

CONTRIBUTIONS TO THE BRYOPHYTE FLORA OF THE PROKLETIJE MTS, MONTENEGRO

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Papp, B., Erzberger, P., Szurdoki, E. & Dragićević, S. (2019): Contributions to the bryophyte flora of the Prokletije Mts, Montenegro. – *Studia bot. hung.* 50(1): 29–52.

Abstract: 282 bryophyte taxa (64 liverworts and 218 mosses) were recorded during our field trip to the Prokletije Mts. Two liverworts (*Mannia fragrans*, *Riccardia incurvata*) and ten mosses (*Brachytheciastrum collinum*, *B. dieckii*, *Bryum violaceum*, *Fissidens gracilifolius*, *Orthotrichum shawii*, *Seligeria trifaria*, *Sphagnum divinum*, *Syntrichia subpappilosissima*, *Tortella fasciculata*, *T. pseudofragilis*) are recorded for the first time in Montenegro. 45 species have conservation interest; rare in the Balkans or even in Europe and/or candidates of the new European bryophyte red-list.

Key words: liverworts, mosses, new national records, species of conservation interest, the Balkans

INTRODUCTION

Due to intensive bryological field explorations carried out in Montenegro in the last 15 years, our knowledge of the national flora has been considerably increased. But new species to the Montenegrin bryoflora still continuously appear with every new investigation conducted. Summarisation of the knowledge on Montenegrin bryophyte flora can be found in liverwort and moss checklists of southeastern Europe and the Mediterranean (ROS *et al.* 2007, 2013; SABOVLJEVIĆ & NATCHEVA 2006; SABOVLJEVIĆ *et al.* 2008). The liverwort checklist (ROS *et al.* 2007) counts 106 species from Montenegro and the moss checklist (ROS *et al.* 2013) reports 527 mosses from there. According to the most recent European bryophyte checklist (HODGETTS 2015) the Montenegrin bryophyte flora consists of 701 taxa (147 hepatics and 554 mosses). One liverwort and 17 additional moss species have been reported in ALEGRO *et al.* (in press), PAPP *et al.* (2014), ANĐIĆ *et al.* (2018a, b), DRAGIĆEVIĆ *et al.* (2017), ELLIS *et al.* (2016a, b, 2017), KALNÍKOVÁ *et al.* (2017), PETERKA *et al.* (2017), and VULEVIĆ *et al.* (2017).

In the present paper, we publish the results of the collecting trip to Prokletije Mts in 2006.

MATERIAL AND METHODS

Description of the investigated area

The Prokletije mountain range is located in the southeastern part of Montenegro, on the border with Serbia, Kosovo, and Albania. It is made up of many large sections or mountain massifs. These mountains extend dominantly in northeast-southwestern direction (RADOJIČIĆ 1996). Mountain ranges of Prokletije, about 40 of them, are surrounded by the Zeta Plain, Drin River (Albania), Komovi and Bjelasica Mts, and the mountains of Kučka Krajina and cover around 250 km². The highest peaks, over 2,000 m, lie along the Montenegrin–Albanian border (Maja Kolata, 2,534 m; Maja Rosit, 2,525 m; Bogićevica, 2,374 m; Karanfili, 2,490 m), and the highest peak, Maja Jezercë (2,695 m) is in Albania (VINCEK *et al.* 2004).

The oldest rocks in this area are of Palaeozoic age (there are also rocks of Triassic, Jurassic, Cretaceous, and Quaternary). The Prokletije area belongs to the Dinaric mountains and glaciation was very active here (BEŠIĆ 1980). Particular geomorphologic units are Karanfilsko–Bjelica zone (one of the most rugged parts of this area with a very pronounced vertical dissection of reliefs, numerous peaks over 2,000 m, glacier cirques, waves, hydrological and speleological objects, mountain valleys – the most famous are Grebaja and Ropojana), Visitors Zone, Bogićevica Zone, zones of Bor and Kofiljače, and Staračko-zavojska zone.

The most prevalent soils in this area are brown soils on siliceous rocks and mountain chernozem on limestone; smaller areas are occupied by alluvial, alluvial-diluvial, and diluvial deposits in the valleys of the watercourses and in the foothills.

The presence of numerous lakes, rivers, springs, sources of drinking and mineral water, and mountain ponds, makes Prokletije the richest hydrological area in Montenegro. Besides Plavsko Lake, glacial lakes (Hridsko, Visitorsko, Rikavačko, Bukumirsko, Ropojansko, Tatarijsko, Bjelajsko, Koljindarsko, Čardačko) are natural phenomena known as ‘mountain eyes’ (‘gorske oči’). Other well-known hydrological objects in this area are Alipašini izvori, Savina water and Vruja, subterranean rivers – Vruja i Dolja, Grlja Canyon (BULIĆ *et al.* 2007).

The largest part of the Prokletije area is under the influence of continental, mountain and sub-Alpine climate, with cold and long winters and fresh and short summers. The most part of the area has a mean annual air temperature of 2–7 °C, but in the valleys and river valleys it ranges from 6 to 9 °C. The average temperature in January in the high mountains is –6 °C, and at the foothills it is –2 °C. The warmest month is July with a mean monthly temperature of 16 °C, while temperature in the highest parts of Prokletije is only 6 °C. Maximum precipita-

tion is in December, and the minimum in August. Snow cover occurs from early November to early April (BULIĆ *et al.* 2007, MULIĆ 2016).

The composition of the soil and the mixture of the continental and Mediterranean climate have caused a large diversity of vascular flora. It is estimated that approximately 2,000 vascular plants are growing here. With over 40 typical plant communities, this mountain massif can be considered as floristically and vegetationally one of the richest in the entire Balkan Peninsula (forest communities of endemic-relic woody plants are particularly valuable and the most important are: *Pinetum heldreichii bertisceum montanum* Blečić, *Pinetum peucis montenegrinum* Blečić & Tatić, *Aceretum visianii subalpinum* Lakušić *et al.*, *Aceri visianii–Fagetum moessacae subalpinum* Lakušić *et al.*, *Piceo-Pinetum peucis montanum* (Blečić & Tatić) Lakušić (BLEČIĆ & LAKUŠIĆ 1976, BULIĆ *et al.* 2007). There are 19 habitat types of EU importance registered in Prokletije (PETROVIĆ *et al.* 2012).

Glacial valley Grebaja, due to the exceptional natural features and the presence of a large number of endemic, subendemic, relict plant species such as *Acer intermedium* Pančić, *Amphoricarpos autariatus* ssp. *bertisceus* Blečić & Mayer, *Geum bulgaricum* Pančić, *Lunaria telekiana* Jáv., *Pinus heldreichii* Christ, *Silene macrantha* (Pančić) H. Neumayer, *Valeriana pancicii* Halácsy & Bald., *Wulfenia bleicii* Lakušić has the status of IPA area (Important Plant Areas) (PETROVIĆ 2009).

According to the criteria for the identification of the EMERALD area, the Bern Convention and the EU Wild Birds Directive, the Prokletije region has been proclaimed as a national park, and it is defined as a particularly important EMERALD area in Montenegro with the name 'Plavsko–Gusinjske Prokletije with Bogičevica' (BULIĆ *et al.* 2007), while Hridsko Lake and Volušnica have the status of nature reserves.

Methods

Our collecting trip was made in October 2006. Various habitat types, such as wetlands, streams, calcareous and siliceous rock formations, grasslands, forests were investigated, and bryophytes were collected from different substrates (soil, exposed and shaded rocks, tree bark, and decaying wood). The investigated area can be seen in Figure 1.

