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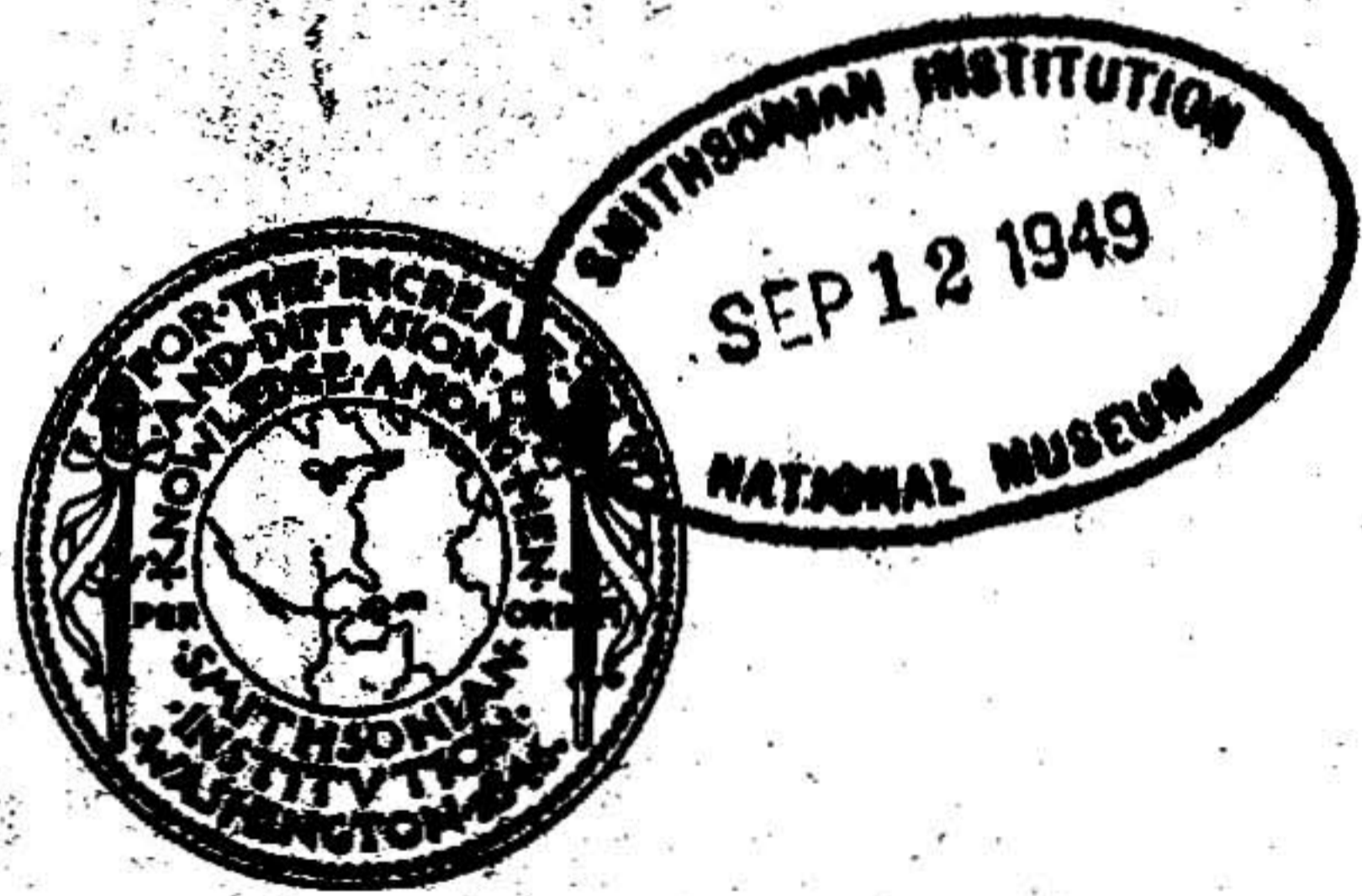
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**CONTRIBUTIONS
FROM THE
UNITED STATES NATIONAL HERBARIUM**

VOLUME 30, PART 3

**ADDITIONAL PHANEROGAMS IN THE
FLORA OF GUAM, WITH NOTES ON
UNVERIFIED RECORDS**

By EGBERT H. WALKER and ROBERT RODIN



**SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM
WASHINGTON, D. C.**

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ADDITIONAL PHANEROGAMS IN THE FLORA OF GUAM, WITH NOTES ON UNVERIFIED RECORDS

BY EGBERT H. WALKER and ROBERT RODIN

INTRODUCTION

THE principal additions to the flora of Guam here recorded are based on collections made by members of the United States armed forces stationed there during World War II. The first set of all the servicemen's specimens here cited is deposited in the United States National Herbarium, except those collected by the junior author, of which the first set is in the herbarium of the University of California. Duplicate sets have been distributed to various institutions. A few records based on other than servicemen's collections are added here for the sake of completeness. The pteridophytes from the servicemen's collections are fully treated by W. H. Wagner and D. F. Grether (11).

