

Mount Maquiling Bryoflora (Luzon)

By P. TIXIER*

Résumé L'auteur analyse ses récoltes personnelles faites au Mont Maquiling en 1965. Cette liste comprend 34 espèces de Mousses et 42 espèces et variétés d'Hépatiques. Il y a 16 Mousses nouvelles pour la station et une pour la Science. Les chiffres concernant les Hépatiques s'élèvent à 35 et 5 espèces et variétés nouvelles. Les espèces et variétés nouvelles sont: *Endotrichella maquilingensis*; *Cololejeunea pseudoschmidtii*, *C. haskarliana* var. *luzonensis* et var. *thermarum*, *C. selaginellicola*, et *C. armata*.

Summary The author analyses in this paper his collections from *Mt. Maquiling* of 1965. This list contains 34 species of Mosses and 42 species and varieties of the Liverworts. Of the mosses 16 are new for this hill station and one for science. Liverworts number 35 as novel records and new species and varieties 5. The species and varieties described here as new are:—*Endotrichella maquilingensis*; *Cololejeunea pseudoschmidtii*, *C. haskarliana* var. *luzonensis* and var. *thermarum*, *C. selaginellicola*, and *C. armata*.

This paper contains the list of the author's collections on Mt. Maquiling of 10th July 1965, consisting of numbers 1358 to 1457, a complete set of which is deposited at the "Laboratoire de Cryptogamie, Muséum National d'Histoire Naturelle" in Paris. The reader is reminded that Mt. Maquiling is a dead volcano, rising up to 1100 m, on the side of Laguna de Bay — the inland lake of central Luzon — at sixty kilometers from Manila. The annual rainfall at the College of Agriculture in Los Banos at the foot of the hills reaches 1930 mm annually for 179 rainy days (figure I). The botanical aspect of this hill station is renowned by the work of the great north American botanists early in the century: Merrill, Copeland and Elmer.

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I MUSCI

1. *Fissidens sylvaticus* Griff. — Corticolous, no. 1435.

Thailand, Cambodia, Vietnam, Sumatra, Java, Celebes, Borneo, Hongkong, Bataan, Luzon (M.Q.).

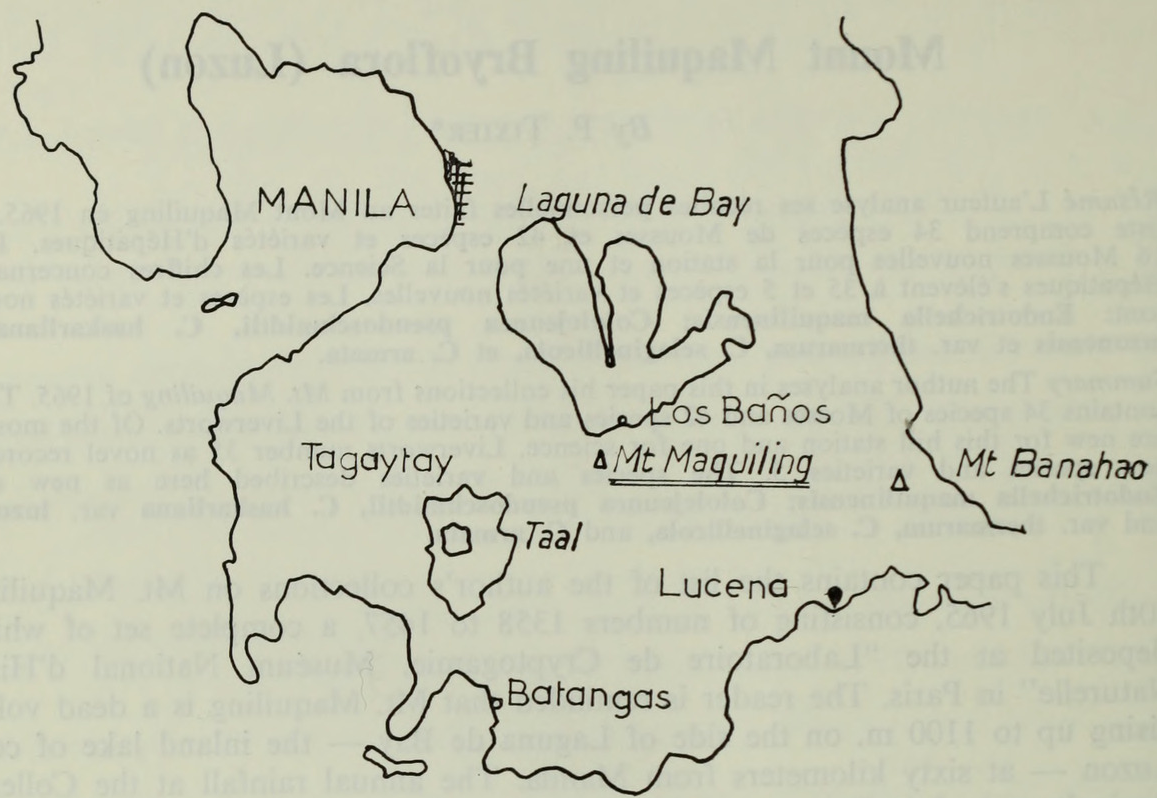
2. *Leucoloma molle* (C. Muell.) Mitt. — On twigs and trunks, nos. 1410, 1443, 1444, 1436.

Widely distributed from Indo Malaya to Pacific Islands, Hawaii, China, Japan, Luzon (Maquiling and Mountain Province), Mindoro, Palawan, Mindanao.

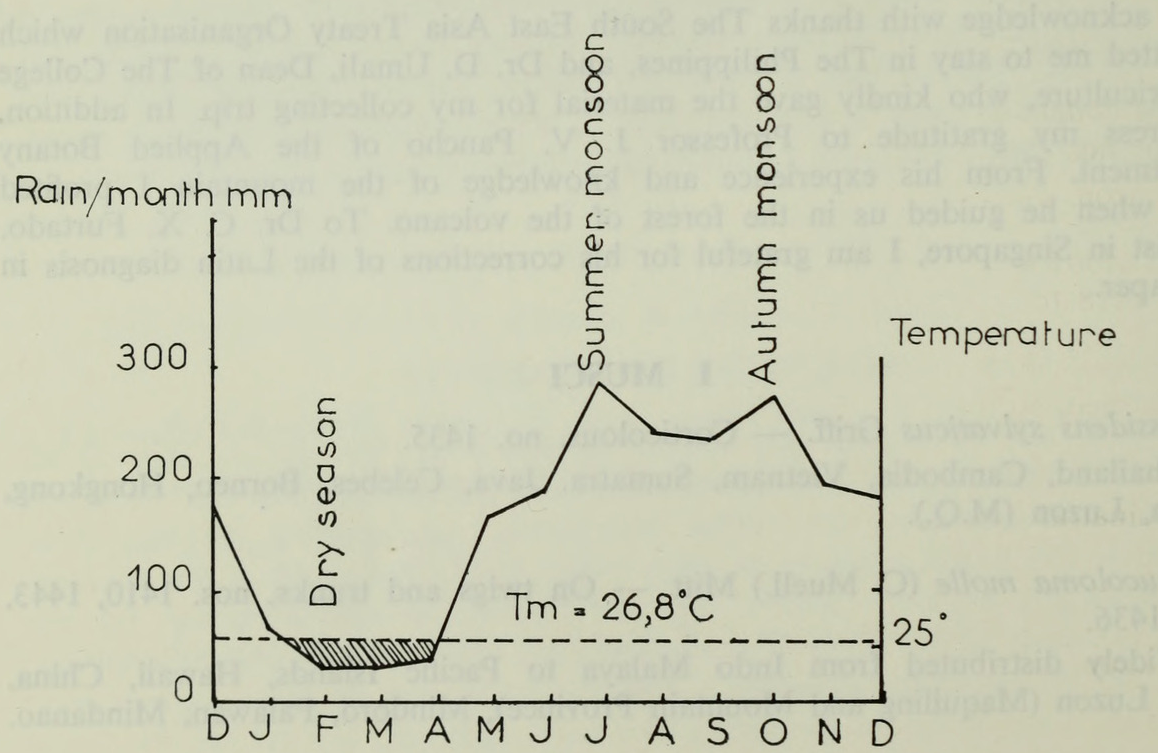
3. *Dicranodontium uncinatum* (Harv.) Jaeg. — On twigs, no. 1403.

India, Thailand, Japan, Moluccas, Luzon (Benguet and Mt. Banahao).

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MANILA and surroundings



CLIMATOGRAM of LOS BAÑOS

Fig. I. Southern part of Luzon. Climatology of Los Banos.

