

A CHECKLIST OF BRYOPHYTE SPECIES RECORDED IN PEMBROKESHIRE

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ABSTRACT

A checklist of the bryophyte species recorded in Pembrokeshire during the past 100 years has been compiled, together with a brief account of the bryological importance of the major habitats in the county. Altogether a total of 481 species have been recorded including 356 mosses and 125 liverworts. Within the UK, 3 species are considered to be nationally rare and 53 nationally scarce. Four species are listed in the British Red Data Book, 10 are listed in the European Red Data Book and 10 are classed as "key" species for biodiversity in the UK. Within a European context, 2 species, *Drepanocladus vermicosus* and *Petalophyllum ralfsii*, are considered to be particularly endangered, both of which are now protected under European law. The flora also includes 1 species (*Fissidens celticus*) endemic to Britain and 16 species endemic to Europe. The bryophyte records for each of the thirty-one 10 km² in Pembrokeshire are also included, and show that there is a need for further recording in some of these squares, particularly SN11 which includes the area around Narberth. Presently, there are no official Pembrokeshire records for SN22, but most of it lies within Carmarthenshire, and there is a shortage of records for SM71 (2) and SN04 (4). However, the bulk of the area of the latter two squares lies mainly offshore.

INTRODUCTION

Vice County 45 (Pembrokeshire) is largely rural in character with about 83% (132,121 ha) of its 159,000 ha devoted to agriculture. Much of this, about 61% (80,455 ha), is permanent grassland and arable land accounts for a further 27% (36,001 ha) (Dyfed County Planning Department, 1989; Welsh Office, 1995). According to Brown (1960), much of the landform can be classified as coastal plain, with a small area of hills, but no mountains. However, this belies its geological complexity which spans much of the early and middle eras of geological time and includes Pre-Cambrian, Cambrian, Devonian, Carboniferous, Ordovician and Silurian rock formations. The county forms the most westerly extremity of Wales with a climate described as hyperoceanic (Bendelow & Hartnup, 1980). Pembrokeshire is, therefore, well-suited for many bryophytes of Atlantic distribution in Europe. It lies within the region described as the Southern Atlantic biogeographical zone (Ratcliffe, 1968) and, according to Ratcliffe's bryogeographical account of Atlantic species in Britain, bryophytes indicative of this zone in Pembrokeshire include *Cryphaea lamyana*, *Fissidens celticus*, *F. monguillonii*, *Orthotrichum rivulare*, *O. sprucei*, *Cololejeunea minutissima*, *Fossombronina angulosa*, *Jubula hutchinsiae*, *Marchesinia mackaii* and *Porella pinnata*.

MAJOR HABITATS AND THEIR IMPORTANCE FOR BRYOPHYTES

Despite extensive agriculture, Pembrokeshire still supports a wealth of natural and semi-natural habitats. The following provides a brief synopsis of the importance of these habitats for bryophytes. In each case reference is made to the major National Vegetation Classification (NVC) vegetation types (Rodwell, 1991, 1992, 1995).

Woodland

Unfortunately much of the county's former woodland has been lost. It is estimated that only about 8,359 ha of ancient and secondary woodland in stands exceeding 2 ha (ca 5.3% of the area) remain (Lister & Whitbread, 1988). Nevertheless, several of the remaining woodlands, including Tycanol Wood (National Nature Reserve) and Pencelly Forest (National Nature Reserve), represent outstanding examples of western oceanic woodlands. Their high humidity and narrow temperature fluctuation provide ideal conditions for many bryophytes (Hodgetts, 1993). Particularly rich in bryophytes are the Atlantic oak woodland communities described as *Quercus petraea* – *Betula pubescens* – *Dicranum majus* (W17) and *Quercus petraea* – *Betula pubescens* – *Oxalis acetosella* (W11) communities in the National Vegetation Classification (Rodwell, 1991a), both of which are well represented in Pembrokeshire (Cook & Saunders, 1989). Oceanic ground species include *Bazzania trilobata*, *Fissidens celticus*, *Plagiochila spinulosa*, *Saccogyna viticulosa* and *Scapania gracilis*. This is also the habitat of the nationally scarce *Leucobryum juniperoideum*. However, most of the less common Atlantic woodland species tend to occur either on trees (e.g. *Frullania fragilifolia*) and/or on rocky substratum (e.g. *Dicranum scottianum*, *Plagiochila punctata*).

Woodlands on more base-rich soils over Carboniferous Limestone in the south of the county are mainly composed of the *Fraxinus excelsior* – *Acer campestre* – *Mercurialis perennis* (W8) woodland community. Trevallen Wood on the Stackpole National Nature Reserve is a good example (Cook & Saunders, 1989). These provide for a number of shade-loving calcicoles including, *Cirriphyllum piliferum*, *Euryhynchium striatum*, *Euryhynchium swartzii* and *Plagiomnium affine*. Woodland clothing the often exposed seacliff slopes, such as Pennar Cants and Lawrenny Wood, represent some of the most westerly woodland in the UK. They vary according to degree of exposure, but they are usually composed of stunted oaks with a ground flora often dominated by *Luzula sylvatica*. The majority appear to be dominated by the *Quercus robur* – *Pteridium aquilinum* – *Rubus fruticosus* (W10) woodland community (Cook & Saunders, 1989). These woodlands are often rich in bryophytes including a number of species, such as *Bartramia pomiformis* and *Hookeria lucens*, that are not common in Pembrokeshire.

Coastal Cliffs

Much of the coastline occurs within the Pembrokeshire Coast National Park and includes a range of coastal habitats, with some of best developed hard rock seacliffs in Britain. However, only a few species, including *Schistidium maritimum*, *Tortella flavovirens* and *Ceratodon purpureus*, are capable of tolerating truly maritime conditions, but the more sheltered areas provide habitat for a variety of species. Most of the seacliffs in the northern part of the county, including Strumble Head and St David's Head, are composed of acidic igneous rocks and provide important habitat for uncommon species such as *Glyphomitrium daviesii*. The vegetation along the coastal strip at Strumble Head is composed mainly of *Festuca rubra* – *Armeria maritima* (MC8) maritime grassland (Cooper, 1988a), but various other maritime cliff communities have been recorded (Prosser & Wallace, 1996), the most exposed of which is the *Critmum maritimum* – *Spergularia rupicola* (MC1) rock crevice community. This community is exposed to large amounts of salt-spray and so the bryophyte component is normally composed only of the salt tolerant *T. flavovirens* and *C. purpureus*. A greater diversity of bryophytes can be found in the adjacent maritime grasslands including *Calyptogeia muelleriana*, *Cephaloziella hampeana*, *Frullania tamarisci*, *Calliargon giganteum*, *Hypnum jutlandicum* and *Mnium hornum*.

In contrast to the northern coast, large stretches of the sea cliffs on the southern coast are composed of Carboniferous Limestone. Around the Stackpole area, the *Festuca rubra* – *Plantago* spp (MC10) community and *Festuca rubra* – *Daucus carota* (MC11) community represent the most important cliff-top vegetation types (Cooper, 1988b). Common cliff-top bryophytes include *Trichostomum brachydontium*, *Hypnum cupressiforme* and *Rhytidiadelphus squarrosus*. These limestone cliff-tops also provide habitat for the uncommon coastal species *Pottia bryoides*, whilst the adjacent calcareous grasslands and rocky outcrops support a variety of calcicoles including

Ctenidium molluscum, *Encalypta streptocarpa* and *Tortella tortuosa*, and provide useful indicators of such conditions. Uncommon species include *Bryum torquescens* and *Gymnostomum calcareum*.

