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An updated checklist of the bryophytes of Italy, including the Republic of San Marino and Vatican City State

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ABSTRACT

The present contribution offers an updated inventory of recorded bryophyte species for Italy, providing the regional distribution for each one. The checklist is based on literature data, revision of bryological collections from several Italian and foreign institutional or private herbaria and recent observations and reports. Five categories based on Natural Breaks have been identified to highlight the floristic diversity between the administrative regions. The checklist includes 1273 taxa (1220 species, 17 subspecies and 36 varieties). Among these, hornworts and liverworts are represented by 301 species, 5 subspecies and 4 varieties, grouped into 99 genera and 55 families, while mosses total 919 species, 12 subspecies and 32 varieties, grouped into 259 genera and 77 families. Such data is presented by a table distinguishing their presence before and after 1968, as well as indicating dubious species based on information relating to bibliographic data. Critical notes on distribution and taxonomy are included and, for ease of reference, synonyms are given for each species. In the last three years, the bryoflora of Italy has increased by 29 taxa. The analysis of the data showed that the regions with the highest peaks of the Alpine chain are the ones with the greatest biodiversity. Among the Apennine regions, Tuscany is the most floristically rich. Sardinia and Sicily have medium levels of biodiversity, favoured by their geomorphological diversity and insularity. For some regions, the low bryophyte richness is linked to the lack of research. Furthermore, the trend of scientific publications on bryophytes over the last 200 years is highlighted.

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Introduction

Bryophytes are a long neglected systematic group that is now recognised as playng an important role in the conservation of biodiversity and, more generally, of ecosystems as well. Indeed, the growing interest in this group of plants is remarkable, given the diversity of habitats they colonise, including the most extreme ones, where they are often the few forms of plant life. The increase in bryological knowledge in all Italian regions in recent years is due to various new floristic and taxonomic data published in floras at a regional scale, notulae, taxonomic reviews, the recent European checklist (Hodgetts and Lockhart 2020). Also the numerous molecular works have led to substantial nomenclatural updates (Hodgetts et al. 2020). In particular, from a taxonomic and nomenclatural point of view, the division of mosses has undergone significant changes in recent years. An example of this is the genus *Didymodon*, which has been divided in to five genera following the molecular study by Jiménez et al. (2022): *Didymodon* Hedw., *Geheebia* Schimp., *Husnotiella* Cardot, *Trichostomopsis* Cardot and *Vinealobryum* R.H.Zander.

The aim of this work is to propose a new edition of the Italian Bryophyte Checklist, just three years after the previous one (Aleffi et al. 2020), in order to have an updated picture of the bryophyte consistency in Italy. The new checklist has also been integrated with the list of synonyms to make it easier to consult. Recent molecular and taxonomic work has led to numerous changes in the systematics and nomenclature of many species, genera, and even entire families. It was also necessary to update the notes on species considered rare, doubtful, or extinct.

A comprehensive list of hornworts, liverworts and mosses known in the administrative regions of Italy is given here. Reports from the Republic of San Marino and the Vatican City State have also been included.

Materials and methods

The present checklist is based on information from the following sources:

- literature relating to Italian reports and studies regarding species from taxonomically difficult genera or groups of species of doubtful occurrence;
- revision of bryological collections from Italian and foreign institutional or private herbaria, following recent molecular works;
- reports *in litteris* of Italian and foreign bryologists.

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The regional distribution is given for each taxon; the tabular representation follows that of previous editions of the checklists. Figure 1 shows the bryophyte richness for the different regions in different shades gray. In order to visualise the distribution of the data, the regions were ranked according to the number of species in five categories (Very high, High, Medium, Medium-low, Low) using the Natural Breaks function (Jenks Natural Breaks algorithm, Slocum 1999). The administrative regions of Italy are arranged from north to south and are designated by the following abbreviations:

AOS = Aosta Valley
PIE = Piedmont
LOM = Lombardy
TRA = Trentino-Alto Adige
VEN = Veneto
FRV = Friuli-Venezia Giulia
LIG = Liguria
EMR = Emilia-Romagna
SMR = Republic of San Marino
TUS = Tuscany
MAR = Marche
UMB = Umbria
LAZ = Lazio
SCV = Vatican City State
ABR = Abruzzo
MOL = Molise
CAM = Campania
PUG = Puglia
BAS = Basilicata
CAL = Calabria
SAR = Sardinia
SIC = Sicily

Nomenclature follows the Checklist of Bryophytes of Europe, Macaronesia and Cyprus (Hodgetts et al. 2020). For the genera *Didymodon* (Jiménez et al. 2022), *Trichostomum* (Ros et al. 2022) and *Ulota* (Lara et al. 2022) the most recent revision works were followed.

A list of synonyms is given in the appendix to facilitate the search (Supplementary Appendix 1).

1. The bibliography consulted until October 2023, starting from 1697, consist of about 2500 references. It includes all the works published by Italian and foreign authors that refer to bryophytes for the Italian territory. The bibliographical citations are grouped in decades from 1801 to 2020 (Figure 4). In order to facilitate the consultation of local floristic knowledge with the bibliography cited in the text and in the notes, all the bibliographic references that report on the Italian territory until 2020, divided into administrative regions, are added as appendices (Supplementary Appendix 2).
2. The list of taxa in the regional distribution table follows an alphabetical order of genera within the Anthocerotophyta, Marchantiophyta and Bryophyta divisions (Table 1).

   Each report uses the following symbols:

   ○report based on collections published before 1968
   ●report based on collections published during or after 1968
   (○)doubtful report based on collections published before 1968
   (●)doubtful report based on collections published during or after 1968
   + report without precise collection data or locality
   (+) doubtful report without precise collection data or locality

   List of abbreviations cited in the notes:

   J.V.: J. Váňa
   M.A.: M. Aleffi
   R.G.: R. Grolle
   R.S.: R. Schumacker
   conf.: confirmavit
   det.: determinavit
   in litt.: in litteris
   leg.: legit
   per: with the erroneous name of
   rev.: revised by
   s.l.: sensu lato
   s.str.: sensu stricto
   sub: with the synonym of
   v.: vidit

   Abbreviations of the 25 Herbaria consulted follow the Index Herbariorum NYBG:

   [BER]: Orto Botanico di Bergamo "Lorenzo Rota", Italy-Bergamo
   [BI]: Museo Orto Botanico, Università degli Studi di Bari (Santarelli Herbarium), Italy-Bari
   [BM]: The Natural History Museum, U.K. England. London.
   [BR]: Meise Botanic Garden, Belgium-Meise.
   [CAG] Università degli Studi di Cagliari, Italy-Cagliari
   [CAME]: University of Camerino, Italy-Camerino (MC)
   [CHER]: Yu. Fedcovich Chernivtsi State University, Ukraine. Chernivtsi.
   [DUKE]: Duke University Herbarium, Durham, North Carolina (USA)
   [FI]: Natural History Museum (Cryptogamic Herbarium), Italy-Firenze
   [G]: Conservatoire et Jardin botaniques de la Ville de Genève, Switzerland-Genève
   [GJO]: Universalmuseum Joanneum, Austria-Graz
   [GZU]: Karl-Franzens-Universität Graz, Austria-Graz
   [JE]: Friedrich Schiller University Jena, Germany-Jena
   [LGHF]: University of Liege – Station Scientifique des Hautes-Fagnes, Belgium-Liège.
   [PC]: Muséum National d'Histoire Naturelle, France-Paris
   [PI]: Università di Pisa. Italy-Pisa
   [RO]: Università degli Studi di Roma La Sapienza (De Notaris Herbarium), Italy-Roma
   [S]: Swedish Museum of Natural History, Sweden-Stockholm
   [SIENA]: Università di Siena, Italy-Siena
   [STU]: Staatliches Museum für Naturkunde Stuttgart (Düll Herbarium), Germany. Stuttgart.
   [TO]: University of Turin, Italy-Torino
   [MRSN]: Museo Regionale di Scienze Naturali, Italy-Torino
   [TR]: MUSE - Museo delle Scienze (Venturi Herbarium), Italy-Trento.,
   [VER]: Museo Civico di Storia Naturale di Verona (Massalongo Herbarium), Italy-Verona
   [W]: Naturhistorisches Museum Wien, Austria-Wien

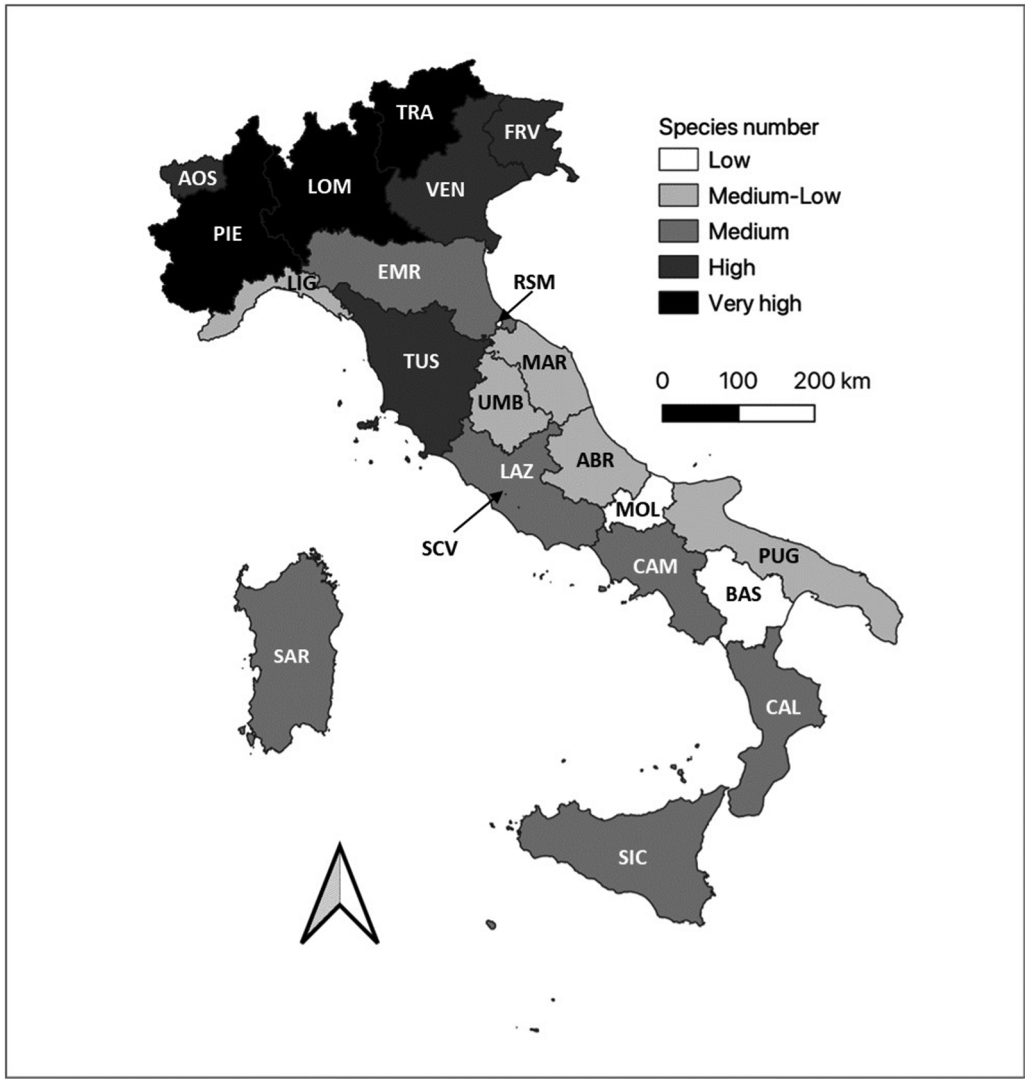


Figure 1. The administrative borders of the Italian regions with the indication of the abbreviations of the regions shown in the taxa distribution tables. Different shades of grey highlight the richness of bryophytes by region. Five categories have been identified based on Natural Breaks, according to the following intervals relating to the number of taxa: Low (192–270); Medium-Low (271–435); Medium (436–610); High (611–755); Very high (756–1038).

Results and discussion

The Italian bryophyte flora comprises 1220 species, 17 subspecies and 36 varieties. Among them, the hornworts and liverworts include 301 species, 5 subspecies and 4 varieties, grouped in 99 genera and 55 families, of which, according to Söderström et al. (2016), three species, one subspecies and one variety present serious doubts about the value of the taxon and have been marked in the table with an asterisk (*). The mosses comprise 919 species, 12 subspecies and 32 varieties, grouped into 259 genera and 77 families. With this new update it has been possible to record an increase of 29 taxa in only three years.

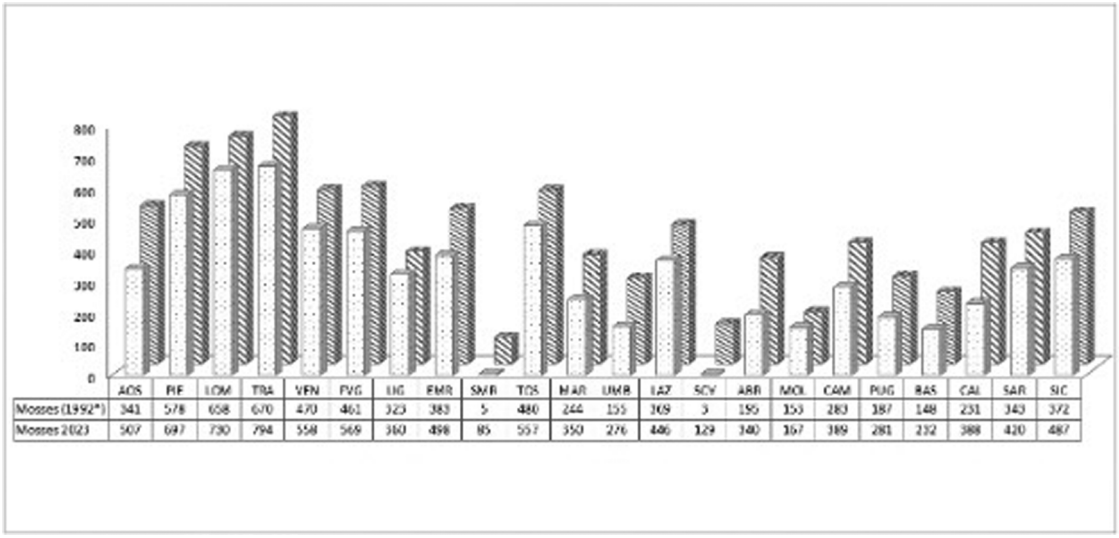
Thirty-six species of liverworts and 11 species of mosses are excluded from the Italian flora, which, although already included in the previous checklists, are considered essential to include in this new edition for the sake of completeness of the data.

Bryophyte taxa recorded in Italy so far are listed in a table indicating the regions where the species' records are made.

The checklist also provides critical annotations on some important misidentifications, nomenclatural and taxonomic problems, and species for which only one record is known.

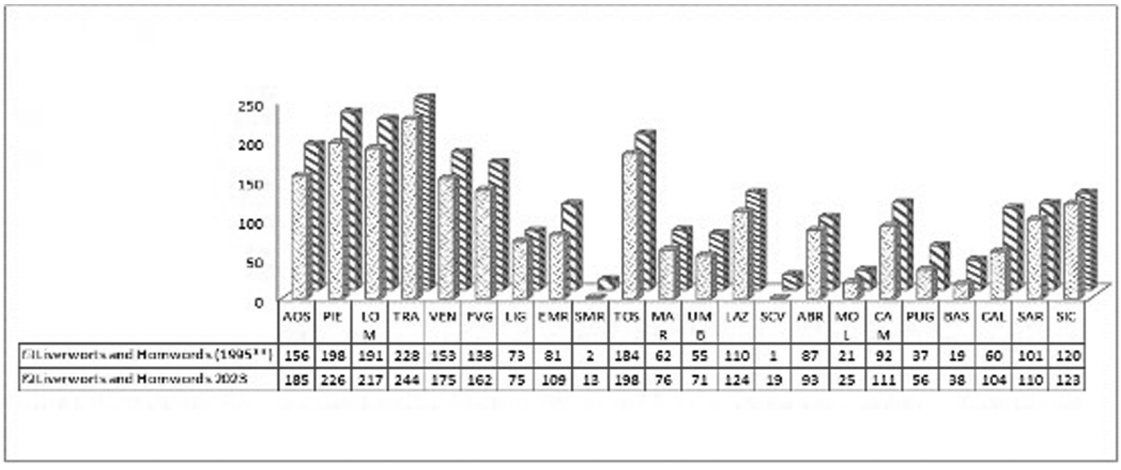
In relation to the 2020 European Checklist, the Italian Brioflora includes almost 64.4% of the European species.

A timely update of the checklist is also an important tool for assessing the threat status of the species. In this regard, following the European Red List (Hodgetts et al. 2019), the Italian bryophytes, for which the Red List of liverworts and hornworts has recently been published (Puglisi et al. 2023), are also evaluated. In this first contribution, 152 of a total of 306 taxa were evaluated, of which 27.4% are assigned to a category at risk and, therefore, considered threatened in Italy; as far as mosses are concerned, 517 out of 963 taxa are being evaluated.



	AOS	PIE	LOM	TRA	VEN	FVG	LIG	EMR	SMR	TOS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
Mosses (1992*)	341	578	658	670	470	461	323	383	5	480	244	155	309	3	155	353	283	387	148	231	343	372
Mosses 2023	507	697	730	794	558	569	360	498	85	557	350	276	446	129	340	367	389	281	232	388	420	487

Figure 2. Increase in the number of entities for each administrative region (including Republic of San Marino and Vatican City State) compared to the data reported in the first Checklist of mosses by Cortini Pedrotti (1992).



	AOS	PIE	LOM	TRA	VEN	FVG	LIG	EMR	SMR	TOS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
Liverworts and Hornworts (1995**)	156	198	191	228	153	138	73	81	2	184	62	55	110	1	87	21	92	37	19	60	101	120
Liverworts and Hornworts 2023	185	226	217	244	175	162	75	109	13	198	76	71	124	19	93	25	111	56	38	104	110	123

Figure 3. Increase in the number of entities in the for each administrative region (including Republic of San Marino and Vatican City State) compared to the data reported in the first Checklist of liverworts and hornworts by Aleffi and Schumacker (1995).

Compared to vascular plants, it is more complex for bryophytes to define the native or non-native status of taxa because the mechanisms of spore dispersion, which also occur over long distances, determining a potential adaptability to colonize different habitats. It is therefore complex to determine whether or not a particular taxon is native to Europe (Hodgetts et al. 2020). Approximately 11% of European bryophytes are considered endemic, 18% of which are also found in Italy; two species (*Riccia breidleri* Jur. Ex Steph. And *Orthotrichum dentatum* T.Kiebacher & Lüth) are considered endemic to the Alpine chain, reported for Italy as well as for France, Switzerland and Austria.

From Figure 1 it can be seen that the regions with the greatest biodiversity are Trentino-Alto Adige, Lombardy and Piedmont, whose territories are occupied by the highest peaks of the Alpine chain. At the same time present a great variety of substrates and are subject to different climatic influences compared to the Mediterranean and continental ones. On the other hand, Aosta Valley, Veneto and Friuli-Venezia Giulia, although also part of the Alpine area, have several taxa that can be placed in a lower category, probably due to the greater uniformity of the substrate.

Compared to the other peninsular regions, Tuscany is the Apennine region with a greater floristic richness, which is due to the great environmental variability, both from a geological and climatic point of view, compared to the other regions of the central-southern Apennines, where there is greater edaphic uniformity and a significantly reduced number of taxa. In particular, the Adriatic regions have in a medium to low bryophyte richness compared to the Tyrrhenian regions, which are in a medium category. Among the latter are Sardinia and Sicily, certainly favoured by the geomorphological diversity (iosystematic by the presence of the mountain massifs of Gennargentu and Limbara in Sardinia, and of Etna and Madonie in Sicily) and, above all, by insularity.

Another important aspect to be taken into consideration is the different level of bryophytic knowledge at a regional level, which varies greatly from one region to

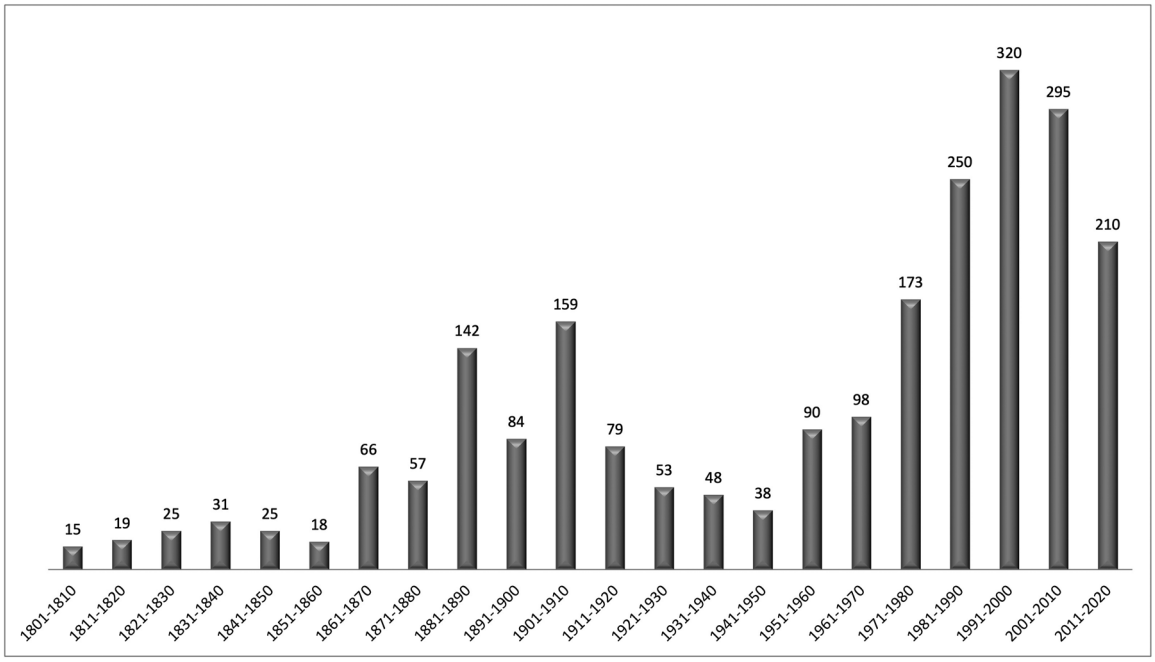


Figure 4. Bibliographical citations grouped in decades from 1801 to 2020.

another. This is particularly the case for Molise and Basilicata, which have a low recorded bryophyte richness. While, as can be seen in Supplementary Appendix 2, the regions with the highest number of surveys are mainly those of the Alpine chain.

These two aspects are iosystema in the two histograms showing the increase in the number of entities at a regional level over the last 30 years for mosses (Figure 2) and liverworts (Figure 3). This result is shown by comparing the first two checklists (Cortini Pedrotti 1992; Aleffi and Schumacker 1995) with the current data.

In general, the analysis of the bibliographical data shows that the progress of bryological research in Italy since the eighteenth century has been remarkable. As can be seen of Figure 4, bryological knowledge in Italy began to gain some importance at the beginning of the nineteenth century. However, the golden age of Italian bryology reached its peak in the second half of the nineteenth century. This increase in scientific production is mainly due to the contribution of some Italian bryologists through the publication of monographs on genres of complex interpretation. In the first half of the nineteenth century, Italian Bryology enters the most critical period of its history and it is necessary to reach the end of the seventies to notice a certain resumption of bryological studies by young scholars and researchers. This recovery is documented by the increase in scientific production of an exclusively bryological nature and by the creation, in 1992, of the Working Group for Bryology of the Italian Botanical Society, under the impetus given to this research by Prof. Carmela Cortini.

Conclusion

The growing interest in this systematic group on the part of numerous researchers is leading to a constant increase in the number of species included in the census, as well as in its ecological value in relation to the increasingly frequent cross-taxon surveys aimed at defining plant biodiversity and, consequently, at protecting the habitats in which species grow.

At the same time, molecular iosystematics investigations have also made considerable progress in recent years, often leading to the clarification and modification of the placement of some genera and species, sometimes in unexpected ranks. From these considerations and from the data obtained, it is clear that there is a need to constantly update and increase the number of field studies, especially in those areas of the Italian territory that, according to the current state of knowledge, are still poorly explored from a bryofloristic point of view.

Finally, it should be noted that the Checklist of the Bryophytes is not only an important contribution from a floristic and chorological point of view, but it also allows new and more in-depth reflections on the ecology, biogeographical and conservation aspects of the Italian bryophyte flora. An example of this is the role of the group of species of Community interest listed in Annex II of the Habitats Directive 92/43/EEC. By constantly updating knowledge of the distribution of these species, it is possible to carry out a careful analysis of the conservation status of the species and habitats protected by the Directive. It also makes it possible to continuously assess the trends of the various populations and to review the threats affecting their future prospects. One example is *Petalophyllum ralfsii*, a typical Mediterranean species of coastal salt meadows and lagoons environments. *Riccia breidleri*, a liverwort endemic exclusive to alpine lakes. The presence and distribution of *Hamatocaulis vernicosus* and all the species of the *Sphagnum* genus are crucial for monitoring the health status of peatlands.

Table 1. Regional status of taxa.

