

**Mycological survey of selected semi-natural
grasslands in Carmarthenshire**

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March 1999

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of SELECTED SEMI-NATURAL GRASSLANDS
in CARMARTHENSHIRE**

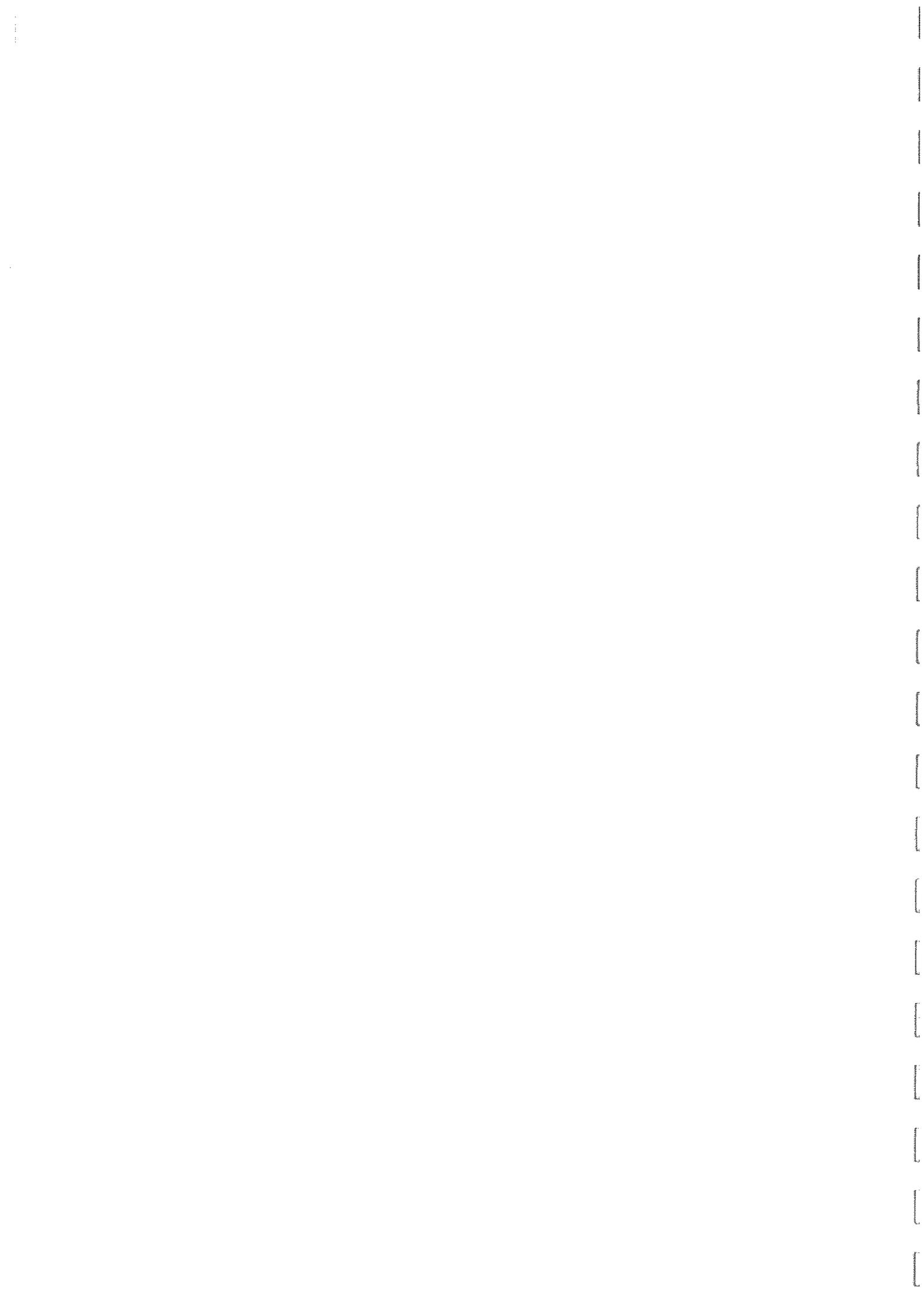
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March, 1999

[Report to the Countryside Council for Wales]



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EXECUTIVE SUMMARY

Fungi of the "Waxcap-grassland" indicator group of species were recorded in a study in October and November, 1998, at ten selected grassland sites in Carmarthenshire and seven additional sites. Four selected sites were shown to be of very high conservation value, with two being of National Importance. Twenty-one fungal species recorded from some of the 17 sites were rare, threatened or endangered, featuring on one or more of the known Red Data Lists or Biodiversity Action Plans. MG5 *Cynosurus-Centaurea* grassland, was the richest grassland type, mycologically, while impoverished MG6 *Lolium-Cynosurus* grassland was also very productive. More fertilised sites were mycologically poor as were Mires (M23, M24 & M25). Sheep and rabbits are suggested as the most successful grazing animals to encourage fungal fruiting, even when grazing was relatively heavy. Further mycological recording within Carmarthenshire and throughout Wales is recommended in order to identify and conserve other grassland sites of mycological importance and to fulfill the requirements of the UK Biodiversity Action Group.

1 INTRODUCTION

The Countryside Council for Wales (CCW) is currently completing a systematic survey of semi-natural grasslands in Wales using the National Vegetation Classification (NVC) [Rodwell, 1991, *et seq.*] to define plant communities. As well as providing basic information on the distribution and extent of unimproved grassland, a further aim of this CCW survey is to identify the best examples of this habitat in Wales and to seek to protect these as Sites of Special Scientific Interest (SSSIs).

The above initiative is being taken against a background of conservation concern about the disappearance of traditionally managed meadows and pastures through damage or destruction by modern agricultural methods and development. Since the end of the Second World War, Britain has lost 95 per cent of its hay meadows and 80 per cent of its chalk downs [Evans, 1992]. Traditional grasslands and their characteristic communities of native plants have been lost through treatment with artificial fertilisers and selective herbicides, and through ploughing and reseeded. This picture is repeated across Europe, with many countries suffering even greater losses. (In the Netherlands, for example, traditional unimproved grasslands are now virtually confined to nature reserves [Eef Arnolds, pers. comm.])

As with many vascular plants, certain species of macrofungi are largely confined to – and are therefore indicative of – traditionally managed grasslands. For this reason such habitats have been described by mycologists as “*Hygrocybe* grasslands” [Feehan & McHugh, 1992] or “Waxcap Grasslands” [Rotheroe *et al.*, 1996]. The genus *Hygrocybe* (Waxcaps) is not the only indicator in this fungal grassland community. Waxcaps are often accompanied by Fairy Clubs (clavarioid fungi); pink-spored species of the genus *Entoloma* (Pink-gills); and Earth Tongues (family Geoglossaceae). Many of the taxa in these groups feature in the British and European Red Data Lists (RDLs) of threatened or endangered fungi [Ing, 1992, 1993]. Several are also listed in many of the 11 published national RDLs in Europe. According to Arnolds & de Vries [1993], all European species of *Clavaria* (Fairy Clubs) are included on a Red Data List somewhere in Europe, while 67 per cent of another grassland Fairy Club genus, *Clavulinopsis*, feature on at least one European RDL. Figures for other genera are: *Hygrocybe*, 89 per cent and *Entoloma s.l.*, 97 per cent.

However, the criteria for the selection and notification of biological SSSIs are generally based on vascular plant assemblages and largely ignore the fungi – principally because of the absence of data on their distribution and abundance [Hodgetts, 1992]. This has led to concern that mycologically rich sites may be under-represented within the SSSI series – a situation that may have been exacerbated by the fact that certain waxcap grasslands can be botanically impoverished [Keizer, 1993]. Responding to this data deficiency, the British Mycological Society (BMS) initiated a survey throughout the British Isles of the fungi characterising unimproved meadow and pasture grassland [Rotheroe *et al.*, 1996]. This began in 1996 and continued in 1997 and 1998. It is an ongoing survey.

The main aim of the present project was to carry out a mycological survey and assessment of a small number of grassland sites in Carmarthenshire. Most of the sites were selected on the basis of their rich vascular plant flora, but a few additional sites with known mycological interest were also included for comparative purposes. The survey also aimed to examine any relationship between mycological interest and NVC type or management regime. A copy of CCW's specification for the project is included as APPENDIX I.

2 METHODS

2.1 Site selection

Ten target sites were identified in conjunction with CCW officers and these embraced a number of different NVC types, including examples of Mesotrophic Grasslands (MG); Mires (M);

Calcifugous Grasslands (U); and Calcicolous Grasslands (CG). These sites are listed in Table 1 below. (Note: some site names are abbreviated for ease of tabulation and the full names are given in section 4.2. Fuller descriptions of NVC communities and sub-communities are given in the Results tables.)

Table 1: Details of the ten target sites selected for survey

Site No.	Location	Code	Grid Ref	NVC Types Represented (data supplied by CCW)
1	'Talley' SSSI	TAL	SN6--3--	MG5a, MG5c, M25b
2	Pwll Edrychiad SSSI	PED	SN584162	MG5a, MG5c, M25b (+)
3	Caeau Nant Garenig SSSI	CNG	SN673124	MG5, M25b, M24b/c (*)
4	Cae Blaen-dyffryn SSSI (*)	CBD	SN604445	MG5a (*) & MG6b (in annex)
5	Caeau Blaen-byderyn SSSI	CBB	SN558439	U4c, M25b
6	Carreg Cennen SSSI	CCN	SN670191	CG1e, CG2c, MG6b
7	Whitehill Down SSSI	WHD	SN290135	MG5a, M24b/c (*)
8	Rhosydd Castell-du SSSI	RCD	SN655116	MG5c, M24b/c, M25b
9	Waun-las (Middleton)	WLS	SN528178	MG6b
10	Caeau Caradog	CCG	SN694460	MG5a, MG5c, U4a

(+) Also includes some secondary calcareous grassland around rocky outcrops.

(*) Also includes Annex to SSSI.

(*) Also includes small stands of MG5c.

Coincidental with the present survey, the author was also engaged in two other mycological surveys – of Dinefwr Park (National Trust [NT]) in Carmarthenshire and Hafod Estate in Ceredigion (Cardiganshire vice-county). The author also made casual visits to other locations in south Wales: e.g. Garn Ddyrys, near Tumble, Blaenavon, Breconshire; the grounds of St David's College, University of Wales, Lampeter, Ceredigion; Maestir Churchyard, Lampeter; Llanrhystud Chapelyard, Ceredigion; the lawn at Llanerchaeron Estate, Ceredigion (NT). Details of these additional sites are given in Table 2 below. (Note: NVC surveys have not been carried out at these sites.)

Table 2: Additional sites surveyed

Site No.	Location	Code	Grid Ref
11	Llanerchaeron Estate (NT)	LLAN	SN480600
12	Llanrhystud Chapelyard	LRST	SN547692
13	Hafod Estate	HAFD	SN756731
14	Dinefwr Park (NT)	DINF	SN617225
15	Maestir Churchyard, Lampeter, Cards	MAES	SN553494
16	St David's College lawns, Lampeter, Cards	STD	SN579482
17	Garn Ddyrys, Tumble	GARN	SO258117

Past records from some of these sites, namely Site Nos. 1, 9, 11, 13 and 17, enabled cumulative lists to be compiled. Cumulative data were also obtained from recording visits by other workers to Gilfach Farm, Rhyader, Radnorshire [Ray Woods, pers. comm.].

2.2 Field procedures

For a number of administrative reasons, fieldwork at the ten target sites did not commence until 1st October, 1998. The survey continued until the end of November, 1998. Survey work at some of the additional sites was carried out in September, 1998, with a single visit to the Hafod Estate on 1st December, 1998. Each of the 17 sites was visited at least twice

and some sites which proved more productive were visited on more than two occasions. Each recording visit lasted between two and four hours, depending upon the size of the site. Recording effort was concentrated in relevant stands of vegetation which were identified from CCW Phase II vegetation maps. Once a homogeneous stand representing one of the target NVC types was located, a "mowing" transect was carried out, by walking back and forth across the area as if mowing a lawn. However, in fields and areas which from the outset could be regarded as lacking any fungal fruiting (usually the mire sites), a less rigorous system of criss-cross transects was used. Once an individual fruit body or population was found, the immediate area was combed for other populations of the same or other species. Relevant NVC type and management regimes, from Phase II reports and field observations, were also recorded. Fruitbodies of common or easily-identifiable fungi were left *in situ* but for most identifications it was necessary to collect representative samples for closer macroscopic and microscopic examination in the laboratory. Dried voucher material was retained for all but the commonest species and this material has been deposited in the herbarium of the National Botanic Garden of Wales (NBGW) or in Herb K(M) (Royal Botanic Gardens, Kew). The data obtained from all the fieldwork were entered into the BMS database.

2.3 Evaluation of conservation value

As observed in the Introduction, conservation of this habitat has been the subject of intensive study in recent years, in both Britain and Europe. The results of these studies provided a well-documented context in which to evaluate the findings of the present survey. A number of formulae have been proposed to permit the evaluation and quantification of the mycological importance of a particular grassland site, using the indicator species. Thus it is possible to assign conservation values to the mycota (fungus flora) of a location, to facilitate comparisons with other locations.

The data generated by the present survey were analysed using the methodologies proposed by Rald [1985], Rotheroe *et al.* [1996], Rotheroe [1997] and Rotheroe [1999a]. These methods have been summarised by Rotheroe [1999b] and are set out in APPENDIX II. (Briefly, these techniques involve judging the importance of a site by counting the number of waxcaps recorded on a single visit. Next, the mycological profile ('CHEG profile') of the site is produced by listing the numbers of indicator species in the various groups represented i.e. C = Fairy Clubs; H = Waxcaps; E = Pink-gills; G = Earth Tongues. Finally those species listed by Rotheroe [1999a] as being indicators of the highest conservation value are tabulated to produce a prediction of the site's potential, following recording visits made when fruiting is sparse, but when certain key species may be present.)