The specimens are preserved in the Herbarium of the Hungarian Natural History Museum, Budapest (BP) and in the Herbarium of the Botanic Garden and Botanical Museum, Berlin-Dahlem (B). Nomenclature of bryophytes follows HODGETTS (2015), except for *Tortella fasciculata* and *T. pseudofragilis*, which follows KÖCKINGER & HEDENÄS (2017), and *Sphagnum divinum* following HASSEL *et al.* (2018). Where species distributions are indicated for SE Europe, the following abbreviations are used: ALB = Albania, BG = Bulgaria, BIH =

Bosnia and Herzegovina, GR = Greece, HR = Croatia, MK = Macedonia, MNE = Montenegro, RO = Romania, SLO = Slovenia, SRB = Serbia, TR = European part of Turkey. Abbreviations of red list categories are as follows: CR = critically endangered, EN = endangered, VU = vulnerable, NT = near threatened, DD = data deficient.

Country distributions, national red list categories in SE Europe, and indication of candidates for the new European red-list are taken from HODGETTS (2015), with updates where relevant.

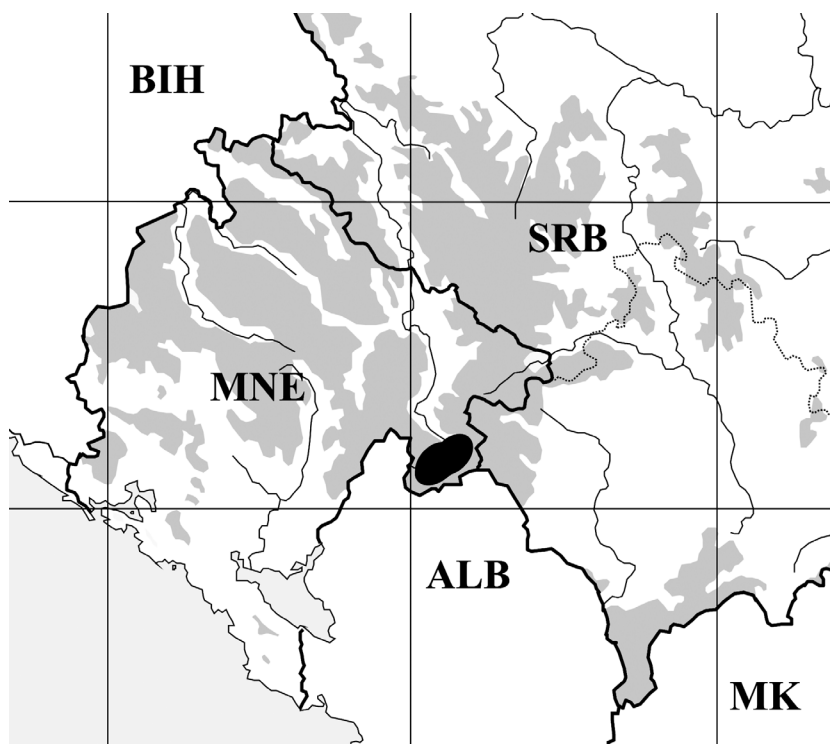


Fig. 1. Location of the investigated area (ALB = Albania, BIH = Bosnia and Herzegovina, MK = Macedonia, MNE = Montenegro, SRB = Serbia).

Site details

1. Montenegro, Prokletije Mts, Gusinje, Dolina Grebaja, Treća livada 1,223 m, 42.51156° N, 19.77803° E, 05.10.2006.

2. Montenegro, Prokletije Mts, Plav, Plavsko jezero lake, 3,5 km of Plav on the road between Plav and Gusinje, 921 m, 42.58486° N, 19.89947° E, 06.10.2006.

3. Montenegro, Prokletije Mts, Vusanje, Ropojana valley, at waterfall Grlja, 976 m, 42.52292° N, 19.84169° E, 06.10.2006.

4. Montenegro, Prokletije Mts, Gusinje, Alipašini izvori spring, 935 m, 42.55011° N, 19.82617° E, 07.10.2006.

5. Montenegro, Prokletije Mts, Vusanje, Ropojana valley, around Grlja waterfall and along Grlja stream, 976 m, 42.52292° N, 19.84169° E, 07.10.2006.

6. Montenegro, Prokletije Mts, Vusanje, Ropojana valley towards Zastan koliba, 1,157 m, 42.49653° N, 19.81525° E, 07.10.2006.

7. Montenegro, Prokletije, Vusanje, Ropojana valley, Oko Skakavice spring, 1,022 m, 42.51169° N, 19.83469° E, 07.10.2006.

8. Montenegro, Prokletije, Plav, from Bajrovića katun (Hridski Stanovi) to Hridsko jezero lake, 1,700–1,928 m, 42.58222° N, 20.02725° E and 42.57183° N, 20.03408° E, 08.10.2006.

9. Montenegro, Prokletije, Plav, on the way back from Hridsko jezero lake in valley of Treskavička rijeka stream at Gradina, 1,175 m, 42.60756° N, 19.99747° E, 08.10.2006.

10. Montenegro, Visitor Mts, Brezojevica, Visitorsko jezero lake, 1,570–1,740 m, 42.63547° N, 19.89119° E and 42.62647° N, 19.88169° E, 09.10.2006.

11. Montenegro, Prokletije, Vusanje, from Zastan koliba towards Maja Rosit peak under Valjbones in dolina Korita, 1,342 m, 42.48919° N, 19.81575° E, 10.10.2006.

12. Montenegro, Prokletije, Vusanje, from Zastan koliba towards Maja Rosit peak under Valjbones in dolina Korita, 1,717 m, 42.48611° N, 19.82736° E, 10.10.2006.

13. Montenegro, Prokletije, Vusanje, from Zastan koliba towards Maja Jezercë at Zastan izvor spring and through Krvetaštit until the border of Montenegro and Albania, 1,500–1,775 m, 42.48131° N, 19.81419° E and 42.47667° N, 19.81600° E, 11.10.2006.

14. Montenegro, Prokletije Mts, Gusinje, Dolina Grebaja, from Treća livada on Kotlovi path towards the peak, 1,223–1,370 m, 42.51156° N, 19.77803° E, 12.10.2006.

RESULTS AND DISCUSSION

282 bryophyte taxa (64 liverworts and 218 mosses) were recorded during our field trip. The complete list of species can be found in the Appendix. 12 species (2 liverworts and 10 mosses) are recorded for the first time in Montenegro. 45 species have conservation interest; rare in the Balkans or even in Europe or/and candidates of the new European bryophyte red-list.

Species new to the Montenegrin bryophyte flora

Mannia fragrans (Balb.) Frye & L. Clark – This is an eastern sub-Mediterranean species (DÜLL 1983). It has a sporadic distribution in Europe and it is red-listed in many countries where it occurs; in Norway and Spain (CR), in Finland, Germany, Italy, Latvia and Poland (EN), in Austria and Switzerland (VU), Czech Republic (NT). In SE Europe it is known from almost all countries except ALB, GR, TR, and MNE. It is also red-listed in Serbia (EN). It is a candidate for the new European Bryophyte Red List. In the Prokletije Mts it was collected in limestone grassland at *ca* 1,000 m a.s.l.