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
Hornworts and Liverworts																						
Anastrepta (Lindb.) Schiffn. (Anastrophyllaceae)																						
orcadensis (Hook.) Schiffn. [1]	○	○	○	●		○																
Anastrophyllum (Spruce) Steph. (Anastrophyllaceae)																						
assimile (Mitt.) Steph.	○	○		●																		
michauxii (F.Weber) H.Buch			○		○	○																
Aneura Dumort. (Aneuraceae)																						
pinguis (L.) Dumort.	●	●	●	●	●	●	●	●		●	●	●	●		●	●	●		+	○	●	●
Anthelia (Dumort.) Dumort. (Antheliaceae)																						
julacea (L.) Dumort.	●	●	○	●		○																
juratzkana (Limpr.) Trevis.	●	●	●	●	●	○		●		●			●		●							
Anthoceros L. (Anthocerotaceae)																						
agrestis Paton		○	●	●						○			●	●			○			●	○	●
caucasicus Steph. [2]										●												
punctatus L.	○	○	○	●			○			●	○		○				●	○		●	●	●
Apopellia (Grolle) Nebel & D.Quandt (Pelliaceae)																						
endiviifolia (Dicks.) Nebel & D.Quandt	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	○	●	●	●
Arnellia Lindb. (Arnelliaceae)																						
fennica (Gottsche) Lindb. [3]	○			(○)		(○)																
Asterella P.Beauv. (Aytoniaceae)																						
africana (Mont.) Underw. ex A.Evans [4]																					○	
lindenbergiana (Corda ex Nees) Lindb. ex Arnell	●	●	○	●	●	○							●									
saccata (Wahlenb.) A.Evans	●	○	○			○																
Barbilophozia Loeske (Anastrophyllaceae)																						
barbata (Schmidel ex Schreb.) Loeske	●	●	●	●	●	●	●	●		●	●		●		○	●						●
hatcheri (A.Evans) Loeske	●	●	●	●				●		●		●	●		●	●				●	●	●
lycopodioides (Wallr.) Loeske	●	●	●	●	●	●		●		●	●		●		●	●						
sudetica (Nees ex Huebener) L.Söderstr., De Roo & Hedd.	●	●	○	●	●	○		●		●			●				●					
Bazzania Gray (Lepidoziaceae)																						
flaccida (Dumort.) Grolle		●	●	●				○		●										○		
tricrenata (Wahlenb.) Lindb. var. *tricrenata*	●	●	●	●	●	○		(○)		(○)										(○)		
trilobata (L.) Gray var. *trilobata*		●	●	●	●	●				●			○									●
Blasia L. (Blasiaceae)																						
pusilla L.	●	●	○	●	○	○	○			●	○		●		●		○			●		○
Blepharostoma (Dumort.) Dumort. (Blepharostomataceae)																						
trichophyllum (L.) Dumort. subsp. *trichophyllum*	●	●	●	●	●	●	○	●		●			○		●					●		
subsp. *brevirete* (Bryhn & Kaal.) R.M.Schust.	●	●		●		●																
Calypogeia Raddi (Calypogeiaceae)																						
arguta Nees & Mont.	+	○	●	●	●	●				●					●		●			●	●	●
azurea Stotler & Crotz [5]	●	●	●	●	●	●	(○)	(○)		○			(○)		●		(○)			●	(○)	●
fissa (L.) Raddi subsp. *fissa*	●	●	●	●	●	●	●	●		●	●	●	●		●		●		●	●	●	●
integristipula Steph.		●		●		●																
muelleriana (Schiffn.) Müll.Frib. subsp. *muelleriana*		●	●	●	●	●				●										○		●
neesiana (C.Massal. & Carestia) Müll.Frib. subsp. *neesiana*	●	●	●	●	●	●															●	
sphagnicola (Arnell & J.Perss.) Warnst. & Loeske [6]	●	(○)	●	●	●															●		+
suecica (Arnell & J.Perss.) Müll.Frib.			●	●	●	●				●					●							
Cephalozia (Dumort.) Dumort. (Cephaloziaceae)																						
ambigua C.Massal.	●	●	●	●	●			●		●												
bicuspidata (L.) Dumort. subsp. *bicuspidata*	●	●	●	●	●	●	○	●		●	●	○	●		●		●	○		●	●	●
Cephaloziella (Spruce) Schiffn. (Cephaloziellaceae)																						
baumgartneri Schiffn.		○	●	●	●	●		●		●	●	●	●	●			●	●		●	●	●
calyculata (Durieu & Mont.) Müll.Frib.					○			●		●		●					●				●	●
dentata (Raddi) Steph.		○				●				●			●				●				●	●
divaricata (Sm.) Schiffn. var. *divaricata*	●	●	○	●	○	●	●	●		●	●	●	○	●	●		●			●	●	●

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
elachista (J.B.Jack ex Gottsche & Rabenh.) Schiffn. var. *elachista*			●	●	(●)												(○)					
elegans (Heeg) Schiffn.		○		○	○												○					
grimsulana (J.B.Jack ex Gottsche & Rabenh.) Lacout.	○	●		○																		
hampeana (Nees) Schiffn. ex Loeske	●	●	+	●	●	●		●		●	●	●	●		●		○	●		○	●	
integerrima (Lindb.) Warnst. [7]		(○)	●							(○)												
massalongi (Spruce) Müll.Frib.	●	●		●						●												
phyllacantha (C.Massal. & Carestia) Müll.Frib.		●								●												
rubella (Nees) Warnst.	●	●		●	●	●		●		●	●	●	●		●		○			●	●	●
stellulifera (Taylor ex Carrington & Pearson) Croz.		●		●	○					●		●	●				●				●	●
turneri (Hook.) Müll.Frib.			○				●			●		●	●				●			●	●	●
varians (Gottsche) Steph.		○	○	●																		
Chiloscyphus Corda (Lophocoleaceae)																						
pallescens (Ehrh.) Dumort. var. *pallescens*	○	○	○	●	●	○	○	●		○	●		●		●		○			○	●	●
polyanthos (L.) Corda var. *polyanthos*	●	●	●	●	○	●	●	●	○	●	●		●	●	●	●				●	●	●
Clevea Lindb. (Cleveaceae)																						
hyalina (Sommerf.) Lindb.	●	●	●	●	○	○							●		○				○	○		
spathysii (Lindenb.) Müll.Frib.																	○		○			●
Cololejeunea (Spruce) Steph. (Lejeuneaceae)																						
calcarea (Lib.) Steph.	●	●	●	●	●	●				●	●				●		●	○	○	●	●	
rossettiana (C.Massal.) Schiffn.				●		●		●		●	●	●	●	●			●	●		●	●	●
Conocephalum Hill (Conocephalaceae)																						
conicum (L.) Dumort.	●	●	●	●	●	●	●	●	○	●	●	●	●		●	●	●	●		●	●	●
salebrosum Szweyk., Buczk. & Odrzyk.			●	●	●	●				●	●	●	●	●						●		
Corsinia Raddi (Corsiniaceae)																						
coriandrina (Spreng.) Lindb.	○	○	●		○		●			●			●				●			●	●	●
Crossocalyx Meyl. (Anastrophyllaceae)																						
hellerianus (Nees ex Lindenb.) Meyl.		○		●	○	○																
Cyathodium Kunze (Cyathodiaceae)																						
foetidissimum Schiffn. [8]																	●					
Diplophyllum (Dumort.) Dumort. (Scapaniaceae)																						
albicans (L.) Dumort.	●	●	●	●	●	●	○	●		●			●							●	●	●
obtusatum (R.M.Schust.) R.M.Schust. [9]										○												
obtusifolium (Hook.) Dumort. subsp. *obtusifolium*	●	●	●	●		●					○		○		●							
taxifolium (Wahlenb.) Dumort. var. *taxifolium*	●	●	○	●	●	○		○		●												
Dumortiera Nees (Dumortieraceae)																						
hirsuta (Sw.) Nees subsp. *hirsuta*						(●)	●			●							●			●		
Eremonotus Lindb. & Kaal. ex Pearson (Jungermanniaceae)																						
myriocarpus (Carrington) Lindb. & Kaal. ex Pearson	●	●	○	●		●		●		●												
Exormotheca Mitt. (Exormothecaceae)																						
pustulosa Mitt.																	○					●
Fossombronia Raddi (Fossombroniaceae)																						
angulosa (Dicks.) Raddi		○	○	●			●			●		○	●	●			●			●	●	●
caespitiformis (Raddi) De Not. ex Rabenh. subsp. *caespitiformis*			○		●		○	●		●	●	●	●	●			●	●		●	●	●
subsp. *multispira* (Schiffn.) J.R.Bray & Cargill					●		○			●		●	●				●	●		●	●	●
echinata Macvicar							●			●			○				●				●	●
foveolata Lindb.				(○)		○																
maritima (Paton) Paton [10]																	●					
mittenii Tind. [11]																						●
pusilla (L.) Nees	+	○	○	○	●		○			○	○	●	●				●	●	●	●	●	●
wondraczekii (Corda) Dumort. ex Lindb.		○	●						○	●		●					●			○	○	●
Frullania Raddi (Frullaniaceae) [12]																						
cleistostoma Schiffn. & W.Wollny [13]				●																		

(*Continued*)

Table 1. Continued

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
dilatata (L.) Dumort. subsp. *dilatata*	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●
fragilifolia (Taylor) Gottsche, Lindenb. & Nees	●	○		●	●	●		●		●					●			●		●	●	○
jackii Gottsche	●	●	○	●	○					●												
parvistipula Steph.				●																		●
riparia Hampe		○	●	●	○	●				○	●											
tamarisci (L.) Dumort.	●	●	●	●	●	●	○	●		●	●	●	●		○	○	●	●	○	●	●	●
Fuscocephaloziopsis Fulford (Cephaloziaceae)																						
albescens (Hook.) Váňa & L.Söderstr. var. *albescens*	●	●	○	●											●							
*var. islandica (Nees) Váňa & L.Söderstr. [14]			○																			
catenulata (Huebener) Váňa & L.Söderstr. subsp. *catenulata*	○	○	○	●	○	●				●												
connivens (Dicks.) Váňa & L.Söderstr. subsp. *connivens*	●	●	●	●	●	○		●		●							○					
leucantha (Spruce) Váňa & L.Söderstr.		●		●	○	○																
loitlesbergeri (Schiffn.) Váňa & L.Söderstr.		○		●																		
lunulifolia (Dumort.) Váňa & L.Söderstr.	●	○	●	●	●	●		●		●					●					●		
macrostachya (Kaal.) Váňa & L.Söderstr. subsp. *macrostachya* [15]		●																				
pleniceps (Austin) Váňa & L.Söderstr. var. *pleniceps*	●	●	●	●	●	●																
Geocalyx Nees (Geocalycaceae)																						
graveolens (Schrad.) Nees	○	○	○																			
Gongylanthus Nees (Southbyaceae)																						
ericetorum (Raddi) Nees				○			●			●	●	●	●				●	●		●	●	●
Gymnocolea (Dumort.) Dumort. (Anastrophyllaceae)																						
inflata (Huds.) Dumort. subsp. *Inflata*	●	●	●	●	●	●	○	●		●	○											
*subsp. acutiloba (Schiffn.) R.M.Schust. ex L.Söderstr. & Váňa [16]				●																		
Gymnomitrion Corda (Gymnomitriaceae)																						
adustum Nees [17]		○																				
alpinum (Gottsche ex Husn.) Schiffn.	○	○	○	●																		
brevissimum (Dumort.) Warnst.	●	●	○	●		○		●		●												
commutatum (Limpr.) Schiffn.	○	●	○	●		○																
concinnatum (Lightf.) Corda	●	●	○	●	○	○		●		●												
corallioides Nees	●	●	○	●	+	○																
obtusum Lindb. [18]				●																		
revolutum (Nees) H.Philib. subsp. *revolutum*		○	○	●		○																
Haplomitrium Nees (Haplomitriaceae)																						
hookeri (Lyell ex Sm.) Nees var. *hookeri*		●	(○)	(○)																		
Harpalejeunea (Spruce) Schiffn. (Lejeuneaceae)																						
molleri (Steph.) Grolle subsp. *molleri*							●			●											○	
Harpanthus Nees (Harpanthaceae)																						
flotovianus (Nees) Nees			○	●																		
scutatus (F.Weber & D.Mohr) Spruce	○		+	●	○	○																
Hygrobiella Spruce (Hygrobiellaceae)																						
laxifolia (Hook.) Spruce		○		○																		
Isopaches H.Buch (Anastrophyllaceae)																						
bicrenatus (Schmidel ex Hoffm.) H.Buch	○	●	●	●	○					●			○				○	○				
decolorans (Limpr.) H.Buch	●	●		●																		
Jungermannia L. (Jungermanniaceae)																						
atrovirens Dumort.	●	●	●	●	●	●	●	●		●	●	●	●		●		●		●	●	●	●
borealis Damsh. & Váňa	●	●		●	●					●												
eucordifolia Schljakov	○	○	○	●		●	○															○
polaris Lindb.	●	●	○	+		○				●					●							

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
pumila With.	●	●	○	●	○	●	○			●			○		●		●					○
Kurzia G.Martens (Lepidoziaceae)																						
sylvatica (A.Evans) Grolle		○								●												
trichoclados (Müll.Frib.) Grolle		○	○	●																		
Lejeunea Lib. (Lejeuneaceae)																						
cavifolia (Ehrh.) Lindb.	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●
lamacerina (Steph.) Schiffn. subsp. *lamacerina*		●		●	●	●				●			●				○				●	
Lepidozia (Dumort.) Dumort. (Lepidoziaceae)																						
reptans (L.) Dumort.	○	●	●	●	●	●		○		●			○									
Liochlaena Nees (Jungermanniaceae)																						
lanceolata Nees	○	○	○	●	○	●	○	●		○	○							○			○	
Lophocolea (Dumort.) Dumort. (Lophocoleaceae)																						
bidentata (L.) Dumort.	●	●	●	●	●	●	○	●		●	●	●	●		●	●	●	●	●	●	●	●
fragrans (Moris & De Not.) Gottsche, Lindenb. & Nees subsp. *fragrans*								○		●			●				○					
heterophylla (Schrad.) Dumort. subsp. *heterophylla*	●	●	●	●	●	●	●	●		●	●	●	●		●	●	●	●		●	●	●
minor Nees	●	●	○	●	●	○	●	●		●	●		●		●		●					●
Lophozia (Dumort.) Dumort. (Lophoziaceae)																						
ascendens (Warnst.) R.M.Schust.	●	●		●	●	●									●							
guttulata (Lindb. & Arnell) A.Evans	○		+	●	○					+												
longiflora (Nees) Schiffn.	●	●	●	●	○	●				●												
silvicola H.Buch [19]				●																		
ventricosa (Dicks.) Dumort.	●	●	●	●	●	●		●		●			●		●					●	(○)	
**wenzelii* (Nees) Steph. [20]	●	●	○	●	●	●		●		●			●		●							
Lophoziopsis Konstant. & Vilnet (Lophoziaceae)																						
excisa (Dicks.) Konstant. & Vilnet var. *excisa* [21]	○	●	●	●	○	○				●	●		●		○		○				(○)	●
longidens (Lindb.) Konstant. & Vilnet subsp. *longidens*	●	●	●	●	●	○				○												
Lunularia Adans. (Lunulariaceae)																						
cruciata (L.) Dumort. ex Lindb. subsp. *cruciata*		●	●	●	●	●	●	●	○	●	●	●	●	●	●		●	●	○	●	●	●
Mannia Corda (Aytoniaceae)																						
androgyna (L.) A.Evans	○	●	●	○	●	○	○	○	○	●		○	●				●	○		●	●	●
californica (Gottsche) L.C.Wheeler [22]			●																			
fragrans (Balb.) Frye & L.Clark subsp. *fragrans*	●	○	●	●	●	○		○		○			○						○			●
gracilis (F.Weber) D.B.Schill & D.G.Long	●	●	●	○	●										●							
pilosa (Hornem.) Frye & L.Clark	●	○	●	●	○	○																
triandra (Scop.) Grolle		○	●	●	○	○				○			○				○					
Marchantia L. (Marchantiaceae)																						
paleacea Bertol. subsp. *paleacea*		○	●	●	○	●	●			●		●	●		●		●	○		●		●
polymorpha L. subsp. *polymorpha*	●	●	●	●		●				●		●	●		●		○	●	●	●	●	
subsp. *montivagans* Bischl. & Boissel.-Dub.	●	●	●	●	●	●						●			●				●			
subsp. *ruderalis* Bischl. & Boissel.-Dub.	●	●	●	●	●	●	○	●		●	●	●	●	●	●	●	●	●	○	●	●	●
quadrata Scop. subsp. *quadrata*	●	●	●	●	●	●	●	●		●	●	●	●		●		●	●		●	●	○
Marchesinia Gray (Lejeuneaceae)																						
mackaii (Hook.) Gray				●			●	●		●			●				●					
Marsupella Dumort. (Gymnomitriaceae)																						
aquatica (Lindenb.) Schiffn.	○	○	○	●						●												
boeckii (Austin) Lindb. ex Kaal.	○					○																+
condensata (Ångstr. ex C.Hartm.) Lindb. ex Kaal.			○	+																		
emarginata (Ehrh.) Dumort.	●	●	●	●	●		●	●		●	●		●				●			●	●	●
funckii (F.Weber & D.Mohr) Dumort.	●	●	○	●	●	○	●	●		●					●							
sparsifolia (Lindb.) Dumort. subsp. *sparsifolia*	●	○	○	○																		
sphacelata (Gieseke ex Lindenb.) Dumort.	●	●	●	●																		

(*Continued*)

Table 1. Continued

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
sprucei (Limpr.) Bernet	●	●	○	●				●		●					●							
Mesoptychia (Lindb.) A.Evans (Jungermanniaceae)																						
badensis (Gottsche ex Rabenh.) L.Söderstr. & Váňa	●	●	●	●	●	●				●			●		●							
bantriensis (Hook.) L.Söderstr. & Váňa subsp. *bantriensis*	●	●	○	●	●	●		●		●	●		●		●		●			●		
**collaris* (Nees) L.Söderstr. & Váňa [23]	○	○	●	●	●	●		○		●					●	●		●	●		○	●
gillmanii (Austin) L.Söderstr. & Váňa var. *gillmanii*	●	●																				
heterocolpos (Thed. ex Hartm.) L.Söderstr. & Váňa var. *heterocolpos*	●	●	○	●	●	○				○			●		●							
turbinata (Raddi) L.Söderstr. & Váňa	○	○	○	○	●	●	○	●		●	●	●	○		●		●		●	●	●	●
Metzgeria Raddi (Metzgeriaceae)																						
conjugata Lindb.	○	●	●	●	●	●	●			●					●		○			●	●	
furcata (L.) Corda	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●
pubescens (Schrank) Raddi	●	●	●	●	●	●	○	○		●	○		○		●		○			○		●
**simplex* Lorb. ex Müll.Frib. [24]							●			●												
violacea (Ach.) Dumort.				●	●	●																
Microlejeunea (Spruce) Steph. (Lejeuneaceae)																						
ulicina (Taylor) Steph.				●	●					●										●		●
Moerckia Gottsche (Moerckiaceae)																						
blyttii (Mørch) Brockm.	●	●	+	○																		
flotoviana (Nees) Schiffn.				●		○																
hibernica (Hook.) Gottsche		○		●		●				○					●							
Mylia Gray (Myliaceae)																						
anomala (Hook.) Gray	●	○	○	●	●	○				○												
taylorii (Hook.) Gray			(○)	●	●	●																
Myriocoleopsis Schiffn. (Lejeuneaceae)																						
minutissima (Sm.) R.L.Zhu, Y.Yu & Pócs subsp. *minutissima*			○				○			●			●		●		●	●		●		●
Nardia Gray (Gymnomitriaceae)																						
breidleri (Limpr.) Lindb.	●		○	●																		
compressa (Hook.) Gray	●	○	○	●																		
geoscyphus (De Not.) Lindb. var. *geoscyphus*	●	●	●	●		○		●		●					●							○
scalaris Gray var. *scalaris*	●	●	●	●		○		●		●	○	●	○				○			●		●
Neoorthocaulis L.Söderstr. (Anastrophyllaceae)																						
attenuatus (Mart.) L.Söderstr., De Roo & Hedd.	○	○	○	●	●	○				○												
floerkei (F.Weber & D.Mohr) L.Söderstr., De Roo & Hedd.	●	●	●	●	●	○				○												●
Notothylas Sull. (Notothyladaceae)																						
orbicularis (Schwein.) Sull. [25]				○																		
Nowellia Mitt. (Cephaloziaceae)																						
curvifolia (Dicks.) Mitt.	○	○	●	●	●	●				○	●		●							●		
Obtusifolium S.W.Arnell (Cephaloziellaceae)																						
obtusum (Lindb.) S.W.Arnell		●	○	●				●														
Odontoschisma (Dumort.) Dumort. (Cephaloziaceae)																						
denudatum (Mart.) Dumort. subsp. *denudatum*		○	●	●	●	●		●		●												
elongatum (Lindb.) A.Evans	●	○	●	●	●	●				●												
fluitans (Nees) L.Söderstr. & Váňa			●	●	●	●																
francisci (Hook.) L.Söderstr. & Váňa [26]										○												
macounii (Austin) Underw. [27]				○																		
sphagni (Dicks.) Dumort.		○	○	●	●					○												
Oleolophozia L.Söderstr., De Roo & Hedd. (Cephaloziellaceae)																						
perssonii (H.Buch & S.W.Arnell) L.Söderstr., De Roo & Hedd. [28]				●																		

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
Oxymitra Bisch. ex Lindenb. (Oxymitraceae)																						
incrassata (Brot.) Sérgio & Sim-Sim	●	○	●	●	○					●			○				●	●		●	●	●
Pallavicinia Gray (Pallaviciniaceae)																						
lyellii (Hook.) Gray		○	+							●												
Pedinophyllum Lindb. ex Nordst. (Plagiochilaceae)																						
interruptum (Nees) Kaal.	●	●	●	●	●	●	●	●		●	●		●		●	●	●		●	●	●	●
Pellia Raddi (Pelliaceae)																						
epiphylla (L.) Corda subsp. *epiphylla*	●	●	●	●	○	●	○	●		●	●	●	●	●	●		○	●		●	●	●
neesiana (Gottsche) Limpr.	●	●	●	●	●	●				●					●					●		
Peltolepis Lindb. (Cleveaceae)																						
quadrata (Saut.) Müll.Frib.		●	●	●	●	●																
Petalophyllum Nees & Gottsche (Petalophyllaceae)																						
ralfsii (Wilson) Nees & Gottsche										●										●	●	●
Phaeoceros Prosk. (Notothyladaceae)																						
carolinianus (Michx.) Prosk. [29]			●																			
laevis (L.) Prosk.		○	○	●	○	○				●		●	●				●			●	●	●
Phymatoceros Stotler (Phymathocerotaceae)																						
bulbiculosus (Brot.) Stotler, W.T.Doyle & Crand.-Stotl.			○	○			○			●	○		●				○			●	●	●
Plagiochasma Lehm. (Aytoniaceae)																						
rupestre (J.R.Forst. & G.Forst.) Steph. var. *rupestre*	●		●				●			●			●				●		●	●	●	●
Plagiochila (Dumort.) Dumort. (Plagiochilaceae)																						
asplenioides (L.) Dumort.	●	●	●	●	●	●	●	●	○	●	○	●	○		●	●	●		●	●	●	●
bifaria (Sw.) Lindenb. var. *bifaria* [30]										●												
exigua (Taylor) Taylor		●								●												
porelloides (Torr. ex Nees) Lindenb. var. *porelloides*	●	●	●	●	●	●	●	●		●	●	●	●		●	●	●	●	●	●	●	●
Porella L. (Porellaceae)																						
arboris-vitae (With.) Grolle subsp. *arboris-vitae*	+	●	●	●	●	●	●	●		●	●	○	○		●		●			○	●	○
baueri (Schiffn.) C.E.O.Jensen	○	○	○	●	●								●									+
cordaeana (Huebener) Moore	●	●	○	●	●	●		●		●	●	○	○		●	●	●	●	●	●	●	●
obtusata (Taylor) Trevis.	○	○	○	●	○	○	○		○	●	●	○	●					●			●	●
platyphylla (L.) Pfeiff.	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
Ptilidium Nees (Ptilidiaceae)																						
ciliare (L.) Hampe	●	●	○	●	●	●		●														
pulcherrimum (Weber) Vain.	●	●	●	●	●	●																
Radula Dumort. (Radulaceae)																						
complanata (L.) Dumort.	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●
lindenbergiana Gottsche ex C.Hartm.	●	●	●	●	●	●		●		●	●	○	●					●	●		●	●
visianica C.Massal. [31]				○	○																	
Reboulia Raddi (Aytoniaceae)																						
hemisphaerica (L.) Raddi subsp. *hemisphaerica*	●	●	●	●	●	●	○	●	○	●	●	●	●		●	○	●	●	●	●	●	●
Riccardia Gray (Aneuraceae)																						
chamedryfolia (With.) Grolle	●	●	○	○						●		●						●		●	●	●
latifrons (Lindb.) Lindb. subsp. *latifrons* [32]		○		●	●	●				○					●							
multifida (L.) Gray subsp. *multifida*	●	○	●	●	●	●	○	○		●	○						●	●		●	●	●
palmata (Hedw.) Carruth.	○	○	○	●	●	●				○										●		●
Riccia L. (Ricciaceae)																						
atromarginata Levier var. *atromarginata*													○								(○)	●
beyrichiana Hampe		○	●	○						●		●					●	●			●	
bicarinata Lindb.										○							●				●	●
bifurca Hoffm.		○	○	●	●		○	○		●			○				●			●	●	●
breidleri Jur. ex Steph.	●	●	●	●																		
canaliculata Hoffm.		○	○		○					○		●	●								●	
cavernosa Hoffm.		●	●	●	●			●		○					●			●		●		●

(*Continued*)

