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BRYOFLORISTICAL RESEARCHES OF HARGHITA MOUNTAINS

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Abstract: The Harghita Mountains are located in the interior arch of the East - Carphatians, in contact with Transsylvanian Basin. It is a 90 km long volcanic mountain range with a 1425 km^2 territory, formed by a succession of 8 volcanic eruptions. Since 1961 in this area there was not realized a systematic bryofloristhical research. We can find the most of the data for this area in Boros manuscript catalogue found in Hungarian Scientific Museum, and Mohan (1998). According to this, until now 200, species of bryophytes has been reported from Harghita Mountains.

In 2000 and 2001 bryofloristical exploration of South Harghita Mountains was organized and bryophytes were collected from 24 field samples like valleys, moorlands, peaks representing the diversity of the range. 184 bryophyte species were collected of which two are new for the bryoflora of Romania *Cephaloziella integerrima* and *Dicranella staphylina* and 63 species are new for the bryoflora of Harghita Mountains.

The list of the identified species is given in this paper. According to former data and our study the bryoflora of Harghita Mountains is rich and valuable. The *Brachydontium trichodes* (R), *Lophozia ascendens* (R), *Cephalozia lacinulata* (V) growing here are listed in the Red Data Book of European Bryophytes. The richest habitats are the moorlands and the cramped valleys.

The main disturbance factors presented in the territory are: forestry works (clear cutting), grazing, tourists' activities and natural disasters.

Introduction

The Harghita Mountains can be found in the interior arch of the East - Carphatians, in contact with Transylvanian Basin. It is a 90 km long volcanic mountain range with a 1425 km^2 territory, formed by a succession of 8 volcanic eruptions. Harghita belongs to the group of mountains with medium height, the highest peak of it is the Mădăraş Peak of 1800 m.

The first bryofloristical notes were published by Barth (1905). He mentioned about 28 hepatics and 97 mosses from Vlăhiţa and Homorod-Băi. In 1961, Pall enumerated 108 species for this territory from which 23 new species. The peat bogs species was presented by Pop (1960). The territory was investigated by foreign scientists as well. Boros et Vajda (1967) mentioned some rare bryophytes collected by him in this territory. Gyarmati (2000) published the bryoflora of the Cheile Vârhişului and Jakab (2000) collected here a new species for the Romanian bryoflora: *Cephaloziella massalongi.*

Our aim it was the bryofloristical exploration of South Harghita Mountains.

Material and Methods

In 2000 and 2001 we collected bryophytes from 24 field samples (Table 1) like valleys, moorlands, peaks representing the diversity of the range. The floristic study included bryophytes growing on rocks, soil, decaying wood, trunks and branches of trees, water bryophytes.

The collected material was compared with the existing data in Boros manuscript catalogue found in Hungarian Scientific Museum and Mohan, (1998). According to this until now 200 species of bryophytes has been reported from Harghita Mountains.

From our 600 collected samples we have identified 184 species of which two are new for the bryoflora of Romania (**) [1] and 63 species are new for the bryoflora of Harghita Mountains (*) [8].

The list includes only our proper collections. The samples were collected by L. Bálint and K. Csízi and identified by the authors. The specimens have been deposited in Eszterházy Károly College's Herbarium (EGR).

The nomenclature is according to Schumacker et Váňa (2000) – for hepatics, and Frahm et al. (1995) – for mosses.

Table 1: Detailes concerning to the places of occurence

Place of collection	Date of collection	Altitude	County	Cod nr.
Minei Valley (riverhead)	11.07.2000	1200 m.	Harghita	1
Greu Mt.	11.07.2000	1100 m.	Harghita	2
Minei Valley	11.07.2000.	1100-1200 m.	Harghita	3
Vermet Valley	02.07.2000	1050-1250 m.	Harghita	4
Asău Valley	22.10.2000	1000-1100 m.	Harghita	5
Cifrabuc	16.08.2001	1200 m.	Harghita	6
Pietros Mt.	15.08.2001	1295 m.	Covasna	7
Bakratas Mt.	15.08.2001	1363 m.	Harghita	8
Sphagnum moor near Câmpul Galben	16.08.2001	1350 m.	Harghita	9
Mic Valley	16.08.2001	1050-1150 m.	Harghita	10
Asău Valley (riverhead)	16.08.2001	1300 m.	Harghita	11
Descut	15.08.2001		Harghita	12
Groapa Mare	16.08.2001	1300 m.	Harghita	13
Podului de Piatră Mt.	15.08.2001	1551 m.	Harghita	14
Rotund Mt.	28.08.2001	1100 m.	Covasna	15
Pietros Valley	28.08.2001	900 m.	Covasna	16
Cormoş Valley	28.08.2001	900 m.	Covasna	17
Boitor forest	28.08.2001	1000-1100 m.	Covasna	18
Luci	13.08.2001	1050 m.	Harghita	19
Borsáros	06.04.2001	650 m.	Harghita	20
Ulieşul Mic	17.04.2001	1150 m.	Harghita	21
Luci Meleche forest	13.08.2001	1050 m.	Harghita	22
Cucu Mt.	15.08.2001	1550 m.	Harghita	23
Câmpul Galben	16.08.2001	1396 m.	Harghita	24

