

BRYOFLORESTICAL DATA FROM
THE TRANSDANUBIAN MOUNTAIN RANGES,
BAKONY AND VÉRTES MTS (HUNGARY)

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During various field trips carried out between 2003 and 2011 in the Bakony and Vértes Mts, the author had compiled a bryofloristical data set comprising of 256 entries and containing 36 taxa (21 liverworts and 15 mosses). According to the Hungarian Red List, 5 of these taxa fall into the endangered (EN) category, 12 are vulnerable (VU), 16 are near threatened (NT), and 3 have no recent data (DD). Among these bryophytes three are included in the Red data book of European bryophytes (ECCB 1995) as well, along with two species (*Anomodon rostratus*, *Taxiphyllum densifolium*) in the rare (R) and one (*Asterella saccata*) in the vulnerable (VU) category.

Key words: Bakony Mts, liverworts, mosses, red-listed species, Vértes Mts

INTRODUCTION

During field trips in the past eight years to further explore the bryoflora of the region, numerous bryofloristical data were collected in the Bakony and Vértes Mts. Many of these were published in former articles (NÉMETH 2007, 2008, 2009), but the most interesting results of the ongoing identification and revision work are presented here.

Apart from the last few years (GALAMBOS 2010, NÉMETH 2007, 2008, 2009, NÉMETH and PAPP 2011), no comprehensive bryofloristical papers have been published from this area since 1968 (BOROS 1968), thus the actual distribution of the bryophytes living here is barely known. In recent years the taxa contained by the Red data book of European bryophytes were searched for and checked with greater attention than usual, hence they are represented by some recent data from the study area (PAPP 2008, PAPP and ERZBERGER 2000, 2003, PAPP *et al.* 2000).

MATERIALS AND METHODS

The investigated area

Parts of the Transdanubian Mountain Ranges, the Bakony and Vértes Mts are more or less a series of SW–NE running ranges consisting predominantly of several types of limestone and Upper Triassic dolomite. With a rather rugged surface, these ranges are divided by deep valleys and gorges with or without streams. Shaded rocky habitats of the north-facing slopes of these valleys are ideal locations for alpine-boreal bryophytes, while on the rocky grasslands in southerly exposure numerous xerophytic species occur.

Methods

The collecting trips were made between 2003 and 2011. Mainly the north-facing steep rocky walls, gorges, deep valleys were investigated and bryophytes collected from soil and exposed, shady rocks but some open rocky grasslands of south facing dolomite slopes were also studied. The nomenclature and threat status of the bryophytes follow PAPP *et al.* (2010). Information on flora elements, occurrences of the given species in the investigated area come from BOROS (1968, 1915–1971) in addition distributional data in Hungary are given on the basis of ORBÁN and VAJDA (1983). The records of enumeration are composed of date, geographical coordinates, elevation above sea level, and collection number. In the case of confirmed old occurrences the sources where the original data were published are given in brackets. The specimens were determined by the author, unless otherwise stated.

Voucher specimens have been deposited both in the Herbarium of the Hungarian Natural History Museum, Budapest (BP) and the private herbarium of the author.

Abbreviations used in the text: **EN** = endangered; **VU** = vulnerable; **NT** = near threatened; **DD** = data deficient (no recent data); **DD-va** = data-deficient, vanished; **LC-att** = least concern attention; **IND** = indicator of high nature conservation value of the habitat; **det.** = determined by.

RESULTS

Hepaticae

Aneura pinguis (L.) Dumort. – NT, IND – Circumpolar, nearly subcosmopolitan species. It thrives on various types of damp places. Uncommon.

New record of occurrence: **Bakony, Bakonyszűcs**: Bécsi-árok (10.04.2010, 47.31675°N, 17.74033°E, alt. ca 363 m, 3069/2, det.: B. Papp).

Apometzgeria pubescens (Schrank) Kuwah. – VU – A species of humid gorges and woodlands, which mainly favours shaded rocks. In Hungary, it became quite rare in the last decades. Earlier data have proved its presence in the territory (Bakony: Alsó-Cuha-szurdok, Valley of Fekete-Séd, Kertes-kői-szurdok, Miklóspál-hegy, Ördög-árok, Vár-völgy; Vértés: Fáni-völgy), but only two of them have recently been confirmed (Kertes-kői-szurdok (NÉMETH 2008) and Ördög-árok). New localities of the species did not turn up and unfortunately it was unsuccessfully searched for on most of its earlier localities.

Old occurrence confirmed: **Bakony, Bakonyoszlop**: Ördög-árok (05.02.2011, 47.32451°N, 17.91354°E, 280 m, 3505/4); (BOROS 1968).

Asterella saccata (Wahlenb.) A. Evans – VU – Xerophytic, subcontinental species, which lives in open calcareous grasslands usually associated with the more widespread *Mannia fragrans*. It is vulnerable according to the Red data book of European bryophytes (ECCB 1995) and the Hungarian Red List alike. Its actual occurrences in Hungary were listed in PAPP (2008), PAPP and ERZBERGER (2000, 2003) and PAPP *et al.* (2000). It ranges from the Cserhát Mts to the Keszthely Mts, in addition to an island-like occurrence in the Villány Mts. A protected species in Hungary.

New records of occurrence: **Bakony, Bakonybél**: Som-hegy (06.03.2011, 47.24976°N, 17.77565°E, alt. ca 552 m, 3547/3). **Vértés, Csókakő**: Vár-völgy (ridge between Kőlyuk-völgy and Buhin-völgy) (22.03.2009, 47.36272°N, 18.27788°E, alt. ca 390 m, 2773).

Old occurrences confirmed: **Vértés, Csókakő**: Csóka-hegy (22.03.2009, 47.36694°N, 18.25904°E, alt. ca 439 m, 2768); (22.03.2009, 47.36330°N, 18.26653°E, alt. ca 419 m, 2769/1); Csókakői-vár (22.03.2009, 47.36099°N, 18.27591°E, alt. ca 369 m, 2771); **Gánt** (Vértéskozma): Hirczy-tető (Fáni-völgy) (26.02.2011, 47.46102°N, 18.46181°E, alt. ca 258 m, 3532/1); **Mór**: Csóka-hegy (22.03.2009, 47.37152°N, 18.24737°E, alt. ca 326 m, 2764); (22.03.2009, 47.36962°N, 18.25127°E, alt. ca 352 m, 2765/1); (22.03.2009, 47.36934°N, 18.25182°E, alt. ca 370 m, 2766); (22.03.2009, 47.36909°N, 18.25319°E, alt. ca 392 m, 2767/1); **Szár**: Boglári-tisztások (Fáni-völgy) (26.02.2011, 47.46132°N, 18.46336°E, alt. ca 254 m, 3535/1); (BOROS 1915–1971, 1968).

Athalamia hyalina (Sommerf.) S. Hatt. – EN – A circumpolar species with arctic-alpine character. So far it was recorded only from some xerophytic habitats in the southern part of the Vértés Mts, as well as the Baglyas Hill of Bakony Mts by BOROS (1968). In addition, a few data of occurrence are given from the Buda Mts (ORBÁN and VAJDA 1983). It is worth mentioning that although it is usually treated as a xerophytic hepatic (by the above mentioned authors by stating that it lives in southern exposure together with other typical xerophytic species, e.g. *Riccia ciliifera*, *Mannia fragrans*), the present author found that each of the new records comes from shaded, humid and rather cool (microclimatic) habitats in north-facing slopes, the species is accompanied by alpine-boreal bryophytes (e.g. *Mannia triandra*, *Myurella julacea*, *Plagiobryum zierii*) and glacial relict vascular plants (e.g. *Allium victorialis*, *Primula auricula*).

New records of occurrence: **Bakony, Hajmáskér**: Tobán-hegy (26.03.2011, 47.20291°N, 17.95037°E, alt. ca 340 m, 3573/12); **Isztimér**: Burok-völgy (26.03.2006, 47.26762°N, 18.14980°E, alt. ca 278 m, 1535/6). **Vértés, Csákberény**: Kőkapu-völgy (25.03.2006,

47.36253°N, 18.30774°E, alt. ca 352 m, 1530/2); (02.04.2011, 47.36287°N, 18.30812°E, alt. ca 327 m, 3581/1); Meszes-völgyi-lyuk (19.04.2003, 47.36383°N, 18.30892°E, alt. ca 369 m).

Blepharostoma trichophyllum (L.) Dumort. – VU, IND – It occurs in montane-colline regions of Hungary on soil, rock, decaying wood, but often growing over or through cushions of mosses. According to BOROS (1968) it grows only at 5 sites of the Bakony Mts (Durrogós-tető, Fekete-Séd völgy, Hubertus hunter house, Köves-patak, and Somberek-Séd völgy). Two of them are actually confirmed here.