No complete collection of the plants of Guam has ever been made, although many botanists from Thaddeus Haenke and Luis Née in 1792 to the present day have collected there. These collections are deposited in widely scattered herbaria, but probably the U. S. National Herbarium has about as good a representation of this island's flora as exists today in one place. This is largely due to the wisdom and foresight of Dr. E. D. Merrill, who, as director of the Bureau of Science in Manila, sent here duplicate sets of the Guam specimens which were received by him for determination from various collectors in the early part of the century. The earlier collections made before about 1900, however, are not represented here.

Every collection made in Guam has added records of additional species. W. E. Safford in his monumental work "The Useful Plants of the Island of Guam," published in 1905 (10), brought together his extensive and intensive economic and botanical knowledge of the island's plants and the previous records of species collected there. In 1914, E. D. Merrill published "An Enumeration of the Plants of Guam" (6), bringing the records together in a systematic manner and citing the specimens upon which they are based, most of which he had determined in Manila. He included all published records and commented on their basis and validity. This enumeration, along with his list of additions published in 1919 (7), has provided the most complete knowledge of the species occurring there. Safford's work has provided information concerning the plants themselves.

In 1933, the Japanese botanist Prof. R. Kanehira issued in Japanese an illustrated "Flora Micronesica" (4), and in 1935 there appeared in English his "An Enumeration of Micronesian Plants" (5). Both contain references to Guam, but careful examination reveals that these are based largely, if not exclusively, on Merrill's enumeration. They furnish some adjustments of nomenclature and suggest that many species, recorded as occurring in the formerly Japanese mandated islands, may occur also in Guam, at least in the as yet botanically unexplored parts of the islands.

E. H. Bryan, of the Bernice P. Bishop Museum in Honolulu, instituted in 1936 a continued series in the Guam Recorder (2) on the plants of this island intended for local use and inspiration. It was based on his observations and collections there. The war interrupted this series after consideration of the Icacinaceae. Additional references to the literature on Guam plants may be found in the recent Pacific botanical bibliography by E. D. Merrill (8) and the index to it by E. H. Walker in the same issue of the Contributions from the United States National Herbarium (12).

Among the servicemen stationed in Guam after its recapture were a few professional and amateur botanists. One or two were officially detailed to collect plant specimens in connection with military developments and sanitary control work, but most of them collected in order to while away idle hours, to satisfy a burning curiosity, to accumulate material in connection with hoped-for future academic studies, or to supply institutions back home that wanted such collections. So extensive did biological collecting become on Guam that there was organized a Guam Natural History Society, which held a number of meetings. With this stimulus, enthusiasts sometimes collected in groups. These joint enterprises are reflected in the occurrence in this paper of citations of the same species collected by different men on the same day and in the same locality. As a result of the senior author's encouragement and assistance to some of these and other servicemen collectors,¹ the U. S. National Herbarium under the Smithsonian Institution received several collections of plant specimens from Guam for determination and deposit. These form the foundation for the present paper.

The junior author was stationed on Guam during 1944 and 1945 and made over 300 collections with the expectation of using them in postwar academic studies. The additions to the known flora of Guam represented in his collection are included in this list rather than published separately, in order to consolidate the material needed by future botanists.

¹ For an account of this work see E. H. Walker, *Biological collecting during World War II*. *Scientific Monthly* 63: 333-340. 1946.

In 1946 Dr. F. R. Fosberg, frequently accompanied by E. Y. Hosaka of Hawaii, collected extensively throughout the Micronesian islands in which the United States has recently acquired new responsibilities. His collection is the largest so far made in that area and was deposited in the Smithsonian Institution by the U. S. Commercial Company, which employed Dr. Fosberg as botanist along with other scientists in their extensive survey of the resources of these islands. This survey was made preparatory to the formulation of a wise plan for the development and utilization of these resources. This collection contains much material from Guam, but it has not as yet been fully identified and is not included in this report.

