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Annotated checklist of Estonian bryophytes

Kai Vellak[1,2], Nele Ingerpuu[2], Mare Leis[3] & Loore Ehrlich[4]

[1]Natural History Museum, University of Tartu, 46 Vanemuise Street, Tartu 51014. E-mail: kai.vellak@ut.ee
[2]Institute of Ecology and Earth Sciences, University of Tartu, 40 Lai Street, Tartu 51005. E-mail: nele.ingerpuu@ut.ee
[3]Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences, 5 Fr. R. Kreutzwald Street, 51014 Tartu. E-mail: mare.leis@emu.ee
[4]Estonian Museum of Natural History, 26 Toompuiestee Street, 10148 Tallinn. E-mail: loore.ehrlich@loodusmuuseum.ee

Abstract: The updated list of Estonian bryophytes includes 594 species from all three phyla. Only one species is reported for Estonia according to the literature data, all others have voucher speciemens in herbaria, two of them outside of Estonia. Altogether 242 species are frequent in Estonia, 173 species are rare, and 161 are sporadically distributed. We do not have any recent data for 20 species, and their presence in Estonia is doubtful. In 2008 a new Estonian Red list was compiled and 369 bryophyte species were evaluated against IUCN criteria. Approximately one fifth of the Estonian bryoflora (129 species) is designated to the three threat categories.

Keywords: Bryoflora, frequencies of species, protected species, red list

INTRODUCTION

The diversity of taxa at the global or local scale depends greatly on the taxonomical research. The species number of bryophytes in the world varies between 15 000 and 20 000 (Shaw et al., 2011). The number of liverwort species, reported between 5500 and 9500 in recent 20 years, has been estimated to be 7500 by assessing rates of synonymy in recently revised taxa (Von Konrat et al., 2010). Regional species lists updated according to recent taxonomical conclusions are of help to understand the distribution of global diversity.

The first attempt to compile a list of bryophyte taxa occurring in Estonia dates back to the middle of the 19th century (Girgensohn, 1860). The first and most recent checklist that includes all groups of bryophytes was published in 1994 (Ingerpuu et al., 1994). Since then several species new for Estonia were recorded during inventories as well as herbarium material examinations (Kannukene et al., 1997; Leis & Kannukene, 2007; Vellak et al., 2001, 2006, 2009, 2011, 2013). The taxonomy of bryophytes has been changed during past 20 years and some species are separated into two or more species, some are united into one. Some subspecies have been raised to species level and vice versa. Taxonomical rearrangements have been made for higher levels as well. All this has led to the need to update the list of bryophytes registered in Estonia. The aim of this new checklist of Estonian bryophytes is to arrange the taxa according to recently accepted synonyms, supply every taxa with a voucher specimen, estimate the present frequency in Estonia and give proper names in Estonian for new taxa or new synonyms.

Nomenclature of species and lower taxa bases on the lists of European bryophytes (Hodgetts, 2015), for the higher ranks the Engler's system is used (Frey & Stech, 2009). Some taxonomical supplements for hepatics are followed by Feldberg et al. (2010), Váňa et al. (2013), Shaw (2015) and Söderstöm et al. (2010, 2015), and for mosses Hedenäs & Rosborg (2008), Spence (2005) and Werner et al. (2004).

MATERIAL AND METHODS

Four Estonian herbaria (TAA; TALL; TAM; TU), database eBiodiversity (http://elurikkus.ut.ee/) and literature data were revised for updating the list. For every species, subspecies and variety a most typical, recent and abundant voucher specimen was chosen. The frequency of every species in Estonia was evaluated in three categories: 1) rare (r) species that have one to seven documented localities; 2) sporadically distributed (p) species that have 8 to 30 localities, and 3) frequent (fq) species that have 31 and more localities. Species occurrence were evaluated as doubtful (?) in Estonia if no records have been found since 1951. For the species that do not

have any specimens in herbaria, the source reference is provided.

All new names in Estonian were discussed and confirmed by the Committee of Estonian Botanical Terminology.

RESULTS AND DISCUSSION

In 2015 the Estonian bryoflora includes 594 species. The list of species with their higher taxonomical ranks (genera, families, orders and classes), their common names and recent synonyms is available as an electronic supplement (http://dx.doi.org/10.12697/fce.2015.52.14).

Previously three classes of the phylum *Bryophyta* were accepted, but according to the results of recent research it has been confirmed, that these classes are independent phyla (Vanderpoorten & Goffinet, 2009). In Estonia all three phyla are presented: *Anthocerotophyta* includes two, *Marchantiophyta* 127, and *Bryophyta* 465 species. Numbers of orders, families and genera have increased, but numbers of subspecies and varieties have decreased (Table 1).

Compared with the previous list the Estonian bryoflora has increased by 84 species during last twenty years. From these 76 species are new findings for Estonia and sixteen species are results of new taxonomical combinations. Eight species are excluded from the previous list due to misidentifications or misinterpretation of synonymy.

Five species were excluded comparing with the previous list (Ingerpuu et al., 1994) due to misidentifications: specimens of *Orthotrichum tenellum* and *Ditrichum heteromallum* are now identified as *O. pallens* and *D. flexicaule* accordingly (Kannukene et al. 1997), specimens of *Dicranodontium denudatum* and *Dicranum muehlenbeckii* as *Ditrichum* sp. and as *Dicranum brevifolium* (Vellak et al., 2009). *Pterogonium gracile* was first reported for Estonia in 1994 with two localities (Ingerpuu et al., 1994). Checking the specimens both were identified now as *Pterigynandrum filiforme*.

One species is eliminated from the list due to new taxonomical treatment. Despite good morphological characteristics, according to the molecular data *Bryum neodamense* has been found to be identical to *Bryum pseudotriquetrum* and they are treated as a single species (Holyoak & Hedenäs, 2006). *Pterogonium gracile* and *Bryum neodamense* belong to the list of protected species of Estonia (Riigi Teataja, 2014a, b), but due to taxonomical re-arrangements they should be eliminated from that list.

Two further species (*Pohlia campotrachela* and *Schistidium strictum*) were eliminated from the list due to misinterpretation of synonymy. *P. campotrachela* was included in the previous list according to old records named as *Bryum annotinum*, collected by Girgensohn (Girgensohn, 1860), and as *Pohlia grandiflora*, reported by N. Malta (1930). These names are now accepted as *Pohlia annotina*. Unfortunately no herbarium specimens were found for *Pohlia grandiflora*, whereas *Bryum annotinum* from Girgensohns' collection was identified as *Pohlia andalusica*. *Pohlia annotina* has been recorded in Estonia from a new locality rather recently (Leis & Kannukene, 2007). *S. strictum* was presented in the previous list as a frequent species in Estonia, but is now eliminated from the list since in the 1994 list *S. apocarpum* subsp. *gracile* was considered

Table 1. The comparison of numbers of different taxonomical units in the two lists of Estonian bryophytes

	Hornworts *Anthocerotophyta*		Liverworts *Marchantiophyta*		Mosses *Bryophyta*	
	1994	2015	1994	2015	1994	2015
Class	1	1	1	6	1	5
Order	1	2	3	18	16	20
Family	1	2	25	32	37	54
Genus	2	2	42	59	117	159
Species	2	2	112	127	396	465
subsp./var	0	0	6	4	22	28

to be a synonym of *S. strictum* due to misinterpretation. All specimens of that species belong to *S. trichodon* var. *trichodon* according to the revision of *Schistidium apocarpum* compex by Blom (1996).

Here we present locality data for two new species for Estonia:

1) *Grimmia longirostris,* loc. 1: Lääne-Viru Co., Vihula District, on a stone near sea coast behind the building of the Käsmu Sea Museum, 03 August 2008, leg/det. M.Leis (TAA); loc. 2; Harju Co., Kuusalu District, on a stone in open area, near bus station of Kolga-Aabla, 13 August 2008, leg./det. M.Leis (TAA).
2) *Didymodon sicculus*, loc.: Saaremaa Co., Muhu Island, Koguva limestone quarry, on a limestone, 07 July 2014, leg. E.Oja; 25 June 2015, det J.Kucera.

