

BRYOPHYTAE INDOSINICAE

Bryophytes from Thai Tenasserim

by

P. Tixier ¹

Resume : L'auteur donne une liste des ses propres récoltes dans la région de Ranong. Elle comprend 36 espèces de Mosses et 35 espèces d'Hépatiques. Cinq espèces sont nouvelles pour la Science : *Glassadelphus torrentium*, *Cololejeunea ombrophila*, *Cololejeunea pseudonymanii*, *Cololejeunea pusilla*, *Cololejeunea ranongensis*.

The Tenasserim Range is a badly known region from the geographical point of view, but wellknown in the biogeographical respect **Croizat** wrote, in his voluminous books, long paragraphs on the subject.

On the practical side, since her independence, Burma, of which the Tenasserim is a province disconnected herself from the outside world; the admittance remains difficult to foreign scientists.

We have old references on the region but only few recent documents. For the bryological flora we owed to the classical collection of **Parish** and more recently to that of R.D. **Svihla**.

We have, since a long time, problems about the Tenasserim, because it represents a biogeographical province, some elements of which such as orchids, may be found along the foothill of the South Annamitic Range.

On the other hand, the area is one of the wettest in South-East Asia and the rainfall is up to 5000 mm/year with only 2 or 3 dry months (Victoria Point). This natural phenomenon is of great interest, and a trip in the humid parts along the west coast of Thailand in 1965, we found that Ranong on the mainland in the Isthmus of Kra has the same climatic character as Victoria Point at the southern end of the Mergui Archipelago.

1) Laboratoire de Cryptogamie, Museum National d'Histoire Naturelle (Paris)

Though the Burmese Tenasserim is forbidden to foreign botanists, there is a possibility to visit the Thai part for a comparative study.

We must thank very sincerely, and very kindly, Mr. Tem Smitinand, Director of the Forest Herbarium, who perfectly understood our problems and supplied the logistic means. We also appreciate the valuable help of Mr. Chamlawng Phengkhlai.

I. MOSSES

1. *Fissidens sylvaticus* Griff.
Boon Ya Ban waterfalls, on wet rocks, n° 3973; Ranong, on twigs, in forest, n° 3992.
Tropical Asia, from India to Hong Kong, Java, Celebes, Borneo, Luzon, Thailand.
2. *Garckea comosa* (D. & M.) Wijk and Marg.
Boon Ya Ban waterfalls, on banks, n° 3967.
South East Asia and Indo-Malaya.
3. *Leucobryum bowringii* Mitt.
Ranong, Hot Springs, on trunk, 18/9/1968, n° 3950.
Ceylon, Malaya, Sunda Islands, Philippines, Botel Tobago, Taiwan, Japan, Thailand, Cambodia, Vietnam.
4. *Leucobryum brachyphyllum* Hpe.
Ranong, Hot Springs, on trunks, 18/9/1968, n° 3965.
Thailand, Cambodia, Vietnam, Laos, Queensland, New Caledonia.
5. *Leucophanes albescens* C.M.
Ranong, Hot Springs, on sunny trunks, 18/9/1968, n° 4001
Thailand, Java, Borneo, Luzon, Mindanao, Celebes, New Caledonia, Vietnam, Cambodia,
6. *Octoblepharum albidum* Hedw.
Ranong, on wood near the river side, 18/9/1968, s.n.
Pan Tropical.

7. *Exodictyon blumii* (C.M.) Fleisch.
Ranong, Hot Springs, on trunks, 18/9/1968, n° 3868, 3946.
Java, Borneo, Luzon, Negros, Vietnam, Cambodia.
8. *Syrrhopodon croceus* Mitt.
Ranong, Hot Springs, on trunks, 18/9/1968, n° 3964.
Ceylon, Malaysia, Cambodia, New Guinea, Solomon Islands,
Fiji, Samoa.
9. *Calymperopsis semiliber* (Mitt.) Fleisch.
Ranong, Hot Springs, 18/9/1968, n° 3897.
Chittagong, Tenasserim, Thailand, Laos, Cambodia, Vietnam.
10. *Thyridium fasciculatum* (Hook. & Grev.) Mitt.
Ranong, Hot Springs, 18/9/1968, n° 3897.
Mauritius, Ceylon, Malaya, Thailand, Queensland, New Guinea,
Chile, Cambodia, Chittagong
11. *Calymperes donnellii* Aust.
Ranong, Hot Springs, 18/9/1968, n° 4002
South America, South East Asia.
12. *Calymperes gracilescens* Broth.
Ranong, Hot Springs, on trunks, 18/9/1968, n° 3945, 3953, 4007,
4009, 4020, 4023.
Thailand, Cambodia.
13. *Calymperes hyophilaceum* C.M.
Boon Ya Ban waterfalls, 17/9/1968, n° 3980.
Java, Sumatra, Luzon, Jolo Islands, Caroline Islands, Marshall
Islands, Thailand.
14. *Calymperes serratum* A.B.
Ranong, Hot Springs, on bark, 18/9/1968, n° 4010.
Malaya, Eastern China, Thailand, Cambodia, Vietnam, Luzon,
Negros, New Caledonia, Samoa, Fiji.
15. *Hyophila involuta* (Hook.) Jaeg.
Boon Ya Ban waterfalls, on wet rocks, 17/9/1968, n° 3970
From India to Philippines and Southern China.

