

Bryophytes of the Northern Mariana Islands, Micronesia

I. Hepaticae and Anthocerotae

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Abstract A list of Hepaticae and Anthocerotae made from the northern Mariana Islands, Micronesia, is presented. Fifty-eight taxa of Hepaticae and three taxa of Anthocerotae are recognized, including eight unidentified ones. Localities, habitat and representative specimens examined are provided for each species.

Key words: Hepaticae, Anthocerotae, northern Mariana Islands.

The Natural History Museum and Institute, Chiba, is conducting a research project on the Izu-Mariana Archipelago in order to understand the origin and evolution of the fauna and flora. The museum organized an expedition to the northern Mariana Islands in cooperation with the Department of Natural Resources (Commonwealth of the Northern Mariana Islands) and the University of Guam Marine Laboratory between 10 May and 10 June 1992. As a member of the group, I was able to study the bryophytes and collected about 800 specimens during the expedition. These included about 600 specimens of Hepaticae and Anthocerotae and a tentative list is presented here.

Study Sites

The northern Mariana Islands consist of the small, younger volcanic islands, lying north and south between 13°20'N and 20°40'E between the Volcano Islands (Minami-Iwou etc.) and the southern Mariana Islands (Saipan etc.). The party visited nine of the islands: Uracas, Maug, Asuncion, Agrihan, Pagan, Alamagan, Guguan, Sarigan and Anatahan (Fig. 1), and stayed at each island between one and six days. The sites studied were located along route a–t as mentioned below. Most specimens were collected by myself except for those collected by Dr. H. Harada along route i of Agrihan Is.

1. URACAS Is.

Route a. 0–330 m alt., 6 June 1992. In grassland at lower elevations, exposed area on

south-east-facing slope above 50 m alt., and on outcrop at south end of island. Only mosses were found on outcrop.

2a. MAUG EAST Is.

Route b. 0–50 m alt., 2 and 5 June 1992. In grassland at lower elevations, *Terminalia catappa* and *Hibiscus tiliaceus* forest on slope above 100 m alt., and *Cocos nucifera* mixed forest on the ridge at north end of island.

Route c. 0–100 m alt., 4 June 1992. In grassland at lower elevations and *Terminalia* forest on west-facing slope above 50 m alt. Only mosses were found.

2b. MAUG WEST Is.

Route d. 0–110 m alt., 5 June 1992. In grassland, shrub, and *Pandanus tectorius* mixed forest. Only mosses were found.

3. ASUNCION Is.

Route e. 0–850 m alt., 1 June 1992. In evergreen forest mixed with *Pandanus*, *Ficus tinctoria* var. *neo-ebundarum* and *Hibiscus* below 250 m alt., and grassland mixed with ferns at higher places.

4. AGRIHAN Is.

Route f. 0–550 m alt., 29 and 31 May 1992. In *Cocos* forest, evergreen forest mixed with *Barringtonia asiatica* and *Elaeocarpus joga* and shrubs with *Blumea* sp. on north-west-facing slope at north end of island.

Route g. 0–250 m alt., 28 May 1992. In *Cocos* forest and evergreen forest similar to that of route f on west-facing slope.

