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BRYOFLORISTICAL DATA FROM THE TĂTARULUI GORGE (IGNIŞ MOUNTAINS, ROMANIAN EASTERN CARPATHIAN, TRANSYLVANIA)

Andrea Sass-Gyarmati

Eszterházy Károly Catholic University, Institute of Biology, Department of Botany and Plant Physiology; Eger, Pf. 43, H-3301 Hungary;
E-mail: sass.gyarmati.andrea@uni-eszterhazy.hu

Abstract: The main aim of this study was to explore the bryophyte diversity and distribution patterns in the Igniş Mountains. From our collections hitherto 54 bryophyte species were identified. Among them the endangered (EN) *Grimmia trichophylla*, vulnerable (VU) *Plagiomnium ellipticum*, *Dicranella rufescens* the near threatened (NT) *Andreaea alpestris*, *Plagiomnium elatum* and the not evaluated (NE) *Racomitrium elongatum* are worth to be mentioned.

Keywords: bryoflora, vulnerable species, Igniş Mountains, Romania

INTRODUCTION

In spite of other previous investigations, like those of Boros and Vajda (1967), and Codoreanu (1972) and Béres (2011) who compiled the list of bryophyte collection made by A. Coman and A. Boros we only have some limited information on this bryologically neglected area. The following 30 species were known from Tătarului gorge, based on these publications, are the following: *Calypogeia neesiana, Lepidozia reptans, Marsupella emarginata, Metzgeria conjugata, Porella arboris-vitae, Riccardia palmata, Scapania nemorea, Abietinella abietina, Andreaea alpestris, Dicranella rufescens, Dicranum montanum, Hylocomium splendens, Paraleucobryum longifolium, Plagiomnium affine, P. rostratum, Plagiothecium undulatum, Pleurozium schreberi, Polytrichastrum formosum, Polytrichum juniperinum, P. strictum, Pseudanomodon attenuatus, Pseudoleskeella nervosa, Pseudotaxiphyllum elegans, Pteryginandrum filiforme, Ptilium crista-castrensis, Racomitrium heterostichum* var. *gracilescens, Sanionia uncinata, Schistidium rivulare, Schistostega pennata* and *Sphagnum capillifolium.*

The investigated area

The Gutâi Mountains are a mountain range within the Vihorlat – Gutâi area of the inner Eastern Carpathians. Igniş and Gutâi mountains are situated at the western and southern limit of Maramureş Land, they are the oldest sector of the volcanic range in Eastern Carpathians. There are two units distinguished by geoforms originating from different types of volcanic activity. They are separated by mountain passes from the neighbouring units (Huta 587 m, Gutâi 984 m, Neteda 1039 m): Igniş mountains is an andesitic plateau, mostly stratified, with small depressions, cliffs and residual forms, named 'rocks' (Piatra Săpânței, Piatra Goală, Piatra Rea, etc.). The climate of the SE Carpathians is colder and more continental than that of the NW Carpathians (Hajdú-Moharos 1996).

Cheile Tătarului is a nature reserve in the Gutâi Mountains, located on the territory of Mara village, Deseşti commune, Maramureş county. This tourist objective has been included in category III of the National Union for Nature Conservation. The conservation area covers an 15 hectares and the gorges themselves are 700 metres long. They are formed by the Igniș-Mara, in pyroxene andesite bedrock. Their two slopes are different, one is covered by forests and the other is a vertical cliff. The natural reserve Cheile Tătarului is declared a protected area by Law no.5/6 March 2000 (Lege 2000). Runcu stream flows through the gorge. A reservoir with a dam is under construction since 1987 on the same stream. The finalization of this dam will lead to the covering of the area of the gorges.

MATERIAL AND METHODS

In May 2024 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 Boros and Vajda (1967), Rațiu and Moldovan (1972) and Béres (2011). The collection was made in various vegetation types: meadows in front of the gorge entrance and the spruce forest which is present along the gorge (*Figure 1*). Igniş Mountain is covered otherwise by beech forests, except for

some spruce inclusions on the northern slopes, enclaves preserved in areas with a cold and humid microclimate. The spontaneous existence of spruce forests is evidenced by studies in the Tătarului Gorge (Moldovan 1970; Rațiu and Moldovan 1974).

