

# New records and extension ranges in Lejeuneaceae (Schizostiapae) from Nagaland, Northeast India

Sushil Kumar Singh<sup>1\*</sup>, Sutanu Lal Bondya<sup>2</sup> & Shashi Kumar<sup>1</sup>

<sup>1</sup>Botanical Survey of India, Eastern Regional Centre, Shillong – 793003, India.

<sup>2</sup>P.G. Department of Botany, S.K.M. University, Dumka – 814101, India.

\*Corresponding author's e-mail: sksbsinc@rediffmail.com

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## ABSTRACT

Five species, namely *Cheilolejeunea kitagawae* Ye and Zhu, *Cheilolejeunea laeviuscula* (Mitt.) Steph., *Drepanolejeunea erecta* (Steph.) Mizut., *Drepanolejeunea pulla* (Mitt.) Grolle and *Microlejeunea punctiformis* (Taylor) Steph. are reported here for the first time from Nagaland (Northeast India). The genus *Microlejeunea* Steph. is recorded here for the first time from Nagaland.

**Key words:** Lejeuneaceae, Schizostiapae, *Cheilolejeunea*, *Drepanolejeunea*, *Microlejeunea*.

## INTRODUCTION

Nagaland is one of the small mountaineous state in the Northeast of India with an area of about 16,575 km<sup>2</sup>. The state is well known for its rich floristic diversity and vegetation. Recently, a floral checklist of Nagaland was published by Mao et al. (2017) reporting 2008 taxa of flowering plants, 425 taxa of pteridophytes and 7 taxa of gymnosperms, but without any mention of bryophytes. However, Eshuo (2012) documented 123 species of liverworts and hornworts from the state, but the identity of several species is doubtful and needs to be studied in detail. Later, Singh et al. (2016) also recorded 40 species (including 3 endemic species) of liverworts and hornworts. Based on our recent field explorations and the documentation of liverwort and hornwort by Eshuo, it is evident that the state abode much diversified liverwort and hornwort flora.

As far as *Schizostiapus* genus of Lejeuneaceae is concerned, all together 9 species are recorded from the state (including uncertain reports of Eshuo). During the course of taxonomic studies on the family Lejeuneaceae (Schizostiapae) from Northeast India, we

came across with many epiphytic and epiphyllous populations representing the *Schizostiapus* genus. The identification has been done based on published literatures as well as herbarium specimens available at Assam. The study reveals the presence of *Cheilolejeunea kitagawae* Ye and Zhu, *Cheilolejeunea laeviuscula* (Mitt.) Steph., *Drepanolejeunea erecta* (Steph.) Mizut., *Drepanolejeunea pulla* (Mitt.) Grolle and *Microlejeunea punctiformis* (Taylor) Steph. hitherto undescribed from the state. All the studied specimens are deposited in herbarium of Botanical Survey of India, Eastern Regional Centre, Shillong.

## SYSTEMATIC DESCRIPTION

*Cheilolejeunea kitagawae* Ye and Zhu, J. Bryol. 32: 280. 2010. *Leucolejeunea paroica* N. Kitagawa, Acta Phytotax. Geobot. 16: 191. 1960 (Text-Figure 1).

*Description:* Plants large, pale yellow in herbarium; shoots 12 – 25 mm long, 1.37 – 2.25 mm wide, branching irregular, *Lejeunea*-type. Stem oval – suborbicular in cross-section, 112.5 – 176.2 × 93.7 –

137.5  $\mu\text{m}$ , 7–8 cells across diameter; cortical cells in a layer of 13–17 cells, subquadrate–rectangular or polygonal, 12.5–43.7  $\times$  10.0–27.5  $\mu\text{m}$ , thin–slightly thick-walled; medullary cells 22–29, polygonal, 8.7–22.5  $\times$  6.2–20.0  $\mu\text{m}$ , thick-walled. Ventral merophyte 4–6 cells wide. Leaves imbricate, widely spreading; leaf lobes ovate–oblong-ovate, 0.92–1.15 mm long, 0.25–0.90 mm wide, apex broadly rounded, margin entire, antical margin arched, postical margin straight or slightly arched; marginal leaf cells towards apex subquadrate–pentagonal, 10.0–17.5  $\times$  7.5–12.5  $\mu\text{m}$ ; median leaf cells pentagonal–hexagonal, 17.5–27.5  $\times$  12.5–20.0  $\mu\text{m}$ ; basal leaf cells slightly elongated, pentagonal–hexagonal or polygonal, 20.0–47.5  $\times$  15.0–27.5  $\mu\text{m}$ ; cells thin-walled, with well developed subnodulose–nodulose trigones and intermediate thickenings occasionally present. Cuticle smooth. Vittas absent. Oil-bodies grape cluster like, large, usually elliptical, or occasionally oval or spherical, 2–4 (–5) per cell, 6.1–17.0  $\times$  3.6–7.2  $\mu\text{m}$ , the spherical one's smaller 3.6–6.1  $\mu\text{m}$ . Leaf lobules large, inflated, rectangular-ovate, 1/2–3/5 as long as the lobe length, 0.04–0.52 mm long, 0.20–0.27 mm wide, bidentate, first tooth obsolete; second tooth 1–3 cells long, 1–2 cells wide at base, hyaline papilla at the distal base of second tooth. Underleaves large, contiguous–remote, reniform, usually wider than long, 3.0–4.5 times as wide as the stem, 0.37–0.57 mm long, 0.52–0.77 mm wide, rounded apex, occasionally slightly retuse, margin entire. Androecial and gynoecial branches not observed.

**Habitat:** Epiphytic, in pure population or in association with *Lejeunea subacuta* Mitt.

**Specimen examined:** India, Nagaland, Kohima District, near lower forest colony, river side, 25°39'33.50"N, 94°05'02.73"E, 1493 m, 14.11.2016, *Shashi Kumar* TSLI–2450.

**Distribution:** India (Meghalaya, Nagaland – present study), China, Indonesia, Japan, Taiwan, Thailand (Singh et al. 2016).

**Remarks:** *Cheilolejeunea kitagawae* shows affinity with *Cheilolejeunea turgida* (Mitt.) W. Ye & R.L. Zhu. However, latter differs from the former in having cross-sections of stem with 17–19 cortical cells,

comparatively smaller leaf lobules never longer than 1/2 of the leaf lobe length (Udar & Awasthi, 1983). In *Cheilolejeunea kitagawae* cross-sections of stem with 13–17 cortical cells and the leaf lobules comparatively large, up to 3/5 of leaf lobe length.

***Cheilolejeunea laeviuscula*** (Mitt.) Steph., Sp. Hepat. 5: 668. 1914. *Lejeunea laeviuscula* Mitt., J. Proc. Linn. Soc., Bot. 5: 114. 1861 (Text-Figure 2).

