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Drepanolejeunea longii (Lejeuneaceae, Hepaticae), a new species from Bhutan

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A new species, *Drepanolejeunea longii* Grolle & R.L. Zhu, is described and illustrated from Bhutan. It is similar to *D. pulla* (Mitt.) Grolle, but differs in its falcate leaves with serrate margins, absence of gynoecial innovations, and 2(–3) uniseriate cells of the underleaf lobe apex.

Key words: Bhutan, *Drepanolejeunea longii*, *Drepanolejeunea pulla*, Lejeuneaceae, new species, taxonomy

Drepanolejeunea pulla (Mitt.) Grolle was first described by Mitten (1861) as *Lejeunea pulla* Mitt., based on Sikkim material. Udar and Awasthi (1982) and Long and Grolle (1990) reported its occurrence in India and Bhutan respectively. *Drepanolejeunea pulla* is somewhat similar to *Rhaphidolejeunea foliicola* (Horik.) P. C. Chen (recognized by Mizutani 1996 as *Drepanolejeunea foliicola* Horik.). In the course of our studies on *Rhaphidolejeunea*, we re-examined some specimens of *D. pulla* and its related species, and found out that material reported by Long and Grolle (1990) as *D. pulla* from Bhutan represented a new species. This species is here described and illustrated.

Drepanolejeunea longii Grolle & R. L. Zhu, *sp. nov.* (Fig. 1)

Drepanolejeuneae pullae (Mitt.) Grolle affinis, sed differt: 1) *foliis falcatis, marginibus serratis,* 2) *lobis amphigastriorum apice* 2(–3) *cellulis uniseriatis et* 3) *gynoeciis sessilibus, innovatione nulla.*

Type: Bhutan. SE of Sengor, near large waterfall above Namning, shady ravine in wet mixed broad-leaved forest, ca. 2 730 m, on damp mossy log, 6.VII.1979 *D. G. Long 8670* (holotype JE, isotype E). Paratype: Bhutan. SE of Sengor, near large waterfall above Namning, shady ravine in wet mixed broad-leaved forest, ca. 2 730 m, on twigs, 6.VII.1979 *D. G. Long 8658* (E, JE).

Dioecious. Plants pale yellow in dry condition. Stems 5–12 mm long, 56–64 µm in diam-

