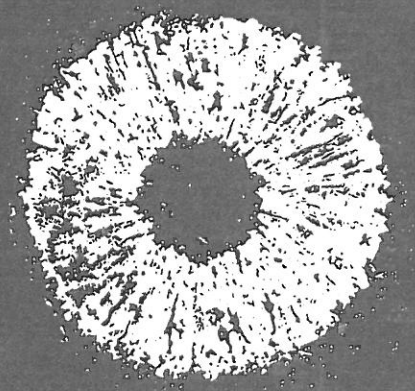
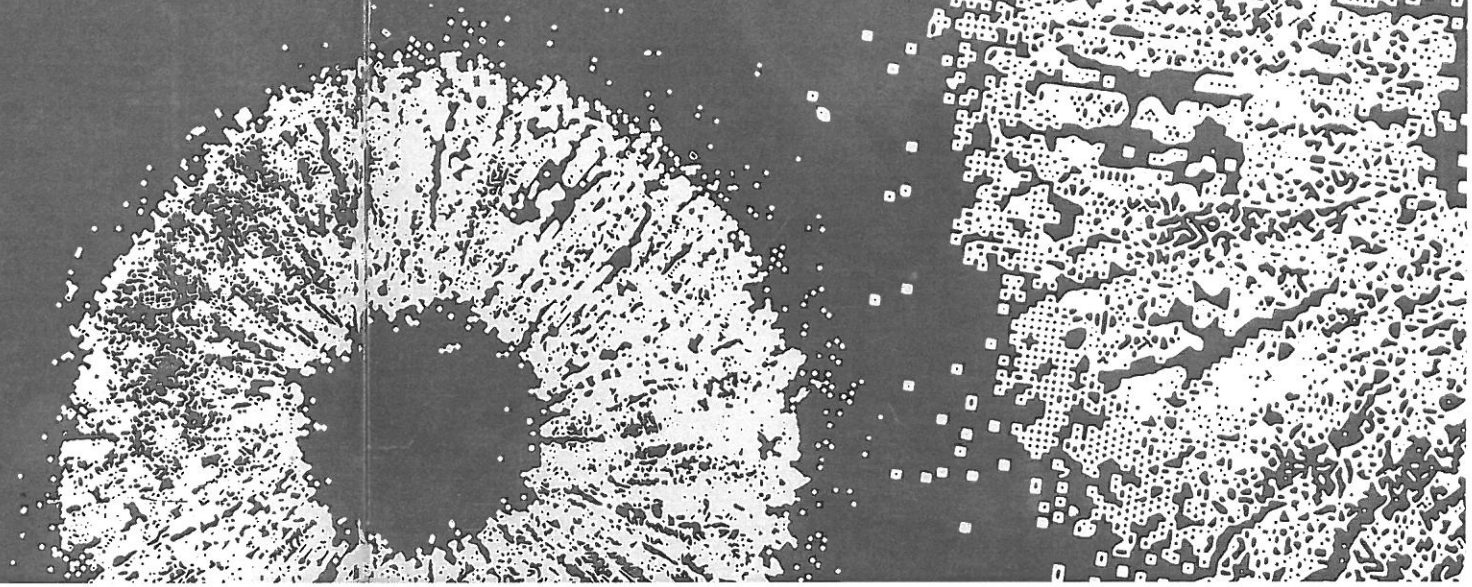
# The Rust Fungi of the British Isles

## A Guide to Identification by their Host Plants

D M Henderson

British Mycological Society





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# The Rust Fungi of the British Isles

## A Guide to Identification by their Host Plants

**With an appendix correcting and updating the 2000 Checklist**

by

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# Introduction

This small work aims to complement the *Checklist of the Rust Fungi of the British Isles* (Henderson, 2000). The rusts are arranged under host families, genera and sometimes species which are arranged alphabetically. This is, of course, an artificial arrangement but is the route most followed in identifying rusts by students of these fascinating fungi. Under host genera the rust species are keyed out where necessary, and all known host species are included. The host names are those in Stace's *New Flora of the British Isles* (1997). The names of cultivated plants follow the Royal Horticultural Society's *New Dictionary of Gardening*. I depart from family names in a few instances. It seems more meaningful to place all the conifer hosts together under Coniferae, likewise all ferns under Polypodiaceae s.l.

The spore stages are cited under the usual contractions : 0 = spermagonium, I = aecium, which always means an aecidioid (with a peridium and spores borne in rows) unless qualified as uredinoid (with spores borne singly) or caeomoid (without a peridium), II = uredinium, III = telium.

In some cases it has been possible to give some indication of the alternation pattern, such as uredo-perennating where alternation is not obligatory, or obligatorily heteroecious where alternation always takes place. Where alternate hosts are known for rusts outwith the British Isles, I have noted this to aid search for alternation here.

I have also tried to indicate if a rust is native or an introduction - often on a non-native host. Where I doubt the correct identification of a host I place the name in quotes.

I am indebted to Dr Nigel Stringer and Mr Richard Davies for use of their draft Checklist of the Rust Fungi of Wales (*in litt.*), which contains many new records (cited as STR) and to the former for reading the typescript and supplying many corrections. Halvor Gjaerum of Oslo has also helped with corrections. Mike Richardson checked, formatted and produced the final copy.

## Adoxaceae

***Adoxa***

0, I only. Alternates with *Impatiens*. On *A. moschatellina* — ***Puccinia impatientis***

0, I : II, III. Autoecious. On *A. moschatellina* — ***Puccinia albescens***

III only. On *A. moschatellina* — ***Puccinia adoxae***

## Amaryllidaceae

***Narcissus***

III only. Probably introduced even on the only native host, *N. pseudonarcissus*. On cultivated *N. jonquilla*, *N. pseudonarcissus* subspp. *majalis* and *pseudonarcissus* — ***Puccinia schroeteri***

II only. Probably a chance cross infection from some commonly infected host. On *N. pseudonarcissus* — ***Coleosporium tussilaginis***

## Apocynaceae

***Vinca***

0, I : II, III. I uredinoid. Sori from a systemic mycelium, on deformed leaves on sterile shoots. Introduced with its introduced host. On *V. major* — ***Puccinia vincae***

## Araceae

***Arisaema***

0, I on systemic mycelium. Introduced. On *A. triphyllum* — ***Uromyces ari-triphylli***

***Arum***

0, I only. Alternates with *Phalaris*. On native *A. maculatum*, on introduced *A. creticum* and *A. italicum* subsp. *neglectum* (STR) — ***Puccinia sessilis***

***Peltandra***

0, I only. On systemic mycelium. On introduced host *P. virginica* — ***Uromyces ari-triphylli***

## Balsaminaceae

***Impatiens***

II, III only. Alternates with *Adoxa*. On the introduced *I. capensis* — ***Puccinia impatientis***

## Berberidaceae

***Berberis***

0, I on leaves and fruits. Alternates with many grasses. On *B. vulgaris* — ***Puccinia graminis***

0, I on deformed shoots. Alternates with *Arrhenatherum*. On *B. vulgaris* — ***Puccinia brachypodii* var. *arrhenatheri***

***Mahonia***

0, I on leafspots. Alternates with grasses. On *M. aquifolium*, *M. bealei* — ***Puccinia graminis***

0, I:II, III. 0, I on thickened spots. Introduced. On *M. aquifolium*, *M. bealei* — ***Cumminsiella mirabilis***

## Betulaceae

***Alnus***

II, III. III reddish, crustose. May alternate with *Larix*. Most frequently on seedlings. On *A. cordata*, *A glutinosa*, *A. incana* — ***Melampsoridium betulinum***

***Betula***

II, III. III reddish, crustose. Alternates with *Larix*, frequently uredo-perennates. On native *B. nana*, *B. pendula*, *B. pubescens* s.l., *B. pubescens* subspp. *pubescens* and *tortuosa* (STR) and on cultivated *B. fontinalis*, *B. jacquemontii*, *B. occidentalis*, *B. papyrifera* — ***Melampsoridium betulinum***

## Boraginaceae

***Anchusa*, *Echium***

0, I only. Alternates rarely with *Secale*. On *A. officinalis*, *A. arvensis* — ***Puccinia recondita* f.sp. *recondita***

0, I only. Alternates with *Elytrigia*. On *E. vulgare* (requires confirmation) — ***Puccinia recondita* f.sp. *echii-agropyrina***

***Symphytum***

II, III. II orange, from systemic mycelium, often covering whole leaves, III intra-epidermal. Known to alternate with *Abies* elsewhere. II on *S. asperum*, *S. officinale*, *S. tuberosum*, II, III on *S. uplandicum* (*S. asperum* x *S. officinale*) — ***Melampsorella symphyti***



## Buxaceae

***Buxus***

III only. On *B. microphylla* cv. (STR), *B. sempervirens*, inc. cv. Suffruticosa (STR) — ***Puccinia buxi***

## Campanulaceae

***Campanula***

II, III. II orange, III crustose, reddish. May alternate with *Pinus*. On *C. carpatica* var. *turbinata*, *C. glomerata*, *C. isophylla*, *C. latifolia*, *C. persicifolia*, inc. var. *planifera* cv. Alba, *C. rapunculoides*, *C. rotundifolia*, *C. trachelium* many of which are in cultivation — ***Coleosporium tussilaginis***

III only, brown. On *C. rapunculus*, *C. rotundifolia*, doubtfully on *C. persicifolia* — ***Puccinia campanulae***

***Jasione***

III only, brown. On *J. montana* — ***Puccinia campanulae***

***Petromarula***

II, III? On introduced *P. pinnata* — ***Coleosporium tussilaginis***

## Caprifoliaceae

***Lonicera***

0, I only. Alternates with *Festuca*. On *L. periclymenum* — ***Puccinia festucae***

## Caryophyllaceae

***Arenaria***

III only. III sori pulvinate, pale brown, darkening. On *A. serpyllifolia* — ***Puccinia arenariae***

***Cerastium***

III only. III sori pulvinate, pale brown, darkening. On *C. fontanum* subsp. *holosteoides* — ***Puccinia arenariae***

II, III only. II from a systemic mycelium, orange, sori opening by small pores. III on pale or reddish areas, spores intra-epidermal. Alternates facultatively with *Abies*. On *C. arcticum*, *C. arvense*, *C. fontanum* subsp. *holosteoides*, *C. semidecandrum*, *C. tomentosum* — ***Melampsorella caryophyllacearum***

***Cucubalus***

III only, pulvinate, pale brown. On *C. baccifer* — ***Puccinia arenariae***

***Dianthus***

III only, pale brown. On *D. barbatus*, *D. deltoides* — ***Puccinia arenariae***

II, III. II brownish, III dark brown. Alternates with *Euphorbia* elsewhere. On cultivated *D. barbatus*, *D. caryophyllus*, *D. chinensis* — ***Uromyces dianthi***

***Gypsophila*, *Herniaria*, *Minuartia*, *Moehringia*, *Sagina***

III only. Sori pulvinate, pale brown. On cultivated *Gypsophila elegans* and *Sagina subulata* var. *glabrata* cv. Aurea and on native *Herniaria glabra*, *Moehringia trinervia*, *Sagina apetala*, *S. nivalis*, *S. nodosa*, *S.* x *normaniana*, *S. procumbens*, *S. saginoides*, *S. subulata*, *S. uliginosa* — ***Puccinia arenariae***

***Silene***

III only. III pulvinate, light brown. On *S. dioica*, *S. latifolia* (= *S. alba*), *S. vulgaris* (STR) — ***Puccinia arenariae***

0, I : II, III. 0, I on conspicuous purple spots. On *S. uniflora* (= *S. maritima*), *S. vulgaris* — ***Uromyces behenis***

II, III. (0, I not yet found in Britain). On *S. nutans* — ***Uromyces inaequialtus***

***Spergula***
III only. III pulvinate, light brown. On *S. arvensis* ***Puccinia arenariae***

***Spergularia***
0, I (rare) : II, III. On *S.marina, S. intermedia, S. rubra* ***Uromyces sparsus***

***Stellaria***
III only. Sori pulvinate, light brown. On *S. graminea, S. holostea, S. media, S.nemorum* ***Puccinia arenariae***

II, III. II sori orange, broadly effused. III intra-epidermal. On *S. graminea, S. holostea, S. media* ***Melampsorella caryophyllacearum***

**Celastraceae**

***Euonymus***
0, I. I caeomoid. Alternates with *Salix*. On *E. europaeus* ***Melampsora epitea* var. *epitea***

**Chenopodiaceae**

***Beta***
0, I (uncommon) : II, III. Recorded on native hosts so presumably native. On *B. vulgaris* subspp. *vulgaris* (including Beetroot, Mangold and Sugarbeet), *cicla* (Spinach beet), and *maritima* ***Uromyces betae***

***Salicornia, Sarcocornia***
0, I : II, III. On *S. europaea, S. dolichostachya, S. ramosissima* and *Sarcocornia perennis* ***Uromyces salicorniae***

***Spinacia***
II, III. On *S. oleracea* (STR) ***Uromyces betae***

***Suaeda***
0, I : II, III. On *S. maritima, S. maritima* var. *flexilis, S. vera* (= *S. fruticosa*) ***Uromyces chenopodii***

***Compositae***

***Achillea***
III only. III dark brown or greyish. On *A. millefolium, A. ptarmica* ***Puccinia cnici-oleracei***

***Arctium***
0, I : II, III. I uredinoid (rare, on the upper surface of leaves). On *A. lappa, A. minus* subspp. *minus* and *pubens* ***Puccinia calcitrapae***