Riccardia incurvata Lindb. – This is a boreal-montane species according to HILL & PRESTON (1998). It is widely distributed in Europe except the Mediterranean areas, but it is red-listed in many countries especially in Central Europe; in Slovakia (CR), in Latvia (EN), in Austria, Czech Republic, Estonia, Germany, Poland, Spain, Switzerland (VU), in Finland (NT), and in Hungary (DD). In SE Europe it is known only from BG, RO, and SRB, but it has been recently reported from HR (ALEGRO *et al.* 2015) and MK (PAPP & ERZBERGER 2012). It is also red-listed in BG (VU) and RO (EN). In the Prokletije Mts it was collected in a wetland at *ca* 1,900 m a.s.l. at Hridsko jezero where siliceous bed-rocks are characteristic.

Brachytheciastrum collinum (Schleich. ex Müll. Hal.) Ignatov & Huttunen (det. M. Ignatov) – This is an arctic-alpine species (DÜLL 1985). It has a sporadic distribution in Europe, mainly in Northern Europe and in high mountains of Europe, but it is red-listed even in Finland (VU), in Poland (DD) and extremely rare in Germany. In SE Europe it is known only from GR and SLO (DD). It is a candidate for the new European bryophyte red-list. In the Prokletije Mts it was collected at a rivulet at Hridsko jezero at *ca* 1,900 m a.s.l.

Brachytheciastrum dieckii (Röll) Ignatov & Huttunen (conf. M. Ignatov) – Its geographical distribution ranges from the western Mediterranean and Macaronesia to the eastern Mediterranean and the Middle East (ORGAZ *et al.* 2010). In Europe it is known only from Portugal, Spain, Cyprus, Albania, and Greece. It is a candidate for the new European bryophyte red-list. In the Prokletije Mts it was found on siliceous rocks at Hridsko jezero.

Bryum violaceum Crundw. & Nyholm – This European temperate species according to HILL & PRESTON (1998) is a member of *Bryum erythrocarpum* complex, bearing reddish rhizoid tubers. It is widely distributed in Europe except the Mediterranean areas. In SE Europe it is known in GR and SRB. However, according to our opinion this is an overlooked species. In the Prokletije Mts it was collected from soil among limestone rocks.

Fissidens gracilifolius Brugg.-Nann. & Nyholm – This temperate, montane species (DÜLL 1984) is widespread in Europe and typically found in shaded limestone habitats. It is known in almost all SE European countries except BIH, MK, MNE, and TR. It is red-listed in BG (VU) and RO (VU). In the Prokletije Mts it was found on a vertical surface of a shaded limestone rock.

Orthotrichum shawii Wilson – A southern suboceanic epiphyte species previously treated synonymous with *O. striatum*. *O. shawii* has recently been shown to be a distinct species (MAZIMPAKA *et al.* 2000). It is known only from Belgium, France, Italy, Netherlands, Poland, Portugal (DD), and Spain (VU). In SE Europe it is known only from ALB and GR and it has recently been reported from MK (PAPP *et al.* 2016). It is a candidate for the new European bryophyte red-list. It was found on *Fagus* bark in the Prokletije Mts.

Seligeria trifaria (Brid.) Lindb. – This is an Euro-Siberian boreal-montane element according to HILL & PRESTON (1998). It has a sporadic distribution in Europe and is red-listed in many countries. It occurs in France, Italy, Austria, Belgium, Switzerland, Slovakia, in the Caucasus, in Germany and Spain (VU), in Great Britain and Hungary (DD), and rare in Poland. In SE Europe it is known in ALB, BIH, BG (DD), GR, RO (VU), and SLO. It is a candidate for the new European bryophyte red-list. In the Prokletije Mts it was found on the vertical surface of shaded limestone rock at an elevation above 1,500 m a.s.l.

Sphagnum divinum Flatberg & Hassel – This species has recently been described by HASSEL *et al.* (2018) in a paper demonstrating that *S. magellanicum* Brid. is restricted to the South of America (Tierra del Fuego, Chile, Argentina), whereas in the Northern Hemisphere two similar species occur, *S. medium* Limpr. and the newly described *S. divinum*. They differ mainly in overall and branch leaf morphology, *S. medium* having rather blunt tapering divergent branches, and divergent branch leaves at the proximal end with large pores on the convex surface, whereas *S. divinum* is characterised by rather narrowly tapering, slender-cylindrical divergent branches, and divergent branch leaves at the proximal end with smaller pores on the convex surface, mostly filling out less than half of cell breadth. In these respects our plants correspond to the newly described species. The distribution of *S. divinum* is still imperfectly known, according to HASSEL *et al.* (2018) it occurs in Asia (Russia, Japan), North America (USA, Canada), and Europe (Norway, Sweden, Denmark, Estonia, Latvia, Germany, Georgia).

Syntrichia subpappilosissima (Bizot & R. B. Pierrot ex W. A. Kramer) M. T. Gallego & J. Guerra – This is an Atlantic, Mediterranean element according to DÜLL (1984). It is known only from Andorra, the Balearic Islands, France, Portugal, Spain, Austria, and Germany. In SE Europe it was reported from Crete (GR) by GALLEGO (2005). Later on, it has been reported from HR (PAPP *et al.*

2013), MK (PAPP *et al.* 2016) and BG (PAPP *et al.* 2018b). In the Prokletije Mts it was collected from soil among limestone rocks.

Tortella fasciculata (Culm.) Culm. – Due to the recent taxonomic treatment according to KÖCKINGER & HEDENÄS (2017) the taxon traditionally named *Tortella bambergeri* auct. consists of two species: *Tortella fasciculata* (Culm.) Culm. and *T. pseudofragilis* (Thér.) Köckinger & Hedenäs. *T. fasciculata* is a suboceanic-sub-Mediterranean floristical element in Europe. In SE Europe it has recently been reported from ALB (PAPP *et al.* 2018a) and HR (ALEGRO *et al.* 2019). It was collected from limestone rocks in three sites in the Prokletije Mts.

Tortella pseudofragilis (Thér.) Köckinger & Hedenäs – This is the other species derived from the recent taxonomic treatment of *Tortella bambergeri* auct. and it seems to be a boreal-montane element (KÖCKINGER & HEDENÄS 2017), currently known from Central Europe (frequent in the Austrian Alps) and Scandinavia. In SE Europe it has recently been reported from Albania (MARKA *et al.* 2018). In the Prokletije Mts it was found on exposed limestone rock at an elevation above 1,500 m a.s.l.

Conservation aspects

In the Prokletije Mts during our field survey several species of conservation interest were found. Five species (*Brachythecium geheebii*, *Buxbaumia viridis*, *Lophozia ascendens*, *Mannia triandra*, *Lescurea saviana*) are included in the Red data book of European bryophytes (ECCB 1995). *Buxbaumia viridis* and *Mannia triandra* are also listed in the EU Habitat Directive. Further 12 species (*Lophozia guttulata*, *L. wenzelii*, *Mannia fragrans*, *Solenostoma confertissimum* and *Brachytheciastrum collinum*, *B. dieckii*, *Entosthodon muehlenbergii*, *E. pulchellus*, *Neckera menziesii*, *Orthotrichum shawii*, *Pseudoleskeella rupestris*, *Seligeria trifaria*) are on the candidate list of the new Red data book of European bryophytes (HODGETTS 2015) and 19 species (*Cephalozia connivens*, *C. lunulifolia*, *Clevea hyalina*, *Diplophyllum taxifolium*, *Leiocolea heterocolpos*, *Lophoziopsis excisa*, *Obtusifolium obtusum*, *Schistochilopsis incisa*, *Solenostoma hyalinum*, *S. sphaerocarpum* and *Calliergon cordifolium*, *Kiaeria starkei*, *Palustriella decipiens*, *Plagiomnium ellipticum*, *Rhizomnium magnifolium*, *Schistidium dupretii*, *Sciuro-hypnum glaciale*, *Seligeria acutifolia* and *Straminergon stramineum*) and all *Sphagnum* species (*S. auriculatum*, *S. capillifolium*, *S. divinum*, *S. fallax*, *S. girgensohnii*, *S. palustre*, *S. platyphyllum*, *S. russowii*, *S. subsecundum*) can be regarded as rare in the Balkans.