When Merrill prepared his "Enumeration of the Plants of Guam," he was in Manila and unable to substantiate all the records included by Safford in his "Useful Plants of the Island of Guam." Some of Safford's records are based on his collections or those of other current collectors, others apparently on his own notes and observations, and still others on the published reports of the earlier explorers of the Pacific, which he had carefully combed for references to Guam plants. Many of these reports had not been verified at the time of Merrill's work in 1914 by additional collections, or else they were based on wrong determinations or erroneous locality data. Most of these earlier collections are deposited in European herbaria. Some of these early records have been verified since Merrill's work by having been re-collected, and the species concerned are now represented in American herbaria. Others still remain unverified, at least so far as specimens and records were available for examination by the present authors after a reasonable search. The lack of scientific material of the cultivated plants of Guam, which comprise the majority of these unverified species, is due to the assumption by collectors that garden plants are thoroughly known and need not be collected. This omission has been decried by the well-known horticulturist L. H. Bailey in his *Gentes Herbarum* 2: 159-163. 1930.

The species reported to occur in Guam without any known material to substantiate the report are:

- Ruppia maritima* L. (Potamogetonaceae)
- Cymbopogon citratus* (DC.) Stapf (Gramineae)
- Eragrostis pilosa* (L.) Beauv. (Gramineae)
- Arenga gamuto* (Houtt.) Merr. (Palmae)
- Ananas comosus* (L.) Merr. (Bromeliaceae), pineapple
- Cyanotis cristata* (L.) D. Don (Commelinaceae)
- Allium cepa* L. (Liliaceae), onion
- Allium sativum* L. (Liliaceae), garlic
- Sansevieria roxburghiana* Schultes (Liliaceae)
- Listed by Merrill as *S. zeylanica* (L.) Willd.
- Polianthes tuberosus* L. (Amaryllidaceae)
- Zephyranthes rosea* (Spreng.) Lindl. (Amaryllidaceae)

- Musa cavendishii* Lamb. (Musaceae)
Musa paradisiaca L. (Musaceae)
Musa textilis Nees (Musaceae)
Zingiber officinale Rosc. (Zingiberaceae)
Aristolochia elegans Mast. (Aristolochiaceae)
Canavalia ensiformis (L.) DC. (Leguminosae), sword bean
Cassia mimosoides L. (Leguminosae)
Indigofera tinctoria L. (Leguminosae)
Mucuna pruricens (L.) DC. (Leguminosae), cowhage; cowitch
Tribulus cistoides L. (Zygophyllaceae)
Canarium indicum Stickm. (Burseraceae)
 Probably this is wrongly identified. Merrill suggests it may be *C. ovatum* Engl. The native name is *brea blanca*.
Cardiospermum halicacabum L. (Sapindaceae)
Grewia multiflora Juss. (Tiliaceae)
 Probably a misidentification by Safford (cf. Merrill, 6, p. 110).
Triumfetta tomentosa Boj. (Tiliaceae)
Eugenia malaccensis L. (Myrtaceae)
 Merrill suggests this is a misdetermination of *E. javanica* Lam.
Polyscias scutellaria (Burm. f.) Fosb. (Araliaceae)
 Listed by Merrill as *Nothopanax cochleatum* (Lam.) Miq.
Polyscias fruticosa (L.) Forst. (Araliaceae)
 Listed by Merrill as *Nothopanax fruticosum* (L.) Merr.
Foeniculum vulgare Gaertn. (Umbelliferae)
Jasminum sambac (L.) Ait. (Oleaceae)
Operculina peltata (L.) Hallier f. (Convolvulaceae)
Heliotropium curassavicum L. (Boraginaceae)
Mentha arvensis L. (Labiatae)
Capsicum annum L. (varieties) Solanaceae)
Sesamum orientale L. (Pedaliaceae)
Mussaenda frondosa L. (Rubiaceae)

ADDITIONS, CORRECTIONS, AND NOW VERIFIED SPECIES

GRAMINEAE

FESTUCEAE

Arundo donax L. Sp. Pl. 81. 1753.

First described from Spain.

Collected in an inland slough near Pago Bay, *D. H. Johnson* D-38, August 27, 1945.

Eragrostis amabilis (L.) Wight & Arn. in Nees in Hook. & Arn. Bot. Beechey Voy. 251. 1838.

Poa amabilis L. Sp. Pl. 68. 1753.

First described from India.

A commonly found grass represented by *Knox* 860, October 18, 1945, without locality. *McGregor* 373 and 434 and *Thompson* 10, cited by Merrill as *E. tenella* (L.) Roem. & Schult., may be referred here; also *Safford & Seale* 1074, collected near Agana, May 25, 1900. *Bryan* (2 [2-May]: 36. 1937) discusses this grass.

Sporobolus elongatus R. Br. Prodr. Fl. Nov. Holl. 170. 1810.

First described from Australia.

Collected on Pati Point, *Necker* 401, September 19, 1945, and without locality by Knox on October 18, 1945.

