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The distribution of *Metzgeria violacea* in the Apuseni Mountains (Romanian Western Carpathians)

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Abstract: *Metzgeria violacea* (Ach.) Dumort. was known from three places in Romania. It recently has been found at several localities in the Apuseni Mountains, mostly in deep gorges, on twigs of different woody species. The distribution, ecology and the distinguishing characters from the related species are discussed.

Kokkuvõte: *Metzgeria violacea* levik Apuseni mägedes (Rumeenia Lääne-Karpaadid)

Metzgeria violacea (Ach.) Dumort. oli teada kolmest leiukohast Rumeenias. Hiljuti leiti teda mitmest kohast Apuseni mägedest, enamasti sügavates kuristikes eri puuliikide okstel. Käsiletakse lähedaste liikide levikut, ökoloogiat ja eristustunnuseid.

INTRODUCTION

The simple thalloid hepatic, *Metzgeria violacea* (Ach.) Dumort., before known also under the name of *Metzgeria fruticulosa* (Dicks.) A. Evans, is an oceanic ("atlantic") geographical element.

Its distribution is known from Tierra del Fuego, Valdivia, Argentina and from Peru in the Southern Hemisphere, furthermore from the northern and western part of Europe (Grolle & So, 2003). The records from New Zealand (Campbell, 1961) are erroneous (So, 2002). It was known only from a few localities in the whole Carpathian range, for instance, in Slovakia from the Muran Plateau and from Vihorlat Mts. (Duda, 1962; Peciar, 1960), from Mt. Hoverla in Carpatho-Ukrainia (Boros & Vajda, 1969).

It was first discovered in Romania from the Cibin Mts., Râul Mare Gorge in the Southern Carpathians by Boros & Vajda (1967), confirmed by Gündisch (1977). Later, Goia & Ştefanuţ (2004) recorded the species from the Bihor Mts., Cobleş Valley near Arieşeni. The latter authors also provided a distribution map of the taxon for Romania.

Pócs (2006) recorded a new locality from the Pădurea Craiului near the Vida Lake, mistakenly under the name of the closely related *Metzgeria temperata* Kuwah. The three authors of the current paper collected it again at several localities of the Bihor Mountains, where it seems to be a typical ramicolous element of streamside trees and shrubs in deep, damp, shady gorges. These new records are significant because we are convinced that the species will be more widespread than currently documented, and we predict it will be found from the Romanian Western Carpathians (Apuseni Mts.) at many similar habitats rich in relics and rare plants.

RESULTS & DISCUSSION

Localities of *Metzgeria violacea* in the Apuseni Mountains (Fig. 1)

Bihor Mountains:

Cheile Galbenei, gorge below the bridge, on shady limestone rocks and on decaying wood near the river, at 700 m alt., 46°33'11"N, 22°40'20"E. Coll.: I. Goia & T. Pócs, 06065/G, 8 Sept. 2006;

Cobleş Valley NW of Arieşeni, on spruce roots in small patch ca 1040 m alt, 46°32'29"N, 22°44'07"E. Coll.: I. Goia (Goia 2001, Goia & Ştefanuţ 2004).

Valea Gârda Seacă, on twigs of *Viburnum lantana* along a creek of Izbuc Coteţul Dobreştilor, NW of Dobreşti village, in shady bush, at 763 m alt., 46°28'41"N, 22°48'32"E. Coll.: A. Sass-Gyarmati 06031/G, 13 June 2006.

Cheile Ordâncuşii NE of Gârda, at several points of this deep gorge, seems to be widespread here: along the trail to the entrance of Poarta lui Ionele Cave near a creek, in *Piceo-Fagetum*, on *Picea* and on *Acer pseudoplatanus* twigs and bark, 770 m

Fig. 1. The distribution of *Metzgeria violacea* (Ach.) Dumort in Romania.

alt, 46°27'59"N, 22°50'18"E. Coll.: A. Sass-Gyarmati 06044/F, 06044/G, 27 June 2006. At the narrowest part of the gorge, on *Salix caprea* twigs along the streamlet, at 830–840 m alt. 46°28'30"N Coll. S. & T. Pócs 07042/E, 20 Apr. 2007. In the upper part of the gorge, on twigs of different shrubs in streamside *Alnetum incanae* and *Petasitetum* stands at 860–870m, 46°28'41–43"N, 22°50'51"E. Coll. Sass-Gyarmati 06045/B, 27 June 2006.