***Artemisia***
II, III. III dark brown or greyish. On *A. absinthium, A. vulgaris* ***Puccinia tanaceti***

***Aster***
0, I only. Alternates with *Carex*. On *Aster tripolium* ***Puccinia dioicae* var. *extensicola***
III only. III black. On *A. tripolium* ***Puccinia cnici-oleracei***

***Bellis***
0, I only. Peridial cells 40-50 µm. Alternates with *Luzula*. On *B. perennis* ***Puccinia obscura***

I : III. Autoecious. Peridial cells 30-40 µm. Introduced. On *B. perennis* cultivars ***Puccinia lagenophorae***

0, I : III. Autoecious. Introduced. On *B. perennis* and cvs ***Puccinia distincta***



***Calendula***
I, III. Autoecious. I spores echinulate. On *C. officinalis* (by inoculation only) ***Puccinia lagenophorae***

II (and III?). II spores warted. May alternate with *Pinus*, but not recorded in Britain). On cultivated *C. officinalis* ***Coleosporium tussilaginis***

***Carduus***
0, I : II, III. I rare, uredinoid. On *C. acanthoides, C. crispus, C. crispus* subsp. *multiflorus, C. crispus* x *nutans, C. tenuiflorus* ***Puccinia calcitrapae***

***Carlina***
0, I : II, III. I uredinoid. On *C. vulgaris* ***Puccinia calcitrapae***

***Carthamus***
II, III on imported *C. tinctorius* ***Puccinia calcitrapae***

***Centaurea***
0, I : II, III. I uredinoid, on systemic deforming mycelium. On *C. cyanus* ***Puccinia cyani***

0, I only. Alternates with *Carex arenaria*. On *C. nigra* ***Puccinia dioicae* var. *arenariicola***

0, I : II, III. I uredinoid, rare. II spores with three equatorial pores. On *C. calcitrapa, C. nigra, C. scabiosa* ***Puccinia calcitrapae***

0, I : II, III. I uredinoid, rare. II spores with two supra-equatorial pores associated with smooth patches on the walls. On *C. nigra* ***Puccinia hieracii* var. *hieracii***

***Chrysanthemum***
III only, compact, dark brown. On *C. segetum* ***Puccinia cnici-oleracei***
II only? II orange, spore walls warted. On cultivated *C. carinatum* ***Coleosporium tussilaginis***

***Cichorium***
II, III only. II spores with two supra-equatorial pores. On cultivated *C. endivia, C. intybus* ***Puccinia hieracii* var. *hieracii***

***Cirsium***
0, I. Alternates with *Carex*. On *C. dissectum, C. palustre* ***Puccinia dioicae***
0, I : II, III. I scarce. Autoecious. On *C. eriophorum, C. vulgare* ***Puccinia cnici***
0, I : II, III. I uredinoid, on systemic mycelium. Perennates in host rhizomes. Autoecious. On *C. arvense* ***Puccinia punctiformis***
III only. III compact, dark brown. On *C. heterophyllum, C. palustre* ***Puccinia cnici-oleracei***

***Crepis***
0, I : II, III on conspicuous yellow spots. Autoecious. On *C. paludosa* ***Puccinia major***
II, III only. On *C. biennis, C. capillaris, C. vesicaria* subsp. *taraxacifolia* ***Puccinia crepidicola***

***Delairea***
II only, orange. On *D. odorata* (= *Senecio mikanioides*) ***Coleosporium tussilaginis***

***Dendranthema***
III only. III pulvinate, whitish. On *D.* x *grandiflorum, D. indicum, D. sinense* and, by inoculation, *D. nipponicum* ***Puccinia horiana***
II, III. III brown. On *D.* x *grandiflorum* ***Puccinia tanaceti***

***Emilia***
II, III. III crustose, orange-red. Unconfirmed record on cultivated *E. sagittata* (= *Cacalia suaveolens*) ***Coleosporium tussilaginis***

***Euryops***
II, III? II orange. On *E. acraeus* ***Coleosporium tussilaginis***

***Hieracium***
0, I : II, III. I uredinoid. II spores with two supra-equatorial pores. On *H. vulgatum* s.l. Needs critical investigation of host micro-species, but recorded on *H. oreades*, *H. sabaudum*, *H. umbellatum* (STR), *H. vagum* ***Puccinia hieracii* var. *hieracii***

***Hypochaeris***
0, I : II, III. I uredinoid. II spores with 2(3) equatorial pores. On *H. glabra*, *H. radicata* ***Puccinia hieracii* var. *hypochaeridis***

II, III only. II spores with two supra-equatorial pores. On *H. maculata* ***Puccinia hieracii* var. *hieracii***

***Kleinia***
II, orange III? On cultivated *K. grandiflora* ***Coleosporium tussilaginis***

***Lactuca***
0, I only. Alternates with *Carex*. Apparently introduced and now extinct. On *L. sativa*, *L. virosa* ***Puccinia opizii***

***Lapsana***
0, I : II, III. Autoecious. On *L. communis* ***Puccinia lapsanae***

***Leontodon***
0, I (known, elsewhere) : II, III. I, if present, uredinoid. On *L. autumnalis*, *L. hispidus*, *L. saxatilis* ***Puccinia hieracii* var. *hieracii***

***Leucanthemum***
III only. III compact, dark brown. On *L. vulgare* ***Puccinia cnici-oleracei***

***Mycelis***
I : II, III. On *M. muralis* ***Puccinia maculosa***

***Pericallis***
II, III? On *P. hybrida* (= *Senecio cruentus*) ***Coleosporium tussilaginis***
I : III. On *P. hybrida* ***Puccinia lagenophorae***

***Petasites***
II, III. II powdery, orange. III crustose, orange-red. Alternates with *Pinus*. On *P. albus*, *P. hybridus*, *P. japonicus*, *P. frigidus* var. *palmatus* ***Coleosporium tussilaginis***

***Picris***
II, III. II spores with 2(3) supra-equatorial pores. On *P. hieracioides* ***Puccinia hieracii* var. *hieracii***

***Pilosella***
0, I : II, III. I uredinoid (seldom observed). II spores with 2(3) slightly supra-equatorial pores. On *P. officinarum* (= *Hieracium pilosella*), *P. aurantiaca* (STR) ***Puccinia hieracii* var. *piloselloidarum***

***Pulicaria***
0, I only. Alternates with *Juncus*. On *P. dysenterica* ***Puccinia junci***



***Senecio***
II, III. II orange, III crustose, orange-red. May alternate with *Pinus*. On native *S congestus* var. *palustris* (= *Tephroseris*) (now extinct), *S. squalidus*, *S. sylvaticus*, *S. vulgaris* and doubtfully *S. jacobaea*. On cultivated *S. cineraria* (= *S. candicans*), *S. fluviatilis*, *S. moorei*, *S. smithii*, *S. viravira* (= *S. leucostachys*), *S. viscosus* ***Coleosporium tussilaginis***

III only, dark brown, compact. On *S. aquaticus*, *S. jacobaea* ***Puccinia glomerata***

0, I only. Alternates with *Carex arenaria*. On *S. jacobaea* ***Puccinia dioicae* var. *schoeleriana***

I (sometimes with 0) : III. Introduced. On *S. cambrensis*, *S. jacobaea* (STR), *S. squalidus*, *S. vulgaris*, *S. vulgaris* var. *radiatus* ***Puccinia lagenophorae***

***Seriphidium***
II, III. III sori pulvinate, dark brown ***Puccinia tanaceti***

***Serratula***
0,? I? : II, III. On *S. tinctoria* ***Puccinia hieracii* var. *hieracii***

***Silybum***
II, III. Introduced. On *Silybum marianum* ***Puccinia mariana***

***Solidago***
0, I only. Alternates with *Trichophorum*. On *S. virgaurea* ***Puccinia eriophori***
III only. III compact on yellow spots. On *S. virgaurea* ***Puccinia virgae-aureae***

***Sonchus***
II, III. II powdery, orange, III crustose, orange-red. May alternate with two-needled pines. On *S. arvensis*, *S. asper*, *S. oleraceus*, *S. palustris* ***Coleosporium tussilaginis***
0, I : II, III. I uredinoid, II and III surrounded by dark paraphyses. On *S. arvensis*, *S. asper*, *S. oleraceus*, *S. palustris* ***Miyagia pseudosphaeria***

***Tanacetum***
II, III. III pulvinate, brownish- black. On *T. coccineum*, *T. vulgare* ***Puccinia tanaceti***

***Taraxacum***
0, I only. May alternate with montane *Carex*. On *T. officinale* agg. ***Puccinia dioicae***
0, I : II, III. II spores with two equatorial pores. Autoecious. On *T. officinale* agg., *T. palustre* agg. ***Puccinia variabilis***
0, I : II, III. II spores with two supra-equatorial pores. On *T. officinale* agg., *T. palustre* agg. ***Puccinia hieracii* var. *hieracii***
**Note** : The hosts of the rusts on *Taraxacum* deserve more attention.

***Tragopogon***
0, I : III. On *T. pratensis* subspp. *minor* and *pratensis* ***Puccinia hysterium***

***Tussilago***
0, I on conspicuous yellow spots. Alternates with *Poa*. On *T. farfara* ***Puccinia poarum***

II, III. III crustose, orange-red. Alternates with two-needled pines. On *T. farfara* ***Coleosporium tussilaginis***

**Coniferae**

***Abies***
0, I only. On yellowish leaves of witches brooms. Alternates with *Cerastium* or *Stellaria*. On *A. alba*, *A. cephalonica*, *A. concolor* var. *lowiana*, *A. nordmanniana*, *A. pinsapo* ***Melampsorella caryophyllacearum***

***Abies* (cont.)**

0, I on needles, no witches brooms. I spores 15-21 x 10-14 µm. Alternates with *Epilobium*. On *A. grandis* — ***Pucciniastrum epilobii***

0, I on needles, no distortions. I spores e.g. 28-48 x 22-44 µm. Alternates with ferns:-

*Blechnum*. On *A. alba, A. amabilis, A. cephalonica* — ***Milesina blechni***

*Polypodium*. On *A. alba* and by inoculation *A. pectinata* — ***Milesina dieteliana***

*Dryopteris*. On *A. alba, A. grandis, A. nordmanniana* and, by inoculation, *A. cephalonica* — ***Milesina kriegeriana***

*Phyllitis*. On *A. alba, A. concolor* — ***Milesina scolopendrii***

***Juniperus***

III On *J. communis*

III on fusiform swellings on woody stems. III spores 50-120 x 10-21 µm. Alternates with *Crataegus*. On *J. communis, J. communis* cv. Hibernica — ***Gymnosporangium clavariiforme***

III on younger branches and leaves. III spores 32-52 x 18-28 µm. Alternates with *Sorbus* — ***Gymnosporangium cornutum***

III On *J. sabina, J. chinensis*

III spores bluntly conical at apex. Alternates with *Pyrus*. On *J. sabina* — ***Gymnosporangium sabinae***

III spores rounded at apex. Alternates with *Crataegus, Cydonia, Mespilus, Pyrus*. On *J. sabina* — ***Gymnosporangium confusum***

III on introduced *J. chinensis* — ***Gymnosporangium asiaticum***

***Larix***

0, I. I with a peridium. Alternates with *Betula* and perhaps *Alnus*. On *L. decidua, L. gmelinii, L. kaempferi, L. potaninii* — ***Melampsoridium betulinum***

0, I. I caeomoid (without a peridium). Alternates with *Salix*. On *L. decidua, L. kaempferi* — ***Melampsora epitea***

0, I. I caeomoid (without a peridium). Alternates with *Populus*. On *L. decidua* — ***Melampsora populnea***

0, I. I caeomoid. Alternates with *Salix caprea* and perhaps other related *Salix* spp. On *L. decidua, L. kaempferi* — ***Melampsora larici-capraearum***

***Picea***

0, I. I opening by a slit, on under side of cone scales. Alternates with *Prunus padus*. On *P. abies* — ***Pucciniastrum areolatum***

III only, on needles, orange, waxy. Introduced. On *P. abies, P. rubens, P. sitchensis* — ***Chrysomyxa abietis***

0, I, on needles. Alternates with *Rhododendron*. Introduced. On *P. abies, P. omorika* cv. Pendula, *P. engelmannii, P. glauca, P. gemmata, P. glauca* var. *albertiana, P. sitchensis, P. sitchensis* x *jezoensis, P. wilsonii* and on many *P. abies* cvs — ***Chrysomyxa ledi* var. *rhododendri***

***Pinus***

0, I. I caeomoid on deformed shoots. Alternates with *Populus*. On *P. nigra* s.l., *P. nigra* subspp. *nigra* and *laricio, P. pinaster, P. sylvestris* — ***Melampsora populnea***

0, I. 0 large disc-like, I sac-like on perennial mycelium on deformed branches. Alternates with *Paeonia, Tropaeolum* On *P. nigra* subsp. *laricio, P. sylvestris* — ***Cronartium flaccidum***

As above but non-alternating. On *P. sylvestris* — ***Endocronartium pini***



***Pinus* (cont.)**

0, I. I on extensive patches on stems and branches of five-needled pines. Alternates with *Ribes*. On *P. aristata, P. ayacahuite, P. cembra, P. griffithii, P. lambertiana, P. monticola, P. parviflora, P. strobus* — ***Cronartium ribicola***

