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Contribution to the Bryophyte flora of the Vršačke Planine Mts., Serbia

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ABSTRACT: The study provides an insight into the bryophyte flora of the Vršačke Planine Mts. This "island highland" in the eastern part of Vojvodina host 69 bryophytes species of which there are only three hepatics. It is the habitat for 8 species exclusively recorded here in the whole province of Vojvodina (N. Serbia).

Key words: bryophytes, Vršačke Planine Mts., flora, Serbia

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INTRODUCTION

The Vršačke Planine Mts (also known as Vršački Breg; Romanian: Munții Vârşeț) are an autonomous and separate geo-morphological unit in southeastern Banat, and the highest mountain massif in northern Serbian province of Vojvodina (Gudurički Vrh, 641m altitude) (Fig. 1.). It covers the surface of 170 km square, of which 122 is in Serbia and the rest is in Romania.

Geomorphologically, this massif represents a remnant block of the old Pannonian massif. Though called "mountains", today it is an isolated hilly area with a lengths of 19km and a width of 8 km. The original relief of metamorphic rocks and magmatic breakthroughs went through many changes over geologic times, but some features remained obvious so that the characteristic blocks and boulders that are visible today, are an exceptional contribution to the overall geo-diversity of the Vršačke Planine Mts. The northern slopes are steep while the southern ones are gently sloping down. Today, much of the southern slopes are covered by vineyards. It is an island mountain that had been a real island in the Pannonian Sea. Its climate is mild continental with continental influence from the east, with a rather dry period in August, September and October. The average yearly temperature is 11.6°C, with the warmest months of July (21.6°C) and August (21.5°C) and the coolest is January with (-0.2°C). Recorded lowest temperature is -32.6°C. Average precipitation is 645 mm, with most of the rainfall in May (74mm) and June (85mm), and the least precipitation in March (34mm), September (38mm), and October (36mm).

Prevailing wind direction is southeastern or southern, which take the natural humidity out from the area resulting in the lowest relative humidity in Vojvodina (72%). (Pekanović 1991; Vučković 1991)

The origins and position of the Vršačke Planine Mts helped to develop a rich flora and vegetation at the transition of the forest-steppe and forest zones, with floristic influences of the Pannonian, Dakian, and Moesian floristic provinces. The vascular flora of this massif consists of 1017 species, 7 of which are listed in the Red Data Book of Serbia. Among them, there are endemic relic and rare species as well, such as *Minuartia hirsuta* (M. Bieb.) Hand.-Mazz. subsp. *frutescens* (Kit.) Hand.-Mazz., *Helleborus*

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purpurascens Waldst. & Kit., *Doronicum hungaricum* Rchb., and two species of bellflower (*Campanula grossekii* Heuffel and *Campanula sphaerotrix* Griseb.), all these occurring in Vojvodina only here. The vegetation of the Vršačke Planine Mts consists of 17 forest- and a number of meadow communities. Oaks, lindens and (of the introduced ones) black locust are the most frequent, and locally smaller stands of beech, maple and pine occur in the area.

The Vršačke Planine Mts are today a Nature Park of 4.408 hectares, with the core area of 190ha of the highest level of protection.

The bryophytes of the Vršačke Planine Mts have not been investigated previously, although some data of bryophyte occurrences from the mountain are summarized in Sabovljevic (2003). The present study provides the first insight into the bryophyte flora of this conservationally important place.

MATERIALS AND METHODS

The so called transect method was applied while collecting bryophytes visiting two points. Randomly visited sites of ecologically different environment offer the possibility of recording bryophytes in their diversity in the studied area. The specimens were deposited in the herbarium of the Hungarian Natural History Museum (BP).

Collecting sites are as follow:

1. Serbia, Vršac, Vršačka Planina Mts at Središte monastery and sourroundings, on soils (1.1) and the tree barks (1.2).
   N 45°08',32,9", E 21°23'54,0", 215 m, 07.04.2010.
2. Serbia, Vršac, Vršačka Planina Mts at Vrsačka Kula, on sandstone rocks (2.1) and the tree barks (2.2).
   N 45°07',26,5", E 21°19'40,1", 370 m, 07.04.2010.

The nomenclature follows Ros *et al.* (2007) for liverworts, and Hill *et al.* (2006) for mosses.

RESULTS

The list of bryophyte species recorded is given alphabetically follwing by the location and substrate.

