

# Hepaticae from Truk, Caroline Islands

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The Truk Islands are situated within a large lagoon formed by an extensive somewhat circular barrier reef. Gressitt (1954) indicated about 40 islands in the lagoon with six being of some size and height. During the Miami University-Collegiate Rebel Expedition in 1960 collections were made on Mount Unibot, Tol Island, which is the highest peak in Truk reaching 452 meters. In addition, Mount Tonaken (Chukumong), 370 meters high, on Moen was explored. The ten remaining, and lower, high islands remain bryologically unknown. Only Falas and Etten of the low atoll-like islands were examined (Miller, Whittier and Bonner, 1963).

A summary of the collection numbers and localities follows:

- 676-774 Moen Island, Mt. Tonaken, in summit forest, ca. 370 meters, leg. H. O. Whittier and H. A. Miller, 28-29 July 1960.  
775-819 Etten Island, near sea level, leg. H. O. Whittier, 1 August 1960.  
820-864 Moen Island, Mt. Tonaken, sea level to 100 meters, leg. H. O. Whittier, and H. A. Miller, 2 August 1960.  
865-1022 Tol Island, Mt. Unibot, sea level to 452 meters, leg. H. O. Whittier, and H. A. Miller, 3 August 1960.  
7426-7475 Falas Island, near sea level, leg. H. A. Miller and H. O. Whittier, 30 July 1960.

The following key to species presently known from Truk is provided to encourage further study of bryophytes. Exploration of still uncollected islands in diverse ecological niches as tree tops, dripping banks, exposed rocky cliff faces, leaves, tree bark, exposed roots, soil, humus, rotting logs, and stones will surely result in numerous additions to the liverwort flora. To assist in the identification of species already known, we have provided small scaled sketches of each. Naturalists and others working in Truk or elsewhere in Micronesia who have difficulty with identifications of mosses or liverworts should forward them to the author who is preparing a handbook for the region.

## KEY TO GENERA AND SPECIES LISTED

1. Plants thallose with strap-shaped branches (*Riccardia*) ..... 2

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1. Plants leafy throughout with 2 or 3 ranks of leaves ..... 3
- 2(1). Antheridial branches lacinate fringed, branches with a narrow wing, 1-2 cells wide..... 38. *Riccardia atollica*
- 2(1). Antheridial branches winged but scarcely erose on the margin, branches with a wing usually 3-5 cells wide...39. *Riccardia trukensis*
- 3(1). Leaves simple, plane or nearly so..... 4
- 3(1). Leaves complicate bilobed with the somewhat reduced lobule folded under the lobe ..... 9
- 4(3). Leaves incubous..... 5
- 4(3). Leaves succubous..... 6
- 5(4). Underleaves wider than the stem, orbicular and with a fringed margin, leaves trifid .....1. *Bazzania paradoxa*
- 5(4). Underleaves about as wide as the stem, deeply trilobed, leaves unevenly bifid.....2. *Acromastigum obliquatum*
- 6(4). Underleaves as wide as the stem or wider and connate with the leaves (*Chiloscyphus*)..... 7
- 6(4). Underleaves absent or scale-like and free of the leaves (*Plagiochila*)..... 8
- 7(6). Leaves with 4-10 spinose cilia on the truncate tip ..... 4. *Chiloscyphus argutus*
- 7(6). Leaves shallowly bifid, truncate, with a single cilium on each segment .....3. *Chiloscyphus communis*
- 8(6). Leaves more or less quadrate, distant, and ciliate distally..... 5. *Plagiochila acanthophylla*
- 8(6). Leaves nearly deltoid from a broad base, the apical margin as well as the tip regularly ciliate.....6. *Plagiochila similima*
- 9(3). Rhizoids originating from the middle of the lobule, underleaves absent .....7. *Radula javanica*
- 9(3). Rhizoids originating from the stem, underleaves present or, if absent, replaced by a tuft of rhizoids..... 10
- 10(9). Lobule cylindrical-saccate, free of, and parallel to the stem and narrowly attached to the postical margin of the lobe ..... 8. *Frullania apiculata*
- 10(9). Lobule formed by folding of the leaf and attached to some degree to the stem (*Lejeuneaceae*)..... 11
- 11(10). Underleaves present ..... 12
- 11(10). Underleaves absent and often replaced by a tuft of rhizoids (*Cololejeunea*) ..... 35
- 12(11). Underleaves one per pair of lateral leaves ..... 13
- 12(11). Underleaves one for each lateral leaf .....32. *Colura superba*
- 13(12). Underleaves undivided at the apex (*Lejeuneaceae-Holostipae*) ..... 14
- 13(12). Underleaves divided at the apex, bifid, bilobed or notched at the apex (*Lejeuneaceae-Schizostipae*) ..... 19
- 14(13). Female inflorescence not innovated and usually terminal on a short side branch..... 15
- 14(13). Female inflorescence terminal on the main stem and once or twice innovated.....14. *Archilejeunea mariana*

