the populations on the Ynys-las dunes SN69B, C, 2007 (NMW) are densely glandular and have prostrate stems but large flowers, so even these do not agree entirely with subsp. *maritima*. Conversely, some populations on shaly tracksides on the MoD site, Aber-porth SN243525, 2002 (NMW) are much less glandular and hairy, though prostrate and with smaller flowers. The matter has yet to be fully investigated, and in so far as the subspecies are worth recognising, it may be that most or all of the plants in the county are best referred to subsp. **intermedia** (Rouy) Asch. & Graebn.

**Ononis alopecuroides** L. - Salzmann's Restharrow - Tagaradr Salzmann

This Mediterranean species has been recorded only once, as a bird-seed alien in a garden in Clarach Road, Borth SN607885 in 1973 (ABS, ADQA).

**Melilotus altissimus** Thuill. - Tall Melilot - Yr Wydro Dal

A rare archaeophyte casual recorded by Salter (1935) from near Ynys-las station SN618931, undated, from near the Aberystwyth gasworks SN595809 in 1925, and from Llanbadarn Fawr c.SN68A in 1934. A single plant was on waste ground by Park Avenue, Aberystwyth SN588811 in 1992 (NMW), and in 2005 it was abundant on waste ground by the railway there. Native of Europe.

**Melilotus albus** Medik. - White Melilot - Yr Wydro Wen

A rare casual, first recorded by Salter on railway ballast at Glanyrafon SN6180 in 1938 (Wade 1952), near where several plants were seen on waste ground SN610800 in 1993 and 1994. Other records have been from Windover, Aberystwyth SN581808 (the author's home, when he was then aged one) in 1934 (NMW, PCh); from a building site in Bow Street SN618846 in 1978 (NMW, RLe); from waste ground by Park Avenue, Aberystwyth SN588811 in 1991-2005 (NMW); from the overgrown rubbish-tip below Pendinas SN584798 in 1991; from the Penparc sand quarries SN201486 in 2005; and from waste ground by the Ynys-las boatbuilding yard SN616933, 2006 (AOC & JPW). Native of Europe and Asia.

**Melilotus officinalis** (L.) Pall. - Ribbed Melilot - Yr Wydro Resog

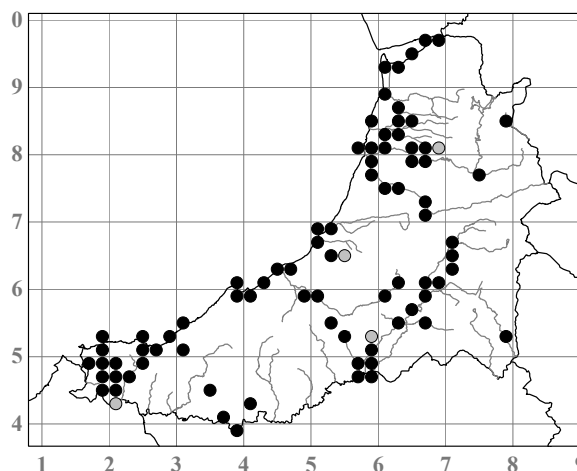
A rare casual recorded by Salter three times, from the Aberystwyth rubbish-tip SN591811 in 1900 (Diary 6.11.1900), from the Ynys-las sawmills SN617931 in 1907 (Diary 21.6.1907) and from railway sidings at Strata Florida station SN711672 in 1928 (1935). Subsequent records have been from the disused Lampeter station SN582484 in 1978; from Winllan, Talsarn SN567574 in 1990 (IWC); from waste ground by the railway at Aberystwyth SN588811 in 1991-1997, where it became established and very abundant (NMW, AOC; SPC); and from waste ground by the Ynys-las boatbuilding yard SN616933, 2006 (AOC & JPW).

**Melilotus indicus** (L.) All. - Small Melilot - Yr Wydro Blodau Mân

A rare casual recorded, by Salter, only twice, from the Aberystwyth rubbish-tip SN591811 in 1932 (1935), and from the Commins, Llanbadarn Fawr SN596805 in 1935 (Wade 1952). Native of Europe and Asia.

**Medicago lupulina** L. - Black Medick - Maglys Du

A frequent but often rather local plant of dry, open habitats such as sandy and rocky pastures, road verges and tracks, graveyards, railway ballast, waste ground and as a garden weed. The map suggests a distinct correlation with the railway system, so it may at least in part be an introduction. Most of the populations seem to be of var. **lupulina**. There is much variation in hairiness of legumes and indeed of the whole plant, but extreme plants referable to var. **eriocarpa** (Rouy) P. D. Sell have been seen in only a few places, for example on the disused railway at Felin-y-mor, Aberystwyth SN581802, 1991 (NMW). Var. **major** G. Mey., erect plants with larger leaflets and flowers, has been seen by the Aberystwyth marina SN58158127, 2008 (NMW), on waste ground at the MoD site, Aber-porth SN250519, 2000 (NMW), on a road verge at Blaenannerch SN247490, 2002, and at the Cardigan Cattle market SN180457, 2002; this variety is the “Trefoil” formerly used in hay crops in parts of Wales, but the early agricultural writers do not specifically mention it being used in the county. Altitude limit 335m, “extending to the small hill-farms, at 1,000 to 1,100ft.” (Salter 1935); 410m, roadside verge, Eisteddfa Gurig SN797840, 1993.



**Medicago sativa** L. subsp. **sativa** - Lucerne - Maglys Rhuddlas

After a long period of neglect as a fodder crop, Lucerne has recently come back into use in a small way in the county. It is uncertain how much it was grown in the past. Davies (1815) quotes a grower of it in the Teifi valley (whether in Cardiganshire or Carmarthenshire is unclear) as finding it a valuable crop, in spite of the inconvenience of having to keep it free of grass which would otherwise overwhelm it. Morgan (1848) lists it, but with no comment or locality. Salter (1935) described it as “Of rare occurrence as a casual or escape from cultivation”, implying that it *was* being cultivated, and gave only one record, Borth c.SN68E, 1927. In the early 1990s it was grown for silage at Felin-wynt SN219504, three cuts being taken off a 6 acre field in 1992 and 1993. In 1998 it was being grown on the NT estate at Llanerchaeron c.SN46V as part of an organic farming project. The only record of it as a casual since Salter’s is of a single plant on the rubbish-tip below Pendinas, Aberystwyth SN584799 in 1993.

Subsp. *falcata* (L.) Arcang. was recorded from Borth c.SN68E by Morgan (1851), presumably as a casual, but whether correctly identified or not is uncertain.

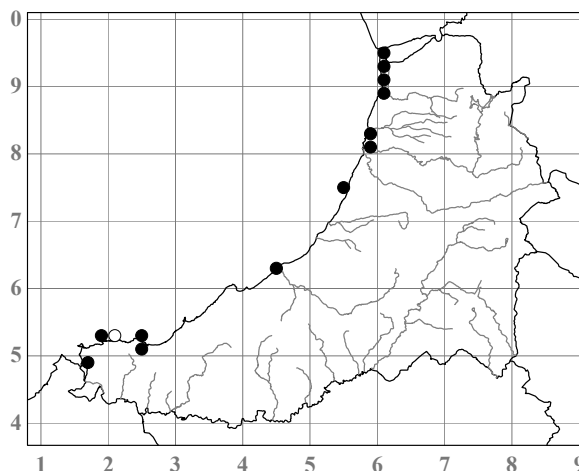
**Medicago arabica** (L.) Huds. (*M. maculata* Sibth.) - Spotted Medick - Maglys Brith

Salter (1935) described this as “Scarce, but well established in a few localities”, implying that it was not native. He himself recorded it only at Aberystwyth on the castle grounds SN579815 (1935) and in the Isolation Hospital grounds, Penyrangor SN580806, 1923 (Diary 16.4.1923, 1935), as a garden weed at Crugiau SN591793, 1905 (Diary 26.9.1905) and by a lane nearby SN593792 (1935); he also gives a record from Llechryd c.SN24G (ETT, Diary 26.9.1905) and mentions a Morgan (1848) record from Borth c.SN68E. The only four other records are recent, from waste ground at the Ynys-las boatbuilding yard SN616933, 2006 (JPW & AOC), where it was a casual; from Llanina churchyard SN405598, 1980 (NMW) - 2005, where there are many plants in the rough grass and on graves S of the church and where it could perhaps be native; from a lawn by the National Library, Aberystwyth SN59508156, 2002-2005 where it must be an introduction; and in amenity grassland by the steps to the lifeboat station, New Quay SN38995989, 2006 (SPC), also an introduction.

**Trifolium ornithopodioides** L. (*Trigonella purpurascens* Lam.) - Bird’s-foot Clover - Corfeillionen Wen

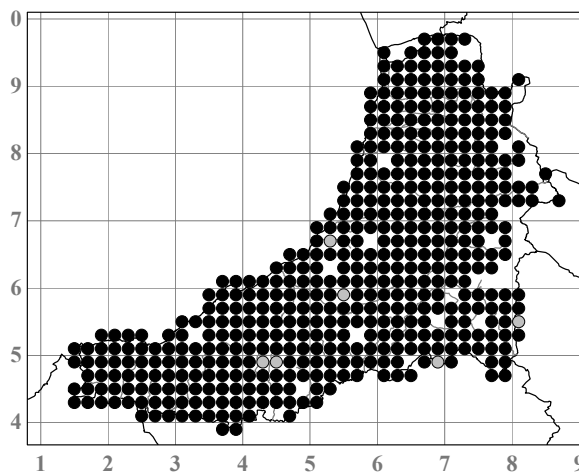
A rare plant of closely grazed, trodden or mown sites along the coast, usually on sand, sandy shingle or shale and often on tracks and paths. It was first recorded in 1906 from a path in St Michael’s churchyard,

Aberystwyth SN580816 (Towndrow 1907, Salter 1935), and Salter knew it only from around Ynys-las SN69B, 1907-1925 (Diary 28.8.1907, 5.8.1925). Whellan (1942) recorded it a mile E of Mwnt SN25A. It has since been found in about a dozen sites, but varies in abundance greatly from year to year although it is undoubtedly becoming generally more regularly abundant. It still occurs at Ynys-las, a few plants on a track by the Information Centre in the dunes SN610940, 1998, and in great abundance on gravelly ground just W of the mouth of the Afon Leri SN61609350 where plants were flowering in October 2007 (NMW). In 1983 it was recorded in the main dune slack SN60789382 (ABS, ADQA). At Borth one plant was seen on partially vegetated trodden shingle by the road at the N end SN607911, 1987 (JRA & CDP), and in 2002 it was abundant in a similar site 1km S at SN608901. It was frequent on the Sunday market site at Clarach SN595838 in 2004 (SPC). On the quarry floor at the top of Constitution Hill SN584827 c.12 plants were seen in 1997 (SPC), and there were 100 or more in 2005 after building works and consequent disturbance. A dozen plants were seen on a disused bowling green at Plas Crug, Aberystwyth SN588814 in 1996 (SPC). A few plants were seen on thin soil on a rocky slope by the stream at Mynachdy'r-graig SN55757486 in 2008 (AOC & JPP). In a parking area at the back of the beach SW of Aberaeron harbour SN453629, where only a few plants were seen in 1985 (JRA & CDP) and only two in 1995 (AOC & JPW), there were c.140 in 1998. A very few plants have been seen on shaly ground on the MoD site, Aber-porth SN24205240 and 25355192, 1997-2001 (SPC & AOC), and it was abundant on a path on Foel y Mwnt SN19405205 in 1996-1997 (JPW; DAP & AOC). At Gwbert it is on pathsides on the golf course SN167498, 1998, and in sandy turf by caravans on the Penyrergyd dunes SN1648, 1985 (JRA & CDP) - 2007 (AOC & JPP).



### **Trifolium repens L. - White Clover - Meillionen Wen**

Very common in all but the most acidic and infertile of the grazed and mown grasslands, less frequent than *T. pratense* in tall swards and in damper sites, but extending much more into the uplands. It is also very common in dune slacks and on clifftop grasslands, on tracksides, waste ground and as a weed in arable fields and gardens. It seems not to have been sown in leys either as early as or as much as *T. pratense*, Lloyd & Turnor (1794) commenting: "Indeed, some have introduced in addition to the common clover and rye grass, white clover, cow grass and plantain...", and Davies (1815) also implied that its use then was somewhat innovative. Dutch strains were very widely used, and in the 20<sup>th</sup> century New Zealand ones, and much has been done on testing and developing various strains at the WPBS by R. D. Williams and later at IGER. 'S.100' and 'S.184' were of particular importance, the latter being a small-leaved variety with great persistence under heavy grazing that has been used for longer than any other of the 'S' strains of legumes.

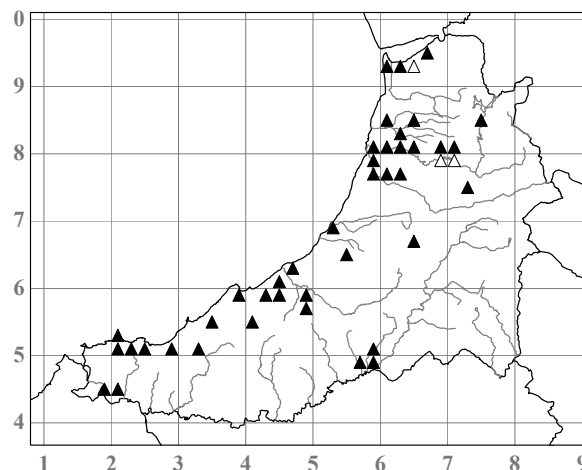


The enormous morphological diversity in the county is presumably partly natural variation of the native populations and partly due to the sowing and naturalisation of these cultivated strains, and three varieties, themselves of course very variable, can in general be recognised. Var. **carneum** Gray, small plants with pinkish flowers, is the common variety along the coast, often in open sandy or shingly habitats, as well as in grasslands, and extending inland especially on roadside verges and other open sites. Var. **repens** is the abundant grassland variety throughout the county, while the larger agricultural strains are best considered as var. **grandiflorum** Peterm. Altitude limit 450m, Esgair Hir c.SN7391 (Salter 1935); 560m, verge of rough road, Rhos y Garn, Cwmystwyth SN797766, 2002.



**Trifolium hybridum** L. subsp. **hybridum** - Alsike Clover - Meillionen Sweden

Widely sown in reseeded pastures, particularly on damp soils, and on roadside verges and often naturalised in and near these sites. It is also occasional on waste ground and as a weed of arable fields and gardens. Although there are no specific references to its early cultivation in the county, it has probably been grown since the late 18<sup>th</sup> century. It is native at least in Europe, but much of the seed used in the 20<sup>th</sup> century has come from Canada. The earliest record is from Llanfynfelyn c.SN6492 in 1886 (Ley, *BRC Rep.* **1884-1886**: 147 (1887)). Altitude limit 300m, abundant weed in Turnip field 1.5km SW of Devil's Bridge SN730759, 1995.



[*Trifolium glomeratum* L. - Clustered Clover - Meillionen Glystyrog

Erroneously recorded in Salter (1901); see Salter (1935).]

[*Trifolium suffocatum* L. - Suffocated Clover - Meillionen Fygedig

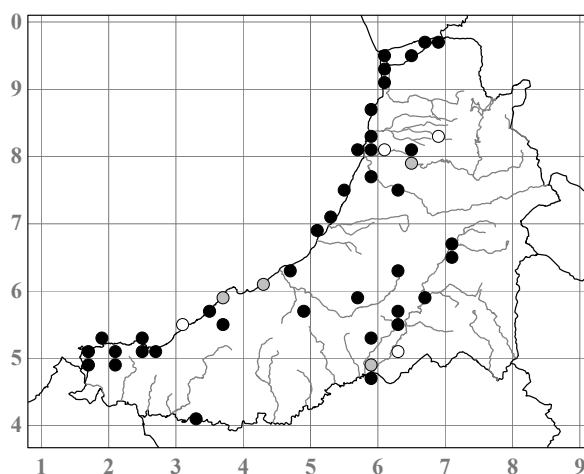
Recorded by Morgan (1848, etc.), probably in error for *T. ornithopodioides*.]

**Trifolium fragiferum** L. - Strawberry Clover - Meillionen Fefusaidd

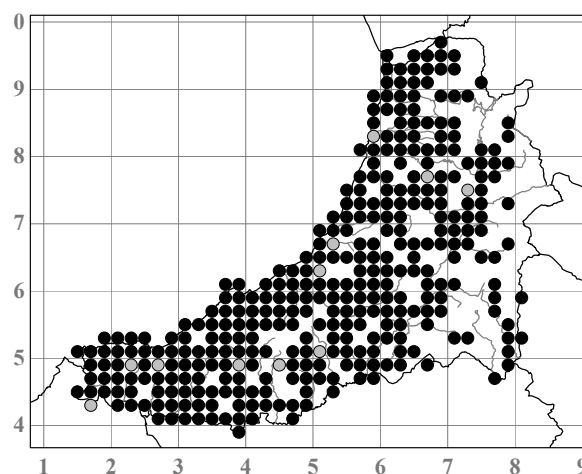
Confined as a native to the dune slacks at Ynys-las SN69B, C, where it was first collected by Lees in 1841 (K, Herb. Watson) - 2007, and where it can sometimes be abundant. In 1991 it was sown in a seed-mix with *Lolium perenne* and *Puccinellia distans* along 2km of reconstructed floodbank on the W side of the Afon Leri SN616898-616920 (NMW), but it decreased rapidly and had become rare there by 2004. Both native and sown plants are subsp. **fragiferum**.

**Trifolium campestre** Schreb. (*T. procumbens* auct.) - Hop Trefoil - Meillionen Hopysaidd (Y Wê Felen)

Occasional, in a wide variety of dry grassy habitats in the lowlands including sand dunes and dune slacks, banks, cliff slopes and dry pastures, disturbed ground, road verges and railway embankments, chiefly near the coast. Most populations are of var. **campestre**. Var. **minus** (W. D. J. Koch) Gremli is frequent on more open, stony sites, for example on tracksides at the MoD site, Aber-porth SN240523, 2006 (NMW). Unusually robust plants occurring as a weed in an Oat crop near Ciliau Aeron SN497573 in 1992 (NMW) were var. **majus** (W. D. J. Koch) P. D. Sell.



*Trifolium campestre*



*Trifolium dubium*

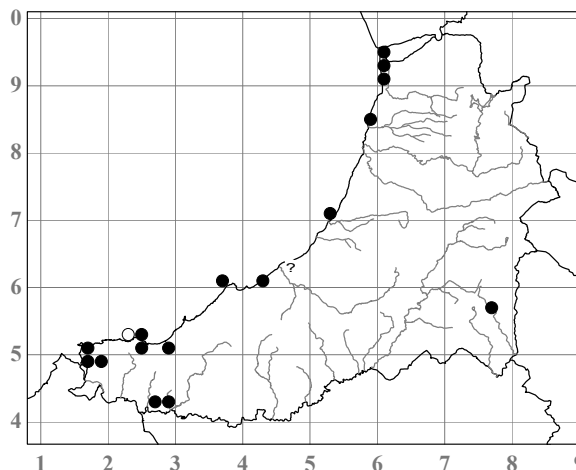
**Trifolium dubium** Sibth. - Lesser Trefoil - Meillionen Hopysaidd Fach

A common plant of usually dry pastures and hay meadows, and of waste and disturbed places, but in the uplands tending to become confined to road verges and tracksides. Most plants are var. **dubium**. Var.

**microphyllum** (Ser.) P. D. Sell is abundant on the dry mature dunes at Ynys-las SN69B, C, 2007 (NMW) and elsewhere in short turf, on bare ground and along pathsides near the coast. Altitude limit 510m, FC road verge 2.5km NNE of Nant-y-maen SN775604, 2001 (AOC & RDP).

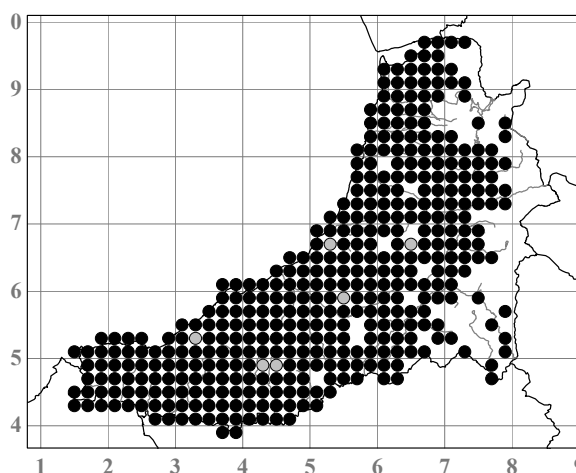
**Trifolium micranthum** Viv. (*T. filiforme* L., nom. rejic.) - Slender Trefoil - Meillionen Hopysaidd Eiddi

Uncommon and chiefly coastal, growing on tracksides, dry banks, trampled sandy places and in lawns. It grows on the golf courses at Borth SN69A, B, 1987 (JRA & CDP) - 1994, and Gwbert SN1649, 1998. On the Ynys-las dunes it is confined to a few places on tracks and by old concrete foundations SN610940, 1998-2001 (AOC; SPC). Rarely it occurs in unimproved pastures, for example S of Wallog SN591851, 1993; 450m W of Banc, Llanrhystud SN534703, 1995 (SPC); near Craig yr Adar, New Quay SN378600, 1996; and in several places inland in the dry, acidic pastures on the SSW-facing slope E of Capel Tygwydd SN270432-280428, 1997 (AOC, MDS & LRG). Occasionally it is abundant in reseeded pastures. The earliest record is from banks near Aber-arth c.SN46R, 1854 (K, Herb. Watson, MMA). Altitude limit 350m, abundant on margin of claypit lagoon 2km SSE of Nant-y-maen SN771565, 2000 (NMW, RGW), presumably derived from reseeded in the area.



**Trifolium pratense** L. - Red Clover - Meillionen Goch

Very common throughout the lowlands in the more fertile grasslands of all sorts, both dry and marshy, on road verges, in hedgebanks, graveyards, on waste ground and in lawns, but extending much less into the uplands than *T. repens*. There is great variation. The small, dark-flowered plants characteristic of unimproved pastures are mostly the wild var. **pratense**. Larger, pale-flowered plants, var. **sativum** Afzel., have long been sown, and, judging by how common such plants are everywhere, they must self-sow and become naturalised very readily. Very large plants with long, patent hairs on the stems, var. **americanum** Harz, are sometimes seen, for example on waste ground at Ponterwyd SN750810, 1988 (BM) where the plants were 190cm tall, and they are becoming increasingly common on reseeded road verges.



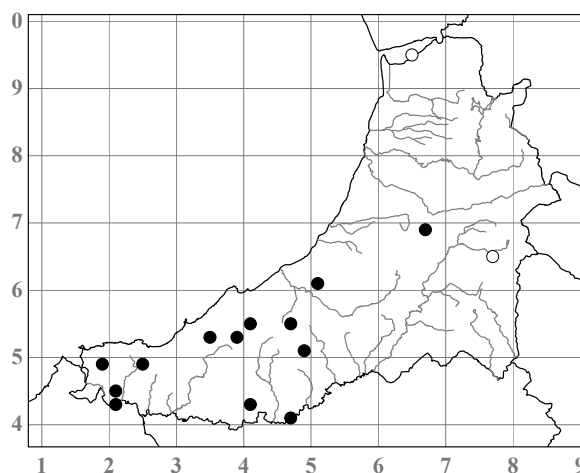
Plants with white flowers are very rarely seen, but were on a roadside bank at Penparcau c.SN584810, 1995 (SPC). A plant entirely lacking anthocyanin was seen on the MoD site, Aber-porth SN241522, 1992, but such plants are also either very rare or overlooked.

Lloyd & Turnor (1794) described how whenever grass was sown in the county it was mixed with Red Clover, and how many farmers, after three or four crops of corn had been grown in succession, would sow Red Clover with the last crop, sometimes mixed with Rye-grass. It remains a standard constituent of leys. How much of the Red Clover present in pastures today originated from imported seed, which first came into Britain from the Netherlands in the 17<sup>th</sup> century, is unknown. A great deal of work on Red Clover breeding was done at the WPBS, especially by R. D. Williams, and continued at IGER; 'S.123' and 'S.151', bred from Welsh strains, were often used in the county. Altitude limit c.350m, Cwm Doethie c.SN78Q (Salter 1935); 540m, by the ruin of the Pumlumon lead mine SN795857, 2002.

**Trifolium medium** L. - Zigzag Clover - Meillionen Igam-ogam

An uncommon plant chiefly of the clay soils in the S half of the county. It is frequent in marshy pastures at Gwaun Penlan, Llechryd SN203434, 1981 (NMW) and W of Gwernmedd, Llangoedmor SN211453, 1997 (LRG & AOC), and in wet *Juncus acutiflorus* fen by the Afon Mwldan near Penparc SN197483, 1990-2005. Its most northerly current site is among *Molinia* by a stream in a valley mire 200m SE of Brynarth, Ty'n-y-

grai SN670696, 2001, a most unusual habitat although it does occur in similar ones in Radnorshire (SPC pers. comm.). In drier communities it grows in rhos pasture below Gellie SN381534, 1984 (CF, DGJ & AOC) and on a slope cleared of scrub at Hafodwen, Coedmore SN201431, 1999. Otherwise it is mostly on roadside banks and verges, and it has also been recorded from Waunifor chapel graveyard SN465414, 1989-2005, and in mown grassland by the Blaenannerch airfield SN248495, 1999. The earliest record was by Jones (1880), unlocalised, and Salter did not see it until 1936, by the railway NE of the Cletwr mouth SN69M (NMW, Diary 15.8.1936, Wade 1952).



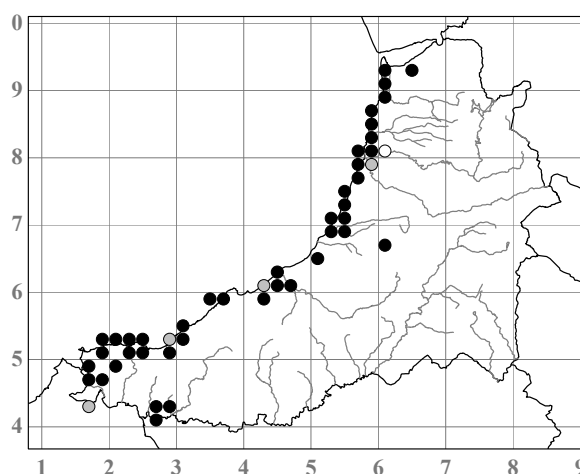
**Trifolium incarnatum** L. subsp. **incarnatum** - Crimson Clover - Meillionen Waetgoch

Probably occasionally cultivated in the county in the past for fodder or hay rather than for grazing. The only old record of it is by Thompson (1924) who recorded it in permanent pasture immediately N of the National Library at Aberystwyth SN595817. In 1987 a few plants were found in a field of mixed Turnips and Fodder Peas 1km SE of Llanerchaeron SN488597. In 1991 it was co-dominant with *Glebionis segetum* from a seed-mix sown on a restored area of contaminated spoil at the Cwmerfryn lead mine SN685830 (NMW, LANC). Native of S Europe.

**Trifolium striatum** L. - Knotted Clover - Meillionen Rychog

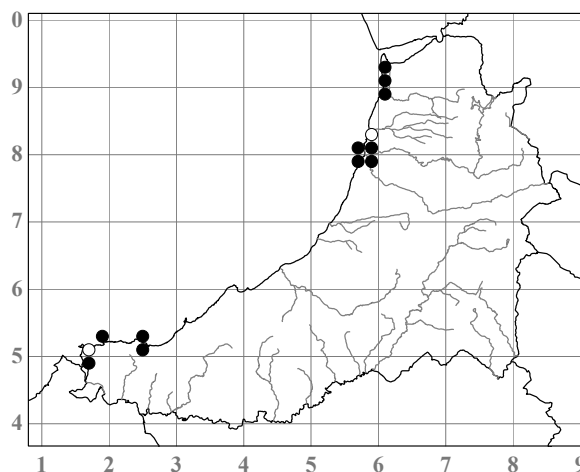
Frequent all along the coast but rarely any distance inland, growing in dry pastures, on rocky slopes, compacted and partially vegetated shingle, tracksides and arable field margins. Well inland it is on the SSW-facing dry slopes between Capel Tygwydd and Cwm Cou SN24R, W, 1996-2002 (AOC & JPW), on riverside rocks below Cenarth bridge SN269416, 1996, in the Penparc sand quarries SN201487, 1993 (AOC & SPC) and doubtless as a casual at 310m, its altitude limit, on a road verge SW of Llyn Eiddwen SN60006645, 2008 (MDS & AOC)

Salter (1935, Wade 1952) recorded var. **erectum** Leight. as frequent, and it was recorded on a bank at the Chemical Laboratories gardens on the Buarth, Aberystwyth SN587815, c.1994 and on waste ground at the MoD site, Aber-porth SN25L (SPC). Salter (Wade 1952) also noted a “dwarf form, sand links, Ynys-las”.



**Trifolium scabrum** L. - Rough Clover - Meillionen Arw

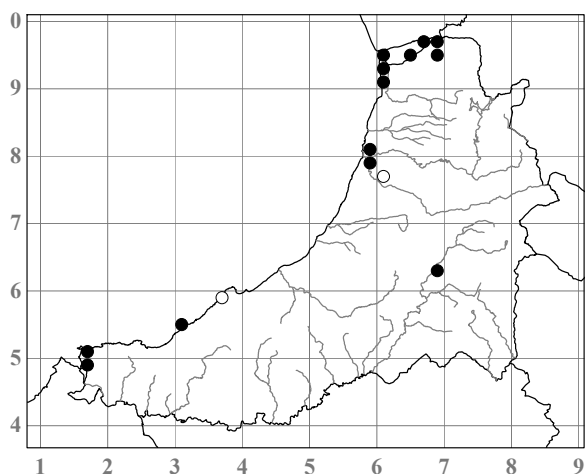
An uncommon plant of the coast at Ynys-las and Borth SN68E, 69A, B, around Aberystwyth SN57U, Z, 58Q, V, and at the MoD site, Aber-porth SN25K, L, Mwnt SN15W and Gwbert SN14U. It grows in compacted sandy shingle at the top of beaches, on tracksides, gravelly waste ground and banks, but varies greatly in abundance from year to year. The earliest record was “at Aberystwyth” and “near the Aberystwith castle” (Forster 1805) and it has been regularly recorded along Tan-y-bwlch beach SN579807-579798 and on the castle grounds SN57978159, before 1936 (Salter 1935) - 2008 where it grows on rocks, dry banks and paths and can sometimes be very abundant, as in 1998 (SPC).





### **Trifolium arvense** L. - Hare's-foot Clover - Meillionen Gedennog

An uncommon plant of sand dunes, sandy pastures, cliff slopes and railway ballast, almost confined to the coast. It is locally abundant on the dunes at Ynys-las SN69B, C, 1848 (Purchas 1848) - 2008, and Penyrergyd SN14U, pre-1936 (Salter 1935) - 2008, and is in other sandy grassland on the golf courses, pastures and road verges near these two sites. Away from the sandy sites, it occurs on grassy rock ledges, cliff slopes and pastures by the sea, at Penyrangor, Aberystwyth SN58038070, 1945-2005, in the Traeth y Coybal cwm SN3759, 1902 (Salter Diary 9.7.1902), on Llangranog Head SN312552, 1996, and on the Gwbert cliffs SN161495, 1984. Salter recorded it on the railway at Ynys-las SN6193 in 1904 (Diary 7.7.1904), and later (1935) wrote that it occurred on the railway at Borth and on towards Glandyfi; it is now abundant in many places there SN6090-6997, 1957-2005. It has also been recorded on the disused railway both 1km S of Aberystwyth SN584798, 1991, and at Maesllyn, Cors Caron SN698633, 1983-1987 (JWH). Salter (1935) recorded it from the Chemistry Dept. grounds, Aberystwyth SN588815, and it persisted there until at least 1987 when there were a few plants seen in the flowerbeds. Morgan (1849) recorded it from Aber-mad c.SN6076 where it has not been seen since.



*Trifolium arvense* and *Thymus* on Penyrergyd dunes, view NW from SN16194869, July 1979

### **Trifolium subterraneum** L. - Subterranean Clover - Meillionen Ymguddiol

A rare plant of a few sites along the coast. Salter (1935) described it as occurring on "Dry road-sides and sandy pastures, frequent", yet he lists only sites around Aberystwyth, apart from an erroneous 1906 one at Ynys-las which he presumably forgot he had realised was a misidentification for *T. ornithopodioides* as early as 1907 (Diary 28.8.1907); it seems unwise to assume a definite decline. The first record was from near Aberystwyth castle c.SN5781 (Forster 1805). Morgan (1849) recorded it from Borth c.SN68E. Salter first recorded it in 1899 from the Ropewalk Hill SN585820 (Diary 17.5.1899). In 1905 he saw it on the Buarth, and in his Flora (1935) described this as "near the Chemical Laboratories"; it was still present, in some quantity, in the flowerbeds and lawns by these Laboratories SN588815 in 1978 (NMW) but has not been found there since. He also saw it on a bank above his house at Llanbadarn Fawr SN598811 in 1925, and on the rough road along Tan-y-bwlch beach c.SN5780 (1935). Since then it has been seen only in dry pastures 600m S of Wallog SN590851, 1995 (SPC) and 500m W of Banc, Llanrhystud SN534703, 1995 (SPC) - 2008 (SPC); on a dry grassy slope in a gully 1.3km WSW of Morfa-mawr, Llan-non SN49206495, 2000 (TAL); and on the shaly margins of clifftop arable fields at Mwnt SN1952 and 2052, 1987-1993 (AOC & SPC).

In the early 1920s *T. subterraneum* was grown by the WPBS for at least five years in trials at Frongoch Farm SN605826 (Williams & Davies 1924) using Australian seed. It was described as "a wonderfully winter green plant", suitable both as a catch crop and for temporary leys, and was freely grazed by sheep, but the project seems not to have come to much. Material at K from these trials was identified by Lousley (*Watsonia* 1: 118-119 (1949)) as var. **oxaloides** (Bunge) Rouy, a robust variant native of the Mediterranean region.

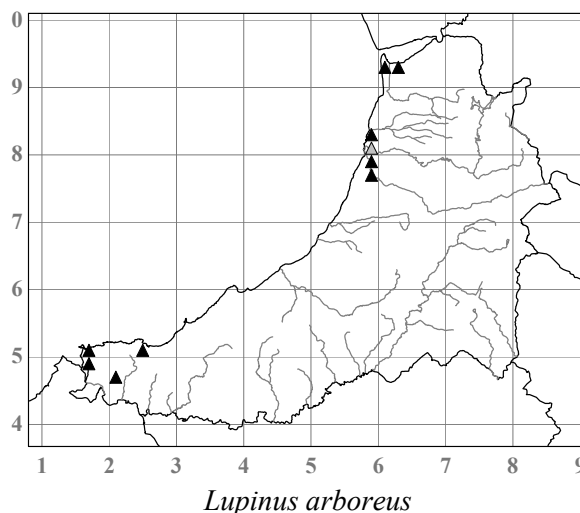
### **Lupinus arboreus** Sims - Tree Lupin - Coeden Bysedd y Blaidd

Well-naturalised in scrub in several places on the older dunes at Towyn Warren and Penyrergyd, Gwbert SN14U, 1976 (NMW) - 2005, as well as on laneside banks in this area and on sandy slopes at Penparc SN207479, 1992-2004. Seed was sown at the back of Tan-y-bwlch beach SN580800 in 1974, and a few plants grew there until about 1980. It was also sown as a stabiliser on the shaly S slope of Constitution Hill

SN583826 in 1979 and became abundantly naturalised in the 1980s, but few plants remained by 1996 as the vegetation cover increased and it had gone by 2000. At Ynys-las it was becoming naturalised by Moel Ynys Pool SN607923 in 1998, and in a sandy field 600m E of the railway bridge SN622929 in 2001. Single bushes were seen on the Pendinas rubbish-tip SN584798 in 1992 and by the disused railway at Llanfarian SN591779 in 1993 (SPC). The earliest record is a field one at BRC from Aber-porth SN257513 in 1963 (DWB), but whether naturalised or not is uncertain.

**Lupinus albus L. - White Lupin - Bysedd-y-blaidd Gwyn**

A mostly blue-flowered variant was grown experimentally at the WPBS in the early 1980s, and in 2004 IGER began trialling it as part of the 'Lupins in Sustainable Agriculture' (LISA) project, aimed at introducing spring-sown Lupins into long-term farm systems. In 1996 a 5ha field of white-flowered *L. albus* on NT land at Llanerchaeron SN484602 was grown for the seeds as a joint venture by Dalgety Ltd. and Antur Teifi. There seems so far to have been little commercial growing in the county, although in 2005 a 5ha crop, mixed with Oats, was grown at Nantyferwig SN169477.



*Lupinus albus* crop, Llanerchaeron, view WNW from SN484602, June 1996

**Lupinus luteus L. - Annual Yellow-lupin**

'Wodjil' was trialled at IGER SN637837 as part of the LISA project, and a few casual plants came up around this site in 2005.



**Laburnum** Fabr.

The Laburnum hedges of SW Cardiganshire are one of the most striking landscape features of the county. They are mostly on the higher ground at 150m altitude or more, away from both the coast and the Teifi valley, and Salter (Diary 15.9.1924) remarked that the area between Brynhoffnant and Rhydlewis “might be called ‘the laburnum country’”. When in flower in late May or early June they are spectacular, and there are probably some hundreds of pure Laburnum hedges, as well as countless others containing scattered bushes. Some of the best are around Synod Inn SN45C, Ffostrasol SN34T, Penrhiw-pal SN34M and Pentre-gat SN35K. Most are of *L. anagyroides*, but *L. ×watereri* was often planted as isolated trees or sometimes alternately with *L. anagyroides*; as it flowers about three weeks later and generally forms a taller tree, this was clearly done for decorative effect. The hedges are normally coppiced at regular intervals of 20 years or so, resulting in abundant growth of straight, abundantly flowering stems that do not make for a very stock-proof barrier; trimmed Laburnum hedges by contrast tend not to flower so profusely but are relatively stock-proof. Laying or pleaching does not work well and there are few Laburnum hedges managed in this way.

There is little evidence, but much conjecture, as to when and why Laburnum was so widely planted. A common but rather fanciful idea that fenceposts of Laburnum were brought from Spain as ballast in ships during the Napoleonic wars, and sprouted when put in the ground, is thought to explain local Welsh names for it. Laburnum was widely available at least as seed in this area in the early 19<sup>th</sup> century (Davies 1815). This author recommended it as a decoy for hares which “... will not browse on any other tree, as long as any of the laburnum remains in a plantation; and though eat to the ground every winter, it will spring with additional vigour the succeeding summer. The produce of a few shillings worth of seed, will furnish plants enow to protect half a million other trees.” Elsewhere (1813) he quoted continental authors

as saying that Laburnum in times of scarcity has been found “a most excellent forage”, and goes on to say that “cattle and sheep are exceedingly fond of it.” This rather belies the usual view of Laburnum as very poisonous; it contains the poisonous alkaloid cytisine in all parts of the plant, but especially concentrated in the seeds and bark. The amounts present vary greatly however (Cooper & Johnson 1998) and there has been much controversy in the medical journals about its toxicity for humans. Although there must be numerous farms in Cardiganshire with Laburnum in their hedges, I have heard of only a couple of suspected cases of animal poisoning, neither fatal, and I have seen Horses, Sheep, Cattle and Goats eating shoots in both flower and fruit. It is possible that the forms planted here are less toxic than some others, but this has not been investigated.

There is some documentary evidence that Laburnum was used for hedges in the 1840s (Williams 1961), and the size of the largest stools, up to a metre in diameter in a few hedges, supports this. Eye-witnesses have told me that pure Laburnum hedges were still being planted around 1910-1920. Cuttings are very easy to strike, and grow quickly, and for this reason it has often been used to fill gaps in existing hedges. Although seedlings have been found a few times below parent bushes, mature bushes that were more likely to have been self-sown than planted have almost never been reported, although some authors (D. Hamer, *BEC Rep.* 3(3): 209 (1913), R. F. May 1967) claim Laburnum to be naturalised in other parts of Wales. In Cardiganshire Laburnum is virtually confined to hedges, and I believe its use here in hedges to have been largely for decorative effect (however much this may go against the common perception of the motives of Cardiganshire farmers and other landowners). Their preservation has recently become something of an issue, although few have been destroyed in recent years and they are mostly very well looked after by their owners who take the same pride in them as I suspect their planters did. For various place-names derived from names for Laburnum, including Tresi-aur SN324483, Euron SN344456, Bryneuron SN326535, and Laburnum Hall SN519641, see Wmffre (2004 pp.143, 158, 286, 728).



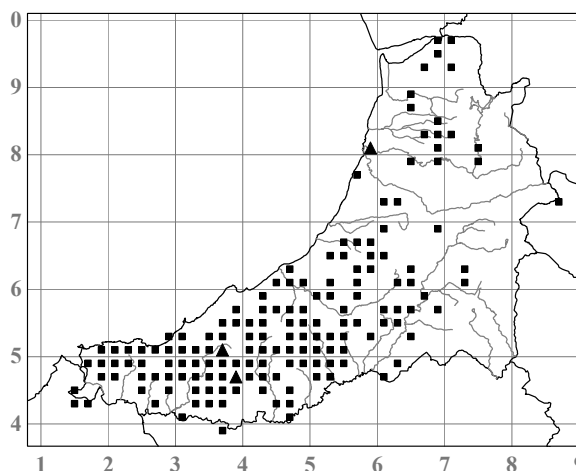
*Laburnum anagyroides* hedge, Brynhoffnant,  
view S from SN326511, March 2006



The taxonomy of these planted Laburnums is complicated and has been discussed at length, along with other aspects of these hedges, by Chater (1998a).

**Laburnum anagyroides** Medik. - Laburnum - Tresi Aur (Leloc Melyn, Blodau Cocos, Meillionen Sbaen, Coed Sbaen)

The dominant Laburnum of hedges in the county. The flowers are mostly 22-23mm long, conspicuously longer than those of the wild European plants as well as those of most garden specimens seen from England. It is presumably either a cultivar, although it does not match any obvious one, or an undescribed form of the hybrid with *L. alpinum* that is much closer to *L. anagyroides* than the plants of *L. ×watereri* discussed below. It has been planted in hedges and around houses and farms throughout the county, although pure hedges of it are largely confined to the SW as described above. Seedlings have been seen in a few places, for example under a trackside bush 800m E of Dinas Cerdin SN393469, 1996 (NMW), and a self-sown sapling c.30cm tall was growing between sidings in the Aberystwyth station yard SN586814, 1994 (SPC). Among the biggest coppice stools are several just over 300cm in girth in a hedge alongside a footpath at Sarnau SN31355111, 1991. Among the largest trunks measured were dead ones 80-112cm in girth on coppiced bushes in a field hedge 2km ESE of Cribyn SN53825043, 1991 (NMW). Salter (Diary 13.5.1894) mentions that it was called Spanish Trefoil by the Welsh. Altitude limit (planted) 360m, Abergwngu SN870735, 1997 (AOC & JPW).



*Laburnum anagyroides* in hedges at Brynhoffnant, view SE from SN337519, May 1990



*Laburnum anagyroides* hedges, Penrhiw-pal, view W from SN343458, June 2004

**Laburnum ×watereri** (Wettst.) Dippel (*L. alpinum* × *anagyroides*)

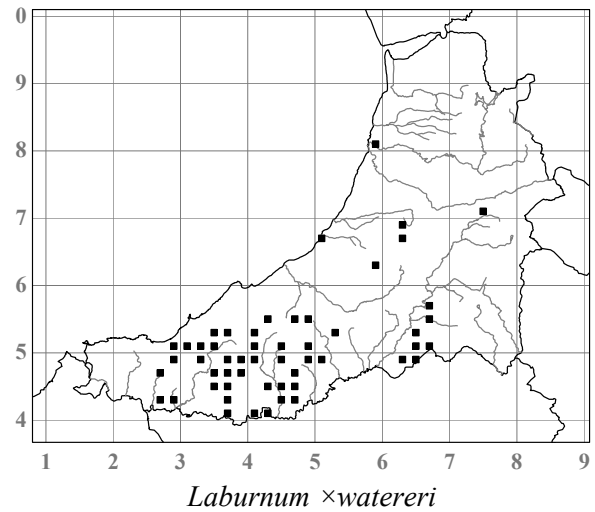
Much less frequently planted than *L. anagyroides*, and more often planted singly and maintained as a standard in Laburnum or other hedges, although it does form pure hedges in a number of places mostly in the same parts of the county. It grows more quickly than the species as well as flowering three weeks later, and has longer racemes and flowers of a slightly more lemon yellow. Good examples of hedges where it alternates with *L. anagyroides* are 1km E of Plwmp SN375525, 2004, and there are conspicuous pure hedges by the Pwntan Quarry, Tan-y-groes SN29034925, 2004 and near Croes-lan SN377451, 1993. E of Llanfair Clydogau c.SN65K, 1997-2008, there are numerous hedges of it, some trimmed and some overgrown, and it is the only Laburnum planted in this area; the largest tree measured here, near Esgair SN649512 in 2008, was 109cm girth.

The Cardiganshire trees have flowers 18-21mm long, whereas British garden material in the main herbaria has the flowers 14-18mm long. If they are a recognisable cultivar, '**Parkesii**', first raised in 1842, is the most likely one. Seedlings or obviously self-sown trees have not been noted, and the legumes contain

only 1-2(-3) seeds as against the (1-)2-4(-6) in our form of *L. anagyroides*. Roadside trees E of Capel Cynon SN38924942, 1991 (NMW), had trunks up to 100cm in girth. Altitude limit (planted) 360m, hedges by ruined farm 1.3km NW of Llyn y Gwaith SN661515, 1996 (NMW).

**Laburnum alpinum** (Mill.) J. S. Presl - Scottish Laburnum - Tresl Aur Alpadd

Although occasionally planted in gardens, this species has not been seen in hedges in the county but only as an amenity planting on the N side of the Cwm Rheidol Reservoir SN70727930, 2004 (NMW) and as a street tree by the Blaenannerch airfield SN246495, 1999 (NMW). Native of Europe.



**Cytisus striatus** (Hill) Rothm. - Hairy-fruited Broom - Banhadlen Godflewog

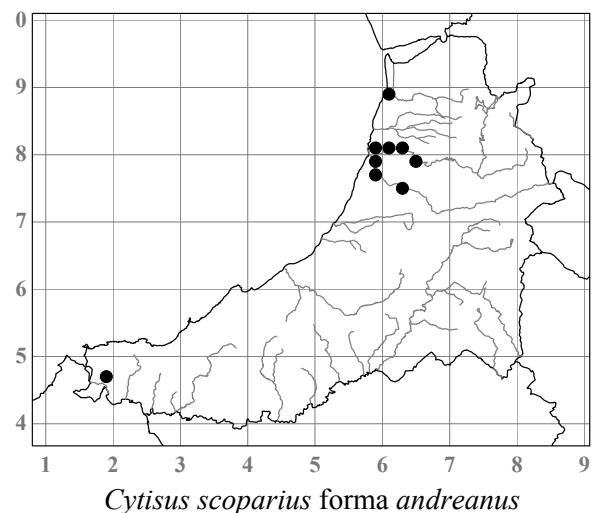
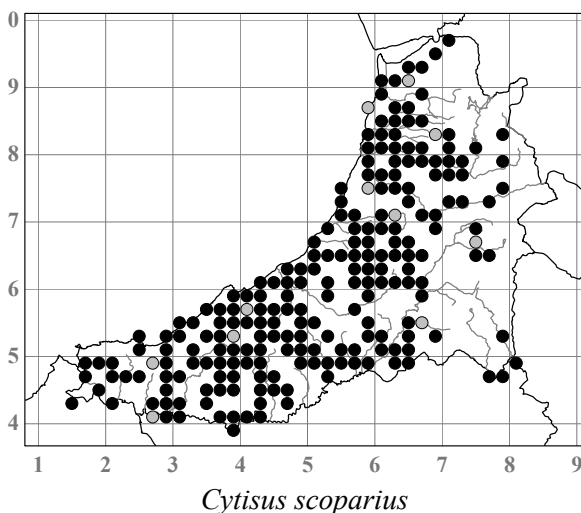
Planted along with *C. scoparius* on the slope above the A487(T) between Aberystwyth and Penparcau SN585808 in about 1970, and self-sown since then so that it is now naturalised along a 400m length, 2007 (Chater 1978, **BM**, **LTR**, **NMW**, det. BES). In about 1982 it was planted on a shaly slope above the A44(T), 1km WNW of Cwmergyr SN786829, at 350m altitude, and there too it has self-sown, though very sparingly, with one bush in 1987 and two in 1993-2005. It has also been planted on the University campus, Penglais, Aberystwyth SN59868205, 2006, where self-sown bushes grow; and on the S bank of the Teifi at Cardigan SN180458 although it has not yet become naturalised there, 1997. Native of Spain and Portugal.



*Cytisus striatus* on SW bank of A487(T), Aberystwyth, view NW from SN586808, May 1980

**Cytisus scoparius** (L.) Link subsp. **scoparius** - Broom - Banhadlen

Salter's description (1935) holds generally true: "Dry banks and waste places; generally, but rather sparsely distributed, especially in the half-cultivated upland districts, seldom in quantity sufficient to form a conspicuous feature comparable to a gorse-cover". There are however areas of dense Broom scrub on the



hillock behind Ynysfergi, Borth SN614896, 2005, in the valley above Mynachdy'r-graig SN559748, 1999, and in a few other sites. There is a striking abundance of wind-pruned bushes on the steep, shaly cliff slope above the sea by Carreg-y-ty, Llangranog SN301536, 2001, and a bush on shaly scree on Constitution Hill, Aberystwyth SN583826, 1996 (**Herb. SPC**, SPC), although prostrate from exposure and grazing, was also otherwise subsp. *scoparius*. A semi-prostrate bush 1m across and 25cm tall on mature dunes at Penyrergyd SN162487, 1979 (NMW), approached subsp. **maritimus** (Rouy) Heywood but the habitat was untypical. Forma **andreanus** (Puiss.) Zabel, with deep orange-crimson wings to the flowers, occurs as single bushes among normal plants at about ten sites, and usually appears native as on river shingle near Glanyrafon SN60608034, 1993 (NMW) and in the Broom scrub at Ynys Fergi SN614896, 2005 (SPC). There is a planted or self-sown bush of 'Cornish Cream', with yellow and white flowers, in scrub by the site of Capel Bangor Station SN647798, 1998 (NMW). Broom was sometimes used as an underthatch on rural cottages (William 1995). Altitude limit 455m, heathy roadside bank by felled conifer plantation, Bryn-y-rhyd SN681524, 2008.

### **Spartium junceum** L. - Spanish Broom - Banhadlen Sbaen

Occasionally planted in amenity sites, for example at the N end of Trefechan Bridge, Aberystwyth SN58308188, 1990-2005, and around car parks, but seen naturalised only by the railway 600m ESE of Aberystwyth station SN58968110, 2002-2008, where there are several self-sown flowering and fruiting bushes. It is native of the Mediterranean.

### **Genista tinctoria** L. - Dyer's Greenweed - Melynog y Waun

#### Subsp. **tinctoria**

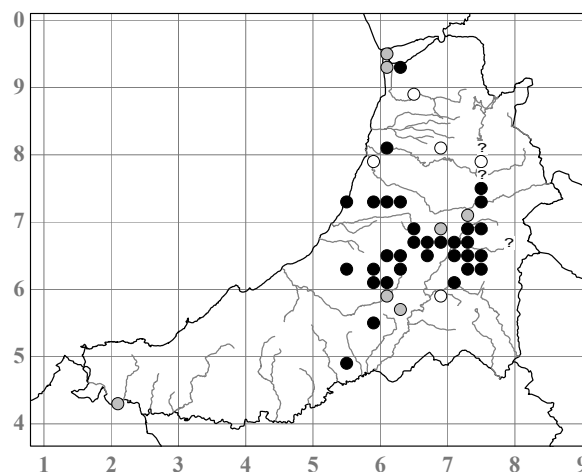
An occasional plant of rhos pastures, hay meadows, streambanks and other unimproved grasslands, chiefly in the middle part of the county and mostly between 150m and 300m altitude. Outlying occurrences have been of single plants in sandy grassland at Ynys-las at SN610940 in the 1950s, and at SN609938 in 1976 (JEH); a single plant in a pasture at the N side of Cors Fochno SN631920, 2004 (JPL), where it had perhaps been brought in with hay; and in Gwaun Penlan, Llechryd SN20354345, 1981; Salter (Diary 15.9.1905) had also received a specimen from the Llechryd area in 1905 (ETT). It has probably decreased less than *G. anglica*, having a wider ecological range, and is sometimes much more abundant than that species ever is, for example in pastures 1.5km S of Ysbyty Ystwyth SN728699, 1997 (MDS), or on roadside banks near Strata Florida SN749653, 1986-2003, near where Salter saw "golden sheets" of it in 1902 (Diary 22.7.1902). Altitude limit 330m, meadow 400m NNW of Cae'r-meirch, Pontrhyd-y-groes SN755741, 1996 (AOC & JPW).

#### Subsp. **littoralis** (Corb.) Rothm.

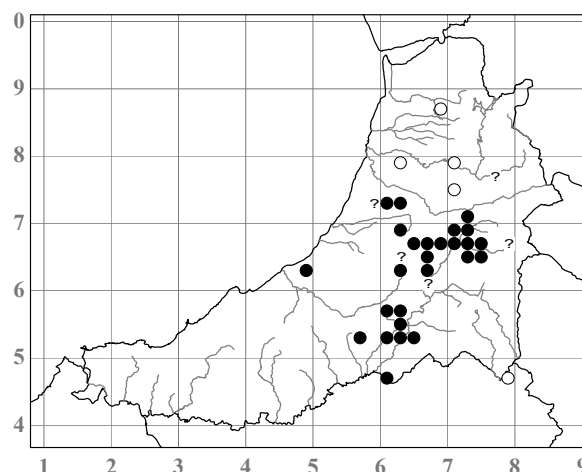
Plants in heathy grassland by the coast footpath at Penderi, Llanddeiniol SN55257333, 2008 (NMW, MPo; AOC) have prostrate-ascending stems and leaves averaging 3.4 times as long as wide, but glabrous legumes, and are the same form of this subspecies as occurs on the N coast of Cornwall and Devon (Stace 1997, French *et al.* 1999). Salter (1935) recorded the species on the coast "near Monk's Cave", so this was perhaps the same site and taxon, as was perhaps a plant known among *Prunus spinosa* on the sea cliffs close by at SN55207345 from 1975 (APa) until 1998 (ADQA).

### **Genista anglica** L. - Petty Whin - Cracheithinen

An uncommon dwarf shrub of wet heaths and damp usually heathy pastures in the middle of the county,



*Genista tinctoria* all records



*Genista anglica*



between 125m and 280m altitude. It has decreased considerably during the last 50 years or so because of drainage and ploughing, and it no longer occurs anywhere N of the Ystwyth where Salter (1935) knew it in four sites. It rarely occurs in any abundance, and is commonly associated with *Molinia* and *Erica tetralix* and sometimes with *Genista tinctoria*.

***Genista hispanica* L. subsp. *occidentalis* Rouy - Spanish Gorse - Eithinen Sbaen**

Native of SW Europe, and abundantly naturalised on the S-facing slope near the top of Constitution Hill, Aberystwyth SN583828 (NMW, BM, Chater 1978). There is a specimen collected in 1927 (BM) with an accompanying letter from Mrs B. Adamson of Bovey Tracey: "The *Genista hispanica* my daughter [a student at Aberystwyth] found growing in plenty on a bare hillside above Aberystwyth - far enough from anywhere, so I understand, for the idea of an escape not to occur to her or me." This must have been from the same locality, and as a "Luna Park" with paths and gardens was laid out on this hillside following the construction of the Cliff Railway in 1897 (Lewis 1980) the *Genista* probably dates from then. It is remarkable that Salter, who walked there regularly, never mentioned it. In 2004 it covered c.500m<sup>2</sup>, having increased by c.10% since 1977, and when in flower in May, with a brighter yellow than the surrounding Gorse, it can be easily seen from a mile and more away across the town.



Landscaping of Constitution Hill, Aberystwyth, view N from SN584824, 1890s postcard



Extent of *Genista hispanica* (bright yellow) on Constitution Hill, Aberystwyth, view NNW from SN58468242, May 2004



*Genista hispanica* on Constitution Hill, Aberystwyth, view S from SN584827, 3 June 1979

***Genista aetnensis* (Raf. ex Biv.) DC. - Mount Etna Broom - Banhadlen Etna**

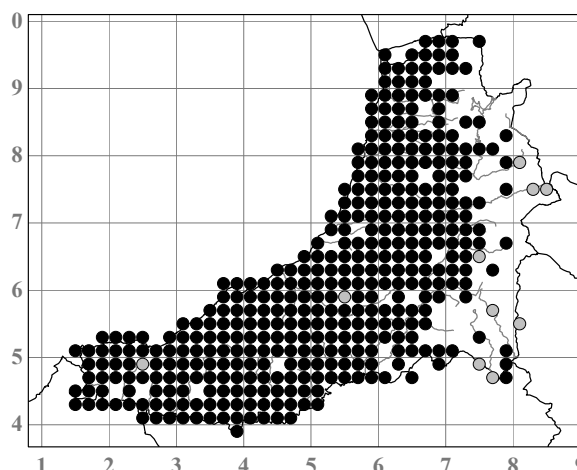
Planted as a street tree in Heol Tyn-y-fron, Penparcau, SN594802, 1993-2005, and on the University campus, Llanbadarn Fawr SN603811, 2004. Native of Sardinia and Sicily.

***Ulex europaeus* L. - Gorse - Eithinen Ffrengig**

Common throughout the lowlands in abandoned or undergrazed pastures, on steep slopes, in hedges and frequently spreading out from them into pastures, on river shingle and waste ground. Gorse is especially abundant on the coastal slopes, where extensive areas are often burnt, deliberately or accidentally, and regenerate rapidly by sprouting and by seed. Where there are mixed populations, as on Pendinas SN5880 and 5879, repeated burnings do not significantly alter the relative distributions of *U. europaeus* and *U. gallii*. The seasonality of flowering varies greatly, in some years many populations may be in almost full flower in late autumn, while in other years most of the flowering may be delayed until spring. The extensive colony of c.25ha on the SW-facing sandy slope of Towyn Warren, Gwbert SN1648 usually flowers much less in autumn, and several weeks later in spring, than those over most of the rest of the county. Is it possible that

this is a native population, and that it is an introduction elsewhere? There is a tendency for bushes near the coast to be lower, more compact and more densely hairy than those inland, but whether any are var. *maritimus* Hy is uncertain.

Gorse was widely cut for fodder, and in areas where Heather was unavailable it was used for underthatch in rural cottages (William 1995). It was also used for hedging. Wyndham (1775), when referring to his 1774 journey along the coast road from Llechryd to Llanarth, wrote: "Furze fences have lately been introduced, and we saw some of them thrive well on the earthen banks", although he later (1781) wrote, referring to his 1777 journey from Cardigan to Lampeter: "Several experiments had been tried in planting living fences on the earthen banks, but in vain; for here too, the various thorns, elders, hazel and birch were all decaying or decayed. The furzes flourished to a certain height, and then alas! underwent the same hard fate." Lloyd & Turnor (1794), writing of the planting of hedges on banks in the county, said that "Furze thrive well; but when they come to any size they are apt to shake down the banks of earth, which are not supported by layers of stone." Davies (1815) described how double or treble rows of furze were sown and the bushes coppiced or "hogg'd" to produce a Sheep-proof hedge, and that "In numerous instances, the mound [i.e. the bank] has two rows, one of hawthorn, and the other of furze: some very effectual fences of this kind were observed in Cardiganshire." Pure Gorse hedges can still be seen in many places, and at least sometimes are deliberately maintained as such.



*Ulex europaeus*, view ENE along coast path  
from SN448624 to Aberaeron, May 2006



*Ulex europaeus* hedges at Sarnau,  
view E from c.SN310508, May 2009

#### ***Ulex* × *breoganii*** (Castrov. & Valdés-Berm.) Castrov. & Valdés-Berm. (*U. europaeus* × *gallii*)

An apparently rare, if not overlooked hybrid, recorded from only five sites, at all of which both parents were present: scrub below Science Park, Llanbadarn Fawr SN597813, 2007 (SPC), but since destroyed; W slope of Pendinas, Aberystwyth SN581804, 1997 (conf. PMB), and 50m SSE of here, 1997 (NMW); SW-facing slope by footpath 400m WNW of Pont Nanternis SN370570, 1998 (AOC & JPW); W-facing slope at Llangranog SN310539, 1998 (AOC & JPW); and W-facing slope 400m N of Llanborth, Penbryn SN296526, 2001.

#### ***Ulex gallii*** Planch. - Western Gorse - Eithinen Fân

Common and often dominant on the coastal slopes, in heaths and heathy pastures, and on dry or well-drained heathy slopes and on the less heavily grazed sheepwalks in the uplands. The combination of its golden yellow flowers with the purple of *Erica cinerea* where the two grow mixed on coastal and upland slopes is one of the spectacles of the county, and especially fine displays can usually be seen on Penybaddell, Llangranog SN314547 on the coast, and just E of Craig y Pistyll SN714856 in the uplands. It is very sensitive to frosts and cold winds and whole populations in the uplands are often largely killed in cold winters and may take a decade or more to recover, for example on Banc Bwa-drain SN725804 and elsewhere in the 1987/1988

winter. Altitude limit 550m, head of the Nant y Moch, Pumlumon SN784862, Salter (Wade 1952), 2002 (AOC & PAS); 580m, rocks 400m ENE of the Llyn Llygad Rheidol dam, Pumlumon SN79538806, 2001.

**Ulex minor** Roth - Dwarf Gorse - Coreithinen

Very occasionally planted, for example in 1994 alongside the Vale of Rheidol Railway line by the sewage treatment works at Glanyrafon SN606802, and in 1992 at the S edge of the Aberystwyth golf course SN590823, but not yet becoming naturalised. It is native of parts of England.

**Cercis siliquastrum** L. - Judas-tree

There is a planted tree on the lawn at Llwynycelyn, Glandyfi SN690962, 2006, and one at Plas Gogerddan, SN631837, 2000. Native of the E Mediterranean and grown in Britain for at least 300 years.

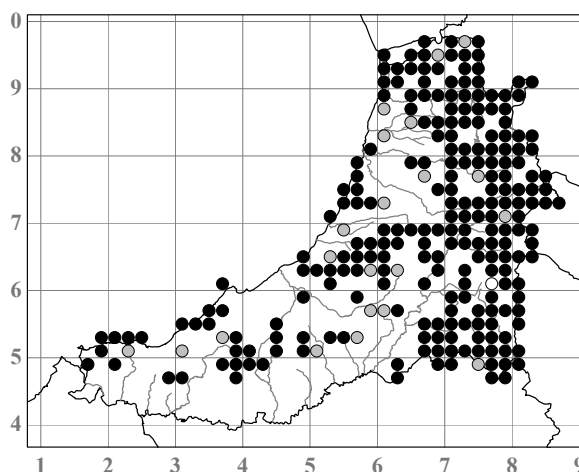
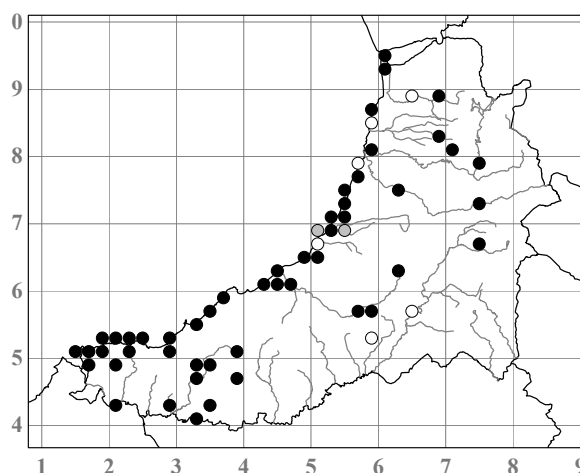
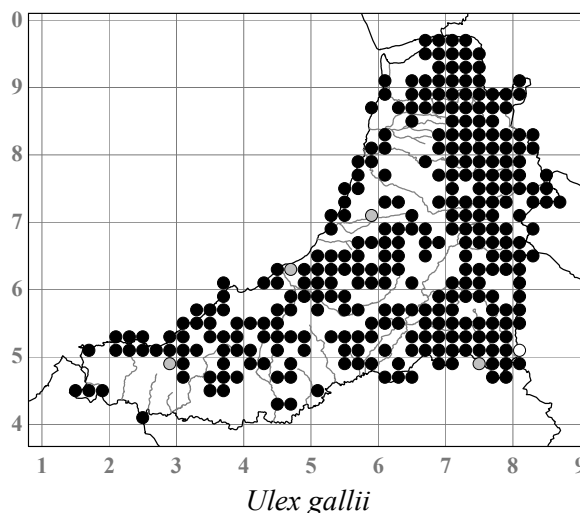
## POLYGALACEAE

**Polygala vulgaris** L. (*P. oxyptera* Rchb.) - Common Milkwort - Amlaethai Cyffredin

A frequent plant of sand dunes and grasslands on the coastal slopes. Inland it is uncommon, and occurs chiefly in unimproved neutral pastures, especially on the drier mounds in rhos pastures, on S-facing grassy slopes, and on base-rich lead mine spoil. The highest altitude it has been seen was at 260m, in pasture ENE of Caemadog, Strata Florida SN756665, 1994. Varieties have not been systematically investigated, but var. **vulgaris** has been recorded in neutral pasture at Ffosyrodyn, Blaenpennal SN62596353, 2004 (NMW); var. **intermedia** Chodat in neutral pasture on the E side of Pendinas, Aberystwyth SN58588057, 2007 (NMW); var. **dunensis** (Dumort.) Buchenau on the mature dunes at Ynys-las SN606941, 2007 (NMW); and var. **caespitosa** Pers. in heathy grassland above sea cliffs on the MoD site, Aber-porth SN24305250, 2007 (NMW). Plants with the characters of subsp. *collina* (Rchb.) Borbás have been found on the Ynys-las dunes SN608940, 1993 (SPC), in neutral grassland at Dolau Hafod SN57405795, 1996 (NMW) and in Gartheli churchyard SN586567, 1998 (NMW), but intermediates with subsp. *vulgaris* occur with them, the characters are not well correlated, and it is clearly not worth recognising.

**Polygala serpyllifolia** Hosé (*P. serpyllacea* Weihe) - Heath Milkwort - Amlaethai'r Waun

A common plant of both dry and wet heaths, raised bogs and blanket bogs, the drier parts of rhos pastures and other more acidic grazed grasslands, upland sheepwalks, rock ledges and the coastal cliff slopes. In comparison with *P. vulgaris* it is much more an inland and upland plant. Our plants all appear to be var. **serpyllifolia**. Gentian-blue is the usual flower colour, but white- and pink-flowered plants are frequent often in the same locality. Altitude limit c.610m, Pumlumon ("to between 1,750 and 2,000 ft.", Salter 1935); 620m, Carnfach-bugeilyn SN826904, 1991.





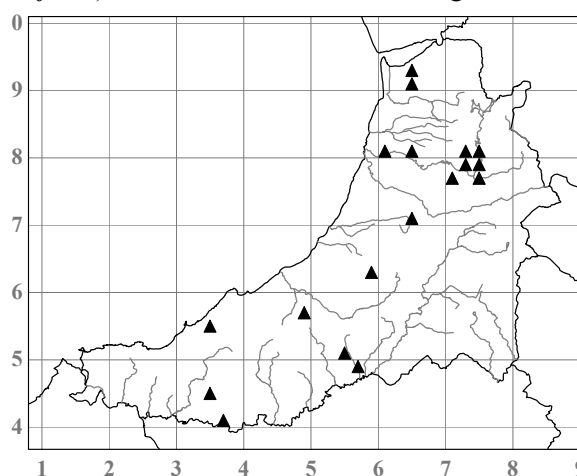
## ROSACEAE

[*Spiraea salicifolia* L. - Bridewort - Erwain Dail Helyg

It is not known to which of the various species and hybrids nowadays recognised that the early records of this species referred, but most were probably *S. ×pseudosalicifolia*; *S. salicifolia* itself has not been confirmed in the county. Several authors mistakenly supposed that the bushes they saw were native. J. E. Smith (1828) wrote: "I believe it to be wild also at Hafod, Cardiganshire [c.SN77R], the situation in which it grows being perfectly similar to its native swamps in the north of Europe"; Turner & Dillwyn (1805) precisified Smith's record to "In a wood at Hafod, near a gate, in the Eastern approach to the House". Lees (1841) wrote: "On a wild common about midway between Aberystwith and Cardigan, I observed a number of tall plants of this species, but it was very near a part recently enclosed, and therefore a half doubt arose whether they might not have been planted. But there was no garden or habitation near, and no soul about the desolate spot of whom to make the enquiry". Salter (1935) described it as "Frequent as a denizen, i.e. a long and thoroughly established alien.... It is occasionally planted to form a hedge".]

***Spiraea ×pseudosalicifolia*** Silverside (*S. douglasii* × *salicifolia*) - Confused Bridewort - Ffug Erwain-dail-helyg

The commonest taxon in the county, recorded as planted and naturalised by suckering in c.20 sites. Most are along roadsides where it often forms pure stretches, for example, by the A482, 3.5km WNW of Lampeter SN559507, 1979 (NMW, det. AJS) - 2005, but it also grows in scrub in a few sites, for example at the top of the Rheidol gorge 100m NE of the George Borrow Hotel, Ponterwyd SN748807, 1978 (NMW, det. AJS) - 2005. Altitude limit 340m, naturalised by suckering, scrub slope N of Pen-yr-hen-rhiw, Ystumtuen SN740794, 1991-2005.



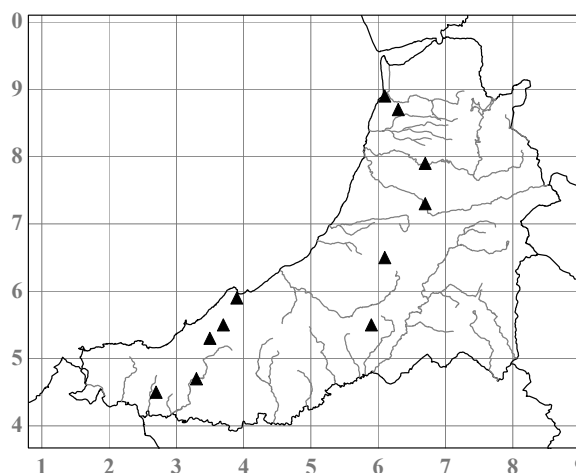
*Spiraea ×pseudosalicifolia*

***Spiraea ×rosalba*** Dippel (*S. alba* Du Roi × *salicifolia*) - Intermediate Bridewort - Erwain Gwridog

The first record was of a patch 3m long on a roadside bank at Rhydcathal, NE of Rhydowen SN462471, 1979 (NMW, det. AJS). It has also been recorded forming 3m of a roadside hedge 350m NNW of Penyrcoeduchaf near Betws Bledrws SN57885283, 1991 (NMW, det. AJS), and from the Upper Forest conifer plantation, Lampeter SN5749, 2004 (DB). All these colonies, with deep rose-pink flowers, are referable to nothovar. **rubella** (Dippel) Silverside. Two other colonies, in hedges 1.5km S of Dihewyd SN484546, 1982 (NMW) - 2006 (AOC & JPP) and W of Pontsian SN425467, 1982 (NMW) - 1998, were considered by Silverside (1990) to appear to be referable to nothovar. **rosalba**.

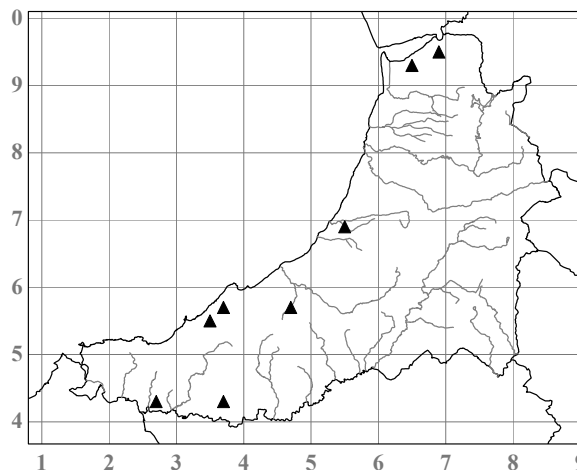
***Spiraea ×billardii*** Hérincq (*S. alba* Du Roi × *douglasii*) - Billard's Bridewort - Erwain Billard

Var. **billardii** is occasionally planted and naturalised by suckering in hedges in several parts of the county, and first recorded from a roadside hedge at Ponthirwaun SN262452 in 1980 (NMW, det. AJS). Isolated bushes and small thickets, whether planted or from throw-outs is unknown, have been recorded from a grassy area by the Glanrhyd-ty-noeth gravel pits, Capel Bangor SN667783, 1994 (NMW) and from scrub on a slumping clay slope on the coast at New Quay SN392594, 1998. Bushes forming a roadside hedge 100m W of the Rhydpennau school SN627862, 1995-2008 (AOC & JPP) are var. **macrothyrsa** (Zabel) J. Duvign.



**Spiraea douglasii** Hook. subsp. **douglasii** - Steeple-bush - Erwain Douglas

Conspicuous by the whitish tomentum on the under surface of its leaves, this species has been planted, and naturalised by suckering, in hedges in several parts of the county. It forms pure hedges in several places: by the millpond 600m ENE of Llanrhystud church SN543698, 2001; on the roadside by the Afon Mydr at Cwmwenallt SN465565, 1992-2006 (AOC & JPP); by the lane to Rhandir, Penbontrhydyfothau SN357547, 1994; and around much of Capel Tygwydd graveyard SN271436, 1991-2005 (NMW). In roadside hedges S of Pwll-y-wheel, Pontgarreg SN352540, 1992 (NMW) - 2006 (AOC & JPP) lengths of 75m, 10m and 5m are interspersed with lengths of *S. ×pseudosalicifolia*. Scattered bushes grow in roadside hedges 100m E of Llancynfelyn church SN647921, 1998, and at Brynderw, Penrhiw-llan SN375425, 1999. Native of W North America.

**Spiraea japonica** L. f. - Japanese Bridewort - Erwain Japan

Naturalised by suckering in a hedge below the A487(T) in Aber-arth SN479639, 1980 (NMW, det. AJS). It was also seen growing from buried bushes in dumped rubble by the boatbuilding yard, Ynys-las SN616933, 2006 (AOC & JPW). Native of E Asia.

**Spiraea canescens** D. Don - Himalayan Spiraea - Erwain Himalaiaidd

Naturalised in rocky scrub by an old cottage site at the Allt Goch quarries, Cwrtnewydd SN491483, 1991 (NMW) - 2006 (AOC & JPP), and several bushes, at least some of which appeared self-sown, were found in scrub at the edge of estate woodland at Derry Ormond SN591523, 1993 (NMW). Native of the Himalaya.

**Spiraea ×vanhouttei** (Briot) Carrière (*S. cantoniensis* Lour. × *trilobata* L.) - Van Houtte's Spiraea - Erwain Van Houtte

Naturalised by suckering along two stretches, 3m and 2m, of roadside hedge 100m SW of the Neuadd-lwyd chapel SN473595, 1997 (NMW) - 2006 (AOC & JPP).

**Prunus dulcis** (Mill.) D. A. Webb - Almond - Coeden Almon

Occasionally planted in amenity areas or as a street tree, for example on the verge of Primrose Hill, Llanbadarn Fawr SN603812, 2005. Native of SW Asia and long grown in Britain.

**Prunus ×amygdalopersica** (Weston) Rehder '**Pollardii**' (*P. dulcis* × *persica*)

There are three planted trees by the Day Centre at the NW end of Park Avenue, Aberystwyth SN58458150, 2005.

**Prunus persica** (L.) Batsch - Peach - Coeden Eirin Gwlanog

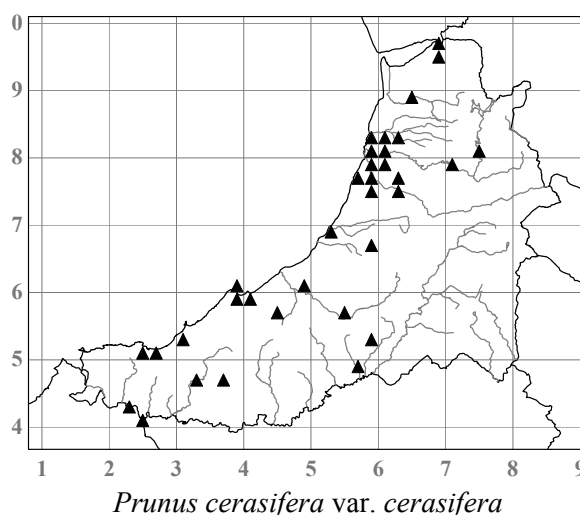
Davies (1815) wrote that his assistant, Edward Williams (Iolo Morganwg), "never saw finer peaches, or ripened in greater perfection, than in the Revd Mr. Millingchamp's fine fruit-garden at Trevor." This is presumably an error for Plas Llangoedmor SN197459 where Millingchamp lived, and Vaughan (1926) wrote that Peaches, as well as Apricots (*P. armeniaca* L.) still fruited well there. Native of China and long cultivated in Britain.

**Prunus cerasifera** Ehrh. var. **cerasifera** - Cherry Plum - Coeden Goeg-geirios

Frequently planted and naturalised in hedges, copses and woods in the lowlands and conspicuous by its early flowering in February or even late January, but probably much under-recorded. Fruits have been seen at only three sites in recent decades, along a hedge at Pantgwyn Villa, Chancery SN58307693, 1992 (NMW), with a strong, sharp, pleasant taste; nearby in a copse at Ffosrhydgaled SN57807653, 1992, where the fruits were insipid; and along the roadside by the Afon Evan, New Quay SN38975938, 1992, again with insipid fruits. The frequency with which Cherry Plum occurs, especially in woods and scrub in places where it is unlikely to

have been planted, suggests that it may have fruited more widely in the past. It is generally said not to sucker, and suspected clonal thickets of it in woods and scrub always turn out to be a glabrous state of *P. spinosa*. Native of SE Europe and SW Asia and long grown in Britain. Maximum 107cm girth, 8m tall, in a field just NE of Glandyfi Castle SN693967, 1994 (AOC & WMC).

Var. **pissardii** (Carrière) L. H. Bailey ('Pissardii') is occasionally planted as a street tree and in amenity areas, especially around Aberystwyth and in Penparcau, but is surprisingly rare in the county. 'Nigra', with deeper pink flowers, is even less frequent as a street tree; two were planted by the road 400m NNE of Eglwys Fach church SN68749576, 1993-2005, and it was occasionally planted in copses and elsewhere in the wild, for example by the Afon Ceulan in a pasture 200m E of Tal-y-bont church SN65858977, 1998-2005, in scrub E of Bronpadarn, Llanbadarn Fawr SN603809, and by Pont Glan-mad, Aber-mad SN599757, 1993.

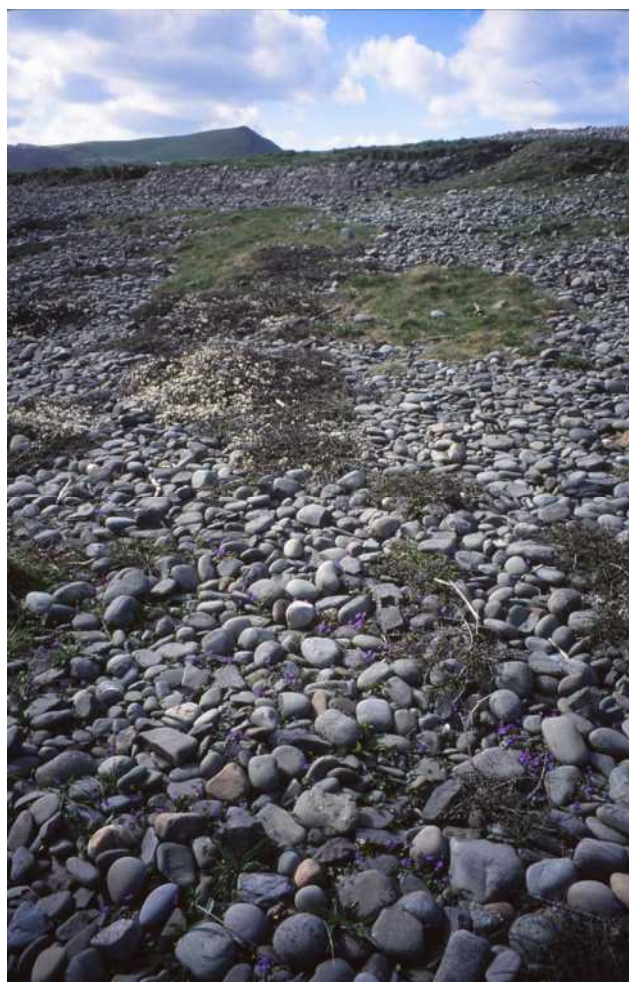


### ***Prunus spinosa* L. - Blackthorn - Draenen Ddu**

A very common shrub of hedges, scrub and woodland, often forming extensive thickets especially on the coastal slopes and in dingles and ravines by the sea. It is very salt-tolerant, and even grows in the estuarine Alder-carr in Rosehill Marsh, Cardigan SN189454, 1990-2004. It suckers rapidly into abandoned or under-grazed pastures. Flowering and fruiting vary greatly in abundance from year to year, and were unusually prolific throughout the county in 1991. There is enormous variation in habit, morphology and time of flowering and leafing between populations. Densely spiny bushes with short, divaricate twigs, dense bunches of flowers well before the leaves emerge and small fruits with subglobose stones, are frequent, and have been named forma **densiflora** (Jord.) P. D. Sell, and grade into forms that are scarcely spiny, with longer, less divaricate twigs, sparse flowers coming out later with the leaves, and larger fruits with somewhat flattened stones. These in turn grade into what are assumed to be *P. ×fruticans*, and it is impossible to tell how much of the variation is due to hybridisation.



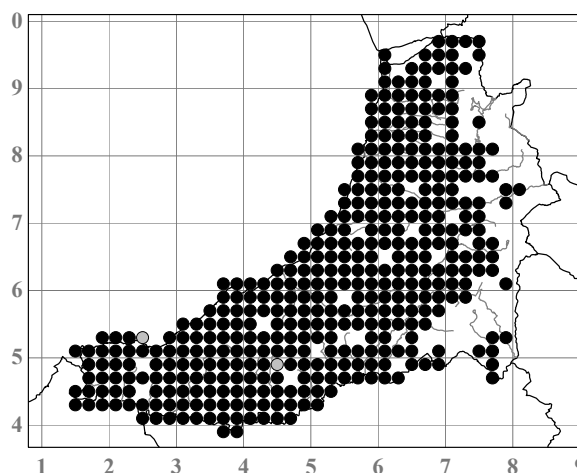
Prostrate *Prunus spinosa* on back of Tan-y-bwlch beach in 1910 (from Yapp 1911)



Prostrate *Prunus spinosa*, Tan-y-bwlch beach, view S from SN58008050, April 1998



Prostrate and often dwarf bushes occur on exposed screes both on the coast, for example between Borth and Wallog c.SN595873, 1976-2005, and inland, for example by the Nant Bwa-drain waterfall, Cwm Rheidol SN714790, 1992-2005, but whether there is a genetic element in their habit is unknown; they are presumably var. **prostrata** Druce. On the landward side of Tan-y-bwlch Beach, Aberystwyth SN58008050 there are completely prostrate patches of Blackthorn on otherwise bare shingle. A 1910 photograph (Yapp 1911) showed them much as they still are nearly a century later, and Yapp wrote of the two bushes shown that “The larger is of considerable age, probably not much less than a century old.” Salter (1935) described them as “probably of great age”, and in 1938 (Diary 16.6.1938) reported, prematurely as it turned out, “the blackthorn bushes uprooted and killed” by a storm, and the next year (Diary 20.6.1939) he wrote that “The stunted blackthorn bushes are now nearly all dead or overwhelmed.” In 1979 there were c.20 patches in an area 15 × 6m, and in 2001 there were c.55 patches in an area 27 × 10m. In this latter year, A. Cresswell and M. Hayes, IGER, used DNA fingerprinting on samples from nine of these patches and from seven other bushes in the neighborhood, and the results indicated that the former were all the same plant, or at least the same clone, and were distinct from the latter. Whether the patches on the shingle are the tips of the branches of a deeply buried tree, or whether they are separately rooted plants connected by suckers, is unknown; Salter’s 1938 observation perhaps suggests the latter. They flower and fruit well.



Blackthorn, along with Hawthorn, has always been widely planted for hedging (Lloyd & Turnor 1794). Wmffre (2004 p.1046) gives the old name for Gelli SN703799 as Celli’reirin, a place 400m to the W having been a noted site for collecting Sloes. Blackthorn becomes rare or absent in the uplands. Altitude limit c.305m (“to about 1,000ft.”), (Salter 1935); 405m, two bushes, probably originally planted, by Tywi Fechan ruin SN791612, 1992.

#### **Prunus ×fruticans** Weihe (*P. domestica* × *spinosa*)

Bushes intermediate between Black Bullace and Blackthorn, with leaves more like those of the latter and fruits 16-21mm and the stones 10-15mm, have been variously described as hybrids or as *P. spinosa* forma *macrocarpa* (Wallr.) P. D. Sell. They are occasional in hedges and scrub and by farms, and every intermediate occurs between them and the presumed parents.

#### **Prunus domestica** L.

##### Subsp. **domestica** - Wild Plum - Coeden Eirin Gwyllt

This archaeophyte was said by Salter (1935) to be, compared to subsp. *insititia*, less frequent and “evidently a ‘denizen’, a relic of, or escape from, cultivation”. Several informants have told me that Wild Plums they knew in the past in hedges have stopped fruiting in recent decades, sometimes because of too much pruning but perhaps also sometimes because of too little, and as they are almost impossible to identify in the absence of fruit many occurrences may have been missed. Early references to Wild Plums may often have referred to Bullaces. At only three sites have fruiting bushes been recorded since Salter’s day: several bushes in the roadside hedge just S of Pont Gogoyan SN6454, 1975; several bushes in the E hedge of the A484 road bordering an abandoned garden 250m WSW of Stradmore SN247416, 1992, their fruits 35-45 × 30-35mm, dull purple, slightly sour, slightly adherent to the stone, with the stones 25-28 × 11-13 × 8mm; and one bush at the corner of a copse 100m NW of Ffosrhydgaed, Chancery SN57817654, 1992, its fruits 33-40 × 32-37mm, yellowish-red, sweet, not adherent, with the stones 18-20 × 13-16 × 9-10mm. Native of SW Asia and long grown in Britain.

##### Subsp. **insititia** (L.) Bonnier & Layens var. **nigra** Asch. & Graebn. - (Black Bullace)

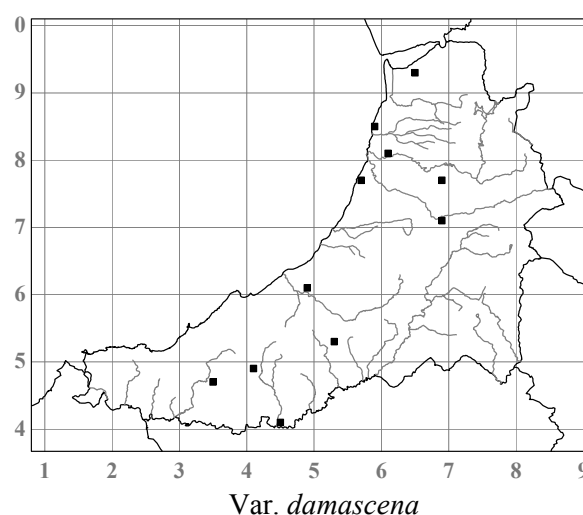
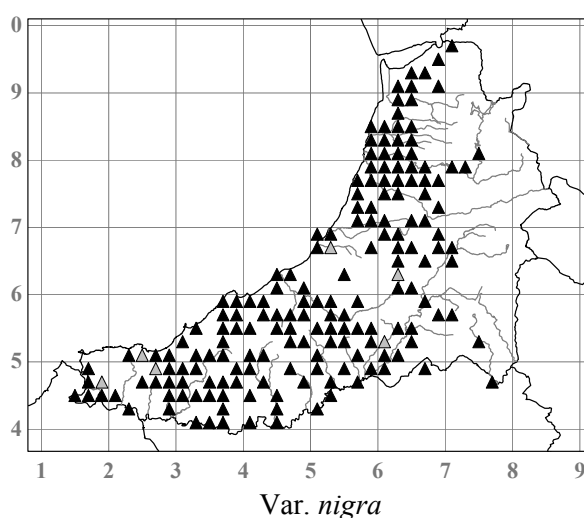
Frequent in hedges throughout the county, and occasionally in deserted garden sites and by farms and cottages. The fruits of the Black Bullaces in Cardiganshire are mostly slightly sweet or insipid and only very occasionally slightly astringent to the taste, whereas in much of the rest of Britain they tend to be distinctly astringent. They fruit freely in most years. The plants are very variable in many other characters such as flower-size, pubescence of stems, shape, toothings and rugosity of leaves, and shape and size of fruits and stones, and are often difficult to distinguish from the other varieties and subspecies, and from *P. spinosa*. Davies (1815)

wrote that “The great frequency of bullace trees in the fences of the western coast of Cardiganshire, and Pembrokeshire, with the size of the fruit, shew the natural geniality of the climature for the production of superior fruit. In more inland places, sloes are frequent, and bullace very rare.” Marshall (1900) recorded Bullaces as abundant in hedges in the Aberaeron area SN46. Among many collections made recently are ones from a laneside hedge 500m E of Wallog SN600858, 1996 (CGE, conf. PDS), with slightly sweet fruits  $19-21 \times 19-22$ mm; and from a roadside hedge just NE of Pont Tany Castell, Llanychaiarn SN58917880, 1999 (CGE, conf. PDS), with slightly sweet fruits  $17-22 \times 19-21$ mm. Altitude limit (probably planted) 360m, by Gwarallt ruin, 3km ESE of Tregaron SN703577, 1993.

White Bullace, var. *syriaca* (Borkh.) Koehne, and Gages, subsp. *italica* (Borkh.) Hegi, have not been seen in the wild but the latter at least is grown in gardens.



*Prunus domestica* subsp. *insititia* var. *nigra*,  
Pont Tany Castell, Rhydyfelin, view NE  
from SN58917880, April 2009

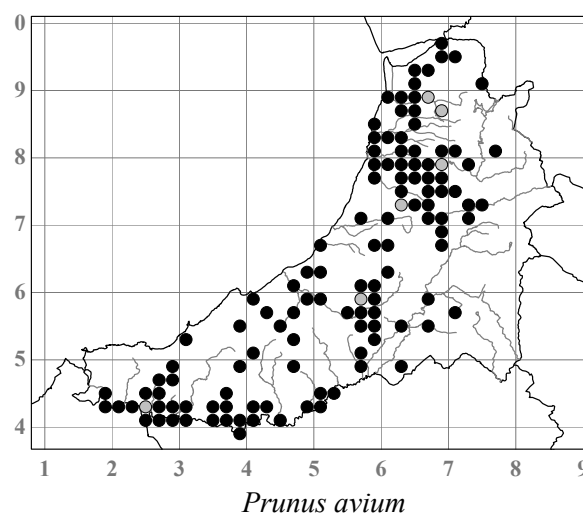


Subsp. *insititia* (L.) Bonnier & Layens var. **damascena** L. - (Damson)

Damsons are occasionally found in abandoned orchards and in hedges. They generally seem to fruit better than the Wild Plums, although at a few sites, for example around the ruin of Pantyrhedydd, Blaencribor SN403484, 1996, I have been told that the trees are much less prolific than in the past. Among the dozen recent records are ones of several trees in a hedge by Pen-y-graig, Craigypenrhyn SN653926, 1997 (AOC & TDD); a shapely tree in a paddock, formerly an orchard, just SW of Pont Llanafan SN686713, 1996-2005, since gone; and a tree in a laneside hedge 200m NW of Hawen Hall SN343469, 1995 (NMW). Several trees in a hedge E of the Coach House, Frongog, Llanbadarn Fawr SN61448127, 1995 (NMW) are probably ‘**Langley Bullace**’, a Damson cultivar sometimes considered to be a hybrid with subsp. *domestica*.

***Prunus avium* (L.) L. - Wild Cherry - Coeden Geirios Du**

An occasional tree of woods, copses and hedges in the lowlands, chiefly in the more fertile mixed woodlands in many of which it is presumably native, and absent from most of the more acidic *Quercus petraea* woods. It is also widely planted, especially in estate woods, in hedges and as a street and amenity tree, and its native distribution must remain uncertain. It spreads by suckers as well as by seed,



and extensive clonal thickets are often seen, for example in a pasture at Figure Four SN58557750 where *c.*60 trees ranging in girth from 8 to 188cm grow in an area 35 × 30m, 2004. The double cultivar ‘*Plena Alba*’ grows as a planted tree in estate woodland at Ynys-hir SN68219603, 2001, in graveyards and as a street tree in the main towns. Another cultivar, single, with a low, rounded canopy, is also an occasional street tree. Maximum *c.*450cm girth, Cwm Woods *c.*SN6083, Salter (1935: “The old cherry-trees in the Cwm woods, Aberystwyth, were falling with age when they were felled, at probably about 120 years old. The largest one seen must have been 15ft. in girth when in its prime”). Recent maximum 352cm, edge of conifer plantation 250m WSW of the Hafod mansion site SN75697312, 1991. Altitude limit (planted) 360m, by Gwarallt ruin, 3km ESE of Tregaron SN703577, 1991.

***Prunus* ×*schmittii* Rehder (*P. avium* × *canescens* Bois) - (Schmitt’s Cherry)**

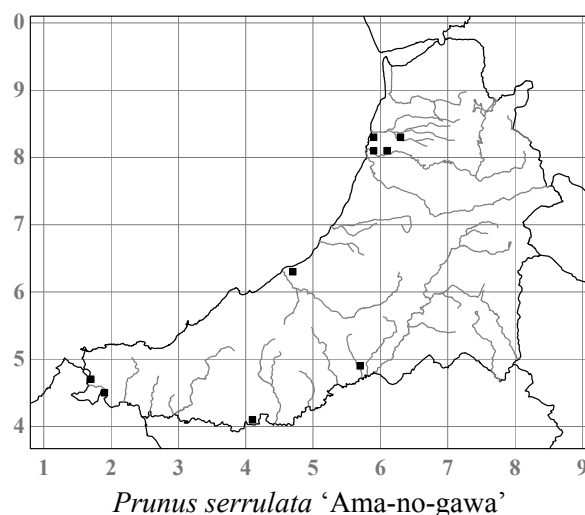
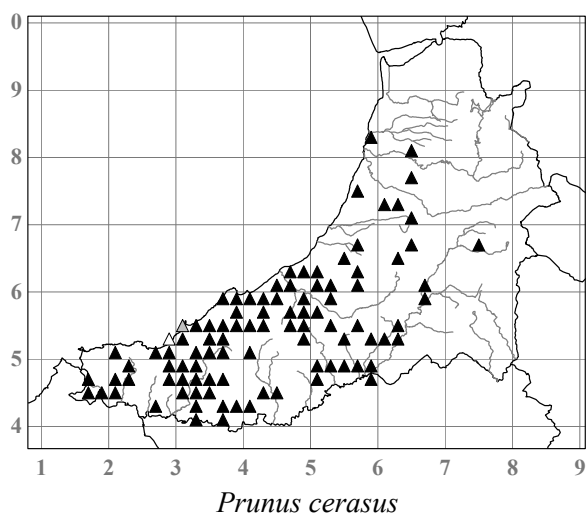
This fastigate Cherry raised in the USA in 1923 has recently become a popular street tree, planted in six streets and amenity areas around Aberystwyth, notably in Portland Street SN58328183, 2004, and at the Parc-y-llyn development SN59488059, 2004. Maximum 101cm girth, 9m tall, Iorwerth Avenue, Aberystwyth SN59008160, 2004.

*Prunus* ×*schmittii* in Portland Street, Aberystwyth, view W from SN583818, April 2010



***Prunus cerasus* L. - Dwarf Cherry - Coeden Geirios Coch**

Frequently planted and naturalised in hedges chiefly in the SW half of the county, both alongside roads and in field hedges, but rarely seen in scrub or woodland. In a few cases pure hedges were planted of it, for example by the A487(T) 1km E of Aberaeron SN471633, 1996-2007, around Pontgarreg SN34M etc., 1992 (NMW) - 2004, and at Penbryn SN287513 etc., 1992-2004, but usually there are only scattered bushes or short lengths of it; it suckers vigorously. The record in Morgan (1949) from the “Melindwr Woods” *c.*SN68Q probably refers to *P. avium*, Purchas (1848) lists it (as *Cerasus austera*) with a query, and the first reliable record is by Marshall (1900) who noticed it “occasionally [about Aberaeron], but only as an obvious introduction” in 1899. Native of SW Asia and long grown in Britain. Altitude limit 305m, with *Berberis vulgaris* in the roadside hedge opposite Lluest-fach, Ffair-rhos SN74856772, 1998.



***Prunus serrulata* Lindl. - Japanese Cherry - Coeden Geirios Japan**

Many cultivars of this native of China and Japan known as Japanese Cherries have been widely planted as street trees and in amenity areas, mostly in towns and villages in the lowlands. They have mostly been named using Kuitert (1999), but a few trees remain unidentified. Most of them do not set seed or spread vegetatively, and are grown grafted, or rarely from cuttings.



### **‘Ama-no-gawa’**

Some 20 trees of this fastigate cultivar have been noted, mostly street and amenity trees in the main towns. One of two in Queen’s Square, Aberystwyth SN585819, 2001, was, according to its label, “presented by the mayor [of] Kayacho Japan as a token of friendship” in 1987. Among the others is one in Llandysul churchyard SN419407, 2001, several old ones in the grounds of Plas Gogerddan SN629836, 2001, several on the University campus, Llanbadarn Fawr SN603812, 2001, one in the St David’s College grounds, Lampeter SN578482, 2001, and one in the Cardigan hospital grounds SN181459, 2001.

### **‘Ariake’**

One tree on the N verge of Primrose Hill, Llanbadarn Fawr SN60308125, 2005; the sepals are distinctly serrated and it might be referable to ‘Senrico’ if this were to be recognised as a separate cultivar.

### **‘Bendono’**

One tree in a shrubbery on the University campus, Penglais, Aberystwyth SN593818, 2001. This is one of the few cultivars in this group which is said to set good seed and come true.

### **‘Fudan-zakura’**

There are three old trees on greens in the Afallen Deg housing estate, Bow Street SN623848, 2001 (NMW), flowering much earlier than any other cultivar in this group of Cherries in the county.

### **‘Eugenzo’**

Two small, umbrella-shaped trees on the small green by the entrance to Ysbyty Cynfyn churchyard SN753790, 2001 (NMW) seem to be this cultivar but are poorly developed.

### **‘Fukurokuju’**

One tree about half way along Plas Crug, Aberystwyth SN58888119, 2001.

### **‘Horinji’**

There is a tall, spindly tree with flowering branches emerging from among a group of *Chamecyparis* trees in the cemetery on the A475 just W of Lampeter SN56804790, 2001 (NMW).

### **‘Kanzan’**

By far the most common, and garish, of this group of Cherries, with c.130 trees noted, mostly street and amenity trees in the towns and villages, but also as roadside trees by farms, in estate grounds and on the University campuses. There are trees in the churchyards at Eglwys Fach SN685955, 2001, Llanafan SN684720, 2001, Trefilan SN549571, 2001, and Llandysul SN419407, 2001. Several clones occur, with slight differences in time of flowering and other characters.

### **‘Kiku-shidare-zakura’**

One small tree of this weeping Cherry W of the old building in the grounds of St David’s College, Lampeter SN578482, 2001.

### **‘Ojochin’**

One small street tree near the entrance to Maesceinion, Waun Fawr, Aberystwyth SN605816, 2001.

### **‘Pink Perfection’**

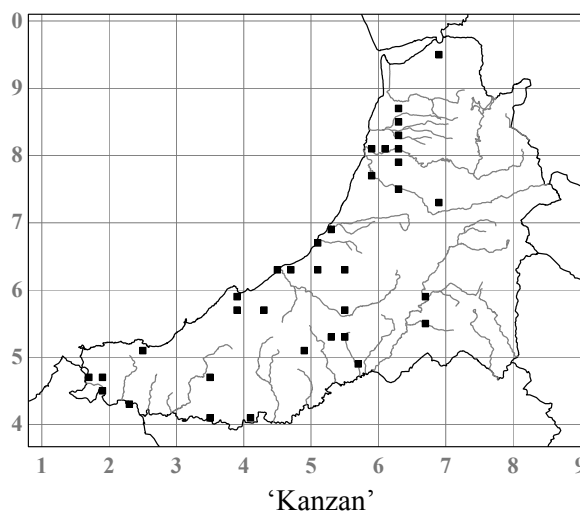
Perhaps overlooked because of its similarity to ‘Kanzan’, but of a more pleasing pink and flowering slightly later. Only two trees have been noted, one on the green between Heol Ystrad and Third Avenue, Penparcau SN59058017, 2001, where it grows by three ‘Kanzan’ trees; and the other by Gwbert road, just N of Victoria Gardens, Cardigan SN18204665, 2002, where the *P. avium* on which it was grafted flowers mixed with it.

### **‘Shirotae’**

This most extravagantly flowering of all the white Cherries has been planted in four places. In Eglwys Fach churchyard SN68539549, 2001 (NMW) a tree grows intertwined with *P. avium* ‘Plena Alba’. The N-most Cherry on the verge of the railway just N of the level crossing in Llandre SN625870, 2001 (NMW) is this cultivar; there is one on a green in Afallen Deg housing estate, Bow Street SN623848, 2001; and there is a tree at the S end of Victoria Gardens, Cardigan SN181465, 2001 (NMW).

### **‘Shogetsu’**

There is a small tree on the University campus, Llanbadarn Fawr SN604811, 2001, one by the entrance to the Queens Road bowling green, Aberystwyth SN58488202, 2005, and one by the A475 road S of St Peter’s church, Lampeter SN57504820, 2001 (NMW). A tree on the railway verge just N of the level crossing in



Llandre SN625869, 2001 (NMW), differs slightly from these others and may be either an unusual clone or a different cultivar. Three magnificently floriferous old trees in a paddock N of the A487(T) on Penglais Road, Aberystwyth SN59288192, 2001 (NMW) were planted in 1961 as 'Shiro-fugen'; although this is now considered a synonym of 'Shogetsu', these trees do not seem entirely typical.

**'Tai-haku'**

Five trees of this cultivar, with the largest and most delicate flowers in this group of Cherries, grow in the shrubbery by the bowling green in Aberaeron SN45916251, the largest 75cm in girth, 2001 (NMW), and there is one tree near the SE corner of the grounds of Ynys-hir Hall, Eglwys Fach SN68329580, 2006.

**'Taoyame'**

One tree on the University campus, Llanbadarn Fawr SN604811, 2001.

**'Ukon'**

Nine trees of this cultivar with creamy greenish flowers have been noted. An old tree is in the grounds of Plas Dolau SN62258135, 2005. In Penparcau there is one near the SE end of Maes Maelor SN589803, 2001, and two near the SE end of Heol Ystrad SN591801, 2001 (NMW). One has recently been planted on the verge of Primrose Hill, Llanbadarn Fawr SN603812, 2006, and there are two poorly grown trees in the Llanilar school grounds SN624752, 2001. The larger of two trees in the shrubbery by the bowling green in Aberaeron SN45916251, 2001, was 59cm in girth, 2001, and there is one near the S end of Maeshenffordd, Cardigan SN181463, 2001.



*Prunus* 'Ukon' and 'Kanzan', Maes Maelor, Penparcau, view NNW from SN589803, April 2004

***Prunus incisa* Thunb. × *sargentii* Rehder**

'Spire' is a frequent street tree in Britain, but the only one noted is in Iorwerth Avenue, Aberystwyth SN590817, 2001.

***Prunus campanulata* Maxim. × *kurilensis* Miyabe**

An old, grafted tree of 'Kursar' in the forecourt of the Cambrian Printers works in Llanbadarn Fawr SN60078078 is (except for *P. subhirtella* 'Autumnalis') the earliest flowering and one of the most striking of all the ornamental Cherries in the district, coming out as early as the earliest *P. cerasifera*, and turning a vivid orange in autumn, 1994-2008. There is also a small, poorly grown specimen in Maes Maelor, Penparcau SN58928042, 1994-2005. This hybrid was raised by Collingwood Ingram.



*Prunus* 'Kursar', Llanbadarn Fawr, view NW from SN60078078, March 2010



*Prunus* 'Kursar', Llanbadarn Fawr, view NW from SN60078078, October 2005

### ***Prunus sargentii* Rehder - (Sargent's Cherry)**

There is a big planted tree in Eglwys Fach churchyard SN685955, 2001 (PSC & AOC), and another on the railway bank just N of the level crossing in Llandre SN625870, 2001. Native of E Asia and introduced to Britain in 1893.

### ***Prunus sargentii* × *subhirtella* Miq.**

Rather rarely planted for ornament, always as 'Accolade'. A very floriferous bush just SE of Pont Pen-y-bont, Penparcau SN59438025, 1993, was destroyed in 1996. There is an old tree in the Penglais dingle, Aberystwyth SN595821, 2005 (NMW), three in the grounds of the former Ardwyn school, Aberystwyth SN59188158, 2002, several on the University campus, Penglais, Aberystwyth c.SN595817, 2004, and a recently planted one on the Cae Job housing estate, Penparcau SN58927998, 2004.

### ***Prunus serrula* Franch. - Tibetan Cherry**

A tree planted in 1982 in the Trawsgoed grounds SN66987313 was 45cm girth and 5m tall in 1994. Native of W China and introduced to Britain in 1908.

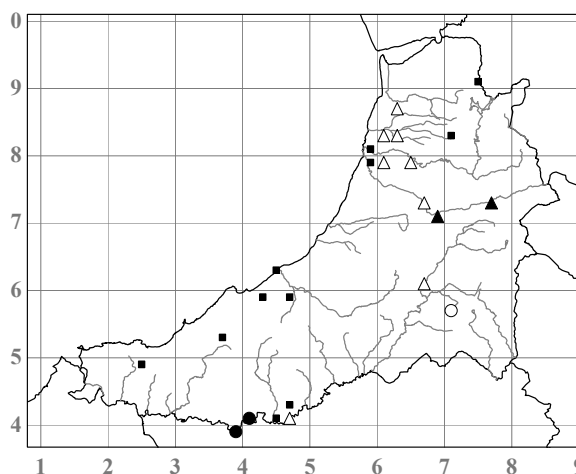
### ***Prunus* × *subhirtella* Miq. (probably *P. incisa* × *pendula* Maxim.)**

'Autumnalis' is occasionally planted as a street and amenity tree, and is conspicuous for its flowering throughout the winter. There are two trees in Eglwys-fach churchyard SN685955, 2005, several on the University campuses at Aberystwyth, one on the road by the Science Park at Llanbadarn Fawr SN59948128, 2002, one on the green in Maesceinion, Waun Fawr SN60488198, 2002, one in the Holiday Village, Aberystwyth SN58568096, 2004, and one in the Trawsgoed grounds SN67027300, 1994. Some of these may be 'Autumnalis Rosea', but the distinction is very slight.

### ***Prunus padus* L. - Bird Cherry - Coeden Geirios yr Adar**

It has long been noticed that Bird Cherry is rare or absent in Cardiganshire, in contrast to its frequency in Radnorshire and Montgomeryshire. Davies (1815) wrote: "Though this shrub, together with the spindle and dog-trees, are pretty common in the fences of East Wales; yet we did not observe a single plant of either of them in the counties of Cardigan and Pembroke." Salter (1935) wrote: "Not at all frequent, though very common in two or three of the adjoining counties", and gave only three localities although in his diaries he mentions at least six more. Old trees he knew in the estate woods at Cwmcyn-felin c.SN6083 had fallen by 1931 (Diary 9.8.1931). He saw trees at Gogerddan c.SN68G (Diary 20.4.1933), at Nanteos SN67E (Diary 4.5.1924), and at Trawsgoed SN67R (Diary 13.5.1895), and he repeatedly mentioned it by the road above Pont Llanafan SN67V-77A, 1898 (Diary 8.6.1898) - 1938 (Diary 12.4.1938). At most of his sites it was probably planted. He saw it in the woods by the railway S of Capel Bangor SN67P (Diary 12.4.1935), where it could have been native, but only by the Nant yr Arian in Cwm Berwyn c.SN719579 does he actually say that it was "probably native", 1902 (Diary 10.5.1902) - 1928 (20.4.1928). The earliest record was by Ley (1887) from a "Hedge near Tregaron", and Salter (1935) suggested that this was the site where he himself saw it "in lane on left after crossing Pont Einon", i.e. c.SN675609. Salter (Wade 1952) recorded it from Hafod, perhaps in the fernery below Mariamne's Garden SN764732 where there are c.10 trees, 1991-2005. In his diaries he three times mentions a tree near Hen Gaer, Bow Street c.SN6384: "The old broken-down Bird Cherry in the wood below the camp must have had a trunk fifteen feet [c.450cm] round" (Diary 21.12.1928), "the big old Cherry tree, now a complete ruin" (Diary 3.1.1933), and "the remains of the great Cherry-tree" (Diary 11.1.1941).

In recent decades it has been seen in only two sites where it might possibly be native: coppice growth from a stool in a laneside hedge in woodland by the quarry on the Teifi bank 300m below Pont Tyweli SN412402, 1996; and several large, old trees, some at least of which look self-sown, on the disused railway and on the wooded slope above Isdwr, 700m WNW of Pontalltycafán on the Teifi SN380395, 1996.





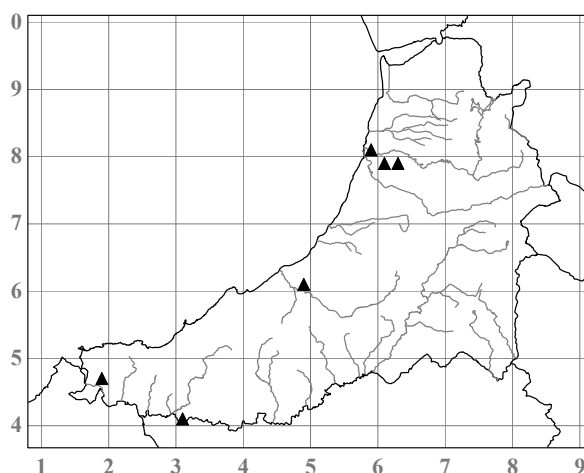
Elsewhere it has been occasionally planted, by the FC along forest roads, for example at Esgair Fraith SN744910, 1996, at Llyn Pendam SN709839, 1990 (NMW), and at Grogwynion SN694716, 1995, where it was suckering extensively; on new road embankments, for example on the A482 at Pont Shollop SN476597, 2003, and on the A487(T) SW of Llwynycelyn SN438593, 1995 (NMW, as several cultivars); in hedges, for example at Pil Bach, Plwmp SN369528, 2000 (NMW); and as a small plantation 150m W of Cwmtegyrd, Capel Dewi SN44294186, 2002 (AOC, BH & GH). The map makes an attempt to reflect the probable status of each record. Altitude limit (planted) 400m, Esgair Fraith SN744910, 1996.

### ***Prunus serotina* Ehrh. - Rum Cherry - Coeden Geirios Rŷm**

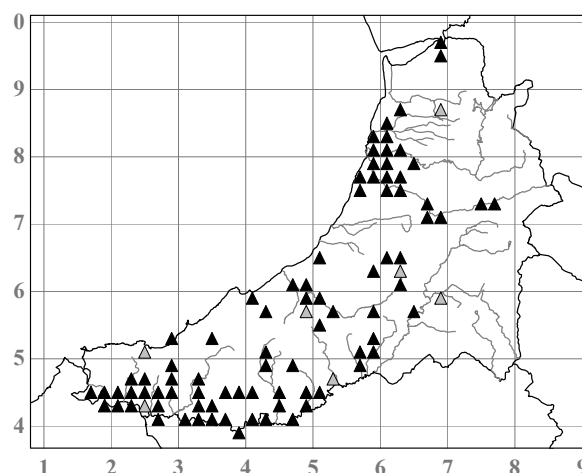
Extensively naturalised in two places, and occasionally planted for ornament elsewhere. In the SW part of Allt Fawr, 1km ENE of Llanwnnen SN543475, 1990 (NMW, CGE) - 2007, it is abundant and up to c.10m tall in many places in the *Quercus petraea* wood, and is even dominant in the shrub layer over about an acre, flowering and fruiting well and regenerating freely. By the drive to Trecwn, Neuadd Cross SN258458, 1998 (NMW) it is similarly well naturalised in estate woodland. A bush 4m tall, planted c.1972, by the road at Glasbwl, Llynant SN739974, 2004, never flowers. There is a bush in the FC Arboretum, Gogerddan SN630832, 1992, and a row of bushes by the road at Aber-mydr on the Llanerchaeron estate SN47506040, 2002. Native of North America, introduced to Britain in the 17<sup>th</sup> century.

### ***Prunus lusitanica* L. - Portugal Laurel - Coeden Lawrgeirios Portiwgal**

Commonly planted in graveyards and public gardens, but much less often in estate woodlands than Cherry Laurel. It is though well-naturalised by suckering in woods at Glandyfi Castle SN691965, 1994 (AOC & WMC); in Coed Penglanowain and elsewhere at Nanteos SN610786 etc., 1992-2005; at Llanerchaeron SN480602, 1982 (the first formal record); and at Cilgwyn, Adpar SN312409, 1994. Only such records are shown on the map. Native of SW Europe and introduced to Britain in 1648. Maximum 190cm girth, just outside the walled garden, Nanteos SN62097860, 1995 (RL & CDPa), a broken trunk.



*Prunus lusitanica*



*Prunus laurocerasus*

### ***Prunus laurocerasus* L. - Cherry Laurel - Coeden Lawrgeirios**

Widely planted and commonly naturalised by suckers or layers and by seed in estate shrubberies and woodlands, in graveyards, by abandoned gardens and along hedgebanks and wooded streamsides near villages and houses. Seedlings and obviously self-sown bushes are not common but are abundant in some estate woods, for example at Old Cilgwyn, Adpar SN315415, 1998-2004, and isolated self-sown plants occasionally occur, for example on the rocky bank of the Ystwyth just above Pont Llanafan SN686714, 1993. Although Salter in his diaries often gives flowering dates of Cherry Laurel and must have noticed it naturalised, he does not specifically mention this and the first definite record was in Coed Penglanowain, Nanteos SN613786 in 1982; the bushes here are up to 15m tall, with multiple trunks. Rarely in the county does it form a proper tree, but in the grounds of Plas Dolau SN62438140 a copse of trees 14m high has tall straight trunks mostly 90-100cm girth, with the maximum 105cm girth, 2005. Native of SE Europe and SW Asia, introduced to Britain in 1576.

Most records are of forma **laurocerasus**. Forma **magnoliifolia** (Bean) Rehder, with big leaves 20-28 × 7-10cm, is sometimes planted and naturalised in similar situations, for example in estate woodland behind

Plas Penglais, Aberystwyth SN595822, 2001, at Nanteos SN613786, 2001 (NMW) and at Ty-glyn, Ciliau Aeron SN498598, 2001, usually with forma *laurocerasus*. Forma **shipkaensis** (Späth) Zabel, a neat, small shrub with narrow, dark leaves  $c.10 \times 3\text{cm}$ , is a much more clearly defined taxon and is often planted in amenity areas and around car parks, for example at the Aberystwyth crematorium SN603831, 2004, but has only once been seen naturalised, by suckering in woodland on the University campus, Penglais, Aberystwyth SN59738150, 2003 (NMW).

**Cydonia oblonga** Mill. - Quince - Coeden Gwins

Two bushes, of '**Lusitanica**' and '**Vranjo**', planted in 1966 on the old orchard site in mixed estate woodland by the lane 200m N of Ynys-hir SN68189610 (PSC & WMC) persist as relics, 2004. Probably native of Asia and long grown in Britain.

**Pyrus pyraister** (L.) Burgsd. - Wild Pear - Coeden Ellyg Gwyllt

The only two trees seen are presumably planted, in the Maes-y-pwll woodland below the B4342 road in New Quay SN39105950, 2006 (NMW). Both have globose, yellowish fruits; those of the SW tree are (2-)2.4-3cm, while those of the NE tree are 3-3.5cm, and this latter tree has much more purple-tinged leaves. This is one of the native wild Pear species of Europe.



*Pyrus pyraister* trees at Maes-y-pwll, New Quay, view N from SN391595, April 2007

**Pyrus communis** L. - Pear - Coeden Ellyg

Widely planted in gardens and occasionally in orchards. Lewis Morris mentioned grafts of what he called '**Mary Harry**' (an untraced cultivar) and '**Buree de Roy**' (the latter now known as '**Brown Beurré**') in his orchard at Penbryn, Goginan SN683810 in a letter of 15 May 1762 (Davies 1909). Old trees of several varieties including '**Pitmaston Duchess**' and '**Doyenne de Comice**' can be seen at Llanerchaeron SN481601, 2006. Pears for making perry are grown in the Toloja Cider commercial orchard at Ty-gwyn, Dihewyd SN492563, started in 2004.

Trees in the wild of this archaeophyte are rare. A probably planted laneside tree 400m E of Wallog SN59468562, 2007 (JPW & AOC) has rather sour fruits 3.5-4cm. There is an apparently self-sown tree in scrub S of the Afon Rheidol 100m downstream of Glanyrafon Bridge SN60828044, 1992-2006 (NMW), with fairly sweet fruits 4-5.5cm. Two probably planted trees in a field hedge 250m SW of Gwenlli church SN39005338, 1997 (MDS) - 2007 (NMW), when the larger was 170cm girth, have harder, less sweet fruits 5-6cm which have been used by the owners to make perry. All are probably a small-fruited form of var. **sativa** Lam. & DC., the cultivated Pear. *P. communis* is of uncertain, probably garden origin.



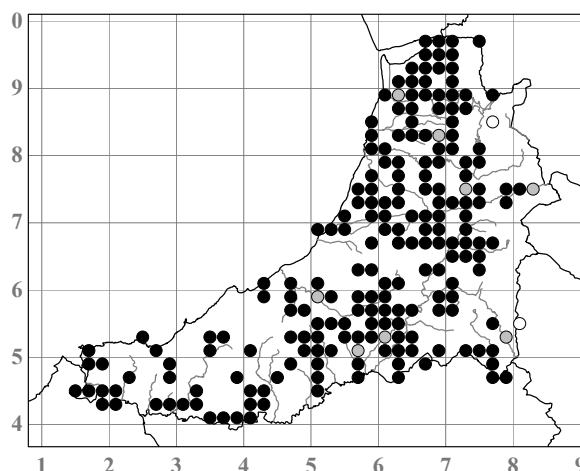
*Pyrus communis*, 250m SW of Gwenlli church, view NW from SN39005338, August 2007

**Pyrus salicifolia** Pall. - Willow-leaved Pear

Planted for ornament in several amenity areas and on the University campuses. There is a tree 44cm girth and 4m tall, 1994, in the Trawsgoed grounds SN67007298, and another of '**Pendula**', 39cm girth and 4m tall, nearby. Native of SW Asia, introduced to Britain in 1780.

***Malus sylvestris* (L.) Mill. (*Pyrus malus* L.) - Crab Apple - Coeden Afalau Surion (Fale Sur Bach, Crabs)**

To what extent true *M. sylvestris* occurs in Wales or even in Britain as a whole, the extent to which it hybridises with *M. pumila*, and whether the two can be considered specifically distinct, are matters of controversy. There is a complete range of forms in the county between trees with spines on the twigs, more or less glabrous leaves, glabrous outer surface of the sepals, glabrous hypanthia and small fruits *c.*3cm or less, through to obvious self-sown *M. pumila* with spineless twigs, pubescent leaves, petioles, sepals and hypanthia, and much larger fruits. Trees at the *M. sylvestris* end of the range are widespread in hedges, scrub and woodland, and although they may often have been planted, or bird- or animal-sown from planted trees, there are populations in many places in the uplands and in some of the inner valleys that look plausibly native. The map shows records of all these forms provided that they have the outer surface to the sepals glabrous. Lloyd & Turnor (1815), in their recommendations for the planting of hedges, describe the “true and indigenous wild crab. Its growth is less, and its fruit much smaller and more acid, than those of the former variety [the cultivated apple]. It is also much more spinous, and consequently a much better component of fences [hedges]. When raised for the purpose in a nursery, care should be taken to collect seed from the true wild crab tree, and not from the mongrel half-apple trees without spines.”



*Malus sylvestris* 275cm girth,  
Coed Geufon, Penparcau, view  
SE from SN60358019, April 2009



Prostrate *Malus sylvestris*, Cae'r-meirch,  
Hafod, view W from SN753733,  
August 2006

Good examples, with trees having in particular the outer surface of the sepals glabrous, occur in open scrub on Esgair Nantyrarian SN705818, 1987-2003 (NMW); in Coed Mynachlog-fawr SN743652, 2007; and in rocky scrub S of Troedrihw-rhuddwen SN771474, 1992. There are also good populations in some woodlands, for example in an Oak/Ash wood near Glanhelyg, Llechryd SN212448, 1986, and in the Teifi gorge Oak woods at Coedmore SN206431, 1984. There is a remarkable group of ancient bushes, again with the outer surface of the sepals glabrous, forming completely prostrate mats on rock outcrops above Hafod SN753733, 1976-2006 (NMW). Individual outstanding trees include one 216cm girth, 11m tall, 18m spread, with glabrous sepals and fruits *c.*2.5cm, in Ash woodland, Coed Nant Llolwyn SN58807698, 1990 (AOC & APF), which was the same dimensions in 2007 (NMW); and a tree 240cm girth at the base, splayed into two huge decumbent boughs above this that are rooting in several places, *c.*6m tall, with glabrous sepals, somewhat villous hypanthia and fruits 21-27cm, on a rock outcrop 900m SSW of Caerhedyn SN70329671, 2007 (NMW). There has been a tree or trees with intermediate characters for at least 60 years at the top of the steep, dead-straight footpath 200m SE of the National Library, Llanbadarn Fawr SN59608143, down which generations of children have rolled apples to see if they can make them reach the road 200m away at the bottom. Maximum a tree 275cm girth at 30cm up, branched above this into several trunks, 8m tall, 16m



spread, with glabrous sepals and sparsely hairy hypanthia, in open floodplain grassland at Coed Geufon, Penparcau SN60358019, 2007. Altitude limit 440m, Peithnant SN78S, Salter (Wade 1953); 375m, rocky bank of Maesnant SN77458895, 2005.

**Malus pumila** Mill. (*M. domestica* (Borkh.) Borkh.) - Apple - Coeden Afalau

Trees of this archaeophyte, presumed to be bird-sown or from discarded Apple cores, are frequently found in hedges, scrub and woodland, but can often be difficult to tell from planted ones; their fruits are usually poorly developed. The map shows records of such trees.

Apple orchards are widespread in the county, although most are now neglected. Lewis Morris planted one at Penbryn, Goginan SN683810 and wrote on 13 May 1760 (Davies 1909): "If God prevents a blast, such as we had last year, I shall make a couple of hogsheads of cyder", and Davies says that the remains of this orchard could still be seen in 1909. Walter Davies (1815) expressed agreeable surprise at finding at St Dogmaels SN14S "an orchard of apples, pears, plums, &c. attached to each house, the only instance of the kind we met with in West Wales.... Orchards prosper in the Vale of Teifi, from Llanybydder down to the sea below Cardigan, as at Llandyssul, Pen y Wenallt, Llwyn-dyrus, Pen y Lan, &c."

St Dogmaels remains notable for its apples, and on a visit there in 1997 the Marcher Apple Network "were introduced to three more Welsh varieties, **Pig Aderyn** (Bird's Bill), **Pen Caled Afal** (Hard-headed Apple) and **Afal Pren Glas** (Green Tree Apple). The first two appear to be multipurpose varieties making good light ciders while Afal Pren Glas is a dessert apple..... The children of nearby Llandudoch have collected the names of other Welsh varieties for a school project" (Leitch 2004). Other names from St Dogmaels known to the Welsh Folk Museum include 'Afal Shinw', 'Afal Biam', 'Afal Cot Ledr', 'Afal Tan Coed', 'Afal Bysedd y Forgan', 'Afal Melys', 'Afal Gwyn' and 'Afal Pig y Gloman', although to what extent these represent distinct varieties is uncertain; 'Trwyn y Hwch' was similarly known from Dyffryn Aeron SN55. Smith (1971) mentions a variety 'Cordi' from Lampeter in 1902. The walled gardens at Llanerch-aeron SN481601, 2004, have a great range of Apple varieties and the older trees here include 'Adam's Pearmain', 'Alfriston', 'Blenheim Orange', 'Cambusnethen Pippin', 'Hanwell Souring', 'Howgate Wonder', 'Keswick Codlin', 'Lord Grosvenor', 'Norfolk Beauty', 'Northern Greening', 'Stirling Castle' and 'Wyken Pippin', some probably grown here since the mid or early 19<sup>th</sup> century (JPS); there are also several distinctive unidentified varieties here, including a very small Russet. The NT organises Apple Days here each autumn when locally grown varieties are on display and apples can be taken to be identified. The only remaining tree in the Ynys-hir orchard SN68179610, 2004, is a 'Yorkshire Greening' (det. MP). Many apples in other old orchards have not yet been systematically identified.

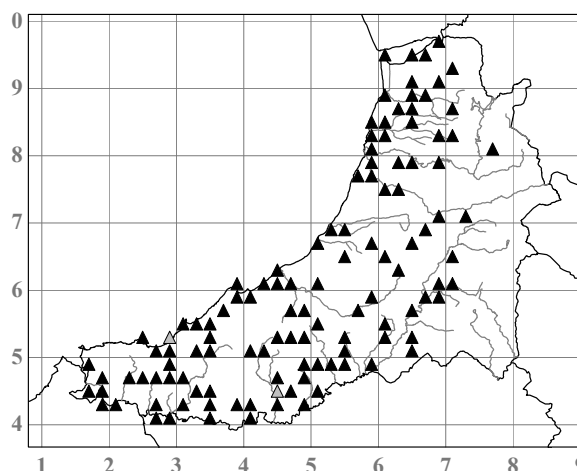
The Toloja Cider Brewery was started in 2004 at Ty-gwyn, Dihewyd SN492563, using an orchard there containing among other varieties 'Broom Apple', 'Cadwalader', 'Cissy', 'Dabinett', 'Michelin', 'Monmouth Green', 'Morgan Sweet', 'Pen Caled', 'Perthyre', 'Pig Aderyn', 'Raglan Redstalk' and 'Sweet Coppin'.

**Malus niedzwetzkyana** Dieck ex Koehne

Planted as a street tree in Peterwell Terrace, Lampeter SN57594798, 2001, and in Alban Square, Aberaeron SN459628, 2001. Native of Asia and introduced to Britain in 1894.

**Malus** × **purpurea** (E. Barbier) Rehder (*M. atrosanguinea* (Späth) C. K. Schneid. × *niedzwetzkyana*) - Purple Crab - Coeden Afalau Porffor

Occasionally planted, for example by the railway at Llandre SN625869, 1996 (NMW); on the University campus, Llanbadarn Fawr SN903812, 2001; in Llanilar churchyard SN622750, 2001; in Alban Square, Aberaeron SN459628, 2001; and as a street tree in Maeshenffordd, Cardigan SN181463, 2001. A garden hybrid.



**Malus 'John Downie'**

There is a planted tree in an amenity area in Llandre village SN62578689, 1994-2001. A cultivar dating from at least 1891.

**Malus ×robusta** (Carrière) Rehder '**Red Sentinel**' (*M. baccata* (L.) Borkh. × *prunifolia* (Willd.) Borkh.) - Hybrid Siberian-crab

Planted as a street tree in the upper part of Primrose Hill, Llanbadarn Fawr SN604813, 2006, and in Maes yr Haf, Cardigan SN182464, 1992. There are three planted bushes in woodland at the bottom of the Penglais dingle, Aberystwyth SN59278192, 2006. A cultivar of a garden hybrid.

**Malus ×zumi** (Matsum.) Rehder '**Golden Hornet**' (*M. baccata* (L.) Borkh. × *toringo* (Siebold) de Vriese)

Planted on the University campus, Penglais, Aberystwyth SN59768160, 2006; and as a street tree in the upper part of Primrose Hill, Llanbadarn Fawr SN604813, 2006. A cultivar, originated in 1949, of a hybrid from Japan.

**Malus tschonoskii** (Maxim.) C. K. Schneid. - Pillar Apple

Planted as a street tree, with one in Iorwerth Avenue, Aberystwyth SN590817, 1992-2004, and ten in the Glanyrafon Industrial Estate SN61358038, 2005. Native of Japan and introduced to Britain in 1897.

**Sorbus aucuparia** L. - Rowan - Criafolen, Cerddinen

Common throughout the county in woodland, scrub and hedges, on rocky hillsides, cliffs, peat bogs and streambanks, very characteristic of the upland valleys but much less common on the coast and becoming rare in the extreme SW. Thomas Johnes included it in his plantations at Hafod c.SN77L, R in the 1790s (Malkin 1804). It is often planted as a street tree, especially as '**Sheerwater Seedling**', for example in Portland Street, Aberystwyth SN584818, 2000-2008, or as '**Fructu Luteo**', for example by the Plas Crug leisure centre, Aberystwyth SN59408120, 2006.

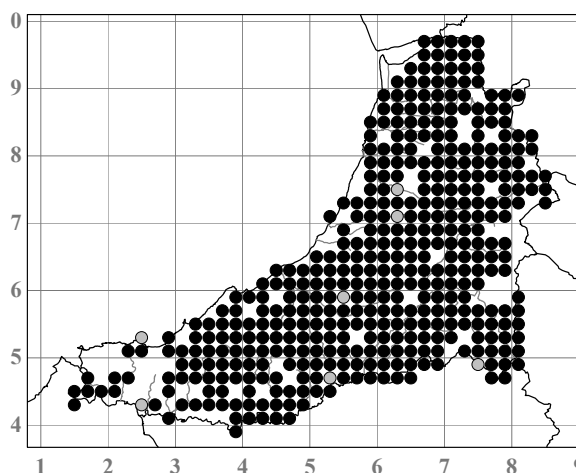


*Sorbus aucuparia* arch, Llwyn-gwyn, Furnace, view E from SN68389410, April 1963



*Sorbus aucuparia* arch at Brynhyfryd ruin, Cwmsymlog SN69998390, October 2004

Rowans and their wood were formerly used to ward off witches and other evil spirits and were often planted by houses for this purpose in the county. Davies (1911) recorded that this custom was especially prevalent in the Tal-y-bont area c.SN68P, and mentioned among other examples “that a man carrying home a little pig was seen with a branch of this wood to protect the animal from witchcraft.” Rowan arches, two trees planted on either side of the entrance gate to a dwelling and trained together to form an arch, perhaps symbolising marital fidelity as well as to ward off evil, can still be seen in several places, for example at Llwyn-gwyn, Furnace SN68389410, c.1950-2004 (PSC & AOC) and at Brynhyfryd ruin, Cwmsymlog SN6998390, 2004; the remains of another such arch at Felin-y-cwm, Furnace SN69139479 were described by Condry (1993); and one at Gors-fach, Pennant SN518638 is depicted in an etching of 1953, “Kissing Trees”, by George Chapman. Years with exceptionally prolific fruiting included 1973, 1992 and 1995. A tree with berries distinctly longer than wide was seen by the road just S of Llyn Frongoch SN721749, c.1985. Maximum 272cm girth, Coed Cornwall-fach, Strata Florida SN746654, 1980. Altitude limit 455m, Lluest y Graig, Pumlumon SN802890, (Salter 1935); 620m, cliff above Llyn Llygad Rheidol SN79408724, 2002.



**Sorbus ×thuringiaca** (Ilse) Fritsch (*S. aria* × *aucuparia*) - German Service-tree

One planted as a street tree in Bro Teifi, Cardigan SN183462, was 5m tall in 1992. Several trees planted in the car park by Aberaeron harbour SN457629, 1992, are ‘**Fastigiata**’.

**Sorbus cashmeriana** Hedl. - (Kashmir Rowan)

This native of Kashmir with very large, white fruits, probably introduced to Britain in the 1930s, is planted on the University campus, Penglais, Aberystwyth SN59478194, 2008 (AOC & JPP).

**Sorbus glabriuscula** McAllister (*S. glabrescens* auct., non (Cardot) Hand.-Mazz., *S. hupehensis* auct., non C. K. Schneid.) - (White Hubei Rowan)

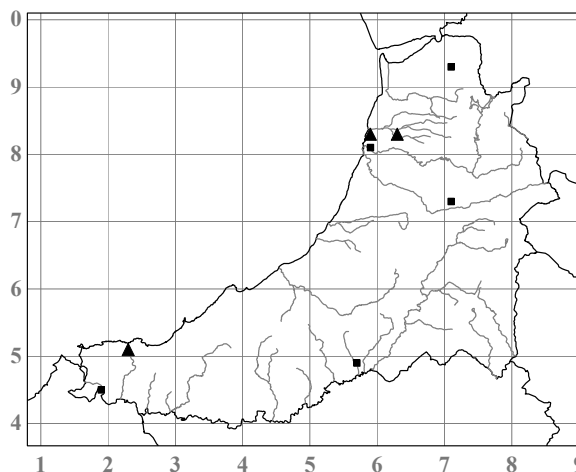
Planted in several places on the University campus, Penglais, Aberystwyth SN598819 etc., 2003. Native of China, introduced to Britain in 1910.

**Sorbus hybrida** L. - Swedish Service-tree - Cerddinen Groesryw

Five bushes planted on the stream bank E of the Parc-y-llyn roundabout, Llanbadarn Fawr SN59608047, 1991 (NMW, det. ER & TCGR) - 2008; also planted on the road verge in the IGER grounds, Plas Gogerddan SN628836, 1999 (SPC), and on the University campus, Penglais SN599816, 2007. Native of Scandinavia.

**Sorbus intermedia** (Ehrh.) Pers. (*S. scandica* (L.) Fr.) - Swedish Whitebeam - Cerddinen Sweden

Salter (1935) described this native of the Baltic region as much-planted and mentioned Plas Crug, Aberystwyth SN5881; he also collected it in Cwm Woods c.SN5983 or 6083 in 1936 (NMW, conf. TCGR). More recently it has often been planted as a street and campus tree in Aberystwyth and Penparcau SN58V, W, 1991-2005, and in Lampeter SN5748, 1992-2005, and occasionally at amenity sites. Self-sown trees have been seen in several places, for example on a quarry face by Bryn-y-mor Road, Aberystwyth SN588826, 1992 (NMW) - 2005, and in a hedgerow S of Pen-y-graig, Felin-wynt SN220516, 1994 (AOC & SPC).





**Sorbus aria** (L.) Crantz - Common Whitebeam - Cerddinen Wen**Var. aria**

Occasionally planted in hedges and estate woodlands, and as a street tree, and sometimes bird-sown in woodland and scrub and on rocky slopes and cliffs, chiefly in the Aberystwyth area. There are many trees in Cwm Woods SN5983-6083, 1891 (Salter Diary 4.10.1891) - 2005, the larger of which were 150-170cm girth in 1997. The map shows only trees planted in wild situations or self-sown ones.

**'Lutescens'**

Planted as a street tree in North Parade SN585818, and elsewhere around Aberystwyth, 1992-2008.

**Var. longifolia** Pers.

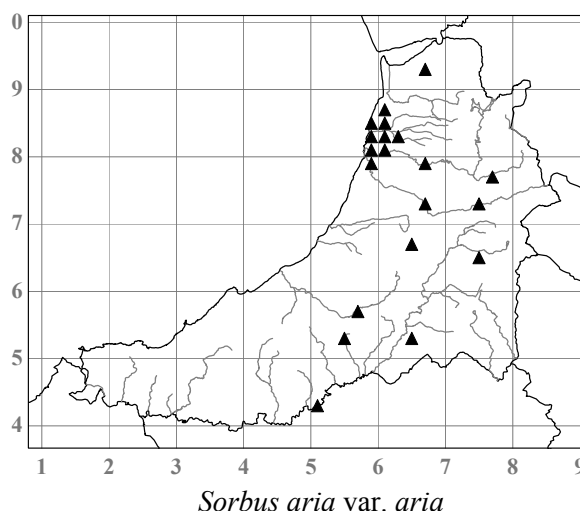
A population of *c.*6 small trees, formerly coppiced, in the Oak woodland above the B4340 road at Penparcau SN593797, 1976 (CGE, NMW, det. PDS) was shown to have  $2n = 34$ , 1977 (HAMcA). Of all the *S. aria* in the county, these are the only ones that give the impression of being possibly native.

**Var. magnifica** Hesse ('Magnifica')

Planted as a street tree by the Tre'r-ddol bypass SN66029238, 1992-2003; in Aberystwyth and Penparcau SN58V, especially in North Parade SN585818, 1992-2007, where its salt tolerance has made it the preferred variety; at the N end of Bronnant SN642679, 1992-2003; in Alban Square, Aberaeron SN459628, 1993; and in the Gorsedd garden at Lampeter SN57884838, 1992-2005. (Some of these trees may be *S. aria* × *vestita* 'Wilfrid Fox'.) There is also a tree by the airfield housing estate at Blaenannerch SN246496, 2002 (CGE, det. PDS) - 2005.

**Var. majestica** (Dippel) Zabel ('Majestica')

A frequent street tree in Penparcau and Aberystwyth SN58V, 1992-2008, where it is planted with var. *magnifica* in North Parade, and in Alban Square, Aberaeron SN459628, 1993-2008. An avenue of trees in the airfield housing estate at Blaenannerch SN246495, 2002 (CGE, det. PDS) has been destroyed.

**Sorbus latifolia** (Lam.) Pers. - Broad-leaved Whitebeam - Cerddinen Lydanddail

There were seven large planted trees *c.*20m tall and 134cm, 103cm, 92cm, 86cm, 79cm, etc. girth, 1980 (CGE, det. PDS, Sell 1989), in a straight line in the copse NW of Rhosgellan-Fawr, Wallog SN59728555, but one was blown down in 1990 which had *c.*90 annual rings and the others were felled soon after. Native of France.

**Sorbus croceocarpa** P. D. Sell - Orange Whitebeam - Cerddinen Ffrwythau Saffrwm

Rarely planted, but probably overlooked. Of two large trees in the copse 100m S of Rhosgellan-fawr, Wallog SN59828542, 1977 (CGE, det. PDS, Sell 1989) - 2005, the S one was 128cm girth and 21m tall in 1980, 131cm girth in 1992, and 133cm girth and 21m tall in 2004 (NMW); the N one was 130cm girth in 2004. A tree in the Trawsgoed grounds SN67037280 measured by Mitchell as 183cm girth and 18m tall in 1969 (as *S. aria*) was 218cm girth and 18m tall in 1994 (AOC & CDPa). The only others noted are a big tree by the W gate of Plas Hendre, Waun Fawr SN60018229, 2004; and a street tree in Fifth Avenue, Penparcau SN58888064, 1992 (NMW), since destroyed. The origin of the species is obscure.

**Sorbus mougeotii** Soy.-Will. & Godr. - Mougeot's Whitebeam

There are seven trees, the largest 100cm girth in 1998, planted along the FC road in Allt y Crib plantation, Tal-y-bont SN650892, 1995 (NMW) - 2005; and one planted in a copse on the Blaendolau playing fields, Llanbadarn Fawr SN59558041, 1995 (NMW). Native of Europe.

**Sorbus thibetica** (Cardot) Hand.-Mazz. 'John Mitchell'

Surprisingly rarely planted, but the best of Aberystwyth's street trees is one of this cultivar at the corner of North Parade and Terrace Road SN58458175, 1992-2008. Others are on the University campus, Penglais, Aberystwyth *c.*SN598816, 2002-2006, and two are on the stream bank E of the Parc-y-llyn roundabout, Llanbadarn Fawr SN59608047, 1992-2008. The species is from the Himalaya and W China.

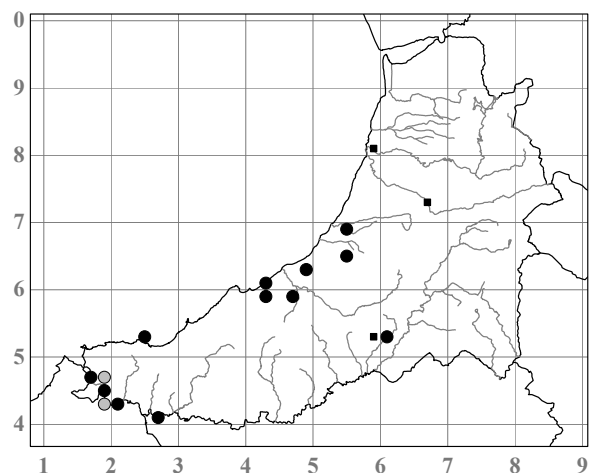


*Sorbus thibetica* 'John Mitchell', North Parade, Aberystwyth, view ENE from SN58448174, July 2004

### ***Sorbus torminalis* (L.) Crantz - Wild Service-tree - Cerddinen Wyllt**

A rare tree characteristic of rocky bluffs on steep slopes in ancient woodland where it forms suckering colonies. The best populations are in the valleys of the Afon Arth and the tidal part of the Afon Teifi. Salter knew it only from the Arth valley SN494624 where he found it in 1937 (Diary 14.5.1937), and it has since been found in about ten other sites. In Cwm Wyre SN55846997, 1994 (JS & JND) a colony  $12 \times 7\text{m}$  is in Oak coppice replanted with Larch. One bush is in a laneside hedge at Nebo SN54686492, c.1975 (RGW) - 2008. In the Arth valley itself there are many colonies in the ancient woodland from SN482635 up to 495625, 1976-2002 (AOC & PAS). Two trees are in Ash woodland on the N bank of the Afon Drywi 400m up from its mouth SN42886045, 1994. Three colonies in ancient coppiced Sessile Oak woodland in Allt Castellgeifr, Llanarth SN421585, 1988 (RJC) were (W to E)  $6 \times 3\text{m}$ ,  $30 \times 25\text{m}$  and  $35 \times 20\text{m}$  in 2003. A colony is in Allt yr Haern on the steep slope above the Afon Mydr SN479588, 1988 (GS). Two trees are in the roadside hedge by the Llangybi golf course SN603536, 1983-1996, and the only seedlings seen in the county were two here in 1990 (SPC). There are four trees, each with several sucker growths, on the sea cliffs at the MoD site, Aber-porth SN24515254, 1992 (GW) - 2007, growing with Aspen and Oak; the largest was 58cm girth in 1992.

By the Afon Teifi there are two colonies 150m apart on the steep rocky slope above the estuary in Netpool Wood, 1981 (SBE) - 2005, the W one at SN170462 with nine trees, the largest of which was 124cm girth in 1982, the E one at SN171462 with six trees, the largest 96cm girth in 1982; both colonies had many small sucker growths. Further up the river many colonies are in the Oak woodland on the steep slopes at



Coedmore from SN194445 to 206431, 1975 (TAWD, SBE & MPa) - 2005, at least 84 trees and suckers, the largest c.65cm girth and c.10m tall being counted in 1975. There is one bush on the wooded, rocky slope of Allt y Graig above the river at Cenarth SN270416, 2003.

Flowering and fruiting are very irregular, but abundant fruits were seen in Netpool Wood in 1982 and 1990, and the trees in the Arth valley often flower well. Trees are rarely planted, but one by the Science Park, Llanbadarn Fawr SN598813, fruited in 2004 (SPC), and a tree at Trawsgoed c.SN67R, presumably planted, was recorded as fruiting in 1893 (Salter Diary 5.9.1893). Maximum 124cm girth, see above.

**Amelanchier lamarckii** F. G. Schroed. - Juneberry - Criafolen Mehefin

Planted and probably at least sometimes self-sown in several places in the estate woodlands at Ynys-hir, for example by the Afon Einion SN684954, 1992 (NMW) and in Covert Coch SN676955, 1995 (AOC & WMC); in a hedge at Capel Bangor SN652805, 2000 (SPC); in Coed Penglanowain SN613784, 2006 (NMW) and in Flat Covert, Nanteos SN626784, 2001; and by the Afon Aeron at Llanerchaeron, SN47886031, 1997-2005. Of uncertain origin.

**Stranvaesia davidiana** Decne. (*Photinia davidiana* (Decne.) Cardot) - Stranvaesia - Stranfaesia

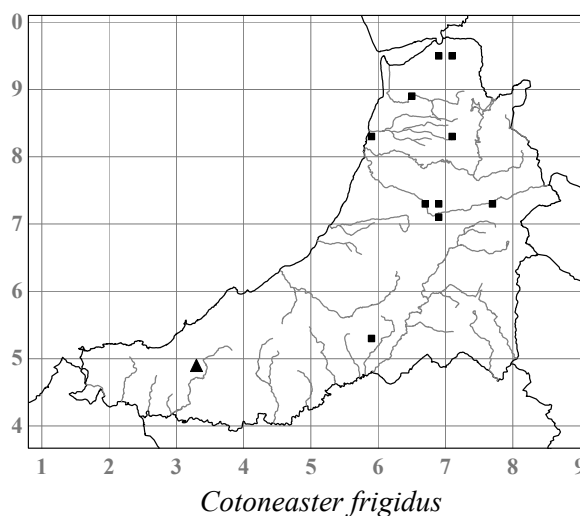
A planted, coppiced shrub has long persisted on the bank of a FC road in the Coed Alltfedw conifer plantation 700m W of the Trawsgoed Post Office SN65887274, 2000 (NMW, RG & AOC) - 2008. Native of E Asia.

**Cotoneaster salicifolius** Franch. - Willow-leaved Cotoneaster - Cotoneaster Dail Helyg

There are several self-sown bushes on rocks by the Afon Castell, Ponterwyd SN749808, 1991 (NMW, det. JF). Native of China.

**Cotoneaster frigidus** Wall. ex Lindl. - Tree Cotoneaster - Cotoneaster Talsyth

Occasionally planted for decoration by the FC at picnic sites and at the edges of plantations along roadsides, as in Cwm Einion SN690946 and SN707940, 2003, and by Llyn Pendam SN709839, 1992 (NMW, conf. JF), and in estate grounds and woodlands, as at Plas Penglais SN595822, 2002, and at Derry Ormond SN592523, 1993. The only site where it seems naturalised by self-seeding is in hedges around the road junctions 1.5km E of Glynarthen SN327484, 1997. Native of the Himalaya. Altitude limit (planted) 345m, Llyn Pendam SN709839, 1992.



**Cotoneaster ×watereri** Exell (*C. frigidus* × *salicifolius*) - Waterer's Cotoneaster - Cotoneaster Waterer

There is a self-sown bush of this garden hybrid on the slope at the SW corner of the E bay, Aber-porth SN258514, 1992 (NMW, conf. JF) - 2005.

**Cotoneaster affinis** Lindl. - Purpleberry Cotoneaster - Cotoneaster Aeron Porffor

Dominant and abundantly self-sown along 150m of both hedges of the road at Ty-rhos, 1km S of Plwmp SN371513, 2002, first recorded here in 1978 (NMW, M. Evans, det. JF 1993). Native of the Himalaya.

**Cotoneaster congestus** Baker - Congested Cotoneaster - Cotoneaster Trwchus

There are many self-sown plants on the walls of the long-abandoned walled garden at Highmead, Llanybydder SN500430, 2002 (NMW). Native of the Himalaya.

**Cotoneaster integrifolius** (Roxb.) G. Klotz (*C. microphyllus* auct., non Wall. ex Lindl.) - Entire-leaved Cotoneaster - Cotoneaster Cyfandail

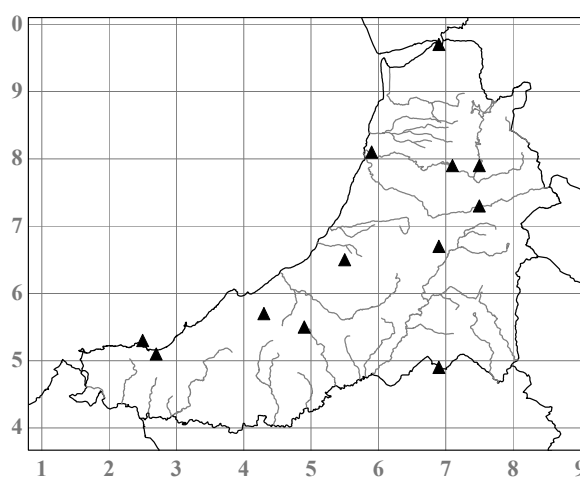
Self-sown and well-naturalised on the lead mine sites of Caegynon SN717784, 1997, and Llwynmalus SN690679, 1992 (SPC), on the rubble of Hafod mansion ruins SN759732, 1996-2005, by the railway at



Glandyfi SN695970, 1997, and in several other places on roadside banks and on walls. Several relic or self-sown bushes grew picturesquely on and around the ruined farm of Llwynteifi, Ystumtuen SN743786 until the 1990s, and one large one still remains, 2008. Native of the Himalaya and China. Altitude limit (self-sown) 315m, on walltop of Blaencothi ruin SN694487, 1995.

**Cotoneaster dammeri** C. K. Schneid. '**Hybridus Pendulus**' - Weeping Cotoneaster - Cotoneaster Wylofus

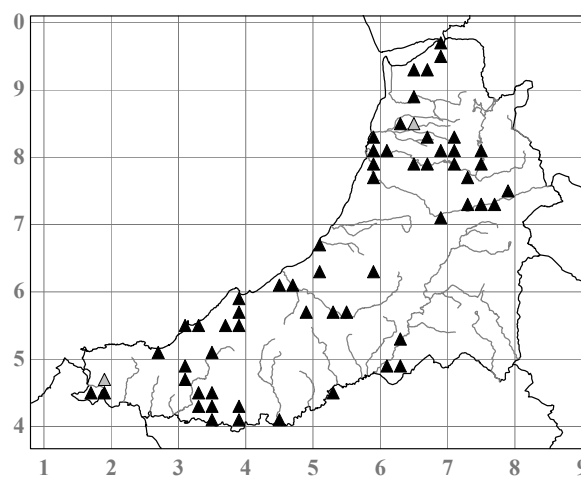
Several small fruiting plants of this possible hybrid with *C. salicifolius*, not appearing planted, were seen on a sloping rock by the road at Gwynfryn, 1km E of Dihewyd SN497556, 1999.



*Cotoneaster integrifolius*

**Cotoneaster simonsii** Baker - Himalayan Cotoneaster - Cotoneaster Simons

By far the commonest self-sown and established *Cotoneaster*, occurring in hedges, scrub, woodland, on cliffs and rocks, walls, waste ground, graveyards and lead mines. First recorded self-sown in scrub woodland at Penparcau SN593797, 1976 (NMW, det. GDR). Native of the Himalaya. Altitude limit (self-sown) 300m, roadside hedgebank, Penuwch SN592627, 1996.



*Cotoneaster simonsii*

**Cotoneaster hjelmqvistii** Flinck & B. Hylmö - Hjelmqvist's Cotoneaster - Cotoneaster Hjelmqvist

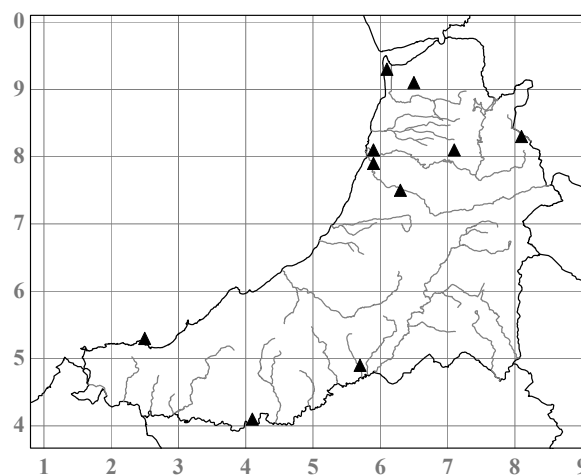
Two self-sown bushes have been seen, on the wooded cliff above the road at Glandyfi SN694968, 1993 (NMW, conf. JF), and on a wall in Bryn-y-mor Road, Aberystwyth SN585825, 1994. Native of China.

**Cotoneaster horizontalis** Decne. - Wall Cotoneaster - Cotoneaster Asgwrn

Native of China, and occasionally self-sown on walls, roadside slopes and verges, in churchyards and in one place on the Ynys-las dunes SN60619340, 2000. It was also established from throw-outs on the shaly slope below the FC road 2.3km SE of Eisteddfa Gurig SN811820, 1996, at 450m, its altitude limit.

**Cotoneaster hsingshangensis** J. Fryer & B. Hylmö - Hsing-Shan Cotoneaster - Cotoneaster Hsing-Shan

There is a self-sown bush in scrub by a track across Pantyrhedydd Common, Blaen Cribor SN40444837, 2009 (NMW, det. JF). Native of China.



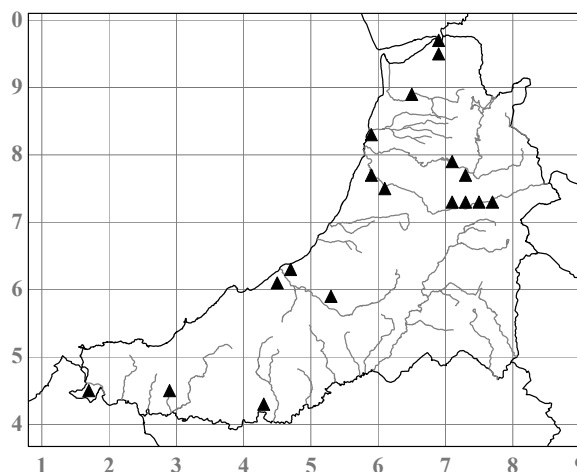
*Cotoneaster horizontalis*

**Cotoneaster rehderi** Pojark. - Bullate Cotoneaster - Cotoneaster Deilgrych Rehder

Often self-sown in scrub and woodland, on roadsides and waste ground, sometimes far from habitation. It was first recorded in 1992, in scrub below the A487(T) road near Ffos-y-ffin SN444601 (NMW, conf. JF). Native of China.

**Cotoneaster franchetii** Bois - Franchet's Cotoneaster - Cotoneaster Franchet

Two self-sown bushes in scrub on the railway embankment 200m W of the Afon Einion bridge, Glandyfi SN686966, 1992 (NMW, conf. JF). Native of China.



*Cotoneaster rehderi*

**Cotoneaster sternianus** (Turrill) Boom - Stern's Cotoneaster - Cotoneaster Stern

Self-sown in three sites in Cwm Rheidol: in scrub by the river by the Power Station SN707793, 1992 (NMW); in scrub above the road by the reservoir dam SN695796, 1996 (NMW); and on the rocky bank of the river by Felin Newydd bridge SN69267940, 2002. The only other sites where it has been seen self-sown are on the roadside hedgebank 700m NE of Pennant SN518639, 1997, and on the rocky, wooded slope above the Afon Aeron 150m N of Lovers' Bridge, Aberaeron SN457626, 2002. Native of China.

**Cotoneaster dielsianus** E. Pritz. ex Diels - Diels' Cotoneaster - Cotoneaster Diels

There is a self-sown bush in rocky scrub by the road 150m SSW of Gwynfa, Tresaith SN28525119, 1995 (NMW, AOC & PCu) - 2005. Native of China.

**Pyracantha coccinea** M. Roem. - Firethorn - Llosgddraenen

Occasionally planted in amenity areas, sometimes as '**Lalandei**', but seen naturalised only on a rocky slope above the road by the Cwm Rheidol reservoir, where several presumably bird-sown bushes grow in sparse scrub SN696796, 1996 (NMW) - 2005. The conspicuous leaf-mines of the micromoth *Phyllonorycter leucographella*, spreading rapidly across Britain, were first noted in the county in a garden in Queens Road, Aberystwyth SN58608160 in 2004. Native of S Europe and SW Asia.

**Crataegus** L.

The taxonomy of both the native bushes and of the alien taxa planted for hedging is very confusing, and whether some of the taxa should be considered hybrids is controversial. An attempt has been made, especially by marking individual bushes and collecting flowering and fruiting specimens at different times of year, to identify samples from throughout the county, but the difficulty of finding stipules on the flowering shoots, and the apparently great variation in all these taxa, mean that any statement on what occurs in the county must be very provisional.

So far as the ornamental alien taxa are concerned, Aberaeron has an unusually large number around Alban Square, in Chalybeate Gardens and as street trees. The identity of a few of these, and of some others planted for decoration elsewhere in the county, remains uncertain too.

**Crataegus persimilis** Sarg. - Broad-leaved Cockspurthorn

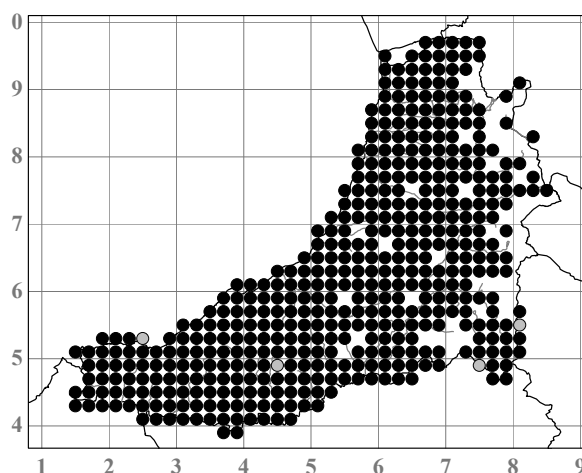
Two bushes have been recorded, one planted on the roadside verge at a lay-by 200m E of Bryndulas, Olmarch SN623549, 1992 (NMW) - 2005, and another on the green 150m SSW of Lampeter church SN57484820, 1992-2005 (NMW). Believed to be of ancient hybrid origin between two North American species.

**Crataegus monogyna** Jacq. - Hawthorn - Draenen Wen (Coeden Griafol)

Very common in hedges, in scrub, as an understorey shrub in woodland, and on hillsides and cliffs in the upland valleys and along the coast. It is the dominant hedging plant in the county, often in the past and almost always now being the only species used when a hedge is planted. Early references include Lloyd & Turnor (1794), who mention mixed hedges of "white and black thorn". In the 19<sup>th</sup> century it was often mixed with

Beech to provide the stock-proof element in a sheltering hedge, “tair draenen wen a ffawydden” (Chater 1985, 1994). Haws were sometimes germinated in a Wheat rope buried in a furrow and extracted, or the rope used directly to establish the hedge (Lyons 1996). Saplings for hedging have in recent decades largely originated from the Netherlands and Poland, and are less suitable for local conditions than native stock (Jones & Evans 1994), but although they usually leaf and flower earlier than apparently native plants they seem not to differ consistently in morphological characters and are mostly either *C. monogyna* or *C. ×subsphearica* or a mixture of the two. Salter regularly recorded early leafing of Hawthorn bushes, now gone, at the Aberystwyth cemetery SN591812, although he does not speculate on the reasons (Diary 5.2.1934, 31.1.1939, 27.11.1939, 2.12.1940 etc.). D. Thomas (1958) used the Hawthorns in the Melindwr valley SN68Q-78A to devise his wind-exposure zones based on tree deformation.

Plants both in upland scrub and in hedges in general are very variable, particularly in pubescence of the hypanthium, in leaf-size and -shape and in peduncle-length, all characters used to distinguish subspecies; bushes with all the characters of subsp. **nordica** Franco, judged by Franco to be the only subspecies in Britain, and others with those of subsp. **monogyna** can be found in all situations, but bushes variously combining the characters of the two (chiefly small leaves with villous hypanthia) are at least as common and the subspecies seem not worth recognising. Bushes with the characters of subsp. **brevispina** (Kunze) Franco, native of the W Mediterranean, also occur. Even undoubtedly native populations in the upland valleys, for example the abundant old bushes at the head of Cwm Berwyn SN7257, 1956-2007 (NMW), especially spectacular when in flower in June, or those near Berthgoed SN763651, 1994 (NMW), are extremely variable. At the former site, of 50 bushes sampled in 2007, and using the vegetative characters in Franco (1968), 15 appeared to be subsp. *monogyna*, 13 appeared to be subsp. *brevispina*, 18 appeared to be intermediates between these two subspecies, and the remaining 4 appeared to be subsp. *nordica*; almost all though had pubescent hypanthia and fairly bright red berries. At the latter site some bushes had leaves 50mm, lobed to 1/3, and petioles 35mm, while others had leaves 20mm, lobed to the midrib, and petioles 12mm, and all intermediates occurred. Bushes with large berries more than 10mm, var. **splendens** Druce, eaten by Fieldfares and Mistle Thrushes and the other larger frugivores (Snow & Snow 1988), are widespread in hedges and scrub but are nowhere common. Upland colonies obviously spreading rhizomatously have not been noticed, as they have in other parts of Wales. Two place-names probably deriving from Ysbyddaden, an old name for a Hawthorn tree, in surprisingly upland areas of the county are discussed by Wmffre (2004, pp.525, 532, 1273): Bryndafaden SN694498 and Esgairstafaden SN716560. Maximum 157cm girth (at 1m up), roadside immediately E of Capel Betws Lleucu church SN607582, 1984. Altitude limit 380m, Ffrwd ar Gamddwr SN761576, Salter (1935); 415m, Eisteddfa Gurig SN797840, 2002. Bird-sown seedlings are often seen higher, but do not persist.



Pink *Crataegus monogyna*, Cwm Mwyro SN777649, June 2004



Variation in *Crataegus monogyna*, Cwm Berwyn, view NNW from SN727579, July 2007



There is a Glastonbury Thorn, forma **biflora** (Weston) Rehder, in Llanbadarn Fawr churchyard, on the S side of the nave SN59908100, 2004, that usually flowers between December and March and again in May. Thirteen bushes of forma **stricta** (Loudon) Zabel. are planted at the site of Strata Florida Station SN710672, 2003, presumably dating from well before the railway was closed in 1967. ‘**Pink May**’ is occasionally planted, for example in a laneside hedge at Bronwydd SN352433, 1996 (NMW). In some of the upland valleys bushes with pink flowers occur, occasionally quite deep pink as in Cwm Mwyro SN777649, 2004 (AOC & PAS); in such sites they appear to be part of the natural native variation.

**Crataegus ×media** Bechst. (*C. laevigata* × *monogyna*)

Only one bush has been identified, in a laneside hedge 130m SW of Tan-llan, Llanbadarn Odwyn SN63316094, 1996 (NMW). This is only 250m from the native-looking *C. laevigata* in Allt Pantybeudy.

**Crataegus ×subsphaerica** Gand. (*C. ×heterodonta* Pojark., *C. kyrtostyla* auct., non Fingerh. ex Schltdl.; *C. monogyna* × *rhipidophylla*)

Widely planted in hedges, especially in recent decades when it has been brought from Europe, chiefly from the Netherlands and Poland. Many of the bushes that come into leaf and flower conspicuously early in roadside hedges are this hybrid, but it is extremely variable especially in the size and shape of the leaves, in the serration of the lobes, and in the shape and orientation of the sepals, and it is frequently not clearly distinguishable from its parents. Both nothovar. **subsphaerica** and nothovar. **domicensis** ((Hrabětova) K. I. Chr. occur, but they often seem too weakly differentiated to record with certainty. Examples of roadside hedges of which this hybrid forms at least a part include the W hedge of the A487(T), 125m S of the Llandre turning at Maesnewydd SN64468768, 2007 (NMW); the N hedge of the A44(T), just W of the Lovesgrove roundabout SN631811, 1980-2006 (NMW); the N hedge of the the A44(T), E of Penllwyn chapel, Capel Bangor SN653803, 2006 (NMW); the SW hedge of the B4575, 250m NNW of Trawsgoed bridge SN665732, 1994-2006 (NMW) where the bushes are very similar to *C. rhipidophylla*; and the N hedge of the lane at the top of Maes-y-pwll wood, New Quay SN39085956, 2006 (NMW).

**Crataegus rhipidophylla** Gand. (*C. curvisepala* Lindm.) - Large-sepalled Hawthorn

Native of Europe and seen planted in three hedges, but probably overlooked elsewhere and difficult to distinguish from *C. ×subsphaerica*: several bushes in a hedge between a rough track and the railway 2km WNW of Ynys-hir SN660951, 2004 (NMW); forming part of a hedge planted in the 1980s at Pen-bont Rhydybeddau SN675836, 2005 (NMW); and many bushes in the N hedge of St Dogmael’s Road, 700m W of Cardigan Bridge SN170459, 2004. It is not clear to which of the vars. *rhipidophylla* or *lindmanii* any of these bushes belong.

**Crataegus laevigata** (Poir.) DC. (*C. oxyacanthoides* Thuill.) - Midland Hawthorn - Draenen Wen Lefn

The only site in the county where this species, virtually absent from Wales as a native except for the extreme SE, grows in a wild site and looks like a native is in Allt Pantybeudy, 2km NE of Llangeitho SN63206119, 1989 (NMW), an Oakwood with scattered *Fraxinus* and *Betula* and a shrub component of *Corylus*, *Ilex* and *Crataegus monogyna*. There is one bush of *C. laevigata*, which flowers well, in a slight ditch by a bank 12m into the wood. There are several planted and perhaps self-sown bushes in a roadside hedge 3km N of here by Aeron Villa, Blaenpennal SN633641, 2002-2008. A large bush at the top of Netpool Wood, Cardigan SN17064617, 1996 (NMW) might appear native, but is accompanied by obviously planted trees. A bush in a hedge opposite Capel Bangor church SN65608018, 2001 (NMW), destroyed in 2005, was subsp. **palmstruchii** (Lindm.) Franco. There is a planted tree of *C. laevigata* by Aberaeron harbour SN45766288, and a grafted tree at the NE side of Alban Square SN45996286, 2001.

Three cultivars occur, but they may be better placed under *C. ×media*. ‘**Paul’s Scarlet**’ is occasionally planted as a street tree and on roadsides in the country, for example one at the SW side of Alban Square, Aberaeron SN45976278, 2002, and there are others in Holy Cross churchyard, Llechryd SN218437, 2006, in the Cardigan hospital grounds SN181460, 2006, and around Aberystwyth and elsewhere. ‘**Punicea Flore Pleno**’ is less often seen than in many other parts of Britain, but there are four bushes in the Plas Gogerddan grounds SN631837, 2006, a row of bushes just W of Llanbadarn Fawr church SN598810, 2001, and three around Alban Square, Aberaeron SN459628, among others. ‘**Punicea**’ has been seen only in Chalybeate gardens, Aberaeron SN45826267, 2002 (NMW).

***Crataegus heterophylla* Flüggé** - Various-leaved Hawthorn - Draenen Wen Amryddail

Planted in a shelter belt at Denmark Farm, Betws Bledrws SN584536, 1999 (NMW). Known only in cultivation.

***Crataegus altaica* (Loudon) Lange** - (Altai Mountain Thorn)

The S-most Hawthorn in Chalybeate Gardens, Aberaeron SN45816261, 2002, is probably this species, native of C Asia, but may be the closely related *C. wattiana* Hemsl. & Lace.

***Crataegus* × *lavallei* Hérincq** (probably *C. calpodendron* (Ehrh.) Medik. × *mexicana* Mocino & Sessé) - Hybrid Cockspurthorn

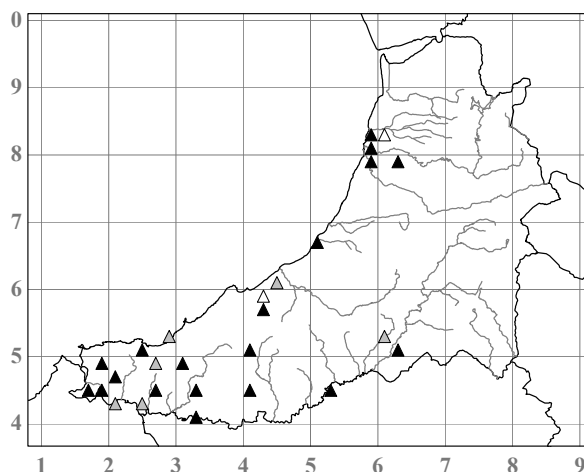
Two planted trees in Chalybeate Gardens, Aberaeron SN45856267, 2002, and two at the S side of Alban Square SN45946282, 2002. One of the latter is very similar to *C. crus-galli* L., sometimes considered as one of the parents, with glabrous calyx and hypanthium and with strong spines, but it has hairy pedicels. There is also a planted tree above the New Quay lifeboat station SN389597, 2007 (AOC & JPP). A hybrid of garden origin.

***Crataegus* × *dippeliana* Lange** (*C. ?punctata* Jacq. × *tanacetifolia* (Lamb.) Pers.)

There are two trees of this garden hybrid in Chalybeate Gardens, Aberaeron SN45856267, 2002, and one on the SW side of Alban Square, SN45946282, 2002.

***Filipendula vulgaris* Moench** (*Spiraea filipendula* L.) - Dropwort - Y Grogedau (Brenhines y Weirglodd, Brenhines y Ddôl)

Salter (1935) described this calcicole as “Established in several places, chiefly in churchyards”, and gives seven churchyards and two former cottage garden sites, the latter being between Llwyncelyn and Cwmbedw SN4359 (Diary 28.5.1929) and at Pennant SN56B (in Wade 1952). Since 1970 it has been seen in 21 churchyards and chapel graveyards, and it is still in all those where Salter knew it. Being a much more attractive and sweet-scented plant than *Galium album*, which is the other possible native most disproportionately confined to graveyards, and being much more of a calcicole, it is almost certainly always introduced. Why it should be so common in graveyards in SW Wales (Pearman *et al.* 2002) is a mystery. The only non-graveyard sites where it has recently been seen naturalised are on a roadside bank at Clarach SN588837, 1981-2004; on the road verge opposite Llandyfriog church SN33354126, 1977 (NMW) - 2004, when the colony was 2.5 × 1.5m; and on the roadside hedgebank just N of Tregroes school SN406449, 1999.



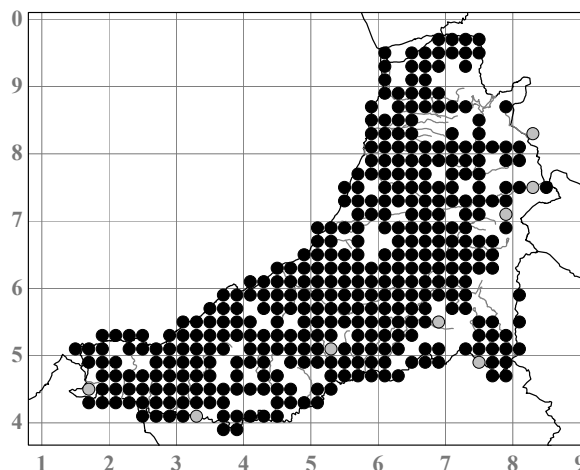
*Filipendula vulgaris* in Llangybi churchyard, view NE from SN608531, June 1981

**Filipendula ulmaria** (L.) Maxim. (*Spiraea ulmaria* L.) - Meadowsweet - Erwain

Very common in marshes, damp pastures, wet woodlands, streamsides, flushed slopes and damp roadside verges, especially in shaded sites. It is common in flushes on the coastal slopes and in gullies on the sea cliffs, as well as on damp cliffs and in sheltered gullies in the uplands. It frequently forms extensive, dense stands to the virtual exclusion of other species. Smith (1878) remarked that it and *Eupatorium* “were the two commonest plants of the roadside” in August 1878 in the Lampeter district, but drainage and cutting regimes mean that this is no longer true.

Yapp (1912) conducted extensive experiments at Aberystwyth on the occurrence of tomentum on the lower surface of the leaves, relating it to the humidity of the different strata of the vegetation in which it grew. While the first leaves were always glabrous, later ones tended to become progressively more tomentose as they grew up into a drier atmosphere; while this was generally related to humidity, plants which he called var. *denudata*, although developing a scattered or slight tomentum, never achieved the dense tomentum of typical plants under the same environmental conditions. Most plants examined in recent years in the county have most of the leaves white-tomentose beneath, but almost every population contains some plants with the leaves glabrous except for minute hairs on the veins, some plants have both glabrous and tomentose leaves, and the tomentum is often irregularly patchy (most unusual in any kind of plant). In some sites where the atmosphere is generally very humid, for example in the Llyfnant SN79D, I, 2006, and the Devil’s Bridge ravine SN77N, 2007, there is a predominance of largely glabrous plants, but the complexity of the factors involved, well recognised by Yapp, makes it uncertain whether it is really worth formally naming such populations var. *denudata* (J. Presl & C. Presl) Maxim.

Altitude limit c.610m, “to about 2,000 ft. on Plynlimon” SN793873, Salter (Diary 26.9.1903, 1935); 610m, flush on cliffs above Llyn Llygad Rheidol SN79328731, 2002.

**Rubus** L.

Subgen. **Rubus** (*R. fruticosus* L. agg.) - Bramble - Llwyn Mwyar Duon (Meri Duon, Mafon Duon)

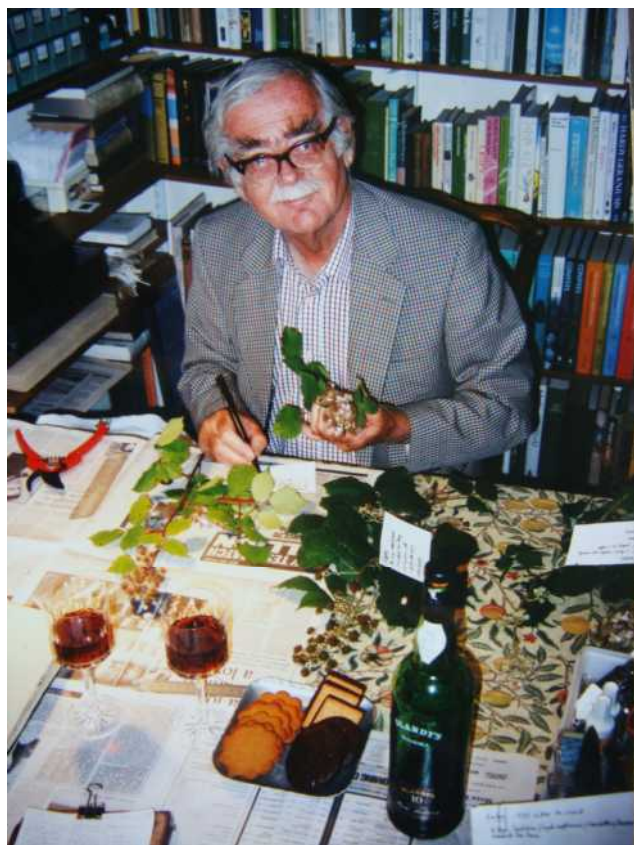
By D. E. Allen & A. O. Chater

**History of recording**

The first collection of one of these species was by George Anderson (d.1817), a botanist from West Ham, London, with a special interest in Willows and Peonies. He collected *R. nessensis* at Devil’s Bridge in autumn 1808, and incidentally attempted unsuccessfully to give it a new name, *R. suberectus*. In 1843 Edwin Lees (1800-1887) of Tewkesbury, one of the earliest competent British batologists, collected *R. hylocharis*, *R. bertramii* and *R. scissus* at Devil’s Bridge c.SN77N, and *R. nemoralis* along with *R. bertramii* between Aberystwyth and Ystrad Meurig. He was again in the county the following year when he collected *R. silurum* at Cwmcynfelin SN68B. Charles Cardale Babington (1808-1895) of Cambridge visited Aberystwyth, where he collected *R. bartonii*, in 1848, and went to Devil’s Bridge by coach where he collected *R. albionis*, walking back to Aberystwyth presumably via Ponterwyd SN78K, because he collected *R. pyramidalis* there. The remarkably perceptive Bristol botanist Martha Maria Atwood (1808-1885) collected *R. hylonomus* at Monachty c.SN56A during her stay of about two months in the county in 1854.

There was then a considerable gap in batological activity until the Revd W. H. Painter (1835-1910), latterly Rector of Stirchley in Shropshire, collected material on his visits to the county from 1891 until 1908, several times accompanying Salter in the field. Many of his specimens were identified or confirmed by the experts W. O. Focke in Germany and W. Moyle Rogers. He made the earliest collections of several species including *R. raduloides* and *R. incurvatus*. His own herbarium in **ABS**, although it contains c.700 *Rubus* specimens, includes very few from the county. The Revd Augustin Ley (1842-1911) of Herefordshire, commemorated by *R. leyanus*, made a number of collections, including eight of new species, on his short visits to the N of the county in 1886 and 1899, and a third member of the clergy, the Revd Edward Shearburn Marshall (1859-1929), paid especial attention to the genus during his month-long exploration by bicycle of the area around Aberaeron in 1899 and collected ten species new for the county. The *Handbook* by Rogers





David Allen processing *Rubus* material,  
Windover, Aberystwyth, July 1999

(1900) indicated most of the species that had been recorded in the county up to that time. William Charles Barton (1874-1955), a schoolmaster of South Kensington, one of the most scholarly of batologists and commemorated by *R. bartonii*, collected in the Llyfnant c.SN79D, I and elsewhere in the N of the county in 1923 from his holiday home at Barmouth. Salter in his Flora (1935), drawing chiefly on Rogers, assembled all the available records and covered about 59 species and 16 varieties, but seems to have taken no interest in them on his own account.

Again there was something of a gap until the early 1970s when Alan Newton (AN) recorded and collected extensively from Strata Florida and Aberystwyth northwards on field trips in the 1970s (Newton 1972) and in 1994, and as can be seen below he has provided or confirmed the names of the specimens on which very many of the recent records from the county are based (in so far as they were of species so far described). In 1978 the BSBI organised a 4-day *Rubus* field meeting based at Lampeter, led by Newton and Eric Smoothey Edees (1907-1993), co-authors of the standard modern monograph in 1988. This meeting ranged over much of the southern half of the county, complementing Newton's surveys in the north, and its participants recorded and collected in a total of some 12 hectads.

In 1993-2004 David Allen (DEA) made a series of annual visits, all except two being of nearly a week in duration and timed to coincide with the *Rubus* flowering season, in the course of which the two of us jointly listed the species in 259 tetrads, more than half of all in the county, and so were able to obtain a fair idea of the distribution of the species. Vouchers supporting records of the less common species, as well as series of specimens of the various unnamed local forms that we encountered, have been deposited in **BM** by DEA, with many duplicates in **NMW** (mostly not cited here). During this survey some 30 named species were added to the county list. The total now stands at 78 (a creditable achievement as the equally well recorded Brecknockshire, the one Welsh county with a resident expert, has 101, and the southern counties of England, with much more diverse *Rubus* floras, average about 100).

A reasonable proportion of the plants met with throughout the county cannot be matched with any named species, and most of these appear to be local forms with too small a distribution to merit the generally accepted requirements for formal description and the privilege of a scientific name. The more distinctive and/or widespread of these are however included here, and given the informal nicknames by which they have come to be known. A few of them, notably "false *semiglaber*", "false *adscitus*" and "pink floriferous *Vestiti*", may well, in the light of further investigation and recording, merit formal recognition in the future.

## Distribution

The British and Irish distributions of our species as known up to the year 2000 can best be seen in Newton & Randall (2004), and are briefly summarised in updated form in the accounts below so that their distributions within the county can be related to the wider context. Newton (1980, Edees & Newton 1988, Newton & Randall 2004) has recognised a number of *Rubus* florulas, covering areas of Britain and Ireland characterised by certain assemblages of species. Cardiganshire is now considered to comprise the southern part of the Irish Sea Florula (although it was earlier considered as part of a now abandoned Main Welsh Florula), and is effectively isolated from the South and Midland Florula to the east by the Cambrian Mountains. To the south it abuts onto the Severn Bay Florula. Characteristic components of the Irish Sea Florula that occur in the county include *R. dasyphyllus*, *R. lindleianus*, *R. nemoralis*, *R. plicatus*, *R. polyanthemus*, *R. scissus* and *R. wirralensis*.

Predominantly thermophilous and southern species that are predominantly coastal in the county include *R. cardiophyllus*, *R. ulmifolius* and *R. hastiformis*, the latter reaching its northern limit here. Other species with a southern distribution in Britain but that are found only in the lower Teifi valley include

*R. largifiscus*, *R. melanodermis*, *R. mucronatiformis* and *R. scaber*; this part of the valley is notable for its well-insolated south-facing slopes and has a higher January mean temperature than any other inland part of the county. Predominantly south-western species that reach the county include *R. aequalidens*, *R. altiarquatus*, *R. hibernicus*, *R. longus*, *R. orbus*, *R. prolongatus*, *R. rilstonei*, *R. rubritinctus* and *R. villicauliformis*. Two of our species, *R. dumnoniensis* and *R. lanaticaulis*, are of broadly western, as opposed to south-western, distribution in Britain. Two of the commonest species in the county, *R. bartonii* and *R. silurum*, are strongly western in their British distribution and endemic, with Wales as their chief stronghold, and *R. perdigitatus*, another endemic, centred on S Wales, is widespread in the S of the county. Of the species of Newton's Padarn Complex, endemics of N Wales, *R. celticus* and *R. monensis* occur in the county, but *R. semiglaber* has yet to be found; *R. segontii*, so far known chiefly from N Wales, but also from S Lancashire and two counties in Ireland, may be expected too. Other species largely confined in Britain to N Wales that also occur here include *R. effrenatus*, *R. fuscicortex*, *R. ordovicum*, *R. riparius* and *R. "Dolgellau robustus"*. *R. angusticuspis* and *R. ariconiensis*, endemics centred on SE Wales, just reach the SW of the county. The distributions of *R. pascuorum* and *R. pampinosus* suggest the influence of the Dyfi gap in the mid-Wales mountain chain, similar to the Ribble and Tyne gaps in the Pennines (Newton & Randall 2004), through which frugivorous birds may have spread the species.

Within the county, there is a very distinctive micro-florula in the Rheidol valley, characterised by *R. cardiophyllus*, *R. lindleianus*, *R. lanaticaulis*, *R. pascuorum* and the undescribed "Rheidol white". The richest site for species is Coed Newydd, Coedmore SN196443, in the SW of the county, a partly felled mixed plantation on clay comprising glaciolacustrine deposits laid down in the late Devensian Llyn Teifi, when the Teifi estuary was dammed by the Irish Sea Ice Sheet; 24 species have been recorded here including *R. ariconiensis*, *R. biloensis*, *R. boudiccaae*, *R. hylocharis*, *R. mucronatoides*, *R. orbus*, *R. rhombifolius* and *R. scaber*. The roadside hedgebanks by Bryn-Eithyn Hall, Llanfarian c.SN580780 are also notably rich, with the extraordinary total of 16 species including *R. boudiccaae*, *R. hylocharis*, *R. pascuorum* and *R. percrispus*, the latter some 150 km NW of its main area of distribution; the age of these hedges is uncertain, but the road was certainly in existence at least as long ago as the late 18<sup>th</sup> century, and the arrangement of the fields around the Hall has been taken to suggest that it is the site of a medieval trefgordd, a family holding of land (Dodgshon 1994, Palmer 2004). Whether hedge-dating by Brambles (see Allen 1971) is generally more valid in the county than that by the conventional counting of woody species (see section above on hedges p.134) remains to be investigated.

In this account "endemic" is used to mean that the species does not occur outside Britain, Ireland and the Channel Islands. The maps contain only records approved by DEA, AN, BAM or ESE, except for those of *R. silurum*, *R. ulmifolius* and the species in Sect. *Rubus* where AOC has included a number of his own determinations.

### Craft and legend

Bramble stems were an essential element in lipworking in the county, the making of seedlips or baskets chiefly for carrying seed corn for sowing. These were made from 'Hen Gymro' Wheat straw twisted into rolls that were bound together by Bramble stems split lengthwise into two and with the prickles and pith removed. Probably the last exponent was the late Benjamin Evans of Brynllin, Penuwch SN588607, whose methods were described and illustrated in Jenkins (1965, 1968, 1976): "The best type of bramble grows in sheltered positions under trees in forests and plantations, and the craftsman has to walk many miles from his hillside home to the valleys, in search of suitable raw material. Hedgerow bramble is almost useless for lip making, for it has too many off-shoots and is much weaker than the forest-grown variety. The bramble must be winter-cut, when there is no sap between the bark and the core." It is to our lasting regret that we never asked Evans where he collected his stems so that the Bramble could have been identified; the Gwenffrwd valley is the most likely site. Examples of similar lipwork can be seen in the Ceredigion Museum, Aberystwyth, and at the Museum of Welsh Life, St Fagans.

Henfynyw SN46K, an ancient site with a church, near Aberaeron, has been the subject of much speculation of batological interest by Thomas & Howlett (2003). In discussing the complex relationship between the names for St Davids and Henfynyw, where St David is said to have been educated, they quote Giraldus Cambrensis writing in his late 12<sup>th</sup> century life of the saint: "Puer autem nutritus est in loco qui Vetus Rubus dicitur, qui et Kambrice *Hen-meneu*, Latine vero Vetus Menevia vocatur. Sortitus est autem locus hic nomen ab Hybernico *Muni* quod et rubus sonat. [And the boy was reared at a place called Vetus Rubus, which in Welsh is called *Hen-meneu* and in Latin moreover Vetus Menevia. The place-name here arises from the Irish *Muni*, which means 'a bramble bush.']" They equate Vetus Rubus with Henfynyw, and among much else they bring in the Biblical Jewish tradition of the Burning Bush, which they take to have been a species of *Rubus*, and question whether this place-name may have been chosen with the implication

that St Padarn, a contemporary of St David who was believed to have originated in Brittany, and who was also associated with Henfynyw, was destined to lead the people of his adopted land of mid-Wales, like Moses, to the promised land. “Was there ever a real, single, distinctive bush here? Was it ever on fire?” they ask. The batologist has, alas, no answer.

### Sect. *Rubus*

The species of this section have suberect stems that do not spread by rooting at the tip, and thus, although they usually sucker and often form dense thickets, they are not as invasive as the remainder of the species. As they flower a month or two earlier, and are especially characteristic of wet heaths and valley mires, they are an important nectar source for insects and this, combined with their non-invasive nature, should make them more tolerated by practical conservationists. They are absent from the SW of the county where the more calcareous Irish Sea Ice Sheet drift predominates.

#### *Rubus arrheniiformis* W. C. R. Watson

Only recorded as a small patch on a heathy roadside verge 2km NNE of Llangwryfyon SN61207228 in 2004 (BM, DEA & AOC, conf. AN). Thickets at the margin of the Rhos Rydd valley mire SN573734, 1991 (BM) were considered to be possibly of this species by AN and DEA. It is generally characteristic of old heathlands, and in Britain is confined to scattered sites in Wales and C and S England.

#### *Rubus bertramii* G. Braun

Sparsely distributed on wet heaths, at the edge of valley mires and raised bogs, in felled conifer plantations and on roadside banks, but absent from the drift soils of the SW. It was first collected in 1843 from a “Thicket between Aberystwith and Ystrad-meirg” (CGE, EL, det. BAM, conf. DEA). Altitude limit 330m, slope below conifer plantation, 700m NNW of Blaen Twrch SN679501, 2003 (DEA & AOC), its only site above 300m.

#### *Rubus briggsianus* (W. M. Rogers) W. M. Rogers

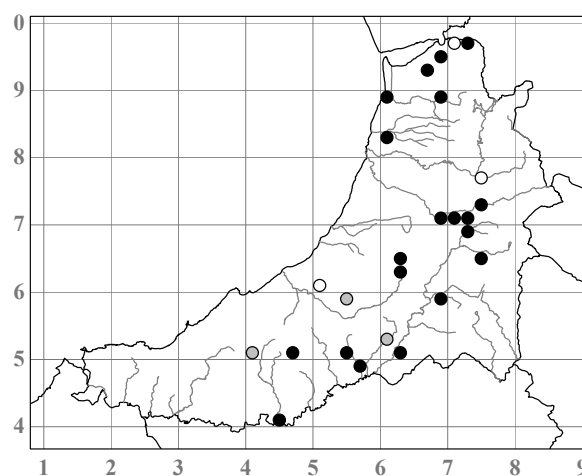
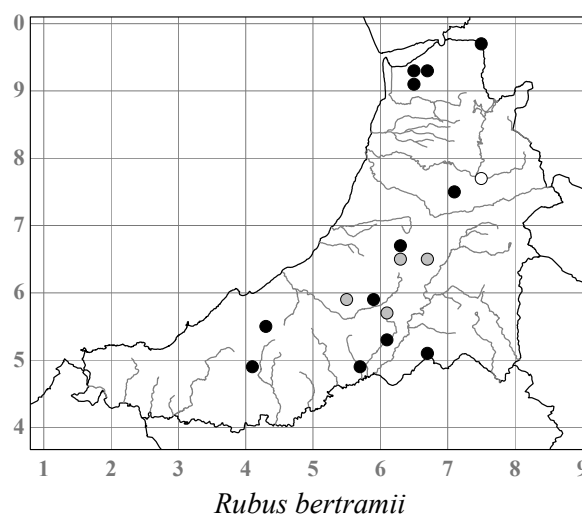
Recorded only as a single bush on a roadside hedge-bank 250m SE of Penwaun, St Dogmaels SN157442 in 1995 (BM, DEA & AOC, conf. AN). Apart from many records from Anglesey, it occurs chiefly in SW Wales, SW England and in NW Ireland, and is a British endemic.

#### *Rubus nessensis* W. Hall

Widely scattered on heaths, in felled conifer plantations and by FC roads, on roadside banks and occasionally on pingo ramparts and even in wet Alder woods, but absent from the extreme SW and not recorded from over 275m altitude. There is a large colony of exceptionally luxuriant, big-leaved plants in mixed estate woodland 300m ENE of Plas Gogerddan SN632838, 2005 (BM, det. DEA), and similar material has been collected from Perthshire. First recorded in 1808 “in the wood behind the Devil’s Bridge” SN77N (Anderson 1815), and occurring throughout most of Britain and parts of Ireland.

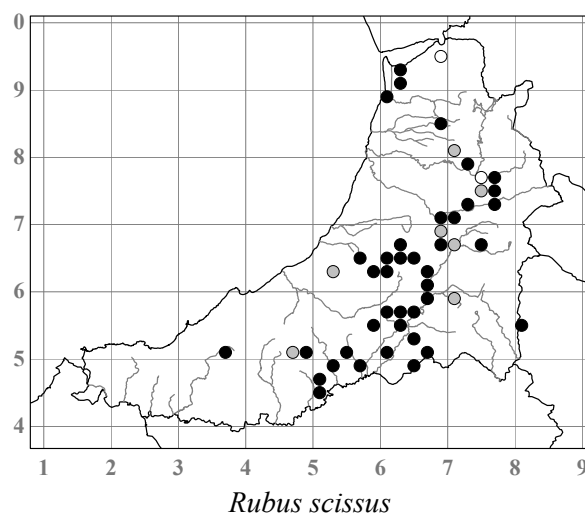
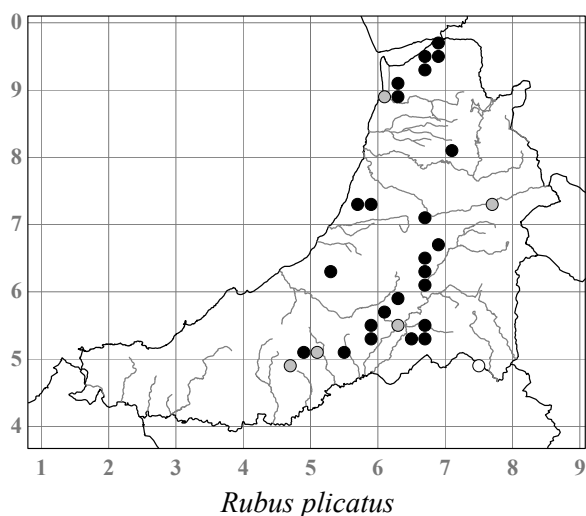
#### *Rubus plicatus* Weihe & Nees

Scattered through the N and C of the county, chiefly on wet heaths and in valley mires and around the raised bogs where it can form extensive thickets, less often in felled conifer plantations, at the edges of plantations or





on heathy roadside banks. First collected in the county in 1885 from Cors Fochno SN69 (**BM**, det. WMR, conf. DEA) and widespread throughout Britain and Ireland. Altitude limit 340m, edge of conifer plantation 1.3km S of Llanddewi-Brefi SN665539, 2003 (DEA & AOC), with three other sites over 300m.



### **Rubus scissus** W. C. R. Watson

Widespread in Britain and Ireland, and the most frequent of the suberect species in the county, more upland than the others and with ten sites at over 300m altitude, and again absent from the SW. Burkill & Willis (1894) remarked that it grew “In the valleys above Strata Florida, at the top limit of the Bramble.” It occurs chiefly in and around the raised bogs and valley mires, where it often colonises old peat cuttings, in marshy fields, on heaths and on heathy roadside banks, in Sessile Oak woodland and in felled conifer plantations. It was first collected, in a mixed gathering with *R. bertramii*, presumably in 1843, at Devil’s Bridge SN77N (**CGE**, EL, det. BAM). Altitude limit 390m, replanted conifer plantation 1.2km NNE of The Arch SN772765, 2003 (DEA & AOC).

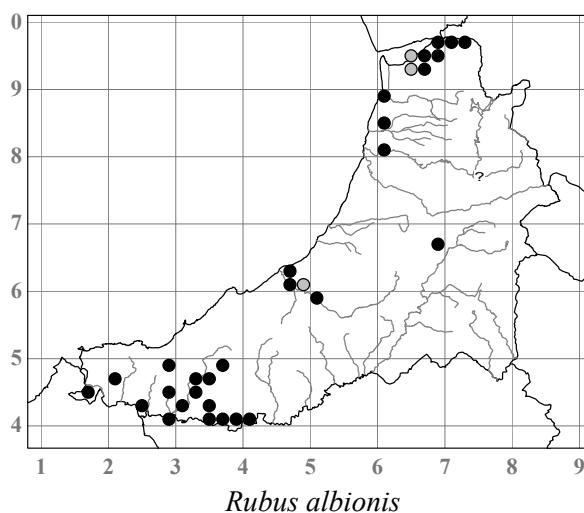
Sect. **Glandulosus** Wimm. & Grab.  
Ser. *Sylvatici* (P. J. Müll.) Focke

### **Rubus albionis** W. C. R. Watson

Chiefly in the Dyfi, lower Aeron and lower Teifi valleys and their tributaries, in woods, scrub, felled plantations and hedgebanks. Although it has surprisingly not been seen recently in the Rheidol and Ystwyth catchments, the first record is from the former, at Devil’s Bridge c.SN77N in 1848 (**CGE**, CCB as *R. schlehtendalii*, det. WMR, conf. BAM). It is an endemic with a generally SW distribution in Britain and is widespread in Ireland. Altitude limit 310m, edge of conifer plantation 1.5km N of Ffostrasol SN373492, 1995 (DEA & AOC).

[*Rubus dasycoccus* W. C. R. Watson

Watson (1958) gives an unlocalised and presumably erroneous record for this local endemic known only from Monmouth and Gloucestershire.]



### **Rubus lindleianus** Lees

Widespread over most of England, parts of Ireland, W Scotland and Wales except for the SW. It is frequent in the lowlands of the county in hedgebanks, woods and wood margins and scrub, and has not been recorded from over 275m altitude. First recorded by Marshall in 1899 (**K**, det. WMR, conf. AN); an earlier record by

Lees (1848) of it occurring “abundantly near Aberystwyth” probable refers to *R. silurum*, *fide* DEA.

### **Rubus ludensis** W. C. R. Watson

An endemic, chiefly of the Welsh Marches, it has been found in three sites, in roadside hedgebanks 100m S of Waunwhiod, St Dogmaels SN145450 in 1995 (**BM**, DEA & AOC) and just NW of Abercoed, SSW of Tregaron SN670581 in 2002 (**BM**, DEA & AOC), and in a felled conifer plantation 200m S of Eglwys Newydd SN767735 (**BM**, DEA & AOC), all conf. AN.

[*Rubus macrophyllus* Weihe & Nees

This name was applied very broadly by the early batologists. The record in Watson (1883) was presumably based on an 1848 specimen from Aberystwyth (**CGE**, CCB) renamed as *R. bartonii* by AN; a record from a “Hedge, Glandyfi” SN69Y in Ley (1887) will not have referred to the true species which is confined to C and SE England.]

[*Rubus mercicus* Bagn.

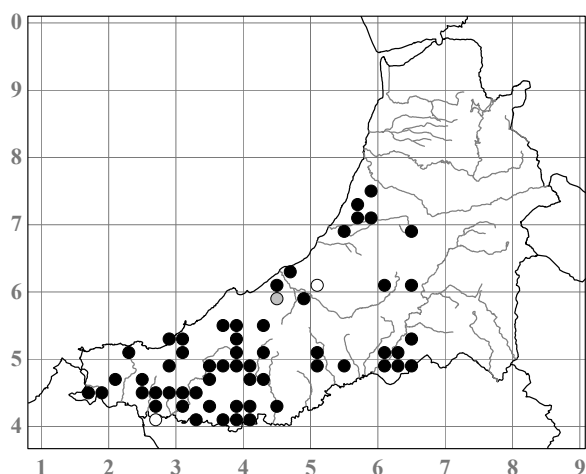
Erroneously listed for the county in Hyde & Wade (1934).]

### **Rubus monensis** W. C. Barton & Ridd.

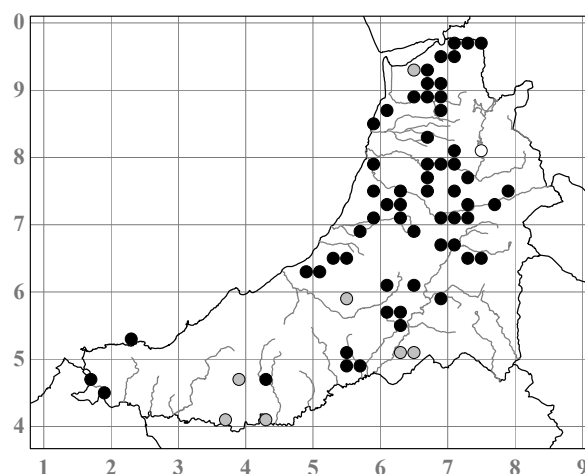
This N Wales endemic, one of the three species in Newton’s Padarn Endemic Complex, was first recorded in the county from Dol-y-bont SN68J in 1994 (**Herb.** AN, AN), and has since been found on a roadside bank by a Bracken colony just W of Penbonrhydybeddau SN672837 (**BM**, DEA & AOC, conf. AN) and on a heathy bank below the dam at Llyn Frongoch SN722751 (**BM**, DEA & AOC, conf. AN) at 280m altitude, its S-most limit.

### **Rubus perdigitatus** A. Newton

Largely confined to SW Wales, this endemic is widespread in the SW half of the county. First recorded in hedges around Monachty c. SN56A and around Bethania and Cross Inn nearby in 1899 (**BM**, ESM, det. DEA), it grows in hedgebanks, scrub, on heaths and Bracken slopes and in felled conifer plantations. Altitude limit 340m, road verge by Sitka Spruce plantation 2.5km SE of Llanfair Clydogau SN641490, 1995 (DEA & AOC).



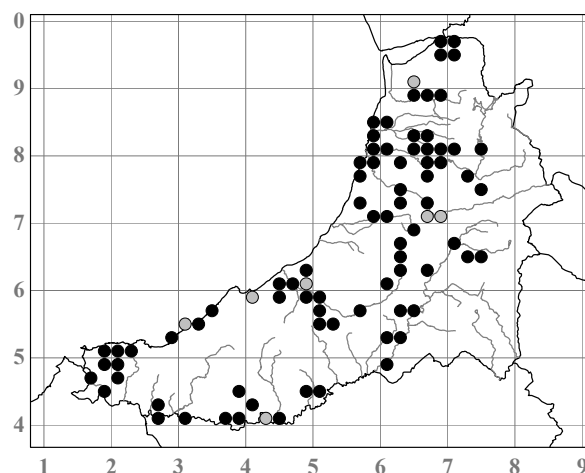
*Rubus perdigitatus*



*Rubus pyramidalis*

### **Rubus pyramidalis** Kaltenb.

Widespread in England, Wales except for the SW, Ireland and W Scotland, and frequent throughout the county except for the SW, occurring in hedgebanks, heathy places, woods and plantations. It was first recorded from Ponterwyd SN78K in 1848 (**CGE**, CCB, det. WMR, conf. BAM), but is chiefly lowland, not having been recorded from over 240m altitude unless this Ponterwyd site was slightly higher.



*Rubus lindleianus*

[*Rubus questieri* Lefèvre & P. J. Müll.

Listed for the county by Rogers (1900), but in the absence of confirmatory evidence it is best ignored.]

### ***Rubus riparius* W. C. Barton ex A. Newton**

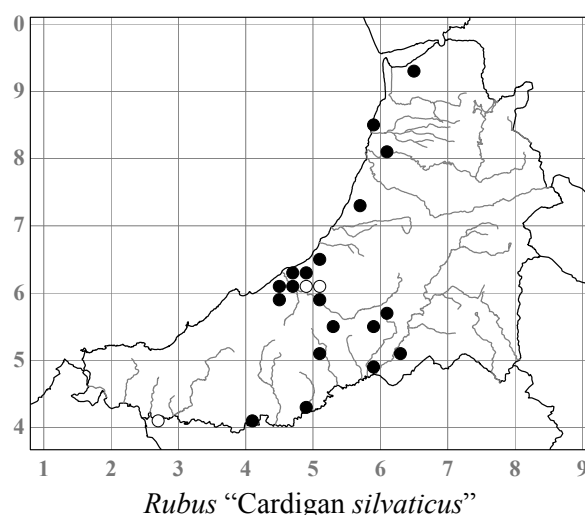
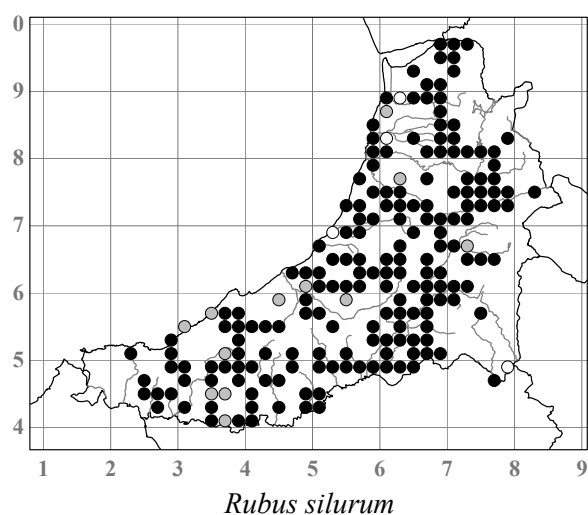
Chiefly confined in Britain to NW Wales, but this may be the relic of a once much wider range as it also occurs in Dorset, Hampshire, the Isle of Wight and Normandy. It was first recorded in the county from the Llyfnant SN79D or I in 1923 (**BM**, WCB, conf. AN), and was seen again there in 1997 on a roadside bank below felled conifers 700m W of Glasbwl SN732975 (**BM**, DEA & AOC). It seems not to be abundant in the N of the county as implied by Newton (1972), and the above are the only two localised records.

[*Rubus sciocharis* (Sudre) W. C. R. Watson

Recorded, presumably erroneously, from the county in Hyde & Wade (1934) as *R. gratus* var. *sciaphilus*.]

### ***Rubus silurum* (Ley) Ley**

One of the commonest species in the county, which is in the centre of its endemic distribution that extends from Westmorland to N Devon, with one record from E Ireland. The earliest record is from Cwmcynfelin SN68B in 1844 (**CGE**, CCB, det. DEA). It occurs throughout, even in much of the uplands, though absent from the extreme SW, chiefly in hedges but also in scrub, woods, felled plantations and conifer stands. There are 20 records of it from over 300m altitude, more than for any other species, and it is probably the commonest species on the Mynydd Bach. Altitude limit 435m, side of FC road at NW edge of Llyn Berwyn SN743571, 1990 (**NMW**, det. DEA).



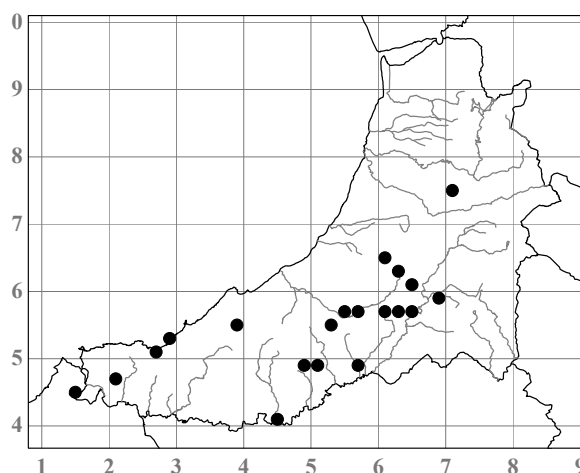
### ***Rubus* "Cardigan silvaticus"**

This still unnamed local endemic was first noted by Marshall in (1900) who saw it near Monachty c.SN56A and at Llanerchaeron c.SN46V in 1899 (**BM**) and described it as "A very handsome bramble, with the leaves much cut and the stems curiously spotted with red". It was collected near Cenarth bridge SN24Q in 1932 (**BM**, FRi, det. DEA), and has more recently been recorded from many sites extending from the Dyfi to the middle part of the Teifi valley in a total of 22 tetrads in twelve hectads, being especially common around Aberaeron, growing in hedgebanks, woods, scrub and on heathy commons.



### **Rubus “pink floriferous *Vestiti*”**

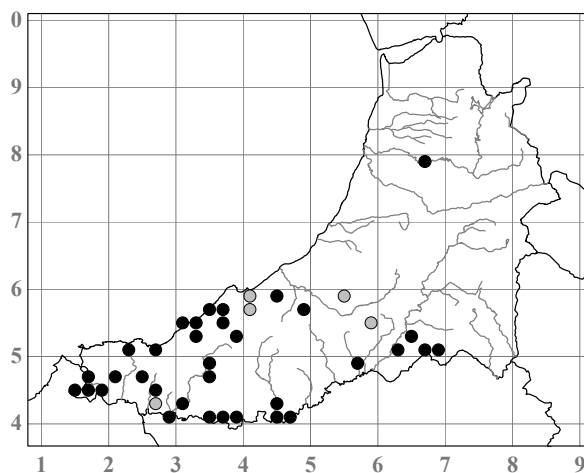
Widespread in the county, centred in the upper Aeron valley and extending from near Llanafan in the N to the SW corner, and recorded altogether from 20 tetrads in ten hectads. It is especially frequent in woodland and scrub, and is also on hedgebanks, felled conifer plantations and quarries. Representative material includes some from roadside woodland, Allt Cefn-Llanfair, 2.5km E of Llandysul SN444408, 1996 (BM, DEA & AOC). It has also been recorded in N Pembrokeshire and perhaps from Herefordshire, but Cardiganshire is its stronghold. The inappropriate name reflects an earlier placing of it in Ser. *Vestiti* because it is slightly glandular.



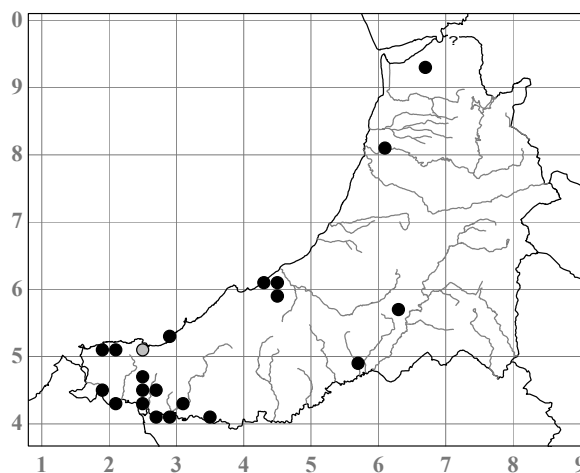
Ser. *Rhamnifolii* (Bab.) Focke

### **Rubus altiarquatus** W. C. Barton & Ridd. (*R. cariensis* sensu W. M. Rogers, non Ripart ex Genev.)

Largely south-western in Britain and scattered in Ireland, this handsome species is confined to the SW half of the county, except for a single record from the Rheidol valley SN663789, 1996 (DEA & AOC). It is especially characteristic of woodlands and scrub, but is also frequent in hedgebanks, on railway embankments and on Bracken slopes, and is chiefly lowland with only three records from over 300m altitude. It was first recorded in 1899 from the lower Drywi valley SN46F (CGE, ESM, det. BAM) and from between Llanerchaeron and Aberaeron SN46Q (Marshall 1900). Altitude limit 340m, roadside bank by conifer plantation in Cwm Twrch SN679501, 1995 (DEA & AOC).



*Rubus altiarquatus*



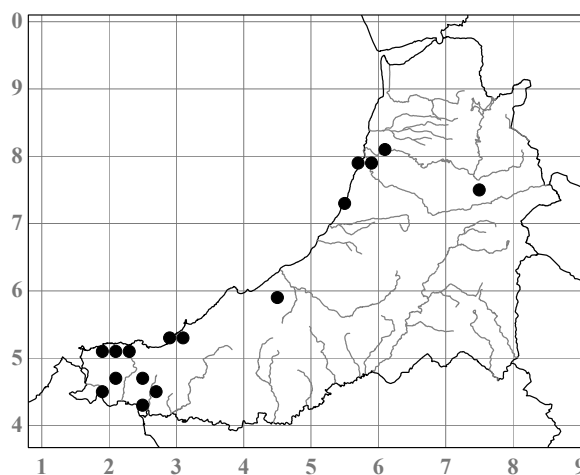
*Rubus amplificatus*

### **Rubus amplificatus** Lees

Widespread in England and Ireland, but chiefly coastal in Wales, and in the county mostly in scattered localities along the coast and more frequently in the lower Teifi valley. First recorded in 1923 from the Llyfnant c.SN79D or I (BM, WCB, det. DEA), it grows in hedgebanks, scrub, at wood margins and in felled plantations, all below 160m altitude.

### **Rubus boudicca** A. L. Bull & Edees

Endemic to Britain and Ireland and known from widely disjunct areas, though probably still very under-recorded. It is chiefly coastal in Wales, as in

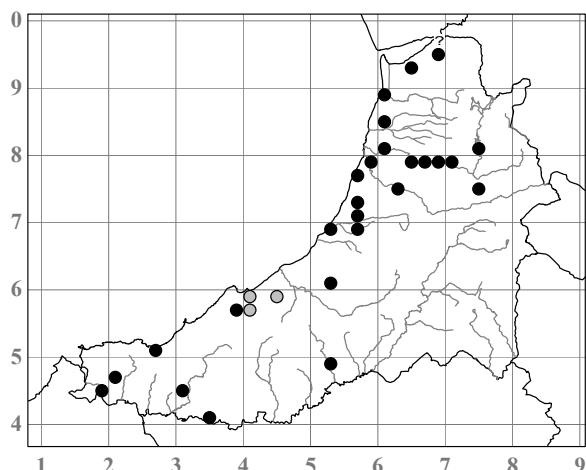


*Rubus boudicca*

the county, where it grows in woodland, scrub and hedgebanks. It was first recorded from scrub near Warren Farm, Penparc SN201477 in 1996 (**BM**, DEA & AOC, conf. AN), and is most abundant on the sandy soils of this area. An isolated inland bush, by the farmyard at Dolgors, 3km S of Devil's Bridge SN746740, 2003 (DEA & AOC) is perhaps an accidental introduction.

***Rubus cardiophyllus* Lefèvre & P. J. Müll.**

Widespread especially in the SW half of England, largely coastal in Wales, with scattered sites along the coast in the county, especially in the N, though rare elsewhere except for the Rheidol valley where it is quite frequent. It is in hedgebanks, scrub, woodland and waste ground, and was first recorded in 1923 from Glandyfi c. SN69Y (**BM**, WCB).



*Rubus cardiophyllus*



*Rubus davisii*, N of Argoed  
SN61207228, July 2004

***Rubus davisii* D. E. Allen**

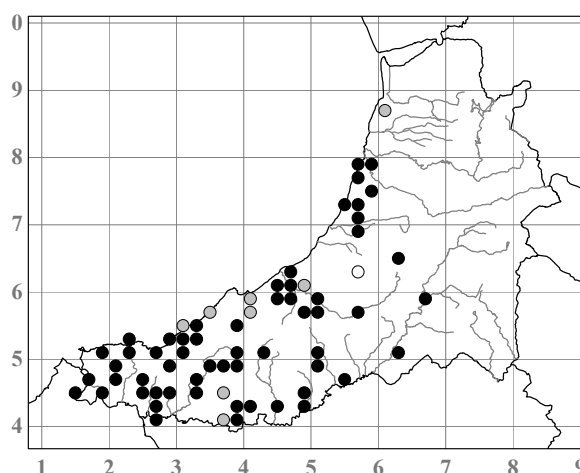
An endemic, named in 1998 in honour of the Pembrokeshire botanist T. A. W. Davis (1899-1980), and occurring in SW Wales and parts of S England. It was first collected in the county in 1941 along the cliffs between Tresaith and Aber-porth SN25Q (**NMW**, JAW, det. RDR, conf. DEA), although it could not be refound there in 2000 (DEA & AOC). It has since been found on a heathy lane verge at Swyddffynnon SN69406601 in 2001 (**BM**, DEA & AOC) and on a roadside bank 1.5km N of Argoed SN61277265-61207228 in 2003 (DEA & AOC) - 2004. Its treatment by Newton & Randall (2004) as a synonym of *R. villicauliformis* is a matter of debate, resolvable only by deeper research. The Cardiganshire plant is impressively homogeneous and certainly very different in appearance from the plant of the Devon and Cornwall moors for which the name *R. villicauliformis* was coined.

***Rubus dumnoniensis* Bab.**

Of distinctly western distribution in Britain and Ireland, endemic except for one locality in Normandy. It is largely confined to the W half of the county where it is frequent in hedgebanks, scrub, heaths and on Bracken slopes. It was first recorded in 1899 from between Aberaeron and New Quay (**BM**, ESM, det. WMR, conf. DEA). Altitude limit 310m, roadside by conifer plantation 1.5km N of Ffostrasol SN373492, 1995 (DEA & AOC).

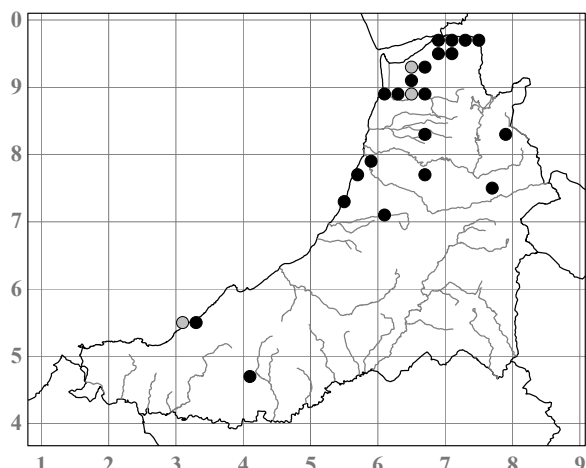
***Rubus incurvatus* Bab.**

Almost endemic, with one locality in Denmark. In Britain mainly in the SW half, with its stronghold in N Wales, this species is one of the very few to be largely confined to the N of the county where it grows in woodland, scrub, felled plantations and on hedgebanks, well into the uplands. First recorded from Glandyfi SN69Y and from near Aberystwyth in 1891 (**BM**, WHP, conf. DEA). Altitude limit 360m,

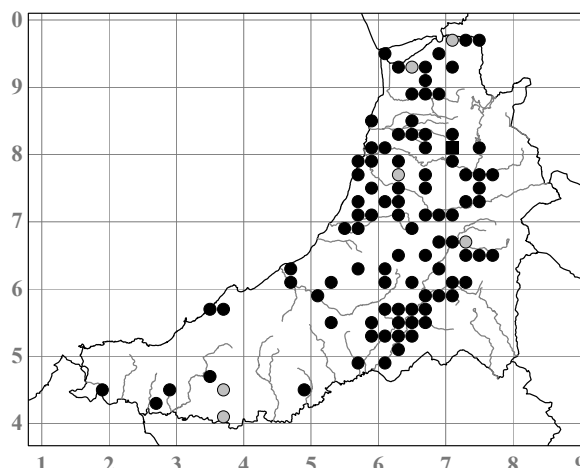


*Rubus dumnoniensis*

replanted conifer forest, The Arch SN765756, 2003 (DEA & AOC) and edge of conifer plantation, Cwmergyr SN793830, 1994 (NMW, DEA & AOC).



*Rubus incurvatus*



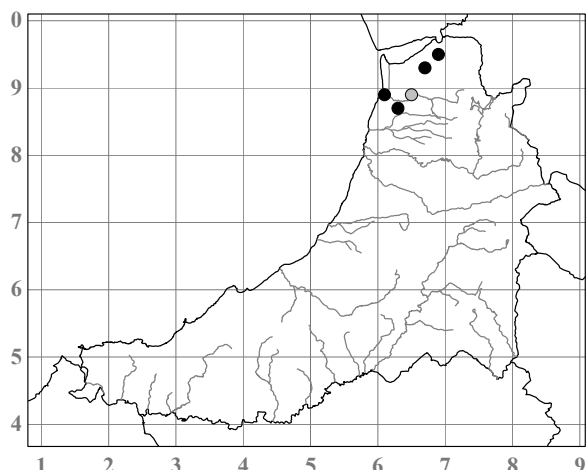
*Rubus nemoralis*

### ***Rubus nemoralis* P. J. Müll.**

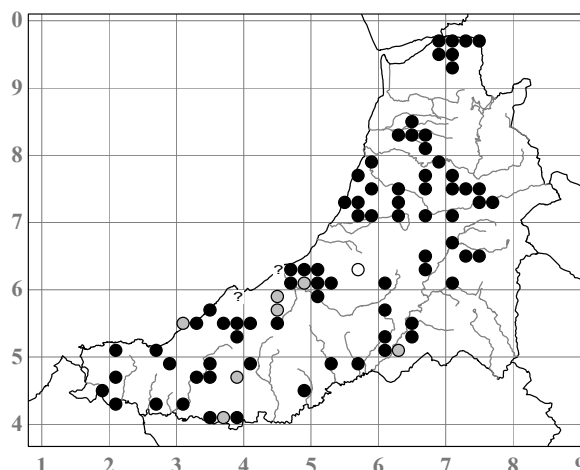
This conspicuous pink-flowered species, occurring throughout most of Britain and Ireland, is common over much of the county but becomes rare in the SW. Although it extends well into the upland valleys, it is only recorded from two sites at over 300m altitude. It was first recorded from “between Aberystwyth and Ystradmeirg” in 1843 (CGE, EL, det. BAM, conf. DEA), and grows on hedgebanks, heaths, in scrub, woodland and felled plantations as well as rocky streamides and fen margins. Altitude limit 320m, roadside hedge 1.8km SSW of Llanddewi-Brefi SN654539, 2003 (DEA & AOC).

### ***Rubus pampinosus* Lees (*R. favonii* W. C. R. Watson)**

Endemic to the SW half of England and Wales, this species reaches its northern limit at its six sites in the extreme NW of the county, where it was first recorded in the 1970s from SN6488 (AN). Three of the other sites are on roadsides in conifer plantations, one is at the edge of a streamside Alder thicket, and one at a wood margin.



*Rubus pampinosus*



*Rubus polyanthemus*

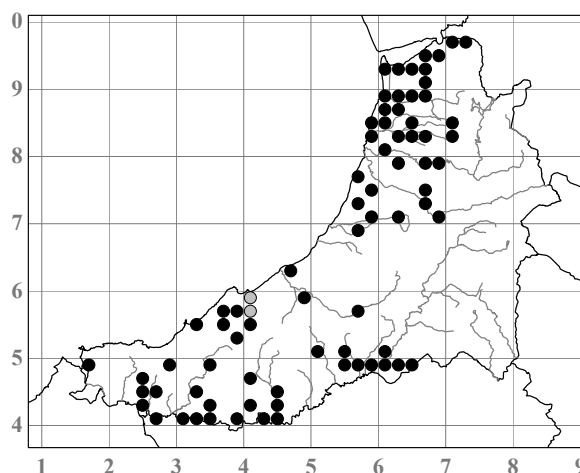
### ***Rubus polyanthemus* Lindeb. (*R. pulcherrimus* Neumann)**

Widespread throughout Britain and Ireland, and equally so, though nowhere common, in the county, where it is virtually absent from the uplands. It grows chiefly on hedgebanks and heathy places, and occasionally in woods, felled plantations, railway embankments and quarries. A colony in a felled FC plantation 1.6km SE of Strata Florida SN756644, 1994 (NMW, DEA & AOC) had an unusually large proportion of leaves with seven leaflets. It was first recorded in 1899 at Bethania SN56R, Aberaeron c.SN46L and New Quay c.SN35Z (Marshall 1899). Altitude limit 330m, heathy roadside 3km NE of Llanfair Clydogau SN653532, 2003 (DEA & AOC), its only site at over 300m.



**Rubus prolongatus** Boulay & Letendre (*R. hypoleucus* auct., ?non Lefèvre & P. J. Müll.)

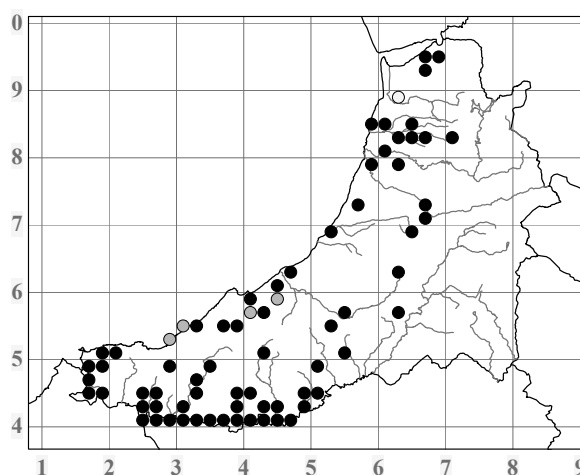
Strongly south-western in Britain and Ireland, and frequent in the county especially towards the N and SW. It was first recorded in 1905 from Dol-y-bont c.SN68J (**BM**, WHP, det AN, DEA). In contrast to most of the other commoner species, it grows more often in woodland, scrub, felled plantations and at wood margins than in hedgebanks, and also grows on Bracken slopes and on sand dunes. It is the dominant species in the Leri valley for 2km ESE from Tal-y-bont SN68U. Altitude limit 350m, felled conifer plantation, Llyn Pendam SN709839, 2000 (DEA & AOC), where it is locally abundant; there are two other sites at over 300m.

**Rubus rhombifolius** Weihe ex Boenn.

Widespread but sparsely distributed in Britain and Ireland, and in W Wales recorded only from Llŷn, and from partially felled woodland on clayey soil at Coed Newydd, Coedmore SN196443, 1998 (**BM**, DEA & AOC, conf. AN).

**Rubus rubritinctus** W. C. R. Watson

Largely south-western in Wales as in Britain and Ireland as a whole, and though scattered throughout the county only common in the lower Teifi valley where, as well as occurring in hedgebanks, it is often on S-facing wooded or scrub slopes and at the S margins of woods and plantations. It is almost entirely lowland. First recorded for the county in Watson (1958). Altitude limit 350m, felled conifer plantation, Llyn Pendam SN709839, 2000 (DEA & AOC), but at no other sites over 275m.

*Rubus rubritinctus***Rubus villicauliformis** A. Newton

Endemic to SW Britain, and recorded from two sites in the middle of the county, on Aber-arth Common SN479624, 1993 (**BM**, DEA & AOC, conf. AN) and at the edge of Cors y Cwn bog, Bethania SN578642, 1993 (**BM**, DEA & AOC, conf. AN).

**Rubus “Dolgellau robustus”**

Although recorded from only one site in the county, where there is a colony at the wood edge at the bottom of Pant Da, Capel Bangor SN671787, 1996 and 2000 (**BM**, DEA & AOC), this distinctive plant was collected at several sites around Dolgellau, Merioneth and from near Machynlleth, Montgomeryshire in 1923 by Barton and Riddelsdell (**BM**, det. DEA).

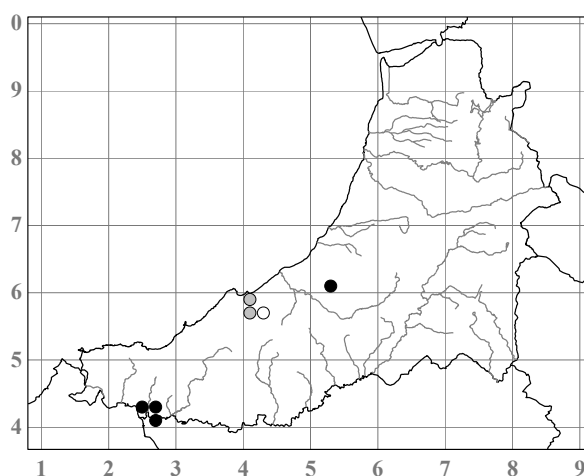
**Rubus “white Rhamnifolii”**

Recorded from three sites in three hectads in the S of the county, in scrub by a conifer plantation, Gwachal Dwmlo SN258425, 2000 (**BM**, DEA & AOC), in recently felled woodland nearby, Allt Gudd SN275418, 1996 (**BM**, DEA & AOC) and in felled and replanted conifer plantation, Allt Maestir SN546503, 1997 (**BM**, DEA & AOC). It matches material from Hampshire (**BM**, DEA H764) and perhaps the Cardiganshire occurrences originate from the same tree nursery source as that.

Ser. *Sprengeliani* Focke

### **Rubus sprengelii** Weihe

Widespread in England, very local in Ireland and rare in Wales. It was first recorded in 1899 from between Llanarth and Llanina (Marshall 1900, **BM**, ESM, conf. BAM), and was re-found there on a scrub and Bracken slope SN418579 during the 1978 BSBI *Rubus* meeting (**NMW**, AN). It has since been recorded from seven other sites in the SW of the county, on Bracken slopes, in felled woodland and on heathy banks, and it was notably abundant over some 12ha of secondary woodland dominated by *Betula pubescens* at Coed Tyddyn-du, Cennarth SN273426 in 1980 (**NMW**, conf. AN).

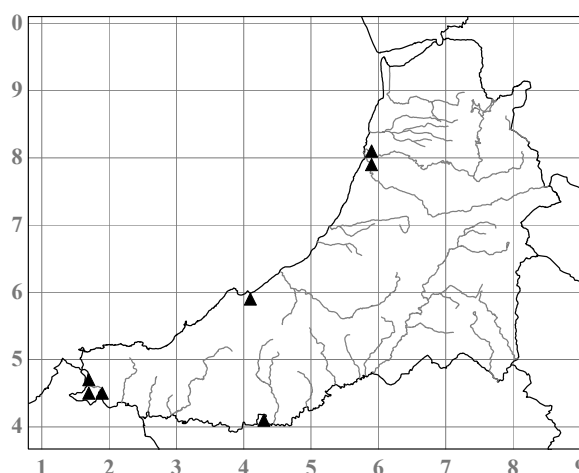


*Rubus sprengelii* in Bracken, slope above B4342, Llanarth SN418579, July 1979

Ser. *Discolores* (P. J. Müll.) Focke

### **Rubus armeniacus** Focke

This large, aggressively spreading Bramble of uncertain origin, marketed commercially as '**Himalayan Giant**' and grown for its fruit, has spread over much of Britain in recent decades, but was not recorded in the county until 1996 when a well-established colony was seen on a roadside slope on the S outskirts of Cardigan SN178456 (**NMW**, DEA & AOC). It has since been found in several other sites near Cardigan, including felled woodland at Coed Newydd, Coedmore SN196443 in 1999 (DEA & AOC), and a few elsewhere on waste ground, tips and railway verges, but is spreading only slowly here and seems to be intolerant of the cooler and wetter climate of the Celtic fringe; it is rare and scarcely naturalised in Ireland.



### **Rubus rossensis** A. Newton

Endemic and generally south-western in Britain, rare in Ireland, and recorded only from a roadside hedgebank 100m N of Henllan station SN357408 in 1999 (**BM**, DEA, AOC & RDP, conf. AN). This is its most northerly site in Wales.

**Rubus ulmifolius** Schott

Throughout much of Britain and Ireland, but becoming rare in the N, and markedly coastal in its distribution in the county. Burkill & Willis (1894) described it as “confined to the lower valleys”, and Painter described it as “The prevailing Bramble at Aberystwyth” (Salter 1935), both statements being still largely true. It is especially common in hedgebanks by the coastal towns and villages, and along the coastal slopes, but also occurs on sand dunes, in woodland, felled plantations, on waste ground, tips and quarries. Altitude limit 310m, a single, doubtless accidentally introduced bush by the Llyn Brianne dam SN789486, 1997.

Hybrids with various other species are quite frequently seen, and among those noted have been ones with *R. altiarcuratus* in woodland 1.4km NW of Llwyndafydd SN361563 in 1998 (DEA & AOC); with *R. amplificatus* in hedges near Llechryd SN208438 in 1998 (DEA & AOC); with *R. longus* by estate woodland at Noyadd Trefawr SN260457 in 2001 (DEA & AOC); with *R. prolongatus* on a roadside hedgebank 1.5km E of Tal-y-bont SN666889 in 2000 (DEA & AOC); and with *R. vestitus* on a roadside hedgebank W of Llanarth SN418578 in 1978 (AN).

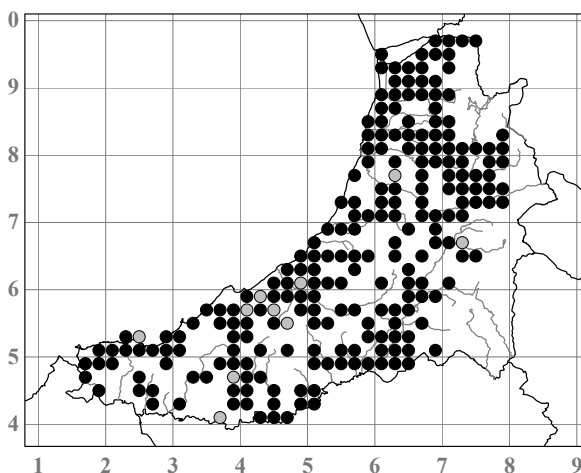
Ser. *Vestiti* (Focke) Focke

[*Rubus adscitus* Genev.

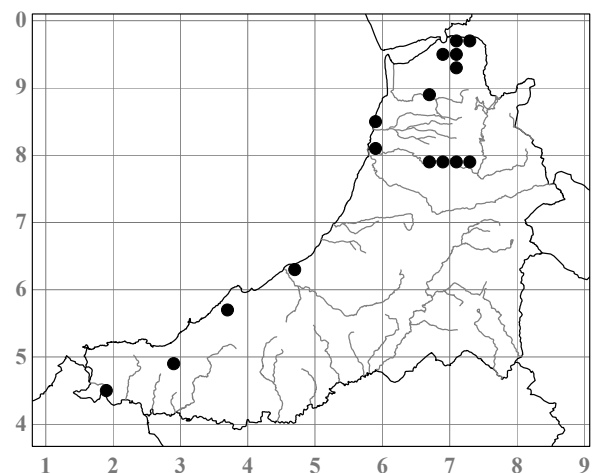
The record for this in Hyde & Wade (1934) refers to *R. prolongatus* (fide AN and DEA).]

**Rubus bartonii** A. Newton (*R. lettii* auct., non W. M. Rogers, *R. hirtifolius* auct., ?non P. J. Müll. & Wirtg.)

Endemic, chiefly in Wales and adjacent parts of England, and very local but spreading aggressively (and perhaps introduced) in Ireland and the Isle of Man. It is a familiar plant elsewhere as it is marketed commercially as ‘**Ashton Cross**’. Probably the commonest species in the county, in all the usual habitats, it extends almost as much into the uplands as *R. silurum*, with 18 records from over 300m. It was first collected in 1848 from Aberystwyth (CGE, CBB, det. AN). Altitude limit 400m, a large patch among roadside conifers 1.2km N of Blaen-twrch SN681508, 2003 (DEA & AOC).



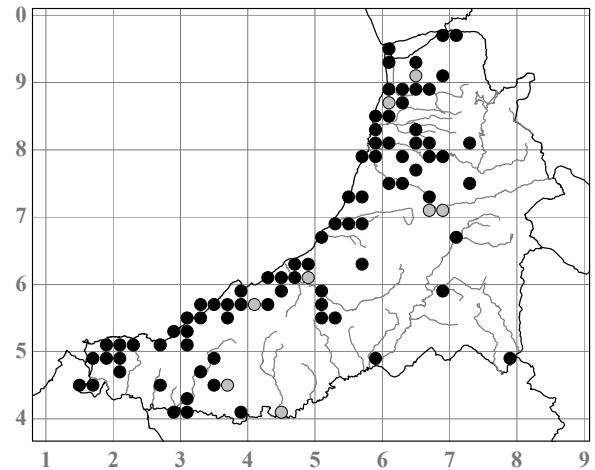
*Rubus bartonii*



*Rubus lanaticaulis*

**Rubus lanaticaulis** Edees & A. Newton

Widespread in Ireland and W Britain, but rare in SW Wales and in the county chiefly in the N, where it was first recorded in 1995 by a road in mixed woodland W of Dol-goch SN703944, (BM, DEA & AOC). It grows chiefly in hedgebanks, woodland and scrub, and is in felled woodland at its SW-most site, Coed Newydd,





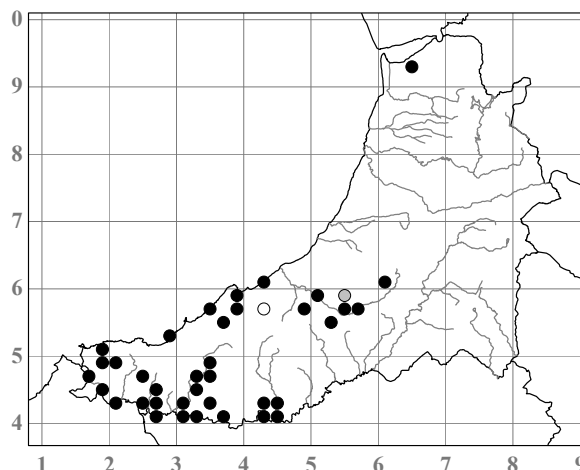
Coedmore SN196443, 1998 (DEA & AOC). A cut-leaved form was collected in a hedge by the National Library, Aberystwyth SN593816 in 1993 (**BM**, DEA).

### **Rubus lettii** W. M. Rogers

Endemic, occurring in N Ireland, the Isle of Man and SE Pembrokeshire, and a substantial colony was found in 2001 in both hedges of the road at Penffos, Rhydlewish SN347481 (**BM**, DEA & AOC, conf. AN).

### **Rubus longus** (W. M. Rogers & Ley) A. Newton

Endemic and confined to S Wales, SW England and SE Ireland, and in the county confined to the SW half apart from a single record from a roadside hedgebank at Craigypenrhyn SN656925, 2001 (DEA & AOC). Marshall (1900, and **BM**, det. AN) was the first to record it, in 1899 as *R. lasiocladus* var. *angustifolius* and wrote: "Remarkably common and characteristic about New Quay and Aberaeron, when in flower, its bright rose-coloured petals contrast admirably with the white-felted under side of the leaves." It is frequent in the SW in hedgebanks, woodland, scrub, felled plantations and on Bracken slopes.



### **Rubus orbus** W. C. R. Watson

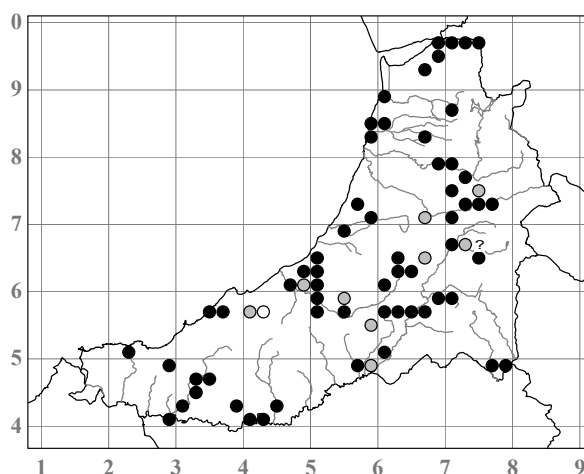
Endemic to S Wales and SW England, and recorded in the county only from partially felled woodland on clay soil in Coed Newydd, Coedmore SN196443 in 1999 (**BM**, DEA & AOC, conf. AN). A 1932 collection from a roadside near Cenarth SN24 (**NMW**, FRi, det. RDR, conf. AN), is too poor to be confidently determinable, *fide* DEA.

### **Rubus ordovicum** A. Newton

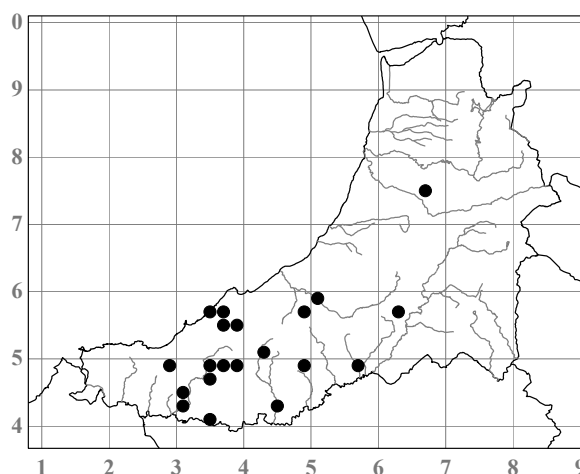
Endemic to N Wales and Co. Dublin in Ireland, one bush, presumably a bird-sown stray, of this striking species with deep pink flowers was found at the margin of mixed woodland, Coed Wileirog, 1.5km E of Wallog SN603856 in 1994 (**BM**, DEA & AOC, conf. AN).

### **Rubus vestitus** Weihe

Throughout most of Britain and Ireland, though rare in Scotland, and scattered throughout most of the county. As in most of Ireland, plants with deep pink flowers are much commoner than those with either pale pink or white ones. It grows in hedgebanks, woods, scrub, felled plantations, on disused railways and waste ground, and is generally lowland. First recorded in 1893 by Burkill & Willis (1894) from "Under Pen-y-Bannau" c. SN76N. Altitude limit 300m, gully in cliffs, Craig Ddu, Cwm Doethie SN769483 (det. DEA).



*Rubus vestitus*



*Rubus* "False *adscitus*"

**Rubus “false *adscitus*”**

A white-flowered species, widespread and recorded in 20 tetrads in nine hectads in the S of the county, on heaths, hedgebanks and Bracken slopes, in woodland, scrub, felled plantations, quarries and waste ground. Representative material was collected from heathy roadside banks and a felled conifer plantation 700m N of Gwenlli church SN389541 in 1998 (**BM**, DEA & AOC), among other sites. A site by a ride in a conifer plantation 400m WSW of Llanerch-yr-oen, Abermagwr SN667747, 2001 (**BM**, DEA & AOC) is well north of its main range. Altitude limit 300m, roadside Beech hedge, Pen Garn-wen, Ffostrasol SN374491, 1995 (**BM**, DEA & AOC). It has also been recorded in N Carmarthenshire.

**Rubus “false *norvicensis*”**

Collected from three tetrads in SN35, from *Molinia* grassland on Rhos Gellie SN380535, 1994 (**BM**, DEA & AOC), from the edge of wet heat on Rhos Penffynnon, Sarnau SN315505, 2000 (**BM**, DEA & AOC) and from a pathside in dry, mixed woodland 300m NW of Pontgarreg school SN334543, 2000 (**BM**, DEA & AOC). Similar plants have been collected in Kintyre and Guernsey, and it may turn out to be a widespread western species.

**Rubus “Roman pink”**

A pink-flowered species strikingly associated with the Roman road Sarn Helen, along which it is common in the hedges for c.5km from Deri-Odwyn to Llanio, with representative material collected from 800m S of Deri-Odwyn SN643613, 2002 (**BM**, DEA & AOC). The only other site where it has been noted is the Cwrtnewydd quarries, SN489482, 1997 (**BM**, DEA & AOC). It is known from a total of three tetrads, SN44Z, 65N and 66K, in three hectads.

Ser. *Mucronati* (Focke) H. E. Weber

**Rubus fuscicortex** Sudre

Endemic to N Wales and Cheshire. Recorded only once, from the Llyfnant valley c.SN79D or I, explicitly in Cardiganshire, in 1923 by Barton (**BM**, conf. DEA), the S limit of its distribution.

**Rubus mucronatiformis** (Sudre) W. C. R. Watson

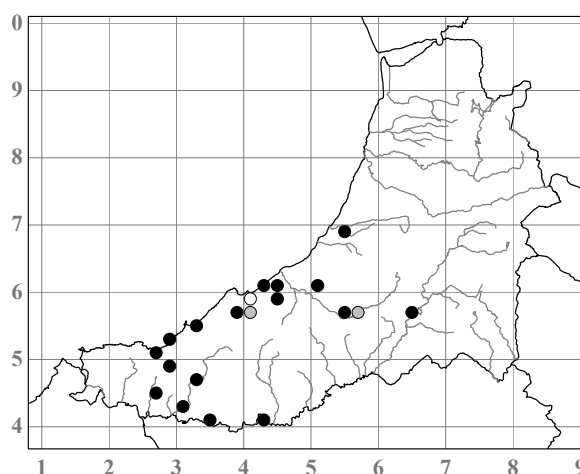
Endemic to S England, where its distribution is centred on the New Forest. One small patch on sandy soil in scrub at a field margin, extending to a roadside hedgebank, was found 200m N of Warren Farm, Penparc SN201477 in 1996 (**BM**, DEA & AOC, conf. AN), c.180km from its main area and of uncertain status, perhaps an accidental introduction.

**Rubus mucronatoides** Ley ex W. M. Rogers

Endemic to S Wales and parts of C England, but everywhere scarce. A patch of it was found on clayey soil in Coed Newydd, Coedmore SN197443 in 1998 (**BM**, DEA & AOC, conf. AN), far from its main area in Brecknockshire and Radnorshire.

**Rubus wirralensis** A. Newton

Endemic and chiefly western in Britain, and rare in Ireland, this species is confined in the county to the lowlands in the SW half, where it occurs in hedgebanks and woods and on the drift slopes on the coast. It was first recorded at such a site between Aberaeron and New Quay SN46F in 1899 (Marshall 1900, **BM**, ESM, det. DEA, conf. AN). A record from Penglais, Aberystwyth SN68W, 1891 (**ABS**, WHP, det. WOF as *R. mucronatus*) requires confirmation.



Ser. *Micantes* Sudre ex Bouvet

**Rubus aequalidens** A. Newton

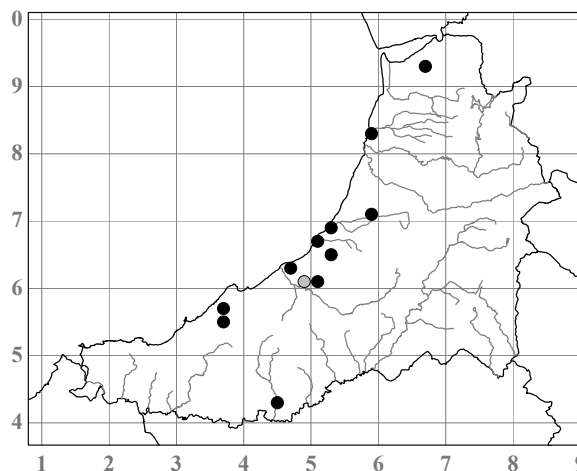
South-western in Britain and Ireland, and reaching its N limit in Britain on a conifer plantation trackside in Long Wood, 1.4km S of Llangybi SN610515, where it was first recorded for the county in 1996 (**BM**, DEA & AOC, conf. AN). The only other record is from a similar site at Gwachal Dwmlo, Cenarth SN258425, 2002 (DEA & AOC).

[*Rubus glareosus* W. M. Rogers

Although recorded for the county from near Llanfair SN4540 in 1978 (**NMW**, ESE, det. AN), the voucher specimen cannot now be found and the record is best ignored.]

**Rubus hastiformis** W. C. R. Watson

The N-most locality in Britain and Ireland for this generally south-western species is at Lodge Park SN665934, 1994-2004 (DEA & AOC) where there are several fine bushes in felled, regenerating woodland and by a layby on the A487(T) road. Although uncommon in the county it is comparatively more frequent than around the English coast, and is often abundant where it occurs, especially in felled and intact woodland, in a quarry at Tynfron, Llangwryfyon SN597708, 1994 (DEA & AOC), and in overgrown hedges. It was first recorded in 1978 near Ty-glyn, SN495608 (RJP, det. AN).



**Rubus melanodermis** Focke ex W. M. Rogers

This species chiefly of S England is rare in S Wales and local in Ireland and just reaches the S of the county, where it was recorded from a S-facing rocky slope by the A484 just W of Pontbren Pwll-crwn, 1.5km NW of Cenarth SN258424 in 1998 (**BM**, DEA & AOC, conf. AN).

**Rubus micans** Godron

Mainly in S and C England and SE Wales, and scattered in Ireland, this species was first recorded from a laneside hedgebank 300m SW of Penffynnon Farm, 2km W of Llandysul SN395408 in 2002 (**BM**, DEA & AOC, conf. AN). The only other record, of two patches on the disused line at Llanilar station SN628752 in 2003 (**BM**, DEA & AOC), was doubtless a railway introduction.

**Rubus moylei** W. C. Barton & Ridd.

Endemic and with a patchy distribution in S England, S Lancashire, SE Wales and S Ireland, the only record is from heathy ground in a felled conifer plantation 700m NW of Gwenlli church SN389541 in 1998 (**BM**, DEA & AOC, conf. AN) where it was perhaps introduced with the trees.

**Rubus norvicensis** A. L. Bull & Edees

An endemic apparently restricted to East Anglia and (possibly) the Teifi valley in S Cardiganshire as a native of woodland and old hedges. In central S England, Guernsey and many parts of Ireland it has an introduced look and occurs in plantations, garden hedges and waste places, putatively accidentally dispersed from nurseries within the past 100 years. Its Cardiganshire sites, in two of which it is abundant, are in woodland, and in one case a conifer plantation, where it could easily have escaped notice until recorded in 1978. In that year it was collected, though unrecognised at the time, from SN4540, probably in woodland at Allt Ddol-Walter (**NMW**, ESE, det. RDR, conf. DEA). In 1996 it was found in abundance in mixed woodland 300m S of Capel Dewi church SN451421 (**BM**, **NMW**, DEA & AOC, conf. AN). Its other sites are close by in SN44F and G, apart from one 10km to the W, in the wooded dingle by Cwmsylltyn Farm SN306437, where it was abundant along a 300m stretch in 1999 (**BM**, DEA & AOC).



**Rubus percrispus** D. E. Allen & R. D. Randall

A probably under-recorded, recently described and distinctive endemic from the S half of England, its Cardiganshire records forming a remote cluster. It was found in 1997 in one of the very Bramble-rich hedgebanks 300m WSW of Bryn-Eithyn Hall, Llanfarian SN579780 (**BM**, DEA & AOC), and in 2004 some 3km to the S in two other Bramble-rich roadside hedgebanks N of Tancwarel SN58507501 (**BM**, DEA & AOC) and SN58497558 (DEA & AOC).

**Rubus raduloides** (W. M. Rogers) Sudre

Widespread through much of Britain and Ireland, though largely absent from SW England and SW Wales. It was first recorded from the county in Cwm Einion c.SN69X in 1906 (**BM**, WHP, det. DEA, conf. AN). The only other collections are from a woodland laneside E of Llanfair SN4540 in 1978 (**NMW**, ESE, det. AN), and from scrub in the dingle above Ty-gwyn, Mwnt SN199516 in 1998 (**BM**, DEA & AOC, conf. AN).

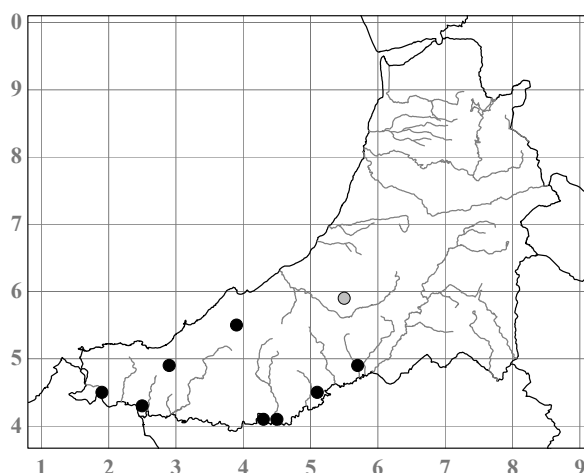
Ser. *Anisacanthi* H. E. Weber

**Rubus anglofuscus** Edees

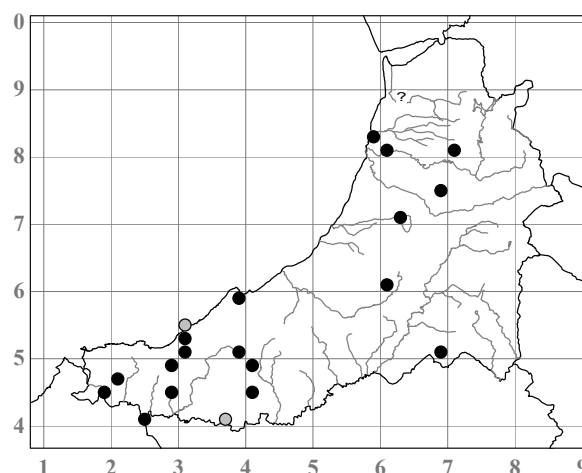
Centred in the W Midlands, with isolated records in Surrey and Dorset. A colony, doubtless introduced, was found in, and for quite a radius around, a disused roadside quarry 1km SE of Devil's Bridge SN747763 in 2003 (**BM**, DEA & AOC, conf. AN).

**Rubus biloensis** A. Newton & M. Porter

Endemic to S Wales and with outliers in SW England and Denbighshire, and recorded from scattered sites in the SW half of the county, where it was first collected in 1978 from the FC picnic site 1.5km N of Trefilan SN552587 (**NMW**, ESE, det. RDR) and from several sites close to Lampeter. It has since been recorded from mixed woodland and wood margins, felled woodland and hedgebanks, ranging from scattered bushes in a hedge by the Lampeter Rugby Club SN578487, 1998 (**BM**, DEA, MP & AOC) to a large colony in felled woodland in Coed Newydd, Coedmore SN196443, 1998 (**BM**, DEA & AOC, conf. AN).



*Rubus biloensis*



*Rubus dentatifolius*

**Rubus dentatifolius** (Briggs) W. C. R. Watson (*R. vectensis* W. C. R. Watson)

Chiefly in the SW half of Britain, widespread in Ireland, and in scattered sites through the county, for which it was first mentioned by Watson (1958) from Dol-y-bont c.SN68J, probably from a 1923 Barton collection. It can be very abundant in plantations, for example in a FC Larch plantation on a S-facing slope, Allt Tyn-y-graig, Goginan SN700818, 2003 (**NMW**, DEA & AOC), and also occurs in hedgebanks, scrub, on heathy and Bracken slopes and railway embankments. Altitude limit 410m, roadside bank at passing place 1.7km N of Blaen-twrch SN682511, 2003 (**NMW**, DEA & AOC), its only site at over 300m.

**Rubus effrenatus** A. Newton

One of the most attractive Brambles, with large, diffuse inflorescences and pink petals, endemic to N and C Wales, and with outlying stations in the Isle of Wight and SW Ireland. It was first collected in 1888 from

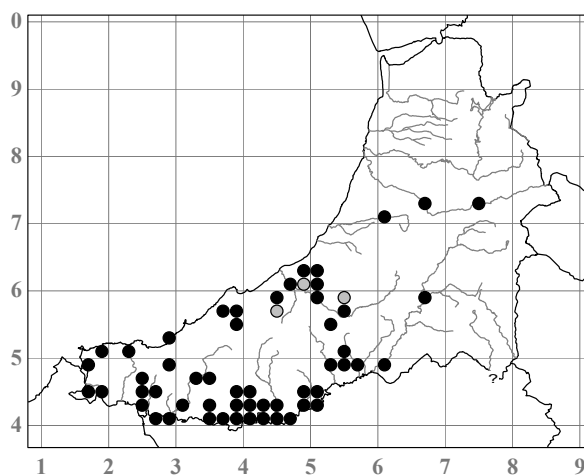
Cwm Einion c.SN69X (**CGE**, JP, det. AN), and has since been seen in ten sites mostly in the N of the county. It is abundant in *Salix* woodland on peat in the Taliesin Carr SN653913, 1995 (**DEA** & **AOC**), in several felled conifer plantations, and is also in hedgebanks, scrub and on heathy roadside banks. Further S it is in scrub at Llanina SN405598, 1998 (**BM**, **DEA** & **AOC**), and is abundant along the trackside in the conifer plantation of Cockshead Wood SN625552 and along the disused railway nearby in the Woodland Trust's Coed Garthenor SN634559, both 1996 (**DEA** & **AOC**).

**Rubus hibernicus** (W. M. Rogers) W. M. Rogers

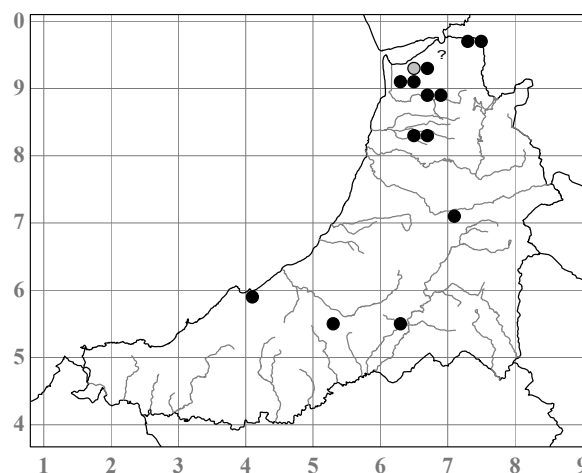
Chiefly a SW Wales endemic, extending to SW Cardiganshire. It was originally described from NE Ireland, and there are outlying localities in the Isle of Man and SW England. The single record is of a patch on a cliff slope above the road 250m W of the Crown Inn, Llwyndafydd SN36875551 in 1999 (**BM**, **DEA** & **AOC**, det. AN).

**Rubus leyanus** W. M. Rogers

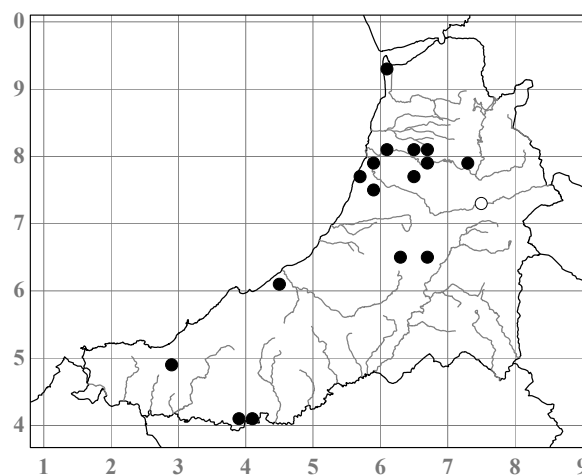
In Britain chiefly in the S half, especially common in S Wales, scattered in Ireland again chiefly in the S half, and with single records from Guernsey and the adjacent French coast. It is absent from the N of the county and is commonest in the Teifi valley, occurring chiefly in hedgebanks but also in woods and plantations and at wood margins, and has not been recorded from over 270m altitude. It was first recorded in 1890 "Near the Pysgotwr valley" c.SN74T (**BM**, **AL**, det. **DEA**).



*Rubus leyanus*



*Rubus effrenatus*



*Rubus pascuorum*

**Rubus pascuorum** W. C. R. Watson

Endemic to the W Midlands and S Wales, and quite widespread in the county where it was first recorded in 1886 at Pontrhyd-y-groes c.SN77L (Ley 1887, **BM**, **AL**, det. **DEA**). It is commonest around Aberystwyth and up the Rheidol valley, and occurs in hedgebanks, at wood margins, in scrub, and even on the Ynys-las dunes SN60769388, 2001 (**BM**, **DEA** & **AOC**) where it grows in an Elder thicket, suggesting that it may have been bird-sown. It has not been recorded from over 220m altitude. A subeglandular form was collected on a roadside hedgebank 3.5km SW of Swyddffynnon SN66386423 in 2001 (**BM**, **DEA** & **AOC**).

**Rubus "cut-leaved glandular"**

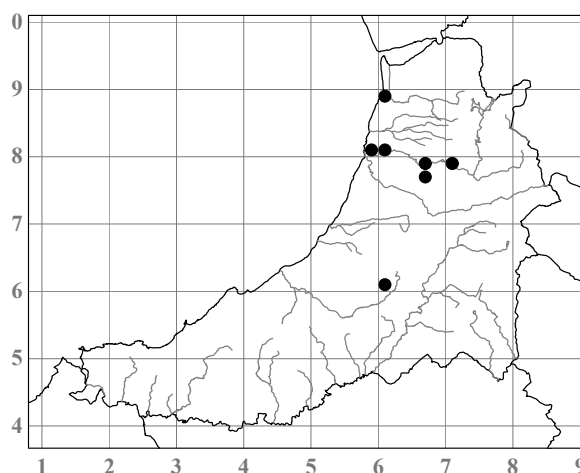
Recorded from three tetrads in two hectads in the N of the county, in a laneside hedgebank 600m E of Pengwmryn, Capel Dewi SN647822, 2000 (**BM**, **DEA** & **AOC**), by a lane in woodland, Rhosgellan-fawr SN596854, 1994 (**BM**, **DEA** & **AOC**), and in roadside hedges at Llwyniorwerth-uchaf, Capel Bangor SN651810, 2000 (**DEA** & **AOC**) where it is common.

**Rubus “false *turritus*”**

Recorded from five tetrads in three hectads in the middle of the county. It is close to *R. biloensis* and has clasping sepals. Among representative material is some from a colony in a laneside hedge W of Aeron Villa, 2.5km NE of Llangeitho SN633620, 1997 (**BM**, DEA & AOC).

**Rubus “Rheidol white”**

A very distinctive plant with large white flowers and deeply toothed leaflets, possibly a hybrid between *R. albionis* and *R. dentatifolius*. It is widespread up the Rheidol valley, and is especially abundant in hedgebanks and at wood margins between Glan-rheidol SN663789, 1996 (**BM**, DEA & AOC) and Dol-fawr SN704794, 1996 (DEA & AOC). Further afield it has been collected in a hedgebank at Dol-y-bont SN617882, 2001 (**BM**, DEA & AOC) in the N, and at Ffynnon Geitho-isaf, Llangeitho SN619617, 2001 (**BM**, DEA & AOC) in the middle of the county. Altogether it has been recorded from seven tetrads in five hectads.



Ser. *Radulae* (Focke) Focke

**Rubus celticus** A. Newton

This N Wales endemic was first collected in the county in 1906 from Cwm Einion c.SN69X (**MANCH**, WHP, det. AN) and again from there in 1907 by WHP. It was collected from the Llyfnant c.SN79D or I in 1923 (**BM**, WCB, det. DEA), but in spite of the implication by Newton (1974) that it occurs from Tal-y-bont northwards, there seem to be no other localised records from the county.

[*Rubus echinatus* Lindl.

Listed for the county by Rogers (1900), though not verified by him, and presumably erroneous.]

**Rubus flexuosus** P. J. Müll. & Lefèvre

Predominantly of southerly distribution in Britain and Ireland, and in Wales chiefly in the S. It was first recorded for the county in 1886 near Pontrhyd-y-groes c.SN77L (Ley 1887), and the first recent record was in 1994 from an Oak/Ash wood by the Nant Adal 700m S of Llanilar SN622743 (**BM**, DEA & AOC) where it was abundant. Nearby it was recorded on the disused railway near Pant-mawr SN607756, 1994 (DEA & AOC), and further up the Ystwyth valley it is in FC plantations near Pontrhyd-y-groes SN722720, 2000 (DEA & AOC) and Hafod SN750732 and 767735, 2000 (DEA & AOC). It has also been recorded in the S of the county from a scrub slope 1.5km N of Llanwnen SN537484 in 1998 (DEA, MP & AOC), and from a clearing in conifers, Gwachal Dwmlo, Cenarth SN258425 in 2002 (DEA & AOC). In a Larch plantation 900m W of Hafod SN750732 in 2000 (DEA & AOC) an apparent hybrid with *R. pyramidalis* was growing with both parents.

**Rubus largificus** W. C. R. Watson

Endemic, and with a puzzling distribution. It is chiefly in SE England and S and W Ireland, with outlying populations in C Scotland, Nottinghamshire, Pembroke town and in the lower Teifi valley. It was first recorded in the county in 1998 growing amongst *R. leyanus* in a felled conifer plantation, Gwachal Dwmlo SN258425 (**BM**, DEA & AOC, conf. AN), and later in scrub by a car park at the Newcastle Emlyn Rugby Club SN314409, 1991 (DEA & AOC), in roadside woodland, Allt Fedw, Cwm Cou SN310425, 1999 (**BM**, DEA & AOC), and as a colony by a footpath in scrub E of Capel Tygwydd SN274433, 2001 (**BM**, DEA & AOC).

**Rubus longithrysiger** Lees ex Focke

Chiefly in the S half of Britain and in N Wales, as well as in Ireland, it is only known in the county as a colony growing in Alder woodland at the disused station and woodyard site at Llanilar SN62687530, 2003 (**BM**, DEA & AOC, det. AN) where it is doubtless a railway introduction.



**Rubus malvernicus** Edees

An endemic centred around Malvern and the W Midlands, with outliers in Devon and Norfolk. Its occurrence in a felled and replanted conifer plantation in Allt Maestir, 3.5km NW of Lampeter SN546503, where it was collected in 1997 (**BM**, DEA & AOC, conf. AN), is probably due to accidental importation with the conifers.

**Rubus rufescens** Lefèvre & P. J. Müll.

Widespread over much of England and SE Wales, and scattered in Scotland and Ireland, the only record is from Lampeter, SN5748, 1978 (**NMW**, RGE, det. RDR, conf. DEA).

**Rubus “Hafod bramble”**

This pink-stamened plant is locally common in and around conifer plantations at Hafod SN766733, 2000 (**BM**, DEA & AOC).

**Rubus “Penmorfa white”**

Somewhat similar to “false *turritus*”, and recorded from three sites in the SW. It is common in roadside hedgebanks by the wood below Penmorfa chapel SN305520, 2000 (**BM**, DEA & AOC), in a wood at Pontgarreg SN335543, 2000 (DEA & AOC), and there is a colony in scrub at the W end of Tresaith bay SN27635148, 2000 (**BM**, DEA & AOC).

**Rubus “Penparc white”**

One of the most distinctive of the unnamed species in the county, widespread in the SW where it occurs in six hectads and 20 tetrads, and it is also abundant in NW Pembrokeshire. It grows in hedgebanks, scrub and woodland. Representative material includes some from a laneside hedgebank on sandy soil 200m NW of Warren Farm, Penparc SN206475, 1997 (**BM**, DEA & AOC).

Ser. *Hystrices* Focke

**Rubus angusticuspis** Sudre

Endemic to SE Wales and nearby parts of England, with outlying records from Scilly and the lower Teifi valley. It was first found in 1999 at the top of Allt Fedw wood, Cwm Cou SN310425 (**BM**, DEA & AOC, det. AN) and then in 2002 nearby in a laneside hedge and Oak woodland at Trewen SN29174179 (**BM**, DEA & AOC).

[*Rubus babingtonii* T. B. Salter

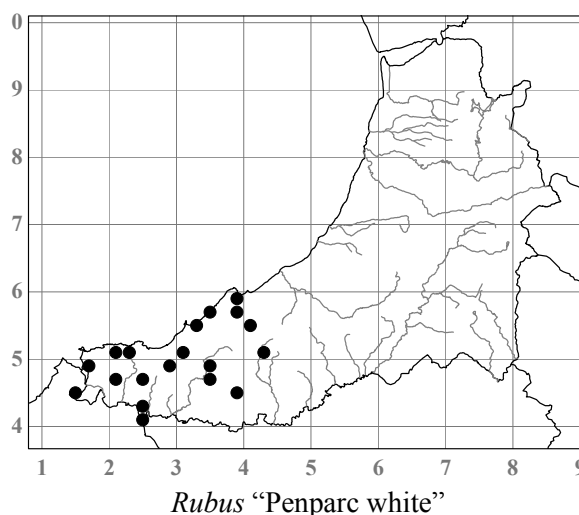
VC 46 is erroneously given for this species, under *R. ochrodermis* A. Ley, by Watson (1958) in error for VC 49.]

**Rubus bercheriensis** (Druce ex W. M. Rogers) W. M. Rogers

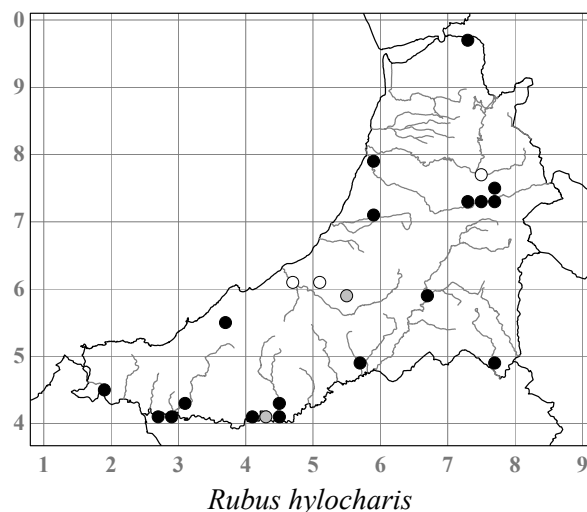
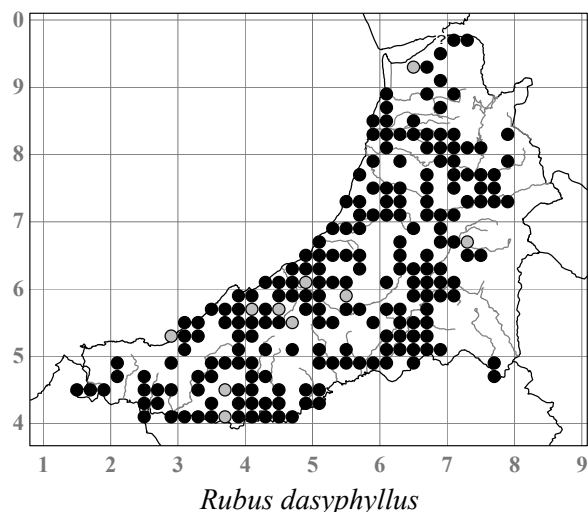
Chiefly in S England and S Wales, and first found in the county in 1995 at the edge of a garden in Cwm Degwel, St Dogmaels SN163454 (**BM**, DEA & AOC, conf. AN) where it was probably an accidental introduction. The only other records were made in 2003 from clearly native sites much further N and close together on heathy roadside banks, 1.8km N of Argoed, Llangwryfon SN61277265 (**BM**, DEA & AOC), and 2km S of Llanilar SN62117278 (**BM**, DEA & AOC).

**Rubus dasyphyllus** (W. M. Rogers) E. S. Marshall

After *R. bartonii* probably the commonest species, occurring throughout the county, and one of the commonest over much of Britain and the N half of Ireland, although absent from Cornwall and W Pembrokeshire. It was first collected in 1885 near Glandyfi c.SN69Y (**BM**, AL, det. ESE). It occurs in



almost all the Bramble habitats, and has been recorded from 14 sites at over 300m altitude. Altitude limit 375m, roadside slope by conifers 1.2km N of Blaen-twrch SN681505, 2003 (DEA & AOC)



### ***Rubus hylocharis* W. C. R. Watson**

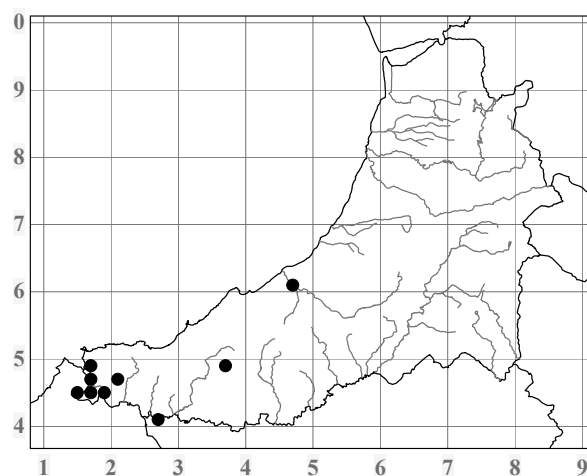
Endemic and widespread in England and S Wales, rare in N Wales, Ireland and Scotland. It was first collected, probably in 1843, from “Woods at Devil’s Bridge” c.SN77N (**BM**, EL, det. DEA), and is scattered through the county, especially in the upper Ystwyth and lower Teifi valleys, chiefly in woods, plantations and heathy scrub, but very rarely in hedgerows. A very robust form with deep pink, rather than the usual white stamens was collected among Bracken at Pont y Twll, Cwmystwyth SN775750 in 2000 (**BM**, DEA & AOC). Altitude limit 360m, replanted conifer plantation, The Arch SN765756, 2003 (DEA & AOC).

### ***Rubus merlinii* A. Newton & M. Porter**

Endemic to S Wales, and recorded from the county only from the Doethie valley SN74 or 75 at the N limit of its distribution range in 1897 (Newton & Porter 1990, **BIRM**, AL).

### ***Rubus rilstonei* W. C. Barton & Ridd.**

Abundant in Cornwall and Devon, with outliers in Hampshire and the Isle of Wight, it also occurs in NE Pembrokeshire and SW Cardiganshire. It was first recorded in 1995 from hedgebanks around Penwaun, St Dogmaels SN157442 (**BM**, DEA & AOC, conf. AN) and has since been found to be common in hedges all around the St Dogmaels/Cardigan/Ferwig area. It has also been recorded in a felled conifer plantation, Allt Gudd, Cenarth SN275418, 1996 (DEA & AOC); at the N-most limit of its distribution in open scrub on Comins Aberaeron SN462619 (**BM**, DEA & AOC); and, at its altitude limit, 310m, in heath by a conifer plantation, 300m S of Pen Garn-wen, Ffostrasol SN373491, 1995 (**BM**, DEA & AOC).

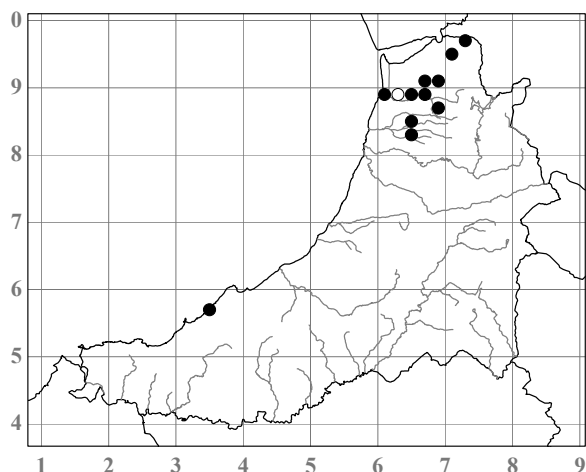
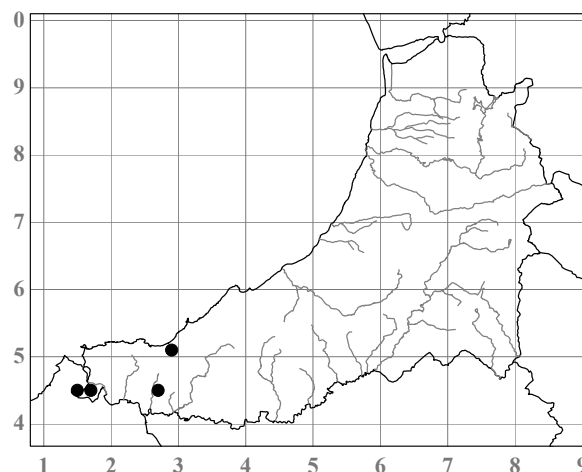


### ***Rubus* “false *atrebatum*”**

Noted from three sites in three hectads in the Lampeter area: a substantial population on a road verge by a conifer plantation 2.5km SE of Llanfair Clydogau SN641490, 1995 (**BM**, DEA & AOC), by a FC track in a conifer plantation, Cockshead Wood SN625552, 1996 (**BM**, DEA & AOC), and in a felled and replanted conifer plantation, Upper Forest SN575494, 1997 (**BM**, DEA & AOC).

**Rubus “false semiglaber”**

A most distinct species occurring from Dolgellau in Merioneth, whence five collections of it were made in 1923 by Barton (**BM**) who thought it might be *R. infestior*, to W Montgomeryshire and N Cardiganshire, where it is frequent in the area between the Llyfnant, Borth and Tal-y-bont. It is especially common around the latter village, for example in a pasture by the Afon Leri just NE of The Square SN655893, 1994 (**BM**, DEA & AOC, det. AN). Barton also collected it at Dol-y-bont nearby in 1923 (**BM**, det. DEA). It is known from eleven tetrads in four hectads in the county. A somewhat similar plant was collected much further SW, at the edge of a Larch plantation 400m NE of Cilie, Cwmtudu SN354562 in 1999 (**BM**, DEA & AOC).

*Rubus* “false semiglaber”*Rubus* “false tumulorum”**Rubus “false tumulorum”**

A white-flowered species of hedgebanks, scrub and mixed estate woodland, noted at five sites in two hectads in the extreme SW of the county. Representative material collected includes some from scrub in Cwm Degwel, St Dogmaels SN163454, 1994 (**BM**, DEA & AOC).

Ser. *Glandulosi* (Wimm. & Grab.) Focke

**Rubus angloserpens** Edees & A. Newton

An endemic of very scattered, mostly ancient woodlands in England, but a patch of this low-growing species was surprisingly found in 2003 on a shaded laneside hedgebank 100m S of Ty'n-y-castell, Devil's Bridge SN726772 (**BM**, DEA & AOC, det. AN).

**Rubus hylonomus** Lefèvre & P. J. Müll.

This delicate, largely woodland species, scattered from SE England across to mid-Wales, was first collected in the county in 1854 in the Monachty woods c.SN56A (**K**, Herb. Watson, MMA, det. DEA), recorded there as *R. serpens* and *R. hostilis* in 1899 by Marshall (1900), re-collected there on the BSBI *Rubus* field meeting in 1978 at SN495623 (**NMW**, det. AN), and seen again there in 1995 (DEA & AOC). It is abundant in several other places in SN46W, 56A and B in these woods, at SN499623, 506617, 507620, 606622, etc., 1995 (DEA & AOC) but is apparently strictly confined to them.

**Rubus scaber** Weihe

Scattered through C and S England, S Wales and parts of Ireland, this species was found in 1999 in recently felled woodland on clayey soil in Coed Newydd, Coedmore SN196443 (**BM**, DEA & AOC, conf. AN).

Sect. *Corylifolii* Lindl.

**Rubus ariconiensis** A. Newton & M. Porter

An endemic chiefly of SE Wales but recently found also in SW Ireland. A specimen collected in 1999 from recently felled woodland in Coed Newydd, Coedmore SN196443 (**BM**, DEA & AOC), was considered by MP to be “slightly atypical, possibly with hybrid influence from *R. ulmifolius*.”



**Rubus conjugens** (Bab.) W. M. Rogers

Widely distributed in Britain and Ireland, but chiefly in the S half of England and rare in Wales. It was first recorded in the county in the 1970s from the valley S of Cwmtudu SN3556 (AN), and then in 1995 from the edge of a dry Oak wood 900m SW of Ferwig SN177487 (BM, DEA & AOC, conf. AN). It has been recorded from six other sites in this extreme SW of the county, on hedgebanks in scrub and on a railway embankment.

**Rubus nemorosus** Hayne & Willd.

Scattered through the S half of England and parts of Ireland, but rare in Wales and mostly in the S. The three records from the county are widely scattered: several thickets on the bank of the Afon Wyre 100m E of Llanrhystud church SN538696, 1993 (BM, DEA & AOC); on waste ground by a disused petrol station, 1.2km SE of Beulah SN297453, 1996 (DEA & AOC); and several large thickets in a pasture at Caeau Lletydybi, Llangybi SN60355352 (NMW, det. DEA).

**Rubus pictorum** Edees

Endemic, with two widely separated areas of distribution centred on SE Wales and C Scotland. It was collected some 50km W of the former area in 2000, on a roadside hedgebank 200m W of Waunmeindy, Sarnau SN315504 (BM, DEA & AOC, conf. AN).

**Rubus pruinus** Arrh.

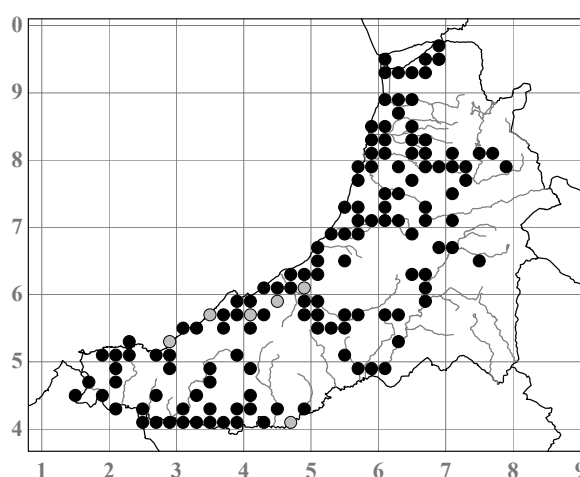
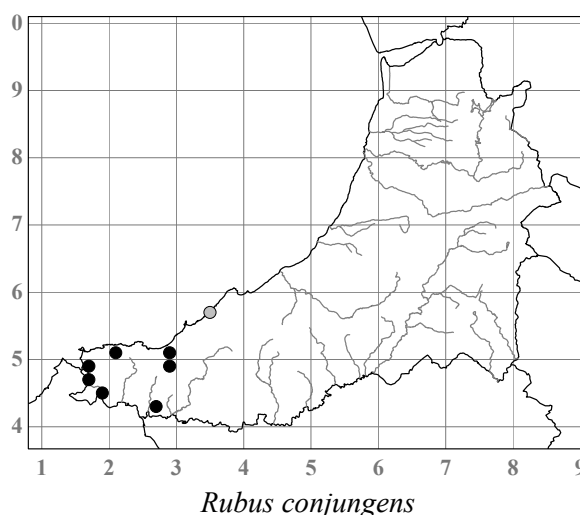
Widespread in England and Ireland, but rare in Wales except for Anglesey. It was collected from the disused railway embankment at the N end of the Allt Fedw cutting, Trawsgoed SN663733 in 1997 (BM, DEA & AOC), where it had been known for some time to JPS, and a small patch was found in mixed estate woodland at Plas Penglais, Aberystwyth SN59208219 in 2002 (BM, DEA & AOC).

**Rubus tuberculatus** Bab.

Widespread in Britain especially in the west, less so in Ireland and Scotland; in the last it is especially associated with the railways. It is probably the fourth commonest species in the county, where it is indeed especially common along the used and disused railways, and is often a garden weed. It is virtually confined to the lowlands, where it occurs in a wide range of habitats from hedgebanks and quarries to woodland and sand dunes. It was first recorded in 1899 by Marshall (1900), who wrote "Aberayron; uncommon in the neighbourhood, I believe", so it must have increased considerably since then (the railway did not reach Aberayron until 1911). Altitude limit 310m, slope below FC car park, Nantyrarian SN718814, 1994 (DEA & AOC), its only site at over 300m.

Sect. **Caesii** Lej. & Courtois**Rubus caesius** L. - Dewberry - Llwyn Mwyar Mair

Widespread over much of England and parts of Ireland, and chiefly coastal in Wales but inland in the more calcareous parts of the north and south. It is in any quantity in the county only on the Ynys-las dunes SN69B, 1973 (Savidge 1973) - 2007 (NMW). Its other sites are also coastal, in a roadside hedge, in mixed woodland, in scrub on a disused railway, and its more unusual habitats include *Phragmites* at the top of a salt marsh at



Nantyferwig SN169482, 2001 (NMW, DEA & AOC), and in *Salix* carr among *Phalaris* further up the tidal part of the Teifi at Coedmore SN191438, 2003 (det. DEA). Morgan (1849) recorded it from the Gogerddan woods c.SN68G, perhaps unreliably, and Marshall (1900) wrote that it appeared to be absent from the Aberaeron district. A hybrid with *R. ulmifolius* was recorded on a sandy roadside bank at Penbryn SN293524 in 1978 (AN).

Subgen. **Dalibardastrum** Focke

**Rubus tricolor** Focke - Chinese Bramble - Llwyn Mwyar Trilliw

Occasionally planted for ground cover in amenity areas and around car parks in the last decade or two, but so far properly naturalised only on stony and grassy ground behind the Police Station on Park Avenue, Aberystwyth SN58688112, 2002 (NMW) - 2008. Native of China.

Subgen. **Cyclactis** (Raf.) Focke

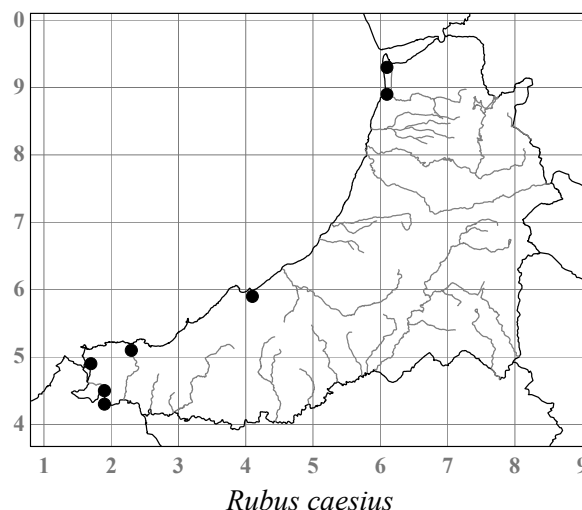
**Rubus saxatilis** L. - Stone Bramble - Corfiaren

First recorded in Coed Rheidol SN746786 in 1977 (DGJ) - 1998, where a colony 7 × 5m grows with *Mercurialis* and *Gymnocarpium dryopteris* on a steep slope in damp Ash/Oak woodland. Since then it has been found at four other sites, all with some botanical or geological evidence of slight base enrichment. Three plants were growing on unshaded damp ledges by the waterfall on the Nant Cwta, 1km ESE of Eisteddfa Gurig SN80308345, 1982-1996, where the Cwmere Formation of the Silurian outcrops, although no other calcicoles were present; two plants were here in 2006 (AOC & SDSB). One plant was on the Nant Brianne Formation rocks, with *Gymnocarpium dryopteris* nearby, by a waterfall under Oaks in a clearing in conifer forest in the Nant Brianne gorge SN783496, 1985 (AOC & DD), but could not be refound in 1999. About twelve plants were on wet rocks with *Geum rivale* and *Valeriana officinalis* under Hazel, Birch and Rowan at the top of the gorge of the Nant Cwm-du on the upper Tywi SN80105548, 1986 (AOC & DD) - 1996 (AOC & JPW). A few plants were with *Sedum telephium* and *Viburnum opulus* under Ash trees on rather dry rocks in conifer forest in the Tywi valley 1km S of Bron-yr-helm SN805514 in 1988 (AOC & DD). Morgan's (1949) record from Dyffryn Paith c.SN67E was presumably an error. Altitude limit 435m, by the Nant Cwta, 2006 (see above).

Subgen. **Idaeobatus** Focke

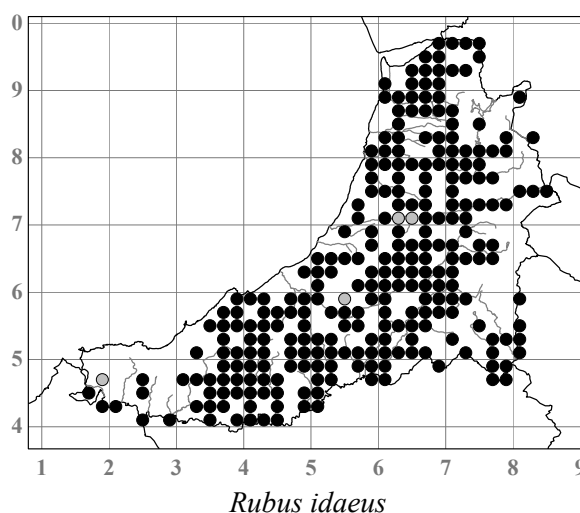
**Rubus idaeus** L. - Raspberry - Llwyn Mafon

Frequent in scrub, wood margins and ravines and on stream banks and cliffs, native probably chiefly in the uplands but also common in hedges, forest clearings, by old garden sites, on waste ground and elsewhere



*Rubus saxatilis* and *Phegopteris connectilis*, Nant Cwta, view SE from SN80308345, August 2006

where it is probably bird-sown from cultivation or derived from throw-outs. It is noticeably absent from the coast and from most of the clay soils in the SW. The map treats all records as native. Littleton Brown (Druce & Vines 1907) recorded it as abundant on the roadsides between Tregaron and Lampeter in 1726. Salter (1935) recorded it as extremely common, and as “everywhere in rough upland country”. It has been grown commercially in small quantity, 1.2ha in 1988 (Anon. 1988). Relic bushes of the yellow-fruited form have been recorded in the old walled garden at Nanteos SN621785, 1995 (RL & CDPa). Altitude limit 535m, Craig y March, Pumlumon SN80658820, 1901 (Salter Diary 16.8.1901); 2005, ditto.



*Rubus idaeus*

### ***Rubus spectabilis* Pursh - Salmonberry - Miaren Oren**

This native of W North America is naturalised in only one site. Salter noted in 1936 (Diary 19.4.1936) that the “*Rubus* from Plas Gwernant” was flowering in his garden, and in 1939 (Diary 8.4.1939) he wrote of a visit to this deserted mansion and estate that “The rose-coloured *Rubus* was still here in abundance”; it still is, forming clumps and thickets over 3-4 acres in mixed estate woodland in the stream dingle just E of Gwernant Home Farm, Troed-yr-aur SN337460, 1995 (NMW) - 2005, flowering spectacularly in April.

### ***Rubus cockburnianus* Hemsl. - White-stemmed Bramble - Miaren Goeswen**

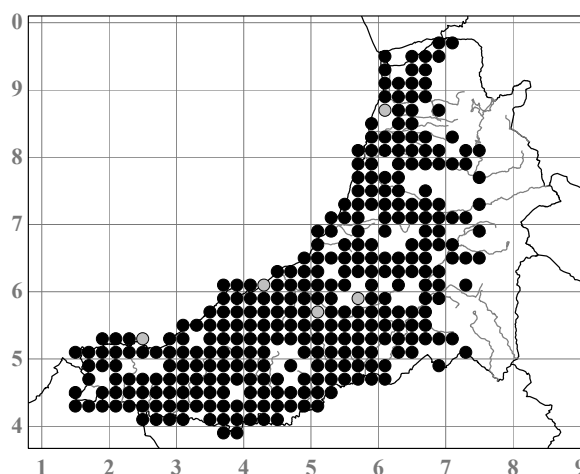
This native of China is naturalised S of Clawdd Helyg, Commins Coch SN61288230, where a colony 40 × 2-3m grows along the N edge of an unimproved pasture, 2003; and on the roadside hedgebank at Bryn-hir, 2km S of Llangeitho SN622577, 2005 (NMW).

### ***Potentilla fruticosa* L. - Shrubby Cinquefoil - Llwyn Pumnalén**

A bush on an *Ammophila/Festuca rubra* dune at Ynys-las SN60969380, 1994-2004, adjacent to a caravan site, must have been self-sown or is perhaps a relic of planting. It is planted in amenity areas often as one or other of its many cultivars.

### ***Potentilla anserina* L. - Silverweed - Dail Arian**

Common in often somewhat open habitats on fertile soils throughout the lowlands, especially on verges, in field gateways, around ponds and ditches and in the draw-down zone of reservoirs, in open areas in marshes, and often very abundant in dune slacks and at the top of sea beaches. There is considerable variation in leaf shape and hairiness which on preliminary investigation seems to have no ecological or distributional significance in the county; the only available chromosome count showed that a plant from Ynys-las SN69 was tetraploid like most British material (Ockendon & Walters 1970). It becomes rare in the uplands and is largely confined there to road verges and disturbed ground. Altitude limit 440m, verge of FC road, Bryn-y-rhyd SN683520, 2003.



### ***Potentilla indica* (Jacks.) Th. Wolf (*Duchesnea indica* (Jacks.) Focke) - Yellow-flowered Strawberry - Llwyn Mefus Melyn**

A colony c.5 × 1.5m on the verge of the disused railway at Pontbren-myrdr, Llanerchaeron SN47586002 was found in 2002 (TG, det. GH) - 2008; it is 70m from a deserted smallholding, and appears to have been long-



established. There is also a colony  $5 \times 4\text{m}$  in dense undergrowth by a path in the Penglais dingle below the University Botany Gardens, Aberystwyth SN59658202, 2005. Native of S and E Asia.

**Potentilla recta** L. - Sulphur Cinquefoil - Pumnalén Dalsyth (Llysiau Pumbys, Blodau Pumbys Mair, Crimp y Dryw)

Naturalised on a stream bank just N of the railway level-crossing in Llanbadarn Fawr SN59908071, 2005 (NMW). Native of Eurasia and NW Africa.

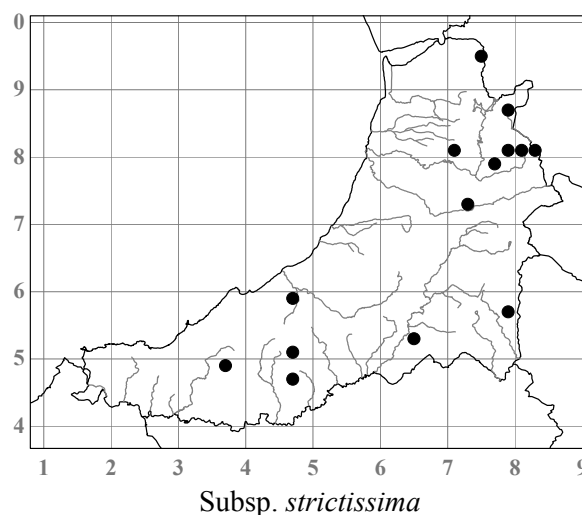
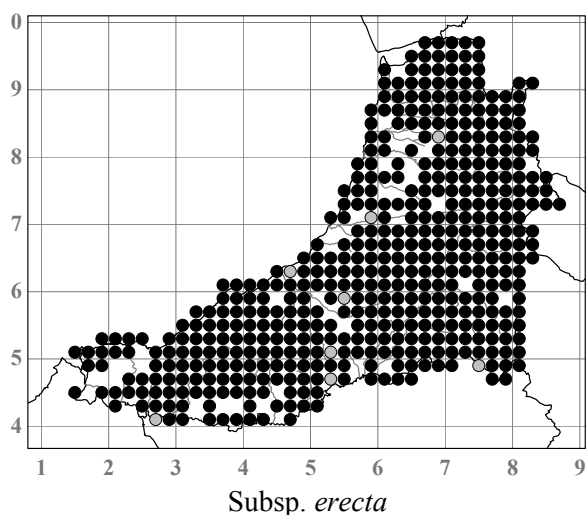
[*Potentilla crantzii* (Crantz) Beck ex Fritsch - Alpine Cinquefoil - Pumnalén y Mynydd

Recorded by J. E. Smith, as *P. alpestris*, "On rough and stony ground at Hafod" c.SN759732 (Smith 1828). The record was taken up by Watson (1883), but was rejected by Salter (1935). It is difficult though to guess what else this plant could have been, as Smith knew the species well and discussed its variation at length. It is a mountain plant not recorded in Wales S of Snowdonia, apart from an 1871 record from the Breidden, and does seem unlikely to have been a native at Hafod.]

**Potentilla erecta** (L.) Raeusch. - Tormentil - Tresgl y Moch (Melyn y Twyni)

Subsp. **erecta** (*P. sylvestris* Neck.)

A common plant of both dry and damp pastures, heaths, banks, rocky slopes both on the coast and in the uplands, verges, graveyards and open woodland and scrub throughout the county. Much commoner than subsp. *strictissima*, even in deep heather moorland in the uplands and on the raised and blanket bogs. Willis & Burkill (1895) gave details of the insect visitors they observed in the Pumlumon uplands. *Flore pleno* plants are occasionally seen, and one was collected c.1800 at Hafod c.SN759732 by Mariamne Johnes (LINN, Herb. Smith). Altitude limit 740m, near Pumlumon Fawr summit SN789869 (Salter 1935); 2002, ditto.



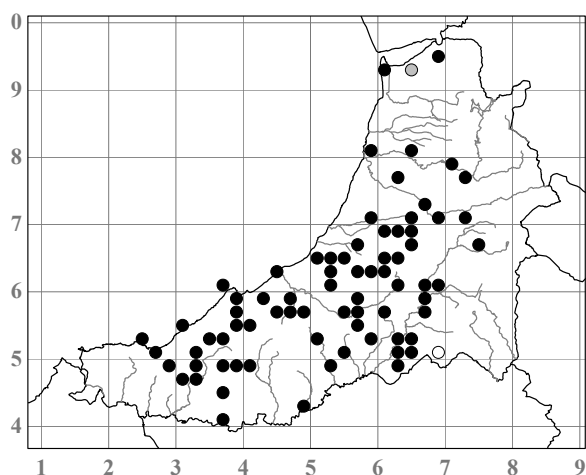
Subsp. **strictissima** (Zimmer) A. J. Richards

First recorded in 1991 growing with subsp. *erecta* in *Empetrum/Calluna/Vaccinium myrtillus* heath on Draws Drum SN797805 at 510m altitude (NMW, conf. BH), and since found in a number of heathland and bog sites, on mountain rock ledges and on lead mine spoil, again sometimes with, but usually much less abundant than, subsp. *erecta*. It has been found as low as at 150m altitude, among *Calluna* and *Molinia* in a bog in secondary woodland 400m SW of Lluest, Neuadd-lwyd SN46555887, 2000 (NMW). Although some of our material certainly matches subsp. *strictissima*, the characters are often not as extreme as in other parts of the range of the subspecies and intermediates with subsp. *erecta* are common; it does not seem to merit subspecific rank, at least on the evidence here. Altitude limit 600m, cliffs above Llyn Llygad Rheidol, Pumlumon SN791874, 1997 (TDD & AOC).

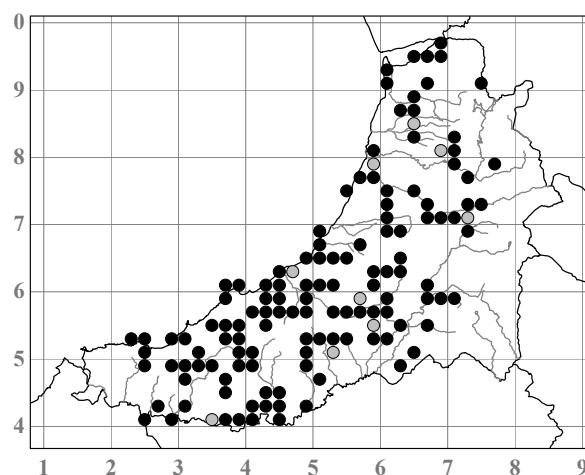
**Potentilla** × **suberecta** Zimmer (*P. anglica* × *erecta*)

In similar habitats to *P. anglica* but generally less frequent, although it occurs in other habitats as well, including Bracken slopes on the coast, streamsides and waste ground. It has also been seen at a higher altitude, 280m, in heathy pasture at Gargoed, Ffair-rhos SN758668, 1994 (AOC, JT & JPW). The first record was from Cwm Twrch SN65V in 1896 (BIRM, AL) where it was said to be very frequent; the next localised

records were from a roadside near Bethania SN56R in 1899, where it was growing with the parents (Marshall 1900), and then from the bank of a drainage ditch by the Afon Cletwr below Tre'r-ddol SN650933, 1970 (LANC, GHa, conf. BM).



*Potentilla* ×*suberecta*



*Potentilla* *anglica*

***Potentilla anglica* Laichard. (*P. procumbens* Sibth.) - Trailing Tormentil - Pumnalen Orweddol**

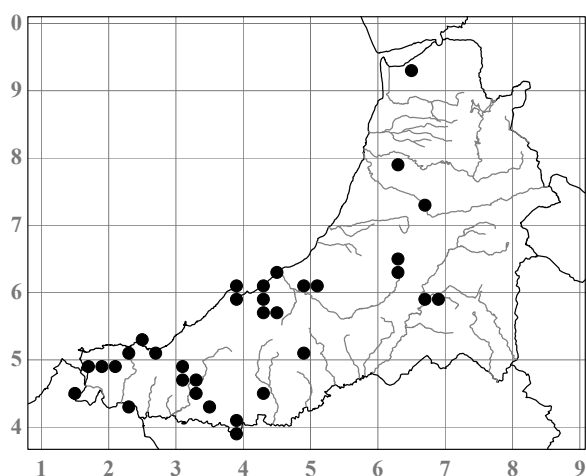
A frequent plant of roadside and field banks, tracksides and verges, dry pastures and graveyards, generally confined to the lowlands and not seen at over 250m altitude. It seems at least as frequent as *P. ×suberecta* and is much more frequent than *P. ×mixta*, but is much less characteristic of pastures and other semi-natural habitats than is *P. erecta*.

***Potentilla* ×*mixta* Nolte ex Rchb. (*P. anglica* × *reptans*) - Hybrid Cinquefoil - Pumnalen Groesryw**

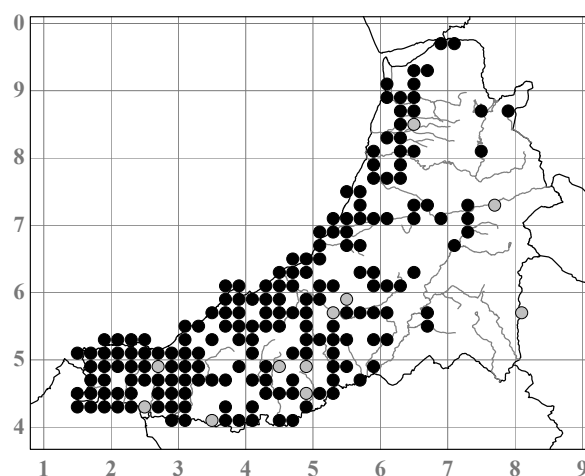
Although overlooked until 1991, when it was found on a roadside bank near Penparc SN199486 (NMW, det. BH), this hybrid has been deliberately searched for since and, in contrast to the situation in much of the rest of Britain, seems distinctly less common than either *P. anglica* or *P. ×suberecta*. It most often occurs on road verges and tracksides and on railway ballast and waste ground, as well as on banks and in grassland, and has not been seen at over 200m altitude.

[*Potentilla* ×*italica* Lehm. (*P. erecta* × *reptans*)

A record from the Aberystwyth district by Towndrow (1907) is unacceptable in the absence of a specimen or indeed of a chromosome count.]



*Potentilla* ×*mixta*



*Potentilla* *reptans*

***Potentilla reptans* L. - Creeping Cinquefoil - Pumnalen Ymlusgol**

A frequent plant chiefly of dry, somewhat open, disturbed habitats, on road verges, tracksides, railway ballast, hedgebanks, in dry, well-grazed pastures, on rocky slopes and in dune grassland. It is very variable in habit, and sometimes is prostrate with small leaves, as when growing out from verges onto paths or tarmac, and

sometimes has very large leaves growing upright on long petioles, as when amongst rank uncut vegetation. It is most frequent near the coast and on the more calcareous soils of the SW, and becomes rare in the uplands. Altitude limit 510m, trackside by Llyn Llygad Rheidol dam, Pumlumon SN791878, 2002.

**Potentilla sterilis** (L.) Garcke (*P. fragariastrum* Pers.) - Barren Strawberry - Llwyn Coeg-fefus

A common plant of hedgebanks, woods, dry pastures, rocky slopes and other dry, open habitats such as graveyards and embankments. It is especially abundant under Bracken on the coastal slopes, and extends into the uplands on cliff ledges and gullies where there is slight base enrichment. Altitude limit 450m, Claerddu SN792688 (Salter Diary 1.6.1904), and Cerrig Maesycawnau, Nant-y-maen SN769587 (Diary 7.6.1938); 480m, slope SW of Llyn y Figyn SN810702, 1989.

**Potentilla montana** Brot. - Western Cinquefoil

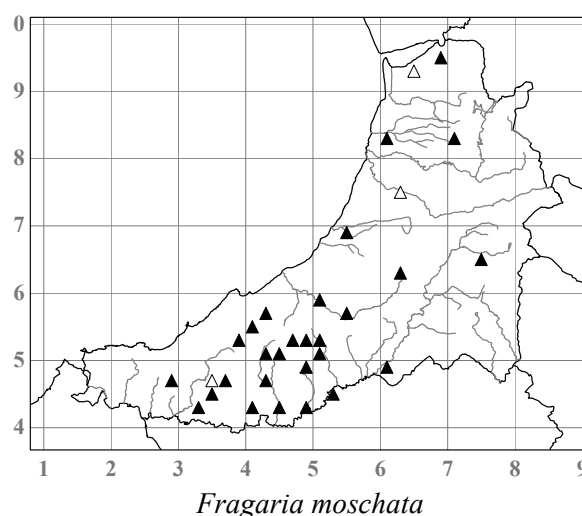
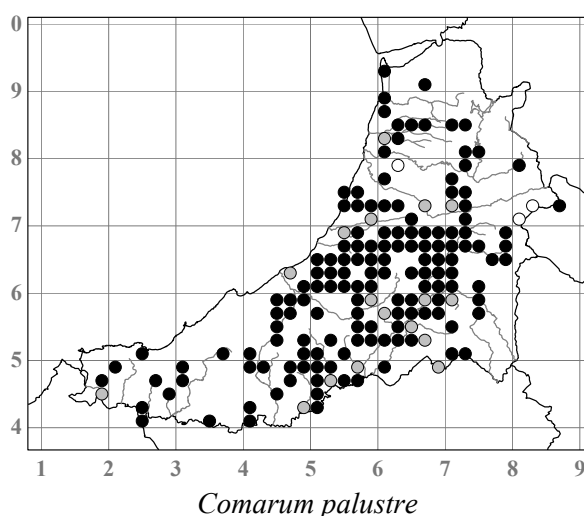
Well-naturalised, forming a colony  $1.7 \times 1.7$  m on a grassy bank near the clifftop on top of Constitution Hill, Aberystwyth SN58408280, 2006 (NMW, ADH, det. AOC); the only other alien in the vicinity is *Genista hispanica* subsp. *occidentalis*, first recorded there in 1927 and probably introduced there in the 1890s. Both grow together in parts of their native range in SW Europe and the climate of Constitution Hill seems to suit them well.

*Potentilla montana* colony, Constitution Hill, Aberystwyth, view N from SN58408280, May 2010



**Comarum palustre** L. (*Potentilla palustris* (L.) Scop.) - Marsh Cinquefoil - Pummalen y Gors

A frequent plant of fens, flushes, boggy pools, lake margins and wet woodland. It grows usually either in standing water or where there is a very high water table, most commonly associated with *Menyanthes* and *Carex rostrata*, but it occasionally occurs, perhaps as a relic, in rather dry *Molinia* tussock fen. In lakes it characteristically forms floating mats stretching out from the shore. It is shade-tolerant and flourishes in Alder and *Salix* carr. Altitude limit 490m (Salter 1935); 490m, fen 500m E of Llyn Crugnant SN759611, 1989 (AOC & DD).



**Fragaria moschata** (Duchesne) Weston - Hautbois Strawberry - Llwyn Mefus Mawr

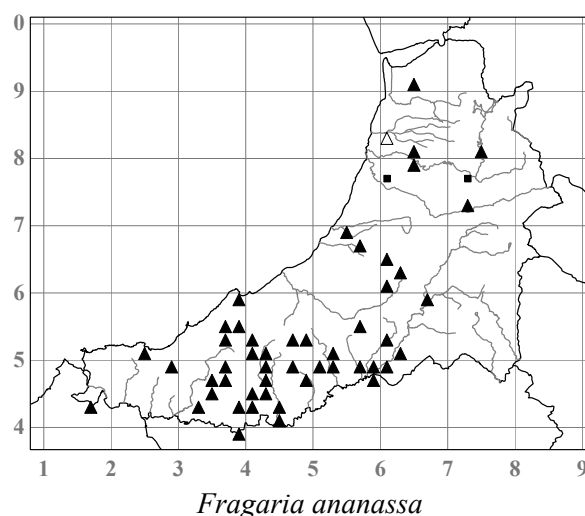
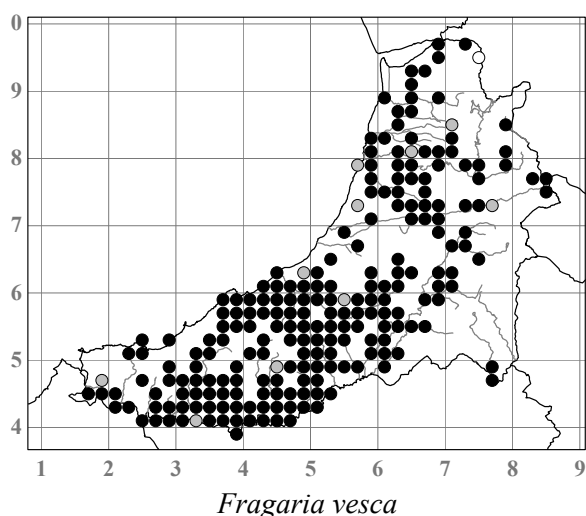
Recorded from a dozen sites by Salter (1935, Wade 1952), and first recorded in Morgan (1849) from Castle Hill SN625746 and, improbably, from Allt-wen SN575795. Although on the continent the fruit is considered



to have a better flavour than that of *F. vesca*, it rarely seems to fruit well nowadays in Cardiganshire. It must have been widely cultivated though, as it occurs naturalised in many places on roadside banks and verges, mostly near houses, and in several graveyards. The largest colony seen was 40 × 2m, along a roadside verge in woodland at the Alltgoch quarry, Cwrtnewydd SN49124832, 2006 (AOC & JPP).

***Fragaria vesca* L. - Wild Strawberry - Llwyn Mefus Gwyllt (Syfi Goch)**

A common plant of dry, well-drained sites, often in shade, on roadside banks, screes, quarries and cliffs, railway ballast and wood margins. It is absent from the more acidic sites, and is often especially abundant on the more base-rich soils such as around lead mine ruins or on clay slopes on the coast, and occurs in some of the more fertile gullies in the uplands. Forma **alba** (Duchesne) Staudt, with white fruits having a very sweet, syrupy flavour, has for at least 46 years occurred in quantity along 150m of the roadside bank 300m ESE of Cwrt-y-cwm, Chancery SN584764, 1963 (KAH) - 2009. Altitude limit 460m, gully by waterfalls at head of Nant Merin SN79768065, 2004 (SDSB & AOC); Salter recorded it here in 1903 (Diary 24.7.1903) but without giving the altitude.

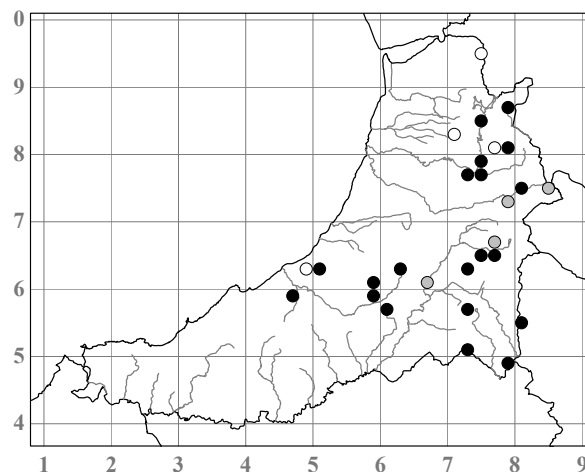


***Fragaria ananassa* (Duchesne) Duchesne - Garden Strawberry - Llwyn Mefus y Gerddi**

Strawberries are grown commercially on a very small scale in the county, with 1.6ha in the open in 1988 (Anon. 1988). In about the 1960s there was a short-lived attempt to grow them on a larger scale in Cwm Rheidol SN734775, well away from sources of virus infection. Among more recent “pick your own” enterprises have been one at Isfryn, Cnwch-coch SN677750 started in the 1970s, a more recent one at Penlanlas, Rhydyfelin SN607770, and one at Penbanc, Capel Dewi SN451436 which closed in 2005. Strawberries are widely grown in gardens, frequently escaping onto adjacent hedgebanks or from throw-outs onto waste ground, and they also occur in several graveyards. ‘Frel’, often called Pink Panda, is naturalised among *Chrysosplenium* on a wet slope by a garden in Allt-yr-esgob, Llandyfrïog SN333422, 2008 (NMW).

***Geum rivale* L. - Water Avens - Mapgoll Glan y Dŵr**

An uncommon plant of streambanks and flushed slopes in wooded valleys, and in gullies and on wet cliff ledges in the uplands. It is especially characteristic of the ancient woodlands in steep-sided valleys such as Coed Rheidol SN749789-732774, 1955-2008, and the Gwenffrwd valley SN596598-597606, 1937 (Salter Diary 17.5.1937) - 2003. Plants from the upland cliffs, for example by the waterfall at the head of the Afon Merin SN797807, 1903 (Salter Diary 24.7.1903) - 2004 (NMW, SDSB & AOC) at 470m altitude, and above Llyn Llygad Rheidol SN79328731, 1980-2003 (NMW, SDSB & AOC) at 610m altitude, have much smaller leaves and paler flowers than the lowland ones, but flower equally



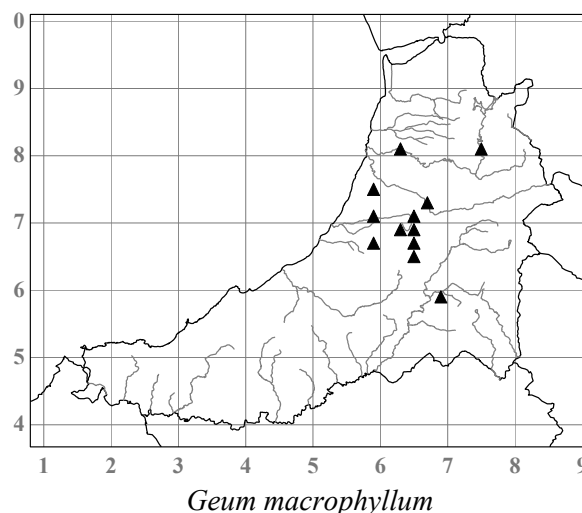
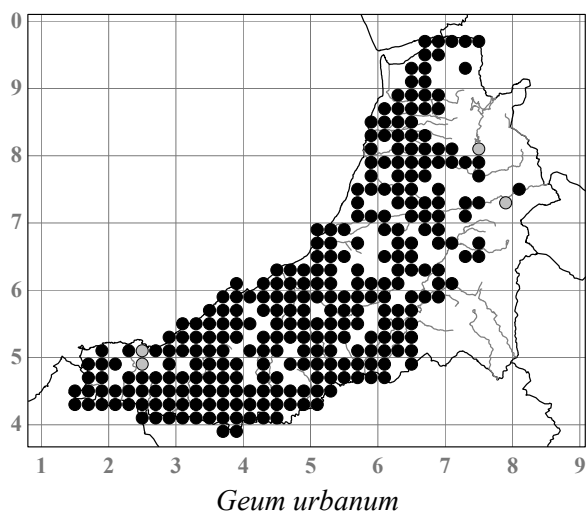
early, and are probably referable to subsp. **subalpinum** (Neuman) Selander (subsp. *islandicum* Å. Löve & D. Löve). Altitude limit 610m, as above.

***Geum* ×*intermedium* Ehrh. (*G. rivale* × *urbanum*) - Hybrid Avens**

Recorded only once, as a single large plant growing with the parents on a streambank in Oak/Ash ancient woodland in the Marchnant valley, Capel Betws Lleucu SN60705780, 1978 (NMW). It is surprising that it is not more common.

***Geum urbanum* L. - Wood Avens - Mapgoll**

A common plant of hedgebanks, all but the more infertile woodlands, scrub, streambanks, roadside verges, graveyards and other generally dry, ungrazed and shaded habitats. It is occasional as a garden weed, is absent from most coastal sites and becomes rare in the uplands. Altitude limit 335m, ravine of the Nant y Cae Isaf, Cwm Ystwyth SN819746, 1999 (AOC & PAS).



***Geum macrophyllum* Willd. - Large-leaved Avens - Mapgoll Fawr**

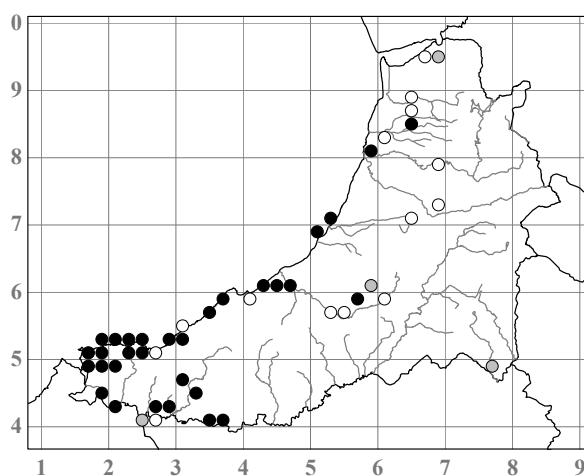
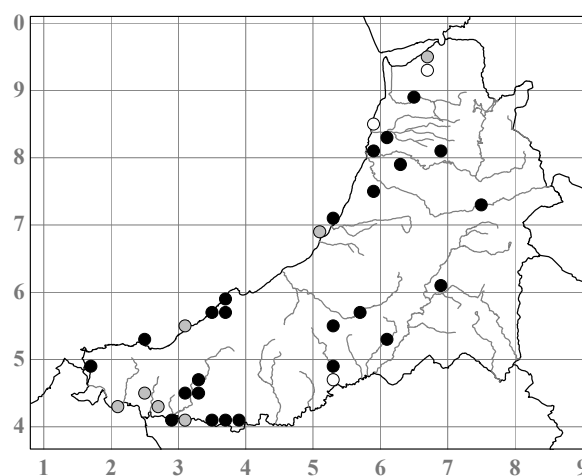


This native of North America and NE Asia, very conspicuous in both flower and fruit, was not identified in the county until 1993, when it was seen in abundance along the roadside verges at Cwmyrolchfa, 1.5km N of Bronnant SN640688 (NMW, GJ, det. AOC), although it had been known there locally since at least 1950. In the last ten years it has been found to be widely and abundantly naturalised on roadside verges, streamsides and on waste ground in this Llangwryfon/ Lledrod/ Bronnant area. Elsewhere it has been found on a roadside verge 2km SE of Tregaron SN694582, 1998 (NMW); on waste ground and in woodland at Ponterwyd SN75128088, 1999 (NMW) - 2005; on the verge of the B4576 road at Glan-mad, Aber-mad SN59997570, 2002; on the verge of the A44(T) road near Lovesgrove SN622811, 2004; in mixed FC woodland, Black Covert, Trawsgoed SN668725, 2006, where it is rapidly spreading; and, at its altitude limit 305m, on the road verge 500m SW of Llyn Eiddwen SN59996645, 2008.

*Geum macrophyllum*, Cwmyrolchfa,  
view N from SN64046889, June 2005

***Agrimonia eupatoria* L. - Agrimony - Llysiau'r Dryw (Cwlwm y Mêl, Agramoni)**

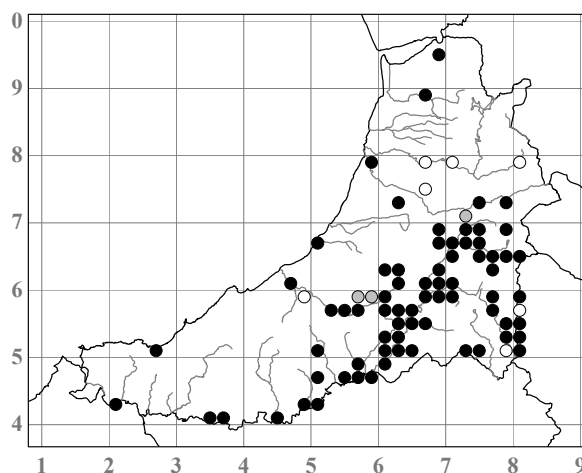
Occasional in open scrub, wood margins, on Bracken slopes especially along the coast, in heathy and rough grassland, hay meadows, hedgebanks, and rarely in marshes. It is absent from the uplands and is most frequent in the SW of the county and in the lower Teifi valley, seeming to prefer the drift soils there. The reason for the apparent decline inland is unknown, and scarcely reflects the national picture.

*Agrimonia eupatoria**Agrimonia procera****Agrimonia procera* Wallr. (*A. odorata* Mill.) - Fragrant Agrimony - Llysiau'r-dryw Pêr**

In similar habitats to *A. eupatoria* but less common, especially along the coast and on the Irish Sea drift clays, though somewhat more widespread inland. The two only occasionally grow together.

***Sanguisorba officinalis* L. - Great Burnet - Bwrned Mawr**

Largely confined to the SE part of the county, occurring in hay meadows, unimproved pastures, on road verges, tracksides, river banks and damp rocks. Where meadows and pastures have been reseeded it often persists around the edges, and although widespread it is rarely abundant. It is rare towards the coast and in the lower Teifi valley. Salter (1935) remarked that it was absent from the N of the county, and the only records from N of the Ystwyth valley are from Braich-Garw, Tal-y-bont SN661888, 1993 (SPC) - 1995, from a meadow at Garth House, Furnace SN681943, 2002 (ADQA) - 2005, and from a wooded pasture 1km NNE of here SN685950, 2004 (CF); at the last two sites it was certainly a new and apparently natural arrival, and it may be that it is spreading into this area. It still grows, 2004, on the same rock ledge inaccessible to Sheep by a little waterfall on the stream 250m NNW of Claerddu SN79236867 at 435m altitude where Salter saw it in 1904 (Salter Diary 22.9.1904). Altitude limit 465m, ungrazed heathy ledge, Cerrig Maesycawnau, Nant-y-maen SN76885868, 2008 (SPC). Native of Europe.

***Poterium sanguisorba* L.****Subsp. *sanguisorba* (*Sanguisorba minor* Scop. subsp. *minor*) - Salad Burnet - Bwrned**

Erroneously recorded in Hyde and Wade (1934, cf. Wade 1952), this calcicole of dry pastures was not seen in the county until 1982 when two colonies were found on the MoD site, Aber-porth. One, 30 × 20m, was on shaly ground above Cribach Bay SN249522 (NMW), where the soil was pH 7.1; the other, 4 × 2m, was on shaly ground and in rough grassland further W at SN24325251, where the soil was pH 5.7. It was still abundant in both areas in 2005, and has also been seen on shaly track verges further E at SN252518 in 1997 (AOC & JPW). In 1995-1997 it was seen on a gravel-covered grave in Llanddeiniol churchyard SN56047210 (NMW) where it might have been considered an introduction had it not been found in quantity nearby, along



20m of an unimproved neutral pasture slope 350m N of Llanrhystud church SN53756998 in 1999 (MDS & AOC).

Subsp. **balearicum** (Bourg. ex Nyman) Stace (*Sanguisorba minor* subsp. *muricata* (Gremli) Briq., *Poterium polygamum* Waldst. & Kit.) - Fodder Burnet - Bwrned Ebran

Formerly grown for fodder, and now occasionally used in seed-mixes on roadside slopes and amenity areas. Davies (1815) referred to "Burnet (*Poterium sanguisorba*)", doubtless this subspecies, as an unsuccessful crop in the Vale of Teifi. Salter (1935) wrote that it was "sometimes sown as a constituent of forage crops", but recorded it only from weedy pastures at Tan-y-castell, Llanychaearn SN588789 in 1905 (Diary 3.6.1905, 7.7.1906, det. WHP). Whellan (1942, **NMW**) recorded it from a field border near Nant-y-ferwig, Cardigan SN169481 in 1941. It was sown c.1988 on the roadsides by the bridge in Llanfarian SN590777, 1990, and remains abundant there, 2008; c.1990 by a pond at Gwernmedd, Llangoedmor SN213454, 1997 (AOC & LRG); c.2000 on a slope by Heol-y-bryn, Aberystwyth SN587821, 2002 (SPC) - 2008; and c.1998 on the embankment at Pont Shollop, Llanerchaeron SN476597, 2003. Native of S Europe. Altitude limit 320m, road verges by the visitor centre, Nantyrarian SN717813, 2006.

**Acaena novae-zelandiae** Kirk - Pirri-pirri-bur - Pirri-pirri

Naturalised in three sites, under pines on the University campus, Aberystwyth SN597817, 1993 (**NMW**, SPC) - 2008, on a road verge on Rhydyfelin hill SN593792, 1999 (SPC) - 2008, and a colony 1 × 1m on a shaded roadside verge at Tyn-y-garth, Cwm Einion SN69209459, 2009 (MPo & AOC). Native of New Zealand and Australia.

**Alchemilla xanthochlora** Rothm. - Intermediate Lady's-mantle - Mantell-Fair Ganolig

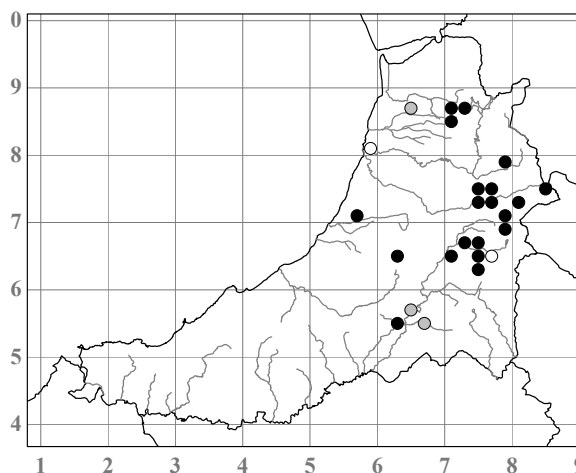
First recorded in 1957 in the pastures on the NW and SE sides of the Ystrad Meurig castle mound SN702675, and still frequent there in 2005, even in one pasture that had been reseeded in 1960. It is also frequent over 2 acres of pasture nearby at Tynybadell SN698665, 1994 (**NMW**, SM). The only other records have been of solitary plants, on a roadside verge near Henllys, Dol-y-bont SN629884, 1956, and on the verge of a green lane at Llanafan SN679722, 1971.

**Alchemilla filicaulis** Buser subsp. **vestita** (Buser) M. E. Bradshaw - Hairy Lady's-mantle - Mantell-Fair Goesfain

In only three sites, by flushes in sheep-grazed pasture at the head of Cwm Berwyn SN726580, 1987-2003 (**NMW**, conf. SMW); in damp pastures near Brongest SN317462 and SN322460, 1996-1997 (MDS, AOC & JPW, **NMW**); and in a hay meadow by Ddol-wen SN46706113, 1992-1996 (**NMW**), but probably now gone from this last site because of road-building and lack of grazing. It is naturalised on waste ground at Borth SN616897, 1999 (TAL). Altitude limit 300m, Cwm Berwyn SN726580, 2003.

**Alchemilla glabra** Neygenf. (*A. vulgaris* pro parte) - Smooth Lady's-mantle - Mantell-Fair Lefn

An uncommon plant of unimproved pastures, hay meadows, upland flushes and cliff ledges, usually in small quantity. Salter (1935), presumably covering *A. xanthochlora* and *A. filicaulis* as well, described it as "Scarce in the northern district of the county; very frequent in the central district; apparently less so in the south," so it must be assumed to have decreased. It grows in two churchyards, Eglwys Newydd SN768737, 1986; and Strata Florida SN747658, 1995, where Salter first noted it in 1900 (Diary 30.5.1900). A single woodland record was from a wet, stony path under Oaks near the Robber's Cave, Hafod SN774727, 1992 (SPC). It is still growing luxuriantly by a waterfall on the stream above Claerddu SN79236867, 2002, where Salter first noted it in 1898 (Diary 8.6.1898), and is unusually frequent in pastures at Talwrn SN745651, 1989, and at Cae'r-meirch SN753738, 1996. Altitude limit 435m, Claerddu SN79236867, 2002, and Graig Ddu SN814739, 1999, where Salter had noted it in 1924 (Diary 23.7.1924).

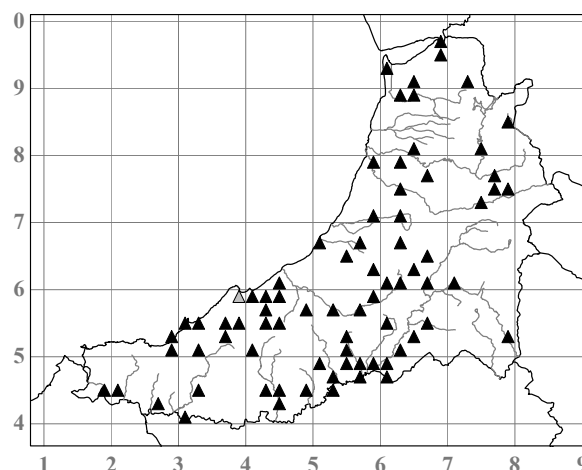


***Alchemilla mollis* (Buser) Rothm.** - Garden Lady's-mantle - Mantell-Fair y Gerddi

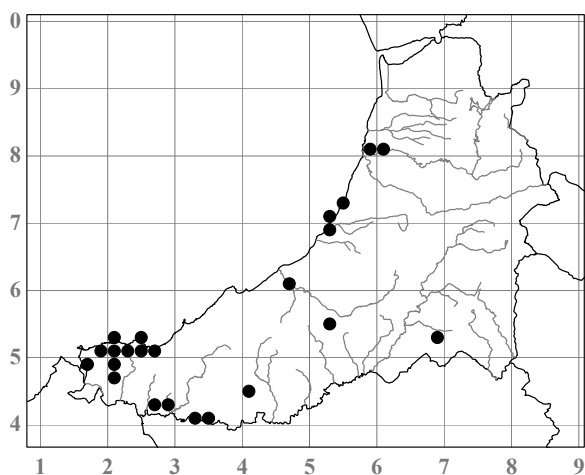
Commonly naturalised on verges, waste ground, graveyards and occasionally hedgebanks, both from throw-outs and from seed. It was first noted in 1990, in a quarry at Penuwch SN589621, and is becoming increasingly common even in the uplands. Native of the Carpathians. Altitude limit 460m, by lead mine ruins, Esgair Fraith SN733912, 2002.

***Aphanes arvensis* L. (*Alchemilla arvensis* (L.) Scop.)** - Parsley-piert - Troed y Dryw

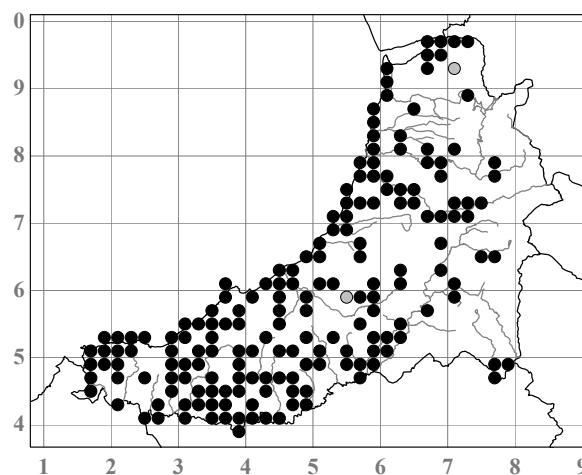
An uncommon plant of dry, open, at least slightly base-rich habitats, in arable fields and closely grazed pastures, on road verges and pathsides, dry banks and disturbed and waste ground. It is apomictic and very variable, and among the more distinctive forms are robust, rather densely hairy and mat-forming plants in the IGER trial fields at Gogerddan SN62688340, 2008 (NMW). Although *A. arvensis* occurs on the Penyrergyd dunes SN162487, 1978, it seems to be absent from the Ynys-las ones. It occurs mostly near the coast and is almost absent from the uplands, and the altitude limit 440m, verge of FC road, Bryn-y-rhyd SN68325209, 2003, is unexpected.



*Alchemilla mollis*



*Aphanes arvensis*



*Aphanes australis*

***Aphanes australis* Rydb.** - Slender Parsley-piert - Troed-y-dryw Main

A common plant of a wide range of dry, open habitats, especially on shaly, gravelly or sandy soils, on road verges and pathsides, arable fields and closely grazed pastures. It is a constant of spring annual communities on thin soils on the coastal slopes, and is sometimes dominant on the verges of FC roads. Altitude limit 450m, FC road verge, Truman, The Arch SN77827681, 2005.

***Rosa* L.**

Many of the early records of species of *Rosa* are difficult or impossible to interpret in the light of modern taxonomy and are consequently ignored here. Salter (1935) recognised that they had not had adequate critical attention, and although I. M. Vaughan made a few reliable records, it was not until the early 1980s, when numerous specimens were sent to G. G. Graham for naming, that a clear picture of the genus in the county began to emerge. Since then A. L. Primavesi has named a lot more material. A series of visits by R. Maskew, starting in 2000, has resulted in a much greater coverage, especially of the hybrids, and this account is largely based on his expertise. Hybrids are very common, and as all the native species, except for *R. spinosissima* and *R. arvensis*, are unbalanced polyploids, when they hybridise the two parents contribute unbalanced gametes. The pollen parent contributes seven chromosomes, and the seed parent usually 28, or sometimes 35, 42 or 65 depending on the ploidy level. Thus any hybrid plant will tend to resemble the seed parent more closely than the pollen parent, and most hybrids between two species will have two very different forms depending on which of the parents was the seed one; where possible these are separately recorded in this

account. The matter is often further complicated by introgression, as the hybrids are at least partially fertile, and more complex hybrids can also occur and some plants prove to be unnameable.

Apart from *R. spinosissima*, the native species and hybrids are predominantly found in hedges, scrub and wood margins, and are most frequent on the more neutral or even base-rich soils in the SW of the county; *R. canina* is more or less ubiquitous in the lowlands, but the other species, and even *R. sherardii*, become rarer or even absent from the extreme N of the county where infertile and acidic soils predominate. An interesting feature is that in several cases hybrids are noticeably more widespread than one or other of the parents, suggesting perhaps a former wider distribution for that parent.

