

## CONTRIBUTION TO THE BRYOPHYTE FLORA OF BJELASICA MTS (MONTENEGRO)<sup>1</sup>

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**Abstract.** During field trips made in 2007 and 2008 to the Bjelasica Mts, 318 bryophyte taxa (84 liverworts and 234 mosses) were collected. Twenty three taxa are reported here for the first time for Montenegro. Eight of the species recorded are red-listed in Europe.

**Key words:** liverworts, mosses, new national records, red listed species

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### INTRODUCTION

Exploration of the bryophyte flora of Montenegro is far from complete, although intensive fieldwork there in the last decade has yielded records of many new species. Knowledge about the bryophytes of Montenegro was first summarized in a checklist (Dragićević & Veljić 2006), then 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) gave 106 species from Montenegro. Later on some other works reported 32 more liverworts from the country (Erzberger & Papp 2007; Erzberger *et al.* 2008; Papp & Erzberger 2007a, 2008). The most recent moss checklist (Ros *et al.* 2013) gives 527 mosses recorded in Montenegro.

Two additional moss species were reported by Papp & Erzberger (2011).

Here we publish the results of collecting trips in the Bjelasica Mts organized in 2007 and 2008 by the Hungarian Natural History Museum and the Natural History Museum of Montenegro. Erzberger *et al.* (2008) reported some taxa new to the bryophyte flora of Montenegro based on the 2007 fieldwork. The present paper contains the complete floristic results of both field trips and reports additional taxa new for the bryophyte flora of the country.

### MATERIAL AND METHODS

#### STUDY AREA

The Bjelasica Mts (Fig. 1) form a high mountain range in the northern part of Montenegro, with several peaks reaching *ca* 2000 m a.s.l., such as Crna glava (2137), Zekova glava (2116), Troglav (2075), Jarčeve strane (2032) and Ogorela glava (1986). They are clearly separated from the neighboring Montenegrin mountains by deep and wide river valleys: from the Prokletije Mts in the east and southeast by the river Lim and from the Sinjavina and Morača Mts in the west by the river Tara.

<sup>1</sup> We are delighted to publish this paper in a volume honoring Tamás Pócs on his 80<sup>th</sup> birthday. Our field trips with him in the Balkans are often recalled. Beáta Papp's first-ever collecting trip, with Tamás Pócs and his colleagues to Serbia in 1998, began our series floristic investigations in the territory of former Yugoslavia, which have produced a huge amount of data and new regional reports on several species, making important contributions to European bryophyte checklisting and red-listing projects which continue today.

The relief of Bjelasica is diverse. There are many springs, streams, and seven glacial lakes situated between 1000 and 2000 m a.s.l. The area's geology is also very diverse. Volcanic and siliceous rocks are characteristic, but limestone, sandstone and slate can also be found (Lakušić 1966).

The climate of Bjelasica Mts is influenced by the Mediterranean, especially on the southern slopes; it is more continental in the northern parts, and montane climate prevails at higher altitudes. In the town of Kolašin lying at 1300 m a.s.l. the average annual temperature is 7.3°C, the coldest month is January at -1.9°C, and the warmest month is July at 16°C. The annual average of sunny hours is 1830. Annual mean precipitation is 2016 mm. The most humid month is December, while July is the driest (Radović & Medenica 2006).

Biogradska gora National Park, situated in the central part of this massif, preserves a very impressive virgin forest with more than 86 tree species. It has many endemic plants and 11 habitats of Appendix I of the Bern Convention, for which it was designated an Important Plant Area (IPA) and an Emerald site (Kasom & Hadžiablahović 2008).

#### SITE DETAILS

1. Bjelasica Mts, at Svinjača stream at Jezerine at Kolašin town, 1360 m, 42°49'49,5"N, 19°37'06,7"E, 18 June 2007.

2. Bjelasica Mts, Katun Rupe at Kolašin town, 1660 m, 42°49'09,9"N, 19°36'59,7"E, 19 June 2007.

3. Bjelasica Mts, Bikovača between Ključ and Kapela at Kolašin town, 1880 m, 42°48'42,1"N, 19°36'57,8"E, 19 June 2007.

4. Bjelasica Mts, above Kolašin town, 1360 m, 42°49'13,7"N, 19°34'20,6"E, 19 June 2007.

5. Bjelasica Mts, along a small side branch at Svinjača stream at Kolašin town, 1355 m, 42°50'18,2"N, 19°34'13,1"E, 20 June 2007.

6. Bjelasica Mts, Svinjača stream at Kolašin town, 1355 m, 42°50'18,2"N, 19°34'13,1"E, 20 June 2007.

7. Bjelasica Mts, between Troglava and Zekova glava peaks at Kolašin town, 2022 m, 42°51'05,7"N, 19°40'08,8"E, 20 June 2007.

8. Bjelasica Mts, Zekova glava peak at Kolašin town, 2080 m, 42°51'04,2"N, 19°40'54,6"E, 20 June 2007.

9. Bjelasica Mts, Biogradsko jezero lake at Mojkovac town, 1100 m, 42°54'02,6"N, 19°35'45,6"E, 23 June 2008.

10. Bjelasica Mts, Biogradsko jezero lake at Mojkovac town, *Alnetum* at inflow of Biogradska reka

stream, 1120 m, 42°53'44,3"N, 19°36'14,7"E, 23 June 2008.

11. Bjelasica Mts, Jaževi at Kolašin town, western source of Biogradska reka stream, 1870 m, 42°51'03,9"N, 19°39'37,9"E, 25 June 2008.

12. Bjelasica Mts, source area of Biogradska reka stream (Izvor Biogradske reke) at Kolašin town, 1880 m, 42°51'20,9"N, 19°40'29,8"E, 25 June 2008.

13. Bjelasica Mts, towards Crna glava peak at Kolašin town, 1920 m, 42°52'22,8"N, 19°40'42,9"E, 26 June 2008.

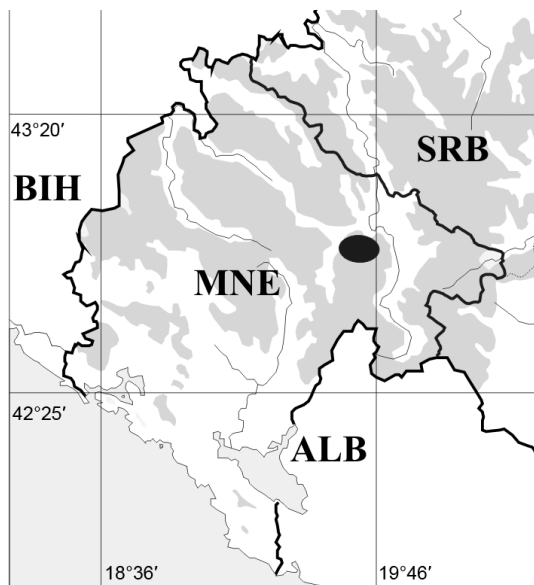
14. Bjelasica Mts, Crna glava peak at Kolašin town, 2070–2140 m, 42°52'03,2"N, 19°41'24,2"E and 42°51'59,6"N, 19°41'53,1"E, 26 June 2008.

15. Bjelasica Mts, between Crna glava peak and Ursulovac lake at Kolašin town, 2060 m, 42°52'03,2"N, 19°41'24,2"E, 26 June 2008.

16. Bjelasica Mts, around Ursulovac lake at Kolašin town, 2040–1920 m, 42°52'18,3"N, 19°41'43,8"E and 42°52'21,0"N, 19°41'39,7"E, 26 June 2008.

17. Bjelasica Mts, between Ursulovac and Mali Ursulovac lakes, 1900 m, 42°52'26,4"N, 19°41'32,9"E, 26 June 2008.

18. Bjelasica Mts, above Mali Ursulovac lake, 1830 m, 42°52'27,6"N, 19°41'16,6"E, 26 June 2008.



**Fig. 1.** Location of the investigated area. (BIH – Bosnia-Herzegovina, MNE – Montenegro, SRB – Serbia, ALB – Albania).

## METHODS

The collecting trips were undertaken in July 2007 and in July 2008. The investigated area is shown in Figure 1. All the main habitat types, such as stream valleys, springs, wet meadows, forests and alpine grasslands were investigated, and bryophytes were collected from different substrates (soil, exposed and shaded rocks, tree bark, decaying wood). Floristic results are considered new to Montenegro if there are no corresponding records in the bryophyte checklist of Montenegro (Dragičević & Veljić 2006), the liverwort checklists of Southeastern Europe and the Mediterranean (Sabovljević & Natcheva 2006; Ros *et al.* 2007), the moss checklist of Southeastern Europe (Sabovljević *et al.* 2008) and some other works containing additional data for Montenegro (Erzberger & Papp 2007; Erzberger *et al.* 2008; Papp & Erzberger 2007a, 2008).

The specimens were shared between the participating parties and are preserved in the Herbarium of the Hungarian Natural History Museum, Budapest (BP), and in the Herbarium of the Botanical Museum Berlin-Dahlem (B).

Nomenclature follows Grolle and Long (2000) for liverworts and Hill *et al.* (2006) for mosses, with the exception of *Grimmia sessitana*, which follows Maier (2002).

The distribution of new and interesting species in SE European countries is given according to the checklists of SE Europe (Sabovljević & Natcheva 2006; Sabovljević *et al.* 2008) and the Mediterranean (Ros *et al.* 2007) unless otherwise cited.

For evaluation of the nature conservation status of species we used the following literature sources: the *European Red Data Book of Bryophytes* (Anonymous 1995), the bryophyte red list for Serbia and Montenegro (Sabovljević *et al.* 2004), the red list of bryophytes in Bulgaria (Natcheva *et al.* 2006), and the checklist and red list of the bryophytes of Romania (Ștefănuț & Goia 2012). Comments on nature conservation status are given for species red-listed in Montenegro or in at least two other SE European countries. The various red lists differ slightly with respect to threat categories, conservation status and symbols. For the *European Red Data Book of Bryophytes* (Anonymous 1995) the symbols are as follows: Ex – Extinct, Ev – Vanished, E – Endangered, V – Vulnerable, R – Rare, K – Insufficiently known, T – Taxonomically ill-defined taxa, RT – Regionally threatened species, and NT – Not threatened. The bryophyte red list for Serbia and Montenegro (Sabovljević *et al.* 2004) uses the following: EX – Extinct, CR – Critically endangered, EN – Endangered, VU – Vulnerable, LR –

Lower risk or near threatened, and DD – Data deficient. The red lists of the bryophytes of Bulgaria (Natcheva *et al.* 2006) and Romania (Ștefănuț & Goia 2012) use these symbols: CR – Critically endangered, EN – Endangered, VU – Vulnerable, NT – Near threatened, DD – Insufficiently known, and NE – Not evaluated.

## RESULTS

During our fieldwork we collected 318 bryophyte taxa (84 liverworts and 234 mosses), 23 of which are first records for the Montenegro (asterisked). The numerals following the species names refer to the collection sites described above.

**Hepaticae**

\**Anastrophyllum minutum* (Schreb.)

R. M. Schust.

COLLECTING SITES: 7, 11 – siliceous rock.

NOTES. Boreal, montane species (Düll 1983). In SE Europe known only from Bulgaria, Croatia, Romania, Serbia, Slovenia. Threat status: LR in Serbia.

*Anthelia juratzkana* (Limpr.) Trevis.

COLLECTING SITES: 8, 13 – soil among siliceous rock outcrops.

NOTES. Reported as new for the Montenegrin bryophyte flora based on part of this collection (site 8: Erzberger *et al.* 2008). In SE Europe known only from Bulgaria, Croatia, Former Yugoslav Republic of Macedonia, Romania, Slovenia. Threat status: VU in Bulgaria.

*Apometzgeria pubescens* (Schrank) Kuwah.

COLLECTING SITES: 5 – limestone rock and bark of *Fagus*; 9 – limestone rock.

*Athalamia hyalina* (Sommerf.) S. Hatt.

COLLECTING SITES: 8 – limestone rock; 11 – schistose rock; 14 – soil among limestone rocks.

NOTES. From Montenegro there are two old records from the Orjen Mts collected in the beginning of the last century (Schiffner 1916a, b;

Dragičević & Veljić 2006). Threat status: CR in Montenegro, VU in Bulgaria.