CONCLUSIONS

The numerous new national records found, the rich bryophyte flora, and the occurrence of several species of conservation interest, rare in the Balkans or even in Europe, highlight the importance of the Prokletije Mts from the point of view of bryophyte conservation.

In the Prokletije Mts wetlands, bogs are the most important habitat types from the point of view of conservation, because these habitats are very threatened by climate warming in SE Europe. The bogs around Hridsko, Visitorsko jezero and at Zastan izvor towards Maja Jezercës peak, in spite of their small extension, still preserve several boreal (e.g. *Calliergon cordifolium*, *Plagiomnium ellipticum*, *Rhizomnium magnifolium*, *Straminergon stramineum*) and subarctic, subalpine species (*Palustriella decipiens*) rare in the Balkans. At Hridsko jezero 9 *Sphagnum* species were also found, which are rare in the Balkans and many of them are red-listed in various Balkan countries (e.g. in Serbia all *Sphagnum* species are vulnerable) (HODGETTS 2015). We also collected *Sphagnum auriculatum* at Hridsko jezero, which is vulnerable (VU) in Montenegro. Some rare liverworts like the arctic alpine *Solenostoma confertissimum*, the boreal, montane *S. sphaerocarpum*, and the temperate montane *S. hyalinum* appear also in these wetlands.

High mountain habitats maintain very diverse bryophyte flora rich in species which are rare in the Balkans. On siliceous rocks and on acidic soil several rare subarctic, subalpine (e.g. *Diplophyllum taxifolium*, *Kiaeria starkei*, *Sciurohypnum glaciale*) and boreal, montane species (e.g. *Lophozia excisa*, *Lophozia wenzelii*, *Obtusifolium obtusum*, *Schistochilopsis incisa*) can be found. In limestone grasslands also many rare subarctic, subalpine, and boreal species (e.g. *Clevea hyalina*, *Mesoptychia heterocolpos*, *Mannia triandra*) occur.

In spite of the high forestry activity that we detected in the Prokletije Mts, still many species of conservation interest and rare in the Balkans appear on rotting logs in beech forests like the boreal, montane *Buxbaumia viridis*, *Cephalozia lunulifolia*, and *Lophozia ascendens* or the sub-Atlantic, montane *Cephalozia conivens* and *Lophozia guttulata*.

* * *

Acknowledgements – We are indebted to the late Wiebke Schröder (Ludwigsstadt-Ebersdorf), the late Eva Maier (Geneva), Cecilia Sérgio (Lisboa), Halina Bednarek-Ochyra (Kraków), Michal Ignatov (Moscow), Nadya Konstantinova (Kirovsk) for their help in confirmation, identification, or revision of some problematic specimens. Many thanks to László Lőkös for the preparation of the map and to Branka Knežević for the English translation of the ‘site details’ part of the paper.

Összefoglaló: Az utóbbi 15 évben megélénkült montenegrói mohászati felméréseknek köszönhetően az ország mohafőráját egyre jobban megismerjük, de még mindig számos új faj kerül elő az ország területéről minden gyűjtött anyag feldolgozása során. Jelen cikkben a Montenegró délkeleti részén található Prokletije hegységbe tett 2006-os gyűjtőutunk eredményeit foglaljuk össze.

Összesen 282 mohataxont (64 májmohát és 218 lombosmohát) találtunk, amelyek közül 2 májmohát (*Mannia fragrans*, *Riccardia incurvata*) és 10 lombosmohát (*Brachytheciastrum collinum*, *B. dieckii*, *Bryum violaceum*, *Fissidens gracilifolius*, *Orthotrichum shawii*, *Seligeria trifaria*, *Sphagnum divinum*, *Syntrichia subpapillosissima*, *Tortella fasciculata*, *T. pseudofragilis*) először közlünk Montenegró területéről. 45 faj pedig ritka, veszélyeztetett a Balkánon vagy egész Európában és/vagy a készülő új Európai moha vörös lista potenciális tagja.

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(submitted: 28.04.2019, accepted: 18.05.2019)

Appendix. Complete list of bryophyte records.

The numerals following the species names refer to the collection sites described above.

Liverworts

- Aneura pinguis* (L.) Dumort. – 10: soil and decaying wood
- Barbilophozia barbata* (Schmidel ex Schreb.) Loeske – 1, 5: limestone rock; 3: limestone grassland; 11: soil at the house and limestone rock (conf. N. Konstantinova); 12: soil among limestone rocks
- Barbilophozia hatcheri* (A. Evans) Loeske – 8: soil, siliceous rock and decaying wood
- Barbilophozia lycopodioides* (Wallr.) Loeske – 10: limestone rock; 11: limestone rock; 12: soil among limestone rocks
- Blepharostoma trichophyllum* (L.) Dumort. – 8: decaying wood; 13: soil among limestone rocks and decaying wood
- Calypogeia suecica* (Arnell & J. Perss.) Müll. Frib. – 10: decaying wood
- Cephalozia bicuspidata* (L.) Dumort. – 6, 8, 13: decaying wood; 10: soil and decaying wood
- Cephalozia connivens* (Dicks.) Lindb. – 13: decaying wood
- Cephalozia lunulifolia* (Dumort.) Dumort. – 8: decaying wood
- Cephaloziella divaricata* (Sm.) Schiffn. – 3: limestone grassland; 8: soil; 10, 12: soil among limestone rocks; 14: decaying wood
- Chiloscyphus pallescens* (Ehrh. ex Hoffm.) Dumort. – 8, 10: wetland
- Clevea hyalina* (Sommerf.) Lindb. – 12, 14: soil among limestone rocks