Except for the map of *R. spinosissima*, those of all the other native taxa contain only records confirmed by one or other of the experts GGG, ALP and RM. This is because of the difficulties in telling whether a bush is a species and not a hybrid, and in accurately identifying the hybrids; these maps thus in many cases doubtless under-represent the true distributions of the taxa.



Roger Maskew and *Rosa micrantha*,  
Rhos Cwmsaeson SN46025866, August 2007

***Rosa multiflora* Thunb. - Many-flowered Rose - Rhosyn Amlflodeuog**

A straggling bush, probably a relic of planting, was recorded on the scrub slope below the parish hall, Llanbadarn Fawr SN598810, 1993 (NMW, SPC; AOC); there is a large bush, probably bird-sown, scrambling up to 4m, in scrub by the road 200m E of the Cleddan bridge, Llan-nnon SN516667, 2002 (NMW); and another in a roadside hedge by the bridge in Pontsian SN43864618, 2006, GH. Native of E Asia.

***Rosa setigera* Michx. hybrids - Prairie Rose hybrids**

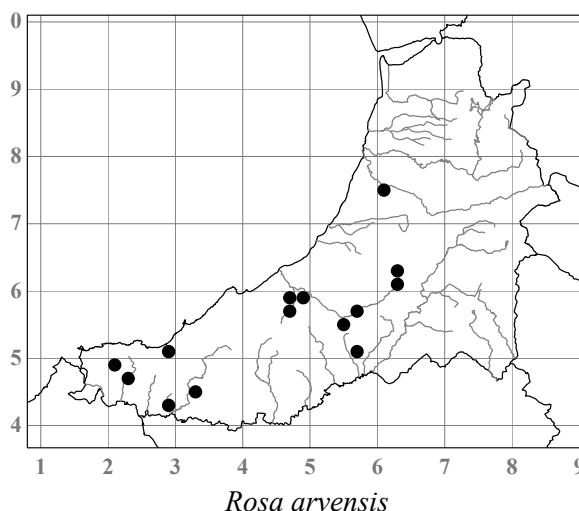
The species itself, a native of North America, has not been recorded and the only two records are probably of one of its hybrids: well-established bushes in scrub by the railway at Capel Bangor SN648797, 1992 (NMW) were determined by GGG as “near *R. setigera*”; and other well-established bushes in scrub by long-disused railway allotments by Felin-y-mor Road, Aberystwyth SN581804, 1992 (NMW) were determined by ALP as a “garden hybrid derived from *R. setigera*”.

***Rosa filipes* Rehder & Wilson**

A row of bushes well naturalised, presumably by suckering, along 5m of roadside hedge 200m NE of Coybal Lodge, New Quay SN37675907, 1999 (NMW), was determined by RM as *R. cf. filipes* or a cultivar of it. Native of China.

***Rosa arvensis* Huds. - Field-rose - Rhosyn Gwyllt Gwyn**

Plants resembling *R. arvensis*, which may either be the species or its hybrid with *R. canina*, are widespread and frequent in the lowlands, but only a small proportion have been expertly named. They occur chiefly in hedges, scrub, at wood margins where they often extend further into the woodland than other species of *Rosa*, and on railway banks and





streamsides. They are commonest in the main river valleys and along the coast, but are rare or absent in the uplands and are conspicuously absent from the higher ground in the middle and S of the county, as well as from some other areas such as the district around Llanybydder and Cwrtnewydd. The 15 confirmed records are from lowland hedgebanks, the margin of *Salix* scrub and a railway embankment. Altitude limit 330m, Llywernog SN78F (Salter 1935, if correctly identified).

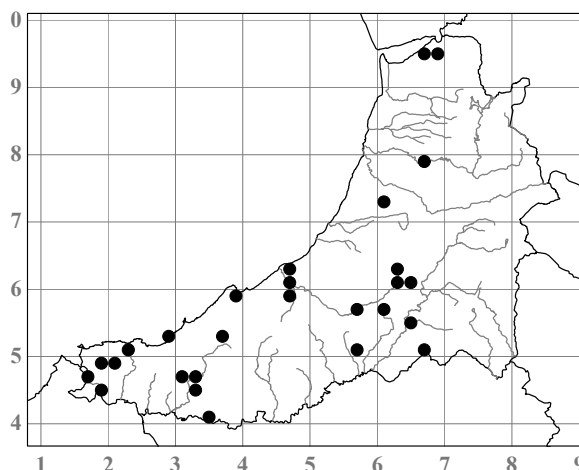
**Rosa ×pseudorusticana** Crép. ex T. A. Preston (*R. arvensis* × *stylosa*)

*R. arvensis* as seed parent: In woodland by Nant Arberth bridge, Tynewydd, Tremain SN232475, 2002 (NMW, RM & AOC, det. ALP & RM). A specimen from the disused railway 550m ESE of Aber-mad SN605758, 1992, was det. GGG as *R. arvensis* with very slight introgression from *R. stylosa* (the latter species has not been recorded in this part of the county).

**Rosa ×irregularis** Déségl. & Guillon (*R. arvensis* × *canina*; *R. ×verticillacantha* Mérat)

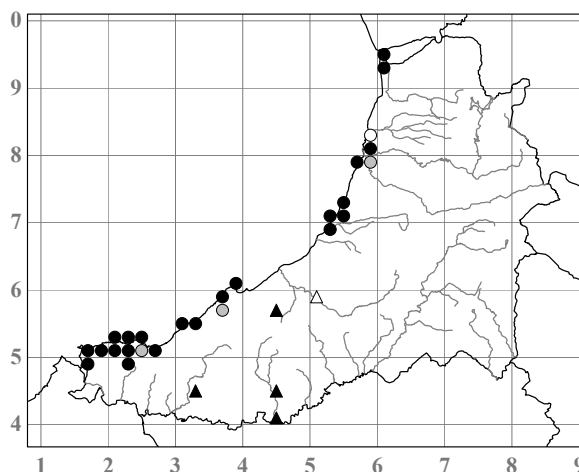
*R. arvensis* as seed parent: widespread and doubtless under-recorded, with 22 records det. RM, and perhaps, at least in some areas, commoner than *R. arvensis*.

*R. canina* as seed parent: usually closely resembling *R. canina* and difficult to detect, but recorded four times: at a roadside wood margin 1.6km SW of Furnace bridge SN672940, 2008 (RM & AOC); in scrub W of the road on Aber-arth Common SN478620, 2001 (NMW, RM & AOC); on a roadside bank by conifers 800m NW of Blaen-twrch SN677501, 1990 (NMW, det. ALP), at 325m altitude; roadside hedge, Netpool, Cardigan SN17614621, 2000 (RM & AOC).



**Rosa spinosissima** L. (*R. pimpinellifolia* L.) - Burnet Rose - Rhosyn Bwrned

Locally abundant and usually forming extensive thickets along the coast on the sand dunes at Ynyslas SN69B, C, and Gwbert SN14U, and in many places on the hard-rock coastal slopes in heath, scrub and grassland, and on scree. It is rarely more than 1km from the sea, and at sites further inland it is probably only naturalised from plantings or bird-sown, for example on a roadside bank 100m SW of Oakford crossroads SN451579, 1998, around Capel Salem, Brongest SN324450, 1992, and in both the chapel graveyards at Rhydowen SN441458 and 443452, 1992-2005.



*Rosa spinosissima*

**Rosa ×involuta** Sm. (*R. sherardii* × *spinosissima*)

*R. sherardii* as seed parent: several bushes in mown coastal heath, MoD site, Aber-porth SN245524, 1994 (NMW, det. GGG), with both parents nearby. A specimen from a streamside near Aber-porth, SN2550, 1978 (NMW, RGE) was determined by ALP as "*R. sherardii* with introgression from *R. pimpinellifolia*". Watson (1883) cited an Atwood specimen of *R. ×involuta* from the county, but no further details are available.

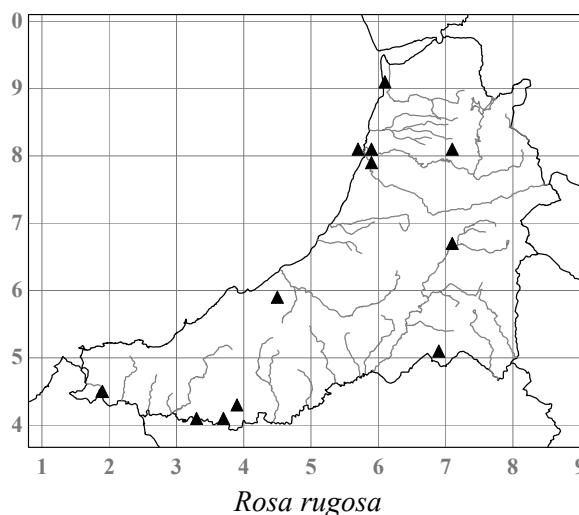
**Rosa rugosa** Thunb. - Japanese Rose - Rhosyn Japan

Deliberately and misguidedly planted on the landward side of Tan-y-bwlch Beach, Aberystwyth SN579806 in 1973 as part of the NT's Operation Neptune and since then spreading by suckers and seed extensively over the shingle, 2005, and by 1990 spread by seed across the river and to Penyrangor Beach nearby SN580808. More recently it has been planted on roadsides and amenity areas, and has become naturalised by suckering there and probably from throw-outs or bird-sown in scrub and in hedgebanks in several places. The flowers of most

colonies are purplish-rose, but the white 'Alba' occurs among the Tan-y-bwlch population. The species is native of E Asia. Altitude limit 435m, a colony probably derived from throw-outs on a rocky slope below the road in FC forest, Bryn Du SN68315199, 2003. Native of E Asia.

#### **Rosa 'Hollandica' - Dutch Rose**

Well-naturalised and forming dense thickets in five sites: In scrub on the lead mine, Cwmsymlog SN69848372, 2001; alongside a hedge 100m E of Llain-fawr, 2.5km W of Devil's Bridge SN716773, 1993 (NMW); on waste ground at the Llanilar old station yard SN62527534, 1992 (NMW); on a lane-side bank 100m E of Clungwyn, 1.5km N of Troed-y-rhiw SN492536, 2003; and in a pasture NW of Cwm-cou school SN289421, 1999 (AOC & MDS).



#### **Rosa palustris** Marshall 'Nuttalliana'

A plant resembling this cultivar was recorded as naturalised in a roadside hedge between Aberystwyth and Devil's Bridge SN67 or 77 in 1966 (NMW, DD, det. IMV as "Probably *R. carolina* var. *nuttalliana*"). Native of E North America.

#### **Rosa virginiana** Herrm. (*R. lucida* auct., non Ehrh.) - Virginian Rose - Rhosyn Virginia

First recorded "In a garden hedge by the roadside, near Newcastle Emlyn, Cardigan [SN34A]" by Jones (1880). Three recent records are of it more definitely naturalised by suckering, probably having spread from plantings or being bird-sown: on the roadside verge by the village hall, Llanfarian SN591779, 1992 (NMW) - 2004; in the Ponterwyd chapel graveyard SN749809, 1999 (NMW); and on the Ynys-las dunes SN60909377, 2004 (NMW). An immature Salter specimen from a hedge at Brynchwyth, Ponterwyd SN753800, 1928 (NMW) was considered by ALP to be probably this species. Native of E North America.

#### **Rosa gallica** L. - Red Rose - Rhosyn Coch Caerhirfryn

Recorded twice in roadside hedges, but whether planted or bird-sown is uncertain: 150m SSW of Llanbadarn Odwyn church SN633603, 1998 (NMW), a *flore pleno* form; and 70m N of Berwyn Villa, 1km E of Tregaron SN688593, 1998. Native of Europe and SW Asia.

#### **Rosa ferruginea** Vill. (*R. glauca* Pourr., non Vill. ex Loisel.) - Red-leaved Rose - Rhosyn Glaswawr

Planted on the University campus, Penglais SN59478193, 2006, and in amenity scrub at the N end of the Cardigan bypass SN188467, 2006. Native of Europe.

#### **Rosa stylosa** Desv. - Short-styled Field-rose - Rhosyn Byrgolofnig

A southern species in Britain, and at its N limit in Wales in the S of the county. In 2001 two bushes were found on the disused railway embankment on the Teifi Marshes SN18664536 and 18634550 (NMW, conf. RM), and in 2003 six more were found here (RM & AOC); these bushes were all within 200m of the VC boundary, and two bushes of *R. ×andegavensis* were also present. In 1994 a bush had been seen in the NW hedge of the road 180m NNE of Pont Gilfach, Gilfach-yr-Halen SN43776132 (JPW & AOC), and fruiting material collected the next year (NMW) was determined by GGG as "*R. stylosa*, with some introgression of *R. canina* ... seems to be near enough to *R. stylosa* though I feel sure there are some genes of *R. canina*"; this bush had gone by 2001, although another, of a hybrid with *R. stylosa* as the seed parent, was still present nearby (see under *R. ×andegavensis*). It was recorded, without locality, by Jones (1880).

#### **Rosa ×andegavensis** Bastard (*R. canina* × *stylosa*)

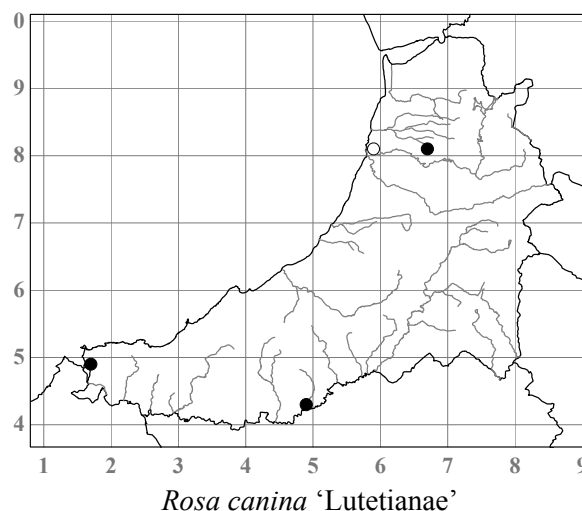
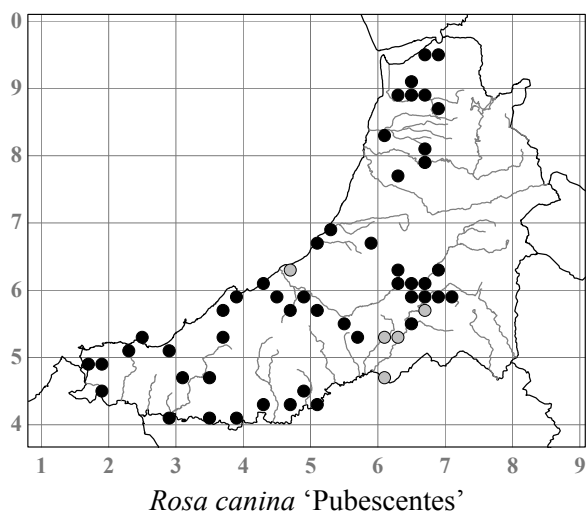
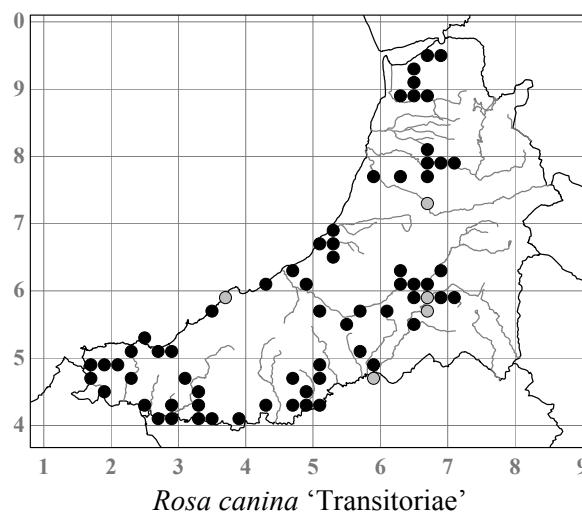
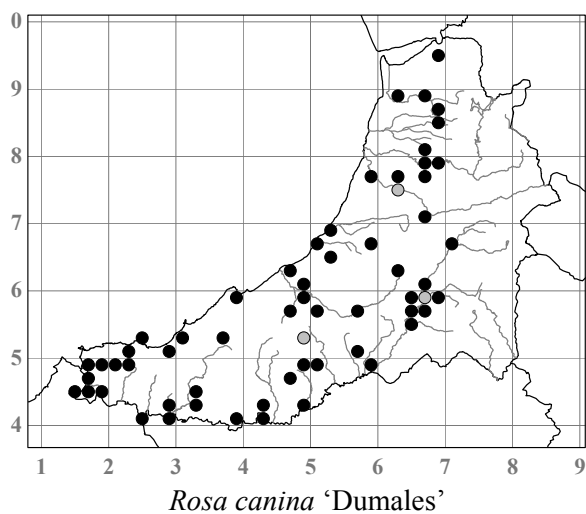
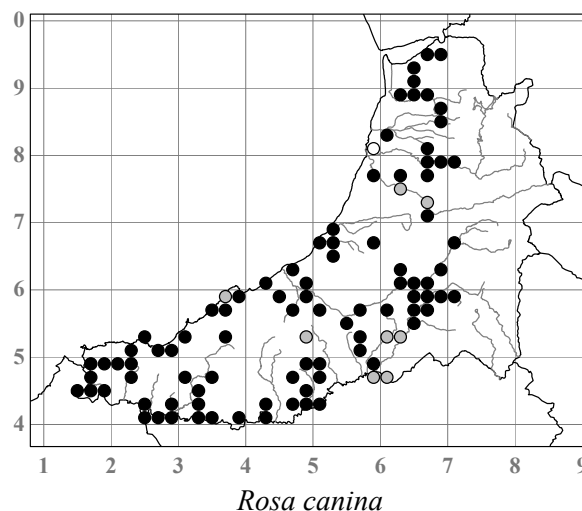
This hybrid has been found in both of the only two sites in the county, Gilfach-yr-Halen and the Teifi Marshes, where *R. stylosa* has been found, as well as in two others in the same SW part of the county.

*R. canina* as seed parent: two bushes in hedge 350m NNW of Maesymeillion, Penparc SN19764865, 1991 (NMW, det. GGG) - 2000 (RM & AOC); two bushes on disused railway embankment on the Teifi Marshes SN18654540 and 18674533, 2003 (NMW, RM & AOC). In addition, material from a hedge just W of Perthneidr, 2km E of Penbryn SN31765228, 1991, was considered by GGG to be "almost certainly *R. canina* introgressed with *R. stylosa*".

*R. stylosa* as the seed parent: Bush in roadside hedge 160m NNE of Pont Gilfach, Gilfach-yr-Halen SN43746130, 2001 (RM & AOC), probably the same bush as one that in 1995 (NMW) had been considered by GGG to be this hybrid but with *R. canina* as the seed parent.

***Rosa canina* L. - Dog-rose - Rhosyn Gwylt (Rhosyn Bwci, Draenen Fwci, Rhosyn Drain)**

Common throughout the lowlands, and extending up most of the valleys into the uplands; it is doubtless a good deal commoner than the map of confirmed records indicates. Of the four informal groups, 'Dumales' and 'Transitoriae' are equally common, and 'Pubescentes' slightly less common, probably more or less throughout the area of the species, although one or other of the groups often predominates in a particular hedge or wider area. 'Lutetianae' is much less common, with only four confirmed records, and the only area where it is confirmed as common is around Cyncoed, Goginan SN6780, 1992 (det. GGG). None of the groups shows any ecological or general distributional bias. Var. *spuria* (Puget) Wolley-Dod, a 'Transitoriae' variety with a striking orange, conical disc to the hip, has been recorded in





hedges 2km NE of Dol-y-bont SN64278921, 2008 (RM & AOC), in the Aeron valley 500m ENE of Llangeitho church SN62506030, 2004 (RM & AOC), at Rhydypanyd SN63376190, 2004 (RM & AOC), at Ciliau Aeron SN500578, 2007 (RM & AOC), in scrub by the Afon Dulas at Lampeter SN58104877, 2004 (RM & AOC), and in a roadside hedge 600m NNE of Llwynpiod, Cardigan SN18104821, 2003 (NMW, RM & AOC). Altitude limit (as the species) 460m, Cerrig Maesycawnau SN769587, 1938 (Salter Diary 7.6.1938, Wade 1952); 360m, Craig Clogan, Cwm Berwyn SN726582, 1992.

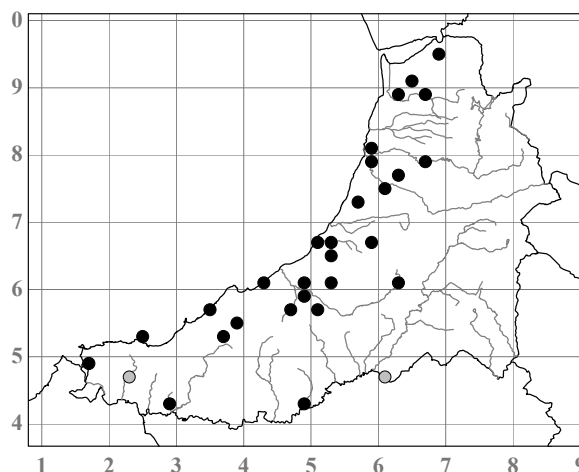
**Rosa ×dumalis** Bechst. (*R. caesia* × *canina*)

Because of the similarity of certain main characters shared by the parents, and the great variation in pubescence and glandulosity in *R. canina*, it is often impossible to tell which the seed parent was and which subspecies of *R. caesia* was involved in the cross. *R. ×dumalis* bushes with the direction of the cross uncertain have been recorded from several sites in the middle and N of the county, including hedges at Llancynfelyn SN64759183, 2008 (RM & AOC), Llanerchaeron SN488598, 2007 (RM & AOC), Ciliau Aeron SN500578, 2007 (RM & AOC), Gilfach-yr-Halen SN437613, 2001 (RM & AOC) and Rhydypanyd SN63376190, 2004 (RM & AOC); they also seem particularly common in the area between the Mynydd Bach and the coast, SN56, 2009 (RM & AOC).

*R. canina* as seed parent, *R. caesia* sens. lat. as pollen parent: hedgebank at Cwmtudu SN357575, 1992 (det. GGG); and hedge S of Waun-fach, Cwm-cou SN286420, 2002 (RM & AOC).

*R. caesia* subsp. *caesia* as one parent, but direction of cross uncertain: although subsp. *caesia* itself has been recorded from only one site in the county, further evidence of its presence, perhaps in the past, can be seen in the occurrences of this hybrid in five widely scattered localities: on disused railway by Felin-y-mor Road, Aberystwyth SN581805, 1995 (det. RM); hedge 700m SW of Llandysiliogogo church SN357570 (RM & AOC); scrub above Cribach Bay, MoD site, Aber-porth SN248522, 2003 (RM & BSBI field meeting); hedge 400m S of Blaenpistyll, Tremain SN232475, 1985 (NMW, det. ALP); and scrub above salt marsh, Nantyferwig SN16894815, 2003 (RM & AOC).

*R. caesia* subsp. *vosagiaca* as one parent: recorded from a dozen scattered sites, usually with uncertainty as to which the seed parent was, including from a field hedge 500m S of Glanrheidol, Capel Bangor SN662788, 2001 (RM & AOC); a laneside hedgebank near Lan-las, Cellan SN60204785, 1982 (NMW, det. ALP); a field hedgebank 400m WNW of Highmead SN497432, 2005 (RM & AOC); and the Cardigan-Gwbert area SN14, 1928 (BM, EBB, det. ALP).

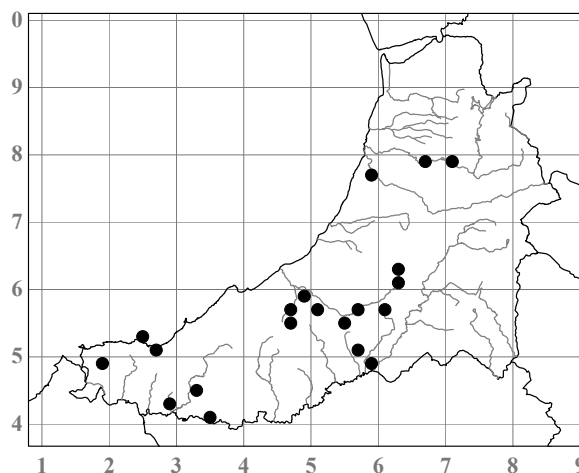


**Rosa ×dumetorum** Thuill. (*R. canina* × *obtusifolia*)

Recorded from 20 sites, although *R. obtusifolia* has been recorded from only three, only one of which is near the hybrid.

Direction of cross uncertain: 14 sites, from a bush in a hedge 400m S of Glanrheidol, Capel Bangor SN66357896, 2001 (RM & AOC) where *R. obtusifolia* had been collected in 1991, and three others also in Cwm Rheidol, 2001 (RM & AOC) in the N of the county, to a bush in a hedge N of Blaenpant, 2km N of Lampeter SN57445007, 2004 (RM & AOC) in the SE and to one in a hedge 200m E of Helyg-fach, Aber-porth SN271512, 2002 (RM & AOC) in the SW.

*R. canina* as seed parent: several bushes in hedge SW of Blaenllynan, Ferwig SN187484-181482, 2003



(RM & AOC); two bushes in hedge by Afon Dulas, Lampeter SN58104886, 2004 (RM & AOC); in hedge SSW of Capel Betws Lleucu SN60565785, 2004 (RM & AOC); and in hedges S of Rhydypanyd SN63376190 and 63316203, 2004 (RM & AOC).

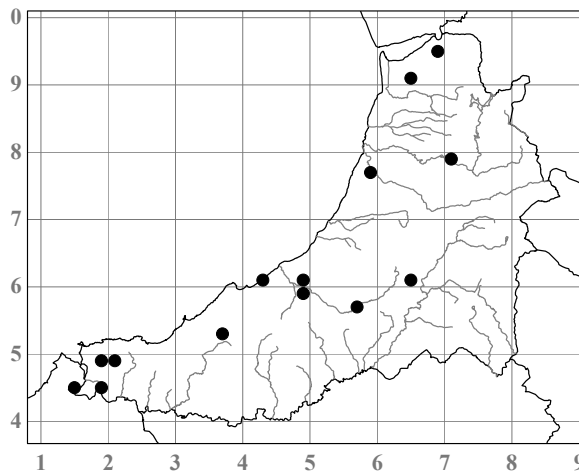
*R. obtusifolia* as seed parent: bush at S margin of Coed Bont Sych, 500m W of Aber-mad SN594761, 2001 (RM & AOC); and a bush in scrub above Cribach Bay, MoD site, Aber-porth SN248524, 2003 (RM *et al.*).

#### ***Rosa* × *scabriuscula* Sm. (*R. canina* × *tomentosa*)**

This hybrid seems to be much more widespread than *R. tomentosa* and the 19 records are widely scattered. Direction of cross uncertain: one bush in the roadside hedge 400m SE of Llancynfelyn church SN64849177, 2008 (RM & AOC).

*R. canina* as the seed parent: two bushes in the S hedge of the road 40m SE of the Ynys-hir bridge SN68489574, 2008 (RM & AOC), and one on the disused railway embankment on the Teifi Marshes SN18634553, 2003 (RM & AOC).

*R. tomentosa* as the seed parent: 16 records, from two bushes in roadside hedges SE of Llancynfelyn church SN64849177 and 64759183, 2008 (RM & AOC) to a bush on the roadside bank 2km WSW of St Dogmaels SN14614497, 2001 (NMW, det. RM).

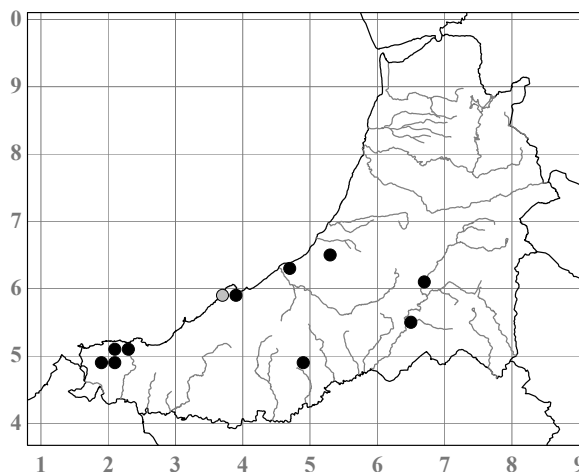


#### ***Rosa* × *rothschildii* Druce (*R. canina* × *sherardii*)**

Recorded from 12 sites scattered throughout the county.

*R. canina* as seed parent: hedge S of Ty-rhos, 1km SW of New Quay SN378590, 1983 (NMW, det. GGG); hedge 250m NE of Llwyn-llwyd, Penparc SN20234899, 1991 (NMW, det. GGG) - 2000 (RM & AOC) and others nearby; hedge 400m E of Pont Gogoyan SN64525450, 2000 (RM & AOC).

*R. sherardii* as seed parent: roadside hedge 2.5km ESE of Llannon SN53946593, 2009 (RM & AOC); several bushes in scrub at S end of Aber-arth Common SN478620, 2001 (RM & AOC); hedge 500m W of Pont Einon SN665615, 2000 (RM & AOC); hedge 100m WNW of Capel Maen-y-groes, New Quay SN384589, 2001 (RM & AOC); two bushes in hedges 150m WNW of Maes-glas, Parc-llyn SN237504, 2002 (RM & AOC); road verge 50m E of Login chapel, Felin-wynt SN208504, 1993 (NMW, det. GGG); hedge 500m WNW of Cwrtnewydd cross-roads SN483481, 2005 (NMW, RM & AOC); hedge 100m NNE of Llwyn-llwyd, Penparc SN20154884, 2000 (RM & AOC); and hedge 300m SW of Brynllynan, Ferwig SN18814840, 2003 (RM & AOC).



#### ***Rosa* × *toddiae* Wolley-Dod (*R. canina* × *micrantha*)**

*R. canina* as seed parent: in scrub by disused railway just E of Llanilar station SN62937524, 2006 (NMW, RM & AOC); roadside hedge 200m NNE of Llwyn-llwyd, Penparc SN20194894, 2000 (RM & AOC).

*R. micrantha* as seed parent: bush at S margin of Coed Bont Sych, 500m W of Aber-mad SN594761, 2001 (RM & AOC); bushes in overgrown quarry and adjacent roadside scrub 300m E of Pont Llannon SN51786665, 2009 (RM & AOC); bush in scrub above Cribach Bay, MoD site, Aber-porth SN248524, 2003 (RM *et al.*).

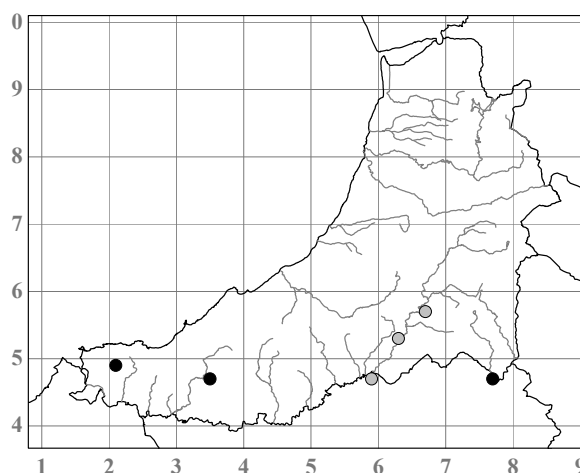
### **Rosa caesia** Sm.

Subsp. **caesia** - Hairy Dog-rose - Rhosyn Rhuddlas

Recorded only from a single site, 1.5km E of Oakford SN467578, where there are several bushes in very mixed roadside hedges, 2007 (NMW, RM & AOC). It is here near its S-most limit in Britain, and on the evidence of its hybrids it was perhaps once more widespread in the county.

Subsp. **vosagiaca** (N. H. F. Desp.) D. H. Kent (subsp. *glauca* (Nyman) G. G. Graham & Primavesi) - Glaucous Dog-rose - Rhosyn Llwydwyrd

Apparently rare and confined to the S of the county. It was first recorded from a laneside hedge at Cellan SN59414797, 1975 (NMW, det. IMV) - 1982 (NMW, det. GGG), and the five other confirmed records are also from hedgebanks.



*Rosa caesia* subsp. *vosagiaca*

### **Rosa obtusifolia** Desv. - Round-leaved Dog-rose - Rhosyn Deilgrwn

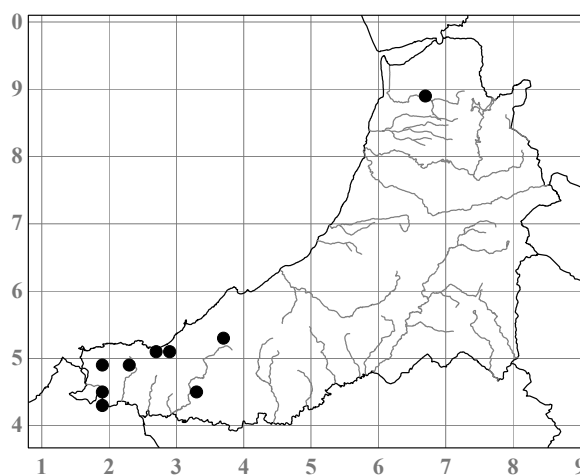
A very rare species in the county with only four bushes recorded. It was first found as a solitary bush on the roadside verge 400m S of Glanrheidol, Capel Bangor SN66337893, 1991 (NMW, GGG); GGG considered that "there are perhaps some genes of *R. canina* in the bush but not enough to label it as a hybrid ... it is too near *R. obtusifolia* to be labelled as *R. ×dumetorum*". This bush died in 1995, and although one bush of *R. ×dumetorum* was found in a field hedge nearby in 2001, no others of the species have been found in the N of the county. In 2002 a bush was found in a roadside hedge 150m W of Troedyrour church SN32574533 (NMW, RM & AOC), and in the same year a bush was found in the roadside hedge 500m NNE of Llwynpiod, Cardigan SN180481 (RM & AOC) and another in the same hedge at SN179481.

### **Rosa tomentosa** Sm. - Harsh Downy-rose - Rhosyn Gwlanog

Confirmed records suggest that it is largely confined to the SW part of the county where it is generally uncommon. Most records are from hedges, but a few are from scrub, for example on the disused railway embankment on the Teifi Marshes SN183458, 1974 (TAWD) - 1985 (NMW, conf. GGG) and SN18564569, 2003 (RM & AOC). The only record in the N of the county is from a roadside hedge 1km SE of Tal-y-bont church SN66448899, 2008 (RM & AOC).

### **Rosa micrantha** × **tomentosa**

*R. tomentosa* as seed parent: there have been four records of this hybrid, otherwise known only from S Hampshire and Surrey, a bush in scrub above the road 1.4km NW of Llwyndafydd SN361564, 1993 (NMW, det. GGG); a bush in a roadside hedge, Brongest SN32304530, 1992 (NMW, det. GGG), and another nearby at SN330445, 1992 (NMW, det. GGG); a bush on the roadside bank 200m S of Llysawel, Penrhiw-pal SN339451, 1992; and a bush in an overgrown field hedge on the Teifi Marshes SN182450, 1992 (det. GGG).



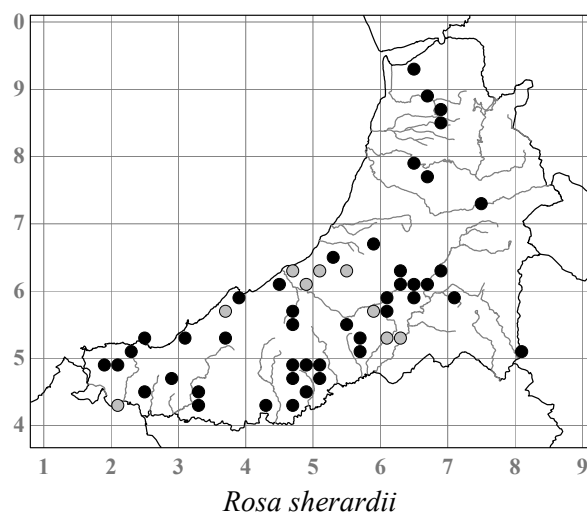
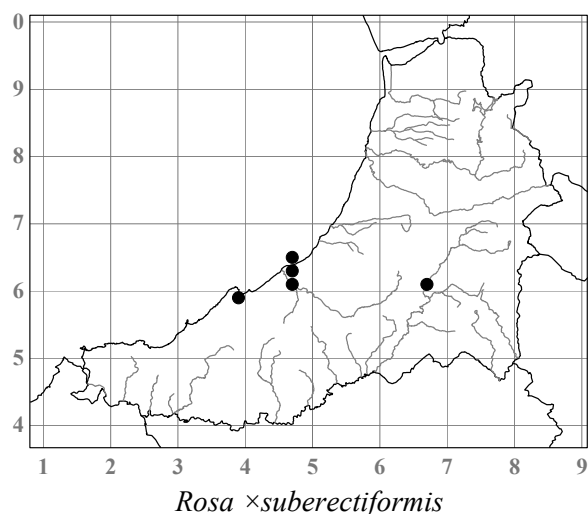
*Rosa tomentosa*

### **Rosa** × **suberectiformis** Wolley-Dod (*R. sherardii* × *tomentosa*)

A difficult hybrid to recognise because of the similarity between the parents. Ten bushes, mostly from the central part of the county from Tregaron to Aber-arth and New Quay, have been determined by GGG (NMW, 1992) as this hybrid, with *R. sherardii* as the seed parent, or as *R. sherardii* introgressed with *R. tomentosa*, or vice versa, but he expressed some uncertainty about the exact nature of all of them. Similar plants have been



seen elsewhere, but none have been seen and confirmed by RM, and the occurrence of this hybrid in the county must remain uncertain.



### ***Rosa sherardii* Davies - Sherard's Downy-rose - Rhosyn Sherard**

Most of the plants called *R. tomentosa* by Salter were probably of this species. After *R. canina* and *R. arvensis* it is the commonest species, and whether in flower or fruit it is a great adornment of hedgebanks, scrub, rough pastures and rocky slopes and cliffs throughout most of the county, but becoming rarer in the N and absent from most of the lower Teifi valley. It extends with *R. canina* into the upland valleys. There is great variation, especially in the prickles which vary on different bushes or populations from almost straight to strongly curved; bushes in the county are often taller than is usual for this species, and the sepals tend to be very erect. Forma **resinosoides** (Crép.) Wolley-Dod, an excessively glandular variant, usually with hispid hips, has been recorded from six widely scattered sites, including a laneside hedge 1.3km ESE of Llanbadarn Odwyn SN645600, 1982 (NMW, det. GGG) and a roadside hedge W of Blaenllynan, Ferwig SN185485, 2003 (RM & AOC). Altitude limit (the species unconfirmed) 350m, verge of the A44(T) 600m NW of Cwmergyr SN79108300, 2003.



*Rosa sherardii*, Cae'r-meirch  
SN75147334, June 2004

*Rosa sherardii* fruits, Capel  
Vicar SN456563, September 1992

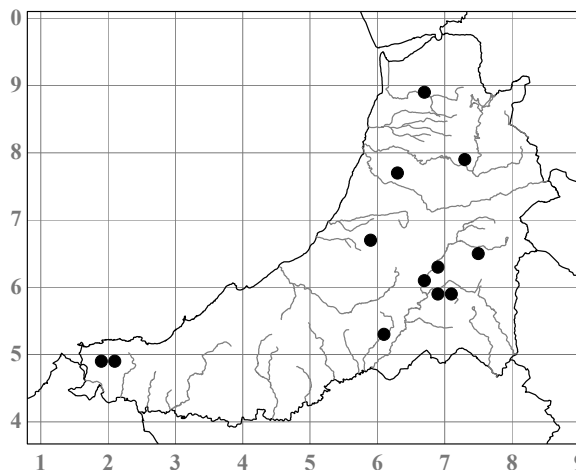


***Rosa* × *perthensis* Rouy (*R. mollis* × *sherardii*; *R. ×shoolbredii* Wolley-Dod)**

Recorded about 15 times, chiefly on the edge of the uplands as in the Tregaron/Strata Florida area, where it may be assumed that *R. mollis* once occurred.

*R. mollis* as seed parent: the rarer form, recorded only from a roadside hedge 300m W of Penpompren, 1km E of Tregaron SN690596, 2000 (RM & AOC); and from a roadside hedge opposite Coed Cwm-hwylog, Nanteos SN622778, 1990 (NMW, det. GGG as this hybrid and probably crossed in this direction).

*R. sherardii* as seed parent: apart from records from hedgebanks near Tregaron, for example in Cwm Berwyn SN70335939, 1992 (NMW, det. GGG) and 500m W of Pont Einon SN665615, 2000 (RM & AOC), and records from near Strata Florida, for example in scrub by the road 800m E of the Abbey SN753659, 1979-1991 (NMW, det. GGG), it has also been recorded from three sites in the N of the county, from the NW slope of the Mynydd Bach where it is suckering along a roadside hedge SN59376656, 2009 (NMW, RM & AOC), and from the SW where there are bushes in the roadside hedge 100m SW of Maesymeillion, Penparc SN19964834, 2000 (RM & AOC, conf. ALP), and in a laneside hedge 100m S of Llwyn-llwyd in the same area SN20064865, 2000 (NMW, RM & AOC, conf. ALP).



***Rosa micrantha* × *sherardii***

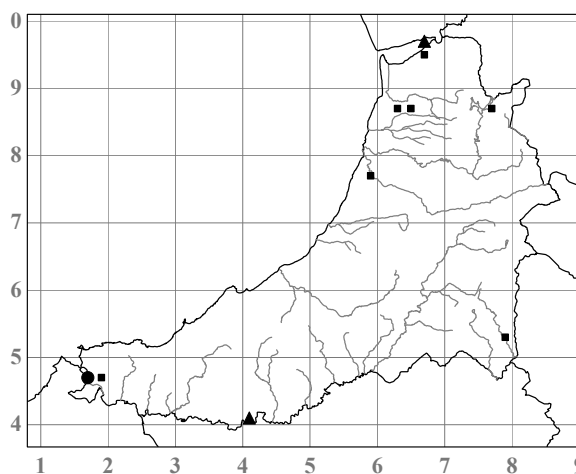
Two bushes in the SW hedge of the road 150m and 170m W of Capel Maen-y-groes, New Quay SN38475896, 1992, were determined as this rarely recorded hybrid by GGG, with the direction of the cross uncertain. A bush growing on the wall of a lead mine ruin 700m SE of Pont Rhyd-y-groes SN747722, 1994 (NMW, AOC & JPW) was determined by GGG as “95% excellent *R. sherardii* introgressed or a back-cross with *R. micrantha* in the parentage”.

[*Rosa mollis* Sm. - Soft Downy-rose - Rhosyn Blewog

Because of the frequency in the county of the hybrid between this species and *R. sherardii*, it seems probable that *R. mollis* formerly occurred here, and its distribution in Wales would lead one to expect it. Although recent searches, especially on some of the less acidic upland cliffs, have been unsuccessful, it may well still be present. Old records may refer to *R. sherardii*, *R. mollis* or *R. tomentosa*.]

***Rosa rubiginosa* L. - Sweet-briar - Drysiên Bêr**

The only probably native bushes of this generally calcicole species are two in a hedge at the S corner of a rough pasture W of the Afon Mwldan, 150m up from its confluence with the Afon Teifi on the outskirts of Cardigan SN17604609, 1995 (NMW, conf. GGG) - 2000 (RM & AOC). Elsewhere it has occasionally been planted, for example along a trackside hedge on the RSPB Reserve at Ynys-hir SN668957, 2004, by the FC on a roadside slope 2.5km SSW of Tal-y-bont SN643872, 1992-2005, by the FC on a roadside slope in Llanfarian SN590777, 1984-2008, and at the N end of the Cardigan bypass SN188467, 1998-2005. At two very remote upland sites single bushes have been planted by sluices on the inflow streams by reservoirs, at Nant-y-moch SN76748689, 2002 (AOC & PAS, conf. RM) at 350m altitude, and at Soar y Mynydd SN78845304, 2003 (conf. RM) at 295m altitude. Bushes presumably self-sown from gardens have been recorded in a rocky Oak wood at Ynys Edwin, Ynys-hir SN67799630, 2002 (NMW) and on a wall by the Teifi at the Porth Hotel, Llandysul SN41904078, 1991 (NMW, conf. GGG as probably a garden form).

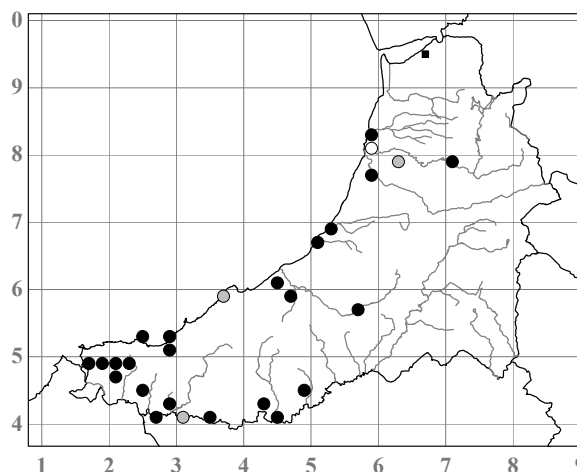


**Rosa ×bigeneris** Duffort ex Rouy (*R. micrantha* × *rubiginosa*)

*R. micrantha* as seed parent: a large bush on the N bank of the A487(T) road 100m SW of Figure Four crossroads SN58837750, 2001 (NMW, RM & AOC, conf. ALP). Although *R. rubiginosa* is not known as a native in this part of the county, c.20 bushes of it were planted by the FC in 1984 on a roadside slope in the village only 350m NNE of here and this was presumably the source of the pollen; *R. micrantha* has been seen 850m away.

**Rosa micrantha** Borrer ex Sm. - Small-flowered Sweet-briar - Drysiên Bêr Fân-flodeuog

Widespread along the coastal zone and up the main river valleys, but nowhere common. More than most of the other species it is often found away from hedges, growing in pastures and scrub and at wood margins. Although most frequent on the slightly base-rich soils in the SW of the county, there are unconfirmed records from very acidic sites, for example in the extreme N of the county on the rocky W slope of Foel Fawr, Eglwys Fach SN688954, 1997, in a rocky Oakwood by Ynys Edwin SN67799630, 1959 (PSC) - 2005, and on a peaty ditchside 700m ENE of Llancynfelyn church SN65119259, 2000. Unusually a colony of 15 bushes was recorded in woodland 200m SE of Llanychaïarn church SN586783, 1995 (SPC).

**ELAEAGNACEAE****Hippophae rhamnoides** L. - Sea-buckthorn - Rhafnwydden y Môr

Towndrow (1906) recorded this normally highly invasive shrub as “Probably planted” in the Aberystwyth district, and Salter (1935) recorded it from the Aberystwyth cemetery SN591812 and the National Library grounds SN593816, from where it has now gone. In 1973 it was insanelly planted to beautify the landward slope of Tan-y-bwlch beach as part of NT’s Operation Neptune, but all the bushes died except for a single one at SN58058020 which fortunately does not sucker and has never been known to flower, 2005. It has more recently been planted on the A487(T) embankment at Morfa Mawr SN504655, 1992-2005, and in hedges by the Cardigan cattle market SN180457, 1992. Four old bushes, planted in sandy scrub by a garden by the road just S of Gwbert SN163493, 1992-2005, have fortunately not resulted in any spread onto the adjacent Penyrergyd dunes. It is also occasionally planted in amenity sites, for example by the Science Park, Llanbadarn Fawr SN599812, 2008 (SPC) where it flowers and fruits freely but where no seedlings have been seen. There is a tree 90cm girth and 4m tall, 2004, by the Aberystwyth Golf Club SN59008243.

**Elaeagnus ×submacrophylla** Servett. (*E. macrophylla* Thunb. × *pungens* Thunb.) - Ebbing’s Oleaster

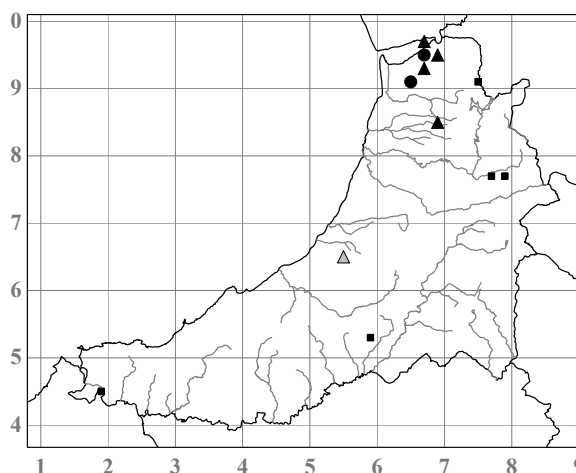
Recorded only as a relic hedge by the railway 500m SE of Aberystwyth station SN588811, 2002, and planted at the W end of the Aberystwyth golf course SN59008243, 2004.

**RHAMNACEAE****Frangula alnus** Mill. var. **alnus** (*Rhamnus frangula* L.) - Alder Buckthorn - Breuwydden

First found by Salter in 1933 (Diary 25.7.1933, 1933) when, working along from Ynys-hir, “My best find, just before I came off the bog at Penrhyn-gerwyn [SN670941], was a small tree of *Rhamnus frangula* among the alders,” and six years later (Diary 18.7.1939) he recorded that there was more of it there than he had thought before. In 1964 it was found to be frequent at the SE edge of Covert Du, Ynys-hir SN677955 (WMC, *Nature in Wales* 9: 29 (1964)); in 1993 c.15 bushes were found in wet *Salix* carr at the edge of Cors Fochno 400m SSW of Gwynfryn SN642914 (JPL & ACW); and in 2007 one bush was found on Ynys Eidiol Common SN67359522 (MB & SDSB). These are the only sites where it is assumed to be native. Because it is the food plant of the Brimstone butterfly, Alder Buckthorn has been enthusiastically planted in several wild sites and in FC woodland by conservationists and foresters. About 1960 J. Oliver planted it along FC forest rides SE of



Ty'n-y-garth, Cwm Einion SN694942, and WMC planted it, grown from Covert Du seed, further N in Covert Du a few years later. A group of bushes by the FC road in Lodge Park wood SN662931, reported in 1974 (PJP, per APF), must have been similarly planted, and about 1980 a bush (with unusually large leaves  $10-12 \times 6-7.5\text{cm}$ , glabrous beneath except on the veins) was planted near the pond here by RB, 1992 (NMW) - 2002; this last bush was transplanted from a roadside by the FC office at Cross Inn SN545642. In 1984/1985 the RSPB planted 230 bushes around newly excavated peaty pools on the Ynys-hir reserve (FE, *RSPB Ynys-hir Reserve 1985 Report*), and later planted bushes on Foel Fawr SN690949, 1997. The FC planted scattered clumps down the valley E from Esgair Fraith SN742911-749906, 1992-2004, as well as by their road 2km NE of The Arch SN778768, 1995-2005. A small bush in marshy grassland near Llety-Ifan-Hên SN694853, 2001 (NG), was not planted and was presumably bird-sown, perhaps from one of these plantings. It has also been planted by the new bridge on the Cardigan bypass SN182458, 1993-2004. Many, but by no means all, of these planted bushes are var. **latifolia** (Dippel) Grubov, native of the Caucasus, which has become naturalised at Ynys-hir. Altitude limit (planted) 400m, Esgair Fraith SN742911, 2004.



## ULMACEAE

### *Ulmus* L.

The following account of the Cardiganshire Elms is based largely on *c.*160 collections from throughout the county named by J. V. Armstrong and P. D. Sell (very many more collections await expert naming). Their taxonomy (Armstrong & Sell 1996) is essentially a micro-species approach, in which what are mostly individual clones are given species names. This reflects the reality of what one sees and can recognise in the countryside, and also has the advantage of allowing one to subsume these species into any broader classification one might choose to adopt. Two papers by R. H. Richens (1985, 1986) give a general geographical and historical overview of Elms in Wales according to an earlier taxonomy, but it is difficult to interpret his very interesting historical and linguistic information in the light of the present classification. Wych Elms were planted on the Hafod estate *c.*SN77L in *c.*1800 by Thomas Johnes (Linnard 1970, Moore-Colyer 1992). Davies (1815) wrote that the Worcestershire elm, which he described as smaller leaved and rougher barked than the Wych Elm, was “the only elm found native in the western coasts of the counties of Cardigan and Pembroke, and on the southern limestone tract”; which species this represents is uncertain, but it does suggest that native-looking trees or woods of Elm other than Wych Elm were present at that date.

The recent epidemic of Dutch Elm disease first appeared in the county in the early 1970s. It has killed most of the big trees in the county, but many Wych Elms, chiefly *U. scabra* and *U. glabra*, have survived, as have trees of a few others. *U. vegeta* generally survived longer than the other suckering species, and with most of these species, even where the trees have died, suckers have developed and grown into substantial and identifiable trees so that to a considerable extent the Elm flora of the county can still be profitably studied. To what extent most of the species are native is uncertain. The non-suckering *U. scabra* and *U. glabra* certainly are, and they are widespread in ancient woodland as well as on streamsides, river banks and in ravines in the inland valleys. The others may well all be introduced either as archaeophytes or neophytes.

Elm woods composed of the suckering species are very few. One of *c.*0.5ha survives by the A487(T) 1.5km N of Llanddeiniol SN563735, although the two species involved have not yet been



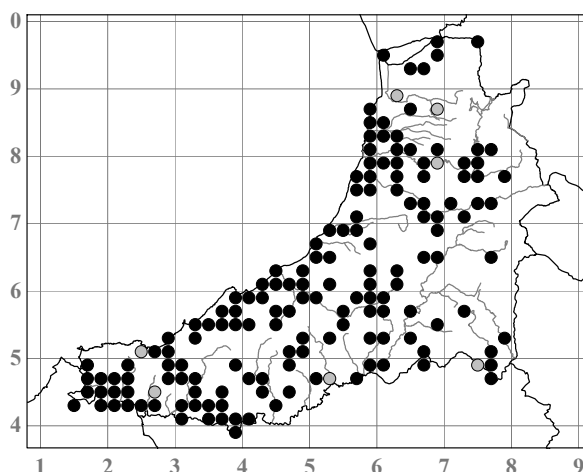
Elm-rich wood of Y Glog, Rhydyfelin, view NNE from SN59297922, April 2009

determined. At Clogfryn on the coastal slope 1.5km SW of Aberaeron SN446621 a similar sized wood of several old trees of *U. chaterorum* and dense smaller trees apparently from suckers fill much of the stream dingle. The W part of the Pigeonsford wood at Llangranog SN318537 was a 1ha wood dominated by *U. vegeta*, with some *U. scabrosa*, until the trees died in the 1990s. Some estate woods or other probably planted woodlands have a surprising variety of Elms, in particular c.1ha of woodland on either side of the A487(T) on the Rhydyfelin hill SN593793 which has *U. angustiformis*, *U. daveyi*, *U. laevis*, *U. occidentalis* and *U. scabrosa*; the W part is in the Crugiaau grounds and the E part was once part of the Nanteos estate, but it is difficult to imagine how such a collection including two undescribed species could have come about, even by accident.

Except for that of *U. scabra*, the maps show only records determined by Armstrong and Sell.

### **Ulmus scabra** Mill. (*U. glabra* auct., non Huds.) - Wych Elm - Llwyfen Lynanddail

The commonest Elm in the county, and the familiar non-suckering Wych Elm. It is almost a constant of the more fertile and damp parts of ancient woodland, especially along rocky streamsides. It also often occurs, perhaps as a relic, along streamsides in secondary woods and plantations. It is very widely planted in hedges and for ornament or shelter in pastures and as a street tree. The famous “Nanteos cup”, a wooden bowl reputed to have healing properties and sometimes equated with the Holy Grail, has been shown to be made from Wych Elm



and to date from the late 14<sup>th</sup> to the 16<sup>th</sup> century, and was probably a domestic mazer bowl found at Strata Florida in the 18<sup>th</sup> or early 19<sup>th</sup> century (Wood 2001; D. B. Hague, An object of romantic history, *Cambrian news* 13 May 1988). Maximum 420cm girth, 18m tall, 2007, on the roadside bank 200m W of Pontargamddwr, 3km WSW of Swyddffynnon SN66706477 (RGW; AOC).

A grafted tree of ‘**Horizontalis**’, 266cm girth and 12m tall in 2005, is in the field NE of Llanllyr mansion SN54475598 (NMW). Two small trees of ‘**Camperdownii**’ are planted in the public garden E of Queens Road, Aberystwyth SN58458214, 2008. A tree of ‘**Exoniensis**’ 88cm girth is at the SE end of Stanley Road, Aberystwyth SN58708157, 2004. Altitude limit (the species, planted) 330m, Graig farmyard, 3km ESE of Llanddewi-Brefi SN691547, 1991 (CGE, AOC & DGJ, det. JVA & PDS).

### **Ulmus glabra** Huds. (*U. glabra* subsp. *montana* Hyl., *U. montana* Stokes)

Much less common than *U. scabra* but similarly distributed both as a native and as a planted tree. The two sometimes grow together on rocky streamsides in ancient woodland, for example in Cwm Cletwr SN663920, 1999, and in the Arth woods SN495623, 1995 (CGE, det. PDS). Ley (1887) recorded it from Devil’s Bridge c.SN77N and Marshall (1900) described it as “Frequent, and very likely a true native, in the woods near



*Ulmus scabra* 420cm girth, 3km WSW of Swyddffynnon, view NE from SN66706477, November 2007



Aberayron". Altitude limit (planted) 330m, with *U. scabra* in Graig farmyard SN691547, 1991 (CGE, AOC & DGJ, det. JVA & PDS).

### ***Ulmus mossii* A. Henry**

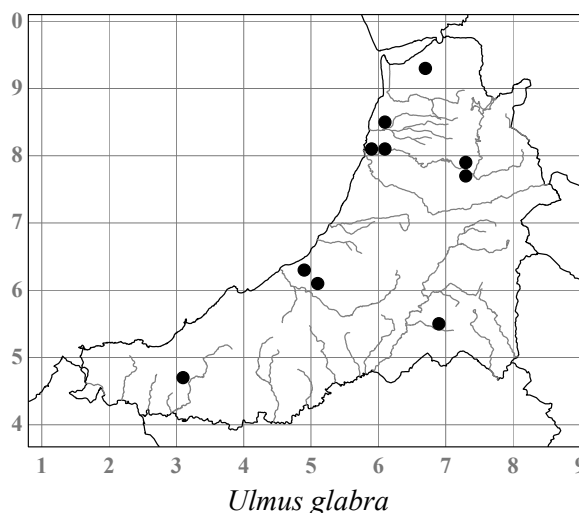
A suckering Wych Elm, probably originally planted in its two sites in the county. There are several big trees, the largest 240cm girth, in estate woodland at Ty-glyn, Ciliau Aeron SN49905995, 1995 (CGE, det. PDS) along with much sucker growth. Similar but smaller trees are suckering along the SE hedge of the A487(T) road opposite Ranger Lodge, Glandyfi SN690964, 1994.

### ***Ulmus scabrosa* J. V. Armstrong & P. D. Sell ined.**

A suckering Wych Elm collected from six sites in the county at all of which it will almost certainly have been originally planted. A tree is in a hedge at Rhydyfelin SN59377929, 1995 (CGE, det. PDS); three trees, the largest 79cm girth and 14m tall in 1995, are in a conifer plantation 350m E of Pont Hopcyns, Trawsgoed SN67637250 (CGE, det. PDS); seven trees from suckers are in damp Alder/Ash woodland at the disused Llanilar woodyard site SN62547530, 1995 (CGE, det. PDS), and a fine tree 229cm girth in 1995 but later felled was in a field nearby SN62497532 (CGE, det. PDS); several trees, suckering vigorously through the *U. vegeta* wood 800m W of Pigeonsford, Llangranog SN31885378-32505390, 1995 (CGE, det. PDS); and a tree 12m tall in estate woodland E of Gwernant Home Farm, Troed-yr-aur SN337460, 1997 (CGE, det. PDS).

### ***Ulmus daveyi* (A. Henry) J. V. Armstrong & P. D. Sell ined.**

A suckering Wych Elm collected from six sites, at all of which it was probably originally planted, and occurring mostly in the Aberystwyth area. A line of long-dead and felled trees, identifiable from sucker growth 6m tall, was along the road 120m NE of Gelli, Llancynfelyn SN64749181, 1995 (CGE, det. PDS),



*Ulmus daveyi*, Lovesgrove, view NNE from SN63108124, April 2008



*Ulmus daveyi* by the A487(T) road at Comins Coch, view WSW from SN61608256, August 2009



one of the stumps being 283cm girth and with 148 annual rings. There is dense sucker growth along the SE hedge of Coed Pwll-crwn, 750m WSW of Plas Gogerddan SN62208337, 1995 (CGE, det. PDS). The conspicuous and picturesque isolated tree by the A487(T) road just above the Comins Coch turning SN61578252 was 220cm girth and 17m tall in 1995 (CGE, det. PDS) and was still healthy in 2009. Another fine tree 246cm girth and 20m tall in 1995, 278cm and 22m in 2008, is at the edge of the copse on the knoll N of the A44(T), 170m W of the Lovesgrove roundabout SN63108125 (CGE, det. PDS). There are many small trees from sucker growth in the wood that has *U. laevis* E of the A487(T) on Rhydyfelin hill SN593793 and on the roadside nearby, 1995 (CGE, det. PDS). The one collection from the S of the county is of a tree 8m tall from sucker growth in a field hedge 200m WNW of Llechwedd, Rhuddlan SN489445, 1995 (CGE, det. PDS). Maximum 283cm girth (see above); 278cm girth, 22m tall (see above).

***Ulmus vegeta*** (Loudon) A. Ley - Huntingdon Elm – Llwyfen Huntingdon

Often making a fine tree, and one of the species that took longer to succumb to Dutch Elm disease than most of the others apart from the Wych Elms. Specimens have been confirmed from a dozen sites. It was especially common in the Bryneithyn valley 3km S of Aberystwyth c. SN580780, 1995 but all have since died, and there was a big tree in a laneside hedgebank nearby at SN58197711, 1998. A tree 370cm girth in 1992 in the pasture 600m WNW of Monachty mansion SN49896231 was 385cm girth in 2002 (AOC & PAS); another close by was 307cm girth in 1995 (CGE, det. PDS); a tree 352cm girth and 20m tall in 1995 is at the edge of a pasture just N of Ty-glyn farm, Ciliau Aeron SN49836001 (CGE, det. PDS); and a tree 376cm girth and 19m tall in 1995 is in the Llanllyr grounds 150m SW of the mansion SN54285583 (NMW). A magnificent tree 397cm girth and 35m tall in 1992 was at the SW end of the Beech avenue 200m SE of Abermeurig House SN56525640 (CGE, det. JVA & PDS) but died and was felled c.2002 and had 121 annual rings in the outer 2/3 of the radius of the trunk; another tree survives just NE but was only 182cm girth and 17m tall in 2005. There was a dense grove of c.50 trees c.18m tall in 1994, 50m N of Llwyndurys mansion SN240434, 1994 (CGE, det. JVA & PDS). Maximum 397cm girth, 35m tall (see above).

***Ulmus wheatleyi*** (Bean) Druce (*U. sarniensis* (C. K. Schneid.) H. H. Bancr.) - Jersey Elm

Sucker growth of this species is frequent in the triangular 2 acre estate woodland at Aber-mydr, 200m W of Llanerchaeron SN475603, 1995 (CGE, det. PDS), presumably derived from trees planted here. The only other collection is from a street tree in Maesyrafon, Aberystwyth SN58508130, 1995 (CGE, det. PDS) - 2008.

***Ulmus plotii*** Druce - Plot's Elm - Llwyfen Plot

The only confirmed tree is one 10m tall at the edge of a conifer plantation 400m E of Pont Hopcyns, Trawsgoed SN67687245, 1995 (CGE, det. PDS), growing near *U. scabrosa*.

***Ulmus hollandica*** Mill. - Dutch Elm - Llwyfen yr Iseldiroedd

Widely planted, and with confirmed material collected from eight sites ranging from by the FC picnic site at Ystrad Einion SN707939, 1992 (CGE, det. JVA & PDS) to by the Teifi footbridge near the Cych confluence SN24514151, 1990 (CGE, det. JVA & PDS). It was especially susceptible to Dutch Elm disease. There were big trees along the N side of the road running from Gosen chapel to the A487(T) at Rhydyfelin SN59157890, 1976 (NMW, LTR, det. RMel as *U. ×hollandica*), and the biggest trunk, when the trees were felled in 1982 after dying of the disease, was 289cm girth with 124 annual rings; they are now represented only by a pure hedge of dense sucker growth, 2008. Only sucker growth is probably now left anywhere in the county, for example by the Tan-y-bwlch drive SN58757892, 1990 (CGE, det. JVA & PDS) - 2007 and by the B4337 road 100m NNE of Llanllyr SN545560, 1990 (CGE, det. JVA & PDS) - 2007.

A recently planted tree of '**Dampieri Aurea**' is in the grounds of Ynys-hir Hall SN682958, 2008 (PSC & AOC).

***Ulmus pseudohollandica*** J. V. Armstrong & P. D. Sell ined.

The only collection is from a twisted tree 14m tall at the edge of wet Alder woodland at the disused woodyard site, Llanilar SN62537530, 1990 (CGE, det. JVA & PDS) where it was presumably planted.

***Ulmus longidens*** J. V. Armstrong & P. D. Sell ined.

Sucker growth of small trees 6m tall of this species form part of the hedge along the E side of the Netpool cemetery, Cardigan SN17594613, 1995 (CGE, det. PDS). There are at least three trees nearby in Netpool

Wood SN17074617 etc., 1990-1996 (CGE, det. PDS), suckering strongly alongside the footpath and on the steep rocky wooded slope above the Teifi estuary. This wood contains both native trees such as *Sorbus torminalis* and planted ones such as *Aesculus hippocastanum* and *Tilia ×europaea*. As *U. longidens* grows here with *U. longicaudata*, and as both species are known outside Cardiganshire only from East Anglia, some connection with that area may perhaps be assumed. There is another collection of *U. longidens*, from a tree 8m tall at the edge of a mixed copse 400m W of Hendreforant, Ciliau Aeron SN487582, 1996 (CGE, det. P. D. Sell).

***Ulmus longicaudata*** J. V. Armstrong & P. D. Sell ined.

Growing near *U. longidens* in Netpool Wood SN17094617, 1996 (CGE, det. PDS) and not collected elsewhere in the county. Otherwise it is known only from scattered sites in East Anglia.

***Ulmus prominentidens*** J. V. Armstrong & P. D. Sell ined.

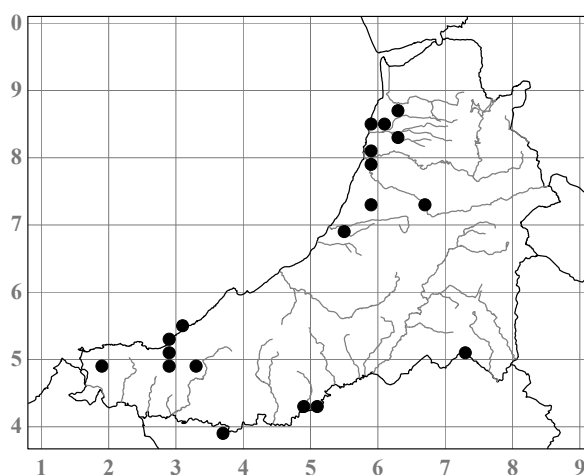
A suckering, obviously planted tree in a copse on the N bank of the Camddwr W of the road bridge 700m N of Pontargamddwr SN66996556, 1995 (CGE, det. PDS with the comment “This is a very close match but all other material comes from East Anglia”).

***Ulmus proceriformis*** J. V. Armstrong & P. D. Sell ined.

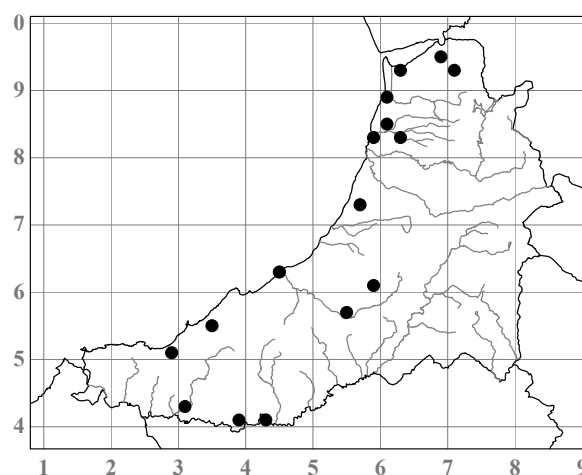
Collected from several places around the Teifi estuary where it survives only as abundant sucker growths, having been one of the first species to succumb to Elm disease, and where it may possibly be native or an archaeophyte. It grows along the wooded and scrub slope above the salt marsh S from Nantyferwig SN14T, 1990 (CGE, det. JVA & PDS), and in most of the hedges along the W edge of the Teifi Marshes SN14X, 1991 (CGE, det. JVA & PDS) - 2007. The only other collection is from the NE corner of the estate woodland at Aber-mydr, 350m W of Llanerchaeron SN47586033, 1990 (CGE, det. JVA & PDS) where sucker growth has extended from a dead stump, probably originally planted.

***Ulmus occidentalis*** J. V. Armstrong & P. D. Sell ined.

This predominantly Cornish species is widespread in the county, growing from suckers; old trees have not been seen. The 21 collections are from hedges, copses, estate woodland and a railway embankment, but also in several places on streamsides and in wooded dingles where it may be native or archaeophyte, for example in the wooded dingle E of Penbryn church SN294519-298523, 1995 (CGE, det. PDS) and by the Nant y Ferwig 500m SW of Ferwig church SN180491, 1995 (CGE, det. PDS).



*Ulmus occidentalis*



*Ulmus gyrophylla*

***Ulmus gyrophylla*** J. V. Armstrong & P. D. Sell ined.

Apart from 17 collections from Cardiganshire, this species is only known from the E half of England. It seems unlikely to be native here, and has been collected throughout the county, from a streamside at the FC picnic site at Ystrad Einion SN707939 (CGE, det. JVA & PDS), where it grows with *U. hollandica*, to a laneside hedge at Abersylltyn, Cwm Cou SN310430, 1994 (CGE, det. JVA & PDS). All records are from sucker growth in hedges and estate woodland, apart from abundant suckers in Ash-dominated woodland by

the Nant Saith, 1km S of Tresaith SN281506, 1991 (CGE, det. JVA & PDS). Judging from the suckers along the N edge of Eglwys Fach churchyard SN685955, 1990 (CGE, det. JVA & PDS) the big Elms that formerly grew here were this species.

***Ulmus angustifrons*** J. V. Armstrong & P. D. Sell ined.

Otherwise known only as two trees at South Luffenham in Leicestershire, there are two trees matching these exactly in the wood E of the A487(T) on the Rhydyfelin hill SN59337929, 1995 (CGE, det. PDS); one was then 8m tall and overhanging the E side of the garden of “Pinewood”, while the other was 28cm girth and 7m tall, just off the NE corner of this garden. This is the greatest puzzle of the Elms of this small bit of woodland.

***Ulmus cuneiformis*** J. V. Armstrong & P. D. Sell ined.

There is a neat, erect planted tree 14m tall on the N verge of the A482 road 1.2km E of Ciliau Aeron church, 1991 (CGE, det. PDS) - 2008; it is otherwise known from scattered sites from Suffolk to Herefordshire.

***Ulmus chaterorum*** J. V. Armstrong & P. D. Sell ined.

Apart from a single tree at Llannon, known only from the c.1ha wood of trees of this species of all ages from perhaps a century or more old down to innumerable sucker growths in and around the Clogfryn dingle on the coast 1km SW of Aberaeron SN446621, 1990 (CGE, det. PDS) - 2008. The old trees are variably windblown,



*Ulmus chaterorum* wood on coast at Clogfryn, view N from SN44616213, January 2009



*Ulmus chaterorum* wood at Clogfryn, view W from SN446622, May 1996



some with prostrate or decumbent and rooting boughs, and are mostly on the NE bank of the stream. The tree 15m NW of the footbridge was 147cm girth in 1996 and 157cm in 2008; the one 10m NW of the footbridge was 232cm girth in 1996; the tree at the NE corner of the footbridge was 191cm girth in 1996 and 205cm in 2008; and the one 8m E of the footbridge was 145cm girth in 1996 and 187cm in 2008. The biggest tree, 6m SE of the footbridge, fallen across the stream but very much alive, was 257cm girth and 21m tall in 2008 (AOC & JPP). Although many of the sucker growths at the seaward edge have been killed by the salt winds, the colony does not seem to have suffered from Elm disease. The site seems a very unlikely place for Elms to have been planted and the wood looks natural, and the apparently almost unique presence here of a distinct species is unexplained.

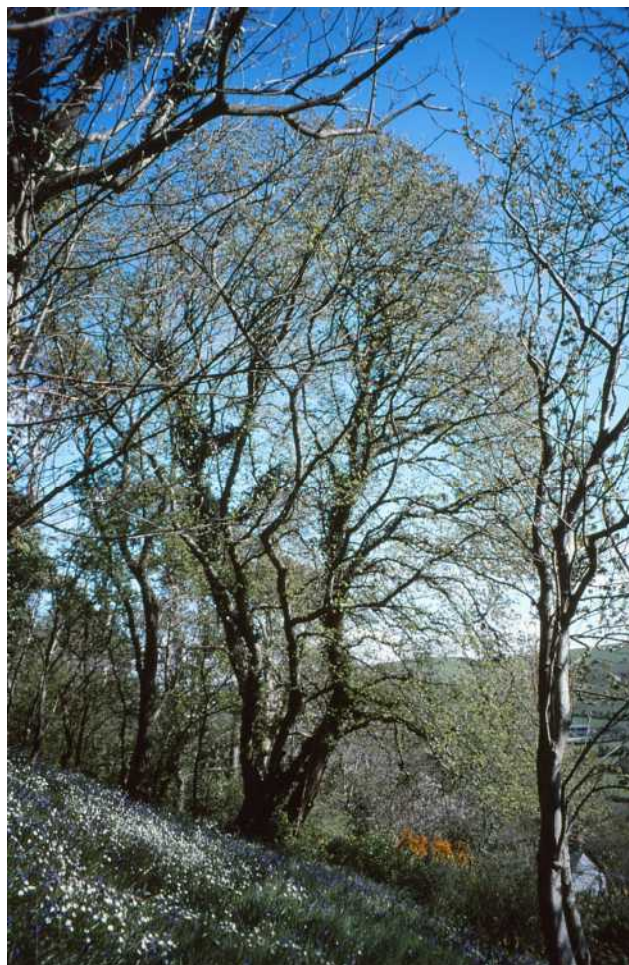
The tree at Llan-non was a big healthy one on the hedgebank above the lane up Cwm Peris, 300m SE of the main road bridge SN51896715 in 1991 (CGE, det. PDS), but it had died of Elm disease by 1995.

### ***Ulmus laevis* Pallas - European White-elm - Llwyfen Ewropeaidd**

Native from E France to the Caucasus, very rarely planted in Britain and largely resistant to Elm disease. There is a thriving colony 10 × 6m in the mostly obviously planted woodland E of the A487(T) road on the Rhydyfelin hill SN59327932, immediately above the garden of "Pinewood", with four trees and nine sucker shoots in 1995 (NMW) - 2008. Two of the trees were 87 and 80cm girth and 10m tall in 1996, and the other two had been cut and the stumps were sprouting; the suckers were 0.3-5m tall.



*Ulmus laevis*, Y Glog, Rhydyfelin, view SE from SN59327932, April 2009



*Ulmus laevis*, Y Glog, Rhydyfelin, view SE from SN59327932, May 1996

### ***Zelkova carpinifolia* (Pall.) K. Koch - Caucasian Elm**

Half a dozen trees of this native of SW Asia, introduced to Britain in 1760, were planted c.1992 near the S edge of Flat Covert (Coed Tamsin), Nanteos SN626784, 2001.

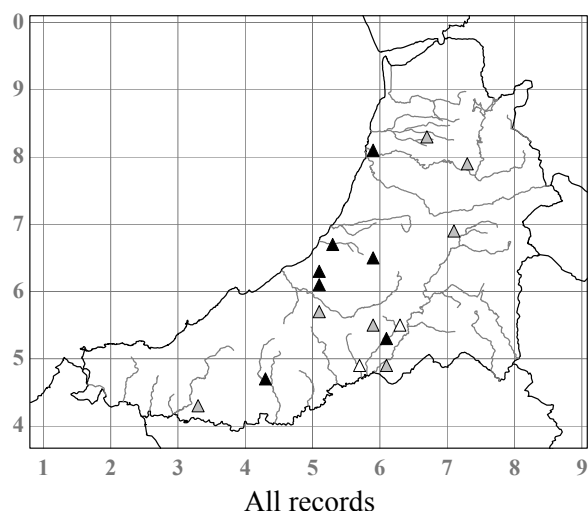
## **CANNABACEAE**

### ***Cannabis sativa* L. - Hemp - Cywarch**

#### **Subsp. *sativa***

Cultivated on a small scale for fibre in the past. Davies (1815) gives an account of a method peculiar to Cardiganshire for fermenting the inflorescences for two weeks to facilitate separating out the seed from female plants for repeat sowing: bundles of stems were buried upside-down, with straw around the tops of the bundles to keep out mould. Meyrick (1810) mentions the cultivation of Hemp at Llwyn near Llanddewi-Brefi SN654551. Wmffre (2004 p.1172) records the name Pwll-yr-hemp SN632915 on an 1847 map of Cors

Fochno, implying a pool where the crop would have been retted, but as he remarks, such a site on the raised bog seems quite improbable. Cultivation of *Cannabis* has been illegal in Britain since 1951, but in 1996 Monachty SN504620 became the first farm in Wales licensed to grow it again, and 25ha were successfully grown, the plants reaching 2.8m high in 3 months, and after retting the crop was taken to Essex for processing. The crop was repeated the following year, and casual plants were frequent around the farm. Salter (1935) mentions it as a frequent rubbish-tip casual, but it is uncertain which subspecies was involved, as is also the case with the only recent casual records, a 1962 field record at BRC from a roadside at Lampeter SN573489; and of a plant on the demolished Siloh Chapel site in Aberystwyth SN58628184 in 1995 (JPL).



Loading retted *Cannabis* crop,  
Monachty, SN505620, September 1995

#### Subsp. *indica* (Lam.) E. Small & Cronquist

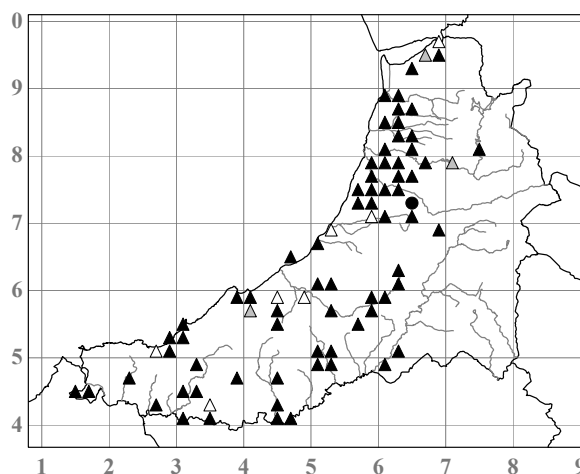
Grown illegally for the narcotic resin on a small scale for at least the last three decades, and the exploring botanist occasionally comes across small patches of plants in remote places, often at the boundary between two farms. It is unlikely that these are profitably harvested except in very long, hot summers. Court reports in the press are another source of records, and it has been grown in at least a dozen tetrads.

#### *Humulus lupulus* L. - Hop - Hopys

Widespread in the lowlands, almost always in roadside hedges and nowhere looking convincingly native in the sort of damp woodland which is supposed to be its natural habitat. In the few sites where it does grow in scrub and woodland, as at Llanina SN405597, 1982, and by the Ystwyth below Pont Pen-y-banc SN618757, 1990-2004, it is near houses or could well have derived from throw-outs. Salter however (1935) said "in some cases native, but, no doubt, in many instances planted", and Morgan (1848) had said "Growing in hedges wild." It is not practicable, using morphological characters, to separate old cultivars, such as those brought into Britain by Flemish planters in the 16<sup>th</sup> century and that might have been planted here, from wild plants.

Widely used for local tavern and home brewing in the past, it is probable that most of the plants and colonies derive from small-scale hedgerow plantings for this purpose. The only report of larger-scale cultivation is in Davies (1815), who said that "About ten years back, a few small hop-yards were planted in the valley of Aeron, in Cardiganshire."

Male plants are very rare, and this is perhaps further evidence that the species is not native, unless they were deliberately extirpated. Salter (1935) knew them in only three sites, "near Glandyfi and Eglwys Fach" c.SN69X, Y (Diary 14.9.1905), where they have not been recorded since; at Parchrydderch SN599588, where they still grow in the roadside hedge and on the streambank, 2004 (NMW); and on the Cardiganshire side of the Teifi near Llanfihangel-ar-arth SN455403, where they still grow in the roadside hedge, 2000 (GH) as well as in the roadside hedge and scrub at Pantyreithinen SN447422, 2km to the NNW, 2001 (NMW, AOC & GH). They have not been found elsewhere.



## MORACEAE

**Ficus carica** L. - Fig - Ffigysbren

There is a tree planted *c.*2001 in the roadside hedge at the W end of the Glanyrafon industrial estate SN60638002, 2008. Anciently introduced to Britain and native of SW Asia.

**Morus nigra** L. - Black Mulberry - Morwydden

A number of the country houses in the county have picturesque planted Mulberry trees, including a broken tree in a paddock at Glandyfi castle SN693967, 158cm girth (at 75cm up) and 4m tall in 1994 (AOC & WMC), 163cm girth and 4m tall in 2005 (AOC & PSC); two fine trees at Nantceirio, Llanbadarn Fawr SN614808, 191cm girth (at the base), and 153cm girth (at 50cm up), in 1993; and two very contorted, almost prostrate trees on a mound in the shrubbery at Nanteos SN621785, 133cm girth and 80cm girth in 1991, a third having blown down and been recently replaced. Maximum a huge tree in the walled garden at Plas Llanina SN404597, 193cm girth (at 80cm up) and 7m tall in 1994 (AOC, SPC & ADH), with a spread of 11 × 9m. These trees are probably all much younger than their appearance suggests (Mitchell 1996). Salter mentioned a “Mulberry tree with fruit” in 1895 and a “big old Mulberry” in 1907 at Nanteos (Diary 11.1.1895 and 1.9.1907), but not a group of three, so the present trees there are probably not the same. No seedlings have been found in the county. Probably native of W Asia and grown in Britain since at least the 16<sup>th</sup> century.

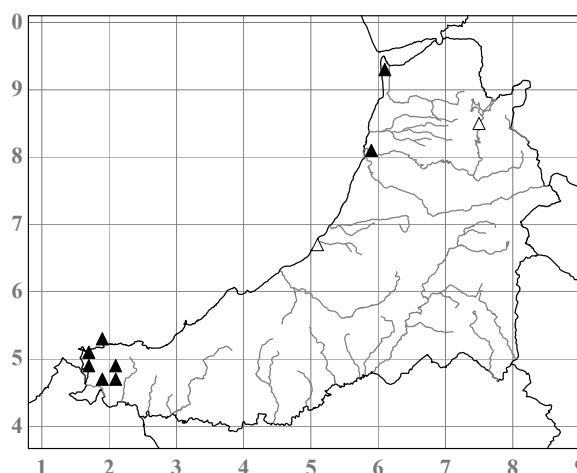
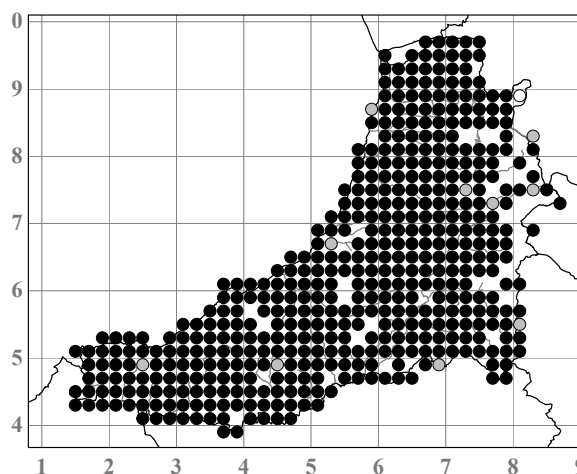
## URTICACEAE

**Urtica dioica** L. - Common Nettle - Danhadlen Boeth (Dail Poethion, Dyned, Dinad)

A very common plant of nutrient-rich habitats in a wide range of situations. Nettles in the county are usually synanthropic and are especially characteristic of disturbed sites with nitrogen and phosphorus enrichment and with mortar-rich rubble providing a well-aerated substrate for the rhizomes. They are common around farms, lead mines, old cottage sites and ruins, as well as on roadside verges, hedgebanks, under bird roosts, in Bramble patches etc. They are often abundant in silage and Maize fields that have been fertilised with slurry. In the uplands they are usually confined to ruins and sheep shelters, and can persist for many decades after sites have been deserted. Plants with both male and female flowers have occasionally been seen. Nettles are fairly salt-tolerant and in a few places occur at the back of shingle beaches. They often occur in wet woodland where they can occasionally be dominant in Alder and *Salix* carr, usually as a tall, narrow-leaved, weakly stinging variant with the lowest flowers sometimes as high as at the 15<sup>th</sup> - 20<sup>th</sup> node; such plants occur for example in the Llyfnant valley SN715974, 2006 (NMW) and on Aber-arth Common SN478621, 1992 (NMW), but they do not entirely agree with *U. galeopsifolia* Wierzb. ex Opiz and their identity is uncertain. Altitude limit 535m, base of cliffs, Craig y March, Pumlumon SN806881, 1904 (Salter Diary 8.6.1904, 1935); 540m, Pumlumon lead mine ruins SN795857, 2002.

**Urtica urens** L. - Small Nettle - Danhadlen Fach

A rare archaeophyte in the county, probably persistent only in the sandy arable fields around Gwbirt and Penyrergyd SN14U and 15Q, 1941 (Whellan 1942) - 2005 (NMW) where it is var. **parvifolia** Druce. Elsewhere it is a casual, often and perhaps always var. **urens**, on manure heaps and around



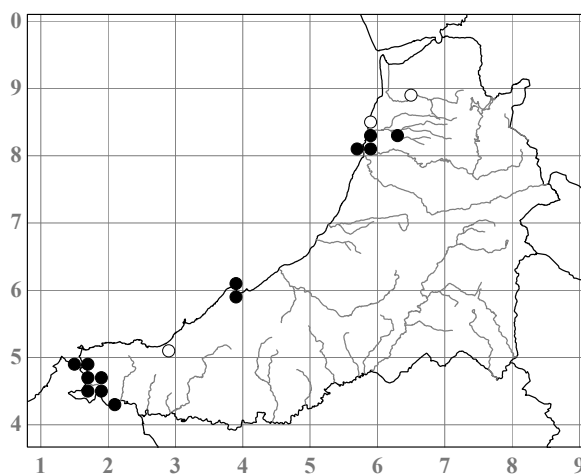
*Urtica urens*



stock feeding sites, in gardens and arable fields, on tips and disturbed ground, and rarely recurring. The earliest record is of var. *parvifolia* from Aberaeron SN46 in 1838 (**BIRM**, MMA, det. AOC). Altitude limit (the species) 355m, manure heap, Henhafod, Pumlumon SN758848, 1893 (Burkill & Willis 1894).

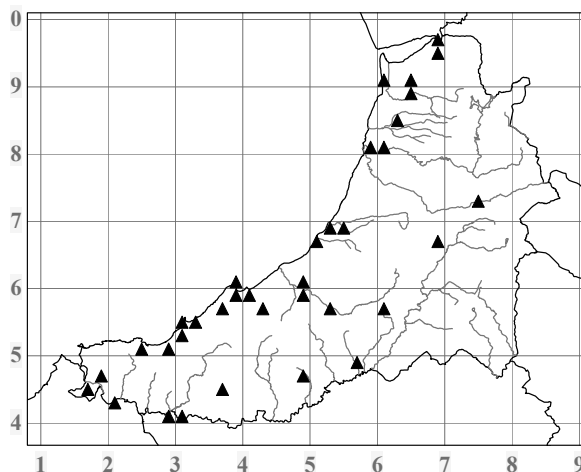
### ***Parietaria judaica* L. - Pellitory-of-the-wall - Paladr y Wal**

A rare but locally abundant species in the county, occurring only in a few places along the coast. Its stronghold is alongside the Teifi estuary where Salter first recorded it in 1894 (Diary 28.6.1894). It grows on the eroding slopes of the Penyrergyd dunes there SN164485, 1991-2005, and nearby on the shingle spit; on cliffs and old walls at Netpool SN173461, 1991-2003; and on old walls all over Cardigan town including the castle and St Mary's church SN14S, T, X, Y, 1904 (Salter Diary 18.6.1904) - 2005. In 1907 and 1929 Salter (Diary 15.8.1907, 21.9.1929) recorded it on Llechryd bridge SN218436 further up the river, where it was again seen in 2006. Salter also knew it on a laneside hedgebank at Staylittle SN6489 in the N of the county from 1925-1928 (Diary 30.10.1925, 17.11.1928); and at Dyffryn Bern, Tresaith SN287511 (1935), from which general area there was a field record in 1936 (WRR & WWB). Chippindale & Milton (1934) surprisingly grew a plant from buried seed in grassland at Rhoscellan Fawr, Wallog SN597855 in c.1930. In 1906 it was reported to Salter from New Quay c.SN35Z (Diary 24.6.1906) and it remains abundant on walls in several places there, 2005. In 1991 one plant was noticed as a pavement weed in Queens Square, Aberystwyth SN58508190, and it has since increased considerably and spread N to Cliff Terrace SN585825, 1993-2005, S to Park Avenue SN58458150, 1995 (JV), E to Poplar Row SN58708175, 2005, and W to the castle walls SN579815, 1998 (SPC) and around Trefechan Bridge SN58358135, 2008. Its only other site is on old walls around Plas Gogerddan SN629836, 1991 (SPC) - 2005.



### ***Soleirolia soleirolii* (Req.) Dandy (*Helxine soleirolii* Req.) - Mind-your-own-business - Mam Miloedd**

This native of the W Mediterranean was first recorded in 1936 as an escape at Llan-non SN56D (Wade 1952), but not again until 1974 when it was found abundantly naturalised on walls by the stream at Pont y Pump, Llangranog SN316540 (**NMW**). Since then it has been found at c.40 other sites, mostly in towns and villages along the bases of damp, shaded walls, on pathsides, in alleys and in pavement cracks, usually near the coast. Away from settlements it is occasionally found at wall-bases in chapel yards and farmyards. Its furthest inland records have been from Hafod, where it was seen along the base of the wall in the long-disused walled garden SN757730 in 1987, and on the gravel drive by the old mansion site SN75907328 in 2005.

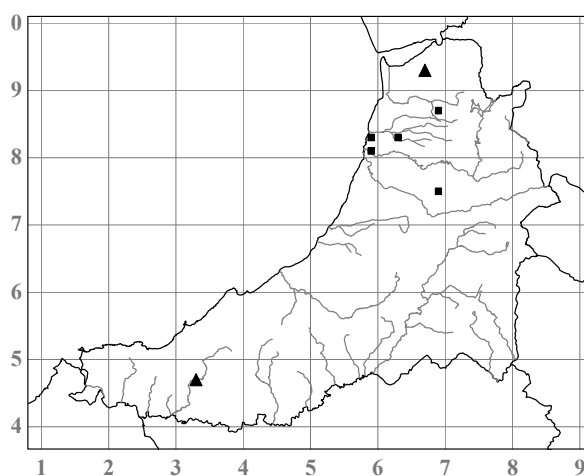


## **NOTHOFAGACEAE**

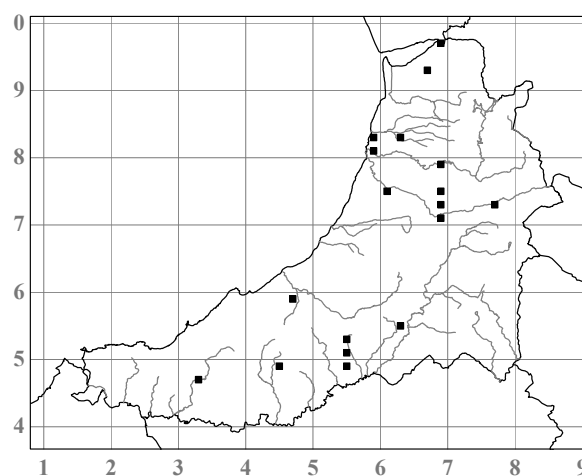
### ***Nothofagus obliqua* (Mirb.) Blume - Roble - Ffawyddden Ddeheuol Roble**

Much less often planted than *N. alpina*, but regularly fruiting and regenerating at Lodge Park SN663931. Here a 2 acre trial plot was planted in 1956, adjacent to the one of *N. alpina*, and although the trees were more slender, 53-79cm girth and c.18m tall in 1992, saplings were abundant and in 2003 many were 1.5m tall (**NMW**); there has been no sign of the hybrid *N. ×dodecaphleps* Mike L. Grant & E. J. Clement. The only other significant plantation seen is a c.½ acre one, mixed with *N. alpina*, in Allt Lwyd, Cwm Newyddion SN689747, where the largest trees were 86cm girth and 12m tall in 1992. In scrub woodland above Penbont-

bren, Brithdir SN33804718 a few trees planted c.1985 set fruit and there are several saplings 3-5 years old, 2008 (AOC & GP). There is a young but conspicuous tree, 67cm girth and 15m tall in 1993, 120cm girth and 17m tall in 2004, overhanging Waun Fawr Road from the University campus, Aberystwyth SN59998211. Native of S South America, but extending further N than the other *Nothofagus* species, and introduced to Britain in 1902. Maximum 174cm girth, 20m tall, 1992, one of a dozen trees in the FC Arboretum, Gogerddan SN630832.



*Nothofagus obliqua*



*Nothofagus alpina*

***Nothofagus alpina*** (Poepp. & Endl.) Oerst. (*N. nervosa* (Phil.) Krasser, *N. procera* Oerst.) - Rauli - Ffawyddden Ddeheuol Rauli

Planted on a small scale for timber by the FC since the 1950s in a few places, and for ornament both by the FC and in a few estate woodlands and elsewhere. It rarely fruits and does not regenerate in the county. Trees in a 2 acre trial plot at Lodge Park SN663931, planted by the FC in 1956, were 52-123cm girth and c.18m tall in 1992, and do not fruit (NMW). Other plantations, mostly FC, include one of scattered trees over c.2 acres by the Nant yr Aber, Aber-ffrwd SN690786, 1993; a plantation mixed with *N. obliqua* in Allt Lwyd, Cwm Newyddion SN689747, where the largest trees were 96cm girth and 13m tall in 1992; several acres of trees 700m E of Llanafan SN693723, planted in 1988 and 1-4m tall in 1993; a small plantation in poor condition in Pen-y-bont Wood, 2km S of Llanafan SN686704, planted in 1986; mixed in shelter belts between Pont Creuddyn and Nanthenfoel SN550524-546519, 2008; and a plantation in Cockshead Wood SN628553, 1992. The only fruiting trees seen were a few in 1995, 137cm girth etc., at the edge of woodland above Glandyfi SN696969 (NMW). Native of S South America and introduced to Britain in 1910. Maximum a fine tree planted in 1962 (Fox 1981), 240cm girth and 23m tall in 1995, 291cm girth and 25m tall in 2004, in the Penglais dingle by the University Botany Gardens, Aberystwyth SN593820.

***Nothofagus betuloides*** (Mirb.) Blume - (Guindo)

Three planted trees on the University campus, Penglais, Aberystwyth SN597815, were 4m tall in 1995 and 10m in 2007. Native of S South America and introduced to Britain c.1830.

***Nothofagus dombeyi*** (Mirb.) Blume - Dombey's Beech

A fine tree planted in 1961 by the drive to Plas Penglais, Aberystwyth SN59548210, was 295cm girth and 19m tall in 2004 (NMW). Native of S South America and introduced to Britain in 1916.

***Nothofagus pumilio*** (Poepp. & Endl.) Krasser - (Lenga)

A planted tree on the University campus, Penglais, Aberystwyth SN59878168, was 58cm girth (at 50cm up) and 7m tall in 2006 (NMW). Native of S South America and introduced to Britain c.1960.

## FAGACEAE

***Fagus moesiaca*** (K. Malý) Czeaczott

There is a coppiced tree in the shrubbery at Llanerchaeron SN479601, 2004 (NMW, det. PDS). A tree in the grounds of Ty-glyn, Ciliau Aeron SN49805989, 430cm girth and 28m tall in 2001 (NMW), appears to be the same rather ill-defined species intermediate between *F. orientalis* and *F. sylvatica*. Native of SE Europe.



*Fagus orientalis* (orange) and *F. sylvatica* (green),  
Devil's Bridge, view E from SN74447723,  
14 October 2003

#### ***Fagus orientalis* Lipsky - (Oriental Beech)**

There are two mature trees planted at the roadside edge of a copse by the entrance to the Woodlands caravan park at Devil's Bridge SN74447723 (NMW, det. PDS), the larger, northerly tree being 183cm girth and 25m tall in 2001. They are especially conspicuous in autumn as the leaves, which are up to  $13 \times 8$ cm, turn colour earlier than those of the adjacent *F. sylvatica* and become a vivid orange-brown. Native of SE Europe and SW Asia, introduced to Britain in 1904.

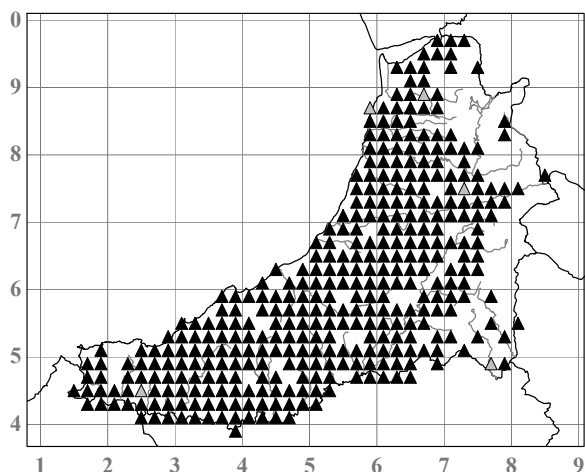


#### ***Fagus sylvatica* L. - Beech - Ffawyddden**

Widely planted in woodlands, hedges and as specimen trees in parks and gardens, and frequently regenerating from seed. In upland areas, especially around the Mynydd Bach and the land to the east, and east of Tregaron and Lampeter, it was common practice to plant mixed Hawthorn and Beech hedges, the former for stock-proofing, the latter for shelter. Such hedges, planted with “tair draenen wen a ffawyddden” a century and more ago at Llain SN655604 were vividly described by Kitchener Davies in his poem “Sŵn y gwynt sy'n chwythu” (Chater 1985). Pure Beech clipped hedges are also often seen especially alongside roads, as by the Sarn Helen stretch of the A485.

The best areas of Beech woodland and the finest trees are on the Hafod estate, where Thomas Johnes planted vast numbers in the 1790s and 1800s, including 30,000 in 1806-1807 alone (Linnard 1979). There are good stands of these trees, mostly 200-350cm girth in 1992, by The Arch SN768758 at 380m altitude (where





there are *c.*60 trees) and SN763758 (where there are *c.*100 trees), and numerous stands remaining among the conifer plantations in the Ystwyth valley opposite the Hafod mansion site *c.*SN77R. The two biggest trees at Hafod are one on Middle Hill SN76097310, 653cm girth and 23m tall in 1991, 714cm girth and 23m tall in 2005, perhaps anciently pollarded at 2.5m up, but falling apart in 2007 and looking as though it may have been bunch-planted; and a spectacular tree in Allt Dihanog, Hafod SN75997273, 827cm girth (at 75cm up) and 21m tall in 1993, with a spread of 37m, which was at that time said to be the biggest in Britain (Little 1993), but appears definitely to have been bunch-planted; both trees are accompanied by others of girths within the normal Hafod range.



Hedge of standard and clipped  
*Fagus sylvatica*, A458, Blaenpennal,  
view NW, December 1977



Bunch-planted Beech (827cm girth in 1993), with Matt Sutton,  
Allt Dihanog, Hafod, view SE from SN760727, January 2006

*Fagus sylvatica*, with Margaret Chater, Henllan,  
view NE from SN359403, April 1976

Among many other estates with fine Beeches are Glandyfi Castle SN693967, where the largest normal tree was 493cm girth and 24m tall in 1994 (AOC & WMC), and where another bunch-planted one was 661cm girth (at 70cm up) in 2005 (AOC & PSC); Nanteos SN67E, J; Trawsgoed SN67R, where the largest, SE of the mansion SN67127398, was 425cm girth in 1994; Ty-glyn, Ciliau Aeron SN498598, where the largest was 458cm girth in 2001; Llanerchaeron SN479602, where the largest was 324cm girth in 1991, and where a felled tree 288cm girth had 192 annual rings in 1991; Abermeurig SN565564, where the trees were 400-450cm girth in 1980; Alltyrodyn SN450441, where the largest was 431cm girth and 24m tall in 1993; and there are many fine trees by the Teifi just above Henllan Bridge SN360403, where the largest was 402cm girth in 1976. A fine tree on the Rectory lawn at Betws Bledrws SN59675200 was 525cm girth and 22m tall in 2008. A remarkable tree by the Rhysgog lead mine, 2km ESE of Llanddewi-Brefi SN68025380, at 340m altitude, was 505cm girth in 2008; it appears to have been anciently pollarded and was possibly bunch-





1899 inscription on Beech  
in Llandre churchyard  
SN623869, April 2006

planted, although this seems unlikely at such a site; the mine was worked at least as far back as 1770. Recent plantations, including some by the FC, are frequent, but have usually remained unthinned and neglected.

Beech is considered to be native now in Wales only in the SE, but prehistoric records of pollen have been made from several sites in the county in the Sub-Boreal (VIIb) and Sub-Atlantic (VIII) periods, i.e. from c.3,000BP onwards (Godwin 1975). The only place-name with “ffawyddden” in the county seems to have been at Llandyfriog c.SN34F, as “Dole y ffouthen” in 1721 and “Dol y ffowythen” in 1722 in the Cilgwyn mss (Melville Richards archive, Bangor University); the ascription of “Bryn Ffawyddden” to Eglwys Fach by Linnard (1979), who comments that these far-flung names may either be indications of the more extensive ancient distribution of Beech, or more likely of 18<sup>th</sup> century plantings, was an error for Eglwys Bach in Denbighshire. Rackham (2003) gives a summary of views on the nativeness of Beech in various parts of England and Wales.

Exceptionally good mast years in the county have included 1922 (Salter Diary 18.8.1922), 1990 and 2004 (when the fallen male flower-heads formed huge drifts). Maximum 660cm girth (at 1.5m up from original ground level), 1996 (AOC & CDPa), Nanteos, by the

old drive NW of the mansion SN61917864; 384cm girth, 31m tall, 2005, Coed Penglanowain, Nanteos SN61277855. Altitude limit (planted and self-sown) 380m, The Arch SN768758, 2004.

‘**Asplenifolia**’ (‘Heterophylla’): two trees were measured at Trawsgoed by Mitchell (1969). One at SN66977295, 190cm girth and 18m tall in 1969, was 190cm girth and 18m tall when re-measured in 1994 (AOC & CDPa). The other, nearby, was 147cm girth and 17m tall in 1969, but was not re-found in 1994. A third tree, in the field E of the S drive SN67257290, was 260cm girth and 13m tall in 1994 (AOC & CDPa).

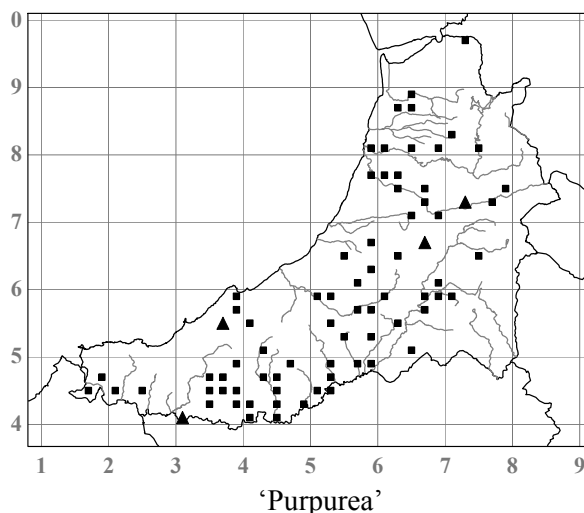
‘**Dawyck**’: there is a row of six trees c.6m tall at E end of University Botany Gardens, Aberystwyth SN596821, 1993; and a row of eight trees 4-5m tall in Bryndomen garden, SW of Tregaron SN660580, 1992.

‘**Pendula**’ (Weeping Beech): a “very fine” tree measured by Mitchell (1969) as 203cm girth and 26m tall, at the end of the avenue at Trawsgoed SN66907293, was 270cm girth in 2008. Of three other trees here, one NW of the tennis court SN66997299 was 305cm girth and 17m tall in 1994. A tree in the wood 200m ENE of Highmead SN50314322 was 277cm girth (at 1m up) and 16m tall in 1997, and a tree planted just N of the house at Old Cilgwyn SN316418 was 7m tall in 2003.

‘**Purpurea**’ (Copper Beech): frequently planted for ornament in estates, gardens, roadsides, hedges and woodlands, and occasionally self-sown. There are many fine trees at Trawsgoed SN67R, and Copper Beeches sometimes form a conspicuous element in the wider landscape, as along the W edge of Black Covert, Trawsgoed SN667727, 2004, where the FC has planted them alternately with green Beeches, and around Rhydowen SN443457, 1999, where many are planted along field hedges. A tree 285cm girth outside the SW corner of the walled garden at Nanteos SN62087860, 1995 (RL & CDPa), was probably one of two ordered from John Miller of



Beech avenue 1.5km E of Alltyrodyn,  
view E from SN464444, April 2002



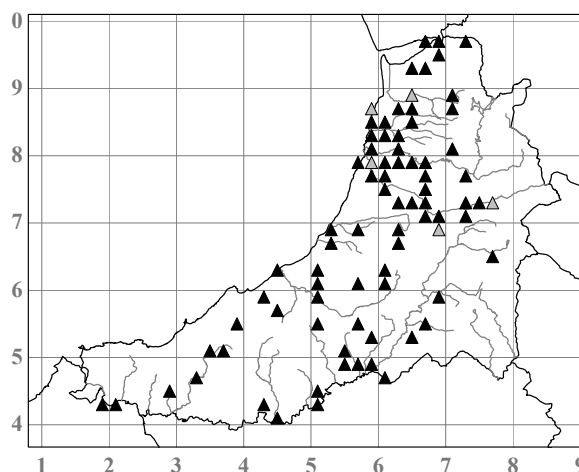
Beeches with rookery in Betws  
Ifan churchyard, view E from  
SN301476, March 2002

Bristol in 1832. A tree in Coed Maenarthur SN722721, 2006 (SPC) had normal green leaves except for a single lower branch with purple-bronze leaves. Maximum 466cm girth (at ground level), 2003, in estate woodland by the former lake 100m S of Blaenpant SN25404426. Altitude limit (planted) 300m, Cefnyresgair-fawr SN706581, 1993.

Var. **rotundifolia** Cripps: trees with very small-leaves are occasionally seen, as along the lane to Cwm Cottage, Plas Cwmcynfelin SN60658300, 2004 (NMW, det. PDS); though the leaves are only 2-4cm long, they do not have the rounded tips of the ornamental ‘Rotundifolia’.

#### **Castanea sativa** Mill. - Sweet Chestnut - Castanwydden Bêr

A widely planted archaeophyte in woodlands, and as single trees in hedges and fields, especially on the old estates. Salter observed that it often fails to ripen its fruit, and this is still the case, but in spite of this it is frequently self-sown and abundant saplings can be found in many places. The map does not distinguish self-sown from planted trees. Unusually prolific flowering occurs in some years, as in 1983 when throughout the county trees were noticeable in woodlands where they had been overlooked before, and parts of Cwm Woods SN618836 etc. were white with the blossom. Areas of former Chestnut coppice can be seen in woods especially in the N of the county, for example in Coed Wallog SN595859, 2003, and Coed Rhyd-tir SN616835, 2003. There



are more recent plantings for timber in FC woodlands particularly in the Ystwyth valley, and it is often planted for amenity along the edges of FC conifer plantations. Native of S Europe and perhaps originally introduced to Britain by the Romans.

Among the fine trees over 500cm in girth are ones at Gogerddan SN628838, 585cm girth, 2003, severely pruned in 2005; at Mabws SN565685, 541cm girth, 1991; a rotting stump at Nanteos SN61807855, c.650cm girth, 1996, with a living trunk at one side (AOC & CDPa); a huge, unmeasurable broken stump at Lodge Park SN66289361, 1996; and a tree at Highmead SN503431, 591cm girth at 1m up, 1997 (AOC & JPW). Another tree at



*Castanea sativa*, Dolgwibedyn, view  
N from SN681714, August 1967



E. H. Chater with *Castanea sativa*,  
Dolgwibedyn, view SE from  
SN681715, August 1967

Gogerddan SN628838 when felled in 2005 was 330cm girth and had c.210 annual rings. Maximum 692cm girth in 1967, and 654cm girth in 2004, in a field W of Dolgwibedyn, Llanafan SN681715; this spectacular stag-headed tree has for at least the last 40 years had only a few living branches but nevertheless often bears abundant good fruit; it is gradually falling to pieces and decreasing in girth.

### ***Quercus suber* L. - Cork Oak**

A fine tree labelled "Llwyndyris wishing cork tree" on the lawn in front of Llwyndurys mansion SN239433 was 260cm girth and 10m tall in 1994 (NMW). A photo of it, looking much as it did in the 1990s, is in Lynn-Thomas (1932), along with the statement, perhaps as fanciful as much else in this strange book: "When seeking information about this giant cork tree, Major J. H. Sandham Griffith, the late owner, informed me that the assumption was that it was planted as a sapling from Spain by his great-great-uncle, who served in the Peninsular War as surgeon, and returned home just before the Battle of Waterloo [1815]". A tree by the drive to Plas Penglais by the University Botany Gardens, Aberystwyth SN59558210, planted in 1961, was 205cm girth (at 50cm up) in 2002. Native of the Mediterranean and introduced to Britain in 1699.

***Quercus × crenata* Lam. (*Q. cerris* × *suber*; *Q. × hispanica* Lam., *Q. × pseudosuber* Santi) - Lucombe Oak - Derwen Lucombe**

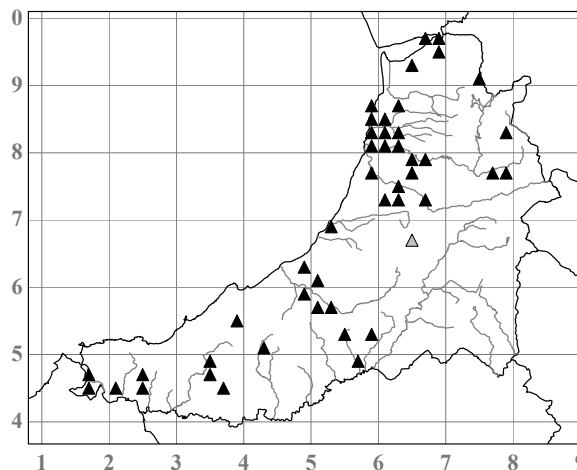
Most of the trees of the Lucombe Oak grown in Britain derive from a cross raised in 1762 at Exeter, and a confusing variety of clones exist. Only four trees, all on the Trawsgoed estate, have been noted in the county, and, although they are conspicuous as the leaves last through much of the winter, others have probably been overlooked. Three are by the entrance to Birchgrove SN66627302, and were 425cm, 273cm and 189cm girth in 1991 (NMW, conf. AJC who wrote that the largest tree "does tend a little towards 'Diversifolia' but that has much more variable leaves. The 3 trees could all be seedlings"). A tree nearby on the N side of Ty-gwyn farmyard SN67357270, 309cm girth (at 50cm up) and 13m tall in 1994, is similar in slightly approaching 'Diversifolia'.



*Quercus suber*, Llwyndurys, view N  
from SN239433, September 1994

### ***Quercus cerris* L. - Turkey Oak - Derwen Twrci**

Introduced into Britain from S Europe in 1735, Turkey Oak has been widely planted in the county and is commonly self-sown. The map does not differentiate between these records. Although of little value for timber, and not apparently used here for tan-bark, it was a major constituent of the 19<sup>th</sup> century plantations on the Cwmcynfelin and Wallog estates SN58W, X, 68B, C, and is dominant, or co-dominant with Sweet Chestnut and other species, in Coed Porthangel SN610845, Coed Wallog SN596860 and other woods nearby, 2004. Although the FC has mostly planted it for ornament, for example by the Afon Lluestgota SN7491, 1992, and at Truman, 2km NE of The Arch SN778768, 1991 (NMW), there is a more extensive plantation of trees 100m W of Tyn-y-garth, Cwm Einion SN689946, 1991. There are fine individual trees on most of the estates, on lawns and in pastures as well as in woodland, and they are frequent elsewhere in woods and hedges, probably often self-sown since saplings are common. The most spectacular tree is in the grounds of Cardigan Castle SN17814595, 374cm girth in 2003 (NMW), its canopy 35m across with huge boughs sweeping down over the terraces.



Other outstanding trees include a fine one on the E side of the A487(T) road at Glandyfi Castle SN690964, 310cm girth and 24m tall in 1994 (AOC & WMC), 330cm girth and 24m tall in 2005 (NMW); a tree 470cm girth and 23m high in 1991, 484cm girth and 24m tall in 2003, on the Plas Cwmcynfelin lawn SN603834; a tree 394cm girth in 1993 at Nantceirio, Llanbadarn Fawr SN614808; a tree (No.0388) 370cm girth in 1994, the largest of several in the Trawsgoed grounds SN67107300 (another just N of the mansion here SN67097315, planted in 1948, was 158cm girth and 9m tall in 1994); and a tree 312cm girth in 1995 by the A482 road 750m SSE of Tan-yr-allt, Ciliau Aeron SN51565790. Maximum 509cm girth (at 1m up) and 20m tall in 1992, 543cm girth (at 1m up) and 22m tall in 2002, in a paddock 120m WSW of Monachty SN50326193, anciently pollarded at 2.5m up and with eleven huge boughs, the best of several magnificent Turkey Oaks in these grounds (four in a pasture 650m NW of the mansion SN499623 were 495cm, 403cm, 365cm and 353cm girth in 1992 (NMW)). Altitude limit (planted) 460m, FC roadside, Truman, The Arch SN778768, 2005.



*Quercus cerris*, Cardigan Castle, view NW from SN178459, July 2005



*Quercus cerris* 509cm girth, Monachty, view WNW from SN503619, May 2009

### [*Quercus coccinea* Münchh. - Scarlet Oak]

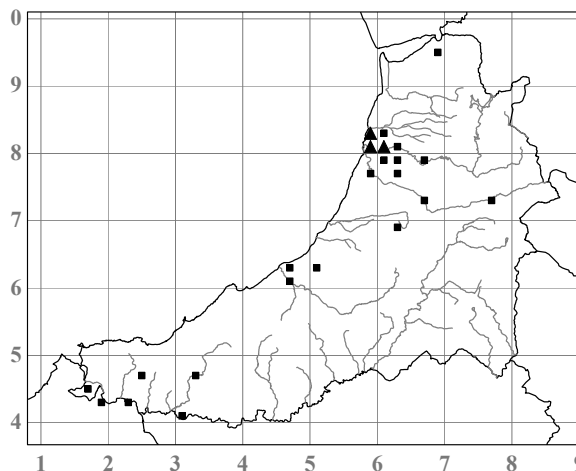
A tree was reported to have been planted by the Eglwys Fach parish hall in 1937 (Gordon 1939), in an area more recently incorporated in the Vicarage garden SN68689562, but the only similar tree there in 2005 was a *Q. rubra* 127cm girth.]

**Quercus palustris** Münchh. - Pin Oak

A tree planted by the Rock Mill bridge near Tregroes SN40484513 in 1938 to commemorate the centenary of the death of the Baptist preacher Christmas Evans (1766-1838) was 154cm girth and 12m tall in 2005 (NMW); a photo of the ceremony is in Anon. (1992). Christmas Evans was born nearby at Esgair-wen on Dyffryn-llynod farm. Native of E North America and introduced to Britain in 1800.

**Quercus ilex** L. - Evergreen Oak - Derwen Fythwyrdd

Native of S Europe and introduced to Britain in the 16<sup>th</sup> century, the Evergreen Oak has been planted on lawns, by drives and in woodlands on many of the estates, as well as in amenity areas in the towns and on the University campuses. Self-sown saplings are sometimes seen, and in a few places self-sown trees, as on the rocky slope 200m SSW of the National Library, Aberystwyth SN59308140, 1998. Most of the large trees are multi-trunked and tall ones are rare. The big, several-trunked tree just SE of the walled garden at Nanteos SN62237843, 1991, must be one of the oldest and was probably supplied by John Miller of Bristol in 1832 (Palmer 2001). Maximum 255cm girth, 21m tall, 1993, one of a row at Nantceirio, Llanbadarn Fawr SN614808; 255cm girth, 12m tall, 1994, 70m S of Llwynduris mansion SN23954324; 236cm girth, 23m tall, 2004, one of several tall trees by the cemetery on Plas Crug, Aberystwyth SN59088118.

**Quercus ×turneri** Willd. (*Q. ilex* × *robur*) - (Turner's Oak)

All specimens of Turner's Oak are said to be grafts derived ultimately from the original hybrid discovered c.1780 in Essex. The only one seen in the county is in the Aber-mad grounds 80m WNW of the mansion SN59977610, 167cm girth and 14m tall in 1996 (NMW, det. AJC), fused at the base with a *Q. petraea* 181cm girth and 17m tall, onto which it had presumably been grafted. As there is a twinned Sycamore/Ash pair of similar age nearby, the *Q. petraea* stock had probably been deliberately encouraged to grow on to produce this curiosity.

**Quercus ×carrisoana** A. Camus (*Q. canariensis* Willd. × *robur*)

Six trees (No. 116, named *Q. lusitanica*) planted in 1959 in the FC Arboretum, Gogerddan SN632833 (NMW) were determined as this hybrid by AJC in 1996; he considered that the great variation among them suggested that, if they were all from the same seed batch, the parent had itself been a hybrid which had backcrossed with *Q. robur*.

**Quercus petraea** (Matt.) Liebl. and **Q. robur** L.

Brief accounts of the two species and of their hybrid are given separately below, but, because of the frequent difficulty of deciding to which taxon any particular tree belongs, comments on Oaks and Oak woods in general, and details of individual trees, along with as accurate identifications as I can make, are given here first in a combined account. Hybridisation and introgression, as well as what is presumably the natural variation within the two species, make identification difficult; the level of hybridisation is usually considered to be about 10% in Ireland and Europe, and seems to be at least this in Cardiganshire. Useful accounts of the problem, including explanations of the various hybrid indices which can be used, include Potter (1994) who describes Dupouey & Badeau's method mentioned several times below, Wigston (1975), Rushton (1978) and Kelleher *et al.* (2004) and the papers cited therein. The extensive native Oak woods on the valley sides, most characteristic of the N part of the county, tend to be dominated by *Q. petraea*, while *Q. robur* is usually more abundant, though rarely dominant, in the perhaps more often planted woods in the lowlands. Rushton (1979) sampled a wood on the lower Teifi that he considered was pure *Q. petraea*, and two woods further NE in the county that he considered were of *Q. petraea* with intermediates indicating hybrids and backcrosses. The windblown Oak woods on the coastal cliff slopes, which would seem obviously native, contain mostly *Q. petraea*, but also hybrids and a small quantity of *Q. robur*, and the trees in them tend to have exceptionally large leaves.



Oak timber was extensively used in building and for many other purposes. Almost all the presumed native Oak woodland in the county has been coppiced in the past and the existing growth is rarely more than 50-100 years old. Much coppicing was done for pitwood during the lead mining era, and Linnard (2000) records a 1755 statement that at Llanbadarn Fawr “there are no quantities of large timber, the mine-works destroying them all, but oakwood of 20 or 30 years growth are sold at about 6d. a foot”; much was also used in the two World Wars for this purpose, and in 1919 Lord Lisburne of Trawsgoed was awarded a gold medal for the best contribution to pitwood supplies during the First World War, 1,119 of the 2,000 acres (452 out of 810ha) of woodland on his Trawsgoed estate, probably mostly Oak, having been cut for this purpose (Linnard 2000). Judging from ring counts, most of Coed Simdde-lwyd, Cwm Rheidol SN7178 was of coppice growth 50-53 years old in 1995 (AOC & JH); that in part of Cwm Cletwr, Tre'r-ddol SN666921 was 73-76 years old in 1997; and that in part of Coed Troed-y-rhiw, Goginan SN683818 was 54-57 years old in 1980. Coppiced Oak was also used widely for charcoal, and charcoal burners were still operating in Cwm Rheidol and perhaps elsewhere in the 1950s. Oak bark was widely used for tanning, and Linnard (1978, 2000) quotes an account of the method used in Cwm Ceri SN34B. Lewis (1969) shows the location of nine former tanneries in the county, including one at Hafod-las 2km S of Tregaron SN672574 only 3km N of a cluster of place-names involving *rhysgog* (bark), including Blaen Rhiscog dating from 1669 and Tir Rhysgog dating from 1688 (Wmffre 2004). Cellan parish, a few km SW of here, was said to have 20 tanners in 1696 and to be famous for them (Lhwyd 1911).

Vast numbers of Oaks were planted on the Hafod state c.SN77L, R, by Thomas Johnes, Malkin (1804) stating that 10,000 were planted between October 1797 and October 1798, and Moore-Colyer (1992) mentioning a 55 acre (22ha) block of upland sown with acorns, 56,000 oaks later “being set” in 1804, and 922,000 trees “raised between 1798 and 1805.” Davies (1815) wrote that “At Lodge Park [SN69R], the oak are among the finest in the county, fit for prime navy pieces, &c.”; some of these survive (see below). Salter in 1924 wrote that Allt Dderw, Gogerddan SN6383 was “by far the finest oak-wood in this neighbourhood” (Diary 15.6.1924), and in 1926 he wrote of Allt Hengeraint and the Llanerchaeron woods SN46Q, V, that “these grand oak woods” were “much the finest in the county” (Diary 28.4.1926); Allt Lan-las c.SN477605 alone remains of these, 2006, and most of the trees in this steep wood are maidens of *Q. petraea*, many of them 300cm or more in girth, 2005.

The maps do not differentiate between native and planted trees.

Outstandingly prolific years for acorns have included 1980, 1984 and 1995. Where there is no grazing, regeneration from seed can be prolific, and where there are clearings, for example those caused by windthrow or by conservationists as can perhaps best be seen in Coed Simdde Lwyd SN716786, the saplings readily grow into trees. Knopper Galls, in which the asexual generation of the wasp *Andricus quercuscalicis* develops, were first recorded in Britain in the 1950s, and in Cardiganshire in 1982 at Llanilar SN622748, and since then have become widespread but not common, always on *Q. robur* except for one record on *Q. ×rosacea*; the sexual generation is in inconspicuous galls on the male flowers of *Q. cerris*.

Annual rings have been counted in a number of felled trees (see Table in Appendix 2). Of nine in woodland, from 35 to 185 years old, the average increase in girth *per annum* was 1.8cm; of ten in the open, from 46 to 212 years old, it was 2.2cm.

Outstanding trees and selected woods (arranged west to east under each river catchment):

#### **Dyfi catchment**

A huge tree on the S boundary of the Glandyfi castle grounds SN69109633 was 645cm girth and 18m tall in 2008, but probably comprised three or four fused trunks. Several fine trees of *Q. robur* have survived along the boundary of the Lodge Park deer park, notably one by the lane to Hen-hafod SN66709393, 503cm girth in 1976 (NMW), 524cm girth and 24m tall in 2005; and another 75m S at SN66699388, 572cm girth and c.26m tall in 2005. Two trees of *Q. petraea* by the road at Tyn-y-garth, Cwm Einion SN690946 were 418cm girth, with an unusually clean trunk, and 435cm girth, branched at 3m up, in 1991.

#### **Clarach catchment**

Old trees of *Q. petraea* in the estate woodland N of Plas Gogerddan c.SN630838 were 370-425cm girth in 1991.

#### **Rheidol catchment**

The mostly rather stunted trees on the old quarries above North Road, Aberystwyth SN588821 are predominantly odd forms of *Q. robur*, with a few *Q. petraea* and hybrids; one semi-prostrate tree at SN58748214 has the characters of *Q. petraea* subsp. *broteroana* O. Schwarz described from N Portugal, with coriaceous leaves and acorns c.4cm long, 1995 (NMW), and several have the clustered and distorted leaves characteristic of *Q. robur* forma *cristata* (see below). These trees are not planted, and are difficult to explain. Nearby in the Penglais Woods SN592821 the sparse Oaks are mostly hybrids, with only a few pure *Q. petraea* and *Q. robur*, 2006.

There is a *Q. robur*, 452cm girth 1993, in the Nantceiro grounds SN614808. In the pastures on either side of the A4159 at Lovesgrove c.SN630814 the 46 trees, mostly *Q. petraea* and *Q. ×rosacea*, were 180-475cm girth and 20-23m tall in 1991. A fine tree of *Q. robur* on the N side of Troedrihlwba farmyard SN66417967 was 565cm girth (at 70cm up) in 1967, and 572cm girth (at 70cm up) in 1992, but blew down in 2004, and one in the pasture 80m N of here SN66417974 was 429cm girth in 1992. The largest trees in the fields between here and Glanrheidol were 445cm girth, at SN66087941, and 426cm girth, at SN66117951, in 1992 (AOC & APF). A picturesque *Q. ×rosacea* on the SE side of the A44(T), 100m S of the old school at Goginan SN68658100 (NMW), is known locally as “Y Goeden Sanctaidd [the sacred tree]” (E. Howells, *Y tincer* 303: 16 (2007)); its trunk would probably be 250-300cm girth if one ignored the huge swellings that surround it, 2007.

The extensive coppiced Oak woods of the Coed Rheidol complex consist largely of *Q. petraea*, but in many places there are individuals or groups of trees that show at least some characters of *Q. robur* and that must be hybrids, for example near the bottom of Coed Simdde-lwyd SN71487868, 1992, where of ten trees scored using the methods of Wigston (1975), three were *Q. petraea* and seven were intermediates.



Parkland Oaks at Nanteos, view NNE from SN620780, December 1991

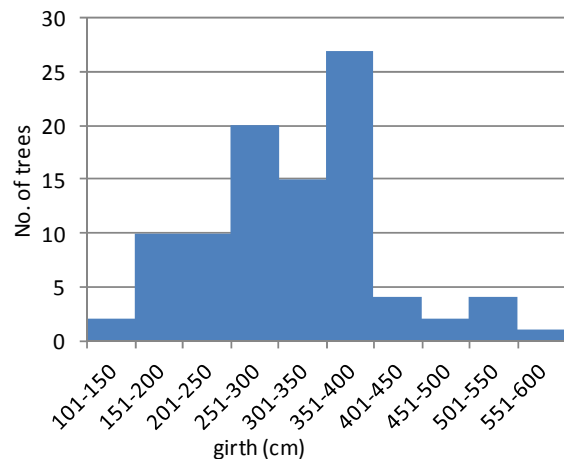
### Ystwyth catchment

At Nanteos there are nearly a hundred old trees, mostly probably *Q. petraea* but with at least some *Q. ×rosacea*, in the pastures opposite the mansion, ranging in girth from 127 to 568cm girth in 1991 (see graph). The largest, 568cm girth (at 3m up) in 1991, is at SN61647808. Two fallen, sawn up trees were 224cm girth, with 124 annual rings, and c.550cm girth, with c.220 annual rings, in 1991, suggesting that many date from the late 18<sup>th</sup> century.

Trawsgoed in 1946 had by far the biggest Oak recorded in the county (species not stated), 993cm girth (P. H. B. Gardner, Hyde 1977); this was perhaps in Waun Gwinau SN678728, now coniferised, where D. O. Baylis (pers. comm. 1992) remembered the biggest oaks being. There are however many huge oaks still on the estate, including the current biggest in the county, a *Q. petraea* on the E bank of the Ystwyth 100m W of Pont Hopcyns SN67157255, 610cm girth in 1978 (NMW), 635cm in 1992, 654cm in 2000, and 663cm girth and 22m tall, with a canopy spread of 35m, in 2004. There are several ancient trees on the roadsides around Dolfor and Dolgelynen nearby, and a tree of *Q. robur* at the SW edge of Black Covert SN66837241, blown

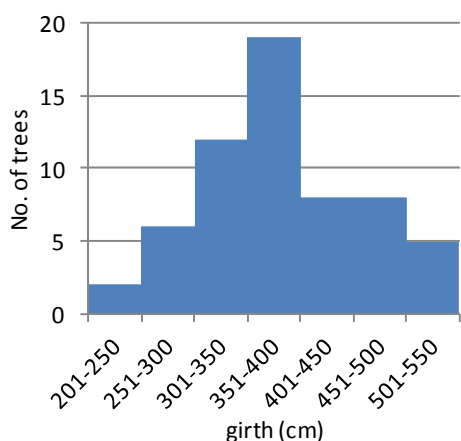


*Quercus robur* 565cm girth, Troedrihlwba, Capel Bangor, view N from SN66417967, December 1972



Distribution of girths of Nanteos oaks, 1991

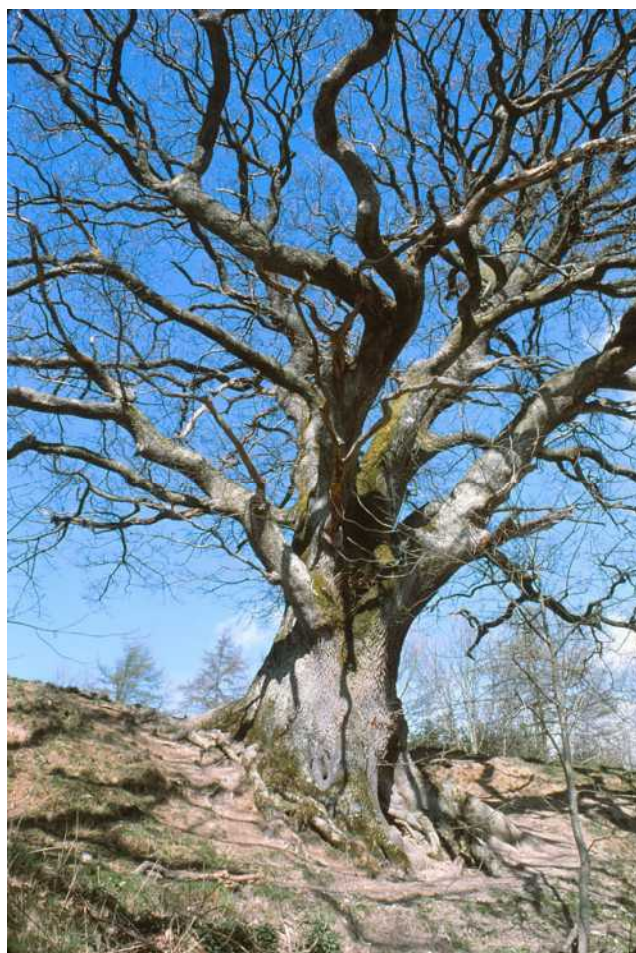




Distribution of girths  
of Trawsgoed oaks, 1992

down in 1990, was 610cm girth in 1980. A *Q. robur* in Abermagwr Wood SN668735 was 593cm girth in 1992. A fine group of c.20 *Q. robur* and *Q. petraea* on the wooded S bank of the Ystwyth 700m W of Pont Llanafan c.SN679713 had girths from 287 to 504cm in 1992 (NMW). In the pastures in front of the mansion SN6773 some 60 Oaks, mostly *Q. petraea*, ranged from 248 to 529cm girth in 1992 (see graph above).

One of the major features of the Trawsgoed grounds is an avenue SE of the mansion SN671730 of a dozen mixed *Q. petraea* and *Q. robur*, the largest (*Q. petraea*) 514cm girth and 20m tall in 1994, 520cm girth in 2008. A number of trees of *Q. robur* here have details of their planting recorded on plaques, including one planted by the 7<sup>th</sup> Earl of Lisburne in 1923 that was 167cm girth in 1994, one planted in 1913 by Alice Countess Amherst that was 108cm girth in 1994, and one planted by the Prince of Wales in 1923 that was 110cm girth in 1994.



Champion *Quercus petraea*, Trawsgoed,  
SN67157255, April 1978



Parkland Oaks, Nanteos, view WNW  
from SN62147797, October 2003

On the Hafod estate most of the larger *Q. petraea* trees were only 250-300cm girth in 1992. The several old trees of *Q. robur* in the pasture below the mansion site are unimpressive but of importance for lichens and invertebrates; a hollow, broken one at SN75727312 would have been c.425cm girth, if complete, in 1989. On the N side of Lan Fraith and in Coed Dolchenog SN776730-783734 the many fine, well-spaced trees were mostly 200-250cm girth in 2005 (AOC & PAS). Macve & Sclater (1996) reproduce several convincingly accurate drawings by Thomas Jones of Pencerrig done in 1786 of contorted and gnarled *Q. petraea* trees on the estate, detailed enough even to show what appears to be the lichen *Lobaria* on some of the trunks (SPC pers. comm.).

#### Wyre catchment

The biggest of several old trees on the Mabws estate is a *Q. petraea* 426cm girth in 1991, one of three 100m E of the Hall SN566685.

#### Arth catchment

There are many well-grown *Q. petraea* on wood banks and in pastures on the Monachty estate, one of the biggest being 396cm girth in 1992, in a pasture 650m WNW of the mansion SN499623.

#### Aeron catchment

Apart from Allt Lan-las (see above), probably the finest uncoppiced Oak wood in the county, the best trees on the Llanerchaeron estate are in the strip of





Pasture Oaks, Parc Pont-faen, view  
E from SN490593, March 1996

woodland S of the Aeron and E of the mansion SN48306023, where one *Q. petraea* was 478cm girth and 28m tall in 1995 (RPB; AOC), 495cm girth and 28m tall in 2005, and in the fields to the S of the mansion where another, 100m E of the pond SN48326008, was 442cm girth and 19m tall in 1995.

At Parc Pont-faen, Ciliau Aeron SN496591, 1992, 146 Oaks form an open wood on a pasture slope (all usefully numbered by the NT). The graph shows the girth range 141-608cm, and 19 trees scored using the methods of Wigston (1975) comprised one pure *Q. petraea* and the remainder all intermediates, although several were very close to *Q. robur*, the population thus appearing either very introgressed or to have been a plantation of largely hybrid trees.

In the valley 500m W of Green Grove a dozen fine Oaks stand in the pastures, with others in the adjacent woods. Most are *Q. petraea*, the largest of these being a shapely isolated tree at SN51305725, 465cm girth and 18m tall in 2008. The bigger of the two *Q. robur* trees, at SN51555770, was 510cm girth and 18m tall in 2008, and the bigger of two *Q. ×rosacea*, at SN51395737, was 451cm girth and 24m tall in 2008.

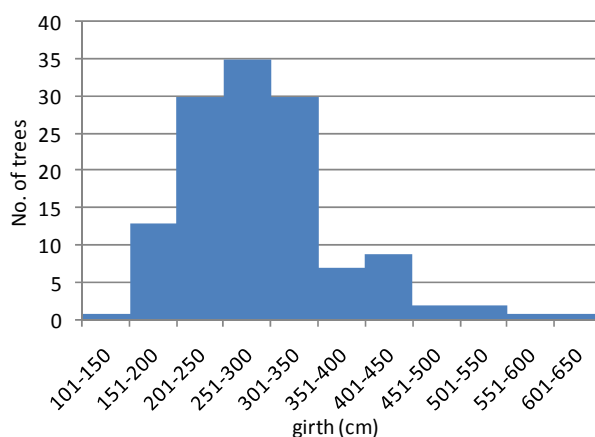
The biggest of several *Q. robur* trees near Brynog, by the track 300m W of Tynewydd SN52605760, is a well-shaped, leaning tree 410cm girth in 1992. One of the larger of many *Q. robur* trees on the Llanllyr estate, by the footpath 400m WNW of the house SN539561, was 438cm girth in 1992. The biggest Oak surviving until recently in this valley was a stag-headed one (species unrecorded) 586cm girth in 1993, in a pasture near Abermeurig House, 50m S of the bridge SN56355663. A well-shaped *Q. robur* in a field below the road 450m E of Hafod, Nantcwnlle SN57785795 was 411cm girth in 1981 and 448cm girth in 2009.

### Teifi catchment

There are several fine trees in the fields on the E side of Llandygydd SN2443. A massive *Q. robur* in a paddock by Penwenallt, Cwm-cou SN281416 was 787cm girth in 1995, but greatly exaggerated by outgrowths so this did not reflect its age.

There is an outstanding collection of 57 pasture Oaks, mostly *Q. robur*, on the Old Cilgwyn estate, with a considerable range of size (see graph) and shape. The two biggest were one, c.538cm girth in 1992, a split and hollow tree near the S end of the drive SN31404112, and another, 489cm girth in 1992, 150m N at SN31424127.

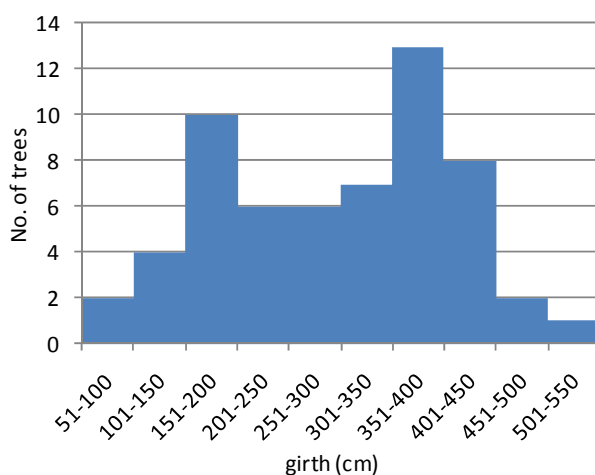
A historic tree of *Q. ×rosacea* in the roadside hedge at Llwynrhydowen, 200m S of the Rhydowen crossroads SN444450, was 495cm girth (at 60cm up)



Distribution of girths of  
Parc Pont-faen oaks, 1992



Pasture Oaks at Parc Pont-faen, Ciliau Aeron,  
view SE from SN496592, April 1976



Distribution of girths of Old Cilgwyn oaks, 1992



*Quercus x rosacea*, Llwynrhydowen,  
view ESE from SN44484500, (above) April  
2006; (right) from Davis (1927)

in 1984 (NMW), 530cm girth (at 60cm up) and 7m tall in 2006; David Davis (1745-1827), Presbyterian minister, poet and founder of the celebrated school at Castell Hywel, was ordained under this tree in 1773 (Martin 1977) and pre-1911 postcards of it (in NLW), and a photo in Davis (1927), show it looking much as it does now nearly a century later.

Oaks are among the many fine trees on the slope below Highmead, the best being an anciently pollarded *Q. petraea* 542cm girth in 1997, at SN50374291, another pollarded *Q. petraea* 525cm girth (at 2m up) in 1997, at SN50204300, and a *Q. robur* 444cm girth (at 2.5m up), 20m tall in 1997, at SN50454300.

At Llanfechan near Llanybydder the biggest of several fine Oaks are a *Q. petraea* 465cm girth in 1995, on the lane bank 600m WSW of the ruins SN51064519, and a *Q. robur* 448cm girth in 2002 (AOC & PED), in a pasture 150m S of the ruin SN51584527.



*Quercus robur* at farmyard entrance, Llanfair  
Clydogau, view NE from SN62485122,  
(right centre) April 1963; (right bottom) May 1978;  
(above) April 2005





The very picturesque, anciently pollarded *Q. robur* at the entrance to the farmyard by Llanfair Clydogau church SN62485123 was 594cm girth in 1980 (NMW) and 610cm girth and 8m tall, with most of the branches dying off, in 2005; its age was a matter of speculation in the letters pages of the *Cambrian news* in September/October 2007, and it is said locally to have once been part of an Oak avenue. Another attractive but much younger farmyard tree is a pollarded *Q. petraea*, 242cm girth in 1992, at Tyndomen SN65905812, and among others on this farm is one, 492cm girth (but distorted by outgrowths) in 1995, in the field to the N. Also nearby, at the edge of the Teifi flood plain 420m ENE of Tomen Llanio SN66485807, is a half dead *Q. robur*, 440cm girth in 1992, with a healthy *Q. robur* 392cm girth nearby at SN66395806.

Another historic tree is a *Q. petraea* at Tanyralltuchaf, 2km ENE of Tregaron SN698603, 432cm girth in 1978 (NMW), 449cm girth and 18m tall in 2005; its lower branches were removed in the 1950s. There is a photo of it, as it was before it was pruned, in Rees (1936), who states that Williams Pantycelyn (William Williams 1717-1791), Methodist preacher and poet, composed the hymn “Cyfiawnder marwol glwyf” under it, and another photo of it is in Jones *et al.* (1976), who quote the poem “Derwen Tan-yr-allt” on it by Isgarn (Richard Davies 1887-1947).

In Coed Mynachlog-fawr, Strata Florida SN743653, 2006, a rather open upland wood with much Birch and Alder among the Oaks, of 54 trees sampled most were *Q. petraea* but 20-45% (depending on the characters used) were to a varying extent intermediate, indicating some hybridisation with *Q. robur* and introgression.

#### **Woods on the sea cliffs**

There are isolated trees of unknown age in many places on the cliffs, mostly of *Q. petraea*, stunted and windblown and usually with very large leaves, for example on Constitution Hill, Aberystwyth SN58308267, 2000, where a tree has most of its leaves 12-15 × 7-10cm. There are also a number of remarkable woods, the most extensive being those at, and S of, Penderi c.SN552734, where the trunks and branches are windblown parallel to the steep slopes. Here, using Dupouey & Badeau’s method, most of the trees are *Q. petraea*, but many are intermediates with *Q. robur*; the leaves of all these trees tend to be very large, (8-)10-15(-18) × (3.5-)6-10(-12)cm, the intermediates often show a distinct similarity to *Q. robur* in the development of the auricles at the leaf-base, and there are also a few trees of almost pure *Q. robur* though with a very few stellate hairs on the lower surface of the leaves, 1967 (NMW) - 2006.

In the Oak woods on the very steep coastal slopes at the MoD site, Aber-porth SN237522-251520, some areas are so windblown that the branches touch the ground and one can walk over the canopy. Although *Q. petraea* is dominant again here, using Dupouey & Badeau’s method, there are a few *Q. robur* and many hybrids, 1979 (NMW) - 2006, and again the leaves are mostly very large.

#### **Quercus petraea (Matt.) Liebl. (*Q. sessiliflora* Salisb.) - Sessile Oak - Derwen Mes Di-goes**

The Sessile Oak is probably the most abundant tree in the county, dominant in most of the Oak woods on the slopes of the major valleys, where it has almost always been coppiced in the past. It is also a major constituent, if not a dominant, in most of the other Oak woods, including those on the coastal cliffs, and it is frequent in mixed and estate woodlands. It is also a common constituent of hedges, though never dominant in them, both as standard trees and as layered and trimmed bushes. Allt Lan-las c.SN477605 is one of the finest woods of uncoppiced trees in the county. Sessile Oak is extremely variable in habit and in other



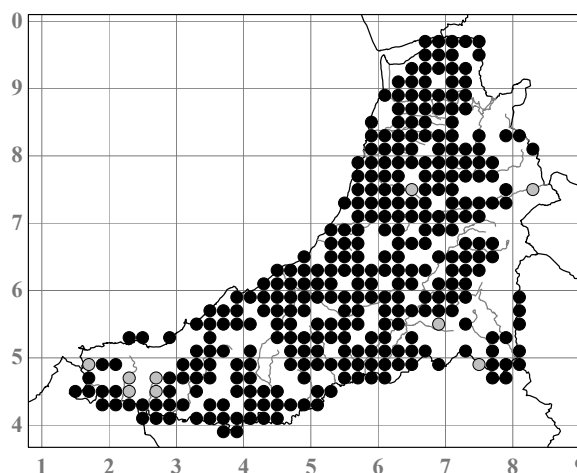
*Quercus petraea* at its altitude limit,  
Hafan incline, view N from  
SN72968797, September 2005



Jay-planted *Quercus petraea* seedling on  
Craig yr Allt-ddu, Cyneiniog valley,  
SN719875, September 2005



characters. The occurrence of a tree resembling subsp. *broteroana* O. Schwarz is mentioned above, and other similar trees have been seen. Maximum 663cm girth, 22m tall, 2004, Trawsgoed SN67157255 (see above). Altitude limit *c.*280m (Salter 1935, as *Q. robur* but presumably meaning *Q. petraea*); 370m, several stunted trees and a patch of scrub 5 × 3m on cliffs on the N side of the Hafan incline, Cerrig yr Hafan SN72968797, 1987-2005 (AOC & SDSB). Nearby on Craig yr Allt-ddu SN719875, 2005 (AOC & SDSB) at 360m altitude, several seedlings were seen growing out of cushions of *Campylopus atrovirens* and other mosses on the vertical N-facing cliffs, presumably planted by Jays which are common in the valley below, suggesting how Oaks may still reach these cliff sites even if there are no relic populations there.

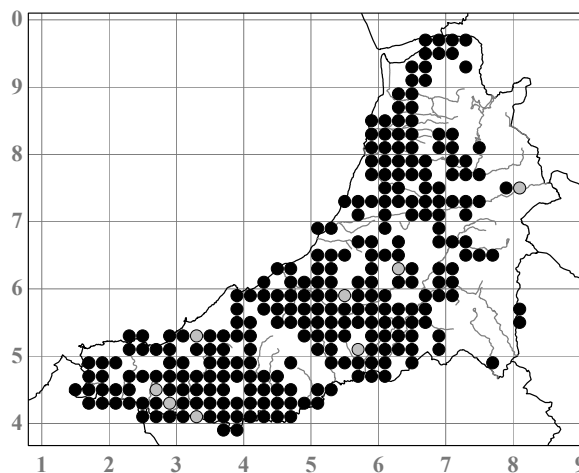


#### ***Quercus* × *rosacea* Bechst. (*Q. petraea* × *robur*)**

Problems of defining this hybrid make it difficult to judge its abundance (see above) and it is not mapped, but it seems to occur, with varying degrees of introgression, in most of the Oak woods as well as in hedges and is often planted. It was not formally recorded until 1965, when it was noted as frequent in the Mynach valley just above Devil's Bridge SN744765 (SMW & AOC). Maximum 553cm girth, 24m tall (No.0343), 1994, Trawsgoed grounds SN67017322 (AOC & CDPa). Altitude limit 330m, with *Q. petraea* in the Nant Brianne ravine SN783496, 1985 (AOC & DD).

#### ***Quercus robur* L. - Pedunculate Oak - Derwen Mes Coesynnog**

Often the dominant Oak in lowland Oak woods, at least as often planted as *Q. petraea* in estate woodlands as well as for ornament and in hedges, and generally commoner than it on the drift soils in the SW. A few trees can be found even in the coppiced *Q. petraea* woods on the valley slopes, for example at Derwen SN732774, 1987, and in Coed Rheidol SN744777, 2004. It is as variable as *Q. petraea*. Some trees on the quarries in Parc Natur Penglais, Aberystwyth SN587521, 2004, are identical with forma **cristata** (A. Henry) P. D. Sell ined., the Savernake Cluster Oak. Forma **fastigiata** (Lam) O. Schwarz is occasionally grown as a street tree and in amenity areas, for example at Parc-y-llyn, Aberystwyth SN592806, 2002. 14 trees of 'Koster', an extreme version of this forma, have been planted by the new Welsh Assembly building nearby, 2009, and there are two by Theatr Mwldan, Cardigan SN178464, 2009. *Q. robur* seems generally to be confined to the lowlands and not to have been planted in the uplands in the past, but there are several recent plantations at high altitudes, for example on a felled private conifer plantation at Bryn-y-rhyd SN681522, 2008, at 435m altitude. Maximum 610cm girth, 1980, Black Covert, Trawsgoed (see above); 593cm girth, 1992, Abermagwr Wood, Trawsgoed SN668735 (see above).



#### ***Quercus rubra* L. (*Q. borealis* F. Michx.) - Red Oak - Derwen Goch**

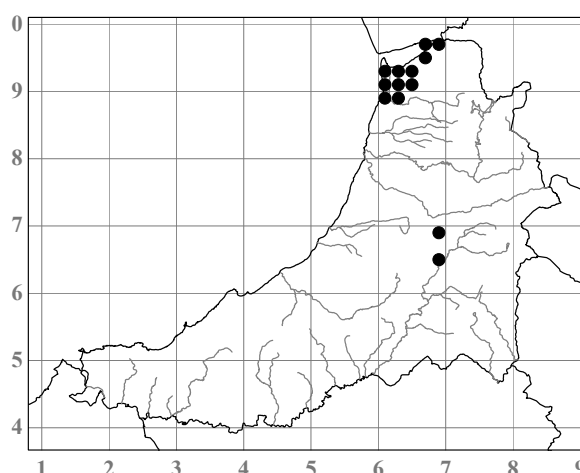
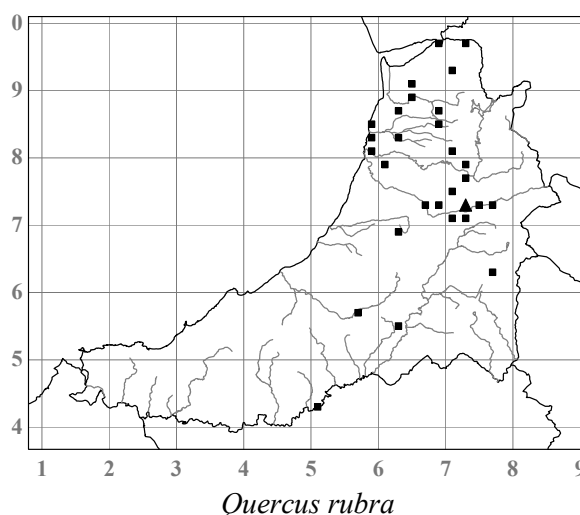
Introduced into Britain from North America probably in 1724. This fast-growing Oak has been planted by the FC in many places since the 1950s for timber, for example in the plantations SW of Tal-y-bont SN68P, 1981-2005, in Coed Penrhiw, Cwm Rheidol SN734779, 1998, and WSW of Hafod SN753729, 2004. It was also often used, largely because of its autumn colours, as a decorative screen along the edges of conifer plantations, for example in many places in the Ystwyth Forest *c.*SN77A, F, G. Acorns are rarely seen, although some were noted in Coed Cilmeddu SN722720 in 1991, in Allt Dderw, Gogerddan SN635835 in 2005 and at Ystrad Einion SN709939 in 1992, and they were abundant at Winllan, Talsarn SN56705733 in 2001 (NMW) and at

Trawsgoed SN67217268 in 2005. Coppice growth from the stools of felled trees is prolific, but a self-sown sapling has only once been seen, by the FC track at the bottom of Coed Maenarthur SN722721, 2006 (SPC). There are good individual trees on several estates, for example by the drive at Glandyfi Castle SN69089642, 212cm girth and 16m tall in 2005; and at Nanteos by the drive SN61407841, 262cm girth in 1996 (AOC & CDPa). Maximum 341cm girth, 18m tall (No.0369), 1994, in Trawsgoed grounds SN67037314 (AOC & CDPa).

## MYRICACEAE

**Myrica gale** L. - Bog-myrtle - Gwyrddling (Helyg Mair)

Abundant over much of Cors Fochno and the surrounding areas of peatland SN69, from Ynys-las and Borth to Glandyfi where it was first recorded in 1682 by Llwyd as “*Elaeagnus Cordi lob.* ... found in the marshes below Tyno hîr” (Chater 1984a). It is also abundant in the valley bog at Cors y Sychnant, Ty’n-y-graig SN697688, 1976 (NMW) - 2005. It was surprisingly never seen on the nearby Cors Caron raised bogs, a fact especially commented on by Godwin & Conway (1939), until a presumably recently established colony 4 × 3m was found in 1996 near the NW edge of the West Bog SN68206422 (JEDa). Salter (1901) listed it from “Borth and Tregaron Bogs”, but obviously in error as he later (1935) said that he had never seen it on the latter. There are no other sites for it in the county. On Cors Fochno it is very low-growing all over the ombrotrophic raised bog SN69F, but much taller around the margins where there is lateral movement of water. Extensive thickets of often very tall bushes are best seen near the E side of the bog SN69K, and in places here it is sometimes in Birch and Alder carr. E of Hen-hafod SN667943 bushes 2.6m tall were seen in the 1960s. There are large thickets on Ynys Edwin bog SN677961, 1960-2009. W of the Afon Leri it is locally abundant on Morfa Borth c.SN613908, 1987 (TRB) - 2004, and by 1996 it had begun colonising the Aberleri Fields SN613916 (MB) where the grazing had been reduced. *Myrica* grows in several places along the Dyfi estuary in quite brackish marshes, as among *Juncus maritimus* and *Molinia* W of the railway N of Glandyfi SN69629753, 1995.



*Myrica gale*, colour variation of male bushes, Ynys Edwin bog, view W from SN677961, March 2007



*Myrica gale*, Ynys Edwin bog, view SE from SN677962, April 2009

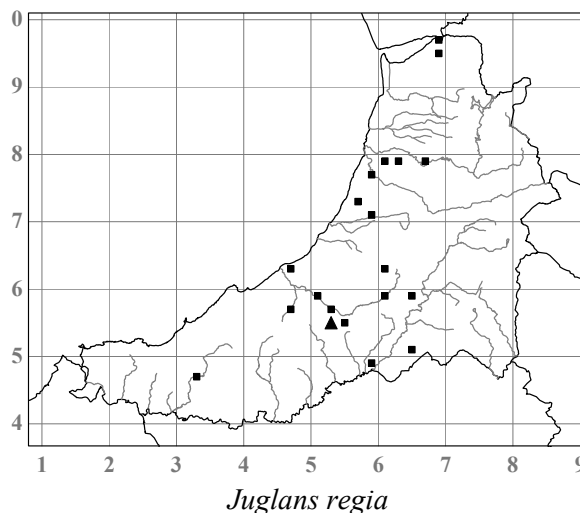
## JUGLANDACEAE

**Juglans regia** L. - Walnut - Coeden Cnau Ffrengig

Occasionally planted for the fruit or for ornament in parks, gardens, orchards, fields and woodland and along roadsides. Self-sown saplings have been seen only at Cwmere-isaf, Temple Bar SN534545, 1992, from a tree that fell in 1987. Native of SE Europe and Asia. Maximum 377cm girth, 1997, on slope E of walled garden, Gwernant Home Farm SN33704630.

**Pterocarya ×rehderiana** C. K. Schneid. (*P. fraxinifolia* (Poir.) Spach × *stenoptera* DC.) - (Hybrid Wingnut)

There is a planted tree of this hybrid, which was first raised in North America in 1879, on the University campus, Penglais SN59478181, 2006.

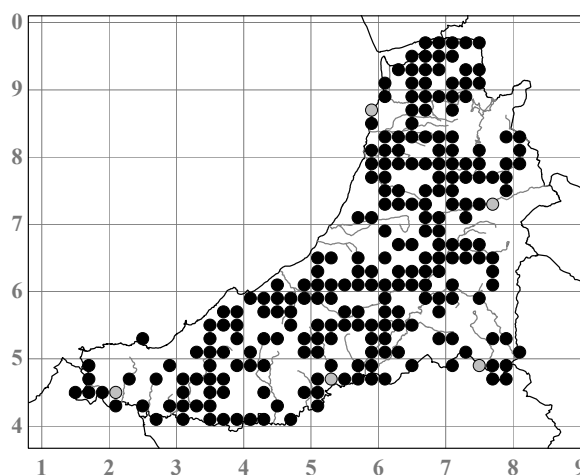


## BETULACEAE

**Betula pendula** Roth (*B. alba* auct., non L.) - Silver Birch - Bedwen Arian

Common in hedges, scrub and mixed woodland, but, contrary to the opinion of Salter (1935), generally less common than *B. pubescens*. Especially good stands include one just W of the Cwm Rheidol lead mine SN728782 where one of the larger trees was 169cm girth and 22m tall in 2005. It is uncommon on the coast, although there are a few trees on the sea cliffs, for example at the MoD site, Aber-porth SN244525, 1982-2005. It is a rapid colonist of open ground and felled woodland. Maximum *c.*305cm girth, *c.*15m tall, 1959, *c.*287cm girth, 1970, but dead by 1990, by the roadside at Cwmpantygwyfol, Llanilar SN618763 (NMW). Altitude limit 510m, FC plantation, Llyn Du SN769610, 1989.

Various cultivars are often planted, especially 'Dalecarlica', for example on the University campus, Lampeter SN579483, 1993. A tree of 'Fastigiata' 185cm girth and 20m tall in 1969, at Trawsgoed SN67087289 (AFM), was then the biggest known in Britain, but had gone by 1994.

[*Betula celtiberica* × *pendula*

A tree, perhaps planted, on the N bank of the Afon Clarach 400m W of Llangorwen church SN59908389, 2005 (CGE) was determined by PDS as perhaps this hybrid.]

[*Betula litwinowii* × *pendula*

Self-sown saplings in a pasture just NW of Ynys Edwin, Ynys-hir SN67759630, 2005 (CGE) were considered by PDS to be perhaps this hybrid, although *B. litwinowii* has not been seen nearby.]

[*Betula* × *aurata* Borkh. (*B. pendula* × *pubescens*)

This hybrid is likely to occur but has not been definitely identified. Trees formerly suspected of being it may well have been *B. celtiberica*.]

**Betula papyrifera** Marshall × **pendula**

A large, 2-trunked, presumably planted tree on the bank of the Teifi in fields at Alltyblacca SN522454, 1990 (NMW), was identified as almost certainly this hybrid by KA.



**Betula populifolia** Marshall - Grey Birch

There is an old planted tree by the Physical Sciences building on the University campus, Penglais SN59608176, 2006; several planted by the disused railway 1.5km SW of Llanerchaeron SN468612, 2008 (NMW); a younger one at the E corner of the Glanrafon Industrial Estate, Llanbadarn Fawr SN61448041, 2006 (NMW); and one by Theatr Mwldan, Cardigan SN178464, 2008. Native of E North America, introduced to Britain in 1750.

**Betula pubescens** Ehrh. - Downy Birch - Bedwen LwydSubsp. **pubescens**

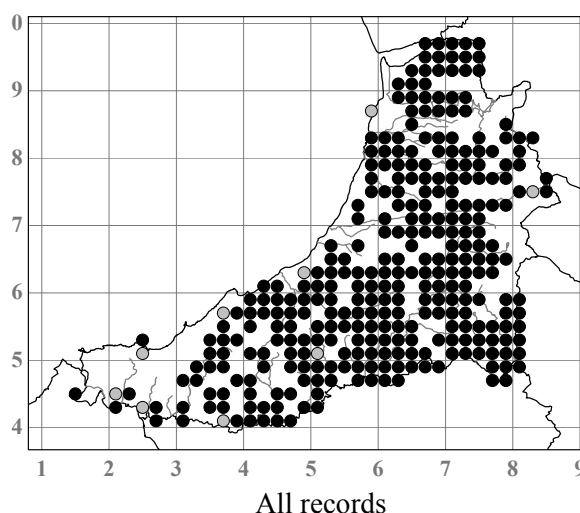
Very common, especially in damper sites than *B. pendula*, and abundant and often dominant in woodland and secondary scrub where it is an equally rapid colonist. It is a common constituent of hedges. Birches are often disapproved of by conservationists because they rapidly colonise heaths, mires and commons, but are often approved of by amenity-conscious foresters because they ameliorate the bleakness of recently felled conifer plantations and because they provide a pleasing dappled shade. Happily these contradictory urges sometimes come together as they did in 1995 when fruiting trees and branches culled from Cors Caron by CCW were placed upright in felled conifer plantations above Cwm Berwyn SN745580 by FC to encourage quick colonisation; this resulted in some 4,000 new Birch trees per hectare here (Mason 2004), but by 2007 few of these had reached even 2m tall. It is less often planted than *B. pendula*, but is sometimes seen in amenity areas and on roadsides, occasionally as 'Aurea' and 'Fetisowii'. Altitude limit 450m, roadside in FC plantation, Bryn-y-rhyd SN682523, 2003.

Subsp. **tortuosa** (Ledeb.) Nyman

Isolated groups of small bushes up to 2.5m high, with leaves less than 3cm long, on the raised bog, West Bog, Cors Caron SN682636, 2001 (NMW), are very distinctive and appear to be this subspecies. They are variable in the pubescence of the twigs, and resinous glands may or may not be present. A specimen labelled "Tregaron", 1937 (NMW, HAH), almost certainly collected from the West Bog, is similar but has slightly larger leaves. Godwin & Conway (1939) in their description of this part of the raised bog, the *Molinietum*, said that "*Betula pubescens* is very frequent, and as many of the trees are still quite young it may be that this species will ultimately attain dominance. Some of the trees, however, appear well grown, having trunks up to 10 or 15cm. in diameter." For whatever reason, there are very few Birch bushes now on the raised bog.

**Betula celtiberica** × **pubescens**

Probably widespread where the two species occur, and probably occasionally planted. A tree in the ancient woodland at the top of Coed Rheidol just E of Parson's Bridge SN74957905, 2005 (CGE, det. PDS) must be of natural occurrence. Specimens from several widely scattered sites collected as *B. celtiberica* were considered by PDS to be possibly this hybrid too.



*Betula pubescens* W of Berthgoed, Strata Florida, view NE from SN762653, May 2005

***Betula celtiberica* Rothm. & Vasc.**

Probably widespread, especially in the inland valleys and in woods and on rocky slopes in the uplands, but only recently recognised as occurring in Britain (Sell & Murrell in press, Chater 2010). It was first collected, as *B. alba*, in 1893 at Bwlch Nantyrarian c.SN720813 (CGE, IHB & JCW, det. PDS) with the remark that it was “certainly not planted” (Burkill & Willis 1894), and it gives every impression of being native in most of its sites although it is also occasionally planted in amenity areas and elsewhere. Representative native material has been collected from many sites, including open woodland on the S slope of Foel Fawr, Eglwysfach SN69029490, 2004 (CGE, conf. PDS), open woodland 500m ENE of Strata Florida SN752659, 2005 (CGE, conf. PDS), and a trackside in Cwm Mwyro, 3km E of Strata Florida SN773649, 2004 (CGE, AOC & PAS, conf. PDS). To what extent it hybridises with the other native species is uncertain. It is widespread in N & C Spain and N Portugal. Altitude limit 310m, Bwlch Nantyrarian, 1893, as above.

***Betula utilis* D. Don subsp. *jacquemontii* (Spach) Kitam. - Himalayan Birch**

This white-barked Birch is occasionally planted for decoration, as in the Vicarage grounds, Eglwys Fach SN68609560, 2003 (NMW); by the Clock Tower, Aberystwyth SN58228163, 2001-2006, but then inexplicably felled; and in the grounds of Old Cilgwyn SN31674178, 2003. On the University campus, Penglais SN59488180, three trees were planted in memory of the well-known gardener and broadcaster Clay Jones, 1923-1996, who was at the University 1946-1952; three other trees are nearby at SN59778193, 2006. There was a tree, now gone, in Coed Penrhyn-mawr, Ynys-hir SN681962, 1997 (NMW, WMC, det. AOC), and there are several trees planted c.1992 in Coed Tamsin, Nanteos SN626784, 2001 (NMW). Nine are planted near Theatr Mwldan, Cardigan SN178464, 2008. Native of the Himalaya and introduced to Britain in the late 19<sup>th</sup> century.

***Betula alleghaniensis* Britton (*B. lutea* F. Michx.) - (Yellow Birch)**

Of six trees (No.9) planted in 1956 in the FC Arboretum, Gogerddan SN630832, misnamed *B. lenta*, the largest of the five remaining was 96cm girth (at 30cm up) and 12m tall in 1996 (NMW); and of another group of nine (No.17) also planted in 1956, the largest of the five remaining was 117cm girth (at 50cm up) and 16m tall in 1996 (NMW). The bruised twigs have a strong smell of oil of wintergreen. Native of North America, introduced to Britain in 1767.

***Betula japonica* Siebold (*B. mandshurica* (Regel) Nakai var. *japonica* (Siebold) Rehder) - (Japanese Silver Birch)**

Occasionally planted, and perhaps sometimes self-sown, in the wild. A tree in Oak woodland at Ynys Edwin, Eglwys Fach SN67779628, 2006 (NMW) is not known to have been planted. There are two trees, on the N bank of the Afon Rheidol 200m above Pont Pen-y-bont, Llanbadarn Fawr SN59708021, 2004 (CGE, det. PDS) - 2007, and several trees c.8m tall on the SW bank of the Afon Aeron below Pont Talsarn SN541566, 1993 (CGE, det. PDS) and SN538569, 2007 (NMW). It has also been seen at the NW corner of Lower Forest, Lampeter SN574498, 2008 (NMW, MPo, det. AOC). One of many puzzling trees in Coed Mynachlog-fawr, Strata Florida SN74476542, 2006 (NMW), most unlikely to have been planted, agrees with this species in all respects but has rough, grey bark. Native of Japan, introduced to Britain in the 1880s but said to be rarely grown here.



*Betula japonica*, Rheidol bank upstream of Pont Pen-y-bont, view SE from SN59708021, April 2006



**Betula lenta** L. - (Cherry Birch)

Four trees 8-10m tall, planted, presumably for decorative effect, in a steep ride among FC *Pinus contorta* plantations at 340m altitude above Llyn Brianne SN800499, 1996 (NMW, AOC & DD). Native of North America, introduced to Britain in 1759.

**Betula nigra** L. - (River Birch)

Three trees planted on a lawn on the University campus, Llanbadarn Fawr SN60308105, 2008 (NMW). Native of SE North America and introduced to Britain in 1736.

**Betula litwinowii** Doluch.

An obviously self-sown tree 6m tall of this rarely grown species, native of the Caucasus, is in *Salix* carr on Llancynfelyn Common, Cors Fochno SN637924, 2005 (CGE, det. PDS). The site is 600m from the nearest gardens, but where the seed can have come from is unknown. A tree in Coed Mynachlog-fawr, Strata Florida SN74566546, 2006 (NMW) is most unlikely to have been planted, and its origin is equally obscure. Six trees (No.103) planted in 1957 in the FC arboretum, Gogerddan SN631833 as *B. albosinensis* are in fact this species; the largest was 110cm girth and 14m tall in 1996 (NMW).



*Betula lenta* and Dafydd Davies,  
Llyn Brianne, view E from  
SN800499, September 1996

**Betula maximowicziana** Regel - (Monarch Birch)

A planted tree 7m tall is in the grounds of Felin-fach college SN520570, 1993 (NMW). Native of E Asia, introduced to Britain in the late 19<sup>th</sup> century.

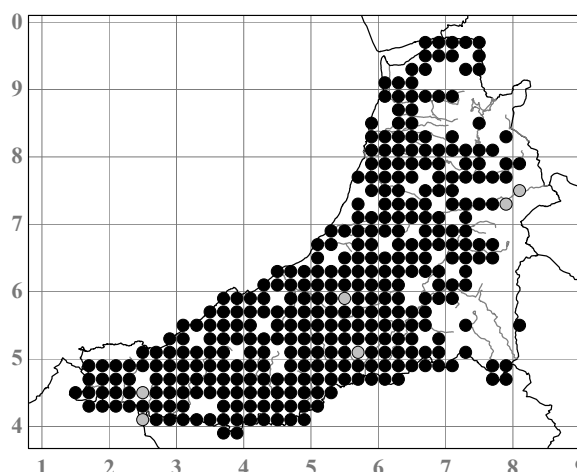
**Betula platyphylla** Sukaczew

Of nine trees (No.31) planted as *B. japonica* in 1956 in the FC arboretum, Gogerddan SN630832, the three surviving in 1996 (NMW) were this species, which is native of NE Asia.

**Alnus glutinosa** (L.) Gaertner - Alder - Gwernen

Very common along streamsides and riverbanks, in damp or wet woodlands and in hedges. Extensive Alder carr occurs on river floodplains, in valley mires and around the major bog complexes of Cors Fochno and Cors Caron. Most of the older trees show signs of having been coppiced, chiefly by clog makers both locally based and itinerant (see Jenkins 1968, 1971, 1976, the latter containing a photo of clog makers at Tal-y-bont c.1920; Salter mentions them here in 1903 (Dairy 29.8.1903)). Alder carr on steep flushed slopes is well represented in steep-sided valleys such as the Llyfnant SN712973, 2003. Near Berthgoed SN763653 one of these slope woods contains several huge uncoppiced trees one of which was 530cm girth (at 30cm up) in 1994, and 549cm girth (at 30cm up) and 14m tall in 2005; another tree here was 497cm girth (at 30cm up) in 1994. There is a rare example of estuarine Alder carr at Rosehill Marsh in the Teifi estuary SN188454, 1985-2005.

The *Phytophthora* disease has recently seriously depleted the trees in this last site, and outbreaks have occurred sporadically along the main rivers, especially the Teifi and the Aeron. The red, tongue-like gall on the female catkins, caused by *Taphrina alni*, was first noticed at Llanychaearn SN589788 in 2001 on var. *glutinosa* and was widespread within a couple of years, being especially common on planted trees of var. *macrocarpa*. Alder has long been planted, and in one year from June 1796 on the Hafod estate c.SN77L, R, 50,000 were planted (Malkin 1804). In the uplands in FC areas it can be difficult to distinguish planted from







Slope *Alnus glutinosa* wood, Allt-ddu, Llyfnant, view W from SN712973, June 2006

native trees, but Alder as a native does seem generally absent from the uplands. The post-glacial rise of Alder took place in the county *c.*7,000BP (Moore 2004). Timberlake (2003) describes a launder made from an Alder trunk, radio-carbon dated to *c.*2,000BP, used in the early Bronze Age opencast copper mine on Copper Hill, Cwmystwyth SN81167520; it is perhaps the oldest item of mine drainage equipment known in Britain. Maximum 635cm girth (at 1m up), 13m tall, 2005, a huge, healthy tree anciently pollarded at 2m up by a ditch between fields 250m SSW of Llanllyr mansion, Talsarn SN54235570. Altitude limit (native) 300m, Nant Lletygleisiau SN795497, 1985 (AOC & DD); (probably self-sown) 360m, mature tree in felled FC conifer plantation below the A44(T), Cwmergyr SN79408304, 2004; (planted) 445m, with *Quercus robur* in felled conifer plantation, Bryn-y-rhyd SN681522, 2008.



*Alnus glutinosa* 635cm girth, Llanllyr, view NNE from SN54235570, August 2005

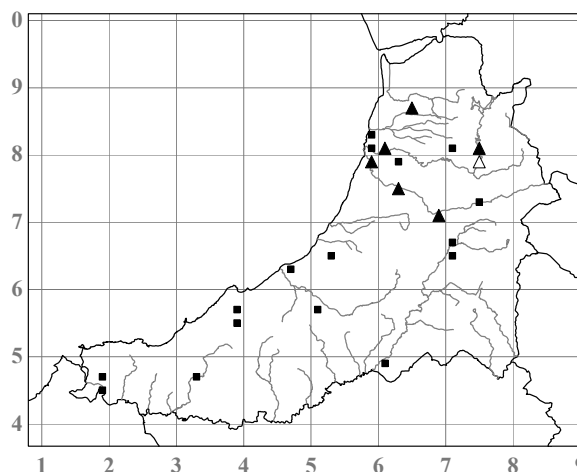
In so far as the three varieties, var. **microcarpa** Rouy, var. **glutinosa** and var. **macrocarpa** Loudon, can be distinguished (cone size and leaf size are often not well correlated), the first two are widespread; var. *microcarpa* is commoner on higher ground and inland, and is for example the dominant variety in the Llyfnant, around and above Strata Florida, and in the upper Aeron valley. Var. *macrocarpa* is the least common, and all the definite examples of it seen have been fairly recent plantings on roadsides, by car parks, picnic sites and other amenity areas where it is the favoured variety.

***Alnus* × *hybrida*** A. Braun ex Rchb. (*A. glutinosa* × *incana*; *A. × pubescens* Tausch, non Sart.)

At least seven spontaneous bushes were found among abundantly regenerating trees of both parents in wet woodland and waste ground by the old railway station yard, Llanilar SN628752, in 1992 (NMW) - 2005. At three other sites the hybrid has been planted, at the Aberaeron Wildlife and Leisure Centre SN478624, 1994 (SPC); by the Aberystwyth Golf Course SN59078283, 2001 (NMW); and at Coed Tynbedw SN69457162, 2001 (NMW). Maximum 172cm girth, 19m tall, Coed Tynbedw SN69457162, 2001.

***Alnus incana*** (L.) Moench - Grey Alder - Gwernen Lwyd

Salter noted in 1926 (Diary 18.8.1926) that much of the Alder in the Rheidol ravine below the George Borrow Hotel, Ponterwyd SN746805, did not appear to be *A. glutinosa*, and nine years later he "Saw a tree of *Alnus incana* (here evidently not planted)" apparently in the same place (Diary 16.8.1935) although he transferred it to "below Bryn Bras" in his Flora (1935). There is now a sizeable and clearly self-sown tree here by the Afon Llywernog waterfall into the Rheidol by the Hotel SN74688050, 2001 (AOC & JPW, NMW). It is planted in many other places and is often self-sown and suckering, chiefly in amenity sites, by ponds and streams and in plantations. Only subsp. *incana* var. *incana*, with the leaves grey-pubescent beneath, has been noted. Native of the Caucasus, introduced to Britain in 1780.

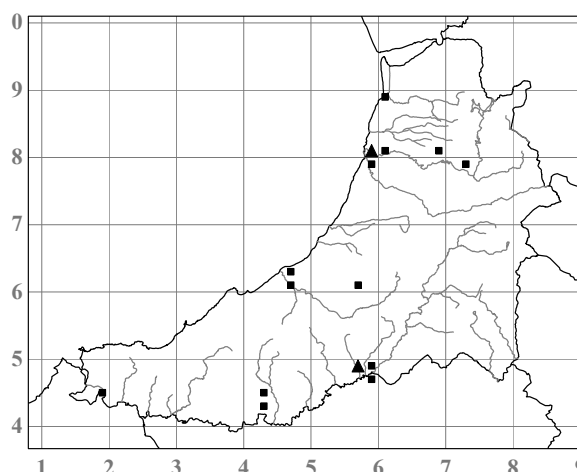


***Alnus rubra*** Bong. - Red Alder - Gwernen Goch

There were three planted trees by the FC parking site at Coed Tynbedw SN694715, the largest 190cm girth and 24m tall in 2001 (NMW), unfortunately felled in 2008; two big trees planted in c.1963 in the University grounds in the Penglais dingle, Aberystwyth SN59388204, the larger 238cm girth and 32m tall in 2002; and a small lopped tree by a footpath at Pen-y-graig, Llanfarian SN588784, 1998 (SPC) - 2008. Native of W North America, introduced to Britain in the 19<sup>th</sup> century.

***Alnus cordata*** (Loisel.) Duby - Italian Alder - Gwernen yr Eidal

This has become a very popular tree for amenity planting during the last 25 years, especially around car parks, picnic sites and on roadsides and riverbanks. Self-sown trees and seedlings are frequent around Aberystwyth, in waste ground and scrub around the playing fields and supermarkets at Blaendolau SN599804, 2003, and Parc-y-llyn SN594804, 2003, on the University campus, Penglais SN599804, 2000 (SPC), and by new houses at Cefn-llan SN60008145, 2008 (SPC). Native of Corsica and Italy, introduced to Britain in 1820.

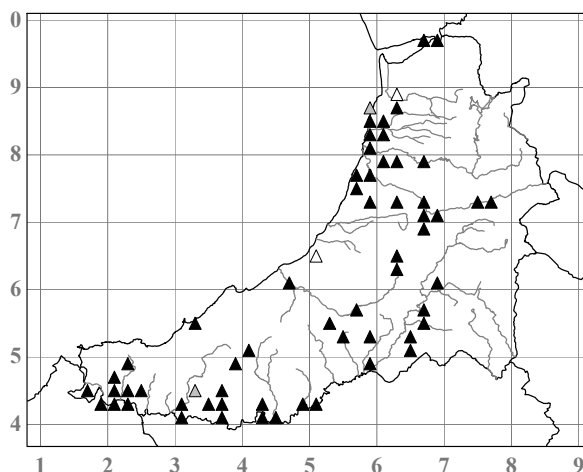


*Alnus cordata*

***Carpinus betulus*** L. - Hornbeam - Oestrwydden

Native further SE in Britain, but widely planted in the county in most of the estate woods and grounds and in roadside and field hedges. Self-sown plants have been noticed only in Coed Porthangel SN610845, 1991, and in the wooded part of Llandre churchyard SN622869, 2003 (AOC & PAS), but the map does not distinguish planted from self-sown. Many trees from old plantings survive on the Hafod estate, although the good trees on Middle Hill c.SN761732 died out c.1985 (PED); trees above Hafod at Cei'r-meirch SN755735, 1991-2004 (NMW), are the highest altitude ones in the county at 290m, and some here bear "Witches brooms". A hedge line of old trees, the largest 291cm girth in 2008, is S of the Afon Ystwyth 1km W of Pont Llanafan SN67907130. In woods it has often been coppiced,





*Carpinus betulus* on Hafod estate, Cae'r-meirch,  
view SE from SN75507353, October 2004

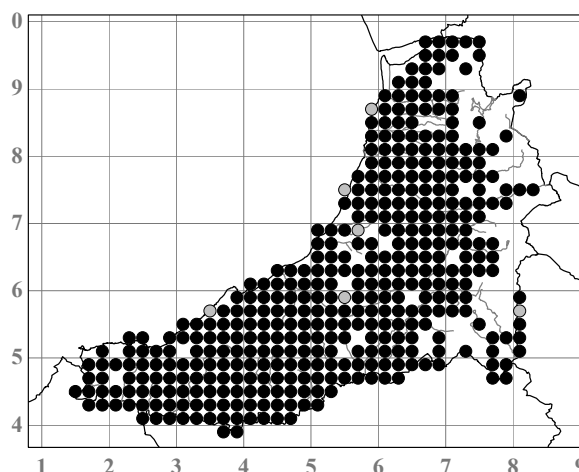
and in hedges it is grown both as a standard tree and as a trimmed hedge bush. '**Fastigiata**' is used as a street tree in North Road, Queen's Road and St David's Road, Aberystwyth SN5881, 1992-2005. Maximum 354cm girth, estate woodland by drive 400m SW of Nanteos SN61657844, 2006, fallen and cut up in 2007, with 133 annual rings.

#### **Ostrya carpinifolia** Scop. - European Hop-hornbeam

There are *c.*15 planted trees in the Buarth wood, Aberystwyth SN589815, 1996-2007 (NMW), several on the University campus SN598816 etc., 2004 (NMW), and several in copses on the Blaendolau playing fields, Llanbadarn Fawr SN598801, 2005 (NMW). All appear to be this species, but the Buarth trees have the young twigs and petioles with short-stalked, ovoid multicellular glands or hairs *c.*75 × 60µm as well as dense, longer, eglandular hairs. One tree at Blaendolau has some of these glands and dense hairs but unusually small leaves and short twigs. Native of S Europe and SW Asia and introduced to Britain in 1724.

#### **Corylus avellana** L. - Hazel - Collen (Cynfonnau'r Wŷn Bach, Cwte'r Wŷn Bach, Cwte'r Wŷn)

Commonly forming an understorey in woodland and scrub and on rocky hillsides, and very common in hedges. More or less pure Hazel thickets occur in places, especially on a few valley-sides in the uplands and on several of the coastal slopes. Seedlings seem very rarely to occur; in most recent years Grey Squirrels have eaten all the nuts before they could ripen, except in 2006 when, for unknown reasons, ripe nuts were plentiful. Sheep grazing in woods, and Rabbits, probably eat most seedlings that do grow. Coppicing of Hazel has virtually been abandoned but was almost ubiquitous in the past, and it is rare to find an old uncoppiced Hazel in any habitat. Some coppiced stools are very large, and one by the drive just W of Old Cilgwyn SN316418 was *c.*470cm girth, 1991. Maximum, for an uncoppiced tree, 116cm girth (the larger of two branches of the trunk which divides at 1m up), in Larch copse 2km W of Llanfihangel-y-Creuddyn SN647758, 2002; 110cm girth (at narrowest point), bank of Afon Doethie 350m N of its confluence with the Tywi SN777470, 1988 (AOC & DD). Altitude limit 450m, Lluest y Graig *c.*SN803889, Salter (1935); 350m, rocky ravine, Craig Nant-Iwrch SN766527, 1988 (AOC & APF); (planted) 445m, with *Quercus robur* in felled conifer plantation, Bryn-y-rhyd SN681522, 2008.



Hazel twigs were widely used in wickerwork and wattle-and-daub in the construction of cottage walls and chimneys, and long Hazel twigs were used in making the ridges of thatched roofs (William 1995, Smith 1998).

Most bushes are forma **avellana**, with the involucre no longer than the nut and irregularly incised-dentate. Forma **grandis** (Aiton) Schelle, with the involucre longer than the nut and often curved but not constricted, grown for the nuts as 'Kentish Cobs', is occasionally planted; there is an old coppiced bush in





*Corylus avellana* scrub with  
*Hyacinthoides*, Ystumtuen, view NE  
from SN73807840, May 2004



*Corylus avellana* scrub, Ysguboriau,  
Ysbyty Ystwyth, view NE from  
SN728704, March 2007

estate woodland 150m W of Cae'r-berllan, Ynys-hir SN68159635, 2004, and a large, old bush in the grounds of Henblas, Aber-mad SN59907620, 1998. Forma **schizochlamys** (Spach) Hegi, with the involucre equalling or slightly longer than the nut and regularly palmately incised-dentate, is often found by old cottage sites, as well as in remoter hedges and thickets, for example in a hedge S of The Moat, Llandyfrïog SN341406, 1996 (NMW, CDP & AOC, conf. PDS); it is also the commonest form used in recent plantings, as by the new sewage works at Glanyrafon SN607801, 2006 (NMW) and along reconstructed roadsides. These last two forms are sometimes interpreted as *C. avellana* × *maxima*. For details of them and of other forms likely to occur, see Sell (1980).

#### ***Corylus maxima* Mill. - Filbert - Collen Farfog**

The true Filbert, native of SE Europe and SW Asia, was formerly very likely to have been widely grown in orchards and on estates in the county, but it was often mis-named. Salter (1900, and Diary 27.11.1894) referred to Hutchings having once seen a Nuthatch in "some old filbert trees at Tanybwllch" c.SN581794. There is a large bush in an old orchard at Blaenwern SN423563, 1991. A grove was said to have been planted in estate woodland 100m WNW of Cae'r-berllan, Ynys-hir SN681963 in the 1930s by W. H. Mappin (WMC), but most of these bushes were recently destroyed and the only similar bush left there now proves to be one of *C. avellana* forma *grandis*.

#### ***Corylus colurna* L. - Turkish Hazel - Collen Twrci**

A planted tree, 99cm girth and 13m tall in 2006, is in the wooded dingle below the University Botany Gardens, Penglais, Aberystwyth SN59388202, and three are on the University campus SN59748158, the largest 103cm girth and 10m tall in 2006. Native of SE Europe and SW Asia, introduced to Britain in the 16<sup>th</sup> century.

### **CUCURBITACEAE**

#### ***Echinocystis lobata* (Michx.) Torr. & A. Gray - (Prickly Cucumber)**

Once seen as a weed in a Marrow bed in the garden of Plas Penglais, Aberystwyth SN594821, 1990 (SPC), and thought later to have been this species rather than *Sicyos angulatus*. Native of North America.

### **CELASTRACEAE**

#### ***Euonymus europaeus* L. - Spindle - Piswydden**

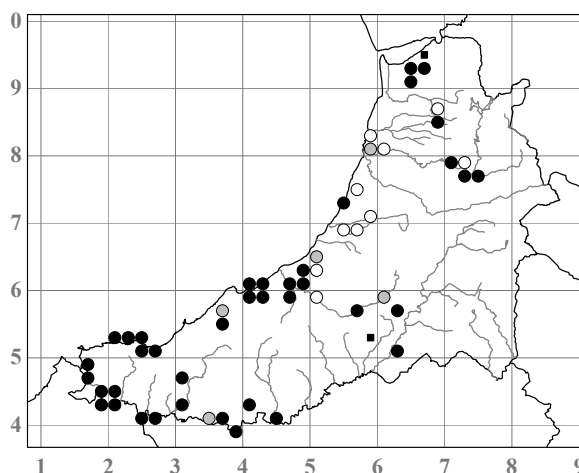
An occasional bush of woods and hedges throughout most of the lowland parts of the county, commonest on the drift soils in the SW, and elsewhere usually in the more base-rich parts of the valley woodlands where *Fraxinus*, *Tilia cordata* and *Ulmus scabra* occur. It can be abundant in some of the coastal dingle woods and in the Oak woods on the cliff slopes; in a steep gully on the sea cliffs in the MoD site, Aber-porth SN244525, 1982-2005, bushes with trunks up to 30cm girth form a pure thicket 30 × 20m, and there are other similar thickets nearby on Craig y Filain SN238523, 1997-2005. It becomes much rarer inland, and has not

been seen recently at over 190m altitude. Salter (1935) remarked that it seldom ripens fruit; this remains generally true, and abundantly fruiting bushes are certainly seldom seen. Altitude limit 335m, Ystumtuen SN77J (Salter 1935); 190m, garden hedge by road, Elerch SN681859, 1991, perhaps native as Salter (1935) saw it here.

Most bushes are forma **europaeus**, but in the Teifi gorge 400m NW of Coedmore SN191437, 2006 (NMW, conf. PDS) where the wooded slope meets the flood meadow, there are several bushes of forma **intermedius** (Gaudin) Borza, native of C Europe, with much larger leaves and fruits, contrasting strikingly with the adjacent forma *europaeus*; they are presumably either planted or bird-sown escapes from cultivation.



*Euonymus europaeus* forma *europaeus* (left) and forma *intermedius* (right), by the Teifi 400m N of Coedmore, view NE from SN1914372, September 2006



Fruiting *Euonymus japonicus*, Alexandra Hall, Aberystwyth, SN58388249, December 2003

### ***Euonymus japonicus* Thunb. - Evergreen Spindle - Piswydden Fythwyrdd**

Relic bushes from old plantings, sometimes spreading by layering of the branches to form dense thickets, can be seen around Aberystwyth, as on slopes at the N end of Queen's Road SN584824, 2004, and in a few other places along the coast, but definitely self-sown plants have not been recorded. Flowering and fruiting have become common and abundant since c.2000, and had scarcely ever been noticed before; it is sensitive to hard winters. All our plants appear to be var. **macrophyllus** (Regel) Beissn. Native of Japan, introduced to Britain in 1804.

## **PARNASSIACEAE**

### **[*Parnassia palustris* L. - Grass-of-Parnassus - Brial y Gors**

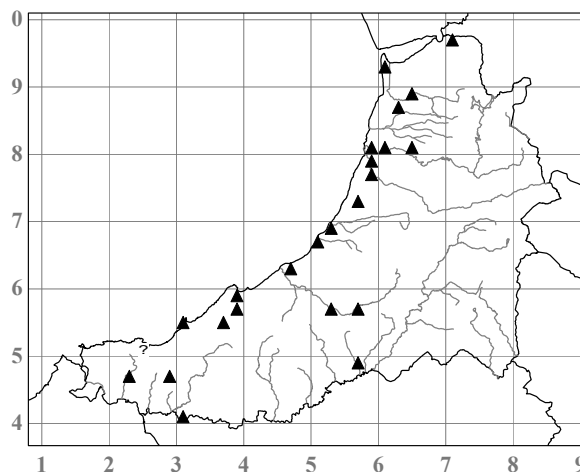
Reported several times but never substantiated. Webb (1947) wrote "On a bog nearby [i.e. Ysbyty Cynfyn SN77P] the present writer and another member [of the Swansea Field Naturalists' Society] in 1926 found *Parnassia palustris* (two plants) but it was not seen on the present occasion [19 July 1947]". He had earlier (1927) reported the find as "Near Parson's Bridge", the same site. Wade (1952) wrote that confirmation of this record was highly desirable, implying some doubt about it. Salter (1935) remarked that "There appears to be an old and unsubstantiated record for the county", citing Hyde & Wade (1934), who give the species with no locality or reference. The most likely location was a bog 200m SSW of the church, but this has since been drained. It remains one of Webb's more doubtful records. An even more doubtful one was by Evans (1804), who improbably recorded it from the Teifi Pools area c.SN76Y.]

## OXALIDACEAE

**Oxalis corniculata** L. - Procumbent Yellow-sorrel - Suran Orweddol

Salter recorded this alien of uncertain origin as a greenhouse weed, together with *O. exilis*, in his garden at Llanbadarn Fawr SN598810 in 1929 (NMW). It was found at Aber-porth SN25K or Q in 1951 (NMW, JAW) and 1954 (Webb 1956), and on a streamside wall in Llanbadarn Fawr SN600809 in 1973 (NMW, RGE). Since 1990 it has been recorded in many places, chiefly as a persistent weed of pavements and cobbled areas in the towns and villages, on roadside verges and in gardens. An odd form with solitary flowers, 4-5 of the stamens without anthers, capsules 6-8mm and the locules with 4(-5) seeds was a garden weed at Winllan, Talsarn SN567574, 1998 (NMW, det. MFW). The purple-bronze-leaved var. **atropurpurea** Planch. is at least as frequent as the green var. **corniculata**.

The following two species, *O. dillenii* and *O. stricta*, are often now considered conspecific with *O. corniculata*, but are recorded separately here as the specimens seen were reasonably distinctive.

**Oxalis dillenii** Jacq. - Sussex Yellow-sorrel - Suran Felen Sussex

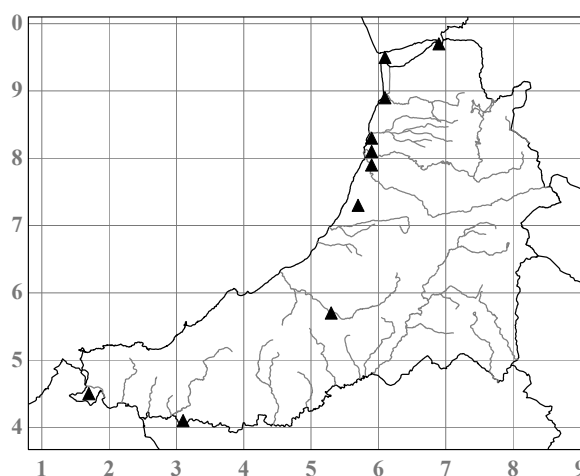
Native of E North America, and recorded from a bank by the Afon Rheidol near Lovesgrove SN628807 in 1964 (NMW, RGE, det. AOC); well-naturalised by a track through rough pasture S of Glanrheidol, Capel Bangor SN663792 in 1990 (NMW); and as a recently arrived and increasing weed in the walled garden at Hafod SN756730, 2007 (NMW, RGW).

**Oxalis stricta** L. (*O. europaea* Jord.) - Upright Yellow-sorrel - Suran Felen Unionsyth

Said by Salter (1935) to occur occasionally as a garden weed, the first localised record was from by the Teifi near Pont Tyweli, Llandysul c.SN415402 in 1981 (AO). The only other records have been of it amongst bird-seed casuals at Pontsian SN43984600 in 1992 (NMW); naturalised near the 1981 site on the Teifi bank 300m below Llandysul church SN420404 in 1993 (AOC & TCGR); as a weed in the walled garden at Llanerch-aeron SN480601 in 1996; as a casual on river shingle at Llanddewi-Brefi SN6555 in 2004 (DB); and dominant in a small enclosure 20 × 10m among fields S of the road 2km SSE of Llangeitho SN62685781, 2005 (NMW). Native of North America and E Asia.

**Oxalis exilis** A. Cunn. - Least Yellow-sorrel - Suran Felen Fach

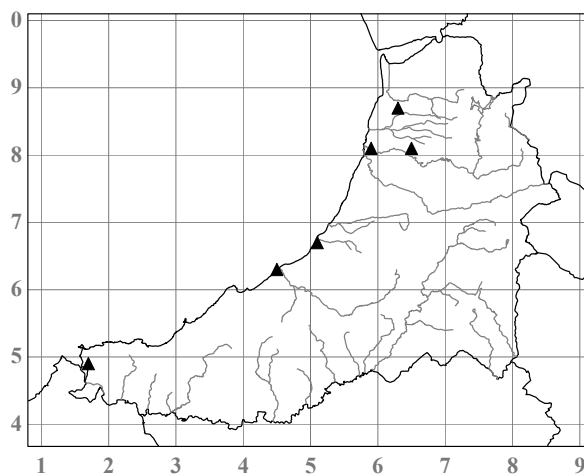
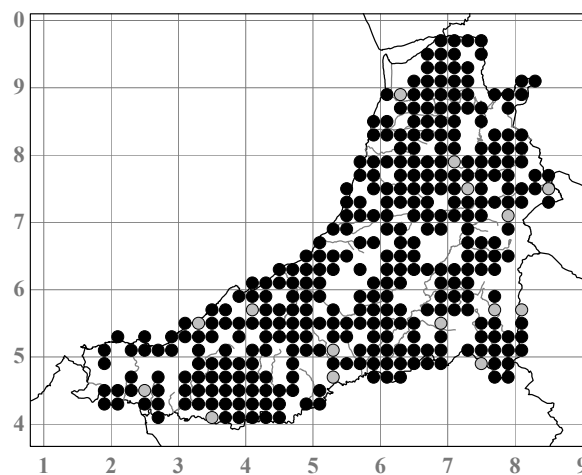
Recorded by Salter as a greenhouse weed at Llanbadarn Fawr SN598810 in 1929 (NMW). In the open it was first recorded, abundantly naturalised and in places dominant, in most of the lawns at Carrog, Llanddeiniol SN562724 in 1991 (NMW). Since then it has been found in ten other sites mostly as a pavement weed in towns and villages, though rarely as abundant as *O. corniculata*. It is abundant in lawns and on paths at Glandyfi Castle SN692967, 1994 (AOC & WMC) - 2005 (AOC & PSC), and by a shaly path by the visitor centre on the Ynys-las dunes SN609940, 2000 (SPC). Native of Australasia.





***Oxalis articulata* Savigny - Pink-sorrel - Suran Ruddgoch**

A rare escape, established from garden throw-outs. First recorded on a roadside hedgebank by the Rhydyppennau school SN629862, 1995 (NMW), it has since been found at seven other sites on hedgebanks, road verges, shingle and railway ballast. Native of E South America.

*Oxalis articulata**Oxalis acetosella****Oxalis acetosella* L. - Wood-sorrel - Suran y Coed (Bara a Caws y Gog, Bwyd y Gwcw, Dail Caws, Dail Surion)**

A common plant of a wide range of usually slightly damp and at least partially shaded sites, especially in woodlands of all sorts, on hedgebanks and under Bracken. In the uplands it is common especially on N facing well-grazed slopes, chiefly where there is some flushing, and in screes, rock crevices and shaded ledges. To what extent its occurrence on open ground is a survival from former woodland is uncertain. It often persists and is abundant in coniferised woodland. On the coast it is often abundant under Bracken and in woodland and scrub on the cliff slopes, and in damp gullies. It is one of several woodland species often found on and amongst *Carex paniculata* tussocks in the valley mires. Most populations are of var. **acetosella**, with white, mauve-veined flowers. Var. **subpurpurascens** DC., with pink-purple flowers RHS74C, was reported by Salter (1935) to be “not uncommon, as in woods in the Arth valley” c.SN46W, and colonies of it have since been noted in the Cletwr dingle woods SN670920, 1978; on Bracken slopes above the sea at Wallog SN59008562, 1997 (AOC & JPW) and Cwmtudu SN35385757, 1996; on the roadside hedgebank E of Caer Penrhos, Llanrhystud SN557697, 1995 (SPC); and on hedgebanks and in woodland near Alltyrodyn SN457443, 1974-2005 (NMW, AOC; BH). Altitude limit c.610m (“to above 2,000ft.”), Pumlumon, Salter (1935); 540m, E facing grassy slope, Craig y March, Pumlumon SN806881, 2002.

***Oxalis debilis* Kunth var. *corymbosa* (DC.) Lourteig - Large-flowered Pink-sorrel - Suran Oddfog**

Native of tropical America and a rare weed, first recorded on a roadside hedgebank by the Upper Bridge, Aberaeron SN45896230 in 1994 (NMW), and since found naturalised in an old sandpit at Banc y Warren, Penparc SN203477 in 1996, in several places on hedgebanks at Llan-non SN56D, 2002 (NMW), and on a grassy slope by Felin-y-mor Road, Aberystwyth SN58068071, 2004. Solitary plants have been seen on waste ground at Llanarth SN420575 in 1999, and at Tregibby Farm, Cardigan SN182473 in 1999.

***Oxalis pes-caprae* L. - Bermuda-buttercup - Suran Felen Bermuda**

The only record of this South African alien is from “waste ground near Llannon” c.SN56D in 1974 (RGE & AOC, field card at BRC).

***Oxalis incarnata* L. - Pale Pink-sorrel - Suran Welw**

Native of South Africa, and first recorded in the Ynys-las market gardens SN613927 in 1994 (NMW), where it had been known for a long time as a greenhouse weed. It grows abundantly in the small chapel-like sepulchre of John Harden d.1921 in the lower churchyard at Llandre SN623869, c.1970-2005 (not identified until 1995), and is a conservatory weed at Llanerchaeron SN480601, 1996, and doubtless elsewhere. In the open it was found naturalised on a tip at Lampeter SN581479 in 1994 (NMW), on a roadside in Llangranog

SN315540 in 1996-2006 (NMW, AOC & JPP), and on a pathside hedgebank at Llan-non SN51606732 in 1996.

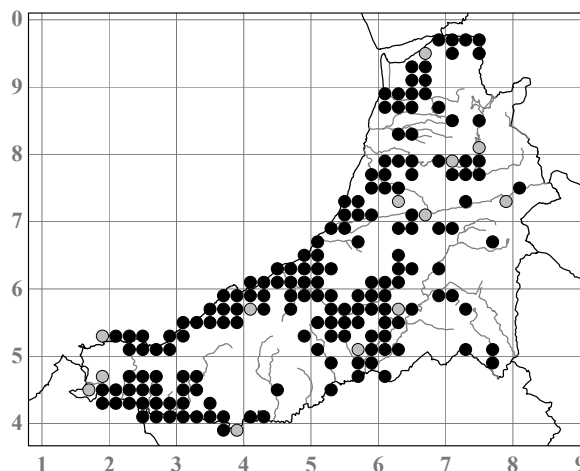
## EUPHORBIACEAE

### ***Mercurialis perennis* L. - Dog's Mercury - Bresychen y Cwn (Sawdl y Crydd)**

A frequent plant of the more base-rich and fertile woodlands where it forms large, unisexual colonies, usually in the damper parts with *Fraxinus* and Wych Elm. It is also frequent in similarly fertile hedgebanks, under Bracken on the coastal slopes, and in damp, shaded gullies both on the sea cliffs and in the uplands. Woodland colonies are much more prone to wilting in dry weather than those on the coastal slopes. Altitude limit 305m ("extending to 1,000ft.") (Salter 1935); 335m, gully of the Nant y Cae Isaf, Cwm Ystwyth SN819746, 1981-1994 (AOC & SDSB).

### ***Mercurialis annua* L. - Annual Mercury - Bresychen-y-cŵn Flynyddol**

Although recorded by Morgan (1949) from Pantygwyfol c.SN624759, Salter never saw this archaeophyte and there have been only two records since, of a few plants growing as a weed in Windover garden, Aberystwyth SN581808 regularly from 1953 to 1960 (NMW, EHC), and of a single plant on the pavement of Quay Road, Aberystwyth SN58038132 in 1995.



*Mercurialis perennis*

### ***Euphorbia peplis* L. - Purple Spurge - Llaethlys Rhuddlas**

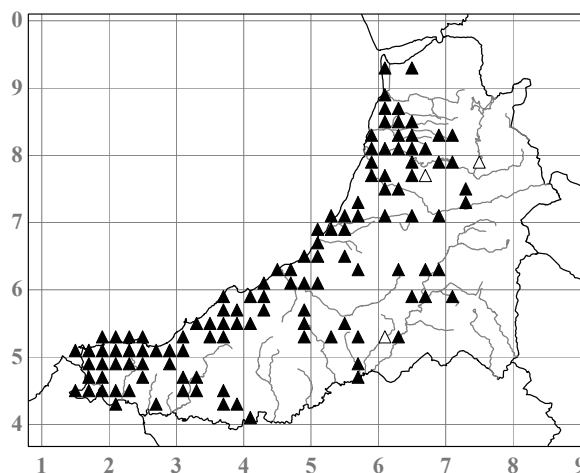
First recorded by the Revd Littleton Brown in a letter to Dillenius dated "Xmas Day 1731", where he writes "I have sent you a specimen of *Tithymalus marit.* it grows in great plenty on ye shore at Aberystwith" c.SN58V (Druce & Vines 1907, p.lxxv). Gough (1789, p.529) recorded it "On sandy sea shores, near Aberystwith", and Evans (1804, p.338) recorded it from the neighbourhood of Aberystwyth. Turner & Dillwyn (1805) quote T. F. Forster (who was partly responsible for the plant lists in Gough) saying "I have received a specimen from the shore at Aberystwith". Morgan (1849) lists it, but probably did not see it himself. There are no subsequent records. The species is now extinct in Britain, having last been seen on Lundy in 1965; Aberystwyth was its most northern locality in Britain, and indeed in the world.

### ***Euphorbia oblongata* Griseb. - Balkan Spurge - Llaethlys y Balcanau**

Well-naturalised in scrub below Salter's garden (where it was still growing) at Fairview, Llanbadarn Fawr SN598810, 1991 (NMW) - 1997 (SPC & AOC, det. BSW); it was originally misidentified as *E. hyberna* (*Watsonia* 19: 147 (1992); 23: 574 (2001)). Native of the E Mediterranean.

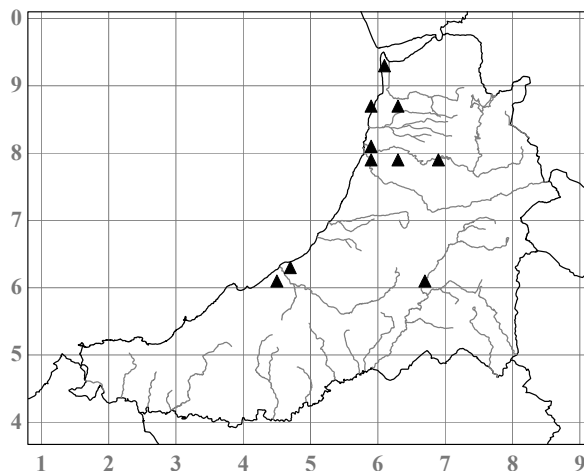
### ***Euphorbia helioscopia* L. - Sun Spurge - Llaethlys yr Ysgyfarnog (Blodau Llaeth)**

A common archaeophyte weed of arable fields, gardens, waste ground and tips, becoming rare in the uplands. Altitude limit 300m, Cabbage and Turnip field NE of Tan-y-graig, 1.5km SW of Devil's Bridge SN730759, 1995, probably the same site as Salter's (1935) "Oat-fields towards Fron Goch, Devil's Bridge".

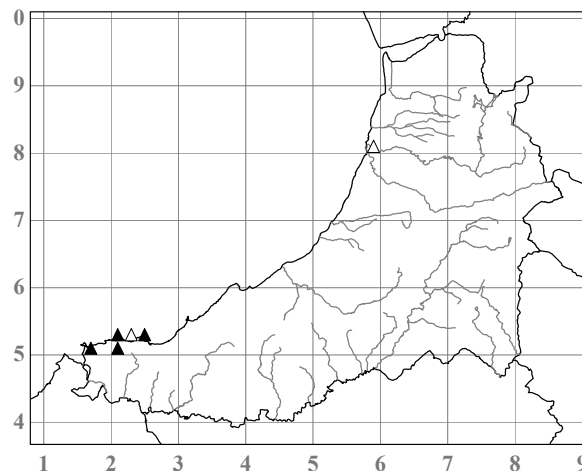


### ***Euphorbia lathyris* L. - Caper Spurge - Llaethlys Caprys**

An archaeophyte, first recorded as an escape in 1991 when it was found abundant and effectively naturalised in the shrubbery and scrub outside the walled garden at Nanteos SN62207853. It has since been found as a casual on roadsides, tips and waste ground, usually as single plants, at nine other sites.



*Euphorbia lathyris*



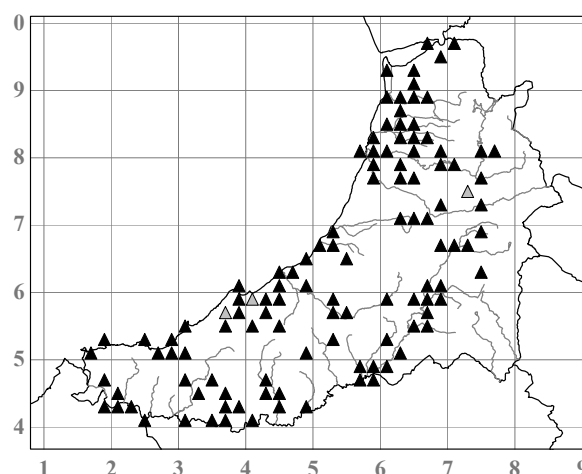
*Euphorbia exigua*

### ***Euphorbia exigua* L. - Dwarf Spurge - Corllaethlys**

A rare arable archaeophyte weed, described by Salter (1935) as “not very common”, but he himself recorded it only once, from “Corn-fields between Aber Porth and Mwnt” SN25 (1935, Diary 28.6.1894), apart from a sighting on the Aberystwyth rubbish-tip SN591811 (Diary 6.11.1900); he also gave a record from Cardigan (HLJ). Whellan (1942, Wade 1952) recorded it from Craig y Filain SN239522 in 1941 as abundant on waste ground, and there are field records at BRC from “Tresaith and neighbourhood” SN25, 1936 (WRR & WWB) and an unlocalised 1950s one from SN58. The few more recent records are all from the coastal slopes between Aber-porth and Gwbert. At the MoD site, Aber-porth, probably the same general site as Salter’s and Whellan’s, it appeared in 1979 where a trench had been dug through coastal heath on the site of pre-1937 arable fields at SN246525 (Chater 1982a), and was found nearby in 1997 on bare, shaly ground among *Calluna* at SN24305247 (JT); the latter plants were the small, more or less prostrate and little-branched var. **exigua**. It was found at the edges of spring-sown Barley fields 1.5km W of Mwnt SN174514 and 176514 in 1987 (AOC & APF) and at the edge of a spring-sown Wheat field here in 2005 (PJW); and at the edges of Wheat, Flax and Pea fields and in the winter stubble of Wheat and Barley fields at Llwynysgaw SN2151-2152 in 1990-2004 (NMW, AOC; SPC; SDSB & CMFB), these latter plants being the large, bushy, more or less erect and much-branched var. **diffusa** (Jacq.) Beck. The other populations were not identified to variety.

### ***Euphorbia peplus* L. - Petty Spurge - Llaethlys Bach**

A common garden archaeophyte weed, but usually much less common than *E. helioscopia* in arable fields, and occasionally found on waste ground, tips and roadside verges. It has been remarkably abundant on ballast at Aberystwyth Station SN585815 in recent years, 2008. It is absent from the uplands except at its altitude limit of 325m, as a garden weed at Hafod-newydd, Strata Florida SN75606397, 2008.



*Euphorbia peplus*

### ***Euphorbia portlandica* L. - Portland Spurge - Llaethlys Portland**

Confined to the sand dunes at Ynys-las and Penbryn, and to the sea cliffs at Penbryn and Tresaith. At Ynys-las SN69B, C, where it was first recorded by Morgan (1849), it is scarce on the younger, seaward dunes where *E. paralias* is commoner, and is frequent and generally the only species on the older, landward side, 1958-2009. At Penbryn it was first recorded by Salter (Diary 14.9.1924), and there is a 1934 specimen from “Penbryn Sands” (NMW, PCh); it grows there both on the small dune SN293525, 1975 (AP, c.35 plants) -



2002 (c.5 plants) and on the cliffs from SN28605200, 1976 (NMW) to SN296528, 2000 (AOC & MDS). At Tresaith it grows on the shaly and sandy cliffs from the waterfall to the N end of the beach SN280516-278516, 1986-1991 (APF; AOC). Salter (1935) recorded it from Cwmttydu SN35N but there are no later records from there.

### ***Euphorbia paralias* × *portlandica***

One plant of this nationally rare hybrid was found in 2003 growing with frequent *E. paralias* and occasional *E. portlandica* in an open community in the N part of the Ynys-las dunes SN607945 (**Herb. SPC**, SPC, conf. PMB).

### ***Euphorbia paralias* L. - Sea Spurge - Llaethlys y Môr**

Confined to the sand dunes at Ynys-las and Penyrergyd, this species was first recorded from “Borth Sands” (probably referring to Ynys-las) by W. H. Darby (Watson 1837). At Ynys-las SN69B, C, 1958-2008, it is frequent, and is characteristic of the mobile and younger dunes on the seaward side, where it is much commoner than *E. portlandica*, and is more or less absent from the mature dunes on the landward side. At Penyrergyd SN1648, 1879 (HLJ, *BRC Rep.* **1879**: 71 (1880)) - 2005, it is frequent in several places on the seaward part of the dunes and on sandy shingle. It was recorded at Clarach on the sandy foreshore SN587839 in 1955, but not before or since.



Pioneer *Euphorbia paralias* at seaward edge of Ynys-las dunes, view N from SN604934, January 2005

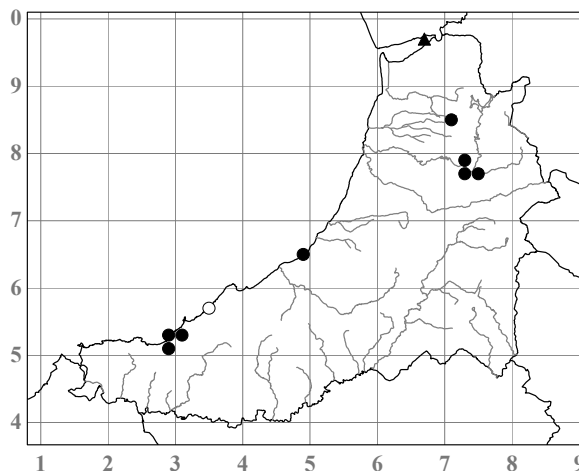
### ***Euphorbia cyparissias* L. - Cypress Spurge - Llaethlys Cypreswydd**

Salter (1935) described this as being frequent as an escape in the neighbourhood of cottage gardens, but gave only Llanarth SN45, Rhyd Lewis and district SN34 (also Diary 15.9.1924) and Lledrod SN67K. Since then it has been recorded, as var. **esuloides** DC., only in Llanilar churchyard SN623751, 2001 (NMW) where it is well-naturalised, and at the bases of walls in Trefechan SN58408101, 2004 (RAJ) and in North Road, Aberystwyth SN59608188, 2004.

### ***Euphorbia amygdaloides* L. - Wood Spurge - Llaethlys y Coed**

#### **Subsp. *amygdaloides* var. *amygdaloides***

Although usually considered a woodland species, in only one group of its Cardiganshire sites is it under trees and it is very much a plant of cliff ledges and steep coastal cliff slopes. At Craig y Pistyll SN712855, 1976-2005, 20-50 inflorescences can be seen most years on damp, well-vegetated ledges on the S-facing slightly base-rich cliffs; it was first recorded here by Salter in 1893 (Diary 10.4.1893). By the Gyfarllwyd Falls on the Rheidol SN742775, 1991-2004, it grows on damp, base-rich ledges under *Fraxinus* and *Ulmus scabra*, and it is in two places downstream, on the rocky wooded slope in Allt Boeth SN73707733, 2006 (CMFB, TAL & AOC), and by the Cwm Rheidol lead mine SN729781 in 2005 (SPC). The remaining sites are all coastal: there are several small colonies on the cliffs between Morfa Mawr and Aber-arth SN490649-494651, 1894 (Salter Diary 12.5.1894) - 2003; it is in several places between Llangranog and Penbryn SN305537, 296528 and



297527, 1981 (PB) - 2003, and in small quantity on the cliffs above Traeth Penbryn SN28855125-28605200, 1976 (AOC & DGJ) - 2003, where it was first seen by Salter in 1902 and 1929 respectively (Diary 10.7.1902 and 22.9.1929). Altitude limit 350m, Craig y Pistyll SN712855, 2005.

'**Rubra**' is abundantly naturalised in an abandoned pasture just W of Ynys Edwin, Ynys-hir SN67739628, 2007, where it has self-sown from the adjacent garden.

Subsp. **robbiae** (Turrill) Stace

This rhizomatous garden subspecies, native of NW Turkey, has been seen naturalised in five sites: in woodland W of Cymerau Hall SN696962, 1996 (SPC); on a laneside slope 200m S of Llanafan church SN685719, 1998; by the Afon Arth in Aber-arth SN47976377, 2007 (RDP & KAP); along a hedgebank S of the Upper Bridge, Aberaeron SN45896230, 1996-2007; and in Capel Salem graveyard, Brongest SN32404500, 1997.



*Euphorbia amygdaloides* subsp. *amygdaloides* 'Rubra' invading grassland, Ynys Edwin, view N from SN67739628, May 2007

**Euphorbia characias** L. subsp. **characias** - Mediterranean Spurge - Llaethlys Môr y Canoldir

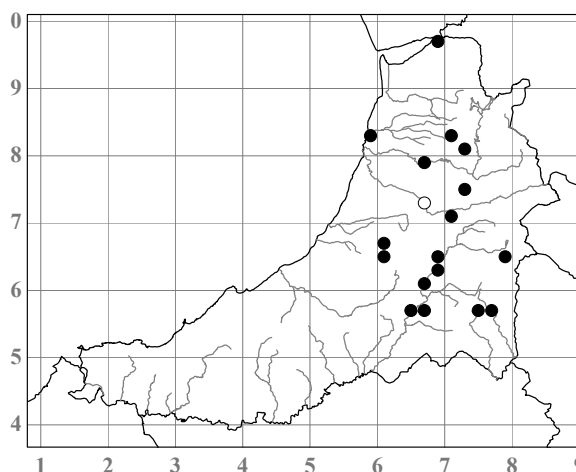
Naturalised in three sites near Aberystwyth: in dense vegetation on the river bank at the E side of the Blaendolau playing fields SN599802, 1997; by the lane between gardens and woodland 400m NW of Llanbadarn Fawr church SN596813, 1999 (NMW); in the roadside shrubbery by the Llanbadarn campus SN602811, 2005 (SPC). It is also naturalised in a disused quarry by the Afon Clydan at Llan-non SN51806666, 2006, and on the Penyrergyd dunes SN16254880, 2007 (NMW). Native of the W Mediterranean.

## ELATINACEAE

**Elatine hexandra** (Lapierre) DC. - Six-stamened Waterwort - Gwybybyr Chwebrigerog

Salter knew this species from only three sites, and, although it is easily overlooked and varies greatly in abundance from year to year, it has probably genuinely increased since his day. It is clearly capable of colonising recently created water bodies, and seems to have arrived very recently in several well-botanised lakes such as Llyn Pendam and Llyn Berwyn where its presence is unlikely to have been overlooked before. Salter (Diary 30.6.1925) recorded it on mud by the Teifi above Pont Einon SN672616, where it still occurs, 2008. He omitted this site from his Flora, presumably because he had second thoughts when he found it again three weeks later at Llyn Blaenmelindwr SN715835 (NMW), where it has not been recorded since, noting (Diary 21.7.1925) that here it was "easily noticeable on account of its red colouration, and quite unlike anything that I saw the other day." It is indeed a protean species, and almost as bafflingly variable phenotypically as *Luronium*. Salter's third site was the reservoir 400m W of Trawsgoed station SN661725 (1933, Diary 29.7.1933), where it was seen again in 1939 (Webb 1941) but not since. A surprising record of two plants of *E. hydropiper* germinated from buried seed in an old pasture below Nant Llan, Clarach SN596838 in c.1930 is given by Chippindale & Milton (1934); if the genus was correct, it must surely have been *E. hexandra*.

*E. hexandra* can occur in vast abundance, particularly on bare mud at the edges of water bodies, for example at the lead mine reservoir SE of Llantrisant church SN729747, where it was first seen in 1959 (EHC),

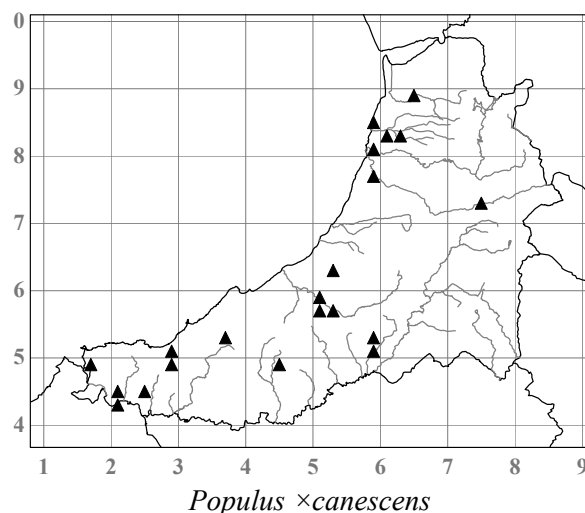
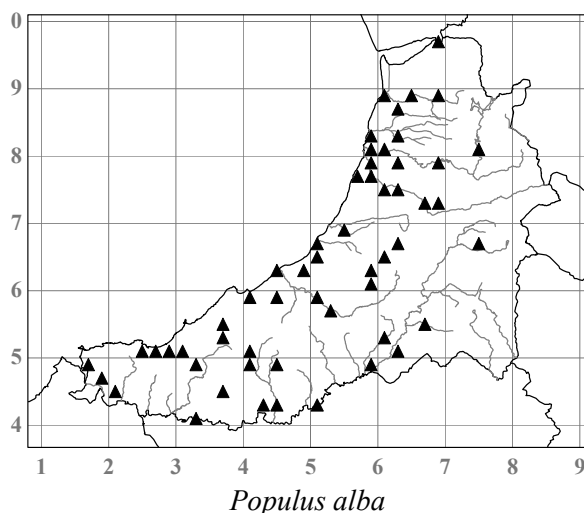


and where in July 1984 c.12,000,000 plants were estimated, covering 10% of the mud exposed in this dry summer. The natural lakes it has been recorded from are Llyn Eiddwen SN604668, 1990 (SPC) - 1999; Llyn Gynon SN799649, 1989 (JRA & BSBI Field Meeting) - 1998; Llyn Fanod SN604645, 1961 (Seddon 1972) - 1994 (AOC & LC); Llyn Maesllyn SN693627, 1993 (AOC & CM), as well as several lagoons and pools nearby on Cors Caron; and Llyn Berwyn SN741568, 2007 (AOC & ACJ). Additional artificial water bodies where it occurs are a pond dug in the 1960s on the RSPB Reserve at Ynys-hir SN684969, 2001 (NMW, AOC & RB); a small pool on the Aberystwyth golf course SN593828, 1998 (NMW); the lead mine reservoir of Pond Llywernog SN722815, 1999; two gravel pits at Glanrhyd-ty-noeth SN667786, dug c.1970, and SN665785, dug c.1971, 1990 (NMW); a clay pit dug c.1970, 1km N of Maesglas on the Camddwr SN773564, 1995-2000 (RGW); the mine reservoirs of Llyn Pendam SN707837, 2007 (AOC & ACJ) and Llyn Rhosgoch SN713832, 1996 (AOC & ACJ); and a 4ha lake dug c.1967 at Pant, Llanddewi-Brefi SN661563, where it was in great abundance, 1997. Its increase may possibly be due to increase in the amount of silt in the water bodies, caused by agricultural and FC drainage operations. Altitude limit 425m, Llyn Gynon SN799649, 1998.

## SALICACEAE

### **Populus alba** L. - White Poplar - Poplysen Wen

Occasionally planted, especially in the coastal parts of the county, and sometimes naturalising by suckers in scrub and woodland and along hedges. It is popular for windbreaks at coastal caravan parks. 'Pyramidalis' has recently been planted in Pentre Jane Morgan, Penglais SN59958221, 2004, and elsewhere. Maximum 266cm girth, one of several big trees by the railway near the old gasworks, Aberystwyth SN59438091, 1992; 263cm girth, 21m tall, in pasture 200m WSW of Tynewydd Brynog SN52755748, 1992.



### **Populus ×canescens** (Aiton) Sm. (*P. alba* × *tremula*) - Grey Poplar - Poplysen Lwyd

Occasionally planted, both as individual trees in hedges and woodland, and as shelter belts or rows, and naturalised by vigorous suckering. In several places there are back-crosses to *P. alba*, and these trees have sometimes clearly come from seed, for example in the A482 roadside hedge 800m NE of Ciliau Aeron church SN50795878, where such a tree 6m tall in 1991 (NMW, LANC) was near a huge *P. ×canescens* and 200m from *P. alba*, and suckering strongly. Another such back-cross was a small tree among 15 big *P. ×canescens* in woodland by the Afon Stewi 400m E of Plas Gogerddan SN633838, 1993 (NMW). Maximum 396cm girth (at 75cm up), 23m tall, 2005, N hedge of A482, 800m NE of Ciliau Aeron church SN50795878 (NMW, LANC).

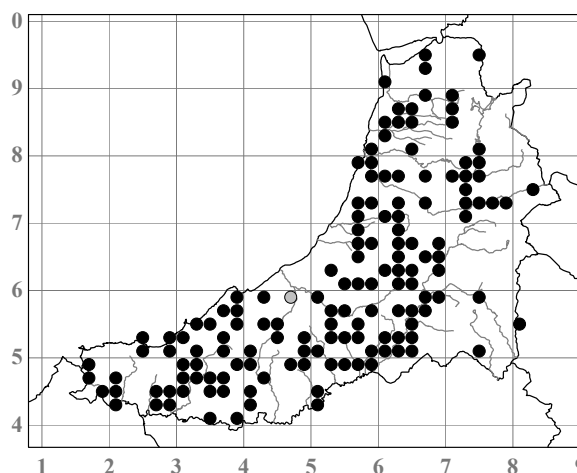
### **Populus tremula** L. - Aspen - Aethnen

Widespread but rather sparse throughout the county, and more often seen as a planted tree or in hedges than as an obvious native in woodland. There are though small colonies in ancient woodland in several sites, for example in Coed Rheidol SN752794, 2005 (SDSB & AOC); in the Nant Llwlwyn dingle, Llanfarian SN590773-584767, 1907 (Salter Diary 11.3.1907) - 2005; and in Cwm Du, Coedmore SN19604452, 1996 (AOC & DAP) - 2004. There is a colony in the coastal cliff Oak woods at the MoD site, Aber-porth



SN246525, 1982-2005, and it is also probably native in scrub on the till slope by the Teifi estuary S of Nantyferwig SN16884783, 2003 (AOC & RM). In the uplands it is undoubtedly native on a cliff in the open by the Nant Cwm-du, 800m SW of Dolgoch in the Tywi valley SN800555, 1986 (AOC & DD). Colonies at the edges of woods, for example along the top of the Ystwyth gorge at Pontrhyd-y-groes SN735721, 1991-2005, and by streams, for example by the Nant y Ffin, E of Ysbyty Ystwyth SN76097158, 2004 (AOC & JPW) may also be native.

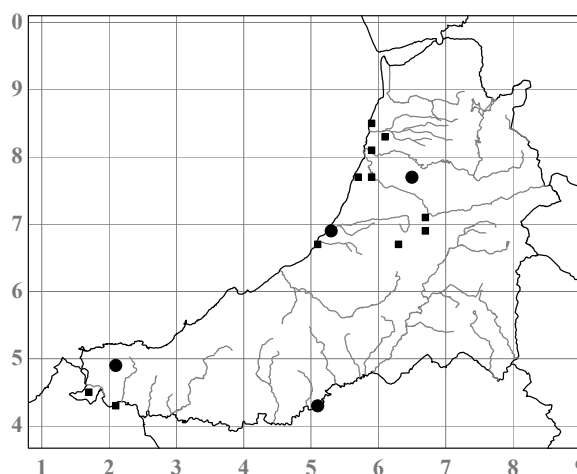
The most extensive suckering colonies are usually in secondary or planted woods, and in neglected pastures, for example by the drive to Tan-y-bwlch SN58757878, 1990-2008, and SN58287918, 1991-2008 (both are female, and a small male colony is nearby at SN58367860, 1927 (Salter Diary 21.2.1927) - 2008; in Hazel scrub opposite Penrhiw, Ystumtuen SN737784, 1990-2004; in pasture in Cwm Soden SN367576, 1986-2002; and in rocky pasture 600m NNW of Henllan church SN35244078, 1990-2002. Aspen was planted by the FC in 1994 in an area of felled forest NE of Cors Caranod, Bethania c.SN570652 (RNT). It has often been planted by farms and at amenity sites. There is great variation in habit, leaf size and shape, and hairiness. Maximum 207cm girth, 16m tall, 1992, S bank of Afon Aeron 500m W of Brynog SN524575. Altitude limit c.365m ("about 1,200ft."), no locality (Salter 1935); 350m (native), cliff by Nant Cwm-du, Dolgoch SN800555, 1986 (AOC & DD); 460m (planted), FC conifer plantation 1km N of Llyn Berwyn SN741580, 2008.



### **Populus nigra** L. - Black-poplar - Poplysen Ddu

#### Subsp. **betulifolia** (Pursh) Dippel

There appear to be at least three and perhaps five native, unplanted Black-poplar trees in the county, as well as about 26 planted trees (excluding the cultivars that are discussed separately below). Probably at least four different clones are involved (designated A-D here). 14 trees, all but one in the Ystwyth valley and Aberystwyth area and at least two being native, comprise one clone, A, and have few bosses on their trunks, largely lack the heavy, downturned lower boughs normally characteristic of subsp. *betulifolia*, and have subglabrous twigs and petioles and thus have every appearance of being subsp. *nigra*; there are two trees in Merioneth, at Brynrug and Pont Dysynni, that appear to belong to this same clone, and according to D. S. Hobson (pers. comm.) these Merioneth trees are similar to the Black-poplars found around Dublin. Subsp. *nigra* is unrecorded in the wild in Britain, and even as a planted tree it seems virtually unknown; Elwes & Henry (1913) said of it only that "The glabrous continental tree is very rarely planted in Britain", and the only recent reference I have found is in Johnson (2003) who writes: "The continental type, with hairless shoots, may not be grown here." It is very surprising that such a widespread European tree has been so neglected. Further investigation of our clone A is certainly needed, and may well show that these trees should in fact be called subsp. *nigra*. There is one living apparently native tree of normal subsp. *betulifolia* in the county (clone B), similar in habit and pubescence to characteristic trees of this subspecies elsewhere in Britain. The remaining two clones are certainly of *P. nigra*, but do not fit well with either subspecies. All the trees in the county are male. The only record of a female is a Salter specimen labeled "Aberystwyth (Planted) 1931" (NMW) that appears to be of clone A, but unfortunately there is no further information. Whether the "black poplars" planted on the Hafod estate c.1802 (Moore-Colyer 1992) were *P. nigra* or hybrids is unknown.



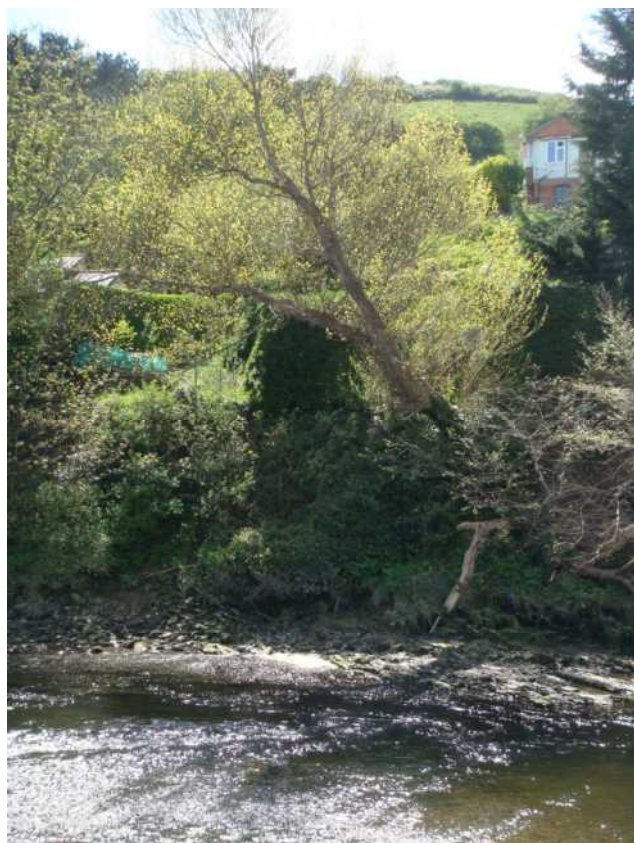
#### **Clone A**

The two native trees are on the banks of the Afon Llanfihangel below Llanfihangel-y-Creuddyn and were confirmed (along with most of the planted ones) as *P. nigra* by EWBHM-R from pressed material and photos,

*Populus nigra* clone A, Tan-llan,  
view NE from SN658762, March 1994

and it was he who first suggested that from their location they were likely to be native. One is at Tan-llan SN65807627 in a marshy corner of a pasture on the S side of the stream and was 296cm girth (at 2m up) and 22m tall in 1992 (NMW) and 304cm girth and 22m tall in 2004. The other is 450m downstream, in a copse on the N bank SN65357629, 347cm girth (at 1m up) and 24m tall in 1994. This is not an area where unusual trees would have been planted, and the latter site is not near any former dwelling (G. Morgan pers. comm.). A large but unmeasurable tree on the rocky, tidal S bank of the Afon Rheidol 300m above Trefechan Bridge, Aberystwyth SN58518105, 2001 (NMW) does not look planted, and may well be either native or grown from a branch washed downstream; two branches fallen from it had rooted on a rock ledge 10m downstream and grown into saplings 1m and 1.5m tall in 2003 and were presumably somewhat salt-tolerant, and two cuttings were planted on the opposite bank in 2004 (RAJ). A many-trunked, presumably coppiced tree on the bank of the Afon Wyre below Llanrhystud SN53546951, 2006 (SPC) also does not look planted.

The obviously planted trees are all within 10km of the native Afon Llanfihangel ones. The two



*Populus nigra* clone A, Rheidol  
estuary, view S from SN58578107, April 2009



*Populus nigra* clone A (centre)  
grown from fallen branch, Rheidol estuary,  
view SW from SN58538109, June 2009





*Populus nigra* clone A, Wenallt,  
Llanafan, view WNW from SN675717,  
1971 (photo E. H. Chater)

here was built in 1875 so the tree could well date from then (J. Davies pers. comm.). A tree at Brynarth, 2.5km E of Lledrod SN66886979 was 371cm girth and 23m tall in 2002. One by the pond in the Aberlloolwyn grounds SN58707728, anciently lopped high up, was 343cm girth and 22m tall in 1992. The remaining seven trees are around the playing fields and railway by the old gasworks site at Aberystwyth: the northerly of two (both sensitively lopped at c.12m up in 1994) by Ysgol Penweddig SN59538115 was 379cm girth and 23m tall in 1992, and 401cm girth and 21m tall in 2005; the southerly of these two SN59538113 was 386cm girth and 21m tall in 1992, and 413cm girth and 21m tall in 2005; the northerly of two trees by the former gasworks SN59488098 was 336cm girth and 21m tall in 1992, and 361cm girth and 25m tall in 2004, while the southerly of these two SN59468095 was 394cm girth and 21m tall in 1992 (NMW), and 445cm girth and 25m tall in 2004; the easterly of two trees 5m apart by the railway at SN59198100 was 282cm girth and 17m tall in 1992, and 328cm girth and 24m tall in



*Populus nigra* clone A, northerly  
tree at gasworks site, Aberystwyth, view  
ESE from SN59438100, February 2005

biggest are 5km SSE, 5m apart on the SW side of the B4340 road at Wenallt SN67467184, and were first noted in 1969 when one was measured as 500cm (16ft 5ins) girth (AFM, Hyde 1977, where the location was erroneously given as 2km E of Trawsgoed; AFM *in litt.* to M. Wainwright, 14.7.1993, again mentioned “two big roadside trees near (2km east of) Trawsgoed”, obviously these same ones); the N tree here was c.450cm girth and 31m tall in 1993, and c.475cm girth and 31m tall in 2004, while the S tree was c.500cm girth and 31m tall in 1993 (NMW), and c.500cm girth and 35m tall in 2004 (both trees have dense Ivy that makes measuring their girth difficult). A tree by the W corner of the garden of Tan-y-fon, Bronnant SN63436721 was 296cm girth and 18m tall in 1994, and was cut off at 1.5m up in 2003 when it had c.114 rather obscure annual rings; the first house



*Populus nigra* clone A, Aberlloolwyn,  
view S from SN587772, March 1994



2005, while the westerly of these two was 21m tall in 1992, and 279cm girth and 21m tall in 2005; a tree S of the railway on waste ground at SN59838111 was c.180cm girth and 8m tall, but distorted and poorly grown, in 1994 (NMW), and has since gone.

Cottrell *et al.* (2005) studied the chloroplast DNA throughout Britain and Europe in order to provide insights into the postglacial migration routes of *P. nigra*. They included one of the two clone A trees by the old gasworks site SN594809 (J. E. Cottrell pers. comm.) which had the usual haplotype of the majority of British trees.

#### Clone B

The one tree with the normal characters of subsp. *betulifolia* that appears native is on the bank of a miniature “dry valley” by the headwaters of the Afon Mwldan, a tributary of the Teifi, 50m W of Glennydd (formerly Rhyd-fach), Penparc SN21294856, 405cm girth (at 75cm up) and 365cm girth at 2m up (above a lost bough) and 22m tall in 1994 (NMW); the upper boughs were broken in a storm in 2002. Two cuttings from this tree



*Populus nigra* clone B, Glennydd,  
view W from SN213485, April 1994

were planted by the WTSWW in their Coed Madie B. Godard Reserve at Llechryd SN210436 in 2000. A planted tree by the entrance to Blaen-ddol (Barberry), St Dogmaels SN16054495, 234cm girth and 14m tall in 1994 (NMW), lopped in 2000, may also be this same subspecies; it has similarly pubescent twigs but lacks any big boughs. In 1994 a heavily bossed dead stump 220cm girth, 1994, with a length of trunk lying alongside it with one heavily bossed, downcurved bough, was found in marshy woodland by an ox-bow of the Afon Teifi at Pyllau Gleision, Highmead SN50684288; this may have been the only other remnant of a native population of subsp. *betulifolia* in the Teifi valley.

#### Clone C

Two very windblown trees on the garden boundary of Tanrallt, Llan-non SN50716619, have heavily bossed trunks and densely pubescent twigs, but differ from all the other *P. nigra* in the county in coming into leaf three or four weeks earlier. They are perhaps another clone of subsp. *betulifolia*. The NE tree had three trunks from one stool, the largest c.300cm girth at 1.3m up, c.15m long and almost horizontal, 1994 (NMW), and was heavily lopped in that year. The SW tree was c.250cm girth, broken off at 6m up, 1994, but was growing well after being cut at 3m up in c.2000.

#### Clone D

This clone consists of ten planted trees, with very sparse pubescence like clone A, with often more bosses on the trunk and on the often more downcurved boughs, but with a distinctive twiggy growth giving the trees an untidy appearance. Were they better grown they might perhaps become acceptable as part of clone A. They occur N of Aberystwyth around Llangorwen and S of Aberystwyth around Chancery, and are all within 2km of the coast. A tree in a pasture just NE of Rhosgellan-fach farm, Wallog SN59658524, was 228cm girth and broken off at 12m up in 1994 (NMW), and was believed to have been planted in the 1850s by Williams of Wallog (J. P. C. Evershed pers. comm.); it blew down in 2005. Another very poorly grown tree nearby at the edge of a mixed plantation SN59738555 was 170cm girth, also broken off at 12m up, in 1994, and felled with the rest of the plantation in 1996, was doubtless of the same origin. Two trees in a copse in the pasture 300m NE of Plas Cwmcynfelin may date from the same time, and were both very poorly grown: one at SN60568365 was 240cm girth (at 2m up above a bough), broken off at 17m up, 1994; the other at SN60568365 was 262cm girth (at 1m up), broken off at 18m up, 1994.

The trees of the southerly colony around Chancery, mostly now gone, were of at least two generations. Two trees, 5m apart in the copse S of Brynrychain SN580773, were 242cm girth and 19m tall in 1994 (NMW, the SE tree), and 198cm girth and 18m tall (the NW tree). A tree in a paddock at Atherstone (formerly Sunny-Hill) SN57557732, felled in 1994, (NMW) was 240cm girth and had at least 60 annual rings; three smaller ones nearby were also felled in that year. At the SE corner of Ty'n-fryn farmyard SN57407696 a tree, 245cm girth and 13m tall in 1994, was said to have been sizeable in the 1950s and there had been another close to it which was felled c.1980 (B. Jones pers. comm.). Two others 6m apart in a



*Populus nigra* clone D at  
Brynyrychain, Llanfarian SN580773,  
view from the NW, April 2009

*Populus nigra* cf. 'Italica Foemina',  
Fagwyr, Tal-y-bont, view N from  
SN64428742, April 2005

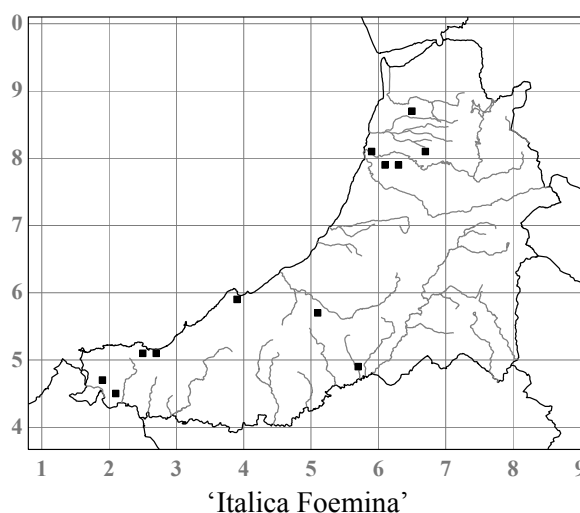


paddock on the S side of this farm SN57387694 were 155cm girth and 13m tall (the N tree), and 169cm girth (at 1m up) and 11m tall (NMW, the S tree), in 1994, and had been planted as cuttings from Sunny-Hill in c.1960 (B. Jones pers. comm.).

**'Italica Foemina'** ('Gigantea') - Giant Lombardy-poplar - Poplysen Enfawr

This female fastigiate cultivar was probably introduced into Britain about 1880, although its origin is unknown. The trees are very variable and several clones are probably covered under this cultivar name in the county. It is less often planted here than the male 'Plantierensis', but some 35 trees in a dozen sites have been recorded. Some are in woodland, for example a group of ten trees, c.190cm girth and 20-24m tall in 1994, in the College grounds, Cardigan SN180465; some are street trees, for example two, 198cm girth and 13m tall, and 172cm girth and 13m tall, in 1992, in Min-y-ddol, Penparcau SN593803; and others are in amenity areas, in roadside hedges or by playing fields. Three trees on the Nanteos estate are probably the oldest and largest: one, 227cm girth and 31m tall in 1992, 245cm girth and 31m tall in 2005, is on the SW bank of the Nant Paith in Coed Penglanowain SN613784; another, 225cm girth and 21m tall in 1992 (NMW) is on the S bank 300m SSE of the mansion SN621783; while the third, 295cm girth and 21m tall in 1992, is on the N bank here.

A group of eight trees between Tal-y-bont and Bow Street, resembling a weakly fastigiate form of 'Italica Foemina', and also differing from it in having puberulent twigs, comprise a very distinct clone. At Fagwyr SN645874, three trees in a copse W of the house were 176cm girth and 18m tall, 171cm girth and 18m tall, and 114cm girth and 16m tall, while one on the bank S of the house was 124cm girth and 15m tall, in 1995 (NMW); these were planted by H. James some time between 1940 and 1965 (H. H. James pers. comm.). A smaller tree, 96cm girth and 10m tall in 1995, is by the A487(T) at the entrance to the Fagwyr drive SN64418743. Three trees on the SE side of the road at Bryngwyn-canol SN64448616 were also planted by H. James: 194cm girth (at 50cm up) and 12m tall (the W tree), 194cm girth (at 50cm up) and 15m tall (the middle tree), and 178cm girth (at 1m up) and 15m tall, in 1995 (NMW).



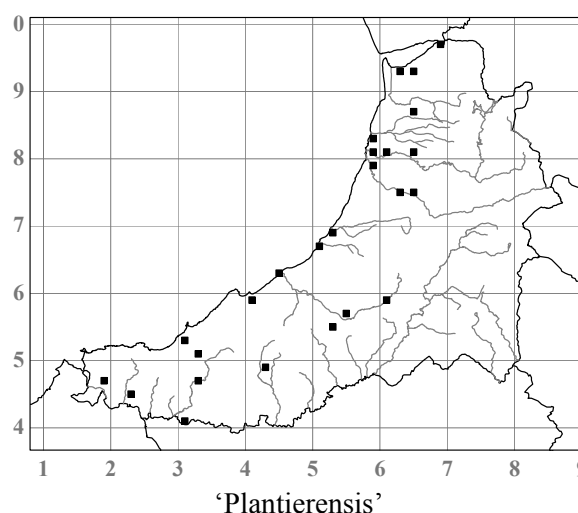
### ‘Plantierensis’

This male fastigiate cultivar with minutely and often very sparsely puberulent twigs was probably introduced into Britain from France in the late 19<sup>th</sup> century. It is the commonest Lombardy Poplar in the county, often planted in shelter belts, as a street tree, in amenity areas and for decoration in hedges and estates. The trees are in general smaller and doubtless mostly more recently planted than the ‘Italica Foemina’ trees, and one of the few noted over 200cm girth was in the Vicarage grounds, Llanrhystud SN539699, 219cm girth and 21m tall in 1992. Maximum 245cm girth, 21m tall, 1992, in pasture N of Afon Cledan, Llan-non SN51556679.

‘Italica’, with glabrous twigs, has not been seen in the county.

### ‘Vereecken’

A male cultivar introduced into Britain in 1950 from the Netherlands. A tree in Greenfield Square, Cardigan SN17724625, was 72cm girth and 7m tall in 1994, and 230cm girth and 14m tall in 2009; it is said to be the fastest growing Black-poplar clone.

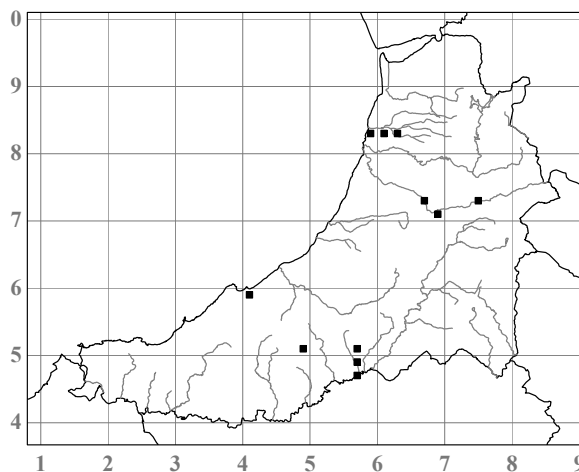


### **Populus ×canadensis** Moench (*P. deltoides* Marshall × *nigra*) - Hybrid Black-poplar - Poplysen Ddu Groesryw

I have attempted to identify all the Hybrid Black-poplars planted in the county, but the identity of a number of trees, including several resembling ‘Regenerata’ and ‘Casale 78’, remains uncertain, and a few cultivars may have been missed. The older pre-1950 trees, some perhaps dating back to the late 19<sup>th</sup> century, are mostly ‘Serotina’, with a few ‘Marilandica’; ‘Regenerata’ and ‘Eugenii’ seem to have been seldom planted. Probably no surviving ‘Robusta’ dates from before 1949, and in the 1950s and 1960s this, and to a much lesser extent ‘Gelrica’ and ‘Casale 78’, were widely planted by the FC and others both for timber and for shelter and ornament; ‘Heidemij’ was rarely used. After this, the Balsam Poplar cultivar *P.* ‘Balsam Spire’ became the most popular. None of the Hybrid Black Poplars has been found naturalised by suckering, or from seed, and all records are of planted trees.

### ‘Casale 78’ (‘I-78’)

A female cultivar, introduced into Britain from Italy in 1939. Most of the plantings in the county are from the 1950s and 1960s, and several of them are in the same experimental sites where ‘Gelrica’ was planted. The largest of the FC trees in Black Covert, Trawsgoed SN668726, was 171cm girth and 24m tall in 1992, and they are generally larger than the contemporaneous ‘Gelrica’ there. The largest of 26 FC trees in the long row of Poplars along the N edge of Allt Dderw, Gogerddan SN636836 was 123cm girth and 22m tall in 1994, but here they are smaller than the adjacent ‘Gelrica’. The largest of six FC trees by the Hafod drive SN748728 was 142cm girth and 20m tall in 1994. At the SE end of Wern Wood, Lampeter SN565477 the largest was 163cm girth and 23m tall in 1995, a little larger than the adjacent ‘Heidemij’. At Gorsgoch SN484505 in a shelter belt planted by the village hall c.1965 the largest was 149cm girth but only 15m tall in 1994; this was at 245m altitude. Maximum 192cm girth, 26m tall, 1994, one of several trees on the N side of Falcondale Lake SN569500.



### ‘Eugenii’

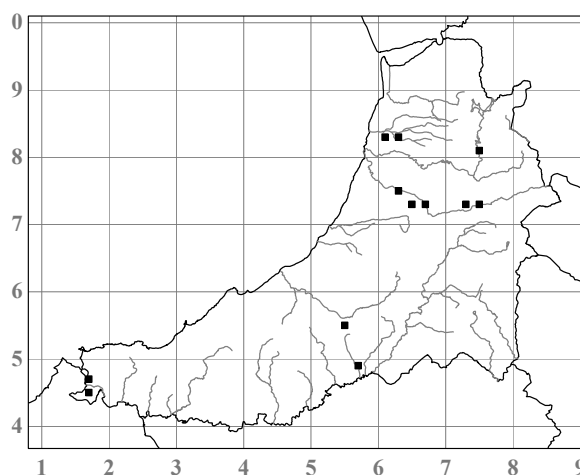
A male cultivar, introduced into Britain from France in 1888. The only healthy trees seen in the county are three by the drive to Parc, Ciliau Aeron SN501584, the largest 241cm girth, 26m tall, 1995. The others are all half-dead trees of some canker-prone clone of it (cf. Peace 1952): three trees, the largest 210cm girth, 26m tall, 1994, by the lane to Y Felin, Aber-mad SN596763, planted by W. A. Cadman of the FC in the 1950s;



two trees, 105cm girth, 21m tall, and 101cm girth, 18m tall, 1995, E of the drive 450m N of Falcondale SN56404959; and three similar trees nearby at SN56424944, 1992.

#### **‘Gelrica’**

A male cultivar, introduced into Britain from the Netherlands in 1937. It was planted on a small scale, mostly in experimental sites, in the 1950s and 1960s, but rarely since. Nine trees in estate woodland at Llanllyr SN540559, the largest 209cm girth and 27m tall in 1994, are perhaps the oldest. It was planted for timber by the FC on marshy ground in Black Covert, Trawsgoed SN668725, where the largest was 141cm girth and 18m tall in 1992, and in Coed Allt-fedw nearby SN658727, 124cm girth and 23m tall in 1994. The largest of 20 trees planted by the FC in the long row of Poplars along the N edge of Allt Dderw, Gogerddan SN636836, was 170cm girth and 26m tall in 1994, and these ‘Gelrica’ trees are taller than the ‘Robusta’, ‘Heidemij’ and ‘Serotina’ trees of the same age in this row. Among other good groups or rows of trees are those in estate woodland by the Nant Adal S of Llanilar SN624747, the largest 183cm girth and 26m tall in 1994, and on the S side of the Hafod drive SN748728, the largest 130cm girth and 19m tall in 1994. Maximum 209cm girth, 27m tall, 1994, as above.



**‘Heidemij’**  
A male cultivar, introduced into Britain from the Netherlands in 1950. It was planted in only a few places in the county, and for timber only by the FC at the SE end of Wern Wood, Lampeter SN565477, where the largest was 136cm girth and 23m tall in 1995; and in the E part of Coed Pwll-crwn, Gogerddan SN625834, where the largest was 87cm girth and 22m tall in 1995, and where their radial growth was less than that of adjacent ‘Robusta’ and ‘Gelrica’. A tree planted in the 1950s by W. A. Cadman of the FC by the lane to Y Felin, Aber-mad SN59707634 was 237cm girth and 25m tall in 1994. Two trees 209cm girth and 22m tall, and 199cm girth and 20m tall, in 1993, at the University Botany Gardens, Aberystwyth SN58588210, grow instructively beside a ‘Robusta’, as do those in the long row of Poplars along the N edge of Allt Dderw, Gogerddan SN636836, where the largest ‘Heidemij’ was 130cm girth and 22m tall in 1995. Maximum 215cm girth, 21m tall, 1993, the bigger of two trees, both unfortunately now gone, in the Aberystwyth Holiday Village SN587808.

#### **‘Marilandica’**

A female cultivar of uncertain origin, introduced into Britain in 1843. Only 22 trees have been noted in the county, most probably dating from well before 1950 and several being perhaps a century or more old. They are fairly uniform, and seem distinct from the variable ‘Regenerata’ clones to which this cultivar can elsewhere be confusingly similar and with which it has recently been combined. The best and oldest trees are a row of six alongside the disused railway at Trawsgoed SN665729, the N-most and largest being 393cm girth and 30m tall in 2004. Of five trees in the grounds of Ranger Lodge, Glandyfi SN690965, the largest was 203cm girth and 25m tall in 1994, and the larger of two at Ffosrhydgale, Chancery SN57927667, was 291cm girth and 25m tall in 1992. An old-looking tree, though only 158cm girth and 12m tall in 1992, is in a pasture at Morfa Mawr, Llan-non; two slightly larger trees nearby with hollow trunks were felled in 1992. A big tree at the Trawsgoed Experimental Farm SN67527398 was felled in 1993. A very fine tree on the Teifi bank just below Pont Llanio SN65155697, 368cm girth and 26m tall in 1992, was pollarded c.1999. The other trees were two rising above the canopy in mixed woodland NW of the Afon Mwldan below New Mill, Cardigan SN18604734, the larger N one 283cm girth and 30m tall in 1994; a leaning tree 121cm girth and 19m tall in 1995, at the E end of the row of cankered ‘Regenerata’ 800m SSE of Falcondale SN57124849; and a spindly tree 163cm girth and 18m tall in 1996, in a row of Sycamores at Odyn-fach, Tal-y-bont SN64528767. Maximum 393cm girth, 30m tall, 2004, as above.

#### **‘Regenerata’**

A group of female clones, introduced into Britain from France in about 1870. Although commonly planted over much of Wales, it was either rarely planted or has seldom survived in this county. All the 30 or so trees in a shelter belt 800m SSE of Falcondale SN571484, the largest of which was 169cm girth and 28m tall in 1992, are badly cankered and are presumably of a susceptible clone. A much-lopped 5-trunked tree by the

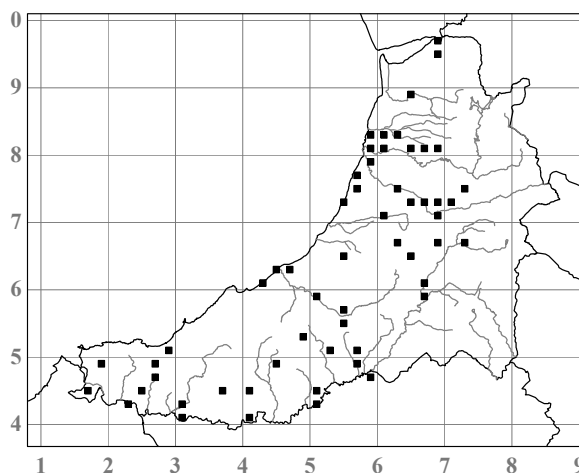
Plas-crug Leisure Centre, Aberystwyth SN59488119 had its largest trunk 134cm girth and 20m tall in 1992 (NMW). There is a good tree 145cm girth and 14m tall in 1995, probably planted c.1956, at the entrance to Tryal manor SN482534, opposite a 'Robusta'. The only other definite 'Regenerata' trees were eight, only 7-10m tall in 1999, in a row by Maesyfelin-isaf, Llanwenog SN500455. Two groups of trees by the B4342 near Gylfachreda are puzzling, and perhaps another clone of 'Regenerata' although they have some resemblance to 'Casale 78'; the largest of these, at SN414584, was 131cm girth and 18m tall in 1992, and there are similar trees at SN402591. Maximum 169cm girth, 28m tall, 1992, as above.

#### 'Robusta'

A male cultivar introduced into Britain from Europe in about 1910. In the 1950s and 1960s it was the Poplar most widely planted for timber in the county, as in the rest of Britain, and then and since it has also been much used for shelter belts and amenity planting in the county. The oldest surviving plantation is in the valley at the S side of Coed Alltfedw, Trawsgoed SN665727, where the largest of the trees planted by the FC in 1949 was 196cm girth and 24m tall in 1992 (NMW). Another early planting was in 1951, of a shelter belt of six trees, the largest 135cm girth and only 15m tall in 1994, by Blaenllynan, Ferwig SN189485; a sucker from one of these, planted out in 1960 in a damp, more sheltered site by the stream 250m to the E, was 171cm girth and c.22m tall in 1994. Trees planted c.1960 in Coed Pwll-crwn, Gogerddan SN621836 were c.220cm girth and c.25m tall in 1992 (NMW). This cultivar seems fairly salt-tolerant, and healthy though severely wind-distorted trees can often be seen at caravan and chalet sites along the coast. Maximum 250cm girth, 21m tall, 1992, in a fine row of six trees at the N end of a conifer plantation 200m W of Talgarth, Trawsgoed SN680727; 216cm girth, 26m tall, 1992, one of five trees along the W edge of the playing fields, Lampeter school SN571481.

#### 'Serotina'

A male cultivar, introduced into Britain from Europe in the mid 18<sup>th</sup> century. Most of the older planted Poplars in the county are this, including many huge and impressive examples some of which may well date from the early 20<sup>th</sup> or late 19<sup>th</sup> century. It is the last of the Poplars, and usually the last of all trees, to come into leaf, emerging bronze-red about mid-May. It grows especially well on marshy ground, and most of the trees lean conspicuously to the NE away from the prevailing wind. Most of the plantings have been of single trees or small groups for ornament or shelter, and it does not seem to have been used significantly for timber. Of all our Poplars, 'Serotina' is the one that most contributes to the landscape and there are many fine examples along the rivers, for example by the Nant Clarach E of Llangorwen SN608838, 2005, by the Ystwyth



*Populus x canadensis* 'Serotina', Ystrad Caron, view NW from SN673597, May 1992

at Llanfarian SN590774, 2005, by the Aeron below Brynog SN524575, 2004, and by the Teifi at Cenarth SN2641, 2005. Large isolated specimens or groups include a huge, gaunt tree overhanging Ystrad-Caron farmyard, Tregaron SN67305970, c.350cm girth and 21m tall in 1992; a tree in a pasture NE of Cwmere-isaf, Temple Bar SN53705488, whose main trunk at 1.5m up was 330cm girth and 22m tall in 1992 (its double trunk at 50cm up being 431cm girth); five trees planted in 1953 for the Coronation at Maen-gwyn, Croeslan SN38254320, the largest 174cm girth and 25m tall in 2008; and two trees, 364cm girth and 19m tall, and 358cm girth and 20m tall, in 1995, the only ones remaining of twelve after a gale in 1990,

N of Cefnmaesmawr, Brongest SN32424641. A house to the E of this last site is called Poplars, but as this name dates back to 1791 (Wmffre 2004) it is unlikely to be connected with the present trees.

The Poplars planted *c.*1830 in Poplar Row, Aberystwyth SN587817 are likely to have been either 'Serotina', the only one of these cultivars available at that date, or *P. nigra*. Each cottage claimed its own tree, they grew to a good height, and after one blew down in a storm in 1870 the rest were felled by *c.*1876 (Evans 1902).

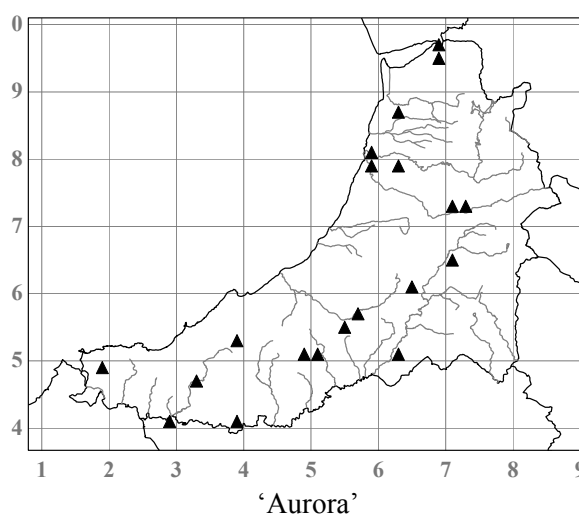
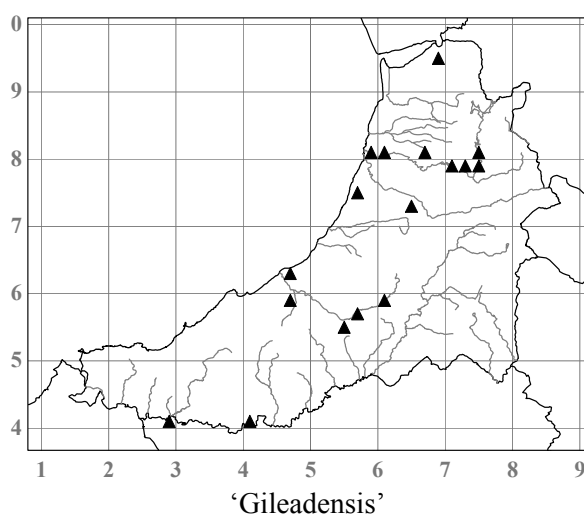
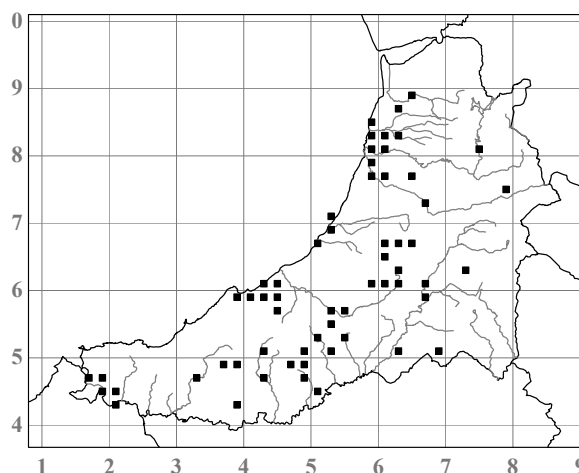
Growth can sometimes be slow even in apparently suitable sites, and three trees 244cm, 210cm and 169cm girth, the first 24m tall, 1995, at Dolganod, Aber, Cwrtnewydd SN47744831, grew from fence posts put in as long ago as 1926. Maximum 383cm girth, broken off at 7m up, 1994, N side of A484, 500m S of Llangoedmor church SN19994527; *c.*400cm girth (at 1m up just below where pollarded), 20m tall, 1995, on SW bank of road 450m WNW of Pontsian crossroads SN43424641; 297cm girth, 30m tall, 1998, on SE bank of Afon Aeron 200m NNW of Aeron Parc, 2km NNE of Llangeitho SN62986170.

Altitude limit 320m, two trees by ruin 500m SSW of Wauncynnydd, Cwm Twrch SN681502, the larger 322cm girth and 24m tall, the other 162cm girth and horizontal for 6m and then upright for 17m, in 1995 (AOC & JPW); the owner remembered the latter tree as unchanged in appearance since *c.*1955.

**Populus ×jackii** Sarg. (*P. balsamifera* × *deltoides* Marshall; *P. ×candicans* auct., non Aiton, *P. ×gileadensis* Rouleau) - Balm-of-Gilead - Poplysen Balm Gilead

Introduced to Britain in 1773, and occurring only as female clones, probably mostly 'Gileadensis', which was occasionally planted for ornament in the county in copses, on roadsides, in hedges and amenity areas where it naturalises vigorously by suckers. None of the trees is of any great size and many are cankered, and many have several trunks. Because of its susceptibility to canker the FC has never recommended planting it. Suckers can be up to 15m from the parent tree, for example at an old cottage site in Coed Pant-mawr, Cwm Rheidol SN70277917, 1992 (NMW), and in several other sites there are extensive thickets of suckers, for example by Pont Pen-y-bont, Llanbadarn Fawr SN59478036, 1992 (NMW), and by Trewen mill, Cwm-cou SN292418, 1994 (NMW). Maximum 173cm girth, 15m tall, 1994, behind the Feathers Hotel, Aberaeron SN46056278.

'Aurora', a cultivar whose first leaves are usually a pleasant green but whose later ones become hideously variegated, became available in the 1920s, but fortunately seems not to have been noticeably planted in the county until the 1980s. It is becoming increasingly common in gardens, amenity areas and along roadsides.





**Populus lasiocarpa** Oliv. - (Chinese Necklace Poplar)

Introduced to Britain from China in 1900, this very large-leaved species has been planted at least twice in the county. A tree in the Trawsgoed grounds SN67007290, 10m tall and 127cm girth in 1969 (AFM) blew down some years later. Trees were planted in Black Covert, Trawsgoed c.SN670724 by the FC in the 1950s (Mr. Jones, Aberdwynt, pers. comm. 1994), perhaps experimentally for timber, but have long gone.

**Populus maximowiczii** Henry - (Japanese Balsam Poplar)

Planted in estate woodland W of Cae'r-berllan, Ynys-hir c.SN681963 by W. H. Mappin c.1936 (fide PSC) but now gone. Native of NE Asia and Japan, introduced to Britain about 1918.

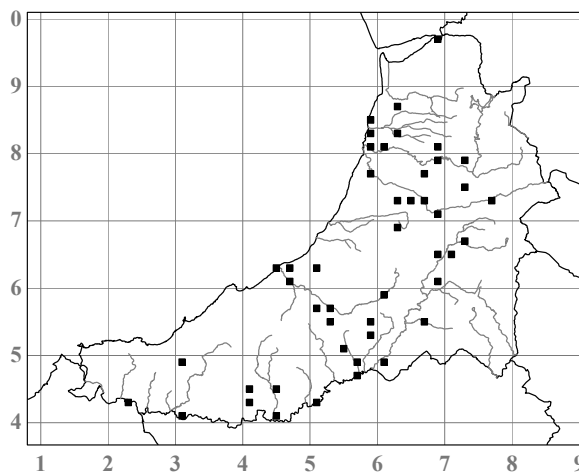
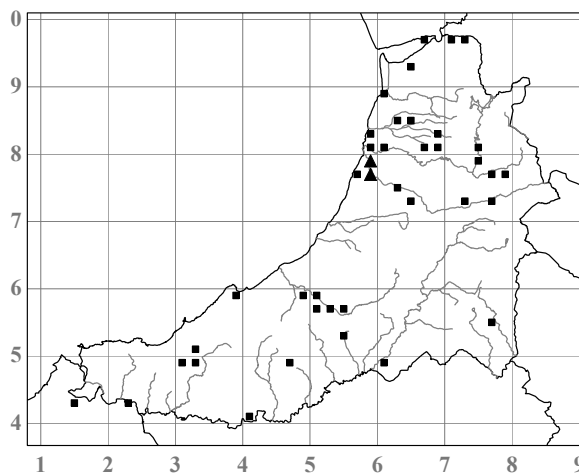
**Populus trichocarpa** Torr. & A. Gray ex Hook. - Western Balsam-poplar - Poplysen Falmaidd y Gorllewin

Introduced to Britain from North America in 1892 and quite widely planted in the county, almost always just for ornament and shelter. It rarely naturalises, by suckering, and some of the trees are badly affected by canker. Surviving trees probably all date from after 1950, and disease-resistant clones are still being planted. It has occasionally been planted to soften the edges of conifer plantations, for example N of the Afon Aeron ESE of Newbridge SN512588, where the largest of eight big trees was 226cm girth in 1992 (NMW). One of the few plantations was a group of 14 trees just W of Brwyno, Glandyfi SN708964, c.75cm girth and c.15m tall in 1994 (NMW). The most vigorously suckering tree was one at The Dingle, Rhydyfelin SN593792, 183cm girth and 18m tall in 1992 (NMW), the largest sucker growth being 124cm girth. Maximum 241cm girth and 21m tall in 1992 (NMW), 304cm girth and 22m tall in 2008 (AOC & MPo), a fine tree planted in 1957 by the Nant y Factory, Glasbwl, Llyfnant SN73909741. Altitude limit (planted) 340m, 120cm girth and 10m tall in 1995, Maes-glas farmyard, 2.3km NNW of Soar y Mynydd SN773554.

Some 2,000 cuttings and saplings of two cultivars that had been introduced into Britain from Belgium in 1985, 'Columbia River' and 'Trichobel', were experimentally planted by the FC in 1994 in the valleys of the Nant Rhuddnant SN775775 and Afon Merin SN790796, at 265-330m altitude, but almost all had died by 2001.

**Populus 'Balsam Spire'** (*P. balsamifera* × *trichocarpa*; *P.* 'Tacatricho 32') - Hybrid Balsam-poplar

A female cultivar introduced into Britain from North America in 1948, and the earliest of the Balsam-poplars or Hybrid Black-poplars to come into leaf in the district. Since the 1970s it has overtaken *P.* 'Robusta' as the most frequently planted Poplar in the county. The first were probably those planted by the FC in the late 1950s in Black Covert, Trawsgoed SN66787260, where the largest was 176cm girth and 23m tall in 1994 (NMW) and 204cm girth and 30m tall in 2004. About the same time two trees were planted by W. A. Cadman of the FC by the lane to Y Felin, Aber-mad SN597763, the N one of which was 165cm girth and 21m tall in 1994. It is commonly seen as rows of up to a dozen or so trees planted for decoration or shelter alongside roads or drives, in estates or large gardens, or as single trees in hedges or amenity areas. It is often planted alternately with other trees, for example with *P.* 'Robusta' by the B4333 1km NW of Adpar SN300415, 1992 (NMW) - 2005, or with *Alnus cordata* as at the Glanyrafon Industrial Estate SN610803, 1992 (NMW) - 2005. Small plantations were sometimes made, for example at Deri Ormond SN588522 by the FC in 1961, where the trees were c.140cm girth and c.20m tall in 1993. Trees planted c.1972 at 265m altitude in a copse on wet ground at



Blaenpentre, Llantrisant SN723749 were poorly grown and only c.10m tall in 1992; it has not been seen at any greater altitude. Maximum 204cm girth, 30m tall, 2004, as above.

**Populus ×generosa** A. Henry (*P. deltoides* Marshall × *trichocarpa*) - Generous Poplar - Poplysen Hael

Rooted cuttings 1m tall of ‘**Beaupré**’, a fast-growing Belgian cultivar introduced to Britain in 1985, were planted by the FC by their office at Llanafan SN685719 in 1994, but this cultivar seems not to have been tried on a larger scale in the county.

**Populus balsamifera** L. - Eastern Balsam-poplar - Poplysen Falmaidd y Dwyrain

A row of six trees c.10m tall, E of the road in Comins Coch village SN613820, 1992 (NMW) was destroyed in 1993. The only others seen, a row of seven at the entrance to Blaencwrt Farm, 2km NE of Cwrtnewydd SN50404885, the largest of which was 101cm girth and 12m tall in 1994 (NMW), had also been destroyed by 1999. Native of E North America, introduced to Britain in 1689.

**Salix** L.

Salter took a particular interest in this genus in the 1930s, growing many in his garden and occasionally in his diaries mentioning pollinating them. He also recorded planting out *S. ×capreola* and *S. ×fruticosa* at “Mr. Bonsall’s pools” SN610805 on 10.10.1938; there was no sign of them there in 2005. Many recently collected specimens have been determined by R. D. Meikle, but most of the trees of *S. alba* and *S. ×fragilis* and their related variants and hybrids have yet to receive expert attention and the following accounts of them are very provisional.

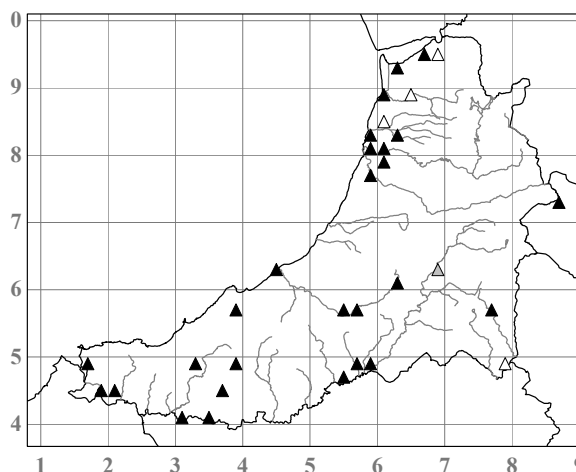
**Salix pentandra** L. - Bay Willow - Helygen Bêr

Planted and probably self-sown or grown from fallen branches in a few sites, but nowhere native. Salter (Diary 7.8.1922, 1935) first saw “good-sized trees” at an old cottage site above Morfa Bychan SN57107704 in c.1892, and in 1958 (NMW) there were two old trees and 5 smaller bushes here, and in 2005 c.6 bushes were still present. Salter also recorded trees around Llyn Frongoch in 1924 (Diary 27.8.1924), and c.12 were still there in 2005, three large ones on the E bank and 8 smaller ones in swampy carr at the N end SN721755. The only other records have been from by the Afon Tryal E of Mabws SN574686, 1964 (EHC), and of c.10 bushes in Ponds Wood, 2km W of Highmead SN480430, 1979 (NMW). Maximum 205cm girth (at 1m up), 2005, a thriving but fallen tree, pollarded at 1.5m up, on the E bank of Llyn Frongoch SN72187553 (NMW).

**Salix alba** L.

Var. **alba** - White Willow - Helygen Wen

An archaeophyte, recorded by Salter from by the Afon Aeron at Abermeurig (Diary 5.6.1934, 1935) where there are still many trees in copses, hedges and shelter belts c.SN5656, 1996 (NMW). He also recorded it in Coed Pwll-crwn, S of Bow Street c.SN620838, 1925 (NMW, Salter, conf. AJW), where the biggest tree in 2005 was 251cm girth and 21m tall; and in Rhos-fawr Plantation NNW of here at SN61738420, 1937 (NMW, Salter, conf. AJW), where only *S. ×fragilis* var. *rubens* was present in 2005. It is generally rare in the county, and most if not all the trees seen appear to have been planted. Conspicuous examples are two by the road across Cors Fochno SN628928, 1958 (NMW) - 2005; forming a hedge along the B4353 road at Glanwern, Borth SN610888, 1991-2005 (NMW); a row of mature trees in the park in Waun Fawr SN604818, 2005 (AOC & PWD); several trees by the Blaendolau fields, Llanbadarn Fawr SN598805, 1991-2005; and around Dolau-gwyrddon-uchaf on the Teifi SN5546, 1989, planted by the then owner’s father. Maximum 251cm girth, 21m tall, 2005, Coed Pwll-crwn SN62058387. Altitude limit 345m, three planted trees by the claypit reservoir 1km N of Maesglas on the Camddwr SN772565, and apparently self-sown saplings in the swamp at the SE corner of this reservoir.



Var. **caerulea** (Sm.) Dumort. - (Cricket-bat Willow)

Undoubtedly under-recorded, but there is a planted tree on the S bank of the Afon Aeron above Lovers' Bridge, Aberaeron SN45856242, 1994-2005 (NMW, conf. RDM).

Var. **sericea** Gaudin - (Silver Willow)

Eight trees of this variant with densely sericeous, long-lasting leaves were planted on the University campus, Penglais SN59448187, the largest 125cm girth and 17m tall in 2006.

Var. **vitellina** (L.) Arcang.

Forma **vitellina** (L.) P. D. Sell ined. (Golden Willow), with the twigs yellow in winter, was said by Salter (1925) to be much planted. Ley (1887) recorded it at Eglwys Fach SN69X. More recently it has occasionally been seen in copses and woodland and by roads and rivers, for example at Penpompre Hall, Tal-y-bont SN659899, 1956, and by the Afon Teifi 1.5km E of Lampeter SN595483, 1993. Forma **britzensis** Späth (Coral-bark Willow), with the young twigs bright red in winter, is occasionally planted; a tree, 244cm girth and 21m tall in 2007, was planted in the lower part of the Penglais dingle SN59208195 in 1973.

**Salix ×fragilis** L. (*S. alba* × *euxina* I. V. Belyaeva) - Crack-willow - Helygen Frau

A frequent archaeophyte along the main rivers and by streams and in marshes, often clearly planted but probably also often growing from washed-down branches or perhaps self-sown. A group of fine old trees at Pwll Simon, Llanbadarn Fawr SN595804, 1924 (Salter Diary 4.5.1924, 1935) - 1988 was destroyed c.1990. Male trees seem very rare, Salter (1935) saying he had seen only one, and in 1936 (Diary 3.5.1936) reporting one at Gogerddan c.SN68G; these were probably var. *fragilis*. Recent work (Belyaeva 2009) has shown that the Crack-willow is a hybrid between *S. alba* and a glabrous-leaved plant, *S. euxina*, native of the Black Sea region. It seems unlikely that the male var. *furcata* and *S. euxina* (var. *decipiens* auct.) have occurred in the county.

Var. **fragilis**

The only definite record is of a fallen male tree in Coed Pwll-crwn SN622835, 2005 (NMW, conf. RDM), perhaps one of, or a clonal derivative of one of, the two male trees recorded by Salter (see above).

Var. **russelliana** (Sm.) W. D. J. Koch - Bedford Willow

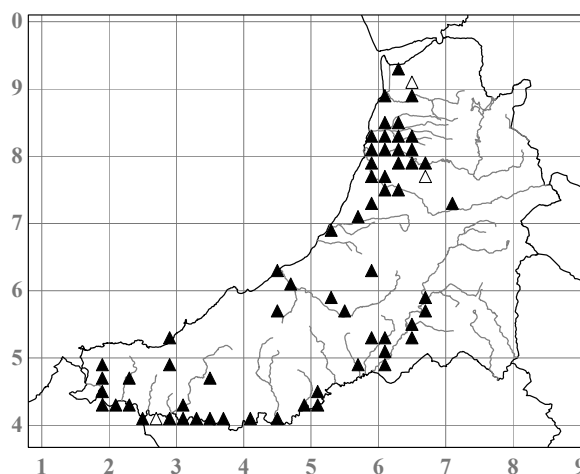
Probably most of the other trees of *S. ×fragilis* in the county are of this female variety. Large old trees remain by the Ystwyth at Llanychaearn SN57Z, 1992 (NMW, conf. RDM) - 2008, and elsewhere in the Aberystwyth area, as well as along the Aeron and in many places along the Teifi, although in the absence of pollarding most have at least partially collapsed; well-maintained pollards of any Willow species in fact seem to be absent from the county. Maximum 246cm girth and 20m tall in 1995, 305cm girth and 21m tall in 2005, N edge of Coed Pwll-crwn, Gogerddan SN61988372 (NMW, conf. RDM).

Var. **rubens** (Schränk) P. D. Sell ined.

A rather rarely planted archaeophyte for which the hybrid name *S. ×rubens* (Hybrid Crack-willow - Helygen Frau Groesryw) used to be used. There was a thicket on the A487(T) embankment just S of Llanfarian Bridge SN59007770, 1992 (NMW, det. RDM); a tall bush in the shrubbery at Devil's Bridge station SN738770, 1995 (NMW, det. RDM), but gone by 2005; and a bush in a swampy fen at Rhos Bwlch-y-rhandir, 3km SSW of Aber-mad SN593732, 1992 (NMW, det. RDM as probably one of its cultivars). Maximum 311cm girth, 19m tall, at the N edge of the Rhos-fawr Plantation, SW of Bow Street SN61738420, 2005 (NMW, det. RDM).

Var. **basfordiana** (Scaling ex Salter) P. D. Sell ined. forma **basfordiana** (Meikle) P. D. Sell ined.

The conspicuous thicket of trees with yellowish twigs at the NW corner of Pont Pen-y-bont, Llanbadarn Fawr SN59468035, 1992-2005 (NMW, det. RDM) is this forma.





**Salix ×sepulcralis** Simonk. (*S. alba* × *babylonica*) - Weeping Willow - Helygen Wylofus

Occasionally planted, for example by the Nant y Factory, Glasbwl, Llyfnant SN739974, 1992; in Rhydlewys village SN347473, 1992; by the Afon Dulas in the grounds of Lampeter university SN580483, 1991-2005; in St Mary's churchyard, Cardigan SN181460, 1984-2004; and by St Dogmaels Road, Cardigan SN170459, 2004. Most of these are probably nothovar. **chrysocoma** (Dode) Meikle.

**Salix babylonica** L. var. **pekinensis** Henry 'Tortuosa' - Corkscrew Willow

Occasionally planted for ornament, for example by the old chapel, Glandyfi SN695970, 1994; in shrubberies on the University campus, Penglais, Aberystwyth SN595816, 2005; and on a road verge 450m E of Llechryd bridge SN222437, 1994 (NMW). The species is native of China.

**Salix triandra** L. - Almond Willow - Helygen Dribrigerog

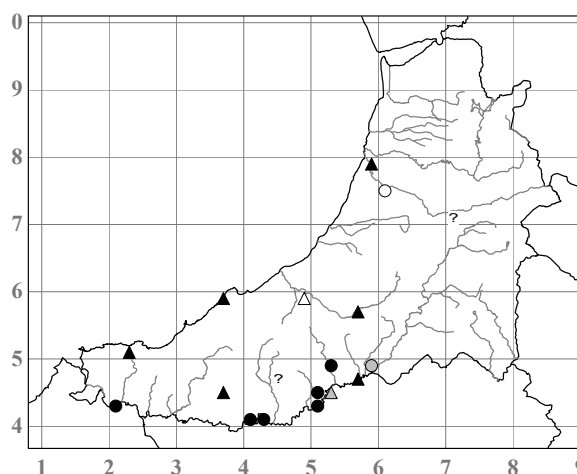
A rare archaeophyte and almost always planted, but probably also growing from fallen or water-carried branches. Salter (1935) recorded it from three sites: a female bush from by the Afon Clarach below Llangorwen church SN599839, pre-1936 (NMW), which was last seen here in 1961; a male tree by a backwater of the Afon Rheidol at Lovesgrove SN629810, 1924 (Diary 4.5.1924) - 2005, which had a second flowering in August 1992 (NMW); and one by the stream at Tresaith SN2751 or 2851, 1938 (1935), where it has not been refound. The only other records are of a male tree by the road 500m SW of Abermeurig SN558559, 1974 (NMW); three bushes in a c.1900 shelter belt N of the Afon Aeron 200m SSW of Felin coed, Talsarn SN55965660, 1996; and a 1980 plantation around a pond 750m ESE of Ciliau Aeron church SN508578, 1981. These were all of var. **triandra** or its cultivars. Var. **hoffmanniana** Bab., much-branched bushes with small green, non-glaucous leaves, occurs on the banks of the Afon Teifi in the Coedmore woods SN191438-195444, 1972 (NMW) - 2005, forming thickets in several places, and always male.



*Salix triandra* var. *hoffmanniana* by the Teifi, Coedmore, view S from SN191438, May 2006

**Salix purpurea** L. subsp. **purpurea** - Purple Willow - Helygen Gochlas

Scattered along the Teifi as far up as Lampeter, on the banks of the river and in adjacent marshes and carr, and in *Salix* and Alder carr by the Afon Grannell near Belicadarn SN52704822, 1980 (AOC & DGJ). Salter did not record it from the Teifi, and the earliest record there was in 1941 from Llandysul c.SN44 by Whellan (1942, Wade 1952) who considered it probably native. Salter knew it at the Pant Mawr pool by the Ystwyth SN60907560, 1924-1933 (Diary 29.3.1924, 12.4.1933); surprisingly "on the mountain track between Trefriw and Ysbyty Ystwyth" c.SN77A (1935, Diary 12.4.1938); and from Pont Faen in the Aeron valley SN4959 (1935). The only other record from the Aeron was of a bush by the river at Winllan SN566572, 1984. Salter also recorded it planted at Llanddewi-Brefi c.SN6655 (1935), and it has been seen obviously planted and naturalised in several other sites since: by the Nant Paith at Rhydyfelin SN592791, 1990; in a laneside hedge E of Coybal SN376590, 1983-2004 (SPC); around a paddock at Blaen-ffos, Bwlch-y-groes SN375455, 1993; and by a pond E of Pen-y-graig, Felin-wynt SN22295179, 1994. The only sites where it is likely to have been native are some on the Teifi, and perhaps at Pant Mawr.



**Salix ×rubra** Huds. (*S. purpurea* × *viminialis*) - Green-leaved Willow - Helygen Werdd

Collected by Salter from the pool by the Ystwyth at Pant Mawr SN60907560 in 1931 and 1941 (NMW), although he mentioned only a generalised Watson (1883) record in his Flora (1935); whether it was planted or spontaneous here is uncertain. The only other record is of four bushes planted by Park Avenue, Aberystwyth SN586813, 2000 (SPC, conf. RDM).

**Salix daphnoides** Vill. - European Violet-willow - Helygen Borffor

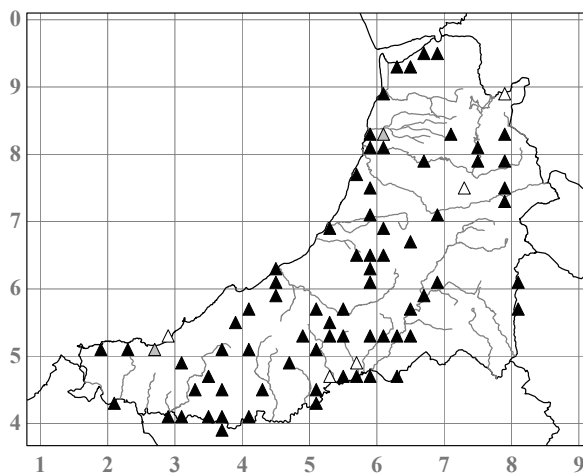
Planted for ornament in Plas Crug, Aberystwyth SN588813, 1991-2005; at the top of the brackish marsh by the Rheidol estuary SN58478115, 2005; along the Afon Dulas in the grounds of Lampeter College SN580483, 1991-2005; and by the Teifi by St Mary's churchyard, Cardigan SN180459, 1992-2004. Native of Scandinavia.

**Salix acutifolia** Willd. - Siberian Violet-willow - Helygen Borffor Siberia

A bush 4m tall growing out of the wet cliff alongside the A44(T) road 800m W of Bwlch Nantyrarian SN71168101, 2009 (AOC & JPP) was clearly self-sown. There was a densely planted hedge of this species at the SW corner of the Glanyrafon industrial estate, Llanbadarn Fawr SN610801, 1993-2005 (NMW), and two trees planted in the amenity area just W of the A487(T) bridge in Aberaeron SN45746281, 1995-2008. Native of N and C Asia.

**Salix viminalis** L. - Osier - Helygen Wiail

A much-planted archaeophyte and common in hedges, scrub, along river and stream banks and in marshes. Like its hybrids, it has sometimes been planted to stabilise slumping clay slopes on the coast. It is extremely variable in leaf shape, and it can be difficult to tell whether or not this is due to hybridisation. Altitude limit 375m, Hengwm Annedd, Pumlumon SN797893, 1940 (Salter Diary 2.7.1940, Wade 1952); 375m, Moel-prysgau, upper Tywi valley SN806612, 2001.



Var. *linearifolia* Wimm. & Grab. seems more constant than Meikle (1984) suggests; Salter recorded "some very narrow-leaved" plants at Llyn Frongoch SN7275 (1935), there was a tree above the Rheidol gorge in Ponterwyd SN748808, 1991 (NMW) - 2005, and others have been seen in similar sites where the bushes are by no means stressed.

Since 2003 various cultivars of *S. viminalis* and its hybrids, notably 'Tora' and 'Bjorn', derived from *S. schwerinii* E. Wolf × *viminialis*, have been trialled for biomass production on short rotation coppice at IGER, Gogerddan c.SN631835, which directs the "Willow for Wales/ Helyg y Gymru" project with European funding under Objective 1.

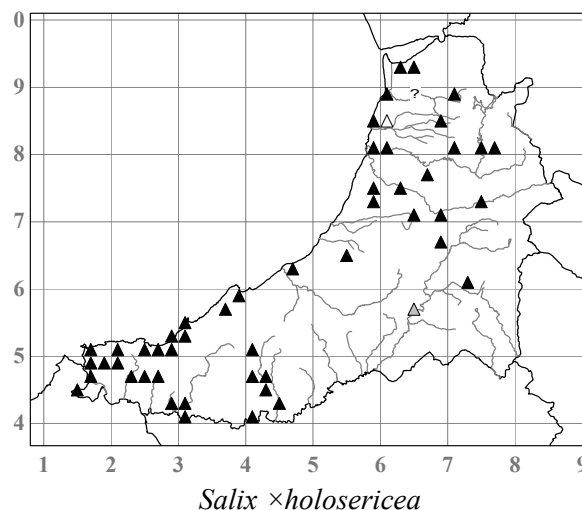
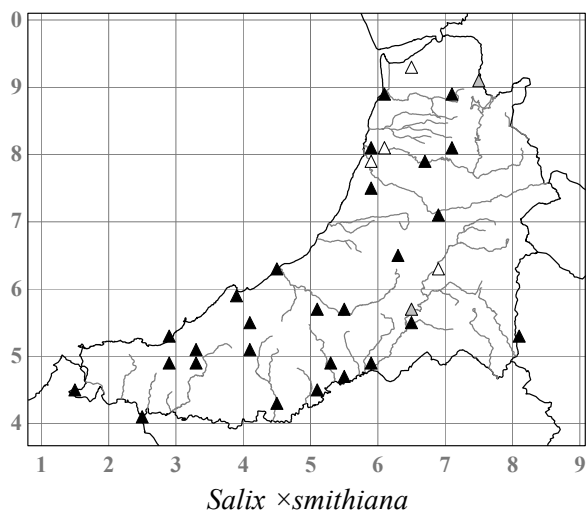


ADAS biomass *Salix* trials above Cwmystwyth, view NNE from SN784752, November 2005

**Salix ×smithiana** Willd. (*S. caprea* × *viminialis*; *S. ×sericans* Tausch ex A. Kern.) - Broad-leaved Osier

Often planted around ponds and in marshes, and in hedges and shelter belts, but also sometimes appearing spontaneous and it can often be impossible to judge its status. The earliest records were by Ley (1887) who saw it in a hedge at Borth c.SN68E, where it still occurs in the hedges alongside the B4353 road, 2005, and at

Maesllyn SN66W, where he said of the bushes that they were “not appearing to have been planted”. Altitude limit (planted) 300m, by new FC lake at Bwlch Nantyrarian SN719813, 2003.



***Salix ×holosericea* Willd. (*S. cinerea* × *viminalis*; *S. smithiana* auct., non Willd.) - Silky-leaved Osier**

Frequently planted in hedges, shelter belts, by ponds, in marshes and to stabilise slopes. Like *S. ×smithiana*, it is probably also sometimes spontaneous, for example by the Teifi at Llandysul SN416403, 1981 (NMW, AO, det. RDM), on the disused railway at Pont Llanio SN652569, 1982 (NMW), and by the Afon Cletwr bridge in Capel Dewi SN45094240, 2007, where there is an unusually large specimen. Both hybrids have been planted in the B4353 roadside hedges at Glanwern, Borth SN610888, 2004. *S. ×holosericea* is especially abundant on several of the slumping clay slopes on the coast, for example at Aber-porth SN259515, 1992-2005. The map does not distinguish different statuses.

***Salix ×hirtei* Strähler (*S. aurita* × *cinerea* × *viminalis*)**

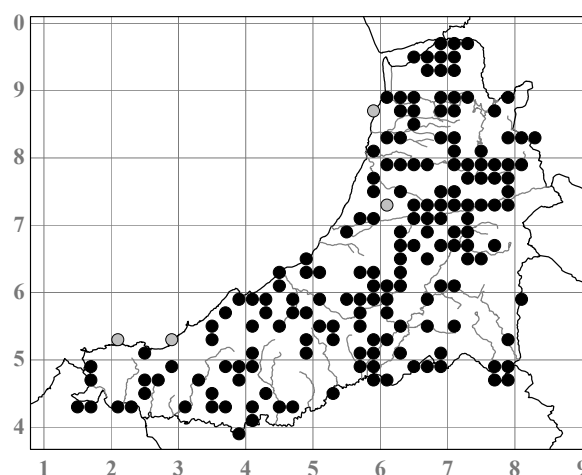
Material from one of several bushes on the S bank of the Afon Rheidol 250m below Pont Pen-y-bont SN592805, 1991 (NMW) was considered by RDM to be perhaps this triple hybrid which, although occasionally grown commercially, would probably have been spontaneous here. It requires confirmation.

***Salix elaeagnos* Scop. subsp. *angustifolia* (Cariot) Rech. f. - Olive Willow - Helygen Dail Olewydd**

Planted on the University campus, Penglais, Aberystwyth SN59968180, 2006. There was a planted bush among *Alnus incana* etc. on the reclaimed refuse tip at Blaendolau, Llanbadarn Fawr SN600804, 1990 (NMW) - 2004, and two smaller ones, looking self-sown, on the river bank 10m away, but all have since disappeared. It was also planted in a copse by the disused railway at Llanfarian SN589782, 1992 (SPC). Native of Europe, NW Africa and SW Asia.

***Salix caprea* L. subsp. *caprea* - Goat Willow - Helygen Ddeilgron**

Frequent throughout the county but becoming rare in the uplands, largely absent from the heaths and wetlands and generally more characteristic of woodlands than *S. cinerea*; it is often abundant around FC conifer plantations, and seeds prolifically into felled areas. There are many big trees at Hafod, including one in the walled kitchen garden SN756730, formerly pollarded, 292cm girth in 1998 (SPC) and 297cm girth in 2009 (AOC & JPS). In many places trees recorded as *S. caprea* may have been *S. ×reichardtii*. Maximum 300cm girth, 1994, by Nantperfedd ruin, 2km E of Elerch SN706867. Altitude limit 470m, lead mine site by the Maesnant, Pumlumon SN778876, 2002.





***Salix* × *reichardtii*** A. Kern. (*S. caprea* × *cinerea*)

Almost certainly very under-recorded, and the only seven records are from Gogerddan c.SN68G, 1939 (NMW, Salter); by the FC road in woodland 700m W of Trawsgoed Station SN658726, 1991; in scrub on the N side of the Afon Ystwyth at Hafod SN760730, 1995 (SPC & RJW); in a hedge by Glandyfi station SN696971, 1996 (CDP & AOC); by the FC road E of the Esgair Fraith lead mine SN743910, 1996 (CDP & AOC), at 400m at its altitude limit; by the FC road at Nantsyddion in the Afon Merin valley SN773791, 1998; and by the disused railway on Cors Caron SN708662, 1999 (NMW).

***Salix* × *capreola*** Jos. Kern. ex Andersson (*S. aurita* × *caprea*)

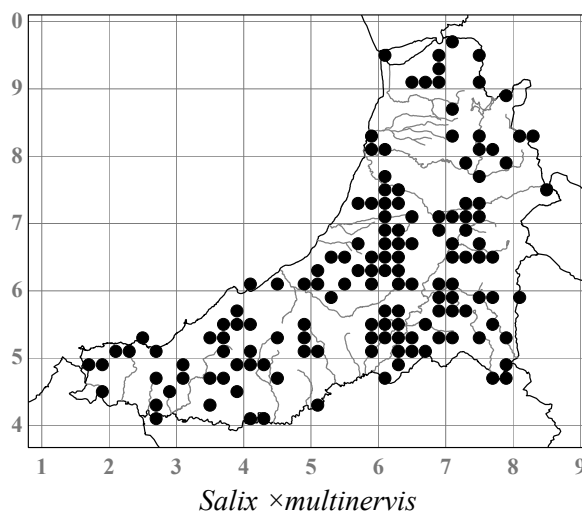
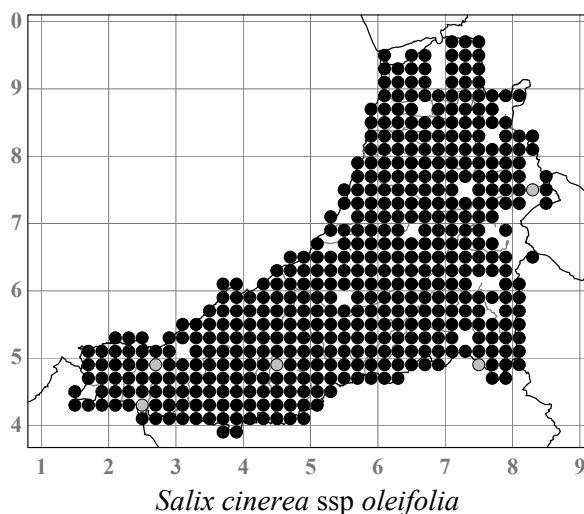
A rare hybrid, recorded only three times: in scrub alongside the Afon Rheidol by the Glanyrafon Industrial Estate, Llanbadarn Fawr SN614804, 1991 (NMW, conf. RDM); by track in FC plantation through the heathy common, Blaen Cribor SN402482, 1996; and by track just E of Llyn Rhuddnant SN808783, 1995 (JAG & WMcC) at its altitude limit 460m.

***Salix cinerea*** L. subsp. ***oleifolia*** Macreight (*S. atrocinerea* Brot.) - Rusty Willow - Helygen Lwyd

Very common throughout the county, often forming extensive carr in valley mires and by rivers, abundant on streambanks, wood margins, in scrub and felled woodland, in hedges and on heaths and in marshes. It is often abundant on the sea cliffs, and appears very salt-tolerant. In 2003 *S. cinerea* was used by CCW to construct an effective barrier of sticks held in place by living stakes to prevent erosion of the A487(T) road at Dolau SN621810 (KH). It is extremely variable in the county, and much of the variation is probably due to hybridisation and introgression with *S. aurita* and other species. Some bushes by the Ynys-las dune slacks SN69B, C, 2008, with very few rust-coloured hairs under the leaves approach subsp. *cinerea* (SPC pers. comm.). A bisexual individual was collected by the Afon Ystwyth at Llanychaearn SN590789 in 1959 (NMW). Altitude limit c.425m ("about 1,400ft."), Llyn Conach c.SN740930 (Salter 1935); 540m, ruins of Pumlumon lead mine SN795857, 2002.



*Salix cinerea* living gabion and Karen Heppingstall by Rheidol backwater, Dolau, view W from SN621810, October 2007

***Salix* × *multinervis*** Döll (*S. aurita* × *cinerea*)

Common throughout the county, often in the absence of one or both parents, but because of apparent widespread introgression it is very difficult to judge the relative abundance and distributions of the three taxa. The maps probably underestimate the hybrid, and overestimate at least *S. cinerea*. Altitude limit 450m, roadside by conifer plantation, Bryn-y-rhyd SN681524, 2003.

***Salix ×pontederiana* Willd. (*S. cinerea* × *purpurea*)**

Known only from the Teifi bank 200m S of Llanybydder church SN518437, 1993 (TCGR & AOC) - 2000 (NMW, conf. RDM), where five female bushes are growing with both parents. Whether these are planted or spontaneous is uncertain.

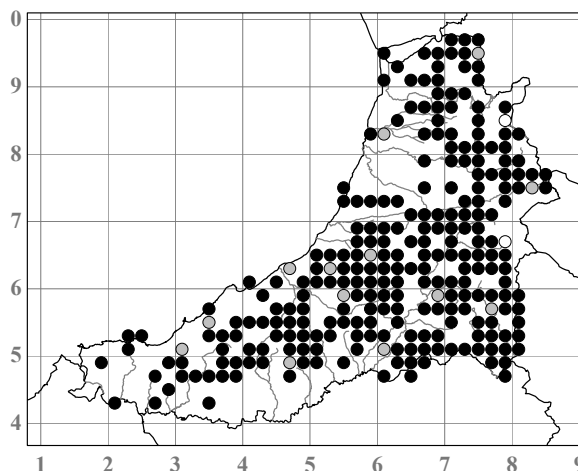
***Salix ×subsericea* Döll (*S. cinerea* × *repens*)**

Recorded only from a “Damp meadow of the Peris brook, above Llannon” c.SN549671, 1930 (NMW, Salter, det. RDM); Salter (Diary 12.6.1930) described this as being in “the last field before the road” going up the valley from Llan-non, and mistakenly thought it was *S. aurita* × *repens*.

***Salix aurita* L. - Eared Willow - Helygen Glustiog**

A frequent shrub, chiefly of damp, acidic sites, in hedges, scrub, wood margins, marshes and bogs, on heaths and moorlands and on streamsides. It is generally commoner in the uplands and is largely confined to heathy areas in the lowlands, but it is unpredictable, being abundant for example in hedges in some areas but absent from others. It is perhaps most abundant and characteristic of the heaths and valley mires in the middle part of the county; in some of these mires it can form large areas of carr, for example at Blaenclettwr SN44655289, 1981, where very large, old bushes with contorted trunks up to 8m long cover c.0.5 acre. Although it is uncommon along the coast, it does form extensive scrub on a few of the cliff slopes, for example just W of Cwm Tudu SN352572, 1994 (AOC & KNAA).

It is largely absent from the lower Teifi valley. How much of what has been recorded as *S. aurita* is unaffected by hybridisation and introgression with *S. cinerea* is uncertain, and it may be that pure *S. aurita* is rare or even absent from much of the county. Bisexual individuals have been recorded in Cwm Ystwyth c.SN77X, 1928 (NMW, Salter, Diary 28.4.1928); and on heathland at Allt Crug-garn, Cilcennin SN518616, 1961 (NMW). Altitude limit 550m, head of the Nant y Moch SN784862, 1937 (Salter Diary 27.8.1937, Wade 1952) - 2002 (AOC & PAS); 560m, by rough road, Rhos y Garn, Cwm Ystwyth SN797766, 2002.



**[*Salix ×ambigua* Ehrh. (*S. aurita* × *repens*)**

Two specimens formerly ascribed to this hybrid have been redetermined as *S. ×subsericea* and *S. ×multinervis* respectively by RDM: damp meadow by the Peris brook above Llannon c.SN549671, 1930 (NMW, Salter); and heath SE of Tryal-bach, Llan-non SN52226555, 1978 (NMW, AOC & DGJ).]

***Salix eriocephala* Michx. - Heart-leaved Willow - Helygen Dail Calon**

Planted by J. Corfield in c.1973 on the Ystwyth bank 200m W of the road bridge in Llanfarian SN588778 to prevent erosion, and by 1992 forming two colonies 8 × 7m and 12 × 7m, 25m apart (NMW, SPC & AOC, conf. RDM); by 2005 these had merged to form one more or less continuous colony 57 × 7m. It was more recently planted by the sewage works at Glanyrafon SN60608010, 2006 (NMW), where it also forms large suckering colonies. At both sites it appears to be ‘*Americana*’, a male clone of possible hybrid origin. Native of North America.

*Salix eriocephala* on Ystwyth bank, Llanfarian,  
view N from SN588777, May 2005



**Salix repens** L. - Creeping Willow - Corhelygen

Although var. *fusca* seems very distinctive in the county (doubtless because there is so little of it), both var. *repens* and var. *argentea* are so variable that attributing particular populations to one or the other is an unsatisfactory exercise.

**Var. repens**

An occasional plant of rhos pastures, valley bogs and wet heaths in the C and S of the county. It can grow close to the sea, for example in flushes on the cliff slopes W of Careg Wynt SN23275195, 1982 (AOC & DGJ). Salter (1935) described it as “scarce and local” and gave only five localities, with two more in Wade (1952), but it is difficult to imagine that it should have increased so much since then and he must often have overlooked it.

There is great variation in habit and in size, shape and pubescence of the leaves, and for example among *Calluna* and *Molinia* 500m WSW of Pennar-fawr, Plwmp SN368535, 2002 (NMW) plants have unusually small leaves 5-10(-12) × 2-4(-5) mm, densely silvery-sericeous beneath and densely hairy ovaries. Altitude limit 300m, flush in *Molinia* colony 250m NW of Cae'r-meirch SN75407385, 1996 (AOC & JPW).

**Var. argentea** (Sm.) Wimm. & Grab.

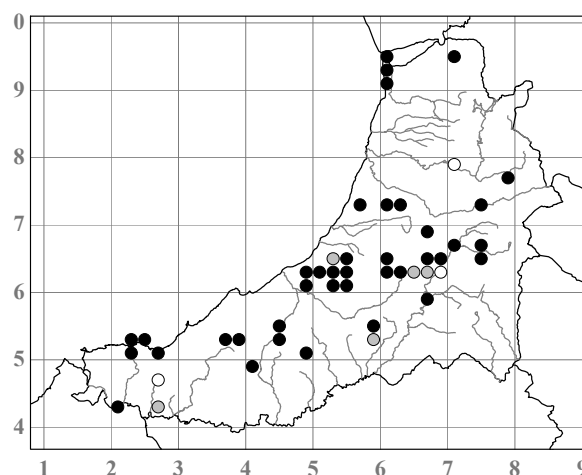
Abundant in several of the slacks in the Ynys-las dunes SN69B, C, 1955-2008, and as Salter never saw the species there it is likely to have arrived some time between 1941 and 1955. It was first noticed in the main slack W of the road SN608938; in the slack E of the road SN611938 it was first seen as several bushes in 1976 and has since become abundant there. The bushes are rather variable in both habit and hairiness. A conspicuous isolated circular colony, with prostrate branches, in the main slack W of the road at SN60789382 was 9.5 × 8m in 2005. Two upland colonies are also probably attributable to this variety: one, 6 × 8m, was found 9km E of here on a flushed heathy slope at 200m altitude on the N side of Dynyn Hill SN702956 in 1994 (NMW, AOC & RB); the other, 1.5 × 1m, was in heathy grassland by the FC road E of Truman, The Arch SN78547709, 2005 (NMW), at 470m, the altitude limit.

**Var. fusca** Wimm. & Grab.

First recorded from Cors Caron in 1936 (NMW, HAH). In 1994 a colony 3 × 2m was found near the N end of the bog SN709666 (NMW, AOC & ADH), very erect bushes 75cm tall, with ovate-orbicular, silvery-sericeous leaves.

**Salix herbacea** L. - Dwarf Willow - Helygen Fach

Known only from near the summit of Pumlumon Fawr, where it was first found by Salter in 1905 (NMW). His diary entry (21.9.1905) reads “I reached the cairns on Pen Plynlymon Fawr at 2, and at once got down to work on the rocks overlooking Llyn Llygad Rheidol. I very shortly found, growing with the bilberry, a small quantity of what I took to be *Salix herbacea*, but far larger than this plant as I gathered it in the Lake District.” His specimen is a twig 12.5cm long. In spite of repeated searches, he never refound it, and it was not seen again until 1980 when it was reported as “Several plants amongst *Lycopodium selago* and *L. alpinum* near the summit of Pumlumon Fach” c.SN787874 (AB & MK), which, if correctly located, must have been a different site. Later the same year it was found in or near what was presumably Salter’s site, c.100m NW of the summit of Pumlumon Fawr, SN789871 (NMW, RMe & IS). In 1981 it was found scattered in an area 5 × 7m with *Vaccinium myrtillus* in *Festuca ovina* turf 250m NNW of the summit SN78958714 (RLe *et al.*), probably the same site.



All records



*Salix herbacea*, “Nr. summit of Plynlimmon”, SN789871, collected by J. H. Salter in 1905 (NMW)





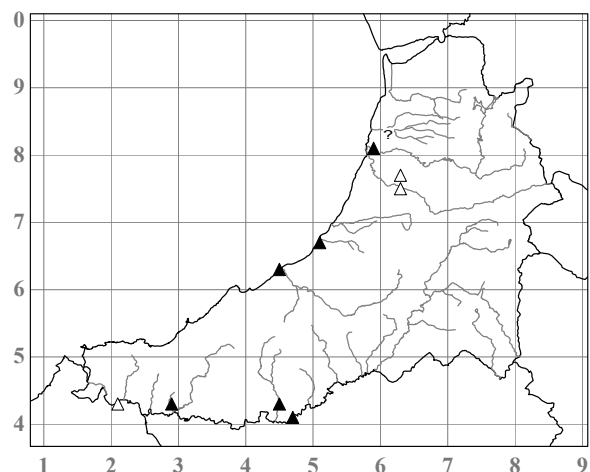
*Salix herbacea*, Pumlumon SN789871, August 2007

Since then the area it occupies has decreased, perhaps through over-grazing, to  $2 \times 2\text{m}$  in 1990 (APF & DCB),  $70 \times 50\text{cm}$  in 2000 (AOC & JPW),  $60 \times 30\text{cm}$  in 2003 (AOC & SDSB) and  $45 \times 30\text{cm}$  in 2009; in 2003 another colony  $30 \times 15\text{cm}$  was found in rock crevices 18m W of here (SDSB). Catkins have not been seen since 1981. These colonies are at 710m altitude, and may be the most southerly extant ones in Britain as it has not been seen in any of its S Wales sites since the early 1980s. Moore (1970) recorded *S. herbacea* from Late-glacial deposits at Gors Lwyd SN858750, and commented that it may have survived through the Post-glacial at its Pumlumon and N Wales sites.

## VIOLACEAE

### *Viola odorata* L. - Sweet Violet - Fioled Bêr

Described by Salter (1935) as frequent, with the white-flowered variety predominating, but he listed no localities and mentioned only half a dozen in his Diary; at none of these has it been refound. Of the seven extant populations, six are of var. **dumetorum** (Jord.) Rouy: a colony  $1 \times 1.5\text{m}$  on the S side of the chancel of Llanbadarn Fawr church SN59918100, 2005; two colonies  $4 \times 2\text{m}$  and  $2 \times 1\text{m}$  on grassy waste ground by the Afon Cledan 350m upstream of Pont Llan-non SN51786664, 1985-2002 (NMW); a colony on the bank above the path in mixed woodland 50m N of Lovers' Bridge, Aberaeron SN45736258, 2001-2004; a colony on the shaded roadside bank 50m E of Capel Dewi church SN45284251, 1999-2002; a colony on a roadside



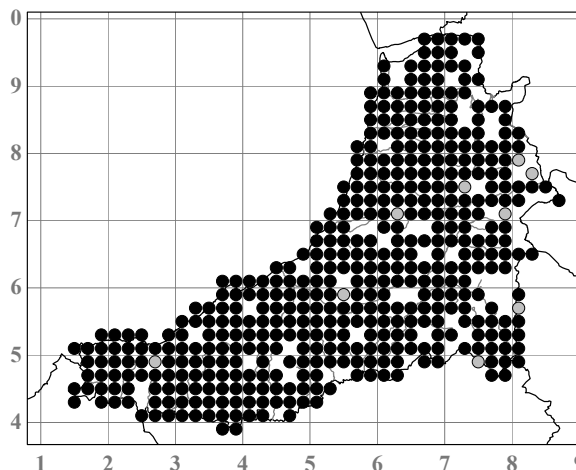
hedgebank at Bryn Martyn, Waunifor SN46354118, 2006 (AOC, BH & GH); and a colony on a rough grassy track to the chapel graveyard from the Nant Gwrog bridge in Cwm-cou SN29234204, 1998-2002. The seventh is a colony of probably var. **odorata**, 1m across, on the N hedgebank of the A487(T) opposite the National Library entrance, Aberystwyth SN59308192, 2001-2007. It would appear to be naturalised rather than native at all these sites.

[*Viola* × *scabra* F. Braun (*V. hirta* L. × *odorata*)

Erroneously recorded for the county in Stace (1975, cf. Ellis 1983).]

### ***Viola riviniana* Rchb. - Common Dog-violet - Fioled Gyffredin**

A common plant of woodlands, unimproved pastures, heaths, hedgebanks, streamsides, rock ledges, sand dunes and many other habitats throughout the county, from vegetated shingle on the coast to cliff ledges and gullies in the uplands. As a garden weed it was first noticed becoming abundant at Aberystwyth SN58V in c.1985, not long after this was noticed in the London area (Kent 1981). There is considerable variation in habit, leaf shape and flower colour, but this has not been properly investigated in the county. Plants with dark spurs the same colour as the rest of the corolla are sometimes seen, for example in woodland at Aberaeron SN461622, 1996, and in a ravine on the sea cliffs 1km SW of Llangranog SN30115342, 2003 (AOC & SPC). Plants with distinctive, very deep violet corollas and the spur pale greyish-violet are common on the coastal slopes, for example at the last mentioned site; under Bracken and in the Oak woodland at Penderi SN553736, 1996 (AOC & BJ); in grassland 400m S of Carreg Ti-pw, Llanrhystud SN53477055, 2003 (NMW); and under Bracken 500m WNW of Cilfforch SN44106183, 2003 (NMW). Var. **minor** (Murb. ex Greg.) Valentine was recorded on the Penyrergyd sand dunes SN14U by Whellan (1942), and dwarf plants corresponding with this taxon are frequent on the dunes and other sandy places there, 2003, on the Ynys-las dunes SN69B, C, 2003, and in other exposed, dry sites along the coast, as well as inland on spoil at some of the lead mines such as Esgair Fraith c.SN740911, 1992-2008 (SPC; AOC). Altitude limit c.610m, above Llyn Llygad Rheidol, Pumlumon, 1903 (Salter Diary 26.9.1903, 1935); 600m, ditto SN79328731, 2002.



### ***Viola* × *intersita* Beck (*V. canina* × *riviniana*)**

Recorded only from an old part of the dunes at Ynys-las SN605938 in 1974 (NMW) where *V. canina* is abundant but *V. riviniana* rare; a few large clumps were seen, but the hybrid has not been seen there recently. Marshall (1900) recorded it from moorland above Aber-arth (**BM**, **MANCH**, **ABS**, **BIRM**), and the specimen in **BIRM** was thought by ESG to be probably this hybrid, but this will more likely have been *V. lactea* × *riviniana*.

### ***Viola lactea* × *riviniana***

Plants from “Moorland above Aberarth, with the parents, quite sterile” and elsewhere nearby, 1899 (**MANCH**, **ABS**, **BIRM**) collected by Marshall (1900) as *V. ericetorum* × *riviniana* were presumably *V. lactea* × *riviniana*, as *V. canina* (*V. ericetorum*) is confined to sand dunes in the county. Salter (Diary 26.5.1932), when he recorded *V. lactea* from “the rough patch of common” between Pennant and Llan-non, probably c.SN520647, wrote that “with it were plants of what I should take to be *V. lactea* × *riviniana*”.

The hybrid now occurs in the coastal heath on the MoD site, Aber-porth SN239524-243524, 1995 (NMW, AOC *et al.*, det. DMM) - 2008, with both parents, and is much more frequent than *V. lactea*, with many plants showing signs of introgression. The same applies to a population at Rhos Cwmsaeson SN461586, 2009 (AOC & RAJ), where many plants of *V. lactea* but no hybrids were seen in 1995, and the population then disappeared because of overgrowth by scrub. After scrub clearance, almost all the c.65 plants that were seen in 2009 (NMW, AOC & RAJ) were the hybrid or introgressed. Presumably here, as often happens elsewhere in Britain, *V. lactea* is being introgressed out of existence, and this appears already to have happened further down the coast 250m ENE of Mwnt church SN196521, 1992 (NMW, det. DMM), and more



surprisingly in an unimproved pasture at Cae'r-meirch, Pontrhyd-y-groes SN751736, 1996 (NMW), at both of which sites only the hybrid and *V. riviniana* have been found. In 2009 one plant was found with both parents in coastal heath at Penpeles SN21815227 (SPC).

***Viola reichenbachiana* Jord. ex Boreau (*V. sylvestris* Lam., *pro parte*)** - Early Dog-violet - Fioled y Coed

Now known from only one site in the county, and in the rest of Wales generally rare and largely confined to base-rich soils. It was clearly often misidentified in the past, and the statements by Burkill & Willis (1894) that it was "Fairly common", and by Salter (1935) that it was "Fairly frequent, but not nearly so common or generally distributed" as *V. riviniana*, must be in error for the latter. Its likely habitat, woodland on the more calcareous drift soils, has not decreased that much, and none of its likely associates have significantly declined. The only reliable early record is from a wood a mile N of Newcastle Emlyn, which must have been the Cwmdy woods in the Ceri valley c.SN34B, 1941 (NMW, Whellan 1942), but it has not been refound there in spite of repeated recent searches. In 2003 a colony of 7 plants was found in an area 1 × 1m on the sandy sloping bank of the tidal part of the Teifi in dense deciduous woodland opposite the Cilgerran slate quarries SN20444299 (AOC & JPW), and in 2004 ten plants were here and another one was 30m downstream (LRG).



*Viola reichenbachiana*, Teifi bank  
at Coedmore SN20444299, April 2003  
(photo Lin Gander)

***Viola canina* L. subsp. *canina* (*V. ericetorum* Schrader)** - Heath Dog-violet - Fioled y Cŵn

Confined in the county to the sand dunes at Ynys-las SN69B, C, 1848 (Purchas 1848 as "Surrey Violet") - 2008, and Penyrergyd SN14U, 1879 (HLJ, *BEC Rep.* 1879: 65 (1880), as *V. flavicornis*) - 2008 (AOC & JPP). At Ynys-las it is locally abundant, often forming extensive patches, on both the older and younger parts of the dunes. At Penyrergyd it is rare and confined to the seaward tip of the dunes. There was much confusion between this species and *V. lactea* in the past, and old records of *V. canina* and *V. ericetorum* from other sites in the county are probably all attributable to *V. lactea*.

***Viola lactea* Sm.** - Pale Dog-violet - Fioled Welw

A rare plant of coastal heaths and inland wet heaths in the S half of the county. There are only three extant sites. At Rhos Cwmsaeson, Oakford SN46125870, 1994 (AOC, JT & JPW) - 1995 (NMW, conf. DMM) many grew among Bramble and *Ulex gallii* in overgrown wet heath, and several young plants were also growing where the vegetation had recently been burnt. All or most of the plants appeared to be pure *V. lactea*. It was not seen there on several visits over the next ten years, but after extensive scrub clearance and Cattle grazing c.65 plants of *V. lactea*, its hybrid with *V. riviniana* and variously introgressed plants, and a few of *V. riviniana*, were found in 2009 (AOC & RAJ), but by this time very few of these plants were pure *V. lactea*. At the MoD site, Aber-porth SN239524-243524, 1995 (NMW, AOC *et al.*, conf. DMM) -

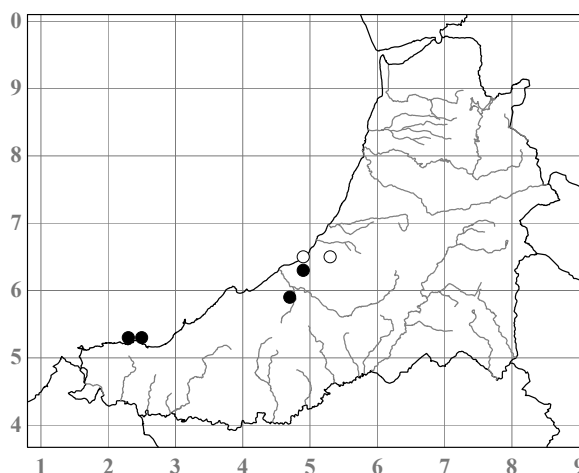


*Viola lactea* and *V. lactea* × *riviniana*, Rhos  
Cwmsaeson, view NE from SN46095863, May 2009



2008, 50 or more plants can usually be seen in the mown coastal heath at the seaward edge of the headland, again mixed with *V. riviniana*, but with a somewhat lower proportion of hybrid and introgressed plants. In 2009 two plants were found in coastal heath at Penpeles SN21805226 (SPC), probably derived from a seed bank disturbed by recent construction of the coast path; *V. riviniana* was frequent here, and there was one plant of the hybrid nearby.

The earliest record, apart from an unreliable and unlocalised one by Morgan (1848), was probably by Marshall (1900), whose *V. ericetorum*, “remarkably luxuriant” on moorland above Aber-arth was presumably *V. lactea*. Salter found *V. lactea* in this area in 1932 (NMW, Diary 26.5.1932, 1935) when walking from Pennant to Llan-non “On the rough patch of common where *Carum verticillatum* grows”, and found two or three plants of it there again in 1935 (Diary 13.6.1935); this was probably around SN520647, where the remaining heathland was destroyed by ploughing in the 1970s. He recorded it again in 1939 (Diary 10.6.1939, Wade 1952) near Pwll y Brawd (“the pool on the left of the Aber-arth-Pennant road”) SN491641, confusingly saying in his Diary entry “Saw *Viola lactea* here again”; the heathland here has also long been destroyed. In 1988 several large colonies scattered over c.1 acre of *Molinia* sward, with no sign of hybridisation, were seen nearby, 400m ESE of Hengwrt SN49556332 (NMW, AOC & APF), but this site too was destroyed soon after. In 1992 a single plant was found among *Molinia* at the edge of *Ulex gallii* heath only 250m ENE of the Rhos Cwmsaeson site SN46395880 (RPB), but it has not been seen there since.



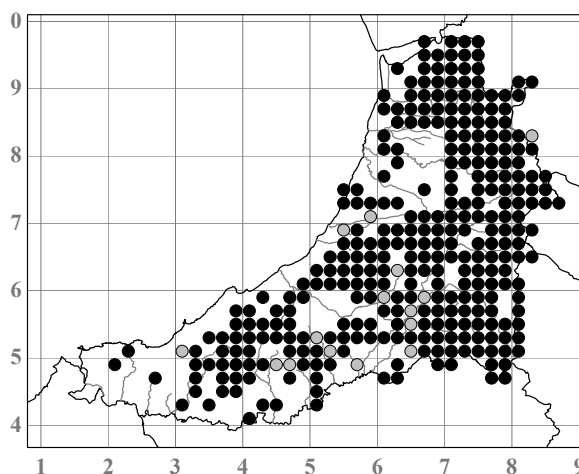
### ***Viola palustris* L. - Marsh Violet - Fioled y Gors**

#### **Subsp. *palustris***

A common plant of wet acidic woodland where it usually grows among *Sphagnum*, of acidic marshes, bogs, flushed slopes and shaded streamsides. It is almost absent from the coastal zone, but extends well into the uplands. Largely white-flowered colonies are sometimes seen, for example by the Afon Llethi in woodland 700m N of Llanarth church SN424584, 1987, and in woodland 200m N of Alltmaen, Talgarreg SN403501, 1987. Altitude limit 610m, Pumlumon (Salter 1935); 640m, flush by stream above Llyn Llygad Rheidol, Pumlumon SN797873, 2003.

#### **Subsp. *juressi* (Link ex Wein) P. Fourn.**

Recorded from eight sites, at most of which it grows with subsp. *palustris*. From this limited evidence it appears to be more characteristic of the rhos and valley mire sites in the SW of the county than of the uplands. It is at Rhos Llawr-cwrt, Talgarreg SN41304997, 1993 (NMW), nearby at SN41105010, 2003, and on Cors y Clettwr SN420492, 1994; in Alder carr at Rhos Pil-bach, Plwmp SN36705292, 1994 (AOC & SPC); in a marsh by the Nant Gwylan 400m NW of Bronwydd ruin SN350434, 1996; and in a marsh by the Afon Grannell, 150m W of Pant-yr-hwch, Llanwnen SN523486, 1999. In the Llyfiant valley it is frequent on shaded streamside rocks 900m W of Glasbwl SN729974, 1995 (NMW, AOC & JPW). The only upland record is from a flush by the Nant Crafanglach near Pwllpeiran SN770742 at 250m altitude, 2001 (SPC). This subspecies seems poorly differentiated, and intermediate plants showing one or two of the characters of subsp. *palustris* are often seen.



*Viola palustris* all records

### ***Viola lutea* Huds. - Mountain Pansy - Trilliw y Mynydd**

Widespread but local in unimproved sheepwalks, hay meadows, on banks and rocky and heathy slopes, chiefly in the uplands. It is almost absent from the Ordovician rocks of the Pumlumon area, and is most

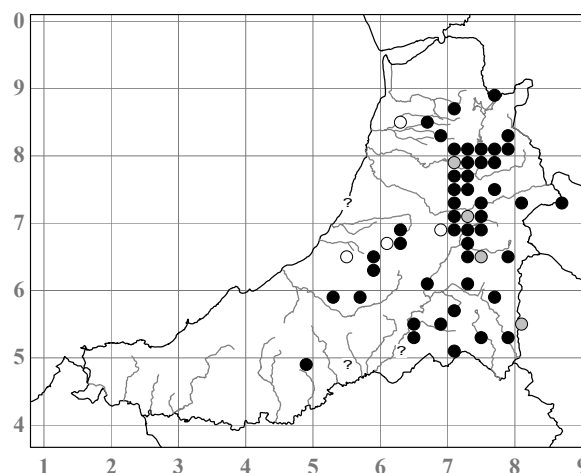
common S of this area between Ponterwyd and Tregaron. It has probably declined considerably in abundance since Salter's day, as he described it (1935) as "Abundant in the hill district", but there seems to have been little contraction of its range. There are especially good populations on the ridge 700m E of Ystumtuen SN742788, 2004, and in acidic pasture 400m S of Ysguboriau, Ysbyty Ystwyth SN729699, 1997 (MDS). It has gone from the two most lowland sites where Salter recorded it: Hen Gaer, above Bow Street SN6384, at 160m altitude, where he saw thousands of plants in 1907 (Diary 11.7.1907); and near Llanddeiniol c.SN57L in 1903 (Diary 8.7.1903) in which area it was again recorded "On the coastal slopes N. of Llanrhystyd"



*Viola lutea* on ridge E of Ystumtuen  
SN742788, May 2004

in 1934 (NMW, PCh). A remote outlier from its main distribution is a small population on a grassy hilltop at the W edge of the Cwrtnewydd quarries SN489481, 1991. Although it occasionally occurs in grassy and heathy vegetation on lead mine spoil, for example at Cwmsymlog SN699837, 1993-2005, it is by no means a constant of such sites as it is in some other parts of Britain (SPC pers. comm.). Willis & Burkill (1895) gave details of the few insect visitors they observed in the Pumlumon uplands, and remarked that they saw no visitors at the higher altitudes.

Burkill & Willis (1894) reported that both yellow- and blue-flowered forms were abundant. Salter (1935) wrote that the two were connected "by every possible variation", and the impression one gets from the regular mention of "yellow pansies" in his Diary is that yellow was probably the commoner. Yellow-flowered plants have certainly been by far the most often seen in recent decades. Most populations are entirely yellow, with small flowers, and are probably var. *murrayi* Drabble which has runners; var. *lutea*, without runners, has not been investigated, and var. *grandiflora* (Huds.) W. D. J. Koch, with larger flowers, has not been recorded, although both may well occur. Our blue-flowered plants all seem to be the small-



*Viola lutea*, Banc Troedrhwiwseiri, view  
W from SN671858, July 1980

flowered var. **elegans** Spach (var. *amoena* auct.). Altitude limit 500m (Burkill & Willis 1894, Salter 1935); 420m, sheepwalk by track, Cwm Mwyro SN789640, 2004 (AOC & PAS).

### ***Viola tricolor* L. - Wild Pansy - Trilliw**

#### Subsp. **tricolor**

An uncommon weed of arable fields, sand and gravel quarries and waste and disturbed ground, much less frequent than *V. arvensis*. Salter (1935) wrote that “*V. tricolor* is, like *V. arvensis*, a common weed of arable land”, so it may well have decreased in comparison with the latter since then, as it has over most of the rest of Britain. As an arable weed it usually grows with that species, when intermediates or hybrids are sometimes found, for example in winter Barley near Parc-llyn SN237518, 2000 (NMW, AOC & MDS), and in Wheat stubble at Llwynysgaw, Felin-wynt SN217520, 2004 (NMW, AOC & SDSB). Salter (1935) and Wade (1952) give records for *V. lejeunii* Jord., *V. lepida* Jord. and *V. lloydii* Jord., but these taxa are not usually recognised nowadays.

#### Subsp. **curtisii** (E. Forst.) Syme

A specimen labelled “Sand dunes. Borth”, 1959 (ABS, JHu), presumably from the Ynys-las dunes c.SN69B, is clearly this rhizomatous subspecies, but it has never been refound.

### ***Viola* × *wittrockiana* Gams ex Kappert (*V. altaica* Ker Gawl. × *lutea* × *tricolor*) - Garden Pansy - Trilliw'r Gerddi (Ofer Garu)**

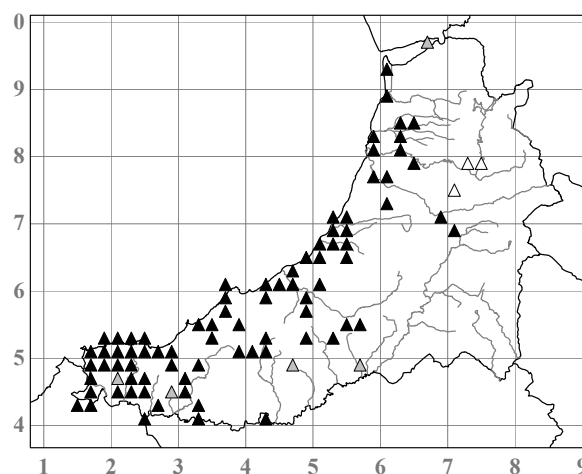
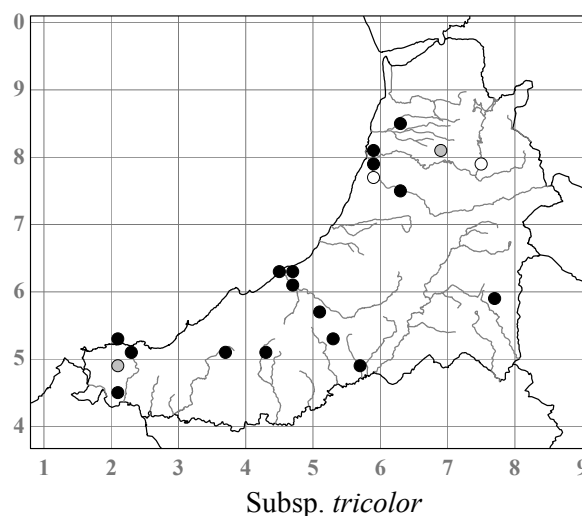
A rare casual of tips and waste and disturbed ground, represented by several different cultivars. First noted on a tip at Blaendolau, Llanbadarn Fawr SN599806 in 1993 (SPC), it has since been seen at Llandre SN625863 in 1995, at Lampeter University SN540488 in 1995, on the MoD site, Aber-porth SN24815242 in 2005, and at the Ynys-las boatbuilding yard SN615932 in 2005 (SPC).

### ***Viola* × *contempta* Jord. (*V. arvensis* × *tricolor*)**

Putative hybrids were found to comprise slightly under 1% of a population of the parents in a derelict field near Aberystwyth by Pettet (1964). The matter is complicated, and to what extent other plants of intermediate morphology quite often seen in the county may be hybrids is uncertain.

### ***Viola arvensis* Murray - Field Pansy - Trilliw'r Tir Âr**

A frequent archaeophyte weed of arable fields in a wide range of crops, on ground disturbed for road widening or building sites and at the edges of reseeded pastures. It is commonest near the coast and in the SW half of the county, and scarcely extends into the uplands. There is no evidence of conspicuous decline or contraction of range, and Salter (1935), while saying it was common, “and general in the south-western part of the county”, gave only two records of his own from outside this area. There is enormous variation, and a complete range of intermediates with *V. tricolor*, and mixed populations of plants typical of these two species sometimes occur. Salter (1935) and Wade (1952) give records for *V. agrestis* Murray, *V. deseglisei* Jord., *V. obtusifolia* Jord., *V. ruralis* Boreau and *V. segetalis* Jord., but these taxa have not usually been maintained in recent decades. Pettet (1964) confirmed both *V. arvensis* and *V. tricolor* by chromosome counts from populations near Aberystwyth.





## LINACEAE

**Linum bienne** Mill. (*L. angustifolium* Huds.) - Pale Flax - Llin Culddail

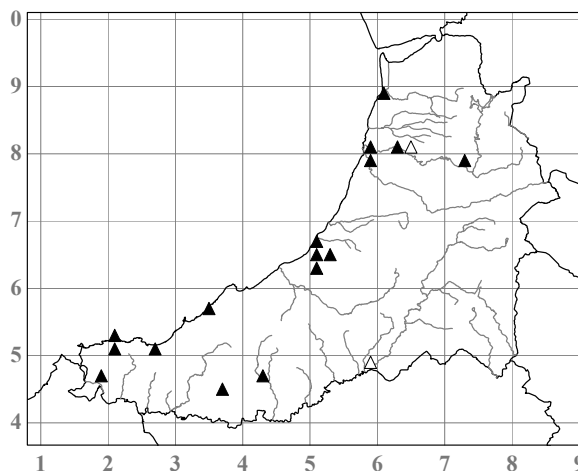
A rare weed of waste and disturbed ground, first recorded from a field near the Aberystwyth Workhouse SN591818 by Morgan (1949), by Salter (1935) in 1924 from between Nanternis and New Quay SN35, and in 1929 from between Aber-porth and Mwnt SN25 (Diary 18.9.1929). Subsequent records are mostly from the New Quay area: from New Quay Head SN3860 (FD, Wade 1952); from a cliff ledge by New Quay pier SN389601, 1993; and from waste ground used for car parking S of Pencestyll SN387601, 1994. It has also been found on a reseeded slope by Pont Pen-y-bont, Penparcau SN595804, 1978; on a stream bank at Gilfachreda SN412588, 1957; and on a sandy laneside 100m S of Towyn Farm, Gwbert SN16344994, 1991.