Route h. 5–20 m alt., 30 May 1992. In village

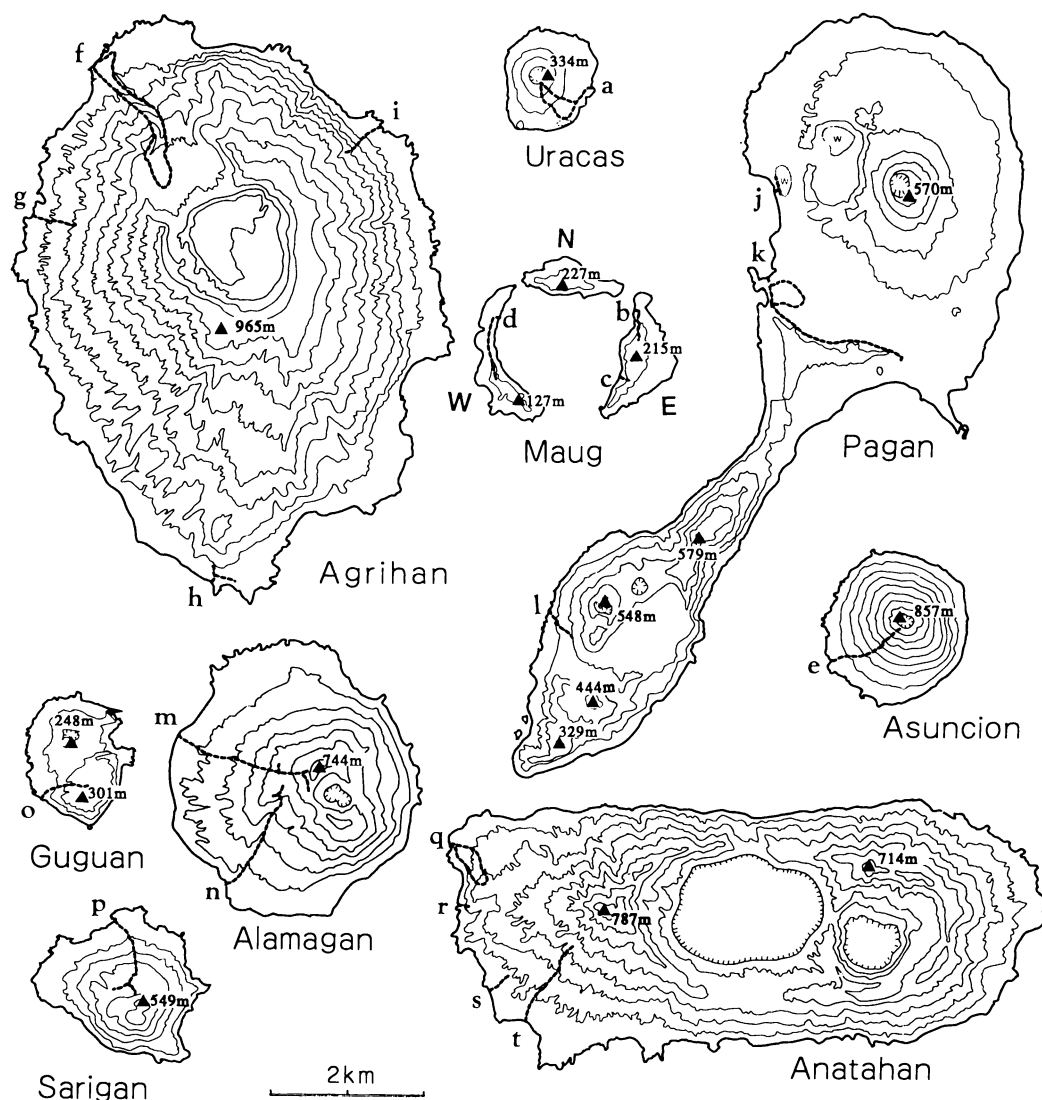


Fig. 1. Maps of study sites in the northern Mariana Islands. The sites studied are located along the routes a–t as dotted lines. For detailed explanations, see text.

near the coast at south end of island.

Route i. 0–350 m alt., 30 May 1992, collected by Dr. H. Harada. In evergreen forest similar to route f on north-east-facing slope.

5. PAGAN Is.

Route j. 10 m alt., 26 May 1992. In open place near the coast of the northern part of island. No bryophytes were found.

Route k. 0–70 m alt., 24 and 25 May 1992. In open place at center of island.

Route l. 0–320 m alt., 25 May 1992. In evergreen forest mixed with *Aglaia mariannensis*,

Elaeocarpus on west-facing slope of the southern part of island.

6. ALAMAGAN Is.

Route m. 0–700 m alt., 9 June 1992. In *Cocos* forest and evergreen forest mixed with *Ficus*, *Elaeocarpus* and tree ferns below 450 m alt., and grassland and shrubs at higher places, on west-facing slope.

Route n. 0–450 m alt., 19 May 1992. In *Cocos* forest and evergreen forest similar to route m on south-west-facing slope.

7. GUGUAN Is.

Route o. 0–220 m alt., 17 May 1992. In *Cocos* forest and evergreen forest dominated by *Pisonia grandis* and *Terminaria* on west-facing slope of the southern part of island.

8. SARIGAN Is.

Route p. 0–380 m alt., 15 May 1992. In *Cocos* forest, evergreen forest mixed with *Pisonia* and *Artocarpus altilis* and grassland on north-facing slope.

9. ANATAHAN Is.

Route q. 0–265 m alt., 11 May 1992. In *Cocos* forest, evergreen forest mixed with *Hibiscus* and *Pandanus*, and grassland on north-west-facing slope of the north-west end of island.

Route r. 0–20 m alt., 14 May 1992. In *Hibiscus* forest near the coast.

Route s. 0–70 m alt., 12 May 1992. In *Cocos* forest and evergreen forest mixed with *Terminalia* and *Barringtonia* on south-west-facing slope of the south-west end of island.

Route t. 0–365 m alt., 13 May 1992. In *Cocos* forest and evergreen forest mixed with *Aglaia*, *Ficus*, *Artocarpus*, *Elaeocarpus* and tree-ferns, and grassland on south-west-facing slope of south-west end of island.

Enumeration of species

The arrangement of families and of genera in each family follows Grolle (1983). Each species name is followed by the localities, which are arranged from north to south, habitat, and the representative specimen(s) examined. All specimens are deposited in the herbarium of the Natural History Museum and Institute, Chiba (CBM).

