

Type studies on *Pycnolejeunea* (Lejeuneaceae, Hepaticae), II

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Pycnolejeunea decurviloba Steph. and *P. valenciae* Gott. ex Steph. are transferred to *Cheilolejeunea* (Spruce) Schiffn. Complete descriptions and illustrations are provided.

Key words: *Cheilolejeunea*, Hepaticae, Lejeuneaceae, *Pycnolejeunea*

Originally described as *Pycnolejeunea decurviloba* Steph. and *P. valenciae* Steph., the distal hyaline papilla at the apex of the lobule and the absence of ocelli indicate that these two species must be transferred to *Cheilolejeunea* (Spruce) Schiffn. (cf. He 1995). The descriptions and illustrations are as follows:

Cheilolejeunea decurviloba (Steph.) X.-L. He, *comb. nov.* (Figs. 1, 2)

Basionym: *Pycnolejeunea decurviloba* Steph., Hedwigia 35: 125. 1896. — Type: Trinidad. “Tucuche Insula Trinidad Antill”, 4.XII.1847, *Crüger* 5 (G!, lectotype), *Crüger* 10 (G!, syntype), *Crüger* (BM!, syntype). Ecuador. *Wallis* 406 (G!, syntype), *Wallis* (BM!, syntype).

Dioicous. Plants medium-size, shoots < 5.0 cm long and < 2.0 mm wide, yellowish green or dull brown in dry condition, on bark, usually forming appressed mats. Branching *Lejeunea* type, ramification pattern irregularly pinnate. Stems 160–230 µm in diam., stem cells rectangular, on the ventral side 42–75 µm long and 20–32 µm wide, in cross section composed of 14–16 epidermal cells surrounding 34–37 med-

ullary cells, epidermal cells rectangular-subrectangular, cell walls thickened, medullary cells somewhat smaller than epidermal cells, isodiametric, ventral merophytes 3–6 cells wide. Leaves rather imbricate, widely spreading when moist, insertion line J-shaped; lobes ovate-suborbicular, 0.65–1.10 mm long, 0.55–0.75 mm wide, dorsal margin strongly arched, ventral margin gently arched or almost straight, apex obtuse and somewhat involute, margins entire; lobe cells isodiametrical or subrectangular at the base of lobe, apical marginal cells 16–25 × 12–20 µm, median cells 22–40 × 22–30 µm, basal cells 30–47 × 27–30 µm, trigones large and well-developed, triangular, occasionally becoming confluent, intermediate thickenings present, cuticle smooth; ocelli absent, oil bodies unknown. Lobules ovoid-triangular, curved downward, inflated, very small, 0.17–0.25 of lobe length, cells isodiametrical, 15–25 × 12–20 µm, keel short and nearly straight, free margin entire, curved downward to the lobule apex, the apex gently semi-circular, apical tooth one-celled, obtuse to acute, occasionally somewhat falcate, hyaline papilla relatively large, oblong, situated at inner side of the lobule, distal to the apical tooth. Underleaves large,