- 15(14). Perianth smooth, rounded in cross-section with 3-10 smooth, weakly inflated keels, lower lobule margin incurved (*Ptychocoleus*) ..... 16
- 15(14). Perianth flat in cross-section, 3-4 angled, keels often toothed..... 17
- 16(15). Lobulus inrolled on the underside to form a nearly closed cylinder, lobulus with 2 coarse teeth...9. *Ptychocoleus cumingianus*
- 16(15). Lobulus not so strongly inrolled or flattened, lobulus faintly toothed.....10. *Ptychocoleus pycnocladus*
- 17(15). Perianth 4-keeled in cross section, keels winged or coarsely toothed, lobule lacking a distinct apical tooth, trigones absent (*Lopholejeunea*). 18
- 17(15). Perianth 3-keeled in cross-section, keels smooth or toothed, lobule with an elongate apical tooth, trigones present.....13. *Caudalejeunea reniloba*
- 18(17). Lobule inrolled but not inflated, much reduced and with rudimentary teeth.....11. *Lopholejeunea javanica*
- 18(17). Lobule inflated adjacent to the stem with a plane margin bearing well-defined teeth.....12. *Lopholejeunea subfusca*
- 19(13). Leaf lobes pointed or toothed on the margins, ocelli sometimes present. 20
- 19(13). Leaf lobes rounded, entire or slightly crenulate on the margins, ocelli absent ..... 25
- 20(19). Underleaf segments widely divergent from a subquadrate distinctly bordered basal disc, plants epiphyllous ..... 23. *Leptolejeunea subacuta*
- 20(19). Underleaf segments from a rounded, unbordered basal disc, plants epiphytic or epiphyllous (*Drepanolejeunea*)..... 21
- 21(20). Leaf margin strongly dentate to ciliate-toothed on the margin..... 22
- 21(20). Leaf margin entire to crenate-toothed on the margin ..... 23
- 22(21). Leaf cells smooth, ocelli in mid-lobe of the leaf trigones and intermediate thickenings small .....19. *Drepanolejeunea micholitzii*
- 22(21). Leaf cells mamilliose-papillate, ocelli at the base of the leaf, trigones and intermediate thickenings distinct..... 21. *Drepanolejeunea ternatensis*
- 23(21). Leaves broadly acute, cell walls thin, trigones and intermediate thickenings lacking.....20. *Drepanolejeunea ponapensis*
- 23(21). Leaves acuminate to filiform tipped, cell walls somewhat thickened or with trigones and intermediate thickenings ..... 24
- 24(23). Underleaves about the same width as the stem segments parallel to slightly divergent .....18. *Drepanolejeunea canceroides*
- 24(23). Underleaves somewhat broader than the stem segments divergent.....22. *Drepanolejeunea ualanensis*
- 25(19). Lobule of leaf  $\frac{1}{2}$  or more the size of the lobe, plants tiny (*Microlejeunea*) ..... 26
- 25(19). Lobule of leaf  $\frac{1}{4}$  or less the size of the lobe, plants mostly small to medium..... 27
- 26(25). Underleaf rounded in outline, segments 3-4 cells broad at the base.....30. *Microlejeunea cucullata*
- 26(25). Underleaf elongate in outline, segments 2 cells broad at the base .....31. *Microlejeunea lunulatiloba*

- 27(25). Underleaves of main stem 1.5–2.0 times broader than long, sinus broad and shallow, lateral branches somewhat smaller than main axes..... 15. *Hygrolejeunea sordida*
- 27(25). Underleaves of main stem about same width as length, sinus 1/3 or more, lateral branches scarcely differentiated from the main axis .... 28
- 28(27). Underleaf segment 6 or more cells broad at the base, sinus acute (*Cheilolejeunea*)..... 29
- 28(27). Underleaf segment 2–4 cells broad at the base, sinus rounded or obtuse (*Lejeunea*)..... 30
- 29(28). Keel of the lobule somewhat arched, lobule about the same length as width underleaf segment about 5 cells wide at the base ..... 16. *Cheilolejeunea grandiflora*
- 29(28). Keel of the lobule straight, lobule nearly twice as long as wide, underleaf segments about 8 cells wide at the base .. 17. *Cheilolejeunea intertexta*
- 30(28). Underleaf bifid 1/3–1/2 on main axis, sinus acute, 3–4 cells broad at the base of the segment..... 31
- 30(28). Underleaf bifid 1/2 or more on main axis, sinus rounded, segments usually narrower..... 32
- 31(30). Keel somewhat arched and joining the lobe in a gradual curve, underleaf sinus narrow, trigones none or indistinct..... 29. *Lejeunea trukensis*
- 31(30). Keel strongly arched and joining the lobe in an abrupt 90° curve, underleaf sinus broadly acute, trigones small and distinct..... 28. *Lejeunea patersonii*
- 32(30). Underleaves and bracteoles often with well developed lateral teeth..... 24. *Lejeunea aloboidea*
- 32(30). Underleaves and bracteoles lacking prominent lateral teeth... 33
- 33(32). Cells of the lobe small (16–18  $\mu$ ) and rather thick-walled ..... 27. *Lejeunea gracilis*
- 33(32). Cells of the lobe larger (20–25  $\mu$  or more) and medium-thick to generally thin-walled ..... 34
- 34(33). Perianth about 3 times the length of the bracteole, marginal walls of underleaf cells very thin and sometimes collapsed ..... 25. *Lejeunea boninensis*
- 34(33). Perianth to 2 times the length of the bracteole, marginal walls of underleaf cells not differentiated ... 26. *Lejeunea clavata*
- 35(11). Leaves with a long acuminate tip ..... 37. *Cololejeunea wightii*
- 35(11). Leaves with rounded tips..... 36
- 36(35). Leaf margins with a distal hyaline band 1–3 cells wide, cells smooth..... 37
- 36(35). Leaf margins normal and not hyaline, cells papillose ..... 38
- 37(36). Distal tooth of lobule 1–2 celled, small, perianth ca. 0.5×0.4 mm.... 34. *Cololejeunea kapingaensis*
- 37(36). Distal tooth of lobule 5–8 celled, well-developed, perianth ca. 0.7×0.6 mm ..... 35. *Cololejeunea planissima*
- 38(36). Largest tooth of lobule long, slender and curved toward the keel, stylus 2–3 celled..... 36. *Cololejeunea verrucosa*

- 38(36). Largest tooth of lobule short and straight, stylus 1 celled ....  
 ..... 33. *Cololejeunea campanulata*

### ENUMERATION OF COLLECTIONS

The first series of collections is deposited at Miami University Herbarium (MU) with representative collections distributed to TNS, G, BISH, DS, US, NSW, NY, LE, and the private herbarium of H. A. Miller.

1. *Bazzania paradoxa* (Sande Lac.) Schiffn. Conspect. Hep. Arch. Indici p. 168. 1898.

Collections: 979, 980, 983.

Distribution: New to Micronesia. Java, Sumatra, Fiji (Stephani, 1908).

This species was collected from crotches in upper branches of a large tree. Further collecting from such niches will surely expand the known liverwort flora of Truk. The large size, the strongly imbricate trilobed leaves, and the elaborately fringed underleaves are distinctive.

2. *Acromastigum obliquatum* (Mitt.) Evans. Ann. Bryol. Suppl. 3:110. 1934.

Collections: 721.

Distribution: Palau, Kusaie. Solomon Islands (Inoue and Miller, 1965).

