

Additions to the bryophyte flora of the Durmitor National Park (Crna Gora) and a first conspectus of all records

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Abstract

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An inventory of 191 bryophytes from the Durmitor National Park (Montenegro) is presented, based on literature records and a recent collection of 211 numbers made by members of the Institute of Botany and Botanical Garden Belgrade. 19 taxa (nine liverworts and ten mosses) are reported for the first time from the area, including nine species (four liverworts and five mosses) new to Montenegro. Previous literature records have critically been revised with respect to the current taxonomy and nomenclature.

Introduction

The flora and vegetation of the Durmitor National Park in northern Crna Gora (Montenegro), which covers the plateau between the rivers Piva and Tara (Fig. 1), is one of the most interesting and best known of the former Yugoslavia, attracting botanists still today. Being part of the Dinarids, the area is dominated by the impressive scenery of a limestone mountain range strongly subjected to karstic erosion and rising from (600–)900 m up to 2522 m (Bobotov Kuk). Owing to this large vertical extension a clear altitudinal zonation of the vegetation, a variety of vegetation types, and a high diversity of ecological niches exist (Lakušić 1968, 1969, 1970a, b, 1984, Lakušić & al. 1982).

Also with respect to the bryophytes, the Durmitor National Park harbours one of the richest floras of the Balkans. Its bryophyte flora is treated in a small number of floristic and phytosociological papers, which are, however, partially outdated in taxonomic and nomenclatural respect (Vilhelm 1923, Martinčić 1964, Birks & Walters 1973, Pavletić & Pulević 1980). The hitherto most complete account, by Martinčić (1964), lists about 120 mosses but surprisingly no liverworts. Together with the records by Vilhelm (1923), which are based on the collections of J. Rohlena (Prague), the 18 mosses collected by Birks & Walters (1973) in the vicinity of Barno Jezero, and the species reported by Pavletić & Pulević (1980), nearly 170 taxa of bryophytes are known from the Durmitor area. This comparatively high number impressively demonstrates the bryofloristically outstanding position of the Durmitor area. The research history and state of bryological knowledge in Montenegro have been described by Pulević (1970). Further import-

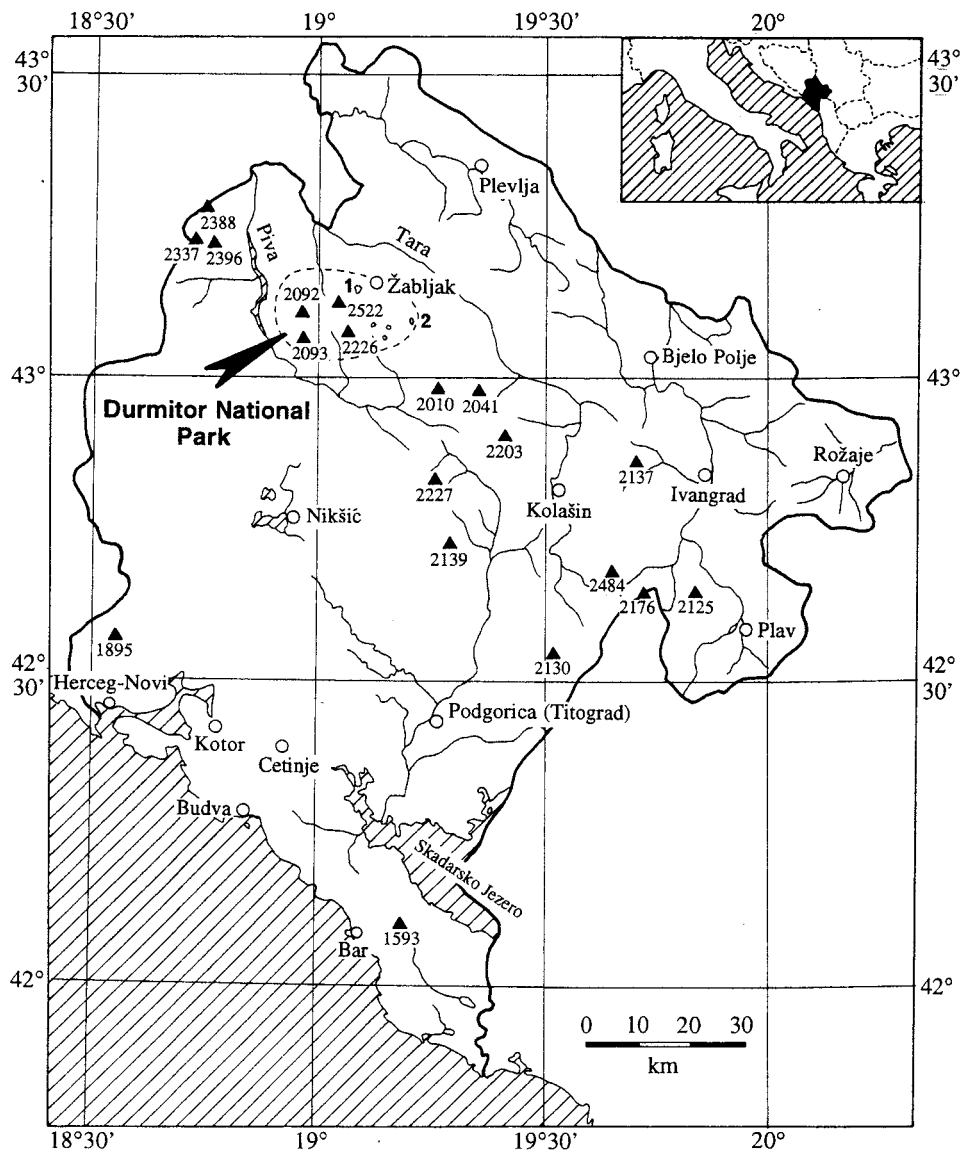


Fig. 1. Map of Crna Gora (Montenegro) with the Durmitor National Park (1 = Crno Jezero, 2 = Zminje Jezero).

ant sources are the bibliographies to the flora and vegetation of Montenegro (Pulević 1980, 1985), the “Prodromus flore briofita Jugoslavije” (Pavletić 1955), the “Catalogus florae Jugoslaviae, Musci” (Martinčić 1968), and the list of liverworts of coastal Yugoslavia by Bischler & Jovet-Ast (1973).

Between 1989 and 1994, S. Jovanović, D. Lakušić, S. Pavić and V. Stevanović of the Institute of Botany and Botanical Garden Belgrade made additional gatherings in the Durmitor area, which were sent to Berlin for identification and are deposited in the herbarium of the Botanic Garden and Botanical Museum Berlin-Dahlem (B). These collections contain 211 num-

bers, including some mixed gatherings, which have been separated and numbered by adding small letters to the original 179 collection numbers.

