

New species to the bryophyte flora of Bulgaria

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Abstract. *Sphaerocarpos michelii*, *Southbya nigrella* and *Bryum klinggraeffii* are reported for the first time for the bryophyte flora of Bulgaria. The first two species have been found at one and the same locality in SW Bulgaria, in the Pirin floristic region, and the latter in the Znepole region, West Bulgaria.

Key words: bryophytes, *Bryum klinggraeffii*, Bulgaria, new species, *Southbya nigrella*, *Sphaerocarpos michelii*

Introduction

The genera *Sphaerocarpos* and *Southbya* are predominantly Mediterranean in distribution. Members of these genera were not known to occur in Bulgaria so far. During a field inventory in the southern part of the Pirin Mts, the liverworts *Sphaerocarpos michelii* Bellardi (*Sphaerocarpaceae*, *Sphaerocarpaceae*) and *Southbya nigrella* (De Not.) Henriq. (*Arnelliaceae*, *Jungermanniales*) were observed at a single locality.

Bryum klinggraeffii Schimp. (*Bryaceae*, *Bryales*) is a suboceanic moss and prefers calcareous to slightly acid bare soils in arable fields, but also grows along the margin of ponds and reservoirs. It belongs to the *B. erythrocarpum* complex with rhizoidal gemmae. The complex is represented in Europe by nine species (Crundwell & Nyholm 1964), of which *B. radiculosum*, *B. rubens* and *B. subapiculatum* are reported for Bulgaria.

Here we report for the first time the occurrence of *Sphaerocarpos michelii*, *Southbya nigrella* and *Bryum klinggraeffii* in Bulgaria, and present details on the morphology and ecology of these species based on local material.

Material and methods

An inventory of the bryophyte flora of the surroundings of Nova Lovcha village (Blagoevgrad district) at the southern foothills of the Pirin Mts was performed in order to confirm and evaluate the populations of the threatened species *Riccia crustata* and *Mannia triandra*, which were reported for this place by Petrov (1963, 1966). During this trip, *Sphaerocarpos michelii* (SOM-B 8876) and *Southbya nigrella* (SOM-B 8877) were found on the southern slopes of the hill north of Nova Lovcha village, at 717 m, 41°25'29" N, 23°43'22" E, GL-29, and at 800 m, 41°25'43" N, 23°43'27" E, GL-29, 31.03.2007, respectively, coll./det. R. Natcheva & A. Ganeva (Fig. 1). The dry rocky slopes of the hills north and northeast of Nova Lovcha village, with altitude up to 900 m, are dominated by *Juniperus oxycedrus* formations, developed on deforested areas (habitat type F5.1311 according to EUNIS habitats classification). In such habitats bryophyte diversity is not very high. The species usually form patches in shady and more humid places close to the juniper shrubs, on rather clayey soil at the foothills, and also in rock crevices.

Bryum klinggraeffii (SOM-B 8235) was found in the Znepole floristic region, West Bulgaria, along the

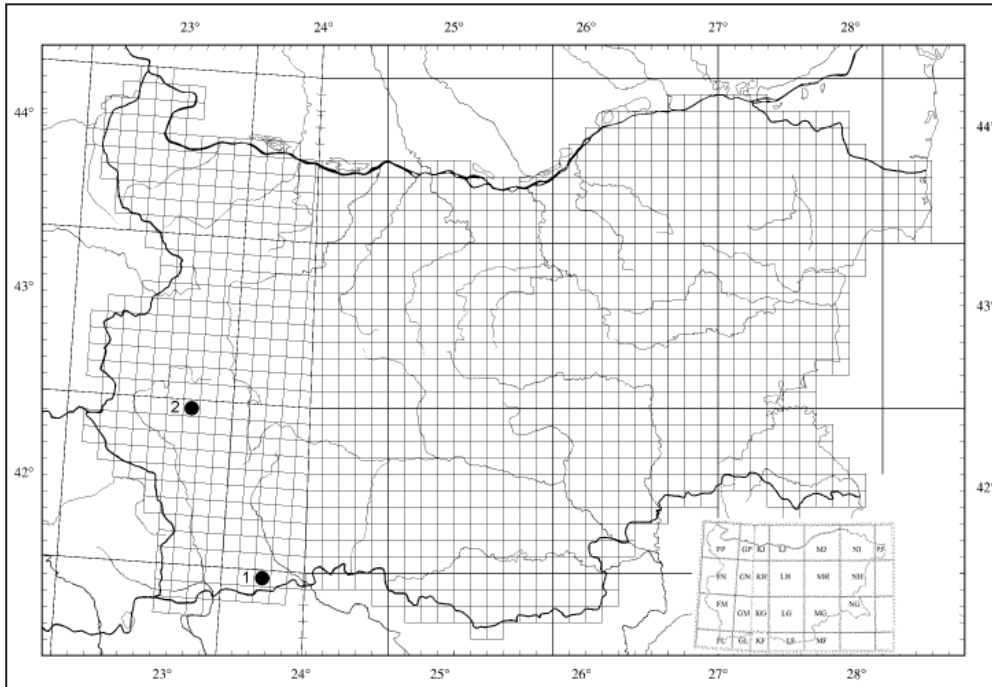


Fig. 1. Map of Bulgaria showing the localities of *Sphaerocarpos michelii* (1), *Southbya nigrella* (1) and *Bryum klingraeffii* (2).

road from Sofia to the town of Doupnitsa, near the road fork to Dren village (Pernik district), at 700 m, 42°25'N, 23°80'E, FM-79, 13.03.2003, coll./det. R. Natcheva & A. Ganeva.