**Description:** Plants large, pale yellow in herbarium; shoots 8–13 mm long, 1.12–1.62 mm wide, branching irregular, *Lejeunea*-type. Stem suborbicular in cross-section, 108.9–122.2  $\times$  99.2–106.4  $\mu\text{m}$ , 7–8 cells across diameter; cortical cells in a layer of 7 cells, subquadrate–rectangular, 27.5–39.9  $\times$  15.0–25.0  $\mu\text{m}$ , thick-walled; medullary cells 22–23, polygonal, 10.0–18.1  $\times$  6.0–12.5  $\mu\text{m}$ , thick-walled. Ventral merophyte 2 cells wide. Leaves imbricate, obliquely–widely spreading; leaf lobes ovate, 0.75–0.93 mm long, 0.56–0.88 mm wide, apex subacute–obtuse, margin entire, antical margin arched, postical margin straight or slightly arched; marginal leaf cells towards apex subquadrate–pentagonal, 7.5–15.0  $\times$  7.5–12.5  $\mu\text{m}$ ; median leaf cells pentagonal–hexagonal, 17.5–32.5  $\times$  12.5–20.0  $\mu\text{m}$ ; basal leaf cells elongated, pentagonal–hexagonal, 20.0–45.0  $\times$  17.5–32.5  $\mu\text{m}$ ; cells thin-walled, with prominent nodulose trigones and with 0–1 intermediate thickenings each cell wall, cuticle smooth and without vitta. Leaf lobules small, inflated, ovate, 1/3–2/5 as long as the lobe length, 0.25–0.40 mm long, 0.18–0.32 mm wide, bidentate, first tooth obsolete; second tooth multicellular, 2–7 celled, hyaline papilla at the distal base of second tooth. Underleaves contiguous, reniform, usually wider than long, (3–)4–5 times as wide as the stem, 0.31–0.45 mm long, 0.47–0.66 mm wide, bilobed to 1/4–1/6 of its length, apex acute–subacute, lobes triangular, sinus “U” or “V” shaped. Androecial and gynoecial branches not observed.

**Habitat:** Epiphytic, in pure population or in association with *Lejeunea flava* (Sw.) Nees.

**Specimen examined:** India, Nagaland, Kohima District, near Kohima Botanical Garden 25°39'39.17.26"N, 94°05'30.80"E, 1634 m,

17.11.2016, *Shashi Kumar* TSLI – 2645B.

**Distribution:** India (Karnataka, Nagaland - present study, Sikkim, Tamil Nadu, West Bengal), Nepal (Singh et al. 2016).

**Remarks:** *Cheilolejeunea laeviuscula* is allied to *Cheilolejeunea intertexta* (Lindenb.) Steph., but latter differs in having orbicular leaf lobes, mammillose leaf lobe cells with small trigones, leaf lobules with 1-celled second tooth, underleaves bilobed to 1/2 of its length (Mizutani 1982). In *Cheilolejeunea laeviuscula*, leaf lobes are ovate or ovate – oblong, smooth leaf lobe cells with prominent nodulose trigones, leaf lobules with 2-7 celled second tooth, underleaves bilobed to 1/4 – 1/6 of its length.

***Drepanolejeunea erecta*** (Steph.) Mizut., J. Hattori Bot. Lab. 40: 442. 1976. *Leptolejeunea erecta* Speth., Bull. Soc. Roy. Bot. Belgique 38: 44. 1899 (Text-Figures 3-4).

**Description:** Plants small, light green when fresh, pale yellow in herbarium; shoots 9 – 15 mm long, 0.50 – 0.90 mm wide, branching irregular, *Lejeunea*-type. Stem suborbicular in cross-section, 75.0 – 92.5 × 70.0 – 80.0 μm, 4 cells across diameter; cortical cells in a layer of 7 cells, subquadrate – rectangular, 17.5 – 32.5 × 15.0 – 22.5 μm, thin-walled; medullary cells 3, polygonal, 20.0 – 25.0 × 12.5 – 20.0 μm, slightly thick-walled. Leaves imbricate – contiguous, obliquely – widely spreading. Leaf lobes ovate – oblong-ovate, 0.30 – 0.52 mm long, 0.20 – 0.36 mm wide, apex acute, occasionally obtuse, margin slightly denticulate, antical margin arched, postical margin straight or slightly arched; marginal leaf cells towards apex subquadrate – rectangular, 10.0 – 12.5 × 10.0 – 15.0 μm; median leaf cells pentagonal – hexagonal, 12.5 – 25.0 × 10.0 – 17.5 μm; basal leaf cells elongated pentagonal – hexagonal or rectangular, 15.0 – 40.0 × 10.0 – 25.0 μm; cells thin-walled, without trigones and intermediate thickenings; cuticle smooth; ocelli 1(-2) per leaf lobe, suprabasal, oval – elliptical, 47.5 – 52.5 × 25.0 – 32.5 μm. Leaf lobules inflated, ovate, 1/3 – 1/2 as long as the lobe length, occasionally reduced, (0.06-) 0.15 – 0.17 mm long, (0.04) 0.08 – 0.11 mm wide, bidentate, first tooth unicellular, elongated, strongly curved with a hyaline papilla at the proximal base of first tooth; second

tooth obsolete, free lateral margin with 4 – 5 (-6) rectangular or rectangular – linear cells. Under leaves contiguous – distant, suborbicular, 1.5 – 3.0 times as wide as the stem, 0.10 – 0.20 mm long, 0.10 – 0.21 mm wide, bilobed to 1/3 – 1/2 of its length, apex acute – subacute, lobes triangular, 4 – 6 cells long, (4-) 5 – 9 cells wide at base, sinus “v” shaped. Brood branches not observed, dioicous, androecia on a short or long branches; terminal on main shoots or lateral branches 0.37 – 0.65 mm long, 0.26 – 0.38 mm wide; male bracts in 2 – 5 pairs, densely imbricate, obliquely spreading, bract lobe ovate – oblong-ovate, apex acute – obtuse, margin entire; bract lobule inflated, almost as long as the lobe length, occasionally 1/2 as long as the bract lobe length, 0.19 – 0.24 mm long, 0.12 – 0.21 mm wide; bracteoles 2 – 4, present throughout the androecium, 0.08 – 0.15 mm long, 0.06 – 0.16 mm wide, bilobes to 2/5 – 1/3 of its length, lobe 4 – 7 cells long, 3 – 8 cells wide at base, apex acute – subacute, sinus “V” shaped. Gynoecia terminal on short lateral branches, with or without subfloral innovation; with oblong-ovate female bract lobe, 0.40 – 0.51 mm long, 0.19 – 0.31 mm wide, apex acute, margin usually slightly dentate; bract lobules oblong, 3/4 as long as the bract lobe, 0.34 – 0.42 mm long, 0.12 – 0.19 mm wide, margin nearly entire to slightly dentate; female bracteoles obovate, almost as long as the lobe, 0.40 – 0.45 mm long, 0.34 – 0.37 mm wide, bilobed to 1/3 of its length, connate with bracts on both sides, outer margin slightly dentate, inner ones entire. Perianth obovate, 0.56 – 0.63 mm long, 0.32 – 0.37 mm wide, smooth on surface with keel 5 (2 lateral, 2 ventral, 1 dorsal), horizontally spreading, sharp, horn-like keels. Seta in transverse sections 120 – 150 μm in diameter, with 12 outer cells surrounding 4 inner cells. Capsule globose, 0.21 – 0.24 mm in diameter, blackish brown, dehiscing into 4 valves; capsule wall bistratose, cells of the outer layer with trigonous – nodular thickenings, those of the inner layer with irregular nodular thickenings. Spores irregularly oblong, 26.62 – 58.08 × 13.31 – 30.25 μm, surface with minute papillae. Elaters more or less tubaeform, 147.62 – 199.65 μm long, 10.89 – 13.31 μm wide, wall with sinuate thickenings.