Sand Dunes

Pembrokeshire includes a number of outstanding sand dune systems such as Broomhill, Brownslade and Linney burrows, and Stackpole Warren. Dargie (1995) lists eleven dune systems for Pembrokeshire with a total area of about 818 ha. These sand dunes support a rich assemblage of bryophytes including a number of ecologically important, xerophytic, sand-binding species such as *Tortula ruralis* ssp. *ruraliformis* (Birse *et al.*, 1957) which, together with *Hypnum cupressiforme* is a major component of the *Ammophila arenaria* – *Festuca rubra* (SD7) semi-fixed dune community. It is also commonly associated with the *Festuca rubra* – *Galium verum* (SD8) fixed dune community. Uncommon species of these dry sandy areas include *Pleurochaete squarrosa*, *Barbula acuta*, *Bryum pallascens*, *B. canariense* and *Tortella inclinata*. However, by far the most bryologically rich areas of sand dunes are dune slacks, which, unfortunately, are not well represented in Pembrokeshire. According to Dargie (1995) the total area of dune slack in the county is less than 3ha (ca 2.4ha), most of which is concentrated at Broomhill, Kilpaison and Brownslade burrows. Furthermore, apart from tiny areas of the *Salix repens* – *Campylium stellatum* (SD14) dune slack community at Whitesands Bay and small areas of *Salix repens* – *Calliargon cuspidatum* (SD15) dune slack community at Stackpole Warren and Broomhill Burrows, the bryologically rich dune slack communities are absent. Most of the slacks have been classified as either *Salix repens* – *Holcus lanatus* (SD16) slack or *Potentilla anserina* – *Carex nigra* (SD17) slack. Nevertheless, the conservation importance of Pembrokeshire's dune slacks belies their size since they provide habitat for the internationally rare liverwort *Petalophyllum ralfsii* and other uncommon dune slack species including *Brachybecium mildeanum*, *Bryum dunense*, *Campylium polygamum*, *Drepanocladus lycopodioides* and *Drepanocladus sendtneri*, but so far none of the rarer (Red Data Book) dune slack *Bryum* spp have been recorded. For further details of sand dune NVC communities see Rodwell (in-press).

Saltmarsh

Saltmarsh is a comparatively rare habitat in Pembrokeshire. The total area is about 396 ha with most of it restricted to Milford Haven and the Eastern and Western Cleddau river systems (Burd, 1989). The *Spartina anglica* (SM6) saltmarsh community represents by far the most important saltmarsh vegetation type, occupying about 198 ha. Other common communities include the *Puccinellia maritima* (SM13) and the *Festuca rubra* (SM16) saltmarsh communities, and there are large stands of the *Phragmites australis* (S4) upper marsh swamp community (Burd, 1989; Rhind, 1995). For details of the NVC communities see Rodwell (in press) and Rodwell (1995).

Only one bryophyte, *Pottia heimii*, recorded on saline mud at West Williamston, is known to be truly halophytic, but other species such as *Eurhynchium praelongum* and *Amblystegium serpens* commonly occur in the upper saltmarsh transition zones. In fact, Adam (1976) recorded 63 bryophyte species on British saltmarshes and found that the richest saltmarsh bryophyte assemblages occurred on the west coast of Britain. In Milford Haven he recorded up to five species on some of the saltmarshes, but with the exception of *P. heimii*, sporophytes were rarely observed in saltmarsh bryophytes and this precluded the specific identification of a number of *Bryum* specimens.

Coastal Heathlands

In addition to the large areas of heathland in the Preseli Mountains, there are also extensive stands of both dry and wet heath on the coastal plain. The *Calluna vulgaris* – *Ulex gallii* dry heath (H8) and the two wet heath communities, *Scirpus cespitosus* – *Erica tetralix* (M15) and *Erica tetralix* – *Sphagnum compactum* (M16) form major components, but in addition there are also important stands of the *Calluna vulgaris* – *Scilla verna* (H7) coastal heath (Cooper, 1988a; Blackstock, *et al.*, 1988; Prosser & Wallace, 1996, 1997), especially on Ramsey Island and in the area around St David's Head. In the

most maritime zones, only one or two salt-tolerant bryophytes can be found but in more sheltered areas species such as *Campylopus introflexus*, *Campylopus paradoxus*, *Dicranum scoparium*, *Polytrichum juniperinum*, *Polytrichum piliferum* and *Scapania compactum* are among the more frequent species.

Aquatic Habitats

Truly aquatic bryophytes tolerant of prolonged submergence in rivers and streams are comparatively few in number. Fast-flowing mountain streams with rocky beds and boulders tend to be the richest aquatic habitats for bryophytes. Watson (1919) divided these into four main community types:

1. A constantly submerged, stream bed community, which commonly included *Cinclidotus fontinaloides*, *Racomitrium aciculare*, *Fontinalis antipyretica* and *Hyocomium armoricum* depending on the acidity of the water.
2. A frequently submerged and constantly moist (through splashes or spray) community which commonly included *Conocephalum conicum*, *Lunularia cruciata*, *Bryum pseudotriquetrum* and *Schistidium apocarpum*.
3. An occasionally submerged and often wet community which commonly included *Thuidium tamariscinum*, *Dicranella heteromalla*, *Amblystegium serpens* and *Lophocolea bidentata*.
4. A community of plants growing in or near waterfalls, which commonly included *Pellia epiphylla*, *Blindia acuta*, *Brachythecium rivulare* and *Hygrohypnum ochraceum*.

However, these aquatic communities include a number of other species and many of them are common to all four community types.

Less common aquatic and semi-aquatic species recorded in Pembrokeshire include the nationally scarce *Octodicerus fontanum* recorded on a submerged concrete embankment of the Western Cleddau (Hill, 1984) and the nationally rare *Cryphaea lamyana* found on tree boles in the flood plain of the Afon Teifi (Orange, 1993). The county also includes a number of rare semi-aquatic species of *Fissidens*, including *F. celticus*, *F. limbatus*, *F. monguillonii* and *F. rufulus*. In fact, there is a wide range of species that grow on banks and rocks close to rivers and streams. *Jubula butchinsiae*, for example, is one of the less common liverworts that occupies this niche. Lakes and ponds provide habitat for another group of specialist species. A free-floating existence sometimes displayed by *Riccia fluitans* in eutrophic ponds is unusual. Most of these semi-aquatic species tend to occupy the marginal zones. *Drepanocladus* species, including *D. aduncus*, *D. exannulatus*, *D. fluitans* and *D. revolvens* are typical of a range of wet habitats, including dune slacks, fens, mire pools and mountain flushes.

