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Vascular Flora of the Northern Marianas Islands

F. RAYMOND FOSBERG,
M. V. C. FALANRUW,
and MARIE-HÉLÈNE SACHET



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Vascular Flora of the Northern Marianas Islands

*F. Raymond Fosberg, M. V. C. Falanruw,
and Marie-Hélène Sacht*

ISSUED
MAY 23 1974



SMITHSONIAN INSTITUTION PRESS

City of Washington

1975

ABSTRACT

Fosberg, F. Raymond, M. V. C. Falanruw, and Marie-Hélène Sachet. Vascular Flora of the Northern Marianas Islands. *Smithsonian Contributions to Botany*, number 22, 45 pages, 2 figures, 1975.—A systematic catalog of the vascular plants known from the northern 10 islands in the Marianas Archipelago in Micronesia, with a short geographical introduction and, for each species, ecological and geographic data and specimen citations, or, where these are unavailable, citations of literature records.

OFFICIAL PUBLICATION DATE is handstamped in a limited number of initial copies and is recorded in the Institution's annual report, *Smithsonian Year*. SI PRESS NUMBER 5217. SERIES COVER DESIGN: Leaf clearing from the katsura tree *Cercidiphyllum japonicum* Siebold and Zuccarini.

Library of Congress Cataloging in Publication Data

Fosberg, Francis Raymond, 1908–

Vascular flora of the Northern Marianas Islands.

(Smithsonian contributions to botany, no. 22)

Bibliography: p.

Includes index.

Supt. of Docs. no.: SI 1.29:22

I. Botany—Mariana Islands. I. Falanruw, Marjorie V. C., joint author. II. Sachet, Marie-Hélène, joint author. III. Title. IV. Series: Smithsonian Institution. Smithsonian contributions to botany, no. 22.

QK1.S2747 no. 22 [QK473.M34] 581'.08s [581.9'96'7] 74-20631

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Vascular Flora of the Northern Marianas Islands

*F. Raymond Fosberg, M. V. C. Falanruw,
and Marie-Hélène Sachet*

Introduction

Micronesia (Figure 1) consists of a group of archipelagoes in the western tropical Pacific Ocean, all made up of very small islands (hence the name Micronesia). With a few exceptions, they are all in the northern hemisphere. One of the archipelagoes to the west is the long north-south chain of the Marianas Islands. To date there is no flora of the Marianas, let alone of the smaller northern islands of the group, but enough information has now accumulated to make such a flora meaningful, phytogeographically. Very considerable scientific interest has developed in recent years concerning these small islands. They, especially the uninhabited ones, form excellent, somewhat inaccessible, natural ecological and evolutionary laboratories.

Several expeditions have been organized by members of the Biology Department and Marine Laboratory of the University of Guam. One of the authors of this paper, Mrs. Falanruw, heads a project for interpretation of vegetation changes in these islands from satellite and aerial imagery. The U. S. Navy is about to file an environmental impact statement for a project to use Farallon de Medinilla as a target range.

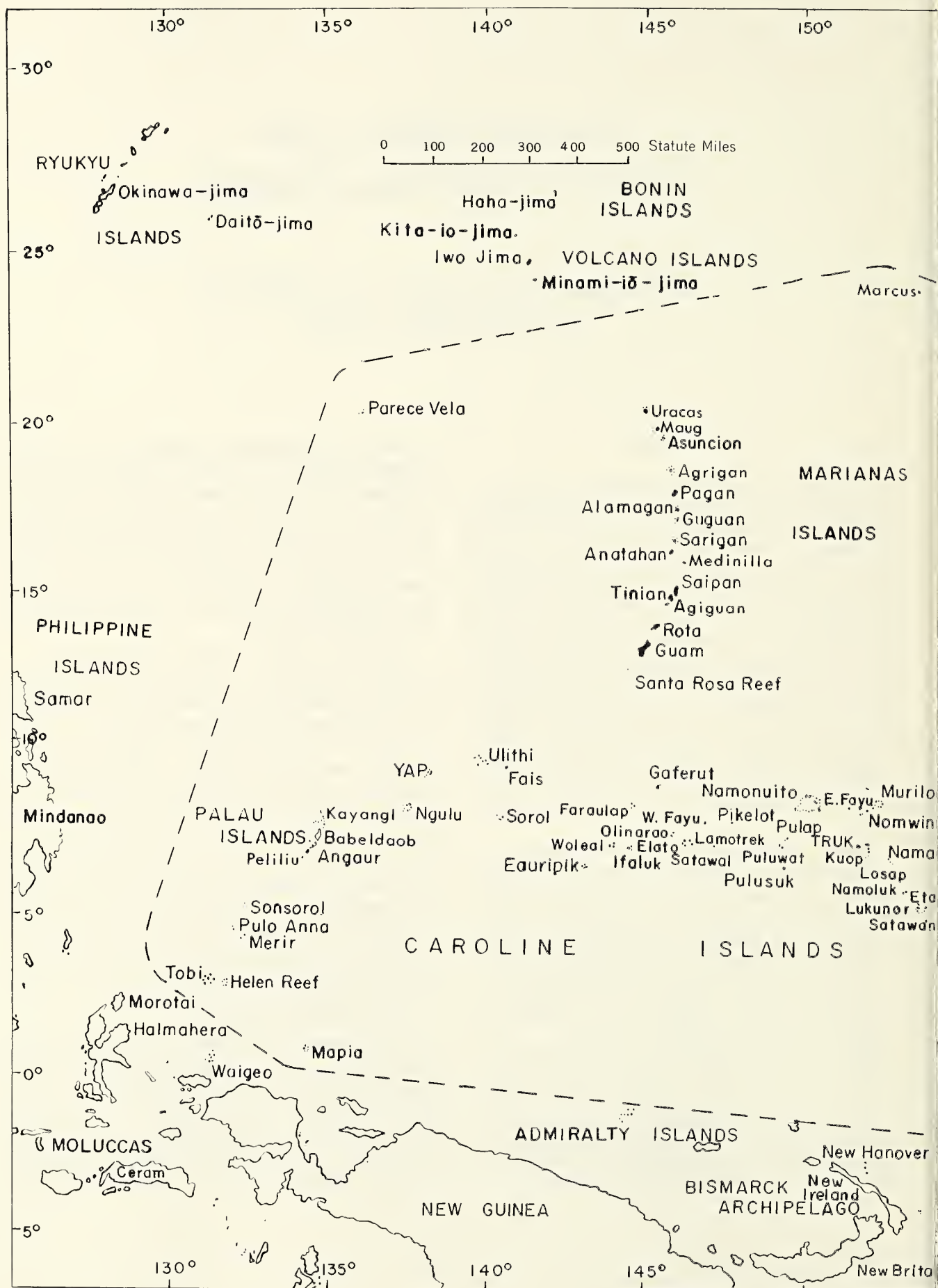
Hence, and as a part of the vegetation interpretation project mentioned above, we have brought

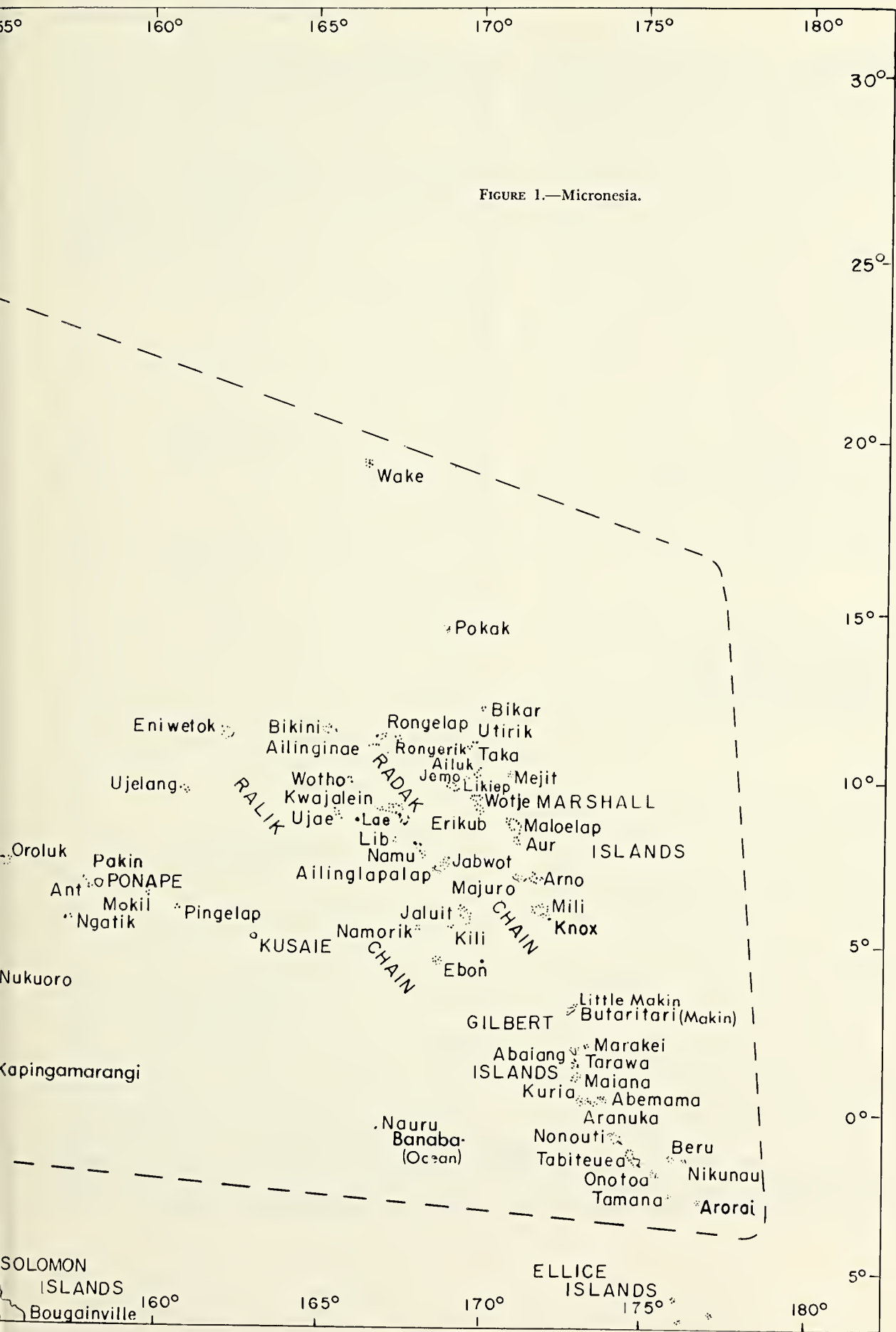
together the information available to us and put it into the form of a systematic census of the vascular plants of the islands north of Saipan. The paper, therefore, serves as a record of "ground truth" for the Trust Territory of the Pacific Islands EROS Project: Vegetation Changes in the Northern Marianas. Additional interpretation of the vegetation of the Northern Marianas is planned using aerial and orbital imagery.

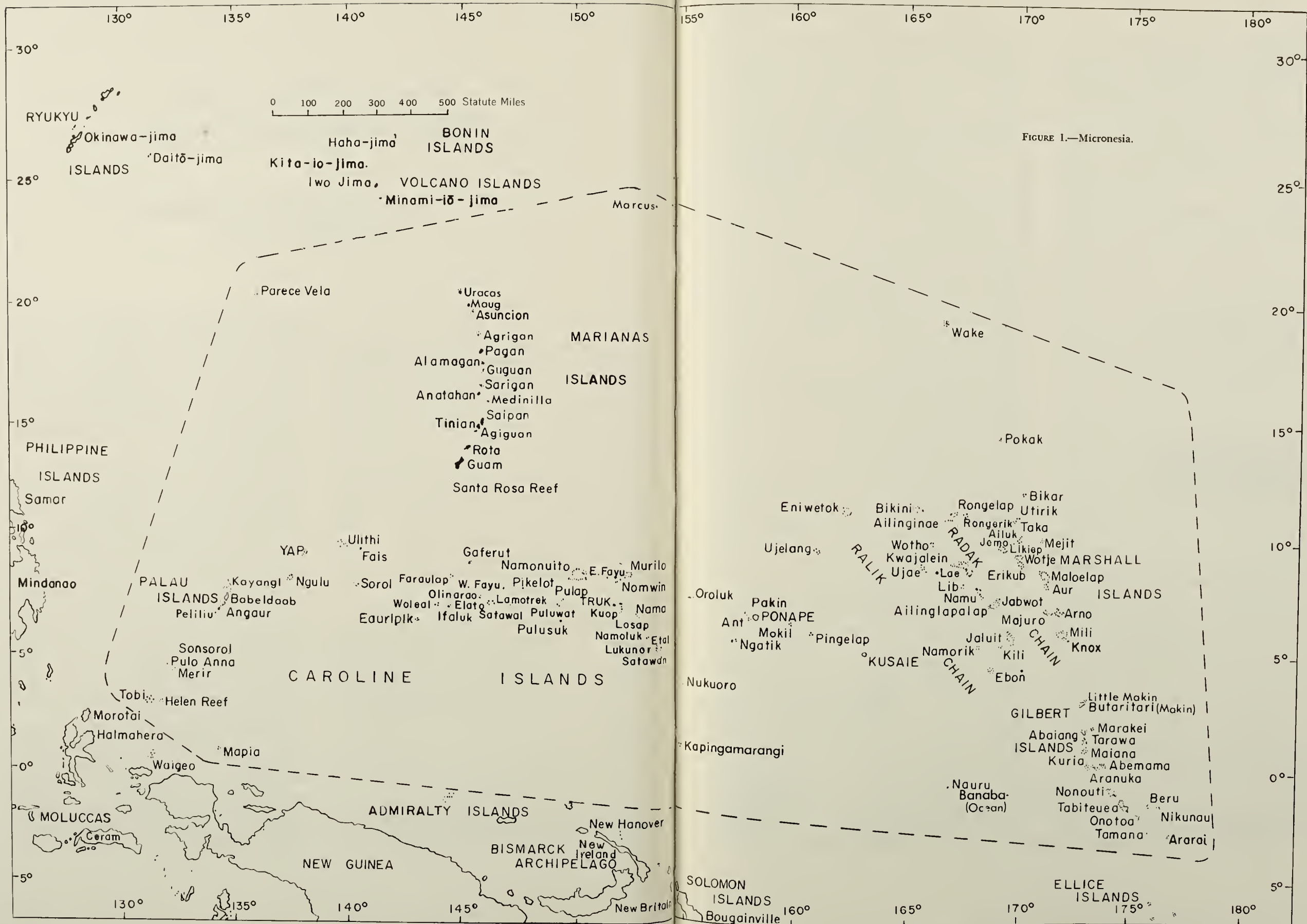
Because two of the authors of this flora are engaged in preparing a major flora of Micronesia, which will have full synonymies, keys, descriptions, and literature citations, these features are not included in the present work. Verified names, ecological and distributional information, and specimen citations are provided. We feel that the distribution by islands is reasonably complete, though careful exploration may fill this in and even reveal new species. One, *Terminalia rostrata*, was found on Asuncion Island in 1972. Medinilla, the smallest island, is also by far the least botanically well known. Much information on many of these species may be found in Stone's comprehensive Flora of Guam (1971). Guam is the southernmost and largest of the Marianas.

The Northern Marianas, the chain of islands extending about 480 km from Medinilla north to Uracas (Figure 2), are, with the exception of tiny Medinilla, active or dormant volcanoes. Anatahan may be extinct, but probably is only dormant. Medinilla is a flat-topped limestone remnant about 0.85 sq km in area and 30 m high. Geologically it might perhaps better be associated with the

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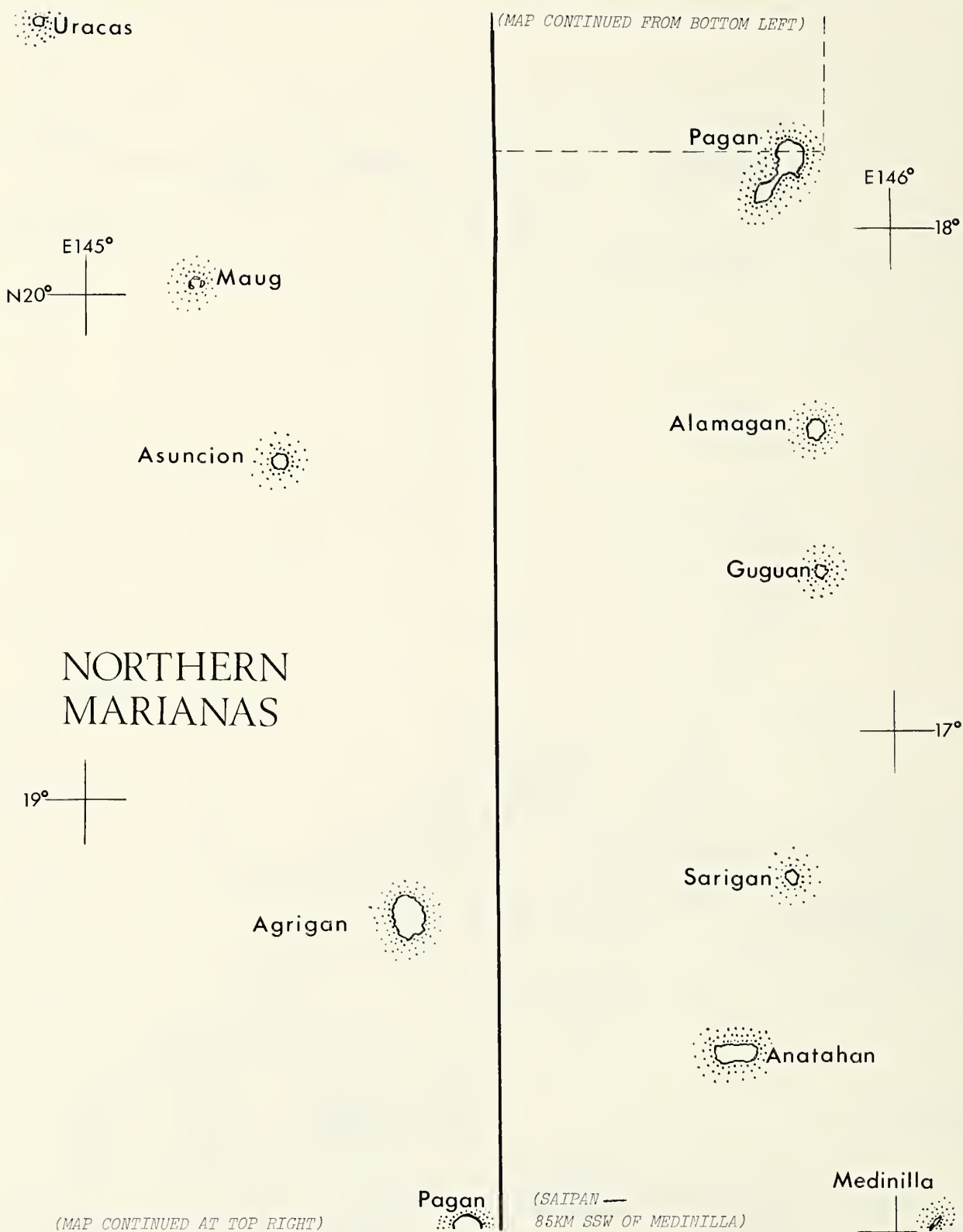


FIGURE 2.—The Northern Marianas. (One degree of latitude = 60 nautical miles = 111 km.)

Southern Marianas. The others are both larger and higher, and limestone is only known from a very small area on Pagan. Otherwise the substratum is entirely of volcanic origin.

The limitation in area and in substratum types is, at least in part, responsible for a limited flora. Isolation, and the extreme geological youth of at least the volcanic islands, exert an influence in the same direction, toward a small flora.

A detailed history of botanical exploration will be reserved for the Micronesian flora. Only those responsible for the records and specimens cited here will be mentioned. Doubtless many of the early voyagers sighted, perhaps even visited, some of the 10 islands treated here. La Pérouse (1797), who visited the islands in 1786, reported stunted coconuts on Asuncion at that time. Captain Beechey (1831, II:438), in H. M. S. *Blossom*, visited Asuncion in 1827 and gives a very contrasting account from that of La Pérouse. Whether any plants were collected we have not found out. None are reported in the botany of the voyage. De la Corte (1926, 1927) wrote an account mentioning some plants by their Chamorro names. The first collections of herbarium specimens were probably those made in 1887 by Marche (1891). Governor Fritz, administrator under the German regime, made a trip visiting all of the islands in 1901, making some botanical observations and planting a number of useful plants (Fritz, 1902). Few of these persisted, but a number of weedy species may have been carried along by accident and established themselves.

The first significant collections were made by the Japanese, especially Professors Ryoza Kanehira and Takahide Hosokawa, during the 1930s. They published informal accounts with some listing of collections (Kanehira, 1934; Hosokawa, 1934) and cited these plants in appropriate taxonomic treatments. These records from the literature, or the specimens if we have been able to see them, are listed under the species below.

More recent collections were made by Donald Anderson (Pacific Vegetation Project) in 1949; F. R. Fosberg (Pacific Vegetation Project) in 1950; L. D. Bonham and G. W. Corwin (U. S. Geological Survey) in 1954; Michael Evans (Pacific Vegetation Project) in 1966; M. Villa-Gomez (University of Guam) in 1970; Philip Moore (Guam Public Schools) in 1971. M. V. C. Falanruw (University

of Guam and Smithsonian Institution), in 1970 and 1972, made collections from the motor sailing ship *Wanderer* (Robert Hervin, Master).

The best sets of these recent collections are or will be deposited at the Smithsonian Institution (U. S. National Herbarium). The Japanese collections are in the Kyushu and Taipei University Herbaria, with some duplicates in various U. S. and European herbaria. We have been able to study part of them.

Recently two other sources, not documented by specimens, have become available and are included here especially because they provide more information than hitherto available on the plants of Medinilla. They are an excerpt from a manuscript draft environmental impact statement, by Swedberg, on Medinilla, mentioning a few plants, and a booklet on the Marianas by Lehne and Gäbler (1972), mentioning some plants by Chamorro or German names. They include five names for which we have been unable to find botanical equivalents: Admahaian, Dumpkin, Kürbisse, Nok, Paypaygebüsch.

The principal botanical papers on or including Northern Marianas plants are listed in the literature cited at the end of this account. Special mention may be made of four of these papers, not cited otherwise, but dealing with aspects of Northern Marianas botany: Corwin et al., 1957; Fosberg, 1958; Fosberg and Corwin, 1958; and Fosberg, 1960.

The floristic information in the present account has been accumulated in our Micronesian flora card files by Fosberg and Sachet over a period of many years. It was compiled from this source and from specimen labels into the present form by our efficient botanical technician, Mr. Royce Oliver, to whom our appreciation is very sincere. The ecological information has been put together from field notebooks by Falanruw and Fosberg. Plant identifications are largely by Fosberg and Sachet. Much of the work on the manuscript, as well as on the original card files is by Sachet, who has worked in the Southern Marianas, though not yet in the northern islands, and who has handled and studied many of the collections and checked most of the published records.