Hepaticae

Family Lepicoleaceae

1. *Mastigophora dicladus* (Brid.) Nees

ASUNCION: route e, on humus, Furuki 10845 (CBM-BB-11283). AGRIHAN: route f, 550 m alt., on trunk of tree, Furuki 10796 (CBM-BB-11234). ALAMAGAN: route m, 600 m alt., on soil, Furuki 10940 (CBM-BB-11377).

Family Lepidoziaceae

2. *Bazzania tridens* (Reinw. et al.) Trev.

AGRIHAN: route f, 550 m alt., on trunk of tree, Furuki 10801 (CBM-BB-11239).

Family Calypogeiaceae

3. *Calypogeia arguta* Nees et Mont.

AGRIHAN: route g, 275 m alt., on soil, Furuki 10731 (CBM-BB-11169). ALAMAGAN: route n, 450 m alt., on rocks, Furuki 10597 (CBM-BB-11035).

4. *Calypogeia* sp.

AGRIHAN: route f, 550 m alt., on root of tree fern, Furuki 10807 (CBM-BB-11245).

Family Cephaloziaceae

5. *Cephalozia otaruensis* Steph.

ALAMAGAN: route m, 700 m alt., on soil, Furuki 10960 (CBM-BB-11397); route n, 450 m alt., on rocks, Furuki 10597 (CBM-BB-11035).

Family Jackiellaceae

6. *Jackiella javanica* Schiffn.

ASUNCION: route e, 850 m alt., on soil, Furuki 10855 (CBM-BB-11293). ALAMAGAN: route m, on soil, Furuki 10960 (CBM-BB-11397).

Family Jungermanniaceae

7. *Jungermannia truncata* Nees

ASUNCION: route e, 700 m alt., on soil, Furuki 10849a (CBM-BB-11287). ALAMAGAN: route m, 700 m alt., on soil, Furuki 10958 (CBM-BB-11395); route n, 450 m alt., on soil, Furuki 10598a (CBM-BB-11036).

Family Geocalycaceae

8. *Heteroscyphus coalitus* (Hook.) Schiffn.

AGRIHAN: route g, 275 m alt., on root of tree, Furuki 10729 (CBM-BB-11167). PAGAN: route l, 50 m alt., on soil, Furuki 10636 (CBM-BB-11074). SARIGAN: route p, 350 m alt., on rocks, Furuki 10475 (CBM-BB-10913). ANATAHAN: route q, 200 m alt., on rocks, Furuki 10316 (CBM-BB-10746).

Family Plagiochilaceae

9. *Plagiochila frondescens* (Nees) Lindenb.

SARIGAN: route p, 350 m alt., on trunk of tree, Furuki 10485 (CBM-BB-10923).

10. *Plagiochila bantamensis* (Reinw. et al.) Dum.

ALAMAGAN: route m, 380 m alt., on trunk of tree, Furuki 10927 (CBM-BB-11364); route n,

325 m alt., on root of tree fern, Furuki 10558 (CBM-BB-10996). ANATAHAN: route q, 100 m alt., on trunk of tree, Furuki 10347 (CBM-BB-10785).

Family Radulaceae (by K. Yamada)

11. *Radula apiculata* Sde Lac.

AGRIHAN: route f, 300 m alt., on rocks, Furuki 10816 (CBM-BB-11254).

New to the Mariana Islands.

12. *Radula javanica* Gott.

AGRIHAN: route f, 125 m alt., on trunk of tree, Furuki 10685 (CBM-BB-11123). PAGAN: route l, 35 m alt., on rocks, Furuki 10630 (CBM-BB-11068); 100 m alt., on rocks, Furuki 10643 (CBM-BB-11081). ALAMAGAN: route m, 450 m alt., on boulder, Furuki 10928 (CBM-BB-11365); 600 m alt., on soil, Furuki 10937a (CBM-BB-11374); route n, 340 m alt., on root of fern, Furuki 10562 (CBM-BB-11000); 375 m alt., on trunk of tree, Furuki 10588 (CBM-BB-11026). SARIGAN: route p, 350 m alt., on rocks, Furuki 10588 (CBM-BB-11026).

This has not been reported from the Mariana Islands except for Guam. The complex of *Radula javanica* varies widely in leaf lobules and leaf shape. Well-developed plants of *R. javanica* rarely resemble *R. cordiloba*, known only from Nightingale I. in the Pacific Ocean, but I think the appearance of *R. cordiloba* places it in the category of variations shows by *R. javanica*.

Family Frullaniaceae

13. *Frullania apiculata* (Nees in Reinw. et al.) Dum.

ASUNCION: route e, 700 m alt., on rocks, Furuki 10850 (CBM-BB-11288). ALAMAGAN: route m, 450 m alt., on boulder, Furuki 10928 (CBM-BB-11365); 600 m alt., on soil, Furuki 10941 (CBM-BB-11378); route n, 400 m alt., on humus, Furuki 10606 (CBM-BB-11044).

