

CONTRIBUTIONS TO THE KNOWLEDGE OF THE BRYOPHYTE FLORA OF THE SE CARPATHIANS (ROMANIA)

G. JAKAB

*Directorate of the Körös–Maros National Park
H-5541 Szarvas, Anna-liget, Pf. 72, Hungary*

The bryophytes collected in the Kőhát (1997) and Lapos (1998) mountains have been recorded. These bryologically neglected areas have provided some interesting data to the floristical knowledge of the Carpathians. The boreal elements are widespread here (like in the higher mountains of the SE Carpathians), and numerous arctic elements occur as well (e.g. *Sphagnum cuspidatum*, *S. riparium*, *S. warnstorffii*, *Tayloria tenuis*). The rare *Sphagnum pylaesii* is reported from the Carpathians for the first time. Other interesting species are *Calypogeia fissia*, *Cololejeunea calcarea*, *Hygrohypnum eugyrium*, *Leucobryum juniperoideum*, *Plagiobryum zierii*, *Porella cordaeana* and *Radula lindenbergiana*.

Key words: bryophytes, Carpathians, enumeration, Romania, Transylvania

INTRODUCTION

Rozsály-Kőhát Mts (Muntii Ignis) and Lapos Mts (Muntii Lapusului) in the SE Carpathians (Romania) are bryologically neglected territories (cf. STEFUREAC 1986). In spite of the investigations by Á. Boros and L. Vajda (BOROS 1942–62, 1951, BOROS and VAJDA 1967, 1968) and some recent bryologists (KÓSA 1997) we only had limited information on the bryophytes of these areas. In 1997 and in 1998 I had the opportunity to conduct an investigation which resulted in more than 1200 collected specimens during three expeditions. In this article I intend to outline the main bryological features of these mountains.

MATERIALS AND METHODS

The neighbouring Rozsály-Kőhát Mts and Lapos Mts are a part of the inner volcanic ridge of the SE Carpathians. This is a Sarmatian-Pliocene volcanic ridge running from the Vihorlát Mts to the Gutin Mts on the southeastern edge of the Great Hungarian Plain. In the southern part it is connected to the inner flysch-zone of the Carpathians (HAJDÚ-MOHAROS 1996). Though the mountains sometimes reach 1000 metres above sea level (e.g. Gutin – 1445 m, “Fenyves-csúcs” (“Fenyves” Peak) – 1353 m, “Cigány-kő” (“Cigány” Rock) – 1224 m), the mean elev-

ation ranges between 700 and 900 metres, and plateau-like parts occur frequently at about 900 metres above sea level.

The climate of the SE Carpathians is colder and more continental than that of the NW Carpathians (HAJDÚ-MOHAROS 1996). The peaks reach the highest part of the beech (*Fagus sylvatica*) zone and spruce (*Picea abies*) stands often occur because of climatic inversion.

The collected specimens are deposited in the private collection of the author (Szarvas) and in the Herbarium of the Hungarian Natural History Museum (Budapest). The nomenclature follows DÜLL (1983, 1984, 1985). The identifications provided by specialists other than me have been marked in the list of taxa (* E. Szurdoki, ** S. Orbán, in the Appendix).

THE INVESTIGATED AREAS

I made three collecting expeditions in the SE Carpathians in 1997 and 1998. The first expedition organised by the Tisza Klub (Szolnok) and the Museum of Máramarossziget (Sighetu Marmatei) took place between the 15th and 21st of June, 1997. We investigated the vegetation of the watershed area of the Szaplonca Stream (Raul Sapinta) near Máramarossziget.

Collecting sites

1. Stern Plantation (Cioatele lui Stern): Secondary *Picea* forest near Poiana Colibi beside the Runk Stream. I found *Blechnum spicant*, *Huperzia selago* and *Viola biflora* in the forest and *Dactylorhiza majalis*, *Eriophorum vaginatum*, *Veratrum album* on the clearings near the stream.

