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CONTRIBUTION TO THE KNOWLEDGE OF THE BRYOFLORA OF THE REGION OF PETNICA (W SERBIA, YUGOSLAVIA)

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Based on our recent research, the region of Petnica in W Serbia counts 136 bryophyte taxa (116 mosses and 20 liverworts). In the present account 15 species are reported for the first time in Serbia, and 11 for the F. R. of Yugoslavia. The 136 bryophyte species represent about 22% of the total number of bryophytes recorded up to now in the country. For the small area of Petnica, this means a very high level of diversity, which is the result of the great number and diversity of microhabitats. Among the bryophytes now on record, two species are European endemic, and three of them are included in the Red Data Book of European Bryophytes. Most bryophytes in the region are of temperate character, but considering the altitude of around 200 m above sea level, the specific position with considerable influence from the Mediterranean areas and the surrounding mountains, as well as the good hydrology with many peculiarities, we believe that some areas populated by the most interesting bryophytes should be declared protected areas (concept of microreserves).

Key words: bryophyte flora, redlisted species, Serbia

INTRODUCTION

At present, the bryophyte flora of the Federal Republic of Yugoslavia (Serbia and Montenegro) is very poorly known. Bryology and bryophyte research had been a neglected area of botany for many decades. This explains the small number of the investigated regions and that the number of recorded species is relatively low. To date, the bryophyte flora of the F. R. of Yugoslavia counts 118 hepatic and 511 moss species, respectively (SABOVLJEVIĆ and STEVANOVIĆ 1999, SABOVLJEVIĆ 2000). However, as more investigations take place, more and more species appear as new for the region (SABOVLJEVIĆ 1998, SABOVLJEVIĆ and STEVANOVIĆ 2000*a, b*).

MATERIAL AND METHODS

The bryophyte investigation, we based our study on, was conducted in the end of March and the beginning of April 2000, in the region of Petnica (UTM 30TDQ01; Fig. 1). Petnica and its surroundings are situated in western Serbia, close to the city of Valjevo. In a sense the area lies in a transitional