Pădurea Craiului (The Royal Forest) Hills:

Topliţa Valley E of Vida Lake and Luncasprie Village, in streamside *Fageto-Carpinetum*, small patches on bark of *Carpinus betulus,* at 250 m alt., 46°51'47"N, 22°18'56"E. Coll.: T. Pócs & R. Rico 06011//F (Pócs 2006: 11–12 under the name of *Metzgeria temperata*).

The voucher specimens of the above are deposited in CL and in EGR.

Ecology of *Metzgeria violacea*

The ecology of this species is briefly described by Goia & Ştefanuţ (2004), as corticolous or occasionally rupicolous, skiaphilous, mesophilous, micro-mesothermal and moderately acidophilous. Of significance, we add that due to its oceanic distribution and climate requirements in the Apuseni Mountains it is restricted to the relict habitats of narrow gorges or at least to the microclimate of damp valleys and regularly occurs near watercourses, on roots and bark, but mainly on narrow twigs, accompanied by species of *Orthotrichum* and *Ulota.* This seems to prove in the macroclimate of Carpathians its requirement for relatively high air humidity. Its substrate selectivity is low, occurring on the bark of any trees and shrubs, sometimes even on different rocks.

Taxonomy of *Metzgeria violacea*

The taxonomy of this species has historically been very confusing for long time. Morphologically, *Metzgeria violacea* belongs to Subgenus *Biforma* Kuwahara (1978), which is represented by some 10 species worldwide (Kuwahara 1986) and is characterized by two kinds of thallus ends within the same plant. One part of the thallus ends is attenuating, bearing disciform gemmae concentred to the narrow thallus apices (Fig. 2 & 3). Within the same individual are also occurring thallus ends of normal width having obtuse or emarginate apex without gemmae. Three species from this group, the so called *M. temperata-violacea-fruticulosa* complex (Schuster 1992) have oceanic distribution and are sometimes difficult to distinguish from each other. Their synonymy and specific characters were clarified only recently and are provided by Pócs (1993), Paton (1999), Grolle & So (2003), So (2003, 2004). They proved that *M. fruticulosa* is a misapplied name, and *M. consanguinea* belongs to the above named complex.

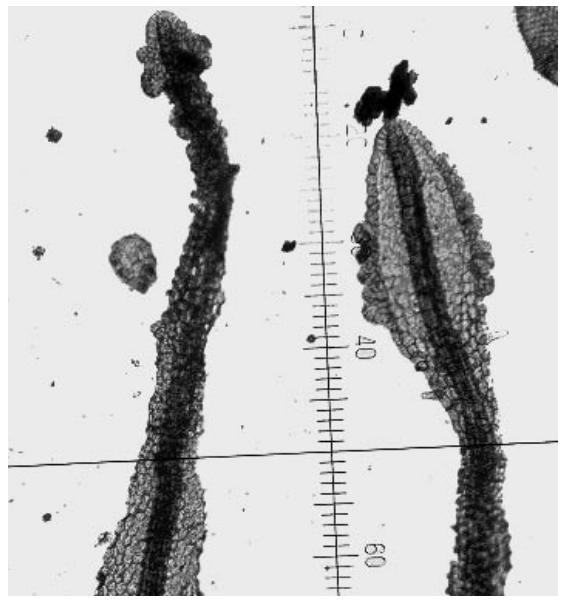

Fig. 2. Attenuated branches bearing gemmae (scale unit 25 μm).

