

**COLOLEJEUNEA MICROSCOPICA VAR. MICROSCOPICA
(MARCHANTIOPHYTA: LEJEUNEACEAE) – A NEW RECORD FOR INDIA**

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The genus *Cololejeunea* (Spruce) Schiffn. is one of the largest genera of the Lejeuneaceae, represented by 436 taxa in the world dissevered in to 13 subgenera (Söderström *et al.*, 2016). The members of this genus are predominantly found in the wet tropics, subtropics and in some oceanic warm temperate areas where they grow mostly in foliicolous condition, but they also grow as epiphyte and on other substratum too (Pócs and Piippo, 2011). In India, the genus is represented by 56 species and 1 variety (Singh *et al.*, 2016; Manju *et al.*, 2017). An overview of subgenus *Aphanolejeunea* of *Cololejeunea* was presented by Pócs and Bernecker (2009) wherein 43 binomials accepted under it. Seven taxa of subgenus *Aphanolejeunea* namely, *Cololejeunea diaphana* A. Evans [formerly *C. truncatifolia* (Horik.) Mizut.], *C. grossepapillosa* (Horik.) Pócs, *C. hyalina* G. Asthana & S.C. Srivast., *C. karnatakensis* G. Asthana & S.C. Srivast., *C. microscopica* var. *exigua* (A. Evans) Bernecker & Pócs and *C. nilgiriensis* G. Asthana & S.C. Srivast. are described from India (Asthana and Srivastava, 2003; Dey and Singh 2012; Asthana and Srivastava, 2015; Singh *et al.*, 2016).

Earlier, Singh and Kumar (2016) have recorded 10 species and an unnamed *Cololejeunea* from Tripura based on collections made during intensive field exploration tour to the State in October 2015 but mainly from Jampui Hills in North district and Longtarai Valley in Dhalai district. The detailed study of the unnamed specimen mentioned under specimen examined, confirms their identity as *Cololejeunea microscopica* var. *microscopica*. The same has been reported and described in present communication. However, it is interesting to note that our studied plants show some variation in lobule size and gemmae which might be due to different ecological and geographical conditions.

***Cololejeunea microscopica* (Taylor) Schiffn., Hepat. (Engl.-Prantl): 122. 1895. *Jungermannia microscopica* Taylor in Mackay, Fl. Hibern. 2: 59. 1836. *Aphanolejeunea microscopica* (Taylor) A.Evans, Bull. Torrey Bot. Club 38: 273. 1911. var. *microscopica* (Fig. 1).**

Plants light-green when fresh, pale yellow in herbarium; shoots 2–5 mm long, 0.29–0.42 mm wide; branching irregular; stem cross-section oval–suborbicular in outline, 36.5–46.0 × 34.0–39.0 µm, 3 cells across the diameter; cortical cells in a layer of 5 cells, subquadrate–polygonal, 12.5–18.0 × 9.5–14.5 µm, thin-walled, medullary cell one, polygonal, 8–11 × 6–8 µm, thin-walled; ventral merophyte single cell wide. Leaves distant, obliquely spreading; leaf lobes ovate–oblong-ovate, 0.11–0.16 × 0.10–0.13 mm wide, antical margin slightly convex, postical margin convex, apex plane or rounded–obtuse, margin slightly crenate–entire; marginal leaf cells towards apex subquadrate–polygonal, 12.5–18.0 × 10.0–13.5 µm, median leaf cells pentagonal–hexagonal or rectangular, 14.0–24.0 × 9.5–15.0 µm, basal leaf cells slightly elongated pentagonal–hexagonal or polygonal, 15.0–27.5 × 10–18 µm; cells thin-walled, without trigones and intermediate