HEPATICAE

Conocephalaceae Müll. Frib: *Conocephalum conicum* (L.) Dumort. (21);

Marchantiaceae (Bisch.) Endlicher*: Marchantia polymorpha* L. emend. Burgeff (5,13,16,20,21); *Apometzgeria pubescens* (Schrank.) Kuwah. (10);

Metzgeriaceae Klinggr.: *Metzgeria conjugata* Lindb. (2,5,6,10); *M. furcata* (L.) Dumort. (4,5,6,15,17,18,21,22);

Aneuraceae Klinggr.: *Aneura pinguis* (L.) Dumort. (5,10,11,20,22,23); *Riccardia palmata* (Hedw.) Carruth. (5,15,19);

Pelliaceae Klinggr.: *Pellia endiviifolia* (Dicks.) Dumort. (3,13,20,21,22,23); **P. epiphylla* (L.) Corda (1,13);
Blasiaceae Klinggr.: *Blasia pusilla* L. (6);
Jungermanniaceae Reichb.: *Barbilophozia barbata* (Schimdel. ex. Schreb.) Loeske (4); *B. hatcheri* (A. Evans) Loeske (5); *Lophozia ascendens* (Warnst.) R.M. Schust. (7); **L. bicrenata* (Schmidel ex Hoffm.) Dumort. (3,7); *Anastrophyllum minutum* (Schreb.) R.M. Schust. (4,5,21); **Tritomaria exectiformis* (Breidl.) Loeske (5); *Jungermannia gracillima* Sm. (7); **J. hyalina* Lyell (10,21); **J. sphaerocarpa* Hook. (3,6);
Plagiochilaceae (Jörg.) Müll. Frib: *Plagiochila asplenoides* (L. emend. Tayl.) Dumort. syn.: *P. major* (Nees) S. Arn. (4,10,21); *P. porelloides* (Torrey et Nees) Lindenb. (1,4,5,10,13,15,23);
Lophocoleaceae (Joerg.) Vand. Bergh. In Robyns: *Chiloscyphus coadunatus* (Sw.) J.J. Engel et R.M. Schust.(15), *C. profundus* (Nees) J.J.Engel et R.M. Schust. (2,4,5,6,7,8,12,13,14,15,18,19,21), *C. minor* (Nees) J.J.Engel et R.M. Schust.(2,5) **C. polyanthos* (L.) Corda var. *polyanthos* (Corda) (3,4,5,16), *C. polyanthos* (L.) Corda var. *pallescens* (Ehrh. ex Hoffm.) Hartm. (13,16);
Scapaniaceae Migula: **Diplophyllum obtusifolium* (Hook.) Dumort. (3); *Scapania irrigua* (Nees) Nees (21); **S. mucronata* H. Buch (21,23); *S. nemorea* (L.) Grolle (5,21); **S. uliginosa* (Sw. ex Lindenb.) Dumort. (3); **S. umbrosa* (Schrad.) Dumort. (7); *S. undulata* (L.) Dumort. (2,3,4,5,10,16,21,22);
Cephaloziellaceae Douin: **Cephaloziella elachista* (J.B. Jack ex Gottsche et Rabenh.) Schiffn. (6); *C. rubella* (Nees) Warnst. (3); ***C. integerrima* (Lindb.) Warnst. (13);