The 211 numbers comprise 77 taxa, of which 19 taxa are new to the Durmitor area (marked with an asterisk); nine of them are also new to Montenegro. These 77 taxa are listed below. In addition, an updated and revised catalogue of the bryophytes of the Durmitor National Park is presented (Tab. 1), comprising 19 liverworts and 172 mosses.

Collections of Durmitor bryophytes made by Jovanović, Lakušić, Pavić, and Stevanović between 1989 and 1994

Collecting localities

The collecting localities are numbered 1–21 in the following list and quoted in the list of the taxa below by these numbers, followed by a colon and the collection number (*1–179*) in italics.

- 1 Crno Jezero, 1410 m, pepples, 14.7.1994, *S. Pavić (no. 1, 3–10b)*
- 2 Crno Jezero, 1410 m, spruce wood, 14.7.1994, *S. Pavić (no. 32–43)*
- 3 Žabljak, between hotels Ribnica and Durmitor, 1400 m, spruce-fir wood, 16.7.1994, *V. Stevanović (no. 11–31)*
- 4 Žabljak, Otoka reka, 1400 m, meadows near the river, 15.7.1994, *V. Stevanović (no. 44–57)*
- 5 Between Barno Jezero and Crno Jezero, 1440 m, spruce wood, 6.2.1990, *D. Lakušić (no. 58–86)*
- 6 Between Crno Jezero, Mlinski potok and Zminje Jezero, 1430 m, spruce wood, 11.8.1993, *S. Pavić (no. 88–109)*
- 7 Between Lomni Do and Stožina, 1600 m, along the road's edge, 12.8.1993, *S. Pavić (no. 110, 113a, b)*
- 8 Between Lomni Do and Valovito Jezero, 1700 m, 12.8.1993, *S. Pavić (no. 111a, b, 112)*
- 9 Between Sedlo, Lomni Do and Valovito Jezero, 1700 m, 12.8.1993, *S. Pavić (no. 114–118)*
- 10 Between Sedlo, Uvita Greda and Lomni Do, 1600 m, 12.8.1993, *S. Pavić (no. 119–123)*
- 11 Between Crno Jezero, Točak and Velika Kalica, 1410–2020 m, spruce wood, 13.8.1993, *S. Pavić (no. 124–134)*
- 12 Canyon of Vaškovska reka, 650 m, 14.8.1993, *V. Stevanović & S. Jovanović (no. 135–139)*
- 13 Zminje Jezero, 1490 m, spruce wood, 1.10.1993, *S. Pavić (no. 140–157)*, 9.8.1994, *V. Stevanović (no. 170)*
- 14 Canyon of Sušica reka, 1100–1300 m, beech-fir-spruce wood, 15.7.1994, *S. Pavić (no. 159–169)*
- 15 Govedje Jezero, 1500 m, gap in spruce wood, 12.8.1994, *V. Stevanović (no. 171–174)*
- 16 Nadgora, Malo Crno Jezero, 1400 m, 12.8.1994, *V. Stevanović (no. 175, 176a, b)*
- 17 Žabljak, 1400 m, along the road's edge, 25.9.1993, *S. Pavić (no. 2)*
- 18 Lojanik, 2000 m, 29.7.1989, *D. Lakušić (no. 87)*
- 19 Between Govedje Jezero and Pošćensko Jezero, 1600 m, peat bog, 10.7.1994, *V. Stevanović (no. 177)*
- 20 Žugica, 1400 m, peat bog, 17.7.1994, *V. Stevanović (no. 178a, b)*
- 21 Ranisava, 1800 m, rocks above the lake, 16.7.1994, *V. Stevanović (no. 179)*

List of the taxa

Hepaticae

Jungermannniidae

Geocalycaceae

**Chiloscyphus pallescens* (Ehrh.) Dumort. – 13: *149b*.

Lophocolea heterophylla (Schrad.) Dumort. – 10: *120d*.

Jungermanniaceae

**Jungermannia leiantha* Grolle – 5: 76. – New to Montenegro.

Lepidoziaceae

**Lepidozia reptans* (L.) Dumort. – 6: 106c.

Plagiochilaceae

**Plagiochila porelloides* (Torr. ex Nees) Lindenb. – 1: 8b (among *Campylium stellatum* var. *protensum*); 10: 122b. – Previously included in *P. asplenioides*, but distinctly smaller in all its parts and separated by smaller leaf lamina cells. Cultivation experiments and biochemical studies have shown that the two species are specifically distinct (Grolle 1983). For phyto-geographical reasons Vilhem's (1923) record of *P. asplenioides* ought to be referred to *P. porelloides*.

Pseudolepicoleaceae

**Blepharostoma trichophyllum* (L.) Dumort. – 6: 106b. – New to Montenegro.

Ptilidiaceae

**Ptilidium pulcherrimum* (Weber) Vain. – 4: 45a; 5: 82 p.p. – New to Montenegro.

Radulaceae

**Radula lindenbergiana* Gottsche ex Hartm. f. – 3: 25b. – New to Montenegro.

Scapaniaceae

**Scapania aequiloba* (Schwägr.) Dumort. – 1: 8c (among *Campylium stellatum* var. *protensum*).

Marchantiidae**Marchantiaceae**

**Conocephalum conicum* (L.) Dumort. – 18: 87.

Marchantia polymorpha L. subsp. *polymorpha* – 19: 177.

Musci**Sphagnidae****Sphagnaceae**

**Sphagnum centrale* C.E.O. Jensen – 16: 175. – New to Montenegro.

S. squarrosum Crome – 13: 142, 143.

S. subnitens Russow & Warnst. – 5: 86.

Polytrichidae**Polytrichaceae**

Polytrichum juniperinum Hedw. – 2: 41; 9: 117; 10: 121; 13: 141.

Bryidae**Amblystegiaceae**

Calliergon giganteum (Schimp.) Kindb. – 4: 55; 13: 146, 152; 15: 171a, 173; 16: 176b.

Calliergonella cuspidata (Hedw.) Loeske – 1: 7; 3: 24b; 16: 176a; 20: 178a.

Campylium stellatum var. *protensum* (Brid.) C.E.O. Jensen – 1: 8a.

Drepanocladus aduncus (Hedw.) Warnst. – 15: 174.