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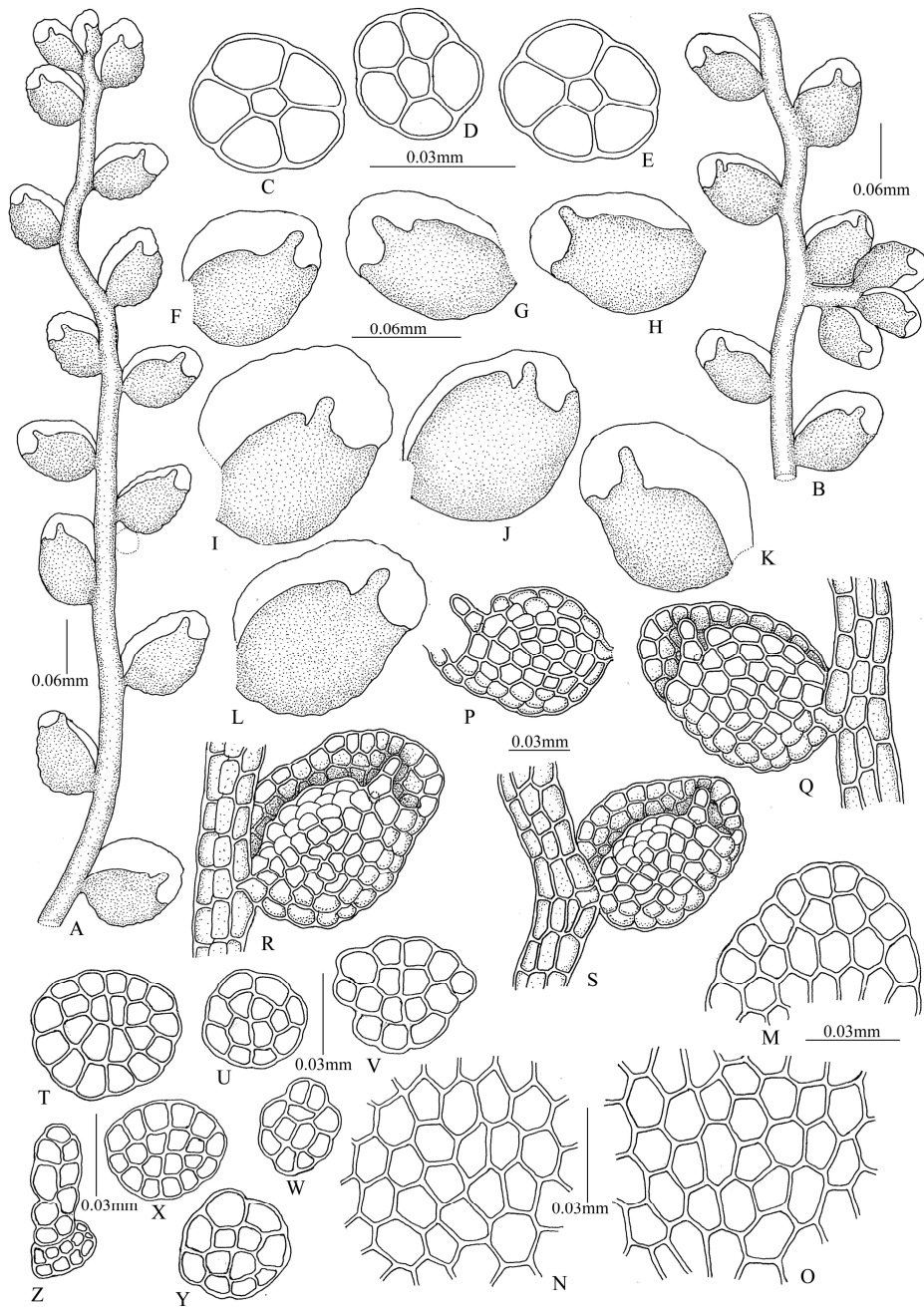