**Habitat:** Epiphyllous, in pure population or in association with *Cololejeunea* sp.

*Specimen examined:* India, Nagaland, Kohima District, near Kohima Botanical Garden 25°39'39.17.26"N, 94°05'30.80"E, 1634 m, 17.11.2016, *Shashi Kumar* TSLI – 2631.

*Distribution:* India (Arunachal Pradesh, Meghalaya, Manipur, Nagaland- present study, Sikkim, West Bengal), Bhutan, China, Japan, Laos, Nepal, Taiwan, Vietnam (Singh et al. 2016).

*Drepanolejeunea pulla* (Mitt.) Grolle, *J. Hattori Bot. Lab.* 46: 349. 1979. *Lejeunea pulla* Mitt., *J. Proc. Linn. Soc. Bot.* 5: 116. 1861 (Text-Figure 5).

*Description:* Plants small, green when fresh, pale yellow in herbarium; shoots 5 – 8 mm long, 0.62 – 0.75 mm wide, branching irregular, *Lejeunea*-type. Stem suborbicular in cross-section, 77.5 – 100.0 × 65.0 – 80.0 µm, 4 cells across diameter; cortical cells in a layer of 7 cells, subquadrate – rectangular, 17.5 – 37.5 × 12.5 – 22.5 µm, thin-walled; medullary cells 3, polygonal, 12.5 – 27.5 × 10.0 – 15.0 µm, slightly thick-walled. Leaves imbricate, widely spreading; leaf lobes ovate – oblong-ovate, 0.43 – 0.56 mm long, 0.37 – 0.43 mm wide, apex acute, margin denticulate, antical margin convex, postical margin straight or slightly arched; marginal leaf cells towards apex subquadrate – rectangular, 7.5 – 17.5 × 5.0 – 12.5 µm; median leaf cells pentagonal – hexagonal, 20.0 – 40.0 × 15.0 – 20.0 µm; basal leaf cells elongated pentagonal – hexagonal or rectangular, 15.0 – 50.0 × 7.5 – 22.5 µm; cells thin-walled, with small trigones and intermediate thickenings; cuticle smooth; ocellus 1 – 2 per leaf lobe, suprabasal, oval – elliptical, 47.5 – 60.0 × 25.0 – 32.5 µm; leaf lobules inflated, ovate, 2/5 – 1/2 as long as the lobe, 0.16 – 0.23 mm long, 0.12 – 0.14 mm wide, bidentate, first tooth unicellular, elongate, curved with a hyaline papilla at the proximal base of first tooth, second tooth obsolete, free lateral margin with 4 – 5 subquadrate – rectangular cells. Under leaves contiguous – distant, 1.0 – 1.5 (-2) times as wide as the stem, 0.10 – 0.21 mm long, 0.11 – 0.26 mm wide, bilobed to 2/3 of its length, oblong, apex acute – subacute, lobes triangular, sinus “U” – “V” shaped. Androecial and gynoecial branches not observed.

*Habitat:* Epiphytic, in pure population or in

association with *Cololejeunea* sp., *Frullania* sp., *Plagiochila* sp.

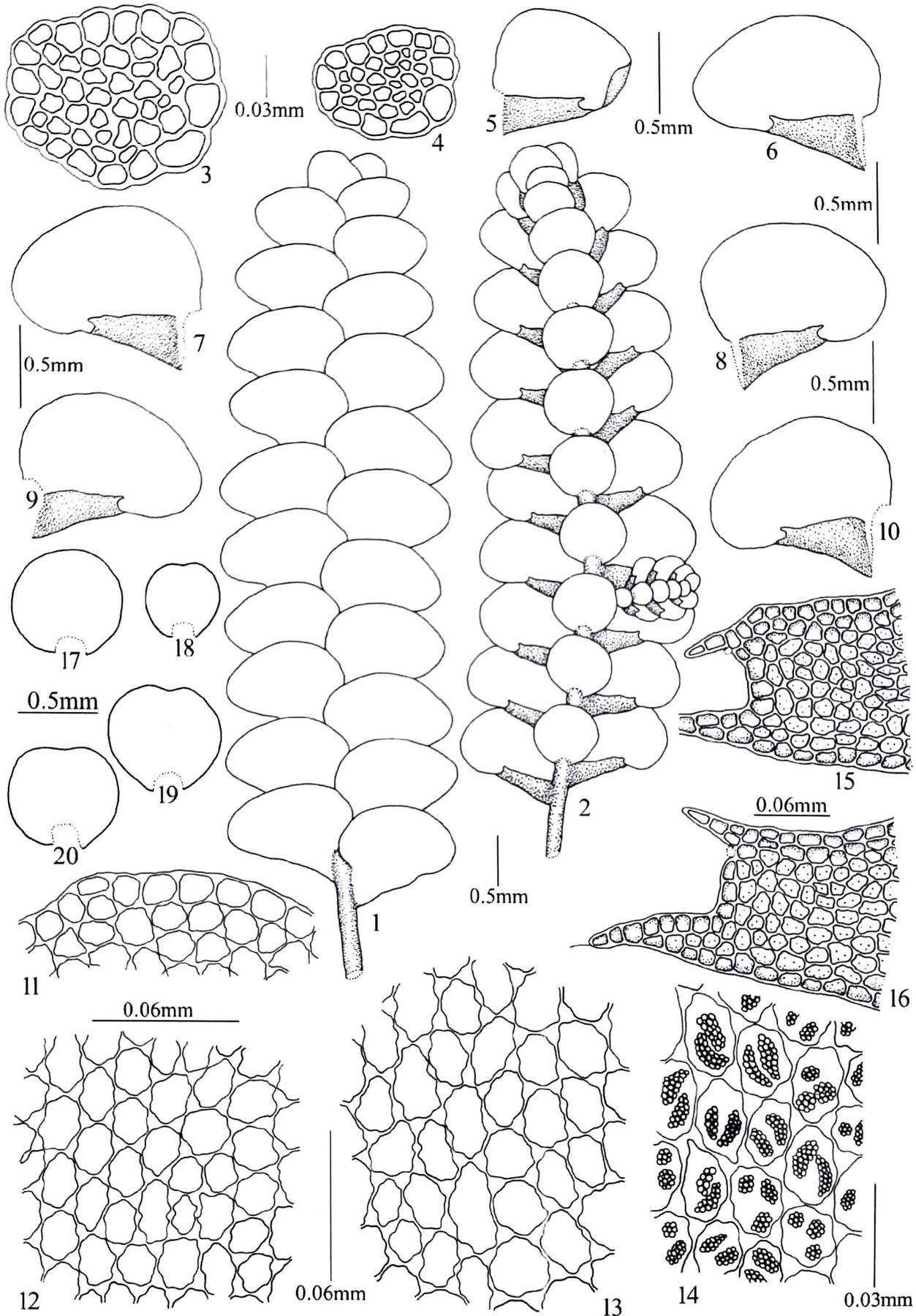
*Specimen examined:* India, Nagaland, Kohima District, near Kohima Botanical Garden 25°39'39.17.26"N, 94°05'30.80"E, 1634 m, 17.11.2016, *Shashi Kumar* TSLI – 2648C.

