

CONTRIBUTIONS TO THE BRYOPHYTE FLORA  
OF EASTERN ALBANIA  
(KORÇA AND KOLONJA DISTRICTS)

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During a field trip in July 2009 to eastern Albania, 232 bryophytes (23 liverworts and 209 mosses) were collected. Among them 72 taxa (2 liverworts, 70 mosses) are recorded for the first time in Albania: *Conocephalum salebrosum*, *Marchantia polymorpha* subsp. *montivagans*, *Abietinella abietina*, *Amphidium mougeotii*, *Aulacomnium androgynum*, *Barbula convoluta* var. *sardoa*, *Brachythecium glareosum*, *B. mildeanum*, *Bryum archangelicum*, *B. creberrimum*, *B. lonchocaulon*, *B. moravicum*, *B. pallescens*, *B. turbinatum*, *Campylophyllum calcareum*, *Didymodon ferrugineus*, *D. insulanus*, *D. spadiceus*, *Drepanocladus polygamus*, *Fabronia pusilla*, *Fissidens curvatus*, *F. gracilifolius*, *F. pusillus*, *F. viridulus*, *Grimmia anodon*, *G. decipiens*, *G. dissimulata*, *G. longirostris*, *G. montana*, *G. orbicularis*, *G. ovalis*, *G. sessitana*, *G. trichophylla*, *Gyroweisia tenuis*, *Hygroamblystegium tenax*, *Hypnum cupressiforme* var. *lacunosum*, *H. revolutum*, *H. vaucheri*, *Isoetecium myosuroides*, *Mnium marginatum*, *Nekera menziesii*, *Orthotrichum alpestre*, *O. cupulatum* var. *riparium*, *O. pumilum*, *O. rupestre*, *Oxyrrhynchium speciosum*, *Oxystegus tenuirostris*, *Phascum cuspidatum*, *Philonotis caespitosa*, *Plagiomnium elatum*, *Plagiothecium cavifolium*, *P. denticulatum*, *P. succulentum*, *Pleuridium acuminatum*, *Pogonatum aloides*, *Pohlia nutans*, *Pseudoleskeella rupestris*, *P. tectorum*, *Pterygoneurum ovatum*, *Schistidium atrofusum*, *S. brunnescens* subsp. *brunnescens*, *S. brunnescens* subsp. *griseum*, *S. confertum*, *S. crassipilum*, *S. flaccidum*, *S. helveticum*, *S. pruinatum*, *S. subflaccidum*, *Seligeria recurvata*, *Syntrichia handelii*, *S. virescens*, *Weissia brachycarpa*. Three species (*Fissidens curvatus*, *Grimmia sessitana*, *Pseudoleskea saviana*) are included in the Red Data Book of European Bryophytes.

Key words: liverworts, mosses, new and red-listed species

INTRODUCTION

Compared to many other European countries, the bryophyte flora of Albania is insufficiently explored (SABOVljević *et al.* 2001, SÖDERSTRÖM

*et al.* 2002). The main reasons have been the isolation of the country and the lack of local expertise in this particular field of botany. However, some studies, dating back to the late 19th century (HÖHNEL 1893, 1894) and the first half of the 20th century (BAUMGARTNER 1914, 1915, SZEPESFALVY 1926, MARKGRAF 1927*a, b*, 1931), are available and provide basic information and species records for interested researchers. Later PETROV (1960, 1962), KÁRPÁTI and VAJDA (1961), MEYER and GROLLE (1963, 1968) and BISCHLER *et al.* (1980) have reported on the occurrence of additional bryophyte species for Albania. These records were summarised in a preliminary checklist of the Albanian bryophytes (COLACINO and SABOVLJEVIĆ 2006), in which 3 hornworts, 86 liverworts and 238 mosses were shown. Also, in the checklist of hornworts and liverworts for SE Europe (SABOVLJEVIĆ and NATCHEVA 2006), 3 hornworts and 88 liverworts were mentioned from Albania. SABOVLJEVIĆ *et al.* (2008) have reported 219 species in the checklist of mosses of SE Europe. The numerical deviation between these checklists results from taxonomic and nomenclatural differences. In recent years various authors have shown interest in the investigation of the Albanian bryoflora, a process that has revealed new data including those of ERZBERGER (2007), PAPP *et al.* (2009), COLACINO and MARKA (2009) and MARKA and SABOVLJEVIĆ (2010).

Specifically from Korça prefecture, 16 liverworts have been reported, 15 species by PETROV (1960) and 1 species by PAPP *et al.* (2009). Moreover, 61 mosses have been listed, 58 by PETROV (1960, 1962) and 3 by PAPP *et al.* (2009).

## MATERIALS AND METHODS

### Description of the investigated area

Korça is one of the largest administrative regions (prefectures) of Albania located in the southeastern part of the country, divided into four districts (District of Korça, Kolonja, Devolli and Pogradeci). From a physico-geographical aspect, it belongs to the southeastern segment of the central mountainous region. The central mountainous region is one of the four main geographical regions of Albania and also the largest one (250 × 80 km, 13,108 km). The southeastern part of the central mountainous region (110 × 50 km, ca 5,000 km) is subdivided into ca 15 units (*e.g.* mountain ranges, valleys, depressions, etc.) (KABO 1991). It has a complex geology, with Triassic-Jurassic and Cretaceous limestone, flysch, ultra basics, etc. The climate is typically continental-temperate, with low tempera-

tures, low precipitation throughout the year, but with more humid summers compared to other regions of Albania, with the exception of the Albanian Alps. The hydrological network comprises the upper sections of the Devolli, Osumi and Shkumbini rivers, and a few small tributaries. However, the region has no rich water resources.

For the area visited during our field trip some of the major characteristics will be mentioned, mainly based on literature information.

### *Big Prespa Lake*

This region is situated east of Mt Mali i Thatë from 853 m up to 1,200 m a.s.l. (KABO 1991). It has relatively cool summers (mean July–August temperature is *ca* 20 °C) and cold winters (average January temperature is 0.8 °C). Annual average temperature is 10.7 °C, with the absolute minimum –17.8 °C and absolute maximum 35.5 °C. It has low precipitation values with an annual average of 889 mm, most of it falling in autumn (305 mm). It has a sparse hydrological network. It also has a rather secondary vegetation cover, among the woody plants mainly with oak species.

### *Moraves Mountains*

The Moraves Mountains are confined to the plateau of Korça in the west, with the upper part of Devolli valley in the east and the Kolonja depression in the south. The bed-rock is composed of molasses, ultra basics and limestone (KABO 1991). The altitudinal range of the Moraves Mountains extends from 900 to 2,043 m a.s.l., with a prevalence of the altitudes above 1,100 m.

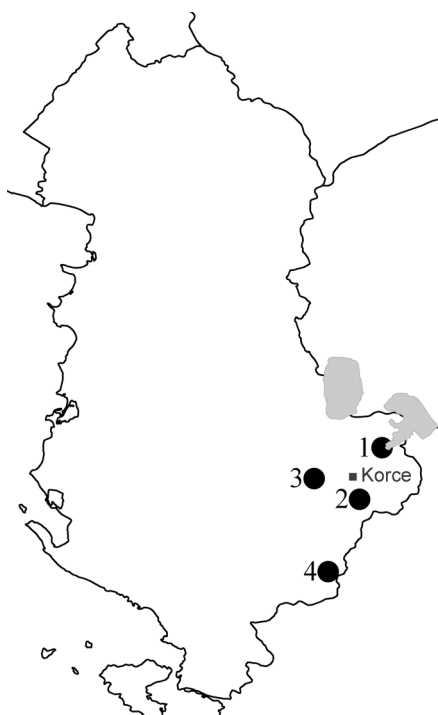
### *The mountainous region between Devolli and the upper section of the Osumi river*

The mountain area of Voskopoja is situated in the northern segment of the southeastern part of the central mountainous region with altitudes between 600 and 1,650 m a.s.l., with a prevalence of the altitudes above 1,100 m (KABO 1991). Annual mean temperature is 10 °C. The highest monthly average temperatures (*ca* 20 °C) are registered in July and August, and the lowest in January (–2 °C). The absolute minimum temperature for the whole country (–30.4 °C) is also recorded in Voskopoja. The vegetation is composed of mixed forests of beech, pine, and oak. At the highest altitudes lush alpine meadows can be found. The mountainous area of Vithkuq is situated south of Voskopoja, with altitudes from 1,000 m up to 2,380 m a.s.l.

### *Kolonja depression*

This region is situated south from the Qarri Pass, bordered by the Kolonja Mountains from the southwest, and by Mt Gramozi from the east. Extending *ca* 20 km from north to south, and varying 1 to 9 km in east–west direction, it covers an area of 108 km<sup>2</sup>. The Kolonja depression has an irregular relief with altitudes from 550 to 1,200 m a.s.l.