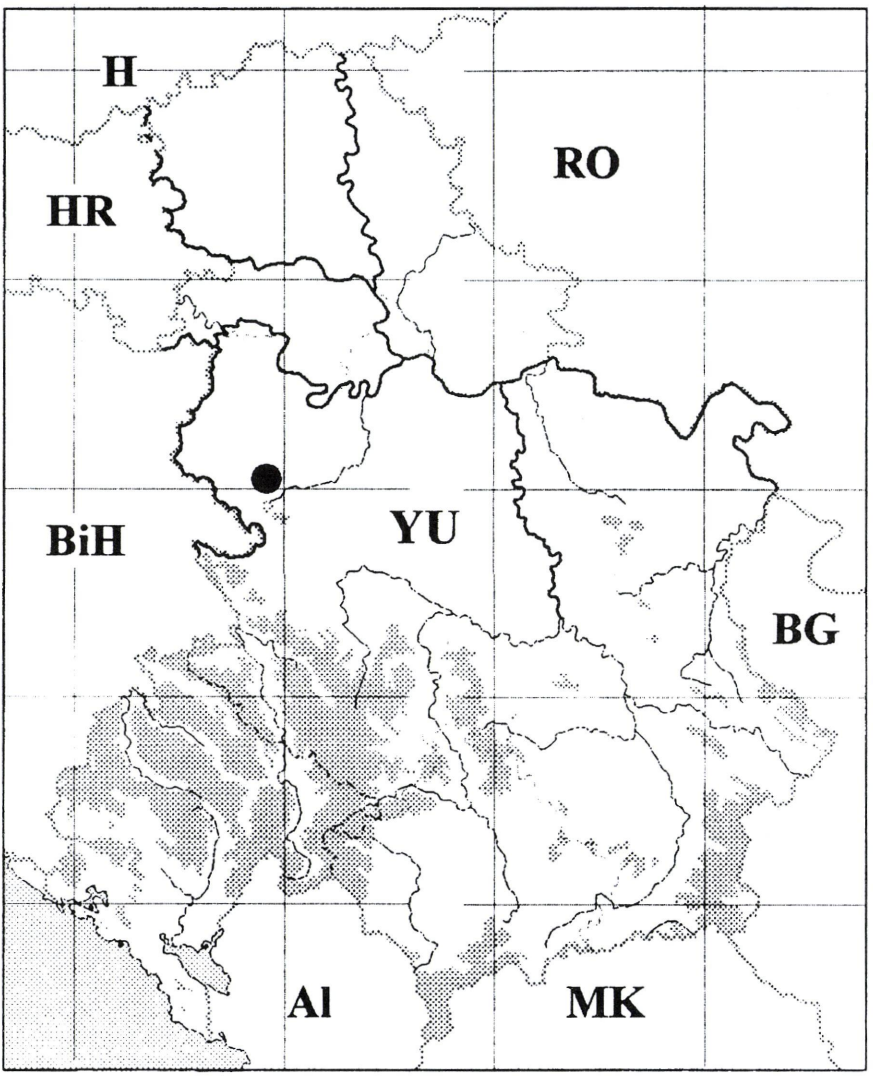


Fig. 1. Investigated area in the Federal Republic of Yugoslavia presented on the UTM map 100 km × 100 km, by full black circle. Mountain areas above 1000 m of altitude appear in grey. Abbreviations: YU = Yugoslavia (Serbia and Montenegro), Al = Albania, BiH = Bosnia and Herzegovina, BG = Bulgaria, H = Hungary, HR = Croatia, MK = Macedonia, RO = Romania.

position between the Pannonian plains and the Dinaric Alps. Geologically, limestone is the most typical bedrock, but rarely some layers of other rocks and minerals like cinnabar occur. The area has a varying geomorphology with rugged karstic reliefs, gorges, hills, caves, etc. The investigated region is also known for its varying hydrography: springs, torrents, rivulets, the Banja and the Gradac rivers and the lake Petničko, and many temporarily (or rarely permanently) moist meadows. The altitude is usually around 200 m a. s. l. From the south, the investigated area is surrounded by mountains (Povlen, Maljen, Medvednik, Jablanik, Bobija), and to the north, it is open to the Pannonian plains through the wide valley of the Kolubara river.

Despite the mountainous south, the Mediterranean influence is able to reach this region through the canyons and gorges in the southwest. Also, there are different types of soil, most importantly gley, pseudogley, clayly, sceletous and alluvial soils. The climate is mild continental with hot and usually dry summers and cold winters with abundant precipitation.

All these factors plus the various types of plant formations and plant communities (forests, meadows, wet meadows, pastures, ruderals, cultivated fields, vertical rock walls) contribute greatly to the variety of microhabitats which provide excellent habitats to many bryophytes in the relatively small investigated area of *ca* 10 km^2.

The flora and vegetation of this area show refugial-relict characteristics, with many relict and some endemic species. Also, the number of woody plant species is unusually high. The main associations are the followings. Mesophilous *Querco-Carpinetum moesiacum* (*serbicum*) Rudski, 1940; thermophilous *Quercetum frainetto-cerris* Rudski, 1940 (s. l.) with many varieties; interestingly, some communities with sub-Mediterranean character: *Ostryo-Quercetum frainetto-cerris* E. Vuk., 1979; *Quercetum frainetto-cerris juglandetosum* E. Vuk., 1976; *Carpino orientalis-Polyquercetum* E. Vuk. 1987, etc. In some parts of the investigated area there are planted forests of Scotch pine (*Pinus sylvestris* L.) and spruce (*Picea abies* (L.) Karst.).

For the great number of habitats and microhabitats, we used the methods of creating transects to cover larger surfaces, and to reach as many as possible different microhabitats.

The specimen identification was based on SMITH (1991, 1993) and FREY *et al.* (1995), LEWINSKY-HAAPASAARI (1995), MAIER and GEISSLER (1995). For the nomenclature and to establish the European distribution types in the floristic evaluation, we followed DÜLL (1983, 1984, 1985, 1992). The specimens are preserved in the Hungarian Natural History Museum, Budapest (BP) and in the private collection of Marko Sabovljević (Belgrade, Yugoslavia).