Uplands

Mynydd Preseli and Carningli Common are the only upland areas of any size in the county with much of the area lying within the Pembrokeshire Coast National Park. The vegetation was described by Burn (1984) and recently interpreted in terms of NVC by Marcus Yeo of the Countryside Council for Wales. The area has recently received international recognition as a proposed Special Area of Conservation under the EC Habitats and Species Directive. It is particularly important for its oceanic dry heaths which are composed mainly of *Calluna vulgaris* – *Ulex gallii* (H8) heath (ca 555 ha), *Calluna vulgaris* – *Vaccinium myrtillus* (H12) heath (ca 602 ha), and *Vaccinium myrtillus* – *Descampsia flexuosa* (H18) heath (ca 345 ha). These provide habitat for a large variety of calcifugous bryophytes including *Rhytidiadelphus loreus*, *Hylocomium splendens* and *Ptilidium ciliare*. There are also large areas of wet heath (ca 585 ha) including both *Scirpus cespitosus* – *Erica tetralix* (M15) wet heath and *Erica tetralix* – *Sphagnum compactum* (M16) wet heath which provide ideal conditions for many *Sphagnum* species (for details of the NVC communities see Rodwell, 1991b)

Areas of impeded drainage also include several important mire communities. Particularly important amongst these are the *Carex echinata* – *Sphagnum recurvum/auriculatum* mire (M6) and

Narthecium ossifragum – *Sphagnum papillosum* mire (M21) with areas of approximately 240ha and 77ha, respectively. Common bryophyte species include *Aulacomnium palustre*, *Sphagnum subnitens*, *S. tenellum*, *S. papillosum*, *S. subsecundum*, *Breutelia chrysocoma*, *Campylopus atrovirens* and *Scorpidium scorpioides*. Closely allied to the mires are many flushes in the area, and some of the less acidic of these providing habitat for the internationally endangered *Drepanocladus vernicosus*. Other more common flush species include *Cratoneuron commutatum*, *Drepanocladus exannulatus* and *Philonotis fontana*.

Finally, the upland areas also include large stands of acid grassland which tend to be dominated by mat grass (*Nardus stricta*). The most common vegetation type is the *Nardus stricta* – *Galium saxatile* (U5) grassland community with approximately 358ha. The remainder is composed mainly of *Festuca ovina* – *Agrostis capillaris* – *Galium saxatile* (U4) grassland (ca 159ha) and *Juncus squarrosus* – *Festuca ovina* (U6) grassland (ca 40ha). Typical bryophytes include *Pleurozium schreberi*, *Rhytidiadelphus loreus* and *Campylopus flexuosus*. For details of heathland and grassland NVC communities see Rodwell (1991b and 1992).

The Pembrokeshire Islands

Apart from the study by Gillham (1954) on Skokholm, no detailed studies of bryophytes on the Pembrokeshire islands have been carried out. Gillham recorded 100 taxa (67 mosses and 33 liverworts) on Skokholm, including the nationally scarce *Campylium polygamum*, *Cololejeunea minutissima*, *Fossombronia angulosa*, *Fumaria obtusa* and *Pottia crinita*. For an island of just 98ha this appears to be a surprisingly rich bryophyte flora. On the other hand, Blackstock *et al.* (1994) recorded 197 bryophytes on Bardsey island in North Wales, but this island is nearly twice the size (179ha) of Skokholm. According to Rhind & Blackstock (1997), Bardsey supports 17 major habitats as opposed to 10 on Skokholm, but the number of micro-habitats providing additional niches for bryophytes will be considerably more numerous in both cases. Gillham found that bryophytes were virtually absent from the west and south west coastal regions of Skokholm which became drenched with sea spray during stormy weather. Only isolated plants of *Eurhynchium praelongum*, *Schistidium maritimum*, *Tortella flavovirens* and *Pottia crinita* could be found, all occurring in local shelter. In this connection, bryophytes were found to be exceptionally rare on the even more exposed island of Grassholm which lies approximately eight miles west of Skokholm. Here only small clumps of yellow and attenuated specimens of *E. praelongum*, *Dicranella heteromalla* and *Poblia* sp were recorded, and these were all in moist, sheltered, eastern depressions.

BRYOLOGICAL RECORDING IN PEMBROKESHIRE

The long list of species compiled here represents the culmination of 100 years of bryophyte recording in Pembrokeshire. Its history can be traced back to 1898 when a list containing 51 species was published by H. N. Dixon in the *Journal of Botany* (Dixon, 1898). Dixon, who later became the author of *The Student's Handbook of British Mosses*, was just the first of many distinguished bryologists that have contributed to the Pembrokeshire bryophyte flora. Other well known bryologists include E. V. Watson author of *British Mosses and Liverworts* and Francis Rose, author of numerous publications on bryophytes, lichens and vascular plants including *The vegetation and flora of Tycanol Wood* (Rose, 1975). D. H. Dalby is another well-known bryologist to have spent time actively recording bryophytes in Pembrokeshire. He ran regular courses at Dale Fort Field Centre in the 1960s and is responsible for many of the records listed for the Dale area of Pembrokeshire (see Dalby, 1965). Many of the records of rarer species are the results of visits by prominent members of the British Bryological Society (BBS) including A. R. Perry the current President and former recorder for vice county 45, M. E. Newton, General Secretary, R. C. Stern, Conservation Officer, and various past and present referees including T. H. Blackstock, T. L. Blockeel, M. F. V. Corley, A. C. Crundwell, M. O. Hill, J. A. Paton and M. Yeo. Furthermore, many Pembrokeshire records can be

traced to either the 1958 or the 1980 annual BBS field meetings held in Pembrokeshire (Swinscow, 1959; Perry, 1979, 1981). The 1958 meeting concentrated on Great Treffgarne Mountain, wooded valleys of the Western Cleddau near Solva and Walwyn's Castle, Trewellwell and Little Treffgarne woods, the coasts of Whitesands Bay, Saundersfoot, Newgale Sands and St Goven's Head, the slopes of Mynydd Preseli and Cwm Gwaun, and Broomhill Burrows. Of major interest was the discovery of a species of *Fissidens* in Little Treffgarne Wood which was initially thought to be *F. flexinervis*, which would have been a new record for Britain, but it later transpired that this was a new species apparently endemic to Britain, which was subsequently given the name *F. celticus* (Paton, 1965). Many of the localities visited in 1958 were re-visited by the 1980 group. They also managed to visit various other sites including Strumble Head, Dowrog and Ambleston commons, Merry Vale, the Marloes Peninsula, Neyland, Abereiddy Bay, Brynberian Moor, the Afon Cych, Minwear and Lawrenny woods, West Williamston, Lydstep Point and Pembroke Castle.

More recently, M. E. Newton has done much recording in Pembrokeshire as a result of running bryophyte courses for the Field Studies Council at Orielton Field Centre. Finally, now that the vice county recorder for bryophytes, and author of this paper, is no longer resident in Pembrokeshire, the present most active resident recorder is Mrs Jean Hambly.

ARRANGEMENT OF THE CHECKLIST

The taxonomic nomenclature is based on Hill, *et al.* (1991, 1992, 1994) and, although species are listed in alphabetical order, the mosses and liverworts are listed separately. Adjacent to each species are the ten kilometre squares in which that species has been recorded. These records represent a summary of data held at the Biological Records Centre, Huntingdon, together with more recent records.

Altogether, 481 species have been recorded comprising 356 mosses and 125 liverworts, and 67 of these are considered to be rare or scarce (Table 1). Of these, 53 are deemed to be nationally scarce (i.e. restricted to between sixteen and one hundred 10km squares in the UK), 3 are deemed to be nationally rare (i.e. restricted to a maximum of fifteen 10km squares or fewer) and protected under Schedule 8 of the Wildlife and Countryside Act, 4 species represent British Red Data Book species, 10 species represent European Red Data Book species, and 10 species are designated "key" species for biodiversity in the UK (HMSO, 1995a, 1995b). In a European context, two species, *Drepanocladus vernicosus* and *Petalophyllum ralfsii*, are considered to be particularly endangered and these are now protected under Annex 11 of the EC. Habitats and Species Directive. These two species are also listed under Appendix I of the Bern Convention. In addition, 17 species (Table 2) are considered to be endemic to Europe.