Only one species is known in Estonia by literature data, all other taxa have voucher specimens at different herbaria. In the review of N. Malta (1930) the occurrence of *Dicranella rufescens* in Estonia was noticed without indicating the herbarium specimens.

All voucher specimens are registered in eBiodiversity – a database for the taxa found in Estonia (http://elurikkus.ut.ee/). Two species have voucher specimens outside Estonia, both in Swedish Museum of Natural History (S). The record of *Tortula lindbergii* as a new species for Estonia was published in 1990 sub nom. *Pottia lanceolata* (Hedw.) C.Müll. (Hedenäs, 1990) and the specimen holds registration number B216405 in S. *Jungermannia subulata* was identified for Estonia by J. Váňa (1973) from Mikutowicz' exciccatae collection of Bryotheca Baltica, no 459 (S; reg. no B216672). In TU we have also the Mikutowicz' exciccatae collection, but under specimen no 459 only *Cephalozia pleniceps* was found.

Through numerous inventories of Estonian bryoflora our knowledge about the frequencies of species has improved. Altogether 242 species (40%) are frequent in Estonia, 173 species (29%) are rare, and 161 species (27%) are sporadically distributed. For twenty species we do not have any recent data, and their presence in Estonia is doubtful, one of these is reported for Estonia only by literature source. Some species estimated as frequent earlier have scarce recent data and are now evaluated as sporadically distributed.

Altogether 369 species, 62% of the whole Estonian bryoflora, has been evaluated against IUCN criteria (categories (Red Data List 2008: http://elurikkus.ut.ee/prmt.php?lang=eng). 155 species of these are considered as species with no risk, a little less (129 species) belong to the three threat categories (Table 2). For ten species, that have been considered to be extinct from Estonian bryoflora, new records have been registered. For example, *Loeskypnum badium* was found for the first time in 1904, and in 2012 the second locality was registered; *Kiaeria blytti* had only old literature data, but in 2009 a new locality was found on Mohni Island. Five spescies had insuffient data for evaluating them against IUCN threat categories. For example *Sphagnum auriculatum* had only two old records, and was evaluated as data deficient (DD) according to IUCN categories in 2008. One of these localities in a paludified forest in North-Estonia has been degraded due to drainage (Vellak et al., 2013), but two new records from small lakes in South-Estonia were found in 2014 and the status of *S. auriculatum* could now be evaluated as vulnerable.

Since red list does not have legal power for protection of species, 24 bryophyte species were taken under state protection in 1994 for the first

Table 2. Share of evaluated species in different IUCN categories (Red Data List 2008: http://elurikkus.ut.ee/prmt.php?lang=eng)

	IUCN category						
Taxon group	**RE**	**CR**	**EN**	**VU**	**NT**	**DD**	**LC**
Hornworts	-	-	-	1	-	-	-
Liverworts	5	2	2	25	14	1	36
Mosses	21	9	18	72	41	4	118
Total	**26**	**11**	**20**	**98**	**55**	**5**	**154**

time (Riigi Teataja, 1994). In 2004 and in 2014 several corrections have been made, and the latest version includes altogether 45 bryophyte species in three protection categories (Riigi Teataja, 2014a, b). One species, *Rhynchostegium murale* was eliminated from the present list since the state of the species has improved due to several newly discovered localities.

Decision for the IUCN categories at country level are made on the basis of species occurrence and state in particular region, therefore the renewal of county checklists is important for judgement of the status and protection need of species at larger regional levels. Efficient species conservation planning can be based also on the results obtained by monitoring. Since 1994, when the first list of protected species was compiled, also the bryophyte monitoring started in Estonia. At present 26 species are included in the state monitoring program, five species of these belong to the EU Habitat Directive list (Vellak & Ingerpuu, 2012).

The present checklist includes altogether 76 species that have been discovered by more thorough investigation during last twenty years. It is possible that most of these species have always been part of Estonian bryoflora *(Rhytidiadelphus loreus, Sphagnum pulchrum* etc.*),* but some of them are newcomers, e.g. *Campylopus introflexus,* that is an invasive species in Europe (Hassel & Södersröm, 2005). On the other hand we do not have recent localities for 19 species and they may be lost from our bryoflora, also some species have decreased significantly their distribution. The reason for such losses can be climate change (*Splachnum* spp., *Meesia longiseta*), but the main cause is still human impact. The reduction and damage of habitats threatens especially sensitive or rare species. Altogether 92 species occurring in Estonia are evaluated as candidate species for the red list of European bryophytes (Hodgetts, 2015), nine species of them have no recent records in Estonia. Here elaborate and efficient conservation methods can improve the state of threatened species, since the decline of such species distribution range starts long before the results are visible at larger global scale (Hallingbäck, 2002).

CHECKLIST OF ESTONIAN BRYOPHYTES

List of Estonian bryophytes with their distribution frequency (Freq), IUCN category in Red List of Estonia (ERL 2008), State Protection Category in 2014 (LK 2014), and indication of proofing source (voucher). Abbreviations: Frequency classes: r – rare (1–7 documented findings); p – sporadically (8–30 localities); fq – frequent, (31 or more localities); ? – doubtful (no records after 1950). Herbaria: S – Swedish Museum of Natural History; TAA – Herbarium of the Estonian University of Life Sciences; TALL – Herbarium of the Tallinn Botanical Garden; TAM – Herbarium of the Estonian Natural History Museum; TU – Herbarium of the Natural History Museum of the University of Tartu.

Accepted name	Freq	ERL 2008	LK 2014	Voucher
DIVISON ANTHOCEROTOPHYTA Rothm. ex Stotler & Crand.-Stotl.				
Anthoceros agrestis Paton	p			TU169164
Phaeoceros carolinianus (Michx.) Prosk.	r	VU		TAA5004627
DIVISION MARCHANTIOPHYTA Stotler & Crand.-Stotl.				
Aneura pinguis (L.) Dumort.	fq	LC		TU161273
Barbilophozia barbata (Schmidel ex Schreb.) Loeske	fq	LC		TU152550
Barbilophozia hatcheri (A.Evans) Loeske	p			TU169121
Barbilophozia lycopodioides (Wallr.) Loeske	p			TU168251
Barbilophozia sudetica (Nees ex Huebener) L.Söderstr., De Roo & Hedd.	?	RE		TAA5004631
Bazzania trilobata (L.) Gray	p	NT	II	TU160962
Blasia pusilla L.	fq	LC		TU151862
Blepharostoma trichophyllum (L.) Dumort.	fq	LC		TU169187
Calypogeia azurea Stotler & Crotz	r	DD		TU150865