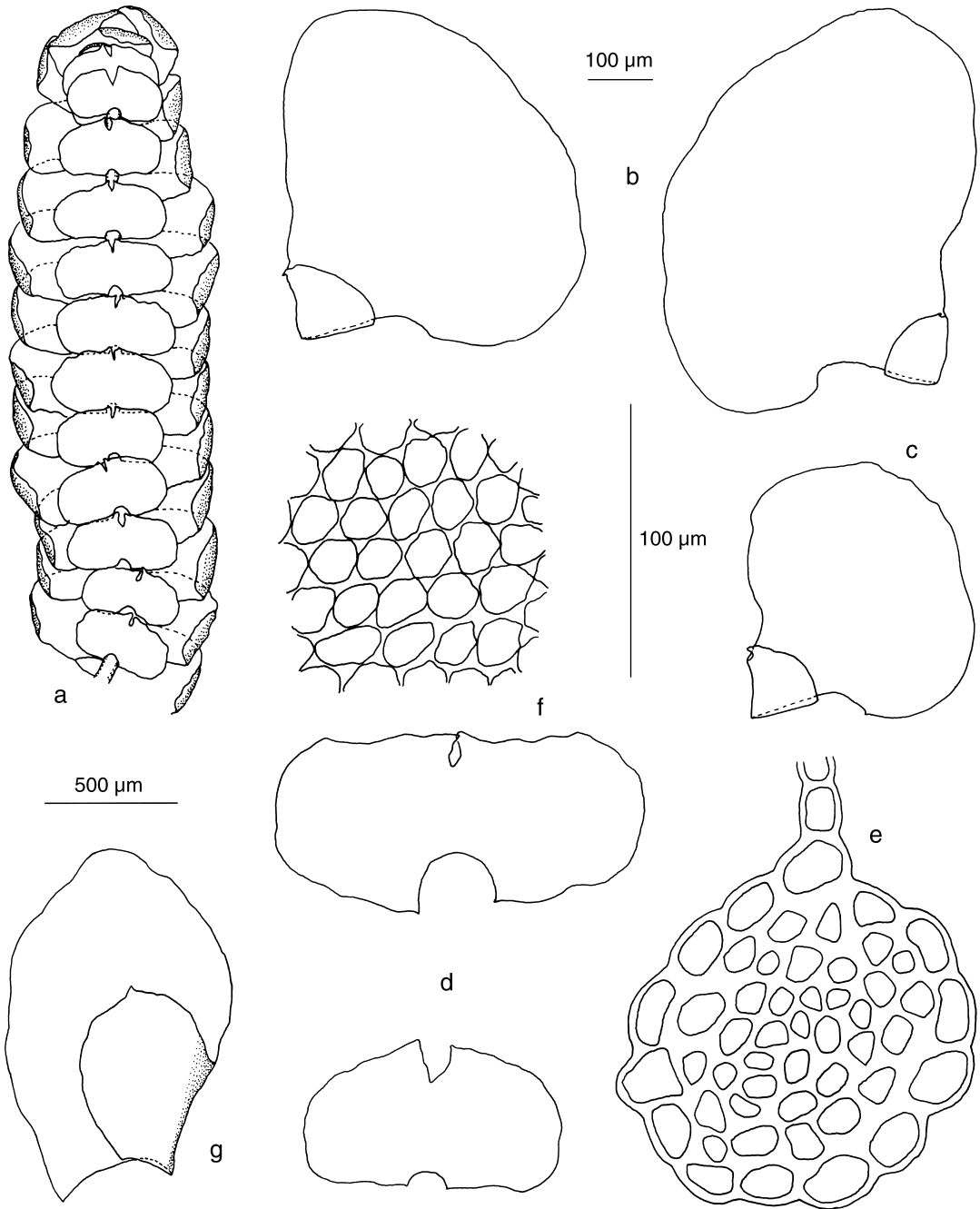


Fig. 1a–g. *Cheilolejeunea decurviloba* (Steph.) X.-L. He (a–f drawn from: Crüger 5, G; g: Bischler 197, U-540266 B). — a: Habit. — b–c: Leaves. — d: Underleaves. — e: Cross-section of the stem. — f: Cells from middle portion of leaf. — g: Female bract. — Use the 500 µm scale for a, the longer 100 µm scale for e and f, and the shorter 100 µm scale for b, c, d and g.