Old occurrences confirmed: **Bakony, Bakonybél**: Fekete-Séd völgy (23.04.2011, 47.22285°N, 17.70700°E, alt. ca 260 m, 3623/6); **Farkasgyepü**: Köves-patak (16.04.2011, 47.19102°N, 17.61044°E, alt. ca 338 m, 3610/6); (BOROS 1968).

Calypogeia fissa (L.) Raddi – NT, IND – A montane, circumpolar species with southern Atlantic-Mediterranean character; it usually grows on acidic soil, rock, in alder forests along brooklets, and in acidic woodlands. Not common in the montane-colline regions of Hungary. Its recent occurrences come from the steep slopes of the Bakony, where the soil is leached by runoff after rains. From the Vértes it has neither earlier nor recent data.

New records of occurrence: **Bakony, Bakonyszentlászló**: Alsó-Cuha-szurdok (gorge) (03.11.2011, 47.37822°N, 17.83450°E, alt. ca 250 m, 3490/1); **Farkasgyepü**: Köves-patak (16.04.2011, 47.19178°N, 17.60911°E, alt. ca 323 m, 3611/1).

Chiloscyphus pallescens (Hoffm.) Dumort. – VU – A circumpolar species growing on damp grounds usually in acidic woodlands of hilly areas. On the characteristically base-rich substrates of the Bakony it is very rare and occurs only on locally leached soils.

New records of occurrence: **Bakony, Bakonybél**: Száraz-Gerence (06.03.2011, 47.25951°N, 17.74761°E, alt. ca 345 m, 3551/1); **Farkasgyepü**: Köves-patak (16.04.2011, 47.18907°N, 17.60268°E, alt. ca 304 m, 3613/1).

Cololejeunea calcarea (Lib.) Schiffn. – NT, IND – It is a species of montane character. It thrives on shaded calcareous rocks and often grows on other bryophytes.

New records of occurrence: **Bakony, Isztimér**: Burok-völgy (26.03.2006, 47.27013°N, 18.13387°E, alt. ca 320 m, 1533/5); (26.03.2006, 47.26762°N, 18.14980°E, alt. ca 278 m, 1535/5). **Vértes, Csákberény**: Ugró-völgy (16.05.2005, 47.37022°N, 18.31453°E, alt. ca 406 m, 777/6).

Old occurrences confirmed: **Bakony, Várpalota**: Vár-völgy (21.04.2007, 47.22658°N, 18.09662°E, alt. ca 368 m, 2089/1). **Vértes, Vértesboglár**: Fáni-völgy (08.10.2005, 47.45986°N, 18.46133°E, alt. ca 281 m, 1336/4); (BOROS 1968).

Cololejeunea rossettiana (C. Massal.) Schiffn. – NT, IND – It is a montane element with sub-Atlantic, sub-Mediterranean character. It occurs in north-facing shaded places, mainly on other bryophytes.

New records of occurrence: **Bakony, Bakonybél**: Kertes-kői-szurdok (gorge) (Oltár-kő) (06.03.2011, 47.23884°N, 17.76334°E, alt. ca 385 m, 3545/3); **Bakonynána**: Gaja-szurdok (26.03.2011, 47.26866°N, 17.98370°E, alt. ca 280 m, 3579/2); **Isztimér**:

Burok-völgy (01.04.2006, 47.27104°N, 18.15994° E, alt. ca 371 m, 1537/4); **Várpalota**: Vár-völgy (21.04.2007, 47.22810°N, 18.10099°E, alt. ca 344 m, 2087/4); **Veszprém**: Mohos-kő (13.01.2007, 47.18642°N, 17.88146°E, alt. ca 396 m, 2050/4). **Vértes, Csákberény**: Kőkapu-völgy (06.01.2011, 47.36232°N, 18.30590°E, alt. ca 377 m, 3514/3).

Old occurrences confirmed: **Bakony, Bakonyoszlop**: Ördög-árok (21.03.2010, 47.33234°N, 17.91401°E, 290 m, 3057/1); (21.03.2010, 47.32432°N, 17.91339°E, 320 m, 3063/2); **Bakonyszentlászló**: Alsó-Cuha-szurdok (13.03.2010, 47.37822°N, 17.83450°E, alt. ca 230 m, 3056); **Bakonyszűcs**: Nagy-Márvány-árok (10.04.2010, 47.30765°N, 17.73599°E, alt. ca 408 m, 3075/2); (10.04.2010, 47.30616°N, 17.74277°E, alt. ca 512 m, 3072/2); (BOROS 1968).

Frullania tamarisci (L.) Dumort. – NT, IND – A montane circumpolar species with some Atlantic character; the plant can be found appressed to the rock or upon other mosses usually in northern exposure. It is an indicator of places in good natural condition. Not common.

New records of occurrence: **Bakony, Bakonyoszlop**: Ördög-árok (09.01.2011, 47.33120°N, 17.91334°E, alt. ca 327 m, 3495/2). **Vértes, Csákberény**: Gémfőrtés-völgy (16.04.2005, 47.35400°N, 18.13567°E, alt. ca 360 m, 638/2); Meszes-völgyi-lyuk (19.04.2003, 47.36383°N, 18.30892°E, alt. ca 369 m); **Csákvár**: Kálvária-völgy (03.04.2005, 47.40436°N, 18.43608°E, alt. ca 287 m, 623/2); (15.10.2005, 47.40442°N, 18.43794°E, alt. ca 269 m, 1363).

Old occurrences confirmed: **Bakony, Várpalota**: Vár-völgy (24.06.2006, 47.22539°N, 18.09042°E, alt. ca 307 m, 1673); (21.04.2007, 47.22810°N, 18.10099°E, alt. ca 344 m, 2087/2); (18.04.2010, 47.22775°N, 18.10583°E, alt. ca 300 m, 3089); (BOROS and VAJDA 1963). **Vértes, Csákvár**: Kőlik-völgy (03.04.2005, 47.39567°N, 18.44192°E, alt. ca 319 m, 608/2); (BOROS 1915–1971).

Jamesoniella autumnalis (DC.) Steph. – NT – An uncommon liverwort with montane, circumpolar distribution in acidic woodlands, on siliceous rocks, and forest soils. In absence of adequate acidic habitats so far it was known only on one site of the Bakony Mts, which is confirmed here.

Old occurrence confirmed: **Bakony, Farkasgyepű**: Köves-patak (16.04.2011, 47.19102°N, 17.61044°E, alt. ca 338 m, 3610/7); (BOROS 1968).

Jungermannia hyalina Lyell – EN – It is a montane, circumpolar species with sub-Mediterranean-Atlantic character. It grows most commonly in different humid and acidic habitats. It was mentioned from several places of the Bakony Mts by BOROS (1968). According to ORBÁN and VAJDA (1983) the species is frequent in Hungary, but based on the very few recent data it was placed into the category of rare and endangered.

New records of occurrence: **Bakony, Bakonyszentlászló**: Alsó-Cuha-szurdok (03.11.2011, 47.37822°N, 17.83450°E, alt. ca 250 m, 3490/4 det.: B. Papp); **Isztimér**: Burok-völgy (11.10.2008, 47.26575°N, 18.12028°E, alt. ca 371 m, 2740/1, det.: B. Papp).

Leiocolea collaris (Nees.) Schljakov – VU – A species of alpine character with European and North American distribution. It grows on or near shaded, damp calcareous rocks, both on the rock itself or on soil. Its actual data from the Bakony and Vértes Mts have recently been listed by NÉMETH (2007, 2008).

New records of occurrence: **Bakony, Márkó:** Slézinger-völgy (13.04.2009, 47.16472° N, 17.83285°E, alt. ca 413 m, 2816/6). **Vértes, Csákberény:** Cseresznyés-völgy (02.04.2011, 47.38247°N, 18.32536°E, alt. ca 408 m, 3586/2); Meszes-völgyi-lyuk (19.03.2005, 47.36383° N, 18.30892°E, alt. ca 369 m, 512/20).

Old occurrences confirmed: **Bakony, Bakonyszentlászló:** gorge of Cuha-patak (21.03.2010, 47.34741°N, 17.83271°E, alt. ca 320 m, 3065/3); **Hajmáskér:** Tobán-hegy (26.03.2011, 47.20291°N, 17.95037°E, alt. ca 340 m, 3573/16); **Isztimér:** Burok-völgy (23.12.2010, 47.27103°N, 18.15943°E, alt. ca 256 m, 3485/4); **Várpalota:** Vár-völgy (03.04.2011, 47.22860°N, 18.10164°E, alt. ca 348 m, 3593/5); (BOROS 1968).