Rotting logs in protected places where humidity remains high favor the development of this species. The straight unevenly bifid leaves are usually diagnostic.

3. *Chiloscyphus communis* Steph. Spec. Hep. 3:211. 1906.

Collections: 706, 710, 716, 727, 887, 889, 891, 893, 919, 921, 922, 933, 1014.

Distribution: New to Micronesia. Java Sumatra, Celebes, New Guinea, Timor, Andaman, Queensland, Assam, Sikkim, Japan, Samoa (Stephani, 1906).

This and the following species are distinct in their relatively large size, succubous plane leaves adnate to well developed underleaves, and ciliate leaf tips. They are usually loosely attached to decaying logs or growing on tree bases.

4. *Chiloscyphus argutus* (Nees in R.B.N.), Nees. In G.L.N. Syn. Hep. p. 183. 1845.

Collections: 688, 692, 700, 706, 710, 712, 716, 717, 730, 740, 742, 744, 765, 770, 889, 917, 954, 976, 981, 1021.

Distribution: Bonins, Kusaie. India, Burma, Assam, Mauritius, Java, Sumatra, Borneo, Banca, New Guinea, Norfolk, Australia, New Zealand, Philippines, Japan (Inoue and Miller, 1965).

This species is assigned to *Chiloscyphus* of which *Heteroscyphus* is a segregate recognized by some authors.

5. *Plagiochila acanthophylla* (Gott.) Bot. Zeit. Beih. 16:38. 1858.

Collections: 975, 976.

Distribution: New to Micronesia. Java, Sumatra, Andaman, Celebes, Tonkin, Philippines (Inoue, 1962).

Found growing in organic debris among grasses near the summit of Mt. Unibot. The plants are mostly comprised of slender branches with distant, somewhat small ciliate, more or less quadrate leaves.

6. *Plagiochila simillima* Steph. Spec. Hep. 6:208. 1921.

Collections: 894, 897, 905.

Distribution: New to Micronesia. Sumatra (Stephani, 1921).

Collections: 679, 685, 698, 703, 709, 724, 726, 729, 731, 734, 747, 760, 766, 771, 772, 773, 870, 894, 895, 898, 901, 902, 903, 906, 909, 910, 911, 912, 913, 916, 918, 920, 924, 926, 928, 932, 939, 940, 948, 949, 950, 957, 963, 965, 967, 968, 993, 1005, 1008, 1009, 1013, 1017, 1018, 1022.

Distribution: Kusaie, Bonins. Sumatra, Java, Moluccas, Borneo, Philippines, Formosa, Ryukyu, Japan (Inoue and Miller, 1965).

This species grows on the upper surfaces of leaves in moist woods. It has a characteristic odor somewhat like wintergreen when it is alive. It was so common on leaves along the trail near the top of Mt. Tonaken on Moen that there was a faint perfume in the air.

24. *Lejeunea aloboidea* Miller and Bonner. Nova Hedwigia Beih. 11:59. 1963.  
Collections: 786, 795, 7443, 7462, 7463.

Distribution: Carolines, southern Marshalls (Miller, *et al.*, 1963). Previously reported from Truk (Falas and Etten).

The *Lejeuneae* are usually epiphytic or on organic debris. The leaves are usually shiny and less imbricate than *Cheilolejeunea*. The group is a perplexing one and some intermediate forms may be difficult to identify.

25. *Lejeunea boninensis* Horik. Journ. Sci. Hiroshima Univ. ser. B, div. 2, 1: 24. 1931.

Collections: 687, 733, 739, 741, 761, 830, 840, 846, 847, 857, 878, 1002.

Distribution: Kusaie, Bonins. Japan, Ryukyu (Inoue and Miller, 1965).

This species may have a small, blunt, lateral tooth on the underleaves which have a very broadly rounded sinus. The thin marginal underleaf walls set it apart from *L. clavata* and *L. aloboidea*.

26. *Lejeunea clavata* Lindenb in G.L.N. Syn. Hep. p. 379. 1845.

Collections: 794, 797, 7435, 7459.

Distribution: Carolines, southern Marshalls (Inoue and Miller, 1965). Previously reported from Truk (Etten and Falas).

27. *Lejeunea gracilis* Steph. Spec. Hep. 5:777. 1915.

Collections: 797, 7456.

Distribution: Carolines, southern Marshalls. New Guinea (Miller, *et al.*, 1963). Previously reported from Truk (Falas and Etten).

28. *Lejeunea patersonii* Steph. Hedwigia 35:93. 1896.

Collections: 741.

Distribution: Kusaie. Java, New Guinea (Inoue and Miller, 1965).

This species is amply distinct from all other Trukese species in the abrupt angle formed at the confluence of the lobe and lobule and by the strongly crenulate margin. It was in admixture with *Hygrolejeunea sordida* in our collection.

29. *Lejeunea trukensis* Miller and Bonner. Nova Hedwigia Beih. 11:56. 1963.

Collections: 7427, 7432, 7444, 7446, 7461, 7475.

Distribution: Carolines, southern Marshalls. (Inoue and Miller, 1965). Previously reported from Truk (Falas).

30. *Microlejeunea cucullata* (R.B.N.) Steph. Bot. Centralbl. 60:106, 1894.

Collections: 683, 689, 696, 751, 759, 764, 835, 956.

Distribution: Carolines. Widely distributed from Madagascar to New Zealand and Hawaii (Inoue and Miller, 1965).

Small pale green threads running among other hepatics are usually *Microlejeunea*. In Truk, *M. cucullata* with circular underleaves is found in moist sites and *M. lunulatiloba* occurs in strand situations.

31. *Microlejeunea lunulatiloba* Horik. Journ. Sci. Hiroshima Univ. ser. B., div. 2, 1:27. 1931.

Collections: 7428, 7429, 7448, 7472.

Distribution: Bonins, Carolines, southern Marshalls, Hawaii. (Inoue and Miller, 1965). Previously reported from Truk (Falas).

32. *Colura superba* (Mont.) Steph. Spec. Hep. 5:941. 1916.

Collection: 910.

Distribution: Kusaie, Borneo, New Hebrides, Tahiti, Sumatra (Inoue and Miller, 1965).

