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Finds of rare glacial relic moss species in the Volovské vrchy Hills (Slovakia).

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ABSTRACT: During a bryological trip to the Volovské vrchy Hills on September 23, 1997 the authors found some rare moss species belonging to the glacial relics - *Meesia triquetra* and *Helodium blandowii*. The latter was refound on the original habitat after being reported by GYÖRFFY in 1935.

KEYWORDS: Bryophyta, *Meesia triquetra*, *Helodium blandowii*, glacial relics

The Volovské vrchy Hills belongs to the largest orographic units of Slovakia. On the area of about 1320 km^2 there have, up to present, been listed 224 moss species (ŠOLTÉS 1996) so from bryological point of view the territory is explored poorly. The papers of ŠMARDA (1948; 1961a) and PECIAR (1974a, b; 1976) mostly contributed to the knowledge of bryoflora of the Volovské vrchy Hills. It is not the aim to give a proper list of the papers dealing with the bryoflora of the Volovské vrchy Hills. But it would be unfair to leave out the papers of DUDA and VÁŇA, despite the fact, that the data refering to the Volovské vrchy Hills can be found there sporadically, only in a few papers are to be found more information refering to the bryoflora of the Volovské vrchy Hills (e. g. DUDA & VÁŇA 1969; 1982; 1984 and others). Bryological information on the bryoflora of Volovské

vrchy are given in phytosociological papers as well, e. g. JURKO (1961), ŠOMŠÁK (1995), FAJMONOVÁ (1980), and in others. Nomenclature of vascular plants (except for *Carex fusca* ALL.) follows ČERVENKA (1986), that of mosses follows KUBÍNSKA & JANOVICOVÁ (1996). During a bryological trip to the Volovské vrchy Hills the authors found rare moss species - *Helodium blandowii* (F. WEBER et D. MOHR) WARNST. and *Meesia triquetra* (RICHTER) ANGSTR., that are listed in the Czech and Slovak Republic Red Data Book (VÁŇA & SOLDÁN 1995). These species belong to the arctic and subarctic relic species (RYBNÍČEK 1966, ŠMARDA 1960 and others). In the Slovak Red List both of the species are evaluated as endangered „E" (KUBÍNSKA & JANOVICOVÁ 1996).

Meesia triquetra (RICHTER) ANGSTR.

Meesia triquetra occurs throughout holarctic Europe, North America and Greenland (SMITH 1980). The authors of the Czech and Slovak Republic Red Data Book (VÁŇA & SOLDÁN 1995) as probably existing locations report the following: near Nová Polianka in the High Tatra Mts, fen near Oravice, Starobocianska dolina Valley in the Low Tatra Mts., and Predná Poľana in the Volovské vrchy Hills.

The authors of this paper found a new location of this rare moss species in the fen Šeliská west from the settlement Závadka, the Volovské vrchy Hills (Fig. 1). The moss occurs here scattered overgrowing other bryophytes. The species is easy to identify in the field with the help of hand lens (Fig. 3).

Location:

The Volovské vrchy Hills, fen Šeliská west from Závadka Settlement, *Caricetum goodenowii*, 730 m a. s. l., area 4 x 4 m, ENE aspect., gradient 3^0, cover E_1 100%, E_0 100%, September 23, 1997.

Relevé:

E_1

Carex fusca 3, *Juncus conglomeratus* 3, *Agrostis *tenuis* 2, *Anthoxanthum odoratum* 1, *Briza *media* 1, *Festuca pratensis* 1, *Lysimachia vulgaris* 1, *Potentilla *erecta* 1, *Ranunculus acris* 1, *Cruciata glabra* 1, *Poa pratensis* 1, *Nardus stricta* 1, *Deschampsia caespitosa* +, *Carex echinata* +, *Festuca ovina* +, *Lychnis flos-cuculi* +, *Myosotis palustris* +, *Epilobium palustre* +, *Knautia *arvensis* +, *Holcus lanatus* +, *Viola *palustris* +, *Mentha arvensis* +, *Achillea *millefolium* +, *Carex leporina* +, *Valeriana simplicifolia* +, *Cirsium palustre* +, *Acetosa pratensis* +, *Veronica officinalis* +, *Galium molugo* +, *Luzula campestris* +, *Leontodon *autumnalis* r.