- ▪ species new to Vojvodina province (i.e. Banat in Serbia and Vršački breg);
- • species new to Banat in Serbia and Vršački breg;
- ◆ species new to Vršački breg

Liverworts

1. ▪ *Cephaloziella divaricata* (Sm.) Schiffn. - 1.1
2. *Frullania dilatata* (L.) Dumort. - 1.2
3. *Porella platyphylla* (L.) Pfeiff. - 2.2

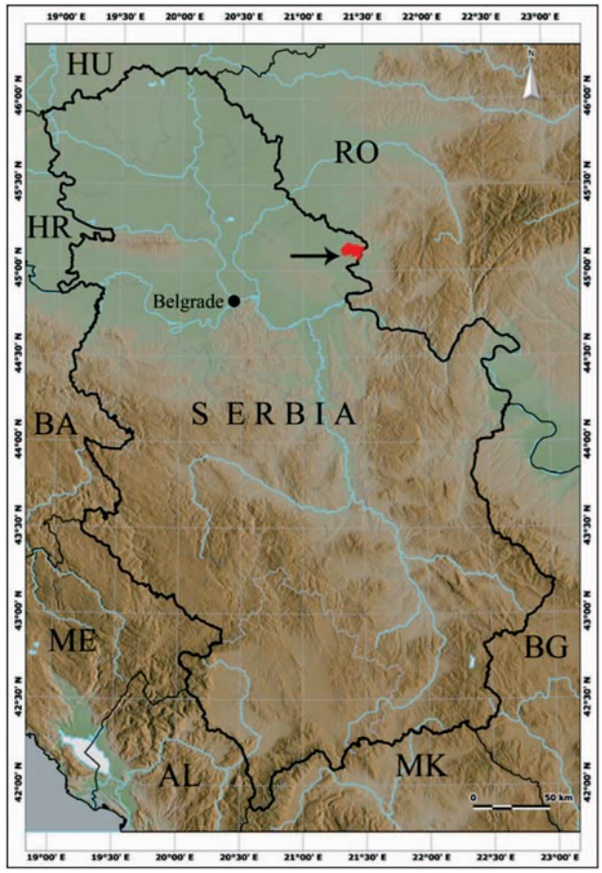

Fig. 1. The position of investigated area (Vršačke Planine Mts.) in Serbia (marked with an arrow).

Mosses

1. *Atrichum undulatum* (Hedw.) P. Beauv. - 1.1
2. ◆ *Barbula convoluta* Hedw. - 2.1
3. *B. unguiculata* Hedw. - 1.1, 2.1
4. *Brachythecium albicans* (Hedw.) Schimp. - 1.1
5. ◆ *B. glareosum* (Bruch ex Spruce) Schimp. - 1.1
6. ◆ *B. rutabulum* (Hedw.) Schimp. - 1.1, 2.1
7. *Brachytheciastrum velutinum* (Hedw.) Ignatov & Huttunen - 2.2
8. • *Bryum alpinum* Huds. ex With. - 1.1
9. *B. argenteum* Hedw. - 1.1
10. *B. capillare* Hedw. - 1.1, 2.1
11. *B. dichotomum* Hedw. - 1.1
12. • *B. gemmiferum* R. Wilczek & Demaret - 1.1
13. • *Drepanocladus polygamus* (Schimp.) Hedenäs - 1.1
14. *Ceratodon purpureus* (Hedw.) Brid. - 1.1
15. *Didymodon insulanus* (De Not.) M.O. Hill - 1.1
16. *D. rigidulus* Hedw. - 2.1
17. • *Fissidens bryoides* Hedw. - 1.1
18. • *F. taxifolius* Hedw. - 1.1

