

BRYUM BARNESII, A MOSS SPECIES NEW FOR RUSSIA

BRYUM BARNESII – НОВЫЙ ВИД МХА ДЛЯ РОССИИ

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Abstract

Bryum barnesii J.B. Wood ex Schimp. is found for the first time in Russia, in foothill of the Caucasus, in Stavropol Territory. Description and illustrations of Caucasian specimen are provided. *Bryum barnesii* differs from other species of the genus with bulbils in leaf axils in their greater number, 5–15 per axil in the upper leaves. It is also characterized by the reddish color of leaf base and often decurrent leaves. The differences of the species from *Bryum bicolor* are discussed.

Резюме

Bryum barnesii J.B. Wood ex Schimp. впервые приводится для России, он найден в предгорной части Кавказа, в Ставропольском крае. Даны описание и иллюстрации вида. *Bryum barnesii* отличается от других видов рода с выводковыми почками в пазухах листьев их многочисленностью, по 5–15 в пазухах верхних листьев. Листья *Bryum barnesii* часто имеют выраженное низбежание, а основание листа имеет красноватую окраску. Обсуждаются отличия этого вида от *Bryum bicolor*.

KEYWORDS: Caucasus, Stavropol Territory, axillary bulbils

INTRODUCTION

Bryum barnesii J.B. Wood ex Schimp. was described from the northwest England, near the village of Levens in the county of Westmorland, by collection of Barnes (Schimper, 1876). In the protologue the presence of numerous bulbils in the axils of the upper leaves was noted: “superiora et summa propagule gemmiformia viridia foliorum rudimenta exhibentia in axillis gerentia”. However, the doubt about its independence from *Bryum lacustris* was expressed in the original description: “Me fugit an deformatio pygmaea *Bryum lacustris* sit an species propria”. Limpricht (1895) submerged *B. barnesii* as a synonym of *Bryum lacustris* and f. *bulbifera*. In the “Index Bryologicus”, the taxon is listed as *B. lacustris* f. *bulbifera* Limpricht (Paris, 1904).

Dixon examined the type collection of Barnes and noted the poor condition of the herbarium material: “The specimens appear to represent one or those undeveloped, somewhat abnormal barren forms not uncommon in this genus, and often impossible of identification.” Thus he referred *B. barnesii* to *Bryum atropurpureum* (Wahlenb.) F. Weber & D. Mohr ex Fourn. var. *gracilentum* Tayl. (Dixon, 1924).

Brotherus (1924) submerged *B. barnesii* into synonymy of *B. bicolor* Dicks., and his approach to the species status has been used in subsequent publications, including “Flora of Britain and Ireland” (Smith, 1980), where *B. barnesii* is referred to an ecological variety of *B. bicolor*.

However, Wilczek & Demaret (1976) revised the “*Bryum bicolor* complex,” accepting in it five species,

B. bicolor, *B. versicolor*, *B. gemmiferum*, *B. gemmilucens*, and *B. barnesii*, thus resurrecting the species independence of the latter. They published descriptions, illustrations, and key to identification, and shortly after that published another article discussing species of the “*Bryum bicolor* complex” that included illustrations and a table where species distinctions were summarized (Demaret & Wilczek, 1980).

Vanderpoorten & Zartman (2002) published the results of their study of the *Bryum bicolor* complex in North America, including *B. bicolor*, *B. gemmilucens*, *B. gemmiferum*, and *B. barnesii*. The authors noted that the most important characteristics for distinguishing species within the complex were the shape, size, and number of bulbils in the leaf axils. They report that the bulbils of *B. barnesii* are 200–450 µm long, greenish, with wide, obtuse leaf primordia.

Dolnik (2006) published a study of *B. barnesii* variation in shape and number of bulbils per axil under controlled conditions. He concluded that the number of bulbils remains stable, but their shape varies depending on the season of the year. It was also found that the bulbils were capable of floating on the surface of water for several days and were therefore suitable for long-distance dispersal along streams and shorelines with fluctuating water levels.