Table 1. Continued

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
ciliata Hoffm.	●	●	●	●	○					○	○	●	○				●				●	●
ciliifera Link	●	○	●	●						○							●	●			●	●
crozalsii Levier	●			●		●				●		●	●				○	●			●	●
crystallina L.		○	○	○	●			○		●			●				●				●	●
duplex Lorb. ex Müll.Frib. var. *duplex* [33]						●																
fluitans L.		●	●	●	○	●	○	●		●	●	●	●				○	●		○		●
frostii Austin var. *frostii*		○	●					○														
glauca L. var. *glauca*	○	○	●	●	●	●	○	○		○	○		●		●		○			●	●	●
var. *ciliaris* Warnst.	○																				●	
gougetiana Durieu & Mont. var. *gougetiana*				●						●	○	●	●				●				●	●
var. *armatissima* Levier ex Müll.Frib.										○											●	
huebeneriana Lindenb. subsp. *huebeneriana*			●	●				○		○												
lamellosa Raddi				●						○							●	●			●	●
ligula Steph.		○	○														○				●	
macrocarpa Levier										●			●				○	●			●	●
michelii Raddi	○	●	○							●	○	●	●				○	●		●	●	●
nigrella DC.	○	○	●	●	○		○			●		●	○				●	●		●	●	●
papillosa Moris			○	●						●							○				●	●
perennis Steph.					○																●	
sommieri Levier										●							○				●	
sorocarpa Bisch. subsp. *sorocarpa*	●	○	●	●	●			●		●		●	●				●	●		●	●	●
subbifurca Warnst. ex Croz.	○		●							●		●					●	●				
trabutiana Steph. [34]																						●
warnstorfii Limpr. ex Warnst.	●	○	○	●						●			○		●						(○)	●
Ricciocarpos Corda (Ricciaceae)																						
natans (L.) Corda		○	○	●	○			○		●	●	●	●		●							
Riella Mont. (Riellaceae)																						
helicophylla (Bory & Mont.) Mont. var. *helicophylla* [35]																					●	
notarisii (Mont.) Mont.																				●	○	●
Saccobasis H.Buch (Scapaniaceae)																						
polita (Nees) H.Buch	●	●	○	●	●																	
Saccogyna Dumort. (Saccogynaceae)																						
viticulosa (L.) Dumort.		+	+			●		○		●			○								(○)	
Sauteria Nees (Cleveaceae)																						
alpina (Nees) Nees	●	●	●	●	●	○																
Scapania (Dumort.) Dumort. (Scapaniaceae)																						
aequiloba (Schwägr.) Dumort.	●	●	○	●	●	●	○	●	○	●		○	●		●	●	●		●	●		●
apiculata Spruce	○	○		●	○																	
aspera M.Bernet & Bernet		○	●	●	●	●				●	●	●	●		●		●	●	●	●	(○)	●
calcicola (Arnell & J.Perss.) Ingham	●	●		●	●					●	●		●		●	●						
carinthiaca J.B.Jack ex Lindb. var. *massalongi* Müll.Frib. [36]	●				○																	
compacta (Roth) Dumort.	○	○	●	●	○		●			●	○	●	●				●		●	●	●	●
crassiretis Bryhn	●	○	○																			
curta (Mart.) Dumort. var. *curta*	●	●	○	●	●	●		●		○		○			●			○		○		○
cuspiduligera (Nees) Müll.Frib. var. *cuspiduligera*	●	●	○	●	●	●							●		●							
glaucocephala (Taylor) Austin var. *glaucocephala*		●		●																		
gracilis Lindb.			(○)	●	●					●		(○)										
gymnostomophila Kaal.		●		●																		
helvetica Gottsche	●	●	○	●	○	○		●		●												
irrigua (Nees) Nees subsp. *irrigua*	●	●	●	●	●	●		●		●					●							
lingulata H.Buch var. *lingulata* [37]	●																					

(*Continued*)

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
mucronata H.Buch	●	●	●	●						●												
nemorea (L.) Grolle	●	●	●	●	●	●	●	●		●	●	●	○		●		○		●	●		○
obscura (Arnell & C.E.O.Jensen) Schiffn. [38]	●																					
paludicola Loeske & Müll.Frib. var. *paludicola*	●	●	●	●	●	●		●														
paludosa (Müll.Frib.) Müll.Frib.	●			●	●	●																
praetervisa Meyl. [39]	●	●																				
scandica (Arnell & H.Buch) Macvicar var. *scandica*	●	●		●	●			●		●			●		●							
scapanioides (C.Massal.) Grolle [nota]					○										(○)							
subalpina (Nees ex Lindenb.) Dumort. var. *subalpina*	●	●	○	●				●		○										●		●
uliginosa (Lindenb.) Dumort.	○	●	○	●	●	●		●														
umbrosa (Schrad.) Dumort.	○	○	●	●	●	●				●												
undulata (L.) Dumort.	●	●	●	●	●	●	●	●	○	●	●	●	●		●					●	●	●
verrucosa Heeg		●	○	●				○		○												
Schistochilopsis (N.Kitag.) Konstant. (Scapaniaceae)																						
grandiretis (Lindb. ex Kaal.) Konstant.				○	●																	
incisa (Schrad.) Konstant.	●	●	●	●	●	●				○												
opacifolia (Culm. ex Meyl.) Konstant.	●	●		●	●			●					●		●							
Schljakovia Konstant. & Vilnet (Anastrophyllaceae)																						
kunzeana (Huebener) Konstant. & Vilnet	○	●	●	●		○																
Schljakovianthus Konstant. & Vilnet (Anastrophyllaceae)																						
quadrilobus (Lindb.) Konstant. & Vilnet	(○)	●	●	●		○																
Solenostoma Mitt. (Solenostomataceae)																						
confertissimum (Nees) Schljakov	●	●		●				●		●									●	●		
gracillimum (Sm.) R.M.Schust.	●	●	●	●	●	●		●		●	●	●	●		●		●		●	●	●	●
hyalinum (Lyell) Mitt.	●	●	●	●	●	○	○	●		●	●		●		●		●			●	●	●
obovatum (Nees) C.Massal.	●	●	○	●	○	○		●		○					●							●
sphaerocarpum (Hook.) Steph.	●	●	○	●	●	○		●		●										●	(○)	●
subellipticum (Lindb. ex Heeg) R.M.Schust.	●							●							●							
Southbya Spruce (Southbyaceae)																						
nigrella (De Not.) Henriq.			●	○	●	○				●	●		●		●		●	●	●	●	●	●
tophacea (Spruce) Spruce		○	●	●		○	○	●		●	●	●	●		●		●		○	●	●	●
Sphaerocarpos Boehm. (Sphaerocarpaceae)																						
europaeus Lorb.		○	○							○							●				●	●
michelii Bellardi		○	○	●	●		+	○		●	●	●	●	●		●	●			●	●	●
Sphenolobus (Lindb.) Berggr. (Anastrophyllaceae)																						
minutus (Schreb. ex D.Crantz) Berggr.	●	●	●	●	●	●	○	○			○		○					○		●		
saxicola (Schrad.) Steph.			○	●																		
Syzygiella Spruce (Adelanthaceae)																						
autumnalis (DC.) K.Feldberg, Váňa, Hentschel & Heinrichs	●	●	●	●	○	○							○									
Targionia L. (Targioniaceae)																						
hypophylla L. subsp. *hypophylla*	+	○	●	●	●		○	○	○	●	○	○	●	●			●	●	●	●	●	●
lorbeeriana Müll.Frib.										●							○				●	●
Tetralophozia (R.M.Schust.) Schljakov (Anastrophyllaceae)																						
setiformis (Ehrh.) Schljakov			(○)	○																		
Trichocolea Dumort. (Trichocoleaceae)																						
tomentella (Ehrh.) Dumort.	○	○	●	●	●	●				●	○		○							○		
Trilophozia (R.M.Schust.) Bakalin (Lophoziaceae)																						
quinquedentata (Huds.) Bakalin var. *quinquedentata*	●	●	●	●	●	●	●	●		●	○		●		●							
Tritomaria Schiffn. ex Loeske (Lophoziaceae)																						
exsecta (Schmidel) Schiffn. ex Loeske subsp. *exsecta*	●	●	●	●	●	●		○		●					●							
exsectiformis (Breidl.) Schiffn. ex Loeske subsp. *exsectiformis*	●	●	○	●	●	●																
scitula (Taylor) Jørg.	●	●		●											●							

(*Continued*)

Table 1. Continued

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
Mosses																						
Abietinella Müll.Hal. (Thuidiaceae)																						
abietina (Hedw.) M.Fleisch. var. *abietina*	●	●	●	●	●	●	●	●	○	●	●	●	●		●	●		○				
var. *hystricosa* (Mitt.) Sakurai										○		○			○		○					
Acaulon Müll.Hal. (Pottiaceae)																						
fontiquerianum Casas & Sérgio										●											●	●
mediterraneum Limpr.										○										●	○	●
muticum (Hedw.) Müll.Hal.	●	○	○	○				●		○							●				●	
piligerum (De Not.) Limpr. [41]																					○	
triquetrum (Spruce) Müll.Hal.																	○			●	○	●
Alleniella S.Olsson, Enroth & D.Quandt (Neckeraceae)																						
besseri (Lobarz.) S.Olsson, Enroth & D.Quandt	●	●	●	●	●	●				○	●	○	●	●	●	●	○					●
complanata (Hedw.) S.Olsson, Enroth & D.Quandt	●	●	●	●	●	●	○	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
Aloina Kindb. (Pottiaceae)																						
aloides (Koch ex Schultz) Kindb.	○	○	○	○	●	○	○	●	○	●	●	○	○		○		●	●	○	●	●	●
ambigua (Bruch & Schimp.) Limpr.	○	○	○	●	○	○	○	○	○	○	●	●	●		○	○	○	●	○	●	●	●
bifrons (De Not.) Delgad. [42]																					○	
brevirostris (Hook. & Grev.) Kindb.	●			○																	○	●
rigida (Hedw.) Limpr.	○	○	○	●	●	○	○	○		○	●		●	●			○	●		●	●	●
Amblyodon P.Beauv. (Meesiaceae)																						
dealbatus (Hedw.) P.Beauv.	●	●	○	●	○	○																
Amblystegium Schimp. (Amblystegiaceae)																						
serpens (Hedw.) Schimp.	●	●	●	●	●	●	●	●		●	●	●	○	●	●		●	●		●	●	●
Amphidium Schimp. (Amphidiaceae)																						
lapponicum (Hedw.) Schimp.	●	●	○	●	○	○		○		○										●		
mougeotii (Schimp.) Schimp.	●	●	●	●	●	●	○			●			●							●	●	●
Anacamptodon Brid. (Amblystegiaceae)																						
splachnoides (Froel. ex Brid.) Brid.		○	○	○		○																
Anacolia Schimp. (Bartramiaceae)																						
webbii (Mont.) Schimp.																				●	●	●
Andreaea Hedw. (Andreaeaceae)																						
alpestris (Thed.) Schimp.	●	●	●	●																		
crassinervia Bruch		●		●																		
frigida Huebener		●	●	●	●																	
heinemannii Hampe & Müll.Hal. subsp. *heinemannii*	●			●																		
hookeri Schimp.		○	○																			
nivalis Hook.	●	●	●	●	●																	
rothii F.Weber & D.Mohr subsp. *rothii*	●	●	●	●						○												
subsp. *falcata* (Schimp.) Lindb.			○	○																	●	
rupestris Hedw. var. *rupestris*	●	●	●	●	●	○		●		●			+							●		
var. *papillosa* (Lindb.) Podp.		●		○																		
Anoectangium Schwägr. (Pottiaceae)																						
aestivum (Hedw.) Mitt.	●	●	○	●	●	○				+			●									
Anomobryum Schimp. (Bryaceae)																						
concinnatum (Spruce) Lindb.	●	○	●	●		●		○		○												
julaceum (Schrad. ex P.Gaertn., E.Mey & Scherb.) Schimp.	●	●	○	●	○	○	○			●	●		●				●	○		○	○	●
Anomodon Hook. & Taylor (Anomodontaceae)																						
longifolius (Schleich. ex Brid.) Hartm.		●	○	●	●	●				●	●					●						
rugelii (Müll.Hal.) Keissl.	●	●	○	●	●	●		○											●			

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
tristis (Ces.) Sull. & Lesq.		●	○	○	○		○						○									
viticulosus (Hedw.) Hook. & Taylor	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
Antitrichia Brid. (Antitrichiaceae)																						
californica Sull.			○	○						○											●	●
curtipendula (Hedw.) Brid.	●	●	●	●	●	●	○	●		●	●		+		●	○	●	○	●	●	●	●
Aongstroemia Schimp. (Aongstroemiaceae)																						
longipes (Sommerf.) Bruch & Schimp.	●	○	○	○																		
Archidium Brid. (Archidiaceae)																						
alternifolium (Hedw.) Mitt.		●	○	●	○	○	○	●		●	●	●	●				●			●	●	●
Arctoa Schimp. (Rhabdoweisiaceae)																						
fulvella (Dicks.) Bruch & Schimp.		●	○	○																		
Aschisma Lindb. (Pottiaceae)																						
carniolicum (F.Weber & D.Mohr) Lindb.										○							●			●	○	●
Atlantichella F.Lara, Garilleti & Draper (Orthotrichaceae) [43]																						
calvescens (Carrington) F.Lara, Garilleti & Draper																		●				●
Atractylocarpus Mitt. (Leucobryaceae)																						
alpinus (Schimp. ex Milde) Lindb. [44]				●																		
Atrichum P.Beauv. (Polytrichaceae)																						
angustatum (Brid.) Bruch & Schimp.	○	●	●	●	●	●	○	●		●	●	●	○				○			○		●
flavisetum Mitt.		●		●	●																	
tenellum (Röhl.) Bruch & Schimp.		●	○	●	●													●				
undulatum (Hedw.) P.Beauv.	●	●	●	●	●	●	●	●		●	●	●	○		●	○	●	●		●	●	●
Aulacomnium Schwägr. (Aulacomniaceae)																						
androgynum (Hedw.) Schwägr.	●	●	●	●						○			●				●		○	●		●
palustre (Hedw.) Schwägr.	●	●	●	●	●	●	●	●		●	●	●	●				○			●	●	●
Barbula Hedw. (Pottiaceae) [45]																						
unguiculata Hedw.	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
Bartramia Hedw. (Bartramiaceae)																						
aprica Müll.Hal. [46]		●	○		○	○	○			●	○		●				●		○	●	●	●
breviseta Lindb. [47]	○																					
halleriana Hedw.	●	●	●	●	●	●	●	○		○	●		○		●					●	○	
ithyphylla Brid.	●	●	●	●	●	●	●	●		●	●		●		●	●	●			●	●	●
pomiformis Hedw.	●	●	●	●	●	●	●	●		●	●		●		●		○			●	●	●
subulata Bruch & Schimp.	●		○	●		○														○		
Blindia Bruch & Schimp. (Seligeriaceae)																						
acuta (Hedw.) Bruch & Schimp.	●	●	●	●	○			○		●			○		●							●
caespiticia (F.Weber & D.Mohr) Müll.Hal.	●	●	○	○		○		○														
Blindiadelphus (Lindb.) Fedosov & Ignatov (Seligeriaceae)																						
campylopodus (Kindb.) Fedosov & Ignatov [48]				●																		
diversifolius (Lindb.) Fedosov & Ignatov [49]			○																			
recurvatus (Hedw.) Fedosov & Ignatov		●	●	○	○	●	○	●		●					●						●	
Brachydontium Fürnr. (Ptychomitriaceae)																						
trichodes (F.Weber) Milde			○					●														
Brachytheciastrum Ignatov & Huttunen (Brachytheciaceae)																						
collinum (Schleich. ex Müll.Hal.) Ignatov & Huttunen	●	●	○	●	○			●														●
olympicum (Jur.) Vanderp. et al.										○					●		●		●		○	○
salicinum (Schimp.) J.D.Orgaz, M.J.Cano & J.Guerra		●	○		●					○		●	○								○	●
trachypodium (Brid.) Ignatov & Huttunen	●	○	○	●	●			○		○					●							
velutinum (Hedw.) Ignatov & Huttunen	●	●	●	●	●	●	○	●		●	●	●	●		●	●	●	●	●	●	●	●
Brachythecium Schimp. (Brachytheciaceae)																						
albicans (Hedw.) Schimp.	●	●	●	●	●	●		●		●	●	○	●		●	●	●	○	○	○	●	●
campestre (Müll.Hal.) Schimp.	○	●	○	●	●	●		●		●	●	●	●					●			●	●

(*Continued*)

Table 1. Continued

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
capillaceum (F.Weber & D.Mohr) Giacom.			○	●																		
cirrosum (Schwägr.) Schimp.	●	●	●	●	●	●		●					●		●	●		●				●
erythrorrhizon Schimp.	●	●	●					●														
funkii Schimp.				○	●																	
geheebii Milde		●	○	●				○					○									
glareosum (Bruch ex Spruce) Schimp.	●	●	●	●	●	●	●	●	○	●	●	●	○		●	●	●	●	●	●	●	●
japygum (Głow.) Köckinger & Jan Kučera					●	●																
laetum (Brid.) Schimp.		○	○	●															●			
mildeanum (Schimp.) Schimp.		●	●	●	●	●		●		●		●						●		●		
rivulare Schimp.	●	●	●	●	●	●	●	●		●	●	●	●	●	●		○	●	●	●	●	●
rutabulum (Hedw.) Schimp. var. *rutabulum*	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
salebrosum (Hoffm. ex F.Weber & D.Mohr) Schimp.	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●
tauriscorum Molendo			○	○																		
tenuicaule (Spruce) Kindb.		●		○																		
tommasinii (Sendtn. ex Boulay) Ignatov & Huttunen		●	○	●	●	●					●		●		●	●			●	●	○	○
turgidum (Hartm.) Kindb.		●	●	●	○																	
Braunia Bruch & Schimp. (Hedwigiaceae)																						
alopecura (Brid.) Limpr.	○	○	●	●			○													○		
imberbis (Sm.) N.Dalton & D.G.Long			●	○	●																	
Bruchia Schwägr. (Bruchiaceae)																						
flexuosa (Schwägr.) Müll.Hal. [50]		○																				
Bryoerythrophyllum P.C.Chen (Pottiaceae)																						
alpigenum (Venturi) P.C.Chen	○	○	○	●																		
ferruginascens (Stirt.) Giacom.		●		●																		
recurvirostrum (Hedw.) P.C.Chen	●	●	●	●	●	●	+	●		●	●	●	●		●	●	●	●	○		●	●
rubrum (Jur. ex Geh.) P.C.Chen		○	○	○	●	○																
Bryum Hedw. (Bryaceae)																						
argenteum Hedw.	●	●	●	●	●	●	○	●		●	●	●	●	●	●	●	●	●	●	●	●	●
bavaricum Warnst.			○	●		○																
blindii Bruch & Schimp. [51]	○	●	●	○		○																
canariense Brid.			○			●	○	○		●	●		○		○		●	○	●	+	●	●
dichotomum Hedw.	●	●	●	●	●	●	●	●	○	●	●	●	●	●	○	●	●	●	●	●	●	●
gemmiferum R.Wilczek & Demaret [52]				●																		
gemmilucens R.Wilczek & Demaret																						●
gemmiparum De Not.		○	○	●						●	●	●	●	●	●		●				●	●
klinggraeffii Schimp.	●	●		●	●	●		●									○			○		●
radiculosum Brid.		●	○	●	●	●	○	●		●	●	●	●	●	●		●	●	○	○	●	●
ruderale Crundw. & Nyholm				●	●	●		●		●	●	●	●	●			●	●			●	●
sauteri Bruch & Schimp.		●	○	●				●														
versicolor A.Braun ex Bruch & Schimp.		●	○	○	●	●		○		○	●		●				○	●			○	●
violaceum Crundw. & Nyholm				●													●					
Buckia D.Rios, M.T.Gallego & J.Guerra (Pylaisiaceae)																						
vaucheri (Lesq.) D.Rios, M.T.Gallego & J.Guerra	●	●	●	●	●	●		●		●	●	●			●	●					●	●
Buxbaumia Hedw. (Buxbaumiaceae)																						
aphylla Hedw.		●	○	●		○	○															
viridis (Moug. ex Lam. & DC.) Brid. ex Moug. & Nestl.	●	●	●	●	○	●		○		○			●		●		●			●		
Callicladium H.A.Crum (Callicladiaceae)																						
haldanianum (Grev.) H.A.Crum	○	●	●	●	●	○																
imponens (Hedw.) Hedenäs, Schlesak & D.Quandt		●	○			●		○		●	●		●		○							●

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
Calliergon (Sull.) Kindb. (Calliergonaceae)																						
cordifolium (Hedw.) Kindb.		●	●	●	●			●		●									●			
giganteum (Schimp.) Kindb.	●	●	●	●	●	●	●	●														
richardsonii (Mitt.) Kindb.	○	●		●		●																
Calliergonella Loeske (Pylaisiaceae)																						
cuspidata (Hedw.) Loeske	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●		●	●	●	●
lindbergii (Mitt.) Hedenäs	●	●	●	●	●	●	○	○		●							○			○		
Calymperes Michx. (Calymperaceae)																						
erosum Müll.Hal. [53]																						●
Campyliadelphus (Kindb.) R.S.Chopra (Amblystegiaceae)																						
chrysophyllus (Brid.) R.S.Chopra	●	●	●	●	●	●	●	●		●	●	●	○		●	●	●	●	●		●	
elodes (Lindb.) Kanda	●	●	●	●		●				○												
Campylium (Kindb.) R.S.Chopra (Amblystegiaceae)																						
bambergeri (Schimp.) Hedenäs, Schlesak & D.Quandt	○	●	○	●	●																	
protensum (Brid.) Kindb.	●	●	●	●	●	●	●	●		○		●	●		●				○			
stellatum (Hedw.) Lange & C.E.O.Jensen	●	●	●	●	●	●	●	●		●	●	●	●		●	●	●				○	
Campylophyllopsis W.R.Buck (Amblystegiaceae)																						
calcarea (Crundw. & Nyholm) Ochyra	●	●	●	●	●	●	●	●		●	●	●	●		●	●	●	●	●	●		
sommerfeltii (Myrin) Ochyra	○	●	●	●	●	●	○	●		●	●		○		○	○	○	○	●			
Campylophyllum (Schimp.) M.Fleisch. (Amblystegiaceae)																						
halleri (Hedw.) M.Fleisch.	●	●	●	●	●	●	●	●			○		+		●	●						
Campylopus Brid. (Leucobryaceae)																						
atrovirens De Not.	●	●	●	●			○			○		●	●								●	●
brevipilus Bruch & Schimp.		○	○	○						●		●					●				●	●
flexuosus (Hedw.) Brid.		●	●	●	●					●			○									
fragilis (Brid.) Bruch & Schimp.	●	●	●	●	●	○	○														○	
gracilis (Mitt.) A.Jaeger	●	●	○	●		○																
introflexus (Hedw.) Brid.		●	●	●	●		●			●		●	●				○			●	●	●
oerstedianus (Müll.Hal.) Mitt.		●	●	○													○					●
pilifer Brid.	●	●	●	●	●		●			●		●	●				●			○	●	●
pyriformis (Schultz) Brid.		●	●	●		●		○		●												●
schimperi Milde	●	●	●	○	●	○																
subulatus Schimp. ex Milde		●	○	●			●	●		○	●											
Campylostelium Bruch & Schimp. (Ptychomitriaceae)																						
pitardii (Corb.) E.Maier																	●					●
saxicola (F.Weber & D.Mohr) Bruch & Schimp.			●														●					
strictum Solms [54]					○																	
Catoscopium Brid. (Catoscopiaceae)																						
nigritum (Hedw.) Brid.	●	●	○	●	●	●	○	●														
Ceratodon Brid. (Ditrichaceae)																						
conicus (Hampe) Lindb.				○		●					●		●		●		●		●	●	●	●
heterophyllus Kindb.	●	●		○																		
purpureus (Hedw.) Brid. subsp. *purpureus*	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	○	●	●	●	●
subsp. *stenocarpus* (Bruch. & Schimp. ex Müll.Hal.) Dixon										○							○			○	○	○
Cheilothela Broth. (Ditrichaceae)																						
chloropus (Brid.) Broth.										●		●	●				●	●	●	●	●	●
Chenia R.H.Zander (Pottiaceae)																						
leptophylla (Müll.Hal.) R.H.Zander			●	●	●						●										●	
Chionoloma Dixon (Pottiaceae)																						
tenuirostre (Hook. & Taylor) M.Alonso, M.J.Cano & J.A.Jiménez var. *tenuirostre*		●	●	●		●	●	●					●	●			●	●		●	●	●

(*Continued*)

Table 1. Continued

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
Cinclidium Sw. (Mniaceae)																						
stygium Sw.		●	●	●	○																	
Cinclidotus P.Beauv. (Pottiaceae)																						
aquaticus (Hedw.) Bruch & Schimp.		●	○	○	●	●	○	○		●	○	●	●	●	●		○			●	○	○
danubicus Schiffn. & Baumgartner						●							○									
fontinaloides (Hedw.) P.Beauv.	●	●	○	●	●	●	○	●		●	●	●	●	●	●						●	
riparius (Host ex Brid.) Arn.	●	●		●	●	●				○	●		●		●	●					○	●
Cirriphyllum Grout (Brachytheciaceae)																						
crassinervium (Taylor) Loeske & M.Fleisch.	●	●	●	●	●	●	●	●	○	●	●	●	●		●	●	●	●	●	●	●	●
piliferum (Hedw.) Grout	●	●	●	●	●	●		●		○			○							○		
Claopodium (Lesq. & James) Renauld & Cardot (Leskeaceae)																						
rostratum (Hedw.) Ignatov			●	●	●	●				○	●				●							
whippleanum (Sull.) Renauld & Cardot [55]																					●	
Climacium F.Weber & D.Mohr (Climaciaceae)																						
dendroides (Hedw.) F.Weber & D.Mohr	●	●	●	●	●	●	●	●		●	●	●	○					○		○		
Cnestrum I.Hagen (Rhabdoweisiaceae)																						
alpestre (Wahlenb. ex Huebener) Nyholm ex Mogensen [56]				○																		
schisti (F.Weber & D.Mohr) I.Hagen		○		●																		
Codonoblepharon Schwägr. (Orthotrichaceae)																						
forsteri (Dicks.) Goffinet			○				○	○		○	●		●	●			●		●		○	●
Conardia H.Rob. (Amblystegiaceae)																						
compacta (Drumm. ex Müll.Hal.) H.Rob.		●	○	●																		
Conostomum Sw. (Bartramiaceae)																						
tetragonum (Hedw.) Lindb.	●	●	○	●	●																	
Coscinodon Spreng. (Grimmiaceae)																						
cribrosus (Hedw.) Spruce	●	●	●	●	●	○	○			●			○				○				●	●
humilis Milde			●	●																		
Cratoneuron (Sull.) Spruce (Amblystegiaceae)																						
curvicaule (Jur.) G.Roth	●	●	○	●	●	○							●		●			●				○
filicinum (Hedw.) Spruce	●	●	●	●	●	●	●	●	○	●	●	●	●		●	●	●	○	●	●	●	●
Crossidium Jur. (Pottiaceae)																						
aberrans Holz. & E.B.Bartram [57]																				●		
crassinervium (De Not.) Jur.		○	○			○		●					○				●	●		●	○	●
geheebii (Broth.) Broth. [58]																				●		
laxefilamentosum W.Frey & Kürschner [59]																						●
squamiferum (Viv.) Jur. var. *squamiferum*	●	●	○	●	○	●	○	●		●	●	○	○		●	○	●	○	○	●	●	●
var. *pottioideum* (De Not.) Mönk.	●	○	○	○		○	○								●		○					
Cryphaea D.Mohr (Cryphaeaceae)																						
heteromalla (Hedw.) D.Mohr		○	●	●	●	●	○	○		●	○		●		●		●	○	○	●	●	●
Ctenidium (Schimp.) Mitt. (Myuriaceae)																						
molluscum (Hedw.) Mitt.	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
Cynodontium Bruch & Schimp. (Rhabdoweisiaceae)																						
bruntonii (Sm.) Bruch & Schimp.	●	●	●	○		●		○		●			●	●							●	●
fallax Limpr.	●	●		●																		
gracilescens (F.Weber & D.Mohr) Schimp.	●	●	○	●	●	○		●														
polycarpon (Hedw.) Schimp.	●	●	●	●	○	●		○		●			+								○	
strumiferum (Hedw.) Lindb.	●	●	○	●	●	○																
tenellum (Schimp.) Limpr.	○	○	○	●		○		●			●									○		
Cyrtomnium Holmen (Mniaceae)																						