0, I on needles of two-neeedled pines. Alternates with many members of the Campanulaceae, Compositae, Scrophulariaceae and to a minor extent other families. On *P. nigra, P. nigra* subsp. *laricio* (STR), *P. pinaster, P. sylvestris* — ***Coleosporium tussilaginis***

**Convolvulaceae**

***Convolvulus***

I : II, III. Only one doubtful record. On *C. sepium* — ***Puccinia convolvuli***

**Crassulaceae**

***Sedum, Umbilicus***

III only. Autoecious. On *S. roseum, U. rupestris* — ***Puccinia umbilici***

***Sempervivum***

0, III. Systemic infection. III sori aecidioid. On many introduced species of *Sempervivum* — ***Endophyllum sempervivi***

**Cruciferae**

***Cochlearia***

III only. Autoecious. On *C. pyrenaica* subsp. *alpina, C. danica* — ***Puccinia eutremae***

**Cyperaceae**

***Bolboschoenus***

II, III. III spores one-celled. Alternates with *Berula, Glaux, Oenanthe, Sium*. On *B. maritimus* — ***Uromyces lineolatus***

***Carex***

**Key to rusts on *Carex***

II, III. Large thick-walled amphispores present. Alternation unknown. On *C. vesicaria* only — ***Puccinia microsora***

Amphispores absent

II, III. II spores with two equatorial pores. Alternates with *Lactuca*. On *C. appropinquata, C. divulsa, C. muricata, C. paniculata* — ***Puccinia opizii***

II, III. II spores with two supra-equatorial pores. Alternates with *Aster, Centaurea, Cirsium, Senecio, Taraxacum* — ***Puccinia dioicae***

II, III. II spores with 3-4(5) pores. Alternates with :-

*Parnassia* — ***Puccinia uliginosa***

*Pedicularis* — ***Puccinia paludosa***

*Ribes* — ***Puccinia caricina***

*Urtica* — ***Puccinia urticata***

**Sedge rusts by host species**

*C. acuta*. May alternate with *Ribes* — ***Puccinia caricina* var. *pringsheimiana***

*C. acutiformis*. Probably alternates with *Urtica* — ***Puccinia urticata* var. *urticae-acutiformis***

*C. appropinquata*. II spores with two equatorial pores — ***Puccinia opizii***

*C. aquatilis*. Alternation unknown — ***Puccinia caricina* s.l.**

*C. arenaria*

0, I. On *Centaurea*. Rare, perhaps extinct — ***Puccinia dioicae* var. *arenariicola***

**Sedge rusts by host species (cont.)**

0, I. On *Senecio jacobaea* — ***Puccinia dioicae* var. *schoeleriana***

*C. bigelowii.* Alternation unknown — ***Puccinia paludosa***

*C. binervis.* II only — ***Puccinia caricina* s.l.**

*C. capillaris.* May alternate with *Taraxacum* — ***Puccinia dioicae* var. *silvatica***

*C. caryophyllea* — ***Puccinia caricina* s.l.**

*C. diandra* (Dennis, 1983) — ***Puccinia caricina* s.l.**

*C. dioica.* II spores with two pores. Alternates with *Cirsium* — ***Puccinia dioicae* var. *dioicae***

*C. disticha*

II spores with two equatorial pores. Alternation unknown — ***Puccinia dioicae* s.l.**

II spores with more than two pores. Alternation unknown — ***Puccinia caricina* s.l.**

*C. divulsa* (Dennis, 1988). II spores with two equatorial pores. May alternate with *Lactuca* — ***Puccinia opizii***

*C. elata*

II, III. II spores usually with three pores. May alternate with *Pedicularis* — ***Puccinia paludosa***

II, III. II spores usually with four pores. May alternate with *Urtica* — ***Puccinia urticata* var. *urticae-acutae***

*C. extensa* II, III. II spores with two pores. Alternates with *Aster tripolium* — ***Puccinia dioicae* var. *extensicola***

*C. flacca* II, III. III spores usually present. Probably alternates with *Urtica* — ***Puccinia urticata* var. *urticae-flaccae***

*C. flagellifera* II, III on imported plants — ***Puccinia caricina* s.l.**

*C. hirta* II, III. III spores usually abundant. Alternates with *Urtica* — ***Puccinia urticata* var. *urticae-hirtae***

*C. hostiana*, *C. hostiana* x *C. viridula* subsp. *oedocarpa*. Alternation unknown — ***Puccinia caricina* s.l.**

*C. juncella.* Alternation unknown — ***Puccinia caricina* s.l.**

*C. laevigata* II only — ***Puccinia caricina* s.l.**

*C. lasiocarpa.* Alternates with *Ribes* elsewhere — ***Puccinia caricina* var. *ribis-nigri-lasiocarpae***

*C. maritima* II only. II spores with two equatorial pores — ***Puccinia dioicae* s.l.**

*C. montana* (Dennis, 1988) — ***Puccinia dioicae* s.l.**

*C. muricata* subspp. *muricata* and *lamprocarpa* (STR) II, III. II spores with two equatorial pores. May alternate with *Lactuca* — ***Puccinia opizii***

*C. nigra*

III spores > 50 µm long

0, I on *Urtica.* II spore walls thin, 1.5µm — ***Puccinia urticata* var. *urticae-acutae***

0, I on *Pedicularis.* II spore walls thick, 2-3 µm — ***Puccinia paludosa***

III spores < 50µm long

0, I on *Ribes.* II spore walls 1.25-1.75 µm thick — ***Puccinia caricina* var. *pringsheimiana***

0, I on *Parnassia.* II spore walls 1.75-2.5 µm thick — ***Puccinia uliginosa***

*C. ovalis* II only. II spores with two equatorial pores — ***Puccinia dioicae* s.l.**

*C. pallescens* II only. II spores with two pores — ***Puccinia urticata* var. *biporula***



**Sedge rusts by host species (cont.)**

*C. panicea* II, III.

II spore walls 2-3 µm thick. May alternate with *Pedicularis* — ***Puccinia paludosa***

II spore walls 1.5-2 µm thick. May alternate with *Urtica* — ***Puccinia urticata* var. *urticae-paniceae***

*C. paniculata* II, III.

III sparse. May not alternate in Britain. Known to alternate with *Ribes* elsewhere — ***Puccinia caricina* var. *ribis-nigri-paniculatae***

II spores with two pores. May alternate with *Lactuca* — ***Puccinia opizii***

*C. pendula* II, III. III sparse. Known to alternate with *Ribes* elsewhere — ***Puccinia caricina* var. *ribesii-pendulae***

*C. pseudocyperus* II, III.

II spores less than 30 µm diam, with three pores. Known to alternate with *Ribes* elsewhere — ***Puccinia caricina* var. *caricina***

II spores more than 30 µm diam, with 3-4 pores. Known to alternate with *Urtica* elsewhere — ***Puccinia urticata* var. *urticae-acutiformis***

*C. riparia* II, III.

III spores less than 60 µm long. Alternates with *Ribes* elsewhere — ***Puccinia caricina* var. *magnusii***

III spores more than 60 µm long. Probably alternates with *Urtica* — ***Puccinia urticata* var. *urticae-ripariae***

*C. rostrata* II, III. III spores usually present. Probably alternates with *Urtica* — ***Puccinia urticata* var. *urticae-inflatae***

*C. rostrata* x *vesicaria* — ***Puccinia caricina* s.l.**

*C. vesicaria*

III present, no amphispores. May alternate with *Urtica* — ***Puccinia urticata* var. *urticae-vesicariae***

III and amphispores present. No alternation known — ***Puccinia microsora***

*C. viridula* subspp. *brachyrrhyncha* and *oedocarpa* II, III. II spores with two equatorial pores. Alternation unknown — ***Puccinia dioicae* s.l.**

***Cladium***

II only in Britain. Alternation unknown. On *C. mariscus* — ***Puccinia cladii***

***Schoenoplectus***

II, III. Alternates with *Nymphoides.* On *S. lacustris* — ***Puccinia scirpi***

***Trichophorum***

II, III. Alternates with *Solidago.* On *T. cespitosum* subsp. *germanicum* — ***Puccinia eriophori***

**Empetraceae**

***Empetrum***

II, (III not yet found in Britain). II powdery, orange. Alternates with *Picea* elsewhere — ***Chrysomyxa empetri***

**Ericaceae**

**x *Azaleodendron***

II, III? On *A.* cv. Dr Masters — ***Chrysomyxa ledi* var. *rhododendri***

***Ledum***

II only. On imported *L. groenlandicum* — ***Chrysomyxa ledicola***

***Rhododendron***
II, III. Usually II only, except on *R. ponticum*. Alternates with *Picea*. Introduced. On many cultivated species and varieties of *Rhododendron* (see Checklist)
***Chrysomyxa ledi* var. *rhododendri***

***Vaccinium***
II, III. II pale, pustular. III spores intra-epidermal. Alternates with *Tsuga* elsewhere. On *V. myrtillus*, *V. oxycoccus*, *V. uliginosus*, *V. vitis-idaea* ***Naohidemyces vacciniorum***
III crustose on stems, brownish. Alternates with *Abies* elsewhere. On imported cvs on *V. corymbosum* and very doubtfully on native *V. vitis-idaea*
***Pucciniastrum goeppertianum***

**Euphorbiaceae**

***Codiaeum***
0, I. On imported *C. variegatum* ***Dietelia codiaei***

***Euphorbia***
0, I only on pale, deformed shoots. The aeciospores germinate to form basidia. No alternation. On *E. amygdaloides* ***Endophyllum euphorbiae-sylvaticae***
0, I on pale deformed shoots. Alternates with many genera of the Leguminosae. On *E. cyparissias* ***Uromyces pisi-sativi***
0, I : II, III. On *E. exigua* ***Uromyces tuberculatus***
III only. On deformed host leaves. On *E. cyparissias* ***Uromyces scutellatus***
III only. On *E. hyberna* ***Uromyces tinctoriicola***
[0, I doubtfully in Britain]. II, III. II orange with capitate paraphyses, III orange-brown forming a sub-epidermal crust. Often only II present. On *E. amygdaloides*, *E. characias*, *E. cyparissias*, *E. dulcis*, *E. exigua*, *E. helioscopia*, *E. hyberna*, *E. lathyris*, *E. paralias*, *E. peplus*, *E.* x *pseudovirgata* (TFP, *in litt.*, 1999) ***Melampsora euphorbiae***

***Mercurialis***
0, I. Sori conspicuous, orange. Alternates with *Populus*. On *M. annua*, *M. perennis*
***Melampsora populnea***

**Fagaceae**

***Nothofagus***
II only? One uncertain record on introduced *Nothofagus*. Alternates with *Araucaria*
***Mikronegeria fagi***

***Quercus***
II only. Usually on sucker shoots. On *Q. ilex*, *Q. petraea* (STR), *Q. robur*
***Uredo quercus***

**Gentianaceae**

***Gentianella***
II, III. III brown, spores one-celled. On *G. amarella* ***Uromyces gentianae***

***Gentiana***
II, III. II black. III spores two-celled. On cultivated *G. acaulis*, *G. verna*
***Puccinia gentianae***

**Geraniaceae**

***Geranium***
0, I : II, III on conspicuous spots. On *G. dissectum*, *G. molle*, *G. pratense* vars *pratense* and *album*, *G. pusillum*, *G. pyrenaicum*, *G. robertianum*, *G. robertianum* subsp. *celticum* (STR), *G. rotundifolium*, *G. sylvaticum* and cultivated *G. albiflorum*, *G. cinereum* cv. Ballerina, *G. endressii* ***Uromyces geranii***



***Geranium* (cont.)**
0, I. Alternates with *Fallopia*. On *G. dissectum*
***Puccinia polygoni-amphibii* var. *convolvuli***

***Pelargonium***
II, III. II in circular groups. III rare. Introduced. On cultivated *P. zonale* and its cultivars
***Puccinia pelargonii-zonalis***

**Graminae**

***Agrostis***
II only or with sparse erumpent III. III spores with coronate apices. May alternate with *Rhamnus* or *Frangula*. On *A. canina*, *A. capillaris* (= *A. tenuis*), *A. stolonifera*
***Puccinia coronata***
II, III. III immersed. III spores without apical projections. Alternates perhaps obligatorily with *Aquilegia*. On *A. capillaris*, *A. stolonifera* and perhaps *A. gigantea*
***Puccinia recondita* f. sp. *agrostidis***
II, III. II spores with four equatorial pores, III erumpent, black. On *A. canina*, *A. capillaris*, *A. gigantea*, *A. stolonifera* ***Puccinia graminis***

***Alopecurus***
II, III. II spores with scattered pores, III immersed. Alternates, probably obligatorily, with *Ranunculus*. On *A. geniculatus* (STR), *A. myosuroides* (STR), *A. pratensis*
***Puccinia recondita* f.sp. *perplexans***
II, III. III, if present, erumpent, III spores coronate. May alternate with *Rhamnus* or *Frangula*. On *A. pratensis* ***Puccinia coronata***
II, III. II spores with four equatorial pores, III erumpent, black. Alternates with *Berberis*. On *A. pratensis* ***Puccinia graminis* s.l.**

***Ammophila***
II, III. II without capitate paraphyses, III immersed. Alternate host perhaps *Thalictrum*. On *A. arenaria* ***Puccinia elymi***
II, III. II with capitate paraphyses. Uredo-perennates in Britain, alternates with *Berberis* and *Mahonia* elsewhere. On *A. arenaria* ***Puccinia pygmaea* var. *ammophilina***