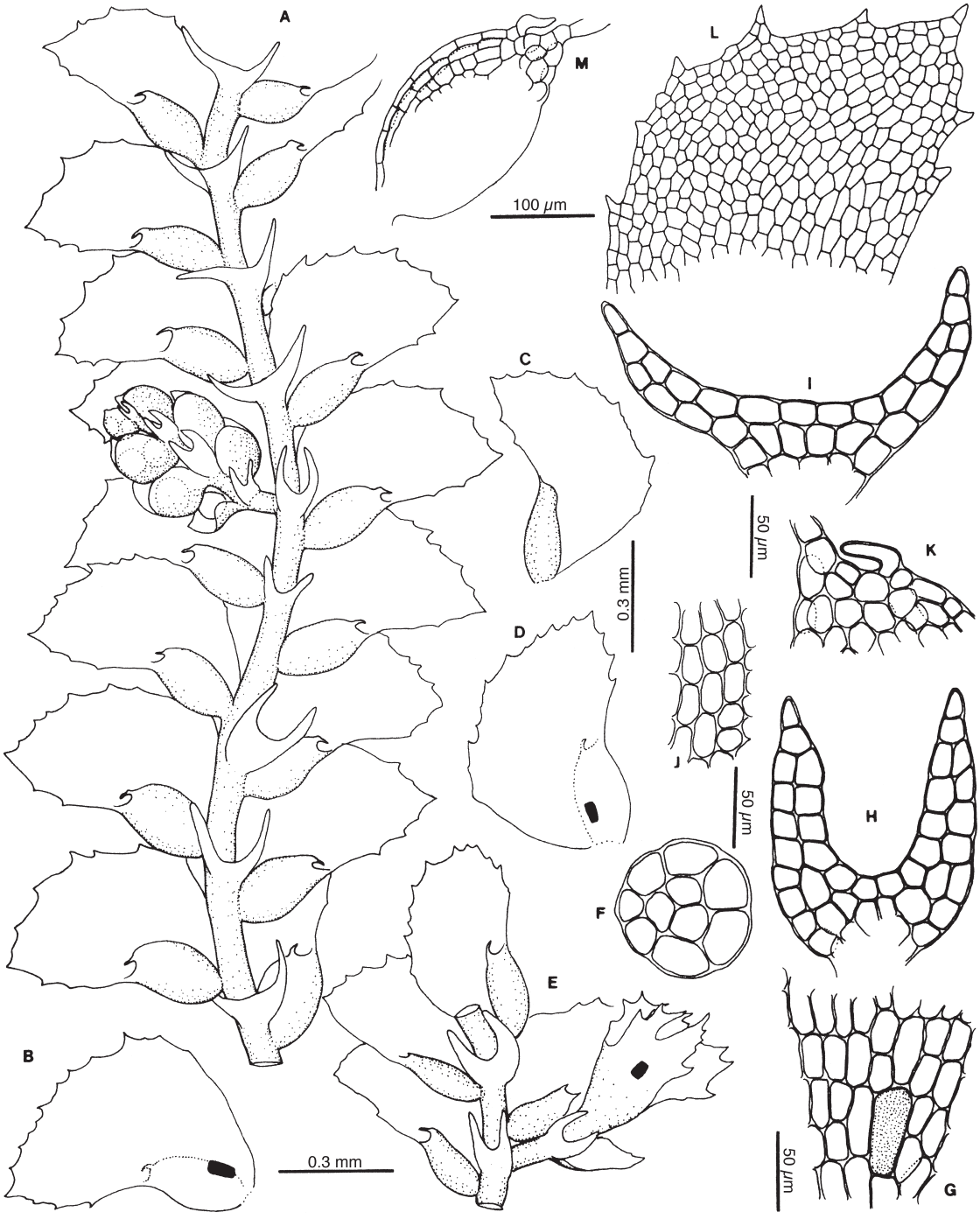

Fig. 1. *Drepanolejeunea longii* Grolle & R. L. Zhu (from holotype). — A: Portion of male plant, ventral view. — B–D: Leaves; C in ventral view. — E: Portion of female plant showing gynoecium, ventral view. — F: Transverse section of stem. — G: Basal cells of leaf lobe showing ocellus. — H, I: Underleaves. — J: Median cells of leaf lobe. — K: Apex of leaf lobule. — L: Apex of leaf lobe. — M: Leaf lobule showing free marginal cells.

eter, 0.8–1.3 (–1.4) mm wide with leaves, irregularly branched, branching of *Lejeunea*-type, transverse section of 7 cortical cells and 3 medullary cells, cortical cells ± rectangular, 22–34 × 16–24 µm, medullary cells ± isodiametric, 18–26 × 14–20 µm. Rhizoids at base of underleaves, numerous, fasciculate, usually hyaline, rhizoid disc absent. Leaves loosely imbricate, diverging from stem at an angle of 60–80°. Leaf lobes ovate, usually falcate, 0.50–0.64 mm long, 0.28–0.44 mm wide, apex acute, margin serrate. Leaf lobules ovate, inflated, ca. 1/2.5 as long as leaf lobe, free margin usually strongly incurved, consisting of 7–10 cells, apex usually constricted, with a unicellular, strongly elongate and curved tooth, keel arched, hyaline papilla situated at the proximal side of apical tooth. Leaf cells thin-walled to slightly thickened, trigones small, intermediate thickenings indistinct, marginal cells of leaf lobes quadrate to rectangular, 11–22 × 6–13 µm, median cells isodiametric to rectangular, 16–34 × 11–23 µm, basal cells rectangular, 20–44 × 12–16 µm, cuticle smooth. Vitta absent. Ocellus 1**,** suprabasal, separated from stem by a single unspecialized cell, 50-60 × 20-30 µm. Oil bodies unknown. Underleaves remote, very deeply bilobed, lobes spreading from stem at an angle of 0–60°, 6–9 cells long, 2–3(–4) cells wide at base, with 2(–3) uniseriate cells at apex, margin entire. Androecia on main shoot or short lateral branches, apical vegetative continuation absent, bracts (2–)3–6 pairs, 0.11–0.22 mm long, 0.10–0.18 mm wide, rounded or apiculate at apex, bract lobule nearly as long as bract-lobe, antheridia 2 per bract, bracteoles 2–8, present throughout androecium. Gynoecia usually on very short lateral branches, innovations absent; bracts ovate, smaller than leaves, margin serrate, acute at apex; bract lobules oblong to ligulate, as long as bract lobes, apex acute, margin serrate; bracteoles oblong, connate with bracts at base on both sides, bilobed to ca. 1/3 its length, margin serrate. Perianth and asexual reproduction not seen.