The single collection came from the fissures in bark of a relatively coarsely barked tree of unknown identity. The erect finger-like leaves are distinctive under a hand lens so it could be recognized in the field.

33. *Cololejeunea campanulata* Benedix. Feddes Repert. Beih. 134:66. 1953.

Collections: 7459, 7461, 7465.

Distribution: Carolines. Sumatra, Java. (Inoue and Miller, 1965). Previously reported from Truk (Falas).

This species and *C. verrucosa* have large conical papillae and strongly dentate margins under the microscope.

34. *Cololejeunea kapingaensis* Miller. Bryologist 59:170. 1956.

Collections: 821, 823, 826, 870, 878, 932.

Distribution: Carolines, southern Marshalls (Inoue and Miller, 1965). Previously reported from Truk (Falas).

This closely adhering, pale yellow, almost translucent, species with a hyaline border is common on coconut rootlets. *C. planissima* is a larger plant overall and is from a moister site than the strand.

35. *Cololejeunea planissima* (Mitt.) Mizutani. Journ. Hattori Bot. Lab. 24:245. 1961.

Collections: 993.

Distribution: New to Micronesia. Japan, Ryukyu, Formosa, Tonkin, India, Ceylon. (Mizutani, 1961).

36. *Cololejeunea verrucosa* Steph. Hedwigia 34:253. 1895.

Collections: 873.

Distribution: New to Micronesia. Java, Molucca, Borneo (Benedix, 1953).

37. *Cololejeunea wightii* Steph. Hedwigia 34:253. 1895.

Collections: 775, 777, 778, 791, 806, 815, 7445, 7464.

Distribution: Carolines. New Guinea (Miller, *et al.*, 1963). Previously reported from Truk (Etten and Falas).

Decaying coconut shells are often completely covered with a loose, feathery pale green, mat of *C. wightii*. The pointed lanceolate leaves arched from the substrate are distinctive.

38. *Riccardia atollica* Miller and Bonner. Nova Hedwigia Beih. 11:68. 1963.

Collections: 818.

Distribution: Truk and Mokil (Miller, *et al.*, 1963). Previously reported from Truk (Etten).

Species of *Riccardia* usually grow on decaying wood or coconut husks in sheltered places. The thalli are variable and reasonable identifications are possible only if mature sexual branches are present. Other genera of thalloid liverworts can be expected in Truk on soil or rocky banks. Their discovery would be noteworthy.

39. *Riccardia trukensis* Miller and Bonner. *Nova Hedwigia* Beih. 11:70. 1963. Collections: 779, 802, 803, 811.

Distribution: Endemic. Previously reported from Truk (Etten).

### References

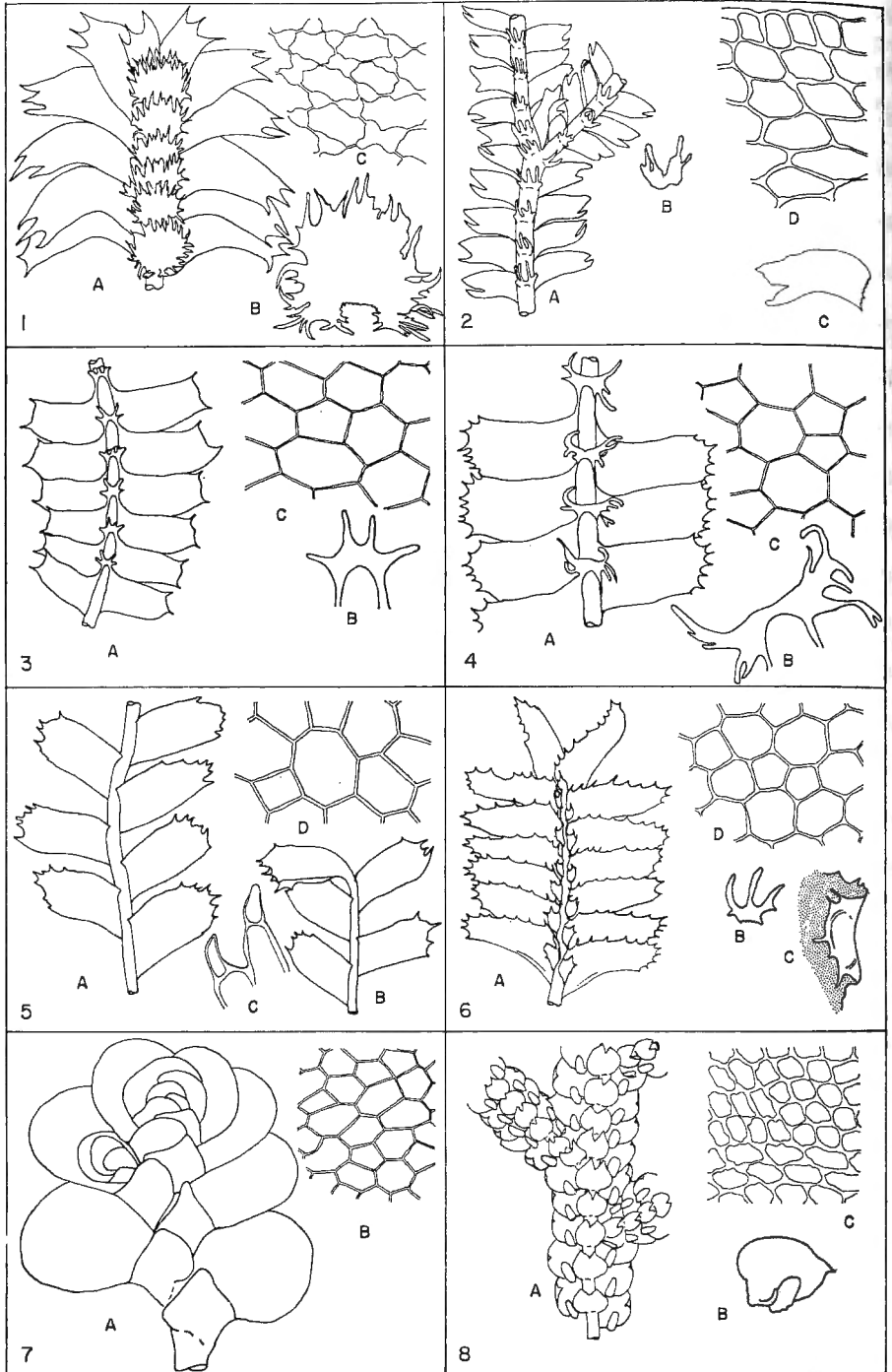
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### Explanation of Figures