***Anisantha***
II, III. II orange, II spores with four equatorial pores. III erumpent, black. May alternate with *Berberis*. On *A. sterilis* ***Puccinia graminis* subsp. *graminis***
II pale yellow in distinct lines. Alternation unknown. On *A. sterilis*
***Puccinia striiformis* var. *striiformis***
II, III. II orange-yellow, scattered. Uredo-perennates, but elsewhere alternates with Boraginaceae and Ranunculaceae On *A. diandra*, *A. madritensis*, *A. sterilis*, *A. tectorum*
***Puccinia recondita* f.sp. *bromina***

***Anthoxanthum***
II, III. II without capitate paraphyses. II spores with four equatorial pores. III erumpent, black. On *A. odoratum* ***Puccinia graminis* subsp. *graminicola***
II only, with capitate paraphyses ***Puccinia brachypodii* var. *poae-nemoralis***

***Arrhenatherum***
II, III. II spores with four equatorial pores. III black, erumpent. May alternate with *Berberis*. On *A. elatius* ***Puccinia graminis* subsp. *graminis***
II, III. II without paraphyses, II spores with scattered pores. III small, III spores coronate. May alternate with *Rhamnus* or *Frangula*. On *A. elatius* ***Puccinia coronata***

***Arrhenatherum* (cont.)**
II, III. II with capitate paraphyses. III immersed. Alternates with *Berberis* on which it forms witches' brooms. On *A. elatius*, *A. elatius* cv. Variegatum
***Puccinia brachypodii* var. *arrhenatheri***

***Arundinaria***
II, III. III spore apex conical or rounded. Alternates with *Deutzia* elsewhere. Introduced. On *A. fastuosa* ***Puccinia kusanoi***

***Avena***
II, III. II spores with four equatorial pores. III black, erumpent. May alternate with *Berberis*. On *A. fatua*, *A. sativa*, *A. strigosa* ***Puccinia graminis* var. *graminis***
II, III. II spores with scattered pores. III spores coronate. May alternate with *Rhamnus* or *Frangula*. On *A. fatua*, *A. sativa*, *A strigosa* ***Puccinia coronata***

***Brachypodium***
II, III. II sori in lines, pale chrome. No paraphyses. On *B. sylvaticum*
***Puccinia striiformis* var. *striiformis***
II, III. II sori not in conspicuous lines, orange. Paraphyses capitate. On *B. sylvaticum*
***Puccinia brachypodii* var. *brachypodii***

***Briza***
II, III. II spores with four equatorial pores. III erumpent, black. On *B. media*
***Puccinia graminis* var. *graminicola***

***Bromopsis***
II, III. II spores with equatorial pores. III erumpent, elongate, black. On *B. ramosa*
***Puccinia graminis* s.l.**
II, III. II spores with scattered pores. III immersed. On *B. erecta*, *B. inermis*, *B. ramosa*
***Puccinia recondita* f. sp. *bromina***

***Bromus***
II sori pale chrome. Sori in lines. On '*Bromus* sp.' ***Puccinia striiformis* s.l.**
II orange. III spores coronate. On *B. racemosus* ***Puccinia coronata***
II sori orange. II with capitate paraphyses. Uredo-perennates, but known to alternate elsewhere with Boraginaceae and Ranunculaceae. On *B. commutatus*, *B. hordeaceus* subspp. *hordeaceus*, *ferronii* and *thominei*, *B. secalinus*
***Puccinia recondita* f.sp. *bromina***

***Calamagrostis***
II, III. III long immersed. III spores not coronate. Uredo-perennates, but known to alternate with *Berberis* elsewhere. On *C. epigejos* ***Puccinia pygmaea* var. *pygmaea***
II, III. III early erumpent, spores coronate. May alternate with *Rhamnus* or *Frangula*
***Puccinia coronata***

**x *Calammophyla***
On x *C.* (= *Ammocalamagrostis*) *baltica* ***Puccinia elymi***

***Cynosurus***
II, III. II spores with four equatorial pores. On *C. cristatus* ***Puccinia graminis* s.l.**

***Dactylis***
II, III. III usually absent. II in long lines, pale chrome On *D. glomerata*
***Puccinia striiformis* var. *dactylidis***
II, III. III usually present, orange or brownish-orange
III spores two-celled, coronate. May alternate with *Rhamnus* or *Frangula*. On *D. glomerata* ***Puccinia coronata***



***Dactylis* (cont.)**
III spores two-celled not coronate. II spores with four equatorial pores. On *D. glomerata* ***Puccinia graminis* subsp. *graminicola***
III spores one-celled. Alternates with *Ranunculus* often nearby. On *D. glomerata*
***Uromyces dactylidis***

***Deschampsia***
II, III. II spores coronate. II spores with scattered pores. On *D. cespitosa*
***Puccinia coronata***
II, III. II spores with equatorial pores. III erumpent, black. On *D. cespitosa*
***Puccinia graminis* subsp. *graminicola***
II, III. II sori with capitate paraphyses. On *D. cespitosa*
***Puccinia brachypodii* var. *arrhenatheri***
II, III. III spores one-celled. On *D. flexuosa* ***Uromyces airae-flexuosae***

***Elymus***
II, III. II sori with capitate paraphyses. On *E. caninus* var. *donianus*
***Puccinia recondita* f.sp. *persistens***
II, III. II sori without capitate paraphyses, pale yellow
***Puccinia striiformis* var. *striiformis***

***Elytrigia***
II, III. II with equatorial pores. III erumpent, black. On *E. repens*
***Puccinia graminis* subsp. *graminis***
II, III. II with scattered pores
II in long lines, pale chrome. On *E. repens* ***Puccinia striiformis* var. *striiformis***
II orange or orange brown
III erumpent. III spores coronate. On *E. repens* ***Puccinia coronata***
III immersed. III spores rounded at apex. On *E. atherica* (STR), *E. juncea*, *E. repens*
***Puccinia recondita* f.sp. *persistens***

***Euchlaena***
II only. On *E. mexicana* ***Puccinia sorghi***

***Festuca***
II only. II spore walls often rather thick On *F. brevipila*, *F. ovina*, *F. rubra*
***Uredo festucae***
II, III. III spores one-celled. II usually present. Alternates probably obligatorily with *Ranunculus*. On *F. rubra* and probably *F. ovina* ***Uromyces dactylidis***
II, III. III spores two-celled
III erumpent, spores not coronate. Alternates probably obligatorily with *Lonicera*. On *F. arenaria*, *F. longifolia*, *F. ovina*, *F. rubra* subsp. *rubra* ***Puccinia festucae***
III immersed, spores coronate. May alternate with *Rhamnus* or *Frangula*. On *F. altissima*, *F. arundinacea*, *F. giganteum*, *F. pratensis*, *F. pratensis* x *Lolium multiflorum*, *F. pratensis* x *Lolium perenne* ***Puccinia coronata***
III spores erumpent, apex not coronate. II spores with equatorial pores. May alternate with *Berberis*. On *F. arundinacea* (STR), *F. pratensis*, *F. rubra* and possibly *F. gigantea* ***Puccinia graminis* s.l.**

***Glyceria***
II, III. II with capitate paraphyses. III spores rounded at apex. On *G. fluitans*
***Puccinia brachypodii* var. *poae-nemoralis***

***Glyceria* (cont.)**

II, III. II spores with scattered pores, without capitate paraphyses. Alternates with *Rhamnus*. On *G. maxima* — ***Puccinia coronata***

***Helictotrichon***

II, III. III spores smooth at apex. II spores with equatorial pores. May alternate with *Berberis*. On *H. pratense* — ***Puccinia graminis* s.l.**

II, III. III spores finely echinulate at apex. Life cycle unknown. On *H. pratense* — ***Puccinia pratensis***

***Holcus***

II, III. III erumpent, coronate at apex. May alternate with *Rhamnus* or *Frangula* but certainly uredo-perennates. On *H. lanatus* and probably *H. mollis* — ***Puccinia coronata***

II, III. III immersed, spores not coronate. On *H. lanatus*, *H. mollis* — ***Puccinia hordei***

***Hordeum***

II, III. II pale chrome in long lines. Alternation unknown. On *H. marinum*, *H. murinum* s.l. and subsp. *murinum* (STR), *H. vulgare* — ***Puccinia striiformis* var. *striiformis***

II, III. II orange or brownish-orange

III spores mostly two-celled. II spores with equatorial pores. On *H. vulgare* and doubtfully *H. murinum* — ***Puccinia graminis* subsp. *graminis***

III spores often one-celled. II spores with scattered pores. Some races may alternate with *Ornithogalum*. On *H. distichon*, *H. murinum*, *H. vulgare* — ***Puccinia hordei***

***Koeleria***

II, III. Rare. Known to alternate with *Sedum* elsewhere. On *K. macrantha* — ***Puccinia longissima***

***Leymus***

II, III. II pale chrome, in long rows. On *L. arenarius* — ***Puccinia striiformis* var. *striiformis***

II, III. II orange or brownish-orange. May alternate with *Thalictrum*. On *L. arenarius* — ***Puccinia elymi***

***Lolium***

II, III. Immersed. III spores smooth at apex. May alternate with *Ornithogalum*. On *L. multiflorum* and by inoculation *L. perenne* — ***Puccinia hordei***

II, III. III erumpent, spores coronate. May alternate with *Rhamnus* or *Frangula*. On *L. multiflorum*, *L. perenne* — ***Puccinia coronata***

III spores not coronate. II spores with equatorial pores. Records on '*L. perenne*' require confirmation — ***Puccinia graminis* s.l.**

***Molinia***

II, III. III black, conspicuous. 0, I on *Prunella*. On *M. caerulea* — ***Puccinia moliniae***

II, III. III black, conspicuous. 0, I on *Melampyrum*. On *M. caerulea* — ***Puccinia nemoralis***

***Phalaris***

II, III. III spores coronate. May alternate with *Rhamnus* or *Frangula*, but uredo-perennates. On *P. arundinacea* — ***Puccinia coronata***

II, III. III spores rounded at apex. Alternates, perhaps obligatorily with various monocotyledons: *Allium*, *Arum*, *Convallaria*, *Dactylorhiza*, *Gymnadenia*, *Listera*, *Paris*, On *P. arundinacea* — ***Puccinia sessilis***



***Phleum***

II, III. II spores with equatorial pores. On *P. pratense* — ***Puccinia graminis* subsp. *graminicola***

***Phragmites***

II, III. II with abundant capitate paraphyses. Alternates, perhaps obligatorily, with *Ranunculus*. On *P. australis* — ***Puccinia magnusiana***

II, III. II lack capitate paraphyses. Alternates with *Rumex*, doubtfully with *Rheum*. On *P. australis* — ***Puccinia phragmitis***

***Poa***

II, III. III spores (usually present) one-celled. Alternates, perhaps obligatorily, with *Ranunculus*. On *P. compressa*, *P. palustris*, *P. pratensis*, *P. trivialis* and doubtfully *P. annua* — ***Uromyces dactylidis***

III spores two-celled

II, III. III spores coronate. May alternate with *Rhamnus* or *Frangula*. On *P. pratensis* — ***Puccinia coronata***

II, III. II sori with capitate paraphyses. III spores rounded at apex. Uredo-perennates On *P. angustifolia* (Dennis, 1995), *P. annua*, *P. compressa* (Dennis, 1995), *P. nemoralis*, *P. pratensis*, *P. trivialis* — ***Puccinia brachypodii* var. *poae-nemoralis***

II, III. II lack paraphyses, II spores with equatorial pores. May alternate with *Berberis*. On *P. annua*, *P. pratensis*, *P. trivialis* — ***Puccinia graminis* subsp. *graminicola***

II, III. II lack paraphyses, II pores scattered. Alternates, perhaps obligatorily, with *Tussilago*. On *P. pratensis*, *P. trivialis* and possibly *P. annua* — ***Puccinia poarum***

***Pseudosasa*, *Sasa***

II, III. Introduced. On *P. japonica*, *Sasa veitchii* — ***Puccina longicornis***

***Puccinellia***

II, III. II sori with capitate paraphyses. On *P. distans* (STR), *P. maritima* — ***Puccinia brachypodii* var. *poae-nemoralis***

***Secale***

II, III. II spores pale chrome. Sori in rows. On *S. cereale* — ***Puccinia striiformis* var. *striiformis***

II, III. II spores orange to orange-brown

II with equatorial pores. May alternate with *Berberis*. On *S. cereale* — ***Puccinia graminis* subsp. *graminis***

II with scattered pores. Alternates with *Lycopus* and rarely *Anchusa*. On *S. cereale* — ***Puccinia recondita* f.sp. *recondita***

***Sesleria***

II, III? II with four equatorial pores. May alternate with *Berberis* or *Mahonia*. On *S. caerulea* — ***Puccinia graminis* subsp. *graminicola***

***Trisetum***

II, III. II spores with equatorial pores. III erumpent, black. On *Trisetum flavescens* — ***Puccinia graminis* subsp. *graminis***

II, III. II spores with scattered pores. III long immersed. Alternates with *Sedum* in Europe. On *T. flavescens* — ***Puccinia recondita* f.sp. *triseti***

***Triticum***

II, III. II pale chrome arranged in lines. Uredo-perennates. On *T. aestivum* — ***T. striiformis* var. *striiformis***

***Triticum* (cont.)**

II, III. II orange or orange-brown. Alternates with *Thalictrum* elsewhere. On *T. aestivum*
***Puccinia recondita* f.sp. *tritici***