The nomenclature follows Grolle & Long (2000) for liverworts, and Hill & al. (2006) for mosses. All sizes are based on the measurement of 10 individuals from the material collected in Bulgaria.

Results and discussion

Sphaerocarpos michelii (Fig. 2a) is a small and delicate ephemeral liverwort. The gametophytes are pale green to pale brown at maturity, rosette-like, divided into several short plane lobes. The species is unisexual. Female rosettes are up to 15–20 mm in diameter, bearing a number of ovoid to pyriform involucre, where sporophytes develop. The involucre develop in succession from the centre to the periphery of the rosette. The male plants are up to 5 mm in diameter, more strongly pigmented, with several flask-shaped involucre, where the antheridia develop. Spores are dark brown and remain united in tetrads, 100–120 µm in diameter. The distal spore surface is regularly reticulate with 6–8 alveolae (Fig. 2b), spinulose in silhouette (Fig. 2c).

The plants grew on temporary moist, eroded, calcareous loamy soil, in a pasture among vineyards, in association with *Entosthodon muhlenbeckii* (Turner)

Fife, *Barbula unguiculata* Hedw. and *Tortula truncata* (Hedw.) Mitt.

Sphaerocarpos michelii is a Suboceanic-Submediterranean species. It differs from the other European representative of the genus *Sphaerocarpos*, *S. texanus*, by the spores that have 4–6 alveolae across the distal surface and are winged in silhouette in the latter species. It is likely that *S. texanus* also occurs in Bulgaria, since both species have similar distribution on the Balkan Peninsula and similar ecological preferences. In the Balkans, *Sphaerocarpos michelii* is reported from Greece and Croatia (Sabovljević & Natcheva 2006).

Southbya nigrella (Fig. 3) is a leafy liverwort forming thin mats, bright green to brownish and almost black when dry. Shoots are prostrate, with terminal branches, stems in transverse section are at least twice wider than high. The leaves are opposite, succubous (ventral leaf margin nearer to the stem apex), plane to concave, reniform, wider than long, often with unistratose appendages towards the apex on the dorsal surface. *S. nigrella* is bisexual, with male bracts situated just below the female. It was collected with mature sporophytes.

It is an Oceanic-Mediterranean species, growing on calcareous soil in temporary moist, shaded rock crevices and at the bases of rocks in open habitats (open scrublands of *Juniperus oxycedrus* and rocky pastures). At Nova Lovcha village the species grew in association

with *Gymnostomum viridulum* Brid. and *G. calcareum* Nees & Hornsch.

The species is fairly widespread in the Balkan countries, with (sub-) Mediterranean climatic influence: Greece, Albania, Slovenia, Bosnia and Herzegovina, Montenegro, Croatia (Sabovljević & Natcheva 2006).

Bryum klinggraeffii (Fig. 4a) is a Suboceanic moss. It forms 2–5 mm high, dense or loose bright green tufts. The leaves are ovate-lanceolate, with shortly excurrent nerve and hardly forming a border. Rhizoids are pale yellowish-brown. Gemmae are usually abundant on longer rhizoids, never axillary, bright crimson, irregularly spherical, 70–100 µm in diameter, with protuberant cells (Fig. 4b). The species is unisexual and capsules are rarely produced. In Bulgaria, it was collected sterile but with numerous rhizoidal gemmae.

This species was collected along the margin of an arable field, close to the road, near shrubs. It is probably more widespread in Bulgaria, but routinely overlooked due to its small size. It is likely to be misidentified for other members of the *B. erythrocarpum* complex, but a close examination of the rhizoidal gemmae that are relatively small and irregularly shaped, with protuberant cells, would distinguish *B. klinggraeffii*. A similar example is given by another member of the complex, *B. rubens*, that was first reported for Bulgaria by Ganeva & Ros (2002) and later on turned out to be fairly common in old arable fields, disturbed grounds (Papp & al. 2006), and in loess areas (Natcheva & Ganeva 2006).

On the Balkan Peninsula, *B. klinggraeffii* is found in Greece, Macedonia, Slovenia and Romania.