*Distribution:* India (Sikkim, Nagaland - present study, West Bengal), Bhutan, Nepal (Singh et al. 2016).

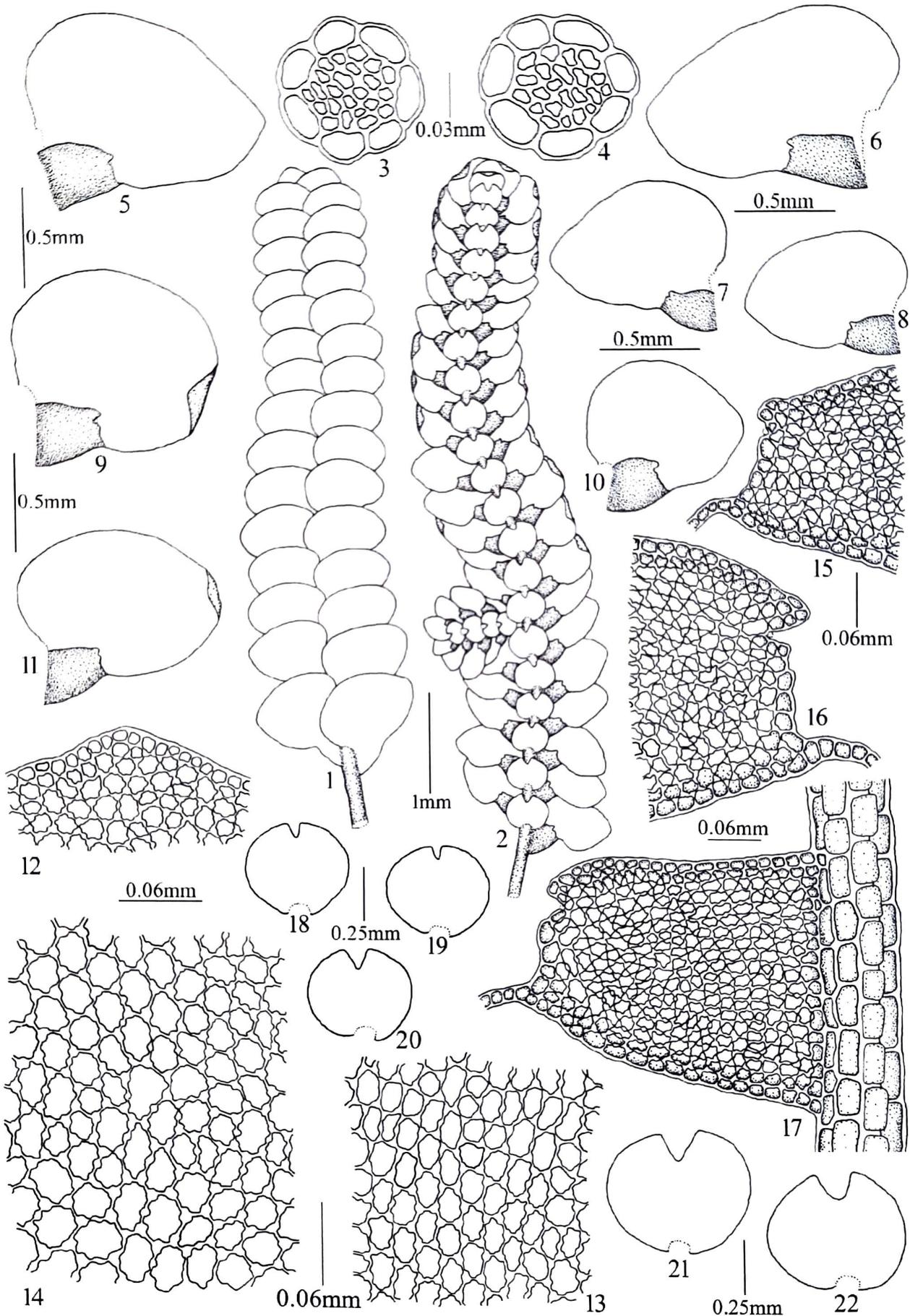
*Remarks:* *Drepanolejeunea pulla* resembles *Drepanolejeunea erecta* in the arrangement of leaf, margin denticulation and arrangement of underleaves which are remote. However, former differs from the latter in having narrow underleaves which are 1 – 1.5 (-2) times as wide as the stem, bilobed to 2/3 of its length, oblong with triangular lobes 3 – 6 cells long, 2 – 3 (-4) cells wide at base and sinus “U-V”-shaped whereas *Drepanolejeunea erecta* is having orbicular, underleaves which are bilobed to 1/3 – 1/2 of its length, lobes triangular, 4 – 6 cells long, (4-) 5 – 9 cells wide at base, sinus “v”-shaped (Zhu & So 2001).

*Microlejeunea punctiformis* (Taylor) Steph., *Hedwigia* 29: 90. 1890. *Lejeunea punctiformis* Taylor, *Syn. Hepat.* 767. 1847 (Text-Figures 6-7).