2.4 Nomenclature

In general the classification of the *Dictionary of the Fungi* [Hawksworth, *et al.*, 1995] has been used in this study. However, there is some disagreement currently over aspects of nomenclature for certain groups. For the Entolomataceae (Pink-gill species), this study uses the nomenclature of Noordeloos [1992], which reduces some genera to sub-generic level, notably *Leptonia* and *Nolanea*, rather than the classification of the *Dictionary of the Fungi*, which retains these at generic level. For *Hygrocybe*, the nomenclature follows Boertmann [1995], with a number of small modifications proposed by Henrici [1996].

2.5 Meteorological data

Meteorological data for 1998 were obtained from Michael Smith [pers. comm.], at the weather station at Gelli Aur Country Park, which is the closest weather station to most of the survey sites in Carmarthenshire. However, because this station did not begin operating until 1993, comparisons with long-term means would not be statistically significant. Additional data were therefore obtained via John Wildig [pers. comm.] relating to the weather station at the ADAS Pwllpeiran Research Centre at Cwmystwyth, Ceredigion, and from John Powell [pers.

comm.] at Swansea. Both of these stations have data from the past 30 years.

3 RESULTS

3.1 Analysis of data obtained

A full list of all the indicator species recorded at the 17 sites surveyed is given in the database print-out in APPENDIX III. (Note: collections which could not be identified to species level are not included in the database, but they are counted in the tables below.) There follows a series of tables which seek to evaluate the raw data obtained in the survey, using the techniques outlined in APPENDIX II. Total CHEG numbers for indicator species recorded at the survey sites per visit in 1998 are shown in Table 3 below. For an explanation of terms and abbreviations used in the table see APPENDIX II. Note: the figures under the column "Rainfall" relate to the total rainfall in the week prior to the recording visit as registered at the Gelli Aur Weather Station. This is intended to provide a rough indication of the amount of moisture in the grassland soils at the time of the visits, although it is conceded that the Gelli Aur data are not reliable for Hafod or, perhaps, for other Ceredigion sites. Only monthly rainfall figures were available from the Cwmystwyth station.

Table 3: Numbers of Waxcap-grassland indicator species recorded at 17 locations during present survey, by date (Ten CCW target sites in bold)

Site No.	Location	Date	C	H	E	G	Rainfall (mm)
13	Hafod Estate	6 Sep, 1998	0	4	2	0	2.5
13	Hafod Estate	16 Sep, 1998	1	11	0	0	71.8
11	Llanerchaeron Estate (NT)	27 Sep, 1998	1	5	0	0	13.5
12	Llanrhystud Chapelyard	29 Sep, 1998	0	4	0	0	18.2
13	Hafod Estate	29 Sep, 1998	2	12	1	0	18.2
14	Dinefwr Park	30 Sep, 1998	0	1	0	0	18.2
3	Caeau Nant Garenig SSSI	1 Oct, 1998	0	0	0	0	18.2
8	Rhosydd Castell-du SSSI	1 Oct, 1998	0	0	0	0	18.2
2	Pwll Edrychiad SSSI	1 Oct, 1998	1	8	3	0	18.2
7	Whitehill Down SSSI	2 Oct, 1998	1	3	0	0	18.2
9	Waun-las (Middleton)	2 Oct, 1998	1	9	1	0	18.2
4	Cae Blaen-dyffryn SSSI	7 Oct, 1998	0	6	2	0	5.9
6	Carreg Cennen SSSI	7 Oct, 1998	2	13	3	0	5.9
5	Caeau Blaen-byderyn SSSI	12 Oct, 1998	1	4	0	0	7.2
10	Caeau Caradog	12 Oct, 1998	0	3	0	0	7.2
1	'Talley' SSSI	13 Oct, 1998	1	10	1	0	7.2
13	Hafod Estate	14 Oct, 1998	1	15	0	0	7.2
11	Llanerchaeron Estate (NT)	15 Oct, 1998	0	9	0	0	7.2
3	Caeau Nant Garenig SSSI	17 Oct, 1998	0	0	0	0	7.2
14	Dinefwr Park	18 Oct, 1998	1	6	0	0	7.2
2	Pwll Edrychiad SSSI	21 Oct, 1998	1	8	3	1	81.3
9	Waun-las (Middleton)	21 Oct, 1998	2	10	3	0	81.3
11	Llanerchaeron Estate (NT)	22 Oct, 1998	2	6	0	0	81.3
17	Garn Ddyrys, Tumble	24 Oct, 1998	1	17	0	4	81.3
14	Dinefwr Park	28 Oct, 1998	1	5	0	0	145.2
15	Maestir Churchyard, Lampeter	28 Oct, 1998	2	7	1	2	145.2
11	Llanerchaeron Estate (NT)	29 Oct, 1998	1	10	0	0	145.2
7	Whitehill Down SSSI	29 Oct, 1998	0	1	0	0	145.2
5	Caeau Blaen-byderyn SSSI	31 Oct, 1998	0	4	0	0	145.2
6	Carreg Cennen SSSI	1 Nov, 1998	3	14	1	0	145.2
1	'Talley' SSSI	1 Nov, 1998	1	9	6	0	145.2

4	Cae Blaen-dyffryn SSSI	5 Nov, 1998	0	5	0	0	74.5
8	Rhosydd Castell-du SSSI	5 Nov, 1998	0	0	0	0	74.5
16	St David's College lawns, Lampeter	14 Nov, 1998	2	10	3	3	88.6
11	Llanerchaeron Estate (NT)	15 Nov, 1998	4	13	4	1	88.6
6	Carreg Cennen SSSI	16 Nov, 1998	1	7	0	0	88.6
9	Waun-las (Middleton)	20 Nov, 1998	1	1	0	0	36.5
14	Dinefwr Park	21 Nov, 1998	0	0	0	0	36.5
10	Caeau Caradog SSSI	22 Nov, 1998	0	1	0	0	36.5
13	Hafod Estate	1 Dec, 1998	1	2	0	0	36.4

Note: the reason for ordering these data chronologically is to highlight the performance of sites in relation to rainfall conditions. Thus, if sites in close proximity to each other are visited within a period of one or two days, valid comparisons can be made, which exclude the weather as a factor. In the above table the contrast in species numbers recorded at Site Nos 3, 8 and 2 on 1st October and between Site Nos 5, 10 and 1 on 12th and 13th October is dramatic.

3.2 Evaluation using the Rald [1985] formula (see APPENDIX II)

Table 4 below shows the total number of Waxcap species recorded on a single visit to the prime locations. These values have been developed in a European context and are effectively being 'extrapolated' to Wales. This seems to be quite justified since similar analyses in the UK have been applied during the BMS Waxcap-grassland Survey and the results do appear to reflect the conservation importance of the respective sites examined [Pers. obs.].

Table 4: Highest number of *Hygrocybe* (Waxcap) taxa recorded on a single visit, 1998 (Conservation Values after Rald [1985])

Site No.	Location	C	H	E	G	Conservation Value
17	Garn Ddyrys, Tumble	1	17	0	4	(National Importance)
13	Hafod Estate	1	15	0	0	(National Importance)
6	Carreg Cennen SSSI	3	14	1	0	(National Importance)
11	Llanerchaeron Estate (NT)	4	13	4	1	(National Importance)
9	Waun-las (Middleton)	2	10	3	0	(Regional Importance)
1	'Talley' SSSI	1	9	6	0	(Regional Importance)
16	St David's College lawns, Lampeter	2	9	3	3	(Regional Importance)
2	Pwll Edrychiad SSSI	1	8	3	1	(Regional Importance)
15	Maestir Churchyard, Lampeter	2	7	1	2	(Regional Importance)
4	Cae Blaen-dyffryn SSSI	0	6	2	0	(Regional Importance)
14	Dinefwr Park (NT)	1	6	0	0	(Regional Importance)
5	Caeau Blaen-byderyn SSSI	1	4	0	0	
12	Llanrhystud Chapelyard	0	4	0	0	
7	Whitehill Down SSSI	1	3	0	0	
10	Caeau Caradog	0	3	0	0	
3	Caeau Nant Garenlg SSSI	0	0	0	0	
8	Rhosydd Castell-du SSSI	0	0	0	0	

Cumulative totals of indicator species recorded up to the end of December, 1998, are given in Table 5 below [evaluation after Rald, 1985]. Note: sites for which no previous records existed (therefore cumulative totals are for 1998 only) are underlined.

Table 5: Cumulative list of indicator species recorded
(Conservation values after Rald [1985])

Site No.	Location	C	H	E	G	Conservation Value
17	Garn Ddyrys, Tumble	3	28	0	5	(National Importance)
13	Hafod Estate	4	26	7	0	(National Importance)
11	Llanerchaeron (NT)	6	23	7	2	(National Importance)
	Gilfach Farm, Rhayader	3	23	0	0	(National Importance)
9	Waun-las Farm, Middleton	4	22	7	0	(National Importance)
6	<u>Carreg Cennen SSSI</u>	4	19	4	0	(National Importance)
1	<u>'Talley' SSSI</u>	2	16	14	0	(Regional Importance)
2	<u>Pwll Edrychlad SSSI</u>	3	11	3	1	(Regional Importance)
16	<u>St David's College lawns, Lampeter</u>	2	9	3	3	(Regional Importance)
14	<u>Dinofwr Park (NT)</u>	1	9	0	0	(Regional Importance)
15	<u>Maestir Churchyard, Lampeter</u>	2	8	1	2	
5	<u>Caeau Blaen-byderyn SSSI</u>	1	6	0	0	
4	<u>Cae Blaen-dyffryn SSSI</u>	0	6	2	0	
12	<u>Llanrhystud Chapelyard</u>	0	4	0	0	
7	<u>Whitehill Down SSSI</u>	1	3	0	0	
10	<u>Caeau Caradog</u>	0	3	0	0	
3	<u>Caeau Nant Garenig SSSI</u>	0	0	0	0	
8	<u>Rhosydd Castell-du SSSI</u>	0	0	0	0	

3.3 Evaluation using the Rotheroe [1999a] formula (see APPENDIX II)

Rapid Assessment values of these grasslands according to the "Top Twenty-four" formula proposed by Rotheroe [1999a] are set out below. Note: As score higher than Bs and the sites are listed in order of their estimated mycological importance. From the results below the first seven sites may be judged to have shown their high conservation value (extremely high in a UK context). The following six suggest a potential which is not yet realised.

Table 6: Rapid Assessment values for Waxcap Grasslands in present survey using "Top Twenty-four" scores

Site No.	Location	Conservation Value
11	Llanerchaeron Estate (NT)	A7 B4
13	Hafod Estate	A4 B8
	Gilfach Farm, Rhayader	A4 B4
17	Garn Ddyrys, Tumble	A3 B10
9	Waun-las Farm, Middleton	A3 B5
15	Maestir Churchyard, Lampeter	A3 B2
1	<u>'Talley' SSSI</u>	A1 B5
14	<u>Dinofwr Park (NT)</u>	A1 B2
16	<u>St David's College lawns, Lampeter</u>	A1 B2
6	<u>Carreg Cennen SSSI</u>	A1 B2
2	<u>Pwll Edrychlad SSSI</u>	A1 B1
4	<u>Cae Blaen-dyffryn SSSI</u>	- B1
12	<u>Llanrhystud Chapelyard</u>	- B1
3	<u>Caeau Nant Garenig SSSI</u>	- -
5	<u>Caeau Blaen-byderyn SSSI</u>	- -
7	<u>Whitehill Down SSSI</u>	- -
8	<u>Rhosydd Castell-du SSSI</u>	- -
10	<u>Caeau Caradog</u>	- -

3.4 Correlations with NVC types

The following tables set out the macrofungal species recorded from the various NVC types at the sites surveyed. Note: no NVC surveys had been carried out at the additional sites listed, nor at Waun-las Farm. But it was suggested that most of the grassland at this latter location is referable to MG6 [Jamie Bevan, pers. comm.]. Records from this site are therefore listed under that heading. NVC types for the other additional sites are omitted.

The greatest number of species were clearly recorded from the neutral grassland types MG5 and MG6. Fewer species were recorded from calcicolous and calcifugous grassland, although to some extent this may simply reflect under-representation of these habitats within the survey sites. The mire types M23 and M25 are clearly very impoverished from a mycological perspective.