It has a temperate climate, influenced by the relatively high altitudes of the surrounding mountains, and passes noted for winds of varying direction and often rather high speed. The annual mean temperature is 9.8 °C, with mean value for January 0.6 °C and for August 18.6 °C. Temperature fluctuations are less extensive than those in the Korça region, since Kolonja is a more ventilated place, which also affects the highest/lowest temperature records (measured here as 34.9 °C and –19.5 °C, respectively). Precipitation, with the annual average of 943 mm, is somewhat lower than in the surrounding areas. The wettest season is winter (319.3 mm) followed by the autumns with almost the same value. The driest season is summer with precipitations one third of that of the winters; an important factor is the snow cover, which stays for 30 to 40 days per year. The area has a well-developed natural network of intermittent streambed system, mostly delivering water only after big rains and at times of snow melting.



**Fig. 1.** Location of the investigated areas. 1 = Lake Prespa, 2 = Moraves Mts, 3 = surroundings of Voskopojë, 4 = surroundings of Sheguri reserve

## Methods

The collecting trip was made in July 2009. The investigated area is shown in Figure 1. All main habitat types, such as stream valleys, gorges, forests and grasslands were investigated, and bryophytes collected from different substrates (soil, exposed and shady rocks, tree bark, decaying wood, etc.).

The specimens have been shared between the participating parties and are preserved in the Herbarium of the Hungarian Natural History Museum, Budapest (BP), the Herbarium of the Botanical Museum Berlin-Dahlem (B), and the Department of Biology, Faculty of Natural Sciences, Tirana University (J. Marka collection).

Nomenclature of the species follows GROLLE and LONG (2000) for liverworts and mainly HILL *et al.* (2006) for mosses, with some exceptions (e.g. *Bryum lonchocaulon*, *Grimmia sessitana*). New floristical results for the country are given according to the checklists of southeastern Europe (SABOVLJEVIĆ and NATCHEVA 2006, SABOVLJEVIĆ *et al.* 2008) and the preliminary checklist for Albania (COLACINO and SABOVLJEVIĆ 2006). The conservation value of the bryoflora was analysed on the basis of the Red Data Book of European Bryophytes (ECCB 1995).

## Site details

1. Albania, District of Korça, Voskopoja, N of the village, along the road to Krushova, serpentine, 40°39'01.1" N, 20°34'59.3" E, 1,155 m, 19.07.2009.
2. Albania, District of Korça, Voskopoja, S of the village (direction Lekas), wet meadow and *Juniperus* shrubs, 40°37'21.8" N, 20°35'35.8" E, 1,280 m 20.07.2009.
3. Albania, District of Korça, Voskopoja, S of the village, along the road to Vithkuq through the mountain, serpentine, 40°34'09.7" N, 20°35'58.3" E, 1,415 m 20.07.2009.
4. Albania, District of Korça, Voskopoja, S of the village, along the road to Vithkuq through the mountain, serpentine, 40°34'18.6" N, 20°35'02.0" E, 1,435 m, 20.07.2009.
5. Albania, District of Korça, Voskopoja, along the road to Gjergjevica, wet serpentine rock wall, 40°35'02.6" N, 20°35'03.9" E, 1,305 m, 20.07.2009.
6. Albania, District of Korça, Voskopoja, along the road to Gjergjevica, serpentine, 40°35'03.8" N, 20°34'21.1" E, 1,175 m, 20.07.2009.
7. Albania, District of Korça, Moraves Mts, *Abies* forest at Drenova village (National Park Bredhi Drenoves), 40°34'46.1" N, 20°50'30.8" E, 1,350 m, 21.07.2009.
- 7x. Albania, District of Korça, Moraves Mts, Guri i Cjapit at Drenova village, conglomerate rock, 40°35'25.8" N, 20°50'51.4" E, 1,510 m, 21.07.2009.
8. Albania, District of Korça, Moraves Mts, in Dardha village, artificial rock wall, 40°31'09.9" N, 20°49'39.6" E, 1,311 m, 21.07.2009.
9. Albania, District of Korça, Moraves Mts, W of Dardha village, stream in *Fagus* shrub forest, conglomerate and flysch, 40°31'25.1" N, 20°48'52.8" E, 1,415 m, 22.07.2009.
10. Albania, District of Korça, Moraves Mts, a peak NW of Dardha village, conglomerate and flysch, 40°31'55.1" N, 20°48'44.6" E, 1,670 m, 22.07.2009.

11. Albania, District of Korça, Moraves Mts, S of Dardha along the road to Arrëz village, *Quercus trojana* forest, conglomerate and flysch, 40°30'11.7" N, 20°49'49.3" E, 1,295 m, 22.07.2009.
12. Albania, District of Korça, Moraves Mts, E of Dardha, Mt Gurit të Vjeshtës, grey clayey schist and limestone rocks, 40°31'22.0" N, 20°49'42.3" E, 1,270 m, 23.07.2009.
13. Albania, District of Korça, Moraves Mts, stream N of Dardha, limestone and flysch, 40°31'47.7" N, 20°49'36.1" E, 1,270 m, 23.07.2009.
14. Albania, District of Korça, Moraves Mts, along the road between Dardha and Sinica villages, spring on grey clayey schist, 40°31'08.3" N, 20°50'28.5" E, 1,205 m, 23.07.2009.
15. Albania, District of Korça, Moraves Mts, along the road between Dardha and Sinica villages, deep stream valley with limestone rocks, 40°31'10.6" N, 20°50'55.2" E, 1,150 m, 23.07.2009.
16. Albania, District of Korça, Lake Prespa at Liqenas village, limestone rocks, rock wall, 40°46'37.1" N, 20°54'32.3" E, 850 m, 24.07.2009.
17. Albania, District of Kolonja, Gërmenj along the road from Erseka to Leskovik, stream valley at Taverna Peshku, serpentine and limestone rocks, *Alnetum*, 40°12'18.1" N, 20°39'52.6" E, 1,075 m, 25.07.2009.
18. Albania, District of Kolonja, along the road from Erseka to Leskovik, at the crossroad to Radanj village, exposed limestone rocks, 40°12'36.9" N, 20°37'53.7" E, 1,095 m, 25.07.2009.
- 18x. Albania, District of Kolonja, at the Shelegur Ice Lake, along the road from Erseka to Leskovik, 40°10'48.7" N, 20°38'50.4" E, 1,005 m, 25.07.2009.
19. Albania, District of Kolonja, Shelegur reserve along the road from Erseka to Leskovik, between Radanj and Shelegur Ice lake, just eastward at the crossroad to Radanj village, shaded limestone rocks, 40°12'09.0" N, 20°38'17.4" E, 1,105 m, 25.07.2009.
20. Albania, District of Kolonja, Shelegur reserve along the road from Erseka to Leskovik, between Radanj and Shelegur Ice Lake, just eastward at the crossroad to Radanj village, shaded limestone rocks, 40°11'56.4" N, 20°38'25.1" E, 1,160 m, 26.07.2009.
21. Albania, District of Kolonja, Gërmenj, along the road from Erseka to Leskovik, road into the forest under Taverna Jorgos, shaded limestone rocks, 40°13'49.2" N, 20°39'45.4" E, 1,036 m, 26.07.2009.
22. Albania, District of Kolonja, Gërmenj, along the road from Erseka to Leskovik, stream valley under Taverna Jorgos, limestone rocks, 40°13'33.5" N, 20°39'50.2" E, 1,050 m, 26.07.2009.

## RESULTS AND DISCUSSION

Altogether 232 bryophyte taxa (23 liverworts and 209 mosses) were collected during our field trip. 72 taxa (2 liverworts, 70 mosses) are recorded for the first time in Albania (\*).

## List of the species

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

## Hepaticae

- Aneura pinguis* (L.) Dumort. – 13: on rock at stream; 14: on schist at spring  
*Barbilophozia barbata* (Schreb.) Loeske – 20: on limestone  
*Cephaloziella divaricata* (Sm.) Schiffn. – 1, 3, 4, 6: on soil over serpentine; 7, 13, 22: on soil  
 \* *Conocephalum salebrosum* Szweykowski, Buczkowska et Odrzykoski – 9: on soil at the stream  
*Frullania dilatata* (L.) Dumort. – 1: on serpentine; 11: on the bark of *Quercus*; 12: on tree bark (cf. *Carpinus*); 17: on the bark of *Alnus* and *Salix*; 21: on limestone  
*Frullania tamarisci* (L.) Dumort. – 21: on soil over limestone; 22: on limestone  
*Jungermannia atrovirens* Dumort. – 9: on wet rock (conf./ det. L. Meinunger)  
*Leiocolea badensis* (Gottsche) Jörg. – 15: on limestone  
*Leiocolea collaris* (Nees) Schljakov – 15: on limestone  
*Leiocolea turbinata* (Raddi) H. Buch – 17: on soil at stream; 22: on perpendicular face of travertine  
*Lophocolea bidentata* (L.) Dumort. var. *bidentata* – 17: on soil at the stream  
*Lophocolea heterophylla* (Schrader) Dumort. – 22: on rotting wood near the stream  
*Marchantia polymorpha* L. subsp. *polymorpha* – 1: on moist soil  
 \* *Marchantia polymorpha* L. subsp. *montivagans* Bisch. et Boisselier – 1: on soil near the stream  
*Pellia endiviifolia* (Dicks.) Dumort. – 1, 2, 13, 17, 22: on soil; 5: on wet serpentine; 9: on clay at the stream; 14: on schist at spring; 15: on limestone  
*Plagiochila porelloides* (Torrey ex Nees) Lindenb. – 4: on serpentine; 7, 9, 13, 17: on soil; 12: on the bark of *Fagus*; 15, 20, 22: on limestone  
*Porella baueri* (Schiffn.) C. E. O. Jensen – 12: on limestone  
*Porella cordaeana* (Huebener) Mohr – 9: on the bark of *Fagus*; 12: on limestone and on schist; 13: on rock at the stream  
*Radula complanata* (L.) Dumort. – 1: on serpentine; 7: on the bark of *Abies*; 9: on the bark of *Fagus*; 12: on the bark of *Prunus*; 13: on rock near the stream; 17: on the bark of *Alnus* and *Salix*; 20: on limestone; 22: on rotting wood  
*Reboulia hemisphaerica* (L.) Raddi – 19: on soil over limestone  
*Riccia ciliifera* Link ex Lindenb. – 10: on soil (f. *pedemontana* Steph., det. K.-F. Günther)  
*Scapania aspera* M. Bernet et Bernet – 20, 21: on limestone  
*Southbya tophacea* (Spruce) Spruce – 22: on perpendicular face of travertine