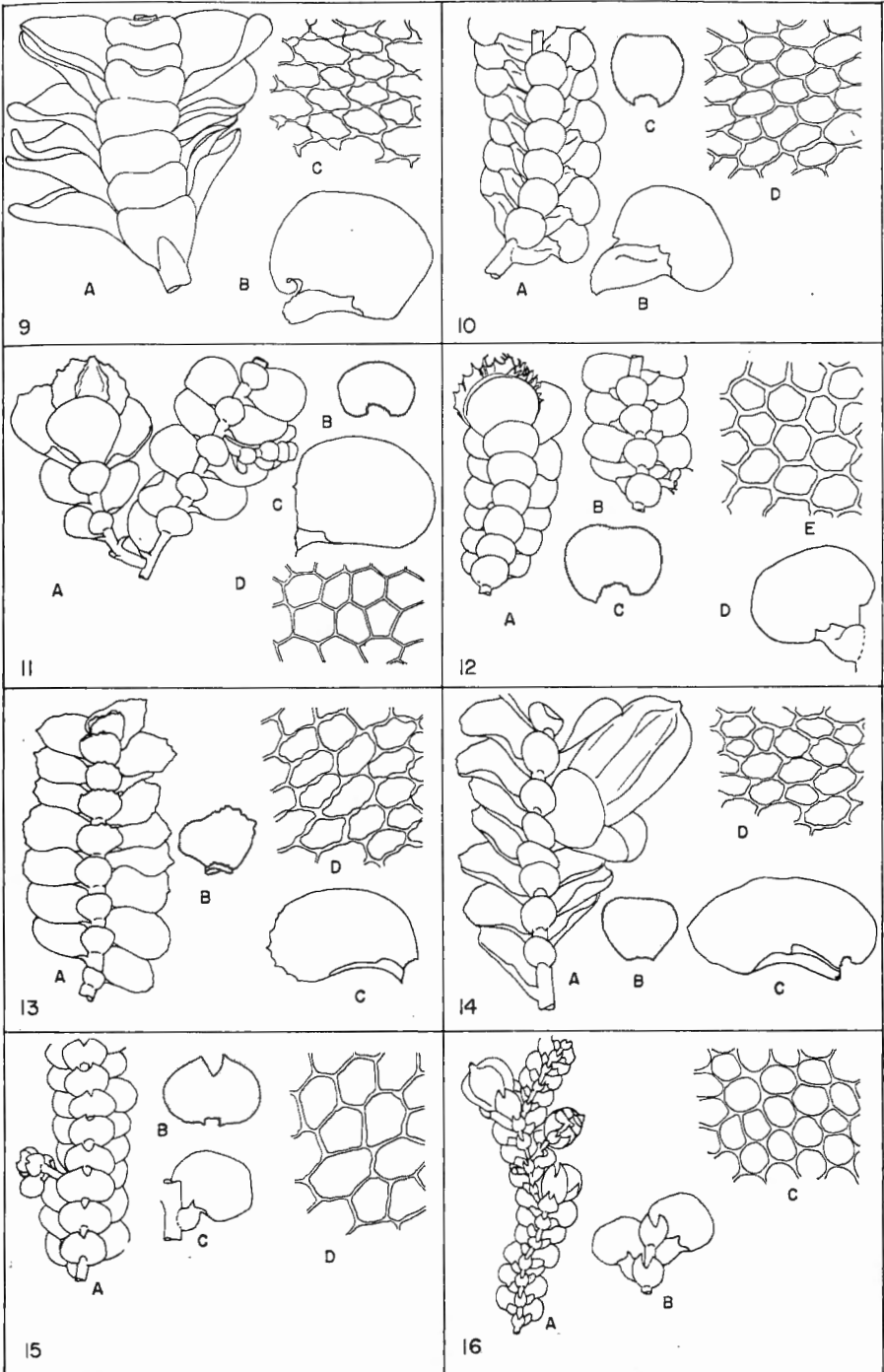
- Fig. 1. *Bazzania paradoxa*. A. ventral habit  $\times 8$ ; B. underleaf  $\times 15$ ; C. median leaf cells  $\times 240$ .
- Fig. 2. *Acromastigum obliquatum*. A. ventral habit  $\times 15$ ; B. underleaf  $\times 28$ ; C. leaf  $\times 28$ ; D. upper margin to median leaf cells  $\times 240$ .
- Fig. 3. *Chiloscyphus communis*. A. ventral habit  $\times 8$ ; B. underleaf  $\times 28$ ; C. median leaf cells  $\times 240$ .
- Fig. 4. *Chiloscyphus argutus*. A. ventral habit  $\times 8$ ; B. underleaf  $\times 28$ ; C. median leaf cells  $\times 240$ .
- Fig. 5. *Plagiochila acanthophylla*. A. ventral habit  $\times 8$ ; B. ventral habit branch  $\times 8$ ; C. underleaf  $\times 240$ ; D. median leaf cells  $\times 240$ .
- Fig. 6. *Plagiochila simillima*. A. ventral habit  $\times 8$ ; B. underleaf  $2 \times 8$ ; C. inner leaf flap  $\times 28$ ; D. median leaf cells  $\times 240$ .
- Fig. 7. *Radula javanica*. A. ventral habit  $\times 15$ ; B. median leaf cells  $\times 240$ .
- Fig. 8. *Frullania apiculata*. A. ventral habit  $\times 15$ ; B. leaf  $\times 28$ ; C. median leaf cells  $\times 240$ .
- Fig. 9. *Ptychocoleus cumingianus*. A. ventral habit  $\times 15$ ; B. leaf  $\times 15$ ; C. median leaf cells  $\times 240$ .
- Fig. 10. *Ptychocoleus pycnocladus*. A. ventral habit  $\times 15$ ; B. leaf  $\times 28$ ; C. underleaf  $\times 28$ ; D. median leaf cells  $\times 240$ .
- Fig. 11. *Lopholejeunea javanica*. A. ventral habit with perianth  $\times 15$ ; B. underleaf  $\times 28$ ; C. leaf  $\times 28$ ; D. median leaf cells  $\times 240$ .
- Fig. 12. *Lopholejeunea subfusca*. A. ventral habit with perianth  $\times 15$ ; B. ventral habit  $\times 15$ ; C. underleaf  $\times 28$ ; D. leaf  $\times 28$ ; E. median leaf cells  $\times 240$ .