2. Poiana Colibi (Campu Trumos): Transitional bog with 8 *Sphagnum* species (about 870 metres above sea level). *Vaccinium oxycoccos*, *Dactylorhiza majalis*, *Drosera rotundifolia* (sometimes on bare rock surface), *Veratrum album*, *Eriophorum vaginatum*, *E. latifolium* grow on the fen. Abundance of *Andreaea rupestris* was observed on the rocks. BOROS (1956) mentioned it as a *Ligularia*-stand on a *Sphagnum*-bog with the occurrence of *Aulacomnium palustre*. In his notes (BOROS 1942) he recorded *Chiloscyphus polyanthus* (in water), *Sphagnum fallax*, *S. magellanicum*, *S. contortum*, *S. centrale*, *Calliargon stramineum*, *Drepanocladus fluitans*, *Polytrichum commune*, *P. strictum* (on the bog) as well.

3. Poiana Runcului: Grazed pasture beside the Runk Stream.

4. Runk Waterfall: 4–5 metres high waterfall in a recent clear-felling.

5. Sapincioara: Large *Picea* forest.

6. Vraticele: Transitional bog with some *Picea* on the edge. *Ligularia sibirica* and *Vaccinium oxycoccos* grow on the fen.

7. Sipot Waterfall (Cascada Sipot): 6–8 metres high waterfall on Nyíres Stream on the way to Jilerescu fen.

8. Jilerescu: An elongated large fen with numerous small streams. *Dactylorhiza majalis*, *Drosera rotundifolia*, *Eriophorum vaginatum*, *E. latifolium*, *Ligularia sibirica*, *Polygonum bistorta*, *Salix aurita*, *Veratrum album*, *Vaccinium oxycoccus* grow on the fen.

9. The Great Sapinta Waterfall (Cascada Covatar): 20–25 metres high waterfall on the Szaplonca Stream at “Sólyomkő” Rock at about 900 metres above sea level. Remarkable vascular plants: *Aquilegia vulgaris*, *Clematis alpina*, *Saxifraga paniculata*, *Selaginella helvetica*, *Viola biflora*, *Woodsia ilvensis*. In his notes BOROS (1942) recorded *Sphenolobus minutus*, *Nowellia curvifolia* (Dicks.) Mitt. in Godman, *Bazzania trilobata*, *Diplophyllum albicans*, *Scapania nemorea*, *Sphagnum squarrosum*, *Fissidens osmundoides* Hedw., *Amphidium mougeotii*, *Dicranodontium denudatum* and *Leucobryum glaucum* at the Great Sapinta Waterfall. I have not managed to find the most interesting species, *Schistostega pennata* (Hedw.) Web. et Mohr (BOROS 1943).

10. Lake Demeter (Taul lui Dumitrue): Raised bog at about 1200 metres above sea level. *Andromeda polifolia*, *Eriophorum vaginatum*, *Vaccinium uliginosum*, *V. oxycoccus* can be found on the bog.

11. Poiana Brazilor: Woody raised bog at about 1000 metres above sea level. *Pinus mugo* stands are on the edge and patches of *Picea abies* can be found in the centre of the bog.

The second expedition was led between the 21st and 23rd of August, 1998 to the vicinity of Erzsébetbánya (Baiut). It was organised by W. Übelhart from Nagybánya (Baia Mare). We investigated mainly the vegetation of some little known peatbogs of Lápos Mts.

Collecting sites

12. Blojita: Slope-bog beside the road that leads from Kapnikbánya (Cavnic) to Erzsébetbánya. It is situated near Kapnikbánya on an east-facing slope. The following vascular plants have been registered: *Achillea ptarmica*, *Carex flava*, *Dactylorhiza maculata*, *Drosera rotundifolia*, *Eriophorum angustifolium*, *Gentiana asclepiadea*, *Homogyne alpina*, *Potentilla erecta*, *Salix aurita*, *Vaccinium oxycoccus*, *V. vitis-idaea*.

13. *Picea* forest beside the Tocsila Stream near Erzsébetbánya (600 m above sea level). Vascular plants: *Blechnum spicant*, *Gentiana asclepiadea*, *Homogyne alpina*, *Huperzia selago*, *Lycopodium annotinum*.

14. A 4 m high west-facing rock at the confluence of Varátyik and Fehér Stream near Erzsébetbánya (800 metres above sea level).