**Linum usitatissimum** L. - Flax - Llin

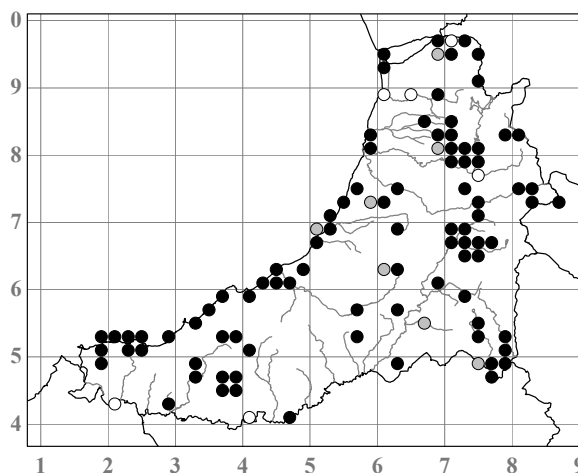
Although Flax has for a long time been grown in the county, it never seems to have been an important crop. Moore-Colyer (1992) quotes Thomas Martyn writing that “Although the neighbouring farmers laughed at the idea and insisted upon it that it would not answer”, Thomas Johnes had healthy crops of Wheat and Flax flourishing at considerable altitudes at Hafod c. SN77L, presumably in the 1790s. It was grown in places in the lowlands too, as Davies (1815) lists “Crops of flax” being offered premiums by the county agricultural society in 1813, although none had been given the previous year, and it was grown on a small scale throughout the 19<sup>th</sup> century, for example 15 acres of it being recorded in the county in 1869 (Anon. 1869). Cultivation probably ceased in the early 20<sup>th</sup> century, and had presumably all been of the long-stalked var. **usitatissimum** for fibre.

Trial plots of Flax were being grown by the WAC at Lovesgrove SN634811 in the late 1980s, and at the College Farm at Morfa SN502659 in the early 1990s, and at about this time, encouraged by substantial subsidies, it was being commercially grown on several farms in the SW of the county, such as Blaenplwyf SN217512, 1991-1993, where the short-stalked var. **crepitans** Boenn. ‘Mikael’ was grown for linseed. Var. **usitatissimum** was grown for fibre at Monachty SN504621 in 2000-2001.

Flax has long been known as an occasional casual from waste ground, tips, roadside verges and pavements, it has been used in seed-mixes on roadside slopes, and it is a rare weed of arable fields where it probably arrives as a seed contaminant. The map shows these casual occurrences.

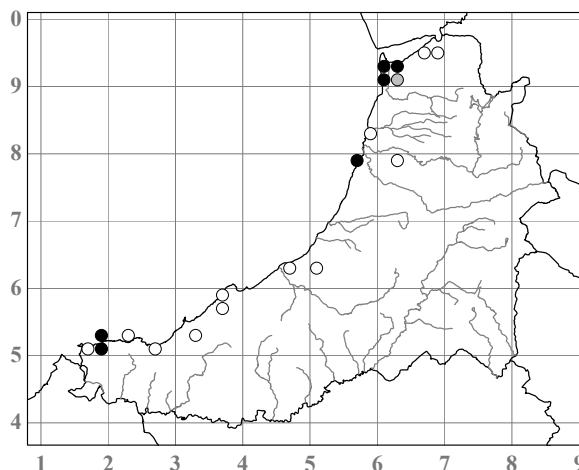
**Linum catharticum** L. - Fairy Flax - Llin y Tylwyth Teg (Llin y Mynydd)

A frequent plant of the more base-rich thin soils, occurring in dry pastures, sand dunes, heaths and cliff slopes especially near the sea, on lead mine sites, disused railway ballast, tracksides and in graveyards. It is equally frequent in damper sites, in more or less base-rich flushes from the coastal slopes well into the uplands, on damp base-rich cliff ledges, and on wet, slumping till slopes above the sea. Most populations are var. **catharticum**, but those in and around the slacks in the Ynys-las dunes SN69B, C, 2009 (NMW) are var. **dunense** (Druce) Druce, with the stems branched from the base and small leaves. Altitude limit 480m, flushed slope in clearing in FC plantation by the Nant Garw-mawr, 2.3km SSE of Eisteddfa Gurig SN809821, 1996.

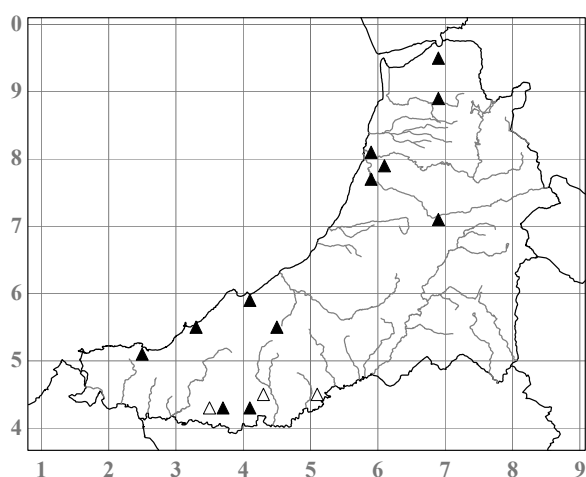


**Radiola linoides** Roth - Allseed - Llin Gorhadog

A rare plant of peaty ground, heaths, grazed flushes and pathsides, chiefly along the coast. The earliest record was from "Fields near Reservoir", i.e. Bryn-y-mor dingle, Aberystwyth SN586826 by Morgan (1848); it was seen at Llanbadarn Trefeglwys SN56B in 1899 by Marshall (1900), near Ynys Greigiog SN69S in 1904 by Salter (Diary 21.7.1904), and near the Ynys-las sawmills SN617933 in 1907 by Salter (Diary 28.8.1907). It was recorded from a total of eleven sites up to 1950. Its stronghold since then has been in peaty, poached pastures and bare peaty areas at the NW corner of Cors Fochno and in the Aberleri fields SN69A, B, F, G, 1983-2004 (ADF; AOC; JPL). It was recorded all along the road along the S side of Foel Fawr, Eglwys Fach SN69X from 1954 for several years (WMC). The only other records since 1950 have been from bare patches on the cliffs slopes 1.5km NE of Morfa Bychan SN57307850, 2001; along a 15m length of path through coastal heath 200m NE of Mwnt church SN19695215, 2003; on a grassy cliff slope 1.5km W of Mwnt church SN180516, 1987 (AOC & APF); and in short turf on the clifftop NW of Clynyrynys, Gwbert SN1650, 1954 (MAER & EWBHM-R, *Watsonia* 12: 189 (1978) and pers. comm.). *Radiola* is unpredictable in its occurrences, and is usually not refindable in later years. There is no definite evidence that it has decreased overall. Salter (1930b, Diary 27.9.1930) mentioned its association with *Anagallis minima* at Aber-arth Common c.SN479624 in 1930, and that Marshall recorded them together in 1899 (see above). They have since been seen together in the Aberleri Fields SN69A, 1994-2000, and at the site 1.5km W of Mwnt church in 1987.

**HYPERICACEAE****Hypericum calycinum** L. - Rose-of-Sharon - Rhosyn Saron (Dalen Dwrch, Basedg Pysgotwr)

Extensively naturalised in a dozen sites in estate woodlands, on roadside hedgebanks, by old cottage sites and on a disused railway and in a chapel graveyard. The earliest record is of it in profusion at Llanfechan SN516455 in 1878 (Smith 1878). It seems to have gone from there, but still occurs in woodland by the drive at Nanteos SN614785, 2004, near where Salter first recorded it as covering "some acres of hillside" in 1891 (Diary 24.10.1891, 1935); this must have been somewhere on open hillside, as in 1936 (Diary 17.11.1936) he wrote "*Hypericum calycinum* has given place to a crop of rape." Native of Bulgaria and Turkey.

*Hypericum calycinum**Hypericum forrestii* in lead mine leat, Chwarel Goch, view E from SN72507219, July 2004**Hypericum forrestii** (Chitt.) N. Robson - Forrest's Tutsan - Dail-y-Beiblau Forrest

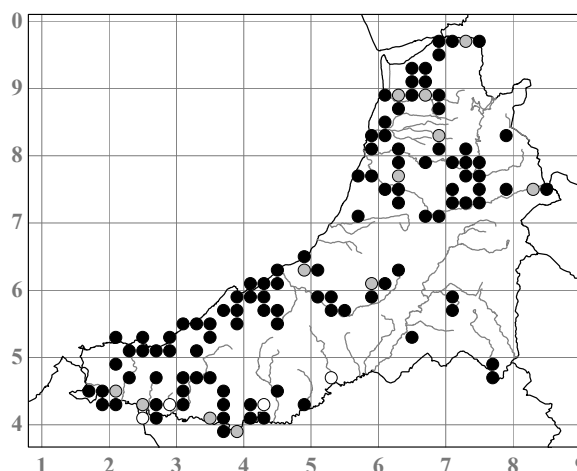
A presumably self-sown bush of this garden ornamental, 1.3m tall and 2.5m wide, suckering or layering at the base, grows in a long-abandoned but still damp lead mine leat in woodland near Chwarel Goch on the N side of the Afon Ystwyth SN72507219, 1994 (NMW, det. NKBR) - 2004. Native of E Asia.

### **Hypericum olympicum** L.

A plant of this attractive dwarf shrub, self-sown from an adjacent garden, has thrived and flowered by the village hall, Cefn Melindwr, Capel Bangor SN657802, 2003 (SPC). Native of the Balkans and SE Asia.

### **Hypericum androsaemum** L. - Tutsan - Dail y Beiblau (Dail Bendigaid)

An occasional plant of usually damp, shaded sites, in gullies, on cliffs and streambanks, in hedgebanks and in woodlands. It always grows singly or in very small groups, and a thicket of wild Tutsan is never seen. It is salt-tolerant and often grows in seepages on the sea cliffs. A few plants grow in an anomalous habitat by the Nant Bwa-drain waterfall, among *Calluna* and *Erica cinerea* on dry, W-facing scree SN714790, 1992 (AOC & DCB). In estate woodlands and grounds it often forms large bushes up to 1.5 × 2m, for example at Plas Cwmcynfelin SN604833, 1995 (NMW), suggesting that they are a cultivar, but in the opinion of NKBR they are just well-grown versions of the wild plant. Altitude limit (native) 360m, flushed slope by the Afon Ystwyth at the Nant Ffos-casaf confluence SN846757, 2006 (SPC); (perhaps introduced) 360m, bramble patch below FC road, Cwmergyr SN79408314, 2004.



### **Hypericum ×inodorum** Mill. (*H. androsaemum* × *hircinum*; *H. elatum* Aiton) - Tall Tutsan - Dail-y-Beiblau Tal

A rare escape, first recorded by Salter (Wade 1952) from Tresaith c.SN2751, and then in 1952 from the New Quay cliffs c.SN36V (Webb 1956). The only other records are from a roadside hedge near Pontargamddwr, Swyddffynnon SN66S (IMV, *Proc. B.S.B.I.* 3: 397 (1960)); in scrub by the stream at Aber-arth SN47906390, 1980-1998 (det. NKBR); and in mixed woodland, Coed Nant Llolwyn, Llanfarian SN588770, 1986 (APF, conf. NKBR).

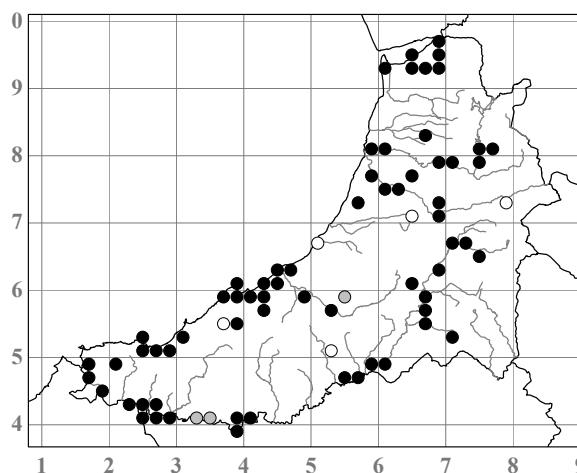
### **Hypericum hircinum** L. subsp. **majus** (Aiton) N. Robson - Stinking Tutsan - Dail-y-Beiblau Drewllyd

A rare garden escape, seen only as one plant on a roadside bank by Llanbadarn Fawr churchyard SN600812, 1977 (det. NKBR); and as several plants growing out of a roadside wall 30m E of Aberaeron church SN45776274, 1998 (NMW, det. NKBR), which had increased to a dozen plants along 8m of the wall by 2000, with several others at the bases of nearby walls by 2009. Native of the Mediterranean and SW Asia.

### **Hypericum perforatum** L. - Perforate St John's-wort - Eurinllys Trydwl

An occasional plant of dry pastures and scrub, rocky slopes, roadsides, banks, waste ground, railway ballast and graveyards. It is commonest near the coast and is confined to the lowlands.

*H. perforatum* is believed to be an allotetraploid of hybrid origin, its reproduction is 97% apomictic and pseudogamous, and it is very variable morphologically. Robson (2002) comments that as this variation appears to be continuous, it is theoretically indivisible and he recognises no infraspecific taxa in Britain. Sell & Murrell (in press), however, treat these plants, including *H. ×desetangsii*, like other apomictic groups and consider that the variation can be divided up into species. These have not yet been properly investigated in the county, but the most distinctive one, **Hypericum microphyllum** Jord., glaucous and with linear leaves, and retaining these characters in cultivation, occurs on rocky slopes and shaly ground in a few places along the coast, and is

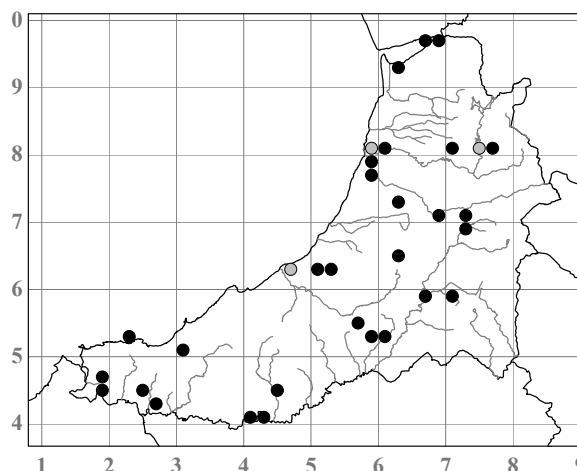




the commonest form on the MoD site, Aber-porth SN242525 etc., 2002 (CGE, det. PDS 2008). **Hypericum lineolatum** Jord. is probably the commonest generally in the county, but has been confirmed only from railway ballast at Plas Crug, Aberystwyth SN590811, 2003 (CGE, det. PDS). **Hypericum graciliramum** P. D. Sell ined. has been collected from scrub on the rocks by the Afon Teifi just below Cenarth bridge SN268415, 2002 (CGE, det. PDS). A broad-leaved plant collected from the grounds of Blaenpant SN253443, 2003 (CGE) as *H. ×desetangsii* is named by PDS as **Hypericum desetangsii** Lamotte, and the other distinctive variants, notably the Pont Glan-Marchnant one mentioned below, will represent other species in the group.

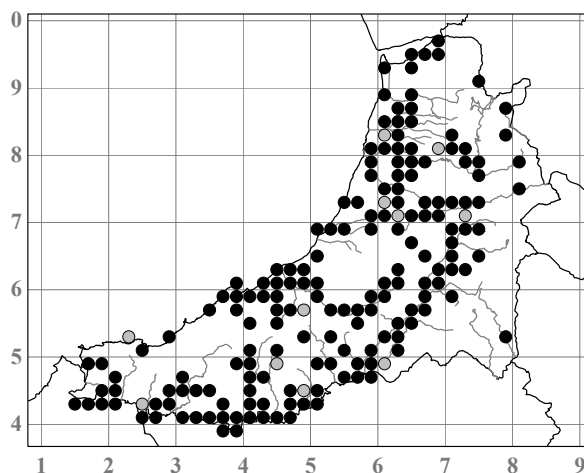
**Hypericum ×desetangsii** Lamotte (*H. maculatum* × *perforatum*) - Des Étangs' St John's-wort - Eurinllys Des Étangs

A frequent and variable hybrid (but see under *H. perforatum*), usually occurring on roadside hedgebanks, waste ground and in gardens, but also in most of the same habitats as the parents. Most specimens show evidence in their characters of back-crossing with *H. maculatum*. The earliest record was from railway ballast at Aberystwyth SN589812 in 1974 (NMW, EHC, det. NKBR). An unusually uniform and distinctive population occurs along c.500m of streamside in the valley mire 1km WNW of Pont Glan-Marchnant SN730695, 1999 (NMW, LTR).

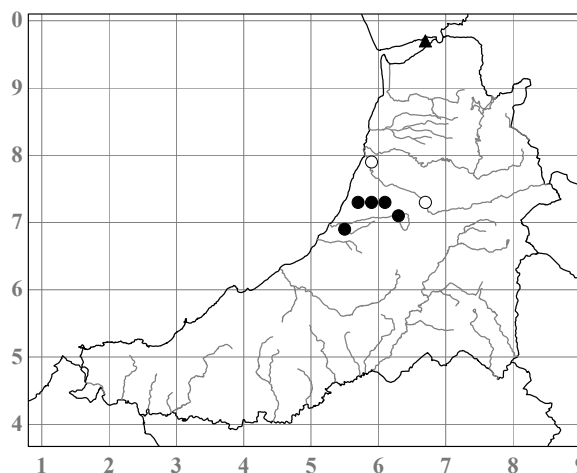


**Hypericum maculatum** Crantz subsp. **obtusiusculum** (Tourlet) Hayek (*H. dubium* Leers) - Imperforate St John's-wort - Eurinllys Mawr

The commonest species of the genus and widespread in grassy places and open scrub in the lowlands. It occurs in the drier parts of fens, on hedgebanks, verges and riverbanks, and is frequent in graveyards. It seems intolerant of grazing, and is usually in damper places than *H. perforatum*. It is very variable and sometimes difficult to separate from back-crossed forms of *H. ×desetangsii* and some records may well belong to this hybrid. The earliest record was from Hafod SN77L by J. E. Smith, 1795 (LINN, Herb. Smith). Altitude limit 510m, Llyn Llygad Rheidol dam, Pumlumon SN791878, 2002.



*Hypericum maculatum*



*Hypericum undulatum*

**Hypericum undulatum** Schousb. ex Willd. - Wavy St John's-wort - Eurinllys Tonnog

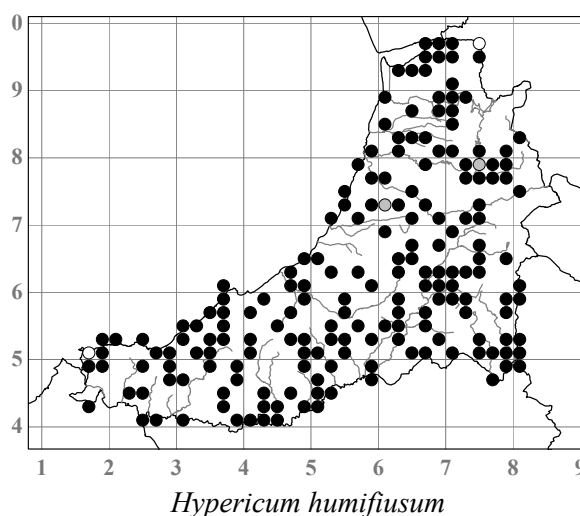
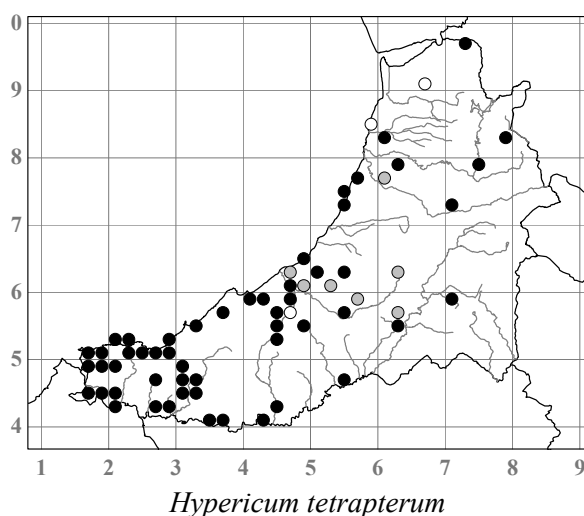
A rare and beautiful plant of poor fen, both in valley mires and on flushed slopes, confined to a small area between the Ystwyth and Wyre valleys, within 10km of the sea. It was first found by Salter in 1933 by the reservoir 500m W of Trawsgoed station SN661725 (1933, NMW, Diary 29.7.1933), when he remarked rather patronisingly "With red underside to its petals, this is quite a good-looking St. John's Wort", and in 1938 (Diary 13.9.1938) he wrote "Plenty of *Hypericum undulatum* - it seems to have increased"; but by 1959 it had become reduced to two plants, perhaps because of shading, and was not seen thereafter. In 1937 Salter found it by the Nant Paith above Rhydyfelin c.SN57Z (Wade 1952), and it was seen again there in 1954 (RMA, field

record at BRC) but not since in spite of repeated searches. In 1957 it was found scattered and locally abundant over c.2.5ha of valley mire at Bwlchyrhandir SN593734 where it still occurs, though in reduced numbers, 2007 (RAJ). In 1963 it was found in poor fen by the Nant Adal 2km S of Llanilar and it is abundant in several places there, including the Rhos y Fforest WTSWW reserve SN617729, 2005, even occurring on the damp, heathy roadside verges. In 1982 c.300 plants were found in fen on a slope near Rhydrosier SN559680 (RMP & MH), and it is scattered over an acre or more of fen NE of Blaencarrog SN575725, 1983-2007 (TAL, AOC, RAJ & JWMcl). Payne (1983) gave some account of its ecology in Cardiganshire. Apart from Arthog Bog in Merioneth, the Cardiganshire sites are the most northerly in the world for this species of Lusitanian distribution.

It was planted c.1960 and grows as a prolific garden weed at Ynys Edwin, Ynys-hir SN678962, and has become naturalised in the adjacent rush pasture 2001-2006 (PSC & AOC).

### ***Hypericum tetrapterum* Fr. - Square-stalked St John's-wort - Eurinllys Pedronglog**

Frequent in fens, rush pastures, by streams and on riverbanks and in ditches in the lowlands, commonest in the SW and becoming rare in the N of the county. It is especially characteristic of the tall herb vegetation along the banks of the Afon Teifi and by its backwaters, and often occurs in flushes and by streams on the sea cliffs. Altitude limit 350m, damp verge of A44(T) road, Cwmergyr SN790830, 1987.



### ***Hypericum humifusum* L. - Trailing St John's-wort - Eurinllys Ymdaenol**

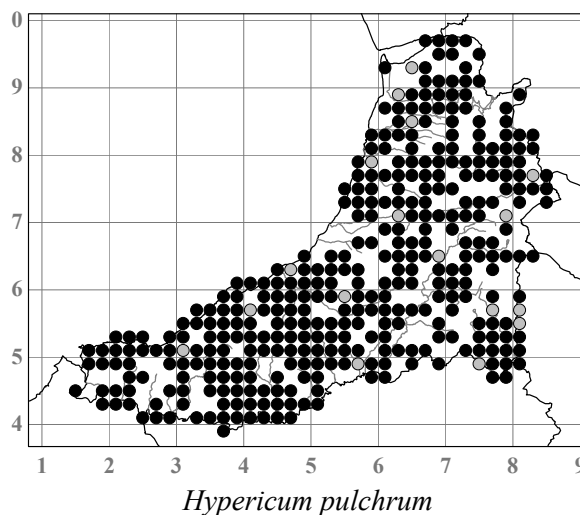
A frequent plant of dry, open habitats, usually on stony or gravelly soil on paths, verges, dry, poached pastures and river shingle. It is especially abundant on the verges of rough FC roads and in quarries. Apparently resistant to some herbicides, it is a common weed of paths in graveyards and gardens. In a few places on the sea cliffs, for example on the S slope of Foel y Mwnt SN191520, 1987-2002, and 1.5km N of Morfa Bychan SN57307850, 2001 (NMW), it occurs in an entirely natural habitat with *Thymus*, *Ornithopus* etc. on shaly, thin soil. Most plants are var. **humifusum**. Var. **liottardii** (Vill.) Vill. sometimes occurs in fallow arable fields where it can form large circular mats with stems up to 30cm long, for example at Llwynysgaw SN215520, 1995 (NMW). Altitude limit 335m, Devil's Bridge district c.SN77N (Salter 1935); 480m, verge of FC road, Peraidd Fynydd SN809821, 1996.

### ***Hypericum humifusum* × *linariifolium* Vahl**

One large plant of this rare hybrid, already known from Pembrokeshire and Llŷn, was found in unmown grassland by a fence on the MoD site, Aber-porth SN24615157 in 2008 (NMW, conf. NKBR). *H. linariifolium* has not yet been found in the county.

### ***Hypericum pulchrum* L. - Slender St John's-wort - Eurinllys Meinsyth**

Common on dry heathy roadside and field banks and acidic pastures on thin soils, heaths, scrub, open dry



Oak woodland and wood margins, rocks and cliffs, from the driest coastal slopes to the upland cliffs where, however, it mostly occurs on damp ledges. Altitude limit *c.*600m (“to nearly 2,000ft.”), Craig y March, Pumlumon SN805882 and above Llyn Llygad Rheidol SN7987 (Salter Diary 26.9.1903, 21.9.1905); 560m, cliffs at the head of the Nant y Moch, Pumlumon SN784862, 2002 (AOC & PAS).

***Hypericum hirsutum* L. - Hairy St John’s-wort - Eurinllys Blewog**

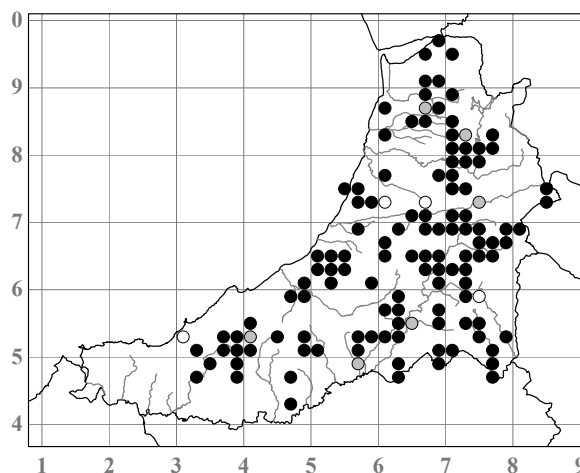
Known only from grassy scrub at the NE corner of the A44(T) road bridge over the Afon Rheidol at Ponterwyd SN748808, where there is a colony *c.*2 × 2m, 1987 (NMW) - 2005; it is presumably a garden escape. A record from Aber-mad SN600760 in Morgan (1849), and a specimen, ostensibly from Aberystwyth, 1961 (ABS, O. J. Brooks) which seems unreliably labelled, are both best ignored.

[*Hypericum montanum* L. - Pale St John’s-wort - Eurinllys Gwelw

Erroneously recorded by Morgan (1849) from the “Higher part Melindwr” *c.*SN78B and by Rees (1890) from “about Rhydyfelin” *c.*SN57Z.]

***Hypericum elodes* L. - Marsh St John’s-wort - Eurinllys y Gors**

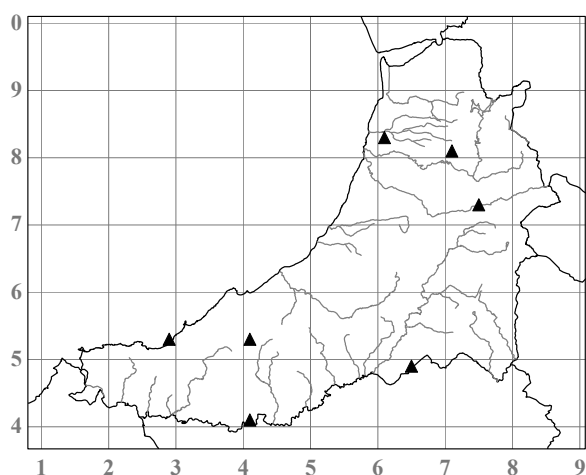
A frequent plant of wet peaty flushes, runnels and soakaways in mires, acidic basin mires, the wetter and more acidic parts of poor fen in valley mires, and in swampy lake margins where it often forms floating masses. It is absent from most of the SW of the county, and from the lower Teifi valley, and its distribution pattern is much the same as that of *Menyanthes*. When in flower its presence is often heralded by the liquorice-like aroma. Altitude limit 425m, “head of Nant Groes [Groes Fawr]” SN7459 (Salter 1935); 415m, poor fen E of Claerddu SN794686, 2002 (AOC & PAS).



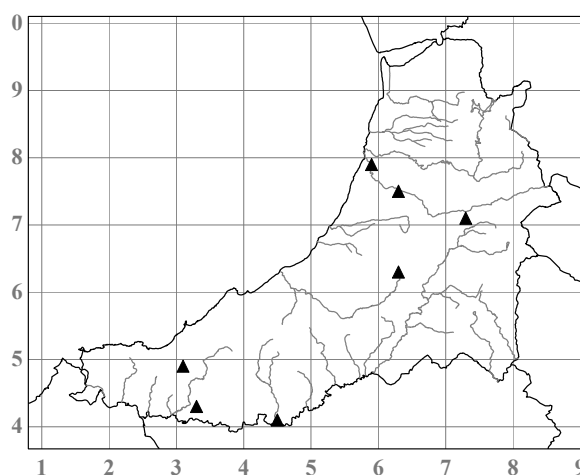
## GERANIACEAE

***Geranium endressii* J. Gay - French Crane’s-bill - Pig-yr-aran Ffrainc**

Occasionally established alongside roads, and first recorded from near a lay-by in Cwm Woods SN602832 in 1993, where it appeared self-sown from seed from garden rubbish, and was setting good seed itself (SPC). Other colonies appear more likely to have been vegetatively established from throw-outs, for example on the heathy verge of the A44(T) at Nantyrarian SN712810, 2000 (SPC), on a grassy slope at the N end of Llandysul SN414408, 1998, and in heathy *Molinia* by the Blaencwm-pant-sod crossroads SN416533, 1999. Native of the Pyrenees. Altitude limit 340m, road verge opposite conifer plantation 3km E of Cellan SN641490, 1997 (AOC & JPW).



*Geranium endressii*



*Geranium oxonianum*



**Geranium ×oxonianum** Yeo (*G. endressii* × *versicolor*) - Druce's Crane's-bill

This hybrid of garden origin is occasionally established from throw-outs or plantings on streambanks, in scrub, in graveyards and on road verges. It was first recorded from the vegetated part of the Pendinas rubbish-tip SN584799 in 1993, and is especially well-established on the bank of the Nant Adal by Llanilar churchyard SN62327517, 1994 (NMW, AOC; SPC) - 2004, in Ysbyty Ystwyth churchyard SN732715, 1995-2004 (NMW), and at the bottom of Allt-yr-esgob, Llandyfriog SN335420, 2008. Plants on a vegetated tip W of the level crossing at Aberleri, Ynys-las SN60909218, 2007 (NMW, AOC & JPP) included one of 'Thurstonianum'.

**Geranium versicolor** L. - Pencilled Crane's-bill - Pig-yr-aran Resog

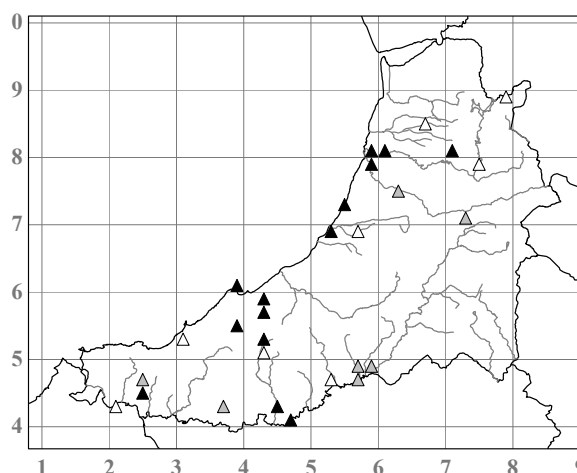
Recorded from the roadside near Panteg, Aberaeron c.SN457622, 1904 (DDW, Salter Diary 25.6.1904), and as abundant in Llangoedmor churchyard SN199458, 1929 (Salter Diary 21.9.1929). The only subsequent record is from the laneside verge opposite the municipal gardens nursery, Bryn-y-mor, Aberystwyth SN589825, 1998 (NMW). Native of the C Mediterranean.

**Geranium rotundifolium** L. - Round-leaved Crane's-bill - Pig-yr-aran Grynddail

Naturalised by the lane and church hall outside Salter's garden at Fairview, Llanbadarn Fawr SN598810, 1991 (NMW) - 2008; in 1995 several plants were in the village square nearby SN60038091. Salter had grown the species in his garden, 1929 (NMW), from seed from Stiffkey, Norfolk, and it was still abundant in the garden until at least 1993 (SPC).

**Geranium pratense** L. - Meadow Crane's-bill - Pig-yr-aran y Weirglodd

Nowhere native, but long-established in a few sites, and occurring occasionally on roadside verges, on hedgebanks, in scrub and in graveyards where it was presumably derived from throw-outs or was self-sown from gardens. The earliest record is a specimen from a "Bank, in a field 3 miles from Aberystwyth. This is the only place where I have met with it, excepting in a churchyard in the lower part of the county," 1854 (K, Herb. Watson, MMA). Salter (Diary 23.6.1893) found it in St Michael's churchyard, Aberystwyth SN581817 opposite the entrance to the College in 1893; a specimen exists from 1905 (ABS, EEJ), and it survived there for nearly a century until c.1988 when, after repeated attempts to remove all "weeds" from the lawn, it was successfully exterminated by applications of selective herbicide. Salter also knew it for at least 20 years in Ysbyty Cynfyn churchyard SN752791 (Diary 5.8.1903, 26.6.1924), and recorded it from seven other sites. In a few of the dozen sites where it has been found in recent decades, cultivars or even perhaps hybrids seem to be involved: on the A487(T) verge near Llanddeiniol SN557727, 2002 (NMW, CMFB) and 1km SW of Llanrhystud SN530688, 2005, where the stems were eglandular (though not the inflorescence) and the petals were 22-25mm long; and on the A44(T) verge at Nantyrarian SN71998129, 2004 (NMW), where the stems were similarly eglandular but the petals were only 18mm. Altitude limit (naturalised) 375m, abandoned cottage garden site, Hengwm Annedd SN797893, 1940 (Salter Diary 2.7.1940), where it must have been planted before 1935; 310m (naturalised), Nantyrarian, 2004, as above.



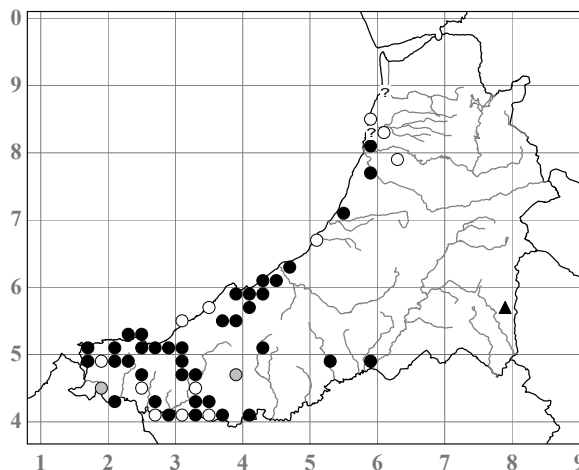
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**Geranium sanguineum** L. - Bloody Crane's-bill - Pig-yr-aran Ruddgoch

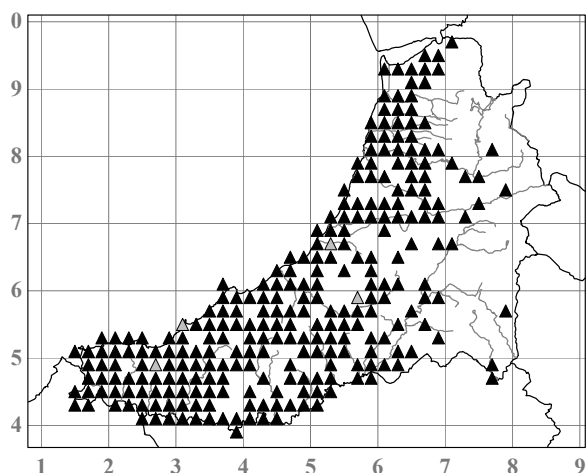
Apart from a 1950s unlocalised field record at BRC from SN69, the only records of it naturalised are on a grassy streambank by the level crossing at Llanbadarn Fawr SN59908052, 2007; in several places in rough pasture just NE of the Ffair-rhos crossroads SN74086808, 2008, at 295m altitude; and on a laneside verge by the entrance to the Penparc sand quarries SN201479, 1992 (NMW).

**Geranium columbinum** L. - Long-stalked Crane's-bill - Pig-yr-aran Hirgoes

An occasional plant of hedgebanks, dry scrub slopes, dry pastures, margins of arable fields, graveyards, railway ballast and road verges, chiefly in the coastal parts of the SW half of the county. Salter (1935) cites old records from Borth *c.*SN68E (FWT), Clarach *c.*SN58W (JAWe) and Moriah *c.*SN620795 (JAWe), but since then the only records N of the Ystwyth have been from a pathside in burnt Gorse scrub on Pendinas SN586800, 2000, and from the disused railway and road verges at Llanfarian, SN5977, 1993-2002 (SPC; AOC). As Salter described it as "Frequent and generally distributed except in the mountain district" it has probably decreased since his day. The species is strictly lowland, and plants on a disturbed verge by a new road bridge 1km W of Nantystalwyn SN794574, 2002, at 380m altitude were presumably either from a seed-mix or were casuals.

**Geranium dissectum** L. - Cut-leaved Crane's-bill - Pig-yr-aran Larpiog

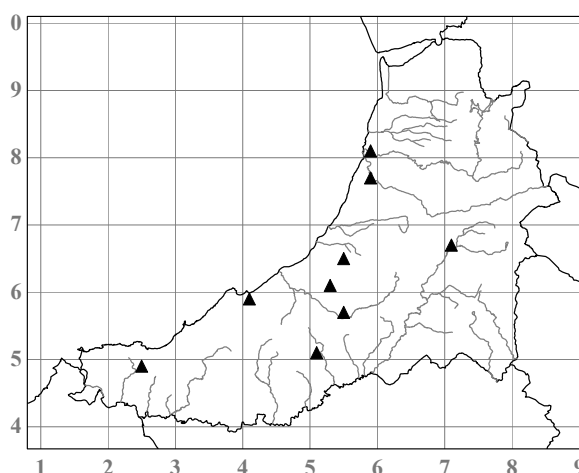
A frequent archaeophyte of dry pastures, rocky slopes, road verges, pathsides, hedgebanks, arable fields, gardens and waste ground. It is generally commoner in the SW half of the county and is mostly lowland. Altitude limit 435m, rank vegetation by lay-by in felled conifer plantation, Bryn-y-rhyd SN683520, 2008.

*Geranium dissectum**Geranium ibericum* in Llangwryfon old churchyard SN597705, June 1990**Geranium ibericum** Cav. - Caucasian Crane's-bill - Pig-yr-aran Cawcasws

This nationally rarely naturalised species, native of the Caucasus, occurs in Llangwryfon old churchyard SN597705 (NMW, LTR), where it was first noticed *c.*1970 and was named by PFY in 1982. In 2002 the colony measured 4 × 1-2m.

**Geranium ×magnificum** Hyl. (*G. ibericum* × *platy-petalum* Fisch. & C. A. Mey.) - Purple Crane's-bill - Pig-yr-aran Borffor

This very conspicuous garden hybrid is occasionally established from throw-outs or plantings on roadside verges, hedgebanks, waste ground and by old garden sites. It was first recorded in 1991 from a road verge just E of Pont Glanrafon, Cribyn SN518512 (NMW).

*Geranium ×magnificum*

### **Geranium pyrenaicum** Burm. f. - Hedgerow Crane's-bill - Pig-yr-aran y Gwrych

Found by Salter in 1924 opposite Hawen chapel SN346468, though it had apparently gone by 1929 (Diary 15.9.1924, 17.9.1929, 1935), there is a record from New Quay c.SN35Z (PWC, Wade 1953), and only two more recent ones. It was found on the roadside bank just W of Llanbadarn Fawr church SN598810 in 1987 (NMW, MC) and is still abundant there and on waste ground nearby, 2008, having doubtless come from Salter's garden at Fairview just above. In 1999 a clump was found by the road at the N end of the golf course at Ynys-las SN607934 (RGW).

### **Geranium pusillum** L. - Small-flowered Crane's-bill - Pig-yr-aran Fân-flodeuog

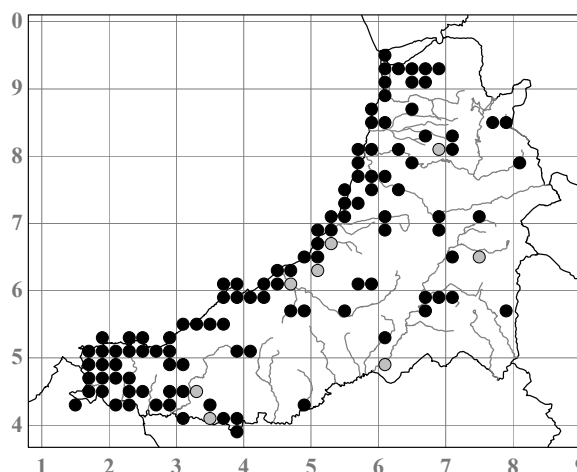
Recorded from Borth c.SN68E by Morgan (1849), and then more reliably by Salter in 1932-1934 (Diary 5.8.1934, 1935) "in some quantity" from ballast on the Devil's Bridge railway between Glanyrafon and Capel Bangor c.SN68F. There are six subsequent records, all from arable fields, flowerbeds or roadside verges: flowerbed by University Art Dept., Aberystwyth SN588815, 1996 (SPC); sandy arable fields, Nantferwig SN168482, 1997-2005 (NMW, AOC & SPC), where among Maize the stems can be erect and up to 55cm tall; roadside verge, Felin-fach SN529558, 1999; Potato and Maize fields 1km NNW of Penparc SN206487, 1999 (SPC) - 2005 (NMW); roadside verge, Llechryd SN214441, 1999; and new verges of car park, Ysgol Penweddig, Aberystwyth SN59518121, 2001-2004.

### **Geranium molle** L. - Dove's-foot Crane's-bill - Pig yr Aran

A frequent plant of dry pastures, banks, rock outcrops, pathsides and verges, sand dunes, waste ground, lawns and arable fields. It is especially characteristic of the droughted, thin, infertile soils of the coastal slopes where it grows as a winter annual, and becomes progressively less common inland.

Var. **molle**, with erect stems and small flowers, is the commonest variant, although var. **arenarium** N. Terracc., with prostrate stems and small flowers, is almost as widespread. The former is more often in taller vegetation, as among *Ammophila* and *Ulex* on the Penyrergyd dunes SN162488, 2002 (NMW), while the latter is usually on bare or closely grazed ground, as on the Rabbit-grazed roadside verge here, 2002 (NMW) and in similar habitats on the Ynys-las dunes SN607940, 2002 (NMW). Intermediates are frequent, for example in the Aberystwyth Cattle-market yard SN58618135, 2002 (NMW), and to what extent the variation is environmental is uncertain. White- or pale pink-flowered plants are occasionally found.

Var. **grandiflorum** Vis., a tall plant with the petals twice as long as the sepals, has been seen in rough coastal grassland 600m W of Gilfach-yr-halen SN430610, 2002, and doubtless occurs elsewhere. Var. *aequale* Bab., with smooth mericarps, has not been seen. Altitude limit 430m, Bwlchgarreg SN724911 (Salter 1930); (var. *molle*) 440m, Nettle patch by track 1km SE of Lle'r-neuaddau, Pumlumon SN76648409, 2005 (NMW, AOC & PAS); (var. *arenarium*) 550m, gravelly ground by track, lead mine N of Eisteddfa Gurig SN79578572, 2007 (NMW, AOC & CRB).



### **Geranium macrorrhizum** L. - Rock Crane's-bill - Pig-yr-aran Wreiddfawr

Rarely established, probably always from throw-outs, this species was first recorded in 1992 from a pathside verge 200m SE of the National Library, Aberystwyth SN59588140 in 1992 where it was still present in 2004 (AOC; SPC). The only other records are from *Salix cinerea* carr near Frongoch farm SN607824, 1998 (SPC), from *Salix cinerea* scrub 200m NW of Cross Inn SN542642, 1997 (NMW), from a grassy slope in Llan-non SN516670, 1997 (AOC & JPW), in kerb-side grassland in the bungalow estate in Cwm Halen, New Quay SN39695882, 2006 (SPC), and on a roadside hedgebank near Gafriw Uchaf, 3km SE of Mydroilyn SN47535347, 2008.



**Geranium  $\times$  cantabrigiense** Yeo (*G. dalmaticum* (Beck) Rech. f.  $\times$  *macrorrhizum*) - Cambridge Crane's-bill

A garden hybrid, naturalised only on the grassy slope of the quarry at the bottom of Bryn-y-mor Road, Aberystwyth SN58458250, 2005 (NMW), where there were three separate colonies derived from throw-outs from a garden opposite; the slope was cleared in 2008 and *G.  $\times$  cantabrigiense* from the same garden was planted along it, with other decorative plants.

**Geranium lucidum** L. - Shining Crane's-bill - Pig-yr-aran Loywddail

This species has increased since Salter's day perhaps more than any other, and it has increased in Britain generally in recent decades (Pearman *et al.* 2002). Salter (1935) described it as rare, with only five sites, and his first record was from the Llechryd area c.SN24B in 1905 (Diary 15.9.1905, ETT). He himself saw it the following year at Llanilar "in plenty" on walls at the Castle Hill gardens SN625745 and at the school SN624751 (Diary 16.5 & 29.6.1906), in 1930 by the churchyard gate at Llanfairorllwyn SN367410, and on a garden wall at Tal-y-bont SN6589 (1935). These all seem to be garden escapes. Whellan (1942) recorded it from Newcastle Emlyn SN34A, Cenarth SN24Q and Llechryd c.SN24B, and Wade (1953) gives additional Salter records from Abertegan SN490438 and Bwlchbychan SN481434. It is still at these seven sites, but is now common along usually shaded roadside banks and on walls and roadside rocks throughout much of the SW half of the county. It remains rare in the north, and N of the Ystwyth only occurs by the lane outside (and doubtless escaped from) Salter's garden at Fairview, Llanbadarn Fawr SN597812, 1965 (NMW, RGE) - 2004; around Tal-y-bont SN68P, 2004; and as a garden weed at Ynys Edwin SN678962, 1991. It is probably not native anywhere in the county, and its recent spread may well have been aided by the shaving of roadside banks by mechanical grass-cutters.

**Geranium robertianum** L. - Herb-Robert - Y Goesgoch (Dail Robin, Pig y Grechi, Coes y Ceiliog, Blodyn y Neidr, Blodyn Te)

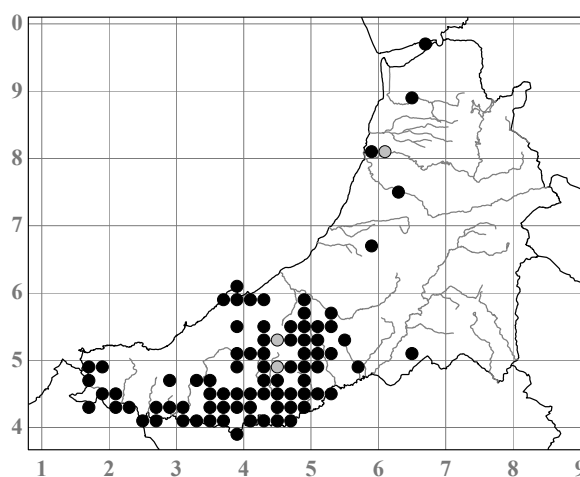
Subsp. **robertianum**

Common throughout the county in hedgebanks and in all but the more acidic woodlands, on screes, cliffs, mortared walls, railway ballast and waste ground, usually in well-drained sites. On the coast it is often abundant on the rock banks of sea defences, for example in the Aberystwyth marina SN581811, 2008. Altitude limit c.535m, Craig y March SN806882, (Salter 1935); 1976, ditto.

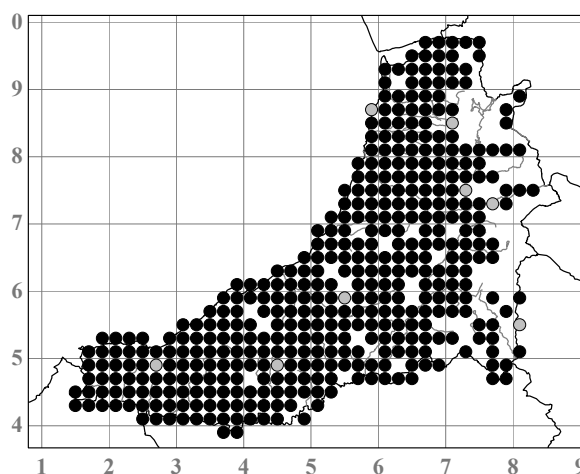
White-flowered variants occur in several localities and their identity is often uncertain (cf. Yeo 1992, Rice 1992). Salter (1935) recorded one from Bryneithin which "comes true from seed", perhaps the roadside locality 400m SW of this mansion at SN579779 where it was seen in 1997; there are also several colonies and individual plants on roadside



*Geranium  $\times$  cantabrigiense*, Bryn-y-mor Road, Aberystwyth, SN58458250, June 2005



*Geranium lucidum*



*Geranium robertianum* all records

banks nearby at SN58607775-58677795, 1959-2008. These plants completely lack anthocyanin and are perhaps ‘**Celtic White**’, though they may be just albino variants of the normal wild plant, and similar plants have been seen at Llanbadarn Fawr, both inside and outside Salter’s garden at Fairview SN59828106, 1992 (SPC) - 2008; at Goginan, by Troedrhicwastell SN69078155, 1992, and in Jezreel chapel graveyard SN690813, 1990; on the Pendinas rubbish-tip SN584799, 1994 (SPC); and in the chapel graveyard at Beulah SN288460, 2008. White- or very pale pink-flowered plants with at least the nodes red-tinged, perhaps ‘**Album**’, ‘**Cygnus**’ or forma **leucanthemum** Beckh., have been seen in a wooded ravine and around the ruins of Coronwen, Cwm Einion SN69849389-69939430, 1997 (NMW); in a hedgebank and in the chapel graveyard at Ciliau Aeron SN499586, 1985-1999; and by the lane at the bottom of Allt Henbant-fawr, Capel Dewi SN449433, 1978, and elsewhere in this area.

Subsp. **celticum** Ostenf.

Very robust, pale green plants, reddish only at the nodes, with the petals 14mm long, pink and with strong white streaks, and the undehisced anthers orange, occur on shaded wet scree on the E bank of the Rheidol 150m upstream of the Mynach confluence at Devil’s Bridge SN742774, 1991 (NMW); they seem to agree with this subspecies in almost all characters and merit further investigation. Less convincing plants approaching this subspecies occur in several other shaded, damp rocky ravines and on wooded cliffs in the uplands, for example under Bryn Bras SN752797, 2004 (NMW), and in Cwm Ystwyth SN820746, 2004 (NMW).

Subsp. **maritimum** (Bab.) H. G. Baker

Baker (1956), in raising this procumbent, usually rather glabrous but ill-defined variant to the rank of subspecies, cited an E. Forster specimen in **BM**, collected “on the shore at Aberystwyth 1805” (Forster 1805, where he called it *G. saxatile*), and another “½ mi. from mouth of R. Ystwyth, 1930, Montfort, Turrill & Carter, 1930” SN580801, in **K**. For many years this plant grew in small quantity here on the shingle beach at Tan-y-bwlch, on the seaward side of the road, and in 1997 one plant appeared on the shingle on the landward side and numbers rapidly increased thereafter. By 2003 there were 112 plants on the seaward side, and 389 along 150m of shingle on the landward side. It also occurs on the landward slope of the shingle beach E of Aberaeron SN463636, 1982-2007. Both our populations seem to be var. **intermedium** Wilmott.



**Geranium phaeum** L. - Dusky Crane’s-bill - Gweddwr Alarus

Salter (1935) described this as a “rather frequent” escape and gave at least six sites, his first record being from Ty Glyn Aeron SN5059 in 1904 (Diary 25.6.1904), near where MLL collected a specimen “Found in lane under Tymawr wood [c.SN515588], May 1919” (**ABS**). A 1935 record for SN46 at BRC referred to this site of Salter’s. In 1923 Salter (Diary 21.12.1923) “saw what appeared to be *Geranium phaeum* in the churchyard” at Llanfihangel-y-Creuddyn SN665761, and this is the only site where it is known still to occur. It survived the spraying of the whole churchyard with weedkiller in 1977 and was abundant N of the nave until about 1980, and then disappeared for unknown reasons; there were a few plants W of the nave in 1981, which had increased to a patch 1.5 × 1.5m by 2007 (AOC & JPP).

*Geranium robertianum* subsp. **maritimum**,  
Tan-y-bwlch beach, view N from  
SN579803, June 2009

**Erodium maritimum** (L.) L’Hér. - Sea Stork’s-bill - Pig-y-crëyr Arfor

A rare plant of dry thin soils and shaly open places on the coastal slopes, sometimes in Rabbit warrens or in other disturbed places, and especially characteristic of short trampled turf on compacted soils. It was first recorded in 1805, at Aberystwyth (Forster 1805), again in 1841 “below the castle rock” (Lees 1841), and was collected again on the Aberystwyth Castle Grounds SN579815 in 1849 (**K**, Herb. Watson, GWS) but has not

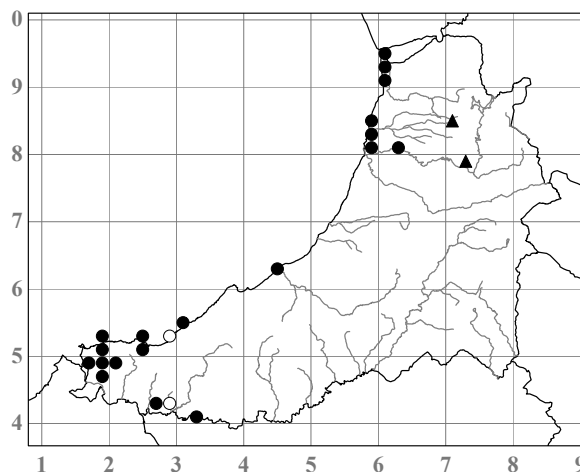
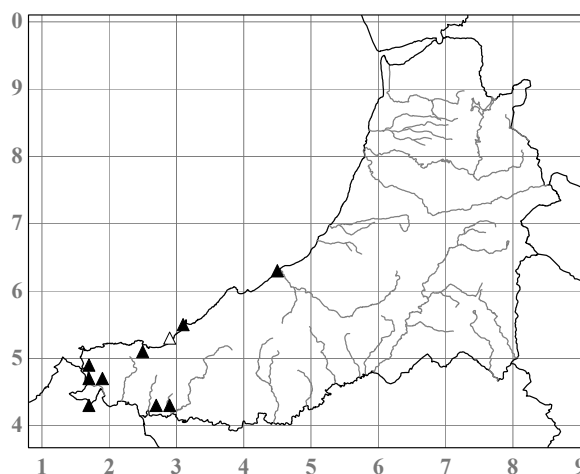
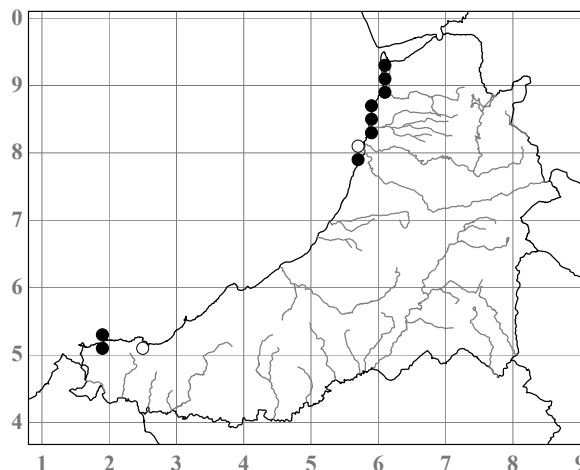
been recorded there since. There are especially good populations on Allt Wen SN574791, on steep shaly scree where there are seepages, *c.*20 plants being seen here in 1984 and *c.*1,300 in 1996; and on the S facing slope of Foel y Mwnt SN194520, 1987 - 2007 where some thousands of plants are often seen. Numbers fluctuate greatly in most sites from year to year. In 1999 *c.*250 plants were seen in a chapel yard at Borth SN60918947 (TAL), and since then it has spread to many other places nearby (CMFB; SPC) and in 2003-2005 it was dominant over an area  $4 \times 3\text{m}$  on the station platform SN60939005. Completely apetalous plants occur in several of the populations.

***Erodium moschatum* (L.) L'Hér. - Musk Stork's-bill - Pig-y-crëyr Fwsg**

A rare archaeophyte, though perhaps less so now than in the past. It is currently known from Aberaeron, Aber-porth, Llangranog and in the lower Teifi valley. It was first recorded in 1726 "On ye rocks by Cardigan" SN14 by Littleton Brown (Druce & Vines 1907), and then by Morgan (1848) without locality, by Oldham in *c.*1924 from the "foreshore above the beach, Penbryn" SN25W (Salter Diary 6.12.1924, 1935), and by Whellan (1942) from a "Bank near Aberporth" SN25K or Q in 1941. Salter never saw it. In 2008 several plants were found in a weedy strip by the Aberaeron rugby ground SN45816310 (SPC). In 1994 four plants were found on the roadside at Llangranog by the chapel SN31295410, and since then it has been on the road verges, at the bases of walls and on grassy slopes here, in increasing abundance, with *c.*13 plants in 1996, *c.*40 in 1997 and more than a hundred in 2003. Perhaps this was the "*Erodium* sp., a hedge in front of 'Castle Rock', Llangranog" reported to Salter by D. E. Thomas in 1904 (Diary 28.6.1904). Well over a thousand plants were found along 400m of dry, shaly, partly mown pasture and trackside on the S facing slope 700m ESE of Capel Tygwydd SN277432 in 1996-1997 (NMW, AOC, LRG & MDS). In 2005 it was found on a disturbed verge on the MoD site, Aber-porth SN253518 (CDP & AOC). In 1998 it was found frequent over an area  $25 \times 10\text{m}$  along a footpath and its verges and in the adjacent mown lawn at Aberdare SN170483, and in 1999 it was found abundant along a trackside and dry grassy slope 100m W of Tregibby Farm SN179475-181474 (MDS & AOC). In the county it usually appears to be a short-lived perennial rather than an annual.

***Erodium cicutarium* (L.) L'Hér. - Common Stork's-bill - Pig y Crëyr**

Common on the sand dunes at Ynys-las SN69 and Penyrergyd SN14, and occasional elsewhere along the coast on dry slopes, especially by Rabbit warrens and on shaly areas. Inland it is rare as a native and seems largely confined to thin soils on the S facing slopes up the Teifi valley, for example 700m ESE of Capel Tygwydd SN27754320, 1997 (AOC, MDS & LRG) where it occurs sparsely with abundant *E. moschatum*; 500m ESE of Dolau, Llandyfrïog SN338412, 1997 (MDS); and 100m W of Tregibby Farm SN18104740, 1999 (AOC & MDS), again with *E. moschatum*. It is common in the Penparc sand quarries SN200483, 1991-2005 (NMW). Otherwise inland it is probably only an introduction, as by the Llyn Craig y Pistyll dam SN718856, 1990-2002 (AOC & SPC), and by the Afon Rheidol in Cwm





Rheidol SN72587821, 2003, where it had clearly come from a seed-mix. Occasionally it grows as an arable weed in sandy Maize fields, for example at Nantyferwig SN16874828, 2002 (NMW). All our plants have the glandulosity and short mericarp beaks of subsp. *dunense* Andreas, but even on the dunes there is so much variation in habit and hairiness that it seems not worth recognising. Many plants on the dunes lack anthocyanin. Altitude limit (probably introduced) 325m, Llyn Craig y Pistyll dam SN718856, 2002.

***Erodium lebelii* Jord. (*E. glutinosum* Dumort.) - Sticky Stork's-bill - Pig-y-crëyr Ludiog**

Although long expected at one or other of the main dune systems in the county, this species was not seen until 1999 when six plants were found at the edge of a small slack at Ynys-las SN60749368 (JHi, conf. PMB). The following year there were *c.*200 plants here, and in 2002 there were 18, but in 2003 only one, and in 2004 eight. Meanwhile in 2001 a few plants were found on a disturbed dune slope 300m away at SN60639396 (SPC).

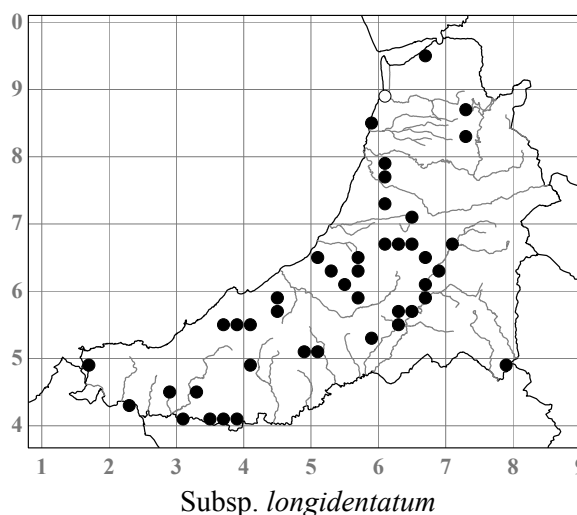
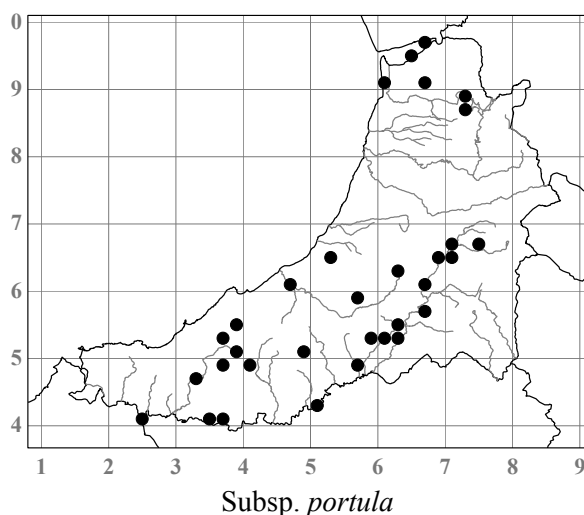
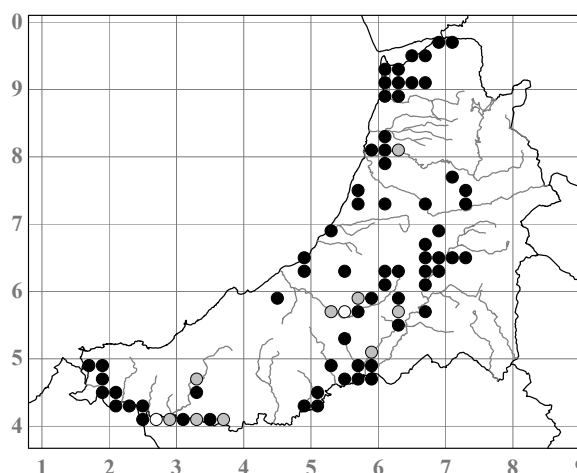
## LYTHRACEAE

***Lythrum salicaria* L. - Purple-loosestrife - Llysiau'r-milwr Coch**

An occasional plant of tall herb vegetation on riverbanks, by ox-bows, backwaters and ditches, in fens, swamps, Alder and *Salix* carr and in reedbeds, and less often in marshy pastures. It is somewhat salt-tolerant, occurring along the Dyfi and Teifi estuaries in slightly brackish marshes and ditches, and on the sea cliffs and coastal slopes in flushes and on streambanks. It has not been seen over 275m altitude, in the swamp at the N end of Pond Rhosrydd SN705760, 1990.

***Lythrum portula* (L.) D. A. Webb (*Peplis portula* L.) - Water-purslane - Troed y Gywen**

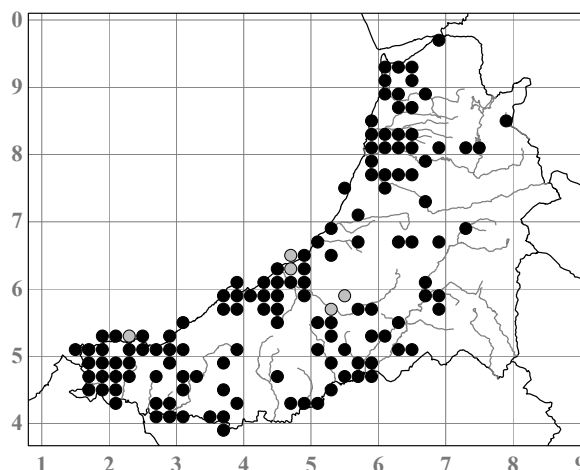
A frequent plant of wet places on open, muddy or clay ground, especially in winter-wet hollows in the floodplains of rivers, in and by ponds and ditches, ephemeral quarry pools, rutted tracks, poached gateways and elsewhere in heavily poached marshy pastures. In the draw-down zone of reservoirs it can be dominant, and it often rapidly colonises new ponds, and often grows as a submerged aquatic. Although generally a calcifuge, it is rare on peat and often occurs on clay soils. Although there is a cline in the length of the epicalyx segments in Britain as a whole, in Cardiganshire subsp. **portula** and subsp. **longidentatum** (J. Gay) P. D. Sell (the more westerly one, with longer segments) are equally widespread and frequent, merge into each other morphologically, and have no discernible ecological differences. The earliest record of the latter is from the "cliff-top near Upper Borth" SN68E, 1930 (K, HMM & WBT, Allen 1954). Altitude limit (subsp. *portula*) 415m, pool 400m SE of Carn Owain SN735879, 1987-2006; (subsp. *longidentata*) 325m, dominant around much of the margin of the drained Bog Pond SN732824, 1994.



## ONAGRACEAE

***Epilobium hirsutum* L.** - Great Willowherb - Helyglys Pêr

Frequent in fens and other rank, marshy vegetation, at the edges of ponds and rivers and in slow-flowing ditches, and also a common plant of waste ground and tips, and a frequent garden weed. Its sites are always ones where there is some movement of water, or that are well-drained, and in its wet sites it is confined to the lowlands. It is especially abundant on shingle by streams where they debouch onto the sea beaches, for example at the mouth of the Wyre SN527697, 1905 (Salter Diary 31.7.1905) - 2004, and by streams on the sea cliffs. Altitude limit 415m, waste ground in Eisteddfa Gurig farmyard SN797840, 1993.

***Epilobium* × *subhirsutum* Gennari** (*E. hirsutum* × *parviflorum*)

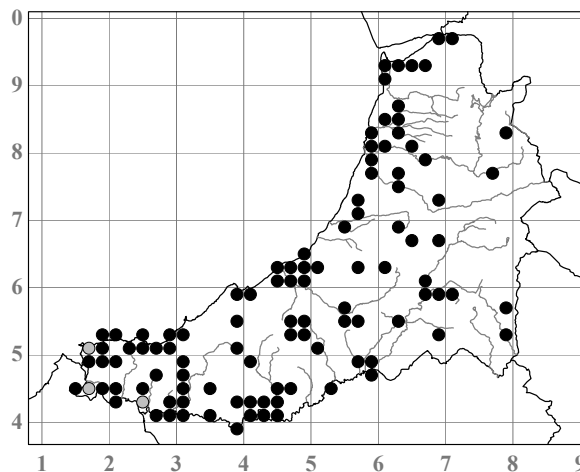
Recorded only from a pathside verge NW of the Science Park, Llanbadarn Fawr SN597813, 2005 (**Herb. SPC**, SPC, conf. TDP).

***Epilobium* × *novae-civitatis* Smejkal** (*E. hirsutum* × *ciliatum*)

Only once recorded, in a quarry in FC plantations 900m N of The Arch, Devil's Bridge SN76407645 at 345m altitude, 2001 (NMW, det. TDP).

***Epilobium parviflorum* Schreb.** - Hoary Willowherb - Helyglys Lledlwyd

Frequent on road verges, waste ground, tips and as a garden weed, on slumping till slopes on the coast, in poached areas of clay pastures and scrub, and in fens and flushes. There is more variation in pubescence, leaf shape and size of flowers and capsules than in most other species in the genus. Altitude limit 450m, damp, heathy road verge, Bryn-y-rhyd SN680524, 2008.

*Epilobium parviflorum****Epilobium* × *limosum* Schur** (*E. montanum* × *parviflorum*)

Recorded only from a hedgebank near Temple Bar SN531531, 1996 (NMW, conf. GDK).

***Epilobium* × *palatinum* F. W. Schultz** (*E. parviflorum* × *tetragonum*)

The only record is by Salter from a ditch at "Ty'n Rhos Farm" [Ty-rhos], New Quay SN379591, 1937 (NMW, det. GMA, conf. GDK); the identification was accepted only provisionally by Ellis (1983) but was confirmed by GDK in 2006.

***Epilobium* × *dacicum* Borbás** (*E. obscurum* × *parviflorum*)

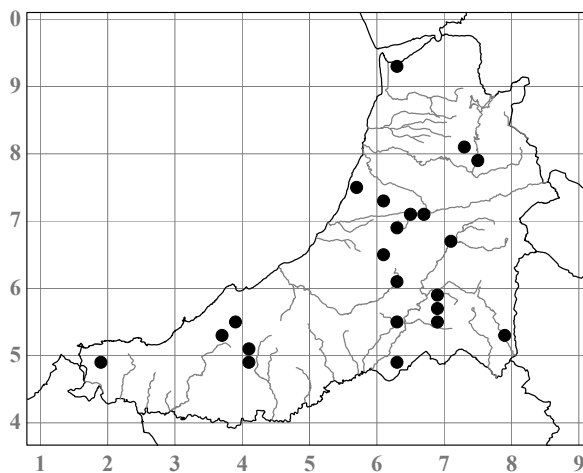
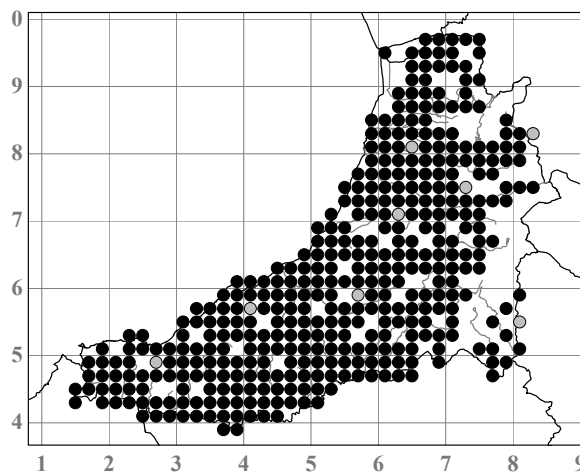
The only record of this generally quite widespread hybrid is from a rough track by new houses at Cefn-llan, Llanbadarn Fawr SN599815, 2006 (SPC, det. TDP). A Salter specimen from Ty-rhos, New Quay SN378590, 1937 (NMW), given as this hybrid by Wade (1952), had been earlier determined as *E. ×palatinum* by GMA and was confirmed as the latter by GDK in 2006.

**Epilobium ×floridulum** Smejkal (*E. ciliatum* × *parviflorum*)

Recorded only five times: in a dune slack at Ynys-las SN610938, 2006 (NMW, AOC & JPP, conf. GDK); in an IGER field at Gogerddan SN623836, 2000 (SPC); in Llwyniorweth-isaf farmyard, Capel Bangor SN647811, 2008; on railway ballast, Capel Bangor station SN648797, 2008 (SPC); and on damp ground by the Afon Mwldan near Penparc SN195483, 1999 (Herb. SPC, SPC, conf. TDP).

**Epilobium ×rivulare** Wahlenb. (*E. palustre* × *parviflorum*)

A frequent hybrid, often in the immediate absence of *E. parviflorum*, and sometimes more abundant than *E. palustre*, in tall herb fens and bogs, usually in *Molinia* or *Juncus acutiflorus* communities, where plants resembling tall, much-branched *E. palustre* usually turn out to be the hybrid. First recorded in *Molinia* fen at Rhos Gellie SN379536, 1994 (NMW, conf. TDP, conf. GDK). Altitude limit 300m, swamp at NW corner of Pond Llywernog, SN721816, 1999.

*Epilobium ×rivulare**Epilobium montanum***Epilobium montanum** L. - Broad-leaved Willowherb - Helyglys Llydanddail

Widespread and common especially in open vegetation in somewhat shaded and damp habitats, in hedgebanks, woodlands, streamsides, rocks and waste ground, a frequent garden weed and a colonist of urban sites, walls and tips. White-flowered plants are often seen, sometimes among normal plants but occasionally forming discrete colonies as in a shaded quarry by the Teifi 400m W of Pont Tyweli SN410402, 1996. Altitude limit 535m, unlocalised, Salter (1935); 480m, FC road verge, Peraidd Fynydd SN809821, 1996.

*[Epilobium ×neogradense* Borbás (*E. lanceolatum* × *montanum*)

Plants growing with the putative parents on the railway 100m W of the Afon Einion bridge SN686966, 1992 (NMW, AOC & WMC) were determined by TDP as probably this hybrid.]

**Epilobium ×aggregatum** Čelak. (*E. montanum* × *obscurum*)

A rare hybrid, recorded from only four sites: “Cefn Hendre, near Bow Street”, SN68, 1928, by Salter (NMW, det. GMA, conf. GDK); rocks in the Afon Rheidol by the Nant Tyn-llwyn SN745782, 1998; disturbed shaly ground by Pencwmganol, Cwm Wyre SN572705, 1994 (NMW, det. TDP); and rocky woodland at Aberaeron SN457625, 1998.

**Epilobium ×mutabile** Boiss. & Reut. (*E. montanum* × *roseum*)

Recorded only once, as a pavement weed in Great Darkgate Street, Aberystwyth SN583817, 1999 (Herb. SPC, SPC, conf. TDP).

**Epilobium ×interjectum** Smejkal (*E. ciliatum* × *montanum*)

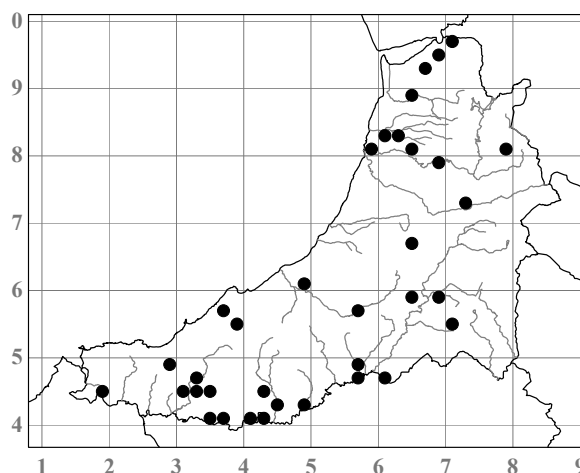
A frequent hybrid, probably very under-recorded. It was first recorded in 1990 on waste ground in Tal-y-bont SN654893, and has since been found throughout the county usually in disturbed sites such as waste ground,



road verges, felled woodland, gardens and graveyards but also in scrub and marshes. Altitude limit 400m, FC road verge 5km E of Llanddewi-Brefi SN712541, 1999.

***Epilobium lanceolatum* Sebast. & Mauri** - Spear-leaved Willowherb - Helyglys Gwaywddail

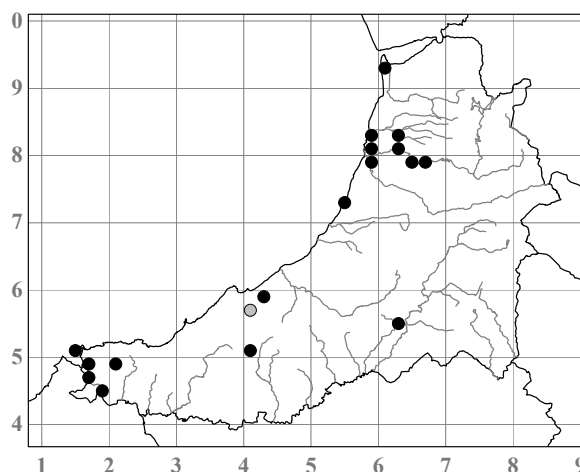
Erroneously recorded from Devil's Bridge in 1924 (Salter 1935, Wade 1952), this species is known only from the ballast of the railway along the Dyfi estuary, where it was first recorded in 1962 opposite Ynys-hir SN673962 (PSC, conf. PMB, *Nature in Wales* 8: 72 (1962)). In 1992 c.30 plants were seen here along c.400m of the railway, and in the same year c.20 plants were seen along a 5m stretch of the railway 100m W of the Afon Einion bridge SN686966 (NMW, AOC & WMC). Herbicide treatment of the ballast both maintains a suitably open habitat for the species, and regularly depletes the population. It has also been a garden weed at Ynys Edwin nearby SN678962 for many years, 1995 (NMW, PSC & WMC, conf. TDP).



*Epilobium lanceolatum*

***Epilobium tetragonum* L.** - Square-stalked Willowherb - Helyglys Pedronglog

Salter (Wade 1952) admitted confusing this species with *E. obscurum* and considered his records of it doubtful. In spite of Wade's comment that the species is not a rare one and that some of Salter's records are doubtless correct, it does seem to be genuinely rare in the county and apart from those in the Aberystwyth area there are only 15 records for it. At Aberystwyth it is always around the Penglais quarries c.SN587821, 1991-2005, and on the cliffs below the Isolation Flats by the mouth of the Ystwyth SN580806, 1993-2003, as well as abundantly on any disturbed ground nearby, and appears sporadically as a casual elsewhere; it is clearly increasing in the area. In the rest of the county it is mostly a casual of waste ground, tips, roadside rocks and as a garden weed. The only places where it has been found in wetland sites are in marshy grassland 500m SE of Garthenor by the Teifi c.SN633556, 2005 (RJW), and in shaded marshy ground by a hedge on the Teifi Marshes SN182455, 1992. In 1998 it was collected on the wooded sea cliffs at Penderi, Llanddeiniol SN550732 (ABS, ADQA), although the plant is atypical in having the ripe fruits only 4-5.5cm long.

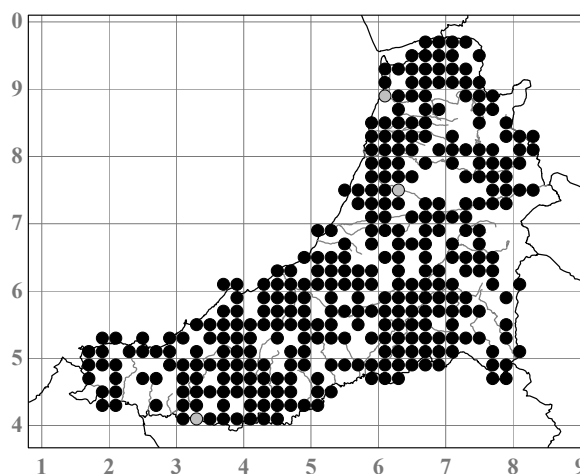


***Epilobium obscurum* Schreb.** - Short-fruited Willowherb - Helyglys Byrgodog

A common species of marshes, fens, damp woodland, flushed slopes and streambanks, as well as of waste ground, roadside verges, gardens and quarries, especially where there are seepages. It is usually in more open sites than *E. montanum*. Altitude limit 410m, Llyn Gynon, Salter (Wade 1952); 470m, FC quarry SE of Carn Fawr SN712566, 1993.

***Epilobium* ×*vicinum* Smejkal (*E. ciliatum* × *obscurum*)**

A frequent hybrid throughout most of the county, but probably very under-recorded and not noted until 1997 when it was found in a felled conifer plantation

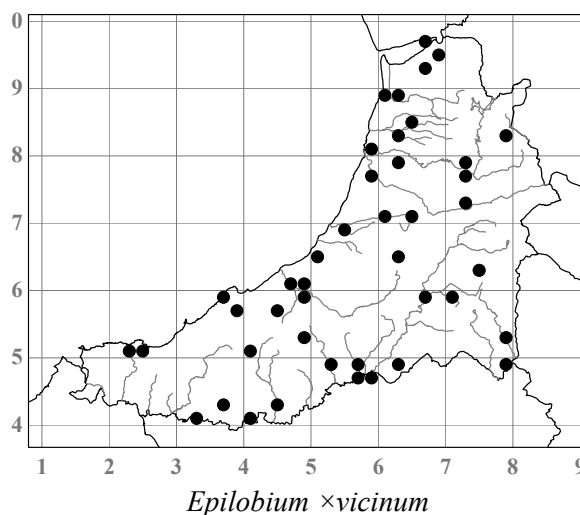


*Epilobium obscurum*

at Lodge Park SN662931 (NMW, conf. GDK). As well as disturbed sites such as waste ground, roadsides, gardens, graveyards and felled woodland it also occurs in marshes and on streamsides. Altitude limit 360m, in felled FC conifer plantation below road, Cwmergyr SN79408304, 2004.

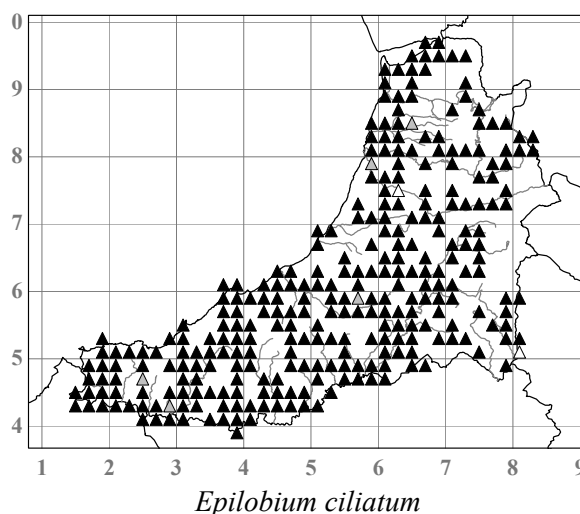
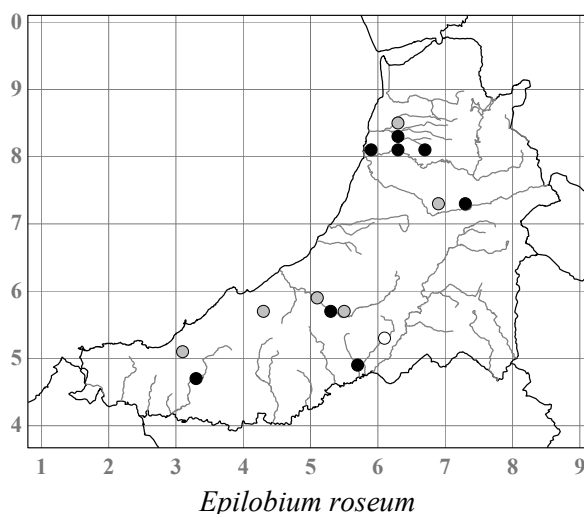
***Epilobium* × *schmidtianum*** Rostk. (*E. obscurum* × *palustre*)

First recorded from the Pysgotwr valley c.SN74 in 1890 (BIRM, AL, conf. GDK), and since then recorded only from six sites: in a dune slack at Ynys-las SN610938, 2006 (NMW, AOC & JPP, det. GDK); by the Rheidol backwater at Pont Dolau SN61918092, 2001; at Rhos y Fforest, 2.5km S of Llanilar SN618729, 2000 (NMW, conf. GDK); in a valley mire at Comin Esgair-maen SN64866476, 2006 (SDSB); in a valley mire 2.4km NE of Cilcennin SN534621, 2002; and at its altitude limit 510m, by the FC road in Tywi Forest 2.5km NNE of Nant-y-maen SN775604, 2001 (NMW, AOC & RDP, conf. GDK).



***Epilobium roseum*** Schreb. - Pale Willowherb - Helyglys Gwelw

An uncommon casual of waste and disturbed ground, road verges, river shingle, pavements, tracksides, gardens and graveyards. It was recorded by Salter from three sites, and has been seen at only 15 since. The only site where it was in a stable, natural community was in marshy grassland by the Rheidol backwater 1km S of Lovesgrove, SN621810, 2001.



***Epilobium ciliatum*** Raf. (*E. adenocaulon* Hausskn.) - American Willowherb - Helyglys America

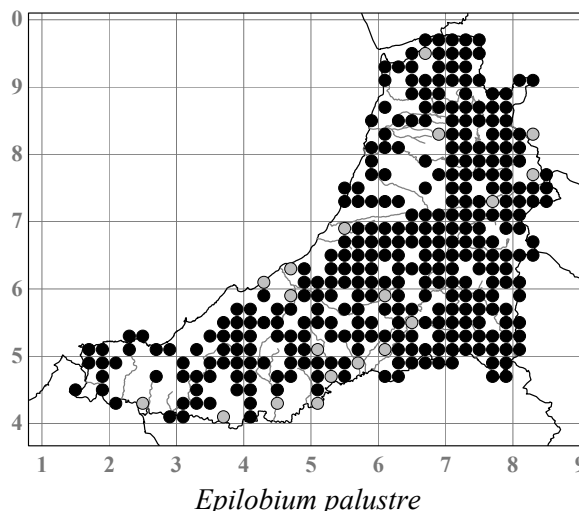
This North American species was first found in Britain in 1891 and, especially over the last 50 years, has spread rapidly from the SE. The first evidence for its occurrence in the county is a tantalisingly unlocalised collection of one of its hybrids from 1956 (NMW, WMC) determined by TDP in 1984 as “*E. ciliatum* Raf. (possibly a hybrid)” and by GDK in 2006 as *E. ciliatum* × *?obscurum*, but atypical. The first localised records of the species are from the Llanilar Station woodyard SN626753, 1962 (NMW, EHC & AOC) and from shingle at the confluence of the Tywi and Camddwr SN807501, 1963 (NMW). By the early 1980s it was almost ubiquitous, at least in the lowlands, and is now a very common and prolific colonist throughout the county not only as a garden and arable weed, on roadsides, disturbed ground and tips, but also in marshes and woodland, and on river shingle and streamsides. Altitude limit 480m, FC road verge, Peraidd Fynydd SN808821, 1996.

***Epilobium* × *fossicola*** Smejkal (*E. ciliatum* × *palustre*)

Recorded only twice: almost at sea level in rank vegetation on peat in a disturbed area of Cors Fochno 600m S of Penpontbrenmochno SN632921, 2002; and at 510m altitude, in a swampy fen by the FC road in Tywi Forest 2.5km NNE of Nant-y-maen at SN775604, 2001, (NMW, AOC & RDP, conf. GDK)

***Epilobium palustre* L.** - Marsh Willowherb - Helyglys y Gors

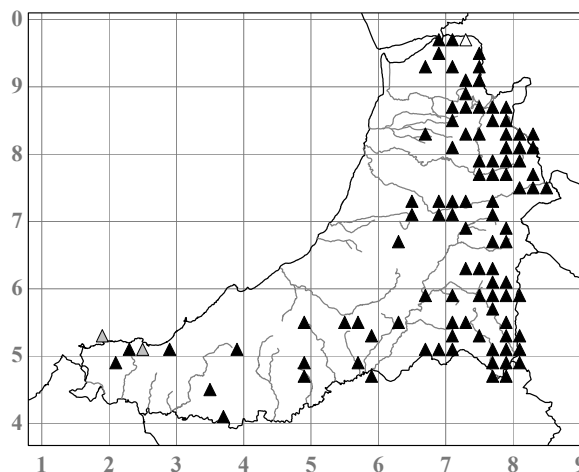
A common plant of flushes and mires especially in the uplands, and in both acidic and quite base-rich mires and marshy pastures in the lowlands. In the uplands it is present in most of the *Juncus effusus* and *Chrysosplenium* flushes but is generally absent from all but the somewhat enriched parts of the blanket bogs, and it seems intolerant of grazing. It is also absent from most coastal sites. Altitude limit 610m ("at 2000 feet or over"), above Llyn Llygad Rheidol SN7987, Salter, 1905 (Diary 21.9.1905); 560m, headwaters of the Nant y Moch, Pumlumon SN784863, 2002 (AOC & PAS).

***Epilobium* × *chateri*** Kitchener & McKean (*E. brunescens* × *palustre*)

This hybrid was found growing with the parents on damp, shaly ground by the FC road in the conifer plantation 2km S of Hafdre, above Llyn Brianne SN804512 at 370m altitude in 1995 (E, NMW, conf. TDP, GDK & DRMck). It was described new to science from this material (Kitchener & McKean 1998), and, although partially fertile, has not been refound either here or elsewhere, in spite of repeated searches. It is, surprisingly, the only hybrid involving *E. brunescens* recorded from the county.

***Epilobium brunescens*** (Cockayne) P. H. Raven & Engelhorn (*E. nerterioides* auct., non A. Cunn., *E. pedunculare* auct., non A. Cunn.) - New Zealand Willowherb - Helyglys Seland Newydd

First recorded in Britain (at Edinburgh) in 1904, and in Wales (in Snowdonia) in 1930, this New Zealand species was first found in the county in 1956 in several places on FC road verges in Cwm Einion SN709937 etc. (AOC & WMC). Its subsequent rapid spread though the county has been generally from N to S, mirroring that in Wales as a whole (Harrison 1968), and has clearly been facilitated by FC operations and the building of reservoir dams in the uplands. It colonises chiefly damp shaly and gravelly disturbed sites such as FC road verges, stony tracks, quarries and lead mine sites, and is, apart from self-sown conifers, the only established neophyte over 500m altitude. The second record was on a wet quarried cliff by the Nant-y-moch Reservoir dam SN752862 in 1964 (JWD, *Nature in Wales* 9: 71 (1964)) and the third by the path down to Parson's Bridge SN7479 in 1966 (TAWD). It was in the Pysgotwr valley SN74 by c.1972 (IMV), and on new FC roads at Soar y Mynydd SN784533 by 1975.



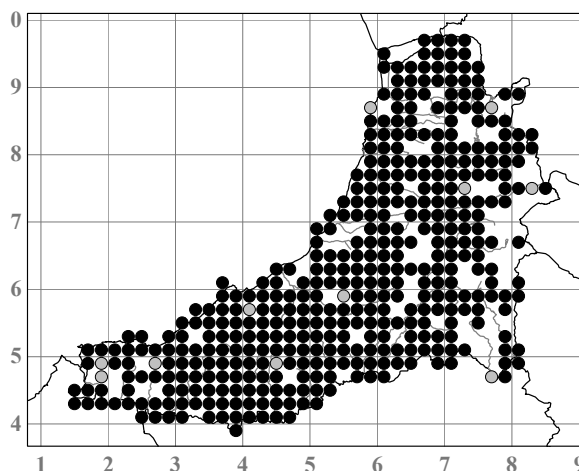
It is generally much rarer in the lowlands, but as early as 1977 it was on shaly roadsides at the MoD site, Aber-porth SN242516, and is now in the Penparc sand quarries SN201486, 2004 (AOC & SDSB). To a limited extent it has colonised entirely natural sites, such as the rocky streamside by the waterfalls at the head of the Afon Merin SN798806, 1994 (AOC & JB), damp rocks by the Afon Ystwyth above Pont Blaen SN830754, 1980, and the shaly ravine of the stream N of here SN826756, 1984-2006 (AOC & SDSB). In such sites it looks like a native. It is curiously absent from towns and villages, although it has been seen on a road verge in Lledrod SN646701, 1999, and in pavement cracks in Dihewyd SN486558, 1999. My



impression is that its spread has slowed down in the last 20 years or so. Altitude limit 640m, streamside S of Graig Las, Pumlumon SN797873, 2003, another quite wild, natural site.

**Chamerion angustifolium** (L.) Holub (*Epilobium angustifolium* L.) - Rosebay Willowherb - Helyglys Hardd (Llysiau'r Milwr)

Common, and often forming large clonal colonies on roadsides, waste ground, felled woodlands, scrub, railway banks, FC roadsides, sand dunes and upland cliffs. The earliest record is by Salter in 1892 from Wallog SN5985 (Diary 18.5.1892), and in the following year he recorded it from the railway from near Trawsgoed c.SN6672 (Diary 20.5.1893). He later (1935) wrote "Spreads rapidly by seed, and is now generally distributed, having even established itself in remote mountain localities", implying that it had spread since he first knew the county, and this is supported by the tone of several entries in his diary. Whether the remote populations on upland cliffs are ancient native colonies or recent arrivals remains uncertain; Salter first recorded it on Craig y March on Pumlumon c.SN806881 in 1924 (Diary 18.7.1924), by the waterfalls at the head of the Afon Myherin SN7980 in 1925 (Diary 15.8.1925), and at Cerrig y Hafan SN7388 in 1928 (Diary 17.4.1928), and it is still (2004-2005) at these sites among other upland cliff ones. Whether a reference by Inglis-Jones (1950) to Thomas Johnes finding it "difficult to avoid seeing the denuded areas [of woodland] for the sheets of rose-red willow-herb that had rushed up from the earth to hide the bleeding stumps" at Hafod c.SN7573 in 1815 is based on documentary evidence or colourful imagination remains to be investigated. All occurrences are mapped as native. Altitude limit 520m, Craig y March SN806881 (Salter 1935); 560m, trackside, Rhos y Garn SN797766, 2002.

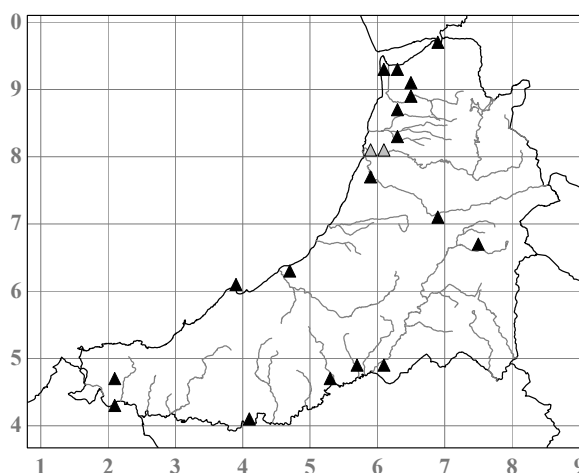


### **Oenothera** L.

The fact that many populations of this genus, even though they may at first glance appear to consist of one species, are now believed to be hybrid swarms, casts doubt on many earlier identifications. The late J. C. Bowra analysed several individual specimens as well as large samples from populations in the county in the light of this, but further work is still needed.

**Oenothera glazioviana** P. Micheli (*O. erythrosepala* Borbás, *O. lamarckiana* auct., non Ser.) - Large-flowered Evening-primrose - Melyn-yr-hwyr Mawr

First recorded by Salter (1935) in 1930 from the gasworks allotments and railway sidings at Aberystwyth SN58V, and from railway ballast at Glanyrafon SN68A at no specified date. It is scattered throughout the lowlands on roadsides and waste ground, but is perhaps less frequent than *O. cambrica*. Altitude limit 300m, Blaenpentre, Ffair-rhos SN743679, 1997 (MDS). Native of North America.



*Oenothera glazioviana*

**Oenothera** ×**fallax** Renner (*O. biennis* × *glazioviana*) - Intermediate Evening-primrose - Melyn-yr-hwyr Canolig

Five plants on the rubbish-tip below Pendinas SN584799, 1994 (SPC) were determined as a hybrid swarm of this parentage by JCB, as were specimens from a colony of c.130 plants on waste ground at the Glanyrafon Industrial Estate, Llanbadarn Fawr SN611802, 1999 (NMW). Specimens from a colony of c.20 plants on the disused railway at Llanfarian SN591778, 1992 (NMW, SPC), which persisted until at least 1996, were determined by JCB as "a good example of what is generally regarded as the stable derivative of female

*O. glazioviana* and male *O. biennis*.” Some of the plants in the triple-hybrid swarm at Ynys-las described below were *O. ×fallax*.

[*Oenothera biennis* L. - Common Evening-primrose - Melyn yr Hwyr

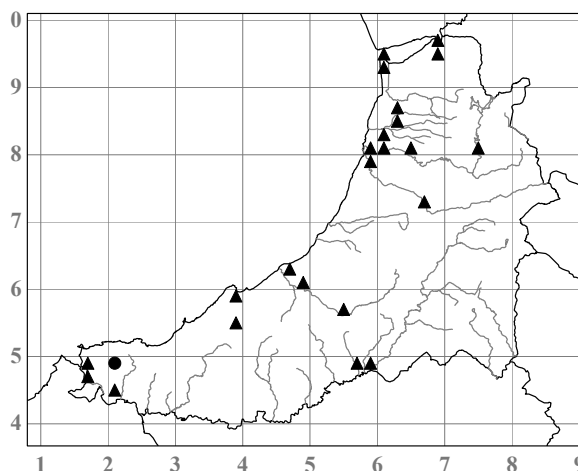
Recorded by Salter (1935) from several railway sites, and in Watkin (1976) from the Ynys-las dunes, but there are no confirmed identifications and these records probably refer to its hybrids.]

### ***Oenothera biennis* × *cambrica* × *glazioviana***

A specimen from waste ground by the railway at Llanbadarn Fawr SN599807, 1970 (NMW, RGE) was determined as this triple hybrid by JCB in 2000, as were roadside ones nearby at SN604801, 1978 (NMW, RGE). A specimen from a colony of several hundred plants on sandy waste ground at Penparc SN207479, 1992 (NMW) was thought to be probably it too by JCB. A colony of *Oenothera* on the Ynys-las dunes SN60649343 consisting of *c.*10 plants in 1992 (AOC & SPC) had increased to many thousands and covered *c.*2 acres by 1997, and *c.*3 acres by 1999, and was then described by JCB on the basis of eight specimens as a hybrid swarm of *O. glazioviana*, *O. biennis* and *O. cambrica*, with the characters of *O. glazioviana* dominating. A 1978 specimen (NMW) from a persistent colony on the roadside bank at the S end of Taliesin village SN658914, 1975 (JEH) - 2008, was determined as *O. glazioviana* × *biennis* and probably × *cambrica* by JCB in 2000. It is likely that other populations recorded as *O. glazioviana* and *O. cambrica* would prove to be of similar complex hybrid origin if they were to be analysed in the same way.

### ***Oenothera cambrica* Rostański - Small-flowered Evening-primrose - Melyn-yr-hwyr Mân-flodeuog**

First recorded in the wild in Britain at Cardiff in 1833, the earliest Cardiganshire records are presumably those that Salter (1935) gave under the name *O. biennis* from Aberystwyth station goods sidings SN588814, from Glanyrafon SN6180 (doubtless on the railway) and from Bow Street station SN621844 “in great abundance.” The earliest definite record is from Glanyrafon SN6180, 1935 (NMW, PCh, det. AOC), and the next is from “By the railway between Glandyfi and Ynyslas” SN69, 1958 (NMW, IAW, det. KR). It remains abundant at all these railway sites, as well as in many others, and is scattered elsewhere on waste ground, tips, building sites and as a garden weed. There is a small colony on the mature dunes at Ynys-las SN608942, 1997-2004. Var. *impunctata* Rostański has not been recorded. *O. cambrica* probably originated in North America. Its altitude limit is at 240m, on waste ground at Ponterwyd SN750811, 1988.



### ***Oenothera stricta* Ledeb. ex Link (*O. odorata* auct., non Jacq.) - Fragrant Evening-primrose - Melyn-yr-hwyr Pêr**

Known only from Penryrergyd where it was first recorded in 1978, when there were *c.*40 plants at the SW tip of the dunes SN161485 and a few others on a sandy grass slope above the road 600m E, SN16604843 (NMW). In 1987 there were *c.*630 plants at and between these two sites, and by 1994 the number had increased to *c.*5,000. By 1996 it had spread up to the disturbed sandy pasture 300m N of Waungelod SN168488 and has since become uncountably widespread in the area. It is native of South America.

*Oenothera stricta*, Penryrergyd, view WSW from SN16054850, July 1979



**Clarkia amoena** (Lehm.) A. Nelson & A. F. Macbr. - Godetia - Godetia

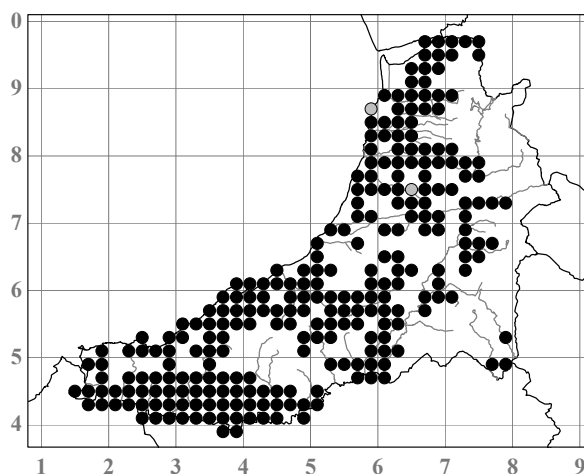
A rare casual garden escape, native of W North America, noted only on a reconstructed roadside verge at Capel Bangor SN657801, 1992, and nearby on gravelly ground by Pwllcenawon farm SN636803, 2001 (SPC); on ground disturbed by road-widening near Aber-porth SN266505, 1992 (NMW); and on waste ground at the old woodyard site, Lampeter SN579488, 1993.

**Fuchsia magellanica** Lam. - Fuchsia - Ffwsia

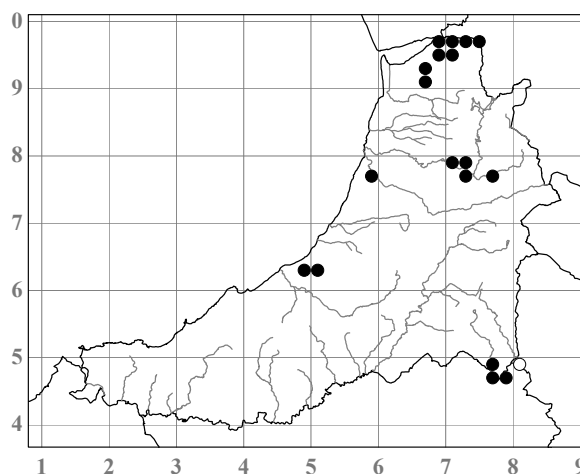
Well-established from plantings or throw-outs in a few places along the coast. It is in Llanllwchaiarn churchyard SN385599, 1983-1998, in scrub on the till slope above the sea 600m S of New Quay pier SN392594, 1998, in scrub 150m NW of Aber-porth church SN255511, 1998 (AOC & JPW), and by a woodland lane at Pontgarreg SN341537, 1997 (NMW). At Tresaith var. *molinae* Espinosa is in scrub above the road SN27975154, 2005 (NMW) and on a path verge nearby SN27885153, 1996 (NMW, AOC & RKB). Altitude limit 450m, a well-established bush from a throw-out on a shaly slope below the FC road by the Nant Garw Mawr SN811820, 1996.

**Circaea lutetiana** L. - Enchanter's-nightshade - Llysiau Steffan

Common, chiefly in the lowlands, in woods and hedgebanks, in dry as well as damp sites and in the former often appearing droughted by late summer. It is especially common under *Fraxinus* on the more fertile soils, by paths in woodland, and in secondary woodland, and can occasionally be a troublesome garden weed. Altitude limit 300m, Soar y Mynydd chapel graveyard SN784532, 1995.



*Circaea lutetiana*



*Circaea ×intermedia*

**Circaea ×intermedia** Ehrh. (*C. alpina* × *lutetiana*) - Upland Enchanter's-nightshade - Llysiau-Steffan yr Ucheldir

Occasional in damp, wooded valleys, usually on the more fertile soils and especially on the slightly base-rich rocks just above the Silurian/Ordovician boundary. It is in many places in the Llyfnant SN79, 1885 (NMW, AL, det. AEW) - 2005; in the Melindwr valley SN6996, 1998; in Cwm Einion SN6994, 1927 (Salter, NMW, det. PHR) - 2005; in Cwm Cletwr SN6791, 1998; in the Rheidol valley SN7178-7277, 1999; in Coed Nant Llolwyn SN5876, 1987 (APF) - 1994 (SPC); in the Arth valley SN495624, 1991; in Cwm Doethie SN7649 and 7648, 1897 (BIRM, AL, det. ECW) - 1998; in the Pysgotwr valley SN7747 and 7748, 1952 (NMW, AEW, det. PHR) - 1998; and in the Tywi valley SN8049, 1968 (ABS, MHB) and SN7847, 1972 (IMV).

**Circaea alpina** L. - Alpine Enchanter's-nightshade - Llysiau-Steffan y Mynydd

Salter (1935) wrote that this occurred in the Llyfnant SN79, and that all the other records he listed probably referred to "var. *intermedia*" or to "an almost glabrous variety of *C. lutetiana* growing in shade". Since the work of Raven (1963), who greatly restricted the previously assumed distribution of *C. alpina*, it has generally been assumed, as Salter himself did, that most earlier records of this species, and especially those unattested by herbarium specimens, were really of *C. ×intermedia*. Unfortunately, Salter did not collect a specimen, and the record has therefore been dismissed since 1963 (eg. Ellis 1983). Salter's first mention of it indicates that he appreciated the problem of identification when he records finding in the Llyfnant, in the company of W. H.



Painter: "Also a *Circaea* which was certainly not *lutetiana*, - either *alpina* or *intermedia*" (Diary 19.6.1904). On later visits he recorded *C. alpina* without comment (Diary 5.8.1922, 2.7.1924, 2.7.1932), and he also gave *C. ×intermedia* for the valley (1935). In 1997 three colonies of true *C. alpina* were found, together with *C. ×intermedia* and *C. lutetiana*, in the upper part of the valley on a steep slope under *Corylus*, *Fraxinus* and *Quercus petraea*, in the wooded ravine of the stream W of Cwmrhaiadr SN7596, along with other colonies on the Montgomeryshire bank (NMW, AOC & TDD, conf. PMB); in 2000 these colonies measured 3 × 2m, 12 × 1-7m and 5 × 2m, and stretched along 60m of the slope (AOC & JB). If Salter did find *C. alpina*, it was probably not at this site as his records of other species mostly seem to refer to lower down the valley, below Glasbwl.

## MYRTACEAE

### **Myrtus communis** L. - Myrtle

Six planted bushes along the S facade of Nanteos mansion SN620786 appear to be very old and photographs show that they have been coppiced a number of times; in 1888 (photo in Parkinson 2001) they reached up to the first-floor windows, assuming they are the same plants. Native probably of W Asia and introduced to Britain before the 16<sup>th</sup> century.

### **Eucalyptus** L'Hér.

At least 42 *Eucalyptus* species were planted in the University woods at Aberystwyth in the 1960s and 1970s, chiefly in the upper part of the wood c.400m NW of Llanbadarn Fawr church SN597813, and 200m NE of Plas Penglais SN594822. Many survive, but I have been able to identify only a few of them, and for anyone interested in the genus these plantings are well worth visiting. There is no evidence of natural regeneration anywhere in the county. There was planting by the FC at Hafod c.SN749728 in the 1960s but the trees have now gone and it is uncertain which species was used. All are native of Australia.

### **Eucalyptus gunnii** Hook. f. - Cider Gum - Ewcalyptws Gunn

There is a fine tree 22m tall, 221cm girth, 1992, in the FC Arboretum, Gogerddan SN630832 (NMW), planted in 1958 (No.95). There are several trees, up to 110cm girth and 25m tall, 2002, in the University woods NE of Plas Penglais SN59498229, and several 121cm girth, 12m tall, etc., 1995, on the University campus SN594818. A big tree is at the entrance to the University campus at Llanbadarn Fawr SN60358125, 2008. Three trees, the largest 252cm girth, 18m tall, 2002, stand by the former FE offices at Llanafan SN68477203 (NMW). There are several small trees in the Trawsgoed grounds SN670730, 1994, and conspicuous trees can increasingly be seen in many gardens throughout the county.

### **Eucalyptus nitens** (H. Deane & Maiden) Maiden - (Silver Top)

There were five multi-trunked trees planted in 1990 in the Penrhos golf club car park, Llanrhystud SN54696952, the largest trunk 113cm girth and 18m tall in 2007, but they were felled the next year. There are also two clumps nearby on the golf course.

### **Eucalyptus pauciflora** Spreng.

#### Subsp. **pauciflora** - (Cabbage Gum)

There is at least one tree in the University woods NE of Plas Penglais SN59498229, 2002, and one 119cm girth in the University wood NW of Llanbadarn Fawr church SN59778129, 2002 (NMW). It was planted along with subsp. *niphophila* on the clifftop at Gwbert SN160501 in 2004 but quickly died.

#### Subsp. **niphophila** (Maiden & Blakely) L. A. S. Johnson & Blaxell (*E. niphophila* Maiden & Blakely) - Shrubby Snow-gum

There is a very poorly grown, leaning tree 42cm girth, 7m tall, 1992, in the FC Arboretum, Gogerddan SN630832 (NMW) planted in 1965 (No.157). There are several c.100cm girth, c.25m tall, 2002, in the University woods NE of Plas Penglais SN59498229, and several in the University wood NW of Llanbadarn Fawr church SN59778129, 2002 (NMW). There is a multi-trunked tree in the Ynys-hir grounds SN68239593, 2004, and trees can be seen in many gardens elsewhere. Several trees were surprisingly planted in clifftop grassland by The Cliff Hotel, Gwbert SN160501 in 2004 but soon died.

Subsp. **debeuzevillei** (Maiden) L. A. S. Johnson & Blaxell (*E. debeuzevillei* Maiden) - (Jounama Snow-gum)

There is a tree 85cm girth, 2002, in the University wood NW of Llanbadarn Fawr church SN59758135.

### **Eucalyptus subcrenulata** Maiden & Blakely

There is at least one tree in the University woods NE of Plas Penglais SN59498229, 2002.

## **STAPHYLEACEAE**

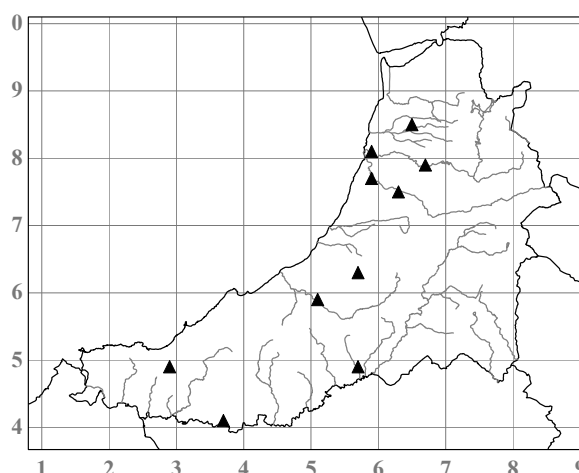
### **Staphylea pinnata** L. - Bladdernut - Cneuen Godog

Well-naturalised by suckering along a hedgebank 100m SW of Dolau farm, Llandyfriog SN33274128, 1958 (NMW, VT) - 2008; the 1958 specimen is annotated "known in the locality for at least 20 years". Salter (Diary 30.5.1925) reported that a *Staphylea*, doubtless this species, had been planted by the pond in the Falcondale grounds SN570490. It has also been planted on the University campus, Penglais, Aberystwyth SN59718195, 2006. This curious shrub, native of C Europe, produces its bladder-like fruits abundantly at Llandyfriog, and is rarely naturalised in Britain.

## **ANACARDIACEAE**

### **Rhus typhina** L. - Stag's-horn Sumach - Coeden Gorn Carw

Naturalised by suckering in a dozen sites, on roadside and path verges where it has spread from gardens, on stream banks, in scrub and on waste ground, sometimes forming extensive thickets, for example by the gravel workings at Glanryd-y-dre, Capel Bangor SN667785, 1994, and on the Ystwyth bank 100m SW of the Llanfarian bridge SN589776, 1998-2005. The first record was from the bank of the Nant Adal just below the Llanilar bridge SN62317509, 1992. Native of E North America and introduced to Britain in 1629.



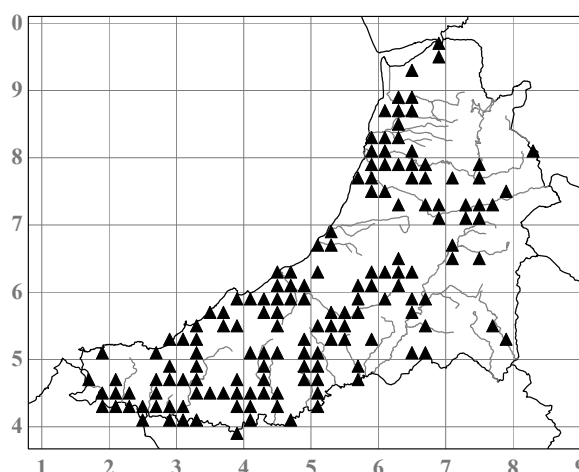
### **Cotinus coggygria** Scop. - Smoke-tree

Planted and suckering or layering along the N hedge of the A487(T), Penglais, Aberystwyth SN594819, 2008. Native from S Europe to China, introduced to Britain in the 1650s.

## **SAPINDACEAE**

### **Aesculus hippocastanum** L. - Horse-chestnut - Castanwydden y Meirch

Frequently planted in woodlands, as a roadside or street tree, in graveyards, by schools and by bridges, and often self-sown; it is impractical to separate the latter on the map. There is great variation in size and tooting of the leaves, and in flower characters; two trees by the bridge at Llanina SN40505970, 2001 (NMW) have huge leaflets up to 35 × 15cm, and similar trees were seen at Dolau SN622813, 2006 (SPC). A remarkable tree 318cm girth, 24m tall, 2005, in estate woodland just N of Alltyrodyn mansion SN44954427, has the trunk and main boughs largely covered with low burrs sprouting twigs with small leaves down to 2cm long; Elwes & Henry (1907) mention a presumably similar tree at Burghley House, Northants, whose trunk was





*Aesculus hippocastanum* below  
Glanmor Terrace, New Quay, view  
S from SN39016010, April 1969



*Aesculus hippocastanum* with epicormic shoots,  
Alltyrolyn SN44974427, May 2005

covered with small twigs when seen in 1903, although the trunk does not show in a cited illustration of 1826. A famous Horse Chestnut tree below Glanmor Terrace, New Quay SN390600, on which hung a bell used for summoning the shipyard workers, was felled in 1970 (Campbell-Jones 1977, Lewis n.d.). The lane by Frongôg SN613811, which has several good trees, has long been known as Conker Lane (Wmffre 2004, p.1019). The leaf mining moth *Cameraria ohridella*, first seen in Britain at Wimbledon in 2002, reached the county by 2008 when it was found mining leaves on trees at Aberlloolwyn, Llanfarian SN58817730, and was at Llechryd SN214437 in 2009. 'Baumannii' is planted by Aberaeron harbour SN456628, 1997 (SPC), and in the Traws-goed grounds SN66917322 where a tree (No.0316) was 304cm girth and 12m tall in 1994 (AOC & CDPa).



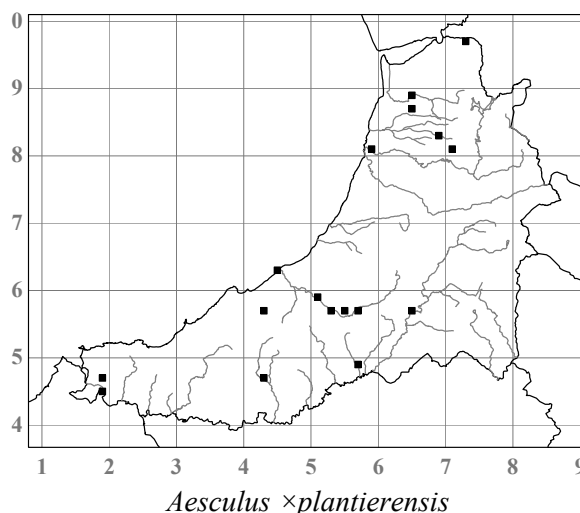
*Aesculus hippocastanum* (left), 'Baumannii' (centre) and *A. ×plantierensis* (right),  
Aberaeron harbour, view W from SN45736290, May 2007



Native of SE Europe, introduced to Britain in 1616. Maximum 474cm (at 1m up), Waunfawr, 2.5km SW of Tregaron SN657582, 1998, but this tree died suddenly for no known reason in 2007. Altitude limit (planted) 355m, Cae Gaer reservoir SN821816, 1993.

**Aesculus ×plantierensis** André (*A. carnea* × *hippocastanum*) - (Pink Horse-chestnut)

This hybrid of garden origin, with salmon-pink flowers, is occasionally planted as a roadside, street and churchyard tree, for example by Aberaeron harbour SN458628, 2003, around Llanio-fawr SN6457, 2005, and along the Falcondale drive, Lampeter SN570485, 1992-2006.



**Aesculus carnea** J. Zeyh. - Red Horse-chestnut - Castanwydden-y-meirch Goch

A tree in the pasture S of the drive 350m SW of Nanteos mansion SN61707843, 2006, is this stabilised polyploid hybrid of *A. hippocastanum* and *A. pavia* L., of garden origin in the early 19<sup>th</sup> century. There are also two trees at the corners of Alban Square, Aberaeron SN46006280 and 45906286, 2007, and two recently planted by the inner harbour nearby SN45766291, 2007. Most other “Red Horse-chestnuts” in the county seem to be *A. ×plantierensis*, but there is considerable variation in flower colour and the identity of some of the trees is very uncertain.

**Aesculus indica** (Cambess.) Hook. - Indian Horse-chestnut - Castanwydden-y-meirch Indiaidd

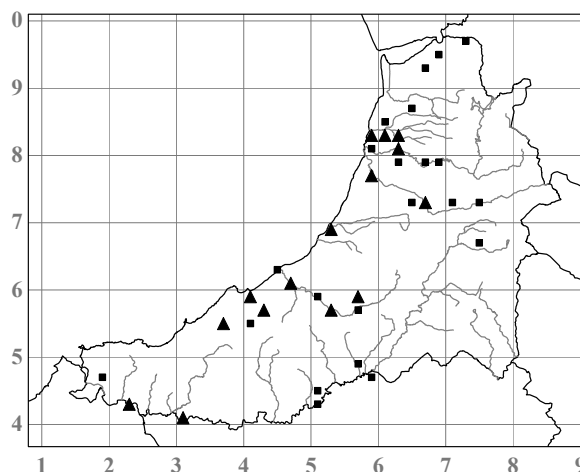
There are two trees planted in the Felin-fach creamery grounds SN516576, the larger 151cm girth, 11m tall, 2005. Native of the Himalaya, introduced to Britain in 1851.

**Aesculus flava** Aiton - Yellow Buckeye

A tree, 93cm girth and 8m tall in 1997, is grafted on *A. hippocastanum* in Mariamne’s Garden, Hafod SN764732. Native of E North America, introduced to Britain in 1764.

**Acer platanoides** L. - Norway Maple - Masarnen Norwy

Commonly planted in estate woodlands, parkland, in amenity areas, as a roadside and street tree, and frequently regenerating. Forestally planted in a few places, as in the 1950s at Coed Allt-fedw SN660727 and Allt Hengeraint SN470604. Maximum 352cm girth, 23m tall, the E-most of four trees in the field E of the bridge in Llanfarian SN59157767, 2005. ‘**Schwedleri**’ is occasionally planted, and is used as a street tree in Peterwell Terrace, Lampeter SN574481, 2003; a red form seen by Salter at Hafod c.SN7573 (Diary 5.4.1894) was doubtless this. ‘**Goldsworth Purple**’ has been more recently planted, as by the Teifi at Llanybydder SN518441, 2006, sometimes with ‘Schwedleri’ as at Lampeter, and by the Ystwyth at Trawsgoed SN66587320, 2006. ‘**Drummondii**’ has been planted by the Afon Teifi at Pont Steffan, Lampeter SN58084766, 2006. Native of Europe and introduced to Britain in 1683.

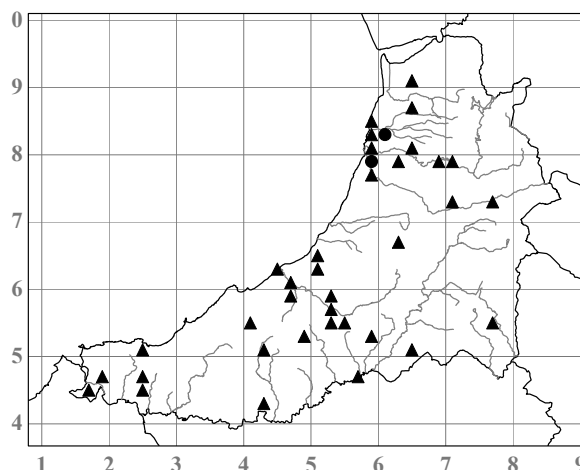


**Acer cappadocicum** Gled. - Cappadocian Maple - Masarnen Capadocia

Planted as a street tree in Peterwell Terrace, Lampeter SN575480, 1992-2005, and in Llwyn yr Eos SN594799 and Second Avenue, Penparcau SN588805, 1992-2005. It is also in the grounds of Plas Gogerddan SN631837, 2005. Native of Asia, introduced to Britain in 1838.

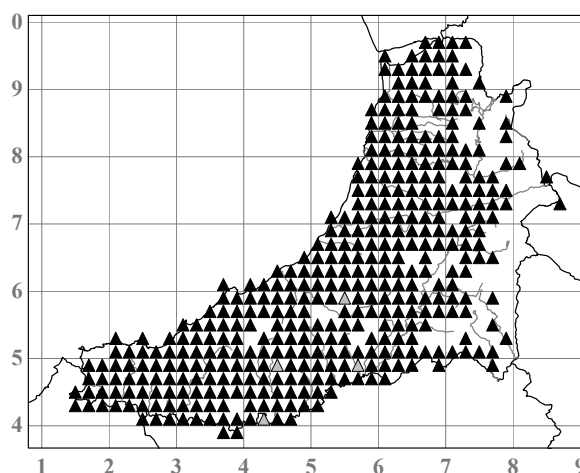
**Acer campestre** L. - Field Maple - Masarnen Fach

Considered native by Salter, and still appearing so in at least two sites where he knew it, in mixed estate woodland in Cwm Woods SN600835, 1935 (Salter 1935) - 2007, and at Wallog SN594856, 1935 (Salter 1935) - 2007, while a few bushes in rocky scrub by Penparcau crossroads SN593798, 1957-2007 (NMW) also appear native; these are mostly subsp. **campestre**. A tree known to Salter (1935) lower down Penparcau Road SN586809 was last seen c.1960 (EHC). Old, obviously planted trees, some of them subsp. **leiocarpum** (Opiz) Pax, native of C Europe, also occur in hedges and gardens in the Cwm Woods and Llangorwen area, as well as in many estate woodlands and hedges throughout the county. Many recent plantings on reconstructed roadside slopes and verges, 1977-2007 (NMW), for example by the A487(T) along Penparcau Road SN585809, at Morfa SN504655, at Rhydybeillen SN406547 and at Cardigan SN188467, are of subsp. **leiocarpum**, subsp. **campestre** var. **oxytimum** Borbás and var. **lobatum** Pax, natives of E Europe, and perhaps of cultivars such as 'Austriacum', and sometimes regenerate from seed. *A. miyabei*, planted in other parts of Britain, has not been seen. The map does not distinguish the different taxa, or planted from self-sown occurrences. Maximum (planted) 269cm girth at 2m up, 18m tall, 1992, Brynog SN52985750.

**Acer pseudoplatanus** L. - Sycamore - Masarnen

Var. **pseudoplatanus** is very common in woods, where it is often dominant in secondary growth, and can be frequent even in ancient woodland. It is common in hedges, is a common street tree and is frequently planted in farmyards, where it is as popular as Ash in the uplands, and regenerates abundantly everywhere. Dwarf self-sown trees are frequent in places on the Ynys-las and Penyrergyd dunes. Trees are very variable, especially in leaf-size and dissection, and small-leaved trees seem especially prevalent in upland farmyards. 'Atropurpureum' is occasionally planted, as by the A485 at Bronnant SN641678, 1998 (NMW). 'Heterophyllum' is planted in estate woodland at Ynys-hir SN680961, 1998 (NMW). 'Leopoldii' is occasionally planted as a street tree, for example in Stanley Road, Aberystwyth SN586816, 2003, and in parkland and by rivers.

Var. **tomentosum** Tausch (*A. villosum* C. Presl), with the leaves persistently tomentose beneath but grading into var. *pseudoplatanus*, is common, especially as a planted tree, for example at the bottom of the Penglais dingle, Aberystwyth SN59178189, 2006 (NMW) and by the Ceulan bridge in Tal-y-bont SN65488924, 2006 (NMW), and is at least sometimes self-sown, for example by the Rheidol estuary SN58468121, 2006.

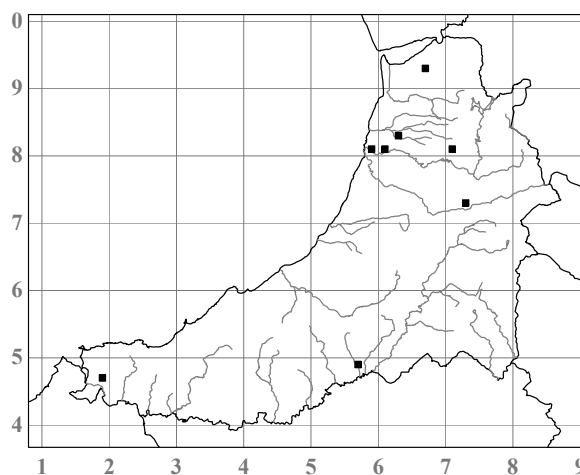


*Acer pseudoplatanus* 516cm girth,  
Gelli, Cwm Rheidol, view NE  
from SN70307989, August 2005

Maximum 521cm girth, 1992, Ty-glyn SN49905991. Native of Europe and long grown in Britain. Altitude limit (planted) 415m, Eisteddfa Gurig SN797840, 2002; (self-sown) 360m, a tree 3m tall on N-facing cliffs, Craig yr Allt-ddu, Cyneiniog SN72278761, 2005 (SDSB & AOC).

**Acer saccharinum** L. - Silver Maple - Masarnen Arian

Planted for decoration along roadsides in a few FC forests, as at Lodge Park SN662931, 2003, as a street tree as in Peterwell Terrace, Lampeter SN574480, 2003, where the largest was 193cm girth, 2006, and in amenity areas and on roadsides, probably always as '**Laciniatum**'. Native of E North America, introduced to Britain in 1725.



*Acer saccharinum*

**Acer rubrum** L. - Red Maple

There is a planted tree 254cm girth, 1996, by the drive in estate woodland at Nanteos SN61847854 (AOC & CDPa), and another probably of this species in estate woodland 100m N of Alltyrodyn SN44904430, 2004 (NMW, AOC & GH). Native of North America, introduced to Britain in 1656.

**Acer negundo** L. - Ashleaf Maple - Masarnen Dail Ynn

There are planted trees on the University campus, Penglais, Aberystwyth SN59758158, 2006, and one in estate woodland at Derry Ormond SN592523, 1993. Native of North America, introduced to Britain before 1868.

**Acer cissifolium** (Sieb. & Zucc.) W. Koch - (Vine-leafed Maple)

Planted c.1936 in estate woodland, Ynys-hir c.SN681963, by W. H. Mappin, fide PSC, but now gone. Native of Japan, introduced to Britain in 1875.

**Acer tataricum** L. subsp. **ginnala** (Maxim.) Wesm. - Tartar Maple

There is a planted tree in the Ynys-hir Hall grounds SN682959, 2009 (AOC & JPP). Native of N Asia and Japan, introduced to Britain in 1860.

**Acer palmatum** Thunb. ex Murray - Smooth Japanese-maple

There are several small planted trees in the University woods, Penglais SN595822, 2002, and four good trees at Blaenpant SN25394429, 130cm girth etc., 2003. Native of E Asia, introduced to Britain in 1820.

## RUTACEAE

**Skimmia japonica** Thunb.

A bush, probably resulting from a garden throw-out, was recorded in scrub on a laneside streambank above Cliff Terrace, Aberystwyth SN59018273, in 1994, and another in a laneside hedge 300m SSE of the Vicarage crossroads, Aberaeron SN460618, in 1995. It is native of SE Asia.

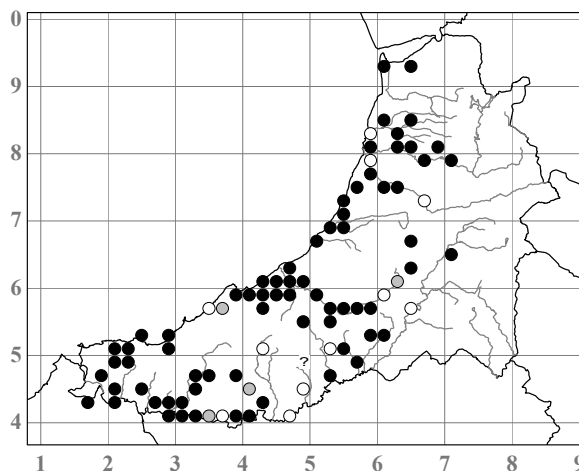
## MALVACEAE

**Malva moschata** L. - Musk-mallow - Hocysen Fwsg

A conspicuous plant of dry banks and pastures, dry scrub, shaly roadside slopes, graveyards, railway ballast and quarries, always on well-drained soils, confined to the lowlands and rarely abundant in any particular site. Although it is commonest along the coastal zone, it rarely grows close to the sea. Plants or whole colonies with white flowers, as reported by Salter (1935), are occasionally seen, for example in the Llancynfelyn cemetery SN648922, 1998 (where they are slightly pinkish) and in Penbryn churchyard SN294521, 1980-2004, and may, like some other populations, have originated as garden escapes. The commonest variety, more compact and more hairy, and perhaps the only native one, is var. **tenuifolia** Guss.; it is generally in

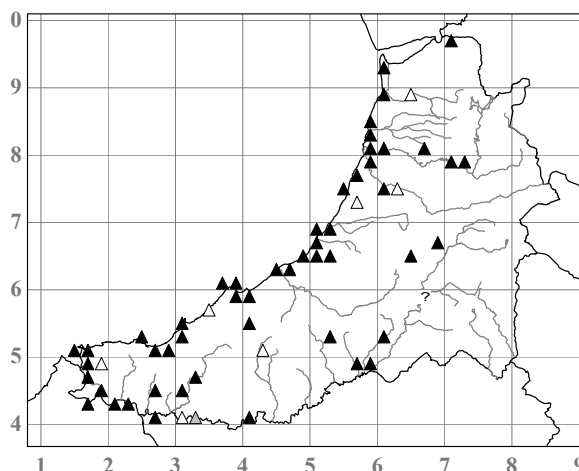


more or less wild situations, for example on scree in a gully on the sea cliffs at Penderi SN550732, 1998 (ABS, ADQA, det. AOC), and in gorse scrub in pasture 200m S of Pantyrerod, Llwynceilyn SN43395997, 2005 (CGE, det. PDS). Var. **undulata** Sims, with longer internodes and less hairy, is probably an introduction, at least in this part of Britain; it is widespread in pastures and on road verges, but is most characteristic of reseeded areas and waste ground, for example in the “wild flower meadow” sown c.1994 by the CCW office at Plas Gogerddan SN62808347, 2003 (CGE, det. PDS), and on the recently reseeded embankment of the A482 at Pont Sholop, Llanerchaeron SN47655978, 2003 (CGE, det. PDS), although var. *tenuifolia* does also sometimes occur in such reseeded areas. Var. **moschata** was collected in the Rheidol valley c.SN67Z in 1934 (NMW, PCh) and probably occurs elsewhere. Var. *integrifolia* Lej. & Courtois has not been recorded.



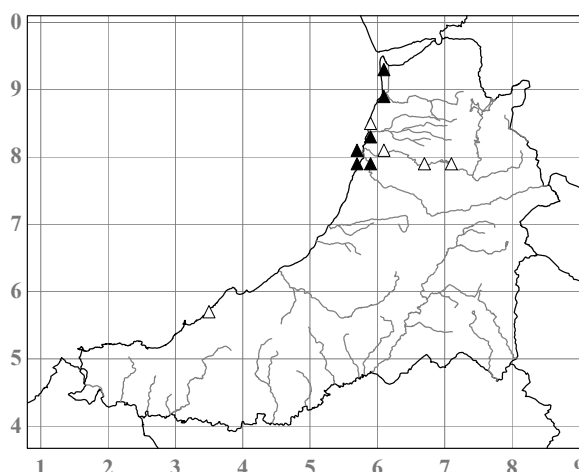
### **Malva sylvestris** L. - Common Mallow - Hocysen (Malws)

An occasional archaeophyte of dry banks, road verges and pathsides, the top of shingle beaches, waste ground and tips, chiefly along the coast and commonest in towns and villages. Inland it is more of a casual and in many sites it does not persist. It was first recorded by Morgan (1849) from the Aberystwyth Ropewalk SN586820, and in his later editions just from waste ground. There is considerable variation. Most plants, more or less erect and with glabrous mericarps, are var. **sylvestris**. Prostrate plants with hairy mericarps, var. **socialis** Griseb., occur with var. *sylvestris* around Aberystwyth harbour SN5881 and on the castle grounds SN5781, 2008, and probably elsewhere along the coast.



### **Malva neglecta** Wallr. (*M. rotundifolia* auct.) - Dwarf Mallow - Corhocysen

A rare archaeophyte of dry places mostly near the sea. It was first recorded in 1849 from “Clarach - Borth” (Morgan 1849), and from Borth in the 1880s (A. Ley, *BRC Rep.* 1884-1886: 88 (1887) and from Clarach in 1934 (NMW, PCh), and has recently been refound at both places, in a roadside flowerbed in Borth SN608893 in 1996, and by tipped stones behind the beach at Clarach SN587839 in 1998 (SPC). Such records may appear to be casual occurrences, but the repeated occurrence of such a rare species in the same locality suggests persistence. It was recorded on the Aberystwyth castle grounds SN579814 in 1880 (HLJ, *BRC Rep.* 1880: 133 (1882)) and in 1890 (Rees 1890), and Salter reported it here and on the adjacent foreshore of the South Beach (1935); it was refound here at the S corner of the Castle Grounds in 1991 (SPC) - 2005, and was on the slipway down to the beach opposite in 1995. It is abundant in sandy pasture behind Tan-y-bwlch Beach SN579798-580799, 1995-2008. The only other records are from Wallog c.SN590858 (Salter 1935); as a casual near Llanbadarn Fawr SN68A, 1925 (Salter Diary 14.6.1925) and 1934 (Salter 1935); from near Glanrheidol SN6679 (Burkill & Willis 1894); from a farm near the Rheidol Falls SN77E (Salter Diary 5.9.1905, 1935); a 1950s field record at BRC from SN46; from Cwm Tydu c.SN3557 (Salter 1935); one at





*Malva negelecta*, Aberystwyth castle grounds, SN57978142, June 2005

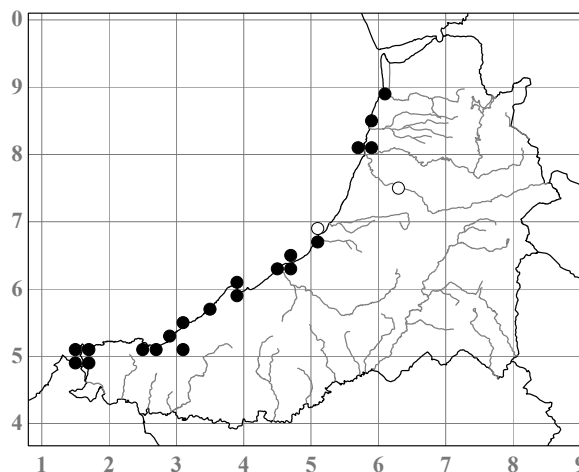


*Malva negelecta* in Tan-y-bwlch fields, view NE from SN580798, July 2008

BRC from SN25, 1936 (WRR & WWB); from the Ceri valley SN34 (Salter 1935); and a single plant on a rubble tip by the boatbuilding yard, Ynys-las SN616932, 2005.

***Malva arborea* (L.) Webb & Berth. (*Lavatera arborea* L.) - Tree-mallow - Hocyswydden**

Frequent along the coast at the top of beaches, on banks, waste ground and tips, on cliffs and streamsides. It is especially abundant in and around villages, and it is impossible to tell where, if anywhere, it is native, but in the S of the county it does sometimes occur in quite wild sites, as on the cliffs on Cardigan Island and on Carreg Lydan islet SN1651, 1961 (Condry 1961) - 2004. On the cliffs at New Quay SN35Z-36V, Marshall (1900) thought it “probably, but not certainly native” (**BM**), and it is still abundant there, 2004. Morgan (1849) recorded it from “Gardens, Portland Street”, Aberystwyth c.SN584819, so it was associated with habitations even then. It is rarely seen at all inland, but was on a tip at Rhippinllwyd SN305504 in 1993, and was frequent in felled woodland at Rhosgellan Fawr, Wallog SN597855 in 1997 (JND).



***Malva ×clementii* (Cheek) Stace (*Malva olbia* (L.) Alef. × *thuringiaca* (L.) Vis.; *Lavatera ×clementii* Cheek, *Lavatera thuringiaca* auct., non L., *L. olbia* auct., non L.) - Garden Tree-mallow - Hocyswydden yr Ardd**

Established, probably from throw-outs, in a few places: in scrub in Bryn-y-mor dingle, Aberystwyth SN59008270, 1992; on the road verge 900m ESE of Capel Tygwydd SN27914319, 1994; many plants on scrubby waste ground below Lewis Terrace, New Quay SN387602, 1996; in scrub on the riverbank by the disused rubbish-tip below Pendinas, Aberystwyth SN583798, 1997 (**NMW**); and on both the Ynys-las SN611939 and Penyrergyd SN161486 dunes, 2009. A hybrid of natives of Europe and Asia.

[*Althaea officinalis* L. - Marsh-mallow - Hocysen y Morfa

Listed in Morgan (1848) without a locality, and presumably in error.]

***Alcea rosea* L. - Hollyhock - Hocysen Fendigaid**

One plant was recorded as a casual in the NE part of the Penparc sand quarries SN204484, 1996 (MDS). The species is of unknown origin.

**Tilia L.**

*T. cordata* is the only species native in the county, but it, and even more *T. ×europaea*, have been widely planted. Some attempt has been made to identify the clones of the latter described by C. D. Pigott (1992). Several other taxa have been planted, and Pigott has determined a selection of specimens from the county. The best collection of different Limes is at Highmead, probably planted in the late 19<sup>th</sup> century, on the slope between the mansion and the Teifi SN54B.

**Tilia platyphyllos** Scop. subsp. **cordifolia** (Besser) C. K. Schneid. - Large-leaved Lime - Pysgwydden Dail Mawr

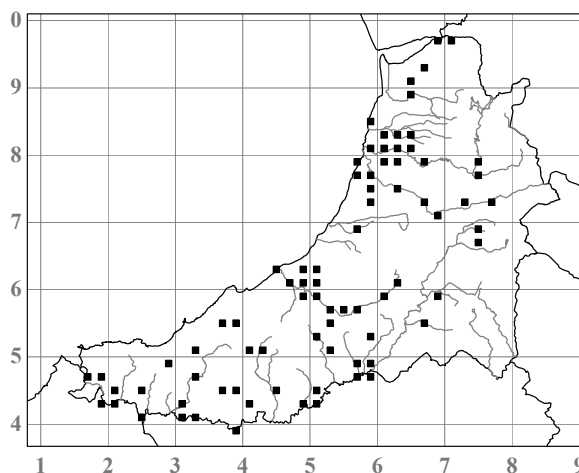
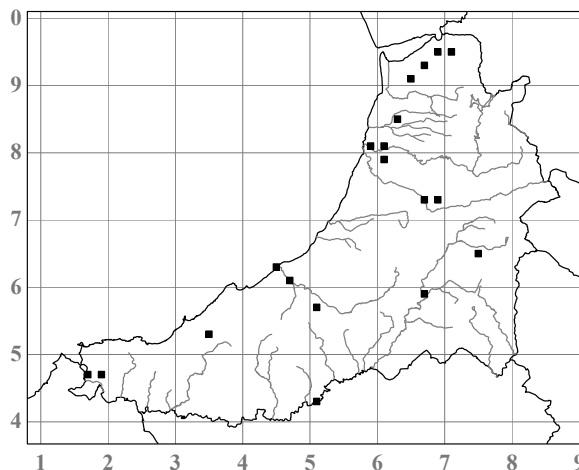
Occasionally planted for ornament in churchyards, in estate parklands, in hedges and on roadsides. There are four shapely trees by the Ynys-hir drive at Furnace SN684952, the SE of which was 209cm girth and 20m tall in 1993, and 229cm girth and 24m tall in 2005. There are several trees in the estate woodland 600m NW of Plas Gogerddan SN625840, 2003 (NMW). The N tree of two by the entrance gate in Strata Florida churchyard SN745657 was 217cm girth and 13m tall, and the S tree was 366cm girth and 15m tall, in 1992, and there is one in Tregaron churchyard SN679596, 216cm girth and 19m tall in 2005. Between the walled garden and the mansion at Llanerchaeron SN479601 a tree, 438cm girth and 27m tall in 1996, has the trunk divided into two at 2m up, formerly held together by chains, and was perhaps two trees planted together (AOC, CDPa & RL). An erroneously planted tree (No.0284) on the NW side of the avenue of *T. ×europaea* at Trawsgoed SN668732 has grown slightly less fast than the latter and was 183cm girth and 25m tall in 1993, and a replacement tree on the SE side is another clone of this species.

Several large trees along the top of Netpool Wood, Cardigan SN170461, 1995 (NMW), were identified by CDPi as subsp. *cordifolia* (Besser) C. K. Schneid., and all the trees seen in the county seem to be this, although the amount of pubescence on the leaves varies a good deal. A grafted tree in the parkland 300m SSE of Highmead SN50284287, 128cm girth and 11m tall in 1997, is '**Laciniata**' (NMW, conf. CDPi), as is a planted tree on the University campus, Penglais, Aberystwyth SN597819, 2006 (NMW). Recently planted trees by the Cardigan bypass SN188467, 1995, are '**Rubra**'. Native in SE Wales and parts of England. Maximum 595cm girth (at base, but the trunk partly double), on the NW side of the A482 road 700m SSE of Tan-yr-allt, Ciliau Aeron SN51555794, 1995.

**Tilia ×europaea** L. (*T. ×vulgaris* Hayne; *T. cordata* × *platyphyllos*) - Lime - Pysgwydden

Widely planted in estate woodlands and copses, as specimen trees in fields and on roadsides, in hedges, as a street tree and to form avenues. No apparently self-sown sapling (or indeed tree) has been seen except for one in Coed Nant Llolwyn, Llanfarian SN588773 in 1992 (SPC).

Many of the older trees can be identified as Pigott's **Clonal Group A**, '**Pallida**', with buttressed trunks with bushy epicormic shoots, among other characters, or as his **Clonal Group B**, including '**Hatfield**' and '**Svartelinde**', with unbuttressed, smooth trunks. The finest avenue is at Peterwell, Lampeter SN569477, 200m long and with 51 trees (there must originally have been 75-80); the largest tree, the W-most one on the N side, was 721cm girth (at 1m up) and 21m tall in 1996, many are over 500cm girth, all are probably about the same age and were probably planted in the 18<sup>th</sup> century, and all but one are '**Pallida**' (NMW, conf. CDPi). Along the A485 road at Aber-mad SN598760 there remain 36 trees of another avenue 450m long, mostly of '**Pallida**', mostly 300-







*Tilia ×europaea* ‘Pallida’ avenue, Peterwell, Lampeter, view ESE from SN568478, February 1996

350cm girth and 22m tall in 2005, probably planted *c.*1875. At Trawsgoed along the B4340 in dense woodland at Pont Hopcyns SN673725 there remain 32 trees of an avenue of ‘Pallida’, mostly 200-250cm girth and 33m tall in 2005; a rather younger-looking, well-kept avenue 300m long of 67 trees along the drive 200m NW of the mansion here SN668732 is again mostly of ‘Pallida’, with the trees mostly 200-250cm girth and 27m tall in 2005. A line of *c.*20 trees, *c.*250cm girth and 27m tall in 2005 (NMW), along the E side of the A4159 road at Lovesgrove SN630817 is of Group B, as is the avenue of 23 trees along the drive to Llandyfrïog church SN333411, 1994.

Among many fine trees at Highmead are two of ‘Pallida’ 300m ENE of the mansion SN50474330, 636 and 591cm girth and both 22m tall in 1997 (NMW, conf. CDPi), and among trees of Group B here is one 400m E of the mansion SN50594320, 267cm girth in 1997 (NMW, conf. CDPi). A tree above a small quarry opposite the drive to Henblas, Abermad SN59807600, out of the line of the avenue here and much bigger than the avenue trees, was 416cm girth in 2005; it was earlier identified as probably Group B ‘Hatfield’ by CDPi. The big trees on the Llanfechan estate SN516454 are mostly Group B, 1995. Huge coppice stools occur in some of the estate woods, for example at Lodge Park SN66789390 where one is *c.*800cm girth (at ground level), two of the trunks from it measuring *c.*200cm girth in 1997 (NMW, CDPa; AOC, det. CDPi as “*T. ×europaea* but towards *T. platyphyllos*”). Similar-



*Tilia ×europaea* avenue, Trawsgoed, view NE from SN667731, April 2008

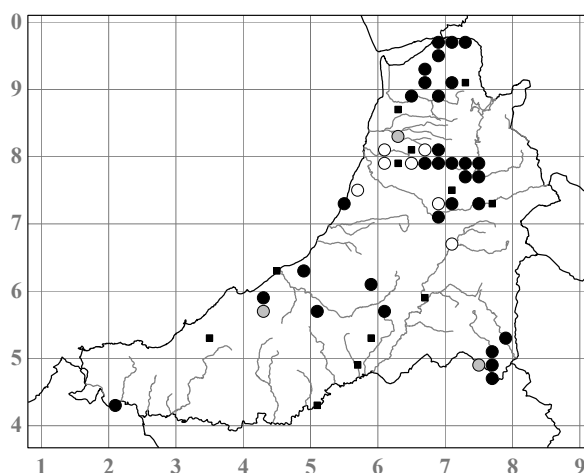


looking trees are in the estate woodland 200m NNE of Plas Gogerddan SN630838 where there are six coppice stools *c.* 600-800cm girth (at ground level), three of which were re-coppiced in 2005 (NMW); that these are not as ancient as they at first look is suggested by three similar stools nearby that appear never to have been coppiced, each supporting within the dense growth of sprouts a single trunk only *c.* 250cm girth and 22m tall in 2005. There are many street trees in and around Aberystwyth *c.* SN58V, 2008. Maximum 721cm girth, 21m tall (see above); 321cm girth, 28m tall, 2003, by bend in drive 800m S of Old Cilgwyn SN31404104, 2003 (NMW, conf. CDPi as Group B).

### ***Tilia cordata* Mill. - Small-leaved Lime - Pisgwydden Dail Bach**

An uncommon native tree, and quite frequently planted. In so far as one can be certain which trees are in fact native, they seem to be largely confined to the more fertile and base-rich, mostly ancient woodlands and to the base-rich outcrops near the base of the Silurian. There are for example trees where these rocks outcrop in the Llyfnant SN79D, I, pre-1936 (Salter 1935) - 2008; in Cwm Einion SN6994, 1956-2008; on the Wenffrwd bank 2km S of Furnace SN679931, pre-1936 (Salter 1935) - 2001 (AOC & PSC); in Cwm Cletwr SN69Q, R, 1978 (WMC) - 2008; in the Cyneiniog valley by Ty-nant SN693885, 1999 (AOC & MDS); in several places in Coed Rheidol SN77N, P, 1955-2005; on the N bank of the Ystwyth at Grogwynion SN719722, 1972 (EHC) - 2005; on Craig Ddu, Cwm Doethie SN769483, 1992-1998; and on Craig Clungwyn SN778472, 1979-1998. Other ancient woodlands where *T. cordata* grows include the ravine at the E end of Coed Simdde-lwyd SN721786, 1986-2004; Derwen and other S parts of Coed Rheidol SN77I, 1987-2005; the Arth woods below Esgair-arth SN488626, 1985 (AOC & APF); the Llethi woods below Llanarth *c.* SN427582, 1985; the Gwenffrwd woods 2km W of Llangeitho SN596608, 1990; and the Nant-y-march woods SN602573, 1995.

Apart from these sorts of sites, there are native trees in places such as the sea cliffs below the hanging Oakwoods at Penderi SN5573, 1981 (WMC) - 2005;



*Tilia cordata* stool on eroded river terrace of the Rheidol, Nantyrnnon, view E from SN66907822, May 2005

by the Camddwr 650m ESE of Soar y Mynydd SN79055295, 1988 (AOC & DD) - 2004; in the Nant Lluet-fach ravine, Cwm Doethie SN77185155, 1987 (AOC & DD); and in a dry ravine above the Afon Pysgotwr SN754490, 1983 (IKM). Many of these native trees look very ancient, and as they are frequently on steep slopes, cliffs or rocky streambanks they have often fallen and regrown from enormous stools. In Cwm Cletwr SN69Q, R in particular, trees that have fallen across the stream have rooted and produced new trees on the other side, and more than any other native tree in the county *T. cordata* often thrives

*Tilia cordata*, Coed Cwm Cletwr, view W from SN667920, May 2004



with its main trunk horizontal. A remarkable tree at the bottom of a steep slope on the S side of the Rheidol near Nantyrnnon SN66907822, anciently fallen and with its root plate standing vertically, has four horizontal trunks, the largest 144cm girth, and 22 younger vertical trunks to 24m tall, 1988 (APF) - 2005. Altitude limit 340m, a stunted bush appressed to the vertical SSW-facing cliff, Craig Ddu, Cwm Doethie SN769483, 1998.

*T. cordata* has been planted in hedges and in estate woodland in many places. These trees usually have single trunks and remain upright much more than the native ones, for example one by the drive at Hafod SN76307318, 1991-2008 when it was 367cm girth (but with a rather swollen trunk) and 24m tall. Maximum 369cm girth and 27m tall in 2004 (AOC & PSC) at Ynys-hir, just N of the gardens SN68299617.

#### ***Tilia* × *euchlora* K. Koch (?*T. cordata* × *dasystyla* Steven) - Caucasian Lime**

Introduced *c.*1860, probably from the Crimea. There are two trees at Highmead, one 200cm girth and 17m tall in 1997, 200m SSE of the mansion SN50204293 (NMW, conf. CDPi), the other 151cm girth and 10m tall in 1997, 300m NE of the mansion SN504434, 1997 (NMW, conf. CDPi).

#### ***Tilia tomentosa* Moench - Silver Lime**

Native of SE Europe and introduced to Britain in 1767. There is a large tree with several trunks in estate woodland 100m E of Lovesgrove SN629816, 1999, and three street trees in North Road, Aberystwyth SN586820, 2001. A tree, 251cm girth and 20m tall in 1997 (NMW), in the parkland 300m SSE of Highmead SN50264286 was considered by CDPi to be probably ‘*Orbicularis*’, a rarely grown cultivar formerly thought to be a hybrid between *T. ‘Petiolaris’* and *T. ×euchlora*. *T. ‘Petiolaris’* itself has not been seen except in a few gardens.

### **THYMELAEACEAE**

#### ***Daphne laureola* L. - Spurge-laurel - Clust yr Ewig**

This calcicole evergreen shrub is very rare in south-west Wales, but there is an apparently native population, of *c.*100 plants in 1984, scattered through *c.*3ha of Ash woodland at Nanternis SN373568, 1984-2004 (NMW). It is naturalised and reproduces freely by seed in several places in estate woodland at Cwm Cynfelyn *c.*SN606831, 2002, where Salter first recorded it in 1923 (Diary 21.10.1923). A probably bird-sown bush was recorded in a laneside hedge at Tal-y-bont SN653891, 1994.

### **CISTACEAE**

#### ***Helianthemum nummularium* (L.) Mill. (*H. vulgare* Gaertn.) - Common Rock-rose - Cor-rosyn Cyffredin**

Naturalised on top of the walls of the former Vicarage grounds, Llanbadarn Fawr SN597810, 1979 (NMW, RGE) - 2009. Otherwise this extreme calcicole has been recorded twice for the county, presumably erroneously, by Watson (1883), without locality, and mysteriously from Ponterwyd SN78K by J. A. Webb, *BEC Rep.* 9: 105 (1930).



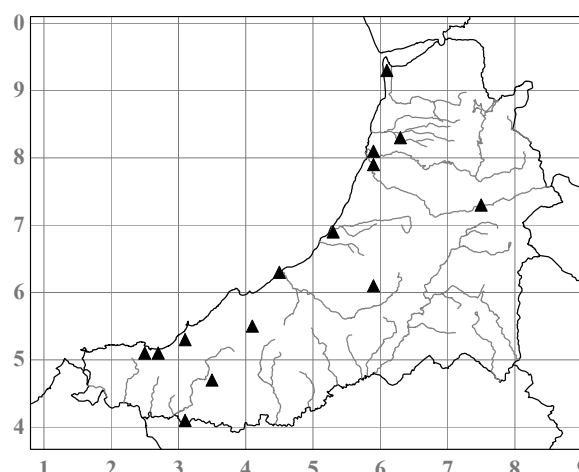
*Daphne laureola* in Ash wood, Nanternis, view W from SN373567, February 1987



## TROPAEOLACEAE

**Tropaeolum majus** L. - Nasturtium - Canan Cornicyll (Blodau Meri a Mari, Sal a Mal, Rhosyn Saron, Clychau Aron)

An occasional casual on waste ground, tips and near gardens, mostly deriving from garden rubbish. It rarely persists, but seems to have become well established in rank vegetation behind the beach just NE of Aberaeron promenade SN459633, 1994-2004, and in scrub on the clifftop just E of Aber-porth SN262515, 1998 (AOC & JPW) - 2005. Native of the Andes.



## LIMNANTHACEAE

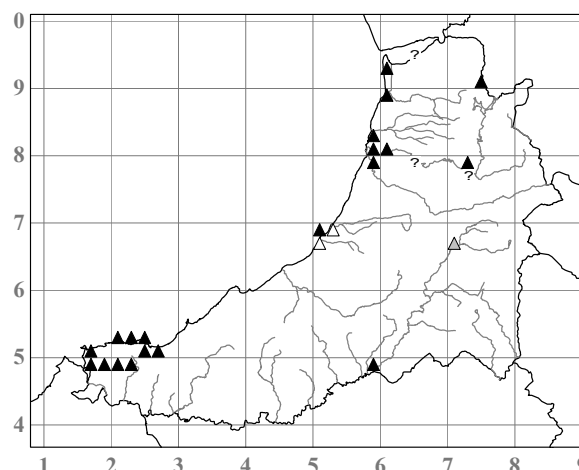
**Limnanthes douglasii** R. Br. - Meadow-foam - Melynwy

Recorded as a casual in rough grass under trees in the University Art Department grounds, Aberystwyth SN588815, 1996 (SPC), and in a roadside ditch near gardens 250m NW of Cross Inn SN542642, 1997. Native of W North America.

## RESEDACEAE

**Reseda luteola** L. - Weld - Melengu

Described by Salter (1935) as occurring "Regularly in some localities; in others single plants occur as 'casuals' for one or two seasons", and this remains true. Most records of this archeophyte are from near the coast. It has been most regularly seen by the railway and around Plas Crug at Aberystwyth SN58V, 1899 (Salter Diary 6.10.1899) - 1995; around Aber-porth village and the MoD site SN25G, K, L, Q, pre-1936 (Salter 1935) - 2005; around Penparc and the sand quarries SN24E, pre-1936 (Salter 1935) - 2004; and around Ferwig, Gwbert and Penyrergyd SN14U, Z, pre-1935 (Salter 1935) - 2004. Records of it as a more fugitive casual have been chiefly from the railways, from building sites and tips, and from road verges and arable fields. A colony was on a terrace of limestone chippings at the Cwm Rheidol lead mine SN72877812 in 1992-1993 (AOC, SPC & JAM). The earliest record was by Purchas (1848) from the Aberystwyth district. Altitude limit 375m, FC road verge by the Afon Lluestgota SN751906, 1992.



**Reseda lutea** L. - Wild Mignonette - Melengu Wyllt Ddi-sawr

A rare casual seen at only four sites: waste ground by the railway sidings near Aberystwyth station SN5980, 1967 (APC & DPSP, *Nature in Wales* 11: 31 (1968)); on the Ynys-las dunes SN69B, 1975-1976 (JEH; JPS); on the disused railway embankment at Abermachnog SN373403, 1985; and on the Penyrangor road verge, Aberystwyth SN58118101, 1995.

## BRASSICACEAE

**Erysimum cheiranthoides** L. - Treacle-mustard - Triagl Arfog

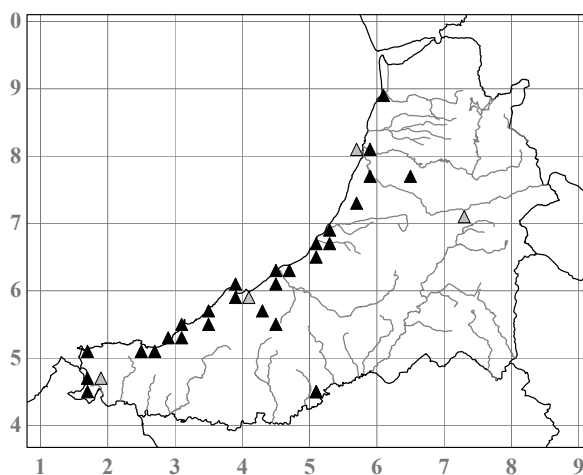
This archaeophyte, rare in W Wales, has been recorded only from by the Lovesgrove roundabout SN631811, where in 1992 a few plants appeared on a reseeded roadside verge (NMW), and in 1993 two plants appeared in an adjacent reseeded field (SPC).

**Erysimum ×marshallii** (Henfr.) Bois (*E. decumbens* (Schleich. ex Willd.) Dennst. × *perofskianum* Fisch. & C. A. Mey.) - Siberian Wallflower - Blodyn-y-fagwyr Siberia

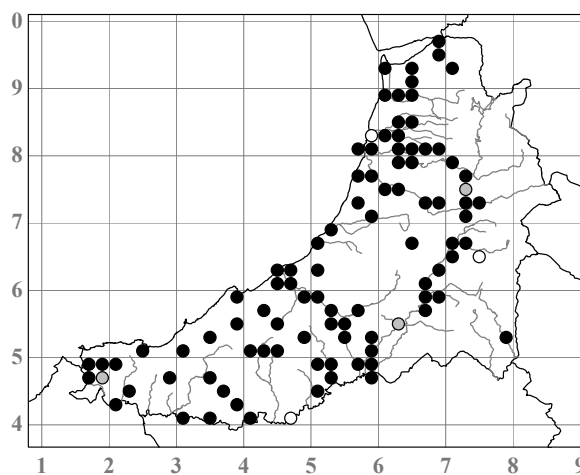
Once recorded, as a casual in 1993, when a single plant was found on waste ground by the ford 350m SW of Dyffryn Castell SN771813 (MP, LG & CM).

**Erysimum cheiri** (L.) Crantz (*Cheiranthus cheiri* L.) - Wallflower - Blodyn y Fagwyr (Jiliffllwrs)

An archaeophyte occasionally naturalised on cliffs, dry banks and old walls, chiefly in towns and villages along the coast. The first record was by Marshall (1900) who found it in 1899 “Quite naturalised on sandstone cliffs, Newquay”, and it is still abundant there SN390600, 2004. It is also especially abundant on cliffs at the mouth of the Ystwyth SN580806, 1979-2004; around Llangranog SN311541 etc., 1924 (Salter Diary 14.9.1924) - 2004; at Aber-porth SN258515 etc., 1976-2004; and on the walls of the castle SN178459 and elsewhere in Cardigan, 1983-2004.



*Erysimum cheiri*



*Arabidopsis thaliana*

**Arabidopsis thaliana** (L.) Heynh. - Thale Cress - Berwr y Fagwyr

An occasional weed of gardens, waste ground, graveyards, bare patches on roadside banks, and rarely on river shingle. It also clearly follows the railways. It is probably rather commoner than in Salter's day, as he described it as “rather scarce and local”, listing only about a dozen localities and giving dry banks as the only habitat.

**Camelina sativa** (L.) Crantz - Gold-of-pleasure - Cydlin

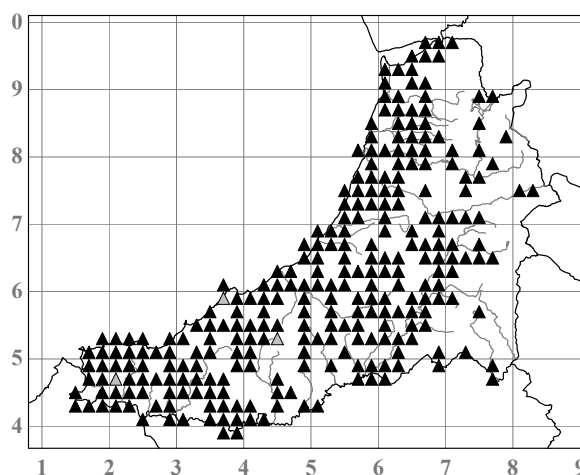
Mentioned by Salter (1935) as a not infrequent casual at the Aberystwyth rubbish-tip SN591811 from 1925-1932 (NMW), and there is a 1922 specimen from the Agricultural Botany Department fields at Penglais c.SN595817 (ABS). This archaeophyte has been recorded since only when it was planted in a mixed crop for bird-seed on the RSPB Reserve at Ynys-hir SN668957 in 2006 (NMW). Native of S and E Europe.

**Capsella bursa-pastoris** (L.) Medik. - Shepherd's-purse - Pwrs y Bugail (Llysiau Tryfal)

A common archaeophyte weed of gardens, arable fields, waste ground, road verges, pathsides, tips and open, disturbed ground of all sorts. It is very variable morphologically, but no attempt has been made to name the variants here. Altitude limit “to over 1,000ft. [305m]”, Salter (1935); 480m, lead mine W of Eisteddfa Gurig SN79188390, 2003.

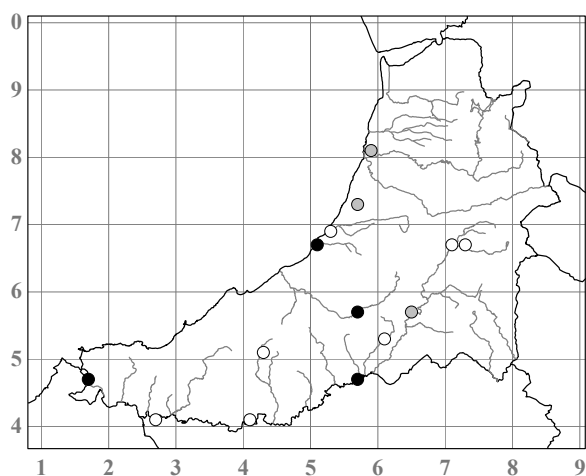
**Barbarea vulgaris** R. Br. - Winter-cress - Berwr y Gaeaf

First recorded at Aberystwyth “on Plascrug Road” c.SN587813 in 1890 (Rees 1890), presumably as a casual, and it has been recorded as a casual in a few

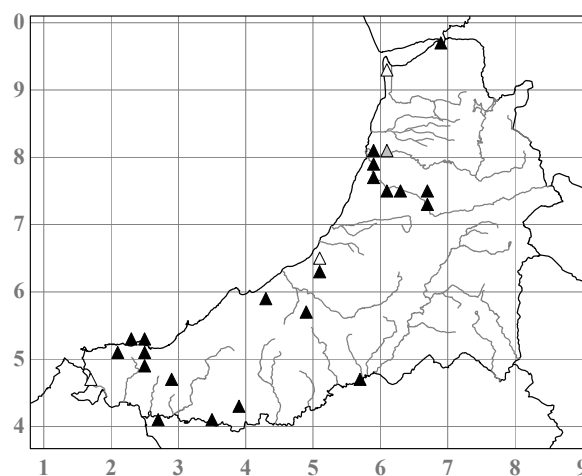


*Capsella bursa-pastoris*

places since, for example in Llanbadarn Fawr churchyard SN599811 in 1977. The following are the only other records with habitat details, and at all of them the plant may well be native: two sites on the banks of the Teifi, at Pont Llanio SN652569, 1978, and at Netpool SN173461, 1990; and three river shingle sites, on the Cledan at Llan-non SN506667, 2000 (NMW), on the Aeron at Abermeurig SN573576, 1996, and on the Teifi at Maes-y-pwll SN564466, 1989 (AOC & APF). Salter (1935) described it as frequent, and although he gave only seven localities, it has probably decreased considerably.



*Barbarea vulgaris*



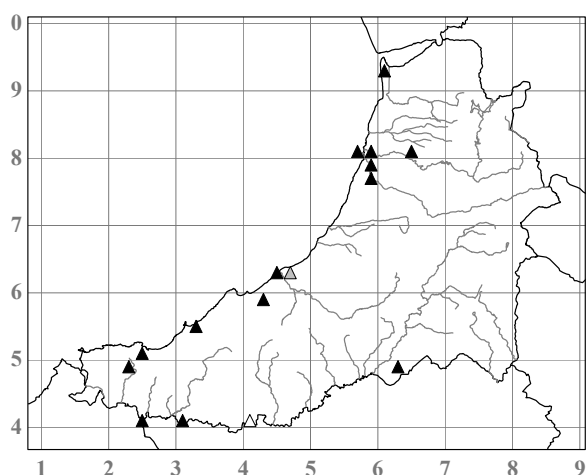
*Barbarea intermedia*

#### ***Barbarea intermedia* Boreau - Medium-flowered Winter-cress - Berwr-y-gaeaf Canolig**

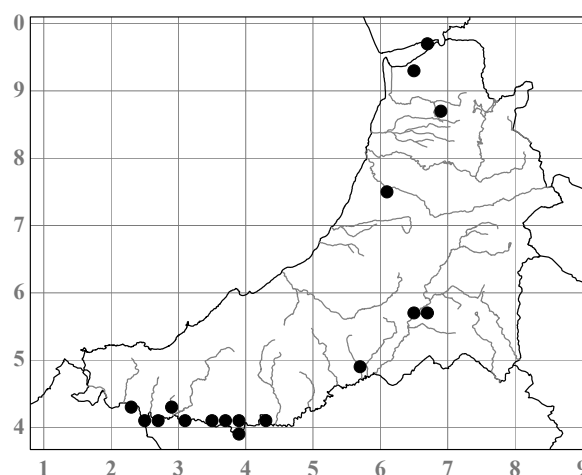
First recorded “in a cottage garden, on Bwlch mountain” in 1854 (K, Herb. Watson, MMA), but where this was in unknown. Salter (1935) said it was “Casual” and gave only one locality, Ynys-las SN69B, 1907 (WHP, Salter Diary 5.7.1907). Wade (1952) gave a Salter record from S of Llan-non c.SN519650. In recent decades it seems to have increased and is an occasional casual with about 20 records, especially around Aberystwyth, on the MoD site at Aber-porth SN2551, 1979-2003, and at the Trawsgoed Farm SN6773, 2000.

#### ***Barbarea verna* (Mill.) Asch. - Small-flowered Winter-cress - Berwr-y-gaeaf Mân-flodeuog**

First recorded, in abundance, on the railway sidings at Aberystwyth c.SN587815 in 1936 by Salter (Wade 1952), and then at Llandysul SN44A and Newcastle Emlyn SN34A in 1941 (Whellan 1942). It is now frequent around Aberystwyth and other places along the railway, but otherwise, although probably increasing, it is a rare casual of disturbed ground, tips and roadsides, and is a garden weed in a few places. Altitude limit 300m, weed in vegetable patch, Tynygwndwn, Llanfair Clydogau SN633496, 1994.



*Barbarea verna*



*Rorippa islandica*

#### ***Rorippa islandica* (Oeder ex Gunnerus) Bórbas - Northern Yellow-cress - Berwr Melyn Gogleddol**

Largely confined to the Teifi valley, but with a few isolated sites further N. An account of its history and distribution on the Teifi was given by Chater & Rich (1995). It was first found there in 1958 at Cenarth (NMW, DEdeV, det. TCGR) and is still present on sloping rocks by the river below the bridge SN26884159,



1991-2005 (NMW, det TCGR & BJ). It has since been seen along the Teifi valley from Llanddewi-Brefi, where it is abundant around the lake at Pant, SN661563, 1997, down to Llwynduris Farm where it occurs in a ditch near the river SN235433, 1993 (NMW). Most of its sites are in occasionally flooded, marshy hollows in the flood plain separated from the river, but it also occurs by pools, for example at Abermachnog SN37484026, 1979 (NMW) - 2003 (AOC, TCGR & WB), on river shingle, for example at Llandysul SN42044043, 2001 (AOC & SA), and in swamp and carr, for example at The Moat SN341408, 1993 (NMW, AOC & TCGR). Well away from the river it has been seen in such sites as a manure heap 2km W of Llandysul SN39684075, 1994, a chicken-run at Porth-y-fynwent, Brongwyn SN28684355, 1999 (NMW), and a woodland track in Upper Forest, Lampeter SN57474928, 1997-1998 (AOC & DEA).

In 1997 a small colony was found on vegetated shingle by the Afon Ystwyth just below Pen-y-banc Bridge, Llanilar SN61857565 (ACW & JPL, conf. AOC); it was seen there again in 2000, but not since. In 2002-2008 a few plants were found, growing with *R. palustris*, on disturbed ground by a stock-feeding area at Ynys Edwin, Ynys-hir SN67829624; in 2006 it was found on a disturbed verge of the B4353 road at Craigypenrhyn, Tre'r-ddol SN65609260; and in 2006-2008 it was an abundant garden weed at Cwmrhydgoch, Bont-goch SN682866 (ACW, conf. SPC).

Problems of identification will probably have meant that *R. islandica* was overlooked in the county in the past, and as it has been actively searched for only since 1991 it is difficult to judge to what extent it may be spreading. In Carmarthenshire it has certainly spread considerably into ruderal habitats in recent years (RDP pers. comm.) and this may be happening in Cardiganshire too. Chater & Rich (1995) reviewed the literature on the dispersal of *R. islandica* and discussed the possibility that the Teifi populations could have originated from seed carried from Iceland by the Greenland race of Greater White-fronted Geese that wintered on Cors Caron on the upper stretches of the river from at least the 1890s until the 1960s. It is interesting that since that paper was written *R. islandica* has been found at Ynys Edwin by the Dyfi estuary where these Geese have been wintering since the 1950s.

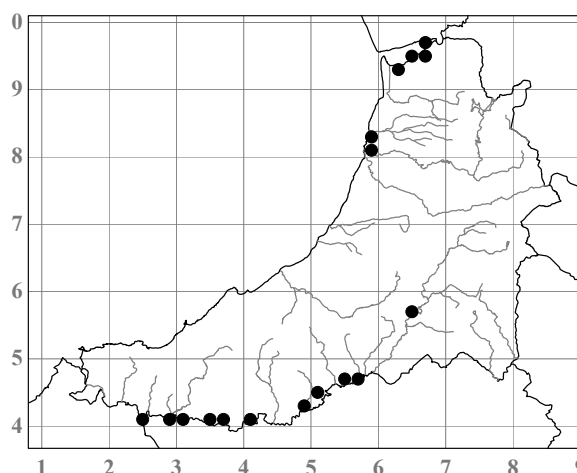


Seeds of *Rorippa islandica* (left)  
and *R. palustris* (right)

### ***Rorippa palustris* (L.) Besser - Marsh Yellow-cress - Berwr Melyn y Gors**

Largely confined to the Afon Teifi, where it was first recorded for the county in 1978 in three sites from Pont Tyweli SN414403 down to Stradmore SN257417 (NTHH). Whether it is a recent arrival, or was just overlooked by Salter and others is uncertain, but it is perhaps slightly increasing in Britain as a whole. It has since been seen in many places from Pont Llanio SN6456, 2004 (DB) down to Stradmore, on river shingle, on the river banks and by pools and backwaters on the flood plain. In the N of the county in 1994 it was found on Cors Fochno, on disturbed ground by a drainage ditch 600m W of Ty-mawr SN623928 (NMW, ADH, det. AOC); in 2002 and the following years it appeared, with *R. islandica*, on disturbed ground by a stock-feeding area at Ynys Edwin SN67689623 (AOC & PSC), and in 2004 it was also by a recently widened ditch 1km WSW of here at SN659950-660951. Its distribution and recording history curiously parallel that of *R. islandica*.

From 1999 to 2003 there were several records of it as a casual on waste and disturbed ground around Aberystwyth SN58V, W (SPC; AOC & JPW). An entry in Salter's Diary (15.9.1924) indicated that he may in fact have once seen it: "I went to the mill [Felin Cwm-hyar SN391459], - there is no *Nasturtium palustre* there now, it was perhaps a casual", but the plant he recorded there in 1907 (Diary 13.8.1907) he then called *N. sylvestre*; he makes no mention of either in his Flora.



**Rorippa sylvestris** (L.) Besser - Creeping Yellow-cress - Berwr Melyn Ymlusgol

The third species of *Rorippa* to be largely confined to the Teifi and not to have been recorded there until comparatively recently (but see under *R. palustris* above for Salter's ambiguous mention). The first record there was from the masonry of Llechryd Bridge SN217436, 1962 (NMW) where it was still abundant in 2005, and it has since been seen on river shingle, rocks and walls by the river as far up as Highmead SN504427, 1997 (RVL & TP).

It must be very tolerant of saline conditions as it was abundant on a shingle islet in the tidal part of the river 500m S of Rosehill farm SN192446 in 1998 (AOC & LRG) and on the Penyrergyd shingle spit SN159484 at the very mouth of the estuary in 2009 (AOC & FN). Along most of the river the plants have the normal long petals, but from SSE of Stradmore SN256417, 1993 (AOC & TCGR), up to Llandysul SN420404, 1993, a clone with the petals only 1.9-2.7mm long, shorter or scarcely longer than the sepals, also occurs, the two sometimes growing together. Neither form has been seen to set good seed on the Teifi.

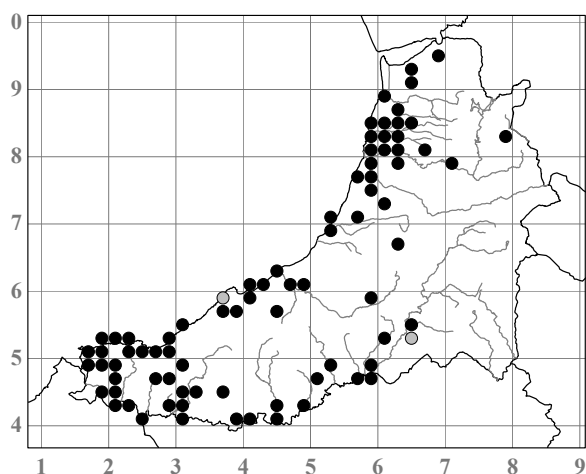
The only records away from the Teifi are of it as a casual on the Aberystwyth rubbish-tip SN591811 in 1928 and 1929 (Salter, NMW, det. TCGR) and in St Michael's churchyard, Aberystwyth SN580817 in 1978.

[*Rorippa lippizensis* (Wulfen) Rchb.

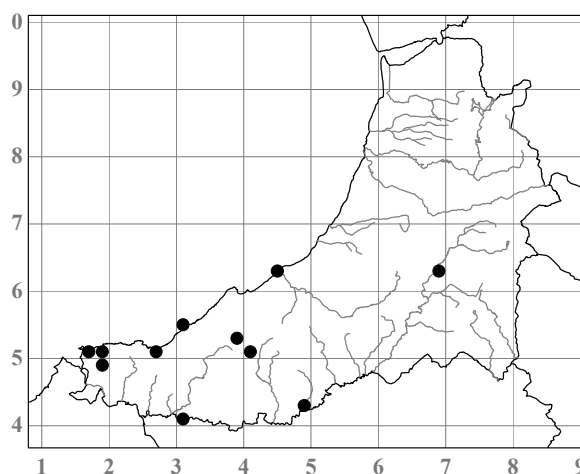
A Salter specimen dated 1928 and 1929 from the Aberystwyth rubbish-tip SN591811 cited by Ellis (1983) is in fact *R. sylvestris* (NMW, det. TCGR).]

**Nasturtium officinale** W. T. Aiton (*Rorippa nasturtium-aquaticum* (L.) Hayek) - Water-cress - Berwr y Dŵr

Frequent along the coast and in the major river valleys, in ditches, streams, flushes and pond margins, chiefly in slow-running water. It is often a dominant, or a co-dominant with *Apium nodiflorum*, and thrives in eutrophicated conditions, and can also grow in somewhat brackish waters. Altitude limit 490m, flush on waste ground, Nant Nod lead mine, Pumlumon SN791839, 2009.



*Nasturtium officinale*



*Nasturtium* ×*sterile*

**Nasturtium** ×**sterile** (Airy Shaw) Oefelein (*N. microphyllum* × *officinale*; *Rorippa* ×*sterilis* Airy Shaw) - Hybrid Water-cress - Berwr-y-dŵr Croesryw

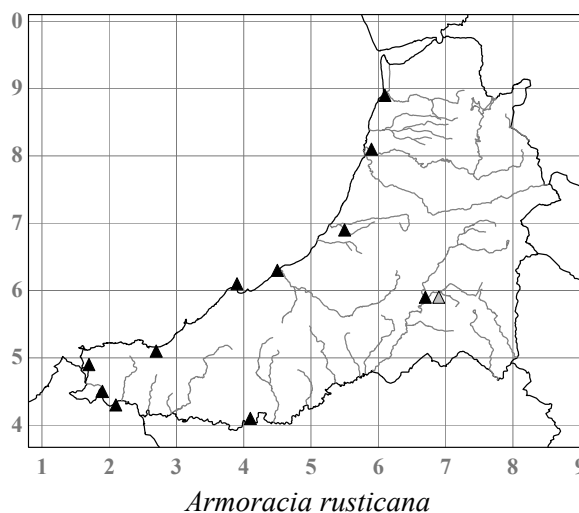
Recorded only a dozen times, but, in spite of the absence of *N. microphyllum*, probably overlooked, as in other areas it often occurs in the absence of one or both parents. Three of the sites are streams on the sea cliffs: the Helyg-fach stream just E of Aber-porth SN270515, 1994, the stream at Traeth y Mwnt SN194518, 1996, and the Crug Farm stream 1.6km W of Mwnt SN17875150, 1987. The furthest inland site is a ditch on Cors Caron, 300m SW of Maesllyn SN689627, 2000.

[*Nasturtium microphyllum* (Boenn.) Rchb. (*Rorippa microphylla* (Boenn.) Hyl. ex Á. Löve & D. Löve) - Narrow-fruited Water-cress - Berwr-y-dŵr Bach

Perring & Sell (1968) gave records from SN68 and 69 but no further details are available and they are best rejected.]

***Armoracia rusticana*** P. Gaertn., B. Mey. & Scherb. - Horse-radish - Rhuddygl Poeth

An occasional archaeophyte of waste ground, tips, grassy slopes and riversides, deriving from throw-outs and very persistent; at Penyrangor, Aberystwyth SN581807, 2008, the same patch has been present for nearly 50 years.



[*Cardamine amara* L. - Large Bitter-cress - Berwr Chwerw Mawr

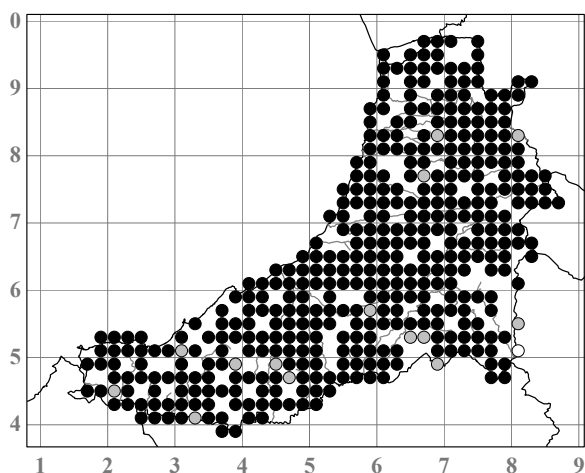
Although Ellis (1983) gives this species for the county, and there are two records from 1978 for the Teifi c.SN5042 and SN7066 (NTHH), and three from 1990 for the Aeron SN570576, SN615595 and SN634628 (KD), none has been confirmed and its presence must be considered doubtful. It is anyway otherwise completely absent from the W side of Wales.]

***Cardamine raphanifolia*** Pourr. - Greater Cuckooflower - Blodyn Llefrith Mawr

At least six plants, naturalised along 400m of wet streamside rocks in the wooded dingle of the Afon Llethi just N of Llanarth SN425580-425583, 2003 (NMW) - 2006. It is certainly a recent arrival here as it was not seen in a careful survey of the dingle in 1988. Native of S Europe.

***Cardamine pratensis*** L. - Cuckooflower - Blodyn Llefrith (Blodyn Llaeth, Bara Can y Llaeth, Bara a Llaeth y Gog, Blodyn y Gwew)

A common plant of damp pastures, marshes, roadside verges, streamsides, woodland clearings and flushes, and on wet cliffs in the uplands. It can flower in spectacular abundance in winter-wet meadows by the Teifi, but in grazed and upland sites it often does not flower and reproduces only vegetatively. Altitude limit c.610m, above Llyn Llygad Rheidol, Salter (1935); 640m, above Llyn Llygad Rheidol SN79368723, 2002.



*Cardamine pratensis* in reseeded pasture on the Teifi floodplain 1km WNW of Cenarth, view NE from SN256422, May 1991

*C. pratensis* is very variable morphologically, but no attempt has been made to name the variants as no satisfactory taxonomy is yet available. A range of material has been deposited in NMW. *Flore pleno* plants occur in lawns at Llwynycelyn, Glandyfi SN69159630, 2007, 2009 (TA), at Bryneithin Hall SN582781, 1994 (CDPa) - 2005, at Winllan SN569575, 1995 (KC & IWC), on Tal-y-bont village green SN654891, and on a hedgebank at Cwrtnewydd SN48904790, 1999; at all these sites it was probably originally planted, or is an escape but a colony in unimproved pasture 2km ESE of Llan-non SN532657, 1998, may be natural.

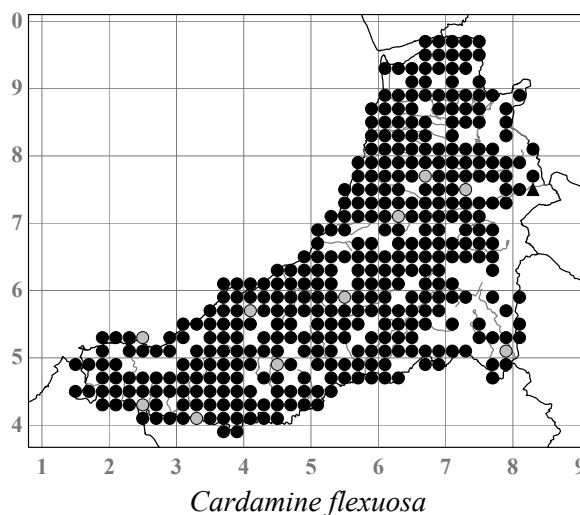


**Cardamine flexuosa** With. - Wavy Bitter-cress - Berwr Chwerw Hyblyg

A very common plant of damp, fertile, usually shaded sites, especially in marshes, woods, gardens and waste ground and on riverbanks. It is very characteristic of mossy rocks on shaded streambanks where floods keep the vegetation sparse, and it often behaves as a perennial. Altitude limit 540m, Craig y March, Pumlumon SN806881, 2002.

**Cardamine ×zahlbruckneriana** O. E. Schulz (*C. flexuosa* × *hirsuta*)

A single plant of this rarely recorded hybrid was found in the Eglwys Newydd car park SN768736, 2001 (NMW, AOC & JPW, conf. TCGR).

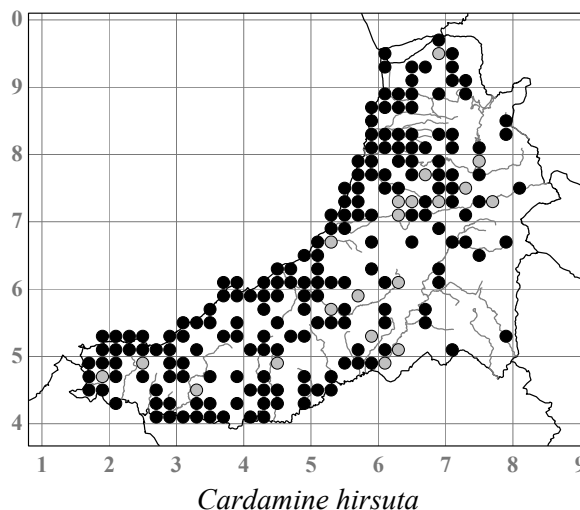


**Cardamine hirsuta** L. - Hairy Bitter-cress - Berwr Chwerw Blewog

A frequent winter annual of dry, usually thin soils in open, unshaded habitats. It is especially common on pathsides, walltops, bare patches on hedgebanks, anthills in graveyards, flowerbeds, scree slopes on the coast, mature dunes and on waste ground, and becomes rare in the uplands. Altitude limit 530m (Salter 1935); 380m, trackside, Draenllwyn-du SN707515, 2002.

**Cardamine corymbosa** Hook. f. - New Zealand Bitter-cress - Berwr Chwerw Seland Newydd

This recent arrival in Britain from New Zealand has been found naturalised, as a very abundant weed, only in a bulb nursery 1km W of Ffostrasol SN363477, 2002 (NMW). It also occurred as a weed among pot plants bought in Aberystwyth in 1999 (ADH).



**Lepidium sativum** L. - Garden Cress - Pupurlys yr Ardd

Recorded three times as a casual, from Tresaith c. SN25Q in 1936 (NMW, WRR); as a single plant with ripe fruit on railway ballast at Llanbadarn Fawr SN598807 in 1994 (SPC); and as a single plant probably from bird-seed on the path verge in Cwm Padarn, Llanbadarn Fawr SN600814 in 2007 (SPC). Originally from W Asia.

**Lepidium campestre** (L.) W. T. Aiton - Field Pepperwort - Pupurlys y Maes

Salter (1935) thought that Morgan's (1849) record from Rhosgellan-fach SN596852 was a mistake for *L. heterophyllum*, and ignored his own 1894 (Diary 28.6.1894) record of it as a cornfield weed from between Aber-porth and Mwnt, saying he had not seen it. The only possibly reliable records of this archaeophyte are unlocalised ones on BRC field cards from the Aberaeron area SN46 in 1955 (Mr & Mrs Glover) and from the Llangranog area SN35 in 1958 (DEdeV & AMcGS); it is rare in Wales as a whole.

**Lepidium heterophyllum** Benth. (*L. smithii* Hook.) - Smith's Pepperwort - Pupurlys Amryddail

A frequent plant of well-drained, thin soils in open habitats, especially characteristic of dry, well-grazed, stony slopes along the coast, stony banks, dry heaths, quarries, railway ballast and waste ground. It is usually in small quantity where it occurs, and is commonest near the coast and in the SW, becoming rarer to the N of the county and especially in the Dyfi area. It occurs on lead mine spoil at Cwmsebon SN685830, 1992-2003, and at Cwmsymlog SN699838, 1985 (APF) - 2003 where it reaches its altitude limit of 260m, but it is

generally uncommon this far inland. Var. *alato-stylum* (F. Towns.) Thell. was recorded on the disused railway by Cors Caron SN686619, 1980 (NMW, DGr) but this variety is not currently recognised.

**Lepidium virginicum** L. (*L. densiflorum* Schrad., *L. neglectum* Thell.) - Least Pepperwort - Pupurlys Bach

Recorded only once, by Salter as a casual from the Aberystwyth rubbish-tip SN591811 in 1925 (NMW, det. GCD as *L. densiflorum*). Native of North America.

**Lepidium ruderae** L. - Narrow-leaved Pepperwort - Pupurlys Culddail

An archaeophyte, recorded three times as a casual, by Salter from the Aberystwyth rubbish-tip SN591811 in 1925 (1935); from waste ground at Blaenannerch SN24P in 1941 (Whellan 1942); and as a pavement weed in Llanrhystud SN53856971 in 1999.

**Lepidium perfoliatum** L. - Perfoliate Pepperwort - Pupurlys Trydwl

Recorded only once, by Salter as a "Casual, introduced with fowl-corn" at Llanbadarn c.SN68A in 1928 (NMW). Native of Europe.

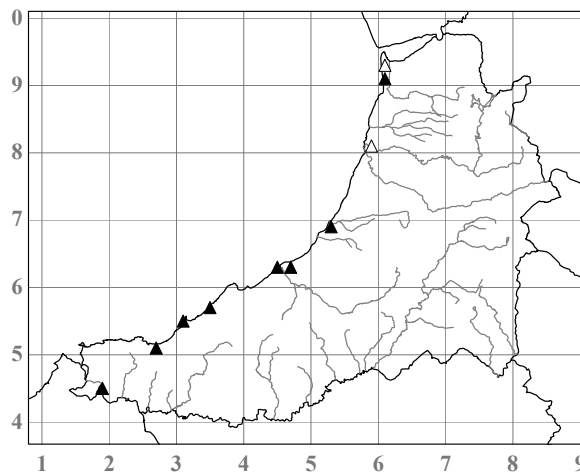
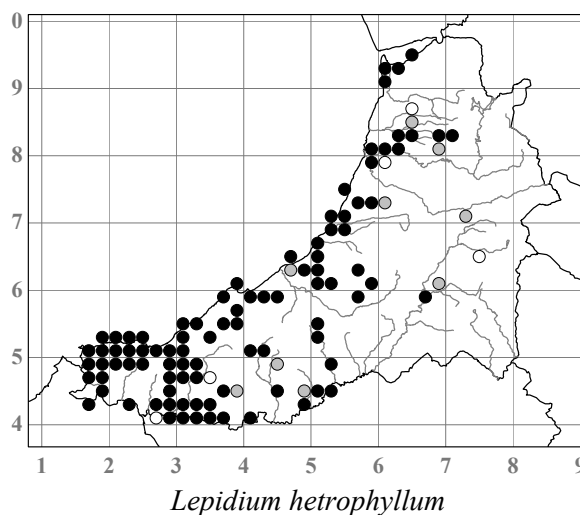
**Lepidium draba** L. subsp. **draba** (*Cardaria draba* (L.) Desv) - Hoary Cress - Pupurlys Llwyd

This native of S Europe is rare in the county, but is becoming increasingly naturalised on waste ground, banks and dry places chiefly by the sea. It is still naturalised in abundance at Aberaeron c.SN4563, 2008, where it was first reported by W. Whitwell (*J. Bot.* **28**: 188 (1890)): "This plant has not yet, so far as I can trace, been recorded from Wales or any portion of the west coast. It has, however, been known by Miss E. Foulkes-Jones [who also made first county records of slugs in the area], resident at Aberayron in Cardiganshire, to have been established for several years at least, on various banks forming field divisions, between that town and the sea. I received specimens from her in 1888, and again during the present month (May)."

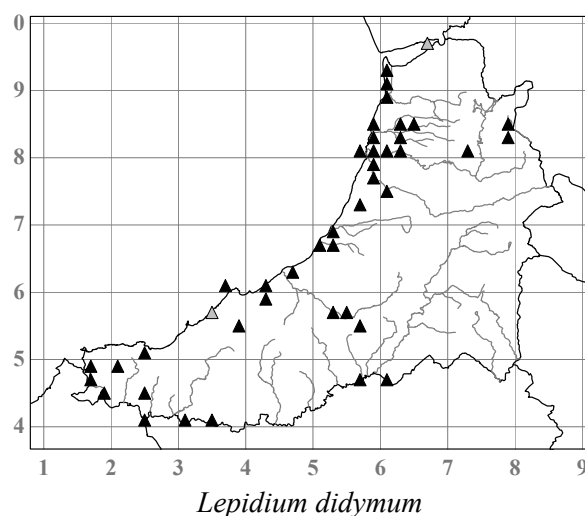
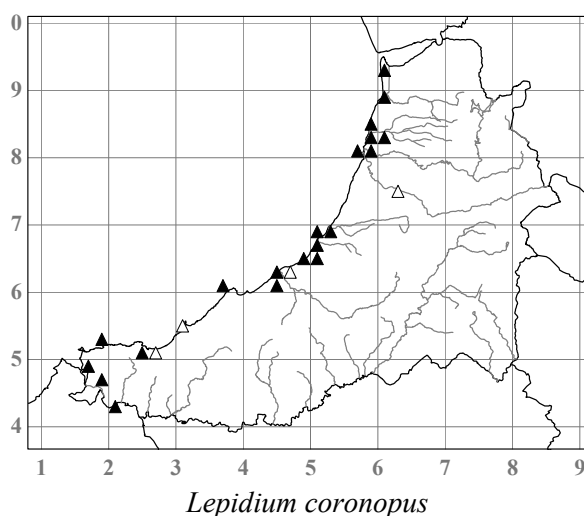
Salter recorded it at the Ynys-las railway sidings SN6193 in 1907-1908 (Diary 21.6.1907, 11.6.1908); at the allotments by the Aberystwyth gasworks SN595809 in 1920-1930 (Diary 1.5.1929, 1930); and in the National Library grounds c.SN594815 pre-1936 (1935). He also recorded it at Llangranog SN35C, pre-1936 (1935) where it was seen by Whellan (1942) in 1941, and where it is still present on the roadside verge and rocks SN312541, 2004. There are more recent records from the Cardigan station and Cattle market SN182457 in 1979 (MPa) - 2004; from shingly waste ground just above the beach at Cwmtedu SN355574 in 1991-2004; from waste ground at Aber-porth SN261515 in 1994; from the back of the shingle beach 500m S of the mouth of the Afon Wyre SN525693 in 2002; and from the railway line at Borth station SN609901 in 2004.

**Lepidium coronopus** (L.) Al-Shehbaz (*Coronopus squamatus* (Forssk.) Asch., *C. ruellii* All.) - Swine-cress - Olbrain

An uncommon archaeophyte weed of waste ground, trodden places such as paths and pavements, farmyards and sandy shingle at the tops of beaches, almost confined to the coast and never more than a few km from the sea. The earliest record is by Morgan (1849) from Aberystwyth castle SN579816, where it is still abundant at



the S end of the grounds, as well as on pavements nearby, 2008, and where it was collected in 1934 (NMW, PCh). It is certainly no longer a common weed as Salter described it. Plants in the beach car park on shingle SE of Aberaeron harbour SN45406288, 1993, were unusually glaucous. Plants in a Beet field at Morfa Mawr SN506662, 1993, were huge with many radiating stems *c.*45cm long (NMW), but all those seen in the county have been entirely prostrate.

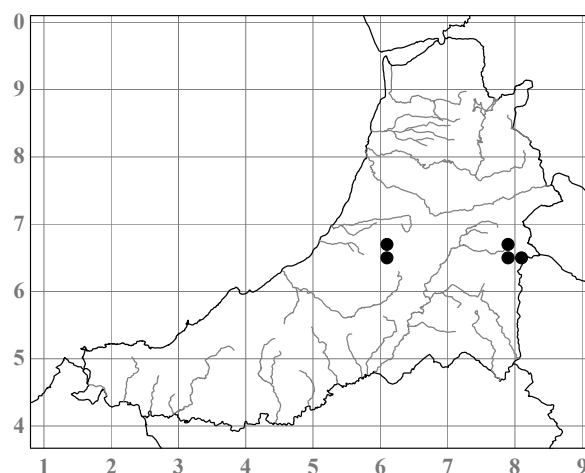


***Lepidium didymum* L. (*Coronopus didymus* (L.) Sm.) - Lesser Swine-cress - Olbrain Bach**

An uncommon weed of waste ground, gardens, tips and pathsides, largely confined to the coast. The earliest localised record is by Morgan (1849) from Constitution Hill SN5882. Salter gave only about four sites, and said that it was much less frequent than *L. coronopus*; it is now a good deal commoner than that species, and must have increased considerably since his day. Two of its recent inland sites were on river shingle by the Teifi, E of Dolaugwyrdon-uchaf SN56404653, 1993, and at Newcastle Emlyn SN309406, 2003. In the uplands it has been seen only on waste ground at 410m, Eisteddfa Gurig SN797840, 1993 (SPC), and at its altitude limit 480m, on waste ground at the Nant Nod lead mine site 600m W of Eisteddfa Gurig SN79188390, 2003.

***Subularia aquatica* L. - Axlwort - Mynawydlys**

This aquatic Crucifer is known from five upland lakes in the county, and currently reaches its S limit in Britain here, not having been seen in its only Carmarthenshire site, Llyn y Fan Fach, since 1902. The lakes are all oligotrophic to slightly mesotrophic. In Llyn Egnant SN76Y, the only one of the five that has been dammed and that is not entirely natural, it was recorded in 1893 (Burkill & Willis 1894), in 1929 when Salter (Diary 13.8.1929) mentioned finding only a few plants here, and in 1966 when Seddon (1972) recorded it in the year the dam was opened, but it has not been seen since in spite of repeated searches. In Llyn Hir SN76Y, 1893 (Burkill & Willis 1894) - 2005, it occurs scattered around most of the lake in shallow water. In Llyn Gynon SN7964-8064, 1893 (Burkill & Willis 1894) - 1998, it occurs in small quantity mostly in the N bay and at the E end.



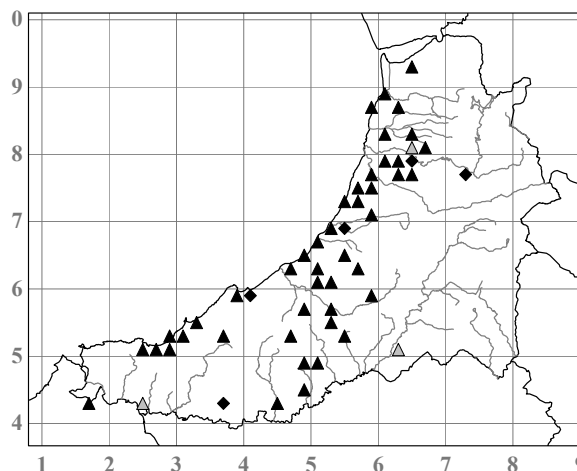
In Llyn Eiddwen SN66D, 1959 - 2005, it is usually quite abundant especially along the E and S shores and around the SW corner. In Llyn Fanod SN6064, where it was not recorded until 1977 (CN & DGJ) the population seems to be steadily increasing; in 1994 (AOC & LC) it was only in small quantity, along the N half of the E side, but in 1997 (AOC & ACJ) it was very abundant here and formed a continuous closed sward at 1m depth in the NE bay, and by 2007 (AOC & NFS) it was in vast abundance around most of the lake in up to 1.3m depth of water. In most of its lakes it is in water up to 1m deep, growing in gravelly or stony substrate, but in Llyn Eiddwen and Llyn Fanod in particular it often grows in silt and peat. In dry years it can sometimes be seen exposed along the shore, flowering and fruiting prolifically.



*Subularia* seeds were recorded by Moore (1970) from Late-glacial deposits at Gors Lwyd SN858750, and it will presumably have survived locally through the Post-glacial in its other lakes that have remained open water. Altitude limit 435m, Llyn Hir SN76Y, as above.

**Lunaria annua** L. (*L. biennis* Moench) - Honesty - Swllt Dyn Tlawd (Dail Arian, Ceiniog Arian, Spectol yr Hen Wŷr, Blodau Spectol)

Frequently and conspicuously naturalised on roadside hedgerbanks and in graveyards where the colonies are often very persistent. Salter (1935) noted this, and called it “a most frequent escape”, but unfortunately mentioned no particular sites, and there are no earlier records. The first localised ones are not until 1977, a colony on a roadside bank at Bronial, Dihewyd SN491566, and a colony in the unusual habitat of Oak woodland, 300m SE of the Upper Bridge, Aberaeron SN461621, and at both sites it was still abundant in 2007. White-flowered colonies are occasional, and are shown on the map as diamonds, but mixed colonies have never been seen. Native of SE Europe.

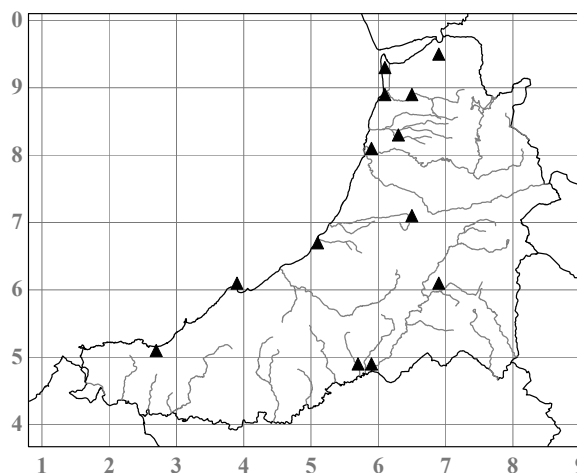


**Berteroa incana** (L.) DC. (*Alyssum incanum* L.) - Hoary Alison - Alyswn Lledlwyd

Reported only from Borth c.SN68E in 1922 by Mrs Debenham (*BEC Rep. 6: 717* (1923)), and from a laneside near Felin-wynt c.SN212509 in 1970 (EBL).

**Lobularia maritima** (L.) Desv. (*Alyssum maritimum* (L.) Lam.) - Sweet Alison - Alyswn Pêr

Salter (1935) said that it “Readily establishes itself upon walls and dry banks in the neighbourhood of cottage gardens”, and the first dated record, unlocalised but probably from the Aberystwyth area, is from 1894 (AHC, Diary 24.11.1894). It is occasionally seen nowadays as a casual in towns and villages and on tips, but is nowhere persistent and is perhaps less frequent than Salter suggested.



*Lobularia maritima*

**Descurainia sophia** (L.) Webb ex Prantl - Flixweed - Piblys

An archaeophyte only once recorded, as a garden weed in Penrhyn-coch SN641840, 1983 (NMW, AGB, det. AOC).

**Arabis caucasica** Willd. ex Schltl. - Garden Arabis - Berwr-y-cerrig yr Ardd

Naturalised in a few places: on old mortared walls at Falcondale SN563491, 1979 (NMW, conf. EJC) - 2004; in Ciliau Aeron churchyard SN502581, 1997; around Llanarth village SN423575, 1999; on roadside banks at Capel Dewi SN453429, 1995; and at Dihewyd SN491566, 1977-1997. Native of S Europe and SW Asia.

**Arabis hirsuta** (L.) Scop. - Hairy Rock-cress - Berwr-y-cerrig Blewog

Recorded by Lees (1841) “Vicinity of Aberystwyth, rock plant”, and, according to Salter (1935), by Ley but with no locality. There are also two unlocalised field records at BRC from the 1950s for SN35 and SN46. Salter never saw it, but it is quite probable that at least some of these records are correct as it occurs in all the adjacent counties and could have occurred on some of the more base-rich rocks or dunes.

**Aubrieta deltoidea** (L.) DC. - Aubretia - Cynfas Biws

Native of SE Europe and SW Asia, naturalised in a few places on walls and hedgebanks. The first record was from walls in Llandysul SN419407, 1978 (NMW) - 2004, and it has been subsequently found at Penglais, Aberystwyth SN590818, 2003 (SPC), at Capel Cynon chapel SN655760, 1992-2008, at Highmead walled garden SN500430, 2002, and on a hedgebank near Capel Maen-y-groes, New Quay SN388590, 1998 (AOC & JPW).

**Draba muralis** L. - Wall Whitlowgrass - Llysiau'r-bystwn y Muriau

A rare casual, and established in one site. It was first recorded in 1965 as a garden weed at Glandyfi castle SN692967 (WMC, *Nature in Wales* 9: 145 (1965)). In the same year it was found on pathsides in Goginan village SN688812, and since then it has increased and spread and in 2003 there were c.200 plants in front of Dyffryn chapel alone (NMW, SPC; AOC); its occurrence on walltops and elsewhere around what was once the mine captain's house "Tamrallt" perhaps suggests a possible origin (SPC). In 1978 there were many plants on gravelly graves in Llanwenog churchyard SN494455 (NMW), and in 1998 half a dozen plants were found on a slope by the A485 road just N of Pont Llwlwyn, Llanfarian SN590774 (SPC). Native in Britain only on limestone.

**Erophila majuscula** Jord. - Hairy Whitlowgrass - Llysiau'r-bystwn Blewog

Known only from the Ynys-las dunes, where populations have been seen at three places around Rabbit-scrapes and on pathsides: at SN61009405, 1993 (NMW, conf. TTE) - 2005 (SJT & AOC), usually 10-60 plants, growing with *E. verna* and *E. glabrescens*; at SN60939401, 2003, a few plants only; and at SN60659402, 2003, a few plants only. Records from Cenarth, Gwbert and Newcastle Emlyn by Whellan (NMW, Wade 1952) are all errors for *E. verna* (det. TTE & SAF; TCGR).

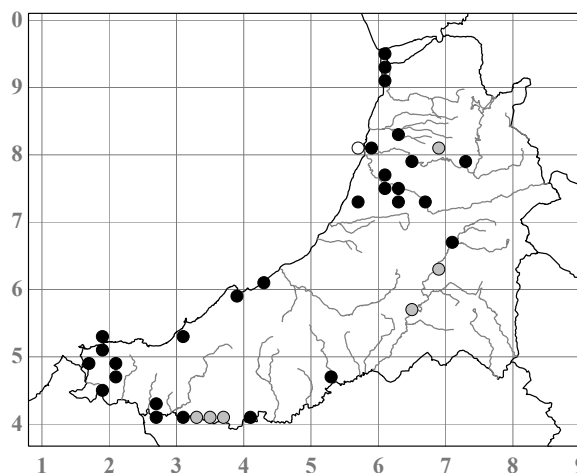
**Erophila verna** (L.) DC. - Common Whitlowgrass - Llysiau'r-bystwn Cynnar

Abundant in many places on the Ynys-las dunes and the Borth golf course SN69A-C, 1894 (Salter Diary 16.5.1894) - 2004 (NMW), on the Penparc sand quarries and adjacent sandy areas SN24D, E, 1992-2004 (NMW), and in a few places on the Penyrergyd dunes SN14U, 1991-2009 (NMW, conf. TTE). Elsewhere it is an occasional plant of sandy places, pathsides and waste ground along the coast. Inland it occurs chiefly along the disused railways, where it can still be found at most of the old stations and wherever the ballast remains open, and it can occasionally be found on gravel drives and car parks and in graveyards. In 1965 (ABS, JPS) - 1992 (AOC, SPC & JAM) it occurred at the Cwm Rheidol lead mine SN728781, and in 2005 it was abundant on the footbridge nearby SN72727818 (AOC & JPW). The only probably truly native inland sites are on bare patches in dry, acidic pasture 600m ESE of Capel Tygwydd SN277432, 1997, and on rocks by the Teifi just below Cenarth Bridge SN268415, 1990-2004 (NMW); Whellan had collected it on a dry bank at Cenarth in 1941 (NMW, det. TCGR).

The earliest record is of it "living in the crannied walls of the old castle" at Aberystwyth SN579815 (Rees 1890), where it has not been recorded since. Salter (1935) recorded the species, or at least the aggregate, only from Borth and Ynys-las, and Whellan collected it from Newcastle Emlyn SN34A and Penyrergyd SN14U in 1941 (NMW, det. TTE & TAF; TCGR). It must undoubtedly have become more widespread since then. All recent records are of var. **verna**. The only confirmed record of var. **praecox** (Steven) Diklić is from the Borth golf links SN69A or B, Salter, 1932 (NMW, det. TTE & SAF).

**Erophila glabrescens** Jord. - Glabrous Whitlowgrass - Llysiau'r-bystwn Llyfn

Abundant in a few places on the Ynys-las dunes, especially in an area of hummocky dune 80m S of the high boardwalk near the seaward edge SN60509362, 1993-2005 (NMW, conf. TTE), usually mixed with *E. verna* but much less common than that species; there is no obvious difference in their ecological preferences.



Numbers vary greatly from year to year. On the Penyrergyd dunes SN1648 it is abundant in several areas, usually as pure populations and generally commoner than *E. verna*, 1991-2004 (NMW, conf. TTE); it occurs on tracksides and chalet lawns as well as on the dunes, and as at Ynys-las does best on the more Rabbit-grazed areas. Elsewhere it has been seen only on a gravelly drive at Plas Gogerddan SN62898370, 2007; and on broken tarmac by the B4342 road in New Quay, 300m S of the Lifeboat Station SN39005960, 1999-2000, the site having been since destroyed.

**Conringia orientalis** (L.) Dumort. (*Erysimum orientale* (L.) Crantz) - Hare's-ear Mustard - Roced Clust Ysgyfarnog

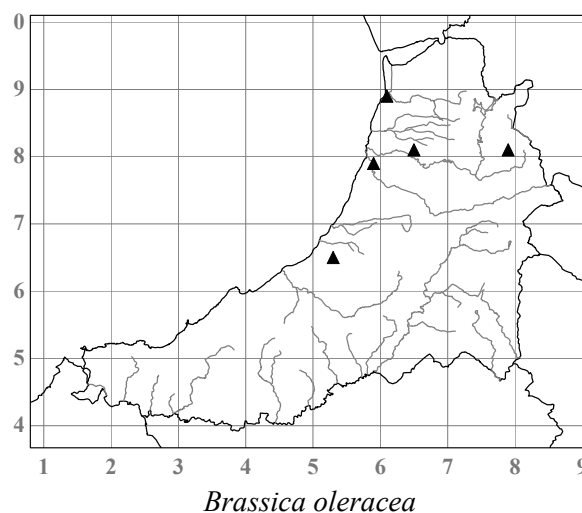
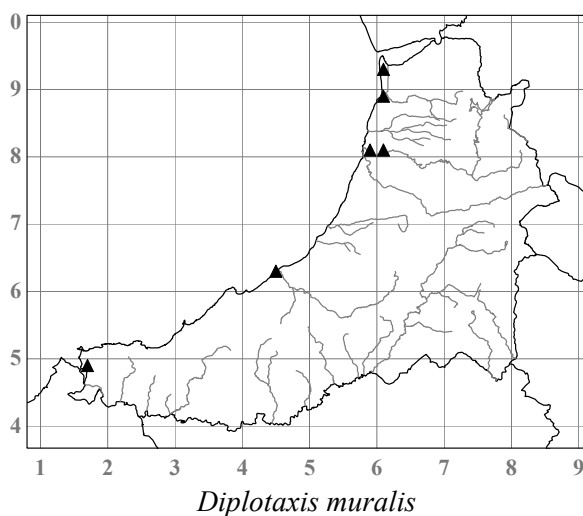
Recorded only twice, as a casual at the Aberystwyth municipal rubbish-tip SN591811 in 1925 and 1928 by Salter (1935). Native of the E Mediterranean.

**Diplotaxis tenuifolia** (L.) DC. - Perennial Wall-rocket - Roced-y-muriau Meinddail

The only records of this archaeophyte are of single large plants on waste ground by a car park 500m SE of Aberystwyth station SN588811 in 1997 (NMW, conf. TCGR), and on a disturbed bank by the Cae'r Wylan housing development, Llanbadarn Fawr SN59988146 in 2007-2008 (SPC).

**Diplotaxis muralis** (L.) DC. - Annual Wall-rocket - Roced-y-muriau'r Tywod

An occasional and sometimes persistent alien, native of Europe, and plants can usually be found on the pavements and waste ground in Aberystwyth, especially around Park Avenue SN584814, 1930 (Salter 1935) - 2004, on disturbed places on the Ynys-las dunes c.SN6093, 1956-1993, and around Aberaeron harbour SN454629, Salter (1935) - 2001 (TCGR & AOC). It is no longer "one of the most frequent of 'casuals' or 'adventives'" as Salter (1935) described it; he also said it was "Always to be seen at the town rubbish-tip [SN591811], Aberystwyth, and practically established there." The first dated record is Llanbadarn c.SN5980, 1928, R. Melville (Wade 1952).



**Brassica oleracea** L. - Cabbage - Bresychen

Cultivated as Cabbage, Kale etc. for feeding to stock, but with less than 335ha in 1988 (Anon. 1988), and as Cabbage for human consumption, with only 7ha in 1988. It is a rare casual on tips and roadsides.

**Brassica napus** L.

Subsp. **oleifera** (DC.) Metzg. - Oil-seed Rape - Rêp Had Olew

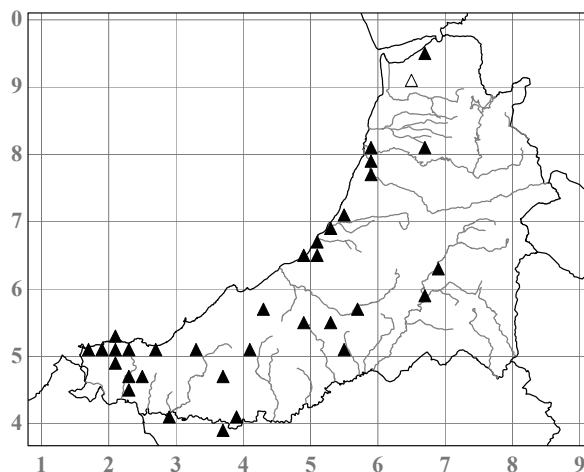
Rape was used by Thomas Johnes for pasture improvement on the Hafod estate c.1800 (Moore-Colyer 1992) and was doubtless used both for this and for fodder widely in the county. A 1718 reference to a "Rape Mill" at Cardigan SN177463 (Wmffre 2004, p.8) indicates that it was being grown then for oil, and in recent decades Oilseed Rape has again been grown, chiefly in the S of the county in small amounts, with 61ha in 1988 (Anon. 1988). It is a much more frequent casual on roadside verges, waste ground and tips than would be expected from its limited cultivation, and it is often abundant on newly reseeded verges. It is very



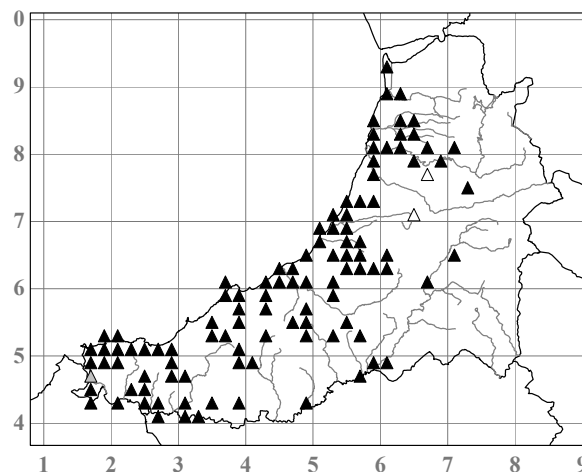
persistent in some places, for example on the roadside bank NE of Llanrhystud SN542701, c.1970-2008 (NMW, det. TCGR).

Subsp. **rapifera** Metzg. - Swede - Rwden

Swedes for feeding to stock are now grown in much smaller quantity than in the past. In 1920, 4,768 acres (1,929ha) of "Swedes and Turnips" were grown (Ashby & Evans 1944) and this had reduced to 200 acres (80ha) by 1988 (Anon. 1988). Salter (1935) recorded Swedes among the kinds of *Brassica* that occur as "escapes or outcasts", but such plants have not been noticed recently.



*Brassica napus* subsp. *oleifera*



*Brassica rapa* subsp. *campestris*

### ***Brassica rapa* L.**

Subsp. **campestris** (L.) A. R. Clapham - Wild Turnip - Erfinen Wyllt

A common archaeophyte of roadside verges, arable fields, farmyards, tips and waste places and, like *B. napus*, often occurring in abundance on newly reseeded verges. Altitude limit 300m, weed in Turnip field 1.5km SW of Devil's Bridge SN730759, 1995.

Subsp. **rapa** - Turnip - Meipen

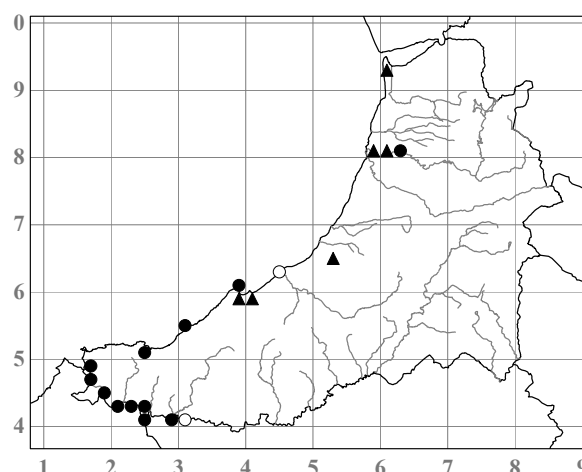
Turnips have long been cultivated, but both Lloyd & Turnor (1794) and Meyrick (1810, probably copying) say that they were not common. The former do however record that they could be grown well, the largest weighing 15 or 16lb (c.7 kilos), and that they were eaten on the ground by young Cattle and Sheep. Colyer (1983) describes the attempts by landlords to get their reluctant tenants to grow Turnips, notably Anne Evans of Highmead SN502432 in the 1780s whose efforts were largely defeated by Turnip Fly; Thomas Johnes (1800a) of Hafod SN759732 and Benjamin Hall of Cilgwyn SN313410 were others who tried the same in the early 19<sup>th</sup> century, and there was still evidence of anti-Turnip prejudice in the 1830s. In the later 19<sup>th</sup> century their cultivation clearly still needed encouragement, and Mrs Brigstocke of Blaenpant SN253444 gave prizes for their cultivation among her tenants in the 1870s (Howell 1978). Although only 80ha of "Swedes and Turnips" were said to be being grown in 1988 (Anon. 1988), Turnip fields are quite often seen especially in the uplands, where they are used for feeding *in situ* to Sheep. The yellow-fleshed variety was especially popular. Salter includes Turnip among the "escapes or outcasts", but there are no recent records of it as a casual.

[*Brassica juncea* (L.) Czern. - Chinese Mustard - Mwstard Tsieina

Tentatively recorded from Bethania by Marshall (1900), but best ignored.]

***Brassica nigra* (L.) W. D. J. Koch - Black Mustard - Mwstard Du**

Locally abundant and appearing native in tall herb vegetation and scrub by the Teifi estuary and up the river as far as Cwm-cou SN295419, 1993 (AOC & TCGR), as well as in small quantity by the Rheidol



*Brassica nigra*

SW of Lovesgrove SN622810, 2001. It is probably also native in scrub on the coast at New Quay SN390600, 2003, at Llangranog SN311541, 1994 (AOC & SPC) and at Aber-porth SN259515, 1992 (NMW); Marshall (1900) reported it (as *B. sinapioides*) abundant and probably native on the cliffs at Aberaeron SN46L. It occurs also as a rare casual, for example at Cei Bach SN409597, 1988, and at several places around Aberystwyth, 2001-2002. It was found as a weed in a barley crop near Nebo SN539659, 1993 (NMW, det. TCGR).

**Sinapis arvensis** L. (*Brassica arvensis* (L.) Rabenh., non L.) - Charlock - Mwstard Gwyllt (Efrau, Maip Gwylltion, Gosgynnydd, Gwrisgynnydd, Llysiau Melynion)

An occasional archaeophyte weed of arable fields, waste and disturbed ground, tips and building sites. Very variable, and plants with hairy fruits, var. **orientalis** (L.) Koch & Ziz, sometimes occur, for example at the garden centre at Capel Dewi SN624822, 1989. Altitude limit 300m, Turnip field 1.5km SW of Devil's Bridge SN730759, 1995.

**Sinapis alba** L. subsp. **alba** (*Brassica alba* (L.) Rabenh.) - White Mustard - Mwstard Gwyn

A rare archaeophyte in Wales, and recorded only four times in the county. Ley (1887) saw it on waste ground at Borth c.SN68E, Marshall (1900) recorded it from cultivated ground near Aberaeron c.SN46L, and there is a 1950s field record at BRC from SN34. The only recent record is of a single plant, among abundant *S. arvensis*, in the WAC trial grounds 700m ESE of Lovesgrove SN634812, 1993 (SPC).

**Hirschfeldia incana** (L.) Lagr.-Foss. - Hoary Mustard - Mwstard Llwyd

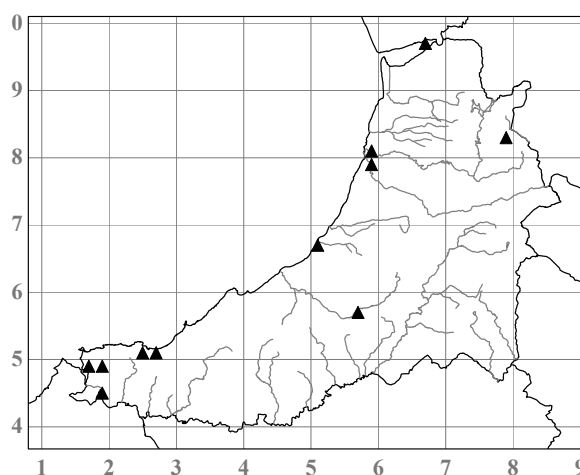
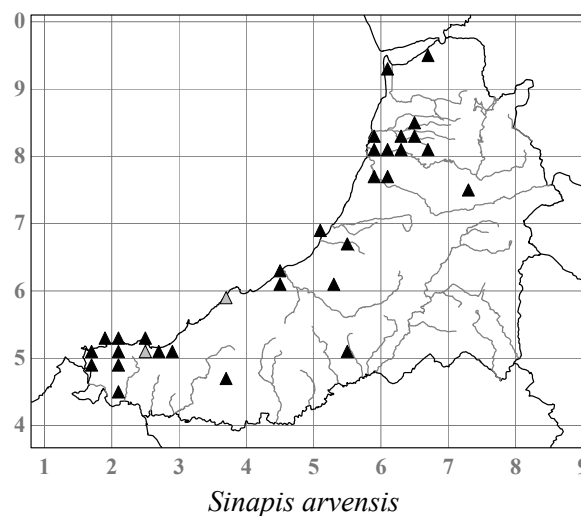
Known since about 1959 in abundance on the railway embankment opposite Ynys Edwin, Eglwysfach SN675965 (WMC & PSC), but probably there well before then; it was misidentified as *Brassica nigra* until 1988 (NMW, conf. EJC) and is still present, 2007. It was not recorded elsewhere until 1990, when it was found on the disused railway by the Pendinas rubbish-tip, Aberystwyth SN584798 (NMW, conf. TCGR) - 2005. It is spreading slowly in the county, and has been recorded from ten other sites, although it seems well-established only along the A487(T) road verge SW of Llan-non c.SN510664, 1990-2007, and on sandy banks by the Yacht Club, Penyrergyd SN163486, 1990-2007. Altitude limit 360m, verge of wind-farm access track off A487(T), Cwmergyr SN79388305, 2008 (SPC).

**Coincya monensis** (L.) Greuter & Burdet subsp. **cheiranthos** (Vill.) Aedo, Leadley & Muñoz Garm. (*Rhynchosinapis cheiranthos* (Vill.) Dandy) - Wallflower Cabbage - Bresychen y Fagwyr

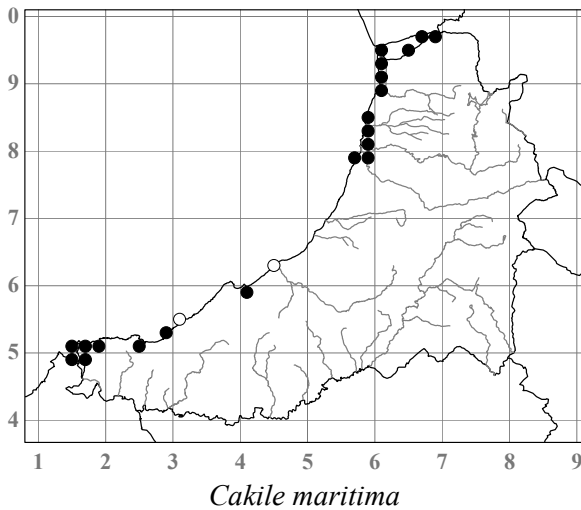
The only record is one at BRC from "Waste ground near sea, Aberayron, very strong colony" SN46, 1957 (IMV, det. AEW). There is no voucher, and it has not been seen since.

**Cakile maritima** Scop. subsp. **integrifolia** (Hornem.) Hyl. ex Greuter & Burdet - Sea Rocket - Hegydd Arfor

A frequent annual of sand and sandy shingle along the strand line, from Ynys-las SN6094 where it is often very abundant to Borth SN6088, 1848 (Purchas 1848) - 2005, and also at Clarach SN5883, 1984-2005, Tan-y-bwlch c.SN5779, 1901 (Salter Diary 11.8.1901) - 2005, Cei Bach SN4059, 1988-1993, Penbryn SN2952, 1904 (DET, Salter Diary 25.7.1904) - 1990, Aber-porth SN2551, 2007, Mwnt SN1951, 1987, at Penyrergyd c.SN1648, 1979-2005, and Gwbirt SN1650, pre-1936 (Salter 1935) - 2005. It is virtually absent from the



pure shingle beaches and rocky shores, although Salter had records of it from Aberaeron SN46 in 1904 (DW, Diary 25.6.1904) and Llangranog SN35 (1935). Occasional stray plants are found at the top of the salt marshes up the Dyfi estuary, for example opposite Ynys Edwin SN678965 and at Glandyfi SN694969 in 1990.



*Crambe maritima*, Ynys-las, view  
S from SN60619222, October 2003

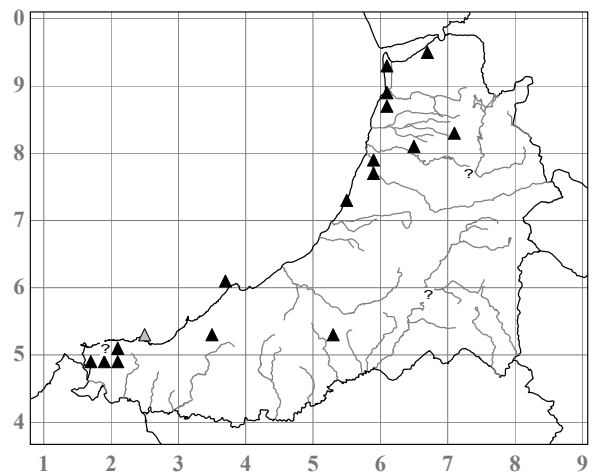
### ***Crambe maritima* L. - Sea-kale - Ysgedd Arfor**

Although occurring at Llwyngwrl and, at least until 1973, near Llanfendigaid in Merioneth (PMB pers. comm. 2001), this very conspicuous plant of shingle beaches and sea cliffs was not seen in the county until 2001 when one plant, probably several years old but not flowering, was found on the shingle at Ynys-las SN60619222 (RB). The following year it disappeared when the beach was re-profiled, but in 2003 it had regrown and it has fruited well each year since.

### ***Raphanus raphanistrum* L.**

Subsp. **raphanistrum** - Wild Radish - Rhuddygl Gwyllt

An occasional archaeophyte weed of arable fields, waste and disturbed ground, tips, farmyards and road verges, perhaps less common than in the past as Salter (1935) described it as frequent. Most of our plants are var. **ochroleucus** (Stokes) Peterm., with pale yellow flowers, but occasionally a few white-flowered ones, var. **raphanistrum**, have been recorded mixed with them, for example on a tip at Borth SN616898, 1991, on a reseeded road verge above Borth SN604877, 1991, and at a field margin at Gwbert SN163495, 1991 (NMW). Altitude limit 310m ("Not unfrequent in the hills up to 1020ft."), Burkill & Willis (1894), but not recently seen in the uplands.



Subsp. **maritimus** (Sm.) Thell. (*R. maritimus* Sm.) - Sea Radish - Rhuddygl Arfor

A rare and usually fugitive plant of rocky ground, vegetated shingle and ditch-sides by the sea. Salter recorded it from Ynys Lochtyr SN3155 in 1927 (Diary 18.5.1927, 1935) but later withdrew the record (Wade 1952). It was then recorded from the gull colony on Cardigan Island c.SN162517 in 1968 (TAWD ms. diary). In 1996 one plant was seen among rank vegetation below a wall on the landward side of Tan-y-bwlch beach, Aberystwyth SN57978061 (SPC; PA), and since then 5-16 plants have been seen there each year until 2005, in 2007-2008 it had unaccountably vanished, but one rosette appeared in 2009; in 2000 one plant was seen in the sandy pasture 800m S of here SN58057995. Also in 1996 one plant was seen on the beach at Mwnt SN194519. In 2001 one plant was seen on the bank of a tidal ditch by the mouth of the Afon Clarach SN58788402; the following year one was seen on a gravelly area by the footbridge here, and another on the strandline of the beach nearby SN587839 (SPC), and 18 were here in 2005. This and Tan-y-bwlch are now the only sites where it persists. In 2008 one plant was seen at the top of the beach at Borth SN60799052



(AOC, RM & JPP), and in 2009 one on the shingle spit at Penyrergyd SN159484 (AOC & FN). The plants in the Clarach colony have consistently from year to year had more seeds in those fruits which have developed than the plants at Tan-y-bwlch, for example in 2006 of the 196 such fruits, 1% had 6 seeds, 5% had 5, 15% had 4, 26% had 3, 33% had 2, and 20% had 1, while in the Tan-y-bwlch colony of the 340 such fruits, 2% had 3 seeds, 10% had 2, and 88% had 1.

**Raphanus sativus** L. - Garden Radish - Rhuddygl y Gerddi

Robust forms known as **Fodder Radish** with variably developed roots, used for fodder and green manure, were grown on a small scale in the county in the 1960s (G. Jones pers. comm.); a few plants of this were in a Two-rowed Barley crop at Ynys-hir SN666952 in 2002, and a few plants were present in a mixed crop sown by the RSPB for bird-seed nearby at SN668957 in 2004. Otherwise the species has been seen only twice as a casual, as the **Salad Radish**: several plants were on the strandline of Tan-y-bwlch beach SN580800 in 1992 (IAW & AOC), and one was on waste ground by Grays Inn Road, Aberystwyth SN58328158 in 1998 (SPC).



*Raphanus raphanistrum* subsp. *maritimus* in flower,  
view S up Ystwyth estuary from SN57978061,  
Aberystwyth, June 2004

[*Sisymbrium irio* L. - London-rocket - Coeg-roced Llundain

Recorded, presumably in error, by Morgan (1849) from Penglais c.SN5982.]

**Sisymbrium altissimum** L. - Tall Rocket - Roked Dal

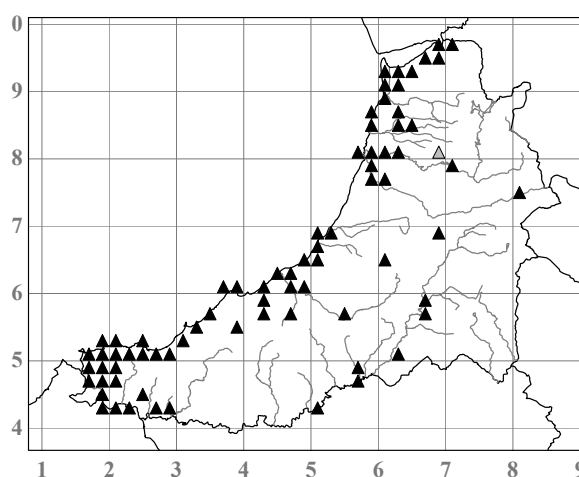
Recorded by Salter (1935) as occasional, as a casual, at the Aberystwyth town rubbish-tip SN591811 “as in 1925”, although this date may refer to *S. orientale*. The only other records are from among shrubs recently planted by the new A487(T) bypass at Cardigan SN188467 in 1995 (NMW), and on a reconstructed road verge by the Waun crossroads, Aberystwyth SN59978215 in 2007 (NMW, SPC, conf. TCGR).

**Sisymbrium orientale** L. - Eastern Rocket - Roked y Dwyrain

Bracketed by Salter (1935) with *S. altissimum* as occasional, as a casual, at the Aberystwyth town rubbish-tip SN591811, with “as in 1925” referring to one or both species. The only subsequent record is a 1950s field record from SN46 at BRC.

**Sisymbrium officinale** (L.) Scop. - Hedge Mustard - Roked y Berth

A frequent archaeophyte occurring throughout the coastal zone of the county on roadside verges, pathsides, waste ground, and in farmyards and gardens, but rare further inland.



*Sisymbrium officinale*

**Alliaria petiolata** (M. Bieb.) Cavara & Grande - Garlic Mustard - Garlleg y Berth

Common on the more nutrient-rich and shaded roadsides and hedgebanks and on waste ground throughout the lowlands, but rare and probably only casual in the uplands. It is also very characteristic of the flood zones of rivers and streams in lowland woods where it is perhaps truly native. Altitude limit 490m, waste

ground, Nant Nod lead mine, Pumlumon SN791839, 2009.

**Teesdalia nudicaulis** (L.) W. T. Aiton - Shepherd's Cress - Berwyr y Bugail

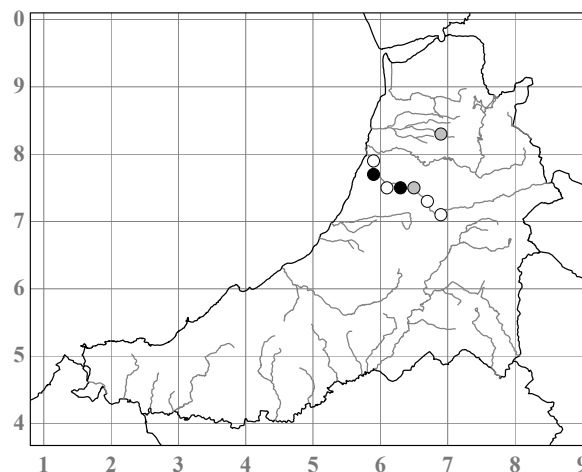
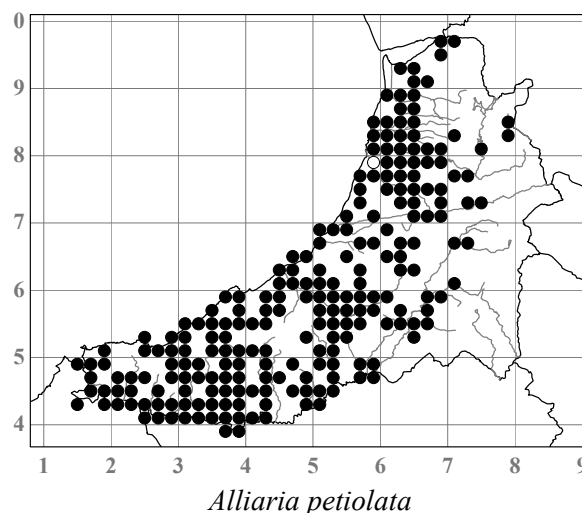
Salter (1935) wrote that "In 1904 *Mr. D. Thomas* showed me this on stony ground at the top of Cae'r Gog Field, Aberystwyth [SN593817]. The site has long since been brought under cultivation, and I have not seen it elsewhere in the county." A diary entry (29.9.1902) indicates that Thomas had known it here at least two years earlier. It has not been recorded since.

**Thlaspi arvense** L. - Field Penny-cress - Codywasg y Maes

Salter (1935) described this archaeophyte as an occasional casual, and gave five records: on the Aberystwyth rubbish-tip SN591811 in 1900; "by fowl-house", Crugiau, Rhydyfelin SN591794 in 1905 (Diary 14.5.1905), and again at Rhydyfelin in 1932; Staylittle SN6489 in 1928; and "Pont-y-geier" [perhaps Pant-y-gwair SN6067] in 1930. Of the six subsequent records two are from sites where seed-mixes were sown: on the A44(T) verge by the Lovesgrove roundabout SN633811 in 1992 (NMW) and on the disused railway embankment, Cwrtyrangor, Aberystwyth SN592810 in 1993. It was a weed in a Strawberry field at Penllanlas, Llanfarian SN606771 in 1994 (SPC) - 1995, and at the edge of a mixed Pea and Barley crop at Penallt-y-gwin, Betws Ifan SN304464 in 1997 (NMW). It was on waste ground by the Ynys-las boatyard SN615932 in 2005 (SPC) - 2008 (SPC), on disturbed ground at Penrhyn-coch SN645841 in 2001 (SPC), and on waste ground by Trefechan Bridge, Aberystwyth SN58308133 in 2005. There thus is no evidence of decline and it may even be becoming more frequent.

**Noccaea caerulea** (J. Presl & C. Presl) F. K. Mey. (*Thlaspi caerulea* J. Presl & C. Presl, *T. alpestre* L., non Jacq.) - Alpine Penny-cress - Codywasg y Mwynfeydd

A plant of particular interest in the county because of its tolerance of heavy metal pollution, its fortunes here having been closely connected with those of the lead mines and their effect on the environment. Salter (1935) recorded it from the Afon Ystwyth from near its mouth c.SN5879 up to Pant Mawr SN607756, saying "This species is favoured by lead-washings and, I believe, has only appeared here within the past twenty years." The first record was from the "Banks of the River Ystwyth near Llan-y-chaiarn" SN57Z (NMW, CVBM, *BEC Rep.* 6: 751 (1923)), and Salter first saw it lower down the river in 1923 (Diary 15.4.1923). It was seen much further up the river at Felindyffryn SN651745 in 1982 (JPS), on the NE bank at Trawsgoed SN672725 in 1956, on the railway at Trawsgoed SN6672 in 1968 (ABS, JPS), and on the NE bank 450m below Pont Llanafan SN68257120 in 1978 (WMC), as well as at several sites in the lower stretches including just above the tidal limit SN5879 in 1960 (ABS, RFU). After the 1970s it decreased rapidly, probably because of a decrease in the heavy metal pollution and as a result of works to prevent erosion of the banks. Above Pant Mawr it was last seen, near Llanilar c.SN629752, in c.1987 (JPS), and lower down there was a small colony on a stone-built retaining wall on the E bank just below Llanfarian SN58907790 in 1992-2004 (SPC, who maintains plants from here in cultivation). At all these riverbank sites it grew in bare or only partially vegetated silt or gravel, usually among *Molinia* or *Luzula sylvatica*, or among stones, close to the river and within the flood zone. At the last Llanfarian site it also grew with a perhaps heavy metal resistant race of *Silene uniflora* and the metallophyte lichens *Absoconditella trivialis* and *Vezdaea leprosa* (SPC). These Ystwyth populations were studied by Ingrouille & Smirnoff (1986) (their "Llanrhystud" refers to Llanrhystud Road, i.e. Llanfarian SN57Y).





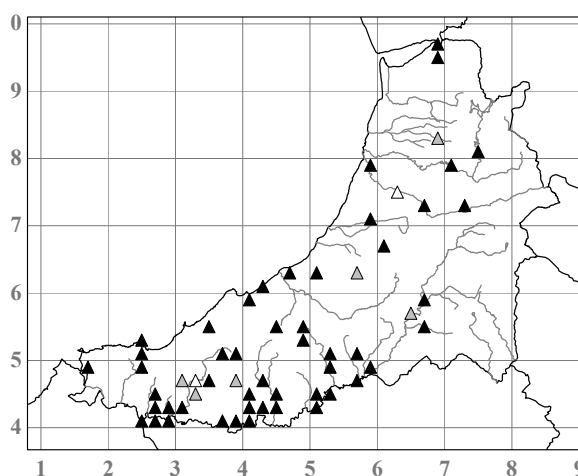
*Noccaea caerulescens* on Ystwyth bank below Pont Llanafan, Grogwynion mine on hillside in distance, view ENE from SN68257120, April 1979

Elsewhere it has been recorded with certainty only from bare areas by the stream at the Cwm Sebon (South Darren) lead mine SN685830 in c.1982 (JPS), from which it had disappeared by 1992. Reports of it at the Cwmerfyn SN701824, Cwmsymlog SN700838 and Goginan SN688817 mines (Baker 1974, Sellers & Baker 1988) remain unsubstantiated and it has certainly sometimes been confused with *Lepidium heterophyllum*. This Nationally Scarce species now appears to be extinct in the county; in view of its ecological requirements it is a moot point whether this is to be welcomed or deplored.

Marquand labelled his 1921 specimen “form approaching var. *occitana* Jord.”, but the species is extremely variable and infraspecific taxa are usually no longer recognised.

### ***Hesperis matronalis* L. - Dame's-violet - Croes yr Hwyr**

An occasional escape on roadside hedgebanks, waste and disturbed ground, graveyards, sand dunes, streambanks and woodland, usually near villages or gardens, and often persisting by old cottage sites. It usually forms quite dense colonies, and grows best in somewhat damp and shaded sites. It is very variable, the flowers being a wide range of colours from pink to purple, although white ones are rare. Occasional colonies of densely hispid plants are seen, as at Dihewid SN48645599, 1992. First recorded in Morgan (1849) from Castle Hill, Llanilar SN6274. Salter (1935) said that it “Occurs, but not commonly”, and gave no localities and mentioned it only once in his diary, so it has probably become commoner in recent decades. This is in contrast to the situation reported for Radnorshire (Woods 1993a). Native of Eurasia. Altitude limit 310m, roadside bank by house 500m SSW of Llyn Eiddwen SN60176630, 2008.



Native of Eurasia. Altitude limit 310m, roadside bank by house 500m SSW of Llyn Eiddwen SN60176630, 2008.



**Matthiola incana** (L.) W. T. Aiton -  
Hoary Stock - Murwyll Lledlwyd

First recorded naturalised in 1924 by Salter (Diary 14.9.1924) at Llangranog where it is still abundant on the roadside bank 100m up from the beach SN311541, 1994 (NMW, AOC & SPC) - 2004. The only other records are recent and also from coastal settlements: established on vegetated shingle at Borth SN608903-608891, 1993 (NMW) - 2004; casual by a wall by Aberystwyth harbour SN581814, 2000 (SPC); established by the old weigh-house at Aberaeron harbour SN454629, 1994; and established by the mouth of the Afon Arth SN478640, 1998.



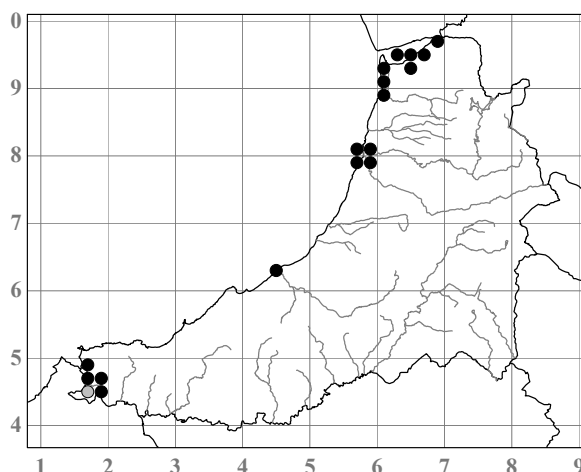
**Malcolmia maritima** (L.) W. T. Aiton -  
Virginia Stock - Murwyll Virginia

*Matthiola incana*, *Malva arborea*, *Erysimum cheiri* etc.,  
Llangranog, view NW from SN311541, May 2008

Although recorded by Salter (1935) as a "Garden escape or outcast. Frequent on rubbish heaps", he gave no localities and it has only once been reported since, as a pavement casual in Portland Street, Aberystwyth SN58308181 in 2006.

**Cochlearia atlantica** Pobed. (*C. anglica* auct., non L.) - (Atlantic Scurvygrass)

The salt marsh *Cochlearia* in the county has usually been recorded as *C. anglica* L., but differs from that species in having truncate or even slightly cordate, rather than cuneate, leaf bases and a less narrow septum in the fruit. Most of the salt marsh *Cochlearia* on the NW coast of Britain is similar, and in the opinion of T. C. G. Rich (pers. comm.) is best recorded as *C. atlantica* for the time being. *Cochlearia atlantica* may be a stabilised hybrid between *C. anglica* and *C. officinalis*; our plants certainly appear intermediate. They are frequent in the salt marshes of the Dyfi estuary SN612934-695976, 1682-2008; in the Rheidol estuary SN580811-585810, 1849 (Morgan 1849) - 2008 (NMW); in the Ystwyth estuary SN579806-581799, 1923 (Salter Diary 18.4.1923) - 2008; in Aberaeron harbour SN458628, 1981-2008; and in the Teifi estuary SN165485-187458, 1935 (Salter 1935) - 2008 (NMW).

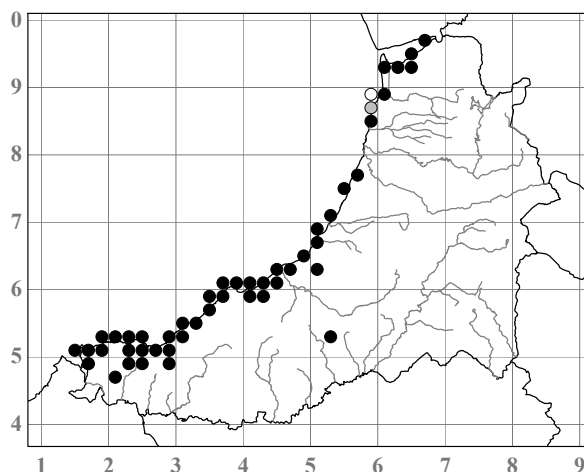


It was first recorded by Llwyd in 1682 as "*Cochlearia Britannica* Ger." (Chater 1983, 1984a) in the upper part of the Dyfi estuary. Above the SE side of Aberystwyth harbour on the grassy clifftop SN580808-581810, 1986-1994, it rather unusually replaced *C. officinalis*, but that population, along with the one in most of the harbour itself, has now gone since the Marina development in the mid 1990s.

**Cochlearia officinalis** L. - Common Scurvygrass - Llwylys Cyffredin

Abundant in many places along the coast where it grows on cliffs, steep grassy slopes, under Bracken and on walls and pathsides. It responds well to nitrification around seabird colonies, and is exceptionally abundant on Ynys Lochtyn SN3155, 2003, and on Cardigan Island SN1651, 1977.

It was first noticed on inland roadsides in the early 1970s, and the state of the two known colonies was detailed in Chater (1975). By the A478(T) at Blaenannerch SN255489 in 1975, 2.5km from the sea, there were scattered plants and one large patch, 5m long, along 190m of the N bank, and on the S bank there were two small patches 20m apart, and a large patch on a garden bank at Blaen-ffos 200m to the W. In 1990 the distribution was exactly the same, but there had been infilling so that on the N side there were now two patches 110m and 5m long, and on the S side one colony 25m long; the garden colony was still present. In

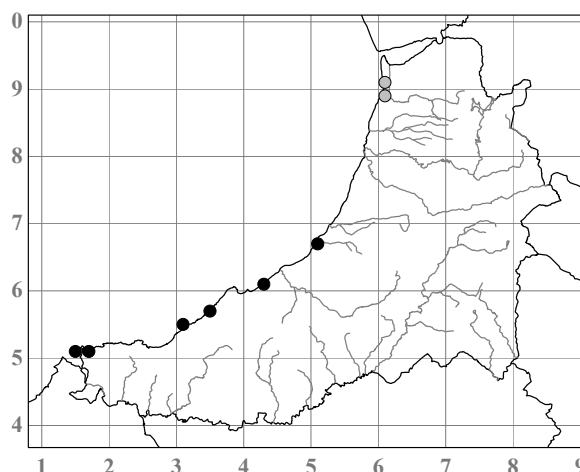


*Cochlearia officinalis* on the cliffs E of Aberporth, view E from SN265515, May 1983

2002 the patches on the N side were 138 and 10m long, and on the S side the colony was 56m long, with two single plants 10m to the W and two 10m to the E; the garden colony was gone. It is curious that the increase has been so contained within the bounds of the stretches occupied in 1975, and it has shown nothing like the rapid and recent spread of *C. danica*. In 1975 the only other inland plants were five in an area  $2 \times 2$  m on the slope of a recent roadside cutting by the same road at Bancywarren SN20504765, 3.5km from the sea. Since then, *C. officinalis* has been recorded from a further four sites more than 1km inland, all but one as single plants, on roadside banks by the B4337 near Temple Bar SN532536, 1996, by the B4577 near Pennant SN51506334, 1996, by the A487(T) near Llanarth SN42805806, 2002, and in a patch  $1 \times 0.5$  m on the SE bank of the A487(T) near Tan-y-groes SN292499, 1995.

#### *Cochlearia danica* × *officinalis*

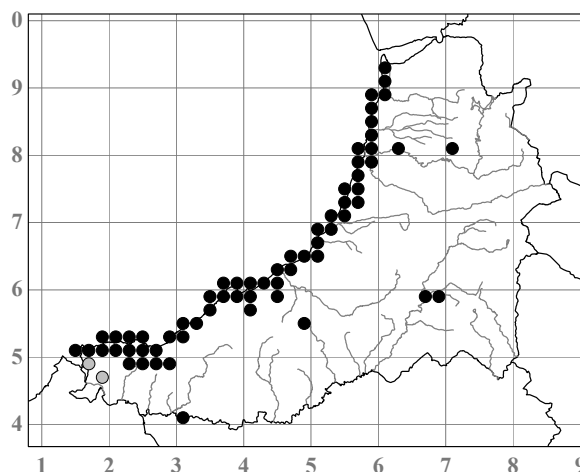
First recorded on the coast at Llangrannog SN309540, and in several places at Borth SN6089 and SN6090, in 1976 (JEH & AJS), this hybrid has since been found in eight other sites, growing with the parents on sea cliffs and banks by the sea. It sometimes occurs as single plants, for example on grassy sea cliffs below the Cliff Hotel, Gwbert SN15975005, 2004 (NMW, SDSB & AOC), where the pollen was 36% sterile, sometimes as many plants variably intermediate between the parents, for example along a bank at the mouth of the Afon Peris SN509674, 1992 (NMW). In a plant at Craig Caerllan SN356578, 2000, the pollen was 32% sterile.



#### *Cochlearia danica* L. - Danish Scurvygrass - Llwylys Denmarc

Common along the coast on sandy shingle, cliff ledges, screes, eroding edges on the clifftops, dry banks, waste ground, roadsides and disturbed areas. It is also often frequent under Bracken on the coastal slopes.

In 1726 the Revd Littleton Brown recorded it as "*Cochlearia marin. folio anguloso parvo* on ye walls of Tregaron church" (Druce & Vines 1907, Chater 1975); it is still there, SN680597, now confined to the tower, though in precariously small quantity. On the tower and sometimes the other walls of the church there were 35 plants in 1974, 2 in 1976, c.25 in 1991, 41 in 1992, 3 in 1996, 4 in 1997, 2 in 1998, 21 in 2002 and 21 in 2005. In 1973 the churchyard was cleared and reseeded, and in 1974 there were many thousands of plants among the new







*Cochlearia danica* on N wall of Tregaron church tower, SN679596, May 2002



*Cochlearia danica* on Tregaron church tower N wall SN679596, view SW, April 2008

grass seedlings, obviously from a massive and old seed bank in the soil derived from seed fallen from the tower. By 1976 it had almost completely gone from the ground, but when there is disturbance it sometimes reappears. How an annual with no obvious means of dispersing its seeds can have remained on the tower for 2½ centuries is a mystery. The site is 18km from the sea. Another instance of persistence is on a stone and earth wall at the S end of Antaron Avenue, Penparcau SN59257970, where Salter first noticed the plant in 1906 (Diary 25.2.1906); it is still there, although the wall is now very fragmentary and overgrown, and in 2007 there were c.130 plants along the 16m length where it grows. This site is 1.3km from the sea.

Away from the immediate coast it has shown a greater spread in recent years than almost any other native species. In several places it is spreading rapidly along roadside banks, especially on bends where the banks are shaved by the traffic or during cutting; for example, on the W bank of the A487(T) near Llanddeiniol SN551717, 750m from the sea, a patch 1m long first noticed in 1979 had extended to 40m by 1990, by 2004 many patches totalling c.400m extended for 1km southwards, and by 2006 it occurred interruptedly another 4.5km northwards to the Glan-rhos turning SN570749. Winter use of salt is unlikely to be relevant here, and anyway this is declining. As an oceanic temperate species, climate change and fewer frosts are presumably favouring it. These inland roadside colonies come into flower several weeks earlier than the coastal ones. At a long lay-by on the A44(T) W of Bwlch Nantyrarian SN711810, 13km inland, a few plants by a grit/salt bin in 2000 had by 2003 become an abundant colony along 100m of gravelly lay-by (SPC). On the pavements and walls in Aberystwyth town *C. danica* had greatly increased in abundance over



*Cochlearia danica*, Tregaron churchyard, SN679596, April 1974

*Cochlearia danica* on walltop where it was first seen by Salter in 1906, S end of Antaron Avenue, Penparcau, view N from SN59257970, March 1991







*Cochlearia danica* by the A487(T) at Tanrallt,  
Llan-non, view ENE from SN50806623, May 2006

the 25 years from 1973 to 1998 (Chater *et al.* 2000), and more recently it has continued to spread. Altitude limit 300m, Bwlch Nantyrarian SN711810, 2003 (SPC).

Varieties have not yet been properly studied, but var. **danica** seems the commonest, and is the one on Tregaron church. Many if not most of the early-flowering inland roadside colonies are var. **praecox** Le Jol. (var. *suberecta* McT. Cowan), and it is abundant at the edges of the Oak woodland on the sea cliffs at Penderi SN5573, 1997 (**ABS**, ADQA, det. AOC). The often biennial and occasionally even perennial plants around the Aberystwyth marina and on Trefechan Bridge SN582812, 2009, seem to be var. **agglomerata** McT. Cowan.

### **Iberis sempervirens** L. - Perennial Candytuft - Beryn Bytholwyrdd

Long-established, presumably originally planted specimens have been recorded on a grave mound in Ysbyty Cynfyn churchyard SN752791, 1984-2003, and in turf on top of a wartime pillbox by the A482 road just NW of Pont Stephen, Lampeter SN580477, 1994-2008. Native of the Mediterranean.

### **Iberis umbellata** L. - Garden Candytuft - Beryn yr Ardd

A rare casual, recorded from the Wstrws gravel pit SN385502, 1990 (AOC & APF) where many plants were growing on dumped soil; from a reseeded road verge at Pont Carfan SN666573, 1997 (**NMW**); and from river shingle at Ty'n-yr-helyg, Llanfarian SN595767, 1999 (SPC). Native of the Mediterranean.

## SANTALACEAE

### **Viscum album** L. - Mistletoe - Uchelwydd

Mistletoe has always been very rare in the county. Salter first saw it in 1924 (Diary 15.1.1924): "At Gogerddan [SN629836] saw two big clumps of Mistletoe, high up on a big poplar. I had no idea that it grew anywhere in this district." In 1926 (Diary 23.11.1926) he noted "Mistletoe at Gogerddan on lime as well as poplar", and in 1927 his son Ronald "pointed out that the Mistletoe by Gogerddan House is now established in two places on an oak" (see also Salter 1928b). In 1929 (Diary 19.10.1929) he wrote that "The big poplar which had the Mistletoe on it at Gogerddan has been cut down", and in his Flora (1935) he wrote that there was "still a little on Lime" there. A bush on presumably the same tree, of *Tilia ×europaea*, by the footbridge to the mansion, survived until at least 1985 (JL pers. comm. 1995).

The Gogerddan plants may perhaps have been native. All the other records either definitely or probably refer to planted bushes, and all are from Apple. Many people have probably successfully inoculated Apple trees in their gardens, as Salter did in 1930 at Fairview, Llanbadarn Fawr SN598810 (Diary 30.12.1930). A large bush was known on an old Apple at Trecefel, Tregaron SN668584 for several generations until the orchard was destroyed in the early 1960s (F. Evans pers. comm. 1996). A bush on an Apple in a garden at Llangorwen SN602837 in the 1960s probably originated, deliberately or accidentally, from the Gogerddan ones (JPS pers. comm. 2005). Thirteen bird-sown bushes in the Broncoed garden, Trawsgoed SN66577265, 2002, originated from two originally planted there (JPS pers. comm. 2002). There was a fine bush on an old Apple in a back garden near Gogerddan Cottages, Penglais, Aberystwyth c.SN589818, c.1983 (Palmer 1996 and pers. comm.). In 1992 there was a flourishing bush that had been grafted in 1987 onto an Apple in a garden by the Nant Howni bridge in Aber-porth SN25855133. In the NT walled garden at Llanerchaeron SN48036011 many seeds were sown on the old Apples and two had become established by 1996 and had developed into big bushes by 2005 when they were accidentally destroyed, by which time at least two bird-sown seedlings were developing (JPS pers. comm. 2005).

## FRANKENIACEAE

**Frankenia laevis** L. - Sea-heath - Grugeilun Llyfn

A plant forming a mat 50 × 25cm, self-sown from a nearby flowerbed, was on shingly waste ground at the S end of Borth beach SN60758890, 2007 (AOC & JPP). Native on the S and E coasts of Britain.

## TAMARICACEAE

**Tamarix gallica** L. - Tamarisk - Grugbren

Several ancient bushes of this ornamental, salt-tolerant shrub native of SW Europe survive as relics on the N and W slopes of the Aberystwyth castle grounds SN579819, 1992 (NMW) - 2008, as do several bushes by the track at the W end of Cribach Bay in the MoD site, Aber-porth SN250521, 1994 (NMW) - 2005. Several bushes are planted as street trees at the SE end of Maes Maelor, Penparcau SN590802, 2003. Salter (1935) mentioned “large old tamarisks at Llanina just above the beach” SN4059. Whether some of the bushes in the county are this species or *T. africana* L., which usually flowers on the previous year’s twigs in May-July and has wider racemes and larger petals, or even *T. parviflora* DC. is uncertain. *T. gallica* usually flowers on the new twigs in August-October, with narrower racemes and smaller petals, but the plants at Aberystwyth castle can flower in July and sometimes show all the characters of *T. africana*, and also in October when they can show all the characters of *T. gallica*.

## PLUMBAGINACEAE

[*Limonium vulgare* Mill. - Common Sea-lavender - Lafant y Mor

A 1950s field record at BRC from SN69 is assumed to be erroneous.]

[*Limonium humile* Mill. - Lax-flowered Sea-lavender - Lafant-y-mor Blodau Llac

A 1959 specimen from “Sandy mud, Borth” (ABS) was mislabelled as to the locality.]

**Limonium cambrense** (Ingr.) P. D. Sell ined. (*L. procerum* (C. E. Salmon) Ingr. subsp. *cambrense* Ingr.) - Welsh Sea-lavender

On visiting the *Limonium* site on the sea cliffs immediately W of the Cliff Hotel, Gwbert SN15995000 in 1994, PDS collected material growing with *L. transcanalis* there which he later identified as *L. cambrense* (CGE). In 2008 there were c.15 plants, growing mostly on the SW-facing cliff ledges and earthy slope, whereas the *L. transcanalis* was mostly on the S-facing cliff ledges and crevices. It is otherwise known only from limestone cliffs in Pembrokeshire.



*Limonium cambrense* below the Cliff Hotel, Gwbert SN15995000, July 2008

**Limonium transcanalis** (Ingr.) P. D. Sell ined. (*L. britannicum* Ingr. subsp. *transcanalis* Ingr.) - Western Sea-lavender

This member of the *L. binervosum* aggregate, confined to N Devon and SW Wales, was first found in the county in 1954, growing with *Crithmum* on the sea cliffs 400m N of the Cliff Hotel, Gwbert SN160505 (NMW, det. AOC), and was collected again in 1963 (NMW, TAWD, det. AOC); the colony was small and had disappeared by 1979 probably because of erosion of the cliff. In 1975 a large colony c.30 × 15m with at least 200 plants was found on a SE facing sloping cliff 1.2km N of the Hotel at SN16175119, 1975 (CWH) - 2008. In 1987 another colony was found on the cliffs immediately W of the Hotel SN15995000, (NMW, JRA



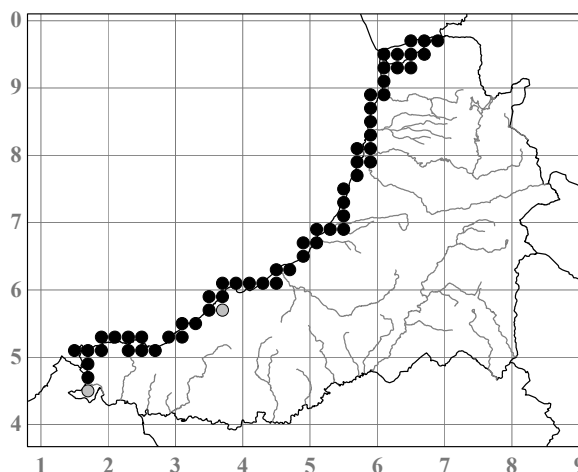


*Limonium transcanalis* 1.2km N  
of the Cliff Hotel, Gwbert  
SN16175119, July 2008

*et al.*); there were *c.*40 flowering plants here in 2008 in an area  $10 \times 1\text{-}2\text{m}$ , along with many non-flowering. The 1987 collection was determined by M. J. Ingrouille, with reservations, as the above taxon; although the leaves were atypical, the plants were reminiscent of specimens of *L. transcanalis* in Pembrokeshire, and “certainly this is the closest taxon.” PDS collected material (CGE) from both sites in 1994 and confirmed that it was *L. transcanalis*, although *L. cambrense* was present too at the Hotel site.

### ***Armeria maritima* (Mill.) Willd. - Thrift - Clustog Fair (Pinc y Mor)**

Abundant all along the coast where there are suitable habitats such as salt marshes, level sandy ground, field banks and grassy and rocky cliff slopes where it is often spectacular in flower, as it was for example on Allt Wen SN577796 in 1985, or on Foel y Mwnt SN193520 in 1994 etc. The earliest record is by Gough (1789) “On maritime and alpine meadows and rocks, near Aberystwyth”. Flower colour is very variable and very deep pink flowers occasionally occur along with the normal pink, as at Penyrangor, Aberystwyth SN580807, 1993-2008; white flowers have been noted only at this site and on Ynys Lochlyn SN314556, 2008 (JPP & AOC). There is often a partial second flowering in October. Away from the sea it grows on the top of Pendinas SN584803, at 120m altitude, 2003, and on top of Y Foel, Llanrhystud SN541693, at 100m altitude and 1.2km inland, 1997-2006 (SPC). In 1990 a clump was seen on railway ballast *c.*1km inland at Aberystwyth *c.*SN591810 (SPC). Salter (1901) said that as well as the sea cliffs, it grew “further inland only on railway ballast or refuse from the lead mines”, but as he made no other references to this, and did not refer to it in his Flora, perhaps he felt that he had been in error. Intraspecific taxa have not been investigated.



## **POLYGONACEAE**

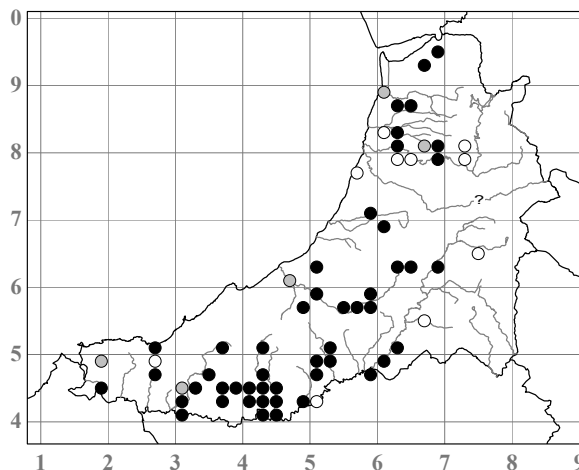
### ***Persicaria campanulata* (Hook. f.) Ronse Decr. (*Polygonum campanulatum* Hook. f.) - Lesser Knotweed - Y Ganwraidd Fach**

First recorded as naturalised in Britain in 1933 in Warwickshire, and in Wales in 1938 in Glamorgan (Conolly 1977). It was first seen in Cardiganshire in 1961 when a colony  $c.2 \times 2\text{m}$  was found in a Bramble thicket by the stream at Llanafan SN687724 (**LTR**, **NMW**, **APC** & **AOC**); this had been destroyed by 1976. The species has been found naturalised in only eight other sites: a colony  $c.1 \times 1\text{m}$  on the bank of the Afon Leri in the wooded gorge 1km N of Elerch SN68178751, 1990 (**LTR**, **NMW**); a colony  $3 \times 2\text{m}$  on a minor road verge at Penpompren, Ty'n-y-graig SN69486867, 1993 (**NMW**, **AOC** & **LRG**); a colony on a minor road verge at the entrance to Faenog Isaf, Mydroilyn SN468560, 2007; planted and naturalised by a pond at Llety'r-cymro, 2.5km S of Cwmtudu SN354550, 1998 (**LRG**); a colony  $12 \times 12\text{m}$  in the wooded Penglais dingle, Aberystwyth SN59348200, 2004, probably derived from a throw-out from the adjacent University Botany Gardens; a small colony among Gorse bushes on the Afon Bedw bank 300m SE of Blaenbedw Fawr SN36955157, 2008; and a small colony in scrub just NE of Gwenlli churchyard SN39265350, 2005 (**NMW**). A colony in scrub by a garden by the disused railway at Abermachnog, Bangor Teifi SN37404030, 2002 (**NMW**) with deep pink flowers RHS63B is probably ‘**Rosenrot**’. Native of the Himalaya and W China.



**Persicaria bistorta** (L.) Samp. (*Polygonum bistorta* L.) - Common Bistort - Llysiau'r Neidr

An occasional plant, almost always on roadside verges or banks, but also in a few graveyards, and only rarely in marshy pastures, woodland or on river banks. Although the map shows all records as native, it may perhaps be so only in a few of the latter habitats, for example in poor fen by the Afon Hirwaun 120m N of Glanrhyd SN268471, 1995, and in marshy hollows by the Afon Cwercyr 1.3km N of Penrhiw-llan SN36954332, 1999, where it grows with *Lysimachia nummularia*. In at least one other native-looking site though, in damp woodland by the Afon Teifi at Allt Craig-lantern, Rhuddlan SN495429, 2000 (NMW), it cannot be native as the colony is of 'Superbum'. This cultivar is also naturalised on a roadside verge at Pennant SN511629, 1997 (AOC & JPW), and may well be elsewhere. The earliest localised record of the species is from Monachty c.SN504620 in 1938 (BIRM, MMA), and it has not been seen higher than 270m, in the chapel graveyard at Trefenter SN606686, 1998.

**Persicaria affinis** (D. Don) Ronse Decr. - Himalayan Bistort

A colony c.1m in diameter, among *Molinia*-dominated vegetation on a streambank at Pen-bont Rhydybeddau SN67878360, clearly derived from a throw-out from a nearby garden and persisted at least from 1992 until 2001. A smaller colony was growing vigorously on dumped rubble in a marshy field below Coed Tan-yr-allt, 2km E of Tregaron SN701594, in 2000 (AOC & RM). Native of the Himalaya.

**Persicaria amplexicaulis** (D. Don) Ronse Decr. - Red Bistort - Y Ganwraidd Goch

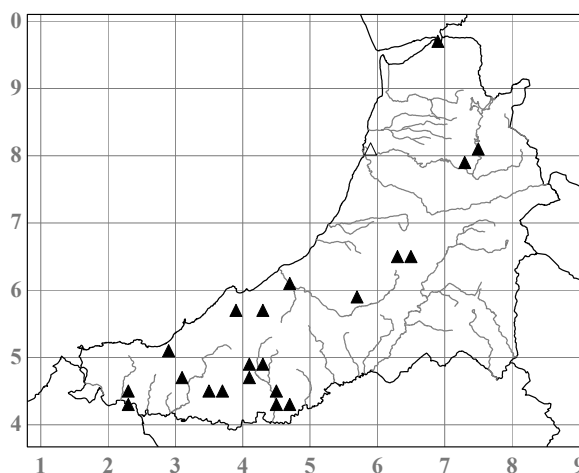
Recorded naturalised only four times, on the verge of Clarach Road, Upper Borth SN607889 in 1997 (JEH, conf. AJS); by the drive verge near Upper Lodge, Hafod SN77017381, 2005 (AOC & PAS); on an old garden site behind Capel Salem, Brongest SN324450 in 1997 (NMW); and in a field hedge at Gwelfro, Pennant SN513638, 2007 (FN). Native of the Himalaya.

**Persicaria capitata** (Buch.-Ham. ex D. Don) H. Gross - Pink-headed Persicaria

Recorded so far only as a casual pavement weed in the three main towns: in Trefechan Road, Aberystwyth SN58288115 in 2003 (RAJ), probably derived from hanging flower-baskets sold nearby; on the Lampeter University campus SN57994830 in 2005 (RAJ); and in Aberystwyth Road, Cardigan SN184466, 2008. Native of Asia.

**Persicaria wallichii** Greuter & Burdet (*Polygonum polystachyum* Wall. ex Meisn.) - Himalayan Knotweed - Y Ganwraidd Himalaiaidd

First recorded naturalised in Britain in 1917 in Devon and Lincolnshire, and in Wales in 1921 in Merioneth. The first Cardiganshire record is a 1936 Salter specimen labelled "Established alien - Lampeter" c.SN54U (NMW); this is var. **pubescens** Greuter & Burdet which was next recorded in 1941 well-naturalised on waste ground at Tresaith (NMW, JAW, Whellan 1942) where it is still present at SN280514, 2005. Since then about 25 naturalised colonies have been found, mostly of var. *pubescens* and mostly on roadside verges and hedgebanks, on waste ground and in scrub. Var. **wallichii** has been only occasionally recorded, in a roadside hedge and paddock at Pengelli, Croesffordd-ty'n-celyn SN643640, 1976 (NMW); on the road verge opposite the George

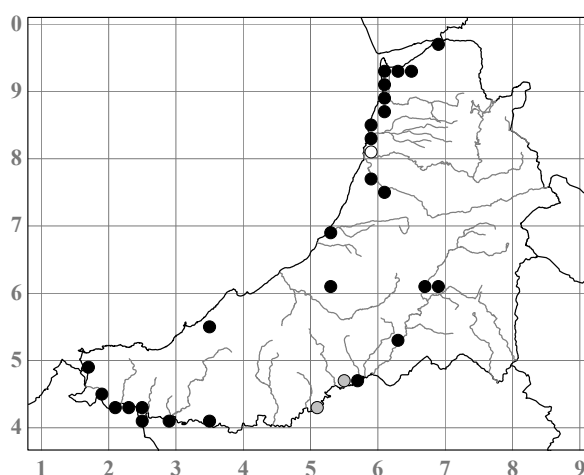


*Persicaria wallichii* invading wet heath, Blaen Cribor, view WSW from SN40444839, September 2009

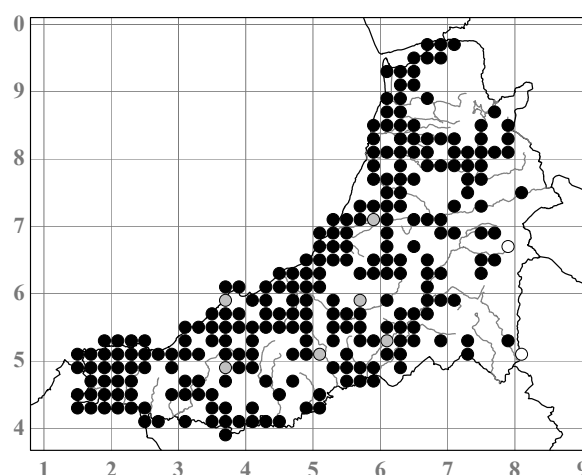
Borrow Hotel, Ponterwyd SN746806, 1976 (NMW) - 2006; and on the W side of the main road in Llanarth SN422576, 1980 (NMW) - 2006. Altitude limit 305m, big colony in layby and field 150m SE of Penrhiw-gaer, Ystumtuen SN726789, 2001, but gone by 2008. Native of the Himalaya.

***Persicaria amphibia*** (L.) Delarbre (*Polygonum amphibium* L.) - Amphibious Bistort - Canwraidd y Dŵr

An occasional plant of ditches, ponds, oxbows, swamps and marshy pastures in the lowlands. It is especially characteristic of damp hollows in pastures on the floodplain of the lower Teifi, and also occurs in brackish marshes by the Dyfi and Teifi estuaries, at Clarach SN587840, 1849 (Morgan 1849) - 2008, and behind the beach S of Llanrhystud SN522687, 1995-2004, where it often grows amongst *Phragmites*. Both the aquatic and terrestrial forms occur, the latter often developing in abundance from the former on mud deposited alongside ditches during clearance operations, and sometimes surviving for long periods in dry habitats, for example on shingly waste ground at Clarach SN58728399, 1984-2006 (AOC; SPC).



*Persicaria amphibia*



*Persicaria maculosa*

***Persicaria maculosa*** Gray (*Polygonum persicaria* L.) - Redshank - Y Ganwraidd Goesgoch (Llysiau'r Dom, Llysiau'r Gaseg, Erw Goch)

A common weed of arable fields, gardens, waste and disturbed ground, tips, farmyards, poached pastures and field gateways, road verges, river banks and shingle. It can be spectacularly dominant in ploughed or reseeded pastures, as for example at Cae'r-ochr, Bontnewydd SN623657 in 1989 when a 1ha field was red with it. Altitude limit 435m, garden plot, Llyn Hir SN790679 (Salter 1935); (var. *maculosa*) 490m, waste ground, Nant Nod lead mine, Pumlumon SN791839, 2009.

Three distinctive varieties can be recognised. Var. **biformis** (Fr.) P. D. Sell ined. (var. *elata*), large, erect plants with erect branches, is a weed of root and vegetable crops such as Turnips, for example at Waungelod, Gwbert SN168489, 2001 (NMW) and Cabbages, for example in Charlie's Field, Llanina SN403596, 1994 (NMW), but is also frequent on waste ground and reseeded areas, for example by Ysgol Penweddig, Aberystwyth SN595812, 2001 (NMW). Var. **ruderalis** (Salisb.) P. D. Sell ined., small, much-branched, prostrate or low-growing plants with small leaves, is characteristic of river shingle, for example in many places along the Afon Teifi including Llandysul SN420404, 2001 (NMW), and at the mouth of the Afon Wyre SN527697, 2001 (NMW); it also occurs in muddy hollows in such areas as the Teifi floodplain, in damp hollows in the Penparc sand quarries SN201486, 2005 (NMW), and on stony waste ground, for

example by the Aberystwyth gasworks SN594809, 2002 (NMW). Var. **maculosa**, medium-sized, more or less erect plants with spreading branches, occurs in a wide variety of habitats including those of the other varieties.

A single plant with densely glandular pedicels, from strip cultivation of Barley and Potatoes at Ty-gwyn, Mwnt SN198520, 1988 (NMW), originally determined as *P. pennsylvanica*, appears to be subsp. **hirticaulis** (Danser) S. Ekman & Knutsson.

**Persicaria ×intercedens** (Beck) Soják (*P. hydropiper* × *maculosa*)

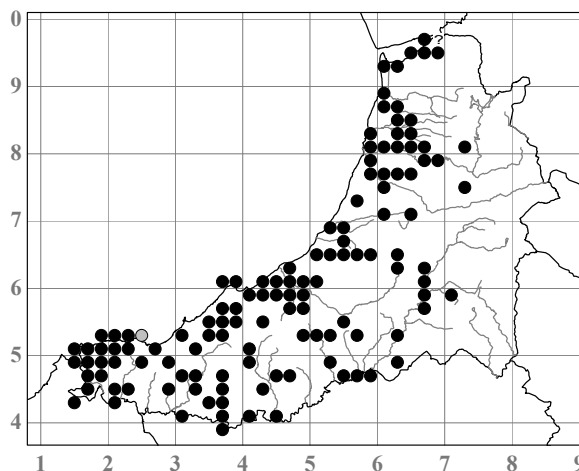
Only once identified, growing with the parents in a paddock by outbuildings at Cymerau Farm, Glandyfi SN69829612 in 1998 (NMW, AOC & JPW, conf. JRA), but possibly overlooked elsewhere.

**Persicaria lapathifolia** (L.) Gray *sens. lat.* - Pale Persicaria - Canwraidd y Dom

A frequent weed of arable fields, gardens, waste ground and tips, and in disturbed places such as building sites. Two segregate species are sometimes recognised and both are widespread in the county.

**P. lapathifolia** (L.) Gray itself (*Polygonum lapathifolium* L., *P. nodosum* Pers.), with dingy pink flowers, is the less common, but it is still surprising that when Salter (1935) cited Ley as recording “*P. maculatum* Trim. and Dyer (*P. nodosum* Pers.) Glandular Persicaria”, presumably this segregate, from the Glandyfi marshes c.SN69Y, he said that he had searched for it himself in the county but not found it (he described “*P. Lapathifolium* L. Pale Persicaria”, presumably the other segregate, as being as common as *Persicaria maculosa*). A *flore pleno* form was found on the disused rubbish-tip below Pendinas SN584799 in 2001 (NMW, AOC, RAJ & PJW).

**P. pallida** (With.) Opiz (*Polygonum pallidum* With.), with greenish-white flowers, is the commoner segregate. The two often grow together and seem to have the same ecology and distribution. Both have been sown for bird-food by the RSPB at Ynys-hir SN668957, 2007. Altitude limit (*P. pallida*) 300m, Cabbage/Turnip field 1.5km SW of Devil’s Bridge SN730759, 1995.

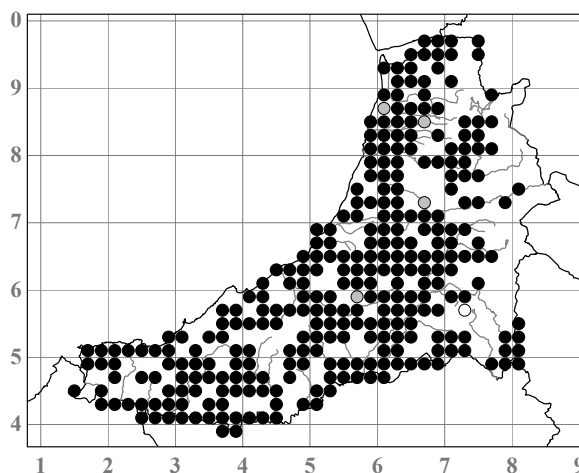


[*Persicaria pennsylvanica* (L.) M. Gómez - Pinkweed - Y Ganwraidd Rosliw

A single plant considered to be this North American species, collected from strip cultivation of Barley and Potatoes at Ty-gwyn, Mwnt SN198520 in 1988 (NMW, conf. JRA & DHK), is now believed to be *P. maculosa* subsp. *hirticaulis*.]

**Persicaria hydropiper** (L.) Delarbre (*Polygonum hydropiper* L.) - Water-pepper - Y Dinboeth

A common plant of marshy pastures, ditches, swamps, river banks and shingle, pond margins, damp waste and disturbed ground and arable fields. It generally favours open, disturbed or periodically flooded habitats, and is especially characteristic of wet hollows in pastures in the flood zone of rivers, and is often dominant in the draw-down zone of reservoirs. It can grow as a submerged aquatic (*Polygonum hydropiper* forma **submersum** Glück), and in the Afon Teifi, for example in Cors Caron SN686630-671613, 1994-2006 (NMW, AOC & JPP), and below Lampeter SN553463, 1989, and in the Afon Ystwyth, for example at Pont Tanycastell SN589788, 2006 (AOC & SDSB), it often forms a line of plants along the middle of the channel in water up to 1.5m deep; these plants seem not to develop terminal inflorescences, but the cleistogamous flowers in the leaf axils develop good seeds. The species is genetically extremely variable, and many different

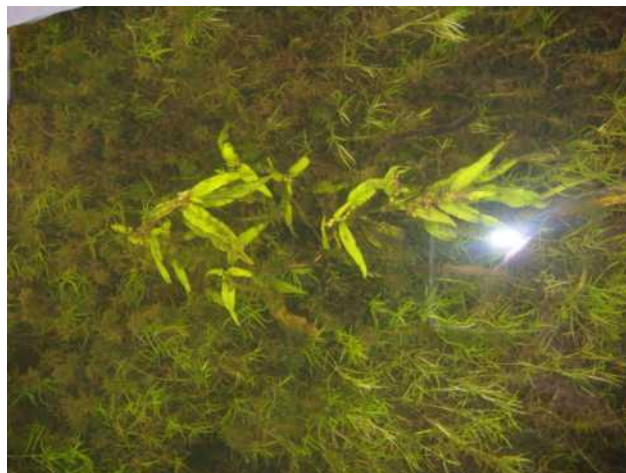




forms can often be seen growing together, most easily in river shingle communities, for example on the Teifi at Bangor Teifi SN374401, 2002 (NMW). Altitude limit 440m, Garreg Lwyd SN7356 (Salter in Wade 1952); 505m, rocky shore of Llyn Crugnant SN754612, 1989.

**Persicaria mitis** (Schränk) Assenov (*Polygonum mite* Schränk) - Tasteless Water-pepper - Y Dinboeth Ddi-flas

The only record is by Salter, who collected it at the pool by the railway on the floodplain of the Afon Teifi at Abermachnog, Bangor Teifi SN37484026 in 1930 (NMW, conf. DAWe & AOC), but it has not been refound in spite of repeated searches.



*Persicaria hydropiper* forma *submersum* in the Teifi above Pont Einon, SN671613, October 2007

**Persicaria minor** (Huds.) Opiz (*Polygonum minus* Huds.) - Small Water-pepper - Y Dinboeth Fach

Recorded by J. Ball in 1849 (*Botanical gazette (London)* 1: 108 (1849)) as “collected about Aberystwyth”, but it is difficult to judge the validity of this. It was then reliably recorded in 1887 “On the Teifi above Tregaron” (BIRM, AL), but then not again until 1994 when it was refound in the same area on Cors Caron, growing on poached muddy and gravelly ground where a track crosses a small stream 400m NW of Maesllyn farm SN689634 (NMW, conf. JRA). It is now known to occur in other similar habitats, as well as on the muddy margins of lagoons and pools, by the Afon Teifi here from SN697644 down to SN672614, 1998-2005.

**Fagopyrum esculentum** Moench - Buckwheat - Gwenith yr Hydd

Buckwheat, native of Asia, was formerly grown in the county for the grain, and as a weed-suppressant which was ploughed in before Wheat was sown. An early reference of 1326 in the *Black book of St. David's* (Willis-Bund 1902) required Buckwheat to be sown at 4 bushels an acre in the Lord's demesne at Llandygwydd c.SN24L. Moore & Chater (1969b) recorded its pollen in peat of about this period at Blaenyresgair SN648661. Lloyd & Turnor (1894) wrote that “To the north of the River Aeron, between the uplands and the sea, buck wheat is commonly cultivated.” Richard Colt Hoare (Thompson 1983) on travelling out of the county by road via Cwm Ystwyth on 1 September 1796 recorded “Roads good but hilly. Lands cultivated. Buckwheat used as a manure by ploughing it in.” Davies (1815) wrote that “It is far from being a common crop, though here and there to be met with ...”, and in the list of premiums offered in 1813 by the county agricultural society that he quotes, the one for Buckwheat is just for its use as manure, and none had been given the previous year. Its cultivation seems to have died out during the 19<sup>th</sup> century, and Salter (1935) said that it was “of casual occurrence, usually where mixed corn for feeding fowls or game has been scattered.” However, in 1936 (Diary 15.8.1936) he records seeing somewhere near Furnace c.SN69X “A small field of Buckwheat grown for pheasants.” There is an unlocalised 1958 record of it from SN15 at BRC (PCH), presumably as a casual. Apart from its cultivation as a constituent of a bird-seed crop by the RSPB at Ynys-hir SN672961 in 2006-2007 (NMW), the only recent record is of six plants on a reseeded floodbank by the Glanyrafon Industrial Estate SN61408047 in 2002 (NMW); these latter plants were unusually large, 70cm tall, with perianths 4.5-5mm and achenes 8-9.5mm.

**Polygonum** L.

The taxonomy of the *P. aviculare* group in Stace (2010) does not at all satisfactorily reflect the distinctive variation of the next 13 entries. I attempted to use the taxonomy of Karlsson (2000), and a small collection of specimens from the county was named by him in 2001, but this too proved unworkable here. A draft of the account by Sell & Murrell (in press) was much more workable, and about 90 specimens from the county were named by Sell in 2003. Their draft is followed here, although I suspect that *P. chamaechyton* and *P. polycnemiforme* may each merit splitting into two or even three species. Karlsson tended to put more emphasis on floral characters, while Sell & Murrell put more on vegetative ones and habit. The breeding systems and cytology of the taxa are imperfectly known, but the plants are mostly if not always self-pollinated. Two or more of the species often grow together, and all tend to be plants of open communities in disturbed, unshaded, usually dry sites. The abundance of the different species varies greatly from year to year, and *P. micro-*

*spermum* and *P. parvulum* in particular are in some years virtually absent. Preston *et al.* (2004) consider *P. arenastrum* to be an archaeophyte, and it is probable that most of the other species should be as well.

[*Polygonum maritimum* L. - Sea Knotgrass - Canclwm yr Arfor

A record from “Borth - Clarach” by Morgan (1849) almost certainly refers to *P. raii*, and see under that species for a record by Lees.]

**Polygonum raii** Bab. (*P. oxyspermum* subsp. *raii* (Bab.) D. A. Webb & Chater) - Ray's Knotgrass - Canclwm Ray

Known only from a few sites on coastal sandy shingle, sometimes abundant, but unpredictable in its occurrence probably largely because of shingle movement by storms. It was recorded from Clarach beach SN5883 in 1854 (K, Herb. Watson, MMA, det. AOC), in 1887-1891 (AHC, Salter Diary 24.11.1894) and again in 1918 (NMW, TS, det. BTS), but there are no subsequent records from there. At Ynys-las SN69B it was recorded as occasional by Savidge (1973) and has been seen at c.SN605935 1990-1994, some years in abundance. At Borth c.160 plants were seen along the top of the beach from SN607911-607904 in 2000.

“*P. maritimum*” was recorded from the vicinity of Aberystwyth by Lees (1841) but his 1836 specimen from here was *P. raii* (BM, det. BTS), and *P. raii* was again recorded here in 1891 (BM, WHP, det. BTS). This may well have been at Tan-y-bwlch Beach c.SN580800 where it was recorded by Salter (1935), and where one very large plant was seen on the shingle slope behind the beach in 1963 (NMW) after some eight years of careful searching. It was then seen annually at SN58028007 until 1968, and then not again until 1987 after riverbank strengthening works had disturbed the slope and many plants appeared by the edge of the river at SN58038002. A few appeared here each year until 1990, and then after a gap of a year several appeared in 1992 in sand on top of the beach a little to the S at SN58018001, increasing to c.190 plants and spreading to SN57987990 and 57998001 by 1996; it has remained in good quantity around here, as well as on sand blown onto the pasture below, 2008. In 1987 several plants appeared on shingle 300m up the river from these sites just above the tidal limit SN58307986 (APF) and were there again in 1990.

The only other site for it was at Traeth y Mwnt SN194519, where two plants were seen in 1996.

### **Polygonum littorale** Link

Prostrate plants with long internodes, heterophyllous and with fairly large, elliptical or obovate leaves, largely confined to coastal beaches where it grows on sandy shingle. It has been found in this habitat at Borth SN60799067, 2003 (NMW), at Clarach SN58718400 (NMW, conf. PDS) and SN587839 (NMW), and at Penbryn SN293524, 2002 (NMW, det. PDS). Other records, probably introductions, are from a trackside through the IGER trial plots 400m W of Plas Gogerddan SN625836, 2002 (NMW, det. PDS), and from Morfa Mawr farmyard, Llan-non SN50296570, 2003 (NMW).

### **Polygonum denudatum** (Desv.) Boreau

More or less prostrate plants with long internodes and narrow leaves, but largely leafless, apparently rare and found only on a few stony tracks, in Llanbadarn Fawr churchyard SN59908108, 2002, along a pasture 800m WSW of Ynys Edwin, Eglwys Fach SN67089570, 2002, and through the IGER trial plots 400m W of Plas

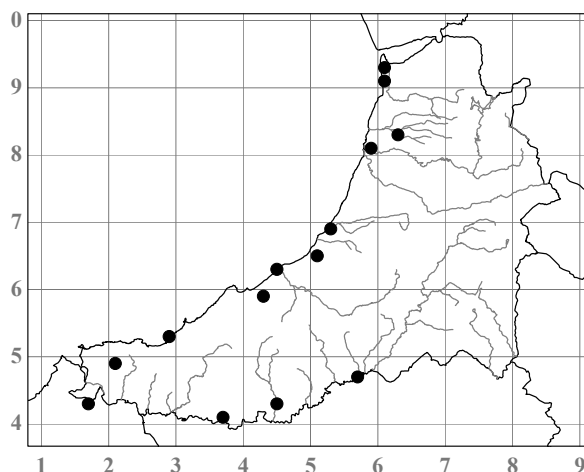


*Polygonum raii*, Tan-y-bwlch beach,  
Aberystwyth, view W from  
SN58028005, September 2006

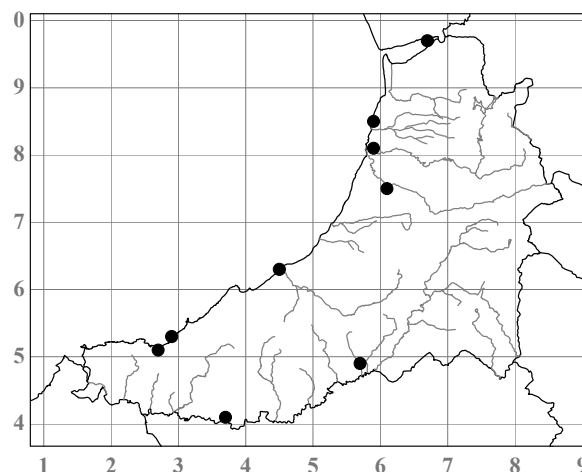
Gogerddan SN625836, 2002 (all NMW, det. PDS). It was also found on shingly waste ground at the top of the sea beach at Aberaeron SN457632, 2003 (NMW).

***Polygonum chamaechyton* P. D. Sell ined.**

Prostrate plants with long internodes, heterophyllous and with fairly large, narrowly elliptical leaves, widespread and common in arable fields, on waste ground and tracksides, often on river shingle or at the top of sea beaches. It often forms dense swards at the edges of arable fields, and is the most variable of the segregates especially in the size and shape of the leaves.



*Polygonum chamaechyton*



*Polygonum microspermum*

***Polygonum microspermum* Jord. ex Boreau**

Prostrate plants with long internodes and small, narrow leaves, previously usually identified as *P. arenastrum*. It is uncommon and occurs mostly on sandy ground by the sea, for example by the stream mouth at Clarach SN587840, 2003, and in a similar situation at Penbryn SN293524, 2002 (NMW, det. PDS); on river shingle, for example by the Ystwyth at Pen-y-banc Bridge, Llanilar SN619757, 2002 (NMW, det. PDS), and by the Teifi at Bangor Teifi SN374401, 2002 (NMW, conf. PDS); and on tracksides, gravelly waste ground and car parking areas.

***Polygonum calcatum* Lindm.**

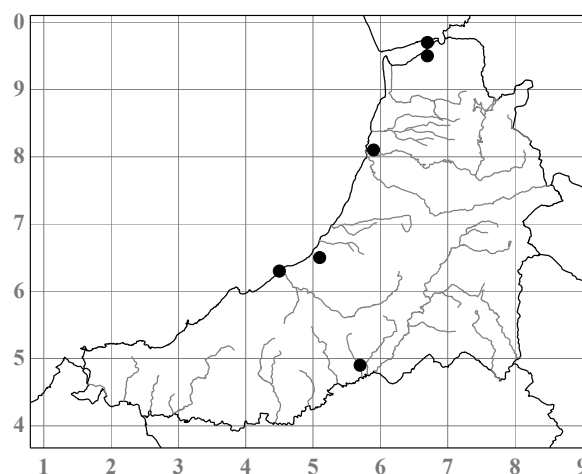
Material from a shaly track through pastures 1km W of Ynys-hir Farm, Eglwys Fach SN671957, 2002 (NMW) was considered by PDS to be a close match with a Lindman Scandinavian specimen of this species, and with the illustration of *P. microspermum* in Karlsson (2000) of which Karlsson has *P. calcatum* as a synonym.

***Polygonum parvulum* (Moss) P. D. Sell ined.**

Prostrate plants with short internodes and very small, narrow leaves, previously usually identified as *P. arenastrum*. An uncommon plant recorded from six sites, on stony tracks, for example along the top of Aberaeron beach SN458633, 2001 (NMW, conf. PDS), and on gravelly car parking areas, for example by the Llanbadarn Fawr church hall SN59888118, 2001 (NMW, conf. PDS).

***Polygonum arenastrum* Boreau (*P. aequale* auct.) - Equal-leaved Knotgrass - Y Canclwm Manddail**

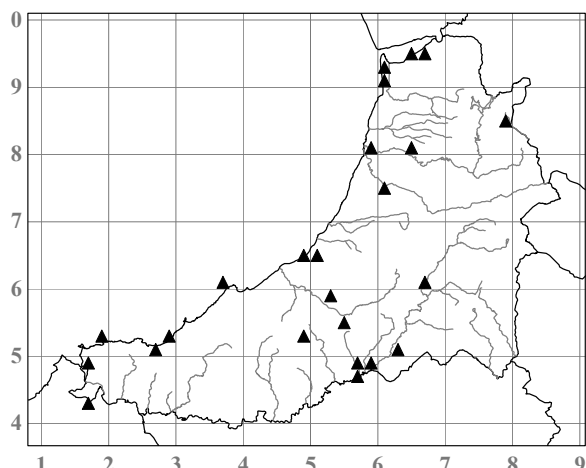
Completely prostrate plants with short internodes and medium-sized leaves all more or less the same size, widespread and common on paths and tracks, in field entrances, farmyards, on parking places and gravelly waste ground. It is almost always on compacted, trodden ground in a more or less open community, but does



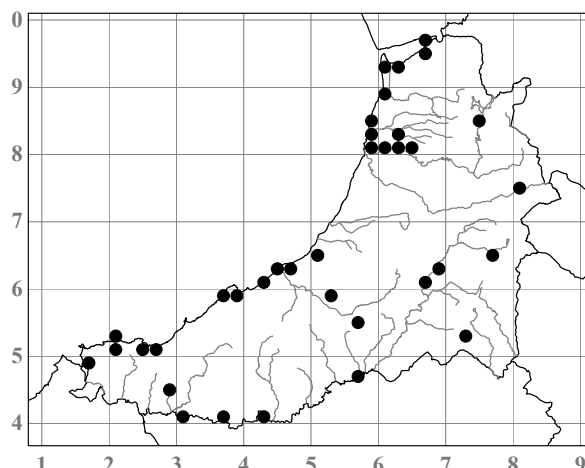
*Polygonum parvulum*



also occasionally occur on river shingle and on sandy shingle at the top of beaches. Altitude limit 460m, shaly track 500m NNW of Eisteddfa Gurig SN794844, 2002.



*Polygonum arenastrum*



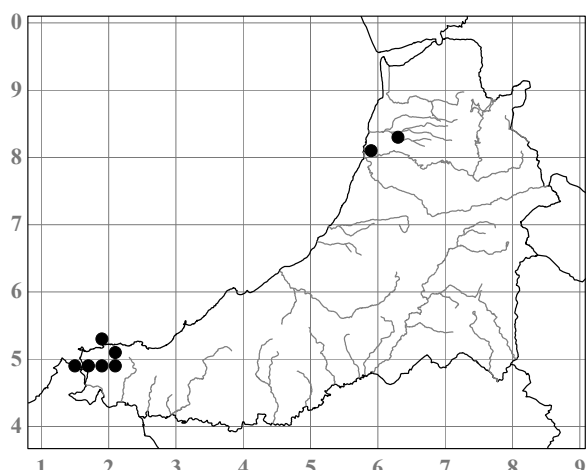
*Polygonum polycnemiforme*

### ***Polygonum polycnemiforme* (Lecoq & Lamotte) Boreau**

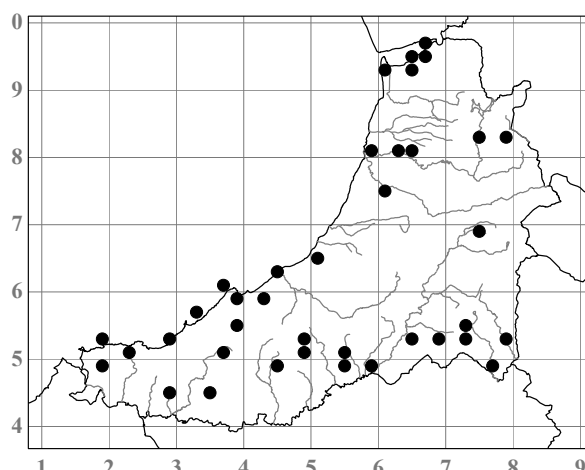
Prostrate plants but with the stems ascending and rather densely leafy towards the apex, only slightly heterophyllous and with persistent, oblong or elliptical leaves. It is perhaps the commonest of the segregates, and was previously usually identified as *P. arenastrum*. Its main habitats are waste ground, tracksides, road verges and disturbed places, but it is also often in more natural habitats such as muddy hollows by rivers, for example on the Teifi floodplain at Newcastle Emlyn SN311405, 2002 (NMW, det. PDS), and on grassy river shingle, for example by the Teifi at Llandysul SN420404, 2002 (NMW, conf. PDS). It is much less common than *P. aviculare* and *P. chamaechyton* in arable fields, and is very variable. Altitude limit 360m, road verge, Lle'r-neuaddau, Pumlumon SN759850, 2005 (AOC & PAS).

### ***Polygonum rurivagum* Jord. ex Boreau - Cornfield Knotgrass - Cancellwm y Tir Âr**

Erect plants with very narrow and fairly long leaves, uncommon but often in abundance in arable fields, and also on waste ground, tracksides and sandy places. Most of the records are from the arable fields near the coast in the SW of the county, for example at Llwnysgaw, Felin-wynt SN219515, 2001 (NMW, AOC & CDP, conf. PDS), at Ty-gwyn, Mwnt SN197521, 2003, and at Nantferwig SN16874828, 2002 (NMW, conf. PDS), but it is also widespread in the IGER arable fields, Gogerddan SN625836, 2002 (NMW, conf. PDS).



*Polygonum rurivagum*



*Polygonum agrestinum*

### ***Polygonum agrestinum* Jord. ex Boreau**

Erect or ascending plants with small, elliptical leaves, widespread and often very abundant in or at the edges of arable fields and along road verges where they often form a fringe between the grassy part and the tarmac. It is also common on waste ground, especially on shaly or gravelly substrates. Altitude limit 490m, waste ground, Nant Nod lead mine, Pumlumon SN491839, 2009.

**Polygonum aviculare** L. - Knotgrass - Y Canclwm

Erect or ascending plants, moderately heterophyllous and with fairly large and broad leaves, fairly common in arable fields, on road verges and waste ground, in farmyards and around manure heaps, but not one of the most abundant of the segregates. Altitude limit 440m, road verge in conifer forest, Bryn-rhyd, 3.5km SE of Llanddewi-Brefi SN68325209, 2003.

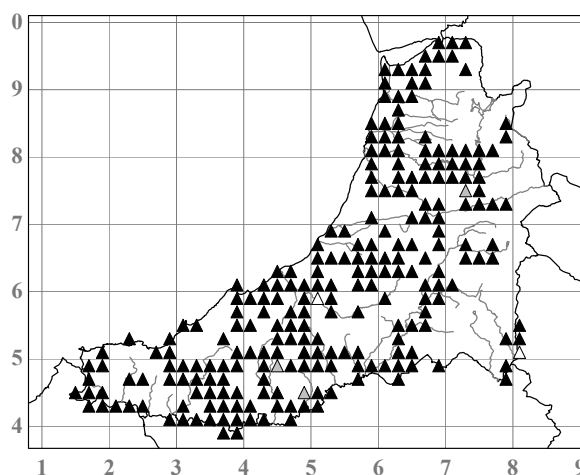
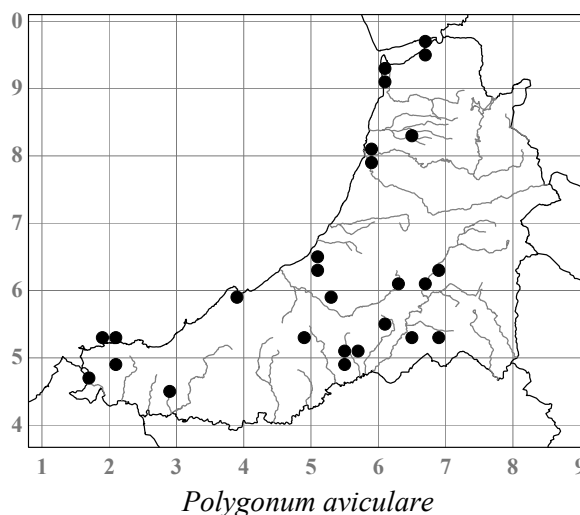
**Polygonum monspeliense** Pers.

Erect plants with very large, broad and strongly heterophyllous leaves, probably introduced from Europe. It was found in a Fodder Beet crop at Pentwd-uchaf, Cardigan SN17264398, 2002 (NMW, AOC & MDS, det. PDS), and very similar plants were found on the reseeded verge of the A487(T) road at Lovesgrove SN632811, 2003 (NMW). Other plants, perhaps this species or possibly very robust *P. aviculare*, were found in a barley field 600m N of Llwynysgaw. Felin-wynt SN21605190, 2001 (NMW) and in weedy fallow at Ty-gwyn, Mwnt SN198521, 2003 (NMW).

**Fallopia japonica** (Houtt.) Ronse Decr. var. **japonica** (*Polygonum cuspidatum* Siebold & Zucc.) - Japanese Knotweed - Clymlog Japan

This famously invasive alien, native of Japan, was first reported in the wild in Britain in 1886 in Glamorgan (Conolly 1977). Its early history in Cardiganshire is unfortunately obscure. Salter's first mention of it (Diary 28.9.1905) seems to be of it flowering and probably in the garden at Crugiau SN591794. His next mention of it (Diary 15.9.1924), "The great *Polygonum* establishes itself everywhere" in the Ceri valley just above Rhyd Lewis SN34N or P, might be thought more likely to refer to *F. sachalinensis* (which he did not distinguish), but that supremely conspicuous plant has never otherwise been recorded in this valley so probably *F. japonica* was meant. In his Flora (1935) he wrote that it "is now so widely and commonly established throughout the county that it is unnecessary to name localities."

Over the last 40 years it has continued to be spread and is now common throughout the lowlands on roadsides, waste ground, river and stream banks and in scrub and woodland. How much harm it has done to natural and semi-natural habitats in the county is unclear, and it is nowhere as dominant or obviously harmful as in parts of South Wales and would seem to be potentially most damaging in riverside communities and on some of the drift slopes on the coast. As it is functionally dioecious and normally male-sterile in Britain, dispersal is not by seed but entirely by fragments of rhizome. Its spread to new sites, at least on roadsides and waste ground, though not along rivers, could easily be stopped by taking appropriate hygienic measures during roadworks and soil moving, and it is an offence under the Wildlife & Countryside Act (1985, amended) to cause or permit its spread. The Ceredigion County Council has in recent years had a programme of regular spraying of roadside colonies, with variable



*Fallopia japonica* in ancient woodland, Llyfnant, view N from SN734975, November 2009



*Fallopia japonica* annually conserved with *Orchis mascula*, and *Prunus* 'Ama-no-gawa', Aberaeron, view W from SN46106302, May 2008

success; in 2004 they were using Tordon 22K (containing picloram as potassium salt) which seems to kill the plants completely, but almost as many new colonies appear as are destroyed. Rather charmingly, small clumps on roadside grass by the Aberystwyth Police Station SN587811 and by the A487(T) at the NE end of Aberaeron SN460630 have in recent years been regularly mistaken for potentially decorative flowers and carefully left by the Council mowers. The species is rare in the uplands in Britain, and Beerling *et al.* (1994) imply that *c.*320m in Monmouthshire is its altitudinal limit in Wales; there is, however, a colony on the verge of the A44(T) road at Cwmergyr SN79008302 at 350m altitude, first noticed as a large clump in 1987 and  $8 \times 1\text{--}3\text{m}$  long in 2003, with an outlier 6m away that is  $1 \times 0.5\text{m}$ . At Eisteddfa Gurig SN79828403 on the grassy bank of the Afon Tarenig there is a colony, first noticed in 1993 and  $4 \times 2\text{m}$  in 2003–2006, and another  $3 \times 3\text{m}$ , 2003–2007, in a Sitka Spruce plantation 20m upstream; these are at 415m, the British limit for the species.

[*Fallopia*  $\times$  *conollyana* J. P. Bailey (*F. baldschuanica*  $\times$  *japonica*)

Fertile fruits of the male-sterile *F. japonica* are often found at a number of sites, for example at Glandyfi SN696970, 1991–2003; Bryn-y-mor dingle, Aberystwyth SN58628263, 2003; by the railway at Ysgol Penweddig, Aberystwyth SN594809, 2002 (SPC); at Goginan SN689811, 2003; and by Llanybydder bridge SN51954413, 2006 (NMW). Pollen may well have come from *F. baldschuanica* which in all cases grew nearby. At the Glandyfi site in 1991 C. Foster (pers. comm.) planted *c.*100 of the seeds in pots, and discarded the only six that germinated as they appeared to be normal *F. japonica*, and in a garden at Aber-arth SN479639 in the same year P. E. Davis (pers. comm.) weeded out seedlings apparently of *F. japonica*; both these occurrences though are most likely to have been of *F. conollyana*, or perhaps of *F. bohemica* (see below), although male-fertile *F. sachalinensis* is not recorded near any of the above sites. No germinated plants of either hybrid have yet been found in the wild in the county, but as fertile seeds capable of growing into them seem to be becoming more frequent they presumably will be found soon.]

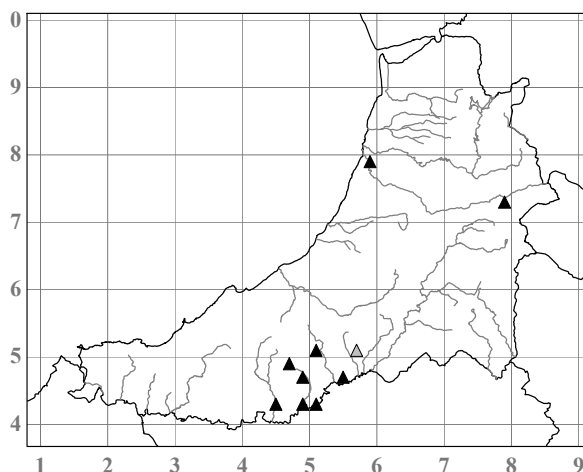
**Fallopia**  $\times$  *bohemica* (Chrték & Chrtková) J. P. Bailey (*F. japonica*  $\times$  *sachalinensis*)

Seed collected from abundantly fruiting plants of *F. japonica* by the Afon Einion at Ynys-hir SN68429579 in 2004 germinated quickly and developed into weak, low-growing non-flowering plants with leaves like those of *F. japonica*; a chromosome count in 2008 showed them to be hexaploid (JPB pers. comm), and thus presumably with *F. sachalinensis* as the other parent. As male-fertile plants of the latter have not been recorded nearer than 24km away to the N, some unnoticed garden population may have provided the pollen.

**Fallopia sachalinensis** (F. Schmidt) Ronse Decr. - Giant Knotweed - Y Glymog Fawr

Native of Sakhalin and Japan, and according to Conolly (1997) first reported naturalised in Ireland (Antrim) in 1896 and in Britain (Cornwall) in 1903, and in Wales (Pembrokeshire) in 1938. Its early history in Cardiganshire is as obscure as that of *F. japonica*. It is now naturalised in a number of places, mostly in the S of the county between Lampeter and Llandysul where it was planted on several of the larger estates. Salter did not list it in his Flora (1935), although he says of *F. japonica* "In favourable situations, as on the rich soil of old garden-sites, it runs up to 10ft. [3m] in the course of the season ..."; these giant plants are more likely to have been *F. sachalinensis*. He certainly saw it at Falcondale Lake in 1925 and 1927, as what was presumably the same colony at SN56965003 was seen in 1978 (NMW, LTR), when it was  $20 \times 4\text{m}$ ; it had gone by 1985 (APC). In 1925 (Diary 30.5.1925) Salter wrote of this site "The big *Polygonum* had established





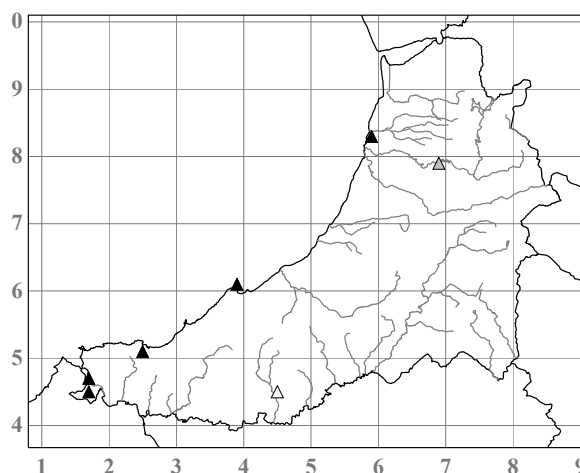
*Fallopia sachalinensis* and Margaret Chater, 1.2kmSW of Cribyn, view ESE from SN513502, August 1978

itself”, and in 1927 (Diary 25.6.1927) “The big *Polygonum* 10 feet high”, so 1925 becomes the first Welsh record. (His 1924 mention of the “great *Polygonum*” is commented on under *F. japonica*.)

The other naturalised colonies are: two,  $15 \times 50\text{m}$  and  $15 \times 5\text{m}$ , by the drive and in the walled garden, Bryneithin, Llanfarian SN582782, 1984, destroyed in the early 1990s; a small colony 5m long, recently planted, alongside a garden fence at Cwmystwyth SN792738, 1985-2008; a small colony by the stream below Cwm-bach, 3km WNW of Cwrtnewydd SN462489, 1979 (APC); a colony  $c.40 \times 10\text{m}$  in an old orchard at Aber SN47774832, 1975, mostly destroyed by 1995 but several small colonies remained by the stream there; a colony  $15 \times 25\text{m}$ , around an old cottage site 400m ESE of Cwrtnewydd crossroads SN493477, 1978 (NMW, LTR) - 2004; a colony on the road verge 30m ESE of the crossroads 1.2km SW of Cribyn SN513502, 7m long in 1978 (NMW, LTR), 16m long in 1993, but destroyed soon after, originating from plants in rubble dumped here from the Cwrtnewydd cottage site SN493477 in *c.*1970 (Mrs D. R. Evans pers. comm.); a colony  $10 \times 15\text{m}$  on waste ground W of Neuadd Pond, Llanwnen SN540476, 1990; a colony  $c.100 \times 40\text{m}$ , and several smaller ones, in long-abandoned gardens in Bryngolau Plantation, formerly part of the Alltyrodyn estate SN445438, 1994; several huge colonies in the drier parts of Moor Wood, Highmead SN508431, 1985-2000, and others on this estate at SN500431, 1985, SN499431, 1985-2002, and SN49584268, 2002. As in *F. japonica*, the plants are functionally dioecious; the Falcondale Lake colony at SN56965003 was found to be male fertile, those at SN792738, 47774832, 513502 and 493477 were found to be male sterile, and all had  $2n = 44$ , in 1984-1995 (JPB & APC). *F. sachalinensis* is less invasive and easier to eradicate than *F. japonica*.

### ***Fallopia baldschuanica* (Regel) Holub (*F. aubertii* (L. Henry) Holub) - Russian-vine - Clymog Rwsia**

This species, native of C Asia, scrambles extensively over scrub in several localities, and it is difficult to tell whether it was planted, derived from throw-outs, or even self-sown, and indeed how many individuals are involved. Conspicuous examples are in the Bryn-y-mor dingle, Aberystwyth SN596826, 1992 (NMW) - 2005; at the N end of Marine Terrace, New Quay SN387603, 1994-2005; by the Afon Mwldan at Cardigan SN174460, 1995; and NW of Aber-porth church SN255511, 1998 (AOC & JPW). The earliest record was of it “planted but becoming naturalised” by the Rheidol at Trotter’s Bridge, Aberffirwd SN692794, 1978 (NMW, RGE); Salter (Diary 16.9.1930) mentioned it only on a cottage wall at Rhydownen SN44M.



### ***Fallopia convolvulus* (L.) Á. Löve (*Polygonum convolvulus* L.) - Black-bindweed - Y Glymog Ddu**

A frequent archaeophyte weed of arable fields and waste ground, especially in the SW half of the county, but virtually absent from the uplands. It occurs in both winter- and spring-sown Barley, and in a wide variety of other crops. It can have a long-lasting seed bank, and was one of the species that came up in 1979 when a

trench was dug through coastal heath on the MoD site, Aber-porth SN246525, that had not been arable for 40 years; it frequently appears in similar situations at road-widening or building sites and other places where there has been disturbance. Chippindale & Milton (1934) grew it from the seed bank under a pasture at Peithyll, Capel Dewi c.SN631826 that had not been arable for over 50 years. The earliest record is a specimen from Aber-aeron c.SN46L, 1839 (MMA, **BIRM**). All material seen has been var. **convolvulus**, with narrowly winged fruits. Altitude limit 305m, vegetable plot, Tynygwndwn, Llanfair Clydogau SN633495, 1993.

**Rheum ×rhabarbarum** L. - Rhubarb - Rhiwbob

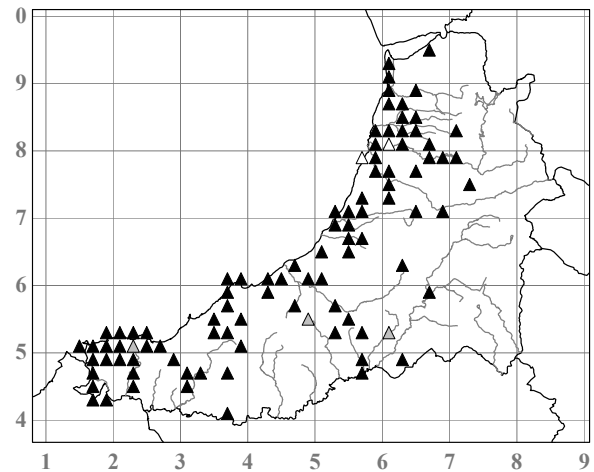
Grown occasionally in small quantity on a market garden scale (Smith 1935). Relic plants are sometimes seen at old cottage sites, and small colonies established from throw-outs have been seen in a hedgebank by Horeb crossroads SN39724257, 2002, and at its altitude limit of 400m, by the remote ruin of Tywi-fechan SN791612, 1992 (the house was abandoned by 1965). A hybrid of uncertain garden origin.

**Rumex acetosella** L. - Sheep's Sorrel - Suran yr Yd

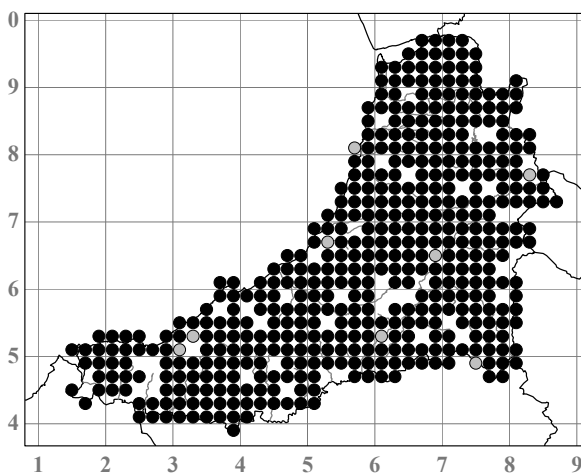
A common plant of dry, unshaded, acidic sites from the coast into the uplands, on banks, overgrazed pastures, heaths, rocky slopes and screes, road verges, gardens and occasionally a pernicious arable weed. Altitude limit 750m, Pumlumon Fawr summit SN789869, 1932 (Salter Diary 5.9.1932, 1935); 685m, rocks 1.5km NE of summit SN80388773, 2002.

Subsp. **acetosella** is probably the commonest subspecies, recorded from all habitats and throughout the county.

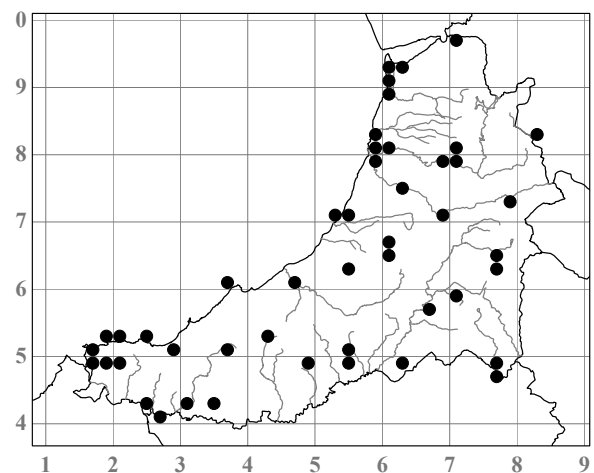
Subsp. **pyrenaicus** (Pourr.) Akeroyd (*R. angiocarpus* auct., non Murb.) is also widespread and in most habitats, and specimens have been confirmed by JRA from 15 of its many sites, at two of which it was in mixed populations with subsp. *acetosella*: on a shaly roadside bank at Ynys-las SN615930, 1999, at 10m altitude; and on a rocky roadside slope at Nantyrarian SN717812, 1999, at 315m altitude. The proportions of angiocarpous fruits per plant vary continuously and the two subspecies seem of little significance.



*Rumex acetosella* on thin, acidic soil, 650m  
ESE of Capel Tygwydd, view SE from  
SN27704327, May 1997



*Rumex acetosella* all records



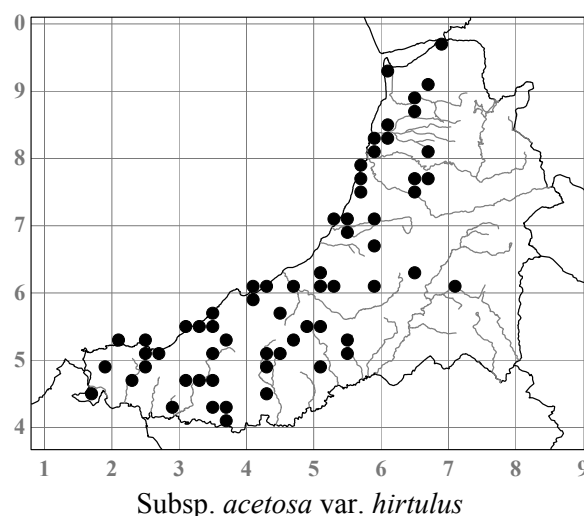
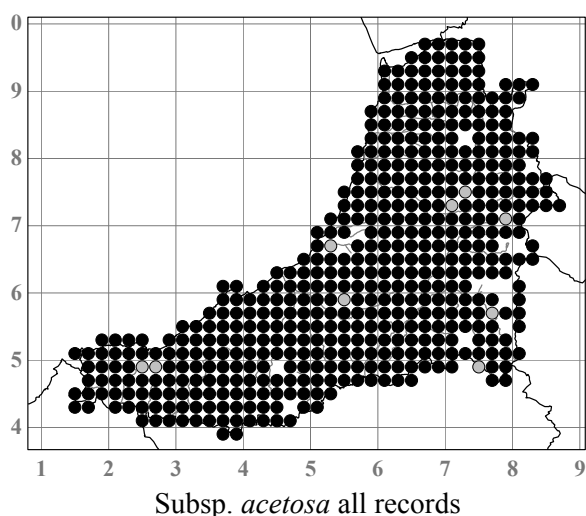
Subsp. *pyrenaicus*

Subsp. **tenuifolius** (Wallr.) O. Schwarz has only once been recorded and then not with certainty, on dry, mossy sand over till E of the road at Penyrergyd, Gwbert SN168488, 2000 (NMW, det. JRA as “more or less subsp. *tenuifolius*”) where it was growing with other plants more obviously intermediate with subsp. *acetosella*; it has surprisingly not been seen on the Ynys-las dunes.

### **Rumex acetosa** L.

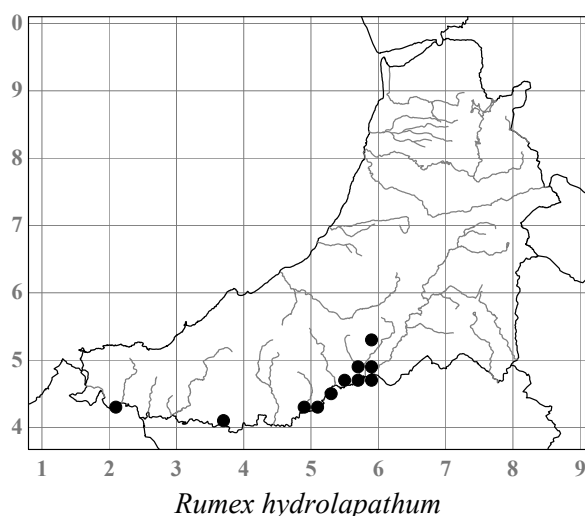
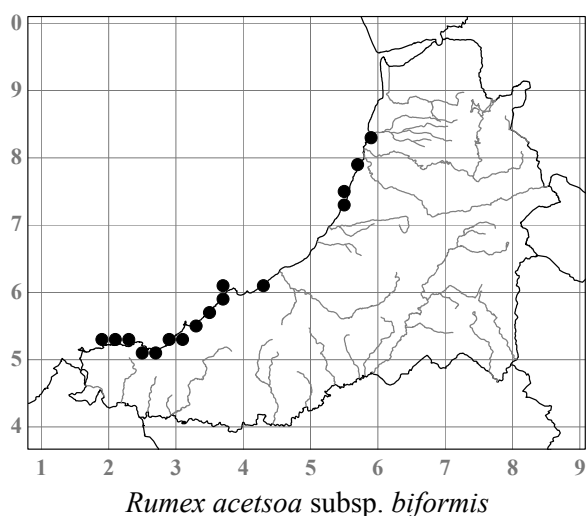
Subsp. **acetosa** - Common Sorrel - Suran y Cŵn

A very common plant of all but the driest pastures and meadows, as well as of marshes, fens, banks and hedges, rock ledges and flushes, which occurs from the coastal slopes well into the uplands. It is only occasionally found in woodland, and is rare as an arable weed. Subsp. **acetosa** var. **hirtulus** Freyn, with papillose or puberulent petioles and leaves, occurs in all habitats, usually in much smaller quantity than var. **acetosa**, and limited recording suggests that it is chiefly in the lowlands and near the coast and absent from the uplands; every gradation between the two varieties is found. Altitude limit 610m, above Llyn Llygad Rheidol, Pum-lumon SN7987, 1903 (Salter Diary 26.9.1933, 1935); 660m, above Llyn Llygad Rheidol SN797873, 2003.



Subsp. **biformis** (Lange) Valdés Berm. & Castro. - Overlooked Sorrel

Locally abundant in scattered sites along the sea cliffs on dry vegetated screes and rock ledges, for example on Constitution Hill, Aberystwyth SN582826, 1996-2005, or on grassy slopes, for example by the mouth of the Afon Drywi SN426607, 1991 (conf. PDS) - 2005, or in damp gullies, for example at Tresaith SN275515, 1994. Intermediates with subsp. *acetosa* have been recorded, and a very robust plant from the clifftop E of Mwnt SN215522, 1994 (SPC, det. JRA) was thought to be perhaps a hybrid with an arable weed form of subsp. *acetosa*.



### **Rumex hydrolapathum** Huds. - Water Dock - Tafolen y Dŵr

First recorded in 1978 by the Afon Teifi at Lampeter c.SN583476 (NTHH), and since then found in many places along the Teifi banks and in its ox-bows and backwaters down as far as Abermachnog SN375401,



2000. For several years from 1994 a large clump, doubtless carried down in a flood, grew at the upstream tip of the island just below Llechryd bridge SN217436. In 1985 many hundreds of plants were seen in a long-abandoned ornamental pond in woodland at Highmead SN499431, and in 1993 many were seen around the lowest of the abandoned ornamental ponds at Derry Ormond SN592521. It is hard to believe that such a conspicuous plant could have been overlooked by Salter, and indeed by others, if it had always been present along the river, and it may be that it has spread downstream, perhaps from Derry Ormond where it was presumably planted. On the other hand, Salter on his two visits to the Derry Ormond ponds (Diary 30.5.1925, 26.7.1930) made no mention of *R. hydrolapathum*, although he recorded *Sagittaria*, *Nuphar* and other species there; if it was planted there it is thus likely to have been after 1930 and before 1950 when the grounds became neglected. The status of the species in the county remains obscure.

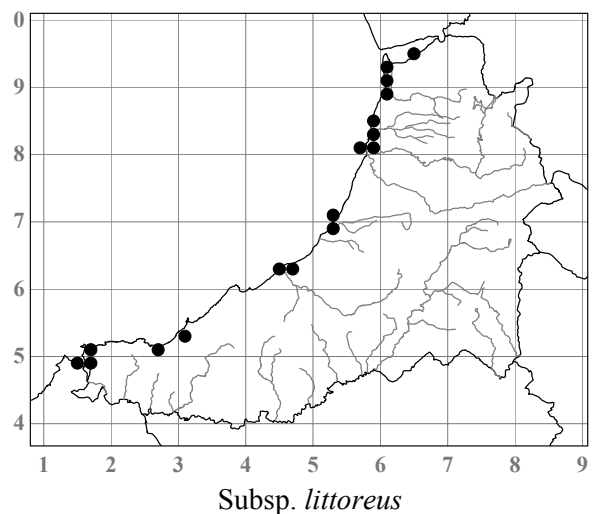
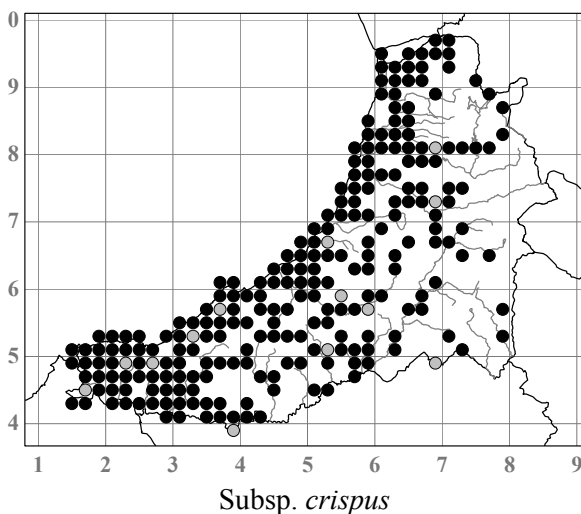
***Rumex crispus* L. - Curled Dock - Tafolen Grech**

**Subsp. *crispus***

A frequent plant of road verges, pathsides, waste and disturbed ground, occasionally an arable weed and less often occurring in pastures and marshy grassland. It is the commonest Dock only in the coastal zone, and is especially frequent in coastal habitats such as shingle beaches, waste ground and in the upper parts of salt marshes, although it is often replaced by the other two subspecies in these habitats. In the uplands it is chiefly confined to roadsides and by tracks and buildings. The considerable variation seen in the county does not seem to match the available varietal taxa and further investigation is required. Altitude limit 510m, trackside by Llyn Llygad Rheidol, Pumlumon SN791878, 2002.



*Rumex hydrolapathum* on the Teifi below Pont Steffan, Lampeter, view E from SN58004760, July 1979



**Subsp. *littoreus* (J. Hardy) Akeroyd**

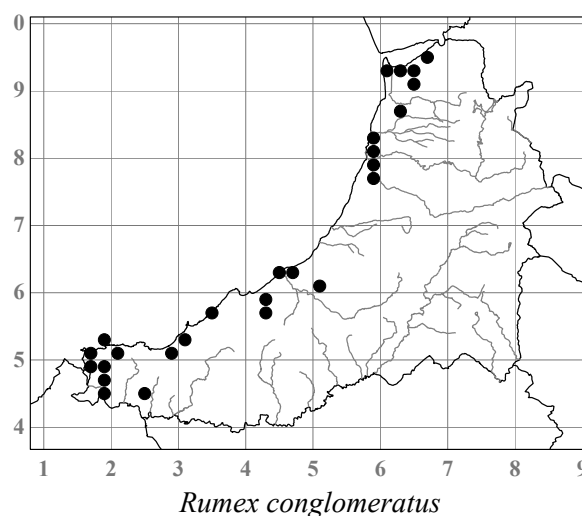
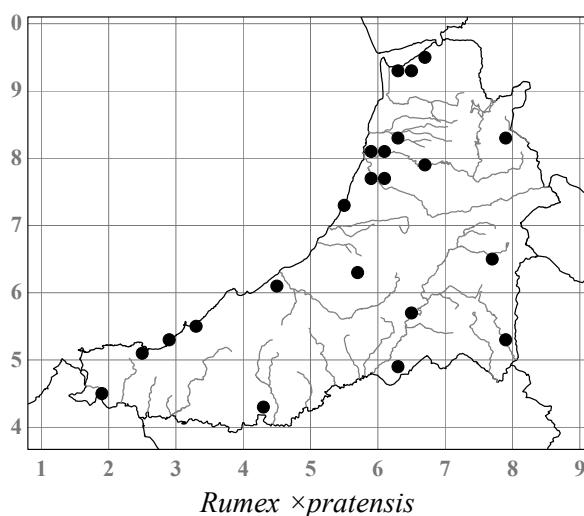
Frequent on shingle beaches all along the coast, as well as on coastal screes and cliffs and on waste ground near the sea. It also occurs in brackish marshes by the Dyfi estuary, for example in the old course of the Afon Leri SN608922, 1990 (JRA & AOC) and at the N end of the Aberleri Fields, Ynys-las SN614922, 1997 (AOC & PAS). Intermediates with subsp. *crispus* often occur in all these habitats.

Subsp. **uliginosus** (Le Gall) Akeroyd

Reaching its N limit in Britain in the Dyfi estuary, where it was first found by Ley in 1885 (BM, det. JRA); characteristic plants have been recorded in several places here in brackish marshes and ditches, especially along the tidal terrace by the Afon Leri SN616899-616911, 1988 (AOC & JRA) - 2005, and along the tidal stretch and associated ditches of the Afon Cletwr SN647941-654929, 1999 (conf. JRA). It has also been recorded in ditches in the Ynys-las dunes SN610940, 2001. On the Teifi estuary it occurs in small quantity at Rosehill Marsh SN189453, 1999 (NMW, det. JRA) - 2005. Elsewhere on this estuary though, only plants intermediate with subsp. *crispus* have been seen, for example on the Teifi Marshes SN184456, 1999, and at Netpool SN173461, 1994 (det. JRA). Such intermediates also occur by the Dyfi.