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
hymenophylloides (Huebener) T.J.Kop.	○	●	○	●	●	●																
Dendrocryphaea Broth. (Cryphaeaceae)																						
lamyana (Mont.) P.Rao [60]										○												
Dialytrichia (Schimp.) Limpr. (Pottiaceae)																						
mucronata (Brid.) Broth.			●	●	●	●	○	●	○	○	●	●	●	●	●		●		○	○	●	●
saxicola (Lamy) M.J.Cano [61]																	●					
Dichelyma Myrin (Fontinalaceae)																						
capillaceum (L. ex Dicks.) Myrin [62]						○																
Dichodontium Schimp. (Aongstroemiaceae)																						
flavescens (Dicks.) Lindb.	●	○	○	○				○		○												
pellucidum (Hedw.) Schimp.	●	●	●	●	●	●	○	●		●	●		●		●					●	●	●
Dicranella (Müll.Hal.) Schimp. (Dicranellaceae)																						
cerviculata (Hedw.) Schimp.		●	●	●								●			●						●	
crispa (Hedw.) Schimp.	●		○	●																		
grevilleana (Brid.) Schimp.	●	●	○	●	●	○		○		○			+				○					
heteromalla (Hedw.) Schimp.	●	●	●	●	●	●		●		●	●	●	○				●	○	●	●	●	●
howei Renauld & Cardot			○	○		●	○	●		●	●		●	●			●	●		●	●	●
humilis R.Ruthe		○				●		○													○	○
rufescens (Dicks.) Schimp.		○	●	○	○	●				○			●								●	●
schreberiana (Hedw.) Dixon	●		○	●	●	●											○					●
staphylina H.Whitehouse	●	●		●	●							●										
subulata (Hedw.) Schimp.	●	●	○	●	●	●	○	●		○	●										○	●
varia (Hedw.) Schimp.	●	●	●	●	●	●	○	●	○	○	●	○	●	●	●		●	●	●	●	●	●
Dicranodontium Bruch & Schimp. (Leucobryaceae)																						
asperulum (Mitt.) Broth.		●	○	○	●			●				●										
denudatum (Brid.) E.Britton	●	●	●	●	●	●	○	●		●		●					○				○	
uncinatum (Harv.) A.Jaeger [63]				●																		
Dicranoweisia Milde (Rhabdoweisiaceae)																						
cirrata (Hedw.) Lindb.		●	●	●	●	●	○	●		●			●				●			●	●	●
Dicranum Hedw. (Dicranaceae)																						
bonjeanii De Not.	●	●	●	●	●	●	●	●				●										●
brevifolium (Lindb.) Lindb.	○		○	●		○																
crassifolium Sérgio, Ochyra & Séneca				●						●												
elongatum Schleich. ex Schwägr.	○	●	○	●	●	○																
flagellare Hedw.	●	●	●	●	●	●																
flexicaule Brid.	●		○	●	●	○									●							
fragilifolium Lindb. [64]			○																			
fulvum Hook.		●	●	●																		
fuscescens Sm.	○	●	●	●	●		○	●		●												
groenlandicum Brid. [65]				○																		
leioneuron Kindb.	●		○	●																		
majus Sm.	○	●	●	●	●	●		●		○						●	●		●		●	
montanum Hedw.	●	●	●	●	●	●							○							●		
muehlenbeckii Bruch & Schimp.		●	○	●	●	●																
polysetum Sw. ex anon.	○	●	○	●	●	●	○					●			●			○			●	
scoparium Hedw.	●	●	●	●	●	●	●	●	○	●	●	●	●		●	●	●	○	○	●	●	●
spadiceum J.E.Zetterst.	●	●	○	●	●	○				○												
spurium Hedw.		●	○																			
tauricum Sapjegin	●	●	+	●				●		○	●		●		●		○			●		
undulatum Schrad. ex Brid.	○		+	●		○																
viride (Sull. & Lesq.) Lindb.		●	●	●		○																
Didymodon Hedw. (Pottiaceae) [66]																						
acutus (Brid.) K.Saito	○	●	○	●	●	●	○	●		●	●	●	●		●	●	●	●	●	●	○	●

(*Continued*)

Table 1. Continued

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
cordatus Jur.			●	●	●	●	○	○		○		●	+				○	●	○			●
desertorum (J.Froehl.) J.A.Jiménez & M.J.Cano [67]																				●		●
glaucus Ryan subsp. *verbanus* (W.E.Nicholson & Dixon) Jan Kučera [68]		○	○																			
icmadophilus (Schimp. ex Müll.Hal.) K.Saito	○			●	○	○																
rigidulus Hedw.	●	●	●	●	●	●	○	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
subandreaeoides (Kindb.) R.H.Zander [69]				●																		
validus Limpr.				●	○	○																
Diobelonella Ochyra (Aongstroemiaceae)																						
palustris (Dicks.) Ochyra	●	●	●	●	●	●		●		●			○							●		●
Diphyscium D.Mohr (Diphysciaceae)																						
foliosum (Hedw.) D.Mohr	●	●	●	●	●	○	○	●		●			+		●		●			●		○
Distichium Bruch & Schimp. (Distichiaceae)																						
capillaceum (Hedw.) Bruch & Schimp.	●	●	●	●	●	●	○	●		●	●	●	●		●		●	○	●	●	●	●
inclinatum (Hedw.) Bruch & Schimp.	●	●	○	●	●	●		●					○		●				●	●	●	●
Ditrichum Timm ex Hampe (Ditrichaceae)																						
heteromallum (Hedw.) E.Britton	●	●	○	●	●	○	○	●		●	●	●	●		●	●	○		●	●		●
lineare (Sw.) Lindb.	●	●	●	○		●																
pallidum (Hedw.) Hampe	○	●	○	●	●	●	○	○		●	●	●	●				●			●	○	●
pusillum (Hedw.) Hampe	●	●	○	●	○	●		●		●	●		●		●	●				○		●
subulatum Hampe								●		●	●		●		●	○	○			○	●	●
zonatum (Brid.) Kindb.	●		○	●				●		●												
Drepanium (Schimp.) C.E.O.Jensen (Amblystegiaceae)																						
fastigiatum (Hampe) C.E.O.Jensen	●		○	●	●	○												(○)				
Drepanocladus (Müll.Hal.) G.Roth (Amblystegiaceae)																						
aduncus (Hedw.) Warnst.	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	○			●	○	●
lycopodioides (Brid.) Warnst.		○	○	○		○							○									
polygamus (Schimp.) Hedenäs	●	●	●	●	●	●				●		●										●
sendtneri (Schimp. ex H.Müll.) Warnst.		○	○	●	●	●				●					○						○	
trifarius (F.Weber & D.Mohr) Broth. ex Paris	●	●	●	●	●	●																
turgescens (T.Jensen) Broth.		●		●	○	●																
Encalypta Hedw. (Encalyptaceae)																						
affinis R.Hedw. subsp. *affinis*	●	○	○	○	○																	
alpina Sm.	●	●	●	●	●	○	○	○		●			+		●		●				●	
ciliata Hedw.	●	●	○	●	●	○	○	○		○	●		○		●			○		○	○	●
longicolla Bruch			○	○	●	○																
microstoma Bals.-Criv. & De Not.	●	●	●	●																		
procera Bruch [70]			+																			
rhaptocarpa Schwägr.	●	●	○	●	●	○	○	●		○					●						●	●
spathulata Müll.Hal.	●			(○)		●																
streptocarpa Hedw.	●	●	●	●	●	●	○	●	○	●	●	●	●		●	●	●	●	●	●	●	●
trachymitria Ripart				○	○										○						●	●
vulgaris Hedw.	●	●	●	●	●	○	+	●	○	●	○	●	●		●	●	●	●	●	●	●	●
Entodon Müll.Hal. (Entodontaceae)																						
cladorrhizans (Hedw.) Müll.Hal.	○	○	○	○	○	●		○														
concinnus (De Not.) Paris	●	○	●	●	●	●	○	○	○	●			○		●		○			○		○
schleicheri (Schimp.) Demet.		○	●	●	●	○																
Entosthodon Schwägr. (Funariaceae)																						
attenuatus (Dicks.) Bryhn		○	○				○			●			●		○		●	○		●	●	●
convexus (Spruce) Brugués				●			○			○			●	●	●		○	○		○	●	●

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
duriaei Mont.										○			○				●					●
fascicularis (Hedw.) Müll.Hal.		○	●	○	○		○	○		●		●	●				●	●		●	●	●
hungaricus (Boros) Loeske																					●	●
muhlenbergii (Turner) Fife	○	○	○	○	○	○	●	○	○	○	●		○		○		●	○	●	○	●	●
obtusus (Hedw.) Lindb.		○	○		○		○	○		●		○					○	●		●	●	●
pulchellus (H.Philib.) Brugués	+	○	○	●	○		○	○		●	●	○	●				○	●			●	●
Ephemerum Hampe (Pottiaceae)																						
cohaerens (Hedw.) Hampe		○		○																●	○	●
crassinervium (Schwägr.) Hampe subsp. *rutheanum* (Schimp.) Holyoak [71]		(●)																				●
subsp. *sessile* (Bruch) Holyoak		○								○	●	●			●		●			●	●	○
recurvifolium (Dicks.) Boulay		●		●						○		●					●				○	●
serratum (Hedw.) Hampe		○	●	○	○					○		●	○				●	●			●	●
Epipterygium Lindb. (Mniaceae)																						
tozeri (Grev.) Lindb.		○	○		○		○			●			●				●			●	●	●
Eucladium Bruch & Schimp. (Pottiaceae)																						
verticillatum (With.) Bruch & Schimp.	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
Eurhynchiastrum Ignatov & Huttunen (Brachytheciaceae)																						
diversifolium (Schimp.) J.Guerra	●	●	○	●	○			●					●		●		●					●
pulchellum (Hedw.) Ignatov & Huttunen	●	●	●	●	●	●	●	●		●	●	●	●	●	●		●	●	●	●	●	●
Eurhynchium Bruch & Schimp. (Brachytheciaceae)																						
angustirete (Broth.) T.J.Kop.		●	●	●	●	●				●		●										
striatum (Hedw.) Schimp.	○	●	●	●	●	●	●	●		●	●	●	●	●	●		●	●	○	●	●	●
Exsertotheca S.Olsson, Enroth & D.Quandt (Neckeraceae)																						
crispa (Hedw.) S.Olsson, Enroth & D.Quandt	●	●	●	●	●	●	●	●	○	●	●	●	●		●	●	●	○	●	●	●	●
Fabronia Raddi (Fabroniaceae)																						
ciliaris (Brid.) Brid.	○	●	●	●	●					○						●	●			●	●	○
pusilla Raddi		○	●	●	●	●	○	○		●	●	●	●	●	●		●	○	●	●	●	●
Fissidens Hedw. (Fissidentaceae)																						
adianthoides Hedw.	●	●	●	●	●	●	●	●		●	●		○		●		●	●	○	●	●	●
bryoides Hedw. var. *bryoides*	●	●	●	●	●	●	○	○		●	●	●	●		○		●	●	●	○	●	●
var. *caespitans* Schimp.													○					●				●
celticus Paton [72]																					●	
crassipes Wilson ex Bruch & Schimp. subsp. *crassipes*			○	●	●	●	○	●		●	●	●	●	●			●	●	●		○	●
subsp. *warnstorfii* (M.Fleisch.) Brugg.-Nann.			○									●	●		●		○					●
crispus Mont.	○					●	○			●	●	●	●	●	●		●	●			●	●
curvatus Hornsch.										○		●								○	●	
dubius P.Beauv. var. *dubius*	●	●	●	●	●	●	●	●	○	●	●	●	●		●	●	●	●	●	●	●	●
exilis Hedw.		●	○	○	●	●		●		●	●	●	●	●			○	●		+		●
fontanus (Bach.Pyl.) Steud.		○	○		○	●	+			●			○								●	●
gracilifolius Brugg.-Nann. & Nyholm				●	●			●		○	●				●		●	●				●
gymnandrus Buse		●		○																		
incurvus Starke ex Röhl.	○		●	○	○	●	○	○		●	●	●	●	●		●	●	●	○	●	●	●
osmundoides Hedw.	●	●	●	●	●	●	●	●		(○)		●	●				●					
ovatifolius R.Ruthe										○			●	●			●	●		○	●	●
polyphyllus Wilson ex Bruch & Schimp.										●	●						○					
pusillus (Wilson) Milde	●	●	○	○	●	●		●	○	●	●	○	●	●			●	●		●	○	●
rivularis (Spruce) Schimp.		●		○						○	●							●		●		●
rufulus Bruch & Schimp.				○		●			○		●	●	●							●	●	
serrulatus Brid.	●	●		●		●	○	●		●	●	●	●	●	●		●	●		●	●	●
taxifolius Hedw.	●	●	●	●	●	●	●	●		●	●	●	●		●	●	●	●	●	●	●	●
viridulus (Sw.) Wahlenb.	●	●	●	●	●	●	○	●		●	●	●	●	●			●	●	○	●	●	●

(*Continued*)

Table 1. Continued

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
Flexitrichum Ignatov & Fedosov (Flexitrichaceae)																						
flexicaule (Schwägr.) Ignatov & Fedosov	●	●	●	●	●	●	○	●	○	●	●	●	●		●	●	●	●	●	○	●	●
gracile (Mitt.) Ignatov & Fedosov	●	●	○	○	●	●					●	●					●					
Fontinalis Hedw. (Fontinalaceae)																						
antipyretica (Hedw.) subsp. *antipyretica*	●	●	●	●	●	●	●	●		●	●	●	●		●	○	○	●	+	●	●	●
subsp. *gracilis* (Lindb.) Schimp.		●	○	○				○		●	●		○		●			●		○	○	
subsp. *kindbergii* (Renauld & Cardot) Cardot			○				●			○												
dalecarlica Schimp. [73]			○																			
hypnoides C.Hartm. var. *hypnoides*			○										○		●			●		●	●	
var. *duriaei* (Schimp.) Kindb.			○		●			○	○	●			+					●			●	●
squamosa Hedw.		●	○	●				○		○	●		○							●	●	●
Funaria Schwägr. (Funariaceae)																						
hygrometrica Hedw.	●	●	●	●	●	●	○	●		●	●	●	●	●	●	○	●	●	●	●	●	●
microstoma Bruch ex Schimp.	+		○	○				○		○						●		○				○
Funariella Sérgio (Funariaceae)																						
curviseta (Schwägr.) Sérgio		○					+			○			○				●	○		○	●	●
Geheebia Schimp. (Pottiaceae) [66]																						
fallax (Hedw.) R.H.Zander	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●		●	●	●	●	●	●
ferruginea (Schimp. ex Besch.) R.H.Zander	●	○	○	●	●	●		●		○	●	●	●	●							●	
gigantea (Funck) Boulay		●	○	●	●																	
lurida (Hornsch.) J.A. Jiménez & M.J.Cano	●	●	●	●	●	●	○	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
spadicea (Mitt.) R.H.Zander	●	●	○	●		●		●		●		●	○	●	●		○		○		●	●
tophacea (Brid.) R.H.Zander	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●
siccula (M.J.Cano, Ros, García–Zamora & J.Guerra) J.A.Jiménez & M.J.Cano											●						●	●		●		●
Gigaspermum Lindb. (Gigaspermaceae)																						
mouretii Corb. [74]																						●
Grimmia Hedw. (Grimmiaceae)																						
alpestris (F.Weber & D.Mohr) Schleich.	●	●	●	●	●			○													○	●
anodon Bruch & Schimp.	●	●	○	●	○		○			(○)					●		○		●	●	○	●
anomala Hampe ex Schimp.	●	●		●																		
arenaria Hampe		○	○	○		○																
atrata Miel. ex Hornsch.	○		○	○		○				○												
caespiticia (Brid.) Jur.	●	●	○	●		○	●														●	
capillata De Not.		+																		●	○	●
crinita Brid.		○	○	●	○	○					●								○	●	●	●
decipiens (Schultz) Lindb.	●	○	○	●	●	○	○	●	○	●			○				●		○	●	●	●
dissimulata E.Maier				●													●				●	
donniana Sm.	●	●	●	●	○		●	○		●											○	●
elatior Bruch ex Bals.-Criv. & De Not.	●	●	●	●	○	○	○														○	●
elongata Kaulf.	●	○	○	●				●									○					●
funalis (Schwägr.) Bruch & Schimp.	●	●	○	●	●	○	○	○		●		○	+								○	
fuscolutea Hook.	○	○		●																		●
hartmanii Schimp.	●	●	●	●	●	●	○	●		●			○							●	●	●
incurva Schwägr.	●	●	○	●				●														
laevigata (Brid.) Brid.	●	●	●	●	●		●	●		●	○		●	●	●		●		●	●	●	●
lisae De Not.		●		●		●	○	●		●	●	●		●	●		●		●	○	●	●
longirostris Hook.		+	●	●				●											●	●	○	●
meridionalis (Müll.Hal.) E.Maier			○							●							●				●	●
mollis Bruch & Schimp.	●	●	●	●																		
montana Bruch & Schimp.	●	●	●	●	○					○							●		●	●	●	●

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
muehlenbeckii Schimp.	●	●	○	●	○	●	○						○								○	
orbicularis Bruch ex Wilson	●	●	●	●	●	●	○	○	○	●	●		●		●		●	○	●	●	●	●
ovalis (Hedw.) Lindb.	●	●	●	●	●	●	○	●	○	●			●				●	○	●	●	●	●
pulvinata (Hedw.) Sm.	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
ramondii (Lam. & DC.) Margad.	○	●	●	●			○	●		●			○							●	●	●
reflexidens Müll.Hal.	●	●	●	●						○											+	
teretinervis Limpr.			●	●		○																
tergestina Tomm. ex Bruch & Schimp.	●	●	●	●		●	○	○		○			○				●		●		+	●
torquata Drumm.	●	●	○	●						●										●	●	●
trichophylla Grev.	●	●	●	●		●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●
triformis Carestia & De Not.	○	○	○	●																		
unicolor Hook.	●	●	○	●	●																	
Gymnobarbula Jan Kučera (Pottiaceae) [45]																						
bicolor (Bruch & Schimp.) Jan Kučera		●		●	○	○							○		●					●		
Gymnostomum Nees & Hornsch. (Pottiaceae)																						
aeruginosum Sm. var. *aeruginosum*	●	●	●	●	●	●	●	○		●	●		○		●		○	●		●	●	●
calcareum Nees & Hornsch. var. *calcareum*	●	●	●	●	●	●	○	●		●	●	●	●	●	●	●	●	●	●	●	●	●
viridulum Brid.			○	●	●	●	○	●		○				●	●		●	●	○	●	●	●
Gyroweisia Schimp. (Pottiaceae)																						
reflexa (Brid.) Schimp.						●					●		●				○				●	●
tenuis (Hedw.) Schimp.		●	○	●	○	●		●		○	●		●	●	●		●	●		○	●	●
Habrodon Schimp. (Habrodontaceae)																						
perpusillus (De Not.) Lindb.		○	●	●	●	●	○	●		●	●	●	●	●	●	●	●	●	●	●	●	●
Hamatocaulis Hedenäs (Scorpidiaceae)																						
vernicosus (Mitt.) Hedenäs	○		●	●	●	●	●	●														
Haplocladium (Müll.Hal.) Müll.Hal. (Thuidiaceae)																						
angustifolium (Hampe & Müll.Hal.) Broth.			○	●	●	○																
virginianum (Brid.) Broth.	●	●	○			○																
Hedwigia P.Beauv. (Hedwigiaceae)																						
ciliata (Hedw.) P.Beauv.	●	●	●	●	●	●	○	●		●	○		●		●		○	○	●	●	●	●
emodica Hampe ex Müll.Hal.	○	●	●	●	●		●	●		●		●								●	●	○
stellata Hedenäs		●					●			○			●	●			●			●	●	●
Helicodontium Schwägr. (Brachytheciaceae)																						
capillare (Hedw.) A.Jaeger [75]										○												
Hennediella Paris (Pottiaceae)																						
heimii (Hedw.) R.H.Zander var. *heimii*		○	○	●									○				○				○	
Herzogiella Broth. (Plagiotheciaceae)																						
seligeri (Brid.) Z.Iwats.		●	●	●	●	●		●		●	●		●		●	○	●	●				
striatella (Brid.) Z.Iwats.		○	○	●	○																	
Heterocladiella Ignatov & Fedosov (Heterocladiellaceae)																						
dimorpha (Brid.) Ignatov & Fedosov	●	●	●	●	●	○		●		●	●				●					○	●	
Heterocladium Bruch & Schimp. (Lembophyllaceae)																						
heteropterum (Brid.) Schimp.	●	●	●	●	●	○		●		●			●							●	○	
Heterophyllium (Schimp.) Kindb. (Pylaisiadelphaceae)																						
nemorosum (W.D.J.Koch ex Brid.) Kindb.	●	●		○	●	●																
Homalia (Brid.) Bruch. & Schimp. (Neckeraceae)																						
lusitanica Schimp.			○			○	○			●	●		●				●	●	●	●	●	●
trichomanoides (Hedw.) Brid.		●	●	●	●	●	○	●		○		●	○				○	●				
Homalothecium Schimp. (Brachytheciaceae)																						
aureum (Spruce) H.Rob.			○						○	●			○		●		●	●	●	○	●	●
lutescens (Hedw.) H.Rob. var. *lutescens*	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	○	●
var. *fallax* (H.Philib. ex Schimp.) Düll			○	○		○			○	○			○		●		○		○	○		○

(*Continued*)

Table 1. Continued

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
philippeanum (Spruce) Schimp.	●	●	○	●	●	●	○	●		●	●	●	●		●	●	●	●	●	●	●	●
sericeum (Hedw.) Schimp.	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
Homomallium (Schimp.) Loeske (Pylaisiaceae)																						
incurvatum (Schrad. ex Brid.) Loeske	●	●	●	●	●	●	●	○		●			+		●	●		○				
Hookeria J.E.Sm. (Hookeriaceae)																						
lucens (Hedw.) Sm.		○	●		●	●				●			+					○				
Husnotiella Cardot (Pottiaceae) [66]																						
asperifolia (Mitt.) J.A.Jiménez & M.J.Cano	○	○	○	●				●														
johansenii (R.S.Williams) J.A.Jiménez & M.J.Cano [76]				●																		
sinuosa (Mitt.) J.A.Jiménez & M.J.Cano		●		●	●	●		●		●	●	●	●	●	●		●	●	●		●	●
Hydrogonium (Müll.Hal.) A.Jaeger (Pottiaceae) [45]																						
bolleanum (Müll.Hal.) A.Jaeger			○	●						○		●		●							●	●
consanguineum (Thwaites & Mitt.) Hilp. var. *kurilense* (Ignatova & Ignatov) Jan Kučera						○											●					
croceum (Brid.) Jan Kučera	●	●	●	●	●	●				●			○		●		●					
Hygroamblystegium Loeske (Amblystegiaceae)																						
fluviatile (Hedw.) Loeske	●	●	●	●			○				●	●	●		●							
humile (P.Beauv.) Vanderp., Goffinet & Hedenäs	●		●	●	○	●				●	●		○					●	●			●
tenax (Hedw.) Jenn.	●	●	●	●	●	●	○	●		●	●	●	●	●	●		○		○	●	●	●
varium (Hedw.) Mönk.	●	●	●	●	●	●	●	●			●	●	●		●		○	●			●	●
Hygrohypnella Ignatov & Ignatova (Scorpidiaceae)																						
ochracea (Turner ex Wilson) Ignatov & Ignatova	●		○	●			●															
polaris (Lindb.) Ignatov & Ignatova [77]	●																					
Hygrohypnum Lindb. (Amblystegiaceae)																						
luridum (Hedw.) Jenn.	●	●	○	●	●	●	○	●		●	●	●	●		●		●		●	●		●
styriacum (Limpr.) Broth. [78]				●																		
Hylocomiadelphus Ochyra & Stebel (Hylocomiaceae)																						
triquetrus (Hedw.) Ochyra & Stebel	●	●	●	●	●	●	●	●		●	●	●	●		●		●	●		○	●	●
Hylocomiastrum Broth. (Hylocomiaceae)																						
pyrenaicum (Spruce) M.Fleisch.	●	●	●	●	●	○		●														
umbratum (Hedw.) M.Fleisch.		●	●	●	●	●							○									
Hylocomium Bruch & Schimp. (Hylocomiaceae)																						
splendens (Hedw.) Schimp.	●	●	●	●	●	●	●	●		●	●	●	●		●	●		○	●	●	+	○
Hymenoloma Dusén (Hymenolomataceae)																						
compactum (Schleich. ex Schwägr.) Ochyra	●	●	○	●																		
crispulum (Hedw.) Ochyra	●	●	●	●	●	○	○	●		●	●		+				○	●		+	○	●
Hymenostylium Brid. (Pottiaceae)																						
recurvirostrum (Hedw.) Dixon var. *recurvirostrum*	●	●	●	●	●	●	○	○		○	●	●	●		●		●					●
xerophilum Köckinger & Jan Kučera [79]				●																		
Hyophila Brid. (Pottiaceae)																						
involuta (Hook.) A.Jaeger			●				○															
Hypnum Hedw. (Hypnaceae)																						
andoi A.J.E.Sm.	●	●	●	●	●	●		○		●		●				●	●	●		●	○	●
cupressiforme Hedw. var. *cupressiforme*	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
var. *filiforme* Brid.		●	○	●	●	●	○	●		●	●	●	●	●		●	○	●	●	●	●	●
var. *lacunosum* Brid.	○	●	●	●	●	●		●		●	●	●	●		●	●	●	●	●	●	●	●
var. *subjulaceum* Molendo	○	●	○	●	○	●		○		○			○		●		○	●	●	○		●
jutlandicum Holmen & E.Warncke	●	●	●	●	●	●				●	●	●	●		●		○			●	●	●
resupinatum Taylor	●	●	●	●	●	●	●	●		●	●	●	●			●	●	●		●	●	●
Hypopterygium Brid. (Hypopterygiaceae)																						