4. *Leucobryum bowringii* Mitt. — Corticolous, nos. 1420, 1436.
Ceylon, Malaya, China, Japan, Formosa, Vietnam, Cambodia, Thailand, Bataan, Luzon, Sibuyan, Negros.
5. *Calymperes serratum* A. Braun — Corticolous, no. 1435.
Malaya, Eastern China, Vietnam, Cambodia, Thailand, Fiji, Samoa, New Caledonia, Luzon (MQ).
6. *Syrrhopodon tristichus* Nees ex Schwaegr. — On twigs, nos. 1416, 1420, 1424, 1425.
Ceylon, Sumatra, Java, Ambon, Borneo, Luzon, Negros.
7. *Macromitrium cuspidatum* Hampe — On trunks, nos. 1400 (c. fr.), 1410.
Sumatra, Cambodia, Java, Borneo, Luzon, Mindoro, Palawan.
8. *Macromitrium semipellucidum* Doz. & Molk. — On branches, nos. 1432 (c. fr.), 1433.
It is nearly impossible to separate *M. semipellucidum* from *M. pungens*. According to *Bryologica javanica* only one character is different i.e. the base of the leaf in *M. semipellucidum* is bordered with small cells.
Luzon, Panay, Mindanao, Vietnam, Cambodia, Sumatra, Borneo, New Guinea.
9. *Rhizogonium spiniforme* (Hedw.) Bruch — On trunks in low positions, nos. 1436, 1437.
Pantropical.
10. *Hypnodendron vitiense* Mitt. — Very common on trunks, in ridge forest, nos. 1430, 1443, 1446, 1447.
Fiji, Solomon Islands, Luzon (MQ), Negros, Mindanao.
11. *Mniodendron fusco-mucronatum* (C. Muell.) Broth. — On rocks, circa 600 m; nos. 1416, 1455.
Luzon, Negros, Biliran, Mindanao.
12. *Endotrichella maquilinensis* P. Tixier sp. nov. — On twigs, nos. 1400 (c. fr.), 1414, 1418 (c. fr.), 1424, 1425.
13. *Endotrichella compressa* (Mitt.) Broth. — On twigs, nos. 1400 (c. fr.), 1436.
Borneo, Luzon.
14. *Symphysodon subneckeroideus* Broth. — On trunk, nos. 1424, 1400.
Sumatra, Java, Borneo, Panay, Luzon, Negros, Mindanao, New Caledonia.
15. *Aerobryopsis longissima* (Doz. & Molk.) Fleisch. var. *prostratula* (C. Muell.) Fleisch. — On twigs, nos. 1418, 1424, (c. fr.), 1399.
Luzon.
16. *Aerobryidium* cf. *filamentosum* (Hook.) Fleisch. — On twigs, no. 1403.
Near *A. filamentosum* by length and colour of leaves, differing only by shape of the cells. I also found this taxon in South Vietnam.
Nilghiries, Sikkim, Ceylon, Yunnan, Szechwan, Sumatra, Vietnam, Laos.
17. *Barbella* cf. *clemensiae* Broth. — On trunks, nos. 1401, 1437.
Luzon.

18. *Himantocladium cyclophyllum* (C. Muell.) Fleisch. — On trunks, circa 700 m, no. 1455.
Java, Celebes, Borneo, New Caledonia, Tahiti, Luzon (MQ), Mindoro, Negros, Biliran, Mindanao, Basilan.
19. *Homaliiodendron flabellatum* (Sm.) Fleisch. — On trunk, no. 1457.
India, Ceylon, Japan, Malaya to Hawaii Islands, Philippines, New Caledonia, Indochina.
20. *Pinnatella* cf. *ambigua* (Bosch. & Lac.) Fleisch. — no. 1435.
This small plant, 1 cm high, may be allied to *P. nana* (Williams) Fleisch. Bhotan, Burma, Sumatra, Java, Thailand, Luzon, Palawan, Negros, Mindanao.
21. *Eriopus microblastus* Broth
Very small specimen, epiphytic on *Clastobryum cuculligerum*. The drawing of Bartram is correct but it seems better to follow Brotherus and to separate *E. microblastus* from *E. parviretus*. The denticulation of the edge is, in the former species, denser, no. 1409.
Luzon, Negros.
22. *Chaetomitrium perarmatum* Broth. — On twigs, nos. 1408, 1411, 1414, 1415.
Mountain Province, Apayo district (Luzon).
23. *Thuidium glaucinum* (Mitt.) Bosch. & Lac. — On twigs, no. 1400.
Himalaya, Southern India, Ceylon, Thailand, Cambodia, Vietnam, Japan, Luzon (MQ), Negros.
24. *Clastobryum cuculligerum* (Lac.) P. Tixier — Whitish mat on twigs, nos. 1409, 1412 (c. fr.), 1416 (c. fr.).
Java, Thailand, Cambodia, Vietnam, Luzon (Benguet), New Guinea, New Caledonia.
25. *Trismegistia calderensis* (Sull.) Broth. — nos. 1441, 1444.
Sumatra, Malaya, Luzon (MQ).
26. *Acanthocladium piliferum* (Broth.) P. Tixier **comb. nov.**
Syn.: *Acanthocladium longipilum* Broth. Beih. Bot. Centralbl. 28, 2, (1909), 361.
Raphidostichum eberhardtii (Thér. & Varde) Broth. Nat. Pfl. 2, 11, (1925), 434.
Raphidostichum luzonense Broth. Nat. Pfl., 2, 11, (1925), 435.
Raphidostichum piliferum (Broth.) Broth. Nat. Pfl., 2, 11, (1925), 434.
On twigs and trunk, nos. 1426, 1445.
Species of variable size, distributed from Thailand to Philippines.
27. *Warburgiella cupressinoides* C. Muell. — On branches, nos. 1413, 1421.
Luzon, Panay, Mindanao, New Caledonia.
28. *Acroporium diminutum* (Brid.) Fleisch. — On twigs. nos. 1416, 1420.
Sumatra, Java, Malaya, Luzon (MQ), Mindanao, Moluccas.

29. *Acroporium hermaphroditum* (C. Muell.) Fleisch. — On trunk, no. 1455.
Thailand, Sumatra, Java, Celebes, Moluccas, New Guinea, New Caledonia, Luzon (MQ), Mindanao.
30. *Acroporium secundum* (Reinw. & Hornsch.) Fleisch. — On trunks and twigs, nos. 1402, 1425, 1426, 1440, 1446, 1454.
Java, Sumatra, Borneo, Celebes, Ceram, Luzon (MQ); Negros, Mindanao.
31. *Ectropothecium buitenzorgii* (Bel.) Jaeg. — On twigs and trunks, nos. 1413, 1438.
Widely distributed in South East Asia.
32. *Ectropothecium falciforme* (Doz. & Molk.) Jaeg. — On trunk and twigs, nos. 1413, 1426, 1442, 1444, 1448.
Luzon, Panay, Negros, Sumatra, Java, Lombok, Borneo, Celebes.
33. *Ectropothecium ichnotocladum* (C. Muell.) Jaeg. — On trunk, no. 1398.
Luzon (MQ), Bohol, Mindanao, Sumatra, Java, Borneo, Celebes, Ambon, Vietnam, New Caledonia.
34. *Isopterygium albescens* (Hook.) Jaeg. — Twigs, nos. 1415, 1419, 1436.
India and Indochina, Malesia, Japan, Pacific Islands.

II HEPATICAE

1. *Metzgeria furcata* (L.) Dum. — Epiphyllous, no. 1370.
Cosmopolitan.
2. *Chiloscyphus communis* St. — On trunk in low position, no 1436.
Assam, Vietnam, Cambodia, Sikkim, Japan, Java, Borneo, Queensland, Luzon (MQ).
3. *Schistochila aligera* Nees & Bl. — On trunk, nos. 1443, 1447.
Java, Sumatra, Moluccas, New Hebrides, Nicobar, Borneo, Ambon, Philippines, Samoa, Vietnam, Thailand.
4. *Lepidozia* cf. *subintegra* Ludg. — no. 1439.
South East Asia.
5. *Herberta* cf. *minima* Horik. — On trunk, very poor specimen, no. 1445.
Formosa.
6. *Trichocolea pluma* Mont. — no. 1446.
Cosmopolitan.
7. *Radula anceps* Lac. — Epiphyllous, no. 1378.
Java, Luzon, New Caledonia.
8. *Radula borneensis* St. — Epiphyllous on *Selaginella* sp. no. 1359.
Southern India, Borneo, Vietnam, Cambodia.
9. *Archilejeunea mariana* (G.) St. — Epiphyllous, no. 1445.
Formosa, Botel Tobago, Thailand, Sumatra, Java, Sarawak, Philippines, Celebes, New Guinea, Mariannas, New Caledonia, Solomon Islands, Tahiti.