D. vernicosus (Mitt.) Warnst. – 3: 15, 24a; 5: 61; 8: 111a; 13: 140, 156; 15: 171b; 20: 178b.

Hygrohypnum luridum (Hedw.) Jenn. – 11: 128.

Sanionia uncinata (Hedw.) Loeske – 1: 9; 2: 38, 42 p.p.; 3: 13, 27; 4: 46, 47a, 50a; 5: 70, 80,

Aulacomniaceae

Aulacomnium palustre (Hedw.) Schwägr. – 5: 65; 13: 144.

Bartramiaceae

**Philonotis seriata* Mitt. – 1: 4, 6; 6: 90, 99. – New to Montenegro.

Plagiopus oederiana (Sw.) H.A. Crum & L.E. Anderson – 1: 10a; 2: 33; 14: 164.

Brachytheciaceae

Brachythecium salebrosum (F. Weber & D. Mohr) Schimp. – 14: 167b.

**Eurhynchium hians* (Hedw.) Sande Lac. – 5: 84; 14: 162b.

Homalothecium lutescens (Hedw.) H. Rob. – 9: 114; 12: 138; 21: 179.

H. philippeanum (Spruce) Schimp. – 3: 25a; 10: 123; 11: 130.

Bryaceae

Bryum caespiticium Hedw. – 9: 118a; 14: 161b, 168.

B. capillare Hedw. – 3: 31; 5: 58, 77; 13: 150.

B. creberrimum Taylor – 10: 120c.

**B. elegans* Nees ex Brid. – 5: 79; 13: 147 p.p.; 14: 165.

B. pseudotriquetrum (Hedw.) P. Gaertn., B. Mey. & Scherb. – 8: 111b; 15: 172.

Pohlia elongata Hedw. – 3: 11, 26; 4: 56, 57 p.p.

**P. longicollis* Hedw. – 3: 16. – New to Montenegro.

Climaciaceae

Climacium dendroides (Hedw.) F. Weber & D. Mohr – 4: 54a; 5: 63, 73; 13: 153a.

Cratoneuraceae

Cratoneuron commutatum (Hedw.) Roth – 4: 44.

C. decipiens (De Not.) Loeske – 1: 3a.

Dicranaceae

Dicranodontium denudatum (Brid.) Britt. – 3: 23; 11: 124; 12: 136.

Dicranum fuscescens Sm. – 4: 50b, 51, 52; 6: 89.

D. scoparium Hedw. – 1: 5; 2: 36, 39, 40, 43; 3: 19, 20, 30; 4: 49; 5: 59, 60, 71, 81, 83; 6: 88, 98, 101, 106a, 109; 11: 127; 13: 145, 148, 151, 155, 170; 14: 161a, 163a.

Orthodicranum flagellare (Hedw.) Loeske – 2: 37; 6: 102, 103.

O. tauricum (Sapjegin) Smirnova – 4: 45b, 57 p.p.; 5: 78, 85.

Ditrichaceae

Ceratodon purpureus (Hedw.) Brid. – 1: 1.

Distichium capillaceum (Hedw.) Bruch & Schimp. – 10: 120a, 122a.

Ditrichum flexicaule (Schwägr.) Hampe – 7: 110; 8: 112.

Encalyptaceae

Encalypta vulgaris Hedw. – 9: 118b.

Funariaceae

**Funaria hygrometrica* Hedw. – 17: 2.

Grimmiaceae

**Racomitrium elongatum* Frisvoll – 4: 48; 11: 131. – New to Montenegro. *R. elongatum* belongs to the *R. canescens* group (Frisvoll 1983), and the report of *R. canescens* (Hedw.) Brid. by Martinčić (1964) perhaps refers to *R. elongatum*.

Schistidium apocarpum (Hedw.) Bruch & Schimp. – 11: 129.

Hylocomiaceae

Hylocomium splendens (Hedw.) Schimp. – 3: 17, 22; 4: 46, 47c; 5: 62, 67, 68, 69; 6: 92, 93.

Pleurozium schreberi (Brid.) Mitt. – 6: 95.

Rhytidiadelphus triquetrus (Hedw.) Warnst. – 3: 14, 18, 21; 4: 47b; 5: 66; 6: 94, 97; 11: 126; 12: 135.

Hypnaceae

Ctenidium molluscum (Hedw.) Mitt. – 2: 35; 3: 28; 6: 96, 107, 108.

Hypnum cupressiforme Hedw. var. *cupressiforme* – 12: 137.

Lembophyllaceae

**Isoetecium alopecuroides* (Dubois) Isov. – 5: 72, 75; 14: 159.

Leskeaceae

Lescuraea incurvata (Hedw.) E. Lawton – 7: 113b.

Mniaceae

**Mnium marginatum* (With.) P. Beauv. – 10: 120b; 14: 160b. – New to Montenegro.

M. spinulosum Bruch & Schimp. – 2: 32; 6: 105; 11: 132.

M. stellare Hedw. – 14: 163b.

Plagiomnium elatum (Bruch & Schimp.) T.J. Kop. – 1: 3b; 13: 153b.

P. undulatum (Hedw.) T.J. Kop. – 4: 54b.

**Rhizomnium magnifolium* (Horik.) T.J. Kop. – 15: 171c. – New to Montenegro.

Neckeraceae

Metaneckera menziesii (Drumm.) Steere – 12: 139.

Orthotrichaceae

Orthotrichum anomalum Hedw. – 13: 157.

Plagiotheciaceae

Herzogiella seligeri (Brid.) Z. Iwats. – 6: 100; 14: 160a, 167a.

Plagiothecium denticulatum (Hedw.) Schimp. var. *denticulatum* – 2: 34.

P. laetum Schimp. – 5: 74.

Pottiaceae

Barbula vinealis Brid. – 9: 118c.

Tortella bambergeri (Schimp.) Broth. – 11: 125, 134. – A critical taxon with a more southern, alpine distribution, distinguished from *T. tortuosa* by a distinct central strand, very fragile leaves, and a weakly twisted peristome (only 1/2 time twisted counterclockwise). Because fragile leaves also exist in some populations of *T. tortuosa*, some authors regard this combination of characters as less reliable and obviously not fixed. Therefore, Frey & al. (1995) include this taxon in the *T. tortuosa* complex.

T. tortuosa (Hedw.) Limpr. – 1: 10b; 3: 12; 6: 104; 7: 113a; 9: 115, 116; 10: 119; 11: 133; 13: 149a, 154; 14: 166.

Tortula ruralis (Hedw.) P. Gaertn., B. Mey. & Scherb. – 5: 64.