RESULTS AND DISCUSSION

Results of the floristical overview are given in Table 1.

The authors recorded 136 bryophyte taxa (116 mosses and 20 liverworts) in the region of Petnica. Projected to the small area, this number represents a very high level of diversity of bryophytes, which is the result of a great number of microhabitats. This species number, on the other hand, represents about 22% of the total number of bryophytes recorded in the F. R. of Yugoslavia. Even with this, the number of bryophyte species is expected to grow with further investigation, both in the region of Petnica and in the whole territory of Yugoslavia. Among the 136 taxa, 15 species is recorded as new for Serbia and 11 for the F. R. of Yugoslavia. These are: *Cephaloziella stellulifera*, *Cololejeunea rossettiana*, *Anomodon rostratus**,

Table 1. Bryophytes of Petnica region (W Serbia). Localities (L): 1. Petnica village surroundings, 2. Rogljević village, 3. Petničko lake, 4. Pocibrava rivulet, 5. Dračić village, 6. Brangović village, 7. Bujačić village.

Species	L	Habitats
LIVERWORTS		
Cephaloziella stellulifera (Spruce) Schiffn.	5	In meadows
Cololejeunea rossettiana (Mass.) Schiffn.	1	Shaded calcareous rocks
	1	Humid calcareous rocks at the cave entrance
Conocephalum conicum (L.) Lindb.	1	Calcareous rocks near the water at the cave entrance
Fossombronia pusilla (L.) Nees	5	Soil at the edge of agricultural fields
Frullania dilatata (L.) Dum.	1	*Morus* trees in the Science Centre
Lejeunea cavifolia (Ehrh.) Lindb. emend. Buch	1	Shaded calcareous rocks
	4	Bark of *Carpinus betulus*
Lophocolea bidentata (L.) Dum.	1	Humid calcareous rocks at the cave entrance
Lophocolea bidentata (L.) Dum. var. *rivularis* (Raddi) Warnst.	1	Calcareous rocks near the water at the cave entrance
Lophocolea heterophylla (Schrad.) Dum.	1	Bark of *Carpinus betulus*
Lophocolea minor Nees	2	Shaded calcareous rocks
Marchantia polymorpha L. emend. Burgeff	1	Humid calcareous rocks at the cave entrance
Metzgeria conjugata Lindb.	1	Shaded calcareous rocks
Metzgeria furcata (L.) Dum.	1	Decaying wood
	1	Bark of *Carpinus betulus*
Pedinophyllum interruptum (Nees) Kaal.	1	Shaded calcareous rocks
	1	Humid calcareous rocks at the cave entrance
Pellia endiviifolia (Dicks.) Dum.	1	Humid calcareous rocks at the cave entrance
Plagiochila asplenioides (L. emend. Tayl.) Dum.	4	Soil by the rivulet
Plagiochila porelloides (Torrey ex Nees) Lindenb.	1	Bark of *Carpinus betulus*
Porella platyphylla (L.) Pfeiff.	1	Shaded calcareous rocks
	1	Decaying wood
	7	Bark of *Quercus* tree
Radula complanata (L.) Dum.	1	Bark of *Carpinus betulus*
Reboulia hemisphaerica (L.) Raddi	1	Shaded calcareous rocks
MOSSES		
Amblystegium humile (P. Beauv.) Crundw.	3	In meadows at the lake
Amblystegium riparium (Hedw.) B., S. et G.	2	Calcareous rocks at a spring
Amblystegium serpens (Hedw.) B., S. et G.	1	Decaying wood

Table 1 (continued)