In the course of our study of Caucasian *Bryum* we found four specimens with bulbils. Their comparison with literature and herbarium material revealed their identity with *Bryum barnesii*, which has never been reported from Russia previously. The species circumscrip-

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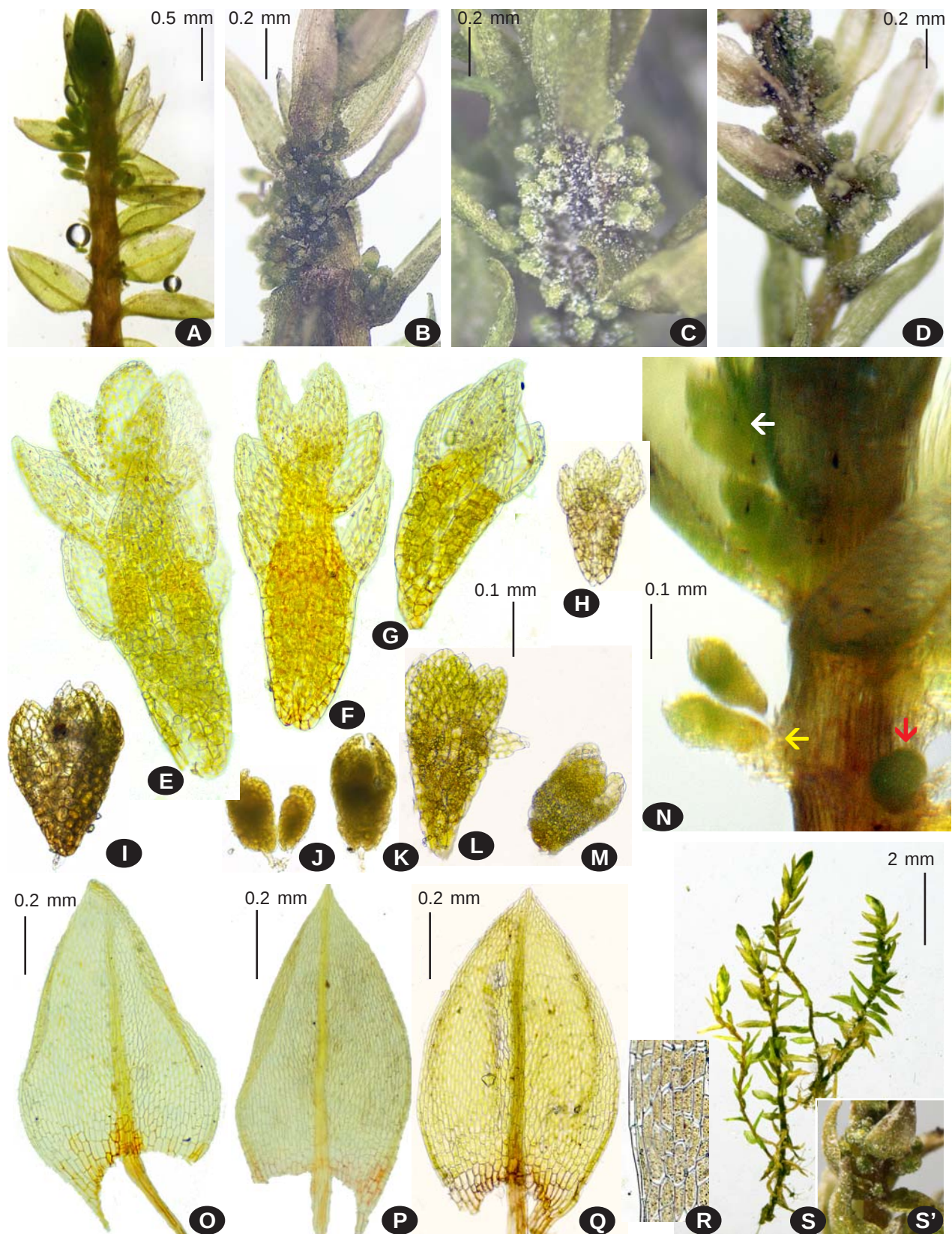


Fig. 1. *Bryum barnesii* from the Caucasus: A: wet shoot; B–D: dry shoots; E–M: bulbils (all at the same magnification!); N: shoot, showing bulbils at different stages of developments (see text for explanation); O–Q: leaves; R: leaf cell difference near the margin; S: wet plants, S': close up of one of these shoots when dry.

tion based based on specimens from the Caucasus is provided below.