Table 7: List of species recorded from Calcicolous Grassland, mainly CG1 & CG2 (*Festuca ovina-Carlina vulgaris* grassland & *Festuca ovina-Avenula pratensis* grassland)

Name	Common Name
<i>Clavulinopsis corniculata</i>	Cow-horn Coral-fungus
<i>Clavulinopsis helvola</i>	Golden Meadow-club
<i>Hygrocybe calyptiformis</i>	Pink Meadow Cap
<i>Hygrocybe chlorophana</i>	Golden Waxcap
<i>Hygrocybe colemanniana</i>	Coleman's Waxcap
<i>Hygrocybe insipida</i>	Insidid Waxcap
<i>Hygrocybe quieta</i>	Tranquil Waxcap
<i>Hygrocybe reidii</i>	Reid's Waxcap
<i>Hygrocybe russocoriaceae</i>	Russian-leather Waxcap
<i>Hygrocybe virginea</i>	White Waxcap
<i>Hygrocybe virginea</i> v <i>fuscescens</i>	Brown-spotted Waxcap
<i>Microglossum olivaceum</i>	Olivaceous Earth Tongue

Table 8: List of species recorded from Mires, M23a & M25b (*Juncus effusus/acutiflorus-Galium palustre* rush-pasture: *Juncus acutiflorus* sub-community & *Molinia caerulea-Potentilla erecta* mire: *Anthoxanthum odoratum* sub-community)

Name	Common Name	NVC
<i>Entoloma corvinum</i>	Raven's Pink-gill	M23a
<i>Hygrocybe chlorophana</i>	Golden Waxcap	M23a
<i>Clavulinopsis helvola</i>	Golden Meadow-club	M25b

Table 9: List of species recorded from Mesotrophic Grassland, MG5a & MC5c (*Cynosurus cristatus-Centaurea nigra* grassland: *Lathyrus pratensis* sub-community & *Danthonia decumbens* sub-community)

Name	Common Name	NVC
<i>Clavaria vermicularis</i>	White Spindles	MG5a
<i>Clavulinopsis corniculata</i>	Cow-horn Coral-fungus	MG5a
<i>Dermoloma cuneifolium</i>	Floury False-waxcap	MG5a
<i>Hygrocybe calyptiformis</i>	Pink Meadow Cap	MG5a
<i>Hygrocybe ceracea</i>	Wax-like Waxcap	MG5a
<i>Hygrocybe chlorophana</i>	Golden Waxcap	MG5a
<i>Hygrocybe citrinovirens</i>	Lemon-green Waxcap	MG5a
<i>Hygrocybe coccinea</i>	Scarlet Hood	MG5a
<i>Hygrocybe conica</i>	Blackening Waxcap	MG5a
<i>Hygrocybe insipida</i>	Insidid Waxcap	MG5a

<i>Hygrocybe pratensis</i>	Meadow Waxcap	MG5a
<i>Hygrocybe pratensis</i> v <i>pallida</i>	Meadow Waxcap white var	MG5a
<i>Hygrocybe psittacina</i>	Parrot Waxcap	MG5a
<i>Hygrocybe quieta</i>	Tranquil Waxcap	MG5a
<i>Hygrocybe reidii</i>	Reid's Waxcap	MG5a
<i>Hygrocybe russocoriacea</i>	Russian-leather Waxcap	MG5a
<i>Hygrocybe unguinosa</i>	Slippery-eel Waxcap	MG5a
<i>Hygrocybe virginea</i>	White Waxcap	MG5a
<i>Hygrocybe virginia</i> v <i>ochraceopallida</i>	Pale Ochre Waxcap	MG5a
<i>Clavulinopsis helvola</i>	Golden Meadow-club	MG5c
<i>Entoloma anatinum</i>	Felty Brown Pink-gill	MG5c
<i>Entoloma cruentatum</i>	Blood-stained Pink-gill	MG5c
<i>Entoloma hebes</i>	Pubescent Pink-gill	MG5c
<i>Entoloma infula</i>	Mitre Pink-gill	MG5c
<i>Hygrocybe calyptriformis</i>	Pink Meadow Cap	MG5c
<i>Hygrocybe chlorophana</i>	Golden Waxcap	MG5c
<i>Hygrocybe conica</i>	Blackening Waxcap	MG5c
<i>Hygrocybe insipida</i>	Insipid Waxcap	MG5c
<i>Hygrocybe laeta</i>	Shining Waxcap	MG5c
<i>Hygrocybe pratensis</i>	Meadow Waxcap	MG5c
<i>Hygrocybe pratensis</i> v <i>pallida</i>	Meadow Waxcap white var	MG5c
<i>Hygrocybe psittacina</i>	Parrot Waxcap	MG5c
<i>Hygrocybe reidii</i>	Reid's Waxcap	MG5c
<i>Hygrocybe russocoriacea</i>	Russian-leather Waxcap	MG5c
<i>Hygrocybe unguinosa</i>	Slippery-eel Waxcap	MG5c
<i>Hygrocybe vitellina</i>	Egg-yellow Waxcap	MG5c

**Table 10: List of species recorded from Mesotrophic Grassland, MG6
(*Lolium perenne*-*Cynosurus cristatus* grassland)**

Name	Common Name
<i>Clavulinopsis corniculata</i>	Cow-horn Coral-fungus
<i>Clavulinopsis fusiformis</i>	Golden Spindles
<i>Clavulinopsis helvola</i>	Golden Meadow-club
<i>Dermoloma cuneifolium</i>	Floury False-waxcap
<i>Entoloma conferendum</i>	Star-spored Pink-gill
<i>Entoloma porphyrophaeum</i>	Porphyry Pink-gill
<i>Entoloma serrulatum</i>	Serrulate Pink-gill
<i>Hygrocybe calyptriformis</i>	Pink Meadow Cap
<i>Hygrocybe ceracea</i>	Wax-like Waxcap
<i>Hygrocybe chlorophana</i>	Golden Waxcap
<i>Hygrocybe cinereifolia</i>	Grey-gilled Waxcap
<i>Hygrocybe citrinovirens</i>	Lemon-green Waxcap
<i>Hygrocybe coccinea</i>	Scarlet Hood
<i>Hygrocybe colemanniana</i>	Coleman's Waxcap
<i>Hygrocybe conica</i> v <i>chloroides</i>	Yellow Blackening Waxcap
<i>Hygrocybe glutinipes</i>	Glutinous Waxcap
<i>Hygrocybe insipida</i>	Insipid Waxcap
<i>Hygrocybe laeta</i>	Shining Waxcap
<i>Hygrocybe nitrata</i>	Nitrous Waxcap
<i>Hygrocybe persistens</i>	Orange-yellow Waxcap
<i>Hygrocybe pratensis</i>	Meadow Waxcap
<i>Hygrocybe psittacina</i>	Parrot Waxcap
<i>Hygrocybe psittacina</i> v <i>perplexa</i>	Brick-red Parrot Waxcap
<i>Hygrocybe punicea</i>	Crimson Waxcap
<i>Hygrocybe quieta</i>	Tranquil Waxcap
<i>Hygrocybe reidii</i>	Reid's Waxcap
<i>Hygrocybe russocoriacea</i>	Russian-leather Waxcap

Hygrocybe splendidissima	Splendid Waxcap
Hygrocybe unguinosa	Slippery-eel Waxcap
Hygrocybe virginea	White Waxcap
Hygrocybe virginea v fuscescens	Brown-spotted Waxcap
Hygrocybe virginea v ochraceopallida	Pale Ochre Waxcap
Ramariopsis kunzei	White Coral

Table 11: List of species recorded from Calcifugous Grassland, U4a; U4b & U4c: (*Festuca ovina-Agrostis capillaris-Gallium saxatile* grassland: Typical sub-community; *Holcus lanatus-Trifolium repens* sub-community; & *Lathyrus montanus-Stachys betonica* sub-community)

Name	Common Name	NVC
Hygrocybe laeta	Shining Waxcap	U4a
Hygrocybe pratensis	Meadow Waxcap	U4a
Entoloma conferendum	Star-spored Pink-gill	U4b
Entoloma infula	Mitre Pink-gill	U4b
Hygrocybe laeta	Shining Waxcap	U4b
Hygrocybe pratensis	Meadow Waxcap	U4b
Clavulinopsis halvola	Golden Meadow-club	U4c
Hygrocybe chlorophana	Golden Waxcap	U4c
Hygrocybe coccinea	Scarlet Hood	U4c
Hygrocybe laeta	Shining Waxcap	U4c
Hygrocybe pratensis	Meadow Waxcap	U4c
Hygrocybe psittacina	Parrot Waxcap	U4c
Hygrocybe reidii	Reid's Waxcap	U4c

3.5 Management regimes

Listed in Table 12 below are the management regimes in place at the sites included in the survey, where known. This information has been obtained from CCW, the site owners and from personal observations.

Table 12: Management history at target sites

- 1 'Talley' SSSI (MG5a, MG5c, M25b) Pasture plus two hay meadows, cattle-grazed. Farmed by organic methods.
- 2 Pwll Edrychiad SSSI (MG5a, MG5c, M25b) Pasture, cattle and sheep-grazed, with clear evidence of rabbit grazing. No evidence of fertiliser treatment.
- 3 Caeau Nant Garenig SSSI (MG5, M25b, M24b/c) Pasture and some Molinia-dominated areas cut for hay. Sheep and pony grazing.
- 4 Cae Blaen-dyffryn SSSI & Annex (MG5a) Pasture, sheep-grazed. Unfertilised (Annex outside SSSI had some recent treatment)
- 5 Caeau Blaen-byderyn SSSI (U4c, M25b) Pasture, cattle and sheep-grazed. Unfertilised.
- 6 Carreg Cennen SSSI (CG1e, CG2c, MG6b) Pasture, cattle and sheep-grazed. Neutral grassland "heavily modified" according to SSSI notification documentation.
- 7 Whitehill Down SSSI (MG5a, M24b/c) Hay cutting with aftermath grazing by cattle. Artificial fertiliser used in certain parts. Some areas show past disturbance "probably ploughing".
- 8 Rhosydd Castell-du a Plas y Bettws SSSI (MG5c, M24b/c, M25b) Pasture, cattle-grazed. No evidence of fertiliser treatment.
- 9 Waun-las (Middleton) (MG6b) Pasture, cattle and sheep-grazed, but sheep withdrawn from large areas for 12 months prior to survey. Previous owners claim no artificial fertiliser or ploughing in living memory.
- 10 Caeau Caradog (MG5a, MG5c, U4a) Pasture, horse, pony and sheep-grazed, very heavily in some areas. MG5a has suffered substantial modification.
- 11 Llanerchaeron Estate (NT) (MG5?) Lawn, ungrazed except when sheep escape from adjoining fields. Mown twice a year. No fertiliser or treatment within living memory.
- 12 Llanrhystud Chapelyard (?) Ungrazed, mown twice a year. No fertiliser.

- 13 Hafod Estate (?) Pasture, sheep-grazed – relatively heavy. No fertiliser or treatment in living memory.
- 14 Dinefwr Park (NT) (?) Deer park, deer and cattle-grazed. Owners claim no fertiliser treatment, but some treatment is suspected.
- 15 Maestir Churchyard, Lampeter, Cards (?) Ungrazed, cut "regularly". Believed no fertiliser.
- 16 St David's College lawns, Lampeter (?) Ungrazed, cut "regularly". Believed no fertiliser.
- 17 Garn Ddyrys, Tumble (?) Pasture, sheep and rabbit-grazed – relatively heavily in many areas. No information on fertiliser treatment, but this is unlikely to have taken place.

3.6 Rare, Threatened and Endangered species

A list of those species recorded at the study sites which feature in the British Red Data List [Ing, 1992] (BRDL); the European Red Data List [Ing, 1993] (ERDL) and the Welsh Red Data List [Rotheroe, 1998] (WRDL) is shown in Table 12 below. Also indicated are the three species covered by the UK Biodiversity Action Plan [Anon, 1999] (BAP).

Table 13: Rare, Threatened & Endangered species recorded at grassland sites in the present study

- | | |
|----|---|
| 1 | Clavaria zollingeri (Zollinger's Fairy Club) – BRDL, WRDL, BAP
Gilfach Farm Rhyader, Hafod, Llanerchaeron, Maestir Churchyard |
| 2 | Geoglossum fallax (Deceptive Earth Tongue) - ERDL
Llanerchaeron, St David's College |
| 3 | Geoglossum glutinosum (Glutinous Earth Tongue) - ERDL
St David's College |
| 4 | Entoloma bloxamii (Bloxam's Pink-gill) - BRDL, WRDL
Llanerchaeron |
| 5 | Entoloma cruentatum (Blood-stained Pink-gill) - WRDL
'Talley' SSSI |
| 6 | Hygrocybe calyptiformis (Pink Meadow Waxcap) – BRDL, WRDL, priority BAP sp.
Cae Blaen-dyffryn, Garn Ddyrys, Gilfach Farm Rhyader, Hafod, Llanerchaeron,
Llanrhystud Chapelyard, Maestir Churchyard, 'Talley' SSSI |
| 7 | Hygrocybe cantharellus (Chanterelle Waxcap) – ERDL
Gilfach Farm Rhyader, Hafod |
| 8 | Hygrocybe fornicata (Arched Waxcap) – ERDL
Garn Ddyrys, Hafod, St David's College, Waun-las |
| 9 | Hygrocybe insipida (Insipid Waxcap) – ERDL
Carreg Cennen, Garn Ddyrys, Hafod, Llanerchaeron, Pwll Edrychiad, Talley, Waun-las |
| 10 | Hygrocybe intermedia (Intermediate Waxcap) - ERDL
Dinefwr, Gilfach Farm Rhyader, Hafod, Llanerchaeron, Waun-las |
| 11 | Hygrocybe nitrata (Nitrous Waxcap) - ERDL
Garn Ddyrys, Gilfach Farm Rhyader, Waun-las |
| 12 | Hygrocybe ovina (Sheep Waxcap) - ERDL
Gilfach Farm Rhyader, Llanerchaeron |
| 13 | Hygrocybe psittacina var perplexa (Brick-red Parrot Waxcap) – ERDL
Carreg Cennen, Hafod |
| 14 | Hygrocybe punicea (Crimson Waxcap) - ERDL
Carreg Cennen, Garn Ddyrys, Gilfach Farm Rhyader, Hafod, Llanerchaeron, Maestir
Churchyard, Waun-las |
| 15 | Hygrocybe quieta (Tranquil Waxcap) – ERDL, WRDL
Cae Blaen-dyffryn, Garn Ddyrys, Hafod, Pwll Edrychiad |
| 16 | Hygrocybe unguinosa (Slippery-eel Waxcap) – ERDL
Gilfach Farm Rhyader, Hafod, Llanerchaeron, Talley, Waun-las |
| 17 | Microglossum olivaceum (Olivaceous Earth Tongue) - BRDL, ERDL, WRDL, priority BAP sp.
Garn Ddyrys, Llanerchaeron, Maestir Churchyard, Pwll Edrychiad |
| 18 | Porpoloma metapodium (Reddening False Waxcap) - BRDL, WRDL
Dinefwr, Hafod, Llanerchaeron |

- 19 Ramariopsis kunzei (White Coral) – WRDL
Carreg Cennen, Hafod
- 20 Trichoglossum hirsutum (Hairy Earth Tongue) - ERDL
Garn Ddyrys, Maestir Churchyard
- 21 Trichoglossum walteri (Walter's Earth Tongue) - WRDL
St David's College

3.7 Meteorological data

The following figures for rainfall from Gelli Aur and Pwllpeiran weather stations are included to allow broad comparisons to be made.