15. Raised bog of "Fenyves-tető" Peak (Vóratec): Woody raised bog near Erzsébetbánya. It is situated at 1340 metres above sea level (beech zone) at the transmission tower. It covers about 2 hectares. It has an output. On the bog surface old but shrubby (2–3 metres high) *Picea* trees can be found. The centre of the bog is without trees (*Eriophoro vaginatae-Sphagnetum*), and lag-zone can be found on the margin of the bog. Where it is missing high *Picea* trees and bare peat surfaces occur. The lag-zone is bordered with *Polytrichum*-carpet. The bog may be on the way of drying out. Vascular plants include *Carex pauciflora*, *Empetrum nigrum*, *Eriophorum vaginatum*, *Homogyne alpina*, *Melampyrum saxosum*, *Vaccinium oxycoccos*, *V. uliginosum*, *V. vitis-idaea*. *Andromeda polifolia* occurs as well (W. Übelhart ex verb.).

16. Raised bog of "Plesca-csúcs" Peak: The raised bog is situated at the vicinity of Erzsébetbánya, south of "Plesca-csúcs" at 1150 metres above sea level (beech-zone). We could not locate the searched "Fekete-tő" raised bog, just this one on the right side of the Mária Terézia Road. The bog has input and output as well. A few small *Picea* trees exist on the bog surface. Vascular plants: *Lycopodium alpinum*, *Huperzia selago*, *Vaccinium oxycoccos*.

17. Ursului Fountain (Fantana Ursului or Fantana Plestii): Fountain situated in the vicinity of Erzsébetbánya, under "Plesca-kő" Rock beside Mária Terézia Road in an old *Picea* forest.

The third expedition was organised between the 16th and 18th of October, 1998. The main purpose of this trip was coring the bogs for palaeoecological studies investigated earlier. But I have collected some specimens as well.

Collecting sites

18. Bog of Neteda: A transitional bog beside the road that leads from Kapnikbánya to Budfalva (Budești) at 800 metres above sea level.

19. Raised bog of Budfalva (Sub Pietriceava, Valea Oanta): A slightly raised bog near Budfalva at 800 metres above sea level. The bog may be under the influence of soil water.

20. Bog of "Három Apostol-csúcs" Peak: A transitional bog beside the road that leads from Kapnikbánya to Budfalva at 900 metres above sea level near the Gutin Mts. The road separates the bog into two parts.

21. "Szökő-kő" Rock (Piatra Serita): A rock outcrop near Erzsébetbánya in the valley of the Tocsila Stream.

22. Raised bog of "Fenyves-tető" Peak.

23. Fountain of "Fenyves-tető" Peak: The fountain is situated below the raised bog of "Fenyves-tető" on the eastern slope of the mountain.

24. Rock of "Fenyves-tető" Peak: A west-facing rock north of the transmission tower.

25. Tocsila Stream: Mosses were collected from the rocks and walls of the bank of the Tocsila Stream near Erzsébetbánya (600 m above sea level).

RESULTS AND CONCLUSIONS

A total of 200 bryophyte taxa have been recorded (Appendix) from the Rozsály-Kőhát Mts and Lápos Mts.

The Great Sapinta Waterfall and its surroundings have a luxuriant bryophyte vegetation. More than 60 bryophyte species have been registered in this site. This fact justifies the need of urgent conservation of this waterfall. The occurrence of *Cololejeunea calcarea* and *Plagiobryum zierii* at the Great Sapinta Waterfall is especially remarkable because of the acidity of the area. *Cololejeunea calcarea* is new in the SE Carpathians. *Barbilophozia floerkei*, *Hygrohypnum molle*, *H. ochraceum* and *Riccardia chamaedryfolia* are quite rare in the SE Carpathians.

Radula lindenbergiana found at the Ursului Fountain is quite rare in the SE Carpathians. *Porella cordaeana*, *Hygrohypnum eugyrium* and *Calypogeia fissa* are new in the SE Carpathians.

Tayloria tenuis is an arctic moss growing on wood. Very rare in the Carpathians. So far reported only from the E Carpathians (STEFUREAC 1986) and new in the SE Carpathians.

Leucobryum juniperoideum could be an overlooked species in the Carpathians. I think it could be more frequent in the *Picea* zone than it was thought before.

