

A note on *Cheilolejeunea trifaria* (Reinw. et al.) Mizut. from Indian Himalayan region

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Cheilolejeunea trifaria (Reinw. et al.) Mizut. is recorded for the first time from the Indian Himalayan region.

Cheilolejeunea trifaria (Reinw. et al.) Mizut. is widely distributed in East and South-east Asia, Central and South America, Africa and Australia (Mizutani 1972, 1982, Tan and Engel 1986, Piippo 1990, Wigginton and Grolle 1996, Zhu and So 2001, McCarthy 2006, Yamada and Iwatsuki 2006). In India the species was known only from Andaman in Andaman and Nicobar Islands (Joshi 2001) till recently when Daniels and Mabel (2010) recorded it from the Western Ghats of Tamil Nadu in Indian mainland. While, Joshi (l.c.) did not provide any taxonomic description or illustrations for the plants from the Andaman, the one provided by Daniels and Mabel (l.c.) for the Western Ghats plants not only failed to provide the details of vital taxonomic features, but also full of inconsistencies between the description and the drawing, hence of little use rather misleading for the taxonomists working on this group.

During the course of ongoing studies on Hepaticae and Anthocerotae of Sikkim the author collected some interesting corticolous population of the genus *Cheilolejeunea* (Spruce) Schiffn. with plants having orbicular, imbricate leaves with 4–5 times as wide as the stem underleaves, sub-orbicular, bilobed to 1/4–1/3 of its length, male bracteoles present only at the basal portion of the androecial branches and obovate, 5-keeled perianth from the North district of Sikkim. In the morphological characteristics, the plants fully compare with typical *C. trifaria* – a species hitherto unknown in Indian Himalayan region as borne out by the review of relevant literature (Mizutani 1963, 1972, 1980, 1982, Asthana et al. 1995, Thiers 1997, Zhu and So 2001, Zhu et al. 2002). The same has been described and illustrated in detail to facilitate its easy identification

in Indian bryoflora and remove the confusion caused by the publication of Daniels and Mabel (l.c.).

Cheilolejeunea trifaria (Reinw. et al.) Mizut. in J. Hattori Bot. Lab. 27: 132. 1964; D. Y. Joshi in V. Nath & A. K. Asthana, Perspectives in Indian Bryology, 142. 2001; A. E. D. Daniels & J. L. Mabel in Lindbergia 33: 77. 2010. *Jungermannia trifaria* Reinw. Et al. in Nova Acta Phys. Med. Acad. Caes. Leop. Carol. Nat. Cur. 12: 226. 1825. “1924”. (Fig. 1, 2)

Plants yellowish green when fresh, light yellowish brown in herbarium; shoot 8.0–13.0 mm long, 0.8–1.2 mm wide, branching irregular. Stem orbicular in outline in transverse section, 86.0–109.0 × 90.0–112.5 µm, 5–6 cells across the diameter; cortical cells in 7 vertical rows, quadrate – subquadrate, 20.0–35.0 × 12.5–22.5 µm, thick-walled; medullary cells in 10–13 vertical rows, subquadrate – polygonal, 12.5–25.0 × 10.0–17.5 µm, thick-walled; ventral merophytes of stem 2 cells wide. Leaves closely imbricate, widely spreading; leaf lobe orbicular, 0.52–0.62 × 0.55–0.60 mm, apex rounded, margin entire, dorsal margin arched, ventral margin almost straight – very slightly arched; apical leaf cells subquadrate – polygonal, 12.5–27.5 × 10.0–22.5 µm; median leaf cells polygonal, 20.0–30.0 × 17.5–25.0 µm; basal leaf cells elongated, polygonal, 25.0–37.5 × 20.0–27.5 µm; cells thin-walled with large, bulging trigones, intermediate thickenings absent; cuticle very slightly mammillose; oil-bodies grayish, 2–3 per leaf cell, ovoid – subspherical, 8.0–12.0 × 6.0–10.0 µm or ellipsoidal, 7.0–18.0 × 6.0–10.0 µm, very coarsely segmented; leaf lobule inflated, 1/5–1/4 as long as the leaf lobe, triangular-vate, 0.14–0.18 mm long, 0.11–0.15 mm