- Cololejeunea calcarea* (Lib.) Schiffn. – 11, 14: limestone rock
Conocephalum salebrosum Szweyk., Buczk. & Odrzyk. – 1, 7, 14: limestone rock
Diplophyllum taxifolium (Wahlenb.) Dumort. – 8: soil
Frullania dilatata (L.) Dumort. – 2: *Salix* bark
Jungermannia atrovirens Dumort. – 6, 14: limestone rock
Lejeunea cavifolia (Ehrh.) Lindb. – 8: siliceous rock
Lioclaena lanceolata Nees (= *Jungermannia leiantha* Grolle) – 8, 10, 13: decaying wood
Lophocolea heterophylla (Schrader) Dumort. – 6, 10, 13, 14: decaying wood
Lophocolea minor Nees – 1, 5, 10: limestone rock; 13: soil among limestone rocks
Lophozia ascendens (Warnst.) R. M. Schust. – 13, 14: decaying wood
Lophozia guttulata (Lindb. & Arnell) A. Evans. – 8, 10, 13: decaying wood
Lophozia ventricosa (Dicks.) Dumort. – 8, 10: soil
Lophozia wenzelii (Nees) Steph. – 8, 10: soil
Lophozia excisa (Dicks.) Konstant. & Vilnet – 11, 13: soil at the house
Mannia fragrans (Balb.) Frye & L. Clark – 3: limestone grassland
Mannia triandra (Scop.) Grolle – 14: limestone rock
Marchantia polymorpha L. subsp. *montivagans* Bischl. & Boissel.-Dub. – 4: at the spring
Marchantia polymorpha L. subsp. *polymorpha* – 4: at the spring.
Marchantia polymorpha L. subsp. *ruderalis* Bischl. & Boissel.-Dub. – 8: wetland
Marsupella funkii (F. Weber & D. Mohr) Dumort. – 8: soil among siliceous rocks
Marsupella sphacelata (Giesecke ex Lindenb.) Dumort. – 8: wetland
Mesoptychia bantriensis (Hook.) L. Söderstr. & Váňa – 8: wetland (conf. N. Konstantinova)
Mesoptychia collaris (Nees) L. Söderstr. & Váňa – 6, 7, 10: limestone rock; 11: soil among limestone rocks; 12, 13, 14: soil among limestone rocks (conf. N. Konstantinova)
Mesoptychia heterocolpos (Thed. ex Hartm.) L. Söderstr. & Váňa – 11, 12, 13: soil among limestone rocks
Metzgeria furcata (L.) Corda – 1: bark of *Acer pseudoplatanus* and *Fagus*; 5, 11, 14: limestone rock; 6: decaying wood; 13: limestone rock and *Fagus* bark
Metzgeria pubescens (Schränk) Raddi – 5, 14: limestone rock
Nardia scalaris Gray – 8: soil
Nowellia curvifolia (Dicks.) Mitt. – 8, 14: decaying wood
Obtusifolium obtusum (Lindb.) S. W. Arnell – 8: at a rivulet; 10: soil
Pedinophyllum interruptum (Nees) Kaal. – 6, 7, 13, 14: limestone rock; 11: soil among limestone rocks

- Pellia endiviifolia* (Dicks.) Dumort. – 2: *Alnus* bark; 7: limestone rock; 8: wetland
- Pellia neesiana* (Gottsche) Limpr. – 8, 10: wetland
- Plagiochila asplenoides* (L.) Dumort. – 6: limestone rock
- Plagiochila porelloides* (Torr. ex Nees) Lindenb. – 1, 5, 6, 7, 10, 11, 13: limestone rock; 8: siliceous rock; 12: soil among limestone rocks
- Porella cordaeana* (Huebener) Moore – 1, 5, 11: limestone rock; 8: at a rivulet
- Porella platyphylla* (L.) Pfeiff. – 1, 9: *Fagus* bark; 6, 11: limestone rock
- Preissia quadrata* (Scop.) Nees – 6, 14: limestone rock; 11, 13: soil among limestone rocks
- Ptilidium pulcherrimum* (Weber) Vain. – 8, 10: decaying wood
- Radula complanata* (L.) Dumort. – 1: *Fagus* bark; 2: *Alnus* and *Salix* bark; 4: *Alnus* bark; 5: decaying wood; 6, 10, 11, 12, 13, 14: limestone rock; 8: siliceous rock
- Reboulia hemisphaerica* (L.) Raddi – 1, 5, 14: limestone rock; 3: limestone grassland; 11, 12, 13: soil among limestone rocks
- Riccardia incurvata* Lindb. – 8: wetland
- Riccia crozalsii* Levier – 6, 12: soil among limestone rocks; 11: soil at the house (all conf. C. Sérgio)
- Riccia sorocarpa* Bisch. – 3: limestone grassland; 11: soil at the house; 12: soil among limestone rocks (conf. C. Sérgio)
- Scapania aequiloba* (Schwägr.) Dumort. – 1, 6, 10, 11, 14: limestone rock
- Scapania aspera* M. Bernet & Bernet – 1, 5, 6, 7, 10, 11, 13, 14: limestone rock; 3: limestone grassland; 8: soil; 12: soil among limestone rocks
- Scapania calcicola* (Arnell & J. Perss.) Ingham – 1: limestone rock; 3: limestone grassland; 11: limestone rock
- Scapania irrigua* (Nees) Nees – 8, 10: wetland
- Scapania umbrosa* (Schrad.) Dumort. – 8, 10, 13: decaying wood
- Scapania undulata* (L.) Dumort. – 8, 10: wetland
- Schistochilopsis incisa* (Schrad.) Konstant. – 10: soil
- Solenostoma confertissimum* (Nees) Schljakov – 8: wetland and at a rivulet (conf. N. Konstantinova); 10: soil (conf. N. Konstantinova); 13: soil among limestone rocks
- Solenostoma hyalinum* (Lyell ex Hook.) Mitt. – 8: wetland (det. N. Konstantinova); 10: soil (det. N. Konstantinova)
- Solenostoma sphaerocarpum* (Hook.) Steph. – 13: limestone rock (det. N. Konstantinova)

Mosses

- Abietinella abietina* (Hedw.) M. Fleisch. – 1: soil; 3: limestone grassland; 5: limestone rock; 11: soil at the house
- Alleniella complanata* (Hedw.) S. Olsson, Enroth & D. Quandt – 3: limestone grassland and base of *Fagus* tree; 5: limestone rock
- Anomodon attenuatus* (Hedw.) Huebener – 5, 7: limestone rock
- Anomodon longifolius* (Schleich. ex Brid.) Hartm. – 1, 6: limestone rock
- Anomodon viticulosus* (Hedw.) Hook. & Taylor – 1, 5: limestone rock
- Aulacomnium palustre* (Hedw.) Schwägr. – 8: wetland
- Barbula convoluta* Hedw. – 1: soil; 3: limestone grassland; 5: limestone rock; 11: soil at the house; 12: soil among limestone rocks
- Barbula unguiculata* Hedw. – 11: soil at the house; 14: soil
- Bartramia halleriana* Hedw. – 5: limestone rock
- Brachytheciastrum collinum* (Schleich. ex Müll. Hal.) Ignatov & Huttunen – 8: at a rivulet (det. M. Ignatov)
- Brachytheciastrum dieckii* (Röll) Ignatov & Huttunen – 8: siliceous rock (conf. M. Ignatov)
- Brachytheciastrum velutinum* (Hedw.) Ignatov & Huttunen – 1, 13: decaying wood; 5, 10: limestone rock; 11: soil among limestone rocks; 14: limestone rock and decaying wood
- Brachythecium albicans* (Hedw.) Schimp. – 8: siliceous rock
- Brachythecium geheebii* Milde – 11: limestone rock (conf. M. Ignatov)
- Brachythecium glareosum* (Bruch ex Spruce) Schimp. – 1, 8: soil; 3: limestone grassland; 5: limestone rock; 10: soil and limestone rock; 11: soil at the house and limestone rock; 12: soil among limestone rocks
- Brachythecium mildeanum* (Schimp.) Schimp. – 2: wetland
- Brachythecium rivulare* Schimp. – 2: *Alnus* bark; 4, 13: at the spring; 6, 7: limestone rock; 8, 10: wetland
- Brachythecium rutabulum* (Hedw.) Schimp. – 1: soil and limestone rock; 3: limestone grassland and limestone rocks at waterfall; 10: soil and in wetland; 14: limestone rock and decaying wood
- Brachythecium salebrosum* (Hoffm. ex F. Weber & D. Mohr) Schimp. – 10: soil and limestone rock; 14: decaying wood
- Brachythecium tommasinii* (Sendtn. ex Boulay) Ignatov & Huttunen – 1, 5, 10, 13, 14: limestone rock
- Bryoerythrophyllum recurvirostrum* (Hedw.) P. C. Chen – 1, 6, 10, 11, 13: limestone rock; 12: soil among limestone rocks

