

Rare and scarce bryophytes of Ireland

What is meant by a 'rare list' and how is one useful for conservation? **Nick Hodgetts** and **Neil Lockhart** report



△ *Rhytidium rugosum*, an NR species in Ireland. Jeffrey G. Duckett

Designating 'nationally rare' and 'nationally scarce' species is a crude but useful way of measuring the frequency of plants. It is complementary to the Red List, which assesses the degree of threat to species. The Red List uses rarity as part of the process of determining which species are the most threatened, but rarity and degree of threat, while clearly related, are not the same thing. Some very rare species may not be under much threat, being naturally rare plants of remote places. Conversely, some species that have been recorded relatively frequently may be under great threat, perhaps because of their fragile habitat. Listing rare and scarce species is less important than producing Red Lists, but it is still useful and interesting, and may even provide 'early warning' that some species are likely to become threatened. A bryophyte Red List for Ireland has been published recently (Lockhart, Hodgetts & Holyoak, 2012), and it is now considered useful to add lists of bryophytes that are Nationally Rare and Nationally Scarce in Ireland.

In Britain, vascular plants and bryophytes recorded since 1950 in 1-15 10km² squares (hectads) are considered *Nationally Rare* (Preston, 2010), and those in 16-100 hectads *Nationally Scarce* (Preston, 2006). There is a

total of 2858 hectads in Britain (comprising England, Scotland, Wales and the Isle of Man, but excluding the Channel Islands). Ireland (including the Republic of Ireland and Northern Ireland) has a total of 1019 hectads, so any similar scheme has to take this smaller total area into account.

Simply using the same proportions and cut-off date in Ireland as in Britain would result in bryophytes occurring in fewer than 5-6 hectads being Nationally Rare (NR) and those in 6-7 to 35-36 hectads Nationally Scarce (NS). However, this would designate as NS a large number of species that almost certainly do not deserve this status, largely because of under-recording in Ireland relative to Britain. NR and NS lists for vascular plants in Ireland use 1-10 hectads for NR (Curtis & McGough, 1988) and 11-25 hectads for NS (Neff, 2000). While this works reasonably well for the bryophytes, it was felt that figures of 1-5 hectads for NR and 6-20 hectads for NS were even more appropriate, given the degree of under-recording compared with the vascular plants. 1970+ records were used in the assessment, in order to be consistent with the bryophyte Red List. The resultant lists appear to be realistic, tying in well with the Red List categories and providing a good assessment



Table 1. Rare and Scarce bryophytes assumed to be aliens in Ireland

Liverworts
<i>Heteroscyphus fissistipus</i>
<i>Lophocolea bispinosa</i>
<i>Lophocolea semiteres</i>
<i>Riccia rhenana</i>
Mosses
<i>Atrichum crispum</i>
<i>Calomnion complanatum</i>
<i>Calyptrochaeta apiculata</i>
<i>Dicranoloma menziesii</i>
<i>Hennediella stanfordensis</i>
<i>Leptotheca gaudichaudii</i> var. <i>gaudichaudii</i>

of what is thought genuinely rare and scarce in Ireland. All taxa that have been recorded in more than 20 hectads since 1970 are assessed as *Least Concern* in the Red List analysis, because frequency, in terms of number of hectads, contributes to the criteria for allocation of taxa to Red List categories. On the other hand, not all taxa that occur in 20 or fewer hectads are threatened, or even *Near Threatened*, so there are many Nationally Scarce taxa that are *Least Concern*.

As this is the first attempt at listing NR and NS bryophytes for Ireland, *all* taxa that fall within the two frequency classes are listed, including taxa recently discovered in Ireland, and taxa with recent taxonomic revisions. In this, the lists differ from the British ones, in which several species were excluded on grounds of being recently recorded, with records increasing year on year. This means that some species will certainly be dropped from the Irish NS list in the fairly near future, when they become more well-known in Ireland, but as these lists are no more than snapshots of what is known at a given time,

this does not matter. Another difference from the British lists is that subspecies and varieties have been included.

Aliens have also been included in the listings. Because it is difficult to distinguish alien bryophytes from natives, there seems to be no convincing argument for excluding them. The most obviously alien bryophytes are listed in Table 1 and are also flagged up as aliens in the main lists.

All taxa considered by the above criteria to be NR are listed in Table 2, with NS taxa listed in Table 3. The published Red List threat category (Lockhart *et al.*, 2012) of each species is also included. While the list of NR species approximately equates to the Red List, they are not identical. Most of the taxa that are considered *Regionally Extinct* in Ireland have been omitted, although the six species rediscovered in Ireland since 2010 are mentioned: *Bartramia halleriana*, *Entosthodon mublenbergii*, *Eurhynchiastrum pulchellum* var. *diversifolium*, *Meesia triquetra*, *Ptilidium pulcherrimum* and *Syntrichia princeps*. The NR list highlights *Data Deficient* species, many of which are likely to move into a 'higher' threat category with more information. The lists include several *Near Threatened* taxa that have a very restricted distribution in Ireland but are relatively frequent within a very limited range. Most notably, some of the Dartry Mountains rarities such as *Dicranella grevilleana*, *Didymodon maximus*, *Hymenostylium recurvirostrum* var. *insigne* and *Seligeria patula* fall into this category. *Hypnum uncinulatum*, tightly restricted to the south-western oak woodlands but not really threatened, also stands out. These taxa are clearly of major national and international importance, and therefore worthy of conservation effort, although they are not deemed to be threatened at the present time.