Hosokawa² lists this species as occurring in Guam, but he cites no specimens.

PANICEAE

Brachiaria subquadripara (Trin.) Hitchc. Lingnan Sci. Journ. 7: 214. 1931.
Panicum subquadriparum Trin. Gram. Pan. 145. 1826.

First described from the Marianas Islands.

Collected in an old field, one-half mile west of Agana Heights, elevation about 300 feet, *Moore* 256, January 24, 1946.

The original description cites collections from the Marianas Islands and the East Indies and mentions collections by Eschholz and Chamisso. Trinius³ drew his illustration from a Guam specimen. This species is not mentioned by Safford or by Merrill.

Cenchrus brownii Roem. & Schult. Syst. Veg. 2: 258. 1817.

Cenchrus viridis Spreng. Syst. Veg. 1: 301. 1825.

First described from the West Indies.

Represented by *Knox* 854 and 856, collected on October 18, 1945.

Bryan (2 [3—June]: 20. 1937) notes *Cenchrus viridis* Spreng. as recorded from Guam.

Digitaria gaudichaudii (Kunth) Henr. Med. Rijks Herb. Leiden 61: 18. 1930.

Panicum gaudichaudii Kunth, Rev. Gram. 385. pl. 106. 1830, based on *Digitaria stricta* Gaudich., 1826, not Roem. & Schult., 1817.

First described from Rota Island in the Marianas Islands.

Collected in a fresh-water marsh at Inarajan on the east coast, *Moore* 353, March 20, 1946.

Merrill (6, p. 54) referred *Safford* 346 to this species, under the name *Panicum gaudichaudii* Kunth, but placed that name as a synonym of *D. stricta* Gaudich., a name that he recognized as untenable. However, because of uncertainties, he did not change the name. Safford's specimen cannot be relocated for verification. Hosokawa⁴ lists this as *Syntherisma stricta* (Gaud.) Hosokawa.

Digitaria microbachne (Presl) Henr. Med. Rijks Herb. Leiden 61: 13. 1930.

Panicum microbachne Presl, Rel. Haenk. 1: 298. 1830.

First described without mention of type locality.

Collected near the beach on Facpi Point, *Necker* 411a, September 18, 1945.

² Journ. Soc. Trop. Agr. 7: 320. 1935.

³ Icon. Pl. 2: pl. 186. 1829.

⁴ Journ. Soc. Trop. Agr. 7: 315. 1935.

Digitaria pruriens (Fisch.) Buse, in Miquel, Pl. Jungh. 379. 1854.

Panicum pruriens Fisch. ex Trin. Gram. Pan. 77. 1826.

First described from the Hawaiian Islands.

Collected at Lasaga, elevation 200 feet, *J. Guerrero* 4, ex parte, November 8, 1918 (determined by John Reeder).

Digitaria radicata (Presl) Miquel, Fl. Ind. Bat. 3: 437. 1855.

Panicum radicosum Presl, Rel. Haenk. 1: 297. 1830.

First described from Luzon.

Collected at Lasaga, elevation 195 feet, *J. Guerrero* 4, ex parte, November 8, 1918 (determined by John Reeder).

Isachne pulchella Roth in Roem. & Schult. Syst. Veg. 2: 476. 1817.

First described from the East Indies.

Collected at a spring in Mount Lamlam area, elevation 1,000 feet, *Moore* 227, January 20, 1946.

Paspalum orbiculare Forst. Fl. Ins. Austr. Prodr. 7. 1786.

First described from the Society Islands.

Collected at the edge of a small pot hole one-half mile northeast of Mount Tenjo, elevation 900 feet, *Moore* 303, February 22, 1946.

This species is mentioned by Bryan (2 [3—June]: 20. 1937) as a roadside weed at Atantano and on the Mount Santa Rosa savanna.

Pennisetum purpureum Schmach. Beskr. Guin. Pl. 64. 1827.

First described from Guinea, West Africa.

Collected in the open on Ritidian Point, *Rodin* 725B, October 21, 1945.

Bryan (2 [3—June]: 20. 1937) refers to this as an introduction by the Guam Experiment Station.

Pennisetum setosum (Swartz) L. Rich. in Pers. Syn. 1: 72. 1805.

Cenchrus setosus Swartz, Prodr. Veg. Ind. Occ. 26. 1788.

First described from the West Indies.

Collected on Ritidian Point, where it is common, *Rodin* 725A, October 21, 1945.

Bryan (2 [3—June]: 20. 1937) refers to this as an introduction in 1920 from the United States.

Setaria pallidifusca (Schumach.) Stapf & Hubb. Kew. Bull. 1930: 259. 1930.