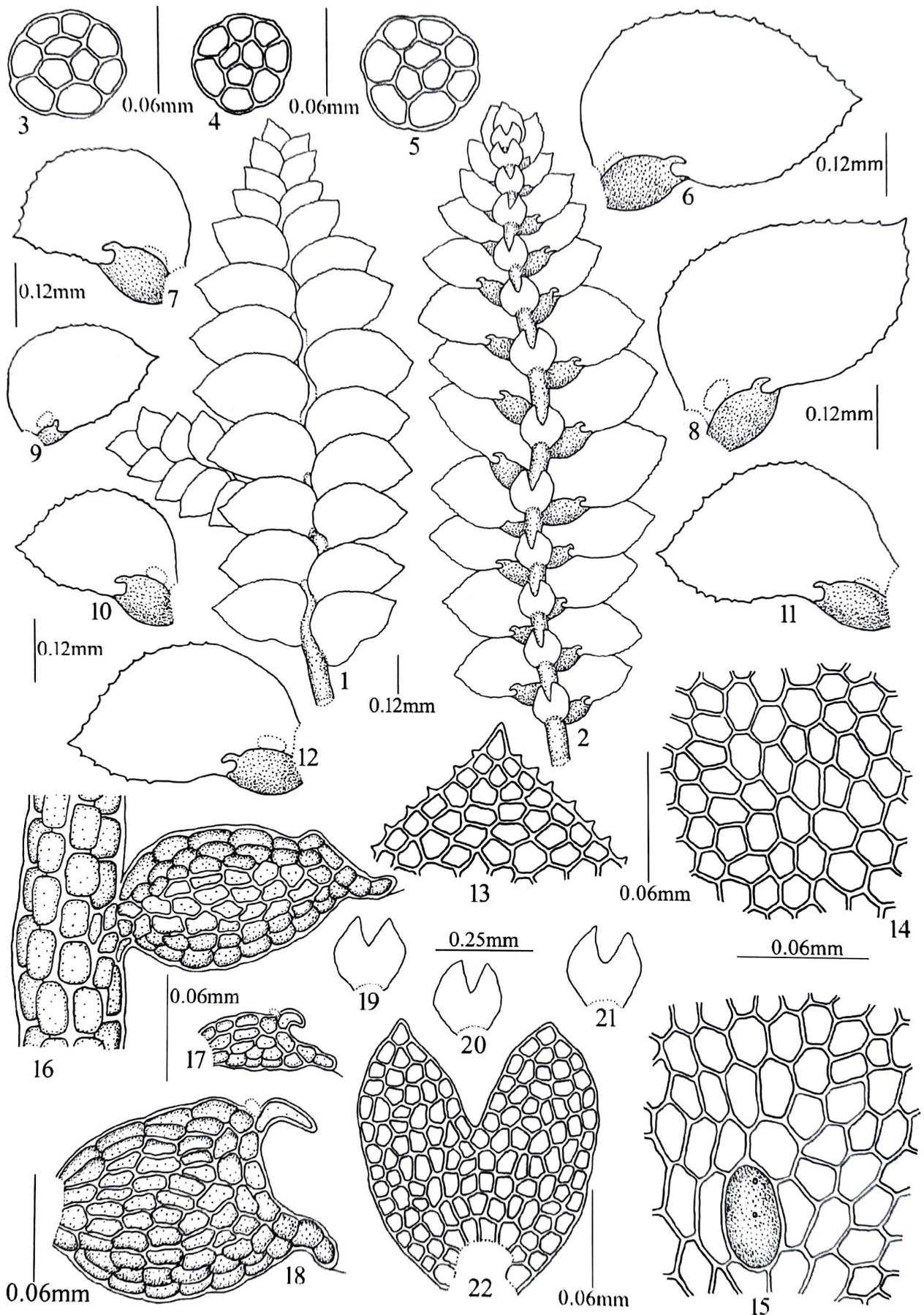
*Description:* Plants small, light green when fresh, pale yellow in herbarium; shoots 6 – 13 mm long, 0.24 – 0.50 mm wide, branching irregular, *Lejeunea*-type. Stem suborbicular in cross-section, 47.5 – 52.5 × 45.0 – 47.5 µm, 4 cells across the diameter; cortical cells in a layer of 7 cells, subquadrate – rectangular, 10.0 – 20.0 × 7.5 – 15.0 µm, thin-walled; medullary cells 3, polygonal, 10.0 – 12.5 × 5.0 – 7.5 µm, thin-walled. Leaves contiguous – remote, obliquely spreading. Leaf lobes ovate, 0.15 – 0.30 mm long, 0.13 – 0.22 mm wide, apex obtuse, occasionally subacute, margin entire, antical margin arched, postical margin straight or slightly arched; marginal leaf cells towards apex subquadrate – rectangular, 5.0 – 12.5 × 5.0 – 10.0 µm; median leaf cells pentagonal – hexagonal, 10.0 – 20.0 × 7.5 – 10.0 µm; basal leaf cells elongated pentagonal – hexagonal or rectangular, 10.0 – 25.0 × 5.0 – 12.5 µm; cells thin-walled, without trigones and intermediate thickenings; cuticle smooth; ocelli 1 – 2 per leaf lobe, suprabasal, oval – elliptical, 20.0 – 30.0 × 15.0 – 20.0 µm; leaf lobules inflated, ovate, 2/3 – 3/4 as long as the lobe