16. *Barbula javanica* D. & M.
Boon Ya Ban waterfalls, on wet rocks, 18/9/1968, n° 3972, 3675.
Nepal, Himalaya, Ceylon, Sumatra, Java, Celebes, Chittagong.
17. *Bryum coronatum* Schw.
Boon Ya Ban waterfalls, on wet rocks, 18/9/1968, n° 3971, 3979.
Cosmopolitan.
18. *Philonotis mollis* (D. & M.) B.J.
Boon Ya Ban waterfalls, on wet rocks, 17/9/1968, n° 3968, 3969.
Southern India, Sumatra, Java, Andaman Islands, Northern
Vietnam.
19. *Neckeropsis gracilentia* (B. & L.) Fleisch.
Ranong, Hot Springs, on twigs, 18/9/1968, n° 3890.
Nicobar, Kra Isthmus, Malaya, Sumatra, Java, Borneo,
Philippines, New Guinea, Samoa.
20. *Himanthocladium plumula* (Nees) Fleisch.
Ranong, Hot Springs, on trunk in evergreen forest, 18/9/1968,
n° 3890, 3957, 3960, 3899, 4004, 4005.
Thailand, Cambodia, Laos, Vietnam, Sumatra, Java, Borneo,
Mindoro, Mindanao, New Caledonia, Burma, Chittagong.
21. *Ephemeropsis tjibodensis* Goeb.
Ranong, Hot Springs, epiphyllous, 18/9/1968, s.n.
Laos, Cambodia, Vietnam, Thailand, Sumatra, Malaya, Java,
New Guinea.
22. *Leskeodon acuminatus* (Bryol. Jav.) Fleisch.
Ranong, wet station, 18/9/1968, n° 4015.
Java, New Caledonia.
23. *Callicostella papillata* (Mont.) Jaeg.
Ranong, Hot Springs, on decayed wood, 18/9/1968, n° 3962.
Bengal, Sumatra, Java, Borneo, Taiwan, Thailand, Vietnam,
Cambodia, Pacific Islands.
24. *Chaetomitrium papillifolium* (v. d. B. & Lac.)
Bryol. Jav.
Ranong, Hot Springs, on trunk, 18/9/1968; n° 4011.
Ceylon, Java, Borneo, Vietnam, Cambodia, Thailand.

25. *Chaetomitrium philippinense* (Mont.) v. d. B. & Lac. Ranong, Hot Springs, on twigs, 18/9/1968, n° 4018.
Javan, Ceram, Panay, Mindanao, Thailand, Chittagong.
26. *Trismegistia rigida* (H. & R.) Broth.
Ranong, Hot Springs, on bark, 18/9/1968, n° 4017.
Sumatra, Java, Borneo, Vietnam, Thailand, New Guinea,
New Caledonia.
27. *Acroporium lamprophyllum* Mitt.
Ranong, Hot Springs, on bark, 18/9/1968, n° 4000
Malaya, Sumatra, Java, Celebes, Borneo, New Guinea, Fiji,
Samoa, Luzon, Negros, New Caledonia, Cambodia, Vietnam.
28. *Trichosteleum hamatum* (D. & M.) Jaeg.
Ranong, Hot Springs, decayed wood, 18/9/1968, n° 3960.
From Malaya to Pacific Islands and Hawaii.
29. *Taxithelium cf. arnottii* Thér.
Ranong, Hot Springs, on ground in forest, 18/9/1969, n° 4003.
India, Vietnam, Thailand.
30. *Taxithelium nepalense* (Schw.) Broth.
Ranong, Hot Springs, decayed wood, 18/9/1968, n° 3961.
South East Asia and New Guinea.
31. *Glossadelphus torrentium* nov. sp.
Ranong, Hot Springs, on decayed wood, 18/9/1968, n° 3978,
4016.
32. *Ectropothecium buitenzorgii* (Bel.) Jaeg.
Ranong, on wood, near the ground, 18/9/1968, n° 3947.
Sumatra, Java, Ambon, Ceram, Celebes, Borneo, Philippines,
Malaya, Thailand, Vietnam, Cambodia.
33. *Isopterygium albescens* (Schw.) Jaeg.
Ranong, Hot Springs, decayed wood, 18/9/1968, n° 3948.
Himalaya, Ceylon, Thailand, Vietnam, Cambodia, Sumatra,
Java, Celebes, Luzon, Mindanao, Negros, Pacific Islands, Hawaii,
Burma, Assam

34. *Isopterygium minutirameum* (C.M.) Jaeg.
Ranong, Hot Springs, on bark, 18/9/1968, n° 3896, 4021.
Thailand, Cambodia, Vietnam, Sumatra, Java, Borneo, Australia,
Fiji, Marquesas, Burma
35. *Isopterygium textorii* (Lac.) Mitt.
Ranong, Hot Springs, wood near the ground, 18/9/1968, n° 3949.
Southern India, Malaya, Vietnam, Cambodia, Borneo, Taiwan,
China, Japan, Luzon, Thailand.
36. *Vesicularia kurzii* (Lac.) Broth.
Ranong, Hot Springs, wet station, 18/9/1968, n° 4013.
Banka.