TAXONOMY

Bryum barnesii J.B. Wood ex Schimp. Syn. Musc. Eur. (ed. 2) 2(1): 471 1876. Fig. 1

Plants in loose tufts, light green, yellowish-greenish to light yellowish. *Stem* erect, unbranched, 0.5–1.5 cm, greenish to brownish, rhizoids few, brown. *Leaves* concave, ovate to oblong-ovate, 0.7–1.3×0.5–0.65 mm; base ± slightly reddish, non decurrent to slightly decurrent; margins entire, plane to slightly recurved proximally; apex broadly acute to acuminate; costa not reaching the apex, percurrent to very rarely short-excurrent; median and distal laminal cells rhomboidal to elongate, 32–56×10–20 µm, 2–4:1, cells along margins in 1–3 rows, narrow rectangular, 5–9 µm wide, 5–10:1, basal laminal cells enlarged, rectangular to subquadrate, 16–30 µm wide. *Specialized asexual reproduction* by bulbils born in leaf axils, (1–)5–15 per axil, greenish, yellowish greenish to yellowish, varying in shape and size, ovate, 200–350×120–180 µm to conic or subcylindrical, 400–650×190–300 µm; leaf primordia distinct, concave, blunt, ecostate, arising from distal 1/2–1/3 of bulbil. *Gametangia* and *sporophytes* unknown in Russia.

Specimens examined: Russia, Caucasus, Stavropol Territory, Kirovsky Distr., stanitsa Mar'inskaya: (1) Proletarskaya str., 9 (43.873191°N – 43.485839°E, ca 440 m alt), on the concrete wall of a ditch near the water, 31.III.2025 *Doroshina* (LE B-0044318); (2) Suvorova str., 17 (43.876512°N – 43.485572°E, ca 440 m alt), on the concrete wall of a ditch near the water, 25.X.2025 *Doroshina* (LE B-0044428); (3) Proletarskaya str., 9 (43.873191°N – 43.485839°E, ca 440 m alt), on the concrete wall of a ditch near the water, 31.XII.2025 *Doroshina* (LE B-0044429); (4) Suvorova str., 17 (43.876512°N – 43.485572°E, ca 440 m alt), on the concrete wall of a ditch near the water, 4.IV.2026 *Doroshina* (LE B-0044430).

DISCUSSION

Bryum barnesii is characterized by numerous (5–15) bulbils in the axils of the upper leaves. Their length was estimated in the North American plants as 200–450 µm (Vanderpoorten & Zartman, 2002), while in Belgian material they were up to 600 µm long (Wilczek and Demaret, 1976). The latter authors concluded that bulbils length varies depending on the developmental stage. The latter observation is fully consistent with our observation of the variation of Caucasian plants. Fig. 1E–M shows their shape and size variation, with all bulbils shown at the same magnification. Also the variation of bulbils is apparent from Fig. 1N, showing that the youngest bulbils are small, ca. 150 µm, almost round, with slightly differentiated, broadly triangular to somewhat obtuse leaves overlapping its top (Fig. 1N, red arrow cf. Fig. 1J, K, M). Later on, the 'trunk' of bulbil elongates and leaves deviate from the bulbil apex (Fig. 1N, yellow arrow, cf. Fig. 1H, I, L), and still later the bulbils elongate further (Fig. 1N, white arrow, cf. Fig. 1E, F, G).

Obviously, the length of bulbils reported in literature, 200–450(–600) µm, is principally correct as this range includes the vast majority mainly of fallen off propagules (Wilczek & Demaret, 1976; Vanderpoorten & Zartman, 2002). However, being a modified branch, the juvenile bulbils might be even smaller in the lower leaf axils, 150–200 µm, while in the upper leaves they elongate up to 750 µm (especially after disconnecting from the stem).

Leaves of *Bryum barnesii* are often decurrent (Fig. 1O–P). The cells along the leaf margins are often narrowly rectangular in 1–3 rows (Fig. 1R). Basal leaf cells are often slightly reddish (Fig. 1O–P). These leaf features have not been noted in the literature.

In Russia, only one species with axillary bulbils, *Bryum bicolor*, has been reported previously (Zolotov, 2018). Bulbils of *Bryum bicolor* are solitary in the leaf axils, their primordial leaflets arise from the base of a bulbil, whereas they are seen only in the upper or middle part on the bulbils of *B. barnesii*. No other species of *Bryum* with numerous bulbils in leaf axils have been identified in Russia so far.

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