Table 14: Monthly rainfall totals (mm) from Gelli Aur and Pwllpeiran weather stations: July-December, 1998

	Gelli Aur	Pwllpeiran
July	107.5	172.5
August	69.9	162.1
September	134.8	233.1
October	303.8	354.5
November	174.8	157.1
December	195.1	149.0

4 DISCUSSION

4.1 Seasonal considerations

In the author's experience, 1998 was one of the poorest years for fungal fruiting of macrofungi of the past decade. Anecdotal evidence suggests that other workers found similar conditions in other parts of Wales and England. Woodlands were particularly badly affected, while in grassland habitats fruiting was delayed at all the locations visited in this study, although the more productive sites eventually had substantial late flushes. The reason for this delayed fruiting is not altogether clear from the meteorological data available. Generally speaking, the highest peaks of fruiting in the autumn fungus season follow hot summers which are succeeded by plentiful late summer/early autumn rainfall. A moist environment is necessary for fungal fruiting to take place. Thus adequate levels of rainfall are essential if fruiting is to be triggered in the majority of macrofungi. However, an essential prerequisite to fruit body initiation is the extension of the fungal mycelial network underground. For macrofungi, this cannot take place in anaerobic conditions. In the event of rainfall sufficient to cause the upper levels of the soil to become waterlogged, anaerobic conditions are created and sustained until the water runs off or is absorbed in lower soil levels, allowing oxygen levels to rise. This could explain the depression of fruiting experienced. The rainfall data from Pwllpeiran are, strictly speaking, relevant only to the Hafod Estate. Nevertheless the general *pattern* may be commented upon. The rainfall total at this station in 1998 was 28 per cent higher than the average for the past 30 years [John Wildig, pers. comm.]. Perhaps it is no coincidence that exactly the same above-average percentage was recorded at the Swansea weather station [John Powell, pers. comm.]. (Pwllpeiran is situated inland at an elevation of 301 metres, while the Swansea station is coastal and at almost sea level. However, Pwllpeiran lies almost 100km due north of Swansea and most of the Carmarthenshire sites are situated approximately halfway between the two.)

All the sites visited were showing the effects of continuous heavy rainfall. This resulted in sodden ground and anaerobic soil conditions which persisted for long periods during what is regarded as the normal autumn fungus season. Because of the waterlogged conditions, cattle or horse grazed sites suffered additional damage through "poaching" of the soil, which can disrupt any underground mycelial networks. Previous work has shown that mire communities hold only marginal mycological interest [Rotheroe, 1997] and sites supporting these communities were particularly adversely affected by the excessive rain.

4.2 Comments on individual survey sites

4.2.1 'Talley' SSSI: Tables 4 and 5 indicate that this site ranks as being of Regional Importance, featuring in sixth or seventh position amongst the top ten sites. However, in the author's opinion, it should be graded as being of National Importance. It is remarkable for the very large number of *Entoloma* species (Pink-gills) recorded there, the cumulative total being 14, which is double that of any other location in this survey. Among these is *Entoloma cruentatum* (Blood-stained Pink-gill), which was a second British record when it was first collected there in 1996, although is also now known from two other locations in Britain. It features on the Welsh RDL and is likely to be included in a revised version of the British RDL, which is currently being prepared by a committee of the British Mycological Society, chaired by the author. This site is an organic farm and is subjected to grazing by cattle only – another feature which distinguishes it from most of the other sites covered by the survey. It should be noted that Field N [Gray, *et al.* 1992] has the richest mycota. The hay meadows (Fields D and E) [*loc. cit.*], which had proved disappointing during recording visits in 1996, produced many records during the present survey, including several new colonies of the British RDL species, *Hygrocybe calyptriformis* (Pink Meadow Waxcap). (Note: the name 'Talley' SSSI is used because the owners do not wish the exact location of the site to be publicised.)

4.2.2 Pwll Edrychiad SSSI: It is felt that two visits to this site were not sufficient to give a satisfactory prediction of the richness of its mycota. It appears to the author to be potentially of National Importance, although using the Rald formula it rates as being only of Regional Importance. It is the only site in Carmarthenshire where the Olivaceous Earth Tongue (*Microglossum olivaceum*) has been recorded. This is an extremely rare fungus which is known from only six other localities in Wales, one of these being Llanerchaeron (recorded 1993 by the author), a second being Maestir Churchyard (recorded 1998 by Penny David) and a third being at Garn Ddyrys (BMS recorders, 1998). It is listed as "Vulnerable" on the British RDL and is one of only four species of macrofungi which appear on as many as nine of the 11 RDLs so far published in Europe [Arnolds & de Vries, 1993]. It is the subject of a UK Biodiversity Action Plan [Anon, 1999]. It has a westerly distribution in mainland Britain and Wales appears to be one of its main population centres (there are only six post-1970 records of the fungus in England. Data for Scotland published in Anon [1999] are unreliable!). The species is an indicator of the highest quality grassland, mycologically speaking, although its distribution appears to be restricted mainly to base-rich soils [Alan Silverside, pers. comm.]. It was fruiting at Pwll Edrychiad on 21st October, 1998, in large numbers (some 200-plus fruitbodies in two colonies) in the open, rocky calcicolous grassland close to where Quadrats 2, 3 and 14 are marked on CCW's NVC vegetation map [Gray & Bevan, 1993]. (It is perhaps worth noting that all the 1998 records referred to above represented the rarer green form of the fungus, which is usually dark olivaceous.)

4.2.3 Caeau Nant Garenig: As will be seen from Table 3, no indicator species were recorded on either visit to this site. The mire communities are commented upon above. The mesotrophic grassland was either not grazed or under-grazed and the vegetation was much too rank to favour macrofungal fruiting.

4.2.4 Cae Blaen-dyffryn SSSI & annex: This site appeared to be relatively promising, but under-grazing resulted in tall, rank vegetation over large tracts. The British Red Data List species *Hygrocybe calyptriformis* (Pink Meadow Waxcap) was recorded here, as was the European and Welsh RDL species, *Hygrocybe quieta* (Tranquil Waxcap). The single-visit CHEG score suggests that it should be regarded as being of Regional Importance. It is an exposed site and it may be that warmer summers and heavier sheep grazing could lead to higher numbers of indicator species being recorded. The annex outside the SSSI (MG6) had received some recent treatment but this did not appear to affect the number of waxcaps fruiting there and, indeed, this enclosure proved to be slightly richer.

4.2.5 Caeau Blaen-byderyn SSSI: The M25b at this site was extremely wet and very difficult to survey. However the calcifugous grassland (U4c) areas in fields B and C were better-drained, well-grazed and showed definite potential. The cumulative indicator score for these areas was C1 H6 E0 G0, but it is thought that the true U4c mycota may be much richer than this score suggests.

4.2.6 Carreg Cennen SSSI: This site was included in the survey for its stands of calcicolous grassland (a scarce resource in Carmarthenshire), although these form relatively small, narrow tracts. However, most the indicator species recorded at this site were on the more extensive MG6b areas. Grazing by cattle and Soay sheep maintains a close-cropped, bryophyte rich turf, which is conducive to fungal fruiting. In general, this was one of the best sites visited and, as can be seen from Table 5, easily qualifies as being of National Importance, with a cumulative indicator score of C4 H19 E4 G0. It ranks as ninth on the 10 highest scoring sites using the "Top Twenty-four" rating. Two European RDL species were recorded there during the three 1998 visits. It seems likely that this site has a far more extensive and rich mycota than has been revealed from the 1998 data. In Carmarthenshire, Carreg Cennen is second only to Waun-las in terms of mycological interest, based on current data. This is, however, an unfair comparison because the Carreg Cennen data relate to one season only, whereas the Waun-las cumulative data were collected over a period of three consecutive years.

4.2.7 Whitehill Down SSSI: All the records from this site were from the mesotrophic grassland (MG5a). The grassland is managed for hay cropping and one of the problems of carrying out mycological surveys at such sites (a problem already experienced at 'Talley' SSSI) is that macrofungal fruiting does not commence until after the hay crop has been taken off. This means that the fungi have a much narrower window of opportunity to fruit than is the case on permanently grazed pastures. It also means that early-fruiting species cannot be detected – although their mycelium may well be present in the soil. However, the site did not appear from casual observation to be a particularly promising one. The wet grassland was extremely waterlogged, with tall, rank vegetation.

4.2.8 Rhosydd Castell-du a Plas y Bettws SSSI: No indicator species were recorded at this location and the comments noted for Site 3 above are equally appropriate here.

4.2.9 Waun-las: This site, having been surveyed by the author in the previous two years, was already known to have a very rich grassland mycota. It ranks as the fifth most important of the sites included in the present study, and is rated as being of National Importance. A total of six European RDL species has been recorded here. On the first visit in October, 1996, a total of 16 different species of Waxcap were recorded. It was noted in 1998, however, that grazing had not occurred over the previous 12 months. The grass was therefore longer and rank, particularly on the Strip Lynchets – the area which had been previously noted as the most productive. Not only were the number of Waxcap species recorded in 1998 reduced, but the number of fruitbodies in evidence showed a considerable drop compared to previous years. Previous grazing by sheep in this area had maintained a relatively short turf, with good bryophyte cover. (It is understood that shortly after the final recording visit to the site, sheep grazing was resumed [Janet Moseley, pers. comm.]) The current owners, the National Botanic Garden of Wales, have already made approaches to CCW, suggesting that the mycological richness of these unimproved grasslands warrants their being notified as an SSSI. They acknowledge, however, that floristically the grasslands are unremarkable and appear to be impoverished MG6b *Lolium-Cynosurus* grassland. This, taken together with the observations at Site 6 above, indicate that a rich mycota can persist in partially-improved neutral grassland as long as grazing pressures are sufficient to maintain short-cropped swards.

4.2.10 Caeau Caradog: The performance of this site appears to be rather poor, with a cumulative total of only three Waxcaps recorded. However, in the author's view the habitats here show much potential. This site, like many others, suffered from much waterlogging in 1998, while the fields where horses were grazing (particularly A, B and F) had rank vegetation. The sheep-grazed fields had a much lower sward height and the areas of MG5a

grassland in fields G, H, L, K and J looked very promising, as did the short tract of U4a in field M. It seems likely that the actual mycota of these grasslands will prove to be much richer than the data available at present suggest. The owner did, in fact, state that there had been some flushes of fungal fruiting earlier in the autumn [L. Chapman, pers. comm.].

5 CONCLUSIONS

5.1 General remarks

The year 1998 was an atypical one as far as the autumn fungus season was concerned. Fruiting of macrofungi in grasslands was delayed and far higher-than-average rainfall resulted in waterlogged conditions at many of the study sites. Nevertheless, some valuable county data were obtained and comparisons with sites known to be mycologically important for grassland indicator species have been possible. Four sites were judged to be of high conservation value. These were Waun-las Farm, Middleton; Carreg Cennen SSSI; 'Talley' SSSI; and Pwll Edrychiad SSSI. The first two are regarded as being of National Importance and the other two might also qualify for this ranking. Two of the remaining sites, Caeau Caradog and Whitehill Down SSSI, may well have a much richer mycota than has been evinced from the present survey.

5.2 Grassland types

The richest grassland type was clearly MG5 *Cynosurus-Centaurea* grassland, while M23, M24 and M25 are mycologically poor. However, some of the most productive habitats were of the MG6 *Lolium-Cynosurus* type. It is clear from this survey that certain less modified forms of MG6 grassland can be rich in fungi despite appearing impoverished from a vascular plant perspective, and the conservation importance of such sites can obviously be considerably underestimated unless they are visited by a mycologist during the late summer and autumn fruiting season. At both Carreg Cennen and Waun-las a clear distinction can be made (from mycological data) between MG6 grassland which has been heavily fertilised or improved in some way and the same grassland type which has been less modified. This distinction is a dramatic one and can be easily observed at Carreg Cennen. The path leading up to the castle is flanked on both sides by MG6 grassland. The steep grassland to the right of the path is extremely rich mycologically, while on the left the more improved MG6 displayed no fungal fruiting whatsoever.

5.3 Management recommendations

At those sites which have been identified as being mycologically important the main recommendation is to maintain the *status quo*, i.e. to refrain from fertiliser application or other chemical treatments and to continue at existing stocking levels. The mycological interest of some of the remaining sites might be enhanced if fertiliser treatments were withheld and stocking levels increased slightly. If a choice is available, then grazing by sheep – even at quite heavy stocking levels – appears to be the most successful to bring about fungal fruiting, although cattle grazing at relatively low intensity (such as occurs at 'Talley' SSSI) can clearly maintain favourable conditions too. Rabbit populations should be encouraged, to produce close-cropped areas.

5.4 Future work

Within Carmarthenshire further mycological recording is recommended, particularly at Carreg Cennen SSSI, Pwll Edrychiad SSSI, Caeau Caradog and Whitehill Down SSSI. This should ideally take place from spring, through summer and into the autumn, over a period of years, if the full mycotas of the sites are to be demonstrated. CCW in Carmarthenshire should be conscious of the various actions required for the conservation of *Microglossum olivaceum* and *Hygrocybe calyptriformis* under the Biodiversity Action Plan [Anon, 1999].

A broader programme of survey throughout Wales is also recommended so that a fuller assessment of the distribution of mycologically-important grasslands of the Principality might be made. This would be a valuable contribution to the process of inventory-taking in order to evaluate fungal biodiversity. It would also make a contribution to the fulfilment of CCW's obligations to the UK Biodiversity Action Group [*loc. cit.*], since three of the 22 fungal Action Plan species in that document are unimproved grassland species. It would also enable Wales to be fully represented in a proposed European Waxcap-grassland Survey for which European funding is currently being sought [various pers. comms.].

A start could be made on taking up this recommendation by the commissioning of a data collection project to set up a database of grassland sites known to have mycological interest and those which might have potential. This could be done, initially, by literature searches, consultation with mycologists holding personal data on Welsh grasslands and by "snapshot" visits to sites of recognised floristic importance, i.e. SSSI's with MG5, and MG6 sites with low soil fertility. Calcifugous and calcicolous grassland sites were not covered extensively by the present survey, but such sites may also merit further study to assess their relative mycological importance.