The Romanian distribution of mosses was established from Plămadă (1998) and Mohan (1998), while that of the liverworts from Ştefănuţ (2008). The nomenclature follows Hodgetts *et al.* (2020). Species names are followed by the collecting site number, and by the substrate on which they were grown. The collected specimens are deposited in the Herbarium of Eger (EGR).

Figure 1. Entrance at Tătarului Gorge (photo: Andrea Sass-Gyarmati).

RESULTS
List of species

During the field study 54 bryophyte species were found in the investigated area. of which 7 belong to Marchantiophyta and 47 to Bryophyta species.

Marchantiophyta

Apopellia endiviifolia (Dicks.) Nebel & D.Quandt – 2401/BB, on irrigated rocks
Calypogeia neesiana (C.Massal. & Carestia) Müll.Frib. – 2401/L, on soil
Lophozia longidens (Lindb.) Konstant. & Vilnet – 2401/BG, on rocks
Marchantia polymorpha L. – 2401/BF, on irrigated soil
Ptilidium pulcherrimum (Weber) Vain. – 2401/I, on decaying wood
Riccardia palmata (Hedw.) Carruth. – 2401/Y, on decaying wood
Scapania nemorea (L.) Grolle – 2401/BC, on irrigated rocks

Bryophyta

Abietinella abietina (Hedw.) M.Fleisch. – 2401/M, on rocks
Andreaea alpestris (Thed.) Schimp. – 2401/AZ, on rocks
Atrichum undulatum (Hedw.) P.Beauv. – 2401/AD, on soil
Brachythecium glareosum (Bruch ex Spruce) Schimp. – 2401/AZ, on grassland
Bryum argenteum Hedw. – 2401/BE, on rocks
Calliergon cordifolium (Hedw.) Kindb. – 2401/U, on irrigated rocks
Calliergonella cuspidata (Hedw.) Loeske – 2401/AS, on marshy meadow
Climacium dendroides (Hedw.) F.Weber & D.Mohr – 2401/H, on soil
Dicranella rufescens (Dicks.) Schimp. – 2401/BI, on soil
Dicranum scoparium Hedw. – 2401/A, on rocks
Dicranum montanum Hedw. – 2401/AA, on decaying wood
Fontinalis antipyretica Hedw. ssp. ***antipyretica*** – 2401/S, on irrigated rocks
Grimmia trichophylla Grev. – 2401/BH, on rocks
Hylocomium splendens (Hedw.) Schimp. – 2401/AM, on rocks
Hymenostylium recurvirostrum (Hedw.) Dixon – 2401/V, on rocks
Hypnum cupressiforme Hedw. – 2401/N, on tree butress
Isopterygiopsis elegans (Brid.) Lindb. – 2401/AT, on decaying wood
Lewinskia speciosa (Nees) F.Lara, Garilleti & Goffinet – 2401/AU, on bark
Oxyrrhynchium hians (Hedw.) Loeske – 2401/AL, on soil
Paraleucobryum longifolium – 2401/AV, on rocks

Plagiomnium affine (Blandow ex Funck) T.J.Kop. – 2401/D, X, on soil
Plagiomnium elatum (Bruch & Schimp.) T.J.Kop. – 2401/AK, on earth covered rocks
Plagiomnium ellipticum (Brid.) T.J.Kop. – 2401/AR, on decaying wood
Plagiomnium undulatum (Hedw.) T.J.Kop. – 2401/E, on *Picea* roots
Plagiothecium curvifolium Schlieph. ex Limpr. – 2401/AH, on tree roots
Pleurozium schreberi (Willd. ex Brid.) Mitt. – 2401/K, on soil
Pogonatum urnigerum (Hedw.) P.Beauv. – 2401/AB, on soil
Polytrichastrum formosum (Hedw.) G. L. Sm. – 2401/AW, on soil
Polytrichum juniperinum Hedw. –2401/BK, on rocks
Polytrichum piliferum (Sw.) Schimp. – 2401/AC, on soil
Polytrichum strictum Menzies ex Brid. – 2401/BL, on soil
Polytrichum commune Hedw. – 2401/AQ, on soil
Pseudotaxiphyllum elegans (Brid.) Z.Iwats. – 2401/O, on earth covered rocks
Ptychostomum moravicum (Podp.) Ros & Mazimpaka – 2401/AO, on rocks
Ptychostomum pseudotriquetrum (Hedw.) J.R.Spence & H.P. Ramsay ex Holyoak & N. Pedersen – 2401/G, marshy bog on soil
Racomitrium aciculare (Hedw.) Brid. – 2401/T, on irrigated rocks
Racomitrium canescens (Hedw.) Brid. – 2401/BD, on stone bridge over the river
Racomitrium elongatum Ehrh. ex Frisvoll – 2401/P, on rocks
Rhizomnium puntatum (Hedw.) T.J.Kop. – 2401/AF, on rocks
Rhytidiadelphus squarrosus (Hedw.) Warnst. – 2401/F; 2401/AG, on soil
Sanionia uncinata (Hedw.) Loeske – 2401/AJ, on bog
Schistidium apocarpum (Hedw.) Bruch & Schimp. – 2401/AN, on rocks
Schistidium rivulare (Brid.) Podp. – 2401/R, on irrigated rocks
Schistostega pennata (Hedw.) F.Weber & D.Mohr – 2401/B, on *Picea* roots
Sphagnum capillifolium (Ehrh.) Hedw. – 2401/C, on bog; 2401/AP, on soil
Sphagnum girgensohnii Russow – 2401/ BA, on marshy meadow
Tetraphis pellucida Hedw. – 2401/Z, on decaying wood