Calypogeia integristipula Steph.	fq	LC		TU169394
Calypogeia muelleriana (Schiffn.) Müll.Frib.	fq			TU160959
Calypogeia neesiana (C.Massal & Carestia) Müll.Frib.	fq	LC		TU168455
Calypogeia sphagnicola (Arnell & J.Perss.) Warnst. & Loeske	p			TU168453
Calypogeia suecica (Arnell & J.Perss.) Müll.Frib.	p			TU160435
Cephalozia bicuspidata (L.) Dumort.	fq	LC		
var. *bicuspidata*				TU161023
var. *lammersiana* (Huebener) Breidl.				TAA5000405
Cephalozia pleniceps (Austin) Lindb.	p			TU152559
Cephaloziella divaricata (Sm.) Schiffn.	p	LC		TU150818
Cephaloziella elachista (J.B.Jack) Schiffn.	r	VU		TU150978
Cephaloziella hampeana (Nees) Schiffn.	p	LC		TU167314
Cephaloziella integerrima (Lindb.) Warnst.	r	VU		TU151842
Cephaloziella rubella (Nees) Warnst.	fq			TU168250
Cephaloziella spinigera (Lindb.) Warnst.	r	VU		TU167210
Chiloscyphus pallescens (Ehrh. ex Hoffm.) Dumort.	fq	LC		
var. *pallescens*				TU152409
var. *fragilis* (A.Roth) Müll.Frib.				TAA5004619
Chiloscyphus polyanthos (L.) Corda	fq	LC		TU160486
Clevea hyalina (Sommerf.) Lindb.	?	RE		TU150201
Conocephalum conicum (L.) Dumort.	p			TU168284
Conocephalum salebrosum Szweykowski et al.	p			TU161125
Crossocalyx hellerianus (Nees ex Lindenb.) Meyl.	fq	LC	III	TU169124
Endogemma caespiticia (Lindenb.) Konstant., Vilnet & A.V.Troitsky	p	NT		TAA5004622
Fossombronia foveolata Lindb.	r	VU		TU160492
Fossombronia wondraczekii (Corda) Dumort.	r	NT		TU169163
Frullania dilatata (L.) Dumort.	fq			TU151845
Frullania tamarisci (L.) Dumort.	r	VU	II	TU152599
Fuscocephaloziopsis catenulata (Huebener) Váňa & L.Söderstr.	r	CR		TU160445
Fuscocephaloziopsis connivens (Dicks.) Váňa & L.Söderstr.	fq	LC		TU167330
Fuscocephaloziopsis loitlesbergeri (Schiffn.) Váňa & L.Söderstr.	p	LC		TAA5004618
Fuscocephaloziopsis lunulifolia (Dumort.) Váňa & L.Söderstr.	fq			TU168643
Geocalyx graveolens (Schrad.) Nees	p	NT		TU167060
Gymnocolea inflata (Huds.) Dumort.	p			TU168058
Harpantus flotovianus (Nees) Nees	r	VU		TAA5004620
Harpantus scutatus (F.Weber & D.Mohr) Spruce	?	RE		TAA5004621
Heterogemma laxa (Lindb.) Konstant. & Vilnet	r	VU		TU167852
Isopaches bicrenatus (Schmidel) H. Buch	p			TU167317
Jungermannia atrovirens Dumort.	r	VU		TU160511
Kurzia pauciflora (Dicks.) Grolle	fq	LC		TU160521
Lejeunea cavifolia (Ehrh.) Lindb.	p			TU151867
Lepidozia reptans (L.) Dumort.	fq	LC		TU169186
Liochlaena lanceolata Nees	p			TU150918
Liochlaena subulata (A.Evans) Schljakov	?	RE		S;reg.no.B216672
Lophocolea bidentata (L.) Dumort.	fq			TU151848
Lophocolea heterophylla (Schrad.) Dumort.	fq	LC		TU161017
Lophocolea minor Nees	fq			TU160539

Lophozia ascendens (Warnst.) R.M.Schust.	r	VU		TU161024
Lophozia guttulata (Lindb. & Arnell) A.Evans	fq			TU160568
Lophozia silvicola H.Buch	r			TU161368
Lophozia ventricosa (Dicks.) Dumort.	fq			TU160969
Lophoziopsis excisa (Dicks.) Konstant. & Vilnet	p			TU160557
Lophoziopsis longidens (Lindb.) Konstant. & Vilnet	p			TU151902
Mannia pilosa (Hornem.) Frye & L.Clark	r	VU		TU167828
Mannia sibirica (Müll.Frib.) Frye & L.Clark	r	VU		TU160588
Marchantia polymorpha L.	fq	LC		
subsp. *polymorpha*				TU169327
subsp. *montivagans* Bischl. & Boisselier-Dubayle				TAA5004625
subsp. *ruderalis* Bischl. & Boisselier-Dubayle				TU168420
Mesoptychia badensis (Gottsche) L.Söderstr. & Váňa	p			TU160972
Mesoptychia bantriensis (Hook.) L.Söderstr. & Váňa	p	NT		TU161286
Mesoptychia heterocolpos (Thed.) L.Söderstr. & Váňa	r	VU		TU152414
Mesoptychia rutheana (Limpr.) L.Söderstr. & Váňa	p	NT		TU168413
Metzgeria conjugata Lindb.	r	CR	I	TU169268
Metzgeria furcata (L.) Dumort.	fq	LC		TU169123
Moerckia hibernica (Hook.) Gottsche	p			TU168520
Mylia anomala (Hook.) Gray	fq	LC		TU151852
Nardia geoscyphus (De Not.) Lindb.	r			TAA5004626
Nardia insecta Lindb.	r	VU		TU167318
Neoorthocaulis attenuatus (Mart.) L.Söderstr., De Roo, Hedd. & Mart.	fq			TU167287
Neoorthocaulis floerkei (F.Weber & D.Mohr) L.Söderstr., De Roo & Hedd.	?	EN		TAM B18:58
Nowellia curvifolia (Dicks.) Mitt.	fq	LC		TU169418
Obtusifolium obtusum (Lindb.) S.W.Arnell	r	VU		TU168077
Odontoschisma denudatum (Mart.) Dumort.	p			TU160958
Odontoschisma fluitans (Nees) L. Söderstr. & Váňa	fq	LC		TU151844
Oleolophozia perssonii (H. Buch & S.W.Arnell) L.Söderstr., De Roo & Hedd.	r	VU	II	TU167878
Pellia endiviifolia (Dicks.) Dumort.	fq	LC		TU162053
Pellia epiphylla (L.) Corda	fq	LC		TU162128
Pellia neesiana (Gottsche) Limpr.	p			TU168064
Plagiochila asplenioides (L.) Dumort.	fq	LC		TU168639
Plagiochila porelloides (Torrey ex Nees) Lindenb.	fq	LC		TU150881
Porella cordaeana (Huebener) Moore	p	NT	III	TU169136
Porella platyphylla (L.) Pfeiff.	p	NT	III	TU167874
Preissia quadrata (Scop.) Nees	fq	LC		TU168588
Ptilidium ciliare (L.) Hampe	fq			TU169407
Ptilidium pulcherrimum (Weber) Vain.	fq	LC		TU169241
Radula complanata (L.) Dumort.	fq	LC		TU152747
Reboulia hemisphaerica (L.) Raddi	p	VU		TU167829
Riccardia chamaedryfolia (With.) Grolle	p	LC		TU167329
Riccardia incurvata Lindb.	r	VU		TU150913
Riccardia latifrons (Lindb.) Lindb.	fq	LC		TU161279
Riccardia multifida (L.) Gray	p			TU167785
Riccardia palmata (Hedw.) Carruth.	fq			TU160647
Riccia beyrichiana Hampe ex Lehm.	r			TU150820