III. LIVERWORTS

1. *Pallavicinia* sp.
Boon Ya Ban waterfalls, wet station, 18/9/1968, n° 3974, 4014.
2. *Chiloscyphus argutus* Nees.
Ranong, Hot Springs, wet decayed wood, 18/9/1968, n° 3968.
Tropical Asia and Australasia.
3. *Plagiochila* sp.
Ranong, Hot Springs, on twigs in forest, 18/9/1968, n° 3944.
4. *Radula acuminata* St.
Ranong, Hot Springs, epiphyllous, 18/9/1968, n° 3911, 3920,
3925, 3927, 3932.
Java, Borneo, Philippines, Japan, New Guinea, Indochina,
Thailand.
5. *Radula borneensis* St.
Ranong, Hot Springs, on bark in forest, 18/9/1968, n° 3958.
Borneo, Southern India, Indochina, Thailand.
6. *Caudalejeunea renilyba* (G.) St.
Ranong, Hot Springs, on twigs in forest, 18/9/1968, n° 4625.
Thailand, Andaman Islands, Sumatra, Java, Malaysia, Borneo,
Philippines, Celebes, Ceram, New Guinea, Marianas Islands,
Australia, New Caledonia, Samoa, Tahiti, Cambodia.

7. *Caudalejeunea stephanii* (Spr.) St.
Ranong, Hot Springs, epiphyllous in forest, 18/9/1968, n° 3927, 3932.
Tropical Asia and Oceania, Mascarenes.
8. *Cheilolejeunea* (*Xenolejeunea*) *meyeniana* (St.) Schust. & Kach.
Ranong, Hot Springs, on bark, n° 3955, epiphyllous n° 3940,
18/9/1968
South East Asia.
9. *Cololejeunea amoena* Bx.
Ranong, Hot Springs, epiphyllous in forest, 18/9/1968, n° 3921.
Chittagong, Malaysia, Java, Southern Mindanao, Laos, Cambodia,
Vietnam, Thailand.
10. *Cololejeunea appressa* (Spr.) Bx.
Ranong, Hot Springs, on bark, n° 3956; epiphyllous, n° 3937.
South Andaman, Java, Vietnam.
11. *Cololejeunea falcatoides* Bx.
Ranong, Hot Springs, on bark, 18/9/1968, n° 4008.
Sumatra, Borneo, Java, Thailand, Cambodia, Vietnam, Celebes,
Luzon, Mindanao.
12. *Cololejeunea floccosa* (Leh. & Lind.) Schiffn.
Ranong, Hot Springs, epiphyllous in forest, 18/9/1968, n° 3908,
3920, 3927, 3936.
Taiwan, Japan, Riu Kiu, China, Philippines, Borneo, Java,
Sumatra, Chittagong, Vietnam, Cambodia.
13. *Cololejeunea formosana* Mizut.
Ranong, Hot Springs, epiphyllous in forest, 18/9/1968, n° 3927.
China, Japan, Taiwan, Vietnam, Thailand.
14. *Cololejeunea ombrophila* nov. sp.
Ranong, Hot Springs, epiphyllous, 18/9/1968, n° 3942.
Vietnam, Cambodia.
15. *Cololejeunea pseudonymanii* nov. sp.
Ranong, Hot Springs, epiphyllous, 18/9/1968, n° 3911, 3920,
3925, 3927, 3932, 3936.

16. *Cololejeunea pusilla* nov. sp.
Ranong, Hot Springs, epiphyllous, 18/9/1968, n° 3942.
17. *Cololejeunea ranongensis* nov. sp.
Ranong, Hot Springs, epiphyllous, 18/9/1968, n° 3932.
18. *Cololejeunea plagiophylla* Bx.
Ranong, Hot Springs, epiphyllous, 18/9/1968, n° 3911, 3924, 3927.
Java, Cambodia.
19. *Cololejeunea sigmoidea* S.J.A. & P. Tx.
Ranong, Hot Springs, epiphyllous in forest, 18/9/1968, n° 3908, 3928, 3936.
Vietnam, Cambodia, Java, Borneo.
20. *Cololejeunea tenella* Bx.
Ranong, Hot Springs, epiphyllous, 18/9/1968, n° 3927.
Malaya, Sumatra, Cambodia, Vietnam, Western Java, Krakatau.
21. *Colura corynephora* (Nees) Trev.
Ranong, Hot Springs, epiphyllous, 18/9/1968, n° 3920, 3921.
Manila, Marianas, Sumatra, Malaya, Borneo, Vietnam.
22. *Colura tixierii* S.J.A.
Ranong, Hot Springs, epiphyllous, leaves near the ground, 18/9/1968, n° 3936, 3943.
Vietnam, Chittagong, Thailand.
23. *Drepanolejeunea micholitzii* Herz.
Ranong, Hot Springs, epiphyllous, 18/9/1968, n° 3921, 3927.
Malaya, Sumatra, Java, Celebes, Moluccas, Indochina.
24. *Drepanolejeunea laevicornua* Herz.
Ranong, Hot Springs, epiphyllous, 18/9/1968, n° 3920, 3921.
Borneo, Java.
25. *Eulejeunea* sp.
Ranong, Hot Springs, epiphyllous, 18/9/1968, n° 3925.
26. *Leptolejeunea epiphylla* L. & L.
Ranong, Hot Springs, epiphyllous, 18/9/1968, n° 3920, 3927, 3928.
From Ceylon to Tahiti.