14. *Frullania ericoides* (Nees) Mont.

MAUG E: route b, 150 m alt., on rocky cliff, Furuki 10861 (CBM-BB-11299). ASUNCION: route e, 200 m alt., on trunk of tree, Furuki 10829 (CBM-BB-11267). AGRIHAN: route f, 125 m alt., on trunk of tree, Furuki 10704 (CBM-BB-11142); route g, 200 m alt., on trunk of palm tree, Furuki 10757 (CBM-BB-11195). PAGAN:

route, k, 30 m alt., on trunk of tree, Furuki 10616 (CBM-BB-11-54); route l, 100 m alt., on trunk of tree, Furuki 10646 (CBM-BB-11084). GUGUAN: route o, 20 m alt., on trunk of tree, Furuki 10509 (CBM-BB-10947). SARIGAN: route p, 75 m alt., on rocks, Furuki 10428 (CBM-BB-10866); 280 m alt., on fallen logs, Furuki 10505 (CBM-BB-10943). ANATAHAN: route r, 5 m alt., on trunk of tree, Furuki 10422 (CBM-BB-10860); route s, 70 m alt., on trunk of tree, Furuki 10365 (CBM-BB-10803); route t, 60 m alt., on trunk of tree, Furuki 10376 (CBM-BB-10811).

15. *Frullania gaudichaudii* (Nees) Nees et Mont.

ANATAHAN: route q, 100 m alt., on trunk of palm tree, Furuki 10348 (CBM-BB-10786).

Family Lejeuneaceae

16. *Archilejeunea planiuscula* (Mitt.) Steph.

ANATAHAN: route s, 35 m alt., on trunk of tree, Furuki 10361 (CBM-BB-10799).

17. *Caudalejeunea recurvistipula* (Gott.) Schiffn.

SARIGAN: route p, 300 m alt., on trunk of tree, Furuki 10452 (CBM-BB-10890). ANATAHAN: route q, 200 m alt., on trunk of tree, Furuki 10292 (CBM-BB-10730); route s, 70 m alt., on trunk of tree, Furuki 10364 (CBM-BB-10802).

18. *Ceratolejeunea oceanica* (Mitt.) Steph.

ALAMAGAN: route m, 550 m alt., on trunk of tree, Furuki 10931 (CBM-BB-11368); 600 m alt., on soil, Furuki 10937a (CBM-BB-11374).

19. *Cheilolejeunea mariana* B. Thiers et Gradst.

ANATAHAN: route s, 20 m alt., on trunk of tree, Furuki 10360 (CBM-BB-10798); route t, 50 m alt., on trunk of tree, Furuki 10419 (CBM-BB-10857).

20. *Cheilolejeunea ceylanica* (Nees) Schust. et Kachr.

AGRIHAN: route f, 550 m alt., on trunk of tree, Furuki 19782 (CBM-BB-11220). SARIGAN: route p, 350 m alt., on trunk of tree, Furuki 10463 (CBM-BB-10901).

21. *Cheilolejeunea imbricata* (Nees) Hatt.

ANATAHAN: route t, 350 m alt., on trunk of tree, Furuki 10383 (CBM-BB-10821).

22. *Cheilolejeunea intertexta* (Lindenb.) Steph.

AGRIHAN: route g, 25 m alt., on trunk of palm tree, Furuki 10771 (CBM-BB-11209). ALAMAGAN: route n, 175 m alt., on trunk of tree, Furuki 10544 (CBM-BB-10982). ANATAHAN: route q, 100 m alt., on trunk of palm tree, Furuki 10284 (CBM-BB-10722); 10285 (CBM-BB-10723).

23. *Cheilolejeunea obtusilobula* (Hatt.) Hatt.

ASUNCION: route e, 50 m alt., on trunk of tree, Furuki 10899 (CBM-BB-11336). AGRIHAN: route f, 110 m alt., on trunk of tree, Furuki 10709 (CBM-BB-11147); route g, 275 m alt., on trunk of tree, Furuki 10724 (CBM-BB-11162); route i, 350 m alt., on trunk of tree, Harada 12766 (CBM-BB-11502). PAGAN: route l, 50 m alt., on standing dead tree, Furuki 10637 (CBM-BB-11075). ALAMAGAN: route n, 250 m alt., on trunk of palm tree, Furuki 10555 (CBM-BB-10993). ANATAHAN: route q, 150 m alt., on trunk of tree, Furuki 10342 (CBM-BB-10780); route t, 350 m alt., on trunk of tree, Furuki 10406 (CBM-BB-10844).

24. *Cheilolejeunea serpentina* (Mitt.) Mizut.