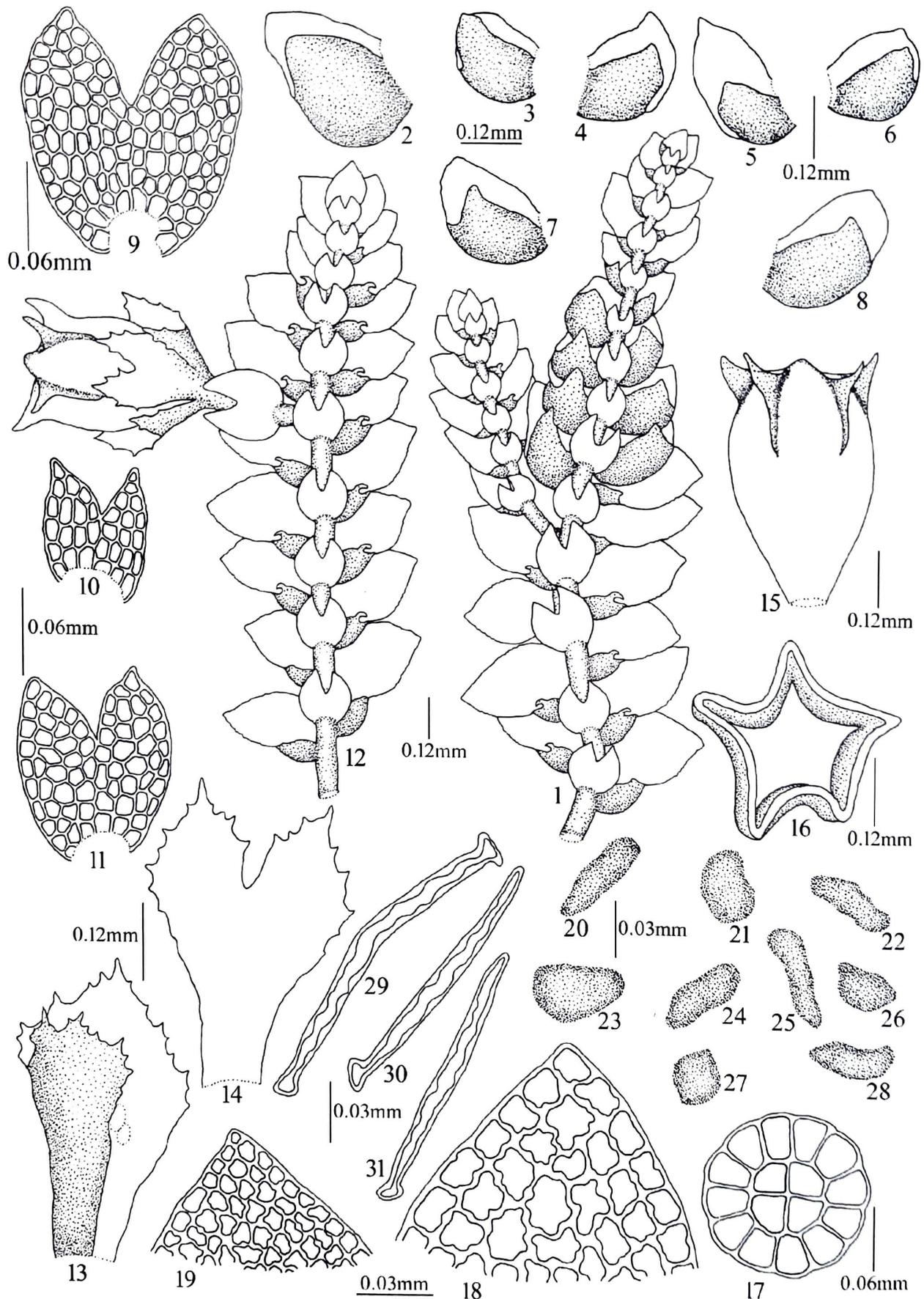
**Text-Figure 1.** *Cheilolejeunea kitagawae* Ye & Zhu: 1. A portion of plant in dorsal view; 2. The same in ventral view; 3-4. Cross-sections of stem; 5-10. Leaves; 11. Marginal leaf cells towards apex; 12. Median leaf cells; 13. Basal leaf cells; 14. Median leaf cells showing oil-bodies; 15-16. Leaf lobules; 17-20. Underleaves.



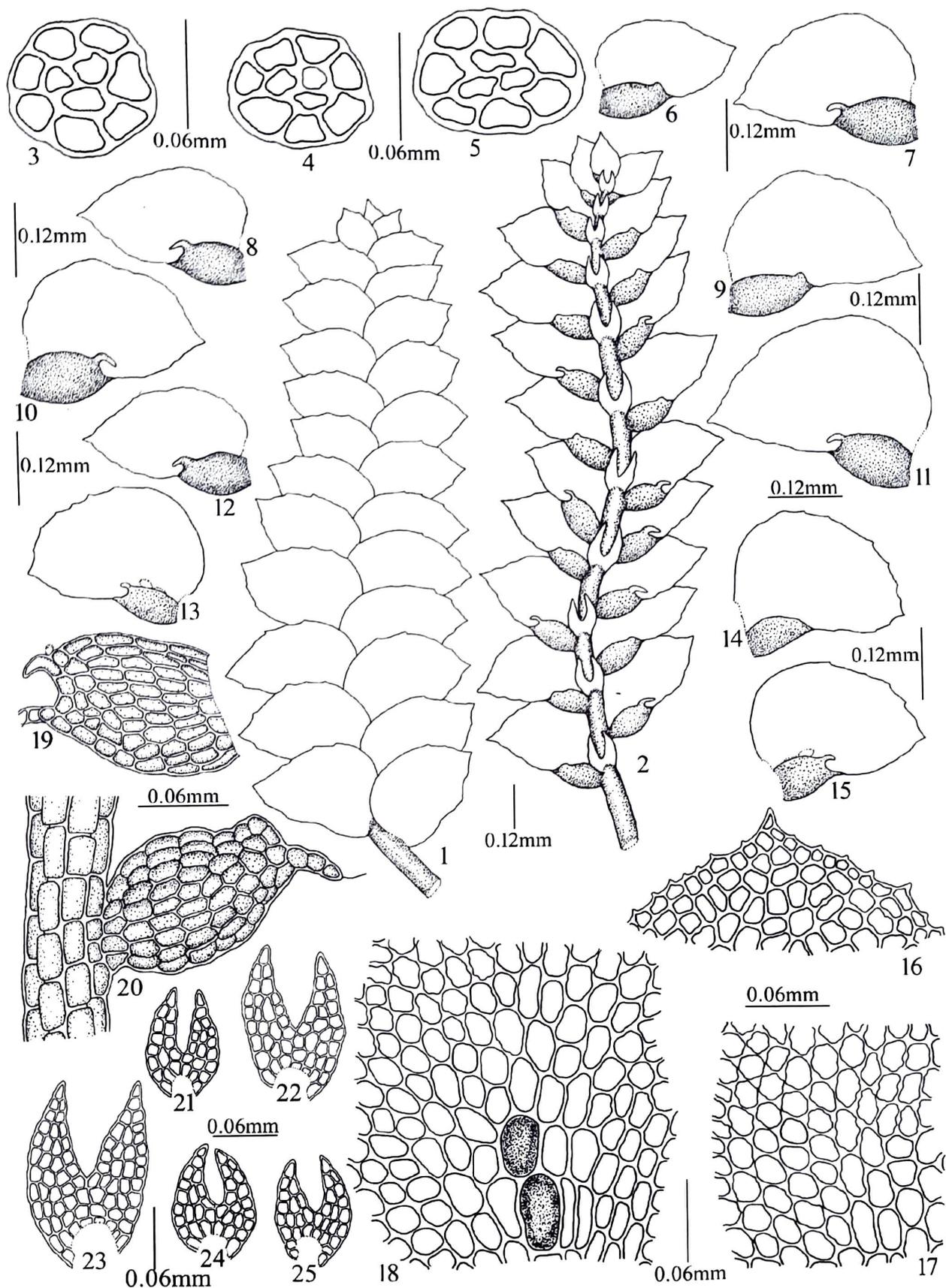
**Text-Figure 2.** *Cheilolejeunea laeviuscula* (Mitt.) Steph.: 1. A portion of plant in dorsal view; 2. The same in ventral view; 3-4. Cross-sections of stem; 5-11. Leaves; 12. Marginal leaf cells towards apex; 13. Median leaf cells; 14. Basal leaf cells; 15-17. Leaf lobules; 18-22. Underleaves.



