

CONTRIBUTION TO THE KNOWLEDGE OF THE BRYOFLORA OF DETUNATA NATURE RESERVE (METALIFERI MOUNTAINS, TRANSYLVANIA)

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Records of the bryophytes collected on Mt Detunata, a bryologically neglected area provided some interesting data to the floristical knowledge of the Western Carpathians (Transylvania). Two hepatic and six moss species, namely *Lophozia longidens*, *Ptilidium ciliare*, *Bryum lanatum*, *Dicranum tauricum*, *Diphyscium foliosum*, *Mnium spinosum*, *Pseudobryum cinclidioides* and *Tetraphis pellucida* are new records to the Metaliferi Mountains.

Prezenta lucrare cuprinde o listă a briofitelor colectate de autori din rezervația geologică Detunatele din Munții Metaliferi, zonă mai puțin studiată din punct de vedere briologic. 8 specii sint noi pentru M-ții Metaliferi: *Lophozia longidens*, *Ptilidium ciliare*, *Bryum lanatum*, *Dicranum tauricum*, *Diphyscium foliosum*, *Mnium spinosum*, *Pseudobryum cinclidioides* și *Tetraphis pellucida*.

Key words: bryophytes, Detunata, Erdélyi Érchegység, Metaliferi Mountains, Mții Apuseni, Romanian Western Carpathians

INTRODUCTION

Research on the bryoflora of Mt Detunata in the Metaliferi Mountains, (partly realised within the framework of the bilateral relations between the Romanian and Hungarian Academies of Sciences) intends to further provide new data to the bryoflora of the region. The present paper is a continuation of a series by GYARMATI (2000), PÓCS *et al.* (2002), ORBÁN and BÁLINT (2002), BÁLINT and ORBÁN (2003), ORBÁN and SASS-GYARMATI (2003). While we were expecting the dominance of xerophytic species (as observed on similar basaltic volcanoes) during the exploration it turned out that the special geomorphology of the scree slope and scree holes provide special microclimatic conditions (low temperatures, high humidity) which support the existence of numerous periglacial species.

The investigated area

The geological reserve of Detunata is part of the Metaliferi Mountains (Erdélyi Érchegység), located in the southern part of the Western Carpathians in Transylvania (Fig. 1). The reserve is noted for its massive basalt columns of hexagonal

shape. The name “detunatele” derives from the huge basalt walls from which, as the result of disintegration, blocks of various size are rolling down. The Detunata Goală is 1,169 m high, its name referring to the fact that it is partially uncovered, exposing a spectacular magmatic anatomy. The Detunata Flocoasă is 1,256 m high and it is covered by spruce forests which consequently hide its geological structure. Locations of some interesting habitats from bryological point of view are shown in Figures 2 and 3.

Overview of previous bryological investigation

In spite of some previous investigations, like those of PÉTERFI (1900) who compiled the list of bryophyte collection made by Mallász, J., and GHIŞA *et al.* (1969) we only have some limited information on this bryologically neglected