II, III. II spores with equatorial pores. III black. On *T. aestivum*
***Puccinia graminis* var. *graminis***

***Vulpia***

II, III. Alternates with *Allium* elsewhere. On *V. bromoides*, *V. myuros* ***Puccinia hordei***

***Zea***

II, III. Alternates with *Oxalis* elsewhere. Introduced. On *Z. mays* ***Puccinia sorghi***

**Grossulariaceae**

***Ribes***

III only. III spores in conspicuous black sori, III spore wall verrucose. On cultivated *R. spicatum* ***Puccinia ribis***

II, III. III spores unicellular, hyaline, in horn-like columns. Alternates with 5-needled pines. Introduced. On *R. nigrum*, *R. rubrum*, *R. sanguineum*, *R. uva-crispa*
***Cronartium ribicola***

0, I. I caeomoid. Alternates with *Salix*.0, I. Not known with certainty in Britain
***Melampsora ribesii-viminalis***
and ***Melampsora epitea* var. *epitea***

0, I. I aecidioid. I spores with conspicuous refractive granules. Alternates with *Carex*. On *R. nigrum*, *R. sanguineum*, *R. uva-crispa* ***Puccinia caricina* var. *pringsheimiana***

**Hypericaceae**

***Hypericum***

I : III. I caeomoid, orange. III subepidermal, crustose, reddish, then dark brown. Autoecious. On native *H. androsaemum*, *H. hirsutum*, *H. maculatum*, *H. perforatum*, *H. pulchrum*, *H. tetrapterum* and cultivated *H. calycinum*, *H. cernuum*, *H. elatum*, *H.* x *inodorum*, *H.* x *inodorum* cv. Elstead (STR), *H. patulum* ***Melampsora hypericorum***

***Crocus***

III only, spores one-celled. No alternation. Introduced. On *C. vernus* ***Uromyces croci***

***Gladiolus***

III only, spores two-celled. Alternates with *Valerianella* elsewhere. Introduced. On cultivated *Gladiolus* sp. ***Puccinia gladioli***

II, III. III spores one-celled. Introduced, not established. On cultivated *Gladiolus* spp.
***Uromyces transversalis***

***Iris***

II, III. Known to alternate with *Urtica* elsewhere. On native *I. foetidissima* and cultivated *I. germanica*, *I. missouriensis*, *I. sibirica*, *'I. xiphium'* ***Puccinia iridis***

**Juncaceae**

***Juncus***

II, III. III one-celled. Alternates facultatively with *Pulicaria*. On *J. articulatus*, *effusus*, *J. inflexus*, *J. subnodulosus* ***Uromyces junci***

II, III. III spores two-celled. Alternation unknown. On *J. acutus* ***Puccinia cancellata***

***Luzula***

II, III. II spores with four equatorial pores. Alternation unknown. On *L . pilosa*
***Puccinia luzulae***



***Luzula* (cont.)**

II, III. II spores with two supra-equatorial pores. Alternates with *Bellis perennis* but also uredo-perennates. On *L. campestris*, *L. forsteri*, *L. multiflora*, *L. pilosa*, *L. sylvatica*
***Puccinia obscura***

**Labiatae**

***Clinopodium*, *Mentha***

0, I : II, III. Autoecious. II spores with two equatorial pores. On *Mentha* the mycelium is systemic and host-deforming. On *Clinopodium ascendens*, *Mentha aquatica*, *M. arvensis*, *M.* x *gracilis* (including *M. cordiacea* and *M.* x *gentilis*), *M.* x *gracilis* cv. Variegata (STR), *M. longifolia*, *M. pulegium*, *M.* x *piperita*, *M.* x *smithiana*, *M. spicata*, *M. suaveolens* (= *rotundifolia*), *M. verticillata*, *M.* x *villosa*, *M.* x *villosonervata* (STR)
***Puccinia menthae***

***Glechoma***

III pulvinate, pale brown, germinating without rest, followed by dark brown III. Autoecious. On *G. hederacea* ***Puccina glechomatis***

***Origanum***

III only, dark brown, systemic infection causing witches' broom distortion. On *O. vulgare* ***Puccinia thymi***

0, I : II, III. II spores ellipsoid with two equatorial pores. On *O. vulgare*
***Puccinia menthae***

***Prunella***

0, I. Alternates obligatorily with *Molinia*. On *P. vulgaris* ***Puccinia moliniae***

***Satureja***

II, III. II spores with two equatorial pores. On cultivated *S. hortensis*
***Puccinia menthae***

***Stachys***

III only, reddish-brown on deformed leaves. On *S. officinalis* ***Puccinia betonicae***

***Teucrium***

III only, pulvinate, reddish-brown. Autoecious. On *T. scorodonia* ***Puccinia annularis***

***Thymus***

III only, on stems and petioles, causing witches' brooms distortions. On *T. polytrichus*, *T. pulegioides* ***Puccinia thymi***

II only, very pale brown, inconspicuous, on under surfaces of leaves. On *T. polytrichus*
***Uredo morvernensis***

**Leguminosae**

***Anthyllis***

II, III only. Known to alternate with *Euphorbia cyparissias* elsewhere. On *A. vulneraria*
***Uromyces anthyllidis***

***Astragalus***

II, III only. Alternates with *Euphorbia cyparissias* elsewhere. On *A. danicus*
***Uromyces pisi-sativi***

***Cytisus***

II, III? Uncommon, but overlooked on *C. scoparius*. On imported *C. battandieri*
***Uromyces pisi-sativi***

***Galega***

II, III only. On *G. officinalis* ***Uromyces pisi-sativi***

***Genista***
II, III only. Alternates with *Euphorbia cyparissias* elsewhere. On *G. anglica, G. pilosa, G. tinctoria* and cultivated *G. sagittalis* ***Uromyces pisi-sativi***
***Hippocrepis***
II, III? Known to alternate with *Euphorbia cyparissias* elsewhere ***Uromyces anthyllidis***
***Laburnum***
II, III. On *L. anagyroides* ***Uromyces pisi-sativi***
***Lathyrus***
II, III only. II spore wall 1.2-2.5 µm thick. Uredo-perennates. On *L. palustris, L. pratensis* and cultivated *L. odoratus* ***Uromyces pisi-sativi***
II, III. II spore wall 3-4 µm thick. On *L. linifolius* var. *montanus* ***Uromyces viciae-fabae* var. *orobi***
***Lotus***
II, III only. II spore wall minutely echinulate, 1.5-4.5 µm thick. Uredo-perennates. Alternates with *Euphorbia* elsewhere. On *L. subbiflorus* ***Uromyces anthyllidis***
II, III. II spore wall minutely verrucose, 1-2.5 µm thick. Uredo-perennates. Alternates with *Euphorbia* elsewhere. On *L. angustissimus, L. corniculatus, L. glaber, L. pedunculatus* ***Uromyces pisi-sativi***
***Lupinus***
II only. On cultivated *Lupinus* ***Uromyces anthyllidis***
***Medicago***
II, III only. Alternates with *Euphorbia cyparissias* elsewhere. On *M. arabica, M. lupulina, M. polymorpha, M. sativa* ***Uromyces pisi-sativi***
***Onobrychis***
II, III. Alternates with *Euphorbia* elsewhere. On *O. viciifolia* ***Uromyces pisi-sativi***
***Phaseolus***
0, I (scarce) : II, III. Autoecious. Introduced. On cultivated *P. coccineus, P. vulgaris* ***Uromyces appendiculatus***
***Pisum***
0, I : II, III. Introduced. On cultivated *P. sativum* ***Uromyces viciae-fabae* var. *viciae-fabae***
II, III only. May alternate with *Euphorbia cyparissias*. On *P. sativum* ***Uromyces pisi-sativi***
***Trifolium***
0, I : II, III.
II spores with 4-7 scattered pores. On *T. pratense* and perhaps doubtfully *T. medium, T. incarnatum* ***Uromyces fallens***
II spores with two equatorial pores. On *T. hybridum, T. repens* ***Uromyces trifolii-repentis***
I : II, III. III spore walls smooth. On *T. dubium, T. incarnatum* subsp. *molineri* ***Uromyces minor***
II, III only. II spores with scattered pores. III spores with rough walls. Alternates with *Euphorbia* elsewhere. On *T. dubium, T. campestre* ***Uromyces anthyllidis***
III only. III spores with a few warts in a line. On *T. fragiferum, T. repens* ***Uromyces trifolii***



***Ulex***
II, III only. May alternate with *Euphorbia* elsewhere. On *U. europaeus* ***Uromyces pisi-sativi***
***Vicia***
0, I : II(rare), III. II spores with 2(3) equatorial pores. On *V. hirsuta* ***Uromyces ervi***
0, I (rare on some hosts) : II, III. II spores with 3-5 pores. On *V. bithynica, V. cracca, V. faba, V. hirsuta, V. lathyroides, V. lutea, V. sativa, V. sativa* subspp. *nigra* and *segetalis, V. sepium, V. sylvatica* (STR) ***Uromyces viciae-fabae* var. *viciae-fabae***

**Liliaceae**

***Allium***
0, I. I caeomoid. Alternates with *Populus*. Records uncertain. On *A. ursinum* ***Melampsora allii-populina***
0, I. I aecidioid. Alternates with *Phalaris*. On *Allium ursinum* ***Puccinia sessilis***
0, I. I aecidioid : II, III. III sori stromatic. III spores two-celled. On *A. cepa, A. cyaneum, A. fistulosum, A. schoenoprasum, A. vineale, A. vineale* var. *compactum*, imported *A. sativum* ***Puccinia allii***
II, III (rare). III spores two-celled. No alternation known. On *A. porrum* ***Puccinia porri***
II, III. III spores one-celled. III sori powdery. No alternation known. On *A. ampeloprasum* var. *babingtonii, A. schoenoprasum, A. scorodoprasum, A. ursinum* ***Uromyces ambiguus***
***Aloë***
0 : III on imported *A. glauca*. Rare ***Uromyces aloes***
***Asparagus***
0, I : II, III. Autoecious. Now rare. On *A. officinalis* ***Puccinia asparagi***
***Colchicum***
III only. III spores one-celled. Alternation unknown. Introduced, rare. On *C. autumnale, C. speciosum* and perhaps '*C. bavaricum*' ***Uromyces colchici***
***Convallaria***
0, I. Alternates with *Phalaris*. Rare. On *C. majalis* ***Puccinia sessilis***
***Erythronium***
0, I : II, III. Introduced, rare. On cultivated *E. dens-canis* ***Uromyces erythronii***
***Gagea***
III only. No alternation. On *G. lutea* ***Uromyces gageae***
***Hyacinthoides***
III only. On *H. hispanica, H. non-scripta, H. non-scripta* x *hispanica* ***Uromyces muscari***
***Lilium***
II only. Rare on imported *L. columbianum* ***Uromyces holwayi***
0, I : III. On imported *L. candidum, 'L. aff. martagon'* ***Uromyces aecidiiformis***
***Muscari***
III only. On imported *M. polyanthum* ***Uromyces muscari***
***Ornithogalum***
0 : III only. On native *O. angustifolium* and imported *O. pyrenaicum* ***Puccinia liliacearum***
0, I only. Known to alternate with *Hordeum*, but only by inoculation in Britain. On *O. pyrenaicum* ***Puccinia hordei***

***Paris***
0, I only. Alternates with *Phalaris*. On *P. quadrifolia* — ***Puccina sessilis***
***Scilla***
III only. On native *S. verna* and cultivated *S. bifolia* — ***Uromyces muscari***
***Tulipa***
0, III only. On introduced *T. australis*, *T. sylvestris* — ***Puccina prostii***

**Linaceae**

***Linum***
0, I : II, III. 0, I rare. II orange, with capitate paraphyses. III sori crustose, spores 60-80 µm long. On cultivated *L. usitatissimum* — ***Melampsora lini* var. *liniperda***
II, III only. III spores 35-55 µm long. On *L. catharticum* — ***Melampsora lini* var. *lini***

**Malvaceae**

***Alcea, Althaea, Brotex, Lavatera, Malva, Sidalcea***
III only, reddish-brown, pulvinate. Introduced. On *Alcea rosea*, *Althaea officinalis*, *Brotex* sp., *Lavatera arborea*, *L. cretica*, *Malva moschata*, *M. neglecta*, *M. pusilla*, *M. sylvestris*, *Sidalcea* sp. — ***Puccinia malvacearum***

**Menyanthaceae**

***Nymphoides***
0, I. Alternates with *Scirpus*. On *N. peltata* — ***Puccinia scirpi***

**Oleaceae**

***Phillyrea***
0, I : II,. Very rare, on imported *P. latifolia* — ***Zaghouania phillyreae***

**Onagraceae**

***Chamerion***
II, III. II small, orange, opening by a pore. III subepidermal, brownish. Alternates with *Abies grandis*, also uredo-perennates. On *C. angustifolium* — ***Pucciniastrum epilobii***
***Circaea***
II, III. II small, orange, opening by a pore. III subepidermal. Alternates with *Abies* elsewhere. On *C.* x *intermedia*, *C. lutetiana* and perhaps *C. alpina* — ***Pucciniastrum circaeae***
III only, brown on large leafspots. On *C.* x *intermedia*, *C. lutetiana* and perhaps *C. alpina* — ***Puccinia circaeae***
***Clarkia***
II, III? II small, orange, opening by a pore. On *C. amoena* (Godetia) — ***Pucciniastrum epilobii***
***Epilobium***
II, III. II small, orange, opening by a pore. III brown, subepidermal. May alternate with *Abies*. On *E. anagallidifolium*, *E. montanum*, *E. palustre* — ***Pucciniastrum epilobii***
III only, on deformed shoots. On *E. anagallidifolium*, *E. hirsutum*, *E. montanum*, *E. obscurum*, *E. palustre* — ***Puccinia epilobii***
0, I : II, III. On *E. hirsutum*, *E. montanum*, *E. parviflorum*, *E. tetragonum* and introduced *E. ciliatum* (STR) — ***Puccinia pulverulenta***
***Fuchsia***
II only, orange, opening by a pore. On cultivated *F. magellanica*, *Fuchsia* cultivars — ***Pucciniastrum epilobii***