T. subulata Hedw. – 3: 29; 14: 169.

Pterigynandraceae

Pterigynandrum filiforme Hedw. – 2: 42 p.p.; 5: 82 p.p.; 14: 162a.

Theliaceae

Myurella julacea (Schwägr.) Schimp. – 13: 147 p.p.

Thuidiaceae

Heterocladium dimorphum (Brid.) Schimp. – 4: 53.

Conspectus of the Durmitor bryophytes and some floristic and phytogeographical remarks

For the first time, an updated and revised catalogue of the bryophytes of the Durmitor National Park is given (Tab. 1), including synonyms used in the older literature (generic, specific, subspecific, and variety names; formae have been neglected). As far as possible, we tried to apply the correct nomenclature according to current taxonomic standards. Accepted names given in the catalogue are largely based on Frahm & Frey (1992) and Frey & al. (1995).

Presently, the known bryophyte flora of the Durmitor area comprises 191 taxa. *Blepharostoma trichophyllum*, *Jungermannia leiantha*, *Ptilidium pulcherrimum*, *Radula lindenbergiana* (Hepaticae), *Mnium marginatum*, *Philonotis seriata*, *Pohlia longicollis*, *Racomitrium elongatum*, *Rhizomnium magnifolium*, and *Sphagnum centrale* (Musci) are reported for the first time from Montenegro. In addition, *Chiloscyphus pallescens*, *Conocephalum conicum*, *Lepidozia reptans*, *Plagiochila porelloides*, *Scapania aequiloba* (Hepaticae), *Bryum elegans*, *Eurhynchium hians*, *Funaria hygrometrica*, and *Isoetecium alopecuroides* (Musci) are new to the Durmitor.

Among the new records there are also species that are quite common and widespread in the temperate regions of the world (e.g. *Conocephalum conicum*, *Funaria hygrometrica*), indicating the lack of an intensive and careful local study. In view of the fact that the Durmitor National Park offers a wide spectrum of different and ecologically highly diverse sites (montane and oreale beech and spruce forests, meadows, bogs, sedge fens, subalpine swards, snow-patches), much more species than presently known could be expected. The conspectus therefore is preliminary and clearly points out gaps in our knowledge of the bryophyte flora of this part of Montenegro. Especially liverworts and *Sphagnaceae* are obviously undercollected, and this holds true also for epiphytic and epilithic taxa as well as taxa preferring subalpine habitats. Future collecting activities should concentrate on these taxa, ecological groups and habitats.

Nevertheless, the 191 taxa recorded from the Durmitor National Park represent approximately 2/3 of all known Montenegrinean bryophytes. Pavletić (1955) lists 307 taxa for Crna Gora, including some that nowadays are considered as synonyms. Adding the new records of Bischler & Jovet-Ast (1973), Pavletić & Pulević (1980), the here presented results, and the mostly neglected older reports (e.g. Vilhelm 1923), a total of about 340–350 bryophytes is estimated for Montenegro.

From a phytogeographical point of view, the bryoflora of the Durmitor area clearly is a Central European one, dominated by the Northern element (Frey & Kürschner 1988), which includes species with a subarctic, circumpolar, boreal, temperate, alpine and submediterranean-subatlantic distribution (Laurasian distribution patterns, Schuster 1983), and cosmopolitan taxa. 78.5 % (150 taxa) belong to the Northern element, whereas 21 % (40 taxa) show cosmopolitan or subcosmopolitan distribution patterns (Tab. 2). In contrast, only 0.5 % (1 taxon, *Funaria muehlenbergii*) are of Mediterranean origin (circum-Tethyan elements sensu Frey & Kürschner 1988, comprising the three xerothermic regions of the Holarctis, the Mediterranean, Saharo-Arabian and Irano-Turanian Region, and forming a floristic-historical unit, the Mesogean Region = Old Mediterranean). The montane to subalpine character of the Durmitor National Park is reflected also by the high percentage of taxa exclusively restricted to high mountain areas (24.1 % or 46 taxa, Tab. 2) and taxa of a subarctic-alpine distribution (2.6 %), a fact, already mentioned by Martinčić (1964). This underlines the Central European character of the continental, inner part of the Balkan Peninsula and the Durmitor National Park.

Tab. 1. Conspectus of the bryophytes of the Durmitor National Park.

| | Source | | | | |
|--|----------------|-----------------|------------------------|---------------------------|--|
| | Vilhelm (1923) | Martinić (1964) | Birks & Walters (1973) | Pavletić & Pulević (1980) | coll. Jovanović, Lakušić, Pavić & Stevanović (1989-1994) |
| HEPATICAE | | | | | |
| Jungermanniidae | | | | | |
| Aneuraceae | | | | | |
| <i>Riccardia latifrons</i> (Lindb.) Lindb. [= <i>Aneura latifrons</i> Lindb.] | - | - | - | • | - |
| <i>Riccardia palmata</i> (Hedw.) Carruth. [= <i>Aneura palmata</i> Dumort.] | - | - | - | • | - |
| Geocalycaceae | | | | | |
| <i>Chiloscyphus pallescens</i> (Ehrh.) Dumort. | - | - | - | - | • |
| <i>Chiloscyphus polyanthos</i> (L.) Corda | • | - | - | - | - |
| <i>Lophocolea heterophylla</i> (Schrad.) Dumort. | - | - | - | • | • |
| Jungermanniaceae | | | | | |
| <i>Jungermannia atrovirens</i> Dumort. [= <i>J. riparia</i> Taylor] | • | - | - | - | - |
| <i>Jungermannia leiantha</i> Grolle | - | - | - | - | • |
| Lepidoziaceae | | | | | |
| <i>Lepidozia reptans</i> (L.) Dumort. | - | - | - | - | • |
| Plagiochilaceae | | | | | |
| <i>Plagiochila asplenioides</i> (L. em. Taylor) Dumort. | • | - | - | - | - |
| <i>Plagiochila porelloides</i> (Torr. ex Nees) Lindenb. | - | - | - | - | • |
| Pseudolepicoleaceae | | | | | |
| <i>Blepharostoma trichophyllum</i> (L.) Dumort. | - | - | - | - | • |
| Ptilidiaceae | | | | | |
| <i>Ptilidium ciliare</i> (L.) Hampe [= <i>Blepharozia ciliaris</i> (L.) Dumort.] | • | - | - | - | - |
| <i>Ptilidium pulcherrimum</i> (Weber) Vain. | - | - | - | - | • |
| Radulaceae | | | | | |
| <i>Radula complanata</i> (L.) Dumort. | - | - | - | • | - |
| <i>Radula lindenbergiana</i> Gottsche ex Hartm. f. | - | - | - | - | • |
| Scapaniaceae | | | | | |
| <i>Scapania aequiloba</i> (Schwägr.) Dumort. | - | - | - | - | • |
| <i>Scapania umbrosa</i> (Schrad.) Dumort. | - | - | - | • | - |
| Marchantillidae | | | | | |
| Marchantiaceae | | | | | |
| <i>Conocephalum conicum</i> (L.) Dumort. | - | - | - | - | • |
| <i>Marchantia polymorpha</i> L. (s. l.) | • | - | - | - | • |