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APPENDIX 1

COUNTRYSIDE COUNCIL FOR WALES TECHNICAL SUPPORT AND RESEARCH PROGRAMME

PROJECT SPECIFICATION: MYCOLOGICAL SURVEY OF SELECTED SEMI-NATURAL GRASSLANDS IN CARMARTHENSHIRE

CCW nominated officers

J M S Bevan, Assistant District Officer, Carmarthenshire
R Woods, East Area Officer and Lower Plant Ecologist
D P Stevens, Lowland Grassland Ecologist

Background

The importance of unimproved grasslands for fungal assemblages has until recently been largely overlooked by British conservation agencies. In continental Europe, however, mycological studies have shown that certain taxa, notably waxcap fungi (*Hygrocybe* species), are virtually restricted to stands of semi-natural grassland, and quickly disappear from such sites following the application of artificial fertilisers (Arnolds 1989). There is now a growing understanding of the significance of such taxa amongst British mycologists and, as such, in 1996 the British Mycological Society (BMS) launched a survey of so-called 'waxcap-grasslands', with a view to producing a national inventory of mycologically important grassland sites (Rotheroe *et al.* 1996).

The Countryside Council for Wales (CCW) are in the process of completing a systematic Phase II survey of semi-natural grasslands in Wales. The principal aims of the survey are to characterise and describe the principality's semi-natural grassland resource, using the National Vegetation Classification (NVC) (Rodwell 1991 *et seq.*) as the basis for plant community definition. Other key objectives are to evaluate each grassland site following the principles and procedures outlined in *Guidelines for Selection of Biological SSSIs* (Nature Conservancy Council 1989); to identify the best remaining examples of semi-natural grassland; and to ensure that representative examples are protected as Sites of Special Scientific Interest (SSSIs). Evaluation is based largely on plant assemblages comprising vascular plants, bryophytes and lichens. No consideration has so far been given to fungal taxa, reflecting a lack of data on their occurrence and distribution in Welsh grasslands. Inevitably it is possible that certain mycologically rich grassland sites or communities may be overlooked using standard evaluation procedures, and consequently certain sites may not receive the statutory protection and sympathetic management they deserve. Selection criteria for fungi outlined in *Guidelines for Selection of Biological SSSIs: non-vascular plants* (Joint Nature Conservation Committee 1992) are poorly developed, and increased knowledge of the local, regional and national and international distributions of important fungal assemblages are badly needed.

Aims and objectives

The main aim of the present project is to carry out a mycological survey and assessment of a small number of high quality semi-natural grassland sites in Carmarthenshire. As well as contributing to the BMS waxcap-grassland survey, the data generated will form a useful if somewhat crude comparative basis for assessing subsequent and previous mycological surveys of grassland sites in the county. If successful, it is possible that the project could act as a pilot study for a wider strategic survey and assessment of the mycoflora of Welsh grasslands in subsequent years.

Specific objectives of the present project are to:

- Carry out a mycological survey of selected semi-natural grassland sites in Carmarthenshire.
- Provide an assessment of survey sites based on mycological interest.
- Provide an assessment of other known mycologically important grassland sites in the county, and compare these with sites covered by the present survey.
- Examine the relationship between mycological interest and grassland NVC (sub-) communities at each survey site.
- Examine the relationship between mycological interest and management at each survey site.
- Provide an overview of the relationship between mycological interest, NVC type and management of grasslands in Carmarthenshire.
- Offer generalisations about the importance of different grassland vegetation types and management regimes for fungal conservation.

Methods

Although based largely on survey methods suggested by Rotheroe *et al.* (1996), the following outline methodology should be viewed as a suggested framework only. A degree of flexibility is anticipated, partly in recognition of the erratic, weather-dependent fruiting of grassland fungi. Applicants are invited to comment on the methodology in their tender application and offer refinements as they see fit.

- Approximately 10 grassland sites to be included in the survey; these will be selected in conjunction with the above CCW nominated officers. It is anticipated that most will be in the region of 1-3 ha. Sites will encompass both mesotrophic (MG5 *Cynosurus cristatus*-*Centaurea nigra* grassland) and calcifugous (U4 *Festuca ovina*-*Agrostis capillaris*-*Galium saxatile* grassland) communities, managed under hay-meadow and grazing regimes. Previous work suggests that mire communities have relatively little mycological interest, but some examples of grazed *Molinia* (M24, M25) pasture will be included to test this suggestion. The rarity of calcicolous grassland in the county precludes its inclusion, although previous studies suggest that this habitat has a rather impoverished mycoflora compared to mesotrophic or calcifugous swards (Rotheroe 1997). Phase II (NVC) survey reports for each site will be provided by CCW.
- At least two visits should be made to each survey site, ideally with the first visit in late summer and the second in autumn, although the precise timing will be dictated to some extent by weather conditions. Visits should coincide with good fruiting periods following spells of substantial rainfall.
- Taxa covered by the survey should include all waxcap *Hygrocybe* species (including *Camarophyllus*), all fairy clubs (Clavariaceae) and all earth tongues (Geoglossaceae); relevant indicator species with the genera *Nolanea*, *Leptonia* and *Dermoloma* should also be included. Such coverage is suggested as the minimum requirement for site assessment. However, additional taxa may be suggested in the tender application.
- All mycological records should include details of grassland NVC type, which will be determined from field observations and existing Phase II survey reports. If more than one NVC type occurs at a site, separate species lists should be compiled for each grassland type. All records should also be accompanied by management details (ie hay, pasture, grazers, fertiliser treatment, etc), again with separate lists if contrasting management regimes operate with a site. Otherwise,

methods of data collection and collation should be decided by the contractor, subject to approval by the CCW nominated officers.

Products

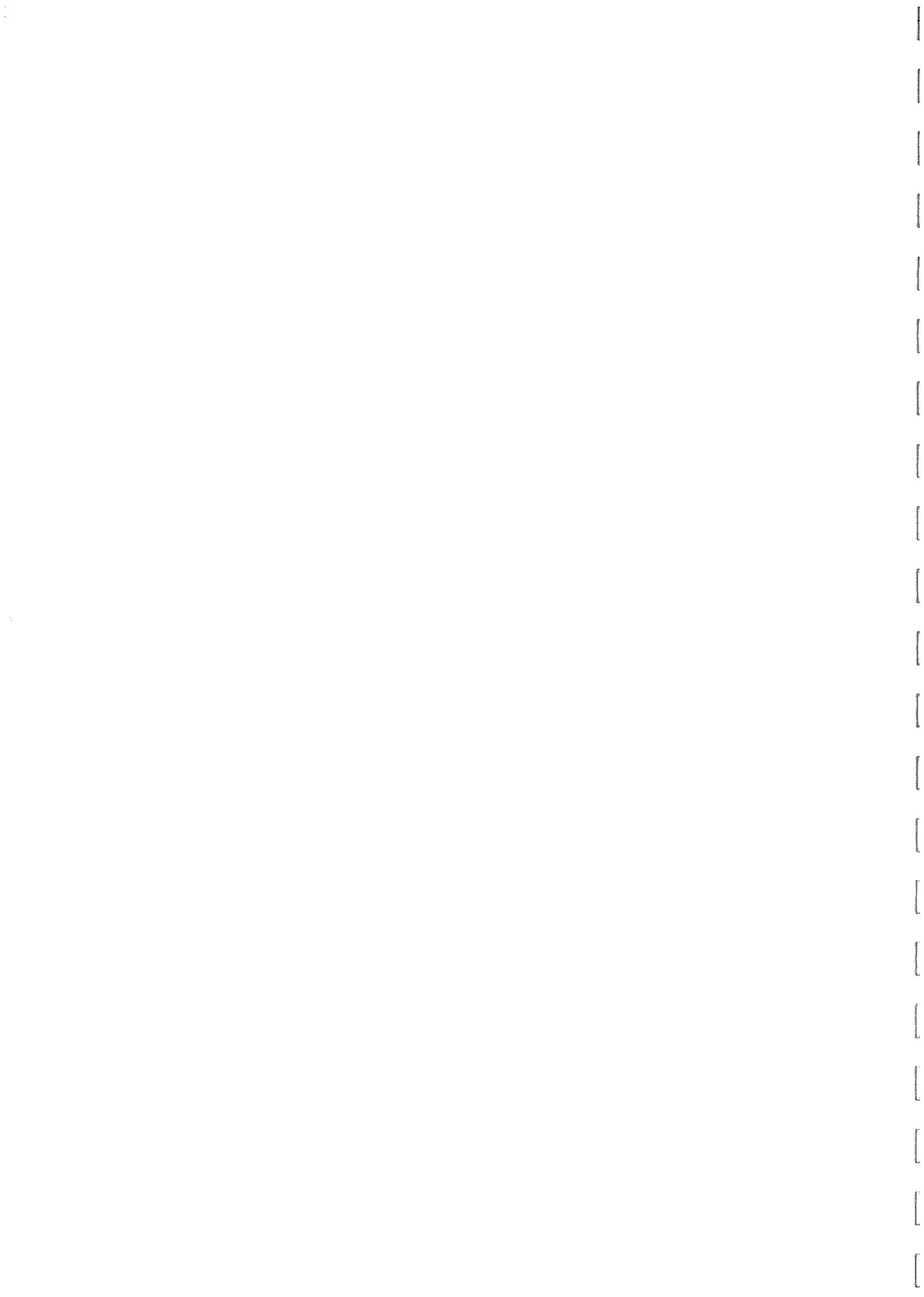
Results of the survey will be presented in a report containing a full methodology together with results sections on site assessment; assessment of other mycologically important grasslands in the county; relationship between mycological interest and NVC type; and relationship between mycological interest and management. A discussion will provide a critical review of any methodological limitations, an overview of the relationship between mycological interest, NVC type and management of grasslands in Carmarthenshire, and generalities about the conservation of mycologically important grassland sites in the county and the rest of Wales. Complete species lists for each site should be included as an appendix and supplied on disc in ascii or spreadsheet format. The report will be produced as a CCW contract science report; guidance on format will be provided by the CCW nominated officers.

Timetable

Fieldwork should take place between late summer-autumn 1998. A first draft (three copies) of the report should be submitted by 8 January 1998. The final draft (30 copies) will be required by 28 February 1999.

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APPENDIX II: Summary of Methodologies used in this Study to Evaluate Conservation Value of Nutrient-poor Grasslands (Waxcap Grasslands) (after Rotheroe [1999b])

Workers in Norway and Denmark have proposed that *Hygrocybe* (Waxcap) species, together with the other characteristic unimproved grassland fungi, should be used as indicator organisms for judging the conservation value of a given locality. Several different formulae for grading the relative habitat quality of a site have been proposed and perhaps the simplest of these is that of Rald, 1985. (Other, more complicated methods tend to produce identical results!) Rald separated four classes by the number of species found:

Conservation value

Total number of *Hygrocybe* species listed

Of national importance (I)	17-32 (11-20 during a single visit)
Of regional importance (II)	9-16 (6-10 during a single visit)
Of local importance (III)	4-8 (3-5 during a single visit)
Of no importance (IV)	1-3 (1-2 during a single visit)

The Rald prediction based on a single visit is useful but should be used with caution. The timing of the single visit is crucial. The phenology of fruiting of the sub-genus *Leptonia* – which makes up about half of all grassland species in the Entolomataceae (Species with pink spores, known in the vernacular as “Pink-gills”) – tends to be early, perhaps in July and August, if weather conditions are favourable. Their flush may be over by the time Waxcap fruiting peaks. (Taken to the extreme, of course, a single visit in January would produce a completely nil return!)

In assessing results using the Rald formula, additional weight can be given to sites which contain species which feature on the British Red Data List of Endangered Fungi (Ing, 1993) and the Red List of Endangered European Macrofungi (Ing, 1994).

Rotheroe *et al*, 1996, suggested that the Waxcap profile of a site, for comparison purposes, could be expressed in a shorthand using the following code letters:

- C (Clavarioid fungi – Fairy Clubs)
- H (*Hygrocybe s.l.* – Waxcaps)
- E (grassland species of the Entolomataceae – Pink-gills)
- G (Geoglossaceae – Earth Tongues)
- and D (*Dermoloma* – Floury False Waxcaps).

Thus a site with survey records of eight waxcaps, two fairy clubs, two earth tongues and one species of *Leptonia*, would be described as: C2, H8, E1, G2. The shorthand system has been used in the present study, except that, in the interests of simplicity, *Dermoloma* and *Porpoloma* are merged with H. This is legitimate, since they have the same ecological affinities and *Porpoloma* was, until recent taxonomic revisions, traditionally included in the genus *Hygrophorus* (as was *Hygrocybe*), while the current classification places *Dermoloma* in the tribus Hygrocybeae. (The effect of this minor departure from the Rald criteria is insignificant.) That author therefore interpreted Rald in this fashion and also referred to the ‘CHEG profile’ as a means of making easy quantitative assessments for comparison of different sites and to suggest their relative conservation value. The combined use of Rald criteria and CHEG profiles has proved successful in making comparative assessments of sites during the first three years of the BMS Waxcap-grassland Survey – a long-term study of grasslands being carried out

throughout the British Isles. (NOTE: In using these numerical formulae a variety record is given equal weighting to that of a species. Thus the numbers refer to taxa, rather than species.)