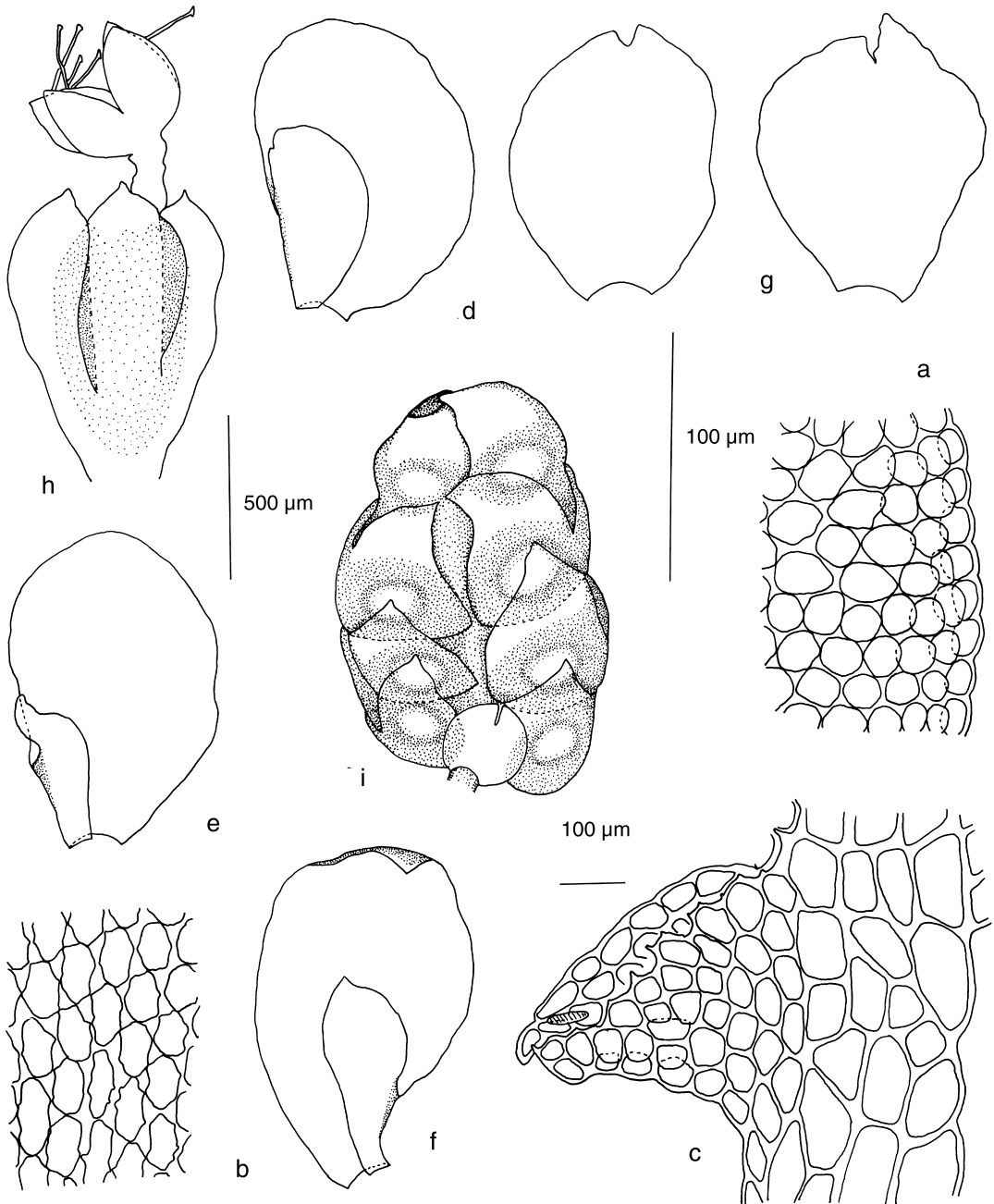


Fig. 2a–i. *Cheilolejeunea decurviloba* (Steph.) X.-L. He (a–c drawn from: Crüger 5, G; d–i: Bischler 197, U-540266 B). — a: Apical leaf margin. — b: Cells from basal portion of leaf. — c: Leaf lobule and its insertion on dorsal side of stem. — d–f: Female bract. — g: Female bracteole. — h: Perianth with sporophyte. — i: Male spike. — Use the 500 μm scale for h, the longer 100 μm for a, b, and c, and the shorter 100 μm scale for d, e, f, g, and i.