27. *Leptolejeunea subacuta* St.
Ranong, Hot Springs, epiphyllous, 18/9/1968, n° 3932.
Cambodia, Malaya, Sumatra, Java, Borneo, Philippines, Taiwan,
Botel-Tobago, Riu Kiu, Bonin Islands, Japan, Vietnam.
28. *Leptolejeunea vitrea* Herz.
Ranong, Hot Springs, epiphyllous, 18/9/1968, n° 3920, 3921,
3927, 3932.
Malaya, Sumatra, Java, Borneo, Philippines, Moluccas, Cambodia.
29. *Lopholejeunea eulopha* (Tayl.) Spr.
Ranong, Hot Springs, epiphyllous, 18/8/1968, n° 4017, 4024, 4026.
Cambodia, Nicobar Islands, Sumatra, Malaya, Java, Borneo,
Luzon, New Guinea, New Caledonia, Queensland, Samoa, Tahiti.
30. *Lopholejeunea subfusca* (Nees) St.
Boon Ya Ban Waterfalls, on bark, 18/9/1968, n° 3891, 3976, 4024.
Tropical Asia and Oceania.
31. *Mastigophora humilis* (G.) Schiffn.
Ranong, Hot Springs, on twigs, 18/9/1968, n° 4012.
South East Asia.
32. *Microlejeunea cucullata* (Nees) St.
Ranong, Hot Springs, 18/9/1968, on bark, n° 3951, epiphyllous,
n° 3925.
Tropical Asia and Oceania.
33. *Pycnolejeunea bidentula* St.
Ranong, Hot Springs, on bark in forest, 18/9/1968, n° 3955.
Java, Borneo, Philippines, New Guinea, Fiji, Vietnam.
34. *Thysananthus spathulistipus* R.B.N.
Ranong, Hot Springs, on twigs, 18/9/1968., n° 3895.
Madagascar, Mauritius, Assam, Sumatra, Java, Borneo, Celebes,
Philippines, New Guinea, New Hebrides, Vietnam, Cambodia,
Thailand.
35. *Frullania nodulosa* (R.B.N.) Nees.
Ranong, Hot Springs, epiphyllous in forest, 18/9/1968, n° 3920.
Pan Tropical.

IV. NEW SPECIES

Glossadelphus torrentium (Figure n° 2)

Ramicola, folia flava, habitu prostrato cum ramis secundaris, tertiariis quaternaris.

Folia caulinarum, ovalia, lanceolata semper parva, nervure nullo, 1-1, 3 mm longa, 0,3 mm lata. Apex leviter crenulatus, cellulis marginis, parietibus tenuibus prope rectangularibus, aliis cellulis elongatis, rhomboidibus in apice, 60 μ longa, 10-15 μ lata. Papilla in extremitate superiori cellulae. Ala parva, margine folii papilloso, cellulis alaribus 15-40 μ longis, 10-15 μ latis. Alia desunt.

On twigs, yellow foliage, prostrate, possessing secondary, tertiary and quaternary, ramifications.

Stalk leaves oval, lanceolate, twisted, without nervure, 1-1, 3 mm long, 0,3 mm wide. Cells of the edge thin-walled, almost rectangular. Cells in the apex of leaf, elongated, rhomboidal, 60 μ long and 15 μ wide with a papilla on the upper top of the cell. Edge of the leaf papillose. Cells of the auricle 15-40 μ long and 10-15 μ wide. Reproductive parts not known.

Cololejeunea ombrophila (Figure n° 3)

Planta magna, viridis pallida, affixa substrato. Caules 1-2 cm longi, pauciter ramosi, 0,07 mm in crassitudine, cum foliis 2,3 mm.

Rhizoideis hyalinis multis. Folia 0,6 mm interse distantia, apice lobi cum margine hyalino. Cellulis hyalinis 20-40 μ \times 10-20 μ . Cellulis marginalibus 20-30 μ \times 10-20 μ ; cellulis basalibus 60-80 μ \times 20-25 μ . Cellulis cum trigonis incrassationibusque intermittentibus.

Lobus orbicularis, 1,20 mm longus, 0,8 mm lotus; lobulus reductus, triangularis, 0,2 mm \times 0,14 mm. Stylus cylindricus 20 \times 10 μ . Papilla hyalina crassa, cylindrica 40 μ \times 15 μ . Propagulis discoideis, 130 μ in diametro cum 24-26 cellulis.

Antheridium generatim axiale. Archegonia lateralia saepius aggregata secundum caulem. Folia floralia similia foliis caulinaribus cum

lobo 0,5 mm longo, 0,18 mm lato; lobuloque 0,3 mm longo, 0,08 mm lato. Perianthia piriformia, crassa, 1,1 mm alta, 0,9 mm lata cum 2 sinibus ventralibus, rostro claro.