There are some little-known or recently



recorded taxa, such as *Schistidium elegantulum* subsp. *elegantulum* and *Sphagnum skyense*, that are likely to drop out of the NR list with more recording. *Scapania subalpina* is probably in the list only as an accident of recent under-recording. Others are more likely to remain rare. *Tortula canescens*, for example, may well be under-recorded, but it is very restricted by habitat and geography to earthy banks on warm maritime cliffs. *Riccia huebeneriana* is restricted to a single site – Vartry Reservoir in Co. Wicklow – where it occurs very sporadically in conditions of low water levels. *Cephalozia macrostachya* var. *spiniflora* is undoubtedly overlooked, but almost all fertile material of *C. macrostachya* that has been found in recent years is var. *macrostachya*, so var. *spiniflora* must surely be genuinely rare.

The NS list contains several taxa that are in the Red List as *Vulnerable*, and even one (*Ditrichum zonatum*) that has been assessed as *Endangered*. Many of these are plants that are perceived to have declined in Ireland, including those whose habitat has been seriously damaged in recent history. Members of the North Atlantic mixed hepatic mat community such as *Adelanthus lindenbergianus* and *Bazzania pearsonii* fall into this category, as do *Cephalozia*

loitlesbergeri, which is confined to undisturbed bogs, *Acrobolbus wilsonii*, a globally rare Atlantic species, and, perhaps most strikingly, the fen moss *Pseudocalliergon lycopodioides*. Recorded recently from no fewer than 14 hectads, this plant has nevertheless been extirpated from many more by drainage and eutrophication.

Many of the NS bryophytes are *Near Threatened*, either because they have declined or because they have very restricted ranges and/or habitats. A number of strictly Atlantic taxa fall into this category. These are plants which are globally very rare, with highly disjunct distribution patterns and restricted to very wet temperate climates. Ireland therefore has an international responsibility for their conservation. For example, *Mastigophora woodsii* is otherwise known only from Scotland, the Faroe Islands, the Himalaya, Taiwan, the Pacific coast of North America and (possibly) Australasia. *Radula carringtonii* is even more restricted, having been recorded elsewhere only from Scotland (where it is very rare), the Azores, Madeira, the Canary Islands, Costa Rica and (possibly) Réunion. Finally, *Lejeunea hibernica* is known outside Ireland only from Madeira and the Azores.



The varieties of *Marsupella emarginata* are included, with var. *pearsonii* being NR and var. *aquatica* being NS. These varieties were *Not Evaluated* in the Red List analysis, and Paton (1999) says, “Further critical studies are required to ascertain whether their varietal status can be maintained or whether they should be treated merely as ecotypes of a single complex taxon”. Clearly both are rather uncommon in Ireland, though almost certainly under-recorded.

Of the alien species that are included here, most are of no conservation significance. On the evidence of its behaviour in Britain, *Lophocolea semiteres* seems likely to become invasive, though not on the scale of *Campylopus introflexus*. The American *Atrichum crispum* is known only as a clonal male population in Ireland (and Britain too), but seems to be fairly efficient at distributing itself, especially along water courses. Most of the rare aliens here are likely to remain insignificant in the Irish flora, as non-invasive ‘garden escapes’. However, *Calomnion complanatum*, imported on tree fern trunks, is regarded as a threatened species in its native Australia, so perhaps the Irish populations should be treasured and conserved rather in the same way as a rare zoo animal such as a rhinoceros!

△Left to right: *Lophozia opacifolia*, *Ptilium crista-castrensis*, and *Marchantia polymorpha* subsp. *montivagans*: vulnerable, critically endangered and endangered respectively, see Table 2. Jeffrey G. Duckett

It should be noted that placement high up on the list of NR species, or having a high threat status, does not *necessarily* mean that conservation action should be a priority. While taxa that are reliant on a long continuity of habitat, such as the North Atlantic mixed hepatic mat species, or Atlantic woodland species, or bog and fen specialists, do indeed require urgent conservation action of a traditional sort, there is a substantial tranche of taxa that are essentially ruderal. For such species, designating protected areas, or affording them legal protection, can be a waste of time, resources and effort. To take the most obvious example, *Aongstroemia longipes* is both extremely rare and highly threatened, but the best conservation prescription would be to hire a mechanical digger and excavate more sand pits in the area where it has been recorded. This, and other species, require a constant turnover of ground to colonise in order to pursue a colonist or even fugitive life strategy. The biggest threats to them are inactivity in the countryside and

general enrichment with nutrients, leading to coarse grassland or scrub developing at the expense of bare soils.

Therefore, deciding on what action should be taken to save species is another step in the conservation process, *after* the lists of rare, scarce and threatened species have been drawn up. The lists are merely members of a cohort of tools that help conservation bodies make an informed decision on conservation action. Other equally important considerations include establishing which aspects of biodiversity we have a particular international responsibility for, and how the very limited resources available for nature conservation can most effectively be deployed.