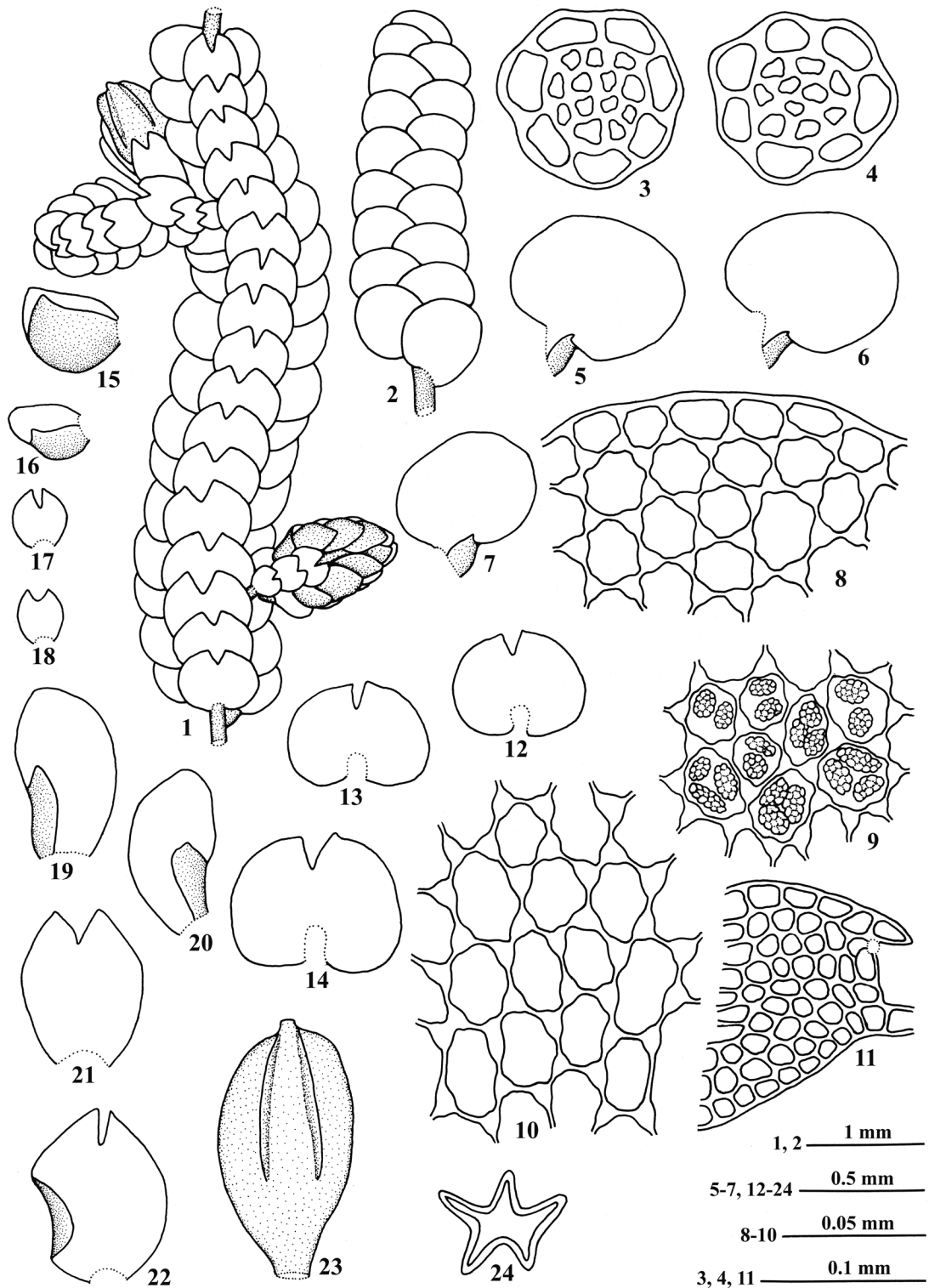


Figure 1. *Cheilolejeunea trifaria* (Reinw. et al.) Mizut. (1) a portion of plant bearing androecial and gynoecial branch in ventral view (rhizoids not drawn). (2) a portion of vegetative plant in dorsal view. (3, 4) transverse section of stem. (5-7) leaves. (8) apical leaf cells. (9) median leaf cells showing oil-bodies. (10) basal leaf cells. (11) leaf lobule. (12-14) underleaves. (15, 16) male bracts. (17, 18) male bracteoles. (19, 20) female bracts. (21, 22) female bracteoles. (23) a perianth. (24) transverse section of perianth.