***Barbilophozia barbata*** (Schreb.) Loeske

COLLECTING SITE: 9 – limestone rock.

NOTES. Reported recently for the first time in Montenegro (Erzberger & Papp 2007); known from several localities from the Durmitor Mts and Lovćen Mts (Papp & Erzberger 2007a, 2010).

***Barbilophozia hatcheri*** (A. Evans) Loeske

COLLECTING SITES: 1 – soil; 2, 7, 8 – siliceous rock; 11 – schistose rock.

NOTES. Red-listed (LR) in Montenegro and Serbia, although apparently not rare in these countries as evidenced by several collections (Papp & Erzberger 2007b, 2009; Papp *et al.* 2008, 2010, 2012).

***Barbilophozia lycopodioides*** (Wallr.) Loeske

COLLECTING SITES: 2, 7 – soil among siliceous rock outcrops; 11 – schistose rock; 14 – soil among limestone rocks.

***Blepharostoma trichophyllum*** (L.) Dumort.

COLLECTING SITES: 1, 9 – decaying wood; 8 – soil among siliceous rock outcrops.

***Calypogeia azurea*** Stotler et Crotz

COLLECTING SITES: 9 – soil; 12 – wet meadow.

NOTES. According to Dragičević and Veljić (2006) known only from a very old record (Beck & Szyszłowicz 1888).

\****Calypogeia muelleriana*** (Schiffn.) Müll. Frib.

COLLECTING SITES: 11 – schistose rock at rivulet; 12 – wet meadow.

NOTES. Subboreal montane species (Düll 1983). In SE Europe known only from Bulgaria, Romania, Serbia, Slovenia and the European part of Turkey. Recently reported from Albania (Marka & Sabovljević 2011), Former Yugoslav Republic of Macedonia (Papp & Erzberger 2012) and

Croatia (Papp *et al.* 2013). Threat status: CR in Serbia.

***Calypogeia suecica*** (Arnell & J. Perss.) Müll. Frib.

COLLECTING SITE: 1 – decaying wood.

NOTES. Reported as a new species for the Montenegrin bryophyte flora based on this collection (Erzberger *et al.* 2008); another record is from the Durmitor Mts (Papp & Erzberger 2010). Threat status: EN in Serbia, VU in Bulgaria.

***Cephalozia bicuspidata*** (L.) Dumort.

COLLECTING SITES: 1 – decaying wood; 12 – peat in spring mire; 16, 18 – soil.

***Cephalozia catenulata*** (Huebener) Lindb.

COLLECTING SITE: 9 – decaying wood.

NOTES. Recently reported for the first time in Montenegro from the Durmitor Mts (Papp & Erzberger 2010). This is the second record for the country. Threat status: VU in Serbia, EN in Bulgaria.

***Cephalozia connivens*** (Dicks.) Lindb.

COLLECTING SITE: 1 – decaying wood.

***Cephaloziella divaricata*** (Sm.) Schiffn.

COLLECTING SITES: 2 – siliceous rock; 3 – limestone rock.

NOTES. Reported recently for the first time in Montenegro (Erzberger & Papp 2007); known up to now from the Durmitor Mts, Rumija Mts and Kotor bay (Papp & Erzberger 2007a, 2010).

\****Cephaloziella rubella*** (Nees) Warnst.

COLLECTING SITE: 12 – soil.

NOTES. Northern subAtlantic species (Düll 1983). Recently reported from Albania (Marka & Sabovljević 2011) and Greece (Papp *et al.* 2011). Known from almost all SE European countries except Bosnia-Herzegovina, FYR Macedonia

and Montenegro. Threat status: VU in Serbia, EN in Bulgaria.

*Chiloscyphus pallescens* (Ehrh. ex Hoffm.) Dumort.

COLLECTING SITES: 1, 11, 16 – soil near spring.

*Chiloscyphus polyanthus* (L.) Corda

COLLECTING SITES: 1 – soil near stream; 2 – at spring; 12 – peat in spring mire.

*Cololejeunea calcarea* (Lib.) Schiffn.

COLLECTING SITE: 5 – limestone rock.

*Conocephalum salebrosum* Szweykowski, Buczkowska & Odrzykoski

COLLECTING SITES: 1, 10 – soil at stream.

NOTES. Reported recently for the first time in Montenegro from the Durmitor Mts (Papp & Erzberger 2010) where it was collected at two sites.

\**Diplophyllum albicans* (L.) Dumort.

COLLECTING SITE: 11 – in dry rock crevice.

NOTES. Northern sub-Atlantic species (Düll 1983). Known from almost all SE European countries except Albania, Montenegro and the European part of Turkey.

*Diplophyllum taxifolium* (Wahlenb.) Dumort.

COLLECTING SITE: 7 – siliceous rock (det. J. Váňa).

NOTES. Reported as a new species for the Montenegrin bryophyte flora based on this collection (Erzberger *et al.* 2008). In SE Europe known only from Bulgaria, Romania and Slovenia.

*Frullania dilatata* (L.) Dumort.

COLLECTING SITES: 1 – bark of *Abies*; 2, 5 – bark of *Fagus*; 9 – limestone rock and bark of *Fagus*; 10 – bark of *Alnus*.

*Frullania tamarisci* (L.) Dumort.

COLLECTING SITES: 9 – bark of *Fagus*; 10 – bark of *Alnus*; 11 – limestone rock.

*Gymnomitrium concinnatum* (Lightf.) Corda

COLLECTING SITES: 7, 8 – siliceous rock; 11 – schistose rock.

NOTES. Reported as a new species for the Montenegrin bryophyte flora based on part of this collection (site 8: Erzberger *et al.* 2008). In SE Europe known only from Bulgaria, Romania and Slovenia.

*Harpanthus scutatus* (F. Weber & D. Mohr) Spruce

COLLECTING SITE: 10 – decaying wood.

NOTES. According to Dragičević and Veljić (2006) there was only a very old doubtful record from Montenegro in Beck and Szyszylowicz (1888). In SE Europe known only from Bulgaria, Bosnia-Herzegovina, Croatia, Romania, Slovenia and the European part of Turkey. Threat status: DD in Bulgaria.

*Jamesoniella autumnalis* (DC.) Steph.

COLLECTING SITE: 11 – schistose rock (conf. S. Stefanuț).

NOTES. According to Dragičević and Veljić (2006) there was only a very old doubtful record from Montenegro (Beck & Szyszylowicz 1888).

*Jungermannia confertissima* Nees

COLLECTING SITE: 16 – soil (conf. S. Stefanuț).

NOTES. Recently reported for the first time in Montenegro from the Durmitor Mts (Papp & Erzberger 2010) where it was found at two sites. This is the third record for the country. In SE Europe known only from Bulgaria, Romania and Slovenia. Threat status: VU in Bulgaria.

*Jungermannia gracillima* Sm.

COLLECTING SITE: 14 – soil (conf. S. Stefanuț).

NOTES. Reported recently for the first time in Montenegro from the Durmitor Mts (Erzberger & Papp 2007). This is the second record for the country.

**\**Jungermannia hyalina*** Lyell

COLLECTING SITE: 16 – soil (conf. S. Stefanuț and J. Váňa).

NOTES. This species of mountain areas of the temperate zone of Europe (Düll 1983) is known from almost all SE European countries except Montenegro and FYR Macedonia, but has recently been reported from FYR Macedonia also (Papp & Erzberger 2012).

***Jungermannia sphaerocarpa*** Hook.

COLLECTING SITES: 13 – soil near late snow bed; 18 – peat in spring mire (det. J. Váňa).

***Leiocolea bantriensis*** (Hook.) Jörg.

COLLECTING SITE: 16 – soil.

NOTES. Threat status: VU in Serbia.

***Leiocolea collaris*** (Nees) Schljakov

COLLECTING SITES: 2, 8 – limestone rock.

NOTES. Red-listed (VU) in Montenegro, although apparently not rare there as evidenced by several records (Papp & Erzberger 2007a, 2010, Papp *et al.* 2008).

***Leiocolea heterocolpos*** (Hartm.) H. Buch

COLLECTING SITES: 11, 14 – soil among limestone rocks; 16 – soil.

NOTES. In the Durmitor Mts found in several localities (Papp & Erzberger 2010). Threat status: VU in Montenegro.

***Lejeunea cavifolia*** (Ehrh.) Lindb.

COLLECTING SITES: 2 –siliceous rock; 10 – bark of *Alnus*.

***Lepidozia reptans*** (L.) Dumort.

COLLECTING SITES: 1, 9 – decaying wood.

***Lophocolea heterophylla*** (Schrad.) Dumort.

COLLECTING SITES: 1, 9 – decaying wood; 14 – soil.

***Lophocolea minor*** Nees

COLLECTING SITE: 16 – soil at lake shore.

***Lophozia ascendens*** (Warnst.) R. M. Schust.

COLLECTING SITE: 1 – decaying wood.

NOTES. Reported as a new species for the Montenegrin bryophyte flora based on this collection (Erzberger *et al.* 2008); also known from the Durmitor Mts (Papp & Erzberger 2010). Threat status: R in the *Red Data Book of European Bryophytes*, VU in Bulgaria, Serbia and Romania.

***Lophozia excisa*** (Dicks.) Dumort.

COLLECTING SITE: 3 – soil among limestone rocks.

***Lophozia incisa*** (Schrad.) Dumort.

COLLECTING SITES: 1 – decaying wood; 8 – siliceous rock; 15 – acidic soil.

NOTES. Reported recently for the first time in Montenegro from the Durmitor Mts (Erzberger & Papp 2007) where it is known from several localities (Papp & Erzberger 2010).

***Lophozia longidens*** (Lindb.) Macoun

COLLECTING SITE: 11 – schistose rock (det. J. Váňa).

NOTES. Reported recently for the first time in Montenegro from the Durmitor Mts (Papp & Erzberger 2010) where it is known from two localities.

***Lophozia longiflora*** (Nees) Schiffn.

COLLECTING SITE: 1 – decaying wood (conf. S. Stefanuț).

***Lophozia obtusa*** (Lindb.) A. Evans

COLLECTING SITE: 1 – soil (det. B. Cykowska).

NOTES. Reported recently for the first time in Montenegro from the Durmitor Mts (Papp & Erzberger 2010) where it is known from several localities.

**\**Lophozia opacifolia*** Culm. *ex* Meyl.

COLLECTING SITE: 16 – soil among siliceous rocks near lake (det. J. Váňa).

NOTES. Among the SE European countries known only from Romania where it is designated EN.

***Lophozia sudetica*** (Nees *ex* Huebener) Grolle

COLLECTING SITES: 2, 7, 12, 16 – siliceous rock; 8 – siliceous rock (conf. B. Cykowska, J. Váňa); 11 – schistose rock; 18 – soil.

NOTES. Reported as new for the Montenegrin bryophyte flora partly based on this collection (Erzberger *et al.* 2008); apparently not rare in the Bjelasica Mts; also known from the Orjen Mts (Papp *et al.* 2008).

***Lophozia ventricosa*** (Dicks.) Dumort.

COLLECTING SITES: 1 – decaying wood; 7, 8, 16 – siliceous rock; 11 – schistose rock.

**\**Lophozia wenzelii*** (Nees) Steph.

COLLECTING SITES: 8, 15 – acidic soil (conf. S. Stefanuț).

NOTES. Boreal, montane element (Düll 1983). Known in SE Europe only from Bulgaria, Greece and Romania. Recently reported from FYR Macedonia (Papp *et al.* 2011).

***Mannia androgyna*** (L.) A. Evans

COLLECTING SITE: 3 – soil among limestone rocks.

NOTES. Threat status: CR in Montenegro and Bulgaria.

***Marchantia polymorpha*** L. subsp. *montivagans* Bisch. & Boisselier

COLLECTING SITES: 2 – at spring; 12, 16, 18 – wet meadow.

***Marsupella funckii*** (F. Weber & D. Mohr) Dumort.

COLLECTING SITES: 7 (det. J. Váňa), 8 (conf. S. Stefanuț) – siliceous rock; 11 (conf. S. Stefanuț), 13 (det. J. Váňa),

17 (conf. S. Stefanuț) – schistose rock; 15 (conf. S. Stefanuț) – acidic soil; 16 (conf. S. Stefanuț) – wet meadow.