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
tamarisci (Sw.) Brid. ex Müll.Hal. [80]		●																				
Imbribryum N.Pedersen (Bryaceae)																						
alpinum (Huds. ex With.) N.Pedersen	●	●	●	●	●	●	○	○		●		●	●		○					●	●	●
mildeanum (Jur.) J.R.Spence	○	●	○	●	●	○		●		○	●	●						●			●	●
muehlenbeckii (Bruch & Schimp.) N.Pedersen	●	●	○	●						○						●	●				+	
subapiculatum (Hampe) D.Bell & Holyoak			●																			●
tenuisetum (Limpr.) D.Bell & Holyoak								●														●
Isopterygiopsis Z.Iwats. (Plagiotheciaceae)																						
muelleriana (Schimp.) Z.Iwats.		○	○	●	○	●															●	
pulchella (Hedw.) Z.Iwats.	●	●	●	●	●	●		●		●	●	●	●				●	●				●
Isopterygium Mitt. (Pylaisiadelphaceae)																						
tenerum (Sw.) Mitt.								○		○							●					
Isothecium Brid. (Lembophyllaceae)																						
alopecuroides (Lam. ex Dubois) Isov.	●	●	●	●	●	●	○	●		●	●	●	●	●	●	●	●	●	●	●	●	●
interludens Stirt. [81]																						●
myosuroides Brid.	●	●	●	●		●	○	●		●	●	●	●				●	●		●	●	●
Jochenia Hedenäs, Schlesak & D.Quandt (Jocheniaceae)																						
pallescens (Hedw.) Hedenäs, Schlesak & D.Quandt		○	●	●	○	●									●							
Kiaeria I.Hagen (Rhabdoweisiaceae)																						
blyttii (Bruch & Schimp.) Broth.			●	●	○																	
falcata (Hedw.) I.Hagen	●	●	●	●		○		●		●												
starkei (F.Weber & D.Mohr) I.Hagen	●	●	●	●	●	○	○	●		●			+				○			○		
Kindbergia Ochyra (Brachytheciaceae)																						
praelonga (Hedw.) Ochyra	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
Leptobarbula Schimp. (Pottiaceae)																						
berica (De Not.) Schimp.		○			●	●	○	●		○			○				●	●				●
Leptobryum (Bruch & Schimp.) Wilson (Meesiaceae)																						
pyriforme (Hedw.) Wilson	●	●	●	●	●	○	○	○		○	○		○				○					●
Leptodictyum (Schimp.) Warnst. (Amblystegiaceae)																						
riparium (Hedw.) Warnst.	●	●	●	●	●	●	○	●	○	●	●	●	●	●	●	●	○	●	●	○	●	●
Leptodon D.Mohr (Neckeraceae)																						
smithii (Hedw.) F.Weber & D.Mohr	○	○	●	●	●	●	○	●		●	●	●	●	●	●		●	●	●	●	●	●
Leptodontium (Müll.Hal.) Hampe (Pottiaceae)																						
styriacum (Jur.) Limpr.		○		●		○																
Lescuraea Bruch & Schimp. (Pseudoleskeaceae)																						
incurvata (Hedw.) E.Lawton	●	●	●	●	●	●	○	●		●	●	●	●		●	●	●	○	●	●	●	●
mutabilis (Brid.) Lindb. ex I.Hagen		○	○	●	○	●	○	●		○							○					○
patens Lindb.		●	●	●	●			●		●					●						○	
plicata (Schleich. ex F.Weber & D.Mohr) Broth.	●	●	○	●	●	●		○	○	●	●				●	●		○		●		
radicosa (Mitt.) Mönk.	●	●	●	●	●	○		●		○						●		●		●		●
saviana (De Not.) E.Lawton															●	○						
saxicola (Schimp.) Molendo	●	●	○	●	●		○	●		●			●								○	●
Leskea Hedw. (Leskeaceae)																						
polycarpa Hedw.	○	●	●	●	●	●		●	○	●	●	●	●		●	●		●			○	●
Leucobryum Hampe (Leucobryaceae)																						
glaucum (Hedw.) Ångstr.	●	●	●	●	●	●	●	○		●	●		○				○	○		●		●
juniperoideum (Brid.) Müll.Hal.		●	●	●	●	●				●												
Leucodon Schwägr. (Leucodontaceae)																						
sciuroides (Hedw.) Schwägr.	●	●	●	●	●	●	○	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
Lewinskya F.Lara, Garilleti & Goffinet (Orthotrichaceae)																						
acuminata (H.Philib.) F.Lara, Garilleti & Goffinet		●		●						●				●			●		●	●	●	●
affinis (Schrad. ex Brid.) F.Lara, Garilleti & Goffinet	●	●	●	●	●	●	○	●		●	●	●	●	●	●	●	●	●	●	●	●	●

(*Continued*)

Table 1. Continued

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
breviseta (F.Lara, Garilleti & Mazimpaka) F.Lara, Garilleti & Goffinet [82]																						●
laevigata (J.E.Zetterst.) F.Lara, Garilleti & Goffinet [83]																					●	
rupestris (Schleich. ex Schwägr.) F.Lara, Garilleti & Goffinet	●	●	●	●	●	●	○	●		●	●	●	●		●	●	●		●	●	●	●
shawii (Wilson) F.Lara, Garilleti & Goffinet		○						○		●						●	●		●	●		●
speciosa (Nees) F.Lara, Garilleti & Goffinet	●	●	●	●	●	●		○		●	●		○	●	●		●		●	●		●
striata (Hedw.) F.Lara, Garilleti & Goffinet		●	●	●	●	●	○	●		●	●	●	○		●	●	●	●	●	●	●	●
Loeskeobryum Broth. (Hylocomiaceae)																						
brevirostre (Brid.) M.Fleisch.		●	●	●	●	●	●			●	●		+				○	○		○		
Meesia Hedw. (Meesiaceae)																						
longiseta Hedw.		○	○	○																		
triquetra (L. ex Jolycl.) Ångstr.	●	●	●	●	●			○														
uliginosa Hedw.	●	●	○	●	○	●							+		●			○				
Microbryum Schimp. (Pottiaceae)																						
curvicollum (Hedw.) R.H.Zander		○	○							○	○		+				○	○		○	●	○
davallianum (Sm.) R.H.Zander var. *davallianum*		○	○	○	●	●	○	●		●	●	●	○				●	○	○	○	○	●
var. *commutatum* (Limpr.) R.H.Zander							○			○							○				○	●
var. *conicum* (Schleich. ex Schwägr.) R.H.Zander		○			○	○	○	○		○	●		●						○	○	○	●
floerkeanum (F.Weber & D.Mohr) Schimp.		●	○			○				●			+									●
rectum (With.) R.H.Zander		○	+		○		○			○	○		●	●			●	○		●	●	●
starckeanum (Hedw.) R.H.Zander		○	○	○	○		○	○		○	●		○				●	●	○	●	●	●
Microeurhynchium Ignatov & Vanderp. (Brachytheciaceae)																						
pumilum (Wilson) Ignatov & Vanderp.		●	●	○		●	○	●		●	●	●	●	●	●		●	●		●	●	●
Microhypnum Jan Kučera & Ignatov (Amblystegiaceae)																						
sauteri (Schimp.) Jan Kučera & Ignatov				●	●	●									●							
Mielichhoferia Nees & Hornsch. (Mniaceae)																						
elongata (Hoppe & Hornsch. ex Hook.) Hornsch.	●		○	●		○				●					●							●
mielichhoferiana (Funck) Loeske	●	●	○	●				○		●												●
Mnium Hedw. (Mniaceae)																						
hornum Hedw.	○	●	●	●	●	●	●	●		●	●		●		●					●	●	●
lycopodioides Schwägr.	●	●	●	●	●	●		●		●	●		○		●					○		
marginatum (Dicks.) P.Beauv. var. *marginatum*	●	●	●	●	●	●	●	●		●	●	●	●		●	●	●		●	●		
var. *dioicum* (H.Müll.) Crundw.	○	○		○						○					●							
spinosum (Voit) Schwägr.	●	●	●	●	●	●		●		●	●		●		●				●			
spinulosum Bruch & Schimp.	●	●	●	●	●			●														
stellare Hedw.	●	○	○	●	●	●		●		●	●	●	●		●	●	●	●	●	○		○
thomsonii Schimp.	●	●		●	●	●					●		●		●		●			●		
Molendoa (Müll.Hal.) Hampe (Pottiaceae)																						
hornschuchiana (Hook.) Lindb. ex Limpr.				●		○				●											○	
Myrinia Schimp. (Myriniaceae)																						
pulvinata (Wahlenb.) Schimp. [84]			+																			
Myurella Bruch & Schimp. (Plagiotheciaceae)																						
julacea (Schwägr.) Schimp.	●	●	○	●	●	●	○	●		●			●		●	●	●			●		
sibirica (Müll.Hal.) Reimers			○			○									●							
tenerrima (Brid.) Lindb.	●	●	○	●	●	●	○	●		●			●		●							
Neckera Hedw. (Neckeraceae)																						
menziesii Drumm.	●		○												●	●	●		●	●	●	●
oligocarpa Bruch				○		●																
pennata Hedw.		●	+	○	○	●	●	○		○			○					●		●	○	
pumila Hedw.		+	●	●	●	●		○		●					●		●	●		●	●	●
Nogopterium Crosby & W.R.Buck (Leucodontaceae)																						
gracile (Hedw.) Crosby & W.R.Buck	○	●	●	●	●	●	●	●		●	●	●	●	●	○		●	●	●	●	●	●
Nyholmiella Holmen & E.Warncke (Orthotrichaceae)																						
gymnostoma (Bruch ex Brid.) Holmen & E.Warncke [85]																				●		
obtusifolia (Brid.) Holmen & E.Warncke	●	●	○	●	●			○			●				●							○

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
Oligotrichum DC. (Polytrichaceae)																						
hercynicum (Hedw.) Lam. & DC.	●	●	●	●		○		●		●												
Oncophorus (Brid.) Brid. (Rhabdoweisiaceae)																						
virens (Hedw.) Brid.	●	●	○	●	●	●		○		○	○		+		●		●				●	○
wahlenbergii Brid.	●		○	○	●	●															○	
Oreas Brid. (Rhabdoweisiaceae)																						
martiana (Hoppe & Hornsch.) Brid.		○	○	●		○																
Oreoweisia (Bruch & Schimp.) De Not. (Rhabdoweisiaceae)																						
torquescens (Hornsch. ex Brid.) Wijk & Margad.			○	●																		
Ortholimnobium Dixon (Plagiotheciaceae)																						
handelii (Broth.) C.Schröck & J.T.Wynns [86]				●																		
Orthothecium Bruch & Schimp. (Plagiotheciaceae)																						
chryseon (Schwägr.) Schimp.			○	○	○	●																
intricatum (Hartm.) Schimp.	●	●	○	●	●	●		○		●	●	●	●		●	●	●					○
rufescens (Dicks. ex Brid.) Schimp.		●	●	●	●	●				●	●		○		●				●			
strictum Lorentz	●		○	●	●																	
Orthotrichum Hedw. (Orthotrichaceae)																						
alpestre Bruch & Schimp.	●	●	○	●	○			○		●										●		●
anomalum Hedw.	●	●	●	●	●	●	●	●	○	●	●	●	○		●	●	●	●	●	●	○	●
cupulatum Brid. var. *cupulatum*	●	●	●	●	●	●	○	●	○	●	●	●	○		●	●	●	●	●	●	●	●
var. *fuscum* (Venturi) Boulay				○															●	●		●
var. *riparium* Huebener			○	●		○	○	○									○				○	
dentatum T.Kiebacher & Lüth [87]				●																		
diaphanum Brid.	●	●	●	●	●	●	○	●	○	●	●	●	●	●	●	○	●	●	●	●	●	●
macrocephalum F.Lara, Garilleti & Mazimpaka [88]																						●
microcarpum De Not.		○		●																		
pallens Bruch ex Brid.	●	●	●	●		○		○		●	●						●		●			●
patens Bruch ex Brid. [89]	●	●	●	○					○	○											(+)	
philibertii Venturi			○					○		●	●		○				●	○		●	●	●
pulchellum Brunt.			●					●							●					●		●
pumilum Sw. ex anon.	●	●	●	●	○	○		●		●	●		●		●		●	○	●	●	●	●
rogeri Brid.		●	●	●	○					●												
scanicum Grönvall				●						○										●		●
schimperi Hammar		●	●	●	○	●		○		○	●		○		○	●	●		○	●	○	●
stellatum Brid.		○		●						●												
stramineum Hornsch. ex Brid.	●	●	●	●	●	○	○	●		●	●	●	+	●	●	●	●	●	●	●		●
tenellum Bruch ex Brid.		●	●	●	●	●	●	●		●	●	●	●	●			●		●	●	●	●
urnigerum Myrin	●	●	●	●	○	●	○					●	●		○	●	○	●				
Oxyrrhynchium (Schimp.) Warnst. (Brachytheciaceae)																						
hians (Hedw.) Loeske	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●		●	●	●	●	●	●
schleicheri (R.Hedw.) Röll.	●	●	○	●	●	●	○	●		●	●	●	●		●	●	●	●	●	●	●	●
speciosum (Brid.) Warnst.	●	●	●	●	●	●	●	●		○	●	●	●	●	●		●	●	●	●	●	●
Paludella Brid. (Meesiaceae)																						
squarrosa (Hedw.) Brid.		○	●	●																		
Palustriella Ochyra (Amblystegiaceae)																						
commutata (Hedw.) Ochyra	●	●	●	●	●	●	●	●		●	●	●	●		●	●	●	●	○	●	●	●
decipiens (De Not.) Ochyra	●	●	●	●	●	●	●	●		●			●		●							
falcata (Brid.) Hedenäs	●	●	●	●	●	●	○	●		●	●	●	●		●	●	●		●	●	○	●
Paraleucobryum (Limpr.) Loeske (Dicranaceae)																						
enerve (Thed.) Loeske		●	●	●	●	○																
longifolium (Hedw.) Loeske	●	●	●	●	●	●	●	●		○	●		○									
sauteri (Bruch & Schimp.) Loeske	●	○		●	○	●	○			○							○					
Philonotis Brid. (Bartramiaceae)																						
caespitosa Jur.		●	●	●		○		●		●			●		●	●				●	●	○
calcarea (Bruch & Schimp.) Schimp.	●	●	○	●	●	●	●	●		●	●	●	●	●	●		●		+	○	○	●

(*Continued*)

Table 1. Continued

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
capillaris Lindb.		●	○	●			○	●		●	●	●	○							●	●	●
fontana (Hedw.) Brid.	●	●	●	●	●	●	○	●		●	●	●	●	●	●		○			●	●	●
marchica (Hedw.) Brid.	○	●	●	●	●	●	○	○		●		○	●	●	●	●	●			○		●
rigida Brid.			●	●	○		○	●		●			●	●			○			●	●	●
seriata Mitt.	●	●	●	●	●	●	●	●		●										●	●	
tomentella Molendo	●	●	●	●	●	●				○					●		●			●	●	●
Physcomitrium (Brid.) Brid. (Funariaceae)																						
eurystomum Sendtn. subsp. *eurystomum*		○	○	○	●												○					●
patens (Hedw.) Mitt.		○	●	●	●										●					●		●
pyriforme (Hedw.) Bruch & Schimp.	●	●	●	●	●	●	○	○		○	○	●	○		●		○	○		●		●
sphaericum (C.F.Ludw. ex Schkuhr) Brid.		○	○									●										
Plagiomnium T.J.Kop. (Mniaceae)																						
affine (Blandow ex Funck) T.J.Kop.	●	●	●	●	●	●	●	●		●	●	●	●		●	●	●	●	●	●	●	●
cuspidatum (Hedw.) T.J.Kop.	●	●	●	●	●	●	○	●		●	●	●	○		●		●	●			○	
elatum (Bruch & Schimp.) T.J.Kop.	●	●	●	●	●	●		●		●	●	●	●	●	●			●	●	●	●	●
ellipticum (Brid.) T.J.Kop.	●	●	●	●	●	●		●		●		●	●		●	●		●	●	●		
medium (Bruch & Schimp.) T.J.Kop.	●	●	○	●	●	●	●	●		●	●	●	●	●	●	●		●		●	●	●
rostratum (Schrad.) T.J.Kop.	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●		●	●	●	●	●	●
undulatum (Hedw.) T.J.Kop. var. *undulatum*	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
Plagiopus Brid. (Bartramiaceae)																						
oederianus (Sw.) H.A.Crum & L.E.Anderson var. *oederianus*	●	●	○	●	●	●	+	○		○	●	●	○		●		●					
var. *alpinus* (Schwägr.) Ochyra	○		○	○											○							
Plagiothecium Bruch & Schimp. (Plagiotheciaceae)																						
cavifolium (Brid.) Z.Iwats.	●	●	●	●	●	●		●		●	●				●							○
curvifolium Schlieph. ex Limpr.		●	●	●	●	●																
denticulatum (Hedw.) Schimp. var. *denticulatum*	●	●	●	●	●	●	○	●		●	●	●	○		●					●	●	●
var. *obtusifolium* (Turner) Moore		●	●	●		●	●															
var. *undulatum* R.Ruthe ex Geh.	○	○	●	○		●		●		●												
laetum Schimp.	●	●	●	●	●	●		●		●	●									●		
latebricola Schimp. [90]			●																			
neckeroideum Schimp. [91]				●																		
nemorale (Mitt.) A.Jaeger	●	●	●	●	●	●		●		●	●		●				●			●	●	●
piliferum (Sw.) Schimp.		●	○	●	●																○	
platyphyllum Mönk.		●		●	●			●														
succulentum (Wilson) Lindb.		●	●	●		●		●		●			●									
undulatum (Hedw.) Schimp.	●	○	●	●	●	●		○		●			+									○
Plasteurhynchium M.Fleisch. (Brachytheciaceae)																						
meridionale (Schimp.) M.Fleisch.			○	●	●	●	○	○	○	●	●	●	●	●	●	●	●	●	○	○	●	●
striatulum (Spruce) M.Fleisch.	●	●	●	●	●	●	○	●		●	●	●	●		●		●	●	●	●	●	●
Platydictya Berk. (Plagiotheciaceae)																						
jungermannioides (Brid.) H.A.Crum	●	●	○	●	●	●									●							
Platygyrium Bruch & Schimp. (Pylaisiadelphaceae)																						
repens (Brid.) Schimp.		●	●	●	●	●	○	●		●							○			○	○	
Platyhypnum Loeske (Amblystegiaceae)																						
alpestre (Hedw.) Ochyra	○		○	○																		
alpinum (Lindb.) Loeske	●	○		●																		
cochlearifolium (Venturi) Ochyra	●	●		●	○					●												
duriusculum (De Not.) Ochyra	●	●	○	●		●	○	○		○												
molle (Dicks. ex Hedw.) Loeske		○	●	●		○																
smithii (Sw.) Ochyra	●	●	○	●	●																	
Pleuridium Rabenh. (Ditrichaceae)																						
acuminatum Lindb.		●	●	●	●		+			○	○	●	●				●	○		●	●	●
subulatum (Hedw.) Rabenh.		●	●	●	●		○	○		●	○	●	+				●			○	●	●
Pleurozium Mitt. (Hylocomiaceae)																						
schreberi (Willd. ex Brid.) Mitt.	●	●	●	●	●	●	●	●		●	●	●	○		●			○		●		●

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
Pogonatum P.Beauv. (Polytrichaceae)																						
aloides (Hedw.) P.Beauv.	●	●	●	●	●	●	●	●		●	●	●	●		●		●	○	●	●	●	●
nanum (Hedw.) P.Beauv.		●	○	●	●	○	○	○		●		●	●				○			●	●	●
urnigerum (Hedw.) P.Beauv.	●	●	●	●	●	●	●	●		●	●		○		●	○	○			●	●	
Pohlia Hedw. (Mniaceae)																						
andalusica (Höhn.) Broth.	●	●		●				●		●			●		●	●						
andrewsii A.J.Shaw	●	●		●																		
annotina (Hedw.) Lindb.	●	●	●	●	○			●		○		●	○				○			●		●
atropurpurea (Wahlenb.) H.Lindb.			○		○			○		●											○	○
bulbifera (Warnst.) Warnst.		●	○	●							●										●	
camptotrachela (Renauld & Cardot) Broth. [92]				●																		
cruda (Hedw.) Lindb.	●	●	●	●	●	●	●	●		●	●	○	●		●	●	●	●		●	●	●
drummondii (Müll.Hal.) A.L.Andrews	●	●	●	●	●	●		●		●												
elongata Hedw. var. *elongata*	●	●	●	●	●	○		●		●	●		●		●		○			●	●	●
var. *acuminata* (Hornsch.) Huebener	○	●	○	○	○	○		○		●												
var. *greenii* (Brid.) A.J.Shaw	●	○	○	●	○	○		○		○											○	
filum (Schimp.) Mårtensson	●	○	○	●	●			●					●		●							
flexuosa Harv. var. *flexuosa* [93]			●																			
lescuriana (Sull.) Ochi			○	●		●					●						+	●				
longicolla (Hedw.) Lindb.	●	●	○	●	○	○																
ludwigii (Spreng. ex Schwägr.) Broth.	●		●	●	○			●							●							
lutescens (Limpr.) H.Lindb.				●						○												●
melanodon (Brid.) A.J.Shaw		○	●	●	●	●	○	●	○	●	●	●	●	●		○	○	●	●	○	●	●
nutans (Hedw.) Lindb. subsp. *nutans*	●	●	●	●	●	●	○	○		○	●	●	●				○	○		●	+	●
obtusifolia (Vill. ex Brid.) L.F.Koch	●	○	●	●																		
proligera (Kindb.) Lindb. ex Broth.	●	●	●	●						●										●		●
sphagnicola (Bruch & Schimp.) Broth. [94]			○	●																		
vexans (Limpr.) H.Lindb. [95]				●																		
wahlenbergii (F.Weber & D.Mohr) A.L.Andrews var. *wahlenbergii*	●	●	●	●	●	●	○	●		●	●	●	●	●	●		●		●	●	●	●
var. *calcarea* (Warnst.) E.F.Warb.			○	○											●		●					●
var. *glacialis* (Brid.) E.F.Warb.	●		○	●	●	○		○														
Polytrichastrum G.L.Sm. (Polytrichaceae)																						
alpinum (Hedw.) G.L.Sm.	●	●	●	●	●	●	●	●		●	●	●	●		●	●	●			○	●	●
septentrionale (Brid.) E.I.Ivanova, N.E.Bell & Ignatov	●	○	○	○																		
sexangulare (Brid.) G.L.Sm.	●	●	●	●	●	○		●		●			●		●							
Polytrichum Hedw. (Polytrichaceae)																						
commune Hedw.	●	●	●	●	●	●	●	●		●	●	●	○			○	○	○	●	●	●	●
formosum Hedw.	●	●	●	●	●	●	●	●		●	●	●	○		●	●		●		●	●	●
juniperinum Hedw.	●	●	●	●	●	●	○	●		●	●	●	●		●	●	●	○	●	●	●	●
longisetum Sw. ex Brid.	○	●	●	●	●	●	○			○							○			●		●
pallidisetum Funck		●		○																		
perigoniale Michx.		●		○				○					○							○		●
piliferum Hedw.	●	●	●	●	●		●	●		●		●	●		●	●	●			●	●	●
strictum Menzies ex Brid.	●	●	●	●	●	●		●		●			●			●	○			○	●	●
swartzii Hartm. [96]					○																	
Pottiopsis Blockeel & A.J.E.Sm. (Pottiaceae)																						
caespitosa (Brid.) Blockeel & A.J.E.Sm.		(●)	●	●		●	○	●			●		●	●			●	●		●	●	●
Pseudanomodon (Limpr.) Ignatov & Fedosov (Neckeraceae)																						
attenuatus (Hedw.) Ignatov & Fedosov	○	●	●	●	●	●	○	●		●	●	●	○		●		●			○		
Pseudephemerum (Lindb.) I.Hagen (Ditrichaceae)																						
nitidum (Hedw.) Loeske			●					○		○		●			●							
Pseudoamblystegium Vanderp. & Hedenäs (Amblystegiaceae)																						

(*Continued*)