## Musci

- \* *Abietinella abietina* (Hedw.) M. Fleisch. – 1: on serpentine
- Amblystegium serpens* (Hedw.) Schimp. – 1: on serpentine; 12: on the bark of *Prunus*; 22: on rotting wood near the stream
- \* *Amphidium mougeotii* (Schimp.) Schimp. – 4, 6: on serpentine; 7x: in rock crevices
- Anomodon viticulosus* (Hedw.) Hook. et Taylor – 15, 16, 19, 20, 21: on limestone
- \* *Aulacomnium androgynum* (Hedw.) Schwägr. – 17: on rotting wood
- Barbula convoluta* Hedw. var. *convoluta* – 1: on soil over serpentine; 7, 10, 13: on soil; 15, 16, 18: on soil over limestone
- \* *Barbula convoluta* Hedw. var. *sardoa* Schimp. – 8: on artificial rock wall
- Barbula unguiculata* Hedw. – 1: on stones of a bridge; 2, 7, 13, 16, 19, 22: on soil; 6: on soil over serpentine; 7x: on conglomerate rock; 10, 12: on soil over limestone; 17: in rock crevices
- Bartramia ithyphylla* Brid. – 7, 9, 10: on soil; 12: on limestone and on soil over schist
- Brachytheciastrum velutinum* (Hedw.) Ignatov et Huttunen – 1, 13, 21: on rotting wood; 3, 4: on serpentine; 7: on soil and on the bark of *Pinus*, *Abies* and other trees; 9: on soil, rock and on the bark of *Fagus*; 10, 11, 22: on soil; 12: on limestone and on the bark of *Fagus*; 17: on soil and on the bark of *Salix*
- Brachythecium albicans* (Hedw.) Schimp. – 1, 2, 10, 20: on soil
- \* *Brachythecium glareosum* (Bruch ex Spruce) Schimp. – 1, 2, 3, 6, 7, 9, 13, 15: on soil; 17: on rock
- \* *Brachythecium mildeanum* (Schimp.) Schimp. – 2, 9: on soil
- Brachythecium rivulare* Schimp. – 1, 9: on soil near the stream; 13, 15, 22: on soil; 17: on soil near the stream and on the bark of *Alnus*
- Brachythecium rutabulum* (Hedw.) Schimp. – 1, 2, 7, 9, 13: on soil; 15, 16: on limestone
- Brachythecium salebrosum* (Hoffm. ex F. Weber et D. Mohr) Schimp. – 9: on soil
- Bryoerythrophyllum recurvirostrum* (Hedw.) P. C. Chen – 1: on serpentine and on stones of a bridge; 4: on serpentine; 7, 9, 15: on soil; 10: on rock; 12, 21: on limestone
- Bryum alpinum* Huds. ex With. – 1: on soil over serpentine; 2, 6: on soil; 3: on serpentine
- \* *Bryum archangelicum* Bruch et Schimp. – 3: on soil (det. W. Schröder)
- Bryum argenteum* Hedw. – 1, 10, 12, 20: on soil; 16: on concrete
- Bryum caespiticiu*m Hedw. – 1: on stones of a bridge; 4: on soil over serpentine; 7, 10: on soil; 7x: on conglomerate rock; 12, 16: on soil over limestone
- Bryum capillare* Hedw. – 1, 4: on soil over serpentine; 7, 9, 13, 17, 21: on soil; 7x: on conglomerate rock; 10: in rock crevices; 12, 16, 20: on soil over limestone
- \* *Bryum creberrimum* Taylor – 10: on soil
- Bryum dichotomum* Hedw. – 1, 16: on soil
- Bryum gemmiparum* De Not. – 1: on rock near a stream (conf. W. Schröder)
- Bryum kunzei* Hornsch. – 10: on soil (det. W. Schröder)
- \* *Bryum lonchocaulon* Müll. Hal. – 1: on soil over serpentine (det. W. Schröder)

- \* *Bryum moravicum* Podp. – 1: on serpentine; 9: on the bark of *Fagus*; 17: on the bark of *Alnus*
- \* *Bryum pallescens* Schleich. ex Schwägr. – 3, 12, 17: on soil (conf. W. Schröder); 17: on rotting wood (det. W. Schröder)
- Bryum pseudotriquetrum* (Hedw.) P. Gaertn. et al. var. *pseudotriquetrum* – 2: on soil; 5, 6: on serpentine; 9, 13, 17: on soil near the stream; 22: on soil and molasse
- Bryum torquescens* Bruch et Schimp. – 16, 20: on soil (both det. W. Schröder)
- \* *Bryum turbinatum* (Hedw.) Turner – 5: on wet serpentine
- Calliergonella cuspidata* (Hedw.) Loeske – 1, 2, 9, 13: on soil; 19: in a wet meadow
- Campyliadelphus chrysophyllus* (Brid.) R. S. Chopra – 1: on soil over serpentine; 2, 3, 7, 9, 13, 17, 20: on soil; 14: on schist at spring; 15: on rock
- Campylium protensum* (Brid.) Kindb. – 1: on rock
- \* *Campylophyllum calcareum* (Crundw. et Nyholm) Hedenäs – 16: on soil; 17: in rock crevices
- Ceratodon purpureus* (Hedw.) Brid. – 3: on soil over serpentine; 7, 10, 16, 17, 20: on soil
- Cirriphyllum crassinervium* (Taylor) Loeske et M. Fleisch. – 15, 16, 19, 20, 22: on limestone; 7x: on conglomerate rock
- Cratoneuron filicinum* (Hedw.) Spruce – 1, 2: on soil and on stones in stream; 5, 6: on serpentine; 9, 13: on stones in the stream; 17: on limestone in the stream; 20, 22: on soil at the stream
- Crossidium squamiferum* (Viv.) Jur. – 1: on serpentine; 12, 18: on limestone
- Ctenidium molluscum* (Hedw.) Mitt. – 2: on soil; 12, 15, 19, 20, 21, 22: on limestone
- Dichodontium pellucidum* (Hedw.) Schimp. – 9: on stones in the stream
- Dicranella howei* Renauld et Cardot – 12: on soil over limestone; 7, 17: on soil
- Dicranella varia* (Hedw.) Schimp. – 1: on moist clay; 9, 13, 17: on soil at the stream; 12: on soil; 14: on schist at a spring
- Dicranum scoparium* Hedw. – 1: on the bark of *Pinus*; 2, 4, 6: on soil over serpentine; 7, 9, 15, 17, 19: on soil; 16, 20, 21: on limestone
- Didymodon acutus* (Brid.) K. Saito – 1: soil over serpentine; 11, 12, 15, 16, 18, 19, 20: on soil over limestone
- Didymodon fallax* (Hedw.) R. H. Zander – 1, 7, 10, 13: on soil; 9: on soil at the stream; 12, 15, 18: on soil over limestone
- \* *Didymodon ferrugineus* (Schimp. ex Besch.) M. O. Hill – 1: on soil over serpentine
- \* *Didymodon insulanus* (De Not.) M. O. Hill – 1: on serpentine and on stones of a bridge; 7, 17: on soil; 8: on artificial rock wall; 9: on the bottom of a *Fagus*; 11: on siliceous rock; 15, 19, 20, 22: on limestone
- Didymodon luridus* Hornsch. – 1: on stones in dry streambed; 12, 17: on limestone
- Didymodon rigidulus* Hedw. – 1: on serpentine; 7: on sandstone; 8: on artificial rock wall; 12, 19: on limestone; 20: on soil; 21: in rock crevices
- Didymodon sinuosus* (Mitt.) Delogne – 16: on limestone
- \* *Didymodon spadiceus* (Mitt.) Limpr. – 9, 13: on rock near the stream; 14: on schist at a spring; 15: on limestone