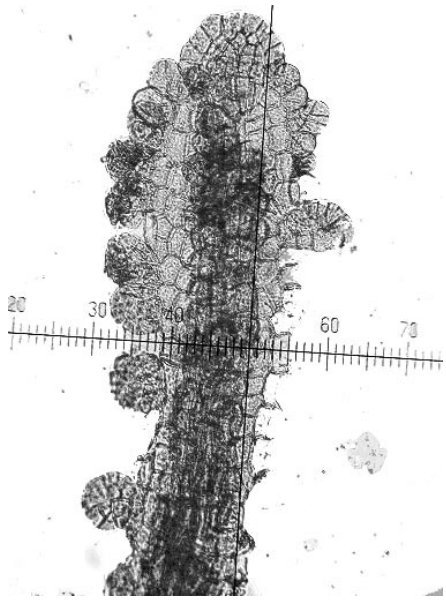

Fig. 3. Branch with costa bearing gemmae (scale unit 8 μm).

Among the European *Metzgeria* species only *M. violacea* turns blue. But we have to be careful with this character, as the bluish colour rarely appears on living plants, in case of full desiccation. The bluish coloration usually appears only several months after the death of the plant, so the green colour in the field may be misguiding. The bluish coloration of some species of *Metzgeria* was largely discussed by Kuwahara (1968), who observed, that the blue color is not bound to any morphological features of the cell or cell content. He recognized the taxonomic significance of blue coloration, which is bound only to two groups of species within this genus. Blue coloration is observed also in other hepatic genera, as it is well known in certain species of the genus *Calypogeia* (e.g. *C. peruviana* Nees et Mont., *C. trichomanis* (L.) Corda = *C. azurea* Stotler & Crotz), where the indigo blue pigment is bound to the oil bodies (Schuster 1969), like in the Andean *Plagiochila longispina* Lindenb. & Gottsche, where in the shoot apexes the blue oil bodies, when disintegrate after their death, stain even the cell walls of the stem cortex (Heinrichs et al., 2000).

We must take in account also the other character, the presence of gemmae on the costa surface (Fig. 3) with reservations, as on certain branches they are present only at the margin, but looking through the whole specimen we definitely find costal surface gemmae too. The most reliable character to distinguish *M. violacea* from the related *M. temperata* is the structure of the costa at the tapering thallus apex, which always has more than 3 epidermal (superficial) cells in *M. violacea* and always only 2 in *M. temperata.* But again, we have to be careful, because this is valid only for the attenuating part of thallus ends, in other parts of the thallus this number in both cases is 2.

However, their distribution is quite different, as there is overlapping only in the distribution of the bipolar temperate *M. violacea* and the hyperoceanic *M. temperate*, which only occurs in western Europe, and *M. consanguinea* is a Pantropical species, which does not occur in Europe.

Key to the species of subgenus *Biforma* occuring in the northern temperate belt

1 – Thallus uniform, lamina without attenuate branches, obtuse or truncate at the apices .... all other subgenera of *Metzgeria*
– Thallus with many attenuate branches bearing gemmae at their apical part (Fig. 2) 2
2 – Thallus with only 2(–3) dorsal and ventral costal cells in the tapered apex..... 3
– Costa of attenuating thallus apices with 3–6 dorsal and ventral cell rows on either side, thallus sooner or later turns blue or at least on their apex with bluish tinge; gemmae at the thallus apex in most cases also on both costal surfaces, often forming clusters ....*Metzgeria violacea*
3 – Thallus never turns blue, not even after years in the herbarium, but remains yellowish or dark green; only marginal gemmae at the attenuating thallus apex; lamina 11–18(26) cells wide, median laminal cells 33–58(70) × 25–43 μm ..... *M. temperata*
– Thallus sooner or later turns blue or at least on their apex with bluish tinge; gemmae at the thallus apex in most cases also on both costal surfaces, not at thallus margins; lamina 13–28(40) cells wide, median laminal cells 25–43(50) × 18–30(35) μm..... *M. consanguinea*

REFERENCES

Boros, Á. & Vajda, L. 1967. Bryologische Beiträge zur Kenntnis der Flora Transsilvaniens. *Rev. Bryol. Lichénol.* 35(1–4): 216–253.