imbricate, 4–5 × stem width, wider than long, reniform, lobed 0.2–0.3 of their length, lobes triangular, acute, often curving toward each other, sinus narrow, margins entire, cuneiform, insertion line deeply arched. Rhizoid disc usually well developed, with hyaline brownish rhizoids at base of underleaves. Androecia on short branches, terminal in position, spicate, bracts in 3–8 pairs, imbricate and saccate, with hypostatic lobules, male bracteole 1, restricted to the base of spike, margins plane, entire. Gynoecia on main stem and elongate branches, innovations single, innovation leaf sequence lejeuneoid or pycnolejeuneoid, female bracts in one pair, suberect, bract lobe ovate-oblong, ca. 1.10 × 0.65 mm, slightly concave, apex obtuse-rounded, or acuminate, margins entire; bract lobule ca. 0.5 of lobe length, usually narrowly oblong, apex irregularly acute, keel ca. 0.3–0.5 of bract length, without wing; bracteole ovate-oblong, 0.85–0.92 mm long and 0.68–0.75 mm wide, the apex 2-lobed to 0.10–0.15 of bracteole length, lobe apices acute, margins entire. Perianth pyriform, with five sharp keels extending over 1/2 the length of the perianth, beak short; capsules pale brown, exerted from perianth, epidermal cells of valves pellucid, except for the yellowish thickenings, rectangular to polygonal, with coarse, yellowish nodular thickenings; inner cells of capsule irregularly rectangular, smaller than epidermal; elaters pale yellowish, spiral, with the single spiral confluent with wall, 10–17 µm in diameter, and 275–400 µm long.

The distinguishing features of *Cheilolejeunea decurviloba* are the relatively robust plants with large, involute lobes and reniform underleaves, the downward curved lobules with hyaline papilla situated at the inner side of lobule, and the 3–6 cells wide ventral merophytes. The small ovoid-triangular lobules and the single-celled apical tooth suggest that *C. decurviloba* belongs to subgenus *Euosmolejeunea* Spruce.

Cheilolejeunea decurviloba grows in lowland and submontane rainforests, as a common epiphyte on trunk bases, shrubs or in canopies, in localities usually rich in bryophytes and lichens. In the collections from Mount Roraima, Guyana, *C. decurviloba* occurs together with *C. fragrantissima* Spruce, both species having large lobes and reniform underleaves.

However, *C. fragrantissima* can be separated by its two cells wide ventral merophytes, longer apical tooth, hyaline papilla with typical *Cheilolejeunea* pattern, situated between the apical tooth and the front portion of the free margin of lobule, and bracteoles throughout the whole male spike.

Distribution: Central and northern South America.