A further system of weighting is proposed by Rotheroe (1999a). His "Top Twenty-four" formula for evaluation of conservation value of Waxcap Grasslands relies heavily on the presence of certain waxcap species, but not exclusively so. It includes the presence of five other indicator species of unimproved grassland. A total of 24 species is listed as representing indicators of the highest quality Waxcap Grassland. The species selected are as follows:

Category A

Hygrocybe punicea (Crimson Waxcap, European Red Data List species)
Hygrocybe ovina (Sheep Waxcap, European Red Data List species)
Hygrocybe ingrata (Spindle-shank Waxcap, European Red Data List species)
Hygrocybe lacmus (Lacquered Waxcap)
Hygrocybe splendidissima (Splendid Waxcap)
Hygrocybe nitrata (Nitrous Waxcap, European Red Data List species)

Non-Waxcap species

Entoloma bloxamii (Bloxam's Pink-gill, British Red Data List species)
Microglossum olivaceum (Olivaceous Earth Tongue, British Red Data List species)
Trichoglossum walteri (Walter's Earth Tongue)
Entoloma incanum (Mousy Pink-gill)
Porpoloma metapodium (Reddening False Waxcap, British Red Data List species)
Clavaria zollingeri (Zollinger's Fairy Club, British Red Data List species)

Category B

Hygrocybe spadicea (Date-coloured Waxcap, British Red Data List species)
Hygrocybe citrinovirens (Lemon-green Waxcap, European Red Data List species)
Hygrocybe intermedia (Intermediate Waxcap, European Red Data List species)
Hygrocybe calyptriformis (Pink Meadow Waxcap, British Red Data List Species)
Hygrocybe flavipes (Yellow-footed Waxcap)
Hygrocybe helobia (Garlic Waxcap)
Hygrocybe colmanniana (Colman's Waxcap)
Hygrocybe quieta (Tranquil Waxcap, European Red Data List species)
Hygrocybe fornicata (Arched Waxcap, European Red Data List species)
Hygrocybe aurantiosplendens (Orange Splendid Waxcap)
Any other species in the Geoglossaceae, except *G. fallax* (Deceptive Earth Tongue)
Hygrocybe unguinosa (Slippery-eel Waxcap, European Red Data List species)

The species are listed in order of their value as indicators of the highest conservation value. This is the criterion in making the list. (Some in the list are, in fact, rather common, i.e. *Hygrocybe punicea*. However, this species above all is an indicator of the best waxcap sites. It is said by Boertmann to fruit only in localities with eight or more *Hygrocybe* species.)

A profile can thus be applied to any location in the following way: A location which has two species in the A category and three in the B category would be termed an A2 B3 site.

The value of this method of assessment is that the potential conservation value of a grassland can be predicted if any of the above species are found to occur, even if total numbers recorded on any or several occasions are few, for one reason or another. (Because presence or absence of a species can be noted only if it fruits, it often takes several years for the complete mycota of a site to emerge.)

APPENDIX III: SPECIES LIST
(Alphabetically , by site)

Name of Fungus	Common Name	NVC	Place	Fle- ld	Ab	Ord	D	M	Year
Clavulinopsis helvola	Golden Meadow-club	M25b	'Talley' SSSI, Carms	I	1.2	02	13	10	1998
Clavulinopsis helvola	Golden Meadow-club	MG5c	'Talley' SSSI, Carms	N		02	1	11	1998
Clavulinopsis luteoalba	Yellowish Fairy Club	MG5c	'Talley' SSSI, Carms	N	1.1	02	1	11	1998
Entoloma anatinum	Felty Brown Pink-gill	MG5c	'Talley' SSSI, Carms	N	4.3	01	1	11	1998
Entoloma anatinum	Felty Brown Pink-gill	MG5c	'Talley' SSSI, Carms	J	1.1	01	1	11	1998
Entoloma conferendum	Star-spored Pink-gill	MG6b	'Talley' SSSI, Carms	H	2.2	01	1	11	1998
Entoloma conferendum	Star-spored Pink-gill	U4b	'Talley' SSSI, Carms	I	1.1	01	1	11	1998
Entoloma corvinum	Raven's Pink-gill	M23a	'Talley' SSSI, Carms	N	2.2	01	13	10	1998
Entoloma cruentatum	Blood-stained Pink-gill	MG5c	'Talley' SSSI, Carms	N	1.1	01	1	11	1998
Entoloma hebes	Pubescent Pink-gill	MG5c	'Talley' SSSI, Carms	J	1.1	01	1	11	1998
Entoloma hebes	Pubescent Pink-gill	MG5c	'Talley' SSSI, Carms	N	1.1	01	1	11	1998
Entoloma infula	Mitre Pink-gill	MG5c	'Talley' SSSI, Carms	N	2.2	01	1	11	1998
Entoloma infula	Mitre Pink-gill	U4b	'Talley' SSSI, Carms	M	1.1	01	1	11	1998
Hygrocybe calyptriformis	Pink Meadow Waxcap	MG5a	'Talley' SSSI, Carms	F	1.1	01	1	11	1998
Hygrocybe calyptriformis	Pink Meadow Waxcap	MG5a	'Talley' SSSI, Carms	E	1.1	01	1	11	1998
Hygrocybe calyptriformis	Pink Meadow Waxcap	MG5a	'Talley' SSSI, Carms	D	12.4	01	1	11	1998
Hygrocybe calyptriformis	Pink Meadow Waxcap	MG5a	'Talley' SSSI, Carms	E	2.1	01	13	10	1998
Hygrocybe calyptriformis	Pink Meadow Waxcap	MG5c	'Talley' SSSI, Carms	N		01	1	11	1998
Hygrocybe calyptriformis	Pink Meadow Waxcap	MG6b	'Talley' SSSI, Carms	H	2.2	01	13	10	1998
Hygrocybe chlorophana	Golden Waxcap	M23a	'Talley' SSSI, Carms	N	3.3	01	13	10	1998
Hygrocybe chlorophana	Golden Waxcap	MG5a	'Talley' SSSI, Carms	D	1.1	01	13	10	1998
Hygrocybe citrinovirens	Lemon-green Waxcap	MG5a	'Talley' SSSI, Carms	E	1.3	01	1	11	1998
Hygrocybe citrinovirens	Lemon-green Waxcap	MG5a	'Talley' SSSI, Carms	D	2.2	01	13	10	1998
Hygrocybe coccinea	Scarlet Hood	MG5a	'Talley' SSSI, Carms	D	2.3	01	1	11	1998
Hygrocybe insipida	Insidid Waxcap	MG5a	'Talley' SSSI, Carms	D	1.1	01	1	11	1998
Hygrocybe insipida	Insidid Waxcap	MG5a	'Talley' SSSI, Carms	D	1.1	01	13	10	1998
Hygrocybe laeta	Shining Waxcap	MG5c	'Talley' SSSI, Carms	J	11.5	01	1	11	1998
Hygrocybe laeta	Shining Waxcap	MG5c	'Talley' SSSI, Carms	K	3.4	01	13	10	1998
Hygrocybe laeta	Shining Waxcap	U4b	'Talley' SSSI, Carms	M	2.2	01	1	11	1998
Hygrocybe laeta	Shining Waxcap	U4b	'Talley' SSSI, Carms	I	1.2	01	1	11	1998
Hygrocybe laeta	Shining Waxcap	U4b	'Talley' SSSI, Carms	I	2.2	01	13	10	1998
Hygrocybe pratensis	Meadow Waxcap	MG5a	'Talley' SSSI, Carms	F	3.3	01	1	11	1998
Hygrocybe pratensis	Meadow Waxcap	MG5a	'Talley' SSSI, Carms	D	6.3	01	1	11	1998
Hygrocybe pratensis	Meadow Waxcap	MG5a	'Talley' SSSI, Carms	F	2.2	01	13	10	1998
Hygrocybe pratensis	Meadow Waxcap	MG5a	'Talley' SSSI, Carms	E	2.2	01	13	10	1998
Hygrocybe pratensis	Meadow Waxcap	U4b	'Talley' SSSI, Carms	I	1.2	01	13	10	1998
Hygrocybe pratensis v pallida	Meadow Waxcap white var	MG5a	'Talley' SSSI, Carms	J	1.1	01	13	10	1998
Hygrocybe pratensis v pallida	Meadow Waxcap white var	MG5a	'Talley' SSSI, Carms	G	1.1	01	13	10	1998
Hygrocybe pratensis v pallida	Meadow Waxcap white var	MG5a	'Talley' SSSI, Carms	H	7.3	01	1	11	1998
Hygrocybe pratensis v pallida	Meadow Waxcap white var	MG5a	'Talley' SSSI, Carms	E	2.2	01	1	11	1998
Hygrocybe pratensis v pallida	Meadow Waxcap white var	MG5c	'Talley' SSSI, Carms	K	3.3	01	13	10	1998
Hygrocybe pratensis v pallida	Meadow Waxcap white var	MG5c	'Talley' SSSI, Carms	H	3.3	01	13	10	1998
Hygrocybe pratensis v pallida	Meadow Waxcap white var	MG5a	'Talley' SSSI, Carms	J	2.2	01	1	11	1998
Hygrocybe pratensis v pallida	Meadow Waxcap white var	MG5c	'Talley' SSSI, Carms	J	2.2	01	1	11	1998

APPENDIX III: SPECIES LIST
(Alphabetically , by site)

<i>Hygrocybe pratensis</i> v <i>pallida</i>	Meadow Waxcap white var	MG5c	'Talley' SSSI, Carns	N	1.2	01	1	11	1998
<i>Hygrocybe pratensis</i> v <i>pallida</i>	Meadow Waxcap white var	MG5c	'Talley' SSSI, Carns	G	1.2	01	1	11	1998
<i>Hygrocybe psittacina</i>	Parrot Waxcap	MG5c	'Talley' SSSI, Carns	N	1.2	01	13	10	1998
<i>Hygrocybe unguinosa</i>	Slippery-eel Waxcap	MG5a	'Talley' SSSI, Carns	F	2.2	01	13	10	1998
<i>Hygrocybe unguinosa</i>	Slippery-eel Waxcap	MG5c	'Talley' SSSI, Carns	J	2.1	01	13	10	1998
<i>Hygrocybe vitellina</i>	Egg-yellow Waxcap	MG5c	'Talley' SSSI, Carns	N	1.1	01	1	11	1998
<i>Dermoloma cuneifolium</i>	Floury False-waxcap	MG6	Cae Blaen-dyffryn SSSI		1.1	01	7	10	1998
<i>Hygrocybe calyptiformis</i>	Pink Meadow Waxcap	MG5a	Cae Blaen-dyffryn SSSI		1.1	01	3	11	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap	MG6	Cae Blaen-dyffryn SSSI		2.2	01	7	10	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap	MG6	Cae Blaen-dyffryn SSSI		1.1	01	3	11	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap	MG6	Cae Blaen-dyffryn SSSI		1.1	01	7	10	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap	MG6	Cae Blaen-dyffryn SSSI		1.1	01	3	11	1998
<i>Hygrocybe psittacina</i>	Parrot Waxcap	MG5a	Cae Blaen-dyffryn SSSI		1.1	01	7	10	1998
<i>Hygrocybe psittacina</i>	Parrot Waxcap	MG6	Cae Blaen-dyffryn SSSI		2.3	01	3	11	1998
<i>Hygrocybe quieta</i>	Tranquil Waxcap	MG5a	Cae Blaen-dyffryn SSSI		2.1	01	7	10	1998
<i>Hygrocybe quieta</i>	Tranquil Waxcap	MG6	Cae Blaen-dyffryn SSSI		2.3	01	7	10	1998
<i>Hygrocybe virginea</i>	White Waxcap	MG5a	Cae Blaen-dyffryn SSSI		2.2	01	7	10	1998
<i>Hygrocybe virginea</i>	White Waxcap	MG6	Cae Blaen-dyffryn SSSI		1.1	01	3	11	1998
<i>Clavulinopsis helvola</i>	Golden Meadow-club	U4c	Caeau Blaen-byderyn SSSI	C	1.2	02	12	10	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap	U4c	Caeau Blaen-byderyn SSSI	B	3.2	01	12	10	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap	U4c	Caeau Blaen-byderyn SSSI	C	1.1	01	31	10	1998
<i>Hygrocybe coccinea</i>	Scarlet Hood	U4c	Caeau Blaen-byderyn SSSI	C	2.4	01	31	10	1998
<i>Hygrocybe laeta</i>	Shining Waxcap	U4c	Caeau Blaen-byderyn SSSI	C	2.2	01	12	10	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap	U4c	Caeau Blaen-byderyn SSSI	C	1.1	01	31	10	1998
<i>Hygrocybe psittacina</i>	Parrot Waxcap	U4c	Caeau Blaen-byderyn SSSI	B	3.2	01	12	10	1998
<i>Hygrocybe psittacina</i>	Parrot Waxcap	U4c	Caeau Blaen-byderyn SSSI	C	3.3	01	31	10	1998
<i>Hygrocybe reidii</i>	Reid's Waxcap	U4c	Caeau Blaen-byderyn SSSI	C	1.1	01	12	10	1998
<i>Hygrocybe laeta</i>	Shining Waxcap	U4a	Caeau Caradog		1.1	01	12	10	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap	MG5a	Caeau Caradog		1.1	01	22	11	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap	MG5a	Caeau Caradog		1.1	01	12	10	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap	U4a	Caeau Caradog		1.1	01	12	10	1998
<i>Hygrocybe pratensis</i> v <i>pallida</i>	Meadow Waxcap white var	MG5a	Caeau Caradog		1.1	01	12	10	1998
<i>Clavaria</i> sp branched	A Fairy Club	MG6b	Carreg Cennen SSSI		1.1	02	1	11	1998
<i>Clavulinopsis corniculata</i>	Cow-horn Coral-fungus	CG2	Carreg Cennen SSSI		1.1	02	16	11	1998
<i>Clavulinopsis corniculata</i>	Cow-horn Coral-fungus	MG6b	Carreg Cennen SSSI			02	1	11	1998
<i>Clavulinopsis fusiformis</i>	Golden Spindles	MG6	Carreg Cennen SSSI		2.1	02	7	10	1998
<i>Clavulinopsis helvola</i>	Golden Meadow-club	CG2	Carreg Cennen SSSI			02	1	11	1998
<i>Clavulinopsis helvola</i>	Golden Meadow-club	MG6b	Carreg Cennen SSSI			02	1	11	1998
<i>Dermoloma cuneifolium</i>	Floury False-waxcap	MG6	Carreg Cennen SSSI		1.1	01	7	10	1998
<i>Dermoloma cuneifolium</i>	Floury False-waxcap	MG6b	Carreg Cennen SSSI			01	1	11	1998
<i>Hygrocybe ceracea</i>	Wax-like Waxcap	MG6b	Carreg Cennen SSSI			01	1	11	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap	CG2	Carreg Cennen SSSI		2.2	01	7	10	1998