Panicum pallide-fuscum Schumach. Beskr. Guin. Pl. 78. 1827.

Setaria flava (Nees) Kunth, misapplied by Merrill, Philippine Journ. Sci. 9. Bot.: 56. 1914.

First described from Guinea, Africa.

Collected in open grassland on Mount Tenjo, elevation 900 feet, *Moore* 320, February 22 1947; near Facpi Point on approach to Mount

Lamlam, elevation 900 feet, *Necker* 408, September 27, 1945; and on open slopes of Mount Tenjo, *Rodin* 543, December 17, 1944. Other collections are *Moore* 378, *McGregor* 383, and Guam Experiment Station 15 and 61, (see Merrill, 6).

ANDROPOGONEAE

Andropogon caricosus L. Sp. Pl. ed. 2. 1480. 1763.

First described from India.

Collected in an open grassy field 1 mile southeast of the village of Agat, elevation about 45 feet, *Moore* 250, January 27, 1947.

Chrysopogon aciculatus (Retz.) Trin. Fund. Agrost. 188. 1820.

Andropogon aciculatus Retz. Obs. Bot. 5: 22. 1789.

Raphis aciculata Desv. Opusc. 69. 1831.

First described from the East Indies; now widely distributed in the tropics.

Collected on the Ylig-Sigua ridge, a common grass on this savanna, *Rodin* 629, September 23, 1945. Merrill cites *McGregor* 421, *Clemens* s. n. and Guam Experiment Station 212.

This species is listed by Safford (10, p. 183) and Merrill (6, p. 53) as *Andropogon aciculatus*; however, *Chrysopogon* is currently included in the list of *nomina generica conservanda*.

Polytrias praemorsa (Nees) Hack. in DC. Monogr. Phan. 6: 189. 1889.

Pollinia praemorsa Nees, Journ. Bot. Kew Misc. 2: 98. 1850.

First described from Java.

Collected in an old camp site one-half mile west of Agana, *Moore* 287, February 13, 1946.

CYPERACEAE

Cyperus cyperoides (L.) Kuntze, Rev. Gen. Pl. 3²: 333. 1898.

Scirpus cyperoides L. Mant. Pl. 2: 181. 1771.

First described from eastern India.

Collected in old fields and grass flats in well-drained areas 1 mile east of Barrigada, *Moore* 13 and 20, November 17, 1945, and 2 miles southwest of Agana, *Moore* 109, September 18, 1945.

Cyperus iria L. Sp. Pl. 45. 1753.

First described from India.

Collected in a slough 1¼ miles north of Agat, *Necker* 68, August 24, 1945.

- Cyperus javanicus* Houtt. Nat. Hist. II. 13: Aanwyz. Plaat. [1], pl. 88. f. 1. 1782.
Cyperus pennatus Lam. Tabl. Encycl. 1: 144. 1791.
Mariscus stuppeus (Forst. f.) Merr. Philippine Journ. Sci. 3. Bot.: 398. 1908;
 9. Bot.: 62. 1914.

First described from Java and now occurring throughout Indo-Malayan, Polynesian, and Micronesian regions.

Collected in a slough 1¼ miles north of Agat, *Necker* 65, August 24, 1945, and 300 feet from the shore of Ajayan Bay, *Necker* 174, August 27, 1945; along the seashore, *McGregor* 371.

This species was referred to by Safford (10, p. 254) and Bryan (2 [4—July]: 23. 1937) as *C. pennatus*, and by Merrill (6, p. 62) as *Mariscus stuppeus*. For a discussion of the binomial *Cyperus javanicus* Houtt. see Merrill's remarks⁵ in 1938.

- Eleocharis dulcis* (Burm. f.) Trin. ex Henschel, Vita Rumph. 186. 1933.
Cyperus dulcis Rumph. Herb. Amboin. 6: 7, pl. 3, f. 1. 1750.

It is not known where the first collection was made, but this species is widely distributed in the Old World Tropics today as a commonly cultivated plant.

In marshes, *McGregor* 469; in highland swamp north of Talofofu River, *Rodin* 689, September 31, 1945.

In Safford's (10, p. 267) and Merrill's (6, p. 60) works this species is referred to as *Eleocharis plantaginoidea* (Rottb.) W. F. Wight. Svenson recognizes *E. dulcis* (Burm. f.) Trin. as the correct name in his revision of the genus.⁶

- Eleocharis geniculata* (L.) Roem. & Schult. Syst. Veg. 2: 150. 1817.
Scirpus geniculatus L. Sp. Pl. 48. 1753, p. p.

First described from Jamaica.