Additional specimens examined. — **Brazil.** Km. 120, Manaus—Caracará Road, on tree bark, 1974 *Nelson 37* (NY). **Colombia.** Dept. of El Valle Buenaventura, at Pacific coast, on trunk, alt. 0–5 m, 1922 *Killip 11698* (JE), “Ohne Furdortsangabe”, 1956 *Killip 5994* (JE, NY, S). Dept. Chocó, au bord d’un caño près de Quibdo, 50 m, 1957 *Bischler 197* (U-540266 B, J), Dept. Chocó, Mun. de Nuquí, Amargal at the Pacific coast SW of Arusi, lowland rainforest with trees up to 40 m (Ceiba) and buttresses, rich in palms, on hilly surface with small creeks, alt. 30 m, 1992 *Gradstein 8858* (U-039472), 8818 (U-040415); Road Tutunendo—El Carmen shortly W of point 20, lightly logged rainforest on ridge with trees up to 25 m and epiphyte cover of 40%, mainly hepatics, alt. 400 m, 1992 *Gradstein 8903* (U-040454), 8924 (U-040360), N of point 12, rather low and wet rainforest with trees up to 20 m and epiphyte cover of 60% on slope above a small river, alt. 700 m, 1992 *Gradstein 8950* (U-040370). **Costa Rica.** Cocos Island, mixed with *Ceratolejeunea*, 1964 *Itow 7 p.p.* (U-540267 B, JE). **Guyana.** Upper Mazarunt District, north slope of Mount Roraima, ca. 25 m tall, mixed mossy forest in valley of rivulet, on trunks, 1985 *Gradstein 5147* (U-457325 B, G-417075, G-417767, JE), 5112 (U-456410 B), Mt. Aymatoi (sandstone), alt. 1 150 m, low forest (to 10 m) with many epiphytes and a dense ground-cover of mosses, 1989 *Maas, Mennega, Welle & Groen 5737* (U-405796, JE); Mt. Latipú, top, shrub savanna with tree-layer up to 6 m, dense ground-layer of mosses and lichens, alt. 900m, 1979 *Maas & Westra 4197* (U-544499 B, JE), ca. 8 km N of Kamarang, in scrub on the summit, epiphyte on trunk bases and shrubs, 1985 *Gradstein 5655* (U-461668 B, U-535073 B, G-344492, JE, L-987168, S). **Panama.** Cerro Jefe, camino detrás la Torre del INTEL entrando por Altos de Cerro Azul, ca. alt. 1 000 m, 1991 *Salazar Allen & Gradstein 9385* (573682 B, G-417124), near Panama City, on smooth bark of small trees in open, secondary vegetation on the summit, ca. alt. 1 000m, 1994 *Gradstein*. **Surinam.** Nassau Mts., in gully along small creek near km 6. T, on dead log, 1949 *Lanjouw & Lindeman 2453* (U-514698 B, JE, P). **Venezuela.** Estado Bolívar, en las laderas del Cerro Uel, 865–1050 m, 1970 *Steyermark & Dunsterville 104562* (JE), cumbre de Cerro Guaiquinima, a lo largo del Río Szczerbanari (Río Carapo), 1–2 km río arriba del Salto Szczerbanari, parte central del cerro, alt. 750 m, 1977 *Steyermark, G. C. K. & Dunsterville 113501* (U-540264 B, JE), Dept. of Piar. Summit of Amarawaitepui, alt. 950–1 000m, on trunk of living tree, 1986 *Delascio*

12709 (JE), Estado Miranda, Cerros del Bachiller, near east end, virgin evergreen forest, between base and summit, above Quebrada Corozal, south of Santa Cruz, 10 kms. west of Cúpira, alt. 20–700 m, 1978 *Steyermark & Davidse 116815* (U-540265 B).

Cheilolejeunea valenciae (Gott. ex Steph.) X.-L. He, *comb. nov.* (Figs. 3, 4)

Basionym: *Pycnolejeunea valenciae* Gott. ex Steph., Spec. Hep. 5: 605. 1914. — Type: Venezuela. Valencia, *Fendler 70* (G!, lectotype), *Fendler 72* (G!, syntype), *Fendler 12* (B-26006!, syntype).