- Didymodon tophaceus* (Brid.) Lisa – 1: on rocks near the stream; 5, 6: on serpentine; 14: on schist at spring; 17: on soil at the stream bank; 22: on limestone
- Didymodon vinealis* (Brid.) R. H. Zander – 7x, 16 (rev. J. Kučera): on limestone; 22: on soil
- Didymodon vinealis* agg. – 12: on soil over schist; 16: on limestone (det. J. Kučera)
- Distichium capillaceum* (Hedw.) Bruch et Schimp. – 12, 15, 21: on limestone
- Ditrichum flexicaule* (Schwägr.) Hampe – 1, 3, 6: on soil over serpentine; 12: on limestone and on soil over schist; 16, 18, 19, 20, 21: on limestone
- Ditrichum gracile* (Mitt.) Kuntze – 1, 6, 17: on soil over serpentine; 19, 20, 21: on limestone
- Drepanocladus aduncus* (Hedw.) Warnst. – 2: on soil
- \* *Drepanocladus polygamus* (Schimp.) Hedenäs – 17: on soil
- Encalypta ciliata* Hedw. – 9, 13: on soil
- Encalypta streptocarpa* Hedw. – 1, 5, 6: on serpentine; 7: on soil and on base-rich rock; 9, 10: on rock; 12: on limestone and on soil; 15, 21: on limestone; 17, 19, 20: on soil
- Encalypta vulgaris* Hedw. – 1: on stones of a bridge; 3: on soil over serpentine; 10: on rock; 12: on soil over limestone; 16, 18, 20: on limestone
- Eucladium verticillatum* (With.) Bruch et Schimp. – 1, 6, 17: on serpentine; 16: on limestone; 22: on perpendicular face of travertine
- Eurhynchiastrum pulchellum* (Hedw.) Ignatov et Huttunen – 4, 7, 9, 10, 12, 13: on soil
- Eurhynchium striatum* (Hedw.) Schimp. – 6: on soil
- \* *Fabronia pusilla* Raddi – 21: on limestone
- Fissidens bryoides* Hedw. – 13: on soil near the stream
- \* *Fissidens curvatus* Hornsch. – 13: on soil near the stream
- Fissidens dubius* P. Beauv. – 3, 4: on soil over serpentine; 9: on soil; 15, 17, 20, 21, 22: on limestone
- \* *Fissidens gracilifolius* Brugg.-Nann. et Nyholm – 9: on stones at the stream; 16: on limestone
- \* *Fissidens pusillus* (Wilson) Milde – 9: on stones in the stream
- Fissidens taxifolius* Hedw. – 7, 9, 13, 15, 17, 22: on soil
- \* *Fissidens viridulus* (Sw. ex anon.) Wahlenb. – 7: on soil (conf./det. W. Schröder); 10: on soil (conf. Th. Homm)
- Funaria hygrometrica* Hedw. – 1: on stone; 5: serpentine; 7, 17: on soil
- \* *Grimmia anodon* Bruch et Schimp. – 1: on serpentine; 12: on rock (conf. E. Maier)
- \* *Grimmia decipiens* (Schultz) Lindb. – 6: on serpentine rock (det. E. Maier)
- \* *Grimmia dissimulata* E. Maier – 12: on schist (rev. E. Maier); 16: on limestone (conf. E. Maier); 18, 19, 20, 21, 22: on limestone (conf./rev. E. Maier)
- Grimmia laevigata* (Brid.) Brid. – 3: on serpentine; 18x: on boulder (conf. E. Maier); 19: on sandstone; 20: on siliceous rock (conf. E. Maier)
- \* *Grimmia longirostris* Hook. – 4: on serpentine (rev. E. Maier)
- \* *Grimmia montana* Bruch et Schimp. – 3: on serpentine (conf./rev. E. Maier); 7x: on conglomerate rock (conf. E. Maier)

- Grimmia muehlenbeckii* Schimp. – 3, 4, 6: on serpentine (conf./rev. E. Maier); 20: on siliceous rock (conf. E. Maier)
- \* *Grimmia orbicularis* Bruch ex Wilson – 12, 17, 18: on limestone (conf. E. Maier)
- \* *Grimmia ovalis* (Hedw.) Lindb. – 1, 3, 4: on serpentine; 6: on rock; 7x: on conglomerate rock (conf. E. Maier); 11: on siliceous rock; 12, 20: on limestone
- Grimmia pulvinata* (Hedw.) Sm. – 1, 2, 3: on serpentine; 7: on sandstone; 7x: on conglomerate rock; 8: on artificial rock wall; 9: on stones; 10, 11, 17: on rock; 12, 16, 18, 20: on limestone; 19: on the bark of *Juglans*
- \* *Grimmia sessitana* De Not. – 3: on serpentine (conf. E. Maier)
- Grimmia tergestina* Tomm. ex Bruch et Schimp. – 1: on serpentine (conf./rev. E. Maier); 7x: on conglomerate rock (conf. E. Maier); 6, 10: on rock (conf. E. Maier); 12: on schist and on limestone (conf. E. Maier); 15, 18: on limestone
- \* *Grimmia trichophylla* Grev. – 7: on sandstone (conf. E. Maier); 7x: on conglomerate rock (conf. E. Maier); 11: on siliceous rock (conf./rev. E. Maier)
- Gymnostomum aeruginosum* Sm. – 5, 6: on serpentine; 9: on wet rock; 16: on limestone; 22: in rock clefts (molasse)
- Gymnostomum calcareum* Nees et Hornsch. – 16: on limestone
- Gymnostomum viridulum* Brid. – 12, 16: on limestone
- \* *Gyroweisia tenuis* (Hedw.) Schimp. – 9, 13: on stones at the stream; 16: on limestone
- Homalothecium lutescens* (Hedw.) H. Rob. – 1, 2, 6, 7, 9, 12, 16, 17, 19: on soil; 20, 21: on limestone
- Homalothecium philippeanum* (Spruce) Schimp. – 7: on base-rich rock; 7x: on the bark of *Prunus*; 9: on the bark of *Fagus* and on soil; 12: on the bark of *Salix*; 15: on limestone and on the bark of *Fagus*
- Homalothecium sericeum* (Hedw.) Schimp. – 1: on serpentine and on the root of *Pinus*; 7: on the bark of *Pinus*; 8: on artificial rock wall; 9: on the bark of *Fagus*; 11: on the bark of *Quercus* and on conglomerate rock; 12: on limestone, on schist and on the bark of *Fagus*, *Carpinus* and *Salix*; 13: on stone; 16, 18, 20: on limestone; 19: on the bark of *Juglans* and on limestone; 21: on limestone and on the bark of *Quercus*
- \* *Hygroamblystegium tenax* (Hedw.) Jenn. – 17: on stone in the stream
- Hygrohypnum luridum* (Hedw.) Jenn. – 9, 13: on wet rock; 15, 22: on limestone rock in the stream
- Hylocomium splendens* (Hedw.) Schimp. – 6: on soil
- Hypnum cupressiforme* Hedw. var. *cupressiforme* – 1: on serpentine and on the root of *Pinus*; 2, 4, 13, 17: on stone; 6: on serpentine; 7: on soil and on the bark of *Abies*; 11: on soil, on rock and on the bark of *Quercus*; 12: on soil; 9, 16, 19, 20, 21: on limestone
- \* *Hypnum cupressiforme* Hedw. var. *lacunosum* Brid. – 1, 2, 3, 4: on soil over serpentine; 7: on soil; 16, 18, 19, 20: on soil over limestone
- \* *Hypnum revolutum* (Mitt.) Lindb. – 1: on serpentine
- \* *Hypnum vaucheri* Lesq. – 21: on limestone