NOTES. Reported recently for the first time in Montenegro from the Durmitor Mts (Papp & Erzberger 2010) where it was found in one locality; apparently not rare in the Bjelasica Mts. Threat status: VU in Serbia and Bulgaria.

***Marsupella sphacelata*** (Gieseke *ex* Lindenb.) Dumort.

COLLECTING SITES: 8 – siliceous rock (det. J. Váňa); 11 (conf. S. Stefanuț) – schistose rock; 18 (conf. S. Stefanuț) – wet meadow.

NOTES. Reported as a new species for the Montenegrin bryophyte flora based on part of this collection (site 8: Erzberger *et al.* 2008). In SE Europe reported only from Bulgaria, Greece, Romania and recently from FYR Macedonia (Papp *et al.* 2011). Threat status: NT in Romania.

***Metzgeria conjugata*** Lindb.

COLLECTING SITES: 5, 9 – limestone rock.

***Metzgeria furcata*** (L.) Dumort.

COLLECTING SITES: 1 – siliceous rock and decaying wood; 2 – siliceous rock; 5 – limestone rock; 10 – bark of *Alnus*.

**\**Nardia scalaris*** Gray

COLLECTING SITES: 13, 18 – soil.

NOTES. A species of mountain areas of the western temperate zone of Europe (Düll 1983). In SE Europe known only from Bulgaria, Croatia, Greece, Romania, Serbia, Slovenia and the European part of Turkey.

***Nowellia curvifolia*** (Dicks.) Mitt.

COLLECTING SITES: 1, 9 – decaying wood.

NOTES. Red-listed (VU) in Montenegro and Serbia, although apparently not rare in these countries as evidenced by numerous records (Papp & Erzberger 2005, 2010, Papp & Sabovljević 2002).

***Pedinophyllum interruptum*** (Nees) Kaal.

COLLECTING SITE: 5 – limestone rock.

***Pellia endiviifolia*** (Dicks.) Dumort.

COLLECTING SITES: 1 – soil near stream; 5 – limestone rock in stream; 16 – wet meadow.

***Pellia neesiana*** (Gottsche) Limpr.

COLLECTING SITES: 1 – at stream; 12 – wet meadow.

NOTES. According to Dragičević and Veljić (2006) there was only a very old doubtful record from Montenegro (Beck & Szyszyłowicz 1888).

***Plagiochila asplenioides*** (L.) Dumort.

COLLECTING SITE: 5 – soil near stream.

***Plagiochila porelloides*** (Torrey ex Nees) Lindenb.

COLLECTING SITES: 1 – soil; 2 – siliceous rock, soil among basic rock outcrops; 5 – on bark of *Fagus* and limestone rock in stream; 7 – soil; 8 – soil among limestone and siliceous rocks; 9, 14 – limestone rock; 10 – bark of *Alnus*; 11 – soil near spring and schistose rock; 12 – soil near siliceous rock outcrops.

***Porella baueri*** (Schiffn.) C. E. O. Jensen

COLLECTING SITE: 5 – limestone rock.

NOTES. From Montenegro also known from the Durmitor Mts (Papp & Erzberger 2010). Threat status: DD in Serbia, NT in Bulgaria.

***Porella cordaeana*** (Huebener) Mohr

COLLECTING SITES: 1 – soil; 2, 3, 12 – siliceous rock; 11 – soil near spring.

***Porella platyphylla*** (L.) Pfeiff.COLLECTING SITES: 2 – siliceous boulder; 5 – bark of *Fagus*.***Preissia quadrata*** (Scop.) Nees

COLLECTING SITES: 2, 8 – limestone rock; 11 – schistose rock; 16 – soil.

***Ptilidium pulcherrimum*** (Weber) Vain.COLLECTING SITE: 1 – bark of *Abies*.***Radula complanata*** (L.) Dumort.

COLLECTING SITES: 1 – siliceous rock and bark of *Abies*; 2 – siliceous rock; 5 – bark of *Fagus*; 9 – base of *Fagus*; 10 – bark of *Alnus*; 11 – schistose rock at rivulet.

***Radula* cf. *lindenbergiana*** Gottsche ex C. Hartm.

COLLECTING SITE: 2 – siliceous boulder (det. J. Váňa).

***Reboulia hemisphaerica*** (L.) Raddi

COLLECTING SITES: 8 – limestone rock; 11 – schistose rock.

***Riccardia palmata*** (Hedw.) Carruth.

COLLECTING SITE: 1 – decaying wood.

***Riccia sorocarpa*** Bisch.

COLLECTING SITES: 2 – limestone rock; 3, 14 – soil among limestone rocks.

***Scapania aequiloba*** (Schwägr.) Dumort.

COLLECTING SITES: 2, 14 – limestone rock; 11 – schistose rock.

***Scapania aspera*** M. Bernet & Bernet

COLLECTING SITES: 2, 5, 8, 9, 14 – limestone rock; 11 – schistose rock.

***Scapania compacta*** (A. Roth) Dumort.

COLLECTING SITES: 9, 16 (det. J. Váňa) – soil.

NOTES. From Montenegro there is a very old record (Loitlesberger 1905; Dragičević & Veljić 2006) and a recent one (Papp & Erzberger 2007a) from the same area around Herceg Novi. Threat status: EN in Bulgaria, DD in Romania.

***Scapania irrigua*** (Nees) Nees

COLLECTING SITES: 12 – wet meadow; 15 – acidic soil.

***Scapania nemorea*** (L.) Grolle

COLLECTING SITES: 1 (conf. J. Váňa), 9 – soil.



**\**Scapania mucronata*** H. Buch

COLLECTING SITE: 16 – soil (conf. S. Stefanuț).

NOTES. Subboreal, montane species (Düll 1983). In SE Europe known only from Bulgaria, Romania and Serbia.

**\**Scapania scandica*** (Arnell & H. Buch)

Macvicar

COLLECTING SITE: 1 (conf. S. Stefanuț, cf. det. J. Váňa), 16 (cf. det. J. Váňa) – soil.

NOTES. Subarctic, montane element (Düll 1983). Known in SE Europe only from Bulgaria, Romania and Serbia. Threat status: EN in Bulgaria, VU in Romania.

**\**Scapania praetervis*** Meyl.

COLLECTING SITES: 3, 14 – soil among limestone rocks (conf. S. Stefanuț).

NOTES. Arctic, alpine element (Düll 1983). Not mentioned from any SE European country.

***Scapania umbrosa*** (Schrad.) Dumort.

COLLECTING SITE: 1 – decaying wood.

***Scapania undulata*** (L.) Dumort.

COLLECTING SITES: 1 – at stream; 11 – schistose rock at rivulet; 12 – siliceous rock at rivulet; 18 – peat in spring mire.

***Scapania undulata*** (L.) Dumort. var. *dentata* (Dumort.) Jörg. Bergens

COLLECTING SITE: 18 – wet meadow.

***Tritomaria exsecta*** (Schmidel) Loeske

COLLECTING SITES: 1, 9 – decaying wood.

NOTES. According to Dragičević and Veljić (2006) there was only a very old doubtful record from Montenegro (Beck & Szyszłowicz 1888).

***Tritomaria quinquedentata*** (Huds.) H. Buch

COLLECTING SITES: 1, 2 – soil; 14 – soil among limestone rocks.

NOTES. Reported as new for the Montenegrin bryophyte flora based on part of this collection (site 2: Erzberger *et al.* 2008).

**MUSCI*****Abietinella abietina*** (Hedw.) M. Fleisch.

COLLECTING SITES: 1, 2 – soil; 13 – soil among limestone rocks.

***Amphidium mougeotii*** (Schimp.) Schimp.

COLLECTING SITE: 2 – siliceous rock.

***Andreaea rupestris*** Hedw.

COLLECTING SITES: 1, 2, 7, 8, 12 – siliceous rock; 11 – schistose rock.

***Anomodon attenuatus*** (Hedw.) Huebener

COLLECTING SITES: 5, 9 – limestone rock and bark of *Fagus*.

***Anomodon longifolius*** (Schleich. ex Brid.) Hartm.

COLLECTING SITE: 9 – limestone rock.

NOTES. Red-listed (DD) in Montenegro and Serbia, but recently several records from Serbia have been published (Papp *et al.* 2006; Papp & Erzberger 2007b, 2009; Papp & Sabovljević 2001).

***Anomodon viticulosus*** (Hedw.) Hook. & Taylor

COLLECTING SITES: 5, 9 – limestone rock and bark of *Fagus*.

***Antitrichia curtispindula*** (Hedw.) Brid.

COLLECTING SITES: 5 – limestone rock and bark of *Fagus*; 6 – limestone rock at stream; 9 – siliceous rock; 10 – bark of *Alnus incana*.

***Atrichum undulatum*** (Hedw.) P. Beauv.

COLLECTING SITES: 1, 9 – soil.

***Aulacomnium palustre*** (Hedw.) Schwägr.

COLLECTING SITE: 12 – wet meadow.

***Barbula unguiculata*** Hedw.

COLLECTING SITE: 16 – soil.

***Bartramia halleriana*** Hedw.

COLLECTING SITES: 9 – soil; 11 – schistose rock.

***Bartramia ithyphylla*** Brid.

COLLECTING SITES: 1, 8 – soil; 2, 7 – siliceous rock; 11 – schistose rock; 15, 16 – acidic soil.

***Brachytheciastrum velutinum*** (Hedw.) Ignatov & HuttunenCOLLECTING SITES: 1 – soil; 2 – siliceous rock; 9 – bark of *Fagus*; 14 – soil among limestone rocks.***Brachythecium albicans*** (Hedw.) Schimp.

COLLECTING SITES: 1, 13 – soil among siliceous and limestone rocks.

***Brachythecium geheebi*** Milde

COLLECTING SITE: 2 – siliceous rock.

NOTES. There are four more recent records from Montenegro but three of them are from one mountain area, the Durmitor Mts (Dragičević & Veljić 2006). Threat status: R in the *Red Data Book of European Bryophytes*, LR in Montenegro, EN in Bulgaria, CR in Romania.

***Brachythecium glareosum*** (Bruch ex Spruce) Schimp.

COLLECTING SITES: 1 – soil, limestone and siliceous rock, decaying wood; 3, 9 – limestone rock; 14 – soil among limestone rocks.

***Brachythecium rivulare*** Schimp.

COLLECTING SITES: 1, 10 – soil at stream; 2 – at spring; 5, 6 – limestone rock in and near stream; 11 – soil among schistose rock at rivulet; 12, 16 – peat in spring mire.

***Brachythecium rutabulum*** (Hedw.) Schimp.COLLECTING SITES: 1 – soil; 9 – soil and siliceous rock, base of *Fagus* and decaying wood; 10 – soil at stream and on bark of *Alnus*.***Brachythecium salebrosum*** (Hoffm. ex F. Weber & D. Mohr) Schimp.

COLLECTING SITE: 1 – limestone rock.

***Brachythecium tommasinii*** (Sendtn. ex Boulay) Ignatov & Huttunen

COLLECTING SITE: 9 – limestone rock.

***Bryoerythrophyllum recurvirostrum*** (Hedw.) P. C. Chen

COLLECTING SITES: 8, 9, 14, 16 – limestone rock.

***Bryum argenteum*** Hedw.

COLLECTING SITES: 7 – siliceous rock; 13, 14 – soil among limestone rocks.

***Bryum caespiticium*** Hedw.

COLLECTING SITES: 7 – siliceous rock; 12 (conf. W. Schröder), 13 – soil among limestone rocks.

***Bryum capillare*** Hedw.

COLLECTING SITES: 1 – soil and siliceous rock; 2, 3 – soil near basic rock outcrops; 6 – limestone rock in stream; 9 – limestone rock.

***Bryum elegans*** Nees

COLLECTING SITES: 2 – siliceous and limestone rock; 8, 14 – limestone rock; 11 – soil near basic rock outcrops.

***Bryum moravicum*** Podp.COLLECTING SITES: 1, 2, 7 – siliceous rock and bark of *Fagus*.***Bryum pallens*** Sw. ex anon.

COLLECTING SITES: 2 – limestone rock (conf. W. Schröder); 11 – schistose rock at rivulet (conf. W. Schröder).