Large species, light green, appressed on substratum. Stem 1-2 cm long, slightly ramified, 70 μ thick, breadth including leaves 2.3 mm. Rhizoids hyaline, numerous. Leaves 0.6 mm apart. Cells thin-walled with trigonous thickenings intermittently. Hyaline cells on the edge of leaf 20-40 $\mu \times 10-20 \mu$; cells of the edge 20-30 $\mu \times 10-20 \mu$; cells in the base of the leaf 60-80 $\mu \times 20-25 \mu$.

Orbicular lobe 1.20 mm \times 0.8 mm; lobule, triangular, 0.2 mm long, 0.14 mm wide.

Styles cylindric 20 \times 10 μ . Papilla hyaline, cylindric, thick, 40 $\mu \times 15 \mu$. Propagulum 130 μ in diameter with 24-26 cells. Antheridium generally axial. Archegonia lateral, sometimes in clusters along the stem. Perianthal bracts similar to those of leaves.

Lobe 0.5 mm long, 0.18 mm wide; lobule 0.3 mm long, 0.08 mm wide. Perianth pyriform, thick, 1 mm high, 0.4 mm wide with 2 ventral folds and a slight beak.

Known from Tenasserim to South Vietnam in the region of Bao Lôc, found also at Phnom Koulen in Northern Cambodia. Same distribution on the mainland as the genus *Freycinetia*.

Cololejeunea Pseudonymanii (Figure n° 4)

Planta foliicola, viridis nitens. Caules usque 1-2 cm longi, seneces ramosi, 0,050 mm in crassitudine, cum foliis 1,1 mm latis. Rhizoideis hyalinis. Folia interse 0,2 mm distantia. Cellulae parietibus tenuibus. Cellulis marginalibus folii papillois, 20 $\mu \times 15 \mu$ deinde ad centrum folii 30-40 $\mu \times 10-15 \mu$. Cellulis basalibus folii inermibus 80-40 $\mu \times 20-25 \mu$. Folia ovalia, asymetrica, angulo laevi inter lobulum et marginem posticum lobi, 0,7 mm longa, 0,4 mm lata. Lobulus prope aequalis lobo, rotundatus \pm inflatus, 0,3 mm longus, 0,2 mm latus. Carena parsque lobuli papillosae.

Dens apicalis cum una Cellula triangulari. Dens media duobus cellulis constituta, papilla hyalina ad marginem internum, sphaerica, 25

μ in diametro. Antheridium laterale 0,8 mm longum, bracteis 3-4 jugs. Archegonia lateralia. Folia floralia cum lobo 0,6 mm longo, 0,2 mm lato lobuloque 0,5 mm longo, 0,2 mm lato.

Perianthia piriformia, 1 mm alta, 0,7 mm lata, sinibus ventralibus haud claris.

Medium-sized species, epiphyllous, bright green. Stem 1-2 cm in length, ramified when mature, 0.050 mm thick, breadth including leaves 1.1 mm. Rhizoids hyaline, numerous; leaves 0.2 mm apart. Cells with thin walls, papillous in the margin of the leaf, $20 \mu \times 15 \mu$; in the centre $30-40 \mu \times 10-15 \mu$; at the base, smooth, $80-40 \mu \times 20-25 \mu$.

Lobe oval, asymmetric with a wide angle between the lobule and the lower edge of the lobe, rounded, more or less swollen, 0.3 mm long, 0.2 mm wide. Keel and a part of the lobule papillous. Apical tooth with only one triangular cell. Median tooth 2-celled.

Papilla hyaline on the inner side of the median tooth, spherical, 25μ in diameter. Antheridium lateral, 0.8 mm long, with 3-4 pairs of fertile bracts. Archegonia lateral. Perianthal bracts with a lobe of 0.6 mm long, 0.2 mm wide; lobule 0.5 mm long, 0.2 mm wide. Perianth pyriform, 1 mm high, 0.7 mm wide, with slight ventral folds.

The species is related to *C. nymanii* but to be distinguished by its lobule with papillous cells which brings it near to the section *Venustae*.

Colotejeunea pusilla (Figure n° 5)

Species parva, foliicola, viridis pallida. Caules 1-3 mm, pauciter ramosi, 0,010 mm in crassitudine, cum follis 0,8 mm lati. Rhizoideis hyalinis Folia 0,2 mm interse distantia, ovalia 0,4 mm longa, 0,2 mm lata. Lobulus elongatus usque ad mediam partem lobi 0,2 mm longus, 0,1 latus; cellulae lobuli 10-30 $\mu \times 10 \mu$. dens media unicellularis, dens apicalis haud aperta. Alia desunt.