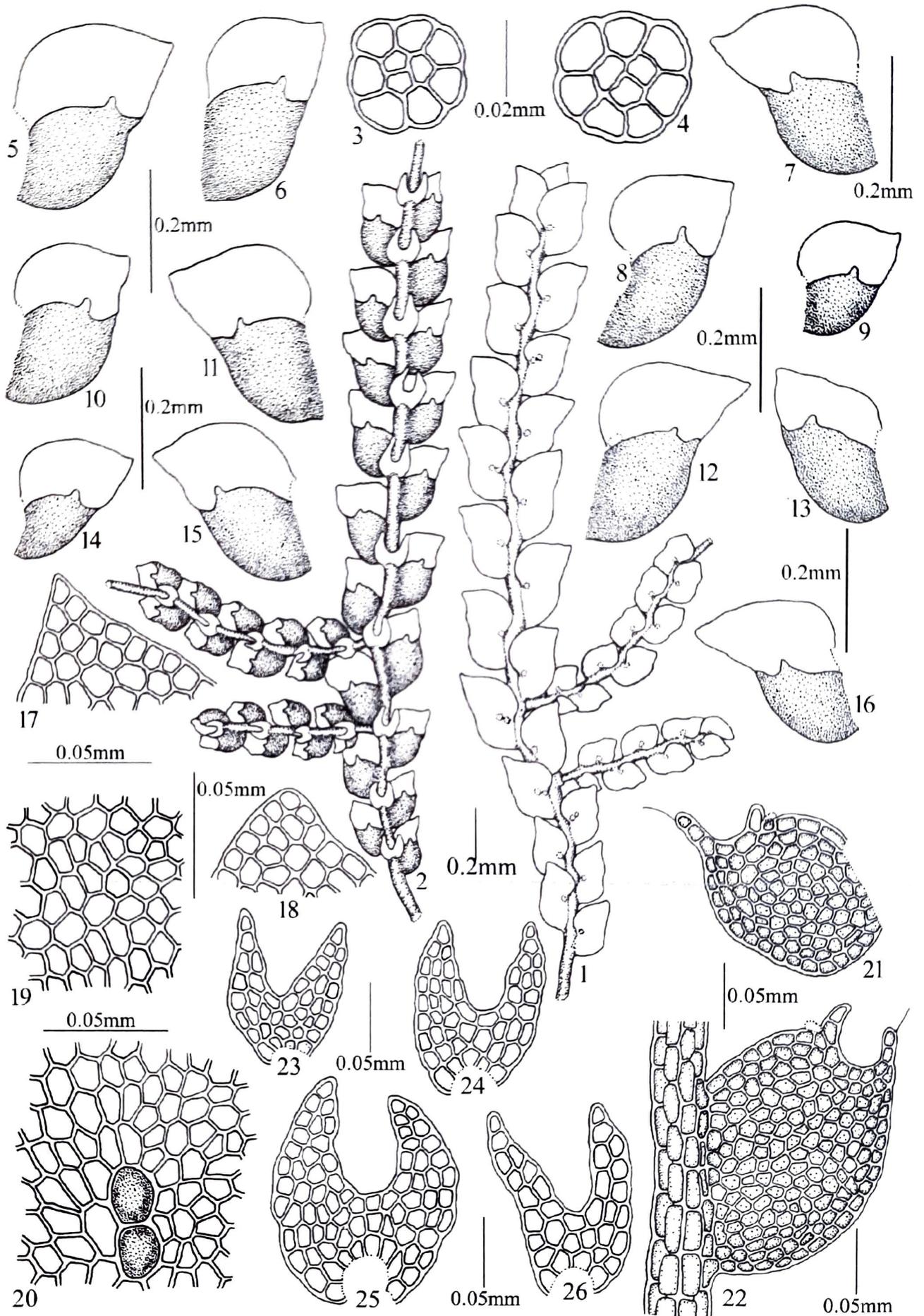
**Text-Figure 3.** *Drepanolejeunea erecta* (Steph.) Mizut.: 1. A portion of plant in dorsal view; 2. The same in ventral view; 3 – 5. Cross-sections of stem; 6 – 12. Leaves; 13. Marginal leaf cells towards apex; 14. Median leaf cells; 15. Basal leaf cells; 16 – 18. Leaf lobules; 19 – 22. Underleaves.