Plagiothecium undulatum is a subatlantic element which is quite frequent in the investigated area.

It is interesting to note that as it was shown earlier (KÁRPÁTI 1941), there are numerous peatbogs in the area that support arctic and alpine elements. Such plant species include *Andromeda polifolia*, *Carex pauciflora*, *Drosera rotundifolia*, *Empetrum nigrum*, *Eriophorum vaginatum*, *Ligularia sibirica*, *Lycopodium alpinum*, *Melampyrum saxosum*, *Pinus mugo*, *Salix aurita*, *Vaccinium oxycoccos*, *V. uliginosum* etc. In my opinion the occurrence of alpine bryophytes is not so surprising after all. *Calliergon stramineum*, *Drepanocladus exannulatus*, *Sphagnum cuspidatum* are common in the area. *Dicranella palustris*, *Drepanocladus fluitans*, *D. revolvens*, *D. vernicosus*, *Homalothecium nitens*, *Sphagnum riparium*, *S. russowii* and *S. warnstorffii* occur as well.

Sphagnum pylaesii (det.: Erzsébet Szurdoki) found on Lake Demeter is extremely local in Europe (DANIELS and EDDY 1985), and this is the first occurrence reported from the Carpathians.

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APPENDIX

List of collected bryophytes

LIVERWORTS

- Barbilophozia barbata* (Schmid. ex Schreb.)
 Loeske: 9, 21
Barbilophozia floerkei (Web. et Mohr)
 Loeske: 9, 24, 25
Bazzania tricenata (Wahlenb.) Lindb. in Bro-
 therus: 24
Bazzania trilobata (L.) S. Gray: 5, 9, 13, 24
Blepharostoma trichophyllum (L.) Dum.: 13,
 15, 24
Calypogeia fissa (L.) Raddi: 24
Calypogeia integristipula Steph.: 5**
Calypogeia muelleriana (Schiffn.) K. Muell.:
 15, 23
Calypogeia neesiana (Mass. et Carest.) K.
 Muell. in Loeske: 15
Calypogeia suecica (H. Arn. et J. Perss. in H.
 Arn.) K. Muell.: 13, 23
Cephalozia bicuspidata (L.) Dum.: 5**, 16**,
 23**
Cephalozia lacinulata Jack ex Spruce: 15**,
 16**
Cephalozia lammersiana (Hueb.) Carring. in
 Lees: 15**
Cephalozia lunulifolia (Dum.) Dum.: 1**,
 5**, 15**
Cephalozia spinigera (Lindb.) Joerg.: 5
Chiloscyphus pallescens (Ehrh. ex Hoffm.)
 Dum.: 8, 9**
Chiloscyphus polyanthus (L.) Corda in Opiz: 4, 7
Cololejeunea calcarea (Libert) Schiffn.: 9
Conocephalum conicum (L.) Lindb.: 9, 13, 25
Diplophyllum albicans (L.) Dum.: 7, 9, 14
Diplophyllum obtusifolium (Hook.) Dum.: 8, 9
Frullania tamarisci (L.) Dum.: 9
Jungermannia caespiticia Lindenb.: 13
Jungermannia sphaerocarpa Hook.: 23
Lejeunea cavifolia (Ehrh.) Lindb. emend.
 Buch: 4, 9
Lepidozia reptans (L.) Dum.: 1, 2, 5, 13, 16, 23
Lophocolea bidentata (L.) Dum.: 13
Lophocolea minor Nees: 5**
Lophozia excisa (Dicks.) Dum.: 5
Lophozia ventricosa (Dicks.) Dum.: 24
Marchantia polymorpha L. emend. Burgeff: 5, 17
Marsupella funckii (Web. et Mohr) Dum.: 24
Metzgeria conjugata Lindb.: 4, 9, 25
Nardia scalaris S. Gray: 23
Pellia endiviifolia (Dicks.) Dum.: 2, 3
Plagiochila asplenoides (L. emend. Tayl.)
 Dum.: 4, 13, 21
Plagiochila porelloides (Torrey ex Nees)
 Lindenb.: 3, 14, 17, 21, 23
Porella arboris-vitae (With.) Grolle var. *killar-
 niensis* Pearson: 9
Porella cordaeana (Hueb.) Moore: 17
Ptilidium pulcherrimum (G. Web.) Vainio: 13
Radula lindenbergiana Gott. ex C. Hartm.: 9
Riccardia chamaedryfolia (With.) Grolle: 23
Riccardia palmata (Hedw.) Carruth.: 13
Riccia ciliifera Link ex Lindenb.: 9
Scapania aquiloba (Schwaegr.) Dum.: 3
Scapania nemorea (L.) Grolle: 7, 14
Scapania praetervisa Meyl.: 9
Scapania undulata (L.) Dum.: 18, f. *dentata*
 Dum.: 4, 13, 17, 23
Sphenobolus minutus (Schreb. in Crazn)
 Berggr.: 7, 10, 24
Tritomaria exsecta (Schmid. ex Schrad.)
 Schiffn. ex Loeske: 4
Tritomaria quinqueidentata (Huds.) Buch: 9, 21