Metzgeria conjugata Lindb. subsp. *conjugata* – NT, IND – A montane, nearly cosmopolitan species, which favours slightly calcareous rocks at springs, along brooklets, or in gorges. While it is absent from the Vértes Mts, in the Bakony Mts, although uncommon, it can be found on the adequate habitats.

New records of occurrence: **Bakony, Bakonyoszlop:** Ördög-árok (21.03.2010, 47.33210°N, 17.91336°E, alt. ca 300 m, 3058/2); (21.03.2010, 47.33117°N, 17.91142°E, alt. ca 320 m, 3061/2); **Veszprém:** Mohos-kő (15.03.2011, 47.18630°N, 17.88140°E, alt. ca 406 m, 3569/9).

Old occurrences confirmed: **Bakony, Bakonybél:** Fekete-Séd völgy (23.04.2011, 47.22285°N, 17.70700°E, alt. ca 260 m, 3623/5); Somberek-Séd völgy (23.04.2011, 47.30080° N, 17.67584°E, alt. ca 280 m, 3620/2); Kertes-kői-szurdok (Oltár-kő) (06.03.2011, 47.23884° N, 17.76334°E, alt. ca 385 m, 3541/13); **Bakonynána:** Gaja-szurdok (26.03.2011, 47.27039°N, 17.98164°E, alt. ca 300 m, 3578/4); **Bakonyszentlászló:** Alsó-Cuha-szurdok (13.03.2010, 47.37822°N, 17.83450°E, alt. ca 230 m, 3055); **Bakonyszücs:** Nagy-Márvány-árok (10.04. 2010, 47.30765°N, 17.73599°E, alt. ca 408 m, 3075/1); **Farkasgyepű:** Köves-patak (16.04. 2011, 47.19178°N, 17.60911°E, alt. ca 323 m, 3611/8); **Márkó:** Borostyán-hegy (10.04. 2011, 47.16371°N, 17.78454°E, alt. ca 420 m, 3596/1); (BOROS 1915–1971, 1968).

Pedinophyllum interruptum (Nees) Kaal. – NT, IND – Alpine circumpolar species, which usually can be found on or near shaded, damp calcareous rocks, both on the rock itself or on soil, and often accompanied by *Leiocolea collaris*, having similar ecological requirements. Some of its actual records were listed in NÉMETH (2007, 2008).

New records of occurrence: **Bakony, Bakonynána:** Gaja-szurdok (26.03.2011, 47.26866°N, 17.98370°E, alt. ca 280 m, 3579/3); **Veszprém:** Mohos-kő (15.03.2011, 47.18630°N, 17.88140°E, alt. ca 406 m, 3569/12).

Old occurrences confirmed: **Bakony, Bakonybél:** Fekete-Séd völgy (23.04.2011, 47.22285°N, 17.70700°E, alt. ca 260 m, 3623/1); Kertes-kői-szurdok (Oltár-kő) (06.03. 2011, 47.23884°N, 17.76334°E, alt. ca 385 m, 3541/8); Somberek-Séd völgy (23.04.2011, 47.30080°N, 17.67584°E, alt. ca 280 m, 3620/3); Száraz-Gerence völgy (06.03.2011, 47.25951°N, 17.74761°E, alt. ca 345 m, 3550/2); **Bakonyoszlop:** Ördög-árok (21.03.2010,

47.33234°N, 17.91401°E, alt. ca 290 m, 3057/3); (21.03.2010, 47.33117°N, 17.91142°E, alt. ca 320 m, 3061/3); (21.03.2010, 47.32432°N, 17.91339°E, alt. ca 320 m, 3063/1); **Bakony-szentlászló**: Alsó-Cuha-szurdok (31.03.2007, 47.31215°N, 17.85338°E, alt. ca 377 m, 2056/2); (13.03.2010, 47.37822°N, 17.83450°E, alt. ca 230 m, 3054); Cuha-patak (21.03.2010, 47.34741°N, 17.83271°E, alt. ca 320 m, 3065/2); **Farkasgyepü**: Köves-patak (16.04.2011, 47.19178°N, 17.60911°E, alt. ca 323 m, 3611/6); **Hajmáskér**: Tobán-hegy (26.03.2011, 47.20291°N, 17.95037°E, alt. ca 340 m, 3573/3); **Szentgál**: Miklóspál-hegy (10.04.2011, 47.11169°N, 17.78512°E, alt. ca 334 m, 3598/4); Mög-szeg (10.04.2011, 47.09320°N, 17.76722°E, alt. ca 361 m, 3603/1); (BOROS 1968).

Porella arboris-vitae (With.) Grolle – EN – A montane, circumpolar species with Atlantic, sub-Mediterranean character. Uncommon liverwort found on shaded andesitic, basaltic and dolomitic rocks of the Hungarian mountain regions in north-facing positions. It became rare and endangered during the last decades. From the Bakony Mts it was earlier reported from four localities (Balogszeg, Burok-völgy, Mög-szeg, Szarvad-árok) (BOROS 1968), which were recently checked without success with the exception of two sites. Whereas in the Burok-völgy the species is present with very low cover value, in the recently found location (Balogszeg) it has a major and stable population.

Old occurrences confirmed: **Bakony, Isztimér**: Burok-völgy (12.02.2011, 47.25723°N, 18.11253°E, alt. ca 342 m, 3516/1); **Szentgál**: Balogszeg (10.04.2011, 47.10595°N, 17.77406°E, alt. ca 319 m, 3599); (BOROS 1968).

Preissia quadrata (Scop.) Nees – EN – It is a circumpolar species with boreal character. It grows on soil of shady ledges of calcareous rocks and on humus between surface roots of trees mainly in northern exposition.

New records of occurrence: **Bakony, Bakonyszűcs**: Bécsi-árok (10.04.2010, 47.31675°N, 17.74033°E, alt. ca 363 m, 3069/1); **Szentgál**: Miklóspál-hegy (10.04.2011, 47.11169°N, 17.78512°E, alt. ca 334 m, 3598/3). **Vértess, Csákberény**: Ugró-völgy (Szentegyházi-hegy) (06.02.2011, 47.36785°N, 18.32028°E, alt. ca 353 m, 3509/2).

Old occurrences confirmed: **Bakony, Farkasgyepü**: Köves-patak (16.04.2011, 47.18943°N, 17.61883°E, alt. ca 338 m, 3606/5); (16.04.2011, 47.18915°N, 17.61920°E, alt. ca 335 m, 3607); (16.04.2011, 47.19178°N, 17.60911°E, alt. ca 323 m, 3611/5); (16.04.2011, 47.19159°N, 17.60767°E, alt. ca 315 m, 3612/1); (16.04.2011, 47.18528°N, 17.59672°E, alt. ca 320 m, 3614/1); **Hajmáskér**: Tobán-hegy (26.03.2011, 47.20291°N, 17.95037°E, alt. ca 340 m, 3573/21); **Isztimér**: Burok-völgy (23.12.2010, 47.26719°N, 18.14668°E, alt. ca 300 m, 3488); (12.02.2011, 47.25516°N, 18.11188°E, alt. ca 395 m, 3515); (12.02.2011, 47.25836°N, 18.11664°E, alt. ca 352 m, 3517/1); (12.02.2011, 47.26925°N, 18.13776°E, alt. ca 333 m, 3521/2). **Vértess, Vértessboglár**: Fáni-völgy (13.05.2005, 47.45928°N, 18.45714°E, alt. ca 281 m, 732/4); Macska-gödör (25.03.2005, 47.45900°N, 18.45600°E, alt. ca 280 m, 558/7); (26.02.2011, 47.45930°N, 18.45671°E, alt. ca 264 m, 3533/3); (BOROS 1968).

Reboulia hemisphaerica (L.) Raddi – NT, IND – A montane, nearly cosmopolitan species with sub-Atlantic character. It grows on calcareous soils usually under the boulders, in many cases together with the very similar, but much rarer *Preissia quadrata*.