10. *Ceratolejeunea maritima* St. — On twigs, corticolous, no. 1409.
Carribean region.
11. *Cheilolejeunea (Xenolejeunea) ceylanica* (G.) Schust. & Kachr.
Epiphyllous, no. 1405.
Tropical Asia, Ceylon, Pulau Penang, Ambon, New Guinea, Formosa, Vietnam, Cambodia.
12. *Cololejeunea floccosa (Taeniolejeunea)* (L. & L.) St.
Epiphyllous, no. 1395.
Japan, Ryukyu, Formosa, China, Philippines, Borneo, Java, Sumatra, Vietnam, Chittagong, Thailand, Cambodia, Laos, Tanzania.
13. *Cololejeunea gynophthalma (Taeniolejeunea)* Bx. — Epiphyllous, no. 1396.
Sumatra, Java, Vietnam, Cambodia, Malaya.
14. *Cololejeunea maquilinensis (Taeniolejeunea)* P. Tixier — Epiphyllous, no. 1394. Endemic.
15. *Cololejeunea pseudoschmidtii* (Globigerae) P. Tixier **sp. nov.**
Epiphyllous, no. 1394 (TYPE).
16. *Cololejeunea hispidissima* (St.) P. Tixier **comb. nov.** (Syn.: *Leptocolea hispidissima* St. Spec. Hep., VI, 243, 1923). Epiphyllous, no. 1394.
17. *Cololejeunea haskarliana* (G.) Bx. var. *luzonensis* **var. nov.** Epiphyllous, no. 1375.
18. *Cololejeunea haskarliana* (G.) Bx. var. *thermarum* **var. nov.** Epiphyllous, no. 1377.
19. *Cololejeunea selaginellicola* (Venustae) P. Tixier **sp. nov.**
Very common, epiphyllous, no. 1383.
20. *Cololejeunea armata* (Venustae) P. Tixier **sp. nov.** — Epiphyllous no. 1383.
21. *Cololejeunea flavicans (Lasiolejeunea, latebrosae)* (St.) Mizutani. Epiphyllous, nos. 1360, 1362.
Endemic of Luzon.
22. *Cololejeunea* aff. *nymanii* (Lasiolejeunea, latebrosae) (St.) Bx. — Epiphyllous, nos. 1364, 1397.
Sumatra, Java, Borneo, New Guinea, Thailand, Vietnam, Cambodia.
23. *Cololejeunea panchoana (Lasiolejeunea, latebrosae)* P. Tixier — Epiphyllous, no. 1358.
24. *Cololejeunea vulcania (Lasiolejeunea, latebrosea)* P. Tixier — Epiphyllous, no. 1392.
25. *Cololejeunea* aff. *yulensis* (Lasiolejeunea, latebrosae) (St.) Bx. Epiphyllous, nos. 1361, 1363, 1368, 1384, 1388.
Malaya, Sumatra, Java, Borneo, New Guinea, Cambodia, Vietnam.
26. *Colura acutifolia* S.J.A. — Epiphyllous, no. 1397.
Borneo, Sumatra, Chittagong, Thailand, Vietnam.

27. *Drepanolejeunea bakeri* Herz. — Very common on the leaves. Endemic of Philippines, known also of Mt. Polis in Mountain Province.
28. *Drepanolejeunea dactylophora* (Nees) Spruce ex Herz. — Epiphyllous, no. 1383.
Luzon, Mindanao, Malaya, Java, Ambon.
29. *Lejeunea flava* (Sw.) Nees. — Corticolous.
Tropical Asia and Oceania.
30. *Leptolejeunea foliicola* St. — Epiphyllous no. 1360.
Malaya, Sumatra, Java, Vietnam, Cambodia.
31. *Leptolejeunea schiffneri* Herz. — Epiphyllous, no. 1446.
Andaman, Malaya, Sumatra, Java, Borneo, Celebes, Moluccas, Philippines.
32. *Lopholejeunea applanata* (R.B.N.) St. — Epiphyllous, no. 1446.
Java, Ryukyu, China, Japan, Borneo, Sumatra.
33. *Lopholejeunea subfusca* (Nees) St. — Corticolous, no. 1401.
Japan, Ryukyu, India, Ceylon, Malaya, Sumatra, Java, Borneo, Philippines, New Guinea, New Caledonia, Northern and Southern America, Africa.
34. *Microlejeunea cucullata* (Nees) St. — Epiphyllous, no. 1339.
Tropical Asia and Oceania.
35. *Ptychocoleus cumingianus* (Mont.) Trev. — Corticolous, no. 1435.
Andaman, Nicobar, Sumatra, Singapore, Malaya, Java, Borneo, Philippines, Indochina, Celebes, Ambon, New Guinea, Queensland, Marquesas, Samoa, Tahiti, Caroline Islands.
36. *Pycnolejeunea bidentula* St. — Epiphyllous, s.n.
Vietnam, Formosa, Ryukyu, Java, Borneo, Philippines, New Guinea, Fiji.
37. *Pycnolejeunea eximia* S.J.A. & Tixier — Corticolous, no. 1432.
Close to *P. fitzgeraldii* St.
Vietnam, China.
38. *Stenolejeunea apiculata* (G.) Schuster — Epiphyllous, no. 1360, 1388.
Formosa, Central Vietnam, Java, Cambodia, New Caledonia.
39. *Frullania apiculata* Verd. — Epiphyllous, no. 1435.
Ceylon, Indo-Malaya to Philippines, Moluccas, New Guinea.
40. *Frullania integristipula* (Nees) Nees. — On trunk, 530 m. alt. no. 1433.
Java, Malaya, Philippines.
41. *Frullania squarrosa* (R.B.N.) Dum. — Corticolous, no. 1435.
Pantropical.
42. *Frullania ternatensis* G. — Corticolous, no. 1378, 1424.
Malaya, Ceylon, Sumatra, Java, Vietnam, Borneo, Celebes, Ternate, Bataan, Philippines.

III DESCRIPTION OF NEW SPECIES

***Endotrichella maquilinensis* sp. nov.** (Fig. II).

Plantae caespitosae, caules flavi, usque ad 4 cm alti, apice divisi. Folia caulina enervia, elongata, acuminata, 4–5 mm longa, 1.2 cm lata, in parte basilari leviter plicata, apice paucidentata, auricula relative parva. Cellulae apicales pariete incrassatae, $100\ \mu$ longae, $10\ \mu$ latae; marginales $80 \times 10\ \mu$; centrales $90\text{--}100\ \mu \times 10\text{--}15\ \mu$; alares scutulatae, quadrataeve, $20\text{--}30\ \mu \times 10\text{--}15\ \mu$. Folia apicalia cum propagulis, pariete aurantiacea, 1–1.6 mm longa, $20\ \mu$ lata. Fructus proprius generis; seta 0.8 mm longa; theca ovalis, elongata, 2 mm longa, 0.8 mm lata. Bracteae perichaetiales usque ad 2.5 mm.