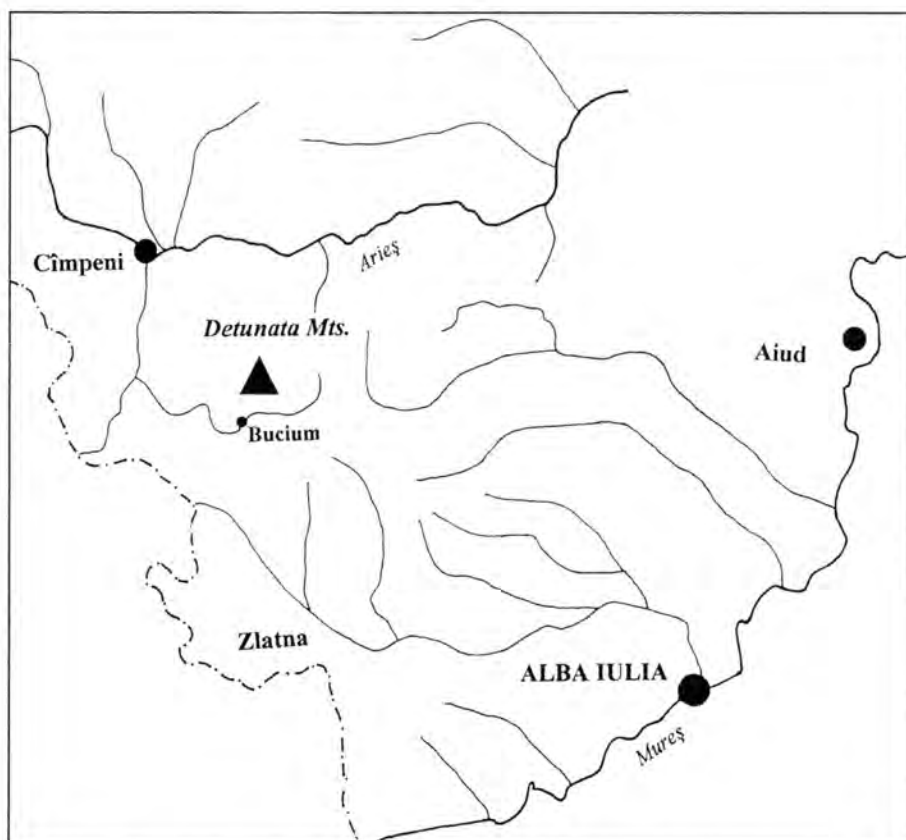


Fig. 1. The location of the investigated area within the Romanian Western Carpathians.



Fig. 2. Scree holes with rich bryophyte vegetation.



Fig. 3. Detunata Goală: prismatic basalt rocks covered by saxicolous lichens and bryophytes.

area. The 22 species known from Mt Detunata, based on these publications, are the following: *Abietinella abietina*, *Andreaea rupestris*, *Bryum capillare*, *Ceratodon purpureus*, *Cynodontium fallax*, *Dicranum scoparium*, *D. scoparium* f. *orthophyllum*, *D. starkei*, *D. tauricum* (see comment in conclusions!), *Eurynchium angustirete*, *E. striatum*, *Grimmia ovata* var. *cylindrica*, *G. tricophylla*, *Hylocomium splendens*, *Hypnum contiguum*, *H. cupressiforme*, *H. cupressiforme* var. *uncinatum*, *Pleurozium schreberi*, *Pogonatum aloides*, *Polytrichum alpinum*, *P. juniperinum*, *Racomitrium lanuginosum*, *R. lanuginosum* var. *robustum*, *Rhytidiadelphus triquetrus*, *Sphagnum subnitens*, *Webera nutans* var. *bicolor*, *W. nutans* var. *stragulata*.

Witnessed by the above record, no hepatics were indicated from this area.

MATERIALS AND METHODS

In June 2004 we organised a collecting trip to record bryophytes from different substrates growing on soil, rocks, decaying wood, trunks and tree branches. The collected material was compared with the records published by PÉTERFI (1900) and GHIŞA *et al.* (1969).

For each species we collected, the abbreviations of the collector names are followed by the specimen number, each of them including the year of collection (two digits), the serial number of locality (two digits), and finally after the slash (/), one or two letters indicating the different specimens from the same locality.

The distributional data were checked against the checklist of MOHAN (1998), the nomenclature and sequence of the species was updated according to SCHUMACKER and VÁNA (2000) for liverworts and according to FREY *et al.* (1995) for mosses. The names of plant communities follow POP *et al.* (2000). The collected specimens are deposited in the Herbarium of Eszterházy College, Eger (EGR) and in the Hungarian Natural History Museum, Budapest (BP).

List of our collecting localities

04066: Upper edge of *Carpino-Fagetum silvaticae* Paucă (with *Symphytum cordatum*). NE of Bucium on the SW ridge of Mt Detunata, on *Fraxinus*. Alt. 880 m, N 46°16.29', E 23°10.96'.

04067: Soil of a seminatural *Pinus sylvestris* stand. Alt. 990 m, N 46°16.47', E 23°11.50'.