Riccia bifurca Hoffm.	fq	LC		TU160651
Riccia cavernosa Hoffm.	p			TU160653
Riccia ciliata Hoffm.	p			TAA5004628
Riccia fluitans L.	p			TU152597
Riccia glauca L.	p			TU160657
Riccia sorocarpa Bisch.	fq	LC		TU160658
Riccia warnstorfii Limpr. ex Warnst.	r	VU		TU160659
Ricciocarpos natans (L.) Corda	p	LC		TU150906
Scapania apiculata Spruce	p	NT	III	TU167884
Scapania calcicola (Arnell & J.Perss.) Ingham	p	NT		TU160966
Scapania curta (Mart.) Dumort.	p			TU168349
Scapania gymnostomophila Kaal.	r	VU		TU160664
Scapania irrigua (Nees) Nees	fq	LC		TU150967
Scapania lingulata H.Buch	p	NT		TU160668
Scapania mucronata H.Buch	p	NT		TU161355
Scapania nemorea (L.) Crolle	r	VU		TU162044
Scapania paludicola Loeske & Müll.Frib.	p			TU168428
Scapania umbrosa (Schrad.) Dumort.	r	VU		TAA5004629
Scapania undulata (L.) Dumort.	r	VU		TU150761
Schistochilopsis incisa (Schrad.) Konstant.	p			TU167839
Schistochilopsis opacifolia (Culm.) Konstant.	?			TAA5004630
Schljakovia kunzeana (Huebener) Konstant. & Vilnet	r	NT		TU161295
Solenostoma confertissimum (Nees) Schljakov	r	EN		TAA5004623
Solenostoma gracillimum (Sm.) R.M.Schust.	?	RE		TU152277
Solenostoma hyalinum (Lyell) Mitt.	r	VU		TU160515
Solenostoma sphaerocarpum (Hook.) Steph.	r	VU		TAA5004624
Sphenolobus minutus (Schreb.) Berggr.	r	VU		TU161118
Syzygiella autumnalis (DC.) K.Feldberg, Váňa, Hentschel & J.Heinrichs	fq	LC		TU167840
Trichocolea tomentella (Ehrh.) Dumort.	p			TU169180
Tritomaria exsectiformis (Breidl.) Loeske	r			TU160681
Tritomaria quinquedentata (Huds.) H.Buch	p	NT		TU161013
DIVISION BRYOPHYTA Schimp.				
Abietinella abietina (Hedw.) M.Fleisch.	fq	LC		TAA5000005
Alleniella complanata (Hedw.) S.Olsson, Enroth & D.Quandt	fq			TU170010
Aloina rigida (Hedw.) Limpr.	r	VU		TAM B803:1
Amblyodon dealbatus (Hedw.) P.Beauv.	r	EN		TAA5004602
Amblystegium serpens (Hedw.) Schimp.	fq	LC		TU151886
Andreaea rupestris Hedw.	p	NT	III	TU161121
Anomodon attenuatus (Hedw.) Huebener	fq			TAA5000177
Anomodon longifolius (Schleich. ex Brid.) Hartm.	fq	LC		TAA5000186
Anomodon rugelii (Müll.Hal.) Keissl.	r	EN	II	TAA5000210
Anomodon viticulosus (Hedw.) Hook. & Taylor	fq	LC		TAA5000213
Antitrichia curtipendula (Hedw.) Brid.	p	NT	III	TU161309
Aplodon wormiskioldii (Hornem.) R.Br.	r	VU		TU158429
Atrichum angustatum (Brid.) Bruch & Schimp.	r	VU		TAA5000227
Atrichum crispum (James) Sull.	r			TU157121
Atrichum flavisetum Mitt.	r			TU151085

Atrichum tenellum (Röhl.) Bruch & Schimp.	p			TU157123
Atrichum undulatum (Hedw.) P.Beauv.	fq	LC		TU168095
Aulacomnium androgynum (Hedw.) Schwägr.	fq			TAM0069986
Aulacomnium palustre (Hedw.) Schwägr.	fq	LC		TAM B866:125
Barbula convoluta Hedw.	fq	LC		TAM B837:250
Barbula unguiculata Hedw.	fq			TAM B824:85
Bartramia ithyphylla Brid.	?	RE		TU151433
Bartramia pomiformis Hedw.	r	VU	II	TU167030
Brachytheciastrum velutinum (Hedw.) Ignatov & Huttunen	fq	LC		TAM0070205
Brachythecium albicans (Hedw.) Schimp.	fq	LC		TAM0056236
Brachythecium campestre (Müll.Hal.) Schimp.	p	NT		TAM B796:27
Brachythecium erythrorrhizon Schimp.	fq			TAM B772:19
Brachythecium glareosum (Bruch ex Spruce) Schimp.	fq			TAM B845:158
Brachythecium mildeanum (Schimp.) Schimp.	fq			TAM B794:9
Brachythecium rivulare Schimp.	fq	LC		TAM B837:153
Brachythecium rutabulum (Hedw.) Schimp.	fq	LC		TAM B821:112
Brachythecium salebrosum (Hoffm. ex F.Weber & D.Mohr) Schimp., nom.cons.	fq	LC		TAM B868:259
Brachythecium tommasinii (Sendtn. ex Boulay) Ignatov & Huttunen	r	CR		TU167010
Brachythecium turgidum (Hartm.) Kindb.	p	NT	II	TAM B808:11
Breidleria pratensis (W.D.J. Koch ex Spruce) Loeske	p			TU152479
Bryoerythrophyllum recurvirostrum (Hedw.) P.C.Chen	fq	LC		TAM B847:62
Bryum argenteum Hedw.	fq	LC		TU158545
Bryum blindii Bruch & Schimp.	r	CR		TAA5001159
Bryum calophyllum R.Br.	r	RE		TU167802
Bryum dichotomum Hedw.	r	VU		TU151916
Bryum elegans Nees	p	LC		TU161126
Bryum funckii Schwägr.	r	VU		TAA5001210
Bryum intermedium (Brid.) Blandow	p			TU167385
Bryum klinggraeffii Schimp.	r	VU		TAM B868:206
Bryum knowltonii Barnes	r	CR		TAM B771:57
Bryum kunzei Hornsch.	r			TAM B783:133
Bryum marratii Hook.f. & Wilson	r	VU	II	TU168090
Bryum radiculosum Brid.	r			TU152704
Bryum salinum I.Hagen ex Limpr.	r	VU		TAA5004603
Bryum subapiculatum Hampe	r	CR		TAA5001251
Bryum turbinatum (Hedw.) Turner	r			TAM B767:40
Bryum warneum (Röhl.) Brid.	p	VU		TU168283
Bryum weigelii Spreng.	r	RE		TU167357
Buxbaumia aphylla Hedw.	p			TU169408
Buxbaumia viridis (Moug. ex Lam. & DC.) Brid. ex Moug. & Nestl.	p	VU	I	TU168623
Callicladium haldanianum (Grev.) H.A.Crum	fq			TU167065
Calliergon cordifolium (Hedw.) Kindb.	fq	LC		TU169388
Calliergon giganteum (Schimp.) Kindb.	fq	LC		TU168664
Calliergon megalophyllum Mikut.	r	VU	II	TAA5001304
Calliergon richardsonii (Mitt.) Kindb.	p	NT		TU150953
Calliergonella cuspidata (Hedw.) Loeske	fq	LC		TU151912
Calliergonella lindbergii (Mitt.) Hedenäs	fq			TU168233

Campyliadelphus chrysophyllus (Brid.) R.S.Chopra	fq			TU168232
Campyliadelphus elodes (Lindb.) Kanda	fq			TU161335
Campylidium calcareum (Crundw. & Nyholm) Ochyra	fq	LC		TU160970
Campylidium sommerfeltii (Myrin) Ochyra	fq	LC		TU152535
Campylium protensum (Brid.) Kindb.	fq			TU161272
Campylium stellatum (Hedw.) Lange & C.E.O.Jensen	fq	LC		TU158019
Campylophyllum halleri (Hedw.) M.Fleisch.	r	NT		TU162015
Campylopus fragilis (Brid.) Bruch & Schimp.	r			TU151120
Campylopus introflexus (Hedw.) Brid.	r			TAA5001408
Campylopus pyriformis (Schultz) Brid.	?	RE		TU157690
Catoscopium nigritum (Hedw.) Brid.	p	NT	II	TU160975
Ceratodon conicus (Hampe) Lindb.	r	VU		TU157825
Ceratodon purpureus (Hedw.) Brid.	fq	LC		TAA5001430
Cinclidium stygium Sw.	fq			TU169177
Cirriphyllum piliferum (Hedw.) Grout	fq	LC		TAM0069888
Climacium dendroides (Hedw.) F.Weber & D.Mohr	fq	LC		TAA5001469
Conardia compacta (Drumm. ex Müll.Hal.) H.Rob.	r	EN		TU167296
Cratoneuron filicinum (Hedw.) Spruce	fq			TU161250
Ctenidium molluscum (Hedw.) Mitt.	fq			TU152458
Cynodontium bruntonii (Sm.) Bruch & Schimp.	r			TAA5000474
Cynodontium polycarpon (Hedw.) Schimp.	r			TAA5000475
Cynodontium strumiferum (Hedw.) Lindb.	p	LC		TAA5000485
Dichelyma capillaceum (L. ex Dicks.) Myrin	r	CR	II	TU151820
Dichelyma falcatum (Hedw.) Myrin	r	EN	II	TU169426
Dichodontium pellucidum (Hedw.) Schimp.	p	NT		TAA5000519
Dicranella cerviculata (Hedw.) Schimp.	fq	LC		TAA5001506
Dicranella crispa (Hedw.) Schimp.	p	NT		TAA5000533
Dicranella heteromalla (Hedw.) Schimp.	fq			TAA5001541
Dicranella humilis R.Ruthe	r			TAA5004582
Dicranella rufescens (Dicks.) Schimp.		RE		Malta 1930
Dicranella schreberiana (Hedw.) Dixon	p	LC		TAA5000544
Dicranella subulata (Hedw.) Schimp.	r	VU		TAA5000559
Dicranella varia (Hedw.) Schimp.	fq	LC		TAA5001546
Dicranoweisia cirrata (Hedw.) Lindb.	r			TAA5000561
Dicranum bonjeanii De Not.	fq	LC		TAA5001595
Dicranum brevifolium (Lindb.) Lindb.	fq			TAA5000564
Dicranum drummondii Müll.Hal.	p			TAA5004583
Dicranum flagellare Hedw.	fq	LC		TAA5001606
Dicranum flexicaule Brid.	fq	NT		TAA5000590
Dicranum fuscescens Sm.	fq			TAA5001614
Dicranum leioneuron Kindb.	p	NT		TAA5000611
Dicranum majus Sm.	fq	LC		TAA5001641
Dicranum montanum Hedw.	fq	LC		TAA5001668
Dicranum polysetum Sw. ex anon.	fq	LC		TAA5001685
Dicranum scoparium Hedw.	fq	LC		TAA5001695
Dicranum spurium Hedw.	fq			TAA5000639
Dicranum undulatum Schrad. ex Brid.	fq	LC		TAA5001560