Diocious. Plant to 2.5 cm long and 2–3 mm wide, yellowish brown in dry condition, on bark, loosely creeping or forming appressed mats. Branching *Lejeunea* type, growth habit irregularly pinnate. Stems 150–220 μm in diam., stem cells rectangular, on the ventral side 37–75 μm long and 20–40 μm wide, in cross section composed of 14–18 epidermal cells surrounding 22–34 medullary cells, epidermal cells rectangular, 20–35 (–40) μm long, 12–17 μm wide, cell walls thickened; medullary cells somewhat smaller than epidermal cells, isodiametric; ventral merophytes on stems (4–) 6–8 cells wide. Leaves imbricate, when moist widely spreading to obliquely upward directed, insertion line J-shaped; lobes ovate to suborbicular, somewhat convex along the upper part of stem, 0.85–1.70 mm long, 0.65–1.30 mm wide, dorsal margin broadly arched, ventral margin gently curved or almost straight, apex obtuse and broadly rounded; margins entire; lobe cells isodiametric to elongate, apical marginal cells 20–22 \times 12–17 μm , median cells 32–37 \times 22–27 μm , basal cells 35–52 \times 20–32 μm , trigones large, well-developed, triangular or extending along the walls and touching each other, occasionally becoming confluent, intermediate thickenings usually present, cuticle smooth; ocelli absent, oil bodies unknown. Lobules ovate-truncate, slightly inflated, rather small, 0.08–0.17 of lobe length, cells irregularly quadrate to rectangular, 12–20 μm long, 10–17 μm wide, keel short and almost straight, free margin slightly incurved from base to apex, lobule apex obtuse, apical tooth usually obtuse to somewhat acute, one-celled, rarely

two-celled, hyaline papilla small, distal to the apical tooth. Underleaves contiguous, occasionally distant, 2–3 \times stem width, almost rotund, lobed 0.3–0.5 of their length, lobes triangular, with a V-shaped sinus, margins entire, insertion line arched. Rhizoid disc relatively small, but distinct at the base of underleaves. Androecia on short or elongated branches, terminal or intercalary in position, spicate, bracts in 3–6 pairs, with hypostatic lobules, male bracteoles 1–2, restricted to the base of spike, margins plane, entire. Gynoecia terminating short branches, innovation absent, female bracts in one pair, suberect, shorter than vegetative leaves, bract lobe ovate-oblong, 1.0–1.2 mm long, 0.65–0.77 mm wide, concave, with involute apex and entire margins; bract lobule ca. 0.5 of bract length, narrowly oblong-acute, keel ca. 0.3 of bract length, without wing; bracteole oblong, ca. 0.7 mm long and 0.5 mm wide, the apex 2-lobed to ca. 0.1 of bracteole length, lobe apices acute, overlapping, margins entire. Perianth emergent, appressed, swollen, latipyriform, with 2 ventral, smooth keels, dorsal keel reduced, somewhat visible, perianth apex slightly retuse, with a short beak.

The distinctive features of *Cheilolejeunea valenciae* are the 4–8 cells wide, broad ventral merophytes, the large lobes with broadly arched dorsal margins, the very small lobules, and the appressed perianth with a reduced dorsal keel. Due to its broadly ovate leaf-lobes, short triangular lobules, single-celled apical tooth, and absence of innovation, placing *C. valenciae* in *Cheilolejeunea* subgenus *Euosmolejeunea* appears natural. Besides *Cheilolejeunea revoluta* (Herz.) Gradst. & Grolle, also from Brazil (Gradstein *et al.* 1993), *C. decurviloba* and *C. valenciae* are the first reported with broad ventral merophytes in the subgenus *Euosmolejeunea*.

Distribution: Venezuela, Nicaragua.

Additional specimens examined. — **Nicaragua.** N Granada, Küsten Cordillera, *Reap* (G), no locality (G).