***Bryum pallescens*** Schleich. ex Schwägr.

COLLECTING SITES: 3, 8 – soil among limestone rocks; 11, 12 – soil near spring (det. W. Schröder).

***Bryum pseudotriquetrum*** (Hedw.) P. Gaertn. *et al.*

COLLECTING SITES: 1 – soil at stream; 11 – schistose rock at rivulet; 12, 16, 18 – peat in spring mires; 15 – at spring.

***Bryum rubens*** Mitt.

COLLECTING SITE: 2 – soil.

***Bryum schleicheri*** DC.

COLLECTING SITES: 2 – at spring; 11 – schistose rock at rivulet (also var. *latifolium*) (conf./rev. W. Schröder); 12 – wet meadow.

***Buxbaumia viridis*** (Moug. *ex* Lam. & DC.) Brid. *ex* Moug. & Nestl.

COLLECTING SITES: 1, 9 – decaying wood.

NOTES. Several extant populations are known in Montenegro (Dragičević *et al.* 2011). Threat status: listed in the Bern Convention and the European Union Habitats and Species Directives (Anonymous 1995), VU in the *Red Data Book of European bryophytes*, CR in Montenegro and Serbia, NT in Bulgaria, EN in Romania.

***Calliergonella cuspidata*** (Hedw.) Loeske

COLLECTING SITES: 4, 12 – peat in wet meadow.

***Campyliadelphus chrysophyllus*** (Brid.)

R. S. Chopra

COLLECTING SITE: 8 – limestone rock.

***Campylium protensum*** (Brid.) Kindb.

COLLECTING SITES: 11, 12 – soil and peat near springs.

NOTES. Probably overlooked, not separated from *C. stellatum*. From Montenegro there are several records from the Durmitor Mts (Papp & Ezberger 2010). Threat status: VU in Bulgaria, EN in Romania.

***Campylium stellatum*** (Hedw.) Lange & C. E. O. Jensen

COLLECTING SITES: 11 – schistose rock at rivulet; 12, 16 – wet meadow.

***Campylophyllum halleri*** (Hedw.) M. Fleisch.

COLLECTING SITES: 1 – siliceous rock; 14 – limestone rock.

***Ceratodon purpureus*** (Hedw.) Brid.

COLLECTING SITES: 1 – soil; 2 – siliceous rock and bark of *Fagus*; 7 – siliceous rock; 11 – schistose rock; 13 – soil among limestone rocks.

***Cinclidotus aquaticus*** (Hedw.) Bruch & Schimp.

COLLECTING SITE: 5 – limestone rock in stream.

***Cinclidotus fontinaloides*** (Hedw.) P. Beauv.

COLLECTING SITE: 6 – limestone rock in stream.

***Cirriphyllum crassinervium*** (Taylor) Loeske & M. Fleisch.

COLLECTING SITES: 5, 9 – limestone rock.

***Cirriphyllum piliferum*** (Hedw.) Grout

COLLECTING SITE: 10 – bark of *Alnus*.

***Climacium dendroides*** (Hedw.) F. Weber & D. Mohr

COLLECTING SITE: 5 – soil near stream.

***Cratoneuron filicinum*** (Hedw.) Spruce

COLLECTING SITES: 1 – at stream; 4 – soil in wet meadow; 5 – shaded limestone rock and limestone rock in stream; 11 – schistose rock at rivulet; 15 – at spring.

***Ctenidium molluscum*** (Hedw.) Mitt.

COLLECTING SITES: 1, 2 – siliceous and limestone rock; 5, 9, 14 – limestone rock.

***Dichodontium palustre*** (Dicks.) M. Stech

COLLECTING SITES: 12, 18 – peat in spring mires.

NOTES. Boreal, montane element (Düll 1984). Known from almost all SE European countries except Albania, Bosnia-Herzegovina, Montenegro and the European part of Turkey. Threat status: LR in Serbia.

***Dichodontium pellucidum*** (Hedw.) Schimp.

COLLECTING SITES: 1 – at stream; 11 – schistose rock at rivulet; 12, 16 – wet meadow; 13 – soil near late snow bed; 15 – at spring.

***Dicranella heteromalla*** (Hedw.) Schimp.

COLLECTING SITES: 7 – siliceous rock; 9 – soil; 11 – schistose rock.

***Dicranella varia*** (Hedw.) Schimp.

COLLECTING SITE: 1 – soil.

***Dicranoweisia crispula*** (Hedw.) Milde

COLLECTING SITES: 1, 2, 7, 8, 12, 13, 17 – siliceous rock; 11 – schistose rock.

***Dicranum scoparium*** Hedw.

COLLECTING SITES: 1 – decaying wood; 2, 5, 9 – limestone and other basic rock; 7, 8 – siliceous rock; 11 – schistose rock; 13 – soil among limestone rocks.

***Dicranum spadiceum*** J. E. Zetterst.

COLLECTING SITE: 11 – schistose rock.

NOTES. Reported recently for the first time in Montenegro from the Durmitor Mts (Papp & Erzberger 2010). This is its second record from the country. In SE Europe known only from Bulgaria, Romania, Serbia and Slovenia.

***Dicranum tauricum*** Sapjegin

COLLECTING SITE: 1 – bark of *Abies* and decaying wood.

***Didymodon fallax*** (Hedw.) R. H. Zander

COLLECTING SITES: 2, 3 – limestone rock.

***Didymodon rigidulus*** Hedw.

COLLECTING SITES: 1 – siliceous rock; 2, 5 – limestone and other basic rock; 6 – limestone rock in stream.

***Diphyscium foliosum*** (Hedw.) D. Mohr

COLLECTING SITE: 9 – soil.

NOTES. Red-listed (LR) in Montenegro and Serbia, but numerous records from these countries

(Papp *et al.* 2007b; Papp & Erzberger 2005) and apparently frequent in some areas, e.g., around Vlasina lake in Serbia (Papp *et al.* 2012).

***Distichium capillaceum*** (Hedw.) Bruch & Schimp.

COLLECTING SITES: 3, 8, 12, 14 – limestone and other basic rock; 11 – schistose rock at rivulet.

***Ditrichum flexicaule*** (Schwägr.) Hampe

COLLECTING SITES: 2, 14 – limestone rock.

***Ditrichum gracile*** (Mitt.) Kuntze

COLLECTING SITE: 2 – limestone rock.

***Ditrichum heteromallum*** (Hedw.) E. Britton

COLLECTING SITE: 15 – acidic soil.

***Ditrichum pusillum*** (Hedw.) Hampe

COLLECTING SITE: 1 – soil.

NOTES. Threat status: LR in Montenegro. Probably overlooked and under-collected. Usually present in our recent collections (Papp & Erzberger 2007a, 2010).

***Encalypta alpina*** Sm.

COLLECTING SITE: 14 – limestone rock.

Threat status: LR in Montenegro and Serbia, VU in Romania. From Montenegro there are two old records and a recent one from the Prokletije Mts (Dragičević & Veljić 2006).

***Encalypta ciliata*** Hedw.

COLLECTING SITE: 2 – limestone rock.

Threat status: VU in Montenegro and Serbia. In Montenegro it was also collected in the Durmitor Mts (Papp & Erzberger 2010).

***Encalypta microstoma*** Bals.-Criv. & De Not.

COLLECTING SITE: 7 – siliceous rock.

NOTES. Reported as a new species for the Montenegrin bryophyte flora based on this collection

(Erzberger *et al.* 2008). Threat status: R in the *Red Data Book of European Bryophytes*, VU in Bulgaria.

***Encalypta raptocarpa*** Schwägr.

COLLECTING SITE: 3 – limestone rock.

***Encalypta streptocarpa*** Hedw.

COLLECTING SITES: 1 – concrete; 9, 14 – limestone rock; 11 – schistose rock.

***Encalypta vulgaris*** Hedw.

COLLECTING SITES: 8, 14 – limestone rock.

***Eurhynchiastrum pulchellum*** (Hedw.) Ignatov & Huttunen var. ***diversifolium*** (Schimp.) Ochyra & Żarnowiec

COLLECTING SITES: 2, 3, 13, 14 – soil among limestone and other basic rocks; 8 – limestone rock.

***Eurhynchium angustirete*** (Broth.) T. J. Kop.

COLLECTING SITES: 1 – soil; 9 – limestone rock.

***Fissidens bryoides*** Hedw.

COLLECTING SITES: 1 – soil; 11, 14 – soil among limestone and other rocks; 16 – soil at lake shore.

***Fissidens dubius*** P. Beauv.

COLLECTING SITES: 8, 9, 14 – limestone rock.

***Fissidens taxifolius*** Hedw.

COLLECTING SITES: 1, 9 – soil.

***Fontinalis antipyretica*** Hedw.

COLLECTING SITES: 5, 6 – limestone rock in stream; 10 – soil at stream.

NOTES. Red-listed (LR) in Montenegro and Serbia. This probably needs to be amended, since we collected this species in a great number of places in these countries (Papp *et al.* 2004; 2006, 2012; Papp & Erzberger 2005, 2007a, b, 2009; Papp & Sabovljević 2001).

***Funaria hygrometrica*** Hedw.

COLLECTING SITE: 2 – soil.

**\**Grimmia alpestris*** (F. Weber & D. Mohr) Schleich.

COLLECTING SITES: 2, 12, 16 – siliceous rock (conf./rev. E. Maier in part).

NOTES. This is a boreal montane element (Düll 1984) known from almost all SE European countries except Bosnia-Herzegovina, Croatia, Montenegro, Slovenia and the European part of Turkey (Sabovljević *et al.* 2008).

***Grimmia anomala*** Hampe *ex* Schimp.

COLLECTING SITES: 2, 16 – siliceous rock; 11 – schistose rock at rivulet (conf. E. Maier in part).

NOTES. Reported as new for the Montenegrin bryophyte flora based on part of this collection (Erzberger *et al.* 2008).

***Grimmia caespiticia*** (Brid.) Jur.

COLLECTING SITES: 7, 12, 16, 17 – siliceous rock (in part conf. E. Maier).

NOTES. In Montenegro also known from the Prokletije Mts (Martinčić 2006). Threat status: R in the *Red Data Book of European Bryophytes*, VU in Montenegro, CR in Romania.

***Grimmia decipiens*** (Schultz) Lindb.

COLLECTING SITE: 12 – siliceous rock near spring.

NOTES. From Montenegro there are records from the Prokletije Mts (Martinčić 2006) and Morača gorge (Milikić *et al.* 2001). Threat status: VU in Bulgaria, EN in Romania.

***Grimmia funalis*** (Schwägr.) Bruch & Schimp.

COLLECTING SITE: 7 – siliceous rock (det./conf. E. Maier in part).

NOTES. In Montenegro also known from the Prokletije Mts (Martinčić 2006). Threat status: VU in Bulgaria, NT in Romania.

***Grimmia hartmannii*** Schimp.

COLLECTING SITES: 2, 7, 9, 10 – siliceous rock (in part conf. E. Maier).

NOTES. *Grimmia hartmannii* was found with sporophytes at site 2; sporophytes are extremely rare in this species (Nebel & Philippi 2000).

***Grimmia montana*** Bruch & Schimp.

COLLECTING SITES: 2, 7 – siliceous rock (in part conf. E. Maier).

NOTES. In Montenegro also known from the Prokletije Mts (Martinčić 2006). This is a widespread *Grimmia* species on exposed acidic rocks in neighboring countries, e.g., Stara planina and around Vlasina lake in Serbia (Papp & Erzberger 2007b; Papp *et al.* 2012), the Korça region in Albania (Papp *et al.* 2010), and FYR Macedonia (Papp *et al.* 2011; Papp & Erzberger 2012). Threat status: VU in Bulgaria, NT in Romania.

***Grimmia muehlenbeckii*** Schimp.

COLLECTING SITES: 1, 2, 12 – siliceous rock; 11 – schistose rock at rivulet (in part conf. E. Maier).

NOTES. Reported recently for the first time in Montenegro from the Durmitor Mts (Papp & Erzberger 2010) where it was found in one locality. Apparently not rare in the Bjelasica Mts. (Erzberger *et al.* 2008). Threat status: VU in Bulgaria and Romania.