19. ▪ *Grimmia hartmannii* Schimp. - 2.1
20. ▪ *G. laevigata* (Brid.) Brid. - 2.1
21. ▪ *G. ovalis* (Hedw.) Lindb. - 2.1
22. *G. pulvinata* (Hedw.) Sm. - 1.1
23. *Hedwigia ciliata* (Hedw.) P. Beauv. var. *ciliata* - 2.1
24. ◆ *Homalothecium lutescens* (Hedw.) H. Rob. - 1.1
25. *Hypnum cupressiforme* Hedw. - 1.1, 2.1
26. ◆ *H. lacunosum* (Brid.) Hoffm. ex Brid. - 1.1
27. *Leskea polycarpa* Hedw. 2.2
28. *Leucodon sciuroides* (Hedw.) Schwägr. - 1.2, 2.1
29. ◆ *Orthotrichum anomalum* Hedw. - 2.1
30. ◆ *O. pallens* Bruch ex Brid. - 2.2
31. ▪ *O. striatum* Hedw. - 1.2
32. ◆ *Plagiomnium cuspidatum* (Hedw.) T.J. Kop. - 2.2
33. ◆ *Platygyrium repens* (Brid.) Schimp. - 1.2
34. *Polytrichum piliferum* Hedw. - 1.1
35. *Pseudoleskeella nervosa* (Brid.) Nyholm - 1.2, 2.2
36. *Pseudoscleropodium purum* (Hedw.) M. Fleisch. - 1.1
37. ◆ *Schistidium crassipilum* H.H. Blom – 2.1
38. ▪ *Syntrichia montana* Nees - 2.1
39. *S. ruralis* (Hedw.) F. Weber & D. Mohr - 2.1
40. *Tortula modica* R.H. Zander - 1.1
41. *T. muralis* Hedw. - 2.1
42. *T. subulata* Hedw. - 1.1
43. ▪ *Weissia brachycarpa* - (Nees & Hornsch.) Jur. 1.1
44. ▪ *W. longifolia* Mitt. - 1.1

In total 47 taxa were recorded, 44 moss species and three liverworts. The previous data on bryophytes of Vršački breg can be found in Soška (1949) and Pavletić (1955) for *Pseudoscleropodium purum* (Hedw.) M. Fleisch., *Tortula truncata* (Hedw.) Mitt., *Polytrichum juniperinum* Hedw., *P. piliferum* Hedw., *Pogonatum urnigerum* (Hedw.) P. Beauv., *Homalothecium sericeum* (Hedw.) Schimp., *Grimmia pulvinata* (Hedw.) Sm., *Funaria hygrometrica* Hedw., *Bryum caespiticium* Hedw., *Brachythecium salebrosum* (Hoffm. ex F. Weber & D. Mohr) Schimp., *B. rivulare* Schimp., *Sciuro-hypnum populeum* (Hedw.) Ignatov & Huttunen, *Barbula unguiculata* Hedw. and *Amblystegium serpens* (Hedw.) Schimp..

Fourty two species are cited for Vršački Breg in Sabovljevic (2003), although only from the southern slopes (sincethe northern segment of his study area is considered as South Banat in Serbia and therefore was not part of the investigation). With the expanded study area, the present study lists twenty three new bryophytes from Vršački Breg; the total area currently counts 69 bryophyte species.

Although according to Sabovljević & Natcheva (2006) and Sabovljević *et al.* (2008) no new species records can be listed for Serbia, now we add new records for the Vršački breg (23), the region of Banat (in Serbia) (13 species) and the province of Vojvodina (8 species). Thus, the area of Vršački Breg is the exclusive locality for 8 species in the whole province of Vojvodina (species marked with an ▪ in the list).

Sabovljević & Stevanović (2006) stated that Vojvodina is bryologically the poorest investigated region of old Yugoslavia. Compared to other region of Serbia, the region of Vojvodina is probably of less pronounced bryological diversity owing to strong human influence shown by the more than 80% of Vojvodina is cultivated land, and its relative uniform geomorphology. However, Vršački breg is an island of locally high bryological diversity and therefore of great conservation value especially for the province of Vojvodina (N Serbia). Bryo-floristically, the region is somewhat similar to two other island mountains such as Fruška Gora and Avala, where bryophyte diversity is slightly higher; but these two mountains receive more precipitation and are of a greater surface (Sabovljević & Cvetić 2003, Cvetić & Sabovljević 2005).

It is expected that with further investigation a few more bryophyte species will be recorded. This is a good hope despite that some elements of the envorinmental factors are inadvantageous (relatively low levels of precipitation, dry winds, and poor hydrological conditions). The area, however, is worthy of continued bryological investigations.

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REZIME

Prilog poznavanju brioflore Vršačkih planina (Srbija)

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Rad pruža uvid u floru briofita Vršačkog brega. Do sada je za ovu ostrvsku planinu u istočnoj Vojvodini poznato 69 briofita o čega je svega tri jetrenjače. Vršački breg je jedini lokalitet u Vojvodini za 8 vrsta briofita.

Ključne reči: briofite, Vršačke planine, flora, Srbija