One hundred years (and more) of solitude: *Meesia triquetra* rediscovered in Bulgaria

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Abstract. Within two years, *Meesia triquetra* has been discovered in two different localities in Bulgaria. The species has not been observed in the country since 1911. One of the localities is a new occurrence, while the other is close to one of the historically known localities. In the light of our current knowledge, the species qualifies as VU under the A2(c)D2 criteria.

Key words: conservation status, *Meesia triquetra,* new discovery, rare species

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Introduction

Meesia triquetra (L. ex Jolycl.) Ångstr. is an elusive species across Europe. It is a boreal and arctic moss with circumpolar distribution, growing in nutrient-rich wetlands, such as pond margins, seepage slopes, and especially in calcareous mires (Favreau & Brassard 2011). Its range spans across the Holarctic temperate-alpine zones of Europe, northwards to Svalbard, Iceland, Caucasus, N America, and Greenland, and with disjunct distribution in N Africa and SE Australia (Odgaard 1988; Smith 2004). The species is treated as a glacial relict (Šoltés 1997, 2000; Šoltés & al. 1998), but according Odgaard (1988), not a glacial relict in Central and West Europe, while in East Europe it is not a relict at all in the strict sense of the term. In Bulgaria, the species has been collected in 1908 by Josef Podpěra and published in his work *Ein Beitrag zu der Kryptogamenflora der bulgarischen Hochgebirge* (Podpěra 1911). There, two localities of the species were given: Dragalevsko Blato (Mt Vitosha) and Čam Koryja (Rila Mts). Since then, *M. triquetra* has never been observed on the territory of the country, despite the multiple attempts. The aim of our study is to present recent data on the distribution of the species in Bulgaria, and to evaluate its threat status.

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Material and methods

During a field expedition on 10 August 2020, investigating some less-know areas of Bulgaria, we were able to confirm the presence of *M. triquetra* in a small mire in Mt Maleshevska. The mountain is located in the southwestern part of the country as a part of the Osogovo-Belasitsa mountain formation. A small patch of about 100 cm^2 of *M. triquetra* was found together with *Sphagnum auriculatum* Ångstr., *Philonotis fonatana* (Hedw.) Brid., *Plagiomnium ellipticum* (Brid.) T.J.Kop., and *Scorpidium revolvens* (Sw.) Hedenäs.

Later, during another expedition on 21 June 2022 in Mt Vitosha, we were able to confirm the presence of *M. triquetra*. It was growing in a large and dense monodominant patch of about 1 m^2 surrounded by *Salix lapponum* L.

The species was sterile at both sites.

Results and discussion

In Bulgaria, *Meesia triquetra* has been known from four localities (Fig. 1). Only two of them are recent. Details of the population in Mt Maleshevska are as follows: W of Kresna town, W of peak Chengene Kale, at the springs of river Hanovska, in a spring fen above the timberline, 1521 m a.s.l., 41.704968°N, 23.030105°E (SOM 11479-B). Details of the population in Mt Vitosha are as follows: Karachair locality, at the springs of river Struma, in a *Sphagnum*-dominated mire complex, 2139 m a.s.l., 42.542459°N, 23.294065°E (SOM 11481-B).

Meesia triquetra has never been observed in Bulgaria since its first finding in 1908 by J. Podpěra (Podpěra 1911). Hájková & al. (2007) discussed three *Meesia* species and their status in Bulgaria. The authors considered the probability of occurrence of the species in Bulgaria as low. Later, Natcheva & Ganeva