Each species has the same status and hectad count as in the database used for the Red List (Lockhart *et al.*, 2012), which was up-to-date at the end of 2010, or, in the case of the few *Least Concern* species not covered by the Red List database, as in the British Bryological Society database available on-line through the NBN Gateway (<http://data.nbn.otg.uk>). There have been a number of significant additional records in 2011 and 2012, and where these have made a difference to the hectad count, the new figure has been added in brackets after the 2010 figure. In a small number of cases, most notably for species new to the Irish flora or 'back from extinction', this would result in a change of status, and this is indicated in the comments column. It is worthwhile including all this extra information as it demonstrates how dynamic bryophyte recording is in Ireland, and how under-recorded Ireland still is in comparison with Britain. There is an ongoing debate about whether Red Lists should be updated continuously or left static for a limited period (say 5 years). We consider it useful for published Red Lists to have a 'shelf life' of about 5 years, so we do not propose

any alterations to the Red List in Lockhart *et al.* (2012) for the present. On the other hand, it would be neglectful not to point out the interesting and important new records made in Ireland over the last two years. Newly-found colonies of some species, notably *Meesia triquetra* and *Syntrichia princeps*, are clearly worthy of conservation and therefore need to be pointed out to conservation authorities and others.

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Table 2. List of Nationally Rare bryophytes in Ireland

Name of taxon	Red List threat category	1970+ hectads	Comments
Liverworts & hornworts			
<i>Barbilophozia atlantica</i>	Endangered	1	
<i>Barbilophozia barbata</i>	Critically Endangered	1 (2)	
<i>Calypogeia integristipula</i>	Endangered	1	
<i>Cephaloziella elachista</i>	Data Deficient	1	
<i>Gymnomitrium corallioides</i>	Critically Endangered	1	
<i>Heteroscyphus fissistipus</i>	Not Evaluated	1	Alien
<i>Leiocolea heterocolpos</i>	Critically Endangered	1	
<i>Lophocolea bispinosa</i>	Not Evaluated	1	Alien
<i>Lophocolea semiteres</i>	Not Evaluated	1	Alien
<i>Marchantia polymorpha</i> subsp. <i>montivagans</i>	Endangered	1	
<i>Ptilidium pulcherrimum</i>	Regionally Extinct	0 (1)	Rediscovered in 2012; status would be Data Deficient
<i>Riccia huebeneriana</i>	Data Deficient	1	
<i>Riccia rhenana</i>	Not Evaluated	1	Alien
<i>Scapania curta</i>	Vulnerable	1	
<i>Southbya tophacea</i>	Critically Endangered	1 (2)	
<i>Anthoceros agrestis</i>	Vulnerable	2	
<i>Leiocolea rutheana</i> var. <i>rutheana</i>	Endangered	2	
<i>Lejeunea mandonii</i>	Endangered	2	
<i>Moerckia hibernica</i> s.s.	Data Deficient	2 (3)	Only three recent confirmed records, but some of the records of <i>M. flotoviana</i> might prove to be <i>M. hibernica</i>
<i>Plagiochila carringtonii</i>	Endangered	2	
<i>Riccia crozalsii</i>	Endangered	2	
<i>Scapania lingulata</i>	Data Deficient	2	
<i>Scapania subalpina</i>	Data Deficient	2	
<i>Cephalozia macrostachya</i> var. <i>spiniflora</i>	Data Deficient	3	
<i>Cephaloziella integerrima</i>	Vulnerable	3	
<i>Fossombronia fimbriata</i>	Vulnerable	3	
<i>Gymnomitrium concinmatum</i>	Endangered	3	
<i>Leiocolea gillmanii</i>	Vulnerable	3	
<i>Scapania gymnostomophila</i>	Vulnerable	3	
<i>Scapania nimbosa</i>	Endangered	3	
<i>Cephalozia crassifolia</i>	Endangered	4	