- Bryum argenteum* Hedw. – 3: limestone grassland
Bryum elegans Nees – 1, 10, 11: limestone rock; 13: soil among limestone rocks
Bryum schleicheri DC. – 4: at the spring (conf. W. Schröder)
Bryum violaceum Crundw. & Nyholm – 11: soil among limestone rocks
Buxbaumia viridis (Moug. ex Lam. & DC.) Brid. ex Moug. & Nestl. – 10, 13, 14: decaying wood
Calliergon cordifolium (Hedw.) Kindb. – 8: wetland
Calliergonella cuspidata (Hedw.) Loeske – 2, 8, 10: wetland; 4: at the spring
Campyliadelphus chrysophyllus (Brid.) R. S. Chopra – 10: limestone rock; 12: soil among limestone rocks
Campylidium calcareum (Crundw. & Nyholm) Ochyra – 5: limestone rock
Campylium protensum (Brid.) Kindb. – 8: at a rivulet
Campylium stellatum (Hedw.) Lange & C. E. O. Jensen – 8: wetland; 12: wet soil; 13: soil among limestone rocks
Campylophyllum halleri (Hedw.) M. Fleisch. – 6, 11, 13, 14: limestone rock
Ceratodon purpureus (Hedw.) Brid. – 8: soil
Cinclidotus fontinaloides (Hedw.) P. Beauv. – 3: limestone rock at waterfall; 5: limestone rock at the bank of river; 7: limestone rock
Cirriphyllum crassinervium (Taylor) Loeske & M. Fleisch. – 14: limestone rock
Cirriphyllum piliferum (Hedw.) Grout – 1: soil and limestone rock
Climacium dendroides (Hedw.) F. Weber & D. Mohr – 5, 6: limestone rock
Cratoneuron filicinum (Hedw.) Spruce – 2: soil in wetland and *Alnus* bark; 3: limestone rocks at waterfall; 4: at the spring; 7: limestone rock; 8: wetland; 13: at a spring
Ctenidium molluscum (Hedw.) Mitt. – 1, 5, 6, 7, 10, 11, 12: limestone rock; 3: limestone grassland
Dichodontium pellucidum (Hedw.) Schimp. – 8: wetland; 11: soil among limestone rocks
Dicranella rufescens (Dicks.) Schimp. – 10: soil
Dicranella varia (Hedw.) Schimp. – 11, 14: soil among limestone rocks
Dicranum scoparium Hedw. – 1, 5: limestone rock; 8: soil and decaying wood; 10: soil
Dicranum tauricum Sapjegin – 8, 10: decaying wood
Didymodon fallax (Hedw.) R. H. Zander – 10, 14: limestone rock; 11, 13: soil among limestone rocks
Didymodon ferrugineus (Schimp. ex Besch.) M. O. Hill – 1, 5, 7: limestone rock
Didymodon insulanus (De Not.) M. O. Hill – 3: limestone grassland

- Didymodon rigidulus* Hedw. – 1, 4, 5, 10, 11, 13, 14: limestone rock; 12: soil among limestone rocks
- Didymodon spadiceus* (Mitt.) Limpr. – 6, 7: limestone rock
- Didymodon vinealis* (Brid.) R. H. Zander – 1: limestone rock
- Distichium capillaceum* (Hedw.) Bruch & Schimp. – 6, 10, 13: limestone rock; 11, 12: soil among limestone rocks
- Ditrichum flexicaule* (Schwägr.) Hampe – 1, 5, 6, 10: limestone rock; 3: limestone grassland; 11: soil at the house and limestone rock
- Ditrichum gracile* (Mitt.) Kuntze – 1, 6, 10, 11: limestone rock; 12: soil among limestone rocks
- Ditrichum heteromallum* (Hedw.) E. Britton – 8, 10: soil
- Drepanocladus aduncus* (Hedw.) Warnst. – 2: wetland
- Encalypta streptocarpa* Hedw. – 1, 10, 11, 13: limestone rock; 3: limestone grassland; 12: soil among limestone rocks
- Encalypta vulgaris* Hedw. – 3: limestone grassland
- Entodon concinnus* (De Not.) Paris – 14: soil
- Entosthodon muehlenbergii* (Turner) Fife – 3: limestone grassland
- Entosthodon pulchellus* (H. Philib.) Brugués – 11: soil among limestone rocks
- Eurhynchiastrium pulchellum* (Hedw.) Ignatov & Huttunen var. *diversifolium* (Schimp.) Ochya & Żarnowiec – 10, 11, 12: soil among limestone rocks
- Exsertotheca crispa* (Hedw.) S. Olsson, Enroth & D. Quandt – 1, 5, 7: limestone rock; 3: limestone grassland
- Fissidens bryoides* Hedw. – 5: limestone rock
- Fissidens dubius* P. Beauv. – 3: limestone grassland; 5, 6, 10, 11, 12, 13, 14: limestone rock
- Fissidens gracilifolius* Brugg.-Nann. & Nyholm – 11: limestone rock
- Fissidens taxifolius* Hedw. – 13: soil among limestone rocks
- Fissidens viridulus* (Sw. ex anon.) Wahlenb. – 11, 13: soil among limestone rocks
- Grimmia alpestris* (F. Weber & D. Mohr) Schleich. – 8: siliceous rock (conf./det. E. Maier)
- Grimmia muehlenbeckii* Schimp. – 8: siliceous rock; 10: stone of the ruins of a house at the lake (rev. E. Maier)
- Grimmia pulvinata* (Hedw.) Sm. – 3: limestone grassland; 4: artificial wall
- Grimmia ramondii* (Lam. & DC.) Margad. – 8: siliceous rock (conf. H. Bednarek-Ochya)
- Grimmia tergestina* Tomm. ex Bruch & Schimp. – 3: limestone grassland (conf. E. Maier); 5: limestone rock
- Gymnostomum aeruginosum* Sm. – 6, 14: limestone rock; 12: soil among limestone rocks