MOSSES

- Amblystegium serpens* (Hedw.) B., S. et G.:
 14, 23
Amphidium mougeotii (B. et S.) Schimp.: 7, 9,
 14, 25
Andreaea rupestris Hedw. var. *rupestris*: 2, 9,
 17
Anomodon attenuatus (Hedw.) Hueb.: 9
Anomodon rugelii (C. Muell.) Keissl.: 9
Anomodon viticulosus (Hedw.) Hook. et Tayl.:
 9, 21
Atrichum undulatum (Hedw.) P. Beauv.: 1, 2,
 4, 5, 8, 13, 19
Aulacomnium palustre (Hedw.) Schwaegr.
 var. *palustre*: 1, 2, 8, 12, 17, 19

- Bartramia halleriana* Hedw.: 7, 9, 14
Bartramia pomiformis Hedw.: 9
Brachythecium mildeanum (Schimp.) Schimp. ex Milde: 7
Brachythecium reflexum (Starke ex Web. et Mohr) B., S. et G.: 23
Brachythecium rivulare B., S. et G.: 1, 17
Brachythecium rutabulum (Hedw.) B., S. et G.: 9
Brachythecium salebrosum (Web. et Mohr) B., S. et G.: 16
Brachythecium velutinum (Hedw.) B., S. et G.: 9
Bryum alpinum With.: 9
Bryum intermedium (Brid.) Bland.: 21
Bryum laevifilum Syd.: 14
Bryum pseudotriquetrum (Hedw.) Gaertn., Meyer et Scherb. var. *bimum* (Schreb. in Hedw.) Lilj.: 4, 9, var. *pseudotriquetrum*: 2, 9, 19
Bryum schleicheri Schwaegr. var. *latifolium* (Schwaegr.) Schimp.: 23
Calliergon cordifolium (Hedw.) Kindb.: 5
Calliergon stramineum (Brid.) Kindb.: 3, 8, 12, 15, 19, 20
Calliergonella cuspidata (Hedw.) Loeske: 1, 8, 9, 12, 18, 19
Campylium stellatum (Hedw.) C. Jens.: 19, 20
Ceratodon purpureus (Hedw.) Brid.: 8, 21, 23
Cirriphyllum crassinervium (Tayl.) Loeske et Fleisch.: 7
Climacium dendroides (Hedw.) Web. et Mohr: 1, 8, 19
Cratoneuron commutatum (Hedw.) Roth: 19
Cratoneuron filicinum (Hedw.) Spruce var. *filicinum*: 3, 14
Ctenidium molluscum (Hedw.) Mitt.: 9
Dichodontium pellucidum (Hedw.) Schimp. var. *pellucidum*: 4, 9
Dicranella heteromalla (Hedw.) Schimp.: 5, 14, 23
Dicranella palustris (Dicks.) Crundw. ex E. Warb.: 12, 23
Dicranella subulata (Hedw.) Schimp.: 11
