

On *Cheilolejeunea tenella* (Jungermannioopsida: Lejeuneaceae), a poorly known species from Singapore

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Cheilolejeunea tenella (Taylor) J.J. Engel & B.C. Tan (Lejeuneaceae) has a proximal hyaline papilla of the leaf lobule and other typical characters of the genus *Lejeunea*. It is reinstated here as *Lejeunea tenella* Taylor. The species has to be excluded from the floras of Indonesia, New Zealand, and the Philippines because previous reports of *Cheilolejeunea tenella* for these countries are based on misidentifications. The description and illustrations of *Lejeunea tenella* here provided are based on the type specimen from Singapore.

Key words: *Cheilolejeunea*, distribution, *Lejeunea tenella*, Lejeuneaceae, taxonomy.

Lejeunea tenella was originally described by Taylor (1846) based on Wallich's collection from Singapore. Stephani (1890) transferred this species to the genus *Euosmolejeunea*, as *E. tenella* (Taylor) Steph., and later (Stephani 1914) reported its occurrence in Java, the Philippines, and Singapore. Campbell (1971, 1977) recorded it in Fiji and New Zealand, respectively. Tan and Engel (1986) moved *Euosmolejeunea tenella* to *Cheilolejeunea*, as *C. tenella* (Taylor) J.J. Engel & B.C. Tan. Piippo *et al.* (2002) did not find additional collections of this species in their recent investigation of liverworts and hornworts from Singapore.

Owing to the lack of good drawings and a complete description, *Cheilolejeunea tenella* was poorly known and it has been confused with other taxa. Examination of the type specimen of *C. tenella* revealed that the species has a proximal hyaline papilla of the leaf lobule and other

characters typical for *Lejeunea*. Therefore, the species is described and illustrated here as *Lejeunea tenella*, based on the type material, the only known collection of this taxon. The records of the species in Java (Stephani 1914 as *Euosmolejeunea tenella*, Bonner 1965 as *E. tenella*, Miller *et al.* 1983 as *E. tenella*), New Zealand (Campbell 1977 as *E. tenella*, Miller *et al.* 1983 as *E. tenella*, Glenny 1988 as *Cheilolejeunea tenella*), and the Philippines (Stephani 1914 as *E. tenella*, Bonner 1965 as *E. tenella*, Miller *et al.* 1983 as *E. tenella*, Tan & Engel 1986 as *C. tenella*) are based on misidentifications.

***Lejeunea tenella* Taylor (Fig. 1)**

London J. Bot. 5: 398. 1846. — *Euosmolejeunea tenella* (Taylor) Steph., Hedwigia 29: 87. 1890. — *Cheilolejeunea tenella* (Taylor) J.J. Engel & B.C. Tan, J. Hattori Bot. Lab.