This is one of the most frequent *Grimmia* species on exposed acidic rocks in neighboring countries, e.g., the Golija Biosphere Reserve, Stara planina and around Vlasina lake in Serbia (Papp & Erzberger 2005, 2007b; Papp *et al.* 2012), the Korça region in Albania (Papp *et al.* 2010), and FYR Macedonia (Papp *et al.* 2011; Papp & Erzberger 2012).

***Grimmia ovalis*** (Hedw.) Lindb.

COLLECTING SITES: 2, 3 – siliceous rock (in part conf. E. Maier).

***Grimmia ramondii*** (Lam. & DC.) Margad.

COLLECTING SITES: 1, 2, 7 – siliceous rock; 11 – schistose rock; 12 – wet meadow (in part conf. E. Maier).

NOTES. In Montenegro also known from the Prokletije Mts (Martinčić 2006). Apparently not rare in the Bjelasica Mts. Threat status: VU in Bulgaria, EN in Romania.

**\**Grimmia sessitana*** De Not.

COLLECTING SITE: 11 – schistose rock.

NOTES. Subarctic, subalpine element (Düll 1984); was known only from Bulgaria, FYR Macedonia, Romania and Serbia (Sabovljević *et al.* 2008). Recently also reported from Albania (Papp *et al.* 2010) and Greece (Papp *et al.* 2011). Threat status: R in the *Red Data Book of European Bryophytes*, EN in Romania.

***Grimmia torquata*** Drumm.

COLLECTING SITE: 2 – siliceous rock.

NOTES. Reported as new for the Montenegrin bryophyte flora based on this collection (Erzberger *et al.* 2008). Threat status: VU in Bulgaria, EN in Romania. In Montenegro this is the only record so far.

**\**Hedwigia ciliata*** (Hedw.) P. Beauv. var. ***leucophaea*** Bruch & Schimp.

COLLECTING SITE: 2 – siliceous rock.

Not reported at infrataxon level from Montenegro even in Düll *et al.* (1999). Known from Albania (Marka & Xhulaj 2011), FYR Macedonia (Martinčić 2009), Greece (Düll 1995) and Slovenia (Martinčić 2003).

***Herzogiella seligeri*** (Brid.) Z. Iwats.

COLLECTING SITES: 1, 9 – decaying wood.

***Heterocladium dimorphum*** (Brid.) Schimp.

COLLECTING SITES: 2, 7 – soil among siliceous and basic rocks; 8 – soil among siliceous and limestone rock; 11 – schistose rock, 14 – soil among limestone rocks.

***Homalia trichomanoides*** (Hedw.) Brid.

COLLECTING SITE: 10 – bark of *Alnus*.

***Homalothecium lutescens*** (Hedw.) H. Rob.

COLLECTING SITE: 1 – soil.

***Homalothecium philippeanum*** (Spruce) Schimp.COLLECTING SITES: 2 – siliceous boulder; 5 – limestone rock; 9 – limestone rock and bark of *Fagus*.***Homalothecium sericeum*** (Hedw.) Schimp.COLLECTING SITES: 2 – siliceous boulder; 5 – basic rock and bark of *Fagus* and *Sambucus nigra*; 9 – limestone and siliceous rock; 10 – basic rock and bark of *Alnus*.***Homomallium incurvatum*** (Schrad. ex Brid.)

Loeske

COLLECTING SITE: 9 – limestone rock.

***Hygrohypnum duriusculum*** (De Not.)

D. W. Jamieson

COLLECTING SITES: 2 – at spring; 12 – wet meadow.

***Hygrohypnum luridum*** (Hedw.) Jenn.

COLLECTING SITES: 1 – at stream; 5, 6 – limestone rock in stream.

***Hylocomium splendens*** (Hedw.) Schimp.

COLLECTING SITES: 1 – soil; 3, 5, 9 – limestone rock.

**\**Hypnum andoi*** A. J. E. Sm.

COLLECTING SITE: 1 – siliceous rock.

NOTES. Atlantic element (Düll 1985). Known from Bosnia-Herzegovina, Greece, Romania, Serbia, Slovenia (Sabovljević *et al.* 2008) and FYR Macedonia (Martinčić 2009). Threat status: VU in Serbia, NT in Romania.

***Hypnum cupressiforme*** Hedw.COLLECTING SITES: 1 – bark of *Abies*; 2 – siliceous rock outcrops; 5 – limestone rock; 6 – limestone rock at stream; 9 – limestone and siliceous rock, and decaying wood; 10 – bark of *Alnus*; 12 – basic rock.***Hypnum cupressiforme*** Hedw. var. *lacunosum* Brid.

COLLECTING SITE: 2 – soil.

***Isothecium alopecuroides*** (Lam. ex Dubois)

Isov.

COLLECTING SITES: 1 – soil; 2, 7 – siliceous rock; 5 – limestone rock and bark of *Fagus*; 9 – limestone and siliceous rock, and bark of *Fagus*; 10 – bark of *Alnus*.***Isothecium alopecuroides*** (Lam. ex Dubois)Isov. var. *robustum* (Schimp.) Düll

COLLECTING SITE: 12 – wet meadow.

**\**Kieria starkei*** (F. Weber & D. Mohr) I. Hagen

COLLECTING SITE: 7 – siliceous rock outcrops (conf. E. Maier, M. Reimann).

NOTES. Subarctic, subalpine element (Düll 1984). In SE Europe known only from Bulgaria, Bosnia-Herzegovina, Romania and Slovenia.

***Leptodon smithii*** (Hedw.) F. Weber & D. MohrCOLLECTING SITE: 5 – bark of *Fagus*.***Lescurea saxicola*** (Schimp.) Molendo

COLLECTING SITE: 2 – siliceous rock outcrops (conf. E. Maier).

NOTES. From Montenegro there are records from the Prokletije Mts (Martinčić 2006). Threat status: VU in Bulgaria and Romania.

***Leucodon sciuroides*** (Hedw.) Schwägr.COLLECTING SITES: 2, 5, 9 – bark of *Fagus*; 10 – bark of *Alnus*.***Mnium lycopodioides*** Schwägr.

COLLECTING SITE: 1 – soil.

NOTES. Apparently not rare in Montenegro (Papp and Erzberger 2010, 2011) and neighboring countries, e.g., Serbia (Papp & Sabovljević 2002; Papp & Erzberger 2005, 2007b). Threat status: VU in Bulgaria and Romania.

***Mnium marginatum*** (Dicks.) P. Beauv.

COLLECTING SITES: 5, 8, 9 – limestone rock; 6 – limestone rock at stream; 9 – soil; 12 – soil near spring.

***Mnium spinosum*** (Voit) Schwägr.

COLLECTING SITE: 8 – limestone rock.

***Mnium spinulosum*** Bruch & Schimp.

COLLECTING SITE: 1 – soil.

***Mnium stellare*** Hedw.

COLLECTING SITES: 8, 9 – limestone rock; 11 – schistose rock; 14 – soil among limestone rocks.

***Mnium thomsonii*** Schimp.

COLLECTING SITES: 5, 8 – limestone rock; 6 – limestone rock at stream.

***Myurella julacea*** (Schwägr.) Schimp.

COLLECTING SITE: 2 – limestone rock.

NOTES. Apparently not rare in Montenegro (Papp & Erzberger 2007a, 2010; Papp *et al.* 2008) nor in Serbia (Papp & Erzberger 2007b, 2009; Papp *et al.* 2004). Threat status: LR in Montenegro and Serbia, VU in Romania.

***Neckera besseri*** (Lobarz.) Jur.COLLECTING SITE: 5 – limestone rock and bark of *Fagus*.***Neckera complanata*** (Hedw.) HuebenerCOLLECTING SITES: 1 – bark of *Abies*; 5 – bark of *Fagus*; 9 – limestone rock and bark of *Fagus*; 10 – bark of *Alnus*.***Neckera crispa*** Hedw.

COLLECTING SITES: 5, 9 – limestone rock.

***Neckera menziesii*** Drum.COLLECTING SITES: 5 – limestone rock and bark of *Fagus*; 9 – bark of *Fagus*.***Neckera pumila*** Hedw.COLLECTING SITE: 10 – bark of *Alnus incana*.

NOTES. From Montenegro there are a record from Morača gorge (Pavletić & Pulević 1980) and recent collections from the Durmitor Mts (Papp

& Erzberger 2010) and Orjen Mts (Papp *et al.* 2008). Threat status: DD in Montenegro, VU in Romania, EN in Bulgaria.

***Orthothecium intricatum*** (Hartm.) Schimp.

COLLECTING SITE: 5 – limestone rock.

***Orthotrichum cupulatum*** Hoffm. ex Brid.

COLLECTING SITE: 2 – siliceous rock.

**\**Orthotrichum cupulatum*** Hoffm. ex Brid. var. ***riparium*** Huebener

COLLECTING SITES: 5, 6 – limestone rock in stream.

NOTES. Sub-Atlantic taxon (Düll 1985). The SE European checklist of mosses mentions no varieties of *Orthotrichum cupulatum* (Sabovljević *et al.* 2008) but Düll *et al.* (1999) report this variety from Bosnia-Herzegovina, Croatia and Slovenia; also known from Greece (Papp *et al.* 1998), Serbia (Papp *et al.* 2006; Papp & Erzberger 2009) and Albania (Papp *et al.* 2010).

***Orthotrichum lyellii*** Hook. & TaylorCOLLECTING SITES: 2 – bark of *Fagus*; 10 – bark of *Alnus*.***Orthotrichum pallens*** Bruch ex Brid.COLLECTING SITES: 1 – bark of *Salix caprea*; 2, 9 – bark of *Fagus*.***Orthotrichum pumilum*** Sw. ex anon.COLLECTING SITES: 2 – siliceous rock and bark of *Fagus*; 5 – bark of *Sambucus nigra*.***Orthotrichum rupestre*** Schleich. ex Schwägr.COLLECTING SITES: 2 – siliceous rock and bark of *Fagus*; 5 – bark of *Fagus*; 6 – limestone rock at stream.***Orthotrichum speciosum*** NeesCOLLECTING SITE: 1 – bark of *Salix caprea* and *Abies*.***Orthotrichum stramineum*** Hornsch. ex Brid.COLLECTING SITES: 1 – bark of *Abies*; 2, 5 – bark of *Fagus*; 9 – bark of *Sorbus*; 10 – bark of *Alnus*.



***Orthotrichum striatum*** Hedw.

COLLECTING SITES: 1 – bark of *Salix caprea* and *Abies*; 2, 5 – bark of *Fagus*; 10 – bark of *Alnus*.

***Oxystegus tenuirostris*** (Hook. & Taylor)

A. J. E. Sm.

COLLECTING SITES: 1 – soil; 6 – limestone rock in stream; 10 – bark of *Alnus*.

***Palustriella commutata*** (Hedw.) Ochyra

COLLECTING SITES: 4, 12, 16 – wet meadow; 5 – concrete and limestone rock in stream; 18 – peat in spring mire.

***Palustriella decipiens*** (De Not.) Ochyra

COLLECTING SITES: 11 – schistose rock and soil at rivulet; 16 – wet meadow.

***Palustriella falcata*** (Brid.) Hedenäs

COLLECTING SITES: 12, 16 – wet meadow.

***Paraleucobryum longifolium*** (Hedw.) Loeske

COLLECTING SITE: 7 – siliceous rock.

***Paraleucobryum sauteri*** (Bruch & Schimp.)

Loeske

COLLECTING SITE: 2 – siliceous rock.

NOTES. Threat status: R in the *Red Data Book of European Bryophytes*, VU in Montenegro and Bulgaria.

***Philonotis caespitosa*** Jur.

COLLECTING SITE: 12 – siliceous rock and wet meadow; 18 – peat in spring mire.

NOTES. From Montenegro there are two old records and a recent one (Dragičević & Veljić 2006). Threat status: DD in Montenegro and Serbia, VU in Bulgaria.

***Philonotis calcarea*** (Bruch & Schimp.) Schimp.

COLLECTING SITES: 4, 12 – peat in wet meadow and near spring.

***Philonotis fontana*** (Hedw.) Brid.

COLLECTING SITES: 1 – at stream; 2 – at spring; 4 – wet meadow; 11 – schistose rock at rivulet; 12, 16 – wet meadow; 18 – peat in spring mire.

***Philonotis marchica*** (Hedw.) Brid.

COLLECTING SITE: 4 – wet meadow.