04068: SW slope of the summit of Detunata Goală. A narrow strip of *Pulmonario rubrae-Abietii-Fagetum silvaticae* (Knapp) Soó with beechwood undergrowth (*Asperula odorata*, *Stellaria nemorum*) on the lower part of the scree slope. Alt. 1,000–1,050 m, N 46°16.0', E 23°11.2'.

04069: *Vaccinio-Piceetum abietis* Brezina et Hadač with *Abies alba* dominating the canopy, with the dominance of *Vaccinium myrtillus* and with abundant *Huperzia selago* in the lower shrub and herb layers, respectively. 0.4–1.5 m deep scree-holes contain persistent ice, called by the locals "ice caves". Alt. 1,055–1,100 m, N 46°16.57', E 23°11.76'.

04070: SW slope below the summit of Detunata Goală on open scree with fallen basalt columns of 0.5–2–3 m diameter, densely covered by *Andreaea rupestris* and by various *Rhizocarpon* and *Cladonia* species. Ice holes near the forest margin also occur at this location. Alt. 1,100–1,180 m, N 46°16.0', E 23°11.5'.

04071: SW facing vertical basalt columns of Detunata Goală summit with pioneer *Asplenietea rupestris* vegetation (*Asplenio trichomanes-Poëtum nemoralis* Boşcaiu). Alt. 1,200 m, N 46°16.61', E 23°11.84'.

RESULTS

A total of 41 bryophyte taxa – 11 liverworts and 30 mosses – were collected during our field trip. A list of species is given below.

Abbreviations: ct = corticolous, on bark; ru = rupicolous; ih = around scree holes with persistent ice; li = lignicolous; te = terricolous; ASG = Andrea Sass-Gyarmati; SO = Sándor Orbán; TP = Tamás Pócs.

Hepaticae

- Barbilophozia lycopodioides* (Wallr.) Loeske – 04069/U' ih-ru. (det. ASG)
Calypogeia integristipula Steph. – 04069/Q ih-li. (det. ASG)
Chiloscyphus profundus (Nees.) J. J. Engel et R. M. Schust. – 04068/E li. (det. SO)
Diplophyllum albicans (L.) Dumort. – 04069/U', W, V ru. (det. TP, ASG)
Frullania dilatata (L.) Dumort. – 04071/B' ru. (det. ASG)
Lepidozia reptans (L.) Dumort. – 04069/U ru. (det. ASG)
Lophozia longidens (Lindb.) Macoun – 04069/S ih-ru. (det. TP)
Porella platyphylla (L.) Pfeiff. – 04071/F ru. (det. ASG)
Ptilidium ciliare (L.) Hampe – 04068/P li. (det. TP)
Ptilidium pulcherrimum (Weber) Vainio – 04069/T ct *Abies*. (det. ASG)
Scapania nemorea (L.) Grolle – 04070/B ih-ru. (det. ASG)

Musci

- Andreaea rupestris* Hedw. – 04069/R (det. TP); 04069/AA (det. SO); 04070/A, Q ru. (det. ASG)
Atrichum undulatum (Hedw.) P. Beauv. var. *undulatum* – 04068/G te. (det. ASG)
Bartamia halleriana Hedw. – 04070/R' ih-ru. (det. ASG)
Brachythecium velutinum (Hedw.) B. S. G. – 04068/C li. (det. SO)
Bryum lanatum (P. Beauv.) Brid. – 04071/A te., 04071/E ru. (det. TP)
Cynodontium strumiferum (Hedw.) Lindb. – 04069/AC ru.; 04069/Z''' ih-ru. (det. SO)
Cynodontium polycarpon (Hedw.) Schimp. – 04070/C ih-ru. (det. SO)
Dicranella heteromalla (Hedw.) Schimp. – 04069/N, O ru. (det. SO)
Dicranum scoparium Hedw. – 04068/H, V ru. (det. SO)
Dicranum tauricum Sap. – 04068/I ru. (det. SO)
Diphyscium foliosum (Hedw.) Mohr – 04069/AB; 04070/K te. (det. TP, ASG)
Encalypta ciliata Hedw. – 04071/D ru. (det. ASG)
Grimmia ovalis (Hedw.) Lindb. – 04070/I, F ru. (det. SO)
Gymnostomum aeruginosum Sm. – 04071/C ru. (det. SO)
Hedwigia ciliata (Hedw.) P. Beauv. – 04070/N' ru. (det. SO)