Parts of the work have been supported by Smithsonian Research Awards Grants, Office of Naval Research contracts, a National Institutes of Health

contract, and a Janss Foundation Grant; our time and space have been provided, over the years, by the National Museum of Natural History (formerly in the U. S. National Museum), the U. S. Geological Survey, the Pacific Science Board NAS/NRC, and the Yap Institute of Science. Transportation to the islands, on several occasions, was provided by the U. S. Navy. To all of these organizations our thanks are here expressed, as well as to the authorities of the many herbaria where we have worked or who have loaned specimens. Herbarium symbols used in the citations are according to the

Index Herbariorum (Lanjouw) system except that the symbol "Fo" indicates material still in the authors' possession, not yet deposited formally. An asterisk (*) before a name indicates that the plant concerned is believed to be a post-European introduction.

For further information on the circumstances of work on the Micronesian flora readers are referred to the first installment of this flora (Fosberg and Sachet, 1975) and to other installments as they appear.

Annotated List of the Vascular Flora

PSILOACEAE

Psilotum complanatum Swartz

Rare; usually epiphytic.

Indo-Pacific.

Alamagan: Hosokawa, 1935a, p. 442.

Psilotum nudum (L.) Beauvois

Uncommon; terrestrial, on steep slope of bare clay soil on Anatahan.

Pantropical.

Pagan: Road to Talague Beach, Moore 334 (US); Mt. Pagan, 1870 ft [570 m], Moore 360 (US).

Anatahan: Northwest corner of island, 300 ft [90 m], Falanruw 1622 (US).

LYCOPODIACEAE

Lycopodium cernuum L.

Uncommon; on lava and ash in open or brushy places.

Pantropical.

Pagan: Mt. Pagan, 1870 ft [570 m], Falanruw 1996.

Alamagan: Hosokawa, 1935a, p. 439.

MARATTIACEAE

Angiopteris evecta (Forster) Hoffmann

Occasional small colonies in deep moist shaded ravines; fronds ascending, 4–5 m tall, from a massive barrel-shaped fleshy rhizome or corm.

Indo-Pacific.

Agrihan: Canyon on east side, Fosberg 31623 (US, BISH, Fo).

Alamagan: Hosokawa 7941 (BISH); Kanehira 2176 (US); south southwest coast, 650–1000 ft [200–300 m], Falanruw 1931 (US); Anderson 427 (US).

Sarigan: Hosokawa 7894; above village, 350–375 m, Evans 2370 (US, BISH, Fo, NY, L, P).

Anatahan: Northern coast, below 250 ft [75 m], Falanruw 1711 (US).

GLEICHENIACEAE

Gleichenia linearis (Burman f.) C.B. Clarke

Common locally on lava and colonizing erosion scars.

Old World tropics.

Pagan: Mt. Charlen, spatter cone east of Fresh Water Lake, Fosberg 31408 (US).

Alamagan: Hosokawa, 1935a, p. 435.

POLYPODIACEAE

Acrostichum aureum L.

Occasional in moist ravines and on wet banks on Anatahan; forming continuous belt of marsh vegetation around lake on Pagan in 1950; generally an inhabitant of swampy places, especially near mangrove swamps on other islands; a tall, stiff, coarse fern.

Pantropical.

Pagan: Crater Lake, Anderson 524 (US, BISH, Fo), 523 (US, BISH, Fo, NY, L); Fresh Water Lake, Fosberg 31379 (US).

Anatahan: Northwest corner of island below 150 ft [45 m], Falanruw 1657 (US); northern coast, be-

low 250 ft [75 m], *Falanruw* 1970 (US).

Asplenium nidus L.

Common, both epiphytic and terrestrial in shaded moist areas; in rock crevices, and on volcanic tuff cliffs, some specimens on Uracas with divided tips.

Pantropical.

Uracas: South coast, below 400 ft [120 m], *Falanruw* 2201 (US).

Maug: South central East Island, 400 ft [120 m], *Falanruw* 2241 (US, BISH).

Asuncion: Southwest slope, 150 ft [45 m], *Falanruw* 2256 (US).

Agrigan: Trail around south side of island, 10–20 m, *Fosberg* 31611 (US, BISH).

Pagan: 2 miles [3.2 km] south of pier, 10 m, *Anderson* 590 (US, BISH, Fo, MICH, IJ); road to Talague beach, *Moore* 333 (US).

Alamagan: Around Partido village, *Fosberg* 31660 (US); south southwest coast, 450 ft [140 m], *Falanruw* 1895 (US); 1025 ft [310 m] *Falanruw* 1991? (US); *Anderson* 417 (US, Fo, MICH, IJ).

Guguan: West coast, below 50 ft [15 m], *Falanruw* 1802 (US).

Sarigan: Above village, 250–300 m, *Evans* 2385 (US, BISH, Fo, NY).

Anatahan: Beach area, sea level, *Falanruw* 1666 (US).

Asplenium unilaterale Lamarck

Terrestrial on shaded banks and moist soil.

Agrigan: Canyon on east side of island, *Fosberg* 31622 (US, BISH, Fo, MICH, IJ).

Pagan: Hosokawa, 1936, p. 232.

Alamagan: 100 m, *Anderson* 405 (US, BISH, Fo, MICH, IJ); south southwest coast, *Falanruw* 1905 (US).

Sarigan: Hosokawa, 1936, p. 232.

Anatahan: Behind village, southwest corner of island, *Falanruw* 1624 (US).

Athyrium sorzogonense (Presl) Milde

Not seen by us.

Alamagan: Hosokawa, 1936, p. 229; Wagner and Grether, 1948, p. 63.

Athyrium sp.

Rare, on scoria cliff.

Agrigan: Canyon on east side of island, *Fosberg* 31626 (US, Fo).

Belvisia spicata (L. f.) Mirbel

Epiphytic on coconut trunk in moist ravine.

Indo-Pacific.

Anatahan: South east of village, under 1000 ft [300 m], *Falanruw* 1972 (US).

Bolbitis quoyana (Gaudichaud) Ching

Terrestrial, shaded banks and in deep ravines, low to moderate elevations.

Indo-Pacific.

Agrigan: Trail around south side of island, 10–20 m, *Fosberg* 31624 (US).

Alamagan: South southwest coast, 1025 ft [310 m], *Falanruw* 1924 (US).

Sarigan: Hosokawa, 1936, p. 248.

Anatahan: Western coast, below 200 m, *Falanruw* 1698 (US); northwest corner of island, 300 ft [90 m], *Falanruw* 1619 (US).

Cheilanthes tenuifolia (Burman f.) Swartz

Terrestrial in savannas on volcanic ash soil. A widely distributed species in open habitats.

Indo-Pacific.

Pagan: *Hosokawa* 7963 (US); northwest, sea level, *Falanruw* 1853 (US); Mt. Pagan, *Moore* 392 (US), 388 (US); 900 ft [275 m], 372 (US); east of Fresh Water Lake, *Fosberg* 31399 (US); Mt. Charlen, spatter cone, east of Fresh Water Lake, *Fosberg* 31405 (US).

Ctenitis subglandulosa (Hance) Ching

Rare on scoria cliffs and in shaded rich moist soil.

Agrigan: East side of island, *Fosberg* 31625 (US); midwest coast, 150 ft [45 m], *Falanruw* 2337 (US, BISH).

Alamagan: *Anderson* 428 (US); south southwest coast, 1025 ft [310 m], *Falanruw* 1992 (US).

Anatahan: Northwest corner of island, 200–300 ft [60–90 m], *Falanruw* 1613 (US).

Davallia solida (Forster f.) Swartz

Ubiquitous, epiphytic on tree trunks and terrestrial, on rocks, cliffs and even on young lava flows, rhizomes creeping extensively. In hot dry barren caldera of Mt. Pagan. Dominant plant on upper slopes of Asuncion above forest margin from 250 to 600 m or higher, forming a deep humus mat. Abundant also on Guguan. Possibly represents the original vegetation on these young volcanic slopes. Widespread in Pacific Islands in diverse habitats. Very variable in size and texture of fronds.

Asuncion: Southwest slope, 1500 ft [460 m],

Falanruw 2291 (US); 250 ft [75 m], 2271 (US, BISH).

Agrigan: Trail around south side of island, 10–20 m, *Fosberg* 31610 (US, BISH).

Pagan: Top of Mt. Pagan, *Villagomez JV-X-12* (US), *JV-7K* (US); isthmus, *Anderson* 571 (US, BISH, Fo, NY, L); east of village, *Moore* 401 (US); Caldera Wall, *Moore* 325 (US); Mt. Charlen, east of Fresh Water Lake, *Fosberg* 31409 (US, BISH, Fo).

Alamagan: South southwest coast, 450 ft [140 m], *Falanruw* 1903 (US); around Partido village, *Fosberg* 31676 (US, BISH, Fo, NY, L).

Guguan: 200–300 ft [60–90 m], *Falanruw* 1842 (US).

Sarigan: Behind village, 50–100 m, *Evans* 2367 (US, BISH, Fo, NY).

Dryopteris dissecta (Forster f.) O. Kuntze

Growing on cool shaded wet clay wall.

Alamagan: South southwest coast, 500 ft [150 m], *Falanruw* 1916 (US).

Histiopteris incisa (Thunberg) J. Smith

Alamagan: Hosokawa, 1936, p. 227.

Humata repens (L. f.) Diels

Epiphytic.

Alamagan: Hosokawa, 1936, p. 121.

Lindsaea ensifolia Swartz

Characteristic of savannas and other open situations, found in *Miscanthus* grassland on Sarigan, in lava crevasses and around steam vents on Pagan.

Indo-Pacific.

Pagan: Mt. Pagan, *Moore* 390 (US); Mt. Charlen, east of Fresh Water Lake, *Fosberg* 31403 (US).

Sarigan: Above village, 375 m, *Evans* 2377 (US, BISH, Fo, NY).

Lindsaea obtusa J. Smith

Not seen by us.

Alamagan: Kramer, 1970, p. 171; Hosokawa, 1936, p. 117.

Lindsaea repens var. *pectinata* (Blume) Mettenius ex Kuhn

Sarigan: Hosokawa, 1936, p. 116.

Nephrolepis biserrata (Swartz) Schott

Terrestrial in very shaded areas.

Pagan: Mt. Pagan, 800 ft [240 m], *Moore* 376 (US).

Alamagan: South southwest coast, 250 ft [75 m], *Falanruw* 1881 (US); 500 ft [150 m], *Falanruw* 1911 (US).

Nephrolepis exaltata (L.) Schott

Could this really be one or more of the other species misdetermined? We have not seen any of the cited material.

Pagan: Hosokawa, 1936, p. 69.

Alamagan: Hosokawa, 1936, p. 69.

Nephrolepis hirsutula (Forster f.) Presl

Terrestrial, common component of herbaceous vegetation in edges of forest on Asuncion.

Asuncion: Southwestern slope, 750 ft [230 m], *Falanruw* 2288 (US).

Agrigan: Trail around south side of island, 10–20 m, *Fosberg* 31593 (US).

Pagan: Mt. Pagan, 1870 ft [570 m], *Moore* 370 (US); *Moore* 387? (US), 389? (US); Caldera Wall, *Moore* 329 (US), 328 (US), near Crater Lake, *Anderson* 520 (US); east of Fresh Water Lake, 2–50 m, *Fosberg* 31406 (US), 31410 (US); south of Fresh Water Lake, 2–50 m, *Fosberg* 31391 (US); 150 ft [45 m], *Bonham* 7 (US).

Alamagan: Around Partido village, *Fosberg* 31699 (US).

Sarigan: Above village, 375 m, *Evans* 2374 (US, BISH, Fo, NY); 50–100 m, 2401 (US, BISH, Fo, NY).

Anatahan: Northwest tip of island, 0–10 m, *Evans* 2455? (US, BISH, Fo, NY).

Nephrolepis multiflora (Roxburgh) Jarrett ex Morton

Terrestrial, in shaded areas.

Pagan: East of Lake Laguna, *Moore* 352 (US), 350 (US); summit Mt. Pagan, *Villagomez JV-X-16* (US).

Guguan: Southwest part of island, 175 ft [50 m], *Falanruw* 1844 (US).

Anatahan: Northwest corner of island, 200–300 ft [60–90 m], *Falanruw* 1618 (US).

Nephrolepis sp.

Undoubtedly belongs to one or more of other species, but too young to identify.

Sarigan: Northwest coast, 400 ft. [120 m], *Falanruw* 1753 (US).

Anatahan: Northwest corner of island, 300 ft [90 m], *Falanruw* 1626 (US).

Polypodium nigrescens Blume

Anatahan: Hosokawa, 1936, p. 246.

Polypodium punctatum (L.) Swartz

Sarigan: Above village, 250–300 m, *Evans 2383* (US, BISH, Fo, NY); 50–100 m, *Evans 2403* (US, BISH, Fo, NY).

Polypodium scolopendria Burman f.

Very common fern, on all islands south of Maug with the possible exception of Medinilla. It grows in a variety of habitats, varying from small pioneer plants on steep cinder slopes on Guguan to very large specimens growing in shaded ravines on Agrigan, fruiting under both harsh and favorable conditions. It may be either terrestrial or, more rarely, epiphytic.

Asuncion: Southwest slope, 150 ft [45 m], *Falanruw 2257* (US).

Agrigan: 10–20 m, *Fosberg 31592* (US, BISH); midwest coast, 150 ft [45 m], *Falanruw 2345* (US).

Pagan: 150 ft [45 m], *Bonham 42* (US); Fresh Water Lake, *Fosberg 31385* (US, BISH); Mt. Pagan 1700 ft [520 m], *Moore 377* (US).

Alamagan: Partido village, *Fosberg 31659* (US); south southwest coast, 450 ft [140 m], *Falanruw 1893* (US); 250 ft [75 m], *1878* (US); Songsong [=Asongsong] village, 15 ft [5 m], *Kondo 13* (BISH).

Guguan: West coast, 200–225 ft [60–70 m], *Falanruw 1824* (US); 200 ft [60 m], *1820a* (US).

Sarigan: Northwest coast, 250 ft [75 m], *Falanruw 1727* (US), *1734* (US); near village, 10–100 m, *Evans 2354* (US, BISH, Fo, NY).

Anatahan: Northwest corner of island, below 150 ft [45 m], *Falanruw 1653* (US); western coast, below 200 m, *Falanruw 1710* (US); northwest tip of island, 0–10 m, *Evans 2456* (US, BISH).

Pteris quadriaurita Retzius (*Pteris pacifica* Hieronymus)

Very common, especially in semishade, on Anatahan and Sarigan. Small but fertile plants occur in full sun on bare black lava bluffs of Asuncion.

Maug: Central East Island, 500 ft [150 m], *Falanruw 2236* (US), *2242* (US).

Asuncion: Southwest slope, 250 ft [75 m], *Falanruw 2276* (US, BISH), *2275* (US, BISH); 15 ft [4.5 m], *2283* (US).

Agrigan: Midwest coast, 150 ft [45 m], *Falanruw 2338* (US), *2339* (US); trail around south side of island, 10–20 m, *Fosberg 31579* (US, BISH).

Pagan: Fossil, *Corwin PC-79-1a* to *1f*; Caldera Wall, *Moore 326* (US); Talague beach, *Moore 339* (US); Fresh Water Lake, 2–50 m, *Fosberg 31388* (US, BISH, Fo, MICH); 50 ft [15 m], *Bonham 40* (US).

Alamagan: Around Partido village, *Fosberg 31665* (US, BISH, Fo, MICH); 170 m, *Anderson 406* (US); south southwest coast, 450 ft [140 m], *Falanruw 1892* (US).

Sarigan: Northwest coast, 250 ft [75 m], *Falanruw 1742* (US); 200 ft [60 m], *1780* (US); near village, 10–100 m, *Evans 2336* (US, BISH, Fo, NY).

Anatahan: Northwest corner of island, 200–300 ft [60–90 m], *Falanruw 1617* (US); 150 ft [45 m], *1654* (US); west end of north coast, below 250 ft [75 m], *Falanruw 1680* (US); northwest tip of island, 0–10 m, *Evans 2444* (US); *Kanehira 2145* (US).

Pteris tripartita Swartz

Four clusters of large specimens growing in semi-shaded crevasse on large exposure of older volcanic rock. A widespread species in the Pacific but curiously restricted in the Northern Marianas.

Uracas: South coast, below 400 ft [120 m], *Falanruw 2202* (US).

Pteris vittata L.

Pagan: East of Lake Laguna, *Moore 349* (US); Mt. Pagan, *Moore 364* (US).

Sphenomeris biflora (Kaulfuss) Tagawa

Terrestrial in moist shaded areas and on bare pyroclastic material.

Agrigan: In canyon on east side of island, *Fosberg 31630* (US, BISH).

Pagan: Mt. Pagan, *Moore 373* (US), *362* (US); near Salt Water Lake, 2–50 m, *Fosberg 31344* (US); east of Fresh Water Lake, 2–50 m, *Fosberg 31407* (US).

Alamagan: South southwest coast, 500 ft [150 m], *Falanruw 1909* (US).

Anatahan: West end of north coast, below 250 ft [75 m], *Falanruw 1687* (US).

Sphenomeris chinensis (L.) Maxon

Pagan: Hosokawa, 1936, p. 115.

Sarigan: Above village, 375 m, *Evans 2376* (US, BISH, Fo, NY).

Thelypteris opulenta (Kaulfuss) Fosberg & Sachet

Terrestrial, occasional in shaded moist areas; bases of cliffs. A widespread Indo-Pacific species,

reaching its northern limit here.

Agrigan: East side of island, *Fosberg 31633* (US, BISH, Fo, MICH); midwest coast, 150 ft [45 m], *Falanruw 2336* (US, BISH, Fo).

Alamagan: 60 m, *Anderson 412* (US, BISH, Fo, MICH, IJ, NY); south southwest coast, 500 ft [150 m], *Falanruw 1913* (US).

Thelypteris ornata (Wallich ex Beddome) Ching

Alamagan: Wagner, 1948, p. 214; Wagner and Grether, 1948, pp. 58–59; Hosokawa, 1936, p. 233.

Sarigan: Wagner, 1948, p. 214; Hosokawa, 1936, p. 233; Wagner and Grether, 1948, pp. 58–59.

Anatahan: Wagner, 1948, p. 214; Hosokawa, 1936, p. 233; Wagner and Grether, 1948, pp. 58–59.

Thelypteris torresiana (Gaudichaud) Alston

Terrestrial, occasional in moist shaded or partly shaded areas.

Pagan: Near Crater Lake, 25 m, *Anderson 519* (US); pass between the two lakes, 2–50 m, *Fosberg 31417* (US).

Alamagan: South southwest coast, 500 ft [150 m], *Falanruw 1910* (US), *1912* (US).

Anatahan: Northwest corner of island, 300 ft [90 m], *Falanruw 1627* (US).

Thelypteris unita (L.) Morton

Terrestrial, common locally in exposed places.

Agrigan: Hosokawa, 1936, p. 76.

Pagan: Summit Mt. Pagan, *Villagomez JV-X-11* (US); east of Lake Laguna, *Moore 351* (US); 150 ft [45 m], *Bonham 41* (US); pass between the two lakes, 2–50 m, *Fosberg 31416* (US).

Alamagan: Hosokawa, 1936, p. 76.

Vittaria incurvata Cavanilles

Epiphytic, rare.

Sarigan: Above village, 250–300 m, *Evans 2382* (US, BISH, Fo, NY).

CYATHEACEAE

Cyathea aramaganensis Kanehira

A common tree fern on high open volcanic slopes above forest limit.

Endemic.

Alamagan: South southwest coast, 1025 ft [310 m], *Falanruw 1927* (US, BISH); west slope of mountain, *Anderson 424* (US).

Sarigan: Hosokawa, 1936, p. 50; Wagner and

Grether, 1948, p. 46.

Anatahan: Seen at higher elevations by Falanruw but not collected.

PANDANACEAE

Freycinentia reineckeii Warburg (*F. mariannensis* Merrill)

Rooted in ground but climbing trees and earth cliffs in moist shaded areas, also in ravines, locally common.

Endemic to Marianas.

Agrigan: Midwest coast, 150 ft [45 m], *Falanruw 2341?* (US).

Pagan: Near Crater Lake, *Anderson 522* (US).

Alamagan: South southwest coast, 350 ft [100 m], *Falanruw 1882* (US); 60 m, *Anderson 411* (US); vicinity of Asongsong village, *Fosberg 31746* (US).

Sarigan: Above village, 250–300 m, *Evans 2384* (US, BISH, Fo, NY), *Evans 2380* (US, BISH, Fo, NY).

Anatahan: Northwest coast, below 200 ft [60 m], *Falanruw 1611* (US).

Pandanus tectorius Parkinson, sensu lato (incl. *P. pseudo-menne* Hosokawa)

Probably present on all islands except Uracas, generally common, sea level to 200 m, occurring both in open and in sparse thickets, also on steep scoria canyon walls. In open the trees are rather low, with leaves touching ground; gregarious. Widespread variable species, which has been variously split up.

Maug: East Island, common on upper slopes, seen but not collected by Falanruw.

Asuncion: Southwestern slope, 25 ft [7 m], *Falanruw 2279* (US).

Agrigan: East side of island, *Fosberg 31638* (US, BISH); midwest coast, 150 ft [45 m], *Falanruw 2346* (US).

Pagan: 150–600 ft [45–180 m], *Bonham 16* (US, BISH).

Alamagan: Vicinity of Asongsong village, 3–15 m, *Fosberg 31704* (US, BISH); south southwest coast, 0–200 ft [0–60 m], *Falanruw 1955* (US).

Guguan: West coast, below 50 ft [15 m], *Falanruw 1811a* (US).

Anatahan: Beach area, sea level, *Falanruw 1671* (US).

GRAMINEAE

**Bambusa vulgaris* Schrader ex Wendland

Two colonies, only seen near upper edge of forest at about 300 m, not seen elsewhere.

Anatahan: Southwest of village, under 1000 ft [300 m], *Falanruw* 1975 (US).

**Cenchrus brownii* Roemer & Schultes

Weed in disturbed places, coconut groves and along trails.

Agrigan: Trail around south side of island, 10–20 m, *Fosberg* 31587 (US, BISH, Fo).

Pagan: Marine camp, 4 m, *Anderson* 601 (US, BISH, Fo, NY).

Alamagan: Vicinity of Asongsong village, *Fosberg* 31715 (US, BISH, Fo).

**Cenchrus echinatus* L.

Weed of disturbed, usually open places, as around villages.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw* 2158 (US).

Pagan: Isthmus, 3 m, *Anderson* 557 (US, BISH, Fo, NY, L); village, *Moore* 396 (US).

Alamagan: South southwest coast, 0–200 ft [0–60 m], *Falanruw* 1954b (US); vicinity of Asongsong village, 3–15 m, *Fosberg* 31715 (US).

Centotheca lappacea (L.) Desvaux

Common under forest canopy, seen only on Anatahan.

Anatahan: *Hosokawa* 7833 (Fo); northwest corner of island, 200–300 ft [60–90 m], *Falanruw* 1631 (US); southwest of village under 1000 ft [300 m], *Falanruw* 1968 (US).

**Chloris inflata* Link

Common in open areas, especially around villages and old human habitations, not seen on uninhabited islands.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw* 2162 (US), 2192 (US).

Pagan: Volcanic ash plain, 50 ft [15 m], *Bonham* 33 (US, Fo); village, *Moore* 415 (US).

Sarigan: Northwest coast, 200 ft [60 m], *Falanruw* 1772 (US); village, 10–50 m, *Evans* 2437 (US, BISH, Fo, NY).

Anatahan: Northwest corner, below 200 ft [60 m], *Falanruw* 1634 (US); northwest tip of island, 0–10 m, *Evans* 2449 (US, BISH, Fo, NY).