**Orchidaceae**

***Calanthe***
II only. On imported *C. reflexa* — ***Coleosporium tussilaginis***
***Cattleya***
II only. On imported *C. dowiana* — ***Uredo oncidii***
***Dactylorhiza***
0, I. I caeomoid. Alternates with *Salix*. On *D. incarnata*, *D. maculata* agg., *D. praetermissa* — ***Melampsora epitea* var. *epitea***
0, I. I aecidioid. Alternates with *Phalaris*. On *D. incarnata*, *D. maculata* agg., *D. fuchsii*, *D. praetermissa* — ***Puccinia sessilis***
***Encyclia***
II only. On imported *E. pentotis* — ***Uredo behnickiana***
***Epidendron***
II only. On imported *E. paniculatum* — ***Uredo epidendri***
II only. On imported *E. vitellinum* — ***Uredo behnickiana***
***Goodyera***
II only. On native *G. repens* — ***Uredo goodyerae***
***Gymnadenia***
0, I. I caeomoid. Alternates with *Salix*. On native *G. conopsea* — ***Melampsora epitea* var. *epitea***
0, I. I aecidioid. Alternates with *Phalaris*. On *G. conopsea* — ***Puccinia sessilis***
***Laelia***
II only. On imported '*Laelia* sp.' — ***Uredo behnickiana***
***Listera***
0, I. I caeomoid. Alternates with *Salix*. On *L. ovata* — ***Melampsora epitea* var. *epitea***
0, I. I aecidioid. Alternates with *Phalaris*. On *L. ovata* — ***Puccina sessilis***
***Oncidium***
II only. On imported *O. cavendishianum* — ***Uredo oncidii***
II only. On imported *O. varicosum* — ***Uredo behnickiana***
***Phajus***
II only. On imported *P. wallichii* — ***Uredo behnickiana***
***Satyrium***
II only. On imported *S. aureum* — ***Puccinia satyrii***
***Spiranthes***
II only. On native *S. spiralis* in Hampshire and Wales (STR) and on cultivated '*Spiranthes* sp.' — ***Uredo oncidii***

**Oxalidaceae**

***Oxalis***
II, III. Alternates with *Berberis*, *Mahonia* elsewhere. On introduced *O. adenophylla*, *O. articulata*, *O. debilis* (STR), *O. latifolia* — ***Puccinia oxalidis***

**Paeoniaceae**

***Paeonia***
II, III. Alternates with *Pinus*. On *P. mascula* — ***Cronartium flaccidum***

## Plumbaginaceae

***Armeria***

0, I : II, III. 0, I often overlooked. III spores one-celled. On native *A. maritima* subspp. *maritima* and *montana* and cultivated *A. alliacea*, *A. plantaginea*, *A. pseudoarmeria* ***Uromyces armeriae***

***Goniolimon***

0, I : II, III. On cultivated *G. tataricum* var. *angustifolium* ***Uromyces limonii***

***Limonium***

0, I : II, III. On native *L. vulgare* and cultivated *L. latifolium* ***Uromyces limonii***

## Polygonaceae

***Fallopia***

II, III. Alternates with *Geranium dissectum*. On *F. convolvulus* ***Puccinia polygoni-amphibii* var. *convolvuli***

***Oxyria***

II, III. 0, I unknown. On *O. digyna* ***Puccinia oxyriae***

***Persicaria***

II, III. III spores two-celled, smooth. Alternates with *Geranium* elsewhere. On *P. amphibia*, *P. maculosa* ***Puccinia polygoni-amphibii* var. *polygoni- amphibii***

II, III. III spores with lines of warts. Alternates with Umbelliferae elsewhere. On *P. bistorta* ***Puccinia bistortae***

II, III. III spores smooth. Alternates with *Thalictrum alpinum*. On *P. vivipara* ***Puccinia septentrionalis***

0, I (rare) : II, III. III spores one-celled. On *P. arenastrum*, *P. aviculare* ***Uromyces polygoni-avicularіae***

***Rheum***

0, I (known only by artificial inoculation). Alternates with *Phragmites*. On *R. rhaponticum* ***Puccinia phragmites***

***Rumex***

0, I on conspicuous red spots. Alternates with *Phragmites*. On *R. acetosa*, *R. crispus* s.l., *R. crispus* subsp. *crispus* (STR), *R. hydrolapathum*, *R. sanguineus* and doubtfully *R. conglomeratus*, *R. obtusifolius* ***Puccinia phragmitis***

II, III. III spores one-celled. II spores with three equatorial pores. Alternates with *Ranunculus ficaria*. On *R. conglomeratus*, *R. crispus*, *R. hydrolapathum*, *R. maritimus*, *R. longifolius*, *R. obtusifolius*, *R. patientia*, *R. sanguineus*, *R. sanguineus* var. *viridis* (STR) ***Uromyces rumicis***

II, III. III spores two-celled. II spores with two supra-equatorial pores. On *R. acetosa* s.l., *R. acetosa* subspp. *acetosa* and *biformis* (STR). Rare on *R. acetosella* ***Puccinia acetosae***

0, I : II, III. II spores with three equatorial pores. On *R. acetosa* s.l., *R. acetosa* subspp. *acetosa* and *biformis*, *R. acetosella* ***Uromyces acetosae***

0, I : II, III. III spores one-celled. II spores with 3-4 equatorial pores. On *R. acetosella* ***Uromyces polygoni-avicularіae***

## Polypodiaceae s.l.

***Adiantum***

II only, orange. Ireland and Kent only. On *A. capillus-veneris* ***Hyalopsora adianti-capilli-veneris***



***Asplenium***

II only, whitish on yellowish spots, opening by a pore. III unknown. On *A. ruta-muraria* ***Milesia murariae***

II only. II spores white. III unknown. On *A. adiantum-nigrum* ***Milesia magnusiana***

***Blechnum***

II, III. II hemispherical, opening by an apical pore. II spores white. III spores in epidermal host cells. May alternate with *Abies* but certainly uredo-perennates. On *B. spicant* ***Milesina blechni***

***Cytstopteris***

II only, orange on fronds and rachises. On *C. fragilis* ***Hyalopsora polypodii***

***Dryopteris***

II on undersurfaces of leaves, hemispheric, whitish, opening by a pore. II spores hyaline, ellipsoid, 23-48 x 15-22 µm. III spores within host epidermal cells. On *D. aemula*, *D. affinis* subspp. *affinis* and *borreri*, *D. carthusiana*, *D. dilatata*, *D. filix-mas* ***Milesina kriegeriana***

II as above, but II spores subglobose, 14-17 x 11-17 µm. On *D. filix-mas* ***Milesina carpatorum***

***Gymnocarpium***

II only, orange, on large yellow spots. Alternates with *Abies* elsewhere. Only once in W. Scotland. On *G. dryopteris* ***Hyalopsora aspidiotus***

***Onoclea***

II only. Once on imported *G. sensibilis* ***Uredinopsis americana***

***Phegopteris***

II, III. II yellow. III spores subepidermal. On *P. connectilis* ***Uredinopsis filicina***

***Phyllitis***

II, III. Alternates with *Abies*. On *P. scolopendrium* ***Milesina scolopendrii***

***Polypodium***

II, III. II hemispherical, opening by a pore, whitish. II spores hyaline. III within host epidermal cells. Alternates facultatively with *Abies*, but mostly uredo-perennates. On *P. cambricum*, *P. interjectum*, *P.* x *mantoniae*, *P. vulgare* s.l. ***Milesina dieteliana***

***Polystichum***

II, III. II whitish. II spores hyaline, smooth. III within host epidermal cells. *Abies alba* infected experimentally. On *P. aculeatum*, *P. setiferum* ***Milesina vogesiaca***

II whitish, III? II spores hyaline, finely echinulate. On *P. setiferum* ***Milesina whitei***

## Portulacaceae

***Claytonia***

III. One collection. Needs further investigation. On naturalised *C. sibirica* ***Puccinia arenariae***

## Primulaceae

***Glaux***

0, I. Alternates with *Bolboschoenus maritimus*. On *G. maritima* ***Uromyces lineolatus***

***Primula***

I : II, III. On *P. vulgaris* and doubtfully *P. veris* ***Puccinia primulae***

***Soldanella***

0, I only in Britain. On imported *S. alpina* ***Puccinia soldanellae***

## Pyrolaceae

***Orthilia***

II only, pale orange. Alternation unknown. On *O. secunda* — ***Pucciniastrum pyrolae***

***Pyrola***

II only, pustular, pale. Alternation unknown. On *P. media*, *P. minor* and perhaps *P. rotundifolia* — ***Pucciniastrum pyrolae***

II large, often diffuse, orange. III crustose, orange-red. Alternates with *Picea* elsewhere. On *P. minor*, *P. rotundifolia* vars. *maritima* and *rotundifolia* — ***Chrysomyxa pirolata***

## Ranunculaceae

***Anemone***

III only, dark brown, on deformed host leaves. No alternation. On *A. nemorosa* and cultivated *A. blanda* — ***Tranzschelia anemones***

0, I only. I more than 1 mm. diam. On deformed host leaves. Alternates with *Prunus*. On cultivated *A. coronaria*, *A.* x *fulgens* and perhaps *A. blanda* — ***Tranzschelia discolor***

0, I only. I less than 1 mm diam on slightly deformed host leaves. Alternates with *Sorbus*. On native *A. nemorosa* and perhaps cultivated *A. blanda* — ***Ochropsora ariae***

***Aquilegia***

0, I only. Alternates with *Agrostis*. On *A. vulgaris* — ***Puccinia recondita* f.sp. *agrostidis***

***Caltha***

0, I : II, III. II with three equatorial pores, III spore wall slightly warted. On *C. palustris* — ***Puccinia calthicola***

0, I : II, III. II with two supra-equatorial pores. II spore wall smooth. On *C. palustris* — ***Puccinia calthae***

***Helleborus***

0, I only. May alternate with *Elytrigia*. Rarely reported. On *H. viridis* probably ***Puccinia recondita* f.sp. *persistens***

***Ranunculus***

III only, dark brown. No alternation. On *R. ficaria* subspp. *ficaria* and *bulbilifer* — ***Uromyces ficariae***

0, I only. I spores with refractive granules. Alternates with *Rumex*. On *R. ficaria* — ***Uromyces rumicis***

0, I only. I spores without refractive granules. Occurs usually in early spring. Alternates with *Dactylis*, *Festuca*, *Poa*. On *R. acris*, *R. bulbosus*, *R. ficaria*, *R. ficaria* subsp. *bulbilifer* (STR), *R. repens*, *R. sceleratus* and perhaps *R. auricomus* — ***Uromyces dactylidis***

0, I only. I spores without refractive granules. Usually occurs in midsummer. Alternates with *Phragmites*. On *R. bulbosus*, *R. flammula*, *R. lingua*, *R. repens* — ***Puccinia magnusiana***

0, I only. Alternates obligatorily with *Alopecurus*. On *R. acris* — ***Puccinia recondita* f. sp. *perplexans***

***Thalictrum***

III only, dark brown. No alternation. On *T. flavum*, *T. minus* subspp. *arenarium* and *montanum* — ***Tranzschelia anemones***

0, I. on conspicuous purple spots. Alternates with *Persicaria vivipara*. On *T. alpinum* — ***Puccinia septentrionalis***

0, I. without purple spots. Alternates elsewhere with boreal grasses. On *T. alpinum* — ***Puccinia recondita* f.sp. *borealis***



***Thalictrum* (cont.)**

0, I. On lowland *Thalictrum*. Alternates with *Elytrigia*. On *T. flavum*, *T. minus* subsp. *arenarium* — ***Puccinia recondita* f.sp. *persistens***

## Rhamnaceae

***Frangula*, *Rhamnus***

0, I. Alternates with many grasses. On *F. alnus*, *R. cathartica* — ***Puccinia coronata***

## Rosaceae

***Agrimonia***

II only. III unknown in Britain. On *A. eupatoria* — ***Pucciniastrum agrimonii***

***Alchemilla***

I : III. I systemic on upstanding leaves, uredinoid, diffuse, orange. III sori brown, III spores one-celled. No alternation. On *A. filicaulis* subspp. *filicaulis* and *vestita*, *A. glabra*, *A. minima*, *A. monticola*, *A. xanthochlora* — ***Trachyspora intrusa***

***Crataegus*, *Cydonia***

0, I. I peridium tubular then lacerate to the base. Peridial cells with isolated warts. Alternates with *Juniperus*. On *C. laevigata*, *C. monogyna* — ***Gymnosporangium clavariiforme***

0, I. I peridium cylindrical, fimbriate in upper half, peridial cells with elongate ridges. Alternates with *Juniperus sabina*. Introduced. On *Crataegus laevigata*, *C. monogyna* and cultivated *Cydonia oblonga* — ***Gymnosporangium confusum***