Tab. 1. continued

| | | | | | |
|---|---|---|---|---|---|
| MUSCI | | | | | |
| Sphagnidae | | | | | |
| Sphagnaceae | | | | | |
| <i>Sphagnum centrale</i> C. E. O. Jensen | - | - | - | - | • |
| <i>Sphagnum contortum</i> Schultz | - | - | • | - | - |
| <i>Sphagnum recurvum</i> P. Beauv. | - | - | • | - | - |
| <i>Sphagnum squarrosum</i> Crome | - | - | • | - | • |
| <i>Sphagnum subnitens</i> Russow & Warnst. [= <i>S. plumulosum</i> Röhl.] | - | - | • | - | • |
| Polytrichidae | | | | | |
| Polytrichaceae | | | | | |
| <i>Atrichum undulatum</i> (Hedw.) P. Beauv. | - | • | - | - | - |
| <i>Pogonatum urnigerum</i> (Hedw.) P. Beauv. var. <i>urnigerum</i> | • | • | - | - | - |
| <i>Pogonatum urnigerum</i> var. <i>ovatum</i> Vilh. | • | - | - | - | - |
| <i>Polytrichum alpinum</i> Hedw. subsp. <i>alpinum</i> | - | • | - | - | - |
| <i>Polytrichum alpinum</i> subsp. <i>rohlenaе</i> Vilh. | • | - | - | - | - |
| <i>Polytrichum commune</i> Hedw. | - | • | - | • | - |
| <i>Polytrichum formosum</i> Hedw. | - | • | - | - | - |
| <i>Polytrichum juniperinum</i> Hedw. | - | • | - | - | • |
| <i>Polytrichum piliferum</i> Hedw. | • | - | - | - | - |
| Tetraphididae | | | | | |
| Tetraphidaceae | | | | | |
| <i>Tetraphis pellucida</i> Hedw. | - | • | - | - | - |
| Bryidae | | | | | |
| Amblystegiaceae | | | | | |
| <i>Calliergon giganteum</i> (Schimp.) Kindb. | - | - | • | - | • |
| [= <i>Acrocladium giganteum</i> (Schimp.) P. W. Richards & Wall.] | | | | | |
| <i>Calliergon trifarium</i> (F. Weber & D. Mohr) Kindb. | - | - | • | - | - |
| [= <i>Acrocladium trifarium</i> (F. Weber & D. Mohr) P. W. Richards & Wall.] | | | | | |
| <i>Calliergon turgescens</i> (T. Jensen) Kindb. | - | - | • | - | - |
| [= <i>Scorpidium turgescens</i> (T. Jensen) Loeske] | | | | | |
| <i>Calliergonella cuspidata</i> (Hedw.) Loeske | - | • | • | - | • |
| [= <i>Acrocladium cuspidatum</i> (Hedw.) Lindb.] | | | | | |
| <i>Campylium stellatum</i> var. <i>protensum</i> (Brid.) C. E. O. Jensen | - | • | - | - | • |
| [= <i>C. protensum</i> (Brid.) Kindb.] | | | | | |
| <i>Drepanocladus aduncus</i> (Hedw.) Warnst. | • | - | - | - | • |
| [= <i>Hypnum aduncum</i> Hedw.] | | | | | |
| <i>Drepanocladus exannulatus</i> (Bruch & Schimp.) Warnst. | - | - | - | • | - |
| <i>Drepanocladus revolvens</i> (Sw.) Warnst. | - | - | • | - | - |
| <i>Drepanocladus vernicosus</i> (Mitt.) Warnst. | - | - | • | - | • |
| <i>Hygrohypnum luridum</i> (Hedw.) Jenn. | - | • | - | - | • |
| <i>Sanionia uncinata</i> (Hedw.) Loeske | • | • | - | • | • |
| [= <i>Drepanocladus uncinatus</i> (Hedw.) Warnst., = <i>Hypnum uncinatum</i> Hedw.] | | | | | |
| Aulacomniaceae | | | | | |
| <i>Aulacomnium palustre</i> (Hedw.) Schwägr. | - | • | • | - | • |

Tab. 1. continued

| | Source | | | | |
|--|----------------|------------------|------------------------|---------------------------|--|
| | Vilhelm (1923) | Martinčić (1964) | Birks & Walters (1973) | Pavletić & Pulević (1980) | coll. Jovanović, Lakušić, Pavić & Stevanović (1989-1994) |
| Bartramiaceae | | | | | |
| <i>Bartramia halleriana</i> Hedw. | - | • | - | - | - |
| <i>Bartramia ithyphylla</i> Brid. | • | • | - | - | - |
| <i>Bartramia pomiformis</i> var. <i>crispa</i> Bruch & Schimp. | • | - | - | - | - |
| <i>Philonotis calcarea</i> (Bruch & Schimp.) Schimp. | - | • | - | - | - |
| <i>Philonotis fontana</i> (Hedw.) Brid. | • | - | - | - | - |
| <i>Philonotis seriata</i> Mitt. | - | - | - | - | • |
| <i>Plagiopus oederiana</i> (Sw.) H. A. Crum L. E. Anderson | - | • | - | - | • |
| Brachytheciaceae | | | | | |
| <i>Brachythecium glareosum</i> (Spruce) Schimp. | - | • | - | - | - |
| <i>Brachythecium rivulare</i> Schimp. | - | • | - | - | - |
| <i>Brachythecium salebrosum</i> (F. Weber & D. Mohr) Schimp. | - | • | - | - | • |
| <i>Brachythecium starkei</i> (Brid.) Schimp. | - | • | - | - | - |
| <i>Brachythecium velutinum</i> (Hedw.) Schimp. | • | • | - | • | - |
| <i>Cirriphyllum piliferum</i> (Hedw.) Grout | - | • | - | - | - |
| <i>Eurhynchium praelongum</i> (Hedw.) Schimp. | - | • | - | - | - |
| [= <i>Oxyrhynchium praelongum</i> (Hedw.) Warnst.] | | | | | |
| <i>Eurhynchium pulchellum</i> (Hedw.) Jenn. var. <i>pulchellum</i> | - | • | - | - | - |
| <i>Eurhynchium pulchellum</i> var. <i>praecox</i> (Hedw.) Dix. | - | • | - | - | - |
| [incl. var. <i>diversifolium</i> (Schimp.) C. E. O. Jensen] | | | | | |
| <i>Eurhynchium schleicheri</i> (Hedw. f.) Jur. | • | - | - | - | - |
| <i>Eurhynchium striatum</i> (Hedw.) Schimp. | • | - | - | - | - |
| <i>Eurhynchium hians</i> (Hedw.) Sande Lac. | - | - | - | - | • |
| <i>Homalothecium lutescens</i> (Hedw.) H. Rob. | • | • | - | - | • |
| [= <i>Camptothecium lutescens</i> (Hedw.) Schimp.] | | | | | |
| <i>Homalothecium philippeanum</i> (Spruce) Schimp.. | • | • | - | - | • |
| <i>Homalothecium sericeum</i> (Hedw.) Schimp. | • | • | - | - | - |
| <i>Scleropodium purum</i> (Hedw.) Limpr. | • | • | - | - | - |
| [= <i>Pseudoscleropodium purum</i> (Hedw.) Fleisch.] | | | | | |
| Bryaceae | | | | | |
| <i>Anomobryum julaceum</i> (P. Gaertn., B. Mey. & Scherb.) Schimp. | • | - | - | - | - |
| [= <i>A. concinatum</i> (Spruce) Lindb.] | | | | | |