**Rumex ×pratensis** Mert. & W. D. J. Koch (*R. crispus* × *obtusifolius*)

First recorded in 1988 from by the Afon Cletwr below Lodge Farm SN651932 (JRA, AOC & CDP), and since then from a variety of sites throughout the county, chiefly on road verges and tracksides and on waste and disturbed ground. In 1997 many thousands of plants grew on land at Parc-llyn SN594805 disturbed for supermarket building. Altitude limit 340m, road verge, Soar y Mynydd SN78675328, 2003.



**Rumex conglomeratus** Murray - Clustered Dock - Tafolen Fair

An uncommon plant of marshes, ditch-sides, road verges, waste ground and tips, and as a weed of arable fields and gardens, confined to the coastal fringe of the county and not recorded more than 7km from the sea. It occurs at the top of the salt marshes in both the Dyfi and Teifi estuaries. Salter must have over-recorded it as he described it as “In damp, waste places, very common. In the mountain district only about folds, shepherds’ cabins, etc.”; there has been no change in its distribution nationally in recent decades.

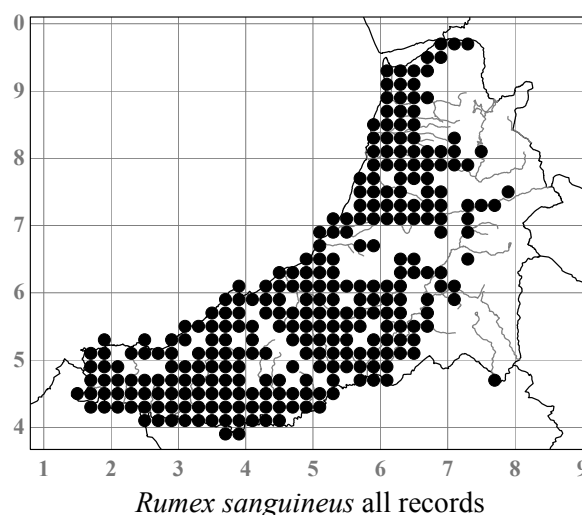
**Rumex sanguineus** L. - Wood Dock - Tafolen y Coed

Var. **viridis** (Sibth.) W. D. J. Koch (*R. condyloides* Bieb.)

The dominant variety in the county and a common plant of the more fertile woodlands, scrub, damp pastures and meadows, hedgebanks, streamsides and pond margins. It varies considerably in the angle of branching, sometimes whole colonies having very long branches almost at right angles to the stem and looking very like *R. conglomeratus*, for example on the roadside verge at Eglwys Fach SN68589540, 2009 (NMW). It is less salt-tolerant than *R. crispus*, and scarcely extends into the uplands.

Var. **sanguinalis** (Moss) P. D. Sell ined.

This rather poorly differentiated variety, with a narrower angle of branching than var. *viridis* and



usually reddish-tinged, occurs sparingly throughout the lowlands, chiefly on roadsides, field margins and waste ground.

**Var. *sanguineus***

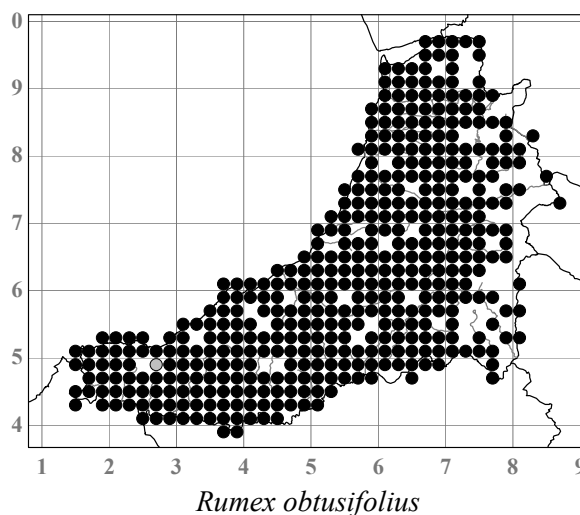
This variety with blood-red leaf-veins and petioles has been recorded as a self-sown garden escape in a roadside gutter in Cliff Terrace, Aberystwyth SN58588260, 2000, AOC & ADH, and as a garden throw-out in woodland at Nanternis SN373567, 2003 (SPC). Two other records are more likely to have been of naturally occurring plants, growing in populations of var. *viridis* and perhaps being a spontaneous mutation: one plant in woodland by the Afon Mwldan 250m NNW of Llwyn-llwyd, Penparc SN200490, 1996 (NMW); and two plants, one on shingle and the other in Alder carr, by the Afon Cerdin 100m below Bargoed bridge SN38724615, 1999.

***Rumex* ×*dufftii*** Hausskn. (*R. obtusifolius* × *sanguineus*)

Recorded only twice: abundant, with both parents, on waste ground at the Glanyrafon Industrial Estate, Llanbadarn Fawr SN611803, 1992 (NMW, conf. JRA); and several plants, with both parents, on a soil tip on the disused railway, Llanfarian SN591778, 1992.

***Rumex obtusifolius* L.** - Broad-leaved Dock - Dail Tafol

A very common plant of pastures, meadows, marshes, roadside verges, arable fields, waste ground and tips. It can be an abundant weed of reseeded pastures and silage fields, especially where slurry is used. It seems less salt-tolerant than *R. crispus* and is less common in coastal sites, but extends equally into the uplands in disturbed sites and by buildings. Altitude limit 435m, keeper's garden plot, Llyn Hir SN790679 (Salter 1935); 450m, road verge in conifer plantation, Bryn-y-rhyd SN680525, 2008.



***Rumex maritimus* L.** - Golden Dock - Tafolen Felen

Recorded only once, as a casual in a flowerbed by the new Ysgol Penweddig school, Aberystwyth SN595811 in 2001 (NMW, AOC & CDP); the topsoil here had been brought from a Sugar-beet residue lagoon near Kidderminster, where the species is frequent.

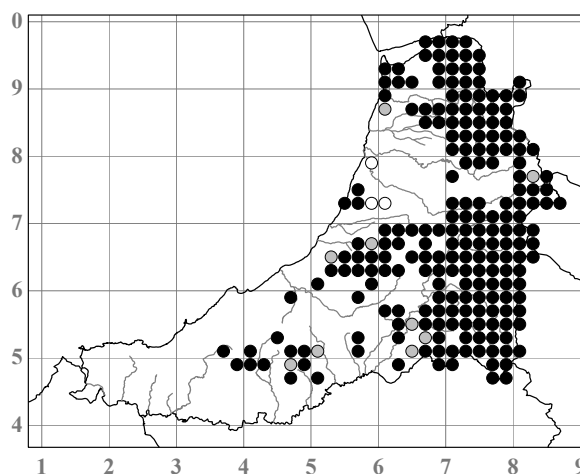
[*Oxyria digyna* (L.) Hill - Mountain Sorrel - Suran y Mynydd

There is an obviously erroneous field record at BRC from Pumlumon in 1957, and a presumably mislabelled 1912 specimen from Aberystwyth in ABS.]

## DROSERACEAE

***Drosera rotundifolia* L.** - Round-leaved Sundew - Gwlithlys

Widespread, growing on *Sphagnum* or sometimes on bare peat, usually confined to wet heaths and raised bogs in the lowlands, but in all sorts of mires and flushes in the uplands. It seems to be absent from the flushes and heaths on the coastal slopes, but Salter (Diary 23.10.1891) planted it in "a little sphagnum bog" on the coast just S of Borth. Altitude limit 535m, Llyn Fyrddon Fach SN797700, Salter (1935, Wade 1952); 640m, above Llyn Llygad Rheidol, Pumlumon SN79368723, 2002.







*Drosera rotundifolia* L. Valley mire, Cwm Mwyro, 500m S of TYNWYM.  
V.C.46. SN 771 649. 290 n.a.s.l. 27.VIII.2002. S.D.S. BOSANQUET.

Teratological form, affecting all flower in inflorescence: flowers 4- or 5-merous; sepals normal, but some of them with 1-3 long glandular hairs on the margin laterally; petals greatly enlarged and shaped like leaves but with much thinner texture and the margins not at all thickened, with long glandular hairs along margins of expanded part and on parts of upper surface, the lamina pale greenish or colorless; stamens and pistils normal.

Teratological *Drosera rotundifolia*, Cwm Mwyro SN771649, August 2002 (SDSB, drawing by AOC)

#### ***Drosera* × *obovata* Mert. & W. D. J. Koch (*D. anglica* × *rotundifolia*)**

Salter found a single plant of this hybrid on Cors Fochno SN69 in 1937 (Diary 22.7.1937), and later wrote (1941): "It is not very difficult, if one is prepared to examine hundreds of individuals, to find a good example of the *rotundifolia* × *anglica* cross ..." He collected it in 1940 (NMW, det. AC), thinking it was *D. ×beleziana* (see below). The next record was in 1960, when two plants were reported near the centre of the bog, growing among very wet *Sphagnum pulchrum* with the parents where *D. intermedia* was absent (PMB, *Nature in Wales* 6: 91 (1960)). In 1993 a plant was found on the firebreak next to the raised bog SN635920 (SM, conf. AOC from a photo), and again in probably the same place in 2002. These seem to be the only documented records.

#### [*Drosera* × *beleziana* E. G. Camus (*D. intermedia* × *rotundifolia*)

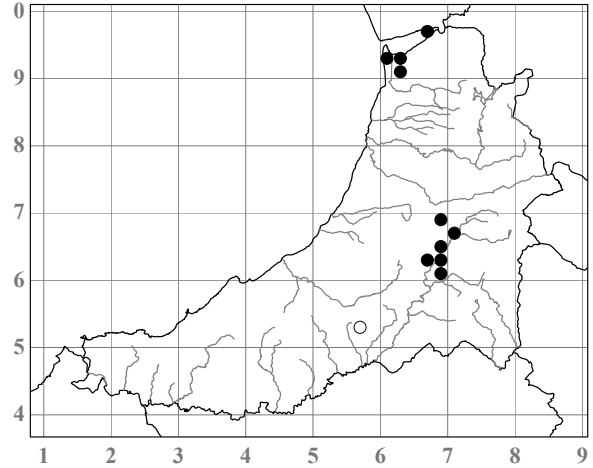
Salter (1941) recorded this hybrid from Cors Fochno SN69 and the record was generally accepted until his 1940 specimen in NMW was redetermined as *D. ×obovata* by A. Culham in 1988 (Pearman & Rumsey 2004).]

#### ***Drosera anglica* Huds. - Great Sundew - Gwlithlys Mawr**

Salter suspected that he had found this Sundew on Cors Fochno SN69 in 1904 (Diary 21.7.1904), but was not satisfied until it was seen there by Pugsley (1906). It occurs in many places on this mire complex, often in abundance in old peat cuttings or in newly dug scrapes, and very sparsely in wet hollows on the raised bog, 2005. It also occurs very sparsely on Ynys Edwin bog SN67759617, where in 1997 only five plants were found (WMC). It was first reported from Cors Caron by Oldham and Lloyd probably c.1924 (Salter 1935), but was not confirmed there until 1937 (Godwin & Conway 1939, Salter Diary 14.7.1937); it now occurs there on the West Bog SN66 rather sparsely in hollows in the "regeneration complex" of the raised bog (Sandell 1956, Savidge & Hardy 1985) and in the lagg SN685646, 1999 (AOC & PCu). It was reported from Gors Lwyd SN8575 by Goode (1968) and relayed in Ratcliffe (1977), but this record is thought to be erroneous.

***Drosera intermedia* Hayne - Oblong-leaved Sundew - Gwllithlys Hirddail**

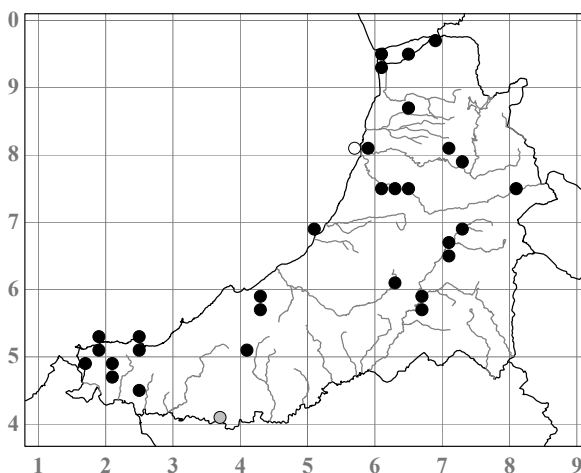
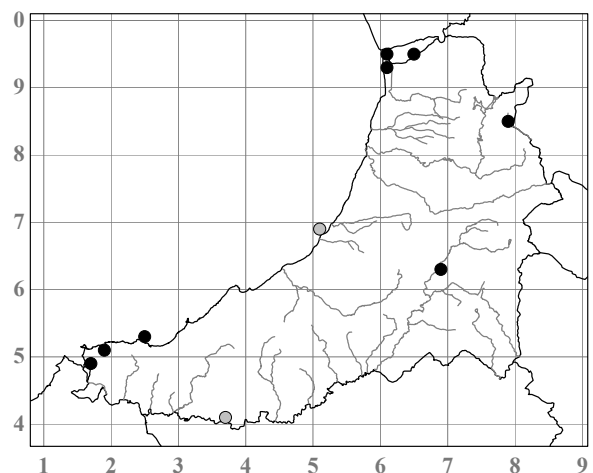
This Sundew was called *D. longifolia* by Salter. It occurs in many places on Cors Fochno SN69 in wet hollows and on bare peat, especially in recently dug scrapes where it can often be abundant. It also occurs in Ynys Edwin bog SN67759617, but only one plant was found in 1997 (WMC). On Cors Caron it occurs on the West Bog SN66 both in wet hollows in the “regeneration complex” of the raised bog where it has declined since the 1930s (Savidge & Hardy 1985), and in the lagg SN685646, 1999 (AOC & PCu) where it is rather more frequent than *D. anglica* and where it seems, like that species, not to have been seen in the surveys of the 1930s and 1980s. It also occurs in the mire in the NW part of Cors Caron SN70486646, 1999 (MDS & DG). Wade (1952) gives a 1940 record from “Marshy ground near Silian [SN55R]” (ARP) but it has not been seen there since. The earliest record was probably by Edward Llwyd who recorded *Ros solis folio oblongo* “found in the marshes below Tyno Hîr” in 1682 (Chater 1984a) which, if in Cardiganshire rather than Montgomeryshire, may have been at Ynys Edwin bog.

**CARYOPHYLLACEAE*****Arenaria serpyllifolia* L. - Thyme-leaved Sandwort - Tywodlys Dail Teim****Subsp. *serpyllifolia***

An uncommon plant of dunes, dry banks, walltops, railway ballast, quarries and other open usually somewhat base-rich sites, not found over 270m altitude and most often found near the coast. It is usually in any abundance only along the current and disused railways, where Salter (1935) noted it as abundant, and on the sand dunes. Assuming that Salter was correct in saying that it was as “frequent and generally distributed” as *Moehringia trinervia*, it must have decreased considerably, as it now occurs in only a fifth as many tetrads as the latter.

**Subsp. *lloydii* (Jord.) Bonnier - Dune Sandwort**

Occasional around Rabbit scrapes and elsewhere on bare patches on the mature dunes at Ynys-las SN69B, C, 1990-2002 (NMW) and Penyrergyd SN162487, 1995, as well as on old molehills on sandy ground at Mwnt SN195520, 1992 (NMW).

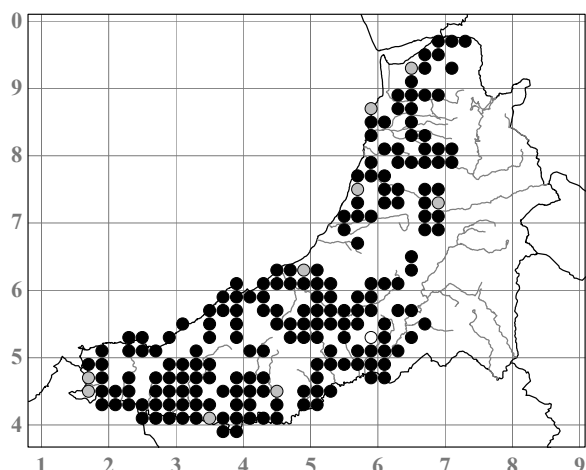
*Arenaria serpyllifolia* all records*Arenaria leptoclados****Arenaria leptoclados* (Rchb.) Guss. (*A. serpyllifolia* subsp. *leptoclados* (Rchb.) Nyman - Slender Sandwort**

Frequent, sometimes with *A. serpyllifolia*, on bare or sparsely vegetated sand, often around rabbit scrapes, on the mature dunes at Ynys-las SN69B, C, 1973 (Savidge 1973) - 2005, Mwnt SN196519, 1988-1996, and Penyrergyd SN164485, 1991-2005; on shaly ground at Cribach Bay SN249522, 1982; on railway ballast at

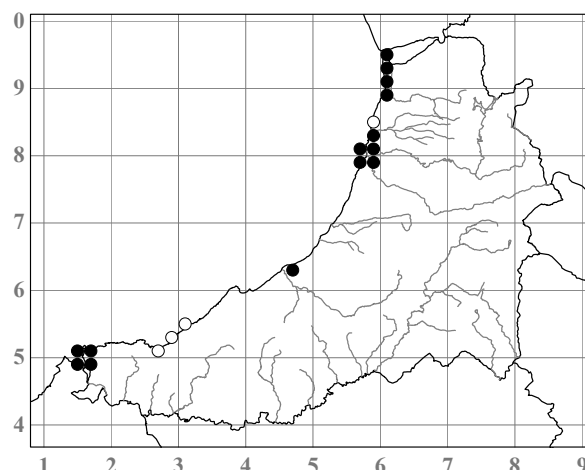
Abermachnog SN372403, 1977, and at Maes-llyn SN694628, 1991; and on waste ground at its altitude limit 410m, at Eisteddfa Gurig, SN797840, 1993. Var. **viscidula** Rouy & Foucaud was recorded at Gwbert (probably the Penyrrgyd dunes SN14U) in 1912 (AWM, det. WPH).

**Moehringia trinervia** (L.) Clairv. (*Arenaria trinervia* L.) - Three-nerved Sandwort - Tywodlys Teirnerf

A frequent, usually annual plant of woodland and hedgebanks, growing in shade on bare soil or in open vegetation with little or no litter, and absent from the more acidic, least fertile and less well-drained sites. It is also frequent under Bracken on the coastal slopes, and, as Salter (1935) remarked, on wall-tops where it can often grow completely out of the shade. It is confined to the lowlands. Only var. **trinervia**, with ciliate leaves and smooth, shiny seeds, has been noted.



*Moehringia trinervia*



*Honckenya peploides*

**Honckenya peploides** (L.) Ehrh. (*Arenaria peploides* L.) - Sea Sandwort - Tywodlys Arfor

A coloniser of usually otherwise bare sand and sandy shingle on most of the sandy sea beaches, dying down in winter to extensive rhizomes and stolons that withstand the storms but that are often exposed. It occurs in abundance at Ynys-las and Borth SN68E-69C, 1849 (Morgan 1849) - 2008; at Clarach



(above) An 'Arber's hoop' on *Honckenya*  
Tan-y-bwlch beach, SN58018001, June 2007



(right, top) *Honckenya*, Tan-y-bwlch beach,  
view SW from SN579799, July 2005



(right, bottom) *Honckenya* rhizomes exposed  
by storms, Tan-y-bwlch beach, view S  
from SN579798, January 2007



c.SN587838, 1849 (Morgan 1849) - 2008; at Aberystwyth on the South Beach SN580811, 2000-2008 (AOC; SPC); at Tan-y-bwlch c.SN579798, 1907 (Salter Diary 21.3.1907) - 2008; in small quantity opposite Drefach, Aberaeron SN464635, 1989 (AOC & JRA) - 2004; at Llangranog SN35C (Salter 1935); at Penbryn SN25W, 1894 (Salter Diary 27.6.1894) - 1934 (NMW, PCh); at Tresaith SN278516, 1924 (Salter Diary 17.9.1924); and at Gwbert, where it was recorded in 1894 (Salter Diary 28.6.1894) and where it grows in abundance in a cove 250m N of the Cliff Hotel SN159503, 1996-2005, and in small quantity at the Penyrergyd shingle spit SN160487, 1976-1978. At Tan-y-bwlch in 2007, several “Arber’s hoops”, circular hoops c.15cm in diameter of thickened stolons, their tips buried, indicating intercalary growth of the stolons, were visible, as described by A. Arber, *The Gramineae* 69-70 (1934) from Devon.

**Minuartia verna** (L.) Hiern - Spring Sandwort - Tywodlys y Gwanwyn

Recorded only by the stream at the Goginan lead mine c.SN690814, 1972 (ABS, JPS) - c.1979 (JPS); this site has since been completely changed by reclamation and landscaping. The mention in Baker (1974) refers to the same record.

**Stellaria nemorum** L. subsp. **montana** (Pierrat) Berher (subsp. *glochidisperma* Murb.) - Wood Stitchwort - Serenllys-y-coed Cymraeg

Confined to the Llyfnant and Cwm Cletwr in the N of the county. It was first recorded in 1875 from a “Rocky glen, near Machynlleth, Cardigan” (AL, *BLRC rep.* 1875: 119 (1876)), and then in 1885 from “Woods in Cwm Rhaidr Valley” (BIRM, AL, det. PSG). These records probably refer to the site where Salter first saw it in 1895 (Diary 19.6.1895) and where it has been seen frequently since, on a damp, wooded cliff slope above the road 200m W of Glasbwl in the Llyfnant SN736974. Salter recorded “thousands of plants” of it there in 1924 (Diary 2.7.1924, NMW), but in 2003 (AOC, SDSB & CMFB) only a small patch 2 × 2m was seen. It has also been recorded on a mossy scree by the river further down the valley SN720975, 1975 (PMB) - 2004 where there were many hundreds of plants in a colony 20 × 7m in 1983. In Cwm Cletwr SN670919 it was first seen in 1984 (IW & WMC); in 1993 there were c.20 plants here in an area 2 × 2m (RB) and by 1999 the colony had extended to 4 × 2m, and in 1999 a second colony 5 × 3m was found 10m further E (RAS & RB).

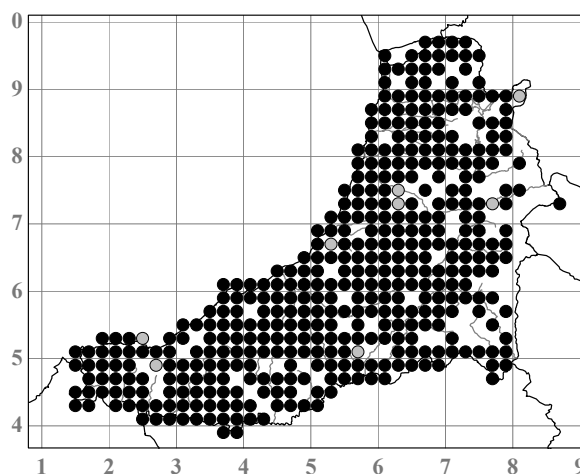


*Stellaria nemorum* subsp. *montana*  
with *Geranium robertianum*, Llyfnant,  
view E from SN720975, June 1985

Green (1954) determined an even earlier specimen from the Llyfnant, “Cwm Rhaidr, 1860” (BIRM, AL) as a possible hybrid between subsp. *montana* and subsp. *nemorum*, and remarked that it had a high proportion of abortive pollen grains; this hybrid is known from the lower Wye valley and has since been described from Spain as nothosubsp. *kersii* Romo. Subsp. *nemorum* has not been recorded from either Cardiganshire or Montgomeryshire, and Preston *et al.* (2002) comment that Welsh populations of it may have been lost to introgression with subsp. *montana*.

**Stellaria media** (L.) Vill. - Common Chickweed - Gwlyddyn y Dom (Gwlydd Dom, Gwlydd yr Ieir)

A very common plant of fertile or enriched soils throughout the county, usually in somewhat open communities and able to tolerate shade. It is especially common as an arable and garden weed, on road verges and pathsides, on river shingle and sand



*Stellaria media*

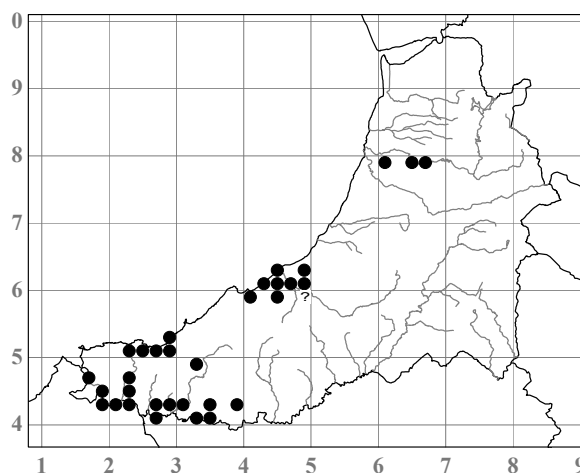
dunes, in farmyards and by manure heaps, in open woodland and under bird roosts. It extends well into the uplands where it chiefly occurs around buildings or ruins and in Sheep nests and along tracks. It is dominant over considerable areas of Cardigan Island in the gull colony SN1551-1651, 2005 (LW); in the Ynys-las dunes SN69B, C, 1964-2008, it is abundant in the Rabbit warrens. Among many variants is a very distinctive robust, mat-forming, compact form with short internodes, growing as a weed in the IGER trial plots at Gogerddan SN62528373, 2006 (NMW). Altitude limit 455m (Salter 1935); 535m, Sheep nest under cliff, Craig y March, Pumlumon SN80658820, 1976.

***Stellaria pallida* (Dumort.) Crép. - Lesser Chickweed - Gwlyddyn-y-dom Bach**

Abundant and largely confined to Rabbit scrapes and especially old burrow entrances, but also in shortly grazed turf and on pathsides, on the Ynys-las dunes SN69B, C, 1970 (PMB) - 2005, and on the Penyrergyd dunes, Gwbert SN1648, 1979-2005. The only other sites where it has been seen are on a sandy verge behind the sea wall at Borth SN608908, 2005 (SPC); at a lawn edge at the S end of the Aberystwyth castle grounds SN579814, 2001 (SPC); and in a sandy scrape on the SE side of Foel y Mwnt SN194520, 1997 (SPC).

***Stellaria neglecta* Weihe - Greater Chickweed - Gwlyddyn-y-dom Mawr**

Confined to three areas of the county, growing in hedgebanks, woods and wood margins, wooded streambanks, scrub and Bracken slopes on the coast. Both var. *neglecta*, with glabrous inflorescences, and var. *elizabethae* (F. W. Schultz) Bég., with glandular-hairy inflorescences, a single dominant gene character, occur. In the lower Rheidol valley it is locally abundant in mixed woodland and is mostly var. *neglecta*, although one population at Rhiwarthen-uchaf SN650795, 2006 (NMW) is pure var. *elizabethae*, and in the next valley S at Nanteos a small isolated colony only 10 × 3m on Old Warren Hill SN61397886, 2006 (NMW) is a mixture of the two. In the Aberaeron/New Quay area, where it mostly seems to be var. *neglecta*, it is locally abundant in woodland, extending up the Afon Aeron to Llanerchaeron SN46V, 1934 (Salter 1935) - 1996 and Ty-glyn c. SN4959 (Salter in Wade 1952), and is widespread here along the coastal slopes with both varieties occurring around Gilfach yr Halen SN4360, 2007; Salter recorded it at Aber-arth c. SN4863 in 1941 (Wade 1952). In the SW of the county it is common in the Aber-porth/Penbryn area, and it extends up the Teifi as far as Henllan SN34K, 1999, and thence up the Nant Iago to Maen-gwyn SN384429, 2008; both varieties grow together in the scrub on rocks below Cenarth bridge SN269416, 2006. Var. *elizabethae* was said to be common in the SW of the county (JAW, Wade 1952). Most, but by no means all of the sites for the species are on till soils; there seems no obvious explanation for its disjunct and distinctive distribution.

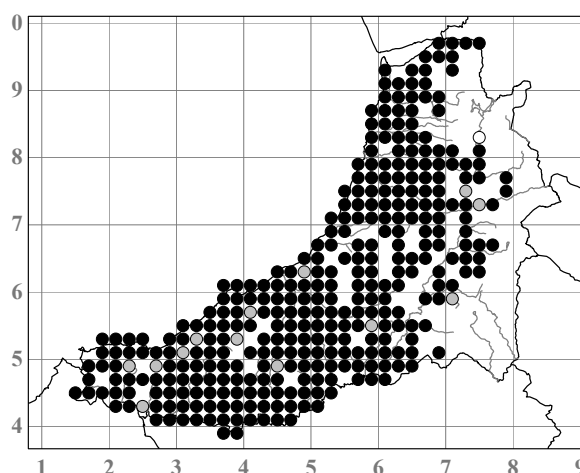


***Stellaria holostea* L. - Greater Stitchwort - Serenllys Mawr (Botwm Crys, Bara Can y Llaeth, Blodau'r Fadfal, Blodun Taranau, Blodau Crach)**

A common plant of hedgebanks, open woodland and wood margins, scrub, rank grassland, streambanks and road verges, largely confined to moderately shaded and dry sites, and almost absent from the uplands. Salter (1935) recorded having been shown the apetalous form by WMJ. Altitude limit c. 305m "only to 900-1,000ft, e.g. Hirnant, on the Rheidol above Ponterwyd," SN754837 (Salter 1935); 295m, silage field 2.5km ESE of Tregaron SN702588, 1985.

[*Stellaria palustris* Ehrh. ex Hoffm. (*S. glauca* With.) - Marsh Stitchwort - Serenllys Llwydlas]

Recorded, presumably in error, from Tanycastell SN587788 by Morgan (1849), and also probably in

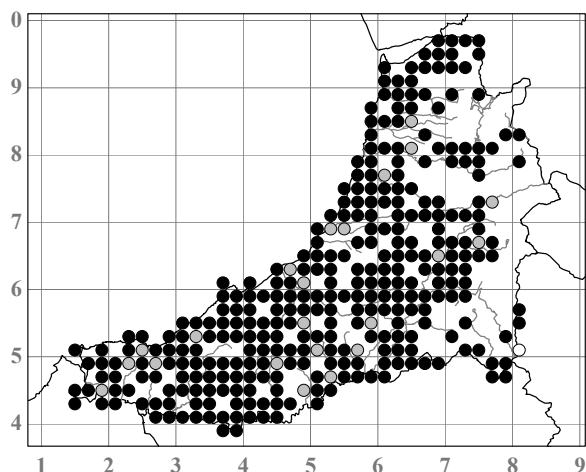


*Stellaria holostea*

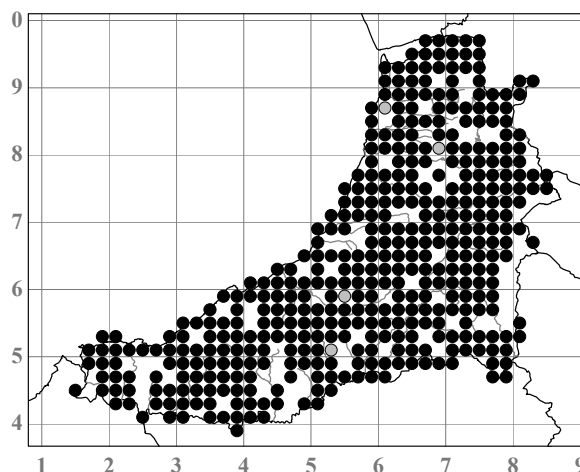
error from two sites by the Teifi in 1978 (NTHH). It has though been recorded from N Pembrokeshire so could perhaps occur.]

***Stellaria graminea* L. - Lesser Stitchwort - Serenllys Bach**

A common plant of pastures and hay meadows, marshes, scrub, hedgebanks and streamsides, chiefly in the lowlands but also occasionally occurring in some abundance in reseeded grassland and rank roadside verges in the uplands. It is more a plant of grazed grasslands and is less tolerant of shade than is *S. holostea*. Altitude limit 405m, improved sheepwalk 400m W of Blaendoethie SN738541, 2008 (AOC & JPP).



*Stellaria graminea*



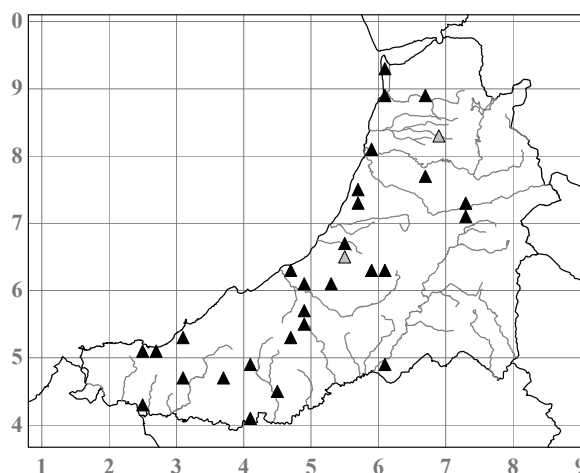
*Stellaria alsine*

***Stellaria alsine* Grimm (*S. uliginosa* Murray) - Bog Stitchwort - Serenllys y Gors**

A common plant of marshes, damp pastures, ditches, swamps, pool margins and stream banks. In the uplands it is especially common both in acidic *Juncus effusus* flushes and on the reseeded sheepwalks, and is quite frequent in the lowlands too in even dry reseeded pastures. In springs and small streams it can behave almost as an aquatic and form dense floating mats. Altitude limit 450m ("to 1,500ft. or over") (Salter 1935); 660m, flush by stream S of Graig Las, Pumlumon SN797873, 2003.

***Cerastium tomentosum* L. - Snow-in-summer - Clust-y-llygoden y Felin**

First recorded naturalised on the clifftop near the Borth War Memorial SN6088 in 1975 (JEH), presumably as a garden throw-out; it is a native of Italy and Sicily. As it was one of the many aliens it was not fashionable to record at that time, it is difficult to know how common it was, but my impression is that it has become much more widely naturalised in recent decades, chiefly on roadside hedgebanks where it was often originally planted for decoration opposite houses in the open countryside. Among other habitats it was abundant on lead mine ruins and spoil heaps at Cwmerfyn SN696829, 1980, and at Pontrhyd-y-groes SN738722, 1994-2005, clearly from throw-outs; it occurs on railway verges at Ynys-las SN618931, 1996, and at Borth SN609899, 1984; and it is also frequent in graveyards. Altitude limit 320m, roadside bank, Bryntair-llyn, S of Llyn Fanod SN603638, 1996-2005.



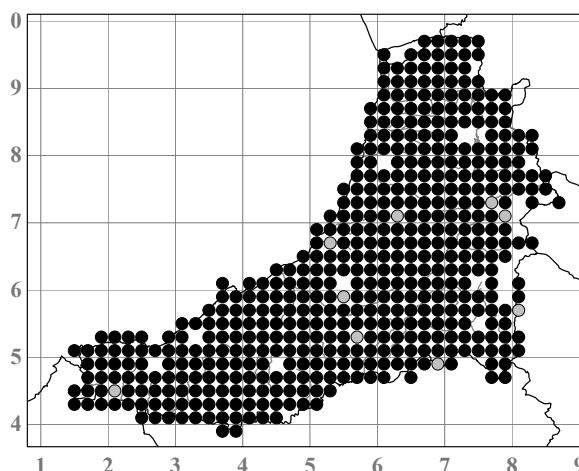
[*Cerastium alpinum* L. - Alpine Mouse-ear - Clust-y-llygoden Alpaidd

Erroneously recorded by Morgan (1848).]



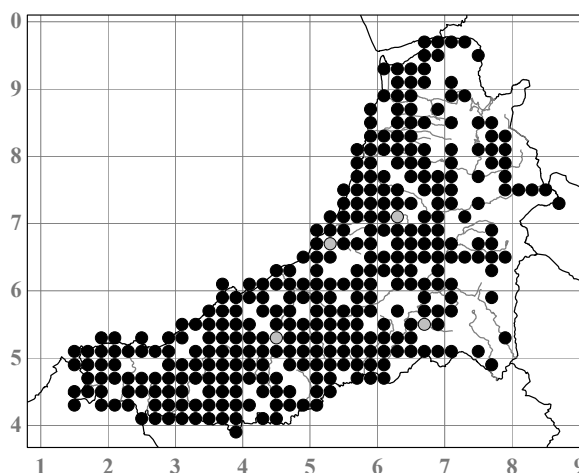
***Cerastium fontanum* Baumg. subsp. *vulgare* (Hartm.) Greuter & Burdet (*C. vulgatum* L. pro parte, *C. triviale* Link) - Common Mouse-ear - Clust-y-llygoden Gulddail**

Very common in pastures, on banks and verges, waste ground, gardens, dunes, lead mine spoil and a wide range of other habitats, but generally absent from shaded sites and wetlands. Salter (1935) mentions that “A fine form of damp meadows may have stems 18 inches in height”, and such plants occur in the base-rich flushes by the Afon Mwldan SN201489, 2002, and elsewhere. Similar plants also occur occasionally in seasonally flooded woodland, as at Llanerchaeron SN483603, 2002, and below Llechryd SN210431, 2003, but none seems to be subsp. *holosteoides*. Many plants in the populations in both damp and dry grassland on the Ynys-las dunes SN69B, C, 2000-2007 (NMW), have the lower cauline internodes with a single row of hairs, but otherwise seem to be just subsp. *vulgare* (see Rich & Jermy 1998). Altitude limit 750m, Pumplumon Fawr SN78Y, 1932 (Salter Diary 5.9.1932) although he later (1935) gives it as “reaching to nearly 2,000ft. [610m]”; 560m, shaly trackside, Rhos y Garn, Cwmystwyth SN797766, 2002.



***Cerastium glomeratum* Thuill. (*C. viscosum* auct.) - Sticky Mouse-ear - Clust-y-llygoden Lydanddail**

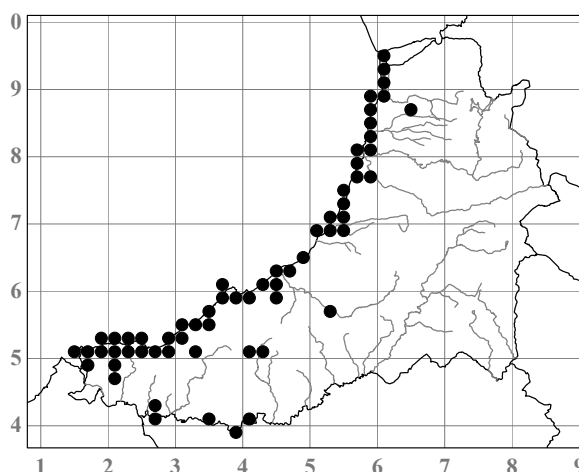
Very common, generally in the same habitats as *C. fontanum*, but much less frequent in unimproved pastures and other semi-natural vegetation and much more common in reseeded pastures, on verges and waste ground and in gardens. Particularly in the reseeded pastures it has increased so conspicuously in recent decades that perhaps some different introduced genotype is involved, although Braithwaite *et al.* (2006) attribute the national increase simply to raised nitrogen levels. Yet over a century ago Burkill & Willis (1894) said that among the features that showed the individuality of the county's flora was “the numerical preponderance of plants of *Cerastium glomeratum* over *C. triviale*”. Altitude limit 420m, verge of rough road 1km SE of Lle'r-neuaddau, Pumplumon SN76478421, 2005 (PAS & AOC).



***Cerastium diffusum* Pers. (*C. tetrandrum* Curtis) - Sea Mouse-ear - Clust-y-llygoden Arfor**

#### Var. *diffusum*

Abundant on dunes, sandy shingle, clifftops, dry banks, bare patches in pastures, tracksides and disturbed, open ground along the coast. It is rare inland, but occurs in abundance around the Penparc sand quarries SN200483, 2004, and on rocky knolls and dry banks on S-facing slopes in a few places up the Teifi reaching 17km from the sea on a steep pasture slope above the river 600m W of Pont Tyweli SN408403, 1996. Other inland sites include similar dry pasture slopes near Tal-y-bont SN642871, 1995, and near Brynhoffnant SN337511, 1995 (where it was at 180m altitude). It occurred as an accidental introduction on the gravelly forecourt of the agricultural merchants at Llanfihangel Ystrad SN527561 in 1996. There is considerable variation, especially



All records

in hairiness and glandulosity. Late-flowering, prostrate plants with fleshy leaves occur in the spray zone on the cliffs at the mouth of the Afon Drywi SN42586072, 2002 (NMW) and at Craig Caerllan SN35655786, 2002 (NMW). Most populations are of 4-merous plants, but that at Craig y Gwbert SN158502, 1996 (NMW) is of entirely 5-merous ones, and many others are mixed.

Var. **glabrum** (Rouy) P. D. Sell ined.

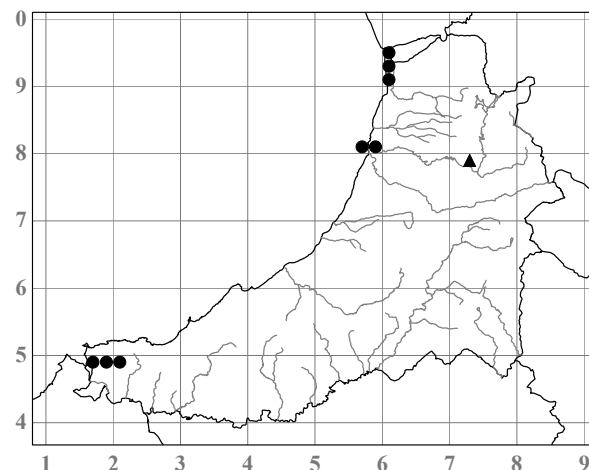
A population of this conspicuous and completely glabrous and eglandular variety was found in sandy dune grassland by the Borth promenade in 1960 (NMW, PMB) and colonies were still there at SN60789064 and 60789097 in 2007. It is also in several places on the Ynys-las dunes 1993 (SPC) - 2007 (NMW, CGE), especially at SN604935, as well as at SN60509363, 60609397 and 60849412, and can be both 4- and 5-merous (Chater 2008). Described from SW France, it has not been noted elsewhere in Britain. Plants approaching it, eglandular but with sparse hairs, have however been recorded on the bank at the NW edge of the University playing fields, Plas Crug, Aberystwyth SN58978140, 2008 (SPC).



*Cerastium diffusum* var. *glabrum*, Ynyslas dunes, SN60509359, April 2007

#### ***Cerastium semidecandrum* L.** - Little Mouse-ear - Clust-y-llygoden Fach

A rare winter annual and the earliest flowering *Cerastium*. It is abundant only on the mature dunes at Ynys-las SN69B, C, 1959-2005, but also occurs in small quantity on dry banks on the Aberystwyth castle grounds SN579816, 1978, on vegetated shingle on Tan-y-bwlch beach SN580802, pre-1936 (Salter 1935) - 2003, in a few places on the Penyr-ergydd dunes SN1648, 1941 (Whellan 1942) - 2002, and in sandy turf in the Penparc sand quarries SN201487, 1993 (SPC & AOC). It has been accidentally introduced with limestone chippings at the Cwm Rheidol lead mine SN72877812, 1992 (AOC, SPC & JAM).



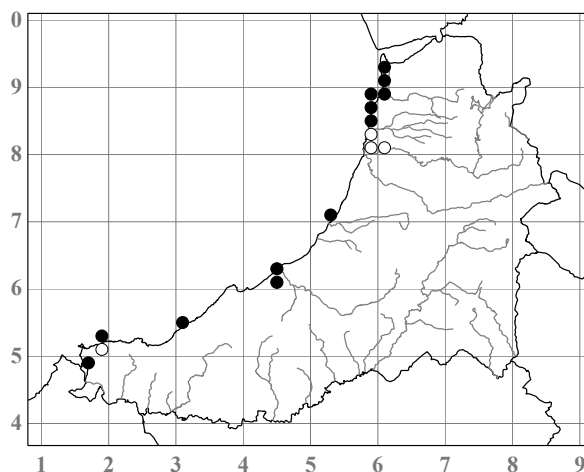
*Cerastium semidecandrum*

#### ***Myosoton aquaticum* (L.) Moench** - Water Chickweed - Llinesg y Dŵr

Absent from most of Wales as a native and with a generally continental distribution, *Myosoton* is a rare casual in the county. It was first recorded in 1956 at Mock farm, Ffostrasol SN379475 (PS). In 1993 one plant was found on the rubbish-tip below Pendinas SN584799 (NMW); in 1995 several plants were found in and around Newman's Garden Centre, Capel Dewi SN625823 (SPC); in 2001 it was a weed in flower-tubs in Regent Street, Aberaeron SN457631, in a hanging flower-basket at the Rhydypennau Inn SN629859 (SPC), and in the newly constructed verges of the Ysgol Penweddig car park, Llanbadarn Fawr SN59518121 (NMW) where it was still present in 2005. The topsoil for this last site came from the Sugar Beet residue lagoons near Kidderminster in Worcestershire in which area the plant is native.

#### ***Moenchia erecta* (L.) P. Gaertn., B. Mey. & Scherb.** - Upright Chickweed - Clust-y-llygoden Seth

An uncommon annual of dry slopes and sandy or stony well-grazed pastures along the coast, almost always associated with *Thymus* and other annuals such as *Ornithopus* and *Aphanes*, and varying greatly in abundance from year to year. It is easily overlooked, and the nine or so recent sites probably do not indicate a real increase over Salter's four. It is still on and near the Borth golf course SN608918-606921, 1995-2006 (SPC),



Characteristic *Moenchia* site, Clogfryn,  
view S from SN44626204, May 2004

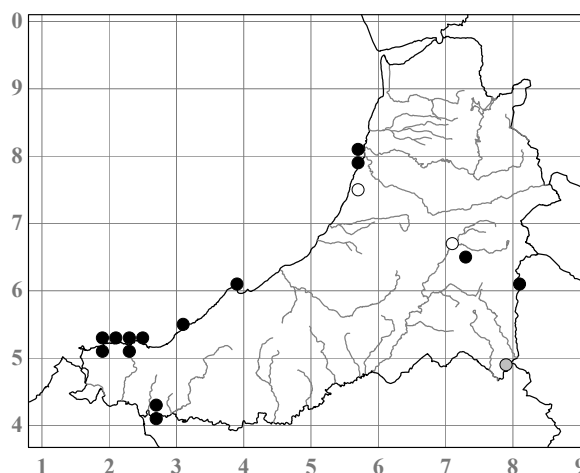
where Salter (1935) knew it. By the coast path southwards from near the Borth war memorial SN602886-596875, 1975 (ABS, ADQA) - 2005 (AOC & SJT) many thousands of plants occur in some years. Other recent records are from Ynys Fergi, Borth SN614896, 2005 (SPC); Wallog SN589852, 1997 (JPW & AOC) and SN590851, 1995 (SPC) - 1997 (JPW & AOC); N of Llanrhystud SN53447030, 1994 (JT & JPW) - 2008 (SPC); Clogfryn SN44626204, 1996-2004; Cilfforch SN44126165, 1996-2002; Llangranog SN31225428, 1996 (AOC & ADH) - 2002; Foel y Mwnt SN194520, 1996-2004; and by "The Dunes" chalet, Penyrergyd SN16394860, 2007. It seems to have gone from Constitution Hill SN58W, where Salter recorded it in 1904 (Diary 22.4.1894), from Pendinas SN5880 where he was told of it in the same year (DT, Diary 17.5.1904), and from Glanyrafon SN6180 where he saw it in 1900 (Diary 21.4.1900); this last site is *c.*3km from the coast, all the others being within 600m of the sea. Cultivated plants from the Llanrhystud site produced a few wholly 3-merous flowers in 1996 (SPC).

#### ***Sagina nodosa* (L.) Fenzl - Knotted Pearlwort - Corwlyddyn Clymog**

Known only from the slacks in the Ynys-las dunes SN69B, C, 2005, where it is locally abundant though inconspicuous when not in flower. It was first recorded there by Salter in 1908 (Diary 25.9.1908). It is surprising that it has not been found in coastal heaths or in flushes or heaths inland, as it occurs widely in such sites elsewhere in Britain.

#### ***Sagina subulata* (Sw.) C. Presl - Heath Pearlwort - Corwlyddyn Mynawydaidd**

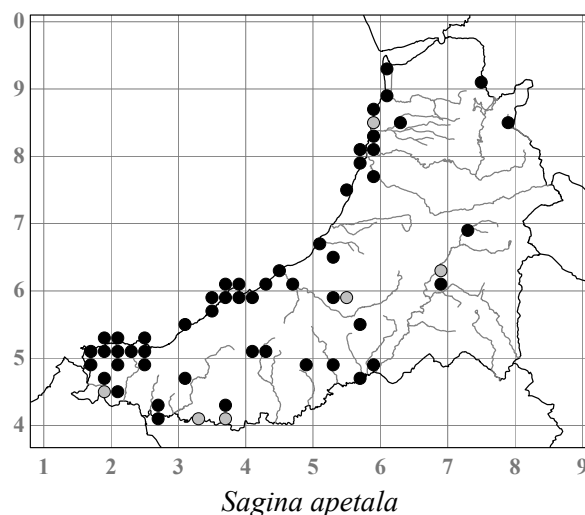
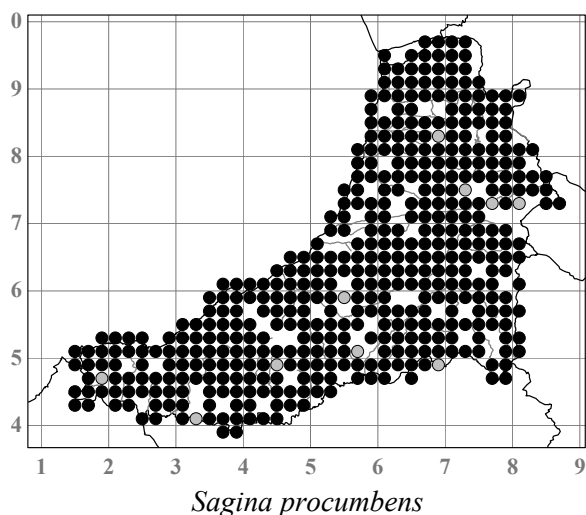
An occasional and very attractive perennial of bare or sparsely vegetated areas of soil in coastal heaths, on clifftops, and especially along paths and tracksides by the sea. Most records are from the SW of the county, and it is perhaps spreading and is certainly generally becoming more abundant. In the Aberystwyth area it was first seen along the footpath on Allt Wen SN577794 in 1991, and in 1998 a few plants were seen on the trampled soil and shingle by the roadway along Tan-y-bwlch beach SN579803 (SPC) where it has since become abundant, 2008. On Foel y Mwnt SN194520, 1978-2005, it occurs on anthills, and in some years it has also been extremely abundant on the paths and bare areas there. Inland it occurs on rocks by the Afon Teifi just below Cenarth bridge SN26884160, 1993 (AOC & TCGR) - 2004, where it appears native, but at its other inland sites it appears most likely to have been a casual introduction along road verges, FC tracks and railways: Salter (1935) recorded it near Strata Florida Station SN76D; it has been seen on FC road verges near Dalar-wen, Llyn Brianne SN794496, 1985 (AOC & DD) and 900m S of Moelprysgau SN809602, 2001 (AOC & RDP); on a stony track 750m ESE of Capel Tygwydd SN27754322, 2002 (JPW & AOC); and on a roadside verge 1km SSW of Pontrhydfendigaid SN724654, 1997 (MDS). Altitude limit 390m, S of Moelprysgau, 2001 (see above).





**Sagina procumbens** L. - Procumbent Pearlwort - Corwlyddyn Gorweddol

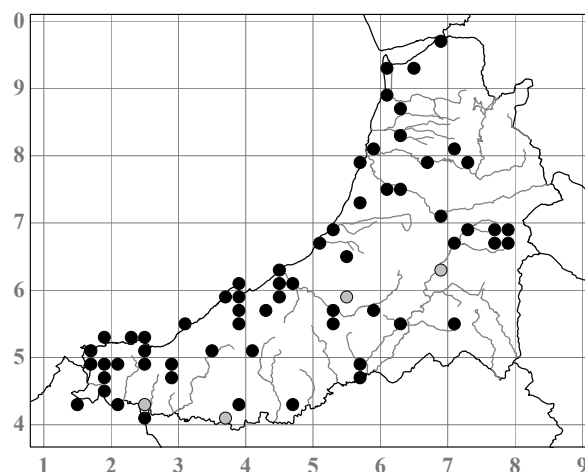
Common in damp heavily grazed or poached pastures, on rocky and grassy slopes and in stony flushes from the coast into the uplands, on streambanks, in dune slacks and coastal turf in the spray zone. It is ubiquitous near habitations on paths, roadside verges, waste ground, in lawns, pavement crevices and as a garden weed, but less often seen on paths and verges in the open countryside. Altitude limit 610m, Pumlumon (Salter 1935); 590m, shaly road verge, Pen y Garn, Cwmystwyth SN800770, 2002.

**Sagina apetala** Ard. (*S. ciliata* Fr.) - Annual Pearlwort - Corwlyddyn Unflwydd

Frequent along the coast in dry, open habitats, usually in sandy and stony places, on tracks, road verges, dry banks and walls, on waste ground and as a pavement weed. On bare patches and in short turf on exposed clifftops above the sea it often grows with *S. maritima*, and sometimes also with *S. subulata* and *S. procumbens*. Inland, *S. apetala* occurs in a few places on tracks, FC roads, railway ballast, waste ground and quarries. There is great variation in habit, in the frequent presence of a non-flowering rosette at flowering time (unusual in a short-lived annual) and in the abundance and distribution of glandular hairs. As with *S. filicaulis*, the varieties have so far scarcely been investigated. Var. **apetala**, with more or less prostrate stems, is common as a pavement weed around the marina SN582811, 2009 (NMW) and elsewhere in Aberystwyth, and most plants in the county are probably this. Var. **patula** (Jord.) P. D. Sell ined., with laxly spreading or more or less erect stems, is the common variety on bare soil at the top of sea cliffs and on cliff slopes above the sea, for example on Llangranog Head SN313552, 2002 (NMW) and Castell Bach, Cwmtudu SN359580, 2002 (NMW). Var. *laevis* S. Gibson, with rigidly erect stems, has not so far been seen. The earliest record of *S. apetala* was from a stony path by Aberaeron church SN457627, 1899 (Marshall 1900) with the comment "pedicels and sepals glandular, as in *S. patula* Jordan, of which it may be a weak state". Altitude limit 415m, roadside verge, Eisteddfa Gurig SN798840, 2002.

**Sagina filicaulis** Jord. (*S. micropetala* Rauschert, *S. apetala* subsp. *erecta* F. Herm., *S. apetala* auct.) - Slender Pearlwort

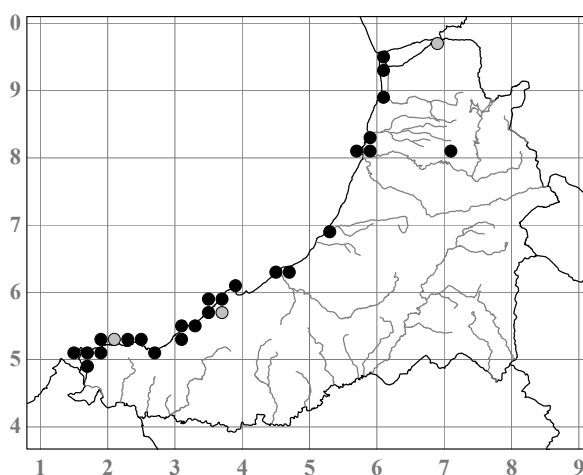
In similar dry, open habitats to *S. apetala*, but less confined to the coast and more widespread inland, and almost completely absent from natural habitats such as the sea cliffs and clifftop communities. It is more frequent as a pavement weed, and on tracks and waste ground, but the two sometimes grow together, for example on the rough road along Tan-y-bwlch beach, Aberystwyth SN580805, 1955-2005, and in the Penparc sand quarries SN201486, 2002. A non-flowering central rosette is frequently present. Varieties have not yet been properly recorded, but the very distinctive var. **stricta** (S. Gibson) P. D. Sell ined. with rigidly erect stems has been found in pavement crevices by the Teifi estuary 400m NW of



Nantyferwig SN166484 in 2002 (NMW); var. **prostrata** (S. Gibson) P. D. Sell ined., with prostrate stems, has been found in the Penparc sand quarries SN201486 in 2002 (NMW), on a stony road verge at Pont Alltycafau SN38683926 in 2002 (NMW), and on a pathside on the Aberystwyth castle grounds SN57958145 in 2009 (NMW); and var. **minor** (Rouy & Fouc.) P. D. Sell ined., with densely branched, ascending stems and small petals, grew with var. *stricta* (see above), and is on graves in the municipal cemetery, Aberystwyth SN592812, 2009, and is a pavement weed in Borth SN608905, 2009. Altitude limit 450m, road verge N of Llyn Hir SN791682, 2000.

### **Sagina maritima** Don - Sea Pearlwort - Corwlyddyn Arfor

In scattered localities along the coast, usually in the spray zone or where it is reached by the highest tides at the top of salt marshes, in thin soils on the clifftops, on damp ledges on the sea cliffs, and in damp sandy places behind the sea beaches, but also in dune slacks, and in pavement cracks on seaside promenades. Salter (1935) described it as occurring



in "Rocky localities along the coast; local", so it may perhaps have spread to other habitats since his day. Inland it has been seen only by a grit and salt bin by the A487(T) at Nantyrarian SN712810, 2000 (SPC) at 300m altitude.

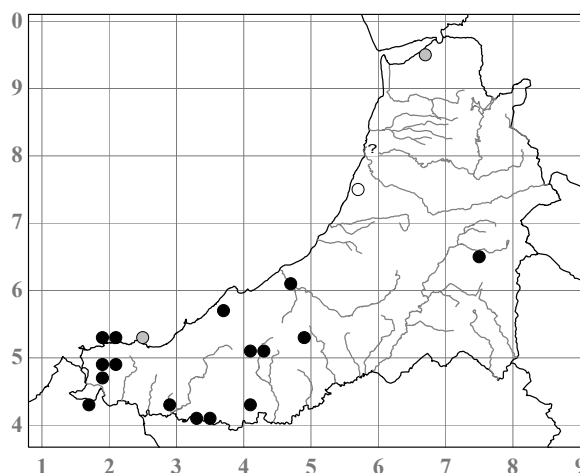
*S. maritima* is very variable in habit, but so far only three variants have been identified in the county. Var. **maritima**, delicate, with ascending or erect stems, looking very like *S. apetala*, is probably the commonest and has been seen in many sites, including the top of the salt marshes in the Dyfi estuary SN614936, 2008 (NMW), and has for example been collected from pavement cracks by the Aberystwyth marina SN581810, 2003 (NMW). Var. **prostrata** Towns., small, prostrate, with fleshy leaves, seems to favour the most exposed sites and has been seen in abundance on bare slopes in the spray zone on Craig Caerllan, Cwm Tudu SN35655786, 2002 (NMW), on partly bare soil on the clifftop on Llangranog Head SN31435532, 2003 (NMW), and on bare soil in the spray zone on Craig y Gwbert SN158502, 2005 (NMW). Var. **elongata** Gren. & Godr., decumbent, with long lateral stems, has been seen on the cliffs by the stream 120m NE of Mwnt church SN19605215, 2003 (NMW).

### **Scleranthus annuus** L. subsp. **annuus** - Annual Knawel - Dinodd Unflwydd

Described by Salter (1935) as "Common in fields and waste places, especially on sandy soils", but seen in only about 20 sites since 1970. The map does not



*Sagina maritima* var. *maritima*, Aberystwyth marina, SN581810, June 2007



*Scleranthus annuus*

indicate the extent of its assumed decline as Salter and most other early recorders did not bother to give localities for the species. Recent records have chiefly been from rocky or stony tracks in farmland, with a few from arable fields and sand and gravel quarries. At the margin of an arable field at Ty-gwyn, Mwnt SN199521 in 2008 there were *c.*40,000 plants. Plants from an old track over a rocky ridge 150m SW of Ynys-greigiog, Furnace SN673947, 1985 (IKM) were considered by PDS to be somewhat intermediate with subsp. *polycarpus*. Altitude limit 310m, FC road verge 800m SSE of Pantyfedwen, Strata Florida SN759643, 1997 (IWC & KC).

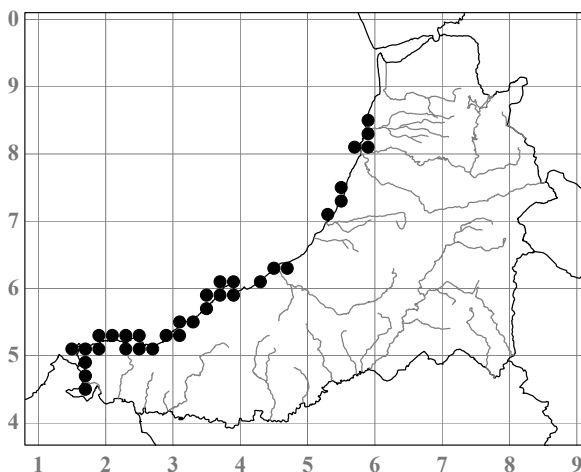
***Spergula arvensis* L. - Corn Spurrey - Troellig yr Yd**

Described by Salter (1935) as very common as a weed of cultivated land and “in every patch of oats and potatoes to the upper limit of cultivation,” it is still a common weed of arable fields, road and path verges, disturbed ground and tips. It is especially characteristic of river shingle, but is absent from salt-influenced sites near the sea. Although it has probably declined to some extent, it is still one of the commoner arable weeds and often occurs in great abundance. Altitude limit *c.*335m (“about 1,100ft.”), Salter (1935); 335m, shingle by the Afon Tarenig SN823822, 1993.

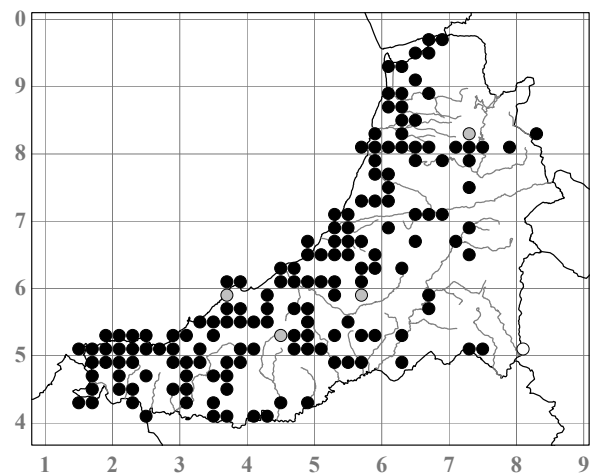
Var. **sativa** (Boenn.) W. D. J. Koch (*S. sativa* Boenn.), which Salter seems not to have recognised, is the commoner variety, but there seems to be no difference in ecology or general distribution between it and var. **arvensis**. In many sites they grow together, and in some of these the latter has been observed to flower earlier.

***Spergularia rupicola* Lebel. ex Le Jol. - Rock Sea-spurrey - Troellig Arfor y Clogwyn**

An often abundant plant of coastal rocks and walls, commonest in the SW of the county, and absent from several stretches of cliff-girt coast such as those S of Borth and the Allt Wen cliffs S of Aberystwyth. It was first recorded in 1906 on the Aberystwyth castle walls SN579815 (HWP, Salter 1935) and is still



*Scleranthus annuus* dominant at margin of stubble field, Mwnt, view E from SN199521, August 2008



*Spergula arvensis*



*Spergularia rupicola* on Aberystwyth castle ruins SN580815, June 2009



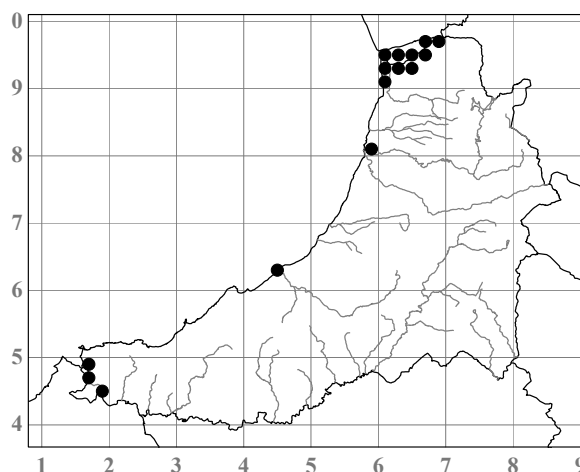


*Spergularia rupicola*, New Quay pier, view E from SN390601, June 2005

abundant there, 2008, as it is also on the Cardigan castle walls SN178459, 1986-2008. It is very abundant all over the rocky parts of Cardigan Island SN1551-1651, 1977-2005 (LW).

***Spergularia media* (L.) C. Presl (*S. marginata* Kitt., nom. illeg.)** - Greater Sea-spurrey - Troellig Arfor Mawr

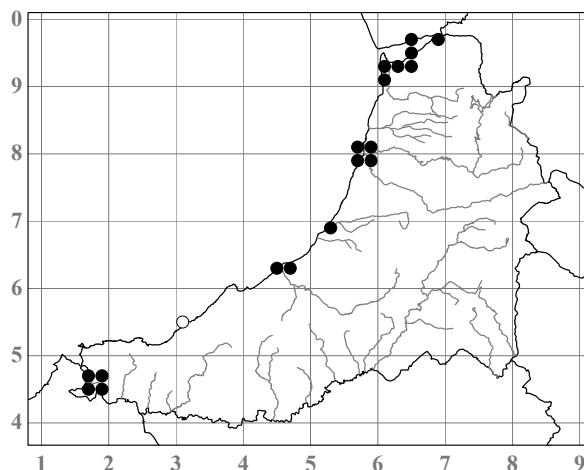
A common plant of the salt marshes on the Dyfi estuary SN69 where it extends much further down the marsh than *S. marina*, sometimes growing with *Salicornia dolichostachya* as its only associate in soft, wet mud, but also sometimes growing with *S. marina* in the top and middle zones. It is also much the commoner species in the inland part of the estuary E of the Cletwr, extending right to the county boundary. It has also been recorded in small quantity from the salt marsh in the Ystwyth estuary SN580806, 1993; in Aberaeron harbour SN457628, 1981-1993; and in the Teifi estuary SN14T, U, X, Salter (1935) - 2005. It was a recent arrival in 1999 on bare mud in brackish marsh on the Teifi Marshes SN184456 (DKR *et al.*). The earliest record was from Aberystwyth, 1837 (K, Herb. Watson, EL, det AOC).



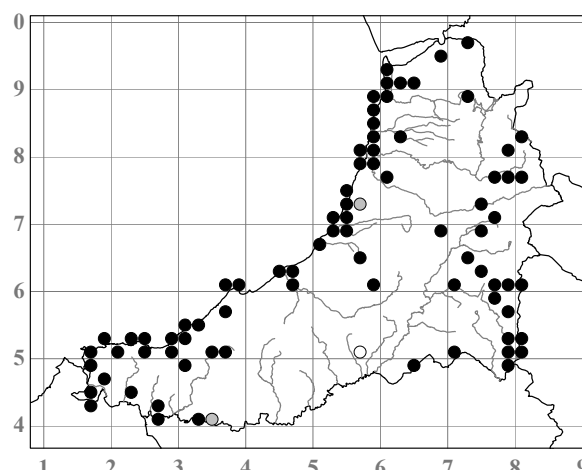
***Spergularia marina* (L.) Griseb. (*S. salina* J. Presl & C. Presl)** - Lesser Sea-spurrey - Troellig Arfor Bach

A frequent plant of the salt marshes and of a few other sites along the coast. In the Dyfi estuary SN69 it often grows with *S. media* in the upper and middle zones of the salt marsh, but is more characteristic of firmer substrates and where there is a better developed turf; it is generally less common there than that species, does not usually extend as far down the marsh, and is not as frequent in the inland part of the estuary. It is also in

the salt marshes of the Rheidol and Ystwyth estuaries SN58, and in the developing salt marshes at Felin-y-mor SN581801, 1993-2005, and below Allt Wen SN579796, 2000-2005; by the brackish ditches behind the beach 1.1km SSW of the mouth of the Afon Wyre SN522687, 1995-2005; in hollows and on the path at the back of the beach NE of Aberaeron SN457632-462635, 1993; and in the salt marshes of the Teifi estuary SN14. Salter (1935) recorded it from the Aberystwyth castle grounds and in 1995 it was frequent in crevices between the Promenade paving stones here SN57868160. It has not been recorded from inland roadsides yet in the county. Var. **neglecta** (Kindb.) ined. has been recorded from the Dyfi estuary SN617934, 1993, and from the Rheidol estuary SN583812, 1998, and is probably the prevailing variety.



*Spargularia marina*



*Spargularia rubra*

### **Spargularia rubra** (L.) J. Presl & C. Presl - Sand Spurrey - Troellig Arfor Coch

A frequent plant of dry rocky and stony places, on paths, verges, waste ground, tips and quarries along the coast, and on FC road verges and other roadsides and tracks in the uplands, but rarely found in between. It has certainly increased in these upland sites in recent decades in line with the national trend (Braithwaite *et al.* 2006). Altitude limit 590m, verges of rough road, Bryn Garw, Cwmystwyth SN800770, 2002.

### **Agrostemma githago** L. (*Lychnis githago* (L.) Scop.) - Corncockle - Bulwg yr Ŷd

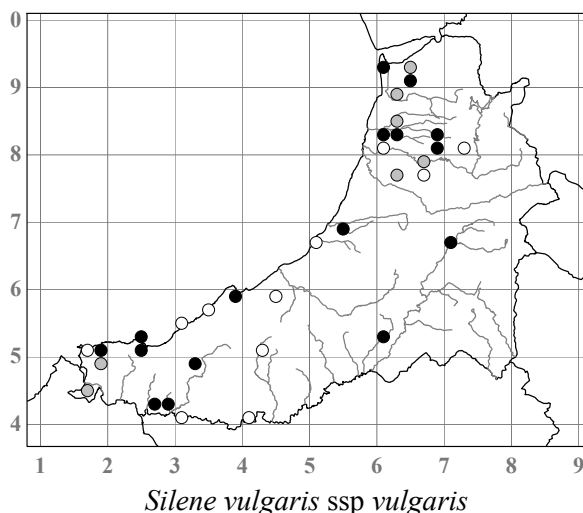
Described by Salter as an occasional cornfield weed, although he gives only six localities, and two more are given in Wade (1952). One of these, from cornfields at Craig y Filain SN238522 in 1941 (Whellan 1942) is the last of it as an arable weed. Earlier records were by Morgan (1849) from Penglais, Aberystwyth SN58V or W, and from cornfields at Aberystwyth in 1880 (HLJ, *BRC Rep.* 1880: 132 (1882)). Since 1941 this archaeophyte has been found only three times, as a casual, on dumped soil in the Wstrws gravel pit SN385502, 1992 (APF & AOC, NMW), grown from a seed-mix in a lawn on the Glanyrafon Industrial Estate, SN609801, 1992-1995 (SPC, NMW), and one plant on a grave in the municipal cemetery, Aberystwyth SN59258125, 2009.

### **Silene otites** (L.) Wibel - Spanish Catchfly - Gludlys Sbaen

Aikin (1797) listed this species, as *Cucubalus otites*, among the plants he saw in 1796 on a walk around Aberystwyth c.SN58V encompassing the marshy banks of the Rheidol, the ruins of Plas Crug mansion and the slate quarries above the town; Evans (1804) repeats this record, and Turner & Dillwyn (1805) misleadingly ascribe it just to the “marshy banks of the Rhyddol”. Aikin’s record is the only one, and there seems no reason to discount it.

### **Silene vulgaris** (Moench) Garcke subsp. **vulgaris** (*S. cucubalus* Wibel) - Bladder Campion - Gludlys Codrwrth (Bwtwn Crys Ifan)

Described by Salter (1935) as “Fairly common”, it is certainly now a rare plant in the county, having been seen in only 20 sites since 1970, and it has been lost, for no obvious reasons, from at least six of these sites more recently. Nowhere does it occur as more than one or a very few plants, except at South Darren mine SN684830 where c.15 plants were seen on disturbed shaly spoil in 1992 (SPC). Most of the recent records



*Silene vulgaris* ssp. *vulgaris*

are from graveyards, railway verges, roadside banks and lead mines, with only three from pastures, and one from cliff-top grassland on the coast.

### *Silene uniflora* × *vulgaris*

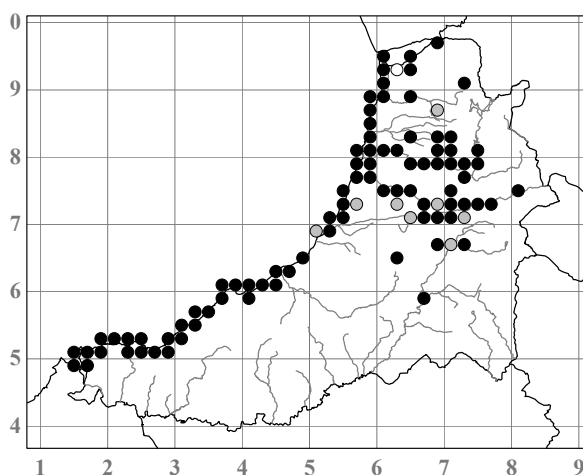
A difficult hybrid to detect, and recorded only from inland sites in the N of the county. It was first recorded in 1930 “Above the station, Devil’s Bridge, 230m” c.SN7376 (Marsden-Jones & Turrill 1957); the authors state that they found a number of these hybrids in that year up the river valleys in the district where *S. uniflora* comes more into contact with *S. vulgaris* than usual. Salter collected a specimen at Aberystwyth c.SN58V in 1936 (NMW). In 1966 “a large and old hybrid population” was recorded on lead mine spoil and along the stream at Cwmerfyn c.SN6982 (JPS, *Proc. BSBI* 6: 415 (1967)), and the hybrid has since been seen in quantity at several mine sites in this valley SN681832-703824, 1992 (SPC) - 2006 (NMW), both parents being present near at least one of them. Two large plants grow on mine spoil at Esgair Fraith SN74019114, 1998-2005 (SPC *et al.*) at 405m altitude, although neither parent has been seen anywhere near. As *S. vulgaris* is now so very much rarer than *S. uniflora* in this N part of the county, it seems unlikely that new plants of the hybrid will occur often in the future.



*Silene uniflora* × *vulgaris*, Esgair Fraith  
lead mine SN74019114, June 2009

### *Silene uniflora* Roth (*S. maritima* With.) - Sea Campion - Gludlys Arfor

Common along most of the coastline on cliffs, screes, walls and rocky slopes. In the early 1970s there was even a small colony on the sand dunes at Ynys-las SN69B (Savidge 1973). It was first recorded by Llwyd from Borth and Aberystwyth in 1682 (Chater 1984a). It is also widespread inland in the N of the county chiefly on lead mines, river shingle and in graveyards, where many of the populations are resistant to heavy metal toxicity and have been extensively studied by Marsden-Jones & Turrill (1957), Baker (1974, 1978), Baker & Dalby (1980) and others. Numerous morphological differences are detectable within and between populations, as well as physiological differences between populations, and there has been much interest in what light these studies may shed on evolution within the Bladder Campions (Savidge 1969).



The earliest record inland was from the “Bed of river at Hafod” c.SN77L where it was collected c.1795 probably by J. E. Smith himself (LINN, Herb. Smith); this was not far below the long-established Cwmystwyth lead mines. In 1893 Burkill & Willis (1894) “traced this species from Aberystwyth up the





*Silene uniflora* on river shingle of the braiding Ystwyth, Grogwynion, view ENE from SN710720, May 2005

Ystwyth river, to a point, Nant Cwm Du [SN87C, by the Cwmystwyth mine], sixteen miles in a straight line from the sea, at 800ft [245m]. It grows on the rocks at the side of the river, possibly depending largely for its maintenance on the lead mine refuse in it. It occurs again near Pont-rhyd-fendigaid, on the débris of a mine [c.SN76I or N]. We compared fresh specimens from the coast and from inland, without observing any difference [!].” Ley (1887, 1889) recorded it on the Teifi near Strata Florida Station SN76D “On the gravels of streams in the Teifi marshes; also on railway ballast, but clearly brought with the gravel.” Its frequency in graveyards inland must be due to the use of the conveniently weed-toxic gravel from nearby lead mines as a covering for graves; there are especially good populations in Jezreel chapel graveyard, Goginan SN690813, 1972-2005, in Ponterwyd chapel graveyard SN749809, 1980-2006, and in Ysbyty Cynfyn churchyard SN752791, 1978-2006. Some of the best lead mine populations are at Cwmsymlog c.SN6983, 1960-2006, at the Wemyss mine in Cwm Newydion SN716741, 1980-2008, on the quarried Graig



*Silene uniflora*, Cwmerfyn lead mine, view NE from SN69608285, June 2006



Fawr cliffs at Cwmystwyth SN803748, 1991-2006, and around the mine ruins and stream in Pontrhyd-y-groes village SN738722, 1976-2006. Extensive river shingle populations include those on the Rheidol at Blaendolau and Glanyrafon SN68A, 1895 (Salter Diary 14.6.1895) - 2006, and on the Ystwyth at Grogwynion SN67V-77B, 1976-2005. It also occurs on railway ballast, for example around the old station yard at Trawsgoed SN665726, 1965-2005 (JPS), and in a few quarries, where heavy metals are not involved, notably the quarries above North Road, Aberystwyth c.SN588821, 1849 (Morgan 1849) - 2008. Marsden-Jones & Turrill (1957) did their fieldwork in the county in 1930, along the coast at Aberystwyth and up the Rheidol and Ystwyth. They commented that while most of the common variants occurred near the sea, neither very narrow-leaved plants with much anthocyanin, nor yellow-green plants completely lacking anthocyanin were found. Plants with multilobed petals were common, especially near the mouth of the Ystwyth c.SN5780. Their sampling for scoring the numerous characters that they analysed unfortunately cannot be meaningfully repeated, as their main sample of 56 plants was from the whole area, and their only

*Silene uniflora* on mine spoil, Cwmsymlog, view E from SN699837, June 1989

localised sample was of just five plants from a rather vaguely defined site, “on old bed of River Ystwyth, 1½-2 miles from the sea” which could have been anywhere between Llanychaearn and Llanfarian. They paid particular attention to a sterile plant with very narrow calyx from the Ystwyth, but as elsewhere in their almost impenetrably confusing book they draw no conclusions. Although they mentioned the connection with lead mines, and suggest that the species may have biotypes reacting differently to varying concentrations of mineral salts, they did not develop this theme. E. J. Salisbury, in his foreword to the book, says more helpfully: “It is difficult to believe that many of these morphological features which distinguish these populations have in themselves any survival value, but they may well be the concomitants of physiological traits that, as the writer suggested in connection with studies of seedling mortality, may affect survival, perhaps long before the adult morphological characters with which they are associated become manifest.”

Baker (1978) in a study of zinc tolerance in *S. uniflora* studied nine populations in Britain, including three in Cardiganshire which were from the sea cliffs at Clarach SN585841 and from the lead mines at Cwmerfyn SN695828 and Grogwynion SN714721. All the populations accumulated zinc to a much higher degree in the roots than in the shoots, but the mine populations managed to exclude zinc from the shoots by several mechanisms: an overall reduction in uptake, a block of transport from root to shoot, or an accumulation of zinc in the roots which may or may not have been coupled with the shoot exclusion mechanism. Baker & Dalby (1980) grew plants from seed collected in 1971 and 1972 to study the morphological variation in mostly these same populations, 30 from each, and found that in general the inland mine plants were more compact and rosette-forming, with elongated, narrow leaves, and had a higher frequency of gynodioecism, while the coastal plants were straggly and prostrate, with wider leaves, and were almost entirely hermaphrodite-flowered. They suggested that colonisation of mine sites affected by heavy-metal toxicity has been influenced by the proximity of suitable mother populations, by the frequency of metal-tolerant genotypes in such populations, by the extent of transport of seed to the sites, and by the dispersal of propagules from one mine to another by Man. These populations that they studied still exist, and in 2006 a simplified repeat of their sampling from Clarach and Cwmerfyn was carried out, but by measuring 30 plants growing *in situ* rather than from seed. From the eight characters measured (selected for the repeat as being the most foolproof to measure and the least likely to be affected phenotypically) it would appear that after 35 years the same differences applied but had become more exaggerated:



*Silene uniflora*, Logau-las lead mine,  
Pontrhyd-y-groes, view NE  
from SN743718, July 1995

	Clarach		Cwmerfyn	
	1971/2	2006	1971/2	2006
Leaf length/width ratio	3.9	3.8	6.7	7.8
Flower diameter in mm	27	28	24	20
No. of styles per flower	4.2	4.2	3.9	3.5
Calyx length/width ratio	1.7	1.4	1.8	1.8
% flowers with petals not overlapping	26	0	17	17
% flowers with blotched petals	0	0	3	13
% flowers with coronal scales	7	10	53	53
% flowers with calyx-mouth contracted	100	93	27	23

At the Cwmerfyn lead mine the leaves had got even narrower, the flowers even smaller and with fewer styles, and more of the plants had blotched petals and a contracted calyx-mouth. This indicates that the lead mine population has continued to diverge from the coastal ones, while the sea cliff one is remaining the same (except for the percentage of flowers with overlapping petals). It would be very interesting to repeat Baker & Dalby's sampling exactly to see whether these apparent trends are real. The Cwmerfyn mine has been worked since at least the 17<sup>th</sup> century, but how long the *Silene* population has been there is unknown.



The Tan-y-bwlch beach SN580805 population has recently been used by Warren & James (2008) in their investigation of the effects on pollinators of the heritable characters of length and thickness of flower stalks, which enable the flowers to wave enough to attract, but not so much as to cut short, the insects' visits.

Altitude limit 305m, walls of Capel Trisant graveyard SN717757, 1986-2008. (It is presumably likely once to have been at Esgair Fraith lead mine, at 405m altitude, as its hybrid with *S. vulgaris* grows there.)

***Silene armeria* L.** - Sweet-William Catchfly - Gludlys Clystyrog

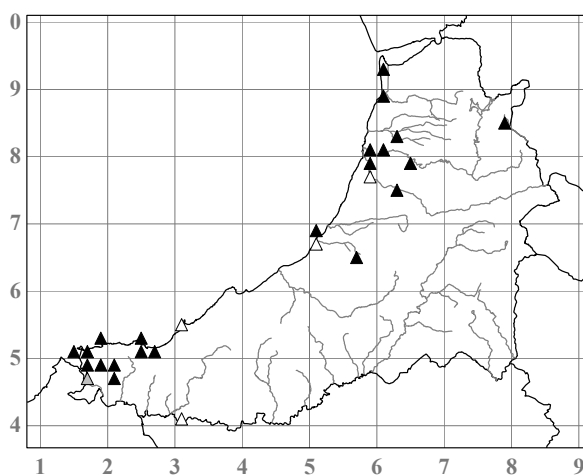
Single plants occurred as casuals in a garden at Pontrhydfendigaid SN736661 in 1988 and 1989 (JWH); it was not being grown in the area. Native of Eurasia.

***Silene noctiflora* L.** - Night-flowering Catchfly - Gludlys Nos-flodeuol

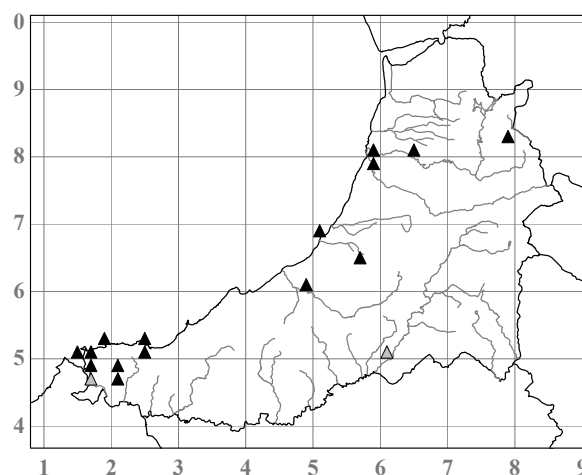
Said by Salter (1935) to occur "Frequently as a weed of cultivation, or as a casual", although the only locality he gave was Llanbadarn Fawr c.SN5980. This archaeophyte must have decreased rapidly, as in Britain generally, and is now no longer a regular member of the flora, the only record since 1935 being of four plants in a small field sown with *Lotus corniculatus* var. *sativus* at Nantsiriol, Bow Street SN612843 in 2002 (NMW).

***Silene latifolia* Poir. subsp. *alba* (Mill.) Greuter & Burdet (*Lychnis alba* Mill.)** - White Campion - Gludlys Gwyn

An occasional archaeophyte weed of arable field margins, disturbed ground and hedgebanks in the coastal parts of the SW of the county, but rare elsewhere and mostly of casual occurrence. It has a persistent seed bank and sometimes appears where road widening or house building disturbs former arable sites. Salter (1935) described it as frequent, but not as common as *S. dioica*, and chiefly in the coastal district, and it has probably decreased considerably since his day. Altitude limit 410m, disturbed ground by new house, Eisteddfa Gurig SN797840, 1993 (SPC).



*Silene latifolia* subsp. *alba*



*Silene* × *hampeana*

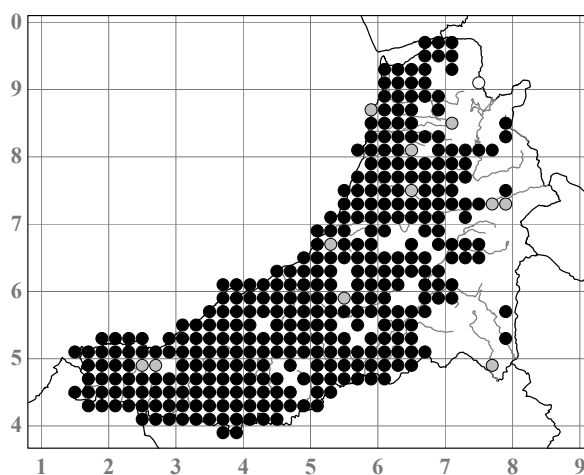
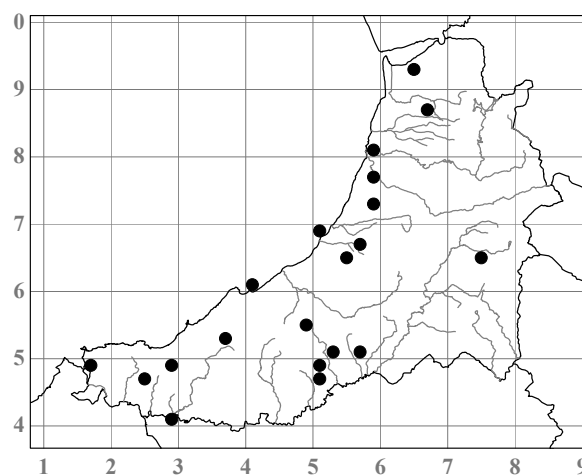
***Silene* × *hampeana* Meusel & K. Werner (*S. dioica* × *latifolia*)**

Almost as common as *S. latifolia* and with a similar distribution, but often occurring in its absence, suggesting that the hybrid has a similarly persistent seed bank. Altitude limit 360m, disturbed verge of the A44(T), Cwmergyr SN793829, 1987.

***Silene dioica* (L.) Clairv. (*Lychnis diurna* Sibth.)** - Red Campion - Blodyn Neidr (Gwas y Neidr, Blodau Taranau, Blodau Llygod)

A common plant of the more fertile woodlands, hedgebanks, scrub, streambanks, damp gullies and ledges on the coastal and upland cliffs, under Bracken and elsewhere on the coastal slopes, and on waste and disturbed ground. It is usually in at least partial shade, and is rare in wet places. The intensity of flower-colour varies, and white-flowered plants, forma *lactea* (Hartm.) Meusel & K. Werner, usually completely lacking anthocyanin, are quite often seen. Allen & Hatfield (2004) argue that a reference to a folk remedy for snake



*Silene dioica**Silene dioica* forma *lactea*

bites recorded from N Cardiganshire by Jones (1930) refers to this species. Altitude limit 395m, “Esgair Hir old mines” SN79K (Salter 1935); 415m, copse by stream, Eisteddfa Gurig SN798840, 2002.

### ***Silene muscipula* L.**

A single plant was found on the shingle path on a new floodbank by the Afon Rheidol at the Glanyrafon Industrial Estate SN61408047 in 2001 (NMW), perhaps originating as a contaminant in a seed-mix. It is native of the Mediterranean.

### ***Silene gallica* L. (*S. anglica* L.) - Small-flowered Catchfly - Gludlys Amryliw**

A rare arable archaeophyte weed virtually confined to the coast in the SW of the county. Salter recorded it from six sites, and there were five other records up to 1958. Since 1970 it has been seen in three sites, one of them having an extensive population; so although there has been some decline, it can remain abundant where it occurs and clearly has an extensive seed bank. It seems worth giving all the available records in detail. The only record from the N was of it in plenty on the margin of a cornfield just W of Taliesin SN69K in 1903 (Salter Diary 15.7.1903). He also saw it in “cornfields north of Ynys Lochtyn”, perhaps SN35H (1935); “in plenty on weedy borders of a cornfield” at Llangranog c.SN35C in 1924 (Diary 14.9.1924); as a cornfield weed somewhere E of Mwnt c.SN25B in 1929 (Diary 18.9.1929); at the edge of a cornfield at Mwnt c.SN15W in 1894 (Diary 28.6.1894); at Gwbert c.SN14U or 15Q after 1935 (Wade 1952); and near Cenarth c.SN24Q (1935). The only other pre-1970 records were from SN25 in 1936 (WRR & WWB); from Gwbert c.SN15Q in 1937 (WRR); from SN35 in 1958 (DEdeV & AMcGS); from SN15 in 1958 (BSBI field meeting); and from “cornfields about Aberporth” c.SN25K, Q in 1958 (Whellan 1942).

In 1987 c.500 plants were seen in a potato strip in a field 200m SE of Pen-y-graig, Llandysiliogogo SN36415782 (NMW, AOC & WMC), but this has been under grass and not ploughed since. In 1990 two plants were seen at the edge of an Oat field 200m NE of Ty-gwyn, Mwnt, SN19915200, and in 1991 over a thousand were at the edge of another arable field nearby at SN20015212 (AOC & DLK); at this latter site variable numbers have been seen whenever it has been ploughed since, most recently in 2005 (PJW) and 2008. In 1993 there were many thousands of plants on another arable margin here at SN19885212 (AOC & SPC), and in 1996 c.8 plants on another at SN19825209 (AOC & PJW). In 2005 there was a small population on an arable margin 500m WNW of Crug Farm, W of Mwnt SN173513 (PJW), and another 700m NW of Llwynysgaw, E of Mwnt SN213520 (PJW). In 1993 a few plants were seen on disturbed ground at the NW corner of the Penparc sand quarries SN201487 (AOC & SPC).

Most records seem to have been of var. **gallica**. Var. **quinquevulnera** (L.) Boiss. has been recorded only twice: there is an anonymous 1936 specimen labelled “W. Mount, N. Cardigan”, presumably Mwnt c.SN15W (BIRM); and a 1977 one from a recently cultivated derelict garden at Penrhiw, Cardigan SN178448 (NMW, RLd) where it was an abundant weed.

### ***Silene conica* L. - Sand Catchfly - Gludlys y Tywod**

Recorded only once, as a casual at Aberystwyth c.SN58V in 1903. Salter (Diary 17.7.1903) wrote: “*Silene conica* reported in “Welsh Gazette” of July 16<sup>th</sup>. as found by the Editor”. The relevant part of the actual article, under an Aberystwyth heading, reads: “Wild Flower - During the past week two rare wild plants were

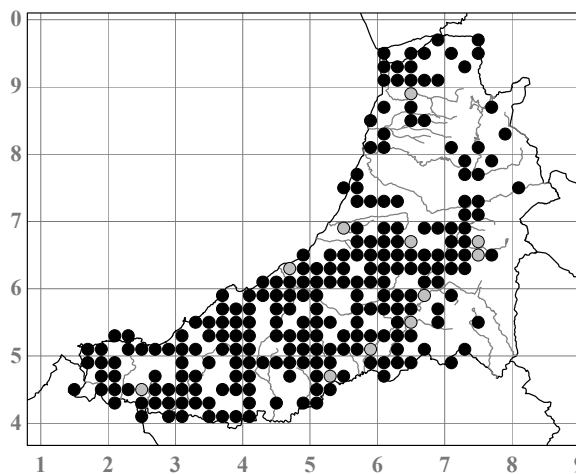
discovered in the Borough, one being the Corn Catchfly (*Silene conica*) - of the Pink family, and the other the Elecampane ...” As the editor, George Rees, was a very competent botanist (Lewis 1980), the plant is unlikely to have been misidentified and must be accepted as a casual.

***Silene coronaria* (L.) Clairv. (*Lychnis coronaria* (L.) Murray) - Rose Campion - Lluglys Gwridog**

First recorded in 1992 on the disused railway at Llanfarian SN591778 (SPC) where it persisted for a few years. It has been recorded as well-established by St. Mary's Hall, Bryn Road, Aberystwyth SN586823 in 1994 (SPC), on a footpath verge SW of Grogal, New Quay SN37355928 in 1999 (NMW), on a roadside hedgebank at Bryngwyn SN299450 in 2008, and on the Penyrergyd dunes SN160485 in 2008 (AOC & JPP). More casual occurrences have been noted at a pavement edge in Llanbadarn Fawr SN606805 in 1998 (SPC), on a wall at Yr Hen Ysgol, Aberystwyth SN58608188 in 2004, and on the Felin-y-mor Road verge SN58118069 in 2004. Native of SE Europe, N Africa and SW Asia.

***Silene flos-cuculi* (L.) Clairv. (*Lychnis flos-cuculi* L.) - Ragged-Robin - Carpiog y Gors (Cochyn Bratiog, Y Goes Goch, Ffrils y Merched)**

A frequent plant of fens, rhos pastures, damp meadows, streambanks and pond margins, especially in the more mesotrophic wetlands and in *Juncus acutiflorus* communities. It is salt-tolerant and occurs in the spray zone on coastal till slopes, where the plants sometimes have fleshy leaves, stout stems and contracted inflorescences, for example at Gilfach-yr-Halen SN434613, 1962. It also grows in brackish marshes, and unusual plants with similarly fleshy leaves and with procumbent, stout, geniculate stems with rooting axillary rosettes grow on tidal mud by Rosehill Marsh in the Teifi estuary SN190453, 1994 (NMW) - 2005. Jones (1930) records an ointment made from Ragged-Robin as a folk remedy for snake bites in N Cardiganshire, although Allen & Hatfield (2004) argue that this should refer to Red Campion. Altitude limit 430m, Llyn Conach c.SN79G (Salter 1935); 340m, margin of Nant-y-moch Reservoir SN770879, 1993 (JPL & ACW).



***Silene chalcedonica* (L.) E. Krause (*Lychnis chalcedonica* L.) - Maltese-cross - Croes Malta**

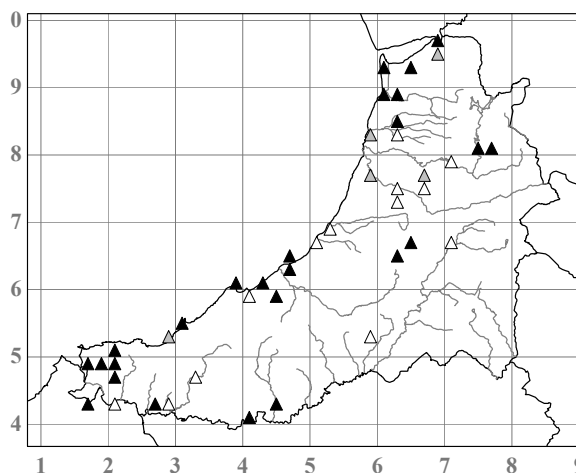
Only recorded once, naturalised among brambles on rubble dumped c.1996 at edge of a valley mire 150m W of Clyn-gwyn, Troed-y-rhiw SN48875367, 2003. Native of Russia.

***Saponaria officinalis* L. - Soapwort - Sebonllys**

An occasional archaeophyte of waste ground, road verges, graveyards, old cottage sites, sand dunes and streamsides. The earliest record was by Morgan (1849) from “Clarach lane” SN58W. As Salter (1935) remarked, most colonies are of the pale pink double cultivar, ‘**Rosea Plena**’.

***Vaccaria hispanica* (Mill.) Rauschert (*Saponaria vaccaria* L.) - Cowherb - Llysiau'r Fwch**

Recorded only by Salter (1935), as a casual on the Aberystwyth rubbish-tip SN591811 in 1905 (det. WHP, Diary 7.7.1906) and 1927. Native of Eurasia and N Africa.



*Saponaria officinalis*

***Dianthus deltoides* L. - Maiden Pink - Penigan y Forwyn**

Only once recorded in the wild, in 1990 when two plants were found on vegetated shingle by the Afon Rheidol 500m below Glanyrafon Bridge SN605803 (APF); as the corolla was a very deep maroon-red, the

plants were clearly an escaped cultivar rather than native. Salter (Diary 22.9.1905) refers to a report of it from the Llandygydd district c.SN24L (ETT), but as he does not mention this in his Flora he presumably doubted its validity. It is abundant on at least one of the “*Sedum* roofs” at the Aber-porth Technology Park SN246494, 2006-2008.

***Dianthus barbatus* L.** - Sweet-William - Penigan Barfog

Recorded only in 1997-1998, when four well-established plants (one white-flowered), perhaps derived from garden throw-outs, grew by the FC depot in Coed Tynbedw SN695715 (SPC). Native of S Europe.

***Dianthus armeria* L.** - Deptford Pink - Penigan y Porfeydd

Salter (1935) stated that the Deptford Pink was found in 1907 between Ciliau Aeron and Llwynceilyn (GR), and (Diary 26.8.1927) that it was re-found there in 1927 (GR). He was sent a specimen in 1928 (Diary 30.8.1928), and shortly after (Diary 23.9.1928) wrote “Mr. Geo Rees states that his locality for the Deptford Pink is between the Mydr and Llwynceilyn [i.e. c.SN45P or U]”. Nothing more is known of this site. The only other site is Pendinas, Aberystwyth, where it was first recorded about 1935 (AHB, Salter 1935); Salter (1934) said that the species is in only *one* locality, presumably referring to Rees’s, so AHB’s record must be after this. It was known to WMJ from Pendinas in a Gorse patch at SN588799 near Piercefield farm, as reported in *West Wales Field Society nature note* 3: 2 (Sept. 1950) “He happened to notice it in a posy gathered by his little niece [Valerie Thompson], who found it near the spot where Mr. Jones himself found it a few years ago, but not since, until this year.” A few years later WMC (MS Diary 25.8.1954 in NLW) was shown it by WMJ “at or near the edge of the gorse in the 2<sup>nd</sup> field from and slightly above his house, Glascoed [Piercefield Lane].” I too saw it here until about 1955, but it has not been seen since. Plantlife has had a project of Gorse-clearance on part of the site since 2004 in an attempt to reactivate any seed bank of the species that may be present, so far without success. Very surprisingly, it is abundant, along with *D. deltoides*, on at least one of the big “*Sedum* roofs” at the Aber-porth Technology Park SN246494, 2006-2008.



*Dianthus deltoides* and *D. armeria* on  
*Sedum* roof, Aber-porth Technology Park  
SN246494, June 2008

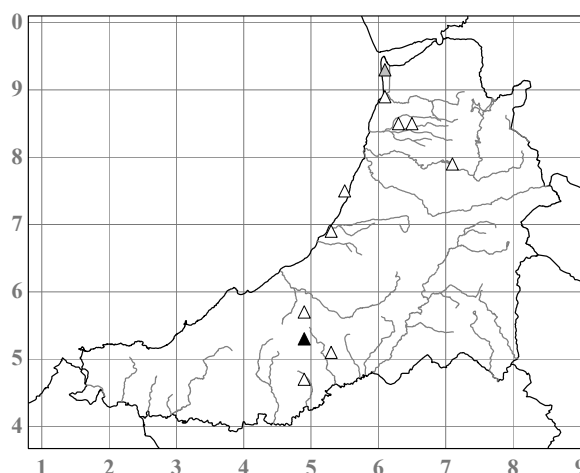
## AMARANTHACEAE

***Chenopodium bonus-henricus* L.** - Good-King-Henry - Llysiau'r Gwrda

Probably always a rare archaeophyte in the county, and not seen since 1987 when three large plants grew on the roadside verge in Troed-y-rhiw hamlet SN499523. Salter (1935, and Wade 1952) gave only eight localities, and Whellan (1942) saw it by the railway at Borth c.SN68E in 1941. The only other record is from the Ynys-las Dunes NNR c.SN69B in the 1970s (JPS). Salter remarks that it was “formerly cultivated as a pot-herb”.

***Chenopodium rubrum* L.** - Red Goosefoot - Troed-yr-ŵydd Coch

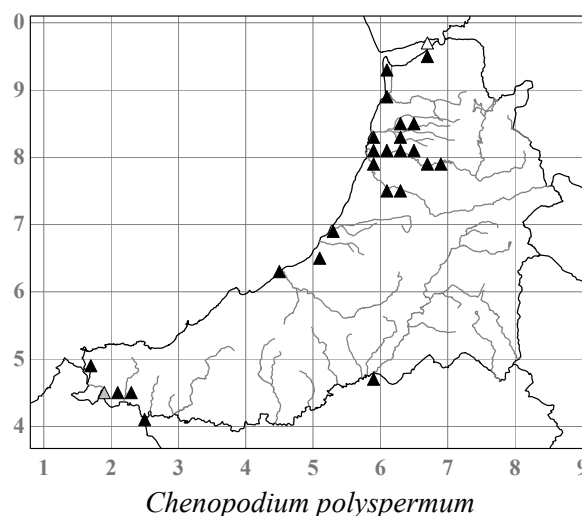
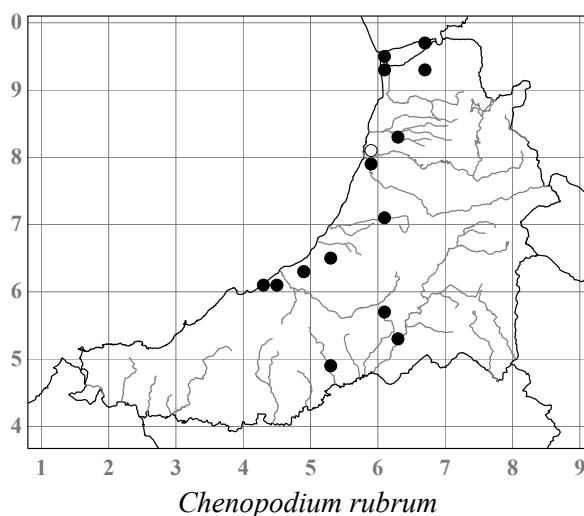
Listed in Morgan (1849), and recorded by Salter only from the Aberystwyth municipal rubbish-tip SN591811 in 1928 (1935), it has been recorded from c.16 sites since 1993, mostly from manure heaps, slurry pits, where most of the plants have been var. **rubrum**, and from waste ground and tips where they have at least sometimes been var. **vulgare** Wallr. A colony of var. **pseudobotryoides** (H. C. Watson ex Syme) Druce, small, reddish, mostly prostrate plants with small seeds 0.7mm, occurred in a hollow flooded by spring



*Chenopodium bonus-henricus*



tides in the Ynys-las dunes just NW of the Information Centre SN609941, c.1974 (RGW) - 2004, the number of plants varying greatly, with a maximum of 43 in 1997 and a minimum of three in 2004; another colony of c.60 plants was found nearby between the top of the salt marsh and the *Ammophila* dunes SN612939 in 2006 (NMW).



***Chenopodium polyspermum* L.** - Many-seeded Goosefoot - Troed-yr-ŵydd Amlhadog

An archaeophyte, first recorded as two plants in a garden in Penyrangor, Aberystwyth SN581808 in 1957 (NMW), abundantly at Bryn-y-mor Road, Aberystwyth SN585825 (BMGJ) in 1959 and as one plant at Ynys Edwin SN678963 (WMC) in the same year. It has become progressively more frequently recorded in the lowland parts of the county since then and has been seen in c.30 sites, and this probably represents a genuine increase in line with the national trend (Braithwaite *et al.* 2006). It occurs on manure heaps, disturbed and waste ground, river shingle, building sites, tips, potato fields and roadside verges. Although varieties have mostly not yet been recorded, the first record above was of var. **acutifolium** (Sm.) Gaudin, which is probably the commoner. Var. **polyspermum** was collected at the WPBS, Plas Gogerddan c.SN630836, 1975 (ABS, RGW, det. AOC) and has been seen at several other sites. The species has not been recorded at a higher altitude than 80m, on a soil tip near Penrhyn-coch SN657845, 1997.

***Chenopodium urbicum* L.** - Upright Goosefoot - Troed-yr-ŵydd Talsyth

An archaeophyte, listed in Morgan (1849) as *C. intermedium*, but the record was reasonably doubted by Salter (1935). The only other record is from Tresaith c.SN2751 in the 1930s (NMW, WWB, Wade 1952).

***Chenopodium murale* L.** - Nettle-leaved Goosefoot - Troed-yr-ŵydd Dail Danadl

An archaeophyte, first recorded by Purchas (1848) “from the immediate neighbourhood of Aberystwyth”. It was described by Salter (1935) as “Not uncommon; manure heaps, rubbish-dumps, etc.”, though he gives records only from the Aberystwyth municipal rubbish-tip SN591811 in 1930, and from a manure-heap at Rhydyfelin c.SN5979 in 1932. Several plants were found, with *C. rubrum*, on a rubble tip at the Ynys-las boatbuilding yard SN616932 in 2005 (NMW) - 2006.

***Chenopodium ficifolium* Sm.** - Fig-leaved Goosefoot - Troed-yr-ŵydd Dail Ffigys

A rare archaeophyte casual seen only at five sites. It was recorded from Tresaith c.SN2751 in the 1930s (WWB, Wade 1952); in 1994-2001 there were many plants on disturbed parts of the old rubbish-tip below Pendinas SN585799 (NMW, JPW & AOC); in 2001 it was locally abundant on new verges by Ysgol Penweddig, Aberystwyth SN595811 (NMW, SPC), the soil having been brought from Kidderminster Sugar-beet residue lagoons; in 2004 it appeared in strips sown with mixed species for bird-seed by the RSPB at Ynys-hir SN66989540; and in 2007 it appeared by a new car park 500m S of Maesllyn, Cors Caron SN692625 (AOC, PAS & MT).

***Chenopodium hircinum* Schrad.** - Foetid Goosefoot - Troed-yr-ŵydd Drycawrus

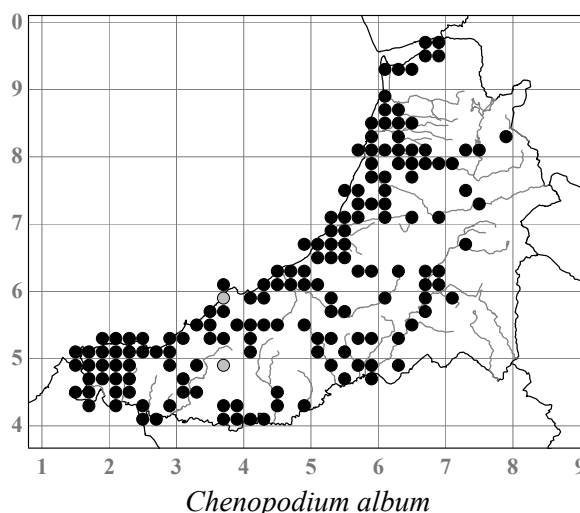
Recorded only once, by Salter (1935) from the Aberystwyth municipal rubbish-tip SN591811 in 1928. Native of E South America.

### **Chenopodium quinoa** Willd. - Quinoa

Sown, among other species, for seed for wild birds by the RSPB at Ynys-hir SN669957 in 2001-2004 in a wide range of colour and habit forms, and self-seeding to a limited extent here as a casual (NMW). Native of South America.

### **Chenopodium album** L. - Fat-hen - Troed-yr-wydd Gwyn

A common weed of arable fields, gardens, roadside verges, farmyards and waste ground in the lowlands. In Maize fields fertilised with slurry it can become very abundant and reach 185cm tall, as near Penparc SN203480 in 1992. Varieties have not been investigated, but var. **album** is certainly the commonest. Altitude limit 305m, garden plot, Tynygwndwn, Llanfair Clydogau SN633495, 1993.



### [*Chenopodium strictum* Roth - Striped Goosefoot - Troed-yr-wydd Stribedog

Erroneously recorded in 1995 from Parc-y-llyn SN594804 (NMW, LANC, LTR), this was redetermined as *C. album* in 2001 by JRA.]

### **Chenopodium foliosum** Asch. - Strawberry Goosefoot

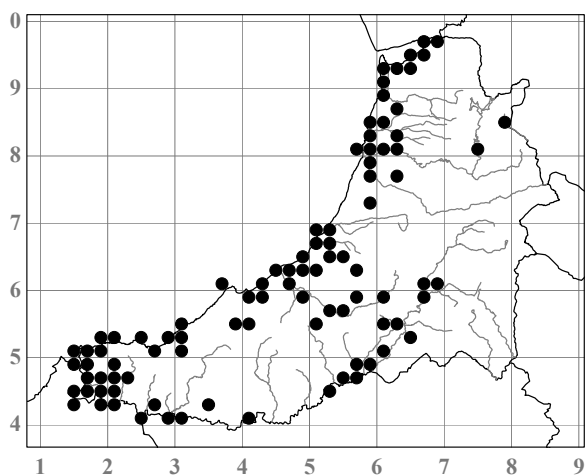
Eight plants of this nationally very rare casual with spectacularly red and fleshy fruits appeared on stony waste ground near the old woodyard site at Lampeter SN58054882 in 1997 (NMW). Native of Eurasia and North Africa.

### **Spinacia oleracea** L. - Spinach - Ysbigoglys

Cultivated commercially on a small scale from time to time, for example in the Aberystwyth district in the 1930s (Smith 1935).

### **Atriplex prostrata** Boucher ex DC. (*A. hastata* auct., non L.) - Spear-leaved Orache - Llygwyn Tryfal

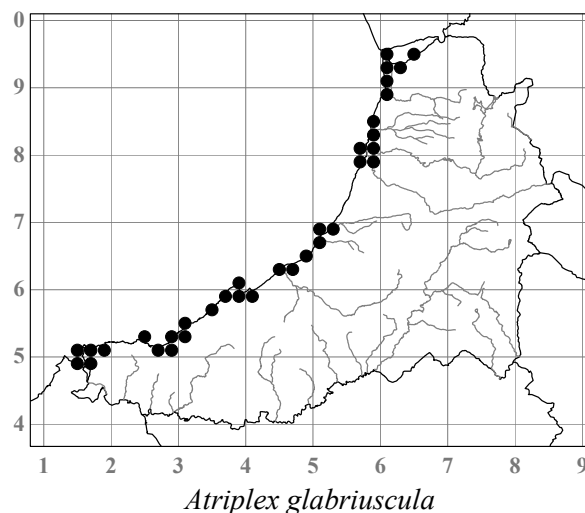
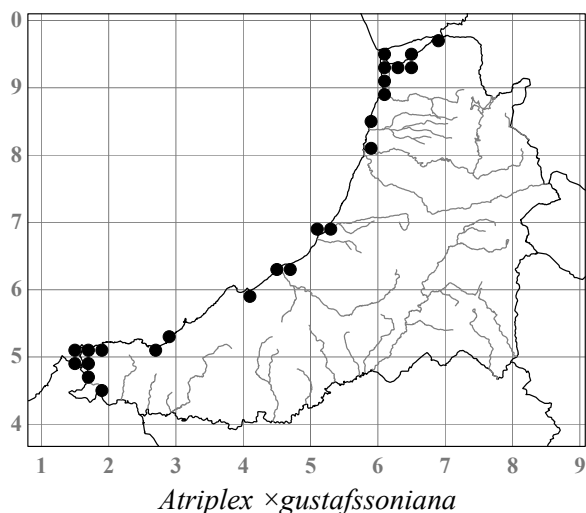
Along the coast on shingle beaches, at the top of salt marshes, on waste ground and less often on sand it is almost ubiquitous and often abundant. In some years it is remarkably abundant or dominant on the cliff slopes all round Cardigan Island c.SN160515, for example in 1977 and 1983. Inland it is less common and largely confined to the lowlands, and occurs chiefly on waste ground, roadside verges, where it has increased conspicuously in recent years, and in farmyards. It is extremely variable, and a series of specimens named as *A. hastata* var. *deltoidea* Moq. and var. *microtheca* Rafn, among others, was collected from Aberystwyth c.SN58V in 1917 (BM, TS, det. AJW). Altitude limit 410m, farmyard, Eisteddfa Gurig SN797840, 1993.



Variation in *Atriplex prostrata* from shingle at S end of Ynys-las dunes SN605925, October 1990

***Atriplex ×gustafssoniana* Tascher. (*A. longipes* × *prostrata*) - Kattegat Orache - Llygwyn Kattegat**

Frequent on shingle and sandy beaches and at the top of salt marshes all along the coast. Unlike *A. glabriuscula*, it often occurs well up the estuaries where it is commonly among *Juncus maritimus* or other tall vegetation and where it is often more abundant than on the open coast.

***Atriplex glabriuscula* Edmondston - Babington's Orache - Llygwyn y Tywod**

Common, and often the dominant species of *Atriplex*, on shingle and sandy beaches, mostly on the strandline, all along the coast. It is largely confined to beaches facing the open sea and is only rarely recorded up estuaries and then only in small quantity, for example on the Dyfi by the Cletwr bridge SN645941, 1990, and by the Yacht Club at Penyrergyd on the Teifi SN165484, 1993. Plants are very variable, and although infraspecific variants are usually no longer recognised in this or in the other species, there are specimens from Aberystwyth c.SN58V collected in 1917 named as var. *virescens* (Lange) Moss & Wilmott and var. *babingtonii* (Woods) Moss & Wilmott (BM, TS, det. AJW).

***Atriplex longipes* Drejer - Long-stalked Orache - Llygwyn Hirgoes**

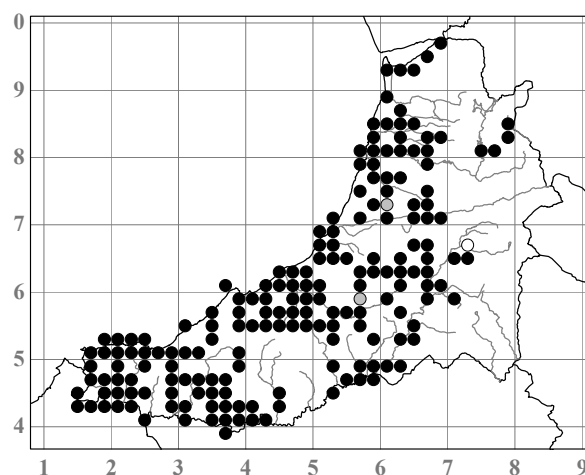
Very rare in the county and first recorded in 1993. It occurs in small quantity amongst *Festuca rubra* and *Juncus maritimus* at the top of the salt marsh in the Dyfi estuary c.250m E of the Afon Leri SN619935-620936, 1993 (NMW, det. JRA) - 2006, and in a similar situation just E of the Cletwr bridge SN645942, 2000 (NMW). In 1995 one plant was found in rank vegetation dominated by *Bolboschoenus* on the S side of the Teifi estuary, 150m E of the main road bridge SN183458.

***Atriplex littoralis* L. - Grass-leaved Orache - Llygwyn Arfor**

A rare plant of disturbed or open ground at the top of salt marshes, first found in 1993 at the Ynys-las boatyard SN616934 (NMW). In the same year it was found at Glandyfi SN695970, in Aberystwyth harbour SN582811 (NMW), and in the Ystwyth estuary by the Isolation Flats SN580806, but it has not been recorded at these sites or elsewhere since.

***Atriplex patula* L. - Common Orache - Llygwyn Culddail**

An abundant weed of waste ground, gardens, arable fields, farmyards and tips, but rarely on shingle beaches. It is often very abundant on roadside verges where it seems to be increasing, and can be the dominant weed of Maize fields fertilised with slurry. It is very variable in habit and leaf shape, and a series of specimens named as var. *angustissima* Gren. & Godr., var. *bracteata* Westerl., var. *erecta* Lange and var. *linearis* (Gaudin) Moss & Wilmott, among others, was collected from Aberystwyth c.SN58V in

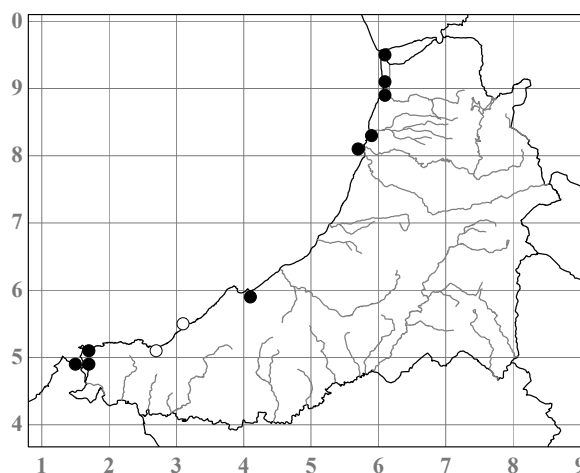




1917 (**BM**, TS, det. AJW). Altitude limit 410m, farmyard, Eisteddfa Gurig SN797840, 1993.

**Atriplex laciniata** L. - Frosted Orache - Llygwyn Ariannaid

An uncommon plant of shingle and sandy beaches, always seen as only one or a very few plants along the strandline. It is in fact unusual to see more than three or four plants altogether in any one year, and, unlike the other species, it almost never reappears at the same site in successive years. The N end of the Ynys-las dunes SN69C and the Penyrergyd shingle spit SN1548 are perhaps the most reliable sites.



*Atriplex laciniata*

**Atriplex portulacoides** L. - Sea Purslane - Llygwyn Llwydwyn

Material from the Gower was planted in the Dyfi estuary, just W of the mouth of the Afon Cletwr SN641941 in 1939 by EHC, who was puzzled that it did not occur there naturally and wanted to see if it would grow. It has gradually increased, and by 2000, 60 years later, there were numerous colonies over an area of c.20ha (bounded by SN640938, 638939, 643946 and 646944); surprisingly though, it has not spread even vegetatively outside this limited area, although a viable stem fragment was found on the Ynys-las strandline 3km W in 2000 and successfully grown on (SPC).

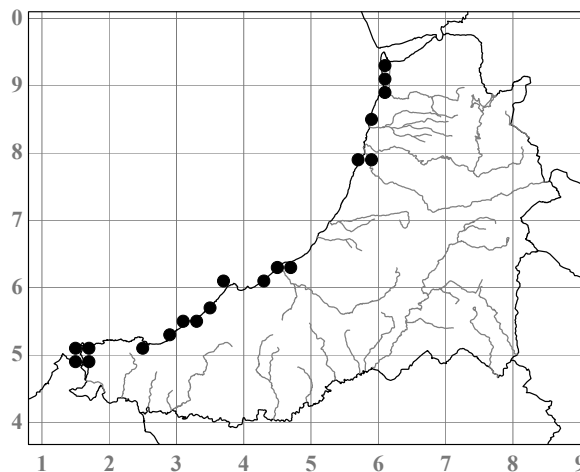
**Beta vulgaris** L.

Subsp. **cicla** (L.) Arcang. var. **cicla** - Foliage Beet - Betysen Ddeiliog

Very occasionally grown, as Leaf Beet, chiefly in the south, and a rare casual on waste ground and tips, for example at Aberystwyth SN588811, 1991 (**NMW**), at the MoD site, Aber-porth SN243516, 1995, and below Pendinas SN584799, 1995.

Subsp. **maritima** (L.) Arcang. - Sea Beet - Betysen Arfor

An occasional native along the coast on shingle, sand and cliffs. It is especially abundant on the steeper parts of the cliffs around Cardigan Island c.SN162515, 1975, as well as on Ynys Lochdyn SN314554, 1975 (CWH & AP), at both of which sites it is out of reach of Sheep. Colonies at the back of the sandy part of Tan-y-bwlch beach, Aberystwyth SN579798, 1907 (Salter Diary 23.9.1907) - 1998 were lost to Sheep. In 1982 it was in dune slacks and salt marsh at Ynys-las (JPS), and it can be abundant in hollows behind the shingle ridges at Ynys-las SN605926, 1993, and NE of Aberaeron SN464635, 1989-2004.



Subsp. *maritima*

Subsp. **vulgaris** - Root Beet - Betysen Wreiddiog

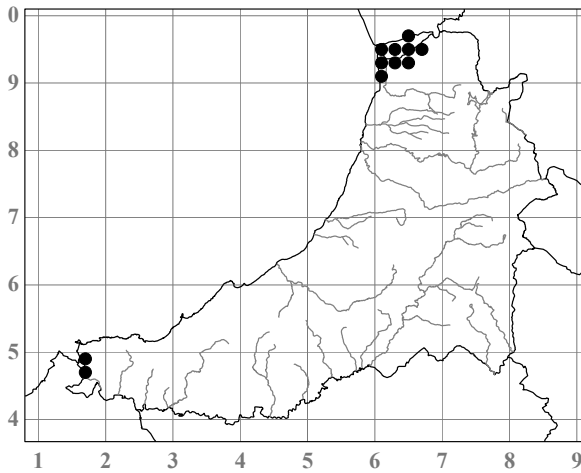
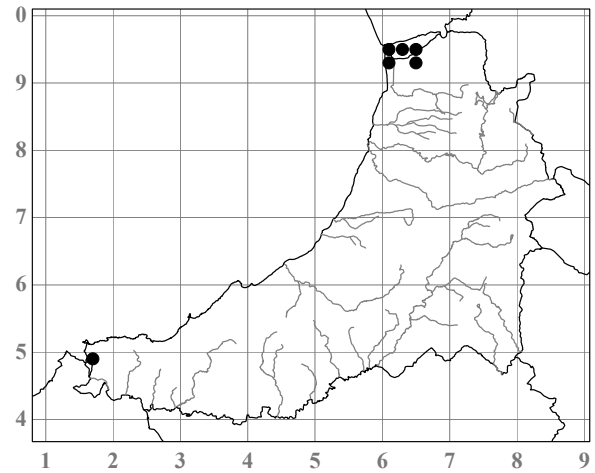
Apparently not significantly grown in past centuries, and recently grown commercially chiefly as Fodder Beet, of which there were 42ha in 1988 (Anon. 1988), and in very small quantity as Sugar Beet, 5ha in 1988, and as Beetroot, 0.7ha in 1988. Mangolds, which grow better in acid soils and keep better through the winter than Swedes, were more widely grown in the past, for example 334 acres (135ha) in 1869 (Anon. 1869), but no longer, although they were still being grown at Brodawel, Silian SN559510 into the 1990s.

**Salicornia** L.

Known only from the salt marshes of the Dyfi and Teifi estuaries. Material from both areas, including all the species known from the county, was named by I. K. Ferguson in 1976. Identification remains difficult, and the following account is based on the rather small proportion of plants that have been more or less confidently named since the 1970s.

**Salicornia ramosissima** Woods - Purple Glasswort - Llyrllys Porffor

Often abundant on the upper and middle parts, and in places extending to the lowest levels with *S. dolichostachya*, of the salt marshes of the Dyfi estuary from Ynys-las to opposite Ynysgreigiog SN613940-661961, 1976 (NMW, det. IKF) - 2006. In the Teifi estuary it is often abundant along the salt marsh S of Nantyferwig SN165466-168481, 1973 (NMW, BSc) - 2004. Plants are very variable, and intermediates with *S. europaea* have been recorded on the Teifi, 1976 (NMW, det. IKF), as well as on the Dyfi.

*Salicornia ramosissima**Salicornia europaea***Salicornia europaea** L. - Common Glasswort - Llyrllys Cyffredin

Frequent to locally abundant along mostly the upper parts of the Dyfi salt marshes from Ynys-las to at least opposite Henhafod SN613940-640940, 1976 (NMW, det. IKF) - 2005. In the Teifi estuary it occurs, usually sparsely, only S of Nantyferwig SN1647-1648, 1955-2004 (NMW, det. IKF).

**Salicornia emerici** Duval-Jouve (*S. nitens* P. W. Ball & Tutin) - Shiny Glasswort - Llyrllys Gloyw

Recorded only from the Dyfi estuary where it occurs, mostly sparsely, along the salt marshes from just E of the Afon Leri to opposite Ynys Greigiog SN620936-661961, 1976 (NMW, det. IKF) - 2004 in tetrads SN69G, H, M, N, S and T.



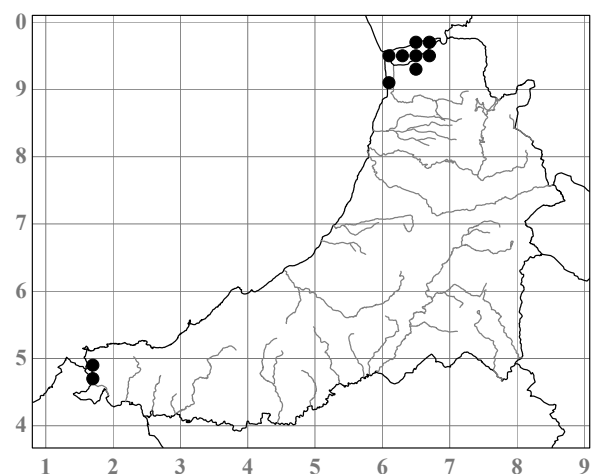
*Salicornia ramosissima* (reddish) and *S. fragilis* (yellowish), Dyfi estuary, view NE from SN625937, October 2006

**Salicornia fragilis** P. W. Ball & Tutin - Yellow Glasswort - Llyrllys Melyn

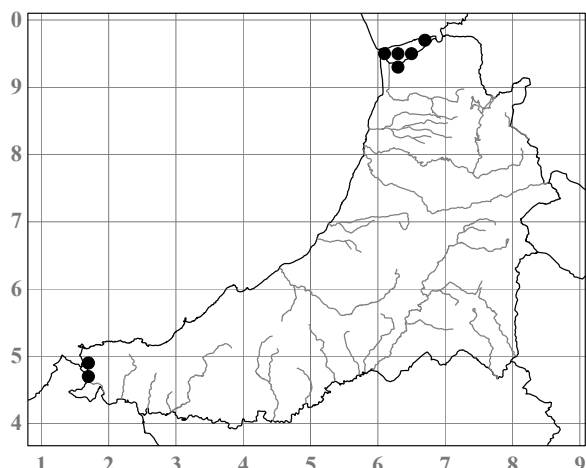
Usually in rather small quantity and local along the lower parts of the salt marshes of the Dyfi estuary from the Afon Leri to opposite Ynys Greigiog SN616941-661961, 1993-2006. In the Teifi estuary it is scattered along the lower salt marsh S of Nantyferwig SN169481-165466, 1976 (NMW, det. IKF) - 2004.

**Salicornia dolichostachya** Moss - Long-spiked Glasswort - Llyrllys Canghennog

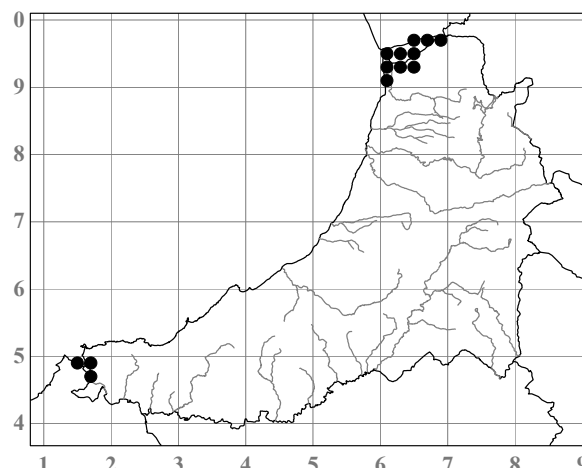
Locally abundant, and the dominant species on the lower parts of the salt marsh, along the Dyfi estuary from Ynys-las to opposite Ynys Greigiog SN613940-

*Salicornia fragilis*

660963, 1924 (GO, Wade 1952) - 2005. In the Teifi estuary it is similarly abundant S of Nantyferwig SN1647-1648, 1976 (NMW, det. IKF) - 2005.



*Salicornia dolichostachya*



*Suaeda maritima*

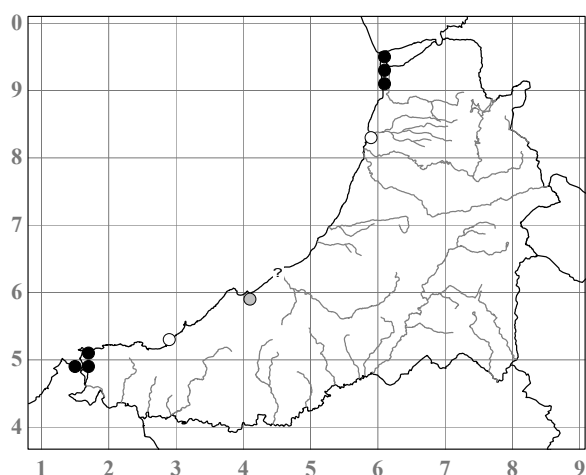
### ***Suaeda maritima* (L.) Dumort. - Annual Sea-blight - Helys Unflwydd**

Locally abundant in the salt marshes of the Dyfi and Teifi estuaries, in the *Salicornia/Spartina* zones in the lower and middle parts of the marsh, and in the upper marsh chiefly in the more open parts on bare mud or on shale and gravel. The following varieties have been identified and material of all (NMW) collected in 2006-2007; all except var. *estuarina* occur in both estuaries, but because of the narrowness of the salt marsh on the Teifi any zonation is not so obvious there, and these notes apply to the Dyfi estuary on either side of the mouth of the Afon Leri SN6193.

Var. **bacciformis** (Dumort.) P. D. Sell ined. was only seen in the lower zone of the marsh where it is very sparse. Var. **erecta** (Moq.) P. D. Sell ined. occurred at all levels. Var. **estuarina** (Dumort.) P. D. Sell ined. was only seen at the top of the marsh just W of the Leri SN61609351 where it was growing in abundance; scattered dwarf, unbranched plants resembling it occurred elsewhere but were probably just poorly developed specimens of other varieties also growing there. Var. **macrocarpa** (Desv.) Moq. was confined to the upper zone, and was abundant in places along the edge of the Afon Leri. Var. **maritima** was frequent in the upper and middle zones. There were a few plants of var. **purpurascens** P. D. Sell ined. in the upper and middle zones. Var. **vulgaris** (Moq.) P. D. Sell ined. was very abundant in the lower and middle zones, forming large, bushy plants turning yellowish green and with none of the reddish colour often seen in other areas. Var. **jacquinii** (Ten.) P. D. Sell ined. has not been seen.

### ***Salsola kali* L. subsp. *kali* - Prickly Saltwort - Helys Pigog**

An occasional and rather unpredictable plant of sea beaches where it grows in sand or sandy shingle around the upper driftline. It is abundant most years at Ynys-las, especially at the seaward side of the N



*Salsola kali* along W edge of recently formed NE dune, Ynys-las, view N from SN60959457, August 2009



part of the dunes, extending S to Borth SN69A-C, 1848 (Purchas 1848) - 2008. Salter (1893) recorded it at Clarach SN5883 in the early 1890s, but there is no later record from there, and he saw a specimen from Aberaeron c. SN46L (DW) in 1904 (Diary 25.6.1904). Two plants were seen at Cei Bach SN409597 in 1988, and Salter saw it at Penbryn SN25W in 1894 (Diary 27.6.1894). Around Penyrergyd at the mouth of the Teifi estuary SN14P, U it is usually frequent, pre-1936 (Salter 1935) - 2005, and in 1987 it was seen in a sandy cove 300m N of the Cliff Hotel SN160503 (AOC & APF). The earliest record was a generalised "Near Aberystwyth" (WHD, Watson 1837). There is no evidence of any change in frequency at the sites where it still occurs.

#### **Amaranthus retroflexus** L. - Common Amaranth - Blodyn Amor

A rare casual with only six records: town rubbish-tip, Aberystwyth SN591811, 1928 (Salter 1935); manure heap, Mwnt SN19705212, 1987 (JRA, CDP & AOC); pavement weed, North Road, Aberystwyth SN58718188, 1994 (NMW); building site, Parc-y-llyn SN592807, 1995 (NMW, det. TBR) and again here in 1996; and disturbed corner of pasture, Old Castle Farm, Cardigan SN169468, 1996 (NMW, CE & JTh, det. AOC). Native of North America.

#### **Amaranthus** × **ozanonii** (Thell.) C. Schust. & M. Goldschm. (*A. hybridus* × *retroflexus*)

Frequent in three unsprayed Maize fields in October 1992 at Oernant, Penparc SN195476, 200476 and 203480 (NMW, det. TBR, EJC & CCT); it did not appear again, although seed from these plants was successfully grown *in hort.* the following year. Scattered plants in a fodder crop at Capel Bangor SN65708022 in 2006 were thought to be probably this hybrid (SPC, det. TBR). Originating from America and first recorded in Britain in 1959.

#### **Amaranthus hybridus** L. group - Green Amaranth - Blodyn Amor Gwyrdd

Plants belonging to this difficult group appeared as bird-seed casuals in a Bow Street garden SN68 in 2005 (NMW, JL).

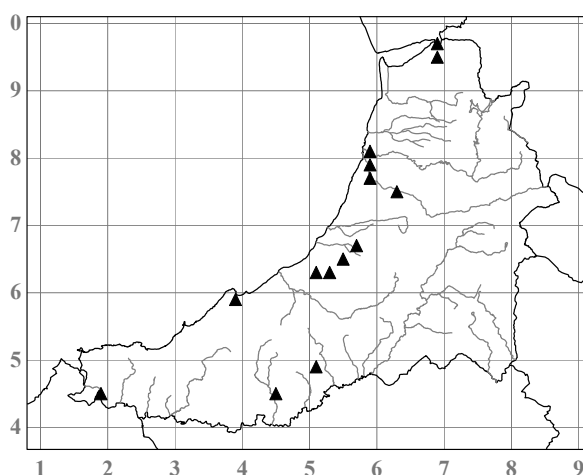
### MONTIACEAE

#### **Claytonia perfoliata** Donn ex Willd. - Springbeauty - Porpin y Gwanwyn

Abundantly naturalised on the sand dunes and along the roadside at Penyrergyd SN14U, where it was first found in 1954 (NMW, WMC) - 2008. A small colony was found among Gorse on the S-facing cliff and scree of Constitution Hill, Aberystwyth SN583826, 1996 (ADH) - 2007 (ADH). Native of W North America.

#### **Claytonia sibirica** L. - Pink Purslane - Porpin Pinc

First found in 1941 by Salter "on the shady roadside bank an immense quantity ....", c.2km SSW of Cribyn (Diary 17.6.1941) and still present, 2008, with five distinct colonies covering a combined length of bank and verge of 60m, extending from SN50804955 to 50614920. Three colour forms are present here: with bright pink petals with darker veins; white, with pink veins; and pure white; all have pink anthers. Elsewhere only pink-flowered plants have been recorded.



*Claytonia sibirica* 2km SSW of Cribyn, view NNE from SN50784939, May 2008

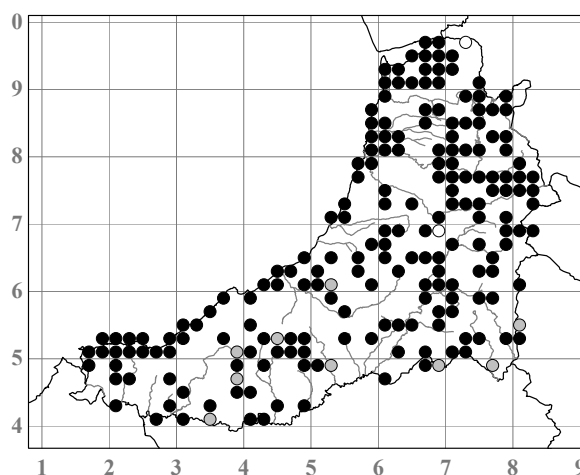
In 1961 it was a garden weed at Ynys-hir SN682959 (WMC), and in 1987 it was found naturalised in the estate woodland there SN682960 (WMC). In 1970 it was recorded as abundant on a wall near a cottage at Joppa SN573663 (FMS), and was on a streamside there in 1997. In 1989 it was recorded in scrub on Pendinas SN58558088 (SPC) and was abundant there for some years until the scrub was cleared, but it still occurs in hedgebanks nearby at SN58358082, 2008 (RAJ & AOC). In 1992 it was found on shingle by the Ystwyth at Llanilar SN621756, and since then has been found in many places along the river from Tan-y-bwlch SN580800, 2003, up as far as Tynrhelyg SN599766, 1998 (SPC). It has also been found on the banks of the Nant Bran SN536625, 1991 (AOC & APF), of the Afon Arth at SN510630, 1997 and SN523628, 1997 (AOC & LRG), and of the Teifi SN193443, 2003 (AOC & SDSB), as well as in several roadside, ditch and woodland sites. It is clearly spreading rapidly, especially along rivers, and is usually very persistent where it occurs. Plants with bulbils in the leaf axils have not been found.

### **Montia fontana** L. - Blinks - Porpin y Ffynnon

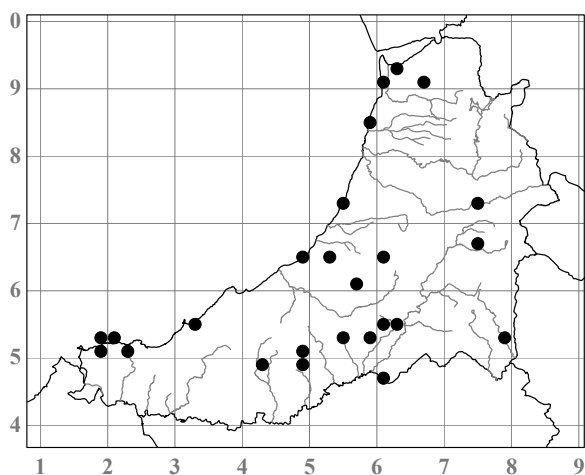
Frequent in a wide variety of habitats from swampy pond margins, marshes, gravelly flushes, rush pastures and streambanks, where it is often perennial, to winter-wet hollows and dry grassy or rocky slopes, especially near the coast, where it is a winter annual. Especially in the wetter habitats it is often found not fruiting, but enough material has been identified to indicate that all four subspecies are widespread in the county.

#### Subsp. **amporitana** Sennen

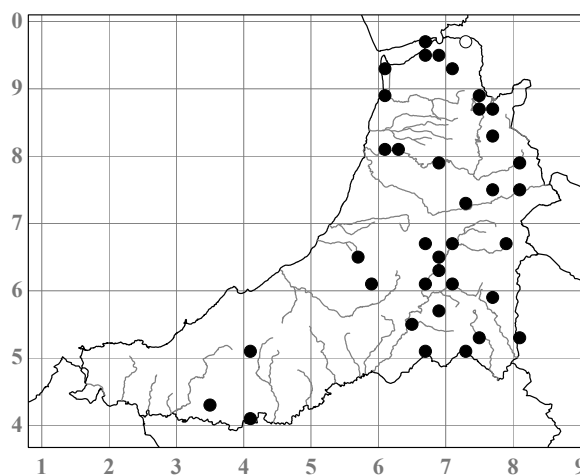
The least common of the subspecies, largely confined to the lowlands and occurring in marshes, damp especially poached pastures, the marginal swamps of ponds, ditches, damp trackbanks, damp arable field margins, and rarely in summer-dry depressions as on rock outcrops in pasture near Nant-llwyd SN791524, 1987 (NMW, det. SMW). Altitude limit 320m, flush in blanket bog N of Llyn Fanod SN60076489, 2007 (SDSB & AOC).



*Montia fontana* all records



Subsp. *amporitana*



Subsp. *fontana*

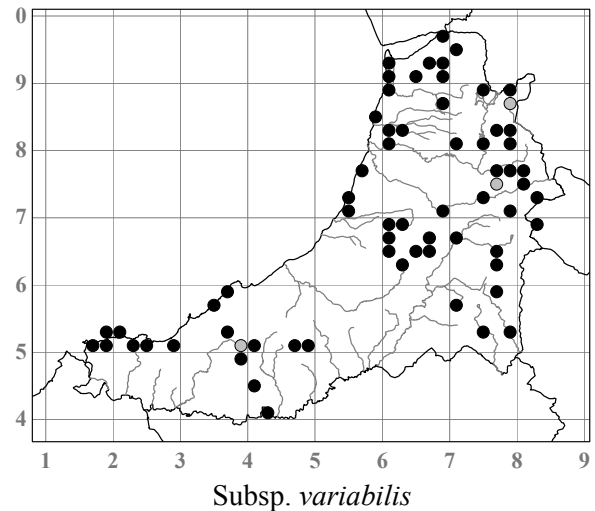
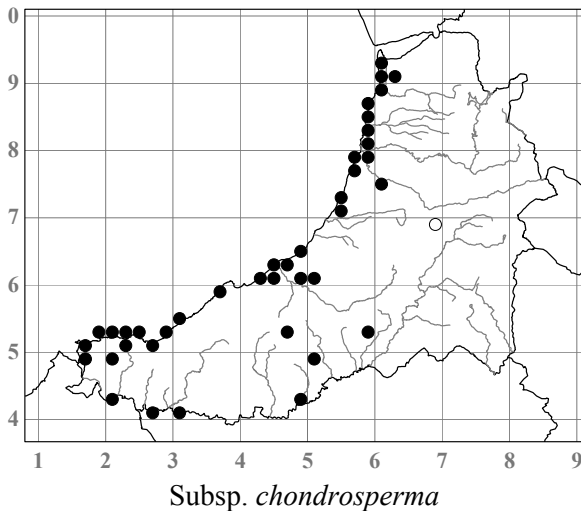
#### Subsp. **fontana**

Predominantly an upland plant, often abundant in reseeded grasslands and favouring damp, poached pastures, also in ditches, for example by the road near Pysgotwr SN733519, 1987 (NMW, det. SMW), the draw-down zones of reservoirs on peaty or gravelly substrates, on trackbanks both dry and damp, and as a garden weed. Altitude limit 460m, track N of Llyn Rhuddnant SN808784, 1995 (JAG & WMcC).

#### Subsp. **chondrosperma** (Fenzl) Walters (subsp. *minor* auct.)

A lowland plant chiefly of the coastal zone and parts of the Teifi valley, probably always annual, more often found in dry habitats than the other subspecies, and a characteristic winter annual of many of the driest, most exposed parts of the coastal slopes where it grows on bare soil or gravel, or among short grasses. It also grows on trackbanks, for example below Cerrig-tranau-uchaf c. SN635900, 1960 (PMB & WMC, conf. SMW),

on sand dunes, golf courses, in pastures, on riverside rocks and river shingle, in flushes on the sea cliffs and in lawns and flowerbeds.



#### Subsp. *variabilis* Walters

The commonest of the subspecies, almost always in wet or damp places such as damp pastures, tracksides and ruts, ditches and streamsides, flushes, the marginal swamps of ponds and winter-wet depressions. It is especially frequent in the uplands, and can be very abundant in disturbed or reseeded pastures; at Pwllpeiran SN771748 it was dominant over 2ha of otherwise sparsely vegetated rush pasture in May 1980 (conf. SMW). Altitude limit 600m (probably this subsp.), wet cliffs above Llyn Llygad Rheidol, Pumlumon SN7987, 1903 (Salter Diary 26.9.1903); ditto SN797875, 1980 (NMW, det. SMW).

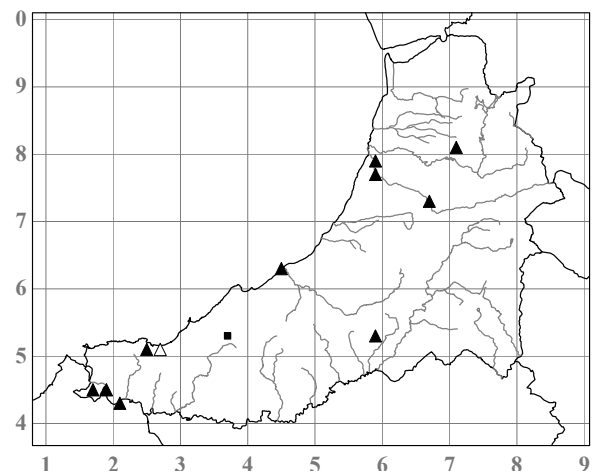
### CORNACEAE

#### *Cornus* L.

There are considerable taxonomic difficulties within the two main groups in this genus, none of which are thought to be native in the county. The taxonomy here follows that proposed by Sell & Murrell (2009), except that *Swida* is not recognised. In the *C. sanguinea/australis/koenigii* group, plantings of the various closely related taxa, including apparent hybrids or intermediates, all of which are very variable within themselves, make identification very difficult, and it may be that the taxa, and *C. koenigii* in particular, would be better considered as subspecies or varieties. The *C. sericea/alba* group is not so confusing, and there do not seem to be hybrids involved, but the distinction between *C. sericea* and *C. alba* is difficult, and it is uncertain which taxa some early records refer to, as indeed is the case with early records of *C. sanguinea*.

#### *Cornus sanguinea* L. - Dogwood - Cwytrosyn

All the known bushes are assumed to have been either planted, or have become naturalised from planted ones by suckering or seed. Davies (1815) remarked: "Though ..... the spindle and dog-trees, are pretty common in the fences of East Wales; yet we did not observe a single plant of either of them in the counties of Cardigan and Pembroke". Salter saw it somewhere along the Aberaeron road from Lampeter but considered it an escape (Diary 2.6.1925) and did not mention it in his Flora. Wade (1952) gives a record from "Hedges, Tresaith" c.SN2751 (WWB). A bush or bushes growing along 5m of hedge by Llechryd bridge SN21804365 was first noticed in 1978, but was destroyed in 2001. There has been much confusion between *C. sanguinea*, *C. australis* and their hybrid, and also with *C. koenigii*. Recent roadside plantings, for example at Llanfarian SN591781, 2002 (NMW) and by the Cardigan bypass SN182458, 2002, well-naturalised by suckering and with seed-





lings, are a mixture of this and other taxa, the bushes of all of them being extremely variable in leaf-shape and colouring, twig-colouring, inflorescence-shape, fruit-size and several other characters. A hedge at Rhos Pilbach, Plwmp SN36955290, 2003, has regularly planted bushes along it.

### ***Cornus australis* C. A. Mey. - (Southern Dogwood)**

Planted and naturalised by suckering in a few woods and on roadside embankments and verges. Most of the bushes by the A487(T) at Llanfarian SN590780, 1995-2008 (NMW) and by the A487(T) Cardigan bypass SN185463, 1995-2008 are this species. There is a thicket of it in scrub S of Lovers' Bridge, Aberaeron SN45746244, 1996 (SPC) - 2008, and it is planted and naturalised in the *Salix* woodland on till at Aber-porth SN259514, 1998 (AOC & JPW). Native of W Asia and introduced to Britain in c.1915.

### ***Cornus australis* × *sanguinea***

In recent decades bushes, which appear to be either this hybrid or intermediates between the two species, have been planted on new roadside embankments and verges, especially by the A487(T) in Llanfarian SN591781, 1995 (SPC) - 2008 where it sometimes abundantly self-sows and is mixed with *C. australis* and the much bigger-leaved putative *C. australis* × *koenigii*; and by the Cardigan bypass SN185463, 1995-2008 where it is mixed with these two taxa as well as with *C. sanguinea* and *C. koenigii*. There is an old bush of this hybrid on the disused railway embankment at Trawsgoed SN663733, 1990 (SPC) - 2004 (CGE, conf. PDS).

### ***Cornus australis* × *koenigii***

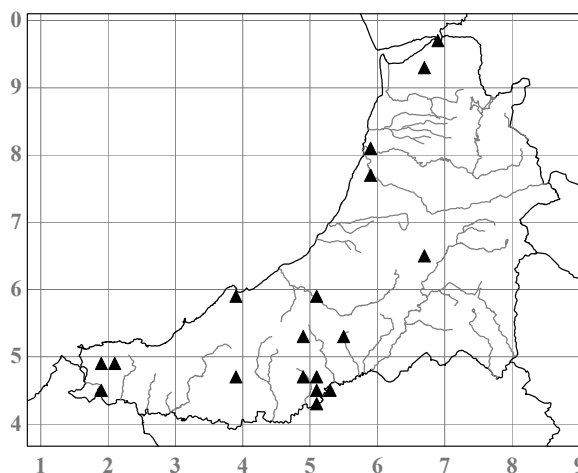
Big-leaved plants, presumably either this hybrid or intermediates, have been planted along with the putative parents by the A487(T) in Llanfarian SN591781, 2008, and by the Cardigan bypass SN185463, 2008.

### ***Cornus koenigii* C. K. Schneid. - (Asian Dogwood)**

Planted along with other taxa by the A487(T) Cardigan bypass SN185463, 2008. Native of W Asia.

### ***Cornus sericea* L. - Red-osier Dogwood - Cwytrosyn Cochfrig**

Planted and naturalised in many places especially along the banks of the Teifi and other rivers, and by ponds in various estates. It was already much-planted and presumably naturalised in Salter's day, although he does not mention the species in his Flora (1935). He reported that the road skirting the grounds of Derry Ormond c.SN5952 was "fringed with bushes of cornel" (Diary 29.8.1906). Between Lampeter and Cribyn he saw "a good deal of red-twigged cornel" (possibly *C. alba* var. *sibirica*) (Diary 13.4.1907), and he saw it again there 21 years later when he called it *C. alba* (Diary 19.5.1928). By a bridge over the Aeron below Llangeitho he noted that "Shrubs of *Cornus* ..... showed good autumnal colouration" (Diary 13.10.1928). It is especially abundantly naturalised in Moor Wood, Highmead SN507430, 1994, by the road at Pont Creuddyn SN551527, 1982 (NMW) - 2008, and by the Teifi at Llanybydder SN5144, 2001 (NMW). Native of North America.



### ***Cornus alba* L. - White Dogwood - Cwytrosyn Rhisgl Coch**

Planted as three main varieties, differing chiefly in the colour of the twigs.

#### **Var. *alba* - White Dogwood - Cwytrosyn Rhisgl Coch**

This variety, with dull, dark red twigs has been planted in several places. Although not as stoloniferous as var. *sibirica*, and much less so than *C. sericea*, it has become naturalised by suckering in the amenity area at the Glanyrafon Industrial Estate SN611804, 2001 (NMW) - 2005.

#### **Var. *sibirica* (Lodd. ex Loudon) Loudon (*C. alba* sensu Stace 1997 pro parte)**

This variety, with bright red twigs, is often planted in amenity areas, and has been found well-naturalised by suckering at three sites, in *Salix* scrub on the slumping till above the shore 200m W of the County Council

Offices, Aberaeron SN45146254, 2003; by the stream at Tresaith SN27995140, 2005; and in a roadside hedge at Rhydownen SN44374537, 1992 (NMW).

Var. **flaviramea** Späth

This variety, with yellowish-green twigs, is often planted in amenity areas, for example on the University campus, Llanbadarn Fawr SN604811, 2004, and by the Teifi at Cardigan SN180458, 2003; it is naturalised by suckering by a streamlet in the grounds of Llwynycelyn, Glandyfi SN689960, 2007.

**Cornus mas** L. - Cornelian-cherry - Cwytrosyn y Ceirios

Planted c.1990 by a pond in the valley 150m W of Nantyrarian SN714813, where it was fruiting well in 2004. It is also occasionally planted and flowering well in shrubberies, for example by the Cwm Rheidol reservoir dam SN693794, 2008 (SPC). Native of S Europe and W Asia and long grown in Britain.

## HYDRANGEACEAE

**Philadelphus coronarius** L. - Mock-orange - Ffug-oren

The only records are of it growing in a hedge, perhaps planted, at Rhydybandy SN6362 in 1974 (NMW, RGE & AOC); and as a relic of planting, or perhaps naturalised, in estate woodland 400m W of Nanteos SN616784 in 2003. It is native of SE Europe and SW Asia, and has been grown in Britain since at least the 16<sup>th</sup> century.

**Deutzia longifolia** Franch.

Several bushes planted in estate woodland at Deri Ormond SN591523, 1993, survive as relics, alongside *D. scabra*. Native of China, introduced to Britain in 1905.

**Deutzia scabra** Thunb. - Deutzia - Deutsia

Relic planted bushes occur along an FC road in Coed Tynbedw SN688709, 1991, and in estate woodland at Deri Ormond SN591523, 1993, and there is a single bush in a marshy hollow by the B4337 road just S of Ffrwyd SN54866825, 2003; all are 'Flore Pleno'. Native of China and Japan, introduced to Britain in 1822.

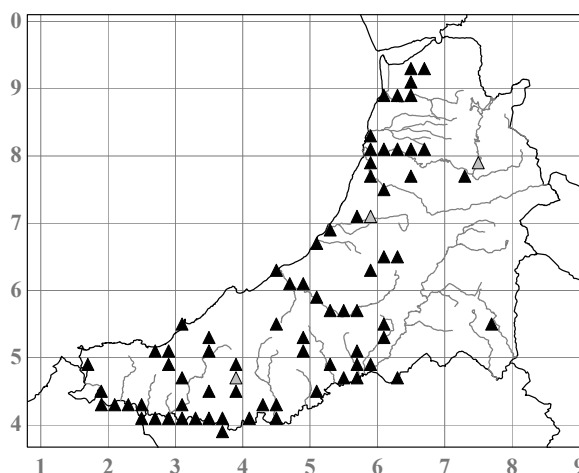
## BALSAMINACEAE

**Impatiens noli-tangere** L. - Touch-me-not Balsam - Ffromlys Melyn

The only record is from an entomological notebook in the Ipswich Museum (*per* APF) of Claude Morley who, looking for the Netted Carpet moth on 14 June 1939, recorded that it "was NOT seen, but one strong bed of its food-plant, Yellow Balsam (*Impatiens nolitangere* L.) was found growing in a gully at Capel Bangor..." Morley obviously knew the plant well. Whether it was native or introduced is unknown, and all attempts to refind the plant in this area c.SN68K have failed.

**Impatiens glandulifera** Royle - Indian Balsam - Jac y Neidiwr

This native of the Himalaya is widely and often abundantly naturalised alongside rivers and streams and occasionally on roadside verges and waste ground, in woods and even in rough pastures. It is salt-tolerant and occurs by streams on the sea cliffs and on sheltered sea beaches. The earliest mention is by Salter (1935), who described it as "Not unfrequently naturalised as a garden escape. On the Clydan brook, below Llannon [SN56D]", and in his diary he mentioned it only there: "*Impatiens glandulifera* has established itself in great showy passages" (Diary 20.8.1924), implying that it had not been there on his many earlier visits in 1894-1907. It has continued to spread and now probably has a more serious impact on semi-natural habitats than Japanese



Knotweed. It dominates much of the floodplain in the lower reaches of the Teifi and Aeron, as well as several smaller streams, and has increased greatly in recent decades along the lower reaches of the Ystwyth, Rheidol and Leri.

There is great variation in flower colour both within and between populations, for example by the Teifi at Llanybydder SN518441, 2006, all plants have deep pink-purple flowers, while by the Teifi at Coedmore SN192437, 2006, they vary from this deep colour to very pale pinkish white. The leaf mines of the fly *Phytomyza melampyga* were first seen in the county in 2003 at Llanerchaeron SN477604. *I. glandulifera* is generally confined to the lowlands, the only upland records being of it at 300m altitude in a ditch in rush pasture near Bryn-glas, 2km W of Bontnewydd SN600658, 2005 (RB) where it is rapidly spreading, 2007; at 320m in a roadside ditch just S of Coed Tangaer, 3km SE of Cellan SN622471, 2008; and, probably planted, again at 320m altitude on a turf roof at Nant-y-graig near Soar y Mynydd SN779542, 1995.

## POLEMONIACEAE

**Polemonium caeruleum** L. - Jacob's-ladder - Ysgol Jacob

Said by Salter to be "an occasional escape" (1935) and "frequently naturalised on old cottage garden sites" (Wade 1952), but the only localities he gave were Mydr c.SN45T or U, along with "Gelli-fach" (Burkill & Willis 1894) and "Sanau Henllan" (1933, JGW); neither of the latter localities has been identified. Since then it has only been seen as a casual at two sites, on waste ground at the Glanyrafon Industrial Estate, Llanbadarn Fawr SN610800 in 1993 (NMW), and on a rubble tip by Pont Einon, Tregaron SN672612 in 2000.

## EBENACEAE

**Diospyros lotus** L. - (Date Plum)

There is a planted tree, 57cm girth in 2006, on the University campus, Penglais, Aberystwyth SN59748158. Native of China and grown in Britain since the 17<sup>th</sup> century.

## PRIMULACEAE

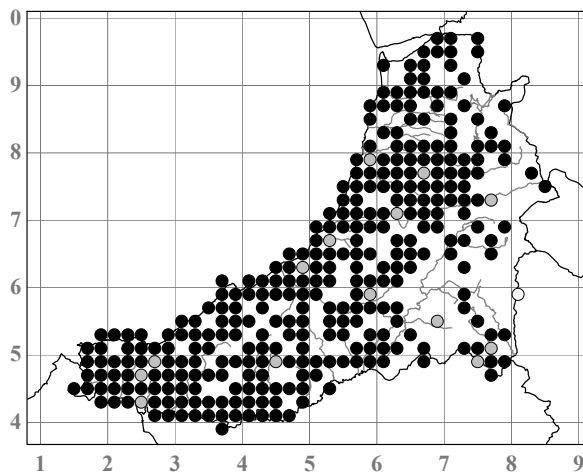
**Primula vulgaris** Huds. (*P. acaulis* (L.) Hill) - Primrose - Briallen

Widespread and common in hedgebanks and in the more fertile woodlands and scrub. It is especially characteristic of shaded flushes, and occurs from the coastal cliff slopes to damp rock ledges and gullies in the uplands. An especially fine colony is on the roadside slope just E of Pant Da wood in Cwm Rheidol SN672789, 1995-2008 (SPC). It is also very commonly planted and naturalised in graveyards, on hedgebanks near houses and in estate woods and amenity areas. The map makes no attempt to distinguish these statuses. Pink-flowered plants are frequent in the wild, and as early as 1868 an anonymous correspondent in *Science gossip* 4: 43 wrote: "In Pembrokeshire and Cardiganshire, [pink Primroses] are in many parts the rule, and yellow the exception. I have seen hundreds of plants contiguous to each other ...", and in the 1970s they were again noted as being unusually common in the wild in the county (RGW). Salter surprisingly mentioned seeing a non-yellow form only once, at Cwm c.SN6083 (Diary 26.4.1893): "On one primrose root flowers had dusty reddish tinge so as to look like a faded polyanthus." White-flowered plants are less often seen in the wild. A high proportion of the naturalised plants have flowers of various shades of pink, purple or magenta, or white, and dingy, pale orange-pink ones are especially common in graveyards. Only subsp. **vulgaris** has been noted, but the taxonomy of the naturalised plants undoubtedly merits more attention in the county. Forma **caulescens** (Koch) Schinz & Thell. is rarely seen in the wild, but is occasionally seen naturalised, often as



*Primula vulgaris*, Cwm Trawsnant, Joppa, SN5666, April 1974



*Primula vulgaris*

coloured variants. A small colony of ‘**Jack-in-the-Green**’ Primroses, with leaflike calyx lobes, is on a hedgebank near Nebo SN5365, 1975 (RGW) - 2005. Allen & Hatfield (2004) refer to a probable folk use in the county, extracted from a household recipe book in *c.*1800, of Primrose roots mixed with Betony leaves as a snuff for migraine. Altitude limit 550m, wet rocks at the head of the Nant y Moch, Pumlumon SN784862, 1937 (Salter Diary 27.8.1937, Wade 1952); 1990, ditto.

**Primula** ×**polyantha** Mill. (*P. veris* × *vulgaris*) - False Oxlip - Briallen Groesryw

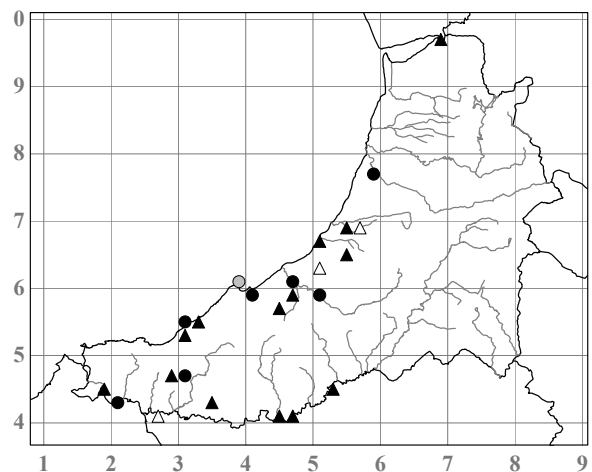
Occasionally found in pastures, scrub and woodland where it may be assumed to have arisen from native populations of the parents, for example in the wooded Nant Llolwyn dingle, Llanfarian SN586770, 1987 (APF), in a clifftop pasture at Llangranog SN30855411, 2002 (NMW), in open scrub 200m NE of Wenallt, Betws Ifan SN31504657, 2009 (AOC & SPC), and in the Hafod-wen meadow, Coedmore SN202430, 1991 (AOC, DCB & APF) - 2003 (AOC & JPW). Much more frequently it is seen in graveyards, and on hedgebanks and verges, where it was either planted and naturalised or has arisen from naturalised populations of the parents. Capel Rhiwbwys graveyard SN545691, 2007 (NMW, SPC; AOC), has a fine population of the hybrid, backcrosses and both parents. Other graveyard plants are often cultivars with variously coloured flowers. Some records may well be misidentifications of the caulescent form of *P. vulgaris*. Morgan’s “*P. elatior*” (1949) from “Mabus - Neuadd”, i.e. Mabws SN5668, was most probably this hybrid and if so is the earliest record. Salter (1935) saw it at Cwm Coedwig SN586778 before 1925 (Diary 3.5.1925), and in Llanbadarn Trefeglwys churchyard SN508631 in 1925 (Diary 14.5.1925). Whellan (1942, Wade 1952) saw it near Cenarth SN24Q. It was generally common in the churchyards in the 1970s (RGW). There is no real evidence of decline, Salter (1935) having described it as “much scarcer and more local than the Primrose.”

**Primula veris** L. - Cowslip - Briallen Fair (Sawdl y Fuwch)

The Cowslip is frequent in graveyards and estate grasslands and elsewhere where it has probably become naturalised from plantings, but it is uncommon as an obviously wild plant in unimproved pastures, scrub and occasionally woodland. The map does not attempt to distinguish these status differences. Salter (1935, Wade 1952) described it as “much scarcer and more local than the Primrose; often restricted to a single meadow,

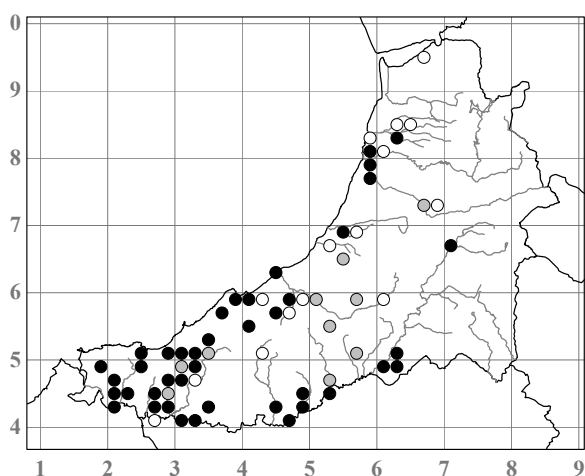


*Primula veris* (bottom), *P. vulgaris* and *P. ×polyantha* (top), Capel Rhiwbwys, SN545691, April 2008





*Primula veris* in pasture on NE side of Pendinas, Aberystwyth beyond, view NNW from SN58578075, May 1979



pasture. Cowslips grow on the till slopes in several places along the coast, notably below the County Council offices at Aberaeron SN452626, 1996-2005. Other areas where they are frequent include around Coedmore and Llechryd, for example in the Coed Madie B. Godard Wildlife Trust Reserve c.SN210437, 1992-2004, the S-facing slope E from Capel Tygwydd SN2743, 1997 (MDS, AOC & LRG), and around Old Cilgwyn SN3141, 1983-2004. In many graveyards it is impossible to tell whether the Cowslips are relics of old pasture, or introductions; they often spread vigorously on paths and graves as they are resistant to some herbicides. There is little evidence of sowing along road verges and embankments in the county, as has been done elsewhere in Britain, although at Pont Shollop, Llanerchaeron SN476597, 1999-2003, the speed with which they appeared on the new embankment did suggest sowing.

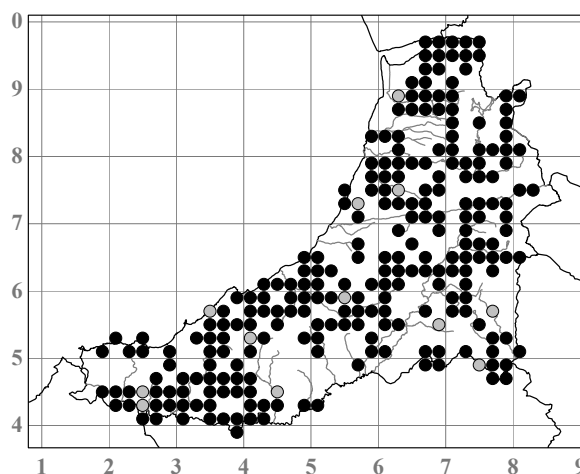
***Primula capitata* Hook. f. subsp. *crispata* (Balf. f. & W. W. Sm.) W. W. Sm & Forrest**

Several clumps were growing on a wet slope in the wooded ravine above Llandre church SN62118688 in 2001, either derived from throw-outs or possibly planted, but they disappeared soon after. Native of the Himalaya.

***Lysimachia nemorum* L. - Yellow Pimpernel - Gwlyddyn Melyn Mair (Melyn y Tywydd)**

Frequent in damp woodland and marshes and on streambanks, especially in acidic sites but also often on clay soils. In the lowlands it is usually in shaded sites, but in the uplands it is characteristic of open streambanks and flushes on the slopes. Like *Carex leporina*, it is often an indicator of species-poor sites and lowers the expectations of the exploring botanist.

known for generations as a 'cowslip field'" and gave about 20 localities, and said that there were more in the Aeron valley; he did not mention graveyards (except for one, Penrhyncoch, in his Diary 28.4.1897) or any other non-native sites. Cowslips have certainly been lost from some sites, but others have been found, and it is uncertain to what extent, if any, they have declined since Salter's day, and since 1970 they have been seen in 29 native-looking sites. Lost sites include the only Cowslip field in the N quarter of the county, NW of the A487(T) 1.3km SW of Furnace SN674943, known from at least 1950 until it was ploughed in the 1960s; and a sloping field across the stream from Llanafan village SN687723, known c.1960 (PSC) but ploughed soon after. Cowslips though can make a come-back: a field by Trawsgoed station SN665725, where Salter (1935) knew them, lost its Cowslips in the late 1970s but had regained them by 1983 (HWR); and a pasture at the SW corner of the crossroads near Caerwedros SN370561 with them, 1983 (HWR), was ploughed c.1985 and, although a few clumps were seen in the hedgebank in 1991 (PD & WPT) it was gone from the field, but in 2002 c.30 plants were seen scattered about the

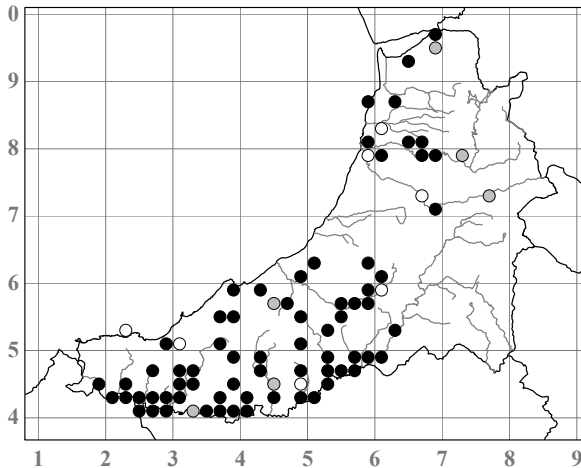


*Lysimachia nemorum*

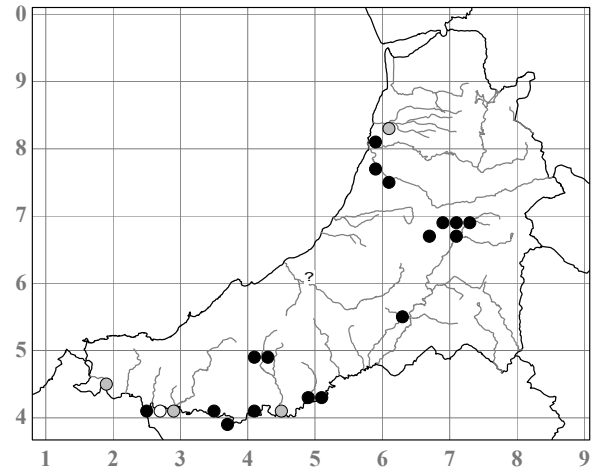
Altitude limit 365m, Nant Rhuddnant c.SN77Z, 1893 (Burkill & Willis 1894, Salter 1935); 530m, headwaters of the Nant y Moch SN783863, 2002 (AOC & PAS).

***Lysimachia nummularia* L. - Creeping-Jenny - Siani Lusg**

An occasional plant of fens, marshy pastures, floodplain hollows and ox-bows, Alder carr and along river banks, chiefly in the main river valleys and uncommon in the N. It is a popular garden plant and often escapes and becomes naturalised on roadside banks and verges, in graveyards, and on disturbed ground, sometimes in very dry places. Often though, as by artificial ponds and in wet places near habitations, it is difficult to guess its status, and the map treats all records as native. It is confined to the lowlands.



*Lysimachia nummularia*



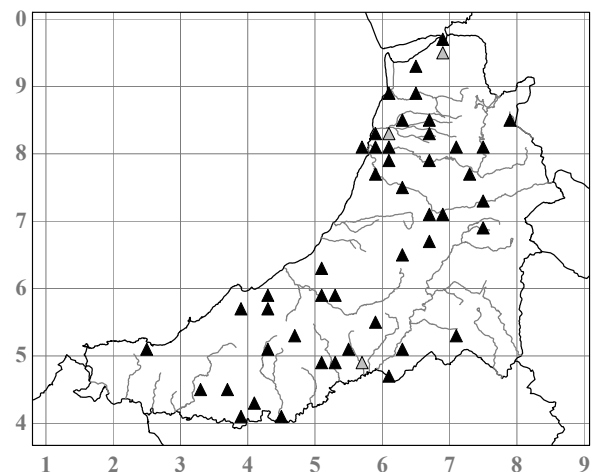
*Lysimachia vulgaris*

***Lysimachia vulgaris* L. - Yellow Loosestrife - Trewyn**

Apparently native in tall herb vegetation on riverbanks and in fens and swamps by ox-bows, backwaters and ponds, especially frequent along the Afon Teifi. It is occasionally naturalised on roadside verges, disused railways and waste ground, and in scrub. First recorded in 1899 at Llanerchaeron c.SN46V by Marshall (1900) who described it as "rare in the district." It was seen there again c.1908 (ABS, MLL) but has not been recorded in the Aeron valley since. Salter surprisingly saw it only once, by the Teifi at Cenarth SN24Q in 1929 (Diary 19.9.1929), but it seems unlikely that its present distribution represents natural spread or naturalisations since his day. The highest it has been seen as a native is 225m altitude, in a streamside fen WNW of Pont Glan Marchnant SN728698, 1997 (MDS), and as naturalised at 250m, on a laneside verge WNW of Swyddffynnon SN674666, 2000. The map treats all records as native.

***Lysimachia punctata* L. - Dotted Loosestrife - Trewyn Brych**

Although first recorded naturalised on the roadside near Falcondale SN5649 in 1978 (NMW, RGE) and on waste ground by the Afon Ystwyth at Wenallt SN674716 in the same year (NMW, RGE), it had probably been widespread but unrecorded for some time previous to this. Naturalised colonies derived from garden throw-outs are now widespread in the county on roadside verges, streambanks, tips and waste ground, in woodland and scrub and by ponds. Altitude limit 410m, bank of Afon Tarenig, Eisteddfa Gurig SN797840, 1993.



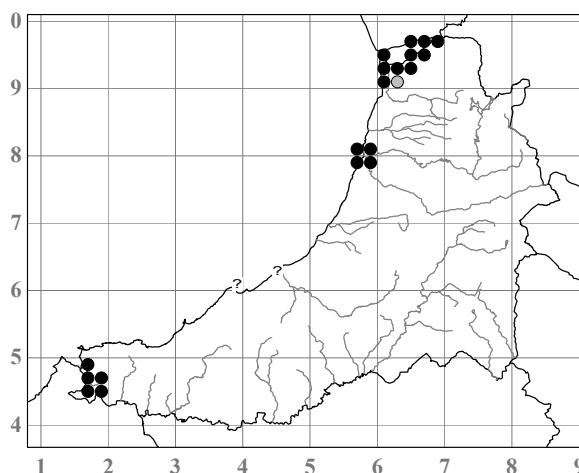
*Lysimachia punctata*

***Glaux maritima* L. - Sea-milkwort - Glas yr Heli**

An abundant plant of salt marshes and dune slacks. It was first recorded by Llwyd in 1682 as *Glaux exigua maritima* from "the marshes below Tyno Hir" on the Dyfi estuary, probably in this county, and still occurs there SN695976, 2004, as well as throughout the Dyfi salt marshes, even extending into the scarcely brackish marshes at the S end of Cors Fochno SN6290

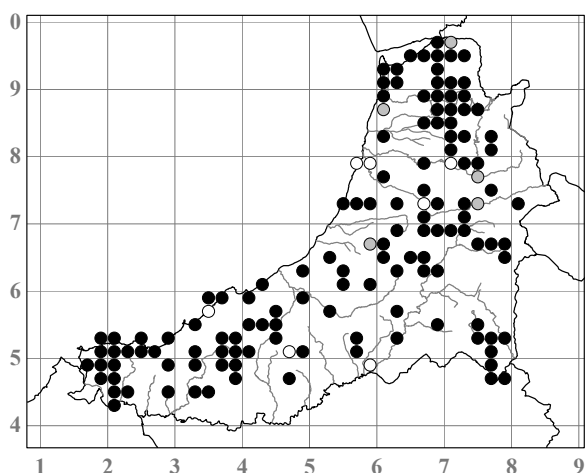


(Slater 1978). It was first recorded on the Ynys-las dunes by Morgan (1849) and is abundant in most of the slacks there SN69B, C, 2005. At Aberystwyth it occurred in fragments of salt marsh in the harbour SN581815, 1980-1995, up the Rheidol and Ystwyth estuaries, pre-1936 (Salter 1935) - 2005, and in increasing abundance in the developing salt marsh in the Tan-y-bwlch fields SN578795, 1950-2004, as well as in pavement crevices on the promenade SN57898162, 1991-1995. There is a 1950s field record from SN46, presumably from Aberaeron, at BRC, and an 1895 specimen from New Quay c.SN36V (SHYB, EBBE). In the Teifi estuary it was first noted by Salter in 1894 (Diary 28.6.1894) and occurs all up the salt marshes to 500m above Cardigan church SN186460, 1962, and into the scarcely brackish marsh by the Afon Piliau NE of Pentood-isaf SN18404565, 1994 (DKR).



### **Anagallis tenella** (L.) L. - Bog Pimpernel - Gwlyddyn-Mair y Gors

Frequent in peaty and sandy places, usually in short turf or among mosses, in upland flushes, rhos pastures, valley mires where it often grows among *Molinia* tussocks, dune slacks and flushes on the coastal slopes. It is especially abundant and floriferous in the Ynys-las dune slacks SN609939, 1904 (Salter Diary 7.7.1904) - 2005, and in the slightly brackish sedge-rich pastures of the Aberleri Fields SN6191, 2000, and can spread rapidly on disturbed or bare peat. Altitude limit 410m, no locality, pre-1935 (Salter 1935); 340m, Drosgol, SN755870, 1993 (JPL & ACW).

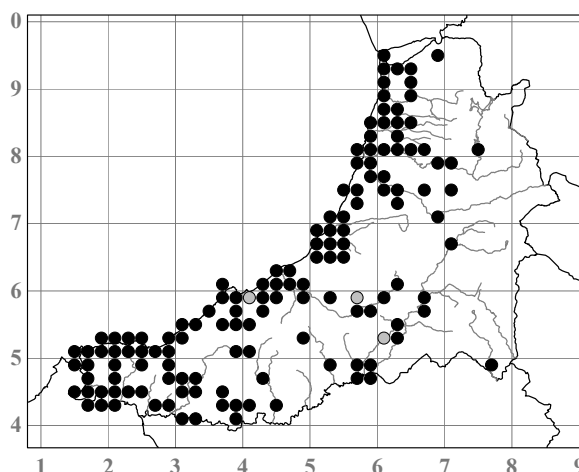


*Anagallis tenella*, Ynys-las dune slack, view N from SN609939, June 2005

**Anagallis arvensis** L. subsp. **arvensis** - Scarlet Pimpernel - Llysiau'r Cryman (Oriawr y Bugail, Cloc yr Hen Wŷr, Coch yr Yd, Blodau Gini'r Owns)

Var. **arvensis** is a common weed of arable fields, waste ground, gardens, sand dunes and slacks, tracksides and gateways, chiefly in the coastal zone and absent from the uplands.

Forma **carnea** (Schrank) Hyl., with pale flesh-coloured corollas, first recorded on the Borth sand links c.SN6091 in 1936 by Salter (Wade 1952), is, along with var. *verticillata*, the dominant variety on the Ynys-las dunes SN69B, 2003 (SPC, AOC). It was recorded as a garden weed in Aberystwyth SN593816 by Salter in 1934 (Wade 1952), and as a





*Anagallis arvensis* and *Armeria maritima*  
on SSW-facing slope, Foel y Mwnt,  
view W from SN193520, June 1996

field weed in the Ceri valley SN34 (Whellan 1942). Forma **lilacina** Hyl., with lilac-purple corollas, was found on disturbed ground at Mwnt SN194519, 1987 (JRA *et al.*). Forma **azurea** Hyl., with deep blue corollas, was found on dumped sand in a Powergen yard, Cwm Rheidol SN694795, 1992 (SPC). Old records for *A. foemina* Mill. (*A. caerulea* auct.) given by Salter (1901, 1935) at Aberystwyth, Glandyfi, Rhydyfelin and Llanfair Clydogau, probably belong here; definite subsp. *foemina* has not been recorded. A plant from waste ground by the Aberystwyth gas-works SN59498091, 2002 (NMW) had pale pinkish petals deep pinkish purple at the base, the glandular hairs 3-celled with the apical cell oblong or ellipsoid, and good seed and fertile pollen; its identity is uncertain.

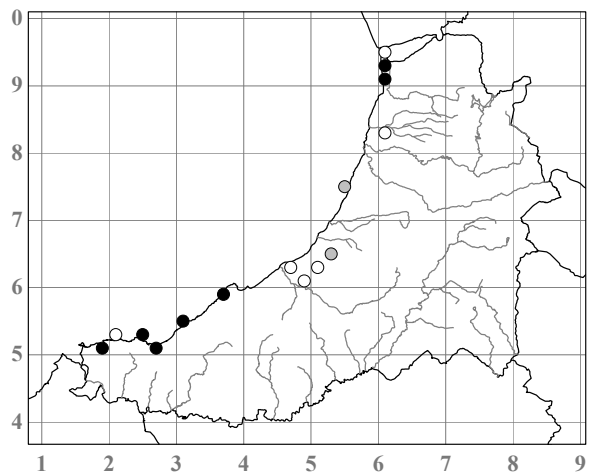
Var. **verticillata** Rouy, with procumbent stems with short internodes, distinctively fleshy leaves 0.3-0.4mm thick (as opposed to the normal thickness in var. *arvensis* of 0.1-0.25mm), and pale flesh-coloured corollas is frequent on the Ynys-las dunes SN69B, C, 2005 (NMW); a dwarf, procumbent form, rooting at the nodes, grows on bare, slightly brackish peat by the Afon Leri SN617926, 1991 (NMW) and may be this variety too. Plants of both varieties frequently have the leaves in whorls of three.



*Anagallis arvensis* forma *carnea*,  
Ynys-las dunes SN604934, August 2007

### **Centunculus minimus** L. (*Anagallis minima* (L.) E. H. L. Krause) - Chaffweed - Gwlyddyn-Mair Bach

A rare plant of damp places on heaths and coastal grassland, often in peaty and shaly places, often by tracks and usually near the sea. It was first recorded, as abundant, on the sandy heath at Ynys-las c. SN69B in 1841 (Lees 1841), and recorded again as abundant in a dune slack there in 1948 (NMW, PWR, *Watsonia* 1: 254 (1950)). Richards, in his annotated copy of Salter's Flora, says that it was near the ferry, i.e. at the N end of the dunes SN69C, and it was seen in the main slack E of the road SN61099390 in 2006 (JPP & AOC) in bare patches where weedkiller had been used to kill *Crassula helmsii*; it has also been seen nearby in peaty places on the Aberleri Fields SN609916-614914 in 1994-2006 (AOC, JPL & ACW). It has been recorded at five inland sites: a plant grown from buried seed in Barn Field pasture, formerly arable, at Frongoch Farm, 2km ENE of Aberystwyth SN605826 in c.1930 (Chippindale & Milton 1934); Aber-arth Common SN4762, 1930 (Salter Diary 27.9.1930); a heath 3.5km ("2¼ miles") SE of Aberaeron SN46V, 1936 (FD, Wade 1952); Llanbadarn Trefeglwys SN56B, 1899 (Marshall 1900); and in heathy pasture, Tryal-bach SN52106534, 1978 (AOC & DGJ); at none of these has it been refound. On the coast it was recorded in cart tracks by Mynachdy'r-graig



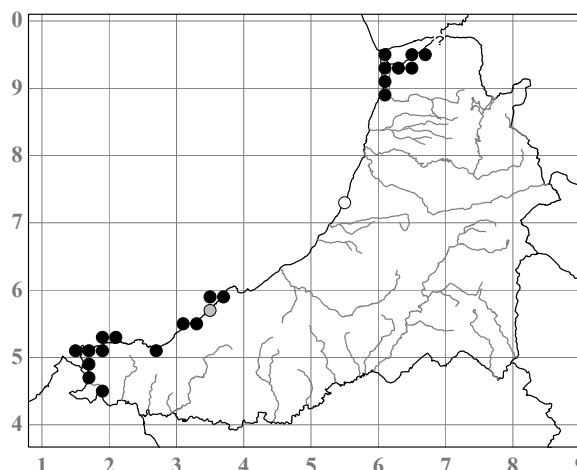
SN557747, 1976 (JPS); by Salter ¼ mile SW of Coubal (Wade 1952) and near here on the coast path at Traeth y Coubal SN37185917, 2000 (JPW & AOC); in closely grazed flushed turf on Llangranog Head SN31435525, 1999 (WMcC *et al.*); in a poached marshy pasture, Tresaith SN27505073, 1996 (MDS); at Craig y Filain, 1941 (Whellan 1942), near which site it still grows on the MoD range in ruts in a marsh SN243524, 1979-1994, and in abundance on disturbed shaly ground SN24795249, 2002 (AOC & ME) - 2008; and on a flushed grassy slope on the sea cliffs 1.5km W of Mwnt SN180516, 1987 (AOC & APF). Except for the inland sites, it shows no signs of decreasing.

### **Cyclamen hederifolium** Aiton - Sowbread - Bara'r Hwch

First reported naturalised or as a relic in 1977 when two clumps were found near an old farmhouse by Llangybi Common SN55X (Mrs Tiffany per IWC). The only other records are from Eglwys Fach where for some years from 1995 a clump of forma **hederifolium** was established on the stream bank by Ynys-hir SN68429578 and one of forma **albiflorum** (Jord.) Grey-Wilson on a laneside bank above the village SN689957 (EG, conf. PSC & WMC); from the roadside hedgebank 300m NNW of Rhydyppennau SN62788622, 2004-2007, where there are two colonies 4m and 5m long of a mixture of both forms; from near Llanfarian where clumps of both forms originally planted are well-naturalised by a woodland path SN595767, 1995 (SPC); and from Fronfraith Farm where there is a clump on a roadside bank SN617819, 2001 (RB). There are probably other sites in estate grounds and woodlands where it is similarly established. Native of S Europe.

### **Samolus valerandi** L. - Brookweed - Claerlys

Frequent in damp sandy, peaty or muddy, usually brackish habitats along the coast, at the top of salt marshes and on ditch-sides, in dune slacks, on slumping till, on sheltered rock ledges and on stream banks where they approach the shore. It tolerates shade, often growing under overhangs. Among *Phragmites*, for example in the Ynys-las dune slacks SN69B, 2008 (SPC), it can grow to *c.*40cm tall. *Samolus* occurs all round the Dyfi estuary, where it was first recorded by Llwyd in 1682 "in the marshes below Tyno Hir" *c.*SN69Y (Chater 1984a). From this area southwards it is surprisingly absent until Traeth y Coubal *c.*SN3759, 1902 (Salter Diary 9.7.1902), but it is in many places from there to the Teifi estuary, where it has been seen as far upstream as 200m NW of Cwm Du in the Coedmore woods SN192446. The only record from between these two main areas was from S of Monks' Cave SN57L in 1905 (Salter Diary 11.9.1905, 1935).



## **THEACEAE**

### **Stewartia pseudocamellia** Maxim. - (Deciduous Camellia)

There is a large planted bush of this native of Japan and Korea, introduced to Britain in 1874, in the grounds of Plas Gogerddan SN63138370, 2007 (ADH & RAJ).

## **ERICACEAE**

### **Empetrum nigrum** L. subsp. **nigrum** - Crowberry - Creiglusen

Locally abundant or co-dominant with other dwarf shrubs on upland heaths, blanket bogs and other peaty habitats, generally becoming commoner above *c.*400m. In heavily Sheep-grazed areas it can persist along with *Vaccinium myrtillus* in the absence of *Calluna*. Below *c.*300m it occurs, usually in smaller quantity, in a variety of valley mires, blanket bogs and raised bogs, especially in the Bethania/Cilcennin area. Several of its sites are somewhat detached from the main area of distribution, such as formerly cut-over areas of peat at Rhos Llawr-cwrt SN40885002 and 411500, 1984-2008, where the population has increased considerably over that period (AOC, APF, RJW), a bit of relic wet heath at Blaen Cribor nearby SN403484, 1996, and another 2.5km WSW of Mydroilyn SN43505445, 1987-2003. Plants with hermaphrodite flowers are occasionally



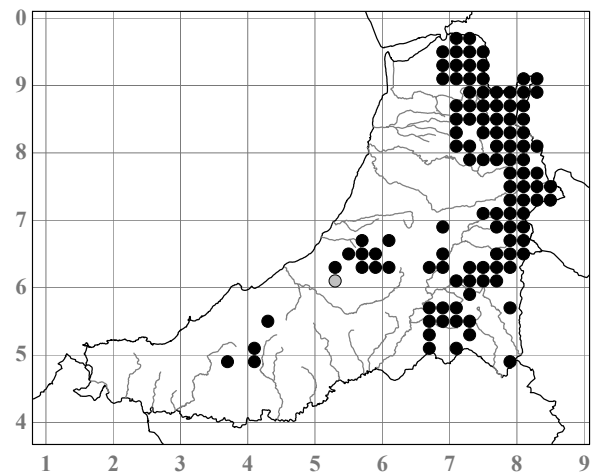
seen, as on Banc Chwarelmelyn SN80578035 at 530m, 1995 (GMK & GWK). The earliest record is by Llwyd in 1682 (Chater 1984a) as *Erica baccifera procumbens nigra*, one of “the plants I found at Plinlimmon.” Altitude limit 750m, Pumlumon Fawr summit SN789869, Salter (1935); 730m, ditto, 2002; it descends to 160m on the raised bog of the West Bog, Cors Caron c.SN6863, 1932 (Salter Diary 9.6.1932) - 2007, where it is frequent.

**Rhododendron ponticum** L. hybrid swarm - Rhododendron - Rhododendron Wyllt

*R. ponticum* is native of the Iberian peninsula and the Black Sea area, and was introduced into Britain some time in the 1760s to 1780s. Milne & Abbott (2000) claim from DNA studies that most if not all British plants originated from Iberia. This species and three others introduced from North America in the 18<sup>th</sup> and 19<sup>th</sup> centuries, *R. catawbiense* Michx., *R. maximum* L. and *R. macrophyllum* D. Don ex G. Don, are thought to have formed a very variable hybrid swarm, deliberately or accidentally, in nurseries and gardens and in the wild (Chater & Cullen 2007, Cullen in prep.). The bushes abundantly naturalised throughout Britain and usually called *R. ponticum* are now considered to belong to this hybrid swarm.

The earliest record of Rhododendrons in the county is of “*Azalea pontica*” being brought to the gardens at Hafod SN7673 in the 1790s; where from is not recorded, but it is just possible that it was from the Black Sea area as Thomas Johnes had at this time a contact who could obtain seeds for him from Constantinople. In 1797 Johnes wrote to J. E. Smith that “The *Azalea pontica* takes kindly: it is much grown - the Gardener talks of layering one to get more” (letter of 26.5.1797 at the Linnean Society), and in 1805 Rhododendrons “were flourishing of a large size in the open air, covered with flower-buds” (R. V. Yates, NLW MS. 687, f.126) in Mrs Johnes’s garden SN766731. Bushes of the *R. ponticum* hybrid swarm are now widely naturalised throughout the county, abundantly so in many estate and other woodlands, including Hafod, and on some uncultivated hillsides, and as self-sown bushes in hedges, scrub, woods, marshes and many other habitats. On the N-facing slopes of the Llynant Valley c.SN7297 in particular it has increased enormously since the 1980s and the RSPB has taken repeated steps to control it, but on few other open sites has it been so invasive. In estate woodlands too, for example at Ynys-hir SN69S, T, and Nanteos SN67E, the RSPB and other conservation bodies have attempted to control it.

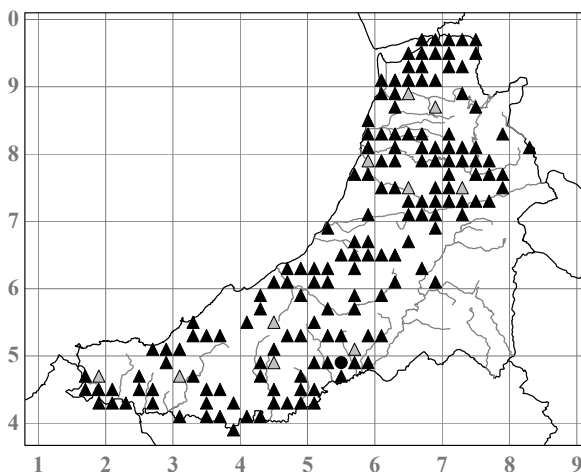
Some 60 recently collected specimens from the county have been annotated by J. Cullen and are in CGE. At almost all the sites where Rhododen-



*Empetrum nigrum* subsp. *nigrum*



Epiphytic *Rhododendron ponticum*, Cwm Castell, Llynant, view N from SN739969, April 2006







Rhododendrons below Tarren Tyn-y-maen, Llyfnant, view SW from SN724972, June 2006

drons are naturalised at least some of the plants show the influence of *R. maximum*, particularly in having varying amounts of white hairs and sometimes also short-stalked glands on the ovaries, for example at Blaenpant SN25404424, 2003 (CGE), or in having the calyx-lobes up to 5(-7)mm long, for example at Tan-y-bwlch SN58517914, 2006 (CGE), Nanteos SN61257858, 2006 (CGE), Llanerchaeron SN48156018, 2006 (CGE) and Coedmore SN19704399, 2006 (CGE); at some sites, as at Devil's Bridge SN7477, 2001, and at Trawsgoed SN67R, 2001, up to 25% of the plants can show these characters. The influence of *R. catawbiense* is less often obvious, but plants particularly with rusty-coloured hairs on the ovary but no glands, or with broad leaves, indicate its involvement and have been seen at Gogerddan SN628839, 2003 (CGE), Penglais SN595821, 2001 (CGE), Devil's Bridge SN7477, 2006, Hafod SN762731, 2003 (NMW), Falcondale SN56494951, 2006 (CGE), and at Blaenpant SN254442, 2003 (NMW). Less obvious still is the influence of *R. macrophyllum*, but some plants from Llanerchaeron SN479601, 2006 (CGE) in particular have the indicative subglabrous pedicels

Salter nowhere specifically recorded Rhododendrons as naturalised, although he did mention them as undergrowth with Cherry Laurel in the Oak, Beech and conifer woods at Monachty c.SN505620 (Diary 30.4.1929), so it is possible that their spread has been largely since his time. Altitude limit (self-sown) 450m, N-facing rocky slope, Craig y Ceffyl SN792774, 1991.

### **Rhododendron arboreum** Sm. Hardy Hybrids

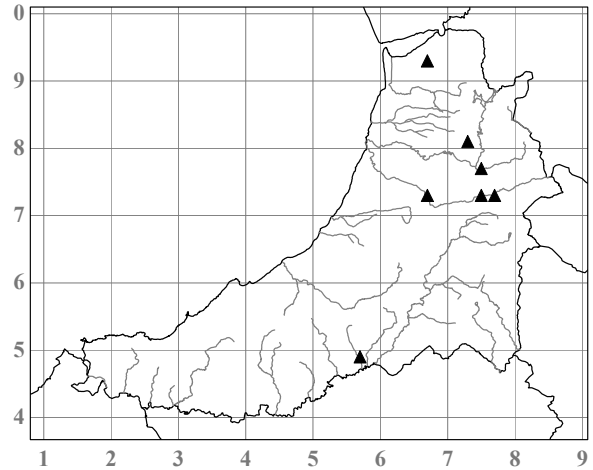
Bushes of this group of Hardy Hybrids, mostly derived from the Himalayan *R. arboreum* and other species such as *R. maximum*, *R. ponticum* and *R. catawbiense*, have been widely planted in churchyards, estate grounds and gardens in the county, but along with various other planted but not naturalised Rhododendrons they have not been critically identified for this Flora. Several good examples can be seen on the Hafod estate SN77L, R, especially around the mansion site, in Mariamne's Garden and in Eglwys Newydd churchyard, as well as by the Devil's Bridge falls SN7477.

**Rhododendron catawbiense** Michx.  $\times$  **griffithianum** Wight

The blatantly conspicuous ‘*Cynthia*’ has been occasionally planted in estate woods, large gardens and shrubberies, for example around Ynys-hir SN682958 and 684952, 1960-2008, and at Glan-paith SN604787, 1970-2008.

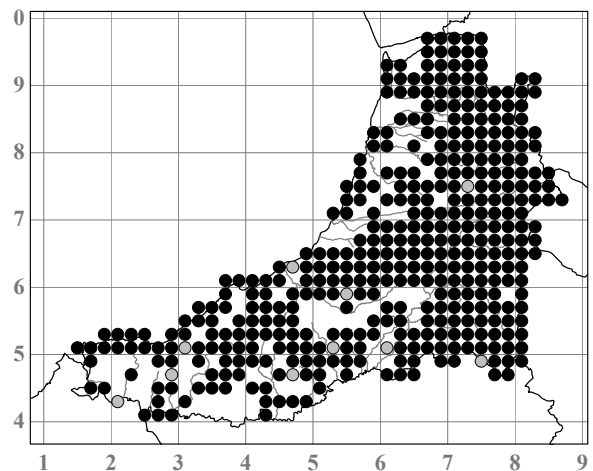
**Rhododendron luteum** Sweet - Yellow Azalea - Rhododendron Felen

Introduced into Britain from the Caucasus in 1792, but it is not known when it was first grown in the county. It is though so well naturalised in several places on the former Hafod estate, for example by the Devil’s Bridge waterfalls SN741772, 1956 (HJMB, *Proc. BSBI* 3: 60 (1958)) - 2005, and in the plantations above the Hafod mansion site SN758733, 1976 (NMW) - 2005, that it may have been introduced there at an early date. It is also well naturalised in the Trawsgoed grounds SN671730, 1994, and is occasionally planted in the wild, for example at Lodge Park, Tre’r-ddol SN662932, 1996 (NMW), and by Pond Llywernog SN722813, 2003. Salter (Diary 2.6.1931) remarked on it in the woods around Falcondale Lake c.SN570499, where it is now naturalised.



**Calluna vulgaris** (L.) Hull - Heather - Grug

Abundant and often dominant in dry and wet heaths at all altitudes. On the coast it can dominate steep rocky slopes and screes, and can be a major constituent of coastal heath on the less steep areas and in abandoned clifftop fields. It is common in bogs of all sorts, and on river shingle, and in the uplands is often abundant on both blanket bogs and on thin, dry soils, although as Salter (1935) remarked it “never forms extensive heather moors, as in Scotland and the North of England”. Sheep grazing has been partly responsible for this, and much work is being done at ADAS, Pwll Peiran on techniques for restoring, or creating, Heather moorland in the uplands. Drought years have also had a great effect, and in 1976 large areas of Heather were killed.



*Calluna* on the N slope of Glog, Cwm Ystwyth, view SE from c.SN774762, August 2005



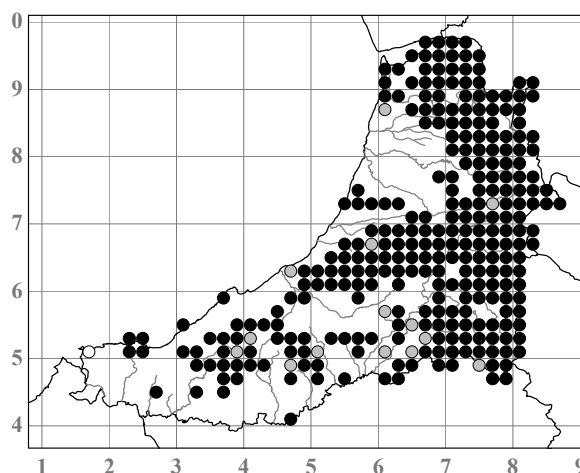
*Calluna* killed by Heather Beetle, Grogwynion river shingle, view E from SN711719, May 2005



Heather Beetle, *Lochmaea suturalis*, is widespread and seems to have become more prevalent in recent years, completely killing large areas of the Heather, for example on the river shingle heath at Grogwynion on the Ystwyth c.SN7171, 2005, and on the hills SE of Ponterwyd c.SN7679, 2005. Willis & Burkill (1895) gave details of Heather's many insect pollinators that they observed in the Pumlumon uplands. Heather colonises some lead mine sites readily, for example at Cwmsymlog SN699837. In the past it was used for thatching, chiefly as underthatch (Williams 1995). Altitude limit 730m, Pumlumon Fawr c.SN7886 (Salter 1935); 740m, summit of Pumlumon Fawr SN789869, 2002.

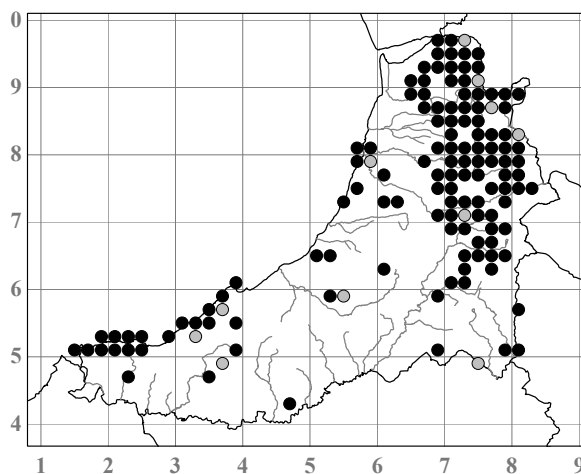
#### ***Erica tetralix* L. - Cross-leaved Heath - Grug Croesddail**

Abundant in wet heaths and mires throughout the county, and a co-dominant with other dwarf shrubs in many sites especially in the uplands. It is a major component of the raised bogs of Cors Fochno SN69 and Cors Caron SN66 and of most of the blanket bogs. In many places in the uplands it is abundant on quite dry heathy slopes, as at Padell Nant-wyddon SN784831, 2007, where it often grows mixed with *E. cinerea*, but on the coast it is confined to the wet heaths. Willis & Burkill (1895) gave details of its insect visitors in the Pumlumon uplands. Altitude limit 715m, Pen Pumlumon Arwystli SN88, Salter (Diary 21.7.1933, 1935); 555m, eroding mire 300m SW of Llan Ddu Fawr SN785697, 2002.



#### ***Erica cinerea* L. - Bell Heather - Grug y Mêl**

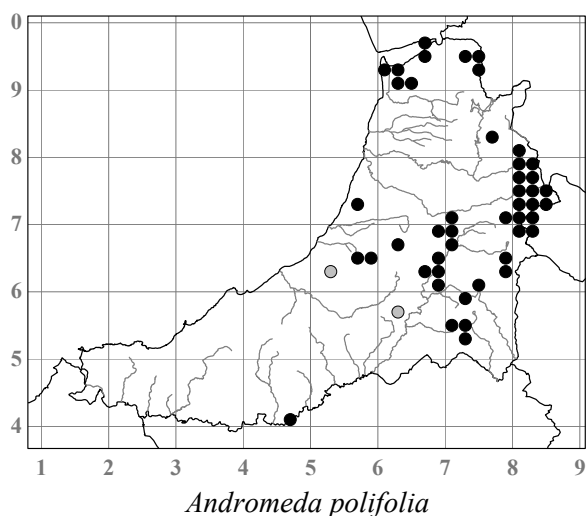
Widespread on many of the coastal slopes and in the uplands, but uncommon and seldom abundant in between. On the coast it forms a dwarf shrub heath with *Ulex gallii* and *Calluna* on exposed slopes in the SW, and there is an especially extensive example of this at Pendinaslochdyn SN314547, 2004. It is also locally abundant on rocky bluffs, smaller areas of heath and on scree slopes elsewhere along the coast. On comparatively ungrazed, dry slopes in the uplands similar heath has developed, fine examples being just E of Craig y Pistyll SN715856 at 350m altitude, 2004, and at Padell Nant-wyddon SN784831 at the same altitude, 2007. At only 200m altitude it is very abundant on the S and W slopes of Foel Fawr SN6995, 2004. It grows on dry banks, rocks, dry heaths and in FC areas where grazing is prevented, but is generally much less frequent than *Calluna* inland and in the uplands. Willis & Burkill (1895) gave details of its insect visitors in the Pumlumon uplands. Altitude limit 590m, cliffs above Llyn Llygad Rheidol SN790875, 1997 (AOC & TDD).



#### ***Andromeda polifolia* L. - Bog-rosemary - Andromeda'r Gors**

Widespread, but scattered and rarely abundant, in the upland bogs, and very abundant on the raised bogs of Cors Fochno SN69, 1863 (Morgan 1863) - 2003, at sea level, and Cors Caron SN66, 2003. It occurs in valley mires at comparatively low altitudes, as at Rhos Rydd SN567737, 135m, 1979-2005; Cors Caranod SN5664, 230m, 1956 (P. Morgan, *Nature in Wales* 2: 353 (1956)) - 1990 (SPC); by the Nant Bryn Maen SN636562, 150m, 1986; Cors Penbwlch SN683686, 255m, 1986 (APF) - 2005; and Cefngwrthafarnuchaf SN527639, 180m, 1981. A very isolated site was a small basin mire near the Teifi at Rhydcaraog SN470416, at only 120m altitude, 1991, but it had gone from here through overshading by 2004. It grows on both eroding and growing bogs and can be found on the driest peat hags as well as in wet *Sphagnum* hollows, and it can be a good colonist of peat cuttings. In some of the more lowland sites, as on Ynys Edwin bog SN678961, 1969 (WMC, Condry 1995) - 2008, and on Cors Caron, there is often a late second flowering in October. In 2004 it

was voted as Ceredigion's County Flower in a Plantlife poll, and it can perhaps be most easily admired from the boardwalks on the RSPB Ynys-hir Reserve SN678959 and on the Cors Caron NNR. Altitude limit 570m, Esgair Maengwynion SN814769, 1993 (CM).



*Leucothoe fontanesiana* naturalised in woodland, Ynys-hir RSPB Reserve, view N from SN68209610, June 2009

***Leucothoe fontanesiana* (Steud.) Sleumer - Dog-hobble**

Planted in the estate woodland at Ynys-hir in the 1930s by H. Mappin and abundantly naturalised by the 1960s (PSC), and, although reduced by shading and deliberate eradication by the RSPB, in the late 1990s there was still a dense stand 12m across at SN68299617, and a small amount at SN68209610 in 2000 - 2009 (NMW, LTR). Native of SE North America, it has apparently not been recorded naturalised anywhere else in Britain although it was introduced as early as 1793.

***Gaultheria shallon* Pursh - Shallon - Gweunlwyn Sialon**

Naturalised in a few places in estate woodlands, at Glandyfi Castle SN692965, 1994 (AOC & WMC) - 2005, at Ynys-hir SN682961 and 684962, 1993-2005, and at Plas Penglais SN593820, 1995-2005. Native of W North America, introduced to Britain in 1826.

***Gaultheria procumbens* L. - Checkerberry - Gweunlwyn Ymlusgol**

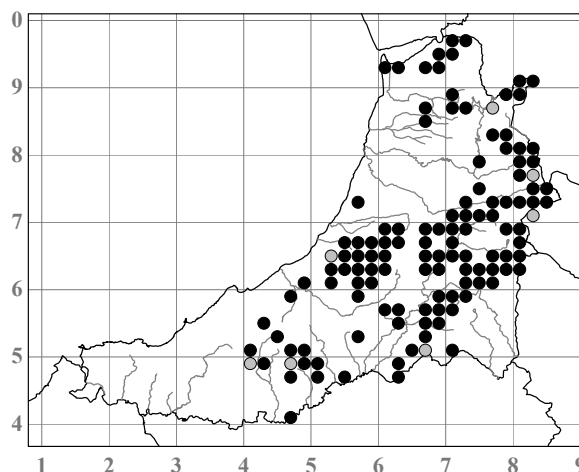
Abundantly naturalised among grass with *Vaccinium myrtillus* under the Oak avenue in the grounds of Traws-god SN671730, 1989 (AOC & RGW) - 2008. Native of E North America, introduced to Britain in 1762.

***Gaultheria mucronata* (L. f.) Hook. & Arn. (*Pernettya mucronata* (L. f.) Gaudich. ex Spreng.) - Prickly Heath - Gweunlwyn Pigog**

Abundantly naturalised on a roadside bank 110m N of Furnace bridge SN68549528, 1991 (NMW, AOC & CDP) - 2008, and on a roadside hedgebank by Carreg-y-Dôll, 2.3km W of Trefenter SN58706762, 2008. Native of Chile and Argentina, introduced to Britain in 1828.

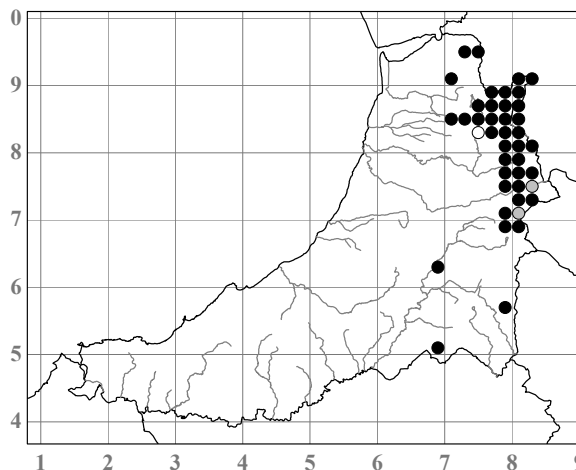
***Vaccinium oxycoccos* L. (*Oxycoccus palustris* Pers.) - Cranberry - Llygaeren (Llygoiron)**

Frequent in *Sphagnum* bogs throughout much of the county, but absent from the SW, becoming less common in the uplands, and indeed almost absent from the uplands in the SE of the county, and largely absent from Cors Fochno SN69 except for a few former peat cuttings around the margins. It is especially characteristic of the valley mires in the middle of the county, where it usually fruits prolifically. Altitude limit 490m, "bogs at the source of the Elan" c.SN8374 (Salter 1935); 550m, by pools in blanket bog 800m WNW of Bryn Llychese SN816810, 1993.



### **Vaccinium vitis-idaea** L. - Cowberry - Llusen Goch

Largely confined to the uplands at over 400m, where it grows, sometimes as a co-dominant, chiefly among *V. myrtillus*, *Calluna* and *Empetrum* on ungrazed or less heavily grazed moorland, blanket bog, cliff ledges and among rocks. The most luxuriant growth is usually seen on Sheep-free rocky slopes in FC areas, for example by the Nant y Gerwyn SN790578, 1993 (RNT), and, unlike *V. myrtillus*, it does not persist in heavily grazed sites. Its lowest altitude is at 165m on Cors Caron, where Salter saw it in 1932 (Diary 9.6.1932) and where it is now known only from three sites on the West Bog, at SN68066243, 68546392 and 68686346, 1999 (JPS; AOC; PCu) (for comment on this last site see under *V. ×intermedium*). The only other sites below 400m are by the Rhuddnant where Salter recorded it (1935) and where a colony on the S bank of the stream SN79487825, at 340m, growing among dense *V. myrtillus*, was 10 × 4m in 2004 (AOC, SDSB & CMFB); and on the cliff slope 50m W of the Llyn Craigytyll dam SN71798555, also at 340m, 1922 (Salter Diary 9.8.1922 etc.) - 2002 (AOC & JPW). The earliest record is from Pumlumon in 1682 by Llwyd (Chater 1984a). Altitude limit 750m, Pumlumon Fawr summit SN789869, 1932 (Salter Diary 5.9.1932, 1935); 730m, near the summit SN789871, 2002.

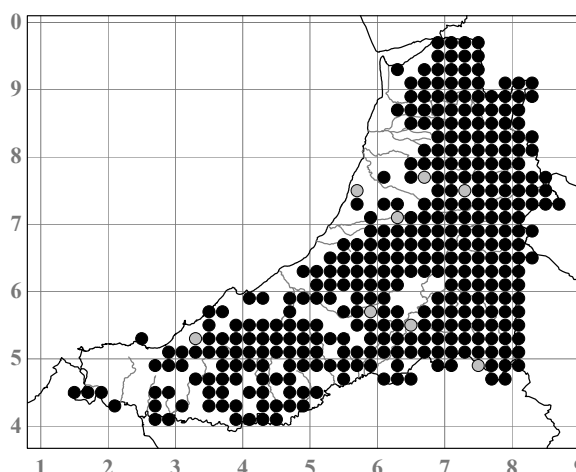


### **Vaccinium ×intermedium** Ruthe (*V. myrtillus* × *vitis-idaea*)

The only definite colony of this hybrid in the county, at the E side of the West Bog, Cors Caron SN68686346, was found c.1980 (JPS). It is among *Molinia* tussocks in the rand community, with both parents growing nearby. In 2000 the colony was 10 × 8m, of dense bushes apparently comprising a single clone, flowering in August (NMW). The few bushes of *V. vitis-idaea* here have long anther-appendages like the hybrid, flower at the same time, and set no or few fruits and so would appear to be back-crossed, 2000 (NMW). A bush growing with the parents on blanket bog on Esgair Fuwch-wen, Pumlumon SN821911, 2008 (NMW) at 480m altitude resembled *V. vitis-idaea* in most characters, but had globose corollas, minute but distinct anther appendages 0.3mm long, and the pollen c.98% sterile; it was in full flower in late September, and is presumably also a back-cross.

### **Vaccinium myrtillus** L. - Bilberry - Llygaeren (Llus Duon)

Throughout most of the county, but rare along the coast and in the SW. In the uplands it is often dominant on steep slopes where the grazing pressure is low, and persists even in closely grazed turf where it can be unnoticed until the grazing is relaxed. It is especially abundant on unplanted slopes and along roadsides in FC areas where Sheep are excluded, and is also often dominant in formerly coppiced *Quercus petraea* woods. In many areas it is co-dominant with *Calluna* and *Erica tetralix*, and it also occurs in blanket bogs, on cliff ledges and in screes. In the lowlands it is abundant on heaths, in valley mires, on many of the less fertile wooded slopes and on banks, but is absent from the coastal heaths as well as from the raised bogs on Cors Caron and Cors Fochno (although a few plants have been seen near the margins of the latter). Salter (1938) remarked that a second flowering in September or October was quite familiar. Willis & Burkill (1895) gave details of the few insect visitors they observed in the Pumlumon uplands. Good crops of fruit are often available. Altitude limit 730m, “almost to the summit of Plynlumon”, Salter (1935); 750m, Pumlumon Fawr summit SN789869, 2002.





## GARRYACEAE

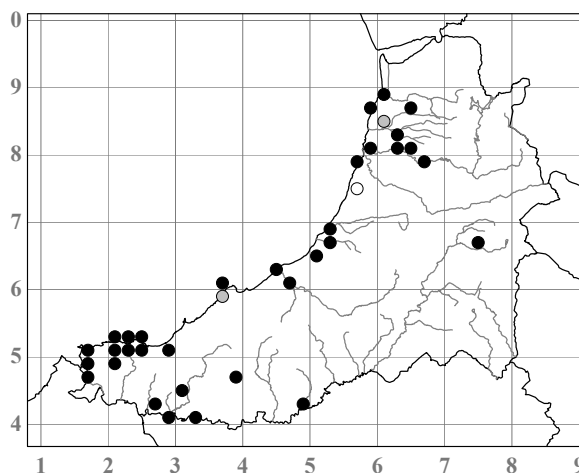
**Aucuba japonica** Thunb. - Spotted-laurel - Coeden Frech Felen

Native of E Asia and often planted in amenity areas and in car parks. It occurs as a relic in several places, as in scrub by the railway at Llandre SN625864, 1995, where it is forma **variegata** (Dombrain) Rehder. In the overgrown grounds of Cardigan Castle SN178459, 2003, there were abundant self-sown bushes as well as relics, including some of forma *variegata* and some of forma **longifolia** (T. Moore) Schelle.

## RUBIACEAE

**Sherardia arvensis** L. - Field Madder - Mandon Las yr Ŷd

An uncommon plant of dry pastures chiefly on the coastal slopes but occasionally inland, and an occasional weed of arable fields, waste and disturbed ground, dry roadside verges and kerb edges, lawns and flowerbeds. Although it has occurred on the Penyrergyd dunes SN163486, 1985, it has not been seen at Ynys-las. It occasionally comes up from a seed bank where roads or housing developments have cut into old fields, and this probably accounts for an impression of increase over the last few decades in line with the national trend (Braithwaite *et al.* 2006). Between the 1930s and 1970s, in which latter decade it was very rarely seen, it must though have declined, as Salter (1935) thought of it as too common to give localities for.



[*Asperula cynanchica* L. subsp. *cynanchica* - Squinancywort - Mandon Fach

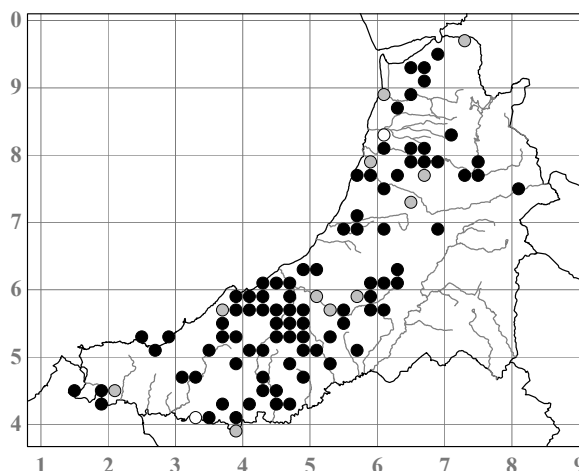
Erroneously recorded in Morgan (1849) and Bennett *et al.* (1929).]

[*Galium boreale* L. - Northern Bedstraw - Briwydd y Gogledd

Erroneously recorded by Morgan (1849), without locality.]

**Galium odoratum** (L.) Scop. (*Asperula odorata* L.) - Woodruff - Briwydd Bêr (Llysiau'r Eryr)

Native in most of the more fertile and base-rich valley woodlands, usually in slightly damper sites than *Mercurialis perennis* and often forming extensive carpets on flushed slopes. It is abundant for example in many places in the ancient woodlands of Coed Rheidol SN77, 1893 (Salter Diary 12.5.1893) - 2004, and the Gwenffrwd valley SN55Z-56V, 1937 (Salter Diary 17.5.1937) - 2002, and in gullies with *Euonymus* in the Oak woods on the sea cliffs at the MoD site, Aber-porth SN244525, 1982-2005. It is also commonly naturalised on hedgebanks, in estate woodlands and around old cottage sites, being very widely grown in gardens. It is often impossible to guess which populations are native, and the map makes no attempt to distinguish statuses. Altitude limit (native) 375m, gully E of Ty-mawr, Cwm Ystwyth SN819746, 1981.

**Galium uliginosum** L. - Fen Bedstraw - Briwydd y Fign

Known only from calcareous flushes and fens around the sand deposits at Penparc, for example by the Afon Mwldan SN197483 etc., 1987 (WF) - 2003 and near Crugmore Farm SN209470, 1993, and from a base-rich flush with *Carex dioica* and *C. hostiana* at the W side of Llyn Gwngu SN837728, 1997 (NMW, JPW &

AOC) - 2006. This latter site is characteristic of its main habitat in Radnorshire, where it is much more widespread. Salter (1935) recorded it from Cors Fochno SN69 and Cors Caron SN66, and wrote (Diary 23.6.1931) that he saw “plenty” of it on Cors Fochno apparently near the NW corner. It has not been recorded from these two bogs since, and although Salter knew the species in the S of England (NMW), there must be considerable doubt about these records. Altitude limit 440m, Llyn Gwngu SN837728, 1997 (JPW & AOC).

### **Galium palustre** L. - Marsh-bedstraw - Briwydd y Gors

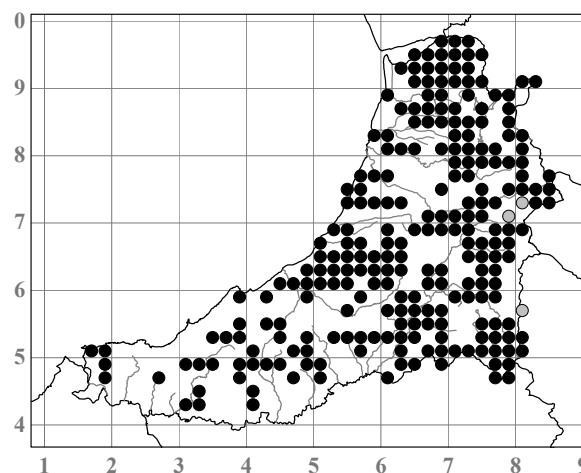
The three subspecies differ in the size of the flowers and fruits and in the size and shape of the leaves, and are generally immediately recognisable and have different habitat preferences. These differences are believed to be correlated with three ploidy levels. Although Stace (2010) includes subsp. *tetraploideum* in subsp. *palustre*, it certainly makes more sense to recognise all three. Altitude limit 505m, Llyn Crugnant SN754613 (Salter 1935); 520m, 2002, see below.

#### Subsp. **palustre** (var. *witheringii* (Sm.) Syme)

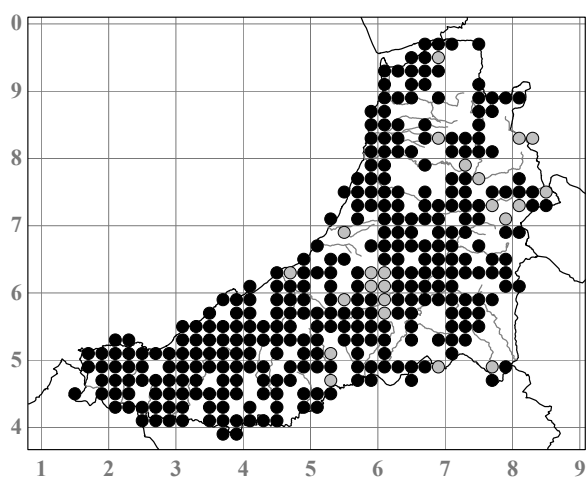
Generally confined to the more oligotrophic mires and usually the commonest subspecies in the uplands. In the valley mire by the Afon Mwyr 3km ESE of Strata Florida SN776648, 1996 (CGE) it is in the most acidic areas with *Narthecium*, *Molinia* and *Carex panicea*, while subsp. *tetraploideum* is in the tall *Juncus acutiflorus* community nearby, and this ecological separation is characteristic of many other valley mires. Altitude limit 520m, flushed slope 700m WNW of Carnfachbugelyln, Pumlumon SN82009079, 2002.

#### Subsp. **tetraploideum** A. R. Clapham ex Franco

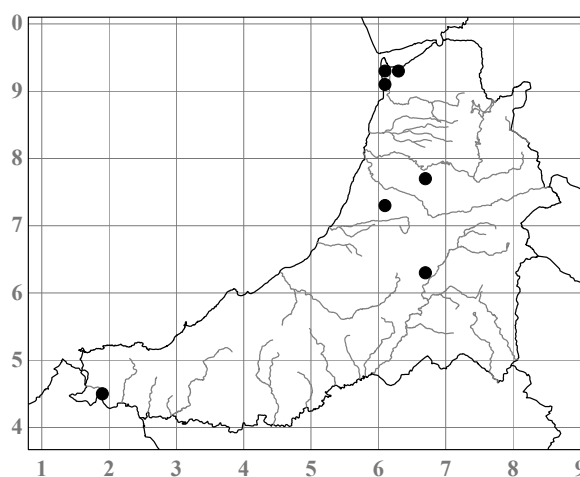
By far the commonest subspecies, occurring in all but the most extreme oligotrophic wetlands. As well as swamp and fen communities it occurs commonly in marshy pastures, on streamsides, riverbanks and lake margins, among *Juncus effusus* in flushes in the uplands, and in dune slacks. It is salt-tolerant, and often grows on harbour and quay walls, as at The Gap, Aberystwyth harbour SN581813, 1993-2004 (NMW) and in Aberaeron harbour SN457629, 1990-2005. It is, surprisingly, a persistent weed in municipal flowerbeds in Aberystwyth, for example in a Rose bed at Penyrangor SN582810, 1992 (NMW) - 2007. Altitude limit 400m, Cwm Gwerin, Pumlumon SN804891, 2008.



Subsp. *palustre*



Subsp. *tetraploideum*



Subsp. *elongatum*

#### Subsp. **elongatum** (C. Presl) Arcang.

An uncommon plant of usually the wetter parts of mesotrophic or brackish fens. It is abundant among *Phragmites* and sometimes *Bolboschoenus* around Cors Fochno, for example in the old course of the Afon Leri SN608921, 1996, and in tall herb vegetation on ditch-sides along the B4353 road SN623928, 2001; around Cors Caron, for example in the lagg on the W side of the West Bog SN674632, 1993 (NMW); and in brackish *Phragmites* in Rosehill Marsh in the Teifi estuary SN189453, 1999 (NMW).

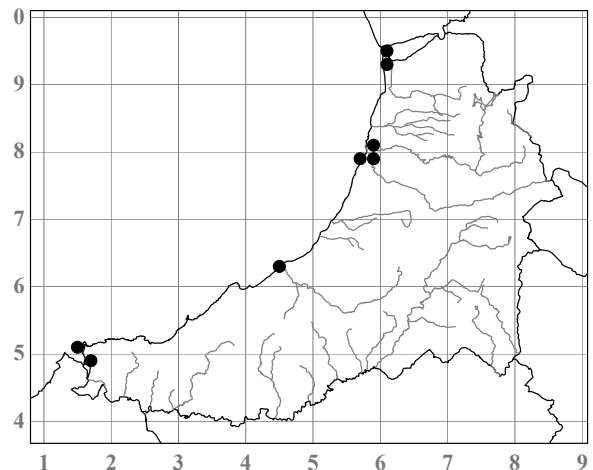
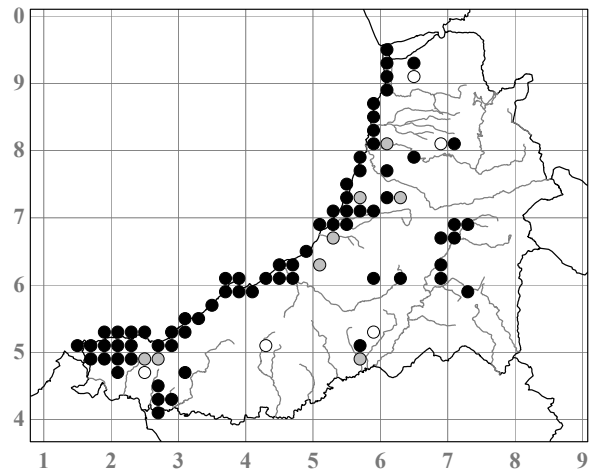
**Galium verum** L. - Lady's Bedstraw - Briwydd FelenSubsp. **verum**

As Salter (1935) said, most frequent along the coast but much less so inland. It is common on dry banks, rough grass slopes, in hay meadows and in pastures near the sea. Inland it is very local in unimproved grasslands, usually behaving as a calcicole and occurring in scattered pastures, hay meadows, dry grassland, on river shingle and in graveyards. There are notable concentrations of sites though in the Swyddffynnon/Ffair-rhos area SN76, and on the S-facing slopes of the Teifi valley SE of Capel Tygwydd SN24R. It is in the churchyards at Llanbadarn Odwyn SN634604, 1906 (Salter Diary 5.9.1906) - 1998, and Silian SN571512, 1999. It has not been seen at over 290m, at which altitude it occurs among *Nardus* and *Molinia* in a valley mire above Ty'n-y-graig SN708692, 1997 (MDS), and among *Nardus* and *Juncus squarrosus* in a S-facing flush below Craig Clogan, Cwm Berwyn SN72645805, 1998, both rather surprising habitats for a species most characteristic of dry, base-rich sites.

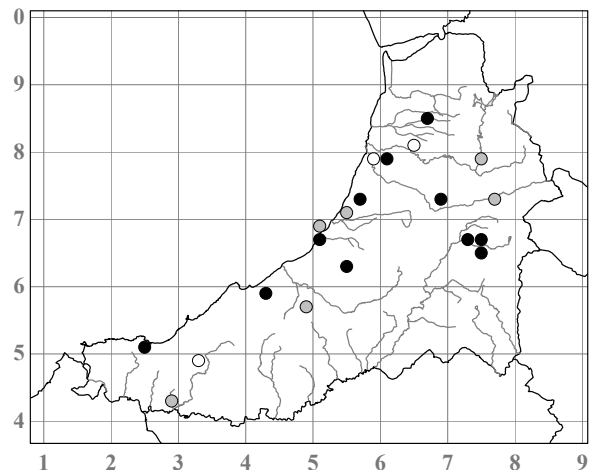
Material collected from the Borth cliffs SN68E in 1886 (**BIRM**, AL) with the flowers light straw-coloured and labelled "*ochroleucum*" (*G. ×pomeranicum* Retz., *G. mollugo* × *verum*) is probably a form of *G. verum* rather than this hybrid. Very robust, almost woody plants up to 1m tall in a sown "wild flower meadow" at the CCW office, Plas Gogerddan SN628834, 1988 (**NMW**) - 2004 are of uncertain identity, possibly subsp. *wirtgenii* (F. W. Schultz) Oborný (Sell & Murrell 2006).

Subsp. **maritimum** (DC.) Adema

Probably the commoner subspecies in most of the more extreme coastal habitats. It is abundant in many places on the mature, stabilised dunes at Ynys-las SN69B, C, 1997, on the sandy landward slope of Tan-y-bwlch beach SN579798, 1997 (**NMW**), and on the seaward ridge of the Penyrergyd dunes SN160485, 1994. It also occurs on vegetated shingle on several of the beaches, for example at Tan-y-bwlch SN580802, 1988 (JRA & AOC), and in cliff-top grassland, for example at Pen y Gloyn SN448625, 1994, and Gwbert SN159500, 1994 (**CGE**, PDS, GM & AOC).

**Galium album** Mill. (*G. mollugo* auct., non L., *G. erectum* Huds. 1778, non 1762) - Hedge Bedstraw - Briwydd y Clawdd

This species, usually considered a calcicole, has been found in 20 very scattered sites in the county, seven of them churchyards, five of them roadside banks, and eight of them pastures, hay meadows or similar. At most of its sites it is represented by a single often very long-lived plant. As it is unlikely that it was ever deliberately planted, it is possible that some at least of this high proportion of churchyard occurrences represent relics of previous permanent pasture (Chater 1977). Salter (1935) saw it in 1929 in Capel Bangor churchyard SN656801, where it has not been recorded since, and in 1933 in Llanafan churchyard SN684722, where it still occurs, 1993 (**NMW**) - 2008. It has also been seen in the churchyards at Eglwys Newydd SN768737, 1977 (**NMW**); Llan-





ddeiniol SN561721, 1976 (NMW) - 1997, where it was abundant; Strata Florida SN746657, 1979-2005; Dihewyd SN484563, 1978; and Aber-porth SN25595110, 2008 (JPP). Salter first saw it, by the B4340 road near Nanteos SN60257888, in 1892 (Diary 18.4.1892) and it is still present there, 1976 (NMW) - 2004 when the colony stretched, with gaps, along 24m of the SE bank of the road. Pasture sites include two of the medieval slangs at Llan-non SN51206687, 1982 (NMW) and SN51366691, 2005, and a pasture at Llwynteifi, Ystumtuen SN741782, 1983. In 1976 it was found by the Aberstringell limekilns SN519684 (NMW) where it may possibly have been introduced with limestone from Pembrokeshire.

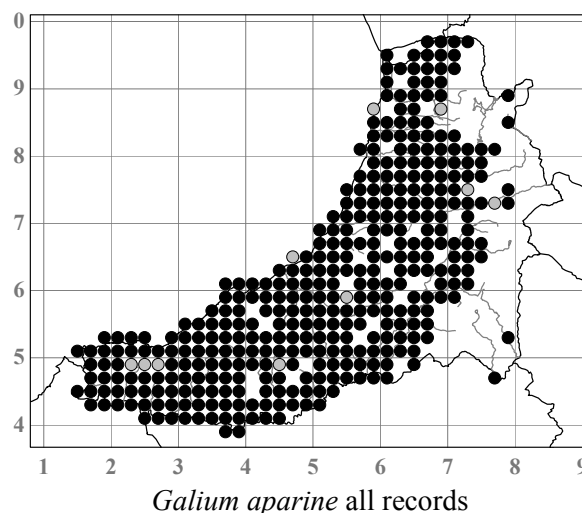
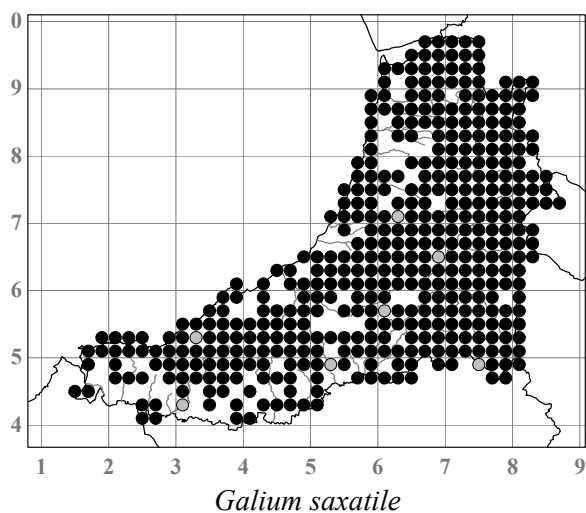
Stace's (2010) use of *G. album* is followed here, obviating the need to decide whether the Cardiganshire plants are *G. mollugo* or *G. erectum*, a problem that was as confusing for me as it had been for Salter (1935). At the Nanteos site, for example, the corollas of the first (unusually early) flowering in May are *erectum*-sized (as are those of most of the other colonies in the county), while those of the second flowering in September after the bank has been cut are *mollugo*-sized. Altitude limit 320m, hay meadow, Pantyffynnon, Ffair-rhos SN738679-740679, 1997 (NMW, MDS).



*Galium album* in Strata Florida churchyard, view NE from SN74646574, July 1984

#### ***Galium saxatile* L. - Heath Bedstraw - Briwydd Wen**

Common in grazed acidic grasslands, and very abundant in all the unimproved upland sheepwalks, in dry heaths, on banks and screes, cliff ledges and in open woodland. It is also widespread and often abundant on the coastal slopes. In wet mires it often grows on the drier moss hummocks. The local name 'Llysiau'r Eryr' refers to its folk use in the county as a cure for shingles (Allen & Hatfield 2004). Altitude limit 750m, summit of Pumlumon Fawr SN789869, 1932 (Salter Diary 5.9.1932) - 2002.



#### ***Galium aparine* L. - Cleavers - Llau'r Offeriaid (Gwlydd y Perthi, Llysiau'r Hidl)**

##### **Subsp. *aparine* var. *aparine***

Very common in hedgebanks and the more nutrient-rich woodlands, where the abundant seedlings are often a conspicuous feature on bare soil in late autumn and winter. It is also common on waste ground, in well-fertilised arable fields and gardens, and on river and coastal shingle. Altitude limit 410m, Eisteddfa Gurig farmyard SN797840, 1993.

Subsp. **agreste** P. D. Sell var. **agreste** P. D. Sell

This compact, low-growing variety of cereal crops, which remains intact in the stubble after harvesting, was collected among stubble in August 1995 in the WAC trial plots, Lovesgrove SN634811 (CGE, conf. PDS). Plants from Barley and Wheat fields at Llwynysgaw SN217518, 2001 (NMW) approach this variety in having shorter, more branched stems and smaller fruits than var. *aparine* in the same habitat, but are not so extreme as the Lovesgrove plants.

Subsp. **agreste** var. **marinum** Fr.

This dwarf, prostrate variety, which retains its characters in cultivation, occurs at the top or back of several of the coastal shingle beaches: at Penyrangor, Aberystwyth SN580808, 1988 (JRA & AOC) - 2005; at Llanrhystud SN525693, 2002; NE of Aberaeron SN457632-460634, 1989 (JRA & AOC) - 2004; and SW of the mouth of the Aeron SN453629, 1994 (NMW) - 2006. It can be abundant where there is a well-established drift line. Where it grows with var. *aparine* it usually fruits and dies off much earlier in the season; a population at Wallog SN589856 (CGE) flowering in September 1995 was perhaps a second generation.



*Galium aparine* subsp. *agreste* var. *marinum*,  
Tan-y-bwlch beach, view SSW from SN579802,  
July 2005

**Cruciata laevipes** Opiz - Crosswort - Llysiau'r Groes

Although widespread in Radnorshire, Breconshire and Carmarthenshire, this generally calcicole species has only once been seen in the county, as a patch 1m<sup>2</sup> on the recently reconstructed verge of the A44(T) just W of Cwmergyr SN792828, at 350m altitude, in 1987; it was clearly an accidental introduction, and persisted for only a few years.

**Rubia peregrina** L. - Wild Madder - Cochwraidd Gwyllt

Recorded only from four sites along a short stretch of the sea cliffs from Penmoelciliau to Penbryn. The first record was from Penmoelciliau in 1902 (Salter Diary 9.7.1902), where scattered plants were again seen on rock ledges and on the slopes at SN341561 in 1981 (AOC & DGJ). Salter next saw it W of Trwyn Crou in 1927 (Diary 3.6.1927), where a few plants were seen growing over Blackthorn scrub at SN329552 in 1997 (JPW & AOC). Salter (1935) also recorded it from Penbryn, where it has since been seen on a rock ledge 200m SW of the mouth of the stream, SN291523, 1978 (AOC & DGJ) and in abundance, growing over Ivy and Blackthorn in the bay NE of Traeth Penbryn SN296528 in 2000 (AOC & MDS). An improbable inland record from near Devil's Bridge c. SN77N by J. Woods in Turner & Dillwyn (1805) is best ignored.

## GENTIANACEAE

**Centaureum erythraea** Rafn (*Erythraea centaurium* auct.) - Common Centaury - Y Ganrhi Goch (Ysgol Fair, Bustul y Ddaear)

Var. **erythraea**

A frequent species of dunes, dry pastures especially on sandy or clay soils, clifftops and cliff slopes, disturbed ground and tracksides. It is commonest near the coast, and on the more calcareous drift soils in the SW, and is absent from many inland areas. Unusual habitats include bare peat by the Afon Cletwr SN6593, 1957, and railway ballast at Trawsgoed SN664734, 1990 (SPC). White-flowered plants are very rarely seen. Allen & Hatfield (2004) refer to a folk use of it in the county for kidney trouble. Altitude limit 435m, FC road verge at Llyn Berwyn SN742570, 2000 (AOC & RDP).

Var. **capitatum** (Willd. ex Cham.) Melderis - Tufted Centaury

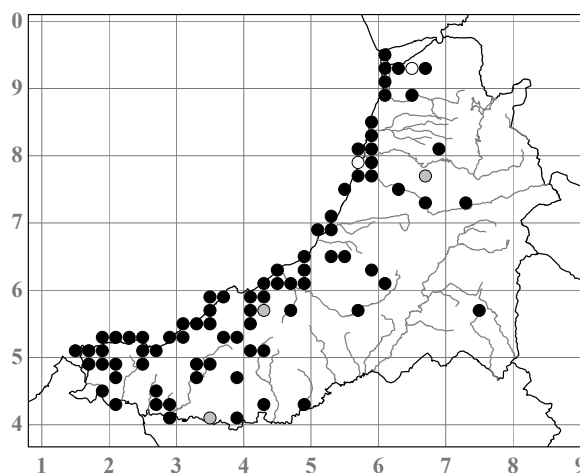
Marshall (1900) recorded this variety as “Very fine on the coast half-way from Newquay to Aberayron” c.SN4361 in 1899, but it has since been recorded only in maritime heath 800m N of the Cliff Hotel, Gwbert SN161509, in 1994 (CGE, PDS & AOC).

Var. **subcapitatum** (Corb.) Ubsdell

More or less acaulescent plants with capitate inflorescences, but with the stamens inserted at the top of the corolla-tube (not at the bottom as in var. *capitatum*) are abundant on the very exposed clifftops on Llan-granog Head SN315552, 1994, on the Penyrergyd dunes SN162487, 2005 (NMW), in the Crugyreryr gravel quarry, Talgarreg SN41915042, 2008, and in other droughted, exposed sites. Salter recorded it on the coast at Morfa Bychan SN5677 (Diary 7.8.1922), and at Craig y Filain SN2352 and Pen Peles SN2152 (Wade 1952), and Whellan (1942) recorded it at Mwnt c.SN1951.

Var. **sublitorale** (Wheldon & C. E. Salmon) Ubsdell

Frequent in some of the dune slacks at Ynys-las SN60549321 etc., 2007 (NMW) and perhaps elsewhere.



*Centaurium erythraea* all records

***Centaurium littorale*** (Turner ex Sm.) Gilmour (*Erythraea littoralis* (Turner ex Sm.) Fr. - Seaside Centaury - Y Ganrhi Goch Arfor

Recorded from “Vicinity of Aberystwyth” by Lees (1841) and from Borth by Morgan (1851), though whether these are reliable records is uncertain. Salter did not find it until 1931 when he wrote “In moist hollows in the Warren there was any quantity of Centaury, some of it I think fairly to be called *littoralis*” (Diary 15.8.1931), and he later refined the locality as “Ynys Las, hollows in the dunes, near the Ferry [i.e. the N end of the dunes c.SN6094]” (1935). There are no specimens extant, it has not reliably been seen since, except perhaps for an unlocalised 1955 field record from SN69 (BHo), and it must now be assumed to be extinct.

***Centaurium pulchellum*** (Sw.) Druce (*Erythraea pulchella* (Sw.) Fr.) - Lesser Centaury - Y Ganrhi Goch Fach

Recorded from “Vicinity of Aberystwyth” by Lees (1841), from Alltwn SN5779 by Morgan (1849) although he later changed the locality to Constitution Hill SN5882 (1851), and again from Constitution Hill by Painter (Salter 1935). Salter (1935) recorded it from the Ynys-las dune slacks and it is still locally abundant there in the more open parts of the old slacks, in the smaller, developing slacks and in damp hollows and along tracks, SN69B, C, 2005. In some years, for example in 1993 and 2000, it has also been abundant among *Juncus gerardii* in the car park slack behind the sea wall SN605926, and in 2008 at the top of the salt marsh on the estuary side of the dunes SN613938. Var. *intermedium* and var. *ramosissimum* both occur but seem too ill-defined to be worth recognition.

***Blackstonia perfoliata*** (L.) Huds. - Yellow-wort - Y Ganrhi Felen

Native on the mature dunes at Ynys-las SN69B, C, 1972 (JPS) - 2006, where it grows in several places, often in abundance and especially near the Information Centre SN607940. It was recorded as a casual in an Aberystwyth car park SN587817, 1976 (JEH), and there is an unlocalised 1958 field record from SN15 at BRC.

***Gentianella campestris*** (L.) Börner (*Gentiana campestris* L.) - Field Gentian - Crwynllys y Maes

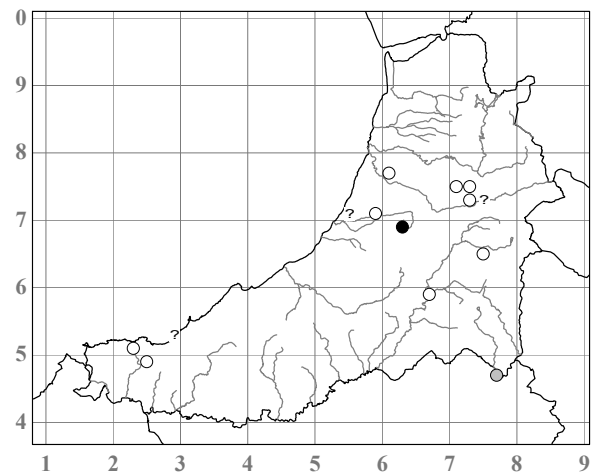
Salter (1935, Wade 1953) recorded this nationally declining species from at least a dozen sites, there are at least five other pre-1970 records, and it was recorded from near the Tywi/Pysgotwr confluence SN74T in c.1979 (CB). In spite of repeated searches in most of them by AOC, MDS and DG among others, it has not been refound in any of these sites, which were widely scattered heaths, unimproved upland pastures and coastal cliff-top pastures. It has clearly gone from some of these sites because of ploughing, but in several cases the sites still look suitable. The only recent site was a pasture 2km N of Bronnant SN636689 where a colony of c.450 plants was found in 2001 (SDSB & DKR; AOC), although none could be found there in 2006,



2007 or 2008 (DKR; RAJ; SDSB; AOC) when the pasture appeared to be becoming somewhat enriched and over-grazed by Sheep; the nearest old site to here was the long-destroyed “moor ground ½ a mile north of Llangwryfyon” c.SN5971 where Salter found it in 1939 (Diary 14.10.1939). The sudden disappearance of a large colony has occurred before in the county, Salter recording in 1926 that “On the dry bank by Frongoch Pool [SN7275] I could not find a trace of the Gentian, though there was plenty of it two years ago” (Diary 14.8.1926, see also 27.8.1924); he suggested no reason for this.

[*Swertia perennis* L.

Evans (1804) recorded this European and Asiatic species, along with *Parnassia*, *Nartheicum* etc. from the Llyn y Fign (“Llyn Ynigen Velin”) SN8170 area, obviously in error, but it is interesting that Hudson, *Flora anglica* 102 (1762) said that Richardson had found it in Wales, a claim rejected by Smith (1828) as an error.]

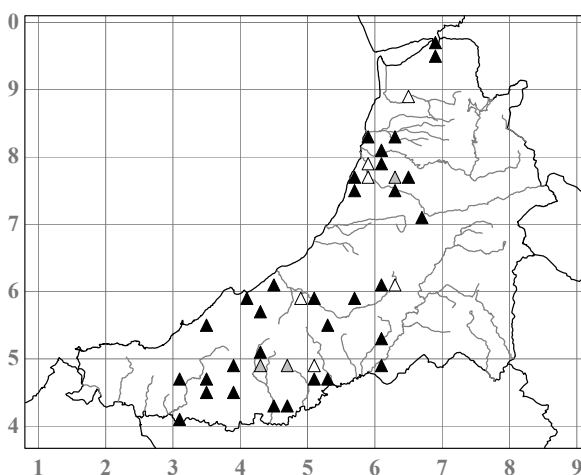


*Gentianella campestris*

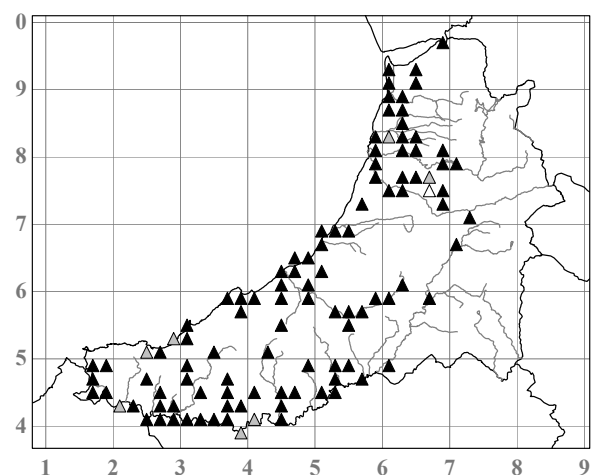
## APOCYNACEAE

### *Vinca minor* L. - Lesser Periwinkle - Perffagl Fach

Native of Europe and an archaeophyte in Britain, and of occasional occurrence in the county. Salter (1935) wrote that it was more frequent than *V. major*, but it is certainly now much less frequent. It mostly occurs on hedgebanks and in woods, chiefly old estate woods, and is rarely in graveyards. Forma **alba** Dippel is naturalised on the roadside hedgebank at Capel-y-groes SN526479, 1998, and abundantly, mixed with the normal form, by an old cottage site in woodland, Brynbedw, Capel Dewi SN467432, 2006 (AOC, BH & GH). ‘**Aureo-variegata**’ is naturalised on the roadside bank at Gwynfa, 1.7km W of Llanfihangel-y-Creuddyn SN648761, 1993, and in scrub near the Llethi bridge 500m SE of the Llanarth crossroads SN42485702, 1999. ‘**Alba Variegata**’ is naturalised by an old orchard and on roadside banks at Felin Cwmhyar in the Cerdin valley SN391459, 1999. All three of these variants, with white, blue and parti-coloured flowers, are naturalised on the roadside hedgebank at Penrhiw-fach, 1km S of Rhydlewis SN34524650, 1999 (NMW). A *flore pleno* form occurs on hedgebanks by the lane in Cwm Padarn, Llanbadarn Fawr SN600812, 1993, and Salter (1935) mentioned that this occurred, as well as plants with dull purple and white flowers, though he gave no localities.



*Vinca minor*



*Vinca major*

### *Vinca major* L. - Greater Periwinkle - Perffagl Fawr

Native of the Mediterranean and widely naturalised on hedgebanks and roadside verges, in graveyards, on sand dunes, in scrub and woodland, especially near old cottage sites, vegetatively spread from gardens or from

throw-outs. '**Variegata**' is occasionally naturalised, for example on a hedgebank at Llanrhystud SN54106978, 1998, and on the hedgebank opposite the school at Aber-banc SN356416, 1999.

## BORAGINACEAE

### **Lithospermum officinale** L. - Common Gromwell - Maenhad

An archaeophyte known only from one site, where it has exhibited remarkable persistence. In 1904 Salter (Diary 18.6.1904) received a specimen from Cardigan (DT), and in 1929 found it himself nearby "on the borders of the sand warren" a little NW of Nantyferwig, "several plants of it." In 1993 three plants were found among weedy vegetation on the sandy slope that had been reconstructed below the road there two years earlier, 400m WNW of Nantyferwig SN165484, and several more were seen in 1994 (SPC; AOC & JPW).

### **Lithospermum arvense** L. - Field Gromwell - Maenhad y Tir Âr

Recorded only once, as a casual on the Aberystwyth rubbish-tip SN591811 in 1926 (Salter 1935).

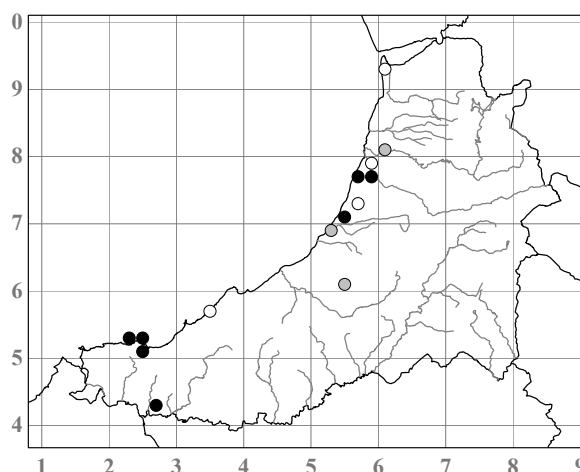
### **Cerinth major** L. - Greater Honeywort

A cultivar with green leaves and purple bracts, the corolla yellow below and deep purple-brown above, was recorded as a casual on a roadside in Aber-arth SN47936389, 2007 (NMW, RDP & KAP). Native of the Mediterranean.

### **Echium vulgare** L. - Viper's-bugloss - Gwiberlys

Currently regularly occurring at only three sites, where it is dependent on periodic disturbance of the soil, but, as Salter (1935) remarks, "of uncertain occurrence, often vanishing from localities where it has been found or making its appearance only as isolated plants." As he described it as "not uncommon" though, it may be assumed to have decreased in general. Salter recorded it in an old quarry at Tyllwyd, Llanfarian SN59477780 in 1935 (Wade 1952), and it is still there, with c.30 plants present in 2002.

It has been known in one or more of several places in fields, a disused quarry and on Gorse slopes by the A487(T) for 2km NE of Llanrhystud SN57K from 1895 (Salter Diary 1.6.1895) - 2008. At Craig y Filain SN237523 it was recorded in 1941 (Whellan 1942) and again in 1975 (JTi), and it is still present nearby on disturbed ground and shaly slopes at various places on the MoD site SN25G, K & L, 2008, often in abundance. Another long-established site was by the railway E of Llanbadarn Fawr c.SN609805, where it was known from 1905 (Salter Diary 9.7.1905) until 1975 (RGW). At its only two other recent sites there is no evidence that it has persisted for long, two plants at a building site near Ty'n Fron, Morfa Bychan SN572770 in 1992 (SPC), and one plant in a field 1km N of Cenarth SN266427 in 1996 (MDS). White-flowered plants are occasional in the W part of the MoD site, Aber-porth SN240520, 2008.



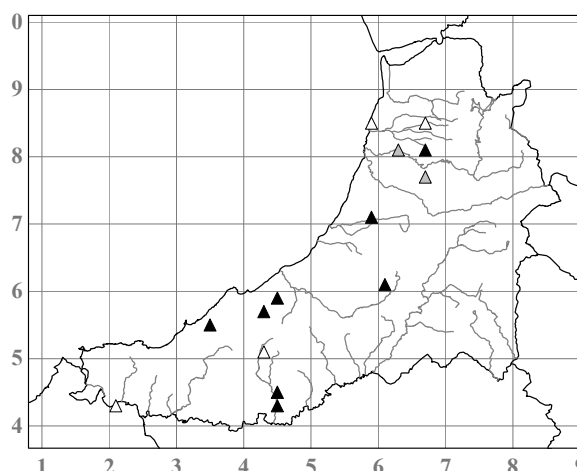
*Echium vulgare*, field corner 600m NE of Llanrhystud church, view N from SN54137005, July 1997

**Echium plantagineum** L. - Purple Viper's-bugloss - Gwiberlys Porffor

An archaeophyte recorded by Salter (1935) as a weed in the National Library gardens, Aberystwyth SN593816 in 1934 and for several years previously. The only subsequent record is of two plants on tipped soil on the infilled railway cutting, Felin-y-mor Road, Aberystwyth SN581808 in 1994 (NMW).

**Pulmonaria officinalis** L. - Lungwort - Llysiau'r Ysgyfaint (Dagrau Mair, Siaced Fraith Joseff)

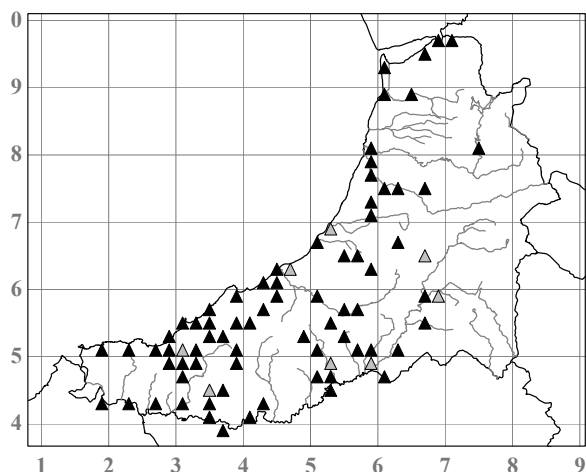
A rare garden escape or relic, or naturalised from throw-outs. The earliest record was from "a plantation near Borth" c.SN68E, some time in 1887-1891 (AHC, Salter Diary 24.11.1894), and Salter recorded it from five sites, including Penbontrhydyfothau SN358547 (1935) where it was seen again in Ash woodland just W of the bridge in 1968 and 2005 (NMW). It has since Salter's time been seen in only eight other sites, on streamsides, road verges and in scrub, as well as in Llanfihangel y Creuddyn churchyard SN665761, 1979 (NMW). Native of Europe.

**Symphytum officinale** L. subsp. **officinale** - Common Comfrey - Cyfardwf

Var. **officinale** (var. *purpureum* Pers.), with purplish corollas, is abundantly naturalised among *Aster* spp. over an area 75 × 7m between the Afon Rheidol and Boulevard St Brieuc, Aberystwyth SN58808113, 2006 (NMW), on the site of the former allotments and refuse tip; and a much smaller colony occurred on an old tip by the railway 100m N of Brondeifi chapel, Lampeter SN581479, 1994 (NMW). The only other naturalised colony, by a field gate on the roadside just W of Gartheli House SN587564, 1998, was of var. **ochroleucum** DC., with creamy-white corollas, but this is now gone. Most of the old records of this species, native in other parts of Britain, were probably in error for *S. ×uplandicum*.

**Symphytum ×uplandicum** Nyman (*S. asperum* × *officinale*; *S. peregrinum* auct., non Ledeb.) - Russian Comfrey - Cyfardwf Rwsia

Widely naturalised on roadside verges, waste ground, railway verges, by old cottage sites, in paddocks and in scrub throughout the lowlands. "Comfreys", where it was grown for fodder, existed on several large farms and estates, and one at Ynys-hir SN678954 was still dominated by *S. ×uplandicum* in 1992 (AOC & WMC) and a small area still survives, 2006 (NMW); another at Aber-mad (Salter 1935), on the SW side of the A485, 200m SSW of Henblas SN59797601, existed until at least 1946, and there are still a few relic plants of *S. ×uplandicum* from it on the adjacent roadside hedgebank, 2006 (NMW). Plants dominating the walled garden at Coedmore Home Farm SN192438, 1989, were unintentionally established when green manure was brought in for a Potato crop in 1979 (M. E. Baines pers. comm.) and were considered to be probably a back-cross between *S. ×uplandicum* and *S. officinale* (FHP). It can be assumed that all or most of the c.25 records



"The Comfrey" at Ynys-hir, *Symphytum* *×uplandicum*, view E from SN678954, May 2006



for *S. officinale* given by Salter (1935) refer to *S. ×uplandicum*, but they are not shown on the map, and it has doubtless been cultivated and naturalised here for a long time. It has not been seen at a higher altitude than 280m, on a roadside bank at Twrgwyn-mawr, Penuwch SN584620, 1990.

[*Symphytum asperum* Lepech. - Rough Comfrey - Cyfardwf Arw

Material from a clump on a roadside bank just SW of Maesglas chapel, Ysbyty Ystwyth SN731713, 1980 (NMW) was determined by EJC as being very close to true *S. asperum* in most characters; the site has since been destroyed by a housing development. There is no more definite evidence of its occurrence in the county.]

### ***Symphytum asperum* × *grandiflorum* × *officinale***

A large clump of ‘Jubilee’, derived from a throw-out, was recorded in a grassy clearing just SE of the University campus, Penglais, Aberystwyth SN59698142 in 2002 (NMW).

### ***Symphytum tuberosum* L. - Tuberous Comfrey - Cyfardwf Glorog**

Native in other parts of Britain, naturalised only by the lane to Y Felin, Aber-mad SN596763, where there were two colonies, 3 × 2m and 1 × 0.5m, in 1994 (NMW) and only one, 4 × 2m, in 2006.

### ***Symphytum grandiflorum* DC. - Creeping Comfrey - Cyfardwf Lusk**

Two colonies 3 × 2m and 2 × 1m of this native of the Caucasus are established in scrub by an old cottage site on the W side of the road 600m NNW of the Rhydowen crossroads SN44174577, 1999 (NMW, conf. FHP) - 2005. A colony 3.5 × 0.5m is on the stream bank E of the A485 road at Cwmyrolchfa bridge SN64076880, 2009 (SPC).

### ***Symphytum orientale* L. - White Comfrey - Cyfardwf Wen**

The only records are of a single plant on the N verge of Ffordd Sulien, 100m SW of Llanbadarn Fawr church SN59808095, 2007 (SPC), increased to two clumps in 2008, and four plants nearby on the grass slope above the church hall SN59868106, 2008 (SPC). They doubtless derived from Salter’s garden close by. Native of S Russia and SW Asia.

### ***Symphytum caucasicum* M. Bieb. - Caucasian Comfrey - Cyfardwf y Cawcasws**

A well-established colony c.5 × 0.5m in rough grassland, behind Cefn Melindwr, Capel Bangor SN65838004, 1999-2004 (SPC, **Herb. SPC**) probably originated from a throw-out; it is native of the Caucasus.



*Symphytum orientale*, Ffordd Sulien, Llanbadarn Fawr, view E from SN598809, March 2008

### ***Symphytum bulbosum* K. F. Schimper - Bulbous Comfrey - Cyfardwf Oddfog**

This native of SC and SE Europe was grown by Salter in his garden at Fairview, Llanbadarn Fawr SN59808104 (NMW, 1927) and was found naturalised on the scrub slope below in 1975 (NMW, VGE, det. EJC); in 1980 it formed two colonies each c.5m in diameter, and by 2002-2005 had formed one large colony 20 × 5-10m, completely dominating the ground vegetation in spring. The only other record is of a colony 4m long on the hedgebank outside the garden of Glascoed, Piercefield Lane, Penparcau SN58997988, 2004

(NMW), formerly the home of W. Miall Jones who died in 1957, a friend of Salter from whom he probably acquired the plant.

***Anchusa arvensis* (L.) M. Bieb. (*Lycopsis arvensis* L.)** - Bugloss - Llysiau'r-gwrid y Tir Âr

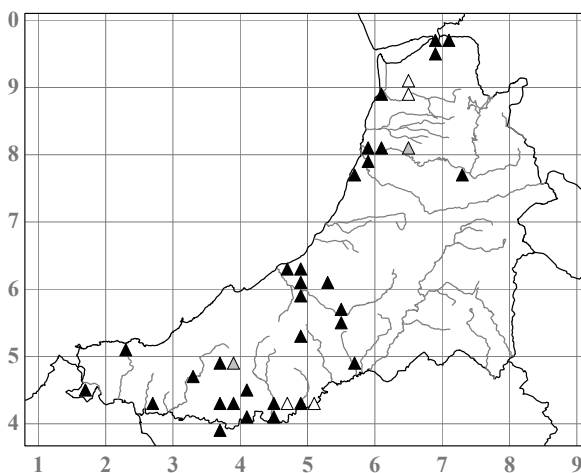
An archaeophyte chiefly confined to the sandy soils in the SW of the county where it can be abundant, as on the Penyrergyd dunes SN163486, 1954 (EWBHM-R) - 2005, the Penparc sand quarries SN200483, 1993-2005, and in arable fields around Nantyferwig SN14T, U, 1929 (Salter Diary 20.9.1929, 1935) - 2005. It also occurs on disturbed shaly ground on the MoD site, Aberporth SN25G, L, 1997-2005. The few records from further N seem to have been of short-lived occurrences: from near Borth c.SN68E (AW, Salter 1935); from the stackyard at Glan-y-mor, Clarach SN587841, 1898 and 1907 (Salter Diary 15.4.1898, 22.6.1907, 1935); from Llanbadarn Fawr c.SN5980, 1932 (Salter 1935); from waste ground on the old allotment and rubbish-tip site, Aberystwyth SN588811, 1991-2003 (APF; AOC); from near Aberystwyth, 1891 (**BIRM**, WHP); from a cornfield on the coast "five miles S. of Aberystwyth" SN57M (Salter 1935); from a field near the mouth of the Afon Wyre c.SN5269, 1902 (Salter Diary 5.7.1902, 1935); and from a Barley field at Llan-non SN508672, 1975 (AP).



*Symphytum bulbosum* dominant below Fairview, Salter's house, Llanbadarn Fawr, view NW from SN59828102, February 2005

***Pentaglottis sempervirens* (L.) Tausch ex L. H. Bailey (*Anchusa sempervirens* L.)** - Green Alkanet - Llysiau'r-gwrid Gwyrdd

Occasionally naturalised as a garden escape on hedgebanks, road verges, old garden sites, in scrub and in graveyards, usually near villages or houses. The earliest record seems to be from Bwlchbychan House SN480434 where Salter reported it in 1908 (Diary 22.4.1908) as having "run wild", where he saw it again in 1924 (Diary 16.10.1924) when he wrote that it "still grows in any quantity by the roadside", and where it still grows abundantly along 60m of the road verge, providing the best display of the species anywhere in the county, 2005 (NMW). It is native of SW Europe.



*Pentaglottis sempervirens*, roadside at Bwlchbychan, view NW from SN480434, May 2005

***Borago officinalis* L.** - Borage - Tafod yr Ych

As in Salter's time, a rare casual. First recorded at Llanbadarn Fawr c.SN599810, 1893 (Salter Diary 17.4.1893), it has since been seen in about ten other sites. Only at the site of the old allotments and town

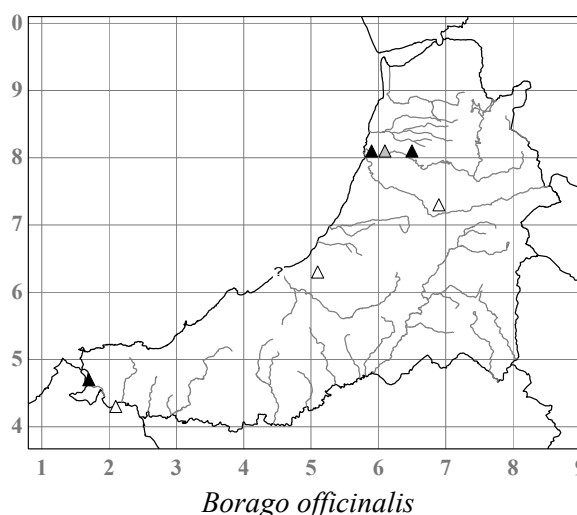
rubbish-tip at Aberystwyth SN589810, 1990-2005 (NMW), has it appeared with any regularity.

**Trachystemon orientalis** (L.) G. Don - Abraham-Isaac-Jacob - Abraham, Isaac a Jacob

Naturalised at only one site, in scrub on the clay slope above the sea 300m S of the lifeboat station, New Quay SN39075958, where there are several large colonies in an area 20 × 7m, 1999 (NMW, AOC & JPW) - 2005. Native of SE Europe and SW Asia.

**Mertensia maritima** (L.) Gray - Oysterplant - Llysiau'r Llymarch

Evans (1804) recorded *Mertensia* among the plants he principally found in the neighbourhood of Aberystwyth, but since most of his account of Aberystwyth and its plants is copied from Aikin (1797) who does not mention *Mertensia* here, it is probable that he is attributing Aikin's Aberdyfi record of *Mertensia* erroneously to Aberystwyth. Turner & Dillwyn (1805) quoted Evans's record, and Watson (1883) recorded it for the county with a query. Morgan (1848) wrote: "... one of the most beautiful indigenous plants of Great Britain, *Pulmonaria Maritima*, whose habitat is almost exclusively confined to Wales, is met with on the beach below Borth Sands", although oddly he does not mention it in the later editions of his *Guide* or in his *Flora* (1849). Purchas (1848) wrote "I did not see Aikin's and others' *Steenhammera maritima* - perhaps I did not go near enough to the mouth of the Dovey." That it ever grew in the county would have remained in doubt, had not a specimen labelled "*Lithospermum maritimum* Aberystwyth Mr T. Bodenham" been found recently in CGE (CDP pers. comm.). Thomas Bodenham 1804-1873 was a Shropshire botanist, and although it is not known when he visited Aberystwyth it was probably about the middle of the century. This was its southerly limit in Europe.



**Amsinckia micrantha** Suksd. - Common Fiddleneck - Amsincia

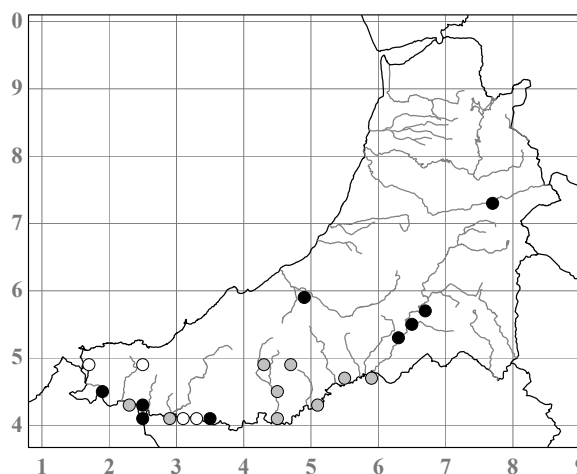
50 or more plants appeared on a recently reconstructed and reseeded verge of the A487(T) by the Waun Fawr crossroads SN59978216 in 2007 (NMW, SPC). Native of W North America.

**Myosotis** L.

Because of confusion over the identification of *M. laxa*, *M. scorpioides* and *M. secunda*, most of the early records of these species, including Salter's and even those of other recorders up into the 1980s, are unreliable and are generally ignored here. The remaining species are almost equally confused and confusing.

**Myosotis scorpioides** L. (*M. palustris* (L.) Hill) - Water Forget-me-not - Sgorpionllys y Gors

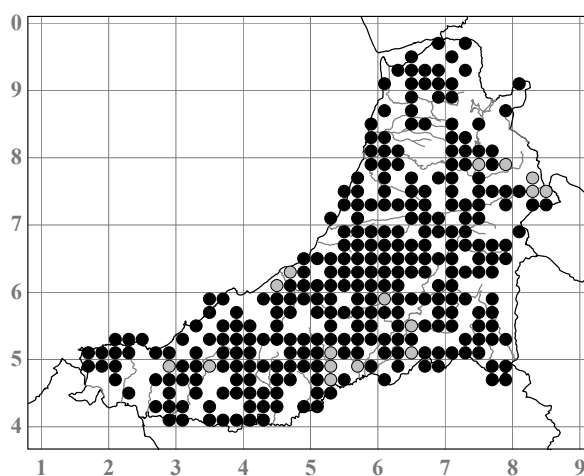
A rare species, recorded with certainty only from the edge of the Pendre pond at Hafod SN762734, 1991 - 2005 (NMW) where it was var. **strigulosa** (Rchb.) Schinz & Keller; from a ditch at Llanerchaeron SN48105998, 2002-2005 (NMW) where it was var. **scorpioides**; and from a few swamps, backwaters and marshes by the Teifi from near Abercarfan SN66405777, 1997, down to the Teifi Marshes SN183452, 1995, where the variety was not noted. Records from higher up the Teifi and from its tributaries, as well as a number from elsewhere in the county, are all unconfirmed apart from one from the Afon Brefi near Llwyn SN6454, 2004 (DB). The map shows only confirmed records.



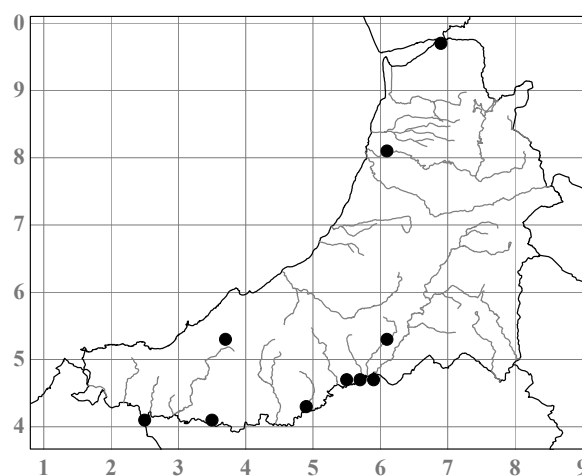


**Myosotis secunda** Al. Murray (*M. repens* auct.) - Creeping Forget-me-not - Sgorpionllys Ymlusgol

A common plant of wetlands of all sorts, from even the more acidic blanket bogs and flushes in the uplands to calcareous fens and flushes in the lowlands. It is absent from the Ynys-las dune slacks and from many of the swamps and marshes along the Teifi where it is replaced by *M. laxa*. Altitude limit 510m, headwaters of the Nant y Moch, Pumlumon SN783862, 2002 (AOC & PAS).



*Myosotis secunda*



*Myosotis* × *suzae*

**Myosotis** × **suzae** Domin (*M. laxa* × *scorpioides*)

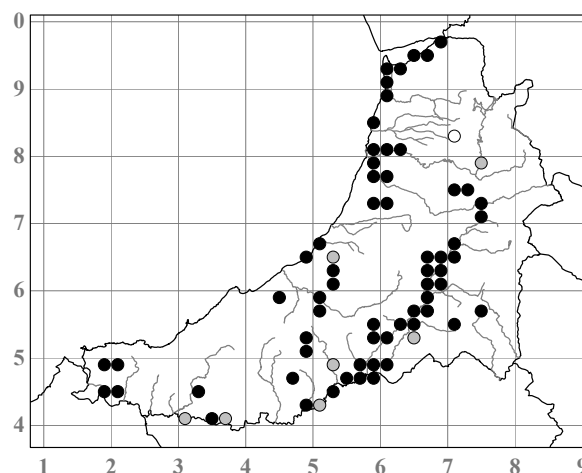
First recorded in 1993 from a pond margin at The Moat, Llandyfriog SN342408 (NMW, conf. PMB) - 1996 (CGE, AOC & CDP), and since then from seven other sites in the Teifi valley. Further N it has been recorded from a swampy pond at Rhos Pil-bach, Plwmp SN36855280, 1994, from the swamp SW of the Glanyrafon Industrial Estate on the lower Rheidol SN607800, 1994 (NMW), and as a spectacular dominant over an area of swampy pond 50 × 20m by the lane 150m N of the Ynys-hir Hall Hotel SN68199603, 2008 (NMW, conf. DWe). It probably remains under-recorded.



*Myosotis* × *suzae* dominant in overgrown pond, N of Ynys-hir Hall Hotel, view SSW from SN68209604, May 2008

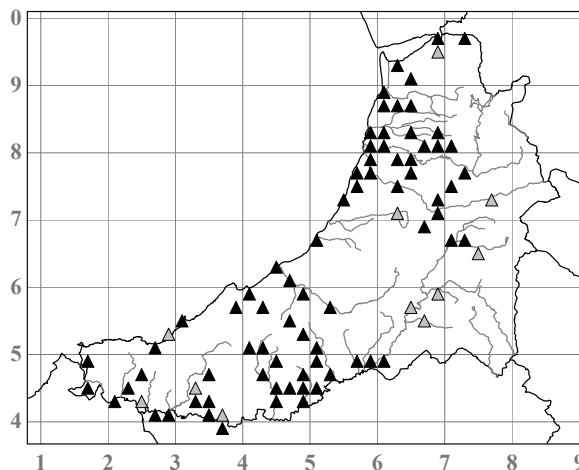
**Myosotis laxa** Lehm. subsp. **caespitosa** (Schultz) Hyl. ex Nordh. (*M. caespitosa* Schultz) - Tufted Forget-me-not - Sgorpionllys Siobynnog

Generally in more mesotrophic habitats than *M. secunda*, but there is no clear explanation for the rather localised distribution of this species. It grows in swamps, fens, ditches, marshy pastures, dune slacks, on streambanks and river shingle and by ponds. It is especially abundant in the Ynys-las area SN69A, B in marshes and ditches, including slightly brackish ones, and has increased greatly since 1990 in the main dune slack E of the road SN610938. It is in many of the swamps and fens in the lower part of the Rheidol valley SN58V-68F, and is frequent down the upper Teifi valley from Cors Caron down to Rhuddlan SN76D-44W, and in the brackish marshes of both the Dyfi SN69 and Teifi SN14X estuaries. Elsewhere it is widely scattered, usually replacing and rarely growing with *M. secunda*. Altitude limit 435m, marsh at N end of Llyn Berwyn SN744571, 1990 (NMW).



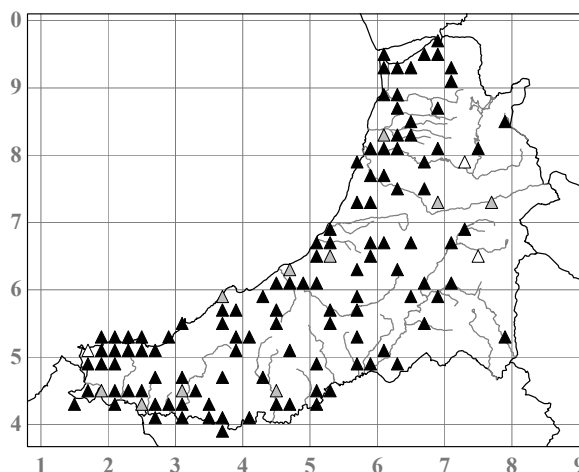
**Myosotis sylvatica** Ehrh. ex Hoffm. - Wood Forget-me-not - Sgorpionllys y Coed

Widely naturalised in hedgebanks, scrub, woodlands, graveyards and waste ground. Salter surprisingly never recorded it, and (1935) in citing Morgan's (1849) record from "Wood under Cwm", i.e. Cwm Woods c.SN603835, commented "No doubt an error". Morgan may well have been correct, and it grows there now. The earliest specimen is from "Damp woods - Aberystwyth", 1958 (ABS, H. Williams) which may well be the same site. Many of the plants in the county have the corollas 8-11mm in diameter and are var. **culta** Voss, for example in scrub 500m NNW of Llanbadarn Fawr church SN595814, 1992 (NMW) and in the old station yard, Llanilar SN625753, 1999 (NMW). *M. dyerae* (E. J. Lowe ex Hook. f.) P. D. Sell, with even larger corollas and an elaiosome on the nutlets, has not been seen. Var. **sylvatica** has also often been seen, for example on the roadside hedgebank 500m SSE of Pont-sian crossroads SN441459, 2005 (NMW) and on the hedgebank of Capel y Groes chapel graveyard, Llanwnnen SN526480, 1995 (NMW), but, as often with var. **culta** too, the plants are usually annual and the distinction from some forms of *M. arvensis* is not always clear.



**Myosotis arvensis** (L.) Hill subsp. **arvensis** - Field Forget-me-not - Sgorpionllys y Maes

A frequent but rarely abundant archaeophyte of dry, usually poached pastures and banks, pathsides, sand dunes, waste ground and a weed of arable fields and gardens, usually behaving as a winter annual. Although plants with large flowers 3-5mm in diameter are occasionally found, they do not have the other characters of var. *sylvestris* Schltld. and, like most of the plants in the county, are probably only var. **arvensis**. Var. **dumetorum** Crép., large plants branched from the base, with long racemes and the basal leaves still green at flowering, occurs among Marram and Gorse on the dunes at Penyrergyd SN162488, 2005 (NMW); these plants merge into *M. ramosissima* and may be better placed under that species. Cultivars with deep blue corollas are occasionally naturalised, for example on a road verge by a garden 1km N of Cwmystwyth SN78627520, at 355m altitude, 2008 (NMW, conf. DWe). Convincing subsp. *umbrata* has not been seen. Altitude limit 335m, Ponterwyd and Ystumtuen SN77J, 78K (Salter 1935); 415m, Eisteddfa Gurig farmyard SN798840, 2007 (AOC & CRB).

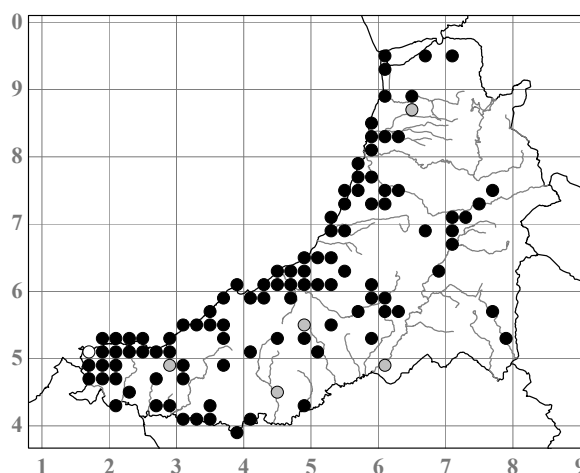


**Myosotis ramosissima** Rochel (*M. collina* auct., non Hoffm., *M. hispida* Schltld.) - Early Forget-me-not - Sgorpionllys Cynnar

Frequent on the older dunes at Ynys-las SN69B, C, 1973 (Savidge 1973) - 2005, where it has perhaps arrived since Salter's time as he never recorded it there, and on the dunes at Penyrergyd SN1648, 1941 (Whellan 1942) - 2008 (NMW); these plants, and probably all those in the county, are subsp. **ramosissima** (conf. PDS) with the calyx more than 2mm and the inflorescence not extending to the base of the stem. Salter (1935) recorded the species on the Allt-wen cliff slopes SN5779, and on the foreshore at Tan-y-bwlch where a few plants were again seen on an anthill on the landward slope of the beach SN58018015 in 2001 (AOC & RVL). There is a small colony on the shaly cliff slope 7m above the beach at Carreg y Ty, Llangranog SN30105360, 2002 (NMW); several populations on shaly, disturbed ground on the MoD site, Aber-porth SN245519, 2006 (NMW); and several colonies at the E edge of the Penparc sand quarries SN204483, 2002 (NMW). The only other record is of it as a casual in a garden centre car park at Capel Dewi SN624822, 1999.

**Myosotis discolor** Pers. (*M. versicolor* Sm.) - Changing Forget-me-not - Sgorpionllys Amryliw

A frequent winter annual of similar sites to *M. arvensis* but more confined to the lowlands and the coastal zone, generally the commoner species on sand dunes and in drier, more open sites, and less common as an arable weed. It is especially characteristic of thin, summer-droughted soils along the coastal slopes and on dry banks, rock outcrops and anthills in pastures, and in dry hay meadows. It usually occurs in discrete colonies. Both subspecies occur, subsp. **discolor** being the commoner, but subsp. **dubia** (Arrond.) Blaise occurs in most of the same habitats. Colonies of the two often grow close together, but mixed ones have not been seen. Subsp. *dubia* occasionally occurs in wet sites, as in rush pasture 1km N of Plwmp SN36975360, 2002, and in base-rich flushes by the Afon Mwldan SN201488, 2002.

**Lappula squarrosa** (Retz.) Dumort. (*Echinosperrum lappula* (L.) Lehm.) - Bur Forget-me-not - Sgorpionllys Gwrychog

Recorded only once, as a casual at Llanilar station SN627753 in 1926 (Salter 1935). Native of Europe and Asia.

**Omphalodes verna** Moench - Blue-eyed-Mary - Mari Lygatlas

This early-flowering garden escape has been known naturalised in Cwm Woods for over a century. It seems to have occurred in at least three different sites there, two of which were known to Salter (1935) as he said it was “on the site of a former cottage garden and near the House [i.e. Plas Cwm Cynfelin].” Salter first saw it in 1892 (Diary 11.4.1892), probably near the Plas c.SN602835, and recorded it there at intervals until 1938; it was again seen there in about 1958. In 1900 (Diary 16.3.1900) Salter saw it “at the Cwm cottages” SN606832, implying that this was a new site, but no other diary entry specifies exactly where he saw it at Cwm. In 1983 a colony c.7 × 1m in mixed woodland on top of the roadside bank 200m SSW of the Plas SN60208328 (NMW,



*Omphalodes verna* (leaves in foreground) in Cwm Woods, view ENE to Plas Cwmcynfelin from SN60208328, April 1995

LTR) was reported to me in extraordinary circumstances. A lady I met in Llangorwen churchyard told me that she had recently seen “the wood gentian”, which she had just read about in the *Sunday Express* as a very rare plant, on top of this bank from the back of her husband’s car as they were driving up the hill. On investigation, I found this to be the long-lost *Omphalodes*, although I never discovered what “the wood gentian” was meant to be. Equally surprisingly, I later found that I had unwittingly included two leaves of *Omphalodes* from this colony with a specimen of *Viola riviniana* collected there in 1976 (NMW). This colony was 9 × 1.3m in 2004. Salter also recorded it from a roadside bank near Llanilar c.SN6275 in 1931 and 1937 (Diary 6.2.1931, 21.1.1937), but it has not been seen there since. Native of Europe,

**Cynoglossum officinale** L. - Hound’s-tongue - Tafod y Bytheiad

Known only from the sand dunes at Ynys-las SN69B, C, where it is widespread and often abundant on the mature dunes, especially where rabbits are most active, 2008. The earliest record from there is by Morgan (1849). A record in Wade (1952) from “Near Borth” 1931 (AW) doubtless also refers to Ynys-las.



**Cynoglossum amabile** Stapf & J. R. Drumm. - Chinese Hound's-tongue

Recorded only once, when several plants appeared on ground disturbed for road-widening at Penrhyn-coch SN641840 in 1993 (NMW). Native of E Asia.

**Phacelia tanacetifolia** Benth. - Phacelia - Ffaselia

This conspicuous and colourful alien from California, first recorded as an escape in Britain in 1885 in Yorkshire and only recently rapidly increasing, was first seen in the county at Fferm y Cwrt, Cwrt Newydd SN497482 in 1995 (NMW, SB). It has since been seen in an Oat crop undersown with Red Clover 700m WSW of Dolgoch, Brongest SN310445 in 1997 (ANGF, AOC & JPW); in a Barley crop at Ynys-hir SN666952 in 2002 (NMW); in abundance in a fallow field at Llwynysgaw, Felin-wynt SN218515, 2002 (JTh) - 2004; as a constituent of a Tir Gofal crop for bird-seed at Wallog SN594855, 2004; and as a garden casual in Penparcau SN588805, 2008 (ID).

**CONVOLVULACEAE****Convolvulus arvensis** L. - Field Bindweed - Cwlwm y Cythraul

Locally frequent on roadside verges and tracksides, banks, vegetated shingle at the tops of sea beaches, arable field margins and waste ground, and almost confined to the coastal strip. The only recent record from more than a few km inland is from railway ballast at Trawsgoed SN663733, 1992, but there are unlocalised 1950s records at BRC from SN77, 76 and 65 which should perhaps be considered suspect unless the last two were also from the railway.



Forma *arvensis*, Llan-non,  
July 2007



Forma *pallidiroseus*, Aberystwyth,  
July 2007



Forma *decemvulnerus*, Llan-non,  
August 2005



Forma *pentarrhabdotus*, Llan-non,  
July 2007



Forma *notatus*, Llan-non,  
July 2007



Forma *perroseus*, Llan-non,  
July 2007



Forma *decarrhabdotus*, Llan-non,  
August 2005



Forma *pentastictus*, Llan-non,  
July 2007



Forma *quinqvulnerus*, Llan-non,  
August 2005

Nine of the ten forms based on the patterning of colour on the corolla occur, but they do not seem to have any ecological or distributional significance; only forma *pallidinotatus* P. D. Sell has not yet been found. Forma *arvensis*, forma *pentarrhabdotus* P. D. Sell and forma *decarrhabdotus* P. D. Sell comprise 87% of the separate plants noted and are almost equally common and widespread. Forma *pallidiroseus* P. D. Sell has been seen at five sites. Forma *notatus* P. D. Sell has been seen on the railway embankment just S of Bow Street SN620842, 1995; on the slangs at Llan-non SN512670, 2000-2007; and on an arable field margin at Mwnt SN198521, 2001 (AOC & CDP). Forma *pentastictus* P. D. Sell has been seen at the back of the sea beach S of the mouth of the Afon Wyre SN525696, 2002; on the slangs at Llan-non SN512670, 2000-2007; and by a track on the MoD site, Aber-porth SN253519, 2000. Three others, forma *decemvulnerus* P. D. Sell, forma *perroseus* P. D. Sell and forma *quinquevulnerus* P. D. Sell have been seen only on the slangs at Llan-non c. SN512670, 2005 - 2007. This latter site, where eight of the forms occur, is the richest in the county for these variants, but this may simply reflect the fact that the species is more abundant there than anywhere else in the county.

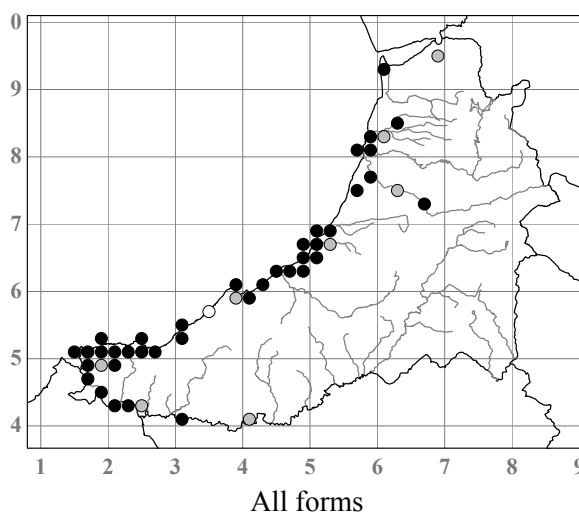
Individual plants can be very long-lived, and one of forma *arvensis* on a roadside bank and garden at Penyrangor, Aberystwyth SN58098087, has been known for 76 years, 1933-2009 (EHC; AOC).

### **Calystegia R. Br.**

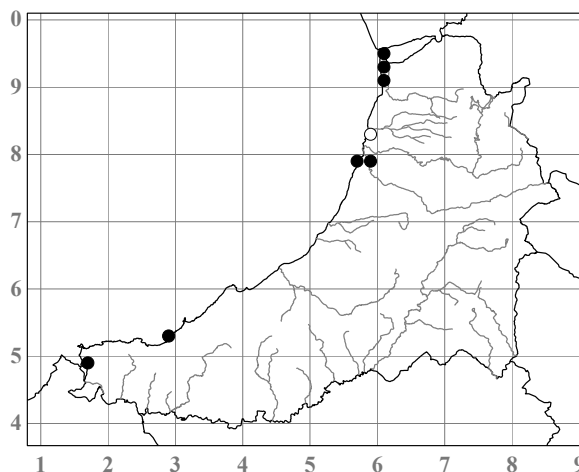
Visits by RKB in 1996 and 1998 to study this genus (other than *C. soldanella*) resulted in a great deal of interesting information and collecting, and much more detail than in what follows can be found in Brummitt & Chater (2000). Individual plants are usually extensive, conspicuous and persistent probably for decades and it is usually easy to make a reasonably complete estimate of which taxa are present in any particular area. The village of Llanarth SN4257 has had almost the complete range of taxa recorded for the county and is well worth a visit from anyone interested in the genus.

### **Calystegia soldanella (L.) R. Br. - Sea Bindweed - Taglys Arfor**

First recorded by Aikin (1797) in 1796 from Ynyslas, this coastal dune plant is frequent in several places on the dunes there and had even colonised the new dune at the N tip SN608946 in 1999 (JH). There is a small colony on the sandy shingle at Borth SN608905, 2001 (JPW & AOC), it was known at Clarach SN5883 from 1848 (Morgan 1848) until 1905 (Salter, Diary 24.6.1905), and it has been known on the vegetated sand at the S end of Tan-y-bwlch beach SN579798 since at least 1926 (Salter 29.6.1926) - 2007, although the size of the colony varies greatly as a result of storms; before 1940 it seems to have been on the seaward side of the beach, but after this on the landward side (Salter Diary 30.8.1940, 5.7.1941). There is a colony, first recorded by Salter in 1894 (Diary 27.6.1894), on the small *Ammophila* dune on Penbryn beach SN29315248, and spreading 10m or so up the roadside bank, 2008. At the Penyrrgyd dunes, on the seaward ridge SN161485, a colony first recorded in 1975 (AP) was then 20 × 1m, and by 1978 was 70 × 10m; it is now, 2006, almost lost because of erosion.



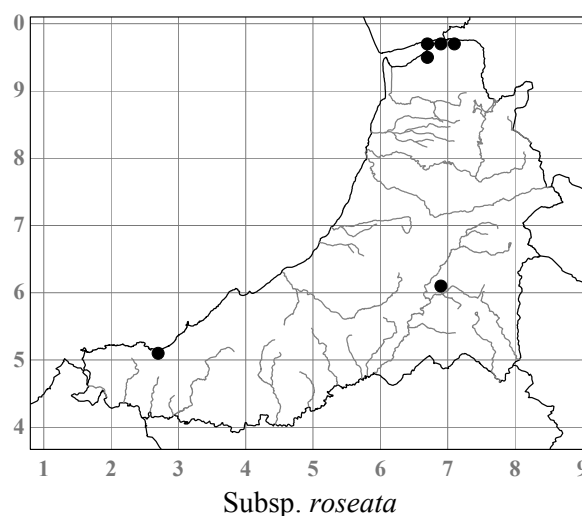
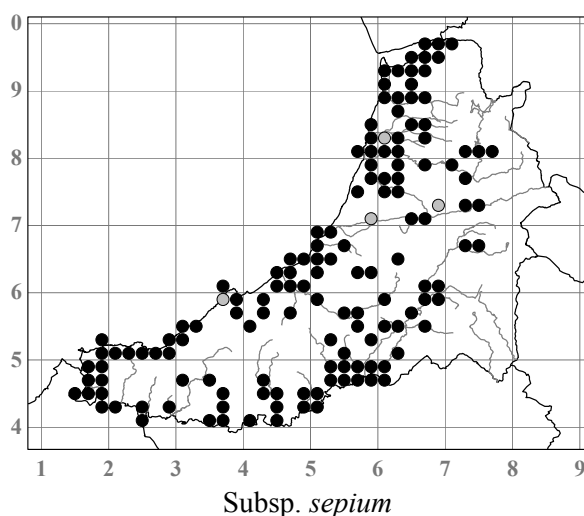
All forms



***Calystegia sepium* (L.) R. Br. - Hedge Bindweed - Taglys y Perthi****Subsp. *sepium***

Frequent in hedges and scrub throughout the lowlands, and occasionally on road verges, in rank vegetation on streambanks, and at the top of coastal shingle beaches. Chiefly at the coastal sites, plants are occasionally found that have distinctly hairy stem apices, and it is possible that this is due to introgression from the predominantly coastal subsp. *roseata*; such plants have been found on the shingle beach in Aberystwyth harbour SN580808, 1996 (K, RKB & AOC); on the scrub slope above Tresaith beach SN277514, 1996 (K, NMW, RKB & AOC); on the scrub slope above the E bay, Aber-porth SN260514, 1996 (NMW, RKB & AOC) and above the W bay SN257515; and in scrub on the old woodyard site, Lampeter SN579487, 1998 (RKB & AOC). Subsp. *sepium* has been found up to 270m altitude, in hedges at Dyffryn Castell SN774816, 1988.

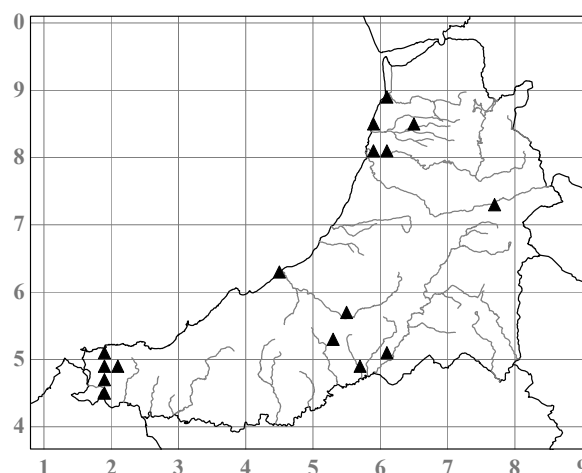
In heavy rain, the corollas of *C. sepium* split readily, whereas those of *C. silvatica* usually remain intact. The only evidence of the inherently split-corolla forma *schizoflora* (Druce) Stace in the county is of a plant in a roadside hedge 600m E of Plas Gogerddan SN635837, 2005 (NMW) which had the corollas split almost to the base when there had been no rain or strong winds for nine days.

**Subsp. *roseata* Brummitt**

Frequent in the upper part of the Dyfi estuary in reedbeds, on ditchbanks and in other marshy vegetation and in hedges, from the Ynys-hir RSPB Reserve to the county boundary, for example along a ditchside by the railway SN673962, 1991 (K, NMW, AOC & WMC, conf. RKB); among *Phragmites* at the edge of West Marsh SN672955, 1998 (NMW, PSC & AOC); and abundant in *Phragmites* by the Dyfi at the county boundary SN693976, 1997 (K, NMW, conf. RKB). There is also a colony in *Salix* carr by the disused railway alongside Cors Caron SN686619, 1996 (NMW, AOC & ADH, conf. RKB). The only other record is of a plant, now gone, in a roadside hedge at Tresaith SN279514, 1991 (NMW). The Cors Caron site is 18km inland, and here it may possibly be an introduction, but in at least the Dyfi sites it appears to be native.

***Calystegia* ×*lucana* (Ten.) G. Don (*C. sepium* × *silvatica*)**

Recorded from c.20 sites throughout the lowlands. In all cases one parent is assumed to be *C. sepium* subsp. *sepium* (the hybrid with subsp. *roseata* occurs in Merioneth), while the other may be one or other of the subspecies of *C. silvatica* although it is often not clear which is involved. The hybrid with subsp. *silvatica* as one parent, for example, occurs among Japanese Knotweed on waste ground at the SW corner of the Glanyrafon Industrial Estate SN608803, 1995 (NMW, det. RKB), while that with subsp. *disjuncta* occurs on the shingle beach in Aberystwyth harbour SN580808, 1996 (K, RKB & AOC).





***Calystegia pulchra* × *sepium* subsp. *sepium***

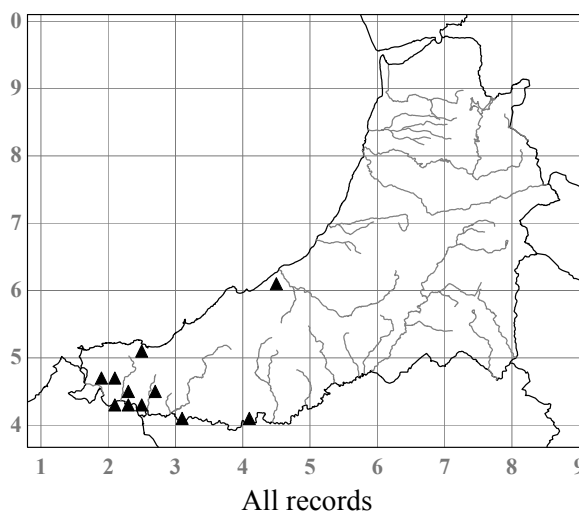
Although the binomial *C. ×scanica* Brummitt is available for the hybrid between these two species, the Swedish material to which it was originally applied is morphologically very different from ours. RKB in consequence prefers to refer to the VC 46 plants in question as “‘a hybrid’ presumably between *C. pulchra* and *C. sepium*”. There are two colour nothomorphs of it:

**White-flowered nothomorph**

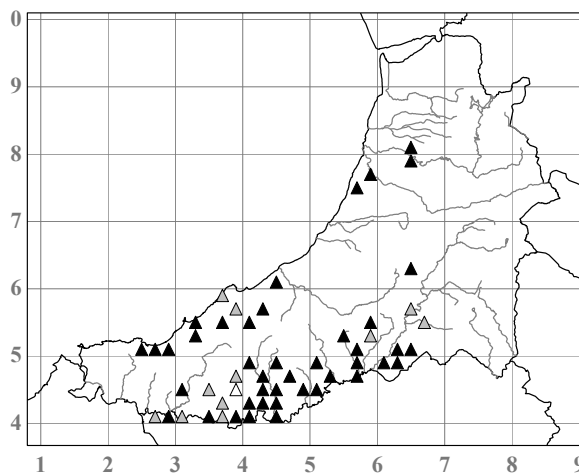
Six plants, all in the S of the county were recorded in 1998 by RKB & AOC, with specimens in **K** and **NMW**: roadside hedge 350m SSE of Henfynyw church SN449609; roadside hedgebank at T-junction 600m SW of Aber-porth church SN25095076; scrub S of road by car park 500m E of Newcastle Emlyn church SN314409; scrub by gardens 150m N of Llandysul church SN41864085; and the Teifi bank by S part of Llandysul churchyard SN41954062. The sixth plant, from scrub on the N side of the A484 road 800m SE of Llwynduris SN244427, is perhaps a back-cross between this hybrid and *C. sepium* subsp. *sepium*.

**Pale pink-flowered nothomorph**

Confined to a much smaller area in the SW of the county than the white-flowered nothomorph, and eight plants have been seen. Four were recorded in 1998 by RKB & AOC, with specimens in **K** and **BM**: S hedge of A487, 150m WSW of Penparc crossroads SN211479; N hedge at the A484/B4570 road junction 800m N of Cardigan church SN189460; S hedge of A484 by Llechryd waterworks SN230435; and scrub S of A484, 800m SE of Llwynduris SN244427. Additional records are: hedge at NW corner of Llechryd bridge SN217436, 1998 (RKB & AOC); hedge by road at Pontbren Pwll-crwn SN258424, 1998 (RKB & AOC); several plants in W hedge of B4570 just SSE of Ponthirwaun SN263448, 1999; and SE hedge of B4570, 100m SW of Pantgwyn crossroads SN239457, 1999.

***Calystegia pulchra* Brummitt & Heywood - Hairy Bindweed - Taglys Blewog**

This very conspicuous pink-flowered alien of uncertain origin is widespread in the lowlands. It grows chiefly in roadside hedges and scrub, usually in or near towns and villages, and is especially common in Llandysul SN44A and elsewhere in the middle part of the Teifi valley. The highest altitude it has been seen is 280m, Blaencribor SN404483, 1996. Salter recorded pink-flowered plants which were doubtless this species, and he too noted that they were the prevailing form in the Llandysul district (1935). *C. pulchra* certainly now grows at Rhydownen SN446448 where his earliest record of such plants was in 1930 (Diary 16.9.1930). The first confirmed record was from Llanddewi-Brefi SN662554 in 1963 (**NMW**, det. RKB).

***Calystegia silvatica* (Kit.) Griseb. - Large Bindweed - Taglys Mawr****Subsp. *silvatica***

Native of the E Mediterranean, and only occasionally naturalised, in hedges, scrub and waste ground, though much less frequently than subsp. *disjuncta*. Typical material confirmed by RKB has been found at c.20 sites, including the roadside hedge at Voelas, Glandyfi SN690964, 1995 (**NMW**); among bushes NE of the B4353 near Dol-y-bont SN620883, 1995; the hedge by the B4340 near Ystrad Meurig SN709673, 1998 (**K**); the W hedge of A487, 200m S of Llanarth church SN42325754, 1996 (**K**); hedges near Llandysul SN426419, 1998 (RKB & AOC); and bushes by the road near Ferwig SN185499, 1998 (**NMW**). The other records are equally widely scattered. Several specimens are considered by RKB to be intermediate between the two subspecies,

for example from scrub by the railway, Llandre SN625870, 1998 (K, RKB & AOC); from among Japanese Knotweed 200m WSW of Glanrafon bridge SN60818037, 1996 (K, RKB & AOC); and in roadside hedges at Pantisdaufan SN434569, 1998 (K). *C. silvatica* was first recorded in the county in 1951 at Aber-porth c.SN25K (JAW, Wallace 1954).

Plants with the corollas split to the base, forma **quinquepartita** (N. Terracc.) Brummitt, grew in hedges in two places in Llanarth SN422576 and SN426576, 1980 (NMW), and in 1983 it was established that this was genetic and not caused by weather conditions; they were still producing split corollas after ten dry, calm days, while normal *C. silvatica* nearby remained intact (Chater 1996). Unfortunately they had gone by 1995. A plant in scrub at the E side of Llanbadarn Fawr churchyard SN59928104, 2006 (NMW), has the corollas split almost to the base even in half-expanded flowers; there was another, less convincing plant in scrub 100m W of the church SN598810 in 1991, in which some corollas were divided into three and others were entire.

#### Subsp. **disjuncta** Brummitt

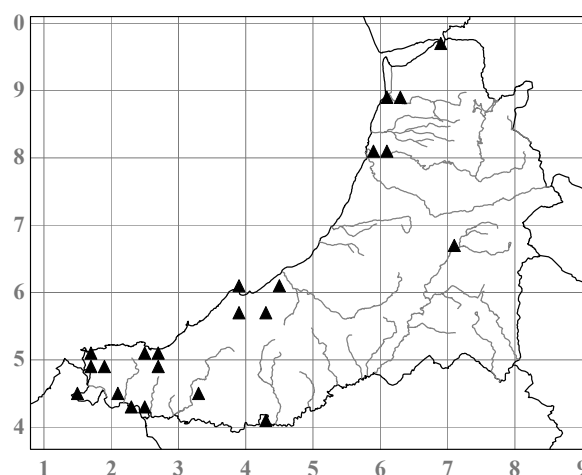
Native of the W Mediterranean, and commonly naturalised in hedges, scrub, marshes, riversides and waste ground throughout the lowlands, although it reaches 285m altitude at Ffair-rhos SN740679, 1998.

***Cuscuta campestris*** Yunck. - Yellow Dodder - Llandag Melyn

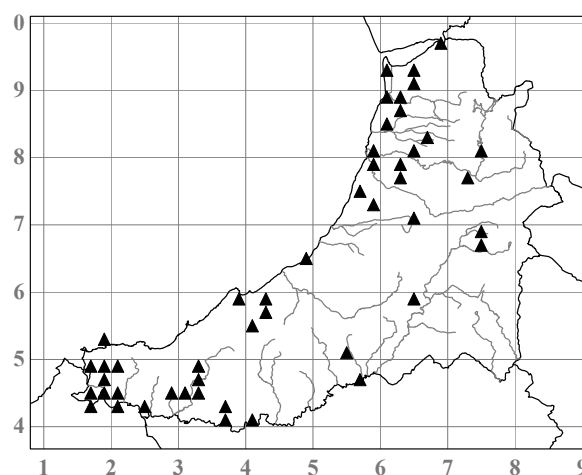
The only record is from 1987, when a dense growth smothered *Clarkia amoena* and *Matthiola* in the garden of Joydon, Penyrangor, Aberystwyth SN58098080 (K, NMW, BM, det. B. Verdcourt). Native of North America.

***Cuscuta epithymum*** (L.) L. (*C. trifolii* Bab.) - Dodder - Llandag

Only recorded from seven sites in the county, and now probably extinct. Salter first recorded it from the edge of a cornfield at the top of Bryn-y-mor “near the upper gate on the way to Cwm”, Aberystwyth c. SN589824 in 1894 (Salter 1894, Diary 12.6.1894, 1935) and saw it regularly there until at least 1927 (Diary 22.5.1927) “on wild thyme etc. .... but now gone” (1935). In a letter to Salter (Diary 23.12.1905), T. W. Barker, the Carmarthenshire botanist, reported “*C. ?epithymum* from cloverfields at Trecefyl and Tyndomen” i.e. SN668585 and 659582, near Tregaron in September 1897 and September 1904: “I was partridge shooting on both occasions, and did not examine the flower very carefully, but I thought it was *epithymum*. It may however have been *trifolii*, which Mr Knight has found near Llandovery” (*C. trifolii* is now included in *C. epithymum*). In 1902 Salter recorded *C. epithymum* on Pendinas, Aberystwyth SN5880 (Diary 1.11.1902), and from 1927 to 1936 he knew it on the Borth links c.SN6091 (Diary 26.7.1927, 3.6.1936). In 1928 he recorded it above Bryn-eithyn c.SN5877 (Diary 4.10.1928), but oddly he does not mention this in his Flora. In 1982, three patches in an area 4 × 1m growing on *Thymus* were found on the E verge and bank of the coast footpath N of Clarach SN58658460, and, although reduced to one patch by 1989, it was still present there in 2003 but could not be found in 2005 or thereafter. In 1995 it was found abundant over c.0.2ha of ungrazed *Festuca ovina*/*Anthoxanthum* grassland, apparently growing on *Lotus corniculatus*, just W of the Cwm Rheidol lead mine SN72797823 (TD), but the following year only four small plants could be found (AOC & APF) and it has not been seen there since.



Subsp. *silvatica*

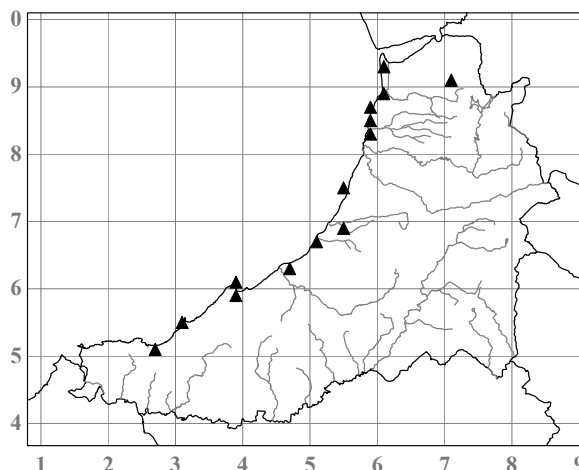


Subsp. *disjuncta*

## SOLANACEAE

**Lycium barbarum** L. (*L. halimifolium* Mill.) - Duke of Argyll's Teaplant - Ysbeinwydden Hardd

Planted and well-naturalised along the coast, in hedges, on banks, growing through walls and on clifftops, always in towns and villages or near houses. It occurs from Borth to Tresaith, and is especially abundant on waste ground on shingle at Borth SN608891, 1990 (NMW) - 2008; by the coast path at Wallog SN590856, 1891 (Salter Diary 25.9.1891) - 2008; on sandy banks at Clarach SN584839, 1891 (ABS, WHP) - 2008 (NMW); on shingle and banks at the mouth of the Afon Cledan at Llan-non SN507668, 1996 (NMW); in several places at Aberarth SN479638, 1956 (JFH & PCH, *Proc. BSBI* 2: 376 (1957)) - 2004 (NMW); along hedgebanks behind the beach at Aberaeron SN463632, 1907 (Salter Diary 16.5.1907) - 2008; on cliff ledges at New Quay SN388603, 1994 (NMW) - 2005, where it is clearly bird-sown; and on a sandy slope at Tresaith SN277515, 1991 (NMW) - 2005. It is curiously absent from Aberystwyth. Inland there is a relic colony by Dolgelynen ruin, Cwm Ceulan SN707901, 1997. Native of China.

**Lycium chinense** Mill. - Chinese Teaplant - Ysbeinwydden Tsieina

The persistent confusion between this species, also native of China, and *L. barbarum* has only recently been resolved, and most of the plants recorded by Salter and others as *L. chinense* were in fact *L. barbarum*. *L. chinense*, planted and naturalised, has been confirmed only at Aberporth, SN2551 and SN2651 (Webb 1956) - 2004 (NMW), where it grows in many places on the cliff slopes and on banks and in hedges around the village; and in a hedge at Ty-gwyn, Mwnt SN197518, 1992 (NMW).

**Hyoscyamus niger** L. - Henbane - Llewyr yr Iâr

This archaeophyte was first recorded from "Clarach-Borth" by Morgan (1849), and Clarach c.SN586840 is the only site where it has been at all regularly seen. Rees (1890) said that it "... has retired to Clarach Sands [from Aberystwyth]", and Salter first recorded it there in 1891 "just above the beach." The next year (Salter 1892) he mentions "... the handsome but poisonous Henbane, planted at Clarach by a former Chemical Assistant, and now seeding far and wide over the sand-hills", and he recorded it thereafter at intervals, and in 1926 (Diary 10.5.1926) wrote "Sowed Henbane seed at Clarach". His last record of it there was of one plant in 1927 (Diary 18.9.1927), and in his Flora (1935) he wrote that it had "almost or quite gone." It has not been seen there since. The sowings were for teaching material for University classes. In 1893 (Diary 17.5.1893) Salter recorded it from Ynys-las c.SN69B, and in 1926 (Diary 5.6.1926) and 1927 (Diary 17.9.1927) from Borth c.SN68E. In 1926 (Diary 12.9.1926) he wrote: "There is now a flourishing colony of Henbane at Wallog [SN589857] on some cartfuls of earth which have been recently tipped", and in his Flora (1935) he wrote that this colony "did not persist"; however, it was recorded there again as plentiful in 1977 (JEH) and as a single plant in 1996 (AOC & CDP). Salter recorded it on the Aberystwyth rubbish-tip SN591811 in 1905 (Diary 1.7.1905) and 1930 (1935), at Crugiau, Rhydyfelin SN591796 in 1905 (Diary 14.8.1905), and by Trefechan Bridge, Aberystwyth SN583812 and at the Llanbadarn Fawr rubbish-tip SN600804 in 1937 (Wade 1952); it was recorded at Penyrangor, Aberystwyth as single plants at SN58088078 in 1959, and at SN58208105 in 1982 (MC). Two large plants on the site of the demolished Seilo chapel in North Parade, Aberystwyth SN58638184 in 1996 attracted much attention. The only other records are of "a good deal" on waste ground at Cwmtudu c.SN357575 in 1924 (Salter Diary 16.9.1924), and at Tresaith c.SN2751 (Salter in Wade 1952).

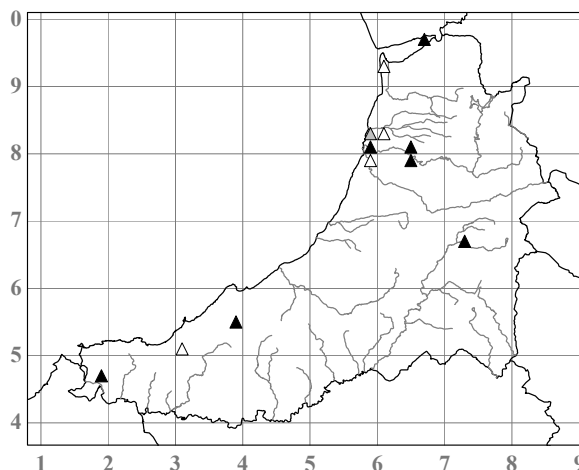
**Nicandra physalodes** (L.) Gaertn. - Apple-of-Peru - Afal Periw

Recorded only as a casual weed in the IGER experimental grounds, Plas Gogerddan SN631835 in 2003 (JV, det. AOC), and in a flowerbed in Mill Street, Aberystwyth SN58338140 in 2008, both being var. **physalodes**. Native of Peru.



### **Datura stramonium** L. - Thorn-apple - Afal Dreiniog

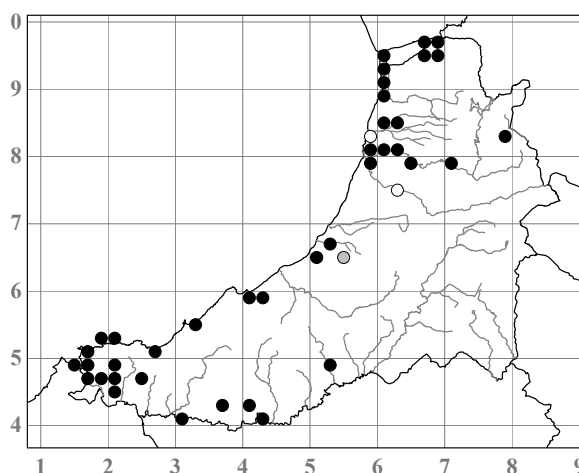
A rare casual, recorded by Salter (1935) five times from tips and gardens between 1901 and 1933. Since then it has been recorded at only nine sites. In the garden of Ynys Edwin, Eglwys Fach SN678963, one or two plants appeared most years 1959-1991 but not since (WMC); it was believed to have been introduced with chicken-feed by the previous owners. There were a few plants around the University greenhouses, Penglais SN596821, 1976-1977 (JEH). In 1986 a few plants appeared in a Maize crop at Oernant, Penparc SN195476 (Emyr Jones pers. comm.), and it reappeared there regularly for at least the next 15 years, sometimes causing great difficulties when the Maize was harvested for silage (NMW); plants have also appeared in reseeded pastures and on waste ground here. In 2003 one plant appeared in the garden of Minawel, Ffair-rhos SN735678 (JEDa), and in 2004 one appeared in a garden at Pontrhydfendigaid SN73156631 (GL), both probably from bird-seed. In 2005 one plant appeared from bird-seed on a pavement by Aberystwyth station SN58518150. There were three occurrences in 2006: five plants appeared in a fodder crop N of the A44(T) road in Capel Bangor SN65708022 (SPC); eight plants were in a disturbed pasture nearby on the N bank of the Afon Rheidol below Capel Bangor bridge SN64667993 (JV); and one plant was on ditch spoil by Llain-wen farmyard, Pentre'r-bryn SN39265510 (RJW). These records are all of var. **stramonium**, with white flowers and spiny fruits. Two plants of var. **chalybaea** W. D. J. Koch (var. *tatula* (L.) Torr.), with purple flowers and spiny fruits, appeared on a newly constructed embankment at Parc-y-llyn, Aberystwyth SN591807 in 1995. Native of America.



### **Solanum nigrum** L. - Black Nightshade - Codwarth Du

#### Subsp. **nigrum** var. **nigrum**

An uncommon weed of arable fields, gardens, waste and disturbed ground, tips, road verges and on the driftlines of coastal and river shingle. Salter (1935) described it as "Scarce and of uncertain occurrence" and gave only four records; it has clearly greatly increased recently, and although there were only four more records until 1990, there have been c.40 since then. As an arable weed it occurs chiefly in Maize crops that have been fertilised with slurry, and is often dominant in them; at Penparc SN203480 in 1992 the plants were dense over 3ha and were 100-145cm tall, with berries 8mm in diameter (NMW). An unusual occurrence of plants in a natural habitat was in the dune slacks at Ynys-las SN69B, c.1979 (JPS). Altitude limit 480m, waste ground at the Nant-nod lead mine, Pumlumon SN79188390, 2003.



#### Subsp. **schultesii** (Opiz) Wessely

This alien subspecies, native of Europe, has been recorded only from Glyn-Rheidol Farm, Cwm Rheidol SN712787 in 1995 (NMW), where it was a frequent garden weed and also grew along the roadside verge with subsp. *nigrum*.

### **Solanum physalifolium** Rusby var. **nitidibaccatum** (Bitter) Edmonds - Green Nightshade - Codwarth Gwyrdd

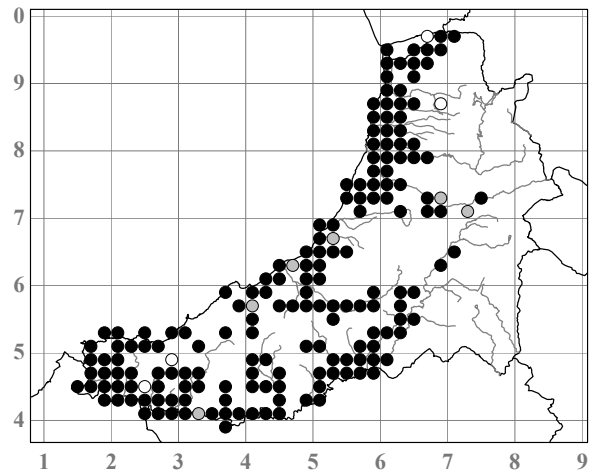
A rare casual, first recorded on stony waste ground by the boatyard at Ynys-las SN616932 in 2000 (NMW, WMcC *et al.*). The only other records have been of a few plants by the visitor centre on the Ynys-las dunes SN609941 in 2004-2005 (AOC; SPC) and of a single large plant on the margin of a Maize field at Waungelod, Gwbert SN16824878 in 2001 (NMW). It is native of South America.

***Solanum dulcamara* L. - Bittersweet - Elinog****Var. *dulcamara***

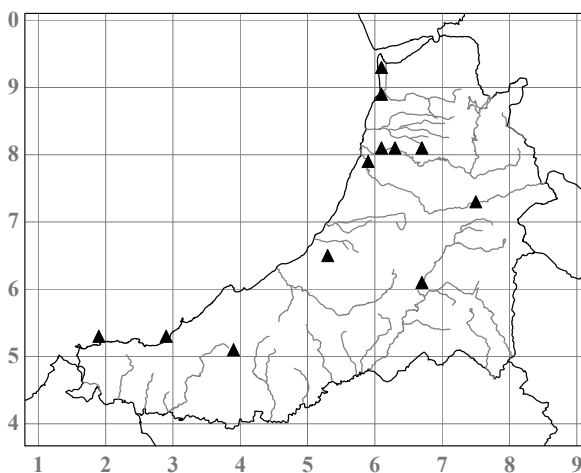
Widespread and frequent in the lowlands, especially alongside streams and ditches, in marginal swamps by ponds and backwaters, and in wet woodland, but also sometimes in quite dry sites such as hedgebanks, graveyards, and on scrub slopes. There are many colonies on the Ynys-las dunes SN69B, C. It is surprisingly rare in the Cors Caron area, and does not extend into the inner valleys, and has not been seen higher than 225m altitude, in Ysbyty Ysytwyth churchyard SN732715, 1983.

**Var. *marinum* Bab.**

Abundant on the landward slope of the shingle beach c.1km SSW of the mouth of the Afon Wyre, Llanrhystud SN5268, 1905 (Salter Diary 31.7.1905, 1935) - 2005 (CGE, conf. PDS).

***Solanum tuberosum* L. - Potato - Taten**

Potatoes “are here universally cultivated” (Lloyd & Turnor 1794). At Hafod c.SN77L, R, Potatoes and Yams (Scottish varieties of Potato) were successfully cultivated on drained and limed peat soils around 1800 (Malkin 1804, Moore-Colyer 1992). In 1801 there were 1,731 acres (700ha) of Potatoes in the 75% of the parishes that made returns (Williams 1950), amounting to 4% of the county’s arable. In 1869 there were 7,828 acres (3,167ha) (Anon. 1869), more than in any other Welsh county. In 1917 there were 5,929 acres (2,399ha), and by 1937 there were only 2,722 acres (1,101ha). During the Second World War in 1942 they had increased again to 6,557 acres (2,653ha). Much information on Potato cult-



*Solanum tuberosum* naturalised, with *Rumex acetosa* subsp. *biformis* and *Silene uniflora* in gully on sea cliffs, Mwnt SN198521, August 2004

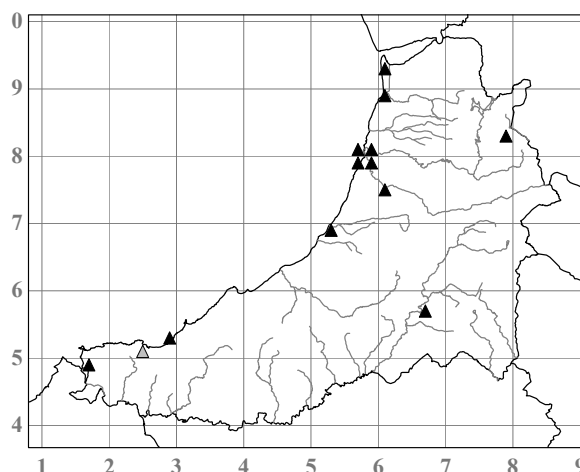
ivation around the end of the 19<sup>th</sup> century is given by Jenkins (1998). In the 1940s and 1950s in the New Quay area the October half-term was known as “Potato Week” when many children picked Potatoes on the farms (Passmore 1992). Their cultivation decreased again after this though, and by 1988 only 139ha of early and maincrop Potatoes were being grown commercially in the county (Anon. 1988). In 1959-1961 the Wold Farmers’ Syndicate from Lincolnshire made a largely abortive attempt to turn much of the Cors Fochno peatlands over to Potato-growing, a threat that greatly contributed to the drive to designate the NNR there.

Potatoes are frequently found as casuals, usually growing from spilt or discarded tubers. The only place where they have been continuously naturalised has been in a grassy gully on the sea cliffs at Ty-gwyn, Mwnt SN198521, where a colony has been observed from 1992 to 2008, derived from throw-outs from the

field above and perhaps replenished occasionally when the crop has been grown again there. Altitude limit (cultivated) 430m, the keeper's garden plot, Teifi Pools SN790679, 1929 (Salter Diary 18.9.1929).

**Solanum lycopersicum** L. (*Lycopersicon esculentum* Mill.) - Tomato - Tomato

An occasional casual especially along the uppermost strandline of sea beaches where it probably indicates human sewage in the area, on river shingle, on tips and as a pavement weed in towns. On the sheltered beach at Penyrangor, Aberystwyth SN580808, it has been present almost every year from 1960 to 2005 and occasionally produces fruit. In 1994 *c.*50 plants, many fruiting, grew on the river shingle at Pen-y-banc Bridge, Llanilar SN619756. Altitude limit 490m, several flowering plants on a tip on waste ground at the Nant-nod lead mine site, Eisteddfa Gurig SN791839, 2009.



**Nicotiana ×sanderae** W. Watson (*N. alata* Link & Otto × *forgetiana* Hemsl.)

A rare casual, seen only in 1995 when a few plants appeared on disturbed ground at the Parc-y-llyn development site, Llanbadarn Fawr SN594804 (NMW), in 2000 when two plants were seen on a tip at the boatbuilding yard, Ynys-las SN616932, and in 2008 when a plant appeared on a rubble tip at the Glanyrafon Industrial Estate SN614803 (NMW). A garden hybrid between two South American species.

**Petunia ×hybrida** (Hook.) Vilm. (*P. axillaris* (Lam.) Britton, Sterns & Poggenb. × *integrifolia* (Hook.) Schinz & Thell.) - Petunia - Petwnia

This garden hybrid has been recorded only once, as a self-sown casual in Portland Street, Aberystwyth SN584818 in 2000 (SPC).

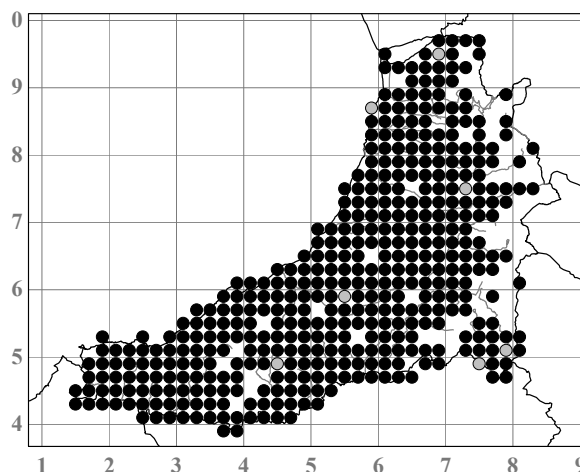
## OLEACEAE

**Forsythia ×intermedia** Zabel (*F. suspensa* (Thunb.) Vahl × *viridissima* Lindl.) - Forsythia - Clychau Aur

A hybrid of garden origin, and a common shrub of garden hedges and derelict gardens in the county. Relict bushes spreading by suckering have been recorded in scrub on the S slope of Constitution Hill, Aberystwyth SN585826, 1993; in estate woodland just NE of Plas Penglais SN594822, 2005 (NMW); in a quarry by Llyn Frongoch SN72057510, 2007 (NMW); and in the Lower Forest woodland, Lampeter SN575492, 1998 (NMW) - 2007 (AOC & JPP).

**Fraxinus excelsior** L. - Ash - Onnen

A very common tree, its bark beloved by bryophytes and their attendant bryologists. It is native in much of the woodland of the county, conspicuously occurring wherever there are seepages or slight base enrichments in the acidic *Quercus petraea* woods, becoming dominant in secondary woodland on the more fertile soils, and picking out any base enrichment on the upland cliffs. It is very widely planted in hedges where it is grown both as a standard tree and laid, in farmyards where it is as commonly planted as Sycamore, especially in the uplands, and in estate and amenity woodland. On the Hafod estate *c.*SN77L, R, much Ash was planted, including 25,000 trees in 1797-1799 (Malkin 1804). The genetic diversity of native populations is obvious in the great variation in phenology and in the shape







*Fraxinus excelsior*, sprouting stump 860cm girth,  
Ystradmeurig, view NNE from SN707674, November 2009

and colour of the leaves; just S of Great Abbey farm, Strata Florida SN74626553 is a tree with huge leaves 40-45cm long and leaflets  $c.15 \times 7$ cm, 2006 (NMW). As is usual with Ash, there are conspicuously good years for fruiting (eg. 1985, 1996, 2003), and trees have different proportions of male, female and bisexual flowers and these proportions, and the consequent amounts of fruit, can also change within the same tree from year to year. Of 19 mature trees along 2km of the A485 at Aber-mad in the Ystwyth valley SN590770-604754 surveyed from 1975 to 1993, five never fruited, six fruited in over half the years, and eight fruited in less than half the years; no tree fruited every year, and in 1976 and 1989 none fruited. In 2005 no fruits were seen anywhere in the county, and virtually none

in the rest of Wales, but in 2006 fruiting was exceptionally abundant.

There are many large trees in the county, including coppice stools probably of great age. The most impressive wreck is a hollow but living and vigorously sprouting stump, 860cm girth (at 1m up where it is still tapering but broken off) in 1989, behind the roadside hedge of the B4340, 200m WNW of Tre-isaf, Ystradmeurig SN707674, 2005. There is a huge stool  $c.1,020$ cm girth, with a trunk 452cm girth growing from it, 1991, in the pasture E of the A4159 at Lovesgrove SN63248130. The largest complete tree was 573cm girth and 21m tall, in 1992, perhaps once pollarded at 3m up, with another tree 565cm girth and 21m tall, and similarly pollarded, growing among the ruins of Peterwell, Lampeter, SN570477; these trees cannot be much more than 200 years old as Peterwell was abandoned in the 1790s. A tree growing by the walled garden near Gwernant Home Farm SN33684634 was 552cm girth (at 2m up, above the main bosses) in 1997, anciently broken off at 5m up. A tree in Coed Pwll-crwn, Gogerddan SN62308342 was 474cm girth in 1986 (AOC & APF), and 527cm girth and 25m tall in 2005.

Salter measured a tree  $c.550$ cm girth ("about 18 feet") in 1932 by Llandre church SN623869 (Diary 29.11.1939). Another huge tree "about eighteen feet around its base", known as "Y Goeden Fawr" on Penparcau Road, Aberystwyth, probably at  $c.$ SN586808, blew down on 11 February 1916 (*Welsh gazette* 17.2.1916, *Cambrian news* 18.2.1916); it had another smaller tree close by, "Y Goeden Fach", and was the site of ritual fights between the schoolboys of Aberystwyth and Penparcau, a haunt of footpads and popularly believed to be haunted. A tree at Aber-mad SN60047603, 168cm girth and 15m tall in 1996, was twin-planted with a Sycamore, their trunks fused at the base. Altitude limit (planted) 415m, Eisteddfa Gurig SN797840, 2003; (self-sown) 350m, a tree 67cm girth, 8m tall, on N-facing cliffs, Craig yr Allt-ddu, Cyneiniog SN72338771, 2005 (SDSB & AOC).

'*Pendula*' is occasionally planted, and there is a good tree in the Black Lion yard at New Quay SN389597, 1999; one in a pasture at Tan-y-bwlch SN58307925 fell in 2000. There is a small tree of '*Aurea*' 26cm girth, 4m tall, 1994, in the Trawsgoed grounds SN670729. Three trees of '*Jaspidea*' are planted by Theatr Mwldan, Cardigan SN178464, 2008.

### ***Fraxinus angustifolia* Vahl - Caucasian Ash**

#### **Subsp. *angustifolia***

There is a tree in Plas Crug, Aberystwyth SN58688152, 2008, and three on a lawn on the University campus at Llanbadarn Fawr SN60308105, 2008.



*Fraxinus excelsior*, stump 860cm girth,  
Ystradmeurig, view SSW from  
SN707674, November 2009

Subsp. **oxycarpa** (Bieb. ex Willd.) Franco & Rocha Afonso

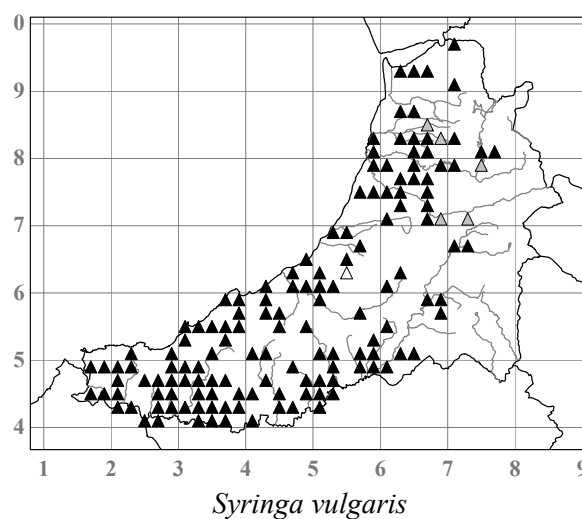
Two trees of '**Raywood**' (forma *purpurascens* P. D. Sell), with the foliage turning purple and orange in autumn, planted in c.2000, are by the Bronglais hospital, Aberystwyth SN59258188, 2006, and three are in the Theatr Mwldan car park, Cardigan SN178464, 2008.

### **Fraxinus ornus** L. - Manna Ash

Native of S Europe and SW Asia, long grown in Britain, but rarely planted in the county where it is a mostly roadside and street tree. It was apparently a favourite a century or so ago at Glandyfi Castle, and the largest of several in the grounds 100m S of the Castle SN692966 was 248cm girth and 13m tall (appearing grafted, and anciently broken above) in 1994 (AOC & WMC), 275cm girth (at 1m up) and 14m tall in 2005 (AOC & PSC); these trees had been noted in 1905 and 1934 (Diary 23.6.1905, 2.6.1934) by Salter, and in 1958 by HJMB. Two more trees there by the road at the entrance to Voelas SN689963 died and were felled c.1975 (WMC). There is an attractive row of six trees by the A487(T) at Rhydyfelin SN592789, 2004; one in Plas Crug, Aberystwyth SN588813, 2004; several on the University campus SN597814, 2003 (NMW); and a stunted, grafted tree in the grounds of Pigeonsford, Llangranog SN325540 (Palmer 2004).