New records of occurrence: **Bakony, Bakonybél**: Fekete-Séd völgy (23.04.2011, 47.22285°N, 17.70700°E, alt. ca 260 m, 3623/9); **Bakonynána**: Gaja-szurdok (26.03.2011, 47.26866°N, 17.98370°E, alt. ca 280 m, 3579/4); **Bakonyoszlop**: Ördög-árok (05.02.2011, 47.32451°N, 17.91354°E, 280 m, 3505/7); **Bakonyszentlászló**: Alsó-Cuha-szurdok (21.03.2010, 47.37749°N, 17.83128°E, alt. ca 230 m, 3066); **Márkó**: Slézinger-völgy (15.03.2011, 47.16471°N, 17.83283°E, alt. ca 413 m, 3571/3); **Szentgál**: Mög-szeg (10.04.2011, 47.09320°N, 17.76722°E, alt. ca 361 m, 3603/6); **Tés**: Szúnyog-völgy (26.03.2011, 47.22758°N, 18.00303°E, alt. ca 436 m, 3575/2); **Veszprém**: Mohos-kő (13.01.2007, 47.18642°N, 17.88146°E, alt. ca 396 m, 2050/6). **Vértes, Csákberény**: Cseresznyés-völgy (02.04.2011, 47.38247°N, 18.32536°E, alt. ca 408 m, 3586/3); **Somos-völgy** (16.04.2005, 47.36061°N, 18.31173°E, alt. ca 343 m, 662/2); **Csókakő**: Kőlyuk-völgy (19.02.2006, 47.36175°N, 18.27869°E, alt. ca 355 m, 437); **Gánt** (Vérteskozma): Fillér-árok-Kápolna-völgy (06.08.2005, 47.46467°N, 18.42403°E, alt. ca 346 m, 1061/3); **Szár**: Holdvilág-árok (30.04.2005, 47.47228°N, 18.46183°E, alt. ca 308 m, 681/10); **Várgesztes**: Zsigmond-szikla (Lófő) (30.04.2005, 47.48117°N, 18.40036°E, alt. ca 330 m, 674/3).

Old occurrences confirmed: **Bakony, Hajmáskér**: Tobán-hegy (26.03.2011, 47.20291°N, 17.95037°E, alt. ca 340 m, 3573/4); **Isztimér**: Burok-völgy (23.12.2010, 47.27103°N, 18.15943°E, alt. ca 256 m, 3485/5); **Márkó**: Esztergáli-völgy (15.03.2011, 47.16996°N, 17.83660°E, alt. ca 385 m, 3570/5). **Vértes, Csákvár**: Kőkapu-völgy (06.01.2011, 47.36232°N, 18.30590°E, alt. ca 377 m, 3514/2); **Meszes-völgy** (19.03.2005, 47.36214°N, 18.31403°E, alt. ca 273 m, 508/3); **Svábrőzse-völgy** (27.03.2005, 47.44225°N, 18.45834°E, alt. ca 315 m, 582/2); **Ugró-völgy** (21.05.2005, 47.37286°N, 18.31428°E, alt. ca 371 m, 812/3); **Ugró-völgy** (Szentegyházi-hegy) (06.02.2011, 47.36798°N, 18.32008°E, alt. ca 353 m, 3508/3); **Ugró-völgyi-lyuk** (06.02.2011, 47.36946°N, 18.31621°E, alt. ca 338 m, 3510/6); **Gánt** (Kápolnapusztá): Juh-völgy (23.04.2005, 47.39467°N, 18.33603°E, alt. ca 397 m, 667/10); **Gánt** (Vérteskozma): Boglári-oldal (13.05.2005, 47.45347°N, 18.44778°E, alt. ca 336 m, 726/4); **Vértesboglár**: Macska-gödör (25.03.2005, 47.45900°N, 18.45600°E, 280 m, 558); (BOROS 1915–1971, 1968).

Riccia ciliifera Link ex Lindenb. – NT, IND – A sub-Mediterranean, sub-Atlantic species living in open calcareous grasslands often in the company of other xerophytic species, such as *Mannia fragrans*, but occasionally with the rare hepatic *Asterella saccata* as well.

New records of occurrence: **Bakony, Bakonybél**: Som-hegy (06.03.2011, 47.24976°N, 17.77565°E, alt. ca 552 m, 3547/2). **Vértes, Csókakő**: Arany-hegy (between Lengyel-völgy and Zsidó-völgy) (22.03.2009, 47.35509°N, 18.28706°E, alt. ca 391 m, 2775).

Old occurrences confirmed: **Vértes, Mór**: Csóka-hegy (22.03.2009, 47.36909°N, 18.25319°E, alt. ca 392 m, 2767/2); **Szár**: Boglári-tisztások (26.02.2011, 47.46041°N, 18.46732°E, alt. ca 278 m, 3536); (BOROS 1915–1971).

Scapania aspera M. Bernet et Bernet – VU – A montane alpine species. It grows on shaded calcareous rocks, but also occurs in north-facing chalk grasslands.

New records of occurrence: **Bakony, Isztimér**: Burok-völgy (11.10.2008, 47.26575°N, 18.12028°E, alt. ca 371 m, 2740/3); **Várpalota**: Vár-völgy (03.04.2011, 47.22860°N, 18.10164°E, alt. ca 348 m, 3593/2); **Vaskapu-völgy** (18.04.2010, 47.23806°N, 18.10028°E,

alt. ca 450 m, 3087/1). **Vértes, Csákberény**: Csete-völgy (11.03.2006, 47.36558°N, 18.29933°E, alt. ca 404 m, 1510/3); (25.03.2006, 47.36548°N, 18.29960°E, alt. ca 408 m, 1511); Meszes-völgyi-lyuk (19.03.2005, 47.36383°N, 18.30892°E, alt. ca 369 m, 512/17); Öreg-somos-völgy (25.03.2006, 47.35267°N, 18.30696°E, alt. ca 309 m, 1522); Ráró-kő (Ugró-völgy) (06.01.2011, 47.37368°N, 18.30842°E, alt. ca 407 m, 3512/1); **Csákvár**: Kerek-hegy (15.10.2005, 47.39890°N, 18.44311°E, alt. ca 258 m, 1365); Kis-Tábor-hegy (20.09.2008, 47.43764°N, 18.45392°E, alt. ca 320 m, 2718/3); **Csókakő**: Csókakői-vár (22.03.2009, 47.36106°N, 18.27630°E, alt. ca 373 m, 2772); Kőlyuk-völgy (02.03.2003, 47.36175°N, 18.27869°E, alt. ca 355 m); **Várgesztes**: Zsigmond-szikla (Lófő) (30.04.2005, 47.48117°N, 18.40036°E, alt. ca 330 m, 674/5).

Old occurrences confirmed: **Bakony, Bakonyoszlop**: Ördög-árok (21.03.2010, 47.33234°N, 17.91401°E, alt. ca 290 m, 3057/5). **Vértes, Vértesboglár**: Macska-gödör (29.10.2005, 47.45844°N, 18.45536°E, alt. ca 313 m, 1428/4); (BOROS 1968).

Scapania calcicola (Arnell et J. Perss.) Ingham – VU – A species of montane character with European and North American distribution. It is a strict calciphilous species, growing on calcareous rocks in northern exposure.

New records of occurrence: **Bakony, Márkó**: Malom-hegy (26.10.2008, 47.11016°N, 17.81708°E, alt. ca 350 m, 2753/3); **Várpalota**: Kis-Burok-völgy (11.10.2008, 47.25134°N, 18.16525°E, alt. ca 275 m, 2736/2); **Veszprém**: Tekeres-völgy (07.04.2007, 47.08988°N, 17.85005°E, alt. ca 291 m, 2082). **Vértes, Csákberény**: Kőkapu-völgy (25.03.2006, 47.36237°N, 18.30639°E, alt. ca 383 m, 1526); (06.01.2011, 47.36232°N, 18.30590°E, alt. ca 377 m, 3514/2); Öreg-somos-völgy (16.04.2005, 47.35181°N, 18.30608°E, alt. ca 356 m, 645/3); Somos-völgy (22.04.2005, 47.36044°N, 18.31100°E, alt. ca 343 m, 661/3); (22.04.2005, 47.36061°N, 18.31173°E, alt. ca 343 m, 663/2); Ugró-völgy (Szentgyházi-hegy) (21.05.2005, 47.36806°N, 18.32025°E, alt. ca 365 m, 781/7); (06.02.2011, 47.36785°N, 18.32028°E, alt. ca 353 m, 3509/3); Ugró-völgyi-lyuk (22.04.2005, 47.36942°N, 18.31658°E, alt. ca 360 m, 346/9); (06.02.2011, 47.36946°N, 18.31621°E, alt. ca 338 m, 3510/1); **Csákvár**: Hosszú-völgy (15.03.2009, 47.40600°N, 18.42407°E, alt. ca 326 m, 2763); **Gánt** (Kápolnapuszta): Juh-völgy (23.04.2005, 47.39467°N, 18.33603°E, alt. ca 397 m, 667/5); (02.04.2011, 47.39481°N, 18.33589°E, alt. ca 379 m, 3588/13).