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<i>Hygrocybe chlorophana</i>	Golden Waxcap	MG6	Carreg Cennen SSSI		5.3	01	7	10	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap	MG6	Carreg Cennen SSSI		2.2	01	16	11	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap	MG6b	Carreg Cennen SSSI			01	1	11	1998
<i>Hygrocybe cinereifolia</i>	Grey-gilled Waxcap	MG6	Carreg Cennen SSSI		1.1	01	7	10	1998
<i>Hygrocybe coccinea</i>	Scarlet Hood	MG6	Carreg Cennen SSSI		2.2	01	7	10	1998
<i>Hygrocybe coccinea</i>	Scarlet Hood	MG6	Carreg Cennen SSSI		1.1	01	16	11	1998
<i>Hygrocybe coccinea</i>	Scarlet Hood	MG6b	Carreg Cennen SSSI			01	1	11	1998
<i>Hygrocybe colemanniana</i>	Coleman's Waxcap	CG2	Carreg Cennen SSSI			01	1	11	1998
<i>Hygrocybe colmanniana</i>	Coleman's Waxcap	CG2	Carreg Cennen SSSI		2.2	01	7	10	1998
<i>Hygrocybe colmanniana</i>	Coleman's Waxcap	MG6	Carreg Cennen SSSI		2.2	01	7	10	1998
<i>Hygrocybe conica</i> v <i>chloroides</i>	Yellow Blackening Waxcap	MG6b	Carreg Cennen SSSI			01	1	11	1998
<i>Hygrocybe glutinipes</i>	Glutinous Waxcap	MG6	Carreg Cennen SSSI		1.1	01	7	10	1998
<i>Hygrocybe insipida</i>	Insipid Waxcap	MG6	Carreg Cennen SSSI		1.1	01	16	11	1998
<i>Hygrocybe insipida</i>	Insipid Waxcap	CG2	Carreg Cennen SSSI			01	1	11	1998
<i>Hygrocybe insipida</i>	Insipid Waxcap	MG6b	Carreg Cennen SSSI			01	1	11	1998
<i>Hygrocybe persistens</i>	Orange-yellow Waxcap	MG6b	Carreg Cennen SSSI			01	1	11	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap	MG6	Carreg Cennen SSSI		1.1	01	7	10	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap	MG6	Carreg Cennen SSSI		3.2	01	16	11	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap	MG6b	Carreg Cennen SSSI			01	1	11	1998
<i>Hygrocybe psittacina</i>	Parrot Waxcap	MG6	Carreg Cennen SSSI		4.3	01	7	10	1998
<i>Hygrocybe psittacina</i>	Parrot Waxcap	MG6b	Carreg Cennen SSSI			01	1	11	1998
<i>Hygrocybe psittacina</i> v <i>perplexa</i>	Brick-red Parrot Waxcap	MG6b	Carreg Cennen SSSI			01	1	11	1998
<i>Hygrocybe punicea</i>	Crimson Waxcap	MG6	Carreg Cennen SSSI		1.1	01	7	10	1998
<i>Hygrocybe punicea</i>	Crimson Waxcap	MG6	Carreg Cennen SSSI		1.1	01	16	11	1998
<i>Hygrocybe punicea</i>	Crimson Waxcap	MG6b	Carreg Cennen SSSI			01	1	11	1998
<i>Hygrocybe reidii</i>	Reid's Waxcap	CG2	Carreg Cennen SSSI		1.1	01	7	10	1998
<i>Hygrocybe reidii</i>	Reid's Waxcap	MG6	Carreg Cennen SSSI		3.3	01	7	10	1998
<i>Hygrocybe russocoriaceae</i>	Russian-leather Waxcap	CG2	Carreg Cennen SSSI		2.2	01	16	11	1998
<i>Hygrocybe russocoriaceae</i>	Russian-leather Waxcap	MG6	Carreg Cennen SSSI		2.2	01	16	11	1998
<i>Hygrocybe russocoriaceae</i>	Russian-leather	CG2	Carreg Cennen SSSI			01	1	11	1998
<i>Hygrocybe virginea</i>	White Waxcap	MG6	Carreg Cennen SSSI		3.3	01	7	10	1998
<i>Hygrocybe virginea</i>	White Waxcap	MG6	Carreg Cennen SSSI		5.4	01	16	11	1998
<i>Hygrocybe virginea</i>	White Waxcap	CG2	Carreg Cennen SSSI			01	1	11	1998
<i>Hygrocybe virginea</i>	White Waxcap	MG6b	Carreg Cennen SSSI			01	1	11	1998
<i>Hygrocybe virginea</i> v <i>fuscescens</i>	Brown-spotted Waxcap	MG6	Carreg Cennen SSSI		1.1	01	7	10	1998
<i>Hygrocybe virginea</i> v <i>ochraceopallida</i>	Pale Ochre Waxcap	MG6	Carreg Cennen SSSI		2.2	01	7	10	1998
<i>Hygrocybe virginea</i> v <i>fuscescens</i>	Brown-spotted Waxcap	CG2	Carreg Cennen SSSI		1.1	01	7	10	1998
<i>Ramariopsis kunzei</i>	White Coral	MG6	Carreg Cennen SSSI		1.1	02	7	10	1998
<i>Clavaria vermicularis</i>	White Spindles		Dinefwr Park, Llandeilo		2.2	02	18	10	1998
<i>Clavaria vermicularis</i>	White Spindles		Dinefwr Park, Llandeilo		1.1	02	8	9	1998
<i>Hygrocybe ceracea</i>	Wax-like Waxcap		Dinefwr Park, Llandeilo		1.1	01	18	10	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap		Dinefwr Park, Llandeilo		1.1	01	30	9	1998
<i>Hygrocybe conica</i>	Blackening Waxcap		Dinefwr Park, Llandeilo		1.1	01	18	10	1998
<i>Hygrocybe conica</i>	Blackening Waxcap		Dinefwr Park, Llandeilo			01	8	9	1998
<i>Hygrocybe flavipes</i>	Yellow-footed Waxcap		Dinefwr Park, Llandeilo		1.1	01	18	10	1998
<i>Hygrocybe glutinipes</i>	Glutinous Waxcap		Dinefwr Park, Llandeilo		1.1	01	8	9	1998

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<i>Hygrocybe intermedia</i>	Intermediate Waxcap		Dinefwr Park, Llandeilo	1.1	01	8	9	1998
<i>Hygrocybe pratensis</i> v <i>pallida</i>	Meadow Waxcap white var		Dinefwr Park, Llandeilo	1.2	01	18	10	1998
<i>Hygrocybe psittacina</i>	Parrot Waxcap		Dinefwr Park, Llandeilo	1.1	01	18	10	1998
<i>Hygrocybe psittacina</i>	Parrot Waxcap		Dinefwr Park, Llandeilo		01	8	9	1998
<i>Hygrocybe psittacina</i>	Parrot Waxcap		Dinefwr Park, Llandeilo		01	17	9	1998
<i>Hygrocybe psittacina</i>	Parrot Waxcap		Dinefwr Park, Llandeilo		01	30	9	1998
<i>Hygrocybe virginea</i>	White Waxcap		Dinefwr Park, Llandeilo		01	18	10	1998
<i>Porpoloma metapodium</i>	Reddening False- waxcap		Dinefwr Park, Llandeilo	1.1	01	8	9	1998
<i>Clavulinopsis corniculata</i>	Cow-horn Coral- fungus		Garn Ddyrys SSSI		02	24	10	1998
<i>Geoglossum cookeianum</i>	Cooke's Earth Tongue		Garn Ddyrys SSSI		39	24	10	1998
<i>Geoglossum fallax</i>	Deceptive Earth Tongue		Garn Ddyrys SSSI		39	24	10	1998
<i>Hygrocybe calyptriformis</i>	Pink Meadow Waxcap		Garn Ddyrys SSSI		01	24	10	1998
<i>Hygrocybe ceracea</i>	Wax-like Waxcap		Garn Ddyrys SSSI		01	24	10	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap		Garn Ddyrys SSSI		01	24	10	1998
<i>Hygrocybe coccinea</i>	Scarlet Hood		Garn Ddyrys SSSI		01	24	10	1998
<i>Hygrocybe colemanniana</i>	Coleman's Waxcap		Garn Ddyrys SSSI		01	24	10	1998
<i>Hygrocybe conica</i>	Blackening Waxcap		Garn Ddyrys SSSI		01	24	10	1998
<i>Hygrocybe fornicata</i>	Arched Waxcap		Garn Ddyrys SSSI		01	24	10	1998
<i>Hygrocybe insipida</i>	Insidip Waxcap		Garn Ddyrys SSSI		01	24	10	1998
<i>Hygrocybe nitrata</i>	Nitrous Waxcap		Garn Ddyrys SSSI		01	24	10	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap		Garn Ddyrys SSSI		01	24	10	1998
<i>Hygrocybe psittacina</i>	Parrot Waxcap		Garn Ddyrys SSSI		01	24	10	1998
<i>Hygrocybe punicea</i>	Crimson Waxcap		Garn Ddyrys SSSI		01	24	10	1998
<i>Hygrocybe quieta</i>	Tranquil Waxcap		Garn Ddyrys SSSI		01	24	10	1998
<i>Hygrocybe reai</i>	Rea's Waxcap		Garn Ddyrys SSSI		01	24	10	1998
<i>Hygrocybe reidii</i>	Reid's Waxcap		Garn Ddyrys SSSI		01	24	10	1998
<i>Hygrocybe russocoriacea</i>	Russian-leather Waxcap		Garn Ddyrys SSSI		01	24	10	1998
<i>Hygrocybe virginea</i>	White Waxcap		Garn Ddyrys SSSI		01	24	10	1998
<i>Microglossum olivaceum</i>	Olivaceous Earth Tongue		Garn Ddyrys SSSI		39	24	10	1998
<i>Trichoglossum hirsutum</i>	Hairy Earth Tongue		Garn Ddyrys SSSI		39	24	10	1998
<i>Clavulinopsis corniculata</i>	Cow-horn Coral- fungus	MG6	Hafod Estate		02	29	10	1998
<i>Clavulinopsis fusiformis</i>	Golden Spindles	MG6	Hafod Estate		02	16	9	1998
<i>Clavulinopsis helvola</i>	Golden Meadow-club	MG6	Hafod Estate	1.1	02	14	10	1998
<i>Hygrocybe ceracea</i>	Wax-like Waxcap	MG6	Hafod Estate	1.2	01	14	10	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap	MG6	Hafod Estate		01	29	9	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap	MG6	Hafod Estate	2.2	01	14	10	1998
<i>Hygrocybe citrinovirens</i>	Lemon-green Waxcap	MG6	Hafod Estate		01	29	9	1998
<i>Hygrocybe citrinovirens</i>	Lemon-green Waxcap	MG6	Hafod Estate	1.1	01	14	10	1998
<i>Hygrocybe coccinea</i>	Scarlet Hood	MG6	Hafod Estate	2.3	01	14	10	1998
<i>Hygrocybe coccinea</i>	Scarlet Hood	MG6	Hafod Estate		01	29	9	1998
<i>Hygrocybe conica</i>	Blackening Waxcap	MG6	Hafod Estate	1.1	01	14	10	1998
<i>Hygrocybe insipida</i>	Insidip Waxcap	MG6	Hafod Estate		01	16	9	1998
<i>Hygrocybe insipida</i>	Insidip Waxcap	MG6	Hafod Estate	1.1	01	14	10	1998
<i>Hygrocybe laeta</i>	Shining Waxcap	MG6	Hafod Estate	1.1	01	14	10	1998
<i>Hygrocybe persistens</i>	Orange-yellow Waxcap	MG6	Hafod Estate		01	16	9	1998