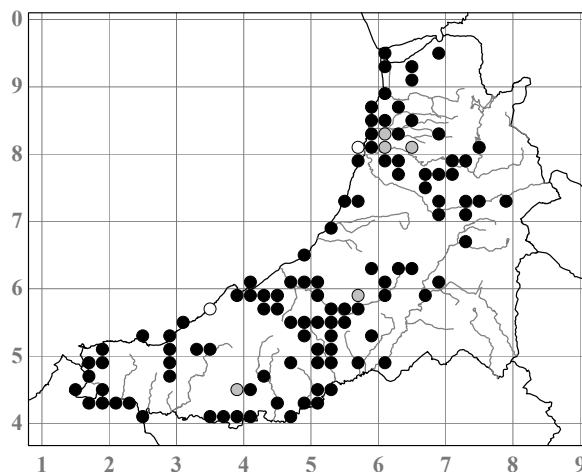
### **Syringa vulgaris** L. - Lilac - Lelog

Frequently planted and naturalised by suckering in hedges throughout the lowlands, and occasionally in woodland and scrub where it may have derived from throw-outs. As a relic, and usually not spreading, it is sometimes seen by cottages or farms in the uplands, for example at 260m altitude near the SW corner of Bwlch lead mine, Cwmerfyn SN70108237, 1993 (NMW), and at 330m altitude above the Cysymlog lead mine SN70088391, 2004. Native of SE Europe.



### **Ligustrum vulgare** L. - Wild Privet - Yswydden

Undoubtedly native, as Salter (1935) remarked, on the sea cliffs where it often forms a major element in the windblown scrub and sometimes grows prostrate on scree. It was first recorded in 1841 "On the castle rock", Aberystwyth SN579815 (Lees 1841), but had gone from there by Salter's time. It is abundant in places on the cliffs between Borth and Wallog SN5987, 1991-2004; at Penderi SN5472, 1905 (Salter Diary 11.9.1905) - 2003; between Morfa Mawr and Aber-arth SN4965, 1987 (AOC & APF) - 2003; at Traeth Penbryn SN2552, 1976-2004, and SN2952, 2000 (AOC & MDS); at Cribach Bay SN2452, 1980-2004; and in Netpool Wood SN1746, 1982-2002. It has not been refound SW of Cwm Tydu SN35N where Salter recorded it in 1931 (Diary 26.5.1931). It is impossible to tell whether it is native elsewhere. It is common in roadside hedges where it is often obviously planted, and for example it is dominant for 60m along the N side of the A4120 1km E of Penparcau SN613795, 1992, but often spreads vegetatively or appears self-sown. Colonies in a few places inland in scrub and woodland may be native, but appear more likely to be naturalised from throw-outs or from bird-sown seed from hedge plants.



### **Ligustrum ovalifolium** Hassk. - Garden Privet - Yswydden yr Ardd

Commonly planted and perhaps sometimes bird-sown in hedges throughout the lowlands. It is unusually abundant in the hedges along c.1km of the A4120 road around Bwlchcrwys, 2km W of Devil's Bridge SN7177, 2007. It is also established from throw-outs in places in scrub and woodland, and appears well-naturalised in several sites, as in the copse E of the Synod Inn crossroads SN403543, 1998. Its hybrid with

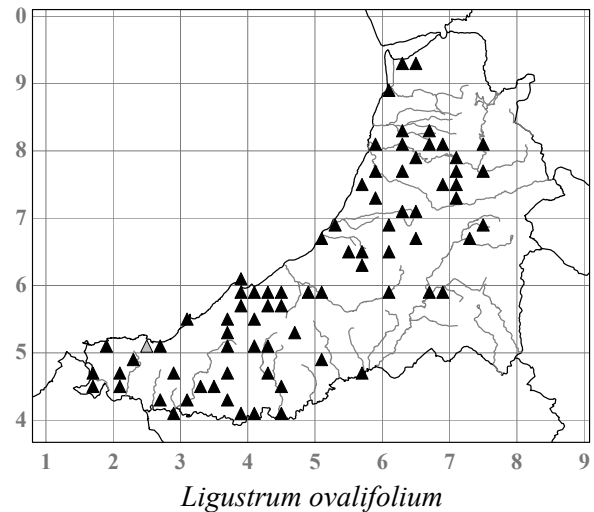
*L. vulgare* (*L. × vicaryi* Rehder) has not been searched for. Native of Japan.

***Ligustrum lucidum* W. T. Aiton - Tree Privet**

An old bush, growing with *L. ovalifolium*, probably as a relic, in scrub between the road and stream in the upper part of Cliff Terrace, Aberystwyth SN590826, 2006 (RGW & AOC). Native of China, introduced to Britain in 1794.

***Olea europaea* L. subsp. *europaea* - Olive**

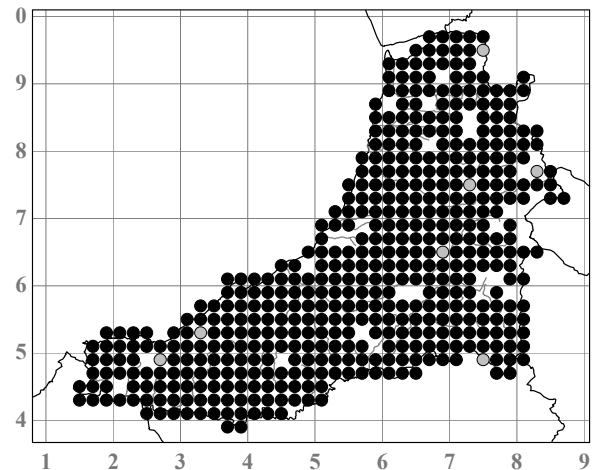
A small grove of eight trees brought from Italy was planted in the walled garden at Pigeonsford, Llangranog SN325542 in 1997 and fruited that year (*Cambrian news* 9<sup>th</sup> April 1998).



## VERONICACEAE

***Digitalis purpurea* L. - Foxglove - Bysedd y Cŵn (Bysedd Cochion, Clatsh y Cŵn, Clatshen y Cochion)**

Very common on hedgebanks, dry slopes, cliffs and screes and on disturbed ground of all sorts, and spectacularly abundant where Gorse has been burnt as well as in recently felled woodland when the disturbance stimulates growth from a persistent seed bank. It is common in the uplands, and occurs in small quantity on several of the remoter cliffs such as Llest y Graig SN803889, 1992, and Craig y March SN806881, 1993. White-flowered plants are occasionally seen, and Morgan (1849) recorded them as common about Devil's Bridge c. SN7477. Altitude limit c. 610m, above Llyn Llygad Rheidol SN7987, 1903, Salter (Diary 26.9.1903, 1935); 520m, Craig y March, SN806881, 1993.

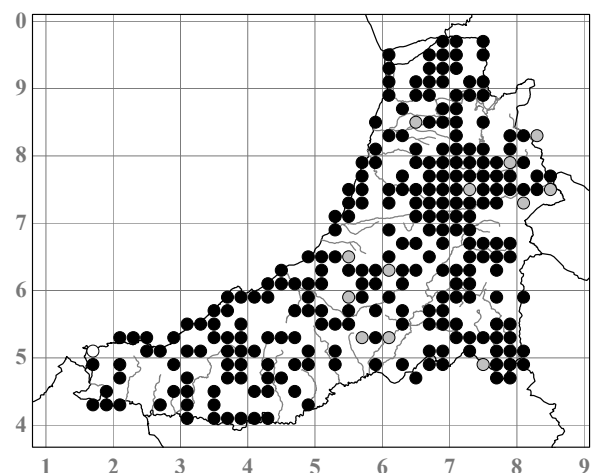


***Erinus alpinus* L. - Fairy Foxglove - Clychau'r Tylwyth Teg**

Abundantly naturalised, presumably having been present for many years, on the walls of a yard off Portland Road, Aberystwyth SN58508186, 2000 (RGW) - 2008, and on old walls at the Ynys-hir Hall Hotel, Eglwys Fach SN68209583, 2008. Native of SW Europe.

***Veronica officinalis* L. - Heath Speedwell - Rhwyddlwyn Maddysol**

A common plant of dry, well-grazed pastures, banks, rocky slopes, road verges and pathsides, sand dunes, lawns and waste ground. As Salter (1935) observed, it is frequent in the upland sheepwalks, and it is common on upland rock ledges. It seems fairly salt-tolerant, occurring for example on shingle in Aberaeron harbour SN45726258, 1990-2003. Several colour forms occur: forma *cyanea* Richen, with deep blue flowers, was found on anthills in a pasture just E of Pont Rhyd-y-groes SN746727, 1996 (CGE, det. PDS); and plants with very pale mauve flowers, ones with pale bluish flowers, and ones with pale pink flowers are often seen. Altitude limit 730m (Salter 1935); 560m, verge of rough road, Rhos y Garn, Cwm Ystwyth SN797766, 2002.



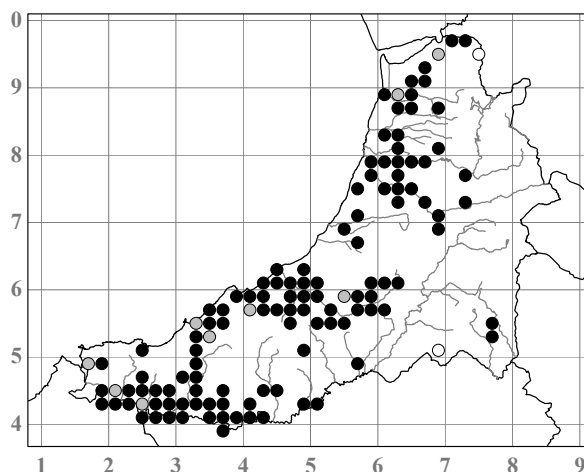


### **Veronica prostrata** L. - Prostrate Speedwell

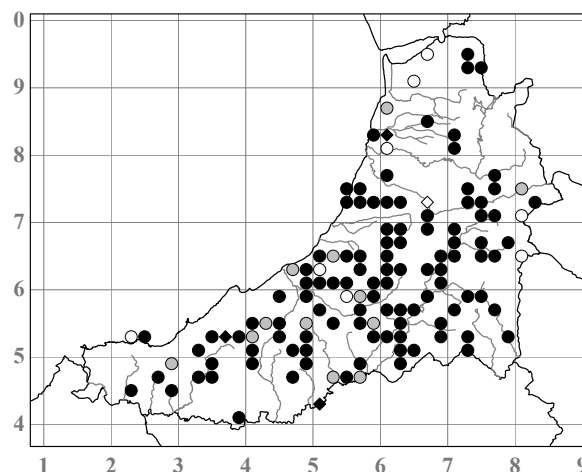
The only record is of it reported as “Hortal. Cardigan [SN14], G. C. Druce” in *BEC Rep.* 6: 34 (1921), perhaps as a casual or established from a throw-out. Native of Europe and Asia.

### **Veronica montana** L. - Wood Speedwell - Rhwyddlwyn y Coed

A frequent plant of damp, fertile woodlands throughout most of the lowlands, and especially common in the woods on clay soils in the Aeron and lower Teifi valleys. Although commonest in ancient woodland, it is by no means a reliable indicator and occasionally occurs in obvious secondary woodland, for example just W Llechryd SN209441, 1986, and at Tyddun-du SN271427, 1980, which it must have colonised within the last 100 years. Altitude limit 410m, streamside in conifer plantation 1.2km NE of Llyn y Gwaith SN683514, 1965.



*Veronica montana*



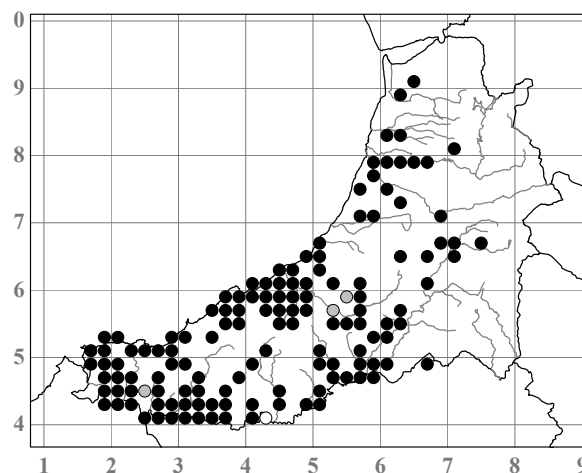
*Veronica scutellata*

### **Veronica scutellata** L. - Marsh Speedwell - Rhwyddlwyn Culddail y Gors

A frequent plant of marshes, flushed slopes, bogs, lake margins and streamsides, extending well into the uplands but absent from the most oligotrophic sites. Like *V. beccabunga*, it is virtually absent from the whole Dyfi catchment, including Cors Fochno, but unlike that species it is absent from the lower Teifi valley and is rare on the coast. Most populations are of var. **scutellata**, and the flower colour varies from pale lilac, pink or bluish to almost white. Var. **villosa** Schumach. was recorded by Salter (Wade 1952) from the reservoir 500m W of Trawsgoed station SN661725, 1936 (NMW), and it has since been recorded three times: one plant, with sparse var. *scutellata*, in a swampy ditch in a sedge-rich pasture 400m SSE of Cwm Cottage, Llangorwen SN609828, 1992; a few plants, all with white flowers, with var. *scutellata*, in a marshy pasture by Moor Wood, Highmead SN50704310, 1994 (NMW); and a few plants, in the absence of var. *scutellata*, in a marshy pasture 200m NE of Ffynnon-Iwan, Plwmp SN376528, 1999. Altitude limit 475m, Llyn y Fign SN812703 (Salter 1935); (var. *scutellata*) 460m, Rhos y Gafallt, Trawsalft SN772706, 1999.

### **Veronica beccabunga** L. - Brooklime - Llysiau Taliesin

Common in open muddy or stony habitats at the edges of rivers, streams, ditches and ponds, especially where poached, frequent in the SW half of the county, becoming rarer in the N and inexplicably almost absent from the Dyfi catchment, except for one record from Taliesin SN656915, 1994, where Salter (1935) had also recorded it, and one from Doly-bont SN625881, 2000. It occurs both in unshaded sites such as river shingle, and in quite deep shade in Alder and *Salix* carr, and is mostly confined to the lowlands. Altitude limit 300m, Alder carr by the Nant Fawr, Blaen Twrch SN678499, 1995.



[*Veronica anagallis-aquatica* L. - Blue Water-speedwell - Graeanllys y Dŵr

Generally very rare in West Wales and not reliably recorded from the county. A record from SN25 in Ellis (1963) was from a list compiled from 1936 field records (WRR & WWB) that did not include *V. scutellata*, so was doubtless an error for that frequent species.]

***Veronica catenata* Pennell** - Pink Water-speedwell - Graeanllys-y-dŵr Rhosliw

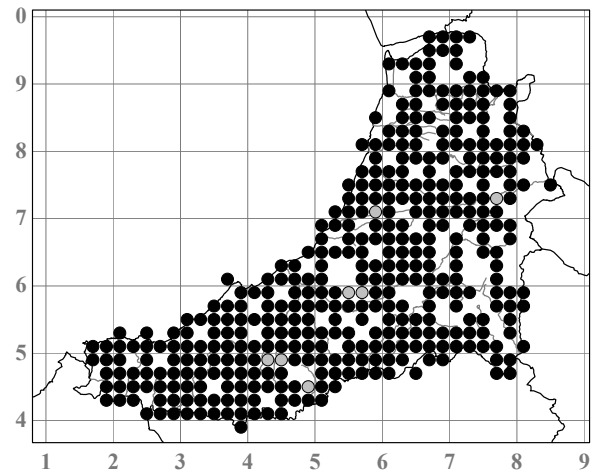
The only record is from the car park verges of the new Ysgol Penweddig, Llanbadarn Fawr SN595811, the topsoil for which came from the Sugar Beet residue lagoons near Kidderminster; two plants appeared there in 2001, four in 2002 and ten in 2004.

[*Veronica peregrina* L. - American Speedwell - Rhwyddlwyn America

A 1956 field record from SN76 at BRC is unsubstantiated and possibly an error.]

***Veronica serpyllifolia* L. subsp. *serpyllifolia*** - Thyme-leaved Speedwell - Rhwyddlwyn Dail Teim

Common throughout the county in usually slightly damp well-grazed pastures, especially on clay soils, on roadside verges and pathsides both in the open and frequently in woodland, on streambanks, as a garden weed, on waste ground, walltops and banks. It extends from the coast well into the uplands, where it is often especially abundant on the gravelly verges of FC roads. Large plants with the inflorescence-axis and pedicels densely glandular-hairy are occasionally seen in marshes, for example 150m N of Brynllŷn, Penuwch SN588609, 1992. Altitude limit 370m, Ffrwd ar Gamddwr SN762576 (Salter 1935); 560m, verge of rough road, Rhos y Garn, Cwmystwyth SN797766, 2002.

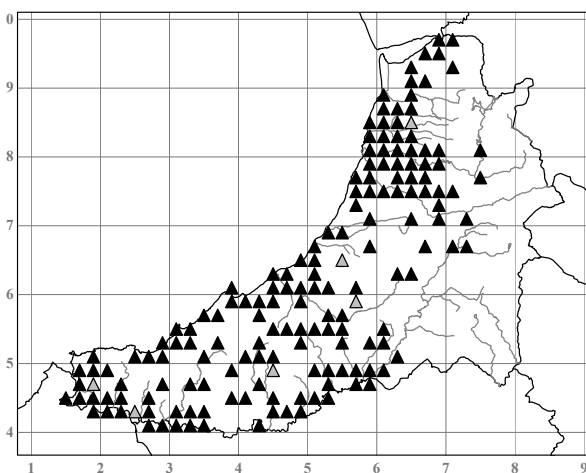


***Veronica longifolia* L.** - Garden Speedwell - Rhwyddlwyn Hirddail

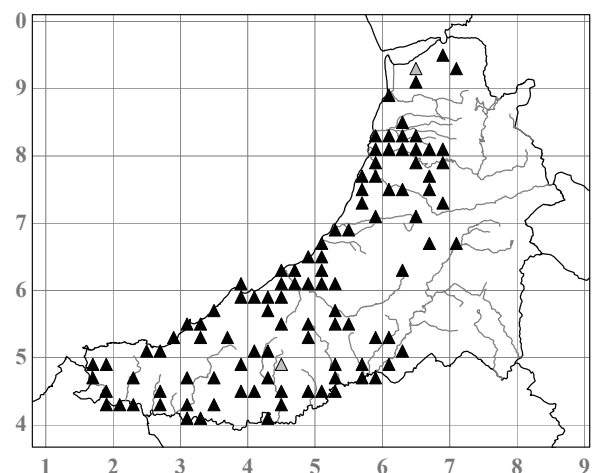
A garden ornamental, native of Eurasia, recorded naturalised from throw-outs in only two places: a colony with c.20 inflorescences persisted for at least five years in rough grass and scrub on the site of the former Blaendolau rubbish-tip, Llanbadarn Fawr SN600804, 1990; and a similar colony was on the site of the former Rhippinllwyd tip at Sarnau, SN305504, 1993.

***Veronica hederifolia* L.** - Ivy-leaved Speedwell - Rhwyddlwyn Dail Eiddew

A common archaeophyte weed of gardens, shaded banks, disturbed and open ground of all sorts, railway ballast, road verges and waste ground, and confined to the lowlands. It is especially characteristic of rocks, shingle or silty places by streams in woodland. The two often rather weakly differentiated subspecies are both



All records



Subsp. *hederifolia*

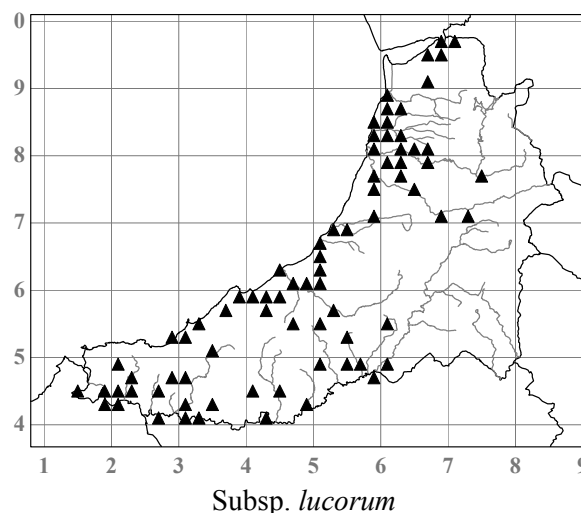
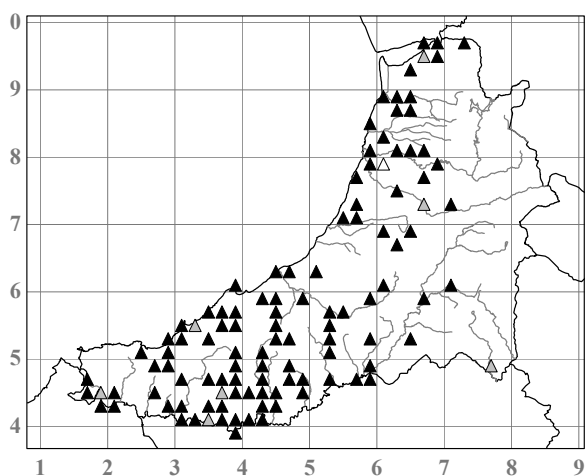
widespread. Subsp. **hederifolia** occurs in all habitats, but is much the commoner as a garden weed, on sand dunes and in open ruderal sites. Subsp. **lucorum** (Klett & Richt.) Hartl. (*V. sublobata* M. A. Fisch.), perhaps native, was first recorded in 1972 in woodland at Felin-y-cwm, Eglwys-fach SN6994 (NMW, PMB, *Nature in Wales* **10**: 180 (1974)) and is more confined to shaded sites; it is the commonest woodland annual in the county, often occurring in vast abundance in spring in the damper and more fertile woods, but the ecological distinction between the two, like the morphological ones, is imperfect.

**Veronica crista-galli** Steven - Crested Field-speedwell - Rhwyddlwyn-y-maes Cribog

Native of the Caucasus and a rare alien in Britain. It was found on the Blaendolau rubbish-tip, Llanbadarn Fawr SN600804 in 1975 (NMW, MHB), and persisted there for two years. Roe (1978) surmised that it “may have come in with shoddy in mattress-packing dumped on the tip.” But in 1991 it was found on waste ground behind the church hall only 600m away SN598810 (NMW), immediately outside Salter’s garden at Fairview, and remains there in varying abundance, 2008, and in 1992 it was found to be an abundant weed in the garden itself (SPC). In 2000 three huge clumps, each c.60cm across, were found 100m away on the verge of Ffordd Sulien SN598809 (SPC). Salter had it in cultivation in 1939 (NMW), having got seed from J. G. Long, an Isle of Wight botanist with an interest in aliens, and all of this long-persisting Llanbadarn population has clearly derived from this source.

**Veronica filiformis** Sm. - Slender Speedwell - Rhwyddlwyn Main

Native of SW Asia and in cultivation in Britain by the early 19<sup>th</sup> century, although it seems not to have begun its effective spread into the wild until the late 1920s. Salter did not mention it in his Flora, although he had it in cultivation in his garden in 1930 (NMW), but in his annotated copy (Wade 1952) he wrote “Becoming established rather frequently as an escape from cultivation (1935)”. There are not enough early records for its spread in the county to be properly charted, but it was still uncommon in the 1950s and has spread much more rapidly since about 1980. Most records are from lawns, road verges, hedgebanks, graveyards, waste ground and tips. It was first noticed in a reseeded pasture in 1982, near Bercoed-uchaf, Bangor Teifi SN391394, and most of the other similar pastures where it has been seen have also been on the Teifi flood plain where fragments have probably been dispersed in the floods. So far at least it seems confined to the lowlands, and has not been seen higher than 280m, on a tip in the Wstrws gravel quarry SN385502, 1990. Developed capsules have not been seen.



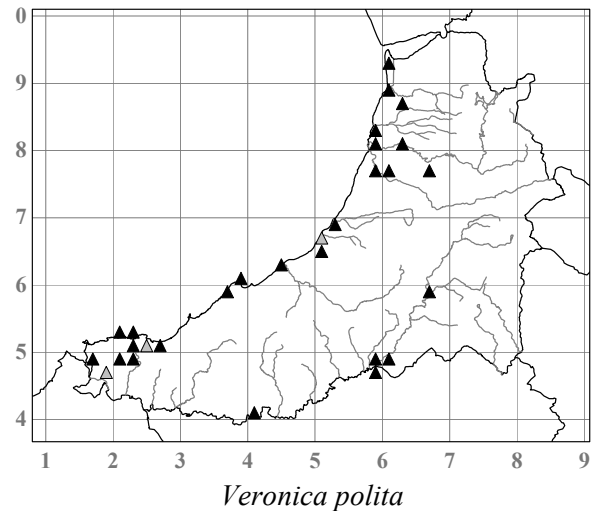
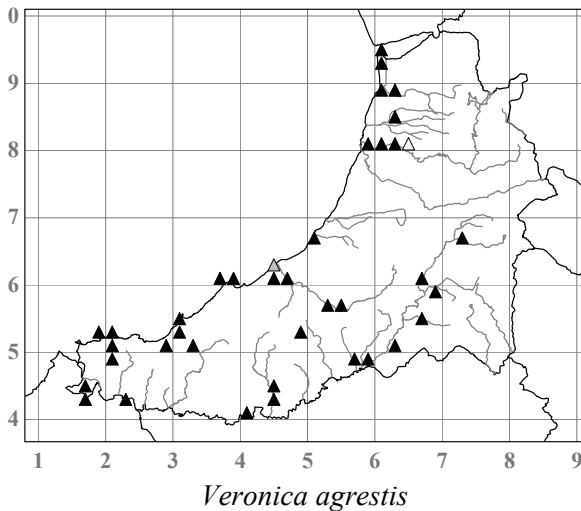
*Veronica filiformis*, Panteg filling station, view N from SN382445, April 1984

**Veronica agrestis** L. - Green Field-speedwell - Rhwyddlwyn-y-maes Gwyrdd

An occasional archaeophyte weed of gardens, arable fields, waste and disturbed ground and tips throughout the lowlands. Salter (1935) described it as “almost ubiquitous as far as cultivation extends”; even allowing



for the difficulties many botanists had at this period in separating it from *V. polita*, it must be less common now than it was, and it has not recently been seen in the uplands.

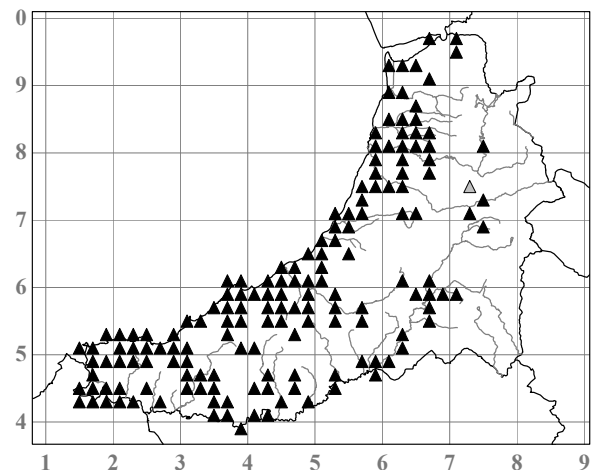


***Veronica polita* Fr. var. *polita* - Grey Field-speedwell - Rhwyddlwyn-y-maes Llwyd**

Rather less frequent than *V. agrestis*, as Salter (1935) remarked, and largely confined to the coastal district. It is a weed of gardens, arable fields, pavements and wall-bases in towns and waste ground. Var. *grandiflora* Bab. has not been seen.

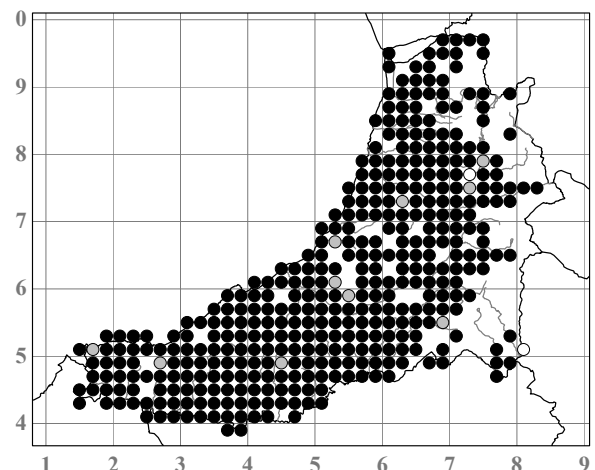
***Veronica persica* Poir. - Common Field-speedwell - Rhwyddlwyn y Maes**

A common weed of cultivated and disturbed ground, abundant in gardens and in all sorts of arable crops, and very much commoner than *V. agrestis* and *V. polita*. Salter (1935) described it as “now a frequent weed of arable and garden ground.” It is confined to the lowlands and is especially frequent along the coast and up the Teifi valley. The slender var. *kochiana* Godr. is widespread, growing both in infertile soils such as the Penparc sand quarry SN20304860, 2007 (NMW) and in fertile soils such as the WIRS trial plots 800m SE of Lovesgrove SN635811, 2007 (NMW). Most of the more robust plants have the leaves with entire, subacute teeth and the lower lip of the corolla whitish and fit neither var. *persica* nor var. *corrensiana* (E. B. J. Lehm.) Hegi exactly; they too grow in a range of soils, and grow together with var. *kochiana* in the WIRS plots (NMW) as well as in many other sites.



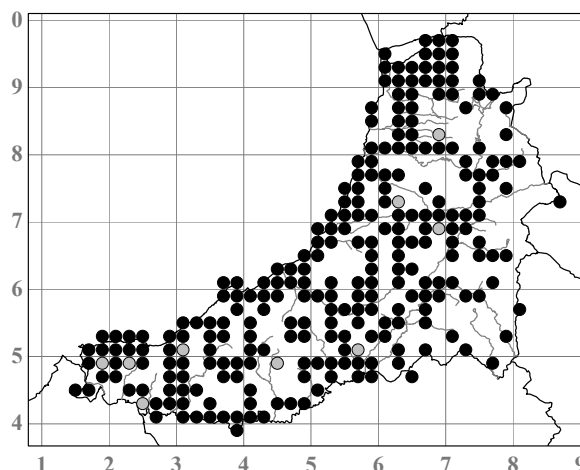
***Veronica chamaedrys* L. - Germander Speedwell - Llygad Doli**

A very common plant of unimproved pastures, hedgebanks, woodland and scrub, sand dunes, graveyards, streambanks and other mostly fairly dry habitats, although it scarcely extends into the uplands. A plant with pale blue flowers with a white centre was found above Bow Street SN629851 in c.2002 (CTG). Altitude limit 275m, Devil's Bridge c.SN7376 (Salter 1935); 330m, trackside 400m ESE of Ty-mawr, Ysbyty Cynfyn SN761790, 1990.



**Veronica arvensis** L. - Wall Speedwell - Rhwyddlwyn y Fagwyr

A common winter annual of dry, open, infertile sites on thin soils throughout the county, especially characteristic of dry banks and walltops, pathsides, sand dunes and waste ground. It is also a common garden weed and an occasional weed of winter cereal crops. Most plants can be accommodated within three varieties. Var. **arvensis** is widespread, especially inland, and is very characteristic of anthills in pastures, for example at Ystrad Meurig castle SN702675, 2005 (NMW) and Felin-y-mor, Aberystwyth SN581804, 2005 (NMW), and of droughted slopes. Var. **polyanthos** (Thuill.) Mathieu, decumbent, sparsely glandular and with large leaves, is more characteristic of ruderal habitats and gardens, for example in Ynys Edwin garden, Eglwys-fach SN678962, 2005 (NMW), around Aberystwyth harbour SN582811, 2006 (NMW), and on a footpath verge at Blaendolau, Llanbadarn Fawr SN600803, 2005 (NMW). Var. **nana** Poir. (var. *eximia* Towns., var. *glandulosa* Legrand), dwarf and usually densely glandular at least in the inflorescence although the glandulosity is variable, is the dominant variant on the sand dunes at Ynys-las SN69B, C, 1924 (Salter Diary 13.5.1924, 1935) - 2005 (NMW) and Penyrergyd SN14U, 2005, and on the coastal clifftops and slopes, for example at Wallog SN59X, 2005 (NMW). Altitude limit 510m, shaly track by the Llyn Llygad Rheidol dam, Pumlumon SN791878, 2002.

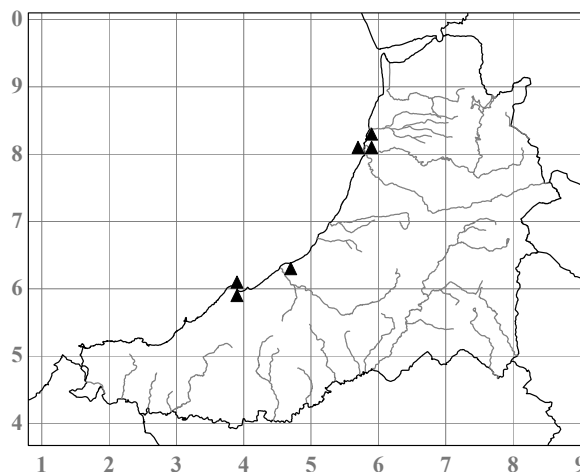


**Veronica salicifolia** G. Forst. (*Hebe salicifolia* (G. Forst.) Pennell) - Koromiko - Pedwar-ban-byd Helygddail

Several bushes, self-sown from an adjacent garden, were in an alley off Queen Street, Aberaeron SN45796299 in 2003 (NMW). Native of New Zealand and Chile.

**Veronica ×franciscana** Eastw. (*Hebe ×franciscana* (Eastw.) Souster; *Veronica elliptica* G. Forst. × *speciosa* R. Cunn. ex A. Cunn.) - Hedge Veronica - Pedwar-ban-byd y Berth

Naturalised since at least the 1930s (EHC) on the cliffs at the SW corner of the Aberystwyth castle grounds SN579816, and apostrophised by Margaret Evans in Jones (1980) as “the bravest clumps of veronica set four square into that Cardigan Bay wind and the sweep of the bay ...” Four self-sown bushes were still here in 2008, and they were determined by PSG in 1976 as the “wild type”, which is also naturalised on Constitution Hill alongside the Cliff Railway SN584826, 1996 (NMW) and is self-sown on walls on the Buarth SN58828164, 2004. Cultivars with larger flowers, darker green, larger leaves and a more erect habit are naturalised elsewhere along the coast, as on the cliff above the Ystwyth estuary SN580807, 1981-2005; by the A487(T) at the E end of Aberaeron SN462631, 1992-2005 (NMW); and in several places on the cliff slopes at New Quay SN389599-389602, 1983-2005. A garden hybrid between two S hemisphere species.



**Sibthorpia europaea** L. - Cornish Moneywort - Deilen Gron Cernyw

This Oceanic Temperate species reaches its N limit as a native in Britain in the county, where it still occurs in three of the five sites in the Llandysul area from which it has been recorded. It was first found in 1907 by Salter (Diary 13.8.1907) “amongst mosses and ferns in a shady nook where water trickled from a tiny spout” on the roadside 400m NW of Felin Cwm-hyar in the Cerdin valley SN38774617; he saw it there again in 1924 and 1931 (Diary 15.9.1924 and 16.9.1931), but although the spout is still there the *Sibthorpia* has not been seen since. In 1930 he saw it “in a similar situation” somewhere near to but N of Llanfair SN44F (Diary 18.9.1930, 1935), and it has not been refound there either. In 1977 one patch 2 × 1.5m was found on the wet,

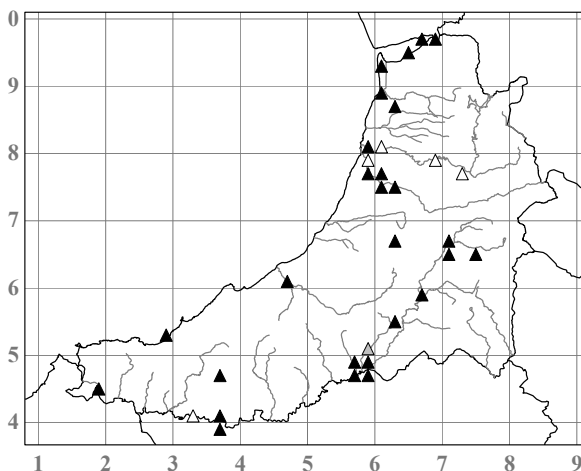


*Sibthorpia* on wet cliff by disused railway, Bangor Teifi, SN379399, September 1979

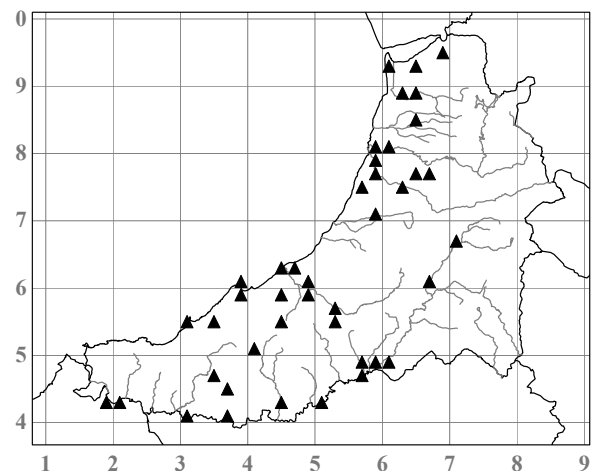
vertical cliff by the disused railway in woodland 500m SSE of Bangor Teifi church SN379399 (NMW, MC & AOC) along with several smaller patches by the streamlet in the wood above (CDP); in 1979 three more patches were found on the cliff, but in 1995 (AOC & JPW) only the original patch, now  $2.5 \times 2\text{m}$ , could be found, and by 2000 it had shrunk to  $1.5 \times 0.3\text{m}$ . In 1995 a very large colony extending for  $c.100\text{m}$  through flushes, *Salix* carr and scrub was found on the N side of the Afon Teifi 600m W of Pont Tyweli SN408403 (JB & AOC), and it was still as abundant there in 2000. In 1999, only 1.3km SSE of Salter's original locality, a few plants were found among *Athyrium*, *Juncus effusus* and Brambles in a steep flush in a NE-facing cwm in the pasture 200m S of Fforest-Cerdin SN39484504.

***Antirrhinum majus* L. - Snapdragon - Trwyn y Llo (Pen Ci)**

Frequently naturalised on walls, mostly in towns and villages, often in graveyards, and a casual of waste ground and tips. Salter (1935) says it is "nowhere established", but it certainly is now. Many colour forms occur. Native of the W Mediterranean.



*Chaenorhinum minus*



*Antirrhinum majus*

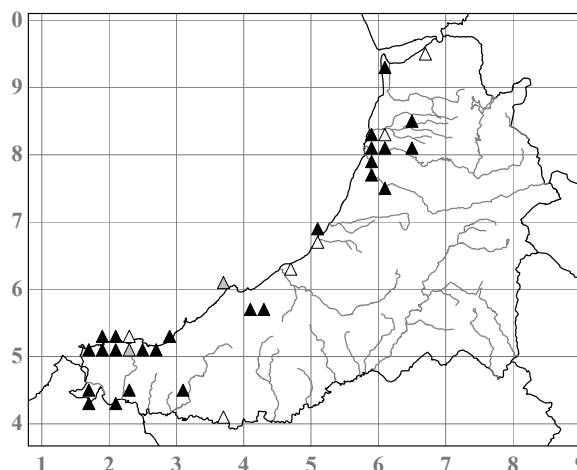
***Chaenorhinum minus* (L.) Lange (*Linaria minor* L.) - Small Toadflax - Trwyn-y-llo Bach**

Salter said that this "occurs commonly on ballast on the railway lines, but is rarely seen elsewhere". This remains generally true, and this archaeophyte persists along both the used and disused railways. Elsewhere it can be found on waste ground, gravelly tracks, pavements and walls. It occurred in abundance on river shingle by the Teifi 2.5km ESE of Henllan SN378393 in 1995 (AOC & LRG), and S of Maes-y-pwll SN564466 in 1996 (JPW & AOC). It reaches 280m altitude on a stony woodland track S of Strata Florida SN756642, 1990. The earliest record is an unlocalised one from the N of the county by Morgan (1848), as *Antirrhinum minus*, and if correct is of interest as it pre-dates the railway. The next is a specimen from a railway embankment, Aberystwyth  $c.$ SN58V, 1898 (**BIRM**, ex herb. L. Kitching).



**Misopates orontium** (L.) Raf. (*Antirrhinum orontium* L.) - Weasel's-snout - Y Trwyn-y-llo Lleiaf

This archaeophyte is probably less frequent now than when Salter (1935) described it as “not uncommon about cultivated ground”, and certainly it is never now “Sometimes a troublesome garden weed.” The earliest record is by Lees (1841) from near Aberystwyth. Most of the older as well as the more recent records have been from arable fields, gardens, roadside verges, building sites, waste ground and tips. It usually appears as a casual, perhaps increasingly so in the last 20 years than in the preceding few decades, but in the coastal parts of the S of the county it is of regular occurrence in many arable fields in crops including Barley, Potatoes and Flax. In the Aberystwyth area it seems especially characteristic of Potato patches (SPC).

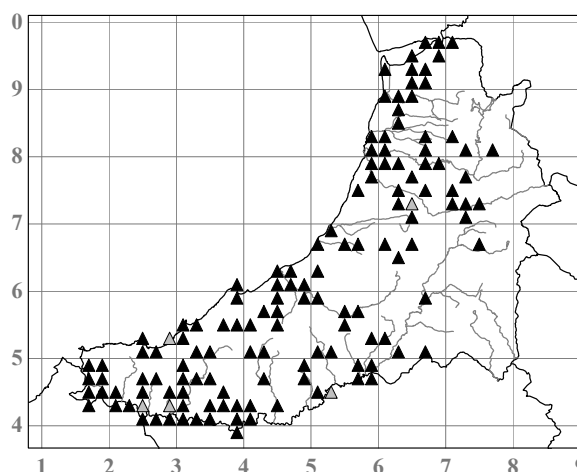


**Asarina procumbens** Mill. - Trailing Snapdragon - Trwyn-y-llo Ymlusgol

A native of SW Europe grown for ornament, and naturalised on a shaded stone wall outside the Ynys-hir garden SN68179586, 2001 (NMW), and on a wall at Frongog, 1km E of Llanbadarn Fawr SN614813, 2006 (SPC).

**Cymbalaria muralis** P. Gaertn., B. Mey. & Scherb. subsp. **muralis** (*Linaria cymbalaria* (L.) Mill.) - Ivy-leaved Toadflax - Trwyn-y-llo Dail Eiddew

Commonly naturalised on mortared walls especially in towns and villages, at the top of shingle beaches, on railway ballast, tips, waste ground, lead mine spoil and occasionally on eroding river-banks. Salter (1935) described it as “universal”, but his earliest documented record is from a bridge at Aberaeron SN4562 in 1904 (DW, Diary 25.6.1904). He said that white-flowered plants occurred, but gave no localities; such plants completely lacking anthocyanin now grow abundantly on the wall of a lane in Tal-y-bont SN655897, 1992-2005, on a wall by the main car park in New Quay SN38775968, 1998, on a garden wall in Tresaith SN279515, 1994, and on roadside banks around Y Rofft, Aber-porth SN25405140-25635158, 1998 (JPW & AOC) - 2008. The species has not been found above 290m altitude, where it occurs on the outbuilding walls at Cwmpenllydan, Brynafan SN717731, 2008. Native of S Europe.



**Cymbalaria pallida** (Ten.) Wettst. - Italian Toadflax - Trwyn-y-llo-dail-eiddew yr Eidal

Naturalised at only two sites, on an old wall in an alley in Doldre, Tregaron SN679595, 1998 (NMW), and on an old roadside wall by cottages at Felin-fach SN53005570, 1999-2009. Native of Italy.

**Cymbalaria hepaticifolia** (Poir.) Wettst. - Corsican Toadflax - Trwyn-y-llo-dail-eiddew Corsica

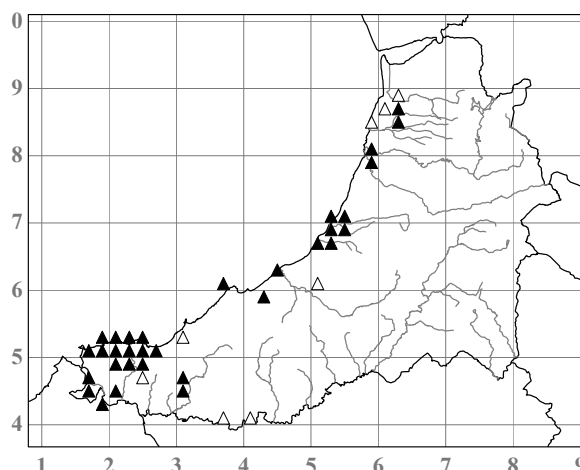
Occurring as a garden weed, not planted, at Winllan, Talsarn SN567574, 2008 (NMW, IWC & AOC); the plants have corollas with unusually short spurs 3-3.5mm. Native of Corsica.

**Kickxia elatine** (L.) Dumort. (*Linaria elatine* (L.) Mill.) - Sharp-leaved Fluellen - Llysiau Llywelyn

An occasional archaeophyte weed of arable fields, disturbed ground and tips, largely confined to the coastal parts of the S of the county. The only records from N of Aberystwyth have been from near Clarach c.SN5884 in 1892 (Salter Diary 22.10.1892); as a weed in Turnip fields at Dol-y-bont SN681, J in 1925 (Salter Diary 30.10.1925); in a “cornfield about 1 mile W. of Llandre” c.SN610870 in 1943 (PWR); in the Rhydypennau

chapel graveyard SN628863 in 2004 (ACW); and as a weed in the IGER trial plots at Gogerddan SN622842, 2006 (AOC & JPW). Although Salter (1935) described it as frequent, he listed only a dozen localities, and his Diary entries too suggest that it was not much commoner in his day than it is now, except perhaps in the N. The presence of a long-term persistent seed-bank ensures that it often appears where there has been road-widening, and it regularly appears at the MoD site, Aber-porth SN25G, K, L in shaly disturbed places. As an arable weed it has in recent years occurred in Barley, Maize, Cabbage, Oilseed Rape and Potato crops, and in gardens. Plants collected from winter stubble at Llwynysgaw SN217521, 2007 (NMW) are subsp. **crinita** (Mabille)

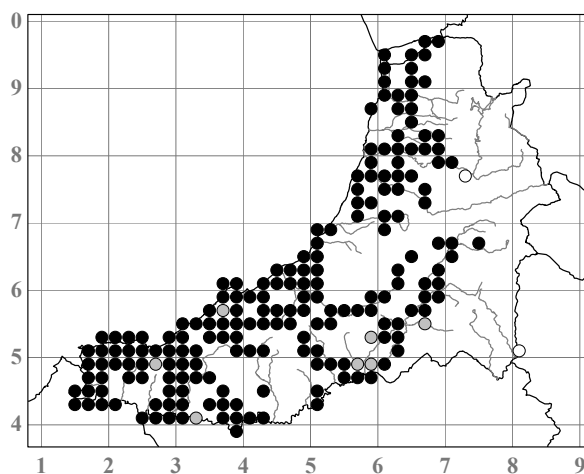
Greuter var. **prestandreae** (Guss.) P. D. Sell, fairly densely hairy but with glabrous pedicels, and with much-branched radiating main branches, while plants from near Cilcennin SN5060, 1964 (ABS, JPS) are subsp. **elatine**; it is not yet known which is the commoner taxon in the county.



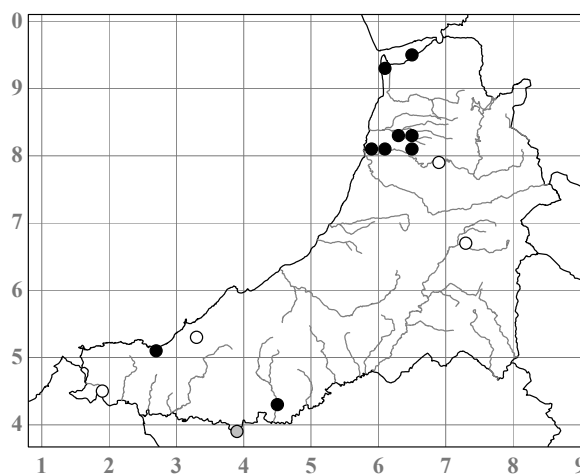
[*Kickxia spuria* (L.) Dumort. (*Linaria spuria* (L.) Mill.) - Round-leaved Fluellen - Llysiau-Llewelyn Deilgrwn  
Listed in Watson (1883) and Druce (1932), but these records must be considered unreliable.]

#### ***Linaria vulgaris* Mill. - Common Toadflax - Llin y Llyffant (Blodau'r Neidr)**

A common plant of hedgebanks, railway verges and ballast, graveyards and waste ground, probably never found in semi-natural habitats and virtually confined to the lowlands. A peloric flower was found on a plant on the railway at Glandyfi SN695971 in 1990. Var. *latifolia* Bab. was recorded from Castell Fan-grach SN727775 (Burkill & Willis 1894), but apparently has no genetic basis (Allen 1966). Not seen above 290m, above Bwa Drain c.SN7179 (Salter 1935).



*Linaria vulgaris*



*Linaria xsepium*

#### ***Linaria xsepium* G. J. Allman (*L. repens* × *vulgaris*)**

An occasional hybrid of roadside hedgebanks and railway ballast, first recorded in 1901 by Salter near Fronfraith where a colony 10m long still grows on the roadside bank SN615818, 1997. It is predictably commonest in the same area as *L. repens*, inland and to the NE of Aberystwyth. It is very variable, sometimes forming hybrid swarms, and often occurs in the absence of one or both parents.

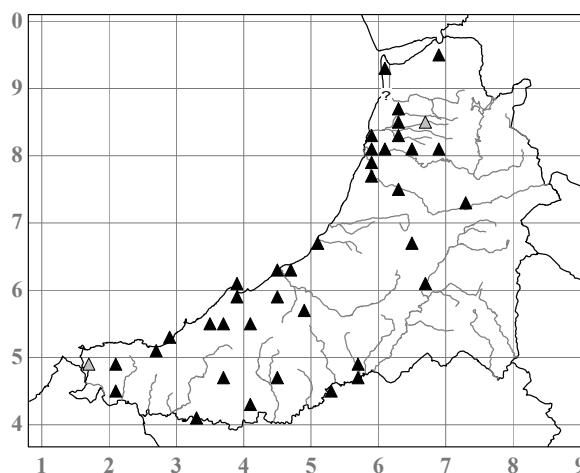
#### ***Linaria purpurea* (L.) Mill. - Purple Toadflax - Llin-y-llyffant Porffor**

The earliest record is from Borth c.SN68E, 1886 (A. Ley, *BEC Rep.* 1886: 157 (1887)), and Salter reported that it had been found in 1902, presumably in the Aberystwyth area (DT, Diary 29.9.1902). It was not recorded again until 1963, on the Penyrergyd dunes SN1648 (EBL), and 1976, when it was frequent in hedgebanks around Salem SN669842 as both purple- and pink-flowered forms (JEH) and on the Aberystwyth

railway sidings SN5881 (JEH). It was seen in 1985 on a pavement in New Quay SN389596 and on a wall at St. David's College, Lampeter SN579479, and in 1987 as a weed in the University Chemistry Department grounds, Aberystwyth SN588815 (JRA, AOC & CDP). In the 1990s it spread rapidly and is now established throughout the lowlands in many places on walls, waste ground, tips, roadside verges and at the top of shingle beaches. It is native of the C Mediterranean.

***Linaria* × *dominii* Druce (*L. purpurea* × *repens*)**

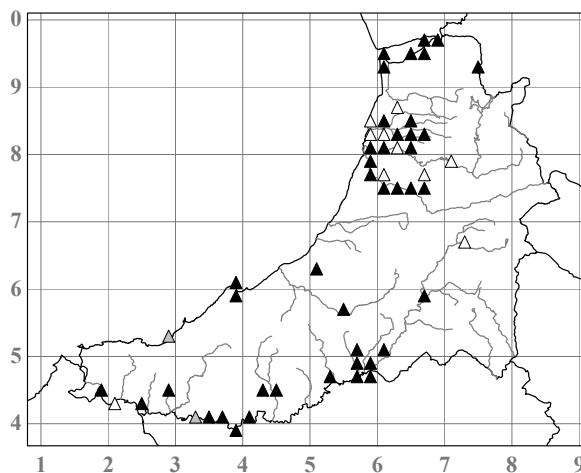
An uncommon, partly fertile hybrid, usually found in the absence of the parents. It was first seen on ballast by Aberystwyth station SN588811 in 1990 (NMW), with both parents. The other records are: one plant on a disturbed roadside bank, Blaenplwyf SN577756, 1991, neither parent seen; several plants in Llanafan churchyard SN684720, 1993, neither parent seen; one plant in a colony of *L. repens* on the disused railway embankment by the Teifi bridge, Lampeter SN581476, *L. purpurea* not seen; and one plant on a lane verge in Llanrhystud SN539693, 1995, neither parent seen.



*Linaria purpurea*

***Linaria repens* (L.) Mill. - Pale Toadflax - Llin-y-llyffant Gwelw**

A locally frequent archaeophyte, usually forming conspicuous colonies on roadside hedgebanks, railway ballast and verges, river banks, on both coastal and river shingle and in graveyards. It was first recorded by Lees (1841) "On the slate rocks of Constitution-hill [c.SN583827], very luxuriant and beautiful", but has not been recorded from there since. From Salter's Diary it is clear that it was well-established along the railways by the 1890s. On roadside banks it is especially frequent inland and to the NE of Aberystwyth. White-flowered plants, with a yellow boss on the lower lip, seen on the railway at Ynys-las SN619931, 1993, may have been part of a hybrid swarm of *L. ×sepium*. In 2008 it was found among *Ammophila* by a boardwalk on the Ynys-las dunes SN606942 (SPC). Altitude limit 415m, a colony 10m across on the FC road verge 500m NW of Llyn Plas-y-mynydd SN740925, 2001 (NMW).



***Linaria triornithophora* (L.) Willd.**

One plant of this decorative species with very large, reddish-purple flowers, native of Spain and Portugal, was found in 1993 on the covered part of the Pendinas rubbish-tip, Aberystwyth SN584799 (NMW).

***Linaria aeruginea* (Gouan) Cav.**

Recorded, as *L. reticulata*, from Aberystwyth c.SN58 in 1920, presumably as a casual (D. A. Jones, *BEC Rep.* 6: 33-34 (1921)). Native of SW Europe.

***Linaria pelisseriana* (L.) Mill. - Jersey Toadflax - Llin-y-llyffant Ffrengig**

Salter (Diary 29.9.1902, 19.6.1903, 1935) reported the find in 1902 of about a dozen flowering plants of this species in a field "on the far side of Pendinas" c.SN5880 (DT), and that the finder "forwarded specimens to Linnaean Socy. and identification was confirmed." There was also a record from the same place "Between Pendinas and the river Istwith, south of Aberystwyth, Cardigan, Jones" (*BEC Rep.* 6: 138 (1921)); this is D. A. Jones too (see *L. aeruginea*), but whether it represents a 1920 record from the site, or just a report of

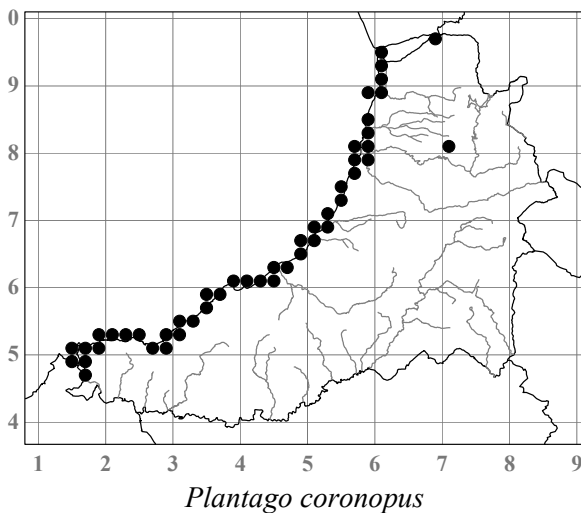


Salter's earlier one, is uncertain. It seems unlikely that Salter would have missed the plant if it had been there for 20 years, and two introductions of such an unusual alien in the same place seem unlikely.

## PLANTAGINACEAE

### ***Plantago coronopus* L. - Buck's-horn Plantain - Llyriad Corn Carw**

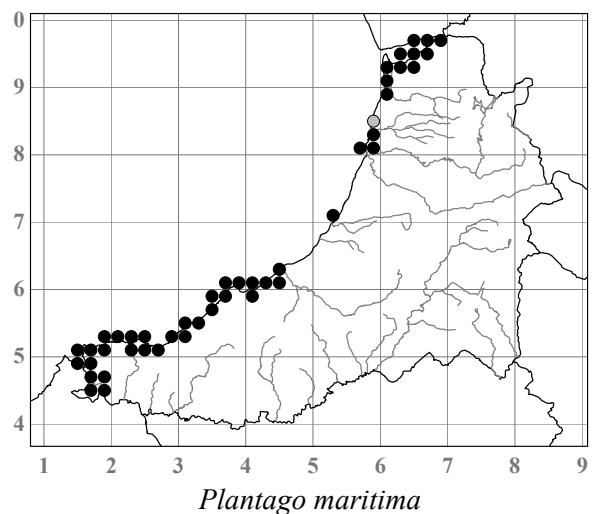
Common along the coast in dune slacks, the upper parts of salt marshes, on sandy shingle and pastures, on thin soil on the clifftops, on rocks, on tracksides and on waste ground, always within the immediate influence of the sea and usually in open habitats. There is immense variation in leaf shape and habit, well seen for example in the extensive population alongside the rough road on Tan-y-bwlch beach SN580803, 1950-2008. It is surprisingly absent from the sandy habitats around the Penparc sand quarries, and the only inland record is from by a grit and salt bin in a lay-by on the A44(T) at Nantyrarian SN712810, 2000 (SPC) at 300m altitude.



Teratological *Plantago coronopus*, sea cliffs at Penbryn SN290523 (RGW), July 2008 (photo Sarah Stille)

### ***Plantago maritima* L. - Sea Plantain - Llyriad Arfor**

Abundant in all the salt marshes along the coast, sometimes extending up into brackish marsh well away from the sea, for example on Morfa Borth SN613910, 1991. It also occurs in many places on rock ledges in the spray zone on the sea cliffs, and abundantly in maritime turf on the coastal slopes, for example at Cwm Cilfforch SN439616, 1985 (JRA & CDP) - 2004, at the mouth of the Afon Drywi SN425606, 1985 (JRA & CDP) - 2004, and at Cwm Tudu SN356577-354575, 1994-2003. Littleton Brown (Druce & Vines 1907) wrote in 1726 "On ye shoar facing Cardigan Island [SN1651] I think there grow 2 sorts of *Plantago marina*", but it is not clear what these could have been. Lees (1841) recorded "a curious proliferating variety" in the vicinity of Aberystwyth. Plants on ledges on the sea cliffs at Castell Bach SN359580, 2002, have consistently large leaves *c.*10mm wide, most other populations in the county having them considerably narrower.



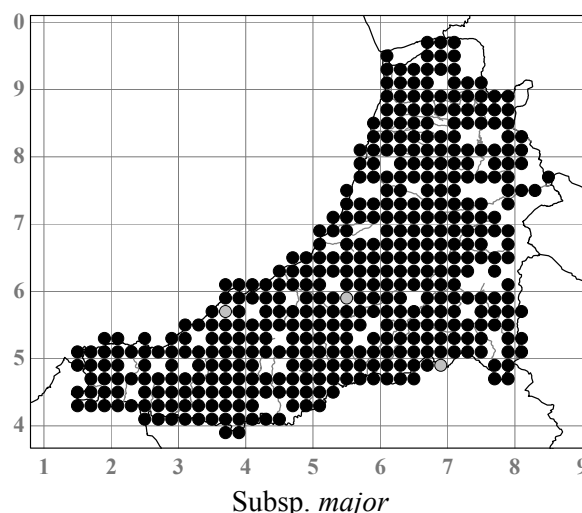
**Plantago major** L. - Greater Plantain - Llydan y Ffordd (Cwt Llygoden)

**Subsp. major**

Very common in poached pastures, lawns, tracksides, road verges, waste ground, trampled places of all sorts and often where water has lain in winter. Prostrate forms are much commoner than ones with erect leaves, and there is great variation in leaf shape. A very large, fleshy form occurs in the salt marsh and creek-sides by Rosehill Marsh in the Teifi estuary SN189454, 1994-2005. Altitude limit 560m, verge of rough road, Rhos y Garn, Cwmystwyth SN797766, 2002.

**Subsp. intermedia** (Gilib.) Lange

Apparently rare and recorded only six times. A few plants at the edge of a Potato field N of Ty-gwyn, Mwnt SN197521, in 1987 (AOC, JRA & CDP), and a few around a pond in a fallow arable field at Penralltisaf, Llechryd SN217445, in 1993 (AOC & LRG), were var. **scopulorum** Fr. & Broberg (var. *intermedia* (Gilib.) Lange). In 2004 it was frequent on bare mud in the draw-down zone of the Camddwr branch of Llyn Brianne reservoir at Noddfa SN79255243, where the plants were var. **sinuata** (Lam.) Decne. Plants on waste ground around Aberystwyth harbour SN581813 in 2007 (NMW, AOC & PAS) remained wintergreen and were var. **salina** Wirtg. It was also on a reconstructed roadside bank by the Lovesgrove T junction SN636810 in 1992 (SPC), and on rubble at the Glanyrafon Industrial Estate SN608802 in 1993 (SPC), but the variety was unidentified.

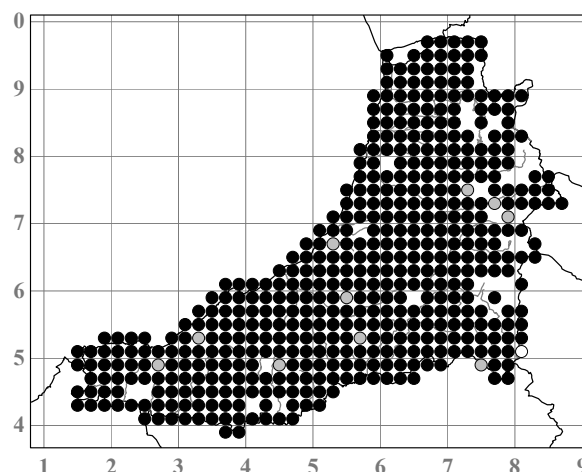


**Plantago media** L. - Hoary Plantain - Llyriad Llwyd

Since 1936 recorded reliably from only one site, on the W side of the chapel in the always well-mown Bethany chapel graveyard at Ciliau Aeron SN498585, where several hundred plants were seen in 1988 and 285 in 2005; the first chapel was built in this enclosure in 1755, and the present one in 1899. It is possible that it is a native relict here although it is normally characteristic of calcareous grasslands; on the limestone in NE Wales where it is clearly native it can be commoner in chapel grasslands than outside (SPC pers. comm.). Morgan (1848) recorded it from "Sands going to Aberdovey", i.e. the Ynys-las dunes SN69B, C, and Purchas (1948) listed it, perhaps more reliably, from "the immediate neighbourhood of Aberystwith." Salter (1935) said that it had been seen once at Clarach SN5883-5884 (JLW) but that he had not seen it himself. It was recorded from Tresaith c.SN2751 in 1936 (WWB, Wade 1952). In 1974 it was found on a rubbish-tip at Glanyrafon, Llanbadarn Fawr SN68A (RGE), probably derived from a garden throw-out. The surprising number of unlocalised records from the 1950s on field cards at BRC from SN24, 56, 65, 69, 77 and 79, must be considered unreliable.

**Plantago lanceolata** L. - Ribwort Plantain - Llyriad yr Ais (Llwynhidydd, Ceiliog ar Iâr, Dail Ceiliogod, Pennau Ceiliogod, Dail y Cryman)

Very common in grazed and mown grasslands of all sorts, on banks, pathsides and waste ground, but largely absent from wetter sites in the lowlands and from the more acidic grasslands in the uplands. It is salt-tolerant and occurs in the upper parts of salt marshes and at the top of shingle beaches. Davies (1815) mentions it as being sown with Rye-grass and Clover as a four or five year ley in the Cardigan area. There is great variation, and although it is difficult to tell what is phenotypic and what genetic, the following varieties seem fairly distinctive. Altitude limit 425m, Llyn Gynon c.SN7964, Salter (1935); 560m (var. *pusilla*), flushed slope at head of the Nant y Moch, Pumlumon SN784862, 2002 (AOC & PAS).



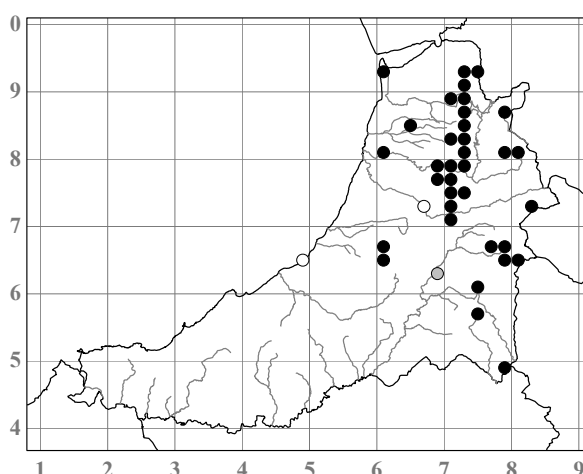
Var. **pusilla** Baumg. (var. *sphaerostachya* Mert. & Koch), small plants with narrow leaves and globose inflorescences, occurs in many of the upland flushes, for example by the Nant y Llyn, Pumlumon SN78498879, 2001, and in Cwm Doethie SN761532, 2002, and is usually the only variety found there, but it also occurs in the lowlands in a wide range of grazed grasslands from damp rhos pastures to dry sandy fields. Var. **bakeri** C. E. Salmon, large plants with broad leaves and long inflorescences, is in hay meadows, in gardens, for example on Waun Fawr, Aberystwyth SN60058210, 2007 (NMW), and on waste ground, and apparently identical plants occur in the salt marshes, for example in the Gap in Aberystwyth harbour SN581813, 2004 (NMW). Var. **latifolia** Wimm. & Grab., medium-sized plants with ovate to elliptical leaves and ovoid inflorescences, is common in damp pastures and especially in lawns; distinctive very broad-leaved plants with conspicuously hairy leaves (looking remarkably like *P. media*) in clifftop grassland below the Cliff Hotel, Gwbert SN159501, 2004 (NMW) and in the sand quarry at Penparc SN20254860, 2007 (NMW), may also be this. Var. **lanceolata** is in most habitats except the upland flushes.

**Plantago arenaria** Waldst. & Kit. (*P. psyllium* L., nom. ambig., *P. ramosa* Asch.) - Branched Plantain - Llyriad Canghennog

Recorded only as a casual at the Aberystwyth rubbish-tip SN591811 by Salter in 1933 and 1934 (1935, NMW). The Welsh name Llysiau Silin connects this plant with St Silin (*Geiriadur Prifysgol Cymru* 2: 2280 (1987), Davies & Jones 1995, etc.) who is associated with Capel Sain Silin SN516509; but this name was probably a borrowing of either St Julien of Le Mans or St Giles of Saint-Gilles in Provence (Ó Riain 1994) and is unlikely to have any relevance to the county. Breverton (2000) erroneously said that the plant was named after Sulien of Llanbadarn Fawr, 1011-1091, who was twice Bishop of St Davids. The plant is native of Europe, Asia and N Africa.

**Littorella uniflora** (L.) Asch. - Shoreweed - Beistonnell Ferllyn

Abundant in many of the lakes and reservoirs, both oligotrophic and mesotrophic, often dominant around the margins and flowering where exposed on the shore when water levels are low. Most often on firm, gravelly or stony substrates, although it is sometimes also on mud and peat. It is generally a good colonist, and has appeared in several recent reservoirs and in pools on quarry floors. Although chiefly in the uplands, many small colonies appeared on the bed of the Cwm Rheidol Reservoir SN695795 at 50m altitude when it was drained in 1991, and a colony 1 × 0.4m was found in a backwater of the Rheidol SN61898094 further downstream at 10m altitude in 2001. It has also occurred in the main dune slack at Ynys-las SN608938, 1973-1998, where it had probably arrived since Salter's time as he does not mention it there. Its other sites have all been at over 100m altitude. Willis & Burkill (1895) gave information on its flowering and pollination in the Pumlumon uplands. Altitude limit 530m, W-most lake, Llynnoedd Ieuan SN795815, 1993.



Red (longer exposed) and green zones of *Littorella* by the reservoir SE of Llantrisant church, view ENE from SN72857473, August 2005

## HIPPURIDACEAE

**Hippuris vulgaris** L. - Mare's-tail - Rhawn y Gaseg

Salter (Diary 28.9.1929) visited Cors Caron to follow up a record by the unreliable J. A. Webb and wrote "I was quite unable to find *Hippuris* ... reported by Mr Webb", and excluded it from his Flora (1935). In 1948 it



was abundant in a small concrete reservoir by the Ystwyth at Rhydyfelin SN59107916, where it had originally been planted by J. G. Galloway to provide specimens for her Botanical Supply Agency, but it disappeared in the 1950s.

## CALLITRICHACEAE

### *Callitriche* L.

Much work in the county on this genus was done by H. Jones (1952, 1955a, b, c, d), by J. P. Savidge, and more recently by R. V. Lansdown on visits to many different areas. Among much else, Jones's work (1955b) involved translocation experiments of plants of *C. stagnalis*, *C. obtusangula* and *C. hamulata* var. *hamulata* from a ditch in the Tan-y-bwlch fields SN580797 to the Afon Rheidol c. SN619808.

[*Callitriche hermaphroditica* L. - Annual Water-starwort - Brigwlydd Cynhaeaf

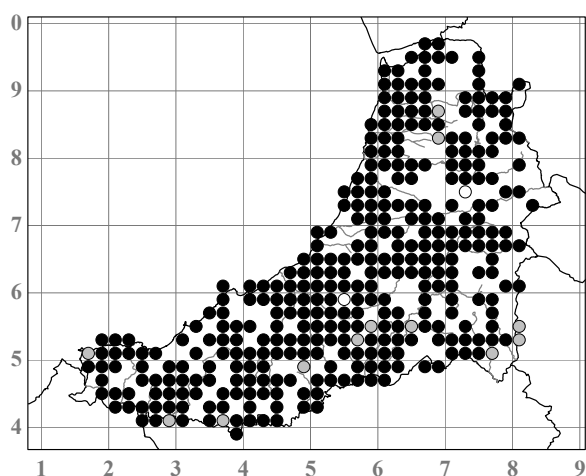
Recorded as *C. autumnalis*, presumably in error, from "Borth Marsh" by Lees (1841).]

### *Callitriche stagnalis* Scop. - Common Water-starwort - Brigwlydd Cyffredin

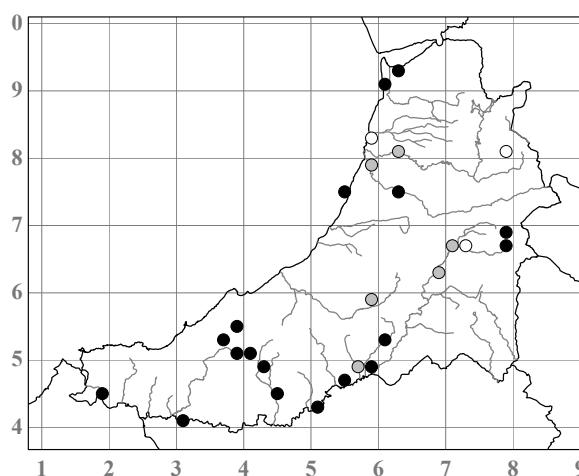
Very common in both still and flowing water bodies and in marshes and muddy places of all sorts, much more catholic in its habitats than any of the other species, and much more tolerant of shade. It is sometimes even found, growing as an annual, on clay soils in poached pastures where there is no surface water, and is frequent in ruts and other seasonally wet hollows on tracks (even in deep shade in conifer plantations). It is salt tolerant, occurring in brackish ditches and marshes on the coast, including tidal mud from the A487(T) bridge to Rosehill Marsh in the Teifi estuary SN182460-189453, 2005-2008 (NMW), and extends well into the uplands. The neotype (Lansdown 2006) is from the Aberleri Fields SN61209160, 1998 (NMW, AOC). Altitude limit 510m, outflow of Llyn Llygad Rheidol SN791878, 2002.



*Callitriche stagnalis* (pale green) and *Ulva* sp. (dark green) in the Teifi estuary at Rosehill Marsh, view N from SN18984535, July 2005



*Callitriche stagnalis*



*Callitriche platycarpa*

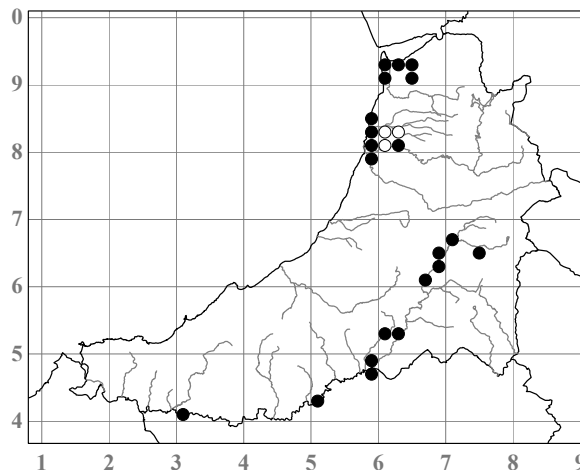
### *Callitriche platycarpa* Kütz. - Various-leaved Water-starwort - Brigwlydd y Gwanwyn

Problems of identification in the past make it difficult to assess the distribution of this species, and some of the early records have been discounted or queried by RVL. Records confirmed by him are from the Aberleri

Fields SN612916, 1998 (NMW, AOC & RVL), where it occurs in many places in ditches and scrapes and is sometimes dominant on wet, peaty mud; and from the Teifi S of Highmead SN500424 and E of Abergrannell SN550460, both 1997 (RVL, TP & AOC). Records by others suggest that it occurs in water bodies of all sorts and extends into the uplands, showing a preference for muddy ponds and ditches. Altitude limit 435m, Llyn Hir SN790679, 1993 (AOC & CDP).

***Callitriche obtusangula* Le Gall - Blunt-fruited Water-starwort - Brigwlydd Ffrwythau Blaendwn**

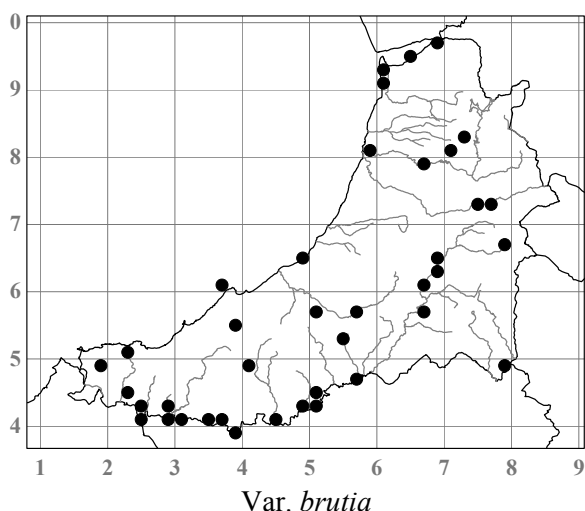
Occasional in ponds, ditches, streams and rivers in the lowlands from the Dyfi area to Aberystwyth, and along the Teifi valley. It occurs in such varied water bodies as somewhat shaded ox-bows of the Rheidol at Lovesgrove SN630810, slightly brackish coastal ditches as at Tan-y-bwlch SN581796, 1956-2003, the fast-flowing rather mesotrophic Afon Dulas at Lampeter SN580482, 1991-2005, and in peaty scrapes on the Aberleri Fields SN612916, 1998 (RVL & AOC). Unusually for this normally lowland species, it extends up the Teifi to Cors Caron, at 160m altitude, where it is common in ditches and streams as well as in the river, and occurs on up the Teifi to Strata Florida SN745658, 1979 (JPS) where it reaches its altitude limit of 190m.



***Callitriche brutia* Petagna**

**Var. *brutia* - Pedunculate Water-starwort - Brigwlydd Coesog**

Plants with the stalked fruits and characteristic leaf shape and habit of this probably much less common of the two varieties have been recorded from the muddy margins of many pools, lakes and rivers, but absence of fruits makes the identification of many populations of this species uncertain. The first record was from Llyn Teifi SN7867 by Burkill & Willis (1894), as *C. intermedia* var. *pedunculata*, and it still occurs there as well as around Llyn Egnant SN790672, 1994-2003 (AOC, RAJ & JPW). It is especially common along the Teifi and in the Dyfi area. On bare peaty substrate on the Aberleri Fields SN610912 in 1994 it formed circular colonies up to 1.5m in diameter dying away in the middle by late summer so that they consisted of circular bands c.30cm wide, while similar colonies of *C. stagnalis* remained solid and green throughout. Material from nearby was confirmed by RVL in 1998. Altitude limit 425m, Llyn Egnant SN790672, 1994 (AOC & RAJ).

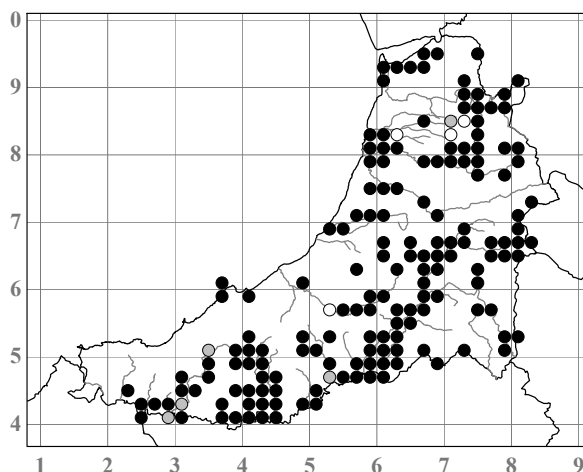


*Callitriche brutia* var. *brutia* (hollow rings) and *C. stagnalis* (solid patches beyond), Aberleri Fields, view NNE from SN610912, September 1994

**Var. *hamulata* (Kütz. ex W. D. J. Koch) Lansdown (*C. hamulata* Kütz. ex W. D. J. Koch, *C. intermedia* Hoffm.) - Intermediate Water-starwort - Brigwlydd Canolig**

Very common in rivers, streams, lakes and ponds of all sorts, but usually most abundant in the more oligotrophic waters, and forming large swathes occupying much of the river channel especially in parts of the Rheidol and Teifi. Its distribution, ecology and variation in the Rheidol, including translocation experiments, and its gradual recovery from the effects of heavy metal pollution, were described by Jones (1955a, b,





1956). In common with other aquatics, its recovery from the pollution in the Ystwyth has been much slower and it remains scarce there. Altitude limit 435m, Llyn Gwngu SN839729, 1925 (NMW, Salter, det. JPS, conf. RVL); 530m, Llynnoedd Ieuan W lake SN795815, 1997 (AOC & ACJ).



*Callitriche brutia* var. *hamulata* in the Afon Rheidol above the Rheidol Falls, view N from SN712785, August 2004

### SCROPHULARIACEAE

[*Verbascum blattaria* L. - Moth Mullein - Pannog y Gwyfyn

Salter was growing this alien from Europe in his garden in Caradog Road, Aberystwyth and later at Fairview in 1906-1925 (Diary 7.7.1906, det. WHP, NMW), but there is no evidence of it in the wild in the county and the record in Ellis (1983a) perhaps refers to this garden plant.]

***Verbascum virgatum* Stokes** - Twiggy Mullein - Pannog Fain

Probably only an alien in Britain but native elsewhere in W Europe, and recorded from only five sites in the county. Salter saw "about two plants, by the beehives opposite the gate-keeper's lodge" at Nanteos SN612786 in 1898 (Diary 5.10.1898); had it been planted, like the *V. phlomoides* at Capel Bangor, for the bees? He saw it on a wall by the Nanteos gardens in 1923 (Diary 17.4.1923), and it was seen in abundance on the wall of the walled garden there SN622787 in 1981 (NMW) and 1999. The only other records are of it on a tip at Penyrangor, Aberystwyth SN581808 in 1962; of one plant on a disturbed part of the scrub slope above the church hall at Llanbadarn Fawr SN598810 in 1996 (AOC & JPW), perhaps originating from Salter's garden adjacent; and of 13 flowering and 12 non-flowering plants on short-lived waste ground where the Cambrian Printers works had been demolished in Grays Inn Road, Aberystwyth SN584815 in 1998 (SPC).

***Verbascum phlomoides* L.** - Orange Mullein - Pannog Oren

Native of Europe but only naturalised and casual in Britain. There have been two long-established populations in the county. A colony of Mulleins on the disused railway at Felin y Mor, Aberystwyth SN581804, known there for many years and erroneously identified as *V. ×thapsi*, was redetermined in 1990 as *V. phlomoides* (K, BM, NMW, det. IKF); there had been a population explosion in 1977 when c.800 plants were in flower, far fewer having been seen in previous years, but with overgrowth of the railway by scrub the colony persists now only on the slope between it and the river below, and has decreased greatly, with c.80 flowering plants in 1986, 12 in 1987, 11 in 1990, 31 in 1997, 3 in 2004, 16 in 2005



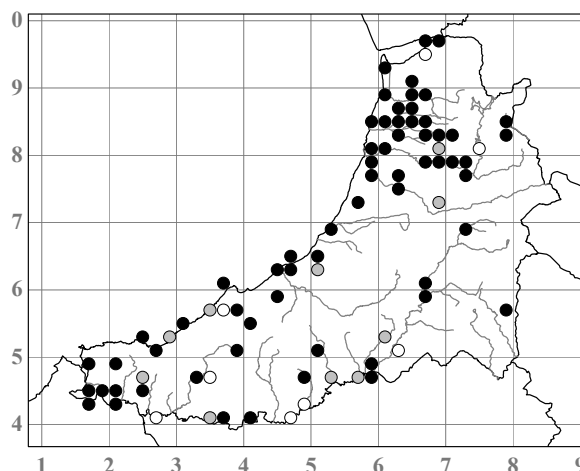
*Verbascum phlomoides*, Capel Bangor, SN661801, July 1995



(AOC & SDSB), 23 in 2006 and 11 in 2008. In 1992 three plants were seen in a chicken yard at the rear of 1 Melindwr Terrace, Capel Bangor SN66108016 (NMW), the owner having known it there since c.1940 and having been told that it was originally introduced pre-1914 by his grandfather for his bees as it was supposed to make the honey yellow; there were two plants there in 1995, and one in 2004. In 1937 Salter collected a specimen from Aberystwyth (NMW), status unmentioned; in 1990 there were several plants on waste ground S of the railway at Pendre, Llanbadarn Fawr SN605804 (NMW); and in 2004 there was one plant on waste ground by Ynys Edwin, Eglwys-fach SN67839624 (NMW).

***Verbascum thapsus* L.** - Great Mullein - Pannog Felen (Dail Melfed, Cynffon y Gath, Tapr Mair)

Occasional throughout the lowlands on waste ground, rubble tips, mine spoil, road verges, wall-tops, railway ballast and disturbed ground, persistent in many places but often only casual as Salter (1935) remarked. Its distribution has probably not changed much since his day, and it is never in anything like a natural habitat. Altitude limit 480m, waste ground at the Nant-nod lead mine, Pumlumon SN79188390, 2003.



*Verbascum thapsus*

***Verbascum nigrum* L.** - Dark Mullein - Pannog Dywyll

Native in England and S Wales, but a rare casual in the county. Salter recorded one plant on a rubbish heap in the Llanbadarn Fawr area c.SN58V or 68A in 1900 (Diary 29.9.1900, 1935). There is a 1950s field record at BRC from SN79. Eight plants were in an abandoned pasture by Ash Grange, Comins Coch SN611825 in 1986 (APF, conf. AOC); these had pale cream flowers with a purple spot in the centre.

***Verbascum speciosum* Schrad.** - Hungarian Mullein - Pannog Hwngaria

Several rosettes of this spectacular native of SE Europe were seen on a footpath verge 350m SW of Grogal, New Quay SN37355928 in 1999, perhaps deliberately sown as several other aliens were also at this quite remote site. Four plants flowered there in 1999 (NMW), two in 2000 (AOC & JPW), and two in 2001.

***Verbascum pulverulentum* Vill.** - Hoary Mullein - Pannog Lwyd

Native in East Anglia and a rare introduction elsewhere in Britain. In 1981 c.30 plants were found on waste ground on the S side of Priory Street, Cardigan SN178461 (MPa) that had been used until two years earlier by the Teifi Agricultural Cooperative Society for storing new and used farm implements, some of which had come from East Anglia. The colony persisted, and later counts were of 26 plants in 1982, one in 1993 and five in 1998 (NMW).

***Verbascum lychnitis* L. var. *album* (Mill.) Druce** - White Mullein - Pannog Wen

Native in S England and known from only two sites in the county. It was a persistent garden weed at Winllan, Talsarn SN567576 in 1982-1992 (IWC), where it had not been deliberately introduced. Two



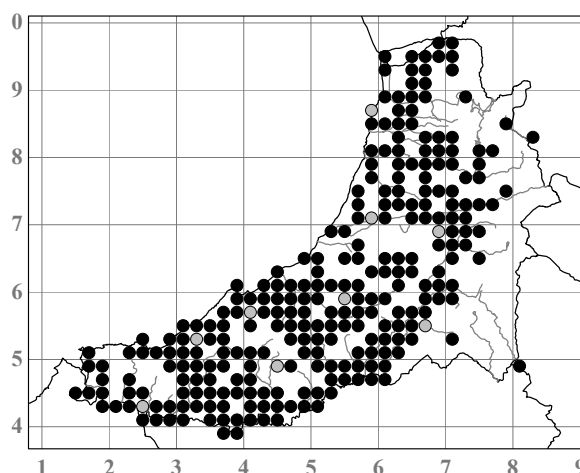
*Verbascum pulverulentum*, Priory Road, Cardigan, view N from SN178461, June 1982

plants were on the site of the Teifi Agricultural Cooperative Society, Priory Street, Cardigan SN178461 in 1982 (MPa) where *V. pulverulentum* also occurred.

**Scrophularia nodosa** L. - Common Figwort - Gwrnerth (Dail Duon Da)

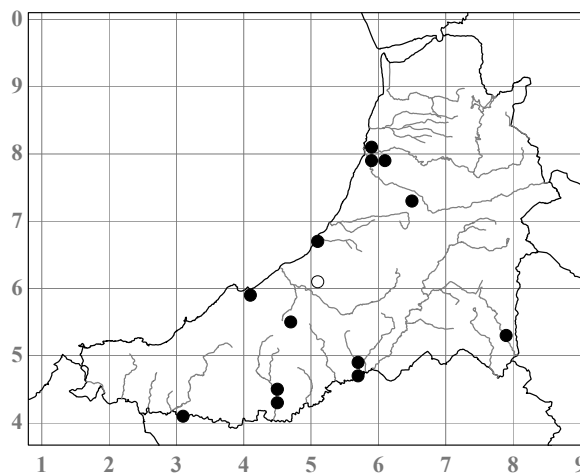
Var. **nodosa** is frequent in hedgebanks, woodland, scrub, on streamsides, road verges, sand dunes and waste ground, usually in slightly damp and shaded sites, but becoming rare in the uplands. Plants are usually solitary or a very few together, and it is never abundant at any of its sites; it must in fact, along with *Hypericum androsaemum*, be one of the least numerous of all the widespread species in the county. Altitude limit 415m, waste ground, Eisteddfa Gurig SN798840, 2007 (AOC & CRB).

Var. **pallescens** Döll (var. *bobartii* Pryor), with yellowish-green flowers, was seen by the Afon Ystwyth at Llanfarian SN588777, 1994 (SPC).



**Scrophularia auriculata** L. (*S. aquatica* auct., non L.) - Water Figwort - Gwrnerth y Dŵr

An uncommon plant of streamsides and riverbanks, slumping clay slopes on the coast, and as a casual on waste ground and roadsides where it is clearly increasing. Salter recorded it by the Nant Paith near Rhydyfelin SN5979 in 1906 (Diary 7.9.1906), and it has since been seen on this stream from Nanteos SN615783, 1987 (APF) downwards, and by the Ystwyth from Pont Tanycastell SN589788 down to SN581799, 1991. It is in rank marshy vegetation by the Afon Rheidol 150m N of Pont St Brieuc, SN589810, 2000; by the Afon Cledan at Llan-non 50m up from the sea SN506667, 2000; by the Teifi 200m E of Newcastle Emlyn castle SN314407, 1998; by the Afon Geyron 400m ESE of Alltrodyn SN45344409, 2004 (AOC, BH & GH) and nearby by the Afon Clettwr SN4443, 2004 (DB). It is abundant in scrub on the slumping clay at Cei Bach c. SN412598, 1894 (Salter Diary 26.6.1894) - 2008 (SPC). At its other sites, such as the refuse tip below Pendinas, Aberystwyth SN584798, 1991-1994 (AOC; SPC), a roadside quarry E of Mydroilyn SN46945554, 2008, the old woodyard site at Lampeter SN579488, 1995, as well as on waste ground by Teifi Terrace SN577478, 2003, and on the track by the sluice on the Camddwr 400m ESE of Soar y Mynydd SN788530 at 295m altitude, 2003, it has obviously been just a casual.



**Scrophularia scorodonia** L. - Balm-leaved Figwort - Gwrnerth Dail Gwenyn

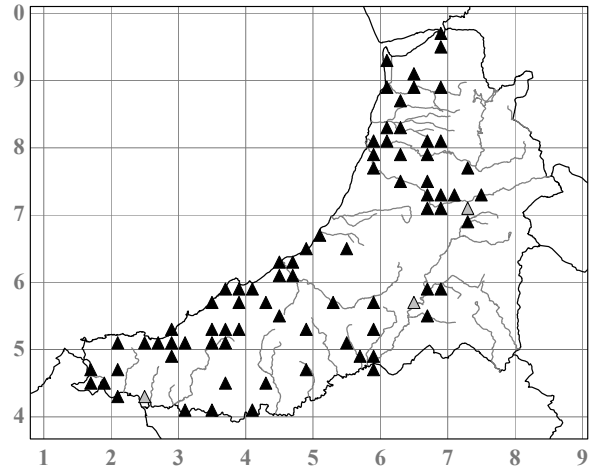
Abundantly naturalised on laneside banks and verges and in scrub around Salter's garden, Fairview, Llanbadarn Fawr SN598810, 1963 (NMW, RGE; VGE) - 2007, clearly originating from the garden where Salter grew it, 1931 (NMW). One or two plants were seen in 1963 (RGE), six clumps in 1978, c.40 in 1980, c.150 in 1994, and at least 200 in 2005.

**Scrophularia vernalis** L. - Yellow Figwort - Gwrnerth Melyn

Naturalised in scrub below Salter's garden, Fairview, Llanbadarn Fawr SN598810, 1977 (NMW, RGE) - 1997 (SPC) when five clumps were present, but it has now gone. It clearly originated from the garden where Salter grew it, 1929 (NMW).

**Buddleja davidii** Franch. - Butterfly-bush - Y Gynffon Las (Cwt yr Oen)

It is impossible to be certain when this species began its spread, as in the past it was usually not thought worth recording, but it must have been well before 1979 as in that year it was first noted as abundantly naturalised by the railway at Glandyfi SN692967 and as well-established in roadside hedges near Plwmp SN373527 (DWB had reported one “not obviously planted” bush here in 1963). It is now abundantly established, especially on walls, waste ground, railway ballast and scrub in all the main towns and villages, as well as on several lead mines, scrub slopes on the coast and on river banks. One of its more striking colonisations, perhaps indicative of future problems, was in 2005 when on the SW slope of Pendinas, Aberystwyth SN595799 a hundred or more bushes had recently appeared in dense Gorse over an area of *c.*1ha. Several colour forms occur, for example at the Grogwynion lead mine SN715721, 2008 (SPC) where they perhaps correspond to ‘**Black Knight**’ and ‘**White Cloud**’. Native of China, introduced to Britain in the late 19<sup>th</sup> century.

**Buddleja globosa** Hope - Orange-ball-tree - Coeden-fêl Peli Oren

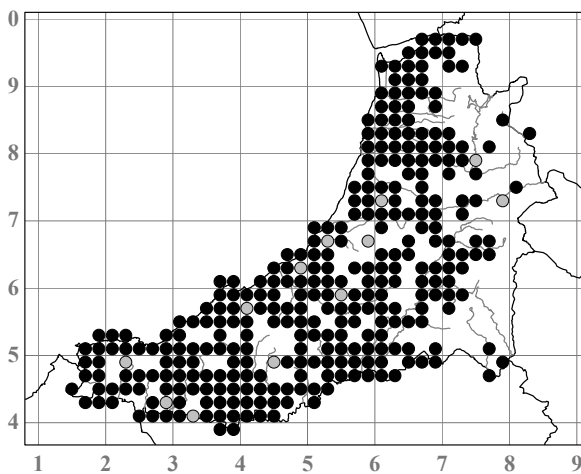
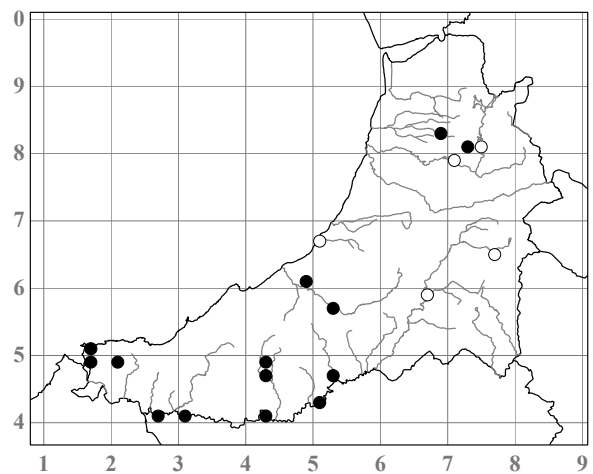
The only record is of an old self-sown bush in woodland at Llanina SN404598, 1987 (erroneously given as SN35 in Preston *et al.* 2000). Native of Chile and Peru, introduced to Britain in 1774.

**LAMIACEAE****Stachys byzantina** W. Koch - Lamb's-ear - Clust yr Oen (Tafod yr Oen, Clust y Gath)

A rarely naturalised ornamental, native of SW Asia; there is a colony 4 × 2m in a small pasture just SSW of Wallog SN59018566, 2000-2005, and a clump was recorded on the old allotments site by Park Avenue, Aberystwyth SN589810 in 1993 (SPC).

**Stachys sylvatica** L. - Hedge Woundwort - Briwllys y Gwrych

A common plant of hedgebanks, roadside verges, streamsides, waste ground, open woodland and scrub, chiefly in somewhat fertile and often disturbed sites and often forming dense stands. It is rare and even more confined to disturbed ground in the uplands. Altitude limit 430m, trackside 400m W of Eisteddfa Gurig SN793840, 2007 (AOC & CRB).

*Stachys sylvatica**Stachys xambigua***Stachys xambigua** Sm. (*S. palustris* × *sylvatica*) - Hybrid Woundwort - Briwllys Croesryw

An uncommon plant of arable fields, marshes, streamsides and waste ground, recorded by Salter (1935, Wade 1952) from five sites, and since then from about 15 more.



***Stachys palustris* L.** - Marsh Woundwort - Briwlys y Gors

A frequent plant of marshes, damp pastures, ditches, riverbanks, streamsides especially where the streams run out onto shingle by the sea, wet woodland, and as a weed of arable fields where it is at least as common as *S. ×ambigua*. Altitude limit 305m, Hirnant SN7583 (Salter 1935); 325m, marshy road verge 3km NE of Llanfair Clydogau SN653532, 2008.

***Stachys annua* (L.) L.** - Annual Yellow-woundwort - Briwlys Unflwydd

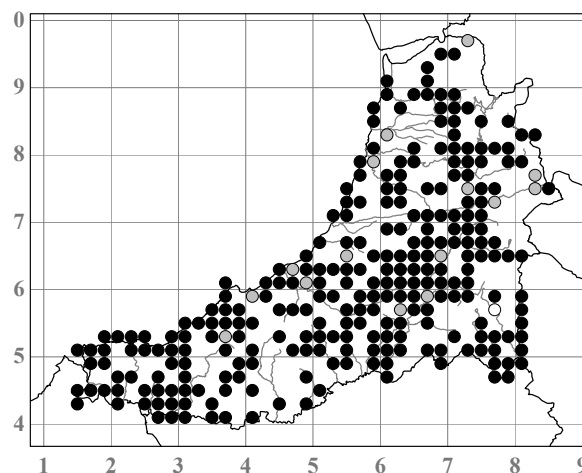
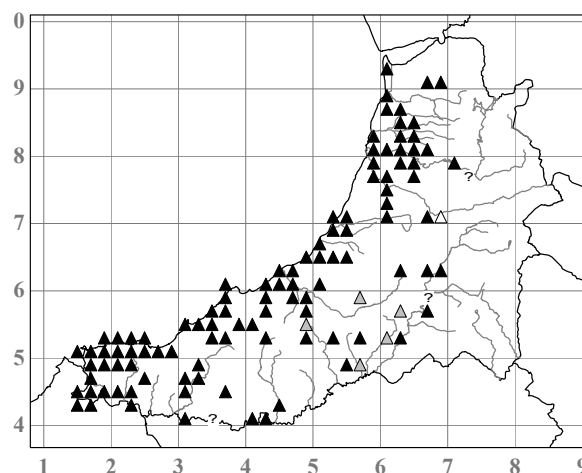
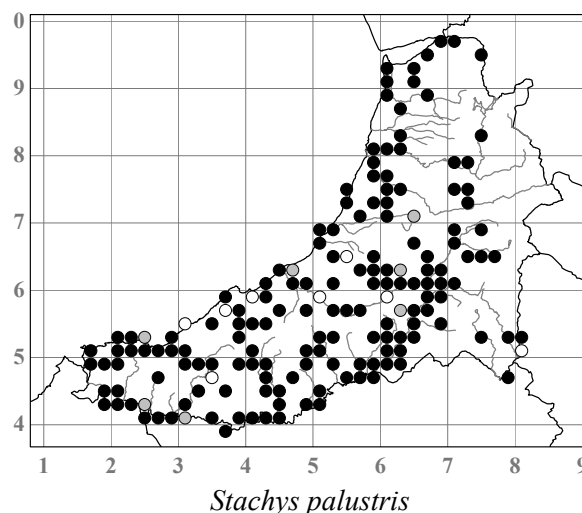
Recorded only once, a single plant on waste ground used as a car park, Park Avenue, Aberystwyth SN587812 in 1994 (JPL, conf. AOC). Native of Eurasia.

***Stachys arvensis* (L.) L.** - Field Woundwort - Briwlys y Tir Âr

Although no longer “perhaps, the most abundant of all weeds of cultivated and arable land, especially corn-fields” as Salter (1935) described it, *S. arvensis* is still a frequent weed of arable crops of all sorts, and even seems to have increased over the last 20 years or so in line with a national trend (Braithwaite *et al.* 2006). Having a good seed bank, this archaeophyte often appears where the soil of former arable fields has been broken into by road-widening, house-building or other forms of disturbance. It is also often seen on tips, in gardens, and occasionally as a weed in silage fields. Generally confined to the lowlands, it has not been seen higher than 230m, in a mixed Oats and Barley crop near Wernfelig, Temple Bar SN539529, 1996.

***Betonica officinalis* L. (*Stachys officinalis* (L.) Trevis., *Stachys betonica* Benth.)** - Betony - Cribau San Ffraid

A frequent plant of well-drained, neutral or slightly acidic unimproved pastures, heathy slopes especially along the coast, banks, graveyards, rock ledges, wood margins and open woodland. It is a great adornment of the roadside banks in late summer. Allen & Hatfield (2004) refer to a snuff of Betony leaves and Primrose roots as a cure for migraine, extracted c.1800 from a Cardiganshire household recipe book. White-flowered plants are commonest on the coastal slopes, but sometimes occur inland, and pink-flowered ones are similarly distributed but less often seen. Var. **nana** Druce ex Davey occurs on the heathy slopes above the sea E of Mwnt SN197521, 1987 (JRA, CDP & AOC) - 2005, where it too is occasionally white-flowered. Var. **hirta** Leyss., recorded from Aberystwyth c.SN58V, 1931, and elsewhere (Salter 1935, Wade 1952), is probably of no taxonomic significance. Altitude limit 380m, Garreg Lwyd, Cwm Mwyro SN785647 and Ffrwd-ar-gamddwr SN762576 (Salter 1935); 480m, waterfalls at the head of the Nant Merin SN797807, 1988.



**Ballota nigra** L. subsp. **meridionalis** (Bég.) Bég. - Black Horehound - Marddanhadlen Ddu

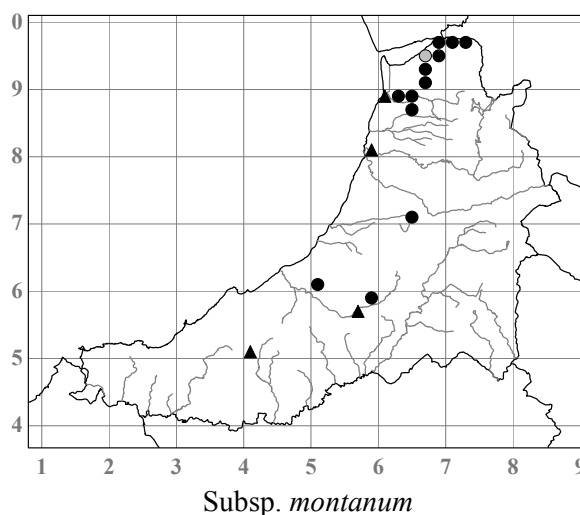
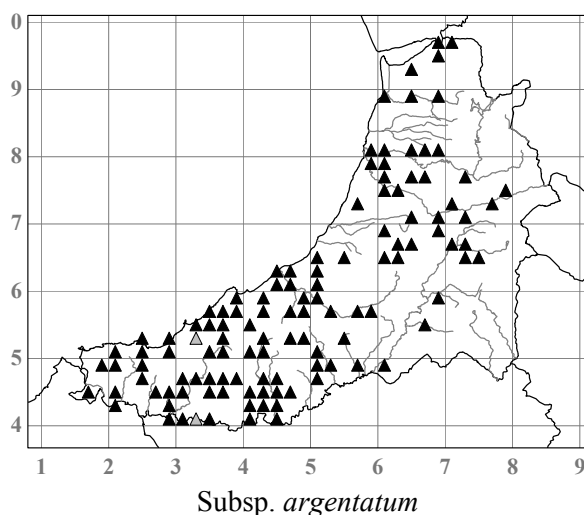
An archaeophyte known at Borth from 1907, when Salter (Diary 3.10.1907) recorded “by the railway bridge .... a good deal of it” SN614887, until 1935 (Diary 8.3.1935), when he saw it only nearer the coast c.SN608888 where he had first seen it in 1924 (Diary 9.12.1924). The first record is an unlocalised one by Purchas (1848). Morgan (1849) gave it for Dyffryn Paith c.SN6078. Otherwise there is only an undated probably 1930s record for Tresaith c.SN2751 (WWB, Wade 1952), a Salter record for Ffrwdwenith-uchaf SN233514 in 1936 (Wade 1952), a 1950s field record for SN56 at BRC, and a 1959 specimen from undrained permanent pasture at Mydroilyn c.SN45M (ABS, MED). The only recent record is of several plants in rank vegetation on a trackside near Ysgol Penweddig, Llanbadarn Fawr SN59598101 in 2004.

**Leonurus cardiaca** L. - Motherwort - Mamlys

This native of Europe was first recorded in 1854: “... a weed in the Garden Cringa Newydd, near Cardigan [SN251483] ... I have observed this plant occasionally spring up in some gardens in Cardiganshire” (K, Herb. Watson, MMA), and recorded by Salter from eight sites mostly in or near old cottage gardens “where it was evidently a relic of the old cottage herbalists” (1935): “in a deserted cottage garden” between Llan-non and Llanrhystud SN56J, 1905 (Diary 31.7.1905); the railway sidings at Ynys-las SN6193, 1907 (Diary 21.6.1907, but not in his Flora so perhaps discounted later); Aberystwyth c.SN58V, 1925 (NMW, Wade 1952); near the 5<sup>th</sup> milestone on the Devil’s Bridge road c.SN648788 (1935); Ponrhyd-y-groes c.SN77G (1925); Llangwryfon c.SN57V (1935); just S of Llanrhystud SN56J, 1905 (Diary 31.7.1905); Felin Wnda SN34I (Wade 1952); and opposite Llanfihangel-ar-Arth SN44K, 1907-1930 (Diary 5.9.1907, 18.9.1930 “There is still plenty of *Leonurus* here”). The only record since was from “near Aberystwyth, SN58” in 1971 (NMW, VGE, det. GHu).

**Lamium galeobdolon** (L.) Ehrend. & Polatschek - Yellow Archangel - Marddanhadlen FelenSubsp. **argentatum** (Smejkal) Stace

First recorded in the wild in Britain in 1974 in Oxfordshire, this variegated garden plant was first noted in the county in 1982 along a laneside in woodland by the lodge at Nanteos SN614786 (BM, NMW), when the colony was already 20m long; by 2004 it was 45m long. Since then it has been found increasingly often throughout the lowlands, chiefly in woodland and scrub but also occasionally on open streamsides, road verges, tracksides and waste ground. It always originates from throw-outs and seedlings are never seen, and although there is usually rapid spread for a few years, it does not seem to be such a threat to native vegetation as was once thought. It seems to spread more rapidly on roadside verges than in woodland or other semi-natural sites. A colony on the verge of a minor road 2km SE of Rhydyfelin SN60907720, 7m long in 1992, had spread to 38m long by 2007 and had also crossed the road. By contrast, a colony in estate woodland at Falcondale SN564492 that was 45m across in 1995 had decreased, for no obvious reason, to 25m by 2005. A similar unexplained decrease of a colony, from 30 × 20m in 1989 to 20 × 15m in 1998, was seen in the wooded dingle at Pont Felin Cwrrws, Henllan SN353412. At Garreg, Glandyfi SN696970 in 1993 a colony was spreading into brackish marsh with *Bolboschoenus*. In a small plantation at Winllan SN566572 in 2002 a large colony had been showing progressive die-back over the previous two years in an area 15m across in the middle of the colony, with necrotic patches on the remaining leaves; the periphery was still healthy (IWC, KC & AOC). Altitude limit 350m, roadside bank, Lluest, above Cwmystwyth SN79057497, 2008.

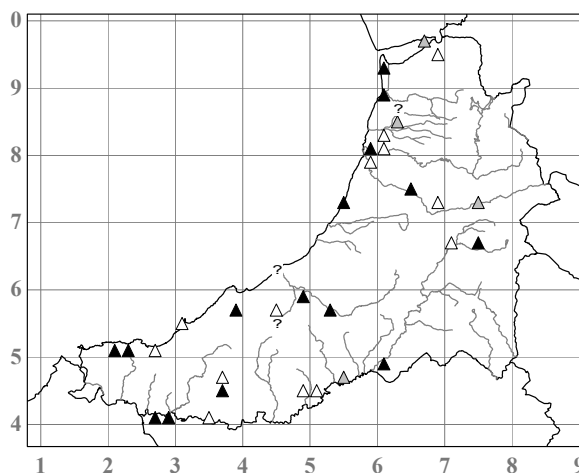


Subsp. **montanum** (Pers.) Ehrend. & Polatschek (*Lamium galeobdolon* (L.) L.)

An uncommon but characteristic plant of the damper, more fertile and base-rich parts of stream dingles in lowland ancient woodland, and occasionally in Alder carr in more acidic places. It is especially abundant in the N of the county in suitable parts of the Llyfnant SN736975, etc., 1893 (Salter 1893) - 2005; in Cwm Cletwr SN663920-675918, Salter (1935) - 2005; and in the Leri valley SN645880, 1903 (Salter, Diary 29.8.1903) - 2005 and SN621884-630882, 1979 (RL) - 1994 (SPC). It is occasionally naturalised, probably from throw-outs, for example on the slope below Salter's garden, Llanbadarn Fawr SN598810, 1991, and in a wood 2km W of Talgarreg SN403501, 1987-2003.

**Lamium album** L. - White Dead-nettle - Marddanhadlen Wen

First recorded from Llanbadarn Fawr c.SN58V in 1849 (Morgan 1849), this archaeophyte is uncommon in the county as well as in the whole of West Wales. Its distribution here, and the history of many of the individual colonies, were studied in detail by A. P. Conolly in the 1960s. It has been recorded from about 40 sites in the county throughout the lowlands, almost always close to habitations. Colonies are often very persistent, although the plant rarely spreads much, and in a few sites at least it was deliberately introduced by local residents. At Llangorwen crossroads SN602839 Salter knew it from 1892 (Diary 29.4.1892) till 1937 (Diary 10.12.1937); by the Glanwern railway bridge, Borth SN614887 it was known from 1907 (Salter Diary 3.10.1907) till 1961; in Llanfihangel Ystrad churchyard SN524562 from 1908 (Salter Diary 11.4.1908) till 1978; in scrub on the rocks by Cenarth bridge SN268416 from 1929 (Salter Diary 19.9.1929) till the present, 2007; at Strata Florida Station SN711671 from 1940 (Salter Diary 6.9.1940) till 1960; and on a demolished cottage and old walls at Cellan SN60374881 from 1965 (APC) till 1999. It has been associated with the railways in at least six sites.

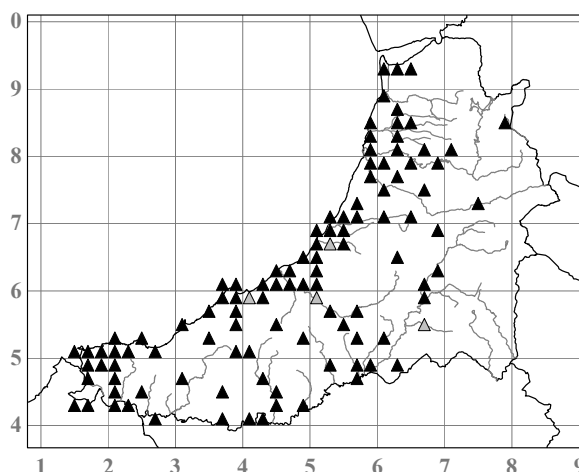


**Lamium maculatum** (L.) L. - Spotted Dead-nettle - Marddanhadlen Fraith

Salter (1935) noted both purple- and white-flowered forms as frequent escapes from village gardens, and wrote that they commonly maintained themselves on the sites of cottage gardens. It must have become less frequent, as it has been noted since 1940 only on a roadside verge at Brongwyn SN286435 in 1999, as a weed around street trees in Aberystwyth SN5881 in 2000-2001 (SPC; AOC), and on waste ground at the Ynys-las boatyard SN615932 in 2005 (SPC). It is native of Europe and Asia. Altitude limit 375m, "in a neglected scrap of crofter's garden", Hengwm Annedd, Pumlumon SN797893, 1940, Salter (Diary 2.7.1940), where it must have persisted since before the site was deserted in 1935.

**Lamium purpureum** L. - Red Dead-nettle - Marddanhadlen Goch (Dynad Coch)

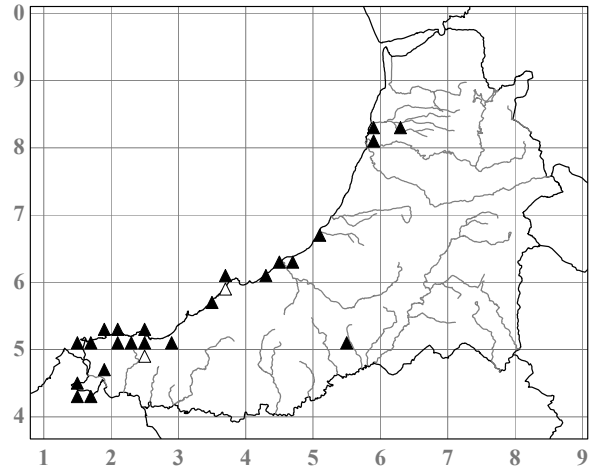
A frequent archaeophyte weed of arable fields, gardens, farmyards, waste and disturbed ground and road verges. Both summer and winter annual forms occur, the latter especially near the coast, and within both there is great variation, dwarf plants with small corollas 8-12mm sometimes growing with robust plants with corollas 15-19mm, as on sandy road verges at Penyrergyd SN162490, 2006 (NMW). Var. **albiflorum** Dumort. has been seen in a flower-bed in Aberystwyth SN583823, 1994 (SPC), and by Moelwyn farmyard, Lledrod SN645713, 1999. Salter's (1935) records of var. *decipiens* probably refer to *L. hybridum*. Altitude limit c.305m ("about 1,000ft."), Salter (1935); 410m, Eisteddfa Gurig farmyard SN797840, 1993.



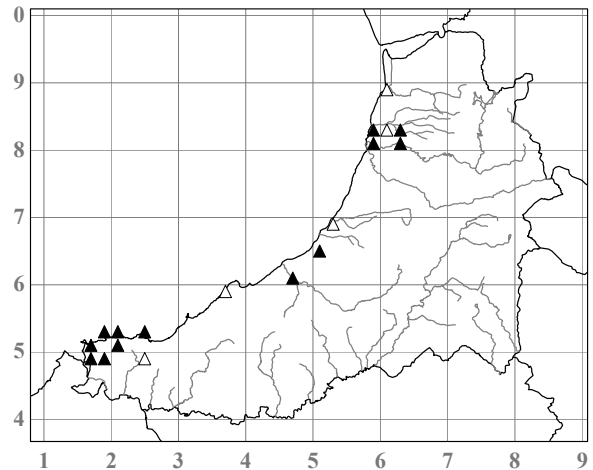


**Lamium hybridum** Vill. - Cut-leaved Dead-nettle - Marddanhadlen Dorddail

An occasional archaeophyte weed of arable fields, gardens and waste and disturbed ground, chiefly in the coastal parts of the S of the county. Although Salter recorded it “beside the Bow Street road” c.SN6183 in 1923 (Diary 29.12.1923), he omitted it altogether from his Flora (1935). He did however write that var. *decipiens* Sonder of *L. purpureum* was “seen occasionally”, and, as a 1936 specimen of his from Aberaeron (NMW) labelled this is clearly *L. hybridum*, he probably always confused the two. A later Salter record of *L. hybridum* as a “cornfield weed, Ty’n Rhos, New Quay (in some quantity 1938)” SN378591 is in Wade (1952), as well as a 1941 record “Roadside, near Blaenannerch” SN24P (Whellan 1942). It has been recorded from at least 20 sites since 1990, and is perhaps increasing in line with the national trend (Braithwaite *et al.* 2006).

**Lamium amplexicaule** L. - Henbit Dead-nettle - Marddanhadlen Goch Ddeilgron

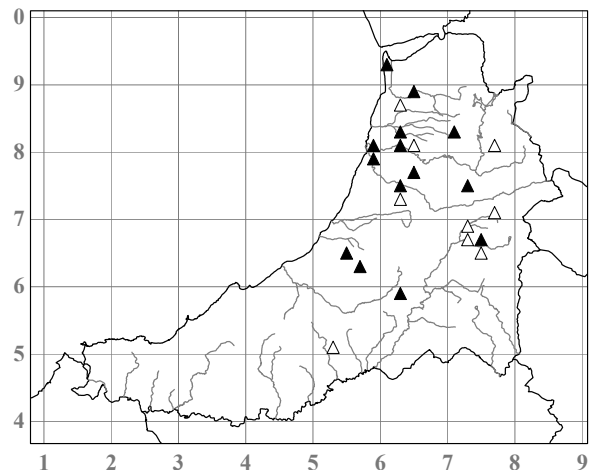
An uncommon archaeophyte weed of arable fields, gardens and disturbed ground. First recorded from “Llanbadarn road” c.SN5981 by Morgan (1848), it has been seen in this area at intervals ever since by the level crossing at Plas Crug and by the old allotments nearby SN589811 (Salter 1935) until 1993 (SPC). It has been seen in 11 sites since 1980, mostly along the coast in fields of Barley, Wheat, Beans, Cabbages and Flax, but also on a reconstructed verge at the Waun crossroads, Aberystwyth SN59978215 in 2007 (SPC), on an eroding dune slope at Penyrergyd SN164485, 1991, and on disturbed ground in the MoD site, Aber-porth SN240521, 2003, where it clearly came from a seed bank. In 2000 it was locally dominant or co-dominant with *L. hybridum* in fallow parts of the IGER fields at Gogerddan SN623836 (SPC). Both chasmogamous and cleistogamous plants occur, the latter persistently for example in Ferwig churchyard SN18304957, 1997-2002 (NMW).

*Galeopsis angustifolia* Ehrh. ex Hoffm. - Red Hemp-nettle - Y Benboeth Goch

There is an unconfirmed record from a pasture at Denmark Farm SN586536, 1994 (NT). A record of *G. ladanum* L. from Llandre SN68I in Morgan (1849), unless just an error, perhaps belongs here.]

**Galeopsis speciosa** Mill. (*G. versicolor* Curtis) - Large-flowered Hemp-nettle - Y Benboeth Amryliw

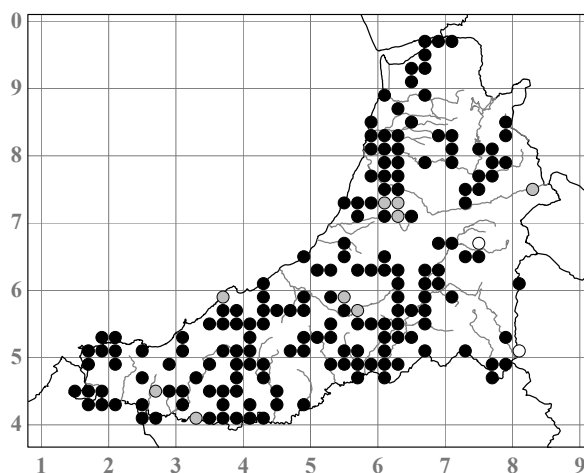
Described by Salter (1935) as “a showy weed of cultivated ground, especially in the hill district”, and recorded as “Rather common in fields at Bethania” SN5763 by Marshall (1900), this archaeophyte has probably decreased considerably at least as an arable weed. It was abundant though in a turnip field 1.5km SW of Devil’s Bridge SN730759 in 1995 (JPL) where Salter saw it in 1922 “in immense quantities in the oat-fields” and 1926 “but not so much as in 1922” (Diary 16.8.1922, 14.8.1926), and it is a regular arable weed in the WPBS/IGER experimental fields SN626830, 1991 (JV). It was seen on shingle



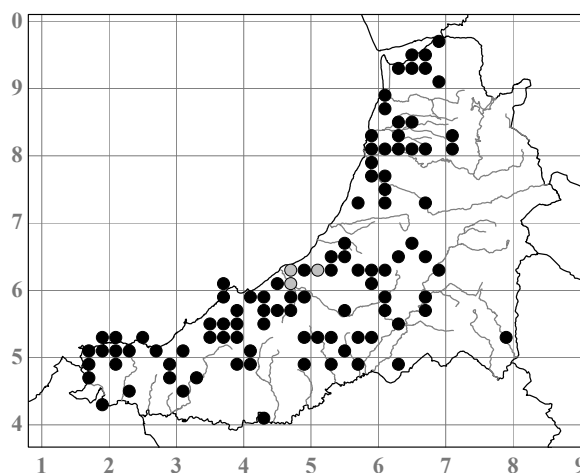
by the Ystwyth above Pen-y-banc Bridge SN6275 in 1994 and 1999 (JPL). The ten other recent records have all been from building sites, roadworks and other disturbed ground where it will have come up from a seed bank, including an area recently planted with trees near Bethania SN562631 in 1997. Altitude limit 300m, SW of Devil's Bridge SN730759, 1995 (JPL).

### ***Galeopsis tetrahit* L. - Common Hemp-nettle - Y Benboeth**

Common in tall-herb vegetation in marshes and damp scrub, as a weed of arable fields, roadsides, riverbanks, hedgebanks, waste ground and tips, and generally more characteristic than *G. bifida* of semi-natural habitats. There is great variation in corolla colour, with, for example, a uniformly white-flowered population in scrub on rocks below Cenarth Bridge SN269416, 2002. Var. *nigricans* Bréb., with black setae on the calyx, was recorded by Salter (1935) as frequent, but is apparently not genetically distinct (Allen 1966). Altitude limit 410m, verge of FC road, Truman, The Arch SN77087609, 2005.



*Galeopsis tetrahit*



*Galeopsis bifida*

### ***Galeopsis bifida* Boenn. (*G. tetrahit* L. var. *bifida* (Boenn.) Lej. & Court.) - Bifid Hemp-nettle - Y Benboeth Holtt**

Almost as common and widespread as *G. tetrahit* and often growing with it. In arable fields, on waste ground, building sites and other disturbed sites it is usually the commoner species, but it is less often found in marshes, scrub, hedgebanks and other semi-natural habitats. It is very variable especially in the patterning and shape of the corolla; plants with the corolla pale yellow, with red veins on the lower lip, were seen on disturbed ground between Barley fields at Llwynysgaw SN216519, 2001 (AOC & CDP). Altitude limit 350m, garden of Nant-llwyd SN783524, 2003.

### ***Melittis melissophyllum* L. - Bastard Balm - Y Wenynog**

There are records of this spectacular woodland perennial from at least four sites in the county, but at only one of these is it known to be extant; this is now its N-most site in Britain. The earliest is represented by Atwood specimens from a "Wood nr. Aberayron", 1854 (K, Herb. Watson, **BIRM**, MMA), a record that Salter was not aware of, although in 1904 (Diary 25.6.1904) he saw a specimen collected "one mile from the town [Aberayron] in wood on N. side of Aeron valley" c.SN4661 (DW), doubtless the same locality. When he looked for it there in 1925 (Diary 8.7.1925) he wrote: "Some wood has been felled but there is plenty left and if *Melittis* is here as reported, there would be little chance of finding it without giving many hours to the search." Surprisingly he did not give this site in his Flora (1935), though he mentioned, without knowing where it was collected, the "Atwood, specimen" as listed by Watson (1883).

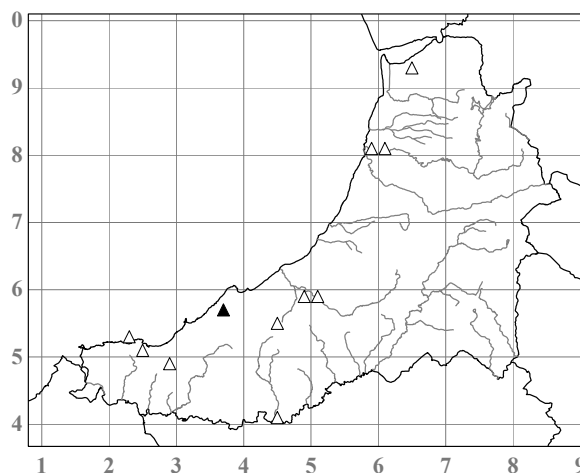
In 1924 Salter quoted a letter from Charles Oldham (Diary 28.8.1924): "Is Balm (*Melittis*) a common plant in Cardiganshire? We [CO & BL in 1924] found it both on the Cardiganshire and Carmarthenshire banks of the Teifi near Newcastle Emlyn." Later (Diary 4.9.1924) he again quotes Oldham: "The Cardiganshire locality is in the Ceri Valley, on the north side of the river about a mile above Pont Ceri, where a rough cart-road passes through the woods." Salter saw it here in 1931 (Diary 18.9.1931): "Above this spot [a small water leat by the waterfall 1.5km upstream of Pont Ceri SN30804272] I could see a track, running horizontally along the hill-side, through the thickets - From Mr. Oldham's description this should be just about the place for the *Melittis*. I climbed up to this track, and, growing beside it, saw something which

looked likely. On examination, I found that it was indeed *Melittis*, of course not now in flower and, with its leaves now turning purplish, very different in appearance from the plants which I knew in the S. of England. I was much pleased, as to find the “Bastard” was one of the chief objects of my visit.” A specimen was collected here a few years later: “A rare plant, growing in only one place in Cardiganshire viz. Cwm Ddu, Ceri valley, & found by me in June 1935” (ABS, MLL), and others were collected in 1941 (K, NMW, JAW) when Whellan (1942) recorded it as in the “Ceri Valley, locally plentiful.” There were reports of it from several places in these woods in the late 1980s, but without confirmation. It was refound in 1991 seemingly exactly where Salter saw it, three flowering and five non-flowering plants just below an old track and just above the ruined cottage of Craig-y-rhuad, in secondary woodland of *Quercus petraea*, *Fraxinus* and *Ulmus*, with *Crataegus*, *Prunus spinosa* and Brambles. Between three and seven plants have been seen here most years since, most recently three in 2005 (AOC, SJT & KT).

The only other records have been from Allt Hoffnant c.SN322521 in 1955 and for several years thereafter (JTh), where it was in *Quercus petraea* woodland, and from “near Llechryd” c.SN24B in 1958 (DEdeV & AMcGS, record at BRC and see *Proc. BSBI* 3: 464 (1960)), but it has not been found at either site since.

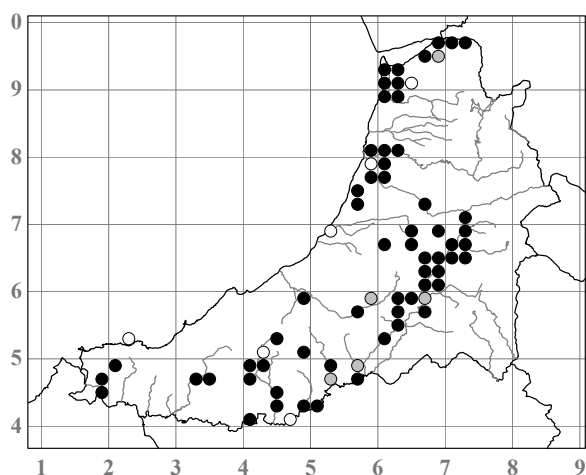
**Marrubium vulgare** L. - White Horehound - Llwyd y Cŵn

Salter (1935) described the White Horehound as “of occasional, more or less adventive or casual, occurrence.” It is probably now extinct in the county, the only post-1936 record having been of a single large plant in the deserted farmyard at Pen-y-graig, Llandysiliogogo SN363579, 1994 (NMW) - 2000. Salter (1935) and Wade (1952) give ten records from 1895 to 1936, both coastal and inland as far as Llanfihangel-ar-Arth SN4540, 1907 (Diary 5.9.1907); there is no evidence of persistence at any of these sites, which include farmyards, by a cottage, a rubbish-tip and an estuary embankment.

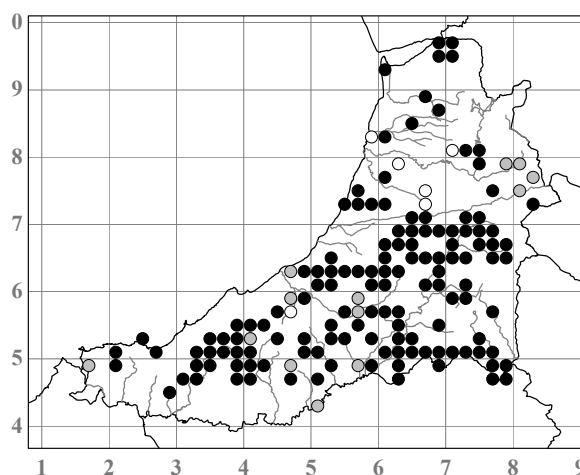


**Scutellaria galericulata** L. - Skullcap - Cycyllog

An occasional plant chiefly of tall herb vegetation in marshes, swamps and wet woodland, and by ditches, streams and ponds. The curious distribution pattern is concentrated on the main areas of raised bogs and valley mires, around Cors Fochno and Cors Caron and the central uplands, and on the ditches and marshes in the Aberystwyth area. *S. galericulata* is salt-tolerant and grows in brackish marshes by the Dyfi and Teifi estuaries, and on coastal shingle at Penyrangor, Aberystwyth SN58048085, 2001 (NMW), but here, as elsewhere, it is var. **galericulata** and not var. *pubescens* DC. Altitude limit 300m, marginal swamp of Llyn Eiddwen SN605667, 1903 (Salter Diary 11.7.1903) - 1989.



*Scutellaria galericulata*



*Scutellaria minor*

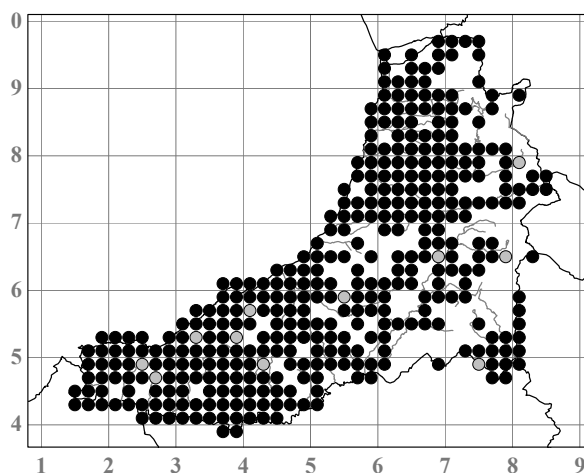


**Scutellaria minor** Huds. - Lesser Skullcap - Cycyllog Bach

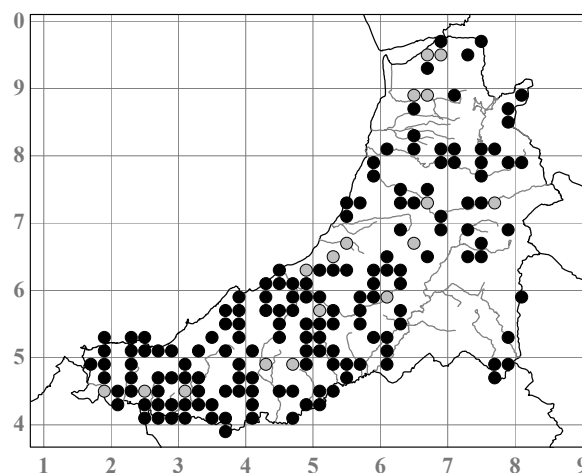
A frequent plant of the wetter parts of rhos pastures, wet heaths, valley mires and flushed slopes, extending well into the uplands but conspicuously absent from the lower Teifi valley and from most of the coastal zone. Strikingly large plants up to 96cm tall, with the corolla 6mm, pink and with darker markings, grow in “Godwin’s lagg” by the West Bog, Cors Caron SN685646, 1999 (NMW, AOC & PCu). Altitude limit 440m, flushes on slope W of Llyn Gwngu SN837728, 1925 (Salter Diary 23.7.1925) - 2002.

**Teucrium scorodonia** L. - Wood Sage - Chwerwyls yr Eithin (Saets yr Eithin, Saets Gwyllt)

A common plant of dry, rocky slopes, cliffs and screes, heaths, dry woodland and scrub and hedgebanks, from the coastal slopes well into the uplands. A. E. Jones (1980) was told in 1977-1979 of its use in the Aberystwyth district as a diuretic and stomachic. Altitude limit 455m, Fainc Ddu, Pumlumon c.SN779880, Salter (1935); 480m, rocky gorge at the head of the Afon Merin SN797807, 1988.



*Teucrium scorodonia*



*Ajuga reptans*

**Ajuga reptans** L. - Bugle - Glesyn y Coed (Corn Glas, Bual)

Common in damp pastures, verges, streamsides, upland flushes and cliff ledges, under Bracken on the coastal slopes and in damp woodlands. It is more frequent on the clay soils in the SW and becomes uncommon in the uplands and in the N. A white-flowered form was seen in woodland at Castle Hill, Llanilar SN624746, 1976, and a pinkish-purple one in pasture at Cae Heslop, Adpar SN318414, 1998 (NMW). ‘*Atropurpurea*’ is naturalised in a Sitka Spruce copse at Eisteddfa Gurig SN798840 at 415m altitude, 2007 (AOC & CRB). Altitude limit 560m, head of Nant y Moch SN784862, 2002 (AOC & PAS).

**Nepeta cataria** L. - Cat-mint - Mintys y Gath

An archaeophyte, recorded from Llanbadarn Fawr SN58V or 68A by Morgan (1849), doubtless as a garden escape; there have been no further records.

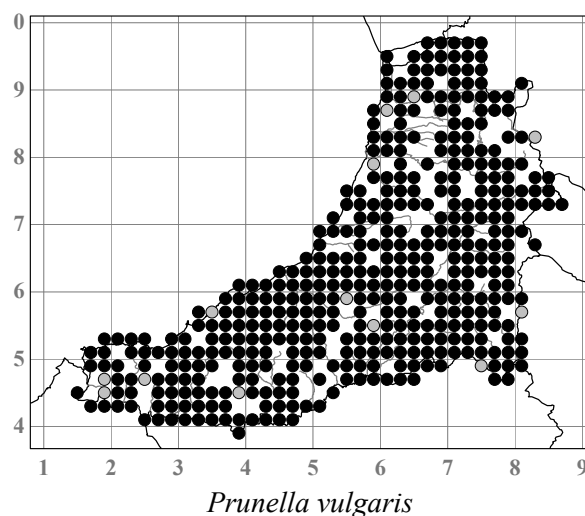
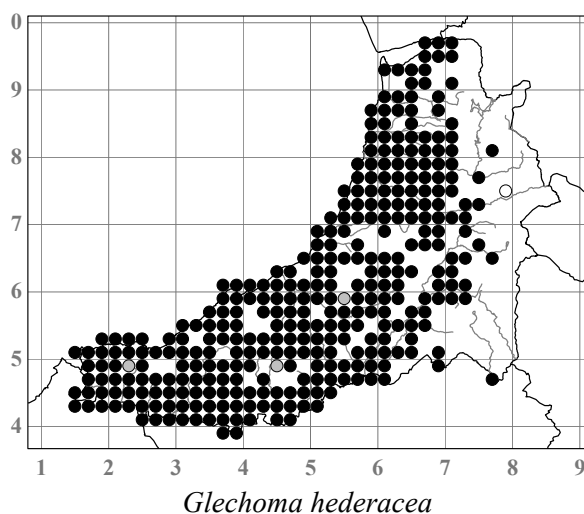
**Nepeta ×faassenii** Bergmans ex Stearn (*N. nepetella* L. × *racemosa* Lam.) - Garden Cat-mint - Mintys-y-gath yr Ardd

Known only as a well-established colony 4 × 1m, derived from a throw-out, among *Ammophila* and *Rosa pimpinellifolia* on The Patch dunes, Penyrergyd SN162485, 1993 (NMW).

**Glechoma hederacea** L. - Ground-ivy - Eidral (Llysiau’r Gerwyn, Iorwg Llesg, Y Feidiog Las)

A common plant of hedgebanks, woodland, scrub, dry slopes and waste ground, chiefly in the lowlands. It is especially characteristic of Bracken and Gorse colonies along the coastal slopes, becoming very abundant in the disturbed ground of Rabbit warrens whose inhabitants find it distasteful. In so far as three varieties can be separated, var. **hederacea** is the commonest and occurs in all habitats. Var. **grandiflora** H. Mart., a striking plant with larger corollas and leaves, is frequent, especially in woodland and other more shaded habitats, for example in a roadside hedgebank at Capel Bangor SN63298045, 2003 (NMW), and in scrub at Rhydypanyd SN63516226, 2001 (NMW), and sometimes grows with var. *hederacea*. Var. **minor** Gilib., with smaller corollas and leaves, is less common and is most often found on the coastal slopes, for example in Gorse

thickets near Carreg Ti-pw SN53417030, 2003 (NMW), and under Bracken near Byrlip SN36455855, 2002 (NMW), and also sometimes grows with var. *hederacea*. Plants with small leaves but large flowers, giving them an *Ajuga*-like appearance, are characteristic of the coastal slopes, for example at Penderi, SN552733, 2005 (NMW, AOC & CDP) and at the MoD site, Aber-porth SN240523, 2005. All the varieties frequently have all or some of the flowers cleistogamous. Altitude limit *c.*335m, “appears to be about 1,200ft.” (Salter 1935).

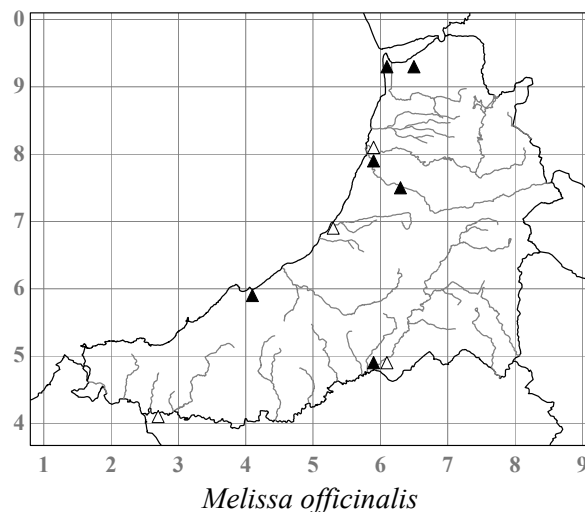


### ***Prunella vulgaris* L. - Selfheal - Y Feddyges Las**

A common plant of closely grazed pastures, road verges, pathsides, rocky slopes, dune slacks, waste ground and lawns. In the uplands it is most frequent in flushes, and in woodland and scrub it is restricted to rides and clearings where it can often be very robust. Salter (1935) mentioned that the flowers are sometimes mauve, and that at Nanteos *c.*SN629787 “a variety with small white flowers occurs”, i.e. forma **leucantha** (Schur) Hegi. Dwarf plants abundant in the dune slacks at Ynylas SN69B & C, 2005, are probably var. **dunensis** Druce. Altitude limit 455m, Esgair Hir mines SN7391 (Salter 1935); 560m, flushed slope at the head of the Nant y Moch, Pumlumon SN784862, 2002 (AOC & PAS).

### ***Melissa officinalis* L. - Balm - Balm**

Naturalised from throw-outs, or perhaps sometimes self-sown, in a few places in scrub, on waste ground, roadside verges, streambanks and tips, usually near gardens. The earliest record is by Salter (Diary 24.7.1902, 1935) of a “Large patch of Balm growing as an escape” near a cottage on Pendinas, Aberystwyth SN583803. It is still well-naturalised in scrub by the Afon Cletwr at Craigypenrhyn SN65419282, 2008, where Salter recorded it (1935).

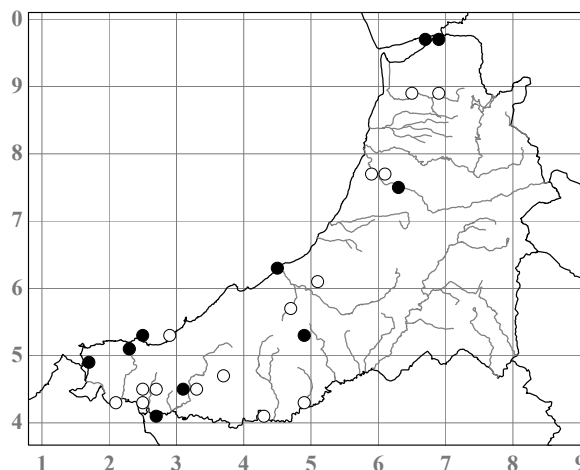


### ***Clinopodium ascendens* (Jord.) Samp. (*Calamintha officinalis* auct.) - Common Calamint - Brenhinllys**

Burkill & Willis (1894) very surprisingly described this as frequent, and gave no localities. It was first reliably recorded by Salter in 1907 from Llangoedmor churchyard SN199458 (Diary 15.8.1907), where it still grows against the S wall of the church, 2005. On the same day he recorded it on a roadside bank at St Dogmaels SN167459, and he saw it again there in 1924 (Diary 19.9.1924), presumably the same place that Whellan (1942) saw it in 1941. The only other records are of it naturalised as an obvious garden escape on a scrub slope at Llechryd-isaf SN213437, 1993 (NMW, TCGR & AOC), and as a casual on the old tip site at Blaendolau, Llanbadarn Fawr SN601804, 1997.

***Clinopodium vulgare* L. (*Calamintha clinopodium* Benth.) - Wild Basil - Brenhinllys Gwyllt**

An uncommon plant of open scrub, wood margins, Bracken slopes, hedgebanks and rough grassland. Salter recorded it from *c.*22 sites (1935, and Diary), but it has been seen in only nine sites since, so has probably declined. The main concentrations have been in the Ystwyth valley where Salter recorded it from several sites from Llanfarian to Llanilar, and where it still grows near Pantygwyfol SN622759, 1994 (JPL), and along the coastal slopes in the SW of the county. It also occurs on railway ballast SW of Glandyfi SN672961 and 687966, 1992, where it was first found in 1975 (MW; WMC).

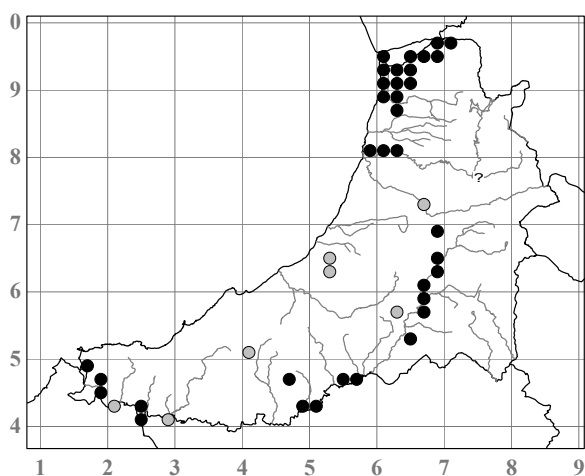


[*Clinopodium acinos* (L.) Kuntze - Basil Thyme - Brenhinllys y Maes

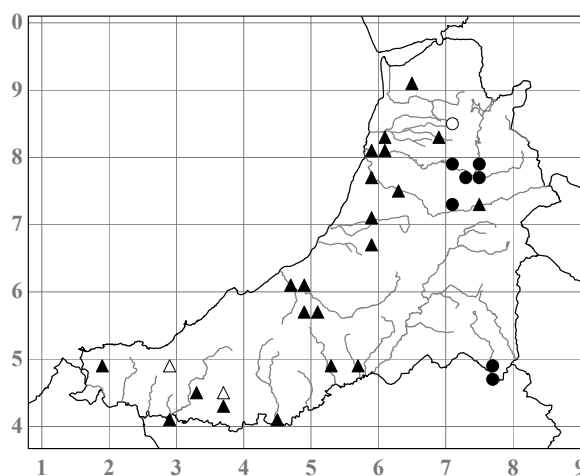
Reported from Brynrychain SN580774 by Morgan (1849) as *Acinos vulgare*, presumably in error as it is very unlikely to have been even a casual there.]

***Lycopus europaeus* L. - Gypsywort - Llysiau'r Sipsiwn**

An occasional plant of tall-herb fens, swamps, wet woodland, ditches, river banks and pond margins in the lowlands, often in shaded situations. It is especially characteristic of the flood zones of the Dyfi, the Rheidol and the Teifi. It is quite salt-tolerant and grows well in tidal brackish marshes, for example by the Afon Leri ENE of Borth church SN616901, 1988 (AOC & JRA) - 2005 and by the Teifi estuary just S of Nantyferwig SN168481, 1991-2004, as well as in the wetter dune slacks at Ynys-las SN69B, C, 1848 (Morgan 1848) - 2004. The only presumably upland record is from "Above Devil's Bridge" *c.*SN77N, 1908 (ABS, WHP).



*Lycopus europaeus*



*Origanum vulgare*

***Origanum vulgare* L. - Wild Marjoram - Penrhudd**

An uncommon calcicole, undoubtedly native on some of the more base-rich rock outcrops at the base of the Silurian but so often grown in gardens and escaped that its status at most of its other sites is uncertain. The definite native sites are on Craig y Pistyll SN712854, 1893 (Salter Diary 10.4.1893) - 1905 (Salter Diary 30.9.1905); in Coed Rheidol, Allt Boeth and by the Gyfarllwyd Falls and the Devil's Bridge waterfalls SN77I, N, P, 1944 (PWR) - 2007; by the Nant Bwa-drain waterfall SN714790, 1907 (Salter Diary 6.7.1907) - 2004 (AOC & SDSB), presumably the locality given as "Cwmrheidol" by Morgan (1849); on the N side of the Ystwyth at Grogwynion SN719722, 1972 (EHC) - *c.*1990 but now gone; and on Craig Clungwyn SN778472, 1979-1998, and Craig Ddu SN769483, 1978-1998. The localities where it is naturalised are on roadside hedgebanks, walls and verges, railway embankments, graveyards and cottage garden sites. Identification to subspecies, most of which are aliens, would help in deciding which populations are native, but it has not yet been attempted in the county. Altitude limit (native) *c.*300m or more, Craig y Pistyll SN712854, 1905 (Salter Diary 30.9.1905); 340m (native), Craig Ddu (as above).

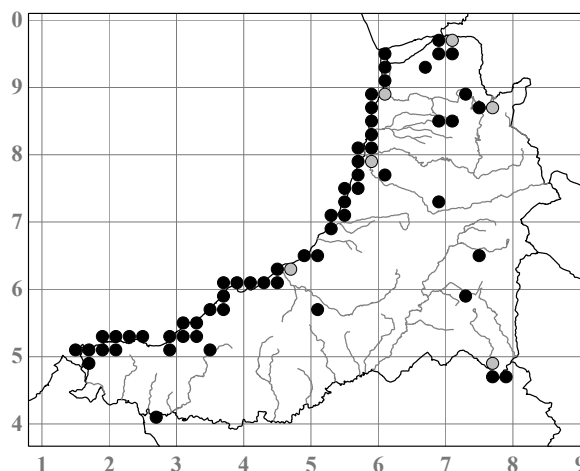


[*Thymus pulegioides* L. (*T. chamaedrys* Fr., *T. ovatus* Mill.) - Large Thyme - Teim Gwyllt Mawr

Erroneously recorded by Towndrow (1907) and Druce (1932).]

**Thymus polytrichus** A. Kern ex Borbás subsp. **britannicus** (Ronniger) Kerguélen (*T. serpyllum* auct., non L.) - Wild Thyme - Teim Gwyllt

Common along the coast, on mature sand dunes, on rocky slopes and cliff ledges, on vegetated screes, on exposed banks and pathsides, and in short turf. Inland it is rare and largely confined to the uplands where most or all of the populations are on at least slightly base-rich sites, for example at the E end of Craig Clogan in Cwm Berwyn SN727580, 1998 (AOC & JPW) - 2005, at 310-380m altitude, by far the most extensive upland population in the county, where it grows near *Alchemilla filicaulis* subsp. *vestita*; and on Craig Clungwyn c.SN777472, 1991, where it grows with *Origanum* and *Sedum forsterianum*. Salter (Diary 10.4.1893) recorded it at Craig y Pistyll SN712857; it has not been seen there recently, but does occur nearby on mortar-rich spoil and walls at the Llawr-y-cwm-bach lead mine SN707853, 1992 (AOC & SPC). Even in less base-rich upland sites it is



accompanied by other indicators of slight enrichment such as *Saxifraga stellaris* by the Maesnant on Pumlumon SN775879, 1976, and *Carex hostiana* at the S tip of Drosgol SN755870, 1993 (JPL & ACW).



*Thymus polytrichus* and *Leontodon saxatilis* var. *arenarius*,  
Ynys-las dunes, view N from SN609938, July 2007

Inland in the lowlands there are very few sites, usually with very few plants, but there are good populations on the riverside rocks below Cenarth bridge SN268416, 1991-2005, and in stony, acidic grassland 400m S of Penlan-fawr, Pentregat SN357506, 1996 (MDS). There is an early specimen of 1828 from a roadside near Aberystwyth (WOS, R. J. N. Streeten, per RM). Both the coastal and upland plants have the leaf surfaces glabrous or only very sparsely hairy and appear to be var. **neglectus** (Ronniger) P. D. Sell. Altitude limit 395m, by the Maesnant, Pumlumon SN775879, 1976.

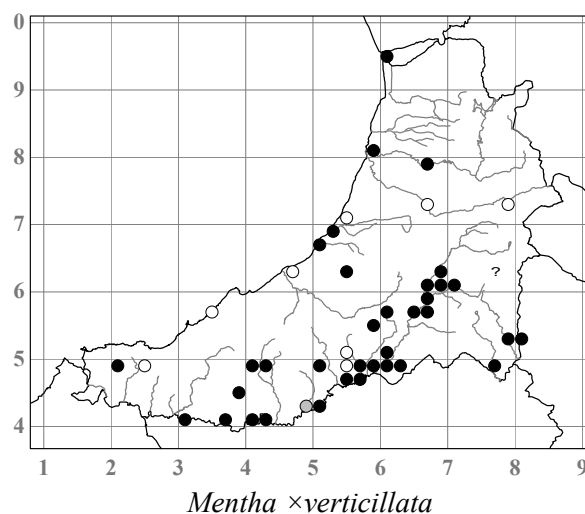
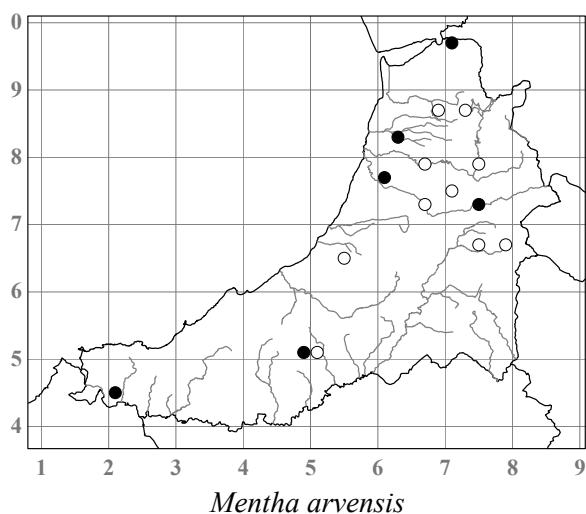
## **Mentha** L.

Salter took a particular interest in this genus and it is unusually well represented in his herbarium. There is a need for expert revision of this and other material from the county and the following account is very provisional. The nativeness or otherwise of many of the taxa in the county is uncertain and can often only be guessed at.

### **Mentha arvensis** L. - Corn Mint - Mintys yr Âr

Because of frequent over-recording of this species for one or other of its hybrids, it is difficult to be certain of its distribution in the past. Salter (1935) described it as "common as far as the upper limit of cultivation, where it occurs as a weed in the patches of oats or potatoes", but there have been only six definite records since 1970, and even allowing for some misidentifications it has probably suffered a real decline. Salter's specimens at NMW from a pool below Bont-goch SN68Y, 1937, from Nebo SN56M, 1939, and from Capel Sain Silin, Cribyn SN5150, 1937, are correct. The recent records are from a pasture E of Coed Cymerau

SN70199643, 2009 (SPC); from fallow trial plots at IGER, Gogerddan SN631835, 2005 (NMW); from a strawberry field at Penlan-las, Rhydyfelin SN607771, 1995-2008 (SPC); from the corner of a hay meadow at Cae'r-meirch SN75617381, 1996; from the unusual habitat of wet *Juncus acutiflorus* fen, Cors Gorsgoch SN48105038, 2002 (NMW, AOC & PSJ); and from an arable field at Penralltisaf, Llechryd SN217445, 1993 (NMW, AOC & LRG) - 1996. Altitude limit 435m, Llyn Hir SN76Y (Salter 1935), probably as a weed in the vegetable garden that was then there; 310m, corner of hay meadow, Cae'r-meirch SN75617381, 1996.

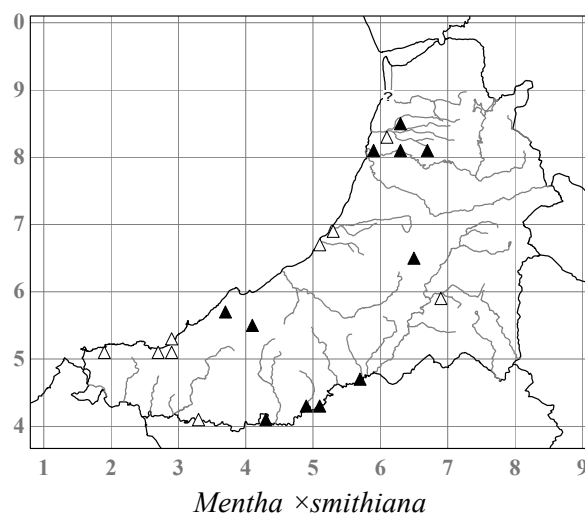


***Mentha xverticillata* L. (*M. aquatica x arvensis*) - Whorled Mint - Mintys Troellennog**

A frequent and variable Mint of fens and swamps, riverbanks, pond and reservoir margins, ditches, wet woodland and river shingle, and rarely as a weed of arable land or tips. It is especially prevalent in the wetlands of the Teifi catchment. The *M. arvensis x hirsuta* recorded by Marshall (1900) will have been this hybrid. Var. *paludosa* Sole and var. *rivalis* Briq. recorded in Salter (1935) and Wade (1952) are now considered not worth recognising. Altitude limit 300m, marsh by Soar y Mynydd SN785535, 1995.

***Mentha xsmithiana* R. A. Graham (*M. aquatica x arvensis x spicata*; *M. rubra* Sm., non Mill.) - Tall Mint - Mintys Coch**

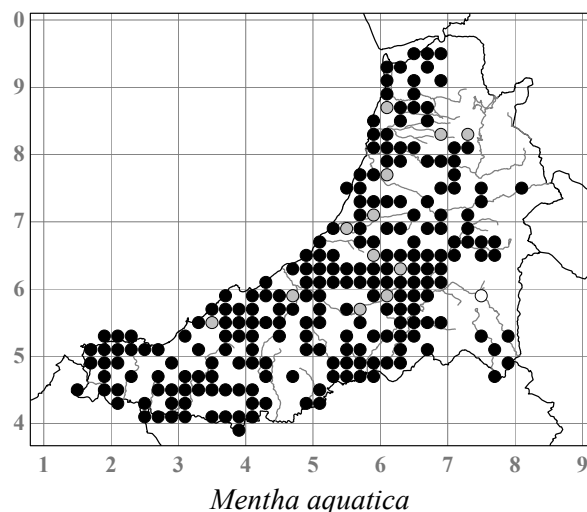
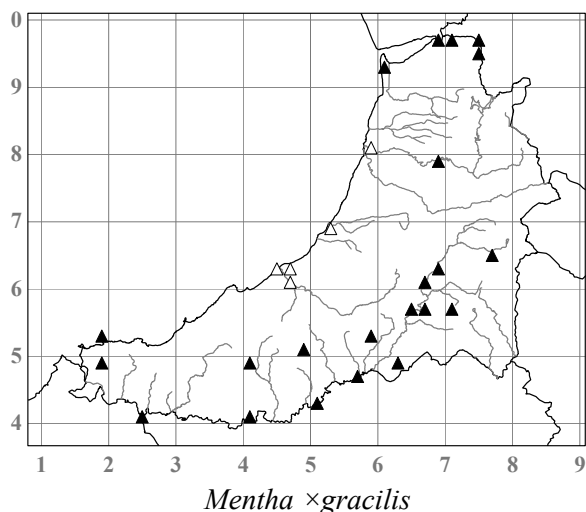
This Mint used occasionally to be found by old cottage sites and in farmyards, and was generally assumed to be a garden escape, Salter (1935) for example saying: "A form of this Mint [*M. rubra*] was evidently grown in cottage gardens as a substitute for the true cultivated mint. It is frequent, usually on former garden sites." It seems now though to be commoner in wild sites, being recorded recently only from marshy pastures, fens and riverbanks, apart from one farmyard, at the deserted Pen-y-graig, Llandysiliogogo SN363579, 1992 (NMW). The earliest record is by Morgan (1849) from Borth c. SN68E, as *M. rubra*.



***Mentha xgracilis* Sole (*M. arvensis x spicata*; *M. xcardiaca* (Gray) Baker, *M. gentilis* auct., non L.) - Bushy Mint - Mintys Culddail**

Salter (1935) described this Mint as "Only rarely seen as an outcast from gardens", although recent records show it to be almost as frequent as *M. xverticillata* and to occur in fens, marshy pastures, swamps and ditches, on streambanks, river shingle and lake shores, as well occasionally as an arable weed. The discrepancy must

be explained by difficulties of identification. Altitude limit 360m, by a ruined farm 600m SSW of Cefnyresgair-fawr, SE of Tregaron SN703577, 1993.

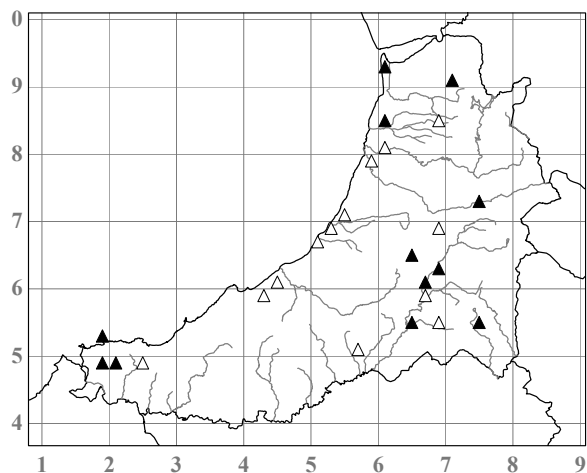


### ***Mentha aquatica* L. - Water Mint - Mintys y Dŵr**

A common plant of all but the more acidic wetlands, in fens, marshes, swamps, rush pastures, wet woodland and scrub, dune slacks, on streambanks and in the tall herb vegetation by rivers and ponds. Var. *major* Sole, recorded by Salter (Wade 1952) from the reservoir pool at Trawsgoed SN661726, 1936 (NMW) and from Monachty c.SN504620, is now considered simply a luxuriant form of the species. Altitude limit 425m, head of the Nant Groes SN7459 (Salter 1935).

### ***Mentha ×piperita* L. (*M. aquatica* × *spicata*; *M. ×dumetorum* auct., non Schult.) - Peppermint - Mintys Poeth**

An occasional Mint of fens, marshy pastures, ditches and streambanks where it may be native, for example by the stream E of Mwnt church SN19635201, 2002 (NMW), and of lanesides and old cottage sites where it is clearly an escape, for example on a lane verge near Wileirog-fach, Wallog SN60598571, 2002 (NMW). The earliest records are from Llanbadarn Fawr c.SN68A by Morgan (1849) and from “by a small stream in a bog - Nant Llan nr. Tremaine [SN240483]”, 1854 (K, Herb Watson, MMA), and Salter (1935) said that it “Usually occurs as a garden escape, or maintaining itself on former sites of cottage gardens”. He recorded var. **subcordata** J. Fraser from a ditch in the Teifi water meadows at Trecefel SN65U in 1936 (NMW, Wade 1952). The fact that he noted both *M. ×piperita* and “*Mentha sylvestris*” by the Afon Wyre below Llanrhystud SN56J (Diary 31.7.1905) suggests that he thought he had found var. **sylvestris** Sole, although he does not mention it in his Flora. A 1932 record of *M. palustris* from near Mwnt c.SN15W (NYS, Wade 1952) will have been of var. **hirsuta** J. Fraser. The only record of var. **citrata** (Ehrh.) Boivin (Eau de Cologne Mint) is by Morgan (1849), without a locality. Altitude limit 300m, *Molinia* fen by the Doethie Fach, 900m NE of Ty’n-y-cornel SN757541, 1995 (NMW, AOC & JPW).



### ***Mentha spicata* L. (*M. viridis* (L.) L., *M. longifolia* auct., non (L.) Huds.) - Spear Mint - Mintys Ysbigog**

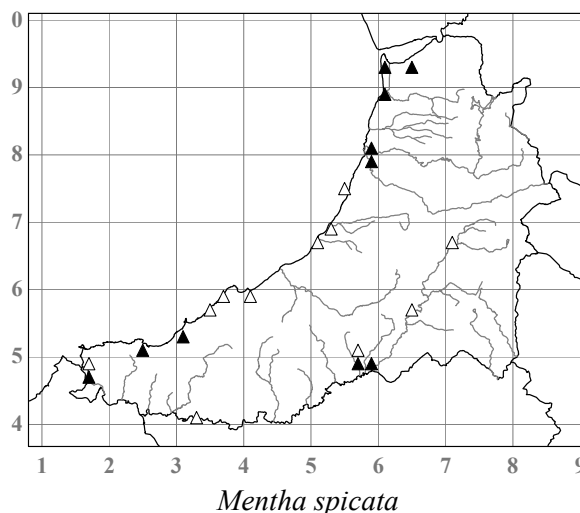
An occasional archaeophyte of streambanks, pathsides, railway verges, waste ground and tips. Salter (1935) described it as “The cultivated Mint; only occurs as an escape from cultivation or on old garden sites.” It is very variable in pubescence as well as in other characters, and Salter’s records of *M. longifolia* refer



to the more hairy forms, var. **scotica** (R. A. Graham) P. D. Sell.

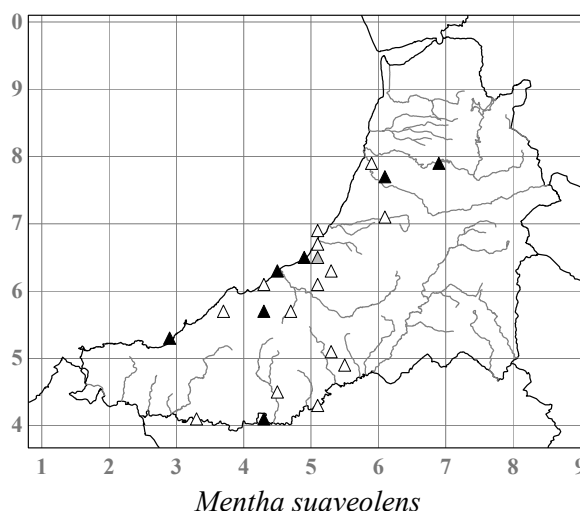
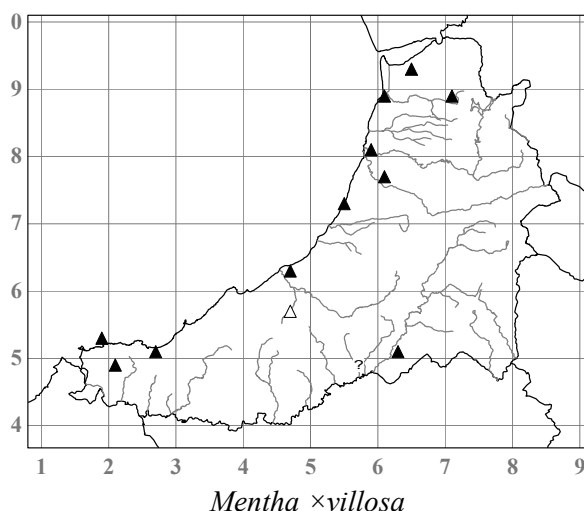
**Mentha ×villosonervata** Opiz (*M. longifolia* × *M. spicata* (L.) Huds.; *M. nouletiana* auct., non Timb.-Lagr.) - Sharp-toothed Mint - Mintys Danheddog

A rare Mint of tips and waste ground. Salter (1935) described it, as *M. nouletiana*, as “Much grown as a culinary mint” and gave only one site, the municipal rubbish-tip at Lampeter SN5747. The only other records have been from the reclaimed rubbish-tip below Pendinas, Aberystwyth SN58287999, 1994 (NMW, AOC & JPW); from a hedgebank at Drefnewydd, Aberaeron SN463632, 1994 (NMW); from disturbed ground by Cwmcoedwig, Llanfarian SN586778, 1996; from waste ground by the railway, Aberystwyth SN589811, 1997-1999 (NMW); from waste ground at Aber-porth SN255511, 1998 (AOC & JPW); and from the back of the shingle beach S of Aberaeron harbour SN453628, 2006 (PAS & AOC).



**Mentha ×villosa** Huds. (*M. spicata* × *suaveolens*; *M. cordifolia* auct., ?non Opiz ex Fresen.) - Apple-mint - Mintys Lletgrwn

Occasionally naturalised in scrub, rough grassland, streambanks, roadside banks, the backs of sea beaches, waste ground, old allotments and old cottage sites. Salter seems to have known it in only three sites, allotment gardens at Aberystwyth c.SN58V (Wade 1952), Rhiwbren in the Afon Mydr valley SN4757, 1937 (NMW, Wade 1952), and as a garden outcast in Lampeter c.SN54U, 1938 (NMW), and as it has been recorded from 14 sites since 1980 it may be becoming more widespread. Var. **alopecuroides** (Hull) Briq. has been recorded from the old Aberystwyth allotments site SN590806, 1992-1995, and from by Dolgarn-wen in the Cyneiniog valley SN703880, 1999. Most other colonies have not been identified to variety, but var. **villosa** is well-established in rough grass on the clifftop at Borth SN604887, 1996-2004.



**Mentha suaveolens** Ehrh. (*M. rotundifolia* auct., non (L.) Huds.) - Round-leaved Mint - Mintys Deilgrwn

Salter (1935) said of this Mint that it “Occurs usually, but not always, in the neighbourhood of cottages, having been grown, along with other species of Mint, by the old herbalists”, and gave a dozen localities, with five more in Wade (1952). A large colony still grows by the mouth of the Morfa Mawr stream SN499657, 2003, where Salter (Diary 16.7.1904) knew it, and there are six other records since 1970 from waste ground, road verges and churchyards. There is a good colony in Llandysul churchyard SN419407, 1978-2004 (NMW), and there is a very extensive, interrupted colony c.200m long on the grassy bank of the Cwm Rheidol reservoir SN697795, 1995-2007 (NMW). Whether it is native in any of these sites is uncertain and it is mapped as a naturalised alien.

**Rosmarinus officinalis** L. - Rosemary - Rhosmari

Recorded only once, as a self-sown casual in St David's Road, Aberystwyth SN59128168, 2004.

[*Salvia verbenaca* L. - Wild Clary - Clari Gwyllt

Recorded only by Morgan (1849), from Swyddffynnon c.SN6966, but it was doubtless either an error or a cultivated plant.]

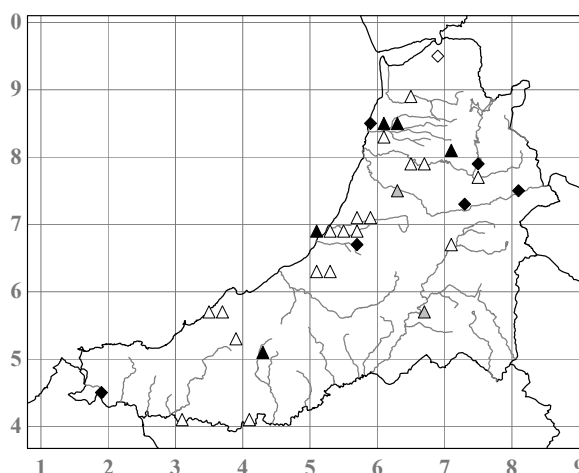
**PHRYMACEAE****Mimulus moschatus** Douglas ex Lindl. - Musk - Mwsg

Recorded by Salter (1935) as "naturalised in a wet spot near the house" at Plas Cwmcynfelin SN604836, and seen there again in 1972 (EHC). Salter also found it, "strongly established and completely naturalised", by the stream on Silian Common in 1939 (NMW, Diary 7.8.1939) where it was seen again at SN569513 in 1988 (NMW, IKM). Native of W North America.

**Mimulus guttatus** agg.

Because of the comparatively recent recognition of hybrids, the identity of most plants recorded in the past as *M. guttatus*, *M. langsdorffii* and *M. luteus* is uncertain; most or all though will have been referable to one of the two following taxa. Salter (1935, Wade 1952) gave 17 sites, several of them composite, for the aggregate. Although he wrote (1935) that it "Seems to have made its appearance within the past twenty-five years and has spread rapidly along the streams and ditches of the lowland part of the county", he first saw it in 1903 on the Afon Wyre between Llangwryfon and Llanrhystud SN57V-56J when he wrote (Diary 8.7.1903) that "all the way down the stream for the best part of three miles were yellow masses of *Mimulus luteus*"; this will have been *M. guttatus* (see below). *Mimulus* has certainly decreased greatly since 1935, and colonies are now rare in the county.

Casual pavement colonies of garden escapes have been seen a few times in Aberystwyth, and one in Alexandra Road SN58478160, 1991 (NMW, CDP) was probably a complex hybrid of *M. cupreus*, *M. variegatus* and another unknown species.

**Mimulus guttatus** DC. - Monkeyflower - Blodyn Mwnci

Two early collections from Llanrhystud c.SN57V, c.1908 (ABS, MLL, det. AOC), and 1934 (NMW, PCh, det. AOC) indicate that the plant Salter saw all up the stream here in 1903 (see above) was this. It was abundant by the Afon Leri E of Borth church SN617898 in 1981; by the Bowstreet Brook near Capel y Garn SN62428554 in 2000 (AOC & JV); in a ditch E of Llangorwen church SN606840 in 1993; by a recent pond at Nantyrarian SN714813 in 2004; and by the Afon Brenig in Tregaron SN67955972 in 2002 (NMW) - 2006 and by its confluence with the Teifi SN673589 in 1993 (NMW) where plants seen c.1939 (WGGL) were doubtless the same taxon. Salter's (1935) records from the Afon Leri SN68P and from Bow Street c.SN68B, C are also likely to have been this.

**Mimulus ×robertsii** Silverside (*M. guttatus* × *luteus* L.) - Hybrid Monkeyflower - Blodyn-mwnci Croesryw

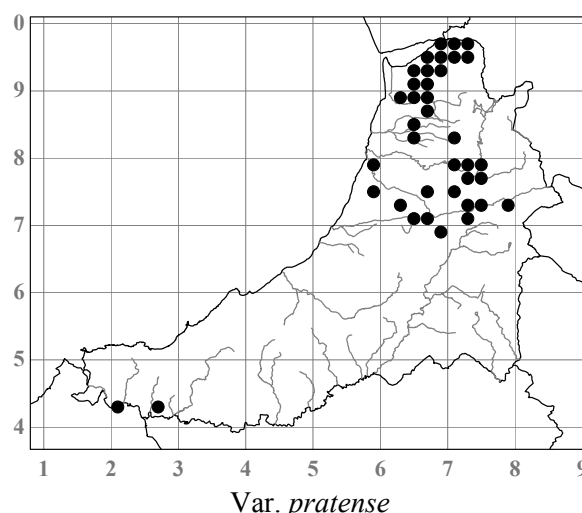
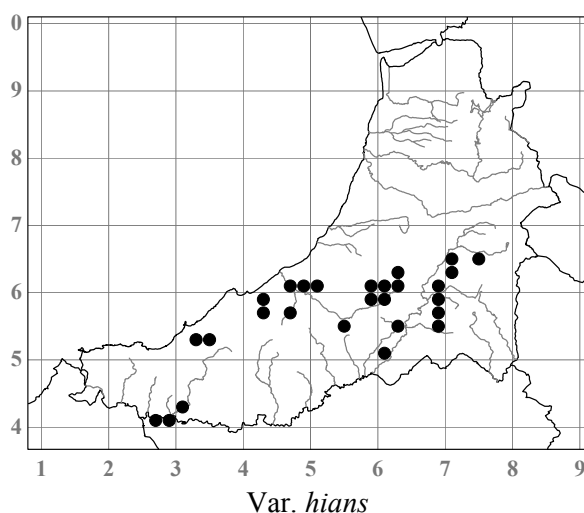
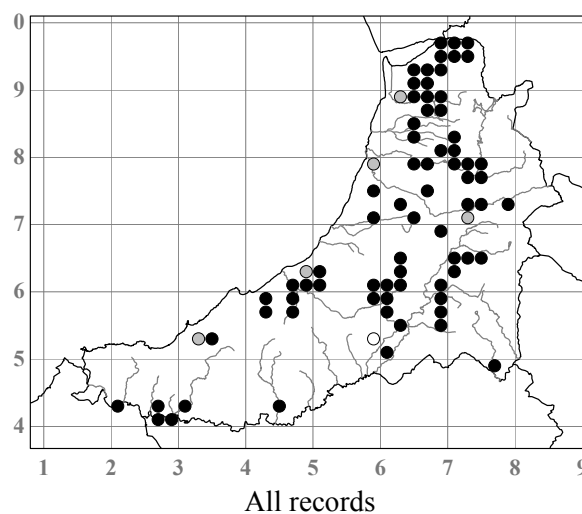
None of the confirmed records for this hybrid are from any of Salter's sites for the aggregate. It was first recorded in 1961 at Eglwys Fach SN69X (PMB, Roberts 1964). It grew in a small rill by the lane to Ty-mawr, Ysbyty Cynfyn SN755793 from c.1970 for many years but had gone by 1990, and plants from here had a chromosome count of  $2n = 44$  and 3% pollen fertility (Parker 1975). There is a persistent colony in a ditch in Ty-mawr farmyard, Cwm Ystwyth SN814747, c.1985-2007 (NMW), and it was seen lower down the Ystwyth on river shingle at Grogwynion SN721721 in 2001. A few plants were found in a ditch W of Llangorwen SN596838 in 1990. In 1997 it was frequent along 150m of a streamlet by Taihirion, Joppa SN572663 (NMW). In 1999 it was found on the Teifi Marshes SN18104482 (LRG, det. AOC).

## OROBANCHACEAE

### **Melampyrum pratense** L. subsp. **pratense** - Common Cow-wheat - Gliniogau

This semi-parasite of woody plants is frequent in *Quercus petraea* woodlands, on shaded banks and in heaths, occasionally under Oaks in unimproved pasture, and sometimes persisting as a relic in old woodland replanted with conifers. It usually grows in discrete colonies, dense in woodland but mostly much less so in heaths. Most of its sites are not or only lightly grazed, and on the upland moorlands it grows mostly among *Sphagnum* and other mosses in deep *Calluna*, *Vaccinium* and *Empetrum*.

Var. **hians** Druce, with uniformly deep golden yellow corollas and a northern and western distribution in Britain, is surprisingly confined to the S half of the county, while var. **pratense**, with pale yellow or whitish corollas, slightly deeper yellow at the mouth, is virtually confined to the N half of the



county (Chater 2009a). The only exceptions are a colony of var. *pratense* in dominant *Luzula sylvatica* in Oak woodland in the Teifi gorge near Coedmore SN204429, 2003-2008, and one in heathy woodland on a laneside verge near Capel Tygwydd SN264437, 1996-2008. There is no ecological distinction between the two varieties, both occurring in lowland woodland as well as in upland heaths, and the sharp dividing line between the two is unexplained. Var. *montanum* Johnst., recorded by Painter from Devil's Bridge c.SN77N (Salter 1935), is not now regarded as distinct from var. *pratense*.

A dense colony 30 × 12m of plants with pale, rather uniformly coloured corollas in Oak woodland by the Nant Brwyno SN70228118, 2004-2008 (NMW) fits neither variety. A mixed colony 1km N of here of plants sparsely scattered over several acres of a N-facing slope dominated by *Molinia* and with abundant *Calluna* and some *Empetrum*, 1km ESE of Cwmerfyn SN704824, 1991 (NMW) - 2008, has a range of corolla colours from typical var. *pratense* to the same pale but uniformly coloured ones as those by the Nant Brwyno, and even has a few plants with orange-tinged corollas. Salter (1935)

*Melampyrum pratense* (above) var. *hians*, 2km N of Tregaron, July 2008, (below) var. *pratense*, Cae'r-meirch, July 2008





mentions that “Druce found a form near var. *hians*” near Devil’s Bridge c.SN77N, doubtless the same as the Cwmbrwyno and Cwmerfyn plants. Altitude limit 530m, above Llyn Fyrddon Fach c.SN7970 (Salter Diary 5.8.1938, Wade 1952); 420m (var.*pratense*), *Calluna*/*Empetrum* moorland, NW slope of Foel Goch SN693929, 1997; 400m (var. *hians*), *Vaccinium myrtillus*/*Empetrum*/*Calluna* heath, W slope of Esgair Hir, 3km E of Llanddewi-Brefi SN686549, 1991 (NMW).

### **Euphrasia** L. - Eyebright - Effros (Llygad Siriol)

Until the last few decades there had been no very thorough investigation of this genus in the county, and at no time, unfortunately, have any of the experts on the genus studied them in detail in the field in the county. W. H. Painter collected a few in the early 1900s, now in ABS, which were named by F. Townsend. E. S. Marshall (1900), on his visit to the Aberaeron area in 1899, collected material, some of which he sent to R. Wettstein for naming. Salter collected a few, and had specimens named by W. H. Pearsall and H. W. Pugsley (Pugsley himself visited Borth for a holiday in June 1906 but does not seem to have collected any *Euphrasia* in the county). The Revd T. Stephenson, his botanical enthusiasms unassuaged by the difficulties of *Dactylorhiza*, became interested in *Euphrasia* in the early 1940s and reported his finds to Salter. Among others contributing miscellaneous records, I. Fleming-Williams made a collection in the Ystumtuen area around 1959 which he got P. F. Yeo to check the naming of, but unfortunately this material seems now to be lost. In recent decades both P. F. Yeo and A. J. Silverside have named a great deal of material collected mostly by myself in the county, and the situation of the genus here is probably now fairly well known.

### **Euphrasia officinalis** L.

Subsp. **anglica** (Pugsley) Silverside (*E. anglica* Pugsley) - English Eyebright - Effros Lloegr

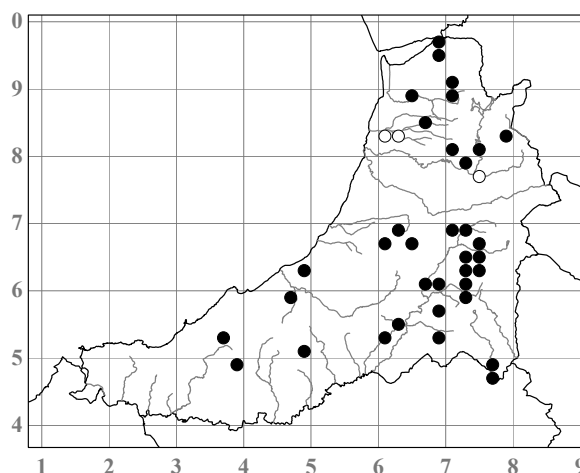
Chiefly an inland and upland plant, rare or absent on the coastal slopes, and requiring regular grazing of the pastures it inhabits, although it tolerates considerable variation in both moisture and pH. It is frequent in unimproved acidic to neutral pastures, often in the upland sheepwalks, for example on the Mynydd Bach NE of Trefenter SN622694, 1991 (NMW, det. AJS) and in heathy Sheep-grazed pastures, for example at Esgair Nantyrarian SN705817, 1984 (NMW, det. PFY). It is also often in damp Cattle-grazed pastures, for example E of Hengwrt, Aberarth SN495633, 1997 (NMW, det. AJS) where it grows with *Linum catharticum* and *Eleocharis quinqueflora*, or in seasonally flooded Horse-grazed riverside pasture, for example by the Teifi on Cors Caron SN673615, 1994 (NMW, det. AJS) where it grows with *Succisa* and *Platanthera chlorantha*. It grows both on somewhat base-rich pingo ramparts, as at Rhos Glynyrhelig SN498513, 1984 (NMW, det. PFY), and under Bracken on dry acidic slopes, for example SW of Hafodwnog, Capel Cynon SN389487, 1996. Salter (1935) had material from above Cwm Cynfelin SN68B named by Pugsley, and TS (Wade 1952) recorded it from Capel Dewi SN68G and Devil’s Bridge c.SN77N. Altitude limit 450m, grassy road verge by conifer plantation, Bryn-y-ryd SN682523, 2003.

Intermediates between subsp. **anglica** and subsp. **pratensis**

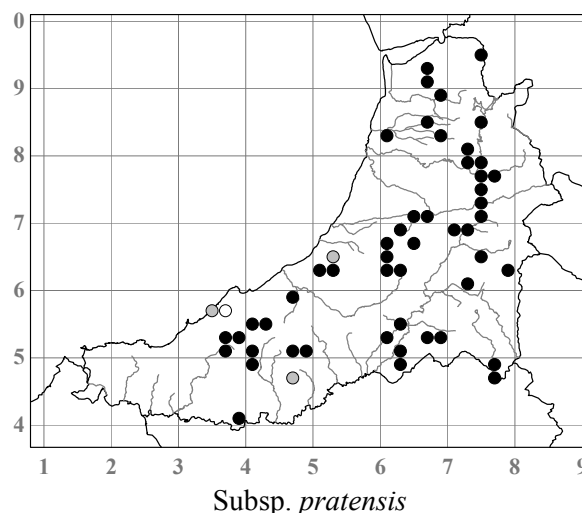
Material from near Aber-arth SN46, 1899 (ESM) was determined as *E. anglica* × *rostkoviana* [*pratensis*] by PFY. Further material, mostly from ungrazed sites, has been determined by AJS in recent years as intermediate between these two subspecies: ungrazed acidic-neutral pasture 300m SSE of Parcau-uchaf, Llanarth SN428551, 1991 (NMW); grazed acidic-neutral rhos pasture 400m W of Gellie SN376533, 1995 (NMW); dry heathy slope, Cwmerfyn lead mine SN695828, 2000 (NMW); rank hay meadows 100m E of Gwar-llethr SN612636, 1996-2003 (NMW), where these intermediates are the dominant Eyebright; and heathy verge of FC road by Mynach Vale lead mine SN772775, 1996 (NMW, AOC & PAS).

Subsp. **pratensis** Schübl. & G. Martens (*E. rostkoviana* Hayne subsp. *rostkoviana*) - Rostkov’s Eyebright - Effros Blodau Mawr

A frequent plant of hay meadows, rough pastures, grassy streamsides and road verges, and after *E. nemorosa* and *E. confusa* × *nemorosa* the third commonest *Euphrasia* taxon in the county. It is very characteristic of upland hay meadows, for example at Cae’r-meirch SN752736, 1981 (NMW, det. AJS), of Cattle- or Horse-grazed rhos pastures, for example on the pingo ramparts at Rhos Llawr-cwrt SN411500, 1988 (NMW, det.



PFY), of neutral, herb-rich pastures, for example at Llety-cybi SN603535, 1978 (NMW, det. AJS), and of flushed grassland on the coastal slopes, for example at Penmoelciliau SN342561, 1981 (NMW, det. AJS). Early records include ones from “several places between Aberarth and Pennant” SN46 (Marshall 1900) and from Parson’s Bridge SN77P, 1904 (BM, WHP, det. PFY). Salter (Diary 28.12.1905) had material from Ysbyty Cynfyn SN77P and Aberaeron SN46 named by Townsend. W. H. Pearsall (*BEC Rep.* 11: 21-49 (1936)) had material from Tymawr, Ysbyty Cynfyn SN756789 named by Pugsley, and it remains abundant in the hay meadows there, 1998 (AOC & JPW). Altitude limit 455m, heathy road verge, Bryn-y-rhyd SN681524, 2008.



Subsp. **monticola** Silverside (*E. rostkoviana* subsp. *montana* (Jord.) Wettst.) - Montane Eyebright  
AJS has determined several specimens as this subspecies, characteristic of damp, upland hay meadows, but because of taxonomic uncertainty these identifications are provisional, and the identity of material from a dozen other sites remains even more problematical. The most typical specimens are from herb-rich, unimproved neutral pasture at Llety-cybi, Llangybi SN603535, 1982 (NMW, conf. AJS), and from a hay meadow at Tymawr, Ysbyty Cynfyn SN756789, 1990 (NMW, conf. AJS). Less convincing specimens are from a hay meadow E of Hafodygofaint-isaf, Tyn-y-graig SN700694, 1997 (NMW, det. AJS as “cf. subsp. *monticola*”), and from a hay meadow E of Cilmeddu, 1km WNW of Ysbyty Ystwyth SN722717, 1993 (NMW, det. AJS as intermediate between subsp. *monticola* and subsp. *pratensis*). The remaining problematical specimens are all from hay meadows, rough pastures and road verges in the uplands.

#### ***Euphrasia arctica* subsp. *borealis* × *officinalis* subsp. *pratensis***

Recorded from a rough, Bracken-infested pasture below the road 1km SE of Devil’s Bridge SN747763, 2003 (NMW, det. AJS). Material from a large population in an acidic upland pasture just W of Tan-y-ffordd, 1km WSW of Ponterwyd SN740803, 1999 (NMW) was determined by AJS as “*E. officinalis* subsp. *rostkoviana* [*pratensis*] introgressed with *E. arctica*”.

#### ***Euphrasia nemorosa* × *officinalis* subsp. *pratensis***

A colony of this rare hybrid, otherwise known only from Monmouthshire, was found on a grassy working area in the felled conifer plantation on Bryn Du-bach, 3km SSE of Llanddewi-Brefi SN678527, 2003 (NMW, det. AJS) at 430m altitude.

#### ***Euphrasia confusa* × *officinalis* subsp. *pratensis***

There are several populations of this uncommon hybrid between tetraploid and diploid species in the Camddwr valley above Llyn Brienne, growing in rather dry acidic Sheep-grazed pasture: below the road 1.2km NNW of Soar y Mynydd SN782545, 1995 (NMW, CGE, LTR, det. AJS) at 330m altitude; by Rhydtalog ruin SN791521, 1995 (NMW, det. AJS) at 280m; and just E of the Camddwr 400m ESE of Soar y Mynydd SN78805309 (NMW, det. AJS) at 295m. Similar, but rather diminutive plants were seen in a flush in sheep-grazed pasture 300m SSW of Blaenglasffrwd SN766630, 1999 (NMW, AOC & MDS) at 380m altitude. Plants from Sheep-grazed slopes with *Linum catharticum* and *Thymus* at the E end of Craig Clogan, Cwm Berwyn SN72675806, 2003, closely resembling *E. rivularis*, proved to be this hybrid too (NMW, det. AJS).

#### ***Euphrasia arctica* Lange ex Rostrup subsp. *borealis* (F. Towns.) Yeo (*E. brevipila* auct.) - Arctic Eyebright - Effros yr Arctig**

Frequent in hay meadows, damp pastures with longish grass and not Sheep-grazed, on road verges and tracksides, inland and in the uplands, and almost absent from the coast. It was abundant and by far the commonest *Euphrasia* species in the now degraded upland hay meadows at Nant-llwyd SN788526, 1987-1996 (NMW, det. PFY). It was in wet calcareous fen with *Briza media* and *Epipactis palustris* by the Afon Mwldan SN200489, 1987 (NMW, det. PFY), and in dry mortar-rich grassland with *Leontodon hispidus* by the Hafod Arms Hotel, Devil’s Bridge SN742769, 1995 (NMW, det. AJS), as well as in acidic hay meadows E of

Lluest-bach, Comins Capel Betws SN624568, 1997 (NMW). It is especially characteristic, and often the commonest species, on heathy verges of roads and FC tracks in the uplands, as on the A44(T) W of Ponterwyd SN738807, 1999, and on lead mine sites, as at Pontrhyd-y-groes SN738722, 1994 (NMW, det. AJS). The only coastal record is from the steep grassy slope above the sea at Ty'n-bwlch SN553734, at 75m altitude, 1967 (NMW, det. PFY). Salter (1935) recorded this species (as *E. brevipila*) from a number of sites, and reported that material from "Llanbadarn Bog" SN6080, Parson's Bridge SN77P, Aberaeron SN46 and Strata Florida SN76M was determined as this by F. Townsend (Diary 28.12.1905).

Plants from the upland hay meadows at Cae'r-meirch SN751733, 1991 (NMW), from the lowland one at Winllan SN566572, 1992-2003 (Herb. AJS), and from a grassy FC road verge above the Nant Rhiwafallen SN552587, 1991 (Herb. AJS) have been determined by AJS as "approaching subsp. *arctica*" (which has not yet been found in the county). Altitude limit 455m, heathy road verge, Bryn-y-rhyd SN681524, 2008.

#### ***Euphrasia arctica* subsp. *borealis* × *nemorosa***

Material from the ballast of the disused railway 1km WNW of Llanilar SN614754, 1994 (NMW) was determined by AJS as "*E. arctica* subsp. *borealis* × *nemorosa* × ?*confusa*".

#### ***Euphrasia arctica* subsp. *borealis* × *confusa***

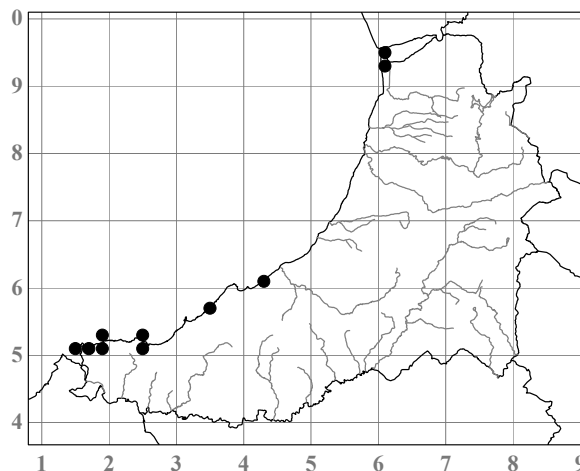
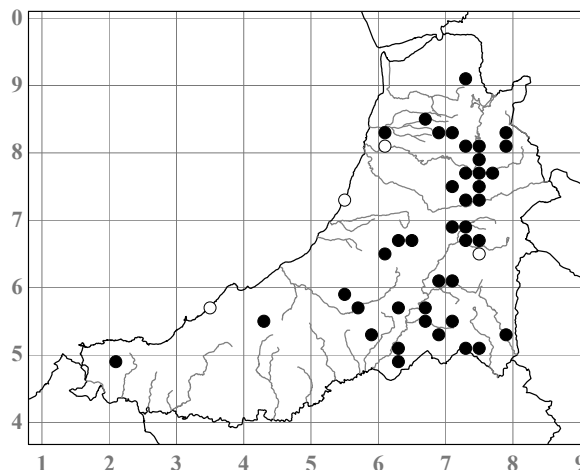
There are seven records of this hybrid, from a variety of habitats from acidic to calcareous, and from Sheep-grazed pastures to hay meadows: unimproved pasture, Caeau Llety Cybi SN603535, 1982 (NMW, det. AJS); stony *Calluna* heath slope 1km SE of Cwmerfyn SN704824, 1991 (NMW, det. AJS); Llwynmalus lead mine SN690679, 1992 (Herb. SPC, SPC, det. AJS); rough grass, disused station yard, Llanilar SN625753, 1992 (NMW, det. AJS); spoil at Mynach Vale lead mine SN77207750, 1997 (NMW, det. AJS); and hay meadow, Winllan SN5665720, 2003 (NMW). Altitude limit 385m, Sheep-grazed acidic pasture 800m S of Fuchsgau SN767800, 1993 (NMW, det. AJS).

#### ***Euphrasia* × *venusta* F. Towns. (*E. arctica* subsp. *borealis* × *scottica*)**

Recorded from a flush in blanket bog above the Afon Tarenig SN80128385, 2006 (NMW, SDSB & AOC, conf. AJS) at 370m altitude, and from a mineral-rich flush 200m W of Nant-Ilwyd, Soar y Mynydd SN78115240, 2003 (NMW, det. AJS) at 420m altitude.

#### ***Euphrasia tetraquetra* (Bréb.) Arrond. (*E. occidentalis* Wettst.) - Western Eyebright - Effros y Gorllewin**

Locally abundant on dunes and in grassy places on the cliff slopes and clifftops along the coast, although in most sites its hybrid with *E. confusa* is more abundant. It is on the mature dunes and on the golf course at Ynys-las SN69B, C, 1975 (JEH, conf. AJS) - 2004, although it has not been recorded on the Penyrergyd dunes. It is in short turf at the mouth of the Afon Drywi SN425607, 1997; abundant on the steep slope above the beach on the W side of Cwm Tudu SN355575, 1994 (NMW, conf. AJS); on banks and the verges of tracks at the E corner of the MoD site, Aber-porth SN255519, 1997; on the cliff slopes and in the sandy pasture by the church at Mwnt SN15V, W, 1987-2001 (NMW, conf. AJS); and abundant in clifftop turf in several places at Gwbert SN161507 etc., 1979 (NMW, det. AJS as "excellent material"). The earliest records are by Marshall (1900), who had material from "Heaths about Aberarth, Pennant, and Cross Inn" determined as *E. occidentalis* by Wettstein; Marshall remarks that they were "a very different-looking plant from my Cornish and Dorset specimens", and, considering

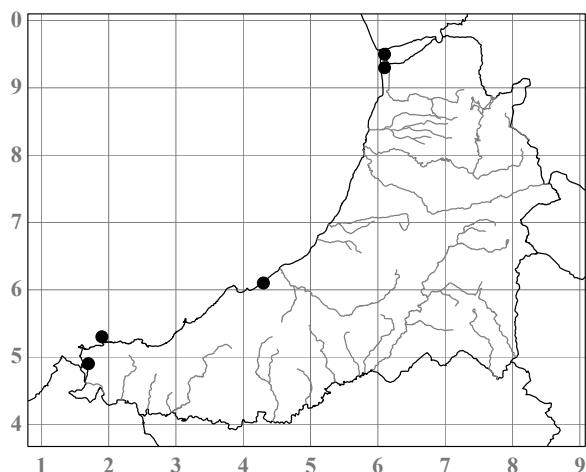




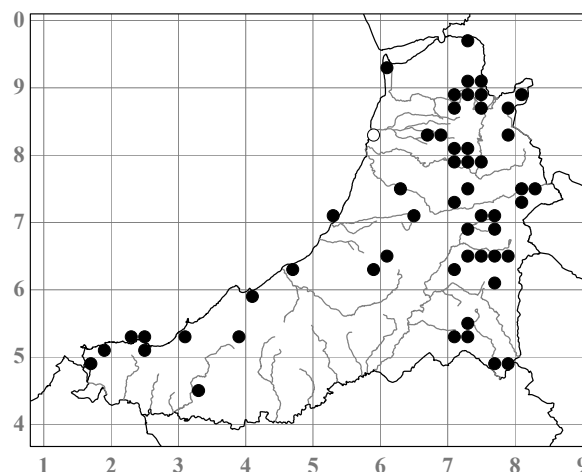
that they were inland, they cannot have been *E. tetraquetra* and were doubtless forms of *E. nemorosa*. Salter (1935) recorded the species from Ynys-las, and T. Stephenson recorded it, as *E. occidentalis* var. *calvescens* Pugsley (not now recognised) from Aberystwyth (Wade 1952).

### ***Euphrasia confusa* × *tetraquetra***

First recorded from “Cliffs near Aberystwyth” in 1966 (NMW, VG, det. PFY), this hybrid is known from four other coastal sites where it is usually more abundant than *E. tetraquetra* and usually occurs in the absence of *E. confusa*: locally abundant on the mature, grassy parts of the dunes at Ynys-las, for example at SN606935, 1997 (NMW, conf. AJS); steep grassy slope NE of the mouth of Cwm Cilfforch SN439616, 1994 (NMW, AOC & JPW, det. AJS); abundant in sheep-grazed sandy turf in and around Mwnt churchyard SN194520, 1982-1997 (NMW, conf. AJS); and grassy clearings on a Gorse slope, Penyrergyd SN162489, 1996 (NMW, conf. AJS).



*Euphrasia confusa* × *tetraquetra*



*Euphrasia nemorosa*

### ***Euphrasia nemorosa* (Pers.) Wallr. - Common Eyebright - Effros**

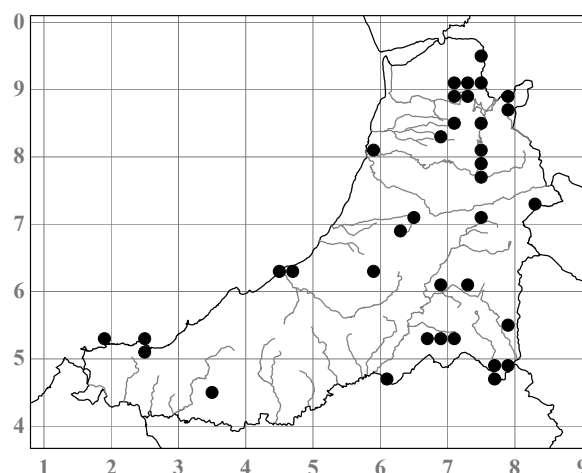
The commonest of the *Euphrasia* taxa in the county, and widespread in well-grazed pastures from the coast to the uplands, as well as in a range of other habitats such as roadside verges, dune slacks, lead mine sites, disused railways and cliff ledges. It can be abundant on acidic soils, for example on the heathy verge of the A44(T) road at Cwmergyr SN793829, 1987 (NMW, det. PFY), or on the sheepwalks near Blaenceulan SN708897, 1997 (NMW). It can be equally abundant on base-rich soils, as on the coast at Mwnt SN196519, 1995 (NMW, det. AJS) where it grows on sandy soil with *Briza media*, or among *Festuca rubra* on slumping till on the coast at Llanina SN404597, 1992 (NMW, det. AJS), or at Esgair Fraith SN740911, 1991 (NMW, det. AJS) where it grows with *Linum catharticum* on lead mine spoil. The earliest record is from “Mountain pastures, Plynlimun”, 1886 (AL) cited by Salter (1935), and Marshall (1900) recorded it (as *E. curta* var. *glabrescens*, which his specimens were named as by Wettstein) as common. Altitude limit 560m, damp cliff ledges at the head of the Nant y Moch, Pumlumon SN784862, 2002 (AOC & PAS).

### ***Euphrasia nemorosa* × *pseudokernerii***

Known only from the verge of the FC road by the Mynach Vale lead mine SN772775, 2003 (NMW, det. AJS), where it grows close to the colony of *E. pseudokernerii*.

### ***Euphrasia confusa* × *nemorosa***

Perhaps, along with *E. nemorosa* itself, the commonest *Euphrasia* taxon in the county, this hybrid is widespread in a great variety of dry and damp, acidic and base-rich grassland and heathy habitats from the coastal slopes to the uplands. It was first recorded from *Nardus* turf at the Esgair Fraith lead mine SN740912, 1990 (NMW, det. AJS) and in the same year from amongst *Carex flacca* on slumping clay on the coast



*Euphrasia confusa* × *nemorosa*

at Clogfryn SN445622 (NMW, det. AJS), an indication of its ecological range. It usually occurs in the absence of *E. confusa* and often in the absence of *E. nemorosa*. Altitude limit 600m, flushed slope above Llyn Llygad Rheidol SN79328731, 2002 (NMW, det. AJS).

#### ***Euphrasia confusa* × *micrantha* × *nemorosa***

Material from a heathy FC road verge 100m S of the Marchnant bridge SN801583, 1999 (NMW, AOC & JPW) was determined by AJS as possibly this triple hybrid.

#### ***Euphrasia confusa* × *nemorosa* × *scottica***

Material from a flush at 600m altitude above Llyn Llygad Rheidol SN79328731, 2002 (NMW) was determined by AJS as “apparently” this triple hybrid; all three putative parents grow nearby.

#### ***Euphrasia micrantha* × *nemorosa***

PFY has determined material from near Aber-arth SN46 collected in 1899 (ESM, cf. Ellis 1983), and from a pasture above Ty’n-y-pwll, Goginan SN674819, 1970 (NMW) as this hybrid. The only subsequent records are from among *Calluna* on lead mine spoil at Cwmsymlog SN696836, 2000 (NMW, det. AJS), and from a heathy slope by the lower road bridge at the Cwmerfyn lead mine SN695828, 2000 (NMW, det. AJS).

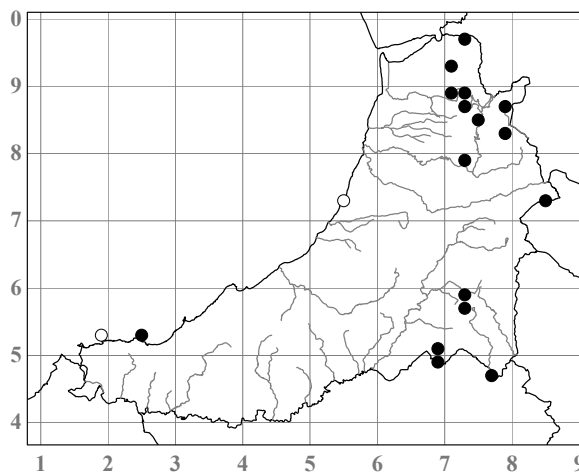
#### ***Euphrasia pseudokernerii* Pugsley - Chalk Eyebright - Effros y Calch**

It is surprising that this decreasing plant of chalk downland and limestone pastures, whose nearest locality is in Flintshire (where it has not been seen since 1962), should occur in the county. At the MoD site, Aber-porth SN247525 it grows in rough, somewhat base-rich grassland above the sea cliffs, 1979 (NMW, Herb. AJS, det. AJS). At the Mynach Vale lead mine SN77297751 it grows on calcareous spoil and on an adjacent FC road verge, 1996 (NMW, AOC & PAS, conf. AJS) - 2003 where there were *c.*125 plants in 1997.

It is perhaps even more surprising that material from wet, calcareous fens by the Afon Mwldan, growing with *Gymnadenia*, *Briza media*, *Carex viridula* subsp. *brachyrrhyncha* and *Phragmites*, SN201489, 1986 (NMW), and SN197483, 1990 (CGE) was determined by PFY in 1988-1990 as *E. pseudokernerii* forma *elongata* Pugsley, known otherwise only from fens in East Anglia. AJS however, in 2005 considered this material to be unassignable and perhaps to resemble a hybrid between *E. arctica* and *E. nemoralis*.

#### ***Euphrasia confusa* Pugsley - Confused Eyebright - Effros Gliniog**

Although this predominantly upland species is most characteristic of dry, Sheep-grazed, acidic pasture, it also occurs on calcareous lead mine sites, heathy road verges, streamsides and in flushed grassland. Several collections have been determined as “untypical” or “more or less *E. confusa*” by PFY or AJS and are ignored here, and really typical plants are not often found. Its hybrids, chiefly with *E. nemorosa*, are much commoner than the species itself. Representative collections typical of the species include: abundant in Sheep-grazed *Festuca ovina*/*Nardus* pasture, SE side of Craig yr Ochrau SN733594, 2003 (NMW, conf. AJS); in ungrazed, flushed, but dry, acidic pasture N of the stream in Cwm Ceulan SN702899, 1997 (Herb. AJS, conf. AJS “very typical”); on heavy metal polluted soil close to *Ditrichum plumbicola*, Cwmergyr lead mine SN79108271, 2006 (NMW, AOC & SDSB, det. AJS); on limestone chippings, Cwm Rheidol lead mine SN729782, 1992 (Herb. SPC, SPC, det. AJS as “very typical”); and on a heathy roadside verge 700m NW of the Tywi/Doethie confluence SN773472, 1998 (NMW, det. AJS). The earliest record seems to be from Aberystwyth (TS) in Wade (1952). Altitude limit 520m, among *Juncus effusus* and *Nardus* tussocks in Sheep-grazed turf by the Llyn Llygad Rheidol dam SN791878, 1997 (NMW, AOC & TDD, det. AJS).



#### ***Euphrasia confusa* × *micrantha***

First recorded (Ellis 1983) from near Ponterwyd *c.*SN78K, 1959 (IF-W, det. PFY), this hybrid has subsequently been recorded only twice: among *Calluna* on a heathy roadside bank, 2.3km E of Ffair-rhos

SN762680, 1998 (NMW, det. AJS); and, at its altitude limit of 495m, on a heathy FC road verge 1.5km NNE of Nant-y-maen SN771596, 2001 (NMW, AOC & RDP, det. AJS).

### ***Euphrasia confusa* × *scottica***

Recorded from five sites in the uplands: flush on streambank 200m N of Lluest-Dolgwial SN842771, 1990 (NMW, det. AJS); flush on Cwm Ystwyth lead mine SN810751, 1992 (Herb. SPC, SPC, det. AJS); flushed slope under Birches, 1.2km NNW of Soar y Mynydd SN778541 (NMW, det. AJS); heathy roadside verge 700m SW of Hafdre SN798530, 1995 (NMW, det. AJS); and steep, heathy and rocky S-facing slope just NW of Craig Clungwyn SN777472, 1998 (NMW, det. AJS) with other populations nearby. Altitude limit 370m, the first two sites above.

### ***Euphrasia micrantha* Rchb. (*E. gracilis* (Fr.) Fr. ex Drejer) - Slender Eyebright - Effros Mân-flodeuog**

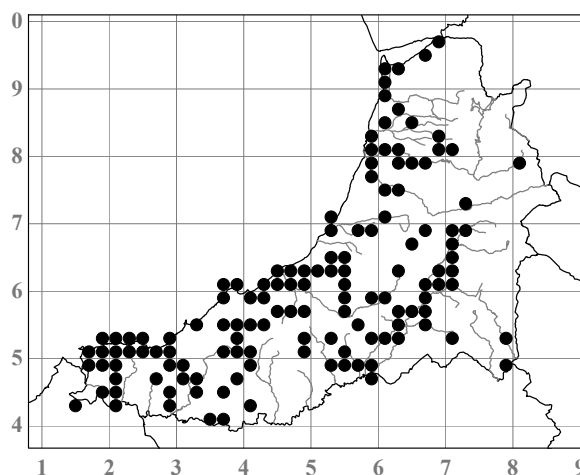
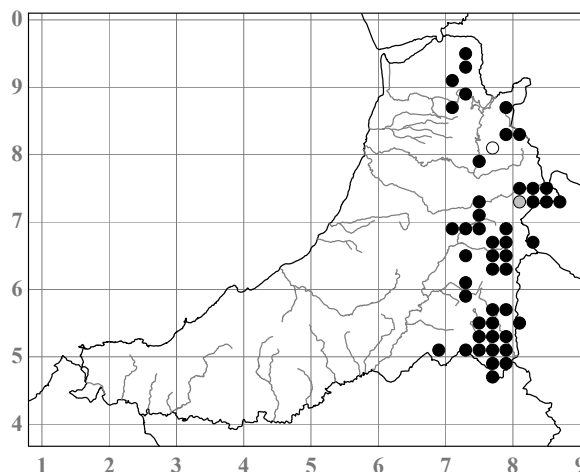
Very rare in the county. Specimens were named by Pugsley from Aber-arth c.SN480638, 1899 (BM, ESM); from Devil's Bridge c.SN740770, 1915 (BM, WCB); and from near the Rheidol Falls SN77E, 1919 (BM, CVBM). Ones collected by Salter labelled "Above Llyn Llygad Rheidol, Plynlimmon" SN7987 and "Plynlimmon, 1925" (NMW) were determined by Pugsley as "apparently abnormal *E. micrantha* Rchb.", but were inadvertently placed under *E. scottica* in Salter's Flora (1935, see Wade 1952). Pugsley (1930) cites a Ley record from Pumlumon. Salter (Diary 30.7.1942, his last botanical entry) reports that TS brought him *E. micrantha* from between Ponterwyd and Devil's Bridge SN77. It was then found in 1955 on the Cardiganshire side of the Llyfnant SN79 (NMW, JEL, det. PFY & PDS), and in 1973 on the slope above the road S of Troedrhiwrddwen SN772475 (IMV). The 1942 and 1973 records were not confirmed by experts, but may well be correct. The only recent records are: among *Calluna* on shaly lead mine site by road gate, Cwmerfyn SN701822, 1991 (NMW, conf. AJS); among *Calluna* on a stony slope by the Afon Doethie at its confluence with the Nant y Cnwch SN767499, 2000 (NMW, AOC & JPW, conf. AJS); and at its altitude limit 385m, among *Calluna* on gravelly verge of FC road in a felled conifer plantation, 900m NW of Nantystalwyn SN80105836, 2001 (NMW, AOC & RDP, det. AJS).

### ***Euphrasia scottica* Wettst. - Scottish Eyebright - Effros Eiddil y Fawnog**

A very characteristic plant of slightly mineral-rich flushes on upland slopes, where it grows with such species as *Carex hostiana*, *C. pulicaris*, *Rhynchospora alba* and *Eleocharis multicaulis*, often in areas dominated by *Molinia*. It usually occurs as small populations scattered down the wetter parts of the flushes, and is rarely seen on the surrounding drier ground. It occurs mostly at over 300m altitude, the lowest record being at 180m in a flush on the W bank of the Afon Doethie SN765495, 1988 (NMW, det. PFY). Altitude limit c.610m ("to about 2,000ft."), Pumlumon, Salter (1935); 640m, flush above Llyn Llygad Rheidol, Pumlumon SN79368723, 2002.

### ***Odontites vernus* (Bellardi) Dumort. subsp. *serotinus* (Syme) Corb. (*Bartsia odontites* (L.) Huds. var. *serotinus* Syme) - Red Bartsia - Gorudd**

A frequent plant of pastures, pathsides, road verges, railway ballast, quarries and waste ground. It is especially common in unimproved but poached neutral grassland and in trampled gateways, but it also occurs, sometimes in abundance, on reseeded grass slopes and on reclaimed and reseeded lead mine spoil, for example on a slope reseeded in 1999 by the Aberystwyth Marina SN58208119, 2004, and on spoil reseeded in 1991 at the Goginan mine SN689815, 1994 (NMW). It can become abundant in fallow arable land, as at Llwynysgaw SN216521,





1996 (NMW, AOC & PJW). Ley (1887), Marshall (1900) and Burkill & Willis (1894) all recorded only var. *serotinus*, and Salter seems not to have distinguished varieties on his own account. There are no definite records of var. *vernus* and it probably does not occur in the county. Altitude limit 340m, FC road verge 600m NE of Dalar-wen, Llyn Brianne SN793496, 1999.

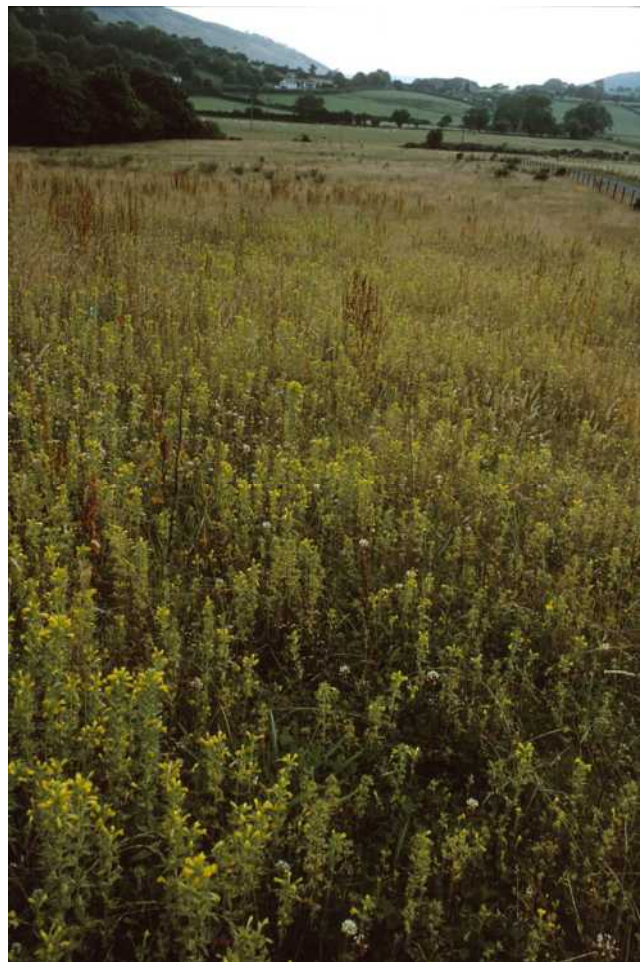
**Parentucellia viscosa** (L.) Caruel (*Bartsia viscosa* L.) - Yellow Bartsia - Gorudd Melyn

First recorded, in rhos pasture on and around pingo ramparts, 400m E of Ardwyn, Gorsgoch SN49265037, in 1982 (DGJ & DAW), where c.1,300 plants were counted (NMW, AOC & MC), and c.20 in 1996 (JT); this was the only probably native site for it in the county. In 1994 it was found in abundance over several acres of reclaimed lead mine spoil reseeded with grass about three years earlier at the Goginan mine SN689815 (KL, JL & JWH) and remains in variable but often considerable abundance there, 2007. Also in 1994 a few plants were found on a reseeded roadside slope by Glanyrafon Bridge SN609805 (SPC).

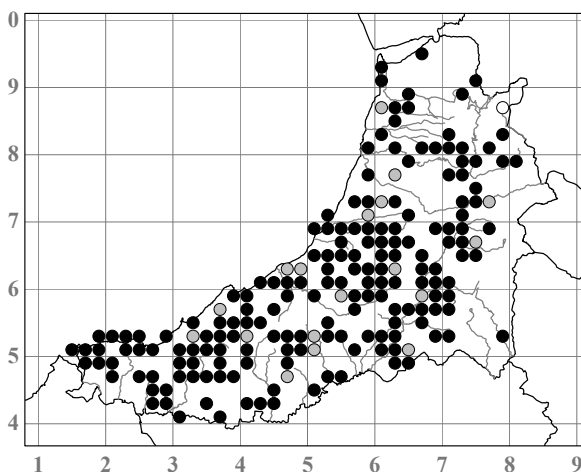
**Rhinanthus minor** L. - Yellow Rattle - Cribell Felen (Hopsyn y Gwair, Pwrs y Bugail, Pwrs Grog, Pwrs Siarad)

Subsp. **minor** (*R. crista-galli* L.)

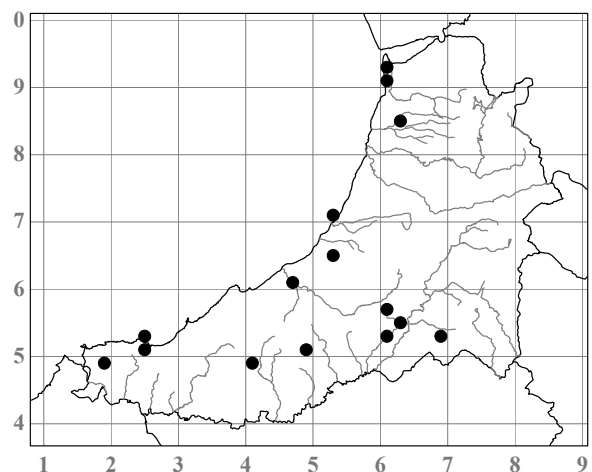
A frequent hemi-parasitic annual of hay meadows, unimproved pastures and road verges. It is usually confined to relatively infertile and well-drained soils, and can often be very abundant as in the hay meadows on Pendinas, Aberystwyth SN581804, 1965-2005, and 500m NNW of Pengarreg, Llanrhystud SN532700, 1992-2004 (NMW). It does also occur in marshy grassland, for example by the old course of the Afon Leri at Ynys-las SN608921, 1991-2004 (NMW), where it grows with subsp. *stenophyllus*, and in rhos pastures, for example at Rhos Glandenyys, Nebo SN538650, 1992-2004. Salter (1935) described it as “extremely common and seems to form half the crop in the small upland patches of hay-meadow”, and it has clearly decreased in abundance with the loss of these meadows since his day. The map of *R. minor* comprises chiefly subsp. *minor* but also records unallocated to a subspecies. Altitude limit (as the species) 610m, above Llyn Llygad Rheidol SN7987, 1905 (Salter Diary 21.9.1905, 1935).



*Parentucellia* on reclaimed mine spoil, Goginan, view SW from SN690816, July 1994



*Rhinanthus minor*



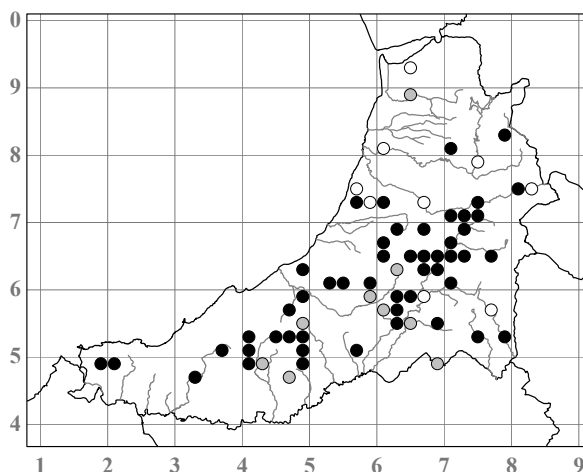
*Rhinanthus minor* subsp. *stenophyllus*

Subsp. **stenophyllus** (Schur) O. Schwarz

Later flowering than subsp. *minor*, more characteristic of damp, slightly base-rich pastures and fens, and less widespread and frequent. It occurs chiefly near the coast and in the SW of the county, for example in fens and damp pastures around Ynys-las SN69A, B, 1996-2004, in wet heath and flushes on the MoD site, Aber-porth SN25K, L, 1997-2001 (NMW), and in base-rich fen by the Afon Mwldan near Penparc SN2048, 1996 (NMW). Altitude limit 455m, heathy road verge, Bryn-y-rhyd, 3.5km SE of Llanddewi-Brefi SN681524, 2008.

**Pedicularis palustris** L. - Marsh Lousewort - Melog y Waun

Confined to the wetter parts of valley mires and to peaty flushes in rhos pastures, often in tall herb communities and usually in small quantity. It becomes rare in the uplands and is most characteristic of sites at around 160-200m altitude. Altitude limit *c.*470m ("about 1,550ft."), Salter (1935); 325m, valley mire, Cors Bwlch-y-baedd SN71147014, 2004.



*Pedicularis palustris* in flush, Rhos Llawr-cwrt, view N from SN414499, July 1982

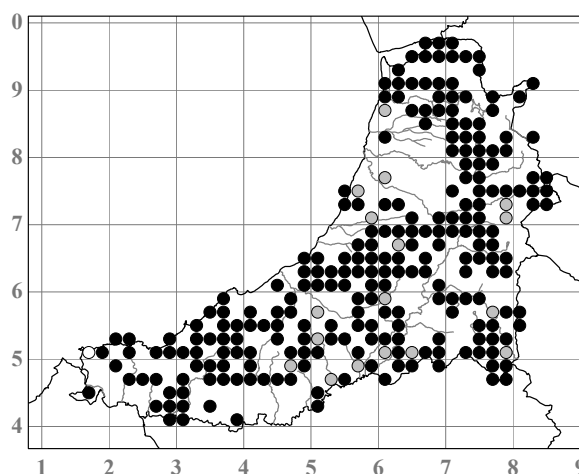
**Pedicularis sylvatica** L. - Lousewort - Melog y Cŵn

Subsp. **sylvatica**

A common plant of rhos pastures and damp acidic grazed grasslands of all sorts, wet heaths and the drier parts of valley mires. It occurs in flushes and heaths on the coastal slopes, and extends well into the uplands. White-flowered plants are often seen. Altitude limit *c.*470m ("same altitudinal range" as *P. palustris*), Salter (1935); 470m, flushes in blanket bog 1.3km ENE of Llyn Gwngu SN851737, 1997 (AOC & JPW).

Subsp. **hibernica** D. A. Webb

This variant with pubescent calyces and pedicels, predominantly western in the British Isles (the opposite of the distribution of the pubescent variant of *Veronica scutellata*, var. *villosa*, and probably of no greater taxonomic significance) is occasionally found, always with subsp. *sylvatica*, and shows no ecological or geographical distinction from it in the county. It is usually much less frequent than subsp. *sylvatica* and often occurs just as single plants; only on the wet heath at Rhos Cilcennin SN526619, 1997, and in places in rhos pastures near Glanrhocca, Llangybi



Subsp. *sylvatica*



SN628543, 1999, is it the more abundant variant. Altitude limit 330m, flush on NW-facing slope S of Cefnyresgair-fawr, 3km ESE of Tregaron SN707581, 1993.

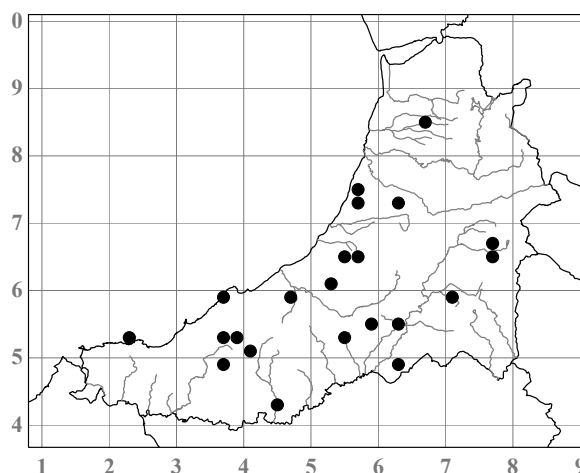
### ***Lathraea squamaria* L. - Toothwort - Deintlys**

Recorded from only three places in the county, in damp, fertile valley woods and river banks, and from nowhere else in West Wales. At Tyn-y-garth, Cwm Einion SN690945, it has not been seen since its original discovery, reported to Salter (Diary 27.5.1930): "Mr. E. Chambers writes: 'As to the locality for *Lathraea squamaria*, - I found it in the Einion valley. It appeared in 1910, 11 and 12 on the roots of Cherry Laurel on the bit of path leading up to the Refreshment Farm on the right going up. I never saw it again, and I believe it must have been introduced with some bush or other.'" In 1966 it was found in the second valley S, Cwm Cletwr SN668919 (JPS), under Hazel; the numbers of spikes counted here have been c.48 in 1983 (ADF), 40 in 1986, 13 in 1987, none in 1988, 3 in 1989, 12 in 1990, 14 in 1991, 55 in 1993 (all RAS). In 1993 a new colony was found further W at SN667920 (RAS & WMC), under Small-leaved Lime, with 4 spikes in 1993, 3 in 1994 (SPC), 15 in 1997 (WMC), 20 in 2002 (BW) and 18 in 2004.

In 1971 it was found in the Aeron valley at Aber-mydr SN476604, in mixed estate woodland and on an adjacent cottage lawn, under Hazel, Elm, Lime, Horse Chestnut etc.; the numbers of spikes counted have



*Lathraea squamaria*, Coed Cwm Cletwr,  
view W from SN667920, May 2004



*Pedicularis sylvatica* subsp. *hibernica*

been 131 in 1971, 25 in 1975, 81 in 1976, 28 in 1977, 92 in 1978, 15 in 1988, 16 in 1989, 17 in 1990, 51 in 1992, 30 in 1994, 8 in 1996, 28 in 1997, 15 in 1999, 23 in 2003, 31 in 2004, 28 in 2006, 24 in 2007 and 15 in 2008 (RPB). In 1999, just across the Afon Mydr here, 111 spikes were found under Hazel, reduced to 4 in 2003, 25 in 2004, 31 in 2006, and 42 in 2007. In 1996, 1km down the Aeron from here, c.20 spikes were found at the base of a wooded slope by the river at Ddol-wen SN467611 (RJWi), with 43 counted in 1997, 84 in 2003, 80 in 2004, and 164 in 2007. In 2008 (RPB; AOC) nine more colonies, mostly under Hazel and Ash, were found along the river connecting these two sites, so there is in fact a metapopulation here extending for c.1.2km.

### ***Lathraea clandestina* L. - Purple Toothwort - Deintlys Porffor**

Naturalised in the Penglais dingle, Aberystwyth SN59348202, where it has been known for at least 30 years and where in 2006 there were two small clumps 20cm apart (RG); these are at the base of a *Metasequoia*, but the likely host is *Populus tremula*, suckers of which are only 10m away. Native of W Europe.

### ***Orobanch* L.**

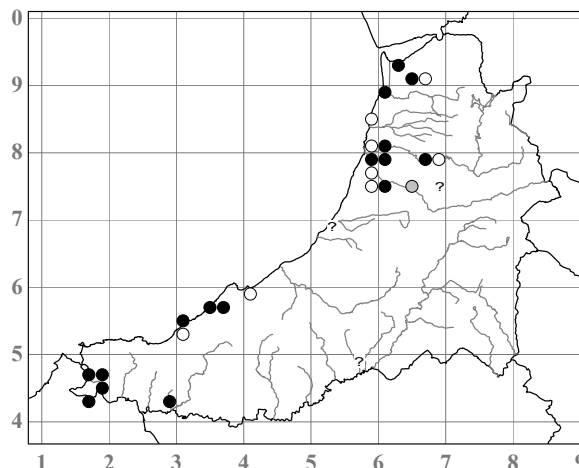
There seems to have been only one record of a host in the county proven by haustorial connection (see below). I have always been unwilling to guess at hosts since seeing an *Orobanche* in the middle of an acre of bare sand on the Cabo de Gata in Portugal; it was growing next to a concrete post, and I realised that if that post had been any sort of plant, I would have been absolutely certain that it was the host.



***Orobanche rapum-genistae* Thuill. (*O. major* auct.) - Greater Broomrape - Gorfanhadlen Fawr**

Recorded from about 16 sites in the county before 1950, and from 20 since. Most of records are in the coastal zone, but it extends *c.*10km up the Rheidol and Ystwyth valleys and *c.*20km up the Teifi valley. At most of its sites it seems to have been growing amongst and thus probably parasitising *Ulex europaeus*, but Salter mentions *Cytisus scoparius* as a host, and haustorial connections to the roots of *Cytisus* were found in 1990 on a plant in Pant Da wood SN670788, 1989-1994 (SPC). Near Pantmawr, Llanilar SN609754, 1993 (JPL), and near a hide on the Teifi Marshes SN183454, 1991 (MEB) it has been recorded growing among both *Cytisus* and *Ulex*. Its usual habitat is just behind the leading edge of Gorse scrub where it is spreading over pasture.

Counts of spikes in a colony in open Gorse scrub NE of Borth church SN614898, where it was first seen in 1984 (ADF) have been 28 in 1988 (AOC & JRA), none in 1996, 23 in 1998, 19 in 2004, but none in 2005. The largest known colony, uncountable but certainly with well over a hundred spikes, is in extensive Gorse scrub 200m W of Tregibby Farm, Cardigan SN180474, 1999 (AOC & MDS). Evidence of long-term persistence is slight, except for a site at Tan-y-bwlch SN581790, where Salter recorded it from 1904 to 1906 (Diary 14.11.1904, 10.6.1906) and where about eight spikes were seen in 1993 (AM). The earliest records were from Cwmnewydion *c.*SN67X-77C and Llanrhystud *c.*SN56J (Morgan 1858). Wmffre (2004, pp.90, 502, 754, 775) discusses the possibilities of various place-names in the county deriving from names for this species, Corn-yr-afr, Corn-y-bwch, Cornbwch and Cribin Cornhydd, but none are conclusive.



***Orobanche hederæ* Duby - Ivy Broomrape - Gorfanhadlen Eiddew**

In several places along the sea cliffs growing with Ivy, both in the open and in woodland. It was first seen at Penbryn in 1924 (Salter Diary 14.9.1924) and is still frequent in several places both on the cliffs from



*Orobanche hederæ*, Penbryn cliffs SN291524, July 1976

SN29655285, 2000 (AOC & MDS) to SN28855215, 2004, and in scrub and woodland for 100m up the dingle towards Llanborth SN29365230, 1995 (AOC & PC). It has also been recorded from the cliffs at the NE end of Cei Bach SN415600, 1982; from cliffs just N of Llangranog SN310542-312544, 1958 (DEdeV & AMcGS, field card at BRC) - 1999; from scrub by the lane to Lochtyn at Llangranog SN313541, 2002 (SPC); and from the steep, rocky Netpool Wood on the Teifi estuary SN170461, 1982. In 1936 Salter “Found *Orobanchae hederæ* in good flower in the garden”, i.e. at Fairview, Llanbadarn Fawr SN598810, probably implying that he had not planted it (Diary 4.9.1936); in 1989 five spikes were seen under a Yew tree in the garden of the house immediately below Fairview (SPC), and later counts here have been of *c.*25 spikes in 1990 (SPC), 15 in 1992, 11 in 1993 (SPC), 11 in 1995, 14 in 1996, *c.*40 in 2002, 17 in 2003, 26 in 2004 including four 10m to the W on the Ivy-covered roadside slope outside the garden, 27 in 2005 (SPC), 40 in 2006 (SPC), 21 in 2007 (SPC) and 11 in 2008 (SPC).

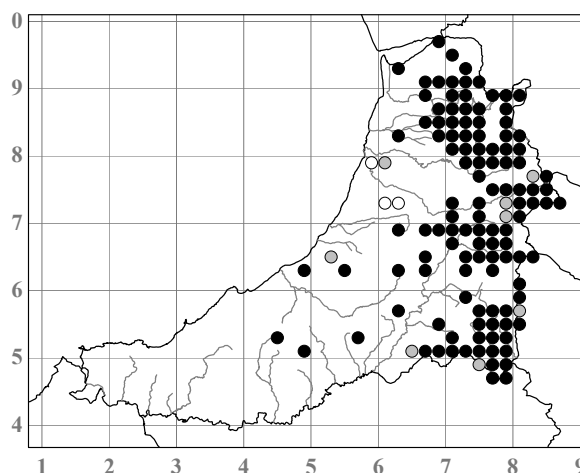
#### ***Orobanche minor* Sm. - Common Broomrape - Gorfanhadlen**

First recorded growing on Clover at the College Farm, Tan-y-graig SN590757 in 1916 (AJ, Salter 1935). In 1938 Salter saw it “In great quantity (hundreds of plants) in a clover cultivation, College Experimental Station, Penglais”, Aberystwyth (Diary 1.8.1938, Wade 1952); it was found again more or less in the same place but in a very changed environment in a shrubbery on the University campus under *Brachyglottis ×jubar* ‘Sunshine’ in 1981 (ABS, MHB), and in 1995 one spike was found here among *Cotoneaster* bushes by the entrance to Penbryn Hall SN59708197 (RBi), and in 2008 one spike was in a shrubbery nearby at SN595818 (SPC). The only other site for the species was 1km away in the grounds of the University Chemistry Department (now the Art Department) on the Buarth SN58808151 where three spikes were seen in 1987 (JRA, AOC & CDP), 18 were seen in 1990 when it was under *Brachyglottis ×jubar* ‘Sunshine’, and a few again in 1995.

### **LENTIBULARIACEAE**

#### ***Pinguicula vulgaris* L. - Common Butterwort - Tafod y Gors**

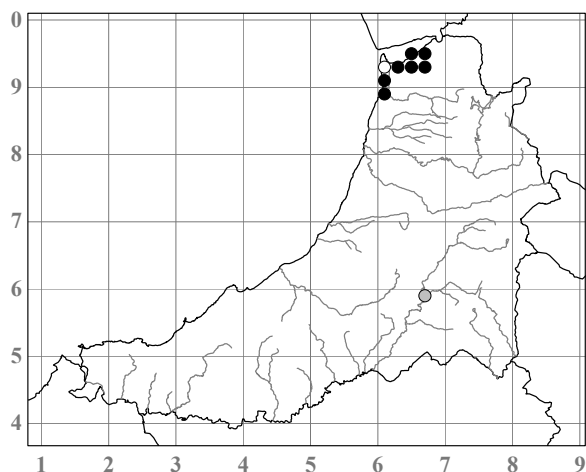
A frequent plant of peaty and gravelly flushes, wet rocks, streambanks and wet heaths chiefly in the uplands, in all but the most acidic sites. It occurs at almost sea level on Cors Fochno SN69G, 1892 (Salter Diary 11.5.1892) - 2005, but not on the sea cliffs. It can be very abundant on wet, gravelly banks by FC roads, for example at Soar y Mynydd SN784533, 1987-2005, and sometimes grows on the mortared walls of lead mine ruins, for example in the wheelpit of the Nantyrarian mine SN70538142, 1987-2004. Altitude limit *c.*610m (“to about 2,000ft.”), above Llyn Llygad Rheidol, Pumlumon, Salter (Diary 26.9.1903, 1935); 640m, wet rocks above Llyn Llygad Rheidol SN79368723, 2002.



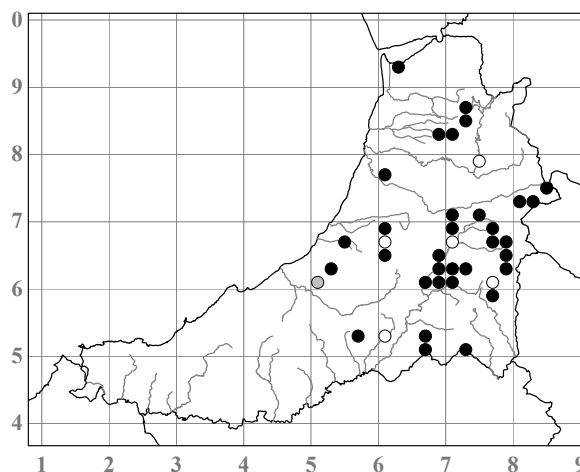
#### ***Utricularia australis* R. Br. (*U. neglecta* Lehm., *U. major* auct., *U. vulgaris* sensu Salter, non L.) - Bladderwort (Western Bladderwort) - Chwysigenddail Cyffredin**

Rarely flowering in the county, but all the records of Bladderworts other than *U. minor* that have been confirmed by floral characters have proved to be this species, and early records and more recent ones of non-flowering plants have been assumed to be it too. It is locally abundant in peaty ditches around Cors Fochno SN69, 1904 (Salter Diary 12.5.1904, as *U. vulgaris*) - 2005, where it is very much commoner than *U. minor*, and seems, as elsewhere in the county, always to grow in less oligotrophic waters. In 1926 (Diary 11.9.1926) Salter reported that part of Moel Ynys pool SN606923 was “fairly choked up with *Utricularia vulgaris*”, an unusually base-rich site for *U. australis* assuming it was this species. Although apparently not setting seed in Britain, it is a rapid colonist by turions and arrived and became frequent in the borrow pit in the Aberleri Fields SN6191 between its enlargement in 1991 and 1994 (AOC & MB), it appeared in scrapes dug on Cors Fochno SN635924 within a couple of years in 1997 (SPC), in 1993 it was found in a pool at the Loveden mine, 400m E of Henhafod SN668940, in 1994 in a pond in the conifer plantations at Lodge Park SN662932 (NMW), and in 2004 in recently enlarged ditches 400m W of Ynys Greigiog SN662949; at none of these

sites had it been seen on previous visits. The only record of it elsewhere in the county is from a recently cleaned-out ditch on the Teifi floodplain at Ystrad Caron SN671594 in 1986 (K, det. PT).



*Utricularia australis*



*Utricularia minor*

### ***Utricularia minor* L. - Lesser Bladderwort - Chwysigenddail Bach**

An occasional aquatic of oligotrophic, acidic and usually peaty waters in the middle and N of the county, chiefly in the uplands. It often grows amongst *Sphagnum* and other vegetation in swamps and may often be overlooked. It is commonest in old peat cuttings, bog pools and peaty ditches, and also often occurs in lakes both in marginal swamps and in water up to at least 1m deep, and in lead mine reservoirs. Although it is occasionally found in the moving water of peaty flushes, it has not been seen in the flowing water of streams or rivers. It has probably decreased significantly, both through drainage and because of the cessation of peat cutting, but often appears in newly-dug ditches, pools or dragonfly scrapes. On Cors Fochno it has since Salter's time been recorded only from two artificial pools at SN633921 in 1999, and SN63519204 in 2002. Altitude limit 490m, bog between Llyn Crugnant and Llyn Du c.SN760611, 1893 (Burkill & Willis 1894); 485m, lead mine reservoir 3.7km ENE of Ffair-rhos SN775686, 1998.

## **ACANTHACEAE**

### ***Acanthus mollis* L. - Bear's-breach - Troed yr Arth**

Three self-sown plants were seen on the roadside bank just NW of the Nant Gilwen bridge in Aber-porth SN25665158, 2008 (AOC & JPP), derived from garden plants nearby. Native of the W Mediterranean.

## **BIGNONIACEAE**

### ***Catalpa speciosa* (Barney) Engelm. - (Western Catalpa)**

Native of North America and introduced to Britain in 1880. There are nine trees planted by Theatr Mwldan, Cardigan SN178464, 2008.

### ***Catalpa* × *erubescens* Carrière (*C. bignonioides* Walter × *ovata* G. Don) - (Hybrid Bean)**

There is a conspicuous planted tree on the roadside at Dolgwartheg, 1.5km SSE of Aberaeron SN462613, 1992-2005 (NMW). Mitchell recorded a tree 109cm girth, 10m tall, in the Trawsgoed garden SN67037290, 1969, but this had gone by 1994.

## **VERBENACEAE**

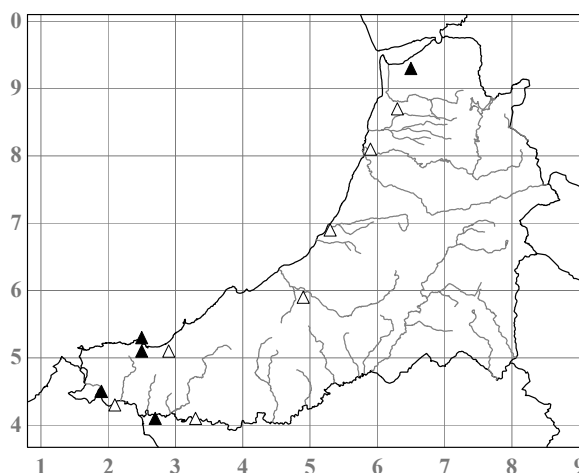
### ***Verbena officinalis* L. - Vervain - Y Ferfain**

Apart from two small but remarkably persistent populations at the two extremities of the county, this archaeophyte has been rarely recorded. At Craigypenrhyn, Tre'r-ddol SN654927 one plant was seen by Salter in 1904 (Diary 21.7.1904), "plenty" by him in 1907 (Diary 10.10.1907), a few were seen in 1957 and then regularly until the last sighting in 1991, when two were seen; it grew on the rock outcrop between the houses



and on the lane verges. At Cenarth SN269416 Salter saw it “in great abundance” in 1929 (Diary 19.9.1929), and it has been seen there regularly ever since, on the riverside rocks by the bridge, although since 1979 never more than half a dozen plants; about 1990 most of its habitat was destroyed to make a car park, and in 1993 only one plant was present, but six were seen in 2005 and three in 2007 (AOC & JPP).

The earliest record was from near the Aberystwyth workhouse SN589818 (Morgan 1849). Rees (1890) recorded it from Plas Crug, Aberystwyth SN5881, and Salter saw it there in 1900 (Diary 26.8.1900). Salter saw it on the road from Cardigan to Llechryd SN14X or 24C in 1894 (Diary 29.6.1894), and saw it as a garden weed at Llandre SN68I in 1904 and 1907 (Diary 25.7.1904, 29.9.1907). In c.1907 it was found close to Coed-y-Brenin, Ciliau Aeron SN492598 (ABS, MLL). Salter (1935) also recorded it from Llanrhystud c.SN5369, Penbryn c.SN2951 and Llandyfriog SN34F, and there is a 1936 field record at BRC from the Tresaith area SN25 (WRR & WWB). In 1995 it was recorded on the disused railway track on the Teifi Marshes c.SN186456 (DKR) but has not been seen there since. As a casual it was abundant on a tip above Cribach Bay at the MoD site, Aber-porth SN250519 in 1997, and one plant was seen further W on the site at SN24055239 in 2008.



### ***Verbena bonariensis* L. - Argentinian Vervain - Ferfain yr Ariannin**

Naturalised along the roadside verge by old cottages in Llan-non SN51396677, 2007 (AOC & JPP). A casual plant was seen by a path just SE of Pont Tanycastell, Llanychaiarn bridge SN58937879, 2009 (JPW & AOC). Native of South America.

## **AQUIFOLIACEAE**

### ***Ilex aquifolium* L. - Holly - Celynnen**

Frequent in woodland where it is often dominant in the shrub layer under *Quercus petraea*, on cliffs and screes, and in hedges, but also widely planted so its native range is uncertain. Woods with dominant Holly include the SW part of Coed Tan-yr-allt, Tal-y-bont SN649898, 1981-2004; Coed Troedrhiwseiri 2km S of Capel Bangor SN663783, 2005 (SPC); Allt Dderw, a *Quercus robur* wood, Pentre-gat SN361512, 1991; and Foel y Bryn, Cwrtnwydd SN489480, 1991-2004. It is salt-tolerant and on the coast at Allt Wen SN574791, 1981-2007, and at Cribach Bay and further W, SN25L, G, 1984-2001, it grows on screes and on the clifftops. Davies (1815) describes a Holly hedge made by progressive layering on the Peterwell demesne c.SN54T. There are conspicuously good and bad fruiting years, for example 1980 and 1981 respectively; several male trees at Capel Dewi SN451434, 454426 etc., 2000-2001, regularly flower in December (GH). A local item of folk medicine was recorded in the late 1970s from a Cardiganshire informant who remembered “seeing



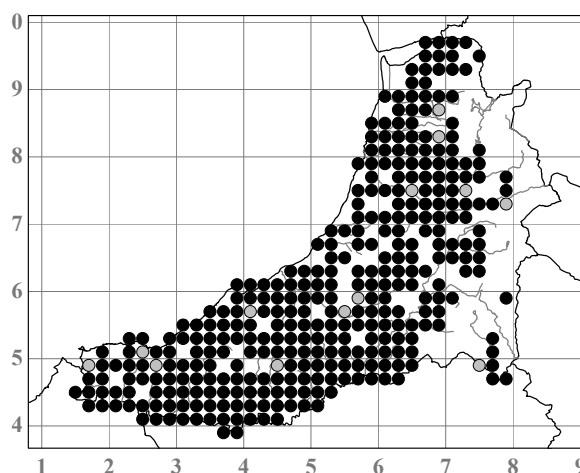
*Ilex aquifolium* on Ynys Celynnen, Ynys-hir, view NW from SN67789615, December 1979



1915 graffito on *Ilex* trunk, Ynys Celynnen, December 1979

a ring made of holly being put in the ears of cows that were unable to conceive" (Jones 1980).

The largest trees are difficult to measure. One, on the eponymous Ynys Celynnen, Eglwys-fach SN677961, "girthed fourteen feet [420cm] at ground-level before forking into two massive limbs", and had "1905" carved into its bark (Condry 1975, p.20), and the site name can be traced back to 1847 (Wmffre 2004, p.1189); the two limbs appear to have been separate since the sapling stage, and in 1979 the larger limb was 269cm girth (at 1.1m up), with "1915" carved on it, and the smaller 197cm (at 1.5m up), with "1910" carved, but the tree was later badly damaged and was dead by 2003, although a new sapling was growing from an upper fork, 2005; it fell in 2006. Another tree in the same parish, by the ruin of Ty'n-y-pwll SN68299430, was 340cm girth (at 30cm up) in 1992, but was probably multiple-trunked and had perhaps once been coppiced. A fine tree in the grounds of Plas Dolau SN62438140 was 271cm girth and 19m tall in 2005. A tree referred to by Wmffre (2004, p.1277) formerly grew by the eponymous Nantgelynnen, now known as the Nant Cnwch-gwyn SN7551 or 7651, and there are still trees by the Afon Doethie close by, 2005. Altitude limit c.305m (Salter 1935); 325m, N bank of Llyn Craigypistyll SN718856, 1992.



*Ilex aquifolium* invading *Quercus petraea*  
coppice woodland, Coed Ty-llwyd, Cwm  
Rheidol, view W from SN693798, March 2009

*Ilex aquifolium* on Ynys Celynnen,  
dead but with sapling, view E  
from SN677961, January 2006



Many cultivars are planted in gardens, estates and in hedges and no attempt has been made to identify all of them: '**Argenteomarginata**' is often planted in a variety of clones, as at Trawsgoed SN66957324, 164cm girth, 12m tall, etc., 1994 (AOC & CDPa) and in the Cardigan Castle grounds SN178459, 2003. A tree of the male '**Silver Queen**' at Trawsgoed SN66987291, was 98cm girth and 11m tall in 1994 (AOC & CDPa). '**Aureomarginata**' is equally common; a tree at Trawsgoed SN66907322, measured as 145cm girth and 17m tall and described as "Remarkable" by Mitchell (1969), was 170cm girth and 15m tall in 1994 (AOC & CDPa). A bush of '**Ferox**' 5m tall is in estate woodland, Llanerchaeron SN479601, 1999 (AOC, RL & CDPa).

Forma **chrysocarpa** Loes. (forma *bacciflava* (Weston) Rehder), with the berries yellow (RHS13B), is occasionally planted: there are several trees in the copse on the E side of Primrose Hill, Llandadarn Fawr SN60038098, 2001; one outside the S wall of the walled garden at Nanteos SN62167855, 1995 (RL & CDPa); and one in the roadside hedge by the back gate to Plas Einon (Lapley Grange), Furnace SN68439487,

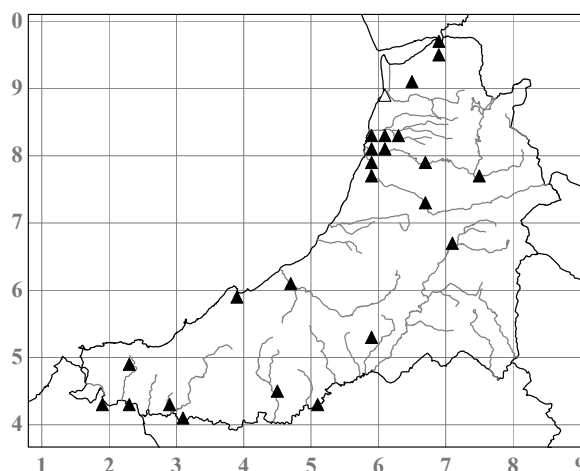


2001 (PSC & AOC). A big tree in the Convent grounds, Aberystwyth SN590815, c.1940-1970, has long gone. Another tree by the back gate to Plas Einion, along with one by the A487(T) nearby at SN68399504, 2001-2004, has amber-coloured berries RHSN163C; these seem similar to 'Amber'.

**Ilex ×altaclerensis** (Loudon) Dallim. (*I. aquifolium* × *perado* Aiton) - Highclere Holly - Celynnen Highclere

Widely planted in estate woods, graveyards, gardens and hedges, and often bird-sown in these and other situations. Every gradation to *I. aquifolium* occurs, and identification is often uncertain. Especially large populations occur in the Glandyfi Castle woods SN692967, 1994 (AOC & WMC), in the Penglais woods, Aberystwyth SN587821, 2004, and in the Alltyrodyn grounds SN449443, 2004. Maximum 202cm girth, Aberllofyn grounds SN588772, 1992 (NMW).

Among the many cultivars, the female 'Golden King' has been noted in Llangorwen churchyard SN603838, 2001, and a tree of the male 'Hodginsii' 190cm girth (at 50cm up), 11m tall, 1994, at Trawsgoed SN66997290, but these and other cultivars are doubtless more widespread.



## CAMPANULACEAE

**Campanula persicifolia** L. - Peach-leaved Bellflower - Clychlys Meinddail

Naturalised in two sites, on the W bank of the Afon Einion by the bridge at Ynys-hir SN68409580, 1993-1997 (NMW) but now gone; and on a hedgebank at the Tal-y-bont cemetery SN654900, 1998 (NMW) - 2004, a white-flowered form. In 1996 it occurred as a casual at Llanfarian SN589778 (SPC). Native of Europe.

**Campanula medium** L. - Canterbury-bells - Clychlys Caer-gaint

A large self-sown plant was on a retaining wall near the steps below Crynfryn Row, Aberystwyth SN58268180 in 2007. Native of S Europe.

**Campanula glomerata** L. - Clustered Bellflower - Clychlys Clystyrog

Reported, doubtless in error, from Porthmawr Wood, Llan-non SN5267 by Morgan (1849). In 1997 it was found growing from a throw-out in a layby on the A485 at Ty'nyreithin SN662622 (FS). Native only in the S and E parts of Britain.

**Campanula portenschlagiana** Schult. -  
Adria Bellflower - Clychlys Adria

Naturalised on walls, and occasionally in hedgebanks, and largely restricted to towns and villages. First recorded in 1980 naturalised on a wall in New Quay SN36 (NMW, RGE), it is now abundant on walls in several parts of the town, much more so than *C. poscharskyana*. It is also the dominant of the two species in Taliesin SN657914, and in much of Aberystwyth, Llanrhystud, Llan-non and Aberaeron. Much less common inland, it does occur in Tregaron SN678595, 1997 (where it



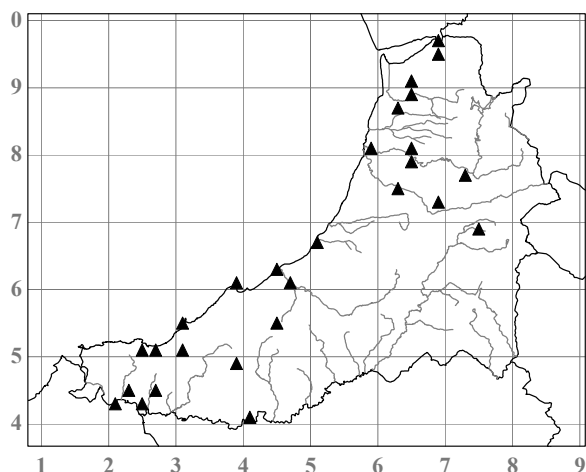
*Campanula portenschlagiana*, Taliesin,  
view N from SN657913, May 2007



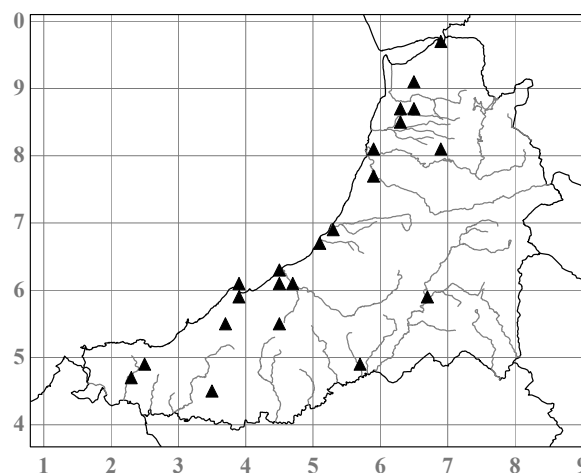
reaches its altitude limit at 165m) and Lampeter SN578486, 1997. Native of Yugoslavia.

***Campanula poscharskyana* Degen - Trailing Bellflower - Clychlys Ymlusgol**

Generally less abundant than *C. portenschlagiana*, it is more often found inland and on hedgebanks, for example where it was first recorded 1.5km W of



*Campanula poscharskyana*



*Campanula portenschlagiana*

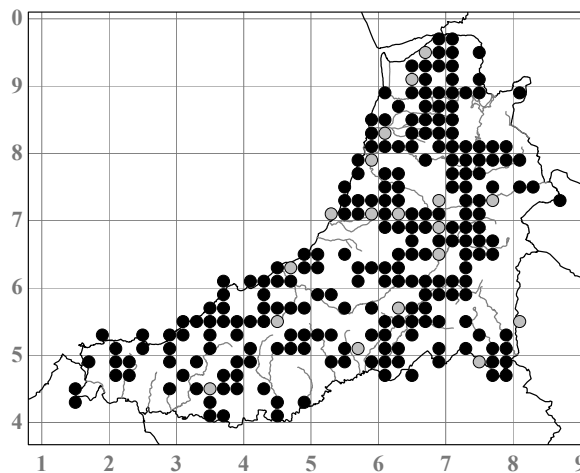
Sarnau SN301509 in 1984, and at Devil's Bridge SN735769, 1999 (where it reaches its altitude limit at 230m). It is the dominant of the two species in Eglwys Fach SN687957, 2004, and in much of Aberporth SN259513, 2003. In the N of the county it is sometimes known as the Aberdyfi Weed because of its abundance there. Native of Yugoslavia.

***Campanula trachelium* L. - Nettle-leaved Bellflower - Clychlys Dail Danadl**

The only localised record is of it apparently naturalised "in some very thick grass and nettles in the Tyglyn [Aeron] 'wilderness' " c.SN502597, 1908 (ABS, MLL). Salter mentions seeing it "in some quantity in private grounds, but perhaps planted" at an unspecified site NE of Aberystwyth (Diary 12.8.1924).

***Campanula rotundifolia* L. - Harebell - Clychau'r Eos (Clychau Glas, Clychau'r Gog)**

Frequent in well-drained grassland on infertile soils, on banks, rock outcrops, lead mine spoil and on the coastal slopes. It is surprisingly absent from the Ynys-las and Penyrergyd dunes. Although it is usually common on the upland sheepwalks, grazing prevents much of the flowering there and it is easily overlooked. It is by contrast one of the chief adornments of many roadside banks in late summer, and was exceptionally prolific in 1982 and 1991. There is considerable variation both within and between populations, and some of this was commented on by Pollard (1962) who studied populations from Bow Street, Borth, Elerch and Ystrad Meurig among others from elsewhere. White-flowered plants are rare and subsp. *montana* (Syme) P. D. Sell has not been seen. Altitude limit 530m, Craig y March, Pumlumon SN806881 (Salter 1935) and 2002, where it is very abundant and usually heavily infected by the rust *Coleosporium tussilaginis*.



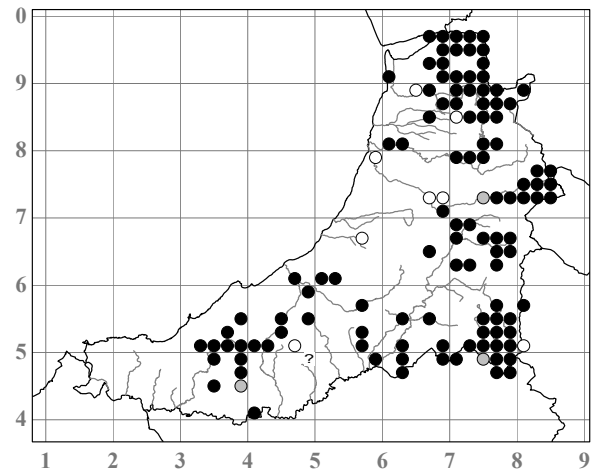
***Wahlenbergia hederacea* (L.) Rchb. - Ivy-leaved Bellflower - Clychlys Dail Eiddew**

A frequent but easily overlooked plant of damp grassland, marshes and flushes, especially characteristic of streambanks and flushed grassy slopes in the uplands. It often grows in *Sphagnum*, or among *Molinia* tussocks, and tolerates shade enough to grow sometimes in open woodland and under Bracken. Although generally absent from the coast, it does occur on low, grassy mounds in a field 200m SSW of Domen Las at Ynys-hir on the Dyfi estuary SN68579674, 2001 (RB & AOC) that is often flooded at high spring tides. It has been recorded from four lawns: at Glandyfi Castle SN692967, 1992 (AOC & WMC) - 2005 (AOC &

PSC), and nearby at Llwynceilyn SN691962, 2003 (CMFB) - 2008, in both of which it is abundant; at Ynys Edwin, Eglwys Fach SN67809625, 2007; and at Llanerchaeron SN479601, 1992-2008 (JPS), where it is in small quantity. In 1981 it was recorded from Ysbyty Cynfyn churchyard SN752791.

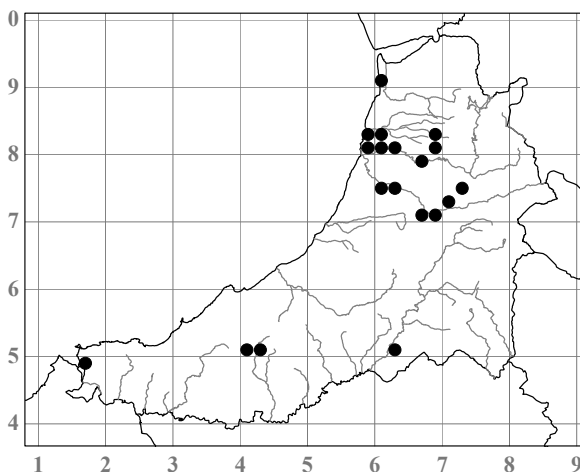
*Wahlenbergia* is certainly one of our most attractive plants, and the Cardiganshire populations of this nationally declining Oceanic Southern-temperate species are among our best botanical assets. It has probably declined slightly in the county in recent decades through drainage and grassland improvement, chiefly in the lowlands, but its tolerance of quite heavy grazing means that it has survived where some other species have been lost.

Especially good populations can easily be seen in the Leri valley above Tal-y-bont SN6688, 1904 (Salter Diary 30.7.1904) - 2004; in Cwm Mwyro SN7764 and 7864, pre-1936 (Salter 1935) - 2004; and around Soar y Mynydd SN7853, 1975-2005. Lees, who in 1837 (Lees 1838) was the first to note it in the county, later wrote evocatively: "I have gathered this fairy bell amidst the dark turbaries of Plinlimmon, by Llyn Teify and its sister lakes that fill the craters and hollows of the mountain above Strata Florida ..." (Lees 1842). In experiments in c.1930 by Chippindale & Milton (1934), 44 plants grew from the seed bank in the marsh below Frongoch Farm, 2km ENE of Aberystwyth SN608828, where it still occurs, 2004. Willis & Burkill (1895) gave details of the few insect visitors they saw at it in the Pumlumon uplands. Altitude limit c.455m, no locality (Salter 1935); 520m, flushed slope by the headwaters of the Nant y Moch, Pumlumon SN783863, 2002 (AOC & PAS).

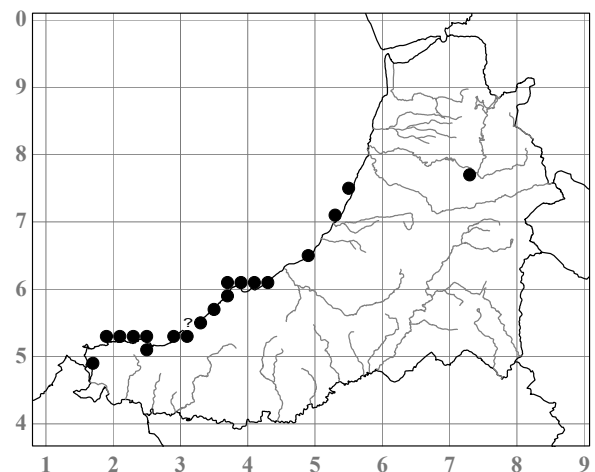


#### *Jasione montana* L. - Sheep's-bit - Clefryn

A common plant of dry banks, rocky slopes, shingle, screes and cliff ledges from the coast well into the uplands, and confined to open communities or short turf on thin, acidic soils. There is great variation, and three rather ill-defined ecotypes that have been given varietal status (Parnell 1987, Sell & Murrell 2006) can be recognised. Var. *litoralis* Fr., with numerous prostrate and ascending stems and small, narrow leaves, is the dominant one on sandy mounds on Morfa Borth SN610908, 1991, and the nearby golf course SN608916, 1991 (AOC & KH) as well as on the Gwbert golf course SN166495, 1991. It is also often abundant on river shingle, for example by the Rheidol below Glanyrafon Bridge SN608803, 1991 (NMW) and by the Ystwyth at Grogwynion SN699717-716720, 1991 (NMW), as well as on screes and on lead mine spoil, for example below Llyn Frongoch SN722751, 1997 (NMW) and at Gwaith yr Afon lead mine SN690839, 1991. Var. *latifolia* Pugsley, with one or two main stems, large leaves and often strikingly large capitula with conspicuous ovate bracts, is the dominant one on both hard and soft rock sea cliffs and slopes, for example at Mynachdy'r Graig SN557748, 1991 (NMW) and NE of Cei Bach SN418601, 1994 (NMW); Oldham (in Salter Diary 28.8.1924, and Salter 1935) had noted this variety on the sea cliffs at Llangranog c. SN35C and N of Cardigan. Inland it has been recorded on a roadside bank 1km SSW of Devil's Bridge SN73057600, 2006

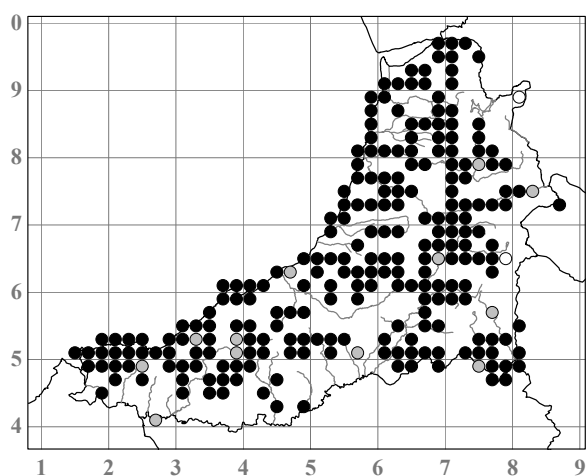


Var. *litoralis*

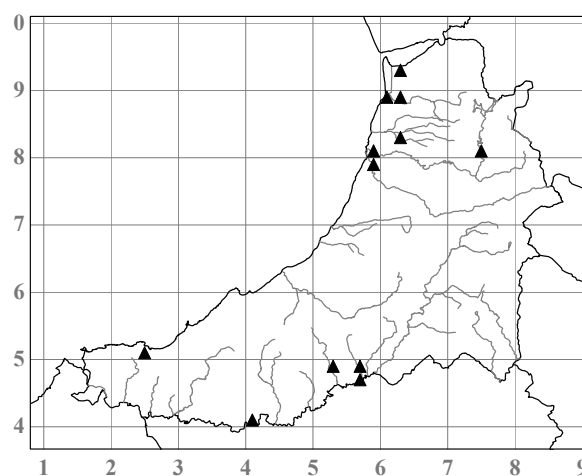


Var. *latifolia*

(NMW). Var. **montana** is the dominant one on dry banks and grassy and rocky places, but also occurs in smaller numbers in the characteristic habitats of the other two, and intermediates are common. Willis & Burkill (1895) gave details of the many insect visitors they observed in the Pumlumon uplands. Altitude limit 455m, Lluest y Graig SN803889 (Salter 1935); 350m, rocky ravine, Craig Nant-Ierch SN766525, 1988 (AOC & APF).



*Jasione montana* var. *montana*



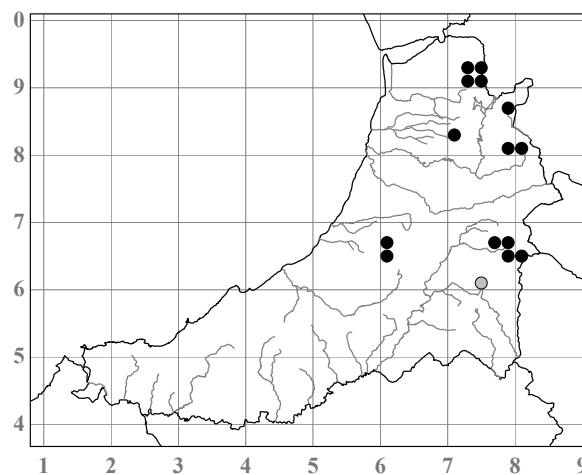
*Lobelia erinus*

#### **Lobelia erinus** L. - Garden Lobelia - Bidoglys yr Ardd

An occasional casual of pavements where it self-seeds from hanging baskets and window boxes, waste ground, tips, roadside verges and river banks, first recorded in 1991 on the eroding bank of the Afon Teifi 700m W of Pont Tyweli SN407403 (NMW), far from any habitation. It is becoming increasingly frequent. Native of S Africa.

#### **Lobelia dortmanna** L. - Water Lobelia - Bidoglys y Dŵr

Known from 16 of the more or less oligotrophic upland lakes and long-established reservoirs, growing on gravelly, stony or silty substrates and usually forming dense stands in shallow water. It is rarely mixed with other emergent species. There is little evidence of any change in its distribution or abundance over the last century or so, but in 1989 and 1993 it could not be found in Llyn Crugnant SN754613 where it had been recorded several times up to 1972 (BS). In Llyn Pendam SN70758370, where it had never been seen before, a single plant was found in 1998 (ACJ & AOC) and two plants were found 250m away at SN70888395 in 2007 (AOC & ACJ), and similarly in Llyn Conach SN73989315 a single plant was found in 2006 (AOC & JPW); this suggests that whereas it may have good powers of dispersal, it is unable to establish new colonies. Altitude limit 530m, W-most lake of Llynnoedd Ieuan SN795815, 1993.



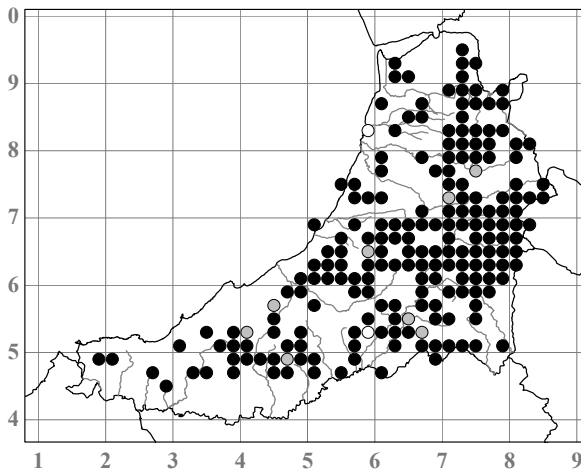
### **MENYANTHACEAE**

#### **Menyanthes trifoliata** L. - Bogbean - Ffeuen y Gors (Ffar Gors)

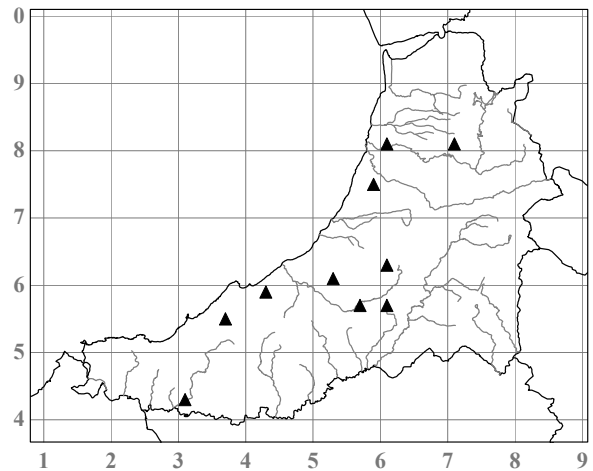
A frequent, and when in flower a most decorative plant of swamps, valley mires, the wetter parts of blanket bogs, in *Sphagnum* in wet woodland, and often in peaty pools and fringing backwaters and lakes. It tends to be dominant only in open water, where it often forms extensive floating mats. Of Cors Fochno c.SN69F in the 1860s, Jones (1887) wrote: "In May and June ... every bit of water will be fringed with white starry bogbean, lifting its bunches of marabout feather-flowers up out of the ink-dark water ..."; marabou (not marabout) is an exceptionally white kind of raw silk. From this same bog, Jones (1930) recounts the story of



an old hag, Yr Hen Wrâch, who, on being bade goodnight by an old woman who saw her eating her supper of Bogbeans and toadstools, leapt up, hissed like a serpent and then vanished. Jones (1980) reported on the evidence of interviews in the county in 1977-1979 that it was once thought to be beneficial for the kidneys. Altitude limit 520m, "in peat drains to 1,700ft" (Salter 1935); 520m, moorland flushes SE of Graig Ddu SN814736, 1991, and two other sites.



*Menyanthes trifoliata*



*Nymphoides peltata*

***Nymphoides peltata* Kuntze - Fringed Water-lily - Lili'r-dŵr Eddiog**

First recorded naturalised in 1992 in a ditch and pond at Brynamlwg, Penuwch SN609630 (ISF) where it had originally been planted. In the same year it had spread into the Afon Aeron from a garden pond at Winllan, Trefilan SN567573 (ISC, AOC & ISF). Since then it has been recorded from seven other widely scattered ponds and from a backwater of the Afon Rheidol at Glanyrafon SN61368048, 2002-2008. Native in Britain only in the Thames valley and East Anglia.

**ASTERACEAE**

***Echinops sphaerocephalus* L. - Glandular Globe-thistle - Ysgallen Bengron Chwarennog**

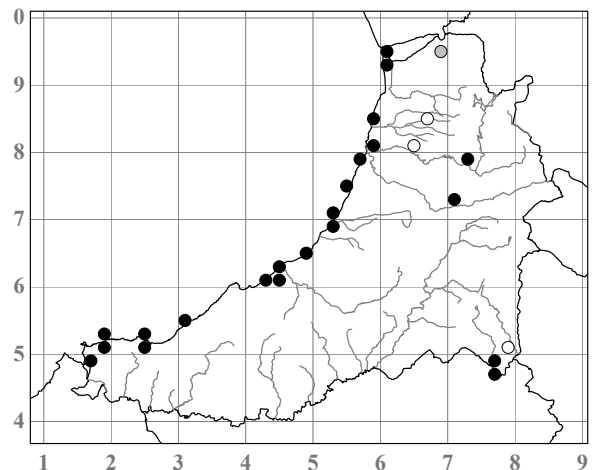
Four plants were found at the edge of a conifer plantation by the WPBS offices at Plas Gogerddan SN631835 in 1987 (APF), presumably deriving from the nearby gardens. It is a native of S Europe.

***Echinops bannaticus* Rochel ex Schrad. - Blue Globe-thistle - Ysgallen Bengron Las**

A large plant of this native of SE Europe, escaped from a nearby garden, was growing in an alley on the N side of High Street, Lampeter SN576481 in 2005 (NMW, CMO, det. AOC) - 2007.

***Carlina vulgaris* L. var. *vulgaris* - Carline Thistle - Ysgallen Siarl**

An occasional plant of sand dunes and dry open slopes on the coast, but very rare inland. On the Ynys-las SN69B, C and Penyrergyd SN14U dunes it is widespread but rarely abundant, and the coastal sites where it is most frequent include steep W-facing slopes NE of Aber-arth SN495651, 1990 (APF & AOC) - 2005 and at Cwm Cilfforch SN439616, 1994 (AOC & JPW). The only undoubtedly native inland sites are on the S-facing slope of Foel Fawr SN691949, 1983 but now probably gone (AOC & WMC), where it grew with *Linum catharticum*; and on the steep, W- and SW-facing, slightly base-rich grassy scree slopes below Craig Ddu SN768484, 1992, and Craig Clungwyn SN778472, 1979-1992, at the SE corner of the county where it grows with *Thymus* and *Carex caryophyllaea*. It is probably accidentally introduced at three sites, on landscaped lead mine spoil at the Cwm Rheidol mine SN728781, 1992-2005, and at



Grogwynion SN71507204, 2000 (AOC & JB), and at the Aberystwyth gasworks SN593809, 1995 (SPC). Salter (1935) recorded it at a few other inland sites, Troedrhwiwseiri SN6785, Llwyniorwerth c.SN650810, the Camddwr c.SN7951 (Diary 8.5.1902, the site being now under Llyn Brianne) and Llechryd c.SN2143 (Diary 15.09.1905, but this was in a list from ETT that includes several coastal species obviously not from inland at Llechryd); it has not been seen at the first two sites since. Altitude limit 320m, Craig Ddu SN768484, 1992.

### **Arctium lappa** L.

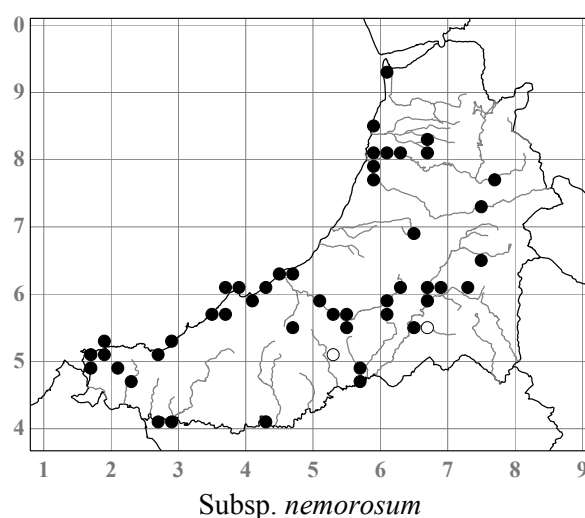
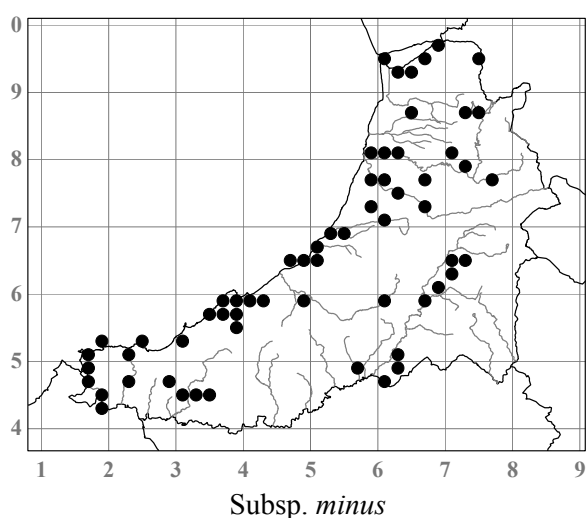
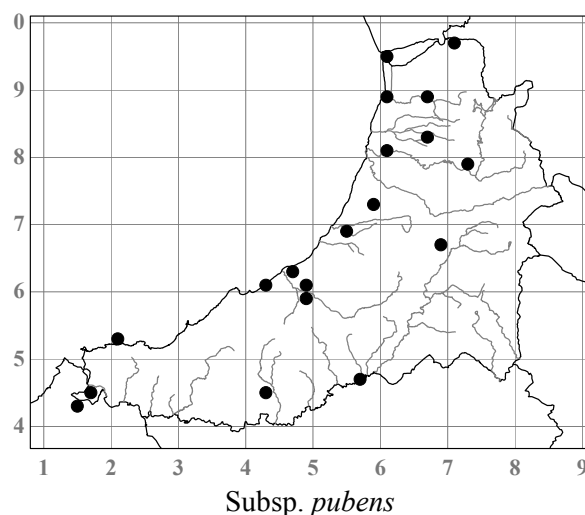
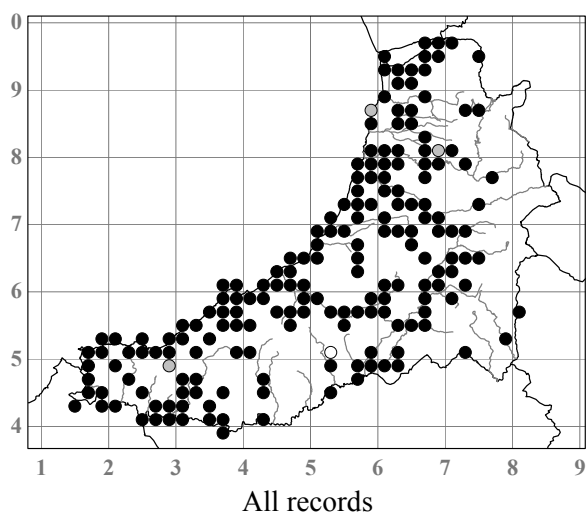
The taxonomy of Sell & Murrell (2006) is adopted here. The three commoner subspecies all grow on such sites as waste and disturbed ground, tips, tracksides, field and wood margins, scrub slopes, farmyards, deserted gardens, sand dunes, and are especially characteristic of horse-grazed pastures. They are confined to the lowlands.

Subsp. **lappa** - Greater Burdock - Cyngaf Mawr

Apart from a cryptic record by Morgan (1849) from “Grogathan” (no such place seems to be known), this archaeophyte has only once been seen in the county, in 1992 when three plants were growing in scrub by a path below Pentwd-isaf on the Teifi Marshes Reserve SN182455 (NMW). It never recurred there.

Subsp. **pubens** (Bab.) P. D. Sell (*A. pubens* Bab.) - Wayside Burdock - Cyngaf Min y Ffordd

First recorded in 1991 when a colony of c.20 plants was growing on disturbed ground by the Ystrad Teilo caravan site, Llanrhystud SN546695 (NMW, conf. FHP), close to a colony of subsp. *minus*. It has since been seen in 17 sites, at several of which it grows with either subsp. *nemorosum* or subsp. *minus*.



Subsp. **minus** (Hill) Hook. f. (*A. minus* (Hill) Bernh.) - Lesser Burdock - Cyngaf Bach

Probably frequent throughout the lowlands and as common as subsp. *nemorosum* with which it sometimes grows, but recent changes in the taxonomy have resulted in uncertainty about some of the records and the map of this subspecies may well over-represent it.

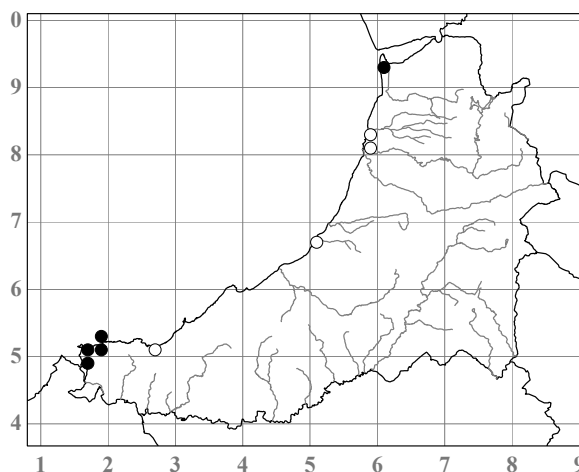
Subsp. **nemorosum** (Lej.) P. D. Sell (*A. nemorosum* Lej., *A. intermedium* Lange) - Wood Burdock - Cyngaf y Coed

Frequent throughout the lowlands. In several places it has been seen on the sides of FC roads in conifer plantations, as in Coed Hafod SN754731, 1991-2004; here as elsewhere colonies are often very long-

persistent. A small colony by the footpath gate to Pendinas at the E end of Dinas Terrace, Aberystwyth SN585809, identified 1992-2004, had been in existence since at least 1945.

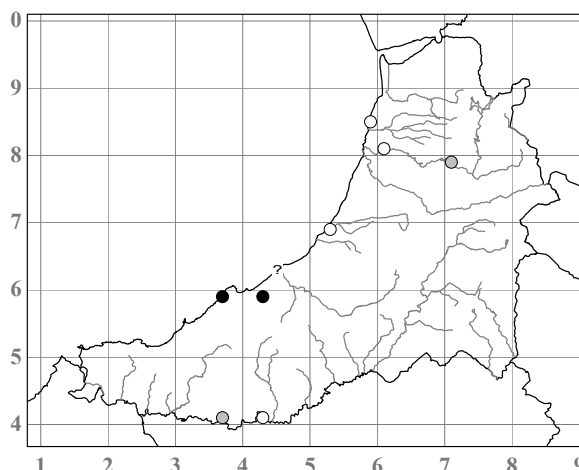
***Carduus tenuiflorus* Curtis (*C. pycnocephalus* sensu Salter, non L.) - Slender Thistle - Ysgallen Flodfaen**

A rare plant of dry, sandy places, pathsides, arable field margins and waste ground along the coast. It occurs at Tycanol, Ynys-las SN613929, 1993; around Ty-gwyn, Mwnt SN1951, pre-1936 (Salter 1935) - 1993; around the Cliff Hotel, Gwbert SN1650, 1941 (Whellan 1942) - 1990; and around the Penyrergyd sand dunes SN1648, 1975-2006 (NMW). Salter made the first record, at Clarach c.SN5883, in 1894 (Diary 14.10.1894) and it was still there in 1922 (Diary 12.8.1922); additional records by him were from Tresaith SN25Q (Wade 1952); from Llansantffraid churchyard SN512675 (Diary 16.7.1904); and from Pendinas c.SN5880 (1935). Morgan's (1849) record from Llwyniorwerth SN650810, an inland site, must be discounted.



***Carduus crispus* L. subsp. *multiflorus* (Gaudin) Gremli - Welled Thistle - Ysgallen Grech**

A rare plant, probably nowhere properly established in the county. It was first recorded by Purchas (1848), without locality, and Marshall (1900) reported it as very scarce and apparently found only a single, perhaps casual plant at Aberaeron c.SN46L (BM). Salter recorded it from four sites: at Glan-yr-afon c.SN6180 in 1892 (Diary 5.11.1892) and 1935 (Wade 1952); at Rhoscellan SN597855 (1935); at Llanfair SN433409 in 1930 (1935); and on the Wyre below Llanrhystud c.SN5269 in 1935 (Diary 23.8.1935). Since then, apart from unlocalised records from the 1950s at BRC from SN24, SN35 and SN56, it has been recorded only four times: several plants in a marsh by the Rheidol Falls SN709789, 1976 (JEH); three plants by the stream at Aberbachnog SN37404032, 1979 (NMW); c.20 plants at edge of recently reseeded pasture 1.5km S of Llwyneclyn SN439583, 1988 (NMW); and six plants in a similar situation 400m S of Craig yr Adar SN375597, 1996.

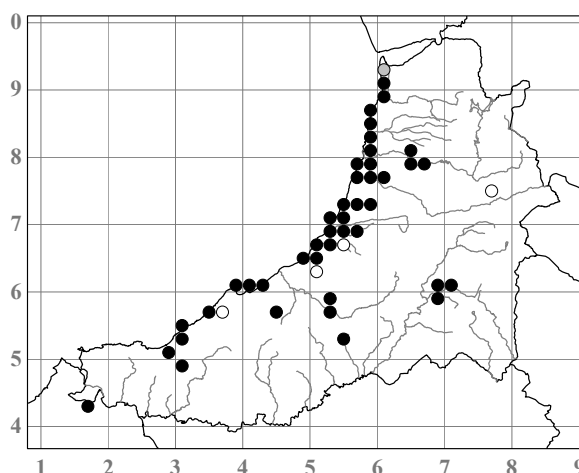


***Carduus* × *stangii* H. Buek ex Nyman (*C. crispus* × *nutans*)**

A single plant was found on disturbed ground by new houses on Felin-y-mor Road, Aberystwyth SN58098062, 2003 (NMW, det. CAS). *C. nutans* was nearby, but *C. crispus* has not been seen in this area.

***Carduus nutans* L. - Musk Thistle - Ysgallen Bendrom**

Described by Salter (1935) as "Frequent, but has few regular localities where it persists, often occurring merely as a casual in waste places"; this is still partly true, but it has become very much more common in the last 20 years especially in reseeded pastures and particularly near the coast. It is still abundant most years in sandy pasture behind Tan-y-bwlch beach SN580799 where it was first recorded by Morgan (1849) and where Salter reported it in 1901 (Diary 11.8.1901) and 1931 (1935), and it still occurs in pastures near Ty-



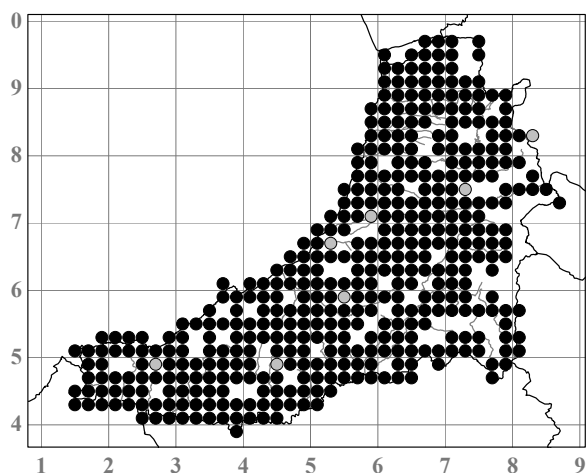
*Carduus nutans*



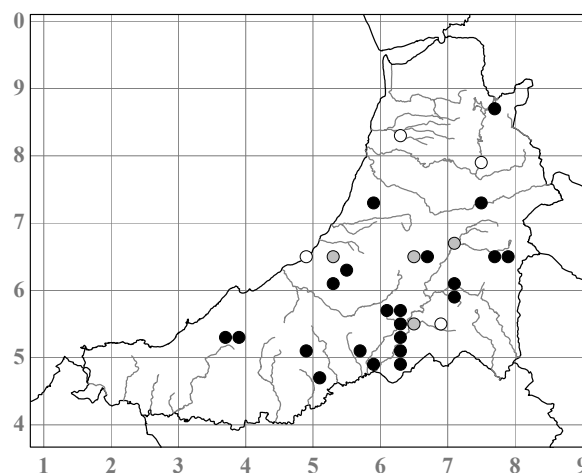
llwyd SN600771 where Salter first reported it in 1932 (1935). Apart from pastures, it often occurs on disturbed and waste ground, tracksides and the margins of arable fields. Var. *litoralis* P. D. Sell has not been seen. Altitude limit 315m, abundant in reseeded pasture, Drysgol SN684581, 1998. A record from Cahn Hill c.SN7675 by Wade (1952) is possibly from 350m or higher, and is of interest as it is from the pioneering hill pasture improvement site.

***Cirsium vulgare* (Savi) Ten. (*Cnicus lanceolatus* (L.) Willd.) - Spear Thistle - Marchysgallen**

Very common in pastures, disturbed and waste ground, roadside verges, felled woodland, often in reseeded pastures even in the uplands, but absent from the damper and more shaded habitats. White-flowered plants, as at Clarach SN587839, 1999 (SPC), are very rarely seen. Var. *litorale* P. D. Sell has not been seen. Altitude limit 380m, "Nant Camddwr (Plynllunon)" (Salter 1935); 550m, lead mine ruins N of Eisteddfa Gurig SN795857, 2002.



*Cirsium vulgare*



*Cirsium dissectum*

***Cirsium dissectum* (L.) Hill (*C. pratense* (Huds.) DC., *Cnicus pratensis* (Huds.) Willd.) - Meadow Thistle - Ysgallen y Ddô**

An uncommon plant of rhos pastures, wet heaths, valley bogs and *Molinia* tussock marshes in the middle parts of the county, forming conspicuous clonal colonies that rarely seem to set good seed. It is now known from c.20 sites, several with many colonies over a large area. Surprisingly, Salter recorded it from only five sites, and did not record it new for the county until 1924 when he found one or more of the still flourishing colonies by the Afon Mwyro SN776649-780648 (Diary 12.7.1924); it seems unlikely that it has really become more widespread since his day. The development of individual colonies varies a good deal. Details of many of them have been recorded, but few have so far been re-measured. Two colonies near Bwlchyrhandir SN593733 which, when measured in 1957, were 7 × 4m and 8 × 8m, had by 1991 coalesced into one colony 30 × 26m, and this had decreased to 30 × 15m by 1994 although there was no obvious change in the habitat (JT, but see comment under *C. ×forsteri*). A colony near Tal-glas SN556634 that was 16 × 8m in 1983 (RP) was 12 × 4m in 1991. A colony near Glwydwern SN497505 that was 20m in diameter in 1978 (AOC & DGJ) was the same size in 1993 (JT). Along with the Afon Mwyro, the area with greatest concentration of colonies is E of Comins Capel Betws SN6257, 1997. Altitude limit 320m, Afon Mwyro SN78036482, 1998 (AOC & JPW).



*Cirsium dissectum*, Bronyrhelem, view NE from SN62305750, July 1986

***Cirsium ×forsteri* (Sm.) Loudon (*C. dissectum* × *palustre*)**

Of 23 leaf samples collected at 1-2m intervals throughout a 30 × 15m colony near Bwlchyrhandir SN593733 in 1994 (JT), 17 were found on genetic analysis (RFJ & QONK) to be this hybrid and six were *C. dissectum*,

and a further 11 leaves collected from an area  $2 \times 3\text{m}$  here were all the hybrid. As the whole colony appeared in the field to be typical *C. dissectum*, if the analysis was correct it is possible that the hybrid may be widespread in the county. Two other records have been made, purely on morphological evidence: one plant, with both parents, in a fen SSE of Comins Capel Betws SN614564, 1995 (PD & THB; AOC); and several plants, again with both parents not far from here at SN622575, 1998 (MDS & DPS).

***Cirsium heterophyllum* (L.) Hill (*Cnicus heterophyllus* (L.) Retz.) - Melancholy Thistle - Ysgallen Fwyth**

Recorded, presumably erroneously, from Abermad c.SN5976 by Morgan (1849). In c.1966 it was planted in scrub near Cae'r-berllan, Ynys-hir SN683964 by WMC, became naturalised and was still present in 1986 (FE). It is native from Radnorshire northwards in Britain.

***Cirsium palustre* (L.) Scop. (*Cnicus palustris* (L.) Willd.) - Marsh Thistle - Ysgallen y Gors**

Var. **palustre** is very common in damp pastures, fens and all except the most acidic bogs, in scrub, on streambanks and on the coastal slopes on drift. On the upland sheep-walks it forms conspicuous colonies wherever there is flushing, and it can become very abundant even in drier areas where reseeding has taken place. Local agricultural shows still sometimes have a class for "Tallest Thistle" which a plant of *C. palustre* usually wins. White-flowered plants are common. Altitude limit c.610m, above Llyn Llygad Rheidol SN7987 (Salter Diary 26.9.1903); 640m, above Llyn Llygad Rheidol SN79368723, 2002.

Var. **ferox** Druce occurs generally between 300 and 450m in several, but by no means all of the upland parts of the county, and plants of it rarely



Champion Thistle, *Cirsium palustre*, at Llanfarian Show, Dorothy and Denys Evans, September 1997

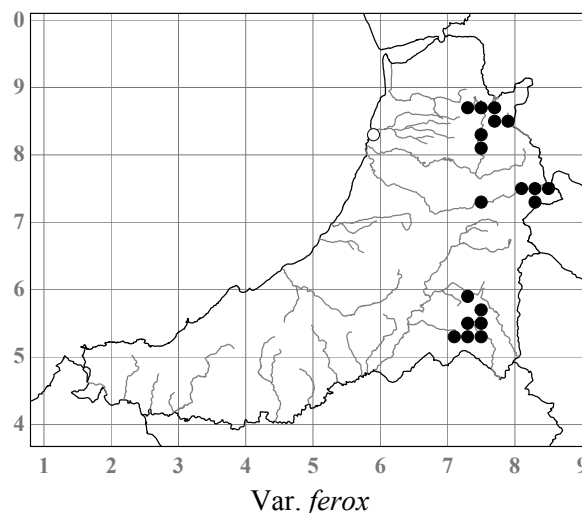
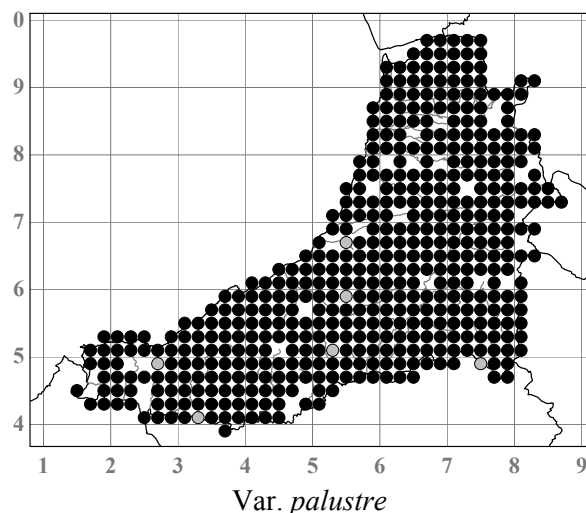


*Cirsium palustre* var. *palustre*, Nanteos, SN612786, July 2009



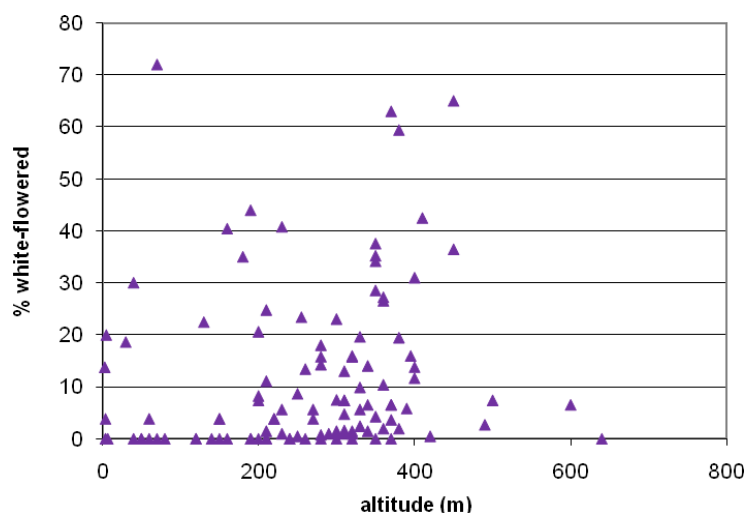
*Cirsium palustre* var. *ferox*, 2.3km E of Blaen-y-cwm, SN850757, July 2004



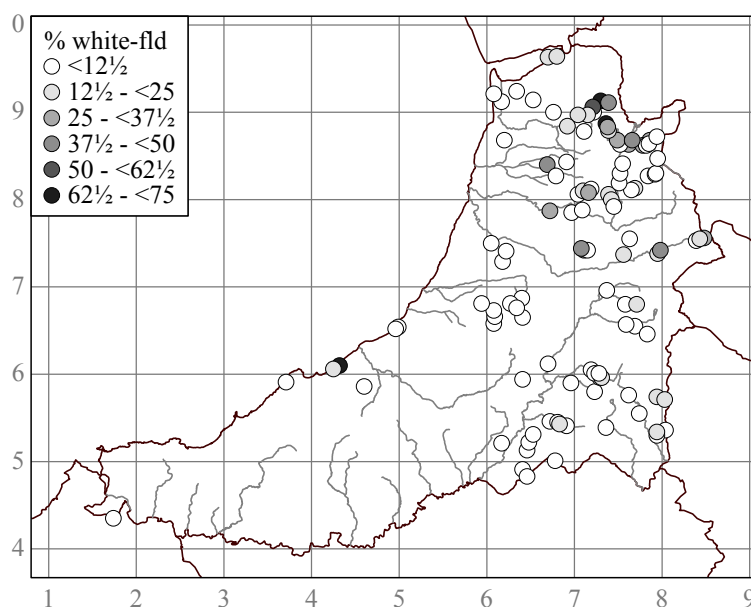


form more than about 10% of any population. Like var. *palustre*, it can become abundant in reseeded areas, and, although usually purple, populations can have up to 50% white flowers. Especially good examples can be seen by the road E of Cwmystwyth SN850757, 2001 (NMW, CDP & AOC). A very extreme specimen

was surprisingly collected by the coast at Clarach c.SN5883 in 1934 (NMW, PCh). Altitude limit 490m, one plant by track NNW of Eisteddfa Gurig SN795849, 2002.



The percentage of white-flowered plants (as opposed to purplish-white to purple) varies with altitude, and counts of 110 populations in 2002-2003 showed that in 78 populations from between 0 and 349m altitude the average was 9% white, while in 27 populations from between 350 and 499m it was 21%, and from above 500m where only 3 populations were counted it was 5%. Between 0 and 349m, 70% of the populations contained at least some plants with white flowers, while between 350 and 499m 93% did. Yet paradoxically the lowest population, in a marshy field often flooded at spring tides at Ynys-hir SN680964, had 32% white, while the highest, at 640m on Pumlumon SN792872, had none. For a discussion of the complex nature of this colour polymorphism see Mogford (1974, 1978). He found that throughout southern and central Wales, and to a slightly lesser extent in north Wales, there was an abrupt “barrier effect” at 280m altitude, with only purple-flowered populations below, and a high frequency of white-flowered plants in the populations at higher altitudes. Statistical analysis of the 2002-2003 Cardiganshire results by PAS (pers. comm.), however, shows that there is no clear relationship between altitude and the percentage of white-flowered individuals.



However, when the localities are plotted on the map (left), a general pattern similar to that observed by Mogford



(1974, 1978) is revealed, with greater proportions of white-flowered individuals present in upland populations.

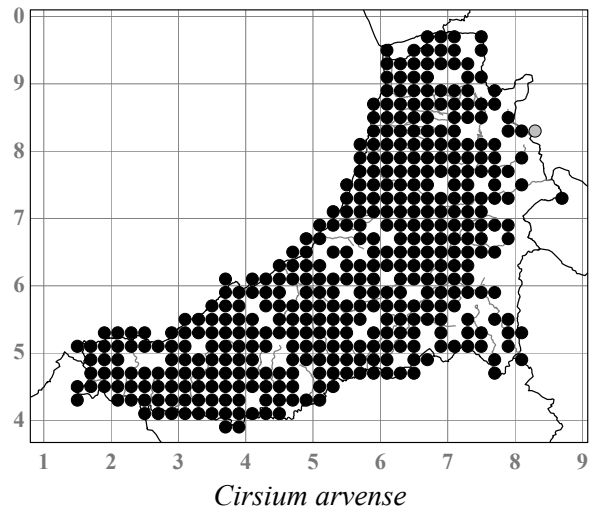
**Cirsium arvense** (L.) Scop. - Creeping Thistle - Ysgallen y Maes

Var. **arvense** is a very common plant of pastures, road verges, riverbanks, waste ground and open scrub, but usually absent from the most acidic soils. It can be an abundant weed in arable fields, and frequently forms large clonal patches in both unimproved and reseeded pastures. White-flowered clones are rarely found. Altitude limit 380m, “Nant Camddwr, above Ponterwyd”, Salter (1935); 430m, trackside, Nant Nod SN794841, 2002.

Var. **maritimum** Fr., scarcely branched and with a condensed inflorescence with few capitula, has been recorded from the exposed grassy slopes and clifftops on the coast at Gwbert SN159500, 1994 (PDS & AOC), and is likely to occur elsewhere in similar habitats.



*Cirsium arvense* ring, view W from  
Pen y Bannau SN742670, August 1998



**Onopordum acanthium** L. - Cotton Thistle - Ysgallen Gotwm

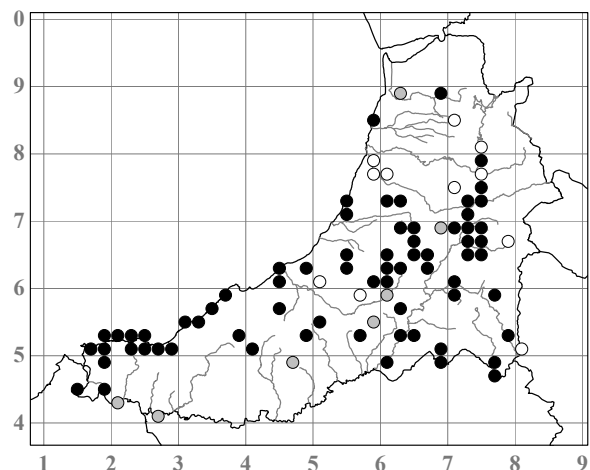
Salter (1935) said that this archaeophyte “occurs rarely as a casual or garden outcast, chiefly on rubbish-heaps”. There are only three localised records: Morgan (1849) recorded it from Tan-y-bwlch c.SN581793; Salter (Diary 28.6.1894) recorded it, as “Scotch Thistle”, on a walk between Mwnt and Gwbert SN15Q-V; and in the same year, or perhaps in 1893, he recorded it “by the cottages” at Clarach c.SN587837 (Salter 1894).

**Silybum marianum** (L.) Gaertn. - Milk Thistle - Ysgallen Fair

Although he did not mention it in his Flora, Salter (Diary 24.11.1894) recorded that A. H. Church told him of seeing this archaeophyte as an escape in Llanbadarn Road, Aberystwyth c.SN5981 at some time in the period 1887-1891 when he was at the University. It is native of the Mediterranean.

**Serratula tinctoria** L. - Saw-wort - Dant y Pysgodyn

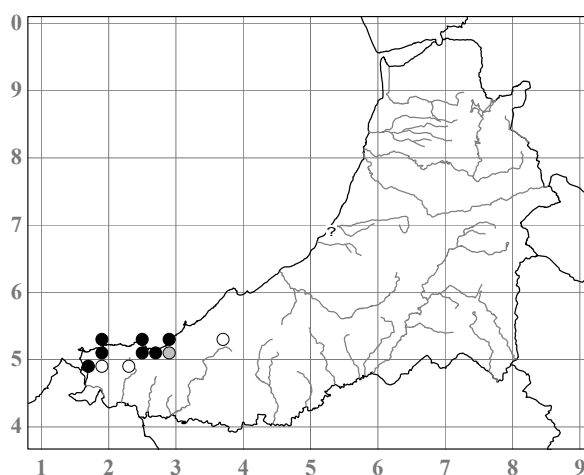
Locally abundant on heathy coastal slopes, especially from New Quay westwards. Inland it is widespread but rarely abundant, in rhos and other unimproved pastures, in flushes and fens, on heathy banks and streamsides, on cliff ledges and in open woodland, but it has a patchy distribution, being mostly in the middle of the county in the area W of Cors Caron, and from Strata Florida up to Devil’s Bridge; it is very rare both N of the Ystwyth and in most of the Teifi valley. Away from its core areas, it often occurs as single, very isolated plants, for example on a lane verge in woodland 500m E of Wallog SN594856, 1994-2007 (perhaps the locality “Near Sarn Cynfelin” where it was recorded in 1943 (PWR)). There is perhaps some evidence of



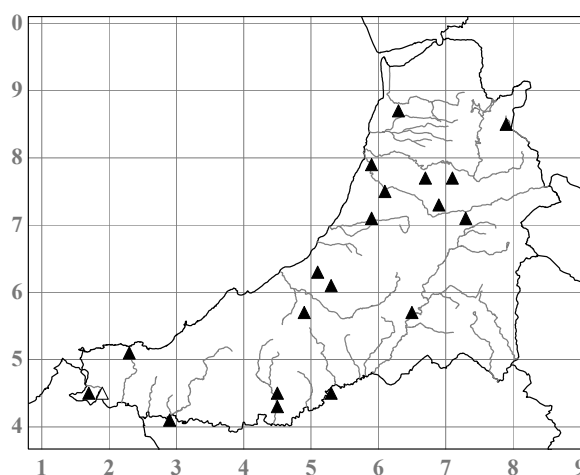
decline since Salter's time, but it is easily overlooked. Salter's record of var. *monticola* Boreau was discounted by Wade (1952). White-flowered plants have been seen a very few times on the coast. Dwarf plants referable to var. *reducta* Rouy occur in coastal heath in several places, for example E of Mwnt SN201520, 2006 (NMW), but here as elsewhere there is continuous variation to tall, much-branched plants of var. *tinctoria*. Altitude limit 425m, rocks above Llyn Egnant SN76Y (Salter 1935); 460m, NW-facing cliffs, Cefncerrig, 400m ESE of Nant-y-maen SN765582, 1994.

***Centaurea scabiosa* L. var. *scabiosa* - Greater Knapweed - Y Bengaled Fawr**

Confined to the coastal part of the SW of the county where it is, and has been since Salter's day, a local plant of roadside banks, clifftops and sandy pastures; it is abundant only in the sandy pastures and on some of the field banks at Mwnt SN196519, 1929 (Salter Diary 18.9.1929) - 2005. It appears prominently in John Brett's 1891 painting "Summer on the Cliffs" which almost certainly depicts a Barley field at Pencribach SN25L, now in the MoD site (Sumner 2001), where Salter, "skirting edge of corn-field", saw it in 1894 (Diary 28.6.1894). Salter also found one plant between Llan-nnon and the Wyre mouth c.SN56J (Diary 23.8.1935) and recorded it at Capel y Grugiau SN366523, 5km inland (Diary 16.8.1907). Otherwise there are only unlocalised 1950s field records at BRC of unknown, possibly casual status, from SN69, SN46 and SN55.



*Centaurea scabiosa*



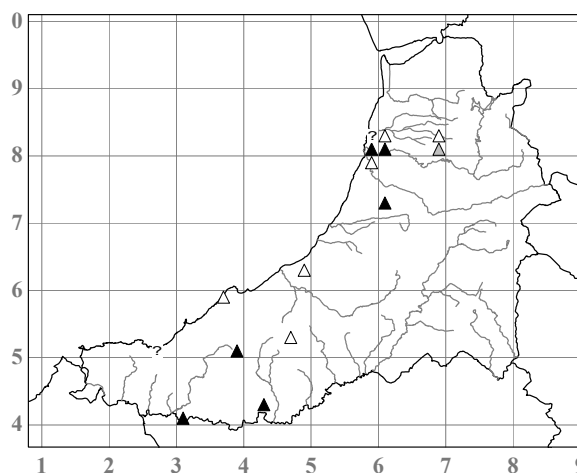
*Centaurea montana*

***Centaurea montana* L. - Perennial Cornflower - Y Benlas Luosflwydd (Yr Hen Wraig Benlas, Y Widw Benlas, Botwm yr Hen Ŵr, Llygaid Dafydd)**

Occasionally naturalised, especially in churchyards as Salter (1935) remarked, on roadside banks usually near habitations, and by old cottage sites. The earliest record is from the Rheidol valley near Capel Bangor SN67 in 1905 (Salter Diary 12.5.1905). Because some records have been lost the map is very incomplete. Native of Europe. Altitude limit 415m, roadside verges, Eisteddfa Gurig SN798840, 2003.

***Centaurea cyanus* L. - Cornflower - Glas yr Ŷd**

There are scattered records of this archaeophyte until the 1930s chiefly as an arable weed along the coast, Salter (1935) remarking that it was more frequent in the SW part of the county: Clarach c.SN5883 (Morgan 1849); roadside near Newcastle Emlyn c.SN34A, 1879 (BM, HLJ); Rhydyfelin SN57Z, ?1893 (Salter 1935, probably Diary 6.9.1893); cornfield near Coybal c.SN3759, 1894, 1902 (Salter Diary 27.6.1894 and 9.7.1902); cornfield in the lower Arth valley c.SN4863, 1907 (Salter Diary 31.7.1907); SW of Bow Street c.SN6183, 1924 (Salter Diary 20.7.1924); and Tresaith area c.SN25Q, 1936, field card at BRC (WRR & WWB). The only recent record of it as an arable weed, presumably derived from the seed bank, is of a single plant in an organic



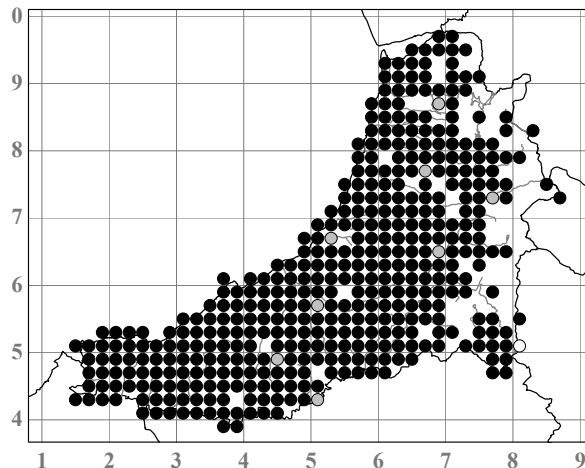
*Centaurea cyanus* in organic Turnip field, Pen-rhiw, Capel Dewi SN43534222, September 2008

Turnip crop with abundant other weeds, 700m NNW of Pen-rhiw, Capel Dewi SN43534222, 2008 (BH, GH & AOC). As a casual it has been recorded in recent decades at Goginan SN689816, 1977 (PH); on a road verge at Pen-ty-parc, Llanilar SN616735, 1997; on a building site on the University campus, Penglais, Aberystwyth SN59848196, 2006; and on tipped soil in the Wstrws gravel pit SN385502, 1990 (AOC & APF). It has also been seen grown from seed-mixes on the Glanyrafon Industrial Estate SN609801, 1994, and in a “wild flower” meadow E of Adpar SN319412, 2003.



### *Centaurea nigra* L. (*C. obscura* Jord.) - Common Knapweed - Y Bengaled

“In Cardiganshire *Centaurea nigra*, with little trace of contamination with *C. jacea* or *C. nemoralis*, is common on road verges, hay fields, grass fields, and grassy places of various kinds. It has evidently suited itself to, or was pre-suited to, and has accompanied man’s cultivation and treatment of grasslands in West Wales. The general scoring for plants seen and for samples collected was *C. nigra* *eradiata normalis*... In the hills, it was particularly noticeable that knapweeds only occurred on road verges and in hay fields and not on heaths and moorlands” (Marsden-Jones & Turrill 1954). This remains true, and subsp. **nigra** is a very common plant throughout the lowlands. Altitude limit 490m, Salter (1935); 440m, FC roadside, Bryn-y-rhyd SN683520, 2003.



In recent years a very robust form up to 1m tall and flowering until late October has been introduced to roadside verges in seed-mixes, for example at the Lovesgrove roundabout on the A44(T) SN632811, 2006 (NMW), and on the A487(T) just SW of Aber-arth SN477636, 2006.

Subsp. **rivularis** (Brot.) Cout. (*C. nigra* var. *radiata* Koch), with pseudoradiate capitula, is rare and occurs mostly along the coast, but is especially abundant between New Quay Head and Coybal c.SN3759, 1938 (Salter in Wade 1952) - 2000 (NMW, AOC & JPW), and at Carreg y Nodwydd SN299535, 1996 (NMW); Turrill recorded such plants (as *longiflora*) on the cliffs above Aberystwyth harbour SN581810, 1930 (K) and near Llanrhystud Road Station c.SN5977, 1930 (K), and further inland they have been recorded near Strata Florida at Garreglwyd SN7864 (Salter in Wade 1952) and Talwrn SN744651, 1996 (AOC & JPW). A very showy form from a seed-mix sown c.1993 is in the “wild flower meadow” by the CCW office, Plas Gogerddan SN628834, 1999 (NMW).

### *Centaurea debeauxii* Gren. & Godr. - Chalk Knapweed

The species has not been mapped as it has only been recognised in the county in recent years.

Subsp. **nemoralis** (Jord.) Dostál var. **nemoralis** (Jord.) P. D. Sell (*C. nemoralis* Jord.) Frequent all along the coast, for example N of Clarach SN58X, 2006 (NMW); on Constitution Hill, Aberystwyth SN58W, 2006 (NMW); along Tan-y-bwlch beach SN579798-580799, 1996-2007 (NMW, CGE, and conf. in field CAS & FK in 2003); SW of Aberaeron, SN46L, F, 2006 (AOC & PAS); and around Mwnt SN15V, W, 25B, 2006 (NMW, AOC & PAS) and Nantyferwig SN169479, 2006. It has also been noted inland in many places, for example in unimproved upland pasture at Cae'r-meirch, Pontrhyd-y-groes SN753733, 2006 (NMW), and on roadside verges and banks near Tal-y-bont SN645877, 2006 (NMW).



SDSB) and near Dyffryn Castell SN770813, 2006. It seems to have been included in seed-mixes used on reconstructed road verges in several places. At most of its sites intermediates with *C. nigra* are at least as common as *C. debeauxii*, but whether such plants are hybrids or part of a continuous variation is uncertain. Druce (1932) gave it for the county, and Whellan (Wade 1952) said “I think *C. nemoralis* is pretty widely distributed” and recorded it from Cenarth SN24Q. It is indeed probably much commoner than the available records indicate.

Subsp. **nemoralis** var. **minima** (C. E. Britton) P. D. Sell

First recorded as “dwarf plants, *C. nemoralis* (?), *eradiata normalis*” (K, CEH, Marsden-Jones & Turrill 1954) collected “on banks of R. Ystwyth near sea, in sand and shingle” in 1929. It is still present there SN579798-580799 (NMW, CGE) growing with var. *nemoralis*, and has also been recorded in the clifftop turf by the Ystwyth bridge SN57998071, 2007 (NMW), and in sandy pasture and on heathy slopes above the sea at Mwnt SN196519 and 192516, 2006.

Subsp. **thuillieri** Dostál var. **thuillieri** (Dostál) P. D. Sell

This delicate and attractive subspecies with pseudoradiate capitula is abundant and the dominant *Centaurea* taxon on parts of the Bracken-covered and heathy coastal slopes at Penmoelciliau SN35H, I and N, 2009 (AOC, FN & JPP), and is doubtless elsewhere along the coast. Inland it has been seen as a native only in unimproved upland pasture at Cae'r-meirch SN753733, 2006 (NMW), where it grows with subsp. *nemoralis* and *C. nigra*. It also grows on a reconstructed and reseeded road verge at Gogerddan just N of the A4159 bridge SN62588377, 2008 (NMW) where it is presumably an introduction.

### **Carthamus tinctorius** L. - Safflower - Safflwr

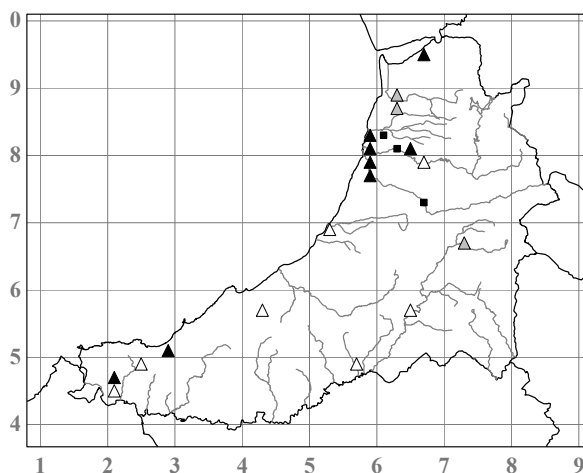
Recorded only by Salter, as a casual at the Aberystwyth rubbish-tip SN591811 in 1925 and 1928 (NMW). Native of SW Asia.

### **Scolymus hispanicus** L. - Golden Thistle - Ffug-ysgallen Felen

Persisted in one site for at least five years, by the footpath N of the Afon Rheidol 350m upstream of Trefechan Bridge, Aberystwyth SN586811 (Rbi), two plants in 1997, seven in 1999 when the ground was disturbed by the erection of a fence, and one in 2001. Native of the Mediterranean.

### **Cichorium intybus** L. - Chicory - Ysgellog

A rare archaeophyte casual of roadsides, waste ground and fields, with only seven records since 1970. Salter's comment “I do not know of any regular locality where it persists” remains generally true. On a reconstructed roadside slope at the NE corner of Llanfarian bridge SN590777, however, it was present from 1983 till 1995. Salter also commented “The seed appears sometimes to be sown with that of rye-grass or other forage-crop”. This is still done, to bring up minerals from deep in the soil, for example where it was sown in a silage crop at Ty-hen Farm, Penbryn SN287516 in 1991, and occasional plants appeared here for the next ten years or so (NMW, AOC & JPW). These, and probably all Salter's records, refer to the cultivated subsp. **intybus**. In 1995 a New Zealand cultivar, ‘**Grasslands Poona**’, was being tested as a fodder crop for sheep in the WAC/WIRS trial grounds at Lovesgrove SN634811; the plants here in fact appeared to be a mixture of subsp. *intybus*, subsp. **silvestre** (Bisch.) Janch. and intermediates (NMW). Similar

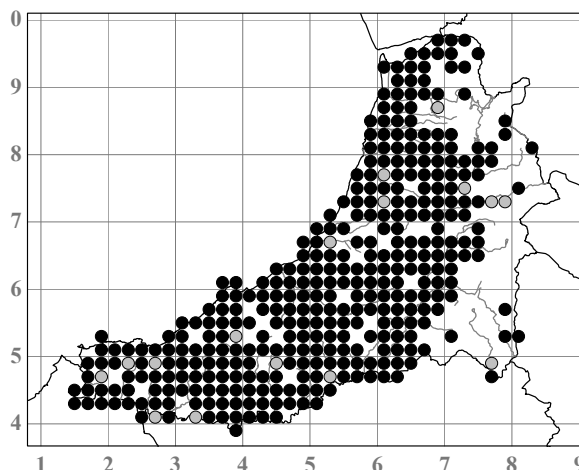


WIRS trial plots of *Cichorium intybus*, Lovesgrove, view WNW from SN63498112, August 2004

trials have been carried out since in other WIRS fields at SN619830 and SN605822, 2002, and by IGER at Trawsgoed SN679732, 2005. It has been planted by the RSPB for bird-seed on its Ynys-hir reserve SN670958, 2007. Chicory was listed without locality in Morgan (1848), though not in later editions, and is then mentioned in a dozen or so localities by Salter from 1895 onwards in his Diaries and Flora.

**Lapsana communis** L. subsp. **communis** - Nipplewort - Cartheig

A common plant of hedgebanks, scrub, woodland, arable fields, gardens, waste ground and verges, preferring somewhat open and nutrient-rich habitats. The infraspecific taxonomy remains to be worked out. Probably the majority of plants are subglabrous and eglandular. Forma **hirta** (Ten.) Jáv. (var. *glandulosa* Freyn) with varying numbers of glandular hairs in the inflorescence, sometimes occurs, for example on a rubble tip at Glanyrafon Industrial Estate SN617804, 2008 (NMW). Plants with dense glandular hairs on the stems, pubescent leaves, but with glabrous, eglandular inflorescences, also occur, for example on a disturbed roadside at Llwyn-y-groes SN59185625, 2007 (NMW). A population with uniformly very pale whitish-yellow ligules is in a felled conifer plantation above Llanfair Clydogau SN641494, 1997. Huge plants 2m tall, with c.600 capitula, were recorded on a hedgebank near Ffos-y-ffin SN449603, 1995. A considerable proportion of the plants in the county have the flowers remaining open until late afternoon, whereas they are elsewhere usually said to close up by about midday. Altitude limit 415m, waste ground by stream, Eisteddfa Gurig SN798840, 2002.



**Hypochaeris radicata** L. - Cat's-ear - Melynydd

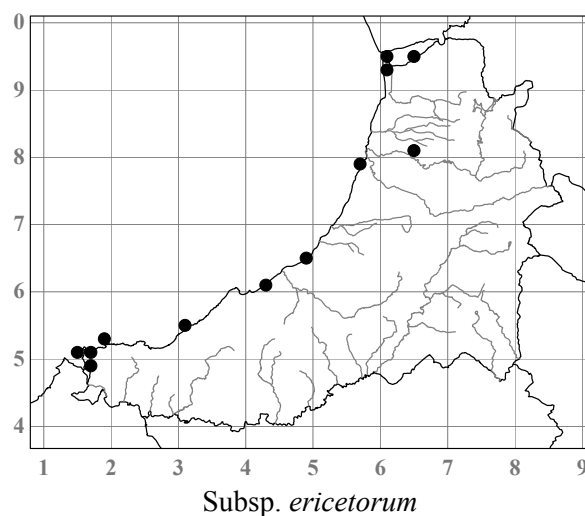
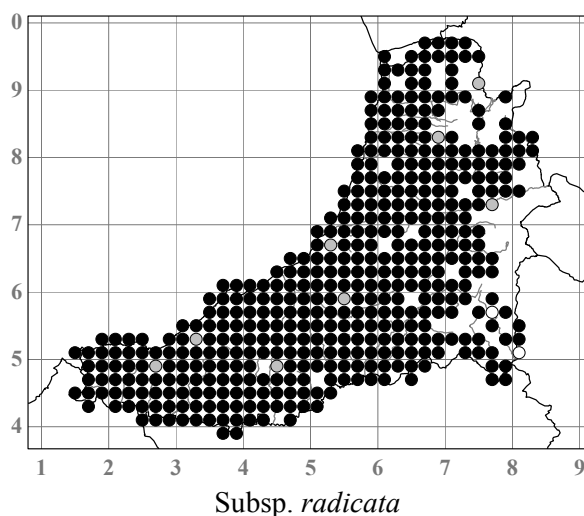
Subsp. **radicata**

A common plant of dry pastures, banks, heaths, dunes, verges, lawns and waste ground. It has increased greatly in recent decades on roadside banks where its perennial rosettes survive the shaving by mechanical



*Hypochaeris radicata* on NW bank of B4338, Blaen-ffos, Synod Inn c.SN406541, July 1978

cutters and in several areas, for example SE of Synod Inn c.SN45B, 1978-2004, it provides spectacular displays when in flower. Altitude limit 370m, Ffrwd-ar-gamddwr SN762576, Salter (1935); 500m, verge of FC track 800m ENE of Bryn Llychese SN832810, 1993.



#### Subsp. *ericetorum* Soest

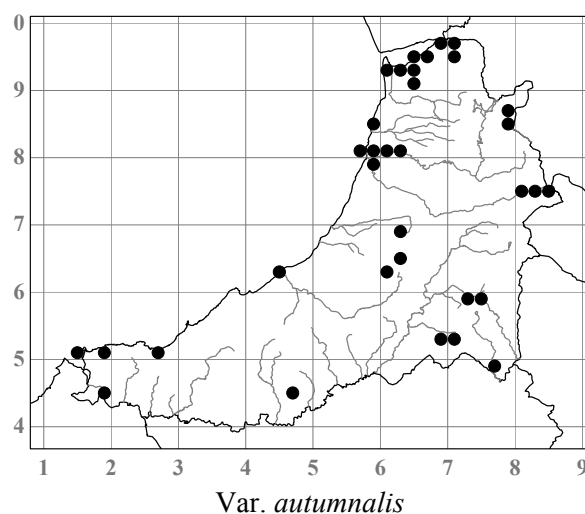
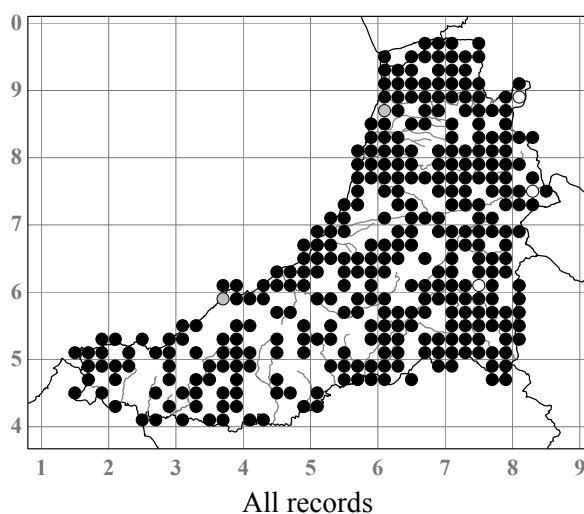
A common plant of exposed, short turf on clifftops, sandy slopes, pathsides, dunes and shingle along the coast, for example on the Ynys-las dunes SN69B, C, 1995-2005 (NMW) and on the sea cliffs at Gwbert SN15K, Q, 1994 (NMW, CGE, PDS, GM & AOC) - 2004.

#### *Hypochaeris glabra* L. - Smooth Cat's-ear - Melynydd Moel

Known only from sandy ground at Tywyn Warren, Gwbert SN1648, where it was first found in 1995 (NMW) - 2007. Some thousands of plants occur over several ha, both as stable populations in closely grazed pastures, lawns and tracksides and as ephemeral ones in areas where Gorse has recently been cleared. It survives considerable Rabbit pressure and when nibbled sometimes behaves as a perennial with a sizeable stock.

#### *Scorzoneroideis autumnalis* (L.) Moench (*Leontodon autumnalis* L.) - Autumn Hawkbit - Peradyl yr Hydref

A common plant chiefly of grazed or regularly cut grasslands, especially dry pastures, road verges, pathsides and lawns, but also often occurring in taller vegetation in marshes and other damp sites, and extending well into the uplands. A series of well-defined varieties can be recognised, several of them with distinct ecological preferences. Altitude limit c.610m ("to about 2,000ft. on Plynlunon"), Salter (1935); and see below.



#### Var. *autumnalis*

The commonest variety in the upper zones of salt marshes, for example all along the Dyfi estuary SN69 and in the Ystwyth estuary SN580804, 1997 (CGE, NMW) - 2005, in grassland on the clifftops and slopes above the sea, for example at Craig y Gwbert SN158502, 1997 (CGE), and in upland flushes. It also often occurs in marshes as well as on roadside verges. Altitude limit (also for the species) 590m, flushed slope above Llyn Llygad Rheidol, Pumlumon SN79708746, 2003 (AOC & SDSB).

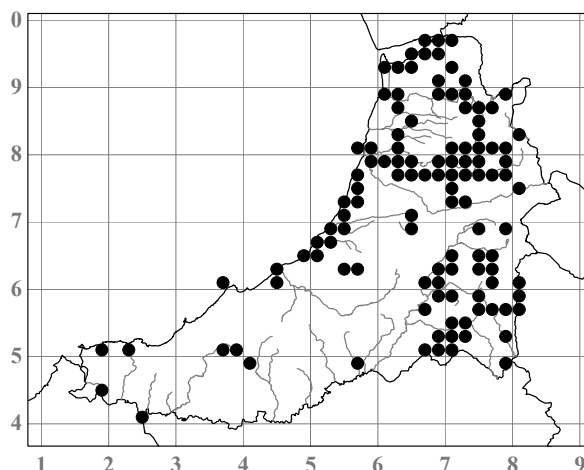


**Var. *dentata*** (Holuby ex Schur) P. D. Sell

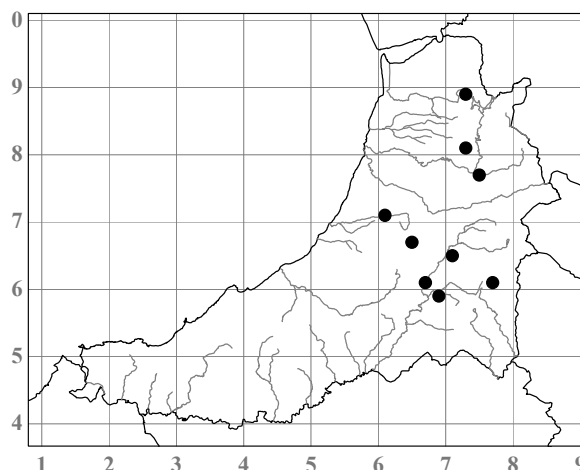
Of generally western distribution in Britain, this variety has been seen among *Festuca rubra* subsp. *junceae* on cliff slopes above the sea in two sites: W of the Cliff Hotel, Gwbert SN159500, 1994 (CGE, PDS & AOC) - 2004, where it grows with the very similar-looking *Hypochaeris radicata* subsp. *ericetorum*; and at Carreg Wynt, Parclyn SN234520, 1999 (NMW, AOC & JPW).

**Var. *coronopifolia*** (Lange) P. D. Sell

The commonest variety in the county, widespread in pastures including reseeded upland sheepwalks, in fens and in brackish and freshwater marshes and on waste ground. Its most conspicuous habitat though is roadside verges, and along much of the A44(T), for example at Dyffryn Castell SN770813, 1995 (CGE, NMW), the A487(T) and other roads such as the A4120 it can be in vast abundance, usually almost at tarmac level (*Hypochaeris radicata* usually growing higher up on the sloping or vertical banks). Altitude limit 470m, verge of FC road E of Truman, The Arch SN78527705, 2005.



Var. *coronopifolia*



Var. *latifolia*

**Var. *latifolia*** (Schur) P. D. Sell

Almost confined to roadside verges, where it occurs in small quantity often among much more abundant var. *coronopifolia* or var. *pinnatifida*, for example by the Nant-y-moch Reservoir SN736887, 2001 (NMW). It has also been seen on the disused railway at Cors Caron SN708654, 2001, and in marshy pasture with the above two varieties by the Afon Teifi just above Pont Einon SN671613, 2001. Altitude limit 510m, verge of FC road 2.5km NNE of Nant-y-maen SN775604, 2001.

**Var. *pinnatifida*** (Schur) P. D. Sell

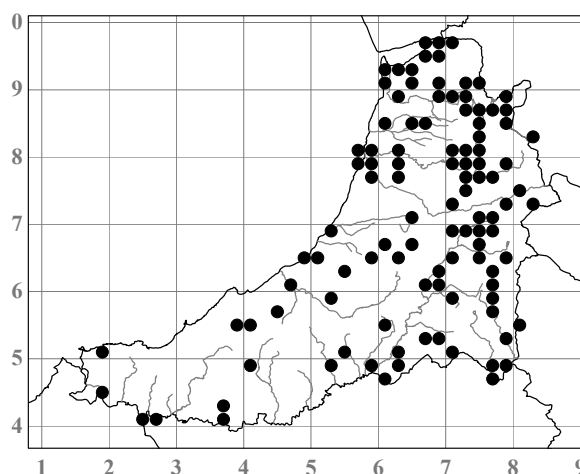
In much the same habitats as var. *coronopifolia* and sometimes growing with it, but rarely as abundant on roadside verges and with an even wider ecological range including river shingle, woodland clearings, for example 300m E of Allt-ddu in the Llyfnant SN717974, 1997 (CGE), and sand dunes and foreshores, for example where it grows with *Eryngium maritimum* on Tan-y-bwlch beach SN57987982, 2006 (NMW). Altitude limit 440m, verge of FC road 1.5km NE of Llyn y Gwaith SN68325209, 2003.

**Var. *salina*** (Aspegren) P. D. Sell

Although plants of var. *autumnalis* approaching this variety are frequent in salt marshes, the true plant seems more restricted and has been seen only in the Dyfi estuary where it can be locally abundant, for example among *Phragmites* 400m S of Dovey Junction Station SN696976, 1997 (NMW); among *Juncus maritimus* and *Festuca rubra* subsp. *litoralis* NE of the mouth of the Afon Ddu SN660953-666956, 2002 (NMW); and with these associates E of the mouth of the Afon Leri SN619935, 2000.

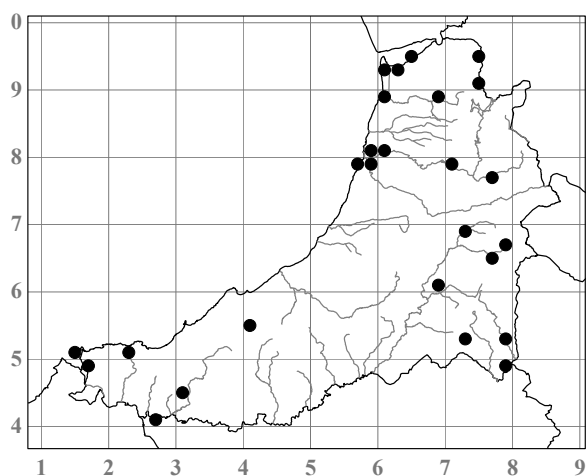
**Var. *simplex*** (Duby) P. D. Sell

Sometimes difficult to distinguish with certainty from grazed or trampled forms of var. *coronopifolia* or var. *pinnatifida*, this variety is frequent in short turf with *Festuca rubra* subsp. *junceae* on the sea cliffs, as at the mouth of the Afon Drywi SN425606, 1997 (CGE, NMW), on paths and slacks in the dunes at Ynys-las

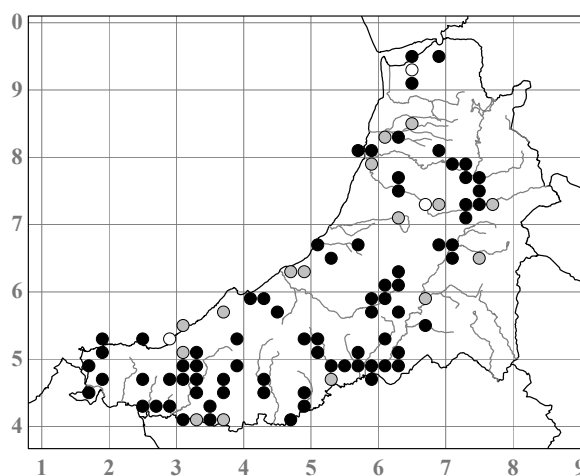


Var. *pinnatifida*

SN69B, C, 1997 (NMW) and Penyrergyd SN14U, 1997, on vegetated shingle and sandy pastures elsewhere along the coast, on river shingle and riverside rocks, for example near Pont Glan-marchnant SN735695, 1999 (NMW), and on gravelly roadside and track verges and on quarry floors. An isolated salt marsh record was from among *Juncus maritimus* and *Festuca rubra* subsp. *litoralis* on the E side of the Afon Cletwr SN646942, 1997 (CGE). Altitude limit 380m, verge of FC road 1km ESE of Esgair Fraith lead mine SN751905, 2002 (NMW).