Table 1. Continued

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
subtile (Hedw.) Vanderp. & Hedenäs		●	○	●	●	●	+	●		○	○	●			●	●			●			●
Pseudobryum (Kindb.) T.J.Kop. (Mniaceae)																						
cinclidioides (Huebener) T.J.Kop.		○				○																
Pseudocampylium Vanderp. & Hedenäs (Amblystegiaceae)																						
radicale (P.Beauv.) Vanderp. & Hedenäs		●	○	●	○	●		●			●				●							
Pseudocrossidium R.S.Williams (Pottiaceae)																						
hornschuchianum (Schultz) R.H.Zander	●	○	●	●	●	●	●	●		●	●	○	●		●	●	●	●	●	●	●	●
obtusulum (Lindb.) H.A.Crum & L.E.Anderson [97]																						●
replicatum (Taylor) R.H.Zander																				●		●
revolutum (Brid.) R.H.Zander		○	○	●	●	●		●	○	●	●	●	●	●	●	○	●	●	○	●	●	●
Pseudohygrohypnum Kanda (Pylaisiaceae)																						
eugyrium (Schimp.) Kanda			●	●				●														
fertile (Sendtn.) Jan Kučera & Ignatov				●		●																
Pseudoleskeella Kindb. (Pseudoleskeellaceae)																						
catenulata (Brid. ex Schrad.) Kindb.	●	●	●	●	●	●		●		●	●	●	●	●	●	●	●	●				
nervosa (Brid.) Nyholm	●	●	●	●	●	●		●		●	●		●	●	●	●	●	●	●	●		●
tectorum (Funck ex Brid.) Kindb. ex Broth.		●	○	●	●			○														
Pseudoleskeopsis Broth. (Leskeaceae)																						
artariae (Thér.) Thér.			●	●																		
Pseudomalia Enroth (Echinodiaceae)																						
webbiana (Mont.) Enroth [98]				●																		
Pseudorhynchostegiella Ignatov & Vanderp. (Brachytheciaceae)																						
duriaei (Mont.) Ignatov. & Vanderp.													●								●	
Pseudoscleropodium (Limpr.) M.Fleisch. (Brachytheciaceae)																						
purum (Hedw.) M.Fleisch.	○	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
Pseudostereodon (Broth.) M.Fleisch. (Pylaisiaceae)																						
procerrimus (Molendo) M.Fleisch.	○	○	○	●		○		○		(●)					●							●
Pseudotaxiphyllum Z.Iwats. (Plagiotheciaceae)																						
elegans (Brid.) Z.Iwats.	●	●	●	●	●			●		●			●		●					●	●	●
Pterigynandrum Hedw. (Pterigynandraceae)																						
filiforme Hedw.	●	●	●	●	●	●	●	●		●	●	●	●		●	●	●	●	●	●	●	●
Pterygoneurum Jur. (Pottiaceae)																						
lamellatum (Lindb.) Jur.		○		○	●			○														●
ovatum (Hedw.) Dixon	○	○	●	●	○		○	○		○			○					○	○			●
subsessile (Brid.) Jur.				●																		●
Ptilium De Not. (Pylaisiaceae)																						
crista-castrensis (Hedw.) De Not.	○	○	●	●	●	●				●		○	+				○			○		
Ptychomitrium Fürnr. (Ptychomitriaceae)																						
incurvum (Schwägr.) Spruce		○	○																		●	
nigrescens (Kunze) Wijk & Margad. [99]																						○
polyphyllum (Dicks. ex Sw.) Bruch & Schimp.		○	●	●	○		○			●	●		●		●	●	●	○		●		
Ptychostomum Hornsch. (Bryaceae)																						
arcticum (R.Br.) J.R.Spence ex Holyoak & N.Pedersen			○	○	●	●																
calophyllum (R.Br.) J.R.Spence		(●)										●									○	
capillare (Hedw.) Holyoak & N.Pedersen	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
cellulare (Hook.) D.Bell & Holyoak																				○		●
cernuum (Hedw.) Hornsch.		○	○	○																		●
compactum Hornsch. var. *compactum*	●	●	○	○		●	●	●		●	●		○			●	●				○	●
creberrimum (Taylor) J.R.Spence & H.P.Ramsay	●	●	○	●	●	●	○	●	○		●		●		●			●			●	●
demissum (Hook.) Holyoak & N.Pedersen	●	●	○	○		○																
donianum (Grev.) Holyoak & N.Pedersen	●	●	○		●		●	●	○	●	●	●	●	●	●		●	●	●	●	●	●
elegans (Nees) D.Bell & Holyoak	●	●	●	●	●	●		●		●	●	●	●	●	●		●	●	●		●	●
funkii (Schwägr.) J.R.Spence		○	○	●		●									●		●					●
imbricatulum (Müll.Hal.) Holyoak & N.Pedersen	●	●	●	●	●	●	○	●		●	●	●	●	●	●	●	●	●	●	●	●	●
inclinatum (Sw. ex Brid.) J.R.Spence	●	●	●	●	●	●		○		●	●	●					●	●		○		●

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
intermedium (Brid.) J.R.Spence	●	●	+	○		●	○	○		●	●				●		○				○	●
*kunzei (*Hornsch.) J.R.Spence			○	●			+	●		●			●		●	●	○			●	●	●
moravicum (Podp.) Ros & Mazimpaka		●	●	●	●	●												●				
pallens (Sw. ex anon.) J.R.Spence	●	●	●	●	●	●	○	●		●	●	●	●	●	●	●	●	●	●	●	●	●
pallescens (Schleich. ex Schwägr.) J.R.Spence	●	●	○	●	●	●	○	●	○	●	●	●	●	●	●		○	●	○	●	●	●
pseudotriquetrum (Hedw.) J.R.Spence & H.P.Ramsay var. *pseudotriquetrum*	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●		●		○	●	●	●
var. *bimum* (Schreb.) Holyoak & N.Pedersen	●	●	○	○	●	○		●		●								●		○	●	
rubens (Mitt.) Holyoak & N.Pedersen		●	●	●	●	●	○			●	●	●	●				●	●			●	●
schleicheri (DC.) J.R.Spence ex D.Bell & Holyoak var. *schleicheri*	●	●	●	●	●	●		●		●	○	○	●		●		●		●	●	●	●
torquescens (Bruch & Schimp.) Ros & Mazimpaka		●	●	●	●	●	●	●		●	●	●	●	●	●		●	●	○	●	●	●
turbinatum (Hedw.) J.R.Spence	●	●	●	●	●	●		●		●	●		●		●		●	●		○	●	●
weigelii (Biehler) J.R.Spence	●	●	○	●	●	○		○		○	●		+		●						○	●
zieri (Hedw.) Holyoak & N.Pedersen	●	●	○	●	●	●		○		○		●	○		●		●					
Pulvigera Plášek, Sawicki & Ochyra (Orthotrichaceae)																						
lyellii (Hook. & Taylor) Plášek, Sawicki & Ochyra		●	●	●	●	●	○	●		●	●		○	●	●	●	●	●	●	●	●	●
Pylaisia Schimp. (Pylaisiaceae)																						
polyantha (Hedw.) Schimp.	○	●	●	●	●	●	○	○		●	●		●			●	●	●		●		●
Pyramidula Brid. (Funariaceae)																						
tetragona (Brid.) Brid.		●	○	○																		○
Racomitrium Brid. (Grimmiaceae)																						
aciculare (Hedw.) Brid.	○	●	○	●	●	●	●	●		●			●							●	●	●
affine (F.Weber & D.Mohr) Lindb.		●	●	●		●		●		●										●		●
aquaticum (Brid. ex Schrad.) Brid.	●	●	●	●		○	○	●		●			○							●	○	
canescens (Hedw.) Brid. subsp. *canescens*	●	●	●	●	●	●	●	●		●	○	●	●		●		●		○	●	●	●
elongatum Ehrh. ex Frisvoll		●		●	●		●	●		●					●					●	●	●
ericoides (Brid.) Brid.	●	●	●	●	●	●	○	●		●	●	●	○						●	○	●	●
fasciculare (Hedw.) Brid.	●	●	●	●	●			●		●												
heterostichum (Hedw.) Brid.		●	●	●	●	○		●		●									●	●	●	●
lanuginosum (Hedw.) Brid.	●	●	○	●	○		○	●		●			+				○			●	●	●
macounii Kindb. subsp. *macounii*	●	●	●	●																		
subsp. *alpinum* (E.Lawton) Frisvoll	●			●			●			●												
microcarpon (Hedw.) Brid.		●	○	●	○			○												●	○	
obtusum (Brid.) Brid. [100]		●																				
sudeticum (Funck) Bruch & Schimp.	●	●	●	●	●	○	○	○		●	●		+							●	●	○
Rhabdoweisia Bruch & Schimp. (Rhabdoweisiaceae)																						
crenulata (Mitt.) H.Jameson [101]		●	●																			
crispata (Dicks.) Lindb.		●	●	●	●															●		
fugax (Hedw.) Bruch & Schimp.	●	●	●	●						●			+								●	●
Rhizomnium (Broth.) T.J.Kop. (Mniaceae)																						
magnifolium (Horik.) T.J.Kop.	●	●	○	●	○	●		●														
pseudopunctatum (Bruch & Schimp.) T.J.Kop.	●	●	●	●	●	○		●														
punctatum (Hedw.) T.J.Kop. var. *punctatum*	●	●	●	●	●	●	●	●		●	●	●	●		●		●		○	●	●	●
Rhodobryum (Schimp.) Limpr. (Bryaceae)																						
ontariense (Kindb.) Kindb.				●	●	●																
roseum (Hedw.) Limpr.	○	●	●	●	●	●				○		●	○									
Rhynchostegiella (Schimp.) Limpr. (Brachytheciaceae)																						
curviseta (Brid.) Lindb.		○	●	●		●	●	●		●	●		●	●	●		●	●		○	●	●
litorea (De Not.) Limpr.						●	●			●	●		●				●	●		●	●	●
tenella (Dicks.) Limpr.	○	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●
teneriffae (Mont.) Dirkse & Bouman	+		●	○	○	○	○			●			○				●				●	●
Rhynchostegium Bruch & Schimp. (Brachytheciaceae)																						
confertum (Dicks.) Schimp.	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
megapolitanum (Blandow ex F.Weber & D.Mohr) Schimp.	○	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●
murale (Hedw.) Schimp.	●	●	●	●	●	●	○	●		●	○	●	●		●	●	●		●	●		

(*Continued*)

Table 1. Continued

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
riparioides (Hedw.) Cardot	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
rotundifolium (Scop. ex Brid.) Schimp.			○	●		●		●			○	●	○									●
strongylense (Bott.) W.R.Buck & Privitera																	●					●
Rhytidiadelphus (Limpr.) Warnst. (Hylocomiaceae)																						
loreus (Hedw.) Warnst.	○	○	●	●	●	●	●	●		●	○		+									
squarrosus (Hedw.) Warnst.	●	●	●	●	●	●	●	●		●	●	●	●		●	●		●			●	○
subpinnatus (Lindb.) T.J.Kop.		●	●	●	●	○																
Rhytidium (Sull.) Kindb. (Rhytidiaceae)																						
rugosum (Hedw.) Kindb.	●	●	●	●	●	●	●	○		○			+					○		○		
Roaldia P.E.A.S.Câmara & Carv.-Silva (Pylaisiaceae)																						
dolomitica (Milde) Hedenäs, Schlesak & D.Quandt				●	●	○									●							
revoluta (Mitt.) P.E.A.S.Câmara & M.Carvalho-Silva	●	●	○	●	○	○																
Saelania Lindb. (Saelaniaceae)																						
glaucescens (Hedw.) Broth.	●	●	●	●	●	○		●		●			●		●		○		●	●		
Sanionia Loeske (Scorpidiaceae)																						
uncinata (Hedw.) Loeske	●	●	●	●	●	●	●	●		●	○		●		●	●				○	●	○
Sarmentypnum Tuom. & T.J.Kop. (Calliergonaceae)																						
exannulatum (Schimp.) Hedenäs	●	●	●	●	●	●	●	●		●					●					○		(○)
sarmentosum (Wahlenb.) Tuom. & T.J.Kop.	●	●	●	●	●	●	●				●											
trichophyllum (Warnst.) Hedenäs			●	●																		
Schistidium Bruch & Schimp. (Grimmiaceae)																						
agassizii Sull. & Lesq.	●	●	○	●		○									○						○	
apocarpum (Hedw.) Bruch & Schimp. [102]	●	●	●	●	●	●	(○)	●	(○)	●	●	●	●		●	●	●	●	●	●	●	●
atrofuscum (Schimp.) Limpr.	○	(○)		(○)		(○)	(○)	(●)			●				●		●		●	●		●
brunnescens Limpr. subsp. *brunnescens*	(●)			●							●				●							
subsp. *griseum* (Nees & Hornsch.) H.H.Blom																●	●					
confertum (Funck) Bruch & Schimp.	●	●	(○)	●	●	(○)	(○)	(○)		(○)	●		(+)		●		●			●	●	●
crassipilum H.H.Blom		●	●	●	●	●	○	●		●	●	●	○		●		●	●	●	●	●	●
dupretii (Thér.) W.A.Weber	○	○		●	○	●						●							●	●		
elegantulum H.H.Blom subsp. *elegantulum*			○	●	○	○									○	●	●		●			
subsp. *wilsonii* H.H.Blom [103]															○							
flaccidum (De Not.) Ochyra	●	●	●	●						●							●			●		●
grande Poelt [104]				●																		
helveticum (Schkuhr) Deguchi						●		●		○	●						●	●	●	●	●	●
lancifolium (Kindb.) H.H.Blom [105]				●																		
marginale H.H.Blom, Bedn.-Ochyra & Ochyra				○		●																
papillosum Culm.	●	○		●	●		●			○												
platyphyllum (Mitt.) H.Perss.		●		●																		●
pruinosum (Wilson ex Schimp.) G.Roth		(○)	○	●	(○)					●												
pulchrum H.H.Blom [106]				●																		
rivulare (Brid.) Podp.	●	●	●	●	●			(○)									●		●	●	(○)	●
robustum (Nees & Hornsch.) H.H.Blom				●	○					●					●							
sordidum I.Hagen				●	●																	
subconfertum (Broth.) Deguchi [107]				○																		
subflaccidum (Kindb.) H.H.Blom [108]				●																		
succulentum Ignatova & H.H.Blom [109]				●																		
trichodon (Brid.) Poelt var. *trichodon*	●	●	○	●	●	●																
Schistostega D.Mohr (Schistostegaceae)																						
pennata (Hedw.) F.Weber & D.Mohr	●	●	●	●			○						●					●				
Sciuro-hypnum (Hampe) Hampe (Brachytheciaceae)																						
curtum (Lindb.) Ignatov		○		●																		
flotowianum (Sendtn.) Ignatov & Huttunen			○	●				○		○									○		○	●
glaciale (Schimp.) Ignatov & Huttunen	●	●	●	●	●	○		●							●							
latifolium (Kindb.) Ignatov & Huttunen	●	●	●	●		●																
ornellanum (Molendo) Ignatov & Huttunen [110]					○																	(○)

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
plumosum (Hedw.) Ignatov & Huttunen	●	●	●	●	○	●	○	●		●		●	+	●			○	●		●		●
populeum (Hedw.) Ignatov & Huttunen	●	●	●	●	●	●	○	●		●	○		○		●				●	○	○	○
reflexum (Starke) Ignatov & Huttunen	●	●	●	●	●	●		●		●			○		●	●				○		●
starkei (Brid.) Ignatov & Huttunen	●	●	○	●	●	●		●		●	●	●	○		●			●			○	●
tromsoeense (Kaurin & Arnell) Draper & Hedenäs [111]				●																		
Scleropodium Bruch & Schimp. (Brachytheciaceae)																						
cespitans (Wilson ex Müll.Hal.) L.F.Koch		○				●				●	●									●	●	●
touretii (Brid.) L.F.Koch	●	●	○	●	●	●	○	●	○	●	●	●	●		●		●	●	●	●	●	●
Scopelophila (Mitt.) Lindb. (Pottiaceae)																						
ligulata (Spruce) Spruce	●			●						●												
Scorpidium (Schimp.) Limpr. (Scorpidiaceae)																						
cossonii (Schimp.) Hedenäs	●	●	○	●	●	●		●														
revolvens (Sw. ex anon.) Rubers	●	●	●	●	●	●		●			●	●	●		●	●			○		●	
scorpioides (Hedw.) Limpr.	●	●	●	●	●	●	○	●			●											
Scorpiurium Schimp. (Brachytheciaceae)																						
circinatum (Bruch) M.Fleisch. & Loeske		○	●	○	●	●	●	●	○	●	●	●	●	●	●		●	●	●	●	●	●
deflexifolium (Solms) M.Fleisch. & Loeske										●			○				○				●	●
sendtneri (Schimp.) M.Fleisch.		●		○	○		○						○				●				●	●
Seligeria Bruch & Schimp. (Seligeriaceae)																						
acutifolia Lindb.		●								○	●				●							●
brevifolia (Lindb.) Lindb. [112]				●																		
calcarea (Hedw.) Bruch & Schimp.			○	●				○		○	●		○									
calycina Mitt. ex Lindb.										○												●
donniana (Sm.) Müll.Hal.	●	●	○	●	●	●		○		●												
irrigata (H.K.G.Paul) Ochyra & Gos [113]															●							
pusilla (Hedw.) Bruch & Schimp.		●	○	●	●	●		●		○	●	●	●		●		●			○		●
trifaria (Brid.) Lindb. var. *trifaria*			●	●	●	●				●	●				●							
Sematophyllum Mitt. (Sematophyllaceae)																						
adnatum (Michx.) E.Britton		●	●																			
demissum (Wilson) Mitt.		●	●	●	●					●			○									
substrumulosum (Hampe) E.Britton								●		●	●		●				●					●
Serpoleskea (Limpr.) Loeske (Amblystegiaceae)																						
confervoides (Brid.) Schimp.		○	○	●	●	●					●		○		●				●			
Sphagnum L. (Sphagnaceae)																						
affine Renauld & Cardot				●		○		○		●												
angustifolium (C.E.O.Jensen ex Russow) C.E.O.Jensen	●	●	●	●	●	●		○														
auriculatum Schimp.		●	●	●	●	●		●		●								○		●	●	●
balticum (Russow) C.E.O.Jensen [114]				●																		
capillifolium (Ehrh.) Hedw.	●	●	●	●	●	●	●	●		●			●					○		○	●	
centrale C.E.O.Jensen	●	●	●	●	●	●		●		●										○		
compactum Lam. & DC.	●	●	●	●	●	●		●		●												
contortum Schultz		●	●	●	●	●	●	●		●										○		●
cuspidatum Ehrh. ex Hoffm. var. *cuspidatum*		○	●	●	●	●		●		○												
divinum Flatberg & Hassel				●		●																
fallax (H.Klinggr.) H.Klinggr. var. *fallax*	●	●	●	●	●	●		●		●										●		
fimbriatum Wilson		●	●	●				○		●												
flexuosum Dozy & Molk.		●	●	●	●	●		●		●												
fuscum (Schimp.) H.Klinggr.	●	●	●	●	●	●	●															
girgensohnii Russow	●	●	●	●	●	●		●		●			●									
inundatum Russow		●	○	●		●	○	●		●										●		○
magellanicum Brid. [115]	●	●	●	●	●	●		●														○
majus (Russow) C.E.O.Jensen var. *majus*	●		●	●		●																
medium Limpr.	○	○	○	●	●																	
molle Sull.		○	○	●	●	●																
obtusum Warnst.		●		●	○																	

(*Continued*)

Table 1. Continued

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
palustre L.	●	●	●	●	●	●	●	●		●			●				○	○	○	●		
papillosum Lindb.		●	●	●	●	●				●												
platyphyllum (Lindb. ex Braithw.) Warnst.	●	●	●	●		●		○		●		●										
quinquefarium (Braithw.) Warnst.	●	●	●	●	●	●		●		●												
riparium Ångstr. [116]		○																				
rubellum Wilson	●	●	●	●	●	●	●	●														
russowii Warnst.	●	●	●	●	●	●	○	●		●												
squarrosum Crome	●	●	●	●	●	●	●	●		●									○			
subfulvum Sjörs subsp. *subfulvum* [117]				●																		
subnitens Russow & Warnst. subsp. *subnitens*		●	●	●	●	●	○	●		●										●	●	
subsecundum Nees	●	●	●	●	●	●	●	●		●		●								●		●
tenellum (Brid.) Pers. ex Brid.		●	○	●	●	●																
teres (Schimp.) Ångstr.	●	●	●	●	●	●	●	●		●												
warnstorfii Russow	●	●	●	●	●	●																
Splachnobryum Müll.Hal. (Pottiaceae)																						
obtusum (Brid.) Müll.Hal. [118]																	●					
Splachnum Hedw. (Splachnaceae)																						
ampullaceum Hedw.		○	+	○	○	○		○														
sphaericum Hedw.	○	●	○	●	○																	
Stegonia Venturi (Pottiaceae)																						
latifolia (Schwägr.) Venturi ex Broth. var. *latifolia*	●	○	○	●	○	○																
var. *pilifera* (Brid.) Broth.		●	○	●	○	○																
Stereodon (Brid.) Mitt. (Stereodontaceae)																						
callichrous (Brid.) Lindb.	○	●	●	●	●	●	●	○		●		●	+									
hamulosus (Schimp.) Lindb.	●		○	●	○							●										
pratensis (W.D.J.Koch ex Spruce) Warnst.		●	●	●	●	●							(○)									
Straminergon Hedenäs (Calliergonaceae)																						
stramineum (Dicks. ex Brid.) Hedenäs	●	●	●	●	●	●		●		●												
Streblotrichum P.Beauv. (Pottiaceae) [45]																						
convolutum (Hedw.) P.Beauv. var. *convolutum*	●	●	●	●	●	●	○	●		●	●	●	●	●	●	●	●	●	●	●	●	●
var. *commutatum* (Jur.) J.J.Amann					○		○			●	●		●		●		○	●			●	●
enderesii (Garov.) Loeske			○			○																
Syntrichia Brid. (Pottiaceae)																						
calcicola J.J.Amann	○	●	○	●	○	○		●			●				●			●	●	●	○	●
caninervis Mitt. var. *caninervis* [119]				+																		
var. *gypsophila* (J.J.Amann ex G.Roth) Ochyra	○	○																				
echinata (Schiffn.) Herrnst. & Ben-Sasson [120]																						●
fragilis (Taylor) Ochyra		●	●	●	●	○				○												
handelii (Schiffn.) S.Agnew & Vondr. [121]																						●
laevipila Brid.		●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
latifolia (Bruch ex Hartm.) Huebener			○	●							●											●
montana Nees var. *montana*	●	●	●	●	●	●	●	●	○	●	●	●	●		●		●	●	●	●	●	●
norvegica F.Weber	●	●	●	●	●	●		○		○	●		●		●	●	●		●	●		●
papillosa (Wilson) Jur.		●	●	●	●	●	○	○		●	●	●	●	●	●				●	●		●
papillosissima (Copp.) Loeske																					+	●
princeps (De Not.) Mitt.				●				●		●	●	●	○		●		○	○	○	●	●	●
ruraliformis (Besch.) Mans.	●		○	●	●	○		●		●	●	●	●		●		●		●	●	●	●
ruralis (Hedw.) F.Weber & D.Mohr var. *ruralis*	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
sinensis (Müll.Hal.) Ochyra	○	○	○	●	●												●					
virescens (De Not.) Ochyra	●	●	●	●	●	○					●	●	○		●			●			●	●
Taxiphyllum M.Fleisch. (Taxiphyllaceae)																						
wissgrillii (Garov.) Wijk & Margad.		●	●	●	●	●	●	●				○	○			●						
Tayloria Hook. (Splachnaceae)																						
acuminata Hornsch.			○	○																		
froelichiana (Hedw.) Mitt. ex Broth.	●	●	○	●	●	○																

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
hornschuchii (Grev. & Arn.) Broth. [122]				○																		
lingulata (Dicks.) Lindb.	●	●	●	●	●																	
serrata (Hedw.) Bruch & Schimp.			○	●	●	●																
splachnoides (Schleich. ex Schwägr.) Hook.		○	○	●	○																	
tenuis (Dicks.) Schimp.		○	○	●	○																	
Tetraphis Hedw. (Tetraphidaceae)																						
pellucida Hedw.	●	●	●	●	●	●		○		●			●									
Tetraplodon Bruch & Schimp. (Splachnaceae)																						
angustatus (Hedw.) Bruch & Schimp.		○	●	●				○														
mnioides (Hedw.) Bruch & Schimp.		+	●	●																		
urceolatus (Hedw.) Bruch & Schimp.		○	○	○																		
Thamnobryum Nieuwl. (Neckeraceae)																						
alopecurum (Hedw.) Gangulee	○	●	●	●	●	●	●	●	○	●	●	●	●		●	●	●	●	●	●	●	●
angustifolium (Holt) Nieuwl. [123]		●																				
neckeroides (Hook.) E.Lawton [124]															●							
Thuidium Bruch & Schimp. (Thuidiaceae)																						
assimile (Mitt.) A.Jaeger	●	●	●	●	●	●	●	●		○	●	○			●				●			
delicatulum (Hedw.) Schimp.	●	●	●	●	●	●	○	●		●	●	●	●		●			○	○	●		
recognitum (Hedw.) Lindb.	●	●	●	●	●	●	●	●		●	●		○				●					
tamariscinum (Hedw.) Schimp.	○	●	●	●	●	●	●	●		●	●	●	○		●		○	○		○		
Timmia Hedw. (Timmiaceae)																						
austriaca Hedw.	●	●	○	●	●	●		○		○	●		●		●	●	●		○			
bavarica Hessl.	●	●	○	●	●	●	○								●	●	●			●	+	●
megapolitana Hedw. [125]	○																					
norvegica J.E.Zetterst.	●	●	○	●	●	●									●							
Timmiella (De Not.) Limpr. (Timmiellaceae)																						
anomala (Bruch & Schimp.) Limpr.		○	●	●	○		○	●		○			●				●			●	●	●
barbuloides (Brid.) Mönk.		○	○							○			●				●	●		●	●	●
flexiseta (Bruch) Limpr.													○								○	●
Tomentypnum Loeske (Amblystegiaceae)																						
nitens (Hedw.) Loeske	●	●	●	●	●	●	●	●		●			○					○				
Tortella (Müll.Hal.) Limpr. (Pottiaceae)																						
alpicola Dixon [126]				●	●																	
densa (Lorentz & Molendo) Crundw. & Nyholm	●	●		●	●	●		●			●				●							
flavovirens (Bruch) Broth. var. *flavovirens*		●		○	●	●	●	●		●	●	●	●				●	●	●	●	●	●
var. *papillosissima* Sérgio & Casas																	●	●				●
fragilis (Drumm.) Limpr.	●	●	○	●	●	●		○		○					●							
humilis (Hedw.) Jenn.		○	○	●	●	●		●		●	●	●	●		●	●	●	●	●		●	●
inclinata (R.Hedw.) Limpr.	●	●	○	●	●	●	○	●		●	●	○	●		●	●	●	●	○	●	●	●
inflexa (Bruch) Broth.				●				●		●	●	●	●	●			○	●	●	●	●	●
mediterranea Köckinger, Lüth, O.Werner & Ros [127]										●												
nitida (Lindb.) Broth.	●	●	●	●	●	●	●	●		●	●	●	●	●		●	●	●	●	●	●	●
squarrosa (Brid.) Limpr.	○	●	●	●	●	●	●	●	○	●	●	●	●		●	●	●	●	●	●	●	●
tortuosa (Hedw.) Limpr.	●	●	●	●	●	●	●	●	○	●	●	●	●		●	●	●	●	●	●	●	●
Tortula Hedw. (Pottiaceae)																						
acaulon (With.) R.H.Zander var. *acaulon*		●	○	●	●	●	○	○		●	●	●	●		●		○	○	○	●	●	●
var. *pilifera* (Hedw.) R.H.Zander	●	○	○	●	○	●		●		○	●		○					○	○	●	●	●
var. *schreberiana* (Dicks.) R.H.Zander		○	○																		○	
atrovirens (Sm.) Lindb.	○	●	○	●	○	○	○	●		●			●	●	●		○	●		●	●	●
bolanderi (Lesq. & James) M.Howe														●							●	●
brevissima Schiffn.																				●	●	●
canescens Mont.		○	○	●	○	○	○	○	○	●	●	●	●	●		●	○	○	●	●	●	●
caucasica Broth.	○	●	●	●	●	●	●	●		●	○	●	●		○			○	○	●	●	●
cernua (Huebener) Lindb.			○	●	○	○																
cuneifolia (Dicks.) Turner	●	○	○	●	○	●	●	●		●	●		○			○	●	●		●	●	●