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<i>Cladopodiella francisci</i>	Vulnerable	4	
<i>Geocalyx graveolens</i>	Endangered	4	
<i>Metzgeria pubescens</i>	Vulnerable	4 (5)	
<i>Pallavicinia lyellii</i>	Endangered	4 (5)	
<i>Plagiochila heterophylla</i>	Endangered	4	
<i>Scapania cuspiduligera</i>	Vulnerable	4	
<i>Cephaloziella massalongi</i>	Vulnerable	5	
<i>Cephaloziella rubella</i>	Vulnerable	5	
<i>Cephaloziella turneri</i>	Vulnerable	5 (6)	New record would move this species to Nationally Scarce
<i>Fossombronia caespitiformis</i> subsp. <i>multispira</i>	Data Deficient	5	
<i>Lophozia opacifolia</i>	Vulnerable	5 (6)	New record would move this species to Nationally Scarce
<i>Marsupella emarginata</i> var. <i>pearsonii</i>	Not Evaluated	5	
<i>Marsupella sphacelata</i>	Vulnerable	5	
Mosses			
<i>Aongstroemia longipes</i>	Critically Endangered	1	
<i>Bartramia halleriana</i>	Regionally Extinct	0 (1)	Rediscovered in 2013; status would be Critically Endangered
<i>Bryum knowltonii</i>	Endangered	1	
<i>Bryum moravicum</i>	Critically Endangered	1	
<i>Bryum salinum</i>	Critically Endangered	1	
<i>Calypstrochaeta apiculata</i>	Not Evaluated	1	Alien
<i>Cynodontium jeneri</i>	Vulnerable	1	
<i>Dicranoloma menziesii</i>	Not Evaluated	1	Alien
<i>Ditrichum cornubicum</i>	Critically Endangered	1	
<i>Ditrichum flexicaule</i>	Data Deficient	0 (1)	Assigned Data Deficient status although no 1970-2010 records; new record in 2011
<i>Ditrichum lineare</i>	Critically Endangered	1	
<i>Encalypta ciliata</i>	Critically Endangered	1 (2)	New record would move this species to Endangered
<i>Encalypta rhabtocarpa</i>	Critically Endangered	1	
<i>Entosthodon mühlenbergii</i>	Regionally Extinct	0 (1)	Rediscovered in 2012; status would be Critically Endangered
<i>Entosthodon pulchellus</i>	-	0 (1)	Discovered new to Ireland in 2011; status would be Endangered
<i>Ephemerum recurvifolium</i>	Data Deficient	1	Added to Irish list recently but likely to remain rare
<i>Eurhynchiastrum pulchellum</i> var. <i>diversifolium</i>	Regionally Extinct	0 (1)	Rediscovered in 2013; status would be Critically Endangered
<i>Grimmia atrata</i>	Endangered	1	

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<i>Hedwigia ciliata</i> var. <i>ciliata</i>	Vulnerable	1	
<i>Hennediella stanfordensis</i>	Not Evaluated	1	Alien
<i>Hygrohypnum duriusculum</i>	Critically Endangered	1	
<i>Kiaeria falcata</i>	Critically Endangered	1	
<i>Meesia triquetra</i>	Regionally Extinct	0 (1)	Rediscovered in 2012; status would be Critically Endangered
<i>Meesia uliginosa</i>	Endangered	1	
<i>Molendoa warburgii</i>	Vulnerable	1	
<i>Oedipodium griffithianum</i>	Critically Endangered	1	
<i>Orthodontium gracile</i>	Critically Endangered	1	
<i>Oxyrrhynchium schleicheri</i>	Critically Endangered	1	
<i>Paludella squarrosa</i>	Critically Endangered	1	
<i>Phascum cuspidatum</i> var. <i>papillosum</i>	Data Deficient	1	Probably under-recorded
<i>Phascum cuspidatum</i> var. <i>piliferum</i>	Data Deficient	1	Probably under-recorded
<i>Philonotis arnellii</i>	Endangered	1	
<i>Philonotis cernua</i>	Critically Endangered	1	
<i>Plagiopus oederianus</i>	Critically Endangered	1 (2)	
<i>Plagiothecium latebricola</i>	Vulnerable	1	
<i>Ptilium crista-castrensis</i>	Critically Endangered	1	
<i>Racomitrium elongatum</i>	Vulnerable	1	
<i>Schistidium elegantulum</i> subsp. <i>wilsonii</i>	Data Deficient	1	Subspecies of <i>S. elegantulum</i> not included in checklist (Hill <i>et al.</i> 2008)
<i>Schistidium pruinosum</i>	Data Deficient	1 (3)	
<i>Syntrichia princeps</i>	Regionally Extinct	0 (1)	Rediscovered in 2012; status would be Critically Endangered
<i>Syntrichia virescens</i>	Data Deficient	1	Probably under-recorded but likely to remain rare
<i>Tetraplodon angustatus</i>	Data Deficient	1	
<i>Tortula lanceola</i>	Critically Endangered	1	
<i>Ulota coarctata</i>	Critically Endangered	1	
<i>Weissia condensa</i>	Data Deficient	1	
<i>Abietinella abietina</i> var. <i>abietina</i>	Endangered	2	
<i>Aloina ambigua</i>	Endangered	2	
<i>Bryum creberrimum</i>	Data Deficient	2	
<i>Bryum elegans</i>	Vulnerable	2	
<i>Bryum gemmiparum</i>	Vulnerable	2	
<i>Bryum tenuisetum</i>	Data Deficient	2	
<i>Calomnion complanatum</i>	Not Evaluated	2	Alien
<i>Dialytrichia mucronata</i>	-	0 (2)	Discovered new to Ireland in 2011, and another 1994 record detected in herbarium; status would be Vulnerable
<i>Dicranella crispa</i>	Endangered	2	
<i>Encalypta alpina</i>	Vulnerable	2	
<i>Ephemerum spinulosum</i>	Endangered	2	