- Mnium spinosum* (Voit.) Schwaegr. – 04068/L ru.; 04068/M' te. (det. SO)
Orthotrichum diaphanum Brid. – 04066/C ct. (det. SO)
Orthotrichum lyelli Hook. et Tayl. – 04066/A, A'' ct. (det. SO)
Orthotrichum striatum Hedw. – 04066/B ct. *Fraxinus* (det. SO)
Paraleucobryum longifolium (Hedw.) Loeske – 04068/B; 04069/O ih-ru., N ru. (det. ASG)
Pohlia cruda (Hedw.) Lindb. – 04069/AD ru. (det. SO)
Pohlia elongata Hedw. – 04069/Z', X ru. (det. SO)
Polytrichastrum alpinum (Hedw.) G. Sm. – 04068/K ru. (det. SO)
Plagiothecium denticulatum (Hedw.) B. S. G. – 04068/F li. (det. SO)
Pseudobryum cinclidioides (Hüb.) T. Kop. – 04069/D li. (det. SO)
Racomitrium lanuginosum (Hedw.) Brid. – 04070/M ru. (det. SO)
Racomitrium microcarpon (Hedw.) Brid. – 04069/Z ih-ru.; 04070/N ru. (det. SO)
Rhytidium rugosum (Hedw.) Kindb. – 04067/A te. (det. ASG)
Sphagnum subnitens Russ. et Warnst. – 04069/V ru. (det. SO)
Tetraphis pellucida Hedw. – 04069/A, A' li. (det. ASG, TP)

CONCLUSIONS

Both former records and our recent collections in the study area indicate that the bryoflora of Detunata Mts is quite diverse. The richest habitats are the ice holes and scree slopes. Based on the checklist of bryophytes of Romania published by MOHAN (1998), the following eight species represent new records for the Detunata Mts:

Lophozia longidens (Lindb.) Macoun – Circumboreal, subarctic, montane-subalpine in Central Europe, associated with acidic substrates in spruce forests, like siliceous rocks, bases old tree trunks, decaying wood and peat bogs. Quite rare in the Romanian Carpathians: Țibleș, Ciucaș, Suceava.

Ptilidium ciliare (L.) Hampe – Montane, circumpolar species occurring on acidic peaty soils, in form of short turf, often associating with deciduous and coniferous forests.

Mnium spinosum (Voit.) Schwaegr. – Circumpolar species, forming dark green patches on turf, rock crevices in shaded habitats. Frequent in Romania.

Pseudobryum cinclidioides (Hüb.) T. Kop. – Circumpolar, boreal species, being rare in Romania, known only from Maramureșului-Rodnei Mts (Máramaros-Radnai havasok), Hargita Mts, Sibiului-Cindrel Mts (Szebeni-havasok–Csindrel-hegység), (BORZA 1959, ORBÁN 1975), also from Grădinița moorland and from the peat bogs of Drăgoiaș located in Suceava county (MOHAN 1998).

Diphyscium foliosum (Hedw.) Mohr. – Circumpolar species, frequent in Romania; here we found it on shaded soil.

Dicranum tauricum Sap. – In the checklist of MOHAN (1998) the occurrence of this species is reported by mistake from Detunata, based on PÉTERFI's article (1900), who communicated it from Kirulyfördő (Băile Chirui) near Lövete (Lueta, Harghita county).

Bryum lanatum (P. Beauv.) Brid. – According to FRAHM (2002) "the differences between *B. argenteum* var. *argenteum* and var. *lanatum*, both morphologically and ecologically, are so important that it is proposed to treat var. *lanatum* on a species level, as *B. lanatum* (P. Beauv.) Brid."

Tetraphis pellucida Hedw. – Montane species, frequent in Romania in montane and subalpine habitats. Abundant around the scree holes.

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