**Chrysopogon aciculatus* (Retzius) Trinius

Common pioneer species on volcanic ash and cinders from low elevations to at least 450 m (on Asuncion); in old village sites.

Asuncion: Southwestern slope, 1500 ft [450 m], *Falanruw* 2296 (US).

Pagan: Marine camp, 20 m, *Anderson* 516 (US, BISH, Fo, NY, L); volcanic ash plain, 50 ft [15 m], *Bonham* 30 (US, Fo); east of Fresh Water Lake, *Fosberg* 34412 (US); village, *Moore* 411 (US).

Alamagan: Hosokawa, 1935b, p. 313.

Guguan: West coast, 50 ft [15 m], *Falanruw* 1809 (US).

**Cynodon dactylon* (L.) Persoon

Common in open areas around human habitations; sod-forming. Widespread.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw* 2163 (US), 2187 (US).

Pagan: Marine camp, 20 m, *Anderson* 512 (US, BISH); isthmus, 10 m, *Anderson* 583 (US, BISH, Fo, NY, L, P).

Alamagan: South southwest coast, 0–200 ft [0–60 m], *Falanruw* 1961 (US).

Sarigan: Village, 10–50 m, *Evans* 2438 (US, BISH, Fo, NY).

Medinilla: Swedberg ms. 1974.

**Dactyloctenium aegyptium* (L.) Willdenow

Occasional to common along paths and in open somewhat bare areas around human habitation.

Agrigan: Trail around south side of island, 10–20 m, *Fosberg* 31583 (US).

Pagan: Isthmus, *Anderson* 558 (US); volcanic ash soil, 50 ft [15 m], *Bonham* 28 (US, Fo); west side near Salt Lake, *Fosberg* 31351 (US); village, *Moore* 413 (US).

Alamagan: Vicinity of Asongsong village, 3–15 m, *Fosberg* 31710 (US, BISH, Fo); south southwest coast, 0–200 ft [0–60 m], *Falanruw* 1953 (US).

**Digitaria ciliaris* (Retzius) Koeler

Occasional in open places, on roads and paths, also on open lava and ash.

Agrigan: Trail along south side of island, 10–20 m, *Fosberg* 31606 (US, BISH, Fo, NY, L).

Pagan: Fresh Water Lake, 2–50 m, *Fosberg* 31401 (US, BISH, Fo); near Salt Water Lake, west side of island, *Fosberg* 31366 (US, BISH, Fo).

Sarigan: Hosokawa, 1935b, p. 314.

Anatahan: Hosokawa, 1935b, p. 315.

**Digitaria ciliaris* var.

One plant seen on volcanic cinder sand at low elevation, among pioneer vegetation.

Guguan: West coast, below 50 ft [15 m], *Falanruw* 1801 (US).

Digitaria gaudichaudii (Kunth) Henrard

Occasional pioneer on volcanic cinder sand; appears very hardy.

Guguan: West coast, below 50 ft [15 m], *Falanruw* 1812 (US); 200–300 ft [60–90 m], 1851 (US).

Digitaria mariannensis Merrill

Occasional on hot dry banks.

Maug: North end of East Island, below 400 ft [120 m], *Falanruw* 2212 (US).

Digitaria mezii Kanehira

Sarigan: Mez in Diels, 1924, p. 25.

Digitaria radicata (Presl) Miquel (*Digitaria timorensis* (Kunth) Balansa)

Common in coconut groves and open areas from low elevations to 500 m (on Asuncion).

Asuncion: Southwest slope, 1500 ft [450 m], *Falanruw* 2311 (US); 250 ft [75 m], 2269 (US).

Alamagan: Asongsong village, 3–15 m, *Fosberg* 31711 (US, BISH, Fo); *Anderson* 415 (US, BISH, Fo, NY).

Sarigan: Northwest coast, 200 ft [60 m], *Falanruw* 1773 (US).

Digitaria setigera Roth (*Digitaria pruriens* (Fisher ex Trinius) Büse)

In open areas.

Alamagan: Vicinity of Asongsong village, 3–15 m, *Fosberg* 31713 (US, BISH, Fo); *Fosberg* 31712 (US).

Digitaria setigera var. (*Digitaria pruriens* var.)

Sarigan: Below village, 0–20 m, *Evans* 2431 (US, BISH, Fo, NY).

Anatahan: Northwest tip of island, 0–10 m *Evans* 2451 (US, BISH, Fo, NY).

**Eleusine indica* (L.) Gaertner

Weed in villages and open areas. Cosmopolitan.

Agrigan: Village, *Fosberg* 31431 (US); southwest coast, below 300 ft, *Falanruw* 2164 (US); below 200 ft [60 m], 1649 (US); midwest coast, below 200 ft [60 m], *Falanruw* 2328 (US, BISH).

Pagan: Isthmus, 5 m, *Anderson* 560 (US, BISH, Fo, NY, L); near Salt Lake, west side of island, *Fosberg* 31353 (US).

Alamagan: Around Partido village, *Fosberg* 31651 (US).

Sarigan: Near village, 10–100 m, *Evans* 2332 (US, BISH, Fo, NY).

Anatahan: Northwest tip of island, *Evans* 2458 (US, BISH); northwest corner of island, below 75 m, *Falanruw* 1694 (US); 60 m, *Falanruw* 1649 (US).

**Eragrostis tenella* (L.) Beauvois (*Eragrostis amabilis* Wight & Arnott)

Common on open bare ground, along paths, and in villages. Widespread.

Agrigan: Trail around south side of island, *Fosberg* 31572 (US); midwest coast, 200 ft [60 m], *Falanruw* 2335 (US).

Pagan: Isthmus, *Anderson* 556 (US, BISH, Fo, NY, L); Salt Lake, west side of island, 2–50 m, *Fosberg* 31367 (US, BISH).

Alamagan: Around Partido village, *Fosberg* 31644 (US, BISH).

Sarigan: Near anchorage, 150 ft [45 m], *Falanruw* 1723 (US).

Anatahan: Village area northwest corner of island, below 200 ft [60 m], *Falanruw* 1645 (US); northwest tip of island, 0–10 m, *Evans* 2452 (US).

Heteropogon contortus (L.) Beauvois

Common on bare ash slopes, from low elevations to 500 m (on Asuncion).

Asuncion: Southwest slope, 1500 ft [450 m], *Falanruw* 2302 (US), 2308 (US).

Agrigan: Hosokawa, 1935b, p. 313.

Pagan: West side of island, near Salt Lake, *Fosberg* 31355 (US, BISH); Talague beach, *Moore* 335 (US); isthmus, 6 m, *Anderson* 561 (US, BISH, Fo, NY, L); west side of Lake Laguna, *Moore* 353 (US).

Alamagan: Near Asongsong village, *Fosberg* 31745 (US).

Guguan: West coast, below 50 ft [15 m], *Falanruw* 1814 (US); 200–300 ft [90 m], 1850 (US).

Medinilla: Swedberg, ms 1974.

Ischaemum longisetum Merrill

Occasional on upper slopes of volcanoes.

Asuncion: Upper southwestern slope, 500 m, *Falanruw* 2298 (US); 2310 (US).

Pagan: Hosokawa 7952 (US).

Alamagan: Hosokawa, 1935b, p. 311.

Anatahan: Hosokawa, 1935b, p. 311.

Ischaemum sp.

Sarigan: Behind village, 50–100 m, *Evans 2365* (US, BISH, Fo, NY) (sterile).

Lepturus repens (Forster) R. Brown

Small patch on top of bluff over ocean.

Agrigan: Trail around south side of island, 10–20 m, *Fosberg 31584* (US, BISH).

Pagan: *Villagomez JV-03* (US) (sterile, doubtful); Mt. Pagan, *Moore 379* (US).

Miscanthus floridulus (Labillardière) Warburg ex Schumann & Lauterbach

Common or abundant on all islands except Uracas, least so on Maug, Asuncion, and Guguan, which have been least subject to burning or grazing by goats. On the other islands it is the dominant vegetation on upper slopes, more locally so on the three mentioned. It is also occasionally found down to near sea level. On upper slopes it forms matted brakes to 3 m deep, with harsh cutting leaf margins. It recovers readily from burning. Widespread in the high islands of the west and south Pacific. In Micronesia, found only in the Marianas chain and on Ponape, reaching its northern limit on Maug.

Maug: Fritz, 1902, p. 104.

Asuncion: Southwest slope, 1000 ft [300 m], *Falanruw 2303* (US).

Agrigan: *Marche 294* (P, Fo); east side of island, *Fosberg 31628* (US); midwest coast, 200 ft [60 m], *Falanruw 2334* (US).

Pagan: Mt. Pagan, *Villagomez JV-X-13* (US), *JV-2K* (US); *Hosokawa 7950* (Fo); isthmus, 10 m, *Anderson 517* (US, BISH, NY, L); 150 ft [45 m], *Bonham 4* (Fo); *Kanehira 2198* (KY); east end of air strip, *Moore 301* (US).

Alamagan: Vicinity of Asongsong village, 3–15 m, *Fosberg 31744* (US).

Sarigan: Northwest coast above anchorage, 0–75 ft [0–20 m], *Falanruw 1788* (US).

Anatahan: *Hosokawa 7830* (US); northwestern corner of island, below 250 ft [75 m], *Falanruw 1693* (US); sea level, *1663* (US).

Oplismenus compositus (L.) Beauvois

Common on ground in shade in semi-open forests. Not found on the most active volcanoes. A widespread Indo-Pacific species.

Asuncion: Southwestern slope, 400 ft [120 m], *Falanruw 2313* (US).

Agrigan: *Marche 299* (P, Fo); trail around south side of island, 10–20 m, *Fosberg 31605* (US).

Alamagan: South southwest coast, below 500 ft [150 m], *Falanruw 1936* (US) (sterile); vicinity of Asongsong village, 3–15 m, *Fosberg 31735* (US).

Sarigan: Above village, 150–250 m, *Evans 2390* (US, BISH, Fo, NY).

Anatahan: Northern coast, below 200 ft [60 m], *Falanruw 1964* (US); northwest corner of island, 200–300 ft [60–90 m], *Falanruw 1615* (US).

Oplismenus undulatifolius var. *imbecillis* (Roemer & Schultes) Hackel

Seen only growing abundantly in open area on slope above sea.

Indo-Pacific.

Sarigan: Northwest coast, 0–75 ft [0–20 m], *Falanruw 1789* (US).

**Panicum ambiguum* Trinius (*Brachiaria paspaloides* (Presl) Hubbard)

Rare in 1950 on roadsides near landing.

Indo-Pacific.

Pagan: Near landing, *Fosberg 31639* (US, BISH, Fo).

**Panicum distachyon* L.

Not seen by us.

Indo-Pacific.

Anatahan: *Hosokawa, 1935b, p. 318.*

Panicum reptans L.

Growing along open path in village area.

Pantropical.

Agrigan: Southwest coast village area, below 300 ft [90 m], *Falanruw 2179* (US).

**Paspalum commersonii* Lamarck (*Paspalum scrobiculatum* auct. non L.)

Agrigan: *Hosokawa, 1935b, p. 313.*

Pagan: Air strip, *Moore 302* (US).

Alamagan: *Hosokawa, 1935b, p. 313.*

**Paspalum conjugatum* Bergius

Occasional to common along paths and in semi-open areas, abundant in moist area near Fresh Water Lake on Pagan, not known from the islands less disturbed by human activity and from the less-wooded islands.

Pantropical, originally from tropical America.

Agrigan: Trail around south side of island, 10–20 m, *Fosberg 31568* (US).

Pagan: Fresh Water Lake, 2–50 m, *Fosberg 31394* (US).

Alamagan: South southwest coast, 750 ft [230

m], *Falanruw* 1922 (US).

Sarigan: Near anchorage, 100 ft [30 m], *Falanruw* 1719 (US); near village, 1–100 m, *Evans* 2335 (US, BISH, Fo, NY).

Anatahan: *Falanruw* 1987 (US).

Paspalum distichum L. (*Paspalum vaginatum* Swartz)

Forming mats in saline areas near beaches and margins of Salt Water Lake.

Pantropical.

Pagan: West side of Lake Laguna, *Moore* 357 (US).

Anatahan: Beach area, sea level, *Falanruw* 1669 (US).

Paspalum orbiculare Forster

A pioneer species on volcanic cinders and in soil pockets on lava, reaching 500 m elevation on Asuncion, also around villages.

A widely distributed weedy species, distinguished with difficulty from *P. cartalagineum* Presl.

Asuncion: Southwest slope, 1500 ft [460 m], *Falanruw* 2299 (US); 2307 (US).

Pagan: *Fosberg* 31398 (US); isthmus, 5 m, *Anderson* 559 (US, BISH, Fo, NY, L); village, *Moore* 412 (US).

Guguan: West coast, 200–225 ft [60–65 m], *Falanruw* 1852 (US).

**Pennisetum purpureum* Schumacher

Forming dense tangled brakes locally along road near Salt Lake in 1950.

From Africa.

Pagan: Near Salt Lake, west side of island, *Fosberg* 31350 (US).

**Saccharum officinarum* L.

Not collected in the area since 1900.

Indo-Pacific.

Anatahan: Fritz, 1902, p. 98; Lehne and Gäbler, 1972, p. 22, as "Zuckerrohr."

**Setaria lutescens* (Weigel) Hubbard

Not seen by us.

Pantropical.

Agrigan: Hosokawa, 1935b, p. 319.

Alamagan: Hosokawa, 1935b, p. 319.

**Sporobolus diander* Beauvois

Growing in open area near dwelling.

Pantropical.

Anatahan: Northwest corner of island, below 200

ft [60 m], *Falanruw* 1644 (US).

**Sporobolus fertilis* (Steudel) Clayton

On west side of Salt Lake.

Tropical Asia.

Pagan: West side of Lake Laguna, *Moore* 354 (US), 355 (US).

Sporobolus virginicus (L.) Kunth

Very abundant along beach on Pagan and on upper slopes of exposure of older lava on Uracas.

A pantropical strand grass, surprisingly localized in Northern Marianas.

Uracas: West side of south coast, below 400 ft [120 m], *Falanruw* 2203 (US, BISH, Fo).

Pagan: Trail to Pansantati, below 100 ft [30 m], *Falanruw* 1862 (US); back of beach, 3 m, *Anderson* 611 (US).

Stenotaphrum micranthum (Desvaux) Hubbard

Rare in crevices in lava rock on hot dry lee slope.

Widespread, but usually not abundant Indo-Pacific species, known from Southern Marianas.

Maug: North end of East Island, below 400 ft [120 m], *Falanruw* 2218 (US).

Thuarea involuta (Forster f.) R. Brown ex Roemer & Schultes

Widespread Indo-Pacific strand species, surprisingly rare in the Northern Marianas, but elsewhere usually found on coral sand, which is not abundant here.

Sarigan: Hosokawa, 1935b, p. 320.

**Zea mays* L.

Does not ordinarily persist long uncultivated. American.

Pagan: Corte, 1927, p. 330.

Zoysia matrella (L.) Merrill var. *matrella*

This species forms a dense, very low turf or mat locally in openings and especially on cliff tops, seashores and other exposed places. The relationship between the two varieties merits further study. The difference is chiefly in leaf width and degree of involution of the blades. In cultivation at least certain clones seem to maintain their characteristics. How much simple fluctuation in response to environmental severity is involved and how much ecotypic variation merit much further study. To be conclusive this should involve careful field observation on islands where both varieties occur, as well as cultivation experiments with living ma-

terial brought from the same islands but different habitats.

Eastern Asiatic and Micronesian.

Uracas: Seen by Falanruw from a distance forming mats on exposures of older lava, but variety not determined.

Maug: Northern end of East Island, below 400 ft [120 m], *Falanruw* 2215 (US).

Asuncion: Southwest slope, 50 ft [15 m], *Falanruw* 2285 (US).

Agrigan: Southwest coast village area, below 300 ft [90 m], *Falanruw* 2155 (US).

Alamagan: *Hosokawa* 7919 (US); south southwest coast, 0–200 ft [0–60 m], *Falanruw* 1954 (US).

Sarigan: Northwest coast, 0–75 ft [0–20 m], *Falanruw* 1774 (US).

Anatahan: *Hosokawa*, 1935b, p. 314.

Zoysia matrella var. *tenuifolia* (Willdenow ex Thiele) Sasaki (*Zoysia tenuifolia* Willdenow ex Thiele)

Generally from more severe habitats, exposed cliff-tops and other saline places.

Asuncion: Southwest slope, 750 ft [230 m], *Falanruw* 2287 (US).

Agrigan: Trail around south side of island, 10–20 m, *Fosberg* 31581 (US, BISH, Fo).

Pagan: Near Salt Lake, *Fosberg* 31345 (US, BISH, Fo); near landing, 3 m, *Anderson* 514 (US, BISH, Fo, NY, L).

Alamagan: Asongsong village, 15 m, *Fosberg* 31709 (US, BISH, Fo).

Sarigan: Seashore, 0–20 m, *Evans* 2430 (US, BISH, Fo, NY, L).

Anatahan: *Hosokawa* 7857 (Fo); north coast, below 200 ft [60 m], *Falanruw* 1963 (US).

CYPERACEAE

**Cyperus brevifolius* (Rottboell) Hasskarl

Found in disturbed, usually open places, undoubtedly carried accidentally by man; present distribution pantropical, but origin now obscure. Strangely rare in Northern Marianas.

Agrigan: Southwest coast village area, below 300 ft [90 m], *Falanruw* 2179 (US).

**Cyperus compressus* L.

A weed of villages and other disturbed open places.

Pantropical and warm-temperate.

Pagan: 50 ft [15 m], *Anderson* 34 (US, Fo); isthmus, *Anderson* 553 (US).

Alamagan: South southwest coast, village area, 0–200 ft [0–60 m], *Falanruw* 1959 (US).

Anatahan: Northwest coast village area, below 200 ft [60 m], *Falanruw* 1636 (US).

Cyperus cyperinus (Retzius) Suringar

A weedy tufted sedge growing in semi-open and open areas from low elevations to 500 m (on Asuncion), on cinder banks and slopes on Agrigan and Guguan. Widespread in warm-temperate and subtropical zones, origin obscure.

Asuncion: Southwest slope, 1500 ft [460 m], *Falanruw* 2300 (US).

Agrigan: Midwest coast, 200 ft [60 m], *Falanruw* 2326 (US); trail around south side of island, 10–20 m, *Fosberg* 31571 (US).

Pagan: Air strip, *Moore* 303 (US); isthmus, 6 m, *Anderson* 532 (US, BISH, Fo, NY, L, P), 554 (US); *Bonham* 6 (US, BISH).

Alamagan: South southwest coast, 450 ft [140 m], *Falanruw* 1900 (US).

Guguan: 350 ft [100 m], *Falanruw* 1837 (US); 200–300 ft [60–90 m], 1830 (US).

Sarigan: Northwest coast, 0–75 ft [0–20 m], *Falanruw* 1796 (US); north of village 50–175 m, *Evans* 2420 (US, BISH, Fo, NY).

Anatahan: *Koyama*, 1964, p. 97.

Cyperus digitatus Roxburgh

In tall grass and under semi-open forest canopy.

Pantropical.

Anatahan: West end of north coast, below 250 ft [75 m], *Falanruw* 1962 (US); northwest corner of island, below 200 ft [60 m], *Falanruw* 1600 (US).

Cyperus javanicus Houttuyn

A coarse tufted sedge, abundant and widespread in many habitats on all islands visited; from volcanic cinder sands on Guguan to soil pockets on recent lava on Pagan and rich volcanic soil on Anatahan, one of the most abundant plants on Uracas, holding the soil and providing anchorage and materials for booby nests on the loose pyroclastic slopes.

A widespread and common Indo-Pacific species usually from saline habitats, generally rather close to the sea. Its behavior in the Northern Marianas is unusual, in that it seems not at all confined to saline places, and reaches high elevations. A pos-

sible explanation is that the small flora in these islands provides only reduced competition, permitting the species to show its real tolerance for a much wider range of conditions than is possible in most of its geographic range.

Uracas: South coast, below 400 ft [120 m], *Falanruw* 2207 (US), 2206 (US, BISH, Fo).

Maug: North end of East Island, below 400 ft [120 m], *Falanruw* 2231 (US).

Asuncion: Southwest slope, 150 ft [45 m], *Falanruw* 2262 (US).

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw* 2169 (US); *Marche* 296 (P, Fo); *Fosberg* 31575 (US, BISH, Fo, NY).

Pagan: *Anderson* 554 (US, BISH, Fo, NY); Caldera Wall, *Moore* 330 (US); Fresh Water Lake, *Fosberg* 31397 (US); Laguna village, *Villagomez JV-X-8* (US).

Alamagan: Near Partido village, *Fosberg* 31641 (US, BISH, Fo, NY); south southwest coast, 450 ft [140 m], *Falanruw* 1901 (US).

Guguan: West coast, below 50 ft [15 m], *Falanruw* 1816 (US), 1807 (US).

Sarigan: Above anchorage northwest coast, 0–75 ft [0–20 m], *Falanruw* 1793 (US); near village, 10–100 m, *Evans* 2357 (US).

Anatahan: Northwest corner of island, below 150 ft [45 m], *Falanruw* 1656 (US); northwest tip of island, *Evans* 2457 (US, BISH).

Medinilla: Swedberg, ms 1974, as "*Cyperus* spp." (probably this species).

**Cyperus kyllingia* Endlicher

Found in semishaded and moist open, usually disturbed areas, often about villages.

A common pantropical species.

Agrigan: Midwest coast, 30 ft [10 m] *Falanruw* 2315 (US).

Alamagan: South southwest coast, 450 ft [140 m], *Falanruw* 1902 (US).

Anatahan: Northwest corner of island, below 250 ft [75 m], *Falanruw* 1691 (US), 1994 (US).

Cyperus odoratus L.

A pantropical and warm-temperate species found in moist or wet places.

Anatahan: Koyama, 1964, p. 100.

Cyperus polystachyos Rottboell

A pantropical weed, found in open usually moist places.

Agrigan: *Hosokawa* 8004 (Fo).

Pagan: Fresh Water Lake, *Fosberg* 31387 (US, BISH, Fo, NY); Caldera Wall, *Moore* 331 (US).

Fimbristylis boninensis Hayata (*Fimbristylis urakasiana* Kükenthal)

A pioneer species, scattered in harsh environments, on crater rims in Pagan, barren cinder sands on Guguan, to 500 m on Asuncion; the only species on expanses of pyroclastic slopes on Uracas.

Endemic to the Bonins and Northern Marianas.

Uracas: West side of south coast, below 400 ft [120 m], *Falanruw* 2208 (US, BISH, Fo), *Falanruw* 2204 (US), *Falanruw* 2205 (US).

Maug: Northern end of East Island, below 400 ft [120 m], *Falanruw* 2214 (US, BISH), *Falanruw* 2213 (US, BISH), *Falanruw* 2216 (US).

Asuncion: Southwest slope, 1500 ft [460 m], *Falanruw* 2301 (US).

Pagan: Trail to Pansantati, below 100 ft [30 m], *Falanruw* 1863 (US); *Fosberg* 31415 (US).

Guguan: West coast, below 50 ft [15 m], *Falanruw* 1804 (US).

Anatahan: Koyama, 1964, p. 88.

Fimbristylis cymosa R. Brown

A small densely tufted sclerophyllous sedge, growing in pioneer habitats often of extreme severity, but also, where competition is not too severe, in more mesic places, where it reaches a much greater stature. Found on all islands visited except Uracas. Survives on cliffs and very steep slopes.