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<i>Fissidens crispus</i>	Data Deficient	2	
<i>Fissidens serrulatus</i>	Vulnerable	2	
<i>Grimmia anomala</i>	Endangered	2 (3)	Probably under-recorded but likely to remain rare or scarce; new record would move this species to Vulnerable
<i>Grimmia dissimulata</i>	Vulnerable	2	
<i>Isopterygiopsis muelleriana</i>	Vulnerable	2	
<i>Leptodon smithii</i>	Endangered	2	
<i>Leptotheca gaudichaudii</i> var. <i>gaudichaudii</i>	Not Evaluated	2	Alien
<i>Orthotrichum pallens</i>	Endangered	2	
<i>Physcomitrium sphaericum</i>	Vulnerable	2	
<i>Plagiothecium laetum</i>	Vulnerable	2	
<i>Pogonatum nanum</i>	Endangered	2 (4)	
<i>Pohlia elongata</i> var. <i>greenii</i>	Endangered	2	
<i>Pohlia wahlenbergii</i> var. <i>calcarea</i>	Data Deficient	2 (3)	
<i>Rhytidium rugosum</i>	Vulnerable	2	
<i>Schistidium agassizii</i>	Vulnerable	2	
<i>Schistidium robustum</i>	Data Deficient	2	
<i>Schistidium trichodon</i>	Vulnerable	2	
<i>Tortella inclinata</i>	Endangered	2	
<i>Tortula canescens</i>	Data Deficient	2	Possibly under-recorded but likely to remain rare
<i>Weissia brachycarpa</i> var. <i>brachycarpa</i>	Data Deficient	2	
<i>Weissia longifolia</i> var. <i>angustifolia</i>	Vulnerable	2	
<i>Arctoa fulvella</i>	Vulnerable	3	
<i>Bryum calophyllum</i>	Endangered	3	
<i>Bryum uliginosum</i>	Endangered	3	
<i>Campylostelium saxicola</i>	Endangered	3	
<i>Dicranella grevilleana</i>	Near Threatened	3	
<i>Dicranodontium asperulum</i>	Vulnerable	3	
<i>Didymodon acutus</i>	Endangered	3	
<i>Didymodon umbrosus</i>	Vulnerable	3	
<i>Ditrichum plumbicola</i>	Endangered	3	
<i>Fissidens rivularis</i>	Vulnerable	3	
<i>Fissidens rufulus</i>	Endangered	3	
<i>Hygroamblystegium humile</i>	Endangered	3	
<i>Leptobarbula berica</i>	Vulnerable	3	
<i>Myurella julacea</i>	Endangered	3	
<i>Plagiothecium cavifolium</i>	Vulnerable	3	
<i>Plagiothecium curvifolium</i>	Vulnerable	3 (4)	
<i>Plagiothecium platyphyllum</i>	Vulnerable	3	
<i>Pohlia lescuriana</i>	Data Deficient	3	
<i>Racomitrium canescens</i>	Vulnerable	3	

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<i>Racomitrium macounii</i> subsp. <i>alpinum</i>	Vulnerable	3	
<i>Rhabdoweisia fugax</i>	Vulnerable	3	
<i>Scleropodium touretii</i>	Endangered	3	
<i>Scopelophila cataractae</i>	Vulnerable	3	
<i>Sphagnum affine</i>	Vulnerable	3	
<i>Sphagnum capillifolium</i> subsp. <i>capillifolium</i>	Data Deficient	3 (4)	Must be under-recorded
<i>Sphagnum flexuosum</i>	Vulnerable	3 (4)	
<i>Sphagnum skyense</i>	Data Deficient	3 (7)	Must be under-recorded; new records would move this species to Nationally Scarce
<i>Weissia rutilans</i>	Vulnerable	3	
<i>Amphidium lapponicum</i>	Vulnerable	4	
<i>Brachydontium trichodes</i>	Endangered	4	
<i>Brachytheciastrum velutinum</i>	Endangered	4 (5)	
<i>Bryum intermedium</i>	Endangered	4	
<i>Bryum riparium</i>	Endangered	4	
<i>Bryum warneum</i>	Endangered	4	
<i>Fissidens fontanus</i>	Vulnerable	4	
<i>Philonotis tomentella</i>	Vulnerable	4	
<i>Pohlia andalusica</i>	Endangered	4	
<i>Pseudocalliergon trifarium</i>	Vulnerable	4	
<i>Seligeria calcarea</i>	Vulnerable	4	
<i>Sematophyllum substrumulosum</i>	Vulnerable	4 (7)	New records would move this species to Near Threatened (debatably) and Nationally Scarce
<i>Bryum caespiticium</i>	Vulnerable	5	
<i>Didymodon maximus</i>	Near Threatened	5	
<i>Didymodon tomaculosus</i>	Vulnerable	5	
<i>Discelium nudum</i>	Near Threatened	5	
<i>Fissidens polyphyllus</i>	Vulnerable	5	
<i>Fontinalis antipyretica</i> var. <i>cymbifolia</i>	Data Deficient	5	
<i>Grimmia muehlenbeckii</i>	Data Deficient	5	
<i>Hymenostylium recurvirostrum</i> var. <i>insigne</i>	Near Threatened	5	
<i>Hypnum uncinulatum</i>	Near Threatened	5	
<i>Pohlia filum</i>	Vulnerable	5	
<i>Seligeria oelandica</i>	Vulnerable	5	
<i>Seligeria patula</i>	Near Threatened	5	<i>S. trifaria</i> s.s. has not been reliably recorded from Ireland
<i>Timmia norvegica</i>	Vulnerable	5	