To date, the greatest number of species (251) have been recorded in square SN03 which includes part of the Preseli Mountains, Carningli Common and Cwm Gwaun, whereas at the other end of the scale, there are currently no official Pembrokeshire bryophyte records for square SN22. However, most of this square lies within Carmarthenshire. Other under recorded squares include SN11 (1 record) which is also shared with Carmarthenshire, but in this case the bulk of the area lies in Pembrokeshire, and includes the region around Narberth. Two other under recorded squares include SM71 (2 records), which mainly lies in St Brides Bay, but includes The Nab Head and the village of St Brides, and SN04 (4 records), which mainly lies in Cardigan Bay but includes Dinas Head and a small area north of Nevern.

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TABLE 1. Rare and scarce bryophytes recorded for Pembrokeshire

NS = Nationally scarce species;

S8 = Species protected under Schedule 8 of the Wildlife and Countryside Act.

RDB = Red data Book species (RDB/E = European List, RDB/B = British List);

KS = Key species in Biodiversity: the UK Steering Group Report.

BC = Species protected under the Bern Convention,

EC = Listed under Annex II of the EC Habitats and Species Directive

Bryophyte	NS	S8	RDB/B	RDB/E	KS	BC	EC
<i>Andreaea megistospora</i>	•			•			
<i>Barbula acuta</i>	•						
<i>Brachythecium mildeanum</i>	•						
<i>Bryum canariense</i>	•						
<i>Bryum donianum</i>	•						
<i>Bryum dunense</i>	•						
<i>Bryum intermedium</i>	•						
<i>Bryum pallescens</i>	•						
<i>Bryum torquescens</i>	•						
<i>Calypogeia azurea</i>	•						
<i>Campylium polygamum</i>	•						
<i>Campylopus polytrichoides</i>	•						
<i>Campylopus subulatus</i>	•						
<i>Cephalozia macrostachya</i>	•						
<i>Cephaloziella elachista</i>	•						
<i>Cephaloziella stellulifera</i>	•						
<i>Cephaloziella turneri</i>			•				
<i>Cololejeunea minutissima</i>	•						
<i>Coscinodon cribrosus</i>	•						
<i>Cryphaea lamyana</i>		•	•	•	•		
<i>Cryptothallus mirabilis</i>	•						
<i>Desmatodon convolutus</i>	•						
<i>Drepanocladus lycopodioides</i>	•			•			
<i>Drepanocladus sendtneri</i>	•			•			
<i>Drepanocladus vernicosus</i>		•			•	•	•
<i>Fissidens algarvicus</i>				•			
<i>Fissidens celticus</i>					•		
<i>Fissidens limbatus</i>	•						
<i>Fissidens monguillonii</i>				•			
<i>Fissidens rufulus</i>	•						
<i>Fossombronia angulosa</i>	•						
<i>Fossombronia caespitifformis</i>	•						
<i>Fossombronia busnotii</i>	•						
<i>Funaria mublenbergii</i>	•						
<i>Glyphomitrium daviesii</i>				•	•		
<i>Gymnomitrium crenulatum</i>					•		
<i>Gymnostomum calcareum</i>	•						
<i>Jubula hutchinsiae</i>	•						
<i>Kurzia sylvatica</i>	•						
<i>Lejeunea lamacerina</i>					•		
<i>Leucobryum juniperoidesum</i>	•						
<i>Nardia geoscyphus</i>	•						
<i>Octodiceras fontanum</i>	•						
<i>Orthotrichum sprucei</i>				•	•		
<i>Petalophyllum ralfsii</i>		•	•	•	•	•	•
<i>Philonotis arnellii</i>	•						

<i>Philonotis caespitosa</i>	•		
<i>Plagiochila killarniensis</i>			•
<i>Plagiochila punctata</i>			•
<i>Plagiochila spinulosa</i>			•
<i>Pleurochaete squarrosa</i>	•		
<i>Porella obtusata</i>	•		
<i>Porella pinnata</i>	•		
<i>Pottia bryoides</i>	•		
<i>Pottia crinita</i>	•		
<i>Pottia starkeana</i>	•		
<i>Racomitrium affine</i>	•		
<i>Racomitrium elongatum</i>	•		
<i>Riccia beyrichiana</i>	•		
<i>Riccia cavernosa</i>	•		
<i>Riccia subbifurca</i>	•		
<i>Schistostega pennata</i>	•		
<i>Sphagnum platyphyllum</i>	•		
<i>Sphagnum pulchrum</i>	•		
<i>Sphagnum subsecundum</i>	•		
<i>Thuidium abietinum</i>	•		
<i>Tortula cuneifolia</i>		•	
<i>Weissia perssonii</i>	•		•

TABLE 2. Bryophytes considered endemic to Europe recorded from Pembrokeshire

<i>Bryum gemmiferum</i>	<i>Glyphomitrium daviesii</i>	<i>Plagiochila killarniensis</i>
<i>Campylopus brevipilus</i>	<i>Gymnomitrium crenulatum</i>	<i>Plagiochila punctata</i>
<i>Fissidens celticus</i>	<i>Jubula hutchinsiae</i>	<i>Plagiochila spinulosa</i>
<i>Frullania fragilifolia</i>	<i>Kurzia trichoclados</i>	<i>Ptychomitrium polyphyllum</i>
<i>Frullania microphylla</i>	<i>Marchesinia mackaii</i>	<i>Saccogyna viticulosa</i>
<i>Frullania teneriffae</i>	<i>Orthotrichum sprucei</i>	

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	SM 70	SM 71	SM 72	SM 73	SM 80	SM 81	SM 82	SM 83	SM 84	SM 90	SM 91	SM 92	SM 93	SM 94	SN 00
MOSSES contd.															
<i>Bryum dunense</i>	P		P		P										
<i>Bryum erythrocarpum</i> complex															
<i>Bryum gemmiferum</i>	P														
<i>Bryum inclinatum</i>					P										
<i>Bryum intermedium</i>			P												
<i>Bryum klinggraeffii</i>												P			
<i>Bryum microerythrocarpum</i>			P					P		P		P	P		
<i>Bryum pallens</i>	P		P			P	P								P
<i>Bryum pallescens</i>															
<i>Bryum pseudotriquetrum</i>	P		P		P	P			P		P		P	P	P
<i>Bryum rubens</i>	P		P		P			P	P			P		P	
<i>Bryum radiculosum</i>										P	P	P			P
<i>Bryum ruderale</i>					P										P
<i>Bryum sauteri</i>			P										P		
<i>Bryum torquescens</i>															P
<i>Calliergon cordifolium</i>			P		P							P	P		
<i>Calliergon cuspidatum</i>	P		P		P	P	P	P	P	P	P	P	P	P	P
<i>Calliergon giganteum</i>			P				P								
<i>Calliergon sarmentosum</i>															
<i>Calliergon stramineum</i>			P		P										
<i>Campylium cbrysophyllum</i>	P		P												P
<i>Campylium polygamum</i>	P		P												
<i>Campylium stellatum</i>	P		P		P	P		P				P	P		
<i>Campylopus atrovirens</i>			P												
<i>Campylopus brevipilus</i>			P				P								
<i>Campylopus fragilis</i>	P		P		P		P	P				P	P	P	
<i>Campylopus introflexus</i>	P		P			P	P		P	P		P	P	P	P
<i>Campylopus paradoxus</i>	P		P			P			P	P		P	P		
<i>Campylopus polytrichoides</i>							P								
<i>Campylopus pyriformis</i>						P	P					P	P		P
<i>Campylopus schwarzii</i>			P												
<i>Campylopus subulatus</i>															
<i>Ceratodon purpureus</i>	P		P	P	P	P	P	P	P	P	P	P	P	P	P
<i>Cinclidotus fontinaloides</i>			P		P							P	P		
<i>Cinclidotus mucronatus</i>					P										
<i>Cirriphyllum crassinervium</i>						P									P
<i>Cirriphyllum piliferum</i>	P		P							P	P	P	P		P
<i>Climacium dendroides</i>												P			
<i>Coscinodon cribrosus</i>															
<i>Cratoneuron commutatum</i>			P						P						
<i>Cratoneuron filicinum</i>	P		P		P	P	P	P	P			P	P		P
<i>Cryphaea heteromalla</i>			P		P	P	P	P			P	P	P		P
<i>Cryphaea lamyana</i>															
<i>Ctenidium molluscum</i>			P		P	P		P	P			P	P		P
<i>Cynodontium bruntonii</i>												P			
<i>Desmatodon convolutus</i>			P												
<i>Dichodontium pellucidum</i>											P				
<i>Dicranella heteromalla</i>	P		P		P	P	P	P	P	P	P	P	P	P	P
<i>Dicranella palustris</i>															
<i>Dicranella rufescens</i>						P						P			
<i>Dicranella schreberana</i>					P							P			P
<i>Dicranella staphylina</i>								P				P			
<i>Dicranella varia</i>								P							P
<i>Dicranodontium denudatum</i>															
<i>Dicranoweisia cirrata</i>			P					P		P		P	P		