Pantropical, extremely variable, no attempt made here to separate varieties.

Maug: North end of East Island, below 400 ft [120 m], *Falanruw* 2230 (US, BISH), *Falanruw* 2222 (US).

Asuncion: Southwest slope, 20 ft [6 m], *Falanruw* 2278 (US, BISH, Fo).

Agrigan: Midwest coast, 20 ft [6 m], *Falanruw* 2321 (US).

Pagan: Mt. Pagan, *Moore* 363 (US); 900 ft [275 m], *Moore* 369 (US); Talague beach, *Villagomez JV-ID-11* (US); Talague beach, *Moore* 344 (US).

Alamagan: South southwest coast, 0–200 ft [0–60 m], *Falanruw* 1952 (US); vicinity of Asongsong, village, 3–15 m, *Fosberg* 31703 (US).

Guguan: West coast, 200 ft [60 m], *Falanruw* 1817 (US); below 50 ft [15 m], 1803 (US), *Falanruw* 1806 (US), *Falanruw* 1810 (US).

Sarigan: Northwest coast, above anchorage, 0–

75 ft [0–20 m], *Falanruw 1792* (US); shore, 0–20 m, *Evans 2404* (US, BISH).

Anatahan: *Kanehira 2150* (P, NY, FU); beach area, sea level, *Falanruw 1661* (US).

Fimbristylis dichotoma ssp. *podocarpa* (Nees & Meyen) T. Koyama

Widespread weedy species, apparently uncommon in this area.

Agrigan: Koyama, 1964, p. 87.

Pagan: *Anderson 564* (US, BISH, Fo).

Alamagan: Koyama, 1964, p. 87.

Sarigan: *Kanehira 2166* (KY).

Anatahan: Koyama, 1964, p. 87.

Schoenus philippinensis (Palla) Kükenthal ex Merrill

Rare in our area.

Alamagan: Koyama, 1964, p. 105; Hosokawa, 1935a, p. 263.

Scleria lithosperma (L.) Swartz

Occasional large patches in forest and in thickets in semi-open places.

Pantropical.

Asuncion: Southwestern slope, 150 ft [45 m], *Falanruw 2261* (US).

Agrigan: Koyama, 1964, p. 71.

Pagan: *Anderson 584* (US, BISH, Fo).

Alamagan: Around Partido village, *Fosberg 31670* (US).

Sarigan: Above village, 375 m, *Evans 2368* (US, BISH, Fo, NY).

PALMAE

**Areca catechu* L.

Small palm growing in jungle and cultivated in semi-open area on Anatahan, where common enough that nuts are exported to Saipan. Cultivated trees are usually robust and short, with inflorescences within easy reach.

Indo-Pacific economic species.

Agrigan: Seen but not collected by Falanruw.

Alamagan: South southwest coast, 750 ft [230 m], *Falanruw 1921* (US), *1921b* (US).

Anatahan: Beach area, *Falanruw 1989* (US); west coast, below 200 ft [60 m], *Falanruw 1705* (US); northern coast, below 250 ft [75 m], *Falanruw 1695* (US).

**Cocos nucifera* L.

Generally extensively planted coconut groves are

present on all inhabited islands, plus Maug, with copra exported at least from Anatahan. One stunted yellowing tree seen on Guguan. Coconuts were planted by Fritz in 1900 on Medinilla and Uracas but did not persist.

Pantropical economic species.

Uracas: Planted by Fritz in 1900 (Fritz, 1902, p. 116), not seen in 1972.

Maug: Fritz, 1902, p. 114.

Asuncion: Seen by Falanruw, 1972, not collected. 100 stunted trees reported by La Pérouse (1797, II:309) as growing on the lava in 1786.

Agrigan: Corte, 1927, p. 345; Fritz, 1902, p. 109.

Pagan: *Bonham 25* (US, BISH); fossil, *Corwin P6-79-6* (USNM).

Alamagan: South southwest coast, sea level, *Falanruw 1993* (US).

Guguan: 320 ft [100 m], *Falanruw 1841* (US). Coconuts planted by Fritz in 1900 (Fritz, 1902, p. 101).

Sarigan: Corte, 1927, p. 328.

Anatahan: Village area, below 250 ft [75 m], *Falanruw 1697* (US).

Medinilla: Fritz, 1902, p. 97.

ARACEAE

**Alocasia macrorrhiza* (L.) Schott

Found in shaded moist areas, gorge bottom (Agrigan), and around lake (Pagan); undoubtedly spread by man. Fossil occurrence on Pagan (Fosberg and Corwin, 1958, p. 10) regarded as evidence of presence of man in the Northern Marianas prior to the major eruption that formed the caldera on Pagan.

Agrigan: Midwest coast, 150 ft [45 m], *Falanruw 2331* (US); trail around south side of island, 10–20 m, *Fosberg 31618* (US).

Pagan: Fossil, *Corwin PC-43-2A*, *PC-43-3a*, *PC-43-5* (USNM); Fresh Water Lake, 2–50 m, *Fosberg 31375* (US).

Alamagan: South southwest coast, 650–1000 ft [200–300 m], *Falanruw 1932* (US).

Sarigan: North of village, 50–175 m, *Evans 2424* (US, BISH, Fo, NY).

**Colocasia esculenta* (L.) Schott

Planted and persisting in marshy places, doubtless brought by man.

Pantropic food plant.

Pagan: Fresh Water Lake, 2–50 m, *Fosberg 31376* (US).

Alamagan: *Anderson 413* (US).

Anatahan?: Lehne and Gäbler, 1972, p. 22, "taro."

**Xanthosoma sagittifolium* (L.) Schott

Commonly planted in shaded and semishaded areas, especially under coconut trees.

Food plant of American origin.

Agrigan: Trail around south side of island, 10–20 m, *Fosberg 31576* (US).

Pagan: North of marine camp, *Anderson 605* (US).

Alamagan: Around Partido village, *Fosberg 31694* (US).

Sarigan: Northwest coast, 250 ft [75 m], *Falanruw 1738* (US).

Anatahan: West coast, below 200 ft [60 m], *Falanruw 1699* (US).

FLAGELLARIACEAE

Flagellaria indica L.

Extensive tough liana, climbing in trees by means of curling leaf-tips, occasional in thickets and woods in canyon bottoms.

Indo-Pacific.

Agrigan: East side of island, *Fosberg 31635* (US); midwest coast, 200 ft [60 m], *Falanruw 2318* (US).

Sarigan: Above village, 150–250 m, *Evans 2396* (US, BISH).

BROMELIACEAE

**Ananas comosus* (L.) Merrill

Common in cultivation and semiwild on Pagan.

Food plant of American origin.

Agrigan: Lehne and Gäbler, 1972, p. 36.

Pagan: 150–300 ft [45–90 m], *Bonham 24* (US, BISH); north of marine camp, *Anderson 604* (US, BISH); Fresh Water Lake, 2–50 m, *Fosberg 31374* (US).

Alamagan: Fritz, 1902, p. 104.

COMMELINACEAE

**Commelina benghalensis* L.

Common weed in open places and plantations around villages.

Probably of Asiatic origin.

Alamagan: Vicinity of Asongsong village, 3–15 m, *Fosberg 31723* (US).

Sarigan: Above village, 150–250 m, *Evans 2397* (US, BISH, Fo, NY).

LILIACEAE, sensu latissimo (incl. AGAVACEAE and AMARYLLIDACEAE)

**Agave americana* L.?

Persisting from planting.

Ornamental of American origin.

Pagan: Fosberg, 1958, p. 19.

**Agave rigida* Miller

Persisting from planting.

Fiber plant of American origin.

Pagan: *Villagomez JV-X-9* (US).

**Agave rigida* var. *sisalana* (Perrine) Engelmann

Pagan: Isthmus, *Anderson 555* (US).

Crinum asiaticum L.?

Abundant, growing spontaneously on cliffs and lower seaward slopes; also planted around graves.

Asiatic, widely planted as an ornamental, possibly native in Northern Marianas.

Maug: Leeward slope of central East Island, 30 ft [10 m], *Falanruw 2239* (US).

Asuncion: Seen but not collected, *Falanruw* in 1972.

Alamagan: Seen but not collected, *Falanruw* in 1972.

Anatahan: North northwest coast, below 250 ft [75 m], *Falanruw 1696* (US).

Crinum macrantherum Engler

Not seen by us.

New Guinea to Micronesia.

Pagan: Hosokawa, 1935a, p. 266 (doubtful record).

Curculigo orchioides Gaertner

Usually found in grasslands, not seen by us.

Indo-Pacific.

Pagan: Kanehira, 1935a, p. 289.

Dianella ensifolia L.

Common in Southern Marianas in grassland on volcanic soil, not yet known living from Northern Marianas.

Pagan: Fossil, *Corwin PC-85-1*, *PC-85-2*, *Termon & Corwin ID2-(F)-3*, *ID-2(F)-4* (USNM).

(See Fosberg and Corwin, 1958, p. 10).

**Hymenocallis littoralis* (Jacquin) Salisbury

Planted as an ornamental and sometimes persisting.

Tropical American strand species.

Pagan: Isthmus, 3 m, *Anderson 592* (US, BISH, Fo, NY, L); sea level, *Bonham 22* (US, BISH); village, *Moore 397* ? (US).

Medinilla: Swedberg, ms 1974 as "*Pancratium littorale*."

TACCACEAE

**Tacca leontopetaloides* (L.) O. Kuntze

Persisting from early introduction by Micronesians. Growing in open rich volcanic soil.

Indo-Pacific food plant.

Pagan: 6 m, *Anderson 529* (US, BISH).

Sarigan: Vicinity of anchorage, 200 ft [60 m], *Falanruw 1766* (US), *1765* (US).

DIOSCOREACEAE

**Dioscorea alata* L.

Planted and persisting in moist wooded area.

Pantropical food plant.

Alamagan: South southwest coast, 500 ft [150 m], *Falanruw 1906* ? (US).

Sarigan: Above village, 150–250 m, *Evans 2388* (US, BISH, Fo, NY).

Dioscorea esculenta var. *spinosa* (Roxburgh) Prain & Burkill

Probably spontaneous, not seen by us.

Old World tropics.

Agrigan: Corte, 1927, p. 344.

Pagan: ?Lehne and Gäbler, 1972, p. 33, as "Wilde yams."

**Dioscorea nummularia* Lamarck

Not seen by us.

Pagan: Corte, 1927, p. 330.

MUSACEAE

**Musa sapientum* L.

Wild, seedy, small-fruited bananas are common in upper ravines of Anatahan (1974), with many seedlings (1715, 1965). Cultivated plants at lower elevations (1714) had larger fruits with very few seeds.

Asuncion: Seen but not collected by Falanruw.

Agrigan: Fritz, 1902, p. 109.

Pagan, Fritz, 1902, p. 104.

Alamagan: Fritz, 1902, p. 102.

Anatahan: East side of village, under 1000 ft [300 m], *Falanruw 1974* (US); western coast, below 200 ft [60 m], *Falanruw 1714* (US); north of village, 400 ft [120 m], *Falanruw 1965* (US) seedling; western coast, below 200 ft [60 m], *Falanruw 1715* (US) seedling.

**Musa textilis* Nees

Occasional groups of plants with small seedy fruits on ravine banks. Fiber is used to make lavas by the inhabitants who are of Carolinian origin. This species may have been introduced by them for this purpose.

Originally from Philippines.

Agrigan: Midwest coast, *Falanruw 2342* (US).

ZINGIBERACEAE

Curcuma australasica Hooker f.?

Growing about graveyard and near house.

Probably native to Micronesia or of very early introduction.

Anatahan: Northwestern corner of island, below 200 ft [60 m], *Falanruw 1713* (US); below 200 ft [60 m], *1642* (US) (both collections sterile).

Zingiber zerumbet (L.) Roscoe

Occasional, growing along trails in moist forested areas.

Indo-Pacific.

Anatahan: Northern coast, below 250 ft [75 m], *Falanruw 1712* (US); south east of village, under 1000 ft [300 m], *Falanruw 1973* (US).

MARANTACEAE

**Maranta arundinacea* L.

In secondary forest in ravine.

Alamagan: *Anderson 429* (US).

ORCHIDACEAE

Calanthe furcata Bateman?

Terrestrial, frequent in sparse forest on lower slopes from 30 to 150 m.

Indo-Pacific.

Asuncion: Southwest slope, 400 ft [120 m], *Falanruw 2312* (US); 250 ft [75 m], *2277* (US).

Eulophia macrostachya Lindley

Not seen by us. Said to be usually terrestrial.
Indo-Pacific.

Alamagan: Hosokawa, 1942, p. 9.

Sarigan: Hosokawa, 1942, p. 9.

Nervilia aragoana Gaudichaud

Terrestrial; in moist ravine bottoms and forest floors.

Indo-Pacific.

Anatahan: *Falanruw* 1914, *Falanruw* 1966, *Falanruw* 1967.

Alamagan: *Falanruw* 1928.

Spathoglottis sp.

Rare, found living only once; reported fossil from Pagan as *S. micronesiaca* Schlechter in Fosberg and Corwin (1958, p. 10) but not at all certain that it is that species.

Pagan: Fossil, *Corwin* 1D2(F)7 (USNM).

Alamagan: 200 m, *Anderson* 404 (US) (Sterile).

Taeniophyllum mariannense Schlechter

Epiphytic.

Endemic in Marianas.

Alamagan: Above Partido Village, *Fosberg* 31677 (US).

Sarigan: *Falanruw* 1756; above village, 150–250 m, *Evans* 2400 (US).

CASUARINACEAE

Casuarina equisetifolia L.

Becomes established on open mineral substrata; lava, scoria and ash, also in grassland, forms forests in a few years, quite susceptible to fire, rather uniform stands of various ages on relatively recent volcanic areas, notably on Pagan. Large groves on east end of north coast of Anatahan and on east coast of Agrigan. In all likelihood native in the Northern Marianas, but this is by no means established. A more thorough search in consolidated volcanic ash deposits on all the islands might throw light on this question. No *Casuarina* was found in the small fossil plant collection made on Pagan (Fosberg and Corwin, 1958).

Uracas: Planted by Fritz in 1900 (Fritz, 1902, p. 116).

Maug: Small group seen on top of East Island by *Falanruw* in 1972.

Agrigan: Trail around south side of island, 10–

20 m, *Fosberg* 31578 (US, BISH, Fo, NY, L).

Pagan: *Hosokawa* 7949 (US, Fo); Mt. Pagan, *Moore* 371 (US); *Bonham* 20 (US, Fo); *Kondo* in 1949 (BISH); isthmus near pier west side of island, *Anderson* 580 (US, BISH, Fo, NY, L); Mt. Charlen, east of Fresh Water Lake, *Fosberg* 31411 (US, BISH, Fo, NY, L); Laguna, *Villagomez* JV-02 (US).

Alamagan: Around Partido village, *Fosberg* 31646 (US).

Guguan: Planted by Fritz in 1900, Fritz, 1902, p. 101.

Anatahan: Beach area, *Falanruw* 1660 (US); northwest tip of island, 0–10 m, *Evans* 2447 (US, BISH, Fo, NY).

Medinilla: Fritz, 1902, p. 97.

PIPERACEAE

Peperomia mariannensis C. de Candolle
f. *mariannensis*

In semishaded rock crevices, on vertical scoria cliffs and wooded banks.

Endemic to Marianas.

Agrigan: Canyon east side of island, *Fosberg* 31621 (US, BISH, Fo, NY, DPU).

Pagan: *Hosokawa* 7987 (A).

Alamagan: *Hosokawa* 7908 (A); south southwest coast, 1025 ft [310 m], *Falanruw* 1923 (US); Partido village, *Fosberg* 31678 (US, BISH, Fo, DPU); *Anderson* 408 (US, BISH, NY, DPU, L); *Fosberg* 31674 (US, BISH, Fo, NY, DPU); *Hosokawa* 7908 (BISH).

Sarigan: Near anchorage, 700 ft [215 m], *Falanruw* 1797 (US); 325 ft [100 m], *Falanruw* 1746 (US); forest above village, 250–300 m, *Evans* 2381 (US).

**Piper betle* L.

Climbing on trees in forest at higher elevations, probably of aboriginal introduction.

Indo-Pacific, mostly associated with man, as the leaves are used in betel-chewing.

Agrigan: *Hosokawa* 8009 (A); seen but not collected by *Falanruw* in 1972.

Alamagan: South southwest coast, 500 ft [150 m], *Falanruw* 1914 (US); 650–1000 ft [200–300 m], 1929 (US); *Anderson* 418 (US); around Partido village, *Fosberg* 31667 (US).

Sarigan: Above village, 350–375 m, *Evans* 2371 (US, BISH, Fo, NY).

Piper guahamense C. de Candolle

Found in gorge bottom.

Endemic to Marianas.

Agrigan: *Hosokawa 8011* (BISH); canyon on east side of island, *Fosberg 31620* (US, BISH, Fo, NY, DPU).

ULMACEAE

Trema orientalis var. *argentea* (Planchon)

Lauterbach

Generally distributed small to medium-sized tree in forests, thickets, semi-open ravines and even scattered in *Miscanthus* grassland on open slopes.

India to Japan, Bonins and Marianas, in its extreme form in the Bonins and Marianas, intergrading with other varieties in Asia.

Maug: Seen but not collected by Falanruw in 1972.

Asuncion: Southwest slope, 150 ft [45 m], *Falanruw 2252* (US).

Agrigan: Trail around south side of island, 10–20 m, *Fosberg 31602* (US).

Pagan: Air strip, *Moore 304* (US); Fresh Water Lake, *Fosberg 31371* (US); *Anderson 530* (US); 150 ft [45 m], *Bonham 12* (US).

Alamagan: South southwest corner of island, below 500 ft [150 m], *Falanruw 1940* (US); around Partido village, *Fosberg 31669* (US).

Guguan: West coast, 200 ft [60 m], *Falanruw 1818* (US); 200–300 ft [60–90 m], *1843* (US).

Sarigan: Near anchorage, 400 ft [120 m], *Falanruw 1758* (US); above village, 250–300 m, *Evans 2386* (US, BISH, Fo, NY, L, P); 10–100 m, *Evans 2352* (US, BISH, Fo, NY, L, TI).

Anatahan: Northwest corner of island, 350 ft [110 m], *Falanruw 1625*.

Trema orientalis var. *viridis* Lauterbach

Pagan: Caldera Wall, near airstrip, *Moore 332* (US).

MORACEAE

**Artocarpus altilis* (Parkinson) Fosberg

Found about villages and in forests in canyons. Putative hybrids with *A. mariannensis* seen by Falanruw on all inhabited islands from Agrigan southward. *Artocarpus altilis*, being sterile, must have been planted by people. The hybrid may have originated locally or may have been carried from

island to island by fruits bats. *Artocarpus altilis* is pantropical in cultivation, possibly of New Guinea origin.

Asuncion: Lehne and Gäbler, 1972, p. 39, as "Brotfruchtbäume."

Agrigan: Canyon on east side of island, *Fosberg 31634* (US).

Pagan: Isthmus, *Anderson 579* (US, BISH, Fo, NY, L, Ca); 150 ft [45 m], *Bonham 26* (US, Fo).

Sarigan: Village, 10–50 m, *Evans 2439* (US, BISH, Fo, NY).

Alamagan: South southwest coast, 500 ft [150 m], *Falanruw 1935* (US).

Artocarpus altilis × *mariannensis*

Anatahan: Northwest corner of island, 200–300 ft [60–90 m], *Falanruw 1630* (US).

Artocarpus mariannensis Trécul

In wooded canyon, probably found on most islands from Agrigan south, but no specimens available.

Found wild on Marianas and Palau, planted elsewhere.

Alamagan: Vicinity of Asongsong village, 15 m, *Fosberg 31736* (US).

**Ficus benghalensis* L.

Doubtless planted.

South Asian.

Pagan: *Moore 347* (US).

Ficus microcarpa var. *latifolia* (Miquel) Corner

Small, stunted trees on volcanic cinder sand crest. Indo-Pacific.

Guguan: West coast, 200–225 ft [60–70 m], *Falanruw 1822* (US).

Ficus prolixa Forster f.

Both varieties of this are found together on some islands, possibly on all of the wooded islands, in woods and in open. Field studies are in order to ascertain whether these varieties are really distinct, or only phenotypes sorted out from a variable population.

Pacific; varieties Micronesian.

Pagan: Corner, 1965, p. 10.

Ficus prolixa var. *carolinensis* (Warburg) Fosberg

Asuncion: Southwest slope, 150 ft [45 m], *Falanruw 2255* (US).

Agrigan: *Marche 291* (P, Fo).

Pagan: 150 ft [45 m], *Bonham 17* (Fo).

Alamagan: Near Asongsong village, *Fosberg* 31738 (US, BISH, Fo, NY, CA), *Fosberg* 31737 (US, BISH, Fo, CA); near Partido village, *Fosberg* 31684 (US, BISH, CA).

Guguan: 320 ft [100 m], *Falanruw* 1836 (US); 200–300 ft [60–90 m], *Falanruw* 1828 (US).

Sarigan: Near anchorage, 250 ft [75 m], *Falanruw* 1729 (US); near village 10–100 m, *Evans* 2351 (US, BISH, Fo, NY).

Medinilla: ?Lehne and Gäbler, 1972, p. 20, as "Nunok."

Ficus prolixa var. *subcordata* Corner

Pagan: *Anderson* 508 (US, BISH, CA); near crater lake [=Freshwater Lake], 25 m, *Anderson* 521 (US, BISH, Fo, NY, CA).

Alamagan: South southwest coast, 250 ft [75 m], *Falanruw* 1877 (US).

Sarigan: Near anchorage, 425 ft [130 m], *Falanruw* 1755 (US); 250 ft [75 m], *Falanruw* 1734 (US).

Ficus saffordii Merrill

Pagan: South of Fresh Water Lake, *Fosberg* 31392 (US, BISH, CA).

Ficus tinctoria Forster f.

Small tree in open and semi-open areas, climbing in forest and on rocks. Plants with acuminate leaves called var. *neo-ebudarum*. This distinction should be studied in the field to see if it holds up.

Pacific.

Maug: North end of East Island, below 400 ft [120 m], *Falanruw* 2211 (US).

Agrigan: Midwest coast, 200 ft [60 m], *Falanruw* 2320 (US); trail around south side of island, 10–20 m, *Fosberg* 31612 (US).

Pagan: Talague beach, *Moore* 343 (US); Caldera Wall, *Moore* 316 (US).

Alamagan: Vicinity of Asongsong village, 3–15 m, *Fosberg* 31733 (US).

Sarigan: Near village, 10–100 m, *Evans* 2355 (US? BISH, Fo, NY); *Evans* 2339 (US, BISH, Fo, NY).

Anatahan: West coast, 200 m, *Falanruw* 1701 (US); northwest corner of island, 200–300 ft [60–90 m], *Falanruw* 1629 (US), 1603 (US).

Ficus tinctoria var. *neo-ebudarum* (Summerhayes) Fosberg

Agrigan: *Hosokawa* 7997 (A); trail around north side of island, 10–20 m, *Fosberg* 31612 (US, BISH, Fo, NY, L).

Pagan: *Hosokawa* 7962 (Fo); *Bonham* 14 (US,

BISH); Fresh Water Lake, *Fosberg* 31384 (US, BISH, Fo); isthmus, *Anderson* 537 (US, BISH, Fo, NY, L).