Species	L	Habitats
Amblystegium serpens (Hedw.) B., S. et G.	1	Bark of *Carpinus betulus*
	2	Calcareous rocks at a spring
Amblystegium varium (Hedw.) Lindb.	3	Bark of a tree by the lake
Anomodon attenuatus (Hedw.) Hueb.	1	Shaded calcareous rocks
	1	Bark of *Carpinus betulus*
	4	Calcareous rocks by the rivulet
Anomodon longifolius (Brid.) Hartm.	1	Shaded calcareous rocks
	4	Calcareous rocks by the rivulet
Anomodon rostratus (Hedw.) Schimp.	4	Calcareous rocks by the rivulet
Anomodon viticulosus (Hedw.) Hook. et Tayl.	1	Shaded calcareous rocks
	4	Calcareous rocks by the rivulet
Atrichum angustatum (Brid.) B. et S.	5	In meadows
Atrichum undulatum (Hedw.) P. Beauv.	1	Soil in forest
Barbula convoluta Hedw.	6	Rocky soil in an open area
	1	On burnt wood
Barbula unguiculata Hedw.	1	Calcareous rocks near the water at the cave entrance
	3	Rocky soil by the lake
	5	In meadows
	7	On soil in an open area
Brachythecium mildeanum (Schimp.) Schimp. ex Milde	3	In meadows
	5	In meadows
Brachythecium rutabulum (Hedw.) B., S. et G.	1	Calcareous rocks near the water at the cave entrance
	2	Soil in an open area
	2	Calcareous rocks at a spring
Brachythecium salebrosum (Web. et Mohr) B., S. et G.	6	In planted *Picea* forest
Brachythecium velutinum (Hedw.) B., S. et G.	1	Decaying wood
	2	Shaded calcareous rocks
Bryoerythrophyllum recurvirostrum (Hedw.) Chen	1	Calcareous rocks near the water at the cave entrance
	2	Calcareous rocks at a spring
Bryum alpinum With.	7	Soil in an open area
Bryum argenteum Hedw.	3	Rocky soil by the lake
	6	Rocks of the railway bed

Table 1 (continued)

Species	L	Habitats
Bryum bicolor Dicks.	2	Soil in an open area
	3	Rocky soil by the lake
Bryum capillare Hedw.	2	Soil in an open area
	4	Calcareous rocks by the rivulet
Bryum gemmiferum Wilcz. et Demar.	6	On burnt wood
Bryum laevifilum Syed	1	On an old roof
	1	Bark of *Carpinus betulus*
	2	Soil in an open area
	4	Soil by the rivulet
Bryum rubens Mitt.	2	Soil in an open area
	3	Rocky soil by the lake
	5	In meadows
Bryum ruderale Crundw. et Nyh.	5	In meadows
Calliergonella cuspidata (Hedw.) Loeske	1	Calcareous rocks near the water at the cave entrance
	3	In meadows
Campylium calcareum Crundw. et Nyh.	1,2	Decaying wood
	2	Shaded calcareous rocks
	7	Bark of *Quercus* tree
Campylium chrysophyllum (Brid.) J. Lange	6	Rocky soil in an open area
Campylium polygamum (B., S. et G.) J. Lange et C. Jens.	5	In meadows
Ceratodon purpureus (Hedw.) Brid.	3	Rocky soil by the lake
	6	Rocks of the railway bed
Cinclidotus fontinaloides (Hedw.) P. Beauv.	4	Calcareous rocks by the rivulet
Cirriphyllum crassinervium (Tayl.) Loeske et Fleisch.	1	Shaded calcareous rocks
	1	Calcareous rocks near the water at the cave entrance
Cirriphyllum piliferum (Hedw.) Grout	1	Soil in forest
Cirriphyllum reichenbachianum (Hueb.) Wijk et Marg.	1	Shaded calcareous rocks
Cratoneuron filicinum (Hedw.) Spruce	1	Calcareous rocks near the water at the cave entrance
Ctenidium molluscum (Hedw.) Mitt.	1	Shaded calcareous rocks
Dicranella heteromalla (Hedw.) Schimp.	6	In planted *Picea* forest
Dicranella varia (Hedw.) Schimp.	5	In meadows

Table 1 (continued)