Dicranum viride (Sull. & Lesq.) Lindb.	p	NT	II	TAA5000655
Didymodon fallax (Hedw.) R.H.Zander	fq			TAM0056317
Didymodon ferrugineus (Schimp. ex Besch.) M.O.Hill	p			TAM B744:39
Didymodon insulanus (De Not.) M.O.Hill	p	VU		TAM B737:74
Didymodon rigidulus Hedw.	fq	LC		TAM0056280
Didymodon sicculus Cano, Ros, Carcía-Zamora & J.Guerra	r			TU169462
Didymodon tophaceus (Brid.) Lisa	p	NT		TAM0056437
Didymodon vinealis (Brid.) R.H.Zander	r	VU		TAM B812:20
Diphyscium foliosum (Hedw.) D.Mohr	r	VU		TAA5004594
Discelium nudum (Dicks.) Brid.	r	RE		TAM B853:70
Distichium capillaceum (Hedw.) Bruch & Schimp.	fq	LC		TAA5001769
Distichium inclinatum (Hedw.) Bruch & Schimp.	p	NT		TAA5000667
Ditrichum flexicaule (Schwägr.) Hampe	fq	LC		TAA5001778
Ditrichum lineare (Sw.) Lindb.	r	VU		TAA5000703
Ditrichum pallidum (Hedw.) Hampe	r	VU		TAA5000704
Ditrichum pusillum (Hedw.) Hampe	r	VU		TAA5000705
Drepanocladus aduncus (Hedw.) Warnst.	fq	LC		TU161306
Drepanocladus longifolius (Mitt.) Paris	p	VU		TU168278
Drepanocladus lycopodioides (Brid.) Warnst.	p			TU159257
Drepanocladus polygamus (Schimp.) Hedenäs	fq			TU160974
Drepanocladus sendtneri (Schimp. ex H.Müll.) Warnst.	fq			TU161008
Drepanocladus sordidus (Müll.Hal.) Hedenäs	p			TU168001
Drepanocladus trifarius (F.Weber & D.Mohr) Loeske	p	NT		TU168663
Drepanocladus turgescens (T.Jensen) Loeske	fq			TU167806
Encalypta ciliata Hedw.	r	EN		TAA5004595
Encalypta mutica I.Hagen	r	VU	II	TAM B764:94
Encalypta rhabtocarpa Schwägr.	fq			TAM0056313
Encalypta streptocarpa Hedw.	fq	LC		TAM0070277
Encalypta vulgaris Hedw.	fq			TAM B823:80
Ephemerum serratum (Hedw.) Hampe	r	VU		TAM B813:12
Eucladium verticillatum (With.) Bruch & Schimp.	r	RE		TAA5004592
Eurhynchiastrum pulchellum (Hedw.) Ignatov & Huttunen	fq			
var. *pulchellum*				TAM B874:353
var. *praecox* (Hedw.) Ochyra & Żarnowiec				TU152212
Eurhynchium angustirete (Broth.) T.J.Kop.	fq	LC		TAM B876:234
Eurhynchium striatum (Hedw.) Schimp.	p	VU		TAM B837:38
Exsertotheca crispa (Hedw.) S.Olsson, Enroth & D.Quandt	r	VU	II	TU152490
Fissidens adianthoides Hedw.	fq	LC		TAA5001960
Fissidens arnoldii R.Ruthe	r	VU	I	TAA5000706
Fissidens bryoides Hedw.	p			TAA5000708
Fissidens dubius P.Beauv.	fq			TAA5004584
Fissidens exilis Hedw.	p	NT		TU152631
Fissidens fontanus (Bach.Pyl.) Steud.	r	VU	II	TAA5000726
Fissidens gracilifolius Brugg.-Nann. & Nyholm	p	LC		TAA5000729
Fissidens osmundoides Hedw.	fq			TAA5001998
Fissidens pusillus (Wilson) Milde	p	LC		TAA5004590
Fissidens taxifolius Hedw.	fq	LC		TAA5002031

Fontinalis antipyretica Hedw.	fq	LC		
subsp. *antipyretica*				TU151184
subsp. *gracilis* (Lindb.) Kindb.				TU170102
Fontinalis dalecarlica Schimp.	r	VU		TAA5004607
Fontinalis hypnoides C.Hartm.	p	VU		TU167049
Fontinalis squamosa Hedw.	r	EN		TAA5004608
Funaria hygrometrica Hedw.	fq	LC		TAA5002090
Grimmia anomala Hampe ex Schimp.	r			TAM B872:60
Grimmia crinita Brid.	r	RE		TALL D009254
Grimmia hartmanii Schimp.	fq			TAM B863:330
Grimmia laevigata (Brid.) Brid.	r	VU		TAM B813:14
Grimmia longirostris Hook.	r			TAA5004597
Grimmia muehlenbeckii Schimp.	fq			TAM B829:318
Grimmia ovalis (Hedw.) Lindb.	fq			TAM0070032
Grimmia pulvinata (Hedw.) Sm.	fq			TAM B821:202
Grimmia trichophylla Grev.	fq			TAM B803:222
Gymnostomum aeruginosum Sm.	p	NT		TAM B803:226
Gymnostomum calcareum Nees & Hornsch.	fq			TAM B837:143
Gyroweisia tenuis (Hedw.) Schimp.	p	NT		TAM B853:62
Hamatocaulis lapponicus (Norrl.) Hedenäs	r	DD		TU167562
Hamatocaulis vernicosus (Mitt.) Hedenäs	fq	NT	III	TU168417
Hedwigia ciliata (Hedw.) P.Beauv.	fq			
var. *ciliata*				TU169352
var. *leucophaea* Bruch & Schimp.				TAM B837:105
Hedwigia stellata Hedenäs	r			TAA5002178
Helodium blandowii (F.Weber & D.Mohr) Warnst.	fq			TAA5002193
Hennediella heimii (Hedw.) R.H.Zander	p			TAA5000503
Herzogiella seligeri (Brid.) Z.Iwats.	fq	LC		TU168642
Herzogiella striatella (Brid.) Z.Iwats.	r	VU		TAA5002216
Herzogiella turfacea (Lindb.) Z.Iwats.	r	VU		TU160038
Homalia trichomanoides (Hedw.) Brid.	fq	LC		TU158880
Homalothecium lutescens (Hedw.) H.Rob.	fq			TAM B866:85
Homalothecium sericeum (Hedw.) Schimp.	fq			TAM B851:69
Homomallium incurvatum (Schrad. ex Brid.) Loeske	p			TU160081
Hygroamblystegium fluviatile (Hedw.) Loeske	p			TU158039
Hygroamblystegium humile (P.Beauv.) Vanderp., Goffinet & Hedenäs	r	RE		TAA5000018
Hygroamblystegium tenax (Hedw.) Jenn.	p			TU167302
Hygroamblystegium varium (Hedw.) Mönk.	fq			TU152529
Hygrohypnum luridum (Hedw.) Jenn.	p			TU161005
Hylocomiastrum umbratum (Hedw.) M.Fleisch.	r	NT		TU161297
Hylocomium splendens (Hedw.) Schimp.	fq	LC		TU168686
Hymenostylium recurvirostrum (Hedw.) Dixon	p			TAM0056368
Hypnum cupressiforme Hedw.	fq	LC		
var. *cupressiforme*				TU152715
var. *filiforme* Brid.				TU161458
var. *lacunosum* Brid.				TU151949
Hypnum fertile Sendtn.	?	RE		TU171737