- Isothecium alopecuroides* (Lam. ex Dubois) Isov. – 5, 13: on soil; 6: on serpentine; 7: on soil and on the base of trees; 9: on soil and on the bark of *Fagus*; 11: on the bark of *Quercus*; 15: on limestone and on the bark of *Fagus*; 17: on the bark of *Pinus*; 20, 21: on limestone
- \* *Isothecium myosuroides* Brid. – 16: on limestone
- Leptodon smithii* (Hedw.) F. Weber et D. Mohr – 16, 19, 20, 21: on limestone
- Leucodon sciuroides* (Hedw.) Schwägr. – 11: on rock and on the bark of *Quercus*; 12: on limestone and on the bark of *Salix*; 16, 17, 20, 21: on limestone; 19: on the bark of *Juglans*
- \* *Mnium marginatum* (Dicks.) P. Beauv. – 9, 13: on soil
- Mnium stellare* Hedw. – 7: on soil and on base-rich rock; 9, 13, 15, 20: on soil; 12: on limestone and on the bark of *Fagus*
- Neckera besseri* (Lobarz.) Jur. – 19, 20, 21: on limestone
- Neckera complanata* (Hedw.) Huebener – 15: on limestone and on the bark of *Fagus*; 16, 19, 20, 21: on limestone
- Neckera crispa* Hedw. – 19, 20: on limestone
- \* *Neckera menziesii* Drumm. – 15: on limestone and on the bark of *Fagus*; 19, 20, 21: on limestone
- Orthotrichum affine* Schrad. ex Brid. – 2: on the bark of *Juniperus* and on stones in stream; 7: on the bark of *Abies*, *Fagus* and *Pinus*; 11: on the bark of *Quercus*; 12: on the bark of *Fagus*, *Fraxinus ornus* and *Salix*; 13: on the bark of *Fagus*; 17: on the bark of *Alnus* and *Salix*; 19: on the bark of *Juglans*; 20: on the bark of *Tilia*
- \* *Orthotrichum alpestre* Bruch et Schimp. – 9: on the bark of *Fagus* (conf. R. Garilleti)
- Orthotrichum anomalum* Hedw. – 1: on serpentine; 2: on limestone in stream; 11: on conglomerate rock; 12: on limestone and on schist; 16, 17, 18, 20: on limestone; 19: on limestone and on the bark of *Juglans*
- Orthotrichum cupulatum* Hoffm. ex Brid. var. *cupulatum* – 1: on serpentine; 2: on limestone in stream; 8: on artificial rock wall; 9, 11: on rocks; 12, 16, 17, 19, 20, 21, 22: on limestone
- \* *Orthotrichum cupulatum* Hoffm. ex Brid. var. *riparium* Huebener – 1: on rocks at the stream; 22: on limestone rock in the stream
- Orthotrichum lyellii* Hook. et Taylor – 7: on the bark of *Abies* and *Fagus*; 11: on soil and on the bark of *Quercus*; 12, 17: on the bark of *Alnus* and *Salix*; 19: on the bark of *Juglans*; 22: on the bark of *Salix*
- Orthotrichum pallens* Bruch ex Brid. – 7: on the bark of tree; 9: on the bark of *Fagus*; 12: on the bark of *Salix*; 17: on the bark of *Alnus*
- \* *Orthotrichum pumilum* Sw. – 7x: on the bark of *Fagus*; 11: on the bark of *Quercus*
- \* *Orthotrichum rupestre* Schleich. ex Schwägr. – 1, 3, 4, 17: on serpentine; 9, 12: on the bark of *Fagus*; 11: on rock and on the bark of *Quercus*
- Orthotrichum shawii* Wilson – 9: on the bark of *Fagus* (conf. R. Garilleti)
- Orthotrichum speciosum* Nees – 2: on the bark of *Juniperus*; 4: on serpentine rock; 7, 12: on the bark of *Fagus* and *Salix*; 7x, 9: on the bark of *Fagus*; 17: on the bark of *Alnus*

- and *Salix*; 19: on the bark of *Juglans*; 20: on the bark of *Tilia*; 22: on the bark of *Salix*
- Orthotrichum stramineum* Hornsch. ex Brid. – 7, 9, 12: on the bark of *Fagus*; 11: on the bark of *Quercus*; 17: on the bark of *Salix*
- Orthotrichum striatum* Hedw. – 2: on the bark of *Juniperus*; 7, 9, 12: on the bark of *Fagus*; 11: on the bark of *Quercus*; 13, 19: on the bark of *Salix*; 17: on the bark of *Alnus* and *Salix*; 20: on the bark of *Tilia*
- Oxyrrhynchium hians* (Hedw.) Loeske – 12, 13, 20: on soil; 15, 22: on soil near the stream
- Oxyrrhynchium schleicheri* (R. Hedw.) Röhl – 13: on soil
- \* *Oxyrrhynchium speciosum* (Brid.) Warnst. – 1: on humid soil
- \* *Oxystegus tenuirostris* (Hook. et Taylor) A. J. E. Sm. – 9: on rocks at the stream
- Palustriella commutata* (Hedw.) Ochyra – 2: on soil; 5: on serpentine; 9: on stones in the stream; 13, 17: on soil and on rock in the stream; 14: on schist at a spring; 21: in a wet meadow; 22: on limestone rock in the stream
- Palustriella falcata* (Brid.) Hedenäs – 2: on soil; 5: on serpentine; 9, 17: on stones in the stream
- \* *Phascum cuspidatum* Hedw. – 13: on soil
- \* *Philonotis caespitosa* Jur. – 1: on soil near the stream
- Philonotis calcarea* (Bruch et Schimp.) Schimp. – 2, 9, 13: on soil; 19, 21: in a wet meadow
- Philonotis fontana* (Hedw.) Brid. – 1: on humid soil
- Plagiomnium affine* (Blandow ex Funck) T. J. Kop. – 1: on humid soil
- \* *Plagiomnium elatum* (Bruch et Schimp.) T. J. Kop. – 1: on soil near the stream
- Plagiomnium undulatum* (Hedw.) T. J. Kop. – 9, 22: on soil; 17: on soil near the stream
- Plagiopus oederianus* (Sw.) H. A. Crum et L. E. Anderson – 15: on limestone and on the bark of *Fagus*; 16, 20, 21: on limestone
- \* *Plagiothecium cavifolium* (Brid.) Z. Iwats. – 9: on soil
- \* *Plagiothecium denticulatum* (Hedw.) Schimp. – 9: on rotting *Fagus* wood
- Plagiothecium nemorale* (Mitt.) A. Jaeger – 9: on soil
- \* *Plagiothecium succulentum* (Wilson) Lindb. – 9: on soil
- Plasteurhynchium striatulum* (Spruce) M. Fleisch. – 12, 16, 19, 20, 21: on limestone
- Platyhypnidium riparioides* (Hedw.) Dixon – 1: on rocks in the stream; 9: on moist rock in the stream; 15, 17, 22: on limestone in the stream
- \* *Pleurodictum acuminatum* Lindb. – 3: on soil over serpentine
- Pleurochaete squarrosa* (Brid.) Lindb. – 16, 19, 20: on soil over limestone
- \* *Pogonatum aloides* (Hedw.) P. Beauv. – 9: on clay
- Pohlia cruda* (Hedw.) Lindb. – 5, 9, 13: on soil
- Pohlia melanodon* (Brid.) A. J. Shaw – 1, 7, 17, 22: on soil
- \* *Pohlia nutans* (Hedw.) Lindb. – 10: on soil
- Pohlia wahlenbergii* (F. Weber et D. Mohr) A. L. Andrews – 1, 9, 12, 13, 22: on soil near the stream
- Polytrichum juniperinum* Hedw. – 7, 10: on soil; 11: on rock
- Pseudocrossidium hornschruchianum* (Schultz) R. H. Zander – 12: on limestone; 16: on soil

- Pseudocrossidium revolutum* (Brid.) R. H. Zander – 1: on stones of a bridge; 8: on artificial rock wall; 10, 15: on soil; 12, 18: on soil over limestone
- Pseudoleskea incurvata* (Hedw.) Loeske – 9: on rocks and at the bottom of a *Fagus*; 12: on limestone and on the bark of *Fagus* stem base
- Pseudoleskea saviana* (De Not.) Latzel – 7: on soil and on the root of *Abies*; 9: on soil and the root of *Fagus*
- Pseudoleskeella catenulata* (Brid. ex Schrad.) Kindb. – 12, 19, 20, 21: on limestone
- Pseudoleskeella nervosa* (Brid.) Nyholm – 8: on artificial rock wall; 9, 12: on the bark of *Fagus*
- \* *Pseudoleskeella rupestris* (Berggr.) Hedenäs et L. Söderstr. – 12: on rotting wood and on stones (conf. W. Schröder)
- \* *Pseudoleskeella tectorum* (Funck ex Brid.) Kindb. ex Broth. – 12: on the bark of *Juniperus* (conf. W. Schröder)
- Pseudoscleropodium purum* (Hedw.) M. Fleisch. – 1, 2, 6: on soil over serpentine; 17, 19, 21: on soil over limestone
- Pterigynandrum filiforme* Hedw. – 2: on the bark of *Juniperus*; 4: on serpentine; 7: on the bark of *Pinus* and *Abies*; 8: on artificial rock wall; 9, 12, 15: on the bark of *Fagus*; 11: on the bark of *Quercus*; 13: on rock near the stream; 17: on the bark of *Alnus*; 21: on limestone; 22: on the bark of *Salix*
- Pterogonium gracile* (Hedw.) Sm. – 16, 19, 20, 21: on limestone
- \* *Pterygoneurum ovatum* (Hedw.) Dixon – 12: on gray clayey flysch
- Racomitrium canescens* (Hedw.) Brid. – 1: on soil over serpentine
- Rhizomnium punctatum* (Hedw.) T. J. Kop. – 1, 7, 9, 17: on soil
- Rhynchostegiella tenella* (Dicks.) Limpr. – 16: on limestone
- Rhytidiadelphus triquetrus* (Hedw.) Warnst. – 6: on soil over serpentine; 16: on soil over limestone
- Saelania glaucescens* (Hedw.) Broth. – 9: on soil
- Schistidium apocarpum* (Hedw.) Bruch et Schimp. – 7: on sandstone; 9: on rock; 17: on serpentine
- \* *Schistidium atrofusum* (Schimp.) Limpr. – 1: on serpentine rock
- \* *Schistidium brunnescens* Hedw. subsp. *brunnescens* – 7x: on conglomerate rock; 10: on rock (conf. W. Schröder); 12: on limestone and on schist (conf. W. Schröder); 18: on limestone (conf. W. Schröder)
- \* *Schistidium brunnescens* Hedw. subsp. *griseum* (Nees et Hornsch.) H. H. Blom – 10, 18: on exposed rock (conf. W. Schröder)
- \* *Schistidium confertum* (Funck) Bruch et Schimp. – 3: on serpentine
- \* *Schistidium crassipilum* H. H. Blom – 1: on serpentine (conf. W. Schröder) and on stones of a bridge; 2: on stone in stream; 6: on flat serpentine boulder top in stream; 7: on base-rich rock and on sandstone; 8: on artificial rock wall; 9: on moist stone near the stream; 10, 11: on rock; 12: on schist; 13, 17: on stone near the stream; 15, 16, 18, 19, 21, 22: on limestone
- Schistidium elegantulum* H. H. Blom – 19: on limestone (cf. det. W. Schröder); 20: on limestone (cf. det. W. Schröder); 21: on limestone (det. W. Schröder)