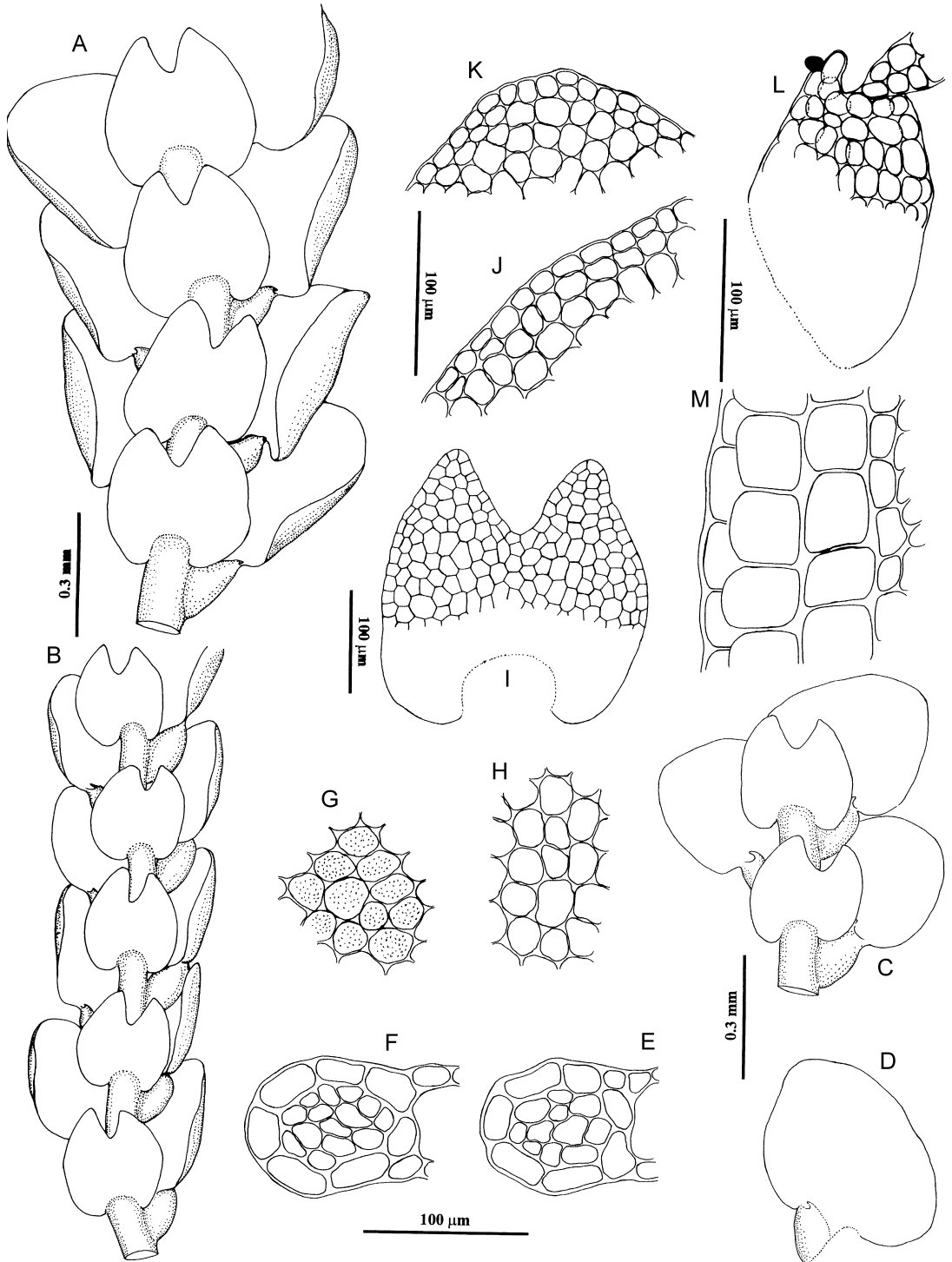


Fig. 1. *Lejeunea tenella* (from Wallich s.n., FH). — **A–C:** Portion of plant, ventral view. — **D:** Leaf, ventral view. — **E** and **F:** Transverse section of stem. — **G:** Median cells of leaf lobe showing punctate cuticle. — **H:** Basal cells of leaf lobe. — **I:** Underleaf. — **J** and **K:** Apex of leaf lobe. — **L:** Leaf lobule showing a proximal hyaline papilla. — **M:** Portion of stem showing the ventral merophyte.

60: 301. 1986. — TYPE: Singapore. On *Dicranum fragile*, 1843 *Wallich s.n.* (holotype FH!, Herb. Hooker; isotype G!).

Dioecious? Plants brown in dried condition. Stem 5–20 mm long, 80–100 μm in diameter, 0.5–0.8 mm wide with leaves, scarcely irregularly branched, branching of *Lejeunea* type, leaf sequence of lateral branches lejeuneoid, transverse section of stem with 7 cortical cells and 9–15 medullary cells, cortical cells quadrate to rectangular, 26–40 \times 13–25 μm , medullary cells \pm subsisodiametric, or rarely rectangular, 14–28 \times 10–16 μm . Ventral merophyte of stem 2 cells wide. Rhizoids at base of underleaves, numerous, tufted, usually hyaline, rhizoid disc absent. Leaves imbricate, sometimes contiguous, diverging from stem at an angle of 45°. Leaf lobes ovate, usually somewhat falcate, 0.40–0.60 mm long, 0.30–0.50 mm wide, apex rounded to rounded-obtuse, usually incurved, margin entire or slightly crenulate, dorsal margin slightly arched. Leaf lobules triangular-subquadrate, strongly inflated, 1/4–1/3 as long as leaf lobes, lateral free margin incurved, bordered by ca. 5 subquadrate to rectangular cells, apex sinuate, slightly constricted, with a unicellular apical tooth towards leaf apex, hyaline papilla oblong to spherical, ca. 11 \times 7 μm , situated at proximal side of apical tooth, keel usually arched, occasionally almost straight, smooth. Leaf cells moderately thick-walled, trigones small to moderately large, intermediate thickenings usually frequent. Marginal cells of leaf lobe quadrate to rectangular, 12–20 \times 7–14 μm , median cells \pm isodiametric, 20–30 \times 16–26 μm , basal cells isodiametric to rectangular, 22–32 \times 16–22 μm , dorsal cuticle finely punctate. Vitta and ocelli absent. Oil bodies unknown. Under-