- Gymnostomum calcareum* Nees & Hornsch. – 11, 14: limestone rock
Herzogiella seligeri (Brid.) Z. Iwats. – 10, 13: decaying wood
Heterocladium dimorphum (Brid.) Schimp. – 8: siliceous rock
Homalothecium lutescens (Hedw.) H. Rob. – 1: soil; 3, 5: limestone grassland
Homalothecium philippeanum (Spruce) Schimp. – 6, 7: limestone rock
Homalothecium sericeum (Hedw.) Schimp. – 1, 12: limestone rock; 2: *Salix* bark; 3: limestone grassland
Hygrohypnum luridum (Hedw.) Jenn. – 6, 7, 14: limestone rock; 8: at a rivulet; 13: at a spring
Hylocomium splendens (Hedw.) Schimp. – 1, 8: soil; 6: limestone rock
Hymenoloma crispulum (Hedw.) Ochyra – 8: siliceous rock
Hymenostylium recurvirostrum (Hedw.) Dixon – 6: limestone rock
Hypnum cupressiforme Hedw. – 1: soil; 2: *Alnus* bark; 5: limestone rock
Hypnum cupressiforme Hedw. var. *lacunosum* Brid. – 1: soil
Hypnum vaucheri Lesq. – 3: limestone grassland; 14: limestone rock (det. M. Ignatov)
Isothecium alopecuroides (Lam. ex Dubois) Isov. – 5, 10: limestone rock; 8: siliceous rock; 12: soil among limestone rocks; 14: decaying wood
Kiaeria starkei (F. Weber & D. Mohr) I. Hagen – 8: siliceous rock
Lescuraea incurvata (Hedw.) E. Lawton – 1, 11: limestone rock
Lescuraea plicata (Schleich. ex F. Weber & D. Mohr) Broth. – 1, 10, 11, 13, 14: limestone rock
Lescuraea saviana (De Not.) E. Lawton – 1: limestone rock and *Fagus* bark; 5, 6, 10, 11, 12, 14: limestone rock; 8: siliceous rock
Leucodon sciuroides (Hedw.) Schwägr. – 1, 9, 11: *Fagus* bark; 2: *Alnus* and *Salix* bark; 5: limestone rock and bark of *Pinus nigra*
Mnium lycopodioides Schwägr. – 13: soil among limestone rocks
Mnium marginatum (Dicks.) P. Beauv. – 5: limestone rock; 14: decaying wood
Mnium spinulosum Bruch & Schimp. – 8: siliceous rock
Mnium stellare Hedw. – 1, 5: limestone rock; 14: decaying wood
Mnium thomsonii Schimp. – 6, 14: limestone rock; 11, 13: soil among limestone rocks
Myurella julacea (Schwägr.) Schimp. – 12: soil among limestone rocks; 13: limestone rock
Neckera menziesii Drumm. – 1, 11: limestone rock
Nyholmiella obtusifolia (Brid.) Holmen & Warncke – 2: *Salix* bark; 5, 9: *Fraxinus* bark
Orthothecium intricatum (Hartm.) Schimp. – 6, 11, 14: limestone rock
Orthothecium rufescens (Dicks. ex Brid.) Schimp. – 6, 14: limestone rock

- Orthotrichum affine* Schrad. ex Brid. – 1: bark of *Sambucus nigra*; 2: *Alnus* and *Salix* bark; 4: *Alnus* bark; 5: *Fraxinus* bark; 7: *Salix* bark; 9: *Fagus* bark
- Orthotrichum anomalum* Hedw. – 6: limestone rock
- Orthotrichum cupulatum* Hoffm. ex Brid. – 1, 10: limestone rock
- Orthotrichum cupulatum* Hoffm. ex Brid. var. *riparium* Huebener – 3: limestone rocks at waterfall
- Orthotrichum pallens* Bruch ex Brid. – 1: bark of *Acer pseudoplatanus*; 4: *Alnus* bark
- Orthotrichum pumilum* Sw. ex anon. – 9: *Fagus* bark
- Orthotrichum shawii* Wilson – 11: *Fagus* bark
- Orthotrichum speciosum* Nees – 1: bark of *Acer pseudoplatanus*; 5: *Fraxinus* bark and decaying wood
- Orthotrichum stramineum* Hornsch. ex Brid. – 1: bark of *Acer pseudoplatanus*; 2: *Salix* bark; 4: *Alnus* bark; 5: *Fraxinus* bark; 11: *Fagus* bark
- Orthotrichum striatum* Hedw. – 1: bark of *Acer pseudoplatanus*; 2: *Alnus* bark; 5: *Fraxinus* bark
- Oxyrrhynchium hians* (Hedw.) Loeske – 1, 5, 6, 11, 14: limestone rock; 13: soil among limestone rocks
- Oxyrrhynchium speciosum* (Brid.) Warnst. – 2: *Alnus* bark
- Oxystegus tenuirostris* (Hook. & Taylor) A. J. E. Sm. – 8: siliceous rock
- Palustriella commutata* (Hedw.) Ochyra – 4: at the spring; 8: wetland
- Palustriella decipiens* (De Not.) Ochyra – 8: wetland
- Palustriella falcata* (Brid.) Hedenäs – 4: at the spring; 8: wetland
- Philonotis fontana* (Hedw.) Brid. – 8: wetland
- Philonotis seriata* Mitt. – 4: at the spring; 8: wetland
- Plagiomnium affine* (Blandow ex Funck) T. J. Kop. – 8: siliceous rock
- Plagiomnium elatum* (Bruch & Schimp.) T. J. Kop. – 2: soil in wetland and *Alnus* bark; 8, 10: wetland
- Plagiomnium ellipticum* (Brid.) T. J. Kop. – 13: at a spring
- Plagiomnium rostratum* (Schrad.) T. J. Kop. – 1, 5, 6, 7: limestone rock
- Plagiomnium undulatum* (Hedw.) T. J. Kop. – 5, 7: limestone rock
- Plagiopus oederianus* (Sw.) H. A. Crum & L. E. Anderson – 3: limestone grassland; 5, 12, 14: limestone rock
- Plagiothecium curvifolium* Schlieph. ex Limpr. – 8: siliceous rock and decaying wood
- Plagiothecium nemorale* (Mitt.) A. Jaeger – 10: soil
- Plagiothecium undulatum* (Hedw.) Schimp. – 8: soil
- Plasteurhynchium striatulum* (Spruce) M. Fleisch. – 14: limestone rock

- Platydictya jungermannioides* (Brid.) H. A. Crum – 1, 13, 14: limestone rock; 11: soil among limestone rocks
- Pleurozium schreberi* (Willd. ex Brid.) Mitt. – 8: soil
- Pogonatum aloides* (Hedw.) P. Beauv. – 8: soil
- Pogonatum urnigerum* (Hedw.) P. Beauv. – 8: soil
- Pohlia andalusica* (Höhn.) Broth. – 8: soil
- Pohlia cruda* (Hedw.) Lindb. – 10: limestone rock; 11, 13: soil among limestone rocks
- Pohlia melanodon* (Brid.) A. J. Shaw – 10: soil
- Pohlia nutans* (Hedw.) Lindb. – 8: soil and decaying wood
- Pohlia wahlenbergii* (F. Weber & D. Mohr) A. L. Andrews – 1: soil; 5, 14: limestone rock; 11: soil among limestone rocks
- Polytrichastrum alpinum* (Hedw.) G. L. Sm. – 10: soil
- Polytrichum commune* Hedw. – 8: wetland
- Polytrichum formosum* Hedw. – 8, 10: soil; 12, 13: soil among limestone rocks
- Polytrichum juniperinum* Hedw. – 3: limestone grassland; 8, 10: soil; 12: soil among limestone rocks
- Polytrichum piliferum* Hedw. – 8: siliceous rock
- Pseudoamblystegium subtile* (Hedw.) Vanderp. & Hedenäs – 1: bark of *Sambucus nigra* and *Fagus* bark; 5: decaying wood
- Pseudoleskeella catenulata* (Brid. ex Schrad.) Kindb. – 1, 10, 11, 13: limestone rock; 3: limestone grassland
- Pseudoleskeella nervosa* (Brid.) Nyholm – 2: *Alnus* bark; 5: decaying wood; 9: *Fagus* bark; 11: limestone rock
- Pseudoleskeella rupestris* (Berggr.) Hedenäs & L. Söderstr. – 5: limestone rock
- Pseudotaxiphyllum elegans* (Brid.) Z. Iwats. – 8: siliceous rock
- Pterigynandrum filiforme* Hedw. – 1: bark of *Acer pseudoplatanus* and *Fagus*; 2: *Alnus* and *Salix* bark; 5, 10: limestone rock; 8: siliceous rock; 11: *Fagus* bark
- Ptychostomum boreale* (F. Weber & D. Mohr) Ochyra & Bednarek-Ochyra (*Bryum pallescens*) – 4: at the spring
- Ptychostomum capillare* (Hedw.) Holyoak & N. Pedersen – 1: limestone rock
- Ptychostomum imbricatum* (Müll. Hal.) Holyoak & N. Pedersen (*Bryum caespitium*) – 8: soil
- Ptychostomum moravicum* (Podp.) Ros & Mazimpaka – 1: limestone rock, bark of *Sambucus nigra* and *Fagus*; 4: *Alnus* bark; 14: decaying wood
- Ptychostomum pallens* (Sw.) J. R. Spence – 6: limestone rock; 8: at a rivulet
- Ptychostomum pseudotriquetrum* (Hedw.) J. R. Spence & H. P. Ramsay – 2: *Alnus* bark; 4: at the spring; 6: limestone rock; 8, 10: wetland; 12: wet soil