Cephaloziaceae Migula: **Cephalozia bicuspidata* (L.) Dumort. (6,13,15,19,21); *C. connivens* (Dicks.) Lindb. (3,19); **C. lacinulata* J.B. Jack ex Spruce (3,6,15,19,21); *C. lunulifolia* (Dumort.) Dumort. (15,19); *C. pleniceps* (Aust.) Lindb. (19); *Nowelia curvifolia* (Dicks.) Mitt. (3,13,15);
Lepidoziaceae Limpr.: *Lepidozia reptans* (L.) Dumort. (2,3,4,5,6,12,14,15,19,21,23) **Kurzia pauciflora* (Dicks.) Grolle (9)
Calypogeiaceae (Müll. Frib.) H. Arn.: *Calypogeia integristipula* Steph. (3,13,19,21); **C. muelleriana* (Schiffn.) Müll. Frib. (6,19,22); *C. neesiana* (C. Massal. et Carestia.) Müll. Frib. (19); **C. sphagnicola* (Arnell et J. Perss.) Warnst. et Loeske (19); **C. suecica* (Arnell et J. Perss.) Müll. Frib. (5,13,19);
Pseudolepicoleaceae Fulf et Tayl.: *Blepharostoma trichophyllum* (L.) Dumort. (4,5,6,15);
Ptilidiaceae Klinggr.: *Ptilidium pulcherrimum* (G. Weber) Vainio (2,5,12,14,15,19,22);
Radulaceae (Dumort.) Müll. Frib.: *Radula complanata* (L.) Dumort. (3,5,6,15,16,18,21,22); **R. lindbergiana* Gottsche ex.C. Hartm. (4);
Jubulaceae Klinggr.: *Frullania dilatata* (L.) Dumort. (5,6,17,21);
Lejeuneaceae Cas.-Gil.: *Lejeunea cavifolia* (Ehrh.) Lindb. (5);
Sphagnaceae Müll. Holla: *Sphagnum girgensohnii* Russ. (3,19,22); *S. capillifolium* (Ehrh) Hedw. (9,19); *S. fallax* (Klinggr.) Klinggr. (3,9,19); *S. magellanicum* Brid. (19); **S. obtusum* Warnst. (10); *S. palustre* L. (9,19,24); **S. papillosum* Lindb. (9); *S. quinquefarium* (Lindb.) Warnst. (13,19); *S. subnitens* Russ. et Warnst. (19); *S. teres* (Schimp.) Angstr. (19);
Tetraphidaceae Schimp.: *Tetraphis pellucida* Hedw. (3,7,9,12,15,19,21,22,23);
Polytrichaceae Müll. Holla.: *Atrichum undulatum* (Hedw.) P. Beauv. (2,5,6,15); *A. undulatum var. gracilisetum* Besch. (13); *Pogonatum aloides* (Hedw.) P. Beauv. (3,4,6); **P. urnigerum* (Hedw.) P. Beauv. (7); **Polytrichastrum alpinum* (Hedw.) G. L. Smith (10,14,21); *P. commune* Hedw. (7,8,9,10,22); *P. formosum* Hedw. (4,7,12,13,15,21); *P. juniperinum* (Willd.) Hedw. (14); *P. piliferum* Hedw. (10); *P. strictum* Brid. (9,19); *Schistostega pennata* (Hedw.) Weh. et Mohr. (3);
Ditrichaceae Limpr.: **Pleuridium acuminatum* Lindb. (8); *Ditrichum subulatum* (Br. eur) Hampe (3); **Ceratodon purpureus* (Hedw.) Brid. (7,8);