NOTES. From Montenegro there are two old and two recent records according to Dragičević and Veljić (2006), and it was found in two localities in the Durmitor Mts (Papp & Erzberger 2010). Threat status: EN in Bulgaria, NT in Romania.

***Philonotis seriata*** Mitt.

COLLECTING SITES: 11 – schistose rock at rivulet; 12, 16, 18 – wet meadow.

***Philonotis tomentella*** Molendo

COLLECTING SITE: 4 – wet meadow.

***Plagiobryum zierii*** (Hedw.) Lindb.

COLLECTING SITE: 2 – limestone rock.

NOTES. From Montenegro there are two old (Dragičević & Veljić 2006) and several recent records from the Orjen and Durmitor Mts. (Papp & Erzberger 2010; Papp *et al.* 2008). Threat status: LR in Montenegro and Serbia, VU in Bulgaria.

***Plagiomnium affine*** (Blandow *ex* Funck)

T. J. Kop.

COLLECTING SITES: 1 – soil; 14 – soil among limestone rocks.

***Plagiomnium cuspidatum*** (Hedw.) T. J. Kop.

COLLECTING SITES: 9 – limestone rock; 10 – soil at stream.

***Plagiomnium elatum*** (Bruch & Schimp.)

T. J. Kop.

COLLECTING SITES: 1, 5 – soil at stream; 4 – wet meadow; 9 – limestone rock; 11 – schistose rock at rivulet.

***Plagiomnium rostratum*** (Schrad.) T. J. Kop.

COLLECTING SITES: 1 – soil; 2 – limestone rock and soil at spring; 5, 9 – limestone rock; 12, 16 – wet meadow.

***Plagiomnium undulatum*** (Hedw.) T. J. Kop.

COLLECTING SITES: 1, 9 – soil; 5 – limestone rock in stream; 10 – soil at stream.

***Plagiopus oederianus*** (Sw.) H. A. Crum & L. E. Anderson

COLLECTING SITES: 2, 5 – limestone rock.

***Plagiothecium cavifolium*** (Brid.) Z. Iwats.

COLLECTING SITES: 8 – limestone and siliceous rock; 1, 9 – soil and limestone rock; 14 – soil among limestone rocks.

***Plagiothecium denticulatum*** (Hedw.) Schimp.  
var. *denticulatum*

COLLECTING SITE: 1 – soil.

***Plagiothecium denticulatum*** (Hedw.) Schimp.  
var. *undulatum* R. Ruthe ex Geh.

COLLECTING SITE: 1 – soil.

***Plagiothecium platyphyllum*** Mönk.

COLLECTING SITE: 9 – limestone rock.

NOTES. In Montenegro known from the Prokletije (Martinčić 2006) and Durmitor Mts (Papp & Erzberger 2010) from one locality each. Threat status: VU in Bulgaria, NT in Romania.

**\**Plagiothecium succulentum*** (Wilson) Lindb.

COLLECTING SITES: 1, 7, 9 – soil; 2 – siliceous rock.

SubAtlantic element (Düll 1985). Known from many SE European countries, e.g., Bulgaria, Bosnia-Herzegovina, Greece, Romania, Serbia, Slovenia and the European part of Turkey. Recently also reported from Albania (Papp *et al.* 2010).

***Plasteurhynchium striatulum*** (Spruce) M. Fleisch.

COLLECTING SITES: 5, 9 – limestone rock.

***Platydictya jungermannioides*** (Brid.) H. A. Crum

COLLECTING SITE: 2 – limestone rock.

NOTES. In Montenegro known from the Prokletije (Martinčić 2006) and Durmitor Mts (Papp & Erzberger 2010) from one locality each. Threat status: VU in Bulgaria, NT in Romania.

***Platyhypnidium riparioides*** (Hedw.) Dixon

COLLECTING SITES: 1 – at stream; 5, 6 – limestone rock in stream; 12 – peat near spring.

***Pleurozium schreberi*** (Willd. ex Brid.) Mitt.

COLLECTING SITE: 12 – soil.

***Pogonatum aloides*** (Hedw.) P. Beauv.

COLLECTING SITES: 1, 7, 9 – soil.

***Pogonatum urnigerum*** (Hedw.) P. Beauv.

COLLECTING SITES: 1, 7, 8, 9 – soil and soil among siliceous rock outcrops.

***Pohlia andalusica*** (Höhn.) Broth.

COLLECTING SITES: 13, 14 – soil among limestone rocks.

NOTES. Reported recently for the first time in Montenegro (Erzberger & Papp 2007); known from several localities in the Durmitor Mts (Papp & Erzberger 2010).

***Pohlia cruda*** (Hedw.) Lindb.

COLLECTING SITES: 1, 7, 16 – soil; 2 – siliceous and limestone rock; 8 – limestone rock and soil among siliceous rocks; 11 – schistose rock; 14 – soil among limestone rocks.

***Pohlia melanodon*** (Brid.) A. J. Shaw

COLLECTING SITES: 1, 16 – soil.

***Pohlia wahlenbergii*** (F. Weber & D. Mohr)  
A. L. Andrews

COLLECTING SITES: 1 – soil; 15 – at spring.

***Polytrichastrum alpinum*** (Hedw.) G. L. Sm.

COLLECTING SITES: 1, 9, 16 – soil; 2, 8 – soil among siliceous and basic rocks; 11 – schistose rock; 14 – limestone rock.

***Polytrichum commune*** Hedw. var. *commune*

COLLECTING SITE: 18 – peat in spring mire.

***Polytrichum commune*** Hedw. var. *perigoniale* (Michx.) Hampe

COLLECTING SITE: 18 – peat in spring mire.

NOTES. Reported recently for the first time in Montenegro from the Durmitor Mts (Erzberger & Papp 2007); this is the second record from the country.

***Polytrichastrum formosum*** (Hedw.) G. L. Sm.

COLLECTING SITES: 8 – limestone rock; 1, 9 – soil; 11 – schistose rock; 12 – peat near spring.

***Polytrichum juniperinum*** Hedw.

COLLECTING SITES: 1, 7 – soil; 2 – soil among siliceous and basic rocks; 3, 14 – soil among limestone rocks; 11 – soil among schistose rocks; 15 – acidic soil.

***Polytrichum piliferum*** Hedw.

COLLECTING SITES: 2, 7 – soil among siliceous rocks.

***Pseudoleskea incurvata*** (Hedw.) Loeske

COLLECTING SITES: 1, 2, 7, 8, 9 – soil among siliceous rocks; 11 – schistose rock; 13 – soil; 14 – limestone rock.

***Pseudoleskea patens*** (Lindb.) Kindb.

COLLECTING SITES: 2 – siliceous rock; 12 – basic rock.

***Pseudoleskea radicata*** (Mitt.) Macoun & Kindb.

COLLECTING SITE: 2 – siliceous boulder.

NOTES. From Montenegro there are several records from the Prokletije Mts (Martinčić 2006) and another old record from Andrijevića (Düll

*et al.* 1999). Threat status: NT in Bulgaria and Romania.

***Pseudoleskea saviana*** (De Not.) Latzel

COLLECTING SITES: 1, 7, 9 – siliceous rock, 11 – schistose rock.

NOTES. Not rare in Montenegro (Martinčić 2006; Papp & Erzberger 2010, 2011) and in Serbia (Papp & Erzberger 2005, 2007b; Papp *et al.* 2004, 2012). Threat status: RT in the *Red Data Book of European Bryophytes*, VU in Montenegro and Serbia, CR in Romania.

***Pseudoleskeella catenulata*** (Brid. ex Schrad.) Kindb.

COLLECTING SITES: 1 – siliceous rock; 9 – limestone rock.

***Pseudoleskeella nervosa*** (Brid.) Nyholm

COLLECTING SITE: 2 – bark of *Fagus*.

***Pseudotaxiphyllum elegans*** (Brid.) Z. Iwats.

COLLECTING SITES: 7 – siliceous rock; 9 – soil.

NOTES. Reported as new for the Montenegrin bryophyte flora based on this collection (Erzberger *et al.* 2008). Threat status: VU in Bulgaria, NT in Romania. Probably under-collected. From neighboring Serbia there are several recent records (Papp & Erzberger 2005, 2007b, Papp *et al.* 2012).

***Pterigynandrum filiforme*** Hedw.

COLLECTING SITES: 1 – siliceous rock and bark of *Abies*; 2, 9 – siliceous rock and bark of *Fagus*; 5 – bark of *Samolus nigra*; 7 – siliceous rock; 10 – bark of *Alnus*.

***Ptychodium plicatum*** (Schleich. ex F. Weber & D. Mohr) Schimp.

COLLECTING SITES: 8, 14 – limestone rock; 11 – schistose rock.

NOTES. From Montenegro there are an old record from Komovi Mts (Velenovsky 1901; Dragičević & Veljić 2006) and several recent records from the Prokletije Mts (Martinčić 2006); also known from the Durmitor Mts (Papp

& Erzberger 2010). Threat status: VU in Bulgaria and Romania.

***Racomitrium aciculare*** (Hedw.) Brid.

COLLECTING SITES: 1, 2 – siliceous rock.

\****Racomitrium affine*** (F. Weber & D. Mohr) Lindb.

COLLECTING SITE: 1 – siliceous rock (conf. H. Bednarek-Ochyra).

NOTES. Boreal, montane species (Düll 1984). Known in SE Europe only from Bulgaria, Romania (Sabovljević *et al.* 2008) and Greece (Papp *et al.* 2011).

\****Racomitrium aquaticum*** (Brid. ex Schrad.) Brid.

COLLECTING SITE: 1, 17 – siliceous rock; 11 – basic rock.

NOTES. Boreal, montane element (Düll 1984). Known in SE Europe in many countries, e.g., Bulgaria, Bosnia-Herzegovina, Croatia, Greece, Romania and Slovenia.

***Racomitrium canescens*** (Hedw.) Brid.

COLLECTING SITES: 2, 7 – siliceous rock; 3 – soil among limestone rocks; 13 – soil near late snow bed (in part conf. H. Bednarek-Ochyra).

***Racomitrium elongatum*** Ehrh. ex Frisvoll

COLLECTING SITES: 12 – soil among siliceous rocks; 2, 15 – acidic soil; 18 – soil (in part det./rev. H. Bednarek-Ochyra).

NOTES. Apparently not rare in Montenegro, with several recent records from the Durmitor and Prokletije Mts (Kürschner & Parolly 1997; Dragičević & Veljić 2006; Martinčić 2006; Papp & Erzberger 2010). Threat status: DD in Montenegro.

***Racomitrium lanuginosum*** (Hedw.) Brid.

COLLECTING SITES: 7 – siliceous rock; 11 – schistose rock.

NOTES. Reported as new for the Montenegrin bryophyte flora based on part of this collection (site 7: Erzberger *et al.* 2008).

***Racomitrium sudeticum*** (Funck) Bruch & Schimp.

COLLECTING SITES: 7, 8, 17 – siliceous rock; 11 – schistose rock; 13 – siliceous rock near late snow bed.

***Rhizomnium punctatum*** (Hedw.) T. J. Kop.

COLLECTING SITES: 1 – soil, stones and decaying wood; 9 – base of *Fagus* and decaying wood; 10 – soil at stream; 11 – schistose rock at rivulet; 12, 16 – wet meadow.

***Rhytidiadelphus loreus*** (Hedw.) Warnst.

COLLECTING SITES: 1, 7, 16 – soil.

***Rhytidiadelphus squarrosus*** (Hedw.) Warnst.

COLLECTING SITE: 16 – soil.

***Rhytidiadelphus triquetrus*** (Hedw.) Warnst.

COLLECTING SITES: 1, 18 – soil; 2 – decaying wood; 8 – soil among siliceous rock outcrops.

***Rhytidium rugosum*** (Hedw.) Kindb.

COLLECTING SITE: 13 – soil among limestone rocks.

***Saelania glaucescens*** (Hedw.) Broth.

COLLECTING SITES: 2 – limestone rock; 8 – siliceous rock; 14 – soil among limestone rocks.

***Sanionia uncinata*** (Hedw.) Loeske

COLLECTING SITES: 1 – decaying wood; 8, 14 – limestone rock; 7, 15 – acidic soil; 12 – peat near spring; 13 – soil near late snow bed.