- \* *Schistidium flaccidum* (De Not.) Ochyra – 1, 3, 4: on serpentine; 6: on rock
- \* *Schistidium helveticum* (Schkuhr) Deguchi – 1: on serpentine (conf. W. Schröder); 7x: on conglomerate rock (conf. W. Schröder); 10: on siliceous rock (det./conf. W. Schröder); 12: on limestone and on schist (conf. W. Schröder); 18: on limestone (conf. W. Schröder)
- \* *Schistidium pruinsum* (Wilson ex Schimp.) G. Roth – 1, 3: on serpentine; 7x: on conglomerate rock (all conf./rev. W. Schröder)
- \* *Schistidium subflaccidum* (Kindb.) H. H. Blom – 3 (cf. det. W. Schröder), 10: on siliceous rock (det. H. Köckinger)
- Scleropodium touretii* (Brid.) L. F. Koch – 16: on soil over limestone
- Scorpiurium circinatum* (Bruch) M. Fleisch. et Loeske – 16: on limestone
- \* *Seligeria recurvata* (Hedw.) Bruch et Schimp. – 9: on rock at the stream; 12: on schist outcrops
- Syntrichia calcicola* J. J. Amann – 12: on soil over limestone
- \* *Syntrichia handelii* (Schiffn.) S. Agnew et Vondr. – 16, 19, 20, 21: on limestone
- Syntrichia laevipila* Brid. – 16: on limestone
- Syntrichia montana* Nees – 1, 11: on rock; 12: on limestone and on schist; 16, 19: on limestone
- Syntrichia ruralis* (Hedw.) F. Weber et D. Mohr var. *ruralis* – 1: on soil over serpentine and on the root of *Pinus*; 3, 4: on soil over serpentine; 6, 7, 10, 15: on soil; 7x, 11: on conglomerate rock; 9: on the bark of *Fagus*; 16, 20, 21: on limestone
- Syntrichia ruralis* (Hedw.) F. Weber et D. Mohr var. *ruraliformis* (Besch.) Delogne – 1: on stone; 13: on soil
- \* *Syntrichia virescens* (De Not.) Ochyra – 4: on serpentine; 11: on the bark of *Quercus*; 12: on the bark of *Salix*; 19: on the bark of *Juglans*; 21: on the root of *Pinus* and on the bark of *Quercus*
- Thamnobryum alopecurum* (Hedw.) Gangulee – 19: on limestone
- Thuidium recognitum* (Hedw.) Lindb. – 6: on soil over serpentine
- Timmia austriaca* Hedw. – 7, 9, 12: on soil; 15: on soil over limestone
- Timmia bavarica* Hessel. – 7, 13, 15: on soil
- Tortella humilis* R. Ruthe – 17: on soil near the stream; 21: on soil over limestone
- Tortella inclinata* (R. Hedw.) Limpr. – 1: on soil over serpentine; 12: on soil over limestone and schist
- Tortella tortuosa* (Hedw.) Limpr. – 1, 3, 4, 6: on serpentine; 5, 7, 9: on soil; 7x: on conglomerate rock; 10, 11, 13: on rock; 12, 16, 17, 18, 19, 20, 21, 22: on limestone
- Tortula inermis* (Brid.) Mont. – 1: in soil-filled serpentine crevices; 12, 18: on limestone
- Tortula muralis* Hedw. – 1: on serpentine and on stones of a bridge; 7x: on conglomerate rock; 6, 10, 17: on rock; 11: on siliceous rock; 12, 13: on limestone and on schist; 16: on concrete
- Tortula subulata* Hedw. – 1, 3, 4, 6: on soil over serpentine; 7x: on conglomerate rock; 7, 9, 10, 11, 13, 17: on soil; 12, 20, 21: on soil over limestone; 15: on rotting wood
- Trichostomum brachydontium* Bruch – 12: on soil over limestone

- Trichostomum crispulum* Bruch – 2: on soil; 4, 6: on soil over serpentine; 12, 20: on soil over limestone; 14: on schist at spring; 16, 21: on limestone
- \* *Weissia brachycarpa* (Nees et Hornsch.) Jur. – 4: on serpentine; 11, 12, 13: on soil; 20: on soil over limestone
- Weissia condensa* (Voit) Lindb. – 3: on soil over serpentine; 11, 12: on soil over limestone and schist; 18, 20: on soil over limestone
- Weissia controversa* Hedw. var. *controversa* – 3, 4: on soil over serpentine; 12: on soil over limestone
- Weissia controversa* Hedw. var. *crispata* (Nees et Hornsch.) Nyholm – 1: on soil
- Zygodon rupestris* Schimp. ex Lorentz – 21: on the bark of *Quercus* and in limestone rock crevice

### Taxa reported for the first time in Albania

*Conocephalum salebrosum* Szweykowski, Buczkowska et Odrzykoski – This recently described thalloid liverwort (SZWEYKOWSKI *et al.* 2005) is closely related to *C. conicum*. The species has also been recently reported from Serbia (PAPP and ERZBERGER 2009) and Montenegro (PAPP and ERZBERGER 2010).

*Marchantia polymorpha* L. subsp. *montivagans* Bisch. et Boisselier – It is a suboceanic, dealpine element according to DÜLL (1983). In the SE European liverwort checklist, no varieties of *Marchantia polymorpha* have been mentioned (SABOVLJEVIĆ and NATCHEVA 2006), but in DÜLL *et al.* (1999) this variety is reported from Croatia, Montenegro and Slovenia as *M. alpestris*. This taxon is also known from Greece (DÜLL 1995) and Bulgaria (GANEVA and NATCHEVA 2003). It has been also recently recorded in Serbia from the Golija-Studenica Biosphere Reserve (PAPP and ERZBERGER 2005) and Stara Planina Mts (PAPP and ERZBERGER 2007a). It seems to be not rare in the high mountains of the Balkan Peninsula.

*Abietinella abietina* (Hedw.) M. Fleisch. – It is a frequent boreal species (DÜLL 1985), known from almost all SE European countries except Albania and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Amphidium mougeotii* (Schimp.) Schimp. – It is a suboceanic, montane species (DÜLL 1984), reported from almost all SE European countries except Albania and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008, MARTINČIČ 2009).

*Aulacomnium androgynum* (Hedw.) Schwägr. – It is a species of temperate zones of Europe (DÜLL 1985), known from several SE European countries, e.g. Bosnia-Herzegovina, Bulgaria, Croatia, Greece, Romania, Serbia (SABOVLJEVIĆ *et al.* 2008) and Macedonia (MARTINČIĆ 2009).

*Barbula convoluta* Hedw. var. *sardoa* Schimp. – It is a sub-Mediterranean species (DÜLL 1984). In the SE European moss checklist, no varieties of *Barbula convoluta* have been mentioned (SABOVLJEVIĆ *et al.* 2008), but in DÜLL *et al.* (1999) it is reported from Croatia and Slovenia as *B. convoluta* var. *commutata*. This taxon is also reported from Greece (DÜLL 1995) and recorded in Serbia from the Kopaonik National Park (PAPP *et al.* 2004) and Suva Planina Mts (PAPP and ERZBERGER 2009).

*Brachythecium glareosum* (Bruch ex Spruce) Schimp. – It is a sub-boreal species (DÜLL 1985), recorded in almost all SE European countries except Albania and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008, MARTINČIĆ 2009).

*Brachythecium mildeanum* (Schimp.) Schimp. – It is a species of the temperate zones of Europe (DÜLL 1985), reported from almost all SE European countries except Albania, Macedonia and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Bryum archangelicum* Bruch et Schimp. – This arctic, alpine species (DÜLL 1984) is recorded in almost all SE European countries except Albania and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Bryum creberrimum* Taylor – It is a boreal species (DÜLL 1984) known in almost all SE European countries except Albania, Greece and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Bryum lonchocaulon* Müll. Hal. – This species is included in *B. pallescens* according to HILL *et al.* (2006), but treated separately by several authors (ZOLOTOV 2000, MEINUNGER and SCHRÖDER 2007). It was recently reported from Serbia (PAPP and ERZBERGER 2009).

*Bryum moravicum* Podp. – It is a frequent species of temperate zones of Europe (DÜLL 1984), reported from all SE European countries except Albania (SABOVLJEVIĆ *et al.* 2008).

*Bryum pallescens* Schleich. ex Schwägr. – This species of the temperate zones of Europe (DÜLL 1984) is also known from all SE European countries except Albania (SABOVLJEVIĆ *et al.* 2008).