Dicranodontium denudatum (Brid.) Britt. var. *denudatum*: 9, 10, 15, 24
Dicranum bonjeanii De Not.: 20
Dicranum fuscescens Turn. var. *fuscescens*: 5
Dicranum montanum Hedw.: 1, 5, 7, 13, 23, 24
Dicranum scoparium Hedw.: 1, 2, 5, 8, 9, 11, 13, 15, 16, 17, 21, 22, 23, 24
Drepanocladus exannulatus (B., S. et G.) Warnst.: 2, 8, 12, 15, 18, 20
Drepanocladus fluitans (Hedw.) Warnst. var. *fluitans*: 5
Drepanocladus revolvens (Sw.) Warnst.: 11
Drepanocladus vernicosus (Mitt.) Warnst.: 19
Encalypta streptocarpa Hedw.: 9, 14
Encalypta vulgaris Hedw.: 25
Eurhynchium angustirete (Broth.) T. Kop.: 7, 9, 13, 21
Eurhynchium striatum (Hedw.) Schimp.: 14, 24
Fissidens adianthoides Hedw.: 4
Fissidens cristatus Wils. ex Mitt.: 4, 9
Fontinalis antipyretica Hedw. var. *antipyretica*: 8, 23
Funaria hygrometrica Hedw.: 8
Grimmia hartmanii Schimp.: 14
Grimmia ovalis (Hedw.) Lindb.: 3
Hedwigia ciliata (Hedw.) P. Beauv.: 1, 3, 9, 13
Homalia trichomanoides (Hedw.) B., S. et G.: 9, 25
Homalothecium nitens (Hedw.) Robins.: 19, 20
Homalothecium sericeum (Hedw.) B., S. et G.: 25
Hygrohypnum duriusculum (De Not.) Jamieson: 7
Hygrohypnum eugyrium (Schimp.) Broth.: 2, 8, 12
Hygrohypnum molle (Hedw.) Loeske: 4
Hygrohypnum ochraceum (Turn. ex Wils.) Loeske: 8
Hylocomium splendens (Hedw.) B., S. et G.: 7, 9, 17
Hypnum cupressiforme Hedw. var. *cupressiforme*: 7, 9, 17, 21, 25
Hypnum fertile Sendtn.: 9, 14
Isothecium alopecuroides (Dubois) Isov.: 9, 21, 24
Leptobryum pyriforme (Hedw.) Wils.: 23
Leskea polycarpa Hedw.: 9
Leucobryum glaucum (Hedw.) Aongstr.: 9
Leucobryum juniperoideum (Brid.) C. Muell.: 13, 24
Neckera besseri (Lobarz.) Jur.: 21
Neckera complanata (Hedw.) Hueb.: 9
Neckera crispa Hedw.: 9
Orthotrichum anomalum Hedw.: 25
Paraleucobryum longifolium (Hedw.) Loeske: 17
Philonotis caespitosa Jur.: 4
Philonotis fontana (Hedw.) Brid. 2, 8, 12, 19
Plagiobryum zierii (Hedw.) Lindb.: 9