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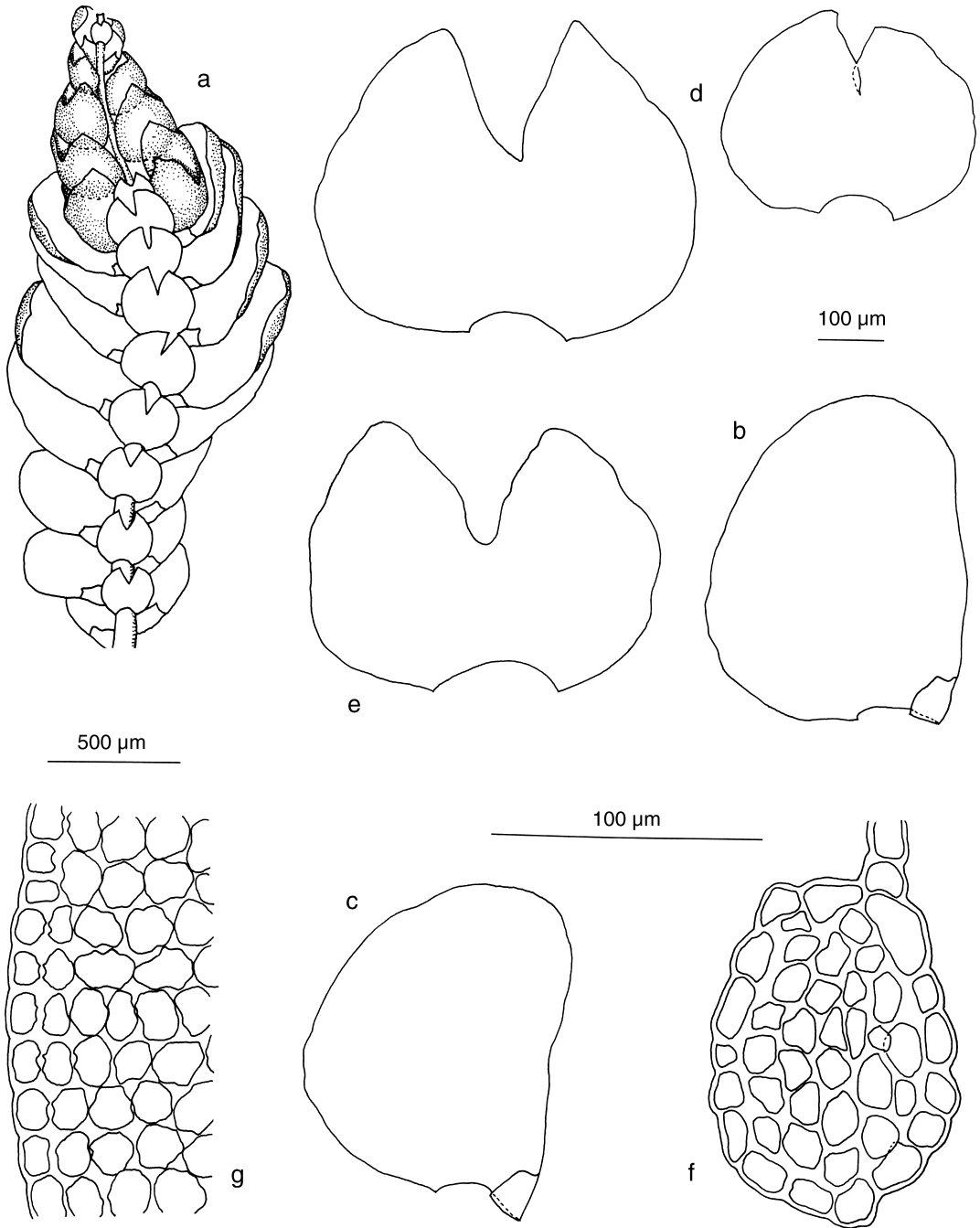


Fig. 3a–g. *Cheilolejeunea valenciae* (Steph.) X.-L. He (drawn from Fendler 12, B-26006). — a: Habit. — b–c: Leaves. — d–e: Underleaves. — f: Cross-section of the stem. — g: Apical leaf margin. — Use the 500 µm scale for a, the longer 100 µm scale for f and g, and the shorter 100 µm scale for b, c, and d.