Rare and scarce bryophytes of Ireland

Table 3. List of Nationally Scarce bryophytes in Ireland

Name of taxon	Red List threat category	1970+	Comments
Liverworts & hornworts			
<i>Acrobolbus wilsonii</i>	Vulnerable	6	
<i>Fossombronia maritima</i>	Near Threatened	6	
<i>Odontoschisma elongatum</i>	Near Threatened	6	
<i>Tritomaria exsecta</i>	Vulnerable	6	
<i>Adelanthus lindenbergianus</i>	Vulnerable	7 (8)	
<i>Cephalozia loitlesbergeri</i>	Vulnerable	7	
<i>Cephaloziella nicholsonii</i>	Vulnerable	7	
<i>Cephaloziella spinigera</i>	Data Deficient	7	
<i>Lejeunea flava</i> subsp. <i>moorei</i>	Vulnerable	7	
<i>Calypogeia azurea</i>	Least Concern	8	
<i>Leiocolea fitzgeraldiae</i>	Near Threatened	8	
<i>Marsupella adusta</i>	Near Threatened	8	
<i>Radula holtii</i>	Near Threatened	8	
<i>Solenostoma paroicum</i>	Near Threatened	8 (9)	
<i>Cephalozia pleniceps</i>	Vulnerable	9 (10)	
<i>Eremonotus myriocarpus</i>	Near Threatened	9	
<i>Gymnomitrium obtusum</i>	Near Threatened	9	
<i>Marsupella sprucei</i>	Vulnerable	9	
<i>Sphenobolopsis pearsonii</i>	Near Threatened	9	
<i>Aneura mirabilis</i>	Vulnerable	10	
<i>Anthelia juratzkana</i>	Near Threatened	10	
<i>Lejeunea eckloniana</i>	Near Threatened	10	
<i>Lejeunea hibernica</i>	Near Threatened	10	
<i>Marsupella emarginata</i> var. <i>aquatica</i>	Not Evaluated	10	
<i>Marsupella funckii</i>	Near Threatened	10	
<i>Nardia geoscypus</i>	Near Threatened	10	
<i>Pedinophyllum interruptum</i>	Least Concern	10	
<i>Porella cordaeana</i>	Near Threatened	10 (13)	
<i>Radula carringtonii</i>	Near Threatened	10	
<i>Douinia ovata</i>	Near Threatened	11 (12)	
<i>Ricciocarpos natans</i>	Near Threatened	11	
<i>Solenostoma sphaerocarpum</i>	Near Threatened	11	
<i>Bazzania pearsonii</i>	Vulnerable	12	
<i>Diplophyllum obtusifolium</i>	Near Threatened	12 (14)	New records would move to Least Concern
<i>Lophozia sudetica</i>	Least Concern	12	
<i>Telaranea europaea</i>	Near Threatened	12	
<i>Cololejeunea rossettiana</i>	Least Concern	13 (14)	
<i>Fossombronia foveolata</i>	Least Concern	13	
<i>Mastigophora woodsii</i>	Near Threatened	13 (14)	

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<i>Metzgeria leptoneura</i>	Near Threatened	13	
<i>Riccia cavernosa</i>	Least Concern	13	
<i>Riccia subbifurca</i>	Least Concern	13 (14)	
<i>Kurzia sylvatica</i>	Near Threatened	14	
<i>Riccia fluitans</i>	Least Concern	14	
<i>Scapania ornithopodioides</i>	Vulnerable	14 (16)	
<i>Solenostoma subellipticum</i>	Near Threatened	14	
<i>Cephalozia macrostachya</i> var. <i>macrostachya</i>	Least Concern	15	
<i>Radula lindenbergiana</i>	Least Concern	15	
<i>Riccia beyrichiana</i>	Least Concern	15	
<i>Cephalozia stellulifera</i>	Near Threatened	16	
<i>Moerckia flotoviana</i>	Data Deficient	16 (17)	Hectad count approx., as a few populations may prove to be the rarer <i>M. hibernica</i>
<i>Porella pinnata</i>	Least Concern	16 (17)	
<i>Riccardia incurvata</i>	Least Concern	16	
<i>Conocephalum salebrosum</i>	Least Concern	17 (19)	Almost certain that this species will soon be recorded in >20 hectads in Ireland
<i>Jungermannia exsertifolia</i> subsp. <i>cordifolia</i>	Least Concern	17	
<i>Leiocolea bantriensis</i>	Near Threatened	17	
<i>Dumortiera hirsuta</i>	Near Threatened	18	
<i>Radula voluta</i>	Least Concern	18	
<i>Reboulia hemisphaerica</i>	Least Concern	18 (19)	
<i>Barbilophozia attenuata</i>	Least Concern	19	
<i>Leptoscyphus cuneifolius</i>	Least Concern	19 (20)	
<i>Lophozia bicrenata</i>	Least Concern	19	
<i>Lophozia excisa</i>	Least Concern	19 (20)	
<i>Scapania scandica</i>	Least Concern	19	
<i>Cephalozia catenulata</i>	Least Concern	20	
<i>Haplomitrium bookeri</i>	Least Concern	20	
<i>Lepidozia pearsonii</i>	Least Concern	20 (21)	New record would remove this species from Nationally Scarce list
<i>Scapania aequiloba</i>	Least Concern	20	
Mosses			
<i>Amblystegium confervoides</i>	Near Threatened	6	
<i>Aulacomnium androgynum</i>	Vulnerable	6	
<i>Bryum bornholmense</i>	Near Threatened	6	
<i>Bryum dyffrynense</i>	Near Threatened	6	
<i>Bryum torquescens</i>	Vulnerable	6	
<i>Campylopus atrovirens</i> var. <i>falcatus</i>	Near Threatened	6	
<i>Cinclidium stygium</i>	Vulnerable	6	
<i>Dicranella cerviculata</i>	Near Threatened	6	