*Scorzoneroides autumnalis* var. *simplex*



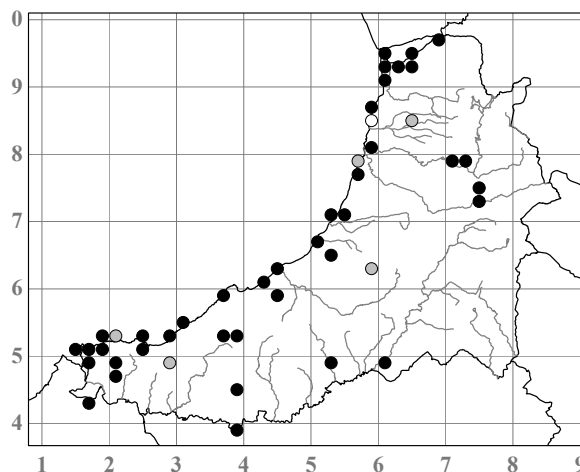
*Leontodon hispidus*

#### **Leontodon hispidus** L. - Rough Hawkbit - Peradyl Garw

An occasional plant of neutral and base-rich grasslands, and often abundant in unimproved dry pastures, hay meadows and graveyards and on verges and railway embankments. It is generally lowland, and has not been seen over 290m altitude, and is absent from woodlands and wetlands of all sorts. Towards the coast it becomes rare, and is largely absent from the coastal slopes. Although it occurs in small quantity on the Penyrergyd dunes SN1648, 2003, it is surprisingly completely absent from the Ynys-las dunes.

#### **Leontodon saxatilis** Lam. (*L. taraxacoides* (Vill.) M  rat, *L. hirtus* auct., non L.) - Lesser Hawkbit - Peradyl Bach

Frequent on dry, usually sandy or stony soils along the coast, less common inland but occurring occasionally in dry, usually neutral or base-rich pastures and on banks, rocky slopes, quarries and gravelly verges; although mostly lowland, it has been seen up to 290m altitude. Var. **arenarius** (Duby) P. D. Sell is the usual variety, characteristic of open habitats and especially abundant on the more open parts of the sand dunes at Ynys-las SN69B, C, pre-1935 (Salter 1935) - 2004 (NMW) and Penyrergyd SN14U (Salter 1935) - 2005. Var. **saxatilis** is comparatively uncommon, but is often found in more rank pastures, in heath or in scrub, for example among *Ulex gallii* on the coastal slope by the mouth of the Afon Drywi SN425607, 1997 (CGE), and in dense *Ammophila* on the dunes, for example at Ynys-las SN605928, 1998 (NMW). The two varieties have not been mapped separately.



#### [*Picris hieracioides* L. - Hawkweed Oxtongue - Tafod y Llew

Recorded from Tan-y-bwlch SN581795, presumably in error, by Morgan (1849).]

#### **Helminthotheca echioides** (L.) Holub (*Picris echioides* L.) - Bristly Oxtongue - Tafod-y-llew Gwrychog

An archaeophyte confined to a few localities along the coast and a rare casual elsewhere. It was first reported in 1903 (Salter Diary 1.9.1903) from Llan-non by the lime kiln SN50516652 and by the corn mill at the

mouth of the Afon Cledan SN50706673, where Salter saw it regularly until 1939, and it was still at the latter site in 1999. At New Quay Salter (1935) first saw it in 1924 and it still occurs in many places around there from Cei Bach SN409597, 1977-2006 (NMW), to Llanllwchaearn churchyard SN385599, 1983-2006 (SPC), and the N end of Lewis Terrace SN388603, 2000 (NMW, AOC & JPW). Around Aberystwyth it was found on the disused railway at Felin-y-mor SN582802 in 1988 (MC) - 2007, on the same railway at Llanfarian SN591778 in 1996 (SPC), on Waun Fawr SN608814 in 1990, and on the Glanyrafon Industrial Estate SN610800 in 1993. At Aber-porth it was seen above the E bay SN260514 in 1994-1996, and on the MoD site SN242524 and 250519 in 1995-2008.

More casual sightings have been at the Ynys-las level crossing SN619931 in 1996; near the visitor centre on the dunes SN608941 in 1998 (SPC) and 2001; on a roadside bank at Llangranog SN313541 in 2002 (SPC); and by the Cardigan bypass SN182457 in 1997. In 2005 it was dominant over half an acre of disturbed ground by the County Council offices at Penmorfa, Aberaeron SN45256258, although it had never been seen anywhere in that hectad before.

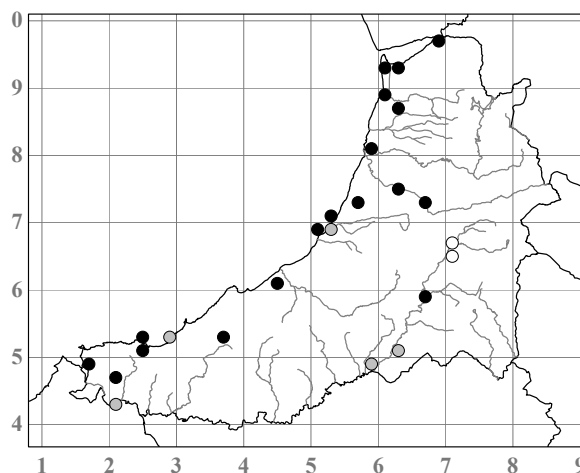
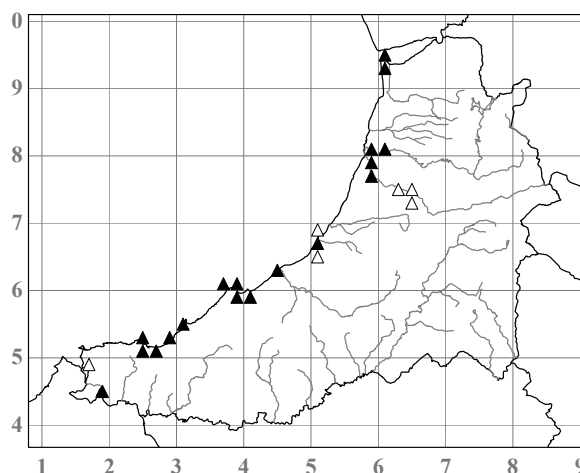
Varieties have only been recognised recently in the county. The plants from Lewis Terrace in 2000, from Cei Bach in 2006 and from the Felin-y-mor railway in 2007 are var. **pratensis** (Chevall.) P. D. Sell (conf. PDS), and probably most of the plants in the county are this. Var. **echioides** has been recorded on dumped rubble by the boatbuilding yard at Ynys-las SN616932, 2005 (NMW), on the disused rubbish-tip on the SW side of Pendinas SN584799-582800, 1995-2007 (NMW, conf. PDS), and at the locations on the MoD site, Aberporth, mentioned above where var. *pratensis* also occurs.

#### **Tragopogon pratensis** L. subsp. **minor** (Mill.) Wahlenb. - Goat's-beard - Barf yr Afr

An uncommon plant, chiefly coastal, and further inland almost confined to the railway system. Most records are from roadside verges, railway ballast and station precincts, graveyards and waste ground. Its disproportionate frequency in graveyards, from five of which it has been recorded, is striking. The only semi-natural sites it has been recorded from are the sand dunes at Penyrergyd SN160485, 1976-1990, and S-facing rank coastal grassland 250m S of Carreg Ti-pw, Llanrhystud SN535706, 1993-2008 (SPC). Salter (1935) described it as "not uncommon", but gave only three localities so there is no real evidence of a decline.

#### **Tragopogon porrifolius** L. - Salsify - Barf-yr-afr Gochlas

This garden vegetable, native of the Mediterranean, is a rare naturalised alien or casual in a few places. The first record was of one plant on the grass verge of Station Road, Cardigan SN180458 in 1973 (MPa). It was recorded from waste ground in Aberaeron in 1976 (KTo), probably SW of the harbour SN45486289 where one clump was seen in 1985 (JRA & CDP). Eight clumps were seen in Aber-arth churchyard SN477633 in 1982 (NMW). One plant appeared in the garden of Y Werydd, Aberystwyth SN580806 in 1994. 19 clumps were on the SE verge of the A487(T) road 150m SW of the Llwyncelyn crossroads SN439596 in 1998, the verge having been reseeded in 1988, and another clump 850m SSW at SN43325883 in 1998; in 1999 there were several large clumps in the chapel graveyard nearby SN441595, but whether all these plants came in



*Tragopogon pratensis*



*Tragopogon porrifolius* in Aber-arth churchyard,  
view W from SN47656327, May 1982

with a seed-mix or had spread from ones already in the graveyard is uncertain. Subspecies have not been distinguished.

***Sonchus arvensis* L.** - Perennial Sow-thistle - Llaethysgallen y Tir Âr

**Subsp. *arvensis* var. *arvensis***

Frequent along the coast on pathsides and waste ground, occasionally on sand dunes and at the back of shingle beaches with var. *maritimus*, and where streams run through shingle. It also occurs in brackish marshes, for example by the tidal part of the Afon Leri SN616901, 2005 (NMW) and by the Teifi estuary at Rosehill Marsh SN189453, 2005. Inland it is also frequent on roadside verges, on field margins and as a weed of arable fields. Plants vary greatly, especially in dissection of leaves which can occasionally be unlobed and finely denticulate. It is chiefly lowland, and its altitude limit is 305m where it is abundant on disturbed ground 600m N of Pen Garn-wen SN37454996, 2008.

**Subsp. *arvensis* var. *maritimus* G. Mey.**

Usually late-flowering plants with glandular-hairy inflorescences and rather fleshy, lobed or unlobed leaves narrow in outline, referable to this variety, have been recorded from the back of shingle beaches at Ynys-las SN605928, 1995-2005; at Tan-y-bwlch SN579805-580803, 1995-2005; 1km SSW of the mouth of the Afon Wyre SN524690, 2005; and ENE of Aberaeron SN463635, 1995 (CGE) - 2005. They also occur on sand dunes, for example at Ynys-las SN69B, C, 1995-2005, and on the strand line of beaches, for example at Penyrangor, Aberystwyth SN580808, 1995-2005.

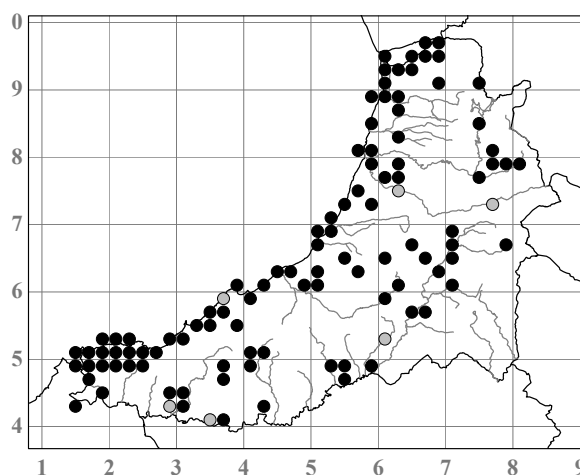
**Subsp. *uliginosus* (M. Bieb.) Nyman (var. *glabrescens* Wimm. & Grab.)**

A population with glabrous inflorescences and shorter involucres occurs in one place on the Ynys-las dunes by the high boardwalk SN606937, 1990 (det. JRA) - 2007. Marshall (1900) recorded it from a hedge between Aberaeron and Henfynyw SN46K or L, remarking that it was entirely glabrous. Mixed populations of what appeared to be this subspecies and subsp. *arvensis* var. *arvensis* occur in several sites, for example on a road verge at Llanrhystud SN538698, 1991 (NMW) and on Tan-y-bwlch beach SN580801, 1994 (SPC).

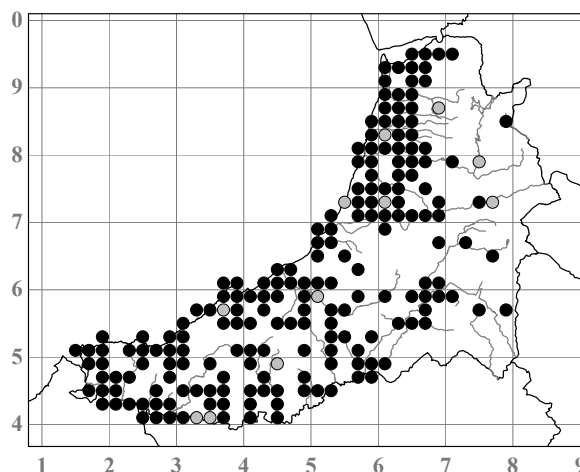
***Sonchus oleraceus* L.** - Smooth Sow-thistle - Llaethysgallen Lefn

**Var. *oleraceus***

A frequent weed of nutrient-rich waste ground, tips, roadside verges and gardens, less common than *S. asper* and scarcely extending into the uplands. There is great variation, especially in the shape of the leaves, and some plants, for example from a shaded footpath verge by the Ystwyth Flats, Aberystwyth SN58038067, 2006 (NMW) have rounded, unpointed auricles. Altitude limit 435m, disturbed ground by the FC road, Llyn Berwyn SN743571, 2000, AOC & RDP.



*Sonchus arvensis* all records



*Sonchus oleraceus* all records

Var. **litoralis** P. D. Sell

Distinctive dwarf, somewhat fleshy plants occur along the coast on shingle, scree and slumping clay slopes, for example at Ynys-las SN604936, 1995; on Tan-y-bwlch beach SN579806, 1995; N of Morfa Bychan SN571785, 2001, AOC & JPW; and SW of Aberaeron SN451626, 1995 (CGE, NMW) - 2004 where they grow with *S. asper* var. *sabulosus*, and like that taxon are perhaps the native representative.

[*Sonchus asper* × *oleraceus*

Difficulties of identification make it uncertain whether this hybrid occurs. Solitary plants with all the supposed characters of the hybrid and not setting seed, but with apparently good pollen, are occasionally found, for example on a roadside verge at Ynys-las SN61209263, 2002 (NMW).]

**Sonchus asper** (L.) Hill - Prickly Sow-thistle - Llaethysgallen Arw

Subsp. **asper** var. **asper**

A common weed of nutrient-rich waste ground, tips, roadside verges, arable fields and gardens, often able to survive in scrub because of its height, and generally much more widespread and common than *S. oleraceus* and extending more into the uplands. Altitude limit 435m, disturbed ground by the FC road, Llyn Berwyn SN743571, 2000 (AOC & RDP).

Subsp. **asper** var. **sabulosus** P. D. Sell

This dwarf variety with condensed inflorescences and deeply divided leaves often occurs along the coast on sand, shingle, screes and on till and rock cliffs, for example on the Ynys-las dunes SN609947, 1974 (CGE, PDS); at Carreg Ti-pw SN535707, 1995; SW of Aberaeron SN451626, 1995 (CGE) - 2004; on the S side of Llangranog Head SN31285517, 1996; and N of the Cliff Hotel, Gwbert SN161511-160503, 1996.

Subsp. **asper** var. **integrifolius** Lej.

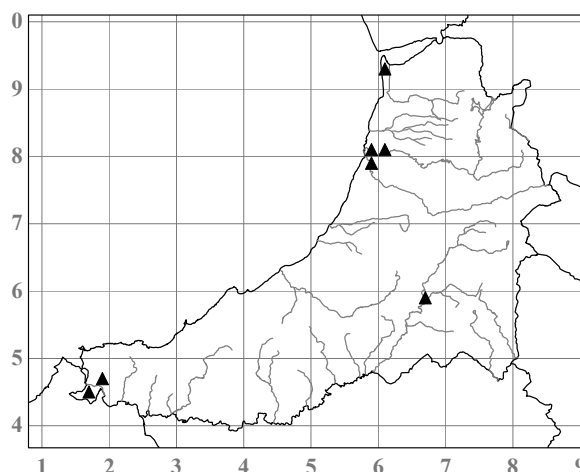
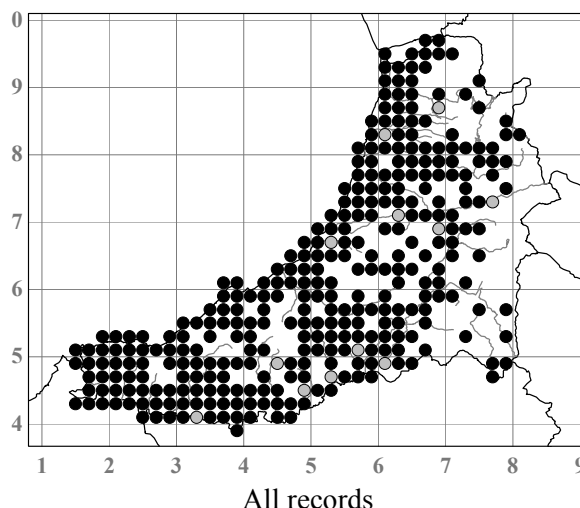
This variety, with unlobed, finely dentate and rather broad leaves has been occasionally seen, for example on the verge of the FC road in Coed Tynbedw, Llanafan SN700713, 2001 (NMW), and in flowerbeds at Llanerchaeron SN480601, 2005, and is the prevailing variety in a few areas, for example E of Llanfair Clydogau c.SN65K, 2008. Altitude limit 300m, abandoned vegetable patch, Tynygwndwn, Llanfair Clydogau SN63344963, 2009.

Subsp. **glaucescens** (Jord.) Ball

This usually large variety with coriaceous, very prickly leaves has been recorded from only four sites, but is probably under-recorded as measuring the diagnostic spicules on the achenes is troublesome: one plant on waste ground at Ynys Edwin, Eglwys Fach SN678962, 2005; waste ground 400m E of Borth church SN616896, 1995 (CGE, conf. PDS); several plants on disturbed ground, Parc-y-llyn, Aberystwyth SN593806, 1995; two plants by the coast footpath 1km SW of Llangranog SN301534, 1996; and many plants along 400m of roadside by the Teifi estuary NW from Nantyferwig SN166483, 1995.

**Lactuca serriola** L. - Prickly Lettuce - Letusen Bigog

A rare but increasingly recorded archaeophyte casual, first seen as a single plant by the Cardigan Cattle market SN178457 in 1987 (NMW, AOC, APF & CDP), with several others being seen in the area at intervals since. In the N of the county it was first seen by St Anne's Church, Penparcau SN59207998 in 1992 (NMW, AOC; SPC) when there were 83 plants, and single plants have since appeared around here and Llanbadarn Fawr c.SN593809-606805, 1993-2006. A single plant on a building site at Tregaron SN674593 in 1992. All have been forma **integrifolia** (Gray) S. D. Prince & R. N. Carter.



**Lactuca sativa** L. - Garden Lettuce - Letusen yr Ardd

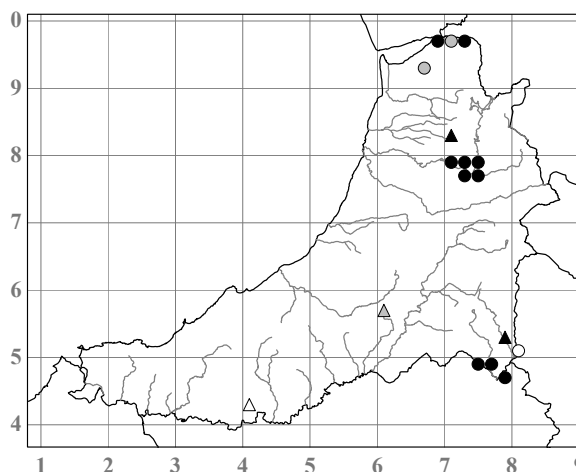
Lettuces, chiefly organic, are grown in small quantity, with 1.7ha being recorded as grown in the open in 1988 (Anon. 1988).

**Cicerbita macrophylla** (Willd.) Wallr. subsp. **uralensis** (Rouy) P. D. Sell - Common Blue-sow-thistle - Llaethysgallen Las

Well established in a few sites, probably always from throw-outs. It was first recorded by Salter (1936): "I first noticed this blue-flowered Lettuce here about ten years ago .... It was strongly established upon a piece of waste ground here [i.e. Llanbadarn Fawr c.SN598811], but it was finally ousted by the builder, not, however, before portions had been taken into several local gardens, where it is now given a home"; he made a specimen of it in 1933 (NMW). It was found on roadside verges by the bridge at Drefach SN500459 in 1965 (APC, *Nature in Wales* 9: 223 (1965)) and by 1979 was in several places by the B4338 just E of here where it still flourishes, 2005. From 1975 to at least 1985 there was a colony by the road at the NE corner of Llyn Pendam SN709839 (NMW, JEH; AOC). A walltop colony by the road in Cwm Woods SN602832 (NMW) was well-established when first noticed in 1983 and is still extant, 2007. On waste ground in Lampeter SN574481 it was first seen in 1987 (KCa & AOC) and was still nearby at the edge of a car park in 2004. The only other colonies are a thriving one in a field 300m N of Closyrefail, 2.5km NE of Llanfair Clydogau SN641533, 2008, and an equally thriving one in an overgrown hedge by the Teifi 100m W of Llanybydder bridge SN518441, 2000. Altitude limit 350m, Llyn Pendam SN709839, 1985.

**Mycelis muralis** (L.) Dumort. (*Lactuca muralis* (L.) Gaertn.) - Wall Lettuce - Gwylaeth y Fagwyr

As a native Wall Lettuce is an uncommon calcicole, though one of the most predictable at picking out the outcrops of slightly base-rich rocks; as an introduction it occurs chiefly on mortared walls. The native sites are on damp, mostly shaded cliffs and screes in the Llyfnant valley SN736975, 1906 (Salter Diary 27.9.1906) - 2005; in the Melindwr valley SN693962, 1996 (SPC); in the Cletwr dingle SN664920, 1935 (Salter 1935) - 2005; in many places in the Rheidol valley from SN748788 to 709790, 1849 (Morgan 1849) - 2005; by the Tywi near the Camddwr confluence SN808510, 1966 (IMV) but now under Llyn Brianne; on cliffs above the Tywi opposite Ystradffyn church SN782470, 1978-1999; by the Pysgotwr Fawr SN753489, 2004 (CMFB); and on Craig Ddu SN769483, 1978-1998. In the Rheidol gorge at Derwen SN7377 it grows in lines on the river shingle marking the peak flood limit, 2007 (SPC). Among the sites where it is naturalised are in a wheelpit at Cwmsymlog lead mine SN70218380, 1995-2007; and on walls at Soar y Mynydd chapel SN78495327, 1963-2003 (AOC & DD). Altitude limit (native) 300m, Craig Ddu SN769483, 1998.



**Taraxacum** L. - Dandelion - Dant y Llew (Blodau Pisho'n Gwely, Blodau Crafu, Blodau Crach)

The following account, based entirely on expertly determined specimens, is very provisional and incomplete and maps have not been attempted. Material collected over much of the county in the late 1970s and early 1980s was named by A. J. Richards, and some later collections were named by him and C. C. Haworth, but very few additions have been made in recent years. Many of the identifications were revised by Richards c.2001. Altogether 65 species have been recorded, but the ratio of records to species is very low, and for only a few is it possible to give any estimate of their frequency or distribution in the county. Unless otherwise stated the records are based on specimens in NMW det. AJR or CCH.



Sect. **Erythrosperma** (H. Lindb.) Dahlst.

Mostly native species of dry, open habitats.

**Taraxacum lacistophyllum** (Dahlst.) Raunk. - (Cut-leaved Dandelion)

Widespread and native in Britain. Seven records from five tetrads, from the mature dunes at Ynys-las SN69B, C, 1965 (**OXF**, DHV) - 2000, from short, Rabbit-grazed turf on the coastal slopes at Pendinaslochtyn SN35C, 2003, and Mwnt SN15W, 2002, and from Rabbit-grazed sandy turf at Bancywarren SN24D, 1976.

**Taraxacum brachyglossum** (Dahlst.) Raunk. - (Purple-bracted Dandelion)

Widespread and native in Britain. Three records, from Rabbit-grazed sandy turf on Bancywarren SN24D, 1976, from the Penyrerhyd dunes SN14U, 1976, and from an E-facing pasture 300m S of Moelcerni, Wallog SN598864, 1979.

**Taraxacum scanicum** Dahlst. - (Skåne Dandelion)

Recorded only from a roadside bank in woodland 400m E of Rhoscellan Fawr, Wallog SN60228549, 2003, presumably an introduction and the first Welsh record of this species, native in Britain only in Breckland and the Channel Islands.

**Taraxacum argutum** Dahlst. - (Sharp-toothed Dandelion)

Recorded only from the grassy slope of the dam at Llyn Craigypistyll SN718856, 2003, at 320m altitude where it was presumably introduced with material to resurface the dam; it is native over much of Britain but usually a calcicole.

**Taraxacum rubicundum** (Dahlst.) Dahlst. - (Ruddy Dandelion)

Widespread and native in Britain, chiefly in the south and characteristic of calcareous grassland and sandy heaths. Recorded only once, on the mature dunes at Ynys-las SN60859389, 2003 (**AOC & PAS**), where, as it is a fairly distinctive species, it must be rare.

**Taraxacum dunense** Soest - (Dune Dandelion)

A local plant, native of sand dunes in England and Wales. Recorded only once, on heavily grazed, damp, sandy pasture by the old course of the Afon Leri, Ynys-las SN608920, 1996, and presumably rare.

**Taraxacum haworthianum** Dudman & A. J. Richards - (Haworth's Dandelion)

Endemic to Britain and Ireland and occurring on sand dunes. Recorded only from the Ynys-las dunes SN606936, 1978, where it had earlier been collected by Salter in 1940.

**Taraxacum oxoniense** Dahlst. - (Oxford Dandelion)

Widespread and native in Britain. A common species of the dunes at Ynys-las SN69B, C, 1978-2002, Mwnt SN15V, 1978, and Penyrerhyd SN14U, 1976, and also recorded from a grassy slope above the beach at Cwm Tudu SN35N, 1978.

**Taraxacum fulviforme** Dahlst. - (Green-bracted Dandelion)

Widespread and native in Britain. Recorded only once, from the Ynys-las dunes SN69, 1965 (**OXF**, DHV).

**Taraxacum glauciniforme** Dahlst. - (Many-toothed Dandelion)

Widespread and mostly southern in Britain, and native. Recorded only once, from an E-facing pasture 300m S of Moelcerni, Wallog SN598864, 1979.

Sect. **Spectabilia** (Dahlst.) Dahlst.

Native species of damp habitats.

**Taraxacum faeroense** (Dahlst.) Dahlst. - (Faeroes Dandelion)

Widespread in Britain. Eleven records from ten tetrads, from damp pastures, dune slacks and hay meadows throughout the county, SN34C, 44Z, 45V, 65L, 66J, 67B, 69B, 78Y, 87M. Altitude limit 620m, flushed slope above Llyn Llygad Rheidol, Pumlumon SN79338728, 2003.

Sect. **Naevoza** M. P. Christ.

Mostly native species of N and W Britain.

**Taraxacum naevosiforme** Dahlst. - (Wetland Dandelion)

Widespread in Scotland and extending to S Wales, and native. Recorded only from the roadside verge SW of Maesnant, Pumlumon SN77328785 at 380m altitude, 2007 (SPC).

**Taraxacum euryphyllum** (Dahlst.) Hjelt - (Wide-stalked Dandelion)

Widespread especially in N and W Britain, and native. Recorded only from two churchyards, Strata Florida SN746657, 1979, and Llanddewi-Brefi SN664553, 1978.

**Taraxacum maculosum** A. J. Richards - (Spotted Dandelion)

Widespread especially in N Britain, and native. Recorded only once, as a population of c.15 plants in a flush on the N-facing slope above the stream at Cwmtudu SN355575, 1981.

Sect. **Celtica** A. J. Richards

Mostly species with a western distribution in Britain and characteristic of damp soils in native or semi-natural habitats.

**Taraxacum gelertii** Raunk. - (Gelert's Dandelion)

Widespread and native in Britain. With 35 records in 29 tetrads, probably the commonest and most widespread species in the county, recorded from a great range of habitats including marshes, unimproved pastures, graveyards, streambanks, hedgebanks, woodlands and cliff slopes on the coast. SN14U, Z, 24W, 25K, 34H, K, Q, R, 35F, 45Z, 46K, R, W, 55I, J, 56F, J, P, 57Y, Z, 58V, W, Z, 67C, P, Q, 68F, M, 78K.

**Taraxacum bracteatum** Dahlst. - (Dark-green Dandelion)

Widespread and native in Britain. Recorded from eight sites in six tetrads, three being in quarries, the others graveyards, a roadside bank, a wooded river bank and coastal wet heath. SN25F, 67Q, 68F, V, 69G, 78K.

**Taraxacum britannicum** Dahlst. - (British Dandelion)

Chiefly western in Britain, and native. Recorded from eleven sites in ten tetrads, all unimproved grasslands on the coastal cliff slopes, in pastures and in graveyards. SN25F, K, 34Q, S, 46L, 57F, G, 58V, 64E, 68V.

**Taraxacum subbracteatum** A. J. Richards - (Dark-bracted Dandelion)

Endemic to Britain and Ireland, and with a generally Atlantic distribution. Recorded four times, from roadside banks at Chancery SN582765, 1976 and at Rhydypany SN635622, 1981, from the new part of Llanbadarn Fawr churchyard SN599811, 1984, and growing on the tower of Tregaron church SN680597, 1976.

**Taraxacum duplidentifrons** Dahlst. - (Double-toothed Dandelion)

Widespread and native in Britain. Recorded five times, from roadside banks in SN44I, 54N, 58X and 68F, and from the Penyrergyd dunes SN162488, 1976.

**Taraxacum celticum** A. J. Richards - (Celtic Dandelion)

Endemic to Britain and Ireland and occurring mainly in Wales and Devon, and described from a roadside bank 150m W of Pont Llanafan SN685714, 1979 (**OXF**, **NMW**, Richards & Haworth 1984). Apart from this type locality it has not been collected elsewhere in the county.

**Taraxacum hesperium** C. C. Haw. - (Western Dandelion)

Predominantly western in Britain and endemic. Recorded only from a shaded copse by the stream 50m SE of Chancery school SN581766, 1976.

**Taraxacum excellens** Dahlst. - (Purple-blotched Dandelion)

Predominantly western in Britain, and native. Recorded only twice, on roadside banks 150m W of Pont Llanafan SN685714, 1983, and at Rhydybandy SN633621, 1981.

**Taraxacum landmarkii** Dahlst. - (Landmark Dandelion)

Mainly northern and western in Britain, and native. Recorded only twice, from damp rocks in the Ystwyth gorge 300m E of Pont Blaen SN830754, 1980, and from a marshy roadside verge 2km SSW of Llanddewi-Brefi SN654532, 1980 at 325m altitude.

**Taraxacum nordstedtii** Dahlst. - (Nordstedt's Dandelion)

Widespread and native in Britain. Widespread in the county, chiefly in damp pastures and marshes, wet heaths and dune slacks, with a few records from hay meadows, and with 24 records in 21 tetrads one of the commoner species. *T. nordstedtii* is extremely variable, and specimens from damp sandy pasture by the old course of the Afon Leri SN608920, 1996, from damp pasture by the Afon Teifi 300m NE of Pont Einon SN673616, 1996, from a flush on the coastal slope 500m SW of the mouth of the Afon Drywi SN422603, 1991, and from calcareous fen by the Afon Mwldan, Penparc SN201490, 1996 have been identified as the informally named '**frugale**'. Another gathering from this last site has been similarly named '**occidentale**'. SN14U, Z, 24E, 25B, G, 34R, 44Z, 45V, 46F, 55I, 58V, 64D, 66J, Q, 67B, C, Q, 69B, 76M, 77I, 78A.

**Taraxacum cambricum** A. J. Richards - (Welsh Dandelion)

Endemic to western Britain and eastern Ireland, and originally described new to science from Aber-porth churchyard SN256511, 1980 (**OXF**, **NMW**, Richards & Haworth 1984). It was re-collected there in 1983 (**BM**), but has not been found elsewhere in the county.

**Taraxacum unguilobum** Dahlst. - (Claw-lobed Dandelion)

Widespread and native, chiefly in northern and western Britain. Recorded from eight sites in seven tetrads, from coastal grassland and heath, mature dunes, damp pastures and a roadside verge and hedgebank. SN25G, L, 35G, 68M, 69B, 76S, 77B.

Sect. **Hamata** H. Øllg.

Mostly weedy species like those of Sect. *Ruderalia*, but more closely related taxonomically to Sect. *Celtica*.

**Taraxacum hamatum** Raunk. - (Hook-lobed Dandelion)

Widespread and native in Britain. One of our commonest species, recorded from 27 sites in 22 tetrads in a variety of habitats including the coastal slopes, sand dunes, woods, hedgerbanks, graveyards and waste ground. SN14Z, 25K, 34R, 35C, T, W, 44I, 45E, 46E, K, Q, X, 56F, P, 57Z, 58V, 64E, 66F, G, 67Q, R, 69B.

**Taraxacum hamatulum** Hagend., Soest & Zevenb. - (Slender Hook-lobed Dandelion)

An uncommon species, possibly native in Britain, and recorded only three times in the county, all from damp pastures, above Gwrthwyntisaf, Ystrad Aeron SN534581, 1977, 300m W of Rhyd-y-fran, Cribyn SN51555241, 1979, and 200m S of Bryn-coch, Cellan SN601479, 1980.



**Taraxacum subhamatum** M. P. Christ. - (Large Hook-lobed Dandelion)

Widespread and native in Britain, and recorded from seven sites in the county in graveyards, a marshy pasture and on roadsides. SN25K, 35W, 46K, 56F, 58V, 66F, 68I.

**Taraxacum marklundii** Palmgr. - (Marklund's Dandelion)

Scattered throughout Britain and native, but only recorded once, on a flushed slope above the stream at Cwmtudu SN355574, 1996.

**Taraxacum hamiferum** Dahlst. - (Dark Hook-lobed Dandelion)

Scattered throughout Britain but doubtfully native, and recorded five times in the county, on a laneside bank, on a riverbank, in graveyards and in coastal heath. SN25G, 34Q, 54I, 57Z, 68J.

**Taraxacum quadrans** H. Øllg. - (Fleshy-lobed Dandelion)

Scattered throughout Britain but doubtfully native, and recorded six times in the county, on roadside banks, in a marsh, in woodland and in a graveyard. SN46F, 56B, 66F, 67R, 68J, V.

**Taraxacum pseudohamatum** Dahlst. - (False Hook-lobed Dandelion)

Widespread and native in Britain, and widespread and one of the commonest species in the county where it has been recorded from 30 sites in 21 tetrads, on coastal slopes, in a marsh, on a river bank, on roadside verges and banks, in graveyards and on waste ground. Altitude limit 305m, laneside bank, Gwndwnmelyn, 2.5km SE of Tregaron SN694579, 1976. SN25K, Q, 34Z, 35C, I, 46K, 54U, Z, 55B, 56A, F, J, P, 57Z, 58V, 64E, 65Y, Z, 68A, B, J.

**Taraxacum fusciflorum** H. Øllg. - (Brown-striped Dandelion)

Widely scattered but uncommon in Britain, probably introduced, and only once recorded in the county, in a pasture at Ffos-y-ffin SN444607, 1980.

**Taraxacum boeckmanii** Borgv. - (Bökman's Dandelion)

Widespread and possibly native in Britain, and recorded from seven sites in the county, in a wooded dingle, a hay meadow, a marsh and several graveyards. SN24W, 25K, 34Q, 44Z, 58V, W, 67C.

**Taraxacum atactum** Sahlin & Soest - (Narrow-bracted Dandelion)

Widespread and possibly native in Britain, and recorded from eight sites in the county, in pastures, in graveyards and on roadside banks. SN34C, N, Q, 35C, 56P, 58V, 67V, 78A.

**Taraxacum hamatiforme** Dahlst. - (Asymmetrical Hook-lobed Dandelion)

Widespread and native in Britain, and recorded from eight sites in six tetrads in the county, in a hay meadow, in mixed woodland and in a graveyard, and on pathsides, a roadside bank and in short turf on the sea cliffs. SN15Q, 35H, 45Z, 57Z, 58V, 65Z.

**Taraxacum lamprophyllum** M. P. Christ. - (Lustrous-leaved Dandelion)

Scattered throughout Britain and doubtfully native, and recorded from three sites in the county, on roadside banks and verges and in a streamside copse. SN25K, 34S, 46K.

Sect. **Ruderalia** Kirschner, H. Øllg. & Štěpánek

Mostly robust, weedy and non-native species, seldom persisting in any one site, and mostly recorded only once or twice in the county as casuals.

**Taraxacum laeticolor** Dahlst. - (Pale-stalked Dandelion)

Scattered through Britain and probably introduced. Recorded from a roadside bank at Aber-porth SN257513, 1980, and there are two old records, from the Rheidol valley c.SN68-77, 1934 (PCh), and from Capel Dewi SN68G (PCh).



*Taraxacum* Sect. *Ruderalia*, Pentre-llyn, Llanilar, view W from SN619751, April 1992

***Taraxacum pannucium* Dahlst. - (Green-stalked Dandelion)**

Widespread in Britain and probably introduced, and recorded from only two sites in the county, on a roadside bank at Pont-sian SN439461, 1977, and from waste ground in Aberystwyth SN583812, 1980.

***Taraxacum subexpallidum* Dahlst. - (Tongue-lobed Dandelion)**

Widespread in Britain and probably introduced, recorded only once in the county, on a roadside bank at Llangranog SN320542, 1978.

***Taraxacum tenebricans* (Dahlst.) Dahlst. - (Shiny-leaved Dandelion)**

Very sparsely scattered and introduced in Britain, and recorded only once, on a roadside verge on Gernos Mountain SN355468, 1976.

***Taraxacum laticordatum* Markl. - (Decumbent Dandelion)**

Widespread and native in Britain, and recorded only once, on a shingle beach by the Afon Aeron at Llanerchaeron SN478605, 1984.

***Taraxacum pallescens* Dahlst. - (Pink-stalked Dandelion)**

Scarce and probably introduced in Britain, and recorded only once, on the Penyrerhyd sand dunes SN162488, 1976.

***Taraxacum subcyanolepis* M. P. Christ. - (Reddish-bracted Dandelion)**

Widely scattered and probably native in Britain, and recorded twice in the county, from Llanbadarn Fawr SN600808, 1974 (RGE), and from the masonry of the Trawsgoed railway bridge SN665728, 1977.

***Taraxacum croceiflorum* Dahlst. - (Orange-flowered Dandelion)**

Widespread and native in Britain, and recorded five times in the county, from three churchyards, mixed woodland and a laneside bank. SN34K, Q, 54N, 57Z, 64E.

***Taraxacum stenacrum*** Dahlst. - (Linear-lobed Dandelion)

Endemic and widespread in Britain and Ireland, and recorded once in the county, from a roadside bank at Allt Goch, Llangranog SN320542, 1978.

***Taraxacum undulatiflorum*** M. P. Christ. - (Dull-leaved Dandelion)

Widespread and probably introduced in Britain, and recorded twice in the county, on a laneside verge at Llanwnnen SN535471, 1979, and on a roadside verge at Penyrangor, Aberystwyth SN580807, 2005 (PAS).

***Taraxacum piceatum*** Dahlst. - (Leaden-bracted Dandelion)

Widespread and probably introduced in Britain, and recorded only once, from St Michael's churchyard, Aberystwyth SN581817, 1979.

***Taraxacum ancistrolobum*** Dahlst. - (Few-lobed Dandelion)

Widespread and native in Britain, but recorded only three times in the county, first from Cardigan SN14, 1957 (JAWe), and more recently from the churchyards at Tregaron SN680597, 1981, and Llanwnnen SN533473, 1979.

***Taraxacum sellandii*** Dahlst. - (Selland's Dandelion)

Widespread and native in Britain, and recorded from eight sites in seven tetrads in the county, on roadside banks and verges, a sandy foreshore, a mortared wall and a churchyard. SN34K, S, 56B, 58V, 66G, 67V, 68B.

***Taraxacum adiantifrons*** E. Ekman & Dahlst. - (Pretty-leaved Dandelion)

Widespread and probably introduced in Britain, and recorded only once, from a laneside bank at Dol-y-bont SN621886, 1980.

***Taraxacum aequilobum*** Dahlst. - (Twisted-bracted Dandelion)

Widespread and probably introduced in Britain, recorded only once, from the University campus, Aberystwyth c.SN58V, 1981 (AJR).

***Taraxacum latissimum*** Palmgr. - (Broad-leaved Dandelion)

Widespread but scarce and introduced in Britain, and recorded only once, from Llanfairorllwyn churchyard SN367410, 1982.

***Taraxacum acroglossum*** Dahlst. - (Broad-bracted Dandelion)

Widely scattered and probably introduced in Britain, and recorded only from St Michael's churchyard, Aberystwyth SN581817, 1979.

***Taraxacum lingulatum*** Dahlst. - (Long-bracted Dandelion)

Widespread and native in Britain, but recorded only twice, from Brongwyn churchyard SN288437, 1979, and from a laneside bank at Cellan SN600478, 1980.

***Taraxacum vastisectum*** Markl. ex Puol. - (Crowded-lobed Dandelion)

Very scattered and introduced in Britain, and recorded only from Betws Bledrws churchyard SN596520, 1983.

***Taraxacum cordatum*** Palmgr. - (Entire-lobed Dandelion)

Widespread and native in Britain, and recorded from six sites, four of them churchyards, the others a roadside bank and as a garden weed. SN34L, 46Q, 64D, 65Z, 68A, 78K.



**Taraxacum sagittipotens** Dahlst. & R. Ohlsen ex G. E. Haglund - (Smooth Dandelion)

Scattered in Britain and probably native, and recorded only twice, from St Michael's churchyard, Aberystwyth SN581817, 1979, and from a roadside verge at the Waun crossroads SN600822, 1984.

**Taraxacum ekmanii** Dahlst. - (Ekman's Dandelion)

Widespread in Britain and probably native, and recorded five times, from meadows, from dry banks, and from waste ground. SN45Z, 58V, 67C, 68K, 68V.

**Taraxacum aurosulum** H. Lindb. - (Tailed Dandelion)

Widespread but scattered and probably introduced in Britain, recorded only once, from waste ground in Aberystwyth SN583812, 1980.

**Taraxacum oblongatum** Dahlst. - (Oblong-leaved Dandelion)

Widespread and native in Britain, and recorded only from six sites, on roadside banks and verges, and as a garden weed. SN46R, 56J, P, 64E, 68A, J.

**Taraxacum cophocentrum** Dahlst. - (Rounded-lobed Dandelion)

Endemic and widespread in Britain and Ireland, and recorded twice, from the A485 roadside verge 1km S of Llanfarian SN593767, 1979, and from Troed-yr-aur churchyard SN327454, 1979.

**Taraxacum sinuatum** Dahlst. - (Sinuate-lobed Dandelion)

Scattered in the SW half of Britain and probably native, and recorded only once, from a dry slope above the road at Allt Goch, Llangranog SN321543, 1978. The record of *T. lacinosifrons* Wiinst. in Dudman & Richards (1997) refers to this specimen.

**Taraxacum dahlstedtii** H. Lindb. - (Dahlstedt's Dandelion)

Widespread and native in Britain, but recorded only once, a distinct colony of c.200 plants on river shingle by the Afon Ystwyth at Wenallt, Llanafan SN67407157, 1979.

**Taraxacum pulchrifolium** Markl. - (Beautiful-leaved Dandelion)

Very scattered and introduced in Britain, and recorded only once, from Llanddewi-Brefi churchyard SN664553, 1978.

**Taraxacum polyodon** Dahlst. - (Common Dandelion)

Widespread and probably native in Britain, but recorded only once, from waste ground by Goginan churchyard SN693811, 1979.

**Taraxacum xanthostigma** H. Lindb. - (Ochre-styled Dandelion)

Widespread and probably native in Britain, and recorded four times, from two churchyards and two roadside banks. SN24W, 34K, N, 54U.

**Taraxacum fasciatum** Dahlst. - (Dense-bracted Dandelion)

Widespread and probably native in Britain, and recorded twice, from roadside verges 1km S of Llanfarian SN593767, 1979, and at the Waun crossroads, Aberystwyth SN600822, 1984.

**Crepis paludosa** (L.) Moench - Marsh Hawk's-beard - Gwalchlys y Gors

Although reported from the Devil's Bridge gorge c.SN7477 by Webb (1933), this record was reasonably distrusted by Salter (1935) in the absence of confirmation. It was recorded as occasional by the Llyfnant stream "near the bridge just W of the *Stellaria nemorum* site" c.SN733975 in 1955 (JEL), but without indication of which county it was in, and it was not confirmed for the Cardiganshire side of the stream there until 1988 when it was seen at this exact spot (RB). A colony was later found on mossy boulders further downstream SN726975, 1994 (SPC) - 2005 (SJT). In 1983 it was found in Cwm Einion on shaded rocks and

in muddy flushes, along the N bank of the stream from SN69309459 to SN69689439 (WMC) and remains frequent there, a colony at SN69529442 having *c.*50 flowering plants in 2006 (AOC & JPP). The only other report is an apparently erroneous one from Coed Allt Lan-las SN481605 in 1988.

***Crepis biennis* L. - Rough Hawk's-beard - Gwalchlys Garw**

This species, assumed to be an introduction in most of Wales in Preston *et al.* (2002), is known from only two sites. It was first found in 1997, *c.*150 plants along 30m of roadside bank and 60m of adjoining field bank, 500m SE of Pont Glynarthen SN313482 (NMW). In 1998 it was found to be frequent along the disused railway embankment on the Teifi Marshes near Cardigan, by the county boundary SN186454. Both populations have remained stable, 2008, since they were discovered.



*Crepis biennis* on disused railway, Teifi Marshes, view N from SN186454, May 2008



*Crepis biennis* on roadside bank, Glynarthen, view NNW from SN313482, June 1997

***Crepis tectorum* L. - Narrow-leaved Hawk's-beard - Gwalchlys Culddail**

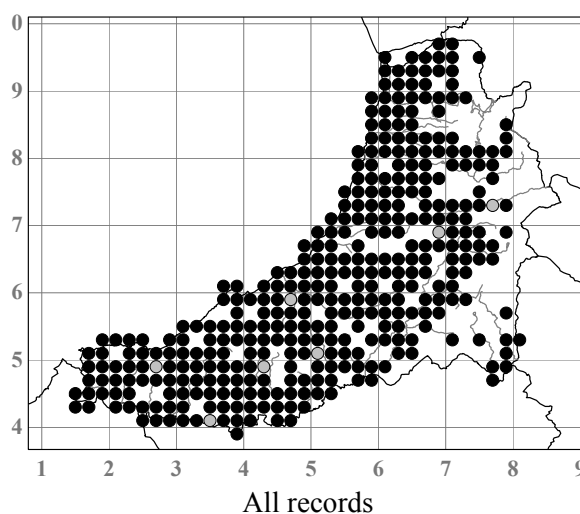
This native of Europe has been recorded once, as a casual in 1992 when a single plant appeared on a road verge reconstructed the previous year, 150m NE of Pont Trecefel, Tregaron SN674592 (NMW).

***Crepis rubra* L. - Pink Hawk's-beard**

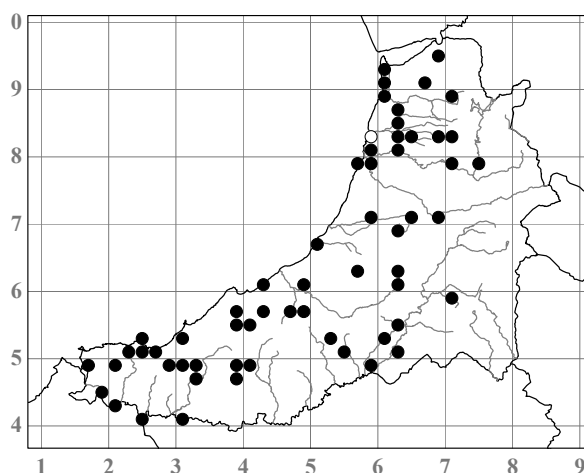
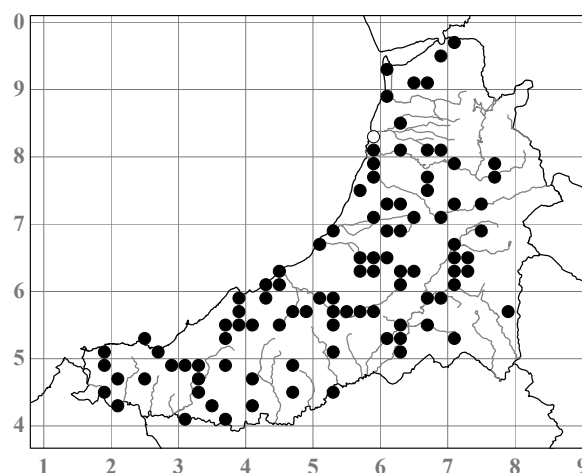
This native of SE Europe, occasionally grown in gardens, has been recorded once, as a casual in 1993 when several plants appeared on ground disturbed for road-widening at Penrhyn-coch SN641840 (NMW).

***Crepis capillaris* (L.) Wallr. (*C. virens* L.) - Smooth Hawk's-beard - Gwalchlys Llyfn**

Common in dry pastures, on road verges, banks and waste ground, in graveyards and gardens, becoming rare and mostly only casual in the uplands. The two sometimes poorly differentiated varieties seem almost equally common. Exemplary specimens of both were collected, although unnamed, at Rhoscellan, Wallog SN5985 by PCh in 1934 (NMW). Var. **capillaris**, with several ascending stems and no obvious main one, and with shorter involucre bracts, is often the more abundant variety on disturbed and waste ground; it is dominant over a 2ha sandy pasture at Gwbert SN16354957, 1991 (NMW), and occurs unusually in rank unmown and ungrazed grassland and other habitats on the MoD range, Aber-porth SN242517, 1999 (NMW). Var. **agrestis** (Waldst. & Kit.) Dalle Torre & Sarnth. (var. *glandulosa* Druce), with a distinct, erect main stem (often with ascending lateral ones as well), and with longer involucre bracts, is perhaps more common in hay meadows, where distinctive forms with subentire leaves occur (SPC) and in unimproved pastures, but the two seem scarcely differentiated ecologically, and



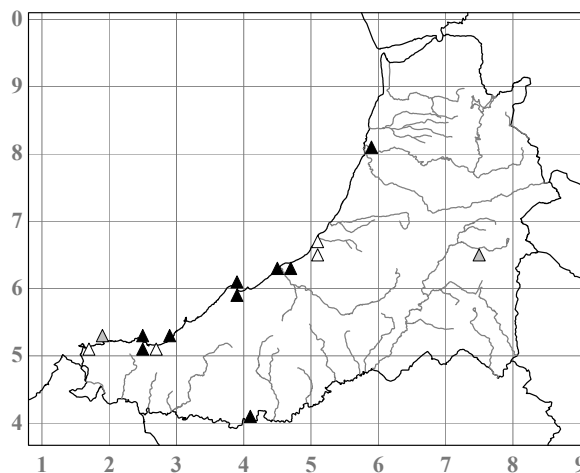
All records

Var. *capillaris*Var. *agrestis*

indeed morphologically if the plants have been grazed. Altitude limit (the species) *c.*305m, Salter (1935); 455m, roadside verge NW of Teifi Pools SN780683, 2002.

***Crepis vesicaria* L. subsp. *taraxacifolia* (Thuill.) Thell. ex Schinz & R. Keller (*C. taraxacifolia* Thuill.)** - Beaked Hawk's-beard - Gwalchlys Gylfinog

This naturalised native of Europe is almost confined to the coast, growing on waste ground, banks, pathsides and grassy slopes. It is very local but sometimes abundant where it does occur, as at Aberaeron SN46L, R, 1989-1998, New Quay SN35Z and 36V, 1941 (JAW, Wade 1952) - 2005 (NMW), and Aber-porth SN25K, L, 1939 (WMJ, Wade 1952) - 1999. Towndrow (1907) recorded it from the Aberystwyth area, but it has not been seen there since except for a few plants around the level crossing at Llanbadarn Fawr SN599807 in 2001, and as a flowerbed weed at Parc-y-llyn SN595807 in 2007 (NMW), nor has it been seen at Llan-non since Salter's day (1935). There are several inland records from the 1950s at BRC, but these must be considered suspect in the absence of confirmation. A specimen from the sea cliffs at New Quay Head SN3860, 1979 (NMW, RGE) is var. ***rutilans*** (Lacaita) P. D. Sell. Most of the other records are probably of var. ***taraxacifolia***.



***Crepis setosa* Haller f.** - Bristly Hawk's-beard - Gwalchlys Gwrychog

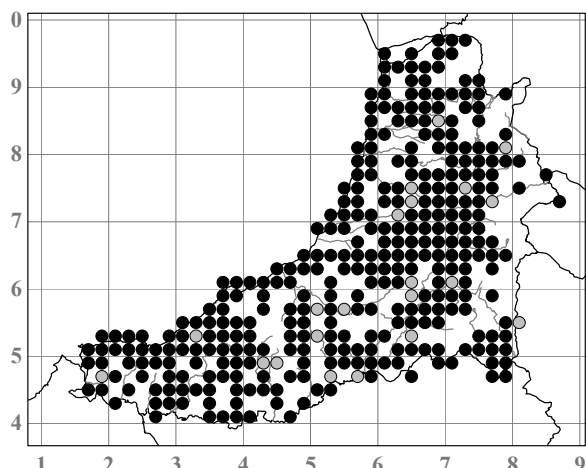
This native of S Europe has been recorded once, as a casual in 1995 when a single plant appeared, along with *Agrostemma*, *Anthemis austriaca* etc., in an area of the Glanyrafon Industrial Estate SN608801 sown with a seed-mix (SPC).

***Pilosella officinarum* F. W. Schultz & Sch. Bip. (*Hieracium pilosella* L.)** - Mouse-ear-hawkweed - Clust y Llygoden

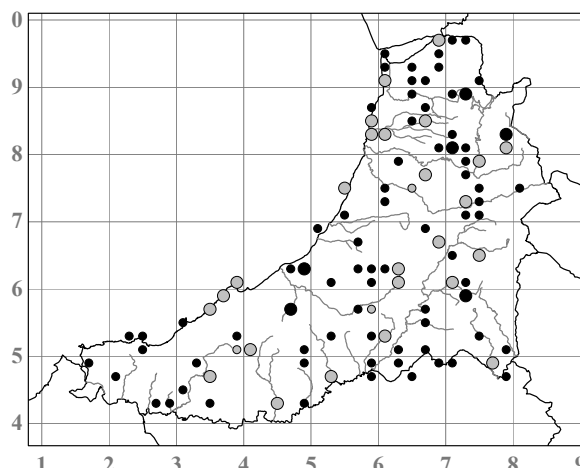
Common in dry places in grazed pastures, rocky slopes, sand dunes, dry banks, graveyards and other mown grasslands, on pathsides, road verges and railway ballast, and occurring from the coastal slopes well into the uplands where it is especially frequent on lead mine sites. All of the seven subspecies recognised in Britain by Sell & West have been found in the county except for subsp. *trichoscapa*; in the maps of them, records confirmed by PDS are shown as standard dots, and those unconfirmed as smaller dots. Although the subspecies differ in abundance, and usually do not grow together, there are no obvious ecological or geographical differences among them in the county and they would seem better treated as varieties or even forms. Intermediates have occasionally been recorded. Altitude limit 395m, "Nant Brefi and Nant Pysgotwr"



SN75 (Salter 1935); 410m (subsp. *trichosoma*), mortar-rich bank, Esgair Fraith lead mine SN740912, 1990 (NMW).



All records



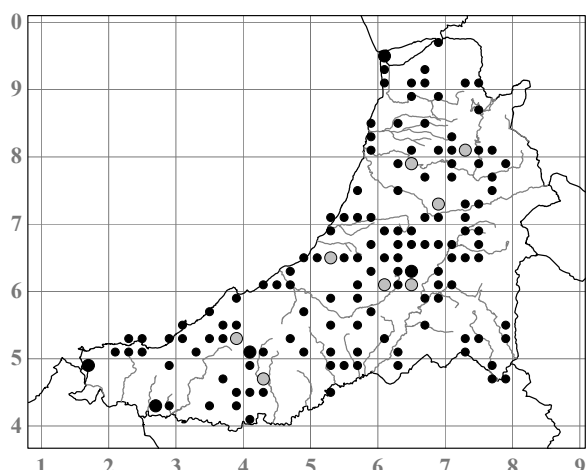
Subsp. *micradenia*

Subsp. **micradenia** (Nägeli & Peter) P. D. Sell & C. West (*Hieracium pilosella* var. *concinnum* F. Hanb.)

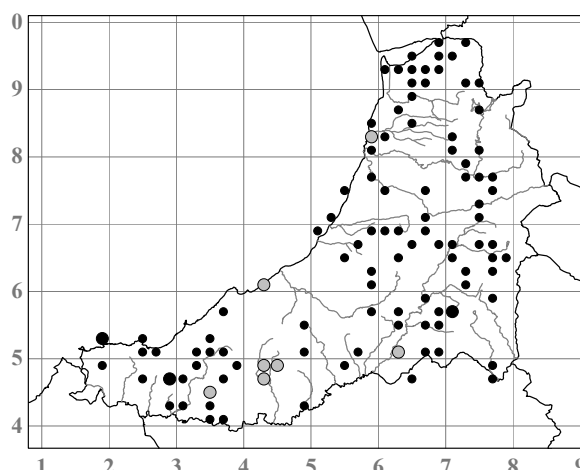
Common and widespread. Altitude limit 360m, mortar-rich mound, Eaglebrook lead mine SN73648927, 1988 (NMW, det. PDS).

Subsp. **euronota** (Nägeli & Peter) P. D. Sell & C. West

Common and widespread. Altitude limit 325m, heathy trackside 200m SW of Llyn Fanod SN59996394, 2007 (AOC & SDSB).



Subsp. *euronota*



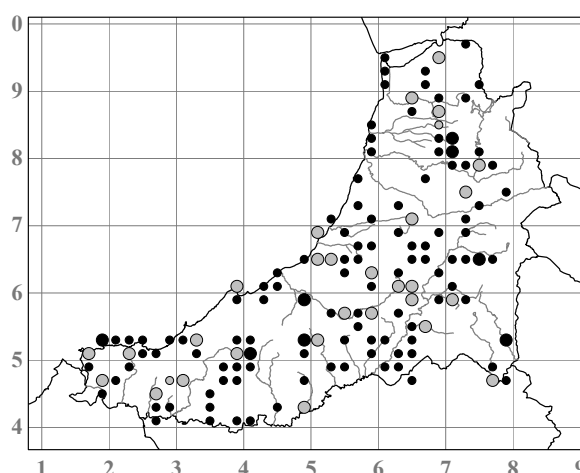
Subsp. *officinarum*

Subsp. **officinarum**

Frequent and widespread, and apparently not as restricted to the lowlands as in other parts of Britain. Altitude limit 390m, verge of track on sheepwalk 3km ESE of Tregaron SN702574, 1993-2008 (conf. PDS).

Subsp. **trichosoma** (Peter) P. D. Sell & C. West (*Hieracium pilosella* var. *nigrescens* Fr.)

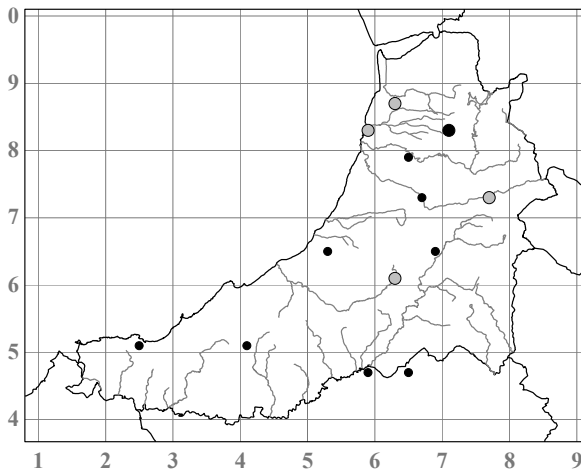
Probably the commonest subspecies, and more frequent in the uplands than the others. Altitude limit 410m (see the species); 320m, disused quarry, Pentre-rhiw, Llanddewi-Brefi SN663542, 1978 (det. PDS).



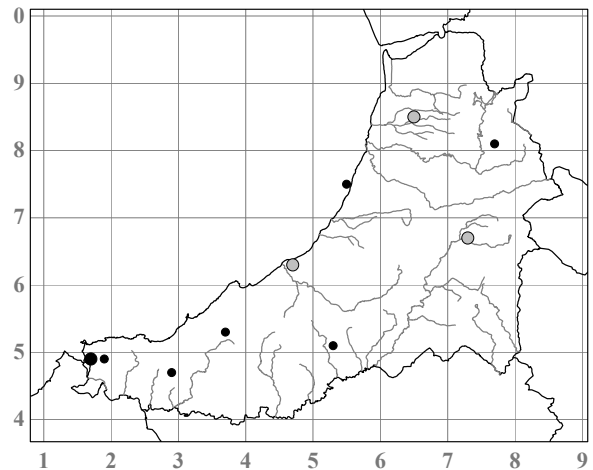
Subsp. *trichosoma*

Subsp. **tricholepia** (Nägeli & Peter) P. D. Sell & C. West

Widespread but uncommon, with only 13 records.



Subsp. *tricholepia*



Subsp. *melanops*

Subsp. **melanops** (Peter) P. D. Sell & C. West

The rarest of the subspecies, recorded only from a roadside bank at Penrhyn-coch SN640840, 1976 (NMW, det. PDS); a heathy coastal slope S of Mynachdy'r-graig SN557743, 1997; a heathy upland pasture E of Dyffryn Castell SN778818, 1994; Aber-arth churchyard SN477633, 1980 (NMW, det. PDS); a roadside bank 800m NE of Swyddffynnon SN698666 (NMW, det. PDS); Cribyn churchyard SN520513, 1999; Plwmp chapel graveyard SN365524, 1999; Beulah chapel graveyard SN288460, 2008; a field bank 220m N of Ferwig church SN183498, 1995; and the Penyrergyd dunes SN162486, 1979 (NMW, det. PDS).

**Pilosella**  $\times$  **stolonifera** (Waldst. & Kit.) F. W. Schultz & Sch. Bip. nothosubsp. **schuriana** (Nägeli & Peter) P. D. Sell (*Pilosella aurantiaca* subsp. *carpathicola*  $\times$  *officinarum* subsp. *euronota*)

Growing with both parents in the chapel graveyard at Tan-y-groes SN284493, 1997 (NMW, CGE, conf. PDS) - 2006, where it was abundant in an area 10  $\times$  4m, and known from nowhere else in Britain. The flowers were of intermediate colour, the phyllaries had only glandular hairs, and a few stems were branched with two capitula.



(above) *Pilosella*  $\times$  *stolonifera* nothosubsp. *schuriana* (in centre) and parents;  
(right) *Pilosella*  $\times$  *stolonifera* nothosubsp. *schuriana* and parents, Tan-y-groes chapel graveyard SN284493, July 1997



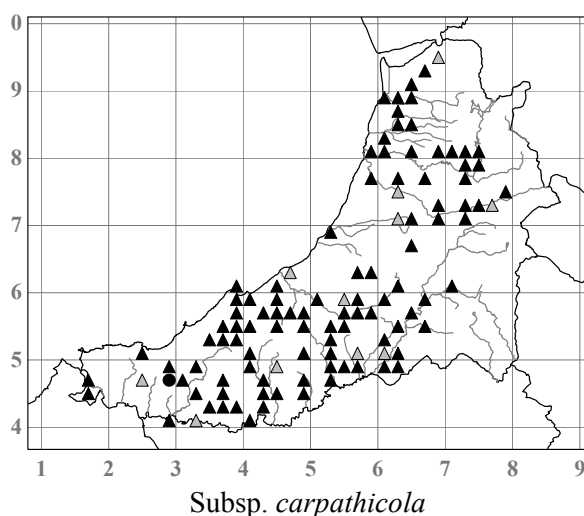
***Pilosella aurantiaca* (L.) F. W. Schultz & Sch. Bip. - Fox-and-cubs - Clust-y-llygoden Euraid**

**Subsp. *aurantiaca***

Recorded only once, naturalised in rough grass in the Ponterwyd chapel graveyard SN749809 in 1987 (NMW, conf. PDS), but the small colony disappeared soon after. As this subspecies has very short stolons it lacks the capacity for aggressive spreading so characteristic of subsp. *carpathicola*. Native of C Europe.

**Subsp. *carpathicola*** (Nägeli & Peter) Soják (*Hieracium aurantiacum* sensu Salter, *H. brunneocroceum* Pugsley)

First recorded in the county in 1904 (Salter Diary 25.6.1904) in two sites, naturalised near Lampeter c. SN54U and near Trefilan church SN55N (DW). Salter (1935) described it as frequently naturalised. It is now naturalised in most graveyards, but less often elsewhere although it is occasionally found on roadside banks and waste ground, and even in a few pastures, for example 250m SSW of Felin Rhiwbren SN472574 in 1988, and in hay meadows, for example at Winllan, Talsarn SN566572 in 1992. It surprisingly appeared in 2002 in the IGER hay meadow reversion experimental plots at Trawsgoed SN681726 (SPC). It is generally confined to the lowlands, but unusually is naturalised at 305m, its altitude limit, on the roadside verge SE of Penrhiw-gaer, Ystumtuen SN726789, 2008. Native of N & C Europe.



*Pilosella aurantiaca* subsp. *carpathicola*,  
Bwlchfadfa chapel graveyard, view  
E from SN43704949, June 1980

***Hieracium* L.**

This largely apomictic genus is widespread in the county but as the species, apart from *H. vagum*, *H. sabaudum* and the sexual diploid *H. umbellatum*, are generally not very abundant, it has proved possible to collect from a reasonable proportion of all the colonies and get the material expertly named. Most of the species grow in obvious colonies on cliffs, rocky stream banks, roadside banks and walls, and while many of these consist of a single species, two or more can sometimes occur within the same colony and either be overlooked or can cause confusion when the colonies are revisited, especially when erroneously supposed duplicates of one of the species have been collected.

There was less early interest in the genus in the county than was the case with *Rubus*, and not until Ley, Painter and Marshall visited the county around the turn of the 19<sup>th</sup> century was any serious recording or collecting done, and then only on a small scale. Salter took little interest in the genus, and Pugsley in his *Prodromus* (1948) gave only 15 records in total for nine species. My own collecting over the last 30 years has mostly been inspired by P. D. Sell, who has named most of the material, while D. J. McCosh has named most of the more recent collections and has also recently revised all the material from the county in NMW, CGE and BM. J. Bevan has also given a lot of help both in herbaria and in the field. The arrangement below follows Sell & Murrell (2006).

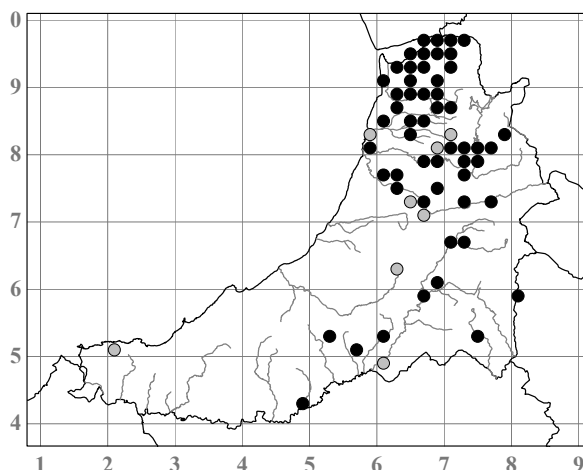
The richest sites are in adjacent upland valleys. At the head of the Afon Myherin SN800798-797807, on the cliffs and streamside rocks, although Hawkweeds are by no means abundant, eight species have been recorded: *H. argenteum*, *H. argillaceum*, *H. cheriense*, *H. consociatum*, *H. daedalolepioides*, *H. deganwyense*, *H. diaphanoides* and *H. scabrisetum*. In the nearby Rhuddnant valley SN770776-803784 seven have been recorded: *H. angustisquamum*, *H. argillaceum*, *H. daedalolepioides*, *H. diaphanoides*, *H. placero-phylloides*, *H. sparsifolium* and *H. subcrocatum*. The various cliffs around the confluences of the Afon Doethie, the Afon Pysgotwr and the Afon Tywi in the SE of the county are almost equally productive. There is also a remarkable concentration of species around and E of Llangeitho in the upper Aeron valley.



Because much of the recording of the genus was done in the late 1970s and early 1980s, the impression of decline given by the maps is mostly an artefact; there has probably been no significant decrease or increase of any of the species in recent decades.

**Hieracium vagum** Jord. (*H. boreale* auct.) - (Glabrous-headed Hawkweed)

This late-flowering species, generally northern in Britain, is common in the N of the county and extends down the Teifi valley as far as Highmead SN496432, 1985 (NMW, det. PDS). There is an



Head of the Afon Myherin, view N from SN79888062, May 2004

outlying record from a roadside bank 2km ESE of Mwnt SN210510, 1983 (NMW, det. PDS). It grows on roadside banks, walls, lead mine spoil, railway ballast and embankments, in felled conifer plantations and sometimes in gardens as a weed, but grows less often on more natural sites such as streambanks, rocks and clearings in woodland. Altitude limit 340m, felled FC plantation E of Llyn Pendam SN715839, 1987 (NMW, det. PDS).

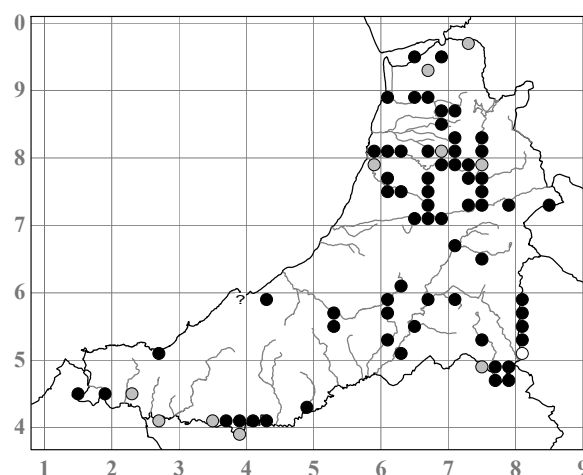
The above records, and many of the others, are of forma **vagum** which is probably the commoner plant. Forma **croceostylum** (Pugsley) P. D. Sell has been recorded from a number of sites including a roadside bank 600m SW of Furnace SN680946, 1976 (CGE, det. PDS 2000), scrub on the Rheidol bank between the bridges at Ponterwyd SN749809, 1976 (CGE, det. PDS 2000) where forma *vagum* also grows, and a roadside bank 400m NE of Falcondale Lake SN573503, 1978 (CGE, det. PDS 2000).

**Hieracium argutifolium** Pugsley - (Sharp-toothed Hawkweed)

Probably native in Britain and Ireland, with a widely scattered distribution. It is recorded in the county only from a disused roadside quarry W of Pontrhyd-y-groes SN732720, 1977 (NMW, det. DJMcC 2004), and from rank grassland by the Afon Rheidol just above Ponterwyd old bridge SN74818089, 2000 (NMW, AOC & JB, conf. DJMcC 2004).

**Hieracium sabaudum** L. - (Autumn Hawkweed)

A late-flowering species, scattered through the county but commoner in the N and very strikingly almost confined to the major river valleys, where it is largely restricted to growing on riverside rocks, riverbanks and shingle and streamsides. It is much less characteristic of roadside banks and other artificial habitats than *H. vagum*, and the two have not been seen growing mixed together. Altitude limit 320m, W-facing cliffs, Craig Ddu, Cwm Doethie SN768484, 1992.



*Hieracium sabaudum*

Most plants are forma **sabaudum** (*H. perpropinquum* (Zahn) Druce, *H. boreale* subsp. *obliquum* (Jord.) Druce). Forma **bladonii** (Pugsley) P. D. Sell has been recorded from rocks by the Nant Ysbyty Cynfyn SN749788, 1994 (CGE, det. PDS 1997); from the railway embankment at Aber-ffrwd SN6878, 1978 (NMW, det. DJMcC 2004); from a roadside cliff 700m ENE of Pont Rhyd-y-groes SN748730, 1993 (NMW, det. DJMcC 2004); and from a roadside bank near Blaenwaun, 2km SE of Aber-porth SN273504, 1994 (NMW, det. DJMcC 2004).

### **Hieracium eminentiforme** Pugsley - (Exmoor Hawkweed)

Six large clumps of this huge Hawkweed were found in 1998 in the wooded Teifi gorge 150-200m NW of the mouth of the Cwm Du stream, Coedmore SN193445 (NMW, AOC & LRG), opposite and in sight of the colony on the disused quarries on the Pembrokeshire side of the river. It is otherwise known only from the N coastal region of Exmoor.

### **Hieracium dumosum** Jord. - (Yellow-glandular Hawkweed)

A rare introduction from W and C Europe and only once recorded, from a dry roadside bank under trees 1km N of Llanfair SN432419, 1976 (CGE, det. PDS 2000). The trees have since been felled and the plant lost.

### **Hieracium umbellatum** L. - (Umbellate Hawkweed)

This largely sexual species is by far the commonest Hawkweed in the county, the great majority of the plants being subsp. *umbellatum* var. *umbellatum*.

#### Subsp. **umbellatum** var. **dunense** Reyn

First collected by Marshall in 1899 from dry banks and heaths from Aber-arth to Bethania SN46W-56R, where he described it as abundant (CGE, det. PDS 1997). It has since been collected from an exposed roadside bank 1km N of Nantcwnlle church SN577596, 1976 (CGE, NMW, det. PDS 1997) and from a shaded roadside bank 600m SE of Llanfair SN438406, 1976 (CGE, NMW, det. PDS 1997). A Stephenson record from Aberystwyth (Wade 1952) is unconfirmed. In most other parts of Britain it is a plant of coastal dunes and shingle.

#### Subsp. **umbellatum** var. **umbellatum**

Common throughout much of the lowlands on banks, in unimproved pastures, on heaths, streambanks and on rock outcrops. It is less common along the coast, but does occur in coastal heath, for example E of Pendinaslochdyn SN323550, 1994 (CGE, NMW, AOC & SPC, det. PDS 1994, DJMcC 2004) where it grows with subsp. *bichlorophyllum* var. *taylori*, and at Llangranog SN30685406, 1994 (NMW, det. PDS 1994) where the plants are intermediate with subsp. *bichlorophyllum*. It becomes rare in the uplands, although its altitude limit is 440m, on a roadside bank by a FC plantation 3.5km SE of Llanddewi-Brefi SN683520, 2000. Smith collected it "By the bridge at Hafod" SN77R in the 1790s (LINN, Herb. Smith, Pugsley 1948).

#### Subsp. **umbellatum** var. **coronopifolium** Bernh. ex Hornem.

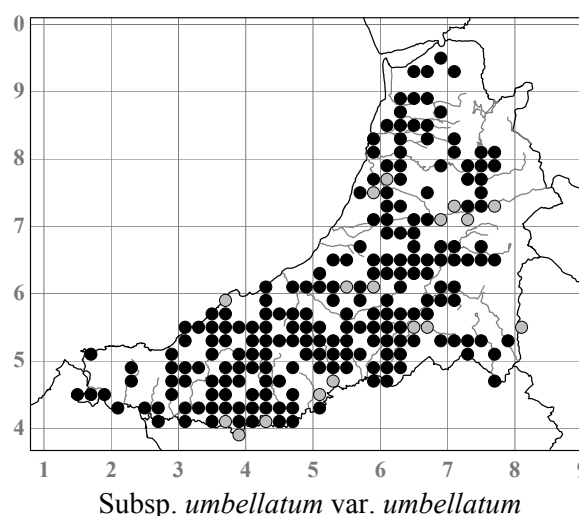
Collected by Marshall in 1899 between Aber-arth and Pennant SN46W-56B along with var. *dunense* (CGE, BM, det. PDS 1997).

#### Subsp. **umbellatum** var. **commune** Fr.

Recorded only from among Gorse on the SW side of Pendinas, Aberystwyth SN58388011, 2000 (NMW, det. DJMcC 2004) and from a roadside in wet heath 2.5km WSW of Mydroilyn SN434545, 2000 (NMW, det. DJMcC).

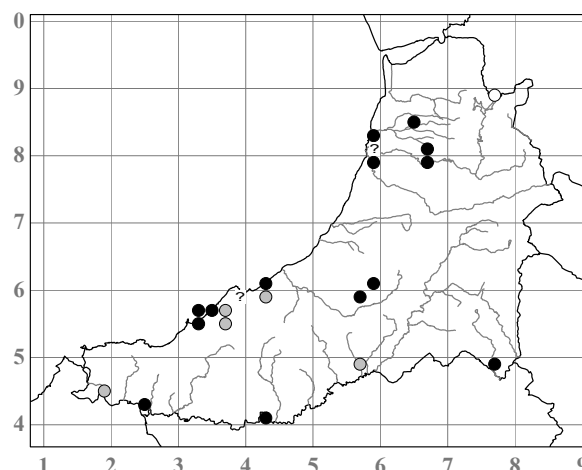
#### Subsp. **bichlorophyllum** (Druce & Zahn) P. D. Sell & C. West var. **curtum** E. F. Linton

"In good quantity" when collected by the Afon Drywi "near its plunge into the sea" SN426606 by Marshall in 1899 (CGE, det. PDS 1997, BM), but only var. *taylori* is to be found there now. Elsewhere it occurs on the W and S coasts of Wales and in the Channel Islands.



Subsp. **bichlorophyllum** var. **taylori** Bab.

Widely scattered throughout the county but uncommon, recorded from the coastal slopes and heaths, from Oak woodland, streamsides and quarries as well as roadside banks. It sometimes grows with subsp. *umbellatum* var. *umbellatum*, and intermediates occur. A large clump with *c.*25 inflorescences on a rocky roadside slope just W of Pontbren Pwll-crwn, Cenarth SN25804243 was known for 20 years, 1978 (NMW, JRP, det. PDS) - 1998, and must have been much older. The earliest record was from Aberystwyth *c.*SN58V in 1848 (BM, JBa, det. PDS & CW 1958, Pugsley 1948). The highest it has recently been seen is at 265m, on a heathy roadside bank SW of Crynfryn Villa, Penuwch SN584616, 2000 (NMW, AOC & JB, det. DJMcC 2004), but an 1886 collection by Ley from Maesnant (BM), probably in SN78U, given by Pugsley (1948), will have been at *c.*380m or more.



**Hieracium subcrocatum** (E. F. Linton) Roffey (*H. bartonii* Pugsley) - (Dark-styled Hawkweed)

Generally upland and northern in Britain and Ireland, and probably endemic, it has been recorded from seven sites in the uplands on rocks by rivers and streams, and was first collected by Ley from the Nant Lletygleision in the Tywi valley *c.*SN74Z in 1897 (NMW, det. PDS 1992). Ley also collected it in 1897 and 1896 respectively from the “Lower Doethie Glen [*c.*SN74U] and Pont Rhyd-y-groes [*c.*SN77G]” (both BM). Salter collected it from Devil’s Bridge *c.*SN77N and from Graig Ddu, Cwm Ystwyth “at 1,500ft” SN87B in 1930 (both NMW, det. DJMcC 2004). Later collections are from near Glasbwl in the Llyfnant SN79I or N, 1955 (CGE, JEL, det. PDS 1995); from the Rhuddnant ravine SN794782, 1995 (NMW, EJMCD & KP, det. DJMcC 2004); from the S bank of the Afon Ystwyth 1.5km above Blaen-y-cwm SN841755, 1984 (NMW, det. PDS 1984, conf. DJMcC 2004); and from the gorge of the Afon Mwyro 2.5km E of Strata Florida SN770652, 1994 (NMW, det. PDS 1994, conf. DJMcC 2004). The only record from another habitat is of it by Ley “In large quantity on a hedge bank Nant Rheiwbie”, presumably *c.*SN7748, 1897 (CGE, det. PDS 1992). Records of *H. corymbosum* from the Llyfnant by Ley and from near Aberystwyth by Painter (Salter 1935) and from Pontrhyd-y-groes *c.*SN77G by Ley (1887) probably refer to this species. Altitude limit 455m, Graig Ddu, 1930 (as above); 330m, Rhuddnant ravine, 1995 (as above).

**Hieracium eboracense** Pugsley - (Northern Hawkweed)

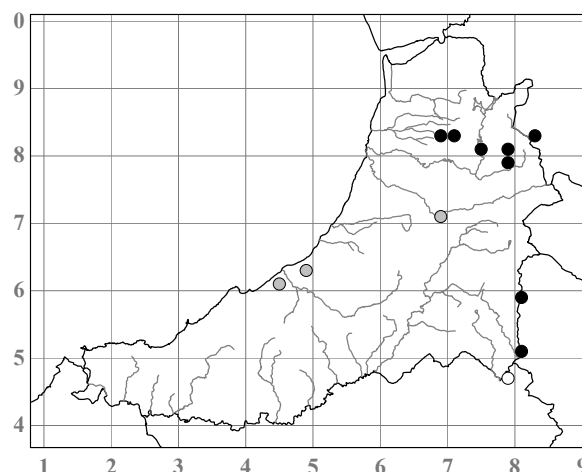
This British endemic, chiefly of South Wales and SE and N England, has been recorded only once, by Ley in 1897 from by the Afon Doethie below the Pysgotwr confluence *c.*SN7648 (CGE, det. PDS).

[*Hieracium trichocaulon* (Dahlst.) Johanss.

Listed for the county in Hyde & Wade (1934), but no further information is available.]

**Hieracium scabrisetum** (Zahn) Roffey - (Scabrous Hawkweed)

Widespread in Wales, with a few localities in England and Scotland. It has been recorded from 11 sites, mostly on rocky streambanks, cliffs, quarries and grassy slopes in the uplands. The first record was by Ley in 1890 from the cliffs across the Tywi from Ystrad-ffin SN7847, his specimen in **Herb. F. J. Hanbury** becoming the type of *H. fragilicaule* forma *subhirsutum* Pugsley (1948), and it has since been recorded in that SE corner of the county from rocks above the Tywi arm of Llyn Brianne SN805514, 1988 (NMW, det. PDS 1989). In the lowlands it is in *Quercus petraea* woodland at the Afon Arth/Nant Erddig confluence SN493623, 1976 (NMW, det. PDS), on a roadside verge just NW of Pont Llanafan





SN686714, 1978 (NMW, det. PDS) and on spoil at the Cwm Sebon lead mine, Cwmerfyn SN685830, 1994 (NMW, JB & AOC, conf. PDS 1994). Altitude limit 480m, rocks at top of waterfall at head of Nant Myherin SN797807, 1988 (NMW, det. PDS 1989); it is in several places at the head of this valley.

**Hieracium placerophylloides** Pugsley - (Purplish-leaved Hawkweed)

Although apparently confined to limestone in most of its sites in N England and Wales, this British endemic has been recorded from two sites on the ostensibly acidic Silurian strata in the county, from the rocky bank of the Afon Pysgotwr Fawr 300m SE of Bryn-glas SN738511, 1995 (NMW, det. DJMcC 2004), and on a damp cliff in the Rhuddnant ravine SN797783, 1996 (NMW, AOC & PAS, det. DJMcC 2004) at 350m altitude.

**Hieracium lissolepium** Roffey - (Hairless-bracted Hawkweed)

Recorded only once, from the verge of the FC road by the Nant Hirgoed, 1.5km SE of Eisteddfa Gurig SN810831 in 1996 (NMW, det. DJMcC 2008) at 375m altitude. Ley recorded it in 1888 from Rhydgaled, only 3km E of there in Montgomeryshire; otherwise it is chiefly known from N England and S Scotland, as well as Caernarfonshire and one site in Brecknockshire.

**Hieracium sparsifolium** Lindeb. (*H. stictophyllum* Dahlst.) - (Sparse-leaved Hawkweed)

Widespread in Wales, N England and Scotland, and also in W Ireland. Although Salter (1935) recorded this species from the upper Rheidol valley in 1927 (and included in error Llechwedd Mawr which is in VC 47), it has been reliably recorded only in the Rhuddnant valley on spoil of the Mynach Vale lead mine SN772775, 1994 (NMW, AOC & RNT, det. PDS 1994), from 2km upstream of there SN792779, 1996 (NMW, AOC & PAS, det. DJMcC 2004) and from slightly higher SN794782, 1995 (NMW, EJMCD & KP, det. DJMcC 2004) at 330m altitude, and by Salter from the ravine below Llyn Rhuddnant c.SN801784, 1926 (NMW, det. DJMcC 2001) at 455m ("1,500ft."), its altitude limit.

**Hieracium angustisquamum** (Pugsley) Pugsley - (Red-tinted Hawkweed)

Recorded only from rocks in the Nant Rhuddnant gorge SN801785, 1984 (NMW, det. PDS 1985, conf. DJMcC 2008) at 380m altitude. This British and Irish endemic is elsewhere mostly restricted to limestone.

[*Hieracium corymbosum* auct.

Records of this species in Salter (1935) and by Ley (1887) from the Llyfnant, from near Aberystwyth and from Pontrhyd-y-groes probably refer to *H. subcrocatum*, *fide* PDS 1994.]

**Hieracium deganwyense** Pugsley - (Deganwy Hawkweed)

First recorded from rocks by the Afon Tywi opposite Ystrad-ffin SN74Y by Ley in 1896 (CGE, det. PDS). Since then it has been recorded only from three upland sites in the Afon Myherin valley: on cliffs by the waterfall SN798806, 1991, at 450m altitude, where Salter (1935) recorded it as *H. leyi*, and on the wheelpit walls of the Nantycreuau lead mine SN789802, both 1991 (NMW, det. DJMcC 2004), and on the rocky streamside 900m N of Blaenmyherin SN79928048, 2003 (NMW, AOC & PAS, det. DJMcC 2004). This British endemic is also in North Wales, N England and Scotland.

[*Hieracium cacuminum* (Ley) Ley - (Summit Hawkweed)

Erroneously listed for the county in Hyde & Wade (1934); Salter's specimen from the head of the Afon Myherin, 1929 (NMW) is *H. argillaceum*.]

**Hieracium rubicundiforme** (Zahn) Roffey - (Rubicund Hawkweed)

This handsome British endemic of North Wales, N England and Scotland, reaches its S limit in the



*Hieracium rubicundiforme*, sea cliffs at Traeth Penbryn SN286520, June 2008

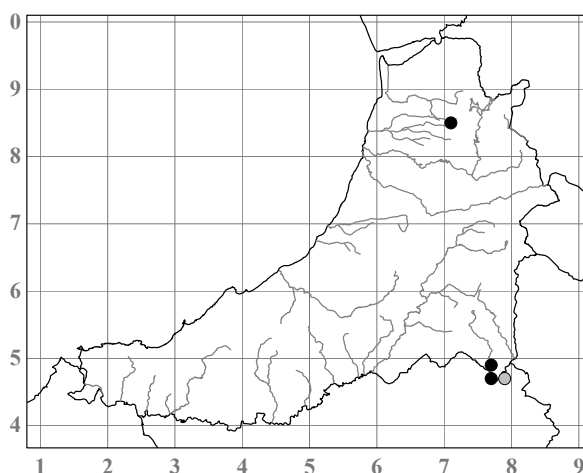
county, where it occurs on the sea cliffs at Traeth Penbryn SN291523, etc., 1934 (NMW, PCh, det. DJMcC 2004) - 2008 (1976 specimen in NMW, det. DJMcC 2004), and on disturbed ground on the MoD site, Aberporth SN245525, 1980 (NMW, det. DJMcC 2002).

### **Hieracium argenteum** Fr. - (Silvery Hawkweed)

A rare species of upland rocks, recorded by Salter from the cliffs at Pistyll y Llyn in 1930 (NMW, det. DJMcC 2004) and seen again here at SN753942 in 1979 (NMW, det. PDS 1979) at 380m altitude; by Salter (1935) from Craig y March, Pumlumon SN8088 at 530m altitude in 1928 and 1940 (NMW, conf. DJMcC 2001); and again by Salter from the head of the Afon Myherin c.SN798807 in 1929 (NMW, det. DJMcC 2001). Material from grassland in Bethel chapel yard at Pontrhyd-y-groes SN739724, 1994 (NMW, det. PDS 1994) was thought by DJMcC in 2001 to be untypical and perhaps not this species. It occurs elsewhere in the uplands of Wales and in N England, Scotland and Ireland.

### **Hieracium lasiophyllum** W. D. J. Koch - (Stiff-haired Hawkweed)

The first plant to flower, in late May and early June, on the few upland cliffs where it occurs, and a beautiful sight with its large flowers and white-fringed leaves. It was first found in 1972 on "Dry rocks above Troedrhiw Rhuddwen" (NMW, IMV, det. JB 1990, conf. DJMcC 2002), presumably Craig Ddu SN769483, where several hundred plants grow on the S-facing cliffs at up to its limit at 320m altitude, 1978 (NMW, det. PDS, conf. DJMcC 2002) - 1998. It is also abundant nearby on Craig Clungwyn SN777472, 1978 (NMW) and on the cliffs W of the Afon Tywi opposite Ystrad-ffin SN782470, 1978 (NMW, det. PDS, conf. DJMcC 2002). These sites are all on the slightly base-rich Nant Brianne Formation of the Silurian.



In the N of the county it has been found only at the E end of the Craig y Pistyll cliffs SN713856, 1976 (NMW, CGE, det. PDS) - 2003 (SDSB), probably on the Cwmere Formation, where there are usually 20-30 plants. Salter (1935) gave a Painter record of *H. schmidtii* Tausch for the Llynfnant, which may perhaps refer to this species. It occurs sparingly through North Wales and in parts of W and N England, Scotland and Ireland.

### [*Hieracium pallidum* Biv.]

Watson (1873) lists VC 46 under this name, which is usually equated with the Scottish *H. sarcophylloides*, on the basis of an Atwood specimen; the matter remains to be investigated.]



*Hieracium lasiophyllum*, Craig Ddu,  
SN771482, June 1978.

### **Hieracium vulgatum** Fr. - (Common Hawkweed)

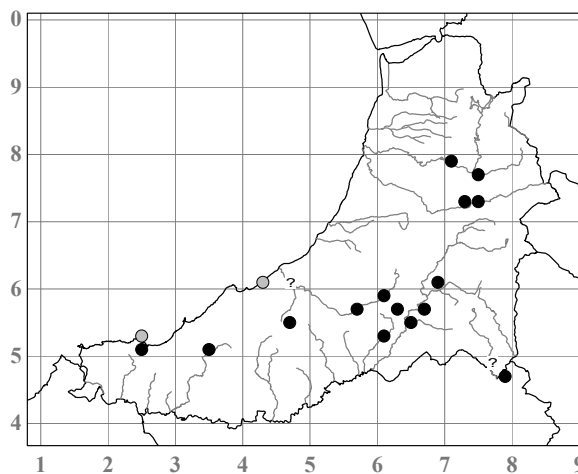
Generally a northern species in Britain and Ireland, and reliably recorded only three times in the county. Forma **vulgatum** was collected from a shaded rocky bank in Oak woodland in the Melindwr valley, 1km NE of Eglwys Fach SN694961 in 1980 (NMW, det. DJMcC 2004). Forma **subfasciculare** (W. R. Linton) P. D. Sell was found on ballast at Aberystwyth railway station SN588811 in 1990 (NMW, det. PDS 1994 as forma *subravusculum*, det. DJMcC 2004 as forma *subfasciculare*), and again on waste ground nearby in Park Avenue SN585813 in 2004 (NMW, det DJMcC 2008).

### **Hieracium spilophaeum** Jord. ex Boreau - (Spotted Hawkweed)

This probably introduced European species, widespread chiefly in S and C England, has been recorded only from the disused railway behind Penyrangor, Aberystwyth SN581808, 1993 (NMW, det. PDS 1994 as *H. pollichiae*, det. DJMcC 2008 as *H. spilophaeum*); the site has since been destroyed.

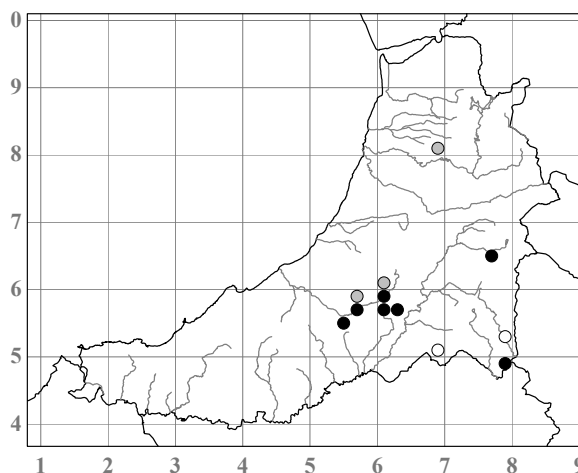
### **Hieracium subamplifolium** (Zahn) Roffey - (Balloon-leaved Hawkweed)

Endemic to South Wales and the English border, and known from *c.*20 sites in the county where it is confined to the lowlands and occurs on rocky slopes and streamsides, on cliffs and walls, in quarries and on hedgebanks. It was first recorded from shaded roadside banks at Llanerchaeron *c.*SN46Q by Marshall (1900, as *H. vulgatum* var. *amplifolium*), and seems commonest in the upper Aeron valley and thence E to the Teifi. In the Rheidol valley it grows by the Gyfarllwyd Falls SN742775, 1991 (NMW, det. PDS 1994) and by the Rheidol Falls SN709788, 1997 (NMW, det. DJMcC), and in the Ystwyth valley in several places in and around Pontrhyd-y-groes SN738722, 1994 (NMW, det. PDS 1994) - SN751733, 1995 (NMW, JB & AOC, det. DJMcC 2004). On the coast it has been recorded from rocks at the mouth of the Afon Drywi SN426607, 1983 (NMW, det. PDS), from rocks by the beach in Cribach Bay, Aber-porth SN252520, 1983 (NMW, det. PDS) and from the nearby heathy slopes. Along with *H. rubicundiforme*, it seems the most salt-tolerant Hawkweed in the county.



### **Hieracium submutabile** (Zahn) Pugsley - (Variable Hawkweed)

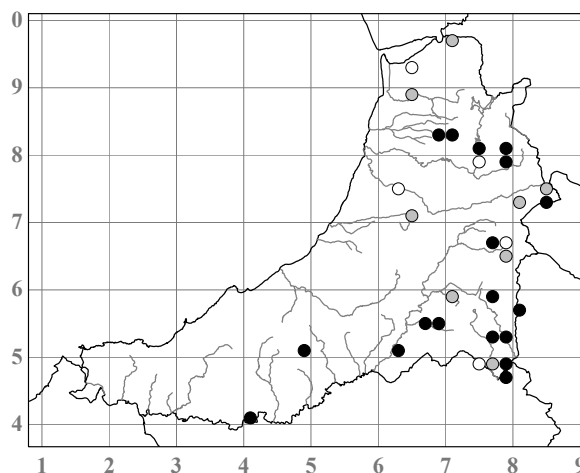
Endemic to Wales and the English border. It has been recorded from a dozen sites in the county, clustered around the upper Aeron valley with outliers on the spoil heaps of the Goginan lead mine SN689817, 1978 (NMW, det. PDS, conf. DJMcC 2004) and on rocks in the Tywi valley at Dalar-wen SN790490, 1996 (NMW, det. DJMcC 2004); Ley had collected it nearby in the Tywi valley, at "Cnuwch", probably Cnwch Rhiwalog SN794522, (CGE, det. PDS, **BM**) in 1890 and 1897. The other sites are all on roadside banks, with an especially large colony of *c.*900 plants under Oaks 300m SW of Nantcwnlle church SN574585, 1979 (NMW, det. PDS 1983, conf. DJMcC 1999). At several sites, for example 400m SE of Betws Leucu church SN613578, 1994 (NMW, JB & AOC, conf. PDS 1994) and 1km S of Llanllyr by the B4337 road SN542548, 1994 (JB & AOC) it has been recorded as growing with *H. rectulum* and the distinction between the two sometimes seems problematical (Sawtschuk 2006). Altitude limit 320m, Dalar-wen, 1996 (as above).





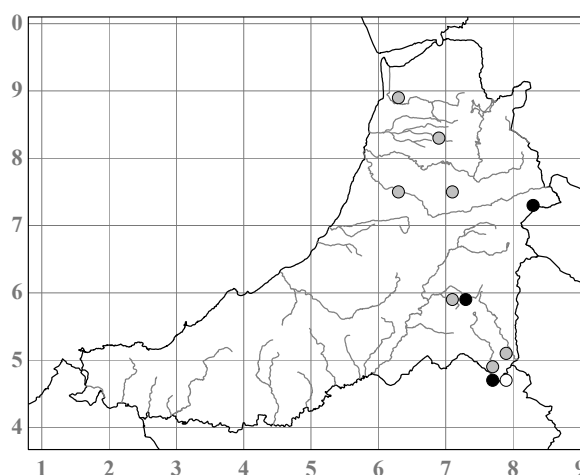
**Hieracium daedalolepioides** (Zahn) Roffey (*H. diaphanum* auct. pro parte, non Fr., *H. acuminatum* auct. pro parte, non Jord.) - (Petite-leaved Hawkweed)

Widespread in the Welsh uplands, with scattered sites in England and S Scotland. It is widespread in the uplands of the county on cliffs and streamside rocks, but is apparently rare in the lowlands where it is largely confined to walltops, although it does occur on shaded rocks by the Afon Teifi below Pont Tyweli SN409402-414402, 1995 (NMW, det. DJMcC 2004); it seems absent from the SW of the county. Some of the material previously determined as *H. acuminatum* and *H. diaphanum* is this, and it is easily confused with *H. anglorum*. Altitude limit 450m, stream gully 600m NE of Craig Dolwen, Rhuddnant valley SN794784, 1995 (NMW, det. DJMcC).



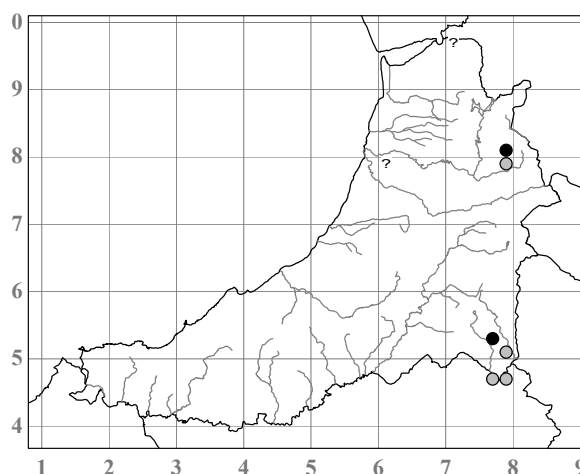
**Hieracium anglorum** (Ley) Pugsley (*H. diaphanoides* auct., non Lindeb., *H. diaphanum* auct. pro parte, non Fr., *H. acuminatum* auct. pro parte, non Jord.) - (Anglian Hawkweed)

Recorded under this name so far from a dozen sites including upland rocks, for example above Llyn Brianne SN798510, 1985 (NMW, det. PDS 1987 as *H. diaphanum*, det. DJMcC 2003 as *H. anglorum*), and lowland sites such as a roadside bank in Cwm Newyddion SN704743, 1978 (NMW, det. PDS 1978 as *H. submutabile*, det. DJMcC 2003 as *H. anglorum*). This British and Irish endemic is probably more widespread in the county than the available records suggest, especially as it is difficult to distinguish from *H. daedalolepioides* in the herbarium. Altitude limit 350m, S-facing cliffs just NW of Craig Clogan, Cwm Berwyn SN721584, 1987 (NMW, det. PDS 1987 as *H. diaphanum*, det. DJMcC 2003 as *H. anglorum*).



**Hieracium diaphanoides** Lindeb. (*H. megapodium* sensu Salter, non Dahlst.) - (Diaphanous Hawkweed)

A rare species of upland rocks and screes, especially in the Tywi valley and its tributaries, for example opposite Ystrad-ffin SN78204705, 1978 (NMW, det. PDS 1978, conf. DJMcC 2004) and at Craig Nant Iwrch SN766527, 1988 (NMW, det. PDS 1989, conf. DJMcC 2004). It is also in the Rhuddnant gorge SN794784, 1984 (NMW, det. PDS 1984, conf. DJMcC 2004) and by the waterfalls at the head of the Afon Myherin SN798806, 1994 (NMW, JB & AOC, conf. DJMcC 2004) at 430m, its altitude limit. Salter (1935) recorded it from the Llyfnant c.SN79D or I, and from Nanteos SN67E or J. His material from rocks above Llyn Hir SN76Y named as *H. diaphanoides* by R. Zahn, is in fact *H. daedalolepioides*; he also gave a 1904 Painter record from Llancynfelyn c.SN6492, perhaps named by Zahn too, which is also this latter species (both NMW, det. DJMcC 2004). It is chiefly a plant of Wales, N England and Scotland.

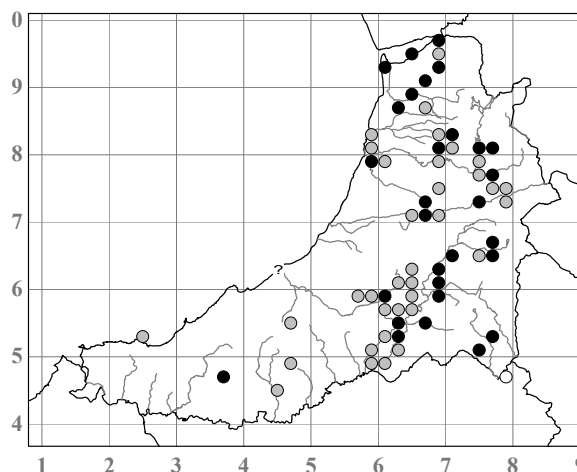


**Hieracium consociatum** Jord. ex Boreau - (Sociable Hawkweed)

Recorded from one native upland site, on shaded rocks in the Afon Myherin ravine 1km N of Blaenmyherin SN79908060, 2003 (NMW, AOC & PAS, det. DJMcC 2004) at 410m altitude, and from five lowland ones where it may be an introduction: on scree in woodland 700m SE of Penbontrhydybeddau SN684831, 1977 (CGE, det. PDS, conf. DJMcC); on ballast of the disused railway both 200m N of Lampeter station SN582485, 1978 (NMW, det. DJMcC 2004) and at Abermachnog SN373403, 1985 (NMW, det. DJMcC 2004); on a shaded roadside bank 400m SSE of Wenallt Farm, Llanafan SN678716, 1995 (NMW, det. DJMcC 2004); and on a roadside bank 1.3km WSW of Llanddewi-Brefi church SN65195471, 2006 (NMW, AOC & JSa, det. DJMcC 2008). It is widespread in Wales and scattered throughout England.

**Hieracium argillaceum** Jord. (*H. acuminatum* auct. pro parte, non Jord., *H. strumosum* auct., non (Ley) Ley, *H. sciaphilum* (Uechtr.) F. Hanb.) - (Southern Hawkweed)

This probably introduced species, recorded throughout England and Wales and native of Europe, is the commonest of the apomictic early summer flowering Hawkweeds in the county, occurring on roadside banks, walls, railway ballast, lead mine spoil, in graveyards and quarries, and to a much lesser extent in more natural habitats on streamside rocks and upland cliffs. It is widespread in the N and in the upper part of the Teifi valley, and seems rare in the SW half of the county. Most of the material from the county previously named as *H. acuminatum* or *H. strumosum* is probably this species. Altitude limit 350m, Nant Craig-Iwrch ravine, Cwm Doethie SN766527, 1988 (NMW, det. PDS 1989 as *H. strumosum*).



**Hieracium aviicola** Jord. ex Boreau (*H. strumosum* (Ley) Ley) - (Many-toothed Hawkweed)

This probably introduced European species has been recorded only from a roadside hedgebank 600m WSW of Trefenter chapel SN601685, 1998 (NMW, det. DJMcC). It is known from a few scattered sites elsewhere in Wales and England.

**Hieracium lortetiae** Balb. - (Lortet's Hawkweed)

Recorded from Llanilar SN67H in 1906 (CGE, WHP, det. PDS 2001). It is known from a few other sites in Wales and Herefordshire, as well as from France.

**Hieracium cheriense** Jord. ex Boreau - (Cher Hawkweed)

This native of C Europe has been recorded from scattered sites in Britain, and from six widely scattered sites in the county. Two are remote mountain gullies, by the Nant Chwarelmelyn 1km N of Blaenmyherin SN803805, 1995 (NMW, GKW & GMK, det. DJMcC 2008), and in Cwm Rhaiadr 500m NNW of Pistyll y Llyn SN751948, 1997 (NMW, TDD & AOC, det. DJMcC 2008). The remainder are more lowland, a roadside bank 500m WNW of Pont Rhyd-y-groes SN736729, 1994 (NMW, det. PDS 1994, conf. DJMcC 2008); the walls of Blaencaron chapel yard SN708611, 1996 (NMW, det. DJMcC 2008); a hedgebank on Sarn Helen 2km ESE of Llangeitho SN640589, 1994 (NMW, det. PDS 1994, conf. DJMcC 2008); and a roadside hedgebank in Allt Cefn-Llanfair, 2.5km E of Llandysul SN444408, 1996 (NMW, AOC & DEA, det. DJMcC 2008). Altitude limit 470m, Nant Chwarelmelyn (as above).

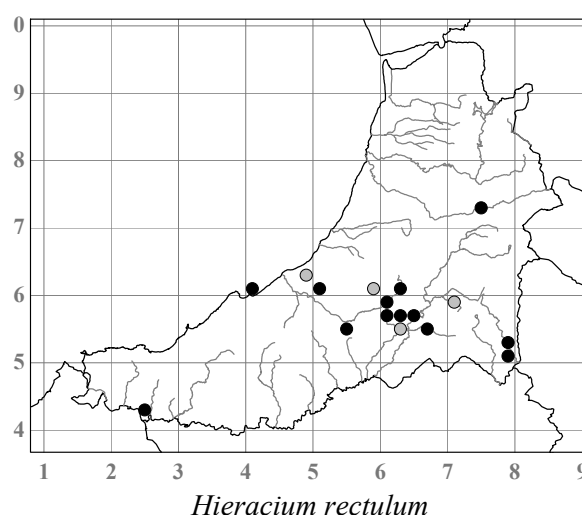
**Hieracium rectulum** Ley - (Dyfed Hawkweed)

Described from limestone rocks near Llangadoc in Carmarthenshire, to which it was thought to be confined until the late 1970s when it was found to be widespread in Cardiganshire, chiefly in a band across the middle of the county. It is a Welsh endemic, and has since been recorded elsewhere only in NW Carmarthenshire and in Denbighshire. All the Cardiganshire colonies were visited in 2006 by AOC & JSa (Sawtschuk 2006). It grows on outcrops of largely acidic Silurian rocks, in dry woodlands, on roadside banks, on walls and in quarries. At the NE end of Cei Bach it grows on the sea cliffs SN415600, 1982 (NMW, det. PDS) and 141

plants were counted here in 2006 (NMW, AOC & JSa, conf. DJMcC). At Pontrhydygroes it grows with *H. exotericum* agg. on a roadside wall ENE of the bridge SN742728, 1980 (NMW, det. PDS) - 2006 (JSa; AOC). The largest colony is on the roadside banks S of Betws Leucu church SN60715810-60555785, 1978 (NMW, BM, det. PDS) - 2006 (NMW, AOC & JSa) when c.3,000 plants were seen. An outlying population in Llandygwydd churchyard SN242438, 1977 (CGE, det. PDS) consisted of only three flowering plants in 2006 and their styles were yellow, not discoloured as in all the other populations. It was first collected by the perspicacious M. M. Atwood in 1854 from rocks by the Afon Arth at Aber-arth (K, Herb. Watson sub *H. pallidum*, det. AOC 2008 as *H. rectulum*), where a colony still existed at SN48186360, 250m upstream of the road bridge, in 1980 (NMW, det. PDS) although it had gone, probably because of overshadowing, by 2006 (AOC & JSa). In several of the *H. rectulum* sites *H. submutabile* has also been recorded, and the differences between the two species seem somewhat obscure and require further research (Sawtschuk 2006). Altitude limit 335m, SE facing cliffs, Banc Hendre'r-dail, Llyn Brianne SN798508, 1979 (NMW, det. PDS) - 2006 (JSa).



*Hieracium rectulum* and Jérôme Sawtschuk, S of Betws Leucu, view N from SN606579, June 2006



#### ***Hieracium scotostictum* Hyl. - (Dappled Hawkweed)**

Native of Europe and grown in gardens for its attractively mottled leaves, where it often becomes an abundant self-sown weed, for example at Cymerau, Glandyfi SN696962, c.1980, at Felindre, Aber-arth SN479638, 2001 (NMW, conf. DJMcC 2004), and at Derwen-fach, Llandygwydd SN242436, 1998 (NMW, det. DJMcC 2004).

#### ***Hieracium grandidens* Dahlst. - (Grand-toothed Hawkweed)**

Native of Europe, and widely naturalised in Britain. It was first noticed in the county in the mid 1970s when it was abundant on the old roadside walls 300m NE of Eglwys Newydd church SN770738, 1976 (NMW, det. PDS, conf. DJMcC 2008) - 2008 and around the churchyard SN768736, 1977 (CGE, NMW, det. PDS, conf. DJMcC 2008) - 2008 where it has been seen flowering in every month of the year. It is also abundant nearby on the rubble of the Hafod mansion site SN759732, 1987-2007. The only other record is from further down the Ystwyth valley, under Beeches in the grounds of Trawsgoed SN669732, 1994 (NMW, JB & AOC, conf. DJMcC 2008), growing near where *H. exotericum* has been confirmed. Specimens from a



*Hieracium grandidens*, Eglwys Newydd churchyard wall SN768736, July 1991



remote site 8km ENE of Eglwys Newydd, on E-facing rocks by the Afon Diliw, Cwmystwyth SN842769, 1990 (NMW, det. PDS in 1994 as *H. grandidens*) at 370m altitude, are best at present referred just to the *H. exotericum* aggregate (*vide* DJMcC 2008).

**Hieracium exotericum** Jord. ex Boreau - (Jordan's Hawkweed)

Native of Europe and probably introduced in Britain, where it is sparsely naturalised. It was recorded in abundance under the ancient Oak avenue in the grounds of Trawsgoed SN671730 and elsewhere in the formal gardens nearby, 1981 (NMW, det. PDS, conf. DJMcC 2008) - 1994.

**Filago minima** (Sm.) Pers. - Small Cudweed - Edafeddog Fach

First recorded by Morgan (1848) as *Gnaphalium minimum*, without locality, this rare native was recorded by Salter (1935) from the Ynys-las dunes SN69, where it was last seen in 1958 (EHC), and from a slope on the coast at Cwm Tydu SN3557 in 1924 (Diary 16.9.1924), where it has not been seen since. Salter also recorded it from railway ballast at Glanyrafon SN6180 (1934, 1935) and there is a 1935 specimen from here (NMW, PCh, det. AOC). Since then it has been recorded from the Penparc sand quarries SN199484, where it is abundant, 1993 (NMW, AOC & CDP) - 2004 (AOC & SDSB), and from disturbed sandy ground at Penyrergyd SN16254865, 1995 (JPC). It has also colonised the verges of the FC road on the W side of Llyn Brianne where several colonies have been seen at SN783495, 795494 and 787489, 1996-1999 (NMW, AOC & DD). Altitude limit 340m, SN795494, as above, 1996.

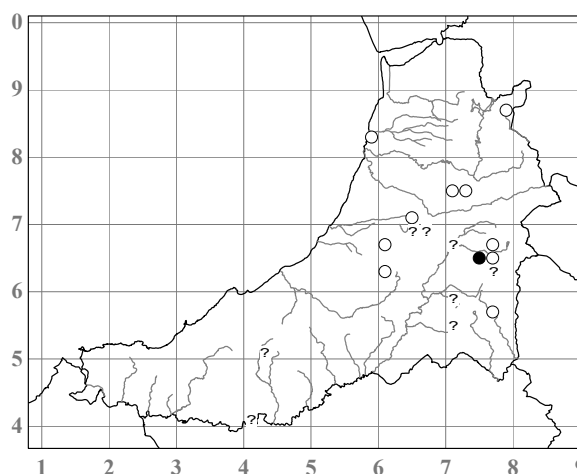
**Filago vulgaris** Lam. (*F. germanica* L., non Huds.) - Common Cudweed - Edafeddog Lwyd

Salter's (1935) description of this now rare species as "frequent as a weed of cultivation" certainly no longer applies. It was first recorded by Morgan, from Llanilar SN67H (1849) and then from Llanychaiarn SN57Z (1851). Salter (1935) recorded it from Ynys-las SN69, and there is a 1935 specimen from here (NMW, PCh); from Llanrhystud, where it was refound in a steep, S-facing pasture at SN53756998 in 1999 (MDS & AOC); from Llangranog SN25, where it has not been seen since; and from Aber-porth, where it still occurs on a dry bank in the MoD site SN25145166, 1997-2002; and from between Aber-porth and Mwnt where he saw it as a cornfield weed in 1924 (Diary 28.6.1924). Whellan (1942) recorded it from "cliffs near Mwnt" SN15W, and in good years it is still abundant here on the steep SSW-facing slope of Foel y Mwnt SN193520, 1982-2007. There are also unlocalised 1950s field records at BRC from SN57, 58, 67 and 68, and a 1936 field record from the Tresaith area SN25, 1936 (WRR & WWB). The species has clearly declined considerably in the county as a whole, but has been increasing in recent years at Mwnt.

**Antennaria dioica** (L.) Gaertn. var. **dioica** - Mountain Everlasting - Edafeddog y Mynydd

Extant in only one site, on rocky bluffs near Strata Florida SN749653, 1985 (JH) - 2006 (AOC & SDSB), perhaps now as only two plants that have not recently been seen to flower; two plants photographed by JH here in 1985 were female. This is probably one of several sites where Salter knew it in this area in the 1890s (Diary 23.6.1892, 3.6.1895). Between 1800 and 1970 it was recorded from at least a dozen other sites. It has declined probably more than any other rarity in the county and both overgrazing and undergrazing, with consequent shading out, may be at least partly to blame. It was first recorded by Ray, as *Gnaphalium montanum album* Ger., "on the top of Plimllimon-hill" SN78Y in 1662 (Ray, 1670), but it has never been seen there since; Turner & Dillwyn

(1805) probably refer to this in citing Merrett as their authority for the Pumlumon record. Most of the other records were from the uplands in the Strata Florida, Cwm Berwyn and Mynydd Bach areas: near Llantrisant church c.SN726750, 1922 (Salter Diary 16.8.1922); "abundant by the roadside" ESE of Lledrod c.SN66U, 1905 (Salter Diary 5.8.1905); near the N end of Llyn Eiddwen SN6067, 1959 (EHC); rocky slope above lane 500m S of Tyncwm, Strata Florida SN772651, 1957 (EHC) - 1960; Glasffrwd valley above Pantyfedwen c.SN76R, 1907 (Salter Diary 22.5.1907); several patches along the railway S of Ystrad Meurig c.SN76D, 1894 (Salter Diary 19.5.1894); Cwm Berwyn SN75E, 1893-1924 (Salter Diary 20.5.1893, 23.5.1924);



Ffrwd-ar-Gamddwr SN7657 (Salter 1935); and “near head of Nant Brefi”, SN75C (Salter 1935). Only one record is coastal, “on the hillside overlooking Clarach Bay” c.SN585834, 1893 (Salter Diary 25.4.1893, 1935), and two other lowland ones are unlocalised: Llandysul c.SN44A, 1916 (MCH, Salter 1935) and Talgarreg c.SN45F (Salter Diary 9.2.1905). Altitude limit c.370m, Ffrwd-ar-Gamddwr SN7657, pre-1936 (Salter 1935); 300m, 500m S of Tyncwm SN772651, 1960.

**Anaphalis margaritacea** (L.) Benth. - Pearly Everlasting - Edafeddog Hirhoedlog

This North American ornamental was first recorded as an escape in Cwm Berwyn c.SN75E in 1893 by Salter (Diary 24.5.1893, 29.4.1898), as he was going down the valley before getting “down to the hedges and meadows again”, by a ruined shed, and in the same year and place by Burkill & Willis (1894). Salter (1935) describes it as “a frequent escape which sometimes establishes itself, being much planted in churchyards and cemeteries”, but it cannot be described as that now and is rarely seen in such places. He gives one other record, Tangarreg SN622652, undated, and there is a 1958 field record at BRC for Llangranog SN35. The only more recent records of it naturalised are on the disused railway at Aber-mad SN605760, 1975, and by the Afon Tarenig at Eisteddfa Gurig SN797840, 1993 (AOC & LRG). Altitude limit 410m, at this last site.

**Gnaphalium sylvaticum** L. (*G. rectum* Sm.) - Heath Cudweed - Edafeddog y Rhos

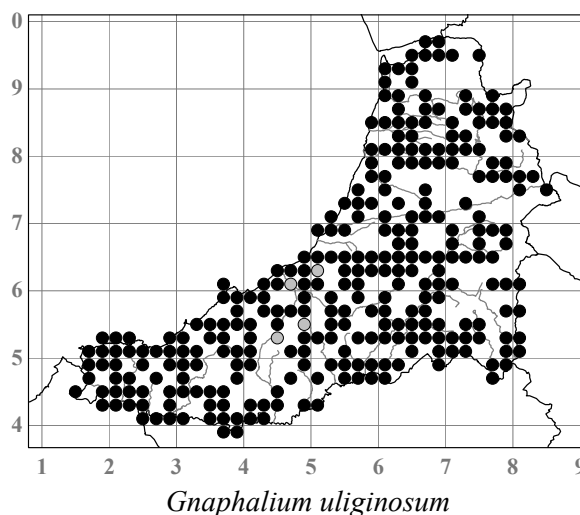
This perennial of open woods, sandy pastures and heaths has decreased greatly in Britain in recent decades (Pearman *et al.* 2002). There are only two records for the county. J. E. Smith (1925) considered that *G. sylvaticum* was confined to the Scottish Highlands, and described the lowland plants of England and Wales as *G. rectum*, but the latter is nowadays sunk as a synonym of the former. Smith wrote of *G. rectum*: “I have dwarf specimens from the Hafod woods, Cardiganshire ...” (LINN, Herb. Smith) and used them in evidence to maintain the two as distinct. It is not inconceivable that the plant may still be at Hafod [c.SN77R] as it thrives in other parts of Britain on FC rides and tracks (eg. Halliday 1997). The other record was by Salter in 1928 (Diary 20.9.1928, 1935): “... I had a look at Crug Cou ... I now took to a field road leading to Talgareg. The stubble fast being cleared, produced the usual weeds of cultivation, but I found in addition *Gnaphalium sylvaticum* which I had not previously seen in Wales. So came down to Talgareg village ...” This was probably near Mynachlog or Rhyd-yr-ŵyn SN45B.

**Gnaphalium uliginosum** L. - Marsh Cudweed - Edafeddog y Gors

A common annual of winter-wet, open ground, especially characteristic of field gateways, rutted tracks, hollows in the river floodplains and the draw-down zone of reservoirs where it is often very abundant. In the uplands it is largely confined to this latter habitat, and to the verges of FC roads and other well-used tracks where it is widespread. Altitude limit 590m, verge of rough road on Bryn Garw SN800770, 2002.

**Helichrysum bracteatum** (Vent.) Andrews - Strawflower

Recorded only once, as a casual on dumped material by the Ynys-las boatbuilding yard SN616933, 2006 (JPW & AOC).



**Cassinia leptophylla** (G. Forst.) R. Br. - (Golden Bush)

This New Zealand shrub has been planted as a private memorial in rough grass near the top of Constitution Hill, Aberystwyth SN58408280, 2009 (SPC).

**Inula conyzae** (Griess.) Meikle - Ploughman's-spikenard - Meddyg y Bugail

Recorded for the Aberystwyth neighbourhood by Purchas (1848), although the first localised record was of one plant on the landward side of the Ynys-las dunes by Salter in 1932 (Diary 16.6.1932); he recorded “In one spot many young plants” there in 1934 (Diary 26.5.1934) and that it was there in plenty in 1938 (Diary 20.7.1938). It remained common on the dunes SN69B, C until the 1950s, but then decreased and seems to

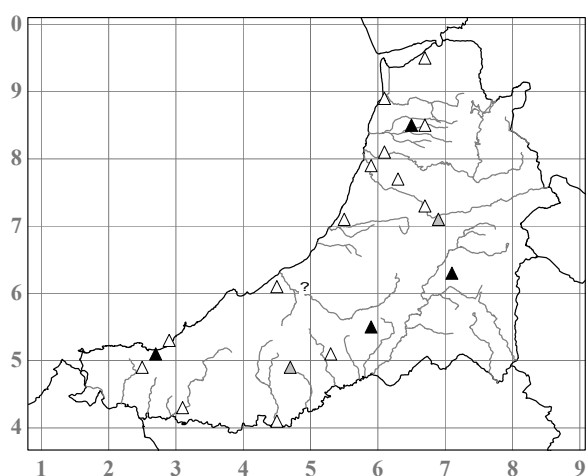
have been last seen in 1984. The only other record was from Tresaith c.SN25Q, 1936 (Wade 1952, field card at BRC).

[*Inula crithmoides* L. - Golden-samphire - Cedowydd Suddlon

Recorded “Just above the splash zone on rocks on SW tip of headland jutting out to W, 400m SW of Ynys Lochtyn” SN312552, c.1977, by an entomologist searching in vain for the moth *Epischinia banksiella* which feeds on it; the record is assumed to be in error, probably for *Tripleurospermum maritimum* with absent or shrivelled ray florets.]

***Inula helenium* L. - Elecampane - Marchalan**

Salter (1935, Wade 1952) had records of this archaeophyte from 17 localities, and there are another five before 1960. Since then it has been recorded from only eight sites. It occurs in rough pastures, on hedgebanks and by old cottage sites, and was probably always originally planted although some of its sites are well away from habitations. Some of the colonies have been long-established, for example at Glanyrafon SN68A where Salter knew it for over 40 years (1935), and on a roadside bank near Maeselwad, Tregaron SN70666390 where a big colony noted in 1960 was still present in 2008.



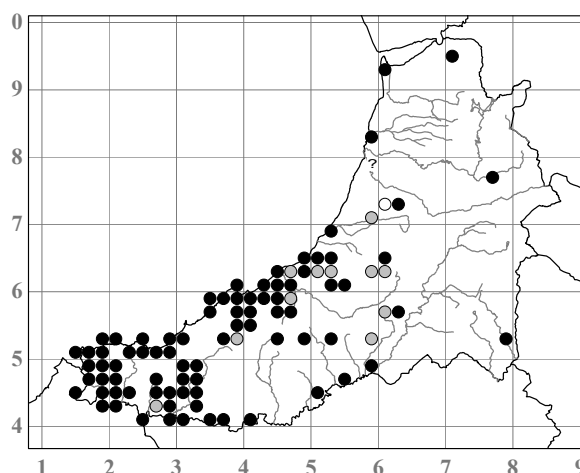
*Inula helenium*



*Inula helenium*, Maeselwad, view SW from SN70666390, August 2004

***Pulicaria dysenterica* (L.) Bernh. - Common Fleabane - Cedowydd**

A frequent plant of damp pastures, especially on clay soils, commonest near the coast and in the lowlands of the S part of the county. It is especially characteristic of slumping till slopes on the coast, and Marshall (1900), referring to the Aberaeron/New Quay district, wrote that “The abundance of *Pulicaria dysenterica* L. along this coast is very striking.” It is a co-dominant in parts of the calcareous fens by the Afon Mwldan SN1948, 1986-2007. Salter (1935) wrote that it was “Almost absent from the north of the county”, and the few records from this part include one “By the old course of the Leri, north of Borth” SN6091 or 6092 (Salter 1935); by Moel Ynys Pool here SN608923, 1956; in a pasture E of the Afon Leri 700m S of the Ynys-las level crossing SN618922, 1999 (JPL); and by the Afon Pemprys 300m NE of Badger Lodge SN710942, 2004 (CMFB). Altitude limit 325m, a large colony on the grassy roadside slope 500m NNW of Soar y Mynydd SN783538, 1989 (AOC & APF).



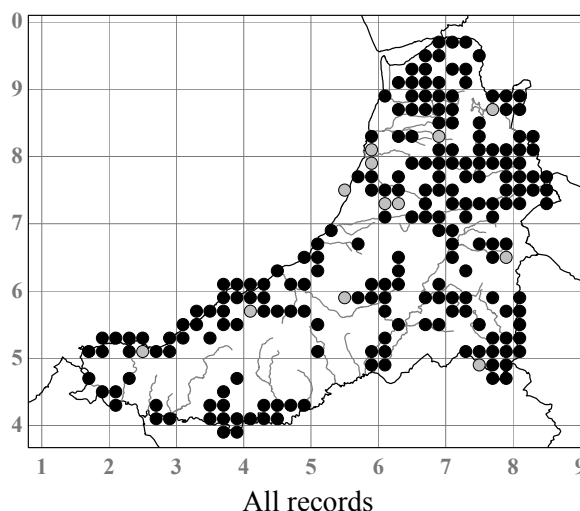


**Solidago virgaurea** L. - Goldenrod - Eurwialen**Subsp. virgaurea**

A frequent plant of dry woods, heaths, heathy pastures, hedgebanks, streambanks, and on rock ledges and cliffs both on the coast and in the uplands. It is replaced by subsp. *minuta* in several upland sites, but the two subspecies sometimes grow together and remain quite distinct, although the normal tall, late-flowering plants of subsp. *virgaurea* are often the only sort on many of the upland cliffs. Altitude limit 720m, rocks by Pen Pumlumon Arwystli SN81578794, 2002.

**Subsp. minuta** (L.) Arcang. (var. *cambrica* (Huds.) Sm.)

Dwarf plants with condensed inflorescences, flowering in June and July mostly at over 400m altitude in the uplands, often two months before subsp. *virgaurea* flowers in the lowlands, are very distinctive and referable to this subspecies. Good populations have been seen on most of the Pumlumon cliffs: on Lluet y Graig SN799890-800891 at 450-500m, 1992-2005; on Craig y March SN805881 at 520m, 1993-2005; above Llyn Llygad Rheidol SN7987 at 510-620m, 1997 (AOC & TDD); above Fainc Ddu Uchaf SN779883 at 410m, 1993; and at only 325m altitude on rocky knolls in pastures at Ty-mawr, Ysbyty Cynfyn SN761789, 1990. In the SE of the county they have been seen on the Cefncerrig cliffs near Nant-y-maen SN765582 at 460m, 1994; on the nearby Cerrig Maesycawnau cliffs SN769587 at 470m, 1994; and at only 140m altitude on rocks in the middle of the Afon Doethie at its confluence with the Afon Tywi SN777466, 1999 (NMW). Plants intermediate between the two subspecies have been seen on rocks at the head of the Afon Ceulan SN721909 at 400m, 1995 (NMW), and by the Maesnant on Pumlumon SN776876 at 420m, 2003. The earliest mention was by Morgan (1849), who wrote that "In elevated situations it is stunted, and by some authors taken for a distinct species under the name of Welsh Golden Rod". Ley (*BEC Rep.* 1886: 154 (1887)) recorded it as var. *cambrica* (conf. CCB) from Llyn Llygad Rheidol SN7987, but Salter (1935), in citing this, surprisingly said that he had not seen any specimens from Cardiganshire localities. Altitude limit 620m, above Llyn Llygad Rheidol SN7987, 1997 (AOC & TDD).



All records

**Solidago canadensis** L. - Canadian Goldenrod - Eurwialen Canada

This native of North America was said by Salter (1935) to be "Occasionally naturalised", but he gives only one record, from the railway cutting between Llanbadarn Fawr and Fronfraith SN68A where he saw it in 1907 (Diary 28.7.1907). It has been recorded since only from this same area, on an old rubbish-tip at Glanyrafon SN609805 in 1964 (NMW, RGE).

**Solidago gigantea** Aiton subsp. *serotina* (O. Kuntze) McNeill - Early Goldenrod - Eurwialen Gynnar

First recorded from near Lampeter SN54 in 1900 (BM, HJR), this native of North America has since been found naturalised at five other sites: by a lane at Llanbadarn Fawr SN598804 in 1970 (NMW, RGE); in abundance in scrub by the Afon Rheidol at Aberystwyth SN586812, 1982 (NMW) - 2005; on waste ground at Borth SN608899 in 1989 (NMW, det. DHK); a large colony by the Ynys-las level crossing SN618931, 1993-2005; a large colony by the railway 500m S of the Llandre post office SN625864 in 1995 (NMW) - 2003; and on the W hedgebank of the B4337 at the N end of Talsarn SN546567 in 1996.

**Aster** L.

Garden Asters are not common in the county, and an attempt has been made to get most of the known colonies expertly named. For those interested in this group, the banks of the Rheidol estuary and by the railway at Aberystwyth SN58V, where five taxa are naturalised, are especially recommended.

**Aster** × *versicolor* Willd. (*A. laevis* L. × *novi-belgii*) - Late Michaelmas-daisy - Blodyn-Mihangel Diweddar

Two small but long-established colonies only, by the Cletwr at its tidal limit at Craigypenrhyn SN65389290, 1992 (CGE, NMW, det. PFY) - 2005 and at the top of the salt marsh on the SW bank of the Rheidol

SN58478113, 1993 (CGE, NMW, det. PFY as “not the common garden plant but nearer to *A. novi-belgii*”) - 2007 (AOC & JPP). Of garden origin or arisen in Europe.

**Aster novi-belgii** L. - Confused Michaelmas-daisy - Blodyn-Mihangel Dyrys (Ffarwel Haf)

Naturalised at five sites on river banks, waste ground and by the railways. Salter (1935) described this as the most frequent of the established Michaelmas Daisy escapes, but did not mention any other taxa and gave no localities. There are several small colonies among the extensive *Aster* populations by the Rheidol at Aberystwyth SN584812-587812, 1993 (CGE, NMW, conf. PFY) - 2005. Others are at the edge of the golf course, Ynys-las SN60759318, a colony 2 × 1m, 2004; in scrub by the railway at Llandre SN626873, 12 × 2m in 1991 (CGE, NMW, det. PFY); on waste ground above Clarach beach SN587837, 2000; and on waste ground in Aberystwyth station yard SN586815, 1990 but since destroyed (CGE, NMW, conf. PFY). Native of North America.

**Aster ×salignus** Willd. (*A. lanceolatus* × *novi-belgii*) - Common Michaelmas-daisy - Blodyn-Mihangel

Naturalised at eight sites on road verges, waste ground and scrub, by the railways and on river banks. The most extensive colonies are again on the N bank of the Rheidol at Aberystwyth SN587812, 1996 (CGE, NMW, det. PFY as “*A. ×salignus* close to *A. lanceolatus*”) - 2005. Other colonies are on the railway embankment at the county boundary at Glandyfi SN696976, a colony 1 × 1m in 1990 (CGE, NMW, det. PFY); on a roadside verge by the Vicarage, Eglwys Fach SN68589560, 2 × 1m in 1991 (CGE, NMW, conf. PFY); by the Leri E of Borth church SN616898, 1990 (CGE, NMW, det. PFY) - 2005; by the S level crossing at Llandre SN625864, 10m long in 1995 (CGE, NMW, det. PFY); in scrub at the top of Cliff Terrace, Aberystwyth SN590827, 1993 (CGE, NMW, conf. PFY & PDS); several colonies on the overgrown rubbish-tip below Pendinas SN584798, 1990 (CGE, NMW, det. PFY); and by the railway at Capel Bangor station SN648797, 25 × 5m in 1992 (CGE, NMW, conf. PFY) - 2005. Of garden origin.

**Aster concinnus** Willd. - Narrow-leaved Smooth-aster

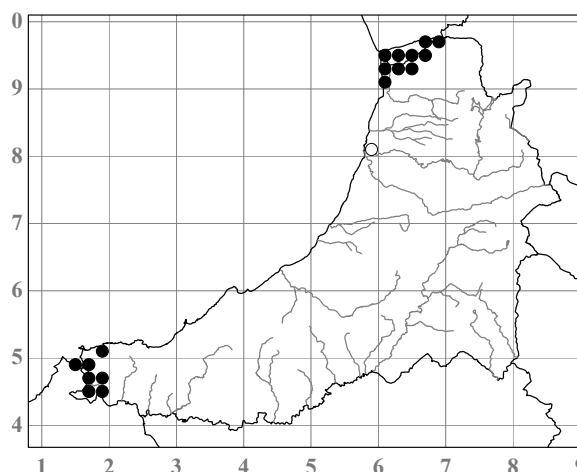
There are two long-established colonies on river banks at their tidal limit, by the Cletwr at Craigypenrhyn SN654929, 1990 (CGE, NMW) - 2006 (LTR) and by the Rheidol at Aberystwyth SN587812, 1990 (CGE, NMW) - 2005, both det. PFY & PDS. Native of E North America and naturalised elsewhere in Britain only near York.

**Aster lanceolatus** Willd. - Narrow-leaved Michaelmas-daisy - Blodyn-Mihangel Culddail

Naturalised at seven sites on river banks, waste ground and by railways. The most extensive colonies are on the N bank of the Rheidol at Aberystwyth SN587812, 1996 (CGE, NMW, conf. PFY) - 2005. It is on a roadside verge across Cors Fochno SN640924, a colony 5m long in 1978 and 9m long in 1991 (CGE, det. PFY); on waste ground E of Borth church SN616897, 1999; by the railway near Aberystwyth SN589811, 1990 (CGE, NMW, det. PFY) - 2005; by the Rheidol at Glanyrafon SN612804, 1990 but since destroyed (CGE, NMW, det. PFY); on the disused railway near Ystrad Meurig SN710666, a colony 10 × 3m in 1992 (CGE, NMW, det. PFY); and by the Aeron below Pont Talsarn SN54405623, a colony 3 × 1m in 1996 (CGE, NMW, det. PFY). Native of North America.

**Aster tripolium** L. - Sea Aster - Seren y Morfa

Abundant in salt marshes in both the Dyfi and Teifi estuaries. It formerly occurred in the fragmentary salt marsh by the Rheidol at Aberystwyth SN586810, 1959, and in 1996 a few plants were seen at the top of the sandy beach at Traeth y Mwnt SN194519. Most records are of the rayed form, var. **tripolium**. Var. **flosculosus** (Gray) P. D. Sell (var. *discoideus* Rchb. f.) occurs only in the Dyfi estuary where it is found sparsely distributed among var. *tripolium* at all levels of the salt marsh. Intermediates occur W of the Afon Leri SN616934, 1993.



**Erigeron glaucus** Ker Gawl. - Seaside Daisy - Amrhydlwyd Arfor

First recorded, self-sown and well-naturalised, on walls and on a chimney in Grays Inn Road, Aberystwyth SN58308152, in 1998 (AOC; RGW) - 2007. A colony 50cm in diameter was found on sandy shingle at the top of the beach 100m SW of Borth station SN60809002 in 2000-2007, and it was found naturalised on a wall in Picton Terrace, New Quay SN38905990 in 2003, and on the roadside wall of Blaenannerch chapel graveyard SN24744908 in 2006. Native of W North America.

**Erigeron karvinskianus** DC. - Mexican Fleabane - Amrhydlwyd y Cerrig

First recorded, self-sown at the base of a wall in the IGER grounds, Plas Gogerddan SN629836, in 2000 (**Herb. SPC**, SPC) - 2008. There were several plants in pavement crevices in Queen's Square, Aberystwyth SN58508195 in 2002 (**NMW**, AOC; SPC) - 2008; it was well-naturalised on walls in Finch Square and Feidrfafr, Cardigan SN179461 in 2002 and in Church Street SN180460 by 2008; and several plants were on walls above the New Quay lifeboat station SN389599 in 2007 (AOC & JPP). Native of Mexico.

**Erigeron acris** L. - Blue Fleabane - Amrhydlwyd Glas

First recorded by Lees (1841) from "Borth sands", and then by Morgan (1849) from "Sandhills, Moelynys", both referring to the Ynys-las dunes SN69B, C. It was described as "plentiful" here by Salter in 1938 (Diary 20.7.1938, Wade 1952) and as "frequent" on the older dunes here by Savidge (1973), but had become scarce by the early 1990s and was last seen, on a dune ridge S of the main slack SN608937, in 1994 (SPC). In 1929 Salter (Diary 20.9.1929, 1935) found "much" of it on the Penyrergyd dunes SN14U, but failed to find it there in 1938 (Diary 9.7.1938) though he thought it might be too early in the year; it has not been recorded there since. In 2004 about a thousand plants of it were found on partially vegetated limestone chippings by the road at the Cwm Rheidol lead mine SN72907810 (AOC & SDSB) - 2006, and in 2005 it was found in small quantity in the Penparc sand quarries SN201486 (**NMW**); at both of these sites it must have been a recent arrival.

**Conyza canadensis** (L.) Cronquist - Canadian Fleabane - Amrhydlwyd Canada

First recorded in 1957 on railway ballast by the Dyfi estuary SN647943 (**NMW**) and then at SN6594 in 1974 (SCH), this alien annual from North America was abundant at Aberystwyth Station SN587814 by or before 1989, and since then has been a regular but sparse casual there and in the streets of the town. Elsewhere only single plants have been seen, on a reconstructed roadside verge near Tregaron SN674592 in 1992, at Bow Street SN623846 (SPC) in 1992, in a Potato field 1km N of Penparc SN206487 in 1999 (SPC), and on waste ground at the Ynys-las boatbuilding yard SN616933 in 2006 (AOC & JPW). Var. **obovoides** P. D. Sell was seen in a yard off Park Avenue, Aberystwyth SN58608137 in 2008 (**NMW**), and a scattered population in the Penparc sand quarries SN201486 in 2005 (**NMW**) was of var. **simplex** P. D. Sell, but otherwise all the plants seen in the county have been of var. **canadensis**.

**Olearia** × **haastii** Hook. f. (*O. avicenniifolia* (Raoul) Hook. f. × *moschata* Hook. f.) - Daisy-bush - Llwyn Llygad y Dydd

A rare relic of seaside planting. There is a bush on the scrub slope above the beach at Cei Bach SN409597, 1987-2003, and one on the A487(T) road verge at the E end of Aberaeron SN462631, 1995-2005. It is also occasionally planted in amenity areas around the towns. Native of New Zealand.

**Olearia** 'Talbot de Malahide'

This cultivar, probably a hybrid of *O. avicenniifolia* (Raoul) Hook. f. from New Zealand, was planted as a hedge alongside the A487(T) road up Penglais hill, Aberystwyth SN595819, 1997-2004, and is spreading vigorously by suckering.

**Olearia solandri** (Hook. f.) Hook. f. - Coastal Daisy-bush

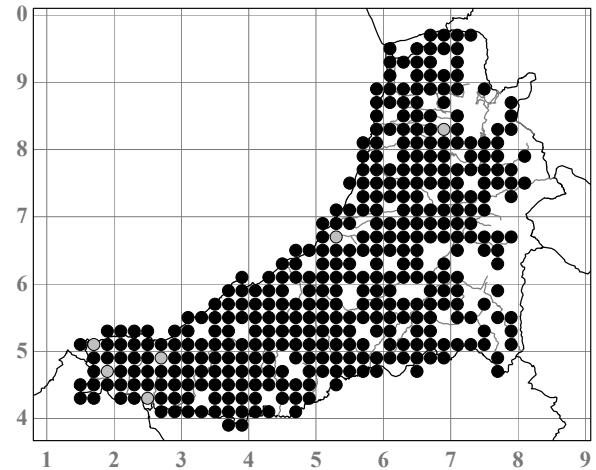
Several self-sown flowering bushes on railway ballast on waste ground at Aberystwyth station SN58608151, 2002 (**NMW**), destroyed in 2005, probably derived from plantings in the grounds of the University School of Art 250m to the E, as will have other self-sown plants on a wall in Buarth Road nearer there at SN58858159, 2003. Native of New Zealand.



***Bellis perennis* L. - Daisy - Llygad y Dydd (Blodau'r Dydd)**

Very common and often abundant in the more closely grazed or mown pastures, on roadside verges, lawns, waste ground and paths. As Salter (1935) observed, in the uplands it is largely confined to the enclosed fields and areas around sheep-folds, and nowadays is sometimes common in reseeded sheep-walks up to *c.*400m altitude. In the lowlands it can be very abundant in damp, clay pastures where there is heavy poaching. The only comparatively unmodified natural habitat it occurs in is dune grassland, and at Ynys-las SN69B, C, it is abundant in short, Rabbit-grazed turf, chiefly, as Savidge (1973) observed, in the narrow transition zone between slack and dune, as well as along the trodden paths.

There is great variation both within and between populations especially in size of capitulum, in ray floret colour and in the amount and kind of hairs on the scapes. To take just one character, ray floret colour, as an example, the proportion of capitula with purely white ray florets seems to increase with altitude, and the proportion of deep pink to pale pink coloration seems to decrease, based on the data in the table below. However, these effects are not reflected in logistic regressions of proportion of white capitula on altitude, probably because there are few observations at higher altitudes. The dune populations are significantly different from all the others except Cwm Cilfforch in the proportion of purely white capitula (they have virtually none), and in the length of the pink part of the ray florets, which is longer (after accounting for differences in the lengths of the ray florets themselves) (PAS pers. comm.).



Site	Grid ref.	Date	Habitat	Altitude (m)	No. counted	% white	% pale pink	% deep pink
Cwm Mwyro	SN77966488	12.6.2004	Unimproved upland pasture	310	100	48	51	1
100m W of Tynygwndwn	SN63224979	23.6.2005	Unimproved upland pasture	290	65	49	42	9
250m SW of Cae'r-Meirch	SN75457350	25.6.2004	Unimproved upland pasture	250	100	27	65	8
Dan-y-coed, Aberystwyth	SN591820	29.3.2004	Mown municipal lawn	40	54	24	48	28
400m ENE of Gamlyn, Aber-ffrwd	SN68187908	21.4.2004	Reverting reseeded pasture	40	100	18	73	9
100m NE of Cwm Cilfforch	SN44006175	3.5.2004	Unimproved mesotrophic coastal pasture	40	100	6	63	31
Penyrangor, Aberystwyth	SN581808	30.3.2004	Mown grass	20	12	33	67	0
Castle grounds, Aberystwyth	SN579816	19.4.2004	Mown grass	10	64	25	55	20
Ynys-las, main slack W of road	SN608938	20.4.2005	Dune slack	10	100	2	28	70
Ynys-las dune slack edges	SN609938	7.4.2004	Dune slack	3	41	2	19	79

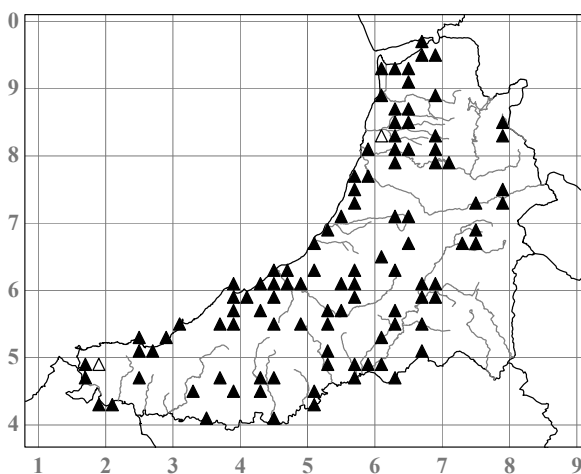


*Bellis perennis* in pasture, Cwm Rheidol, looking ENE from SN673788, April 1981

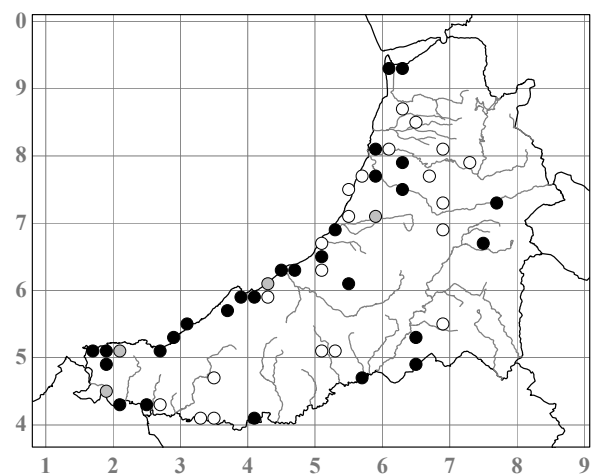
The conspicuous and recently arrived rust *Puccinia distincta* was first noticed on Daisies at New Quay SN390600 and Llanrhystud SN534702 in 1999, but does not yet seem to be very widespread. Altitude limit 415m, farmyard, Eisteddfa Gurig SN798840, 2002.

***Tanacetum parthenium* (L.) Sch. Bip. (*Chrysanthemum parthenium* (L.) Bernh.) - Feverfew - Y Wermod Wen**

Native of SE Europe and a widespread archaeophyte of roadside banks, verges, waste ground and tips. Morgan (1849) recorded it from Llangorwen SN6083, and Salter (1935) described it as “common in the neighbourhood of villages and cottage gardens”. The *flore pleno* form, ‘**Bachelor’s Buttons**’, with yellow tubular florets in the middle of the capitulum, merging into 7-10 rows of long, white ligulate florets, is occasionally found. Altitude limit 480m, waste ground at the Nant-nod lead mine, Pumlumon SN79188390, 2003.



*Tanacetum parthenium*



*Tanacetum vulgare*

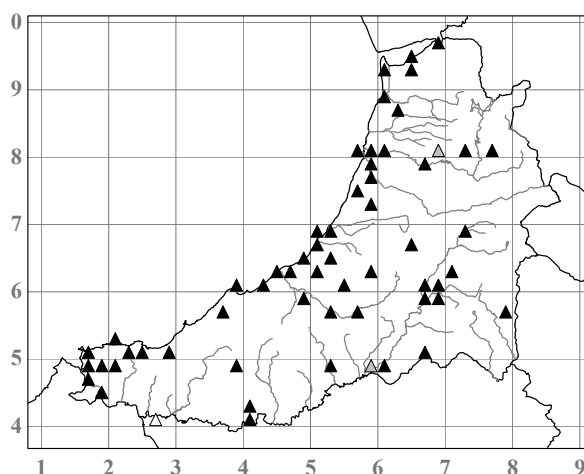
***Tanacetum vulgare* L. - Tansy - Tansi**

Occasionally seen, always as discrete and dense colonies, on roadside verges and hedgebanks and on waste ground. As Burkill & Willis (1894), Marshall (1900) and Salter (1935) all suggested, it is uncertain to what

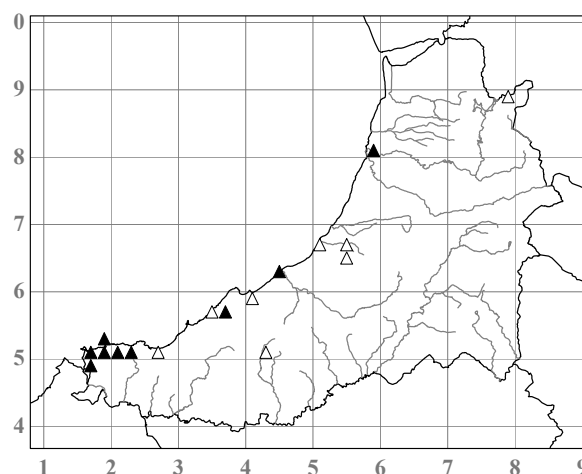
extent it may be native in the county although it is mapped as such. Salter (1935, Wade 1952) listed 36 localities, and it has obviously declined in abundance since his day, though the reasons for this are unknown. An unusual habitat is a low sea cliff at New Quay SN390598, 2006 (SPC) where a small colony grows. Salter (1935) wrote that var. **crispum** DC. was occasionally found, but it has not been recorded since.

#### **Artemisia vulgaris** L. - Mugwort - Y Feidiog Lwyd

An occasional archaeophyte of roadsides, waste places, tips and farmyards. It is especially abundant on the old allotment site at Aberystwyth SN586812, 2003. Our plants are mostly var. **coarctata** Forselles, with brownish-purple stems. Var. **vulgaris**, with green stems, is abundant around Felin-y-mor, Aberystwyth SN581802-584799, 2005, and along the disused railway across the Teifi Marshes SN184454, 2003 (NMW). Altitude limit 410m, FC road verge, Llyn y Gwaith SN673510, 1996.



*Artemisia vulgaris*



*Artemisia absinthium*

#### **Artemisia absinthium** L. - Wormwood - Y Wermod Lwyd

A rare archaeophyte, confined to the coast and mostly in the SW of the county where it grows on dry banks, in fields and on waste ground and in farmyards. It is almost always near farms where it must be a relic of its cultivation as a herb, and colonies can be very persistent. Cattle and Horses avoid it. George Borrow (1862) complained about the Wormwood used to flavour the ale he was given by an old woman near Pont Glan-Marchnant SN7369 in 1854. The farm name Llwynwermod or Llwynwermwnt SN376581, dating back to 1846, may refer to this species or to some other house of this name (Wmffre 2004, p.335). It is especially abundant by Pen-y-graig, Llandysiliogogo SN363580, 1992-2004; at Ty-gwyn, Mwnt SN197519, 1894 (Salter Diary 28.6.1894) - 2005; and at Tywyn farm, Gwbert SN163500, 1991-2005. It has not been refound at the only three inland localities given by Salter: Talgarreg, an unlocalised record from a collection of pressed plants by the schoolmaster (Diary 9.2.1905); Nebo SN56M (Wade 1952); and Hengwm Annedd SN797893 (Diary 2.7.1940), where it must have persisted at least since the site was abandoned in 1935. The only recent record in the north is from waste ground at Park Avenue, Aberystwyth SN587811, 1987-1989 (WAST). Allen & Hatfield (2004) refer to a folk use of it in the county as a cure for insomnia. Altitude limit 375m, Hengwm Annedd, 1940 (see above), but not seen since from over 120m.

#### **Artemisia maritima** L. (*Seriphidium maritimum* (L.) Poljakow) - Sea Wormwood - Wermod y Môr

Recorded only by Morgan (1849) from Clarach c. SN5883, by Jones (1880) without any locality, and by Salter (1935) who wrote: "I have only seen it at Aberaeron [SN46], and there growing close to some cottages." It was probably never native, and must long have been extinct.

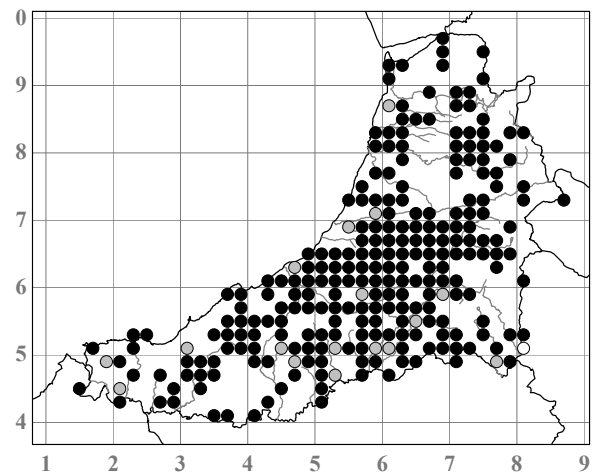
#### **Achillea ptarmica** L. - Sneezewort - Ystrewlys

Heaths, rhos pastures and fens, occasionally on riverside rocks, but becoming rare in the uplands; it is curiously scarce on Cors Fochno. Where it does occur in the uplands it often forms dense and conspicuous colonies several metres across, as in flushed blanket bog at the head of the Afon Pysgotwr Fach SN718506, 2003, or in a similar habitat above the Afon Tarenig SN80038389, 2006 (AOC & SDSB). Altitude limit 435m, streambank, Claerddu SN79236867, 1927 (Salter Diary 6.6.1927); ditto, 1989.





*Achillea ptarmica* colony at source of the Afon Pysgotwr fach, view NE from SN718506, August 2003

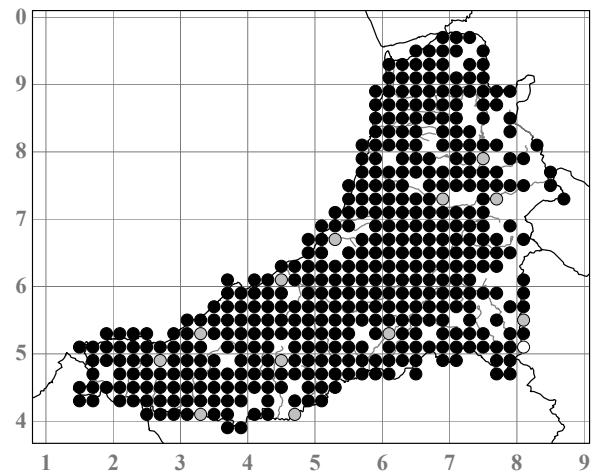


*Achillea ptarmica*

Forma **ligulosa** Vilm., ‘Boule de Neige’ or Bachelor’s Buttons, is naturalised on a roadside bank at Penrhiwllan SN36764177, 1999.

#### ***Achillea millefolium* L. - Yarrow - Milddail (Y Ddalen Fil)**

Subsp. **millefolium** var. **millefolium** is very common in pastures, hedgebanks, verges, lawns and waste ground, becoming rare in the uplands. Pink-flowered forms are occasionally seen. There is an unusual population in wet fen with *Comarum palustre*, *Silene flos-cuculi* etc. in the valley mire of Cors Llyn Farch, Penuwch SN59896352, 2005 (NMW). In 1794 Thomas Johnes requested a supply of Yarrow from J. E. Smith for sowing in his pastures at Hafod c.SN759732, on the advice of James Anderson (letter of 24.11.1794 at the Linnean Society, Colyer 1977), and Moore-Colyer writes (1992) that “we can assume that yarrow was extensively sown on the hills around Hafod.” Altitude limit 455m, Esgair Hir SN734912 (Salter 1935); 460m, sheepwalk above Nant-y-maen SN759588, 2008.



*Achillea millefolium* all records

Subsp. **millefolium** var. **compacta** Bréb. occurs in many exposed coastal grassy sites, as at Traeth Tan-y-bwlch SN579798, 1996 (CGE, det. PDS); Clogwyn SN448624, 2005 (NMW); Carreg y Nodwydd SN299535, 1996, (CGE, det. PDS); and Gwbert SN161508, 1996 (CGE, NMW, det. PDS).

Subsp. **sudetica** (Opiz) E. Weiss from C Europe is the probable identity (*fide* PDS) of very robust plants 100-130cm tall, with finely dissected leaves and more often pink-flowered, that are occasionally established from “wild flower” seed-mixes, as by the CCW office at Plas Gogerddan SN62808347, 2005 (NMW). A tall form, flowering in June, unusually early and different from subsp. *sudetica*, occurs occasionally, as on a roadside verge by the IGER trial fields just S of Bow Street SN62178430, 2004 (NMW).

#### ***Chamaemelum nobile* (L.) All. (*Anthemis nobilis* L.) - Chamomile - Camri (Y Gawmil, Camameil)**

Apart from an unlocalised 1950s field record from SN57 at BRC, there are only two reliable records and the species is certainly extinct in the county. Marshall (1900) recorded it from “Damp ground between Aberayron and Llanerch-Aeron”; this may well have been at the Commins c.SN462620. Salter (1935) found it at or near Llain, presumably Llain-wen SN322531, in 1924, and his description of the find reads: “By way of Llain, rejoined my road of this morning [i.e. Llangranog to Brynhoffnant], noting on the way *Radiola millegrana* [*R. linoides*] and *Anthemis nobilis*, the latter with the *Geranium* [*pyrenaicum*] making two fresh Cardiganshire plants” (Diary 15.9.1924). He also tantalisingly found it just over the county boundary at Eisteddfa Gurig in Montgomeryshire c.SN798841 (Diary 18.8.1934, 4.6.1938, 1935), and equally close at Llanfihangel-ar-arth and Llanllwni in Carmarthenshire (1935).

**Anthemis arvensis** L. - Corn Chamomile - Camri'r Ŷd

Given by Salter (1935) as "Casual, or as a weed of cultivation; rare", but with no localities. The only records since then of this archaeophyte are of a few plants on the Pendinas rubbish-tip, Aberystwyth SN584798, 1992-1994 (NMW, AOC & SPC), and an unlocalised 1950s field record from SN34 at BRC.

**Anthemis austriaca** Jacq. - Austrian Chamomile

Growing from seed-mixes at three sites: lawns on the Glanyrafon Industrial Estate SN609801, 1994-1995 (NMW, CGE, AOC & SPC); roadside by Nant Adal bridge, Llanilar SN623750, 1995 (NMW); "wild flower meadow" below road 1km E of Adpar SN319412, 2003. Native of Europe and SW Asia.

**Anthemis cotula** L. var. **cotula** - Stinking Chamomile - Camri'r Cwn

An archaeophyte, given from Llanychaiarn c.SN584785 by Morgan (1849) and by Salter "Chiefly as a cornfield weed; not common", but with no localities. Chippindale & Milton (1934) grew it from the seed bank in a formerly arable pasture at Pen-y-graig, 1.5km W of Llanfarian SN575781 in c.1930, and there is an unlocalised 1950s field record from SN56 at BRC. The only records since are of it as a sparse weed in Oat and Potato crops near Temple Bar SN539529 and 538527 in 1996 (NMW), and of a single plant by a manure heap at Felin-y-mor, Aberystwyth SN58138025 in 2006 (NMW, AOC & JPP).

**Anthemis tinctoria** L. subsp. **fussii** (Griseb.) Beldie - Yellow Chamomile - Camri Melyn

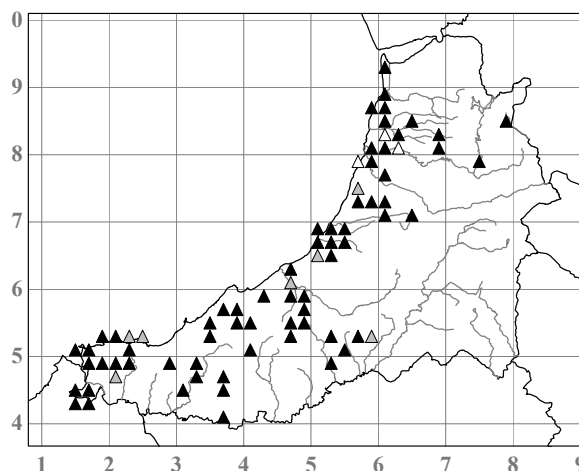
Recorded naturalised only in rough grass near the footpath by the old level crossing site off Felin-y-mor Road, Aberystwyth SN58078060, 2006 (NMW); the colony was presumably derived from garden throw-outs.

**Glebionis segetum** (L.) Fourr. (*Chrysanthemum segetum* L., *Xanthophthalmum segetum* (L.) Sch. Bip.) - Corn Marigold - Melyn yr Ŷd (Gold, Gold yr Ŷd, Gold Melyn, Graban)

A frequent archaeophyte casual and weed of arable fields. It is unusual now to see fields yellow with it, but it can still be a spectacularly dominant arable weed in spring Barley, as for example N of Wallog SN593862 in 1989 (JRA); near Pontgarreg SN347543 in 1992; near Temple Bar SN537528 in 1996; E of Penrhiw chapel SN229499 in 1989; by the Penparc sand quarries SN202488 in 1986; and at Pentood-uchaf SN176443 in 2002 (AOC & MDS) where it benefited from the recent Tir Gofal management. In smaller quantities it is often in Oat, Potato, Fodder Beet and Bean crops. As a casual it is frequent on waste ground, road verges, disturbed ground and building sites, and in many cases it has clearly come up from a seed bank on the site of former arable fields; Chippindale & Milton (1934) gave several such instances.

Historically it always seems to have been abundant. Davies (1815), referring in particular to the Llan-non Barley tract, says that "the light soils of the western coast ... are commonly over-run with the corn marigold", but that it can be got rid of by the application of sea sand, as it can be by liming. Purchas (1848) said it was "the most abundant weed of fields on the hills ascending as high as cultivation - The flowers much

*Glebionis segetum* in Barley field, Penparc, view ENE from SN201488, July 1986



larger than they are [at Ross-on-Wye] where the plant is very rare". Burkill & Willis (1894) mentioned its abundance in the middle of the county. Salter (1935) said that "In late summer the flowers of the Corn Marigold brighten every patch of oats or potatoes in the hill district", and several times mentioned its abundance in the lowlands in his diaries. Webb (1941) said "In vast quantity throughout mid-Cards. in September [1939] - perhaps more abundant than in all the other S. Wales shires altogether, and in sharp contrast to its great scarcity in the neighbouring Montgomeryshire"; Trueman *et al.* (1995) confirm its rarity there, Woods (1993a) considers it to have been very local in Radnorshire for some decades, and Benoit & Richards (1963) describe it as a rare casual weed in Merioneth. There has been no obvious decrease within the county over the last 30 years, in contrast to the national trend (Braithwaite *et al.* 2006). Altitude limit 335m, "to the limit of cultivation", Salter (1928); 410m, disturbed roadside, Eisteddfa Gurig SN797840, 1993 (SPC).

***Leucanthemella serotina* (L.) Tzvelev** - Autumn Oxeye - Llygad-llo'r Hydref

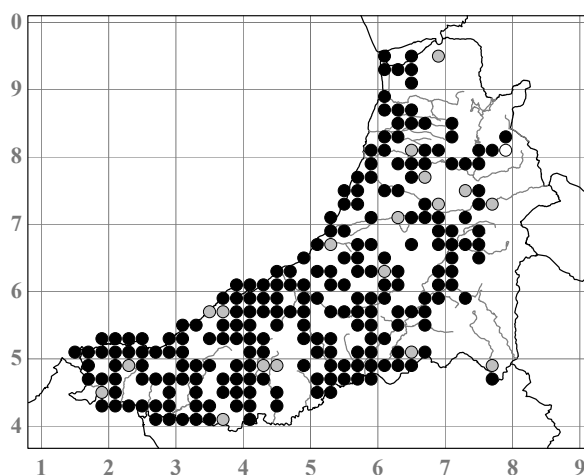
Recorded only once, by Salter as an "Adventive or Garden Escape", from the Aberystwyth rubbish-tip SN591811 in 1928 (NMW, det. EJC). Native of E Europe.

***Leucanthemum vulgare* Lam. (*Chrysanthemum leucanthemum* L.)** - Oxeye Daisy - Llygad-llo Mawr (Blodyn Llo Mawr, Llygad yr Ych, Llygad y Fwch, Llygad y Dydd, Blodau Cae Gwair, Gold Gwynion)

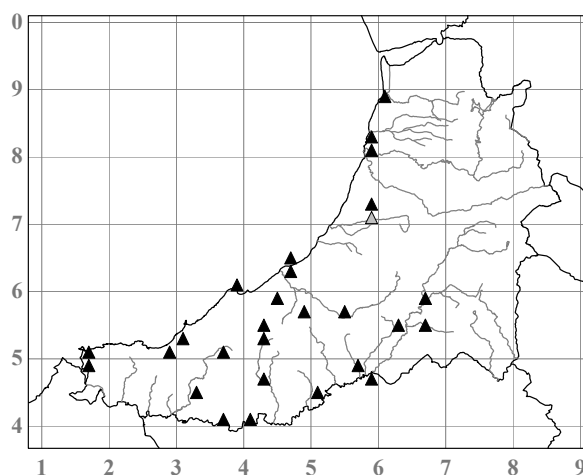
A frequent plant of dry grasslands, and often abundant in hay meadows, unimproved pastures, graveyards, on the coastal slopes and on reconstructed roadside slopes. On cliffs both along the coast and in the uplands it conspicuously picks out areas of even slight base enrichment. In flower it can be spectacular, and Salter (Diary 28.5.1936) wrote "Surely the cemetery [at Aberystwyth SN591812] was never before such a snow-white field of Ox-eye Daisies", and often mentioned meadows white with it. There is great variation both in morphology and in time of flowering, and although the classification of Sell & Murrell (2006) has been used here, much further work is needed.

Subsp. ***ircutianum*** (DC.) P. D. Sell, large, early-flowering and subglabrous, sometimes rather similar morphologically to *L. ×superbum*, is frequent on roadside banks and other sites where it is probably an introduction, and identical plants also occur in hay meadows, for example at Dolau Hafod, 2km NE of Abermeurig SN576577, 1996 (NMW).

Subsp. ***vulgare*** var. ***vulgare***, usually less robust, later-flowering and rather pubescent, is especially characteristic of pastures and hay-meadows and appears native, as do the often larger and earlier-flowering plants of upland cliffs. Early-flowering, subglabrous, undoubtedly native plants are widespread on the sea cliffs, for example at Penderi, Llanddeiniol SN552733, 2005, and by Carreg-y-ty, Llangranog SN301536, 2002 (NMW); they are too large and too glabrous for var. *nanum* Pérard, but have the woody bases and sometimes the subrotund basal leaves of subsp. *crassifolium* (Lange) Rouy, and their identity is uncertain. Altitude limit 380-455m ("1,250-1,500ft."), Salter (1935); 350m, Craig y Pistyll SN713855, 2003.



*Leucanthemum vulgare*



*Leucanthemum ×superbum*

***Leucanthemum ×superbum* (Bergmans ex W. J. Ingram) D. H. Kent (*L. lacustre* (Brot.) Samp. × *maximum* (Ramond) DC.; *L. maximum* auct., non (Ramond) DC.)** - Shasta Daisy - Y Llygad-llo Mwyaf

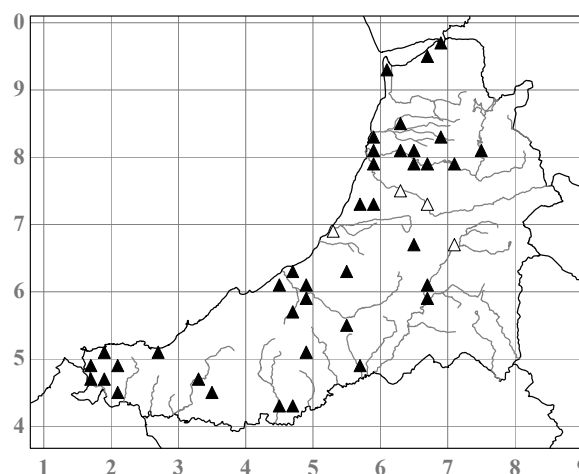
This garden hybrid is occasionally, and increasingly, naturalised from throw-outs and perhaps sometimes self-sown on roadside banks, river banks, waste ground and in graveyards. It was first recorded naturalised in



1977 on waste ground at Penyrangor, Aberystwyth SN581808 (JEH). There is considerable variation, and among the forms seen have been plants with subentire cauline leaves and parallel-sided, well-separated rays from by the Teifi estuary at Nantyferwig SN169481, 1993 (NMW, TCGR & AOC); and plants with huge capitula 11-13 cm across, in Capel Salem graveyard, Brongest SN324450, 1997 (NMW).

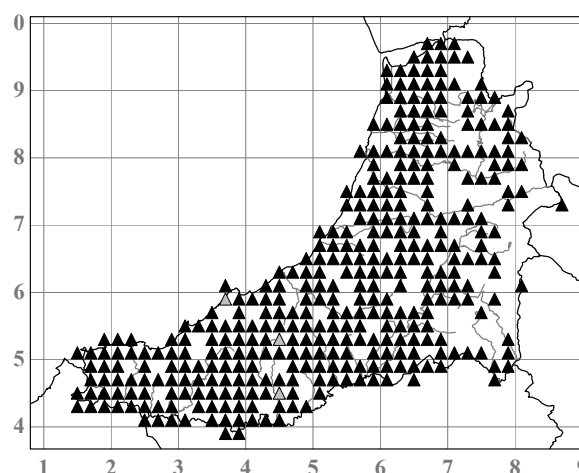
**Matricaria chamomilla** L. (*M. recutita* L.) - Scented Mayweed - Amranwen Bêr

An occasional archaeophyte weed of arable fields, farmyards, gardens, roadsides, disused railways, waste ground and tips. The earliest records were from “Felin-fawr”, perhaps SN676788, and Ystrad Meurig SN76D in 1893 (Burkill & Willis 1894). Salter (1935) remarked that it required careful scrutiny to distinguish it from the commoner *Tripleurospermum inodorum*, so it was perhaps more frequent than he supposed, and this may still be the case; he realised that the common “Chrysanthemum” weed in his garden was *M. recutita* (*M. chamomilla*) in 1906 (Diary 5.8.1906). It is chiefly lowland and has not been seen at over 240m altitude, on waste ground at Ponterwyd SN750811, 1988.



**Matricaria discoidea** DC. (*M. suaveolens* (Pursh) Buchenau, non L., *M. matricarioides* (Less.) Porter) - Pineappleweed - Chwynnyn Pinafal

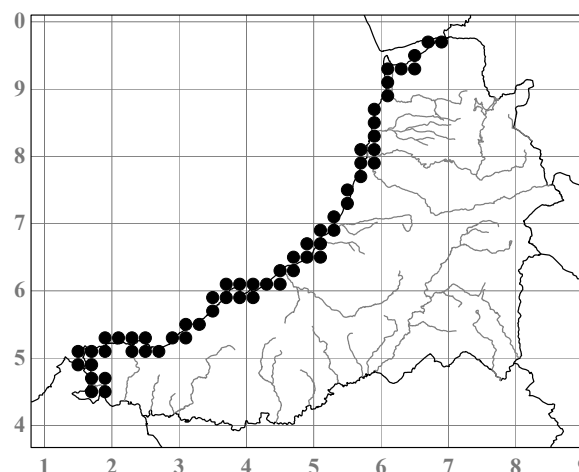
First recorded naturalised in Britain in 1871, and in Wales at Aber in Caernarvonshire in 1899 (QONK pers. comm.). Salter unfortunately never mentioned it in his diaries and only said (1935) that it was “now generally distributed throughout the county”; he did not include it in his list of 34 years earlier (Salter 1901). Salisbury (1964) correlated its rapid spread in Britain after 1900 with the increasing use of treaded motor tyres, its major means of dispersal. It is now abundant throughout the county, chiefly in agricultural areas, on road verges, the green centres of tracks, pathsides, poached field gateways, field margins and waste ground, as well as being an occasional arable weed and persisting in winter stubble. It seems to be uncommon close to the sea, although in 2009 it was abundant around the recently enlarged pond on Cardigan Island SN15985157 (SPC). Altitude limit 450m, verge of FC road, Truman, The Arch SN77827681, 2005; 450m, road verge, Bryn-y-rhyd SN680525, 2008.



**Tripleurospermum maritimum** (L.) W. D. J. Koch

Subsp. **maritimum** (*Matricaria inodora* var. *salina* auct.) - Sea Mayweed - Amranwen Arfor

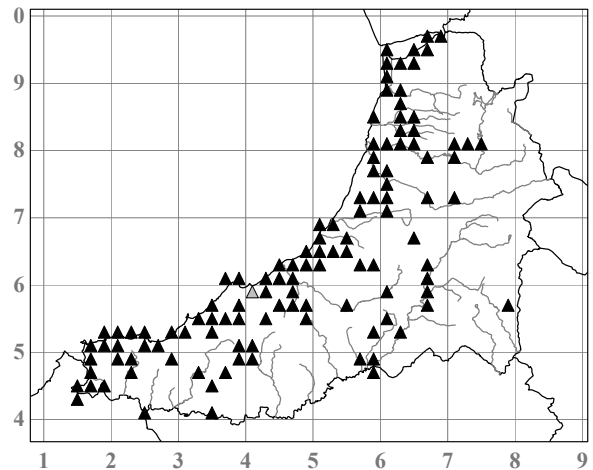
Common all along the coast on sea cliffs, scree slopes, shingle, waste and disturbed ground, usually within the immediate influence of salt spray. It is often especially abundant in seabird colonies. The earliest record is of it as “*Chrysanthemum maritimum*: vicinity of Aberystwyth, littoral plant” (Lees 1841).



Subsp. **inodorum** (K. Koch) Hyl. ex Vaar. (*T. inodorum* (L.) Sch. Bip., nom. illegit., *Matricaria inodora* L., nom. illegit.) - Scentless Mayweed - Amranwen Ddi-sawr

A common archaeophyte weed of arable fields, waste ground, tips, disturbed ground, road verges and tracksides, becoming less frequent inland and scarcely occurring in the uplands. The first distinct record, as opposed to those referable only to *T. maritimum* sens. lat., was by Salter from his garden at Llanbadarn Fawr SN59808107, 1906 (Diary 5.8.1906), but it is impossible to tell whether it has increased or not since his time. Altitude limit 380m, disturbed road verge 1.1km W of Nantystalwyn SN794574, 2002.

Intermediates between the two subspecies, which have usually been recorded as *T. inodorum* × *maritimum*, are frequent along the coast where the two species meet, and were first recorded in 1992 by Aberystwyth harbour SN58208132 (NMW), although a specimen from Wallog c.SN590858, 1934 (NMW, PCh) is probably also such an intermediate.

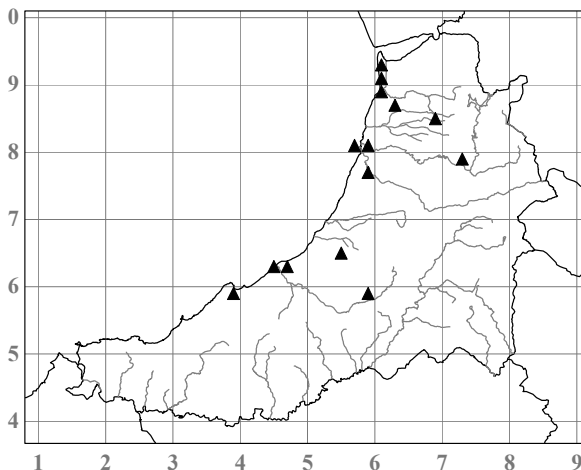


**Senecio cineraria** DC. - Silver Ragwort - Creulys Ariannaid

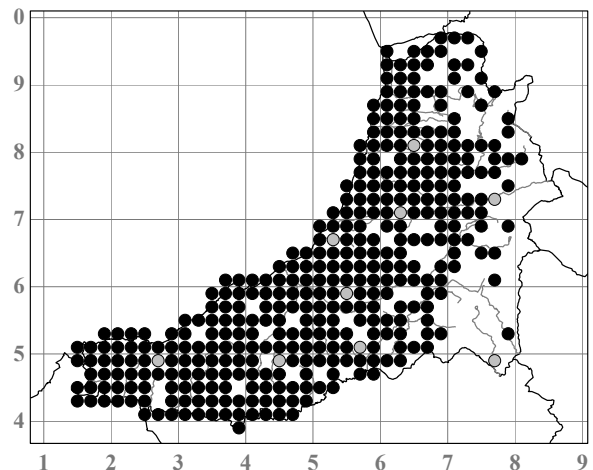
A rare garden escape, not nearly as common as its hybrid with *S. jacobaea*. The only records have been of several bushes at the back of the shingle beach S of Aberaeron harbour SN454629, 1985, from the clifftop W of Mwnt SN187515, 1970 (field record at BRC) and from by the car park off Peterwell Terrace, Lampeter SN574480, 2005 (GHu). It is included in *S. ambiguus* (Biv.) DC. by Sell & Murrell (2006). Native of the Mediterranean.

**Senecio** × **albescens** Burb. & Colgan (*S. cineraria* × *jacobaea*)

Salter (1935) said that this hybrid occurred, but gave no localities. The first localised record was in 1978 from the Aberystwyth castle grounds SN579816 (NMW, conf. PMB), and it has since been seen at some 20 sites, usually as single plants or small groups along the coast near habitations, on waste ground, shingle or sand dunes, on banks, walls and cliffs or in hedgebanks. Inland it has been found in a few sites such as by a pavement in Llanfarian SN591779, 1993 (SPC), in a farmyard at Penrhiw, Ystumtuen SN736784, 1998 (AOC & JPW), and on waste ground at Cross Inn, Nebo SN543642, 1997.



*Senecio* × *albescens*



*Senecio jacobaea*

**Senecio jacobaea** L. subsp. **jacobaea** - Common Ragwort - Llysiau'r Gingroen (Llysiau Penfelyn, Ceion, Griswil, Ragwt)

Common in the lowlands, especially in poached pastures, on road verges and pathsides, on sand dunes and sandy pastures especially around Rabbit warrens, and on waste ground. It occurs chiefly in pastures grazed by Cattle and Horses, which find it unpalatable or poisonous and which poach more heavily, rather than in those

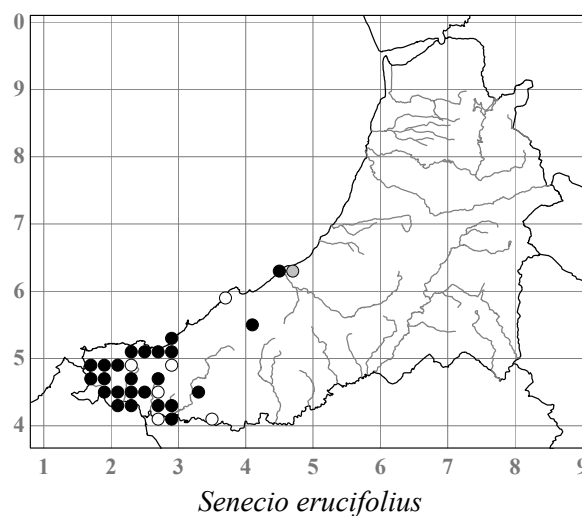
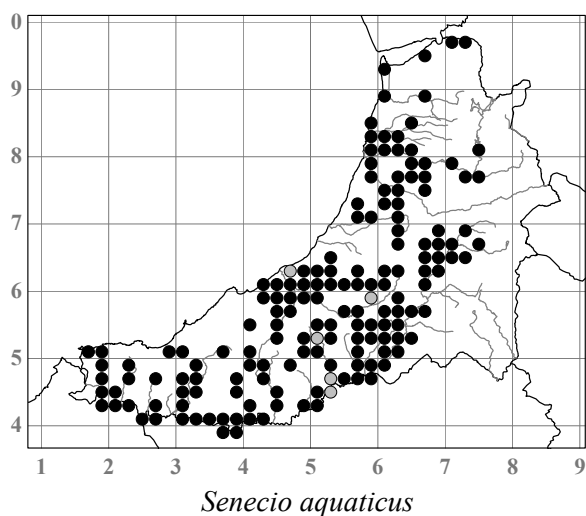
grazed by Sheep which eat it readily and poach less. The most widespread and abundant of the rather ill-defined varieties in the county seems to be var. **nemorosus** (Jord.) Loret & Barrandon, characteristic plants of which occur in most habitats whether wet or dry, and it is by far the most abundant variety even on the mature dunes at Ynys-las SN69B, C, 2005 (NMW). Var. **condensatus** Druce occurs in small quantity on these dunes, 2005 (NMW), but intermediates and plants showing every combination of the characters of this and var. *nemorosus* and var. *jacobaea* are much more frequent. Var. **jacobaea** seems fairly widespread, but as it merges into var. *nemorosus* in most habitats it is difficult to be certain of the relative abundance of the two. Altitude limit c.305m ("to about 1,000ft.") Salter (1935); 510m, FC road verge 2.5km NE of Nant-y-maen SN774604, 2001 (AOC & RDP).

**Senecio ×ostenfeldii** Druce (*S. aquaticus* × *jacobaea*)

First recorded in 1957 from the Teifi bank below Cruglas, Swyddffynnon SN7065 (PMB, *Nature in Wales* 4: 554 (1958)), and since then at five other sites: damp pasture by the Afon Mydr, Felin Rhiwbren SN473573, 1996; lane verge in wood below Rhosgellan-fawr, Wallog SN596855, 1997 (AOC & DEA); shingle by the Afon Ystwyth behind Tan-y-bwlch beach SN580800, c.1998 (SPC) and just above the bridge in Llanfarian SN590777, 1997; and marshy pasture below road by Ty'r-wawr, Devil's Bridge SN747764, 1999. It is probably very under-recorded.

**Senecio aquaticus** Hill subsp. **aquaticus** - Marsh Ragwort - Creulys y Gors

Frequent in marshy pastures and fens, on streamsides and river banks, in damp woodland and scrub and by ponds, scarcely extending into the uplands, and generally not common near the coast. It is especially common on clay soils in the Aberaeron area and in the SW of the county, and in much of the Teifi valley. There is great variation in leaf shape, most plants having lyrate-pinnatifid lower leaves and being referable to var. **aquaticus**, but plants with undivided lower leaves, var. **barbareifolius** Wimm. & Grab., are widespread.



**Senecio erucifolius** L. - Hoary Ragwort - Creulys Lwyd

Confined to the SW of the county where it is frequent on the somewhat calcareous clay soils of the Irish Sea Ice Sheet till in marshy pastures, on the wetter parts of the cliff slopes above the sea, on riverbanks and on roadside verges and hedgerbanks. Forma **discoideus** DC., with rayless heads, has been occasionally seen, for example by the Afon Mwldan near Penparc SN196483, 1990 (CGE). Our plants are variable in leaf shape and pubescence, and in size of capitula, but almost all seem to be var. **communis** Rouy. The exception is a population of var. **viridulus** (Martín-Donos) Rouy, with subglabrous leaves, on damp clay and rocks above the sea at the E side of the E bay at Aber-porth SN25995159, 2003 (CGE, NMW, det. PDS) where it had already been recorded in 1951: "Aberporth, the almost glabrous form, 1951" (Webb 1952); it appears quite native here, but its status in the few other sites where it occurs in Britain is uncertain.



**Senecio inaequidens** DC. - Narrow-leaved Ragwort - Creulys Gutddail

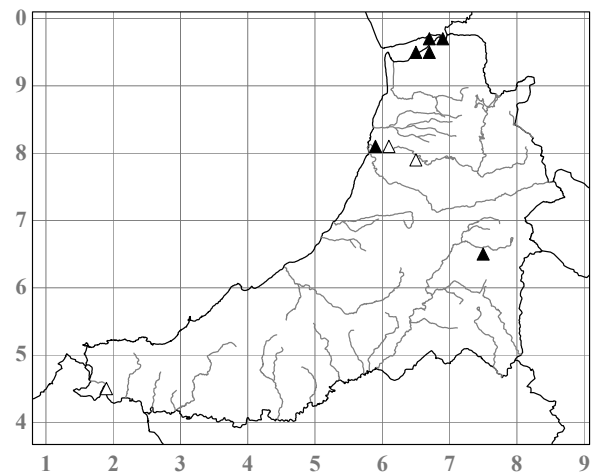
Only recorded from one site but rapidly increasing, on a rubble tip by the boat-building yard, Ynys-las SN616932 (NMW), where 9 plants were found in 2005, *c.*50 in 2006, and some thousands in 2007. Native of S Africa and currently spreading in Britain.

**Senecio squalidus** L. - Oxford Ragwort - Creulys Rhydychen

Recorded chiefly from along the railway system, the earliest record being of a specimen sent from Cardigan, presumably by the station SN180459, to Dr H. Clarke in 1917 (OXF, conf. GCD, Kent 1963). Salter (1935) remarked that it appeared at Aberystwyth after the Great Western Railway took over the Cambrian system (which was in 1922), although there is no actual record by him from there. He recorded it at Capel Bangor station SN648798 in 1925 (Diary 21.8.1925), from Glandyfi SN69Y in 1926, and from Glanyrafon SN6180 in 1927. In 1957 it was noted all along the railway by the Dyfi estuary from the Cletwr bridge SN645941 to Ynys Edwin SN677965, and in 1976 abundantly along the railway at Glandyfi SN6997; it can still be reliably seen along this 6km stretch of railway, 2005 (NMW); the plants here, and doubtless elsewhere in the county, are var. **pinnatifidus** (Evers ex Hegi) P. D. Sell. From 1988 to 1996 between one and *c.*50 plants were seen annually at Aberystwyth station SN585815. In 1956 one plant was found in Waun Fawr SN6081 (S. Conway pers. comm.); since 2000 a few plants have been seen annually around the level crossings and by Capel Saron, Llanbadarn Fawr SN598808; and in 1991 a single plant was seen on the roadside verge at Strata Florida SN745657 (NMW). The species is native of Sicily and was introduced to Britain around 1700.



*Senecio inaequidens*, boatbuilding yard, Ynys-las, view N from SN616933, September 2008



*Senecio squalidus*

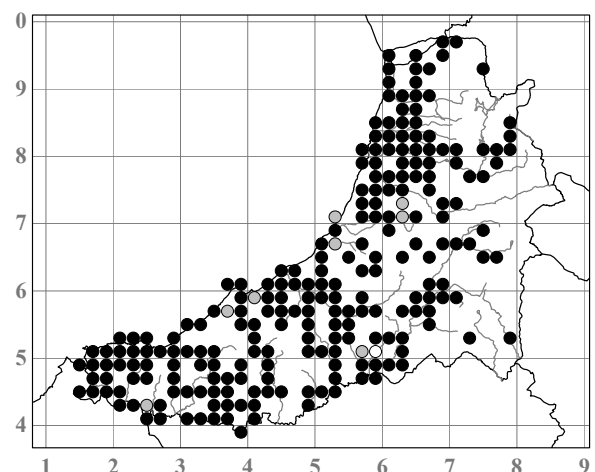
**Senecio ×baxteri** Druce (*S. squalidus* × *vulgaris*)

Salter (1935) wrote that in his garden at Fairview, Llanbadarn Fawr SN598810, these two species hybridised, implying that this occurred naturally. Stephenson (1946) wrote that he had not seen this hybrid where the parents were growing together by the railway here, and there have been no records since. It is quite widespread in Britain.

**Senecio vulgaris** L. subsp. **vulgaris** - Groundsel - Creulys (Y Benfelen, Llysiau Griswil yr Ardd, Grownsil)

Var. **vulgaris**

A common garden weed and pavement weed in towns, and a frequent plant of waste and disturbed ground, road verges, farmyards and sand dunes, but uncommon as an arable weed and becoming rare in the uplands. Allen & Hatfield (2004) refer to a folk



*Senecio vulgaris* all records

use of it in the county as a poultice for extracting thorns. Altitude limit 425m, gravelly area at SE corner of Llyn Conach SN740928, 2006 (AOC & JPW).

Var. **crassifolius** (Rouy) P. D. Sell is frequent on coastal sandy shingle and shingle beaches and dunes from Ynys-las SN604940 to Borth SN607889, 1995-2005 (CGE, NMW), on Tan-y-bwlch beach, Aberystwyth SN579806-579798, 1995-2005 (CGE), and SW of the mouth of the Afon Wyre, Llanrhystud SN524691, 1995-2005 (CGE). Perhaps the only native variety.

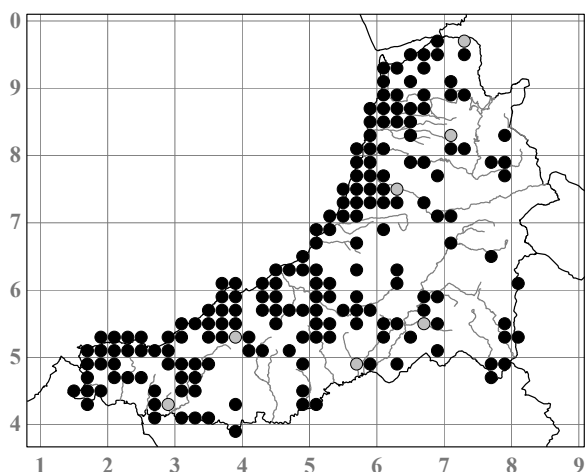
Var. **hibernicus** Syme (var. *radiatus* Koch) was given by Salter (1935) from four sites, the Aberystwyth rubbish-tip SN591811 in 1927; St David's Road, Aberystwyth SN591816, 1929; Cardigan SN14 (JWL); and the station yard, Derry Ormond SN597514, 1931. Stephenson (1946) wrote "I have noticed for quite thirty years *Senecio vulgaris* var. *radiatus* Koch growing in small quantity at Aberystwyth, both about the town and along the Devil's Bridge railway". It was recorded from Llandre station SN625868 in 1945 (PWR). The only subsequent record was of several plants on waste ground by the upper bridge, Aberaeron SN460622, 1993 (NMW).



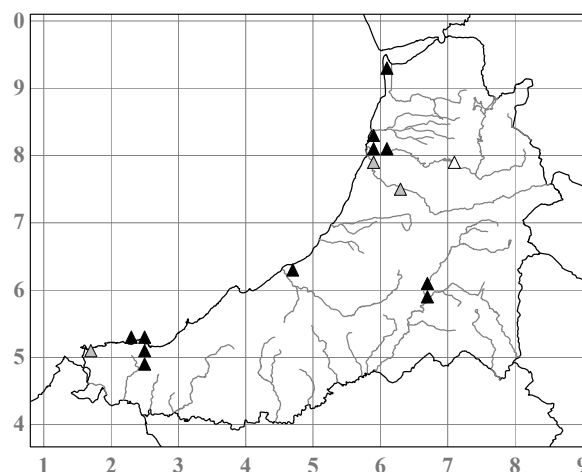
*Senecio vulgaris* var. *crassifolius*,  
Ynys-las dunes, SN607942, April 2007

### **Senecio sylvaticus** L. - Heath Groundsel - Creulys y Rhos

A frequent plant of open ground on thin, dry soils, commonest along the coast and especially abundant on Rabbit warrens, around Gorse patches, on partially eroded banks and slopes, on screes, waste and disturbed ground, along FC road verges, in felled woodland and on railway ballast and lead mine spoil. Morgan (1848) recorded var. *auriculatus* C. A. Mey. (var. *lividus* Hook.), with the upper leaves auriculate and clasping, from Melindwr, perhaps SN68V or 78A, but this character seems part of the normal variation. Var. *nanus* Rouy has not been seen. Altitude limit 490m, waste ground by Nant Nod lead mine, Pumlumon SN791839, 2009.



*Senecio sylvaticus*



*Senecio viscosus*

### **Senecio viscosus** L. - Sticky Groundsel - Creulys Ludiog

Salter indicated in 1907 (Diary 16.8.1907) that he had not yet seen this species in the county, and he seems not to have found it until 1932 when, and for the next two years, he saw it on the railway line at Llanbadarn Fawr c.SN599806 (Diary 2.10.1932, 5.8.1934, 1935). His later records (Wade 1952) also seem to have been from the railways, along the Dyfi SN69, at Rheidol Falls SN708787, 1940, below Pendinas c.SN5880, and at Aberystwyth c.SN5881. Since 1970 it has been seen in a dozen sites, mostly on railway ballast, waste ground and tips. In 1983 it was abundant where Gorse had been burnt on Pendinas, Aberystwyth SN585802, and in 1976 and 1981 single plants were seen in Llanilar churchyard SN624752. In recent years, it has been abundant on ballast at Aberystwyth railway station and around the Marina SN5881, 2008. There is a large colony of distinctive dwarf, much-branched plants on the shingle beach opposite Drefnewydd, Aberaeron SN462635, 1989 (JRA & AOC) - 2006 (NMW); this seems to be the only permanent population in a natural



site in the county, apart perhaps from one on river shingle by the Afon Rheidol W of Glanyrafon SN603803 seen in 1994 and for some years thereafter (SPC).

**Brachyglottis ×jubar** P. D. Sell ‘Sunshine’ (*B. compacta* (Kirk) B. Nord. × *laxifolia* (Buchanan) B. Nord.) - Shrub Ragwort - Llwyn-creulys ‘Sunshine’

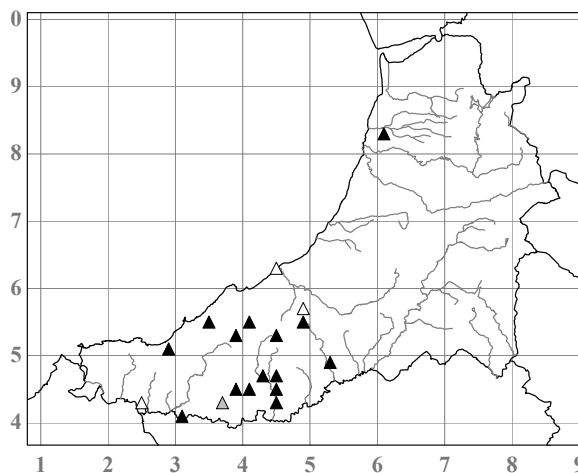
A large bush in a remote gully on the sea cliffs by Traeth y Coybal SN37285932, 1989 (BM, NMW, APF & AOC), 350m from the nearest house, was still present in 2001, and there are bushes naturalised from throw-outs on waste ground at the edge of the sea cliffs by gardens on New Quay Head SN38756035, 2004 (AOC & PAS). A cultivar of garden origin.



*Senecio viscosus* and *Rumex crispus* subsp. *littoreus*, beach E of Aberaeron, view N from SN462635, September 1996

**Doronicum pardalianches** L. - Leopard’s-bane - Llysiau’r Llewpart

Occasionally naturalised, especially on shaded roadside banks where the colonies are conspicuous in flower in late April and early May. It has perhaps increased since Salter’s day, as he recorded only four sites. Some colonies are very persistent, and the first that was recorded for the county, reported to Salter in 1905 (DET, Diary 9.2.1905) by the 14<sup>th</sup> milestone SN381531 from Cardigan on the A487, is still present and now consists of several colonies along 50m of the roadside bank, 1995 (NMW) - 2005. One on the roadside bank by Dihewyd church SN483562 was known to Salter for 34 years (Diary 13.4.1907, 31.5.1941) but is now gone (although it grows close by at Ty’n-parc SN484556, 1999), and one on the roadside bank by Castell Hywel SN440477 noted in 1964 (APC) is still present, 2008. It is also naturalised in woodland in several places, with especially large colonies in Coed Ffynnon-caradog SN617828, 1995 (NMW) and at Pontgarreg SN34025429, 1997 (NMW, AOC & JPW). Native of W Europe.



**Doronicum ×excelsum** (N. E. Br.) Stace (*D. columnae* Ten. × *pardalianches* × *plantagineum*) - Harpur-Crewe’s Leopard’s-bane - Llysiau’r-llewpart Harpur-Crewe

This hybrid of garden origin is naturalised in two places: in abundance on a rocky, wooded mound by the “Druidic Circle” at Lovesgrove SN62988165, 1980 (NMW, det. ACL) but gone by 1995; and several colonies in scrub by a drained pond, Penralltisaf, Llechryd SN220446, 1995 (NMW, AOC & LRG).

**Doronicum plantagineum** L. - Plantain-leaved Leopard’s-bane - Llysiau’r-llewpart Dail Llyriad

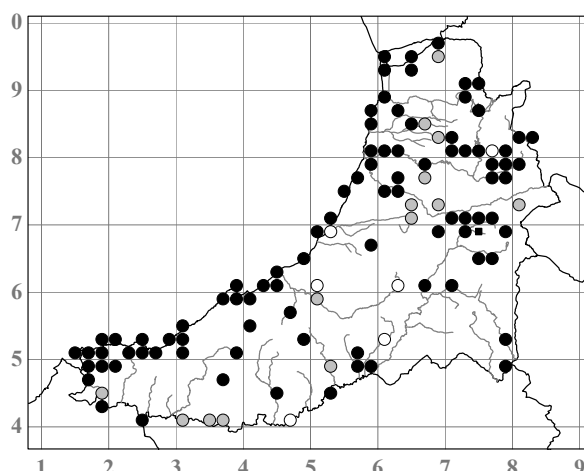
Naturalised in two places on shaded roadside banks: two colonies by Gwynfa, Tresaith SN286513, 1992 (NMW, CGE); and a colony extending into woodland above the T-junction S of Llanborth, Penbryn SN29685199, 1996 (NMW, JPW & AOC) - 2008. Native of W Europe.

**Tussilago farfara** L. - Colt’s-foot - Carn yr Ebol (Troed yr Ebol)

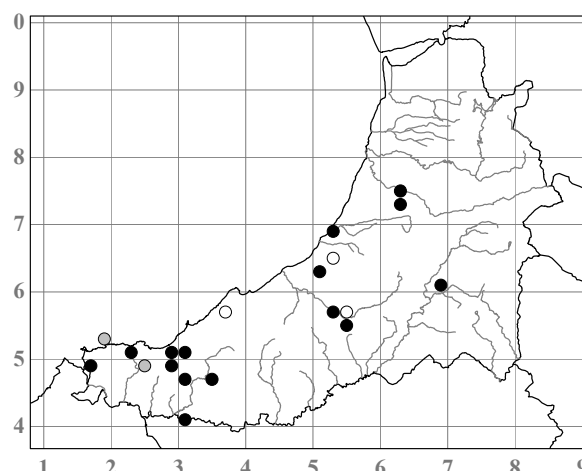
An occasional plant of open sites on unstable clay or stony soils, and on spoil and other artificial or disturbed ground, mostly along the coast and in the uplands. It is often on the slumping clay slopes or damp areas of scree on the coast, on sand dunes and on disturbed roadside verges and waste ground. Inland and in the uplands it is perhaps commonest along FC road verges, and is often on lead mine spoil, for example at Esgair



Fraith where it is abundant on the disturbed slopes rich in calcareous ferroan dolomite SN741912, 1990-2008, and is also occasional on roadside embankments and railway ballast. In more natural habitats inland it is rare and usually only on eroding streambanks, on damp screes and rock ledges and on river shingle. It still grows on a damp Sheep-free ledge by the Afon Claerddu SN79236867 where Salter saw it in 1902 (Diary 22.7.1902) - 2003. Altitude limit 435m, Claerddu, 1902 (as above); 530m, steep flush on W slope of Trawsalit SN777706, 1999.



*Tussilago farfara*



*Petasites hybridus*

***Petasites hybridus* (L.) P. Gaertn., B. Mey. & Scherb. (*P. officinalis* Moench) - Butterbur - Alan Mawr**

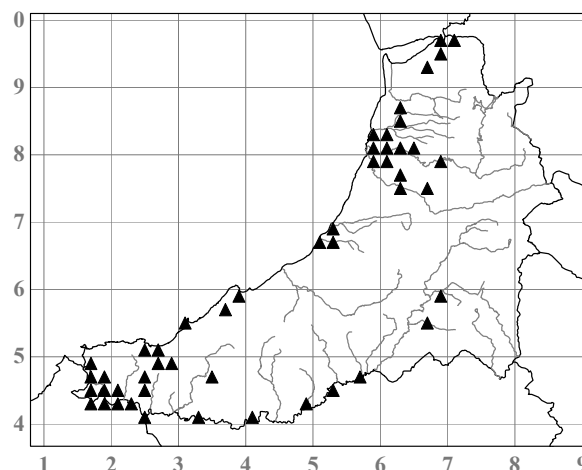
First recorded in 1894 by Salter (Diary 28.6.1894) from the streamside at Mwnt c.SN196520, where it no longer occurs; in 1904 (Diary 18.4.1904) he recorded it from by the Afon Wyre near its mouth where it is still present at SN527697 and SN531693, 2006 (AOC; SPC); and also in 1904 from the Afon Arth dingle below Pennant SN51006305 where it still occurs, 2006. Salter (1935) gave five more sites, including the Castle Hill dingle at Llanilar SN625745 where he first recorded it in quantity in 1906 and where it is still abundant, 2008. It is now known from about 15 sites, and is perhaps truly native by streams in the sites mentioned above, as well as in a copse by the Afon Aeron W of Brynog SN524575, 1992, by the Afon Ceri E of Felin Ganol SN340471, 1992, and in a marshy copse at Nantyferwig SN169482, pre-1935 (Salter 1935) - 2006. In its more usual habitats, on roadside verges and waste ground, it is more likely an escape. All the colonies seen in flower have been "male".

***Petasites albus* (L.) Gaertn. - White Butterbur - Alan Bach**

First recorded naturalised by the stream in the shrubbery and woodland at Plas Gogerddan SN629836 by Salter in 1905 (Diary 30.9.1905) and still there, but reduced to two non-flowering patches  $4 \times 0.5\text{m}$  and  $8 \times 3\text{m}$ , in 2004. A large streamside colony in woodland at Gwenffrwd, 1.5km NNE of Tre'r-ddol SN671933, 1956, was also non-flowering and reduced to a patch  $6 \times 2\text{m}$  by 2005. The only other records are from near Llanybydder on the Lampeter-Llanybydder road SN54, 1964 (NMW, JRG), and on a wooded bank in the Falcondale grounds SN565491, 1993-2005, at which latter date the main colony was  $12 \times 10\text{m}$ , with outliers, but non-flowering. Native of Europe.

***Petasites fragrans* (Vill.) C. Presl - Winter Heliotrope - Alan Pêr**

The earliest localised record is from Christmas Day 1905 when Salter (Diary 25.12.1905) wrote: "Fine show of *Petasites fragrans* all along hedgebottom at Felin y Mor" SN58128028; it is still abundant there, 2007. (He had earlier mistaken the Gogerddan *P. albus* for this species.) It is not known how widespread it was then, but Salter (1901) wrote that it was "Naturalised in several places" and later (1935) wrote that it was "naturalised in numerous localities"; it is now widely naturalised on roadside



verges, in wooded dingles and copses, deserted garden sites, graveyards and waste ground chiefly in the coastal zone and up the Teifi valley, and is confined to the lowlands. Only “male” plants are known, even where it is native in the C Mediterranean.

***Calendula officinalis* L.** - Pot Marigold - Melyn Mair

An occasional casual of tips, waste ground, roadside verges and cultivated areas, but nowhere persisting. It is of unknown origin.

***Osteospermum jucundum* (E. Phillips) Norl.** - Cape Daisy

This garden ornamental, native of South Africa, is well established on a hedgebank in Llandysiliogogo churchyard SN36305745, 2008 (NMW).

***Ambrosia artemisiifolia* L.** - Ragweed - Bratlys

A rare casual with only three records: four plants on the site of the recently demolished Seilo chapel, Aberystwyth SN586818, 1996 (NMW, JPW & AOC); garden weed, Penrhyn-coch, SN643842, 2003 (JV, det. AOC); and one plant in the shrubbery at Yr Hen Ysgol, Aberystwyth SN584816, 2006 (SPC). Native of North America.

***Helianthus annuus* L.** - Sunflower - Blodau'r Haul (Rhosyn Saron)

There are a few records of the small-flowered forms of the plant, native of North America, as a casual on tips and waste ground: on waste ground at the Ynys-las boatyard SN616932, 2005; on the Borth rubbish-tip SN612893, 1993; on waste ground by Borth sewage works SN616896, 1995 (NMW) - 1996; on waste ground in Queen Street, Aberystwyth SN584815, 1998 (SPC); on the Pendinas rubbish-tip, Aberystwyth SN584798, 1992; and on waste ground at Aber-porth SN262515, 1996. It has also been a constituent of crops recently sown for seed for wild birds under Tir Gofal, for example at Wallog SN594855, 2004. Some 2ha of the large-flowered form was cultivated for oil-seed in 2000 at Clynyrynys, Gwbert SN165506.

***Guizotia abyssinica* (L. f.) Cass.** - Niger - Guizotia

Once recorded as a bird-seed casual in the garden of Ynys Edwin, Eglwys-fach SN678962, 1996, and likely to become commoner with the popularity of Niger seed. Native of E Africa.

***Galinsoga parviflora* Cav.** - Gallant Soldier - Galinsoga

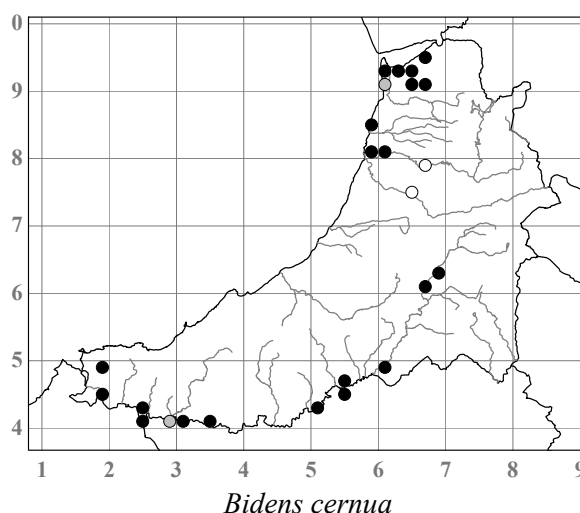
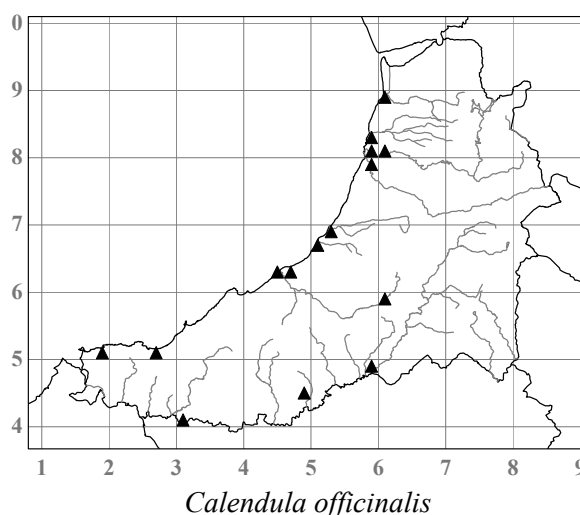
Recorded as a garden weed in Lampeter SN54, 1973 (DHK), and also given for SN58 in Ellis (1983). Native of South America.

***Galinsoga quadriradiata* Ruiz & Pav.** - Shaggy Soldier - Galinsoga Blewog

Recorded only from waste ground in the Botany Gardens, Penglais, Aberystwyth SN596821, 1975 (ABS, det. AOC), and as a flowerbed weed on Aberystwyth promenade SN583823 in 1994 (SPC). Native of Tropical America.

***Bidens cernua* L.** - Nodding Bur-marigold - Graban Gogwydd

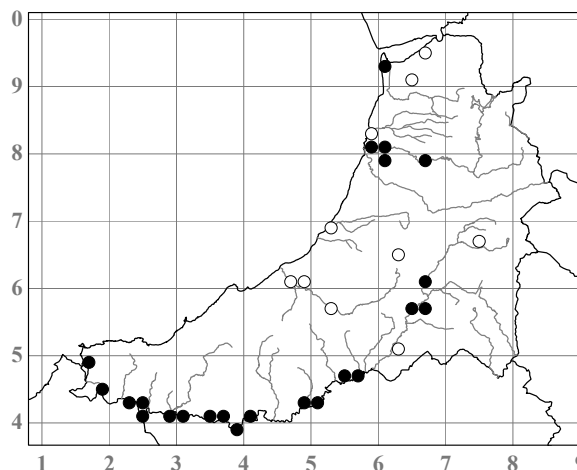
On mud or shingle, in the open or in tall herb vegetation, by rivers, ditches and ponds. It is frequent along the Teifi up as far as Cellan SN613498, 1991 (APF), especially by backwaters and ox-bows, and



again at the S end of Cors Caron. It is in the Dyfi area in ditches, where it was first recorded in the 1880s (Whitwell, *BRC rep.* **1883**: 16 (1884), Ley, *BRC rep.* **1884-1886**: 101 (1887)). There are a few records from the lower Rheidol, but not recently along any other river system, although Salter recorded it at Felindyffryn SN651744 on the Ystwyth (Wade 1952). Elsewhere it occurs only by the Bryndyfi lead mine reservoirs SN663916, 1993 (where it is at 170m altitude), and by ponds at Wallog SN590850, 1993, and Ferwig SN184482, 1995.

***Bidens tripartita* L.** - Trifid Bur-marigold - Graban Teiran

In similar situations to *B. cernua*, often growing with it, and again frequent up the Teifi, as far as Pont Einon SN671613, 1978 (NTHH), although Burkill & Willis (1894) recorded it further up “below Pen-y-banau” c.SN740660 and it is on a 1956 field card at BRC for this area. It also occurs on the lower Rheidol, but is rarer in the Dyfi area, and elsewhere has recently been seen only by the Nanteos lake SN615783, 1995. Morgan (1849) reported it from Clarach SN5883, and Marshall (1900) recorded it from Llanerchaeron c.SN480602, while Salter recorded it further up the Aeron at Brynog SN530573 (1935) and at Blaenpennal c.SN630642 (Diary 5.9.1906), as well as on the Afon Wyre below Llanrhystud c.SN530695 (Diary 23.8.1935).

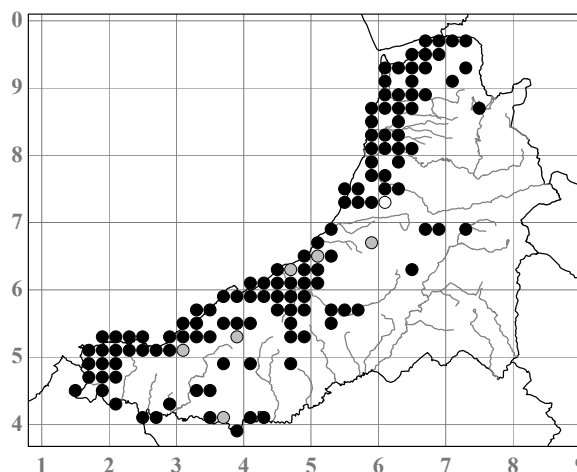


***Tagetes erecta* L.** - African Marigold - Gold Talsyth

This garden ornamental from Mexico has only once been recorded, as a casual on the railway platform at Aberystwyth station SN585815 in 1994 (SPC).

***Eupatorium cannabinum* L.** - Hemp-agrimony - Byddon Chwerw

Largely confined to the coastal zone and main river valleys, where it is common especially in tall herb vegetation in marshes, on ditch-sides and riverbanks, as well as in dry sites such as roadsides, hedgebanks, scrub and wood margins. By the sea it often forms dense stands, along with *Epilobium hirsutum*, at the mouths of streams on shingle or on the cliffs, and it is very characteristic of flushes and wet ledges elsewhere on the sea cliffs. Smith (1878) surprisingly said that it and *Filipendula ulmaria* were “the two commonest plants of the road-side” in the Lampeter-Tregaron area; *Eupatorium* seems to be absent from this part of the county today, and Salter (1935) gave no records from this area, so perhaps Smith was in error.



## ESCALLONIACEAE

***Escallonia macrantha* Hook. & Arn.** - Escallonia - Esgalonia

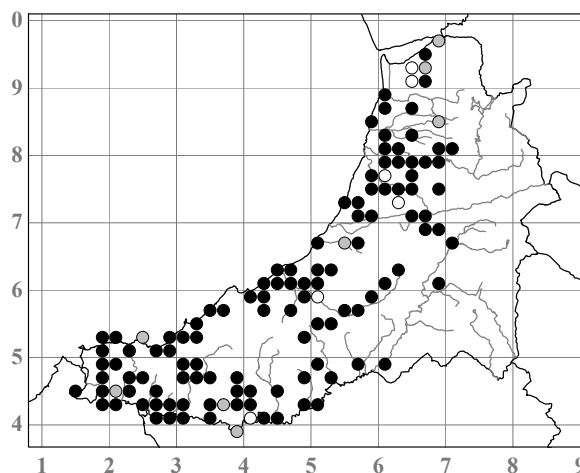
Planted along the FC road in Coed Tynbedw SN688709, 1991 (NMW), where it is ‘Donard Seedling’ and where there are also a few bushes that appear self-sown; in estate woodland at Deri Ormond SN591523, 1993, where it survives as a relic; and in abundance along a roadside hedgebank near Felin Wnda SN3247, 2002 (NMW). There are self-sown bushes in a few other sites, as on cliffs by the mouth of the Ystwyth SN580806, 1993 (NMW) - 2006; on waste ground at Aberystwyth station SN585815, 1994 (SPC); and by the Afon Aeron in Aberaeron SN45806281, 1995. Altitude limit 300m, established, presumably from a throw-out, on a heathy roadside verge 2.5km S of Plwmp SN374502, 2008. Native of Chile.



## ADOXACEAE

**Adoxa moschatellina** L. - Moschatel - Mwsglys

Frequent on hedgebanks and in woodland, chiefly under Ash, Elm or Hazel, sometimes in Alder carr, and often abundant under Bracken on the coastal slopes. It is rare in the extreme N and in the uplands, is commonest on the drift soils in the SW, and seems generally confined to the more fertile soils. Perhaps the most characteristic site for it is between the buttress roots of old Ash and Sycamore trees on hedgebanks and in woodland. Altitude limit 515m (Salter 1935), but he gives no locality and lists no upland ones; I have not seen it over 170m, SE of Ystrad Meurig SN708671, 1999.



## CAPRIFOLIACEAE

**Kolkwitzia amabilis** Graebn. - Beauty-bush

Several bushes outside a garden fence in Lower Forest, Lampeter SN576492, 1998, were probably planted. Native of China.

**Sambucus racemosa** L. - Red-berried Elder - Ysgawen Aeron Coch

Naturalised only in the estate woodlands around Trawsgoed, where it is subsp. **pubens** (Michx.) House var. **pubens** (Michx.) Koehne, and often fails to fruit well: in Aber Magwr Wood SN667735, 1959 - 2007; in Coed Allt-fedw SN664730, 1975-2008 (CGE, NMW); and nearer the mansion c.SN667730, 1994-2008 (NMW). It has been planted further up the Ystwyth above Grogwynion footbridge SN717721, 1994-2005. Native of Eurasia and North America. '**Plumosa Aurea**' is occasionally planted in amenity areas, for example by the new Ysgol Penweddig, Llanbadarn Fawr SN595811, 2004.

**Sambucus ebulus** L. - Dwarf Elder - Ysgawen Fair

An archaeophyte recorded from only six sites, and now present in only two. Salter (1935) saw it by old cottages at Tresaith c.SN279515, 1924-1928 (Diary 17.9.1924, 13.9.1928); on a former cottage garden site 800m NNW of Llanfihangel Ystrad church by the 7<sup>th</sup> milestone from Lampeter SN520569, 1926-1933 (Diary 28.6.1926, 19.8.1933) where he estimated a ¼ acre (0.1ha) of it; by the smithy at Dihewyd SN484561, 1928-1941 (Diary 19.5.1928, 31.5.1941); and at an old cottage site at Ffoshelyg, 1km N of Cilcennin SN519613, 1928-1939 (Diary 27.9.1928, 2.8.1939). In 1978 it was found on a former garden site in New Quay, near the N end of Picton Terrace SN38896001 (SRT), where the colony was 10 × 7m in 1997; by 2004 most of the colony had been cleared to make a new garden but a strip of it had been deliberately preserved as a hedge (AOC & PAS). A colony in one of the Monkey enclosures at the Borth Animalarium SN61308950, 2007 (JPW & AOC) - 2009 (AOC & JPP) was not planted and perhaps derived from bird-sown seed. A 1977 record from Henfynyw churchyard SN448612 was probably an error.



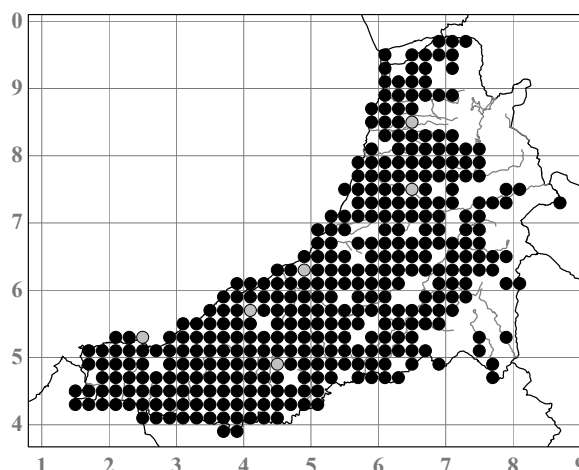
*Sambucus ebulus* in monkey cage, Borth Animalarium SN61308950, September 2009

**Sambucus nigra** L. - Elder - Ysgawen Fawr (Blodau Ysgaw)

Common throughout the county in hedges, scrub, woods, by cottage sites and on waste ground, usually on dry, comparatively fertile soils, often having been planted. It forms thickets in Rabbit warrens on the sand

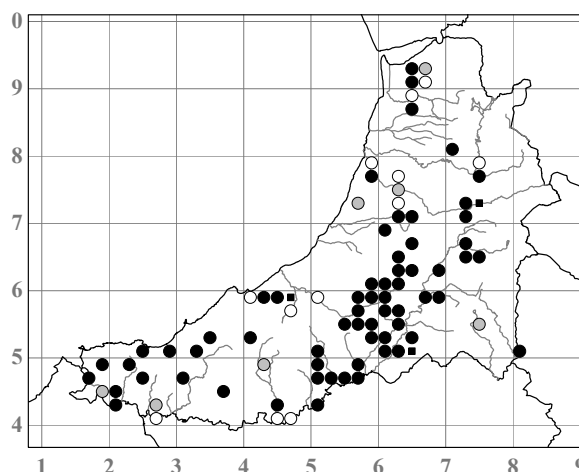
dunes and elsewhere along the coast, being unpalatable and toxic to grazing animals. In the uplands it is chiefly around farms and lead mines, as Salter (1935) remarked. Salter (Diary 21.7.1939, 11.9.1939, 1939) recorded a second flowering in September 1939 at several sites, and in September 1992 a bush was flowering strongly in a roadside hedge 1.5km N of Ty'n-yr-eithin SN662638. Maximum 218cm girth (at 30cm up), 1988, branched into six at 50cm up, with a canopy spread of 12m, one of two trees on the roadside bank in Ferwig SN18334951, destroyed in 1995. Altitude limit 350m, Blaendoethie c.SN742539, 1931 (Salter Diary 31.7.1931, 1935); 405m, four old bushes by Tywi Fechan ruin SN791612, 1992.

Two well-known planted bushes of '**Marginata**' grew on either side of the doorway of the Ship Inn, Pennant SN513631, c.1960-1995, one still surviving in 2009, and another old bush was nearby in front of Wern-ddu SN517627, 1997. Bushes of it in the grounds by Trawsgoed mansion SN66957318, 1994, originated from the vicarage at Eglwys Fach (D. Morley pers. comm.). '**Aurea**' is often planted, for example in hedges NW of Lluet, Llanbadarn Fawr SN607814, 1995-2008; in hedges near Temple Bar SN537531 and 529532, 1996; and in hedges near Blaenwaun-uchaf, Cwrtnewydd SN508491, 1995.



#### **Viburnum opulus** L. - Guelder-rose - Gwifwrnwydden y Gors (Pren Almon)

An occasional shrub of the more fertile damp woodlands and scrub, and quite often seen in hedges. As Salter (1935) remarked, it is most frequent in the centre of the county, being rare in the N and surprisingly infrequent in the clay woods in the SW and along the coast. Often only a single bush is seen in a wood, and it is nowhere abundant. It is probably sometimes planted in the wild, especially in hedges, and some of the mapped records may be of such plantings. The highest it has been seen is 290m altitude, among Ash trees on damp rocks by the Tywi arm of Llyn Brianne SN805514, 1988 (AOC & DD). It has sometimes been planted in recent decades on reconstructed road verges and embankments, for example at Pont Sholop, Llanerchaeron SN477597, 2003 (NMW), but not as often as *V. trilobum*.



#### **Viburnum sargentii** Koehne - Asian Guelder-rose

Occasionally planted in amenity areas, for example at the Parc-y-llyn retail park, Llanbadarn Fawr SN59278061, 2003, and in hedges, for example by the Cilgwyn Golf Club, Llangybi SN60445357, 2004 (NMW). Native of E Asia and introduced to Britain in 1892.

#### **Viburnum trilobum** Marshall - American Guelder-rose

The most frequently planted *Viburnum* on reconstructed road verges and embankments in recent decades, for example by the Cardigan bypass SN189468, 2003 (NMW), and by the A482 at Pont Sholop, Llanerchaeron SN477597, 2003 (NMW) where it is mixed with *V. opulus*. It is also planted in amenity areas, for example SSE of Llandysul church SN41974055, 2003 (NMW). A bush in scrub W of the river 100m S of Lovers' Bridge, Aberaeron SN45756242, 2003 (NMW) may be self-sown or derived from a throw-out. Native of North America and introduced to Britain in 1812.

#### **Viburnum lantana** L. - Wayfaring-tree - Gwifwrnwydden

Occasionally planted in amenity areas, for example at the Parc-y-llyn retail park, Llanbadarn Fawr SN594805, 2004, and also planted at Denmark Farm, Betws Bledrws SN5853, 1995, but nowhere native in the county.

**Viburnum tinus** L. - Laurustinus - Gwifwrnwydden y Gaeaf

Native of S Europe, grown in Britain since the 16<sup>th</sup> century, and widely planted in amenity areas in the county. It is well-naturalised by suckering in a copse by Primrose Hill, Llanbadarn Fawr SN60058102, 2005 (NMW), and there are relic bushes by the trunk road at the N end of Aberaeron SN462631, 1980-2005.

**Viburnum davidii** Franch. - (David's Viburnum)

Planted at the Parc-y-llyn retail site, Llanbadarn Fawr SN59498056, 2008 (JPP & AOC) and at other similar sites, as well as in the Penglais estate woodland, Aberystwyth SN595821, 2008. Native of China and introduced to Britain in 1904.

**Viburnum plicatum** Thunb. 'Mariesii'

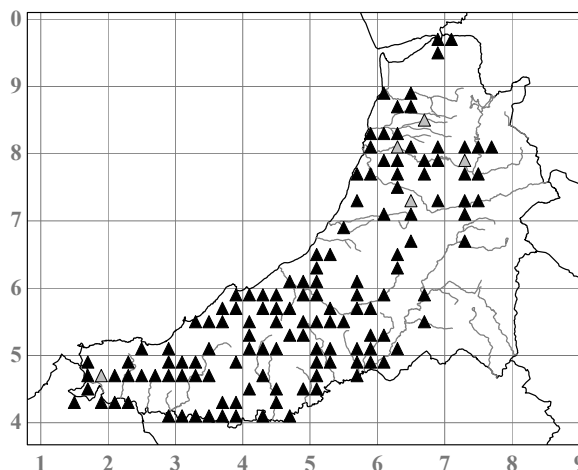
Occasionally planted in larger gardens and grounds, and there are several especially showy suckering clumps E of the mansion at Plas Gogerddan SN631837, 2007 (NMW). Native of China and Japan and introduced to Britain in the 1860s.

**Viburnum rhytidophyllum** Hemsl. - Wrinkled Viburnum

Naturalised by suckering in mixed estate woodland 350m SSW of Old Cilgwyn, Adpar SN31524147, 1998-2004 (NMW). It is planted on the University campus, Penglais, Aberystwyth SN59808165, 2008 (JPP & AOC). Native of China and introduced to Britain in 1900.

**Symphoricarpos albus** (L.) S. F. Blake var. **laevigatus** (Fernald) S. F. Blake (*S. racemosus* Michx.) - Snowberry - Llusen Eira

Native of W North America, and widely planted and naturalised in hedges, estate woodlands, copses, scrub and shrubberies. It often forms extensive thickets by suckering, but does not seem to be spread by seed. The earliest mention was of it in Cwm Woods c.SN6083 by Salter in 1891 (Diary 6.11.1891), and he later noted a thicket of it at Gogerddan c.SN68G (Diary 28.4.1897) and described it as "commonly established near cottages and on the site of former cottage-gardens" (1935). Altitude limit 300m, hedgebank by Penrhiw-gaer, Ystumtuen SN725790, 1985.

**Symphoricarpos** × **chenaultii** Rehder (*S. microphyllus* Kunth × *orbiculatus* Moench) - Hybrid Coralberry - Llusen Gwrel Groesryw

A hybrid of garden origin, often planted in amenity areas and occasionally naturalised from plantings or from throw-outs. It was first recorded naturalised on the bank of the Nant Adal in Llanilar SN623751 in 1992 (SPC) - 1997 (NMW), and has also been seen in a hedge at Glanyrafon nearby SN61977542, 1994; in a hedgebank at Salem chapel, Brongest SN32404500, 1997; in scrub at Ponterwyd SN75028120, 1999; in scrub 200m WNW of Aber-porth church SN254512, 2000; and in a roadside hedgebank 3km SE of Mydroilyn SN47525353, 2008. An apparently bird-sown bush in a hedge by the Cwm Rheidol reservoir SN695795, 2002 (SPC) was near an amenity planting of the hybrid below the dam here.

**Leycesteria formosa** Wall. - Himalayan Honeysuckle - Bachgen Llwm

Occasionally naturalised in estate woodlands where it was probably originally planted as Pheasant cover, for example at Ynys-hir SN69Y, 1998; Tan-y-bwlch SN5879, 2002-2007; Nanteos SN67E, J, 1976-2004; Trawsgoed SN67R, 1977-2004; and Derry Ormond SN55W, 1993. It is also naturalised in several places in scrub, on waste ground and on river banks, and even on a wall-top above Llanbadarn Fawr SN598815, 2006 (SPC), and is abundant on the cliff slopes above the sea at New Quay SN35Z, 1978-2004, where it must be



either bird-sown or derived from throw-outs. Native of the Himalaya and China, introduced to Britain in 1824.

**Weigela florida** (Bunge) A. DC. - Weigelia - Weigela

Several bushes growing as a relic or throw-outs in scrub above gardens in Lower Forest, Lampeter SN576492, 2007 (AOC & JPP), and like most British specimens probably in fact a hybrid. Native of E Asia.

**Lonicera pileata** Oliv. - Box-leaved Honeysuckle - Gwyddfid Llorweddol

Occasionally planted around supermarket car parks and amenity areas, but not yet seen naturalised. Native of China.

**Lonicera nitida** E. H. Wilson - Wilson's Honeysuckle - Gwyddfid Wilson

Established from throw-outs, suckering from planted bushes or hedges, and bird-sown very widely throughout the lowlands, often in remote sites, in woodland and scrub, hedgebanks, waste ground and streambanks and sometimes forming dense thickets. In a few places, as near Pont-Sian SN439467, 1992, it has been used as a hedge plant well away from gardens. Altitude limit 300m, established from throw-outs on a heathy roadside verge 2.5km S of Plwmp SN374502, 2008. Native of China.

**Lonicera xylosteum** L. - Fly Honeysuckle - Gwyddfid Syth

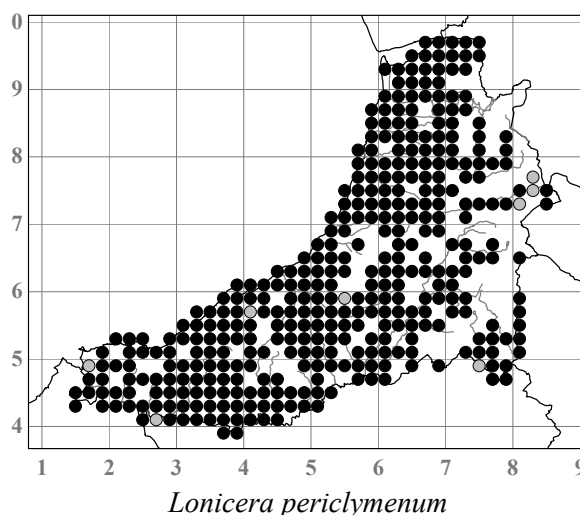
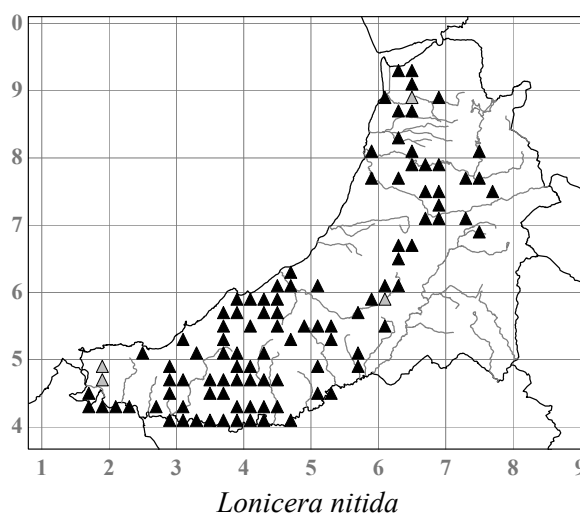
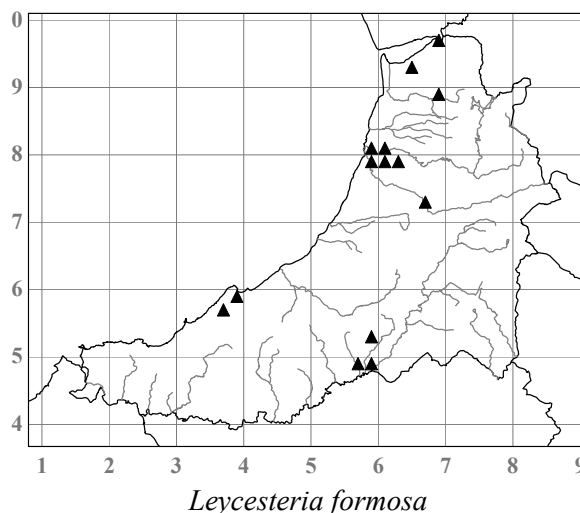
Recorded by Salter as naturalised in Oak woodland at Cwm Woods c.SN68B, 1898-1926 (Diary 3.6.1898, 17.5.1926), and at Hafod c.SN77L (1935). The only record since is of a single large bush in mixed estate deciduous woodland 50m NW of The Lodge, Nanteos SN61227864, 2008.

**Lonicera japonica** Thunb. - Japanese Honeysuckle - Gwyddfid Japan

Naturalised in a few places in scrub, woodland and hedgebanks: by the old allotments, Felin-y-mor Road, Aberystwyth SN581805, 1994-2005 (NMW); on the S bank of the Afon Peris 100m W of Llansantffraed church SN511674, 1997 (JPW & AOC) - 2004; in the wood between the roads just E of Silian SN573508, 1999; in scrub 200m WNW of Aber-porth church SN254512, 2000; and on a roadside hedgebank near Perthyronnen, Gorrig SN400434, 2002. Var. **repens** (Siebold) Rehder is planted in the roadside hedge 700m W of Cardigan old bridge SN170459, 2004 (NMW). Native of E Asia.

**Lonicera periclymenum** L. - Honeysuckle - Gwyddfid (Gwinwydd, Blodau'r Mêl, Llaeth y Gaseg, Sip Sip)

A common climber in hedges, woodlands, scrub and rocky places throughout the county. It grows in a range of woodlands from dry, acidic Sessile Oak woods to comparatively base-rich Ash woods and quite wet Alder carr. In the uplands it is very characteristic of rocky streambanks and cliff ledges where it is out of reach of Sheep, and occasionally



occurs in *Calluna* heath and on screes. The common plant is var. **periclymenum**, but there is great variation in hairiness of stems and leaves, leaf-lobing and in habit. Var. **hirsuta** (Rouy) P. D. Sell is quite widespread, for example in woodland at Devil's Bridge SN742771, 2001 (NMW) and in roadside hedgebanks at Llanilar SN624748, 2001 (NMW). Forma **quercina** (Weston) Rehder, with variously lobed leaves, is, whatever its genetic basis may be, more frequent in some areas, for example at Devil's Bridge SN7477, 1993-2007, than in others. On the coast Honeysuckle grows not only on the sea cliffs and screes, but also at the top of shingle beaches where scrub reaches the shore, and in these habitats at least some of the plants are prostrate with the stems having dense, rigid hairs that are both glandular and eglandular, but with glabrous leaves, for example at Cei Bach SN417601, 1995 (CGE, NMW), and thus do not properly match var. *hirsuta*. Altitude limit 410m ("reaches 1,350ft. in a few sheltered, rocky situations"), Salter (1935); 430m, Graig Ddu cliffs, Cwm Ystwyth SN810738, 1977.

[*Lonicera caprifolium* L. - Perfoliate Honeysuckle - Gwyddfid Trydwl]

Reported to Salter in 1905 (ETT, Diary 22.9.1905) as occurring in the Llangoedmor district c.SN14X-24C, but as he did not include it in his Flora he probably considered it an unreliable record.]

***Lonicera* × *italica*** Schmidt ex Tausch (*L. caprifolium* × *etrusca* Santi) - Garden Honeysuckle - Gwyddfid yr Ardd

Abundantly naturalised in scrub on the cliff slope 150m W of New Quay pier SN38896017, 1998-2004 (NMW). A hybrid of garden origin.

## VALERIANACEAE

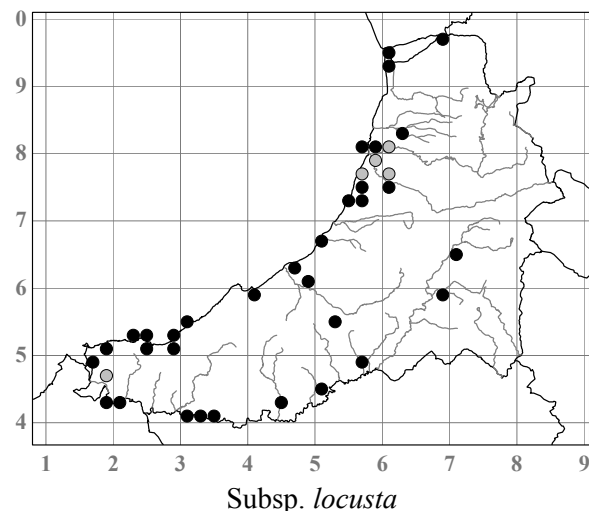
***Valerianella locusta* (L.) Laterr.** - Common Cornsalad - Gwylaeth yr Oen

Subsp. **locusta** (*V. olitoria* (L.) Pollich)

An occasional annual of roadside verges, pathsides, dry banks, walltops, pavements, waste and disturbed ground, gardens, graveyards and sandy places by the sea. Although the probable failure to distinguish *V. carinata* from it in the past may have confused the picture, it has perhaps decreased somewhat since Salter's day, at least as an arable weed, as he described it (1935) from "Wall-tops, dry banks; a common weed of cultivation". It sometimes grows close to *V. carinata*, and there seem to be no obvious differences in ecological preferences, but mixed populations have not been seen. Unlike *V. carinata*, it does occur in the SW of the county, and in the Aberystwyth area it has largely disappeared in recent decades (although it may sometimes have been misidentified there).

Subsp. **dunensis** (D. E. Allen) P. D. Sell

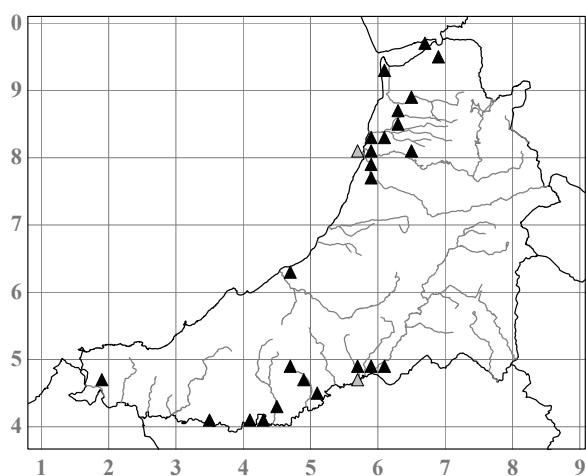
First noted by Salter in 1894 (Diary 16.5.1894), as a dwarf form of the species, on the sand dunes at Ynys-las SN69B, C, and still locally abundant there, 2007. It is also on sandy banks at Mwnt SN19705188, 1992 (NMW), and on the sandy verges of tracks and the road at the Penyrergyd dunes SN163486, 1995-2005. Salter (1935) recorded it from the foreshore at Wallog SN589857, but it has not been seen there since. Other compact plants, but not as extreme as those from the sand dunes, have been recorded from railway ballast at Glandyfi SN695970, 1995 (NMW), where they grow with normal caulescent subsp. *locusta*; from a car park off Mill Street, Aberystwyth SN584814, 2000 (SPC); and from waste ground on the MoD site, Aber-porth SN239523, 2005 (NMW).



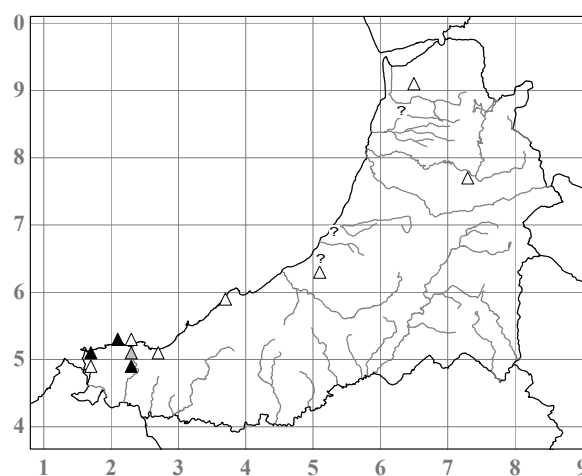
***Valerianella carinata* Loisel.** - Keeled-fruited Cornsalad - Gwylaeth-yr-oen Ffrwythau Rhychog

As in Britain in general, this archaeophyte seems to have increased greatly in the county in recent decades, but it is difficult to be certain to what extent this is because of earlier problems of identification. It was first recorded in 1961 as a garden weed at Ynys Edwin, Eglwys-fach SN678964 (PMB, *Nature in Wales* 7: 67 (1961)) and is still there, 2008 (PSC). In 1978 it was recorded in Lampeter churchyard SN575484, as well as

on a laneside nearby in Peterwell Fields SN575475 (JRP & CBa), and in 1970 it was found in flowerbeds on the Aberystwyth castle grounds SN579816 (AJS). It was not recorded again until 1991, since when it has been recorded as often as *V. locusta*, from roadsides, pavements, car parks, railway ballast, waste ground, flowerbeds and graveyards. It is commonest around Aberystwyth and Lampeter where the increase has been especially noticeable since 2000, and still seems very rare in the SW of the county.



*Valerianella carinata*



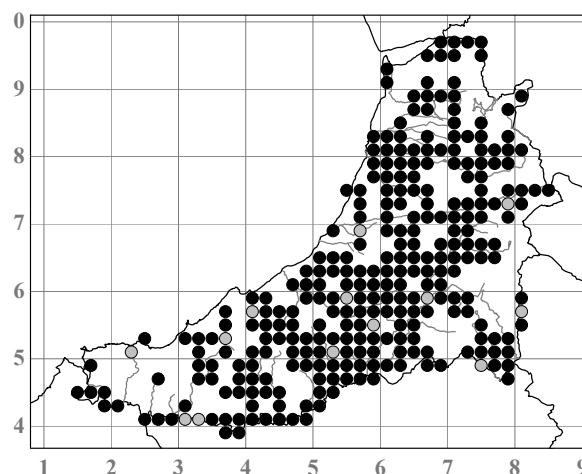
*Valerianella dentata*

### ***Valerianella dentata* (L.) Pollich - Narrow-fruited Cornsalad - Gwylaeth-yr-oen Meinffrwyth**

A rare and decreasing archaeophyte weed of arable fields, known from at least a dozen sites before 1950 but from only four since. The early records were widespread, from Taliesin SN6591 (Salter 1935) to an Oat field W of Devil's Bridge c.SN7376, 1928 (NMW, RMel, Salter 1935) in the N to Nantyferwig c.SN1648 (Salter in Wade 1952) in the SW. The recent records are from a reseeded Rye-grass field 500m S of Craig y Filain, Aber-porth SN237517, 1977 (NMW); from a Potato field 500m E of Mwnt church SN20015207, 1991 (NMW, AOC & DLK), where it was locally frequent; from the margin of a set-aside field 300m NNE of Clynyrynys, Gwbert SN16955095, 1991 (NMW), where it was again frequent; and at the margin of a Barley field just S of Penrhiw chapel, Felin-wynt SN22724988, 1992 (NMW). All plants seen recently and old records supported by specimens are of var. **dentata**, with glabrous fruits. Var. **mixta** Dufour was recorded from a field SW of Coybal SN368586 in 1928 (FD in Salter 1935).

### ***Valeriana officinalis* L. - Common Valerian - Llysiau Cadwgan**

Frequent throughout most of the county in marshes, fens, flushes and wet woodland, on damp rock ledges and streamsides. It also grows in dry, well-drained sites and occurs on both the main sand dune systems and on railway ballast, and is salt-tolerant enough to grow occasionally on shingle beaches by the sea, as at Penyrangor, Aberystwyth SN580808, 1987-1999, and in the estuarine Alder carr at Rosehill Marsh SN188454, 1985 (AOC & DGJ) - 2005. In the uplands it grows in flushes and in ravines wherever there is the slightest indication of base or mineral enrichment. All our plants appear to be stoloniferous, including those on the dunes, and would seem to be subsp. **sambucifolia** (J. C. Mikan ex Pohl) W. R. Hayw., but there is enormous variation in leaf-shape and other characters, and at least half our plants have the terminal segment of the middle cauline leaves narrower than the lateral ones; Salter (1935), who treated *V. officinalis* and *V. sambucifolia* as species, erroneously supposed the former (subsp. *officinalis* is not considered to occur in Britain) to be the commoner in the county. Altitude limit c.610m, above Llyn Llygad Rheidol, Pumlumon SN7987 (Salter 1935); 590m, ditto SN79708746, 2003 (NMW, AOC & SDSB).





**Valeriana dioica** L. - Marsh Valerian - Triaglog y Gors

Although widespread in Radnorshire and Carmarthenshire, *V. dioica* is very rare in West Wales and there have been only two reliable records for the county. In 1965 it was found in the gorge of the Nant Brienne near Dalar-wen SN790487 (IMV, DD), but soon afterwards the site was lost to the Llyn Brienne reservoir. In 1999 it was found in a valley mire at Hafod Fawr, Cross Inn SN54956366 (SLNS & MDS), and in 2002 there were five separate colonies here in an area 20 × 3-7m, among *Molinia* tussocks at the edge of a wetter area with *Menyanthes* and *Comarum palustre*.

**Valeriana pyrenaica** L. - Pyrenean Valerian - Triaglog y Pyreneau

Naturalised in a steeply sloping flush fen 400m E of Rhydowen SN45084620, 2008 (NMW); otherwise in Wales it is known only from one site in Caernarfonshire. Native of the Pyrenees and adjacent Cordillera Cantábrica.

**Valeriana phu** L. - Turkish Valerian

This garden ornamental, probably native of Turkey, has its only British sites as a naturalised plant in Cardiganshire. Salter knew it “well naturalised” on



*Valeriana pyrenaica* in flush E of Moelhedog, Rhydowen SN450462, June 2008



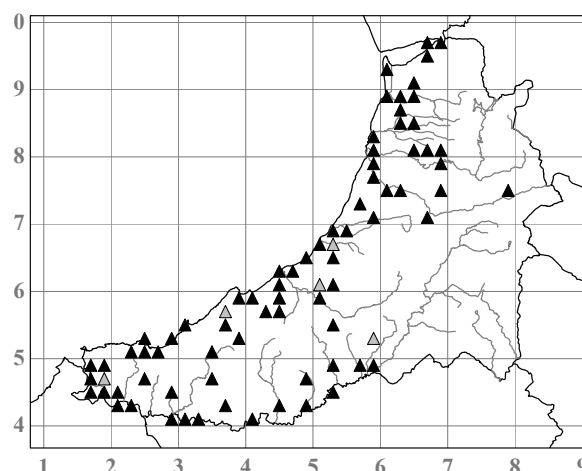
*Valeriana phu*, Neuadd-lwyd, view N from SN473595, May 2006



a laneside bank in Mydroilyn village SN4555 from 1907 until at least 1936 (Diary 9.5.1925, 25.4.1936, 1935), and it was last seen there *c.*1958 (EHC). There are, however, two other colonies on roadside banks 4km away. One is 12m long, on the NW hedgebank of the road 100m SW of the Neuadd-lwyd chapel SN47375953, 1997-2007 (NMW, LTR). The other, known locally since at least 1967, is 4m long, on the E bank of the B4339 by the lane junction at Bronial, Dihewyd SN49105660, 1997 (CGE, AOC & JPW) - 2007.

***Centranthus ruber* (L.) DC. - Red Valerian - Triaglog Goch**

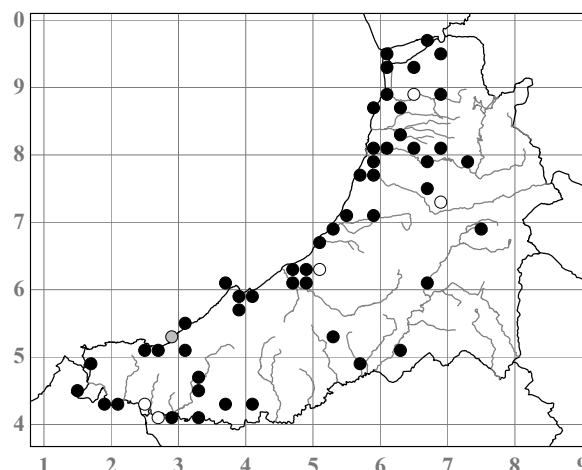
Commonly naturalised on walls, banks, graveyards, railways, cliffs and quarries, especially near the coast and in towns and villages in the lowlands, reaching its highest altitude in Gwenlli churchyard SN392535 at 210m, 1983-2005. Pink-flowered forms are the commonest, but red and white also occur, sometimes all in the same colony, and there is a conspicuous entirely white roadside colony at Castle Hill, Llanilar SN625746, 2000. The earliest record is from 1894 when Salter reported that at New Quay “the red valerian grows semi-wild as at Barmouth” (Diary 13.5.1894), and 40 years later he described it as “Frequently naturalised” (1935).



**DIPSACACEAE**

***Dipsacus fullonum* L. (*D. sylvestris* Huds.) - Wild Teasel - Cribau'r-pannwr Gwyllt**

Of occasional occurrence, often in some quantity, on waste ground, tips, roadside verges, disused railways, graveyards, farmyards and disturbed ground. It seems not to have changed much in frequency since Salter (1935) described it as “Not uncommon, but of uncertain occurrence,” and this is still the case. In a few places there are long-lasting colonies, as in open scrub on slumping clay at the top of the beach at Cei Bach SN406598-416599, where Salter recorded it “in thousands” in 1938 (Diary 2.7.1938) and where it still occurs annually, 1957-2007. Altitude limit 370m, colony of *c.*30 plants by rough track in heathy pasture 2km E of Ffair-rhos SN758680, 2008.



***Dipsacus sativus* (L.) Honck. - Fuller's Teasel - Cribau'r Pannwr**

Salter distinguished Fuller's Teasel (which he called *D. fullonum*) from the Common Teasel (which he called *D. sylvestris*), and recorded it as a rare casual at the Aberystwyth rubbish-tip SN591811 in 1928, 1929 and 1933. It was also reported to him from the Llandygwydd district *c.*SN2443 (ETT, Diary 22.9.1905). There were presumably once “Teasel gardens” associated with the many woollen mills in the county, but no trace of them remains. Teasels were used for both carding and napping (Jenkins 1969). Until the 1970s an electricity-



Teasel-gig from Maesllyn woollen mill, National Woollen Museum, Drefach Velindre, July 2006

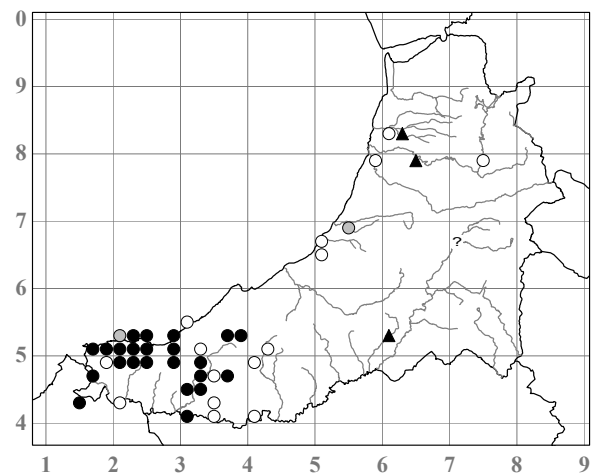
powered Teasel-gig with 3,000 Teasels, used for napping, could be seen at the Maesllyn woollen mill SN368448, although by this time what little Teasel was still used mostly came from Somerset or from abroad; this gig, complete with many of its Teasels, is now on display at the National Woollen Museum, Drefach Velindre, 2006. In the mid-20<sup>th</sup> century an elderly lady at New Quay had a Teasel garden, although for what purpose is unrecorded; and as recently as the 1980s Teasels were being grown at Bangor Teifi c.SN34Q for Edmund Taylor Teasels Ltd. of Yorkshire, the company providing the seed and buying back the Teasels (K. Rees pers. comm.).

***Knautia arvensis* (L.) Coult. (*Scabiosa arvensis* L.) - Field Scabious - Clafrllys y Maes**

A conspicuous but uncommon plant of dry banks, field margins, unimproved grassland, graveyards and the coastal slopes, chiefly in the more calcareous SW parts of the county. It seems intolerant of heavy grazing, but can withstand mowing. It can no longer be described as “common in the central and southern districts” (Salter 1935), and it is now absent rather than “scarce in the neighbourhood of Aberystwyth” and is still “Apparently absent from the north”. Salter’s inland and upland records include ones near Ysbyty Cynfyn SN77P, 1926 (Diary 14.8.1926) and near Ystrad Meurig c.SN76D, 1905 (Diary 5.8.1905). The most northerly recent record from a presumably native site was in the Capel Rhiwbwys graveyard, Llanrhystud SN546692, 1984 (AOC & DGJ), but recent outlying occurrences at Capel Bangor station SN648798, 1979 (ITE railway survey), and on a roadside at Llangybi SN605528, 1991, are probably introductions or from seed-mixes, as was one in the CCW “wild-flower meadow” at Plas Gogerddan SN627834, 1999 (SPC). Individual clumps can be long-lived, and one in a laneside hedgebank at Brongest SN312446 has been known for over 30 years, 1997 (ANGF).



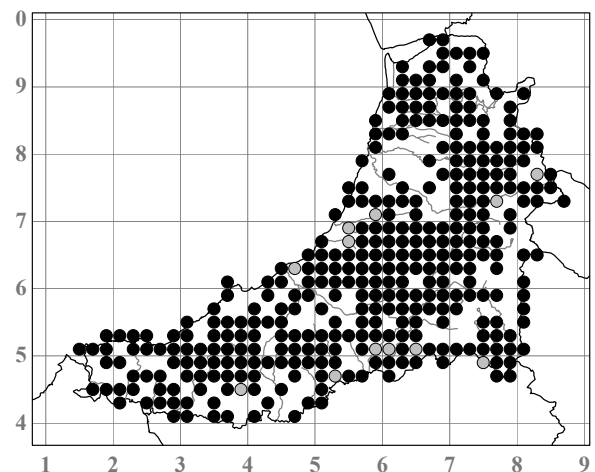
Teasel-gig from Maesllyn woollen mill, National Woollen Museum, Drefach Velindre, July 2006



***Succisa pratensis* Moench (*Scabiosa succisa* L.) - Devil's-bit Scabious - Tamaid y Cythraul**

A common plant of usually damp but not waterlogged pastures, marshes, wood margins and clearings, streamsides, wet heaths and mires both inland and on the coast, rock ledges, road verges and graveyards. In drier pastures it is most abundant where they are well-grazed or poached, and it is a major and characteristic feature of the rhos pastures in the county. It tolerates a wide pH range, and is commonest at middle altitudes. Because of its poor powers of dispersal it rarely colonises reseeded pastures. Willis & Burkill (1895) gave details of the numerous insect visitors they observed in the Pumlumon uplands. *Succisa* is the main food plant of the Marsh Fritillary, a butterfly with significant large populations in the county.

Most of our plants are var. **pratensis**. Early-flowering plants occur in hay meadows in a few places, for example by the Afon Aeron E of Hafod, Nantcwnlle SN577578, 1996 (NMW), and Salter (1937) recorded that “it never fails to begin flowering in some rough pastures and meads here by the 10<sup>th</sup> of June”; this is much earlier than *Succisa* usually flowers now in most sites, and all these early populations may have been close to var. *ovalis*







*Succisa* on roadside bank, Brynbala, view N from SN60098686, September 2007

(Rouy) P. D. Sell, and seem now mostly to have gone from the county. On the sea cliffs and in wet gullies on the coastal slopes, for example just W of Tresaith SN275515, 1994, large plants with rather fleshy leaves occur.

Var. **arenaria** (Rouy) P. D. Sell, dwarf, prostrate, and late-flowering, occurs in several exposed sites on maritime grassland and heath on the coastal slopes, often within the spray zone, for example in coastal heath at the N end of Allt Wen SN57707960, 2006 (NMW); in grazed turf by Carreg y Nodwydd SN299535, 1996 (CGE, NMW); in coastal heath 250m ENE of Mwnt church SN197521, 1994 (CGE, NMW); on a sandy grass slope above Traeth y Mwnt SN194518, 1996; and in heathy turf 800m N of the Cliff Hotel, Gwbert SN161509, 1994 (CGE, PDS & AOC). Altitude

limit 610m, above Llyn Llygad Rheidol, Pumlumon SN7987, Salter, 1903 (Diary 26.9.1903, 1935); 660m, N facing rocks 300m N of Pumlumon Fawr summit SN791872, 2002.

#### **Scabiosa columbaria** L. - Small Scabious - Clafrllys Bach

One plant was found on the Ynys-las dunes SN69B or C in 1972 (JPS) and persisted at least until 1976; it is perhaps best considered a casual.

### GRISELINIACEAE

#### **Griselinia littoralis** (Raoul) Raoul - New Zealand Broadleaf - Griselinia

Widely grown as a hedging plant in amenity areas and gardens along the coast because of its resistance to salt winds. This evergreen shrub, native of New Zealand and introduced to Britain c.1850, self-seeds well and there are full-grown spontaneous bushes on several parts of the University campus, Penglais, Aberystwyth SN598817 etc., 1994 (SPC) - 2005.

### ARALIACEAE

#### **Hedera colchica** (K. Koch) K. Koch - Persian Ivy - Iorwg Persia

Widely grown but seen naturalised only by Caerhedyn, Llyfnant SN709974, 1997-2006 (NMW), where it has spread from the garden into adjacent scrub and woodland. Native of the Caucasus.

#### **Hedera algeriensis** Hibberd (*H. canariensis* auct., non Willd.) - Algerian Ivy - Iorwg Algeria

Widely grown in gardens, often as '**Gloire de Marengo**' which has been seen naturalised along the roadside hedgebank from the garden of Lllys-y-graig, Cwmerfyn SN689831, 2006. Native of North Africa.

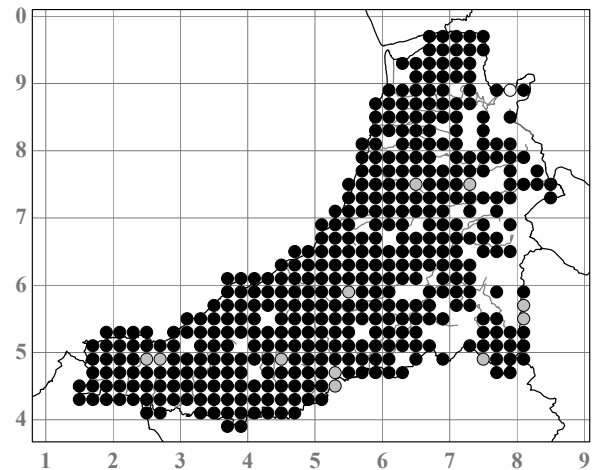
#### **Hedera hibernica** (G. Kirchn.) Bean (*H. helix* subsp. *hibernica* (G. Kirchn.) D. C. McClint.) - Atlantic Ivy - Iorwg yr Iwerydd

Common throughout the lowlands in almost every hedgebank and piece of woodland, on walls and cliffs, and often climbing even isolated trees. It is often dominant over large areas of the cliff slopes on the coast, and in secondary or recently modified woodlands. Chromosome counts of plants from wild sites at the following grid references made by HAMcA in 1979 showed all to be tetraploid with  $2n = c.96$ : SN738974, 670932, 586805, 585787, 625745 and 749732. No positive identification of *H. helix* has been made anywhere in the county either on morphological or cytological grounds. '**Hibernica**' is widely grown and naturalised in estate woodlands and near gardens, for example in Bryn-y-mor dingle, Aberystwyth SN585825, 1999. Plants with leaves exactly like '**Pedata**' ('Caenwoodiana') have been found in many places, for example at Parson's Bridge SN74897910, 1980 (NMW) - 2005, by the road bridge over the Afon Mydr NNE of Felin Rhiwbren SN476579, 1996 (NMW), and on an old wall in the Coedmore woods SN19404360, 1994 (NMW, SPC & AOC); they are more often found in estate woods, on walls etc., than in wild sites, and although this cultivar

is generally said to be of *H. helix*, these plants have appressed hairs and so appear to belong to *H. hibernica*. Other cultivars are undoubtedly naturalised but have not been investigated.

Meyrick (1810) records a Cardiganshire folk custom: "Ivy leaves are gathered, those pointed are called males, and those rounded females; these are thrown into the fire, and should they jump towards each, then the parties who had placed them in the fire, will be beloved by, and married to their sweet-hearts, but should they jump away from one another, then hatred will be the portion of the anxious person."

Huge, unmeasured trunks climb the front of Mabws Hall SN565685, 1998. Maximum 67cm girth, largest of three trunks, on Ash tree (which was 573cm girth) in the Peterwell ruins, Lampeter SN570477, 1993. Altitude limit 455m, Fainc Ddu c.SN780881, Salter (1935); 455m, Craig y Lluest c.SN801890, Salter (1935); 480m, ravine near the head of the Nant Merin SN797807, 1988.



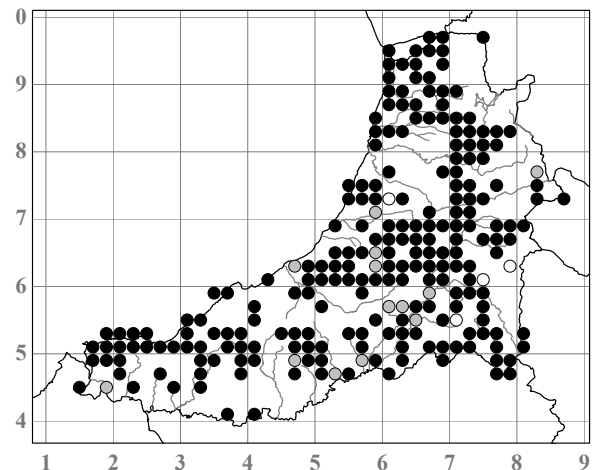
### **Fatsia japonica** (Thunb.) Decne. & Planch. - Fatsia - Ffatsia

There are self-sown and fruiting plants in scrub S of the stream, opposite the University Botany Gardens, Aberystwyth SN593819, 2000. Native of Japan, introduced to Britain in 1838.

## **HYDROCOTYLACEAE**

### **Hydrocotyle vulgaris** L. - Marsh Pennywort - Dail-ceiniog y Gors

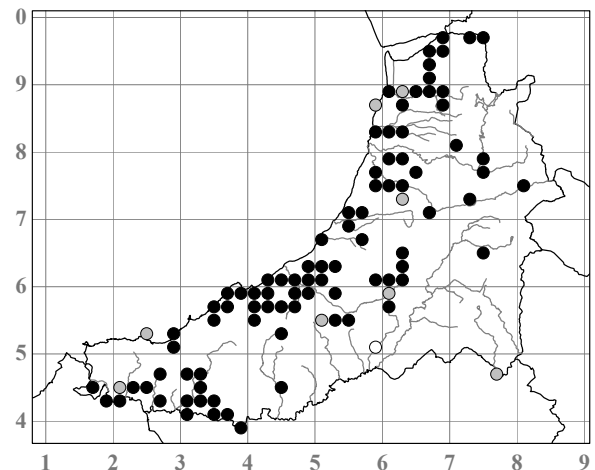
Frequent in fens, flushes, rush pastures, wet heaths, by streams and lakes, chiefly in unshaded and comparatively infertile sites. It is especially abundant in the Ynys-las dune slacks SN69B, C, 1956-2005, and in the sedge-rich pastures on the Aberleri Fields SN69A, 1993-2004. It is clearly salt-tolerant, occurring in brackish marshes, for example at Clarach SN588839, 1955-2003, and in clifftop grassland in the spray zone, for example at Llan-granog Head SN314551, 2003. Altitude limit 455m, Llyn Gorast SN792631 (Salter 1935); 460m, poor fen, Carn Fawr, 4km ESE of Tregaron SN704570, 1993.



## **APIACEAE**

### **Sanicula europaea** L. - Sanicle - Clust yr Arth

Frequent in the damper and slightly more base-rich woodlands, especially on clay soils of the till from the Irish Sea Ice Sheet in the Aberaeron-New Quay area and the lower Teifi valley. It is usually associated with Ash and often Hazel, and is sometimes in Alder carr. In a few of the upland valleys it occurs with Ash in damp ravines. In 2005 it appeared as a surprising accidental introduction on a FC track at Nantyrarian SN717817 (SPC) at 300m altitude. Altitude limit 335m, ravine of the Nant y Cau Isaf, Cwm Ystwyth SN819746, 1981-2004 (AOC & SDSB).

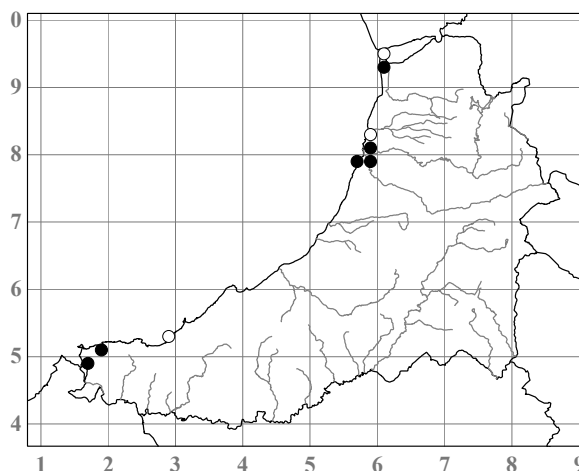


**Astrantia major** L. - Astrantia - Astrantia

Naturalised from a garden throw-out on a shaly slope below the FC road by the Nant Garw Mawr SN811820, 1996 (NMW) at 450m altitude. Native of Europe.

**Eryngium maritimum** L. - Sea-holly - Celynnen y Môr

Known from six sites in sandy places on the coast, but now probably extinct in at least three of these. On the “Sand Hills at Borth” it was first recorded by Purchas (1848) and Morgan (1849), and Salter (1935) described it as occurring “Between Borth and Ynys-las”; Wade (1952) gave a record for Twyni Bach SN6094 (JML & MRD) on the Ynys-las dunes, and since then it has been seen there regularly in a few places, usually further S (Savidge 1973), and most recently at SN605932, 1998 (RB). At Clarach SN5883 it was first recorded by Morgan (1849), and was regularly seen there by Salter; the last sighting was in 1958. At Aberystwyth it was first recorded by Lees (1837) who described it as “a regular denizen of the sea-side from Aberystwyth to Swansea”, and



*Eryngium maritimum*, Tan-y-bwlch beach, view SW from SN579799, July 2005

specifically from Tan-y-bwlch beach SN579799 by Salter in 1907 (Diary 21.3.1907); there is still a thriving population there in coarse sand on the seaward slope, 2008.

At Penbryn SN293524 it was recorded by Salter in 1894 (Diary 27.6.1894), but there are no later records. At Penyrergyd Salter recorded it in 1929 (Diary 20.9.1929), and it was last seen there as a few plants at the tip of the dunes SN161485 in the 1990s. In 2009 a single plant was found in the unusual habitat of a





*Eryngium maritimum* and *Crithmum* on cliff at Traeth y Mwnt, view E from SN193519, September 2009

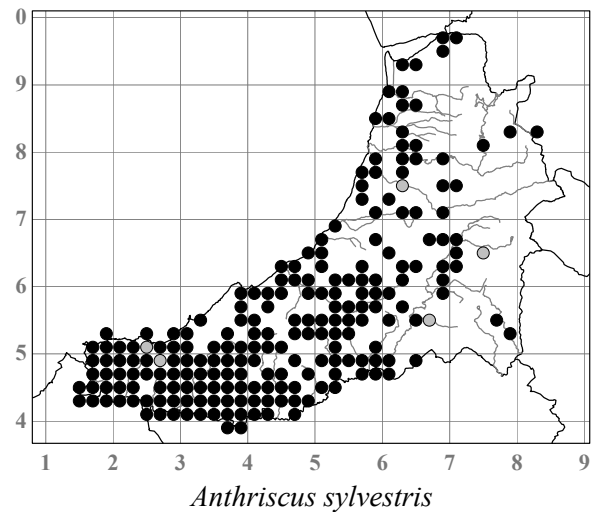
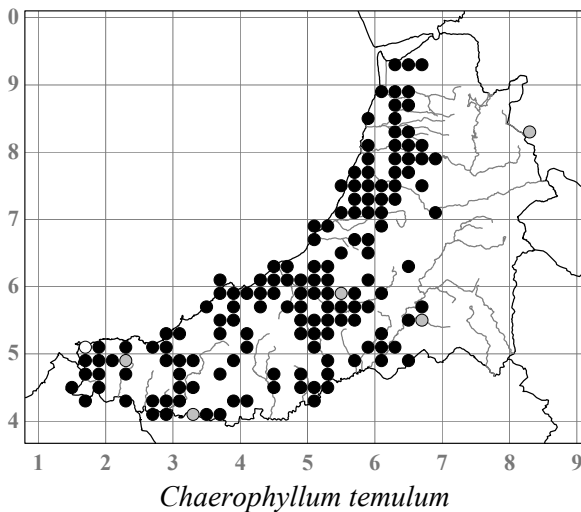


*Eryngium maritimum* and *Elytrigia juncea* rhizomes exposed by storms on Tan-y-bwlch beach, SN579798, January 2007

rock crevice on the cliff on the N side of Traeth y Mwnt SN193519 (CC). There seems no obvious reason for its decline except perhaps increased trampling and tourist pressure.

#### ***Chaerophyllum temulum* L. - Rough Chervil - Gorthyfail Garw**

Frequent on lowland hedgebanks and road verges, but rarely seen elsewhere except sometimes at wood margins and in scrub. It usually flowers in June, between the other two common white hedgebank umbellifers, *Anthriscus sylvestris* and *Torilis japonica*. The probably introduced var. *canescens* has not been seen. Altitude limit 350m, by FC road bridge, Cae Gaer SN823821, 1985.



#### ***Anthriscus sylvestris* (L.) Hoffm. - Cow Parsley - Gorthyfail**

Abundant on roadside verges and hedgebanks, also on waste ground, in graveyards, on river banks, streamsides in woodland, and at wood margins, but generally not common in semi-natural vegetation. It becomes sparse in the N of the county and is absent from the uplands and from coastal habitats. Although there is considerable variation in the shape of the leaf segments, in the opinion of P. D. Sell (pers. comm. 2003) all of a wide range of specimens sampled belonged to var. *sylvestris*, the more northern and western variant in Britain. Altitude limit 305m, roadside bank, Banc Bryn-chwith SN758810, 2000.

#### ***Anthriscus caucalis* M. Bieb. - Bur Chervil - Gorthyfail Gwrychog**

Although Marshall is credited with recording this species by Bennett (1905), Marshall himself (1900) does not list it. There is an unlocalised 1950s field record for SN46 at BRC. It is unlikely to have been a native in the county. In 2004 one plant was found in a flowerbed at Ysgol Penweddig, Aberystwyth SN59518107 (NMW), probably originating from topsoil brought from Sugar Beet residue lagoons near Kidderminster in 2001.

**Scandix pecten-veneris** L. - Shepherd's-needle - Nodwydd y Bugail

Included in the lists of Purchas (1848) and Morgan (1849), and said by Salter (1935) to occur "About waste ground or as a weed of cultivation; not at all common", but the only localised records of this archaeophyte were those made by Salter from "waste ground by cottage gardens" near Morfa Mawr SN5065 in 1894 (Salter Diary 12.5.1894), and by Whellan from a roadside bank at Pennar-uchaf, Aberporth SN244519 in 1941 (NMW). It has not been recorded in the county since.

**Myrrhis odorata** (L.) Scop. - Sweet Cicely - Creithig Bêr

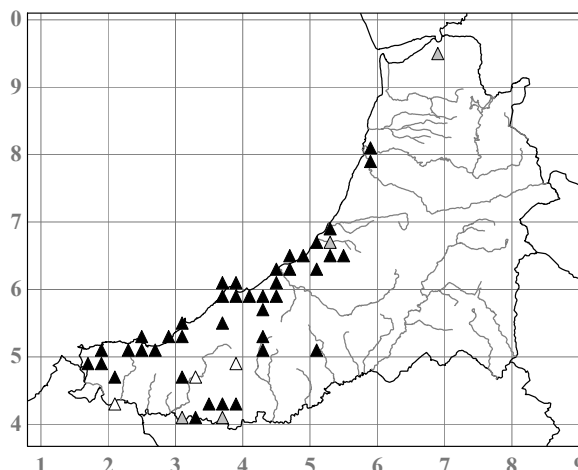
A cottage garden plant naturalised in a few places. It was first noted by J. E. Smith between 1795 and 1805 "Behind a farm house, about a mile West of Hafod" SN77L (Turner & Dillwyn 1805, Smith 1824). Salter recorded it in 1926 (Diary 12.5.1926) in Lledrod churchyard SN646702 where it still occurs, 2004. He also recorded it from near Tregaron SN65U in 1924 (Diary 11.6.1924); near Abermeurig c.SN55T (Diary 5.6.1934, 21.4.1936, 1935); and gave a record from between Aberaeron and New Quay SN45 or 46 (SCW, 1935), perhaps near Gilfachreda SN45E where it was seen in 1964 (APC, field record at BRC). It has more recently been seen at Llangwryfon, where it is scattered throughout the old churchyard SN597705, 1981-2004; in abundance on the roadside bank S of Bronbanadl, Lledrod SN641692, 1976-2004; spreading onto the surrounding banks from the Nant-llwyd garden SN783524, 1987 (AOC & DD) - 2004; on a roadside verge at Login SN208502, 1978, destroyed c.1985; on a laneside bank at Hendy-neuadd, Llanwnnen SN532481, 1981; and in an old orchard at Blaencwmcadifor SN435433, 1994. Altitude limit 365m, Nant-llwyd SN783524, 1987.

*Myrrhis odorata* in Llangwryfon  
old churchyard, view SE from  
SN597705, May 1981



**Smyrnium olusatrum** L. - Alexanders - Dulys

Frequent along the coast from Llanrhystud southwards, chiefly on roadside banks and verges, on pathsides and streamsides, in graveyards and farmyards, and on waste ground, usually near villages or houses. Although an archaeophyte that is believed to have been introduced by the Romans, in Cardiganshire it is absent from the areas of significant Roman occupation. The only records further N have been from Rhydyfelin SN57Z, where Salter recorded it in 1904 (Diary 14.11.1904) and 1932 (Diary 2.4.1932); on the disused rubbish-tip below Pendinas SN585799, in 2008; in scrub below Salter's garden at Llanbadarn Fawr SN598810 where he may perhaps have grown it, in 1991; and in a lay-by at Furnace SN684949 in 1981 (WMC). In the SW of the county it extends inland locally, and the furthest from the sea, 13km, that it has been recorded was on roadside banks NE of Penrhiw-llan SN376425, 1974-1995, and it is interesting that Salter (1935) also recorded it from Penrhiw-llan. It is often very abundant where it occurs, and Grigson (1960) noted approvingly the thickets of it in Penbryn churchyard SN293521.





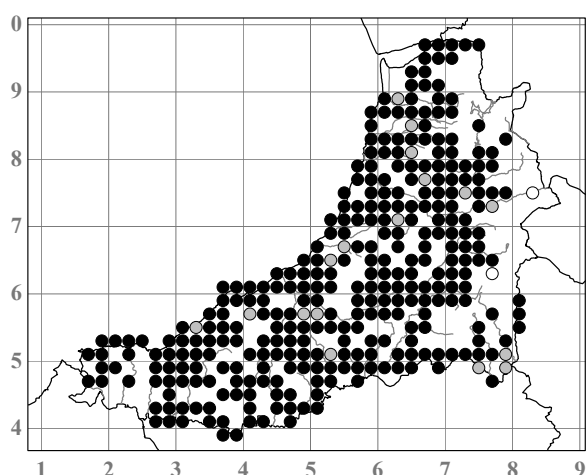
There is no indication that it is spreading in the county as it is nationally (Braithwaite *et al.* 2006), and its occasional northwards incursions have led to no significant colonisation. Altitude limit 220m, roadside hedgebank 400m NNW of Talgarreg bridge SN423515, 1999, 9km from the sea.

***Conopodium majus* (Gouan) Loret (*C. denudatum* Koch) - Pignut - Cneuen y Ddaear**

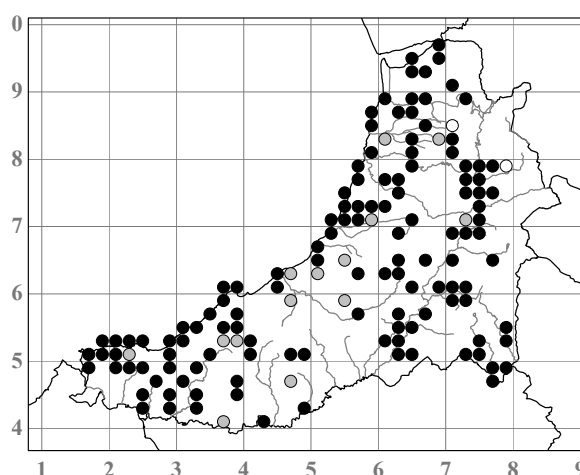
A common plant of pastures, Bracken slopes and open woodland, often associated with Bluebells, usually on fairly deep soils and extending well into the uplands. It can be very abundant under Bracken and elsewhere on the coastal slopes, where Badgers often dig up large areas of turf to get at the deeply buried tubers. Pastures in some of the valleys into the hills, as in Cwm Berwyn c.SN7059, 1985, and Cwm Breff c.SN6654, 1985, can be white with it in June. An untypical habitat is among *Molinia* tussocks on a flushed slope by the Nant Cwm-du SN80025547, 1996, at 350m altitude (AOC & JPW). Altitude limit 460m, Blaen-y-cwm c.SN8275 and “Graig-y-Llust, Cwm Ystwyth”, and Glasffrwd c.SN7663 (Salter 1935); 370m, river terrace by the Camddwr, 1.2km S of Nant-y-maen SN764571, 1988.



*Conopodium majus* excavated by Badgers, Pendinas SN583808, May 2009



*Conopodium majus*



*Pimpinella saxifraga* all records

***Pimpinella saxifraga* L. - Burnet-saxifrage - Gwreiddiriog**

An occasional species of dry, unimproved pastures, dry banks, grassy and rocky places and heaths on the coastal slopes, in graveyards and on railway ballast, usually on the more neutral soils and becoming rare in the uplands. There is great morphological variation, and the following account follows Sell & Murrell (2009) but must be considered provisional as it is based on rather few specimens. Altitude limit 370m, Nant Rhuddnant c.SN77Z (CGE, Burkill & Willis 1894, Salter 1935); 370m, Craig Clogan, Cwm Berwyn SN726582, 2003.

**Subsp. *alpestris* (Spreng.) Vollm.**

A specimen of *P. saxifraga* in CGE labelled “Ysptyty Cynfyn 27 Aug. 1893”, collected by Burkill & Willis, is subsp. *alpestris* (det. PDS, and the only British material he has seen, Sell & Murrell 2009). It still grows there, on unimproved grassy slopes at Ty-mawr SN760790, at 300m altitude, 2005 (NMW), and is a distinctive small, delicate, glabrous plant with ribbed stems and deeply dissected leaves. (Burkill & Willis (1894) in their account of the 1893 visit, confusingly listed *Silau silaus*, as *S. pratensis*, from Ysbyty Cynfyn, presumably in error for *P. saxifraga* subsp. *alpestris* which looks very similar but lacks bracts and bracteoles.)

**Subsp. *saxifraga* var. *dissecta* With.**

Probably the commonest variant in the county, widespread in grassland and heaths along the coastal slopes, for example N of Clarach SN588850, 2001 (NMW) and by the mouth of the Afon Soden, Llandysiliogogo SN36335820, 2004 (NMW), and in many places inland. Occasionally plants are found with a mixture of



basal leaves, some like those of this variety and some like those of var. *saxifraga*, for example on a roadside hedgbank 300m W of Berthdomled, 2km N of Bronnant SN63876979, 2001 (NMW).

Subsp. *saxifraga* var. *intercedens* Thell.

Seen only on the ballast verge of the disused railway across Cors Caron, 700m W of Dolbrychain SN705652, 2001 (NMW), and on a gravelly roadside verge 1.5km N of Argoed, Llangwryfon SN612725, 2003 (NMW) where it was growing with var. *saxifraga*.

Subsp. *saxifraga* var. *saxifraga*

Widespread along the coast, for example in a pasture on the clifftop 1km N of Penbryn SN297530, 2001 (NMW), and in a sandy pasture at Mwnt SN196520, 2002 (NMW), but probably less frequent inland and usually in less base-rich sites than var. *dissecta*.

Subsp. *saxifraga* var. *ovata* Spreng.

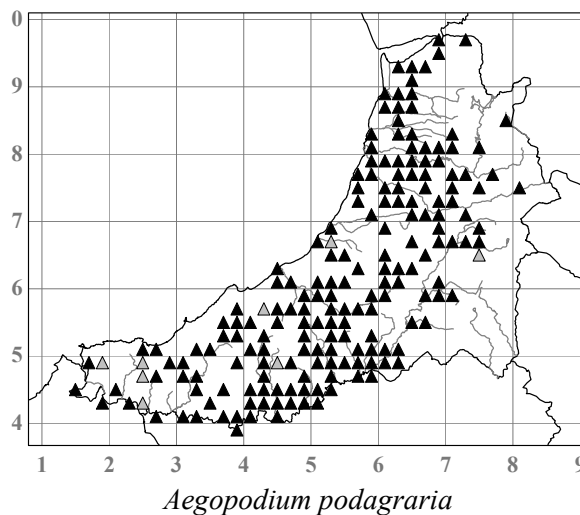
Collected by Salter from cliff slopes above the beach at Penbryn in 1930 (NMW, Salter 1935) and still present there at SN28855215, 1976 (NMW), and on the sandy roadside bank nearby just above the beach SN294523, 2002 (NMW) - 2008. The latter plant in particular is virtually indistinguishable from *P. major*, being glabrous, with hollow stems and large fruits, but was reluctantly confirmed as being a form of *P. saxifraga* by MJS; Salter (Diary 13.9.1928) himself wrote of these Penbryn plants "There was also plenty of an Umbellifer which struck me as being *Pimpinella magna* [*P. major*]. Its leaves were certainly those of that plant. If it turns out to be a form of *P. saxifraga*, there is no reliable point of distinction between the two species, a view which Bentham seems to suggest." This variety is otherwise known in Britain only from very scattered sites around the S and W coasts from Sussex to Sutherland.

***Aegopodium podagraria* L.** - Ground-elder - Llysiau'r Gymalwst

A common archaeophyte of verges, waste ground, gardens, graveyards and woodlands but always near houses and usually forming dense colonies. Altitude limit 415m, Eisteddfa Gurig SN798840, 2002.

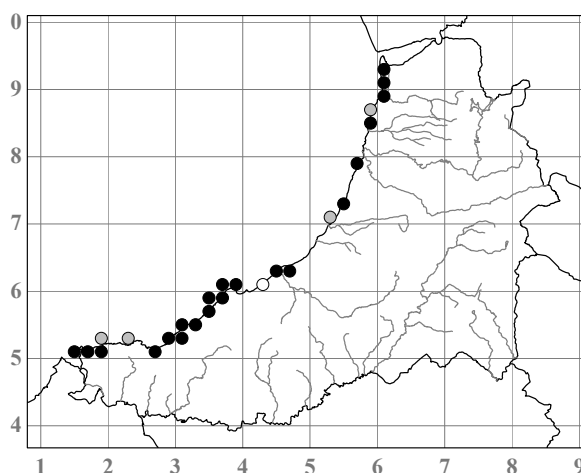
[*Sium latifolium* L. - Greater Water-parsnip - Panasen-y-dŵr Lydanddail

Recorded by Morgan (1849) from Clarach, presumably erroneously.]



***Crithmum maritimum* L.** - Rock Samphire - Corn-carw'r Môr

A local plant of the sea cliffs, but usually abundant where it does occur. Morgan (1848) says "About the cliffs, both to the north and the south of Aberystwyth, the *Crithmum*, or Samphire plant, is very abundant, and is commonly brought to market", yet Lees (1841) recorded it as occurring in the vicinity of Aberystwyth "very sparingly". Salter (Diary 30.9.1934) thought that at Wallog c.SN5985 in 1934 there was "much more than I recollect 10 years ago". Colonies have also been known from various places on the dunes at Ynys-las SN69B from 1958 (EHC) to 2005 (JPL), but usually have not persisted for very long. On shingle and stony beaches a number of colonies have developed apparently within the last decade or two: at Borth SN607890-607909, 1995-2007 (AOC; SPC), where one of the colonies grows out of the vertical side of the wooden sea wall; at the S end of Tan-y-bwlch beach SN578797, where six plants were seen in 2005 (CDPa) and where it must have been a very recent arrival; and NE of Aberaeron SN467635, where several colonies were first noticed in 1993 and by 2003 had merged and increased to cover an area 90 × 28m. *Crithmum* also grew on an old earthy wall at Clarach SN58718402 in the 1950s and still grows just N of Wallog SN591859, 1995-2007. The name Carreg Wallog,



*Crithmum* on Carreg Gwalltog,  
New Quay, view N from  
SN385605, September 2006

going back to 1800, for a rock off New Quay Head SN386605 described in 1895 (Anon. 1895) as “a perpendicular mass of rock rising to the height of nearly eighty feet” where “daring youths continually display their climbing capabilities by mounting to the top where the green patch, with the samphire herb, proves the sea dare not touch”, presumably refers to this hair-like growth of *Crithmum*, and it is still abundant there, 2006.



*Crithmum* on beach E of Aberaeron,  
view E from SN467635, October 2006



*Crithmum* on sea wall, Borth, view E  
from SN60799042, September 2007

[*Oenanthe fistulosa* L. - Tubular Water-dropwort - Cegiden Bibellaidd

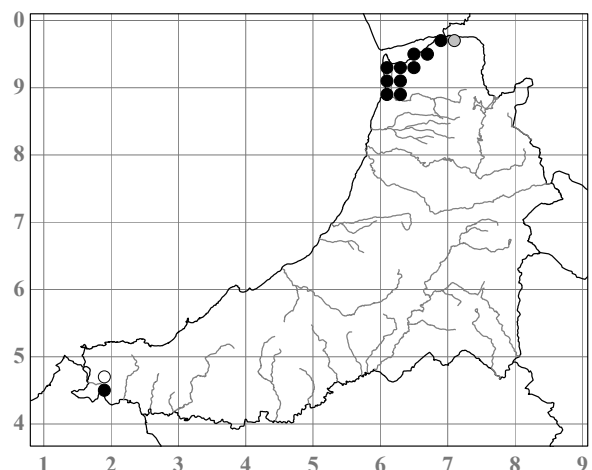
Recorded, presumably erroneously, by Morgan (1849) from Tan-y-castell SN587788.]

[*Oenanthe silaifolia* M. Bieb. - Narrow-leaved Water-dropwort - Cegiden Feinddail

A record of this, as *O. peucedanifolia*, from “Borth Marsh” by Lees (1841) was presumably a misidentification of *O. lachenalii*.]

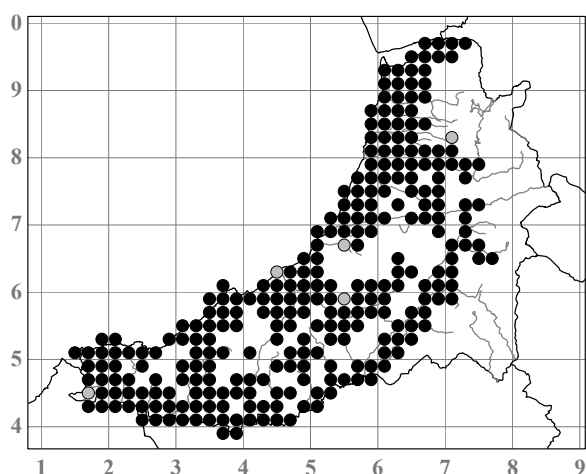
***Oenanthe lachenalii*** C. C. Gmel. - Parsley Water-dropwort - Cegiden Dail Persli

Widespread, but rarely abundant, in the upper parts of salt marshes and in other brackish marshes along the Dyfi and Teifi estuaries, where it is usually associated with *Juncus maritimus* or *Bolboschoenus maritimus*. In the Dyfi area it extends as far from the estuary as the area of brackish incursion at the S tip of Cors Fochno SN619899, 2000, and by the Afon Ddu 700m NNE of Lodge Park SN668941, 1986 (APF). On the Teifi it extends up to Rosehill Marsh SN189455, 1974 (TAWD) - 1993.



***Oenanthe crocata* L. - Hemlock Water-dropwort - Cegiden y Dŵr**

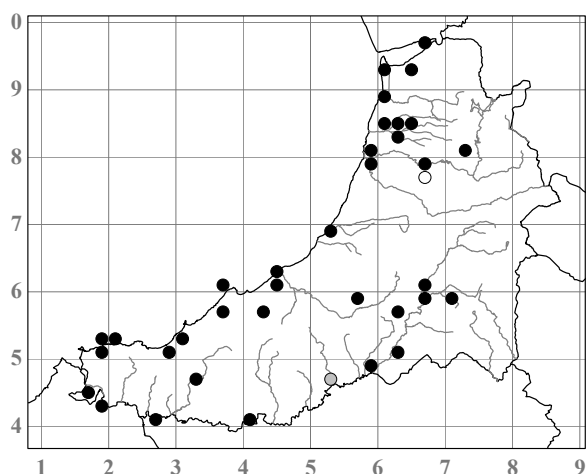
A common plant of streamsides, ditches and marshes in the lowlands, often forming extensive colonies on river banks and in *Salix* and *Alnus* carr. It responds vigorously to eutrophication, and although very poisonous it is often abundant in old farm ponds and in ditches in intensively farmed areas. It is salt-tolerant, and occurs in abundance at the top of salt marshes, along the lower reaches of streams as they reach the shingle beaches, by streams on the sea cliffs, and dwarfed plants often grow on the walls of quays in the harbours.



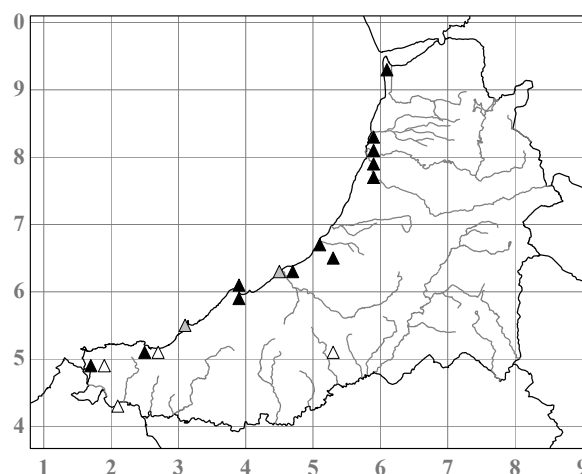
*Oenanthe crocata* tubers exposed by floods, with John Poland, Cwm Cilfforch SN438617, January 2008

***Aethusa cynapium* L. subsp. *cynapium* - Fool's Parsley - Geuberllys**

An occasional weed of cultivated, disturbed and waste ground, tips, gardens and farmyards in the lowlands. It is presumably much decreased since Salter's time as he described it as "very common".



*Aethusa cynapium*



*Foeniculum vulgare*

***Foeniculum vulgare* Mill. subsp. *sativum* (C. Presl) Bertol. - Fennel - Ffenigl**

An archaeophyte, first recorded in 1894 by Salter on the cliff slope at New Quay (Diary 26.6.1894), Fennel is still abundant there SN390600, 1994, and it is still in most of the other sites where he recorded it a century ago. It has been found in a very few other sites, near villages and on waste ground along the coast, and does not seem to have spread significantly. It is especially abundant on the old rubbish-tip and allotment site at Aberystwyth SN589810, 1982-2007, where half the plants are '**Purpurascens**'. Salter (1935) recorded Fennel inland at Cribyn c.SN5251 and Verwig SN1849, and more recently the only inland records are from



the disused railway at Llanfarian SN591778, 1992, and from scrub N of the Afon Cledan near Nebo SN53886596, 1993, at both of which it derived from throw-outs.

**Anethum graveolens** L. - Dill - Llysiau'r Gwewyr

A plant of this casual from Asia, probably derived from bird-seed, was found in Union Street, Aberystwyth SN584816 in 2003 (SPC).

[*Silaum silaus* (L.) Schinz & Thell. - Pepper-saxifrage - Ffenigl yr Hwch

Erroneously recorded from Ysbyty Cynfyn SN77P by Burkill & Willis (1894), a specimen of the rather similar *Pimpinella saxifraga* subsp. *alpestris* having been collected by them there (CGE, det. PDS).]

[*Meum athamanticum* Jacq. - Spignel - Ffenigl Eleri Luyddog

Recorded, presumably erroneously, from Garreg SN696971 by Morgan (1863).]

**Conium maculatum** L. - Hemlock - Cegiden (Cegirn)

A local archaeophyte of roadsides, waste ground, farmyards, graveyards, disturbed ground and building sites, around manure heaps and tips, confined to the lowlands and especially frequent near the coast. It seems to have spread considerably since about 1990, as opposed to the situation in Radnorshire, where it is thought to have decreased (Woods 1993a and pers. comm.). Salter (1935, and in Wade 1952) gave 14 sites for it.

**Bupleurum rotundifolium** L. - Thorow-wax - Paladr Trwyddo Deilgrwn

Recorded as a casual at Crugiaiu SN591794 in 1906, by Salter. Native of Europe.

**Bupleurum subovatum** Link ex Spreng. (*B. intermedium* (d'Urv.) Steud.) - False Thorow-wax - Ffug Baladr-trwyddo-deilgrwn

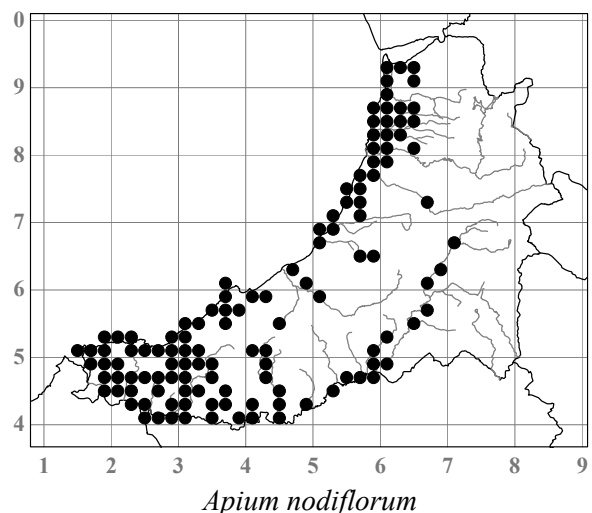
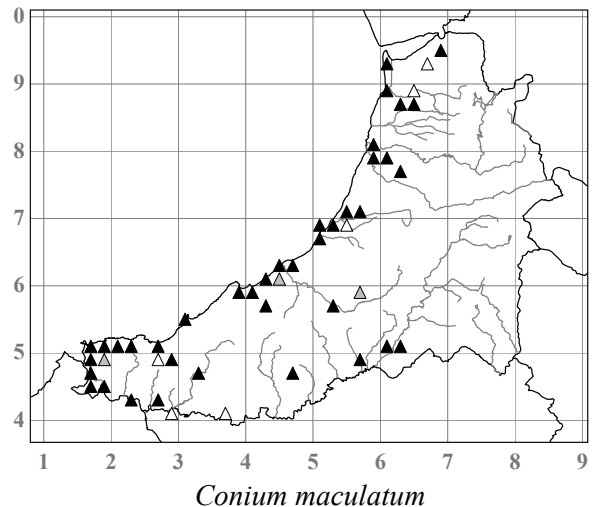
Casual from bird-seed in a garden in Clarach Road, Borth SN607885, 1973 (ABS, ADQA, conf. AOC). Native of the Mediterranean.

**Apium graveolens** L. - Wild Celery - Seleri Gwillt

Var. **graveolens** is known only from salt marsh and adjacent waste ground along the N side of the Teifi estuary from Bryn-y-mor SN162486, 1975 (AP) to 300m E of Cardigan church SN183460, 2008; it was known there by Salter from 1894 (Diary 28.6.1894). A record of Morgan's from Clarach (1849) must be considered unreliable. A specimen from an unknown collector from Aberystwyth, 1892 (SHYB) appears to be the wild plant, but there is no other record from there. Salter (Diary 31.7.1905) recorded what was presumably var. **dulce** (Mill.) DC. (Celery - Seleri) as a garden escape at Llan-non SN56, and saw it at Aberaeron harbour SN4562 (Diary 16.5.1907, but not given in his Flora).

**Apium nodiflorum** (L.) Lag. - Fool's-water-cress - Dyfrforonen Swp-flodeuog

Very common in ditches, streams, riversides, pools, springs and in the wetter marshes in the coastal zone, in the SW of the county and up the main river valleys. The highest it occurs is at 160m altitude, in



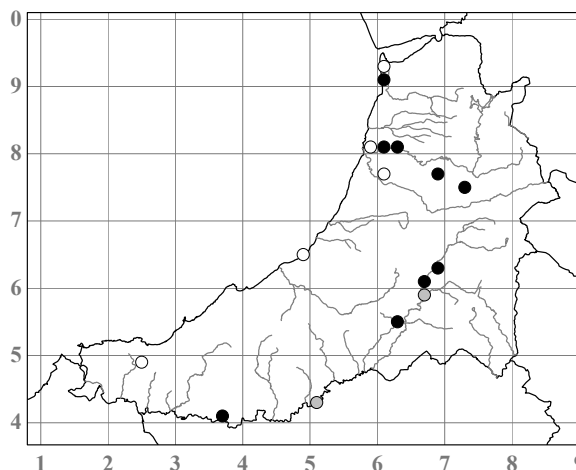
the Teifi near Tregaron SN669601, 1979. It occurs in all but the more acidic waters, and thrives with eutrophication. It is also salt-tolerant and often occurs where streams flow out onto sea beaches.

[*Apium repens* (Jacq.) Lag. - Creeping Marshwort - Dyfrforonen Ymlusgol

Recorded, as *Helosciadium repens*, from the “Ystwith, near Glanyrafon” by Morgan (1849), presumably in error.]

***Apium inundatum* (L.) Rchb. f. - Lesser Marshwort - Dyfrforonen Fach**

An uncommon aquatic, but especially abundant in the gravelly shallows of the Afon Teifi from Cors Caron SN683627 down to opposite Tregaron SN669601, 1979 (NMW) - 1994. It also occurs in the Nant Bryn-maen SN639557, 1996, in backwaters and ox-bows of the Afon Rheidol SN606800, 1992, and SN626808, 1990 (ISF), and is abundant in places in peaty hollows in the Aberleri Fields c.SN614916, 1994 (JPL, ACW & AOC) - 2004. It also occurs in abundance in two artificial but old hilltop ponds, at Banc Blaenmagwr SN693768, 285m altitude, 1962-1990 (ISF), and Penralltfachnog SN371408, 135m altitude, 1994, and in small quantity in the lead mine reservoir 300m SE of Llantrisant church SN728746, 265m altitude, 2005, to which it must have been dispersed by birds. Salter recorded it from three other pools, at Llanbadarn Fawr SN596805 (1935), Banc Tyllwyd SN601774 (1935), and Pwll y Brawd SN491641 (Wade 1952), from all of which it has now disappeared.



***Petroselinum crispum* (Mill.) A. W. Hill (*Carum petroselinum* (L.) Benth.) - Garden Parsley - Persli**

Salter collected subsp. **foliosum** (Alef.) Janch., the flat-leaved Parsley, “long naturalised as an escape” at Llanddewi Aber-arth SN476632 in 1925 (NMW), having first found it there by the church in 1907 (Diary 13.4.1907) when he called it “The Wild Parsley of Clarach”. In his Flora (1935) he described it as “in great quantity” here at Aber-arth, and gave the Clarach locality as “in sand above the beach, by the cottages” c.SN588837, where it was seen again in 1955 (JEL). In 1904 (Diary 16.7.1904) he had recorded it from the roadside just N of Llan-non c.SN5167, describing it as “the parsley-like Umbellifer of Clarach”. At all three of his sites it must therefore have been subsp. *foliosum*. So too was a record of it as a casual in Llanfarian village SN589777 in 1993 (SPC). Subsp. **crispum** was recorded as a casual in a flowerbed by Aberystwyth station SN58508152 in 2006-2008. The species is considered an archaeophyte.

***Petroselinum segetum* (L.) W. D. J. Koch (*Carum segetum* (L.) Benth. & Hook. f.) - Corn Parsley - Perllys yr Yd**

Although there are three differently described sites, all seem to refer to the same locality in SN25F: “Hedge near Blaenannerch, 1941”, Whellan (1942); “Near Aberporth (*J. A. Whellan*, 1941)” and “between Rhos y Gadair and Mwnt farm, in some plenty (*J. A. Whellan*’s locality)” (Salter in Wade 1952), this last entry perhaps implying that Salter himself had seen it here. The only other record is of it as a casual in 1904 when Salter (Diary 19.9.1904) wrote that a specimen of it from the rubbish-tip, presumably at Aberystwyth SN591811, had been named for him by W. H. Painter.

[*Sison amomum* L. - Stone Parsley - Perllys y Cerrig

A 1956 record at BRC from near New Quay SN45 was erroneous.]

[*Cicuta virosa* L. - Cowbane - Buladd

Erroneously listed by Morgan (1849); he gives it the English name Water Hemlock, and was presumably referring to *Oenanthe crocata* which he does not list.]

**Ammi majus** L. - Bullwort - Esgoblys

One plant of this casual from S Europe, probably deriving from bird-seed, appeared in a garden at Pontrhydfendigaid SN73156631 in 2004 (NMW).

**Carum carvi** L. - Caraway - Carwy

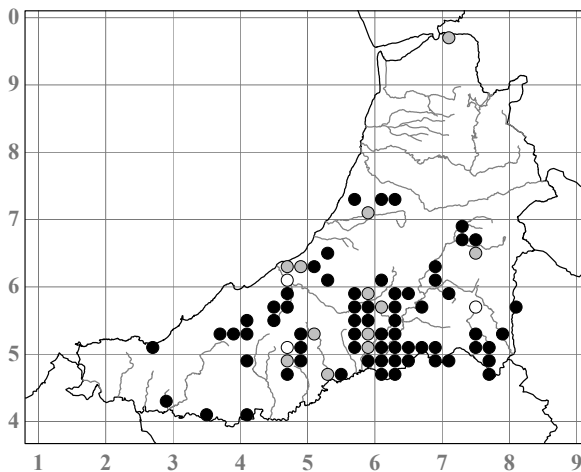
An archaeophyte recorded only by Salter, as a rare casual with only one record, at the Aberystwyth gasworks allotments SN595809 in 1927. Native of Europe.

**Carum verticillatum** (L.) W. D. J. Koch - Whorled Caraway - Carwy Droellenog

A local species, but usually abundant where it occurs, and one of the most characteristic plants of the rhos pastures. It flourishes especially in damp, well-poached, Horse-grazed pastures, which can sometimes be entirely white with it in early July, but it also occurs in a wide range of habitats from wet fens dominated by *Juncus acutiflorus* to wet heath and upland flushes. It is one of the first plants to re-colonise disturbed ground in the rhos pastures. The only record from N of the Ystwyth valley is from a pasture 400m E of Allt-ddu in the Llyfnant SN718973, 1986 (APF), perhaps the same place whence "JL" brought a specimen to Salter in 1925 (Diary 15.7.1925). It is generally absent from the SW, and from the coastal zone except for a marshy pasture near Tresaith SN276508, 1996 (MDS). Altitude limit 435m, Llyn Berwyn c. SN7457 (Salter 1935); 325m, Cwm Twrch SN677501, 1996.



*Carum verticillatum* near Clwt-y-patrwm, view SE from SN620522, July 1986

**Angelica sylvestris** L. - Wild Angelica - Llysiau'r Angel

Common in all but the more acidic mires and damp places, especially in valley mires, streamsides, Alder carr and other wet places in woods, flushes, upland



*Carum verticillatum* in Horse pasture, Rhydcathal, view NW from SN463472, July 1979



and coastal ravines and wet cliff ledges. Populations of dwarf plants 30-100cm tall occur on exposed coastal slopes, for example by Carreg y Nodwydd SN299535, 1996 (CGE) but are not var. *villosa* (Lag.) Lange. Several plants completely lacking anthocyanin were seen in rhos pasture at Bwlchyrhandir SN59327339, 2008 (SPC). Altitude limit 365m, Blaendoethie c.SN741539, pre-1935 (Salter 1935); 360m, marsh in conifer plantation, Lle'r-neuaddau, Pumlumon SN75908497, 2005 (AOC & PAS).

**Levisticum officinale** W. D. J. Koch - Lovage - Llwfach

Only recorded by Salter at Llanrhystud SN539696

“in the lane near the church”, as an “escape from cultivation, known here for 40 years” (Diary 23.11.1929, 1935). Native of SW Asia.

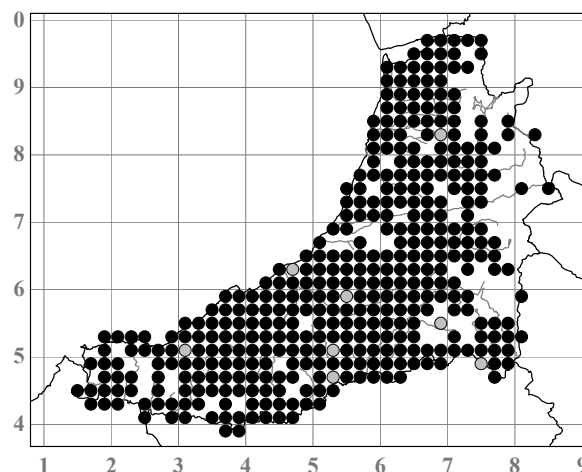
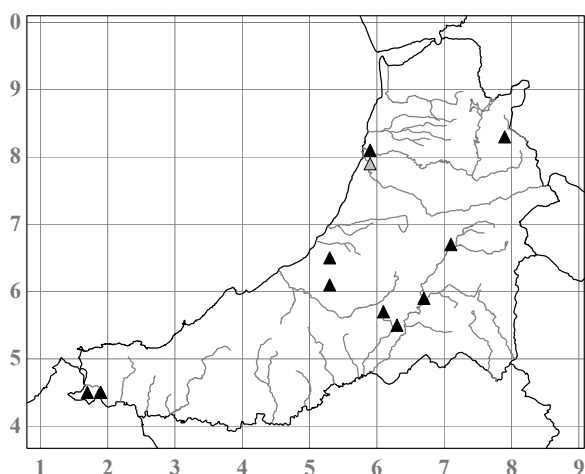
**Imperatoria ostruthium** L. (*Peucedanum ostruthium* (L.) W. D. J. Koch) - Masterwort - Ffenigl-y-moch Gwridog

This archaeophyte was recorded as a garden escape on the roadside bank by Dihewyd church SN484562 by Salter, who saw it there from 1925 to 1941 (Diary 9.5.1925, 31.5.1941). Native of C & S Europe.

**Pastinaca sativa** L.

Subsp. **sativa** - Parsnip - Panasen

Naturalised in only one site, a large and persistent colony on the disused railway embankment 300m S of Ystrad Meurig church SN703673, 1972 (NMW) - 2005. Parsnips have been commercially cultivated only on a very small scale in the county, for example c.0.5ha in the Aberystwyth area in 1931-1932 (Smith 1935), and 0.2ha in the whole county in 1988 (Anon. 1988). Salter (1935) knew the species only “as a casual or garden outcast”, and these occurrences were probably of this cultivated subspecies, as were the few more recent records of it as a casual, including on the Ystwyth bank at Tan-y-bwlch SN583798, 1977 (MC, conf. TGT); on disturbed ground on the old allotment (formerly rubbish-tip) site by the railway at Aberystwyth SN589810, 1990, and nearby on a disturbed slope SN584812, 2004 (SPC); and on a reconstructed road verge by the old railway at Pont Trecefel, Tregaron SN673591, 1998. Altitude limit (casual) 360m, road verge, Cwmergyr SN793829, 1987.



*Angelica sylvestris*



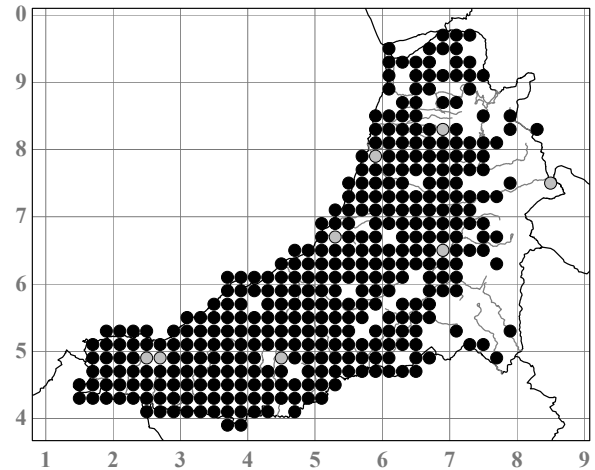
*Pastinaca sativa* subsp. *sativa* and  
E. H. Chater on disused railway, Ystrad  
Meurig SN703673, August 1972

Subsp. **sylvestris** (Mill.) Rouy & E. G. Camus - Wild Parsnip - Panasen Wylt

This subspecies, native elsewhere in Britain, is persistent and often abundant around the old railway station site and cattle market at Cardigan c.SN179457, 1987 (CDP) - 2008 (NMW).

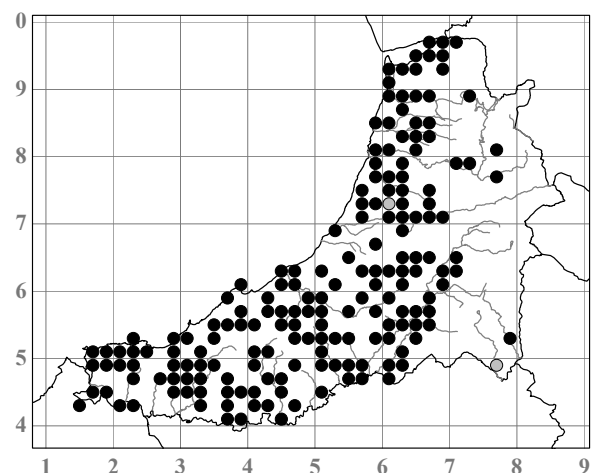
**Heracleum sphondylium** L. subsp. **sphondylium** - Hogweed - Efwr

Common throughout the lowlands on hedgebanks and verges, in rough pastures, in the more fertile damp woodlands, on streambanks, and in rough grassland and scrub on the coastal slopes. Plants in exposed coastal grassland are often dwarf, but this seems not to be genetically determined (RKB pers. comm.). There is great variation, especially in leaf-dissection, and the extreme forma **angustisectum** Gremli, with very narrow leaf-segments, occasionally occurs, sometimes as single plants strikingly distinct from neighbouring more typical plants; it was given, as var. *angustifolium* Huds., for three sites by Salter (Wade 1952). Salter (1935) says of the species "In the mountains usually in moist, sheltered gulleys", but I have not seen it in such situations. Altitude limit 415m, roadside bank, Eisteddfa Gurig SN798840, 2002.

**Heracleum grossheimii** (Manden) Grossh. - (Grossheim's Hogweed)

*Heracleum grossheimii*, Ynys Edwin,  
Eglwys Fach SN678962, July 2005

This member of the *H. mantegazzianum* group, native of SW Asia, was introduced to Ynys Edwin farmyard, Eglwys-fach SN678962 in c.1970 by PSC from the nearby Ynys-hir gardens and has since become well-naturalised, with several plants allowed to flower and fruit each year in the yard and on adjacent waste ground, 2000 (NMW, AOC & PSC, det. PDS) - 2008; a single plant appeared on a road verge in the village nearby at SN68609558 in 1992. It was probably this same species that was introduced and became naturalised in Alltfadog farmyard, Capel Dewi SN660820 in the 1980s and 1990s, but was later eradicated. The only other reliable record of the group, again probably this species, was of a young plant on waste ground by the Afon Brenig at Doldre, Tregaron SN67805940 in 1998.



*Torilis japonica*

**Torilis japonica** (Houtt.) DC. (*Caucalis anthriscus* (L.) Huds.) - Upright Hedge-parsley - Troed-y-cyw Talsyth (Blodau Crach, Persli'r Ddaear, Persli'r Gwrych)

A frequent plant of a great variety of dry, comparatively open habitats throughout the lowlands, especially in hedgebanks and wood margins where it can thrive in quite tall vegetation. It rarely grows close to the sea. Altitude limit 385m, turning area on FC road 1km E of Soar y Mynydd SN794530, 2003.

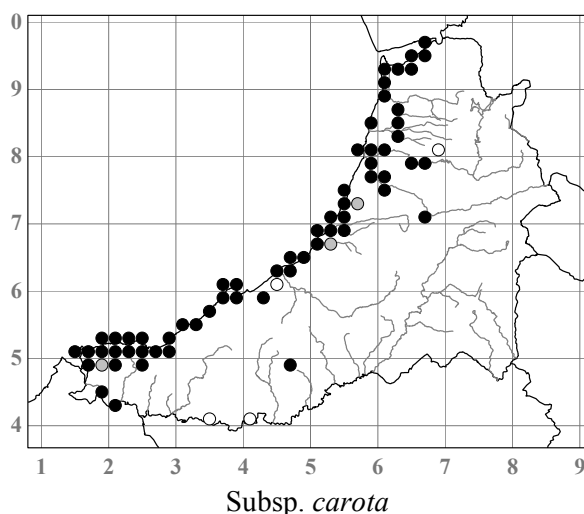
**Torilis nodosa** (L.) Gaertn. (*Caucalis nodosa* (L.) Scop.) - Knotted Hedge-parsley - Troed-y-cyw Clymog

A rare plant of dry, disturbed ground along the coast, extant at only two sites where it appears to be the low-growing predominantly coastal var. **nana** Bréb. Morgan (1849) recorded *T. nodosa* without locality. Salter (1935) recorded it “Commonly near the disused corn-mill and old lime-kiln, Morfa, Llannon [SN508667 and 505665]; appears, in Cardiganshire, to be almost confined to this locality”; he saw it again here in 1904 and 1905 (Diary 16.7.1904, 31.7.1905), but failed to find it in 1931 (Diary 6.10.1931) and reported it as gone in 1936 (Diary 29.9.1936). He may have considered an earlier record from Wallog c.SN590857 (Salter 1894) to have been erroneous as he did not repeat it in his Flora. He also recorded it (Wade 1952) from by the bridge at Aber-arth SN480637 in 1938; from Pant-yr-Celli, probably Pantygelli SN334535, undated; and from Pendinas “in fair quantity” in 1941. At this last site it still grows, 2008, on mortar-rich soil and rubble by the ruined cottage on the W side SN58288035, c.270 plants being counted in 1979 but rarely more than half a dozen each year since the 1990s as the area has become more overgrown. Wade (1952) also gives an undated record from Tresaith c.SN25Q (WRR), and one from Gwbirt (WWB), and there is a 1954 record from here SN163509 at BRC (EWBHM-R). Its other extant site is just inside the main entrance of the MoD site, Aberporth SN247516, 1993-2009, where it is occasional in the lawns, and frequent along the kerbed edges of the lawns where herbicide keeps the vegetation open.

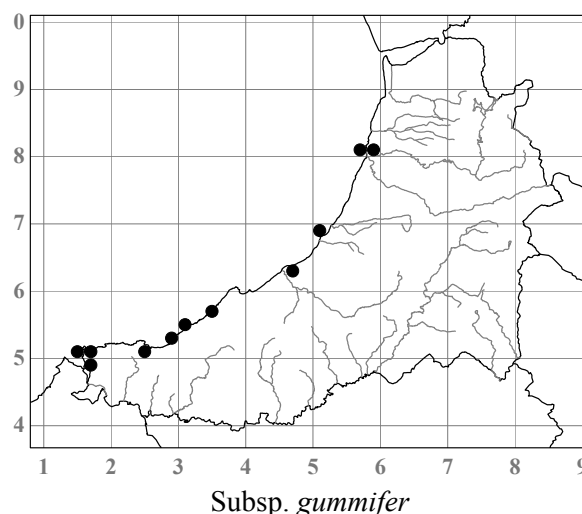
**Daucus carota** L.

Subsp. **carota** var. **carota** - Wild Carrot - Moronen y Maes

Frequent along the coast on grassy slopes, shaly cliffs, vegetated shingle, hedgebanks, verges and waste ground. It is very rare inland where it is absent from semi-natural habitats and is confined to verges, disused railways and waste ground. Var. **nanus** (Druce) Druce, dwarf, usually branched from the base and with small umbels less than 5cm across, is abundant in a few places on the coast, for example on shaly cliffs in the spray zone at Penbryn SN288521, 1976 (NMW) and in calcareous sandy pasture with *Briza media* at Mwnt SN196520, 2002 (NMW).



Subsp. *carota*



Subsp. *gummifer*

Subsp. **gummifer** (Syme) Hook. f. - Sea Carrot - Moronen Arfor

Populations on exposed grassy slopes, banks, clifftops, screes and shingle close to the sea often consist of a range of plants varying from typical subsp. *carota* to ones showing most of the characters of subsp. *gummifer*, but the latter are never as extreme as the plants found for example on the Cornwall coast. In particular, they lack the glossy, thick, dark green, overwintering leaves of the Cornish plants, although they have the flat, uncontracted umbels and usually the long, often recurved hairs on the umbel rays. Good populations can be seen on clifftops at Penyrangor, Aberystwyth SN580809, 2003; on shingle NE of Aberaeron SN462635, 1993; on grassy slopes by Carreg y Nodwydd SN299535, 1996 (NMW); by the limekiln at Cwmtudu SN355575, 1993; and on the clifftop at Gwbirt SN159500, 1994 (NMW, PDS, GM & AOC). All records refer to var. **gummifer**; the dwarf var. *acaulis* (Bréb.) P. D. Sell has not been seen.

Subsp. **maximus** (Desf.) Ball

A population of c.40 plants, 1.5-2m tall, with very strict branching, probably derived from a “wild flower” seed-mix, on the recently reconstructed bank of the Nant Clarach by the A4159 road bridge at Gogerddan SN62588377, 2007-2008 (NMW) is probably this subspecies which is native of the Mediterranean and the Atlantic Islands.



Subsp. **sativus** (Hoffm.) Arcang. - Carrot - Moronen yr Ardd

Carrots seem never to have been much grown in the county, for example 29 acres (12ha) in 1868 (Anon. 1869), and only 4.2ha were reported as being grown in the open in 1988 (Anon. 1988). They have recently been more extensively grown on the sandy soils above Penyrergyd, Gwbert SN14U, and organically at Cilcennin SN56A and elsewhere. They have not been recorded as casuals.

## MONOCOTS - Monocotyledons

### ACORACEAE

**Acorus calamus** L. - Sweet-flag - Gellesgen Bêr

Planted and naturalised in a pond at Highmead SN49814270, 1985-2000, but decreasing through shading and not flowering. It has been planted in a few recent garden ponds but is apparently not elsewhere naturalised. Native of Asia and North America.

### ARACEAE

**Lysichiton americanus** (Hultén) H. St. John - American Skunk-cabbage - Pidyn-y-gog Americanaidd

Occasionally planted by ponds and in wet woodland and spreading rapidly by seed. It was naturalised in the grounds of Ynys-hir SN683959 long before plants from there were planted in wet Alder woodland nearby at Felin-y-cwm SN691947 in 1955 (WMC & PSC); at this latter site it had spread along the adjacent streambanks by 1979 (NMW, ABP & RLe), and is still abundant there, though now controlled (2004, AOC; RB). Other naturalised colonies in this part of the county, and perhaps from the same source, are in the grounds of Ranger Lodge SN690965, 1994; in the grounds of The Mill and for some way down the Afon Melindwr SN691963-689962, 1994-2004; in the grounds of Llwynycelyn SN68979614, 2005; and by the Wenffrwd stream 200m S of the A487(T) road bridge SN668937, 1992 (RB & WMC) - 1998. Elsewhere it grows by the Afon Rheidol opposite Glanrhyd-ty-noeth SN669783, 2006 (RGL); by the Nanteos lake SN615783, 2006; by a pond in a pasture at Bikeryd, Pennant SN519635, 1997; by the Nant Camel at Ty Glyn SN498598, 2005, where it had been planted c.1967 (B. Davies pers. comm.); in wet woodland ESE of Llwyn-teg, Brynhoffnant SN353504, 2008; and by a woodland pond WSW of Glanolmarch, Llechryd SN215443, 1999. Native of W North America.

**Lysichiton camtschatcensis** (L.) Schott - Asian Skunk-cabbage - Pidyn-y-gog Asiaidd

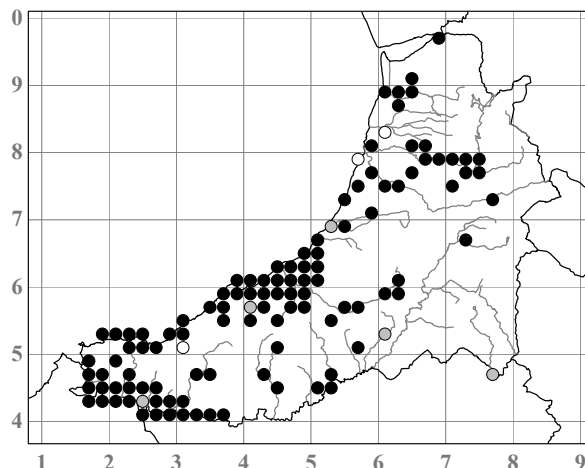
Planted with *L. americanus* by a stream in the grounds of Ynys-hir SN683959 and although spreading by seed and naturalised to some extent in the 1950s, it was never as vigorous and died out in time (PSC). Native of E Asia.

**Zantedeschia aethiopica** (L.) Spreng. - Altar-lily - Lili'r Pasg

A large clump against the S wall of St Mary's church, Cardigan SN18104603, 2003 (NMW) does not look as though it was planted and was perhaps derived from a throw-out. It is native of S Africa.

**Arum maculatum** L. - Lords-and-ladies - Pidyn y Gog

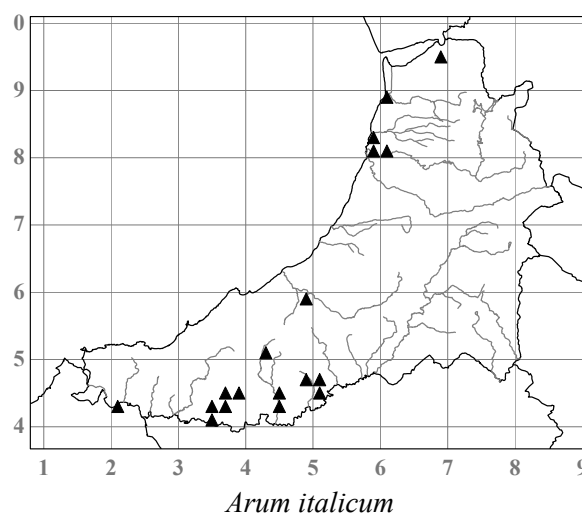
Widespread in hedgebanks, woodland and scrub in the more fertile and base-rich sites. It is also often on the coastal slopes under Bracken and on slumping till deposits where it can sometimes be very abundant, as for example just S of Monk's Cave SN555742, 1992-2008. It is confined to the lowlands and has not been noted over 200m altitude. A remote group of colonies under Bracken by the Afon Pysgotwr bridge SN775471-778469 was known from 1894 (Salter Diary 23.3.1894) until about 1985, but has not been seen since. Plants with blotched leaves, var. **maculatum**, are almost as common as those with



unblotched ones, var. **immaculatum** Mutel, and there seems no habitat or distributional difference between them.

**Arum italicum** Mill. subsp. **italicum** - Italian Lords-and-ladies - Pidyn-y-gog Eidalaidd

Occasionally naturalised on hedgebanks, roadside verges, graveyards and river banks, and rarely in pasture and scrub, conspicuous in winter when the new, pale-veined leaves appear. Most of the records are from well inland in the S of the county. It was first recorded in 1984, from a hedgebank by Henllan churchyard SN354402.



## LEMNACEAE

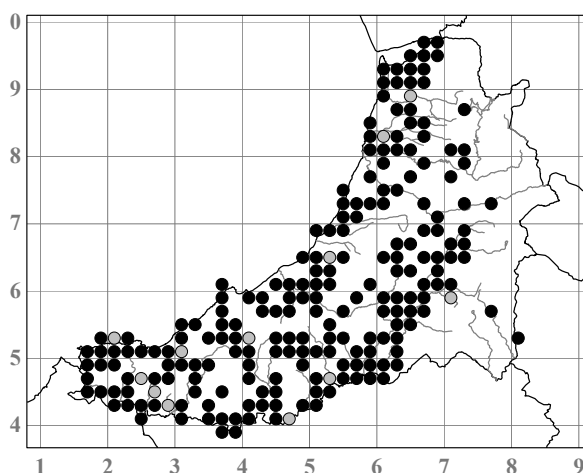
**Spirodela polyrhiza** (L.) Schleid. - Greater Duckweed - Llinad Mawr

A few plants were found among *L. minor* in an ox-bow S of the Afon Teifi 1.5km W of Cenarth SN253413 (VC 46 but modern Carmarthenshire) in 1994 (NMW), and this is the only possibly native site. It was introduced and well established in a field pond 100m ENE of the Brongest T junction SN32284532, 1999 (AOC & LRG), and is often seen in garden ponds.

**Lemna minor** L. - Common Duckweed - Llinad y Dŵr

A common aquatic of mesotrophic and eutrophic ponds, lakes, ditches, wet fens and the stiller parts of rivers and streams throughout the county, but becoming rare in the uplands. Its absence from most of the more oligotrophic waters, so prevalent in the county, caused Burkill & Willis (1894) to write "Very sparingly in one place at Pont-rhyd-fendigaid. We were surprised at the rarity of this, the only *Lemna* observed."

It is tolerant of brackish conditions, and sometimes occurs in rock pools in the spray zone on the sea cliffs, as 400m N of the Cliff Hotel, Gwbert SN160505, 1987-2003. At Bangor Teifi a colony persists, or perhaps is regularly renewed from above, on the vertical damp cliff of a railway cutting SN379399, 1987-2003. Even more remarkable are the persistent colonies on vertical rock faces by waterfalls on the sea cliffs in the spray zone, as at Upper Borth SN605888, 2004 (CMFB); by the Nant y Grogall fall at Traeth y Coybal SN37255933, 1994-2004 (AOC & PAS); and by the Afon Saith fall at

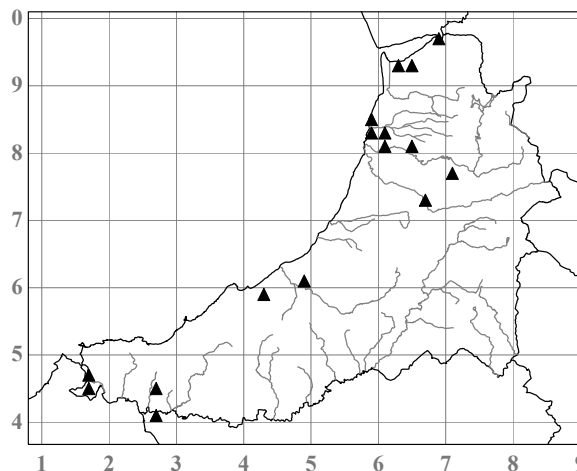


*Lemna minor* (centre) on sea cliffs at Tresaith, view NE at SN27925167, September 2005

Tresaith SN27925167, 1991-2008 where it grows only 6m above the beach. Altitude limit 415m, reservoir pool SE of Carn Owain SN735879, 2002.

### **Lemna minuta** Kunth - Least Duckweed - Llinad Bach

First recorded in Britain in 1977 at Cambridge, this rapidly spreading alien from the Americas was first recorded in Cardiganshire in a small garden pond at Cenarth SN266417 in 1992 (NMW, conf. ACL); it had first appeared there c.1985, its origin unknown. In 1996 it was found dominating a large garden pond at Old Castle Farm, Cardigan SN165463, having been first noticed there c.1990 (JTh). Since then it has been found in a dozen other sites in ponds, ditches and streams in the lowlands, usually with *L. minor*. A population in a small shaded pond by a lane at Ynys-hir SN68199618, 1998 (NMW) - 2008 was of unusually small plants 0.5-1mm long, of a different shade of green, and puzzled E. Landolt to whom they were referred, but in aseptic culture they became normal *L. minuta*; similar forms have been found elsewhere in Britain.



### [*Lemna trisulca* L. - Ivy-leaved Duckweed - Llinad Dail Eiddew

Recorded, doubtless in error, from Lanilar by Morgan (1849). Salter (Diary 11.9.1926, 11.6.1929) seems to have had a report of it from Cors Fochno but failed to find it there himself.]

## **ALISMATACEAE**

### **Sagittaria sagittifolia** L. group - Arrowhead - Saethlys

Recorded by Salter in the lower of the ornamental lakes at Derry Ormond SN592521 in 1930 (Diary 26.7.1930, 1935), and from the lake at Nanteos SN615783 where he said (1935) that it had recently appeared. It is still at Nanteos in small quantity, 2004, but not at Derry Ormond, and was presumably an introduction at both sites. The exact identity of these plants is uncertain as they have not been seen recently in flower and the taxonomy of the group is anyway confused.

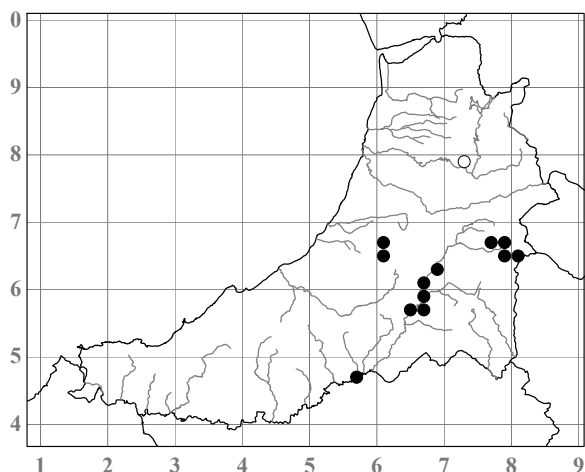
### **Baldellia ranunculoides** (L.) Parl. - Lesser Water-plantain - Llyriad-y-dŵr Bach

Abundant in some years, but almost absent in others, in the marshes around the old course of the Leri between Ynys-las and Borth, where it was first recorded by Salter in 1901 (Diary 15.6.1901); the best population is usually just opposite Glan-gors SN608921, 1986-2008. Salter (1935) recorded it at Moel Ynys Pool SN607923 and it was seen there in 1956 and 1958. Salter (Diary 21.7.1904) seems also to have found it in a ditch E of the canalised Leri a little way S of Ynys-las. In 1955 it was found scattered in a dried-out slack in the Ynys-las dunes, probably SN609938 (BHo), but was not seen again in the dunes until 1999 when it was found in the artificial pool in the slack E of the road SN611938 (RAJ & ADH). Also in 1999 it appeared in a large scrape in the Aberleri Fields nearby SN610918 (RAJ & ADH). In 1903 Salter (Diary 17.8.1903) recorded it at the basin mire above Ty-llwyd SN602774, where it has been seen again only in 1986 and 1987 (APF). There are also unconfirmed and unlikely records from Esgair Hir SN733913 (Salter in Wade 1952) and Llyn Eiddwen c.SN605670. All the populations seem to be of var. **ranunculoides**, lacking runners and with smooth fruits.

### **Luronium natans** (L.) Raf. (*Elisma natans* (L.) Buchenau) - Floating Water-plantain - Llyriad-y-dŵr Arnofiol

Recorded from nine of the oligotrophic upland lakes, as well as from a slow-flowing stretch of the Afon Teifi at c.155m altitude. In the lakes it is usually seen with floating leaves and flowering in shallow water up to c.1m deep, but since 1989 several surveys have shown that in most of them (and probably in all, except possibly Llyn Eiddwen) it also grows in water 1-3m deep where it is only in the form of vegetative rosettes and stolons, sometimes so dense as to form pure lawns of the species; these plants only flower if they are





exposed by lowering of the water level, which usually only occurs in those lakes that have been artificially dammed.

At Llyn yr Oerfa SN728798 it was recorded only in 1893 (Burkill & Willis 1894). At Llyn Hir SN789676, 1989-2004, it flowers in small quantity at about six sites along the W side of the lake and at two on the E side, and is vegetative in deeper water along both sides. At Llyn Teifi SN784675, 1893 (Burkill & Willis 1894) - 2004, it flowers abundantly chiefly along the W and SW sides, and in deeper water forms extensive vegetative lawns which flowered spectacularly in the SE bay when exposed at very low water in 1989. At Pond y Gwaith SN778677 one plant was found on the N shore in 2003 (DB). At Llyn Egnant SN792670, 1893 (Burkill & Willis 1894) - 2004, it flowers in a few places along the W shore and forms vegetative lawns in deeper water. At Llyn y Gorlan SN786669, 1893 (Burkill & Willis 1894) - 1993 (AOC & CDP), only a few plants have been seen. At Llyn Gynon SN800646, 1893 (Burkill & Willis 1894) - 1998 (AOC & JPW), it flowers usually abundantly in shallow water at the N end and sparsely around the rest of the lake, and vegetatively is abundant in deeper water in many parts of the lake. At Llyn Eiddwen SN606670, 1893 (Burkill & Willis 1894) - 2004, it flowers in scattered colonies around the whole lake but is very sparse at the swampy S end. At Llyn Fanod SN604644, 1893 (Burkill & Willis 1894) - 2004, both flowering and vegetatively it is confined to the N part of the lake.

In the Afon Teifi it was first found in 1922 where it flows through Cors Caron (CO, Salter Diary 28.8.1924), and Salter saw it there a little above Pont Einon c.SN6761 in 1925 (Diary 30.6.1925). It has more recently been found in the river from just above the footbridge 2km upstream of Pont Einon SN685627, 1994 (RAJ), down to Lampeter SN577437, 2005 (NTHH).