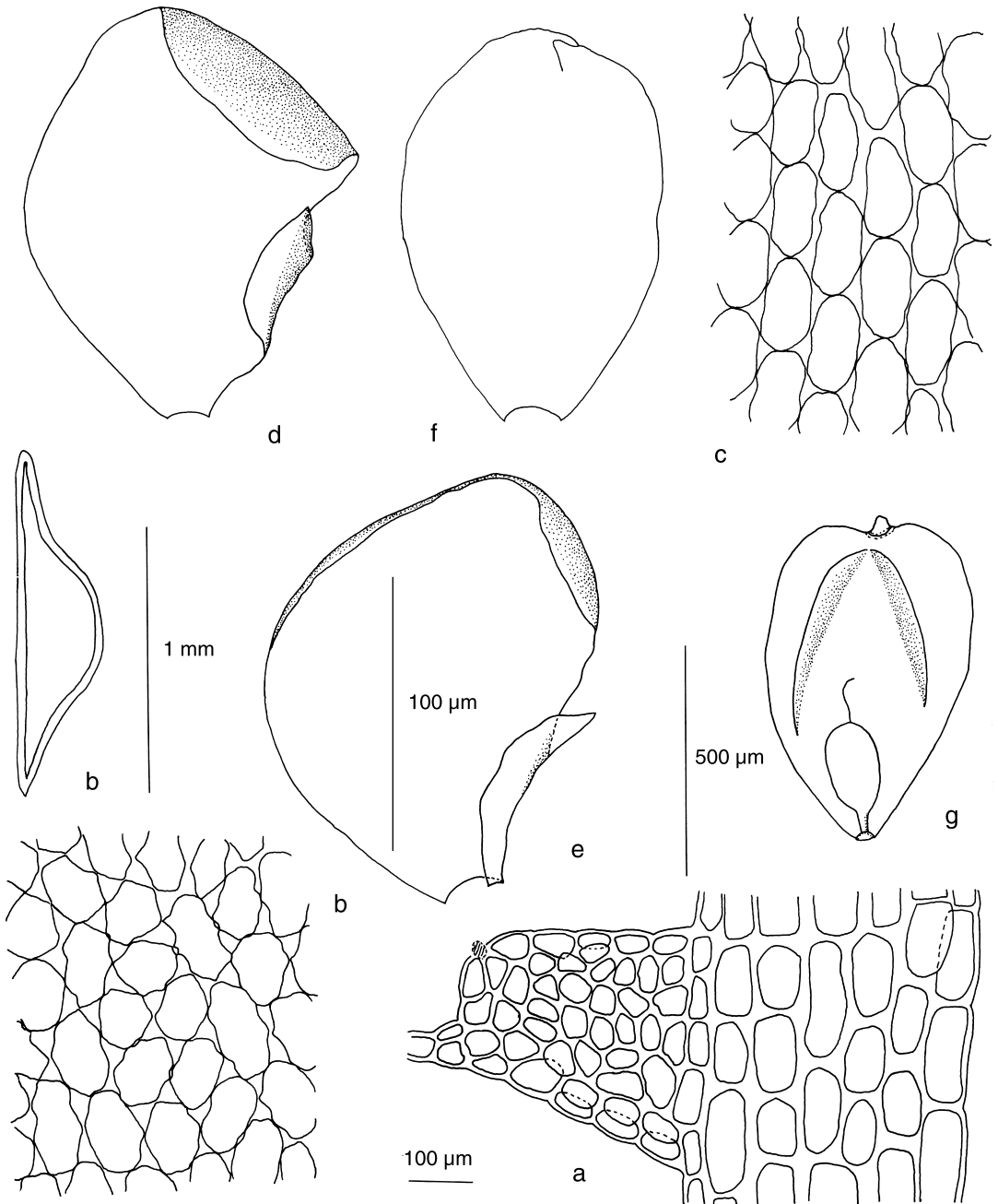


Fig. 4a–h. *Cheilolejeunea valenciae* (Steph.) X.-L. He (drawn from Fendler 12, B-26006). — a: Cross-section of the stem. — b: Cells from middle portion of leaf. — c: Cells from basal portion of leaf. — d–e: Female bracts. — f: Female bracteole. — g: Perianth. — h: Cross-section of the perianth. — Use the 1 mm scale for g, the 500 µm scale for d, e, and h, the longer 100 µm scale for a, b, and c, and the shorter 100 µm scale for f.

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