Species	L	Habitats
Didymodon fallax (Hedw.) Zander	2	Calcareous rocks at a spring
	3	Rocky soil by the lake
Didymodon luridus Hornsch.	1	Calcareous rocks near the water at the cave entrance
	2	Soil in an open area
	6	Rocky soil in an open area
Didymodon rigidulus Hedw.	1	Humid calcareous rocks at the cave entrance
	2	Soil in an open area
	6,7	Rocky soil in an open area
Drepanocladus aduncus (Hedw.) Warnst.	1	In a *Juncetum*
	3	In meadows
Encalypta streptocarpa Hedw.	1	Humid calcareous rocks at the cave entrance
	6	Rocky soil in an open area
Ephemerum serratum (Hedw.) Hampe	5	In meadows
Eucladium verticillatum (Brid.) B., S. et G.	1	Humid calcareous rocks at the cave entrance
Eurhynchium hians (Hedw.) Sande Lac.	1	Shaded calcareous rocks
	1	Decaying wood
	1	Calcareous rocks near the water at the cave entrance
	2	Calcareous rocks at a spring
	3,5	In meadows
Eurhynchium pumilum (Wils.) Schimp.	1	Shaded calcareous rocks
	1	Bark of *Carpinus betulus*
	1	Humid calcareous rocks at the cave entrance
Fissidens bryoides Hedw.	2	Calcareous rocks at a spring
Fissidens cristatus Wils. ex Mitt.	4	Calcareous rocks by the rivulet
Fissidens gracilifolius Brugg.-Nann. et Nyh.	4	Calcareous rocks by the rivulet
Fissidens pusillus (Wils.) Milde	1	Shaded calcareous rocks
	1	Humid calcareous rocks at the cave entrance
	4	Calcareous rocks by the rivulet
Fissidens taxifolius Hedw.	1	Soil in forest
	1	Shaded calcareous rocks
	1	Humid calcareous rocks at the cave entrance
	2	Decaying wood
	2	Soil in an open area

Table 1 (continued)

Species	L	Habitats
Fissidens taxifolius Hedw.	5	In meadows
	6	In planted *Picea* forest
Fontinalis antipyretica Hedw.	4	Calcareous rocks by the rivulet
Funaria hygrometrica Hedw.	6	On burnt wood
Grimmia trichophylla Grev.	6	Rocks of railway bed
Grimmia pulvinata (Hedw.) Sm.	1	Roofs at the Science Centre
Homalothecium lutescens (Hedw.) Robins.	4	Calcareous rocks by the rivulet
Homalothecium philippeanum (Spruce) B., S. et G.	1	Humid calcareous rocks at the cave entrance
Homalothecium sericeum (Hedw.) B., S. et G.	1	Shaded calcareous rocks
	1	Humid calcareous rocks at the cave entrance
Homomallium incurvatum (Brid.) Loeske	1	Shaded calcareous rocks
Hygroamblystegium tenax (Hedw.) Jenn.	1	Calcareous rocks near the water at the cave entrance
	2	Calcareous rocks at a spring
Hygrohypnum luridum (Hedw.) Jenn.	1	Calcareous rocks near the water at the cave entrance
Hypnum cupressiforme Hedw.	1	Bark of *Carpinus betulus*
	1	Bark of *Morus* trees at the Science Centre
	4	Soil by the rivulet
	6	In planted *Picea* forest
Hypnum lindbergii Mitt.	6	Rocky soil in an open area
Isothecium striatulum (Spruce) Kindb.	1	Shaded calcareous rocks
	1	Humid calcareous rocks at the cave entrance
	4	Calcareous rocks by the rivulet
Leskea polycarpa Hedw.	2	Calcareous rocks at a spring
Leucodon sciuroides (Hedw.) Schwaegr.	2	Bark of a *Pyrus* tree
Mnium marginatum (With.) Brid. ex P. Beauv.	1	Shaded calcareous rocks
Mnium stellare Hedw.	1	Shaded calcareous rocks
	4	Calcareous rocks by the rivulet
Neckera besseri (Lobarz.) Jur.	1	Humid calcareous rocks at the cave entrance
	4	Calcareous rocks by the rivulet
Neckera complanata (Hedw.) Hueb.	1	Shaded calcareous rocks
	4	Bark of *Acer campestre*
	4	Calcareous rocks by the rivulet