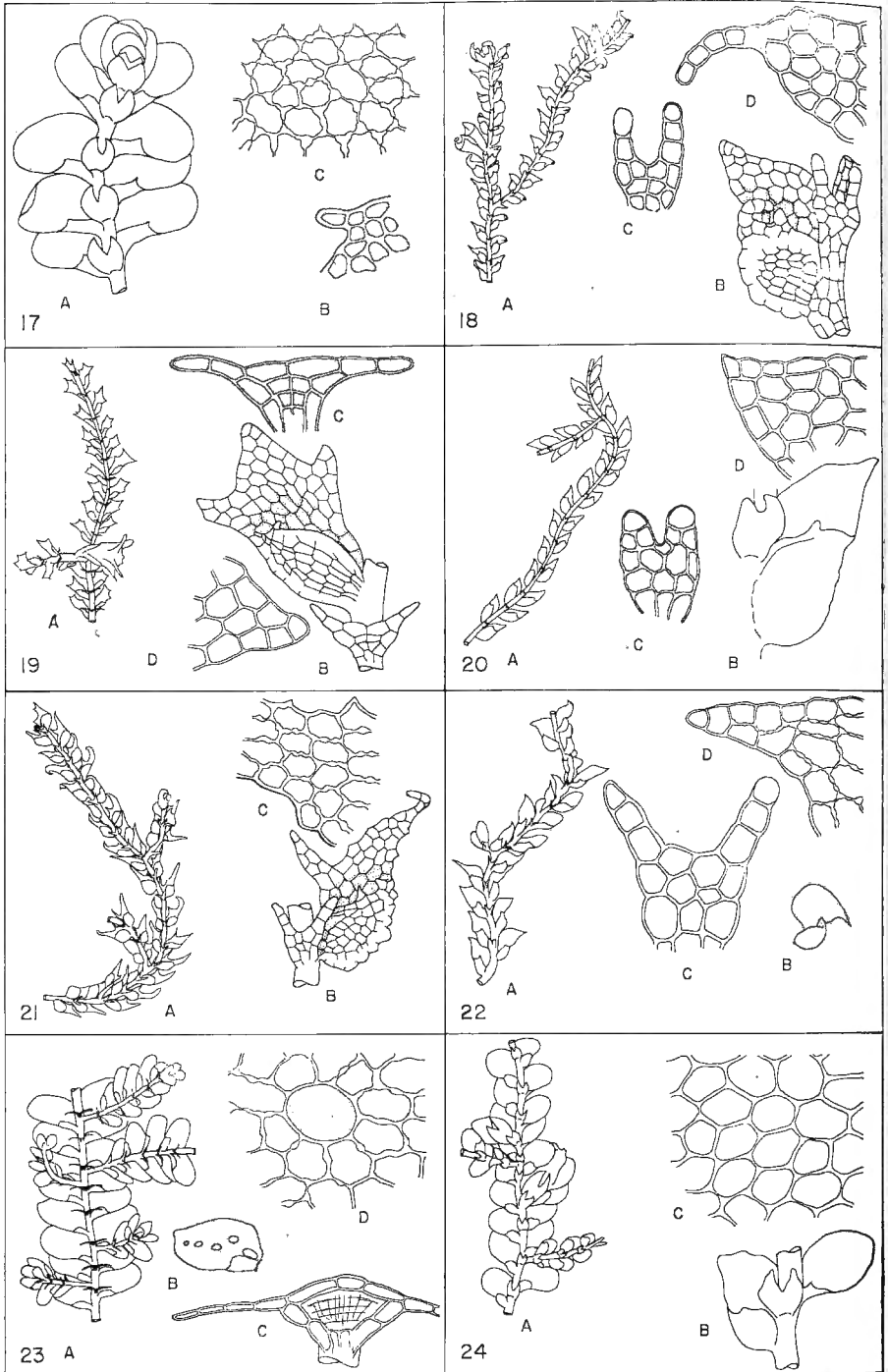
- Fig. 13. *Caudalejeunea reniloba*. A. ventral habit  $\times 15$ ; B. underleaf with both entire and erose margins  $\times 28$ ; C. leaf  $\times 28$ ; D. median leaf cells  $\times 240$ .
- Fig. 14. *Archilejeunea mariana*. A. ventral habit with perianth  $\times 15$ ; B. underleaf  $\times 28$ ; C. leaf  $\times 28$ ; D. median leaf cells  $\times 240$ .
- Fig. 15. *Hygrolejeunea sordida*. A. ventral habit  $\times 15$ ; B. underleaf  $\times 28$ ; C. leaf  $\times 28$ ; D. median leaf cells  $\times 240$ .
- Fig. 16. *Cheilolejeunea grandiflora*. A. ventral view with perianth and male spike  $\times 15$ ; B. ventral habit  $\times 28$ ; C. median leaf cells  $\times 240$ .
- Fig. 17. *Cheilolejeunea intertexta*. A. ventral habit  $\times 15$ ; B. detail of lobule tooth  $\times 240$ ; C. median leaf cells  $\times 240$ .
- Fig. 18. *Drepanolejeunea canceroides*. A. ventral habit  $\times 15$ ; B. leaf and underleaf  $\times 123$ ; C. underleaf  $\times 240$ ; D. leaf tip  $\times 240$ .
- Fig. 19. *Drepanolejeunea micholitzii*. A. ventral habit with perianth  $\times 15$ ; B. leaf and underleaf  $\times 123$ ; C. underleaf  $\times 240$ ; D. leaf tip  $\times 240$ .
- Fig. 20. *Drepanolejeunea ponapensis*. A. ventral habit  $\times 15$ ; B. leaf and underleaf  $\times 123$ ; C. underleaf  $\times 240$ ; D. leaf tip  $\times 240$ .
- Fig. 21. *Drepanolejeunea ternatensis*. A. ventral habit  $\times 15$ ; B. leaf and underleaf  $\times 123$ ; C. leaf cells  $\times 240$ .
- Fig. 22. *Drepanolejeunea ualanensis*. A. ventral habit  $\times 15$ ; B. leaf  $\times 28$ ; C. underleaf  $\times 240$ ; D. leaf tip  $\times 240$ .
- Fig. 23. *Leptolejeunea subacuta*. A. ventral habit  $\times 15$ ; B. leaf  $\times 28$ ; C. underleaf  $\times 123$ ; D. median leaf cells with ocellus  $\times 240$ .
- Fig. 24. *Lejeunea alogoidea*. A. ventral habit with perianth  $\times 15$ ; B. leaf and underleaf  $\times 55$ ; C. median leaf cell  $\times 240$ .
- Fig. 25. *Lejeunea boninensis*. A. ventral habit  $\times 15$ ; B. leaf and underleaf  $\times 55$ ; C. median leaf cells  $\times 240$ .
- Fig. 26. *Lejeunea clavata*. A. ventral habit with perianth and male spike  $\times 15$ ; B. leaf and underleaf  $\times 55$ ; C. median leaf cells  $\times 240$ .
- Fig. 27. *Lejeunea gracilis*. A. ventral habit with perianth  $\times 15$ ; B. leaf and underleaf  $\times 55$ ; C. median leaf cells  $\times 240$ .
- Fig. 28. *Lejeunea patersonii*. A. ventral habit  $\times 15$ ; B. leaf and underleaf  $\times 55$ ; C. marginal to median leaf cells  $\times 240$ .
- Fig. 29. *Lejeunea trukensis*. A. ventral habit with perianth  $\times 15$ ; B. leaf and underleaf  $\times 55$ ; C. median leaf cells  $\times 240$ .
- Fig. 30. *Microlejeunea cucullata*. A. ventral habit with perianth and male spike  $\times 15$ ; B. leaf and underleaf  $\times 123$ ; C. median leaf cells  $\times 240$ .
- Fig. 31. *Microlejeunea lunulatiloba*. A. ventral habit with perianth  $\times 15$ ; B. leaf and underleaf  $\times 123$ ; C. cells of lobe and keel  $\times 240$ .
- Fig. 32. *Colura superba*. A. ventral habit  $\times 15$ ; B. marginal to median leaf cells of lobe  $\times 240$ .
- Fig. 33. *Cololejeunea campanulata*. A. ventral habit with perianth  $\times 15$ ; B. detail of lobule  $\times 123$ ; C. median leaf cells  $\times 240$ .
- Fig. 34. *Cololejeunea kapingaensis*. A. ventral habit with perianth  $\times 15$ ; B. detail of lobule  $\times 123$ ; C. detail of apical margin  $\times 123$ ; D. median leaf cells  $\times 240$ .
- Fig. 35. *Cololejeunea planissima*. A. ventral habit  $\times 15$ ; B. detail of lobule  $\times 123$ ; C. detail of apical margin  $\times 123$ ; D. median leaf cells  $\times 240$ .
- Fig. 36. *Cololejeunea verrucosa*. A. ventral habit with perianth  $\times 15$ ; B. detail of lobule  $\times 123$ ; C. marginal to median leaf cells  $\times 240$ .
- Fig. 37. *Cololejeunea wightii*. A. ventral habit with perianth and male spike  $\times 15$ ; B. detail of lobule  $\times 123$ ; C. median leaf cells  $\times 240$ .
- Fig. 38. *Riccardia atollica*. A. dorsal habit  $\times 2$ ; B. tip of calyptra  $\times 22$ ; C. detail of male branch tip  $\times 55$ .
- Fig. 39. *Riccardia trukensis*. A. dorsal female plant habit  $\times 2$ ; B. dorsal male plant habit  $\times 2$ ; C. tip of calyptra  $\times 22$ ; D. detail of male branch tip  $\times 55$ .
- Fig. 40. Hornworts. A. *Dendroceros* sp.  $\times 2$ ; B. *Anthoceros* sp.  $\times 2$ . These genera have not yet been discovered on Truk but should be there. *Dendroceros* usually grows on moist shaded bark and is often very crisped. *Anthoceros* grows on moist soil in moderately shaded places.