- Ptychostomum zieri* (Hedw.) Holyoak & N. Pedersen – 6, 14: limestone rock; 11: soil among limestone rocks
- Pylaisia polyantha* (Hedw.) Schimp. – 2: *Salix* bark
- Racomitrium aciculare* (Hedw.) Brid. – 8: at a rivulet
- Racomitrium canescens* (Hedw.) Brid. – 3: limestone grassland; 11: soil at the house
- Racomitrium elongatum* Ehrh. ex Frisvoll – 1: soil; 5: limestone rock; 8: siliceous rock (conf./det. H. Bednarek-Ochyra)
- Rhizomnium magnifolium* (Horik.) T. J. Kop. – 8: wetland
- Rhizomnium punctatum* (Hedw.) T. J. Kop. – 8: wetland; 13, 14: decaying wood
- Rhodobryum roseum* (Hedw.) Limpr. – 10: soil
- Rhynchostegium murale* (Hedw.) Schimp. – 5, 10, 13, 14: limestone rock
- Rhynchostegium riparioides* (Hedw.) Cardot – 3: limestone rocks at waterfall; 7: limestone rock
- Rhytidiadelphus loreus* (Hedw.) Warnst. – 8: siliceous rock
- Rhytidiadelphus triquetrus* (Hedw.) Warnst. – 1, 10: soil; 5: limestone rock; 11: soil among limestone rocks
- Rhytidium rugosum* (Hedw.) Kindb. – 3: limestone grassland; 11: soil at the house
- Saelania glaucescens* (Hedw.) Broth. – 13: soil among limestone rocks
- Sanionia uncinata* (Hedw.) Loeske – 1: limestone rock; 6: limestone rock and decaying wood; 8: siliceous rock; 10: soil
- Sarmentypnum exannulatum* (Schimp.) Hedenäs – 8, 10: wetland
- Schistidium atrofusum* (Schimp.) Limpr. – 11: limestone rock
- Schistidium brunnescens* Limpr. subsp. *brunnescens* – 11: limestone rock (conf. W. Schröder); 12: limestone rock
- Schistidium brunnescens* Limpr. subsp. *griseum* (Nees & Hornsch.) H. H. Blom – 10, 12: limestone rock
- Schistidium crassipilum* H. H. Blom – 1, 6, 10, 11: limestone rock
- Schistidium dupretii* (Thér.) W. A. Weber – 13: limestone rock
- Sciuro-hypnum glaciale* (Schimp.) Ignatov & Huttunen – 8: siliceous rock (conf. M. Ignatov)
- Sciuro-hypnum populeum* (Hedw.) Ignatov & Huttunen – 1: *Fagus* bark; 10: limestone rock
- Sciuro-hypnum reflexum* (Starke) Ignatov & Huttunen – 8: decaying wood
- Seligeria acutifolia* Lindb. – 1, 11, 13, 14: limestone rock
- Seligeria trifaria* (Brid.) Lindb. – 13: limestone rock
- Serpoleskea confervoides* (Brid.) Schimp. – 11: limestone rock

- Sphagnum auriculatum* Schimp. – 8: wetland
Sphagnum capillifolium (Ehrh.) Hedw. – 8: wetland
Sphagnum fallax (H. Klinggr.) H. Klinggr. – 8: wetland
Sphagnum girgensohnii Russow – 8: wetland
Sphagnum divinum Flatberg & Hassel – 8: wetland
Sphagnum palustre L. – 8, 10: wetland
Sphagnum platyphyllum (Lindb. ex Braithw.) Warnst. – 8: wetland
Sphagnum russowii Warnst. – 8: wetland
Sphagnum subsecundum Nees – 8: wetland
Straminergon stramineum (Dicks. ex Brid.) Hedenäs – 8, 10: wetland
Syntrichia montana Nees – 3: limestone grassland; 5: limestone rock
Syntrichia norvegica F. Weber – 8: siliceous rock; 11: limestone rock
Syntrichia ruralis (Hedw.) F. Weber & D. Mohr – 1: soil and limestone rock; 2: *Salix* bark; 3: limestone grassland; 5: limestone rock, bark of *Pinus nigra* and decaying wood; 9: *Fagus* bark; 11: soil at the house and *Fagus* bark
Syntrichia subpapillosissima (Bizot & R. B. Pierrot ex W. A. Kramer) M. T. Gallego & J. Guerra – 12: soil among limestone rocks
Syntrichia virescens (De Not.) Ochya – 2: *Salix* bark; 11: *Fagus* bark
Taxiphyllum wissgrillii (Garov.) Wijk & Margad. – 6: limestone rock
Tetraphis pellucida Hedw. – 8: decaying wood
Thamnobryum alopecurum (Hedw.) Gangulee – 7: limestone rock
Thuidium assimile (Mitt.) A. Jaeger – 6, 7: limestone rock; 11: soil among limestone rocks; 14: soil
Thuidium recognitum (Hedw.) Lindb. – 5: limestone rock
Timmia austriaca Hedw. – 6, 11: limestone rock
Timmia bavarica Hessel. – 11, 12: limestone rock
Tortella fasciculata (Culm.) Culm. – 5, 12, 14: limestone rock
Tortella inclinata (R. Hedw.) Limpr. – 1: limestone rock; 3: limestone grassland; 11: soil at the house
Tortella pseudofragilis (Thér.) Köckinger & Hedenäs – 13: soil among limestone rocks
Tortella squarrosa (Brid.) Limpr. – 3: limestone grassland
Tortella tortuosa (Hedw.) Limpr. – 1, 5, 6, 7, 10, 13, 14: limestone rock; 3: limestone grassland; 8: siliceous rock; 11: soil at the house and limestone rock; 12: soil among limestone rocks
Tortula muralis Hedw. – 3: limestone rock at waterfall and limestone grassland; 4: artificial wall
Tortula subulata Hedw. – 3: limestone grassland; 11, 12: soil among limestone rocks

Trichodon cylindricus (Hedw.) Schimp. – 11: soil at the house

Trichostomum brachydontium Bruch – 6: limestone rock

Trichostomum crispulum Bruch – 5, 6, 10, 11, 14: limestone rock; 12: soil among limestone rocks

Weissia brachycarpa (Nees & Hornsch.) Jur. – 13: soil among limestone rocks

Weissia condensa (Voit) Lindb. – 12: soil among limestone rocks