This has been collected in fairly moist soil where other vegetation is suppressed on the beach near Piti village, *Moore* 126, November 10, 1945; in an upland swamp between the Ylig and Talofofu Rivers, elevation 270 to 360 feet, *Steere* 65, September 30, 1945; in highland swamp above Talofofu River, *Rodin* 693, September 31, 1945; on Ylig-Sigua ridge in swampy area, *Rodin* 665, September 23, 1945; and near mouth of Ylig River, *Rodin* 766, November 12, 1945. Earlier collections cited by Merrill are *McGregor* 393 and Guam Experiment Station 74 and 102.

Svenson⁷ has recently revised the nomenclature of this species, which Safford (10, p. 267) and Merrill (6, p. 60) listed as *E. capitata* (L.) R. Br.

⁵ Journ. Arn. Arb. 19: 321. 1938.

⁶ Rhodora 31: 158. 1929.

⁷ Rhodora 41: 51. 1939.

Fimbristylis cymosa R. Br. Prodr. Fl. Nov. Holl. 228. 1810.

First described from the vicinity of the Endeavour River, Australia, now found throughout Polynesia.

Collected near the cliff on Pati Point, elevation about 480 feet, *Markley & Necker* 359, September 25, 1945, and on the beach east of Barrigada, *Steere* 133, 138, and 142. These may represent a variety of this species.

Fimbristylis cymosa R. Br. var. *umbellato-capitata* (Mann.) Hillebr. Fl. Hawaiian Is. 478. 1888, vel aff.

First described from Hawaii.

Collected along the roadside 3 miles northeast of Aganda Heights, elevation about 270 feet, *Moore* 398a, April 4, 1946, and in the Pati Point area, *Necker* 168, 319, and 369, September 1945.

Kükenthal has referred *F. spathacea* Roth. as misapplied by Merrill (6, p. 61) to this variety. Bryan (2 [5—Aug.]: 22. 1937) considered *F. spathacea* Roth. as a synonym of *F. glomerata* (Retz.) Nees.

PALMAE

Heterospathe elata Scheff. Ann. Jard. Bot. Buitenzorg 1: 162. 1876. PLATE 8

First collected in Amboina.

One tree about 25 feet high with fruit, along an old road between Yona village and the Ylig River, *Rodin* 737, October 28, 1945. This is the first material of this palm that can be definitely identified from Guam. Merrill (6, p. 64) cites Guam Experiment Station 129 and 345 as probably being this species, but the material was too fragmentary to make a definite identification possible.

COMMELINACEAE

Commelina benghalensis L. Sp. Pl. 41. 1753.

First described from Bengal, India, and now common in the Old World Tropics.

Collected at the edge of a flat coconut grove where underbrush has been removed, 1 mile south of Barrigada, *Moore* 36, November 25, 1945. Merrill included this species in his list on the authority of Safford's statement. It is discussed also by Bryan (2 [8—Oct.]: 22. 1937).

PHILYDRACEAE

Philydrum lanuginosum Banks, ex Gaertn. Fruct. & Sem. 1: 62. pl. 16. 1788.

First described from Australia.

Collected in 4–6 inches of water in an upland swamp between Ylig and Talofofu Rivers (*Steere*) or Talofofu Basin (*Rodin*), elevation about 300 feet, *Rodin* 673 and *Steere* 67, both on September 30, 1945.

AMARYLLIDACEAE

Curculigo orchioides Gaertn. Fruct. & Sem. 1: 63. pl. 13. 1788.

First described from Australia, now found in India and Malaysia.

Collected in open exposed grasslands on hilltop, Mount Tenjo, elevation 750 to 900 feet, *Moore* 213, January 5, 1946, *Necker* 81, August 10, 1945; east of Agat, *Necker* 121, August 28, 1945; Facpi Point on approach to Mount Lamlam, elevation about 300 feet, *Necker* 383, September 27, 1945; and on red volcanic soil on a hillside, elevation about 360 feet, *Steere* 31, September 23, 1945. Merrill included this in his enumeration, assuming that Safford's reference to *Hypoxis aurea* Lour. indicated this species. *Safford & Seale* 1097 in the U. S. National Herbarium, from savanna on Mount Macajna, near Agana, collected June 4, 1900, with Safford's determination as *Hypoxis aurea*, clearly represents this species. Bryan (*?* [10—Jan.]: 14. 1938) refers to this as growing "commonly in clearings of sword-grass [*Miscanthus floridulus*] on the savannas, such as south of Agana."

ORCHIDACEAE

Dendrobium philippinense Ames, Philippine Journ. Sci. 8. Bot.: 424. 1913.

First described from Leyte, Philippine Islands.