Alamagan: *Hosokawa* 7920 (Fo); around Partido village, *Fosberg* 31656 (US, BISH); near Asongsong village, 3–5 m, *Fosberg* 31733 (US, BISH).

URTICACEAE

Boehmeria celebica Blume

Not seen by us. Possibly should be referred to one of the 2 following species.

Alamagan: Kanehira, 1935a, pp. 308–309.

Boehmeria densiflora Hooker & Arnott

Occasional bushes in upper forest of Alamagan and stunted specimens in caldera of Pagan.

Indo-Pacific.

Pagan: Inside Mt. Pagan, *Villagomez* in 1970 (US), *JV-4K* (US); Mt. Pagan, 1870 ft [570 m], *Moore* 367 (US), *Moore* 382 (US), *Moore* 393 (US); summit of Mt. Pagan, *Villagomez* *JV-X-14* (US).

Alamagan: South southwest coast, 500 ft [150 m], *Falanruw* 1908 (US).

Boehmeria virgata (Forster f.) Guillemain

Frequent small tree in semishaded moist ravine. Indo-Pacific.

Agrigan: East side of island, *Fosberg* 31619 (US).

Alamagan: *Anderson* 425 (US).

Anatahan: Northwest corner of island, below 200 ft [60 m], *Falanruw* 1605 (US).

Pipturus argenteus (Forster f.) Weddell

Occasional in open and semi-open areas, common, tending to be dominant understory shrub or small tree in forest and thickets.

Indo-Pacific.

Maug: North end of East Island, below 400 ft [120 m], *Falanruw* 2227 (US).

Asuncion: Southwest slope, 150 ft [45 m], *Falanruw* 2253 (US).

Agrigan: Trail along south side of island, 10–20 m, *Fosberg* 31586 (US); midwest coast, 200 ft [60 m], *Falanruw* 2324 (US).

Pagan: Isthmus, *Anderson* 534 (US, BISH, Fo, NY); on plain, 150 ft [45 m], *Bonham* 31 (US, BISH); Mt. Pagan, 200 ft [60 m], *Moore* 386 (US).

Alamagan: Around Partido village, *Fosberg* 31666 (US, BISH, Fo, NY); south southwest coast, 650–1000 ft [200–300 m], *Falanruw* 1930 (US).

Guguan: West coast, 225 ft [70 m], *Falanruw 1821* (US).

Sarigan: Above village, 150–250 m, *Evans 2393* (US, BISH, Fo, NY).

Anatahan: Northwest corner of island, below 150 ft [45 m], *Falanruw 1655* (US); western coast, below 200 m, *Falanruw 1700* (US), *1703* (US); south of northwest tip of island, 0–10 m, *Evans 2448* (US, BISH, Fo, NY).

BALANOPHORACEAE

Balanophora fungosa var. *mariannae* (Hosokawa) Hosokawa

A fleshy parasite on roots of other plants. Not seen by us but this may be because its flowering is seasonal and it is subterranean during the vegetative stage.

Species Indo-Pacific; variety endemic in Marianas.

Alamagan?: Hosokawa, 1937, p. 202.

Sarigan: Hosokawa, 1937, p. 202.

POLYGONACEAE

**Antigonon leptopus* Wight & Arnott

Planted and occasionally established in thickets; a climber.

American.

Agrigan: Southwest coast village area, below 300 ft [90 m], *Falanruw 2154* (US).

BATIDACEAE

"*Batis* spp."

Medinilla: Swedberg, ms 1974 [entirely unlikely record!]

AMARANTHACEAE

**Achyranthes aspera* L.

Established along trails and in disturbed places.

Pantropical, probably of southeast Asiatic origin.

Agrigan: Trail around south side of island, 10–20 m, *Fosberg 31596* (US).

Pagan: Talague beach, *Moore 338* (US).

Achyranthes bidentata Blume

Not seen by us.

Southeast Asian.

Sarigan: *Kanehira 2169* (FU).

Achyranthes canescens R. Brown

In forest and on dry open slopes.

Australian-Pacific when taken in a broad sense.

Maug: Northern end of East Island, below 40 ft [12 m], *Falanruw 2210* (US).

Asuncion: Southwestern slope, 250 ft [75 m], *Falanruw 2272* (US).

Agrigan: Trail around south side of island, 10–20 m, *Fosberg 31600* (US).

**Amaranthus dubius* Martius ex Thellung

Weed around village.

Pantropical.

Alamagan: Around Partido village, *Fosberg 31690* (US).

**Amaranthus spinosus* L.

Weed in disturbed and open places.

Pantropical.

Agrigan: Village, *Fosberg 31432* (US).

Pagan: Near Salt Lake, west side of island, 2–50 m, *Fosberg 31363* (US, BISH, Fo, NY).

Anatahan: *Kanehira 2147* (K).

**Amaranthus viridis* L.

Common weed in open and semi-open areas.

Pantropical.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw 2160* (US).

Alamagan: South southwest coast, 0–200 ft [0–60 m], *Falanruw 1947* (US); around Partido village, *Fosberg 31653* (US).

Sarigan: Near anchorage, 250 ft [75 m], *Falanruw 1732* (US); below 25 ft [10 m], *Falanruw 1786* (US); near village, 10–100 m, *Evans 2358* (US, BISH, Fo, NY); near anchorage, 325 ft [100 m], *Falanruw 1745* (US).

**Celosia argentea* L.

Planted around dwellings. Widespread in cultivation.

Agrigan: Around village, 10–20 m, *Fosberg 31562* (US).

Deeringia amaranthoides (Lamarck) Merrill

Rare, climbing over other vegetation on bluff of great lava boulders.

Indo-Pacific.

Agrigan: Trail around south side of island, 10–20 m, *Fosberg 31598* (US, BISH, Fo, NY, L).

**Gomphrena globosa* L.

Planted ornamental around dwellings.

Widely cultivated, probably of tropical American origin.

Agrigan: Around village, 10–20 m, *Fosberg 31561* (US).

Sarigan: Village, 10–50 m, *Evans 2436* (US, BISH, Fo, NY).

NYCTAGINACEAE

**Boerhavia diffusa* L.

Weed of disturbed open places.

South Asian.

Sarigan: North of village, 50–175 m, *Evans 2421* (US, BISH, Fo, NY).

Boerhavia repens L.

Common on ledges and in rock crevices. Probably also on other islands.

Indo-Pacific and African.

Maug: North end of East Island, below 400 ft [120 m], *Falanruw 2219* (US).

Boerhavia sp.

Creeper, fairly frequent on coastal slopes and bluffs, closely related to last species.

Maug: North end of East Island, below 400 ft [120 m], *Falanruw 2225* (US).

Sarigan: Northwest coast, 0–75 ft [0–20 m], *Falanruw 1777* (US).

Medinilla: Swedberg ms 1974 [not necessarily identical with Maug and Sarigan plants].

Pisonia grandis R. Brown

Common small to medium trees in thickets, wood very soft.

Indo-Pacific.

Maug: South central East Island, 500 ft [150 m], *Falanruw 2238* (US), *Falanruw 2237* (US).

Sarigan: Near anchorage, below 25 ft [10 m], *Falanruw 1787* (US); 250 ft [75 m], *Falanruw 1735* (US), *Falanruw 1725* (US); south of anchorage on northwest coast, 200 ft [60 m], *Falanruw 1782* (US); north of village, 175–250 m, *Evans 2411* (US, BISH, Fo, NY).

AIZOACEAE

Sesuvium portulacastrum L.

Prostrate very fleshy halophyte forming mats in strand locations. On Maug seen only around abandoned Japanese installation.

Pantropical.

Maug: North end of East Island, below 400 ft [120 m], *Falanruw 2228* (US).

Pagan: East coast, south of Togari Peninsula, *Moore 419* (US); isthmus, *Anderson 548* (US).

PORTULACACEAE

Portulaca australis Endlicher (*Portulaca samoensis* von Poellnitz)

Small fleshy plant with tuberous root, growing in open coastal areas.

Indo-Pacific.

Maug: North end of East Island, below 400 ft [120 m], *Falanruw 2223* (US), *Falanruw 2229* (US).

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw 2167* (US); trail around south side of island, 10–20 m, *Fosberg 31609* (US).

Sarigan: Seashore below village, 0–20 m, *Evans 2432* (US, BISH, Fo, NY).

Anatahan: Beach area, sea level, *Falanruw 1662* (US); northwest tip of island, 0–10 m, *Evans 2463* (US, BISH, Fo, NY).

**Portulaca grandiflora* Hooker

Cultivated. A widespread ornamental species.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw 2150* (US).

Portulaca lutea Solander ex Forster f.

Very fleshy herb, found only on Uracas and Maug, on rocks, most luxuriant where shaded, smaller, less fleshy, purple-tinged where more exposed. The species is usually associated with sea-bird colonies and may be dispersed as seeds clinging to birds feet or feathers.

Micronesian and Polynesian, with a variety in the Galapagos.

Uracas: South coast, below 400 ft [120 m], *Falanruw 2200* (US).

Maug: North end of East Island, sea level, *Falanruw 2232* (US).

Portulaca oleracea L.

Common, fleshy weed in gardens and disturbed places, and especially in open coastal situations, often with *P. australis*.

Pantropical and warm-temperate in many varieties, difficult to tell if indigenous or introduced in a particular area.

Maug: South central East Island, 15 ft [5 m], *Falanruw 2244* (US).

Agrigan: Southwest coast village area, below 300 ft [90 m], *Falanruw* 2166 (US); trail around south side of island, 10–20 m, *Fosberg* 31582 (US).

Pagan: East coast, south of Togari Peninsula, *Moore* 422? (US); isthmus, *Anderson* 570 (US); near Salt Lake, west side of island, *Fosberg* 31365 (US).

Alamagan: Around Partido village, *Fosberg* 31642 (US).

Sarigan: Northwest coast, 0–75 ft [0–20 m], *Falanruw* 1795 (US); near anchorage, sea level, *Falanruw* 1990 (US); near dock, 0–20 m, *Evans* 2405 (US, BISH, Fo, NY).

Anatahan: Northwest corner of island, 25 ft [10 m], *Falanruw* 1672 (US).

**Portulaca suffrutescens* Engelman

Frequent in cultivated land but only in one place; obviously a recent introduction, but puzzling as it is not known elsewhere in the Pacific.

Mexican and southwest U.S., from desert and semi-arid areas.

Sarigan: In village, 10–50 m, *Evans* 2435 (US, UH, Fo, MO, K).

“*Portulaca* spp.”

Medinilla: Swedberg ms 1974.

ANNONACEAE

**Annona muricata* L.

Semicultivated near village.

Widespread tropical cultivated species.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw* 2171 (US).

**Annona reticulata* L.

Rare, in coconut plantation near village.

Pantropical cultivated species.

Alamagan: Vicinity of Asongsong village, 3–15 m, *Fosberg* 31734 (US).

**Annona squamosa* L.

Several trees near village.

Pantropical cultivated species.

Alamagan: South southwestern coast, 250 ft [75 m], *Falanruw* 1873 (US).

Guamia mariannae (Safford) Merrill

Small tree in native forest on lava.

Endemic to Marianas.

Pagan: *Kanehira* 2199 (FU, US); East of village, *Moore* 410 (US); road to Inae Dikiki or Togari

rock area, below 100 ft [30 m], *Falanruw* 1855 (US); *Anderson* 507 (US).

Alamagan: Around Partido village, *Fosberg* 31662 (US).

LAURACEAE

Cassytha filiformis L.

String-like parasitic vine climbing and forming yellowish tangles over other plants, on open cinders on Guguan, found as high as 350 m on Asuncion.

Pantropical.

Asuncion: Southwestern slope, 1100 ft [335 m], *Falanruw* 2295 (US).

Pagan: East of village, *Moore* 410 (US).

Alamagan: Around Partido village, *Fosberg* 31685 (US, BISH, Fo).

Guguan: West coast, below 50 ft [15 m], *Falanruw* 1805 (US).

HERNANDIACEAE

Hernandia sonora L.

Infrequent medium-sized tree in ravine.

Pantropical.

Maug: Fritz, 1902, p. 114.

Agrigan: Midwest coast, 200 ft [60 m], *Falanruw* 2323 (US); canyon on east side of island, *Fosberg* 31637 (US).

Anatahan: Northwest corner of island, 200–300 ft [60–90 m], *Falanruw* 1628 (US).

CAPPARIDACEAE

Capparis cordifolia Lamarck

Abundant in patches in rocky open coastal areas.

Maug: North end of East Island, below 400 ft [120 m], *Falanruw* 2226 (US).

Pagan: East side of isthmus, *Anderson* 547 (US, BISH, Fo); east coast, *Moore* 421 (US).

Sarigan: Near anchorage, 250 ft [75 m], *Falanruw* 1731 (US).

Anatahan: Beach area, sea level, *Falanruw* 1667 (US).

**Cleome viscosa* L.

Occasional herb on rocky beach. Widespread tropical weed.

Alamagan: South southwest coast, 0–200 ft [0–60 m], *Falanruw* 1948 (US).

LEGUMINOSAE

**Abrus precatorius* L.

Common vine, tangled in and over trees and shrubs in forest and in open areas.

Pantropical.

Agrigan: Trail around south side of island, *Fosberg 31616* (US); southwest coast, below 300 ft [90 m], *Falanruw 2168* (US); midwest coast, 150 ft [45 m], *Falanruw 2340* (US).

Pagan: *Marche 152* (P); Road to Talague beach, *Moore 336* (US); Fresh Water Lake, in forest, *Fosberg 31389* (US); 100 m east of Japanese airfield, center of isthmus, 18 m, *Anderson 574* (US, BISH, Fo, NY).

Alamagan: Around Partido village, *Fosberg 31695* (US); south southwest coast, 250 ft [75 m], *Falanruw 1872* (US); Songsong [Asongsong village], 100 ft [30 m], *Kondo* in 1949 (BISH).

Anatahan: Northwest corner of island, below 200 ft [60 m], *Falanruw 1608* (US).

**Acacia confusa* Merrill

In village area, planted by Japanese.

Native of Taiwan.

Sarigan: Village, 10–50 m, *Evans 2443* (US, BISH, Fo, NY).

**Acacia farnesiana* (L.) Willdenow

Planted in village.

Of Mexican origin.

Agrigan: Village, *Fosberg 31427* (US).

Atylosia scarabaeoides (L.) Benth

Occasional herbaceous vine growing in open area.

Indo-Pacific.

Pagan: Air strip, *Moore 305* (US).

Alamagan: Around Partido village, *Fosberg 31689* (US, BISH, Fo).

Guguan: 320 ft [100 m], *Falanruw 1839* (US).

**Bauhinia monandra* Kurz

Occasional tree along road.

Pagan: Village, *Moore 407* (US); road to Inae Dikiki, 100–200 ft [30–60 m], *Falanruw 1869* (US).

**Calopogonium mucunoides* Desvaux

Tangled vine, forming large patches.

Sarigan: Near anchorage, 300 ft [90 m], *Falanruw 1760?* (US); near village 10–100 m, *Evans 2350* (US, BISH, Fo, NY).

Canavalia megalantha Merrill var.

Vine climbing in forest and creeping on volcanic soil, up to 100 m.

Species endemic to Marianas, the variety to Northern Marianas.

Pagan: Plain of volcanic ash soil, *Bonham 37* (US).

Alamagan: Around Partido village, *Fosberg 31655* (US, BISH, Fo, WIS, L).

Guguan: 200–300 ft [60–90 m], *Falanruw 1829* (US).

Sarigan: Track leading north from village, 175–250 m, *Evans 2416* (US, BISH, K, MO), *Evans 2418* (US, BISH, K, NY).

**Cassia alata* L.

Planted about dwellings.

Widely planted in tropics, of American origin.

Agrigan: Cultivated in village, 10–20 m, *Fosberg 31563* (US); southwest coast village area, below 300 ft [90 m], *Falanruw 2172* (US).

**Cassia leschenaultiana* de Candolle

Weed in open places.

Pagan: s.l., *Anderson 602* (US).

**Cassia mimosoides* L.

Weed in open places.

Pagan: s.l., *Kanehira 2202* (NY, FU).

**Cassia occidentalis* L.

Weed in disturbed places, roadsides.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw 2152* (US).

Pagan: Isthmus, *Anderson 526* (US, BISH, Fo, NY, L); ash beds of isthmus, *Fosberg 31352* (US); east of Lake Laguna, *Moore 348* (US).

Alamagan: 170 m, *Anderson 410* (US).

Sarigan: Village, 10–50 m, *Evans 2441* (US, BISH, Fo, NY).

**Cassia sophera* L.

Weed about villages.

Alamagan: South southwest coast, 650 ft [200 m], *Falanruw 1933* (US); vicinity of Asongsong village, 3–15 m, *Fosberg 31716* (US).

Anatahan: Northwest corner of island, below 250 ft [75 m], *Falanruw 1675* (US).

**Clitoria ternatea* L.

Vine tangled in vegetation about villages and disturbed places.

Pantropical.

Alamagan: Above Asongsong village, 3–15 m,

Fosberg 31727 (US); south southwest coast, landing and village area, 0–200 ft [0–60 m], *Falanruw 1951* (US).

**Crotalaria pallida* Aiton (*Crotalaria striata* de Candolle, *Crotalaria mucronata* Desvaux)

Generally common in disturbed places, around villages, and on open volcanic ash beds, up to 150 m.

Pantropical weed.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw 2151* (US, BISH); trail around south side of island, 10–20 m, *Fosberg 31589* (US).

Pagan: Near crater lake, 15 m, *Anderson 518* (US, BISH, Fo, NY); near Salt Lake west side of island, *Fosberg 31356* (US); village, *Moore 406* (US).

Alamagan: South southwest coast, 450 ft [140 m], *Falanruw 1897* (US); vicinity of Asongsong village, 3–15 m, *Fosberg 31730* (US).

Sarigan: Near anchorage, 300 ft [90 m], *Falanruw 1759* (US).

**Crotalaria trifoliastrum* Willdenow

Not seen by us.

Pagan: Kanehira, 1935a, p. 330; Hosokawa, 1935a, p. 18.

Cynometra ramiflora L.

Grove of large trees at top of ridge of volcanic material, trunks to over a meter in diameter.

Indo-Pacific.

Sarigan: Near anchorage, 400 ft [120 m], *Falanruw 1751* (US).

Medinilla: Lehne and Gäbler, 1972, p. 20, as "Gulus."

Dalbergia candenatensis (Dennstedt) Prain

Climbing in vegetation in moist forested ravine at about 75 m elevation, elsewhere in Western Micronesia found at back of mangrove swamps.

Indo-Pacific.

Anatahan: West end of north coast, below 250 ft [75 m], *Falanruw 1682* (US).

**Delonix regia* (Bojer) Rafinesque

Infrequent tree near village areas.

Native of Madagascar, cultivated throughout tropics.

Pagan: Plain of volcanic ash, 150 ft [45 m], *Bonham 18* (US, Fo).

Anatahan: Northwest corner of island, below 200 ft [60 m], *Falanruw 1633* (US).

**Desmanthus virgatus* (L.) Willdenow

Occasional weed in areas behind beach.

Pantropical weed, of American origin.

Agrigan: Southwest coast, village area, below 300 ft [90 m], *Falanruw 2196* (US).

**Desmodium canum* (Gmelin) Schinz & Thellung

Weed in village.

Pantropical weed.

Anatahan: Village area, northwest corner of island, below 200 ft [60 m], *Falanruw 1643* (US).

**Desmodium gangeticum* (L.) de Candolle

Weed in village and along trails.

Old World tropics.

Anatahan: Northwest corner of island, below 250 ft [75 m], *Falanruw 1681* (US); northern coast, below 250 ft [75 m], *Falanruw 1692* (US).

**Desmodium heterophyllum* de Candolle

Small herb of open places, easily mistaken for the next species.

Widespread.

Alamagan: *Kanehira 2183* (NY).

**Desmodium triflorum* (L.) de Candolle

Abundant small prostrate herb of open sunny habitats; on Guguan a pioneer with *Cassytha*, on bare volcanic cinder sand.

Pantropical.

Asuncion: Southwest slope, 1500 ft [460 m], *Falanruw 2304* (US).

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw 2189* (US); trail around south side of island, 10–20 m, *Fosberg 31573* (US).

Pagan: Marine camp, 20 m, *Anderson 511* (US, BISH, Fo, NY, L); near Salt Lake, *Fosberg 31354* (US); Mt. Pagan, *Villagomez JV-5K* (US); Mt. Pagan, *Moore 381* (US), 378 (US).

Guguan: West coast, below 50 ft [15 m], *Falanruw 1808* (US).

Alamagan: Vicinity of Asongsong village, 3–15 m, *Fosberg 31748* (US); south southwest coast, 450 ft [140 m], *Falanruw 1904* (US).

**Dolichos lablab* L.

Alamagan: Vicinity of Asongsong village, 3–15 m, *Fosberg 31728* (US).

Anatahan: Northwest corner of island, below 200 ft [60 m], *Falanruw 1674* (US, BISH).

Erythrina variegata var. *orientalis* (L.) Merrill

Prickly tree, leafless or almost so at flowering

time; occasional scattered in open or semi-open areas and in woods from inland of coast to higher elevations, reaching nearly 500 m on Asuncion.

Indo-Pacific.

Asuncion: Southwest slope, 750 ft [225 m], *Falanruw* 2286 (US).

Agrigan: Midwest coast, 200 ft [60 m], *Falanruw* 2317 (US); trail around south side of island, 10–20 m, *Fosberg* 31570 (US).

Pagan: Caldera Wall, *Moore* 428 (US); isthmus, 10 m, *Anderson* 577 (US).

Alamagan: South southwest coast, below 500 ft [150 m], *Falanruw* 1937 (US); around Partido village, *Fosberg* 31671 (US).

Guguan: 320 ft [100 m], *Falanruw* 1834 (US).

Sarigan: Near anchorage, 400 ft [120 m], *Falanruw* 1748 (US).

**Glycine clandestina* Wendland

Not seen by us.

Pagan: Hosokawa, 1935a, p. 18; Kanehira, 1935a, p. 334.

**Indigofera tinctoria* L.?

Scattered weedy shrubs along village road.

Pantropical.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw* 2181 (US).

**Leucaena latisiliqua* (L.) Gillis & Stearn (*L. glauca* sensu auct. plur., non (L.) Benth; *L. leucocephala* (Lamarck) de Wit)

This small tree or shrub is a recent introduction, not recorded from Pagan in 1958 but common about village area by 1972. On Agrigan said not to have been on the island before World War II but now common in areas that were bulldozed.

Of American origin but now pantropical.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw* 2188 (US).

Pagan: Village, *Moore* 399 (US).

Sarigan: Village and vicinity, 20–50 m, *Evans* 2407 (US, BISH, Fo, NY).

Mucuna gigantea (Willdenow) de Candolle

Vine climbing in thickets, occurring well above seashore, to 250 m.

Pantropical, distributed by currents.

Agrigan: Midwest coast, 200 ft [60 m], *Falanruw* 2325 (US).

Pagan: Kanehira 2207 (FU, NY).

Sarigan: North of village, 175–250 m, *Evans*

2413 ? (US, BISH, NY).

Mucuna platyphylla Gray

Large vine growing over trees at higher elevations.

Pacific.

Sarigan: Near anchorage, 600 ft, *Falanruw* 1757 (US).