Seligeraceae Schimp.: **Brachydontium trichodes* (Web.) Fuernr. (21);
Dicranaceae Müll. Holla.: **Rhabdoweisia fugax* (Hedw.) B.S.G. (21,23); *Cynodontium polycarpon* (Ehrh.) Schimp. (4,7); **C. schisti* (Web. et Mohr.) Hag. (14); *C. strumiferum* (Hedw.) Lindb. (4); *Dicranoweisia cirrata* Lindb. (3); *D. crispula* (Hedw.) Lindb. (6); *Dichodontium pellucidum* Schimp. (5,10,16); *Dicranodontium denudatum* (Brid.) Broth. (7); *Dicranella cerviculata* (Hedw.) Schimp. (3); *D. heteromalla* (Hedw.) Schimp. (8,14); ***D. staphylina* Whitehouse (7); **D. subulata* (Hedw.) Schimp. (3,9); *Orthodicranum montanum* (Hedw.) Loeske (2,4,5,6,7,12,14,15,19,21,22); **Dicranum polysetum* Sw. (4); *D. scoparium* Hedw. (4,6,7,13,15,16,21,22,23); *Paraleucobryum longifolium* (Hedw.) Loeske (2,7,16);
Fissidentaceae Schimp.: **Fissidens rufulus* B.S.G. (16); **F. gracilifolius* Nyh. (23);
Trichostomaceae B.S.G.: *Tortella tortuosa* (Hedw.) Limpr. (4); *Bryoerythrophyllum recurvirostre* (Hedw.) Chen (5,11,13);
Grimmiaceae B.S.G.: *Schistidium apocarpum* (Hedw.) B.S.G. (16,18); **Grimmia donniana* Smith (4); *G. trichophylla* Grev. (5,7);
Bryaceae Müll. Holla.: *Pohlia cruda* (Hedw.) Lindb. (7); *P. elongata* Hedw. (14); *P. nutans* (Hedw.) Lindb. (4,7,13,20); **Bryum subelegans* Kindb. (16,23); *B. pallescens* Sw. (20); **B. algovicum* Sendt. ex Müll. Holla. (8);
Mniaceae Müll. Holla.: *Rhizomnium punctatum* (Hedw.) T. Kop. (1,2,3,4,5,6,10,12,23); **Pseudobryum cinclidioides* (Hüb.) T. Kop. (22); **Mnium marginatum* (Whit.) Brid. (10,14); *M. stellare* Hedw. (5); *Plagiomnium affine* (Bland.) T. Kop. (21); **P. cuspidatum* (Hedw.) T. Kop. (20); **P. elatum* (B.S.G.) T. Kop. (6,12,15,21); **P. rostratum* (Schrad) T. Kop. (2); *P. undulatum* (Hedw.) T. Kop. (1,17);
Bartramiaceae B.S.G.: *Bartramia pomiformis* Hedw. (5); *Philonotis fontana* (Hedw.) Brid. (24); **P. capillaris* (Lindb.) Lindb. (11);
Aulacomniaceae Boul.: *Aulacomnium palustre* (Hedw.) Schwaeg. (9,13,19,20);
Orthotrichaceae Limpr.: **Zygodon viridissimus* (Dicks.) Brid. (21); *Ulota crispa* (Hedw.) Brid. (21); **Orthotrichum stramineum* Hornsch. Ex. Schwaegr. (6);
Neckeraceae Müll. Holla.: *Neckera complanata* (Hedw.) Hub. (4);
Lembophyllaceae Broth.: **Isothecium alopecuroides* (Dubois) Isov. (2);
Fontinalaceae B.S.G.: *Fontinalis antipyretica* Hedw. (11,17);
Leskeaceae Rab.: **Leskea polycarpa* Hedw. (6);
Thuidiaceae Kindb.: **Heterocladium dimorphum* (Brid.) B.S.G. (10); **H. heteropterum* B.S.G. (21); *Anomodon viticulosus* Hook. et Tayl. (15); *Thuidium tamariscinum* (Hedw.) B.S.G. (6); *Abietinella abietina* (Hedw.) Fleisch. (3,10).
Cratoneuraceae Moenk.: *Cratoneuron commutatum* (Hedw.) G. Roth. (11); **C. decipiens* (De Not.) Loeske (3);
Amblystegiaceae Roth: **Calliergon giganteum* (Schimp.) Kindb. (11); *C. stramineum* (Brid.) Kindb. (19); *Calliergonella cuspidata* (Hedw.) Loeske (20); *Scorpidium scorpioides* (Hedw.) Limpr. (20); **Campylium chrysophyllum* (Brid.) Lange (3,9); **C. polygamum* (B.S.G.) Lange et Jens (20); *C. stellatum* (Hedw.) Lange et Jens (10); *Drepanocladus aduncus* (Hedw.) Warnst. var. *gracilens* (10,11,20); *D. uncinatus* (Hedw.) Warnst. (4,5,10,12,15,19); *D. vernicosus* (Mitt.) Warnst. (20); *Amblystegium tenax* (Hedw.) Jens. (5,10,13); *A. fluviatile* (Hedw.) B.S.G. (5,11); *A. humile* (P. Beauv) Crundw. (20); *A. serpens* (Hedw.) B.S.G. (6,10,15,16,20,21); **A. varium* (Hedw.) Lindb. (11); **Platydicya subtilis* (Hedw.) Crum (18); **Leptodictyum riparium* (Hedw.) Warnst. (4);
Brachytheciaceae B.S.G.: **Scleropodium purum* (Hedw.) Limpr. (3,4,19); **Brachythecium mildeanum* (Schimp.) Schimp. ex Milde (16); **B. rutabulum* (Hedw.) B.S.G. (1,4,11,15); *B. rivulare* B.S.G. (24); *B. velutinum* (Hedw.) B.S.G. (7,10,13,15,18); *Homalothecium nitens* (Hedw.) Schimp. (20); *H. sericeum* (Hedw.) B.S.G. (5); *Rhynchostegium riparioides* (Hedw.) Card. (5,16,17); *Eurhynchium angustirete* (Broth.) T. Kop. (2); **E. praelongum* (Hedw.) B.S.G.