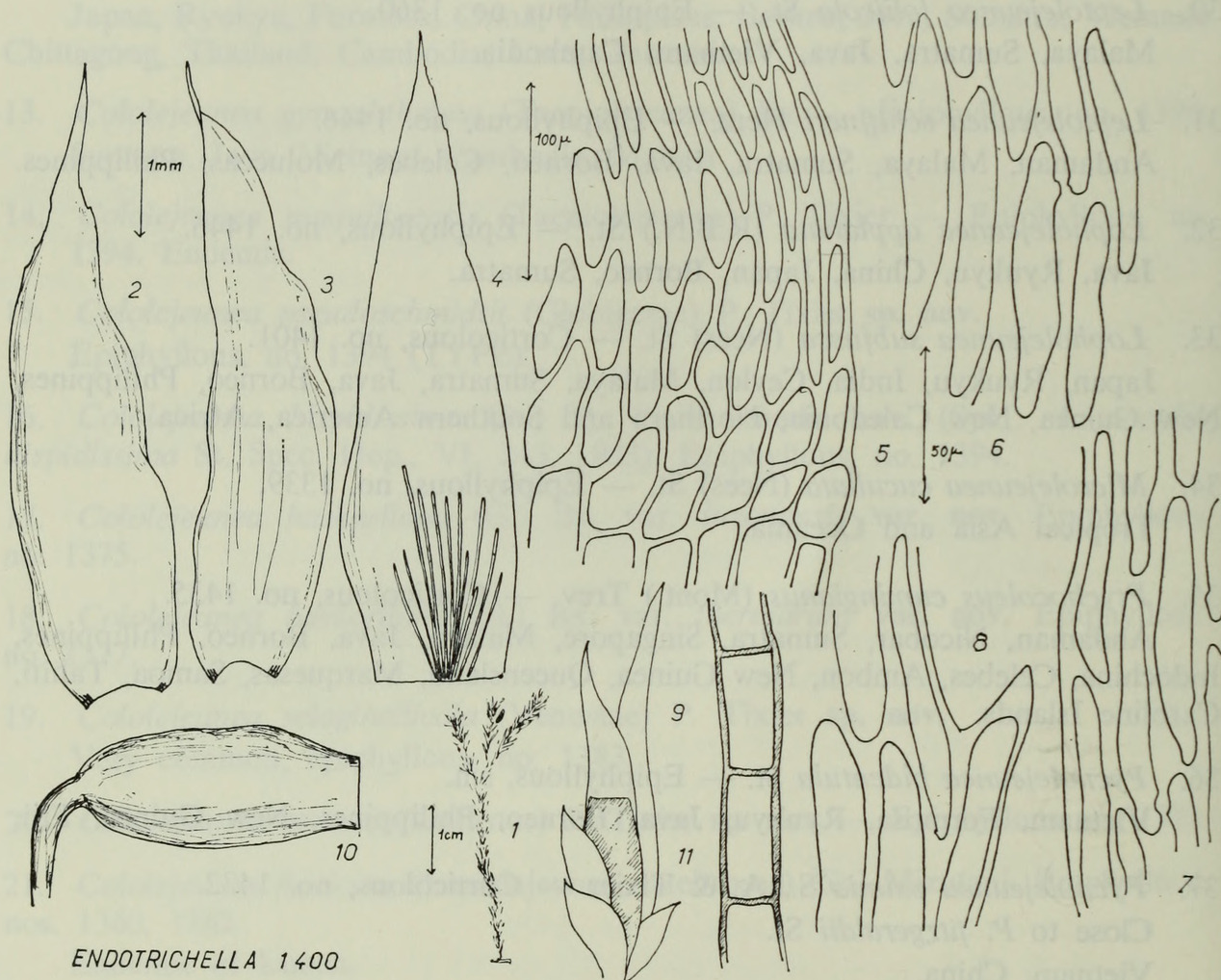


Fig. II. *Endotrichella maquilinensis* sp. nov.

1: Habit; 2–3: Leaves; 4: Leaf with propagules; 5: Auricle; 6: Leaf cells; 7: Edge cells; 8: Denticulate apex; 9: Female inflorescence; 10: Capsule.

Plant epiphytic up to 4 cm tall, branched at the top, light yellow. Stem leaves without veins, elongated, acuminate, with some folds in the basal part of the leaf. Apex with some teeth. Auricle relatively small. Cells in apex with thick walls, $100\ \mu$ long, $10\ \mu$ wide; cells of the edge $80 \times 10\ \mu$; cells of the central part $90\text{--}100\ \mu \times 10\text{--}15\ \mu$. Auricle cells lozenge-shaped to rectangular $20\text{--}30\ \mu$ long, $10\text{--}15\ \mu$ wide. Leaves of the top of the stem bearing propagules with orange coloured cell walls, multicellular, 1–1.6 mm long $20\ \mu$ wide. Fructification characteristic of the genus, seta 0.8 mm long. Ripe capsule horizontal, 2 mm long and 0.8 mm wide, oval, elongated. Perichaetial bracts up to 2.5 mm.

Species very different from all those reported by Bartram in Mosses of Philippines and in his subsequent papers. Characterized by the elongated shape of leaves and the edge entire almost up to the apex. Resembles *E. dimorphophylla* Tx. from South Vietnam.

THE COLOLEJEUNEA COMPLEX

We now arrive at a group of 6 taxa. The first is *Cololejeunea hispidissima* (St.) Tx. conformable to the type of Stephani. Benedix, in 1953, rendered intricate the question by putting together in synonymy, under the name *Cololejeunea haskarliana* (G.) Bx., taxa which are evidently different. Mizutani, in 1961, reported that *C. venusta* Lac. was unlike *C. haskarliana* (G.) Bx. sensu lato because the Sande Lacoste's species has papillous lobule cells. In Maquiling forest the author observed the sympatry of the taxa allied to *Cololejeunea haskarliana* in the locality and sometimes on the same leaf. In Tjibodas (Java) up to 4 different taxa on one leaf were collected. The author intends to return to this problem.

The following three taxa are allied to *Cololejeunea haskarliana*: *Cololejeunea pseudoschmidtii* is related to the Section Globigeræ of Benedix, *Cololejeunea selaginellicola* and *Cololejeunea armata* to Section Venustæ of Mizutani.

***Cololejeunea pseudoschmidtii* sp. nov.** (Fig. III).

Planta dioica, parva, pallide virens, sicca, ad substratum appressa. Caules usque 0.5 cm longi, 0.10 mm crassi, cum foliis 1.4 mm lati. Folia inter se 0.2 mm distantia. Lobus obovalis, 0.9 mm longus, 0.5 mm latus. Cellulæ basalis intermedio leviter incrassatae 20–40 μ longae, 15–20 μ latae haud papillosae; marginales quadratae hexagonales, 10–20 μ longae, 10–15 μ latae, cum papillis humilibus. Lobulus elongatus, inflatus, 0.25 mm longus, 0.15 mm latus, papillosus ad carenam.

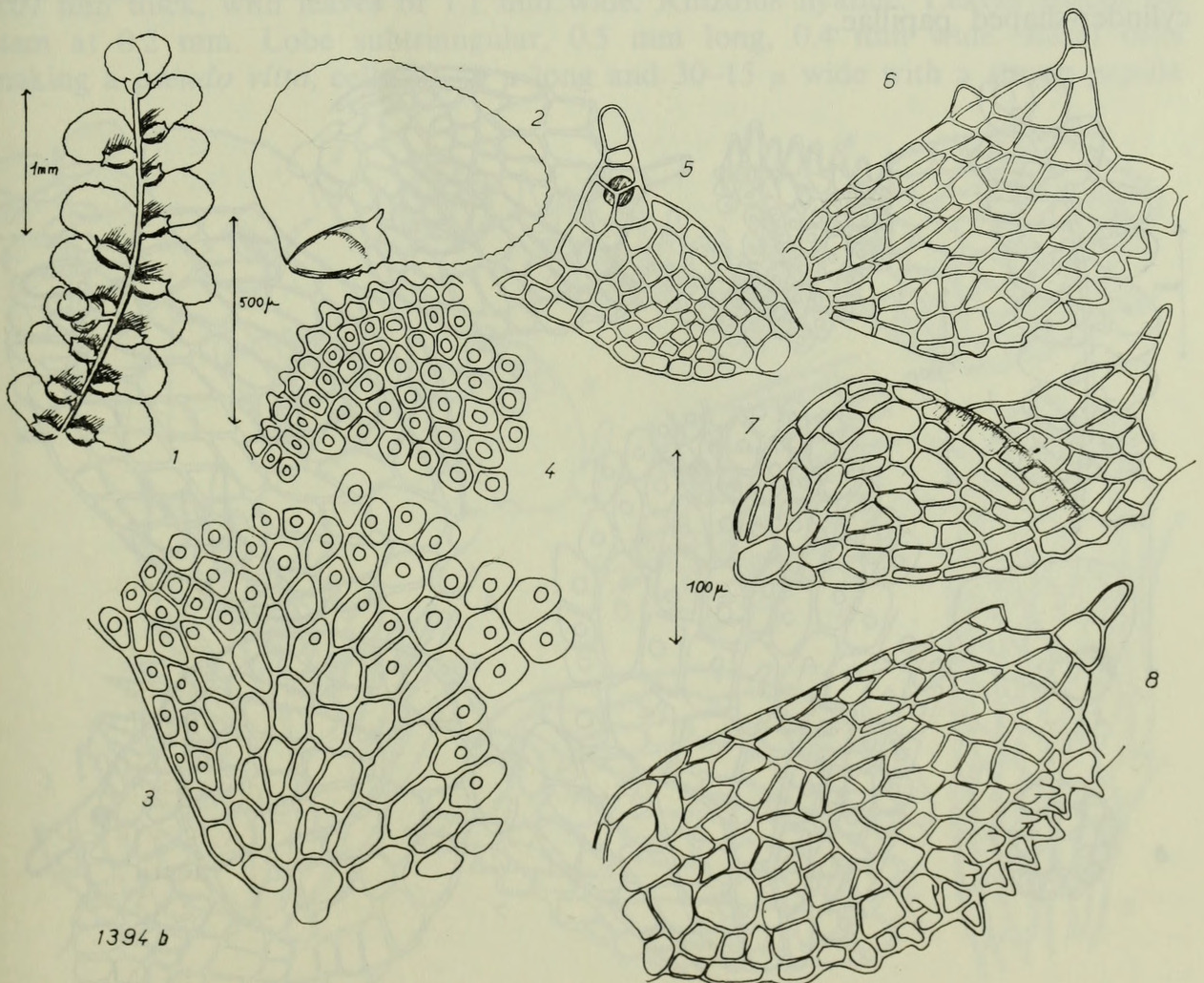


Fig. III. *Cololejeunea pseudoschmidtii* sp. nov.