Collected on breadfruit trees [*Artocarpus altilis* (Parkins.) Fosb.] 20 feet above the ground, on the east coast 2 miles east of Yigo, *Moore* 271, February 3, 1946. This specimen was determined by C. Schweinfurth, who designated it a new record outside of the Philippine Islands, with the flowers larger than usual.

Nervilia aragoana Gaudich. Bot. Freyc. Voy. 422. pl. 35. 1826.

Safford (*10*, p. 331) describes this species rather extensively, and Merrill (*6*, p. 70) refers only to the type collected by Gaudichaud. Several collectors of the United States armed forces collected apparent representatives of this species. *Moore* 389 is a fruiting specimen without leaves from the "ground in dense moist rich woods, one-half mile south of Mount Santa Rosa, March 24, 1946." *Rodin* 636 and *Steere* 34 each consists of a tuberous root with a single erect leaf, collected on a moist stream bank in dense shade in Ylig Valley at 200 feet elevation on September 23, 1945; *Rodin* 666 is a similar specimen, collected in Sigua River canyon the same day. All these specimens have been examined by C. Schweinfurth. A leafless specimen, *Moore* 389, was originally determined by Mr. Schweinfurth as "*Didymoplexis* sp.?"; the sterile specimens as *Nervilia* sp. He has subsequently concurred in the senior author's surmise that these represent different stages in the life cycle of the same species. Apparently the

fruiting stems wither before the leaves mature, so that the association of flowering and leaf-bearing material through erratic field collecting is unlikely to occur.

Phreatia samoensis (Kränzl.) Schlechter, Repert. Sp. Nov. Fedde 3: 320. 1907.
Thelasis samoensis Kränzl. Bot. Jahrb. Engler 25: 607. 1898.

First described from Upolu, Samoan Islands.

Found on a breadfruit tree on Mount Lamlam, elevation 900 feet, Moore 262, January 20, 1946, determined by C. Schweinfurth.

ULMACEAE

Trema orientalis var. *viridis* Lauterb. Bot. Jahrb. Engler 50: 321. 1913.

First described from Malaysia and the Philippine Islands.

A shrub collected at the edge of a woods 1 mile east of Mount Tenjo, Moore 299, February 22, 1946. This determination is based on Hosokawa's treatment⁸ of 1935.

URTICACEAE

Pilea microphylla (L.) Liebm. Vidensk. Selsk. Skr. V. 2: 302. 1851.

Parietaria microphylla L. Syst. ed. 10. 2: 1308. 1759.

First described from Jamaica, now found in most tropical countries.

Collected on rock ledges and cliffs, Mount Tenjo, elevation 900 feet, Moore 221, January 5, 1946; Ritidian Point, Necker 372, October 8, 1945, and Rodin 727, October 21, 1945; and in dense shade along a path to the beach east of Barrigada, Steere 137, October 27, 1945. Bryan (2 [10—Jan.]: 47. 1939) mentions this as a "native of tropical America, now introduced into various tropical countries, both cultivated and escaped to moist walls and similar places."

PAPAVERACEAE

Argemone mexicana L. Sp. Pl. 508. 1753.

First described from Mexico, Jamaica, and the Caribbean, and now found in the Tropics in cultivation and escaped from cultivation.

Collected along the roadside one-fourth mile east of Agana, Moore 215, February 15, 1946.

LEGUMINOSAE

Alysicarpus vaginalis (L.) DC. Prodr. 2: 353. 1825.

Hedysarum vaginale L. Sp. Pl. 746. 1753.

First described from India and now widely distributed in Asia and Malaysia.

⁸ Trans. Nat. Hist. Soc. Formosa 25: 242. 1935.

A suberect plant 4 feet high, in an old field near Piti village, *Moore* 179, November 10, 1945.

Caesalpinia crista L. Sp. Pl. 380. 1753.

First collected in Ceylon.

A climbing vine in a forest on the southern tributary of the Talofofa River, *Rodin* 681, September 31, 1945. Neither Safford nor Merrill cited specimens, although both included the species (*10*, p. 288, *pl.* 51; *6*, p. 88).

Erythrina variegata var. *orientalis* (L.) Merr. Interpret. Herb. Amb. 276. 1917.

Erythrina corallodendron var. *orientalis* L. Sp. Pl. 706. 1753.

Erythrina indica Lam. Encycl. 2: 391. 1785.

First described from India and now found widely in cultivation in the tropics and especially along seashores.

A medium sized tree with red flowers collected at edge of woods at Asan, *Moore* 246, January 22, 1946. Described by Bryan (*2* [3-June]: 110. 1940). Safford (*10*, p. 269) and Merrill (*6*, p. 92) listed this species as *E. indica* Lam.