Fig. 1: *Cololejeunea microscopica* (Taylor) Schiffn. var. *microscopica*: A, B. A portion of plant in ventral view; C–E. Cross sections of stem; F–L. Leaves; M. Marginal leaf cells; N. Median leaf cells; O. Basal leaf cells; P–S. Leaf lobules; T–Y. Gemmae; Z. A gemma showing germination former in having leaf lobes with acute–obtuse apices, papilliose leaf lobe cells, unicellular stylus and 16-celled gemmae with 3 adhesive cells (Zhu and So, 2001; Dey and Singh, 2012).

thickenings; cuticle smooth; oil-bodies not seen; ocelli and vitta absent; leaf lobules large, inflated, (1/2-) 3/4-4/5 as long as the lobe, oblong-ovate, 0.09–0.14 mm long, 0.07–0.10 mm wide, free lateral margin slightly incurved, bordered by 4–6 subquadrate–rectangular cells, apex bidentate, first tooth 1–2 cells long, 1 cells wide at base, second tooth small, unicellular or obsolete, hyaline papilla spherical, on the inner surface of the base of first tooth, keel arched, slightly crenulated–smooth; stylus absent. Gemmae discoid, on the margin of leaf lobe, 11–21-celled, 33.5–65.5 × 50–78 μm, margin entire–crenulated, adhesive cells absent. Androecial and gynoecial branches not observed.

Habitat: Epiphytic, growing on bark of trees in moist and shady places.

Distribution: India (Tripura), Africa and Europe (Pócs, 1984).

Specimen examined: India, Tripura, Dhalai district, Longtarai Valley, 5 km after Chawmanu towards Manu, 23°51'45.5"N, 91°59'53.3"E, 49 m, 30.10.2015, *Shashi Kumar* TSLI – 1424 (ASSAM).

Notes and differentiation: Among the Indian species of the subgenus *Aphanolejeunea*, it resembles *Cololejeunea grossepapillosa* in having very delicate plants, obliquely spreading leaves, thin-walled leaf cells with minute trigones, devoid of intermediate thickenings and leaf lobules with 2 cells long first tooth and unicellular second tooth. But, the latter differs from the former in having leaf lobes with acute-obtuse apices, papillose leaf lobe cells, unicellular stylus and 16-celled gemmae with 3 adhesive cells (Zhu and So, 2001; Dey and Singh, 2012). *Cololejeunea microscopica* var. *exigua* and *Cololejeunea sintenisii* are the other two taxa which show the affinities with species in discussion, but they are quite distinct. *Cololejeunea microscopica* var. *exigua* differ from the species in having dimorphic leaves i.e. fully developed leaves with inflated lobules and reduced leaves which are almost elobulate; presence of dorsal papilosity on the leaf cells (Asthana and Srivastava, 2015). *Cololejeunea sintenisii* differs in having smaller leaf lobules usually less than half of leaf lobe length and usually 1–2-celled falcated 1st lobule tooth (Pócs *et al.*, 2014).

Key to the related species (modified after Pócs *et al.*, 2014):

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| 1. Leaf cells smooth-mammillose; lobe margin of fully developed leaves entire | 2 |
| - Leaf cells more or less papillose or the cells conically protuberant; lobe margin denticulate or crenate | 3 |
| 2. Lobule always more than half of leaf lobe length (3/4 to 4/5); 1st lobule tooth usually consists of two cells, slightly falcate | <i>C. microscopica</i>
var. <i>microscopica</i> |
| - Lobule usually less than half of leaf lobe length (1/4 to 1/2); 1st lobule tooth 1–2-celled, most cases falcate | <i>C. sintenisii</i> |
| 3. First lobule tooth straight; dorsal side of lobe and perianth densely covered by conical papillae. Many leaves reduced, linear, only 2 cells broad | <i>C. grossepapillosa</i> |
| - First lobule tooth falcate; dorsal side of lobe and perianth not densely covered by conical papillae. A good number of leaves fully developed, ovate or ligulate, 3–4 cells broad | <i>C. microscopica</i>
var. <i>exigua</i> |

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