Hypnum pallescens (Hedw.) P.Beauv.	fq	LC		TU168472
Isopterygiopsis pulchella (Hedw.) Z.Iwats.	r	EN		TAM B844:212
Isothecium alopecuroides (Lam. ex Dubois) Isov.	p			TU159495
Isothecium myosuroides Brid.	p	NT		TU160957
Kiaeria blyttii (Bruch & Schimp.) Broth.	r	RE		TAA5000776
Kindbergia praelonga (Hedw.) Ochyra	fq			TAM B824:7
Leptobryum pyriforme (Hedw.) Wilson	fq	LC		TU151978
Leptodictyum riparium (Hedw.) Warnst.	fq	LC		TU158043
Leskea polycarpa Hedw.	p			TU167294
Leucobryum glaucum (Hedw.) Ångstr.	fq	LC	III	TAA5002428
Leucodon sciuroides (Hedw.) Schwägr.	fq	LC		TAM B874:88
Loeskypnum badium (Hartm.) H.K.G.Paul	r	RE		TU160948
Meesia longiseta Hedw.	?	RE		TAA5004611
Meesia triquetra (L. ex Jolycl.) Ångstr.	p	NT		TU168427
Meesia uliginosa Hedw.	r	EN		TAA5004612
Microbryum davallianum (Sm.) R.H.Zander	r	NT		TAA5000807
Microbryum floerkeanum (F.Weber & D.Mohr) Schimp.	r			TAA5000809
Microbryum starckeanum (Hedw.) R.H.Zander	r			TALL D010208
Mnium hornum Hedw.	fq			TU162046
Mnium marginatum (Dicks.) P.Beauv.	p			TU168282
Mnium stellare Hedw.	fq			TU167830
Myrinia pulvinata (Wahlenb.) Schimp.	r	EN		TAM0011655
Myurella julacea (Schwägr.) Schimp.	p			TU152467
Neckera pennata Hedw.	fq	LC	III	TU151793
Nyholmiella gymnostoma (Bruch ex Brid.) Holmen & E. Warncke	p	NT		TAA5000846
Nyholmiella obtusifolia (Brid.) Holmen & E.Warncke	fq	LC		TAA5002643
Oncophorus wahlenbergii Brid.	?	RE		TU151503
Orthotrichum affine Schrad. ex Brid.	fq	LC		TAA5000815
Orthotrichum anomalum Hedw.	fq	LC		TAA5002613
Orthotrichum cupulatum Hoffm. ex Brid.	fq	LC		TAA5002621
Orthotrichum diaphanum Schrad. ex Brid.	p	LC		TAA5000836
Orthotrichum lyellii Hook. & Taylor	r	VU		TAA5000853
Orthotrichum pallens Bruch ex Brid.	fq			TAA5002656
Orthotrichum patens Bruch ex Brid.	r	VU		TAA5000855
Orthotrichum pumilum Sw. ex anon.	fq			TAA5002665
Orthotrichum pylaisii Brid.	r	VU		TAA5000856
Orthotrichum rogeri Brid.	r			TAA5000858
Orthotrichum rupestre Schleich. ex Schwägr.	fq	LC		TAA5002696
Orthotrichum schimperi Hammar	p			TAA5000862
Orthotrichum speciosum Nees	fq	LC		TAA5002708
Orthotrichum stramineum Hornsch. ex Brid.	r	VU		TU170014
Oxyrrhynchium hians (Hedw.) Loeske	fq			TAM0069974
Oxystegus tenuirostris (Hook. & Taylor) A.J.E.Sm.	r	VU		TU167402
Paludella squarrosa (Hedw.) Brid.	fq	NT		TU168444
Palustriella commutata (Hedw.) Ochyra	p			TU161282
Palustriella decipiens (De Not.) Ochyra	r	EN	II	TALL D012924
Palustriella falcata (Brid.) Hedenäs	p			TU161281

Paraleucobryum longifolium (Hedw.) Loeske	fq	LC		TAA5002753
Pelekium minutulum (Hedw.) A.Touw	?	RE		TAM0081133
Philonotis caespitosa Jur.	p	NT		TU161274
Philonotis calcarea (Bruch & Schimp.) Schimp.	fq			TU161269
Philonotis capillaris Lindb.	r			TAA50000871
Philonotis fontana (Hedw.) Brid.	p			TU158829
Physcomitrella patens (Hedw.) Bruch & Schimp.	r	CR		TAM B836:148
Physcomitrium eurystomum Sendtn.	r	VU		TAA5000873
Physcomitrium pyriforme (Hedw.) Bruch & Schimp.	fq	LC		TAA5002803
Plagiomnium affine (Blandow ex Funck) T.J.Kop.	fq	LC		TU152498
Plagiomnium cuspidatum (Hedw.) T.J.Kop.	fq	LC		TU168459
Plagiomnium elatum (Bruch & Schimp.) T.J.Kop.	fq	LC		TU158650
Plagiomnium ellipticum (Brid.) T.J.Kop.	fq			TU158663
Plagiomnium medium (Bruch & Schimp.) T.J.Kop.	p			TU158634
Plagiomnium rostratum (Schrad.) T.J.Kop.	p			TU167674
Plagiomnium undulatum (Hedw.) T.J.Kop.	fq	LC		TU169266
Plagiopus oederianus (Sw.) H.A.Crum & L.E.Anderson	r	VU	II	TU168447
Plagiothecium cavifolium (Brid.) Z.Iwats.	p			TU168004
Plagiothecium curvifolium Schlieph. ex Limpr.	fq	LC		TU167726
Plagiothecium denticulatum (Hedw.) Schimp.	fq	LC		
var. *denticulatum*				TU169269
var. *undulatum* R.Ruthe ex Geh.				TU167265
Plagiothecium laetum Schimp.	fq	LC		TU167988
Plagiothecium latebricola Schimp.	p	NT		TU167089
Plagiothecium nemorale (Mitt.) A.Jaeger	p			TU167857
Plagiothecium succulentum (Wilson) Lindb.	p			TU167023
Plagiothecium undulatum (Hedw.) Schimp.	p	VU	II	TU167660
Platydictya jungermannioides (Brid.) H.A.Crum	p	LC		TU168286
Platygyrium repens (Brid.) Schimp.	fq			TU160941
Pleuridium subulatum (Hedw.) Rabenh.	p			TAA5000876
Pleurozium schreberi (Willd. ex Brid.) Mitt.	fq	LC		TU169405
Pogonatum aloides (Hedw.) P.Beauv.	r	EN		TAA5004613
Pogonatum dentatum (Menzies ex Brid.) Brid.	p	LC		TU157011
Pogonatum nanum (Hedw.) P.Beauv.	r	EN		TAA5004614
Pogonatum urnigerum (Hedw.) P.Beauv.	p			TU157020
Pohlia andalusica (Höhn.) Broth.	r	RE		TAA5004598
Pohlia annotina (Hedw.) Lindb.	r	EN		TU162056
Pohlia bulbifera (Warnst.) Warnst.	r	VU		TU158463
Pohlia cruda (Hedw.) Lindb.	p			TU158473
Pohlia elongata Hedw.	r	VU		TAA5003047
Pohlia lescuriana (Sull.) Ochi	r	CR		TU167135
Pohlia melanodon (Brid.) A.J.Shaw	p			TU151954
Pohlia nutans (Hedw.) Lindb.	fq	LC		TU168463
Pohlia proligera (Kindb.) Lindb. ex Broth.	p			TU161123
Pohlia sphagnicola (Bruch & Schimp.) Broth.	p	LC		TU168236
Pohlia wahlenbergii (F.Weber & D.Mohr) A.L.Andrews	fq			TU158486