***Filipendula***

I : II, III. I uredinoid. III brownish-black. III spores three-celled, with small warts. On *F. vulgaris* — ***Triphragmium filipendulae***

0, I : II, III. I uredinoid. III brownish-black. Warts on III spores conspicuous. On *F. ulmaria* — ***Triphragmium ulmariae***

***Malus***

II, III. II small, hemispheric whitish. III crustose, pinkish. Alternates with *Anemone*. Rare on crab apple, *M. domestica* — ***Ochropsora ariae***

I. I horn-shaped. Rare on imported apples — ***Gymnosporangium juniperi-virginianae***

***Mespilus***

0, I. I with cylindrical peridium, fimbriate in upper half, peridial cells with elongate ridges. May alternate with *Juniperus sabina*. On cultivated *M. germanica* — ***Gymnosporangium confusum***

***Potentilla***

0, I : II, III. I caeomoid. III black. On *P. anglica*, *P. neumaniana*, cultivated *Potentilla* sp. and doubtfully *P. argentea* — ***Phragmidium potentillae***

0, I : II, III. I caeomoid. III brown. On *P. sterilis* — ***Phragmidium fragariae***

0, I : II, III. I caeomoid. III pale brown. On *P. erecta* s.l., *P. erecta* subsp. *erecta*, *P. reptans* — ***Frommëella tormentillae***

***Prunus***

II,III. III black. III spores two-celled, upper cell warted, lower cells almost smooth. Alternates with cultivated *Anemone*. On *P. armeniaca*, *P. domestica* subspp. *domestica* and *institia*, *P. persica* subsp. *persica* and *P. persica* var. *nectarina* — ***Tranzschelia discolor***

II, III. III black. III spores, both cells warted. Alternates with *Anemone ranunculoides* elsewhere. On *P. spinosa* — ***Tranzschelia pruni-spinosae***

***Prunus* (cont.)**

II, III. II small, brown, pustular. III spores intra-epidermal on yellow, then reddish areas. Alternates with *Picea abies* (0, I on cone scales). On *P. padus*
***Pucciniastrum areolatum***

***Pyrus***

0, I. I cornute, peridial cells with ridges. Alternates with *Juniperus sabina.* Introduced. On *P. communis*
***Gymnosporangium confusum***

0, I. I cornute, peridial cells with separate warts. Alternates with *Juniperus sabina.* On *P. communis*
***Gymnosporangium sabinae***

***Rosa***

0, I : II, III. I caeomoid, often on leafbuds. III brown. On *R. pimpinellifolia* and some of its cultivars
***Phragmidium rosae-pimpinellifoliae***

0, I : II, III. I and II with large pores. III black. III spores with 10-12 cells. Presumably introduced (hosts not native). On cultivated *R. caesia* subsp. *glauca*, *R. pendulina*
***Phragmidium fusiforme***

0, I : II, III. I and II spores with large pores (4-5 µm). III spores 5-7-celled. The common rust on cultivated bush roses, *Rosa* cvs Albertine, Complicata, New Dawn (STR), also on *R. caesia* subsp. *glauca*, *R. rubiginosa*, doubtfully on *R. rugosa*
***Phragmidium tuberculatum***

0, I : II, III. I and II with small pores (2-2.5 µm). III spores 6-8-celled. On *R.* x *alba*, *'R. arvensis'*, *R. canina*, *R. caesia* var. *caesia*, *R.* x *centifolia*, *R.* x *involuta*, *R. laxa*, *R. mollis*, *'R. rubiginosa'*, *'R. rugosa'*, *R. sherardii*, *'R. tomentosa'*
***Phragmidium mucronatum***

***Rubus***

III spores hyaline in chains usually 5-7 spores long

0, I : II, III. II spores orange often diffuse over host leaves. On *R. fruticosus* agg., *R.* cv. Merton Thornless, *R* x *loganobaccus*
***Kuehneola uredinis***

III spores black, solitary

II spores aculeate or verruculose

0, I : II, III. III spores 3-5 (mostly 4)-celled. On *R. fruticosus* agg. cultivated Blackberries, *R. loganobaccus*, *R. laciniatus*
***Phragmidium violaceum***

0, I : II, III. III spores 4-7 (mostly 6)-celled. On *R. fruticosus* agg. Sect. *Corylifolii*, *R. caesius*, *R. ulmifolius* x *vestitus*
***Phragmidium bulbosum***

II spores finely echinulate

0, I : II, III. III spores 4-8 (mostly 5-7)-celled. II spore walls 1.5-2.5 µm thick. On *R. saxatilis*
***Phragmidium acuminatum***

0, I : II, III. III spores 5-10 (mostly 7-8)-celled. II spore walls 2-3 µm thick. On *R. idaeus*
***Phragmidium rubi-idaeae***

On introduced Dewberry (*R. ursinus* hybrid?). Not established
***Gymnoconia nitens***

***Sanguisorba***

I : II, III. II orange, III black, III spores 4-22-celled. On *S. officinalis*
***Xenodochus carbonarius***

0, I : II, III. III spores four-celled. On *S. minor* subspp. *minor* and *muricata*
***Phragmidium sanguisorbae***



***Sorbus***

0, I. On orange spots, peridium cornute. Alternates with *Juniperus.* On *S. aucuparia* and cultivated *S. sargentiana*, *S.* x *thuringiaca*
***Gymnosporangium cornutum***

II, III hypophyllous, II pale with palisade of paraphyses, spores hyaline. III spores subepidermal, in groups, hyaline or pinkish. Alternates with *Anemone.* On *S. aucuparia* and perhaps *S. aria*
***Ochropsora ariae***

**Rubiaceae**

***Asperula***

II, III. On *A. cynanchica*
***Puccinia asperulae-cynanchicae***

***Cruciata***

0, I : II, III. I uredinoid, dark brown. On *Cruciata laevipes*
***Puccinia galii-cruciatae***

III only. III spores broadly fusiform. On *Cruciata laevipes*
***Puccinia galii-verni***

0, I : II, III. On *Cruciata laevipes*
***Puccinia punctata***

***Galium***

0, I : III. III compact, black. On *G. aparine*
***Puccinia difformis***

0, I : II, III. On *G. aparine*, *G. mollugo*, *G. odoratum*, *G. palustre* s.l., *G. palustre* subsp. *elongatum*, *G. saxatile*, *G. sterneri* (STR), *G. uliginosum*, *G. verum*
***Puccinia punctata***

III only. On *G. saxatile*, *G. uliginosum*, *G. verum*
***Puccinia galii-verni***

II, III. II small, opening by a pore, III spores intra-epidermal. Alternates with *Abies.* On *G. odoratum*, *G. palustre*, *G. saxatile*, *G. uliginosum*, *G. verum*
***Pucciniastrum guttatum***

***Sherardia***

II, III? II sori small opening by a pore. III sori diffuse, brownish, III spores intra-epidermal. On *S. arvensis*
***Pucciniastrum guttatum***

**Salicaceae**

***Populus***

II, III only. II spores spherical, with spherical interior, apex smooth. Alternates with *Allium* and *Arum* but uredo-perennates frequently. On *P. nigra*, *P. trichocarpa*
***Melampsora allii-populina***

II, III only. II spores ellipsoid with dumb-bell shaped interior. Uredo-perennates. Alternates with *Larix* elsewhere. On *P.* x *canadensis*, *P.* x *canadensis* cvs Serotina, Marilandica, Regenerata and Robusta (STR), *P. laurifolia*, *P. nigra*, *P. nigra* var. *betulifolia*, *P. nigra* cv. Italica, *P. trichocarpa*
***Melampsora larici-populina***

II, III. II spores spherical, interior spherical. Alternates with *Larix*, *Pinus*, *Mercurialis*, but uredo-perennates. On *P. alba*, *P. tremula*, *P. tremula* x *tremuloides*
***Melampsora populnea***

***Salix***

0, I : II, III. I orange, caeomoid, often elongated on stems. II orange, III crustose sub-epidermal, brownish-black. Autoecious. On *S. triandra*, *S. triandra* x *viminalis*
***Melampsora amygdalinae***

II, III only - ***Salix* rusts by host species**:-

*S. acutifolia*
***Melampsora epitea***

*S. alba* vars. *alba* and *vitellina*, *S. alba* x *fragilis*, *S.* x *babylonica.* Apex of II spores smooth
***Melampsora salicis-albae***

**_Salix_ rusts by host species (cont.)**

*S. arbuscula*
Heads of uredo-paraphyses 15-24 µm diam — ***Melampsora epitea* s.l.**
Heads of uredo-paraphyses 18-41 µm diam — ***Melampsora reticulatae***

*S. aurita*
III subcuticular, apices of III spores thickened. Alternates with *Larix* — ***Melampsora capraearum***
III subepidermal, apices of III spores not thickened — ***Melampsora epitea***

*S. aurita* x *caprea* (BMS, 1996) — ***Melampsora capraearum***

*S. aurita* x *cinerea* subsp. *oleifolia* — ***Melampsora capraearum***

*S.* x *calodendron* — ***Melampsora epitea***

*S. caprea* subsp. *caprea* III subcuticular, apices of III spores thickened. Alternates with *Larix* — ***Melampsora capraearum***

*S. caprea* x *viminalis* III sub-epidermal, apices of III spores not thickened — ***Melampsora epitea***

*S. caprea* cv. Kilmarnock — ***Melampsora capraearum***

*S. cinerea* subspp. *cinerea* and *oleifolia*
III subcuticular, apices of III spores thickened — ***Melampsora capraearum***
III subepidermal, apices of III spores not thickened — ***Melampsora epitea***

*S. daphnoides* — ***Melampsora epitea***

*S. fragilis*
Apices of II spores smooth. Alternates with *Allium* elsewhere — ***Melampsora allii-fragilis***
Apices of II spores not smooth, may alternate with *Larix* — ***Melampsora epitea***

*S. fragilis* x *pentandra* Apices of II spores smooth — ***Melampsora allii-fragilis***

*S. herbacea*
II spores densely echinulate. Alternates with montane *Saxifraga* — ***Melampsora arctica***
II spores less densely echinulate. Alternation unknown — ***Melampsora epitea* s.l.**

*S. herbacea* x *myrsinites* II spores densely echinulate. May alternate with *Saxifraga* — ***Melampsora arctica***

*S. herbacea* x *lanata* (*S. sadleri*) II spores densely echinulate. May alternate with *Saxifraga* — ***Melampsora arctica***

*S. lanata* II spores densely echinulate. May alternate with *Saxifraga* — ***Melampsora arctica***

*S. lapponum* — ***Melampsora epitea***

*S. mollissima* var. *hippophaefolia* — ***Melampsora epitea***

*S. myrsinifolia* — ***Melampsora epitea***

*S. myrsinites*
II spores densely echinulate — ***Melampsora arctica***
II spores less densely echinulate — ***Melampsora epitea* s.l.**

*S. pentandra* and *S. pentandra* x *fragilis*
Apex of II spores smooth, walls less than 2 µm thick. Alternates with *Larix* elsewhere — ***Melampsora larici-pentandrae***
Apex of II spores echinulate, walls more than 3 µm thick. May alternate with *Allium* — ***Melampsora allii-fragilis***



**_Salix_ rusts by host species (cont.)**

*S. phylicifolia* (incl. *S. hibernica*) — ***Melampsora epitea***

*S. purpurea.* Alternates with *Ribes* elsewhere — ***Melampsora epitea***

*S. pyrenaica* — ***Melampsora epitea***

*S. repens* vars *repens* and *argentea.* Alternates with several orchids — ***Melampsora epitea***

*S. reticulata*
Heads of II paraphyses 18-41 µm diam. Alternates with *Saxifraga aizoides* — ***Melampsora reticulatae***
Heads of II paraphyses 15-24 µm diam. Alternation unknown — ***Melampsora epitea***

*S. triandra* and *S. triandra* x *viminalis.* 0, I present on stems — ***Melampsora amygdalinae***

*S. viminalis*
Alternates with *Ribes* elsewhere — ***Melampsora ribesii-viminalis***
May alternate with *Larix* — ***Melampsora epitea***

*S. viminalis* x *cinerea* (*S.* x *smithiana*)
Apex of III spores thickened. May alternate with *Larix* — ***Melampsora capraearum***
Apex of III spores not thickened. May alternate with *Larix* — ***Melampsora epitea***

*S. waldsteiniana* (cult.) — ***Melampsora epitea***

**Santalaceae**

***Thesium***
0, I : II, III. On *Thesium humifusum* — ***Puccinia thesii***

**Saxifragaceae**

***Chrysosplenium***
III only. III of two types: leptosporic, pulvinate, pale brown becoming grey due to germinating spores, resting pulverulent III spores surface striate. On *C. alternifolium*, *C. oppositifolium* — ***Puccinia chrysosplenii***

***Saxifraga***
III only. III spore walls striate. No alternation. On *S. granulata*, *S. spathularis*, *S. stellaris*, *S. umbrosa* — ***Puccinia saxifragae***

III only.
Cap on apex of III spores 2-3 µm thick. Introduced. On cultivated *S. callosa*, *S. cotyledon*, *S. diapensioides*, *S. hostii*, *S. longifolia*, *'S. obristii'*, *S. paniculata*, *S. porophylla* — ***Puccinia pazschkei* var. *pazschkei***
Cap on apex of III spores up to 6.5 µm thick. Native. On *S. aizoides*, *S. oppositifolia* — ***Puccinia pazschkei* var. *jueliana***