- Plagiomnium affine* (Bland.) T. Kop.: 8, 19
Plagiomnium cuspidatum (Hedw.) T. Kop.: 9
Plagiomnium elatum (B. et S.) T. Kop.: 1, 2
Plagiomnium ellipticum (Brid.) T. Kop.: 19
Plagiomnium medium (B. et S.) T. Kop. subsp. *medium*: 21
Plagiomnium undulatum (Hedw.) T. Kop.: 17, 21, 23
Plagiothecium curvifolium Schlieph. ex Limpr.: 5
Plagiothecium denticulatum (Hedw.) B., S. et G. var. *majus* Limpr.: 6, 25
Plagiothecium laetum B., S. et G.: 9, 15, 25
Plagiothecium nemorale (Mitt.) Jaeg.: 21
Plagiothecium platyphyllum Moenk.: 1, 7, 9, 23
Plagiothecium ruthei Limpr.: 9
Plagiothecium succulentum (Wils.) Lindb.: 5
Plagiothecium undulatum (Hedw.) B. S. et G.: 5, 9, 13, 23
Pleurozium schreberi (Brid.) Mitt.: 1, 12, 13, 17, 23
Pogonatum urnigerum (Hedw.) P. Beauv.: 4, 7, 9
Pohlia cruda (Hedw.) Lindb.: 9
Pohlia melanodon (Brid.) J. Shaw: 9
Pohlia nutans (Hedw.) Lindb.: 3, 10, 16, 22, 23
Pohlia prolifera (Kindb. ex Breidl.) Lindb. ex H. Arn.: 18
Pohlia wahlenbergii (Web. et Mohr) Andr.: 25
Polytrichum alpinum Hedw.: 9
Polytrichum commune Hedw. var. *commune*: 1, 2, 13, 15, 17, 23, var. *perigoniale* (Michx.) Hampe: 3
Polytrichum formosum Hedw.: 1, 7, 21, 23, 24
Polytrichum juniperinum Hedw.: 1, 3, 13
Polytrichum strictum Brid.: 6, 15, 16
Pottia intermedia (Turn.) Fuernr.: 25
Pseudoleskeella nervosa (Brid.) Nyh.: 9
Pterygynandrum filiforme Hedw.: 17
Racomitrium aciculare (Hedw.) Brid.: 7, 17
Racomitrium aquaticum (Schrad.) Brid.: 9
Racomitrium ellipticum (Turn.) B. et S.: 17, 23
Racomitrium fasciculare (Hedw.) Brid.: 23
Racomitrium heterostichum (Hedw.) Brid.: 9, 13, 21
Rhizomnium punctatum (Hedw.) T. Kop.: 1, 4, 5, 9, 13, 17, 23
Rhynchostegium riparioides (Hedw.) C. Jens.: 9
Rhytidiadelphus squarrosus (Hedw.) Warnst.: 1, 2, 7, 19
Rhytidiadelphus triquetrus (Hedw.) Warnst.: 9, 23, 24
Sanionia uncinata (Hedw.) Loeske: 7, 9, 13, 14, 17, 23
Schistidium apocarpum (Hedw.) B. et S.: 9, 21, 25
Scleropodium purum (Hedw.) Limpr.: 9
Sphagnum angustifolium (Russ. ex Russ.) C. Jens.: 2*, 8*, 11, 13*, 15*, 18*, 20
Sphagnum capillifolium (Ehrh.) Hedw. var. *capillifolium*: 8, 15*, 16, 20*
Sphagnum centrale C. Jens.: 2, 3, 5, 6, 13,
Sphagnum contortum K. F. Schultz: 12, 19
Sphagnum cuspidatum Ehrh. ex Hoffm.: 6, 8, 13, 15, 16, 22
Sphagnum denticulatum Brid.: 2
Sphagnum fallax (Klinggr.) Klinggr.: 2, 3, 5, 6, 8, 11, 12, 13, 15, 16
Sphagnum flexuosum Dozy et Molke.: 1*, 5*, 6
Sphagnum girgensohnii Russ.: 1, 4, 5, 6, 11, 12, 13**, 17, 20, 23
Sphagnum lescurei Sull.: 18, var. *inundatum* (Russ.) Duell: 8*
Sphagnum magellanicum Brid.: 2, 6, 8, 15, 16
Sphagnum palustre L. var. *palustre*: 1, 2, 8, 17
Sphagnum pylaessii Brid.: 10*
Sphagnum quinquefarium (Lindb. ex Braithw.) Warnst.: 1, 2, 4, 5, 9, 11, 13*
Sphagnum riparium Aongstr.: 11
Sphagnum russowii Warnst.: 5, 11, 15*, 16
Sphagnum squarrosum Crome: 5, 9, 13
Sphagnum subnitens Russ. et Warnst.: 2, 3, 6, 8, 9, 11, 15, 16, 23
Sphagnum teres (Schimp.) Aongstr.: 12, 15, 18, 19, 20
Sphagnum warnstorffii Russ.: 18*, 20*
Tayloria tenuis (With.) Schimp.: 15, 23
Tetraphis pellucida Hedw.: 5, 13, 15, 23
Thamnobryum alopecurum (Hedw.) Gang.: 4, 9
Thuidium recognitum (Hedw.) Lindb.: 1, 9
Tortella tortuosa (Hedw.) Limpr.: 9, 14, 25
Tortula ruralis (Hedw.) Gaertn., Meyer et Scherb. subsp. *calicicolens* (W. Kramer) Duell: 21, 25
Tortula subulata Hedw.: 21
Ulotia crispa (Hedw.) Brid.: 9

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