Polytrichum commune Hedw.	fq	LC	
var. *commune*			TU168470
var. *periogonale* (Michx.) Hampe			TU167304
Polytrichum formosum Hedw.	fq		TU169777
Polytrichum juniperinum Hedw.	fq	LC	TU161401
Polytrichum longisetum Sw. ex Brid.	fq		TU167342
Polytrichum pallidisetum Funck	r	VU	TU167255
Polytrichum piliferum Hedw.	fq	LC	TU167728
Polytrichum strictum Menzies ex Brid.	fq	LC	TU169341
Pseudephemerum nitidum (Hedw.) Loeske	?	RE	TAA5004585
Pseudoamblystegium subtile (Hedw.) Vanderp. & Hedenäs	fq		TU152501
Pseudobryum cinclidioides (Huebener) T.J.Kop.	p		TU169184
Pseudocampylium radicale (P.Beauv.) Vanderp. & Hedenäs	r	VU	TU161303
Pseudocrossidium hornschuchianum (Schultz) R.H.Zander	p	NT	TAM B737:179
Pseudocrossidium revolutum (Brid.) R.H.Zander	r		TU150822
Pseudoleskeella catenulata (Brid. ex Schrad.) Kindb.	p	NT	TU158921
Pseudoleskeella nervosa (Brid.) Nyholm	fq	LC	TU152807
Pseudoscleropodium purum (Hedw.) M.Fleisch.	fq		TAM B851:16
Pseudotaxiphyllum elegans (Brid.) Z.Iwats.	r		TU167298
Pterigynandrum filiforme Hedw.	p		
var. *filiforme*			TU161296
var. *majus* (De Not.) De Not.			TU158925
Ptilium crista-castrensis (Hedw.) De Not.	fq	LC	TU169340
Ptychostomum archangelicum (Bruch & Schimp.) J.R.Spence	p		TU158508
Ptychostomum arcticum (R.Br.) J.R.Spence ex D.T.Holyoak & N.Pedersen	r	VU	TU158503
Ptychostomum boreale (F.Weber & D Mohr) Ochyra & Bednarek-Ochyra	fq		TAM B773:56
Ptychostomum capillare (Hedw.) D.T.Holyoak & N.Pedersen	fq		TU169287
Ptychostomum cernuum (Hedw.) Hornsch.	p		TAM B743:34
Ptychostomum compactum Hornsch.	fq		TAM B823:141
Ptychostomum imbricatulum (Müll.Hal) D.T.Holyoak & N.Pedersen	fq	LC	TU161302
Ptychostomum moravicum (Podp.) Ros. & Mazimpaka	fq		TU152886
Ptychostomum pallens (Sw.) J.R.Spence	fq		TU160977
Ptychostomum pseudotriquetrum (Hedw.) J.R.Spence & H.P.Ramsay	fq	LC	
var. *pseudotriquetrum*			TU169257
var. *bimum* (Schreb.) D.T.Holyoak & N.Pedersen			TAA5001249
Ptychostomum rubens (Mitt.) D.T.Holyoak & N.Pedersen	r	VU	TU169457
Pylaisia polyantha (Hedw.) Schimp.	fq	LC	TU151027
Racomitrium aciculare (Hedw.) Brid.	r	VU	TAA5004593
Racomitrium canescens (Hedw.) Brid.	fq		TAM0070063
Racomitrium elongatum Ehrh. ex Frisvoll	fq	LC	TAM B868:112
Racomitrium ericoides (Brid.) Brid.	p		TAM B868:177
Racomitrium fasciculare (Hedw.) Brid.	r	VU	TAM B774:111
Racomitrium heterostichum (Hedw.) Brid.	fq	LC	TAM B772:191
Racomitrium lanuginosum (Hedw.) Brid.	fq		TAM0074053
Racomitrium microcarpon (Hedw.) Brid.	p		TAM B772:194
Racomitrium sudeticum (Funck) Bruch & Schimp.	r	VU	TAM B817:75
Rhizomnium magnifolium (Horik.) T.J.Kop.	r	VU	TAA5004615

Rhizomnium pseudopunctatum (Bruch & Schimp.) T.J.Kop.	p			TU167369
Rhizomnium punctatum (Hedw.) T.J.Kop.	fq	LC		TU168577
Rhodobryum ontariense (Kindb.) Kindb.	p	LC		TU169939
Rhodobryum roseum (Hedw.) Limpr.	fq	LC		TU168688
Rhynchostegium murale (Hedw.) Schimp.	p	LC		TAM B876:1270
Rhynchostegium riparioides (Hedw.) Cardot	p			TU159837
Rhytidiadelphus loreus (Hedw.) Warnst.	r	VU		TU167119
Rhytidiadelphus squarrosus (Hedw.) Warnst.	fq	LC		TU169070
Rhytidiadelphus subpinnatus (Lindb.) T.J.Kop.	p			TU169281
Rhytidiadelphus triquetrus (Hedw.) Warnst.	fq	LC		TU168458
Rhytidium rugosum (Hedw.) Kindb.	r	VU	II	TU169250
Saelania glaucescens (Hedw.) Broth.	r	EN	II	TAA5000883
Sanionia uncinata (Hedw.) Loeske	fq	LC		TU152513
Sarmentypnum exannulatum (Schimp.) Hedenäs	fq	LC		TU168702
Schistidium agassizii Sull. & Lesq.	r	CR		TAA5004591
Schistidium apocarpum (Hedw.) Bruch & Schimp.	fq			TAM B837:192
Schistidium confertum (Funck) Bruch & Schimp.	r			TAM 808:136
Schistidium confusum H.H.Blom	p	LC		TAM B828:47
Schistidium crassipilum H.H.Blom	r			TAM B796:295
Schistidium elegantulum H.H.Blom	r			TAM B753:52
Schistidium maritimum (Sm. ex R.Scott) Bruch & Schimp.	p	VU		
subsp. *maritimum*				TAM B836:77
subsp. *piliferum* (I.Hagen) B.Bremer				TAM B813:36
Schistidium papillosum Culm.	p			TAM B838:10
Schistidium platyphyllum (Mitt.) H.Perss.	p			TAM B740:171
Schistidium rivulare (Brid.) Podp.	p	LC		TAM B836:76
Schistidium robustum (Nees & Hornsch.) H.H.Blom	r			TAM B753:54
Schistidium submuticum H.H.Blom	r	VU		TAM B868:279
Schistidium trichodon (Brid.) Poelt	fq			TAM B858:167
Schistostega pennata (Hedw.) F.Weber & D.Mohr.	p			TAA5003525
Sciuro-hypnum curtum (Lindb.) Ignatov	fq	LC		TAM0070232
Sciuro-hypnum plumosum (Hedw.) Ignatov & Huttunen, nom. cons.	r	VU		TALL D003271
Sciuro-hypnum populeum (Hedw.) Ignatov & Huttunen	fq	LC		TAM B876:32
Sciuro-hypnum reflexum (Starke) Ignatov & Huttunen	fq	LC		TAM B866:270
Sciuro-hypnum starkei (Brid.) Ignatov & Huttunen	fq			TAM B872:319
Scorpidium cossonii (Schimp.) Hedenäs	fq	LC		TU161262
Scorpidium revolvens (Sw. ex anon.) Rubers	p			TU161268
Scorpidium scorpioides (Hedw.) Limpr.	fq			TU167743
Seligeria calcarea (Hedw.) Bruch & Schimp.	p	VU		TU167197
Seligeria campylopoda Kindb.	p	NT		TU168228
Seligeria donniana (Sm.) Müll.Hal.	r	EN		TAA5004616
Seligeria patula (Lindb.) I.Hagen	r	VU	I	TAM0076942
Seligeria pusilla (Hedw.) Bruch & Schimp.	p	NT		TU151875
Seligeria recurvata (Hedw.) Bruch & Schimp.	r	VU		TAA5003579
Serpoleskea confervoides (Brid.) Loeske	r	VU		TU162002
Sphagnum angustifolium (C.E.O.Jensen ex Russow) C.E.O.Jensen	fq			TU168382
Sphagnum aongstroemii C.Hartm.	?	RE		TU168767