1: Stem; 2: Leaf; 3: Basal part of the lobe; 4: Edge of the lobe; 5: Young lobule; 6–8: Mature lobule.

Dens apicalis parvus, triangulari-unicellulatus. Dens medianus cum cellulis in 3 series dispositis, una serie, duabus alteris unicellulatus. Papilla hyaline sphaerica, sub dente media $20\ \mu$ in diametro. Stylus haud visus. Androecia lateral, $0.3\ \text{mm}$ alta, bracteis 2-jugis.

Plant dioic, small, light green, applied to the substrate. Stem $0.5\ \text{cm}$ long, $0.10\ \text{mm}$ thick, with leaves $1.4\ \text{mm}$ wide. Rhizoids hyaline. Leaves spaced on stem at $0.2\ \text{mm}$. Lobe oboval, $0.9\ \text{mm}$ long, $0.5\ \text{mm}$ wide. Basal cells with light intermediate thickenings $20\text{--}40\ \mu$ long, $15\text{--}20\ \mu$ wide, apapillose. Edge cells rectangular to hexagonal, $10\text{--}20\ \mu$ long, $15\text{--}20\ \mu$ wide with a low papilla thickened at the top similar to those of *C. schmidtii*. Lobule elongated, inflated on mature leaves, $0.25\ \text{mm}$ long, $0.15\ \text{mm}$ wide, sometimes papillose near the keel. Apical tooth weak, reduced to a triangular cell. Median tooth with 3 tiers of cells, one with 3 cells, the others with one cell only. Papilla hyaline, spheric, below the median tooth, $20\ \mu$ in diameter. Male inflorescence lateral with 2 tiers of fertile bracts, $0.3\ \text{mm}$ high.

Cololejeunea hispidissima (St.) P. Tixier *comb. nov.* (Fig. IV).

Small plant, light green, applied on substrate. Stem to $0.5\ \text{cm}$ or more, $0.07\ \text{mm}$ thick, with leaves $1.2\ \text{mm}$ wide. Rhizoids hyaline. Leaves spaced at $0.25\ \text{mm}$. Lobe oval, trapeziform, $0.5\ \text{mm}$ long, $0.4\ \text{mm}$ wide. Basal cells making a short *pseudo-vitta*, cells $20\text{--}70\ \mu$ long, $10\text{--}35\ \mu$ wide with a slight papilla. Cells of the edge more or less isodiametric, with thin walls, $10\text{--}20\ \mu \times 10\text{--}16\ \mu$ with cylinder-shaped papillae.

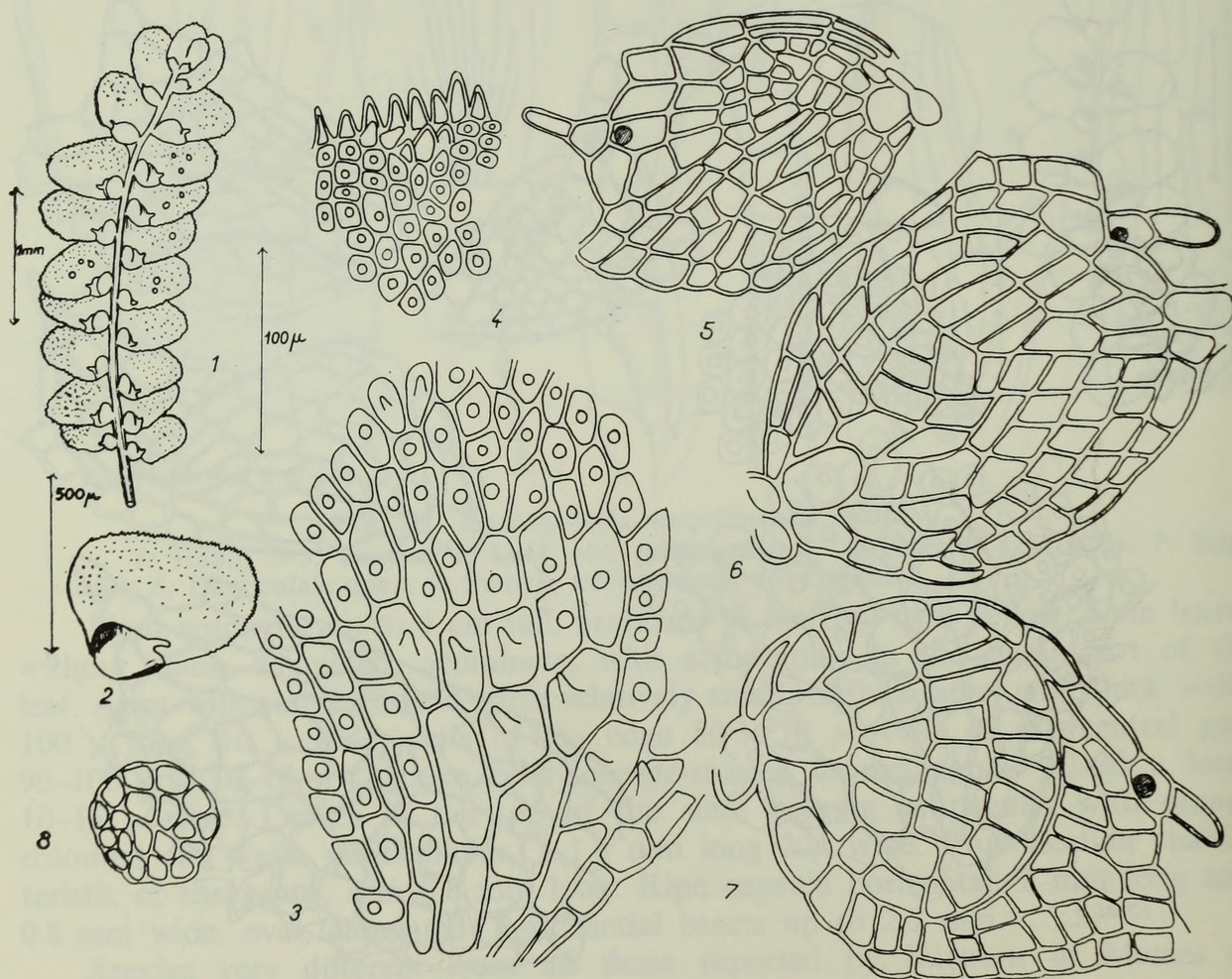


Fig. IV. *Cololejeunea hispidissima* (St.) Tx.

1: Stem; 2: Leaf; 3: Basal part of the lobe; 4: Edge of the lobe; 5: Young lobule; 6 & 7: Mature lobule; 8: Propagule.

Lobule inflated, rounded, 0.25 mm long, 0.25 mm wide, keel without papillae. Apical tooth present on the young leaf, missing on the mature ones. Median tooth with 2 cells, young erect, repelled on the inferior edge.

Hyaline papillae spheric, 10 μ in diameter, under the first cell of median tooth. Fugaceous stylus 16 μ high and 10 μ wide. Propagules discoidal with 20 cells and 65 μ in diameter. Fructification unknown.

Cololejeunea haskarliana (G.) Bx. var. **luzonensis** var. nov. (Fig. V).

Planta dioica, parva, pallida, ad substratum appressa. Caules 0.5 cm longi, 0.07 mm crassi, cum foliis 1.1 mm lati. Rhizoidea hyalina. Folio inter se 0.2 mm distantia. Lobus subtriangularis, 0.5 mm longus, 0.4 mm latus. Cellulae basales in pseudo-vitta 30–40 μ longae, 30–15 μ latae, cum papilla crassa usque ad 25 μ altae, marginales parvae, 10–15 μ in diametro, papillosae. Lobulus ovalis 0.2 mm longus, 0.15 mm latus, carina papillosa. Dens apicalis unicellularis, dens medius cellula arcuata, latere externo lobuli locata. Una cellula e dente medio usque ad marginem posticum. Papilla hyalina subsphaerica, 10 μ in diametro. Stylus bicellularis, 40 μ altus, 10 μ latus. Propaguli disciformes, in statu 12 cellulares, 50 μ in diam. Capitula feminea 0.4 mm alta. Bractee florales cum lobo 0.4 mm longo, 0.15 mm lato, et lobulo 0.3 mm longo, 0.10 mm lato. Perianthia 0.3 mm alta, 0.2 mm lata.