Tab. 1. continued

| | | | | | |
|--|---|---|---|---|---|
| <i>Bryum caespiticiu</i> Hedw. var. <i>caespiticiu</i> | • | • | - | - | • |
| <i>Bryum caespiticiu</i> var. <i>microcarpu</i> Vilh. | • | - | - | - | - |
| <i>Bryum capillare</i> Hedw. | - | • | - | - | • |
| <i>Bryum creberrimu</i> Taylor [= <i>B. affine</i> Bruch] | - | • | - | - | • |
| <i>Bryum elegans</i> Nees ex Brid. | - | - | - | - | • |
| <i>Bryum pseudotriquetru</i> (Hedw.) P. Gaertn., B. Mey. & Scherb. | - | • | • | - | • |
| <i>Pohlia cruda</i> (Hedw.) Lindb. [= <i>Webera cruda</i> (Hedw.) Bruch] | • | • | - | - | - |
| <i>Pohlia elongata</i> Hedw. | • | • | - | - | • |
| [= <i>Webera acuminata</i> (Hoppe & Hornsch.) Schimp.] | | | | | |
| <i>Pohlia longicollis</i> (Hedw.) Lindb. | - | - | - | - | • |
| <i>Pohlia nutans</i> (Hedw.) Lindb. [= <i>Webera nutans</i> (Schreb.) Hedw.] | • | • | - | - | - |
| Buxbaumiaceae | | | | | |
| <i>Buxbaumia viridis</i> (Moug. ex DC.) Brid. ex Moug. & Nestl. | - | • | - | - | - |
| [= <i>B. indusiata</i> Brid.] | | | | | |
| Climaciaceae | | | | | |
| <i>Climacium dendroides</i> (Hedw.) F. Weber & D. Mohr | - | • | • | - | • |
| Cratoneuraceae | | | | | |
| <i>Cratoneuron commutatu</i> (Hedw.) Roth | - | • | - | - | • |
| <i>Cratoneuron decipiens</i> (De Not.) Loeske | - | • | - | - | • |
| <i>Cratoneuron filicinu</i> (Hedw.) Spruce | - | • | - | - | - |
| Dicranaceae | | | | | |
| <i>Dichodontium pellucidu</i> (Hedw.) Schimp. | - | • | - | - | - |
| <i>Dicranodontium denudatu</i> (Brid.) Britt. | - | • | - | - | • |
| <i>Dicranum bonjeanii</i> De Not. | - | - | • | - | - |
| <i>Dicranum fuscescens</i> Sm. | - | • | - | - | • |
| <i>Dicranum majus</i> Sm. | • | - | - | - | - |
| <i>Dicranum polysetu</i> Sw. | - | • | - | - | - |
| <i>Dicranum scopariu</i> Hedw. | • | • | - | • | • |
| <i>Dicranum viride</i> (Sull. & Lesq.) Lindb. | • | - | - | - | - |
| <i>Kiaeria falcata</i> (Hedw.) I. Hagen [= <i>D. falcatu</i> Hedw.] | • | - | - | - | - |
| <i>Oncophorus virens</i> (Hedw.) Brid. | • | - | - | - | - |
| <i>Orthodicranum flagellare</i> (Hedw.) Loeske | - | • | - | - | • |
| <i>Orthodicranum tauricu</i> (Sapjegin) Smirnova | - | • | - | - | • |
| [= <i>O. strictu</i> (Schleich.) Culm.] | | | | | |
| Ditrichaceae | | | | | |
| <i>Ceratodon purpureus</i> (Hedw.) Brid. | • | • | - | - | • |
| <i>Distichium capillaceu</i> (Hedw.) Bruch & Schimp. | • | • | - | - | • |
| <i>Distichium inclinatu</i> (Hedw.) Bruch & Schimp. | - | • | - | - | - |
| <i>Ditrichum flexicaule</i> (Schwägr.) Hampe | - | • | - | - | • |
| <i>Saelania glaucescens</i> (Hedw.) Broth. | - | • | - | - | - |
| Encalyptaceae | | | | | |
| <i>Encalypta alpina</i> Sm. [= <i>E. commutata</i> Bruch & Schimp.] | • | - | - | - | - |
| <i>Encalypta ciliata</i> Hedw. | - | • | - | - | - |
| <i>Encalypta rhyptocarpa</i> Schwägr. | • | - | - | - | - |
| <i>Encalypta streptocarpa</i> Hedw. | - | • | - | - | - |