Table 1 (continued)

Species	L	Habitats
Orthotrichum anomalum Hedw.	1	Shaded calcareous rocks
	6	Rocks of the railway bed
Orthotrichum diaphanum Brid.	1	Bark of *Morus* trees at the Science Centre
Orthotrichum pallens Bruch ex Brid.	1	Bark of *Morus* trees at the Science Centre
	2	Bark of a *Pyrus* tree
	4	Bark of a *Quercus* tree
Orthotrichum patens Bruch ex Brid.	4,7	Bark of a *Quercus* tree
Orthotrichum striatum Hedw.	7	Bark of a *Quercus* tree
Phascum cuspidatum Hedw.	2	Soil in an open area
	3	Rocky soil by the lake
Plagiomnium ellipticum (Brid.) T. Kop.	1	Shaded calcareous rocks
Plagiomnium rostratum (Schrad.) T. Kop.	1	Shaded calcareous rocks
Plagiomnium undulatum (Hedw.) T. Kop.	1	Shaded calcareous rocks
Plagiothecium cavifolium (Brid.) Iwats.	1	Soil in forest
	4	Soil by the rivulet
Plagiothecium denticulatum (Hedw.) B., S. et G. var. *obtusifolium* (Turn.) Moore	4	Soil by the rivulet
Plagiothecium nemorale (Mitt.) Jaeg.	4	Soil by the rivulet
Pleuridium acuminatum Lindb.	5	In meadows
Pleurochaete squarrosa (Brid.) Lindb.	4	In an open grassland
	6	Rocky soil in an open area
Pogonatum aloides (Hedw.) P. Beauv.	1	Soil in forest
Pohlia melanodon (Brid.) J. Shaw	2	Calcareous rocks at a spring
Pohlia wahlenbergii (Web. et Mohr) Andr. var. *calcareum* (Warnst.) Warb.	1	Calcareous rocks near the water at the cave entrance
Polytrichum formosum Hedw.	4	Soil by the rivulet
Pottia truncata (Hedw.) B. et S.	5	In meadows
Pseudoleskella nervosa (Brid.) Nyh.	1	Shaded calcareous rocks
Racomitrium canescens (Timm ex Hedw.) Brid.	6	Rocky soil in an open area
Rhynchostegiella jaquinii (Garov.) Limpr.	4	Calcareous rocks by the rivulet
Rhynchostegiella tenella (Dicks.) Limpr.	1	Shaded calcareous rocks
	1	Humid calcareous rocks at the cave entrance
Rhynchostegium megapolitanum (Web. et Mohr) B., S. et G.	1,2	Soil in an open area

Table 1 (continued)

Species	L	Habitats
Rhynchostegium riparioides (Hedw.) C. Jens.	1,4	Calcareous rocks near the water at the cave entrance
	1,4	Calcareous rocks by the rivulet
Rhytidiadelphus triquetrus (Hedw.) Warnst.	7	Soil at the edge of a forest
Schistidium apocarpum (Hedw.) B. et S.	1	Shaded calcareous rocks
	1	Calcareous rocks near the water at the cave entrance
	1	Humid calcareous rocks at the cave entrance
	2	Calcareous rocks at a spring
	5	On concrete wall
Scleropodium purum (Hedw.) Limpr.	1	Soil in an open area
Seligeria cf. *paucifolia* (Dicks.) Carruth.	7	Calcareous rocks on the edge of a forest
Seligeria pusilla (Hedw.) B., S. et G.	1	Shaded calcareous rocks
	4	Calcareous rocks by the rivulet
Taxiphyllum wissgrillii (Garov.) Wijk et Marg.	1	Shaded calcareous rocks
	4	Calcareous rocks by the rivulet
Thamnobryum alopecurum (Hedw.) Gang.	1	Shaded calcareous rocks
	4	Calcareous rocks by the rivulet
Thuidium abietinum (Hedw.) B., S. et G.	3	In meadows
Thuidium philibertii Limpr.	1	Soil in an open area
	3	In meadows
	7	Soil at the edge of a forest
Tortella tortuosa (Hedw.) Limpr.	2,6	Rocky soil in an open area
	7	Bark of *Quercus* tree
Tortula calcicolens Kramer	2	Calcareous rocks in an open area
	4	In an open grassland
	6	Rocks of the railway bed
	6	Rocky soil in an open area
Tortula intermedia (Brid.) De Not.	4	In an open grassland
Tortula muralis Hedw.	1	Calcareous rocks near the water at the cave entrance
Tortula papillosa Wils.	1	Bark of *Morus* trees in the Science Centre
Tortula ruralis (Hedw.) Gaertn., Meyer et Scherb. subsp. *ruralis*	2	Soil in an open area
	6	Rocks of the railway bed
Tortula subulata Hedw.	1	Soil in forest
	6	Rocky soil in an open area