E_0

Meesia triquetra -1%, *Sphagnum recurvum* 60%, *Aulacomnium palustre* 30%, *Hypnum lindbergii* 5%, *Tomenthypnum nitens* 4%, *Hypnum pratense* -1%.

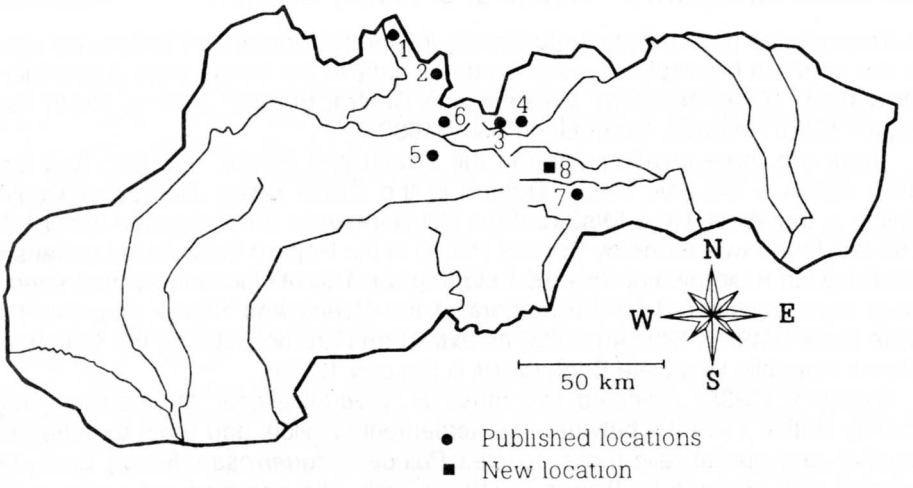

Fig. 1 Distribution of *Meesia triquetra* in Slovakia. Locations: 1 - The fen Beňadovo (RYBNÍČEK & RYBNÍČKOVÁ 1965), 2 - Oravice (RYBNÍČEK & RYBNÍČKOVÁ 1972), 3 - The High Tatra Mts., under Nová Polianka Settlement (ŠMARDA 1961b), 4 - Poprad Basin, Belianske lúky Meadows (ŠMARDA 1961b), 5 - The Low Tatra Mts, Starobocianska dolina Valley (ŠMARDA & VANĚK 1955), 6 - Liptov Basin, the bank of the Belanský potok rivulet (ŠOLTÉS 1997), 7 - The Volovské vrchy Hills, Predná Poľana (VÁŇA & SOLDÁN 1995), 8 - The Volovské vrchy Hills, fen Šeliská, west from the settlement Závadka, the new location.

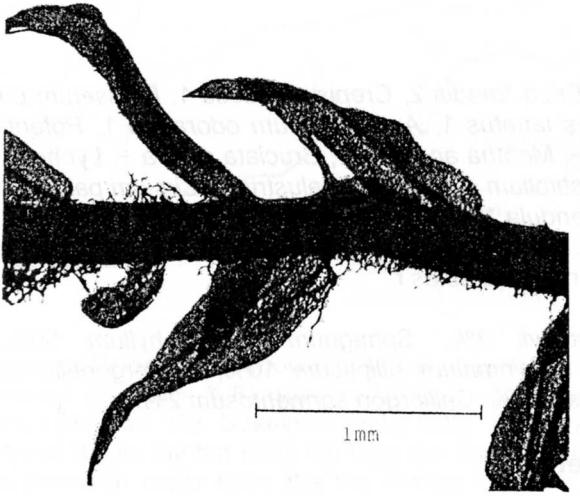

Fig. 3 The part of the shoot of *Meesia triquetra* (IMAGE - PRO)

Helodium blandowii (F. WEBER et D. MOHR) WARNST.

The species occurs widespread in the low arctic, boreal and temperate zones of the northern hemisphere, most predominantly in the boreal zone (LEWINSKY & MOGENSEN 1979); Northern, Western and Central Europe, Iceland, North Asia, Japan, North America, Greenland (SMITH 1980).

There are three location listed in the Czech and Slovak Republic Red Data Book (VÁŇA & SOLDÁN 1995): Trstená in the Orave Basin, Bobrovecká dolina Valley in the West Tatra Mts., and the Hill Berezov in the Bukovské vrchy Hills. The last found was made by ŠOLTÉS (1998) in the Poprad Basin in the exhausted fen Krivý kút near town of Spišská Belá (Fig. 2). The old locations of that species have been considered by the authors of the Czech and Slovak Republic Red Data Book (VÁŇA & SOLDÁN 1995) as extinct and are not listed in the Czech and Slovak Republic Red Data Book (VÁŇA & SOLDÁN 1995).