*Luronium natans* flowering on exposed mud in SE bay of Llyn Teifi, SN785673, July 1989



*Luronium* in flower, *Equisetum fluviatile* beyond, view E over Llyn Eiddwen from SN604669, July 1999

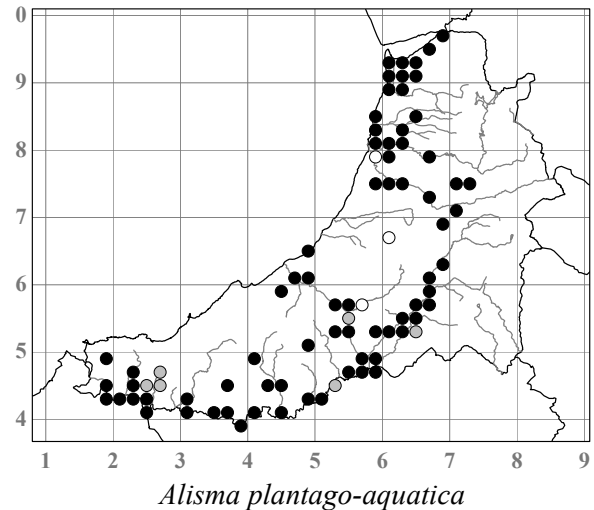
There is no evidence of significant increase or decrease in the county over the last century; it has been lost from one lake, Llyn yr Oerfa, and recently found, and therefore perhaps newly arrived, in one, Pond y Gwaith (at Llyn Hir it was doubtless just overlooked until 1989). It may perhaps though be spreading in the Teifi. Kay *et al.* (1999), in a study of genetic variation in *L. natans*, found that the populations in Llyn Eiddwen and Llyn Fanod each consisted of only a single genotype (different in each case), while the greatest variation and within-popu-

lation diversity of any in the Welsh populations studied was in Llyn Teifi and the nearby Llyn Hir and Llyn Egnant; they comment that these Teifi Pools “may form a particularly effective metapopulation group (that is, a cluster of sites for a species, all more or less self-contained, but linked genetically over time). Nevertheless, even here the number of genotypes that we found was small, suggesting that clonal reproduction predominates....” Concerning the Afon Teifi in Cors Caron they say “There is surprisingly great genetic distance between the two subpopulations separated by the “Flash” [SN675621] on the Afon Teifi, perhaps as a result of downstream vegetative propagation of *L. natans* in the river current, from different older and effectively ancestral colonies upstream. The centre of genetic diversity shown by the data within Wales lies in the upland pools and lakes around Llyn Teifi, which drain into the Afon Teifi.”

*L. natans* is protean in its phenotypic forms, from the familiar flowering plants with elliptical floating leaves usually on well-developed stems, to the deep-water non-flowering usually stolon-bearing rosettes of linear-subulate leaves resembling *Isoetes*. In the Teifi, as well as sometimes in deep water in the lakes, it can produce long, linear, strap-like, translucent submerged leaves. Altitude limit 435m, Llyn Hir SN789676, 2004.

***Alisma plantago-aquatica* L.** - Water-plantain - Llyriad y Dŵr

Common in ponds, ditches, lake margins, riversides and especially in ox-bows and backwaters, chiefly in the Dyfi area and in the Teifi valley, but absent from the more oligotrophic sites and from the uplands. It often arrives within a few years in newly dug ponds. Altitude limit 300m, Llyn Eiddwen SN605668, 1961-1966, Seddon (1972), but not seen there since.



## BUTOMACEAE

***Butomus umbellatus* L.** - Flowering-rush - Brwynen Flodeuog

Recorded from “marsh at Glandyfi, Cards” c.SN6997 by Webb (1933), but Salter does not cite this and never saw the species in the county. This record may, however, refer to a naturalised population known to PSC & WMC in the 1950s in a ditch alongside the Ynys-hir gardens SN682961, where it had originally been planted. It is now extinct.

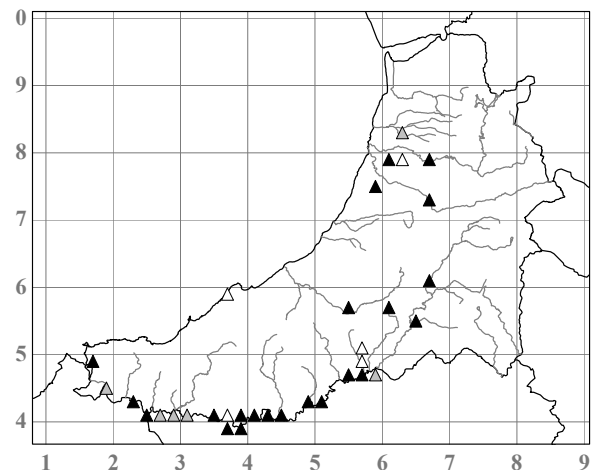
## HYDROCHARITACEAE

***Stratiotes aloides* L.** - Water-soldier - Milwr y Dŵr

In 1937 Salter (Diary 5.7.1937) noted “About a dozen plants of *Stratiotes* now at Nanteos Upper Pool (J. M. J.)” SN636783. The wording implied that it had increased, so probably it had been planted and was naturalised; the pool no longer exists. (JMJ was probably an error for W. Miall Jones, as elsewhere in the diary about then.)

***Elodea canadensis* Michx.** (*Anacharis canadensis* (Michx.) Planch.) - Canadian Waterweed - Ffugalaw Canada

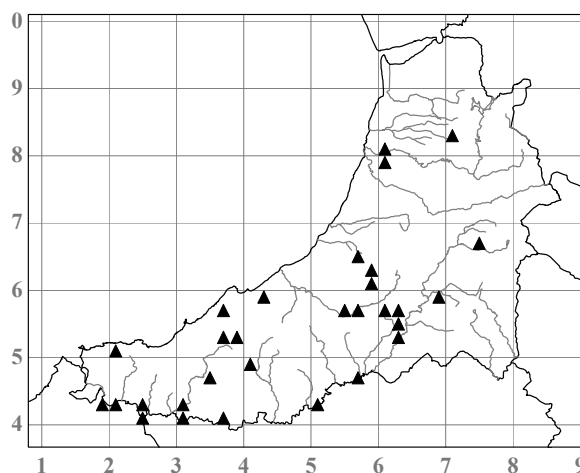
Salter knew this alien aquatic from North America at only five sites: the now vanished upper pool at Nanteos SN636783, where he first recorded it in 1923 (Diary 17.4.1923), and the lake W of the mansion here SN615783 (1935) where it was last seen in 1995; the pond by the Teifi at Bangor Teifi SN375403 (Diary 17.9.1930), where it still grows, 2005; Falcondale Lake c.SN570500 (Diary 5.8.1937), where it has not been seen since; and a pond at Tyrrhos, New Quay SN378589 (Diary 7.8.1937). Apart from the Afon Teifi and pools on its floodplain, it



remains surprisingly rare and has been found in only a few additional ponds: the reservoir 400m W of Trawsgoed station SN661726, 1990; the pond in the Trawsgoed grounds SN670732, 1974 (JH); a lake made c.1980 at Beth Berith, Comins Capel Betws SN616570, 2005; the Llwynduris Farm pond SN238434, 1993 (AOC & TCGR); a pond at Trefedlin, Blaenplwyf SN582751, 1995 (JND); and a pond at Cwmmeudwy SN403415, 1998. In the Teifi it was first recorded near Coedmore SN194444 in 1972, but this was probably material washed down from further upstream. Since then it has been found in many places both in this river and in associated ox-bows and other pools up as far as Pont Einon SN673614, 2000. During the 1980s and 1990s it became progressively more abundant and even locally dominant in the river for c.3km below Lampeter. The only other river record is of a small patch in the Aeron just below Pont Talsarn SN544562, 1996.

***Elodea nuttallii* (Planch.) H. St. John - Nuttall's Waterweed - Ffugalaw Nuttall**

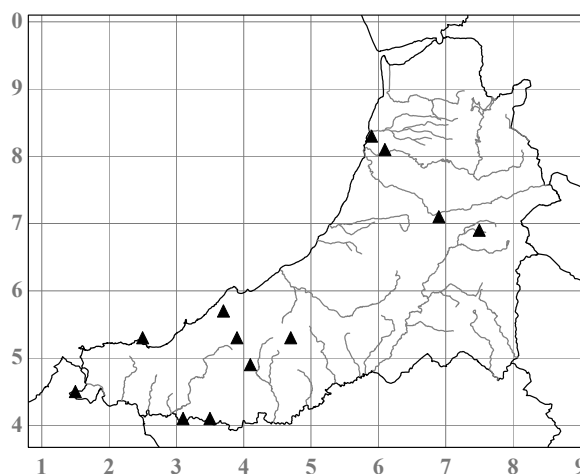
First confirmed in a field pond at Rhos Pil-bach SN368530 in 1989 (NMW, conf. DAS), this has been a much more invasive alien than *E. canadensis* and has been much less confined to the major rivers. The maps show the contrast in distribution patterns strikingly. (A 1984 record from the Teifi at Henllan given in Simpson (1986) was based on material in NMW later redetermined as *E. canadensis* by DAS.) Since then it has been found in a dozen ponds, often completely dominant, sometimes having been introduced but sometimes having come by unknown means. It was found in the Afon Aeron 1km E of Talsarn SN555563 in 1989 (NMW, AOC & DGJ, conf. DAS), and has since been found locally abundant up this river as far as Pont Tre-fran SN573576, 1996. In the Teifi it was first recorded 400m NNW of Coedmore SN191438 in 1991, in abundance, and has since been found in many places up as far as the confluence with the Nant Bryn-maen SN639557, 1996, as well as up this tributary to SN633570. It also occurs in ponds and ox-bows on the floodplain of the Teifi. Its aggressiveness was demonstrated in the 1ha lake W of Nanteos mansion SN615783 where it was abundant when first noticed in 2000, having apparently completely replaced the *E. canadensis*, which had been abundant and was the only species seen there until as recently as 1995. Altitude limit 315m, not deliberately introduced and no other aliens present, in a pond built in 1990 at Pentwyn, Bethania SN583635, 1994 (apart from plants dumped in Llyn Pendam SN709839, at 345m, in 1998 that survived for only about two years before being weeded out (AOC & ACJ)). Native of North America.



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***Lagarosiphon major* (Ridl.) Moss ex V. A. Wager - Curly Waterweed - Ffugalaw Crych**

Commonly planted in garden ponds, this rampantly invasive aquatic from South Africa was first noted more or less in the wild in two ponds at Ffynnon Berw SN381538 in 1994 and has since been found widely throughout the county. It will even grow happily in butyl-lined ponds with no proper substrate, as on the MoD site, Aber-porth SN247524, 1997-2008. An unusually blunt-leaved form fills a pond 2km SW of St Dogmaels SN151448, 2001 (NMW, conf. DAS). Altitude limit 330m, in two ponds 1.8km NNE of Ffair-rhos SN750697, 1997 (MDS).



**APONOGETONACEAE**

**[*Aponogeton distachyos* L. f. - Cape-pondweed - Alaw De Affrica**

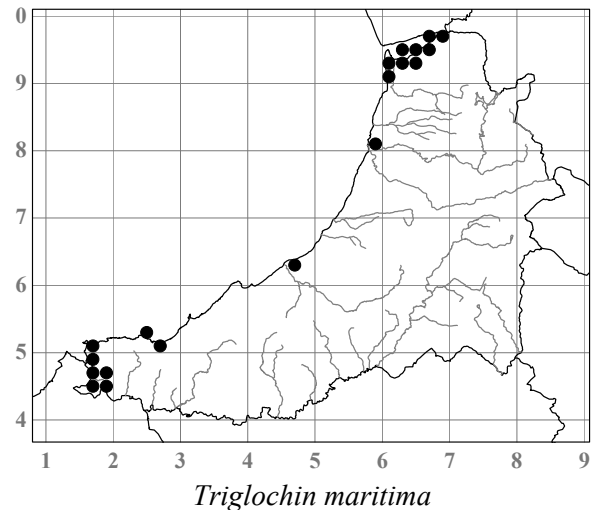
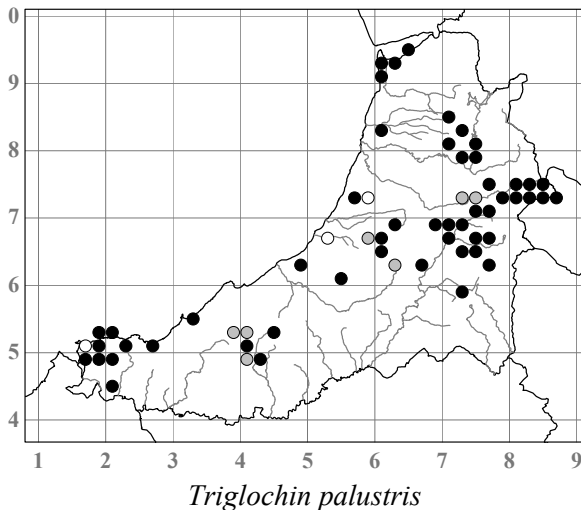
Occasionally planted in ornamental ponds, as in SN56U, SN55T and SN34B, thriving and often flowering in midwinter, but not yet naturalised in the wild.]



## JUNCAGINACEAE

**Triglochin palustris** L. - Marsh Arrowgrass - Saethbennig y Gors

Frequent in the more mineral-rich or mesotrophic flushes and fens where it is tolerant of light poaching, mostly at middle altitudes and in the uplands, but also in brackish sites and flushes along the coast. It is very characteristic of flushes in the rhos pastures, and of flushes in blanket bogs. It is salt-tolerant enough to grow mixed with *T. maritima* at some sites on the coast (see under that species), as well as in several other brackish marshes. It no longer occurs in the dune slacks at Ynys-las SN609939 where it was seen in 1956. Like several species characteristic of flush communities it is virtually absent from the Teifi catchment below Cors Caron. Altitude limit 470m, flushes in blanket bog 1.3km ENE of Llyn Gwngu SN851737, 1997 (JPW & AOC).

**Triglochin maritima** L. - Sea Arrowgrass - Saethbennig y Morfa

Abundant in the salt marshes in the estuaries of the Dyfi SN69, 1682 (Llwyd, Chater 1984a) - 2008, and the Teifi SN14, 1894 (Salter Diary 28.6.1894) - 2008, and in small quantity in the small bits of salt marsh in Aberystwyth harbour and the Rheidol and Ystwyth estuaries SN58V, 1796 (Aikin 1797) - 2008. Elsewhere it has been recorded in slightly brackish marshy hollows NE of Lodge Park SN667942, 1959 (EHC) and on the Aberleri fields SN612915, 1998 (AOC & RVL), at both of which sites it was growing mixed with *T. palustris*; in the slightly brackish marsh on Morfa Borth c.SN614908, 1987 (THB); in a damp hollow behind the beach at Drefnewydd, Aberaeron SN463635, 1993; in a rocky flush in the spray zone 500m E of Aber-porth SN27125150, 1998 (AOC & JPW); on rock ledges in the spray zone at the NE corner of the MoD site, Aber-porth SN255520, 1998-2005; and with *T. palustris* on rock ledges in the spray zone 600m S of the Cliff Hotel, Gwbert SN161495, 1999.

## ZOSTERACEAE

[*Zostera marina* L. - Eelgrass - Gwellt y Gamlas

Morgan (1849, 1874 etc.) stated, probably hopefully, that *Zostera* occurred “On the seashore after storms” in the Aberystwyth district. Salter listed it from the N of the county without locality (1901) and in 1935 (Diary 13.11.1935) reported that E. H. T. Bible said that it “grew sparsely on the upper reaches of the Dovey Estuary”, but he did not include it in his Flora (1935). It has never been confirmed for the county, or indeed for Merioneth. In the 1950s it was experimentally planted in Aberystwyth harbour by EHC and AOC, but it did not persist.]

## POTAMOGETONACEAE

**Potamogeton natans** L. - Broad-leaved Pondweed - Dyfrllys Llydanddail

Frequent in lakes, ponds, ditches and rivers, but generally less common than *P. polygonifolius* and replaced by it in most of the more oligotrophic sites, and generally less common in the uplands. The two species only occasionally occur together. *P. natans* tolerates slightly brackish conditions, for example in a ditch on the Ynys-las dunes SN608937, 1991 (AOC & CDP), and in the Tan-y-bwlch fields SN585793, 1990-2000.

Altitude limit 525m, Llynnoedd Ieuan middle lake c.SN800818, 1924 (Salter Diary 22.8.1924); 515m, Llynnoedd Ieuan SE lake SN800812, 1993-2003 (AOC & PAS).

**Potamogeton**  $\times$  *gessnacensis* G. Fisch. (*P. natans*  $\times$  *polygonifolius*)

In the outflow of the backwater on the S side of the Afon Ystwyth 800m E of Pont Llanafan SN69407168, 2006 (NMW, RVL & AOC, conf. CDP); *P. natans* is abundant in the main part of the backwater, and *P. polygonifolius* is in an inflow near its head.

**Potamogeton**  $\times$  *sparganiifolius* Laest. ex Fr. (*P. gramineus*  $\times$  *natans*) - Ribbon-leaved Pondweed - Dyfrillys Rhubanog

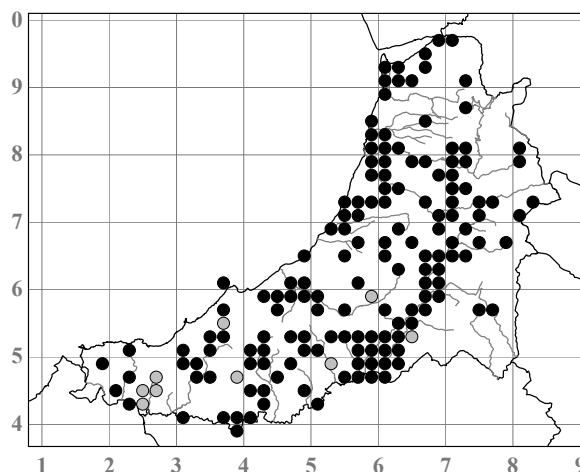
Abundant in the Afon Teifi on gravelly shoals amongst dense *Myriophyllum alterniflorum* for c.100m upstream from Pont Einon SN671614, 2005-2007 (NMW, CGE, RVL & AOC, det. CDP). Although *P. natans* is common in the Teifi, *P. gramineus* has never been recorded, and, as with the parents of *P.  $\times$  olivaceus*, it seems likely that it will have formerly occurred here.

**Potamogeton** *polygonifolius* Pourr. - Bog Pondweed - Dyfrillys y Gors

A common plant of peaty flushes, *Sphagnum* lawns in mires and fens of all sorts, in ditches, pools and lakes. It is most abundant in the more oligotrophic sites, and has, for example, not been reliably recorded from the more mesotrophic Llyn Eiddwen and was only once recorded from Llyn Fanod SN604644, 1966 (Seddon 1972). Although frequent in small, peaty streams, it is rare in the Rheidol and Ystwyth, and in the Teifi it only occurs near the source, just below Llyn Teifi SN779674, 1978 (NTHH). By the Dyfi estuary it occurs in a few ditches that are at least sometimes slightly brackish, for example in the ditch W of the Afon Leri ENE of Borth church SN615900, 1987 (CGE, JRA & CDP), where it grows with *P. natans*, and in a borrow pit in Aberleri Fields SN615916, 1993. Altitude limit 505m, Llyn Crugnant SN754612 (Salter 1935); 525m, Llynnoedd Ieuan middle lake SN799816, 1993.

[*Potamogeton coloratus* Hornem. (*P. plantagineus* Ducros ex Roem. & Schult.) - Fen Pondweed - Dyfrillys y Gors Galchog

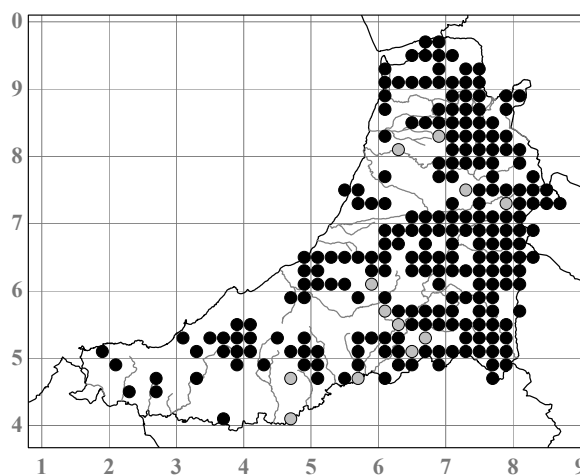
A record from "Streamlets on Tregaron hills", 1879 (HLJ, *BRC rep.* 1879: 60 (1880)) was undoubtedly a mistake for *P. polygonifolius*, as Salter (1935) surmised.]



*Potamogeton natans*



*Potamogeton*  $\times$  *sparganiifolius* and Chris Preston in the Teifi at Pont Einon, view SE from SN671614, September 2005



*Potamogeton polygonifolius*

[*Potamogeton* × *lanceolatus* Sm. (*P. berchtoldii* × *coloratus*)

This very rare hybrid is most unlikely to have occurred in the county and the “*P. lanceolatus*” recorded by Rees (1890) “in and near isolated shallow pools” on the flats near Aberystwyth should be regarded as an error.]

[*Potamogeton lucens* L. - Shining Pondweed - Dyffrllys Disglair

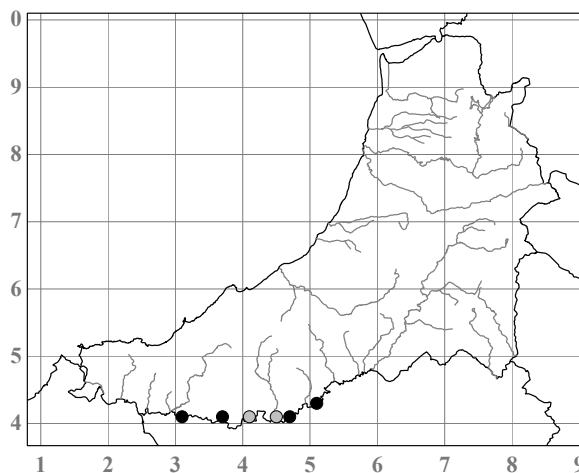
Undoubtedly erroneously recorded by Morgan (1849) from “Pools out of Rheidol.”]

[*Potamogeton gramineus* L. - Various-leaved Pondweed - Dyffrllys Amryddail

Undoubtedly erroneously recorded by Morgan (1849) from “Pools out of Rheidol”, perhaps in error for *P. obtusifolius* (cf. Preston 1995, p.26).]

**Potamogeton** × **olivaceus** Baagøe ex G. Fisch. (*P. alpinus* Balb. × *crispus*) - Graceful Pondweed - Dyffrllys Gosgeiddig

This hybrid was first found as an unrooted fragment in the tidal part of the Afon Teifi at Cwm Du SN194444 in 1972 (BM, det. JED), and has since been found growing in quantity in the river from Llanybydder SN519437, 1979 (AOC & RDP) down to Newcastle Emlyn SN313408, 1979 (NMW) - 2004 (RR) and Cwm-cou SN295418, 1978 (NTHH). It is mostly in the main channel, but also grows in backwaters, for example at Highmead SN50474280, 1997 (RVL, TP & AOC), and at Abermachnog it also grows in the pool 100m from the river SN374402, 1984-2000, where its leafy shoots can usually easily be seen persisting through the winter. It is usually a plant of fast-flowing rivers, and Preston & Croft (1997) indicate that this is the only area where it grows in still water. They also remark that its occurrence in this river system, where neither parent occurs, suggests that the population may be of ancient origin, dating from a time when both parents did grow here. In Britain it occurs nowhere else S of the River Tweed on the English/Scottish border.

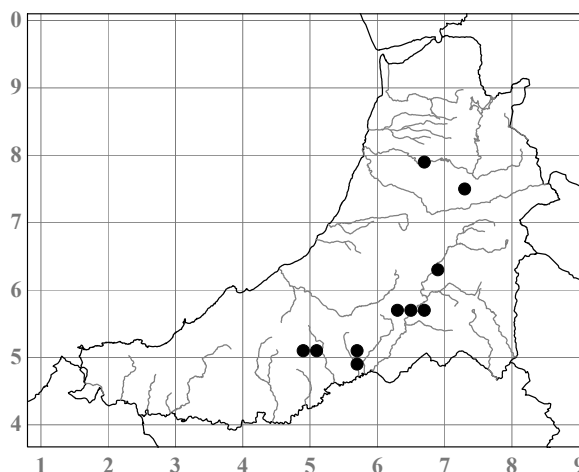


**Potamogeton perfoliatus** L. - Perfoliate Pondweed - Dyffrllys Trydwl

Recorded by Salter (1935) from two sites along the Teifi but not seen since. At Llandysul he saw it in or shortly before 1934 and gave the locality variously as “in the Teifi” (1934) and “In mill stream” (1935), the latter probably referring to either Aber-Cerdin SN420415 or Pantolwen Mill SN416418. At Newcastle Emlyn he found it “by the Castle meads ... in the river, near the mill stream” c.SN311408 in 1931 according to his Diary (18.9.1931), although he said elsewhere (1934, 1935) that it was in the Teifi.

**Potamogeton obtusifolius** Mert. & W. D. J. Koch - Blunt-leaved Pondweed - Dyffrllys Dail Aflym

A rare species, recorded from only seven lakes and ponds, and perhaps either a recent arrival or increasing. It was first recorded in 1978, from Falcondale Lake SN569498-570500 (NMW), when it was frequent all around the lake although it thereafter decreased, perhaps because of eutrophication, and was last seen in 1994. The other sites are mostly slightly more oligotrophic than this lake was in the 1970s: the N gravel pit, Glanrhyd-ty-noeth, Capel Bangor SN667786, 1994; Llyn Frongoch SN722752, 2005, apparently a recent arrival; Llyn Maesllyn SN693627, 1993 (NMW, AOC & CM); occasional, with abundant *P. berchtoldii*, in a pond made in 1970, 150m W of Penlone SN639579-640579, 1997;

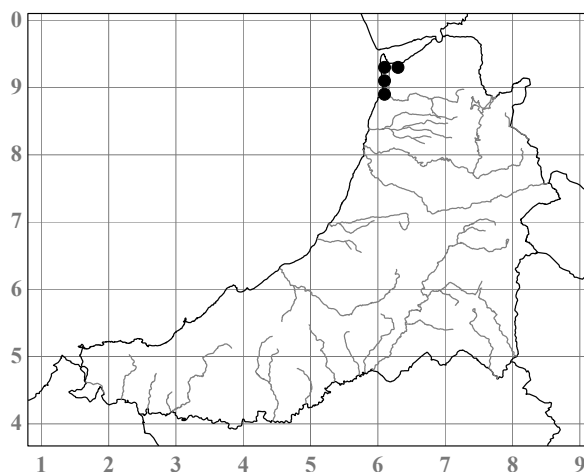




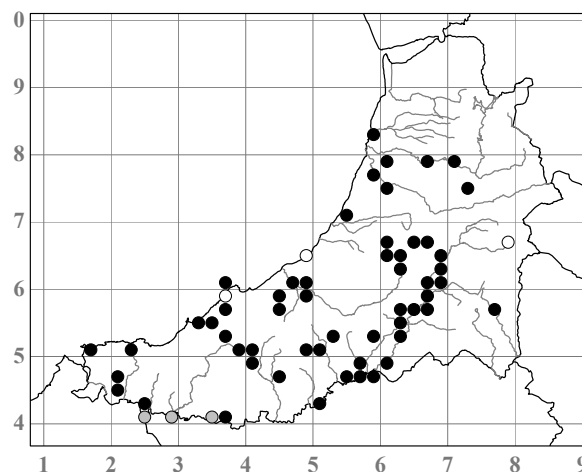
in the lake made in 1967 at Pant, Llanddewi-Brefi SN658563-661563, 1997; and in the pond 100m SW of Glwydwern, Gorsgoch SN499504-500504, 1993 (AOC & ADH) - 1997.

### **Potamogeton pusillus** L. - Lesser Pondweed - Dyfrllys Eiddil

Recorded only from the same area as *P. pectinatus* and often growing with it, in pools and ditches around the Dyfi estuary. It is though less confined to brackish waters, and has for example been recorded from the ditch along the W side of Llancynfelyn Common SN636926, 2003 (TAL). The earliest confirmed record was from a slack at Borth (probably on the golf course SN69A) in 1936 (BM, FD, det. JED & GT). Early records from other parts of the county will have been of *P. berchtoldii*.



*Potamogeton pusillus*



*Potamogeton berchtoldii*

### **Potamogeton berchtoldii** Fieber - Small Pondweed - Dyfrllys Bach

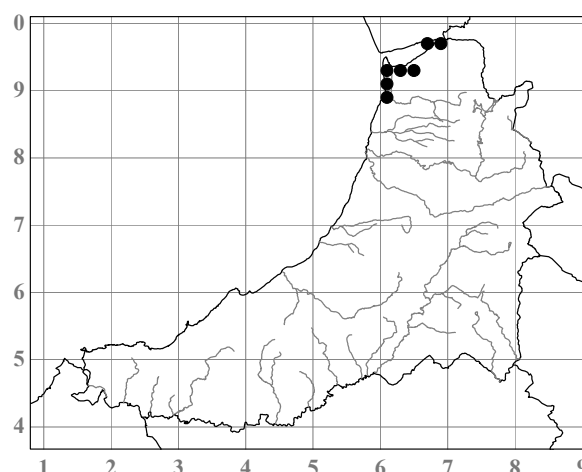
Widespread in lakes and ponds throughout the lowlands but absent from the more oligotrophic sites. It is especially frequent and abundant in farm ponds. Although it occurs in small quantity in Llyn Eiddwen SN605670, 1959-1999, and in Llyn Fanod SN604644, 1996, both somewhat mesotrophic lakes at 300 and 310m altitude respectively, and was once found in the more oligotrophic Llyn Teifi SN785675, 1959 (BM, det. JED) at 405m altitude, it has not been found elsewhere in the uplands. It is frequent in the Teifi and many of its tributaries, but is absent from the other rivers and streams although it often occurs in ox-bows or other ponds on the floodplains of rivers, for example below Pant-mawr by the Ystwyth SN608756, 1991 (NMW, SPC) - 1995. It is completely absent from the whole of the Cors Fochno and Dyfi estuary area SN69. The earliest record was from "Aberystwyth", 1846 (BM, GM, det. JED & GT). Salter (1935, Wade 1952) gave only two other localities, and two or three of his records of *P. pusillus* were probably of this species; he doubtless overlooked it and it is unlikely to have increased as much as the records might suggest. Altitude limit 405m, Llyn Teifi, as above.

### **Potamogeton crispus** L. - Curled Pondweed - Dyfrllys Crych

Abundant in a small pond 200m N of Clogfryn, Aberaeron SN449624, 1996 (NMW, conf. CDP) where it had been introduced and has since disappeared. A field record from the Afon Teifi near Henllan SN3740, 1981 (UWIST Survey) was probably a misidentification of *P. ×olivaceus*, as there are no other records from this very well-botanised river.

### **Potamogeton pectinatus** L. - Fennel Pondweed - Dyfrllys Blaenllym

Confined to pools and ditches around the Dyfi estuary, probably always in ones that are at least slightly brackish, and growing on sandy, muddy or peaty substrates. It can often be very abundant, as in some years in Moel Ynys Pool SN607923, 1926



*Potamogeton pectinatus*

(Salter Diary 11.9.1926, and the only site where he recorded it) - 2004, and in the ditch alongside the B4353 road between Glanwern and the sea SN610888, 1984-2005. Eastwards it extends to pools on Marian Mawr, Ynys-hir SN680966, 2001 (AOC & RB). A 1975 field record at BRC from Cors Caron SN672613 (JOM) is best rejected as very doubtful.

[*Zannichellia palustris* L. - Horned Pondweed - Llynwlyddyn Corniog

In spite of several reports, including one from Llanilar c.SN67H by Morgan (1849), a mention without locality in Salter (1901), and a record from the Dyfi estuary SN69, 1961 (JPS, *Watsonia* **13** :145 (1980)), there have been no confirmed records for the county.]

## RUPPIACEAE

***Ruppia maritima* L** (*R. rostellata* W. D. J. Koch) - Beaked Tasselweed - Tusw Arfor

Known only from brackish pools and ditches along the whole length of the Dyfi estuary, from a shallow pool just W of the Afon Leri SN615936, 2004 (SPC) and a ditch at Glanwern, Borth SN610889, 2000 (CMFB & TAL) to a swampy pool E of the railway at Glandyfi SN696971, 1984 (NMW) - 1993, but very local and not, or at least not now, “common” as Salter (1935) described it. The earliest record was by Morgan (1848), who wrote that “the surprising vegetable automaton, the *Ruppia Maritimum*, or Sea Tassel Grass, is found on the road to Aberdovey”. In the upper salt marsh it occurs in only a handful of the innumerable small pools or “pans”, for example at SN634936, 1994-2004, fruiting in a few but not in others, and remaining confined to these particular pools although they seem no different from many others round about. In a pool just E of the railway 300m N of Voelas, Glandyfi SN69109671, 1993-2004, the plants have been noticed to fail to die down and to continue to flower in the winter, at least in some years such as 1994 and 1998 (see also Preston 1995 p.77).

[*Ruppia cirrhosa* (Petagna) Grande (*R. maritima* sensu Salter, non L.) - Spiral Tasselweed - Tusw Troellog

Salter (1935) said that this was “Reported”, but there is no further information on its occurrence. It is possible that non-fruiting and thus unidentifiable plants of supposed *R. maritima* on the Dyfi estuary may be it.]

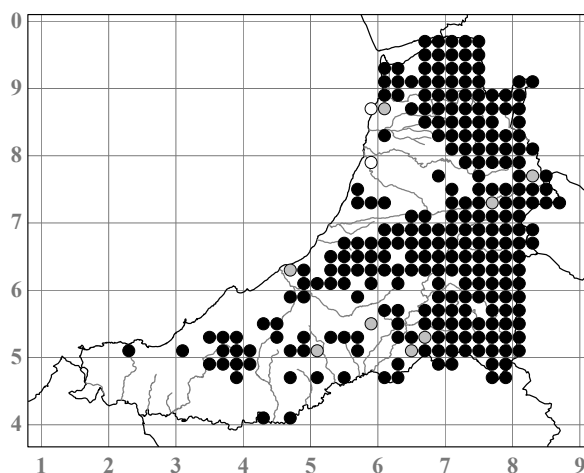
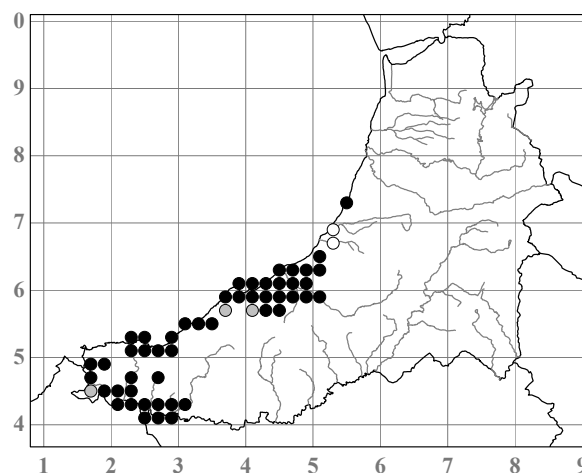
## NARTHECIACEAE

***Narthecium ossifragum* (L.) Huds.** - Bog Asphodel - Llafn y Bladur (Gweiryn y Bladur)

An often abundant plant of wet heaths, raised bogs, blanket bogs and peaty flushes, flourishing especially in the wetter, ungrazed parts of valley mires and tolerant of considerable shade, and in both the lowlands and the uplands. It is very colourful when dominant, orange-yellow in flower, orange-red in fruit and white when dead in late autumn. Willis & Burkill (1895) gave details of insect visitors they observed in the Pumlumon uplands. The earliest record is from 1682 when Llwyd listed “*Asphodelus Lancastriae* ... found in the marshes below Tyno hir” c.SN69Y (Chater 1984a), and it is still abundant on the peatlands in this area. Altitude limit 685m, above Llyn Llygad Rheidol, Pumlumon SN7987, 1926 (Salter Diary 19.8.1926, 1935); 630m, flushed slope SN79408724, 2002.



Seeds of *Narthecium ossifragum* dispersed on alga-covered peat, Esgair Fraith, SN741911, March 2004

*Narthecium ossifragum**Tamus communis*

### DIOSCOREACEAE

#### **Tamus communis** L. - Black Bryony - Cwlwm y Coed (Erfinen Fair)

Chiefly confined to the coastal parts of the SW of the county where it is frequent on the more calcareous drift soils, growing in hedges, scrub and woodland. Apart from the Penderi cliff Oak woods SN552735, 1926 (Salter Diary 3.7.1926) - 1997, and old records from Llanrhystud SN56J (Salter 1935) and the Peris valley above Llan-non SN56I (Salter 1935), its distribution stretches from Morfa Mawr SN56C, 2003, to Cardigan and up the Teifi valley to Cwmdy on the Afon Ceri SN310428, 1999. This last site is its furthest inland, 9km from the sea.

### MELIANTHACEAE

#### **Paris quadrifolia** L. - Herb-Paris - Cwlwm Cariad

Known only from woodland in the Nant Llolwyn dingle, Llanfarian SN588773 where it was seen *c.*1970 or earlier (EHC; AOC) and *c.*1974 (JPS). It grew among *Mercurialis perennis* under Ash and Hazel on somewhat clay soil, but has not been seen since in spite of repeated searches. It is a rare calcicole in W Wales where it is known only from a few sites in Carmarthenshire and Anglesey.

### COLCHICACEAE

#### **Colchicum autumnale** L. - Meadow Saffron - Saffrwm y Ddôl

Only known on a steep wooded slope by a small quarry where there was once a cottage, 150m SE of the Pontsian crossroads SN439460; there were several large naturalised clumps in 1999, but only two in 2005, and it has not been seen to flower.

### LILIACEAE

#### **Tulipa gesneriana** L. - Garden Tulip - Tiwlip yr Ardd

A plant, presumably a throw-out, persisted on a roadside hedgebank 900m W of Capel Dewi SN621821 for at least four years, 1993-1996.

#### **Fritillaria meleagris** L. - Fritillary - Britheg

Naturalised in shaded grassland in the grounds of Aberllolyn, Llanfarian SN588773, 1990-2008. Perhaps native in parts of England.

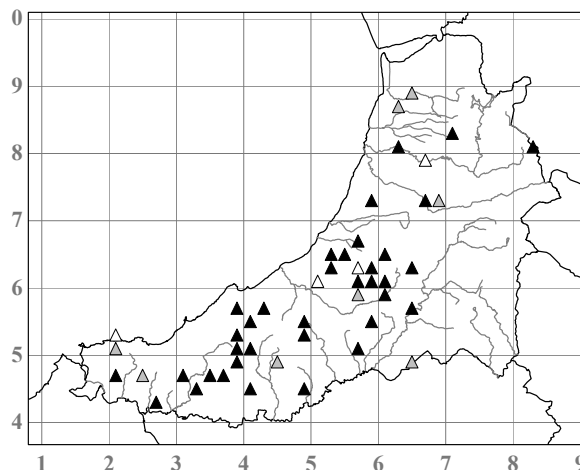
#### **Lilium martagon** L. - Martagon Lily - Lili Fartagon

Recorded only from 3km S of Llangwryfon *c.*SN56Y, where it was presumably naturalised, in 1956 (BM, JFH & PCH). Native of Europe and Asia.



**Lilium pyrenaicum** Gouan - Pyrenean Lily - Lili Ddrewllyd (Drewgi)

Said by Salter (1935) to be naturalised in the woods at Glanrheidol, Capel Bangor c.SN663791, and to maintain itself “not infrequently on old cottage-garden sites”, it is now chiefly in graveyards and on roadside banks, although it was recorded well-naturalised in estate woodland at Lovesgrove SN629816 in 1995, and at Trawsgoed SN671730 in 1994, in a wood at Llwyngwernau SN413556, 1998, and at the heathy edge of a conifer plantation at Cae Gaer Reservoir SN821816, 1993. All the recent records have been of subsp. **pyrenaicum** var. **pyrenaicum**. Altitude limit 365m, colony in grassland by Sarn Helen 3.5km SE of Llanfair Clydogau SN645484, 1983 (JRAb).

**ORCHIDACEAE**

[*Cypripedium calceolus* L. - Lady's-slipper - Esgid Fair

Recorded by some aberration as occurring about Aberystwyth, in an otherwise entirely plausible list of species, by Rees (1890).]

**Cephalanthera longifolia** (L.) Fritsch - Narrow-leaved Helleborine - Y Galdrist Gulddail

A small colony with 8 flowering stems under trees on top of the E roadside bank at Furnace SN683949 was found in 1956 (IMC & WMC, *Nature in Wales* 2: 312 (1956)). Later counts were 19 in 1957 (WMC), 10 in 1961, c.4 in 1978 (WMC), 5 in 1981 including one 25m away from the original colony (WMC), and 1 in 1984 and 1985 (RAS). It has not been seen since and must be considered extinct. The Corsican Pines shading the colony were felled in the 1970s and by 1981 the site had become very overgrown with brambles, and certainly now no longer seems suitable. There is a thriving colony across the Dyfi estuary in Merioneth only 4km away and there is no reason to think that our population was not native.

**Epipactis palustris** (L.) Crantz - Marsh Helleborine - Caldryst y Gors

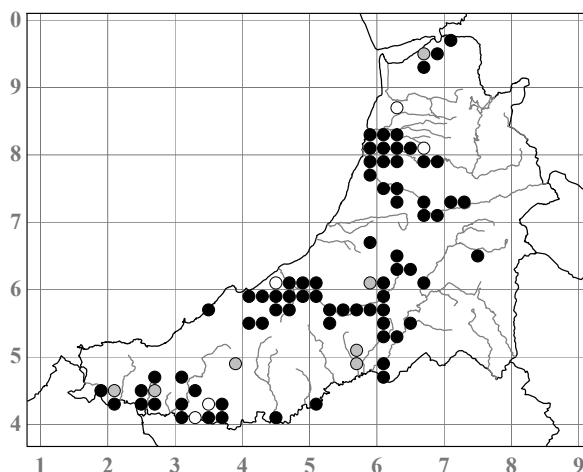
First recorded, in the main dune slack W of the road, at Ynys-las SN609938 “in quantity” in 1964 (PSC, *Nature in Wales* 9: 71-72 (1964)), and, as remarked here by PMB, while it is surprising that it was not noticed earlier in such a well-botanised site, it must have been a fairly recent arrival. It rapidly became more abundant, but remained confined to this slack for at least the next ten years (Savidge 1973), but has now become abundant in most of the other slacks from SN605932 to 610940, the total population amounting to at least 26,000 flowering spikes in 2004. It comes into flower just as the Marsh Orchids are finishing. The only other site where it occurs is by the Afon Mwldan near Penparc SN14Z & 24E, 1986 (AOC, APF & DGJ) - 2005, where it is abundant in several of the calcareous fens. An early unlocalised record by Braithwaite (Bennett *et al.*, 1929, Druce 1932, Salter 1935) is perhaps best discounted.

[*Epipactis purpurata* Sm. - Violet Helleborine - Y Galdrist Ruddlas

Given for the county by Druce (1932), but in the absence of any details the record must be discounted.]

**Epipactis helleborine** (L.) Crantz (*E. latifolia* (L.) All., *E. media* auct.) - Broad-leaved Helleborine - Y Galdrist Lydanddail

A widespread plant of the damper and more fertile woodland soils, but strikingly confined to the main river valleys, and often growing on tracksides or rides. It is also very often on shaded, silty roadside verges, rarely in damp meadows, and occasionally in gardens as a weed or in graveyards. It usually occurs in small quantity, but 86 plants were in an amenity plantation on the University campus, Penglais SN595819 in 1993 (SPC). It can be very persistent in some sites, as in Llanfairorllwyn churchyard SN367410, 1907 (Salter Diary 14.8.1907) - 2002, or by the A44(T) road at the 3<sup>rd</sup> milestone by Dolau SN623811. At this latter site Salter first noted it in 1925 (Diary 22.6.1925), counted 73 plants in 1932, 90 in 1936, 32 in 1939 and 90 in 1941, and (in a procedure reminiscent of the bounty paid to farmers who protected nests of the Red Kites



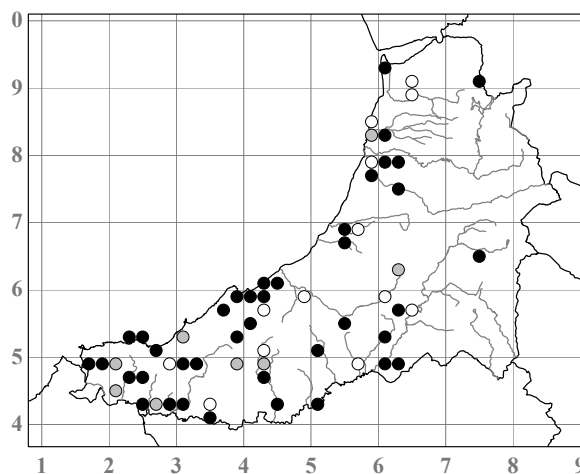
which grew out of the Kite Committee that he had initiated in the early 1900s), paid the road-man 10 shillings annually (the equivalent of c.£10 in today's currency, and a lot in relation to the man's wages then) not to cut it (G. W. Clark, pers. comm. from the road-man's daughter); there were still 16 plants there in 2004. A plant of forma **albifolia** M. R. Lowe, completely lacking chlorophyll, with the leaves and stems white and the flowers pale pinkish-brown, flowered for at least two years in a shrubbery in Derwen-fach garden, Llandygwydd SN24234364, 1997-1998 (EGV & AOC). Stephenson & Stephenson (1920b) showed something of the variation in lip shape in the county. It has not been seen at over 200m altitude.

**Neottia ovata** (L.) Bluff & Fingerh. (*Listera ovata* (L.) R. Br.) - Common Twayblade - Caineirian

Widespread in the more fertile and base-rich woodlands and scrub, in pastures and hay meadows, in graveyards and on drift slopes on the coast. It is often especially abundant in secondary Ash woodland, as at Coed Cwm-du SN308433, 1991-2003, and at Nanernis SN373568, 1984-2004. Salter (Diary 9.7.1906, 1935) recorded it from at least one unusually acidic site, "rough, heathy ground above Rhydyfelin" c.SN596783. Abundant huge plants grow in the sandy rough on the golf course at Ynyslas SN607931, 1990 (APF) - 2004. The decrease suggested by the map is difficult to understand and is perhaps an artefact of recording. *N. ovata* is largely confined to the lowlands and the site of its altitude limit 410m, 12 plants on grassy spoil, Esgair Fraith lead mine SN741912, 1998, is exceptional.



*Epipactis helleborine* forma *albifolia*,  
Llandygwydd, SN242436 July 1997



*Neottia ovata*

**Neottia cordata** (L.) Rich. (*Listera cordata* (L.) R. Br.) - Lesser Twayblade - Caineirian Bach

A rare plant of damp moorland, known only from two areas in the N of the county where it grows among *Sphagnum* and other mosses in hollows in deep growth of *Calluna*. It was first found in 1983 on the N slope of Pen Creigiau'r Llan SN748948, at 430m altitude (AOC, WMC & DGJ) when three plants were seen; two were found in this area in 1990, and five in 2001. In 1991 two plants were found on the N-sloping moorland 1.5km ESE of Llyn Rhuddnant SN820778 at 500m altitude, and since then it has been found scattered all along this moorland in an area of c.15ha bounded by SN812780-820780-817778-808778, 1998 (AOC & JPW). It has been especially abundant in an area where strips of *Calluna* were being experimentally mown by

ADAS Pwllpeiran at SN812778, 1991 (ATJ), and 79 plants were seen here in 1999 (AOC & IH). Altitude limit *c.*540m, ESE of Llyn Rhuddnant SN815775, 1991 (DCB).

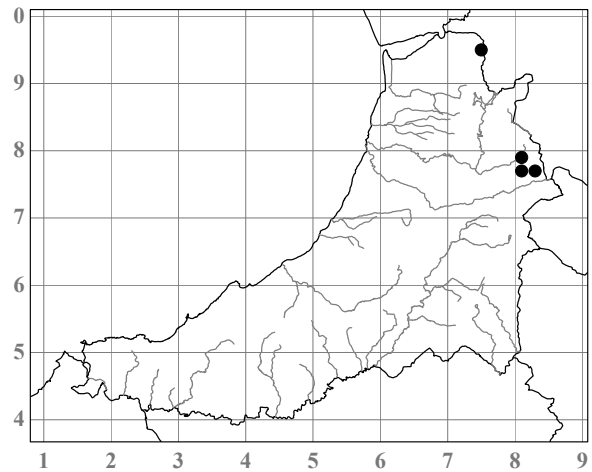
***Neottia nidus-avis* (L.) Rich. - Bird's-nest Orchid - Tegeirian Nyth Aderyn**

Known only from Cwm Woods, Llangorwen, where it has been seen in probably four different places. It was first found as a single plant in 1921 (JLW, Salter Diary 27.10.1924!). In 1924 (Diary 28.8.1924) Salter reported College students finding it there. In 1925 (Diary 24.7.1925) he himself saw five plants, and in 1928 (Diary 6.5.1928, 27.5.1928) "quite fifty plants." In 1930 (Diary 25.5.1930) he saw it "in far Cwm, but not much and likely to be lost through felling of the wood." His later reports were in 1931 (Diary 25.5.1931) when "In Cwm I could not see anything of *Neottia*; its locality is now a mass of *Circaea*"; in 1932 (Diary 5.6.1932) when "*Neottia* is not quite extinct in Cwm, as I succeeded in finding four flowering plants this morning"; and in 1937 (Diary 14.6.1937) when "*Neottia nidus-avis* is reported to be doing well in Cwm." In his Flora (1935) he wrote that it was "apparently in one spot only", so all these records presumably refer to "far Cwm" which must be the woods E of Plas Cwmcynfelin, probably at *c.*SN606835 where one plant was found by a path between conifer and Beech plantations in 1983 (APF).

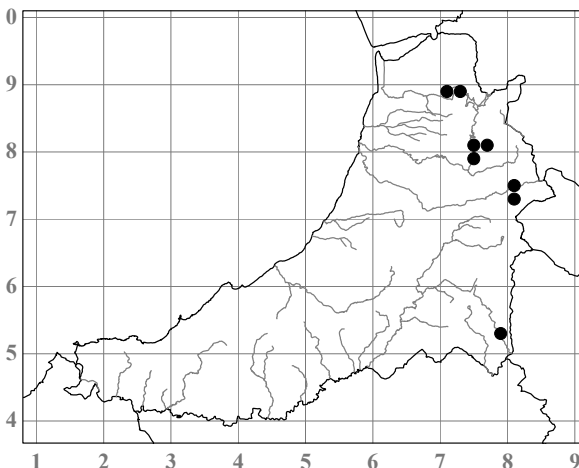
In another part of the woods, under Beech trees 400m WSW of the mansion at SN600833, several plants were seen in about 1942 (AOC!); *c.*20 plants were seen here in both 1957 and in 1958 (DRGH; AOC, see P. M. Benoit in *Nature in Wales* 4: 595 (1958) and 5: 737 (1959)); over the five years 1957-1961 the numbers varied between 15 and 60 (NMW, EHC); it was again reported here in 1974 (WMC); and the more recent counts from here have been at least 26 plants in 1993 (KHo & MEL; AOC; SPC), but only one in 2001. It also seems to have been seen much further E than the original site, as it was reported "known to E. H. Chater in woods near Bow Street ... but these woods have been felled and the orchid has disappeared" and that "The Bow Street locality has been lost for fifteen years, and it is not known whether it was in a part of the woods now felled" (Benoit *loc. cit.*); this locality was probably at *c.*SN617835. Finally there is an undated record: "W. Miall Jones saw this once (one plant) in Cwm Woods, 'in the high part near the College farm and not far from the *O. purpurella*'" (WMC ms. diary in NLW, 13.8.1954); this was presumably near SN604830 or 606830.

***Hammarbya paludosa* (L.) Kuntze - Bog Orchid - Tegeirian Bach y Gors**

Surprisingly never found by Salter, this species was first seen in 1968 on Bryn Bras SN745793 (JPS, TAWD ms diary 8.9.1968), and it has since been found at nine more sites, all in the uplands. At most of these sites the number of individuals varies greatly from year to year (between 107 and nil at one site) so that it is a difficult species to monitor and to assess whether it is increasing or decreasing, but there does seem to have been a definite decrease in numbers over the last 20 years or so. At the six known sites in 1988 there was a total of 237 plants, between 1991 and 1997 the maximum numbers at the by then ten known sites



*Neottia cordata*



*Hammarbya* flushes below N slope of Bryn Bras, view NNW from SN74597997, September 2004





*Hammarbya* flushes on glacial drift, Cwm Du,  
Cwm Ystwyth, view S from SN813748, March 1986

added up to only 152, between 1998 and 2005 at these ten sites it added up to only 18, and in 2008 a survey of all ten sites showed a total of 25 plants (Driver 2008).

It usually grows down the sides of rather acidic upland flushes, in a substrate of decayed mosses (mostly not *Sphagnum*), between the water channel and the closed vegetation of *Sphagnum*, *Juncus kochii*, *Molinia*, *Eriophorum angustifolium*, *Carex viridula* subsp. *oedocarpa*, etc. At Bryn Lluestydd SN72498978 there were 15 plants in 1988, 26 in 1995, 67 in 1996, 1 in 2002, 2 in 2003 and none in 2005 and 2008 (GD). Near Alltgoch-y-mynydd SN708883 there were 38 in 1997 and 23 in 2008 (GD). At Dyffryn Castell lead mine SN77548126 there were 16 in 1988,

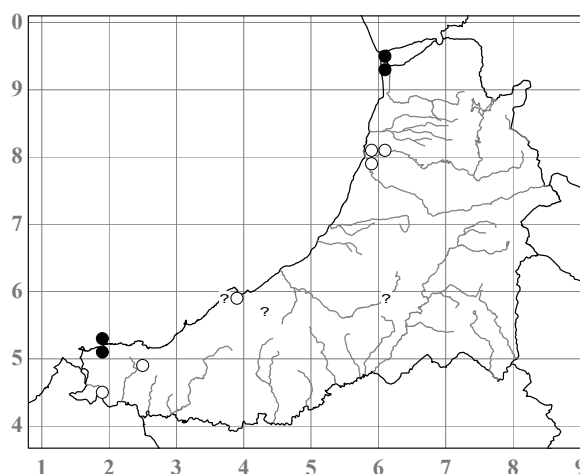
9 in 1992 and none in 2006 and 2008 (GD). Below the N slope of Bryn Bras SN74558001 there were 107 in 1988, none in 1991, 9 in 1992, 6 in 1994, none in 1998, 3 in 1999, 1 in 2002, none in 2005 and 2 in 2008 (AOC; GD). On the S side of Bryn Bras SN74507935 there were 10 in 1988, 6 in 1994, and none in 1998, 2002, 2004 and 2008 (AOC; GD). E of Ty Mawr, Cwm Ystwyth SN81937483 there were 20 in 1983 and none in 1988, 1994, 1999, 2004 and 2008 (GD). SW of Ty Mawr SN81407447 there were 7 in 1977, 7 in 1981, 89 in 1988, 4 in 1994, 3 in 1999 and none in 2008 (GD). Below the E end of Graig Ddu SN813741 there were c.6 in 1991 and none in 1999 and 2008 (GD). Below the W end of Graig Ddu SN81177397 there were 3 in 1991 and none in 1999 and 2008 (GD). On the E side of the Camddwr below Soar y Mynydd SN78705314 there were 5 in 1997, 2 in 1998, 6 in 1999, none in 2000 and 2001, 3 in 2003, 6 in 2004 and none in 2008 (AOC; GD). Altitude limit 380m, Bryn Lluestydd SN724897, 2003.

### ***Spiranthes spiralis* (L.) Chevall. (*S. autumnalis* Rich.) - Autumn Lady's-tresses - Troellig yr Hydref**

Always a scarce plant in the county, but because of the irregularity of its appearances it is difficult to assess whether, and if so by how much, it may have declined; since 1956 it has been recorded from only two sites, the Ynys-las dunes and Mwnt, but before then it had been recorded from more than seven. The earliest record was unlocalised and probably from the 1850s (MMA, Watson 1874). It was reported to Salter from Llanarth c.SN45I in 1895 (TJE, Diary 2.10.1895); as being "common about Llangeitho" c.SN65E in 1904 (DT, Diary 26.3.1904); and from Blaenannerch SN24P (EJT, Salter 1935). Salter himself seems first to have seen it in 1924 (Diary 12.10.1924, 1935) in two wet, clay pastures above Llanbadarn Fawr SN600815, and visited it regularly thereafter, noting that there was "plenty" in 1929, 1932 and 1933, "more than usual" in 1939, only one plant in 1940, and "more of it than I have ever seen previously" in 1941 (Diary 9.9.1941); searches for it here from 1958 onwards proved fruitless.

It was found near Llangoedmor SN14X in about 1922 (ABS, a sheet from M. L. Lewes's herbarium containing no fewer than eleven spikes, collected by H. M. Vaughan, the author and historian who was then living at Plas Llangoedmor; *Spiranthes* has not been recorded there since). Salter (in Wade 1952) also recorded it "In great abundance in several places between New Quay and Cwm Tydi" c.SN35U, and was told of it "on golf links between Pant-teg and the road, one mile south, south-east of New Quay" SN3958 (FD). In 1951 c.30 spikes were found among Gorse on the SW side of Pendinas, Aberystwyth SN584799, two were seen in 1956, but none since.

*Spiranthes* was first recorded in the Ynys-las dune slacks SN69B in 1958 (EHC), and since then it has been seen in several different areas, in the slacks both E and W of the road, and on drier grassy areas near the



road, the numbers and locations varying considerably from year to year. Some 400 spikes were seen in 1978 (JPS); 12 in 1986 (APF); 6 in 1988; 1 in 1991; none in 1992 (SPC); 4 in 1999 (JHi); 7 in 2000 (JHi); *c.*12 in 2002; 3 in 2003 (MB); 35 in 2004; none in 2005; and 18 in 2008 (MB).

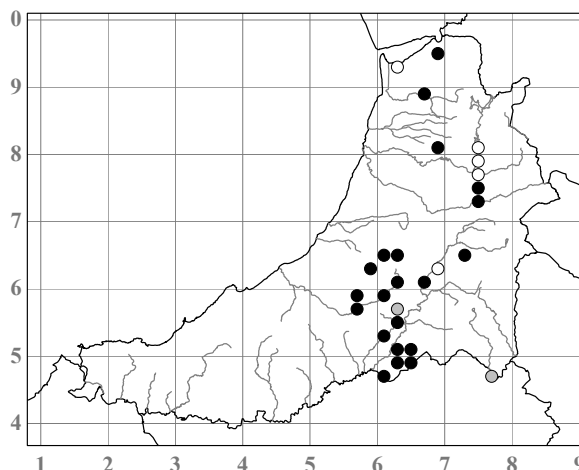
At Mwnt it was first found in 1981 (RLa) when 3 spikes were seen, and it has since been seen in several different places on the sandy grassland and Bracken slopes E of the church SN1951-1952; 3 spikes again were seen in 1988; 18 in 1990 (APF); 25 in 2002 (AOC, SDSB & DKR); 7 in 2005; and 5 in 2006 (AOC, PAS & MT).

[*Herminium monorchis* (L.) R. Br. - Musk Orchid - Tegeirian Mân-flodeuog

Erroneously recorded from the Llyfnant SN79 by Morgan (1863).]

***Platanthera chlorantha* (Custer) Rchb. (*Habenaria chlorantha* (Custer) Bab., non Spreng.) - Greater Butterfly-orchid - Tegeirian Llydanwyrdd**

Not as common as *P. bifolia*, as Salter (1935, and in Wade 1952) remarked; he gave 12 sites for it, and since 1970 it has been seen in 18, but there is no real evidence of change. It occurs chiefly in neutral, unimproved pastures and hay meadows, but also sometimes in slightly more acidic, heathy pastures, and is more often in sizeable colonies and less often as solitary plants than *P. bifolia*. The largest colonies are probably at Winllan, Talsarn SN566572 where it first appeared in the hay meadow as one plant in 1990 (IWC), after *c.*12 years of sympathetic management, and later counts (IWC & KC) included one plant in 1992, 10 in 2001, 17 in 2003, *c.*100 in 2005 and 400-500 in 2006; and in hay meadows at Ger-y-nant, Bontnewydd SN614657, where 16 plants were seen in 1998 (SG & PCu), 130 in 2000 (SG) and over 300 in 2003 (AOC & SG). Other extensive populations include one in the hay meadows above Hafod SN7573, 1981 (AOC & DGJ) - 2004, and several in small pastures and hay meadows *c.*1.5km SSE of Llanfair Clydogau *c.*SN6350. Numbers at all sites vary greatly from year to year. At Caeau Lletydybi, Llangybi SN603534 counts have been 5 in 1971, 126 in 1981 (AOC & MC), *c.*200 in 1992 (RH), 75 in 1993 (LRG), *c.*40 in 1996 (LRG), 26 in 1997 (IH), 20 in 1998 (IH), 12 in 1999 (IH), 157 in 2004, and 306 in 2005 (LW). As might be expected from the latitude (Bateman & Sexton 2008) the mean spur length of 44 plants in the open at Winllan was 29.5mm, 2008. Altitude limit 310m, pasture N of Llidiardau, Penuwch SN59586319, 1992, *c.*20 plants (DGJ) - 1996, one plant.

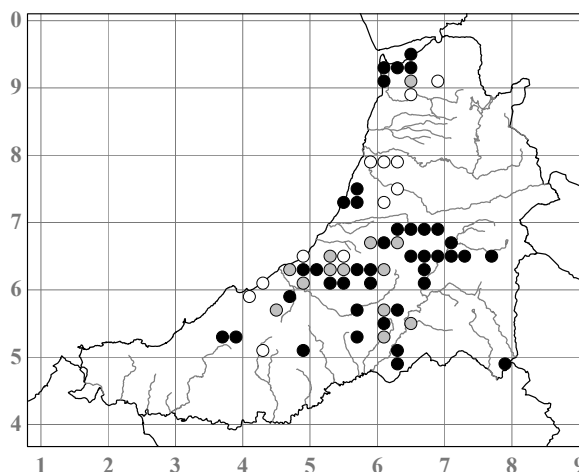


***Platanthera* × *hybrida* Brügger (*P. bifolia* × *chlorantha*)**

Two plants from a population on the river terrace by the Afon Teifi on Cors Caron above Pont Eionon SN672616, 2008, have been confirmed as this rare hybrid by RMB on morphometrical grounds. As well as the generally intermediate disposition of the pollinia, the 30 measurable plants in the population had corolla-spurs only 18-26mm (mean 21.7mm), and it seems possible that the whole population is of hybrid origin.

***Platanthera bifolia* (L.) Rich. (*Habenaria bifolia* (L.) R. Br.) - Lesser Butterfly-orchid - Tegeirian Llydanwyrdd Bach**

An occasional plant of a wide range of habitats, in both the drier and wetter parts of rhos pastures, on wet heaths, in *Molinia* tussock mire, in poor fen in valley mires, in peaty swamps and in hay meadows. It is often seen as solitary plants, but is sometimes in large colonies, for example in the fen and damp sandy pasture by the old course of the Afon Leri at Ynys-las SN608921, 1986-2003. The largest populations seen have been of at least 250 spikes in mire at the NW corner of Cors Caron SN689649, 2004



(APo); 143 spikes in marshy pasture just NE of the Taliesin carr SN654913, 1983 (APF); and of 72 on the Rhos Rydd valley mire c.SN573740, 2005 (SDSB & DKR). Only occasionally does it grow with *P. chlorantha*. At Winllan, Talsarn SN566572 it first appeared in the hay meadow as two plants in 2003 (IWC & KC) after c.25 years of sympathetic management, 13 years after *P. chlorantha* appeared. Salter (1935, Wade 1952) described it as common, and listed 24 localities, and since 1970 it has been seen in about 55, so there is no evidence of change. Altitude limit 300m, swampy mire at SW end of Llyn Eiddwen SN604667, 2000.

**Pseudorchis albida** (L.) Á. Löve & D. Löve (*Habenaria albida* (L.) R. Br.) - Small-white Orchid - Tegeirian Bach Gwyn

Recorded from six sites in the county, but from only two of these in the last 50 years. It is of such remarkably irregular occurrence at some of these sites that it is unwise to say that it is definitely extinct at any of them. The earliest record was in the early 1800s, “On the exposed grassy hills, which surround Hafod”, attributed to both Mariamne Johnes of Hafod and Mr Todd, the Hafod gardener (Turner & Dillwyn 1805), and J. E. Smith also mentions that at Hafod “several of the exposed grassy parts of the hills, where the soil is very good, bear the *Satyrion albidum*” (Smith 1810) and had a specimen from there (LINN, Herb. Smith); it was not recorded again there until 1981, when seven spikes were found on a rocky knoll in a pasture 500m W of Hafod SN754733 (DAW *et al.*), but has not been refound in spite of almost annual searches. It was collected from “Bwlch mountain”, an unidentified locality, in 1854 (K, Herb. Watson, MMA).

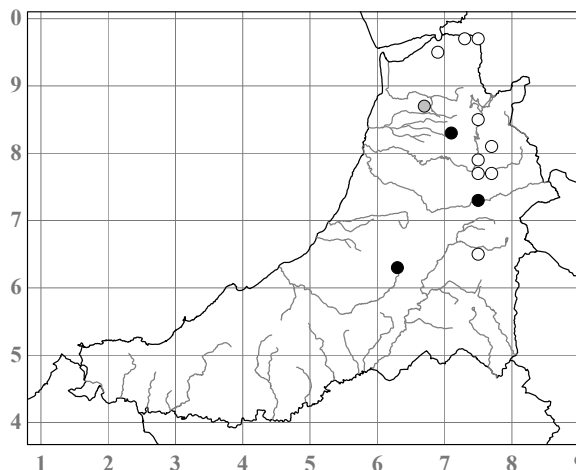
Salter found one plant near Strata Florida in 1892 (Diary 23.6.1892, 1935), and found one plant again there in 1925 (Diary 11.7.1925), having failed to refind it in 1924, and failed again in 1926, 1929 and 1936; in 1965 it was refound there, on the roadside bank 500m ENE of the abbey SN75206595 (APC, *Nature in Wales* 9: 218 (1965), and *in litt.* 1979), but in spite of searches in most years since it has not been seen again. Salter found two spikes near the George Borrow Hotel, Ponterwyd in 1901 (Diary 22.6.1901), and WMJ saw it in a pasture 250m SSW of the hotel SN745803 with Salter, probably in the 1930s (W. M. Condry ms. diary 13.8.1954, and WMJ pers. comm.); it has been searched for in vain there often since. It was seen near Devil’s Bridge c.SN77N in 1916 (TS, Salter 1935), and two or three plants from there were reported to Salter in 1930 (Diary 17.6.1930, 1935). The only other records are from Ysbyty Cynfyn SN77P (PMH & WAS, Wade 1952), and, probably unreliably, from Cors Fochno SN69 (JAW, Wade 1952).

**Gymnadenia densiflora** (Wahlenb.) Dietrich (*G. conopsea* auct. pro parte) - Marsh Fragrant-orchid

Salter’s record of *G. conopsea* from the coastal till slope at Penyrerhyd, Gwbert SN14U (Diary 9.7.1938, Wade 1952) is most likely to have been this species. The only other site for it is in the base-rich flushes and fens by the Afon Mwldan near Penparc SN14Z and 24E, 1986 (DAW & DGJ) - 2006 (conf. FR in 1990 from photos).

**Gymnadenia borealis** (Druce) R. M. Bateman, Pridgeon & M. W. Chase (*G. conopsea* auct. pro parte) - Heath Fragrant-orchid - Tegeirian Pêr

All the pre-1950 records of *G. conopsea*, except for the one that is referable to *G. densiflora* (see above), almost certainly refer to this now rare and decreasing orchid and they are shown on the maps as this. It no longer occurs in any of the eight or so sites where Salter knew it: Cwm Rhaiadr, Llyfnant c.SN7596 (1935); Nant y Castell, Llyfnant c.SN7396 (Diary 30.6.1938); Cwm Einion c.SN6994 (Diary 19.6.1895), and seen near here “in a field behind Lapley Grange [SN685947]” in c.1955 (WMC); Aberpeithnant c.SN7584 (1935); roadside between Ponterwyd and Dyffryn Castell c.SN78Q (1935); near Parson’s Bridge SN77P (Diary 16.6.1904, 27.6.1904), probably the same locality as Ty-mawr where it was collected in 1935 (see below); Devil’s Bridge (Diary 19.6.1900, 22.6.1901, 26.6.1924), probably a meadow 200m SE of Ty’n-llwyn SN747770 where WMC was shown the plant c.1948 by WMJ (WMJ also said that it occurred nearby near Llaneithyr SN761771), and the same site where it was collected in 1934 (see below); and near Strata Florida c.SN7465 (1935). *G. borealis* was definitely the species that was collected from the “Mynach Valley” in 1934 (NMW, PCh, det. AOC), probably one of the Devil’s Bridge sites mentioned





above; and that was collected in 1935 from “Ty Mawr, near Devil’s Bridge”, SN77P (NMW, PMH, det. AOC).

Since 1950 it has been recorded from only five sites. It was seen on a heathy N-facing pasture slope above the Cwmerfyn lead mine SN704824 from c.1950 until 1965; the slope was ploughed soon after this and no plants were seen on frequent visits until a few appeared in 1977, c.60 plants were seen in 1986 (JS), 20 in 1988 (conf. FR in 1990 from photos) and one in 2004. It has been seen in small numbers in several places in the pastures and hay meadows at Cae’r-meirch, Pontrhyd-y-groes SN7573, 1980-2003 (AOC; DGJ & DAW; KH). There is a good colony on a flushed slope by the Aeron Fechan S of Blaenpennal church SN6263, 1978 (DGJ, CF & DAW) - 2004. What was presumably this species was reported as *G. conopsea* from a pasture upstream from the Mynydd Gorrddu reservoir, Elerch c.SN675860 in the 1970s (BF, per DGJ). Altitude limit 300m, Cae’r-meirch (as above).

×**Dactylodenia evansii** (Druce) Stace (*Dactylorhiza maculata* × *Gymnadenia borealis*)

Recorded four times, but not seen for over 70 years, and, judging from the sites and habitats and the fact that *G. conopsea* has never been recorded in the county, most likely to have been this hybrid and not *D. maculata* × *G. conopsea* (×*Dactylodenia legrandiana* auct.) as it was naturally originally recorded in each case. It was recorded from Tregaron SN66 in 1915 (TS, *BEC Rep.* 5: 55 and 166 (1918)). Salter collected a specimen in 1938 which he labelled “Glasbwl” SN79I or N (NMW); he went to the Llyfnant only once that year, according to his diaries, and presumably realised later that he *had* found the hybrid and never corrected the entry that reads (Diary 30.6.1938): “From Glasbwl I struck up the Nant y Castell stream, which here joins the Llyfnant. On grassy slope beyond the wood I at last found *Gymnadenia*, growing with *maculata* which much outnumbered it, but I could not find its hybrid.” Godfery (1933) recorded and illustrated it from “Mountain pastures, Devil’s Bridge... growing with both parents [i.e. *D. maculata* and *G. conopsea* sens. lat.], June 30<sup>th</sup>, 1919. Five specimens seen, in company with Dr. T. Stephenson”, and a flower from here was also illustrated in Stephenson & Stephenson (1921b); this was at Ty-mawr SN757790 (see letter from WAS in NMW, and Wade 1952), and a specimen labelled “Near Devil’s Bridge”, 1935 (BM, PMH), along with a specimen of *G. borealis* collected by PMH on the same occasion, came from here too.

**Coeloglossum viride** (L.) Hartm. (*Habenaria viridis* (L.) R. Br.) - Frog Orchid - Tegeirian y Broga

Salter (1935) described this orchid as “of occasional occurrence”, but gave only three sites for it. He apparently saw it only at Rhydyfelin c.SN5979, one plant in 1906 (Diary 22.6.1906), and at Llywernog c.SN7280 in 1926 which he oddly does not mention in his diary. The third record is from Marshall (1900) who saw it on a “Grassy slope, Henfynyw; in considerable quantity” c.SN4461 in 1899. It was next seen in 1993, when one spike was found on a pingo rampart at Rhos Glynyrhelig SN49675147, but it has not been seen there since in spite of repeated searches. In 1993 c.30 plants were found in unimproved pastures above Llanfair Clydogau SN64 and 65 (AOC & LRG); this seems to be the only extant population in the county, and although c.200 plants were seen here in 1994, several being white-flowered and completely lacking in anthocyanin, only c.10 were seen in 1997, only one in 2005, and four in 2009.

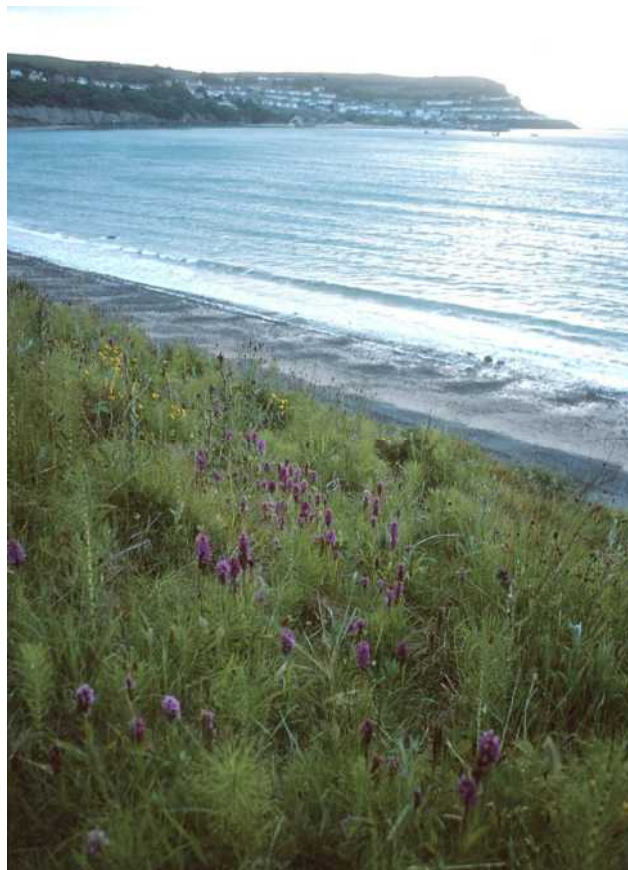
**Dactylorhiza**

The Marsh Orchid populations in the county, especially those around Ynys-las, have attracted many botanists who have been interested in this group over the last century. H. W. Pugsley visited in 1905, and described *Orchis latifolia* var. *cambrica* (now considered a synonym of *D. incarnata* subsp. *pulchella*) from Borth (1935). The Revd T. Stephenson, a Methodist minister, and his son, T. A. Stephenson, who became Professor of Zoology at Aberystwyth, did much of their work here and most notably described *Orchis purpurella* from the Clarach valley. Salter, like many of us, was clearly somewhat baffled by the group, and seems to have discussed it with T. Stephenson only when the latter returned to Aberystwyth in the last two years of Salter’s life. R. H. Roberts knew the Ynys-las populations well, and used them in his biometric studies to establish *D. majalis* subsp. *cambrensis* (1961). P. D. Sell visited Ynys-las in 1977. J. P. Savidge of the Aberystwyth Botany Department studied the local Marsh Orchids extensively, and supervised a PhD thesis on the Ynys-las populations by P. A. Lintin (1980). M. N. Jenkinson (1986) produced a report on several North Wales sites that included biometric surveys from Ynys-las. D. C. Lang (1990), accompanied by A. P. Fowles, visited five sites in the county. The most detailed survey of the Ynys-las populations was by F. Horsman (1991), who visited in the three years 1987-1989, and then in 1991 counted 17,337 flowering plants of seven taxa, as well as four hybrids; he also visited several sites further S in the county. H. Æ. Pedersen (2001) included Ynys-las in his biometric study of the variation in *D. incarnata*. The results of genetic analyses, based on extensive

sampling from several different sites by R. Cianchi in 2001 and 2002, await publication.

Inevitably, there have been differences in the interpretation of the taxa present, and this, combined with changes in taxonomy and the considerable nomenclatural problems in coping with the earlier records, makes summarising what is present in the county difficult. In particular, it should be noted that Horsman (1991), supported by Roberts (1961, and *in litt.* c.1988), was convinced that neither *D. purpurella* nor *D. praetermissa* were present along the old course of the Afon Leri SN609921, whereas Lintin recorded *D. purpurella* there, and Lang recorded both species as abundant there and also recorded hybrids involving both species. The taxonomy of Bateman (2006) is in general followed here so far as genera and species are concerned.

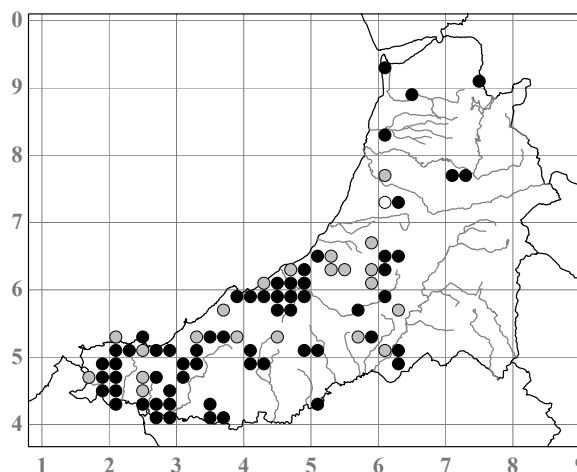
Mixed populations of Marsh Orchids, especially in dune systems that are constantly evolving, but also in pastures and fens, change both in their genetic composition and in their location, and there will always be an interest in expert surveys such as these. For the same reasons, it is the sites of these mixed populations (and there are many more than are mentioned below) that need conserving, and the detailed locations for several of the best of them are given here because the threat to these plants is not from misguided collection of specimens but from the destruction of their habitats because of ignorance of their significance.



*Dactylorhiza* and *Equisetum telmateia*  
on boulder clay cliff slope, Llanina, view  
W from SN403596, June 1994

### ***Dactylorhiza fuchsii* (Druce) Soó (*Orchis fuchsii* Druce) - Common Spotted-orchid - Tegeirian Brych**

A frequent plant of damp, especially shaded pastures, woodlands and wood margins, scrub, valley mires, damp till slopes and flushes on the coast, road verges and graveyards, becoming rare in the uplands. Populations, and plants within them, are very variable, and not only because of hybridisation, and most are of var. **fuchsii**. A population of c.40 plants in a pasture at 270m altitude, above Llanfair Clydogau SN6349, 1994, agreed exactly with var. **alpina** (Landwehr) R. M. Bateman & Denholm, and a population in a damp pasture 1km NE of Pennant SN51956407, 1997 (AOC & LRG), contained a mixture of this variety, var. *fuchsii* and intermediates between the two. Altitude limit 420m, a colony on the line of the old tramway above the FC road, Esgair Fraith lead mine SN74159125, 1998.



### ***Dactylorhiza* ×*transiens* (Druce) Soó (*D. fuchsii* × *maculata*)**

Only once recorded, from a NE facing pasture above Plas Cwmcynfelin SN603832 in 1994 (SPC); the site became overgrown soon after.

### ***Dactylorhiza* ×*grandis* (Druce) P. F. Hunt (*D. fuchsii* × *praetermissa*)**

A rare hybrid, growing with the parents and recorded from only six sites: NE facing pasture above Plas Cwmcynfelin SN603832 (now overgrown), 1990 (Lang 1990); base-rich fen by the Afon Mwldan SN197483, 1991 (Horsman 1991a) and 1993 (SPC & AOC); another fen nearby at SN201489, 1993 (SPC & AOC);



rank pasture 500m NNW of Llanarth church SN421582, 1994 (AM, det. AOC); flush above the sea cliffs, MoD site, Aber-porth SN248524, 1994; and a rhos pasture near Nebo SN538650, 1997 (AOC & LRG).

***Dactylorhiza* × *venusta*** (T. & T. A. Stephenson) Soó (*D. fuchsii* × *purpurella*)

A single plant was found by Horsman (1991a), the second parent being var. *purpurella*, in the slack E of the road at the Ynys-las dunes SN611938.

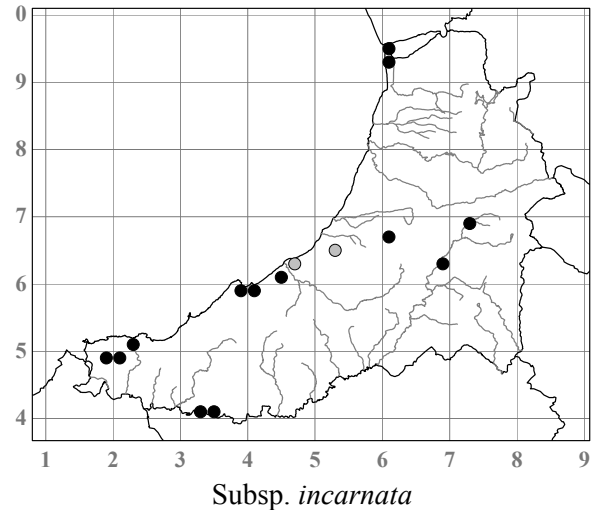
***Dactylorhiza incarnata*** (L.) Soó (*Orchis incarnata* L., *O. strictifolia* Opiz, *O. latifolia* auct., pro parte) - Early Marsh-orchid - Tegeirian-y-gors Cynnar

**Subsp. *incarnata***

This subspecies with comparatively pale, flesh- or salmon-coloured flowers is an uncommon plant of damp pastures, fens, base-rich flushes and slumping till on the coastal slopes. Most of the records are of very small populations or of single plants, but among the larger have been those on the coastal slumping till at Llanina SN402596, where there were 26 spikes in 1982, 3 in 1988 and none in 1991; and in base-rich flushes along the Afon Mwldan c.SN1948, 1986-2003 (Horsman 1991a, etc.). Horsman (1991a) was not convinced that this subspecies occurred in the dune slacks at Ynys-las. Occasional plants do however sometimes occur there that seem indistinguishable from it, and Lang (1990) mentions finding two plants “morphologically resembling” subsp. *incarnata* in the slack at SN608937, and one such plant was seen in the SW slack SN605932 in 2001 (SPC).

**Subsp. *coccinea*** (Pugsley) Soó

This subspecies, usually a small plant with crimson or brick-red flowers, occurs only in the dune slacks at Ynys-las and in damp grassland by the golf course nearby SN607928-611939. In recent years it has been the most abundant marsh orchid there, with 12,600 flowering plants being counted in 1991 (Horsman 1991a). Its



*Dactylorhiza incarnata* subsp. *coccinea* in flooded dune slack Ynys-las, SN69, 30 June 1967 (photo E. H. Chater)



presence at Ynys-las has been confirmed by many others, including Jenkinson (1986), Lang (1990) and Pedersen (2001), but P. D. Sell (pers. comm.) on seeing the populations in 1977 thought that although some plants approached subsp. *coccinea*, the true subsp. *coccinea* was not there. Lang (1990) remarked that in the slack at SN608938 the flowers of subsp. *coccinea* ranged from scarlet to pale pink.

**Subsp. *pulchella* (Druce) Soó**

This subspecies with reddish-purple flowers is apparently rare, with only four reliable records. Horsman (1991a) found a single plant at the edge of the *Schoenus* colony in the slack at SN60909380 at Ynys-las; two spikes were found in a marshy meadow at the edge of Cors Caron below Ty-coed SN687620 in 1993 (RL); six spikes were found in the rather acidic swampy mire at the SW end of Llyn Eiddwen SN60416671 in 2000 (BSBI Field Meeting) and five in 2007 (SDSB & DKR), at 305m altitude; and there is a 1950-1970 field record at BRC from SN76 (PMH). Stephenson & Stephenson (1923) stated that “In West Wales, in Borth and Tregaron bogs, all the *incarnata*’s are purple, and the habit of the plant is somewhat distinct. The leaves tend to a yellowish tone, and are comparatively short and generally erect.” It is not clear though to which subspecies they would have referred these plants. Pugsley (1935) described *Orchis latifolia* var. *cambrica* based on specimens he collected at Borth in 1905, and this is now included in subsp. *pulchella* (Bateman & Denholm 1985, Sell & Murrell 1997). Altitude limit 305m, 2007 (see above).

***Dactylorhiza* × *latirella* (P. M. Hall) Soó (*D. incarnata* × *purpurella*)**

Horsman (1991a) recorded a single plant of the very rare hybrid between what he called *D. incarnata* subsp. *coccinea* and *D. majalis* subsp. *cambrensis* in the main Ynys-las dune slack at SN609938. The previous year Lang (1990) had seen a single plant “possibly this hybrid” in the same slack. In 1989 Horsman had recorded a hybrid here between what he called *D. incarnata* subsp. *pulchella* and *D. majalis* subsp. *cambrensis*, and in 2003 SPC recorded a hybrid here with *D. incarnata* subsp. *incarnata* and *D. majalis* subsp. *cambrensis* as the putative parents.

***Dactylorhiza* × *wintonii* (A. Camus) P. F. Hunt (*D. incarnata* × *praetermissa*)**

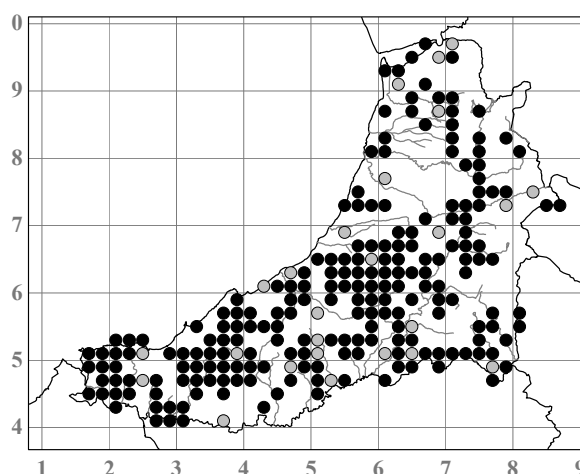
This hybrid was found by Horsman in the main Ynys-las dune slack at SN608938 in 1989, but not in his later survey (1991a), the putative *D. incarnata* parent being subsp. *pulchella*. P. D. Sell (pers. comm.) saw the same hybrid here in 1974.

***Dactylorhiza maculata* (L.) Soó subsp. *ericetorum* (E. F. Linton) P. F. Hunt & Summerh. (*Orchis ericetorum* (E. F. Linton) E. S. Marshall, *O. maculata* L. subsp. *ericetorum* E. F. Linton) - Heath Spotted-orchid - Tegeirian Brych y Rhos**

A common plant of damp usually acidic pastures, mires and wet and dry heaths. It is very characteristic of the rhos pastures and valley mires, as well as of the coastal slopes and is often in graveyards and on road verges, and extends well into the uplands. At Ynys-las it is by the old course of the Afon Leri SN608921, 2005, but generally not in the dune slacks. There is great variation in flower colour. T. A. Stephenson recorded a presumably white-flowered form near Tregaron which he provisionally called “subvar. *leucantha* mihi” (*BEC*



*Dactylorhiza maculata*, old course of the Leri, Ynys-las, view E from SN608921, June 2008





*Dactylorhiza maculata* by Sarn Helen, view E from SN641583, July 1986

*Rep.* 5: 53 (1918)), but such plants are not very rare. Altitude limit 520m, moorland just S of the SE lake, Llynnoedd Ieuan SN800810, 2003 (AOC & PAS).

***Dactylorhiza* × *carnea*** (E. G. Camus) Soó (*D. maculata* × *incarnata*)

This hybrid has been recorded with certainty only by Horsman (1991a) from a calcareous flush by the Afon Mwldan SN201488. Material from Cwm Einion c.SN6994 sent by WMC to V. S. Summerhayes in 1954 was thought by the latter to be probably this hybrid (*WWFS Nature Note* 19: 2 (1954)).

***Dactylorhiza* × *hallii*** (Druce) Soó (*D. maculata* × *praetermissa*)

There are five records of this hybrid. Lang (1990) found it in the damp pasture above Cwm Cynfelin SN603832, as well as by the old course of the Afon Leri SN608921. Horsman (1991a) found it in a base-rich fen by the Afon Mwldan SN19704830. Eight clumps were found in a flush on the MoD site, Aber-porth SN248524 in 1994. It was found near Bowls Farm 2km SSE of Blaenporth SN268468 in 2005 (SPC, conf. AID). Much earlier, Salter (Diary 11.6.1942) had recorded "With regard to the Orchises collected by Mr. Miall Jones, Dr. Stephenson [TS] writes 'The plant with unspotted leaves is *praetermissa*. The one with the small spots on the leaves may be *praetermissa* × *ericetorum* [i.e. *maculata*]. I think the leaf-tips with all spots and no lines may point the same way, as also the more slender spurs"; this material was from Cae Sieffre, Ty-llwyd SN593774, as related by WMC (MS Diary 13.8.1954, NLW).

***Dactylorhiza* × *formosa*** (T. & T. A. Stephenson) Soó (*D. maculata* × *purpurella*)

There are four records of this hybrid with subsp. *ericetorum* and *D. purpurella*, presumably var. *purpurella*, given as the parents: near Cwm Woods c.SN6083 (PMH & WAS, Wade 1952); by the Afon Peris, above Llan-non c.SN5467, Salter (Wade 1952); in rhos pasture, Comins Capel Betws SN616572, 1981 (JPS); and one plant by the old course of the Afon Leri SN609921 (Lang 1990).

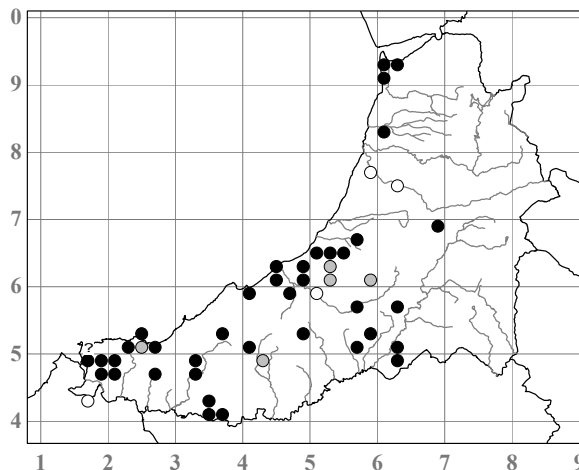
This hybrid, but with *D. purpurella* var. *cambrensis* as one of the parents, was described new to science as *Dactylorhiza* × *dinglensis* (Wilmott) Soó nothosubsp. *robertsii* by F. Horsman (1991b), based on material collected by the old course of the Afon Leri SN608921 in 1987 (NMW, FH, conf. RHR). Horsman at the time called the parents *D. maculata* subsp. *ericetorum* and *D. majalis* subsp. *cambrensis*, and

commented that Stephenson & Stephenson (1921) may well have been referring to this hybrid when, in describing *O. latifolia* from here, they stated “Here are many dark forms along with some lighter ones which may be hybrids, where *O. ericetorum* is present, but no trace as *O. praetermissa*”. Over the next few years Horsman described this hybrid as common here.

***Dactylorhiza praetermissa* (Druce) Soó** (*Orchis pardalina* Pugsley, *O. praetermissa* Druce, *O. latifolia* auct., pro parte) - Southern Marsh-orchid - Tegeirian-y-gors Deheuol

As widespread as, but slightly less common than *D. purpurella*, and often favouring more base-rich and less peaty sites, this Marsh Orchid with a generally southern distribution in Britain occurs in damp pastures, hay meadows, fens, open scrub, flushes and slumping till on the coastal slopes, wet heaths and dune slacks. It can be an invasive garden weed, as at Winllan SN567574, 1990-2004 (IWC). It is uncommon at Ynys-las, Horsman (1991a) counting only 186 flowering plants in the slacks. Stephenson & Stephenson (1920a, 1920d) mentioned its occurrence at the type locality of *D. purpurella* and elsewhere near Aberystwyth, and many of their records of *Orchis latifolia* probably refer to this species. Stephenson (1943) described it as “very local in Cardiganshire, and where it is found it is in very small numbers”. In the previous year he had named for Salter (Diary 11.6.1942) material collected by WMJ from an old meadow, Cae Siefre on Ty-llwyd farm SN593774, and the circumstances of this record are related by WMC in his MS Diary 13.8.1954 (in NLW); Wade (1952) surprisingly implied that this was the first confirmed record for the county. Whellan (1942) recorded it, probably reliably, from Pantygrwndy SN162439, close to the county boundary, and from Tywyn c.SN1649, both in 1941. Earlier records must be considered unconfirmed.

Horsman (1991a) found a single plant by the ditch E of the road in the Ynys-las dunes SN610939 which he suspected of being *D. majalis* × *praetermissa*, an unrecorded hybrid, and Lang (1990) found plants by the old course of the Afon Leri SN608921 which he considered likely to be the same; in the absence of any further information they are best disregarded.



***Dactylorhiza ×insignis* (T. & T. A. Stephenson) Soó** (*D. praetermissa* × *purpurella*)

This hybrid was described from the type locality of *D. purpurella* near Aberystwyth by Stephenson & Stephenson (1922). Salter (Diary 9.7.1942) reported that “Dr. Stephenson [TS] found on the wet field off the Capel Dewi road a specimen or two of *O. praetermissa*, also of what he considered to be *O. purpurella* × *praetermissa*”; this would have been at c.SN6282. Stephenson (1943) recorded this hybrid “in a damp pasture about three miles from Aberystwyth, towards Borth”, implying rather further N. There is a specimen in BM labelled as “*Orchis praetermissa* Druce × *purpurella* T. & T. A. Steph. damp field between Aberystwyth & Bow Street 20.6.1943 T. Stephenson (per H. W. Pugsley)”; Stephenson must have sent the specimen to Pugsley, and the locality accords more with the c.SN6282 one. Wade (1952) gives a record from Moel Ynys (PMH & WAS), and, under *O. pardalina* [*praetermissa*], quotes Salter as saying “Botanists who have studied this colony [at Moel Ynys Pool SN607923] consider that there may have been some admixture with another species, perhaps a cross with *O. purpurella*.” It is surprising that this hybrid has not been recorded since, as the two parents so frequently grow together. It is unfortunate that the name *O. ×insignis* has priority over *Orchis ×salteri* T. Stephenson (1943).

***Dactylorhiza purpurella* (T. & T. A. Stephenson) Soó** (*Orchis purpurella* T. & T. A. Stephenson)

Var. **purpurella** - Northern Marsh-orchid - Tegeirian-y-gors Gogleddol

Widespread in damp pastures, hay meadows, fens, dune slacks, on clay slopes on the coast and sometimes in quite acidic flushes and mires. It is a characteristic plant of the rhos pastures, and is surprisingly often found as single plants on their own or with other Marsh Orchids. The biggest population, of several thousands of plants, was in a damp clay pasture on the coast at Charlie’s Field, Llanina SN403596, 1994, but was destroyed in that year. At Ynys-las SN69B, C, Horsman (1991) counted 431 plants, 276 being along the edge of the



Golf Course and 155 being in the slacks. The species has a northerly distribution in Britain, and the county is probably the one in Wales where the greatest overlap with *D. praetermissa* occurs.

It was described from the county, as *Orchis purpurella*, by Stephenson & Stephenson (1920). They gave the type locality only as “near Aberystwyth, in a very old hill-pasture, along with several other species of Orchids, which include *O. praetermissa* (Druce), *O. latifolia* L. [*D. ?incarnata*], *O. ericetorum* Linton, and *O. fuchsii* Druce.” Salter (Diary 13.6.1937) wrote “On the boggy field below Cwm found *Orchis purpurella* in its *locus classicus*. There was plenty of it and no doubt some hybrids with *maculata*.” Cwm is at SN603834, and the field must have been one of the ones by the Afon Clarach here, although the only boggy fields shown on the 1905 OS 25 inch map seem too far away, at SN607839 and 598837, and as Cwm itself is at only 50m altitude it seems odd to describe anywhere below it as a “hill-pasture.” The *locus classicus* must remain uncertain. Stephenson (1930) wrote that “At the original Aberystwyth station, where for some years the plant grew in hundreds, it almost disappeared for some seasons; but it increased in number recently”; *D. purpurella* no longer grows in this valley, although it is in the same tetrad in a meadow at Cefn Hendre SN60618215, 2004.

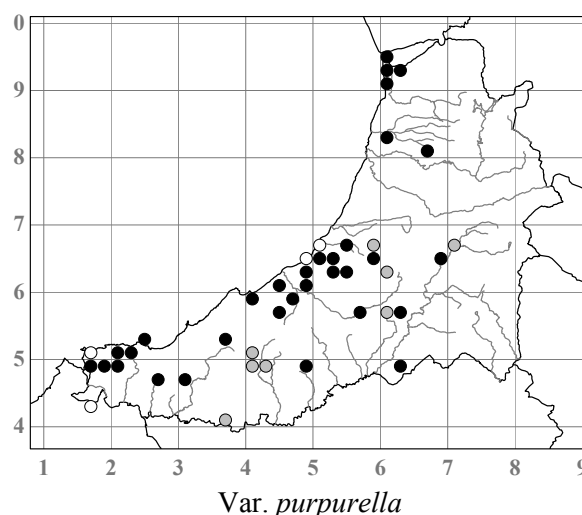
Var. **maculosa** T. Stephenson was found by Horsman (1991) on the slumping till cliff slope at Llanina SN403596, and, as part of this site escaped destruction in 1994 and during later excavations, it may still exist here; it is otherwise known only from Scotland and N England.

Var. **cambrensis** (R. H. Roberts) R. M. Bateman & Denholm (*Dactylorhiza majalis* (Rchb.) P. F. Hunt & Summerh. subsp. *cambrensis* (R. H. Roberts) R. H. Roberts) - Tegeirian-y-gors Llydanddail

Now abundant at Ynys-las, this variety was originally described by Roberts (1961) from Anglesey as a subspecies of *Dactylorhiza majalis*, and the biometric study on which his new taxon was based was carried out on populations at Newborough Warren and at Ynys-las, at that time the only two known. Stephenson & Stephenson (1921) knew these plants at Ynys-las and had included them under their *Orchis latifolia*. Roberts's Ynys-las colony was in the marsh by the old course of the Afon Leri SN608922, and in 1958 he estimated that there were c.1,500 flowering plants of this taxon there (Horsman 1991a); the only other Marsh Orchid present was *D. maculata*. In 1979 Lintin (1980) counted 350 here. In 1988 Horsman estimated c.1,500, the same number as Roberts, but in 1991 he counted 2,806. Meanwhile it had also been found further N, and Lintin counted 210 plants along the E side the Golf Course at SN607923 and 607928 in 1979, where Horsman counted 148 in 1991. In the dune slacks Lintin counted 140 in 1979, Jenkinson (1986) reported it as “abundant (1,000s) throughout dune system, in slacks and on drier slopes and damp ditches”, and Horsman counted 905 plants (in five different areas) in 1991. Horsman's 1991 total for the whole Ynys-las area was 3,859. Var. *cambrensis* was recorded at two other sites in 1991 (Horsman 1991a): at the top of the till cliffs at Llanina SN403596 (this colony was destroyed in 1994); and in a base-rich fen by the Afon Mwldan SN197483. A semi-albino plant was seen in the Ynys-las slacks by Horsman (1991c). Jenkinson (1986, where he called our plant subsp. *occidentalis* var. *cambrensis*) noted “Some plants in one slack apparently intermediate between var. *cambrensis* and subsp. *traunsteinerioides*”. Some plants at Ynys-las have been considered to be *D. majalis* subsp. *majalis* according to Savidge (pers. comm.), but this taxon is considered not to occur in Britain by Bateman (2006).

Horsman (1991) recorded *D. purpurella* subsp. *majaliformis* E. Nelson ex Løjtnant (now considered a synonym of var. *cambrensis* but then thought to occur otherwise only in Scotland) in two sites, in both of which it was growing with what he called subsp. *purpurella* and *D. majalis* subsp. *cambrensis*: a single plant was in the main slack at Ynys-las SN609938, and it was also on top of the till slope at Llanina SN403596, although the latter site was destroyed in 1994.

Plants considered to be hybrids between *D. majalis* subsp. *cambrensis* and *D. purpurella* were recorded by Lintin (1980), who counted 106 plants of them in the Ynys-las dune slacks c.SN609939; Lang (1990) recorded them in the same place, amongst *Molinia*; and Horsman (1991c) found them in the ditch alongside the golf course SN607931. They must now be considered as just part of the variation of *D. purpurella*.

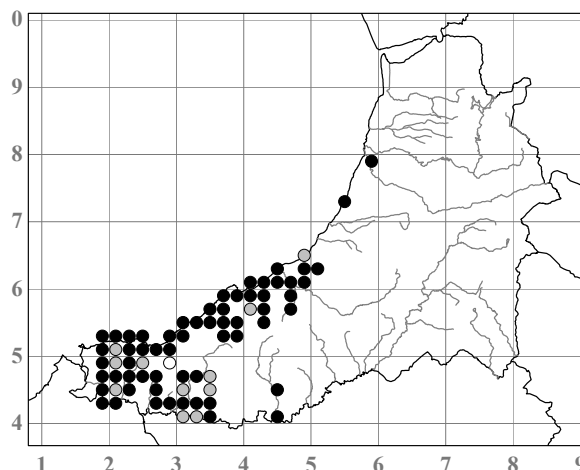


**Dactylorhiza traunsteinerioides** (Pugsley) Landwehr ex R. M. Bateman & Denholm (*D. traunsteineri* auct. brit., non (Saut. ex Rchb.) Soó) - Narrow-leaved Marsh-orchid - Tegeirian-y-gors Culddail

A small colony of about six spikes was found by SPC in the Ynys-las dune slack at SN606936 in 2001, and confirmed by AID (as *D. traunsteineri* subsp. *traunsteineri*) who commented that, although they were not as extreme as plants from Anglesey and some other locations, they were “as convincing as ones in [VC 22] where plants are generally ascribed without reservation [to this taxon].” It may have been a recent arrival at Ynys-las, but the colony has not been re-seen since its discovery.

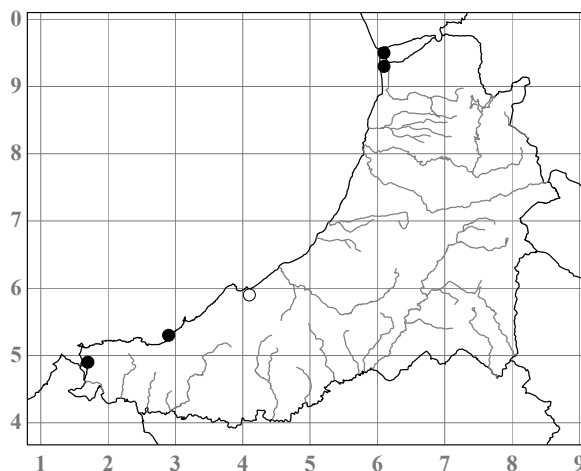
**Orchis mascula** (L.) L. - Early-purple Orchid - Tegeirian Coch y Gwanwyn

Widespread on the coastal slopes, on roadside banks and verges, in graveyards and in the more fertile woodlands in the coastal zone in the SW part of the county, but rare elsewhere and confined to the lowlands. It is often abundant especially along roadsides, on clay slopes on the coast and in secondary Ash woods. The N-most records are from the cliff slope above the sea 700m WSW of Pen-y-graig, Llanddeiniol SN546723, 1992, and a single plant on a roadside verge at Rhydyfelin SN595790, 2007-2009. Inland it has been recorded as far up the Teifi valley as S of Capel Dewi SN44K, 2002 (AOC & GH). Salter (1935) admitted that he had frequently omitted to distinguish between this species and *Anacamptis morio*, so it is probably best to consider all his records unreliable.



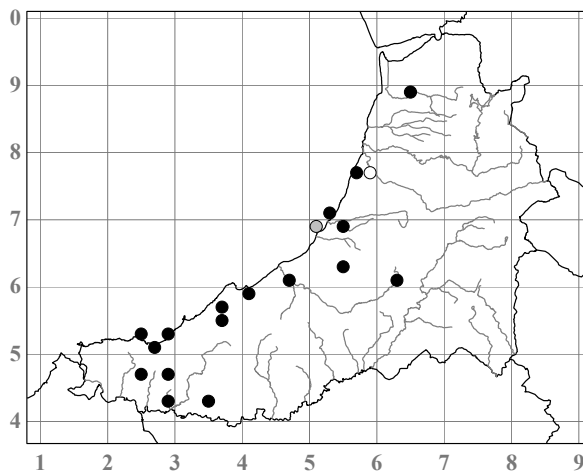
**Anacamptis pyramidalis** (L.) Rich. - Pyramidal Orchid - Tegeirian Bera

On calcareous sands along the coast. The first record for the county was at Penbryn SN292524 by Salter in 1894 (Diary, 27.6.1894), and it is now usually abundant there, 1978-2008, especially where sand is blown up on the cliffs SW of the stream. It was recorded at Penyrergyd SN162487 in c.1924 (CO, Salter Diary 6.12.1924), and in 1938 several colonies, including one of c.60 plants, were seen there (WMJ & Salter, Diary 9.7.1938); during the period 1977-1995 fifty or more plants were often recorded, but since then only a few isolated plants have been seen. It was recorded at Cei Bach SN45E by Salter (1935) but has not been seen there since. At Ynys-las, now its main stronghold, it was first recorded at Moel Ynys c.SN6092 in c.1950 (PMH & WAS, Wade 1952), and since then it has occurred in fluctuating numbers in various places on the dunes SN69B, C, for example none in 1954, abundant in 1955 (PMB), none in 1957, 94 in 1959, and in the last few decades usually very abundant. At Ynys-las the flower-colour varies from deep rose-purple to almost white.



**Anacamptis morio** (L.) R. M. Bateman, Pridgeon & M. W. Chase (*Orchis morio* L.) - Green-winged Orchid - Tegeirian y Waun

Currently known from 17 sites in the county, mostly in neutral pastures but also in six graveyards, and much rarer though more widespread than *Orchis mascula*. In four of the graveyards it occurs in considerable though variable abundance. Mowing when still in flower seems to maintain the numbers in the following year, but allowing a colony to seed, although presumably good for its long-term health, results in a dramatic reduction in flowers for some years. The Aber-porth cemetery SN266506, where *A. morio* had never been noticed, had been cut in early May for many years, but not in 1981 when c.1,000 flowering spikes appeared and were allowed to seed (IAW); the following year mowing was deliberately postponed, but no spikes appeared, c.550 appeared in 1983, and since then there have been counts of c.350 in 1992 and 1994, and of c.1,250 in 1997.



The largest colony is in Bryngwenith chapel graveyard SN341434, where flowering spikes were noticed in the mowings in 1996 (MDS) and where it is mown in flower each year; 500 or more were seen in 1997 (MDS), a spectacular *c.*13,000 in both 2001 and 2002, and *c.*4,400 in 2008 (AOC & MPo). In Capel Rhiwbwys graveyard SN546692, where the mowing is irregular and often affects only parts of the colony, counts have been 150-200 in 1984 (ME), 442 in 1989, *c.*2,000 in 1991, *c.*1,100 in 1992, *c.*300 in 1994 (IWC & KC), 838 in 1997, and 1,015 in 2004. In Llangeitho churchyard SN621601, where it was first noticed in 1982 (RO) and where the mowing is again irregular, counts have been 394 in 1983, *c.*220 in 1990 (IWC), 120 in 1991 (PD), 94 in 1992, 338 in 1996, *c.*240 in 1997, 202 in 2000, 269 in 2001 and 114 in 2008 (AOC & MPo); in addition 52 spikes were seen in the unused NE extension of the churchyard in 1996, *c.*95 in 1997 (IWC), 152 in 2000, 170 in 2001 and 52 in 2008 (AOC & MPo). At Bryngwenith in 2001 the colony included *c.*25 plants with salmon-pink flowers and four with white ones, and in 2002 *c.*20 and one respectively; similar proportions of these colours occur in most of the other larger colonies. *A. morio* probably occurred in more localities, especially in the N of the county, in Salter's day, but as he often did not distinguish it from *Orchis mascula* there is uncertainty over this.



*Anacamptis morio*, *Primula veris* and  
Julian Woodman, Capel Rhiwbwys,  
view NNE from SN545691, May 1997



*Anacamptis morio* in Bryngwenith chapel graveyard, view SW from SN341434, May 2001



### **Ophrys apifera** Huds. - Bee Orchid - Tegeirian y Wenynen

Known only from the two main dune systems. The first record was from the Penyrergyd dunes in 1924 when Salter (Diary 6.12.1924) quoted notes by Charles Oldham who had found it “in great abundance on the sand-dunes at Gwbert, associated with *O. pyramidalis*”. Salter himself seems never to have found it there, and there were no further records until one plant was seen at the tip of the dunes SN160487 in 1977 (RBo), and then two were seen in 1985 (JRA & CDP) and one in 1995; one plant was seen on a bungalow lawn nearby in 2000 (AOC & DGJ). At the Ynys-las dunes one plant was found in 1938 (EHC, Salter Diary 11.7.1938, Wade 1952); the next records from here were of 12 plants in 1954 (WMC), 54 in 1955 (WMC), 65 in 1957 (WMC), c.70 in 1958 (EHC), and 5 “plus a few more” in 1959 (EHC); some, perhaps all, of these records were from around the main slack E of the road c.SN611939, although one plant in 1957 and several at intervals thereafter, including two in 2007, were from W of the road at c.SN609938. In 1997 a colony with c.10 plants was reported by the S-most slack SN60529321 (RB), and there were 30 plants here in 1998, 7 in 1999 (RB) and 16 in 2003. Another colony, usually with c.30 plants, is just S of the main boardwalk at SN60849370, 2005-2008 (SPC).

## IRIDACEAE

### **Sisyrinchium montanum** Greene (*S. bermudiana* auct., non L.) - Blue-eyed-grass - Sisirinciwm Glas Gwyddelig

This native of North America was first seen naturalised in the northern dune slack just W of the road at Ynys-las SN60959389 in 1965 (ABS, MHB, *Nature in Wales* **16**: 216 (1979)), about six plants were seen regularly in the 1970s, three were there in 1992 (GJ), and it was not seen again in spite of annual searches until one was surprisingly seen in 2007.

### **Sisyrinchium californicum** (Ker Gawl.) W. T. Aiton - Yellow-eyed-grass - Sisirinciwm Melyn

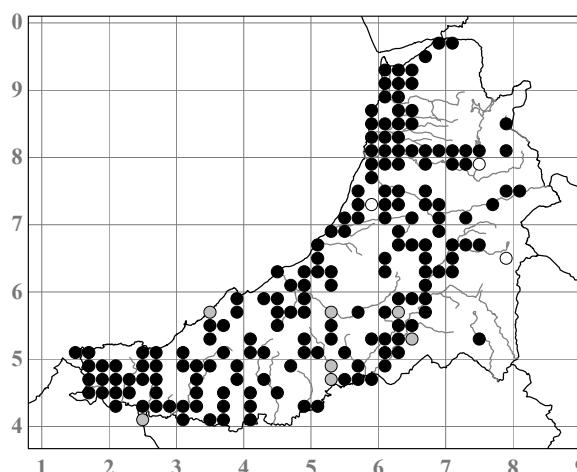
Abundantly naturalised in an area 30 × 10m on a gravelly scrub slope above the sea, with abundant *Buddleja davidii*, below the road at Maes-y-pwll, New Quay SN39105950, 2006 (NMW, conf. EJC); these plants have the leaves 7.5-9.5mm wide, unusually wide for this species which is native of W North America.

### **Iris germanica** L. - Bearded Iris - Gellesgen Farfog

Well-naturalised on the older part of the Penyrergyd sand dunes SN161486, where it has been known for many years c.1985-2008. It is a species of garden origin.

### **Iris pseudacorus** L. - Yellow Iris - Gellesgen (Dail Cyllil, Enfys y Gors, Fflags Melyn)

A frequent plant of marshes, wet woodland, ditches, riverbanks and pond margins, especially common near the coast along the lower reaches of streams and in slightly brackish swamps, for example by the old course of the Afon Leri at Ynys-las SN608922, 2004. It is so often planted that it is difficult to tell its native range, but it seems largely confined to the lowlands. Allen & Hatfield (2004) refer to its folk use in the county for kidney trouble. Altitude limit c.420m, Garreglwyd c.SN7864, Salter (Wade 1952); 410m, flushed area by stream, Eisteddfa Gurig SN797840, 1993.



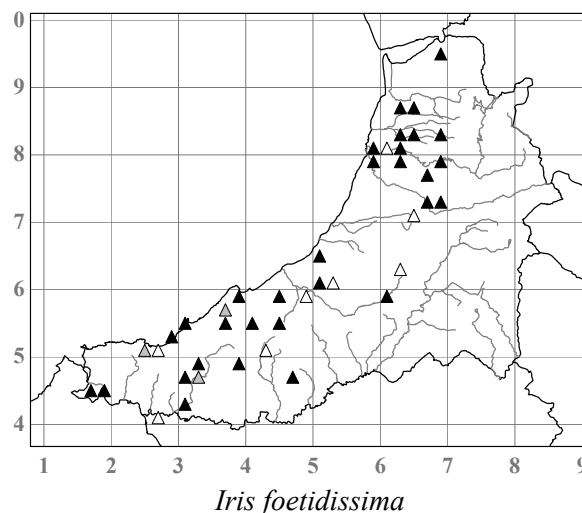
### **Iris foetidissima** L. - Stinking Iris (Gladdon) - Gellesgen Ddrewllyd

Occasional throughout the lowlands in graveyards, old cottage sites, hedgebanks, roadside verges, stream-banks and in woodland, possibly native in the last two habitats but mostly only naturalised. The earliest record was from “Roadside, a mile out of Cardigan” in 1854 (K, Herb. Watson, MMA), and this is presumably the site “About a mile from Cardigan” on the Llechryd road where Salter saw it in 1907 (Diary 15.8.1907), where it was “Found in a ditch bordering road between Noyadd Wylm & Cardigan” in the 1930s (ABS, MLL), and where it is still present on the N side of the road at SN19314560, 2008. Another long-

standing colony is in Penbryn churchyard SN294521 where Salter (1935) knew it, where Geoffrey Grigson (1960) noted that “the churchyard around [the church], as churchyards not infrequently do, nourishes a small collection of ancient medicinal herbs and pot-herbs, clumps of Gladdon, thickets of Alexanders, and straggling stems of Soapwort”, and where it still grows, 2008. In many sites it is probably derived from throw-outs, but in remoter places it is probably bird-sown. All colonies seen in flower have purplish tepals.

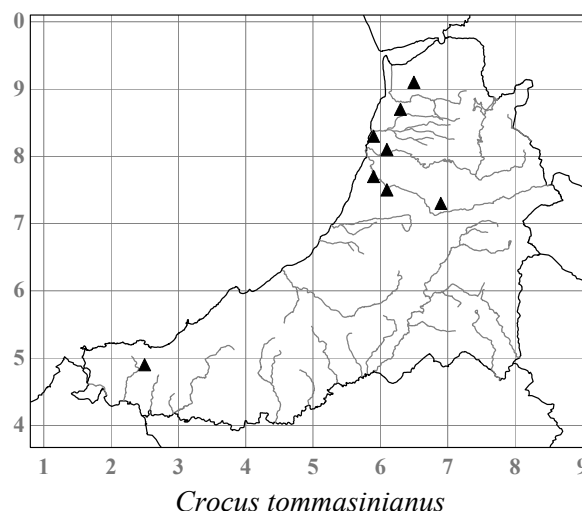
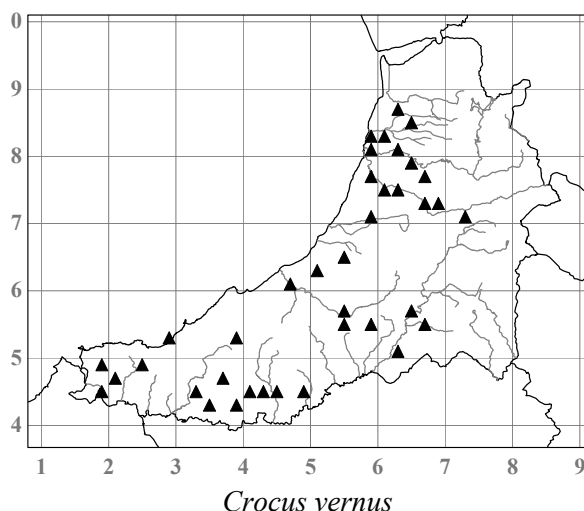
***Iris latifolia* (Mill.) Voss** - English Iris - Gellesgen y Pyreneau

This native of the Pyrenees is well-naturalised in Tregroes churchyard SN406448 (NMW), where it has been known for many years c.1980-2004.



***Crocus vernus* (L.) Hill** - Spring Crocus - Saffrwm y Gwanwyn

Commonly and often abundantly naturalised from plantings and throw-outs and self-sown in graveyards, estates and amenity areas, and occasionally on roadside verges. Violet-purple and white forms are equally common, and intermediate as well as very dark-coloured forms also occur. Some naturalised plants may be ‘King of the Whites’ and ‘Little Dorritt’. Native of S Europe.



***Crocus tommasinianus* Herb.** - Early Crocus - Saffrwm Cynnar

Occasionally naturalised on roadside verges, pathsides, estate lawns and in graveyards. Although most populations are clearly from plantings and throw-outs, in several sites it appears to be self-sown, as by a footpath above North Road, Aberystwyth SN58628210, 2001, and in the new part of Llandre churchyard SN622869, 1997-2005. Native of SE Europe.

***Crocus chrysanthus* (Herb.) Herb.** - Golden Crocus - Saffrwm Euraid

Naturalised from plantings in the SE part of Llanafan churchyard SN685721, 1997-2005. Native of SE Europe and Turkey.

***Crocus* × *hybridus* Petrovič ‘Saturnus’ (*C. biflorus* Mill. × *chrysanthus*)**

Planted and spreading in Dewi Sant churchyard, Nebo SN547657, 1996 (SPC) - 2005.

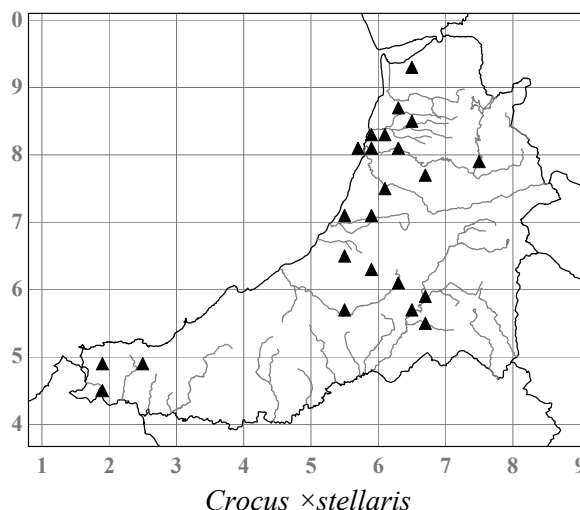
***Crocus* × *stellaris* Haw. (*C. angustifolius* Weston × *flavus* Weston)** - Yellow Crocus

Frequently naturalised from plantings in graveyards and occasionally in amenity and estate lawns. There are populations on roadside verges at the top of Penglais Hill SN599821, 1997, and by the A485 at Llanio-isaf

SN642565, 1995, and a clump of ‘**Dutch Yellow**’ grew on the A487(T) verge NE of Llanrhystud SN54887100 from 1993 to 2005, perhaps from an accidental throw-out; most of the naturalised populations are probably this cultivar.

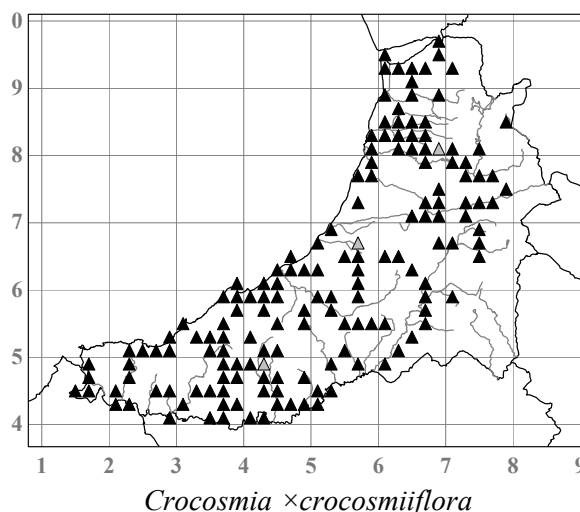
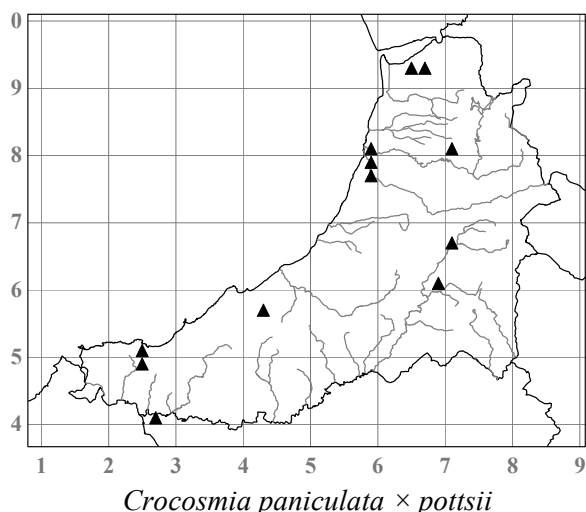
**Schizostylis coccinea** Back. & Harv. ex Hook. ‘**Mrs Hegarty**’ - Kaffir Lily

Well-naturalised, with *c.*60 plants in two areas 10 × 5m and 8 × 4m, in scrub and rough grass near gardens 200m WNW of Aber-porth church SN254512, 2000 (NMW, LTR); not planted, and said locally to have increased greatly in the preceding few years. The species is native of S Africa.



**Crocoshmia paniculata** (Klatt) Goldblatt × **pottsii** (Macnab ex Baker) N. E. Br.

Occasionally naturalised from throw-outs on waste ground, tips, roadside banks and in scrub. Originally recorded as *C. paniculata*, all the colonies recently checked have proved to be this hybrid, including the one first recorded in the county, from a hedgebank in Llancynfelyn cemetery SN64819221, 1994 (NMW) - 2006. Both parents are native of South Africa, and it seems probable that *C. paniculata* does not occur as a naturalised plant in Britain (see Goldblatt *et al.* 2004).



**Crocoshmia ×crocosmiiflora** (Lemoine) N. E. Br. (*C. aurea* (Hook.) Planch. × *pottsii* (Macnab ex Baker) N. E. Br.) - Montbretia - Crib-y-ceiliog (Y Gyrchen Goch)

A garden hybrid between two South African species, frequently naturalised from throw-outs on waste ground, tips, roadside banks, streamsides, wood margins and in scrub. It is especially vigorous near the sea, and occurs abundantly on cliff slopes by the coastal villages, and occasionally even at the top of salt marshes. The earliest record is from by the cliff path 400m E of Aber-porth, SN265516, 1963. A cultivar naturalised on the Ystwyth bank at Black Covert, Trawsgoed SN672724, 1997 (NMW) has the leaves up to 3.5cm wide and the perianth up to 4.7cm long. Altitude limit 415m, waste ground, Eisteddfa Gurig SN798840, 2007 (AOC & CRB).

## XANTHORRHOEACEAE

**Hemerocallis fulva** (L.) L. - Orange Day-lily - Lili Undoed Oren

Naturalised by the path to the footbridge just W of Pont Glanyrafon on the Afon Rheidol SN609804, 2001 (SPC). Native of E Asia.



**Kniphofia uvaria** (L.) Oken - Red-hot-poker - Pocer Poeth

A plant, presumably derived from a throw-out, under Gorse in a heathy hollow among the spoil heaps of Cwmsymlog lead mine SN69898370 was first noticed in 1992 and persisted until 1996. Native of South Africa.

**Kniphofia** × **praecox** Baker sens. lat. - Greater Red-hot-poker - Pocer Poeth Mawr

There is a large clump of one or other of the hybrids in this South African ornamental group established in scrub on the N bank of the Afon Peris by Llansantffraed church SN51206746, 1997 (SPC) - 2005.

**Phormium cookianum** Le Jol. - Lesser New Zealand Flax - Llin-Seland-Newydd Bach

One young plant among *Ammophila* and *Euphorbia paralias* on the landward side of a young dune at the seaward edge of the Ynys-las dunes SN60459377, 2009 (SPC) was presumably self-sown and is 'Sundowner'. Native of New Zealand.

**ALLIACEAE****Allium schoenoprasum** L. - Chives - Cenhinen Syfi

Salter (Wade 1952) recorded it from an old cottage site in the Mydr valley SN45 in the late 1930s. It has since been recorded naturalised, from throw-outs, in a hedgebank below Penlan-y-mor SN416594, 1994 (NMW), on a roadside verge on Gernos Mountain SN355468, 1999 (NMW), and as self-sown clumps in kerb crevices at IGER, Plas Gogerddan SN628836, 1999 (SPC). It is an uncommon native elsewhere in Britain and Ireland.

**Allium cepa** L. - Onion - Nionyn

Onions have been grown commercially in very small quantity (0.1ha in 1988), but the local soils are generally unsuitable. Salter (Diary 13.8.1929) saw it growing in a vegetable plot at Llyn Hir SN790679, at 440m altitude.

**Allium roseum** L. var. **bulbiferum** DC. - Rosy Garlic - Garlleg Rhosliw

Naturalised in Henfynyw churchyard SN448612, 1977 (NMW) - 2008, on the A487(T) road verge and on a laneside bank adjacent, and as a colony 3m long on the verge of a minor road nearby, 500m SW of Vicarage Crossroads, Aberaeron SN455617, 1995. Native of the Mediterranean.

**Allium subhirsutum** L. - Hairy Garlic - Garlleg Blewog

Naturalised along 3m of roadside hedgebank by Pont Gilfachreda SN410588, 1998 (NMW), but the site was destroyed in 2006. Native of the Mediterranean.

**Allium moly** L. - Yellow Garlic - Garlleg Melyn

One record only, as a casual among *Impatiens glandulifera* on river shingle at Llanfarian SN587777, 1995 (SPC). Native of SW Europe.

**Allium triquetrum** L. - Three-cornered Garlic - Garlleg Trionglog

First noticed naturalised in scrub below Salter's garden at Fairview, Llanbadarn Fawr SN598810, in 1991 (SPC & AOC), and along 14m of roadside verge on Waun Fawr SN599819, 1993 (SPC), and since then in several other sites in the Llanbadarn Fawr area and in Parc Natur Penglais SN58918201, 2003-2007 (SPC); it is clearly spreading rapidly. Also naturalised by a path in a wooded dingle at New Quay SN38775946, 1998, and among *Ammophila* and *Phragmites* by Moel Ynys pool, Ynys-las SN608923, 2002-2006 (SPC). Native of the W Mediterranean.



*Allium roseum*, A487(T) verge by Henfynyw churchyard, view N from SN44836123, May 2009

**Allium ursinum** L. - Ramsons - Crafr y Geifr

Abundant in many of the more base-rich damp valley woodlands, especially in the flood-zone in stream dingles, usually forming dominant colonies. It also occurs in some of the coastal cliff Oak woods, as at Penderi SN552733, 1991, and on the MoD site, Aber-porth SN244525, 1982, and is occasionally found on roadside banks and in churchyards. It is absent from the uplands and has not been noted over 220m altitude.

**Allium scorodoprasum** L. - Sand Leek - Cenhinen y Nadroedd

Abundantly naturalised on a wide grassy verge, Penyrangor, Aberystwyth SN581808, c.1970 onwards (conf. WTS), deriving from throw-outs from Windover garden opposite, where it has been a very persistent weed, originating from bird-seed, for many decades. It is a local native elsewhere in Britain.

**Allium vineale** L. var. **compactum** (Thuill.) Boreau - Wild Onion - Nionyn Gwyllt

Occasional, chiefly on roadside verges and grassy waste ground and in graveyards. It is rarely seen in semi-natural vegetation, but does occur in such diverse habitats as, for example, scrub and along pathsides on the old quarries in Parc Natur Penglais, Aberystwyth SN588822, 2004, where Salter had noticed it in 1894 (Diary 29.4.1894), in a brackish marsh by the Afon Mwldan, Cardigan SN176461, 2002, and on riverside rocks below Pont Tyweli SN408402, 2000, and elsewhere by the Afon Teifi. It has increased enormously in recent years on Penglais Hill and Waun Fawr, Aberystwyth SN598820-600818, 2007, and is now dominant in places on the roadside banks.

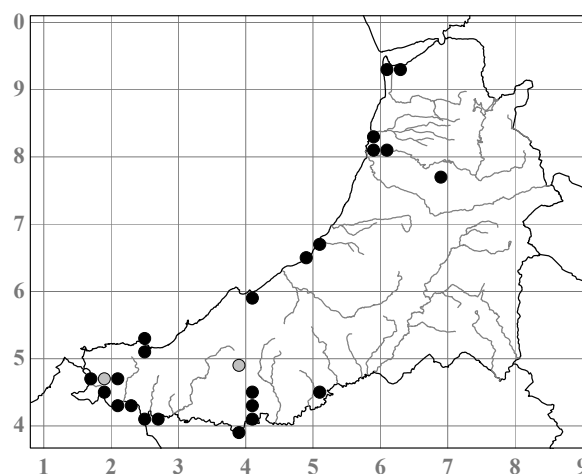
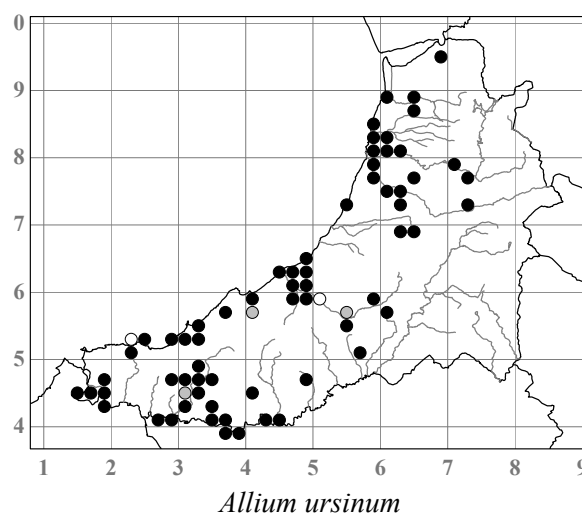
**Tristagma uniflorum** (Lindl.) Traub - Spring Starflower - Sêr-flodyn y Gwanwyn

Recorded twice as a pavement weed in Aberystwyth, in Caradog Road SN59008172 in 1993, and in Elysion Grove SN58998186 in 2004. Native of S America.

**Leucojum aestivum** L. - Summer Snowflake - Eirfaidd yr Haf

Still naturalised in abundance around one of the graves in Llanychaiarn churchyard SN585786 where Salter first recorded it in 1906 (Diary 26.2.1906) - 2004 (NMW). It is nearest to subsp. **aestivum**, with 4-5 flowers and the tepals 18-21mm, although the scapes are smooth throughout. Typical subsp. **pulchellum** (Salisb) Briq. is naturalised on a wooded slope below the road opposite Pendre Farm, Llanbadarn Fawr SN60708050, 2006 (NMW, AOC; SPC). The only other records are from Llangeitho c.SN65E (DT, Salter 1935),

*Leucojum aestivum* in Llanychaiarn churchyard SN585786, April 1978





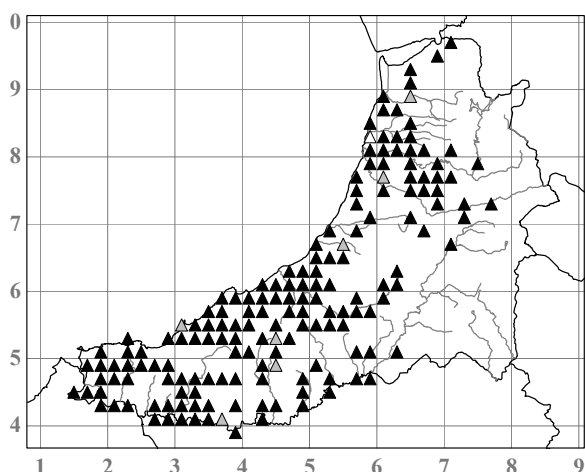
and from a shaded roadside bank below Penmorfa chapel, Penbryn SN304521 in 1999 (ASL & VL), where it has not been refound and where the subspecies was not recorded.

### **Galanthus L.**

There is no evidence that Snowdrops are native in the county, but they are very commonly naturalised throughout the lowlands, from throw-outs or from having been planted on hedgebanks or in woodland or graveyards. Most are *G. nivalis*, or hybrids with *G. plicatus*. One might assume that some at least of these naturalised plants would be recognisable as one or other of the many cultivars widely grown in gardens over the last 150 years or so. Extensive collections and notes have been made from populations throughout the county, and a sample collection of named cultivars was built up, but although there was considerable variation among the naturalised populations, none (with the exception of the rather vaguely defined *G. nivalis* 'Flore Pleno') could be matched with confidence with any particular cultivar. If these results are correct, then apparently either the cultivar characters are lost on naturalisation, perhaps by cross-breeding (which seems unlikely to have happened so thoroughly), or it was not cultivars that got naturalised perhaps because much of the naturalization was initiated before cultivars became popular in local gardens. Nutt (1973) gives much interesting information and comment on naturalisation, and two recent books, Davis (1999) and Bishop *et al.* (2001), describe the cultivars and other taxa in detail. Although some naturalised populations in the county seem to produce good seed in some years, I have never found seedlings in the wild. Spread seems to be by expansion of clumps and by bulbs being pushed up by over-crowding and becoming dispersed by rootling birds and animals, and by water along streamsides during spates.

### **Galanthus nivalis L. - Snowdrop - Eirlys (Blodyn yr Eira, Lili Wen Fach)**

Naturalised in many places in woodlands, graveyards and on hedgebanks, often giving spectacular displays in early spring, as for example at Nanteos SN6178, 1892 (Salter Diary 20.2.1892) - 2004, in Cwm Mabws SN562684, 1849 (Morgan 1849) - 2004, and by the Aeron at Llanerchaeron SN482603, 1907 (Salter Diary 16.5.1907) - 2004 and Ty-glyn SN502601, 1978-2004. Clearly some at least of the colonies are very long-established. Salter (Diary 11.2.1892) records "Snowdrops brought in from Clarach on sale in the streets" of Aberystwyth. Although there is variation in size and shape of the tepals, length of pedicels and stems, width of leaves and time of



*Galanthus nivalis*, Coed Llechweddmylyn, Wallog, view S from SN592856, February 2007

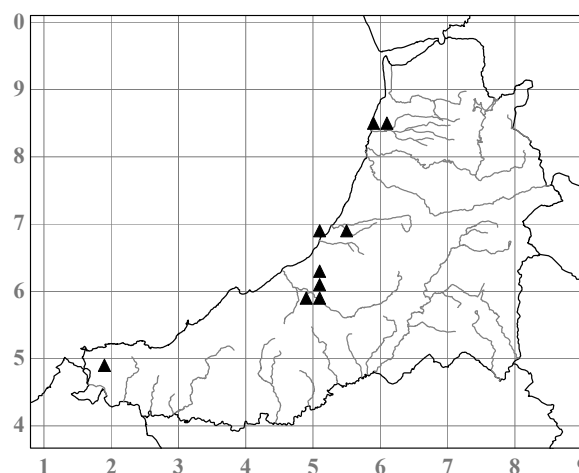
flowering in the naturalised plants, this variation is more between than within colonies.

Double-flowered forms, forma **pleniflorus** P. D. Sell, are common, and some at least come under the cultivar 'Flore Pleno'; they usually seem sterile, although they seem to spread just as successfully as the single forms, and they vary in whether all the tepals or only those of the inner whorl are multiple, in the number of multiples, and in many other characters.



### ***Galanthus nivalis* × *plicatus* M. Bieb.**

Naturalised in at least 15 localities in woodlands, graveyards and hedgebanks. There is considerable variation within and between colonies, and in some, for example at the Aberstringell limekilns SN519684, 1995 (NMW) and at Wallog SN598854, 1997, the plants grade into *G. nivalis*. Plants growing with *G. nivalis* on the roadside bank 1.2km E of Wallog SN60208547, 2002 (NMW, AOC & DAP) are very similar to 'Straffan'. Double-flowered plants occur in several of the colonies, for example in Llanbadarn Trefeglwys churchyard SN508632, 1995 (NMW), around Ciliau Aeron SN49905835 and 50255825, 2002 (NMW), and near Ty-glyn, Ciliau Aeron SN49955998, 2002.



### ***Galanthus elwesii* Hook. f. - Greater Snowdrop - Eirlys Elwes**

Native of SE Europe and Turkey, rarely naturalised. There is a large, expanding clump on the roadside verge outside a garden at Abermeurig SN563562, c.1994-2005. It has also been planted and is becoming naturalised along the grass verges in Plas Crug, Aberystwyth SN586815, 2005.

### ***Narcissus* L.**

Daffodils are not native in the county, but are widely naturalised from deliberate plantings, from throw-outs and as self-sown plants in a wide variety of habitats throughout the lowlands. Many taxa are involved, and these can in theory be named and arranged in a bewildering number of different ways under species, subspecies and varieties as well as horticulturally under divisions (a horticultural classification, see for example Kington 1998) and cultivars. In practice many of the naturalised plants have proved impossible to place or name satisfactorily. In the following account the overall taxonomy of Sell & Murrell (1997) has in general been followed, and where cultivars have been mentioned they have usually been qualified by "resemble", indicating that they look most like, but are not necessarily definitely, the cultivar in question. It is often uncertain where in the overall taxonomy many of the cultivars belong, but I have attempted to place those that have been tentatively identified under the taxa of Sell & Murrell to which they seem most likely to belong. I have been greatly helped in many ways by Sally Kington, the RHS Daffodil Registrar, who visited the county in March 2002, although this account does not necessarily reflect her opinions. The keys to cultivars developed by M. J. Crawley on the web are a most useful recent development, as is the information on the RHS web site. An attempt in 2001 to get living specimens of 32 naturalised plants from the county, including even some of the recent mass plantings and subsequent naturalisations on roadside verges, named to cultivar level by the RHS Daffodil and Tulip Committee was largely unsuccessful; apart from nine which were or which resembled 'Telemonius Plenus', and six that they considered resembled known cultivars, the remaining seventeen proved to be unnameable. There are more than 26,000 cultivar names in the RHS files (Kington 1998). The NT has a large collection of cultivars growing at Llanerchaeron and mounts instructive displays of them each spring.

#### **Sect. *Tazetta***

### ***Narcissus tazetta* L. - Bunch-flowered Daffodil - Cenhinen-Bedr Glystyrog**

Plants naturalised along the roadside hedgebank S of Llangranog church SN316538, 1998, are probably subsp. *tazetta*. Others along the E hedgebank of the A487(T) 200m NE of Clogfryn SN449622, 1998-2005, have cream-coloured tepals and orange corona and fall between subsp. *italicus* (Ker Gawl.) Baker and subsp. *aureus* (Loisel.) Baker.

#### **Sect. *Narcissus***

### ***Narcissus poeticus* L. - Pheasant's-eye Daffodil - Cenhinen-Bedr y Beirdd**

It has proved especially difficult to name plants belonging to *N. poeticus*, *N. radiiflorus* and their various cultivars in Division 9, and to distinguish them from their hybrids. They are not very often naturalised, but do

sometimes appear to have been long-established in the wild. A number of unnamed colonies have been ignored here. *N. poeticus* itself is probably less often naturalised than *N. radiiflorus*. The map covers both species and their cultivars.

#### Subsp. *poeticus*

Several clumps are naturalised at the top of the salt marsh by the Afon Rheidol above Trefechan Bridge SN58588108, 2001 (NMW). At an old garden site at Dyffryn-Llynod, Tregroes SN405455, 1999, it has been naturalised for at least 30 years. Plants naturalised along the A487(T) hedgebank NE of Clogfryn SN449623, 1994-2004, and at Llwyneclyn SN443598, 1995-1999 (NMW), appear to be the 1920s cultivar 'Actaea', as are perhaps the others.

#### Subsp. *recurvus* (Haw.) P. D. Sell

Naturalised in several places in a variety of habitats. Several clumps grow among *Ammophila* on the Ynys-las dunes SN61059403, 1999-2004. It is naturalised in estate woodland at Aberlloflyn SN58827737, 1999, and at Ffosrhydygaled SN578765, 1994-1999; along the A487(T) hedgebank SE of Clogfryn SN449622, 1994-2001 (NMW), and at Tegfan, Llanarth SN418571, 1999; and in Llanwnnen churchyard SN533473, 1999.

### *Narcissus radiiflorus* Salisb. - Salisbury's Daffodil

#### Subsp. *radiiflorus*

Naturalised by the road at Moel Ynys Pool at Ynys-las SN608923, 2002; in estate woodland at Crugiau SN592793, 2002; on the roadside hedgebank at Tanycastell, Llanychaarn SN588788, 1999; and in Llanina churchyard SN405598, 2000. Mapped with *N. poeticus* (see above).

#### Subsp. *exertus* (Haw.) P. D. Sell

Abundantly naturalised in estate woodland at Lovesgrove SN629816, 1995-1999; along the A487(T) hedgebank at Llwyneclyn SN444598, 2001 (NMW) where plants resemble a small form of 'Albatross'; and in Llanina churchyard SN405598, 2001 (NMW) where the plants resemble 'Ornatus' or 'Almira', all late 19<sup>th</sup> century cultivars in Division 9.

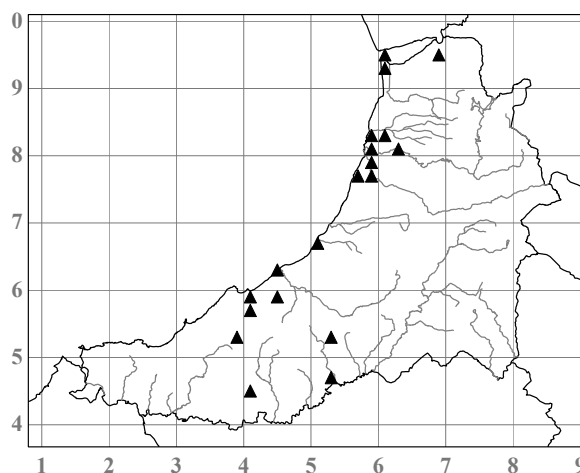
### Sect. *Pseudonarcissus*

### *Narcissus bicolor* L. - Two-coloured Daffodil

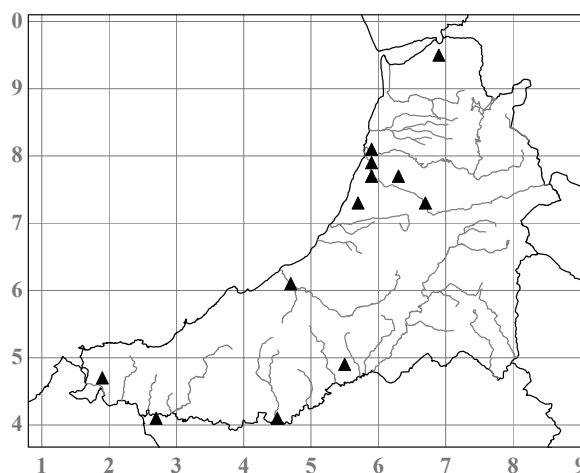
Naturalised in abundance in estate woodlands in several places, for example at Crugiau SN592794, 1996-2004, Aberlloflyn SN588772, 1996-2004, Pen-y-wern SN636765, 1994, and Trawsgoed SN671729, 1998. It also occurs in other woodlands, as at Ddolwen near Llanerchaeron SN466610, 1997-2004, and on roadside verges where it has occasionally been mass-planted, for example by Ffordd Sulien, Llanbadarn Fawr SN599809, 2004, and by the Cardigan bypass SN184462, 1998. These plants are very varied and probably represent several cultivars in Division 2 and perhaps also hybrids.

### *Narcissus* × *dichromus* P. D. Sell (*N. cyclamineus* DC. × *moschatus*) - Bicoloured Daffodil

Naturalised in at least four sites. Plants on the roadside verge at Llangorwen SN601839, 1993, resemble 'Jack Snipe', as do those in Llanina churchyard SN405598, 2001 (NMW). Those on a grassy slope on the University campus, Penglais, Aberystwyth SN596815, 2001 (NMW), resemble 'Dove Wings'. Both cultivars are in Division 6 and from the mid 20<sup>th</sup> century. Plants in Gwenlli churchyard SN392535, 1995-2001 (NMW) have the corona too long for either of these cultivars and do not match any other.

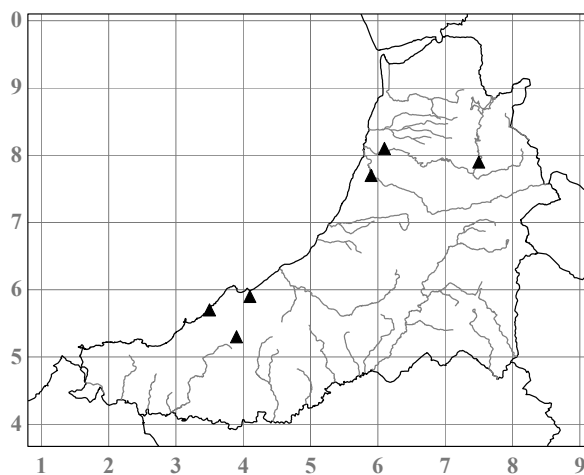


*Narcissus poeticus* & *N. radiiflorus*

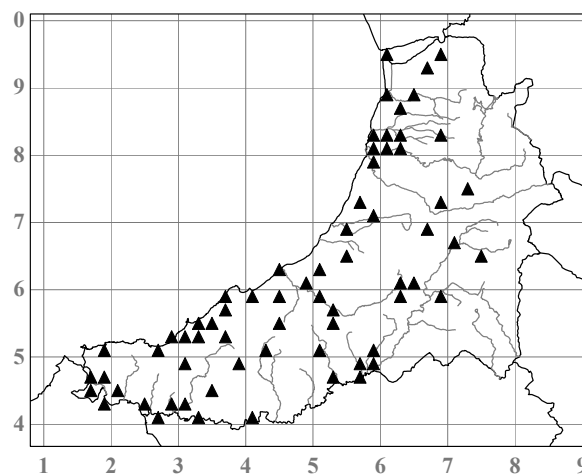


**Narcissus ×monochromus** P. D. Sell (*N. cyclamineus* DC. × *pseudonarcissus*) - Reflexed Daffodil

Naturalised in several sites, the cultivars all being in Division 6. Abundant plants in estate woodland at Aberlloolwyn SN588772, 1996-2004, closely resemble '**March Sunshine**', an early 1920s cultivar. Among several cultivars of this hybrid in Gwenlli churchyard SN392535, 1994-2004 (NMW) are plants closely resembling the equally old cultivar '**February Gold**', others resembling the 1940s '**Peeping Tom**', and others which match no cultivar. Other populations unnameable to cultivar occur in Llanina churchyard SN404598, 2001 (NMW), and in scrub by an old cottage site at Cwmttydu SN357575, 1994-2001 (NMW).



*Narcissus ×monochromus*

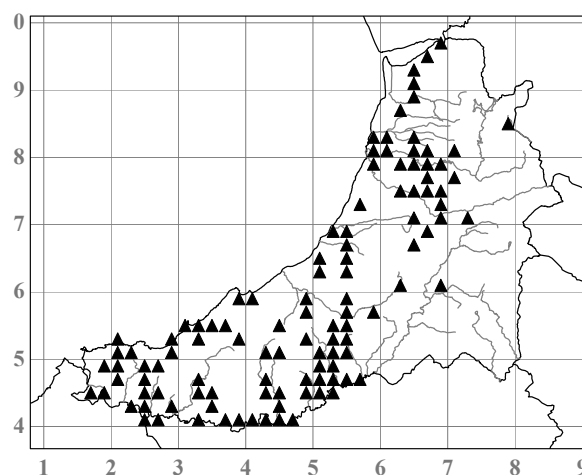


*Narcissus hispanicus*

**Narcissus hispanicus** Gouan (*N. pseudonarcissus* subsp. *major* (Curtis) Baker) - Spanish Daffodil - Cenhinen-Bedr Sbaen

Widely naturalised especially on roadside verges and amenity areas, and in woodlands and graveyards. This is the taxon most used in recent unsightly mass plantings, in a range of cultivars in Division 1 which are difficult to identify with any certainty; the true plant has not been seen. Plants resembling the old cultivars '**King Alfred**', '**Golden Harvest**', '**Monarch**' and '**Henry Irving**', and the c.1950 '**Arctic Gold**', occur in various places. The January-flowering '**Rijnveld's Early Sensation**', developed in the mid 20<sup>th</sup> century, has recently begun to be used in the county. Plants naturalised on a roadside hedgebank 1km W of Ffostrasol SN363476, 2002, resemble the 1880s cultivar '**Golden Spur**'.

*Flore pleno* plants, commonly naturalised in woodlands, scrub, graveyards and hedgebanks, that are usually referred to the early 17<sup>th</sup> century cultivar '**Telemonius Plenus**' ('Van Sion'), Division 4, may belong here, as they tend to have rather more uniformly coloured flowers and a coarseness that fits *N. hispanicus* rather than *N. pseudonarcissus*. They are extremely variable, and are liable to change in appearance from year to year, and seem often not to have been deliberately planted. Altitude limit 415m, roadside bank, Eisteddfa Gurig SN798840, 2003.



'Telemonius Plenus'

**Narcissus moschatus** L. - White Daffodil

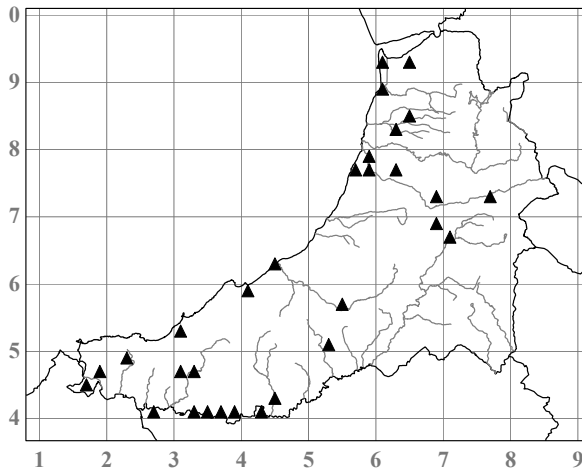
Established only in one site where it was originally planted, on a rocky mound by Bethel chapel, Capel Dewi SN449423, 1995-1998.

**Narcissus nobilis** (Haw.) Schult. f. - Large-flowered Daffodil

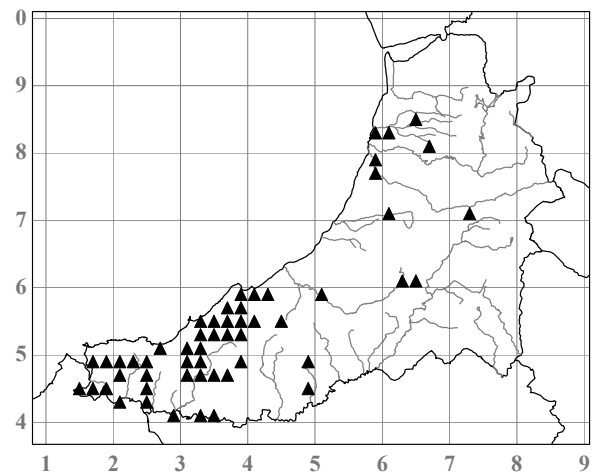
Naturalised in graveyards, woodlands and scrub and on roadside hedgebanks, and comprising var. **nobilis** as well as various uncertain cultivars in Division 1. Good colonies have been seen in, for example, Penrhyn-coch churchyard SN643841, 1995, Llanychaiarn churchyard SN585786, 1994, and in Eglwys Newydd churchyard SN768736, 1994. It has recently been mass-planted by the Cardigan bypass SN184462, 1998, and



on the B4334 verge E of Pont y Brithdir SN342475, 2001 (NMW). Two clumps naturalised in a dune slack E of the road at Ynys-las SN610939 resemble ‘**Empress**’ and ‘**Ptolemy**’ respectively. In the cemetery 400m E of Llancynfelyn church SN649922 there was a clump of the spectacular large-flowered var. **leonensis** (Pugsley) A. Fern., 1995 (NMW), and another in Llandre lower churchyard SN623870, 1995, along with several naturalised clumps of var. **nobilis** (NMW).



*Narcissus nobilis*



*Narcissus obvallaris*

**Narcissus obvallaris** Salisb. - Tenby Daffodil - Cenhinen-Bedr Penfro

Of unknown origin, although wild plants have reputedly been recently found in Spain, the Tenby Daffodil is widely naturalised chiefly in the SW half of the county. It was first reported in 1967 from “two places in the Aeron valley” (Vaughan 1967) and other occurrences were mentioned by Jones (1992) and Chater (1997). Nearly a hundred colonies have since been noted on roadside banks and verges, in copses, fields and graveyards, usually near habitations but sometimes in wild sites far from houses. One of the best displays is in the graveyard of Capel Blaen-y-waun, St Dogmaels SN161448, 1995-2004 (NMW), and although most plants here (as elsewhere) are var. **obvallaris**, a few clumps seem to be of the larger var. **maximus** Pugsley (NMW). Here too, as well as in many other sites such as Gwenlli churchyard SN392535, 1995, Tremain



*Narcissus obvallaris* and Sally Kington, Capel Blaen-y-waun, view NW from SN161448, March 2002

*Narcissus obvallaris*, Capel Blaen-y-waun graveyard, view NW from SN161448, March 1998

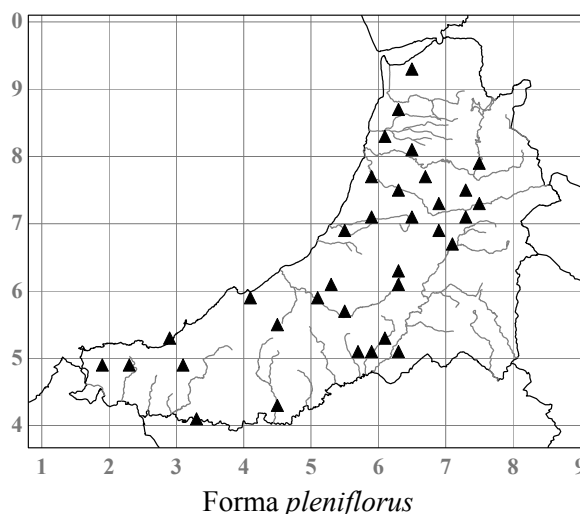
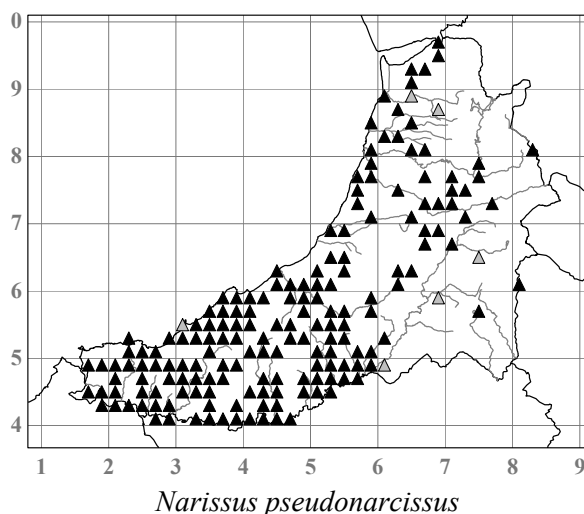
churchyard SN235486, 1994-2002 (AOC & SK), and Llangoedmor churchyard SN199457, 2000, intermediates between *N. obvallaris* and *N. pseudonarcissus* occur along with the two species.

*Flore pleno* plants known as ‘**Thomas’ Virescent Daffodil**’ (‘Derwydd Daffodil’), believed to have originated in Carmarthenshire from *N. obvallaris*, are naturalised in a few places, but nowhere in such abundance as they are at Middleton in that county (see Stepney-Gulston 1906, Woods 1993b, Kington 1999). Small colonies occur in Ysbyty Ystwyth churchyard SN733715, 1999-2002 (AOC & SK, conf. JPS) and on a roadside verge nearby SN733708, 1994-2002 (AOC & SK); and in Verwig churchyard SN183496, 1995-2002 (NMW, AOC & SK). Plants resembling this cultivar but lacking the characteristic swollen base of the flower were recently planted on a roadside verge at Ynys-las SN607930, 2001 (SPC), and occur in Llandyfriog churchyard SN333411, 1994-2002 (AOC & SK) and elsewhere.

***Narcissus pseudonarcissus* L.** - Wild Daffodil - Cenhinen-Beidr Wyllt (Cennin Pedr, Blodau Mis Mawrth, Lili Felen, Lili Bengam, Daffi-twmdili, Pegi Domis, Blodyn Mawr)

This is the commonly naturalised plant usually referred to as the Wild Daffodil or Lent Lily, widely grown in gardens and probably naturalised for two centuries or more. Morgan (1849) reported it from four places, including Mabws SN5668 where it is still abundant, 2008. Salter (1935) described it as “Locally naturalised, in great abundance” and this is still true at the sites he mentions, notably in Penrhyn-coch churchyard SN643841, 1927 (Diary 8.4.1927 etc.) - 2007; at Gogerddan c.SN629837, 1902 (Diary 26.3.1902) - 2008; and in the Aeron valley woods from Ty-glyn SN56A to Llanerchaeron SN46Q, 1907 (Diary 16.5.1907 etc.) - 2008 (NMW). It now occurs in very many places in woods, scrub, pastures, graveyards, and on verges and hedgebanks, but unfortunately is not the Daffodil usually used in the garish mass-plantings that now disfigure so many roadsides. Our plants are mostly var. **pseudonarcissus**, and are very variable; some of this variation may reflect various cultivars in Division 1 that belong here, but I have had no success in identifying any of them. Small plants, with the corollas 35-40mm, are var. **humilis** Pugsley and occur in Penrhyn-coch churchyard SN643841, 1994-2008, where Salter perhaps knew them as he twice specifically mentions the “small” Wild Daffodils there (Diary 23.3.1937, 15.2.1938); similar plants are in the chapel graveyards at Neuadd-lwyd SN474595, 2008, and at Plwmp SN366524, 2001 (NMW).

*Flore pleno* forms (forma **pleniflorus** P. D. Sell) appearing to be derived from *N. pseudonarcissus*, with smaller flowers with paler segments and greater contrast between the tepal and corona segments than in the commoner ‘Telemonius Plenus’, are frequent and may include some named cultivars in Division 4.





## Intersectional hybrids

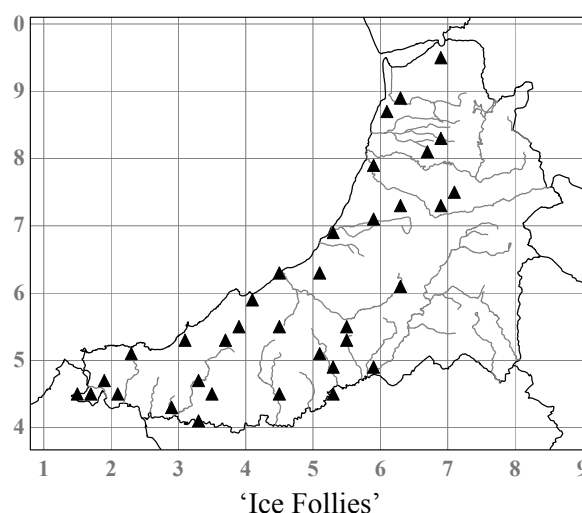
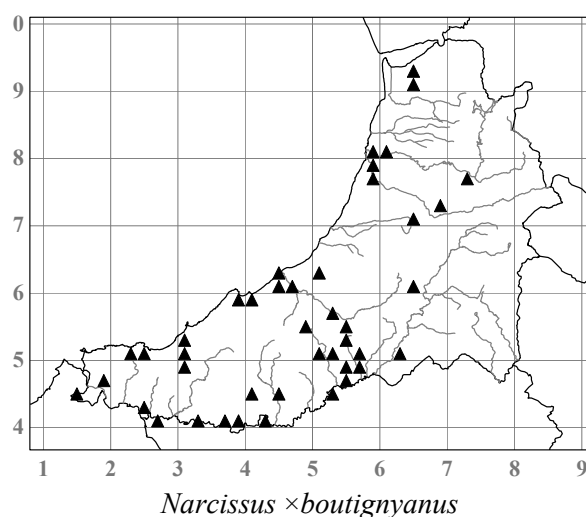
**Narcissus ×medioluteus** Mill. (*N. poeticus* × *tazetta*; *N. ×biflorus* Curtis) - Primrose-peerless - Cenhinen-Beidr Ddeuflodeuog

Salter gives a record of this hybrid clearly naturalised “In plenty, three and a half miles S of Aberaeron, in a field not far from the shore” c.SN4059 (DT, Diary 25.6.1904, 1935). It is now naturalised on the scrubby verge of the A487(T) just N of Clogfryn SN449623, 2000 (NMW), and on the roadside hedgebank 150m S of Llangranog church SN316538, 2001 (NMW), the latter plants somewhat resembling the old cultivar ‘**Geranium**’ in Division 8. Some other naturalised populations are difficult to distinguish from *N. poeticus* or its cultivars.

*Flore pleno* plants closely resembling ‘**Cheerfulness**’, Division 4, are naturalised under trees in the grounds of Lovesgrove SN629816, 1995, on the verges of the lane to Parc, Ciliau Aeron SN501584, 1995, and on the roadside hedgebank just NE of Dihewyd church SN483562, 1995.

**Narcissus ×boutignyanus** Philippe (*N. moschatus* × *poeticus*) - Boutigny’s Daffodil

Plants with the characters given for this hybrid, many of which may be complex crosses involving in addition *N. pseudonarcissus* or *N. ×incomparabilis*, are commonly naturalised on roadsides verges and hedgebanks, in woodland and scrub and in graveyards. There is great variation, but it has rarely proved possible to identify cultivars, which will belong to Divisions 2 and 3. Plants from the roadside hedgebank at Tanycastell, Llanychaiarn SN588788, 2001 (NMW), resemble the 1860s cultivar ‘**Maria Magdaline de Graeff**’. Abundantly naturalised plants in woodland at Ddol-wen, Llanerchaeron SN466610, 2001 (NMW) resemble the equally old ‘**Stella**’; some other plants here, 2001 (NMW), resemble ‘**White Lady**’, a later 19<sup>th</sup> century cultivar, as do plants in the copse E of Primrose Hill, Llanbadarn Fawr SN600810, 2001 (NMW), and in scrub by the church hall nearby SN598810, 2001 (NMW). ‘**Ice Follies**’, a 1950s cultivar, probably belongs under this hybrid, and has recently been very widely planted on roadside verges and banks and quickly becomes naturalised, for example by the Southgate crossroads at Penparcau SN593798, 1993-2004, and along the Cardigan bypass SN184462, 1993-1998, as well as in a few graveyards. ‘**Cassata**’, with a split corona, a 1960s cultivar in Division 11, is also naturalised from plantings by the Cardigan bypass SN184462, 1993-1998.

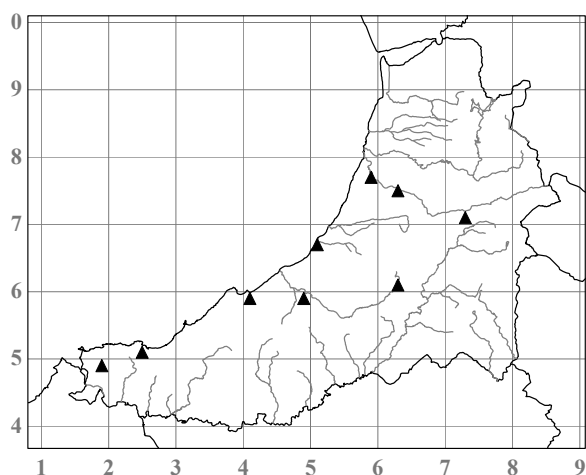


**Narcissus ×cyclazetta** Chater & Stace (*N. cyclamineus* DC. × *tazetta*) - Head-to-head Daffodil

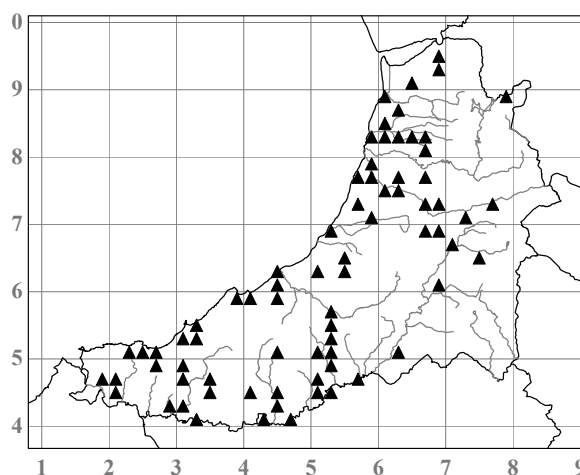
This hybrid includes the very commonly planted ‘**Tête à Tête**’, a 1940s Division 12 cultivar, which is naturalised on sandy grass on the SW bank of the Ystwyth 100m upstream of the bridge at Llanfarian SN59147770, 2005; in Llanilar churchyard SN623751, 2007; in Ysbyty Ystwyth churchyard SN732715, 2007; on the streambank by Llansantffraed churchyard SN513674, 1995-2003 (NMW); in a hedgebank at Llangeitho churchyard SN620601, 1995; in Llanina churchyard SN405598, 1995; on a roadside bank by Ciliau Aeron chapel SN49825842, 2002; in Aber-porth churchyard SN255510, 2004; and in Ferwig churchyard SN183496, 1997. Other populations of this hybrid, but matching no obvious cultivar, were again in Llanina churchyard, 2001 (NMW), and in Gwenlli churchyard SN392534, 2001 (NMW).



Naturalised populations of plants that appear to be other hybrids of *N. cyclamineus*, but with the other parent or parents uncertain, occur in the Llancynfelin cemetery SN649922, 1995, in scrub S of the A44(T) near Capel Bangor church SN656802, 1993, in Gartheli churchyard SN585567, 1995, and in Gwenlli churchyard SN392535, 1995. *N. cyclamineus* has not been found naturalised in the county.



*Narcissus ×cyclazetta*



*Narcissus ×incomparabilis*

***Narcissus ×incomparabilis* Mill. (*N. poeticus* × *pseudonarcissus*)** - Nonesuch Daffodil - Cenhinen-Bedr Anghymharol

Frequently naturalised on roadside verges, often from mass-plantings, on hedgebanks, in scrub and woodland, and in graveyards. Many cultivars of Division 2 are probably involved, but hardly any have been identified with any confidence. It is often difficult to decide whether naturalised plants belong here or under *N. ×boutignyanus*. Plants with a general resemblance to 'Carlton' and 'Saint Keverne' are commonly naturalised on roadsides and in many other habitats, both from mass plantings and from throw-outs. Plants resembling 'Fortune' are in Llanafan churchyard SN684721, 1995, and have also been used in roadside plantings. Plants closely resembling 'Polindra' are on the roadside hedgebanks in Cwm Pantygwyfol SN619757, 1995, and ones resembling 'Pentewan' are in Aber-porth churchyard SN255510, 2004. Altitude limit 375m, by ruin of Hengwm Annedd SN797893, 2005 (NMW), naturalised here since at least 1935 when this remote upland smallholding was abandoned.

*Flore pleno* plants of Division 4 are occasionally naturalised and usually do not match any cultivar, but in woodland at Ddol-wen, Llanerchaeron SN466610, 2001 (NMW), the plants closely resemble 'Butter and Eggs'.

## ASPARAGACEAE

***Convallaria majalis* L.** - Lily-of-the-valley - Lili'r Dyffrynnoedd

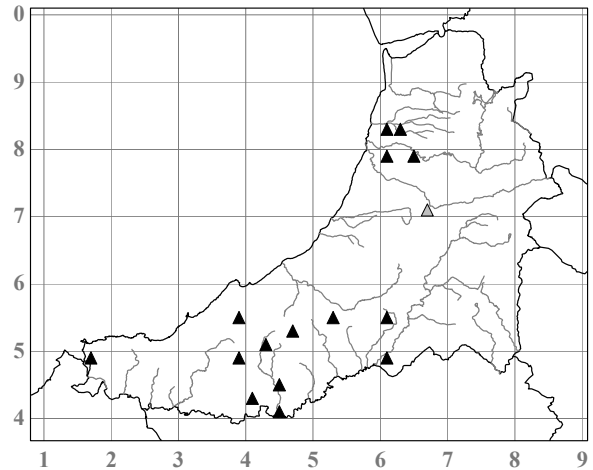
A rarely naturalised species, known to Salter (1935) in the shrubberies at Plas Cwmcynfelin SN604835 and still there until at least 1957, and from an old garden site in the Mydyr valley SN45 (1935). It is well-naturalised in woodland at Glandyfi Castle SN692966, 1994 (AOC & WMC); in Ash woodland on the disused railway at Aber-mad SN602763, 1988 (APF); in woodland E of Llanfair SN444407, 1999, where it was first noticed in 1978 (JRP); and in the graveyard at Penparc chapel SN212478, 1995. It was also naturalised in the churchyard at Strata Florida SN746657, 1979, but has since gone.

***Polygonatum multiflorum* (L.) All.** - Solomon's-seal - Llysiau Solomon

Naturalised and clearly not native in the county. Because of confusion with *P. ×hybridum*, it is uncertain how many of the early records refer to this species itself. Seven colonies have been identified since 1970, as against 13 of the hybrid. A colony on the W hedgebank of the B4576 road 100m N of Gilfach-coed, Llangwryfon SN595700 was 4 × 2m in 1990 (NMW), with another smaller one 120m S. There were also naturalised colonies on a roadside bank at the SW end of Dinas Terrace, Aberystwyth SN58198091, 1995; on top of a roadside hedgebank by Is-creuddyn, 1km SSW of Prengwyn SN423433, 1991 (NMW); on a shaded laneside hedgebank 50m NE of Pantiorlech, Pontsian SN429464, 1999; on the SE verge of the A475 road 150m WSW of the Rhydowen crossroads SN442451, 1999; and on the NW bank of the A487(T) road at Llwynwernau, 2km SSW of Llanarth SN414556, 2000 (NMW).

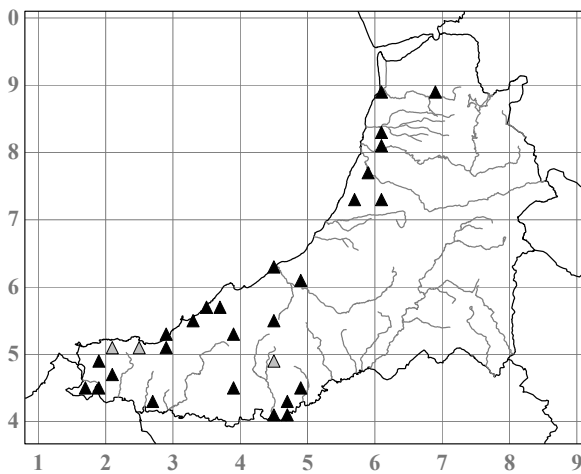
**Polygonatum ×hybridum** Brügger (*P. multiflorum* × *odoratum* (Mill.) Druce) - Garden Solomon's-seal - Llysiau Solomon yr Ardd

Naturalised probably chiefly from throw-outs, mostly in woodlands and on roadside hedgebanks, and first recorded in 1978 in woodland above the road 1km E of Llanfair SN44414075 (NMW, JRP), and still abundant there in 1999. Among the dozen other colonies, one 4m long on a shaded laneside slope 300m ESE of Henbant, Talgarreg SN42005044, 2003 (NMW) is of puzzling taxon with corollas 18mm long, 8mm wide at the apex, and somewhat contracted in the middle, yet with smooth, terete stems. Some at least of Salter's eight records (1935, Wade 1952) probably refer to this hybrid, including that of a remarkably persistent colony at Nanteos that was first reported to him in 1894 (Diary 17.10.1894) and that he first saw in 1900 (Diary 9.5.1900) "growing in several places as escape on top of wall"; it survived there on top of a moss-covered drystone wall in the estate woodland SN618787 until at least 1976, and now grows nearby in woodland at SN61197863, 1997-2007.

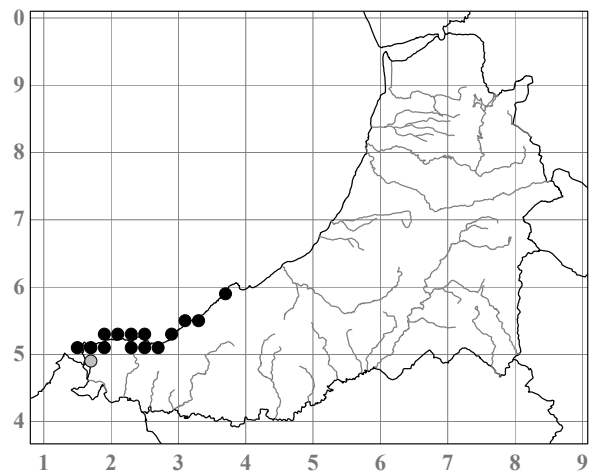


**Ornithogalum umbellatum** L. subsp. **campestre** Rouy (*O. angustifolium* Boreau) - Star-of-Bethlehem - Seren Fethlehem

Occasionally naturalised on hedgebanks, pathsides and in woodland, and in ten graveyards. It grows in unusual abundance in alluvial woodland N of the Afon Aeron at Llanerchaeron SN483603, 1996 (NMW), and in an alluvial meadow by the Afon Teifi 300m NNW of Coedmore SN19004410, 1996 (AOC & JPW). Salter recorded it from only one site, Fronfraith Gate SN618810, in 1934 and 1937 (1935, Wade 1952), so it has probably increased considerably since his day. Probably native in E England.



*Ornithogalum umbellatum*



*Scilla verna*

**Scilla verna** Huds. - Spring Squill - Seren y Gwanwyn

Confined to the hard rock clifftops and slopes along the coast from the Afon Soden SN3658, 1985-2004, to Cardigan Island SN161517, 1961 (Condry 1961) - 1977 and Gwbert SN1650, 1907 (GRW in Salter 1935) - 2003. A record from Aberystwyth by Evans (1804) is best considered unreliable. In many places it is very abundant, growing on thin soils in short turf or on otherwise bare areas. When in flower in May

*Scilla verna* and *Armeria*, Mwnt, view ENE from SN19825215, 26 May 1978



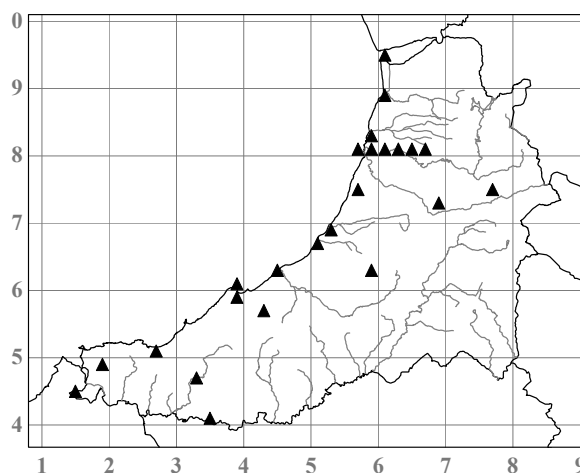


*Scilla verna*, Mwnt, view W from SN201521, 26 May 1978

at Mwnt SN1952 and 2052, on the Foel and E along the cliffs for *c.*1km, it can provide one of the best botanical spectacles in the county; some of the densest colonies are in former arable fields that have long reverted to coastal heath. Plants with white or pink flowers are occasionally seen. Often whole colonies are infected by the smut *Ustilago vaillantii*.

**Hyacinthoides hispanica** (Mill.) Rothm. (*Scilla hispanica* Mill.) - Spanish Bluebell - Clychau'r-gog Sbaenaidd

First recorded in 1977 as naturalised from throw-outs on waste ground at Penyrangor, Aberystwyth SN581808 (JEH), and on the clifftop at the S end of Borth SN605888 (JEH) where it was still abundant in 1994 (NMW). It has since been recorded from a score of sites, mostly on road verges, cliff slopes above the sea, on sand dunes and shingle, on waste ground and in hedgebanks. Variants with pink or white flowers occur. It is often with *H. ×massartiana*, but seems more coastal and is generally not so frequent. Native of Spain and Portugal.

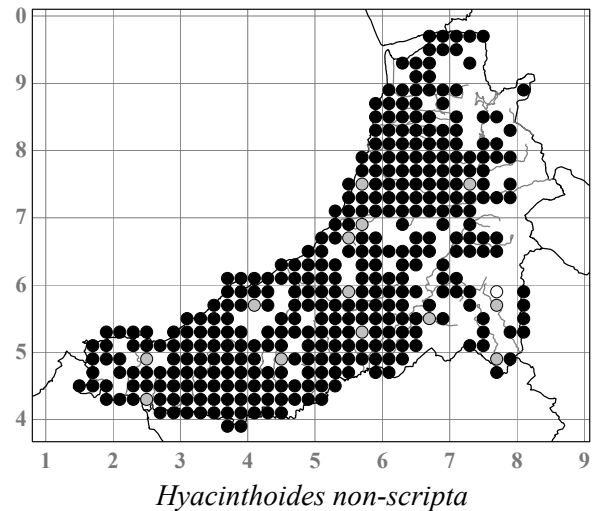
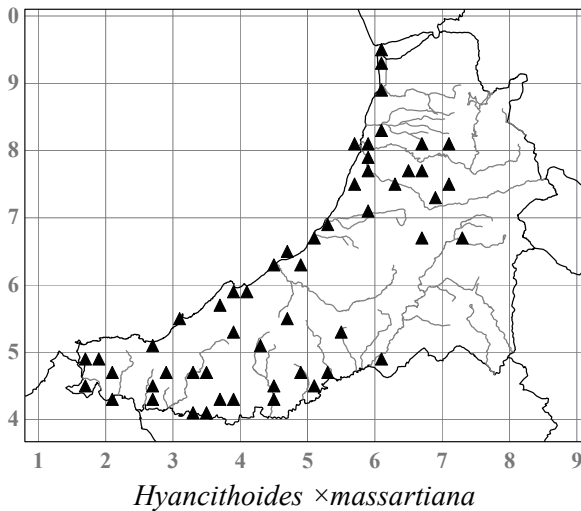


**Hyacinthoides ×massartiana** Geerinck (*H. hispanica* × *non-scripta*) - Clochau'r-gog Croesryw

Frequently naturalised, mostly from throw-outs, but not recorded until 1991, on a grassy bank by the church hall, Llanbadarn Fawr SN598810, although it must have been in the county well before this. It is widespread on roadside verges, in hedgebanks, in graveyards, on waste ground and dunes and in woodland and scrub. Variants with white, pale blue or pink flowers often occur. Plants are very variable in other characters, and every gradation to the parents is seen, but there is no obvious evidence of any contamination of the native Bluebell in its main woodland and grassland habitats; even at Parc Natur Penglais, Aberystwyth *c.*SN591821, where the extensive population of *H. non-scripta* abuts on gardens with *H. hispanica* along 500m of its S



edge, there was no sign of *H. hispanica* influence in 2005. Altitude limit 310m, banks of FC car park, Nantyrarian SN71848134, 2003.



***Hyacinthoides non-scripta* (L.) Chouard ex Rothm. (*Scilla nutans* Sm.)** - Bluebell - Clochau'r Gog (Clychau Glas, Sanau'r Gog, Sanau'r Gwcw, Blodyn y Brain, Coesau Brain, Sanau'r Brain, Cennin y Brain, Clychau'r Eos)

Spectacularly abundant in many woodlands, pastures and coastal slopes, and a common plant of hedgebanks, verges, streambanks, graveyards and cliffs. It can be as dominant in the damper, slightly more fertile *Quercus petraea* woods as in mixed deciduous woods, and perhaps grows best on slopes, but is less common in conifer plantations. Some of the best displays in publicly accessible woods are in Parc Natur Penglais, Aberystwyth SN591821 and in the Old Warren Hill Wildlife Trust Reserve, Nanteos SN613788. An abundance of Bluebells in open grassland sites in the uplands or elsewhere inland is often considered an indication that they were former woodland; this may be generally true, but Bluebells



*Hyacinthoides non-scripta*, coastal slope at Carreg Ti-pw SN535707, April 2007



*Hyacinthoides non-scripta* in Eglwys Newydd churchyard, view SW from SN76917374, June 1983

are often abundant, usually under Bracken, on coastal slopes that have not been wooded for at least two centuries, if ever. Conversely, they are abundant throughout much of the Penglais woodland SN591821 that was open fields until well into the 19<sup>th</sup> century. The E part of Cardigan Island SN162517, where there is no Bracken, is dominated by them 1977-2009 (AOC; SPC). Since about 2000, Bluebells have strikingly





*Hyacinthoides non-scripta* and Soay Sheep, E side of Cardigan Island, view ESE from SN162517, June 1983

increased in abundance on many open pasture slopes near the sea, for example in the fields on the NW slopes of Pendinas, Aberystwyth SN582808. Plants on exposed coastal slopes usually have very fleshy leaves up to 28mm wide, for example on New Quay Head SN381602, 2002, and by Carreg Ti-pw SN535707, 2003 (NMW, AOC & JPW) and even up to 35mm wide and with scapes up to 60cm tall on Cardigan Island SN159515, 2009 (SPC). White-flowered plants are rather rarely seen, and pink-flowered ones even more rarely. A clump of forma **bracteata** (Baker), with long, leaf-like bracts, has persisted for at least a decade under Oaks on the Penglais quarries, Aberystwyth SN587821, 1994-2004 (NMW), and it has also been found at Rhydyfelin SN593793, 1996 (CDPa). Altitude limit 535m, Craig y March, Pumlumon SN806882, 1904 (Salter diary 8.6.1904); 550m, E side of Cwm Gwerin, Pumlumon SN810882, 2000 (SPC). This limit is exceeded by 135m in Snowdonia, but is the same as that in Cumbria (Halliday 1997).

#### **Hyacinthus orientalis** L. - Hyacinth - Hiasinth

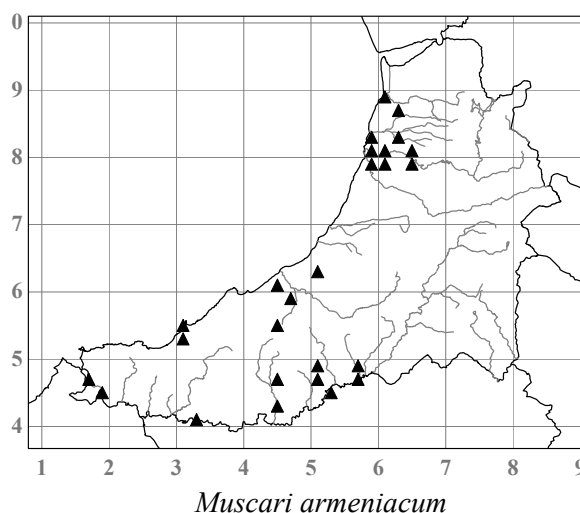
A white-flowered cultivar is established from throw-outs in rough grass on the clifftop above the sea at the S end of Borth SN605888, 2008.

#### **Muscari neglectum** Guss. ex Ten. - Grape-hyacinth - Clychau Dulas

Naturalised on a grassy slope by Primrose Hill, Llanbadarn Fawr SN600811, 1993-2005, and in scrub above the church hall nearby SN598810, 1997 (SPC). In Britain it is native only in Suffolk and Cambridgeshire.

#### **Muscari armeniacum** Leichtlin ex Baker - Garden Grape-hyacinth - Clychau Dulas yr Ardd

Quite frequently naturalised from throw-outs, and often clearly self-sown, on roadside verges and hedgebanks, pathsides, graveyards and disused rail-



ways. It was first recorded in 1992 by a footpath at Rhydyfelin SN59307930, but had probably been ignored previously. Native of SE Europe and SW Asia.

**Asparagus officinalis** L. subsp. **officinalis** - Garden Asparagus - Merllys yr Ardd

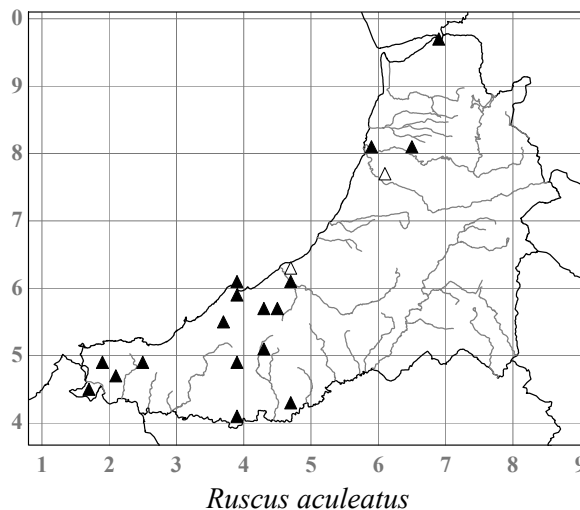
Recorded as an escape in Llanafan churchyard SN685721, 1982. This is the cultivated archaeophyte, presumably bird-sown here. (An 1890 D. A. Jones specimen reported as being at NMW on a BRC card cannot be found.)

**Ruscus aculeatus** L. - Butcher's-broom - Celynnen Fair (Y Goron Ddrain)

Occasionally naturalised or persisting as a relic of planting in hedges, scrub, old garden sites, estate shrubberies and graveyards, chiefly in the SW of the county. Dense clonal thickets are formed, and all seen in flower have been either male or female, not bisexual; fruits are very rare on our plants. It is native elsewhere in Britain.

**Yucca gloriosa** L. var. **gloriosa** - Spanish-dagger - Iwca

Native of NE North America and commonly grown in gardens. A large plant, clearly fallen from a clump inside a garden, grows on the W bank of the A482 just SE of Vicarage crossroads, Aberaeron SN45876207, 1995-2007; and in 2005 a large single-stemmed plant, presumably derived from a throw-out, was found among Bracken and Bramble on the SW slope of Pendinas, Aberystwyth SN583800, just above the former rubbish-tip.



**Cordyline australis** (G. Forst.) Endl. - Cabbage-palm - Palmwydden Fresych

This salt-tolerant, frost-sensitive palm-like tree, native of New Zealand and introduced to Britain in 1823, is often grown in amenity areas and public gardens near the coast. Although fruits are set, no seedlings have yet been found. Several especially fine specimens were to be seen at the NW end of Plas Crug, Aberystwyth SN58608165, but were replaced in 2005.

## ARECACEAE

**Trachycarpus fortunei** (Hook.) H. Wendl. - Chusan Palm

Introduced to Britain from China in 1830. There are groups of Chusan Palms by several of the country houses in the county. Of three at Glandyfi Castle the tallest, by the drive SN69109651, had the trunk 10m tall in 2005 (AOC & PSC). Of six at Bronpadarn, Llanbadarn Fawr SN60218101, the tallest had a trunk 8m tall in 2005. Two at Nantceirio nearby SN61438090 had trunks 7m and 5m tall in 1993, and occasionally self-sow successfully. Four on the Terrace at Highmead SN501431 were 3, 3.5, 4.5 and 6m tall in 2002.



*Trachycarpus fortunei*, Bronpadarn,  
Llanbadarn Fawr, view N from  
SN60208101, February 2005



## COMMELINACEAE

### *Tradescantia fluminensis* Vell. - Wandering-Jew - Llusiau'r-pryf-copyn Brasil

There was a remarkable colony of this frost-sensitive pot plant from South America under a cast iron cellar-grating by the old university building at the W end of King Street, Aberystwyth SN58038166, 2002 (SPC, NMW) - 2006. It was not planted, and was presumably originally blown in. The amount varied, sometimes there was only one stem, and sometimes it entirely filled the cellar-well and flowered prolifically.

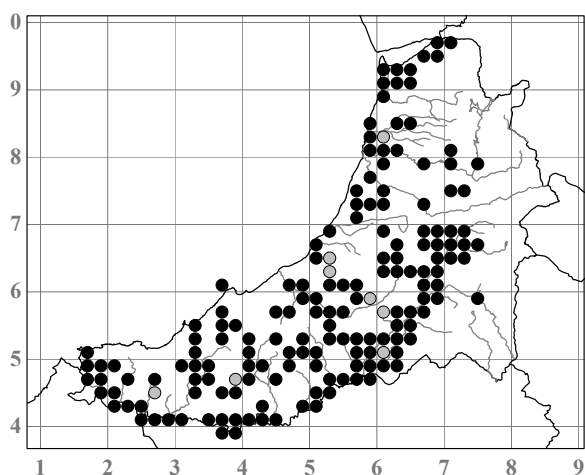
## TYPHACEAE

### *Sparganium erectum* L. (*S. ramosum* Huds.) - Branched Bur-reed - Cleddlys Canghennog

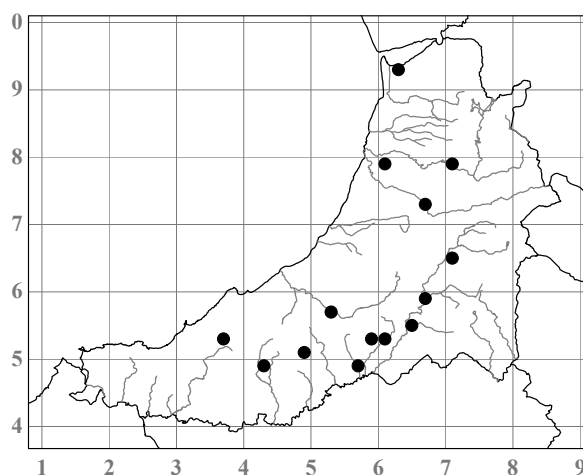
A common emergent of ditches, swamps, pond margins and lakesides, ox-bows and backwaters, and fringing slow-flowing rivers. Because it is often non-flowering, and the period between ripening and shedding of the fruits during which the subspecies can be identified is so short, few records of them have been made and the following account is very provisional. Altitude limit 425m, head of the Groes Fawr SN744592, pre-1936 (Salter 1935) - 1987; in this latter year it was non-flowering and fringing the stream for c.150m.

[Subsp. *erectum*

Erroneously recorded from the reservoir E of Trawsgoed SN661726 in 1990 (NMW) and mapped in Preston & Croft (1997); the specimen is subsp. *microcarpum*.]



*Sparganium erectum* all records



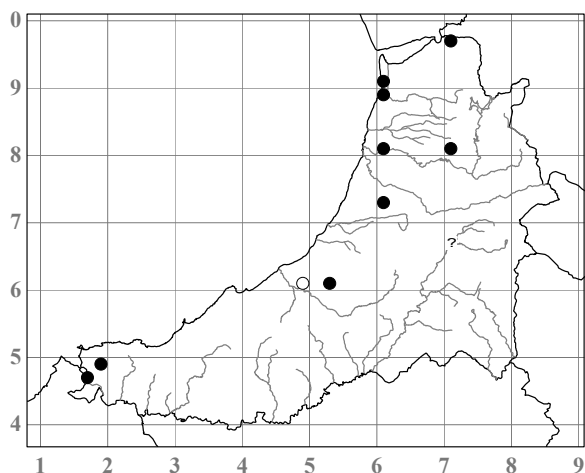
Subsp. *microcarpum*

#### Subsp. *microcarpum* (Neuman) Domin

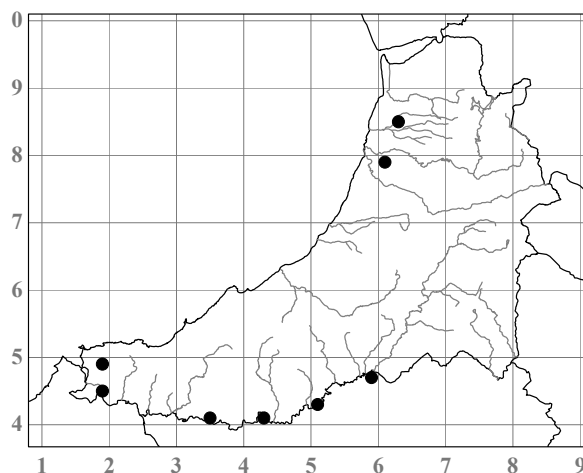
The commonest subspecies, widespread in a variety of habitats, with 17 records 1990-2006.

#### Subsp. *neglectum* (Beeby) K. Richt. (*S. neglectum* Beeby)

Recorded from "Teifi marshes, Strata Florida" c.SN76D (Ley 1887) and from a swamp at Llanerchaeron c.SN481600, 1899 (CGE, ESM, conf. FHP, Marshall 1900); there have been nine records 1990-2006.



Subsp. *neglectum*



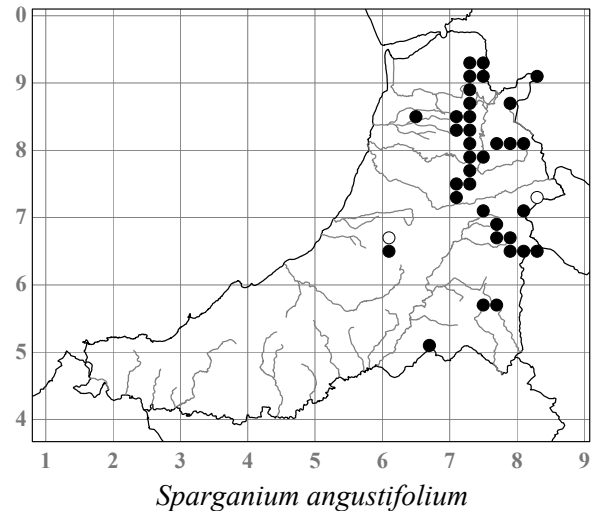
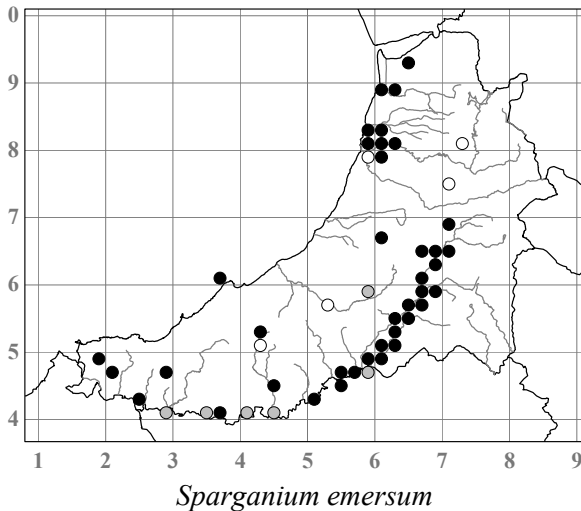
Subsp. *oocarpum*

#### Subsp. *oocarpum* (Čelak.) Domin

There have been eight records 1990-2005, mostly from swamps in the lower Teifi valley.

**Sparganium emersum** Rehmann (*S. simplex* Huds.) - Unbranched Bur-reed - Cleddlys Di-gaine

In contrast to *S. angustifolium*, chiefly a plant of lowland rivers and ponds, and usually in less oligotrophic waters. It is commonest along the Afon Teifi and in its associated backwaters and ox-bows. It occurs in a number of ponds in the Aberystwyth district, and colonises newly dug ones rapidly. It rarely flowers in the county, and may be somewhat under-recorded. Altitude limit 305m, a small colony at the SW corner of Llyn Eiddwen SN604668, 1999.



**Sparganium angustifolium** Michx. (*S. affine* Schnizl.) - Floating Bur-reed - Cleddlys Arnofiol

In most of the upland lakes and reservoirs, often in small quantity, and usually growing in water 0.5-1.5m deep on both peaty and stony substrates. It thrives in the more oligotrophic waters; in the more mesotrophic lakes it has been recorded only once in Llyn Eiddwen SN6066, in 1963 (NMW, BS, Seddon 1972), and in Llyn Fanod SN601642 it was not recorded until 1994. It can occasionally colonise newly dug ponds within a few years, for example at Castell, Devil's Bridge SN725773 where it was recorded in a 5-year-old pond in 2003 (SPC), but, like most other aquatics, it has failed to colonise Llyn Brianne and the Nant-y-moch Reservoir even after several decades, and only one plant has been seen in the Claerwen Reservoir SN829653, in 1991. Apart from the outflow channels of a few lakes it does not occur in running water. It has been found as low as 175m altitude in the Pen-y-cefn Reservoir SN659854, 1990. Altitude limit 575m, boggy pool 500m NW of Carnfachbugeilyn, Pumlumon SN82229062, 2002.

[*Sparganium natans* L. (*S. minimum* Wallr.) - Least Bur-reed - Cleddlys Bach

A 1963 non-flowering specimen from Llyn Eiddwen SN6066 (NMW, BS, det. CDKC) was re-determined by Seddon as *S. angustifolium* in 1966. A 1977 record from the same lake (CN & DGJ) is also assumed to be an error, as is an undated annotation in W. H. Hardaker's copy of Wade (1950) recording it from the outlet of Pond Lluet, Ystumtuen SN73587910.]

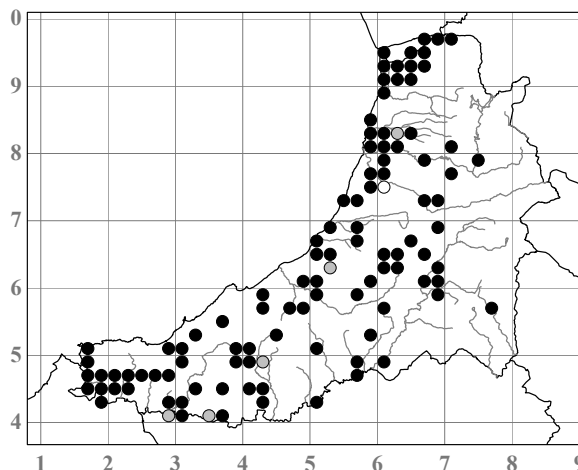


*Sparganium angustifolium* with *Lobelia* in Llyn Nantycagl, view NE from SN729903, August 1988

*Sparganium angustifolium* with *Lobelia* in Llyn Nantycagl, view NE from SN729903, August 1988

***Typha latifolia* L. - Bulrush - Cynffon y Gath (Cociau Melfed)**

Widespread throughout the lowlands in ditches, ponds, lake margins, ox-bows, backwaters and swamps. It is a rapid coloniser of new ponds by its windblown seeds, but is so often planted that it is often impossible to tell where it is native. Salter (1935) described it as very local, and gave only five sites; it has certainly increased vastly since then, and as it is a plant of nutrient-rich sites this may be mostly due to a general eutrophication of the aquatic habitats in the county. This follows the national trend (Braithwaite *et al.* 2006). Existing colonies have also been increasing more and more rapidly in size, and for example in the swamps in the old course of the Afon Leri at Ynys-las SN6091 and 6092, and in the Teifi Marshes at Cardigan SN1845, it has spread from small colonies to dominate large areas very rapidly in the last 20 years or so, 2005. Altitude limit 355m, clay-pit reservoir dug c.1970 in the Camddwr valley 1km N of Maesglas SN773564, 1995-2005.



***Typha angustifolia* L. - Lesser Bulrush - Cynffon-y-gath Gulddail**

Planted c.1992 in a field pond 1km N of Cilcennin SN523613 with *T. latifolia* and later well-naturalised 1995-2000 (JLD; AOC), and also 1993-2008 in the pond by the CCW office, Plas Gogerddan SN62808345 (SPC).

## JUNCACEAE

***Juncus subnodulosus* Schrank (*J. obtusifolius* Ehrh. ex Hoffm.) - Blunt-flowered Rush - Brwynen Flaendon**

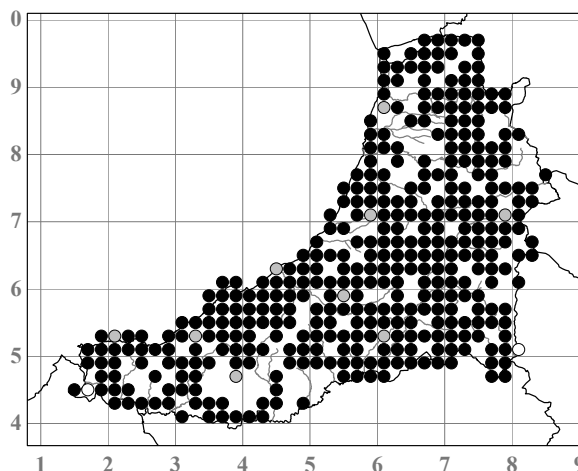
Salter (1935) gives: "Salt-marshes and bog-ditches of the Dyfi estuary: abundant, as near Hen Hafod and Ynys Fach", and in his Diary (22.7.1930, 8.9.1931, 23.7.1932) records seeing it only in this area; it still occurs here E of Ynys Fach SN672949, 1982 (AOC, DGJ & WMC) - 2004 (AOC, PAS & MB; JPL) in rank fen as well as in heavily grazed areas. It has since been found in three other areas, at all of which it seems to have arrived comparatively recently: two colonies in marshy grassland on Morfa Borth SN613908 and SN613905, each c.10m in diameter in 1991; one colony in marshy grassland on the Aberleri Fields SN61309140, 15m in diameter in 2000 (AOC, JPL & ACW); and one colony among *J. acutiflorus* and *Molinia* in the NW part of Cors Fochno SN62409245, 25m in diameter in 2001 (AOC & JPL).

***Juncus articulatus* L. - Jointed Rush - Brwynen Gymalog**

A common plant of wet places, usually in more or less open communities on streamsides, lake shores, tracks, flushes and poached pastures. It is rarely dominant, and is absent from the most acidic sites. Occasionally in pools and lakes it can grow out to form floating masses, but never to the extent of *J. bulbosus*. It is extremely variable, and the following varieties represent only the more distinctive ecotypes.

Var. ***littoralis*** Patze, with short, tufted, prostrate or ascending stems often rooting at the nodes and small, contracted inflorescences, is dominant in places in the dune slacks at Ynys-las SN69B, C, 1936 (NMW, Salter, Wade 1952, as var. *nigritellus*) - 2002 (NMW), but it varies in abundance depending on the degree of flooding and the wetness of the sand in particular slacks.

Var. ***nigritellus*** (D. Don) Druce, with short, erect stems and inflorescences with suberect branches, is the common plant of upland flushes; it was first recorded in 1893 from Bryn Perfedd, Devil's Bridge SN715771 (CGE, IHB & JCW, Burkill & Willis 1894, conf. PDS) and has been found from 160m altitude in the Cyneiniog valley SN701881, 1999, up to the altitude limit of the species at 600m in flushes on the cliffs



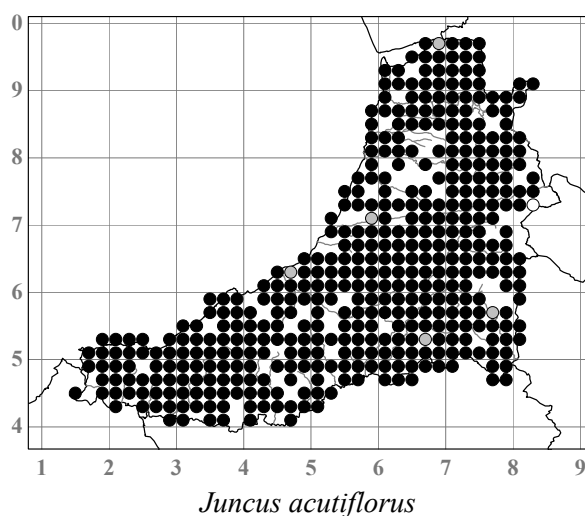
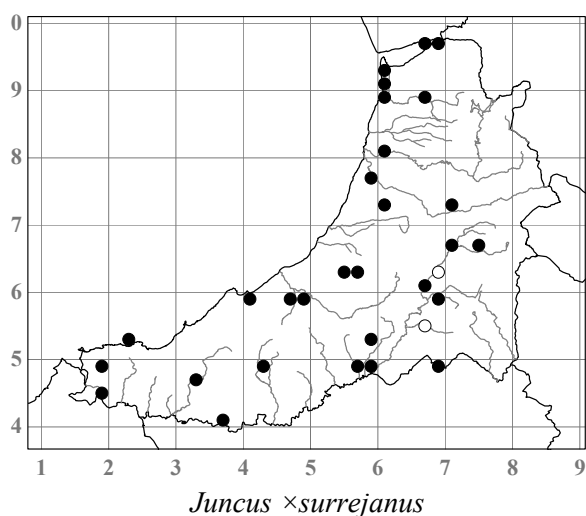


above Llyn Llygad Rheidol on Pumlumon SN79328731, 2002. Salter (1935) recorded the species (doubtless this variety) up to 610m on Pumlumon where he said it was often viviparous.

Remarkable robust plants, with prostrate, fistular stems rooting at the nodes and pale inflorescences and tepals, grow on the muddy banks of tidal creeks at Rosehill Marsh in the Teifi estuary SN189454, 1994 (NMW) and are probably var. **stolonifer** (Wohll.) House. Plants from near St. Dogmaels SN14S, c.1960, were considered by A. R. Clapham (pers. comm.) to be probably the tetraploid “large 80” (see Timm & Clapham 1940, Blackstock & Roberts 1986). Var. **articulatus** itself is very variable and widespread, but is less common than var. *nigritellus* in the uplands.

***Juncus* × *surrejanus*** Druce ex Stace & Lambinon (*J. acutiflorus* × *articulatus*)

First recorded in 1957 from marshy ground near Maesllyn, Cors Caron SN6962 (NMW, PMB, *Nature in Wales* 4: 554 (1958)) and now known from numerous sites where *J. acutiflorus* occurs, but often where *J. articulatus* is sparse or apparently absent. It is perhaps most abundant in rush pasture, especially alongside the Dyfi estuary, but is probably generally under-recorded, being very variable and often difficult to separate from the parents; it is at least sometimes fertile. Altitude limit 330m, flushed slope, Cefn Blewog, Brynafan SN706725, 1993.

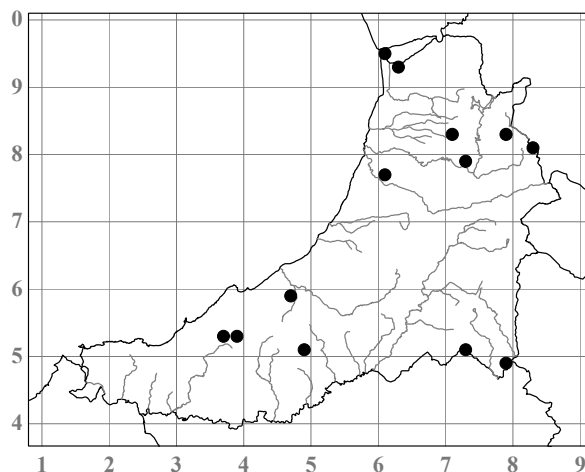


***Juncus acutiflorus*** Ehrh. ex Hoffm. - Sharp-flowered Rush - Brwynen Flodeufain

Common throughout the county in fens and flushes, and often dominant over large areas of valley mire. It extends from the slightly brackish coastal marshes well into the uplands, but becomes uncommon there and is rare in the higher flushes even when these are mineral-rich or slightly base-rich, being usually replaced there by *J. articulatus* var. *nigritellus*. It is easily confused with its hybrid with *J. articulatus* in the lowlands. Altitude limit 440m, Llyn Gwngu SN87G (Salter 1935); 530m, flushed slope 800m WNW of Carnfach-bugeilyn, Pumlumon SN81939076, 2002.

***Juncus bulbosus*** L. - Bulbous Rush - Brwynen Oddfog

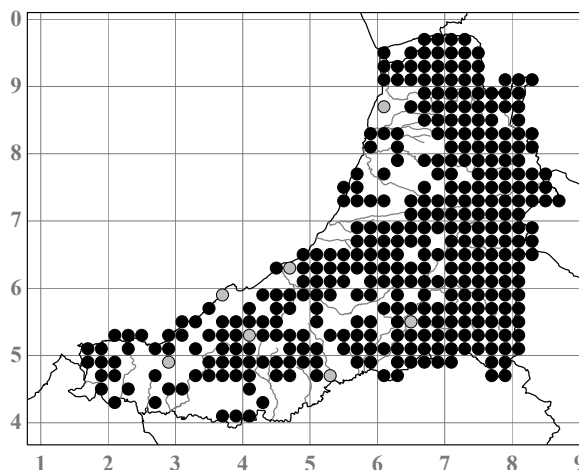
Although many Floras do not recognise *J. bulbosus* and *J. kochii* as separate taxa, in West Wales at least they seem entirely satisfactory species. *J. bulbosus*, with the tepals and capsule green in flower and pale brown in fruit, three stamens and the capsule narrow, obscurely trigonous above and obtuse or subacute, is a rare plant usually of the more fertile marshes in the lowlands, and in dune slacks and ditches, and very rarely occurs in peaty hollows in wet heath and by upland lakes. In the few sites where the two grow together they are immediately separable and *J. bulbosus* flowers later, for example in shaded *Juncus acutiflorus* fen at Glwydwrn, Gorsgoch SN499504, 1997 (NMW, AOC & JPW). Although



most of the plants that form free-floating or submerged masses ('*fluitans*') in lakes and streams can be difficult to identify as they are largely viviparous and mostly do not flower, those that do usually prove to be *J. kochii*. An exception was in the reservoir SSW of Cae Gaer SN821816, 1993, where there was 1ha of floating *Juncus* which, from the many flowers present, seemed all to be *J. bulbosus*. At Llyn Pendam SN708838, 1994 (NMW), the two species grow together on the shore, but all the floating material that had flowers was *J. kochii*. Altitude limit 355m, reservoir SSW of Cae Gaer SN821816, 1993.

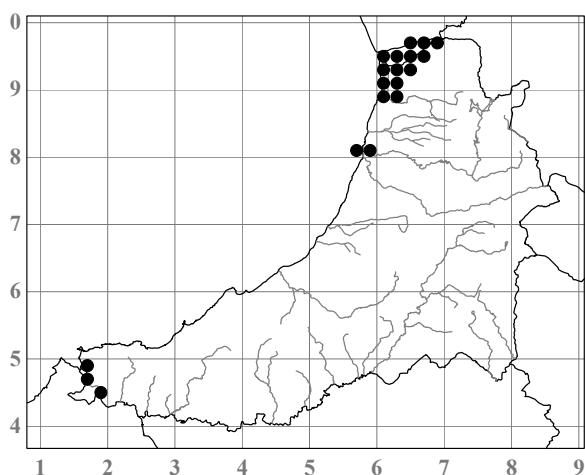
***Juncus kochii*** F. W. Schultz (*J. bulbosus* subsp. *kochii* (F. W. Schultz) Reichg.)

First recorded in 1954 by PMB, a staunch defender of the distinctness of this species, from a stream on the coast between Gwbert and Cardigan Island SN161507 (NMW, *Proc. BSBI* 1: 335 (1955)), *J. kochii* has the tepals and capsule rapidly becoming brown during flowering and dark or blackish in fruit, six stamens and the capsule broad, sharply trigonous above and truncate or retuse. It is a common plant of wet, acidic places of all sorts, mostly in open habitats, and is very characteristic of flushes on upland slopes, streambanks and wet tracksides, ditches, wet heaths, lake shores, ruts and poached places in damp pastures. In upland, acidic lakes and reservoirs it can form huge submerged or floating masses ('*fluitans*'), as in the Claerwen Reservoir SN86H, I, where in 1991 a dense washed-up mattress of it 5-20m wide covered the shore for c.2km. It is sometimes the only aquatic growing in lead mine pools and reservoirs and is presumably to some extent resistant to heavy metal toxicity. Altitude limit 425m ("to at least 1,400ft", as *J. bulbosus* but probably this species, Salter 1935); 640m, flush above Llyn Llygad Rheidol, Pumlumon SN79368723, 2002.

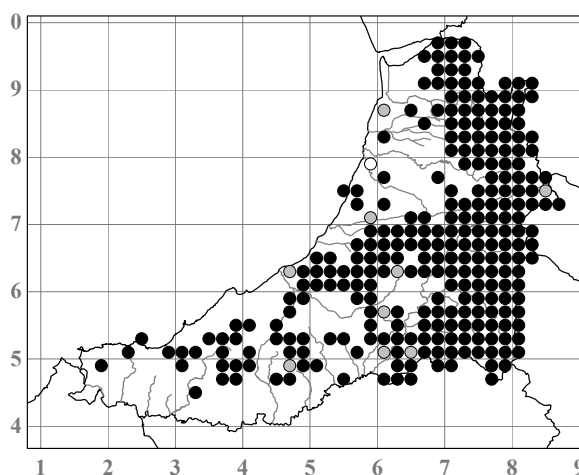


***Juncus maritimus*** Lam. - Sea Rush - Brwynen Arfor

Abundant or locally dominant in the upper parts of the salt marshes in the Dyfi SN69, Ystwyth SN58Q, V and Teifi SN14 estuaries. There are colonies in some of the Ynys-las dune slacks SN69B, C, 2008. By the Dyfi it extends inland as far as there is any brackish incursion, and often persists in abundance where there have been such incursions in the past, as at the S tip of Cors Fochno SN620899, 2000, and on Ynys Eidiol common SN672948, 2004 (NMW).



*Juncus maritimus*



*Juncus squarrosus*

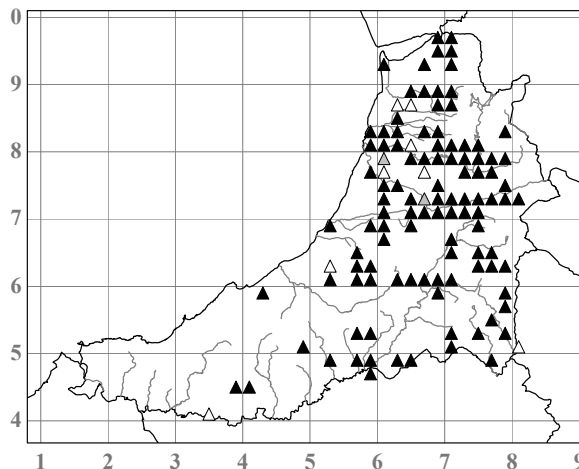
***Juncus squarrosus*** L. - Heath Rush - Brwynen Droellgorun

A common plant of peaty soils on the upland sheepwalks, blanket bogs, wet heaths, well-grazed acidic marshy grasslands, often especially abundant on paths as its habit makes it very tolerant of trampling. It is rare along the coast, but has been found for example in a flush on top of the sea cliffs at the MoD site, Aber-porth

SN243524, 1979-2005. Altitude limit 750m, summit of Pumlumon Fawr SN789869 (Salter 1935); 2002, ditto.

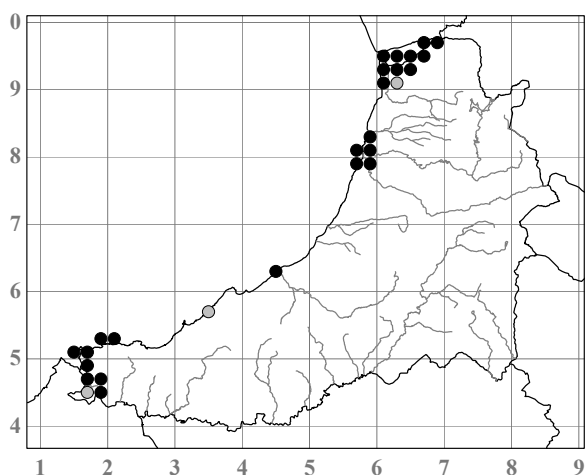
***Juncus tenuis* Willd. - Slender Rush - Brwynen Fain**

This native of E North America was first recorded in Britain in Angus in the 1790s and in Wales near Portmadoc in 1890 (ABS, J. L. Williams, *J. Bot.* **34**: 201-204 (1896), W. H. Painter, *J. Bot.* **29**: 120-121 (1891), Richards 1943). It was first found in Cardiganshire in 1924 at "Dove Junction, Cardigan", i.e. Dovey Junction c.SN69Y, by a Miss Todd (BEC Rep. 7: 600 (1925)); Salter (1935) stated that "It seems to have spread with great rapidity, as it is now common, but is, in general, only seen by road-sides." It is still common in many places, almost always on paths, on road verges especially in FC plantations, and only occasionally in other open habitats such as river shingle, disused railway ballast and poached pastures, but has perhaps not increased since Salter's time as much as might have been expected. It is quite absent from the SW. An increase around Eglwys Fach SN69X about 1990 (ISF) may have been related to increasing visitor numbers at the RSPB Ynys-hir Reserve. The species can be very variable, and on the A44(T) verge 1km W of Ponterwyd SN737807, 1999 (NMW), for example, two distinct forms, with compact and diffuse inflorescences, were growing together. This variation occurs elsewhere, the plants with diffuse inflorescences often being unusually tall, but although such plants look superficially like var. *anthelatus* Wiegand, they do not have the short capsules characteristic of that taxon. Altitude limit 440m, FC road verge 3km E of Strata Florida SN782628, 1993.

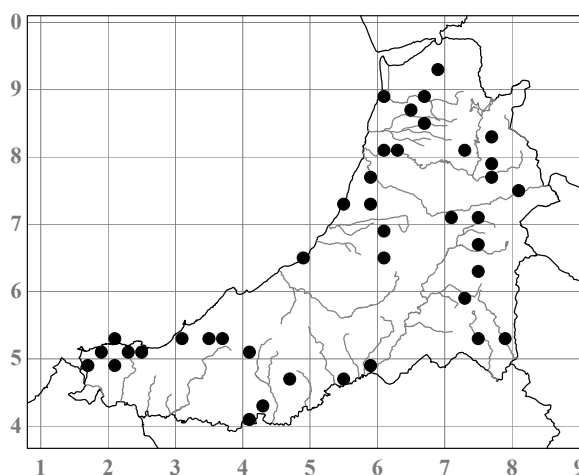


***Juncus gerardii* Loisel. - Saltmarsh Rush - Brwynen Gerard**

Abundant in the upper zones of the salt marshes and in other brackish, muddy sites along the coast. It is in small quantity in some of the Ynys-las dune slacks SN69B, 2008 (SPC). Small patches occur in crevices in the spray zone on the sea cliffs at Gwbert SN161495 and 160505, 1976-2004, and it is abundant and growing with *J. articulatus* above the sea cliffs at 25m altitude in a small area of marsh by the stream 100m NE of Mwnt church SN19605210, 1987-2004 (NMW). At the S end of Cors Fochno SN6290 it has occurred at the inland extremities of brackish incursion (Slater 1978), as it has also 400m ENE of Hen-hafod SN667943, 1959.



*Juncus gerardii*



*Juncus foliosus*

***Juncus foliosus* Desf. - Leafy Rush - Brwynen Ddeiliog**

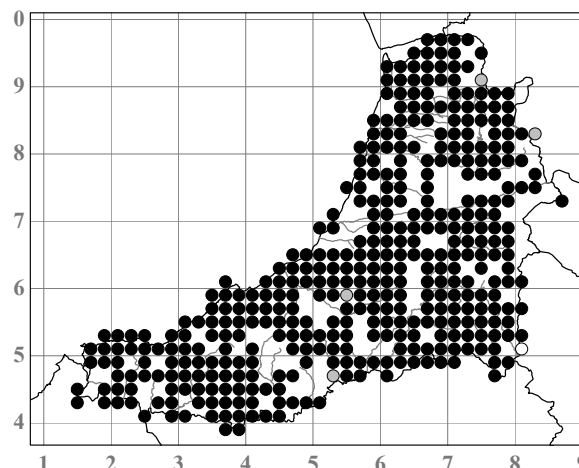
First recorded from a marshy, disused track near Nant-llwyd SN787527, 1987 (NMW, conf. CAS), and now known to be an occasional plant of wet, open or disturbed habitats such as rutted tracks, ditches, damp road verges, FC roadsides, the draw-down zone of reservoirs and poached streambanks and wet pastures. Less



often it occurs in more natural habitats such as flushes in rhos pastures and on the coastal slopes, in base-rich fens and in muddy hollows in river shingle. It can be variable, and on an FC road verge by the Nant Rhuddnant SN773776, 1993 (NMW) two quite distinct forms were growing together. It also varies in abundance from year to year, and in some is scarcely seen at all. Altitude limit 390m, wet hollow in track 2km W of Trawsallt SN759708, 1999.

### ***Juncus bufonius* L. - Toad Rush - Brwynen y Llyffant Du**

Common in a wide variety of damp, open or disturbed habitats, and especially characteristic of tracksides, road verges, ruts and poached places in pastures and marshes. It grows with, and is generally commoner than, *J. ranarius* at the top of salt marshes and in damp sandy or muddy places along the coast, and is often abundant on lake margins, streamsides and the draw-down zone of reservoirs. It is often dominant beside roads where the grassy verge meets the tarmac, for example by the A44(T) above Cwm-brwyno SN709811-722813 in 1988-1999. Altitude limit 510m, gravelly area by Llyn Llygad Rheidol dam, Pumlumon SN791878, 2002.

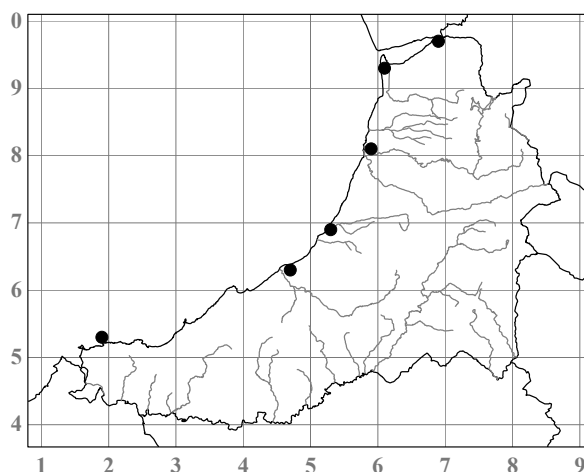


### ***Juncus minutulus* (Albert & Jahand.) Prain**

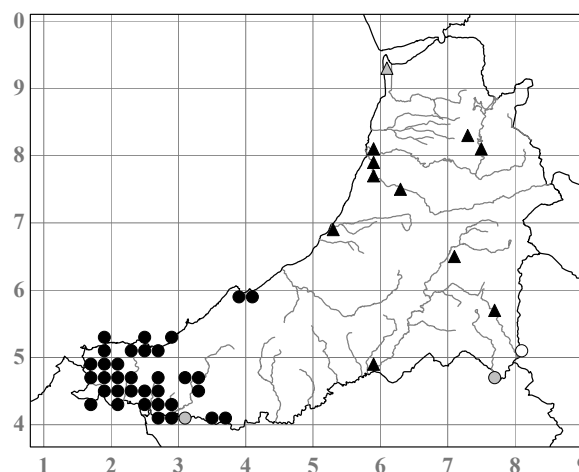
Diminutive plants with short tepals and capsules, referable to this species, have been recorded from several sites, for example a rough track at Ynys Edwin, Ynys-hir SN678962, 2007 (NMW), a path in the main slack at the Ynys-las dunes SN60919380, 2007, and bare ground on a pingo rampart at Rhos Llawr-cwrt SN410499, 2007 (NMW, AOC & CAS), and are probably widespread but have only recently been looked for. To what extent they are worth recognising is uncertain (see Cope & Stace 1978, Kirschner 2002). Altitude limit 320m, stony track through peat 300m S of Llyn Fanod SN60216382, 2007 (NMW).

### ***Juncus ranarius* Sonesson & E. P. Perrier (*J. ambiguus* auct., non Guss.) - Frog Rush - Brwynen y Broga**

An uncommon plant of muddy, peaty or sandy places at the top of salt marshes and behind sea beaches, often in ruts in tracks or in other bare patches. It was first recorded in 1983 growing with *Radiola* on bare peat E of the tidal part of the Afon Leri SN617928 (LTR, NMW, det. CAS). Although it is in many places along the Dyfi estuary and at Ynys-las, as well as by the tidal parts of the Ystwyth SN58V and Aeron SN46L, and in small areas of brackish marsh S of the Wyre mouth SN523687, 2000, and by the stream E of Mwnt church SN19605210, 1991 (NMW), it has not yet been recorded from the Teifi estuary.



*Juncus ranarius*



*Juncus inflexus*

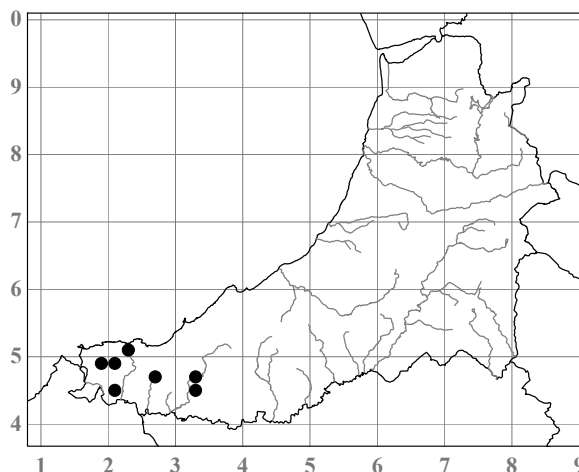
### ***Juncus inflexus* L. (*J. glaucus* Sibth.) - Hard Rush - Brwynen Galed**

Confined now as a native to the SW of the county, where it is frequent and often locally dominant on somewhat calcareous drift soils and sands, usually in marshy grassland, on streamsides and pond margins and

in flushes on the coastal slopes. There are two old native records from the Tywi valley in the SE of the county, from below Cnapyn Melyn SN7747, 1972 (IMV) and from near the Camddwr confluence SN805505, 1966 (IMV), the latter site now under Llyn Brienne. Elsewhere it is an occasional introduction on road verges, disused railways and waste ground, long-established at some sites such as the old station yard, Llanilar SN626753, 1991-2006 (AOC; SPC), and a short-term casual at others such as on waste ground at Ynys-las c. SN608935 in 1975 (ABS, ADQA), and a car-parking area on moorland near Disgwyfla Fach SN73388323 at 285m altitude in 1991. An unusually large cultivar was naturalised on the site of a former nursery garden at Llanbadarn Fawr SN585812, 1981-1995 (BM, NMW, AOC; SPC).

### ***Juncus* × *diffusus* Hoppe (*J. effusus* × *inflexus*)**

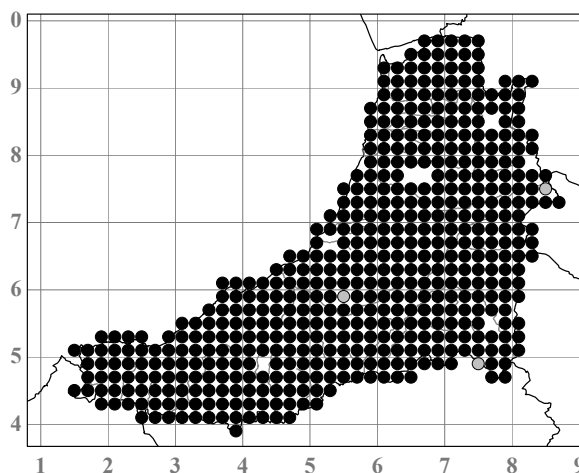
First reliably recorded between a fen with abundant *J. inflexus* and a pasture with *J. effusus* by the Afon Mwldan, Penparc SN19604830, 1994 (NMW, JPW & AOC). Subsequent records are from another pasture nearby SN201489, 1994 (JPW & AOC); a wet pasture at Llechryd SN212440, 1994 (SPC, conf. TAC); wet pastures SW of Cefnmaesmawr, Brongest SN32324610-322459, 1997 (JPW & AOC); a rush pasture SW of Glanrhyd, Heol y Bowls SN268469, 2005 (SPC); and a disturbed rush pasture, MoD site, Aber-porth SN23985167, 2002. It is probably very under-recorded and can be expected elsewhere in the S of the county where the parents grow together. A record by Salter in his annotated copy of his Flora in NMW, "In woods of Mynachty (Arth) [c. SN46W]; one strong clump 1936", could well be correct, although there is no specimen and the record was marked as an error by AEW. It usually occurs as single clumps.



### ***Juncus effusus* L. - Soft-rush - Brwynen Babwyr**

A very common plant of damp or wet habitats of all sorts, often dominant in fens, rush pastures, flushes, around the edges of basin mires, on lake margins and fringing streams. It often occurs at the top of salt marshes with *J. maritimus*, and is frequent in damp woodland. It is regularly mown in lowland pastures to reduce its vigour and spread, and is used for bedding in stables. Formerly it was much used for thatching (William 1995), and relics of this can sometimes still be found, for example on an outbuilding at Gwarallt, 3km ESE of Tregaron SN703577, 1993. The pith was widely used for rush-lights.

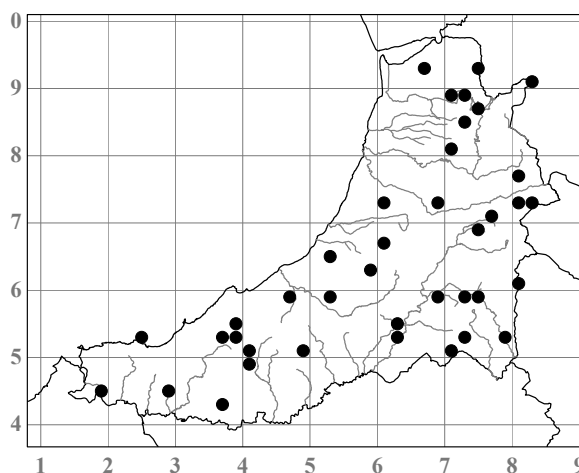
There is great morphological variation, and var. **subglomeratus** DC., with compact inflorescences, is common, though difficult to distinguish from plants showing introgression from *J. conglomeratus*. There is an extensive population in *Salix/Molinia* carr on the West Marsh, Ynys-hir SN676955, 1998 (NMW) with the inflorescence branches 6-12cm long and branched c.4 times. Var. **spiralis** J. McNab, a generally Atlantic variant with oblique or prostrate, slightly flattened stems which are variably coiled in a spiral, has been noted at three sites, but is probably very under-recorded: sedge-rich pasture, Aberleri fields SN611915, 1997 (AOC & PAS); upland sheepwalk SE of Lan Fraith, Cwmystwyth SN786726, 2005 (AOC & PAS); and grassy slope 150m SSE of Hafod mansion site SN76037302, 2006 (PAS & AOC). Altitude limit (the species) c.610m ("about 2,000ft."), Pumlumon (Salter 1935); 750m, in the Pumlumon Fawr summit cairn SN789869, 2002.



### ***Juncus* × *kern-reichgeltii* Jansen & Wacht. ex Reichg. (*J. conglomeratus* × *effusus*)**

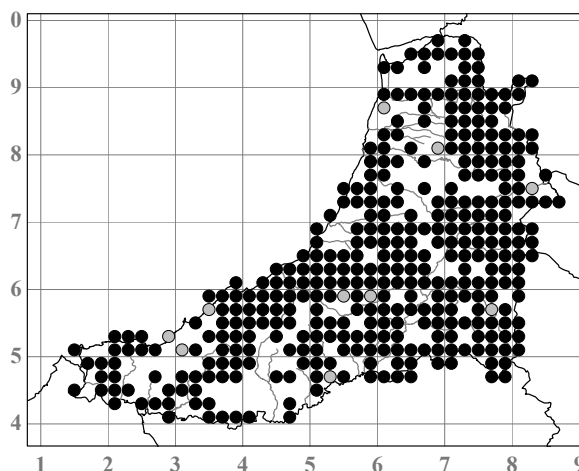
A widespread hybrid, with frequent introgression and often occurring in the current absence of good *J. conglomeratus*. The hybrid was first recorded in the county from near the Nant-y-moch Reservoir SN78

(ADQA pers. comm. 1993) and from around Llyn Eiddwen SN66D (ADQA pers. comm. 1997). Since then, adopting the scatter diagram technique used by Agnew (1968), with number of vascular bundles in the stem (rather than number of ridges), spathe-length and perianth-colour as the main characters, hybrids and evidence of introgression were detected in half a dozen sites including a felled conifer plantation at Lodge Park SN665936, at 50m altitude, 1997 (NMW) and a blanket bog on Drosgol in the Cyneiniog valley SN715884, at 290m altitude, 1997 (NMW). Subsequent records have been made using less rigorous methods of identification. No evidence has been found to support Agnew's (1968) assertion that the hybrid is more frequent at high altitudes, and it can more often than not be found wherever the two species grow together. Altitude limit 520m, blanket bog, Grafea Elan SN817733, 1999 (AOC & PAS).



### **Juncus conglomeratus** L. - Compact Rush - Brwynen Bellennaid

A frequent plant of blanket bogs and wet heaths in both the uplands and the lowlands, as well as in a wide range of other mires and in lowland and upland flushes. It tends to grow in drier and more mineral-rich sites than *J. effusus*, is more characteristic of undisturbed and uniform areas of mire, and usually does not form such dense patches. Var. **subuliflorus** (Drejer) Asch. & Graebn. has been recorded in several sites on hedgebanks, 600m N of Carrog, Llanddeiniol SN564730, 1999 (NMW) and by the old road at Morfa, Llan-non SN505654, 1997 (NMW); and in wet woodland in Coed Cnwch, 1km SSE of Pontrhydfendigaid SN735655, 1995 (NMW); and in the brackish Alder carr on Rosehill Marsh on the Teifi estuary SN189453, 1999 (NMW) where there were scattered huge clumps with stems up to 165cm tall and inflorescences up to 14cm long. Many colonies of apparent *J. conglomeratus* prove on investigation to be hybrid swarms with *J. effusus*. Altitude limit c.685m ("little if any less than 2250ft.") above Llyn Llygad Rheidol, Pumlumon (Salter, Diary 19.8.1926); 600m, flushed slope above Llyn Llygad Rheidol SN79328731, 2002.



### **Luzula forsteri** (Sm.) DC. - Southern Wood-rush - Coedfrwynen Gulddail

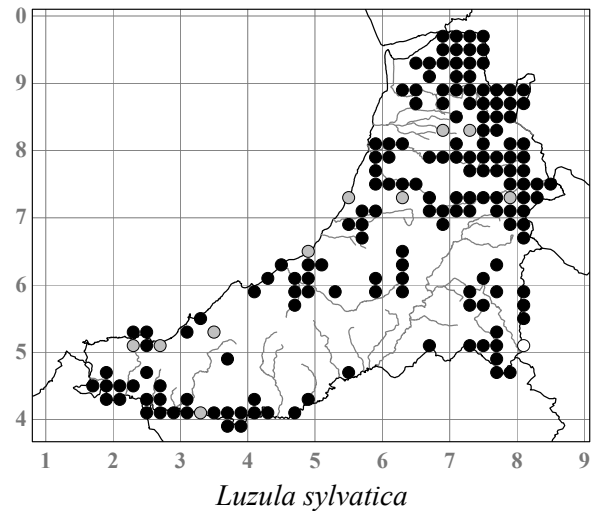
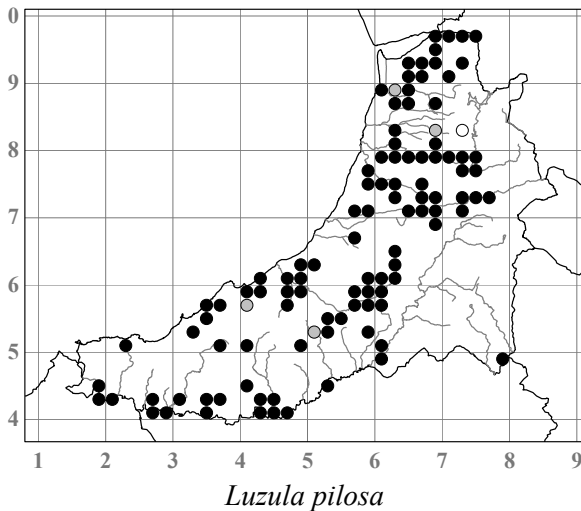
J. E. Smith, who originally described this species (as *Juncus forsteri*) from material collected and grown by E. Forster from Essex, "gathered it in the woods at Hafod, Cardiganshire, growing among the common *J. pilosus*, and flowering in May; but we were not aware of its distinctions till Mr. Forster pointed them out" (*Engl. Bot.* **18**: t.1293 (1803-1804)). He also gave the locality as "In a wood opposite the south front of Hafod house" (*Fl. Brit.* **3**: 1395 (1804)), i.e. SN77L. It has not been found there since. A small colony was found on the roadside hedgebank opposite Siloam chapel at Ferwig SN18504960 in 2000 (NMW) - 2005, and there is also a colony of c.18 clumps in the graveyard here, 2002-2007; it is an unlikely species to have been introduced as it is rarely grown in gardens. The next nearest record is from Brecknockshire.

### **Luzula pilosa** (L.) Willd. (*L. vernalis* (Reichard) DC.) - Hairy Wood-rush - Coedfrwynen Blewog

Frequent but by no means universal in woodlands and shaded hedgebanks, in both damp and dry sites, chiefly where the ground flora is open, commonest in the drier acidic *Quercus petraea* woods, but also occurring in conifer plantations. It is rare near the coast, although it occurs among *Calluna* and Bracken on the N-facing cliff slope above the sea at Traeth y Gwrddon SN232519, 2000 (AOC & MDS); it is mostly absent from the



uplands. The earliest record is by J. E. Smith from Hafod c.SN77L, 1798 (LINN, Herb. Smith). Altitude limit 350m, Esgair Gorlan SN7282 (Salter 1935).



***Luzula sylvatica* (Huds.) Gaudin (*L. maxima* (Reichard) DC.) - Great Wood-rush - Coedfrwynen Fawr**

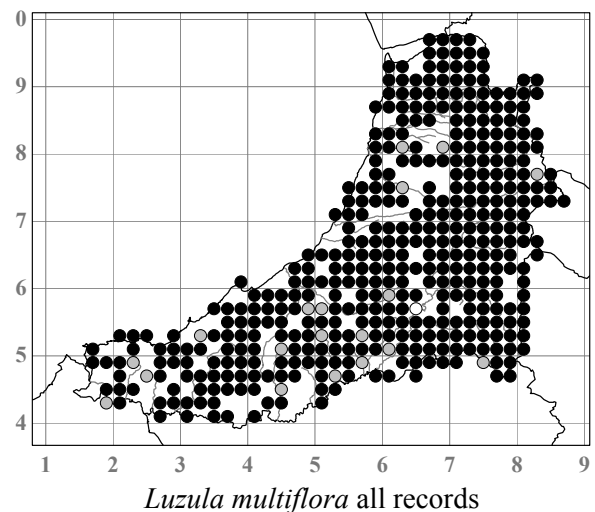
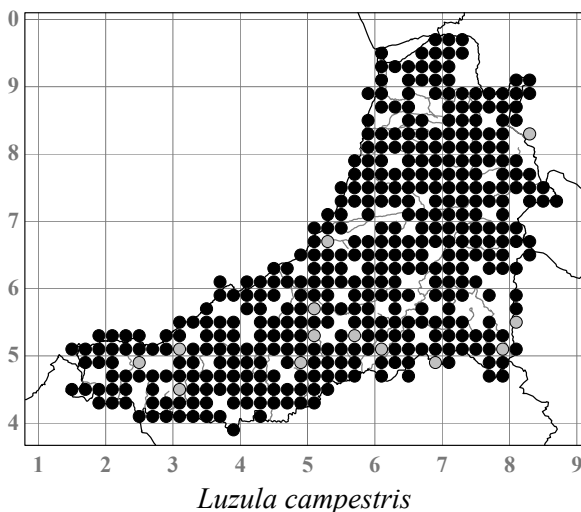
A frequent plant of dry, acidic woodland, streambanks, upland acidic grassland, cliffs and blanket bogs, usually dominant where it occurs but of rather unpredictable distribution. It is especially abundant on some of the steep wooded slopes along the Teifi, especially at Henllan c.SN360402, 1960-2004, and at Coedmore c.SN1943, 1964-2004, and is dominant too in places in the flood zone of the Teifi and the other main rivers. It is salt-tolerant, growing along the banks of the Afon Ystwyth below the tidal limit SN582799, 1979 (LTR, BM) - 2007, and in abundance on many of the coastal slopes. Altitude limit c.750m, "up to the summit of Plynlimmon" SN789869 (Ley 1883); 740m, bog 30m E of Pumlumon Fawr summit SN78998690, 2002.

***Luzula luzuloides* (Lam.) Dandy & Wilmott - White Wood-rush - Coedfrwynen Wen**

Naturalised around the S and W edges of Maestir churchyard SN554493, 1984 (NMW) - c.1995, but apparently since disappeared, 2000. Native of Europe.

***Luzula campestris* (L.) DC. - Field Wood-rush - Milfyw**

A common plant of dry, unimproved pastures, dry banks, heaths, mature dunes, lawns and graveyards, from the lowlands up into the upland sheepwalks and moorlands. As elsewhere in Britain, in Cwm Einion SN69X it was known as Good Friday Grass and its flowering was the sign to put the cattle out to graze, 1950s (PSC). Altitude limit 660m, steep W-facing slope above Llyn Llygad Rheidol, Pumlumon SN797873, 2003 (NMW).

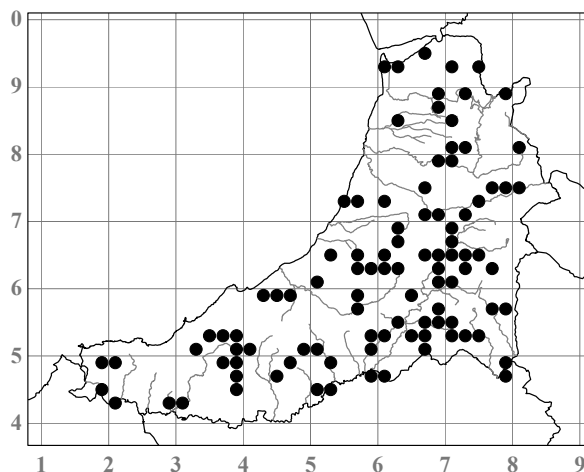


***Luzula multiflora* (Ehrh.) Lej. - Heath Wood-rush - Coedfrwynen Luosben**

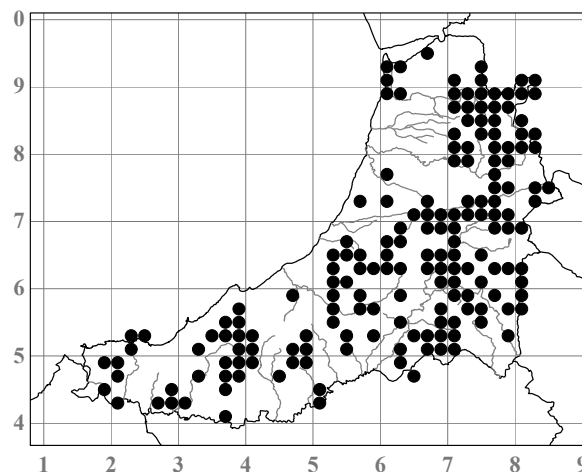
Generally commoner than *L. campestris* in the uplands where it is frequent on the sheepwalks, in blanket mires, on flushed slopes, streamsides, dry and wet heaths and rock ledges. It is especially abundant as a

primary coloniser of felled conifer plantations. In the lowlands it is commonest in valley mires, fens, rhos pastures and heaths, but it also occurs on river shingle, road verges and in hay meadows. It is generally absent from the exposed coastal slopes. Altitude limit (subspecies uncertain) *c.* 610m (“about 2,000ft”), Pumlumon (Salter 1935); 650m, 2005, see below.

Subsp. **multiflora** occurs in most habitats, but seems generally the commoner subspecies in the lowlands and in the more mesotrophic fens and fertile pastures. Altitude limit 360m, felled conifer plantation, Llyn Pendam SN708840, 1993 (NMW, det. TCGR).



Subsp. *multiflora*



Subsp. *congesta*

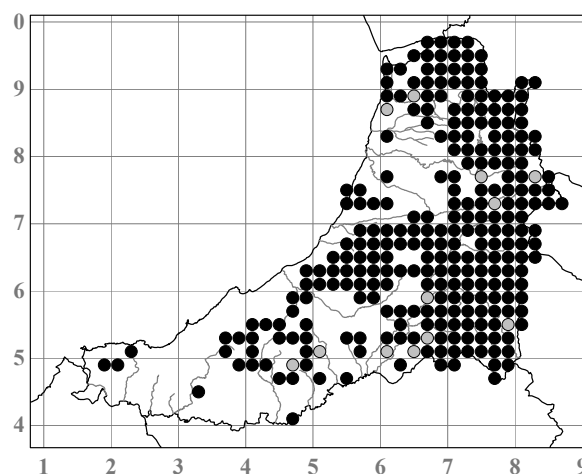
Subsp. **congesta** (Thuill.) Arcang. is frequently difficult to distinguish with confidence, as the seed characters are often intermediate and the inflorescence shape unreliable, but many expert determinations (by JK and TCGR) confirm the general impression that it is the commoner subspecies in the county as a whole, especially in the uplands and in the more acidic wetlands as well as in the drier more acidic heaths. The two subspecies often grow together, for example on river shingle by the Ystwyth at Llanafan SN673719, 1998 (NMW, det. JK; TCGR), and in acidic mire 400m E of Pantyrholiad, Brynhoffnant SN338501, 1995 (NMW, det. JK; TCGR). It was first noted in 1893, “Rhos Elan” *c.* SN87B (Burkill & Willis 1894, as var. *congesta*). Altitude limit 650m, heathy top margin of conifer plantation, S slope of Y Garn, Pumlumon SN77478495, 2005 (AOC & PAS).

Subsp. *hibernica* Kirschner & T. C. G. Rich has so far been recorded only from Ireland, but a very distinctive population in calcareous fen by the Afon Mwldan SN19554830, 2002 (NMW) shows most of the characters of this subspecies and requires further investigation.

## CYPERACEAE

### **Eriophorum angustifolium** Honck. - Common Cottongrass - Plu'r Gweunydd

Widespread and abundant in mires, flushes and wet heaths, both in the lowlands and in the uplands. It is a vigorous colonist of bare peat in eroding mires, and often grows in water in peaty pools and at lake margins. Davies (1945) has much of interest to say about the ecology of this species in the upland mire at Figyn Blaen Brefi SN7154. Goodman (1950, pers. comm. 1998) worked on its ecology especially at the Rhos Rydd valley mires SN57R, S, and recorded there several separate clones with entirely female inflorescences, not producing stamens at all. The few populations investigated recently all have a considerable proportion of the plants with abortive stamens. Cadman (1953, 1957) reported that the roots of the plants were a major winter food of the Greenland race of the Greater White-fronted Goose, judging from a bird shot at Llyn Eiddwen SN605670. Altitude limit 740m, bog 30m E of Pumlumon Fawr summit SN78998690, 2002.

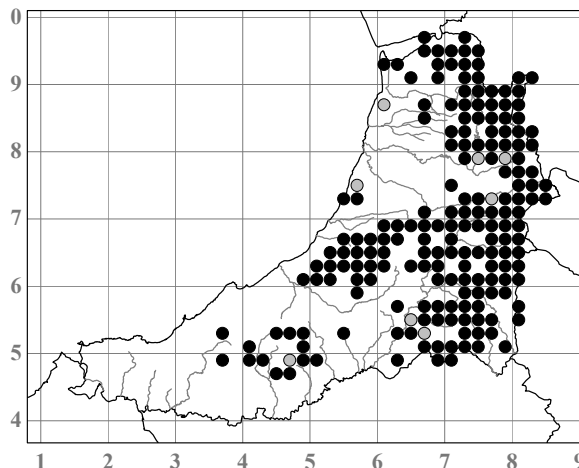


**Eriophorum latifolium** Hoppe - Broad-leaved Cottongrass - Plu'r Gweunydd Llydanddail

A rare species of at least somewhat enriched fens and flushes, known only from three sites. There are many clumps, with a total of 50-70 inflorescences, in a pingo basin mire with pH5.9, with flushing from the slope above, at Glwydwern SN49875045, 1978 (NMW, AOC & DGJ) - 2002 (AOC & PSJ). It is scattered through several base-rich flushes by the Afon Mwldan near Penparc SN14Z & 25E, 1986 (AOC, APF & DGJ) - 2008, and is abundant in a depression in a valley mire by the Afon Meurig SN72996995, 1999 (MDS).

**Eriophorum vaginatum** L. - Hare's-tail Cottongrass - Plu'r Gweunydd Unben (Sidan y Gors)

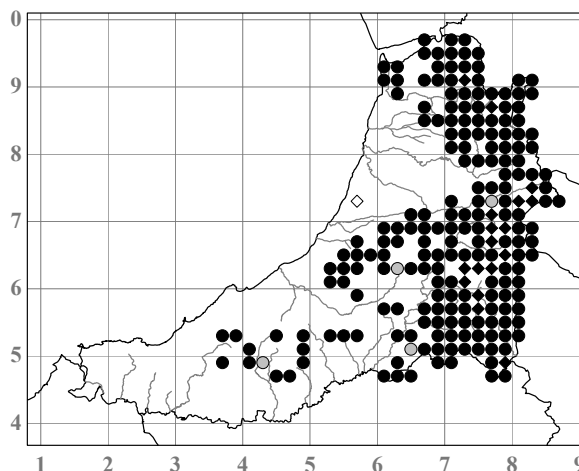
Abundant and often dominant or co-dominant with *Calluna*, *Erica tetralix* and *Trichophorum* on upland blanket bogs, and at lower altitudes common in valley mires and wet heaths, and on parts of the great raised bogs of Cors Fochno and Cors Caron. At the former, as in several other sites, older tussocks have survived burning well, and it readily colonises peat cuttings and other disturbed areas. Stevens & Blackstock (1997) reported the proportions of male-sterile plants on the Cors Fochno raised mire SN69F, and on Cors Caron SN6862; counts have been made at several other sites since and male-sterile plants have always been found, but as the apparent proportions change with the season of sampling, and flowering times anyway change with altitude, it is difficult to identify any pattern. Howells (2005) records how Lewis Rees of Blaen-y-cwm, Cwm Ystwyth SN827754, in the early 20<sup>th</sup> century "when going about his work in the springtime, would see the black buds of the first stages of the cotton grass (*penlliwdiaid*), which is one of the first plants to grow after the winter. He would pick one and put it in his hat as an indicator that spring was not too far away ... It was believed by the old people that this stage of cotton grass was as good for the sheep as the oats is to a horse." (See also under *Luzula campestris*.) Altitude limit 600m or more ("both species ... reach 2,000ft. or more", Salter 1935); 740m, bog 30m E of Pumlumon Fawr summit SN78998690, 2002.



**Trichophorum germanicum** Palla (*T. cespitosum* subsp. *germanicum* (Palla) Hegi, *Scirpus cespitosus* auct., non L.) - Deerglass - Clwbfrwynen y Mawn

Common and often dominant on blanket bogs and heaths in the uplands, less common on lowland bogs and heaths but thriving especially where these are heavily grazed, trampled or burnt. At Cors Caron and Cors Fochno it is abundant around the drier parts of the disturbed margins of the raised bogs where there has been peat cutting, but is almost entirely replaced by *T. ×foersteri* on the raised domes. It is abundant on many of the lowland valley mires, but is absent from coastal heaths. Altitude limit 750m, "to the summit of Plynllunon" SN789869 (Salter 1935); 720m, blanket bog on Pen Pumlumon Arwystli SN817880, 2002.

Proliferous plants are occasionally found, for example in flushes 500m NW of Llyn Nant-y-cagl SN724907, 2002; in the Rhos Rydd valley mire c.SN57R, 1958 (NMW, GTG, conf. GAS); in many places in blanket bog at Grafea Elan c.SN8173, 1999 (AOC & PAS); in many places in blanket bog W of Trawsallt SN77Q, 1999; in flushes by the Nant Lluet, N of the Teifi Pools SN782697, 2002; in the valley mire in Cwm Mwyro SN788641, 2004 (AOC & PAS); in several places in flushes and blanket bog around Blaenglasffrwd, SN76R, 1999; in blanket bog on Bryngwyn Bach SN738631, 1999; and by peaty pools 700m NE of Llyn Berwyn SN750575, 1999. They are shown as diamonds on the map.

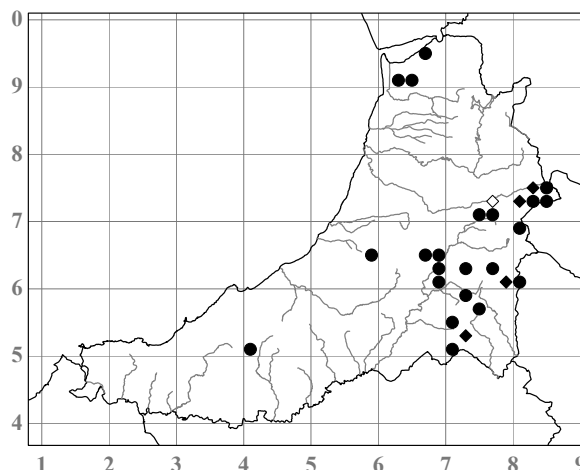




**Trichophorum ×foersteri** (Swan) D. A. Simpson (*T. cespitosum* (L.) Hartm. × *germanicum*; *T. cespitosum* nothosubsp. *foersteri* Swan)

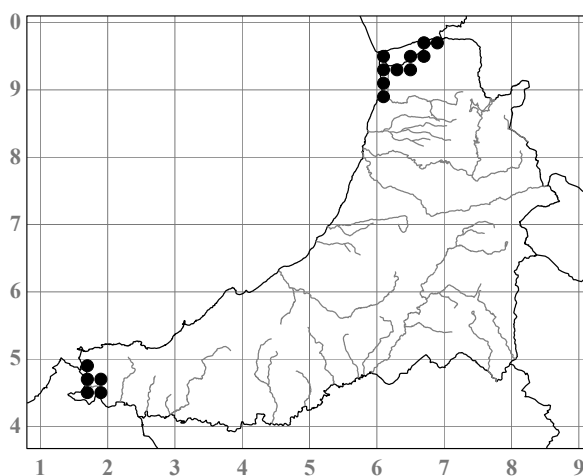
Godwin & Conway (1939) wrote that “The plant present on Tregaron Bog may in all probability be referred to *Scirpus austriacus* [i.e. *T. cespitosum*], one of the two species into which *S. caespitosus* is now divided.” As Swan (1999) surmised, the plant on the raised West Bog here at Cors Caron SN66R, W (NMW, 1999) is in fact the hybrid, which is also the dominant *Trichophorum* on the dome of the Cors Fochno raised bog SN69F (NMW, 1999). Swan gives a possible explanation of this distribution: “Perhaps subsp. *cespitosum* [i.e. *T. cespitosum*] was once the plant of mires in both Scandinavia and Britain; but with the post-glacial amelioration of climate, in the British mires it became too warm for subsp. *cespitosum*, so that it could not compete successfully with the hybrid, which gradually replaced it.” *T. cespitosum* itself has not been found in the county, and in “Godwin’s lagg” at the N side of the West Bog at Cors Caron SN685646, the place where one would most expect it to occur, the only *Trichophorum* is sparse colonies of the hybrid, 1999 (NMW).

The hybrid also occurs quite frequently in flushes in other bogs in both the uplands and lowlands, most often in flushes in sloping blanket bogs but also in such different habitats as the Ynys Edwin valley mire at Ynys Hir SN678959, 2002, with *Andromeda*, and in a level mire with *Carex magellanica* on Bryn Hyrddod SN808689, 2002 (AOC & PAS). It was first collected in 1963, in a flush with *Carex dioica* 500m W of Bryn Mawr, Hafod SN771717 [the grid reference being originally erroneously given as SN769721] (NMW, det. GAS, Swan 1999), but the site was later destroyed by FC drainage. This first record was of the proliferous form of the hybrid (diamonds on the map), which has also been seen on Bryn Hyrddod (as above), in blanket bog at Grafea Elan SN816733, 1999 (NMW, AOC & PAS), nearby at the head of the Nant Cae-isaf SN822740, 1999 (NMW, AOC & PAS), and in blanket bog 900m SW of Moelprysgau SN799604, 2001 (NMW). At all its sites, except for the two main raised bogs, the hybrid is accompanied by varying amounts of *T. germanicum*, as it is in the small presumed raised bog of Gors Goch near Llyn Fanod SN597649, 2007 (AOC & SDSB). All records of the hybrid have been confirmed from stem sections. Altitude limit 520m, blanket bog E of Llyn Du SN80416972, 2002.

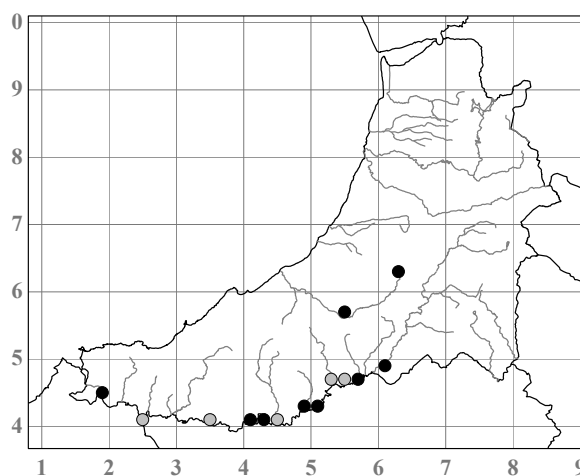


**Bolboschoenus maritimus** (L.) Palla (*Scirpus maritimus* L.) - Sea Club-rush - Ysbigfrwynen y Morfa

Abundant in brackish ditches, pools and marshes in the Dyfi and Teifi estuaries, often dominant in dense stands, and sometimes persisting for many years after drainage has decreased the saline influence in a site.



*Bolboschoenus maritimus*



*Scirpus sylvaticus*

**Scirpus sylvaticus** L. - Swamp Club-rush - Clwbfrwynen y Coed

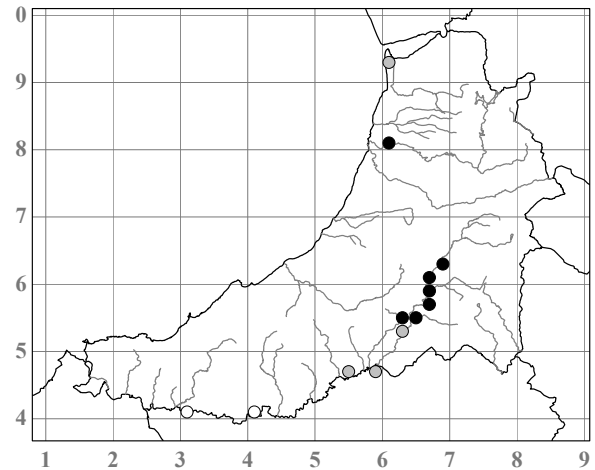
Confined to the Aeron and Teifi valleys where it grows on the riverbanks, by ox-bows and backwaters, in marshes and carr and on flushed slopes in woodland. It was not seen until 1978 (NTHH), when it was

recorded from five sites on the Teifi from near Abergrannell c.SN545460 down to near Stradmore c.SN257417, and has since been seen as far up as Cellan SN61154973, 1993, and as far down as the Teifi Marshes SN18334561, 1999. On the Aeron it has been seen on a flushed slope in woodland just upstream of Pont Gou, Blaenpennal SN63056357, 1997 (AOC & MDS), and dominant in Alder carr 1km E of Talsarn SN555563, 1989 (AOC & DGJ). It is surprising that such a locally abundant species should have been overlooked by Salter and others, and it is most unlikely to have been a recent arrival.

***Schoenoplectus lacustris* (L.) Palla (*Scirpus lacustris* L.) - Common Club-rush - Llafrwynen**

Currently known only from the Rheidol and the Teifi. On the lower Rheidol it was recorded from an ox-bow N of the river just E of Glanyrafon Bridge SN610806 by Salter in the late 1930s (Wade 1952), and two colonies 15 × 2m and 10 × 6m were still there in 2005. It was first recorded from the Teifi on Cors Caron in 1886 (Ley 1887), and Salter (1935) recorded it from Cors Caron “and thence at intervals down to Newcastle Emlyn” SN34A. It now occurs in the river and in its associated backwaters and ox-bows from Cors Caron SN684627, 2005, down to the Nant Bryn-maen confluence SN639557, 1999, often fringing the river in abundance. In 1978 it was recorded in several sites further down, but only as far as 4km below Lampeter SN545460 (NTHH). It may therefore be decreasing on this river. The only other records, apart from an improbable one from Llyn Llygad Rheidol by Morgan (1849), were from the Ynys-las area: Salter (1935) recorded it from “between Borth and Ynys-las”, one plant was seen in a dune slack SN610939 in 1959, and it was reported there in the 1970s (JPS). Salter (1939) admitted confusion with *S. tabernaemontani*, and it may be that all these Ynys-las records were in fact of this species.

*Schoenoplectus lacustris* in the Afon Teifi,  
500m NW of Ystrad Caron, view  
ENE from SN66926010, July 1979



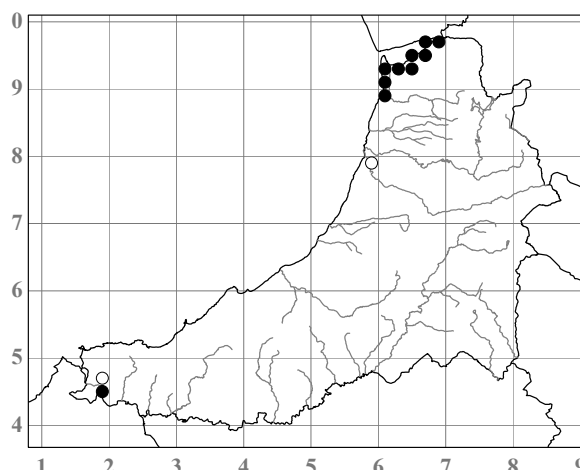
Linear submerged leaves of *Schoenoplectus lacustris* in the Afon Teifi above Pont Einon, SN671614, June 2006



*Schoenoplectus lacustris* in the Afon Teifi above Pont Einon, view NNE from SN671614, July 2006

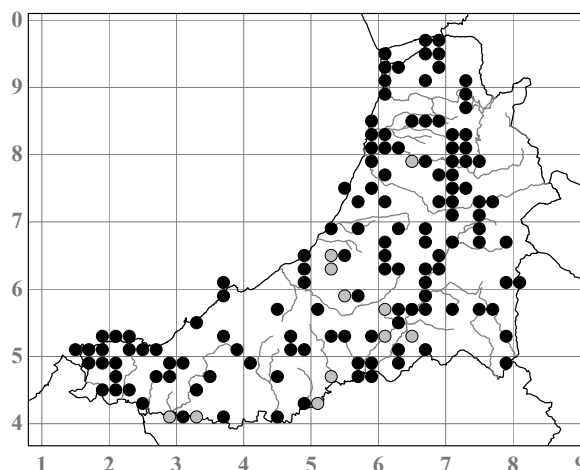
**Schoenoplectus tabernaemontani** (C. C. Gmel.) Palla (*Scirpus tabernaemontani* C. C. Gmel.) - Grey Club-rush - Llafrwynen Arfor

Occurring, often in abundance, in brackish ditches, pools and marshes. It was first recorded on the Dyfi estuary by Ley (1887) as *S. glaucus*, and is in many places from flight ponds and ditches at Glandyfi SN697975, 1994, down to the Ynys-las dune slacks c.SN609939, 1956-2008, and S to the ditch E of the Borth lifeboat station SN609889, 1998-2008. It was first recorded from the Teifi estuary by Whellan (1942, Wade 1952), and has since been seen there above Cardigan church from SN186460, 1962, to SN187458, 1990. Salter (Wade 1952) recorded it after 1935 from a ditch in the Tan-y-bwlch fields, Aberystwyth, and one patch was seen there at SN582795 in 1956. Var. **compactus** (Hausskn.) D. Bakker, was said by Salter (1935) to have been recorded, as var. *capitatus*, at Cardigan by Ley.



**Eleocharis palustris** (L.) Roem. & Schult. subsp. **vulgaris** Walters - Common Spike-rush - Ysbigfrwynen

Frequent as an aquatic fringing the margins of rivers, lakes and ponds, and sometimes dominating large areas in shallow water. It also occurs, though less frequently, in fens and flushes where the stems can be very slender and the spikes few-flowered. On the coast it is abundant in the dune slacks at Ynys-las SN69B, C, 1958-2005, and occurs in brackish marshes, for example at Clarach SN587838, 1958-1993, and even in a true salt marsh in The Gap, Aberystwyth harbour SN58128137, 2001. Populations around toxic lead mine pools are perhaps of heavy metal resistant genotypes (SPC). It occasionally grows with *E. uniglumis*, for example by the old course of the Afon Leri at Ynys-las SN608911-608922, 1994, and can at times be difficult to separate from that species; hybrids have been suspected at several sites but not confirmed. In a small pond below the road 800m S of the Rheidol Falls SN70927804, 1996 (NMW), some spikes in the otherwise normal population had the lowest glume almost encircling the spike and the second glume fertile. Altitude limit 490m, wet verge of FC road 900m 2.5km NE of Nant-y-maen SN78066021, 2001 (AOC & RDP).



**Eleocharis mitracarpa** Steud.

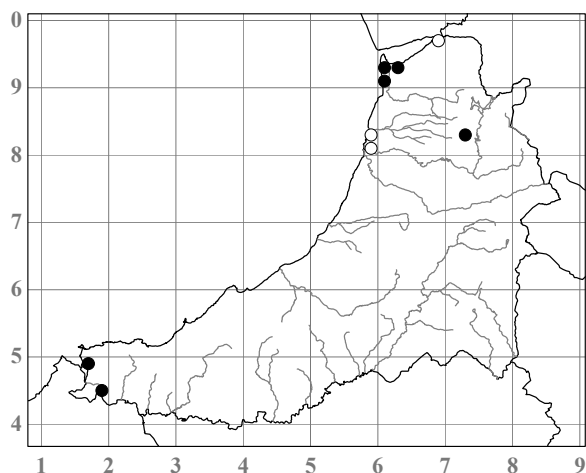
Recent work by G. A. Swan (unpublished) on the *E. palustris* group has shown that plants from Midlothian and Cardiganshire match this Russian species, and it is doubtless much more widespread in Britain and Europe; whether it may better be considered a subspecies, or indeed what the significance of the variation in this group really is, remains to be investigated. Material of it has been collected from a dune slack at Ynys-las SN61089393, 2004 (NMW), from marshy ground by the old course of the Afon Leri at Ynys-las SN608921, 2004 (NMW), and from a flush on the sea cliffs 400m N of the Cliff Hotel, Gwbert SN160505, 1996 (NMW), all det. GAS.

**Eleocharis uniglumis** (Link) Schult. - Slender Spike-rush - Ysbigfrwynen Un Cibyn

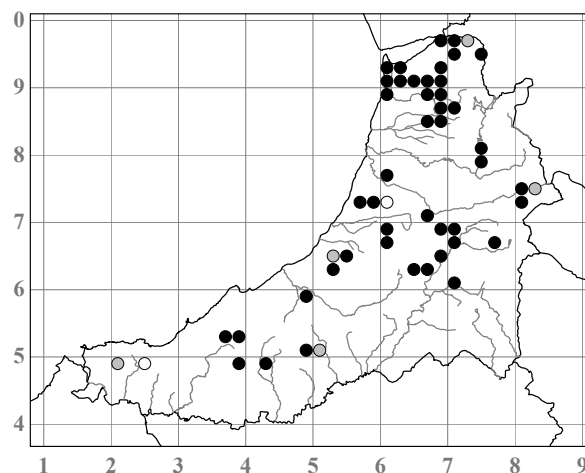
Frequent in the main dune slacks at Ynys-las SN69B, 1958-2005, by Moel Ynys Pool SN607923, 1950 (GEW, Wade 1952) - 2004, and by the old course of the Afon Leri SN608922, 1990-2004, as well as locally abundant in the sandy parts of the Aberleri Fields SN69A, 1990-2004, and on Morfa Borth SN69A, 1987 (THB). It has also been recorded in a marshy field NE of Ynys Edwin, Eglwys Fach SN680964, 1958, in the brackish marsh at Clarach SN587838, 1958, in the Ystwyth estuary SN580807, 1933 and for a few years thereafter (EHC), in a marsh on blown sand on drift at Penyrerhyd SN167490, 1996, and in a brackish marsh



N of the Teifi just E of Cardigan SN187459, 1993. At several of these sites it grows with *E. palustris*. The earliest record is from a “marshy spot near Aberystwith”, 1854 (K, Herb. Watson, MMA, conf. AOC). The only site away from the coast is at its altitude limit of 325m, at Bog Pond SN732824, 1994 (NMW, conf. SMW), where it was abundant over several acres on the drained, partially vegetated bed of this reservoir.



*Eleocharis uniglumis*



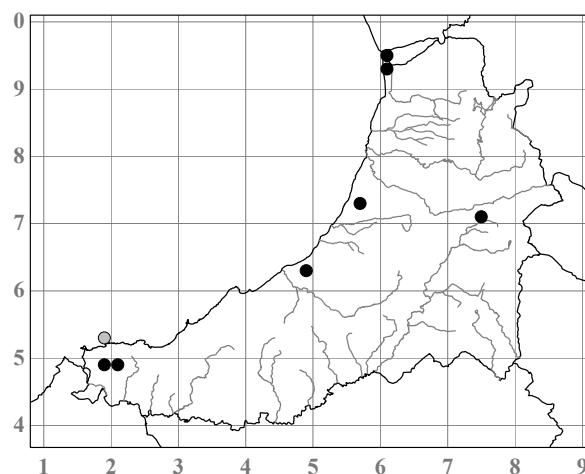
*Eleocharis multicaulis*

***Eleocharis multicaulis* (Sm.) Desv. - Many-stalked Spike-rush - Ysbigfrwynen Gadeiriog**

An occasional species of flushes where they occur in valley mires and blanket bogs, in rhos pastures, and on slopes in the uplands. It also occurs in basin mires, for example at Banc Ty-llwyd SN602774, 1989-2005, and at Cross Inn SN546641, 2003 (AOC & PSJ), and around the margins of raised bogs, for example in peaty hollows in *Myrica* mire at the edge of Cors Fochno SN621925, 1993, and in “Godwin’s lagg” on the West Bog at Cors Caron SN685646, 1999 (AOC & PCu), as well as in old peat cuttings and in recently dug scrapes. Unusually robust plants with stems up to 50cm tall occur in damp hollows in a pasture at the S end of Cors Fochno SN618698, 1991 (CGE, NMW). Plants with proliferating inflorescences are often seen especially late in the season, and the first record of the species is of such a plant from Cringae-newydd SN251483, 1854 (K, Herb. Watson, MMA). Altitude limit 380m, flushes on moraine slope below Graig Ddu, Cwm Ystwyth SN811739, 1991.

***Eleocharis quinqueflora* (Hartmann) O. Schwarz (*Scirpus pauciflorus* Lightf.) - Few-flowered Spike-rush - Ysbigfrwynen Goch**

Locally abundant in some of the Ynys-las dune slacks SN69B, C, 1956 (NMW, conf. SMW) - 2005. It was first recorded in 1880 from “Marshes by the sea, Borth” (ELJ, *BRC rep.* 1880: 138 (1882)), presumably at Ynys-las, and Salter first identified it here at Moel Ynys Pool SN607923 in 1933 (Diary 11.7.1933). Elsewhere it is a rare plant of base-rich flushes at Blaencarrog SN57507238, 2007; 2km W of Pennant SN49556339, 1988 (AOC & APF) - 1997 (MDS); by the stream NE of Mwnt church SN196521, 1983, but now gone; and by the Afon Mwldan SN14Z & 24E, 1986 (NMW, conf. SMW) - 2004. It is in a single upland site, where it is at its altitude limit of 320m, in a flush 1.5km ESE of Pontrhyd-y-groes SN752718, 1993 (NMW).

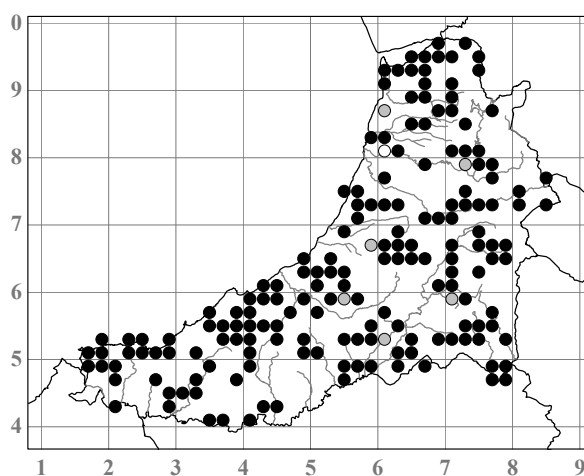


***Eleocharis acicularis* (L.) Roem. & Schult. - Needle Spike-rush - Ysbigfrwynen Fain**

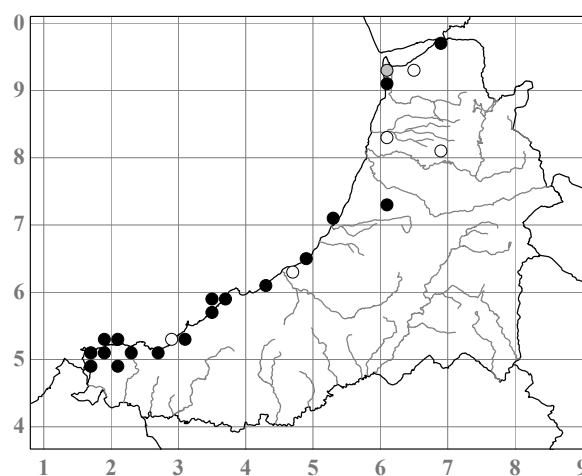
Recorded only from “Mudflat, Borth” in c.1886 by Ley (*BEC rep.* 1884-1886: 109 (1887)); this presumably refers to some non-saline site by the Dyfi estuary or along the Afon Leri SN69.

***Isolepis setacea* (L.) R. Br. (*Scirpus setaceus* L.) - Bristle Club-rush - Clwbfrwynen Wrychog**

A frequent but often overlooked plant of damp pastures, flushes, tracksides, quarries, ditches, lake margins and damp ledges on both inland and sea cliffs. In pastures it is commonest, or most easily seen, in rutted or poached places especially on clay soils. Altitude limit 425m, Llyn Gynon c.SN76X (Salter 1935); 430m, flush by the Nant y Moch, Pumlumon SN775864, 2002.



*Isolepis setacea*



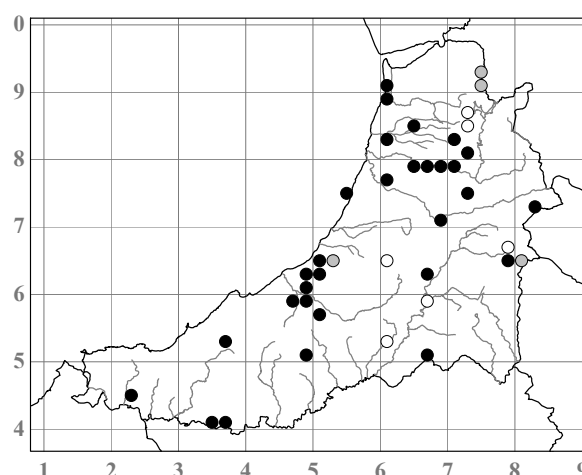
*Isolepis cernua*

***Isolepis cernua* (Vahl) Roem. & Schult. (*Scirpus savii* Sebast. & Mauri) - Slender Club-rush - Clwbfrwynen Fain**

Largely confined to the coast, where it grows in damp places often within the spray zone, in flushes on the sea cliffs, on clay slopes, on pathsides, in ditches and in marshy pastures. Inland, Salter (1935) recorded it from Comins Coch c.SN68B, Goginan SN68V and Aber-arth Common c.SN479625, and more recently it has been recorded from a roadside ditch near Melindwr, Eglwys-fach SN692960, 1998 (JPW & AOC) where it grew with *I. setacea*; from a damp field near Ffosybontbren, Llanilar SN614739, 1997 (ACW); and from a fen by the Afon Mwldan, Penparc SN201488, 1994 (AOC & JPW). Salter (NMW, 1935, Diary 26.7.1927) recorded a dwarf form on wet sand by Moel Ynys Pool SN607923 in 1927, and this still grows nearby at the edge of the marsh by the old course of the Afon Leri SN608917, 1996.

***Isolepis fluitans* (L.) R. Br. (*Eleogiton fluitans* (L.) Link, *Scirpus fluitans* L.) - Floating Club-rush - Clwbfrwynen Arnofiol**

An occasional plant of usually oligotrophic still waters in lakes, ponds, ditches and mires, especially in the uplands. It can form dense and extensive masses in some lakes, and can sometimes completely dominate smaller ponds, for example the one E of Pond Llywernog SN725813, 1988, or the hilltop reservoir at Llanfairorllwyn SN371408, 1994, and is often dominant on bare mud in dry summers. Most unusually, Salter (Wade 1952) recorded it "in the Teifi (in swift currents) below Trecefel bridge, Tregaron [SN65U], 1936", and it has been very rarely seen at the edges of rivers, for example in the Rheidol near Capel Bangor SN67P, 2007 (SPC). It is abundant in ditches by the old course of the Afon Leri SN609910, 1994 (AOC & KH) and E of the Afon Leri SN618895, 1993, as well as in peaty hollows in the Aberleri Fields SN614914, 1994-2004, in at least some of which there is a slight saline influence. Altitude limit 435m, extensive floating masses in Llyn Gwngu SN839729, 1991.



**Cyperus eragrostis** Lam. - Pale Galingale - Ysnoden-Fair Welw

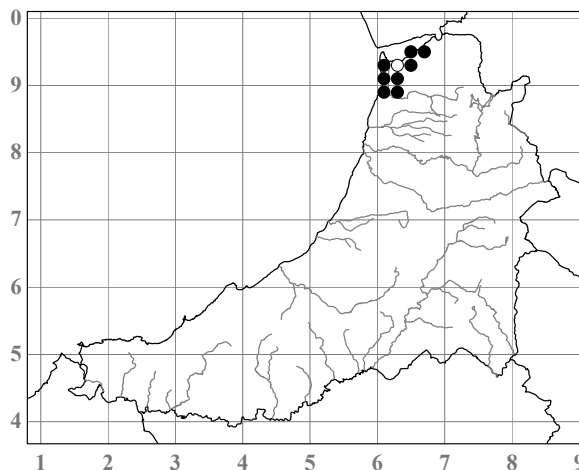
The first record was of three clumps in the swampy stream 150m NE of Pont Pen-y-bont, Llanbadarn Fawr SN595804 in 1997 (NMW), and these had increased to 18 by 2003. Several other clumps have been found within a few hundred metres, by this stream and in wet hollows. Six clumps were found on the University campus, Penglais SN595818 in 1999 (SPC), and in the same year a clump was found on disturbed ground by Bryn-y-mor Road, Aberystwyth SN58968264. In 2004 it was found naturalised in and around a long-drained pond in the Plas Gogerddan grounds SN63158376 (SPC), and in 2006 it was a weed in flowerbeds by Bronglais hospital SN59258179. The species seems to be on the move; it is native of Tropical America.

**Blysmus rufus** (Huds.) Link - Salt-marsh Flat-sedge - Ysbigfrwynen y Morfa

Salter recorded finding this species on Cors Fochno in 1908 in the company of W. H. Painter (Diary 21.7.1908), and implied that he was deliberately looking for it, presumably in the same spot, in 1929 when he recorded not seeing it (Diary 15.8.1929, and see *Rhynchospora fusca* account). It is recorded for the county in Bennett *et al.* (1929) and in Druce (1932), both on the authority of Salter, yet in his Flora Salter (1935) says its occurrence is highly probable but that he has failed to find it. It remains uncertain whether he saw it or not. In 1973 it was found in an area of salt marsh transition at the S end of Cors Fochno SN622902 (NMW, ABS, FMS), and an account of the interesting community here is in Slater (1978). The area has since become overgrown and probably less saline, and the *Blysmus* has not been seen for 20 years and must be considered extinct in the county.

**Schoenus nigricans** L. - Black Bog-rush - Corsfrwynen Du

Occurring only in the dune slacks, brackish marshes, and in a few perhaps non-brackish marshes, by the Dyfi estuary. Apart from a confused reference to "Borth - Plinlunon" by Morgan (1849), the earliest record was by Ley (1887) from "Bogs, Dyfi estuary", and Salter (1935) recorded it as "Locally frequent on Borth and Glandyfi Bogs". It has more recently been seen on the West Marsh, Ynys-hir SN674955, 1980-1991 (WMC), one patch only; from marshes SW of the Cletwr SN6493, 1954-1988 (AOC, JRA & CDP) and SN6392, 1956-1958 (EHC; AOC); from the S part of Cors Fochno SN618901-620899, 1978 (Slater 1978) - 2000; from Morfa Borth c.SN614908, 1987 (THB) - 1991; and from the Aberleri Fields SN6191, 1991-2008. In the dune slacks it was first recorded in 1958 as frequent in one area in the slack E of the road SN610938 (EHC), and by 1976 it was abundant there and in several other places, chiefly in the main slack W of the road SN609938, 2008.

**Cladium mariscus** (L.) Pohl - Great Fen-sedge - Corsfrwynen Lem

Watson (1883) gives it for the county on the authority of E. Straker, but with no locality. The only known locality is in *Salix*/Alder carr and fen 1.7km W of Ciliau Aeron church SN487583, 1987 (NMW, APF), where there were scattered stands over about an acre. By 1996 it had decreased considerably, probably because of drying out of the fen and extension of scrub, but had extended into an adjacent ditch (AOC & JPW). By 2006, when the site had become even more overgrown, it had gone from the ditch and had reduced further in the carr, and only one clump was flowering in a slight clearing. It is a very rare plant in SW Wales.

**Rhynchospora alba** (L.) Vahl - White Beak-sedge - Corsfrwynen Wen

Very abundant on the raised bog of Cors Fochno c.SN69F, 1885 (Ley, *BEC Rep.* 1885: 138 (1886)) - 2005, less abundant on the West Bog of Cors Caron SN66, 1936 (Godwin & Conway 1939) - 2005, and present, usually as rather discrete colonies, in many other bogs and peaty flushes. Its distribution though is very patchy, and what governs it is uncertain. It may have increased at least on the two main raised bogs, as it now seems much more abundant on Cors Fochno than Salter indicated, and it is curious that it was not recorded from Cors Caron until 1936, and that Salter (1935, Wade 1952) gave only six other sites for it. In 2003 many colonies were found in hollows in wet heath at Rhos Cilcennin SN530621 (AOC & PSJ) where it had not been seen on visits in 1982 and earlier and so was probably a new arrival. In the dry summer of 2006 there



was a spectacular abundance on Gors Lwyd SN857752. Cadman (1953, 1955, 1956, 1957) reported that the young shoots and bulbils were a significant element in the food of the Greenland race of the Greater White-fronted Goose (and of a single Lesser White-fronted Goose) in the Dyfi area and on Cors Caron. Altitude limit 500m, Rhos Elan, Cwm Ystwyth SN823739, 2002 (KPe).

**Rhynchospora fusca** (L.) W. T. Aiton - Brown Beak-sedge - Corsfrwynen Losg

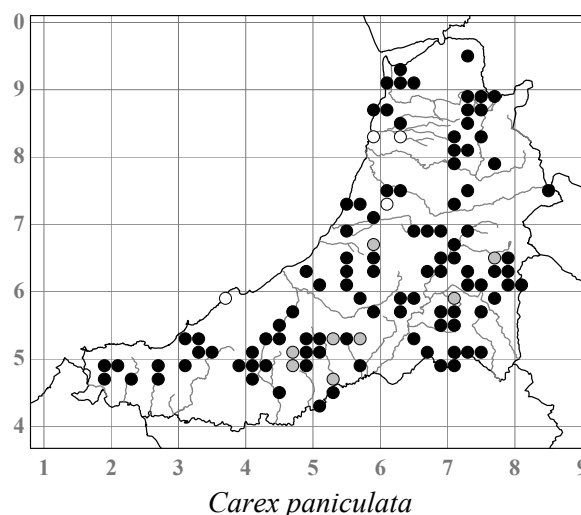
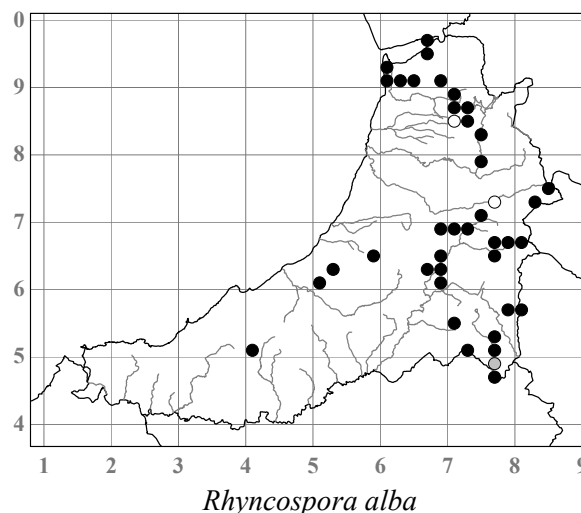
Recorded only from Cors Fochno and Cors Caron, and now restricted to the former. It was first recorded from Cors Fochno by Ley (*BEC Report 1885*: 138 (1886)), presumably from the bog itself although he wrote: "It occurred abundantly in part of the Dyfi estuary, Cardigan, along with the type *R. alba*, Vahl ..." and (Ley 1887): "Dyfi Estuary marshes". Salter was clearly confused about the species. In 1908 he unwittingly saw it on Cors Fochno as there are specimens of *R. fusca* from "Borth Bog" in **ABS** collected by him but labelled in W. H. Painter's hand and called "*Scirpus rufus*", i.e. *Blysmus rufus*; Salter wrote of this occasion (Diary 21.7.1908): "To Ynyslas with Rev. W. H. P. *Rhynchospora alba* and *Blysmus rufus* on the bog ..." In 1929 (Diary 15.8.1929) he wrote of another visit to Cors Fochno: "Quantities of *Rhynchospora*, I believe both *alba* and *fusca* ..." In his Flora (1935) he recorded it from "Marshes of the Dyfi estuary, Ynys Las to Glandyfi; abundant" which, as Benoit (1963) remarked, seems an impossible habitat, but as he was so uncertain of the species himself I suspect that he was probably just following Ley. There are specimens from the bog collected in 1910 (**NMW**, **CGE**, **LCu**) and pre-1926 (**NMW**, **TS**). Yapp (1911) gave a 1910 photo of it in its habitat on the bog at c.SN621918, but it should be mentioned that when he reproduced the photo in a later paper (1916) he called it *R. alba*; the photo is not clear enough to tell which is correct. Whellan (1942) reported "very little seen" on the bog in 1941.

It was next reported in 1963 (**PDM**, *Nature in Wales* 9: 218 (1965)) when c.200 plants were counted in old peat cuttings at c.SN640912 (**PDM** in litt. to **ADF**), east, not south of the centre of the bog as reported in the 1965 reference. In 1978, 694 spikes were counted (**APF**) in a pool in a peat cutting at SN63539210 (**ABS**, **ADF**; **ADQA**), and later counts at this site were 26 in 1979 (**ADF**), 6 in 1983 and 1985 (**ADF**), c.12 in 1986 (**PBu**) and one in 1991 (**AOC** & **APF**). In 1992 three colonies with a total of 410 spikes were found at SN642912 (**SCS**; **MB**; **AOC**), but there were none there the following year. In 1991 pools were dug by **CCW** in the NW part of Cors Fochno SN620922, and in 1993 a total of 738 spikes were counted in six of these pools (**MB** & **ADH**), and in 1994 a total of 2,784 in eight of the pools; in 1995 only 169 were counted, in four pools (**ADH**), in 2001 only one, and in 2005 there were 14 plants in four pools. In 2007 seven colonies with a total of at least 1,000 plants were found in old peat cuttings where they had not been recorded before, on the E part of the bog c.SN641910, as well as several small colonies in the dug pools in the NW part (**MB**). It seems clear that its appearance on Cors Fochno is almost entirely dependent on peat cutting or the artificial creation of pools and that there is a substantial seed bank. The only definite record from an apparently undisturbed part of the raised bog was of three spikes at SN62169181 in 2001 (**JPL**).

On Cors Caron it was first recorded in 1936-1937 (**NMW**, **ABS**, **HAH**, Godwin & Conway 1939) when it occurred on the West Bog c.SN6863 in both the regeneration complex and in the Sphagnetum, apparently at low frequency. It was seen there again in 1956 (Sandell 1956) and was reported "in good quantity there" in 1959 (**EHC**, Benoit 1963), but had disappeared by 1977 (Savidge & Hardy 1985) and has not been seen there since.

**Carex paniculata** L. - Greater Tussock-sedge - Hesgen Rafunog Fawr

A frequent sedge of valley mires, flushed slopes and streamsides. Colonies of the conspicuous tussocks



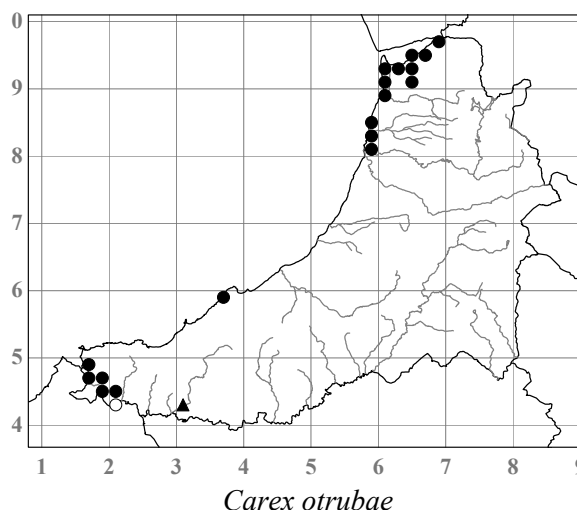
are especially characteristic of springheads both in valley mires and in blanket bogs in the uplands, and along streamsides in these mires. They also occur in *Salix* and Alder carr, where some of the biggest tussocks are found, such as those whose “trunks” are 1.5m high in *Salix aurita* carr at Blaenclettwr SN446528, 1981 (AOC, DGJ & CF). Cross sections of “trunks” were used as rather uncomfortable hassocks in Tregaron church, and a few were still to be seen there until the late 1950s. Altitude limit 490m, E of Llyn Crugnant SN759611 (Salter 1935); ditto, 1989 (AOC & DD).



*Carex paniculata* in *Salix aurita* carr, Blaenclettwr, view S from SN446529, July 1981

**Carex otrubae** Podp. (*C. vulpina* auct., non L.) - False Fox-sedge - Hesgen Dywysennog Goesadeiniog

A local sedge of the upper parts of salt marshes, brackish ditchides and damp places on the sea cliffs. It is common along the Dyfi SN69 and Teifi SN14 estuaries and up their ditch systems. Elsewhere it is recorded in brackish marsh at Clarach SN588839-588840, 1955-2005; at the top of the saltmarsh in Aberystwyth harbour SN581810, 1993 but now destroyed, and up the Rheidol estuary to SN585811, 1993-2008; and on damp rocks by the shore N of Coybal SN373593, 1996, and nearby at the mouth of the Afon Soden SN362583, 1983. The only sites where it occurs away from saline influence are inland from Cardigan on the roadside verge N of Coedmore SN196443, 1983 (MC); in a marsh at Cilbronnau SN205455, 1996 (MDS); and in a ditch near Hafod-lwyd SN202450, 1996 (MDS). It has been introduced to a pond at Felin Geri, Cwm Cou SN300422, 2002 (JPW & AOC).



**Carex ×pseudoaxillaris** K. Richt. (*C. otrubae* × *remota*)

Only one plant has been recorded, a large tussock on the bank of a drainage ditch 500m N of Lodge Farm, Tre'r-ddol SN65419367, 2001 (NMW, AOC & ADH), but this was destroyed in 2003.

**Carex spicata** Huds. (*C. contigua* Hoppe) - Spiked Sedge - Hesgen Ysbigog Borffor

Known from only one site, the verges and banks of the disused railway across Cors Caron SN706653 (NMW, conf. RWD). In 1985 two plants were found, in 1999 there were c.15 along a 135m length of the railway here, but in 2003 the population was greatly reduced by ditch-clearance. It was presumably originally introduced with limestone ballast when the railway was built in the 1860s. Whellan (1942) recorded it, as *C. contigua*, from the Ceri valley, Cardigan, Penbryn, Tal-y-bont, Llandyfrïog, Newcastle Emlyn and Lampeter but these plants must have been *C. muricata* subsp. *pairae* which he did not record anywhere. (In spite of his statement that “All critical species of *Carex* have been seen and named by E. Nemes”, the only specimens of his of this group, from Penbryn, at K were in fact named *C. pairae* [i.e. *C. muricata* subsp. *pairae*] by Nemes.)

**Carex muricata** L. subsp. **pairae** (F. W. Schultz) Čelak. (*C. muricata* subsp. *lamprocarpa* auct., non (Wallr.) Čelak., *C. pairae* F. W. Schultz) - Small-fruited Prickly-sedge - Hesgen Ysbigog

A common sedge of dry slopes, pathsides, roadside banks, railway embankments, graveyards and scrub, characteristic of the more acidic and open sites and occurring chiefly in the lowlands. It is often a surprisingly rapid coloniser of felled woodland. When Nantcwnlle churchyard SN576586 was regularly sprayed with

Brushwood Killer in the early 1980s, it became very abundant, perhaps because of resistance to the chemical, and remained so until at least 1999. Altitude limit 335m, abundant huge tussocks with stems up to 160cm, in recently felled conifer plantation, 200m N of Cae Gaer SN823822, 1993.

**Carex divulsa** Stokes subsp. **divulsa** - Grey Sedge - Hesgen Lwyd

According to R. W. David (pers. comm. 1980) there was a specimen from the disused railway over the Teifi Marshes c.SN185457 in NMW (TAWD), but this cannot now be found.

**Carex arenaria** L. - Sand Sedge - Hesgen y Tywod

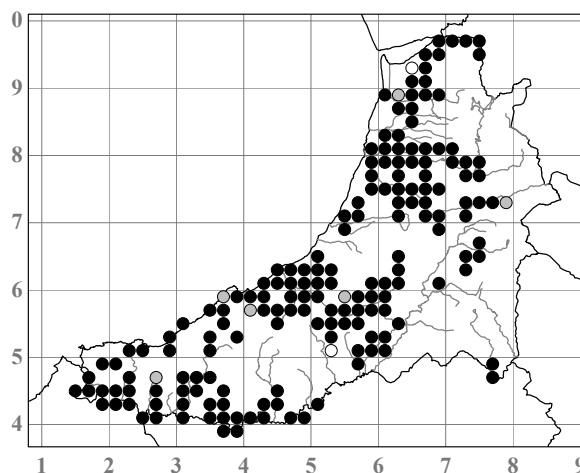
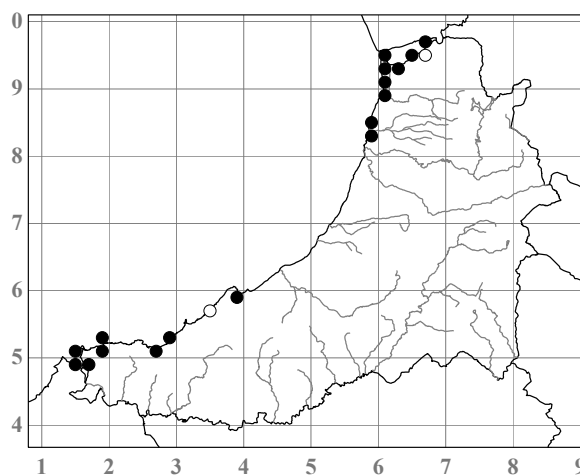
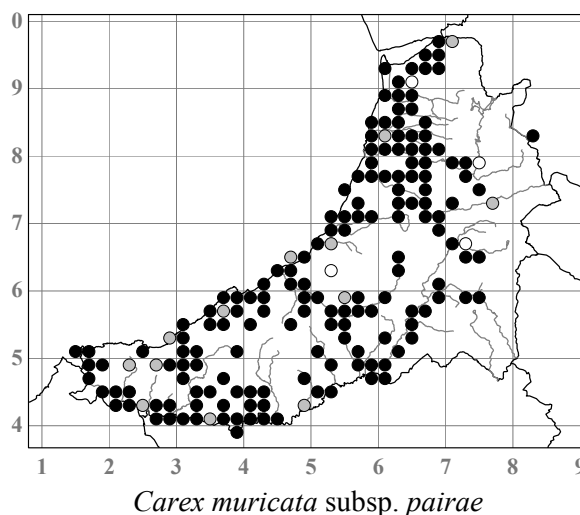
Abundant on the sand dunes and in a few other sites along the coast. From Ynys-las SN69B, C, 1848 (Purchas 1848) - 2005 it extends E intermittently along the sea wall and the railway ballast to Ynys-hir SN678965, 1990, and S along the golf course and beach to Borth SN607890, 2005, where the first record was made by Purchas (1848); it has also occurred in turf on the clifftop by the Borth War Memorial SN601885, 1982, and on lead mine spoil at Penrhyngerwin SN668942, 1959 (EHC & AOC). It is abundant on sandy banks at Clarach SN588840 etc., 1854 (K, Herb. Watson, MMA) - 2005, but then is absent until New Quay where it was found on a walltop SN39035990 in 1998. It is abundant on sandy banks and cliff ledges at Penbryn SN292524 etc., pre-1936 (Salter 1935) - 2005, by the limekiln on the shore at Tresaith SN278515, pre-1936 (Salter 1935) - 2005, and at Mwnt SN194519 on the *Ammophila* dunes and in sandy grassland nearby including the churchyard, 1978-2005. At Gwbert and Penyrergyd SN14U-15K it is abundant on both the golf course and the dunes. Salter recorded it from Cwm Tydu SN3557 after 1935 (Wade 1952), but it has not been seen there since.

[*Carex disticha* Huds. - Brown Sedge - Hesgen Llygliw

A 1941 record from Nantyferwig (Whellan 1942) was withdrawn three years later (Whellan 1945). It is not improbable though that it could occur along the Dyfi or Teifi estuaries.]

**Carex remota** L. - Remote Sedge - Hesgen Blodau Anghyfagos

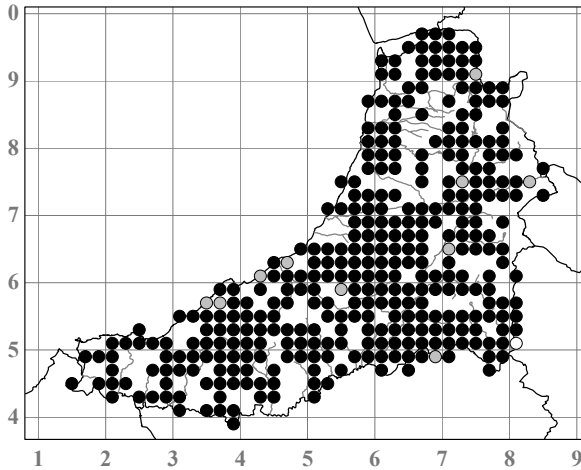
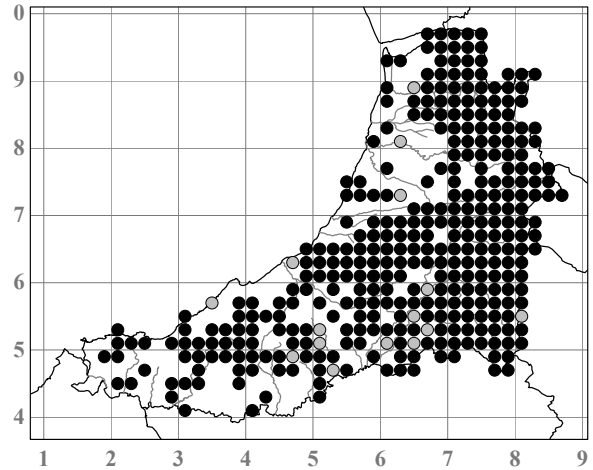
A common sedge of damp woodland and shaded streamsides, usually in habitats where there is little competition, often abundant in Alder carr, in waterlogged hollows in woods with *Caltha palustris*, along pathsides and in other disturbed places in woods especially on clay soils. It often grows on ditch-sides, even near the sea where it also grows on harbour walls as it is able to tolerate somewhat brackish conditions. FC activities and the construction of drainage ditches are probably responsible for a perceived increase in recent decades, in line with the national trend (Braithwaite *et al.* 2006). It is generally lowland, and has not been found at above 245m altitude, in Cwm Ffald SN789732, 1981.





**Carex leporina** L. (*C. ovalis* Gooden.) - Oval Sedge - Hesgen Hirgron

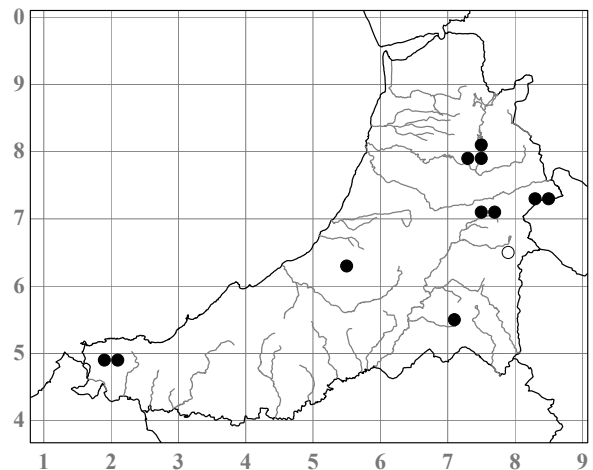
A common sedge of damp or waterlogged, usually rather acidic pastures, acidic marshes, marginal habitats such as pathsides and road verges, and also occasionally in wet heathy places. Generally though the botanist's heart sinks at the sight of it, as it can be an indicator of degraded and species-poor habitats. It occurs sometimes in slightly brackish marshes, and in the uplands it is uncommon and generally restricted to tracksides and other disturbed ground. Altitude limit 520m, Pumlumon (Salter in Wade 1952); 510m, track by Llyn Llygad Rheidol, Pumlumon SN791878, 2002.

*Carex leporina**Carex echinata***Carex echinata** Murray - Star Sedge - Sêr-hesgen

A common and often abundant sedge of the more acidic bogs and heaths, especially in blanket bogs and in acidic flushes. It is generally commoner in the uplands. Altitude limit 745m, Pumlumon SN78Y (Salter 1935); 660m, above Llyn Llygad Rheidol SN793871, 2002.

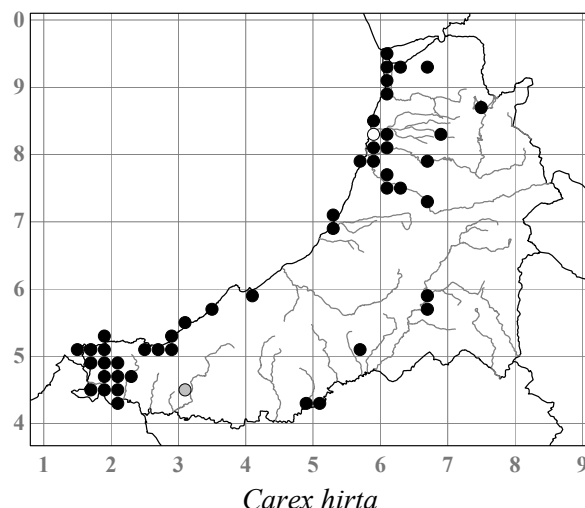
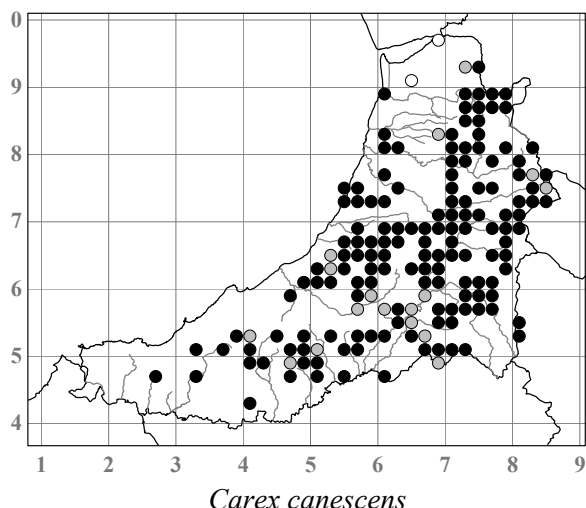
**Carex dioica** L. - Dioecious Sedge - Hesgen Ysgar

An uncommon sedge of base-rich flushes, chiefly in the uplands. It was first found in 1963 on the NW side of Trawsallt SN771717 (NMW), but this site is now lost to drainage and afforestation. There are particularly extensive populations in flushes below Bryn Bras SN743800, 1991 (AOC, DGJ & DAW) - 2005, where it appears to have increased greatly since it was first seen; along the SW side of the Nant Seran SN762709 etc., 1999-2004 (AOC & JPW); and along the SE side of the Afon Mwldan SN201491 etc., 1986 (AOC & APF). Most colonies contain both male and female plants, but entirely male colonies are occasionally found, as on Bryn Bras SN74537930 where one was 15 × 3-7m, 1994 (AOC & JPW) - 2002 (NMW); mixed colonies were present nearby. A colony 5 × 2m of forma *isogyna* (Ångstr. ex Fr.) Kük., with hermaphrodite spikes, was found by the Nant Seran SN76157103, 1999, and scattered plants of it were seen among abundant normal plants nearby in a swamp on Rhos Waun-lloi SN751714, 2004 (AOC & JPW). Altitude limit 500m, NE of Llyn Gwngu SN84257359, 2002.

**Carex canescens** L. (*C. curta* Gooden.) - White Sedge - Hesgen Benwen

A frequent sedge in the wetter parts of the more oligotrophic bogs, often dominant and forming floating swards in pools and at the edges of lakes. It has colonised peat cuttings in the past, and can be especially abundant in the draw-down zone around reservoirs, as well as in peaty drainage ditches. Its absence from the bogs of the Dyfi area, apart from two old records by Salter (1935) from "Glandyfi Bog" SN69Y and "Taliesin

Bog” SN69K is surprising. Altitude limit 435m, Llyn Berwyn c.SN742570 (Salter 1935); 575m, Trawsallt SN786704, 2002.

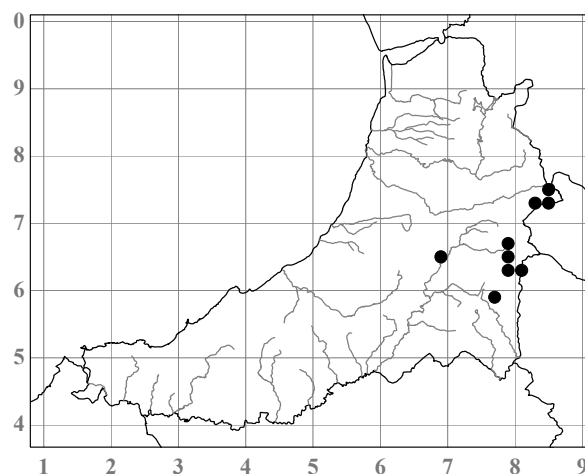


### ***Carex hirta* L. - Hairy Sedge - Hesgen Flewog**

An occasional sedge of sandy and marshy pastures and scrub, road verges, pathsides, railway embankments, slumping till on the coastal slopes, and on sand and shingle at the back of sea beaches. It appears native in many habitats in the coastal zone, but further inland it is usually confined to synanthropic sites such as railways and roadsides, and it is generally absent from the uplands. It can be a flowerbed and shrubbery weed, as at Yr Hen Ysgol, Aberystwyth SN587819, 1990-2003 (SPC). At Cwmsymlog SN697836 it is abundant on silty lead mine spoil, 1991-2005, and it can be a weed of waste ground and of cultivated fields, as in Strawberry fields at Penlan-las, Rhydyfelin SN606771, 1994 (SPC), but there is no evidence of significant increase as has occurred recently on a national scale (Braithwaite *et al.* 2006). Var. **sublaevis** Hornem. occurs in the slacks on the Ynys-las dunes SN6193, 2007 (NMW) and in other marshy sites. Altitude limit 310m, reseeded pasture slope below Nant-y-moch Reservoir dam SN755862, 1999.

### ***Carex lasiocarpa* Ehrh. - Slender Sedge - Hesgen Fain**

A rare sedge of wet bogs, mostly in the uplands and usually forming extensive colonies, but perhaps overlooked as flowering is very irregular and in many years whole colonies will fail to flower. It was first recorded in 1976, at Gors Lwyd SN858753 (Slater 1976) and it occurs over a large area of the watershed mire there, 2004 (NMW) and is rapidly increasing. It was recorded in the lagg at the N end of the West Bog on Cors Caron SN690648 in 1980 (JPS) - 1999, where it was then locally dominant over c.0.4ha; the fact that it was not recorded there in the very thorough survey by Godwin & Conway (1939) suggests that it may be a recent arrival. It is similarly dense and extensive in the mire at the source of the Tywi SN801628, 1993 (NMW). At Llyn Gwngu SN837729, 1997 (AOC & JPW) - 2006 it fringes much of the W shore and there are several small colonies in the wet mire at the head of the Nant Dderwen nearby SN853737, 1997 (AOC & JPW). There are also colonies on the E side of Bryn Caeblaenegnant, SN799661, 1994; at Blaen Mwyro SN791637, 1989 (RMW *et al.*) and SN789641, 2004 (PAS & AOC); and in a flush on the E side of Llyn Gorast SN792630, 2004 (PAS & AOC). The reasons for its increase at some sites are unknown. Altitude limit 465m, bog 2km E of Nant-y-maen SN776598, 1994.



**Carex acutiformis** Ehrh. - Lesser Pond-sedge - Hesgen-y-dŵr Fach

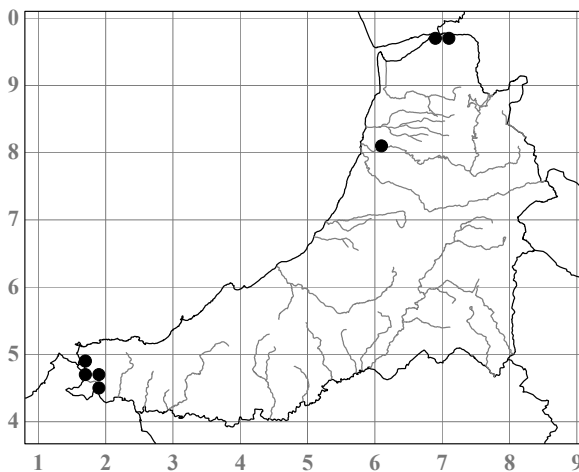
Native probably in only two sites, in the partly brackish marsh by the Wenffrwd E of Henhafod SN668943, 1958 (NMW, EHC), where there were still several small colonies until at least 1986 (AOC & APF), and on flushed slopes by the Afon Mwldan N of Glanllynan SN196483, 1986 (NMW) - 2005, where it is dominant over large areas. On a flushed slope near Blaencwmcadifor SN431430, 1994, it is well naturalised having been planted c.1990, and it was also planted in a pond at Felin Geri SN300421, 2000 (AOC & LG) where it is naturalised. Presumably it was also planted where it occurs in a small pond by the road 400m SE of Blaencelyn church SN35615421, 1995. Wade (1952) gives a Salter record for "Ditches, Glandyfi Bog (1941)", but of his only recorded visit there in that year Salter himself says "Nothing fresh in plants noted but *Carex riparia*" (Diary 10.7.1941) and the record must be discounted.

**Carex riparia** Curtis - Greater Pond-sedge - Hesgen-y-dŵr Fawr

A very local sedge known only from one site by the Dyfi, one by the Rheidol and several around Cardigan. At Glandyfi SN697975-696971, 2003 (NMW) it is abundant along several ditches and along the old course of the Llyfnant E of the railway, and was first recorded here by Salter in 1941 (Diary 10.7.1941). It was introduced from here into the artificial pools on the Ynys-hir RSPB Reserve SN683967 by WMC in 1972. By the Rheidol it is dominant in parts of the swamp below the S slope of the valley by the Glanyrafon Industrial Estate SN60708001, 1992 (NMW) - 2005, and presumably was not there in Salter's day as he knew this site very



*Carex riparia*, Glanyrafon, view  
E from SN60708002, April 2007



well. Around Cardigan it is dominant and increasing in several places on the Teifi Marshes c.SN185453, 1995 (DKR), and it is dominant over several acres in the valley of the Afon Mwldan at Capel SN190476, 1988 (AOC, DGJ & CRF), 1km upstream of where it was first recorded for the county at Llynfelin c.SN181471 in 1920 (GCD, *BEC Rep.* 6: 154 (1921)) (this latter site is now built over); it also occurs lower down the Mwldan in Cardigan SN177464, 2002. It is also in several places along the Teifi estuary from the *Salix* carr at Nantyferwig SN169482, 2003 (where Salter recorded it in 1929 (Diary 20.9.1929)) to Netpool SN171462, 2003.

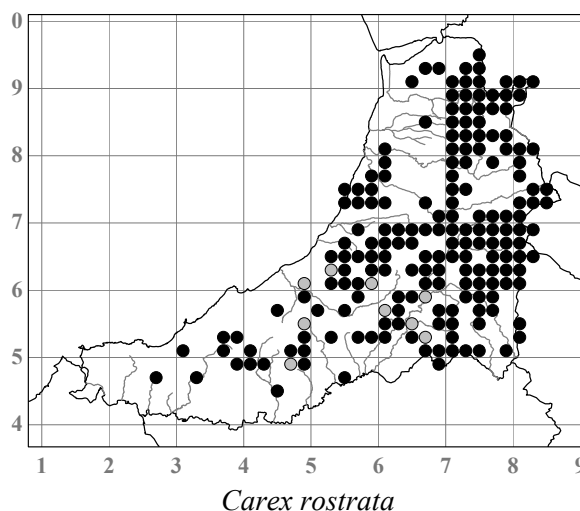
**Carex pseudocyperus** L. - Cyperus Sedge - Hesgen Gynffonnog

A rare sedge of wet fens, first found in 1987 as a single clump in a clearing in *Salix*/Alder carr in a valley bog 1.7km W of Ciliau Aeron church SN487583 (AOC & APF), where *Cladium* also grows; by 1996 a second clump had developed nearby, and by 2006 there were 15 clumps in an area 10 × 6m, all fruiting well. In 1993 it was found in quantity around a pond dug out in 1992 from a swampy, wooded hollow at Cwmsaeson SN453585 (AOC & DGJ), having presumably occurred naturally in the original hollow. In 1999 a single clump was found in scrub in a basin mire at Dolwerdd, 2km SE of Blaenporth SN27434717 (AOC & MDS). *C. pseudocyperus* is a very rare species in West Wales.



**Carex rostrata** Stokes - Bottle Sedge - Hesgen Ylfinfain

A common sedge of mires of all kinds, lakes, riversides and permanently flushed slopes. It partly fringes, and is often dominant in the shallower parts of most of the upland lakes, and fringes many stretches of the rivers. In valley mires, flushed parts of blanket bogs and even in small flushes on heathy slopes and sheepwalks it is often abundant. It readily colonises new ponds, but seems entirely absent from coastal sites, and whole colonies can often be non-flowering or fail to set seed. Altitude limit 575m, pool NW of Carnfachbugeilyn SN82229062, 2002.

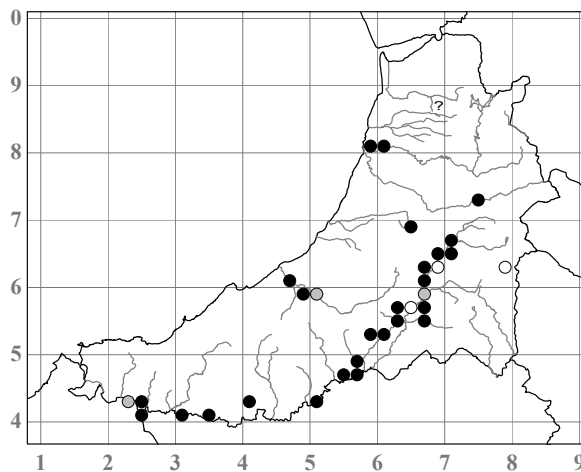


**Carex ×involuta** (Bab.) Syme (*C. rostrata* × *vesicaria*)

Known only from one site, where it was abundant in a pond dug in 1986 by the Teifi, 250m SW of Dolaugwyrddonisaf SN55524642, 1989 (NMW, conf. RWD & ACJ) - 1993 (AOC & TCGR).

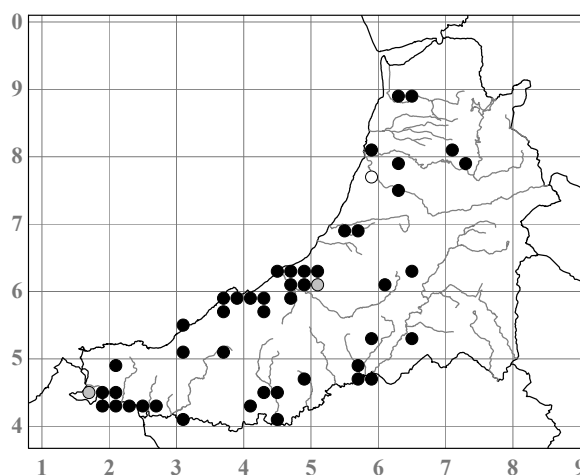
**Carex vesicaria** L. - Bladder-sedge - Hesgen Chwysigennaidd

An occasional sedge of similar habitats to *C. rostrata*, but less common and absent from the uplands, and from the whole Dyfi area and most of the N of the county. It is still present though in the swamp by the Glanrafon Industrial Estate, Llanbadarn Fawr SN60708001 where Salter first recorded it in 1897 (Diary 22.5.1897), but has not been refound at the "pool below Bont Goch" c.SN6886 (Salter 1935), his other site in the N. Further S it occurs in several places by the Aeron. Along the Teifi it is often abundant fringing the river and in backwaters and oxbows, and in marshes and ditches, from Cors Caron downwards. It does not extend into the uplands now, and the highest it has recently been found is at 250m altitude, in a lead mine pool 700m SE of Pont Rhyd-y-groes SN747722, 1994 (AOC & JPW). Salter surprisingly recorded it from the outflow of Llyn Egnant SN791666 at 420m (Diary 10.8.1922), and from Llyn Gorast SN792631 (1935) at 455m which, if correct, would be the British altitudinal limit and 180m higher than it has been recorded in Cumbria (Halliday 1997); these records are best ignored.



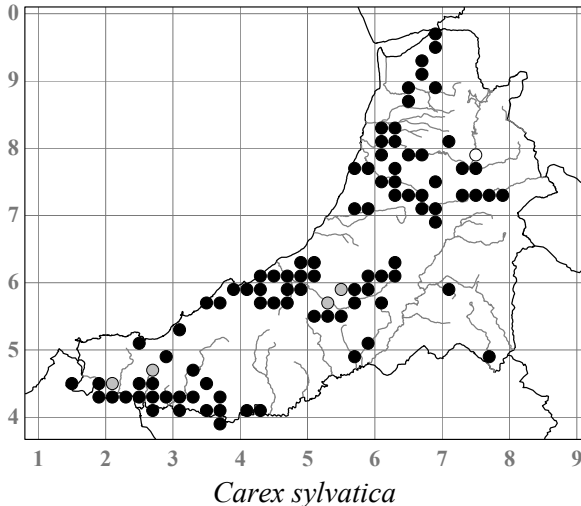
**Carex pendula** Huds. - Pendulous Sedge - Hesgen Bendrom

An occasional sedge of wet woodland, shaded ravines and streamsides, usually on heavy clay soils and sometimes forming extensive colonies on flushed woodland slopes. Although presumably native in many sites, it was often planted in estate woodlands and by ponds and the limits of its natural occurrence are very uncertain. As a native it seems confined to the lowlands, and appears to be increasing in line with the national trend (Braithwaite *et al.* 2006). Altitude limit (escaped) 310m, roadside ditches below Pant-teg, Llanfair Clydogau SN652522, 2008.



**Carex sylvatica** Huds. - Wood-sedge - Hesgen y Coed

Frequent in the more fertile or base-rich woodlands and plantations, often on clay soils and in the damper parts, and often abundant along woodland tracks, rides and banks. It is rarely in unshaded sites, except for a few graveyards, and is a lowland plant, the highest record being at 220m altitude in Cwm Ffald SN789736, 1999. Abundant huge plants of forma **ramigera** Beck, with branched spikes, grow along the verges of the Hafod drive in mixed FC woodland 900m E of Pont Rhyd-y-groes SN750728, 2004 (NMW).



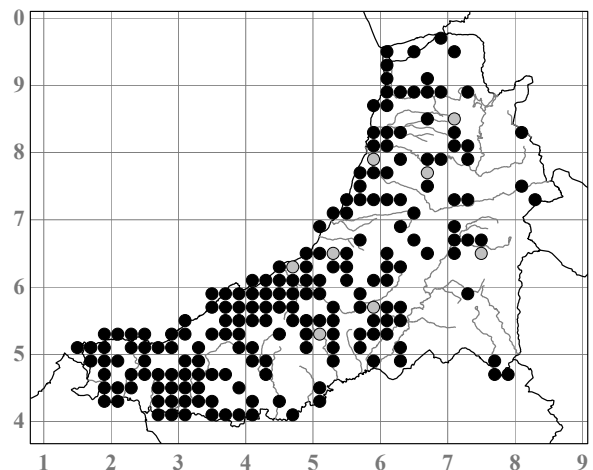
*Carex strigosa* below Llain, Llanfairorllwyn, view SW from SN36684117, July 2009

**Carex strigosa** Huds. - Thin-spiked Wood-sedge - Hesgen-y-coed Benfain

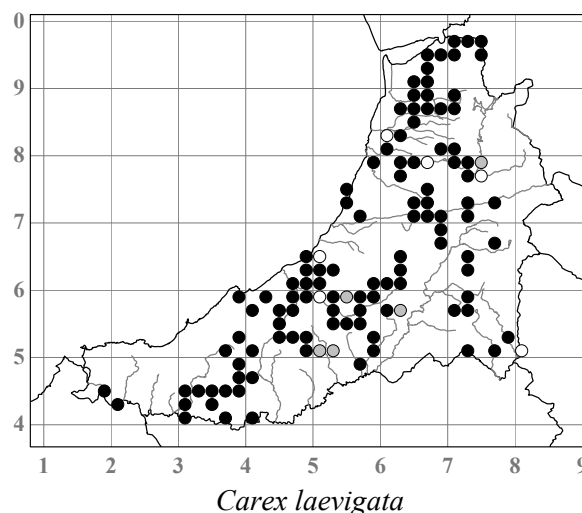
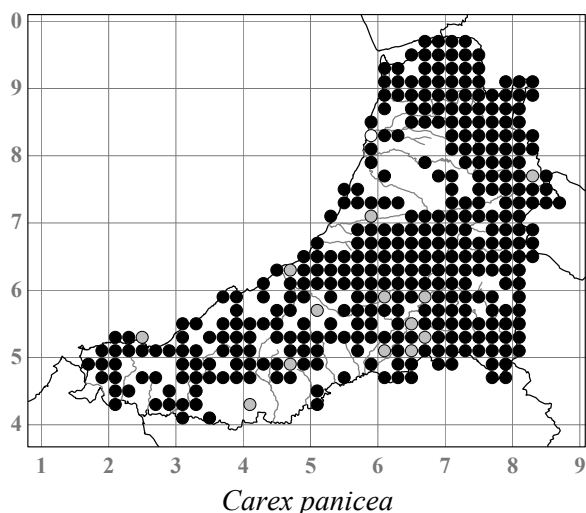
A rare plant in W Wales, occurring in only a few sites in Pembrokeshire, Carmarthenshire and the Gower, it was found in abundance, with at least 1,000 plants, in damp *Salix cinerea* and *Fraxinus* woodland on the Irish Sea till 300m WSW of Llain, Llanfairorllwyn SN36684117 in 2009 (NMW).

**Carex flacca** Schreb. - Glaucous Sedge - Hesgen Lwydlas y Calch

A frequent sedge most characteristic of the more base-rich drift soils, growing on grassy slopes, in pastures and in open scrub. It is abundant and usually dwarfed in the dune slacks at Ynys-las SN609939 etc., 1955 (EKW) - 2008; there is no record of it being there earlier, although there is a record from Moel Ynys SN607929 in Wade (1952, WAS), but as Salter seems to have been rather unfamiliar with it he may well have missed it. On the coastal slopes it can be very robust and dominant on wet, slumping till and on cliff ledges in the spray zone. Very robust plants also occasionally occur in wet *Salix* carr, for example at Rhos Bryn-hir, 2km S of Llangeitho SN619579, 1986-1999 (SPC). It sometimes grows with *C. panicea* in rhos pastures. It is common on banks, road verges, lead mine spoil, in graveyards and wood margins, but in the uplands it is generally confined to base-rich flushes. Altitude limit 440m, flushes W of Llyn Gwngu SN838728, 2002.

**Carex panicea** L. - Carnation Sedge - Hesgen Lwydlas

A common species of bogs, damp pastures, flushed slopes and wet heaths, in all but the most acidic peaty sites, and often occurring on quite dry heathy ground on shallow peat. Altitude limit 735m, poolside by Pen Pumlumon Arwystli SN81568787, 2002.

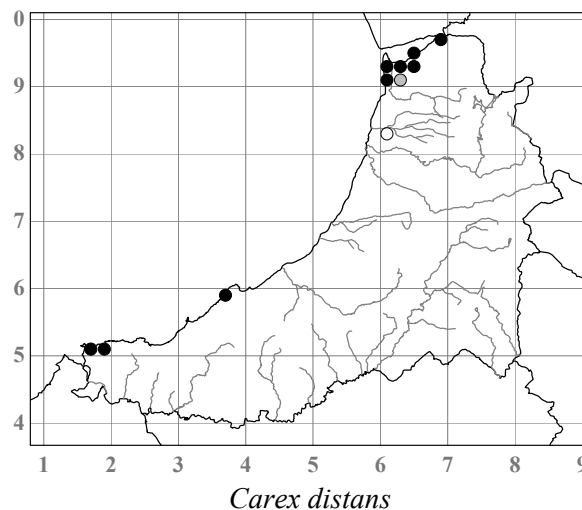
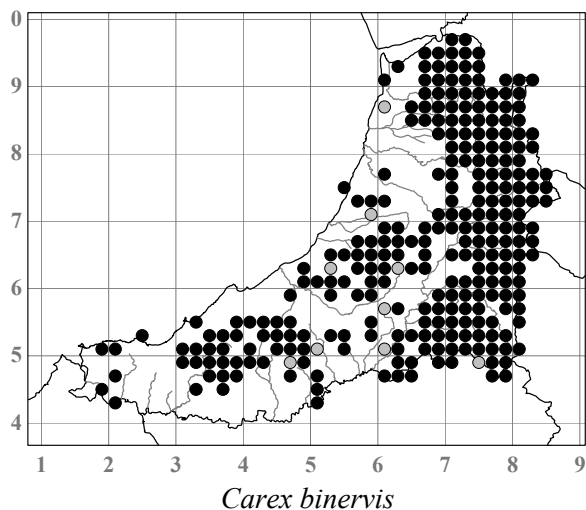


### ***Carex laevigata* Sm. - Smooth-stalked Sedge - Hesgen Lefn**

A frequent sedge of wet woodland, especially Alder carr, in flushes on wooded slopes or in the open in rhos pastures, in shaded gullies and in tall herb fens. It is most common in the wooded valleys in the N and middle of the county, and although it is abundant on the slumping till slopes along the coast in places in the Aberaeron-New Quay area, it is curiously rare on the clay soils in the woods in the SW of the county. In the uplands it is confined to sheltered and shaded sites. Altitude limit 360m, stream gully 450m NW of Diffwys, Cwm Berwyn SN72985808, 1988.

### ***Carex binervis* Sm. - Green-ribbed Sedge - Hesgen Ddeulasnod**

Widespread and often abundant on heaths, dry acidic grassland and the drier parts of bogs, especially in the uplands. It is rarer along the coast, and is generally uncommon in woodland, but in rides and at the margins of conifer plantations where it is free from grazing it can reach its full stature and produce massive tussocks. In felled conifer plantations it can very rapidly become abundant. On the sheepwalks it is usually inconspicuous in the sward and lacking inflorescences. Altitude limit c.550m ("about 1800ft.") (Salter 1935); 730m, near summit of Pumlumon Fawr SN789869, 2002.



### ***Carex distans* L. - Distant Sedge - Hesgen Blodau Pell**

A sedge of brackish marshes and ditch-sides, dune slacks, and gullies and wet ledges on the sea cliffs. Although locally abundant along the Dyfi estuary, it is rare elsewhere and is curiously absent from the Teifi estuary. It is one of the species that has responded most conspicuously to the recent reduction of grazing on the Aberleri Fields SN613917, 1991-2005. It has gone from the "Boggy field below Cwm" c.SN616838 where Salter recorded it after 1935 (Wade 1952), and his record from Cwm Peris c.SN5467 (Diary 1.6.1927), not mentioned in his Flora (1935), was probably mistaken.

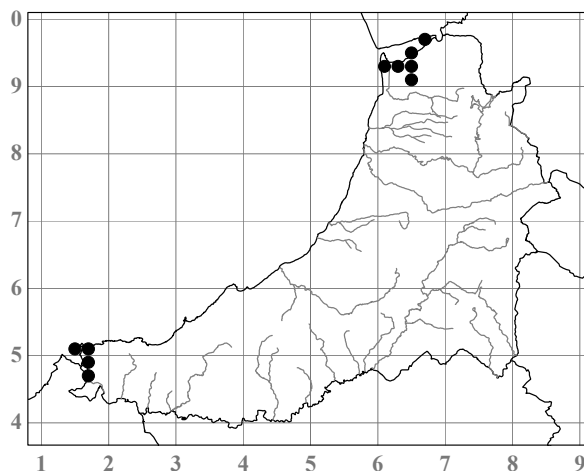
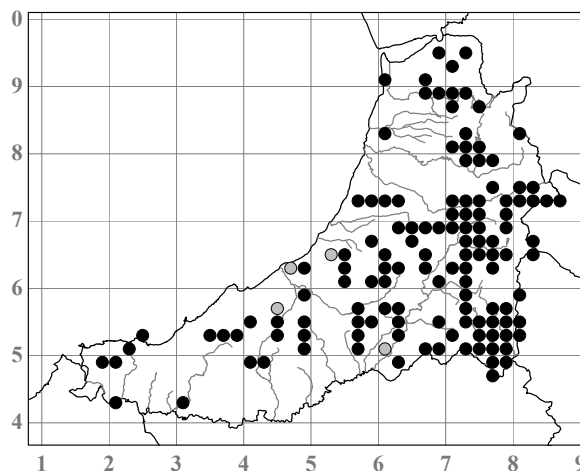


**Carex punctata** Gaudin - Dotted Sedge - Hesgen Fannog

Known only from the estuarine Alder carr of Rosehill Marsh SN188454 in the Teifi estuary, where it was first found in 1970 (NMW, TAWD, det. AOC & RWD). Seven large tussocks, each with 70-100 spikes, as well as several smaller non-flowering tussocks, were found here in 1985, four in 1990 and six in 1994. By 1999 the Alders had been largely killed by the *Phytophthora* disease and the marsh was very overgrown and no *C. punctata* could be found, and it has not been found since and is thus probably extinct in the county.