(*Continued*)

Table 1. Continued

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
freibergii Dixon & Loeske										●								●				●
guepinii (Bruch & Schimp.) Broth.			○										○				○					
hoppeana (Schultz) Ochyra	●	●	○	●	●	○		○		○	○				●							●
inermis (Brid.) Mont.			○	●	●	○	○	●	○	○			●	●	○		●	●	●	●	●	●
israelis Bizot & F.Bilewsky													●								●	●
laureri (Schultz) Lindb.			○	○		○																
leucostoma (R.Br.) Hook. & Grev.	●		○	●											●							
lindbergii Broth.		●	○	●	●	○	○	●		●	●		+		●		○	○	○	●	●	●
marginata (Bruch & Schimp.) Spruce		●	○				○			●	●	●	●	●		●	●	●	●	●	●	●
mucronifolia Schwägr.	●	○	○	●	●					●								●				
muralis Hedw. subsp. *muralis* var. *muralis*	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
var. *aestiva* Hedw.	●	●	○	○	○				○	●	●		○				○	●		●	●	●
muralis Hedw. subsp. *obtusifolia* (Schwägr.) Culm.	○	●		●				●	○									●				
pallida (Lindb.) R.H.Zander												○									○	●
protobryoides R.H.Zander		○	○	○	○	○	○	●		○	●						○		○		●	●
revolvens (Schimp.) G.Roth								●	○											●		●
schimperi M.J.Cano, O.Werner & J.Guerra	●	●	○	●		○	○	○		○			○		●		●		○	●	●	●
solmsii (Schimp.) Limpr.																	●				●	●
subulata Hedw.	●	●	○	●	●	●	○	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
systylia (Schimp.) Lindb.			○	○																		
truncata (Hedw.) Mitt.		●	●	●	●	○	○	○		●	○	●	●				○	○		○	●	●
vahliana (Schultz) Mont.								●		●			●				●			○	○	●
viridifolia (Mitt.) Blockeel & A.J.E.Sm.										●							○				●	●
wilsonii (Hook.) R.H.Zander			○							○			○							●	●	●
Trematodon Michx. (Bruchiaceae)																						
ambiguus (Hedw.) Hornsch.	○	●	○	●			○						○									
brevicollis Hornsch.	○	●		○																		
longicollis Michx.																	●					●
Trichodon Schimp. (Ditrichaceae)																						
cylindricus (Hedw.) Schimp.	●	●	●	●	●	●		●			●		+									●
Trichostomopsis Cardot (Pottiaceae) [66]																						
australasiae (Hook. & Grev.) H.Rob.											●											●
umbrosa (Müll.Hal.) H.Rob.				●							●		●									●
Trichostomum Bruch (Pottiaceae)																						
brachydontium Bruch		●	○	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	○	●	●	●
crispulum Bruch	●	●	●	●	●	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
herzogii Ros, O.Werner, R.D.Porley			○	●			+			●	●				●		○					●
littorale Mitt.					●		●	●		●	●		●				○				●	●
meridionale Ros, O.Werner, R.D.Porley										○							○				●	●
Ulota D.Mohr (Orthotrichaceae)																						
bruchii Hornsch. ex Brid.			●	○		○		●										●		●		
coarctata (P.Beauv.) Hammar		○	○	○	○	●																
crispa (Hedw.) Brid.		●	●	●	●	●	○	○		●			+					●	●	●		●
crispula Bruch		○	○				○											●				
hutchinsiae (Sm.) Hammar		○	●	●	●	○		○		○												
intermedia Schimp.		○				○				○										●		
macrospora E.Bauer & Warnst. [128]			●																			
Vinealobryum R.H.Zander (Pottiaceae) [66]																						
insulanum (De Not.) R.H.Zander	●	●	●	●	●	●	○	●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
nicholsonii Culm. [129]													●									
vineale (Brid.) R.H.Zander	○	●	○	●	●	●		●	○	●	●	●	●	●	●	●	●	●	●	●	●	●
Voitia Hornsch. (Splachnaceae)																						
nivalis Hornsch.	●			○																		
Warnstorfia Loeske (Calliergonaceae)																						
fluitans (Hedw.) Loeske	●	●	●	●	●	●	●	○		●			○							○	○	●

Taxa	AOS	PIE	LOM	TRA	VEN	FRV	LIG	EMR	RSM	TUS	MAR	UMB	LAZ	SCV	ABR	MOL	CAM	PUG	BAS	CAL	SAR	SIC
pseudostraminea (Müll.Hal.) Tuom. & T.J.Kop.				○			○															
Weissia Hedw. (Pottiaceae)																						
brachycarpa (Nees & Hornsch.) Jur.		●	●	●	●	●	○	○	○	○	●	●	●		●	○	●	●		●	●	●
condensa (Voit) Lindb. var. *condensa*	○	○	○	●	●	●	○	●	○	●	●	●	●	●	●	●	●	●	○		●	●
controversa Hedw. var. *controversa*	●	●	●	●	●	●	●	●	○	●	●	●	●		●		●	●	○	●	●	●
var. *crispata* (Nees & Hornsch.) Nyholm	○		○	○	○	●	○	○	○	○	●	○	○		●		○				○	●
var. *densifolia* (Bruch & Schimp.) Wilson			○	○							●						○					○
levieri (Limpr.) Kindb.										○												●
longifolia Mitt.		●	○	●	●	●	○	○		●	●		●				●	●		●	●	●
rostellata (Brid.) Lindb.		●	○	○				●														
rutilans (Hedw.) Lindb.		●	●	●	○	○	○			○	●	●									○	
wilsonii D.A.Callaghan										○											●	
wimmeriana (Sendtn.) Bruch & Schimp.	●	●	○	○	●	○		○		○		●	○		●		○	●		○	●	●
Zygodon Hook. & Taylor (Orthotrichaceae)																						
conoideus (Dicks.) Hook. & Taylor var. *conoideus*										○			+								○	
gracilis Wilson		●			○					○												
rupestris Schimp. ex Lorentz		●	●	●	●	●	○	●		●	●	●	●	●	●	●	●	●	●	●	●	●
viridissimus (Dicks.) Brid. [130]		(○)	●	●	●	(○)	(○)	(○)		●	●						(○)		(○)	(○)	(○)	●

Disclosure statement

No potential conflict of interest was reported by the author(s).

Annotations

Hornworts and liverworts

1. The report from TRA refers to a specimen gathered by Wolfskeel (July, 1993) at the Picco di Vallandro (Dürrensteinhütte, Bolzano) (*det*. R.S. and J.V., 1994).
2. Only reported by Cortini Pedrotti (1980) (*sub A. mandonii*) from the Island of Montecristo (TUS). *A. caucasicus* Steph. 1914 and *A. mandonii* Steph. 1916 are conspecific, as has been shown by Sérgio (1987).
3. The revision by R.S. and J.V. of herbarium specimens [VER] gathered by Carestia at Lake Combal (Courmayeur, Aosta, 21 July, 1885) confirmed its presence in AOS. Given the lack of herbarium specimens, the reports from TRA and FRV are considered dubious.
4. The report from SAR by Bischler and Jovet-Ast (1971–1972) refers to a herbarium specimen [PC] collected by De Notaris and identified as *Marchantia commutata* (= *Preissia quadrata*).
5. The report from SAR by Moris (1829), lacking confirmation by herbarium specimens, is considered uncertain by Bischler and Jovet-Ast (1971–1972). The herbarium specimens from VEN (Colli Euganei) and UMB (Trasimeno Lake) correspond to *Calypogeia fissa*; those from VEN (M. Baldo) and PIE (Riva Valsesia) correspond to *C. neesiana*. Herbarium specimens from TUS reviewed to date correspond to *C. fissa* and *C. neesiana*. Reports from LIG, EMR, LAZ and CAM [*sub C. trichomanis*] are considered dubious.
6. The report by Cappelletti (1927) from PIE (Val Maira) is confirmed neither by Zodda (1934) nor by Müller (1951–1958) and is considered dubious given the species' ecology.
7. In Italy the species was wrongly reported in the past from PIE (*leg*. Cesati 1857, along the Sesia River near Vercelli) and TUS (*leg*. Sommier 19 February, 1901, Elba Island, FI; *leg*. Levier 1885, "Firenze La Concezione", VER), but after a revision of herbarium specimens these reports were referred to *Cephaloziella calyculata* (Aleffi et al. 2008). Therefore, the discovery of *C. integerrima* in LOM (Gavia Pass) (Tacchi et al. 2014) is the first confirmed for Italy.
8. Ligrone and Duckett (2005) have reported the finding of a population of *Cyathodium foetidissimum* Schiffn. in the Ferriere Valley, near Amalfi (CAM).
9. The specimen, gathered by Rossetti in 1891 at the Forno Volasco (Apuan Alps, TUS), and identified as *Diplophyllum obtusifolium*, then later revised by Massalongo as *D. taxifolium*, corresponds to *D. obtusatum* (*rev*. R.S. 1991, *conf*. J.V. 1991).
10. *Fossombronia maritima* was recently found in CAM (ancient city of Pompei) during the excursion of the British Bryological Society (Preston and Blockeel 2006).
11. *Fossombronia mittenii* was recently found (*sub F. crozalsii*) on the Island of Linosa (Pelagian Islands, SIC) associated with *Exormotheca pustulosa* (Carratello and Aleffi 1999). The specimen from TUS (Canale di Renara nel fosso della Canala; Torrente di Antona) by Ferrarini and Marchetti (1983) corresponds to *F. angulosa*.
12. Stephani (1911) reports *Frullania calcarifera* generically for Northern Italy. *F. calcarifera* was placed in synonymy of *F. tamarisci* by Hattori (1972) but shown to be a species separate from it by Heinrichs et al. (2010) and Vilnet et al. (2014).
13. Only reported from TRA (in the environs of Merano) collected by Schiffner in 1899 and by Schwab in 1976. *Frullania inflata* Gottsche as treated in Söderström et al. (2016) is a species complex. *F. inflata s.str*. is confined to North America and reports from Europe belongs to the segregate *F. cleistostoma* (Mamontov et al. 2018).
14. Only reported from LOM by Giacomini (1938b). Konstantinova et al. (2009) considered *Pleurocladula islandica* (Nees) Grolle to be a synonym of *P. albescens* (Hook.) Grolle, but we follow Söderström et al. (2002) and maintain it at the rank of variety. This variety is found from Greenland and Baffin Island to Quebec. It is also in northern Europe south to Switzerland. According to Söderström et al. (2016) there are doubts about the value of the taxon.
15. Only reported by Aleffi et al. (2004) from PIE (Stura di Demonte Valley, Western Alps).
16. *Gymnocolea inflata* subsp. *acutiloba* is a problematic taxon that sometimes has been treated as conspecific with *G. inflata*, sometimes as a separate species. According to Söderström et al. (2016) there are doubts about the value of the taxon.
17. Only reported from PIE (Riva Valsesia, Alpe Rizzolo at Lago Bianco) by Massalongo and Carestia (1882) (*conf*. J.V., 1993).
18. Only reported by Schäfer-Verwimp et al. (2021) from TRA (Ötztaler Alpen, Tisenberg, Schnals). The herbarium specimen [TO] from LOM (*leg*. Davies, 1903 or 1893, Santa Caterina at the feet of Mt. Sobretta) corresponds to *G. concinnatum* (*rev*. R.S. and J.V., 1994).
19. Only reported from TRA (Val Passiria) by Düll (1991) and South Tirol by Spitale et al. (2015).
20. According to Söderström et al. (2016) there are doubts about the value of the taxon.
21. The report from AOS (Valsavarenche, Pian de la Pesse) by Buffa and Miserere (2004) corresponds to *Barbilophozia sudetica*. The report from SAR (Aritzo) by Moris (1829), not being confirmed by herbarium specimens, is considered uncertain by Bischler and Jovet-Ast (1971–1972).
22. Only reported for Italy by Brusa and Hugonnot (Acquafredda, Lenno, Tremezzina, Province of Lecco, LOM; *leg*. Brusa, 6 February, 2019) (Ellis et al. 2019).
23. According to Söderström et al. (2016), there are doubts about the value of the taxon.

24. According to Söderström et al. (2016), there are doubts about the value of the taxon.
25. Only reported by Jack (1898) from TRA (Merano).
26. Only reported by Rossetti (1888) from TUS (Miniere del Bottino near Serravezza) (see Cortini Pedrotti et al. 1991).
27. Only reported by Müller (1906–1916) from TRA (Lago di Braies "*am kleinen See*", 1906 *v.* Degen, *det.* Schiffner).
28. Only reported by Jones (1969) from TRA (Passo di Costalunga). The report from AOS (Valsavarenche, Pian de la Pesse) by Buffa and Miserere (2004) corresponds to *Lophozia sudetica*. Probably overlooked.
29. Only reported from LOM (Rile Tenore Olona Park, Gornate Olona, VA) by Brusa (2020a). The report from TRA by Düll (1983) (*sub P. laevis* subsp. *carolinianus*) is excluded by the author (*in litt*., 1993).
30. Only reported by Cortini Pedrotti et al. (1991) from TUS (Apuan Alps). As Heinrichs, Grolle and Drehwald (1998) have pointed out, the neotropical *P. bifaria* and the European *P. killarniensis* are conspecific.
31. Aleffi et al. (2004) have conducted some searches in the two localities of *Radula visianica*: on the Colli Euganei in VEN (Massalongo 1904) and in the Bosco Welsperg (Fiera di Primiero, Val Cismòn) in TRA (Gerola 1938). These searches did not reveal the species again. However the species has recently been found in Austria by Köckinger (2016). The *Holotypus* of *Radula visianica* ["*nei Colli Euganei «prov. di Padova» al mt. Sengiari (sulla terra o sul tronco degli alberi?) sopra Torreglia, non lungi dal luogo dove trovasi la villa che un giorno possedeva il defunto professore R. De Visiani; 23 febbraio 1878*"; *conf.* R.S., 1994] is preserved in the Massalongo Herbarium of the Civic Museum of Natural History in Verona [VER].
32. The report from SIC (Palermo Botanical Gardens) by Dia and Aiello (1992) corresponds to *R. palmata* (*rev*. R.S., 1994).
33. Only reported by Düll (1968) from FRV (Tagliamento River near Latisana, Udine).
34. Only reported by Baudoin et al. (1984) from SIC (Pachino).
35. Only reported by Ellis et al. (2018a) from SAR (Pauli Murtas, Oristano; *leg.* R.Becker, *det*. Th.Homm, 10 July, 2017).
36. Reported by Müller (1901) for VEN (Revolto, Verona: *leg.* Massalongo, 21 September, 1878 "*ad truncos emarcidos Pini piceae, prope Revolto*", VER; *conf.* R.G., 1975) and by Massalongo (1902) for VEN (Revolto, Verona) and confirmed by Grolle (*conf*. R.G., 1975). This rare species has been found in abundance in the Gran Paradiso National Park (AOS) (Schumacker et al. 1999).
37. Only reported by Schumacker et al. (1999) from AOS (Gran Paradiso National Park: Urtier Valley, Lago Ponton, 2600 m a.s.l.).
38. Only reported from AOS (Gran Paradiso National Park: Eaux-Rouges Valley, 2375–2630 m a.s.l.) by Schumacker et al. (1999).
39. Only reported from AOS (Gran Paradiso National Park: Cogne and Valeille Valley, environs of Lillaz, 1700 m a.s.l.; Urtier Valley, Alpe Broillot, 2400 m a.s.l.) and PIE (Gran Paradiso National Park: Orco Valley, Chiapili di sotto, 1700 m a.s.l.; Piantonetto Valley, Lago di Teleccio, 1950 m a.s.l.) by Schumacker et al. (1999).
40. Only reported by Massalongo (1885) from VEN (Valle di Tregnago near Revolto, Verona, *leg*. Massalongo 1878 "*ad truncos subputridos in sylvis piniferis circa Revolto, prov. Verona*", VER, TO; *conf.* R.G., 1975). Stephani (1898–1924) indicates as a second location "*Abruzzen*". However, the data is not confirmed by Müller (1906–1916), who claims never to have seen specimens from this locality. Recent field research failed to identify the species in this region and thus it is to be considered dubious.

Mosses

41. Only reported from SAR (*sub Phascum bulbosum* var. *piligerum*) by De Notaris (1838) near Cagliari.
42. Only reported from SAR (near Cagliari) (De Notaris 1838).
43. Lara et al. (2022) have re-evaluate from a taxonomic view point the disjunct Mediterranean populations of *Ulota s.l.* in order to obtain an update estimative of the extent of the populations of each species in the main Mediterranean territories where these species occur. As a result, five species, namely *Atlantichella calvescens*, *Ulota bruchii*, *U. crispa*, *U. crispula* and *U. intermedia*, have been found in the study area. Of note is the discovery of *U. crispula*, *U. bruchii* and *U. intermedia* in very southern areas of Portugal and Italy, as well as the discovery for the first time of *A. calvescens* in localities outside the Atlantic area, specifically in the central Mediterranean.
44. *Atractylocarpus alpinus* (Schimp. ex Milde) Lindb. is endemic to Europe and had so far only been known from a few collections in Norway, Switzerland and Austria. Recently it was collected the first time in Italy (Funes Valley, between Bressanone and Chiusa, TRA, 1520 m a.s.l.). Because of its rareness, it is a protected species in the European Union (Frahm et al. 2007).
45. Other European species of *Barbula* were moved to the reinstated genera *Hydrogonium* and *Streblotrichum* and the newly described genus *Gymnobarbula* by Kučera et al. (2013).
46. *Bartramia aprica* is the correct name for the Mediterranean and western North American species historically recognized as *Bartramia stricta* (Müller 2014).
47. Only reported from AOS at Pessé and Machaby (Capra 1905).
48. Only reported from TRA (near Molina, Ledro Lake) between 840 and 940 m a.s.l. (Gos and Ochyra 1994).
49. Only reported from LOM on the dolomitic cliffs of the Mt. Sobretta (Val dell'Alpe), at about 2500 m a.s.l. (Giacomini 1939).

50. Only reported (*sub Bruchia trobasiana*) by De Notaris (1865–1867) from PIE (near Trobaso in Intrasca Valley).
51. Many reports of species belonging to the *B. erythrocarpum complex* have been erroneously assigned to *B. blindii*, which occurs only in a few Italian regions (AOS, PIE, LOM, TRA, FRV). *Bryum blindii* was reported from Sicily by Dia et al. (1987) but it should be excluded from the Sicilian bryoflora.
52. Only reported from TRA (near Calliano, Trento) along the Cavallo River (*leg.* F.Prosser, 18 march 2018) (Ellis et al. 2018b).
53. Only reported (*sub C. sommieri*) from SIC by Bottini (1907) on Pantelleria Island. Recently found by Privitera and Puglisi (2009) in some locations on the island.
54. Only reported from VEN (near Chiapuzza, Belluno, along the Musigo River at 975 m a.s.l.) (Zodda 1907).
55. Only reported from SAR (between Genna Silana and the Gorropu Canyon) by Frahm et al. (2008).
56. Only reported from TRA by Molendo (1864) at Canazei and by Kern (1905) at Bocca di Vallazza in Val Persa near Molveno.
57. Only reported from CAL (at the base of the Timpa del Salto, Marchesato, Crotone) by Puntillo (2004).
58. Only reported from CAL (on the Aspromonte Massif, at the base of Papagallo Mountain) (Privitera and Puglisi 2000).
59. Only reported from SIC at Solunto (Dia and Campisi 2009) and Gela (Puglisi et al. 2013).
60. Only reported by Lindberg (1881) from TUS (on the banks of the Arno River, near Pisa).
61. Only reported from CAM by Ellis et al. (2022) (Villa Cimbrone, Ravello, *leg.* C.Sérgio, 26 March, 2002).
62. Only reported from FRV by Scopoli (1772) in Carnia, Biasoletto (1827) along the Timavo River and by Berini (1826) along the Isonzo River, Mucile Lake and S. Giovanni di Duino River.
63. Only reported from TRA: Lazzago Valley near Vipiteno (Glowacki 1915) and Rabbi Valley (Tacchi 2006).
64. Only reported from LOM (Valfurva) by Giacomini (1939) and the Retiche Alps (Mt. Parè) by Anzi (1877).
65. Only reported by Trautmann (1911) from TRA on the Italian side of the Stelvio Pass.
66. In order to evaluate the circumscription of *Didymodon s.l.* and its relationships with the allied genera *Andinella*, *Gertrudiella*, and *Tridontium*, Jiménez et al. (2022a) have conducted phylogenetic analyses of DNA sequences. Species of these four genera can be divided into eight well-supported and morphologically distinct genera: *Didymodon* s.s., *Geheebia*, *Husnotiella*, *Trichostomopsis*, *Vinealobryum*, *Gertrudiella*, *Tridontium*, and *Zanderella* of wich the first five are present in Italy.
67. Based on morphological and phylogenetic results *Barbula trifaria* var. *desertorum* is transferred to the genus *Didymodon* and recognized at species rank as *D. desertorum* (Jiménez et al. 2022b). The range of this species is extended to most Mediterranean countries and the Canary Islands.
68. All records of *Didymodon glaucus* from Italy refers to specimens identified as *Eucladium verbanum* Nicholson and Dixon. *D. glaucus* subsp. *glaucus* has not yet been found in Italy.
69. Only reported by Schäfer-Verwimp et al. (2021) from TRA (Zillertaler Alpen, Kreuzspitzkamm, Mühlbach, Vals; Tuxer Kamm, Sterzing; Fanes-Sennes-Prags, Pragser Wildsee; Villnöss, between Brogles Alm and Panascharte).
70. Only reported from LOM (Province of Como, Duke Herbarium, 1905) [DUKE].
71. Only reported by Privitera and Puglisi (2002) at Siracusa. The report by Sotti (1977) in Val Sangone (Vallone Rocciavrè) was excluded because the only existing herbarium specimen does not correspond to this species (Pistarino et al. 2005).
72. Only reported from SAR by Frahm et al. (2008) at Lotzorai (Nuoro).
73. Only reported (*sub F. cavareana*) by Farneti (1894b) from LOM in the environs of the city of Pavia.
74. Only reported from SIC: by Carratello and Aleffi (1998) along the seashore of Capaci (Palermo) and Campisi and Provenzano (2004) at Selinunte.
75. Only reported (*sub Dubyella italica*) by De Notaris (1869) from TUS at Massa, near the town of Carrara.
76. Only reported by Spitale et al. (2012) from TRA at Dolomiti di Brenta (Mt. Peller and Piani della Nana, 2100 m a.s.l.).
77. Only reported from AOS in Veny Valley (Mt. Bianco) by O'Shea (2004).
78. Only reported from TRA (Pfitsch, between Gliederscharte and Wiener Neustatt (2400 m a.s.l., *leg.* Kiebacher) (Ellis et al. 2018a).
79. Only reported from TRA (Tramin, Mt. Roen, 1830 m a.s.l., *leg.* T.Kiebacher, 07 October, 2020) (Ellis et al. 2021).
80. Only reported for Italy from PIE (Villa San Remigio Garden, Pallanza) (Aleffi et al. 2010).
81. Only reported from SIC by Privitera et al. (2008) at Lipari Island.
82. Only reported from SIC by Draper et al. (2003). The report refers to herbarium specimen by Lo Giudice (Nebrodi Mountains, 1300 m a.s.l., on *Prunus lusitanica* L., *leg*. Lo Giudice, 20-IX-2001).
83. Only reported from SAR on the Mt. Gennargentu (Frahm et al. 2008).
84. Only generically reported (*sub Leskea subenervis*) by Garovaglio (1844).
85. Only reported from CAL by Lara et al. (2004) at Fossiata (Sila Grande, 1260 m a.s.l.).
86. Only reported from TRA (South Tyrol, Ortler-Alpen, Mittelvinschgau, Latsch, 1710 m a.s.l., *leg.* Schäfer-Verwimp, Mair and Tratter, 6 July, 2022).
87. Kiebacher and Lüth (2017) describe a new species of *Orthotrichum* from the European Alps: *O. dentatum* T.Kiebacher and Lüth. *Orthotrichum dentatum* grows as an epiphyte on a variety of deciduous trees. So far, the new species has only been found in Italy (Type: Trentino-Alto Adige, South Tyrol, Feldthurns, Tschiffnon,

in a garden on bark at the stem of a solitary *Juglans regia* tree, 01 August 2014, *leg*. T.Kiebacher), Austria, Switzerland and France (Hugonnot et al. 2021).