Old occurrence confirmed: **Bakony, Isztimér**: Burok-völgy (01.04.2006, 47.27104°N, 18.15994°E, alt. ca 247 m, 1536/5); (23.12.2010, 47.27103°N, 18.15943°E, alt. ca 256 m, 3485/3); (BOROS and VAJDA 1963).

Musci

Amblystegium confervoides (Brid.) Schimp. – VU – A boreal-temperate element with European and North American distribution. It lives on shady limestone and dolomite rocks. In Hungary it is quite rare, its former data come scattered from nearly the whole area of the Hungarian Mountain Ranges, as well as the Kőszeg Mts and the Mecsek (BOROS 1968, ORBÁN and VAJDA 1983). From the investigated area it had several earlier data

(BOROS 1915–1971), however only one actual occurrence could be recently published (GALAMBOS 2010).

New records of occurrence: **Vértes, Csákberény**: Csonka-bükk (Horog-völgy) (02.04.2011, 47.38632°N, 18.32175°E, alt. ca 410 m, 3589/3).

Old occurrence confirmed: **Vértes, Csákberény**: Cseresznyés-völgy (05.06.2011, 47.38247°N, 18.32536°E, alt. ca 408 m, 3636/4); (BOROS 1915–1971).

Anomodon rostratus (Hedw.) Schimp. – NT, IND – A sub-Mediterranean, montane element of shaded calcareous rocks. It is rare according to the Red data book of European bryophytes (ECCB 1995). Its former occurrences were summarised by BOROS (1968), recent localities are reported by NÉMETH (2007, 2008), PAPP (2008), PAPP and ERZBERGER (2003) and PAPP *et al.* (2000). Protected species in Hungary.

New records of occurrence: **Bakony, Bakonybél**: Fekete-Séd völgy (23.04.2011, 47.22285°N, 17.70700°E, alt. ca 260 m, 3623/10); Hajszabarna (23.04.2011, 47.23148°N, 17.67307°E, alt. ca 440 m, 3622/1); **Bakonyszűcs**: Épületfa-árok (10.04.2010, 47.30636°N, 17.72692°E, alt. ca 382 m, 3077); (10.04.2010, 47.31931°N, 17.73008°E, alt. ca 344 m, 3078); (10.04.2010, 47.31981°N, 17.73038°E, alt. ca 302 m, 3079/1); Régi Kunyhó-árok (10.04.2010, 47.31704°N, 17.74403°E, alt. ca 420 m, 3070/1); between Régi Kunyhó-árok and Köves-Tóth-árok (10.04.2010, 47.30915°N, 17.75318°E, alt. ca 498 m, 3071/1); **Hárs-kút**: Borzás-hegy (15.03.2011, 47.18493°N, 17.83379°E, alt. ca 505 m, 3565/1); **Márkó**: Slézinger-völgy (15.03.2011, 47.16494°N, 17.83098°E, alt. ca 441 m, 3572/1); **Várpalota**: Barbély-völgy (18.04.2010, 47.24164°N, 18.12250°E, alt. ca 367 m, 3080); (18.04.2010, 47.24019°N, 18.12647°E, alt. ca 342 m, 3081/8).

Old occurrences confirmed: **Bakony, Bakonybél**: Som-hegy (Nagy-Pénz-lik) (06.03.2011, 47.25107°N, 17.77910°E, alt. ca 632 m, 3548/1); Bakonyoszlop: Ördög-árok (21.03.2010, 47.33234°N, 17.91401°E, alt. ca 290 m, 3057/2); (21.03.2010, 47.33210°N, 17.91336°E, alt. ca 300 m, 3058/1); **Bakonyszentlászló**: Alsó-Cuha-szurdok (13.03.2010, 47.37822°N, 17.83450°E, alt. ca 230 m, 3053); Cuha-szurdok (21.03.2010, 47.34741°N, 17.83271°E, alt. ca 320 m, 3065/1); **Bakonyszűcs**: Nagy-Márvány-árok (10.04.2010, 47.30616°N, 17.74277°E, alt. ca 512 m, 3072/1); (10.04.2010, 47.30765°N, 17.73599°E, alt. ca 408 m, 3075/3); (10.04.2010, 47.30776°N, 17.73432°E, alt. ca 387 m, 3076); **Szentgál**: Mög-szeg (10.04.2011, 47.09320°N, 17.76722°E, alt. ca 361 m, 3603/2); **Várpalota**: Vár-völgy (18.04.2010, 47.22791°N, 18.10064°E, alt. ca 303 m, 3091); (BOROS 1915–1971, 1968).

Conardia compacta (Müll. Hal.) H. Rob. – DD – A circumpolar, boreal-montane element. Its interesting and spectacular character is the pale, elongated gemmae growing near the back of the leaf tip. There was no information about its actual distribution in Hungary. Earlier data of the species came from the Bakony Mts (Burok-völgy, Esztergáli-völgy, Köves-patak, Odvas-kő, Mögszeg), the Balaton Uplands (Malom-völgy, Szikla-hegy), Lake Velence and Bugac (BOROS 1968, ORBÁN and VAJDA 1983). It can be found in northern exposure either on shaded dolomite rocks or on rocky walls of small caves or in crevices.

New records of occurrence: **Bakony, Hajmáskér**: Tobán-hegy (26.03.2011, 47.20291°N, 17.95037°E, alt. ca 340 m, 3573/7); **Márkó**: Slézinger-völgy (15.03.2011, 47.16471°N, 17.83283°E, alt. ca 413 m, 3571/6); **Szentgál**: Miklóspál-hegy (10.04.2011, 47.11169°N,

17.78512°E, alt. ca 334 m, 3598/7); **Várpalota**: Vár-völgy (03.04.2011, 47.22860°N, 18.10164°E, alt. ca 348 m, 3593/3). **Vértes, Csákvár**: Báracházi barlang (20.02.2011, 47.37720°N, 18.44042°E, alt. ca 190 m, 3529/5); **Gánt** (Kápolnapusztá): Juh-völgy (02.04.2011, 47.39481°N, 18.33589°E, alt. ca 379 m, 3588/4); **Gánt** (Vérteskozma): Fáni-völgy (Boglári-oldal) (25.03.2005, 47.45383°N, 18.44961°E, alt. ca 306 m, 556/3); (26.02.2011, 3539/3); **Vértesboglár**: Fáni-völgy (26.02.2011, 47.45950°N, 18.45737°E, alt. ca 287 m, 3537/1); (26.02.2011, 47.45866°N, 18.46859°E, alt. ca 267 m, 3538/2); Macska-gödör (26.02.2011, 47.45930°N, 18.45671°E, alt. ca 264 m, 3533/2).

Old occurrences confirmed: **Bakony, Bakonybél**: Odvaskő-barlang (13.03.2011, 47.28811°N, 17.71612°E, alt. ca 337 m, 3554/2); **Isztimér**: Burok-völgy (23.12.2010, 47.26910°N, 18.16619°E, alt. ca 289 m, 3483/1); (12.02.2011, 47.25723°N, 18.11253°E, alt. ca 342 m, 3516/2); (12.02.2011, 47.25836°N, 18.11664°E, alt. ca 352 m, 3517/2); (12.02.2011, 47.25910°N, 18.11681°E, alt. ca 360 m, 3518/4) (BOROS 1968).

Distichium capillaceum (Hedw.) Bruch et Schimp. – NT, IND – Circumpolar, boreo-arctic montane element, characteristic of north-facing, shaded calcareous rocks and rocky forests. Although not rare, its presence usually indicates high level of bryological diversity of the given habitat.