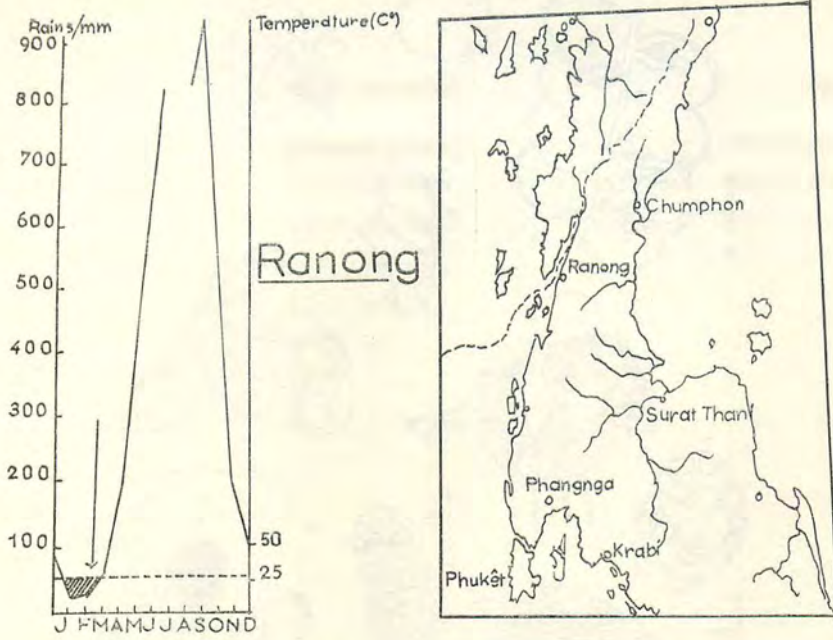


Figure n° 1. Ranong, Climatology

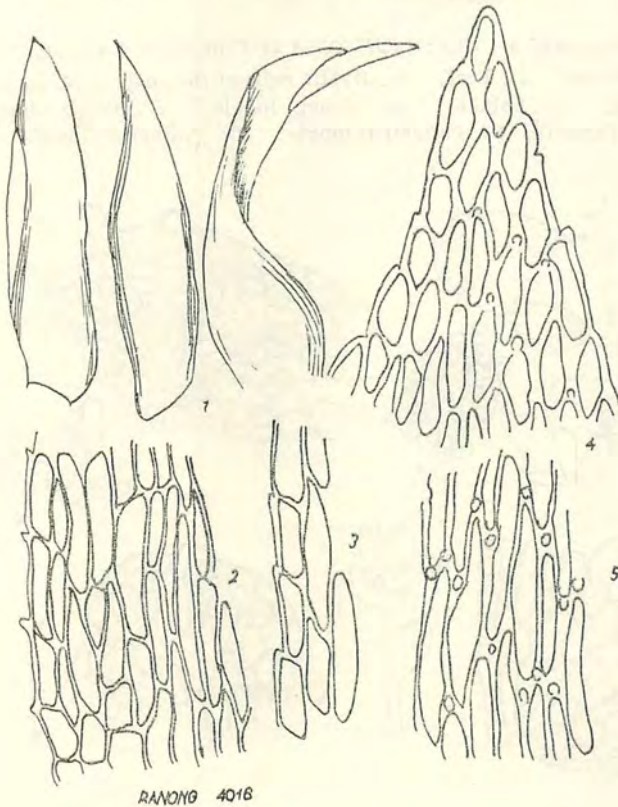


Figure n° 2. *GLOSSADELPHUS TORRENTIUM* nov; sp.
 1/. Leaf, 2/. Cells of the auricle, 3/. Cells of the edge,
 4/. Cells of the apex, 5/. Cells of the leaf.

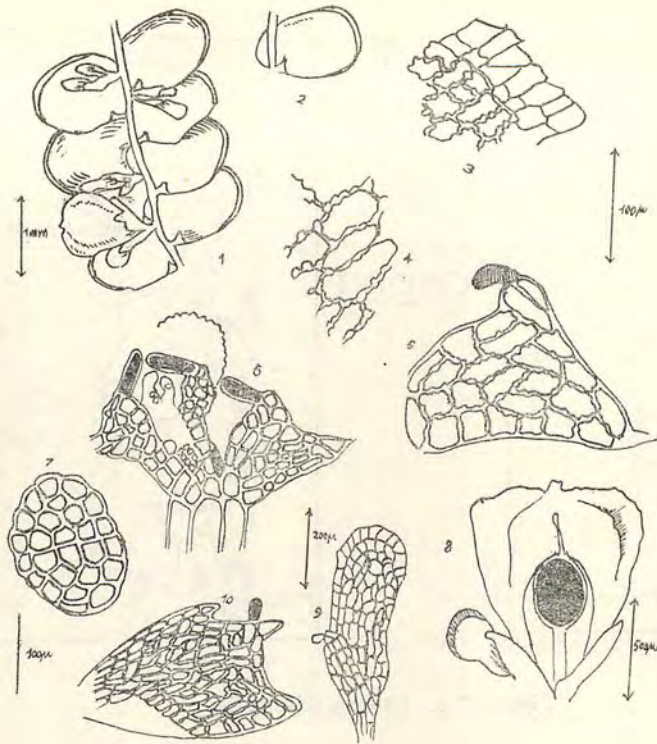


Figure n° 3. *COLOLEJEUNEA OMBROPHILA* nov. sp.

1/. Stem, 2/. Leaf, 3/. Hyalin cells of the edge, 4/. Basal cells, 5/. Lobule, 6/. Young lobule, 7/. Propagulum, 8/. Perianth, 9/. Perianthal lobule, 10/. Antheridial leaf.