Dioic plant, small, light green, applied on substrate. Stem 0.5 cm long, 0.07 mm thick, with leaves of 1.1 mm wide. Rhizoids hyaline. Leaves spaced on stem at 0.2 mm. Lobe subtriangular, 0.5 mm long, 0.4 mm wide. Basal cells making a *pseudo vitta*, cells 30–40 μ long and 30–15 μ wide with a strong papilla

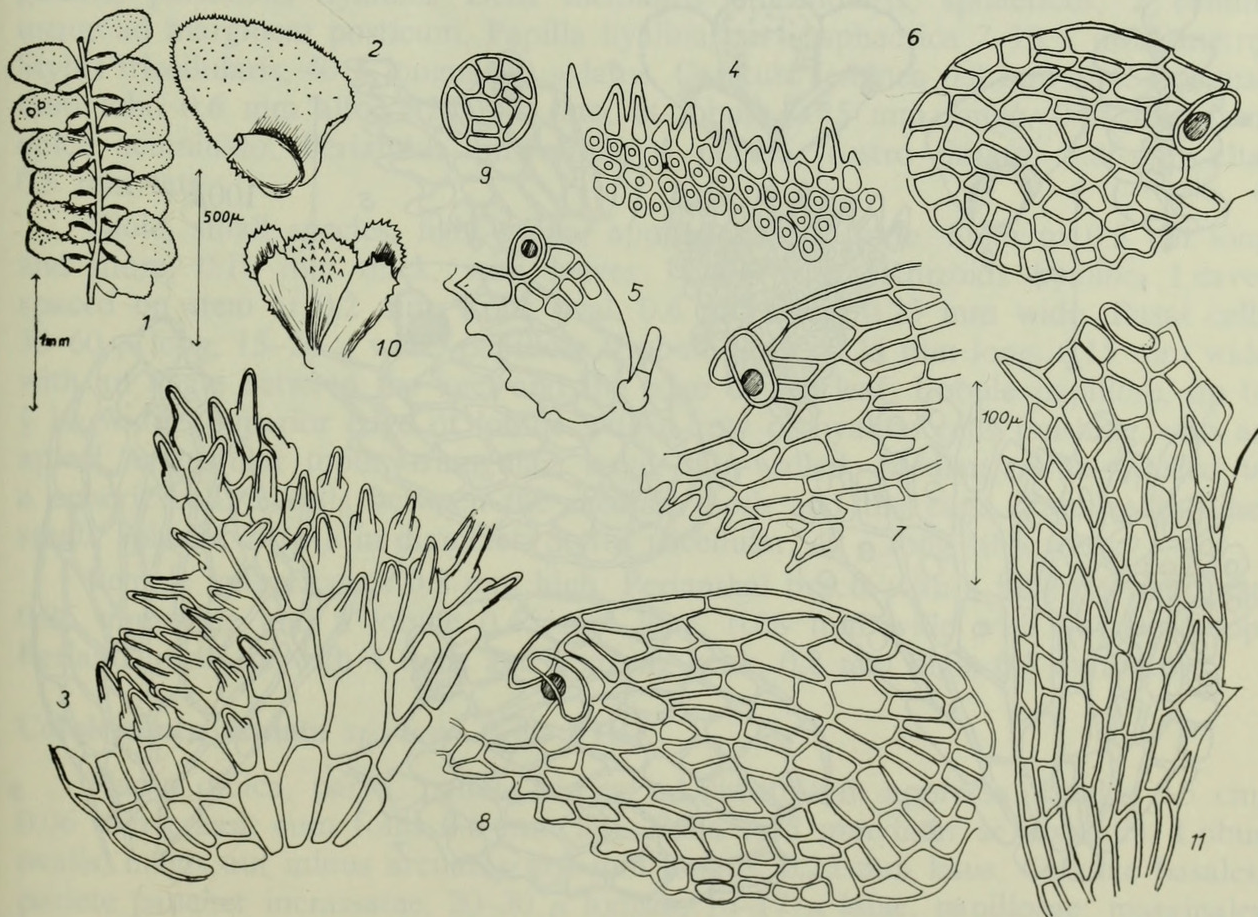


Fig. V. *Cololejeunea haskarliana* Bx var. *luzonensis* var. nov.

1: Stem; 2: Leaf; 3: Basal part of the lobe; 4: Edge of the lobe; 5: Young lobule; 6–8: Lobule; 9: Propagule; 10: Perianth; 11: Lobule of the perianthal bract.

up to $25\ \mu$ tall. Cells of the edge, small, more or less isodiametric, $10\text{--}15\ \mu$ in diameter, papillose on the edge of leaf. Lobule oval, $0.2\ \text{mm}$ long, $0.15\ \text{mm}$ wide papillose on the keel. Apical tooth unicellular, median tooth of one, arc shaped cell lying on the external face of lobule. One cell between the median tooth and the keel. Papillae spheric, hyaline, $10\ \mu$ in diameter, stylus bicellular, $40\ \mu$ high, $10\ \mu$ wide.

Young (?) propagules, $50\ \mu$ in diameter and with 12 cells. Female inflorescence $0.4\ \text{mm}$ high. Perianthal bracts with a lobe $0.4\ \text{mm}$ long, $0.15\ \text{mm}$ wide and the lobule $0.3\ \text{mm}$ long and $0.10\ \text{mm}$ wide. Perianth shorter than perianthal bracts, piriform, $0.3\ \text{mm}$ high, $0.2\ \text{mm}$ wide.

Cololejeunea haskarliana (G.) Bx. var. **thermarum** var. nov. (Fig. VI).

Planta dioica, parva, pallide virens, ad substratum appressa. Caules usque $0.5\ \text{cm}$ longi, $0.07\ \text{mm}$ crassi, cum foliis $1\ \text{mm}$ lati. Rhizoidea hyalina. Folia inter se $0.2\ \text{mm}$ distantia. Lobus subtriangularis, $0.4\ \text{mm}$ longus, $0.4\ \text{mm}$ latus. Cellulae basales in pseudo-vitta, $30\text{--}60\ \mu$ longae, $15\text{--}30\ \mu$ latae cum papilla humili ($10\ \mu$ alta): marginales parvae, $10\text{--}20\ \mu \times 10\text{--}15\ \mu$ metientes. Papillae per tutam marginem. Dens apicalis unicellularis, triangularis, pariete hyalinis. Dens medius unicellularis, rotundatus cum dente medius decussatus: 1 cellula unter dentem medianum et marginem posticum. Papilla hyalina subsphaerica, $25\ \mu$ in diametro. Stylus unicellularis, $30\ \mu$ altus, $10\ \mu$ latus. Capitula feminea $0.5\ \text{mm}$ alta. Bractee florales cum lobo $0.5\ \text{mm}$ longo, $0.25\ \text{mm}$ lato, et lobulo $0.3\ \text{mm}$ longo, $0.15\ \text{mm}$ lato. Perianthia piriformia, inflata, 4 plicata, $0.5\ \text{mm}$ alta, $0.3\ \text{mm}$ lata.