***Schistidium agassizii*** Sull. & Lesq.

COLLECTING SITE: 13 – soil near late snow bed.

NOTES. From Montenegro there is an old record from the Durmitor Mts (Martinčić 1964). Threat status: VU in Montenegro and EN in Romania.

***Schistidium apocarpum*** (Hedw.) Bruch & Schimp.

COLLECTING SITES: 1 – siliceous boulder; 3 – limestone rock; 5 – siliceous boulder near stream; 6 – limestone rock in stream; 9 – siliceous and basic rock.

***Schistidium brunnescens*** Hedw. subsp. *brunnescens*

COLLECTING SITES: 14, 16 – limestone rock.

NOTES. It is a frequent *Schistidium* taxon in limestone areas. In Montenegro known from the Orjen Mts (Papp *et al.* 2008). There are several records from neighboring countries, e.g., Serbia (Papp & Erzberger 2005, 2009), Albania (Papp *et al.* 2010). Threat status: NT in Bulgaria, EN in Romania.

***Schistidium brunnescens*** Hedw. subsp. *griseum*

COLLECTING SITES: 2, 3 – basic rock (both conf. W. Schröder).

NOTES. Reported as a new species for the Montenegrin bryophyte flora from the Lovćen Mts by Erzberger and Papp (2007); also collected in the Orjen (Papp *et al.* 2008) and Durmitor Mts (Papp & Erzberger 2010). Apparently widespread on limestone rocks in the Balkans.

***Schistidium confertum*** (Funck) Bruch & Schimp.

COLLECTING SITES: 2, 7, 8 – siliceous rock.

NOTES. This is one of the most frequent *Schistidium* species on acidic rocks as evidenced by several recent collections from neighboring countries, e.g., Serbia (Papp & Erzberger 2007b; Papp *et al.* 2012), FYR Macedonia (Papp & Erzberger 2012; Papp *et al.* 2011) and Albania (Papp *et al.* 2010). From Montenegro there is one old record (Szepesfalvy 1931 – which cannot be accepted without revision) and a recent record (Dragičević & Veljić 2006; Cvetić & Sabovljević 2004). Threat status: NT in Bulgaria and Romania.

***Schistidium crassipilum*** H. H. Blom

COLLECTING SITES: 1 – concrete; 5, 9 – limestone and other basic rock; 6 – limestone rock in stream.

***Schistidium dupretii*** (Thér.) W. A. Weber

COLLECTING SITE: 1 – siliceous rock and concrete; 11, 14 – on limestone and other basic rock.

NOTES. Reported as new for the Montenegrin bryophyte flora based on part of this collection (Erzberger *et al.* 2008).

***Schistidium elegantulum*** H. H. Blom

COLLECTING SITES: 2, 9 – limestone rock.

***Schistidium papillosum*** Culm.

COLLECTING SITE: 2 – siliceous rock.

NOTES. Reported as new for the Montenegrin bryophyte flora based on this collection (Erzberger *et al.* 2008).

**\**Schistidium pruinatum*** (Wilson *ex* Schimp.) G. Roth

COLLECTING SITES: 2, 8 – siliceous rock.

NOTES. In SE Europe it is recorded in Bulgaria, Serbia (Sabovljević *et al.* 2008), Albania (Papp *et al.* 2010), FYR Macedonia (Papp *et al.* 2012), Greece (Blockeel 2010) and Romania (Stefanuț & Goia 2012).

***Schistidium rivulare*** (Brid.) Podp.

COLLECTING SITES: 1 – at stream; 11 – schistose rock at rivulet; 12 – siliceous rock at rivulet (in part conf. W. Schröder).

NOTES. Threat status: CR in Montenegro.

***Schistidium robustum*** (Nees & Hornsch.) H. H. Blom

COLLECTING SITES: 1, 5 – limestone rock.

NOTES. Reported recently for the first time in Montenegro (Erzberger & Papp 2007); known from several localities in the Durmitor Mts (Papp & Erzberger 2010).

***Schistidium umbrosum*** (J. E. Zetterst.) H. H. Blom

COLLECTING SITE: 8 – siliceous rock (det. H. Köckinger).

NOTES. Reported as new for the Montenegrin bryophyte flora based on this collection (Erzberger *et al.* 2008). Blom (1996) mentions a single specimen from SE Europe collected in Bosnia-Herzegovina.

*\*Sciuro-hypnum flotowianum* (Sendtn.) Ignatov & Huttunen

COLLECTING SITE: 9 – siliceous rock.

NOTES. This subcontinental montane element (Düll 1985) is known in SE Europe in many countries, e.g., Bulgaria, Bosnia-Herzegovina, Greece, Romania, Serbia and Slovenia (Sabovljević *et al.* 2008). Recently reported from Croatia (Papp *et al.* 2013).

*Sciuro-hypnum populeum* (Hedw.) Ignatov & Huttunen

COLLECTING SITE: 1 – siliceous rock.

*Scorpidium cossonii* (Schimp.) Hedenäs

COLLECTING SITE: 12 – peat in wet meadow.

*Scorpidium revolvens* (Sw. *ex anon.*) Rubers

COLLECTING SITE: 12 – peat in wet meadow.

*Sphagnum capillifolium* (Ehrh.) Hedw.

COLLECTING SITE: 18 – peat in spring mire.

NOTES. All *Sphagna* are red-listed (VU) in Montenegro and Serbia, because of the limited extension and threatened status of suitable wetlands.

*Sphagnum contortum* Schultz

COLLECTING SITE: 12 – peat near spring.

NOTES. Threat status: VU in Montenegro and Serbia.

*Sphagnum russowii* Warnst.

COLLECTING SITE: 18 – peat in spring mire.

NOTES. Threat status: VU in Montenegro and Serbia.

*Sphagnum squarrosum* Crome

COLLECTING SITE: 18 – peat in spring mire.

NOTES. Threat status: VU in Montenegro and Serbia.

*Sphagnum teres* (Schimp.) Lngstr.

COLLECTING SITE: 18 – peat in spring mire.

NOTES. Threat status: VU in Montenegro and Serbia.

*Syntrichia norvegica* F. Weber

COLLECTING SITES: 2 – siliceous rock; 11 – schistose rock at rivulet.

NOTES. Several recent records from high mountain areas of Montenegro, e.g., Orjen (Papp *et al.* 2008) and Durmitor Mts (Papp & Erzberger 2010), and from FYR Macedonia (Papp & Erzberger 2012; Papp *et al.* 2011). Threat status: LR in Montenegro and Serbia, NT in Bulgaria, VU in Romania.

*Syntrichia ruralis* (Hedw.) F. Weber & D. Mohr

COLLECTING SITES: 1 – concrete and siliceous rock; 2, 3 – siliceous rock and bark of *Fagus*; 3 – soil among limestone rocks; 5 – bark of *Fagus*; 6 – limestone rock in stream; 8 – limestone rock; 9 – limestone and siliceous rock, and bark of *Fagus*.

*Syntrichia virescens* (De Not.) Ochyra

COLLECTING SITES: 2 – siliceous rock and bark of *Fagus*; 5 – bark of *Sambucus nigra*.

NOTES. Reported as new for the Montenegrin bryophyte flora based on part of this collection (site 2: Erzberger *et al.* 2008). Threat status: VU in Bulgaria, LR in Serbia. Probably overlooked and under-collected. From Montenegro these are the only known sites, but from neighboring countries there are several recent records, e.g., Serbia (Papp *et al.* 2004, 2006; Papp *et al.* 2007b), Albania (Papp *et al.* 2010) and FYR Macedonia (Papp & Erzberger 2012).

***Tetraphis pellucida*** Hedw.

COLLECTING SITES: 1, 9, 10 – decaying wood.

NOTES. Red-listed (VU) in Montenegro and Serbia. In Montenegro one previous record from the Durmitor Mts (Martinčić 1964; Dragičević & Veljić 2006), but from Serbia there are several recent records (Papp and Erzberger 2005; Papp and Sabovljević 2002; Papp *et al.* 2004).

***Thamnobryum alopecurum*** (Hedw.) Gangulee

COLLECTING SITE: 5 – limestone rock.

***Thuidium assimile*** (Mitt.) A. Jaeger

COLLECTING SITES: 5, 9 – limestone rock.

***Timmia austriaca*** Hedw.

COLLECTING SITES: 2, 8, 14 – limestone rock.

***Tortella fragilis*** (Hook. & Wilson) Limpr.

COLLECTING SITE: 2 – limestone rock.

***Tortella tortuosa*** (Hedw.) Limpr.

COLLECTING SITES: 2 – siliceous and limestone rock; 3, 14 – soil among limestone rocks; 5, 9, 16 – limestone rock; 10 – bark of *Alnus*; 11 – schistose rock.

***Tortella tortuosa*** (Hedw.) Limpr. var. ***fragilifolia*** (Jur.) Limpr.

COLLECTING SITES: 2 – siliceous rock; 16 – limestone rock.

***Tortula hoppeana*** (Schultz) Ochyra

COLLECTING SITES: 2, 3, 14 – soil among limestone and other basic rocks; 7 – siliceous rock; 8 – limestone rock.

***Tortula muralis*** Hedw.

COLLECTING SITE: 1 – concrete.

***Tortula schimperi*** M. J. Cano, O. Werner & J. Guerra

COLLECTING SITE: 1 – soil.

***Tortula subulata*** Hedw.

COLLECTING SITES: 2 – siliceous rock; 9 – soil; 11 – schistose rock.

***Trichodon cylindricus*** (Hedw.) Schimp.

COLLECTING SITE: 2 – soil; 13 – soil among limestone rocks.

NOTES. Probably overlooked and under-collected. Threat status: VU in Bulgaria and Romania.

***Ulota bruchii*** Hornsch. *ex* Brid.

COLLECTING SITES: 1 – bark of *Picea abies*; 9 – bark of *Alnus incana* and *Sorbus*; 10 – bark of *Alnus incana*.

NOTES. Reported as new for the Montenegrin bryophyte flora based on part of this collection (site 1: Erzberger *et al.* 2008).

***Ulota crispa*** (Hedw.) Brid.

COLLECTING SITES: 9, 10 – bark of *Alnus incana*.

***Warnstorfia exannulata*** (Schimp.) Loeske

COLLECTING SITES: 11 – schistose rock at rivulet; 12, 18 – peat near spring and in spring mire.

***Weissia controversa*** Hedw.

COLLECTING SITE: 16 – soil.

***Weissia controversa*** Hedw. var. ***crispata*** (Nees & Hornsch.) Nyholm

COLLECTING SITE: 2 – soil.

***Zygodon rupestris*** Schimp. *ex* Lorentz

COLLECTING SITE: 10 – bark of *Alnus*.

## CONCLUSIONS

The high geological diversity and wide range of elevations in the Bjelasica Mts support a particularly rich bryophyte flora. Acidic bedrock is rather rare in Montenegro, as most mountain ranges are built of limestone, and therefore the Bjelasica Mts are of special importance for the bryophyte diversity of

the country. This is underlined by the rich liverwort flora of this mountain range. Our records comprise more than 50% of the Montenegrin hepatic flora. Mountain climate and acidic habitats appear to be the key factors for this high liverwort diversity. For the same reasons, other boreal and subalpine elements also appear in the Bjelasica Mts, many of them rarities. Therefore this region should be designated an Important Bryophyte Area of the Balkans.