Table 1 (continued)

Species	L	Habitats
Weissia condensa (Voit) Lindb.	3	Rocky soil by the lake
	6	Rocky soil in an open area
Weissia controversa Hedw.	2	Soil in an open area
	4	In an open grassland
	5	In meadows
Weissia longifolia Mitt.	5	In meadows
Weissia cf. *squarrosa* (Nees et Hornsch.) C. Muell.	5	In meadows

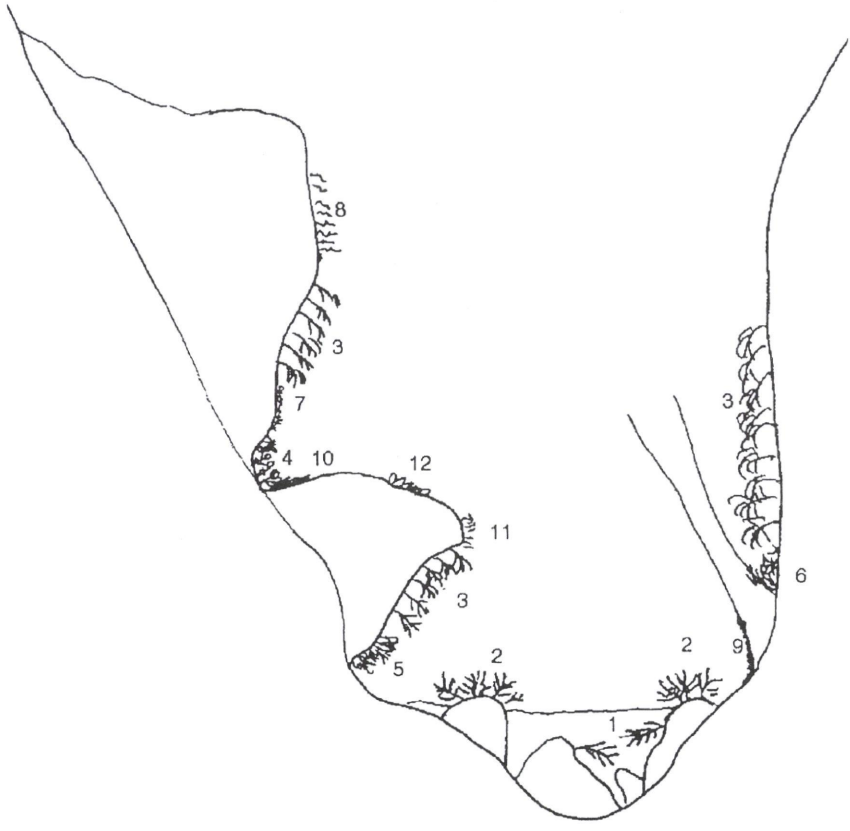


Fig. 2. Characteristic species on the rocks along the Pocibrava rivulet. 1. *Fontinalis antipyretica*, 2. *Rhynchostegium riparioides*, 3. *Thamnobryum alopecurum*, 4. *Anomodon rostratus*, *Fissidens* spp., 5. *Rhynchostegiella jaquinii*, 6. *Anomodon viticulosus*, 7. *Taxiphyllum wissgrillii*, 8. *Neckera complanata*, *N. besseri*, 9. *Plagiothecium nemorale*, 10. *Anomodon longifolius*, 11. *Isothecium striatulum*, 12. *Plagiochila asplenioides*.