ASUNCION: route e, 650 m alt., on soil, Furuki 10842 (CBM-BB-11280). AGRIHAN: route f, 65 m alt., on trunk of palm tree, Furuki 10716 (CBM-BB-11154); 550 m alt., on trunk of tree, Furuki 10780 (CBM-BB-11218). PAGAN: route l, 150 m alt., on rocks, Furuki 10652 (CBM-BB-11090). ALAMAGAN: route m, 450 m alt., on boulder, Furuki 10928 (CBM-BB-11365); 600 m alt., on soil, Furuki 10939 (CBM-BB-11376); route n, 400 m alt., on humus, Furuki 10606 (CBM-BB-11044). SARIGAN: route p, 50 m alt., on rocks, Furuki 10423 (CBM-BB-10861); 350 m alt., on trunk of palm tree, Furuki 10466 (CBM-BB-10904). ANATAHAN: route s, 20 m alt., on root of fern, Furuki 10356 (CBM-BB-10794).

25. *Cheilolejeunea trifaria* (Reinw. et al.) Mizut.

ANATAHAN: route t, 350 m alt., on root of tree fern, Furuki 10382 (CBM-BB-10820). ALAMAGAN: route m, 600 m alt., on soil, Furuki 10942 (CBM-BB-11379).

26. *Cololejeunea infretidens* (Mitt.) Benedix

AGRIHAN: route f, 550 m alt., on trunk of tree, Furuki 10783 (CBM-BB-11221). ALAMA-

GAN: route m, 600 m alt., on trunk of tree, Furuki 10983 (CBM-BB-11415).

27. *Cololejeunea micronesica* Miller et Bonner

MAUG E: route b, 150 m alt., on trunk of tree, Furuki 10864 (CBM-BB-11301). ASUNCION: route e, 20 m alt., on trunk of palm tree, Furuki 10997 (CBM-BB-11324). AGRIHAN: route g, 40 m alt., on trunk of tree, Furuki 10770 (CBM-BB-11208); route h, 5 m alt., on trunk of palm tree, Furuki 10772 (CBM-BB-11210). PAGAN: route k, 30 m alt., on trunk of tree, Furuki 10615 (CBM-BB-11-53); route l, on trunk of tree, Furuki 10679 (CBM-BB-11117). GUGUAN: route o, 20 m alt., on trunk of tree, Furuki 10508 (CBM-BB-10946). SARIGAN: route p, on trunk of tree, Furuki 10432 (CBM-BB-10870). ANATAHAN: route t, 350 m alt., on trunk of tree, Furuki 10409 (CBM-BB-10847).

28. *Cololejeunea planissima* (Mitt.) Abeyw.

PAGAN: route l, 100 m alt., on trunk of tree, Furuki 10645 (CBM-BB-11083); 200 m alt., on trunk of tree, Furuki 10660 (CBM-BB-11098). AGRIHAN: route f, 125 m alt., on leaves of tree, Furuki 10686 (CBM-BB-11124); route g, 200 m alt., on trunk of palm tree, Furuki 10761 (CBM-BB-11199). SARIGAN: route p, 150 m alt., on trunk of tree, Furuki 10437 (CBM-BB-10875); 350 m alt., on trunk of tree, Furuki 10501 (CBM-BB-10939). ANATAHAN: route q, 200 m alt., on leaves of fern, Furuki 10322 (CBM-BB-10752); route t, 350 m alt., on trunk of tree, Furuki 10412 (CBM-BB-10850).

29. *Cololejeunea raduliloba* Steph.

MAUG E: route b, 150 m alt., on trunk of tree, Furuki 10872 (CBM-BB-11309). ASUNCION: route e, 25 m alt., on boulder, Furuki 10889 (CBM-BB-11326). AGRIHAN: route f, 150 m alt., on trunk of tree, Furuki 10694 (CBM-BB-11132); route g, 250 m alt., on root of tree fern, Furuki 10746 (CBM-BB-11184). PAGAN: route k, 30 m alt., on trunk of tree, Furuki 10618 (CBM-BB-11056). ALAMAGAN: route n, 85 m alt., on trunk of tree, Furuki 10539 (CBM-BB-10977). GUGUAN: route o, 25 m alt., on decaying logs, Furuki 10510 (CBM-BB-10948). SARIGAN: route p, 75 m alt., on trunk of tree, Furuki 10426 (CBM-BB-10864); 125 m alt., on rocks, Furuki 10435 (CBM-BB-10873). ANATAHAN: route q, 200 m alt., on trunk of tree,

Furuki 10300 (CBM-BB-10738); route s, 60 m alt., on trunk of tree, Furuki 10369 (CBM-BB-10807); route t, 70 m alt., on trunk of standing dead tree, Furuki 10418 (CBM-BB-10856).

30. *Cololejeunea scabriflora* (Gotts.) Schiffn.

AGRIHAN: route f, 300 m alt., on leaves of fern, Furuki 10818 (CBM-BB-11256). ALAMAGAN: route n, 340 m alt., on root of tree fern, Furuki 10560 (CBM-BB-10998); 360 m alt., on trunk of tree, Furuki 10583 (CBM-BB-11021).