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## REFERENCES

- ANONYMOUS 1995. Red Data Book of European Bryophytes. European Committee for Conservation of Bryophytes. ECCB, Trondheim.
- BECK G. & SZYSZYŁOWICZ I. 1888. *Plantae a D. ore. Szyszyłowicz in itinere per Cernagoram et in Albania adjacentes anno 1886 lectae*. Typis Universitatis Jagellonicae, Cracoviae.
- BLOCKEEL T. 2010. The bryophytes of Greece: new records and observations, 2. *Nova Hedwigia Beih.* **138**: 129–146.
- BLOM H. H. 1996. A revision of the *Schistidium apocarpum* complex in Norway and Sweden. *Bryophyt. Biblioth.* **49**: 1–333.
- CVETIĆ T. & SABOVLJEVIĆ M. 2004. New and interesting bryophyte records from Montenegro. *Phytologia Balcan.* **10**(2–3): 67–69.
- DRAGIĆEVIĆ S. & VELJIĆ M. 2006. Pregled mahovina Crne Gore. Prirodnački Muzej Crne Gore, Podgorica.
- DRAGIĆEVIĆ S., PAPP B. & ERZBERGER P. 2011. Distribution of *Buxbaumia viridis* (Moug. ex Lam. & DC.) Brid. ex Moug. & Nestl. (Bryophyta) in Montenegro. *Acta Bot. Croat.* **71**(2): 1–6.
- DÜLL R. 1983. Distribution of the European and Macaronesian liverworts (Hepaticophytina). *Bryol. Beitr.* **2**: 1–115.
- DÜLL R. 1984. Distribution of the European and Macaronesian mosses (Bryophytina) I. *Bryol. Beitr.* **4**: 1–109.
- DÜLL R. 1985. Distribution of the European and Macaronesian mosses (Bryophytina) II. *Bryol. Beitr.* **5**: 110–232.
- DÜLL R. 1995. Bryophytes of Greece. *Bryol. Beitr.* **10**: 1–229.
- DÜLL R., GANEVA A., MARTINČIĆ A. & PAVLETIĆ Z. 1999. Contributions to the bryoflora of former Yugoslavia and Bulgaria. IDH-Verlag, Bad Münstereifel.
- ERZBERGER P. & PAPP B. 2007. New and noteworthy bryophyte records from Montenegro and Serbia. *Willdenowia* **37**: 339–351.
- ERZBERGER P., PAPP B. & DRAGIĆEVIĆ S. 2008. Notes on some newly recorded bryophytes from Montenegro. *J. Bryol.* **30**: 167–170.
- GROLLE R. & LONG D. G. 2000. An annotated check-list of the Hepaticae and Anthocerotae of Europe and Macaronesia. *J. Bryol.* **22**: 103–140.
- HILL M. O., BELL N., BRUGGEMAN-NANNENGA M. A., BRUGUÉS M., CANO M. J., ENROTH J., FLATBERG K. I., FRAHM J.-P., GALLEGO M. T., GARILLETI R., GUERRA J., HEDENÄS L., HOLYOAK D. T., HYVÖNEN J., IGNATOV M. S., LARA F., MAZIMPAKA V., MUÑOZ J. & SÖDERTSRÖM L. 2006. An annotated checklist of the mosses of Europe and Macaronesia. Bryological Monograph. *J. Bryol.* **28**(3): 198–267.
- KASO G. & HADŽIABLAHOVIĆ S. 2008. National Park Biogradska gora. Natural characteristics. Tourist information. Centre for Ecology and Environmental Management, Republički zavod za zaštitu prirode Crne Gore. Podgorica.
- KÜRSCHNER H. & PAROLLY G. 1997. Additions to the bryophyte flora of the Durmitor National Park (Crna Gora) and a first conspectus of all records. *Willdenowia* **27**: 249–264.
- LAKUŠIĆ R. 1966. Vegetation of meadows and pastures on mountain Bjelasica. *God. Biol. Inst. u Sarajevu* **19**: 25–186.
- LOITLESBERGER K. 1905. Zur Moosflora der österreichischen Küstenländer. *Verh. Zool.-Bot. Ges. Wien* **55**: 475–489.
- MAIER E. 2010. The genus *Grimmia* Hedw. (Grimmiaceae, Bryophyta) a morphological-anatomical study. *Boissiera* **63**: 3–377.
- MARKA J. & SABOVLJEVIĆ M. 2011. New bryophyte records from Albania. *J. Bryol.* **33**: 74–76.
- MARKA J. & XHULAJ M. 2011. Mosses from Lura region (Albania). *International Journal of Ecosystems and Ecology Science* **1**(1): 27–30.
- MARTINČIĆ A. 1964. Beiträge zur Kenntnis der Moosflora Jugoslawiens. I. Durmitor (Montenegro). *Biološki Vestnik* **12**: 43–49.
- MARTINČIĆ A. 2003. Annotated check-list of the mosses of Slovenia. *Hacquetia* **2**(1): 91–166 (in Slovenian with English summary).
- MARTINČIĆ A. 2006. Moss flora of the Prokletije mountains (Serbia and Montenegro). *Hacquetia* **5**(1): 113–130.
- MARTINČIĆ A. 2009. Contributions to the bryophyte flora of Republic of Macedonia. *Hacquetia* **8**(2): 97–114.



- MILIKIĆ S., VELJIĆ M., MARIN D. P. & PETKOVIĆ B. 2001. Mosses of some springs of the Morača river basin. *Archives of Biological Sciences, Belgrade* **53**(1–2): 45–49.
- NATCHEVA R., GANEVA A. & SPIRIDONOS G. 2006. Red list of the bryophytes in Bulgaria. *Phytologia Balcan.* **12**(1): 55–62.
- NEBEL M. & PHILIPPI G. 2000. Die Moose Baden-Württembergs, 1. Ulmer, Stuttgart.
- PAPP B. & ERZBERGER P. 2005. The bryophyte flora of Golija-Studenica Biosphere Reserve and some adjacent sites (SW Serbia, Serbia-Montenegro). *Studia Bot. Hung.* **36**: 101–116.
- PAPP B. & ERZBERGER P. 2007a. Contribution to the bryophyte flora of Montenegro. *Studia Bot. Hung.* **38**: 79–94.
- PAPP B. & ERZBERGER P. 2007b. Contribution to the bryophyte flora of western Stara Planina Mts (E. Serbia). *Studia Bot. Hung.* **38**: 95–123.
- PAPP B. & ERZBERGER P. 2009. Contribution to the bryophyte flora of south-eastern Serbia: Suva Planina Mts and its surroundings. *Studia Bot. Hung.* **40**: 125–142.
- PAPP B. & ERZBERGER P. 2010. Contribution to the bryophyte flora of Durmitor National Park, Montenegro. *Nova Hedwigia* **138**: 145–161.
- PAPP B. & ERZBERGER P. 2011. Additions to the bryophyte flora of the Tara river canyon and Durmitor area, Montenegro. *Studia Bot. Hung.* **42**: 31–39.
- PAPP B. & ERZBERGER P. 2012. Contribution to the bryophyte flora of the Former Yugoslav Republic of Macedonia (FYROM). *Polish Bot. J.* **57**(1): 205–221.
- PAPP B. & SABOVLJEVIĆ M. 2001. Contribution to the knowledge of the bryoflora of the region of Petnica (W Serbia, Yugoslavia). *Studia Bot. Hung.* **32**: 107–120.
- PAPP B. & SABOVLJEVIĆ M. 2002. The bryophyte flora of Tara National Park (W Serbia, Yugoslavia). *Studia Bot. Hung.* **33**: 25–39.
- PAPP B., ERZBERGER P. & SABOVLJEVIĆ M. 2004. Contributions to the bryophyte flora of Kopaonik Mts (Serbia, Serbia-Montenegro). *Studia Bot. Hung.* **35**: 67–80.
- PAPP B., ERZBERGER P. & SABOVLJEVIĆ M. 2006. Contribution to the bryophyte flora of Djerdap National Park (E. Serbia). *Studia Bot. Hung.* **37**: 131–144.
- PAPP B., ERZBERGER P. & DRAGIĆEVIĆ S. 2008. Contribution to the bryophyte flora of the Orjen Mts, Montenegro. *Studia Bot. Hung.* **39**: 101–112.
- PAPP B., ERZBERGER P. & MARKA J. 2010. Contribution to the bryophyte flora of eastern Albania (Korça and Kolonja Districts). *Studia Bot. Hung.* **41**: 61–88.
- PAPP B., ERZBERGER P. & TSAKIRI E. 2011. Contribution to the bryophyte flora of Voras (Nidže) Mts (Greece and the Former Yugoslav Republic of Macedonia). *Studia Bot. Hung.* **42**: 51–76.
- PAPP B., SZURDOKI E. & SABOVLJEVIĆ M. 2012. Bryophyte flora of the Vlasina lake and its surrounding (SE Serbia). *Studia Bot. Hung.* **43**: 27–45.
- PAPP B., TSAKIRI E. & BABALONAS D. 1998. Bryophytes and their environmental conditions at Enipeas (Mt. Olympos) and Lycorrema (Mt. Ossa) streams (Greece). In: I. TSEKOS & M. MOUSTAKAS, *Progress in Botanical Research: Proceedings of the 1st Balkan Botanical Congress*, Dordrecht, Boston, pp. 129–132.
- PAPP B., ALEGRO A., ŠEGOTA V., ŠAPIĆ I. & VUKELIĆ J. 2013. Additions to the bryophyte flora of Croatia. *J. Bryol.* **35**(2): 152–155.
- PAVLETIĆ Z. & PULEVIĆ V. 1980. Prilog za briofitsku floru Crne Gore. CANU, *Glasnik Odjeljenja Prirodnih Nauka, Titograd* **3**: 111–131.
- RADOVIĆ M. & MEDENICA S. 2006. Kolašin. Sustainable development. Kolašin Developmental Board, Kolašin.
- ROS R. M., MAZIMPAKA V., ABOU-SALAMA U., ALEFFI M., BLOCKEEL T. L., BRUGUÉS M., CANO M. J., CROS R. M., DIA M. G., DIRKSE G. M., EL SAADAWI W., ERDAĞ A., GANEVA A., GONZÁLEZ-MANCEBO J. M., HERRNSTADT I., KHALIL K., KÜRSCHNER H., LANFRANCO E., LOSADA-LIMA A., REFAI M. S., RODRÍGUEZ-NUÑEZ S., SABOVLJEVIĆ M., SÉRGIO C., SHABBARA H., SIM-SIM M. & SÖDERSTRÖM L. 2007. Hepatics and Anthocerotales of the Mediterranean, an annotated checklist. *Cryptog. Bryol.* **28**(4): 351–437.
- ROS R. M., MAZIMPAKA V., ABOU-SALAMA U., ALEFFI M., BLOCKEEL T. L., BRUGUÉS M., CROS R. M., DIA M. G., DIRKSE G. M., DRAPER I., EL SAADAWI W., ERDAĞ A., GANEVA A., GABRIEL R., GONZÁLEZ-MANCEBO J. M., GRANGER C., HERRNSTADT I., HUGONNOT V., KHALIL K., KÜRSCHNER H., LOSADA-LIMA A., LUÍS L., MIFSUD S., PRIVITERA M., PUGLISI M., SABOVLJEVIĆ M., SÉRGIO C., SHABBARA H. M., SIM-SIM M., SOTIAUX A., TACCHI R., VANDERPOORTEN A. & WERNER O. 2013. Mosses of the Mediterranean, an annotated checklist. *Cryptog. Bryol.* **34**(2): 99–283.
- SABOVLJEVIĆ M. & NATCHEVA R. 2006. A check-list of the liverworts and hornworts of Southeast Europe. *Phytologia Balcan.* **12**: 169–180.
- SABOVLJEVIĆ M., CVETIĆ T. & STEVANOVIĆ V. 2004. Bryophyte red list of Serbia and Montenegro. *Biodiversity and Conservation* **13**: 1781–1790.
- SABOVLJEVIĆ M., NATCHEVA R., TSAKIRI E., DIHORU G., DRAGIĆEVIĆ S., ERDAĞ A. & PAPP B. 2008. Check-list of the mosses of SE Europe. *Phytologia Balcan.* **14**: 207–244.
- SCHIFFNER V. 1916 a. Hepaticae Litzelianae II. Ein Beitrag zur Kenntnis der Lebermoose Dalmatiens. *Verh. Zool.-Bot. Ges. Wien* **66**: 186–201.

- SCHIFFNER V. 1916b. Hepaticae Baumgartnerianae dalmaticae. *Oesterr. Bot. Z.* **66**: 1–21.
- SZEPESFALVY J. 1931. Zur Moosflora Süd-Dalmatiens. *Magyar Bot. Lapok* **30**: 137–146.
- ȘTEFANUȚ S. & GOIA I. 2012. Checklist and Red list of the Bryophytes of Romania. *Nova Hedwigia* **95**(1–2): 59–104.
- VELENOVSKY J. 1901. Ein Beitrage zur Moosflora von Montenegro. *Oesterr. Bot. Z.* **70**: 254–256.

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