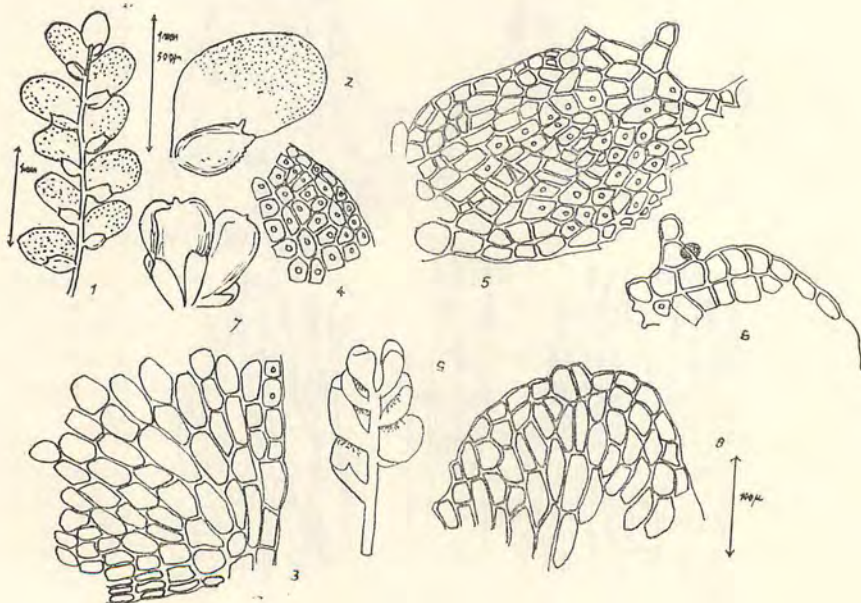
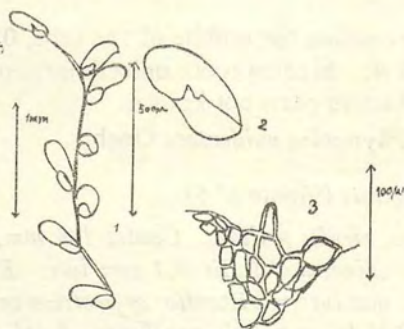


Figure n° 4. *COLOLEJEUNEA PSEUDONYMANII* nov. sp.

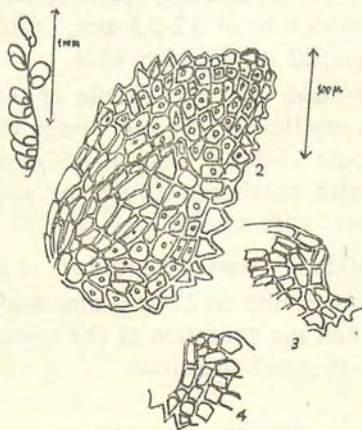
1/. Stem, 2/. Leaf, 3/. Base of the lobe, 4/. Apical portion of the lobe, 5/. Lobule, 6/. Teeth in young lobule, 7/. Perianth, 8/. Apical portion of perianthal lobule, 9/. Antheridium.



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Figure n° 5. *COLOLEJEUNEA PUSILLA* nov. sp.

1/. Stem, 2/. Leaf, 3/. Teeth of the lobule.



RANONG
3952

Figure n° 6. *COLOLEJEUNEA RANONGENSIS* nov. sp.

1/. Stem, 2/. Leaf, 3/. Teeth of the lobule 4/. Median tooth.

Small species, epiphyllous, light green, appressed to substratum. Stem 1.3 mm long, 0.010 mm thick, breadth including leaves 0.5 mm, slightly ramified.

Rhizoids hyaline. Leaves 0.2 mm apart, oval, 0.4 mm long, 0.2 mm wide.

Lobule approaching the middle of the lobe, 0.2 mm x 0.1 mm, cells 10-30 μ x 10 μ . Median tooth unicellular, apical tooth inconspicuous. Reproductive parts not known.

Related to *Physocolea unidentata* Goeb.

Cololejeunea ranongensis (Figure n° 6)

Planta parva, viridis pallida. Caules 1.3 mm, pauciter ramosi, 0.010 mm in crassitudine, cum foliis 0.4 mm lati. Rhizoideis hyalinis paucis. Folia 0.1 mm interse distantia, asymetrica ovalia, cum lobo 0.2-0.3 mm longo. Cellulae marginis papillosae ad apicem 20 μ x 15 μ . Lobulus usque mediam partem folii, 150 μ longus, 100 μ latus. Carena parsque inferior lobuli papillosae. Cellulae lobuli 15-30 μ x 10-15 μ . Dens apicalis cum una cellula, dens media arcuata inter dentem apicalem et marginem folii, 4 cellulis constituta. Papilla stylusque haud visi. Alia desunt.

Small species, epiphyllous, light green, appressed to substratum. Stem 1.3 mm long, 0.010 mm thick, breadth with leaves 0.4 mm, slightly ramified. Rhizoids hyaline; leaves spaced at 0.1 mm. Leaf, oval asymmetric; with a lobe of 0.2-0.3 mm. Cells of the lobe papillous in the upper part, 20 μ long 15 μ wide.

Lobules continued until the middle of the lobe, 150 μ long, 100 μ wide. Cells papillous on the keel and in the lower part of the lobules, cells of lobule 15-30 μ long, 10-15 μ wide. Apical tooth with one cell, median tooth arc-shaped, between the apical tooth and the margin of leaf with 4 cells.