31. *Cololejeunea stylosa* Steph.

PAGAN: route l, 75 m alt., on trunk of tree, Furuki 10640 (CBM-BB-11078). AGRIHAN: route f, 150 m alt., on decaying logs, Furuki 10695 (CBM-BB-11133); 550 m alt., on trunk of tree, Furuki 10805 (CBM-BB-11243); route g, 175 m alt., on trunk of tree, Furuki 19766 (CBM-BB-11204). SARIGAN: route p, 150 m alt., on trunk of tree, Furuki 10438 (CBM-BB-10876); 350 m alt., on trunk of tree, Furuki 10456 (CBM-BB-10894). ANATAHAN: route q, 200 m alt., on trunk of tree, Furuki 10331 (CBM-BB-10769); route t, 350 m alt., on trunk of tree, Furuki 10410 (CBM-BB-10848).

32. *Cololejeunea wightii* Steph.

AGRIHAN: route f, 125 m alt., on trunk of tree, Furuki 10700 (CBM-BB-11138); 500 m alt., on root of tree fern, Furuki 10814 (CBM-BB-11252); route g, 225 m alt., on leaves of fern, Furuki 10751 (CBM-BB-11189). SARIGAN: route p, 350 m alt., on surface of fallen nuts of palm tree, Furuki 10497 (CBM-BB-10935).

33. *Cololejeunea* sp. 1

AGRIHAN: route f, 20 m alt., on leaves of fern, Furuki 10675 (CBM-BB-11113).

34. *Cololejeunea* sp. 2

ANATAHAN: route q, 150 m alt., on leaves of fern, Furuki 10335 (CBM-BB-10773).

35. *Colura superba* (Mont.) Steph.

ALAMAGAN: route n, 340 m alt., on trunk of tree, Furuki 10570 (CBM-BB-11008).

36. *Drepanolejeunea canceroides* Miller et Bonner

PAGAN: route k, 60 m alt., on trunk of tree, Furuki 10624 (CBM-BB-11062); route l, 100 m alt., on trunk of tree, Furuki 10644 (CBM-BB-11082). ALAMAGAN: route n, 200 m alt., on trunk of tree, Furuki 10547 (CBM-BB-10985). GUGUAN: route o, 220 m alt., on trunk of tree, Furuki 10531 (CBM-BB-10969). SARIGAN:

route p, 350 m alt., on trunk of tree, Furuki 10480 (CBM-BB-10918). ANATAHAN: route q, 200 m alt., on trunk of tree, Furuki 10320 (10750); route t, 225 m alt., on trunk of tree, Furuki 10415 (CBM-BB-10853).

37. *Drepanolejeunea serricalyx* Herz.

ASUNCION: route e, 850 m alt., on soil, Furuki 10852 (CBM-BB-11290). AGRIHAN: route f, 550 m alt., on trunk of tree, Furuki 10790 (CBM-BB-11228). ALAMAGAN: route m, 700 m alt., on leaves of tree, Furuki 10963 (CBM-BB-11399); trunk of tree, Furuki 10964 (CBM-BB-11400).

38. *Drepanolejeunea ternatensis* (Gott.) Steph.

AGRIHAN: route f, 550 m alt., on trunk of tree, Furuki 10781 (CBM-BB-11219). ALAMAGAN: route m, 550 m alt., on trunk of tree, Furuki 10934 (CBM-BB-11371).

39. *Lejeunea catanduana* (Steph.) Miller et al.

ASUNCION: route e, 75 m alt., on trunk of tree, Furuki 10903 (CBM-BB-11340). AGRIHAN: route f, 125 m alt., on trunk of tree, Furuki 10688 (CBM-BB-11126); 550 m alt., on trunk of tree, route g, 300 m alt., on branches of tree, Furuki 10736 (CBM-BB-11174); route h, 5 m alt., on trunk of tree, Furuki 10775 (CBM-BB-11213). PAGAN: route l, 50 m alt., on rocks, Furuki 10633 (CBM-BB-11071). ALAMAGAN: route m, 600 m alt., on trunk of tree, Furuki 10985 (CBM-BB-11417); route n, 250 m alt., on trunk of tree, Furuki 10550 (CBM-BB-10988). SARIGAN: route p, 150 m alt., on boulders, Furuki 10439 (CBM-BB-10877). ANATAHAN: route q, 200 m alt., on trunk of tree, Furuki 10287 (10725); route s, 60 m alt., on rocks, Furuki 10373 (CBM-BB-10811); route t, 350 m alt., on trunk of tree, Furuki 10386 (CBM-BB-10824).