88. Only reported from SIC by Lara et al. (2004) and Provenzano et al. (2011).
89. The report from SAR by Herzog (1926) is considered uncertain, according to Lara and Garilleti (*in litt.* 2018).
90. Only reported from LOM by Brusa (*in litt*., 08 April, 1999) at Monate Lake (Varese) and by Zavagno (2007) at Orobie Alps.
91. Only reported from TRA (Rieserfernergruppe) by Schäfer-Verwimp et al. (2021).
92. Only reported from TRA (Stubaier Alpen, Pflerschtal) by Schäfer-Verwimp et al. (2021).
93. Only reported by Brusa and Towsend (2002) from LOM at Mt. Lema (Varese).
94. The report of *Bryum sphagni* by Rota on the Lombardian side of the Tonale Pass (De Notaris 1869) is erroneously assigned to *Pohlia sphagnicola*: *Bryum sphagni* correspond, in fact, to *Bryum weigelii*. The report by Raimondo and Dia (1978) on the Madonie Mountains, following the revision of the herbarium specimens (*rev*. Nordhorn-Richter), corresponds to *Pohlia nutans*.
95. Only reported from some localities in TRA: Val di Fleres, Colle Isarco (Trautmann 1896); Ortler near Solda (Janzen 1904); near S. Gertrude (Trautmann 1911); Rabbi Valley (Tacchi 2006); Ötztaler Alpen, Langtaufers östlich Reschensee (Schäfer-Verwimp et al. 2021).
96. Only reported from VEN in some localities of the Belluno Province between 1050 and 2200 m a.s.l. (Zodda 1912).
97. Only reported from SIC by Dia and Campisi (2006) in the archaeological area of Solunto and Privitera and Puglisi (2009) at Linosa Island.
98. Only reported from TRA (Pinzolo) by Philippi (*in litt*., 4 January, 1994).
99. Only reported from SIC (sub *P. nigricans* var. *albidens*) by Zodda (1911) in the environs of Catania.
100. Only reported from PIE by Bottini (1913) at Campello-Monti and Aleffi et al. (2018) at Maritime Alps. The report by Sotti (1978) in Sangone Valley (Giaveno, Fraz. Ponte Pietra), lacking confirmation by herbarium specimens, is considered uncertain.
101. Only reported by Miserere and Brusa (2003) from PIE (Alta Valle Pesio, Cuneo) and LOM (Veddasca Valley, Varese).
102. Based on the taxonomic revision of the *Schistidium apocarpum* group (Blom 1996), the occurrence of the genus *Schistidium* in Italy has much changed with respect to the previous check-lists. The genus distribution has been exclusively deduced by reference to the Italian records reviewed by Blom and kept in different herbaria [BM, CAME, STU, Greven priv. herb., GZU, PI, S, W], and by reports made after 1996. Bibliographic data previous to this date and not confirmed by revision of the herbarium specimens, are considered uncertain.
103. *Schistidium elegantulum* subsp. *wilsonii* H.H.Blom was reported from ABR in Blom (1996) based on a specimen collected by Martelli in July 1903 on the Mt. Velino [PI].
104. Only reported by Ellis et al. (2017) from TRA (St. Martin in Thurn, Mt. Peitlerkofel, 2870 m a.s.l., *leg*. T.Kiebacher, *det*. H.Köckinger).
105. Only reported from TRA by Pokorny et al. (2004a) (Trento, Gocciadoro Park) and Tacchi (2006) (Val di Rabbi).
106. Only reported from TRA by Pokorny et al. (2004b) (Trento, Gocciadoro Park).
107. The report from TRA refers a herbarium specimen collected by Glowacki (*sub Grimmia atrofusca*, An der Strasse über das Stilfser Joch auf der Paßhöhe, 26 August 1909, J.Glowacki, GJO 0102803), and examined by H.H.Blom. Following the morphological re-examination of the Glowacki-specimen by Kiebacher & Blom (2022) it was found that it represents *S. succulentum*. *S. subconfertum* should be excluded from the list of European and Italian species and again represents a taxon to-date solely known from China, Japan and North Korea.
108. The report from TRA by Ellis et al. (2020) refers a herbarium specimens collected by T.Kiebacher in many localities of South Tirol and Trentino between 2017 and 2018 and a herbarium specimen by Venturi (Mt. St. Vigilio, *leg*. Venturi, *det*. H.Blom, PI).
109. Only reported from TRA by Kiebacher (2020) (St. Ulrich, Mt. Seceda, 2450 m a.s.l., *leg.* M.Lüth 02 September 2002, *det*. T.Kiebacher & H.H.Blom) and by Glowacki (*sub Grimmia atrofusca*, An der Strasse über das Stilfser Joch auf der Paßhöhe, 26 August 1909, J.Glowacki, GJO 0102803) (Kiebacher & Blom 2022).
110. Only reported by Molendo (1865) from VEN in Livinallongo on the Mt. Padon, at 1863 m a.s.l. (*sub Hypnum ornellanum*). The report by Zodda (1907) from SIC is considered uncertain.
111. Only reported by D.Spitale (Blockeel et al. 2010) in Stelvio National Park (TN): Val de la Mare, near Lake Careser, 2654 m a.s.l. (11 August 2008, *leg.* D.Spitale, *conf.* I.Draper).
112. Only reported from TRA (Valcroce, Bressanone) by Hofbauer and Dickson (2020).
113. Only reported by Ellis et al. (2014) from ABR (Gran Sasso-Laga National Park, Mt. Prena, 1868 m, *leg.* R.Tacchi, 23 September 2013; *det*. R.Ochyra, 2014).
114. Only reported from TRA by Düll (2006) at Alpe di Siusi, Bolzano (*leg*. Lauer 1971) and Düll-Wunder (2008) at Sciliar.
115. Molecular and experimental studies have revealed genetic structure within *Sphagnum magellanicum*, and morphological differences associated with these genetic groups. On the base of molecular and morphological evidence all European records of *S. magellanicum* are referable to *S. divinum* or *S. medium* (Hassel et al. 2018). *S. magellanicum s.str*. is confined to southern South America. A systematic revision of the herbarium specimens is necessary. *S. magellanicum* was reported from Sicily by Bottini (1919) (*sub Sphagnum magellanicum*

var. *laxum* Röll) but the species seems to be extinct in Sicily since it can no longer be found there (Raimondo and Dia 1978).

116. Only reported from PIE (Meugliano Lake and Condove, Susa Valley) by Tosco (1951–1962).
117. Only reported from TRA by Ellis et al. (2012) (Adamello Brenta Natural Park, Madonna di Campiglio, 1950 m a.s.l., *leg*. Spitale 6 July 2011; Valbona Lake, 2050 m a.s.l., *leg*. Philippi, July 2000).
118. Only reported by Preston and Blockeel (2006) from CAM (Vesuvio).
119. Only reported by Düll (2006) from TRA (Südtirol, Bolzano Province, without any precise locality, *leg*. Kockinger 1989).
120. Only reported by Campisi et al. (2006) from SIC in Rocca Busambra (Bosco della Ficuzza Natural Reserve).
121. Only reported from SIC at "Bosco della Ficuzza" Natural Reserve, about 10 km south from Marineo (Blockeel 2000) and Erei Mountains and Troina (Lo Giudice and Cristaudo 2004; Lo Giudice and Bonanno 2010).
122. Only reported from TRA by Kern (1913) at Rifugio Cevedale and Glowacki (1915) at Lago Nero (S. Martino al Montenevoso, 2600 m a.s.l.).
123. Only reported from PIE (Torrente Gesso di Valletta, Tetti Gaina, Valdieri, Cuneo) by Spada et al. (2022).
124. Only reported by Mastracci (2003) from ABR on the Bosco Martese (Laga Mountains).
125. Only reported from AOS (Champorcher). The report refers to a specimen from 1905 kept in the Duke herbarium [DUKE].
126. Only reported from TRA (Vigo di Fassa, Kleine Latemarscharte) and VEN (Tofana di Rozes, Cortina d'Ampezzo) by T.Kiebacher (Ellis et al. 2020).
127. Only reported from TUS (Apuan Alps Regional Park: Solco d'Equi and Lizza della Canalonga, Valle di Vinca, Fivizzano, *leg.* Pandeli, 4 March 2020) by Ravera et al. (2020).
128. Only reported from LOM by Ellis et al. (2021) (Ponte in Valtellina, San Bernardo a Strafodes, *leg.* Lara, 3 August 2013).
129. Only reported by Jimenez et al. (2003) from LAZ at Foro Italico (Rome).
130. Bibliographic data from PIE, FRV, LIG, EMR, CAM, BAS, CAL, SAR not confirmed by revision of the herbarium specimens and considering the species ecology, are considered uncertain.

Excluded or doubtful taxa

Hornworts and liverworts

Cephalozia lucens (A.Evans) Steph.

Reported by Rodegher (1896) from LOM (along the Brembo River at Olmo and near Averara, *sub Jungermannia lucens*). The herbarium specimen [BER] could not be found. The species is excluded from the liverwort flora of Italy.

Drepanolejeunea hamatifolia (Hook.) Schiffn.

Reported by De Notaris (1859) from LOM (Carenna, Brumano, Aralatta and Mt. Resegone, *sub Lejeunea hamatifolia* Dum.). However, the herbarium specimens (*leg.* Rota, BER) could not be found. *D. hamatifolia* is excluded from the liverwort flora of Italy; it is an eu-oceanic species which lives only on the Atlantic coasts of Portugal, Spain, France, Ireland, England, and Macaronesia.

Exormotheca bullosa (Link ex Lindenb.) K.Müll.

Incorrectly reported by Zodda (1934) from SIC (Aci Castello). The error was later reported by Müller (1951–1958) and Bischler (1976).

Fimbriaria blumeana Nees

Reported by Tassi (1901) from TUS (Siena Botanical Gardens). The herbarium specimen [SIENA] could not be found. The species is excluded from the liverwort flora of Italy; it lives only in Java and in the Himalayas.

Fimbriaria raddii Corda

Regarding this species, Zodda (1934) writes: "*Specie dubbia, scoperta da Raddi presso Firenze e descritta da Corda, ma non più ritrovata né ivi, né altrove; né è stato possibile rintracciare gli esemplari autotipi*". Müller (1906–1916) writes of never having seen the original specimen and adds that the description was done by Nees, with a specimen at hand.

Fimbriaria stahlii Steph.

Reported by Tassi (1901) from TUS (Siena Botanical Gardens). The herbarium specimen [SIENA] could not be found. The species is excluded from the liverwort flora of Italy; it lives only in Mexico and Guatemala.

Frullania teneriffae (F.Weber) Nees

Reported by Herzog (1905) from SAR (Canale d'Inferno, S. Pietro). The herbarium specimen corresponds to *F. tamarisci* (*rev*. R.G.).

Herbertus sendtneri (Nees) Lindb.

Reported by Zodda (1934) from TRA (Alto Adige between Merano and Bolzano at the Passo della Croce, *sub Schisma sendtneri* Nees). Zodda erroneously reports the data by Dalla Torre and Sarnthein (1904) "*im Anstieg zum Kreuzjoch*" [*sub Herberta straminea* (Dum.) Trevisan], located in Austrian territory. In fact, Müller (1906–1916) reports the data by Dalla Torre and Sarnthein among the Austrian sites of the species and later (Müller 1951–1958) affirms that *Herberta straminea* is found "*In den Ostalpen in einem kleinen Gebiet westlich und östlich von Innsbruck, auf einer Strecke von nur 120 km Luftlinie*", enriching the site list with a map of the species' distribution. Thus Zodda confused the Austrian toponym with the Italian one existing between Bolzano and Merano.

Heteroscyphus integrifolius (Lehm. & Lindenb.) Fulford

Reported by Rodegher (1896) from LOM (Val Brembana, *sub Iungermannia integrifolia*). However, the herbarium specimen [BER] could not be found. The species is excluded from the liverwort flora of Italy; it lives only in Peru and Chile.

Jungermannia brembana Rota

Only reported by Rodegher (1896) from LOM (Bergamo and Val Brembana). The herbarium specimen [BER] corresponds to *Cephaloziella divaricata* (*rev*. R.S., 1993).

Endogemma caespiticia (Lindenb.) Konstant., Vilnet & A.V.Troitsky (Syn.: *Jungermannia caespiticia* Lindenb.)

The herbarium specimen [BER] from LOM (Val Camonica) by Rodegher (1896) corresponds to *Nardia geoscyphus* (*rev.* R.S., 1993). The report from PIE by Cappelletti (1927) refers to a herbarium specimen (*leg*. Gola 1900, Piedimulera, TO) corresponding with *J. atrovirens* (*rev.* R.S., 1994). The reports from TUS (Appennino Pistoiese at the Laghetto del Greppo) by Barsali (1907) and from PIE (Mt. Rocciacotello) by Filipello (1964), lacking confirmation by herbarium specimens, are to be considered as uncertain.

Jungermannia equisetifolia

The report from PIE (Vagna, Domodossola) by Gagliardi (1884) refers to a binomial unknown to liverwort taxonomy. The herbarium specimen has not been found.

Jungermannia horkii Nees

Only reported by Rodegher (1896) from LOM (Sarnico). The herbarium specimen [BER] corresponds to *Cephaloziella* sp. (*rev*. R.S., 1993).

Jungermannia microcarpa Carringt.

The report from PIE (Valsesia) by Gallo (1892) refers to a binomial unknown to liverwort taxonomy. The herbarium specimen has not been found.

Jungermannia minima Scop.

Reported by Scopoli (1772) from Carnia in Austrian territory and doubtfully by Viviani (1804) from LIG (Polcevera) and LAZ (Agro Romano).

Viviani, referring to Scopoli's report, notes: "*A Scopolio tam imperfecte descripta, ut sine dubitationis nota eiusdem synonimon recipere non auserim*".

Jungermannia rorata Rota

Only reported by Rodegher (1896) from LOM (Val Camonica and Val Brembana). The herbarium specimens [BER] correspond to *Cephalozia bicuspidata* (*rev*. R.S., 1993).

Kurzia pauciflora (Dicks.) Grolle

The reports from PIE correspond to *K. sylvatica* and *K. trichoclados* (*rev*. H.Hürlimann). The gatherings of Carestia (Riva Valsesia, Gola Rossa, Ovago d'Otro and Cramisei) correspond to *K. trichoclados*. Farneti (1894a) reports the species doubtfully from LOM (Agro di Como). The reports from TRA by Dalla Torre and Sarnthein (1904) (*sub Lepidozia setacea*) correspond to *K. trichoclados*. Even though the herbarium specimen is sterile, Gerdol's determination (*leg*. Gerdol 1987, Oberrasen Antholz – Rasun Anterselva above) is almost certainly incorrect given the species' ecology. All reports from TUS, after revision of the herbarium specimens (Cortini Pedrotti et al. 1991), correspond to *K. sylvatica*. All the specimens examined were confused with *K. sylvatica* or *K. trichoclados*. For the determination of *Kurzia,* see Stieperaere and Schumacker (1986).

Lejeunea flava (Sw.) Nees subsp. *moorei* (Lindb.) R.M.Schust.

Reported by Massalongo and Carestia (1882) from PIE (Alpe Casera in Valsesia, *sub L. moorei*). According to Müller (1951–1958) and Düll (1983) the identification appears clearly incorrect. Schuster (1966–1992) notes the species in Central and South America and the subsp. *moorei* for Ireland. Probably confusion with yellow forms of *L. cavifolia*.

Lejeunea patens Lindb.

Following revision of the herbarium specimens, all the reports from Italy correspond to *L. lamacerina* and *L. cavifolia. L. patens* only lives along the Atlantic coasts of Europe. For the distinction between *L. patens*, *L. lamacerina* and *L. cavifolia* see Müller (1951–1958) and Geissler (1987).

Lepidozia cupressina (Sw.) Lindenb.

The report from FRV (Mt. Cretabianca) by Gortani (1955), not being confirmed by herbarium specimens, is to be considered as uncertain. *L. cupressina* is a markedly oceanic species that lives in isolated locations (Vosges, Black Forest) under oceanic influences.

Leptoscyphus cuneifolius (Hook.) Mitt.

Reported by Rodegher (1896) from LOM (Ca' S. Marco in Val Brembana, *sub Jungermannia cuneifolia*). The herbarium specimen [BER] corresponds to *Cephalozia bicuspidata* (*rev*. R.S., 1993).

Liochlaena subulata (A.Evans) Schljakov

The herbarium specimen [TO] gathered by Gola in 1905 in PIE (near Piedimulera) corresponds to *J. atrovirens*. The generic report from Italy by Váňa (1973), which refers to a herbarium specimen [BM] gathered by Strickland in 1899 (*sub J. lanceolata*), corresponds to a location on Austrian territory (Váňa *in litt*., May, 1994).

Marsupella apiculata Schiffn.

The report by Düll (1991) from TRA is incorrect. In fact, the reports data of Müller (1951–1958) for Macugnaga (not Macagnuga!) referring it to South Tirol. Nevertheless, this locality is in PIE. However, the reports from PIE by Cappelletti (1929), not being confirmed by herbarium specimens, are considered as uncertain.

Metzgeria temperata Kuwah.

The report from ABR (Vallone di Cacciagrande, Abruzzo National Park) by Mastracci and Düll (1991), corresponds to *M. furcata* (*rev*. M.A., 1994).

Nardia insecta Lindb.

Reported by Levier (1905) from AOS (*leg*. Vaccari, Piccolo S. Bernardo, *det*. Bryhn, *sub Alicularia geoscypha* De Not. fo. *insecta* (Lindb.) K.Müll.). Following revision by Schumacker et al. (1986), the herbarium specimen corresponds to *N. geoscyphus*.

Plagiochila spinulosa (Dicks.) Dumort.

All herbarium specimens from PIE, LOM, FRV and TUS were confused with *P. killarniensis* and *P. porelloides. P. spinulosa* is a North-Atlantic/Macaronesian species (Grolle and Schumacker 1982). In Italy only *P. killarniensis* exists, with a South-Atlantic/Macaronesian distribution (Cortini Pedrotti et al. 1991). For identification of the *Plagiochila* species, see Schumacker and Lecointe (1989).

Pleurozia purpurea Lindb.

The report by Scopoli (1772) (*sub Jungermannia purpurea*) refers to a location in Austrian territory, which furthermore is erroneous, this species being restricted to the British Isles, the Färöer and SW-Norway.

Porella canariensis (F.Weber) Underw.

The report from SAR by Herzog (1905), not being confirmed by herbarium specimens, is considered uncertain by Bischler and Jovet-Ast (1971–1972). In fact, it is *P. obtusata,* owing to nomenclatural confusion (Düll *in litt*., January, 1995).

Porella platyphylloidea (Schwein.) Lindb.

The herbarium specimen (Hb De Notaris, RO), gathered by Bonnay in 1837 "*in valle augustana*" (AOS) corresponds to *P. platyphylla* (*rev.* M.A., 1993). The herbarium specimen (Hb De Notaris, RO) gathered by Cesati in 1837 "*ad Verbanum*" (PIE) corresponds to *P. obtusata* (*rev*. M.A., 1993). The herbarium specimens [TR] of Venturi from TRA (Rabbi e Nogaré) correspond to *P. platyphylla* (*rev.* R.S., 1994). The report from TUS (Montieri, Grosseto) by Murgia and Sassi (1982) is incorrect. The report from SAR (*leg*. Gennari 1858, Monte Sette Fratelli, *sub Madotheca thuja*, Hb De Notaris, RO) by Bertoloni (1858–1962) corresponds to *P. obtusata*. The reports from LIG (De Notaris 1846), VEN (Trevisan, 1840) and LOM (De Notaris, 1859) appear dubious. At present, as shown by Therrien, Crandall-Stotler ad Stotler (1998), *P. platyphylloidea* is considered conspecific with *P. platyphylla*. For the molecular, morphological and taxonomical differences of the European species of the genus *Porella*, consult also Boisselier-Dubayle and Bischler (1994) and Bischler and Boisselier-Dubayle (1998).

Prasanthus suecicus (Gottsche) Lindb.

Massalongo (1923) refers to the species: "*In Italia trovato dal Corbière nelle Alpi marittime: rive del lago Tre Colpas (2150 m.s.m.) ed alla Madonna (2250 m.s.m.)*". These localities are in French territory. The species has not been found in Italy to date.

Protolophozia elongata (Steph.) Schljakov

The report from AOS (Alpi Graie, Passo Garin alle creste dell'Eco, *det.* Bryhn) by Levier (1905), corresponds to *Lophoziopsis longidens* (Müller, 1906–1916).

Radula aquilegia (Hook.f. & Taylor) Gottsche, Lindenb. & Nees

Reported by Rodegher (1896) from LOM (Val Brembana). The herbarium specimen [BER] corresponds to *R. complanata* (*rev*. R.S., 1993).

Riccardia incurvata Lindb.

The reports from LOM by Andreis and Rotondi (1982) and Ferranti and Zavagno (1999) correspond to *R. multifida* (*rev*. R.S., 1994). The report from TUS (Island of Montecristo) by Cortini Pedrotti (1980) corresponds to *R. chamedryfolia* (*rev*. R.S. and J.V., 1994).

Riccia melitensis C.Massal. (Syn.: *Riccia ciliifera* Link)

Reported incorrectly by various authors from SIC. Actually, "*Insula Gozo, prope Sicilia, leg. Sommier, 1906 (G)*" is written on the holotype. It is well known that the Island of Gozo belongs to the independent Maltese archipelago.

Scapania degenii Schiffn. ex Müll.Frib.

The species has been reported from Italy by Potemkin (2002) *sub S. brevicaulis*, and this is the only report for the Mediterranean area. Because the author did not give any indication of the locality, the report should be considered doubtful until specimens can be checked.

Telaranea nematodes (Gottsche ex Austin) M.Howe

Reported by Ferrarini and Marchetti (1983) from TUS (Apuan Alps). All the herbarium specimens correspond to *Blepharostoma trichophyllum* and *Kurzia sylvatica* (Cortini Pedrotti et al. 1991). *T. nematodes* is a neotropical-tropical African species.

Mosses

Cinclidotus pachylomoides Bizot

Only reported by Düll (1991) (Südtirol, without any precise locality, *leg.* Schwab 1976). *C. pachylomoides* is a mainly Asian species; European records have not been confirmed and it is considered very doubtful that this species occurs in Europe.

Cyrtomnium hymenophyllum (Bruch & Schimp.) Holmen

The report of its occurrence (*sub Cinclidium hymenophyllum*) near the Gran Ghiacciaio in the Forno Valley (LOM) by Venturi (1899) must be considered erroneous, as the author took this information from Limpricht (1895) who had reported this species in the Forno Valley from Switzerland. This species should be excluded from the flora of the Italy.

Pelekium minutulum (Hedw.) Touw

The report of its occurrence on the Mt. Rocciacotello in PIE by Filipello (1964) (*sub Thuidium minutulum*) cannot be confirmed because of the poor state of the herbarium record. This species should be excluded from the flora of the Italy.

Ptychostomum bornholmense (Wink. & R.Ruthe) Holyoak & N.Pedersen

Only reported by Mazzoleni et al. (1993) at Capri. The report, not being confirmed by herbarium specimens, is considered uncertain. This species should be excluded from the flora of the Italy.

Ptychostomum minii (Podp. ex Guim.) D.Bell & Holyoak

Only reported in Guspini (Cagliari) on wet rocks (Giacomini 1938a). The report not being confirmed by herbarium specimens, is to be considered as uncertain.

Ptychostomum warneum (Röhl.) J.R.Spence

Only reported on moist sandlands, close to the permanent snow cover of the Azzarini and Pisgana mountains (De Notaris 1869). However, in the absence of any herbarium specimen, the taxonomic identification is unreliable by reference to the previously mentioned site conditions, which do not match the ecological preferences of this species. The report of its occurrence at Solda in TRA by Nicholson (1909) (*sub B. mamillatum*) is to be disregarded, as the revision of the herbarium specimen [BM] revealed that it was erroneously identified. This species should be excluded from the flora of the Italy.

Schistidium maritimum (Sm. ex R.Scott) Bruch & Schimp.

The report of its occurrence (*sub Grimmia maritima*) from LAZ by Brizi (1897) is not reliable because it is not supported by a herbarium specimen. In addition, the distribution area of this species is limited to north-western Europe (Bremer 1980) and its presence in the central Apennines seems for the moment to be unlikely.

Schistidium strictum (Turner) Loeske ex Mårtensson

The occurrence of *Schistidium strictum* in most areas of the Mediterranean (comprises Italy, Sardinia and Sicily) is doubtful because it is a strongly oceanic species and its presence is usually based on reports of *Grimmia apocarpa* var. *gracilis* Röhl., *Schistidium apocarpum* var. *gracile* (Röhl.) Bruch & Schimp., and *Schistidium gracile* (Röhl.) Limpr. There are uncertainties about the correct interpretation of these names and their synonymy with *S. strictum* or *S. apocarpum* (Blom 1996). In the absence of revision of a the herbarium specimens the presence in these areas should be considered doubtfull.

Sphagnum recurvum P.Beauv.

Sphagnum recurvum is exclusively a New World species, not growing in Europe (McQueen and Andrus 2006). Flatberg (1992) stated that *S. recurvum* is endemic to northern South America, Central America and the southeastern part of the United States recently found in the Azores. In Europe the *S. recurvum complex* consists of a group of five closely related and similar species (*S. angustifolium*, *S. fallax* and *S. flexuosum*, common in the Mediterranean basin, and S. *brevifolium* and *S. isoviitae*, more northernly distributed) (Såstad and Flatberg 1994). In the absence of revision of the herbarium specimens the presence in these areas should be considered doubtful and all the regional occurrences are covered by *S. fallax*.

Splachnum vasculosum Hedw.

Only reported from TRA at Terme del Brennero about 1300 m a.s.l. (Röhl 1897). However, Dalla Torre and Sarnthein (1904) report *S. vasculosum* under *S. sphaericum*: "*Brennerbad (Röll 1 p. 663 als S. vasculosum: Röll in litt.)*", according a communication by Röhl himself for wich "Die Angabe: Brennerbad (Röll 1 p. 663) bezieht sich nach gef. Mitteilung des Finders auf *S. sphaericum*".

Vesicularia galerulata (Duby) Broth. and *V. reimersiana* Bizot & P.de la Varde

V. galerulata was reported from Malta by Reimers (1934) (*sub V. sphaerocarpa*). According to Corley et al. (1981), *V. sphaerocarpa* is a synonym of *V. galerulata*. Düll (1984–1985) listed the Maltese plant as *V. reimersiana*, but also asserted that *V. galerulata* had been found in mainland Italy. However, the report by Düll is not supported by any herbarium specimens. Therefore, no species of *Vesicularia* are listed for Italy by Cortini Pedrotti (2001). It seems likely that *V. galerulata* has never been found in Europe and *V. reimersiana* is not present in Italy.

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