Anatahan: Seen, but not collected by *Falanruw*.

**Pachyrrhizus erosus* (L.) Urban

Common around edges of village, climbing over other vegetation.

American, widely introduced in Old World tropics.

Alamagan: Asongsong village, 3–15 m, *Fosberg* 31717 (US, BISH, Fo).

**Phaseolus vulgaris* L.?

Guguan and Medinilla: Lehne and Gäbler, 1972, pp. 20, 27 as "Bohnen," planted in 1901.

**Pithecellobium dulce* (Roxburgh) Benth

Planted and naturalized at low to moderate elevations.

Pantropical but of American origin.

Asuncion: South southwest coast, 0–200 ft [0–60 m], *Falanruw* 2293 (US).

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw* 2195 (US); around village, 10–20 m, *Fosberg* 31564 (US).

Pagan: Vicinity of landing pier, 3 m, *Anderson* 594 (US, BISH, Fo); Caldera Wall, east of airstrip, *Moore* 312 (US); 50 ft [15 m], *Bonham* 23 (US, Fo).

Alamagan: Vicinity of Asongsong village, 3–15 m, *Fosberg* 31747 (US, BISH, Fo); south southwest coast, 0–200 ft [0–60 m], *Falanruw* 1945 (US).

Sarigan: Near village, 10–100 m, *Evans* 2338 (US, BISH, Fo, NY).

Vigna marina (Burman) Merrill

Common vine, normally of sea-beaches but in Northern Marianas common inland and to higher elevations, 500 m on Asuncion.

Indo-Pacific, possibly also in Caribbean.

Asuncion: Southwestern slope of volcano, 1500 ft [450 m], *Falanruw* 2309 (US); 125 ft [40 m], *Falanruw* 2259 (US).

Agrigan: Trail around south side of island, 10–20 m, *Fosberg* 31604 (US); *Marche* 295 (P, Fo).

Pagan: Kanehira 2204 (NY); isthmus, 10 m, *Anderson* 568 (US, BISH, Fo, NY); west side of Lake

Laguna, *Moore 356* (US); Inae Dikiki (Togari Rock Bay), below 100 ft [30 m], *Falanruw 1857* (US).

Anatahan: West end of north coast, below 250 ft [75 m], *Falanruw 1676* (US); northwest corner of island, below 200 ft [60 m], *Falanruw 1648* (US), *Falanruw 1640* (US); northwest tip of island, 0–10 m, *Evans 2453* (US).

OXALIDACEAE

**Oxalis corniculata* L.

In disturbed areas.

Pantropical, in many forms and varieties.

Maug: Northern end of East Island, below 400 ft [120 m], *Falanruw 2224* (US).

Sarigan: Above village, 250–300 ft [75–90 m], *Evans 2387* (US).

RUTACEAE

**Citrus aurantifolia* (Christmann) Swingle

Planted or persisting in and around villages or plantations.

Pantropical in cultivation of Old World origin.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw 2183* (US).

Alamagan: Southwest coast, 750 ft [230 m], *Falanruw 1918* (US); around Partido village, *Fosberg 31692* (US).

Sarigan: Near village, 10–100 m, *Evans 2334* (US, BISH, Fo, NY).

Anatahan: Northwest corner of island, below 200 ft [60 m], *Falanruw 1601* (US).

**Citrus reticulata* Blanco

Planted.

Pagan: Lehne and Gäbler, 1972, p. 33, as "Mandarinen."

**Citrus sinensis* (L.) Osbeck

Small tree near village.

Pantropical in cultivation, originally probably from subtropical Asia.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw 2181* (US).

**Triphasia trifolia* (Burman f.) P. Wilson

Naturalized, forming thorny underlayer in forest.

Tropical Asiatic, widely naturalized elsewhere in tropics.

Pagan: East of village, *Moore 402* (US).

MELIACEAE

Aglaia mariannensis Merrill

Common small tree in thickets and forests.

Endemic to Marianas.

Agrigan: South southwest coast, 200 ft [60 m], *Falanruw 2332* (US, BISH); canyon on east side of island, *Fosberg 31631* (US).

Pagan: Caldera Wall, *Moore 315* (US); *Anderson 504* (US); south of Fresh Water Lake, 2–50 m, *Fosberg 31386* (US); *Anderson 603* (US).

Alamagan: South southwest coast, 250 ft [75 m], *Falanruw 1874* (US); around Partido village, *Fosberg 31679* (US); 200 m, *Anderson 401* (US).

Guguan: Southwest part of island, 175 ft [55 m], *Falanruw 1847* (US).

Sarigan: Northwest coast, 250 ft [75 m], *Falanruw 1741* (US), *Falanruw 1733* (US); 400–450 ft [120–140 m], *Falanruw 1754* (US); north of village 175–250 m, *Evans 2410* (US, BISH, Fo, NY); above village, 150–250 m, *Evans 2399* (US, BISH, Fo, NY).

EUPHORBIACEAE

Drypetes dolichocarpa Kanehira

Endemic to Marianas.

Anatahan: *Kanehira 2141* (US).

**Euphorbia hirta* L.

Common weed in disturbed places, villages, and gardens on inhabited islands.

Pantropical weed.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw 2175* (US).

Pagan: Isthmus, *Anderson 552* (US, BISH, Fo); west side of island, near Salt Lake, *Fosberg 31348* (US, BISH); village, *Moore 395* (US).

Alamagan: Around Partido village, *Fosberg 31648* (US).

Sarigan: Northwest coast, 75 ft [25 m], *Falanruw 1790* (US); near village 10–100 m, *Evans 2360* (US, BISH, Fo, NY).

Anatahan: Northwest corner of island, below 200 ft [60 m], *Falanruw 1639* (US).

**Euphorbia prostrata* Aiton

Weed in path in former village.

Pantropical weed.

Pagan: Fresh Water Lake, 2–50 m, *Fosberg 31380* (US, BISH, Fo, NY).

**Euphorbia thymifolia* L.

Weed in paths in and around villages.

Pantropical weed.

Pagan: Marine camp, 20 m, *Anderson 515* (US); near Salt Lake, 2–50 m, *Fosberg 31364* (US, BISH).

Alamagan: South southwest coast, 0–200 ft [0–60 m], *Falanruw 1950* (US); vicinity of Asongsong village, 3–15 m, *Fosberg 31714* (US).

"*Euphorbia* spp."

Medinilla: Swedberg, ms 1974.

**Jatropha curcas* L.

Common small tree or shrub about villages, said to have been brought by Japanese.

Pantropical, associated with man.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw 2180* (US).

Pagan: Isthmus, 6 m, *Anderson 528* (US, BISH, Fo, NY, L); Caldera Wall, *Moore 322* (US).

**Jatropha gossypifolia* L.

Fleshy-stemmed shrub, leaves purplish, common about villages, dominant in some areas. Said to have been introduced by Japanese in 1930s.

Native of tropical America, widely naturalized in Old World.

Pagan: Isthmus, near shore, *Anderson 566* (US); volcanic ash soil, 150 ft [45 m], *Bonham 5* (US, Fo); near Salt Lake, west side of island, 2–50 m, *Fosberg 31360* (US); village, *Moore 405* (US).

Sarigan: Village, 20–50 m, *Evans 2406* (US, BISH, Fo, NY).

Alamagan: South southwest coast, 0–200 ft [0–60 m], *Falanruw 1943* (US).

Macaranga thompsonii Merrill

Medium sized tree in moist forested area.

Endemic in Marianas.

Anatahan: Under 1000 ft [300 m], *Falanruw 1969* (US); northwest corner of island, below 200 ft [60 m], *Falanruw 1607* (US).

**Manihot esculenta* Crantz (*Manihot utilissima* Pohl)

Planted about villages for its edible tubers. Probably introduced early by Spanish or Germans.

Native of tropical America, widely cultivated.

Agrigan: Fritz, 1902, p. 109.

Pagan: Isthmus, *Anderson 582* (US, BISH, Fo, NY, L).

Alamagan: Seen but not collected by Falanruw.

Sarigan: Near village, 10–100 m, *Evans 2333* (US).

Anatahan: West coast, below 200 m, *Falanruw 1707* (US).

Melanolepis multiglandulosa var. *glabrata* (Mueller-Argoviensis) Fosberg

Common in forest and thickets away from coast. Indo-Pacific, indigenous in Marianas.

Asuncion: Southwest slope, 50 ft [15 m], *Falanruw 2274* (US).

Agrigan: Midwest coast, 200 ft [60 m], *Falanruw 2330* (US); trail around south side of island, 10–20 m, *Fosberg 31603* (US).

Pagan: Caldera Wall, *Moore 323* (US); road to Inae Dikiki, 100–200 ft [30–60 m], *Falanruw 1867* (US); isthmus, 6 m, *Anderson 540* (US); *Bonham* August–September 1954 (US); Fresh Water Lake, 2–50 m, *Fosberg 31381* (US).

Alamagan: South southwest coast, 500 ft [150 m], *Falanruw 1915* (US); around Partido village, *Fosberg 31663* (US).

Sarigan: Near anchorage, 250 ft [75 m], *Falanruw 1736* (US); near village, 10–100 m, *Evans 2344* (US, BISH, Fo, NY).

Anatahan: Northwest corner of island, below 200 ft [60 m], *Falanruw 1606* (US).

**Phyllanthus amarus* Schumacher & Thonning

Common weed in villages, roadsides, and other disturbed places, mostly at low elevations.

Pantropical weed.

Maug: South central East Island, 100 ft [30 m], *Falanruw 2233?* (US).

Asuncion: Southwest slope, 75 ft [25 m], *Falanruw 2282* (US).

Agrigan: Village, *Fosberg 31433* (US, BISH); southwest coast, below 300 ft [90 m], *Falanruw 2174* (US).

Pagan: Near Salt Lake, west side of island, *Fosberg 31349* (US); isthmus, *Anderson 562* (US, BISH).

Alamagan: Around Partido village, *Fosberg 31650* (US); south southwest coast, 0–200 ft [0–60 m], *Falanruw 1944* (US).

Sarigan: Near anchorage, 1000 ft [300 m], *Falanruw 1720* (US); near village, 10–100 m, *Evans 2359* (US, BISH, Fo, NY).

Anatahan: Northwest corner of island, below 200 ft [60 m], *Falanruw 1635* (US).

Phyllanthus marianus Mueller-Argoviensis

Common on lava in open or scrubby areas and

edges of thickets.

Endemic to Marianas, but with close relatives in Western Carolines.

Maug: Central East Island, 100 ft [30 m], *Falanruw* 2243 (US, BISH).

Asuncion: Southwest coast, 25 ft [10 m], *Falanruw* 2294 (US, BISH).

Agrigan: Trail around south side of island, 10–20 m, *Fosberg* 31608 (US).

Pagan: Summit of Mt. Pagan, *Villagomez JV-X-15* (US); Caldera Wall, *Moore* 319 (US); isthmus, 6–8 m, *Anderson* 542 (US); Fresh Water Lake, 0–50 m, *Fosberg* 31402 (US).

Alamagan: Around Partido village, *Fosberg* 31687 (US).

Guguan: 320 ft [100 m], *Falanruw* 1832 (US).

Sarigan: Near village, 10–100 m, *Evans* 2348 (US, BISH, Fo, NY); above village, 375 m, *Evans* 2375 (US, BISH, Fo, NY).

Anatahan: Northwest corner of island, below 200 ft [60 m], *Falanruw* 1610 (US); west end of north coast, below 250 ft [75 m], *Falanruw* 1690 (US).

Phyllanthus saffordii Merrill

Not seen by us. Possibly a misdetermination of extreme forms of *P. marianus*.

Except for these records, endemic to savanna areas of southern Marianas.

Pagan: Hosokawa, 1935a, p. 21.

Alamagan: Hosokawa, 1935a, p. 21.

Anatahan: Hosokawa, 1935a, p. 21.

**Ricinus communis* L.

Occasional in open village areas.

Pantropical.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw* 2153 (US); trail around south side of island, 10–20 m, *Fosberg* 31585 (US).

Alamagan: South southwest coast, below 200 ft [60 m], *Falanruw* 1934 (US); vicinity of Asongsong village, 3–15 m, *Fosberg* 31729 (US).

Sarigan: Near village, 10–100 m, *Evans* 2341 (US, BISH).

Anatahan: West end of north coast, below 250 ft [75 m], *Falanruw* 1886 (US).

ANACARDIACEAE

**Mangifera indica* L.

Large trees planted or persisting in village areas.

Pantropical cultivated tree probably originally from Borneo according to Kostermans (pers. comm.).

Pagan: Volcanic ash plain, 50 ft [15 m], *Bonham* 27 (US, Fo).

Alamagan: Near Asongsong village, 3–15 m, *Fosberg* 31732 (US).

Anatahan: Seen but not collected by Falanruw.

SAPINDACEAE

Dodonaea viscosa L.

Small bushes scattered on open slope of volcano between 250 and 500 m, not seen lower down or on other islands of Northern Marianas.

Pantropical.

Asuncion: Southwest slope, 900 ft [275 m], *Falanruw* 2292 (US, BISH).

RHAMNACEAE

Colubrina asiatica (L.) Brongniart

In forest and thickets, coastal to over 150 m, reaching unusually high elevations compared with its occurrence elsewhere.

Pantropical.

Maug: South central East Island, 500 ft [150 m], *Falanruw* 2234 (US).

Agrigan: Trail around south side of island, 12–20 m, *Fosberg* 31574 (US).

Pagan: Isthmus, 8 m, *Anderson* 536 (US, BISH, Fo, NY, L); road to Talague beach, *Villagomez* in 1970 (US); Caldera Wall, east of air strip, *Moore* 318 (US).

Alamagan: South southwest coast, 350 ft [110 m], *Falanruw* 1884 (US); around Partido village, *Fosberg* 31675 (US).

Guguan: West coast, 200 ft [60 m], *Falanruw* 1819 (US); 200–300 ft [60–90 m], *Falanruw* 1827 (US).

Sarigan: Vicinity of village, 10–100 m, *Evans* 2349 (US, BISH, Fo, NY); northwest coast, 200 ft [60 m], *Falanruw* 1764 (US).

TILIACEAE

Elaeocarpus joga Merrill

Medium sturdy tree, scattered in forest at higher elevations on rough lava.

Endemic in the Marianas and Palau. This has recently (Stone, 1971:402) been reduced to *E.*

sphaericus (Gaertner) K. Schumann, but we have not yet had time to verify this reduction.

Pagan: Kanehira, 1935a, p. 363.

Alamagan: Trail from south southwest coast, 750 ft [225 m], *Falanruw* 1919 (US); vicinity of Asongsong village, *Fosberg* 31740 (US); *Anderson* 423 (US).

Grewia crenata (L. f.) Schinz & Guillaumin

Small tree in second story of forests and groves. Indo-Pacific.

Pagan: *Marche* 151 (P, Fo); east coast, *Moore* 418 (US); Caldera Wall, *Moore* 426 (US); northwest Pagan, sea level, *Falanruw* 1854 (US); *Anderson* 503 (US); Fresh Water Lake, 2–50 m, *Fosberg* 31373 (US).

Sarigan: *Kanehira* 2155 (FU).

**Muntingia calabura* L.

Common about village area.

Tropical American, widely naturalized in Old World tropics.

Anatahan: Northwest corner of island, 300 ft [90 m], *Falanruw* 1620 (US).

Triumfetta procumbens Forster f.

Creeper on beach sands.

Indo-Pacific strand plant.

Pagan: Inae Dikiki or Togari Bay, below 100 ft [30 m], *Falanruw* 1861 (US).

**Triumfetta semitriloba* Jacquin

Tall weed in coconut plantations and in villages. Pantropical.

Agrigan: *Fosberg* 31419 (US, BISH, Fo); southwest coast, below 300 ft [90 m], *Falanruw* 2190 (US); 250 ft [75 m], 1879 (US).

Pagan: *Anderson* 609 (US, BISH, Fo).

Alamagan: Asongsong village, *Fosberg* 31726 (US); south southwest coast, 450 ft [140 m], *Falanruw* 1894 (US); around Partido village, *Fosberg* 31700 (US).

MALVACEAE

**Abutilon indicum* Sweet

Near village.

Indo-Pacific.

Sarigan: North of village 50–175 m, *Evans* 2425 (US, BISH, Fo, NY).

**Gossypium hirsutum* L.

Persisting from plantings.

Pantropical, of American origin.

Maug: Lehne and Gäbler, 1972, p. 42, as "Blühende Baumwolle."

Pagan: Isthmus, *Anderson* 581 (US).

**Hibiscus abelmoschus* L.

Occasional in open weedy village area.

Pantropical.

Anatahan: Northwest corner of island, below 200 ft [60 m], *Falanruw* 1646 (US).

Hibiscus tiliaceus L.

In thickets and ragged forests especially near sea, and around saltwater lake on Pagan: forming belt on slopes of Sarigan, very rare on Guguan.

Pantropical.

Maug: South central East Island, 200 ft [60 m], *Falanruw* 2240 (US).

Asuncion: Lehne and Gäbler, 1972, p. 39, as "Hibiskus."

Agrigan: Trail around south side of island, *Fosberg* 31569 (US, BISH).

Pagan: *Bonham* 10 (US, Fo); isthmus near pier, *Anderson* 599 (US, Fo, BISH, NY, L); near lagoon, *Anderson* 593 (US, Fo, BISH, NY, L); near Salt Lake, west side of island, *Fosberg* 31343 (US); village, *Moore* 398 (US).

Alamagan: Southwest coast, 450 ft [140 m], *Falanruw* 1899 (US); Partido village, *Fosberg* 13658 (US, BISH, Fo).

Sarigan: Near anchorage, *Falanruw* 1785 (US, BISH); 250 ft [75 m], 1726 (US); village and vicinity, 20–50 m, *Evans* 2408 (US, BISH, Fo, NY); behind village, 50–100 m, *Evans* 2364 (US, BISH, Fo, NY).

Anatahan: Beach area, sea level, *Falanruw* 1670 (US); Northwest tip of island, 0–10 m, *Evans* 2459 (US, BISH, Fo, NY).

Medinilla: Swedberg, ms 1974.

**Hibiscus ornamental* hybrid

Planted, apparently did not persist.

Agrigan: Fritz, 1902, p. 109.

Alamagan: Fritz, 1902, p. 109.

**Malvastrum coromandelianum* (L.) Garcke

Common weed in open areas in villages.

Pantropical, of American origin.

Agrigan: Village, *Fosberg* 31436 (US).

Alamagan: South southwest coast, below 200 ft [60 m], *Falanruw* 1938 (US); around Partido village, *Fosberg* 31691 (US, BISH, Fo).

**Sida acuta* Burman f.

Weed in plantations and around villages and other disturbed places.

Pantropical.

Pagan: Village, *Moore 408* (US); near Salt Lake, west side of island, *Fosberg 31362* (US); isthmus, *Anderson 563* (US).

Alamagan: South southwest corner of island, below 500 ft [150 m], *Falanruw 1941* (US); around Partido village, *Fosberg 31702* (US); vicinity of Asongsong village, 3–15 m, *Fosberg 31719* (US).

Sarigan: Near anchorage, 150 ft [45 m], *Falanruw 1724* (US); village and vicinity, 10–50 m, *Evans 2433* (US, BISH, Fo, NY).

Anatahan: Northwest corner of island, below 200 ft [60 m], *Falanruw 1647* (US).

**Sida rhombifolia* L.

Common weed in thickets and plantations.

Pantropical.

Agrigan: Village area, *Fosberg 31421* (US).

Pagan: Village, *Moore 400* (US), *403* (US); *Marche 150* (P, Fo); near Salt Lake, west side of island, *Fosberg 31361* (US).

Sarigan: Near anchorage, 200 ft [60 m], *Falanruw 1781* (US); near village, 10–100 m, *Evans 2346* (US).

**Sida rhombifolia* × *acuta*?

Along path in village area.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw 2185* (US).

**Sida spinosa* L.

Weed in village.

Pantropical.

Alamagan: Vicinity of Asongsong village, 3–15 m, *Fosberg 31720* (US).

Thespesia populnea (L.) Solander ex Correa

Pagan: Isthmus, *Anderson 573* (US, BISH, NY); Talague Beach, *Moore 342* (US).

Alamagan: Around Partido village, *Fosberg 31647* (US); south southwest coast, 0–200 ft [0–60 m], *Falanruw 1492* (US).

Sarigan: *Kanehira 2157* (FU, NY).

Urena lobata L.

Occasional in open and semi-open areas.

Pantropical.

Sarigan: Near anchorage, 200 ft [60 m], *Falanruw 1767* (US).

Alamagan: South southwest coast, 450 ft [140 m],

Falanruw 1898a (US).

Anatahan: Northwest corner of island, below 200 ft [60 m], *Falanruw 1636* (US).

BOMBACACEAE

**Ceiba pentandra* (L.) Gaertner

Persisting around villages from planting by Japanese.

Pantropical.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw 2159* (US).

Pagan: *Anderson 610* (US, BISH, Fo, NY, L).

STERCULIACEAE

Melochia compacta Hochreutiner

At very low elevations in thickets and open areas.

Marianas and Carolines.

Agrigan: Trail around south side of island, 2 m, *Fosberg 31567* (US, BISH).

Pagan: 8–10 m, *Anderson 501* (US).

Melochia villosissima (Presl) Merrill

Along trails at low elevations.

Marianas and Carolines.

Pagan: Caldera Wall, *Moore 427* (US); trail to Pansantati, below 100 ft [30 m], *Falanruw 1864* (US).

THEACEAE

Eurya japonica var. *nitida* (Korthals) Thistelton-Dyer

Eastern Asia to Micronesia.

Agrigan: Hosokawa, 1935a, p. 31.

Pagan?: Hosokawa, 1935a, p. 31.

Alamagan: *Kanehira 2190* (K).

GUTTIFERAE

Calophyllum inophyllum L.

Uncommon.

Indo-Pacific.

Pagan: Near center of island, *Anderson 597* (US, BISH, Fo, NY, L).

Alamagan: Fritz, 1902, p. 102.

Medinilla: Swedberg, ms 1974.

PASSIFLORACEAE

**Passiflora foetida* var. *hispida* (de Candolle) Killip
Weed in plantations and thickets, especially around disturbed areas and villages.

Pantropical, but of American origin.

Agrigan: Village, *Fosberg 31424* (US, BISH, Fo); midwest coast, 200 ft [60 m], *Falanruw 2327* (US).

Pagan: Marine camp, 20 m, *Anderson 510* (US, BISH, Fo); isthmus, *Anderson 527* (US, BISH, Fo, NY); *Bonham 3* (US, Fo); Fresh Water Lake, 2–50 m, *Fosberg 31372* (US); east of village, *Moore 404* (US); edge of air strip, *Moore 309* (US).

Alamagan: South southwest coast, 350 ft. [110 m], *Falanruw 1885* (US).

Sarigan: Near anchorage, 300 ft [90 m], *Falanruw 1762* (US); 100 ft, *1717* (US) (sterile); north of village, 50–175 m, *Evans 2427* (US, BISH, Fo, NY).

CARICACEAE

**Carica papaya* L.

Sparingly naturalized throughout Northern Marianas except Uracas.

Pantropical, of American origin.

Maug: South central East Island, 200–300 ft [60–90 m], *Falanruw 2349* (US).

Asuncion: Southwestern slope, 150 ft [45 m], *Falanruw 2260* (US).