MOSSES contd.	SN 01	SN 02	SN 03	SN 04	SN 10	SN 11	SN 12	SN 13	SN 14	SN 22	SN 23	SN 24	SR 89	SR 99	SS 09	SS 19
<i>Bryum dunense</i>														P		P
<i>Bryum erythrocarpum</i> complex																
<i>Bryum gemmiferum</i>													P			
<i>Bryum inclinatum</i>															P	
<i>Bryum intermedium</i>																
<i>Bryum klinggraeffii</i>																
<i>Bryum microerythrocarpum</i>																
<i>Bryum pallens</i>							P	P						P	P	P
<i>Bryum pallescens</i>															P	
<i>Bryum pseudotriquetrum</i>		P					P	P	P		P			P	P	P
<i>Bryum rubens</i>									P							P
<i>Bryum radiculosum</i>																
<i>Bryum ruderale</i>									P				P			
<i>Bryum sauteri</i>																
<i>Bryum torquescens</i>																
<i>Calliergon cordifolium</i>				P											P	
<i>Calliergon cuspidatum</i>	P	P	P		P		P	P	P		P	P	P	P	P	P
<i>Calliergon giganteum</i>																
<i>Calliergon sarmmentosum</i>		P	P						P							
<i>Calliergon stramineum</i>		P	P				P	P								
<i>Campylium chrysophyllum</i>														P	P	P
<i>Campylium polygamum</i>													P			
<i>Campylium stellatum</i>		P	P				P	P					P	P		P
<i>Campylopus atrovirens</i>			P				P	P								
<i>Campylopus brevipilus</i>									P							
<i>Campylopus fragilis</i>				P												
<i>Campylopus introflexus</i>		P	P				P	P						P	P	
<i>Campylopus paradoxus</i>	P	P	P				P	P								
<i>Campylopus polytrichoides</i>									P							
<i>Campylopus pyriformis</i>	P	P	P				P	P								P
<i>Campylopus schwarzii</i>																
<i>Campylopus subulatus</i>		P														
<i>Ceratodon purpureus</i>	P	P	P				P	P	P		P	P	P	P	P	P
<i>Cinclidotus fontinaloides</i>			P					P	P				P			
<i>Cinclidotus mucronatus</i>																
<i>Cirriphyllum crassinervium</i>			P		P										P	P
<i>Cirriphyllum piliferum</i>		P	P		P		P	P			P				P	
<i>Climacium dendroides</i>			P				P						P	P		
<i>Coscinodon cribrosus</i>									P							
<i>Cratoneuron commutatum</i>	P		P					P			P					
<i>Cratoneuron filicinum</i>	P	P	P					P	P		P			P	P	P
<i>Cryphaea heteromalla</i>	P		P					P			P	P		P	P	
<i>Cryphaea lamyana</i>												P				
<i>Ctenidium molluscum</i>	P		P		P			P			P			P	P	P
<i>Cynodontium bruntonii</i>			P													
<i>Desmatodon convolutus</i>															P	
<i>Dichodontium pellucidum</i>			P						P				P			
<i>Dicranella heteromalla</i>	P	P	P				P	P	P		P				P	
<i>Dicranella palustris</i>			P					P								
<i>Dicranella rufescens</i>								P								
<i>Dicranella schreberana</i>																
<i>Dicranella staphylina</i>													P		P	P
<i>Dicranella varia</i>	P		P					P					P		P	P
<i>Dicranodontium denudatum</i>			P													
<i>Dicranoweisia cirrata</i>	P	P	P		P			P	P							

	SM 70	SM 71	SM 72	SM 73	SM 80	SM 81	SM 82	SM 83	SM 84	SM 90	SM 91	SM 92	SM 93	SM 94	SM 94	SN 00
MOSES contd.																
<i>Dicranum bonjeanii</i>						p						p	p			
<i>Dicranum fuscescens</i>												p				
<i>Dicranum majus</i>										p	p	p	p			p
<i>Dicranum scoparium</i>			p		p	p		p	p	p	p	p	p	p	p	p
<i>Dicranum scottianum</i>													p			
<i>Diphyscium foliosum</i>			p													
<i>Ditrichum cylindricum</i>								p				p				
<i>Ditrichum heteromallum</i>																
<i>Ditrichum flexicaule</i>																p
<i>Drepanocladus aduncus</i>	p		p													
<i>Drepanocladus exannulatus</i>	p											p				
<i>Drepanocladus fluitans</i>	p		p			p				p						
<i>Drepanocladus lycopodioides</i>			p													
<i>Drepanocladus revolvens</i>	p		p			p	p		p			p				
<i>Drepanocladus sendtneri</i>			p													
<i>Drepanocladus vernicosus</i>																
<i>Encalypta streptocarpa</i>																
<i>Encalypta vulgaris</i>																
<i>Entodon concinnus (?)</i>	p															
<i>Ephemerum serratum</i>	p		p						p							
<i>Epipterygium tozeri</i>	p		p		p	p			p	p	p					
<i>Eucladium verticillatum</i>			p								p					
<i>Eurhynchium praelongum</i>	p		p	p	p	p	p	p	p	p	p	p	p	p	p	p
<i>Eurhynchium speciosum</i>			p					p	p	p	p	p				
<i>Eurhynchium pumilum</i>	p		p		p		p			p	p	p		p	p	
<i>Eurhynchium striatum</i>			p		p	p	p			p	p	p	p		p	
<i>Eurhynchium swartzii</i>			p		p	p	p			p	p	p	p		p	
<i>Fissidens adiantboides</i>			p			p	p		p	p		p	p	p	p	
<i>Fissidens algarvicus</i>					p											
<i>Fissidens bryoides</i>	p		p	p	p	p	p	p	p	p	p	p	p	p	p	p
<i>Fissidens celticus</i>										p		p				
<i>Fissidens crassipes</i>												p				
<i>Fissidens cristatus</i>					p							p				p
<i>Fissidens curnovii</i>	p							p			p	p	p			
<i>Fissidens exilis</i>										p	p					
<i>Fissidens incurvus</i>			p		p					p						
<i>Fissidens limbatus</i>					p											
<i>Fissidens monguillonii</i>												p				
<i>Fissidens osmundoides</i>																
<i>Fissidens pusillus</i>																
<i>Fissidens rufulus</i>								p				p	p			
<i>Fissidens taxifolius</i>	p		p		p	p	p	p	p	p	p	p	p	p	p	p
<i>Fissidens viridulus</i>	p		p		p			p		p	p	p		p	p	
<i>Fontinalis antipyretica</i>	p		p								p	p	p			
<i>Fontinalis squamosa</i>	p										p	p	p			
<i>Funaria attenuata</i>			p					p	p		p				p	
<i>Funaria fascicularis</i>					p			p	p			p				
<i>Funaria hygrometrica</i>	p		p		p	p		p	p	p	p	p			p	
<i>Funaria mublenbergii</i>																
<i>Funaria obtusa</i>	p		p			p				p						
<i>Glyphomitrium daviesii (?)</i>			p													
<i>Grimmia donniana</i>																
<i>Grimmia bartmanii</i>																
<i>Grimmia pulvinata</i>	p		p		p		p			p						
<i>Grimmia trichophylla</i>	p		p				p	p		p		p	p	p		