**Carex extensa** Gooden. - Long-bracted Sedge - Hesgen-yr-heli Bractau Hir

A sedge of the upper parts of salt marshes and alongside brackish ditches, locally abundant along the Dyfi SN69 and Teifi SN14 estuaries. From the latter, it extends along the sea cliffs to 500m N of the Cliff Hotel at Gwbert SN160505, 1979, where it grows in small fragments of salt marsh among *Juncus gerardii* in hollows and crevices in the rocks.

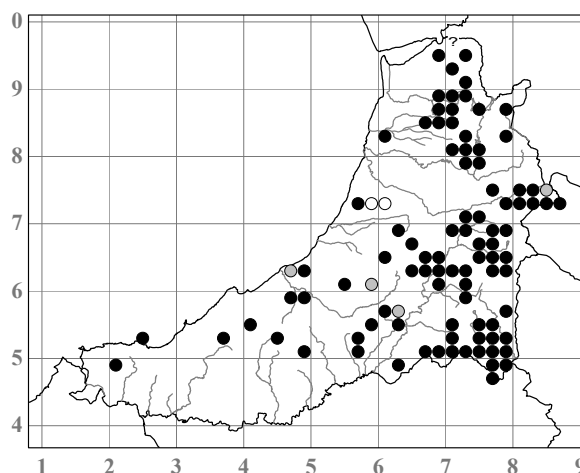
*Carex extensa**Carex hostiana***Carex hostiana** DC. - Tawny Sedge - Hesgen Felynllywd

An almost constant sedge of even the most slightly base-rich flushes and fens, especially in the uplands, and comparatively uncommon in the lowlands. It seems intolerant of saline influence, and is absent from the Ynys-las dune slacks, and from the sedge-rich pastures nearby on the Aberleri Fields. It is however abundant or even dominant in places in sedge-rich flushed pasture E of Frongoch Farm SN608828, 1992, at only 100m altitude, and in flushed pasture by the Afon Mwldan SN201488 etc., 1986-2005, at 80m. Altitude limit 490m, flushes at head of the Nant Gau, Trawsallt SN783708, 1991.

**Carex ×fulva** Gooden. (*Carex hostiana* × *viridula*)

The hybrid between *C. hostiana* and *C. viridula* subsp. *oedocarpa* occurs in over half the sites where *C. hostiana* is found, and is in almost all the *C. hostiana* sites in the uplands but in a rather smaller proportion of them in the lowlands. Particularly in smaller and more well-defined flushes in the uplands, it is often more abundant than *C. hostiana*, and it is occasionally found where *C. hostiana* no longer occurs. The earliest record was from the Llyfnant c. SN79D or I, in 1908 (ABS, WHP, det. AOC). Altitude limit 470m, flushes 1.3km ENE of Llyn Gwngu SN851737, 1997 (AOC & JPW).

The hybrid with *C. viridula* subsp. *brachyrhyncha* has been found at only two sites: one tuft, growing with both parents, in a base-rich flush SE of the Afon Mwldan SN201488, 1986 (NMW, AOC, APF & DGJ, conf. RWD); and a colony with c.30 inflorescences by the Afon Meurig SN72996995, 1999 (NMW, AOC, DG & MDS).



### **Carex viridula** Michx. - (Yellow-sedge) - Hesgen Felen

Subsp. **viridula** (*C. oederi* Retz.) - Small-fruited Yellow-sedge

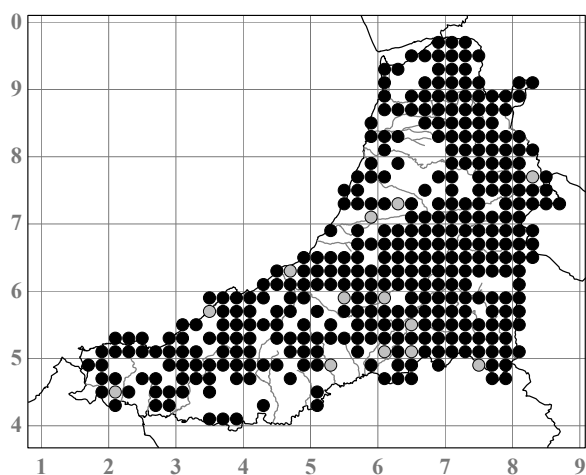
Confined to dune slacks at Ynys-las SN609939 etc., where it was first found in abundance in 1955 (PMB, conf. AEW & EN, *Proc. BSBI* 2: 148 (1956)) - 2005, and in brackish marshes on the Aberleri Fields c.SN614914, 1994 (NMW) - 2005. In the slacks, plants are usually much dwarfed, and have decreased greatly in abundance in recent decades because of drying out, while in the Fields they are increasing because of raising of the water table. Where the plants get partially covered by sand in the slacks they often become effectively viviparous, masses of seedlings developing from the spikes. In the brackish marsh at the S end of Cors Fochno SN622902 plants intermediate with subsp. *oedocarpa*, that are up to 55cm tall and have utricles 3-3.9mm long, occur among *Schoenus* and *Juncus maritimus*, 1991 (NMW).

Subsp. **brachyrrhyncha** (Čelak.) B. Schmid (*C. lepidocarpa* Tausch) - Long-stalked Yellow-sedge

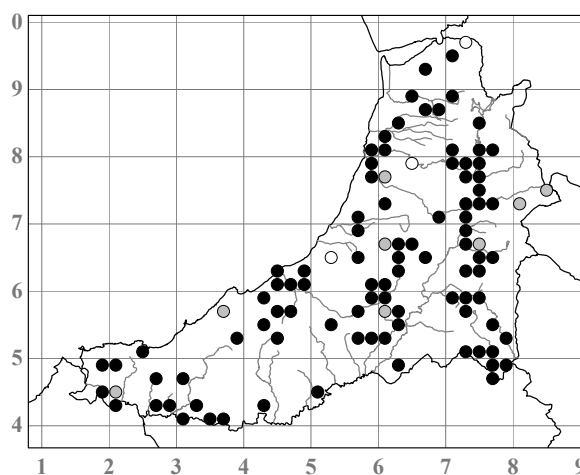
Given for the county in Watson (1883), but the 1854 Atwood specimen (K, Herb. Watson) on which the record is based is subsp. *oedocarpa* (det. AOC). It was recorded from Blaenannerch by Whellan (1942), but there is no specimen and the sedge he collected there on 13 June is also subsp. *oedocarpa* (K, det. EN as *C. demissa* [i.e. subsp. *oedocarpa*]). The first reliable record was from the base-rich flushes by the Afon Mwldan SN195483-202491 in 1986 (NMW, AOC, APF & DGJ, conf. RWD), where it is abundant in several places. The only other sites are in a base-rich depression by the Afon Meurig SN72996995, 1999 (NMW, MDS, AOC & DG, conf. ACJ & DAP), and in a flush by the Nant Bryn-maen SN634571, 1999 (NMW, MDS, conf. AOC, ACJ & DAP). At both these latter sites plants intermediate with subsp. *oedocarpa* grow with or near the subsp. *brachyrrhyncha*, and subsp. *oedocarpa* occurs nearby. Similar intermediates occur, but in the absence of subsp. *brachyrrhyncha*, in more or less base- or mineral-rich flushes by a tributary of the Afon Meurig SN73616913, 1999 (MDS); at the N end of Cors Caron SN710670, 1999 (MDS); by the Camddwr SN66296564, 2000 (NMW); W of Llyn Fanod SN59346451, 2008 (DKR); near Cross Inn SN548635, 1999 (SLNS & CMM); 700m W of Carn Penrhiwllwydog SN73355259, 2009 (SPC); and above the confluence of the Doethie and Tywi SN7747, 1999 (MDS).

Subsp. **oedocarpa** (Andersson) B. Schmid (*C. demissa* Hornem.) - Common Yellow-sedge

A common sedge in all but the most base-rich flushes from the coastal slopes into the uplands, in damp pastures and heaths, on tracksides, streambanks, gravelly and peaty lake margins and rock ledges. It can sometimes form large tussocks in wet places in woodland, as at Coed Tyddyn-du SN272427, 1991 (NMW). It is salt-tolerant, and sometimes occurs in flushes within the spray zone as at Traeth Bach, Pen Peles SN216522, 1976. Altitude limit 610m ("to 2,000ft.") (Salter 1935); 640m, above Llyn Llygad Rheidol SN79368723, 2002.



*Carex viridula* subsp. *oedocarpa*



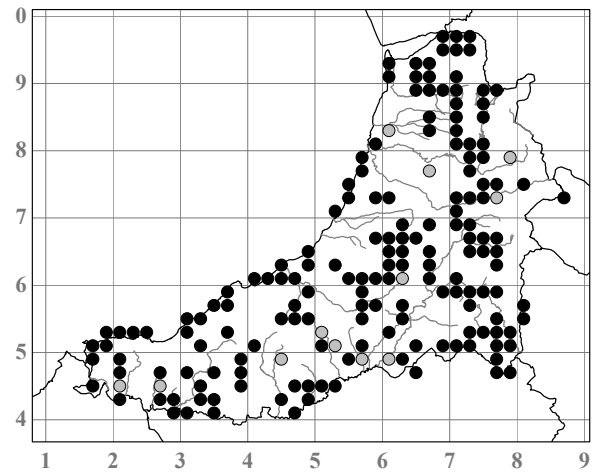
*Carex pallescens*

### **Carex pallescens** L. - Pale Sedge - Hesgen Welw

An occasional species of damp, lightly grazed and usually rather fertile pastures, hay meadows, tall herb vegetation in fens, marshy woodland clearings, damp scrub, and damp ledges and flushes in shaded ravines. In the latter habitats it ascends a bit into the uplands, but it is generally lowland although it is almost completely absent from the coast. Altitude limit 410m, damp cliff ledges, Graig Ddu, Cwm Ystwyth SN810739, 1977.

**Carex caryophyllea** Latourr. - Spring-sedge - Hesgen Gynnar

A frequent sedge of the drier, less acidic, often neutral or base-rich pastures, banks, rock outcrops and slopes, generally absent from woodland and other shaded or damp sites. Although it occasionally grows with *C. pilulifera* it is rarely found in the more acidic grasslands favoured by that species, and in the uplands becomes much scarcer and more restricted. It is common on the coastal slopes, especially under Bracken. Altitude limit 410m, S-facing bank, Nant-y-maen SN760584, 1989 (AOC & DD).



*Carex caryophyllea*

**Carex montana** L. - Soft-leaved Sedge - Hesgen Feddal

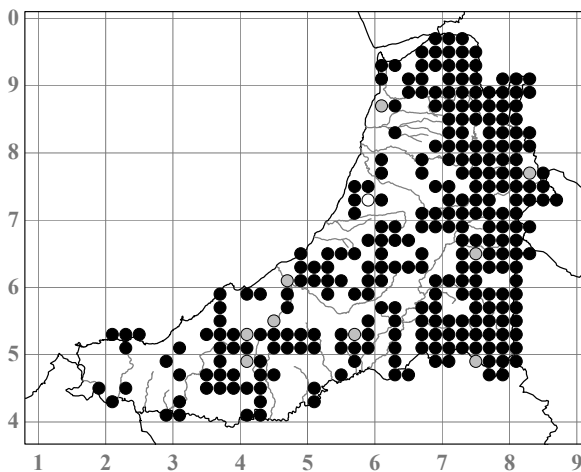
Long expected in the county, as it occurs close by in Vicarage Meadow, Breconshire, c.60 clumps of this sedge were found in 1995 among *Molinia* and *Ulex gallii* on a rocky slope by the Nant Cnwch-gwyn 800m up from its confluence with the Afon Doethie SN75925181 (NMW, JPW & AOC). Later the same year a few plants were found in a similar habitat on Banc Hendre'r-dail above Llyn Brianne SN79445137 (AOC & DD). In spite of much searching it has not been found elsewhere. Altitude limit 355m, Nant Cnwch-gwyn, 1995.

**Carex pilulifera** L. - Pill Sedge - Hesgen Bengron

A common species of dry, usually acidic pastures and heaths, most abundant on the upland sheepwalks and moorland. It rapidly colonises felled woodland both on thin well-drained soils on the upland slopes and on clay soils in the lowlands, often forming very large tussocks on open ground where free of grazing; if, as it seems, it has increased in the county, in line with the national trend (Braithwaite *et al.* 2006), it is probably because of this. Altitude limit 610m, Pum-lumon (Salter 1935); 740m, summit of Pumlumon Fawr SN789869, 2002.



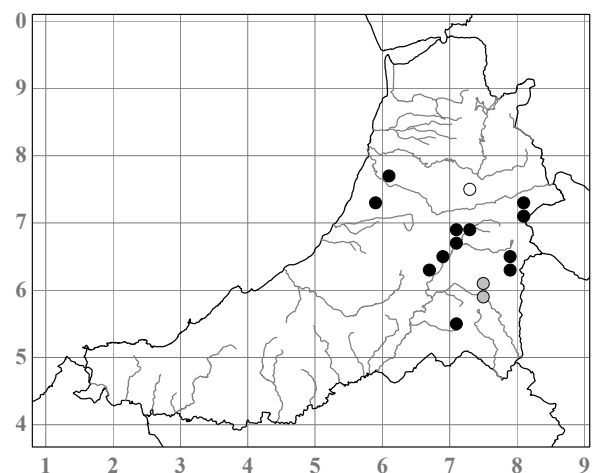
*Carex pilulifera* and *Rhododendron ponticum*  
colonising felled conifer plantation,  
Hafod SN76387324, December 2006



*Carex pilulifera*

**Carex limosa** L. - Bog-sedge - Hesgen Eurwerdd

An uncommon sedge of *Sphagnum* bogs, mostly in the uplands, but perhaps overlooked as it often does not flower. It was first recorded at Llantrisant c.SN7275 (Burkill & Willis 1894a) but has not been seen in this area since. Salter never saw it, and the



*Carex limosa*



next records were from the small basin mire on Banc Ty-llwyd SN602774, 1955 (NMW, DDB) - 2007, and in the lagg at the N end of the West Bog on Cors Caron SN688647, 1956 (NMW, EHC; IMV) - 1999. As with *C. lasiocarpa*, it is curious that it was not recorded on Cors Caron by Godwin & Conway (1939). Its lowest altitude is at 130m at Bwlchyrhandir SN593733, 1987 (APF). It is perhaps most frequent among *Carex rostrata* and *Juncus acutiflorus* by the Camddwr on the W side of Cors Caron SN673639, 1999, in a watershed mire W of Llyn Gwngu SN790650, 1998 (AOC & JPW), and around Llyn y Figyn SN811703, 1988 (DKR). A record from Gors Lwyd (Slater 1976) seems to have been in error. Altitude limit 520m, near Grafea Elan SN816733, 1992 (CM).

***Carex magellanica* Lam. subsp. *irrigua* (Wahlenb.)**  
Hiitonen - Tall Bog-sedge - Hesgen Eurwerdd Lefn

A rare sedge of wet upland mires. It was first found in 1993 in small quantity by a pool among very wet *Sphagnum* in a watershed mire 800m E of Drybedd on the S side of Pumlumon SN77898319 (NMW) - 2007. In 1995 it was found locally abundant over an area 40 × 50m, and sparse in another area 10 × 10m, in a mire 2km NNW of Claerwen SN808689 (NMW), and this is its most southerly site in Britain. The only other site is 1km E of Llyn Rhuddnant SN816782 where it is scattered throughout c.4ha of partially drained mire with poorly grown conifers, 1997 (NMW, CASm & TT). Altitude limit 500m, 800m E of Drybedd SN77898319, 2004.



*Carex magellanica* fringing bog pool,  
with John Poland, Drybedd, view  
S from SN77898319, July 2006.

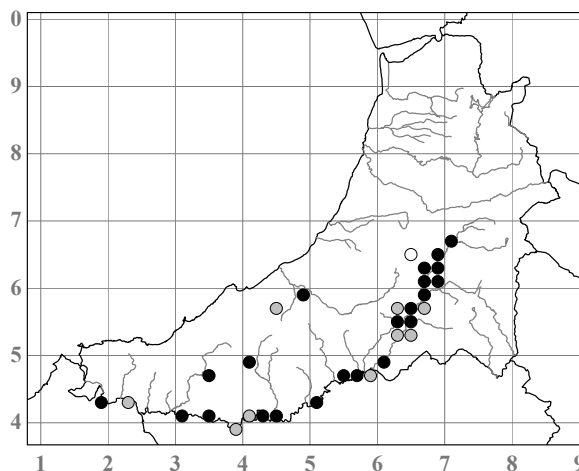
***Carex aquatilis* Wahlenb. - Water Sedge - Hesgen y Dŵr**

Abundant in many places along the Teifi from Cors Caron SN709663 down to Coedmore SN191439, 1959-2007, fringing the river and in backwaters, ox-bows and marshes. It was first recorded in 1886 by Ley in abundance at Llyn Maesllyn on Cors Caron SN693628 (ABS, HLU, BRC Rep. 1884-1886: 110 (1887)), and



*Carex aquatilis* fringing a Teifi backwater S of Pont Gogoyan, view SE from SN641536, June 1980

Salter (1935) says “Still to be found in plenty on the borders of the Maes Llyn and elsewhere. The Teifi bog appears to be the most southern station of this sedge in Britain”. In 1936 Salter found it c.3km S near Trecefel c.SN6658 (NMW). It is surprising that he never saw it further down the Teifi, and this raises the, albeit unlikely, possibility that it may have spread downriver comparatively recently. The Talley Lakes in Carmarthenshire, only 6km S of its southernmost Teifi site, is now the southernmost European site for the species, and it is remarkable that it should grow so abundantly along the Teifi so close to its limit. Away from the Teifi it occurs only in a few artificial though mostly long-established ponds, to some at least of which it may possibly have been originally introduced: a pond made in 1990, 150m WNW of Ystrad Meurig motte SN701676, 2005, where it was not planted; the then drained lake in Llanerchaeron grounds SN481599, 2002; a pond in woodland SW of Derwen Gam SN444571, 1985 (AOC & DGJ); a pond in a copse E of Darren-fawr SN417488, 2000; and a pond in a conifer plantation on top of Gernos Mountain SN358460, 1999.



### **Carex acuta × aquatilis**

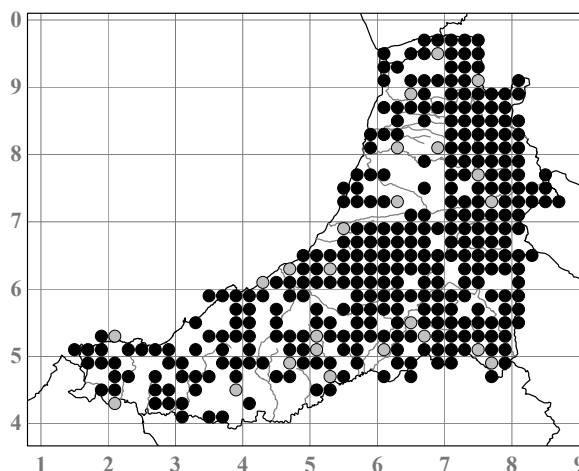
A dense colony in the dry ditch W of the disused railway, 250m S of the Teifi bridge, Cors Caron SN70856618, was 15m long when first noticed in 1991, and 20m long in 1999 (BM, NMW, conf. PMB, ACJ, MJYF & MSP). In some years it does not flower, but can still be recognised by the dense stomata on both surfaces of the leaves.

### **Carex acuta** L. - Slender Tufted-sedge - Hesgen Tysywennau Main

In small quantity at Cors Caron, probably now confined to a few shoots among *C. aquatilis* in the swamp at the S end of Llyn Maesllyn SN693627, 2001 (AOC & MD); and a colony 5m long in the dry ditch W of the disused railway 600m S of the Teifi bridge SN707657, 1999-2005, which usually does not fruit. It was formerly, at least from 1956 until c.1980, more abundant at Llyn Maesllyn, and was also on the Teifi bank W of here SN685629 in 1956, and had first been recorded at Cors Caron in 1895 by Salter (NMW, conf. AOC, Diary 22.5.1895). Records from other parts of the bog are misidentifications of *C. aquatilis*. Salter also recorded it from Cors Fochno SN69 (Wade 1952), but perhaps unreliably as the specimen representing his record from “pools in the old course of the Rheidol, near Capel Bangor” c.SN6579, 1935 (NMW, Wade 1952) is *C. nigra*.

### **Carex nigra** (L.) Reichard (*C. vulgaris* Fr.) - Common Sedge - Hesgen Gyffredin

A very common sedge of wet pastures, acidic and mesotrophic mires and flushes, dune slacks, lake margins and streamsides. It is often dominant in wet pastures, especially where *Molinia* has been reduced by grazing and poaching, as happens in many of the rhos sites, and it is often the only sedge among *Juncus effusus* in the wetter parts of the upland sheep-walks. *C. nigra* is very variable in habit and other characters. In dune slacks at Ynys-las c.SN6093, 2004-2007 (NMW), it can form a close turf with very short leaves and almost globose female spikes (var. **stolonifera** (Hoppe)). In ditches and in areas with bare peat at the edges of mires, where there is a variable water table, for example alongside the railway across Cors Caron SN685617, 1995, it can form dense tussocks with the “trunk” up to 35cm tall and 16cm across, and stems up to 130cm long (var. **recta** (J. Fleisch.) Hyl.). Plants recorded as *C. juncella* from Cors Fochno by Whellan (1942) are referable to the latter variety. Var. *longibracteata* (Salter 1935, Straker 1884) is simply a monstrous form. Altitude limit 700m, 400m S of summit of Pumlumon Fawr SN789864, 2002.



**Carex ×decolorans** Wimm. (*C. bigelowii* × *nigra*)

There is a colony 5 × 0.5m, flowering sparingly, in sheep-grazed turf at the top of a small area of block scree 1.5km ENE of the summit of Pumlumon Fawr SN80388773, 2001 (NMW), 20m from a colony of *C. nigra* and 50m SE of the nearby *C. bigelowii* colony. The plants are clearly intermediate, with dense stomata on both surfaces of the leaves, and correspond to plants described from N England and Scotland by Corner (2002) as “introgressed plants resembling *C. bigelowii*” (conf. RWMC).

[*Carex elata* All. - Tufted-sedge - Hesgen Duswog

Evans (1804) mentioned *C. caespitosa* from the Teifi Pools area, but he was probably referring to a form of *C. nigra* and not intending this species.]

**Carex bigelowii** Torr. ex Schwein. - Stiff Sedge - Hesgen Anystwyth

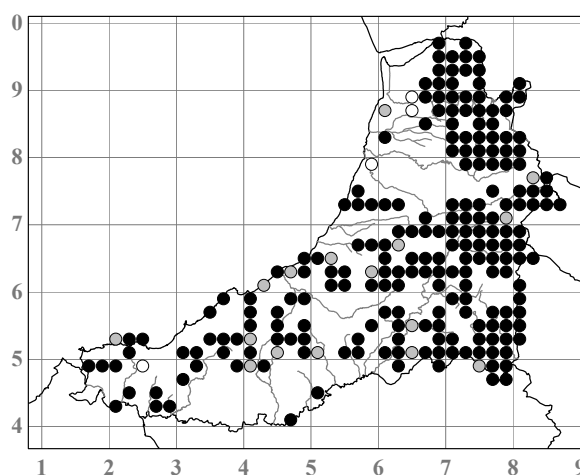
First found in 2000 in sheep-grazed turf among rocks at 685m altitude, 1.5km ENE of the summit of Pumlumon Fawr SN80358777 (SPC). There were two small patches, one 0.5m across, the other 2 × 1m, with c.50 non-flowering and 6 flowering shoots. In 2002 it was found to be locally frequent to dominant at 745m altitude, over an area of short turf and shallow peaty soil c.45 × 25m, stretching NE from 15m NE of the summit itself SN789869 (NMW). The area was very closely grazed and there were no inflorescences, although one was found the following year. It is remarkable that so large a colony of a species so often looked for here should have escaped the notice of the numerous botanists who have visited this summit. This is the most southerly site in Britain for the species. Altitude limit 745m, as above.



*Carex bigelowii* site on Pumlumon Fawr, view SSW to the summit cairn from SN790870, September 2009

**Carex pulicaris** L. - Flea Sedge - Hesgen y Chwain

Widespread in flushes, in damp pastures, on cliff ledges and streamsides, wherever there is even slight base or mineral enrichment and some movement of water. It is common in flushes on slopes both in the uplands and on the coast, in *Molinia* tussock mires on slopes in the uplands, and in rhos pastures. It occurs surprisingly in at least three graveyards, that at Blaenplwyf chapel SN575754, 1995 (SPC) - 2003; at Gwenlli church SN392535, 1980-2008, where it is abundant among *Nardus* N of the church; and at Waunifor chapel SN465414, 1989-2005. Plants with branched inflorescences occur in the Gwenlli churchyard population, 2008 (NMW). Altitude limit 550m, head of Nant y Moch, Pumlumon c.SN7886 (Salter 1935); 600m, above Llyn Llygad Rheidol, Pumlumon SN79328731, 2002.





## POACEAE

**Phyllostachys aurea** Rivière & C. Rivière - (Golden-bamboo)

Salter collected this Bamboo flowering in Llanwenog churchyard SN494455 in 1937 (NMW, det. SAR, Diary 13.7.1937, Salter 1940a), thinking it was *Pseudosasa japonica*. *P. aurea* is native of SE China; it flowered in Britain in 1876, 1919-1920, 1936-1937 and 1967.

**Fargesia spathacea** Franch. - Chinese Fountain-bamboo - Bambŵ'r-ffynhonnau Tsieineaid

There are several large thickets of this Bamboo, native of China, spread from plantings in damp woodland 200m SW of Highmead mansion SN499431, 1985 (NMW, det. CS, erroneously published as *Arundinaria jaunsarensis* in *Watsonia* 16: 196 (1986)) - 2002; and a small colony 1 × 1.5m in the wood E of Pinewood garden, Rhydyfelin SN593793, 1995 (NMW). A large clump in the Penglais dingle, at the bottom of the University Botany Garden, Aberystwyth SN593820, had a partial flowering in 2006 (NMW).

**Sasa palmata** (Burb.) E. G. Camus - Broad-leaved Bamboo - Bambŵ Llydanddail

Native of Japan and Sakhalin, and occasionally naturalised in estate woodlands, often in damp places and by streams or ponds, and spreading vegetatively to form often huge thickets. In the Bryngoleu Plantation at Alltirodyn SN445438 in 1994 it covered c.1ha. It was first recorded naturalised in 1980 in the Bronpadarn dingle, Llanbadarn Fawr SN602810 (NMW, det. DMcC) - 2005. Many colonies flowered in the early 1990s, for example at Plas Gogerddan SN630837 in 1992 (NMW, conf. DMcC). Frost damage to the leaves sometimes mimics variegation, as in the extensive colonies naturalised in scrub at Glandyfi Castle SN692966, 1994 (AOC & WMC) - 2008.

**Sasaella ramosa** (Makino) Makino - Hairy Bamboo - Bambŵ Blewog

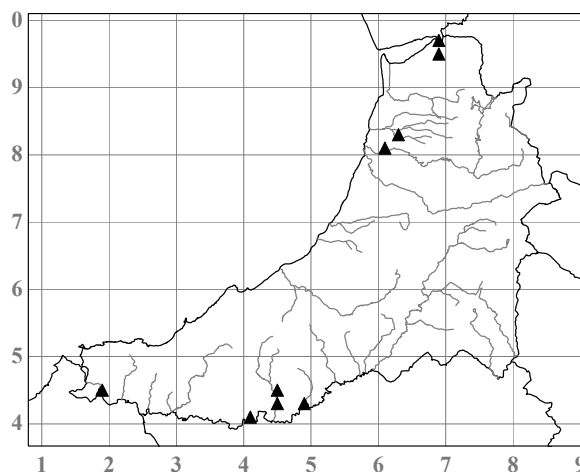
Native of Japan, and naturalised in two estate woodlands. There are extensive thickets in rather open mixed woodland at Glandyfi Castle SN692966, 1994 (NMW, AOC & WMC) - 2008, and it has spread from the long-abandoned garden into damp woodland at Highmead SN499430, 2002 (NMW).

**Pseudosasa japonica** (Siebold & Zucc. ex Steud.) Makino ex Nakai - Arrow Bamboo - Bambŵ'r Saethau

Naturalised, spreading clonally from plantings and throw-outs especially along streamsides and river banks, in estate woodlands, by deserted gardens and in graveyards. The earliest confirmed record was not until 1978, in estate woodland on the E bank of the Ystwyth at Trawsgoed SN669727 (NMW, det. DMcC), although it must have been spreading in the county for a long time before this. Several colonies were seen flowering between 1984 and 1992, for example in the Highmead grounds SN499431, 1985 (NMW, conf. DMcC). Salter (1940a)

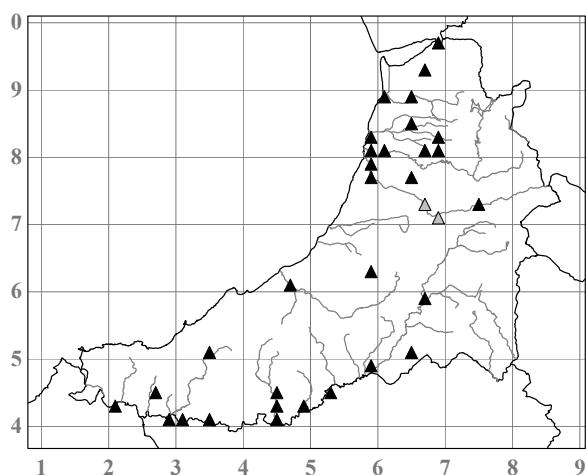


*Phyllostachys aurea*, J. H. Salter, 1937, Llanwenog churchyard SN494455 (NMW)

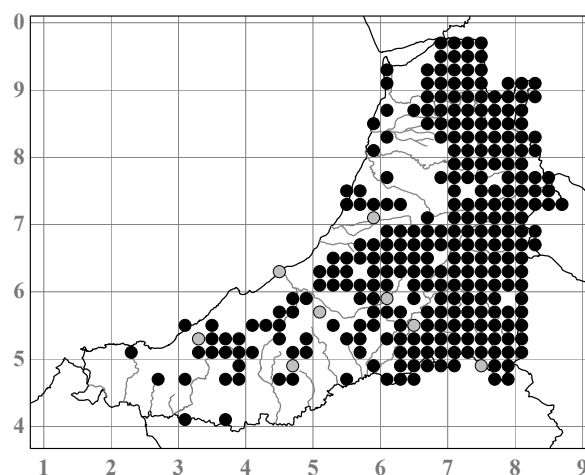


*Sasa palmata*

described a colony of this species flowering in Llanwenog churchyard, but his specimen from here, 1937 (NMW) is *Phyllostachys aurea*. Altitude limit 305m, roadside bank 100m W of Penuwch school SN592627, 1996. Native of Japan and Korea.



*Pseudosasa japonica*



*Nardus stricta*

### ***Nardus stricta* L. - Mat-grass - Cawnen Ddu**

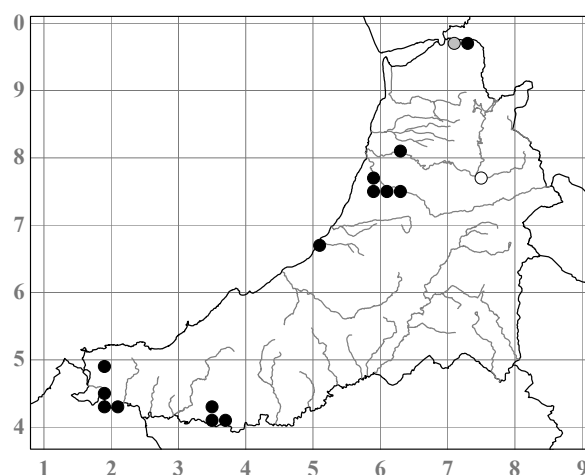
An unpalatable grass abundant or locally dominant on the upland sheepwalks, quite common in well-grazed but unimproved acidic pastures in the lowlands, but notably absent from most of the coastal fringe of the county. It flourishes usually on better drained soils than *Molinia* and can often be dominant on the slopes and ridges in over-grazed *Festuca ovina*/*Agrostis capillaris*-dominated pasture, and can be abundant in acidic upland flushes and along streamsides. *Nardus* is less common in heaths, and is seldom conspicuous in Cattle-grazed pastures. Surprisingly there is a patch, 1.5 × 1m in 2002, 2 × 1.2m in 2005, in the N dune slack W of the road at Ynys-las SN61019395. Altitude limit 750m, Pumlumon Fawr summit SN789869, 2002.



*Nardus* tussocks, Ystrad Einion, view NW from SN706940, February 2006

### ***Milium effusum* L. - Wood Millet - Miledwellt y Coed**

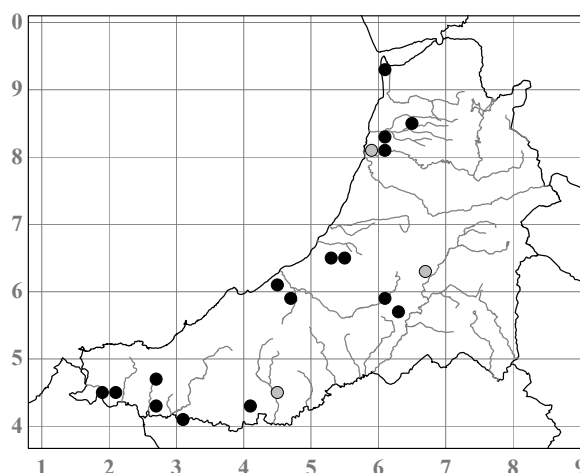
An uncommon grass of some of the more fertile woodlands, often showing a preference for clay soils. It is usually associated with Ash, sometimes in ancient Oak woods but also in secondary Ash/Sycamore woods, and it also occurs occasionally in Beech woods, Blackthorn scrub and on hedgebanks. It is abundant in one place in the Llyfnant valley SN736975, 1925 (Salter Diary 15.7.1925) - 2004; in the lower Ystwyth valley in several places in the Nant Llolwyn woods SN57Y, 1957 (EHC) - 2004, in Coed Bont Sych SN594761, 1999, and in the Afon Fad woods SN600758, 1994 (SPC); in the wooded dingle of the Afon Cledan above Llan-non SN517665, 1996; and in several places in the lower Teifi valley from Henllan SN359402, 1983, down to



the Teifi Marshes SN181452, 1989-2003, and Penparc SN190480, 1995. It grows in mixed estate woodland at Lovesgrove SN629819, 1981-1994, in Alder carr at the old woodyard site, Llanilar SN626752, 1994, and in a conifer plantation, Allt y Gigfran, Llangynllo SN351424, 1996, at all of which it was perhaps introduced.

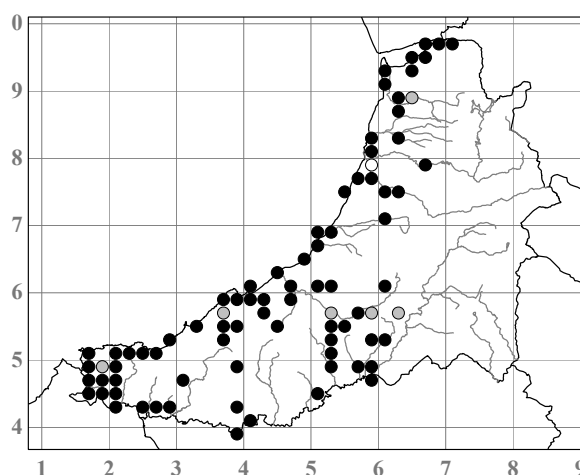
**Schedonorus pratensis** (Huds.) P. Beauv. (*Festuca pratensis* Huds.) - Meadow Fescue - Peiswellt

An uncommon grass of marshy pastures, hay meadows and dune slacks, confined to the lowlands and rarely at all abundant. It is most frequent, with *Molinia* and *Deschampsia cespitosa*, in a *Juncus effusus*-dominated pasture below the University Farm, Frongoch SN608828, 1984-2003. In 1995 it was found in a lawn sown with a seed-mix at the Glanyrafon Industrial Estate SN610801 (SPC). Two varieties developed at the WPBS, 'S.53' and 'S.215', both developed from plants from old pastures in Buckinghamshire, have been particularly successful, though to what extent they have been grown in the county I do not know.



**Schedonorus arundinaceus** (Schreb.) Dumort. (*Festuca arundinacea* Schreb., *F. elatior* auct., non L.) - Tall Fescue - Peiswellt Tal

Salter (1935) distinguished *Festuca elatior* from *F. arundinacea*, and said the former was "Scarce and local" and gave it only from Rhydyfelin SN57Z and Llan-non SN56D, and recorded the latter only as an adventive from the Aberystwyth rubbish-tip SN591811 in 1927. The two are now regarded as conspecific. In semi-natural grassland in pastures and graveyards it remains an uncommon plant, occurring usually as a rather dwarf form, for example in neutral grassland at Caeau Llety Cybi SN60375355, 1979 (LTR, conf. CAS) or in base-rich flushes by the Afon Mwldan SN201488, 1995 (NMW). On riverside rocks in many places, for example below Pont Tyweli SN409402, 1995 (NMW) or below Pont Alltycafán SN385392, 1996, on the Teifi, a densely tussocky form with very narrow leaves occurs. A much larger, more robust form with broad leaves occurs along the estuaries on floodbanks and in stony places at the top of salt marshes, for example by the Teifi at Cardigan SN186459, 1962-2008. Since about 1980, similar robust plants have become progressively more abundant on roadside verges throughout the lowlands, where they can in places be dominant, as well as by paths and on waste ground. This parallels its behaviour in Radnorshire (Woods 1993a), and is doubtless the result of its use in seed-mixes as well as its success in such nutrient-rich, disturbed but comparatively unmown sites (Braithwaite *et al.* 2006). An even more robust form, with stems 135cm tall and leaves 22mm wide, was found among garden refuse in a clearing in University woodland, Aberystwyth SN59698142, 2002 (NMW). 'S.170', a pasture strain developed at the WPBS, has been widely grown in the UK and a good deal of the material in the county is presumably this.



**Schedonorus giganteus** (L.) Holub (*Festuca gigantea* (L.) Vill., *Bromus giganteus* L.) - Giant Fescue - Peiswellt Mawr

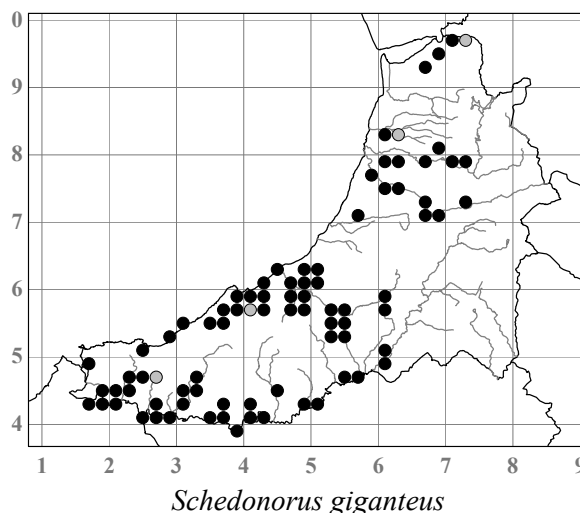
A frequent grass of the more fertile or base-rich woodlands, especially on clay soils in the SW part of the county, where it is most often seen on damp pathsides and streambanks. It is very characteristic of the wooded riverbanks in the lower Aeron and Teifi valleys, and of the wooded coastal dingles. Rare in the north,



it does occur in the Llyfnant SN736975, 1975 (PMB) - 2003, and in small quantity in several of the other wooded valleys. It is confined to the lowlands.

×**Schedolium loliaceum** (Huds.) Holub (×*Festulolium loliaceum* (Huds.) P. Fourn.; *Lolium perenne* × *Schedonorus pratensis*) - Hybrid Fescue - Peisrygwellt Croesryw

Recorded only once, on a field record card at BRC from Llangranog SN35, 1958 (DEdeV & AMcGS). Although the *S. pratensis* parent is uncommon, this hybrid is perhaps overlooked as it is often assumed to have a *Lolium*-like rather than a more branched inflorescence, which it often possesses.

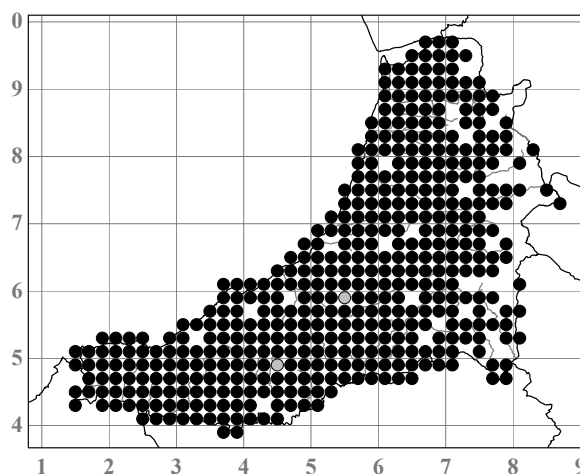


### **Lolium perenne** L. - Perennial Rye-grass - Rhygwellt Parhaol

Very common in the more fertile pastures, hay meadows and other grassy places, both as a native and very widely sown for leys of three years or more. In upland pastures it is probably only introduced. As a sown pasture grass, *L. perenne* was introduced into Wales about 1740 (Davies 1815), if not in the 1690s (Beddows 1967), and by the end of the 18<sup>th</sup> century it was the invariable grass used for leys throughout the county, being sown with Red Clover (Lloyd & Turnor 1794). The great variation found ranges from long-lived, late-flowering plants with many, prostrate tillers and small leaves, to short-lived, early-flowering plants with few, erect tillers and large leaves. The former are mostly pasture forms, and include the probable native populations, while the latter are mostly hay forms and are probably chiefly introductions. Improved varieties of both sorts were widely used in the 19<sup>th</sup> century. In the 1920s and 1930s new breeding techniques for grasses developed at the WPBS under R. G. Stapledon led to the development of new varieties of far-reaching importance. In the words of a later Director: "It is difficult to single out any one variety for special mention, but the S.23 perennial ryegrass bred by T. J. Jenkin has probably had the greatest impact. It has unquestionably been the pivot for hill land improvement in Wales, and the means of increasing production almost fourfold. Again with the better standards of management now practised in the lowlands under conditions of high fertility, progressive farmers are achieving up to 1,500 gallons of milk per acre from this variety during the grazing season - a value which is about twice the national average" (Thomas 1969).

'S.23', perhaps the one plant for which Aberystwyth and the county are famous, was a pasture variety in fact developed from plants chiefly collected from old permanent pastures in Kent, Lincolnshire and the Midlands, and to a lesser extent from plants from old pastures in the Netherlands. 'S.24' was a hay variety developed by Jenkin, and 'S.101' an intermediate hay-pasture variety. More recently many other varieties such as 'AberDart', 'AberElan' and 'AberSilo' have been developed by WPBS/IGER, both diploid and tetraploid, and great emphasis in the last 20 years has been put on developing high sugar content. The wear-resistant 'AberElf' is now widely used for amenity and sports turf.

*L. perenne* is still the most widely sown grass in the county, and has recently been increasingly grown for silage. The awned var. *aristatum* recorded by Burkill & Willis (1984) with the comment "Careful search revealed only the awnless form in the hills; v. *aristatum* Schum. was found in the lower country at Capel Bangor", was probably a form of either *L. multiflorum* or the hybrid, to which such plants are normally ascribed nowadays; other named wild variants ranging from var. *tenue* (L.) Schrad. with few-flowered, well-separated spikelets, frequent especially in dry, unimproved pastures, to forma *ramosum* Schumach. with branched inflorescences, frequent on enriched soils and tips, occur widely in the county but have little or no genetic basis. Altitude limit 540m, trackside by Pumlumon lead mine SN79508567, 2009.

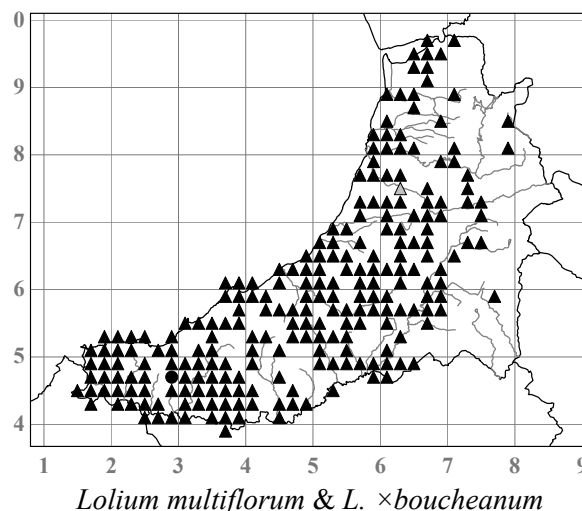


**Lolium ×boucheanum** Kunth (*L. multiflorum* × *perenne*)

Under-recorded, as it is difficult to distinguish from *L. multiflorum* (the map shows both taxa), but so widely sown that it must occur as a casual or naturalised, if not spontaneously arisen, throughout at least the lowlands. As sown in short term leys the hybrid strains are usually longer-lived and more drought resistant than *L. multiflorum*, and recent widely sown WPBS/IGER ones include ‘AberEcho’, ‘AberExcel’, ‘Augusta’ and ‘AberLinnet’. Possibly spontaneous hybrids have been found with the parents in arable fields at Mwnt SN197521, 1995 (NMW), and in a few other places casual or naturalised plants have been recognised.

**Lolium multiflorum** Lam. (*L. italicum* A. Braun) - Italian Rye-grass - Rhygwelht yr Eidal

Widely sown in mixtures or on its own for short term leys and commonly naturalised on verges, waste ground, tips, as a relic in pastures and as a weed in arable fields. Being annual or biennial it is usually rapidly replaced by other species in leys. It was introduced to Britain in 1831 and was presumably sown widely in the county soon after this. The WPBS experimented with its use in leys and the strain ‘S.22’ was developed by T. J. Jenkin by crossing and self-pollinating selected plants of commercial origin in the 1930s; ‘S.22’ was used in 1933 along with Rape as a pioneer crop in the Cahn Hill Improvement Scheme in the Pwllpeiran area c.SN77M, S, and was extensively used elsewhere thereafter. Many strains have since been developed and sown, including recent WPBS/IGER diploid ones such as ‘AberComo’, ‘AberEpic’, ‘Trajan’ and ‘Tribune’, as well as tetraploid strains, and the naturalised plants reflect this considerable variation. The map includes records of *L. ×boucheanum*. *L. multiflorum* is native of Europe, N Africa and SW Asia. Altitude limit (naturalised) 385m, pasture by Glog Fawr reservoir SN748708, 1993.

**Lolium temulentum** L. - Darnel - Efrau

An archaeophyte described by Salter (1935) as “Occasional, as a casual”, but he gave only two records, from the Aberystwyth rubbish-tip SN591811 in 1925 and 1934. It has not been recorded since.

**Festuca altissima** All. (*F. sylvatica* Vill.) - Wood Fescue - Peiswelht y Coed

A rare grass of steep rocky and damp slopes in ancient woodland, now known as a native only from a few sites in the Rheidol woods around Devil’s Bridge, variously associated with *Fraxinus*, *Tilia cordata* or *Ulmus scabra*, where it was first recorded by Ley (*BRC Rep.* 1884-1886: 136 (1887)); Watson (1874) erroneously cites Purchas (1848). Many clumps, which remain conspicuously green throughout the winter, can be seen on rock ledges by the three bridges SN741770, 2004, and it also grows on the E side of the Rheidol above the Gyfarllwyd falls SN744779, 2004 (CMFB), across the valley by the Afon Tuen SN740776, 1998 (AOC & JPW), and down the valley by the Nant y Fawnog SN732774, 1976 (DGJ & RGW) - 2004. Salter (1935) also recorded it, at an unknown date, from Craig y Fintan in Cwm Berwyn SN714582, a surprisingly dry, unshaded and apparently unsuitable site, and noted on a visit there in 1932 (Diary 21.7.1932): “I found little fresh in plants and did not see *Festuca sylvatica*”;



*Festuca altissima*, Devil’s Bridge, view  
SW from SN741770, February 1995

it has not been seen there since. It is naturalised as scattered clumps by the drive in the wooded grounds of Aberceri, Cwm-cou SN29454197, 1995 (NMW) where it was presumably originally planted for ornament.

**Festuca arenaria** Osbeck (*F. juncifolia* St.-Amans) - Rush-leaved Fescue - Peiswellt Dail Brwyn

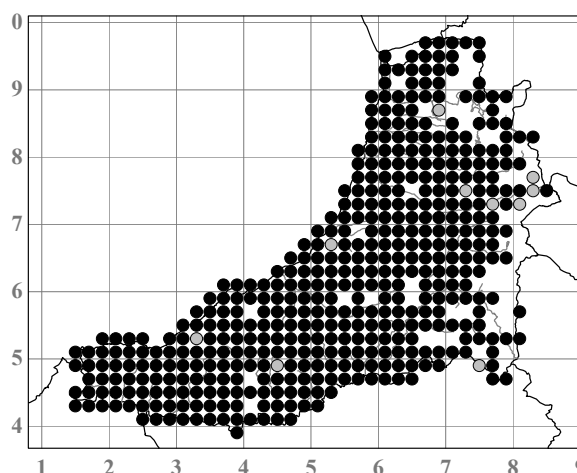
Subsp. **oraria** (Dumort.) Dengler

This member of the *F. rubra* aggregate grows with *Ammophila*, *Carex arenaria*, *F. rubra* etc. at the seaward edge of the dunes at Ynys-las. Because of difficulties of identification (it is distinguishable with certainty only by microscopical examination of leaf sections) the exact extent of its distribution is uncertain. It was first collected from "Borth towards Ynyslas" in 1929 (NMW, CEH, det. AKKAA1-B), and has more recently been found at Ynys-las from SN60549286, 1992 (NMW, conf. CAS as "Good *F. arenaria* for the W coast, but far from typical of E coast plants", i.e. subsp. *oraria*) up as far as SN60519410, 2001. At Penyrergyd a small patch was found on the sandy shingle spit at the SW corner of the dunes SN160485 in 2001 (NMW, AOC & JPW), probably recently arrived as it had been searched for here previously in vain. Salter (1935, Wade 1952) recorded "*F. rubra* var. *arenaria* Koch" from the Borth and Tan-y-bwlch dunes and the Dyfi salt marshes, but in the absence of specimens it is uncertain what these plants were.

**Festuca rubra** L. - Red Fescue - Peiswellt Coch

Subsp. **rubra**

Very common in grasslands throughout the lowlands, especially in the less dry pastures, in hay meadows and graveyards, on banks and verges, in fens, on sand dunes, at the top of salt marshes and on the coastal slopes. It is less common in the uplands than *F. ovina*, and is often confined there to flushes and streamsides, but the two frequently grow together. It is often sown as a constituent of pasture seed-mixes, and on roadside verges. Resulting from breeding experiments at the WPBS, 'S.59' was an especially successful and widely grown variety. Subsp. *rubra* is very variable in habit, pubescence, width of leaves and other characters. Plants with proliferating inflorescences occur occasionally, for example on the Teifi bank by the West Bog, Cors Caron SN682626, 1993-2003 (NMW, AOC & CM) where the population seems permanently viviparous; on river shingle by the Rheidol at Lovesgrove SN633808, 1987 (LTR, AOC & APF, conf. MJW); by the Llyn Craigypistyll dam SN717856, 1992 (AOC & SPC); and in several places in the uplands in 2008, probably resulting from the wet summer. Altitude limit 550m, edge of conifer plantation, SW slope of Y Garn, Pumlumon SN77108473, 2005 (AOC & PAS).

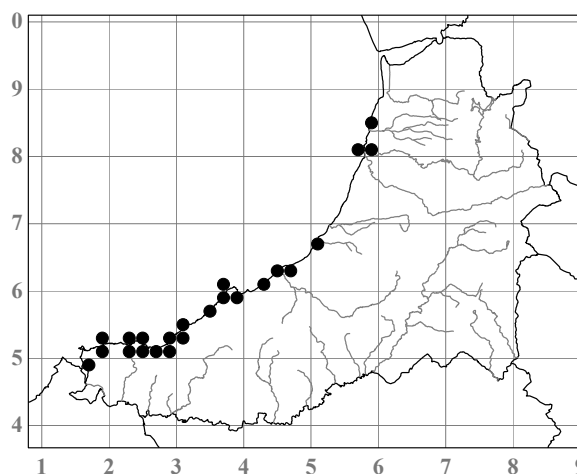


Subsp. **commutata** Gaudin - Chewing's fescue - Peiswellt Chewing

This strongly tufted subspecies is very difficult to identify except where it grows on open ground as it is only then easy to uproot cleanly enough to show its lack of rhizomes; it is probably grossly under-recorded as it is said to be widely sown. The only certain records are from a recently seeded verge on the Glanyrafon Industrial Estate SN610801, 1997 (Herb. SPC, SPC, conf. CAS); at the edge of a reseeded field, Penlan-las SN607772, 2000 (SPC); and ground reseeded in 1997, Parc-y-llyn, Aberystwyth SN590809, 2001 (NMW).

Subsp. **junceae** (Hack.) K. Richt.

Common along the coast on clifftops and ledges, grassy slopes and the tops of shingle beaches. It is best developed, and frequently most glaucous, on the more exposed rocks in the spray zone, for example on the NW side of Foel y Mwnt SN192521, 1994 (NMW) or on Craig Caerllan, Cwm Tudu SN356578, 1994 (NMW). It is abundant on parts of Tan-y-bwlch beach SN579805, 1994 (Herb. SPC, SPC,



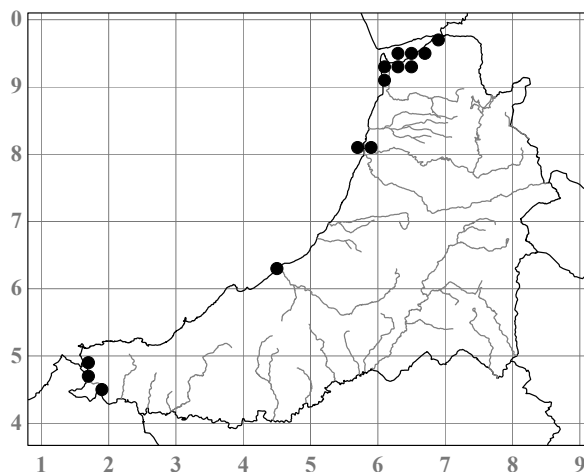
Subsp. *junceae*



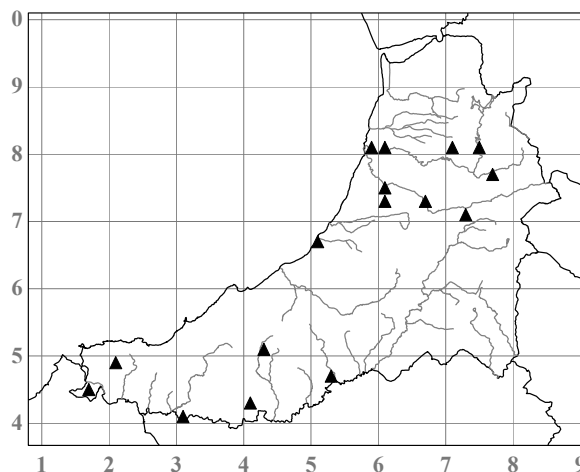
det. CAS), but has not been identified with certainty from the Ynys-las dunes SN605931 etc., 1992 (NMW) where material only approaches subsp. *junceae* (fide CAS). It has not been identified from inland.

**Subsp. *litoralis*** (G. Mey.) Auquier

Dominant and forming dense mats in the upper parts of salt marshes in the estuaries of the Dyfi SN69, 2008, Rheidol SN5881, 2008, Ystwyth SN5780-5880, 2008, Aeron SN4562, 1993, and Teifi SN14, 2008. In many places it is difficult to tell exactly where the boundary between this and subsp. *rubra* is, as the characters overlap considerably.



Subsp. *litoralis*



Subsp. *megastachys*

**Subsp. *megastachys*** Gaudin

This widely sown, probably alien subspecies is confined to sown verges and amenity areas, and was first recorded from a new housing estate in Ponterwyd SN751807 in 1988 (NMW, det. AKKAAI-B) and since then from widely scattered sites. A densely tufted plant with very rigid and inrolled leaves, from a recently worked part of the Penparc sand quarries SN20184850, 2002 (NMW), may be this subspecies. Altitude limit 310m, frequent on S verge of the A44(T) westwards from Bwlch Nantyrarian SN717812, 2002.

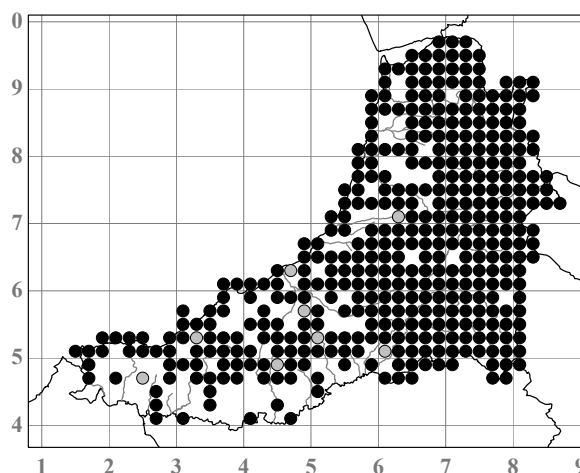
***Festuca ovina* L. - Sheep's-fescue - Peiswellt y Defaid**

Very common on well-drained, infertile soils especially in the uplands where it is usually co-dominant with *Agrostis capillaris* or *Nardus* over much of the sheepwalks. It is equally abundant on many of the coastal slopes, in both upland and lowland heaths where it can be co-dominant with *Deschampsia flexuosa* and *Calluna*, on river shingle, dry banks, screes and cliffs and lead mine spoil. Altitude limit 750m, summit of Pumlumon Fawr SN78978692 (Salter 1935); ditto, 2002.

A great deal of material from Cardiganshire has been named to subspecies, initially a few by M. J. Wilkinson and many more (c.105) by P. J. O. Trist, and then many more still by myself, and most of these specimens are in NMW. There seems little or no ecological or geographical logic to the distribution of these subspecies in the county, and two or even all three of them often grow together and they are impossible to pick out without making detailed measurements. Conversely, several distinct-looking entities can be seen at many sites which on investigation prove to be all the same subspecies. A high proportion of Cardiganshire specimens have the spikelet and lemma lengths only just above the upper limits for subsp. *ovina* and *hirtula* and so must fall within subsp. *ophiolicola*, with which they also agree in the other characters. It is uncertain what Salter's (1935) "*F. duriuscula* L." refers to.

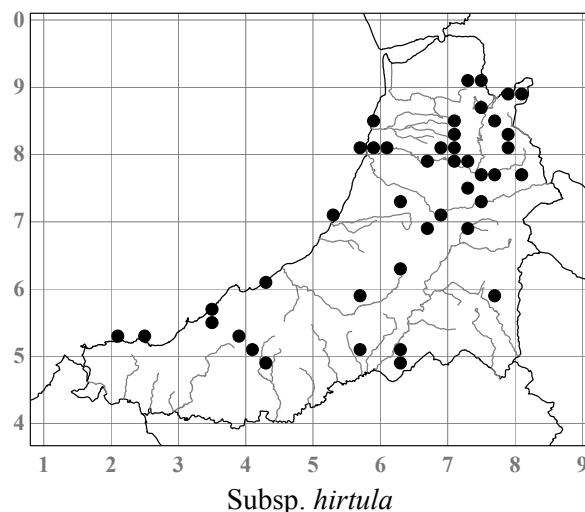
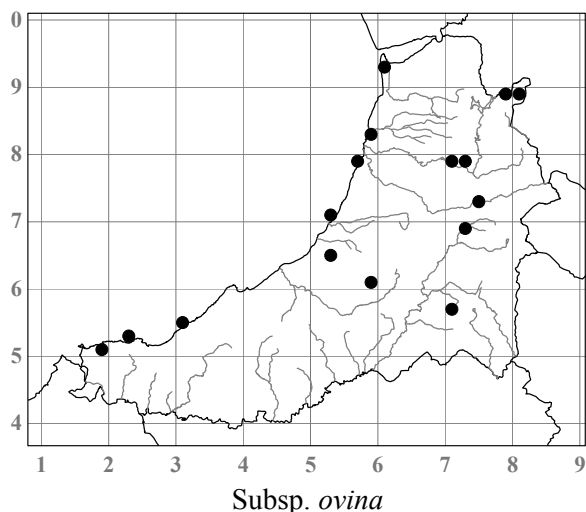
**Subsp. *ovina***

First identified from dry, acidic rock ledges, Cerrig y Hafan SN731880, 1987 (LTR, det. MJW), this is the least often recorded subspecies. It has been collected from upland sheepwalks, coastal turf, lead mine sites



*Festuca ovina* all records

and quarries, dry mounds in rhos pastures, river shingle, dry banks etc. Altitude limit 500m, dry, rocky Sheep-grazed slope, Hengwm Annedd, Pumlumon SN800890, 1992 (NMW, det. PJOT).



**Subsp. *hirtula*** (Hack. ex Travis) M. J. Wilk.

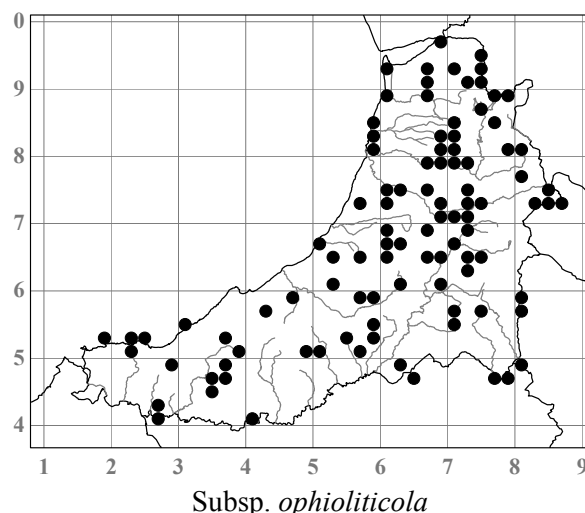
First identified from Sheep-grazed slopes, where it was co-dominant with *Nardus*, on Foel Wyddon SN787835, 1988 (NMW, det. MJW). It has been collected from upland heaths and sheepwalks, from blanket bog, from neutral rhos pastures, coastal heaths and sea cliffs, river shingle, lead mine spoil, dry banks, etc. There is perhaps a bias towards heathy habitats. Altitude limit 650m, ungrazed heathy grassland, E side of Y Garn, Pumlumon SN779850, 1990 (NMW, conf. PJOT).

**Subsp. *ophiolicola*** (Kerguelen) M. J. Wilk. var. *ophiolicola*

First identified from a heathy grassland slope at the Cwmerfyn lead mine SN704824, 1988 (NMW, det. MJW), this is the most frequently recorded subspecies. It has been collected from most of the same habitats as the other two, and from such contrasting ones as among *Molinia* tussocks in a basin mire, dry coastal heath and heavy metal contaminated river shingle. Altitude limit 650m, ungrazed heathy grassland, E side of Y Garn, Pumlumon SN779850, 1990 (NMW, conf. PJOT).

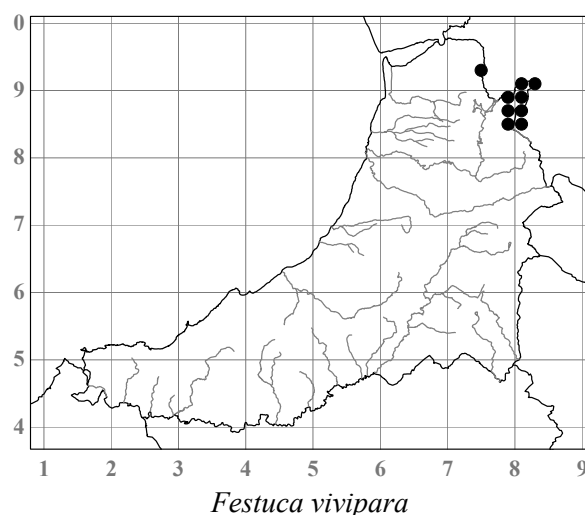
**Subsp. *ophiolicola*** var. *hibernica* (Markgr.-Dann.) M. J. Wilk.

First identified from dry, acidic rock ledges just SE of Hengwm Annedd SN799892, 1988 (NMW, det. MJW), at 440m altitude. Four other gatherings in NMW from a variety of habitats were also given this name by PJOT until he became uncertain first of his identifications and then of the distinctness of the variety itself; no further attempts have been made to identify it in the county.



***Festuca vivipara*** (L.) Sm. - Viviparous Sheep's-fescue - Peiswellt Bywhiliog

Largely confined to the higher parts of Pumlumon where it grows chiefly on rock ledges and steep slopes from 460m altitude upwards. It is commonest by the Nant Gelligogau SN807903, 1989-2002 (NMW), in Cwm Gwerin SN88E, 1963-2005, and by Llyn Llygad Rheidol SN7987, 1886 (Ley 1884-1886) - 2006 (AOC & JPW). Salter (1935) recorded it here as a proliferating form of *F. ovina*. The only other area where it occurs is on a slope at 420-450m altitude on the E side of Llyn Conach SN740934-



745935, 1989 (NMW) - 2006 (AOC & JPW). It is difficult to spot when the inflorescences have been grazed off by Sheep, so is probably under-recorded. Altitude limit 750m, "Summit of Plinlimmon, by the big cairn" SN789869 (Burkill & Willis 1894); 690m, above Llyn Llygad Rheidol SN79108721, 2002.

**Festuca filiformis** Pourr. (*F. tenuifolia* Sibth., *F. capillata* Lam.) - Fine-leaved Sheep's-fescue - Peiswellt Meinddail

Salter (1935) gave this species, as *F. capillata*, for "dry, turf localities" but probably confused it with forms of *F. ovina*. The only confirmed record is from Goginan churchyard SN69318108, 1981 (NMW, det. AMe), but the part it was in has been lost to road-widening and it has not been seen there, or anywhere else in the county, since. Although apparently rare, or at least under-recorded, in West Wales, it should be looked for.

**Festuca lemanii** Bastard - Confused Fescue - Peiswellt Leman

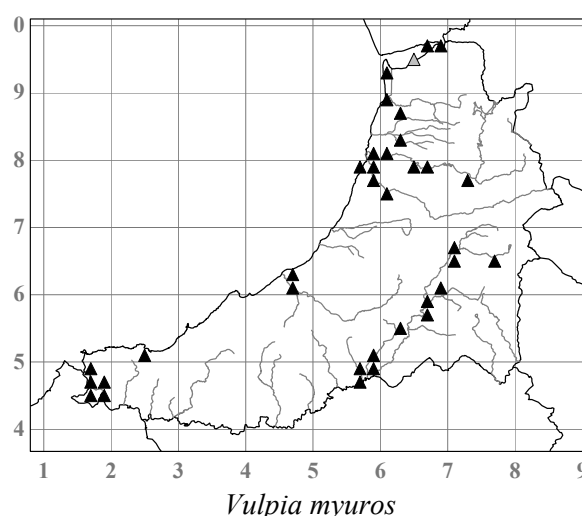
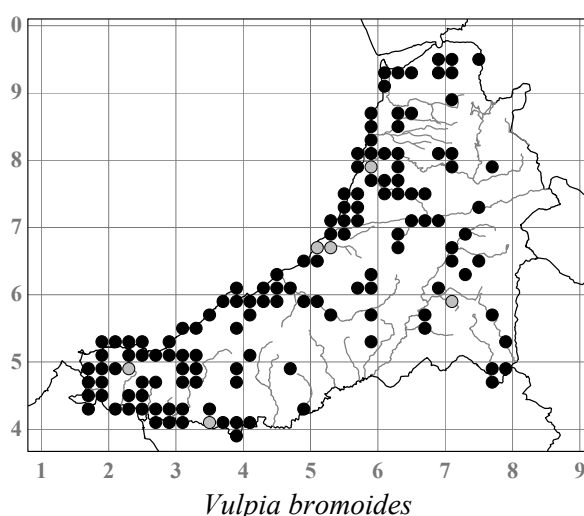
Abundant on stabilised river shingle by the Afon Rheidol at Aber-ffrwd SN670783, 1989 (NMW, conf. CAS 2004) - 2005, and in the same habitat by the Afon Ystwyth at Grogwynion SN711719, 2005 (NMW); at both sites it is undoubtedly native, and grows mixed with *F. ovina* subsp. *ophiolicola* into which it seems to grade in all characters. It presumably occurs elsewhere in similar sites.

**Vulpia fasciculata** (Forssk.) Fritsch (*V. membranacea* auct., non (L.) Dumort., *Festuca uniglumis* Aiton) - Dune Fescue - Peisgwelty Twyni

First recorded in 1906 "in fair quantity on the edge of the walk (on the low wall) going up Constitution Hill", Aberystwyth SN584826 (RFT, Salter Diary 24.2.1907, Towndrow 1907), but not noted there since. It now occurs at the seaward edge of the Ynys-las dunes SN69B, C, 1973 (Savidge 1973) - 2008, extending down from the embryo dunes onto the sparsely vegetated sandy shingle and varying a good deal in quantity from year to year; on sand by the mouth of the stream at Traeth Penbryn SN293524, 1999 (AOC & SPC); and at the seaward edge of the Penyrergyd dunes SN160485, 1978 (NMW, LTR) - 2005. At Ynys-las and Penyrergyd the amount varies greatly from year to year.

**Vulpia bromoides** (L.) Gray (*Festuca bromoides* L.) - Squirreltail Fescue - Peisgwelty Cynffon Gwiwer

Frequent in dry, open habitats on thin soils, sand, gravel and rocks, especially on sand dunes, closely grazed dry pastures, river shingle, road verges, the tops of dry banks and rock outcrops, and also sometimes abundant in hay meadows and as a garden weed. It is commonest near the coast; in the uplands it is largely confined to road verges and FC tracks. My impression is that it has increased considerably in recent decades, in common with the national trend (Braithwaite *et al.* 2006). Altitude limit 370m, roadside verge 1km N of Maesglas, Camddwr valley SN770564, 2000 (AOC & RDP).



**Vulpia myuros** (L.) C. C. Gmel. (*Festuca myuros* L.) - Rat's-tail Fescue - Peisgwelty Fagwyr

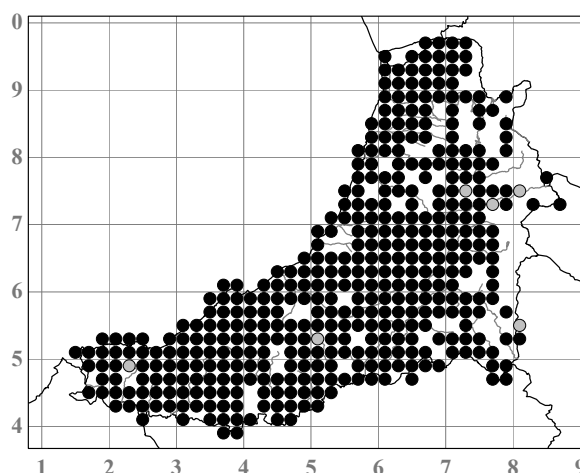
An archaeophyte in Britain as a whole, but first recorded in the county only in 1956, from the railway sidings at Aberystwyth station (NMW, conf. AEW). Its distribution follows the railway system perhaps more closely than that of any other species, and it is often abundant on railway ballast and waste ground by the tracks and



stations. It had clearly colonised much of the Aberystwyth to Lampeter line before that closed in 1967, as well as the Aberaeron and Cardigan lines before they closed in 1965 and 1963 respectively, and was very probably overlooked for a long time before the first records. The other early records were from a wall-top in Cardigan SN14 in 1959 (PMSt, *Proc. BSBI* 3: 300 (1959)); from the disused railway at Llanerchaeron SN474604 on the Aberaeron line in 1960; from Strata Florida Station, Ystrad Meurig SN711672 in 1965 (APC, *Nature in Wales* 9: 214 (1965)); from the railway along the Dyfi estuary SN69M in 1974 (SCH); from the disused Lampeter station SN582484 in 1978 (NMW, conf. CAS); and from Capel Bangor station SN648797 on the Devil's Bridge line in 1979 (CSa). It has still not been recorded from any of the coastal villages that were not served by the railways, and it is remarkable that there have been only four records definitely away from railway influence: from the sandy road verges at Penyrergyd SN164485 in 1992; from the gravel workings at Glanrhyd-ty-noeth, Capel Bangor SN667785 in 1994; from a car parking area 100m W of Tyn-cwm, Strata Florida SN770655 in 1996 (AOC & JPW) where it had certainly arrived within the previous two years; and from waste ground on the MoD site, Aber-porth SN245519, 2006, where it was again a recent arrival. It has not yet been recorded from arable fields, as it has recently in some other parts of Britain.

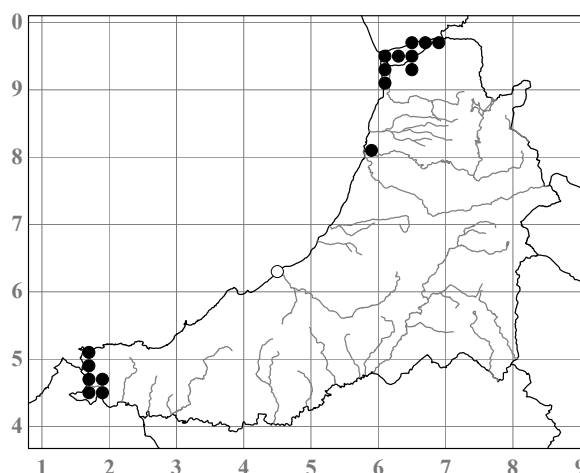
### **Cynosurus cristatus** L. - Crested Dog's-tail - Rhonwellt y Ci

Very common and widespread in pastures, on verges, pathsides, banks and in any unshaded and comparatively dry grassland. It is especially abundant in the older permanent pastures as it was formerly widely sown in seed-mixes for leys, being considered excellent for Sheep on account of its hardiness in the uplands and its long growing season, continuing when most other grasses have ceased; the wiriness of the flowering culms means that they are largely uneaten and this leads to disproportionately abundant self-seeding of the species. A distinctive dwarf form with very broad panicles (reminiscent of *Koeleria cristata*) is found on vegetated shingle by the sea, for example on Tan-y-bwlch beach SN580802, 1976-2007 (NMW, AOC & SDSB). Altitude limit 510m, FC road verge 2.5km NNE of Nant-y-maen SN775604, 2001 (AOC & RDP).



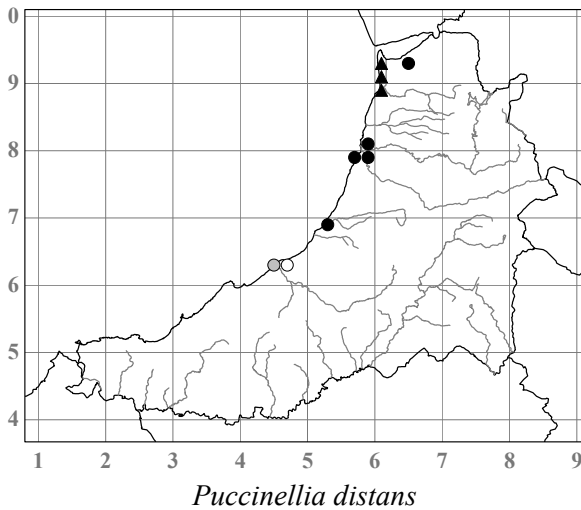
### **Puccinellia maritima** (Huds.) Parl. (*Glyceria maritima* (Huds.) Wahlenb.) - Common Saltmarsh-grass - Gwellt y Morfa

Dominant, or co-dominant with *Festuca rubra* in drier areas, over much of the salt marsh along the estuaries of the Dyfi SN69, 1934 (Salter 1934) - 2008, Rheidol SN5881, 1960-2008, and Teifi SN14, 1962-2008. A record for SN46 in Perring & Walters (1962) must refer to Aberaeron harbour SN46L, where it no longer occurs. It is curious that Salter did not record it until 1934, and that he never recorded it in the Teifi estuary although it must always have been there. It has also been recorded in a fragment of salt marsh on the cliffs, 15m above the sea, just S of Carreg Lydan, Gwbert SN162512, 1987 (JRA *et al.*).



### **Puccinellia distans** (Jacq.) Parl. subsp. **distans** (*Glyceria distans* (Jacq.) Wahlenb.) - Reflexed Saltmarsh-grass - Gwellt-y-morfa Atblygedig

A grass of the upper parts of salt marshes and grassy sea walls, rare as a native although its distribution in the county has been extended and confused by introductions. Marshall (1900) recorded it "a little north-east of Aberayron" SN46R in 1899, and it was seen in the shingly salt marsh in Aberaeron harbour SN457628 in 1981, though not since. It was first recorded from the Dyfi estuary in 1970, on the sea wall NW of Tre'r-ddol



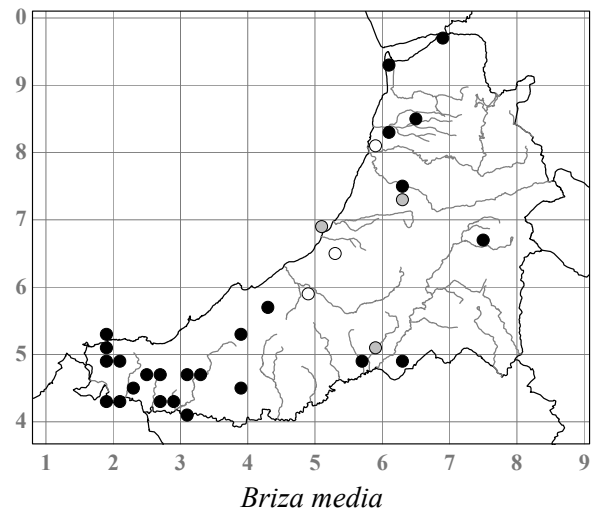
SN6493 (LANC, NMW, GH), and in 1988 from the Cletwr embankment nearby SN651932 (AOC, JRA & CDP). In 1991 it was sown in a seed mix with *Lolium perenne* and *Trifolium fragiferum* along 2km of reconstructed floodbank on the W side of the Afon Leri SN616898-616920, and two years later it was co-dominant here with the *Lolium* (NMW) and had become widely spread by seed in nearby areas of salt marsh. In 1997 it was abundant over large areas of the developing saline marsh behind Tan-y-bwlch beach SN580796-578796, and in 2000 it was abundant in similar areas of saline marsh behind the beach 1km SSW of the mouth of the Afon Wyre SN523687; these two occurrences are presumably natural, as there has been no sowing of it in these parts of the county.

### **Briza media** L. - Quaking-grass - Crydwellt

An uncommon plant of the more neutral and basic pastures and hay meadows. It is in at least five graveyards including Penrhyn-coch churchyard SN644841, where it was reported to Salter (1935) by the Revd J. Williams and where it still occurs, 2004. It occurs on sand dunes at Ynys-las SN609938, where it was first seen in 1992 (GJ), and abundantly at Mwnt SN194519, 2003, where Salter first recorded it in 1894 (Diary 28.6.1894). It is abundant in calcareous fens by the Afon Mwldan near Penparc SN201488 etc., 2002, and elsewhere it often occurs in flushes, as at Rhos Gargoed SN758668, 1994, which, at 290m altitude, seems the highest it occurs. Although Whellan (Wade 1952, but not in Whellan 1942) said it was “fairly frequent in the south-west of the county”, Salter (1935) said it was scarce overall and gave only five sites where he had seen it. He must either have overlooked it or it has increased a good deal.

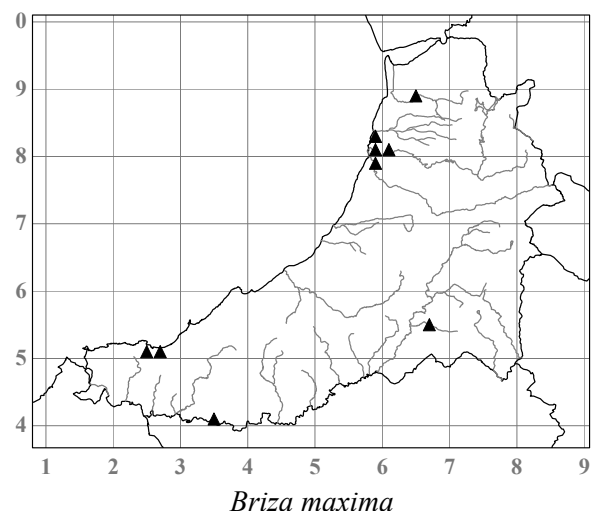


*Trisetum* and *Briza media*, Llanilar churchyard SN623751, June 2004



### **Briza maxima** L. - Greater Quaking-grass - Crydwellt Mawr

Recorded by Salter (1935) as abundant in Llanbadarn Fawr churchyard, and collected by him in 1938 (NMW); it is still abundant there in the SW corner of the new part SN599811 (NMW). In 1992 it was found on the old Penglais quarries SN587822 above Aberystwyth (JH), escaped from an adjacent garden, and has since become very abundant and indeed dominant over several acres there. There have been much smaller colonies in the Cwmpadarn mansion grounds SN601810, 1962 (NMW, RGE) - 1993; in



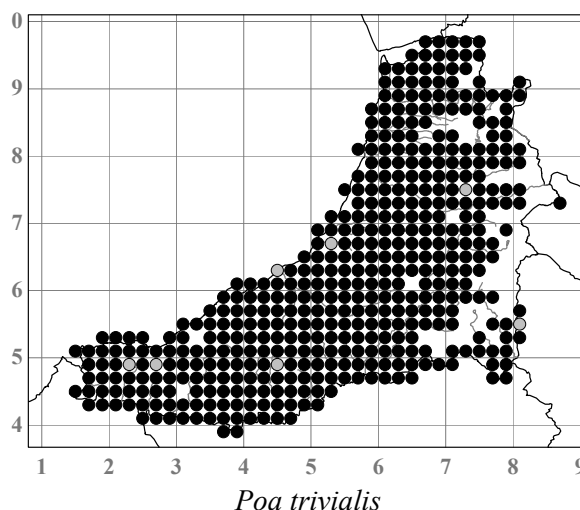
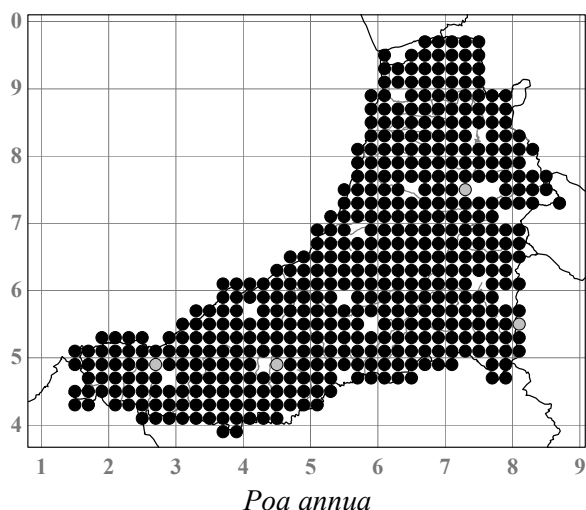
Prospect Street, Llanbadarn Fawr SN601809, 1995-2003 (AOC; SPC); by the National Library SN594816, 2002 (SPC); in Penparcau SN59108002, 2008 (PAS); at Tal-y-bont SN654892, 2005 (SPC); at Henllan SN359406, 1999; at Aber-porth SN262511 and 258514, 2007-2008 (AOC & JPP); and formerly on the rubbish-tip below Pendinas SN594799, 1993-1995 (AOC; SPC).

### ***Poa annua* L. - Annual Meadow-grass - Gweunwellt Unflwyd**

Very common, as var. **annua**, throughout the county in mostly fertile, open habitats, on roadsides, tracks, poached pastures, arable fields, gardens and pavement cracks, wherever in fact there is an opening for it. More natural habitats include dune slacks, Rabbit warrens on the coastal slopes, river shingle, pond margins and flushes on the upland hillsides. In silage fields tall forms of it can often be almost co-dominant with *Lolium*. It flowers throughout the year. On the Aberystwyth golf course c.SN593827, it forms an almost pure sward on the sandy soil of the closely mown greens, having spread steadily in recent decades and caused problems as it becomes patchy during droughts (these greens are believed never to have been reseeded since the Golf Club was founded in 1911); this is the perennial var. **reptans** Hausskn., 1999 (NMW, conf. TAC), which also occurs on greens on the Borth golf course SN609921, 2006 (NMW), around the Ynys-las dune slacks SN69B, C, 1999, on the bowling greens at Queen's Road, Aberystwyth SN585820, 2006, and doubtless elsewhere. Var. **aquatica** Asch., of doubtful taxonomic value, is widespread on pond margins, by ditches and in other damp places. Forma **purpurea** M. L. Grant occurs as a weed of flowerbeds in the Archibalds' garden centre at Bryn Collen, Ffostrasol SN363477, 2006 (NMW, JPP & AOC), having been unnoticed there because it is so well camouflaged, as Grant (2003) observes. Altitude limit (var. *annua*) 750m, Pumlumon summit SN789869, 1932 (Salter Diary 5.9.1932); 2002, ditto.



Aberystwyth golf course green dominated by *Poa annua* var. *reptans*, view N from SN594827, January 2007



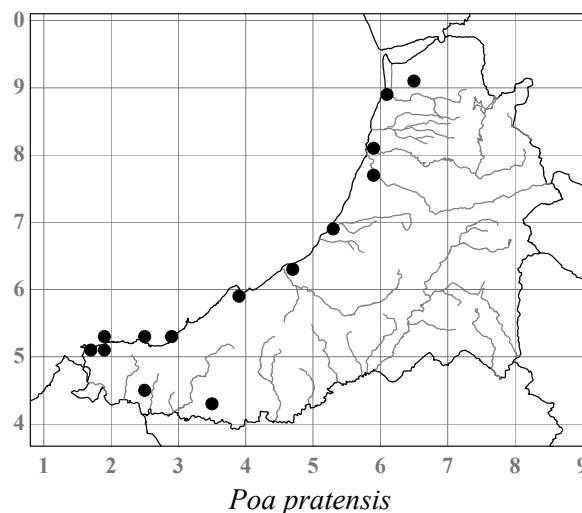
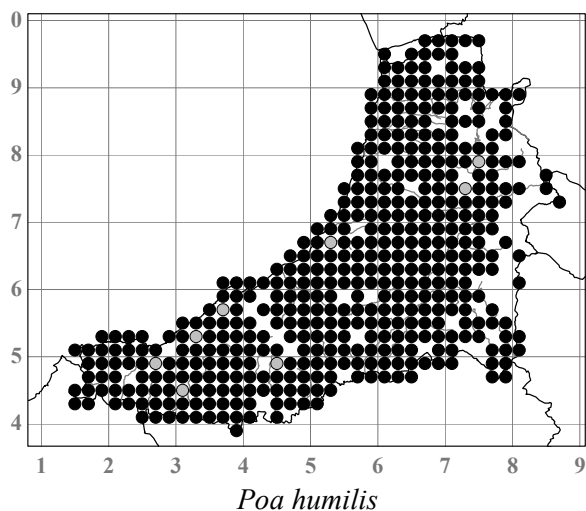
### ***Poa trivialis* L. - Rough Meadow-grass - Gweunwellt Garw**

A very common grass of damp, fertile pastures, verges, hedgebanks, arable fields, woodlands and disturbed and waste ground, but sparse in the uplands. Although very variable, none of the forms seem referable to named taxa. Some forms tolerate shade, and are a conspicuous winter-green feature of the damper parts of woodlands and of the flood-zones of streams in woods as well as in the open. An apparently annual form is common in arable fields. Robust semi-aquatic plants from a Teifi backwater at Lampeter SN584477, and from a ditch by the Teifi 1km W of Pont Trecefel SN665597, both 1979 (NMW, det. TGT & CAS) superficially much resemble *P. palustris*. Altitude limit 510m, grassy slope by Llyn Llygad Rheidol dam, Pumlumon SN791878, 2002.



**Poa humilis** Ehrh. ex Hoffm. (*P. subcaerulea* Sm.) - Spreading Meadow-grass - Gweunwellt Ymledol

A very variable grass that often cannot be satisfactorily distinguished from *P. pratensis*, with which it forms an apomictic complex. Rhizomatous plants with all or most of the other characters ascribed to this segregate are very common in pastures, on road verges, tracksides, hedgebanks, railway ballast, waste ground, and in dune grassland, graveyards, and other grassy habitats. It was not recorded by Salter, although he gave an undated record from Pendinas (WHP, Salter 1935). Altitude limit *c.*610m (Salter 1935 as *P. pratensis*, but probably *P. humilis*); 595m, flushed slope above Llyn Llygad Rheidol, Pumlumon SN79708750, 1997 (AOC & TDD).

**Poa pratensis** L. - Smooth Meadow-grass - Gweunwellt Llyfn

In so far as it can be distinguished from *P. humilis*, *P. pratensis* seems to be an uncommon grass in the county with fewer than 20 definite records. Most are from near the coast on hedgebanks, walltops and road verges; two are from clifftop grassland, and at one of these sites, at Upper Borth SN604887, 1996 (NMW) it was growing with *P. humilis*.

**Poa angustifolia** L. - Narrow-leaved Meadow-grass - Gweunwellt Culddail

Recorded only from grassy railway ballast at four sites. It was first seen in 1960 in some quantity in one place between Glandyfi and Dovey Junction stations SN6997 (PMB) and again at Glandyfi SN694969 in 1979 (CSa), but disappeared soon after. Several colonies were seen on the site of Ynys-las Station SN618931 in 2000 (NMW), and it was seen further S on the main line at Dol-y-bont SN623880 in 1979 (CSa). On the Vale of Rheidol Railway it was seen at Capel Bangor Station SN647798 in 1979 (CSa) and again in 2000 (NMW). It must have spread into the county along the railway, and in her 1979 survey of railway land Sargent found it in several other places along the railway through Montgomeryshire towards Shrewsbury. The significance of its preference for railway sites especially over the W and N parts of its range is discussed in Sargent *et al.* (1986).

**Poa chaixii** Vill. - Broad-leaved Meadow-grass - Gweunwellt Llydanddail

This very decorative grass, native of Europe and SW Asia, has been grown in Britain for ornament and ground cover since the early 19<sup>th</sup> century and was first found naturalised, in Middlesex, in 1852. It is abundantly naturalised in two Cardiganshire churchyards, Llanfihangel Ystrad SN524562, 1978 (NMW) - 2004, and Maestir SN553494, 1983 (NMW) - 2008,

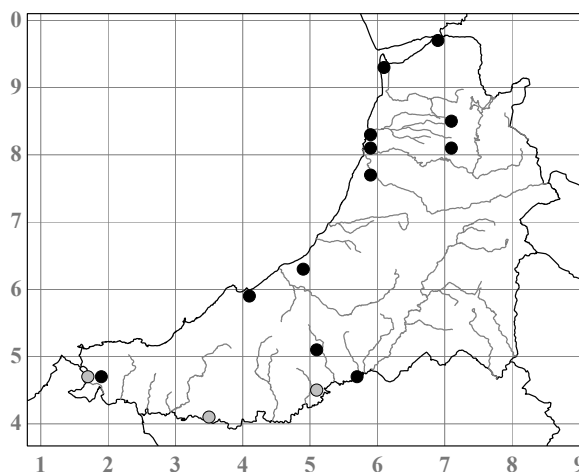
*Poa chaixii* in Llanfihangel Ystrad churchyard SN524562, July 1983



and is also naturalised under Beeches in estate woodland just W of Cilgwyn mansion, Newcastle Emlyn SN31134094, 1994.

***Poa compressa* L. - Flattened Meadow-grass - Gweunwellt Cywasgedig**

An uncommon grass of mortared walls and railway ballast, first recorded in 1960 at Glandyfi Station SN696970 (NMW) where it greatly increased around 1980 but was last seen in 1996. It occurred further along this railway by the Afon Einion bridge SN688966 in 1992, and by the Ynys-las level crossing SN618931 in 1996 (NMW), and on the disused Carmarthen line at Llanrhystud Road (Llanfarian) Station SN591778 in 1992. On walls it is especially characteristic of bridges, and as well as occurring in towns and villages it occurs in several quite remote sites such as on a wall in Glwydwern farmyard, Gorsgoch SN501506, 1978 (NMW) - 2001. It also occurred on the A44(T) lay-by verge near Nantyrarian SN712810 in 2000 (SPC) and at Cwmbrwyno SN70508113 in 2004, and on stony ground on the Llyn Craigypistyll dam SN71808558 in 2001 (AOC & SPC). It is surprising that Salter never recorded it (he was aware of it and specifically mentioned in his Diary, 16.8.1907, that he had not seen it) and, as it has not been found in any "natural" habitats, it may well be a recent arrival. Altitude limit 330m, Llyn Craigypistyll dam SN71808558, 2001 (AOC & SPC).

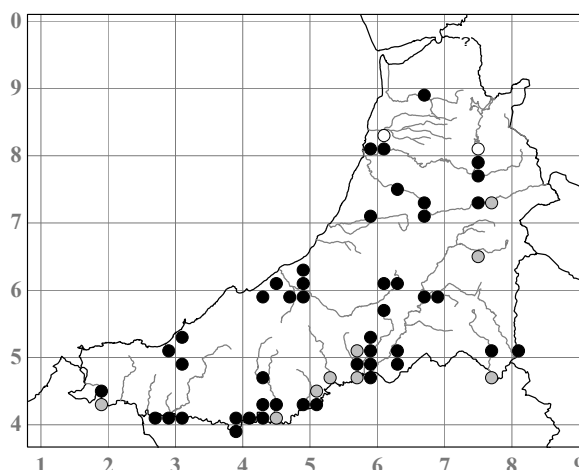


[*Poa glauca* Vahl - Glaucous Meadow-grass - Gweunwellt Llwydlas

A densely tufted, glaucous but very narrow-leaved *Poa*, well-established on a soil and rubble tip on the disused railway at Lampeter SN581479, 1994 (NMW), was variously determined in that year as *P. glauca* (JRE) and as "cf. *P. balfourii* Parn." (RMP & TBR). The latter is itself usually now considered to be just a shade form of *P. glauca*. After growing-on though, it became clear in 2006 that it was just *P. nemoralis* var. *glauca*.]

***Poa nemoralis* L. - Wood Meadow-grass - Gweunwellt y Coed**

An occasional grass of old walls, shaded rocks, and dry woods and hedgebanks. It is absent from the more acidic sites, and is generally rather rare in the more natural habitats, although it occurs in rocky woodland at such places as Devil's Bridge SN77N, pre-1935 (JLW, Salter 1935) - 2004, and along the banks of the Teifi as at Coedmore SN14W, X, 1983-2003, and at Rhuddlan SN495429, 1995. A rhizomatous form occurs on a dry roadside bank in woodland at Falcondale Lake SN56905000, 2006 (NMW). The only other variant noted is var. *glauca* Gaudin, which is abundant on shaded walltops by the entrance to Llanerchaeron farmyard SN48106018, 2007 (NMW), and which was found as a casual by the disused railway at Lampeter SN581479 in 1994 (NMW). *P. nemoralis* is rare in the uplands, but occurs on open rock ledges on Craig Clungwyn SN777472, 1978, and on rocks under Ash trees and conifers above Llyn Brianne 1km S of Nant-y-neuadd SN805514, 1988, at its altitude limit of 290m.



***Dactylis glomerata* L. - Cock's-foot - Troed y Ceiliog**

Very common in the drier pastures, open scrub, hedgebanks and verges, on the coastal slopes, on waste ground and all sorts of rough ground, though it is absent from wet sites of any kind. When grazing in pastures is reduced it can become very rank and abundant, forming large tussocks, especially on the more fertile soils,

and it is comparatively intolerant of heavy poaching and trampling. It becomes rare or absent above about 300m altitude.

Formerly commonly sown for pasture in the county, the first Cocksfoot to be sown in Britain as a pasture grass derived from seed sent from America in 1763, and during the 19<sup>th</sup> century seed was imported from Denmark and New Zealand as well (Beddows 1969b); much of our material must have come from these sources and will not be of native origin. Several varieties were developed at the WPBS for use in seed mixtures in the 1930s and were widely sown, including 'S.26', an especially good pasture strain originating from Devon, used for the less fertile soils at higher altitudes where *Dactylis* was generally considered a better pasture grass than *Lolium*; 'S.37', a hay strain; 'S.143', another pasture strain; and various introduced Danish (mostly hay) and New Zealand Akaroa (pasture) strains. The later 'S.341' was developed to give very early spring fodder.

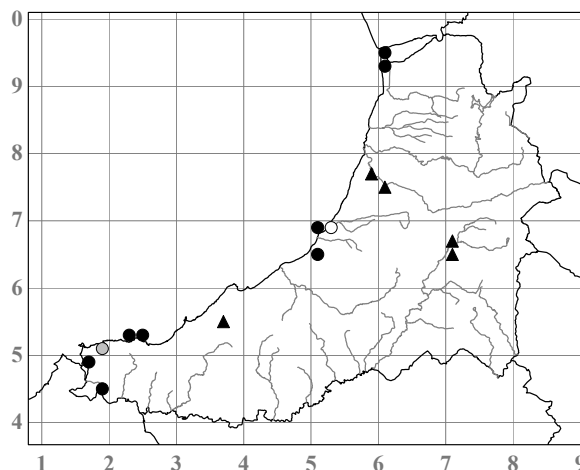
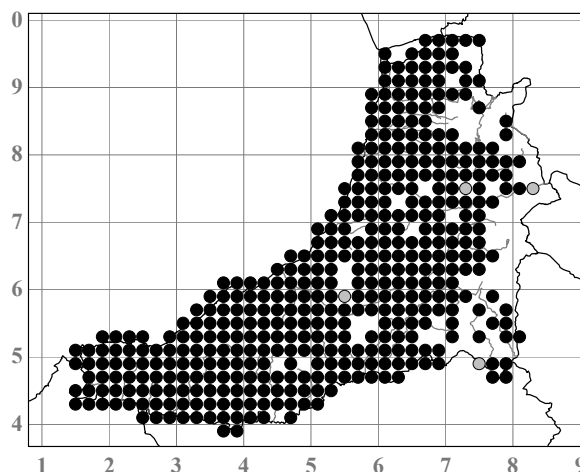
Many ecotypes can be seen, but the only variant worth recognising seems to be var. **collina** Schltld., a dwarf, glaucous-leaved plant with dense inflorescences that is the dominant form on most of the more exposed coastal slopes and cliffs, for example on Llangranog Head SN312551, 1994 (NMW) - 2004, and Cardigan Island SN159515, 1977 (NMW, det. AME); this variety is also on some inland rocky sites, and intergrades with normal plants. Plants with green, yellowish and purplish inflorescences are all almost equally common; ones with proliferating inflorescences are very occasionally seen, for example in a hedgebank S of Pont Gilfach SN436605, 1994 (NMW, AOC & JPW). Altitude limit c.300m "not noted above 1,000ft." (Salter 1935); 415m, roadside bank, Eisteddfa Gurig SN798840, 2002.

[*Catabrosa aquatica* (L.) P. Beauv. - Whorl-grass - Brigwellt Troelennog

Reported by the unreliable Evans (1804), probably erroneously, from the Llanddewi-Brefi area, as *Aira aquatica*. A record by Webb (1928) from Tregaron Bog is also best considered to be an error; there is no specimen and Salter ignored it along with other doubtful Webb records.]

**Catapodium rigidum** (L.) C. E. Hubb. (*Festuca rigida* L.) - Fern-grass - Gwenithwellt Caled

A local annual of sand dunes, open shaly ground, tracksides and walltops by the coast. It is abundant in places on the older dunes at Ynys-las SN607936 etc., 2003, and Penyrergyd SN162487 etc., 2003, and on disturbed shaly ground on the MoD site, Aber-porth SN239523 etc., 2002. It grows with *C. maritimum* at the dune sites, as well as on the low drift clifftop at Aberstringell SN519684, 1997 (SPC). It is clearly an introduction at its inland sites along the disused Aberystwyth to Carmarthen railway at Llanfarian SN591779, 1993 (SPC), at a point 1km WNW of Llanilar SN614754, 1994, and across Cors Caron SN704647 and SN709664, 1999 (NMW), and at Llwyndafydd chapel SN370555, 1998 (NMW) where it is abundant in shingle and gravel on several of the graves.





**Catapodium marinum** (L.) C. E. Hubb. (*Festuca rottboellioides* Kunth) - Sea Fern-grass - Gwenith-wellt y Morfa

An occasional annual of sandy shingle, dunes, clifftops, walltops and tracksides along the coast. The furthest it gets from the sea is only 600m, on ballast in the Aberystwyth railway station yard SN586815, 1991.

**Parapholis strigosa** (Dumort.) C. E. Hubb. (*Lepturus filiformis* auct., non (Roth) Trin.) - Hard-grass - Caledwellt y Morfa

Recorded by Salter (1935) from the Dyfi salt marshes, "but only in small quantity", and remaining a rarity there. It has been seen W of the mouth of the Leri SN69B, 1961 (ABS, GME) - 2008 (NMW), near Ynys-hir SN69Y, 1982 (JPS), and up the Cletwr salt marsh SN648937, 1988 (JRA, AOC & CDP). It was also given from the Teifi estuary in Salter (1935, HLJ), and has been seen there a few times since, in a muddy patch on the Penyrergyd shingle spit SN162486 in 1979 (NMW), and along the salt marsh at Nantyferwig SN168481-168477 in 1975 (APa) - 2002 (NMW).

**Avenula pubescens** (Huds.) Dumort. (*Helictotrichon pubescens* (Huds.) Pilg., *Avena pubescens* Huds.) - Downy Oat-grass - Ceirchwellt Blewog

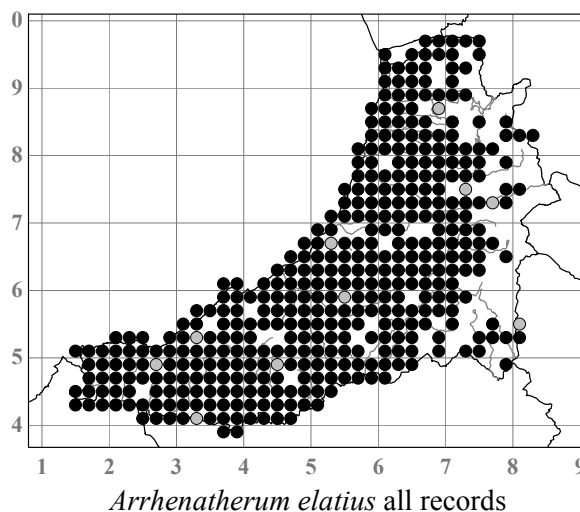
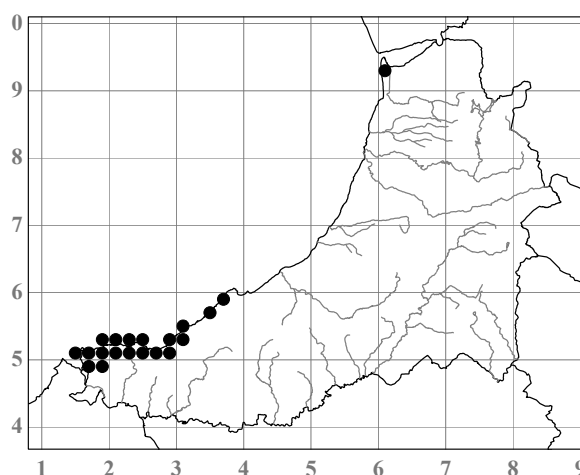
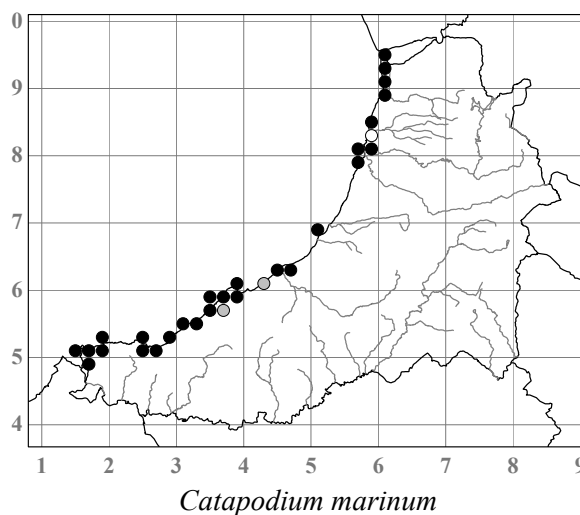
Easily overlooked except for the brief period when the silvery inflorescences are visible, this grass was never seen by Salter, and apart from a doubtful record in Morgan (1849) for Morfa Bychan SN57T (where it has never been seen since) it was first reliably recorded for the county in 1941 from the Llangranog cliffs c.SN35C, Craig y Filain SN2352 and Towyn Warren SN14U (Whellan 1942). Since about 1980 it has been found to be common along the coastal slopes in many places from Coybal SN370590, 1997 (AOC & JPW) - 2005, to Penyrergyd SN163486, 2004. Inland it has been found only on the bank of the Afon Mwldan near Penparc SN196482, 1991 (NMW). Although it had long been known at Aberdyfi in Merioneth, it was not known at the Ynys-las dunes until 1992 when it was found to be abundant over half an acre of level dune grassland just N of the golf course SN607935; by 2002 it had extended at least 400m S on the golf course, and this rapid spread suggests it may be a recent arrival at Ynys-las. Whether it is a recent arrival, or has at least increased, in the SW of the county too is unknown, but it has increased in Britain as a whole in recent decades (Pearman *et al.* 2002).

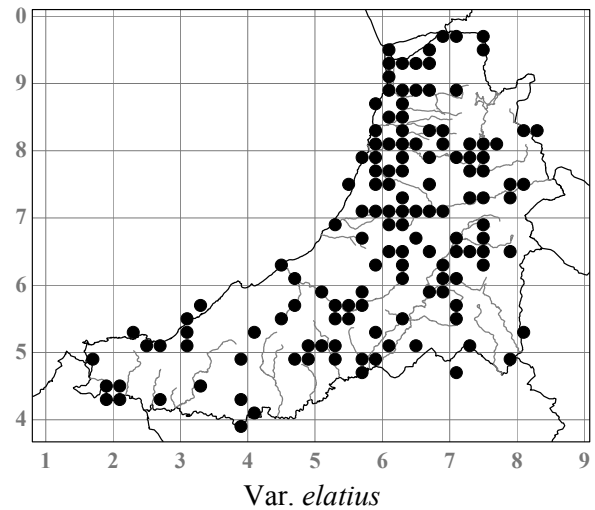
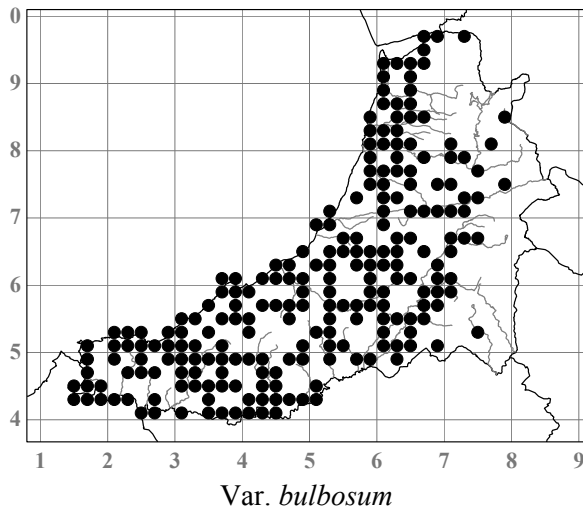
[*Avenula pratensis* (L.) Dumort. (*Helictotrichon pratense* (L.) Besser) - Meadow Oat-grass - Ceirchwellt y Ddôl

Erroneously recorded by Morgan (1849).]

**Arrhenatherum elatius** (L.) P. Beauv. ex J. & C. Presl. (*A. avenaceum* P. Beauv.) - False Oat-grass - Ceirchwellt Tal

Very common on roadside verges, hedgebanks, rough grassland, arable fields, coastal slopes, woodlands especially at the margins and in clearings, railway ballast, dunes and waste ground. Var.





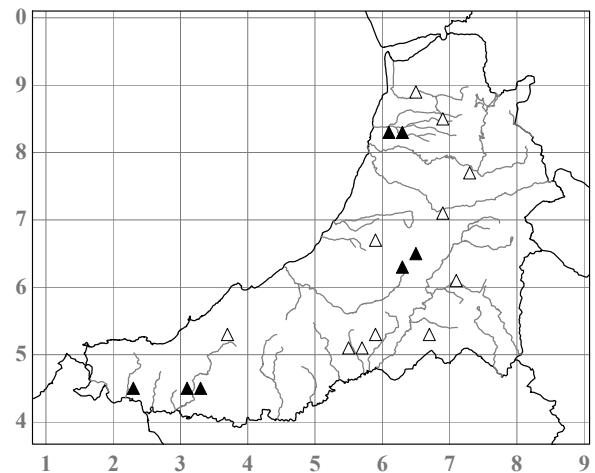
**bulbosum** (Willd.) St.-Amans is the commoner variety as Salter (1935) observed, thriving especially in well-drained and moderately fertile sites. The swollen stem bases are a conspicuous feature of closely cut roadside banks in winter. Jenkin (1931) included locally collected material in his experimental work on the plant at the WPBS. Var. **elatius** is widespread, though much less common in the SW of the county, and occurs in most habitats, but is the dominant or only variety on dune grassland and in woodland. Slender, not or scarcely tufted plants frequent in both wet and dry woods correspond to var. **pauciflorum** Druce, but this is probably only a shade form not worth recognising. Altitude limit 430m, verge of FC road, Bryn Du SN684515, 2003 (var. *bulbosum*).

#### **Avena L.**

For more detailed and especially historical information on the various Oats in the county see Chater (1993).

#### **Avena strigosa** Schreb. - Bristle Oat - Blewgeirchen

Variously known locally as Blewgeirch or Ceirch Blewog (Hairy Oats), Ceirch Teifi (Teifi Oats), and in the 20<sup>th</sup> century as Ceirch Llwyd (Grey Oats), *A. strigosa* was widely grown in the county, especially in the uplands. As it was sometimes known as Black Oats, a name also used for several varieties of *A. sativa*, it is often difficult to know which species is being referred to (eg. Lloyd & Turnor 1794). Davies (1815), however, clearly refers to this species and describes the Blewgeirch as “peculiar to the uplands of Cardiganshire. Its only recommendation is its hardiness, in producing a moderate crop where no other grain can be expected to grow. It was formerly in greater request than at present .... It is probably the only surviving branch of our primitive oats; the common, if not the only bread-grain of our remoter ancestors”. Ley (1887) recorded *A. strigosa* “among oat-crop, and on waste ground, Pont Erwyd [c.SN7480]” in 1886-1887, and Burkill & Willis (1894) recorded it from Castell Fagrach SN727775 and Pontrhydfendigaid c.SN7366, though with no indication of status. Marshall (1900) says of it: “This is cultivated at Bethania [c.SN5763, in 1899] (I saw several fields full of it), and occurs there frequently among the other crops, sometimes



*Avena strigosa* crop, Llwyn-bwch, view WNW from SN637633, August 1997

associated with *A. fatua*". Salter (1935) says that it "is cultivated on upland farms in the hill district", but seems to give no site on his own authority, and he does not distinguish it from *A. sativa* in his diary.

It was a crop of sufficient importance for the WPBS to work on its improvement. C. V. B. Marquand studied its taxonomy, and began a breeding programme continued by E. T. Jones. One of the earliest releases, in 1931, was 'Ceirch Llwyd S.75', a pure line selection from an *A. strigosa* land race (Griffiths 1962, Valentine 1990) which probably remained the only variety grown thereafter. It was cultivated mainly in the north of the county (Jones 1937), usually being cut before it was fully ripe and used for fodder. In the Second World War it was still being grown quite widely in the north,



*Avena strigosa* from D. Evans (*A. sativa* at bottom left), Tal-y-bont Show, 2009

as well as around Lampeter, on the Mynydd Bach and around Plwmp. After 1945 it was largely replaced by the 'S.220' Black Oat variety of *A. sativa*, but was still grown at Denmark Farm SN586536 until 1964, at Llety-Ifan-hen SN685852 until about 1967, at Talwrn-coch SN580672 until about 1970, and at Blaencaron SN709609 and around Tal-y-bont c.SN6589 until about 1975. There is still a class for Ceirch Llwyd at the Tal-y-bont Show and the entry from a small plot kept going at the University Farm at Frongoch SN605825 wins it most years as the sole competitor, 2009. About 2 acres of 'S.75' however were grown from 1942 to 2001 at Llwyn-bwch SN637633, and seed from this stock has been grown at a neighbouring farm since, and this is perhaps the last proper cultivation of it in Wales. 'Ceirch Llwyd S.75' has recently been seen as a casual at Llwyn-bwch, 1997 (NMW); at Dolgoch SN315453 where it was an often abundant weed in the Black Oat 'S.220' crop, 1992 (NMW) - 1997; nearby at Brongest SN320453, 1992 (NMW); and at Frongoch, Llechryd SN223440 in the 'S.220' crop, 1992 (NMW).

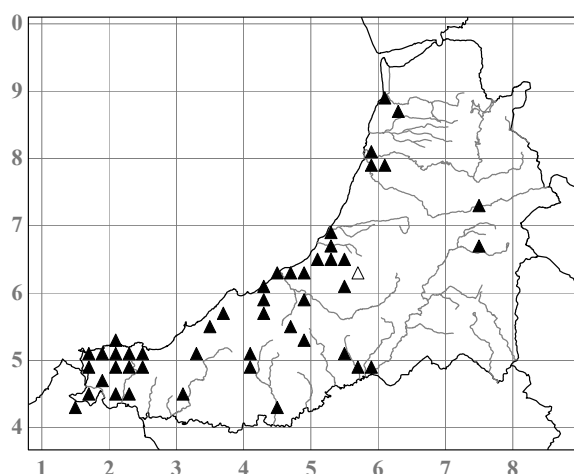
**Naked Oats**, varieties of *A. strigosa* analogous to those of *A. sativa*, including 'Piley Corn' and 'Nackthafer', have been grown in trials at the WPBS/IGER but not yet on a field scale in the county.

#### *Avena brevis* Roth × *strigosa*

'Ceirch Llwyd Cwta S.171', developed at the WPBS from a cross of this parentage made in 1923 (Ashby & Evans 1944, Griffiths 1962), was released to growers in 1936 as a smut-resistant fodder Oat suitable for the same poor upland soils as *A. strigosa*. "Cwta" referred not to its height but to its short awns which enabled it, unlike the long-awned *A. strigosa*, to be sown by drill. It was grown at Cwmhwylog SN620774 and Bryn-du SN608776 in the 1950s for feeding to Horses, but never seems to have been much grown in the county and had more success in NW Scotland. All trace of it has now gone except for the stock held at IGER/IBERS.

#### *Avena fatua* L. - Wild-oat - Ceirchen Wyllt

A frequent archaeophyte weed of arable fields, roadside verges, waste ground and tips, sometimes occurring in great abundance in Oat and Barley crops. Information about its distribution in the past is scanty. According to Salter (1935) it "Usually occurs as a casual; waste ground and rubbish-tips". J. E. Smith recorded it at Hafod c.SN7573 around 1800 (Turner & Dillwyn 1805), and Marshall (1900) recorded that it was sometimes associated with *A. strigosa* as a weed in other crops at Bethania c.SN5763, but it is unclear how common it was as an arable weed before about 1990. Davis (1972) states





surprisingly that MAFF had its first report of *A. fatua* in Wales as recently as 1954; its occurrence and behaviour in South Wales as a whole are described at length in Davies (1815). Altitude limit 300m, Ffair-rhos SN743679, 1991.

***Avena sterilis* L. subsp. *ludoviciana* (Durieu) Gillet & Magne - Winter Wild-oat - Ceirchen Wyllt y Gaeaf**

A rare casual, single plants having been found on only three occasions: in 1993 on a manure heap at the Welsh Agricultural College trial plots, Lovesgrove SN634811 (NMW, SPC); in 1998 on a manure heap at Pen-y-cefn above Tregaron SN693613 (NMW), where straw had been brought from Banbury in 1997; and in 1999 in a car park at Lampeter SN574481.

***Avena sativa* L. - Oat - Ceirchen**

Thriving in the wetter and cooler areas, Oats were relatively much more widely grown than Barley in the uplands of the county; an unknown, perhaps large, proportion of this Oat crop will probably have been of *A. strigosa*, and much of the statistical part of the account that follows may be taken as referring to both species. An early reference is from 1326 in the *Black book of St. David's* (Willis-Bund 1902) when Oats were required to be sown at 8 bushels per acre on the Lord's demesne at Llandygwydd c.SN24L. "Horschettes", low quality Oats probably used for fodder, were grown by tenants of the Llanllŷr Cistercian nunnery (Williams 2001). Lhwyd (1911) was told of them being grown c.1697 in Gwnnws, Llanfihangel Ystrad/Nantcwnlle and Llanfair Clydogau parishes. In the 18<sup>th</sup> and 19<sup>th</sup> centuries Oats were the most important cereal crop in the county. In 1801 they occupied 19,096 acres (7,728ha) and comprised 49% of the total crops in the 75% of parishes in the county that submitted returns (data from Williams 1950, see also Thomas 1960), and in all but a number of parishes along the coast in the SW part of the county and in the lower Teifi valley they were the dominant crop (Thomas 1963). Moore & Chater (1969b) confirmed from pollen analysis that Oats were the most abundant cereal at this period, and that they were especially dominant in the uplands. In 1911-1913 Oats occupied 27,436 acres (11,102ha) and comprised 46% of the total tillage in the county, twice as much as Barley and five times as much as Wheat; in 1939 they occupied 26,082 acres (10,554ha) and comprised 58%, five times as much as Barley and 40 times as much as Wheat (data from Ashby & Evans 1944).

During the 20<sup>th</sup> century, breeding programs at the WPBS, chiefly run by E. T. Jones, and consequent trials on local farms, ensured that the county was a focus of interest in cereal development, especially of Oats (Griffiths 1962). In the mid 1930s more Oats were being grown in this county than in any other in Wales, much of it being used for winter fodder rather than for grain (Davies & Stapledon 1936). At this time the most favoured varieties were 'Castleton', 'Scotch Potato' and 'Victory'. In the south of the county 'Ceirch-du-bach', the old Welsh Black Oats, was especially popular (Jones 1937). 'S.79', developed from an old upland race of the latter and released by the WPBS in 1931, was the chief variety of Black Oats then grown. (An earlier variety of Black Oats, 'Supreme', was very popular from the First World War onwards, especially for feeding horses.) Another Black Oats, 'S.220', released by the WPBS in 1945 and also widely grown for feeding to horses, was especially suitable for poor upland soils where it largely replaced *A. strigosa* 'S.75'. Another of these spring-sown Oats, 'Maldwyn S.221', was released by the WPBS in 1948 and proved the most popular of all for feeding to horses, although it is probably no longer grown. Black Oats were grown at Cwmhwylog SN620774 in the N of the county until about 1985, as 'Supreme' and 'S.220'. In the S of the county at Dolgoch SN315453 (NMW) and at Frongoch SN223440 (NMW), 'S.220' was grown into the 1990s. In 2000, c.70% of the Oats consumed by Man and his animals in the UK was of varieties bred by the WPBS/IGER, and their 'Gerald', a short-strawed winter Oat has for many years been the UK's most popular Oat.

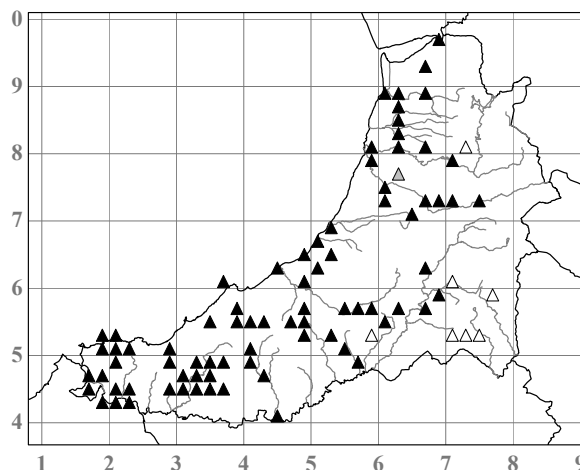
Meanwhile, general cultivation of Oats was decreasing throughout the county: in 1957 there were still 22,356 acres (9,047ha), but by 1967 there were only 7,986 acres (3,224ha), and by 1988 only 692 acres (280ha), plus 51ha of mixed corn, were being grown (Anon. 1988), only about 7% of the amount of Barley. In the 1990s the spring-sown 'Dula' and the winter-sown 'Solva' and 'Image', along with 'Gerald', were among the most popular varieties. Oats are now largely confined as a crop to the S of the county.

Salter often noted small crops of Oats in the uplands, though which species must again be uncertain. In the Llywernog area c.SN7380 he saw the highest patches of Oats at 335m (Diary 10.8.1926); at Nant-y-maen SN762585 there were patches at 410m (Diary 15.8.1928); at Bryn Carregog SN719533 and Llethr SN724537 at 400m (Diary 25.7.1929); and at Ty'n-y-cornel SN751534 at 320m (Diary 31.7.1931). Tibbott (1974) gives much interesting detail on the methods of cooking home-grown Oats in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries, derived partly from Cardiganshire informants.

Local races of Oats were treasured by farmers in several parts of the county, notably the “Denmark Oats”, comprising ‘**Ceirch Gwyn Denmark**’ and ‘**Ceirch Du Denmark**’, white and black respectively, grown at Denmark Farm, Betws Bledrws SN586536 by D. T. Williams from at least 1925 (and perhaps even earlier by a previous owner) until about 1960. These were spring-sown, and the grain was much in demand as feed although other farmers were not allowed to sow it themselves. Although *c.*40 grains of ‘Ceirch Gwyn Denmark’, identified by I. Daniels who used to work on the farm, were found in cracks in the floor of the grain loft at Denmark Farm in 1993, they were not viable and the variety must unfortunately be presumed extinct.

*A. sativa* is frequently found as a casual on roadsides, waste ground, farmyards and in arable fields, and the map is of these records. ‘S.220’ occurs as a casual in several areas where it is cultivated, for example at Brongest SN320453, 1992 (NMW). Altitude limit (cultivated) 410m, 1929 (see above); (casual) 295m, Brynafan SN717731, 1992.

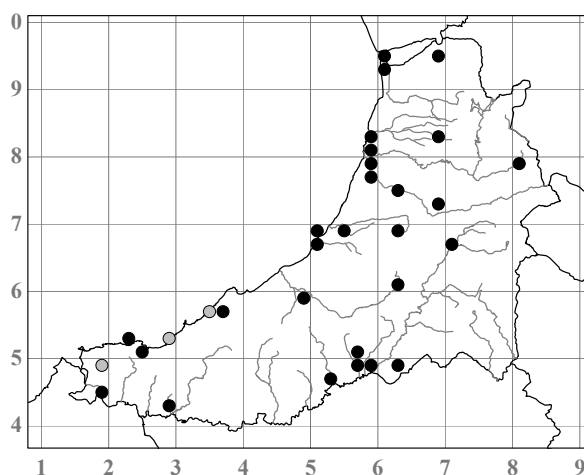
**Naked Oats**, varieties in which the lemma and palea do not adhere to the ripe grain which is therefore released naked on threshing, now comprise 10% of the Oats grown in Britain, but seem not yet to have been much cultivated in the county. Much of the development of these varieties has been done at the WPBS/IGER/IBERS (Valentine 1990). One of these, ‘**Zuton**’, was grown at the Nantclyd Organics farm 2km S of Llanilar SN623726 in 2008 for inclusion in poultry feed as part of an IBERS project. Two different varieties were found as casuals at Pont-sian SN439460, 1992, deriving from bird-seed.



### ***Trisetum flavescens* (L.) P. Beauv. - Yellow Oat-grass - Ceirchwellt Melyn**

#### **Subsp. *flavescens***

An occasional grass of the more base-rich grasslands, in pastures, hay meadows, dune grasslands, graveyards, roadside banks and verges, most frequent near the coast, and appearing only as a casual in the uplands. The earliest record is from the Aberystwyth district in 1906 (Towndrow 1907). Salter (1935) said that it was “Infrequent and only of casual occurrence” and gives two records, by Towndrow and W. H. Painter, and adds that it “has occurred in a few instances where evidently introduced with seeds.” Its occurrence at old lime kiln sites, for example at



Subsp. *flavescens*

*Trisetum flavescens* in Llanwnnen churchyard SN533473, July 1983



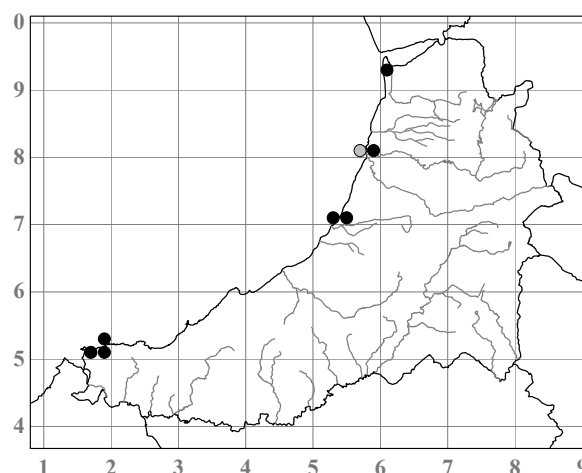
Penyrangor, Aberystwyth SN581808, 1937 (Salter, Wade 1952) - 2008, at Aberstringell SN519684, 1976 (NMW) - 2004, and at Penbryn SN294525, 1981, does suggest that these populations at least may be introductions, imported with limestone from Pembrokeshire or elsewhere, but as it also occurs in many pastures and hay meadows, and in no fewer than ten graveyards, it seems likely to be native at least in much of the county. It occurs on mortar-rich spoil at the Cwmsymlog lead mine SN699837, 1993-2005. It is surprising that Salter missed these sites, but it would be more surprising if the plant had spread so much since his day although it did seem to increase somewhat in the mid 1990s when there were notably dry summers. Its occasional occurrence in farmyards probably originates from brought-in hay, for example at Pantygourych, Llangeitho SN62446116, 2006, and at its altitude limit 345m, the deserted Blaenmyherin farm SN800796, 1991 (NMW).

Subsp. **purpurascens** (DC.) Arcang.

This rather weakly characterised subspecies is native of C and E Europe, and is increasingly being sown in Britain. It has so far been found in the county only on a grass slope that had been reseeded c.1990 by a pond at Gwernydd, Llangoedmor SN213454, 1997 (NMW, CGE, AOC & LRG).

**Koeleria macrantha** (Ledeb.) Schult. (*K. cristata* auct. non (L.) Pers., *K. britannica* (Domin ex Druce) Ujhelyi) - Crested Hair-grass - Cribwellt

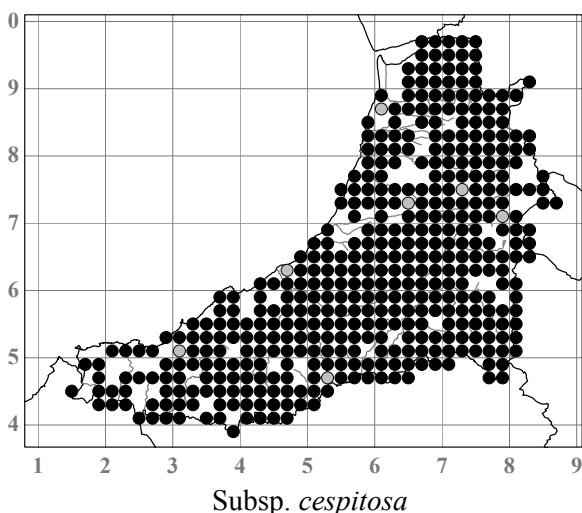
A rare plant of dry rocky, sandy and grassy places along the coast, from Ynys-las where it was recorded on the fixed dunes SN69B, 1958 (EHC) and on a sandy road verge SN607932, 1991 (NMW), to clifftop grassland at Gwbert SN16015035, 1954 (EWBHM-R) - 1997. The earliest records are in Morgan (1849) and Watson (1883, citing an Atwood specimen, i.e. 1854). Material from grassy shingle on Tan-y-bwlch beach, Aberystwyth SN580801, 1929 (K, CEH) was named as *K. britannica* forma *pygmaea* Domin by J. Ujhelyi, but this species is no longer recognised as distinct; it grew there until at least 1980, and still grows nearby on a pathside clifftop behind Bay View, Penyrangor SN58038070, 1977-2008 (NMW).



**Deschampsia cespitosa** (L.) P. Beauv. - Tufted Hair-grass - Brigwellt Garw

Subsp. **cespitosa**

An abundant grass of damp pastures, Alder and Willow carr and wet woodlands of all sorts, streamsides and, especially in the uplands, banks and verges. It flourishes in sites with impeded drainage or a variable water table, and is generally unpalatable to stock. Salter (1935) described it as "A characteristic grass of the rough, undrained, upland country" and, although drainage may now have reduced it to some extent, it is still very widespread here. Material from slope Alder carr in the Llyfnant SN712973, 1987 (APF) was counted as tetraploid by HAMcA (pers. comm.), as were plants from a range of sites in and around upland FC conifer plantations in the Nant-y-moch and Llyn Pendam area by Rothera & Davy (1986). Very distinctive dwarf plants with stiff, inrolled leaves 6-10cm long occur on wet rock ledges above Llyn Llygad Rheidol SN7987, at 500-640m altitude, 2002 (NMW). In 1990 a large population of very robust plants in intermittently flooded pasture by the Cwm Rheidol Reservoir SN706792 had viviparous inflorescences (SPC), but in at least a few other years normal florets were produced here; Conert (1987) mentions flooding as being correlated with vivipary in a related species, *D. littoralis*, in C Europe. The only other reference to vivipary in the county is by Evans (1804), who records "aira caespitosa with a viviparous panicle" from the Teifi Pools area SN76Y. Altitude limit 685m, above Llyn Llygad Rheidol, 1926 (Salter Diary 19.8.1926); 640m, ditto SN79468721, 2002.



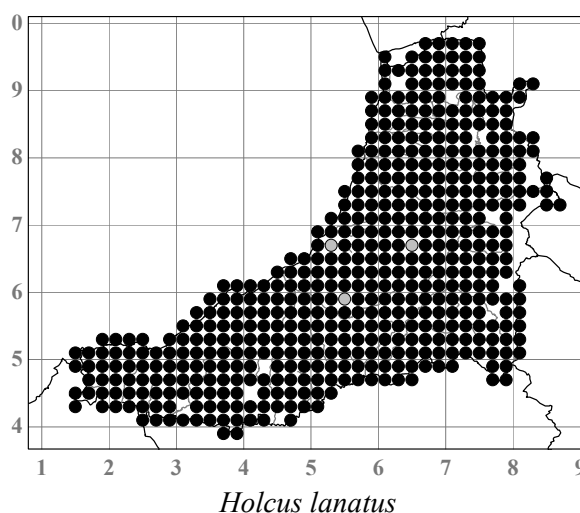
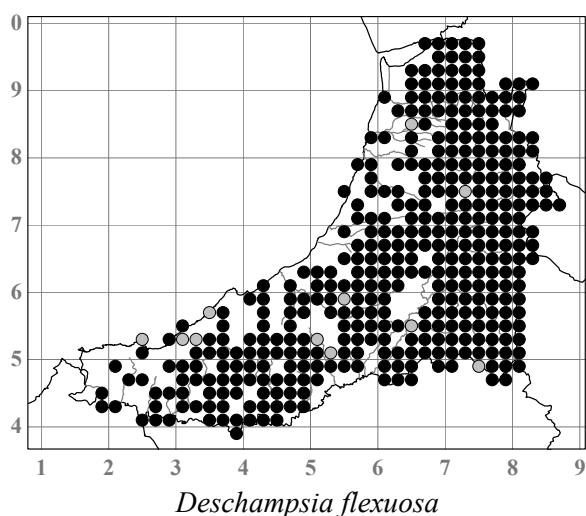


Subsp. **parviflora** (Thuill.) Dumort.

This subspecies is surprisingly rare, and almost all of the many plants from ancient and other damp woodland investigated have proved to be subsp. *cespitosa*. The only records are from periodically flooded Oak/Ash ancient woodland by the Afon Teifi, 1km SW of Llechryd Bridge SN209430, 1998 (NMW); in Alder carr by the Afon Wyre 200m S of Lledrod church SN645700-645699, 1999; and from damp woodland on clay 300m WNW of Glanrhyd, Trebedw SN361414, 1999. Plants from slope Alder carr by the Llyfnant SN714974, 1997 (NMW), near to the tetraploid plants mentioned above under subsp. *cespitosa*, have the lower spikelets of the inflorescence like those of subsp. *parviflora* and the upper ones like subsp. *cespitosa*.

**Deschampsia flexuosa** (L.) Trin. - Wavy Hair-grass - Brigwellt Main

Very common in dry, acidic grasslands and heaths, in Sessile Oak and Birch woodlands, on rocks and screes and on banks. On steep slopes in woodland it can be dominant and strongly tussock-forming but often does not flower. It is often equally dominant, but flowering, in felled conifer plantations. It is much less common on cliffs and screes on the coast than on those inland, and the map shows its general absence from the coastal zone. Altitude limit 735m, Pumlumon c. SN7886 (Salter 1935); 750m, SN789869, Pumlumon Fawr summit, 2002.



**Holcus lanatus** L. - Yorkshire-fog - Maswellt Penwyn

Very widespread and common in most sorts of grassland, often becoming abundant or dominant in damp, fertile hay meadows and pastures. 'S.132' was a robust, multi-tillered strain developed by the WPBS for use on the hill improvement schemes, and established itself very readily at sites from 270-450m altitude (Stapledon 1933). Plants lacking anthocyanin are common and their inflorescences may be whitish or pale greenish. Var. **soboliferus** DuRoi, laxly tufted and with long rhizomes, and distinguishable from *H. ×hybridus* among other characters by its good pollen, has been seen by a footpath in *Quercus petraea* woodland 800m SE of the Rheidol Falls SN713783, 2000. Altitude limit 390m (Salter 1935); 750m, hollow in summit cairn, Pumlumon Fawr SN78978692, 2002.

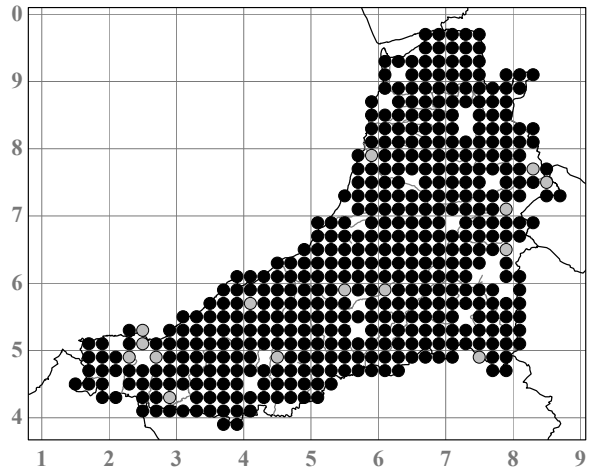
**Holcus ×hybridus** Wein (*H. lanatus* × *mollis*)

Recorded from "near Cwm Rhuddnant" c. SN77Y by Carroll & Jones (1962); Jones (in Stace 1975) says the site was "at the edge of a wood", in an open habitat, with both parents present. The only other record is from an open pasture, again with both parents, where the hybrid formed a patch c. 70cm in diameter, on the S side of the Afon Rheidol 200m SSE of the Rheidol falls SN710786, 2000 (NMW); the anthers were indehiscent and the pollen 95% sterile.

**Holcus mollis** L. - Creeping Soft-grass - Maswellt Rhedegog

A common grass of several very diverse habitats. It is often dominant in dry, acidic *Quercus petraea* woodland, under Bracken on the coastal slopes and in the uplands, and on dry banks in the open, but is also abundant or dominant in acidic flushes and on wet cliffs in the uplands. It is common too in damp pastures and marshes, on hedgebanks, streamsides, road verges and in many other habitats. This occupancy of such a range of habitats is at least to some extent correlated with the occurrence of four ploidy levels, investigated by

Jones (1958) from 14 sites in the N of the county (among other areas of Britain). He recorded chromosome numbers of  $2n = 28, 35, 42$  and  $49$ , and found a general prevalence of the pentaploids which were adapted to a wide range of habitats but which, along with the hexaploids, did especially well in wetter sites, the pentaploids for example thriving in the *Sphagnum* flushes on Pumlumon; the tetraploids were in drier habitats, and were the only ploidy level for example in the Penglais woods SN5982. His only British records of the heptaploids were from Oak woods at 210m altitude at Parson's Bridge SN77P and Devil's Bridge SN77I or N. Apart from this cytological variation, there is great variation in several morphological characters, and to what extent the two are correlated is uncertain. A remarkably robust clone in Eglwys-fach churchyard SN685955, 1977-2004 (NMW), has stems c.1.5m tall and leaves 12-16mm wide. Altitude limit 640m, wet cliffs above Llyn Llygad Rheidol SN79368723, 2002.

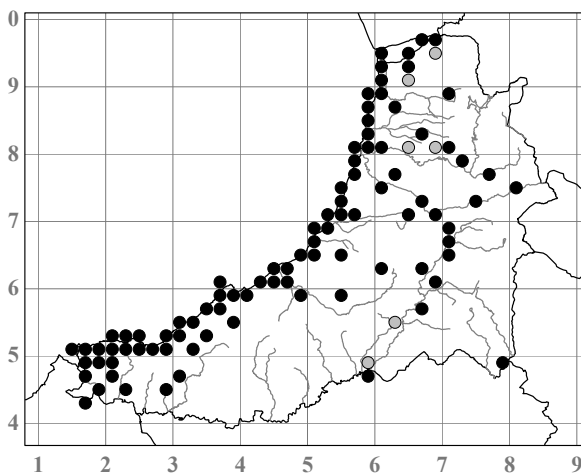


**Aira caryophyllea** L. - Silver Hair-grass - Brigwellt Arian

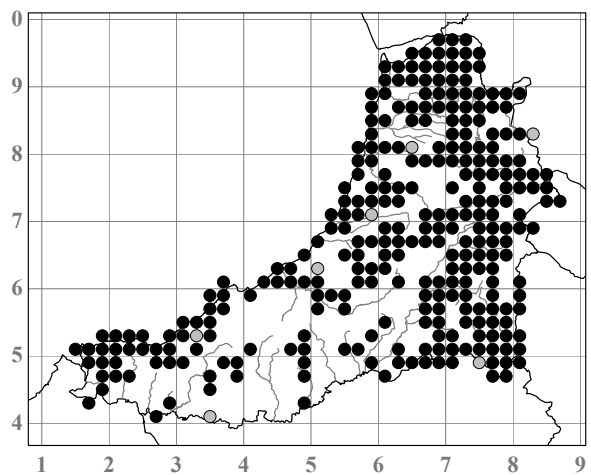
Subsp. **caryophyllea**

Common on dry, often sandy or gravelly places, chiefly near the coast and where the thin soil has a slightly higher pH, especially on dunes, rock outcrops, eroded slopes or banks, pathsides and on anthills, often with *Thymus polytrichus*. Inland it is uncommon, and most often seen on railway ballast. An unusual record was from a dry mound in rhos pasture at Rhos Fullbrook SN667629, 1991 (SPC). It has not been seen above 240m altitude, at a FC picnic site above Trefilan SN552587, 1991 (NMW).

Subsp. **multiculmis** (Dumort.) Bonnier & Layens (var. *aggregata* Timeroy ex Jord.) was recorded from "Aberystwyth district" in 1906, as var. *aggregata*, by Towndrow (1907). It has been noted since only on the ballast of the railway along the Dyfi estuary from Ynys-las SN617930, 1991 (NMW) to Glandyfi SN695971, 1992; and on a pathside NW of the Science Park, Llanbadarn Fawr SN597813, 2004 (SPC, Herb. SPC).



*Aira caryophyllea*



*Aira praecox*

**Aira praecox** L. - Early Hair-grass - Brigwellt y Gwanwyn

Common in dry, open habitats such as banks, walltops, anthills in pastures, mine spoil, rock outcrops, tracksides, from acidic exposures in the uplands to screes and dunes on the coast, often with *Rumex acetosella* and *Sedum anglicum*. Generally more calcifuge than *A. caryophyllea* but often growing with it. Altitude limit 590m, track verge, Pen y Garn SN800770, 2002.

**Anthoxanthum odoratum** L. - Sweet Vernal-grass - Perwellt y Gwanwyn

Abundant and widespread in many types of grassland, from lowland pastures and mown sites such as graveyards to upland blanket bogs and sheepwalks, but absent from the wetter sites. It is common in open

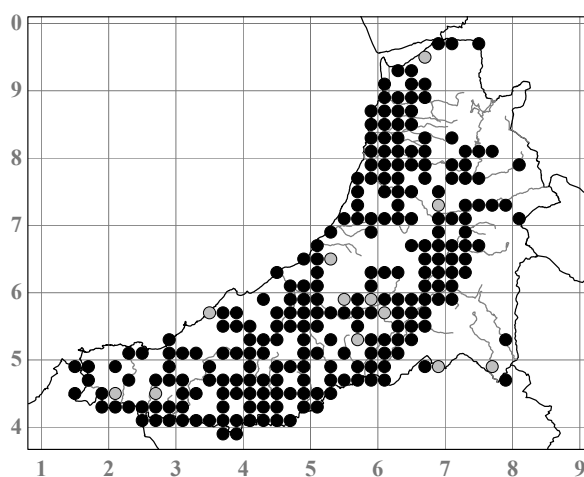
woodland, and rapidly colonises felled conifer plantations and burnt areas. ‘S.64’, a robust strain developed at the WPBS in the 1930s, was grown on upland, peaty soils in the hill improvement schemes where it was “wonderfully early and even in April was providing very appreciable grazing at over 1,300ft [395m]” (Stapledon 1933); doubtless it is still present in the uplands. Altitude limit c.750m, summit of Pumlumon Fawr SN789869 (Salter 1935); 730m, Pen Pumlumon Arwystli SN815877, 2002.

### ***Phalaris arundinacea* L. - Reed Canary-grass - Pefrwellt**

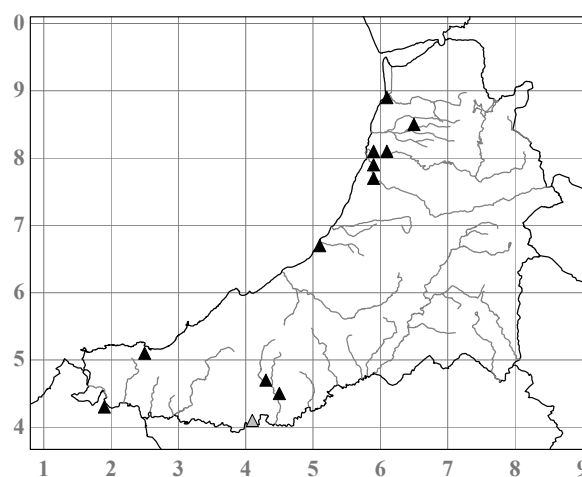
A frequent grass usually forming dense stands in marshes, ditches, at the edges of ponds and streams, and on shingle shoals and shingle margins of rivers, but generally absent from peaty soils. It often occurs by streams close to the sea where there is some brackish influence, and it extends well into the uplands. Flourishing colonies are also perhaps surprisingly often seen on dry roadside banks, for example by the A487(T) 800m NE of Synod Inn SN407550, c.1970-2008, at the W end of Brynhoffnant SN32855121, 2005, and 300m N of Henllan station SN35634104, 2003 (AOC & RM). Altitude limit 475m, locally dominant in marsh on SW side of Llyn y Ffyn SN812704, 1989.

The species has recently been used in biomass trials by IGER/IBERS at Gogerddan SN623838, 2003-2009, and currently a dozen accessions propagated by seed are being tested, including several of local origin within the county. The variety ‘S.230’, derived by the WPBS from *P. arundinacea* × *aquatica* L. and first released in 1946, is being trialled alongside them (JV). ADAS Pwllpeiran is also trialling *P. arundinacea* at Llwynprenteg, Llanafan SN68737160, 2005-2008, and elsewhere.

Gardener’s Garters (Rhuban Llundain, Rhuban y Bechgyn), the invasive cultivar ‘*Picta*’, is occasionally naturalised from throw-outs; it was first noticed on waste ground at Penrhyn-coch SN641840 in 1993 and has since been found established at half a dozen other sites, including a heathy roadside verge 800m N of Pen Garn-wen SN374502 at 300m altitude.



*Phalaris arundinacea*



*Phalaris canariensis*

### ***Phalaris canariensis* L. - Canary-grass - Pefrwellt yr Adar**

An occasional casual, recorded by Salter (1935) as “Of annual occurrence at the municipal rubbish-tip, Aberystwyth [SN591811], and often abundant”. Its recent occurrences probably mostly derive from bird-seed, and it has been seen at about 20 sites since 1970, mostly in towns and villages.

### ***Agrostis* L.**

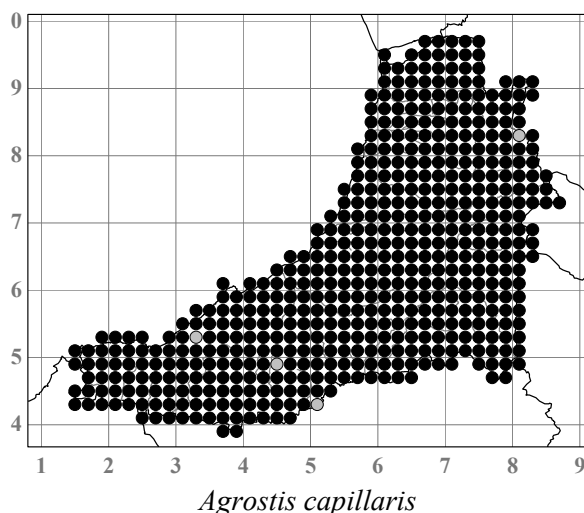
It is often virtually impossible to identify plants of *Agrostis* to species, especially in the many cases where members of the *A. capillaris/gigantea/stolonifera* group are tufted, lack both stolons and rhizomes, and have intermediate ligules. Hybrids have certainly been under-recorded. Philipson (1937) used material from the county in his revision of the genus, and Bradshaw (1959a, b) in his extensive experimental work on *A. capillaris* used material from 28 sites in the county and carried out transplant experiments at several sites.

### ***Agrostis capillaris* L. (*A. vulgaris* With., *A. tenuis* Sibth.) - Common Bent - Maeswellt Cyffredin**

Very common in grasslands, especially the drier, more acidic and nutrient-poor sorts, and often co-dominant with *Nardus* and *Festuca ovina* in the upland sheepwalks. A dwarf form is common on the grey dunes and in the dune slacks at Ynys-las SN609939 etc., 1990 (NMW), but Bradshaw (1959a) has demonstrated the



impracticality of recognising formal infraspecific variants in this species. Bradshaw (1952) also described a population of small, slow-growing plants resistant to lead and zinc poisoning from the Goginan lead mine SN691819, contrasting it with non-resistant plants growing in pasture only c.100m away, demonstrating on how small a scale ecological differentiation could occur. In later papers (1959b, Gregory & Bradshaw 1965), these and other transplant experiments, involving populations from the Goginan and Frongoch SN723745 mines and elsewhere, were used to show that this resistance was clearly a genetically determined character.



Dwarf, early-flowering, tufted plants, usually seen in open habitats and especially common on upland FC road verges, are infected by the smut *Tilletia sphaerococca* and were described by Linnaeus, in ignorance of their origin, as a separate species, *A. pumila*; this was presumably the “dwarf form” brought to Salter three weeks before he died by T. Stephenson from Ponterwyd (Diary 15.7.1942). Altitude limit 750m, Pumlumon Fawr summit SN789869, 2002.

***Agrostis* × *bjoerkmanii*** Widén (*A. capillaris* × *gigantea*)

Bradshaw (1959a) reported that a population of *A. capillaris* “at Llety-Evan-Hen near Talybont, Cards. [SN68X], was found to contain hybrids with *A. gigantea*”, and that this was corroborated by a chromosome count of  $2n = 35$ . It is otherwise recorded in Britain only from Cambridgeshire and South-east Yorkshire.

***Agrostis* × *murbeckii*** Fouill. (*A. capillaris* × *stolonifera*)

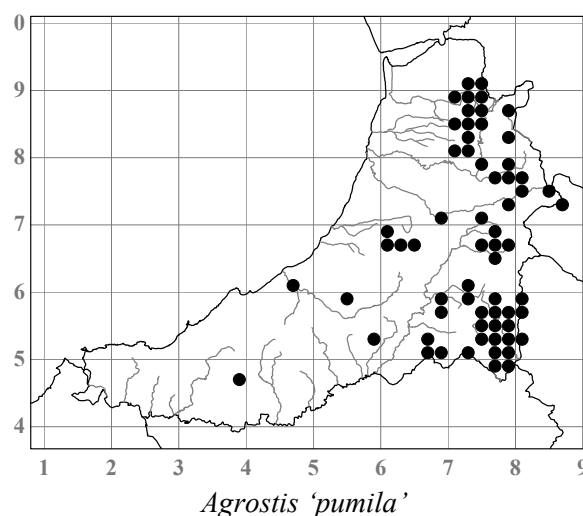
Apart from a 1950s record “on the Rheidol meadows near Aberystwyth” c.SN68A (Bradshaw 1958, 1959a), there are only three records: on river shingle at Llanfarian SN589777, 1997 (SPC), in a lawn below the University School of Art, Aberystwyth SN587815, 2000, and on a pathside on Constitution Hill, Aberystwyth SN584827, 2006 (NMW, AOC & JPP).

***Agrostis gigantea*** Roth (*A. alba* auct. pro parte, non L.) - Black Bent - Maeswellt Mawr

A frequent archaeophyte weed of arable fields, tracksides, disturbed ground and gardens, not seen above 280m, and especially common in spring Barley fields along the coast. Salter did not distinguish it from



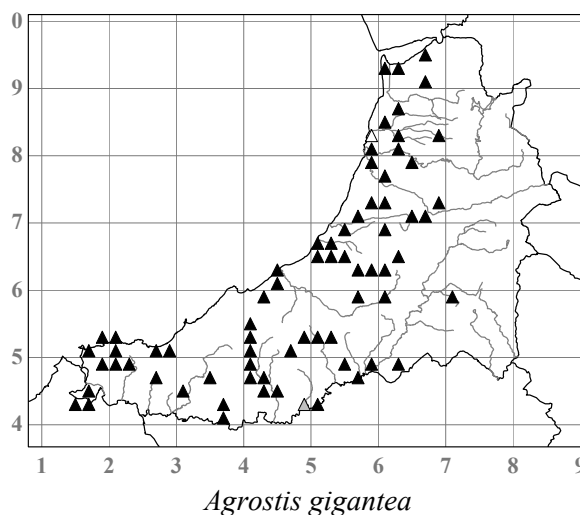
*Agrostis capillaris* flowering on top of a fencepost, Llanddewi-Brefi, August 2008



*A. stolonifera*. A stoloniferous form sometimes occurs, as in Cwm Berwyn SN702594, 1988 (NMW, conf. EJC), and this is probably the same as the var. *dispar* recorded by Philipson (1937) from Aberystwyth c. SN58V (K, CEH) now considered of no taxonomic significance. Altitude limit 300m, abandoned vegetable patch, Tynygwndwn, Llanfair Clydogau SN63344963, 2009.

***Agrostis castellana* Boiss. & Reut. - Highland Bent - Maeswellt y Lawnt**

The true plant, with pubescent lemmas in the terminal spikelets, has been found at only three sites. It persisted for at least 8 years in grassland sown in 1993 on an embankment by Pont Glanyrafon SN610805, 2000 (NMW); several plants were seen in 2004 on recently reseeded verges that had been partially sown as grassland in 2000 by the roundabout at Ysgol Penweddig, Llanbadarn Fawr SN59508120; and it was locally dominant in 2007 on verges reseeded c. 1995 by the Parc-llyn roundabout nearby SN596805. It is native of the Mediterranean.



***Agrostis stolonifera* L. (*A. alba* auct. pro parte, non L.) - Creeping Bent - Maeswellt Rhedegog**

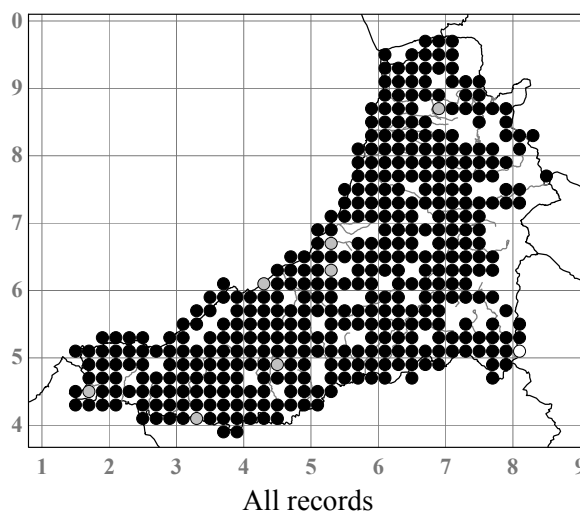
Very common in damp or wet places, especially in rather open vegetation, often in pools and ditches and thriving where these are eutrophicated. The following varieties may have little taxonomic significance, but they appear at least as well defined as the subspecies of *Festuca rubra* in the field and are similarly ecologically distinctive.

Var. **stolonifera** is more or less ubiquitous, except in the wetter and more brackish sites. Altitude limit 750m, Pumlumon Fawr summit SN789869 (Salter Diary 5.9.1932); 690m, 300m N of summit SN790872, 2002.

Var. **marina** (Gray) Kerguelen is locally dominant in the upper parts of the salt marshes in the Dyfi SN69 and Teifi SN14 estuaries, in the developing salt marsh at Tan-y-bwlch SN578797, 1995-2004 (NMW) and elsewhere, and in the spray zone on sea cliffs, combining the ecologies of *Festuca rubra* subspp. *junceae* and *littoralis*. Philipson (1937) recorded it from Ynys-las SN69 as “*ecas salina*” (K). It is also used in lawns, and in golf course greens as at Borth SN69A, B, 1994.

Var. **maritima** (Lam.) W. D. J. Koch was recorded by Salter (1935) from “sand-dunes of the coast.” Plants answering to the description of Conert (1989), with few, short stolons, erect culms and short, dense inflorescences, occur in abundance in the dune slacks at Ynys-las SN69B, C, 2004 (NMW). Sell & Murrell (1997) define var. *maritima* very differently, with long stolons and oblique culms, and such plants are abundant on damp shingly mud in depressions behind the sea beach in the parking area W of the Ynys-las T-junction SN605925, 2006 (NMW, AOC & JPP). Philipson (1937) recorded it from Borth as “*ecas arenaria*” (K), and mentions a specimen with unusual short-awned lemmas.

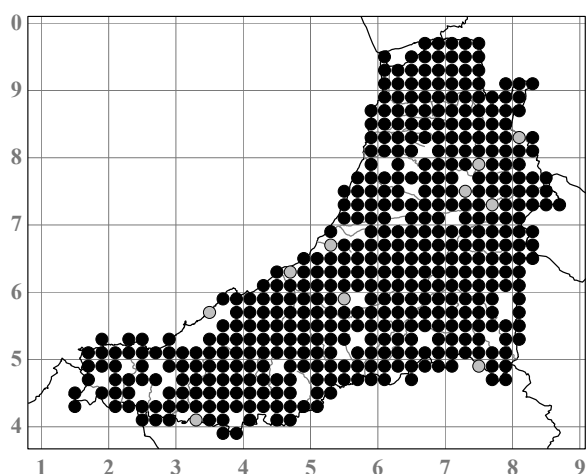
Var. **palustris** (Huds.) Farw. (var. *latifolia* G. Sinclair) is widespread and abundant in ditches, wet fens and swamps and at the edges of streams and ponds, and is assumed to be the plant selected and introduced to agriculture under the name of Fiorin in the early 19<sup>th</sup> century by the Irish agriculturist William Richardson (Armstrong 1948). Influenced by Richardson, Thomas Johnes in 1812 determined to establish a considerable area of *A. stolonifera* at Hafod largely by planting stolons, and wrote optimistically to J. E. Smith that he was



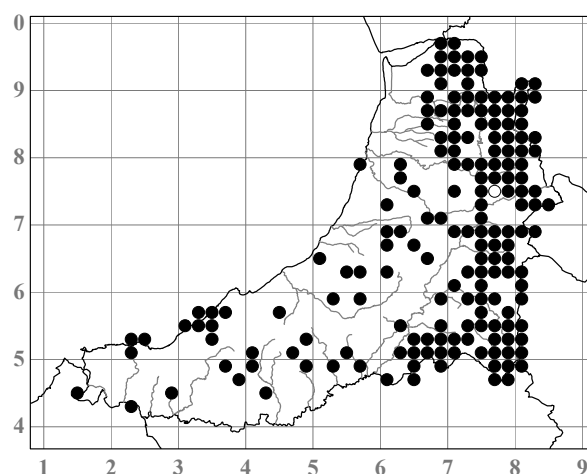
“more and more convinced that it will prove the most beneficial discovery that has been made and all travellers will stop and look at what plantations I have made of it on the road side. It more resembles fine healthy wheat about 3 months old than grass, and the Cattle, who first made me acquainted with its virtues by their greediness in seeking for & devouring it, now eye it with longing Eyes. I shall sow in October & November and I hope by the end of next year to have nearly a hundred acres of it” (letter of 5.7.1812 at the Linnean Society, and Moore-Colyer 1992, pp.32, 275, 278, 281).

***Agrostis canina* L. - Velvet Bent - Maeswellt y Cŵn**

An abundant grass of damp, acidic, often waterlogged grassland, blanket bogs and valley mires, ditches and streamsides, widespread especially in the uplands, characteristically forming dominant mats with axillary rosettes on the stems that root at the nodes. Surprisingly it is occasionally dominant on dry slopes under *Quercus petraea*, as in the Arth dingle SN49426265, 1991 (NMW) or under conifers, as at Lodge Park SN665932, 1996 (NMW). Altitude limit 740m, bog 30m E of Pumlumon Fawr summit SN78998690, 2002.



*Agrostis canina*



*Agrostis vinealis*

***Agrostis vinealis* Schreb. - Brown Bent - Maeswellt-y-cwn y Mynydd**

Common and sometimes co-dominant in mostly dry, acidic pastures and heaths, the drier blanket bogs and in rocky places and on banks, especially in the uplands but extending down to the sea cliffs in places. Not recognised in the county until 1988, although the *Agrostis canina* var. *arida* Schldtl. recorded by Philipson (1937) from Pwll Peiran SN7774 (K) was probably this species. Altitude limit 690m, N of Pumlumon Fawr summit SN790872, 2002.

***Agrostis scabra* Willd. - Rough Bent - Maeswellt Garw**

Only recorded in Llangwryfon old churchyard SN597706, 1987 (NMW, PM, det. CAS). Native of North America.

***Calamagrostis epigejos* (L.) Roth - Wood Small-reed - Corsen Fach y Coed**

A rare grass, forming large, dense colonies at four sites on the coastal slopes. Opposite Llanddeiniol SN546723 the colony is 40 × 5m, 1992; E of Pen Peles SN225519 it is 30 × 10m, 1994; W of Mwnt SN190516 it is 80 × 25m, 1985 (NMW) - 2006; and at Gwbert SN162492 there is a colony in dense *Phragmites*, 1999-2005. The only other site is in a pasture near Coedmore SN203434 where it was found, for the first time in the county, in 1977 (NMW, SBE & DGJ) and where the main colony was 24m in diameter, with several smaller outliers, in 1999.

***Ammophila arenaria* (L.) Link - Marram - Môr-hesgen**

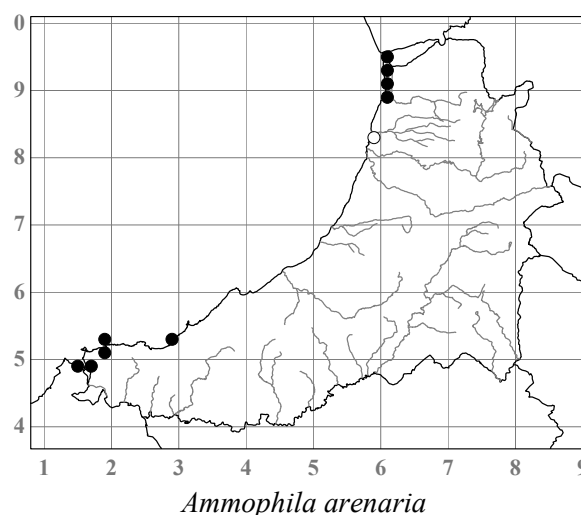
Dominant over most of the dunes at Ynys-las SN69B, C, 2005, at Traeth Penbryn SN292524, 2005, at Traeth y Mwnt SN194519, 2005, and at Penyrergyd SN14U, 2005. At Ynys-las there have been frequent planting programs in order to stabilise parts of the dunes, and during the late 1990s a new *Ammophila* dune developed naturally at the NE tip of Twyni Bach SN609946. There is a colony on the railway ballast S of Borth Station SN609898, 1991 (APF). At Penbryn it grows on blown sand high up on the cliffs as well as on the small area



of dune. The Mwnt colony covers c.0.4ha, on sand on the clifftop above the E side of the bay. At Penyrergyd *Ammophila*, as well as covering the dunes, extends far up the slope where sand covers the till deposits. Formerly at Clarach SN585838, but gone by 1935 (Salter 1935).

[*Mibora minima* (L.) Desv. - Early Sand-grass - Eiddilwellt Cynnar

By some strange confusion this sand dune grass was described in Evans (1804) under its basionym *Agrostis minima* as being among several grasses flourishing “to a prodigious degree on mountains around Llanddewi-Brefi”; EJC (pers. comm.) points out that what he saw was probably the common dwarf, smutted plants of *A. capillaris* (*A. pumila* L.).]

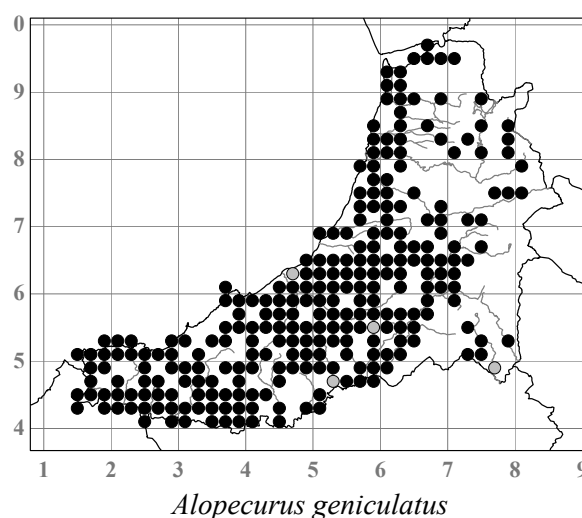
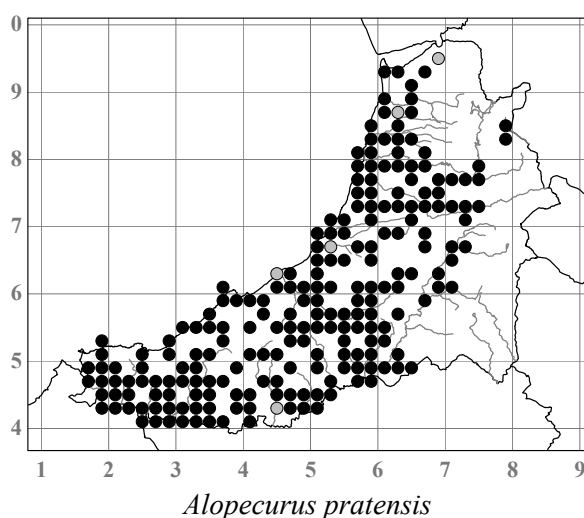


**Polypogon monspeliensis** (L.) Desf. - Annual Beard-grass - Barfwellt Unflwydd

A rare casual, a few plants having been seen on the Borth rubbish-tip SN612893 in 1993 (NMW), and on dumped soil and rubble in the IGER fields, Gogerddan SN622835 in 2002 (NMW). Native of much of the Old World.

**Alopecurus pratensis** L. - Meadow Foxtail - Cynffonwellt y Maes

Common in usually moist, fertile pastures and hay meadows where it has often been sown as a constituent of seed-mixes, in graveyards, at wood margins, on verges and waste ground, but rare in the uplands. Altitude limit 410m, Eisteddfa Gurig SN797840, 1993.



**Alopecurus geniculatus** L. - Marsh Foxtail - Cynffonwellt Elinog

Common in waterlogged pastures, on floodplains, by tracks, ditches and muddy gateways and pond margins, often in brackish marshes, never in shaded places, and rare in the uplands. Altitude limit 430m, Nant Nod SN794841, 2002.

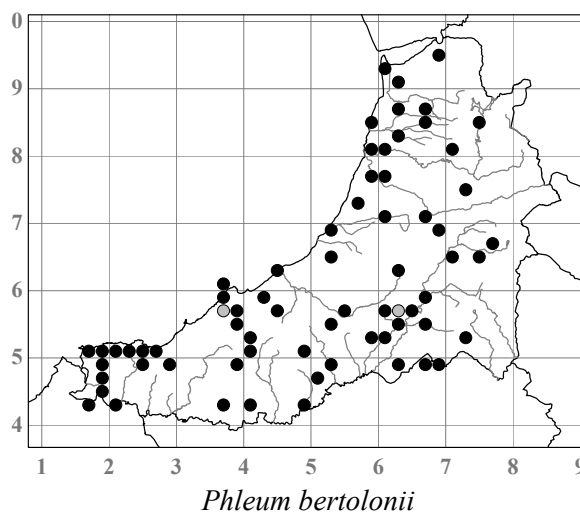
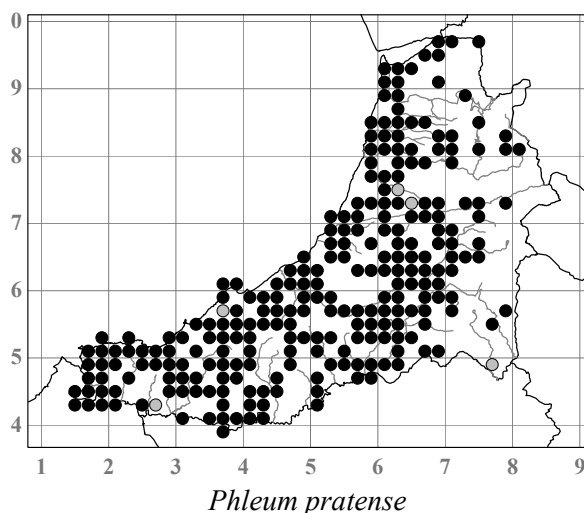
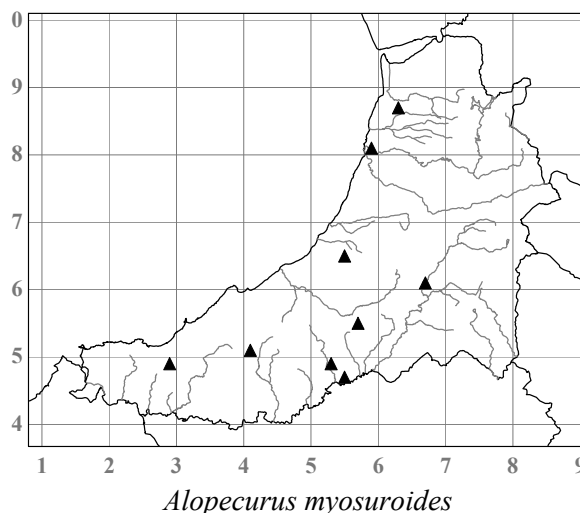
**Alopecurus myosuroides** Huds. (*A. agrestis* L.) - Black-grass - Cynffonwellt Du

A rare casual archaeophyte recorded from nine sites since 1993: on a building site, Llandre SN626871, 1993 (NMW); by a manure heap at Felin-y-mor, Aberystwyth SN58138025, 2006 (AOC & JPP); in a disused market garden, Nebo SN547658, 1993 (NMW); on a rubble tip, Pont Einon SN672612, 1993 (NMW); in Rhiwonnen farmyard, 3km ESE of Talsarn SN570547, 2008; by the Teifi at Dolaugwyrdon-isaf SN5546, 2004 (DB); on a roadside verge, Llanwnen SN531482, 1999; at Tan-y-groes SN24Z, 1997; and in a parking area, Llawr-cwrt SN41605005, 2003. The only early record was an unlocalised one for the county by a

Mr Wilson in 2<sup>nd</sup> report, *UCW Scientific Society, Aberystwyth 1893-1894*: 10 (1894) as *A. agrestis*, but it is not given in Salter (1935).

### **Phleum pratense** L. - Timothy - Rhonwellt

Although first sown in Britain as a pasture grass in the 18<sup>th</sup> century using seed imported from North America (Beddows 1969a), the early agricultural writers seem not to mention Timothy in the county. It must have been widely used in seed-mixes though in the 19<sup>th</sup> century, and is now a common and occasionally even dominant grass of hay meadows and pastures throughout the county, extending well into the uplands; it also occurs on verges, waste ground, in graveyards, lawns and in many other habitats. In the 1930s the WPBS released several strains of it, including a hay strain 'S.51' developed from a local plant; the pasture strains 'S.48', developed from plants from a Dorset pasture, widely grown for at least the next 60 years and one of the longest-used of all the 'S' varieties, and 'S.50' developed from plants from the Midlands and Kent (Stapledon 1933); and many newer strains that are now widely sown in mixes. The great variability now seen in Timothy must reflect this long history of introduction and breeding. Intermediates with *P. bertolonii* are often seen, but are not yet proven to be hybrids. Whether any of the forms are native anywhere in the county is uncertain. Altitude limit 540m, reseeded sheepwalk, Cefn Blaenmerin SN811809, 1993.



### **Phleum bertolonii** DC. (*P. pratense* L. var. *nodosum* auct.) - Smaller Cat's-tail - Rhonwellt Penfain

A frequent grass of unimproved pastures, but also often at the margins of arable fields, on tracksides and even in lawns. It was first recorded from Aberystwyth (WHP, Salter 1935), presumably in 1903-1906. Altitude limit 340m, frequent in damp grassland S of road 600m S of Bryn Carregog, Pysgotwr Fawr valley SN720526, 2008 (AOC & JPP).

### **Phleum arenarium** L. - Sand Cat's-tail - Rhonwellt y Tywyn

A locally abundant winter annual on the Ynys-las dunes SN69B, C, 1849 (Morgan 1849) - 2008, where it occurs chiefly on the seaward side on the semi-consolidated sand among open growth of *Ammophila*, among other annuals or even in sandy grassland as at SN60629245, 1994 (AOC & KH). Morgan (1849) recorded it from Clarach SN5883 as well. It also occurs at Penyrergyd at several places on the dunes c.SN161486, 1904 (Salter Diary 18.6.1904) - 2005, but usually only in small quantity.

### **Glyceria maxima** (Hartm.) Holmb. (*G. aquatica* (L.) Wahlenb.) - Reed Sweet-grass - Melyswellt y Gamlas

Recorded for the county by a Mr Wilson in 2<sup>nd</sup> report, *UCW Scientific Society, Aberystwyth 1893-94*: 10 (1894), without locality. The first localised record was by Salter in 1927 (Diary 25.6.1927) from Falcondale



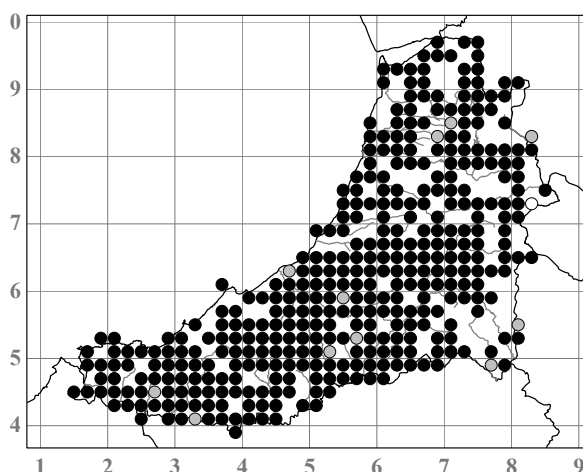
*Glyceria maxima* fringing Falcondale Lake,  
view E from SN568498, May 2007

Lake SN570501, when he wrote that “The tall ‘sedge’ is *Glyceria aquatica*”, implying that he had seen it before, perhaps on his only previous recorded visit in 1925 (Diary 30.5.1925) when he first discovered the lake. *G. maxima* is still abundant there, forming a zone 3-10m wide round much of the margin, and it was probably originally introduced; the lake is artificial and was constructed some time between c.1850 and 1885. In all its other sites it is certainly introduced: ponds on the RSPB Reserve, Ynys-hir SN683967, 2004, where plants from the Shropshire Canal were planted by WMC in 1972; a pond 450m N of Bwa-drain SN71478020, 2004; a field pond 300m SSW of Coed-y-cwm, Cwm Cou SN27574287, 1996; an artificial pool by Nant Cwm-du, Tywi valley SN803555, 1996 (AOC & JPW); a field pond 100m E

of Brongest T-junction SN32284532, 1999 (AOC & LRG); a pond above Felin Gernos bridge SN365440, 1999; and planted along 100m of the bank of the Afon Cerdin at Gorrig SN412431, 2000. ‘*Variegata*’ is naturalised at the N side of the Nanteos lake SN615783, 1995, and in the overgrown leat at Felin Rhiwbren SN473575, 1996. Altitude limit (naturalised) 305m, Bwa-drain, as above.

#### ***Glyceria fluitans* (L.) R. Br. - Floating Sweet-grass - Melyswellt Arnofiol**

A common plant of wetlands of all sorts, abundant in ditches, streams and lakes, often floating or forming dense stands in shallow water, in marshes, damp pastures, fens and even in quite oligotrophic upland mires and lakes where it is sometimes the only aquatic. It tolerates shade much more than *G. declinata*, but is similarly salt-tolerant. In some upland lakes it forms huge floating mats, for example at Llyn Fyrddon-fach SN796699 (NMW) where in 1989 the mat covered 1.2ha and was precariously grazed almost to the leading edge by Sheep, which would occasionally become drowned and eutrophicate the area, leading to increasingly luxuriant growth in this generally dystrophic habitat; one could fancifully imagine that in this pattern of enticement and entrapment to obtain nitrogen, *G. fluitans* was acting here as a carnivorous plant like Sundew. Altitude limit 520m, Llynnoedd Ieuan c.SN7981 (Salter 1935); 560m, mire at Rhos y Garn, Cwmystwyth SN797766, 2002.



*Glyceria fluitans* covering S third of Llyn  
Fyrddon-fach, view NNE from SN796699, July 1989

#### **[*Glyceria fluitans* × *declinata*]**

This hybrid awaits confirmation in the county. Specimens from Llyn Dwfn SN739926, 1990 (NMW), and from a ditch on Cors Fochno SN635926, 1990 (NMW), suspected of being this rare hybrid, were considered by CAS in 1999 to resemble some plants from a population of the hybrid in Buckinghamshire that he had labelled “*G. fluitans*, showing some signs of *G. declinata*”; he commented that there was a possibility that



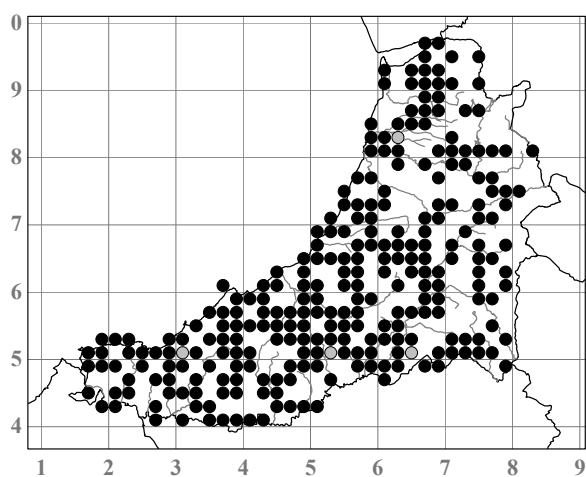
some backcrossing could occur, and just a possibility that the Cardiganshire plants had some *G. declinata* in them, and that, although they had very good pollen, they were very unusual in having tardily dehiscent anthers.]

[*Glyceria* × *pedicellata* F. Towns. (*G. fluitans* × *notata*)

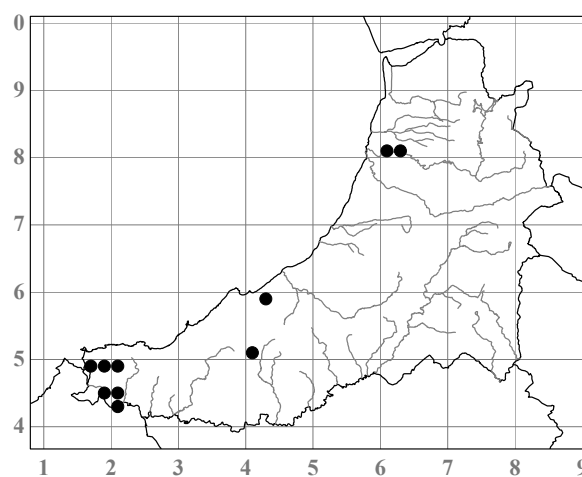
Although this very widespread hybrid has been often recorded from the county in the past, and very probably does occur, the few herbarium specimens once thought to be it are all *G. fluitans* and there are no entirely reliable field records.]

***Glyceria declinata* Bréb. - Small Sweet-grass - Melyswellt Llwydlas**

Confusion about the identity of this plant in Salter (1935) makes it uncertain when this species was first recorded in the county. It is a common plant, and the commonest *Glyceria*, of wet ruts in tracks and in field gateways, and is also common in ditches, by streams and ponds, in open or poached areas in marshy pastures and in all but the more oligotrophic mires. It is much less often found floating than *G. fluitans*, never forms such dominant stands, and often occurs in only winter-wet habitats. On the coast it is salt-tolerant and can occur in flushes in the spray zone. Altitude limit 505m, shore of Llyn Crugnant SN754612, 1989 (AOC & DD).



*Glyceria declinata*



*Glyceria notata*

***Glyceria notata* Chevall. (*G. plicata* Fr.) - Plicate Sweet-grass - Melyswellt Plysedig**

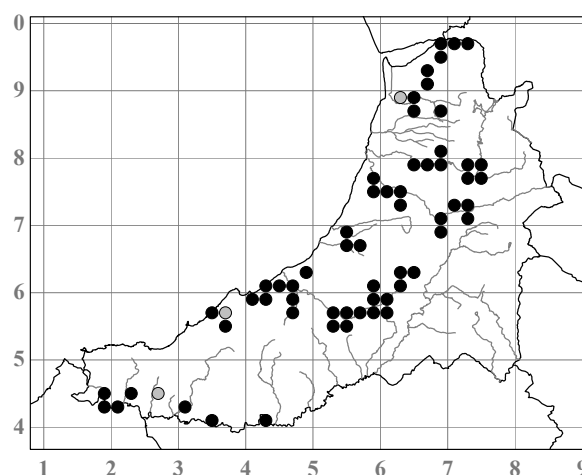
An occasional species of the lower Teifi valley, where it appears to be something of a calcicole, occurring in base-rich flushes and fens, damp areas by the sand quarries, ditches, ponds and marshy hollows. Elsewhere it has been recorded on river shingle and by the backwaters of the Afon Rheidol near Lovesgrove from SN633808, 1987 (AOC & APF) to SN618808, 1996 (DEG); by the ford on the Afon Drywi 500m NW of Pont Rhyd, Llwyncelyn SN435596, 1987; and by the ford on the Bwdram at Llawr-cwrt SN414500, 1987.

***Melica nutans* L. - Mountain Melick - Meligwellt Pendrwm**

Known only from one cliff in Allt Boeth, Ash/Oak woodland on the N bank of the Afon Rheidol, 400m downstream of the Mynach confluence SN73707733, 2006 (NMW, CMFB), where 18 plants grow with *Thalictrum minus*, *Euphorbia amygdaloides* and other calcicoles. This is on the Devil's Bridge Formation of the Silurian.

***Melica uniflora* Retz. - Wood Melick - Meligwellt y Coed**

An occasional grass of the more base-rich woodlands and shaded roadside banks, usually in areas with Ash



*Melica uniflora*

or Wych Elm, often in ancient woodland and most characteristically in the drier, rocky parts of the woods. It normally forms dense stands where it occurs, and is confined to the lowlands.

### **Bromus L.**

In the 1980s much material collected in the county was sent to P. J. O. Trist for naming. More recently L. M. Spalton has also named a great deal, and SPC took part in cultivation experiments in connection with the latter's establishment of *B. hordeaceus* subsp. *longipedicellatus*. There is considerable divergence of current taxonomic opinion about the validity of several taxa in the genus, but it has seemed most useful to retain in this account those splits for which authoritatively named specimens are available from the county.

### **Bromus arvensis L.** - Field Brome - Pawrwellt y Maes

The only record is as a casual in a field of *Lolium perenne* at the College Farm, Aberystwyth c.SN605827, 1929 (NMW, K, CEH).

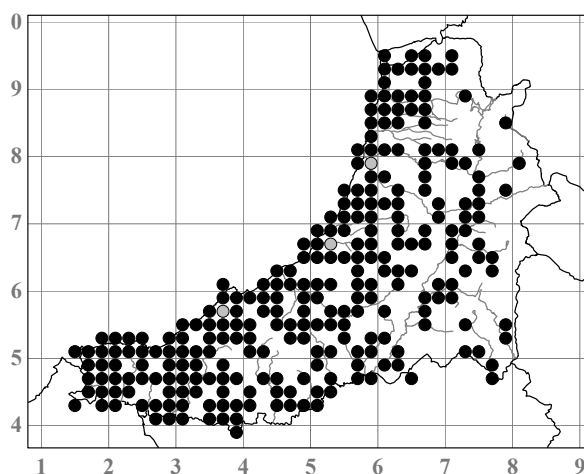
### **Bromus commutatus** Schrad. - Meadow Brome - Pawrwellt y Ddôl

Described by Salter as common, and, although he only cites one record, by Marshall (1900) from between Aberaeron and Llanerchaeron SN46Q, it has presumably decreased considerably. Apart from an unlocalised 1950s BRC record from SN56, there have only been four records since. At two sites, a disturbed bank at the Science Park, Llanbadarn Fawr SN598813, 2005 (SPC, **Herb. SPC**, conf. LMS), and on disturbed ground by Mwnt church SN195520, 1987 (NMW, det. PJOT), it is likely to have come up from a seed bank. The other two records are from winter Barley fields at Llwynysgaw SN219515, 2000 (NMW, det. LMS as var. **pubens** Watson), and nearby at SN218516 in the following year (AOC & CDP), the same variety.

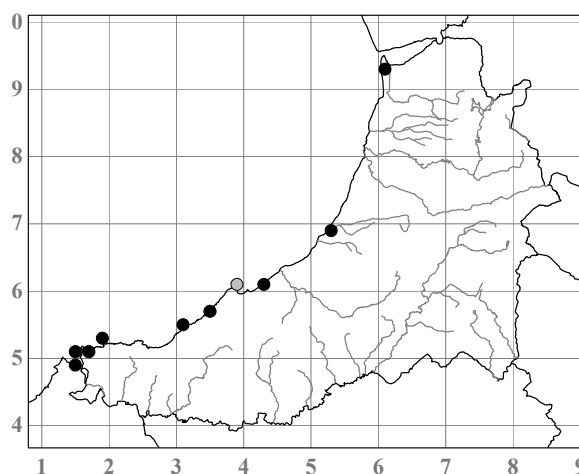
### **Bromus hordeaceus L.** - Soft-brome - Pawrwellt Cyffredin

#### Subsp. **hordeaceus**

A common annual of pastures, hay meadows, roadsides, disturbed ground, thin soils on the sea cliffs and on dunes. It is often very abundant in upland hay meadows, and is a common contaminant of seed-mixes and can be abundant in reseeded pastures. Altitude limit 540m, trackside by Pumlumon lead mine SN79508567, 2009.



*Bromus hordeaceus*



Subsp. *ferronii*

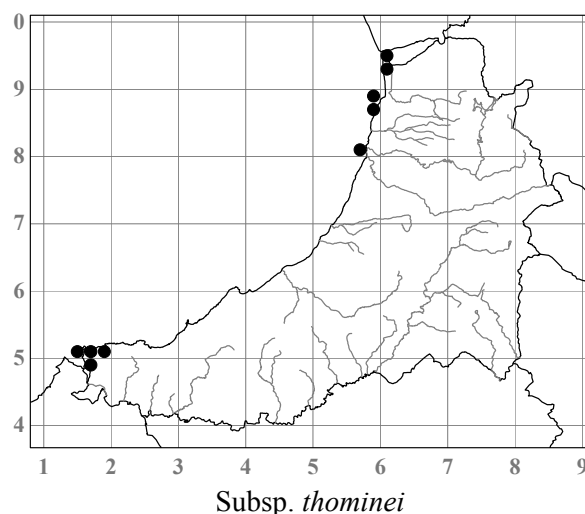
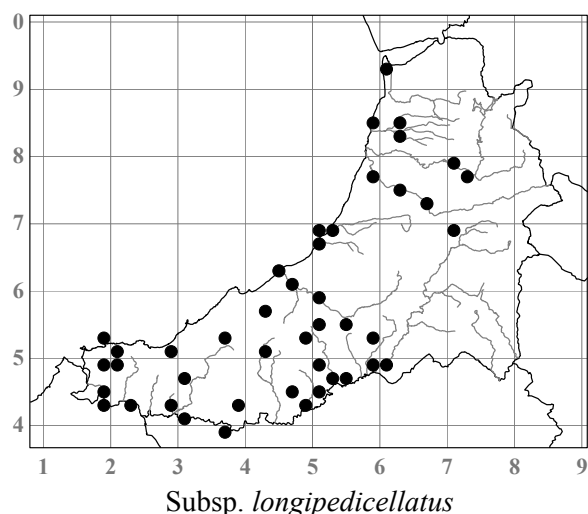
#### Subsp. **ferronii** (Mabille) P. M. Sm.

A rare coastal subspecies, characteristic of the thin, eroding soil at the top of exposed sea cliffs, for example where it was first recorded opposite Cardigan Island SN1651, 1954 (PMB, conf. AMe); between there and Gwbert SN158500-162515, 1996 (NMW, conf. LMS); at the mouth of the Afon Drywi SN426607, 1996 (NMW, conf. LMS); and at Llangranog Head SN313552, 1996 (AOC & ADH). It also occurs in the spray zone on the coastal slopes, as at Craig Caerllan SN356578, 1996 (NMW, conf. LMS), and in dune grassland at Ynys-las SN610938, 1996 (NMW, conf. LMS).

#### Subsp. **longipedicellatus** Spalton

First recorded in 1998 from the Ynys-las dunes SN606925 (NMW, conf. LMS), this recently described but doubtfully distinct subspecies is probably almost as common as subsp. *hordeaceus*, and material from just as

wide a range of habitats has been confirmed by LMS. It perhaps flowers slightly earlier, and in May can be the more frequently seen subspecies on roadside verges.



Subsp. **thominei** (Hardouin) Braun-Blanq.

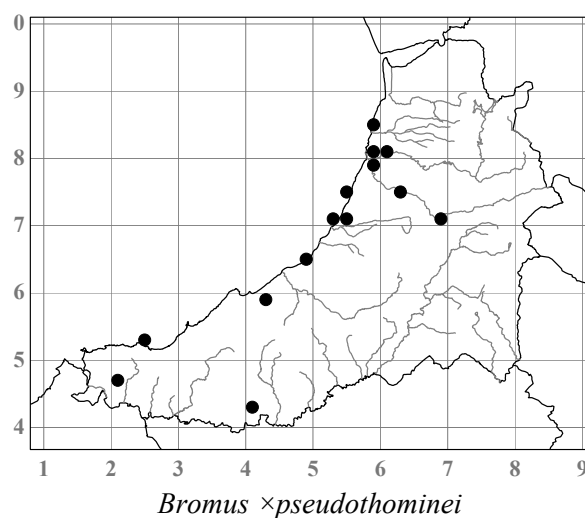
First recorded at Gwbert c.SN1649 in 1954 (PMB), specimens of this subspecies have been confirmed by PJOT, RMP or LMS from sand dunes, grassland and eroding soil on clifftops and tracksides along the coast at the two extremities of the county. It is much more characteristic of sandy habitats than is subsp. *feronii*.

**Bromus** × **pseudothominei** P. M. Sm. (*B. hordeaceus* × *lepidus*) - Lesser Soft-brome - Pawrwellt Min y Ffordd

Now considered merely a form of *B. hordeaceus*, this supposed hybrid was first recorded in 1987 at Felin-y-mor SN582802 (NMW, det. PJOT) and since then at about 15 scattered sites on waste ground, field margins, railway tracks and roadside banks, most recently at Gorrig SN411432 in 2000 (NMW, det. LMS).

**Bromus lepidus** Holmb. - Slender Soft-brome - Pawrwellt Main

Apart from an unlocalised 1950s field record from SN58 at BRC, and an unlocalised and unverified one from SN76 (Perring 1957), the only definite record is from waste ground at Penrhyn-coch SN644843, 1956 (NMW, conf. AOC 1998).

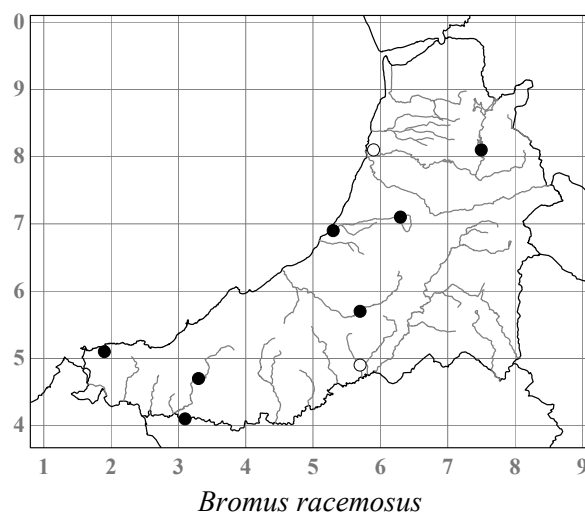


**Bromus secalinus** L. - Rye Brome - Pawrwellt Bach

A very rare archaeophyte casual. Salter (1935) gave three records: Henllan c.SN3540, 1930 (NMW, conf. PMS); Llandyfriog c.SN3341, 1931; and Aberystwyth c.SN58V, 1933. The only record since is from the old stable yard at Hafod SN759732, 2000 (NMW, AOC & JPW, conf. LMS). Native of Europe.

**Bromus racemosus** L. - Smooth Brome - Pawrwellt Llyfn

A rare plant of hay meadows, it occurs at Winllan SN566572, 1992 (NMW, conf. PJOT) where it has increased in abundance greatly in recent years; at





Old Cilgwyn SN314418, 1995 (NMW, JPW & AOC); and near Llanrhystud SN531699, 1994 (JPW & JT). It has also been recorded at a marshy field edge near Brongest SN322460, 1998 (MDS), in sandy pasture S of Mwnt church SN195519, 2006 (PAS & AOC), and as a casual at Ponterwyd SN749811, 1987 (NMW, det. PJOT). Salter had difficulty in identifying it and says "Occurs at Llanbadarn [c.SN5981] and is, perhaps, frequent". Material from Cringae-newydd SN251483, 1854 (K, Herb. Watson, MMA) is considered by TAC (pers. comm. 1995) to be probably this species but with some characters of *B. commutatus*.

**Anisantha diandra** (Roth) Tutin ex Tzvelev - Great Brome - Pawrwellt Mawr

Long-established in very small quantity, often only one or two plants but c.110 in 2007, on a grassy and rocky slope, Penyrangor, Aberystwyth SN58028070, 1982 (NMW, conf. PJOT) - 2008. On waste ground by the road 2.5km E of Synod Inn SN43165420 c.100 plants were seen in 2000-2001 (NMW, conf. LMS), but then disappeared. Native of Europe.

**Anisantha sterilis** (L.) Nevski (*Bromus sterilis* L.) - Barren Brome - Pawrwellt Hysb

A widespread archaeophyte of mostly dry, open habitats on roadsides, waste and disturbed ground, tips, walltops, railway ballast, field margins and occasionally an arable weed and in gardens, and confined to the lowlands.

**Anisantha madritensis** (L.) Nevski (*Bromus madritensis* L.) - Compact Brome - Pawrwellt Cryno

This casual, native of Europe, was recorded on the municipal rubbish-tip, Aberystwyth SN591811, 1925 (Salter 1935).

**Bromopsis ramosa** (Huds.) Holub (*Bromus ramosus* Huds.) - Hairy-brome - Pawrwellt Blewog

Frequent in the damper, more base-rich and fertile woodlands and in hedgebanks, especially on the drift soils in the dingles along the coast and in the lower Teifi and Aeron valleys. It is chiefly in the coastal zone, but goes inland to the Gwenffrwd dingle SN594609, 1984 (AOC & DGJ) and to Devil's Bridge SN741771, 2005.

**Bromopsis inermis** (Leyss.) Holub subsp. *inermis* - Hungarian Brome - Pawrwellt Hwngaria

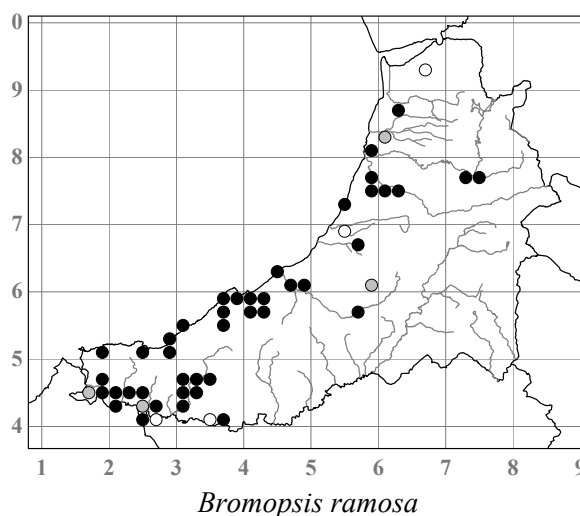
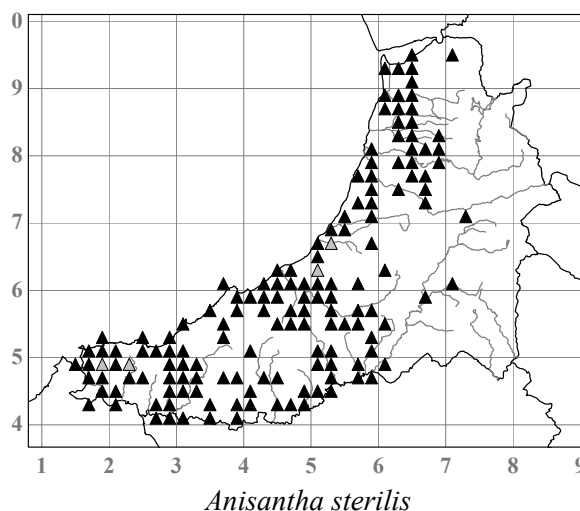
Known only as a colony in a Nettle bed on an artificial sand mound by the Visitor Centre, Ynys-las dunes SN609941, 1998-2007 (NMW, SPC) where it survives both because of and in spite of continued disturbance. Native of Europe.

**Ceratochloa carinata** (Hook. & Arn.) Tutin - California Brome - Pawrwellt California

Only once recorded, c.20 plants in Lloegr-fach farmyard SN493621, 1995 (NMW, DEA & AOC, conf. LMS), where it had been present for several years; its origin was unknown to the farmer. Native of W North America.

**Ceratochloa cathartica** (Vahl) Herter - Rescue Brome - Pawrwellt Porthi

Recorded as a casual at two sites, on a roadside verge in Lampeter SN577489, 1981 (NMW, AO, det. PJOT), and in a back alley by Queen Street, Aberaeron SN45796299, 2003 (NMW). It is well-established at only one site, as a garden weed and on a roadside hedgebank and verge opposite the church at Aber-arth SN476632, 1999 (NMW) - 2004. Native of Central and South America.



**Brachypodium pinnatum** (L.) P. Beauv. sens. lat. - Tor-grass - Breichwellt y Calch

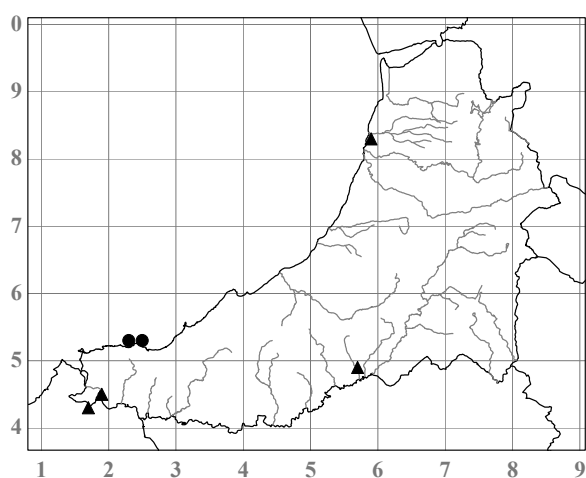
First recorded in 1976 as “a small population” on the disused railway over the Teifi Marshes SN186456 (NMW, SBE & TAWD), it had extended along 33m with 81 separate patches by 1995 (DKR) and is still abundant there. In 1978 it was found on the site of the long-demolished old church building in Lampeter churchyard SN575484 and in 1983-2007 this diffuse population covered an area  $25 \times 10\text{m}$  (NMW). At both sites it was probably an introduction. In 1992 a colony 5m in diameter was found in grassland on the MoD site, Aber-porth SN24825243 (NMW, SME), and by 2001 this had increased to  $9 \times 5\text{m}$ ; in 1995 several small colonies were found nearby in flushed pasture in the Craig y Filain SSSI at SN236521 (JPW & AOC). These two populations, and especially the latter, are presumably native.



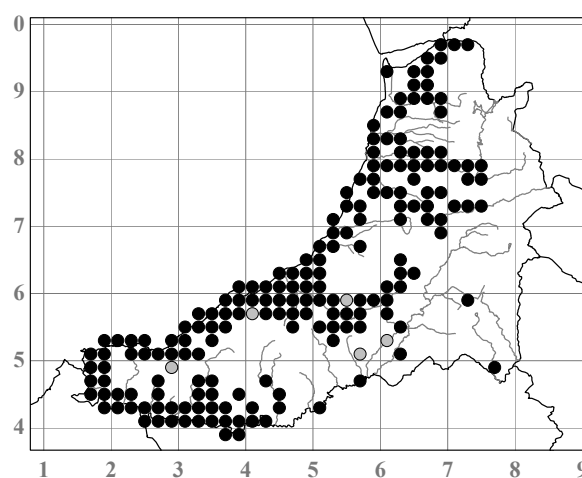
*Brachypodium pinnatum*, Lampeter churchyard SN575483, June 2005

The only other sites are very obvious introductions, on a road verge by a garden at the top of Bryn Road, Aberystwyth SN58728213, 1995 (NMW), and on a road verge in woodland near houses, Glanpwllafon SN17994385, 2001 (NMW).

Whether these populations are *B. pinnatum* or *B. rupestre* (Host) Roem. & Schult. is uncertain, as the diagnostic characters are not well correlated in them, and all six populations differ in varying characters from each other.



*Brachypodium pinnatum*



*Brachypodium sylvaticum*

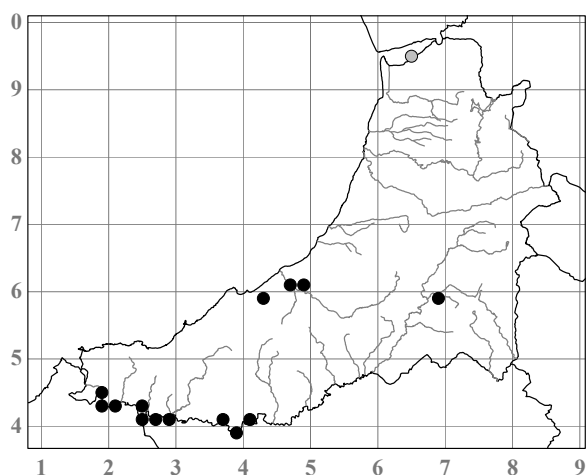
**Brachypodium sylvaticum** (Huds.) P. Beauv. - False Brome - Breichwellt y Coed

Common in the coastal zone in woods, scrub and hedgebanks, and on the coastal slopes, but absent on the poorer and more acidic soils; it extends inland up the main river valleys, but not into the uplands. It is usually in dry and well-drained sites, but can be abundant on slumping clay slopes on the coast, and occurs in Alder carr by the Afon Ddu SN668941, 1986 (AOC & APF).

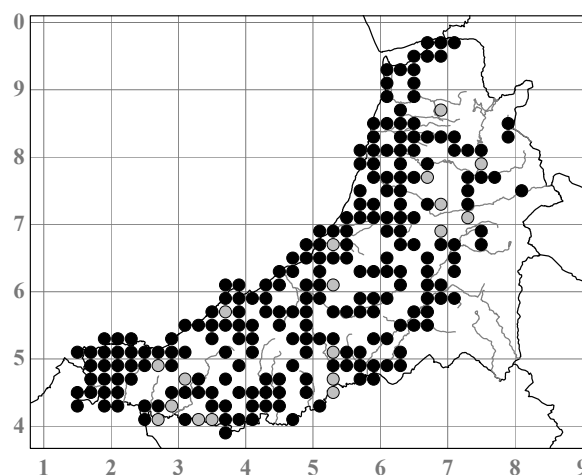
**Elymus caninus** (L.) L. (*Agropyron caninum* (L.) P. Beauv.) - Bearded Couch - Marchwellt y Coed

Listed by Morgan (1849) and Jones (1880), but never seen by Salter (1935), the first localised record of this uncommon species was from the bank of a ditch just N of Hen Hafod by the Dyfi estuary SN6594 in 1974 (SCH); it has not been seen in the N of the county since. Apart from one record of a few plants on a bank at the top of the wood above the Afon Llethi 500m N of Llanarth church SN422583, 1987, it is confined to the Aeron and Teifi valleys. On the wooded banks of the Aeron it occurs from Allt Bryn-gwyn SN465615, 1991-

2004, up to near Pandy SN484604, 1996. On the Teifi it occurs scattered along the wooded banks from Rosehill Marsh in the estuary SN189454, 1983-2004, up to Pont Tyweli SN414402, 2003, and then surprisingly is abundant on the wooded banks of its tributary the Afon Brenig 1km E of Tregaron SN694596, 1998.



*Elymus caninus*



*Elytrigia repens*

***Elytrigia repens* (L.) Desv. ex Nevski subsp. *repens* (*Agropyron repens* (L.) P. Beauv.)** - Common Couch - Marchwellt

A frequent grass of roadside verges, waste ground, gardens and other cultivated land. As an agricultural weed it has long been abundant (Lloyd & Turnor 1794, Meyrick 1810) and remains so especially in the sandy arable fields in the SW of the county. In natural habitats it is largely confined to the coast, where it can be abundant at the top of salt marshes and on shingle beaches, on sand dunes and by ditches and streams; many of these populations are very glaucous and have been mistaken for *E. atherica*. Altitude limit 355m, verge of A44(T) road 450m NW of Cwmergyr SN792828, 1995.

Forma ***aristata*** (Schum.) Beetle, with awned lemmas, occurs in the same habitats but is less frequent. Plants of this forma with the glumes awned as well as the lemmas were found in a potato field at Morfa, Llan-non SN503662, 1992 (NMW, det. PJOT); and very large plants of it, apparently sown with *Lolium perenne* and *Phleum pratense* as a silage crop in a field W of Caerhedyn SN70509750, 1997 (NMW, det. TAC), had the inflorescence axis densely hairy, the anthers undehiscent and the pollen mostly sterile.

***Elytrigia* × *drucei*** Stace (*E. atherica* × *repens*)

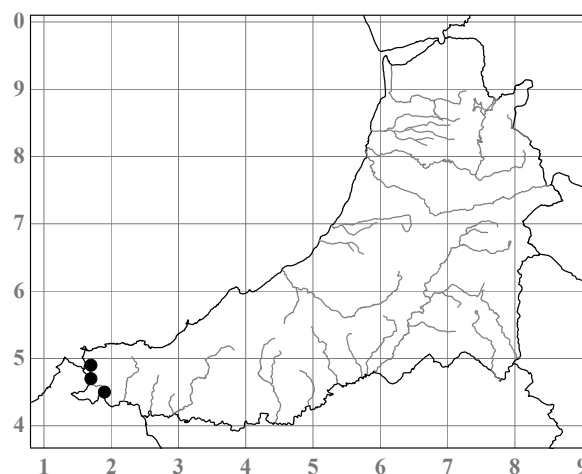
Frequent, with both parents, along the top of the salt marsh in the Teifi estuary S of Nantferwig SN16884779-16884811, 2001-2003 (NMW). It has also been recorded once from the Dyfi area, as a large patch by the golf course groundsman's sheds at the S end of the Ynys-las dunes SN605930, 1990 (K, NMW, det. TAC), although *E. atherica* has not been reliably recorded from the area. (A specimen of *E. ×drucei* from the "Dovey salt marshes" 1956 (K, P. F. Hunt, conf. TAC) was from the Merioneth side.)

***Elytrigia* × *laxa*** (Fr.) Kerguelen (*E. juncea* × *repens*)

Recorded only once, as a patch at least 2 × 1m at the top of Tan-y-bwlch beach SN579799, 1999 (Herb. SPC, SPC, conf. TAC), with both parents.

***Elytrigia atherica* (Link) Kerguelen (*Agropyron pungens* auct., non (Pers.) Roem. & Schult.)** - Sea Couch - Marchwellt Arfor

Records by Salter (1935) from the Dyfi estuary, from Penbryn and Tresaith, and from the Teifi estuary, were probably misidentifications of a glaucous form of *E. repens* in all but the latter area. A more recent record on the Dyfi, from a salt marsh ditch opposite Hen Hafod, SN69M or S, 1974 (SCH) was also



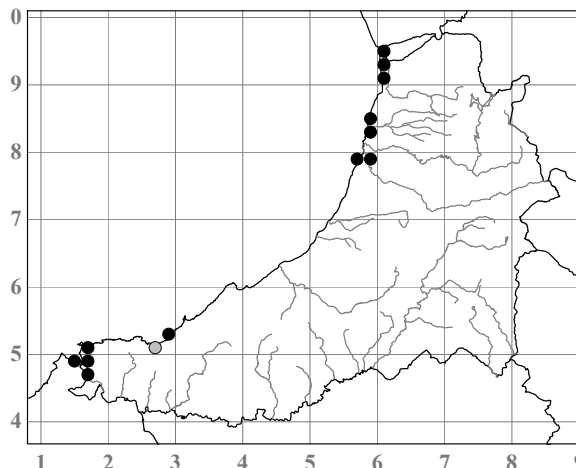
*Elytrigia atherica*



probably misidentified. On the Teifi it occurs from the top of the sandy beach by the Yacht Club SN165485, 1996-2005, along the top of the salt marsh as far up the estuary as just N of Rosehill Marsh SN187456, 1999 (SBE) - 2004 (NMW); at this site the plants are forma *setigera* (Dumort.) Stace, with well-developed awns on the lemmas. There is also an unlocalised 1958 BSBI Field Meeting record at BRC from SN15.

**Elytrigia juncea** (L.) Nevski subsp. **boreoatlantica** (Simonet & Guin.) Hyl. (*Agropyron junceum* (L.) P. Beauv., *A. junceiforme* (Å. Löve & D. Löve) Å. Löve & D. Löve) - Sand Couch - Marchwellt y Twyni

A prominent colonist of the embryo dunes at Ynys-las from SN610950-607920, 2008, and similarly, or on sandy banks or vegetated shingle, at Wallog SN589856, 2005, at Clarach SN587837, 1991, at Tan-y-bwlch c.SN579799, 2008, at Penbryn SN293525, 1975 (AP), at Tresaith SN278516, 1975 (AP) - 1991, and at Penyrergyd SN161485, 1978-2008. Nearby on the Teifi estuary just S of Nantyferwig SN168477, 1975 (AP) - 2008, it grows uncharacteristically on stony mud at the top of the salt marsh. Salter (1935) recorded it at Ynys-las, Wallog, Clarach, Tan-y-bwlch and Penbryn SN25W, and later (in Wade 1952) at Tresaith and on the Teifi estuary. Savidge (1973) comments that at Ynys-las Rabbit-grazing has reduced the colonising abilities of this species, but it has more recently done better on the rapidly developing detached new dune at the N end SN609946, 2005-2008.



**Leymus arenarius** (L.) Hochst. (*Elymus arenarius* L.) - Lyme-grass - Clymwellt

A rare and impermanent plant of the sandy seashores. It was first recorded in 1796 by Aikin near the mouth of the Dyfi estuary: “to the marsh succeeded a sandy plain of considerable extent, on which were pastured some fine cattle; here we found ..... *Elymus arenarius* in great plenty” (Aiken 1797). This record was repeated and distorted by Evans (1804) and by Turner & Dillwyn (1805). Salter (1935) never saw it himself in the county, but said that it had more recently been seen on the Cardiganshire side of this estuary at Ynys-las (JLW). It was known here at Ynys-las in the 1970s (JPS) but had gone by 1982. In 2001 two colonies  $2 \times 2$ m and  $5 \times 4$ m were found on the embryo dunes with *Ammophila* and *Cakile* at the N tip of the Ynys-las dunes SN60689461 (JPL), and these have been increasing steadily since. Also in 2001 a colony  $4 \times 3$ m was found on sandy shingle at the top of Borth beach SN60799032 (JPW & AOC), and this had extended to  $5 \times 5$ m by 2003 and  $8 \times 6$ m in 2007. A large colony by Moel Ynys Pool SN60799230, 1991-2004 (NMW), originated from throw-outs from a garden opposite, the plants having come from a garden centre. It was reported to Salter from the Teifi estuary below Cardigan SN14 in 1904 (Diary 18.6.1904, 1935), but although long known on the Pembrokeshire side it was not recorded from VC46 again until 1992, when a colony  $4 \times 1$ m, still present in 2005 but not increasing, and gone by 2007, was found at the top of the sandy beach at the S end of the Penyrergyd dunes SN164485; in 2003 a small colony  $4 \times 1$ m was found further up the estuary at Nantyferwig SN16904819 (AOC & SPC). In 2000 a colony  $7 \times 2$ m was found among *Ammophila* on Traeth Penbryn SN29385255 (TCL), and had extended to  $11 \times 2$ -3m by 2004.

**Hordeum vulgare** L. - Six-rowed Barley - Haidd Chwerhesog

Six-rowed Barley has probably not been cultivated in the county for some time, and is now a very rare casual. In 1992 it was a sparse weed in fields of the Black Oat ‘S.220’ at Frongoch, Llechryd SN223440, and in 1996 it was seen on waste ground by Cnwcymanal farmyard, 1km SE of Aber-porth SN268504 (NMW), and in 1997 on the demolished Siloh chapel site in Aberystwyth SN586818, 1997 (SPC). It has also been a contaminant in seed-mixes used on new roadside verges, by the A44(T) at Capel Bangor SN657801 in 1992, and by the A485 at Pont Llyndu SN635561 in 1999 where *H. distichon* was also present.

The following historical notes cover both Six-rowed and Two-rowed Barley. An early mention is from 1326 in the *Black book of St. David's* (Willis-Bund 1902) when Barley was required to be sown at  $7\frac{1}{2}$  bushels per acre in the Lord's demesne at Llandygwydd c.SN24L. In c.1697 Barley was mentioned as being grown in the parishes of Gwnnws, Trefilan, Llanfihangel Ystrad, Llangybi, Llanfair Clydogau and Cellan (Lhwyd 1911), and in Trefilan and Llanfihangel Ystrad it was reported as “great and small barley”. Lloyd &

Turnor (1794) stated that “Barley and oats are the principal grain of the county”. Barley was used especially for bread, malt, as “pearl barley” for soups, and for feeding to pigs, and was often grown as a fodder crop. In 1801 it occupied 13,266 acres (5,368ha) and comprised 34% of the total crops in the 75% of parishes in the county that submitted returns (data from Williams 1950, see also Thomas 1960), and it was the dominant crop in about half the parishes along the coast in the SW half of the county and in five parishes in the lower Teifi valley (Thomas 1963). This has remained the main Barley-growing area of the county ever since. Meyrick (1810, p.295) described Llansantffraid parish c.SN56D as “delightfully situated on the sea-side, and consists chiefly of low land, so advantageous for barley, that when manured with the sea-weed mixed with dung, successive crops of that same corn have been raised on it for upwards of sixty years.” Davies (1815) mentioned that Barley had been annually grown on this stretch of land, Morfa Esgob, from time immemorial, and gave much information on the qualities of Cardiganshire Barley, and said that, along with the Pembrokeshire west coast Barley, it had “been in high repute for ages past”.

Throughout the 19<sup>th</sup> century Barley was grown for brewing by local brewing concerns and by the larger farms, as well as for bread and for livestock feed (Moore-Colyer 1998). A large mid-19<sup>th</sup> century oasthouse still stands behind the old malthouse in Trefechan, Aberystwyth (Lewis 1980). By 1911-1913 Barley occupied 14,381 acres (5,819ha) and comprised 24% of the total tillage in the county, half as much as Oats and two and a half times as much as Wheat; in 1939 it occupied 5,490 acres (2,221ha) and comprised only 12%, a fifth as much as Oats and eight times as much as Wheat (data from Ashby & Evans 1944). After the second world war the relative importance of Barley gradually increased: in 1957 there were 3,615 acres (1,462ha) of Barley, and in 1988 there were 9,955 acres (3,982 ha), plus 51ha of mixed corn (Anon. 1988); Barley now comprised 72% of the total crops and fallow, and was 14 times more abundant than Oats, and it is still the most commonly seen arable crop in the county.

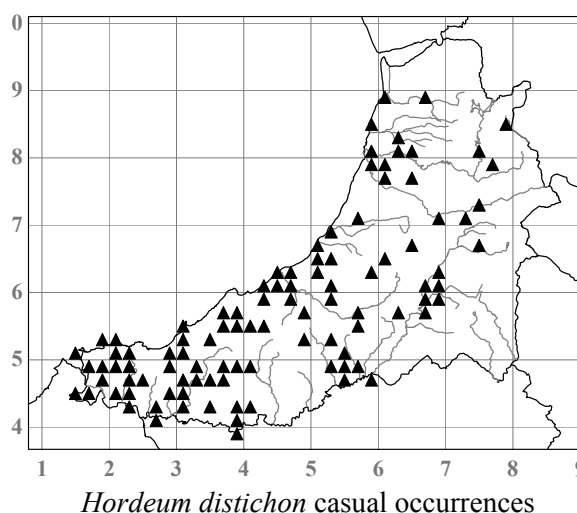
Barley, unlike Oats, and to a much lesser extent Wheat, was never a chief concern of the WPBS and they did not develop their own varieties if it. Until recently most Barley in the county was spring-sown, and in 1988, of the 3,982ha, 3,526ha or 87% of it was spring-sown and 457ha or 13% of it was winter-sown (Anon. 1988); this statistic indicates that Ceredigion had much above the national average of c.30% of total spring tillage of all crops (see Shrubbs 2003, p.291). Except for a number of farms along the coast between Aber-porth and Cardigan where winter stubble, so valuable for finch flocks and the specialist bryophytes of arable fields, can still be seen, most farms plough, if not sow, after harvest in autumn. Barley Saturday (Dydd Sadwrn Barlys), involving a lively parade of horses around the town, has been celebrated in Cardigan since the mid 19<sup>th</sup> century on the Saturday following the last Friday in April; this was the date by which all the Barley, and other cereals, should have been sown. In the 1990s popular varieties in the county included the spring-sown ‘Chad’, ‘Chariot’, ‘Blenheim’ and ‘Hart’, and the winter-sown ‘Marinka’, ‘Intro’, ‘Gaelic’ and ‘Hanna’; all were two-rowed.

***Hordeum distichon* L. - Two-rowed Barley - Haidd Dwyresog**

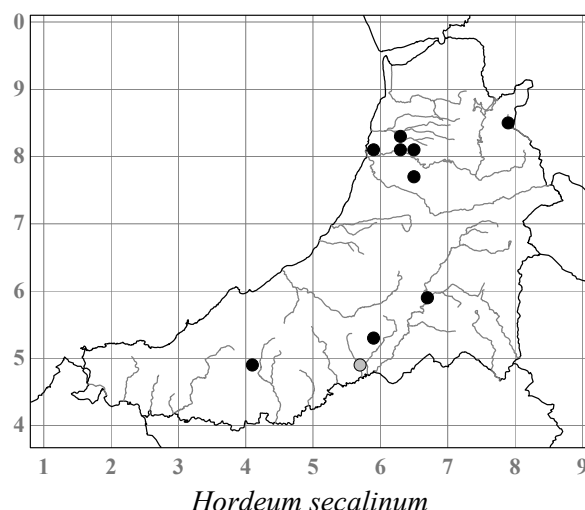
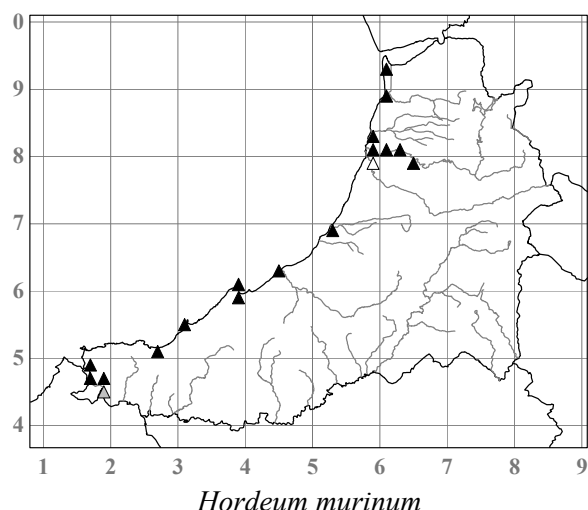
Ten times as much Two-rowed Barley is nowadays grown in the county as all the other cereals put together, and it is a common casual in arable fields, farmyards, roadside verges and waste ground. For convenience, the history of its cultivation is included with that of *H. vulgare* above as it is often uncertain which species was being referred to in the past. The map shows casual occurrences of Two-rowed Barley. Altitude limit (casual) 410m, Eisteddfa Gurig farmyard SN797840, 1993.

***Hordeum murinum* L. subsp. *murinum* - Wall Barley - Haidd y Mur**

An uncommon archaeophyte of waste ground, verges and pavement crevices in towns and villages along the coast. First recorded by Purchas (1848) from “the immediate neighbourhood of Aberystwith”, and Salter first recorded it in 1894 (Diary 26.6.1894) on the cliff slope at New Quay c.SN388602, where it was seen again in 1990, and in nearby Park Street SN388598 in 1994. There are several records of it as a fugitive casual, but it has been persistent only at Aberystwyth in several places SN58V-58W, 1986-2004, and at Llanbadarn Fawr SN58V-68A, 1937 (Salter in Wade 1952) - 1995 (SPC); at Rhydyfelin SN5979, 1906-1931 (Salter Diary



20.7.1906, 19.7.1931); at Aberaeron SN46L, 1904 (DW, Salter Diary 25.6.1904) - 1994 (SPC); at Penyrergyd SN1648, 1979-1994; and around Cardigan SN14, 1985-1993.



### ***Hordeum secalinum* L. - Meadow Barley - Haidd y Maes**

A rare casual but persisting in a few sites. It was first recorded on waste ground in St Peter's churchyard, Lampeter SN575484 in 1978 (NMW), and 45 plants were there in 1985. It occurs by a trackside and in an adjacent pasture at Denmark Farm SN585537, 1991 (JHi) - 2004 (RJW). Casual records are from a roadside bank opposite Tan-llan, Llanfihangel-y-Creuddyn SN658761, 1992 (NMW); a roadside verge opposite Abercoed, 2km SSW of Tregaron SN669580, 1993; a laneside verge 200m NE of Pledrog, Talgarreg SN419499, 1994; waste ground 500m SE of Aberystwyth station SN588811, 1997; and a grassy verge of the A44(T) 150m E of Capel Bangor post office SN654803, 2003 (SPC). It is abundant in the "wild flower meadow" sown with a seed-mix at the CCW office, Plas Gogerddan SN628834, 1994-2005. Altitude limit 540m, as a casual on the track by the Pumlumon lead mine SN794856, 2009 (RAJ), presumably deriving from hay brought up for feeding stock.

### ***Secale cereale* L. - Rye - Rhyg**

Once a significant crop but now very rarely grown and only once recorded as a casual, on the recently reconstructed verge of the A486, 1.2km SSE of Croes-lan SN38884338 in 2008 (NMW). Lloyd & Turnor (1794) reported that it was grown in considerable quantity in the N half of the county, and that "In the upland it is sown alone: but in the neighbourhood of Aberystwith, frequently with a mixture of wheat. The mixture makes good bread, sweeter and moister than that of wheat alone. Those who are used to it, prefer it to any other". Malkin (1804) wrote that through the efforts of Thomas Johnes at Hafod c.SN77L Rye, among other crops, had "been abundantly flourishing in favourable seasons, where it had been considered madness to attempt their growth". Llwyd (1911) had information of Rye being grown in five parishes c.1697. Lewis Morris, writing from Goginan on 18 August 1760 (Davies 1909, Jones 1930), described the festivities associated with the reaping of his Rye crop: "Y foru rwyf ar fedr medi rhŷg [Tomorrow, I intend to reap rye], a kind of feast day, such as the Hebrews made when they sheared their sheep. I may perhaps have 40 or 50 neighbours here to assist in reaping and drinking of ale a bwytta pasteoid a brasder hyrddod [and eating of pasties and the fat of rams]. But for reaping all the other corn we pay dear enough ..." In the S of the county, Wyndham (1781) reported that in the Teifi valley between Cilgerran and Lampeter, some of the cultivated land, "being strongly limed and well dressed, bore plentiful crops of oats and rye".

In 1801 it occupied 636 acres (257ha), but this amounted to only 2% of the total arable in the 75% of the parishes that submitted returns (data from Williams 1950, see also Thomas 1960). Rye was probably never much more extensively grown than this in the county, for example in 1869 only 233 acres (94ha) were grown (Anon. 1869). In the 1960s the WPBS imported two varieties from Hungary, 'Lovazpatonai' and 'Ovari', and along with English large-grained Rye used them to develop its own 'Rheidol, S.239' which was released in 1965 and quite widely grown in the county and elsewhere as a spring forage crop. As recently as 1988 (Anon. 1988) 29ha of Rye were said to have been grown in the county, including 17ha in Llanbadarn Trefeglwys parish c.SN56B, but local enquiries have failed to substantiate this. In 1998 winter Rye to be used for green manure was grown in several fields at Llanerchaeron c.SN4860, as part of an organic farm project on the NT estate. Native of SW Asia.



×**Triticosecale** Wittm. ex A. Camus (*Secale cereale* × *Triticum aestivum*) - Triticale

This intergeneric hybrid has been known for over a century, but was not widely grown commercially until the 1970s in Canada. Several varieties, notably ‘Lasko’ and ‘Cumulus’, have been tested at the WPBS/IGER since 1989, but Triticale seems to have been little-grown commercially in the county. ‘Lasko’ was winter-sown at Pont-faen SN494590 in 1990/1991 but crows ate most of the seeds, although those that survived grew well, and it was not tried again (RPB, Chater 1993). Triticale was grown at the Nantclyd Organics farm 2km S of Llanilar SN623726 in 2008 and the milled grain used in poultry feed.

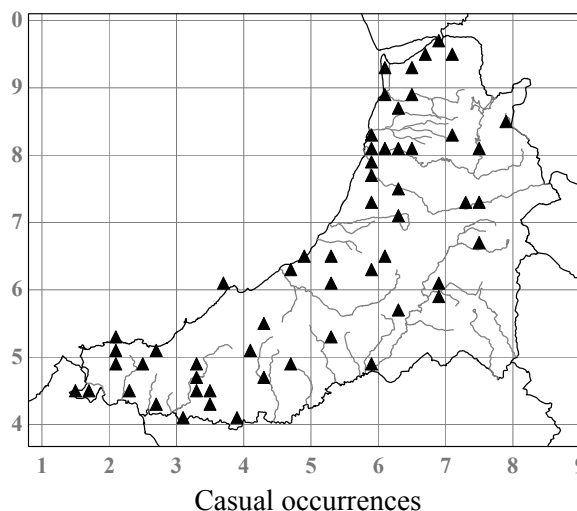
**Triticum aestivum** L. - Bread Wheat - Gwenith

Throughout the recorded history of its cultivation in the county, Wheat has always been very much less grown than Barley and Oats. The high rainfall is especially disadvantageous for the autumn-sown varieties which have almost always been used, and satisfactory spring-sown varieties have not been developed suitable for local conditions. As a casual, Wheat is surprisingly common considering how little (70ha in 1988) is nowadays grown in the county. It occurs widely on road verges, manure heaps, waste ground and in farmyards, probably sometimes from straw bales or from bird-seed, and it is an occasional contaminant in arable crops of all sorts. The map shows only these casual records.

One of the earliest detailed mentions is from 1326 in the *Black book of St. David's* (Willis-Bund 1902), when Wheat was required to be sown at 3½ bushels per acre in the Lord's demesne at Llandygwydd c.SN24L. George Owen wrote about spring-sown Wheat in 1603: “.... holie [so called from being sown in Lent] wheate or sommer wheate, this is used most in the welshe partes of [Pembrokeshire] as also in *Cardigan sheere*; and is sowed in the later end of *Marche* and beginning of *Apryll*; and is a daintie graine like the barlie, and cannot endure to be pinched with cold. yt is a verie profitable graine and yealdeth more encrease than the wynter wheate: It beareth a greater Eare and stalke ....” (Owen 1892). In c.1697 the six parishes, Gwnnws, Trefilan, Llanfihangel Ystrad, Llangybi, Llanfair Clydogau and Cellan, all inland, that mentioned Wheat reported that less of it than of Oats or Barley was cultivated (Lhwyd 1911). Lloyd & Turnor (1794) described Wheat as “commonly grown”, but again less than Oats or Barley, and described spring sowing. In 1801 Wheat occupied 2,580 acres (1,044ha), 7% of the total arable in the 70% of parishes in the county that submitted returns (data from Williams 1950, see also Thomas 1960); in no parishes was it either the first or second ranking crop, in 25 parishes, mostly inland, it was the third ranking, and in eleven it was the fourth ranking (Thomas 1963); and Thomas Johnes (1800a) instructed his tenants on the Hafod estate never to sow Wheat later than the first or second week in September. Malkin (1804) wrote that Wheat was one of several crops that Thomas Johnes grew successfully at Hafod c.SN77L in the uplands “where it had been considered madness to attempt their growth.”

Davies (1815) wrote that “the county supplies itself with wheat and rye, excepting in years of extreme scarcity”, and that “Lleiniau Llan Non [SN56D, E], the celebrated Cardiganshire barley tract” was the earliest spot for the ripening of Wheat. Colyer (1983) quotes an 1815 reference that “The wheat grown in the Vale of Ystwyth is perhaps the heaviest in the island, seldom weighing less than 64lbs the Winchester bushel and it has occasionally weighed 67lbs in Aberystwyth market.” In the 1830s the Ystwyth valley was still notable for its heavy yields of wheat, as was the Teifi valley (Parkinson 1985). The acreage had increased to 7,739 acres (3,131ha) by 1867, but was down to 5,257 acres (2,127ha) by 1911-1913 when it comprised 9% of the total tillage. Apart from brief increases during the two World Wars, the acreage has continued downwards ever since. In 1939 it occupied 663 acres (268ha) and comprised 1.4% of the total tillage (data from Ashby & Evans 1944). By 1988 there were only 70ha (plus 52ha of mixed corn), all in the lowlands in the SW half of the county (Anon. 1988). A few fields of Wheat have been grown further N since, for example one near Brynhir SN5873 in the early 1990s.

Although Wheat was never as important a preoccupation at the WPBS/IGER as Oats, significant work was done there in the 1920s by T. J. Jenkin (1925, 1929), selecting and breeding from local races. He used ‘**Hen Gymro**’, “an old land variety of winter wheat still grown to a considerable extent, particularly in Cardiganshire”, and wrote that, at least in comparatively recent years, it “has been grown not for commercial purposes but to provide home-grown bread, and, more or less incidentally, wheat straw for thatching



Casual occurrences

purposes”, and that “Hen Gymro wheat, at least under the adverse Welsh conditions, generally produces a higher quality grain than most of the modern varieties, while its long and tough straw is ideal for thatching purposes.” Stocks of it always consisted of a mixture of genetic types, and this heterogeneity was thought likely to have been a contributory factor to its success. Three selections, ‘S.70’, ‘S.72’ and ‘S.73’, were released through local Co-operative Societies and were very much in demand in the county (Stapledon 1933).

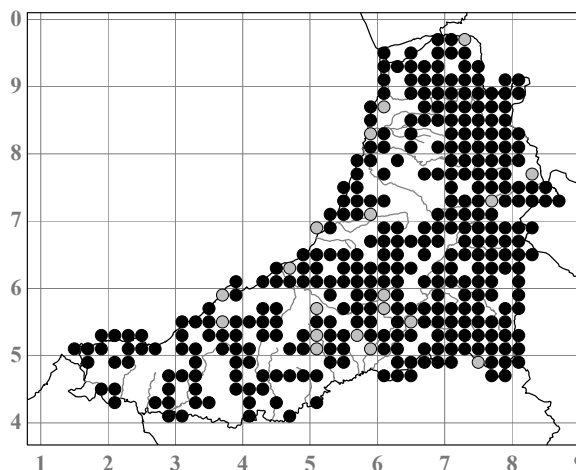
In the past, Wheat straw was, along with rushes and reeds, the main thatching material in the lowlands of the county (William 1995). Jenkins (1965, 1968, 1976) described the use of Wheat straw for making lip-work baskets, and how Benjamin Evans of Penuwch, probably its last exponent, insisted on using the winter-sown ‘Hen Gymro’ straw because of its hardness and better colour, and preferred hand-scythed and thus unbruised straw. Nowadays, as well as for grain, it is occasionally grown for whole-crop silage. A wheatsheaf, representing agriculture, occupies the lower left quarter of the Ceredigion coat of arms, originally granted to the Cardiganshire County Council in 1937. Altitude limit (casual) 410m, waste ground, Eisteddfa Gurig SN797840, 1993.



Ceredigion coat of arms, with Wheat sheaf

**Danthonia decumbens** (L.) DC. (*Sieglingia decumbens* (L.) Bernh.) - Heath-grass - Glaswellt y Rhos

A frequent grass of both inland and coastal heaths, infertile pastures, rough grassland on the coastal slopes, and rock ledges. It is always in well-drained sites but often occurs where there is slight flushing, and is absent from wetlands. It seems intolerant of heavy grazing but is reasonably tolerant of trampling and is common on pathsides. It is tolerant of salt spray, and plants from populations in exposed coastal sites can be very robust, with leaves up to 5.5mm wide, for example by the mouth of the Afon Drywi SN426607, 1982 (NMW). Most of the plants seen in the county have been entirely cleistogamous, including those in the Ynys-las dune slacks, a habitat in which chasmogamous plants occur in Merioneth (Benoit & Richards 1963); solitary, thickened cleistogamous florets among the leaf sheaths at the base of the stem are found on a majority of plants in all habitats. Chasmogamous plants have been seen only on a heathy trackside on the MoD site, Aber-porth SN24795244, 2006-2008 (NMW), where there is a colony of *c.*20 plants, and scattered in rhos pasture on Rhos Pil-bach, Plwmp SN366528, 2006 (NMW); these too have cleistogamous basal florets (Chater 2007). Altitude limit 430m, Llyn Hir *c.*SN790680 (Salter 1935); 590m, trackside, Pen y Garn SN793769, 2002.



**Cortaderia selloana** (Schult. & Schult. f.) Asch. & Graebn. - Pampas-grass - Peithwellt

This rather gaudy grass, native of South America, is subdioecious and self-seeds much less freely than *C. richardii*. The only record is of a tussock established from a throw-out among sparse conifers by a track on the Goginan lead mine SN69208198, 2004.

**Cortaderia richardii** (Endl.) Zotov - Early Pampas-grass - Peithwellt Cynnar

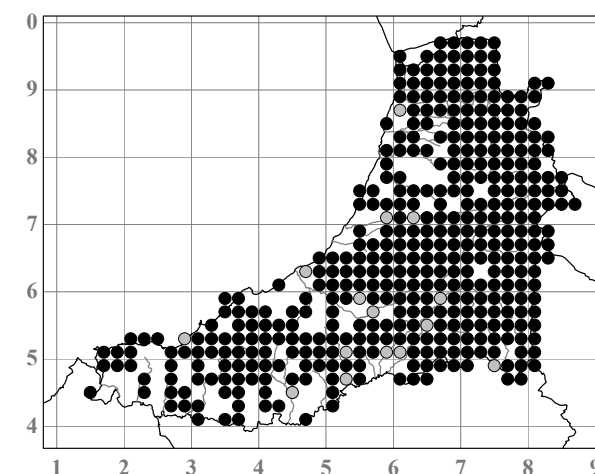
This elegant gynodioecious grass, native of New Zealand, self-seeds abundantly in gardens and has become established probably at six sites: a tussock with 26 inflorescences among Gorse on the slope above the Pendinas rubbish-tip SN584799, 1993 (NMW), accompanied by two more by 1998, were all gone by 2002; two tussocks on a rough grassy slope above Cwrt yr Angor, Aberystwyth SN58218100, 2004-2008; a tussock with two inflorescences on the bank of the Afon Rheidol at Lovesgrove SN62496104, 2008; one tussock on a

roadside cliff opposite Goginan church SN693810, 1999-2008; two tussocks on the bank of the Afon Brenig by the footbridge in Tregaron SN67905964, 2005; and three tussocks on a roadside bank at Mydroilyn SN456554, 1999. A large tussock on the bank of the Afon Einion in woodland below Furnace SN684956, 1995 (PSC) probably arrived from a washed-down throw-out.

***Molinia caerulea* (L.) Moench - Purple Moor-grass (Flying Bent) - Glaswellt y Gweunydd**

Dominant over large areas of marshy grassland from the coast to the uplands, in valley mires and blanket bogs and on flushed slopes. It is often abundant in woodland, especially damp Birch woods and Sessile Oak woods on the steeper slopes. On the coastal slopes it is characteristic of flushes and ravines. By the Rheidol and Ystwyth rivers it is often dominant on shingle. In most sites it is tussock-forming, but in the well-grazed rhos pastures it is often a major constituent of the grassy or heathy sward. It generally requires some movement of water and is usually absent from waterlogged sites, and can tolerate very dry sites such as cliff ledges in the uplands. The unproductive *Molinia* pastures were a major target for the Cahn Hill Improvement Scheme and Stapledon's other upland initiatives at the WPBS in the 1930s. Much *Molinia*-dominated land that survived this was drained and planted with Sitka Spruce by the FC in the 1950s and 1960s, and the dead tussocks can be seen in situ even after many decades. *Molinia* stands are often burnt in early spring to make the new growth more accessible for grazing, but it is otherwise of low nutritional value.

*Molinia* is the only native grass in Britain which sheds its leaves by an abscission layer, and in some exposed areas the windblown detached dead leaves accumulate in such quantity as to break down fences.



Ropes for thatching made from the leaves would last 4-6 years, as opposed to the one-year life of those



Roadside fence broken by windblown *Molinia* leaves, view SSE along Sarn Helen from SN641490 at 340m altitude, April 1963



*Molinia* tussock and Paul Smith, Cwmsymlog, view W from SN700837, February 2005





White dead leaves and stems of *Molinia* in the landscape,  
view ENE from SN725699 to Trawsallt, March 2007

made from Wheat straw or rushes (William 1995). Howells (2005) describes how around and before 1900 in the Pumlumon area “it was a practice on many hills to cut hay (mostly *Molinia*) on the open hill and make it into a stack. The initial work of making this stack was to drive posts into the ground, and pile the hay around them. This was to safeguard the hay from being blown away. *Molinia* hay, called ‘*gwair cwta*’ in Welsh or ‘*rhôs* hay’ in semi-Welsh areas, because of its make-up, could be cut one day and carried the following day, providing the weather was right. This would heat in the stack and it smelled like brandy. Hay of this nature was cut at Hirnant in Ponterwyd [SN7583] in the mid-seventies, and it was possible to smell it down-wind half a mile away. Wonderful stuff.” Evans (1927) describes similar *gwair cwta*, also called bog hay and *gwair rhos* among other names, from Glandyfi c.SN69Y where it consisted of 99% *Molinia* and 1% *Narthecium*. Howells (2005) describes the use of *Molinia*, strengthened by pieces of Cotton-grass, for making hobbles (*tyrch*) for sheep. Its frequent abundance on lead mine spoil and on contaminated river shingle, even though it is deep-rooted, suggests that it, or at least some races of it, are resistant to heavy metal toxicity; Salter (1935) mentioned its occurrence in such sites. Altitude limit 620m, 300m WSW of summit of Y Garn, Pumlumon SN77258505, 2005 (PAS & AOC).

Subsp. *caerulea* and subsp. *arundinacea* (Schrank) K. Richt. both occur. Plants with all the differential morphological characters of both species, however, often grow together, for example big tussock-forming plants and small sward-forming ones in a ride in the FC plantation 1km N of Cyneiniog SN720890, 1988 (NMW, both det. PJOT), or similar plants in sloping fen below the A44(T) road just W of Cwmbrwyno SN700809, 1988 (NMW, both det. PJOT). It has proved impossible to see any consistent differences in ecological preference between the two. Moreover, the characters are frequently not well correlated and separation of the subspecies is very often impossible. An initial suspicion in the late 1980s, when they began to be more widely recognised in Britain, that subsp. *caerulea* was the usual small one in the grazed sward in *rhos* pastures, and subsp. *arundinacea* the big, tussock-forming one of bogs, was largely dispelled by later investigations. It is strange that there is so much uncertainty in our understanding of such an ecologically significant species.

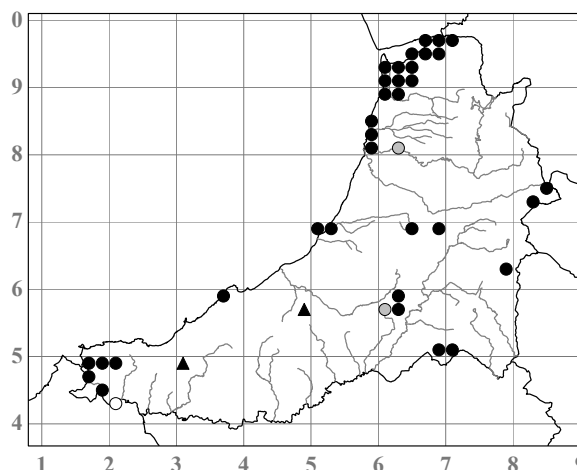
***Phragmites australis* (Cav.) Trin. ex Steud. (*P. communis* Trin.) - Common Reed - Corsen**

Although abundant in many places along the Dyfi and Teifi estuaries, *Phragmites* is rare elsewhere along the coast and occurs in only a few sites inland. Jones *et al.* (2003) estimated a total of 23ha of *Phragmites* reedbeds in the county. The most extensive are by the Dyfi on Llancynfelin Common c.SN640920, 2005, and on the West Marsh, Ynys-hir c.SN673955, 2005, the latter having been encouraged and enlarged by the RSPB in recent decades, as well as on the Teifi Marshes SN1845, 1985-2005, where they have been similarly encouraged by the Wildlife Trust. In the Dyfi area smaller reedbeds are abundant from the Ynys-las dune slacks SN69B southwards to the S tip of Cors Fochno and along the Afon Leri to above its tidal limit SN6189 and eastwards to the county boundary at Glandyfi SN6997, many of them in brackish habitats. Elsewhere on the coast there are small colonies at Clarach SN587840, 1989, and SN585837, 1984-2005; up the estuaries of the Rheidol SN586810, 1849 (Morgan 1849) - 2007 and Ystwyth SN582801, pre-1942 (Salter in Wade 1952) - 2007; behind the beach S of Llanrhystud SN523687 where a colony 50m long from N to S in 1995 had extended to 185m in 2004; and at Traeth y Coybal SN37235931 where in 2004 (AOC & PAS) a new colony 2 × 1m was found on slumping till just above the beach. At the mouth of the Teifi estuary there is a large reedbed on slumping till on the cliffs SN161495, 1984-2005. An unusual habitat was among *Ammophila* and *Festuca rubra* on the foredunes at the estuary edge of the Ynys-las dunes SN61277392, 2004-2008 (AOC; SPC).

In the uplands there are colonies in the swampy pools at Gors Lwyd SN858754, 1960-2008; around Llyn Gwngu SN839728, 1924 (Salter 23.7.1924) - 2006; at Llyn Gorast SN793632, 1924 (Salter Diary 12.7.1924) - 2004 (AOC & PAS); a colony 15 × 20m in a clearing in FC forest 900m SW of Llyn Gorast SN786623, 1992; in a partially drained clearing in FC plantations 400m E of Draenllwyn-du SN71195151, when the colony was 30 × 20m 1992 (ADF) and 70 × 30m in 2003; and a colony 7 × 7m at the edge of *Molinia* tussock mire in Cwm Twrch SN693510, 1995 (JPW & AOC). Moore & Chater (1969a) recorded *Phragmites* remains becoming frequent in the peat at Gors Lwyd from around 7,000BP, coinciding with the Pine decline.

Around the sand quarries at Penparc SN1948-2048, 1986 (AOC & APF) - 2004, there are several colonies, and nearer the Afon Mwldan sparse, rather poorly developed *Phragmites* grows in calcareous fen with *Briza media*, *Eriophorum latifolium*, *Gymnadenia*, etc. Elsewhere inland it is known only from three sites near Llangeitho: a small colony in the corner of a marshy field 450m E of Birch Hill SN63315970, 1996 (PD); a sparse colony 50 × 50m in scrub fen and on a slope amongst *Pteridium* 250m W of Bryn-hir SN61885797, 1986 (AOC, APF & DGJ) - 1999 (SPC); and a larger one in a valley mire below Coedmawruchaf SN628576, 1983 (AOC & DGJ) - 2005.

In the past *Phragmites* was widely used for thatching in the county (William 1995), and there is a



*Phragmites* bed at Coedmawrisaf,  
view S from SN623579, June 1984



Cottage in Llan-non with thatch incorporating  
*Phragmites* from the Teifi Marshes,  
view W from SN51706730, June 2009



dense, apparently artificial reedbed  $60 \times 20\text{m}$  on the slope below Coedmawrisaf itself SN62335792, 1984 (AOC & DGJ), locally thought to have been anciently planted to provide thatch; a photo of c.1900 shows probable *Phragmites* thatch on an outbuilding of the farm (R. Haddaway pers. comm. 1984). In 1301 reeds were being sold at Cardigan market, alongside rushes (J. Cunnane pers. comm.), doubtless coming from the Teifi Marshes where they have recently been harvested for thatching on a small scale; reeds from there were used on a cottage at Llan-non SN51706730 in c.2007. Recently too *Phragmites* has been planted in filter beds at small village sewage works, for example at Dihewyd SN482565, 1996-2005, and by at least one pond in an amenity area, Penpontbren, Glynarthen SN310493, 1997.

There is considerable variation, and for example in the Teifi Marshes SN1845, 2005, clones covering 1ha or more may have uniformly purplish inflorescences, or pale silvery-grey ones, and may differ in leaf colour and in height.

Seed set in the county is very low, or at least was in 2003-2004 when 100 bisexual florets were scored from ten inflorescences from each of eight colonies investigated. Four colonies around the Dyfi at SN610938, 636924 and 696971 and at Clarach SN587839 averaged 0.1-2.6% fertile seeds; colonies from the Rheidol estuary SN589808, the Ystwyth estuary SN581800 and S of Llanrhystud SN523687 had no fertile seeds; and the reedbed on the Teifi Marshes SN182457-186455 averaged 0.1% fertile seeds excluding one exceptional inflorescence which had 83% fertility. All these colonies, except for the Llanrhystud one which was uninfected, had between 2.3 and 23.1% of the florets with ergots of *Claviceps purpurea*. About 1 acre of the Teifi Marshes reedbed at SN183457 was heavily infected with the spectacular smut *Ustilago grandis* in 2003 and this had spread to at least 1ha by 2005; large areas here have also been infected by the gall mite *Steneotarsonemus phragmitidis*, usually resulting in the tip of the inflorescence becoming trapped in the uppermost leaves and thus distorting it uniformly over thousands of stems, 2003-2005.

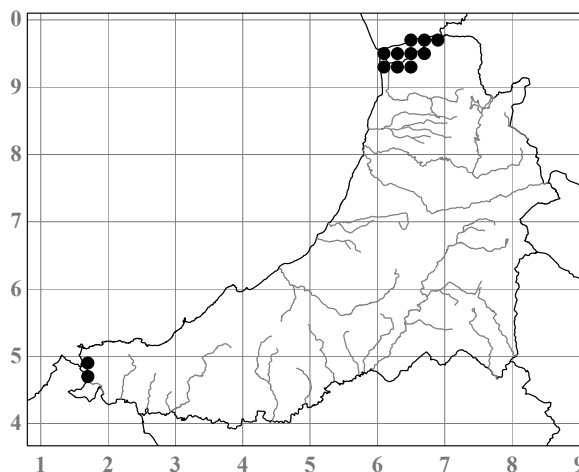
The absence of *Phragmites* from anywhere on the Teifi above the tidal limit, and from the Cors Caron area, is striking. (A mention of *Arundo*, Salter's name for it at the time, on Cors Caron in 1894 (Diary 30.6.1894) must have been a mistake as he does not mention it here in his Flora.) Altitude limit 455m, Llyn Gorast SN793632, 1924 (Salter Diary 12.7.1924) - 2004 (AOC & PAS).



Differing clones of *Phragmites* on the Teifi Marshes, view SSW from SN184457, September 2005

***Spartina anglica*** C. E. Hubb. (*S. ×townsendii* auct., non H. Groves & J. Groves) - Common Cord-grass - Cordwellt Cyffredin

Abundant all along the Dyfi estuary SN69 and along the lower part of the Teifi estuary SN14. *S. anglica* arose naturally as an amphidiploid of *S. ×townsendii* in Southampton Water around 1890, and from about 1910 it was widely planted elsewhere in Britain because of its ability to colonise rapidly and reclaim estuarine mud flats. In 1920 T. O. Cross of Ynys-hir introduced several large plants brought in crates from Southampton Water to the mud flats at c.SN673963 (Chater & Jones 1957, Chater 1976). The following year Yapp (1922), thinking that they had arrived there by natural means, noted ten clumps scattered over almost three-quarters of a mile, several "a foot or more in diameter, the largest being about 16 inches; four of the clumps were in flower." In 1926







*Spartina* (probably *S. anglica*, left, and probably *S. x townsendii*, right) colonies in the Dyfi estuary three years after planting, November 1923 (photos courtesy of Joan Reen, Ynys-hir Hall Hotel)

Yapp, who by then knew that it had been introduced (Yapp 1923), drew Salter's attention to the *Spartina* and the latter saw "two 'islets' of this grass, each with a circular wicker-work protection"; Salter visited the site again on 10.10.1931 "and found five patches of *Spartina*, each some twelve to fifteen feet in diameter. Where not grazed by sheep, the grass had flowered well, and was in fact still in flower on that date. It may consequently be taken that *Spartina* is thoroughly established in the Dovey, though at present only in small quantity and only slowly increasing" (Salter Diary 10.10.1931, 1931). Chater (1976) wrote that in 1932 "colonies, evidently derived from seed produced by the introduced plants, had meadowed to produce a continuous stand of what from memory may have been some 300 × 30m in extent as well as many small

patches scattered along 2km of shore". By 1936 Salter (Diary 22.9.1936) noted that it had "considerably increased since my last visit", and in 1940 (Diary 16.8.1940) he noted that from the train "*Spartina* appears to have much increased on both sides of the estuary". During the war 1939-1945 the estuary was used by the military for training with amphibious "ducks" and other tracked vehicles, and this was assumed to have been the reason that "After the end of the war the *Spartina* was found to have extended its area more during the war years than it had in all the 15 years before the war and it had appeared as far west as the Leri" (Chater 1976). The spread continued, and by 1965 it was estimated to cover 243ha (Hubbard & Stebbings 1967); by 1982 it covered c.375ha, the increase being greatest in the upper part of the estuary E of the Afon Cletwr. Much information on the ecology of *Spartina* on the Dyfi can be found in Chater & Jones (1957) and Chater (1976). Since the 1980s there has been erosion of some of the swards and a certain amount of die-back and decrease in vigour over parts of the estuary, although the exact amount is uncertain; this has presumably been caused, as is surmised in other parts of Britain, by the natural processes of sedimentation and the creation of anaerobic conditions in the soil occasioned by the *Spartina* itself.

It is not known when or how *Spartina* reached the Teifi estuary, but it was present on the Pembrokeshire side by 1955 and on the Cardiganshire side by 1962, and six years later Davis (1968) reported it as well established in the estuary. In 1992 it extended along the E side from Nantyferwig S for 1km SN168481-168472.

Chater & Jones (1951) and Chater (1965) described a '**dwarf brown**' form that may have originated in the early 1940s and that occurred in small quantities throughout the Dyfi estuary (K, JEL). New colonies of it were thought to be no longer being produced by the late 1950s, but a colony c.8m in diameter was found 900m E of the mouth of the Afon Leri SN62589372 in 2006 (NMW) and others to the W of the Leri SN613942 in 2007. The plants were purplish-brown, and the flowering culms only 10-30cm tall. The chromosome number,  $2n = 122$ , was the same as that of some plants of normal *S. anglica*, but its ecology differed in several respects. The only records of it elsewhere have been from the Severn estuary near Chepstow in 1950 (Chater & Jones 1951) and from Colne Point in Essex (K, JEL). Chater &



'Dwarf brown' *Spartina anglica*, Dyfi estuary, SN62109364, 1959 (photo E. H. Chater)

Jones (1951) also reported “less than a dozen” plants of almost normal-sized *S. anglica* with a median yellow stripe down the leaves as occurring, always within colonies of the ‘dwarf brown’ form, in one area on the Dyfi.

Ergots of *Claviceps purpurea* var. *spartinae* are often abundant on *Spartina* on the Dyfi, for example by the Cletwr bridge SN6494 in 1990 and 2004, and by the Leri SN6193 in 2005 and 2006 (Preece & Chater 2006).

***Spartina* × *townsendii*** H. Groves & J. Groves (*S. alterniflora* Loisel. × *maritima* (Curtis) Fernald) - Townsend’s Cord-grass - Cordwellt Townsend

Chater (1976) reported that the F1 hybrid, from which *S. anglica* arose, occurred in small quantity in the Dyfi estuary (K, EHC, det. CEH), and that photos of the planting of the *Spartina* in 1920 showed one of the plants with morphological features which suggested that it may have been the F1 hybrid; photos taken in 1923 similarly show colonies of two distinct kinds (see previous page). *S. ×townsendii* may thus have been introduced at the same time as *S. anglica*, or, as Chater also suggested, it may have arisen *in situ* from the latter by a halving of the chromosomes. *S. ×townsendii* occurs scattered in small quantity all along the estuary mixed with *S. anglica*, usually near the top of the salt marsh, and has presumably spread vegetatively. Specimens confirmed by their pollen 27-37µm in diameter, empty and usually shrunken, have been collected from SN619935 to 628936, 2000 (NMW, PMB, AOC & TGE) - 2006. There is a colony 10m long by a brackish ditch 5km S of the estuary by the B4353 at the S end of Borth SN60838898, 1998 (CMFB) - 2005 (NMW). It also occurs on the Teifi estuary at Nantyferwig SN166483, 2005 (NMW).

There is considerable variation in most characters and the identity of some plants is uncertain. In particular, plants with mixed pollen 30-50µm, 20-50% fertile, with ligules 1-2mm, occur both on the Dyfi SN646944, 2000 (NMW) and on the Teifi SN166483, 2005 (NMW).

***Spartina pectinata*** Bosc ex Link - Prairie Cord-grass - Cordwellt y Paith

A clump c.1m diameter, with pioneer culms beyond this, was growing on the bank of a brackish ditch N of the B4353 road at the S end of Borth SN60888896 in 2007 (NMW, AOC & JPP); it was probably a throw-out. It is native of North America, where it is an inland plant, and is grown for ornament and for biomass trials in Britain, but has not been noticed in cultivation locally.

***Panicum capillare*** L. - Witch-grass - Miled y Wrach

Recorded only as a single casual plant on the site of the demolished Seilo Chapel, Queens Road, Aberystwyth SN586818 in 1996 (NMW, JPW & AOC). Native of North America.

***Panicum miliaceum*** L. - Common Millet - Miled

Salter (1935) described this as “Of annual occurrence at the municipal rubbish-tip, Aberystwyth” SN591811 (NMW, det. AMe). It is now rarely seen, but appeared in a garden at Llwyn-du, Llanfihangel-y-Creuddyn SN666765 in 1975 (ABS, MHB); from dumped bird-seed at Pontsian SN43984600 in 1992 (NMW); on the rubbish-tip below Pendinas SN584798 in 1992 and 1994 (AOC & JPW); on a tip 400m E of Borth church SN616897 in 1999; on waste ground at the Ynys-las boatyard SN615932, 2005 (SPC); on a roadside in Llanarth SN42255775 in 2006; and on an Aberystwyth pavement SN58528151 in 2007. In 2002-2006 (NMW) it was sown at Ynys-hir SN66509542 by the RSPB in a mixture of species to provide food for birds. It is probably native of India.

***Panicum virgatum*** L. - (Switch-grass)

The cultivar ‘**Cave in Rock**’ of this native of North and Central America was being used in biomass trials at IGER/IBERS, Gogerddan SN624840 in 2006-2009; more extensive trials are anticipated for it in the future.

***Echinochloa crus-galli*** (L.) P. Beauv. - Cockspur - Cibogwellt Rhydd

This alien subtropical grass was first recorded in 1976 as a bird-seed alien in the garden of Llwyn-du, Llanfihangel-y-Creuddyn SN666765 (ABS, MHB). In 1993 it was found in abundance in the *Juncus effusus* marsh on the former woodyard site at Lampeter SN579488 (NMW); it must have been naturalised there for a number of years, but decreased in numbers and disappeared a few years after this. It has been seen on five other occasions, but only as a casual: several plants on a back-street verge at Tal-y-bont SN654893, 1998 (NMW); from bird-seed where people feed pigeons by Aberystwyth station SN585815, 2004 (SPC, **Herb. SPC**, conf. TBR) and 2006; one plant on the disused rubbish-tip below Pendinas, Aberystwyth SN584799,

2001 (NMW, AOC, RAJ & PJW); a few plants in a fodder crop at Capel Bangor SN65708022, 2006 (SPC); and several plants on a road verge between sandy arable fields 500m N of Waungelod, Gwbert SN168490, 2003 (NMW).

**Echinochloa colona** (L.) Link - Shama Millet - Cibogwellt y Trofannau

Recorded only once, as a few plants, probably bird-seed casuals, in flowerbeds by the bus station, Aberystwyth SN58608161, 2006 (NMW). Native of the tropics.

**Echinochloa frumentacea** Link - White Millet - Cibogwellt Gwyn

This bird-seed casual has been seen only once, a large clump on disturbed ground by the sewage works at Borth SN616896, 1995 (NMW, conf. RMP). It is of cultivated origin from India.

**Setaria pumila** (Poir.) Roem. & Schult. - Yellow Bristle-grass - Cibogwellt Melyn

A rare casual, first recorded from dumped bird-seed near Pontsian SN43984600 and 43904626 in 1992 (NMW), then from the Pendinas refuse tip SN584798 in the same year (NMW), from a garden at Penglais, Aberystwyth SN590818 in 1994 (NMW, JT), and from a road verge in Cwm Rheidol SN71557853 in 2003 (NMW). In 2004 it occurred in a Tir Gofal crop grown for seed for wild birds near Wallog SN594855 (NMW). Native of warm-temperate and tropical Eurasia and Africa.

**Setaria verticillata** (L.) P. Beauv. var. **verticillata** - Rough Bristle-grass - Cibogwellt Troellog

Apart from a specimen collected by Salter as a casual at Llanbadarn Fawr SN58V or 68A in 1927 (NMW, conf. AOC), the only records are of it as a bird-seed casual in the garden of Llwyndu, Llanfihangel-y-Creuddyn SN666765, 1975 (ABS, MHB, det. AOC), and of a colony 14m long beside a footpath alongside the Vale of Rheidol railway at Aberystwyth Station SN586813 in 2005 (NMW). Native of warm-temperate and tropical regions.

**Setaria viridis** (L.) P. Beauv. - Green Bristle-grass - Cibogwellt Gwyrddlas

A rare casual, recorded only from the Aberystwyth rubbish-tip SN591811 in 1932 (Salter 1935), from bird-seed in Llwyndu garden, Llanfihangel-y-Creuddyn SN666765, 1975 (ABS, MHB), from dumped bird-seed near Pontsian SN43904626 in 1992 (NMW), and in abundance from the site of the demolished Siloh Chapel, Aberystwyth SN586818 in 1996 (NMW, AOC & JPW, det. TBR). Native of Eurasia and N Africa.

**Digitaria sanguinalis** (L.) Scop. - Hairy Finger-grass - Byswellt Blewog

Recorded only twice, as a bird-seed casual, in 2004 (SPC, **Herb. SPC**, det. TBR) from a place by Aberystwyth station SN585815 where people feed pigeons, and in 2006 from a garden at Llanbadarn Fawr SN601809 (SPC). Native of S Europe and Asia.

**Digitaria ciliaris** (Retz.) Koeler - Tropical Finger-grass - Byswellt Trofannol

Recorded only once, as a casual by the walkway in the Aberystwyth marina SN58188120, 2006 (NMW). Native of the Old World tropics.

**Miscanthus** Andersson

In biomass trials at IGER/IBERS, Gogerddan SN68G since 2003, 204 accessions of both wild and horticultural origin of the large ornamental grass **M. sinensis** Andersson, Chinese Silver-grass, from SE Asia have been grown, along with 36 of **M. sacchariflorus** (Maxim.) Hack. and eight of **M. × giganteus** J. M. Greef & Deuter ex Hodkinson & Renvoize, Giant Silver-grass, a triploid hybrid of *M. sinensis* and *M. sacchariflorus*. Propagation is by

*Miscanthus* biomass trials, IGER, Gogerddan,  
view E from SN620840, December 2007





transplanting of rhizomes, breeding experiments are being conducted to increase yield, and varieties derived chiefly from the above two species are considered to have the potential of becoming a major new crop in Britain and Europe. *M. ×giganteus*, spectacular when in flower in late autumn, has also been trialled by ADAS Pwllpeiran at Llwynprenteg, Llanafan SN68807162, 2005 (NMW) - 2008. There has not yet though been any commercial growing of *Miscanthus* in the county as there has in Pembrokeshire and elsewhere. It has been planted for ornament in a few places in the wild, for example in open scrub woodland above Pantteg, Llanfair Clydogau SN652524, 2008, at 325m altitude.

#### ***Zea mays* L. - Maize - India-corn**

Before the 1980s little if any Maize seems to have been grown in the county. In 1988 (Anon. 1988) only 5.5ha were being grown, all in the S in the parishes of Llansantffraid c.SN56D, Ferwig c.SN14Z and Llanwenog c.SN44X. The amount grown rapidly increased after this, and its cultivation has spread steadily northwards. Most of the Maize cultivated is harvested late in the autumn for silage, and for this reason the fields, if they have not been treated with herbicide, are a rich habitat for late-flowering arable weeds. Maize though is now often grown through holes in plastic sheeting. Among the more frequently used varieties have been 'Calypso', 'Fiesta', 'Janno' and 'Eviva'. It has only once been noted as a casual, in 1992 on the rubbish-tip on the SW side of Pendinas, Aberystwyth SN584798.



Variation in *Miscanthus sinensis*, IGER trials, Gogerddan SN624840, August 2008

## Drift seeds

As might be expected from our sheltered position east of Ireland, drift seeds from across the Atlantic are uncommon on the county's beaches. Most of those that do reach us presumably come from the Caribbean and tropical America on the Gulf Stream and then the North Atlantic Drift. A surface current flowing clockwise round Ireland can then carry them southwards into the Irish Sea and Cardigan Bay, and they can also be carried northwards from off Cornwall by residual and surface currents. Their voyage probably lasts on average about 14 months. Borth and Ynys-las are the most productive sites, but my experience is that at least ten hours' search is required on average to find one seed. A stretch at the S end of the dunes SN605928 where drift and especially nurdles (small plastic pellets, the form in which plastic is often transported in bulk) accumulate after storms is the best location. Nelson (2000) is the main source of information on drift seeds in Britain, and see also Chater (1998b).

### ***Dioclea reflexa*** Hook. f. (Fabaceae) - (Sea Purse)

One seed was found on Tan-y-bwlch beach SN579798 on 30.3.1999 by AOC. Native of the tropics.

### ***Entada gigas*** (L.) Fawc. & Rendle (Fabaceae) - (Sea Bean)

The most frequently found drift seed with at least 25 recorded in the county, especially at Borth and Ynys-las SN68E-69C where, for example, L. Trubshaw collected an average of one a year in the 1990s; they have also been collected here by L. Delahaye, A. Clare, MBr, CDPa, AOC and others in 1987-2006. One was found at Clarach SN586890 in 1998 by H. Rabjohns; one at Tan-y-bwlch SN579804 in 2000 by MBr; two only c.2m apart at Gylfach yr Halen SN435613 in 1999 by A. Clare and MDS; and one at Bryn-y-mor on the Teifi estuary SN168474 in 1997 by P. G. & J. C. Young. Native of tropical America and Africa.



Driftline with nurdles, S end of Ynys-las dunes, view N from SN60559282, April 2007

### ***Lathyrus japonicus*** Willd. subsp. ***maritimus*** (L.) P. W. Ball (Fabaceae) - Sea Pea - Ytbysen Arfor

Five seeds were sieved from debris consisting largely of nurdles, derived from the storm of mid-February 1997 by AOC, at the S end of the Ynys-las dunes SN605928; one of these grown by SPC flowered and set seed annually 1999-2008 and is clearly self-compatible. While it is possible that these seeds may have come from Ireland, they seem more likely to have originated from the E coast of North America (Nelson 2000). On the other hand, the grown plant from Ynys-las is clearly subsp. *maritimus*, with racemes 6- to 8-flowered, subglabrous calyces that are glabrous at maturity, and flowers 16-18(-20)mm (SPC pers. comm.), whereas the North American plants are subsp. *japonicus* with fewer, smaller flowers and pubescent calyces. The matter remains unresolved. The only Welsh record of *L. japonicus* is from Bardsey, where it may well also have grown from a drift seed.

### ***Mucuna sloanei*** Fawc. & Rendle (Fabaceae) - (Horse-eye Bean)

One seed was found by a visitor at Ynys-las SN69 in June 1989, H. Slade pers. comm. (and Morgan 1992); it was put on display but was then unfortunately stolen. The only other was found here at SN605926 on 8.2.2007 by RAJ. Native of tropical America.

### ***Sapindus saponaria*** L. (Sapindaceae) - (Soap Berry)

One seed was found among nurdles and other debris from the storm of 25.11.2000 by AOC and MDS, at the S end of the Ynys-las dunes SN606929, and confirmed by E. C. Nelson (Chater 2001b). There is only one previous British record, from Barra in the Outer Hebrides in 1903, and Nelson (2000) discusses the likelihood of it being a true drift seed. The fact that the 2000 specimen was on the same driftline and from the same storm as drift seeds of *Entada gigas* and *Ipomoea alba* perhaps increases the probability that it too really was one. Native of tropical America.

***Ipomoea alba* L. (Convolvulaceae) - (Moonflower)**

One seed of this native of tropical America was sieved from drift debris with abundant nurdles derived from the storm of 25.11.2000 by AOC, at the S end of the Ynys-las dunes SN606929.

***Ipomoea* cf. *pes-caprae* (L.) R. Br. (Convolvulaceae)**

One seed probably of this native of the tropics was sieved from drift debris with nurdles derived from the storm of 1.2.2002 by AOC, at the S end of the Ynys-las dunes SN606928.

***Cocos nucifera* L. (Arecaceae) - (Coconut)**

A small Coconut complete with its husk found at the S end of Borth beach SN6089 in 1995 by L. Delahaye may possibly, as it was so small, have been a true drift seed and not just refuse. Native of SW Asia but widely cultivated in the tropics.



## Appendix 1

**Maximum dimensions of trees.** Details of each case can be found in the species accounts.

	girth (cm)	height (m)		girth (cm)	height (m)
<i>Abies alba</i>	443	39	<i>Picea sitchensis</i>	334	32
<i>Abies nordmanniana</i>	313	31	<i>Picea smithiana</i>	249	16
<i>Abies procera</i>	372	30	<i>Pinus nigra</i>	425	28
<i>Acer campestre</i>	269	18	<i>Pinus peuce</i>	150	
<i>Acer platanoides</i>	352	23	<i>Pinus radiata</i>	334	25
<i>Acer pseudoplatanus</i>	521		<i>Pinus strobus</i>	245	13
<i>Aesculus hippocastanum</i>	474		<i>Pinus sylvestris</i>	338	22
<i>Alnus ×hybrida</i>	172	19	<i>Pinus wallichiana</i>	278	28
<i>Alnus glutinosa</i>	635	13	<i>Platanus ×hispanica</i>	525	24
<i>Alnus rubra</i>	238	32	<i>Platyclusus orientalis</i>	187	12
<i>Araucaria araucana</i>	307	22	<i>Populus ×canadensis</i> ‘Casale 78’	192	26
<i>Betula pendula</i>	305	15	<i>Populus ×canadensis</i> ‘Eugenii’	241	26
<i>Buxus sempervirens</i>	124		<i>Populus ×canadensis</i> ‘Gelrica’	209	27
<i>Calocedrus decurrens</i>	414	22	<i>Populus ×canadensis</i> ‘Heidemij’	215	21
<i>Carpinus betulus</i>	354		<i>Populus ×canadensis</i> ‘Marilandica’	393	30
<i>Castanea sativa</i>	692		<i>Populus ×canadensis</i> ‘Regenerata’	169	28
<i>Cedrus atlantica</i>	405	17	<i>Populus ×canadensis</i> ‘Robusta’	250	21
<i>Cedrus deodara</i>	354	17	<i>Populus ×canadensis</i> ‘Robusta’	216	26
<i>Cedrus libani</i>	656		<i>Populus ×canadensis</i> ‘Serotina’	383	
<i>Chamaecyparis lawsoniana</i>	397	21	<i>Populus ×canadensis</i> ‘Serotina’	297	30
<i>Chamaecyparis lawsoniana</i>	167	24	<i>Populus ×canescens</i>	396	23
<i>Chamaecyparis pisifera</i>	236	15	<i>Populus alba</i>	266	
<i>Corylus avellana</i>	116		<i>Populus</i> ‘Balsam Spire’	204	30
<i>Corylus avellana</i> (stool)	470		<i>Populus nigra</i>	500	35
<i>Crataegus monogyna</i>	157		<i>Populus nigra</i> ‘Italica Foemina’	295	21
<i>Cryptomeria japonica</i>	290	29	<i>Populus nigra</i> ‘Italica Foemina’	245	31
<i>Cryptomeria japonica</i>	338	30	<i>Populus nigra</i> ‘Plantierensis’	245	21
<i>Cupressus macrocarpa</i>	424	27	<i>Populus tremula</i>	207	16
<i>Cupressus macrocarpa</i>	209	29	<i>Populus trichocarpa</i>	304	22
<i>Fagus moesiaca</i>	430	28	<i>Prunus avium</i>	352	
<i>Fagus sylvatica</i>	660		<i>Prunus lusitanica</i>	190	
<i>Fagus sylvatica</i>	384	31	<i>Pseudotsuga menziesii</i>	541	21
<i>Fagus sylvatica</i> (bunch planted)	827	21	<i>Pseudotsuga menziesii</i>	352	36
<i>Fraxinus excelsior</i>	573	21	<i>Quercus ×rosacea</i>	553	24
<i>Fraxinus excelsior</i>	527	25	<i>Quercus cerris</i>	543	22
<i>Fraxinus excelsior</i> (stool)	1020		<i>Quercus ilex</i>	255	21
<i>Fraxinus ornus</i>	275	14	<i>Quercus ilex</i>	236	23
<i>Ginkgo biloba</i>	307	22	<i>Quercus petraea</i>	663	22
<i>Larix ×marschlinsii</i>	275	13	<i>Quercus robur</i>	610	
<i>Larix decidua</i>	279	19	<i>Quercus rubra</i>	341	18
<i>Larix decidua</i>	209	29	<i>Quercus suber</i>	260	10
<i>Larix kaempferi</i>	200	20	<i>Robinia pseudoacacia</i>	299	
<i>Liriodendron tulipifera</i>	483		<i>Salix alba</i> var. <i>alba</i>	251	21
<i>Malus sylvestris</i>	275	8	<i>Salix caprea</i> subsp. <i>caprea</i>	300	
<i>Metasequoia glyptostroboides</i>	240	22	<i>Salix ×fragilis</i> var. <i>russelliana</i>	305	21
<i>Nothofagus alpina</i>	291	25	<i>Salix pentandra</i>	205	
<i>Nothofagus dombeyi</i>	295	19	<i>Sambucus nigra</i>	218	
<i>Nothofagus obliqua</i>	174	20	<i>Sequoia sempervirens</i>	439	27
<i>Picea abies</i>	336	26	<i>Sequoiadendron giganteum</i>	720	36
<i>Picea abies</i>	332	39	<i>Sequoiadendron giganteum</i>	678	42
<i>Picea glauca</i>	168	18	<i>Sorbus aucuparia</i>	272	

	girth (cm)	height (m)		girth (cm)	height (m)
<i>Sorbus torminalis</i>	124		<i>Tilia platyphyllos</i>	595	
<i>Taxodium distichum</i>	397	23	<i>Tsuga heterophylla</i>	308	19
<i>Taxus baccata</i>	714		<i>Ulmus daveyi</i>	283	
<i>Thuja plicata</i>	500	31	<i>Ulmus daveyi</i>	278	22
<i>Thuja plicata</i>	354	36	<i>Ulmus mossii</i>	240	
<i>Thujopsis dolabrata</i>	264	13	<i>Ulmus scabra</i>	420	18
<i>Tilia ×europaea</i>	721	21	<i>Ulmus scabrosa</i>	229	
<i>Tilia ×europaea</i>	321	28	<i>Ulmus vegeta</i>	397	35
<i>Tilia cordata</i>	369	27	<i>Xanthocyparis nootkatensis</i>	356	18

## Appendix 2

**Growth rates of selected trees of known age.** Many of these examples are not included in the species accounts. The measurements were made in the period 1970-2009. The columns contain:

1. Taxon name
2. Grid reference (all in SN)
3. Altitude of the site in metres
4. Position of tree (w = in woodland, o = in the open, w/o = in open woodland or at wood margin)
5. Age of tree in years, from ring count or planting date (\* indicates approximate age)
6. Girth of trunk in cm
7. Increase of girth in cm per year

	Grid ref (SN)	altitude (m)	position	age (yr)	girth (cm)	increase of girth (cm per yr)
<i>Abies alba</i>	631833	70	w	37	174	4.7
<i>Abies alba</i>	631833	70	w	37	80	2.2
<i>Abies alba</i>	630832	75	w	37	104	2.8
<i>Abies amabilis</i>	738906	440	w	36	85	2.4
<i>Abies amabilis</i>	745856	380	w	38	36	0.9
<i>Abies amabilis</i>	631833	70	w	34	128	3.8
<i>Abies concolor</i> var. <i>lowiana</i>	630832	80	w	37	114	3.1
<i>Abies concolor</i> var. <i>lowiana</i>	631833	70	w	37	68	1.8
<i>Abies concolor</i> var. <i>lowiana</i>	630833	70	w	37	130	3.5
<i>Abies concolor</i> var. <i>lowiana</i>	631832	75	w	37	98	2.6
<i>Abies concolor</i> var. <i>lowiana</i>	631932	75	w	37	40	1.1
<i>Abies concolor</i> var. <i>lowiana</i>	633834	60	w	37	118	3.2
<i>Abies concolor</i> var. <i>lowiana</i>	633834	60	w	37	128	3.5
<i>Abies concolor</i> var. <i>lowiana</i>	633834	60	w	37	114	3.1
<i>Abies concolor</i> var. <i>lowiana</i>	691709	190	w	34	105	3.1
<i>Abies delavayi</i>	631833	70	w	34	96	2.8
<i>Abies delavayi</i>	68979620	7	w/o	24	33	1.4
<i>Abies firma</i>	630832	75	w	27	126	4.7
<i>Abies firma</i>	738908	440	w	50	45	0.9
<i>Abies grandis</i>	662932	40	w	37	106	2.9
<i>Abies grandis</i>	739903	410	w	37	96	2.6
<i>Abies grandis</i>	630832	75	w	37	146	3.9
<i>Abies grandis</i>	662932	40	w/o	37	175	4.7
<i>Abies koreana</i>	633834	60	w	31	52	1.7
<i>Abies nordmanniana</i>	631832	75	w	36	105	2.9
<i>Abies nordmanniana</i>	630833	70	w	37	134	3.6
<i>Abies nordmanniana</i>	691709	190	w	34	67	2.0
<i>Abies nordmanniana</i>	474607	75	w	34	50	1.5
<i>Abies nordmanniana</i>	474607	75	w/o	34	140	4.1

	Grid ref (SN)	altitude (m)	position	age (yr)	girth (cm)	increase of girth (cm per yr)
<i>Abies pinsapo</i>	631833	70	w	34	114	3.4
<i>Abies procera</i>	739903	410	w	36	114	3.2
<i>Abies procera</i>	630832	75	w	37	162	4.4
<i>Abies veitchii</i>	630833	70	w	37	113	3.1
<i>Abies veitchii</i>	630832	75	w	37	122	3.3
<i>Acer platanoides</i>	630832	75	w	37	95	2.6
<i>Acer platanoides</i>	630832	75	w	35	89	2.5
<i>Acer pseudoplatanus</i>	518634	170	o	78	174	2.2
<i>Acer saccharinum</i>	630832	75	w	37	159	4.3
<i>Alnus rubra</i>	59388204	45	w/o	39	238	6.1
<i>Araucaria araucana</i>	630832	75	w	36	84	2.3
<i>Araucaria araucana</i>	738908	440	w/o	50	53	1.1
<i>Betula alleghaniensis</i>	630832	65	w	40	96	2.4
<i>Betula alleghaniensis</i>	630832	60	w	40	117	2.9
<i>Carpinus betulus</i>	61657844	115	w/o	133	354	2.7
<i>Castanea sativa</i>	628838	4	w	210	330	1.6
<i>Castanea sativa</i>	630832	75	w	35	114	3.3
<i>Cedrus atlantica</i>	67067300	60	o	59	271	4.6
<i>Cedrus atlantica</i>	630832	70	w	37	210	5.7
<i>Cedrus atlantica</i>	630832	70	w	37	63	1.7
<i>Cedrus deodara</i>	67107315	60	o	46	146	3.2
<i>Cedrus deodara</i>	630832	80	w	34	73	2.1
<i>Cedrus deodara</i>	630832	80	w	34	85	2.5
<i>Cedrus libani</i>	762732	185	o	*205	454	2.2
<i>Cedrus libani</i>	67207298	60	o	*114	574	5.0
<i>Chamaecyparis lawsoniana</i>	765732	210	o	99	205	2.1
<i>Chamaecyparis lawsoniana</i>	720721	95	w	53	86	1.6
<i>Chamaecyparis lawsoniana</i>	720721	95	w	53	116	2.2
<i>Chamaecyparis obtusa</i>	630832	80	w	37	116	3.1
<i>Chamaecyparis pisifera</i> ‘Squarrosa’	68529520	20	o	58	118	2.0
<i>Corylus avellana</i>	482634	30	w	71	67	0.9
<i>Corylus colurna</i>	59388202	45	w/o	45	99	2.2
<i>Cryptomeria japonica</i>	630832	75	w	37	179	4.8
× <i>Cuprocyparis leylandii</i>	738908	440	w	37	70	1.9
<i>Eucalyptus gunnii</i>	66967319	60	o	17	117	6.9
<i>Eucalyptus gunnii</i>	630832	75	w	34	221	6.5
<i>Eucalyptus niphophila</i>	630832	75	w	27	42	1.6
<i>Eucalyptus nitens</i>	54696952	35	o	27	113	4.2
<i>Fagus sylvatica</i>	69059661	5	o	147	346	2.4
<i>Fagus sylvatica</i>	578764	110	o	125	220	1.8
<i>Fagus sylvatica</i>	578764	110	o	129	288	2.2
<i>Fagus sylvatica</i>	685599	180	o	145	483	3.3
<i>Fagus sylvatica</i>	619810	10	o	82	233	2.8
<i>Fagus sylvatica</i>	67207270	65	w	186	328	1.8
<i>Fagus sylvatica</i>	75507358	300	w	156	243	1.6
<i>Fagus sylvatica</i>	66717301	55	w	179	446	2.5
<i>Fagus sylvatica</i>	47926025	40	w	192	288	1.5
<i>Fagus sylvatica</i>	663795	40	w	69	245	3.6
<i>Fagus sylvatica</i>	630832	70	w	35	162	4.6
<i>Fagus sylvatica</i> forma <i>purpurea</i>	62087860	50	w	*163	285	1.7
<i>Fagus sylvatica</i> forma <i>purpurea</i>	630832	70	w	35	65	1.9
<i>Fraxinus excelsior</i>	671851	110	o	173	204	1.2
<i>Fraxinus excelsior</i>	646880	60	o	159	362	2.3
<i>Fraxinus excelsior</i>	713608	230	o	48	163	3.4



	Grid ref (SN)	altitude (m)	position	age (yr)	girth (cm)	increase of girth (cm per yr)
<i>Fraxinus excelsior</i>	550571	100	o	109	317	2.9
<i>Fraxinus excelsior</i>	550571	100	o	138	270	2.0
<i>Fraxinus excelsior</i>	51465779	95	o	82	266	3.2
<i>Fraxinus excelsior</i>	630832	75	w	35	83	2.4
<i>Ginkgo biloba</i>	764732	205	w	118	95	0.8
<i>Ilex aquifolium</i>	585772	60	o	78	120	1.5
<i>Larix decidua</i>	630832	75	w	34	129	3.8
<i>Larix decidua</i>	740771	160	w	121	194	1.6
<i>Larix decidua</i>	740771	160	w/o	121	222	1.8
<i>Larix kaempferi</i>	683840	270	w	71	162	2.3
<i>Larix kaempferi</i>	630832	75	w	35	128	3.7
<i>Liriodendron tulipifera</i>	67067300	60	o	54	198	3.7
<i>Liriodendron tulipifera</i>	630832	70	w	34	120	3.5
<i>Metasequoia glyptostroboides</i>	630832	75	w	37	50	1.4
<i>Metasequoia glyptostroboides</i>	593820	45	w/o	43	240	5.6
<i>Metasequoia glyptostroboides</i>	593820	45	w/o	43	219	5.1
<i>Nothofagus alpina</i>	593820	50	w	42	291	6.9
<i>Nothofagus alpina</i>	663931	45	w	36	52	1.4
<i>Nothofagus alpina</i>	663931	45	w	36	123	3.4
<i>Nothofagus alpina</i>	630832	75	w	37	186	5.0
<i>Nothofagus dombeyi</i>	59548210	60	o	43	295	6.9
<i>Nothofagus obliqua</i>	663931	45	w	36	53	1.5
<i>Nothofagus obliqua</i>	663931	45	w	36	79	2.2
<i>Nothofagus obliqua</i>	630832	75	w	37	182	4.9
<i>Picea abies</i>	630832	70	w	35	124	3.5
<i>Picea abies</i>	69227100	170	w	58	152	2.6
<i>Picea asperata</i>	630832	70	w	26	24	0.9
<i>Picea brachytyla</i>	630832	80	w	37	103	2.8
<i>Picea breweriana</i>	67017297	60	o	18	58	3.2
<i>Picea engelmannii</i>	745865	380	w	38	64	1.7
<i>Picea glauca</i>	630832	80	w	37	99	2.7
<i>Picea glauca</i>	631833	70	w	37	79	2.1
<i>Picea glauca</i>	630832	70	w	37	97	2.6
<i>Picea glauca</i>	630832	75	w	37	49	1.3
<i>Picea glauca</i>	745865	380	w	39	49	1.3
<i>Picea glauca</i>	738908	440	w	36	60	1.7
<i>Picea glehnii</i>	73578181	340	w	50	75	1.5
<i>Picea glehnii</i>	745865	380	w	38	57	1.5
<i>Picea ×lutzii</i>	745865	380	w	37	84	2.3
<i>Picea mariana</i>	631833	80	w	37	49	1.3
<i>Picea omorika</i>	721822	360	w	44	85	1.9
<i>Picea omorika</i>	721822	360	w	44	65	1.5
<i>Picea omorika</i>	736818	350	w	50	72	1.4
<i>Picea omorika</i>	738908	440	w	37	75	2.0
<i>Picea orientalis</i>	632833	70	w	37	101	2.7
<i>Picea orientalis</i>	630832	75	w	37	112	3.0
<i>Picea pungens</i>	66947315	60	o	20	24	1.2
<i>Picea rubens</i>	630832	75	w	37	79	2.1
<i>Picea sitchensis</i>	630832	80	w	37	141	3.8
<i>Picea sitchensis</i>	701843	370	w	63	67	1.1
<i>Picea sitchensis</i>	701843	370	w	63	83	1.3
<i>Picea sitchensis</i>	701843	370	w	63	142	2.3
<i>Picea sitchensis</i>	701843	370	w	63	176	2.8
<i>Picea sitchensis</i>	701843	370	w	63	212	3.4

	Grid ref (SN)	altitude (m)	position	age (yr)	girth (cm)	increase of girth (cm per yr)
<i>Picea sitchensis</i>	713835	335	w	55	155	2.8
<i>Picea sitchensis</i>	713835	335	w	55	98	1.8
<i>Picea sitchensis</i>	713835	335	w	40	131	3.3
<i>Picea sitchensis</i>	718832	320	w	38	125	3.3
<i>Picea sitchensis</i>	718832	320	w	56	64	1.1
<i>Picea sitchensis</i>	718832	320	w	56	144	2.6
<i>Picea sitchensis</i>	702703	310	w	52	202	3.9
<i>Picea sitchensis</i>	702703	310	w	52	229	4.4
<i>Picea sitchensis</i>	713835	335	w/o	55	167	3.0
<i>Picea sitchensis</i>	713835	335	w/o	55	179	3.3
<i>Picea spinulosa</i>	745865	380	w	38	39	1.0
<i>Pinus banksiana</i>	630832	75	w	36	83	2.3
<i>Pinus monticola</i>	630832	75	w	37	99	2.7
<i>Pinus monticola</i>	630832	75	w	36	84	2.3
<i>Pinus muricata</i>	630832	75	w	32	199	6.2
<i>Pinus muricata</i>	630832	75	w	32	134	4.2
<i>Pinus nigra</i>	68409553	7	o	108	204	1.9
<i>Pinus nigra</i>	674816	90	o	*120	290	2.4
<i>Pinus peuce</i>	631833	80	w	34	108	3.2
<i>Pinus peuce</i>	738908	440	w	36	85	2.4
<i>Pinus pinaster</i>	631833	80	w	32	109	3.4
<i>Pinus ponderosa</i>	630832	75	w	37	112	3.0
<i>Pinus ponderosa</i>	631833	80	w	34	87	2.6
<i>Pinus radiata</i>	593821	50	o	26	255	9.8
<i>Pinus radiata</i>	631833	80	w	34	246	7.2
<i>Pinus radiata</i>	597816	80	w/o	36	215	6.0
<i>Pinus resinosa</i>	630832	80	w	37	66	1.8
<i>Pinus resinosa</i>	630832	80	w	37	77	2.1
<i>Pinus sabiniana</i>	630832	75	w	36	83	2.3
<i>Pinus strobus</i>	61677816	65	o	*139	245	1.8
<i>Pinus sylvestris</i>	70277119	245	o	119	291	2.4
<i>Pinus sylvestris</i>	676958	10	w	86	119	1.4
<i>Pinus sylvestris</i>	676958	10	w	121	132	1.1
<i>Pinus sylvestris</i>	676958	10	w	87	142	1.6
<i>Pinus sylvestris</i>	676958	10	w	99	192	1.9
<i>Pinus sylvestris</i>	676958	10	w	100	194	1.9
<i>Pinus sylvestris</i>	74297685	200	w	*200	330	1.6
<i>Pinus sylvestris</i>	74297685	200	w	*188	338	1.8
<i>Pinus sylvestris</i>	631832	80	w	34	121	3.6
<i>Pinus sylvestris</i>	630832	70	w	34	121	3.6
<i>Pinus uncinata</i>	738908	440	w	36	50	1.4
<i>Platanus ×hispanica</i>	630732	70	w	25	62	2.5
<i>Populus ×canadensis</i> ‘Casale 78’	484505	245	o	29	149	5.1
<i>Populus ×canadensis</i> ‘Regenerata’	482534	235	o	*39	145	3.7
<i>Populus ×canadensis</i> ‘Robusta’	189485	100	o	43	135	3.1
<i>Populus ×canadensis</i> ‘Robusta’	19214856	85	o	34	171	5.0
<i>Populus ×canadensis</i> ‘Robusta’	575759	145	o	12	57	4.8
<i>Populus ×canadensis</i> ‘Robusta’	621836	20	w	30	221	7.4
<i>Populus ×canadensis</i> ‘Robusta’	665727	80	w	43	196	4.6
<i>Populus ×canadensis</i> ‘Robusta’	665727	80	w	43	162	3.8
<i>Populus ×canadensis</i> ‘Serotina’	47744831	190	o	69	210	3.0
<i>Populus ×canadensis</i> ‘Serotina’	47744831	190	o	69	169	2.4
<i>Populus ×canadensis</i> ‘Serotina’	47744831	190	o	69	240	3.5
<i>Populus ×canadensis</i> ‘Serotina’	26724165	15	o	49	251	5.1

	Grid ref (SN)	altitude (m)	position	age (yr)	girth (cm)	increase of girth (cm per yr)
<i>Populus</i> × <i>canadensis</i> ‘Serotina’	38254320	180	o	55	174	3.2
<i>Populus</i> ‘Balsam Spire’	635729	150	o	14	46	3.3
<i>Populus</i> ‘Balsam Spire’	635729	150	o	14	103	7.4
<i>Populus</i> ‘Balsam Spire’	588522	150	o	32	142	4.4
<i>Populus</i> ‘Balsam Spire’	550517	170	o	29	130	4.5
<i>Populus</i> ‘Balsam Spire’	534545	125	o	28	133	4.8
<i>Populus</i> ‘Balsam Spire’	66787260	60	w	46	204	4.4
<i>Populus nigra</i>	57387694	125	o	34	155	4.6
<i>Populus nigra</i>	57387694	125	o	34	169	5.0
<i>Populus nigra</i>	57557732	145	o	60	240	4.0
<i>Populus nigra</i>	63436721	255	o	*114	285	2.5
<i>Populus trichocarpa</i>	73909741	85	o	35	241	6.9
<i>Populus trichocarpa</i>	67879628	7	o	34	200	5.9
<i>Populus trichocarpa</i>	498598	60	w/o	*23	102	4.4
<i>Pseudotsuga menziesii</i>	630832	75	w	34	189	5.6
<i>Quercus canariensis</i> × <i>robur</i>	633834	60	w	37	96	2.6
<i>Quercus cerris</i>	67097315	60	o	46	158	3.4
<i>Quercus cerris</i>	630832	75	w	35	116	3.3
<i>Quercus palustris</i>	40484513	115	o	67	154	2.3
<i>Quercus petraea</i>	679932	130	o	185	358	1.9
<i>Quercus petraea</i>	690885	120	o	70	170	2.4
<i>Quercus petraea</i>	467614	35	o	111	335	3.0
<i>Quercus petraea</i>	74207705	190	w	150	185	1.2
<i>Quercus petraea</i>	587706	125	w/o	99	137	1.4
<i>Quercus petraea</i>	74207705	190	w	154	137	0.9
<i>Quercus petraea</i> or <i>robur</i>	54155516	85	o	160	437	2.7
<i>Quercus petraea</i> or <i>robur</i>	476604	35	o	176	174	1.0
<i>Quercus petraea</i> or <i>robur</i>	490597	75	o	190	433	2.3
<i>Quercus petraea</i> or <i>robur</i>	646880	60	o	111	170	1.5
<i>Quercus robur</i>	670731	60	o	46	151	3.3
<i>Quercus robur</i>	51394520	125	o	212	319	1.5
<i>Quercus robur</i>	541564	65	o	125	282	2.3
<i>Quercus robur</i>	6711798	60	w	66	130	2.0
<i>Quercus robur</i>	671730	60	w	51	70	1.4
<i>Quercus robur</i>	671730	60	w	71	110	1.5
<i>Quercus robur</i>	671730	60	w	81	167	2.1
<i>Quercus robur</i>	630832	75	w	38	78	2.1
<i>Quercus robur</i>	671730	60	w	61	108	1.8
<i>Quercus</i> × <i>rosacea</i>	522671	35	o	70	146	2.1
<i>Quercus</i> × <i>rosacea</i>	683965	10	w/o	119	267	2.2
<i>Quercus</i> × <i>rosacea</i>	683965	10	w/o	118	273	2.3
<i>Quercus</i> × <i>rosacea</i>	683965	10	w/o	124	232	1.9
<i>Quercus</i> × <i>rosacea</i>	68339632	10	w/o	154	278	1.8
<i>Quercus rubra</i>	630832	75	w	35	122	3.5
<i>Quercus suber</i>	59438210	60	w/o	41	205	5.0
<i>Robinia pseudoacacia</i>	630832	75	w	37	160	4.3
<i>Robinia pseudoacacia</i>	630832	70	w	27	89	3.3
<i>Salix alba</i> forma <i>britzensis</i>	59208195	30	w/o	35	244	7.0
<i>Sequoia sempervirens</i>	630832	75	w	37	178	4.8
<i>Sequoia sempervirens</i>	630832	75	w	37	210	5.7
<i>Sequoiadendron giganteum</i>	60037599	25	o	*120	534	4.4
<i>Sequoiadendron giganteum</i>	523565	80	o	*138	633	4.6
<i>Sequoiadendron giganteum</i>	61928347	50	o	*120	544	4.5
<i>Sequoiadendron giganteum</i>	630832	75	w	37	114	3.1



	Grid ref (SN)	altitude (m)	position	age (yr)	girth (cm)	increase of girth (cm per yr)
<i>Sequoiadendron giganteum</i>	523565	80	w	*138	571	4.1
<i>Sorbus aria</i>	630832	70	w	37	83	2.2
<i>Sorbus aucuparia</i>	71927625	300	o	71	110	1.5
<i>Sorbus intermedia</i>	630832	70	w	37	86	2.3
<i>Sorbus latifolia</i>	597855	45	w/o	90	134	1.5
<i>Sorbus latifolia</i>	597855	45	w/o	90	79	0.9
<i>Taxodium distichum</i>	630832	80	w	37	49	1.3
<i>Taxus baccata</i>	599810	10	o	104	175	1.7
<i>Thuja plicata</i>	74247681	220	o	*100	282	2.8
<i>Thuja plicata</i>	74247681	220	o	*100	246	2.4
<i>Thuja plicata</i>	630832	75	w	35	137	3.9
<i>Tilia cordata</i>	630832	70	w	34	151	4.4
<i>Tilia cordata</i>	66747313	60	w/o	16	32	2.0
<i>Tilia ×europaea</i>	630832	70	w	35	105	3.0
<i>Tsuga heterophylla</i>	630832	75	w	35	109	3.1
<i>Tsuga heterophylla</i>	630832	75	w	35	138	3.9
<i>Tsuga mertensiana</i>	738908	440	w	50	28	0.6
<i>Ulmus cf. hollandica</i>	591789	10	o	122	284	2.3
<i>Ulmus cf. hollandica</i>	591789	10	o	124	289	2.3
<i>Ulmus cf. hollandica</i>	593796	35	o	155	270	1.7
<i>Ulmus cf. hollandica</i>	593796	35	o	150	201	1.3
<i>Ulmus daveyi</i>	64749181	30	o	148	283	1.9
<b>Average of trees in woodland</b>			<b>w</b>			<b>2.8</b>
<b>Average of trees in open</b>			<b>o</b>			<b>3.3</b>
<b>Average of trees in intermediate position</b>			<b>w/o</b>			<b>3.3</b>
<b>Average overall</b>						<b>2.9</b>

### Appendix 3

**Altitude limits of species occurring at 300m or over.** Full details in all cases can be found in the species accounts. In column 1, P indicates planted, and R indicates regenerating or self-sown. Column 2 gives altitude limits in metres recorded before 1950, while column 3 gives those recorded from 1950-2009.

Species	pre-1950	1950+	Species	pre-1950	1950+
<i>Abies alba</i> P		440	<i>Alchemilla filicaulis</i> subsp. <i>vestita</i>		300
<i>Abies amabilis</i> P		440	<i>Alchemilla glabra</i>	435	435
<i>Abies procera</i> P		540	<i>Alchemilla mollis</i>		460
<i>Abies procera</i> R		350	<i>Alisma plantago-aquatica</i>		300
<i>Acer pseudoplatanus</i> P		415	<i>Alliaria petiolata</i>		490
<i>Acer pseudoplatanus</i> R		360	<i>Alnus glutinosa</i>		300
<i>Achillea millefolium</i>	455	460	<i>Alnus glutinosa</i> P		445
<i>Achillea ptarmica</i>	435	435	<i>Alopecurus geniculatus</i>		430
<i>Aconitum napellus</i> subsp. <i>napellus</i>	375	375	<i>Alopecurus pratensis</i>		410
<i>Adoxa moschatellina</i>	515	170	<i>Anagallis tenella</i>	410	340
<i>Aegopodium podagraria</i>		415	<i>Anaphalis margaritacea</i>		410
<i>Aesculus hippocastanum</i> P		355	<i>Andromeda polifolia</i>		570
<i>Agrostis canina</i>		740	<i>Anemone nemorosa</i>	610	550
<i>Agrostis capillaris</i>		750	<i>Angelica silvestris</i>	365	360
<i>Agrostis gigantea</i>		300	<i>Antennaria dioica</i>	c.370	300
<i>Agrostis stolonifera</i>	750	690	<i>Anthoxanthum odoratum</i>	c.750	730
<i>Agrostis vinealis</i>		690	<i>Anthriscus sylvestris</i>		305
<i>Aira praecox</i>		590	<i>Aphanes arvensis</i>		440
<i>Ajuga reptans</i>		560	<i>Aphanes australis</i>		450

Species	pre-1950	1950+	Species	pre-1950	1950+
<i>Aquilegia vulgaris</i>	375		<i>Carex hirta</i>		310
<i>Araucaria araucana</i> P		440	<i>Carex hostiana</i>		490
<i>Arenaria leptoclados</i>		410	<i>Carex laevigata</i>		360
<i>Arrhenatherum elatius</i>		430	<i>Carex lasiocarpa</i>		465
<i>Artemisia absinthium</i>	375	120	<i>Carex leporina</i>	520	510
<i>Artemisia vulgaris</i>		410	<i>Carex limosa</i>		520
<i>Asplenium adiantum-nigrum</i>	300	430	<i>Carex magellanica</i> subsp. <i>irrigua</i>		500
<i>Asplenium ceterach</i> var. <i>crenatum</i>		420	<i>Carex montana</i>		355
<i>Asplenium ruta-muraria</i>		460	<i>Carex muricata</i> subsp. <i>pairae</i>		335
<i>Asplenium scolopendrium</i>	350	520	<i>Carex nigra</i>		700
<i>Asplenium septentrionale</i>		335	<i>Carex pallescens</i>		410
<i>Asplenium trichomanes</i> subsp. <i>quadrivalens</i>		530	<i>Carex panicea</i>		735
<i>Asplenium trichomanes</i> subsp. <i>trichomanes</i>		470	<i>Carex paniculata</i>	490	490
<i>Asplenium viride</i>		410	<i>Carex pendula</i>		310
<i>Astrantia major</i>		450	<i>Carex pilulifera</i>	610	740
<i>Athyrium filix-femina</i>		560	<i>Carex pulicaris</i>	550	600
<i>Atriplex patula</i>		490	<i>Carex rostrata</i>		575
<i>Atriplex prostrata</i>		410	<i>Carex viridula</i> subsp. <i>oedocarpa</i>	610	640
<i>Avena fatua</i>		300	<i>Carlina vulgaris</i>		320
<i>Avena sativa</i>		295	<i>Carum verticillatum</i>	435	325
<i>Avena</i> sp.	410		<i>Centaurea montana</i>		415
<i>Barbarea verna</i>		300	<i>Centaurea nigra</i> subsp. <i>nigra</i>	490	440
<i>Bellis perennis</i>		415	<i>Centaureum erythraea</i>		435
<i>Berberis vulgaris</i>		305	<i>Cerastium fontanum</i> subsp. <i>vulgare</i>	750	560
<i>Betonica officinalis</i>	380	480	<i>Cerastium glomeratum</i>		420
<i>Betula celtiberica</i>	310		<i>Cerastium tomentosum</i>		320
<i>Betula lenta</i> P		340	<i>Ceratocarpus claviculata</i>		340
<i>Betula pendula</i>		510	<i>Chaerophyllum temulum</i>		350
<i>Betula pubescens</i>		450	<i>Chamaecyparis lawsoniana</i> P		410
<i>Blechnum spicant</i>	c.610	730	<i>Chamaecyparis lawsoniana</i> R		330
<i>Botrychium lunaria</i>		530	<i>Chamaecyparis pisifera</i> P		355
<i>Brassica rapa</i> subsp. <i>campestris</i>		300	<i>Chamerion angustifolium</i>	520	560
<i>Bromus hordeaceus</i> subsp. <i>hordeaceus</i>		540	<i>Chenopodium album</i>		305
<i>Buxus sempervirens</i>		330	<i>Chrysosplenium oppositifolium</i>	610	660
<i>Callitriche brutia</i> var. <i>brutia</i>		425	<i>Cicerbita macrophylla</i>		350
<i>Callitriche brutia</i> var. <i>hamulata</i>	435	530	<i>Circaea lutetiana</i>		300
<i>Callitriche platycarpa</i>		435	<i>Cirsium arvense</i>	380	430
<i>Callitriche stagnalis</i>		510	<i>Cirsium dissectum</i>		320
<i>Calluna vulgaris</i>	730	740	<i>Cirsium palustre</i> var. <i>ferox</i>		490
<i>Caltha palustris</i>	455	425	<i>Cirsium palustre</i> var. <i>palustre</i>	c.610	640
<i>Campanula rotundifolia</i>	530	530	<i>Cirsium vulgare</i>	380	550
<i>Capsella bursa-pastoris</i>	305+	480	<i>Cochlearia danica</i>		300
<i>Cardamine flexuosa</i>		540	<i>Comarum palustre</i>	490	490
<i>Cardamine hirsuta</i>	530	380	<i>Conopodium majus</i>	460	370
<i>Cardamine pratensis</i>	c.610	640	<i>Corylus avellana</i>	450	350
<i>Carduus nutans</i>	?350	315	<i>Corylus avellana</i> P		445
<i>Carex bigelowii</i>		745	<i>Cotoneaster frigidus</i> P		345
<i>Carex binervis</i>	c.550	730	<i>Cotoneaster horizontalis</i>		450
<i>Carex canescens</i>	435	575	<i>Cotoneaster integrifolius</i>		315
<i>Carex caryophyllea</i>		410	<i>Cotoneaster simonsii</i>		300
<i>Carex dioica</i>		500	<i>Crassula helmsii</i>		345
<i>Carex echinata</i>	745	660	<i>Crataegus monogyna</i>	380	415
<i>Carex flacca</i>		440	<i>Crepis capillaris</i>	c.305	455
<i>Carex ×fulva</i>		470	<i>Crocospia ×crocospia</i> flora		415
			<i>Cruciata laevipes</i>		350
			<i>Cryptogramma crispa</i>	610	550

Species	pre-1950	1950+	Species	pre-1950	1950+
<i>Cryptomeria japonica</i> P		410	<i>Equisetum fluviatile</i>	500	525
× <i>Cuprocyparis leylandii</i>		450	<i>Equisetum palustre</i>	320	470
<i>Cynosurus cristatus</i>		510	<i>Equisetum sylvaticum</i>	580	610
<i>Cystopteris fragilis</i>		415	<i>Erica cinerea</i>		590
<i>Cytisus scoparius</i>		455	<i>Erica tetralix</i>	715	555
<i>Cytisus striatus</i>		350	<i>Eriophorum angustifolium</i>		740
<i>Dactylis glomerata</i>	c.300	415	<i>Eriophorum vaginatum</i>	600+	740
<i>Dactylorhiza fuchsii</i>		420	<i>Erodium cicutarium</i>		325
<i>Dactylorhiza incarnata</i> subsp. <i>pulchella</i>		305	<i>Escallonia macrantha</i>		300
<i>Dactylorhiza maculata</i> subsp. <i>ericetorum</i>		520	<i>Euonymus europaeus</i>	335	190
<i>Danthonia decumbens</i>	430	590	<i>Euphorbia amygdaloides</i> subsp. <i>amygdaloides</i>		350
<i>Deschampsia cespitosa</i> subsp. <i>cespitosa</i>	685	640	<i>Euphorbia helioscopia</i>		300
<i>Deschampsia flexuosa</i>	735	750	<i>Euphorbia peplus</i>		325
<i>Digitalis purpurea</i>	c.610	520	<i>Euphrasia arctica</i> × <i>confusa</i>		385
<i>Diphasiastrum alpinum</i>	750	740	<i>Euphrasia arctica</i> subsp. <i>borealis</i>		455
<i>Dipsacus fullonum</i>		370	<i>Euphrasia confusa</i>		520
<i>Drosera rotundifolia</i>	535	640	<i>Euphrasia confusa</i> × <i>micrantha</i>		495
<i>Dryopteris aemula</i>		350	<i>Euphrasia confusa</i> × <i>nemorosa</i>		600
<i>Dryopteris affinis</i> morph. ‘affinis’		590	<i>Euphrasia confusa</i> × <i>officinalis</i> subsp. <i>pratensis</i>		380
<i>Dryopteris affinis</i> morph. ‘convexa’		350	<i>Euphrasia confusa</i> × <i>scottica</i>		370
<i>Dryopteris affinis</i> morph. ‘paleaceolobata’		450	<i>Euphrasia micrantha</i>		385
<i>Dryopteris borrieri</i> morph. ‘borrieri’		430	<i>Euphrasia nemorosa</i>		560
<i>Dryopteris borrieri</i> morph. ‘insolens’		470	<i>Euphrasia nemorosa</i> × <i>officinalis</i> subsp. <i>pratensis</i>		430
<i>Dryopteris cambrensis</i>		510	<i>Euphrasia officinalis</i> subsp. <i>anglica</i>		450
<i>Dryopteris carthusiana</i>		540	<i>Euphrasia officinalis</i> subsp. <i>pratensis</i>		455
<i>Dryopteris</i> × <i>complexa</i> nothosubsp. <i>complexa</i>		410	<i>Euphrasia scottica</i>	c.610	640
<i>Dryopteris</i> × <i>deweveri</i>		500	<i>Euphrasia</i> × <i>venusta</i>		420
<i>Dryopteris dilatata</i>	670	750	<i>Fagus sylvatica</i> P, R		380
<i>Dryopteris filix-mas</i>	670	650	<i>Fallopia convolvulus</i>		305
<i>Dryopteris oreades</i>		550	<i>Fallopia japonica</i>		415
<i>Elatine hexandra</i>		425	<i>Festuca ovina</i> sens. lat.	750	750
<i>Eleocharis multicaulis</i>		380	<i>Festuca ovina</i> subsp. <i>hirtula</i>		650
<i>Eleocharis palustris</i> subsp. <i>vulgaris</i>		490	<i>Festuca ovina</i> subsp. <i>ophiolicola</i>		650
<i>Eleocharis quinqueflora</i>		320	<i>Festuca ovina</i> subsp. <i>ovina</i>		500
<i>Eleocharis uniglumis</i>		325	<i>Festuca rubra</i> subsp. <i>megastachys</i>		310
<i>Elodea nuttallii</i>		345	<i>Festuca rubra</i> subsp. <i>rubra</i>		550
<i>Elytrigia repens</i>		355	<i>Festuca vivipara</i>	750	690
<i>Empetrum nigrum</i> subsp. <i>nigrum</i>	750	730	<i>Ficaria verna</i> subsp. <i>fertilis</i>	c.310	350
<i>Epilobium brunnescens</i>		640	<i>Filago minima</i>		340
<i>Epilobium</i> × <i>chateri</i>		370	<i>Filipendula ulmaria</i>	c.610	610
<i>Epilobium ciliatum</i>		480	<i>Fragaria vesca</i>		460
<i>Epilobium</i> × <i>fossicola</i>		510	<i>Frangula alnus</i> P		400
<i>Epilobium hirsutum</i>		415	<i>Fraxinus excelsior</i> P		415
<i>Epilobium</i> × <i>interjectum</i>		400	<i>Fraxinus excelsior</i> R		350
<i>Epilobium montanum</i>	535	480	<i>Fumaria muralis</i> subsp. <i>boraiei</i>		
<i>Epilobium</i> × <i>novae-civitatensis</i>		345	var. <i>britannica</i>		300
<i>Epilobium obscurum</i>	410	470	<i>Galeopsis bifida</i>		350
<i>Epilobium palustre</i>	610	560	<i>Galeopsis speciosa</i>		300
<i>Epilobium parviflorum</i>		450	<i>Galeopsis tetrahit</i>		410
<i>Epilobium</i> × <i>rivulare</i>		300	<i>Galium aparine</i>		410
<i>Epilobium</i> × <i>schmidtianum</i>		510	<i>Galium album</i>		320
<i>Epilobium</i> × <i>vicinum</i>		360	<i>Galium odoratum</i>		375
<i>Equisetum arvense</i>		435	<i>Galium palustre</i> sens. lat.	505	
<i>Equisetum</i> × <i>dycei</i>		405			



Species	pre-1950	1950+	Species	pre-1950	1950+
<i>Galium palustre</i> subsp. <i>palustre</i>		520	<i>Hordeum secalinum</i>		540
<i>Galium palustre</i> subsp. <i>tetraploideum</i>		400	<i>Huperzia selago</i>	750	750
<i>Galium saxatile</i>	750	750	<i>Hyacinthoides</i> × <i>massartiana</i>		310
<i>Galium uliginosum</i>		440	<i>Hyacinthoides non-scripta</i>	535	550
<i>Genista tinctoria</i> subsp. <i>tinctoria</i>		330	<i>Hydrocotyle vulgaris</i>	455	460
<i>Geranium columbinum</i>		380	<i>Hymenophyllum wilsonii</i>	c.610	530
<i>Geranium dissectum</i>		435	<i>Hypericum androsaemum</i>		360
<i>Geranium endressii</i>		340	<i>Hypericum elodes</i>	425	415
<i>Geranium molle</i> sens. lat.	430		<i>Hypericum humifusum</i>	335	480
<i>Geranium molle</i> var. <i>arenarium</i>		550	<i>Hypericum maculatum</i> subsp. <i>obtusiusculum</i>		510
<i>Geranium molle</i> var. <i>molle</i>		440	<i>Hypericum pulchrum</i>	c.600	560
<i>Geranium pratense</i>	375	310	<i>Hypericum tetrapterum</i>		350
<i>Geranium robertianum</i>	c.535	535	<i>Hypochaeris radicata</i> subsp. <i>radicata</i>	370	500
<i>Geum macrophyllum</i>		305	<i>Ilex aquifolium</i>	c.305	325
<i>Geum rivale</i>		610	<i>Impatiens glandulifera</i>		320
<i>Geum urbanum</i>		335	<i>Iris pseudacorus</i>	c.420	410
<i>Glebionis segetum</i>	335	410	<i>Isoetes</i> × <i>hickeyi</i>		395
<i>Glechoma hederacea</i>	335		<i>Isoetes echinospora</i>		435
<i>Glyceria declinata</i>		505	<i>Isoetes lacustris</i>		530
<i>Glyceria fluitans</i>	520	560	<i>Isolepis fluitans</i>		435
<i>Glyceria maxima</i>		305	<i>Isolepis setacea</i>	425	430
<i>Gnaphalium uliginosum</i>		590	<i>Jasione montana</i> var. <i>montana</i>	455	350
<i>Gymnadenia borealis</i>		300	<i>Juncus acutiflorus</i>	440	530
<i>Gymnocarpium dryopteris</i>		405	<i>Juncus articulatus</i>	c.610	600
<i>Hammarbya paludosa</i>		380	<i>Juncus bufonius</i>		510
<i>Hedera hibernica</i>	455	480	<i>Juncus bulbosus</i>		355
<i>Heracleum sphondylium</i>		415	<i>Juncus conglomeratus</i>	c.685	600
<i>Hesperis matronalis</i>		310	<i>Juncus effusus</i>	c.610	750
<i>Hieracium anglorum</i>		350	<i>Juncus foliosus</i>		390
<i>Hieracium angustisquamum</i>		380	<i>Juncus</i> × <i>kern-reichgeltii</i>		520
<i>Hieracium argenteum</i>	530	380	<i>Juncus kochii</i>		640
<i>Hieracium argillaceum</i>		350	<i>Juncus minutulus</i>		320
<i>Hieracium cheriense</i>		470	<i>Juncus squarrosus</i>	750	750
<i>Hieracium consociatum</i>		410	<i>Juncus</i> × <i>surrejanus</i>		330
<i>Hieracium daedalolepioides</i>		450	<i>Juncus tenuis</i>		440
<i>Hieracium deganwyense</i>		450	<i>Laburnum anagyroides</i> P		360
<i>Hieracium diaphanoides</i>		430	<i>Laburnum</i> × <i>watereri</i> P		360
<i>Hieracium grandidens</i>		370	<i>Lagarosiphon major</i>		330
<i>Hieracium lasiophyllum</i>		320	<i>Lamiastrum galeobdolon</i> subsp. <i>argentatum</i>		350
<i>Hieracium lissolepium</i>		375	<i>Lamium maculatum</i>	375	
<i>Hieracium placerophylloides</i>		350	<i>Lamium purpureum</i>	c.305	410
<i>Hieracium rectulum</i>		335	<i>Lapsana communis</i> subsp. <i>communis</i>		415
<i>Hieracium sabaudum</i>		320	<i>Larix decidua</i>		400
<i>Hieracium scabrisetum</i>		480	<i>Larix kaempferi</i> P		500
<i>Hieracium scanicum</i>		380	<i>Larix kaempferi</i> R		480
<i>Hieracium sparsifolium</i>	455	330	<i>Larix</i> × <i>marschlinsii</i> P, R		320
<i>Hieracium subcrocatum</i>		455	<i>Lathyrus linifolius</i>	455	480
<i>Hieracium submutabile</i>		320	<i>Lathyrus pratensis</i>		360
<i>Hieracium umbellatum</i> subsp.			<i>Lemna minor</i>		415
<i>bichlorophyllum</i>	c.380	265	<i>Lepidium didymum</i>		480
<i>Hieracium umbellatum</i> subsp. <i>umbellatum</i>		440	<i>Leucanthemum vulgare</i> subsp.		
<i>Hieracium vagum</i>		340	<i>vulgare</i>	455	350
<i>Hirschfeldia incana</i>		360	<i>Lilium pyrenaicum</i>		365
<i>Holcus lanatus</i>	390	750	<i>Linaria repens</i>		415
<i>Holcus mollis</i>		640	<i>Linum catharticum</i>		480
<i>Hordeum distichon</i>		410	<i>Littorella uniflora</i>		530

Species	pre-1950	1950+	Species	pre-1950	1950+
<i>Lobelia dortmanna</i>		530	<i>Oenothera glazioviana</i>		300
<i>Lolium multiflorum</i>		385	<i>Ophioglossum vulgatum</i>		410
<i>Lolium perenne</i>		540	<i>Oreopteris limbosperma</i>		580
<i>Lonicera nitida</i>		300	<i>Origanum vulgare</i>	c.300	340
<i>Lonicera periclymenum</i>	410	430	<i>Ornithopus perpusillus</i>		385
<i>Lotus corniculatus</i> var. <i>corniculatus</i>		415	<i>Osmunda regalis</i>		300
<i>Lotus corniculatus</i> var. <i>sativus</i>		360	<i>Oxalis acetosella</i>	610+	540
<i>Lotus uliginosus</i> var. <i>uliginosus</i>	c.350	560	<i>Papaver somniferum</i>		410
<i>Luronium natans</i>		435	<i>Pastinaca sativa</i> subsp. <i>sativa</i>		360
<i>Luzula campestris</i>		660	<i>Pedicularis palustris</i>	c.470	325
<i>Luzula multiflora</i> sens. lat.	c.610		<i>Pedicularis sylvatica</i> subsp. <i>hibernica</i>		330
<i>Luzula multiflora</i> subsp. <i>congesta</i>		650	<i>Pedicularis sylvatica</i> subsp. <i>sylvatica</i>		470
<i>Luzula multiflora</i> subsp. <i>multiflora</i>		360	<i>Persicaria hydropiper</i>	440	505
<i>Luzula pilosa</i>		350	<i>Persicaria maculosa</i>	435	490
<i>Luzula sylvatica</i>	c.750	740	<i>Persicaria pallida</i>		300
<i>Lycopodium clavatum</i>	510	690	<i>Persicaria wallichii</i>		305
<i>Lysimachia nemorum</i>	365	530	<i>Phalaris arundinacea</i>		475
<i>Lysimachia punctata</i>		410	<i>Phegopteris connectilis</i>	670	680
<i>Lythrum portula</i> subsp. <i>longidentata</i>		325	<i>Phleum bertolonii</i>		340
<i>Lythrum portula</i> subsp. <i>portula</i>		415	<i>Phleum pratense</i>		540
<i>Malus sylvestris</i>	440	375	<i>Phragmites australis</i>	455	455
<i>Matricaria discoidea</i>		450	<i>Picea abies</i> P		420
<i>Meconopsis cambrica</i>		380	<i>Picea abies</i> R		325
<i>Meconopsis cambrica</i> 'Aurantiaca'		410	<i>Picea engelmannii</i> P		450
<i>Medicago lupulina</i>	335	410	<i>Picea glauca</i> P		450
<i>Melampyrum pratense</i> sens. lat.	530		<i>Picea glehnii</i> P		380
<i>Melampyrum pratense</i> var. <i>hians</i>		400	<i>Picea ×lutzii</i> P		380
<i>Melampyrum pratense</i> var. <i>pratense</i>		420	<i>Picea mariana</i> P		405
<i>Mentha ×gracilis</i>		360	<i>Picea omorika</i> P		440
<i>Mentha ×piperita</i>		300	<i>Picea schrenkiana</i> P		350
<i>Mentha ×verticillata</i>		300	<i>Picea sitchensis</i> P		670
<i>Mentha aquatica</i>		425	<i>Picea sitchensis</i> R		660
<i>Mentha arvensis</i>	435	310	<i>Picea spinulosa</i> P		380
<i>Menyanthes trifoliata</i>	520	520	<i>Pilosella aurantiaca</i> subsp. <i>carpathicola</i>		305
<i>Mercurialis perennis</i>	305	335	<i>Pilosella officinarum</i> sens. lat.	395	410
<i>Molinia caerulea</i>		620	<i>Pilosella officinarum</i> subsp. <i>euronota</i>		325
<i>Montia fontana</i> subsp. <i>amporitana</i>		320	<i>Pilosella officinarum</i> subsp. <i>micradenia</i>		360
<i>Montia fontana</i> subsp. <i>fontana</i>		460	<i>Pilosella officinarum</i> subsp. <i>officinarum</i>		390
<i>Montia fontana</i> subsp. <i>variabilis</i>	600	600	<i>Pilosella officinarum</i> subsp. <i>trichosoma</i>		410
<i>Mycelis muralis</i>		300	<i>Pilularia globulifera</i>		425
<i>Myosotis arvensis</i>	335	415	<i>Pimpinella saxifraga</i> sens. lat.	370	370
<i>Myosotis laxa</i> subsp. <i>caespitosa</i>		435	<i>Pimpinella saxifraga</i> subsp. <i>alpestris</i>		300
<i>Myosotis secunda</i>		510	<i>Pinguicula vulgaris</i>	c.610	640
<i>Myriophyllum alterniflorum</i>	525	525	<i>Pinus contorta</i> P		540
<i>Myriophyllum aquaticum</i>		345	<i>Pinus contorta</i> R		520
<i>Myrrhis odorata</i>		365	<i>Pinus mugo</i> subsp. <i>mugo</i> P		400
<i>Narcissus ×incomparabilis</i>		375	<i>Pinus mugo</i> subsp. <i>uncinata</i> P		450
<i>Nardus stricta</i>		750	<i>Pinus nigra</i> P, R		500
<i>Narthecium ossifragum</i>	685	630	<i>Pinus peuce</i> P		440
<i>Nasturtium officinale</i>		490	<i>Pinus radiata</i> P		320
<i>Neottia cordata</i>		c.540	<i>Pinus strobus</i> P		440
<i>Neottia ovata</i>		410	<i>Pinus sylvestris</i>		440
<i>Nuphar lutea</i>	505	505	<i>Pinus wallichiana</i> P		460
<i>Nymphaea alba</i>	455	310	<i>Plantago coronopus</i>		300
<i>Nymphoides peltata</i>		300	<i>Plantago lanceolata</i>	425	560
<i>Odontites vernus</i> subsp. <i>serotinus</i>		340	<i>Plantago major</i> subsp. <i>major</i>		560

Species	pre-1950	1950+	Species	pre-1950	1950+
<i>Platanthera bifolia</i>		300	<i>Rheum</i> × <i>hybridum</i>		400
<i>Platanthera chlorantha</i>		310	<i>Rhinanthus minor</i> sens. lat.	610	
<i>Poa annua</i>	750	750	<i>Rhinanthus minor</i> subsp. <i>stenophyllus</i>		455
<i>Poa compressa</i>		330	<i>Rhododendron ponticum</i> R		450
<i>Poa humilis</i>	c.610	595	<i>Rhynchospora alba</i>		500
<i>Poa trivialis</i>		510	<i>Ribes sanguineum</i>	375	
<i>Polygala serpyllifolia</i>	c.610	620	<i>Rosa arvensis</i>	330	
<i>Polygonum agrestinum</i>		490	<i>Rosa canina</i>	460	360
<i>Polygonum arenastrum</i>		460	<i>Rosa</i> × <i>irregularis</i>		325
<i>Polygonum aviculare</i>		440	<i>Rosa rugosa</i>		435
<i>Polygonum polycnemiforme</i>		360	<i>Rosa sherardii</i>		350
<i>Polypodium interjectum</i>		440	<i>Rubus albionis</i>		310
<i>Polypodium vulgare</i>	c.610	560	<i>Rubus altiarcuatus</i>		340
<i>Polystichum aculeatum</i>		420	<i>Rubus bartonii</i>		400
<i>Polystichum</i> × <i>bicknellii</i>		420	<i>Rubus bertramii</i>		330
<i>Polystichum setiferum</i>		480	<i>Rubus dasphyllus</i>		375
<i>Populus</i> × <i>canadensis</i> 'Serotina' P		320	<i>Rubus dentatifolius</i>		410
<i>Populus tremula</i>	c.365	350	<i>Rubus dumnoniensis</i>		310
<i>Populus tremula</i> P		460	<i>Rubus</i> 'false adscitus'		300
<i>Populus trichocarpa</i> P		340	<i>Rubus hylocharis</i>		360
<i>Populus trichocarpa</i> 'Columbia River' P		330	<i>Rubus idaeus</i>	535	535
<i>Populus trichocarpa</i> 'Trichobel' P		330	<i>Rubus incurvatus</i>		360
<i>Potamogeton berchtoldii</i>		405	<i>Rubus nemoralis</i>		320
<i>Potamogeton natans</i>	525	515	<i>Rubus perdigitatus</i>		340
<i>Potamogeton polygonifolius</i>	505	525	<i>Rubus plicatus</i>		340
<i>Potentilla anserina</i>		440	<i>Rubus polyanthemus</i>		330
<i>Potentilla erecta</i> subsp. <i>strictissima</i>		600	<i>Rubus prolongatus</i>		350
<i>Potentilla erecta</i> subsp. <i>erecta</i>	740	740	<i>Rubus rilstonei</i>		310
<i>Potentilla reptans</i>		510	<i>Rubus rubritinctus</i>		350
<i>Potentilla sterilis</i>	450	480	<i>Rubus saxatilis</i>		435
<i>Poterium sanguisorba</i> subsp. <i>balearicum</i>		320	<i>Rubus scissus</i>		390
<i>Primula vulgaris</i>	550	550	<i>Rubus silurum</i>		435
<i>Prunella vulgaris</i>	455	560	<i>Rubus tuberculatus</i>		310
<i>Prunus avium</i> P		360	<i>Rubus ulmifolius</i>		310
<i>Prunus cerasus</i>		305	<i>Rubus vestitus</i>		300
<i>Prunus domestica</i> subsp. <i>insititia</i> var. <i>nigra</i>		360	<i>Rumex acetosa</i> subsp. <i>acetosa</i>	610	660
<i>Prunus padus</i> P		400	<i>Rumex acetosella</i> sens. lat.	750	685
<i>Prunus spinosa</i>	c.305	405	<i>Rumex crispus</i> subsp. <i>crispus</i>		510
<i>Pseudofumaria lutea</i>		400	<i>Rumex obtusifolius</i>	435	450
<i>Pseudotsuga menziesii</i> P		360	<i>Rumex</i> × <i>pratensis</i>		340
<i>Pseudotsuga menziesii</i> R		350	<i>Sagina apetala</i>		415
<i>Pteridium aquilinum</i>	455	470	<i>Sagina filicaulis</i>		450
<i>Pulicaria dysenterica</i>		325	<i>Sagina maritima</i>		300
<i>Quercus</i> × <i>rosacea</i>		330	<i>Sagina procumbens</i>	610	590
<i>Quercus cerris</i> P		460	<i>Sagina subulata</i>		390
<i>Quercus petraea</i>	c.280	370	<i>Salix alba</i> var. <i>alba</i> P, R		345
<i>Quercus robur</i> P		435	<i>Salix aurita</i>	550	560
<i>Ranunculus acris</i>	610	640	<i>Salix caprea</i>		470
<i>Ranunculus flammula</i>	580	540	<i>Salix</i> × <i>capreola</i>		460
<i>Ranunculus hederaceus</i>		390	<i>Salix cinerea</i> subsp. <i>oleifolia</i>	c.425	540
<i>Ranunculus omiophyllus</i>	c.610	545	<i>Salix herbacea</i>		710
<i>Ranunculus repens</i>		550	<i>Salix</i> × <i>multinervis</i>		450
<i>Ranunculus sceleratus</i>		315	<i>Salix</i> × <i>reichardtii</i>		400
<i>Raphanus raphanistrum</i> subsp. <i>raphanistrum</i>	310	230	<i>Salix repens</i> var. <i>argentea</i>		470
<i>Reseda luteola</i>		375	<i>Salix repens</i> var. <i>repens</i>		300
			<i>Salix</i> × <i>smithiana</i> P		300



Species	pre-1950	1950+	Species	pre-1950	1950+
<i>Salix viminalis</i>	375	375	<i>Stellaria alsine</i>	450	660
<i>Sambucus nigra</i>	350	405	<i>Stellaria graminea</i>		405
<i>Sanguisorba officinalis</i>	435	465	<i>Stellaria holostea</i>	c.305	295
<i>Sanicula europaea</i>		335	<i>Stellaria media</i>	455	535
<i>Saxifraga hypnoides</i>		600	<i>Subularia aquatica</i>		435
<i>Saxifraga stellaris</i>	670	660	<i>Succisa pratensis</i> var. <i>pratensis</i>	610	660
<i>Scleranthus annuus</i> subsp. <i>annuus</i>		310	<i>Symphoricarpos albus</i>		300
<i>Scorzoneroide autumnalis</i> sens. lat.	c.610		<i>Syringa vulgaris</i> P		330
<i>Scorzoneroide autumnalis</i> var. <i>autumnalis</i>		590	<i>Tanacetum parthenium</i>		480
<i>Scorzoneroide autumnalis</i> var. <i>coronopifolia</i>		470	<i>Taraxacum argutum</i>		320
<i>Scorzoneroide autumnalis</i> var. <i>latifolia</i>		510	<i>Taraxacum faeroense</i>		620
<i>Scorzoneroide autumnalis</i> var. <i>pinnatifida</i>		440	<i>Taraxacum landmarkii</i>		325
<i>Scorzoneroide autumnalis</i> var. <i>simplex</i>		380	<i>Taraxacum naevosiforme</i>		380
<i>Scrophularia nodosa</i> var. <i>nodosa</i>		415	<i>Taraxacum pseudohamatum</i>		305
<i>Scutellaria galericulata</i>		300	<i>Teucrium scorodonia</i>	455	480
<i>Scutellaria minor</i>	440	440	<i>Thuja plicata</i> P		355
<i>Sedum acre</i>		340	<i>Thymus polytrichus</i> subsp. <i>britannicus</i>		395
<i>Sedum album</i>		355	<i>Tilia cordata</i>		340
<i>Sedum anglicum</i>		545	<i>Torilis japonica</i>		385
<i>Sedum forsterianum</i>	330	330	<i>Trichomanes speciosum</i> gametophyte		330
<i>Sedum rupestre</i>		360	<i>Trichophorum ×foersteri</i>		520
<i>Sedum telephium</i>	380	390	<i>Trichophorum germanicum</i>	750	720
<i>Selaginella selaginoides</i>		390	<i>Trifolium dubium</i>		510
<i>Sempervivum tectorum</i>	305	320	<i>Trifolium hybridum</i> subsp. <i>hybridum</i>		300
<i>Senecio jacobaea</i>	c.305	510	<i>Trifolium micranthum</i>		350
<i>Senecio sylvaticus</i>		490	<i>Trifolium pratense</i>	c.350	540
<i>Senecio vulgaris</i> var. <i>vulgaris</i>		425	<i>Trifolium repens</i>	450	560
<i>Sequoia sempervirens</i> P		440	<i>Trifolium striatum</i>		310
<i>Serratula tinctoria</i>	425	460	<i>Triglochin palustris</i>		470
<i>Silene ×hampeana</i>		360	<i>Tripleurospermum inodorum</i> subsp. <i>inodorum</i>		380
<i>Silene dioica</i>	395	415	<i>Trisetum flavescens</i> subsp. <i>flavescens</i>		345
<i>Silene flos-cuculi</i>	430	340	<i>Triticum aestivum</i>		410
<i>Silene latifolia</i> subsp. <i>alba</i>		410	<i>Trollius europaeus</i>		350
<i>Silene uniflora</i>		305	<i>Tsuga canadensis</i> P		410
<i>Silene uniflora</i> × <i>vulgaris</i>		405	<i>Tsuga heterophylla</i> P, R		380
<i>Sinapis arvensis</i>		300	<i>Tsuga mertensiana</i> P		440
<i>Solanum lycopersicum</i>		490	<i>Tussilago farfara</i>	435	530
<i>Solanum nigrum</i> subsp. <i>nigrum</i>		480	<i>Typha latifolia</i>		355
<i>Solanum tuberosum</i> P		430	<i>Ulex gallii</i>	550	580
<i>Solidago virgaurea</i> subsp. <i>minuta</i>		620	<i>Ulmus glabra</i>		330
<i>Solidago virgaurea</i> subsp. <i>virgaurea</i>		720	<i>Ulmus scabra</i>		330
<i>Sonchus asper</i> subsp. <i>asper</i> var. <i>asper</i>		435	<i>Umbilicus rupestris</i>	410	440
<i>Sonchus asper</i> subsp. <i>asper</i> var. <i>integrifolius</i>		300	<i>Urtica dioica</i>	535	540
<i>Sonchus oleraceus</i> var. <i>oleraceus</i>		435	<i>Urtica urens</i>	355	
<i>Sorbus aucuparia</i>	455	620	<i>Utricularia minor</i>	490	485
<i>Sparganium angustifolium</i>		575	<i>Vaccinium ×intermedium</i>		480
<i>Sparganium emersum</i>		305	<i>Vaccinium myrtillus</i>	730	750
<i>Sparganium erectum</i> sens. lat.	425	425	<i>Vaccinium oxycoccos</i>	490	550
<i>Spergula arvensis</i>	c.335	335	<i>Vaccinium vitis-idaea</i>	750	730
<i>Spergularia rubra</i>		590	<i>Valeriana officinalis</i>	c.610	590
<i>Spiraea ×pseudosalicifolia</i>		340	<i>Verbascum thapsus</i>		480
<i>Stachys palustris</i>	305	325	<i>Veronica arvensis</i>		510
<i>Stachys sylvatica</i>		430	<i>Veronica beccabunga</i>		300
			<i>Veronica chamaedrys</i>	275	330
			<i>Veronica montana</i>		410

Species	pre-1950	1950+
<i>Veronica officinalis</i>	730	560
<i>Veronica scutellata</i> var. <i>scutellata</i>	475	460
<i>Veronica serpyllifolia</i>	370	560
<i>Vicia cracca</i>		415
<i>Vicia orobus</i>		340
<i>Vicia sativa</i> subsp. <i>segetalis</i>		415

Species	pre-1950	1950+
<i>Vicia sepium</i>		355
<i>Viola lutea</i>	500	420
<i>Viola palustris</i> subsp. <i>palustris</i>	610	640
<i>Viola riviniana</i>	c.610	600
<i>Vulpia bromoides</i>		370
<i>Wahlenbergia hederacea</i>	c.455	520

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