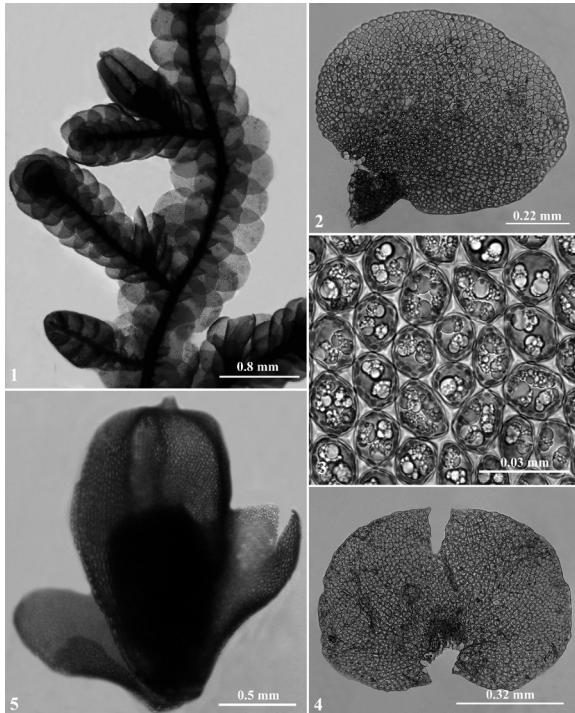


Figure 2. *Cheilolejeunea trifaria* (Reinw. et al.) Mizut. (1) a portion of plant bearing androecial and gynoecial branch in ventral view. (2) a leaf. (3) median leaf cells showing oil-bodies. (4) an underleaf. (5) a perianth showing female bracts and bracteole.

wide, free lateral margin bordered by 4 rectangular cells, bidentate, first tooth obsolete, second tooth 1–2 cells long, spreading towards leaf apex, hyaline papilla present at the distal side of second tooth; keel arched, smooth. Underleaves imbricate, strongly sinuately inserted, 4–5 times as wide as the stem, suborbicular, 0.40–0.54 mm long, 0.55–0.68 mm wide, wider than long, bilobed to 1/4–1/3 of underleaf length, lobes acute – subacute, margin entire, sinus usually narrow with acute – subacute. Rhizoids few, fasciculate at the base of underleaves. Asexual reproductive organs not seen.

Monoecious. Androecia terminal on long or short branches; bracts in 3–5 pairs, densely imbricate; bract lobe oblong-ovate, 0.30–0.40 mm long, 0.20–0.30 mm wide, apex usually obtuse or sometimes subacute, margin entire; bract lobule strongly inflated, almost as long as the bract lobe or 3/4 of bract length; bracteole 1–2, present only at the base of androecium, suborbicular, 0.20–0.24 mm long, 0.18–0.22 mm wide, bilobed to 1/4–1/3 of their length. Gynoecia terminal on long or short branches with 1-subfloral innovation; bract lobe oblong, 0.55–0.70 mm long, 0.35–0.40 mm wide, apex subacute – obtuse, margin entire; bract lobule oblong – lingulate, 1/2–2/3 as long as the bract lobe, apex obtuse – subacute; bracteole oblong, 0.60–0.70 mm long, 0.40–0.50 mm wide, bilobed to

1/4 of bracteole length, margin entire; perianth obovate, 0.90–1.1 mm long, 0.50–0.60 mm wide; keels 5 (2 lateral, 2 ventral, 1 dorsal), extending from apex to 1/2–2/3 of perianth length, lateral keels sharp, ventral keels low, smooth; beak 3–4 cells long. Seta fleshy unable to cut the transverse section. Mature sporophytes not seen.

Habitat: Corticolous, growing compactly from the substratum on the bark of *Alnus nepalensis* in subtropical forest.

Distribution: India [eastern Himalaya (Sikkim – present study), Western Ghats (Tamil Nadu), Andaman & Nicobar Islands (Andaman Islands)], Sri Lanka, China, Taiwan, Japan, Philippines, Indonesia, Thailand, New Guinea, Tahiti, South and Central America, Africa, Brazil.

Specimen examined: India: eastern Himalaya, Sikkim, North district, Khangchendzonga Biosphere Reserve (near Nampringdong forest rest house), ca 1350 m, 28.11.2009, D. Singh 46782 (CAL).

Discussion

Cheilolejeunea trifaria is characterized by monoecious plants (Fig. 1:1, 2:1); orbicular leaf lobe (Fig. 1:5–7, 2:2); imbricate, suborbicular, 4–5 times as wide as the stem, underleaves, bilobed to 1/4–1/3 of underleaf length (Fig. 1:12–14, 2:4); grayish, 2–3 per leaf cell, ovoid – subspherical or ellipsoidal, strongly coarsely segmented oil-bodies (Fig. 1:9, 2:3); 1–2 male bracteoles present only at the basal portion of the androecial branch (Fig. 1:1, 2:1); obovate, 5-keeled perianth (Fig. 1:23–24). Recently Daniels and Mabel (2010) described the leaf lobe as oblong in their plants from Tamil Nadu (Western Ghats), India, but illustrated them as more or less orbicular (Daniels and Mabel 2010, Fig. 1:2–4). More interestingly they described the oil-bodies in the species as smooth, whereas the entire genus characteristically possesses coarsely segmented oil-bodies (see also Mizutani 1972, 1982, Zhu and So 2011). Similarly the underleaves were described as distant, whereas illustration (Daniels and Mabel 2010, Fig. 1:1) shows them to be closely imbricate. On the other hand the position of the hyaline papilla of the second tooth of leaf lobule though described correctly as distal, but has been illustrated as apical (Daniels and Mabel 2010, Fig. 1:5).

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