*Bryum turbinatum* (Hedw.) Turner – A species of the temperate zones of Europe (DÜLL 1984), it is also recorded in all SE European countries except Albania (SABOVLJEVIĆ *et al.* 2008).

*Campylophyllum calcareum* (Crundw. et Nyholm) Hedenäs – This species of temperate zones of Europe (SMITH 2004) is known from all SE European countries except the European part of Turkey and Albania (SABOVLJEVIĆ *et al.* 2008).

*Didymodon ferrugineus* (Schimp. ex Besch.) M. O. Hill – It is a species of mountainous areas of temperate zones of Europe (DÜLL 1984), known from almost all SE European countries except Albania, Macedonia and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Didymodon insulanus* (De Not.) M. O. Hill – This sub-Mediterranean, suboceanic species (DÜLL 1984) is recorded in numerous SE European countries, *e.g.* Bulgaria, Greece, Montenegro, Romania, Serbia, Slovenia and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Didymodon spadiceus* (Mitt.) Limpr. – It is a species of mountainous areas of the temperate zones of Europe (DÜLL 1984), reported from almost all SE European countries except Albania, Macedonia and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Drepanocladus polygamus* (Schimp.) Hedenäs – This boreal species (DÜLL 1985) is known only in the region from Bulgaria, Montenegro, Romania, Serbia, Slovenia (SABOVLJEVIĆ *et al.* 2008) and Macedonia (MARTINČIČ 2009).

*Fabronia pusilla* Raddi – This sub-Mediterranean moss (DÜLL 1985) is reported from almost all SE European countries except Albania, Bosnia-Herzegovina, Serbia and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008), but rare, mentioned in the red lists of Bulgaria (NATCHEVA *et al.* 2006) and Montenegro (SABOVLJEVIĆ *et al.* 2004).

*Fissidens curvatus* Hornsch. – It is a rare oceanic-Mediterranean species (DÜLL 1984). In SE Europe it is known only from Bulgaria, Croatia, Greece and Montenegro (SABOVLJEVIĆ *et al.* 2008). It is included in the Red Data Book of European Bryophytes (ECCB 1995).

*Fissidens gracilifolius* Brugg.-Nann. et Nyholm – It is a species of mountainous areas of the temperate zones of Europe (DÜLL 1984), recorded in several SE European countries, *e.g.* Bulgaria, Croatia, Greece, Montenegro, Romania, Serbia, Slovenia (SABOVLJEVIĆ *et al.* 2008).

*Fissidens pusillus* (Wilson) Milde – It is also a species of mountainous areas of the temperate zones of Europe (DÜLL 1984), known from almost all SE European countries except Albania, Macedonia (SABOVLJEVIĆ *et al.* 2008, PAPP and ERZBERGER 2010).

*Fissidens viridulus* (Sw. ex anon.) Wahlenb. – This sub-Mediterranean species (DÜLL 1984) is also known from almost all SE European countries except Albania, Bulgaria and Macedonia (SABOVLJEVIĆ *et al.* 2008).

*Grimmia anodon* Bruch et Schimp. – This suboceanic, montane species (DÜLL 1984) is known from almost all SE European countries except Albania, Bosnia-Herzegovina, Croatia and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Grimmia decipiens* (Schultz) Lindb. – This sub-Mediterranean-suboceanic (SMITH 2004) species is known in SE Europe from all countries except Albania, Bosnia-Herzegovina and Slovenia (SABOVLJEVIĆ *et al.* 2008).

*Grimmia dissimulata* E. Maier – This species was recently described by MAIER (2002). In SE Europe it is already known from Greece, Montenegro (SABOVLJEVIĆ *et al.* 2008) and Serbia (PAPP and ERZBERGER 2009).

*Grimmia longirostris* Hook. – This is a boreal, montane species (DÜLL 1984) is reported in SE Europe only from Bulgaria, Greece, Serbia (SABOVLJEVIĆ *et al.* 2008) and Macedonia (MARTINČIČ 2009).

*Grimmia montana* Bruch et Schimp. – This suboceanic, montane species (DÜLL 1984) is known from many SE European countries as Bulgaria, Greece, Macedonia, Montenegro, Romania and Serbia (SABOVLJEVIĆ *et al.* 2008).

*Grimmia orbicularis* Bruch ex Wilson – This sub-Mediterranean species (DÜLL 1984) is known from all SE European countries except Albania (SABOVLJEVIĆ *et al.* 2008).

*Grimmia ovalis* (Hedw.) Lindb. – It is a subboreal, montane species (DÜLL 1984) recorded in almost all SE European countries except Albania, Montenegro and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Grimmia sessitana* De Not. – This subarctic, subalpine species (DÜLL 1984) is reported in SE Europe only from Bulgaria, Macedonia, Romania and Serbia (SABOVLJEVIĆ *et al.* 2008). It is included in the Red Data Book of European Bryophytes (ECCB 1995). Nomenclature here follows MAIER (2002) contrary to HILL *et al.* (2006).

*Grimmia trichophylla* Grev. – It is a species of mountainous areas of the temperate zones of Europe (DÜLL 1984), known from all SE European countries except Albania (SABOVLJEVIĆ *et al.* 2008).

*Gyroweisia tenuis* (Hedw.) Schimp. – It is a sub-Mediterranean, suboceanic, montane species (DÜLL 1984) recorded in several SE European countries as Croatia, Greece, Montenegro, Romania, Serbia, Slovenia and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Hygroamblystegium tenax* (Hedw.) Jenn. – This frequent, aquatic species of the temperate zones of Europe (DÜLL 1985) is recorded in almost all SE European countries except Albania and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Hypnum cupressiforme* Hedw. var. *lacunosum* Brid. – This species of the temperate zones of Europe (DÜLL 1985) is recorded in almost all SE European countries except Albania, Bosnia-Herzegovina and Croatia (SABOVLJEVIĆ *et al.* 2008, MARTINČIĆ 2009).

*Hypnum revolutum* (Mitt.) Lindb. – This subarctic, subalpine species (DÜLL 1985) is known from almost all SE European countries except Albania, Greece, Montenegro and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Hypnum vaucheri* Lesq. – It is a subboreal, montane species (DÜLL 1985), recorded in almost all SE European countries except Albania, Greece and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Isothecium myosuroides* Brid. – It is a suboceanic species (DÜLL 1985), reported from almost all SE European countries except Albania and Macedonia (SABOVLJEVIĆ *et al.* 2008).

*Mnium marginatum* (Dicks.) P. Beauv. – It is a subboreal species (DÜLL 1985), reported from almost all SE European countries except Albania and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Neckera menziesii* Drumm. – It is a sub-Mediterranean, suboceanic, montane species (DÜLL 1985), recorded in almost all SE European countries except Albania, Slovenia and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Orthotrichum alpestre* Bruch et Schimp. – This subarctic, subalpine species (DÜLL 1985) is known from many SE European countries, except Bulgaria, Croatia, Serbia, Slovenia and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Orthotrichum cupulatum* Hoffm. ex Brid. var. *riparium* Huebener – This is a suboceanic species (DÜLL 1985). In the SE European checklist of mosses, no varieties of *Orthotrichum cupulatum* are mentioned (SABOVLJEVIĆ *et al.* 2008) but in DÜLL *et al.* (1999) this variety is reported from Bosnia-Herzegovina, Croatia and Slovenia. It is also reported from Greece (PAPP *et al.* 1998), and in Serbia from Djerdap National Park (PAPP *et al.* 2006) and Suva Planina Mts (PAPP and ERZBERGER 2009).

*Orthotrichum pumilum* Sw. – This frequent epiphytic species of the temperate zones of Europe (DÜLL 1985) is recorded in all SE European countries except Albania (SABOVLJEVIĆ *et al.* 2008).

*Orthotrichum rupestre* Schleich. ex Schwägr. – This suboceanic, montane species (DÜLL 1985) is also reported from all SE European countries except Albania (SABOVLJEVIĆ *et al.* 2008).

*Oxyrrhynchium speciosum* (Brid.) Warnst. – This species of the temperate zones of Europe (SMITH 2004) is known from all SE European countries except Albania (SABOVLJEVIĆ *et al.* 2008).

*Oxystegus tenuirostris* (Hook. et Taylor) A. J. E. Sm. – It is a suboceanic, montane species (DÜLL 1984), known from several SE European countries as Bulgaria, Greece, Montenegro, Romania, Serbia and Slovenia (SABOVLJEVIĆ *et al.* 2008).

*Phascum cuspidatum* Hedw. – This common species of the temperate zones of Europe (DÜLL 1984) is recorded in all SE European countries except Albania (SABOVLJEVIĆ *et al.* 2008).

*Philonotis caespitosa* Jur. – This boreal species (DÜLL 1985) is also known from all SE European countries except Albania (SABOVLJEVIĆ *et al.* 2008).

*Plagiomnium elatum* (Bruch et Schimp.) T. J. Kop. – It is a boreal species (DÜLL 1985) recorded from almost all SE European countries except Albania and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008, MARTINČIĆ 2009).