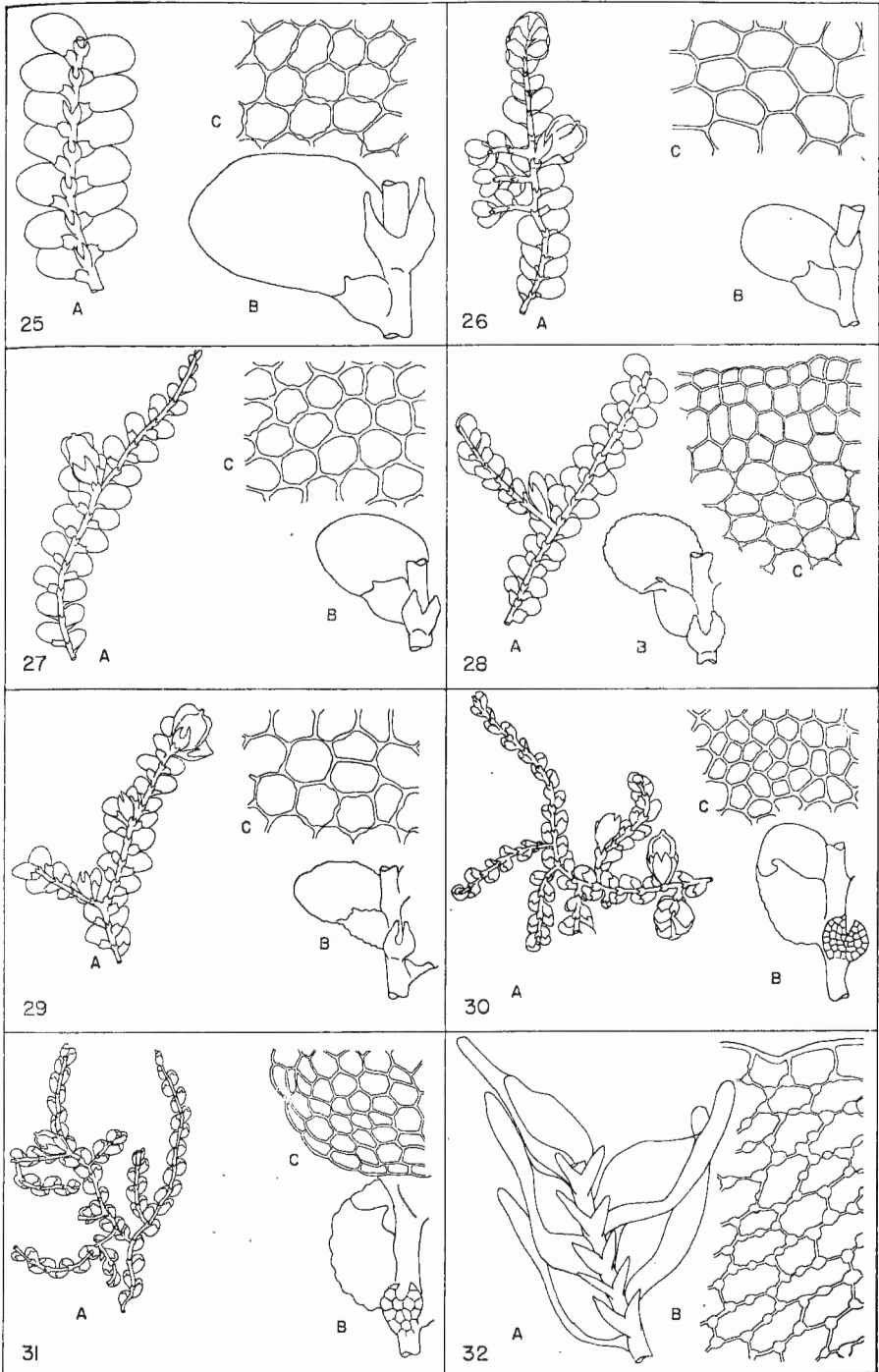
Figs. 1-8.