New records of occurrence: **Bakony, Bakonyszentlászló**: Alsó-Cuha-szurdok (03.01.2011, 47.37822°N, 17.83450°E, alt. ca 230 m, 3491/1); **Fehérvárcsurgó**: Kopasz-hegy (08.03.2003, 47.27931°N, 18.25331°E, alt. ca 200 m); **Szentgál**: Disznó-völgy (Koporsó-kő) (10.04.2011, 47.09917°N, 17.76893°E, alt. ca 339 m, 3604/1); **Várpalota**: Barbély-völgy (18.04.2010, 47.24047°N, 18.12469°E, alt. ca 353 m, 3082/2); Bükkfa-kúti-árok (18.04.2010, 47.23733°N, 18.08608°E, alt. ca 439 m, 3094/2); Kis-Burok-völgy (11.10.2008, 47.25134°N, 18.16525°E, alt. ca 275 m, 2736/4). **Vértes, Csákberény**: Csatorna-völgy (16.04.2005, 47.36122°N, 18.30369°E, alt. ca 333 m, 651); Csete-völgy (11.03.2006, 47.36558°N, 18.29933°E, alt. ca 404 m, 1510/2); Csonka-bükk (Horog-völgy) (02.04.2011, 47.38632°N, 18.32175°E, alt. ca 410 m, 3589/2); Gémfőrtés-völgy (16.04.2005, 47.35400°N, 18.30233°E, alt. ca 360 m, 638/4); (22.05.2005, 47.35358°N, 18.30356°E, alt. ca 346 m, 866/1); Horog-völgy (17.07.2005, 47.37653°N, 18.33503°E, alt. ca 351 m, 994); Somos-völgy (22.04.2005, 47.36044°N, 18.31100°E, alt. ca 343 m, 661/2); Strázsa-hegy (10.09.2005, 47.35672°N, 18.33525°E, alt. ca 279 m, 1232/1); Szentgyházi-hegy (09.09.2006, 47.36733°N, 18.32214°E, alt. ca 369 m, 1780/5); **Csákvár**: Hajdú-vágás (03.04.2005, 47.39200°N, 18.43842°E, alt. ca 260 m, 599); Hosszú-hegy (03.04.2005, 47.40406°N, 18.43789°E, alt. ca 285 m, 619/3); Kálvária-völgy (03.04.2005, 47.40433°N, 18.43631°E, alt. ca 294 m, 622); Nagy-bükk (13.05.2005, 47.43469°N, 18.44489°E, alt. ca 349 m, 751/2); Szőlő-kő (03.04.2005, 47.38717°N, 18.43511°E, alt. ca 210 m, 634); **Szár**: Holdvilág-árok (30.04.2005, 47.47228°N, 18.46183°E, alt. ca 308 m, 681/3).

Old occurrences confirmed: **Bakony, Bakonybél**: Hegyes-kő (06.04.2007, 47.23079°N, 17.73791°E, alt. ca 326 m, 2065/4); Bakonyoszló: Ördög-árok (21.03.2010, 47.33117°N, 17.91142°E, alt. ca 320 m, 3061/1); **Hajmáskér**: Tobán-hegy (26.03.2011, 47.20291°N, 17.95037°E, alt. ca 340 m, 3573/6); **Isztimér**: Burok-völgy (26.03.2006, 47.27013°N, 18.13387°E, alt. ca 320 m, 1533/3); **Márkó**: Esztergáli-völgy (13.01.2007, 47.16988°N, 17.83650°E, alt. ca 395 m, 2052/3); **Szentgál**: Mög-szeg (10.04.2011, 47.09320°N, 17.76722°

E, alt. ca 361 m, 3603/5); Várpalota: Vár-völgy (18.04.2010, 47.22775°N, 18.10583°E, alt. ca 300 m, 3088/4). **Vértes, Csákberény:** Kőkapu-völgy (16.04.2005, 47.36236°N, 18.30694°E, alt. ca 360 m, 638/4); (16.04.2005, 47.36236°N, 18.30694°E, alt. ca 388 m, 655/4); (19.02.2006, 47.36556°N, 18.29900°E, alt. ca 375 m, 1509); (19.02.2006, 47.35167°N, 18.30669°E, alt. ca 378 m, 1513/1); (25.03.2006, 47.35189°N, 18.30464°E, alt. ca 396 m, 1525/1); Meszes-völgy (19.03.2005, 47.36214°N, 18.31403°E, alt. ca 273 m, 508/1); Meszes-völgyi-lyuk (19.04.2003, 47.36383°N, 18.30892°E, alt. ca 369 m); (19.03.2005, 47.35228°N, 18.30878°E, alt. ca 348 m, 522); Öregsomos-völgy (16.04.2005, 47.35267°N, 18.30703°E, alt. ca 337 m, 635/3); (16.04.2005, 47.35197°N, 18.30564°E, alt. 321 m, 641/4); Szedres (Juhdöglő)-völgy (27.07.2005, 47.38014°N, 18.32839°E, alt. ca 340 m, 1016); (27.07.2005, 47.37939°N, 18.32733°E, alt. ca 355 m, 1017); Ugró-völgy (16.05.2005, 47.36803°N, 18.32003°E, alt. ca 355 m, 780/2); (16.05.2005, 47.37022°N, 18.31453°E, alt. ca 406 m, 777/2); (21.05.2005, 47.37286°N, 18.31428°E, alt. ca 371 m, 812/2); (10.09.2005, 47.37036°N, 18.31486°E, alt. ca 392 m, 1277/1); (10.09.2005, 47.37069°N, 18.31447°E, alt. ca 392 m, 1278/2); Ugró-völgyi-lyuk (19.04.2003, 47.36942°N, 18.31658°E, alt. ca 360 m); Ugró-völgyi-odú (19.04.2003, 47.37392°N, 18.31103°E, 380 m); **Csákvár:** Svábrőzse-völgy (27.03.2005, 47.44203°N, 18.45886°E, alt. ca 315 m, 583); **Gánt** (Kápolnapusztá): Juh-völgy (23.04.2005, 47.39467°N, 18.33603°E, alt. ca 397 m, 667/2); (21.05.2005, 47.39072°N, 18.34814°E, alt. ca 342 m, 832/1); (21.05.2005, 47.39369°N, 18.35456°E, alt. ca 313 m, 835/2); Köves-völgy (04.09.2005, 47.40511°N, 18.33522°E, alt. ca 330 m, 1225); **Gánt** (Vérteskozma): Boglári-oldal (Fáni-völgy) (25.03.2005, 47.45383°N, 18.44961°E, alt. ca 306 m, 556/3); (13.05.2005, 47.45347°N, 18.44778°E, alt. ca 336 m, 726/3); **Vértesboglár:** Fáni-völgy (13.05.2005, 47.45928°N, 18.45714°E, alt. ca 281 m, 732/3); Macska-gödör (25.03.2005, 47.45900°N, 18.45600°E, alt. ca 280 m, 558/5); (29.10.2005, 47.45844°N, 18.45536°E, alt. ca 313 m, 1428/1); Nagy-Tábor-hegy (25.03.2005, 47.44875°N, 18.44278°E, alt. ca 348 m, 550); (13.05.2005, 47.45050°N, 18.44564°E, alt. ca 320 m, 721/4); (BOROS 1915–1971, 1968).

Eurhynchium flutowianum (Sendtn.) Kartt. – VU – It is a montane, European-Mediterranean element. It is a rare species with only few actual occurrences. According to the collection of BP it had some former data from the Bakony Mts (Burok-völgy, Cuha-völgy, Köves-árok, Ördög-árok, Vízverte-árok), but none from the Vértes Mts.

New records of occurrences: **Bakony, Bakonyoszlop:** Ördög-árok (05.02.2011, 47.32641°N, 17.91241°E, 272 m, 3501/2, det.: B. Papp); (05.02.2011, 47.32468°N, 17.91386°E, 256 m, 3504/3). **Vértes, Csákberény:** Kőkapu-völgy (06.01.2011, 47.36582°N, 18.30095°E, alt. ca 364 m, 3513/5, det.: B. Papp).

Isopterygiopsis pulchella (Hedw.) Z. Iwats. – DD-va – A boreal-montane species growing either in crevices or overhang on wet, calcareous cliffs or on rocky walls of small caves. It has two earlier localities in the Bakony (Vár-völgy, Nagy-Pénz-lik) (BOROS 1968). Both of these occurrences have recently been confirmed. New to the Vértes Mts. Based on collections of BP it has some additional former data from several sites in Hungary, particularly caves (Bükk, Mecsek, Pilis Mts).

New records of occurrence: **Bakony, Bakonybél:** Kertes-kői-szurdok (Oltár-kő) (06.03.2011, 47.23884°N, 17.76334°E, alt. ca 385 m, 3541/18, 3545/1, 3545/4, 3545/8); Pörgöl barlang (Százaz-Gerence völgy) (06.03.2011, 47.26261°N, 17.74888°E, 351 m, 3552/3); **Bakonyoszlop:** Ördög-árok (09.01.2011, 47.33120°N, 17.91334°E, alt. ca 327 m, 3495/13); (05.02.2011, 47.32641°N, 17.91241°E, 272 m, 3501/1); (05.02.2011, 47.32468°N, 17.91386°E, 280 m, 3503/3). **Vértes, Csákvár:** Báracházi barlang (19.02.2011, 47.37720°N, 18.44042°E, alt. ca 190 m, 3529/7); **Vértesboglár:** Fáni-völgy (Fáni-völgyi-odú) (26.02.2011, 47.45950°N, 18.45737°E, alt. ca 287 m, 3534/4).