	SM 70	SM 71	SM 72	SM 73	SM 80	SM 81	SM 82	SM 83	SM 84	SM 90	SM 91	SM 92	SM 93	SM 94	SN 00
MOSSES contd.															
<i>Gymnostomum aeruginosum</i>															
<i>Gymnostomum calcareum</i>												P			P
<i>Gymnostomum recurvirostrum</i> (?)				P											
<i>Gymnostomum viridulum</i>															P
<i>Gyroweisia tenuis</i>															
<i>Hedwigia ciliata</i>				P				P					P		
<i>Hedwigia stellata</i>				P											
<i>Heterocladium heteropterum</i>				P		P	P	P				P	P		
<i>Homalia trichomanoides</i>								P			P	P	P		P
<i>Homalothecium lutescens</i>															P
<i>Homalothecium sericeum</i>	P		P		P	P		P	P	P	P	P	P		P
<i>Hookeria lucens</i>	P		P		P	P		P	P	P	P	P	P	P	P
<i>Hygrohypnum luridum</i>				P									P		
<i>Hygrohypnum ochraceum</i>													P	P	
<i>Hylocomium brevirostre</i>															
<i>Hylocomium splendens</i>				P				P							P
<i>Hylocomium armoricum</i>													P	P	
<i>Hypnum cupressiforme</i>															
var <i>cupressiforme</i>	P		P	P	P	P	P	P	P	P	P	P	P	P	P
var <i>filiforme</i>			P		P		P	P	P	P	P	P	P		
var <i>laciniata</i>	P		P				P	P	P	P		P			P
var <i>resupinatum</i>	P		P	P	P	P	P	P	P	P	P	P	P	P	P
<i>Hypnum jutlandicum</i>	P		P			P		P	P	P	P	P	P	P	P
<i>Hypnum mammillatum</i>						P					P	P			P
<i>Isopyerygium elegans</i>	P		P		P	P		P		P	P	P	P		P
<i>Isopterygiopsis muelleriana</i>															
<i>Isothecium boltii</i>															
<i>Isothecium myosuroides</i>	P		P		P	P	P	P	P	P	P	P	P	P	P
<i>Isothecium myurum</i>			P			P				P	P		P		P
<i>Isothecium striatulum</i>															
<i>Leskea polycarpa</i>				P		P							P		
<i>Leptobryum pyriforme</i>	P		P		P					P		P			
<i>Leptodon smithii</i>					P										
<i>Leptodontium flexifolium</i>													P		
<i>Leucobryum glaucum</i>				P		P				P				P	P
<i>Leucobryum juniperoideum</i>														P	P
<i>Leucodon sciuroides</i>											P		P		
<i>Mnium hornum</i>	P		P	P	P	P	P	P	P	P	P	P	P	P	P
<i>Mnium stellare</i>											P				
<i>Neckera complanata</i>				P		P	P	P		P	P		P		P
<i>Neckera crispa</i>															
<i>Neckera pumila</i>				P		P				P	P	P	P		P
<i>Octodiceras fontanum</i>											P				
<i>Ortbodontium lineare</i>						P		P							
<i>Ortbotrichum affine</i>					P	P	P	P			P	P	P		P
<i>Ortbotrichum anomalum</i>						P				P		P			P
<i>Ortbotrichum cupulatum</i>										P		P			P
<i>Ortbotrichum diaphanum</i>	P		P		P		P	P		P			P		P
<i>Ortbotrichum lyellii</i>													P		
<i>Ortbotrichum pulchellum</i>			P			P	P	P		P		P	P		
<i>Ortbotrichum rivulare</i>												P	P		
<i>Ortbotrichum sprucei</i>															
<i>Ortbotrichum stramineum</i>															
<i>Ortbotrichum striatum</i>						P						P			

MOSES contd.	SN 01	SN 02	SN 03	SN 04	SN 10	SN 11	SN 12	SN 13	SN 14	SN 22	SN 23	SN 24	SR 89	SR 99	SS 09	SS 19
<i>Gymnostomum aeruginosum</i>							p									
<i>Gymnostomum calcareum</i>																
<i>Gymnostomum recurvirostrum</i> (?)																
<i>Gymnostomum viridulum</i>																
<i>Gyroweisia tenuis</i>	p															
<i>Hedwigia ciliata</i>			p	p				p				p				
<i>Hedwigia stellata</i>																
<i>Heterocladium heteropterum</i>	p	p	p					p	p							
<i>Homalia trichomanoides</i>	p	p	p					p	p			p			p	p
<i>Homalothecium lutescens</i>													p	p	p	p
<i>Homalothecium sericeum</i>	p	p	p			p	p				p	p	p	p	p	p
<i>Hookeria lucens</i>	p	p	p					p	p			p	p			
<i>Hygrohypnum luridum</i>									p							
<i>Hygrohypnum ochraceum</i>			p						p							
<i>Hylocomium brevirostre</i>			p									p				
<i>Hylocomium splendens</i>			p					p	p			p				
<i>Hylocomium armoricum</i>		p	p						p			p	p			
<i>Hypnum cupressiforme</i>																
var <i>cupressiforme</i>	p	p	p			p		p	p			p			p	
var <i>filiforme</i>	p		p						p			p				
var <i>laciniata</i>	p		p							p			p	p	p	p
var <i>resupinatum</i>	p	p	p			p		p	p				p	p	p	
<i>Hypnum jutlandicum</i>	p	p	p					p	p	p		p	p			
<i>Hypnum mammillatum</i>			p			p			p						p	
<i>Isopyrygium elegans</i>	p	p	p					p	p	p			p			
<i>Isopterygiopsis muelleriana</i>																
<i>Isothecium holtii</i>									p							
<i>Isothecium myosuroides</i>	p	p	p			p		p	p	p			p	p		
<i>Isothecium myurum</i>	p	p	p					p	p				p	p		
<i>Isothecium striatulum</i>						p										
<i>Leskea polycarpa</i>	p												p		p	
<i>Leptobryum pyriforme</i>																
<i>Leptodon smithii</i>	p															p
<i>Leptodontium flexifolium</i>				p												
<i>Leucobryum glaucum</i>	p	p	p					p	p				p			
<i>Leucobryum juniperoideum</i>			p						p							
<i>Leucodon sciuroides</i>	p								p							p
<i>Mnium hornum</i>	p	p	p			p		p	p	p			p	p		p
<i>Mnium stellare</i>	p					p			p							
<i>Neckera complanata</i>	p	p	p			p			p						p	p
<i>Neckera crispa</i>	p															p
<i>Neckera pumila</i>	p	p	p					p	p				p	p		p
<i>Octodiceras fontanum</i>																
<i>Orthodontium lineare</i>																
<i>Orthotrichum affine</i>	p		p						p				p	p		p
<i>Orthotrichum anomalum</i>	p	p							p				p			p
<i>Orthotrichum cupulatum</i>		p														
<i>Orthotrichum diaphanum</i>	p		p						p				p		p	p
<i>Orthotrichum lyellii</i>	p		p													
<i>Orthotrichum pulchellum</i>			p						p				p			
<i>Orthotrichum rivulare</i>										p			p			
<i>Orthotrichum sprucei</i>										p			p			
<i>Orthotrichum stramineum</i>			p						p							
<i>Orthotrichum striatum</i>		p		p						p						p