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<i>Ditrichum zonatum</i>	Endangered	6	
<i>Ephemerum cohaerens</i>	Vulnerable	6	
<i>Fontinalis antipyretica</i> var. <i>gracilis</i>	Near Threatened	6 (7)	
<i>Grimmia orbicularis</i>	Vulnerable	6	
<i>Philonotis rigida</i>	Vulnerable	6	
<i>Platydictya jungermannioides</i>	Near Threatened	6	
<i>Polytrichum commune</i> var. <i>perigoniale</i>	Data Deficient	6	Under-recorded
<i>Schistidium elegantulum</i> subsp. <i>elegantulum</i>	Data Deficient	6 (8)	Subspecies of <i>S. elegantulum</i> not included in checklist (Hill <i>et al.</i> 2008); probably overlooked on old walls
<i>Sphagnum strictum</i>	Data Deficient	6	
<i>Sphagnum warnstorffii</i>	Vulnerable	6 (7)	
<i>Bartramia ithyphylla</i>	Vulnerable	7	
<i>Ephemerum crassinervium</i> subsp. <i>rutheanum</i>	Near Threatened	7	
<i>Fissidens exilis</i>	Vulnerable	7	
<i>Hedwigia integrifolia</i>	Vulnerable	7 (8)	
<i>Orthotrichum sprucei</i>	Vulnerable	7	
<i>Orthotrichum stramineum</i>	Vulnerable	7 (8)	
<i>Plagiothecium denticulatum</i> var. <i>obtusifolium</i>	Near Threatened	7	
<i>Plasteurhynchium striatulum</i>	Near Threatened	7	
<i>Pleurochaete squarrosa</i>	Near Threatened	7	
<i>Schistidium platyphyllum</i>	Vulnerable	7 (8)	
<i>Tetradontium brownianum</i>	Near Threatened	7 (8)	
<i>Tortula marginata</i>	Near Threatened	7	
<i>Andreaea megistospora</i>	Vulnerable	8	
<i>Atrichum tenellum</i>	Near Threatened	8	
<i>Dicranodontium uncinatum</i>	Vulnerable	8 (9)	
<i>Ephemerum crassinervium</i> subsp. <i>sessile</i>	Near Threatened	8	
<i>Fissidens monguillonii</i>	Near Threatened	8	
<i>Grimmia donniana</i>	Near Threatened	8	
<i>Hypnum callichroum</i>	Near Threatened	8	
<i>Oxyrrhynchium speciosum</i>	Near Threatened	8	
<i>Sphagnum platyphyllum</i>	Near Threatened	8	(ca. 13)
<i>Sphagnum subsecundum</i>	Near Threatened	8	
<i>Thuidium recognitum</i>	Vulnerable	8	
<i>Tortella densa</i>	Near Threatened	8	
<i>Campylopus subulatus</i>	Vulnerable	9	
<i>Encalypta vulgaris</i>	Near Threatened	9	
<i>Hylocomiastrum umbratum</i>	Near Threatened	9	
<i>Orthothecium rufescens</i>	Near Threatened	9	
<i>Sphagnum russowii</i>	Near Threatened	9	
<i>Weissia rostellata</i>	Near Threatened	9	