GYÖRFFY (1935) collected the moss *H. blandowii* near the narrow gauge railway station Závadka between the settlements Hnilčík and Bindt together with another rare glacial relic moss species *Paludella squarrosa* (HEDW.) BRID. The location was reported by BOROS (1942) as well. The narrow gauge railway was dismaunted at least thirty years ago, but the old location has been refound after 62 years. The species grows here only on a single area of 0.5 m^2 in a fen in a forest clearing. Unfortunately, the species *P. squarrosa* hasn t been confirmed, most likely it is extinct.

Location:

The Volovské vrchy Hills, under the Trubačovec Hill, the fen Žompy, *Caricetum goodenowii*, 740 m a. s. l., area 4 x 4 m, NE aspect, gradient 3^0, cover E_1 100%, E_0 80%, September 23, 1997.

Relevé:

E_1

Carex fusca 2, *Briza *media* 2, *Crepis paludosa* 1, *Equisetum palustre* 1, *Poa pratensis* 1, *Holcus lanatus* 1, *Anthoxanthum odoratum* 1, *Potentilla *erecta* 1, *Ranunculus acris* +, *Mentha arvensis* +, *Cruciata glabra* +, *Lychnis *flos-cuculi* +, *Eriophorum *angustifolium* +, *Myosotis palustris* +, *Cirsium palustre* +, *Equisetum sylvaticum* +, *Filipendula *ulmaria* +, *Lysimachia vulgaris* +, *Scirpus sylvaticus* +, *Galium palustre* +, *Agrostis tenuis* +, *Sanguisorba officinalis* +, *Caltha *laeta* r, *Acetosa pratensis* r, *Picea abies* r.

E_0

Helodium blandowii 3%, *Sphagnum *amblyphyllum* 50%, *Climacium dendroides* 10%, *Plagiomnium ellipticum* 10%, *Calliergonella cuspidata* 3%, *Aulacomnium palustre* 2%, *Calliergon sarmentosum* 2%.

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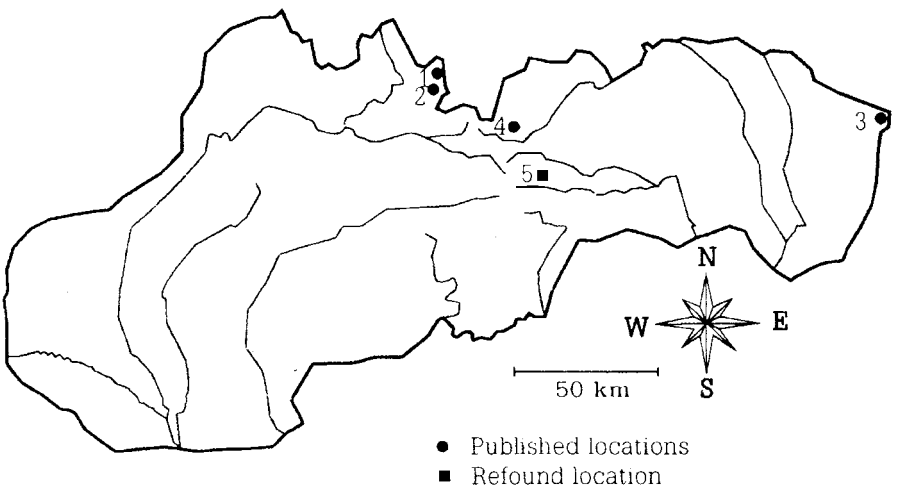

Fig. 2 Distribution of *Helodium blandowii* in Slovakia. Locations: 1 - The fen near the town of Trstená (RYBNÍČEK & RYBNÍČKOVÁ 1972), 2 - Bobrovecká dolina Valley (VÁŇA & SOLDÁN 1995), 3 - The Bukovské vrchy Hills, Berezov Hill (ibidem, leg. SOLDÁN), 4 - Poprad Basin, the fen Krivý kút near the town of Spišská Belá (ŠOLTÉS 1998), 5 - The Volovské vrchy Hills, the fen Žompy between Hnilčík and Bindt Settlements, the refound location.

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