Old occurrences confirmed: **Bakony, Bakonybél:** Som-hegy (Nagy-Pénz-lik) (06.03.2011, 47.25107°N, 17.77910°E, alt. ca 632 m, 3548/2); **Várpalota:** Vár-völgy (03.04.2011, 47.22791°N, 18.10064°E, alt. ca 320 m, 3594/2); (BOROS 1968).

Myurella julacea (Schwägr.) Schimp. – NT, IND – Circumpolar, boreo-arctic montane species. In Hungary it occurs on dolomite substrates of the Transdanubian Mountain Ranges (BOROS 1968, NÉMETH 2007, 2008, ORBÁN and VAJDA 1983), on fillite (containing lime) in the Kőszeg Mts (PURGER *et al.* 1997), as well as in radiolarite rock holes in the Bükk Mts (PÉNZESNÉ KÓNYA and ORBÁN 2000).

New records of occurrence: **Bakony, Nagyvázsöny:** Nyúl-völgy (25.09.2010, 47.04415°N, 17.73748°E, alt. ca 317 m, 3466). **Vértes, Csákberény:** Szappanos-völgy (05.04.2009, 47.37286°N, 18.31443°E, alt. ca 366 m, 2791).

Old occurrence confirmed: **Bakony, Hajmáskér:** Tobán-hegy (26.03.2011, 47.20291°N, 17.95037°E, alt. ca 340 m, 3573/20); (BOROS 1968).

Neckera crispa Hedw. – NT, IND – European temperate element. An indicator species of shaded calcareous (mainly dolomite) rocky habitats in good natural condition.

New records of occurrence: **Bakony, Bakonyoszlop:** Ördög-árok (21.03.2010, 47.33126°N, 17.91204°E, alt. ca 330 m, 3059); **Bakonyszűcs:** Nagy-Márvány-árok (10.04.2010, 47.30765°N, 17.73599°E, alt. ca 408 m, 3075/4); **Márkó:** Borostyán-hegy (10.04.2011, 47.16371°N, 17.78454°E, alt. ca 420 m, 3596/2); **Szentgál:** Disznó-völgy (Koporsó-kő) (10.04.2011, 47.09917°N, 17.76893°E, alt. ca 339 m, 3604/2); Mög-szeg (10.04.2011, 47.09320°N, 17.76722°E, alt. ca 361 m, 3603/9); **Várpalota:** Barbély-völgy (18.04.2010, 47.24019°N, 18.12647°E, alt. ca 342 m, 3081/1); (18.04.2010, 47.24047°N, 18.12469°E, alt. ca 353 m, 3082/2); Bükkfa-kúti-árok (18.04.2010, 47.23733°N, 18.08608°E, alt. ca 439 m, 3094/4); Kis-Burok-völgy (11.10.2008, 47.25134°N, 18.16525°E, alt. ca 275 m, 2736/3). **Vértes, Csákberény:** Somos-völgy (16.04.2005, 47.36061°N, 18.31173°E, alt. ca 343 m, 662/1); **Csákvár:** Hosszú-hegy (03.04.2005, 47.40406°N, 18.43789°E, alt. ca 285 m, 619/2).

Old occurrences confirmed: **Bakony, Bakonyszentlászló:** Alsó-Cuha-szurdok (03.01.2011, 47.37822°N, 17.83450°E, alt. ca 230 m, 3491/1); **Farkasgyepű:** Köves-patak (16.04.2011, 47.19102°N, 17.61044°E, alt. ca 338 m, 3610/2); **Hajmáskér:** Tobán-hegy (26.03.2011, 47.20291°N, 17.95037°E, alt. ca 340 m, 3573/30); **Isztimér:** Burok-völgy (23.12.2010, 47.27103°N, 18.15943°E, alt. ca 256 m, 3485/1); **Márkó:** Esztergáli-völgy (13.01.2007, 47.16988°N, 17.83650°E, alt. ca 395 m, 2052/4). **Vértes, Csákberény:** Gémfőrtés-völgy (16.04.2005, 47.35400°N, 18.13567°E, alt. ca 360 m, 638/5); Kőkapu-völgy (16.04.2005, 47.36236°N, 18.30694°E, alt. ca 388 m, 655/5); Meszes-völgy (19.03.2005, 47.36231°N,

18.31386°E, alt. ca 287 m, 509); Meszes-völgyi-lyuk (19.03.2005, 47.36383°N, 18.30892°E, alt. ca 369 m, 512/5); Szedres (Juhdöglő)-völgy (27.07.2005, 47.38014°N, 18.32839°E, alt. ca 340 m, 1015/2); Ugró-völgy (16.05.2005, 47.37022°N, 18.31453°E, alt. ca 406 m, 777/2); Ugró-völgyi-lyuk (22.04.2005, 47.36942°N, 18.31658°E, alt. ca 360 m, 346); **Gánt** (Kápolnapuszta): Juh-völgy (02.04.2011, 47.39481°N, 18.33589°E, alt. ca 379 m, 3588/14); **Gánt** (Vértesszomszaga): Boglári-oldal (13.05.2005, 47.45347°N, 18.44778°E, alt. ca 336 m, 726/6); Nagy-Tábor-hegy (25.03.2005, 47.44903°N, 18.44292°E, alt. ca 348 m, 551/5); **Vértesszomszaga**: Fáni-völgy (13.05.2005, 47.45928°N, 18.45714°E, alt. ca 281 m, 732/5); Macskagödör (29.10.2005, 47.45847°N, 18.45553°E, alt. ca 308 m, 1429/2); (BOROS 1915–1971, 1968).

Orthothecium intricatum (Hartm.) Schimp. – NT, IND – European boreo-arctic, montane element. A characteristic species of shaded rocks; some of its recent occurrences were published by NÉMETH (2007, 2008).

New records of occurrence: **Bakony, Bakonybél**: Kertes-kői-szurdok (Oltár-kő) (06.03.2011, 47.23884°N, 17.76334°E, alt. ca 385 m, 3541/6); **Bakonyszentlászló**: Alsó-Cuha-szurdok (31.03.2007, 47.31215°N, 17.85338°E, alt. ca 377 m, 2056/1); **Farkasgyepű**: valley of Köves-patak (16.04.2011, 47.19178°N, 17.60911°E, alt. ca 323 m, 3611/4); **Márkó**: Slézingervölgy (13.04.2009, 47.16472°N, 17.83285°E, alt. ca 413 m, 2816/1); **Szentgál**: Miklóspál-hegy (10.04.2011, 47.11169°N, 17.78512°E, alt. ca 334 m, 3598/5); **Várpalota**: Kis-Burok-völgy (11.10.2008, 47.25130°N, 18.16581°E, alt. ca 281 m, 2735).

Old occurrences confirmed: **Bakony, Bakonyháza**: Gaja-szurdok (26.03.2011, 47.26866°N, 17.98370°E, alt. ca 280 m, 3579/7); **Hajmáskér**: Tobán-hegy (26.03.2011, 47.20291°N, 17.95037°E, alt. ca 340 m, 3573/14); (BOROS 1968).

Palustriella commutata (Hedw.) Ochyra – EN – This boreal-temperate element occurs in wet, base-rich habitats, on wet cliffs near springs. According to BOROS (1968) and ORBÁN and VAJDA (1983) the species is not common, but it can be found scattered all over the country. Unfortunately, at present only a few localities are known.

Old occurrence confirmed: **Bakony, Farkasgyepű**: Csurgó-szikla (16.04.2011, 47.18560°N, 17.59518°E, alt. ca 290 m, 3615/1); (BOROS 1968).

Plagiobryum zierii (Hedw.) Lindb. – VU – Circumpolar boreo-arctic montane element. In Hungary it occurs in mixed karstic forests, on humus with dolomite fragments accumulated between surface roots of small beech trees. Three old localities were listed by BOROS (1968), but thanks to searches in recent years the number of sites have increased to 16 (NÉMETH 2007, 2008). The following records are further additional contributions to the distribution of the species. Some earlier attempts to confirm its old occurrence (BOROS 1968) at Kőkapu-völgy was unsuccessful (NÉMETH 2007), but very recently it turned up from this locality as well.