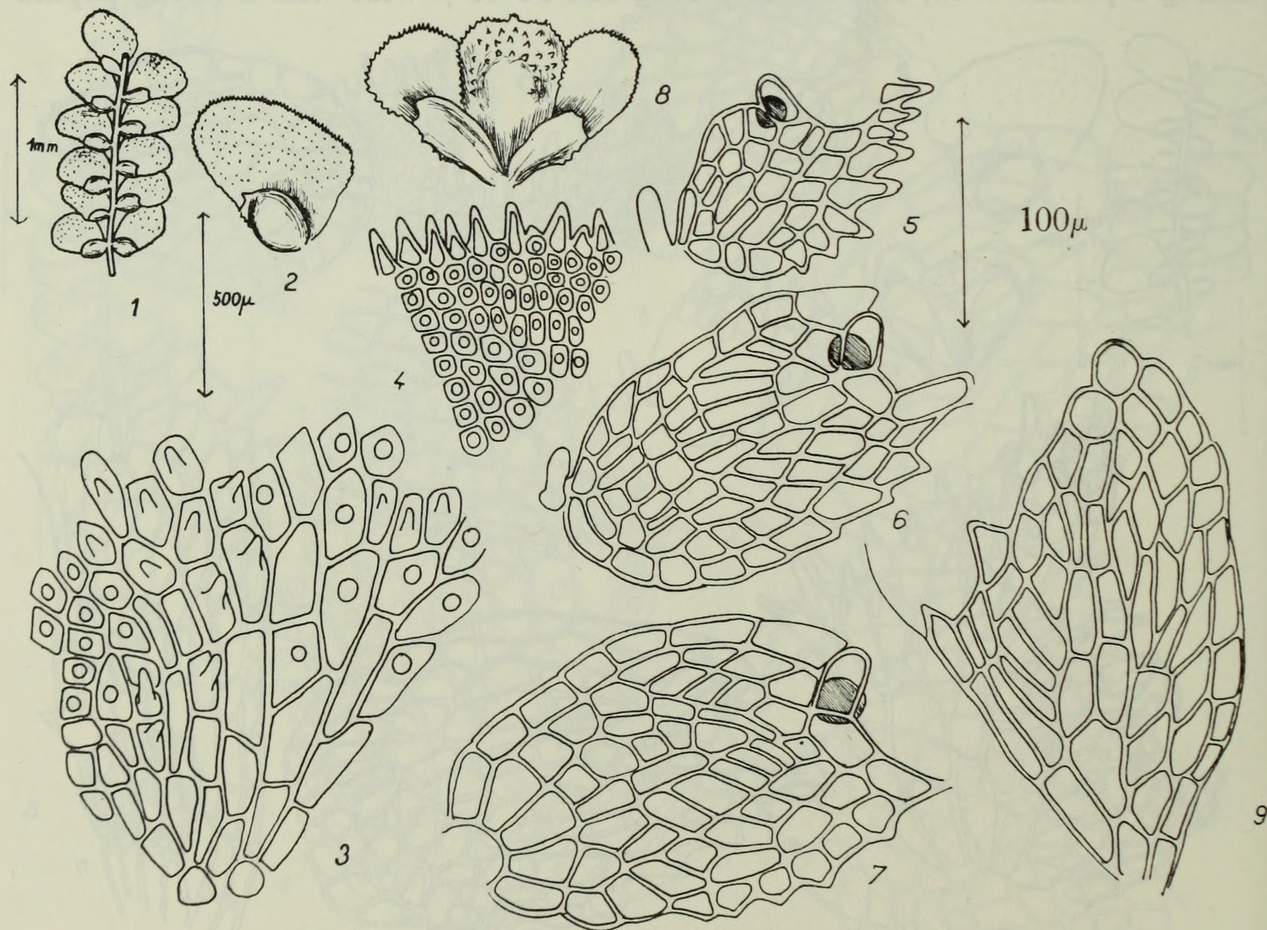


Fig. VI. *Cololejeunea haskarliana* Bx var. *thermarum* var. nov.

1: Stem; 2: Leaf; 3: Basal part of the lobe; 4: Edge of the lobe; 5: Young lobule; 6 & 7: Lobule; 8: Perianth; 9: Lobule of the perianthal bract.

Small dioic plant, light green, applied on substrate. Stem to 0.5 mm long, 0.07 mm thick, with leaves 1 mm wide. Rhizoids hyaline. Leaves spaced on stem at 0.2 mm. Lobe subtriangular, 0.4 mm long and 0.4 mm wide. Basal cells making a *pseudo-vitta*, cells 30–60 μ long and 15–30 μ wide with a low papilla 10 μ high. Edge cells small, more or less isodiametric, 10–20 μ long, 10–15 μ wide. Edge papillose on almost all the periphery. Oval lobule, keel lightly papillose, 0.2 mm long, 0.15 mm wide. Apical tooth triangular with hyaline walls. Median tooth unicellular, crossed with apical tooth. One cell between the median tooth and the edge. Papillae hyaline, spheric, 25 μ in diameter. Stylus unicellular, 30 μ high, 10 μ wide. Female inflorescence 0.5 mm long, perianthal bracts with a lobe 0.5 mm long, 0.25 mm wide and a lobule 0.3 mm long, 0.15 mm wide. Perianth piriform, inflated, with 4 folds, 0.5 mm high, 0.3 mm wide.

Near to the preceding species, differing by the ornamentation of leaf cells, the disposition of the lobule teeth, the shape of the papillae and the perianthal bracts.

***Cololejeunea selaginellicola* sp. nov. (Fig. VII).**

Planta dioica, parva, pallide virens, ad substratum appressa. Caules usque ad 0.6 cm longi, 0.10 mm crassi, cum foliis 1 mm lati. Rhizoidea hyalina. Folia 0.2 mm inter se distantia. Lobus ovalis, 0.6 mm longus, 0.25 mm latus. Cellulae basales 30–60 μ longae, 15–20 μ latae, papillosae; marginales, pariete incrassatae rotundatae 10–15 μ in diametro, cum papillis altis conicis. Lobulus magnus 0.25 mm longus, 0.15 mm latus, papillosus usque ad $\frac{1}{3}$ latitudinis. Margo superior lobuli cum uniseriatis cellulis hyalinalis dens apicalis magnus, unicellularis, triangularis, parietibus hyalinis. Dens medianus unicellularis, sphaericus, 2 cellulis usque ad marginem posticum. Papilla hyalina parva sphaerica 7–10 μ in diametro. Stylus tricellularis, 40 μ longus, 10 μ latus. Capitula feminea 0.8 mm alta. Bractee cum lobo 0.6 mm alto, 0.25 mm lato, et lobulo 0.45 mm longo, 0.08 mm lato, apice acuminato. Perianthia piriformia, 4 plicata, rostro notato, 0.8 mm alta, 0.5 mm lata.

Dioic, small species, light green, applied on substrate. Stem to 0.5 cm long and more, 0.10 mm thick, with leaves 1 mm wide. Rhizoids hyaline. Leaves spaced on stem at 0.2 mm. Lobe oval, 0.6 mm long, 0.25 mm wide. Basal cells 30–60 μ long, 15–20 μ wide, papillose. Lobule large, 0.25 mm long, 0.15 mm wide with an angle between the keel and the edge of the leaf. Lobule papillose, up to $\frac{1}{3}$ its width. Superior edge of lobule with a row of hyaline cells finishing with an apical, unicellular tooth, triangular, large, thin-walled. Median tooth reduced to a spheric cell; 2 cells between the median tooth and the edge. Papillae hyaline, small, spheric, 7–10 μ in diameter. Stylus tricellular, 40 μ long 10 μ wide.

Female inflorescence 0.8 mm high. Perianthal bracts with a lobe 0.6 mm long, 0.25 mm wide and a lobule 0.45 mm long, 0.08 mm wide with an acute top. Perianth piriform with 4 folds and a strong beak, 0.8 mm high, 0.5 mm wide.

***Cololejeunea armata* sp. nov. (Fig. VIII).**

Planta dioica, parva, pallide virens, ad substratum appressa. Caules 0.5 cm, 0.06 mm crassi, cum foliis 0.6 mm lati. Folia 0.15 mm inter se distantia. Lobus ovalis, magis aut minus arcuatus, 0.4 mm longus, 0.25 mm latus. Cellulae basales, pariete pauciter incrassatae, 20–30 μ longae, 10–17 μ latae, papillosae; marginales rotundatae 10 μ in diametro. Lobulus rotundatus 0.15 mm longus, 0.10 mm latus, papillosus praeter ad basin. Margo superior lobuli cum cellulis hyalinis uniseriatim dispositis usque ad dentem apicalem ipsam hyalinam. Dens medianus, bicellularis