Papilla and style not seen. Reproductive parts not known.

This species is related to *Cololejeunea haskarliana* by its leaf shape, morphology and the condition of the apical lobule, and to the section *Venustae* by its papillous lobule.

IV. CONCLUSIONS

The short trip to Ranong did not provide us any material to discuss about the phanerogamic flora; we only observed that it is of great interest. On the bryological aspect we may state the following points.

1. Floristic Wealth

Our collections are of two types :

1) The exhaustive collections as having been made in the South Annamitic Range are being undertaken in Southern Cambodia with a concentration to the same location during one or more years.

2) The casual collections have been made on short excursions to many other localities, where we stayed only one or two days to obtain a "bryological spectrum" of the area.

This type of collecting was followed at Ranong and the bryological spectrum obtained by this method is given as follows :—

	Mosses	Liverworts
Angkor (Cambodia)	12	6
Bach Ma (Vietnam)	38	30
Mt. Maquiling (Luzon)	34	41
Ranong (Thailand)	36	35

It is obvious that a "poor" locality as Angkor where we have the benefit of the peculiar microclimates of the temple moats, yielded a collection of some twenty species. On the other hand, in areas such as Mt. Maquiling, which can be considered rich, the number of species comes to about eighty. Hence we may conclude that the bryoflora of Ranong, belonging to a low region bryoflora, is one of the richest.

2. Mosses

In Ranong we found 36 species, of which the majority is widely distributed. The most interesting ones are *Leskeodon acuminatus* and *Vesicularia kurzii*, unknown on the mainland before, which differ in a certain way, from those collected on the other side of the Isthmus of Kra in the Surat Thani region. We can notice the ample specific richness of the genus *Calymperes* in the *Calymperaceae*. Only one *Thyridium* (*T. fasciculatum*) was found. *Calymperes gracilescens* may jump over the bioclimatological barrier between the Indian Ocean and the Gulf of Thailand.

Himanthocladium plumula is one of the very common mosses of the wet localities of S.E. Asia, i.e. from Chittagong to Southern Thailand. The *Sematophyllaceae* of Ranong are rather poor in

species number in comparison with Cambodia, but we did not collect in old clearings, a vegetation type preferred by certain genera of the family.

3. Liverworts

One of our aims was to find *Cololejeunea siamensis* endemic to the Cambodo–Thai coast between Koh Chang and Ream, and a distinctive taxon that should be found everywhere. In fact our data on the epiphyllous flora gave a total different result. The epiphyllous liverwort florula of Ranong is almost the same of that found at Banana Pass (Deo Chuoi along the foothill of the South Annamitic Range).

Drepanolejeunea thwaitesiana, a species of the wet ridge was collected at Banana Pass, at an altitude of 200 meters, while at Ranong *D. laevicornua*, a species sympatric with *D. thwaitesiana* [both occurring together at Bokor (Cambodia)], was collected.

Let us state, without quoting the full enumeration, that the *Cololejeunea* florulas of these are also closely related. We found, astonishingly, *Cololejeunea ombrophila*, a new taxon that we formerly considered as an endemic species of the region Bao Loc, Banana Pass (Vietnam).

4. Biogeographical relations

We have already gone through parts of the matter in the above paragraphs. It seems that, on the bryological aspect, we have an arc-shaped distribution from the Tenasserim to the South Annamitic. From a more speculative point-of-view the bryological distribution is tying up with that of *Freycinetia* (*Pandanaceae*), which ranges also from the Annamitic coast to the Tenasserim through the Phanom Dong Rek range and Phnom Koulen, the same range of distribution of our *C. ombrophila*. The Southern Cambodia, as a set-off, is thus another province related to southern Malaya and western Indonesia.

TABLE N° 1. EPIPHYLLES

Leaves	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Rate of covering	2	1	2	3	1	4	4	2	1	1	1	4	1	2	1	
Surface of leaves (cm ²)	360	54,9	180	353	148	65	42	75	60	114	471	32,9	224,5	224,5	89,4	
SPECIES																
1 Cololejeunea pseudonymanii	+	+	+	+	+	+	+	+	+							9
2 Radula acuminata	+	+	+	+	+	+	+			+						8
3 Leptolejeunea vitrea		+								+	+	+				6
4 Cololejeunea floccosa	+		+							+				+		4
5 Leptolejeunea epiphylla										+		+				4
6 Cololejeunea sigmoidea														+	+	2
7 Caudalejeunea stephanii					+		+									2
8 Drepanolejeunea micholitzii										+	+		+			2
9 Drepanolejeunea tricornua										+						2
10 Colura sp.										+						1
11 Leptolejeunea subacuta		+				+										2
12 Cololejeunea amoena				+												1
13 Cololejeunea appressa										+						1
14 Cololejeunea formosana										+						1
15 Cololejeunea ombrophila					+											1
16 Cololejeunea plagiophylla			+													1
17 Cololejeunea tenella										+						1
18 Colura tixierii														+		1
19 Lopholejeunea subfusca								+								1
20 Microlejeunea cucullata				+												1
21 Eulejeunea sp.											+	+				2
22 Xenolejeunea meyeniana	+															1
23 Frullania nodulosa	+															1