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<i>Atrichum crispum</i>	Not Evaluated	10	Alien
<i>Cyclodictyon laetevirens</i>	Near Threatened	10	
<i>Hageniella micans</i>	Near Threatened	10	
<i>Leptodontium flexifolium</i>	Near Threatened	10	
<i>Mnium thomsonii</i>	Near Threatened	10	
<i>Paraleptodontium recurvifolium</i>	Near Threatened	10 (11)	
<i>Philonotis caespitosa</i>	Near Threatened	10	
<i>Rhynchostegium megapolitanum</i>	Near Threatened	10	
<i>Antitrichia curtipendula</i>	Near Threatened	11	
<i>Campylopus shawii</i>	Near Threatened	11	
<i>Catoscopium nigratum</i>	Near Threatened	11	
<i>Glyphomitrium daviesii</i>	Least Concern	11 (12)	
<i>Grimmia decipiens</i>	Near Threatened	11	
<i>Grimmia torquata</i>	Near Threatened	11	
<i>Hygroamblystegium varium</i>	Near Threatened	11	
<i>Rhabdoweisia crispata</i>	Near Threatened	11	
<i>Rhodobryum roseum</i>	Near Threatened	11 (ca. 16)	
<i>Sematophyllum demissum</i>	Near Threatened	11	
<i>Sphagnum teres</i>	Near Threatened	11 (12)	
<i>Tomentypnum nitens</i>	Vulnerable	11	
<i>Grimmia hartmanii</i>	Least Concern	12 (14)	
<i>Hamatocaulis vernicosus</i>	Near Threatened	12	
<i>Hygroamblystegium fluviatile</i>	Near Threatened	12	
<i>Platyhypnidium lusitanicum</i>	Near Threatened	12	
<i>Seligeria pusilla</i>	Least Concern	12	
<i>Taxiphyllum wissgrillii</i>	Least Concern	12	
<i>Tortula modica</i>	Vulnerable	12 (14)	New records would move this species to Near Threatened
<i>Zygodon rupestris</i>	Least Concern	12	
<i>Brachythecium mildeanum</i>	Least Concern	13 (17)	
<i>Heterocladium wulfsbergii</i>	Near Threatened	13 (>14)	New records would move to Least Concern
<i>Mnium marginatum</i> var. <i>marginatum</i>	Least Concern	13 (14)	
<i>Pohlia elongata</i> var. <i>elongata</i>	Near Threatened	13 (14)	
<i>Pohlia lutescens</i>	Least Concern	13 (16)	
<i>Racomitrium affine</i>	Least Concern	13	
<i>Rhizomnium pseudopunctatum</i>	Near Threatened	13	
<i>Seligeria donniana</i>	Least Concern	13	
<i>Sphagnum girgensohnii</i>	Near Threatened	13 (15)	
<i>Tortella bambergeri</i>	Least Concern	13	
<i>Tortula atrovirens</i>	Near Threatened	13	
<i>Weissia controversa</i> var. <i>crispata</i>	Data Deficient	13 (15)	
<i>Weissia controversa</i> var. <i>densifolia</i>	Least Concern	13	
<i>Bryum marratii</i>	Least Concern	14	

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<i>Fissidens incurvus</i>	Least Concern	14	
<i>Fissidens taxifolius</i> var. <i>pallidicaulis</i>	Least Concern	14	
<i>Plagiobryum zieri</i>	Near Threatened	14 (15)	
<i>Plagiomnium cuspidatum</i>	Near Threatened	14 (15)	
<i>Pseudocalliergon lycopodioides</i>	Vulnerable	14	
<i>Scleropodium cespitosum</i>	Near Threatened	14 (18)	
<i>Seligeria acutifolia</i>	Least Concern	14	
<i>Ephemerum serratum</i>	Least Concern	15	
<i>Fissidens gracilifolius</i>	Least Concern	15	
<i>Leucobryum juniperoideum</i>	Least Concern	15 (16)	
<i>Orthotrichum rivulare</i>	Near Threatened	15 (16)	
<i>Seligeria recurvata</i>	Least Concern	15	
<i>Cynodontium bruntonii</i>	Least Concern	16	
<i>Kiaeria blyttii</i>	Least Concern	16	
<i>Pohlia cruda</i>	Least Concern	16	
<i>Schistidium strictum</i>	Near Threatened	16 (17)	
<i>Sphagnum angustifolium</i>	Least Concern	16	
<i>Abietinella abietina</i> var. <i>hystricosa</i>	Near Threatened	17	
<i>Dicranella subulata</i>	Least Concern	17	
<i>Microbryum rectum</i>	Least Concern	17	
<i>Sphagnum subnitens</i> var. <i>ferrugineum</i>	Least Concern	17 (19)	
<i>Tortula subulata</i>	Least Concern	17 (21)	New records would remove this species from Nationally Scarce list
<i>Anomobryum concinatum</i>	Least Concern	18 (20)	
<i>Bryum sauteri</i>	Least Concern	18	
<i>Dichodontium flavescens</i>	Least Concern	18 (19)	
<i>Drepanocladus sendtneri</i>	Near Threatened	18 (19)	
<i>Grimmia ramondii</i>	Near Threatened	18 (19)	
<i>Mnium stellare</i>	Least Concern	18 (19)	
<i>Pohlia drummondii</i>	Least Concern	18 (20)	
<i>Campyliadelphus elodes</i>	Near Threatened	19 (21)	New records would remove this species from Nationally Scarce list
<i>Campylopus pilifer</i>	Least Concern	19	
<i>Epipterygium tozeri</i>	Least Concern	19 (24)	New records would remove this species from Nationally Scarce list
<i>Grimmia funalis</i>	Near Threatened	19	
<i>Grimmia lisae</i>	Least Concern	19	
<i>Hygrohypnum eugyrium</i>	Least Concern	19	
<i>Pohlia flexuosa</i>	Least Concern	19 (20)	
<i>Trichostomum hibernicum</i>	Least Concern	19 (20)	
<i>Ctenidium molluscum</i> var. <i>condensatum</i>	Least Concern	20 (21)	New record would remove this species from Nationally Scarce list
<i>Entosthodon fascicularis</i>	Near Threatened	20	
<i>Isoetecium holtii</i>	Least Concern	20	
<i>Leucodon sciuroides</i> var. <i>sciuroides</i>	Least Concern	20	