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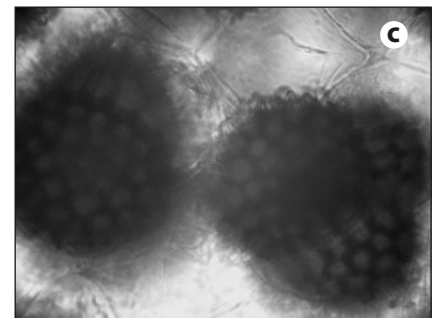
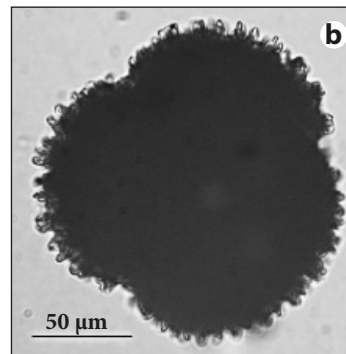
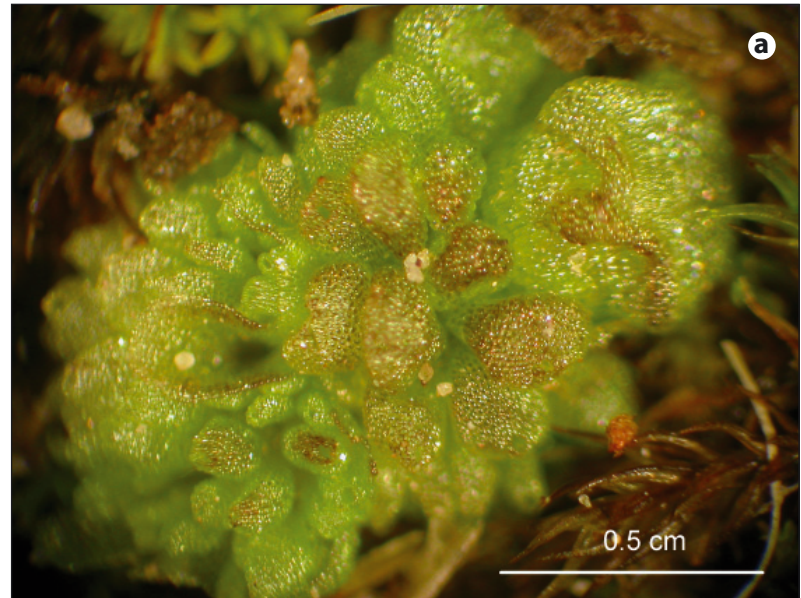


Fig. 2. *Sphaerocarpos michelii*: a – general appearance of a female plant with involucres; b – spore surface in silhouette; c – distal spore surface.



Fig. 3. *Southbya nigrella*: general appearance.

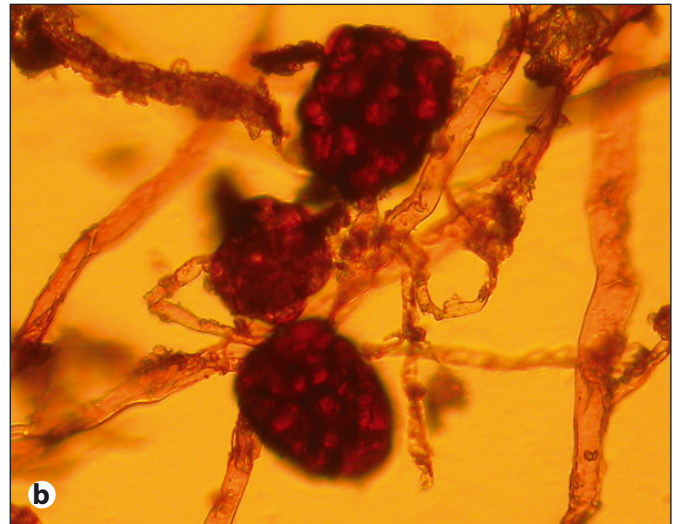
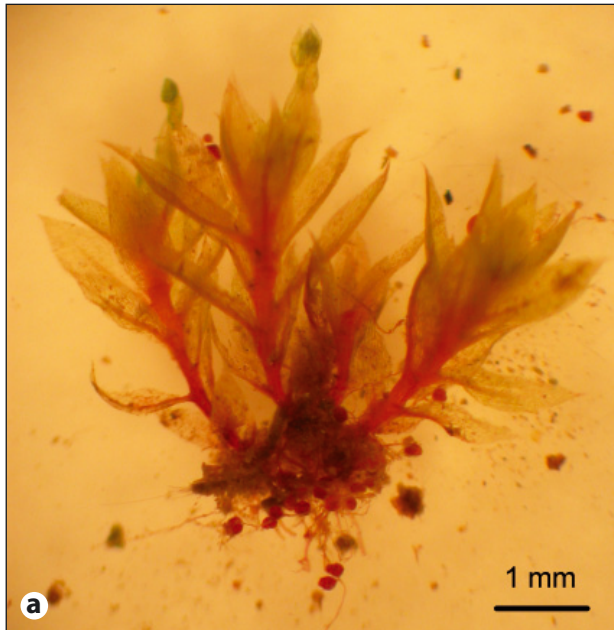


Fig. 4. *Bryum klinggraeffii*:
a – general appearance;
b – rhizoidal gemmae.

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