Drepanolejeunea longii is named in honour of D. G. Long (Edinburgh) who collected the type specimen. The present new species is well characterized and easily recognized by 1) the leaves falcate with serrate margins, 2) apical tooth of leaf lobules single and strongly curved, 3) gynoecia terminal without innovation, 4) male bracteoles present throughout the androecium, 5) laminar ocelli scattered in the leaf lobe absent, 6) underleaves deeply bilobed with 2(–3) uniseriate cells at the tips of lobes, and 7) 7–11 marginal cells on the lateral free margin of leaf lobule.

Drepanolejeunea longii is most closely related to *D. pulla*, however, it differs by its falcate, serrate leaves, absence of innovation, pale white cell walls, and very narrow underleaf lobes with 2(–3) uniseriate cells at their tips. *Drepanolejeunea longii* is somewhat similar to atypical *Rhaphidolejeunea foliicola* in underleaf shape and leaf lobule structure. The latter, however, is immediately separated from the former by the male bracteoles restricted to the basal portion of the androecium, the non-falcate leaves, and by having only 4 elongate free marginal cells of leaf lobules. In habit and leaf shape *D. longii* may be confused with *Drepanolejeunea thwaitesiana* (Mitt.) Steph. and its related species, but these differ in their non-curved apical tooth of leaf lobules, horizontally spreading underleaf lobes, and male bracteoles always restricted to the basal portion of the androecium. *Drepanolejeunea pulla* in the sense of Udar and Awasthi (1982) differs from the true *D. pulla* (cf. Grolle 1979); the illustrations of Udar and Awasthi (1982) clearly show 2–3 uniseriate cells at apex of underleaf lobes, and non-falcate leaves entire or slightly serrulate. The report of *D. pulla* from Bhutan (Long & Grolle 1990) is erroneous, because the voucher specimens actually are assignable to *D. longii*.

Based on Grolle's (1976, 1979) classification, *Drepanolejeunea* comprises 4 subgenera, *Drepanolejeunea*, *Kolpolejeunea* Grolle, *Ophthalmolejeunea* (R.M. Schust.) Grolle, and *Pristolejeunea* Grolle. *Drepanolejeunea longii* clearly belongs to the subgenus *Pristolejeunea* because of its falcate leaves, single unicellular tooth and 7–11 marginal cells on the lateral free margin of the leaf lobules.

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REFERENCES

Grolle, R. 1976: *Drepanolejeunea* subgen. *Kolpolejeunea* — Eine neue Untergattung aus der Paläotropis. — *J. Hattori Bot. Lab.* 40: 191–216.

Grolle, R. 1979: Miscellanea Hepaticologica 191–200. — *J. Hattori Bot. Lab.* 46: 337–355.

Long, D. G. & Grolle, R. 1990: Hepaticae of Bhutan II. — *J. Hattori Bot. Lab.* 68: 381–440.

Mitten, W. 1861: Hepaticae Indiae Orientalis. — *J. Proc. Linn. Soc., Bot.* 5: 89–128.

Mizutani, M. 1996: Re-examination of so-called *Drepanolejeunea japonica* and *D. foliicola*. — *Proc. Bryol. Soc. Japan* 6: 176–179.

Udar, R. & Awasthi, U. S. 1982: The genus *Drepanolejeunea* St. in India. — *J. Hattori Bot. Lab.* 53: 419–437.