Boros, Á. & Vajda, L. 1969. Bryoflora Carpathorum Septentrionali Orientaliorum. *Rev. Bryol. Lichénol.* 36**:**(3-4): 397–450.

Campbell, E.O. 1961. New Zealand Hepaticae (Liverworts) – XI. A review of the New Zealand species of the genus *Metzgeria. Transactions of the Royal Society of New Zealand 88*: 713–725.

Duda, J. 1962. Beitrag zur Verbreitung der Lebermoose in der Tschechoslovakei. *Acta Musei Silesiacae* 7**:** 31–63.

Goia, I. 2001. *Brioflora de pe substrat lemnos din bazinul superior al Arieşului. Studii briotaxonomice, corologice, ecologice şi cenologice (Teză de doctorat*; in Romanian). Univ. „Babeş-Bolyai" Cluj-Napoca. 312 pp.

Goia, I. & Stefanuţ, S. 2004. Rare bryophytes from Romania, identified from the upper basin of the Arieş River (II). *Contribuţii Botanice* 39: 97–105.

Grolle, R. & So, M.L. 2003. *Riccia fruticulosa* O.F.Müll., 1782 and blue *Metzgeria* (Marchantiophyta) in Europe. *Bot. Journ. Linnean Soc.* 142: 229–235.

Gündisch, F.T.R. 1977. Contribuţie la brioflora Munţilor Cibinului (Die Moosflora des Cibingebirges). *Stud. Comunic. Şt, Nat. Muz. Bruckenthal (Sibiu)* 21: 43–77.

Heinrichs, J., Anton, H., Holz, I. & Gradstein, S.R. 2000. On the blue stem color in *Plagiochila longispina* Lindenb, & Gottsche (Plagiochilaceae). *Cryptogamie, Bryol.* 21: 109–111.

Kuwahara, Y. 1968. The blue or blue-green coloration of dried specimens of *Metzgeria. The Bryologist* 71: 46–49.

Kuwahara, Y. 1978. Synopsis of the family *Metzgeriaceae. Rev. Bryol. Lichénol.* 44 (1–4): 351–410.

Kuwahara, Y. 1986. The Metzgeriaceae of the Neotropics. *Bryophytorum Bibliotheca* 28: 1–254.

Paton, J.A. 1999. *The liverwort flora of the British Isles.* Harley Books, Colchester, 626 pp.

Peciar, V. 1960. *Metzgeria fruticulosa* (Dicks.) Evans – eine neues tschechoslovakisches Lebermoos. *Biológia* 15: 125–128.

Pócs, T. 1993. Taxonomic results of the BRYOTROP expedition to Zaire and Rwanda 12. Metzgeriaceae, Plagiochilaceae, Lejeuneaceae (the non epiphyllous collections). *Tropical Bryology* 8: 105–125.

Pócs, T. 2006. Adatok az Erdélyi Szigethegység mohaflórájának ismeretéhez. In: Kalapos, T. (ed.): *Jelez a Flóra és a Vegetáció. A 80 éves Simon Tibort köszöntjük.* Scientia Kiadó, Budapest: 9–24.

Schuster, R.M. 1969 *The Hepaticae and Anthocerotae of North America. Volume II.* Columbia University Press, New York, 1062 pp.

Schuster, R.M. 1992. *The Hepaticae and Anthocerotae of North America. Volume VI.* Field Museum of Natural History, Chicago, 854 pp.

So, M.L. 2002. *Metzgeria* (Hepaticae) in Australasia and the Pacific. *New Zealand Journ. Bot.* 40: 603–627.

So, M.L. 2003. The genus *Metzgeria* (Hepaticae) in Asia. *J. Hattori Bot. Lab.* 94: 159–177.

So, M.L. 2004. *Metzgeria* (Metzgeriaceae, Marchantiophyta) in Africa. *New Zealand Journ. Bot.* 42: 271–292.