*Plagiothecium cavifolium* (Brid.) Z. Iwats. – This boreal species (DÜLL 1985) is reported from all SE European countries except Albania (SABOVLJEVIĆ *et al.* 2008).

*Plagiothecium denticulatum* (Hedw.) Schimp. – This subboreal species (DÜLL 1985) is also known from all SE European countries except Albania (SABOVLJEVIĆ *et al.* 2008).

*Plagiothecium succulentum* (Wilson) Lindb. – This Eurosiberian boreo-temperate species (SMITH 2004) is known from many SE European countries except Croatia, Macedonia, Montenegro and Albania (SABOVljević *et al.* 2008).

*Pleuroidium acuminatum* Lindb. – It is a suboceanic species (DÜLL 1984), recorded in all SE European countries except Albania and Montenegro (SABOVljević *et al.* 2008).

*Pogonatum aloides* (Hedw.) P. Beauv. – A species of the temperate zones of Europe (DÜLL 1984), it is recorded in all SE European countries except Albania (SABOVljević *et al.* 2008).

*Pohlia nutans* (Hedw.) Lindb. – This species of the temperate zones of Europe (DÜLL 1984) is recorded in almost all SE European countries except Albania and the European part of Turkey (SABOVljević *et al.* 2008).

*Pseudoleskeella rupestris* (Berggr.) Hedenäs et L. Söderstr. – A circumpolar, boreal, montane (SMITH 2004) species previously treated as a variety of *P. nervosa*. New to the Balkan Peninsula.

*Pseudoleskeella tectorum* (Funck ex Brid.) Kindb. ex Broth. – This northern-subcontinental species (DÜLL 1985) is known in SE Europe from Bulgaria, Greece, Romania, Serbia and Slovenia (SABOVljević *et al.* 2008).

*Pterygoneurum ovatum* (Hedw.) Dixon – This species of the temperate zones of Europe (DÜLL 1984) is also recorded in almost all SE European countries except Albania, Macedonia, Montenegro, and the European part of Turkey (SABOVljević *et al.* 2008).

*Schistidium atrofusum* (Schimp.) Limpr. – This is a subarctic, subalpine element according to DÜLL (1984), recorded in almost all SE European countries except Albania and the European part of Turkey (SABOVljević *et al.* 2008).

*Schistidium brunnescens* Hedw. subsp. *brunnescens* – A sub-Mediterranean, montane element according to DÜLL (1984), it is also reported from almost all SE European countries except Albania and the European part of Turkey (SABOVljević *et al.* 2008).

*Schistidium brunnescens* Hedw. subsp. *griseum* (Nees et Hornsch.) H. H. Blom – This variant is not included in the SE European moss checklist (SABOVljević *et al.* 2008). It is much rarer in parts of Central and Eastern Europe (BLOM 1996) than the type subspecies (subsp. *brunnescens*). Its range of occurrence spans from Southern Scandinavia to South Europe and

Turkey. In SE Europe it has been reported from Croatia, Bosnia-Herzegovina, Bulgaria and Greece (BLOM 1996). Recently the taxon has also been recorded in Montenegro (ERZBERGER and PAPP 2007, PAPP and ERZBERGER 2007b) and in Serbia (PAPP and ERZBERGER 2009).

*Schistidium confertum* (Funck) Bruch et Schimp. – This is a subboreal, montane element according to DÜLL (1984), also known from almost all SE European countries except Albania and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Schistidium crassipilum* H. H. Blom – This common *Schistidium* species is also known from almost all SE European countries except Albania, Macedonia, Slovenia, and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008).

*Schistidium flaccidum* (De Not.) Ochyra – This is a sub-Mediterranean, montane element according to DÜLL (1984), recorded from many SE European countries, *e.g.* Bosnia-Herzegovina, Bulgaria, Greece, Romania, Serbia and Slovenia (SABOVLJEVIĆ *et al.* 2008).

*Schistidium helveticum* (Schkuhr) Deguchi – It is also known from almost all SE European countries except Albania, Macedonia, and Slovenia (SABOVLJEVIĆ *et al.* 2008).

*Schistidium pruinatum* (Wilson ex Schimp.) G. Roth – This species is known only from Bulgaria and Serbia (SABOVLJEVIĆ *et al.* 2008).

*Schistidium subflaccidum* (Kindb.) H. H. Blom – Recently discovered in Russia, the Caucasus (BLOM *et al.* 2006), and in the Austrian Alps (KÖCKINGER *et al.* 2008), to current knowledge it seems to occur in high mountains. The original description as *Grimmia subflaccida* by Kindberg is based on material from Canada. Our record is new to the whole Balkan Peninsula.

*Seligeria recurvata* (Hedw.) Bruch et Schimp. – It is a species of mountainous areas of the temperate zones of Europe (DÜLL 1984), recorded in almost all SE European countries except Albania, Macedonia, Serbia, and the European part of Turkey (SABOVLJEVIĆ *et al.* 2008), but a rare, red-listed species of Bulgaria (NATCHEVA *et al.* 2006) and Montenegro (SABOVLJEVIĆ *et al.* 2004).

*Syntrichia handelii* (Schiffn.) S. Agnew et Vondr. – It is an East-Mediterranean, continental element (DÜLL 1984), known only from Greece and Montenegro (SABOVLJEVIĆ *et al.* 2008).

*Syntrichia virescens* (De Not.) Ochyra – This species of the temperate zones of Europe (DÜLL 1984) is also recorded in almost all SE European countries except Albania, Macedonia, and Montenegro (SABOVLJEVIĆ *et al.* 2008).

*Weissia brachycarpa* (Nees et Hornsch.) Jur. – It is a species of the temperate zones of Europe (DÜLL 1984), recorded in all SE European countries except Albania (SABOVLJEVIĆ *et al.* 2008).

#### Conservation value of the bryophyte flora of Eastern Albania

Although it would be premature to make a comprehensive conservation assessment of the region's bryoflora, it is worth mentioning the three species that are included in the Red Data Book of European Bryophytes (ECCB 1995).

*Fissidens curvatus* Hornsch. with an oceanic, Mediterranean distribution (DÜLL 1984), is currently included in the Red Data Book of European Bryophytes (ECCB 1995) as an insufficiently known species (K). It was found on muddy soil on a stream bank in Moraves Mts at Dardha village.

*Grimmia sessitana* De Not. is a subarctic, subalpine species (DÜLL 1984) included in the regionally threatened (RT) category according to the Red Data Book of European Bryophytes (ECCB 1995). It was found on exposed serpentine rock at 1,400 m a.s.l., south of Voskopoja village.

*Pseudoleskea saviana* (De Not.) Latzel is a continental, subalpine moss (DÜLL 1985) included in the regionally threatened (RT) category according to the Red Data Book of European Bryophytes (ECCB 1995). It is a species of shaded volcanic rocks, but sometimes it is found on tree bark mainly at the base of trunks. It was found on soil and on the root of *Abies* and *Fagus* in Moraves Mts at Drenova village in the Bredhi Drenoves National Park. It is known from Albania, but it was not reported before from the Korça region. It is not very rare in SE Europe as several populations were found in Serbia (PAPP *et al.* 2004, PAPP and ERZBERGER 2005, 2007a, 2009) and Montenegro (PAPP and ERZBERGER 2010).

## CONCLUSIONS

The high number of species recorded for the first time in Albania during this short (8 days) field trip reflects the limited knowledge of the Albanian bryoflora. Among the newly reported species several are common taxa, frequently found all over Europe, exemplified by *Abietinella abietina*, *Bryum moravicum*, *Campylophyllum calcareum*, *Didymodon insulanus*, *Fissidens pusillus*, *Hygroamblystegium tenax*, *Mnium marginatum*, *Phascum cuspidatum*, *Plagiothecium cavifolium*, *P. denticulatum*, *P. succulentum*, *Pohlia nutans* or *Weissia brachycarpa*. Several species-rich genera at European level were represented only by a few taxa in previous checklists of Albania, like *Fissidens*, *Grimmia* and *Schistidium*. Our work has enriched these groups with locating numerous species in the region. The occurrence of certain species rare in SE Europe has also been proved here, including *Jungermannia atrovirens*, *Amphidium mougeotii*, *Aulacomnium androgynum*, *Bryum turbinatum*, *Didymodon ferrugineus*, *Drepanocladus polygamus*, *Encalypta ciliata*, *Fabronia pusilla*, *Fissidens curvatus*, *Grimmia decipiens*, *G. longirostris*, *G. sessitana*, *Hypnum revolutum*, *Isothecium myosuroides*, *Philonotis caespitosa*, *Pseudoleskella tectorum*, *Saelania glaucescens*, *Seligeria recurvata*, *Syntrichia handelii*, *Tortella humilis* and *Zygodon rupestris*. A number of these species are part of the national red lists of some Balkan countries (NATCHEVA *et al.* 2006, SABOVLJEVIĆ *et al.* 2004).

As a final summary at this stage, it should be noted that in spite of the continental climate of the region with rather low precipitation values, the bryophyte flora has a rich diversity, which may be attributed to the great geological complexity with a variety of bedrocks like limestones, serpentine, flysches and conglomerates, and to the rugged terrain with high elevations, mostly above 1,000 m a.s.l.

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