Tab. 1. continued

| | Source | | | | |
|--|----------------|------------------|------------------------|---------------------------|--|
| | Vilhelm (1923) | Martinčić (1964) | Birks & Walters (1973) | Pavletić & Pulević (1980) | coll. Jovanović, Lakušić, Pavić & Stevanović (1989-1994) |
| <i>Encalypta vulgaris</i> Hedw. | - | • | - | - | • |
| Fissidentaceae | | | | | |
| <i>Fissidens bryoides</i> Hedw. subsp. <i>bryoides</i> | - | • | - | - | - |
| <i>Fissidens dubius</i> P. Beauv. [= <i>F. cristatus</i> Wilson ex Mitt.] | - | • | - | - | - |
| <i>Fissidens taxifolius</i> Hedw. | • | • | - | - | - |
| Fontinalaceae | | | | | |
| <i>Fontinalis antipyretica</i> Hedw. | - | • | - | - | - |
| Funariaceae | | | | | |
| <i>Funaria hygrometrica</i> Hedw. | - | - | - | - | • |
| <i>Funaria muehlenbergii</i> Turner [= <i>F. calcaria</i> Wahlenb.] | - | • | - | - | - |
| Grimmiaceae | | | | | |
| <i>Racomitrium canescens</i> (Hedw.) Brid. | - | • | - | - | - |
| <i>Racomitrium elongatum</i> Frisvoll | - | • | - | - | • |
| <i>Schistidium alpicola</i> (Hedw.) Limpr. | - | • | - | - | - |
| <i>Schistidium apocarpum</i> (Hedw.) Bruch & Schimp. | - | • | - | - | • |
| Hylocomiaceae | | | | | |
| <i>Hylocomium pyrenaicum</i> (Spruce) Lindb. | • | - | - | - | - |
| <i>Hylocomium splendens</i> (Hedw.) Schimp. | - | • | - | - | • |
| <i>Pleurozium schreberi</i> (Brid.) Mitt. | - | • | - | - | • |
| <i>Rhytidiadelphus squarrosus</i> (Hedw.) Warnst. | • | • | - | - | - |
| <i>Rhytidiadelphus triquetrus</i> (Hedw.) Warnst. | • | • | - | • | • |
| Hypnaceae | | | | | |
| <i>Ctenidium molluscum</i> (Hedw.) Mitt. | • | • | - | - | • |
| <i>Homomallium incurvatum</i> (Brid.) Loeske | - | • | - | - | - |
| <i>Hypnum bambergeri</i> Schimp. | - | • | - | - | - |
| <i>Hypnum cupressiforme</i> Hedw. | • | • | - | - | • |
| <i>Hypnum fertile</i> Sendtn. | - | - | - | • | - |
| <i>Hypnum lindbergii</i> Mitt. | - | • | - | - | - |
| <i>Hypnum pallescens</i> (Hedw.) P. Beauv. [= <i>H. reptile</i> auct.] | • | - | - | - | - |
| <i>Hypnum recurvatum</i> (Lindb. & Arnell) Kindb. [= <i>H. fastigiatum</i> Brid.] | - | • | - | - | - |
| <i>Hypnum vaucheri</i> Lesq. | - | • | - | - | - |
| <i>Orthothecium rufescens</i> (Brid.) Schimp. | - | • | - | - | - |

Tab. 1. continued

| | | | | | |
|---|---|---|---|---|---|
| Lembophyllaceae | - | - | - | - | • |
| <i>Isothecium alopecuroides</i> (Dubois) Isov. | - | • | - | - | - |
| <i>Isothecium myosuroides</i> Brid. | - | • | - | - | - |
| Leskeaceae | - | • | - | - | • |
| <i>Lescurea incurvata</i> (Hedw.) E. Lawton | - | • | - | - | • |
| [= <i>Pseudoleskea incurvata</i> (Hedw.) Loeske] | - | • | - | - | - |
| <i>Lescurea mutabilis</i> (Brid.) Lindb. ex I. Hagen | • | • | - | - | - |
| <i>Leskeella nervosa</i> (Brid.) Loeske | - | • | - | - | - |
| [= <i>Leskea nervosa</i> (Schwägr.) Myrin] | - | • | - | - | - |
| Leucodontaceae | • | - | - | - | - |
| <i>Leucodon sciuroides</i> (Hedw.) Schwägr. | • | • | - | - | - |
| Meesiaceae | • | • | - | - | - |
| <i>Meesia uliginosa</i> Hedw. [= <i>M. trichodes</i> Spruce] | • | • | - | - | - |
| Mniaceae | • | - | - | - | - |
| <i>Cyrtomnium hymenophylloides</i> (Huebener) Nyholm | • | - | - | - | - |
| [= <i>Mnium hymenophylloides</i> Huebener] | - | • | - | - | - |
| <i>Mnium ambiguum</i> H. Müll. | - | • | - | - | - |
| [= <i>M. orthorhynchum</i> subsp. <i>lycopodioides</i> (Schwägr.) Podp.] | - | - | - | - | • |
| <i>Mnium marginatum</i> (With.) P. Beauv. | • | - | - | - | - |
| <i>Mnium hornum</i> Hedw. | - | • | - | - | - |
| <i>Mnium spinosum</i> (Voit) Schwägr. | - | • | - | - | - |
| <i>Mnium spinulosum</i> Bruch & Schimp. | - | • | - | - | • |
| <i>Mnium stellare</i> Hedw. | • | • | - | - | • |
| <i>Mnium thomsonii</i> Schimp. [= <i>M. orthorhynchum</i> Lindb.] | - | • | - | - | - |
| <i>Plagiomnium affine</i> (Blandow) T. J. Kop. [= <i>Mnium affine</i> Blandow] | - | • | - | - | - |
| <i>Plagiomnium elatum</i> (Bruch & Schimp.) T. J. Kop. [= <i>Mnium seligeri</i> Jur.] | - | • | - | - | • |
| <i>Plagiomnium ellipticum</i> (Brid.) T. J. Kop. [= <i>Mnium rugicum</i> Laurer] | - | • | - | - | - |
| <i>Plagiomnium rostratum</i> (Schrad.) T. J. Kop. | • | • | • | - | - |
| [= <i>Mnium longirostre</i> Brid. = <i>M. rostratum</i> Schrad.] | • | • | - | • | • |
| <i>Plagiomnium undulatum</i> (Hedw.) T. J. Kop. [= <i>Mnium undulatum</i> Hedw.] | - | - | - | - | • |
| <i>Rhizomnium magnifolium</i> (Horik.) T. J. Kop. | - | • | - | - | - |
| <i>Rhizomnium punctatum</i> (Hedw.) T. J. Kop. [= <i>Mnium punctatum</i> Hedw.] | - | • | - | - | - |
| Neckeraceae | - | • | - | - | • |
| <i>Metaneckera menziesii</i> (Drumm.) Steere | • | • | - | - | - |
| [= <i>Neckera menziesii</i> Hook.] | - | • | - | - | - |
| <i>Neckera complanata</i> (Hedw.) Huebener | - | • | - | - | - |
| Orthotrichaceae | - | • | - | - | • |
| <i>Orthotrichum anomalum</i> Hedw. (incl. var. <i>saxatile</i> Milde) | - | • | - | - | - |
| <i>Orthotrichum cupulatum</i> Brid. | - | • | - | - | - |
| <i>Orthotrichum patens</i> Bruch ex Brid. | - | • | - | - | - |
| <i>Orthotrichum striatum</i> Hedw. | - | • | - | - | - |