Sphagnum auriculatum Schimp.	r	DD		TU169438
Sphagnum austinii Sull.	r			TU151000
Sphagnum balticum (Russow) C.E.O.Jensen	fq			TU168666
Sphagnum capillifolium (Ehrh.) Hedw.	fq	LC		TU168527
Sphagnum centrale C.E.O.Jensen	fq			TU169390
Sphagnum compactum Lam. & DC.	fq			TU168389
Sphagnum contortum Schultz	fq			TU168498
Sphagnum cuspidatum Ehrh. ex Hoffm.	fq	LC		TU169171
Sphagnum fallax (H.Klinggr.) H.Klinggr.	fq	LC		TU160935
Sphagnum fimbriatum Wilson	fq			TU168493
Sphagnum flexuosum Dozy & Molk.	fq	LC		TU168399
Sphagnum fuscum (Schimp.) H.Klinggr.	fq	LC		TU168487
Sphagnum girgensohnii Russow	fq	LC		TU168524
Sphagnum inundatum Russow	p	VU	III	TU168074
Sphagnum jensenii H.Lindb.	r	DD		TAA5004617
Sphagnum lindbergii Schimp.	p	NT	III	TU168402
Sphagnum magellanicum Brid.	fq	LC		TU168386
Sphagnum majus (Russow) C.E.O.Jensen	fq			
subsp. *majus*				TU151773
subsp. *norvegicum* Flatberg				TU168616
Sphagnum molle Sull.	r	VU		TU150810
Sphagnum obtusum Warnst.	fq			TU168593
Sphagnum palustre L.	fq			TU169392
Sphagnum papillosum Lindb.	p			TU168621
Sphagnum platyphyllum (Lindb. ex Braithw.) Warnst.	p			TU168397
Sphagnum pulchrum (Lindb. ex Braithw.) Warnst.	p			TU168754
Sphagnum quinquefarium (Braithw.) Warnst.	r	VU	III	TU150799
Sphagnum riparium Ångstr.	fq			TU169422
Sphagnum rubellum Wilson	fq	LC		TU168486
Sphagnum russowii Warnst.	fq			TU169429
Sphagnum squarrosum Crome	fq	LC		TU168387
Sphagnum subfulvum Sjors	r	EN		TU168651
Sphagnum subnitens Russow & Warnst.	fq			TU169272
Sphagnum subsecundum Nees	p			TU168659
Sphagnum tenellum (Brid.) Pers. ex Brid.	fq			TU160918
Sphagnum teres (Schimp.) Ångstr.	fq			TU152630
Sphagnum warnstorfii Russow	fq			TU168526
Sphagnum wulfianum Girg.	fq	NT	III	TU168638
Splachnum ampullaceum Hedw.	p			TU169410
Splachnum rubrum Hedw.	r	EN		TU150910
Splachnum sphaericum Hedw.	?	RE		TU151532
Splachnum vasculosum Hedw.	?	RE		TU151533
Straminergon stramineum (Dicks. ex. Brid.) Hedenäs	fq			TU168653
Syntrichia calcicola J.J.Amann	fq			TAA5000888
Syntrichia caninervis Mitt.				
var. *astrakhanica* Ignatov, Ignatova & Suragina	r			TAA5000890
Syntrichia montana Nees	r			TAA5000891

Syntrichia norvegica F.Weber	r	VU		TAA5000892
Syntrichia ruralis (Hedw.) F.Weber & D.Mohr	fq			
var. *ruralis*				TAA5003683
var. *ruraliformis* (Besch.) Delogne	p			TAA5000897
Syntrichia virescens (De Not.) Ochyra	p			TAA5000900
Taxiphyllum wissgrillii (Garov.) Wijk & Margad.	p			TU168292
Tayloria tenuis (Dicks.) Schimp.	r	EN		TAA5003710
Tetraphis pellucida Hedw.	fq	LC		TAM0069985
Tetraplodon mniodes (Hedw.) Bruch & Schimp.	r	DD		TAM B767:205
Thamnobryum alopecurum (Hedw.) Gangulee	p	NT	III	TU167925
Thamnobryum neckeroides (Hook.) E.Lawton	r			TAM B753:43
Thamnobryum subserratum (Hook. ex Harv.) Nog. & Z.Iwats.	r			TU167926
Thuidium assimile (Mitt.) A.Jaeger	fq	LC		TAA5003733
Thuidium delicatulum (Hedw.) Schimp.	fq	LC		TAA5003753
Thuidium recognitum (Hedw.) Lindb.	fq	LC		TAA5003771
Thuidium tamariscinum (Hedw.) Schimp.	fq			TAA5003778
Timmia bavarica Hessl.	p	NT		TU158497
Timmia megapolitana Hedw.	r	VU	II	TU168003
Tomentypnum nitens (Hedw.) Loeske	fq			TU169273
Tortella fragilis (Hook. & Wilson) Limpr.	fq			TU168247
Tortella inclinata (R.Hedw.) Limpr.	fq			
var. *inclinata*				TU169359
var. *densa* (Lorentz & Molendo) Limpr.				TU169356
Tortella rigens Alberts.	p	VU		TU169360
Tortella tortuosa (Hedw.) Limpr.	fq	LC		
var. *tortuosa*				TU169437
var. *fragilifolia* (Jur.) Limpr.				TU169354
Tortula acaulon (With.) R.H.Zander	p			
var. *acaulon*				TAA5000870
var. *piliferum* (Hedw.) Hook. & Taylor				TAA5000866
Tortula caucasica Lindb.	p			TAA5000933
Tortula lindbergii Broth.	r	CR		S; reg.no.B216405
Tortula lingulata Lindb.	r	NT	III	TAA5004587
Tortula muralis Hedw.	fq	LC		TAA5003834
Tortula protobryoides R.H.Zander	r	VU		TAM B821:182
Tortula randii (Kenn.) R.H.Zander	?	RE		TU170670
Tortula schimperi M.J.Cano, O.Werner & J.Guerra	r			TAM B803:37
Tortula subulata Hedw.	fq			TAA5003836
Tortula truncata (Hedw.) Mitt.	p			TAA5000943
Trematodon ambiguus (Hedw.) Hornsch.	p	NT		TAA5000953
Trichodon cylindricus (Hedw.) Schimp.	fq			TAA5000686
Trichostomum brachydontium Bruch	r	VU		TAA5004596
Trichostomum crispulum Bruch	p	NT		TAM0070261
Ulota bruchii Hornsch. ex Brid.	fq			TAA5003869
Ulota coarctata (P.Beauv.) Hammar	?	VU		TAA5004588
Ulota crispa (Hedw.) Brid.	fq			TAA5003879
Ulota curvifolia (Wahlenb.) Lilj.	r	VU		TAA5000955

Ulota drummondii (Hook. & Grev.) Brid.	r	VU	TAA5000961
Ulota hutchinsiae (Sm.) Hammar	r	VU	TAA5000963
Warnstorfia fluitans (Hedw.) Loeske	fq		TU151008
Warnstorfia trichophylla (Warnst.) Tuom. & T.J.Kop.	p	LC	TU169461
Warnstorfia tundrae (Arnell) Loeske	r	VU	TU168412
Weissia brachycarpa (Nees & Hornsch.) Jur.	p		TAA5000967
Weissia controversa Hedw.	p		TAA5004589
Weissia squarrosa (Nees & Hornsch.) Müll.Hal.	r	NT	TAA5000990
Zygodon rupestris Schimp. ex Lorentz	r		TAA5000907
Zygodon stirtonii Schimp. ex Stirt.	r		TAA5000908
Zygodon viridissimus (Dicks.) Brid.	p	NT	TAA5000911

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