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<i>Hygrocybe pratensis</i>	Meadow Waxcap	MG6	Hafod Estate		01	29	9	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap	MG6	Hafod Estate	10.4	01	14	10	1998
<i>Hygrocybe psittacina</i>	Parrot Waxcap	MG6	Hafod Estate		01	29	9	1998
<i>Hygrocybe psittacina</i>	Parrot Waxcap	MG6	Hafod Estate	1.1	01	14	10	1998
<i>Hygrocybe psittacina v perplexa</i>	Brick-red Parrot Waxcap	MG6	Hafod Estate		01	16	9	1998
<i>Hygrocybe punicea</i>	Crimson Waxcap	MG6	Hafod Estate	1.2	01	14	10	1998
<i>Hygrocybe quieta</i>	Tranquil Waxcap	MG6	Hafod Estate		01	29	9	1998
<i>Hygrocybe quieta</i>	Tranquil Waxcap	MG6	Hafod Estate	4.3	01	14	10	1998
<i>Hygrocybe reidii</i>	Reid's Waxcap	MG6	Hafod Estate		01	29	9	1998
<i>Hygrocybe reidii</i>	Reid's Waxcap	MG6	Hafod Estate	3.3	01	14	10	1998
<i>Hygrocybe splendidissima</i>	Splendid Waxcap	MG6	Hafod Estate	2.2	01	14	10	1998
<i>Hygrocybe splendidissima</i>	Splendid Waxcap	MG6	Hafod Estate		01	29	9	1998
<i>Hygrocybe unguinosa</i>	Slippery-eel Waxcap	MG6	Hafod Estate		01	29	9	1998
<i>Hygrocybe virginea</i>	White Waxcap	MG6	Hafod Estate	1.1	01	14	10	1998
<i>Hygrocybe virginea v ochraceopallida</i>	Pale Ochre Waxcap	MG6	Hafod Estate		01	29	9	1998
<i>Hygrocybe virginea v ochraceopallida</i>	Pale Ochre Waxcap	MG6	Hafod Estate	1.1	01	14	10	1998
<i>Ramariopsis kunzei</i>	White Coral	MG6	Hafod Estate		02	29	9	1998
<i>Clavaria fumosa</i>	Smoky Fairy Club		Llanerchaeron	1.1	02	29	10	1998
<i>Clavaria fumosa</i>	Smoky Fairy Club		Llanerchaeron	4.2	02	15	11	1998
<i>Clavaria fumosa</i>	Smoky Fairy Club		Llanerchaeron	1.1	02	22	10	1998
<i>Clavaria zollingeri</i>	Zollinger's Fairy Club		Llanerchaeron		02	29	9	1998
<i>Clavaria zollingeri</i>	Zollinger's Fairy Club		Llanerchaeron	2.1	02	15	11	1998
<i>Clavulinopsis corniculata</i>	Cow-horn Coral-fungus		Llanerchaeron	1.1	02	15	11	1998
<i>Clavulinopsis helvola</i>	Golden Meadow-club		Llanerchaeron	3.3	02	22	10	1998
<i>Clavulinopsis luteoalba</i>	Yellowish Fairy Club		Llanerchaeron	1.2	02	15	11	1998
<i>Entoloma conferendum</i>	Star-spored Pink-gill		Llanerchaeron	1.1	01	15	11	1998
<i>Geoglossum fallax</i>	Deceptive Earth Tongue		Llanerchaeron	1.1	39	15	11	1998
<i>Hygrocybe ceracea</i>	Wax-like Waxcap		Llanerchaeron	2.2	01	29	10	1998
<i>Hygrocybe ceracea</i>	Wax-like Waxcap		Llanerchaeron	2.3	01	15	11	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap		Llanerchaeron	2.2	01	29	10	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap		Llanerchaeron		01	29	9	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap		Llanerchaeron	3.3	01	15	10	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap		Llanerchaeron	4.3	01	15	11	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap		Llanerchaeron	2.2	01	22	10	1998
<i>Hygrocybe coccinea</i>	Scarlet Hood		Llanerchaeron	3.3	01	29	10	1998
<i>Hygrocybe coccinea</i>	Scarlet Hood		Llanerchaeron	1.1	01	15	10	1998
<i>Hygrocybe coccinea</i>	Scarlet Hood		Llanerchaeron	4.4	01	15	11	1998
<i>Hygrocybe coccinea</i>	Scarlet Hood		Llanerchaeron	4.2	01	22	10	1998
<i>Hygrocybe insipida</i>	Insidious Waxcap		Llanerchaeron	2.2	01	15	11	1998
<i>Hygrocybe intermedia</i>	Intermediate Waxcap		Llanerchaeron		01	29	9	1998
<i>Hygrocybe laeta</i>	Shining Waxcap		Llanerchaeron	1.1	01	29	10	1998
<i>Hygrocybe miniata</i>	Saturn-red waxcap		Llanerchaeron	1.2	01	15	11	1998
<i>Hygrocybe persistens</i>	Orange-yellow Waxcap		Llanerchaeron	1.1	01	15	10	1998
<i>Hygrocybe persistens</i>	Orange-yellow Waxcap		Llanerchaeron	1.1	01	15	11	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap		Llanerchaeron	3.3	01	29	10	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap		Llanerchaeron	4.3	01	15	10	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap		Llanerchaeron	5.3	01	15	11	1998

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Hygrocybe pratensis	Meadow Waxcap		Llanerchaeron	6.3	01	22	10	1998
Hygrocybe psittacina	Parrot Waxcap		Llanerchaeron	2.2	01	15	11	1998
Hygrocybe psittacina	Parrot Waxcap		Llanerchaeron	2.2	01	22	10	1998
Hygrocybe punicea	Crimson Waxcap		Llanerchaeron	3.3	01	29	10	1998
Hygrocybe punicea	Crimson Waxcap		Llanerchaeron	2.2	01	15	10	1998
Hygrocybe punicea	Crimson Waxcap		Llanerchaeron	7.4	01	15	11	1998
Hygrocybe punicea	Crimson Waxcap		Llanerchaeron	2.4.3	01	22	10	1998
Hygrocybe reidii	Reid's Waxcap		Llanerchaeron	2.3	01	29	10	1998
Hygrocybe reidii	Reid's Waxcap		Llanerchaeron		01	29	9	1998
Hygrocybe reidii	Reid's Waxcap		Llanerchaeron	4.3	01	15	10	1998
Hygrocybe reidii	Reid's Waxcap		Llanerchaeron	2.2	01	15	11	1998
Hygrocybe reidii	Reid's Waxcap		Llanerchaeron	4.2	01	22	10	1998
Hygrocybe russocoriacea	Russian-leather Waxcap		Llanerchaeron	1.1	01	29	10	1998
Hygrocybe russocoriacea	Russian-leather Waxcap		Llanerchaeron	1.2	01	15	11	1998
Hygrocybe splendidissima	Splendid Waxcap		Llanerchaeron	1.1	01	15	10	1998
Hygrocybe splendidissima	Splendid Waxcap		Llanerchaeron	1.2	01	15	11	1998
Hygrocybe unguinosa	Slippery-eel Waxcap		Llanerchaeron	1.1	01	29	10	1998
Hygrocybe unguinosa	Slippery-eel Waxcap		Llanerchaeron		01	29	9	1998
Hygrocybe unguinosa	Slippery-eel Waxcap		Llanerchaeron	1.1	01	15	10	1998
Hygrocybe virginea	White Waxcap		Llanerchaeron	1.2	01	29	10	1998
Hygrocybe virginea	White Waxcap		Llanerchaeron	2.3	01	15	10	1998
Hygrocybe virginea	White Waxcap		Llanerchaeron	3.3	01	15	11	1998
Porpoloma metapodium	Reddening False-waxcap		Llanerchaeron	1.1	01	29	9	1998
Hygrocybe calyptriformis	Pink Meadow Waxcap		Llanrhystud Chapelyard	2.1	01	28	9	1998
Hygrocybe chlorophana	Golden Waxcap		Llanrhystud Chapelyard	2.2	01	28	9	1998
Hygrocybe coccinea	Scarlet Hood		Llanrhystud Chapelyard	2.2	01	28	9	1998
Hygrocybe conica	Blackening Waxcap		Llanrhystud Chapelyard	1.1	01	28	9	1998
Clavaria fumosa	Smoky Fairy Club		Maestir Churchyard	1.3	02	28	10	1998
Clavaria zollingeri	Zollinger's Fairy Club		Maestir Churchyard	1.1	02	28	10	1998
Entoloma conferendum	Star-spored Pink-gill		Maestir Churchyard	1.1	01	28	10	1998
Hygrocybe calyptriformis	Pink Meadow Waxcap		Maestir Churchyard	1.1	01	28	10	1998
Hygrocybe coccinea	Scarlet Hood		Maestir Churchyard	1.2	01	28	10	1998
Hygrocybe laeta	Shining Waxcap		Maestir Churchyard	1.1	01	28	10	1998
Hygrocybe pratensis	Meadow Waxcap		Maestir Churchyard	3.2	01	28	10	1998
Hygrocybe psittacina	Parrot Waxcap		Maestir Churchyard	1.1	01	28	10	1998
Hygrocybe punicea	Crimson Waxcap		Maestir Churchyard	1.2	01	28	10	1998
Microglossum olivaceum	Olivaceous Earth Tongue		Maestir Churchyard	2.5	39	28	10	1998
Trichoglossum hirsutum	Hairy Earth Tongue		Maestir Churchyard	1.3	39	28	10	1998
Clavaria vermicularis	White Spindles	MG5a	Pwll Edrychiad SSSI	1.2	02	21	10	1998
Clavulinopsis corniculata	Cow-horn Coral-fungus	CG	Pwll Edrychiad SSSI	1.1	02	1	10	1998
Clavulinopsis corniculata	Cow-horn Coral-fungus	CG	Pwll Edrychiad SSSI	1.1	02	21	10	1998
Clavulinopsis corniculata	Cow-horn Coral-fungus	MG5a	Pwll Edrychiad SSSI	2.3	02	21	10	1998
Hygrocybe ceracea	Wax-like Waxcap	MG5a	Pwll Edrychiad SSSI	1.1	01	1	10	1998
Hygrocybe chlorophana	Golden Waxcap	MG5a	Pwll Edrychiad SSSI		01	1	10	1998
Hygrocybe chlorophana	Golden Waxcap	MG5a	Pwll Edrychiad SSSI	1.1	01	21	10	1998
Hygrocybe chlorophana	Golden Waxcap	MG5c	Pwll Edrychiad SSSI	3.3	01	1	10	1998
Hygrocybe chlorophana	Golden Waxcap	MG6b	Pwll Edrychiad SSSI	1.1	01	21	10	1998

APPENDIX III: SPECIES LIST
(Alphabetically, by site)

<i>Hygrocybe conica</i>	Blackening Waxcap	MG5a	Pwll Edrychiad SSSI	1.1	01	1	10	1998
<i>Hygrocybe conica</i>	Blackening Waxcap	MG5c	Pwll Edrychiad SSSI	1.1	01	21	10	1998
<i>Hygrocybe insipida</i>	Insipid Waxcap	MG5a	Pwll Edrychiad SSSI	1.1	01	1	10	1998
<i>Hygrocybe insipida</i>	Insipid Waxcap	MG5c	Pwll Edrychiad SSSI		01	1	10	1998
<i>Hygrocybe insipida</i>	Insipid Waxcap	MG5c	Pwll Edrychiad SSSI	1.1	01	21	10	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap	MG5a	Pwll Edrychiad SSSI	1.1	01	1	10	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap	MG5a	Pwll Edrychiad SSSI	1.1	01	21	10	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap	MG5c	Pwll Edrychiad SSSI	3.3	01	21	10	1998
<i>Hygrocybe psittacina</i>	Parrot Waxcap	MG5a	Pwll Edrychiad SSSI	3.3	01	1	10	1998
<i>Hygrocybe quieta</i>	Tranquil Waxcap	CG	Pwll Edrychiad SSSI	1.1	01	1	10	1998
<i>Hygrocybe reidii</i>	Reid's Waxcap	MG5a	Pwll Edrychiad SSSI	2.2	01	1	10	1998
<i>Hygrocybe reidii</i>	Reid's Waxcap	MG5c	Pwll Edrychiad SSSI	1.1	01	21	10	1998
<i>Hygrocybe russocoriacea</i>	Russian-leather Waxcap	MG5a	Pwll Edrychiad SSSI	2.2	01	21	10	1998
<i>Hygrocybe russocoriacea</i>	Russian-leather Waxcap	MG5c	Pwll Edrychiad SSSI	1.2	01	21	10	1998
<i>Hygrocybe virginea</i> v <i>fuscescens</i>	Brown-spotted Waxcap	CG	Pwll Edrychiad SSSI	1.2	01	21	10	1998
<i>Hygrocybe virginea</i> v <i>ochraceopallida</i>	Pale Ochre Waxcap	MG5a	Pwll Edrychiad SSSI	1.1	01	1	10	1998
<i>Microglossum olivaceum</i>	Olivaceous Earth Tongue	CG	Pwll Edrychiad SSSI	2.5	39	21	10	1998
<i>Clavulinopsis corniculata</i>	Cow-horn Coral-fungus		St David's College	1.1	02	14	11	1998
<i>Clavulinopsis luteoalba</i>	Yellowish Fairy Club		St David's College	1.1	02	14	11	1998
<i>Dermoloma cuneifolium</i>	Floury False-waxcap		St David's College	1.1	1	14	11	1998
<i>Geoglossum fallax</i>	Deceptive Earth Tongue		St David's College	1.2	39	14	11	1998
<i>Geoglossum glutinosum</i>	Glutinous Earth Tongue		St David's College	1.1	39	14	11	1998
<i>Hygrocybe ceracea</i>	Wax-like Waxcap		St David's College	3.2	1	14	11	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap		St David's College	2.3	1	14	11	1998
<i>Hygrocybe coccinea</i>	Scarlet Hood		St David's College	4.4	1	14	11	1998
<i>Hygrocybe conica</i>	Blackening Waxcap		St David's College	1.2	1	14	11	1998
<i>Hygrocybe fornicata</i>	Arched Waxcap		St David's College	1.1	1	14	11	1998
<i>Hygrocybe pratensis</i>	Meadow Waxcap		St David's College	3.2	1	14	11	1998
<i>Hygrocybe psittacina</i>	Parrot Waxcap		St David's College	2.2	1	14	11	1998
<i>Hygrocybe virginea</i>	White Waxcap		St David's College	2.3	1	14	11	1998
<i>Hygrocybe virginea</i> v <i>ochraceopallida</i>	Pale Ochre Waxcap		St David's College	2.2	1	14	11	1998
<i>Trichoglossum walterii</i>	Walter's Earth Tongue		St David's College	1.2	39	14	11	1998
<i>Clavulinopsis corniculata</i>	Cow-horn Coral-fungus	MG6	Waun-las	1.1	02	2	11	1998
<i>Clavulinopsis corniculata</i>	Cow-horn Coral-fungus	MG6	Waun-las	1.1	02	20	11	1998
<i>Clavulinopsis fusiformis</i>	Golden Spindles	MG6	Waun-las	1.1	01	2	10	1998
<i>Clavulinopsis fusiformis</i>	Golden Spindles	MG6	Waun-las	1.1	01	21	10	1998
<i>Clavulinopsis helvola</i>	Golden Meadow-club	MG6	Waun-las	1.1	01	21	10	1998
<i>Entoloma porphyrophaeum</i>	Porphyry Pink-gill	MG6	Waun-las	1.2	01	21	10	1998
<i>Entoloma serrulatum</i>	Serrulate Pink-gill	MG6	Waun-las	1.1	01	2	10	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap	MG6	Waun-las	2.4	01	2	10	1998
<i>Hygrocybe chlorophana</i>	Golden Waxcap	MG6	Waun-las	3.2	01	21	10	1998
<i>Hygrocybe citrinovirens</i>	Lemon-green Waxcap	MG6	Waun-las	1.1	01	21	10	1998
<i>Hygrocybe coccinea</i>	Scarlet Hood	MG6	Waun-las	7.4	01	21	10	1998