leaves remote, occasionally weakly imbricate, usually slightly longer than wide, 2–4 times as wide as stem, bilobed to ca. 1/3 underleaf length, sinus U- or V-shaped, lobes triangular, apex obtuse, 4–8 cells long, 6–10 cells wide at base, margin entire or slightly crenulate, insertion line arched, base cordate. Androecia unknown. Perianth “obovate, 5-angled above, and crowned with a minute tube” (*vide* Taylor 1846).

Cheilolejeunea is distinguished from *Lejeunea* mainly by the distal hyaline papilla and lack of punctate cuticle of leaf cells (cf. Gradstein *et al.* 2001, Zhu & So 2001, Grolle *et al.* 2002). *Lejeunea tenella* has the typical characters of *Lejeunea*, including the proximal hyaline papilla (Fig. 1L) and punctate cuticle of leaf cells (Fig. 1G). The combinations of Stephani (1890) and Tan and Engel (1986), therefore, are erroneous.

The type material of *Lejeunea tenella* in FH and G contains only sterile plants. The only perianth known for this species was seen by Taylor (1846), who illustrated it in pencil on the label of the type in FH. Stephani’s (1914: p. 591, as *Euosmolejeunea tenella*) descriptions of androecia “numerosa, breviter spicata, sessilia, ex apice vegetative, saepe repetito spicata, bracteis paucijugis” might be based on the collections of *Cheilolejeunea trifaria* or *C. serpentina*, which were often confused with *Euosmolejeunea tenella* (*see* below).

Lejeunea tenella resembles the East-Asian *Lejeunea compacta* (Zhu 2000), the Himalayan *L. princeps* (Mizutani 1971), and the Bornean *L. contracta* (Mizutani 1970). The differences are summarized in Table 1. When sterile, it is difficult to separate one from another. The differences between *L. tenella* and the other species mentioned above are still unclear because

Table 1. Comparison of *Lejeunea tenella* with morphologically similar species.

Species	Male bracteoles	Sexuality	Lobule	Perianth keels	Trigones	Lobular apex
<i>L. compacta</i>	present throughout androecium	dioecious	1/3(2/5) as long as lobe	non expanded	large	slightly contracted
<i>L. contracta</i>	present only at base of androecium	dioecious	1/4 as long as lobe	non expanded	indistinct	strongly contracted
<i>L. princeps</i>	present throughout androecium	autoecious	1/5–1/4 as long as lobe	expanded as \pm undulate wings	large	slightly contracted
<i>L. tenella</i>	unknown	dioecious?	1/4–1/3 as long as lobe	non expanded	moderately large	slightly contracted

the sexuality and male plants of *L. tenella* are unknown.

SPECIMENS EXAMINED. — *Cheilolejeunea mimosae*: **New Zealand**. Raoul Is., low flat gully, mossy cliff face in shade, 23.XI.1966 W.R. Sykes 671/k (CHR-161835, as *Euosmolejeunea tenella* by Campbell 1977). — *Cheilolejeunea serpentina*: **Indonesia**. Java. *Kurz* 414 (G-011214, as *Euosmolejeunea tenella* by Stephani 1914). — *Cheilolejeunea trifaria*: **Philippines**. Luzon. *Semper s.n.* (G-17185, G-011215, as *Euosmolejeunea tenella* by Stephani 1914).

DISTRIBUTION: Only known from the type collection from Singapore. The record from Fiji (Campbell 1971) could not be confirmed (voucher specimens not available for the present study), but considering Campbell's (1977) concept of the species, this record refers probably to a species of *Cheilolejeunea* rather than *Lejeunea*.

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