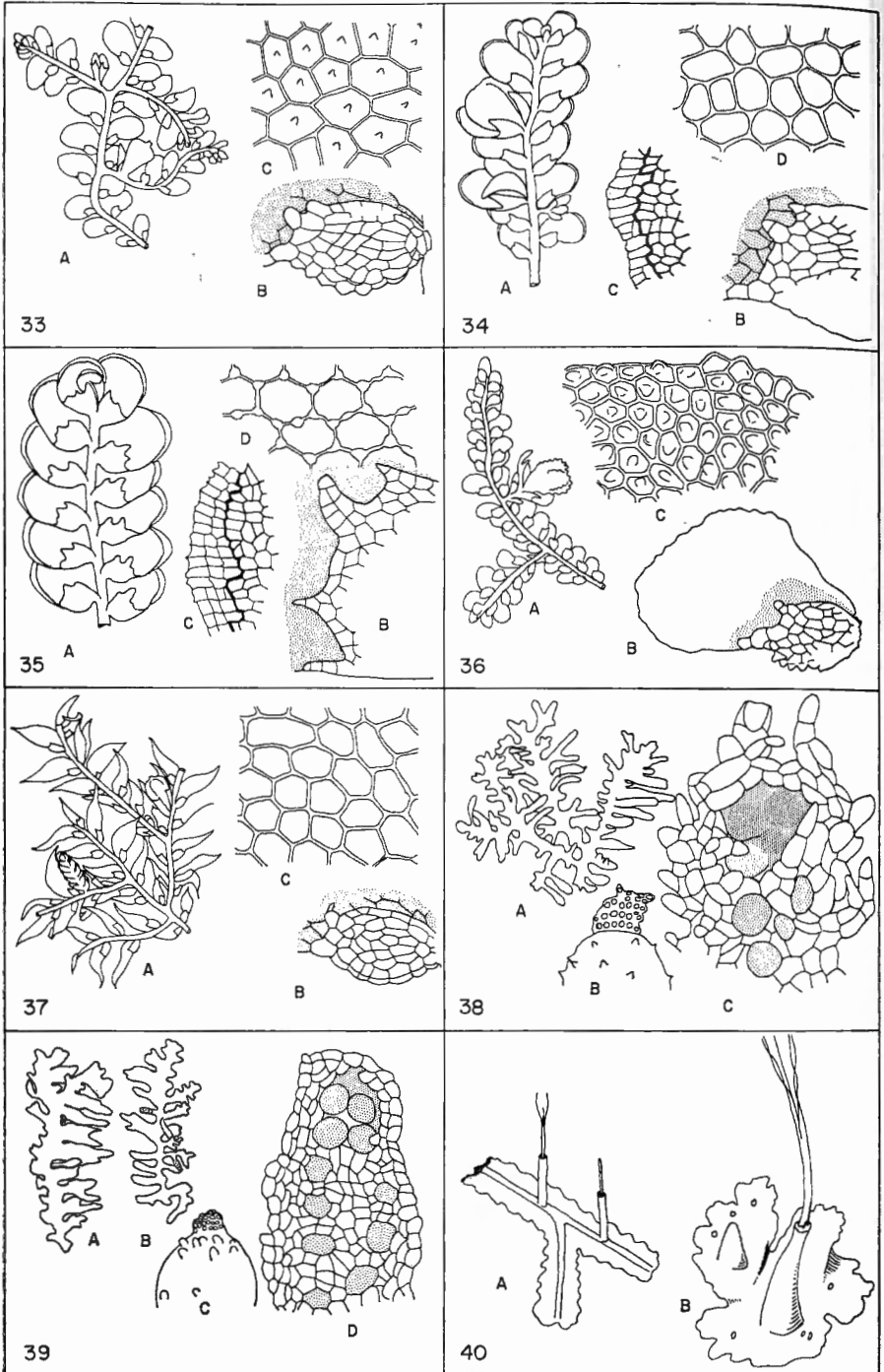
Figs. 9-16.



Figs. 17-24.



Figs. 25-32.



Figs. 33-40.