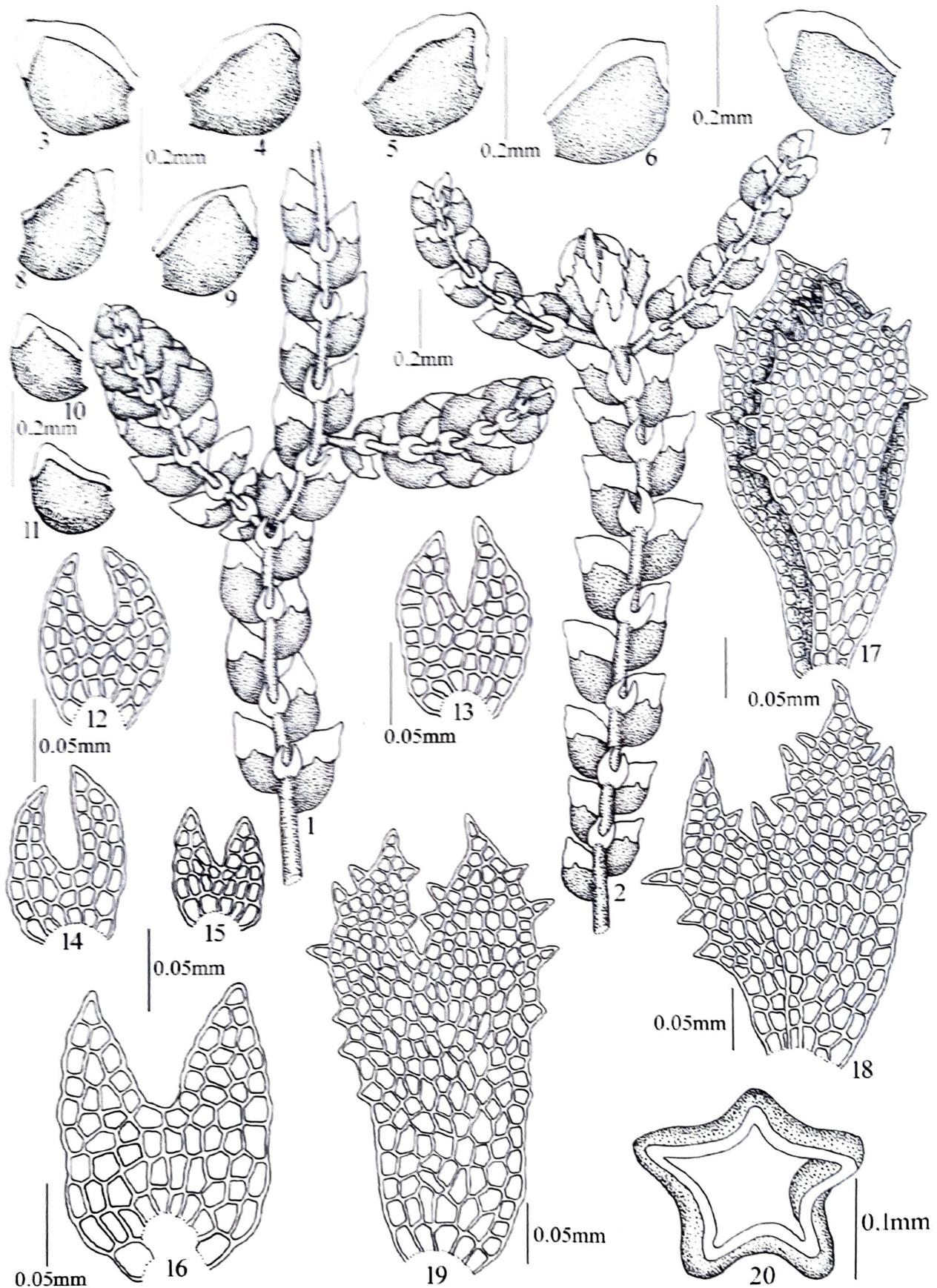
**Text-Figure 4.** *Drepanolejeunea erecta* (Steph.) Mizut.: 1. A portion of plant with male inflorescence 2 – 8. Male bracts; 9 – 11. Male bracteoles; 12. A portion of plant with female inflorescence; 13 – Female bract; 14. Female bracteoles; 15. A perianth; 16. Cross-section of elaters; 17. Cross-section of seta; 18. Cells of outer layer of capsule wall; 19. Cells of inner layer of capsule wall; 20 – 28. Spores; 29 – 31. Elaters.



**Text-Figure 5.** *Drepanolejeunea pulla* (Mitt.) Grolle: 1. A portion of plant in dorsal view; 2. The same in ventral view; 3-5. Cross-sections of stem; 6-15. Leaves; 16. Marginal leaf cells towards apex; 17. Median leaf cells; 18. Basal leaf cells; 19-20. Leaf lobules; 21-25. Underleaves.



**Text-Figure 6.** *Microlejeunea punctiformis* (Taylor) Steph.: A portion of plant in dorsal view; 2. The same in ventral view; 3-4. Cross-sections of stem; 5-16. Leaves; 17-18. Marginal leaf cells towards apex; 19. Median leaf cells; 20. Basal leaf cells; 21-22. Leaf lobules; 23-26. Underleaves.



**Text-Figure 7.** *Microlejeunea punctiformis* (Taylor) Steph.: 1. A portion of plant with male inflorescence; 2. A portion of plant with female inflorescence; 3 – 11. Male bracts; 12 – 16. Male bracteoles; 17 – 18. Female bracts; 19. Female bracteoles; 20. Cross-section of perianth.

length, bidentate, first tooth unicellular occasionally bicellular, elongated, hyaline papilla at the proximal base of first tooth, keel arched, smooth; second tooth obsolete, free lateral margin with 3 – 7 rectangular or rectangular – linear cells. Underleaves distant, oblong – orbicular, 1.5 – 2.0 (-2.5) times as wide as the stem, 0.10 – 0.15 mm long, 0.08 – 0.14 mm wide, bilobed to 1/2 – 2/3 of its length, apex acute – subacute, lobes triangular – lanceolate, 3 – 5 (-7) cells long, 2 – 5 cells wide at base, sinus “U” or “v”-shaped. Monoicous. Androecia terminal on main shoots or lateral branches, or sometimes intercalary, 0.40 – 0.75 mm long, 0.32 – 0.48 mm wide; male bracts in 2 – 6 pairs, densely imbricate, obliquely spreading, bract lobe ovate – oblong-ovate, apex acute – obtuse, margin entire, 0.16 – 0.30 mm long, 0.14 – 0.22 mm wide; bract lobule inflated, almost as long as the lobe length, 2/3 – 3/4 as long as the bract lobe length, 0.13 – 0.28 mm long, 0.12 – 0.18 mm wide; bracteoles 2 – 4, present throughout the androecium, (0.05-) 0.07 – 0.15 mm long, (0.04-) 0.06 – 0.12 mm wide, bilobes to 1/2 – 1/3 of its length, lobe 3 – 6 cells long, 2 – 4 cells wide at base, apex acute, sinus “U” or “V” shaped. Gynoecia terminal on short lateral branches, with 1 – 2 subfloral innovation; female bract lobe oblong-ovate, 0.32 – 0.40 mm long, 0.17 – 0.20 mm wide, apex acute, margin usually denticulate; bract lobules oblong, 5/6 as long as the bract lobe length, 0.26 – 0.35 mm long, 0.10 – 0.14 mm wide, margin nearly entire to slightly dentate; female bracteoles larger, obovate – oblong-ovate, 0.14 – 0.38 mm long, 0.16 – 0.22 mm wide, bilobed to 1/3 of its length, outer margin denticulate. Perianth obovate, 0.40 – 0.52 mm long, 0.25 – 0.30 mm wide, surface smooth with 5 keeled (2 lateral, 2 ventral, 1 dorsal). Rest not observed.

*Habitat:* epiphytic, in pure population or in association with *Lejeunea parva* (Hatt.) Mizut.

*Specimen examined:* India, Nagaland, Kohima District, near Kohima Botanical Garden 25°39'39.17.26"N, 94°05'30.80"E, 1634 m,

17.11.2016, *Shashi Kumar* TSLI – 2668B. 2670B.

*Distribution:* India (Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Kerala, Meghalaya, Manipur, Nagaland-present study, Sikkim, Tamil Nadu, West Bengal), Bhutan, China, Nepal, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam, Australia (Singh et al. 2016).

*Remarks:* This species is allied with *Microlejeunea ulicina* (Taylor) Steph. but the latter differ in having dioicous sexuality, androecia bears 1 – 2 bracteoles only confined at the base and usullay leaf lobe apices rounded - obtuse (Zhu & So 2001). In *Microlejeunea punctiformis*, pants are monoicous, androecia bears 2 – 4 male bracteoles present throughout, and the leaf lobe apices are subacute – obtuse.

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