New records of occurrences: **Bakony, Isztimér**: Burok-völgy (23.12.2010, 47.26852°N, 18.15506°E, alt. ca 259 m, 3486/1); **Márkó**: Slézingervölgy (13.04.2009, 47.16472°N, 17.83285°E, alt. ca 413 m, 2816/2). **Vértesszomszaga**: Ráró-kő (Ugró-völgy) (06.01.2011, 47.37368°N, 18.30842°E, alt. ca 407 m, 3512/4).

Old occurrence confirmed: **Vértes, Csákberény**: Kőkapu-völgy (02.04.2011, 47.36261° N, 18.30694°E, alt. ca 343 m, 3582/1); (BOROS 1968).

Plagiopus oederianus (Sw.) H. A. Crum et L. E. Anderson – VU – Circumpolar, boreo-arctic montane species. In the area of the Bakony Mts it was known from many localities (BOROS and VAJDA 1963), but recently it could be recorded only from four sites. However, its two previous occurrences from the Vértes Mts (BOROS 1968) were confirmed.

New record of occurrence: **Bakony, Veszprém**: Mohos-kő (13.01.2007, 47.18642° N, 17.88146°E, alt. ca 396 m, 2050/2); (15.03.2011, 47.18630°N, 17.88140°E, alt. ca 406 m, 3569/5).

Old occurrences confirmed: **Bakony, Bakonybél**: Hegyes-kő (06.04.2007, 47.23079° N, 17.73791°E, alt. ca 326 m, 2065/2); Kertes-kői-szurdok (Oltár-kő) (06.04.2007, 47.23884° N, 17.76334°E, alt. ca 385 m, 2064/2); **Bakonyoszló**: Ördög-árok (05.02.2011, 47.32451° N, 17.91354°E, 280 m, 3505/5); **Farkasgyepű**: valley of Köves-patak (16.04.2011, 47.19178°N, 17.60911°E, alt. ca 323 m, 3611/3); **Isztimér**: Burok-völgy (01.04.2006, 47.26761°N, 18.14981°E, alt. ca 278 m, 1538); (12.02.2011, 47.26925°N, 18.13776°E, alt. ca 333 m, 3521/1); **Márkó**: Esztergáli-völgy (15.03.2011, 47.16996°N, 17.83660°E, alt. ca 385 m, 3570/3); Szentgál: Miklóspál-hegy (10.04.2011, 47.11169°N, 17.78512°E, alt. ca 334 m, 3598/6); **Várpalota**: Vár-völgy (03.04.2011, 47.22860°N, 18.10164°E, alt. ca 348 m, 3593/1). **Vértes, Várgesztes**: Zsigmond-szikla (Lófő) (30.04.2005, 47.48117°N, 18.40036°E, alt. ca 330 m, 674/1); **Vértesboglár**: Fáni-völgy (13.05.2005, 47.45931°N, 18.45681°E, alt. ca 276 m, 731/2); (BOROS 1968).

Rhynchostegiella tenella (Dicks.) Limpr. – NT, IND – A sub-Atlantic, sub-Mediterranean element. It usually occurs at cave entrances or in shaded rock crevices in the mountains of Hungary. In the Vértes Mts, it was only known from the cave Báracházi barlang, while in the Bakony Mts it had several data. From the latter area it has not turned up recently.

Old occurrence confirmed: **Vértes, Csákvár**: Báracházi barlang (20.02.2011, 47.37720°N, 18.44042°E, alt. ca 190 m, 3529/1); (BOROS 1968).

Rhynchostegiella tenuicaulis (Spruce) Kartt. – DD – A temperate element. In the last 40 years no occurrence was reported in Hungary. Its earlier data also included two places from the Bakony (Burok-völgy, Tobán-hegy) and Vértes Mts (Bodzás-völgy, Csatorna-völgy, Kőkapu-völgy).

New records of occurrence: **Bakony, Bakonyoszló**: Ördög-árok (09.01.2011, 47.33212°N, 17.91376°E, alt. ca 299 m, 3494/5). **Vértes, Csákberény**: Somos-völgy (02.04.2011, 47.36044°N, 18.31100°E, alt. ca 343 m, 3585); Szentegyházi-hegy (17.04.2011, 47.36739° N, 18.30150°E, alt. ca 378 m, 3617/4); **Csókakő**: Kőlyuk-völgy (19.02.2006, 47.36175°N, 18.27869°E, alt. ca 355 m, 437); **Gánt** (Kápolnapuszt): Juh-völgy (02.04.2011, 47.39481° N, 18.33589°E, alt. ca 379 m, 3588/5).

Old occurrence confirmed: **Vértes, Csákberény**: Kőkapu-völgy (02.04.2011, 47.36287° N, 18.30812°E, alt. ca 327 m, 3581/4); (02.04.2011, 47.36261°N, 18.30694°E, alt. ca 343 m, 3582/3); (BOROS 1915–1971).

Taxiphyllum densifolium (Broth.) Reimers – VU – A Pontic (Caucasian), montane element. It thrives on shaded rocks. A rare taxon according to the Red data book of European bryophytes (ECCB 1995), and is protected in Hungary. Its recent localities from the Bükk, Mátra, Pilis and Visegrád Mts and the Aggtelek karst have been listed by PAPP (2008) and PAPP and ERZBERGER (2003). From the Bakony Mts so far only four occurrences were known (Ördög-árok, Bécsi-árok, Nagy-Márvány-árok, Borostyán-hegy) (BOROS 1915–1971, 1968). Three of these locations (Ördög-árok, Nagy-Márvány-árok, Borostyán-hegy) were confirmed during the present study, in addition two new localities were also discovered.

New records of occurrence: **Bakony, Bakonybél**: Kertes-kői-szurdok (Oltár-kő) (06.03.2011, 47.23884°N, 17.76334°E, alt. ca 385 m, 3541/2); **Bakonynána**: Gaja-szurdok (26.03.2011, 47.27039°N, 17.98164°E, alt. ca 300 m, 3578/3); (26.03.2011, 47.26866°N, 17.98370°E, alt. ca 280 m, 3579/5).

Old occurrences confirmed: **Bakony, Bakonyoszlop**: Ördög-árok (05.02.2011, 47.32468°N, 17.91386°E, 256 m, 3504/1); **Bakonyszűcs**: Nagy-Márvány-árok (10.04.2010, 47.30616°N, 17.74277°E, alt. ca 512 m, 3072/3); **Márkó**: Borostyán-hegy (10.04.2011, 47.16371°N, 17.78454°E, alt. ca 420 m, 3596/4); (10.04.2011, 47.16454°N, 17.78395°E, alt. ca 420 m, 3597); (BOROS 1915–1971, 1968).

CONCLUSIONS

The thorough investigation and systematic field work carried out in the past 8 years in the Bakony and Vértes Mts resulted in several bryofloristical records that appear to be important from the aspect of nature conservation. These may be assessed as follows:

1. New occurrences of some data deficient (DD) species, such as *Cornardia compacta*, *Isopterygiopsis pulchella*, *Rhynchostegiella tenuicaulis* should be emphasised, since no recent localities of these taxa were recorded.

2. New localities of bryophytes belonging to endangered (EN) (*Athalamia hyalina*, *Jungermannia hyalina*, *Palustriella commutata*, *Porella arboris-vitae*, *Preissia quadrata*) and vulnerable (VU) (*Amblystegium confervoides*, *Apometzgeria pubescens*, *Asterella saccata*, *Blepharostoma trichophyllum*, *Chiloscyphus pallescens*, *Eurhynchium flotowianum*, *Leiocolea collaris*, *Plagiobryum zierii*, *Plagiopus oederianus*, *Scapania aspera*, *S. calcicola*) threat categories were discovered or their earlier data were confirmed.

3. New records of three species included in the Red data book of European bryophytes (*Anomodon rostratus* and *Taxiphyllum densifolium* as rare (R), *Asterella saccata* as vulnerable (VU)) were discovered.

4. Actual occurrences of near threatened (NT) species (*Aneura pinguis*, *Anomodon rostratus*, *Calypogeia fissa*, *Cololejeunea calcarea*, *C. rossettiana*, *Distichium capillaceum*, *Frullania tamarisci*, *Jamesoniella autumnalis*, *Metzgeria conjugata*, *Myurella julacea*, *Neckera crispa*, *Orthothecium intricatum*, *Pedinophyllum interruptum*, *Reboulia hemisphaerica*, *Riccia ciliifera*, *Rhynchostegiella tenella*), which are not threatened at present but their status can easily turn into vulnerable or endangered category in the future, were also recorded. Most of these are indicator species (IND) and at the same time these taxa are on the lists recommended for the selection and assignment of important bryophyte areas (IBrA) (ANDERSON 2002, PAPP 2008).

* * *

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