DISCUSSION

The results of this study contributes to the knowledge of the biodiversity of Igniș Mountains. The main reason for relatively high biodiversity is the variety of habitat types that can be found in this area.

Andreaea alpestris (Thed.) Schimp. – subarctic-subalpine element, NT in Romanian bryoflora (Ştefănuţ and Goia 2012). The sporadic occurrence of this species is explained by the fact that it is usually noted in the field as *A. rupestris*, without microscopic analysis.

Dicranella rufescens (Dicks.) Schimp. – is VU in Romania. Not redlisted in the neighbouring countries. A tiny species of wet muddy soils is overlooked and undercollected. We can confirm its presence in the gorge.

Grimmia trichophylla Grev. – is treated as vulnerable (VU) in Romania (Ştefănuţ and Goia 2012), it is known just from few localities in the country: jud. Alba: Mţii Apuseni-Detunata; jud. Hunedoara: Mţii Retezat-Vl. Zlătuia; jud. Sibiu: Mţii Cibinului Dl. Ursului (Mohan 1998).

Lophozia longidens (Lindb.) Konstant. & Vilnet – is a circumboreal, subarctic, montane-subalpine in Central Europe, associated with acidic substrates in spruce forests, like siliceous rocks, bases of old tree trunks, decaying wood and peat bogs. Quite rare in the Romanian Carpathians: Ţibleş, Ciucaş, Suceava (Mohan 1998) and Metaliferi Mountains (Sass-Gyarmati *et al.* 2005).

Riccardia palmata (Hedw.) Carruth. – is a circumboreal, mountain species, it is reported only from one locality in Gutâi Mountains: Cheile Tătaru at Mara (Boros and Vajda 1967) and we could confirm its presence here. Also found in Gutai Mountains at Creasta Cocoşului are (Sass-Gyarmati 2019). Other reports from surroundings are from Borşa, Secului Valley, Sighet, Poiana Şarampoiului Forest, Mara, Runc Valley, Puzdra Mountain, (Boros and Vajda 1967); between Tocila Valley and Băiuţ (Jakab 1999), well distributed in the Romanian Carpathians (Mohan 1998).

Plagiomnium elatum (Bruch & Schimp.) T.J.Kop. – is a boreal moss (Düll 1985), NT in Romania. Not red listed in the neighbouring countries, is a characteristic *Plagiomnium* species of wetlands.

Plagiomnium ellipticum (Brid.) T.J.Kop. – is a boreal species, (Düll 1985), VU in Romania (Stefănuţ and Goia 2012). It is a rare wetland species.

Racomitrium elongatum Ehrh. ex Frisvoll – The species is a member of the *Racomitrium canescens* (Hedw.) Brid. group with a boreal distribution (Düll 1994). Typically grows on acid rocks in mountain areas with an oceanic climate, NE (not evatuated) status in Romania (Stefănuţ and Goia 2012).

Tetraphis pellucida Hedw. – is a montane species, frequent in Romania in montane and subalpine habitats.

These findings should enhance the knowledge of bryoflora, the results emphasizes the importance of conservation in its pristine condition this highly valuable area. It is imperative to maintain this natural habitat for future ecological research and sustainability.

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