40. *Lejeunea cucullata* (Nees) Nees

AGRIHAN: route f, 110 m alt., on trunk of palm tree, Furuki 10712 (CBM-BB-11150); 550 m alt., on trunk of tree, Furuki 10779 (CBM-BB-11217). PAGAN: route l, 200 m alt., on trunk of tree, Furuki 10661 (CBM-BB-11099). ALAMAGAN: route m, 550 m alt., on trunk of tree, Furuki 10932 (CBM-BB-11369); route n, 450 m alt., on soil, Furuki 10599 (CBM-BB-11037). ANATAHAN: route q, 100 m alt., on trunk of

palm tree, Furuki 10343a (CBM-BB-10781).

41. *Lejeunea exilis* (Reinw. et al.) Grolle

AGRIHAN: route f, 550 m alt., on trunk of tree, Furuki 10792 (CBM-BB-11230). ALAMAGAN: route m, 700 m alt., on trunk of tree, Furuki 10966 (CBM-BB-11402); route n, 340 m alt., on root of tree fern, Furuki 10567 (CBM-BB-11005). ANATAHAN: route t, 350 m alt., on root of tree fern, Furuki 10407 (CBM-BB-10845).

42. *Lejeunea flava* (Sw.) Nees

AGRIHAN: route f, 550 m alt., on trunk of tree, Furuki 10792 (CBM-BB-11230); route g, 200 m alt., on trunk of tree, Furuki 10762 (CBM-BB-11200). ALAMAGAN: route m, 550 m alt., on trunk of tree, Furuki 10931 (CBM-BB-11368); route n, 340 m alt., on root of tree fern, Furuki 10573 (CBM-BB-11011). ANATAHAN: route t, 350 m alt., on branches of tree, Furuki 10393 (CBM-BB-10831).

43. *Lejeunea sordida* (Nees) Mont.

AGRIHAN: route g, 325 m alt., on trunk of tree, Furuki 10737 (CBM-BB-11175). ANATAHAN: route q, 100 m alt., on trunk of tree, Furuki 10349 (CBM-BB-10787); 200 m alt., on trunk of tree, Furuki 10319 (CBM-BB-10749).

44. *Lejeunea ulicina* (Tayl.) Gott. et al.

AGRIHAN: route h, 5 m alt., on trunk of palm tree, Furuki 10774 (CBM-BB-11212). PAGAN: route l, 200 m alt., on trunk of tree, Furuki 10661 (CBM-11099). ALAMAGAN: route m, 550 m alt., on trunk of tree, Furuki 10931 (CBM-BB-11368); route n, 100 m alt., on trunk of palm tree, Furuki 10541 (CBM-BB-10979). ANATAHAN: route t, 350 m alt., on root of tree fern, Furuki 10383 (CBM-BB-10821).

45. *Lejeunea* sp.

ALAMAGAN: route m, 600 m alt., on root of tree fern, Furuki 10986 (CBM-BB-11418); 700 m alt., on soil, Furuki 10961a (CBM-BB-11398).

46. *Lopholejeunea eulopha* (Tayl.) Schiffn.

ALMAGAN: route m, 450 m alt., on boulder, Furuki 10928 (CBM-BB-11365); 600 m alt., on soil, Furuki 10937a (CBM-BB-11374); root of tree fern, Furuki 10984 (CBM-BB-11416).

47. *Lopholejeunea javanica* (Nees) Steph.

AGRIHAN: route f, 110 m alt., on trunk of tree, Furuki 10714 (CBM-BB-11152); route g, 325 m alt., on soil, Furuki 10740 (CBM-BB-11178). ALAMAGAN: route n, 350 m alt., on

rocks, Furuki 10581 (CBM-BB-11019). SARIGAN: route p, on boulders, Furuki 10441 (CBM-BB-10879). ANATAHAN: route q, 200 m alt., on trunk of tree, Furuki 10323 (CBM-BB-10753); route s, 60 m alt., on rocks, Furuki 10371 (CBM-BB-10809).

48. *Lopholejeunea nigriccans* (Lindenb.) Schiffn.

AGRIHAN: route g, 325 m alt., on trunk of tree, Furuki 10741 (CBM-BB-11179). ALAMAGAN: route n, 340 m alt., on root of tree fern, Furuki 10561 (CBM-BB-10999). ANATAHAN: route q, 200 m alt., on trunk of tree, Furuki 10304 (CBM-BB-10756).

49. *Lopholejeunea subfusca* (Nees) Steph.

PAGAN: route l, 200 m alt., on trunk of tree, Furuki 10661 (CBM-BB-11099). ALAMAGAN: route n, 250 m alt., on trunk of tree, Furuki 10553 (CBM-BB-10991). SARIGAN: route p, 350 m alt., on trunk of tree, Furuki 10470 (CBM-BB-10908). ANATAHAN: route q, 200 m alt., on trunk of tree, Furuki 10294 (CBM-BB-10732); 10306 (CBM-BB-10758); route t, 350 m alt., on trunk of tree, Furuki 10380 (CBM-BB-19818).