0, I only.
Little host distortion. Alternates with many montane willows. On *S. hypnoides*, *S. oppositifolia* — ***Melampsora arctica***
Systemic infection causing host distortion. Alternates with montane willows. On *S. aizoides* — ***Melampsora epitea* var. *reticulatae***

0, I : III only. I caeomoid. III reddish brown, crustose, subepidermal. On *S. granulata* — ***Melampsora vernalis***

**Scrophulariaceae**

***Antirrhinum***
II, III only. 0, I unknown. II chestnut brown. Introduced. On *A. majus*, *A. molle*, *A. glutinosum* — ***Puccinia antirrhini***

***Euphrasia***
II, III. III reddish-orange. May alternate with *Pinus*. On *E. officinalis* s.l. and microspecies *E. arctica* subsp. *borealis*, *E. confusa*, *E. micrantha*, *E. nemorosa*, *E. rostkoviana*, *R. tetraquetra* — ***Coleosporium tussilaginis***

***Melampyrum***
0, I. Alternates probably obligatorily with *Molinia*. On *M. pratense* — ***Puccinia nemoralis***

II, III only. II orange, III crustose, reddish-orange. Alternates with *Pinus sylvestris* and possibly other two-needled pines. On *M. arvense*, *M. pratense* — ***Coleosporium tussilaginis***

***Odontites***
II, III. II orange, III crustose, reddish-orange. May alternate with *Pinus*. On *O. vernus* subspp. *vernus* and *serotinus* — ***Coleosporium tussilaginis***

***Parentucellia***
II, III. II orange, III crustose, reddish-orange. May alternate with *Pinus*. On *P. viscosa* — ***Coleosporium tussilaginis***

***Pedicularis***
0, I. Alternates with *Carex*. On *P. palustris* — ***Puccinia paludosa***

III only. III leptosporic, small pulvinate, light brown or resting spores pulverulent, dark brown, wall striate. On *P. palustris*, *P. sylvatica* — ***Puccinia clintonii***

***Prunella***
0, I. Alternates obligatorily with *Molinia*. On *P. vulgaris* — ***Puccinia moliniae***

***Rhinanthus***
II, III. II orange, III pulvinate, reddish-orange. May alternate with *Pinus*. On *R. minor* subsp. *minor* and *R. minor agg.* — ***Coleosporium tussilaginis***

***Scrophularia***
0, I : III on pale spots often edged with violet-brown. III spores one-celled. Autoecious. On *S. auriculata*, *S. nodosa*, *S. scorodonia*, *S. umbrosa* — ***Uromyces scrophulariae***

***Veronica***
III only, pulvinate, cinnamon-brown or pulverulent, dark brown infection apparently systemic. On *V. alpina* — ***Puccinia albulensis***

III only. III all pulvinate, dark brown. On *V. montana* — ***Puccina veronicae***

III only. On *V. spicata* subsp. *hybrida* — ***Puccinia veronicae-longifoliae***

**Tropaeolaceae**

***Tropaeolum***
II only. Presumably a cross infection from another host. On cultivated *T. peregrinum* — ***Coleosporium tussilaginis***

II, III. Alternates with *Pinus*. On *Tropaeolum majus* — ***Cronartium flaccidum***

**Umbelliferae**

***Aegopodium***
III only. III spores dark brown. On *A. podagraria* — ***Puccinia aegopodii***

***Aethusa***
0, I : II, III. I uredinoid. Autoecious. On *A. cynapium*, *A. cynapium* subsp. *agrestis* — ***Puccinia nitida***

***Angelica***
0, I : II, III. I uredinoid. Autoecious. On *A. sylvestris* — ***Puccinia angelicae***



***Anthriscus***
0, I : II, III. Wall of III spores, reticulate. On *A. sylvestris* — ***Puccinia chaerophylli***

***Apium***
0, I : II, III. On *A. graveolens* — ***Puccinia apii***

***Berula***
0, I only. Alternates with *Bolboschoenus maritimus*. On *B. erecta* — ***Uromyces lineolatus***

***Bunium***
0, I : III. Only. On *B. bulbocastanum* — ***Puccinia bulbocastani***

***Bupleurum***
0, I : II, III. On *B. tenuissimum* — ***Puccinia bupleuri***

***Chaerophyllum***
0, I : II, III. Wall of III spores reticulate. On introduced *C. aureum* — ***Puccinia chaerophylli***

***Cicuta***
0, I : II, III. On *C. virosa* — ***Puccinia cicutae***

***Conium***
II, III only (0, I (uredinoid) in culture elsewhere). On *C. maculatum* — ***Puccinia conii***

***Conopodium***
III only, dark brown. On *C. majus* — ***Puccinia tumida***

***Heracleum***
0, I : II, III. On *H. sphondylium* — ***Puccinia heraclei***

***Hydrocotyle***
II only. 0, I : III known elsewhere. On *H. vulgaris* — ***Puccinia hydrocotyles***

***Meum***
II only. III spores with large spines. On *M. athamanticum* — ***Nyssopsora echinata***

***Myrrhis***
0, I : II, III. Wall of III spores reticulate. On *M. odorata* — ***Puccina chaerophylli***

***Oenanthe***
0, I. Alternates with *Bolboschoenus maritimus*. On *O. crocata*, *O. fistulosa*, *O. lachenalii* — ***Uromyces lineolatus***

***Petroselinum***
0, I : II, III. I uredinoid. On cultivated *P. crispum* — ***Puccinia nitida***

***Peucedanum***
0, I : II. III. I uredinoid. III spores smooth. On *P. palustre* — ***Puccinia angelicae***

0, I : II, III. I uredinoid. II spores longitudinally striate. On *P. officinale* — ***Puccina rugulosa***

***Physospermum***
0 : III only. On *P. cornubiense* — ***Puccinia physospermi***

***Pimpinella***
0, I : II, III. On *P. major*, *P. saxifraga* — ***Puccinia pimpinellae***

***Sanicula***
0, I : II, III. On *S. europaea* — ***Puccinia saniculae***

***Selinum***
0, I : II, III. I uredinoid. On *S. carvifolia* — ***Puccinia angelicae***

***Seseli***
0, I : II, III. I uredinoid. On *S. libanotis* — ***Puccinia libanotidis***

***Silaum***

0, I : II, III. I uredinoid. On *S. silaus* — ***Puccinia angelicae***

***Sium***

0, I only. Alternates with *Bolboschoenus maritimus* — ***Uromyces lineolatus***

***Smyrnium***

0, I : III. III spores coarsely tuberculate. On *S. olusatrum* — ***Puccinia smyrnii***

**Urticaceae**

***Urtica***

0, I only. I on large swollen spots. I spores with 8-10 large refractive granules. Alternates with *Carex*. On *U. dioica, U. urens* — ***Puccinia urticata***

**Valerianaceae**

***Valeriana***

0, I : II, III. III small, brown. III spores one-celled. On *V. dioica, V. officinalis* subspp. *officinalis* and *sambucifolia* — ***Uromyces valerianae***

0, I : II, III. III large, black, often on stems and petioles. III spores two-celled. On *V. officinalis* perhaps only subsp. *sambucifolia* — ***Puccinia commutata***

**Violaceae**

***Viola***

III only. Large sori. On *V. palustris* — ***Puccina fergusonii***

0, I : II, III. 0, I often on distorted shoots. Autoecious. On *V. canina, V. cornuta, V. hirta, V. lutea, V. odorata, V. reichenbachiana, V. riviniana, V. tricolor, V. tricolor* var. *curtisii, V.* cultivars — ***Puccinia violae***

# Appendix

**Additions and corrections to the *Checklist of the Rust Fungi of the British Isles*** (Henderson, 2000)

Delete *Puccinia scorzonerae* and *P. scorzonericola* from the introduction. This collection is dealt with under *Puccinia hieracii.*

In ***Coleosporium tussilaginis*** after *Euphrasia arctica* subsp. *borealis* add *E. micrantha* (BMS foray, 1990) and before *Rhinanthus* add *Petromarula pinnata* cult., a new British host (HB, p. 475).

In ***Cronartium flaccidum*** after *Pinus sylvestris* add *P. nigra* subsp. *laricio*

In ***Melampsora epitea*** var. ***epitea*** after *S. aurita* add *S. aurita* x *S. cinerea* subsp. *oleoides* and *S. aurita* x *caprea* (BMS foray, Sutherland, 1996).

***Melampsora euphorbiae*** correct authority from Cast. to (Schub.) Cast.

In ***Melampsora euphorbiae*** after *E. peplus* add *E.* x *pseudovirgata* (TFP, *in litt.*, 1999). A new host.

In ***Melampsoridium betulinum*** after *B. jacquemontii* add *B. occidentalis* and alter 'three' to four.

After ***Melampsoridium betulinum*** add ***Milesia murariae*** P. & H. Sydow [0, I unknown, presumably on *Abies*] : II on *Asplenium ruta-muraria*, [III unknown]. WH p. 20. GB & Ir.

***Milesia magnusiana*** alter to ***Milesina magnusiana.***

In ***Milesina dieteliana*** after '*Polypodium* x *mantoniae*' add *P. vulgare* s.l., WH p. 25. GB & Ir. The first three ferns are new British hosts (STR, Wales). And delete from '*grandis*' to and including 'WH p. 21. GB & Ir.'

Between ***Milesina dieteliana*** and ***Milesina scolopendrii*** add ***Milesina kriegeriana*** (Magnus) Magnus. 0, I. on *Abies alba, A. cephalonica, A. grandis, A. nordmanniana* and by inoculation *A. concolor* : II, III on *Dryopteris aemula, D. affinis* subspp. *affinis* and *borreri, D. carthusiana, D. dilatata, D. filix-mas.* WH p. 21. GB & Ir. The record on *D. aemula* is the first anywhere (STR, Wales).



To ***Miyagia pseudosphaeria*** add *Sonchus palustris* (Ireland, MM).

***Naohidemyces vaccinii*** alter to ***Naohidemyces vacciniorum***

***Phragmidium tuberculatum*** after *R. afzeliana* add (BMS foray, Yorks., 1986).

***Puccinia antirrhini*** add hosts *Antirrhinum glutinosum* cult. (Herb E), *A. molle* (STR, Wales).

***Puccinia arenariae*** move *Sagina* x *normaniana* to before *S. nodosa*

After *Puccinia arenariae* add ***Puccinia asparagi*** DC. 0, I : II, III on *Asparagus officinalis.* WH p. 219, GB (Rare, perhaps extinct in Scotland).

***Puccinia brachypodii*** var. ***poae-nemoralis*** add new British hosts *Poa angustifolia, P. compressa* (Dennis, 1988),

***Puccinia caricina*** s.l. add *C. diandra* (Dennis, 1983), and add: imported *C. fragellifera.*

***Puccinia cnici-oleracei*** add new host *Achillea ptarmica* (STR, Wales).

***Puccinia coronata*** change *Agropyron repens* to *Elytrigia repens* and replace second *Avena fatua* with *A. sativa.*

***Puccinia dioicae*** s.l. after *C. disticha* add *C. montana* (Dennis, 1988) and after the British Isles 'as is that on *C. montana*'

***Puccinia eutremae*** add 'and England'

***Puccinia*** var. ***graminis*** add hosts *Avena fatua, A. strigosa.*

***Puccinia graminis*** s.l. add host *Festuca arundinacea*

***Puccinia hordei*** add hosts *Bromus racemosus* and *Trisetum flavescens* (Gj, p. 67).

***Puccinia opizii*** add host *Carex divulsa* (Dennis, 1988).

***Puccinia oxalidis*** add after TFP in Wales, 'as are *O. corymbosa* and *O. latifolia*'

***Pucciniastrum epilobii*** add new host, *Clarkia* (= *Godetia*) *amoena* cv. Summer Paradise (STR, Wales).

***Trachyspora intrusa*** add, after *A. vestita*, 'a new host' (BMS foray, Appleby, 1986)

***Tranzschelia anemones*** add new host *Anemone blanda* (Bramley, 1985).

***Uredinopsis filicina*** add, after Scotland, 'and Herts., England' (Dennis, 1995).

***Uredo morvernensis*** add after Galway 'and Wales' (STR)

***Uromyces geranii*** add new hosts 'cultivated *G. albiflorum* and *G. endressii*'.

***Uromyces junci*** add new host *Juncus articulatus*, Surrey (Dennis, 1995).

***Uromyces muscari*** after *H. non-scripta* x *hispanica* add 'a new host'.

***Uromyces pisi-sativi*** add new hosts *Genista pilosa* (STR, Wales) and, before *Lathyrus pratensis, Lathyrus palustris.*

***Uromyces rumicis*** after *R. maritimus*, add *R. obtusifolius.*

***Uromyces salicorniae*** add new host, *S. dolichostachya* (STR, Wales).

Below ***Uromyces trifolii*** add ***Uromyces trifolii-repentis*** Liro 0, I : II, III on *Trifolium hybridum, T. repens* WH p. 337. GB. & Ir.

To **References** add Dennis, R.W.G. (1988). Some overlooked Fungi on British Cyperaceae. Trans. Bot. Soc. Edinb. **45**(3) : 213-217.

To **Index** add

| | |
|---|---|
| *Bromus* | Puccinia hordei |
| *Clarkia* | Pucciniastrum epilobii |
| *Petromarula* | Coleosporium tussilaginis |
| *Scorzonera* | Puccinia hieracii |
| To *Trifolium* | add Uromyces trifolii-repentis |
| To *Trisetum* | add Puccinia hordei |