MOSSES contd.	SN 01	SN 02	SN 03	SN 04	SN 10	SN 11	SN 12	SN 13	SN 14	SN 22	SN 23	SN 24	SR 89	SR 99	SS 09	SS 19
<i>Orthotrichum tenellum</i>																
<i>Oxystegus tenuirostris</i>			p												p	
<i>Phascum cuspidatum</i>																p
<i>Philonotis arnellii</i>								p	p							
<i>Philonotis caespitosa</i>				p												
<i>Philonotis calcarea</i>									p							
<i>Philonotis fontana</i>		p	p				p	p								
<i>Physcomitrium pyriforme</i>										p			p	p		p
<i>Plagiomnium affine</i>				p				p							p	
<i>Plagiomnium cuspidatum</i>																
<i>Plagiomnium elatum</i>									p							
<i>Plagiomnium ellipticum</i>									p							
<i>Plagiomnium rostratum</i>				p		p				p					p	
<i>Plagiomnium undulatum</i>	p	p	p		p		p	p	p			p			p	p
<i>Plagiothecium curvifolium</i>																
<i>Plagiothecium denticulatum</i>	p	p	p								p	p			p	
<i>Plagiothecium latebricola</i>				p												
<i>Plagiothecium nemorale</i>	p	p	p				p	p	p						p	
<i>Plagiothecium rutbei</i>																
<i>Plagiothecium succulentum</i>	p	p	p		p			p			p	p			p	
<i>Plagiothecium undulatum</i>	p		p					p					p	p		
<i>Pleuroidium acuminatum</i>	p		p				p	p				p				p
<i>Pleuroidium subulatum</i>												p				p
<i>Pleurochaete squarrosa</i>													p	p	p	p
<i>Pleurozium schreberi</i>		p	p		p		p	p								
<i>Pogonatum aloides</i>	p	p	p					p	p			p	p		p	
<i>Pogonatum nanum</i>																
<i>Pogonatum urnigerum</i>			p	p					p							
<i>Poblia annotina</i> agg.			p	p					p							
<i>Poblia camptotrachelata</i>			p						p							
<i>Poblia carnea</i>				p					p			p			p	p
<i>Poblia cruda</i>							p	p								
<i>Poblia elongata</i>																
<i>Poblia lutescens</i>	p											p				
<i>Poblia nutans</i>				p				p	p							
<i>Poblia prolifera</i>				p				p						p		
<i>Poblia rothii</i>																
<i>Poblia wahlenbergii</i>									p	p			p			
<i>Polytrichum alpestre</i>				p				p	p							
<i>Polytrichum alpinum</i>				p					p							
<i>Polytrichum commune</i>				p				p	p				p			
<i>Polytrichum formosum</i>	p	p	p					p	p	p			p		p	
<i>Polytrichum juniperinum</i>				p				p	p	p			p		p	
<i>Polytrichum piliferum</i>				p				p	p	p						
<i>Pottia bryoides</i>																p
<i>Pottia crinita</i>																p
<i>Pottia davalliana</i>																p
<i>Pottia heimii</i>																
<i>Pottia intermedia</i>																p
<i>Pottia recta</i>																p
<i>Pottia starkeana</i>															p	p
<i>Pottia truncata</i>				p					p			p		p	p	
<i>Pottia wilsonii</i>																
<i>Pseudephemerum nitidum</i>				p												
<i>Pseudoscleropodium purum</i>	p	p	p				p	p	p		p	p	p	p	p	p
<i>Pterogonium gracile</i>					p				p	p						

MOSSES contd.	SN 01	SN 02	SN 03	SN 04	SN 10	SN 11	SN 12	SN 13	SN 14	SN 22	SN 23	SN 24	SR 89	SR 99	SS 09	SS 19
<i>Pterygoneurum ovatum</i> (?)																
<i>Ptychomitrium polyphyllum</i>			P						P			P				
<i>Racomitrium aciculare</i>	p	p	p				p	p				p				
<i>Racomitrium affine</i>			p													
<i>Racomitrium aquaticum</i>			p					p								
<i>Racomitrium canescens</i>								p								
<i>Racomitrium elongatum</i>				p				p								
<i>Racomitrium ericoides</i>		p					p	p								
<i>Racomitrium fasciculare</i>		p	p				p	p								
<i>Racomitrium heterostichum</i>		p	p				p	p								
<i>Racomitrium lanuginosum</i>			p				p	p								
<i>Rhabdoweisia fugax</i>			p													
<i>Rhizomnium pseudopunctatum</i>						p		p								
<i>Rhizomnium punctatum</i>	p	p	p			p		p				p	p		p	p
<i>Rhodobryum roseum</i>																
<i>Rhynchostegiella tenella</i>	p	p	p			p						p	p	p	p	p
<i>Rhynchostegiella confertum</i>	p	p	p					p				p		p	p	
<i>Rhynchostegiella megapolitanum</i>														p	p	p
<i>Rhynchostegiella murale</i>		p													p	p
<i>Rhynchostegiella riparioides</i>	p	p	p				p	p				p	p		p	
<i>Rhytidiadelphus loreus</i>	p		p				p	p				p	p			
<i>Rhytidiadelphus squarrosus</i>	p	p	p	p			p	p	p			p	p		p	p
<i>Rhytidiadelphus triquetrus</i>	p	p	p					p				p	p	p	p	p
<i>Sanionia uncinata</i>							p									
<i>Schistidium alpicola</i>			p					p				p				
<i>Schistidium apocarpum</i>	p	p	p					p							p	
<i>Schistidium maritimum</i>	p		p			p			p							
<i>Schistostega pennata</i>			p					p				p				
<i>Scleropodium cespitosum</i>			p					p					p			
<i>Scleropodium tourettii</i>															p	p
<i>Scorpidium cossonii</i>																
<i>Scorpidium scorpioides</i>			p				p	p								
<i>Scorpiurium circinatum</i>						p									p	p
<i>Sphagnum auriculatum</i>																
var. <i>auriculatum</i>		p	p					p	p							
var. <i>inu</i>			p					p								
<i>Sphagnum capillifolium</i>			p					p								
<i>Sphagnum compactum</i>		p						p	p							
<i>Sphagnum contortum</i>									p							
<i>Sphagnum cuspidatum</i>			p					p	p							
<i>Sphagnum fimbriatum</i>			p					p								
<i>Sphagnum fuscum</i> (?)																
<i>Sphagnum magellanicum</i>																
<i>Sphagnum palustre</i>		p	p					p	p							
<i>Sphagnum papillosum</i>		p	p					p	p							
<i>Sphagnum platyphyllum</i>									p							
<i>Sphagnum pulchrum</i> (?)			p													
<i>Sphagnum recurvum</i>		p	p					p	p							
<i>Sphagnum russowii</i>																
<i>Sphagnum squarrosum</i>			p					p	p							
<i>Sphagnum subnitens</i>		p	p					p	p							
<i>Sphagnum subsecundum</i>									p							
<i>Sphagnum tenellum</i>			p					p	p							
<i>Sphagnum teres</i>			p					p	p							