Agrigan: Trail around south side of island, 10–20 m, *Fosberg 31590* (US); narrow ravine, midwest coast, 150 ft [45 m], *Falanruw 2347*.

Pagan: North of marine camp, *Anderson 607* (US, BISH, Fo); Fresh Water Lake, *Fosberg 31390* (US).

Alamagan: Around Partido village, *Fosberg 31698* (US, BISH).

Guguan: Seen, but not collected by Falanruw.

Anatahan: Western coast, below 200 m, *Falanruw 1704* (US).

Medinilla: Swedberg, ms 1974.

CUCURBITACEAE

**Benincasa hispida* (Thunberg) Cogniaux

Vine climbing in woody vegetation.

Alamagan: South southwest coast, 500 ft [150 m], *Falanruw 1917* (US); vicinity of Asongsong village, 3–15 m, *Fosberg 31725* (US).

LYTHRACEAE

Pemphis acidula Forster f.

Locally very abundant on limestone area, probably the only occurrence in the Northern Marianas except possibly on Medinilla.

Pagan: East side of isthmus, *Anderson 545* (US, BISH, Fo, NY, L); east coast, *Moore 425* (US); Inae Dikiki or Togari Rock Bay, 100 ft [30 m], *Falanruw 1859* (US).

These are probably all from the same locality, a very localized limestone outcrop.

COMBRETACEAE

**Terminalia catappa* L.

Large trees throughout Northern Marianas except Asuncion, Uracas, and possibly Medinilla. Dwarfed somewhat on Guguan. Generally in open country or in wooded ravines: provide roosting and nesting sites for boobies on Guguan and Maug.

Pantropical.

Maug: South central East Island, *Falanruw 2235* (US).

Asuncion: Lehne and Gäbler, 1972, p. 39, as "Talisay" (possibly *T. rostrata*).

Agrigan: Village area, southwest coast, below 300 ft [90 m], *Falanruw 2173* (US); trail around south side of island, 10–20 m, *Fosberg 31607* (US, BISH).

Pagan: Isthmus, *Anderson 533* (US, BISH, Fo, NY, L); Caldera Wall, east of air strip, *Moore 311* (US).

Alamagan: Above Asongsong village, *Fosberg 31743* (US).

Guguan: 200–300 ft [60–90 m], *Falanruw 1825* (US).

Sarigan: Near anchorage, 250 ft [75 m], *Falanruw 1739* (US, BISH), *1740* (US); village and vicinity, 20–50 m, *Evans 2409* (US, BISH, Fo, NY).

Anatahan: Northwest coast, *Falanruw 1709* (US).

Medinilla: Lehne and Gäbler, 1972, p. 20, as "Talisay-Mandelbaum."

Terminalia rostrata Fosberg & Falanruw

One large tree seen.

Apparently endemic on Asuncion.

Asuncion: Southwestern slope, 400 ft [120 m], *Falanruw 2290* (US).

Terminalia samoensis Rechinger

Common in low forest on lower slopes.

Pacific, widely distributed usually strand species.

Asuncion: Southwestern slope, 100 ft [30 m], *Falanruw* 2281 (US).

LECYTHIDACEAE

Barringtonia asiatica (L.) Kurz

Occasional to common tree in coastal areas, some occurring more inland about village areas.

Indo-Pacific strand trees.

Agrigan: East side of island, *Fosberg* 31636 (US); midwest coast, 200 ft [60 m], *Falanruw* 2344 (US).

Pagan: South of pier on west coast, 20 m, *Anderson* 589 (US, BISH, Fo, NY, L).

Alamagan: Partido village, *Fosberg* 31697 (US).

Sarigan: Near anchorage, sea level, *Falanruw* 1783 (US); north of village, 50–175 m, *Evans* 2426 (US, BISH, Fo, NY).

Anatahan: Beach area, sea level, *Falanruw* 1664 (US); northwest tip of island, 0–10 m, *Evans* 2462 (US, BISH).

MYRTACEAE

Eugenia palumbis Merrill

Possibly too close to *E. reinwardtiana*.

Pagan: Hosokawa, 1940, p. 542.

Eugenia reinwardtiana (Blume) de Candolle

Infrequent in thickets, low forests, and on coastal bluffs.

Indo-Pacific.

Agrigan: Trail around south side of island, 10–20 m, *Fosberg* 31601 (US).

Pagan: Caldera Wall, *Moore* 314 (US); *Anderson* 578 (US).

Guguan: Southwest part of island, 175 ft [55 m], *Falanruw* 1846 (US).

**Psidium guajava* L.

Occasional groups of small trees about dry open village areas.

Pantropical, of American origin.

Pagan: *Anderson* 509 (US, BISH, Fo).

Sarigan: Behind village, 50–100 m, *Evans* 2366 (US, BISH, Fo, NY).

Anatahan: Northwest corner of island, below 200 ft [60 m], *Falanruw* 1673 (US).

MELASTOMATACEAE

Melastoma malabathricum L. var. (*Melastoma marianum* Naudin).

Scattered shrubs in open grassy areas.

Indo-Pacific, variety endemic in Marianas.

Pagan: Mt. Pagan, 1870 ft [570 m], *Moore* 365 (US), *Moore* 385 (US); Mt. Charlen spatter cone, east of Fresh Water Lake, *Fosberg* 31414 (US).

Alamagan: Kanehira, 1935a, p. 383, Kanehira, 1938, pp. 240–241.

Sarigan: Above village, 375 m, *Evans* 2378 (US, BISH, Fo, NY).

ARALIACEAE

Polyscias grandifolia Volkens

In undergrowth in ravines and thickets.

Micronesian.

Pagan: Isthmus, 6–8 m, *Anderson* 541 (US, BISH); Caldera Wall, *Moore* 313 (US).

Alamagan: Vicinity of Asongsong village, *Fosberg* 31739 (US, BISH, Fo); *Anderson* 421 (US, BISH, Fo, NY, L); south southwest coast, 1025 ft [310 m], *Falanruw* 1925 (US).

Sarigan: Kanehira, 1935a, pp. 293–294.

**Polyscias scutellaria* (Burman f.) Fosberg

Persisting around old house site.

Widespread cultivated ornamental.

Pagan: Near Salt Lake, west side of island, 2–50 m, *Fosberg* 31346 (US).

UMBELLIFERAE

Centella asiatica (L.) Urban

Prostrate herb on moist shaded forest floor.

Indo-Pacific, a very closely related species, sometimes regarded as the same, in eastern America.

Alamagan: South southwest coast, 750 ft [230 m], *Falanruw* 1920 (US).

Sarigan: Above village, 375 m, *Evans* 2379 (US, BISH, Fo, NY).

Anatahan: West end of coast, 250 ft [75 m], *Falanruw* 1688 (US).

SAPOTACEAE

Pouteria obovata (R. Brown) Baehni (*Sideroxylon glomeratum* Volkens)

Common tree in forests and wooded ravines.

Indo-Pacific.

Agrigan: Hosokawa, 1937, p. 282.

Pagan: Road to Inae Dikiki, 100–200 ft [30–60 m], *Falanruw* 1868 (US), 1866 (US); Caldera Wall, *Moore* 324 (US); trail to Talague Beach, below 150 ft [45 m], *Falanruw* 1871 (US); isthmus, 20 m, *Anderson* 534 (US).

Alamagan: South southwest coast, 1025 ft [310 m], *Falanruw* 1926 (US); *Kanehira* 2174 (NY); vicinity of Asongsong village, *Fosberg* 31742 (US); 31705 (US); *Anderson* 430 (US); around Partido village, *Fosberg* 31681 (US).

Guguan: 320 ft [100 m], *Falanruw* 1840 (US).

PRIMULACEAE

Lysimachia mauritiana Lamarck

Not found by us.

Indo-Pacific.

Pagan: Hosokawa, 1935a, p. 34; *Kanehira*, 1935a, p. 387.

LOGANIACEAE

Geniostoma micranthum var. (*Geniostoma hoeferi* var. *glabrum* Gilg)

Alamagan: *Anderson* 419 (US); *Kanehira* 2180 (NY).

Geniostoma micranthum de Candolle var. *micranthum*

Rare to common small tree or shrub in open and semi-open areas on lava.

Marianas endemic.

Agrigan: East side of island, *Fosberg* 31629 (US, BISH); *Hosokawa* 7994 (US).

Pagan: *Kanehira* 2209 (NY).

Alamagan: Around Partido village, *Fosberg* 31683 (US, BISH, Fo, NY); *Hosokawa* 7903 (A, US).

Anatahan: Northwest corner of island, below 200 ft [60 m], *Falanruw* 1609 (US); western end of north coast, below 250 ft [75 m], *Falanruw* 1683 (US).

Sarigan: Above village, 375 m, *Evans* 2372 (US, BISH, Fo, NY).

OLEACEAE

Jasminum marianum de Candolle

Uncommon subscandent shrub.

Marianas endemic.

Pagan: Mt. Pagan, *Moore* 359 (US); isthmus, *Anderson* 538 (US).

Alamagan: South southwest coast, 250 ft [75 m], *Falanruw* 1876 (US); vicinity of Asongsong village, 3–15 m, *Fosberg* 31721 (US); 200 m, *Anderson* 420 (US).

APOCYNACEAE

**Catharanthus roseus* (L.) G. Don

Cultivated and naturalized around villages and camps.

Pantropical, native of Madagascar.

Agrigan: Southwest coast village area, below 300 ft [90 m], *Falanruw* 2177 (US); village, 10–20 m, *Fosberg* 31565 (US).

Pagan: Village, *Moore* 416 (US); near Salt Lake, west side of island, *Fosberg* 31358 (US).

Alamagan: South southwest coast, 350 ft [110 m], *Falanruw* 1889 (US), 1890 (US); around Partido village, *Fosberg* 31652 (US, BISH).

Sarigan: Village and vicinity, 10–50 m, *Evans* 2442 (US, BISH).

Anatahan: Village area, northwest corner of island, below 250 ft [75 m], *Falanruw* 1678 (US).

Cerbera dilatata Markgraf

Marianas endemic.

Pagan: *Hosokawa* 7969 (A).

Neiosperma oppositifolia (Lamarck) Fosberg & Sachet

Scattered small trees in thickets and forests.

Indo-Pacific.

Maug: South central East Island, 400 ft [120 m], *Falanruw* 2245 (US).

Asuncion: Southwest slope, 150 ft [45 m], *Falanruw* 2254 (US).

Agrigan: Trail around south side of island, 10–20 m, *Fosberg* 31577 (US, BISH, Fo.).

Pagan: Cinder plain, 150 ft [45 m], *Bonham* 15 (US, Fo); isthmus, *Anderson* 576 (US, BISH, Fo); east of village, *Moore* 414 (US).

Alamagan: South southwest coast, 350 ft [110 m], *Falanruw* 1883 (US); *Anderson* 435 (US), 409 (US, BISH, Fo, NY); around Partido village, *Fosberg* 31657 (US); around Asongsong village, *Fosberg* 31741 (US).

Sarigan: Near anchorage, 200 ft [60 m], *Falanruw* 1778 (US); 100 ft [30 m], 1716 (US); north of village, 175–250 m, *Evans* 2412 (US, BISH, Fo, NY).

Ochrosia mariannensis A. de Candolle

Occasional in open areas, more common in semi-open and low woods.

Marianas endemic.

Pagan: *Kanehira* 2201 (NY, FU); isthmus, 16 m, *Anderson* 535 (US, BISH, Fo, NY, L); Caldera Wall, *Moore* 320 (US); trail to Talague beach, below 150 ft [45 m], *Falanruw* 1870 (US, BISH).

Sarigan: Near anchorage, 200 ft [60 m], *Falanruw* 1770 (US) seedling; below 250 ft [75 m], 1728 (US, BISH); 200 ft [60 m], 1769 (US, BISH); north of village, 175–250 m, *Evans* 2417 (US, BISH, Fo, NY).

**Plumeria rubra* L.

Planted in graveyard.

Pantropical ornamental, of American origin.

Anatahan: Village area, northwest corner of island, below 250 ft [75 m], *Falanruw* 1679 (US).

**Thevetia peruviana* (Persoon) K. Schumann

Small tree occasionally planted about houses.

Pantropical ornamental of American origin.

Agrigan: Village, *Fosberg* 31425 (US); southwest coast, village area, below 300 ft [90 m], *Falanruw* 2156 (US).

Pagan: *Anderson* 598 (US, BISH, Fo, NY, L); near Salt Lake, *Fosberg* 31347 (US); between village and Lake Laguna, *Moore* 358 (US).

CONVOLVULACEAE

**Ipomoea aquatica* Forskål

Growing in low marshy area at east end of lake.

Pantropical potherb.

Pagan: Fresh Water Lake, *Fosberg* 31393 (US, BISH, Fo).

**Ipomoea batatas* (L.) Lamarck

Cultivated and persisting about villages and former habitations.

Widespread food plant, probably of American origin.

Agrigan: Fritz, 1902, p. 102; Gaudichaud, 1826, p. 76.

Pagan: Near Salt Water Lake, west side of island, *Fosberg* 31357 (US); 30 m, *Anderson* 595 (US, BISH, Fo), *Anderson* 596 (US, BISH, Fo).

Alamagan: Fritz, 1902, p. 102.

Sarigan: North of village, 50–175 m, *Evans* 2422 (US, BISH, Fo, NY).

Ipomoea indica (Burman f.) Merrill

Vine climbing over vegetation.

Indo-Pacific.

Alamagan: Vicinity of Asongsong village, 3–15 m, *Fosberg* 31731 (US).

Guguan: Southwest part of island, 175 ft [55 m], *Falanruw* 1848 (US).

Ipomoea pes-caprae ssp. *brasiliensis* (L.)

van Ooststroom

Common coastal species on all islands, occasional inland in pioneer situations, as on volcanic sands and rocks of Guguan and Uracas.

Pantropical.

Uracas: West side of south coast, below 400 ft [120 m], *Falanruw* 2209 (US).

Asuncion: Southwest coast, 100 ft [30 m], *Falanruw* 2280 (US).

Agrigan: *Marche* 298 (P, Fo); Village, *Fosberg* 31429 (US); southwest coast, below 300 ft [90 m], *Falanruw* 2184 (US, BISH); midwest coast, 15 ft [5 m], *Falanruw* 2348 (US).

Pagan: *Bonham* 21 (US, Fo); isthmus, *Anderson* 565 (US, BISH, Fo, NY, L); Fresh Water Lake, *Fosberg* 31396 (US); *Marche* 149 (P, Fo); Mt. Pagan, *Moore* 368 (US); air strip, *Moore* 308 (US); Laguna, *Villagomez JV-D5* (US).

Alamagan: Partido village, *Fosberg* 31645 (US, BISH); south southwest coast, 0–200 ft [0–60 m], *Falanruw* 1956 (US).

Guguan: West coast, below 50 ft [15 m], *Falanruw* 1800 (US).

Sarigan: Coastal bluffs above anchorage, 0–75 ft [0–20 m], *Falanruw* 1775 (US); below village, 0–20 m, *Evans* 2429 (US, BISH, Fo, NY).

Anatahan: Beach area, sea level, *Falanruw* 1665 (US), northwest tip of island, 0–10 m, *Evans* 2460 (US, BISH, Fo, NY).

Medinilla: Swedberg, ms 1974.

Ipomoea sp.

Vine growing along goat trail in ravine, seedling, only, seen.

Anatahan: Western coast, below 200 ft [60 m], *Falanruw* 1708 (US).

**Operculina ventricosa* (Bertero) Peter

Locally abundant vine climbing over thickets and edges of forests.

Pantropical.

Asuncion: Southwestern slope, 150 ft [45 m], *Falanruw* 2251 (US, BISH).

Agrigan: Trail around south side of island, *Fosberg* 31617 (US); midwest coast, 200 ft [60 m], *Falanruw* 2329 (US).

Pagan: *Bonham* 2 (US, Fo); Fresh Water Lake, 2–50 m, *Fosberg* 31383 (US, BISH); *Marche* 148 (P, Fo); edge of air strip, *Moore* 306 (US).

Alamagan: Vicinity of Asongsong village, *Fosberg* 31722 (US, BISH); south southwest coast, below 500 ft [150 m], *Falanruw* 1939 ? (US).

Sarigan: Near village, 10–100 m, *Evans* 2337? (US, BISH, Fo, NY).

Anatahan: *Falanruw* 1988 ? (US).

Stictocardia campanulata (L.) Merrill

Large vine, growing over shrubs and trees in ravines and coconut plantations.

Indo-Pacific.

Alamagan: Around Partido village, *Fosberg* 31696 (US).

Sarigan: Near anchorage, 300 ft [90 m], *Falanruw* 1761 (US); *Kanehira* 2170 (NY).

Anatahan: Western coast, below 200 m, *Falanruw* 1706 (US).

BORAGINACEAE

**Heliotropium indicum* L.

Weed in villages.

Pantropical.

Sarigan: Village and vicinity, 10–50 m, *Evans* 2440 (US, BISH, Fo, NY).

Heliotropium ovalifolium var. *depressum*

(Chamisso) Merrill

Weed in villages.

Species Indo-Pacific; variety supposedly Marianas endemic.

Pagan: Village, *Moore* 394 (US).

VERBENACEAE

Callicarpa candicans var. (*Callicarpa paucinervia* Merrill)

Agrigan: Trail around south side of island, 10–20 m, *Fosberg* 31599 (US).

Pagan: *Kanehira* 2203 (US); south of pier, An-

derson 585 (US); isthmus, 2 m, *Anderson* 546 (US); east coast, *Moore* 424 (US); Talague beach, *Moore* 340 (US).

Alamagan: Vicinity of Asongsong village, 3–15 m, *Fosberg* 31706 (US).

Anatahan: Northwest corner of island, below 150 ft [45 m], *Falanruw* 1652 (US).

Callicarpa lamii Hosokawa

Pagan: *Marche* 153 (P, Fo); north of marine camp, edge of forest, *Anderson* 606 (US).

Alamagan: *Anderson* 416 (US).

Clerodendron inerme (L.) Gaertner

Common component of undergrowth in semi-shade.

Indo-Pacific.

Pagan: Caldera Wall, *Moore* 317 (US).

Sarigan: Near anchorage, 150 m, *Falanruw* 1730 (US).

Premna obtusifolia R. Brown

Small tree, occasional in semi-open and forested areas.

Indo-Pacific.

Asuncion: Southwest slope, 250 ft [75 m], *Falanruw* 2273 (US); 400 ft [120 m], 2289 (US).

Agrigan: Village, *Fosberg* 31426 (US).

Pagan: Volcanic ash soil, 150 ft [45 m], *Bonham* 8 (US, Fo); Caldera Wall, *Moore* 321 (US); Fresh Water Lake, *Fosberg* 31382 (US); isthmus, 6 m, *Anderson* 531 (US, BISH, Fo).

Alamagan: Around Partido village, *Fosberg* 31680 (US, BISH, Fo, NY, L); above village, 150–250 m, *Evans* 2395 (US, BISH, Fo, NY).

Guguan: 200–300 ft [60–90 m], *Falanruw* 1826 (US); 320 ft [100 m], 1835 (US).

Sarigan: Above village, 350–375 m, *Evans* 2369 (US, BISH, Fo, NY).

Anatahan: Northern coast, below 250 ft [75 m], *Falanruw* 1684 (US), 1685 (US).

Medinilla: Lehne and Gäbler, 1972, p. 20, as "Ahgau."

**Stachytarpheta jamaicensis* (L.) Vahl

In disturbed places around village and landing.

Pantropical weed of American origin.

Pagan: East of pier, *Anderson* 612 (US, BISH, Fo); flats near landing, *Fosberg* 31368 (US); village, *Moore* 409 (US).

Vitex negundo L.

Infrequent, in clumps near coast.
Indo-Pacific.

Maug: South central East Island, 15 ft [5 m], *Falanruw* 2246 (US, BISH).

Pagan: Inae Dikiki, below 100 ft [30 m], *Falanruw* 1858 (US, BISH); east coast, *Moore* 423 (US).

LABIATAE

**Hyptis pectinata* (L.) Poiteau

Occasional to common in weedy places and along trails.

Weed of American origin, common in Micronesia.

Maug: South central East Island, 50 ft [15 m], *Falanruw* 2248 (US, BISH).

Agrigan: Trail around south side of island, 10–20 m, *Fosberg* 31594 (US).

Pagan: Fresh Water Lake, *Fosberg* 31395 (US).

Alamagan: South southwest coast, 500 ft [150 m], *Falanruw* 1907 (US); vicinity of Asongsong village, 3–15 m, *Fosberg* 31718 (US).

Sarigan: Near village, 10–100 m, *Evans* 2345 (US, BISH, Fo, NY).

**Ocimum basilicum* L.

Cultivated in gardens and dooryards.

Widespread cultivated species.

Agrigan: Village, 10–20 m, *Fosberg* 31558 (US, BISH).

**Ocimum sanctum* L.

Commonly cultivated in villages.

Indo-Pacific.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw* 2176 (US), 2186 (US); Cultivated, *Fosberg* 31422 (US, BISH, Fo).

Pagan: Road to Talague beach, *Moore* 346 (US); roadside, *Anderson* 608 (US, BISH, Fo).

SOLANACEAE

**Capsicum frutescens* L.

Common shrub planted in villages, naturalized along trails and in undergrowth in thickets and woods.

Tropical American, now pantropical.

Asuncion: Southwest slope, 150 ft [45 m], *Falanruw* 2250 (US), *Falanruw* 2265 (US), *Falanruw* 2267 (US).

Agrigan: Trail around south side of island, *Fosberg* 31588 (US).

Alamagan: Cultivated, *Fosberg* 31701 (US, BISH); around Partido village, *Fosberg* 31668 (US, BISH, Fo); south southwest coast, 350 ft [110 m], *Falanruw* 1886 (US).

Sarigan: Northwest coast, 400 ft [120 m], *Falanruw* 1750? (US); near village, 10–100 m, *Evans* 2343 (US); above village, 150–250 m, *Evans* 2389 (US, BISH, Fo, NY).

Anatahan: Northwest corner of island, 150 ft [45 m], *Falanruw* 1651 (US).

**Datura metel* L.

One plant seen in garden.

Widespread cultivated species.

Agrigan: Village, 10–20 m, *Fosberg* 31566 (US).

**Nicotiana tabacum* L.

Planted around villages.

Widespread cultivated species of American origin.

Agrigan: Fritz, 1902, p. 109.

Alamagan: Around Partido village, *Fosberg* 31693 (US).

Sarigan: Village and vicinity, 10–50 m, *Evans* 2434 (US).

Anatahan: Seen but not collected by Falanruw.

**Physalis angulata* L.

Infrequent in semi-open area.

Pantropical weed.

Anatahan: Northwest corner of island, below 150 ft [45 m], *Falanruw* 1650 (US).

Physalis minima L.

Scattered at low elevations in open rocky areas, infrequent inland.

Old World tropics.

Uracas: Large precaldera rock on south coast, less than 400 ft [120 m], *Falanruw* 2199 (US).

Sarigan: Near village, 10–100 m, *Evans* 2361 (US, BISH, Fo, NY); volcanic ridge near anchorage, 325 ft [100 m], *Falanruw* 1743 (US); 0–75 ft [0–20 m], *Falanruw* 1776 (US); northwest coast, *Falanruw* 1749.

Anatahan: Trail inland from village, less than 1000 ft [300 m], *Falanruw* 1971 (US).

**Solanum melongena* L.

Sparingly cultivated.

Widespread cultivated garden vegetable.