*Bryum gemmiferum**, *B. rubens**, *B. ruderale**, *Fissidens gracilifolius**, *F. pusillus**, *Rhynchostegiella jaquinii**, *R. tenella*, *Seligeria* cf. *paucifolia**, *S. pusilla**, *Weissia condensa*, *W. longifolia*, *W.* cf. *squarrosa**. The species marked with asterisk are new for Yugoslavia.

We also recorded three taxa which are included in the Red Data Book of European Bryophytes (ECCB 1995). These are: *Anomodon rostratus* (R), *Rhynchostegiella jaquinii* (R) and *Weissia squarrosa* (R). Two species are European endemics: *Bryum gemmiferum* and *Weissia squarrosa*. We found the banks of the Pocibrava rivulet to be extremely rich in bryophyte species. To mention two redlisted moss species, *Anomodon rostratus* and *Rhynchostegiella jaquinii*, occur on the rocks along the stream! On Figure 2 the exact location of the most abundant, characteristic species along the rivulet are illustrated.

Considering that the vicinity of Petnica has not been previously investigated – only some records are mentioned in a publication of VELJIĆ and MARIN (1997) – all citations can be taken as new locality records for the species for Serbia and even for the Balkans.

Shown by Figure 3, among the bryophytes of the region of Petnica, the most highly presented type of distribution is that of the temperate zone of Europe (~52% (51.49%)). However, on the basis of the low average altitude of 200 m, the relatively high percentage (18.66%) of the species with (sub)boreal-montane distribution type was not expected. We explain this by the proximity of the mountains and the number of gorges with peculiar microhabitats providing expansion routes for these bryophytes. Species with sub-Mediterranean-montane (6.72%), and suboceanic-montane (7.46%) distribution types are equally present in the region, as well as those with sub-Mediterranean (5.22%) and suboceanic (5.97%) types. This could also be a consequence of the many gorges and canyons that channel the influence from the Mediterranean regions into our area, and also of the good surface hydrology with the great air humidity in some microhabitats.

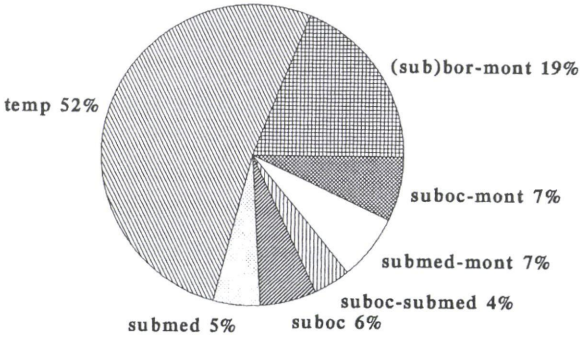


Fig. 3. European distribution types of bryophytes recorded in the region of Petnica.

CONCLUSIONS

The Petnica region is rich in bryophytes. The diversity of bryophytes is considerably high. 136 bryophyte taxa (116 mosses and 20 liverworts) were recorded and it is expected that the number of taxa will increase with further investigations. New records in the region include 15 for Serbia and 11 for the Federal Republic of Yugoslavia. Beyond this, two European endemics have been recorded, as well as three species are included in the Red Data Book of European Bryophytes. The region is predominated by bryophytes of the temperate zones of Europe, but considering the altitude of the area around 200 m, and the transitional position with influences from the Mediterranean areas and also from the surrounding mountains, combined with the good hydrology, it has many peculiarities which deserve much more attention.

The region thus could be developed into a "bryoflora conservation land", which is not only a safe home of some rare species, but where the protection of their habitats offer many new results for further floristical and microhabitat research.

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