Tab. 1. continued

| | Source | | | | |
|---|----------------|-----------------|------------------------|---------------------------|--|
| | Vilhelm (1923) | Martinić (1964) | Birks & Walters (1973) | Pavletić & Pulević (1980) | coll. Jovanović, Lakušić, Pavić & Stevanović (1989-1994) |
| Plagiotheciaceae | | | | | |
| <i>Herzogiella seligeri</i> (Brid.) Z. Iwats. [= <i>Dolichotheca seligeri</i> (Brid.) Loeske] | - | • | - | - | • |
| <i>Isopterygiopsis pulchella</i> (Hedw.) Z. Iwats. [= <i>Isopterygium pulchellum</i> (Hedw.) A. Jaeger] | - | • | - | - | - |
| <i>Plagiothecium denticulatum</i> (Hedw.) Schimp. var. <i>denticulatum</i> | • | - | - | - | • |
| <i>Plagiothecium denticulatum</i> var. <i>undulatum</i> R. Ruthe [= <i>P. ruthei</i> Limpr.] | - | • | - | - | - |
| <i>Plagiothecium laetum</i> Schimp. | - | • | - | - | • |
| <i>Plagiothecium nemorale</i> (Mitt.) A. Jaeger [= <i>P. sylvaticum</i> auct.] | • | - | - | - | - |
| Pottiaceae | | | | | |
| <i>Barbula acuta</i> (Brid.) Brid. | - | • | - | - | - |
| <i>Barbula convoluta</i> Hedw. [= <i>Streblotrichum convolutum</i> (Hedw.) P. Beauv.] | - | • | - | - | - |
| <i>Barbula spadicea</i> (Mitt.) Braithw. [= <i>Didymodon spadiceus</i> (Mitt.) Limpr.] | - | • | - | - | - |
| <i>Barbula unguiculata</i> Hedw. | - | • | - | - | - |
| <i>Barbula vinealis</i> Brid. subsp. <i>vinealis</i> | - | • | - | - | • |
| <i>Barbula vinealis</i> subsp. <i>cylindrica</i> (Tayler) Bouvet [= <i>B. cylindrica</i> Boulay] | • | - | - | - | - |
| <i>Bryoerythrophyllum recurvirostrum</i> (Hedw.) P. C. Chen [= <i>Didymodon rubellus</i> (Hoffm.) Bruch & Schimp.] | • | • | - | - | - |
| <i>Desmatodon latifolius</i> (Hedw.) Brid. | - | • | - | - | - |
| <i>Oxystegus tenuirostris</i> (Hook. & Taylor) A. J. Smith [= <i>Trichostomum cylindricum</i> (Bruch) C. Müll.] | • | - | - | - | - |
| <i>Pseudocrossidium hornschuchianum</i> (Schultz) R. H. Zander [= <i>Barbula hornschuchiana</i> Schultz] | • | - | - | - | - |
| <i>Tortella bambergeri</i> (Schimp.) Broth. [= <i>Trichostomum bambergeri</i> Schimp.] | • | - | - | - | • |
| <i>Tortella tortuosa</i> (Hedw.) Limpr. | • | • | - | • | • |
| <i>Tortula norvegica</i> (F. Weber) Wahlenb. & Lindb. [= <i>Syntrichia ruralis</i> var. <i>alpina</i> Wahlenb.] | - | • | - | - | - |
| <i>Tortula ruralis</i> (Hedw.) P. Gaertn., B. Mey. & Scherb. | • | • | - | - | • |

continued on the next page

Tab. 1. continued

| | | | | | |
|---|---|---|---|---|---|
| [= <i>Syntrichia ruralis</i> (Hedw.) Brid.] | • | • | - | - | • |
| <i>Tortula subulata</i> Hedw. | • | • | - | - | • |
| [= <i>Syntrichia subulata</i> (Hedw.) F. Weber & D. Mohr] | - | • | - | - | - |
| <i>Trichostomum brachydontium</i> Bruch | - | • | - | - | - |
| <i>Weissia controversa</i> Hedw. [= <i>W. fallax</i> Sehm.] | - | • | - | - | - |
| <i>Pterigynandraceae</i> | | | | | |
| <i>Pterigynandrum filiforme</i> Hedw. | - | • | - | - | • |
| <i>Splachnaceae</i> | | | | | |
| <i>Splachnum ampullaceum</i> Hedw. | - | - | • | - | - |
| <i>Tetraplodon mnioides</i> (Hedw.) Bruch & Schimp. | - | - | • | - | - |
| <i>Theliaceae</i> | | | | | |
| <i>Myurella julacea</i> (Schwägr.) Schimp. | • | • | - | - | • |
| <i>Myurella tenerrima</i> (Brid.) Lindb. | • | - | - | - | - |
| [= <i>M. apiculata</i> (Sommerf.) Schimp.] | - | - | • | - | - |
| <i>Thuidiaceae</i> | | | | | |
| <i>Abietinella abietina</i> (Hedw.) Fleisch. | • | • | - | - | - |
| [= <i>Thuidium abietinum</i> (Hedw.) Schimp.] | - | • | - | - | • |
| <i>Heterocladium dimorphum</i> (Brid.) Schimp. | - | • | - | - | • |
| [= <i>H. squarrosulum</i> Lindb.] | - | • | - | - | - |
| <i>Timmiaceae</i> | | | | | |
| <i>Timmia norvegica</i> J. E. Zetterst. | - | • | - | - | - |

Tab. 2. Phytogeographical analysis of the bryophytes of the Durmitor National Park.

| | % | Total number of taxa |
|-------------------------------------|------|----------------------|
| Floristic element | | |
| Cosmopolitan (subcosmopolitan) taxa | 21.0 | 40 |
| Northern taxa | 78.5 | 150 |
| Circum-Tethyan taxa | 0.5 | 1 |
| Distribution | | |
| Lowland to montane (subalpine) | 73.3 | 140 |
| Montane to subalpine | 24.1 | 46 |
| Subarctic-alpine | 2.6 | 5 |

Acknowledgements

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