50. *Schiffneriolejeunea tumida* (Nees et Mont.) var. *haskarlana* (Gott.) Gradst. et Terken

ANATAHAN: route f, 150 m alt., on trunk of tree, Furuki 10341 (CBM-BB-10779).

Family Codoniaceae

51. *Fossombronina* sp.

ASUNCION: route e, 650 m alt., on soil, Furuki 10847 (CBM-BB-11286), sterile.

Family Aneuraceae

52. *Aneura marianensis* Furuki

ALAMAGAN: route m, 700 m alt., on soil, Furuki 10980 (CBN-BB-11412); route n, 485 m alt., on soil, Furuki 10604 (CBM-BB-11042).

53. *Riccardia graeffei* (Steph.) Hewson

AGRIHAN: route f, 125 m alt., on decaying logs, Furuki 10691 (CBM-BB-11129); route g, 275 m alt., on soil, Furuki 10725 (CBM-BB-11163). ALAMAGAN: route m, 600 m alt., on soil, Furuki 10991 (CBM-BB-11423); 700 m alt., on soil, Furuki 10980 (CBM-BB-11412); route n, 340 m alt., on rocks, Furuki 10565 (CBM-BB-11003). ANATAHAN: route q, 200 m alt., on

rocks, Furuki 10286 (CBM-BB-10724); route s, 30 m alt., on soil, Furuki 10374 (CBM-BB-10812); route t, 350 m alt., on root of tree fern, Furuki 10381 (CBM-BB-10819).

54. *Riccardia* sp.

ASUNCION: route e, 650 m alt., on rocks, Furuki 10844 (CBM-BB-11282); 850 m alt., on soil, Furuki 10851 (CBM-BB-11289). ALAMAGAN: route m, 600 m alt., on soil, Furuki 10936 (CBM-BB-11373). All specimens are sterile.

Family Wiesnerellaceae

55. *Dumortiera hirsuta* (Sw.) Nees

AGRIHAN: route f, 40 m alt., on soil, Furuki 10718 (CBM-BB-11156).

Family Marchantiaceae

56. *Marchantia emarginata* Reinw. et al. subsp. *emarginata*

PAGAN: route l, 15 m alt., on soil, Furuki 10626 (CBM-BB-11064). ALAMAGAN: route n, 200 m alt., on soil, Furuki 10548 (CBM-BB-10986). ANATAHAN: route q, 200 m alt., on rocks, Furuki 10310 (CBM-BB-10740); route s, 20 m alt., on rocks, Furuki 10355 (CBM-BB-10793).

57. *Marchantia* sp.

ASUNCION: route e, 525 m, on soil, Furuki 10834 (CBM-BB-11272); 850 m alt., on soil, Furuki 10856 (CBM-BB-11294). ALAMAGAN: route m, 700 m alt., on soil, Furuki 10956 (CBM-BB-11393).

Family Ricciaceae

58. *Riccia* sp.

PAGAN: route k, 10 m alt., on soil, Furuki 10611 (CBM-BB-1149). SARIGAN: route p, 350 m alt., on soil, Furuki 10504 (CBM-BB-10942). ANATAHAN: route t, 30 m alt., on soil, Furuki 10420 (CBM-BB-10858). All specimens are sterile.

Anthocerotae

Family Anthocerotaceae

59. *Folioceros appendiculata* (Steph.) Haseg.

PAGAN: route l, 25 m alt., on soil, Furuki 10627 (CBM-BB-11065). ALAMAGAN: route n, 150 m alt., on decaying logs, Furuki 10546 (CBM-BB-10984). ANATAHAN: route q, 200 m alt., on rocks, Furuki 10309 (CBM-BB-10761).

60. *Megaceros flagerallis* (Mitt.) Steph.

AGRIHAN: route g, 275 m alt., on rocks, Furuki 10728 (CBM-BB-11166). ALAMAGAN: route n, 350 m alt., on rocks, Furuki 10580 (CBM-BB-11018). ANATAHAN: route q, 200 m alt., on boulder, Furuki 10315 (CBM-BB-10745).

Dendrocerotaceae

61. *Dendroceros tubercularis* Hatt.

AGRIHAN: route f, 550 m alt., on trunk of tree, Furuii 10803 (CBM-BB-11241); route g, 300 m alt., on trunk of tree, Furuki 10733 (CBM-BB-11171); route i, 350 m alt., on trunk of tree, Harada 12766 (CBM-BB-11502). ALAMAGAN: route m, 600 m alt., on trunk of tree, Furuii 10989 (CBM-BB-11421); route n, 340 m alt., on trunk of tree, Furuki 10572 (CBM-BB-11010). ANATAHAN: route t, 350 m alt., on root of tree fern, Furuki 10384 (CBM-BB-10822); on trunk of tree, Furuki 10404 (CBM-BB-10842).

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