	SM 70	SM 71	SM 72	SM 73	SM 80	SM 81	SM 82	SM 83	SM 84	SM 90	SM 91	SM 92	SM 93	SM 94	SN 00
MOSSES contd.															
<i>Tetraphis pellucida</i>										P	P	P	P		
<i>Thannobryum alopecurum</i>	p		p		p	p	p					p	p	p	p
<i>Thuidium abietinum</i>															
<i>Thuidium delicatulum</i>															
<i>Thuidium tamariscinum</i>			p		p	p	p			p	p	p	p		p
<i>Tortella flavovirens</i>	p		p		p										
<i>Tortella inclinata</i>	p														
<i>Tortella nitida</i>	p				p	p				p					p
<i>Tortella tortuosa</i>					p				p		p	p			p
<i>Tortula canescens</i>					p										
<i>Tortula cuneifolia</i>					p										
<i>Tortula intermedia</i>										p					p
<i>Tortula laevipila</i>			p		p	p	p								p
<i>Tortula latifolia</i>															p
<i>Tortula marginata</i> (?)															
<i>Tortula muralis</i>	p		p		p	p	p			p	p	p	p		p
<i>Tortula papillosa</i>										p					
<i>Tortula ruralis</i>					p					p	p				
<i>Tortula ruralis</i> ssp. <i>ruraliformis</i>					p										p
<i>Tortula subulata</i>			p												
<i>Tortula virescens</i>										p					
<i>Trichostomum brachydontium</i>	p		p	p	p			p	p	p	p		p	p	p
<i>Trichostomum crispulum</i>					p					p					p
<i>Ulota crispa</i>			p		p	p	p	p	p	p	p	p	p		p
<i>Ulota phyllantha</i>	p		p		p	p	p	p	p	p		p	p	p	p
<i>Weissia controversa</i>	p		p		p	p	p		p	p			p	p	p
<i>Weissia microstoma</i>	p		p		p				p						p
<i>Weissia perssonii</i>					p			p	p						
<i>Zygodon baumgartneri</i>										p					p
<i>Zygodon conoideus</i>								p			p				p
<i>Zygodon viridissimus</i>	p		p		p	p	p			p	p	p	p		p
LIVERWORTS															
<i>Aneura pinguis</i>	p				p				p		p		p	p	
<i>Anthoceros punctatus</i>					p						p				
<i>Barbilophozia attenuata</i>												p			p
<i>Barbilophozia floerkei</i>															
<i>Bazzania trilobata</i>			p					p		p		p	p		
<i>Blasia pusilla</i>															
<i>Calypogeia arguta</i>	p		p		p		p	p	p	p	p	p	p	p	p
<i>Calypogeia azurea</i> (?)					p										
<i>Calypogeia fissa</i>	p		p		p	p		p	p	p	p	p	p	p	p
<i>Calypogeia muelleriana</i>			p			p				p	p	p	p		p
<i>Calypogeia spagnicola</i>													p		
<i>Cephalozia bicuspidata</i>	p		p		p	p		p	p	p	p	p	p		p
<i>Cephalozia connivens</i>			p			p						p	p		
<i>Cephalozia lunulifolia</i>			p								p	p	p		p
<i>Cephalozia macrostachya</i>															
<i>Cephaloziella elachista</i>														p	
<i>Cephaloziella divaricata</i>	p			p	p					p	p	p			
<i>Cephaloziella hampeana</i>	p		p												
<i>Cephaloziella stellulifera</i>				p	p									p	
<i>Cephaloziella turneri</i>					p										p
<i>Chiloscyphus polyanthus</i>	p		p					p		p	p	p	p		p

MOSSES contd.	SN 01	SN 02	SN 03	SN 04	SN 10	SN 11	SN 12	SN 13	SN 14	SN 22	SN 23	SN 24	SR 89	SR 99	SS 09	SS 19
<i>Tetraphis pellucida</i>			P				P									
<i>Thamnobryum alopecurum</i>	P	P	P		P		P	P			P	P		P	P	
<i>Thuidium abietinum</i>		P	P					P								
<i>Thuidium delicatulum</i>								P								
<i>Thuidium tamariscinum</i>	P	P	P		P		P	P			P	P				
<i>Tortella flavovirens</i>													P	P	P	P
<i>Tortella inclinata</i>																
<i>Tortella nitida</i>	P	P	P		P									P	P	P
<i>Tortella tortuosa</i>			P											P	P	P
<i>Tortula canescens</i>																
<i>Tortula cuneifolia</i>																
<i>Tortula intermedia</i>	P	P	P										P	P	P	
<i>Tortula laevipila</i>														P		
<i>Tortula latifolia</i>									P			P				
<i>Tortula marginata</i> (?)	P															
<i>Tortula muralis</i>	P	P	P					P			P	P	P	P	P	P
<i>Tortula papillosa</i>														P	P	
<i>Tortula ruralis</i>														P	P	P
<i>Tortula ruralis</i> ssp. <i>ruraliformis</i>				P										P	P	P
<i>Tortula subulata</i>														P		
<i>Tortula virescens</i>																
<i>Trichostomum brachydontium</i>	P								P				P	P	P	P
<i>Trichostomum crispulum</i>					P			P					P	P	P	P
<i>Ulotia crispa</i>	P	P	P		P		P	P	P		P	P		P	P	
<i>Ulotia phyllantha</i>	P		P		P		P				P			P	P	
<i>Weissia controversa</i>					P						P			P	P	
<i>Weissia microstoma</i>														P	P	
<i>Weissia perssonii</i>																
<i>Zygodon baumgartneri</i>	P		P				P									
<i>Zygodon conoideus</i>	P		P					P						P		
<i>Zygodon viridissimus</i>	P		P		P			P			P			P	P	
LIVERWORTS																
<i>Aneura pinguis</i>		P			P		P	P					P	P		P
<i>Antboceros punctatus</i>																
<i>Barbilophozia attenuata</i>		P	P				P	P								
<i>Barbilophozia floerkei</i>			P					P								
<i>Bazzania trilobata</i>			P					P								
<i>Blasia pusilla</i>								P								
<i>Calyptogeia arguta</i>	P	P	P				P	P		P				P		
<i>Calyptogeia azurea</i> (?)																
<i>Calyptogeia fissa</i>	P	P	P				P	P		P				P		
<i>Calyptogeia muelleriana</i>		P	P				P	P						P		
<i>Calyptogeia sphagnicola</i>			P					P								
<i>Cephalozia bicuspidata</i>	P	P	P				P	P								
<i>Cephalozia connivens</i>		P	P					P								
<i>Cephalozia lunulifolia</i>			P				P	P								
<i>Cephalozia macrostachya</i>								P								
<i>Cephaloziella elacbista</i>																
<i>Cephaloziella divaricata</i>																P
<i>Cephaloziella bampeana</i>		P					P				P					
<i>Cephaloziella stellulifera</i>																P
<i>Cephaloziella turneri</i>																
<i>Chiloscyphus polyanthus</i>	P	P	P					P			P	P		P		