(5,6,13,15,19); *E. striatum* (Hedw.) Schimp. (5,13); *E. pulchellum* (Hedw.) Jenn. (2); *E. hians* (Hedw.) Lac. (13,15,17);
Pterigynandraceae Kindb.: *Pterigynandrum filiforme* Hedw. (4,6,15);
Plagiotheciaceae Fleisch.: *Plagiothecium denticulatum* (Hedw.) B.S.G. (2,4,5); *P. laetum* B.S.G. (23); *P. platyphyllum* Moenk. (12,14,18,21); **P. cavifolium* (Brid) Iwats (10); **P. succulentum* (Wils.) Lindb. (2,6); *Pseudotaxiphyllum elegans* (Brid.) Iwats. (15,18); **Isopterygiopsis muelleriana* (Schimp.) Iwats. (2,5,); *Herzogiella seligeri* (Brid.) Iwats. (2);
Hypnaceae Fleisch.: *Pylaisia polyantha* (Hedw.) Schimp. (4,5,15); **Platygyrium repens* (Brid.) B.S.G. (21); *Ctenidium molluscum* (Hedw.) Mitt. (15); *Hypnum cupressiforme* Hedw. (2,4,6,7,8,16);
Hylocomiaceae Fleisch.: *Pleurozium schreberi* (Brid.) Mitt. (7,19,23); *Hylocomium splendens* (Hedw.) B.S.G. (2,4,17,19,23); *Rhytidiadelphus squarrosus* (Hedw.) Warnst. (10,24); *R. triquetrus* (Hedw) Warnst (2,6,12,16);

Conclusions

According to former data and our study the bryoflora of Harghita Mountains is rich and valuable. The *Brachydontium trichodes* (R), *Lophozia ascendens* (R), *Cephalozia lacinulata* (V) growing here is listed in the Red Data Book of European Bryophytes [13]. The richest habitats are the moorlands and the cramped valleys.

The main disturbance factors presented in the territory are: forestry works (clear cutting), grazing, tourists' activities and natural disasters.

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CERCETĂRI BRYOFLORISTICE ÎN MUNŢII HARGHITEI

(Rezumat)

În partea vestică a Carpaţilor Orientali, în regiunea de contact dintre zona cristalino-mezozoică şi Bazinul Transilvaniei, se întinde lanţul neoeruptiv al Carpaţilor Orientali, Munţii HarghitEI. Aceştia aparţin grupului de munţi cu înălţimi mijlocii, având o suprafaţă de 1425 km^2 şi o lungime de 90 km.

Primele date briofloristice din Munţii HarghitEI au fost publicate de Barth (1905). El enumeră 28 specii de hepatice şi 97 de musci din Vlăhiţa, Homorod Băi şi împrejurimi. După mai bine de cincizeci de ani, Pall (1961)

publică 23 de specii noi; Pop (1960) prezintă speciile mlaştinilor de turbă. Dintre cercetătorii străini, Boros şi Vajda (1967) publică briofitele rare colectate de ei de pe acest teritoriu. Gyarmati (2000) prezintă brioflora Cheii Vârghişului şi, Jakab (2000), colectează o specie nouă pentru brioflora României: *Cephaloziella massalongi*.

Între anii 2000 şi 2001 am efectuat cercetări briofloristice în partea sudică a Munţilor Harghitei, pe 24 de suprafeţe, reprezentând diferitele substrate şi părţi ale masivului.

Din colecţia noastră de 600 de eşantioane, am identificat 183 de specii, dintre care două noi pentru brioflora României [1] şi 63 specii noi pentru Munţii Harghitei [8].

Dintre briofitele colectate şi identificate în partea de sud a Munţiilor Harghitei, 3 specii sunt trecute pe Lista Roşie a Briofitelor din Europa [13]: *Cephalozia lacinulata*, *Lophozia ascendens* şi *Brachydontium trichodes.*

În concluzie, putem spune că brioflora Munţiilor Harghitei este bogată şi variată. Cele mai valoroase habitate sunt tinoavele şi văile înguste ale pâraielor.Totuşi, datorită defrişării pădurilor, unele dintre aceste habitate dispar de la un an la altul.