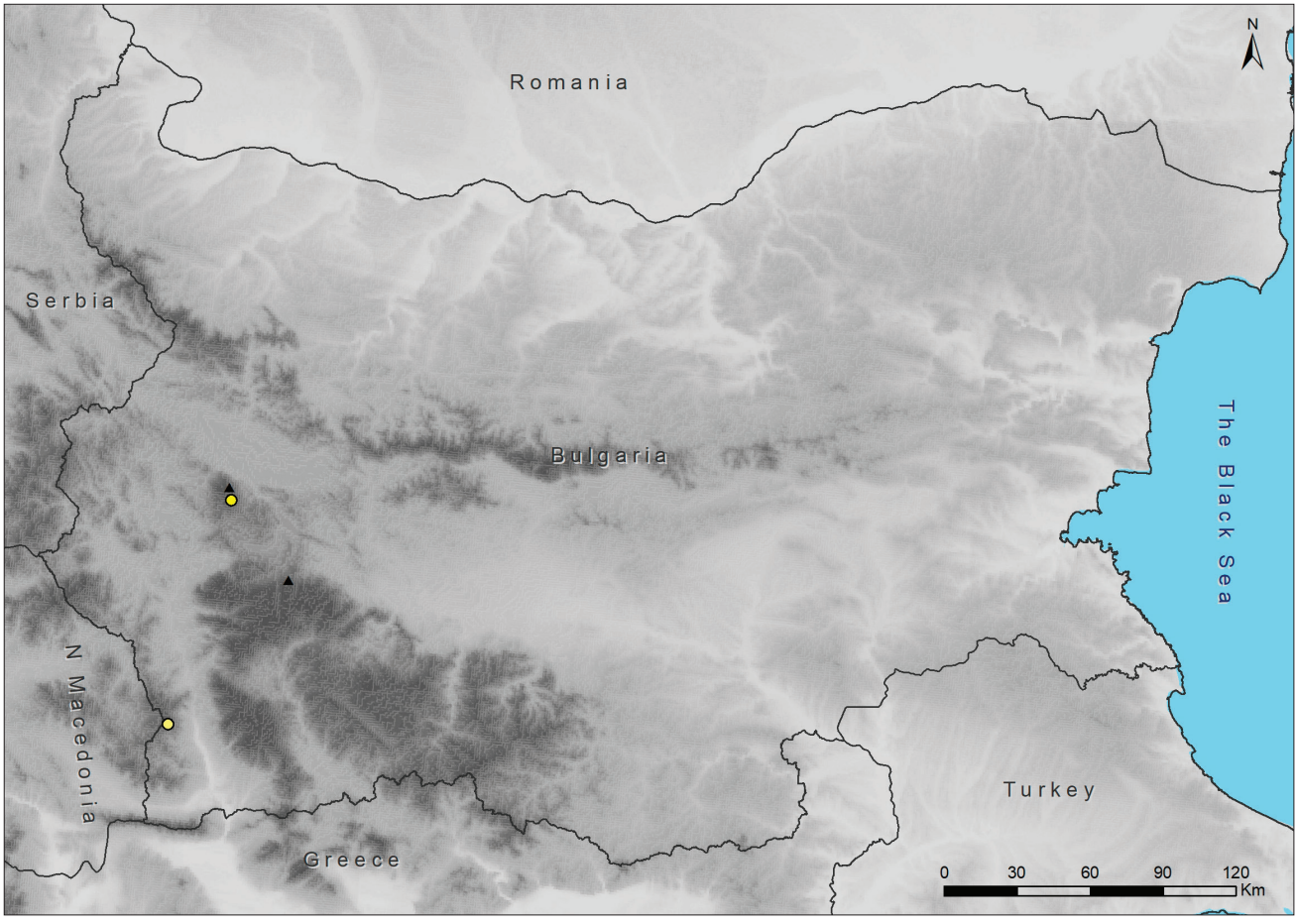

Fig. 1. Known localities of *Meesia triquetra* in Bulgaria. Symbology: yellow circles – recent localities, black triangles – historical localities.

(2018) published a revision of the herbarium specimens of J. Podpěra stored at PR and confirmed that the two vouchers form Mt Vitosha (Dragalevsko Blato, springs of river Dragalevska) and Rila Mts (Čam Koryja, now Borovets Resort) belonged to *M. triquetra*. The population in Mt Vitosha has been repeatedly searched for unsuccessfully many times at the same site. The one in the Borovets Resort has most likely gone extinct in the process of the Resort's expansion. Therefore, the authors concluded that the species was probably extinct from the Bulgarian flora.

The present work provides the first recent data on the occurrence of *M. triquetra* in Bulgaria. The population in Mt Vitosha is relatively large. It is situated in the Vitosha Nature Park where there is no grazing or other human disturbances. It lies *ca*. 4 km away from the locality published by Podpěra in 1911 and is in a different drainage basin. The population in Mt Maleshevska is extremely small and the habitat is highly disturbed by intensive cattle grazing and shows signs of eutrophication. Thus, in Bulgaria, the species is known from three 10×10 km squares. In one of them (Rila Mts), there is a high probability that the species has gone extinct. In another one (Mt Vitosha), there are two populations, but one of these has not been confirmed during the last 115 years. In the third square, the population is small and highly threatened by grazing. Therefore, according to the IUCN criteria (2022), the species qualifies at national level as VU under the A2(c)D2 criteria.

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