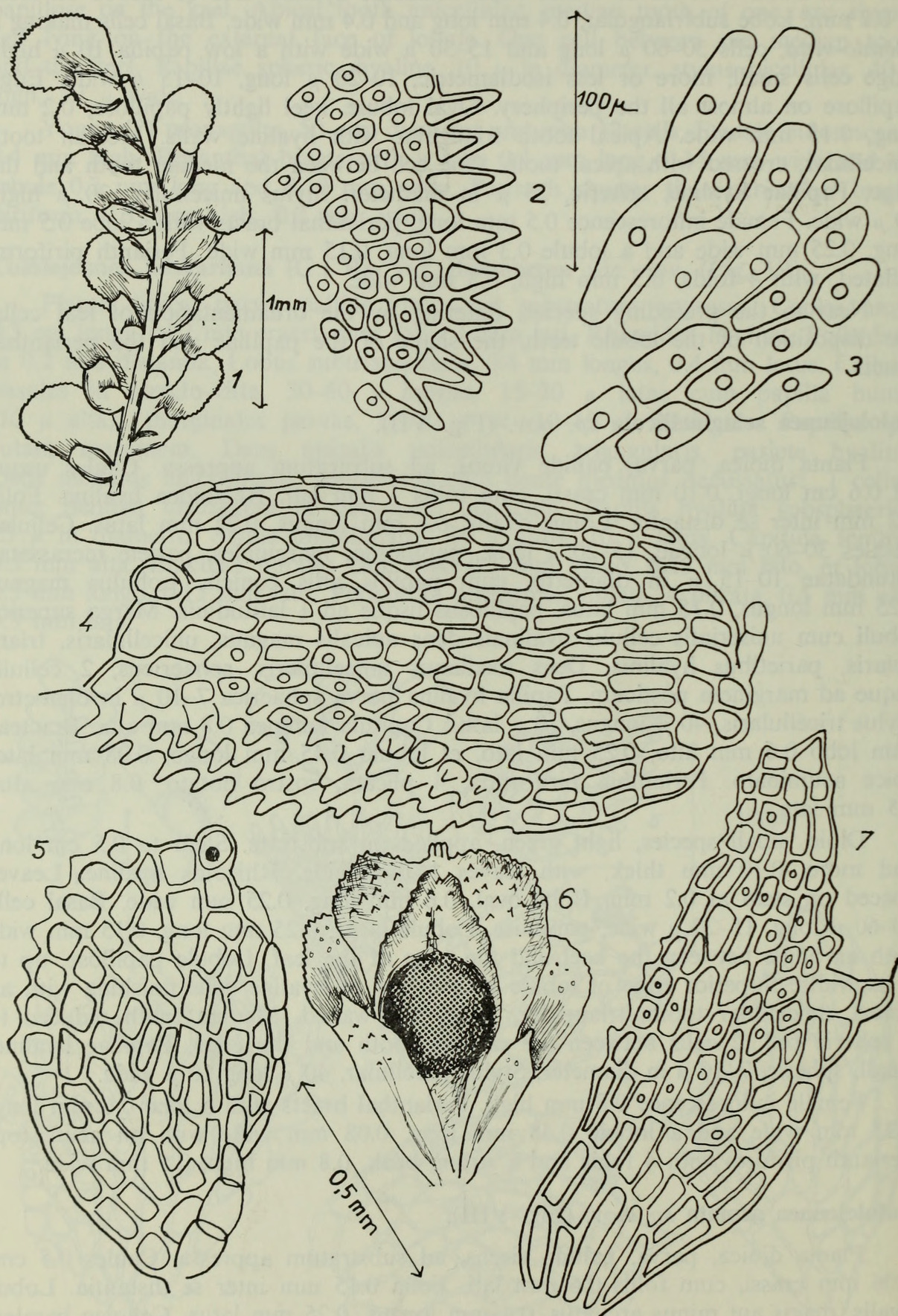


Fig. VII. *Cololejeunea selaginellicola* sp. nov.

1: Stem; 2: Edge of the lobe; 3: Basal cells of the lobe; 4: Lobule; 5: Young lobule; 6: Perianth; 7: Lobule of perianthal bract.

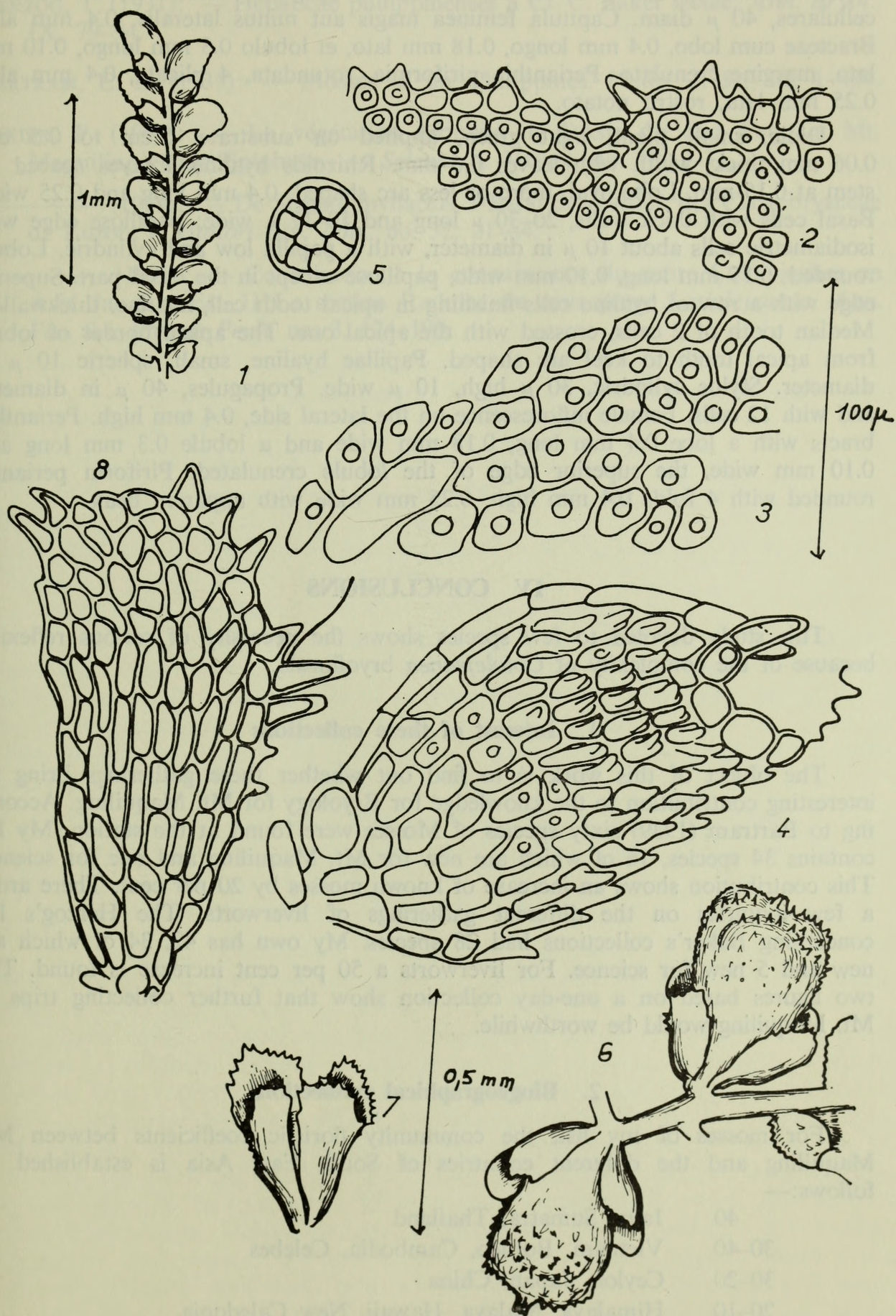


Fig. VIII. *Cololejeunea armata* sp. nov.

1: Stem; 2: Edge of the lobe; 3: Basal cells of the lobe; 4: Lobule; 5: Propagules; 6: Perianth; 7: Perianthal bract; 8: Lobule of the perianthal bract.

decussatus cum dente apicali. Papilla hyalina, parva, sphaerica, $10\ \mu$ in diametro. Stylus cylindratus, $30\ \mu$ altus, $10\ \mu$ latus. Propaguli disciformes, in statu 12 cellulares, $40\ \mu$ diam. Capitula feminea magis aut minus lateralis, 0.4 mm alta. Bracteae cum lobo, 0.4 mm longo, 0.18 mm lato, et lobulo 0.3 mm longo, 0.10 mm lato, margine crenulato. Perianthia piriformia, rotundata, 4 plicata, 0.4 mm alta, 0.25 mm lata, rostro notato.

Dioic, small plant, light green, applied on substrate. Stem to 0.5 cm, 0.06 mm thick, width with leaves 0.6 mm. Rhizoids hyaline. Leaves spaced on stem at 0.15 mm. Lobe oval, more or less arc shaped, 0.4 mm long and 0.25 wide. Basal cells with thick walls, 20–30 μ long and 10–17 μ wide; papillose edge with isodiametric cells about 10 μ in diameter, with a papilla low and cylindric. Lobule rounded, 0.15 mm long, 0.10 mm wide, papillose except in the basal part. Superior edge with a row of hyaline cells finishing in apical tooth cell, hyaline, thickwalled. Median tooth of 2 cells, crossed with the apical one. The apical border of lobule from apical tooth to keel arc shaped. Papillae hyaline, small, spheric 10 μ in diameter. Stylus cylindric, 30 μ high, 10 μ wide. Propagules, 40 μ in diameter and with 12 cells. Female inflorescence on the lateral side, 0.4 mm high. Perianthal bracts with a lobe 0.4 mm long, 0.18 mm wide and a lobule 0.3 mm long and 0.10 mm wide, the superior edge of the lobule crenulated. Piriform perianth, rounded with 4 folds 0.4 mm high, 0.25 mm wide with apparent beak.

IV CONCLUSIONS

This study devoted to few species shows the necessity of serious reflexion because of the complexity of *Cololejeunea* bryoflorula.

1. Interest of these collections

The object of this work is to find out whether these gatherings bring an interesting contribution to the knowledge for Bryology for Mt. Maquiling. According to Bartram (1939) sixty species of Mosses were found at the station. My list contains 34 species, 16 of which are new for Mt. Maquiling and one for science. This contribution shows an increase of known mosses by 20 per cent. There arose a few inquiries on the different gatherings of liverworts. The Herzog's list concerning Baker's collections had 28 species. My own has 42, 34 of which are new and 5 new for science. For liverworts a 50 per cent increase is found. The two figures based on a one-day collection show that further collecting trips to Mt. Maquiling would be worthwhile.

2. Biogeographical connections

For mosses of my list, the community floristic coefficients between Mt. Maquiling and the different countries of South East Asia is established as follows:—

40	Java, Sumatra, Thailand
30–40	Vietnam, Borneo, Cambodia, Celebes
30–20	Ceylon, Japan, China
20–10	Himalaya, Malaya, Hawaii, New Caledonia.

The main axis of affinities goes from Japan to Sunda Straits. Some relations with Hawaii and New Caledonia still remain puzzling.

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