Alamagan: Around Partido village, *Fosberg* 31654 (US).

Sarigan: North of village, 50–175 m, *Evans 2423* (US).

SCROPHULARIACEAE

**Angelonia angustifolia* Benth

Rare, in vicinity of houses.

Cultivated ornamental of tropical American origin.

Anatahan: Northwest corner of island, below 200 ft [60 m], *Falanruw 1640* (US).

**Lindernia crustacea* (L.) F. von Mueller

Rare, on crater floor, a very slender form, perhaps from a shaded spot.

Widespread pantropical weed.

Pagan: Mt. Pagan, 1870 ft [570 m], *Moore 361* (US).

MYOPORACEAE

Myoporum boninense Koidzumi

Endemic to Bonin and Marianas islands.

Pagan: On cliff above shore, 4 m, *Anderson 600* (US).

ACANTHACEAE

Blechum brownei f. *puberulum* Leonard

Abundant along trails and in plantations and thickets.

Pantropical; f. *puberulum* is common Old World form.

Asuncion: Southwest slope, 150 ft [45 m], *Falanruw 2268, 2258* (US).

Agrigan: *Fosberg 31423* (US, BISH, Fo, NY).

Alamagan: Partido village, *Fosberg 31672* (US, BISH, Fo, NY, L); south southwest coast, 350 ft [110 m], *Falanruw 1887* (US).

Guguan: Southwest part of island, 175 ft [55 m], *Falanruw 1845* (US).

Sarigan: Northwest coast above anchorage, 200 ft [60 m], *Falanruw 1771* (US); near village, 10–100 m, *Evans 2342* (US, BISH, Fo, NY); *Kanehira 2167* (FU).

Anatahan: Northwest corner of island, 200–300 ft [60–90 m], *Falanruw 1616* (US); western coast, below 200 m, *Falanruw 1702* (US).

Ruellia sp.

Anatahan: West coast, *Falanruw 1702* (US).

RUBIACEAE

Hedyotis albido-punctata (Merrill) Fosberg

On rocks not far from sea.

Western Pacific and eastern Asia strand species.

Sarigan: Northwest coast, sea level to 75 ft [20 m], *Falanruw 1779* (US), *Falanruw 1794* (US); 300 ft [90 m], *Falanruw 1763* (US).

Anatahan: Northwest tip of island, 0–10 m, *Evans 2450* (US, BISH, Fo, NY).

Hedyotis biflora (L.) Lamarck

Small herbs growing in moist shaded or semi-open areas and along trails.

Agrigan: Midwest coast, 150 ft [45 m], *Falanruw 2343* (US); trail around south side of island, 10–20 m, *Fosberg 31580* (US).

Alamagan: South southwest coast, 350 ft [110 m], *Falanruw 1888* (US).

Anatahan: *Hosokawa 7836* (BISH); west end of north coast, below 250 ft [75 m], *Falanruw 1689* (US); northwest corner of island, 200–300 ft [60–90 m], *Falanruw 1612* (US); northwest tip of island, 0–10 m, *Evans 2454* (US).

Hedyotis foetida var. *mariannensis* (Merrill)

Fosberg

Foetid erect shrub or suffrutescent herb growing back of beaches, on ledges, in rocky areas, and in open on black cinder sand inland on Guguan.

Agrigan: Trail around south side of island, 10–20 m, *Fosberg 31597* (US).

Pagan: Mt. Pagan, *Moore 366* (US); 12 m, *Anderson 502* (US); isthmus, 4 m, *Anderson 550* (US).

Anatahan: Beach area, sea level, *Falanruw 1668* (US); northwest tip of island, 0–10 m, *Evans 2445* (US, BISH, Fo, NY).

Guguan: 320 ft [100 m], *Falanruw 1833* (US).

Alamagan: *Hosokawa 7898* (BISH); south southwest coast, 0–200 ft [0–60 m], *Falanruw 1960* (US); vicinity of Asongsong village, 3–15 m, *Fosberg 31707* (US); around Partido village, *Fosberg 31682* (US); *Anderson 414* (US).

Hedyotis kanehirae (Hatusima) Fosberg

Not seen by us.

Alamagan: Hatusima, 1936, p. 218.

Hedyotis laciniata Kanehira

Alamagan: *Kanehira 2181* (NY).

Hedyotis sariganensis Hosokawa

Not seen by us.

Sarigan: Hosokawa, 1935a, p. 36; Hatusima, 1936, p. 226; Kanehira, 1935a, p. 419.

Hedyotis scabrifolia Kanehira var.

Pagan: Mt. Pagan, Moore 383 (US).

Morinda citrifolia L.

Glossy-leafed shrub or small tree found on all islands except Uracas in semi-open and open areas, thickets, and coconut plantations, on various substrata, dominant "small shrub-like tree" on Medinilla.

Pantropical.

Maug: North end of island, below 400 ft [120 m], *Falanruw* 2217 (US).

Asuncion: Lower southwest slope, 150 ft [45 m], *Falanruw* 2263 (US).

Agrigan: Trail around south side of island, 10–20 m, *Fosberg* 31591 (US); southwest coast, below 300 ft [90 m], *Falanruw* 2194 (US).

Pagan: Isthmus, *Anderson* 575 (US, BISH, Fo, NY, L); 150 ft [45 m], *Bonham* 13 (US, Fo); village, *Moore* 417 (US); east coast, *Moore* 420? (US).

Alamagan: Around Partido village, *Fosberg* 31661 (US); south southwest coast, 250 ft [75 m], *Falanruw* 1880 (US).

Guguan: West coast, below 50 ft [15 m], *Falanruw* 1815 (US).

Sarigan: Above village, 150–250 m, *Evans* 2394 (US, BISH, Fo, NY); northwest coast, 325 ft [100 m], *Falanruw* 1747 (US).

Anatahan: Vicinity of beach, northwest tip of island, 0–10 m, *Evans* 2461 (US, BISH, Fo, NY); behind village, northwest corner of island, below 200 ft [60 m], *Falanruw* 1604 (US).

Medinilla: Swedberg, ms 1974.

Psychotria hombroniana (Baillon) Fosberg (*Psychotria mariannensis* Kanehira)

Marianas endemic.

Alamagan: *Kanehira* 2186 (P, NY).

Psychotria mariana Bartling

Shrubs or small tree, common in undergrowth in forests, thickets, and semi-open areas.

Endemic to Marianas and Yap Island.

Agrigan: *Marche* 292 (P); canyon on east side of island, *Fosberg* 31632 (US, BISH, Fo); trail around south side of island, 10–20 m, *Fosberg* 31615 (US, BISH, Fo, NY, L); midwest coast, 200 ft [60 m], *Falanruw* 2333 (US, BISH).

Pagan: *Kanehira* 2205 (NY); Fresh Water Lake,

2–50 m, *Fosberg* 31370 (US, BISH, Fo), *Fosberg* 31377 (US); *Anderson* 505 (US, BISH, Fo, NY); 150 ft [45 m], *Bonham* 9 (US, BISH); Caldera Wall, *Moore* 327 (US); Talague beach, *Moore* 337 (US); road to Inae Dikiki, below 100 ft [30 m], *Falanruw* 1856 (US); trail to Talague beach, below 150 ft [45 m], *Falanruw* 1871a (US).

Alamagan: Asongsong, 100 ft [30 m], *Kondo* 11b (BISH); 200 m, *Anderson* 403 (US, BISH, Fo), *Anderson* 420 (US, BISH, Fo, NY); south southwest coast, 350 ft [110 m], *Falanruw* 1891 (US); 250 ft [75 m], *Falanruw* 1875 (US); around Partido village, *Fosberg* 31664 (US, BISH, Fo, NY, L).

Sarigan: Near anchorage, 325 ft [100 m], *Falanruw* 1744 (US, BISH); above village, 150–250 m, *Evans* 2391 (US, BISH, Fo, NY); near village, 10–100 m, *Evans* 2340 (US, BISH, Fo, NY).

Randia cochinchinensis (Loureiro) Merrill

Shrub, common in forests.

Indo-Pacific.

Pagan: *Anderson* 506 (US); isthmus, *Anderson* 539 (US).

Alamagan: Around Partido village, *Fosberg* 31673 (US); *Anderson* 422 (US).

CAPRIFOLIACEAE

**Sambucus mexicana* Presl ex de Candolle

Cultivated in village.

American, thought to be medicinal.

Agrigan: Village, *Fosberg* 31435 (US).

GOODENIACEAE

Scaevola taccada (Roxburgh) Gaertner

Shrub found in open areas at about 100 m or below, in other regions mostly found on beaches and sea-facing rocks, here mostly inland; a tall and a depressed form present.

Asuncion: Southwestern slope, 75 ft [20 m], *Falanruw* 2284 (US, BISH, Fo).

Agrigan: *Fosberg* 31428 (US).

Pagan: *Anderson* 587 (US, BISH, NY, L); Talague beach, *Moore* 341 (US); Inae Dikiki, below 100 ft [30 m], *Falanruw* 1860 (US); trail to Pantantati, below 100 ft [30 m], *Falanruw* 1865 (US, BISH).

Alamagan: *Kanehira* 2195 (FU); Partido village, *Fosberg* 31686 (US, BISH).

Guguan: 320 ft [100 m], *Falanruw* 1838 (US, BISH).

Sarigan: Above village, 375 m, *Evans* 2373 (US, BISH, Fo, NY, P).

Anatahan: *Hosokawa* 7844 (A).

COMPOSITAE

**Ageratum conyzoides* L.

Common in openings, forest edges and especially in disturbed areas.

Agrigan: Midwest coast, 20 ft [6 m], *Falanruw* 2322 (US).

Pagan: East of Fresh Water Lake, *Fosberg* 31413 (US, BISH).

Alamagan: Around Partido village, *Fosberg* 31688 (US, BISH); south southwest coast, sea level to 200 ft [60 m], *Falanruw* 1946 (US).

Guguan: 200–300 ft [60–90 m], *Falanruw* 1849 (US).

Sarigan: Near anchorage, sea level, *Falanruw* 1784 (US); 150 ft [45 m], 1722 (US); north of village, 175–250 m, *Evans* 2414 (US); near village, 10–100 m, *Evans* 2356 (US, BISH, Fo, NY).

Anatahan: Northwest corner of island, below 200 ft [60 m], *Falanruw* 1638 (US).

**Artemisia vulgaris* L.

Medicinal herb, abundant in graveyards. Planted widely and becoming established.

Eurasian origin.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw* 2157 (US).

Anatahan: Northwest coast, below 250 ft [75 m], *Falanruw* 1677 (US).

**Bidens sulphurea* (Cavanilles) Schultz-Bipontinus (*Cosmos sulphureus* Cavanilles)

Planted ornamental of American origin.

Agrigan: *Fosberg* 31559 (US).

**Conyza bonariensis* (L.) Cronquist

Found in bare or disturbed places.

Cosmopolitan.

Pagan: Mt. Pagan, *Moore* 375 (US); east of air strip, *Moore* 310 (US).

**Conyza canadensis* (L.) Cronquist

Found near airstrip; generally in bare or disturbed places.

Cosmopolitan.

Pagan: East of air strip, *Moore* 307 (US).

**Elephantopus mollis* Humboldt, Bonpland, & Kunth

Common weed along trails and in village areas, also on new volcanic ash.

Widespread weed of American origin, often confused with the Asiatic *E. scaber*.

Asuncion: Lower southwest slope, 150 ft [45 m], *Falanruw* 2264 (US, BISH).

Agrigan: *Fosberg* 31420 (US, BISH); southwest coast, below 300 ft [90 m], *Falanruw* 2193 (US, BISH).

Pagan: Salt Lake, *Fosberg* 31359 (US, BISH); isthmus, *Anderson* 572 (US, BISH, NY, L); Mt. Pagan, *Moore* 384 (US).

Alamagan: South southwest coast, 450 ft [140 m], *Falanruw* 1898 (US).

Anatahan: Northwest corner of island, 200–300 ft [60–90 m], *Falanruw* 1632 (US).

**Emilia sonchifolia* (L.) de Candolle ex Wight

Scattered in open areas of volcanic ash, as well as in disturbed areas and around villages.

Pantropical, of south Asian origin.

Agrigan: Midwest coast, 30 ft [10 m], *Falanruw* 2316 (US); trail around south side of island, 10–20 m, *Fosberg* 31614 (US, BISH, Fo).

Pagan: Village, *Moore* 429 (US); near Salt Lake, west side of island, *Fosberg* 31369 (US); east of pier, *Anderson* 613 (US).

Alamagan: South southwest coast, sea level to 200 ft [60 m], *Falanruw* 1958 (US).

Guguan: West coast, below 50 ft [15 m], *Falanruw* 1813 (US); 200 ft [60 m], *Falanruw* 1820b (US).

**Eupatorium odoratum* L.

A few patches of low bushes inland of beach.

Pantropical weed of American origin.

Agrigan: Southwest coast, below 300 ft [90 m], *Falanruw* 2191 (US).

Glossogyne tenuifolia (Lessing) Cassini

Scattered on open lava slopes, and open areas of cinder sand, reaching 500 m elevation on Asuncion.

A widely distributed Indo-Pacific savanna species.

Asuncion: Southwestern slope, 1500 ft [460 m], *Falanruw* 2297 (US); 1000 ft [300 m], 2306 (US).

Agrigan: *Hosokawa* 8006 (A).

Pagan: *Hosokawa* 7956 (Fo); *Kanehira* 2212 (P, NY, FU); east of Fresh Water Lake, *Fosberg* 31404

(US, BISH, NY, L); Mt. Pagan, 1870 ft [570 m], *Moore 374* (US).

Guguan: 200–300 ft [60–90 m], *Falanruw 1831* (US, BISH).

**Pseudelephantopus spicatus* (Aublet) Gleason

Occasional in weedy places.

A pantropical weed.

Agrigan: Trail around south side of island, 10–20 m, *Fosberg 31595* (US); southwest coast, below 300 ft [90 m], *Falanruw 2165* (US).

**Synedrella nodiflora* (L.) Gaertner

Around villages, along trails and on open slopes, weedy.

Pantropical, of tropical American origin.

Agrigan: Village, *Fosberg 31434* (US).

Pagan: *Kanehira 2215* (NY, FU).

Alamagan: Asongsong village, 3–15 m, *Fosberg 31749* (US).

Sarigan: Northwest coast, 150 ft [45 m], *Falanruw 1721* (US); 200 ft [60 m], *Falanruw 1768* (US); near village, 10–100 m, *Evans 2363* (US).

**Vernonia cinerea* (L.) Lessing

Common small weed in villages, gardens, and open and semishaded areas generally.

Pantropical.

Maug: South central East Island, 100 ft [30 m], *Falanruw 2249* (US).

Asuncion: Southwestern slope, 250 ft [75 m], *Falanruw 2270* (US).

Agrigan: Village, *Fosberg 31430* (US, BISH); southwestern coast, below 300 ft [90 m], *Falanruw 2161* (US).

Pagan: Isthmus, *Anderson 569* (US, BISH, NY, L); Mt. Pagan, *Moore 380* (US); Fresh Water Lake, *Fosberg 31400* (US).

Alamagan: Partido village, *Fosberg 31649* (US); south southwest coast, sea level to 200 ft [60 m], *Falanruw 1949* (US); 450 ft [140 m], *Falanruw 1896* (US).

Sarigan: Near anchorage, 100 ft [30 m], *Falanruw 1718* (US); near village, 10–100 m, *Evans 2362* (US, BISH, Fo, NY).

Anatahan: *Hosokawa 7856*; northwest corner of island, 300 ft [90 m], *Falanruw 1623* (US).

Wedelia biflora var. *canescens* (Gaudichaud)

Fosberg

Common extensively semi-creeping shrub or coarse herb on rocks and volcanic material, mostly near seacoast.

Indo-Pacific.

Maug: South central East Island, 50 ft [15 m], *Falanruw 2247* (US).

Agrigan: *Fosberg 31613* (US, BISH, NY, L); southwest coast below 300 ft [90 m], *Falanruw 2170* (US).

Pagan: Landing, *Fosberg 31418* (US, BISH); isthmus, *Anderson 551* (US, BISH, NY); south of pier, *Anderson 588* (US, BISH, NY, L); Laguna, *Villagomez JV-04* (US); Talague beach, *Moore 345* (US).

Alamagan: Asongsong village, 3–15 m, *Fosberg 31708* (US, BISH, Fo).

Guguan: 200–225 ft [60–70 m], *Falanruw 1823* (US).

Sarigan: *Kanehira 2165* (FU); northwest coast, sea level to 75 ft [20 m], *Falanruw 1791* (US, BISH); above village 150–250 m, *Evans 2395* (US, BISH, Fo, NY).

Anatahan: Beach area, sea level, *Falanruw 1659* (US); northwest tip of island, 0–10 m, *Evans 2446* (US, BISH, Fo, NY).

Medinilla: Swedberg, ms 1974.

**Zinnia elegans* Jacquin

Planted ornamental in village.

Cosmopolitan in cultivation, of tropical American origin.

Agrigan: Village, *Fosberg 31560* (US).

References

Beechey, F. W.

1831. *Narrative of a Voyage to the Pacific and Beering's Strait* . . . 2 volumes. London.

Corner, E. J. H.

1965. Check-list of *Ficus* in Asia and Australasia with Keys to Identification. *Gardens' Bulletin* (Singapore), 21:1–86.

Corte, F. de la

1926. Memoirs of Don Felipe de la Corte's Eleven Years as Governor of Guam 1855–1866. *Guam Recorder*, 3:96–98, 108–109, 126–127, 138–140, 158–160, 170–174, 214–216, 226–229, 242–244, 254–257.

1927. Memoirs of Don Felipe de la Corte's Eleven Years as Governor of Guam 1855–1866. *Guam Recorder*,

- 3:270-271, 282-283, 298-299, 310-313, 328-331, 344-348.
- Corwin, G., L. D. Bonham, M. J. Terman, and G. W. Viele
1957. *Military Geology of Pagan, Mariana Islands*. 250 pages. Intelligence Division, Office of the Engineer, Headquarters, United States Army, [Tokyo], Japan.
- Diels, L.
1924. Beiträge zur Flora von Mikronesien und Polynesien, III. *Botanische Jahrbücher*, 59:1-29.
- Fosberg, F. R.
1958. Vascular Flora of Pagan Island, Northern Marianas. *Pacific Science*, 12:17-20.
1960. The Vegetation of Micronesia, 1: General Descriptions, the Vegetation of the Marianas Islands, and a Detailed Consideration of the Vegetation of Guam. *Bulletin of the American Museum of Natural History*, 119:1-75.
- Fosberg, F. R., and G. Corwin
1958. A Fossil Flora from Pagan, Mariana Islands. *Pacific Science*, 12:3-16.
- Fosberg, F. R., and M.-H. Sachet
1975. Flora of Micronesia, 1: Gymnospermae. *Smithsonian Contributions to Botany*, 20:1-15.
- Fritz, G.
1902. Reise nach den nördlichen Marianen. *Mittheilungen aus den deutschen Schutzgebieten der Südsee*, 15: 96-118.
- Gaudichaud, C.
1826. Botanique. In M. Louis de Freycinet, *Voyage autour du monde, entrepris par ordre du roi . . . exécuté sur les corvettes de S. M. l'Uranie et la Physicienne pendant les années 1817, 1818, 1819, 1820*. 522 pages. Paris.
- Hatusima, S.
1936. Materials for a Flora of Micronesia, Rubiaceae I: Hedyotideae. *Transactions of the Natural History Society of Formosa*, 26:217-226.
- Hosokawa, T.
1934. Preliminary Account of the Vegetation of the Marianne Islands Group. *Bulletin of the Biogeographical Society of Japan*, 5:124-172.
1935a. Materials of the Botanical Research towards the Flora of Micronesia. *Transactions of the Natural History Society of Formosa*, 25: (III) 17-39, (IV) 117-128, (V) 242-247, (VI) 261-269, (VII) 434-443.
1935b. An Enumeration of Gramineae Hitherto Known from Micronesia under the Japanese Mandate. *Journal of the Society of Tropical Agriculture of Taihoku University*, 7:305-325.
1936. Materials of the Botanical Research towards the Flora of Micronesia. *Transactions of the Natural History Society of Formosa*, 26: (VIII) 44-51, (X) 67-79, (XI) 115-126, (XII) 227-235, (XIII) 244-248.
1937. Materials of the Botanical Research towards the Flora of Micronesia. *Journal of Japanese Botany*, 13: (XIV) 191-203, (XV) 274-284, (XVI) 603-617.
1940. Materials of the Botanical Research towards the Flora of Micronesia. *Journal of Japanese Botany*, 16: (XIX) 535-545.
1942. Materials of the Botanical Research towards the Flora of Micronesia. *Transactions of the Natural History Society of Formosa*, 32: (XXIII) 5-30, (XXIV) 101-105, (XXV) 283-288.
1943. Materials of the Botanical Research towards the Flora of Micronesia. *Acta phytotaxonomica et geobotanica*, 13: (XXVI) 163-171.
- Kanehira, R.
1934. [A Botanical Excursion to the Northern Marianas Islands.] *Botany and Zoology* [Shokubutsu oyobi Dôbutsu], 2:913-922.
1935a. An Enumeration of Micronesian Plants. *Journal of the Department of Agriculture, Kyushu University*, 4:237-464.
1935b. Plantae novae Micronesicae. *Transactions of the Natural History Society of Formosa*, 25:1-10.
1938. New or Noteworthy Trees from Micronesia (XX). *The Botanical Magazine* (Tokyo), 52:235-241.
- Koyama, T.
1964. The Cyperaceae of Micronesia. *Micronesica*, 1(1): 59-112.
- Kramer, K. U.
1970. The Lindsaeoid Ferns of the Old World, V: The Smaller Pacific Islands. *Blumea*, 18:157-194.
- La Pérouse, J. F. de
1797. *Voyage de La Pérouse autour du monde . . .* 4 volumes. Paris.
- Lehne, P. H., and C. Gäbler.
1972. *Über die Marianen*. 47 pages. West Germany: Wohldorf.
- Marche, A.
1891. Rapport général sur une mission aux îles Mariannes. *Nouvelles Archives des Missions Scientifiques et Littéraires*, 1:241-280.
- Ohwi, J.
1941. Grasses of Micronesia. *Botanical Magazine* (Tokyo), 55:537-552.
- Sachet, M.-H., and F. R. Fosberg
1955. *Island Bibliographies*. 577 pages. Washington, D.C.
1971. *Island Bibliographies Supplement*, 427 pages, Washington, D.C.
- Stone, B. C.
1971. The Flora of Guam. *Micronesica*, 6:1-659. [Actual date of issue is 1971, although each page is imprinted 1970.]
- Swedberg, L.
1974. [Excerpt of Natural History section of Draft Environmental Impact Statement on Use of Farallon de Medinilla as a Bombing Range.] Manuscript (2 pages) in files of F. R. Fosberg, Department of Botany, National Museum of Natural History, Smithsonian Institution, Washington, D.C.
- Wagner, W. H., Jr.
1948. A New Fern from Rota, Marianas Islands, *Pacific Science*, 2:214-215.
- Wagner, W. H., Jr., and D. H. Grether
1948. Pteridophytes of Guam. *Occasional Papers of the Bernice P. Bishop Museum*, 19:25-99.
- Yuncker, T. G.
1959. Piperaceae of Micronesia. *Occasional Papers of the Bernice P. Bishop Museum*, 22:83-108.

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