Moghania strobilifera (L.) J. St. Hil. ex Jacks. Ind. Kew. 2: 252. 1894.

Hedysarum strobiliferum L. Sp. Pl. 746. 1753.

Flemingia strobilifera (L.) R. Br. in Alt. f. Hort. Kew. ed. 2. 4: 350. 1812.

First described from India and now found widespread in Asia and Malaysia and introduced into Mauritius and the West Indies.

A common low shrub, 2 to 3 feet high, in open sunny glade on bank of Agana River 2 miles southeast of Agana, *Wagner & Conover* 567, February 27, 1945; near Yona, *Rodin* 567, February 13, 1945. Bryan (*2* [1-Apr.]: 23. 1940) refers to this as "noticed principally near Agana Spring."

Mimosa pudica L. Sp. Pl. 518. 1753.

First described from Brazil and now found as a weed in practically all warm countries.

Collected in an eroded place without accompanying vegetation near Agana, elevation 300 feet, *Moore* 116, September 6, 1945; about one-fourth mile south of Anigua at same elevation, *Moore* 270, February 2, 1946; and 1¼ miles south of Piti, *Necker* 189, September 8, 1945.

Pongamia pinnata (L.) Merr. Interpret. Herb. Amb. 271. 1917.

Cytisus pinnatus L. Sp. Pl. 741. 1753.

First described from India and now a common plant near seashores around the Indian Ocean, southern Asia, the western Pacific, Polynesia, and Australia.

A medium-sized tree on the edge of woods one-half mile north of Asan, *Moore* 234, January 20, 1946.

Sesbania cannabina (Retz.) Pers. Syn. Pl. 2: 316. 1807.

First described from Malabar.

Collected in moist open fields, in the vicinity of Piti, elevation about 45 feet, *Moore* 63, December 12, 1945.

Vigna marina (Burm.) Merr. Interpret. Herb. Amb. 285. 1917.

Phaseolus marinus Burm. Index Univ. in his Herb. Amb. Auct. [sep. pag. 16]. 1755.

Vigna lutea (Sw.) A. Gray, Bot. U. S. Explor. Exped. 1: 452. 1854.

First described from Amboina, now a widely distributed tropical strand plant.

Collected along a roadside 1 mile southwest of Agat, *Moore* 253, January 27, 1946; along the shore between Inarajan and Merizo, *Necker* 205, September 4, 1945; on Facpi Point, *Necker* 366, September 27, 1945; beach near mouth of Ylig River, *Rodin* 722, October 20, 1945; 2 miles south of Agat on beach, common, *Rodin* 780, December 2, 1945; on beach east of Barrigada, *Steere* 141, October 27, 1945; also the earlier collections of the Guam Experiment Station 78 and 415. *Safford* (10, p. 397), *Merrill* (6, p. 94), and *Bryan* (2 [3—June]: 112. 1940) have listed this species as *V. lutea*.

POLYGALACEAE

Salomonina cantoniensis Lour. Pl. Cochinch. 14. 1790.

First described from Cochin China, now found in southern China and through Malaysia to India and tropical Australia. Reported from Palau and Yap by *Hosokawa*⁹ in 1938.

Collected in marshes at 275 feet elevation, 2 miles east of Mount Tenjo, *Moore* 319, February 22, 1946, and between Ylig and Pago Rivers west of Yona village, *Steere* 26 and 27, September 23, 1945.

EUPHORBIACEAE

Acalypha wilkesiana Muell.-Arg. in DC. Prodr. 15²: 817. 1866, vel. aff.

First described from the Fiji Islands.

Common in several places, apparently an escape from cultivation, collected at Yona village, *Rodin* 735, October 27, 1945.

Aleurites trisperma Blanco. Fl. Filip. 755. 1837.

Originally described from the Philippine Islands.

This is a tree about 15 feet high, apparently an introduction, collected at Northwest Field, *Rodin* 809, December 2, 1945. The material clearly matches specimens from the Philippines.

⁹ Trans. Nat. Hist. Soc. Formosa 28: 155. 1938.

Endospermum moluccanum (Teysm. & Binn.) Becc. *Malesia* 2: 38. 1884.

First described from Amboina.

A tree collected at Northwest Field, *Rodin* 806, December 2, 1945.

Phyllanthus acidus (L.) Skeels, U. S. Dept. Agr. Bur. Pl. Ind. Bull. 148: 17. 1909.

Averrhoa acida L. Sp. Pl. 428. 1753.

First described from India.

A medium-sized tree collected on edge of woods 1 mile west of Agana, *Moore* 311, February 21, 1946.

SAPINDACEAE

Tristiropsis obtusangula Radlk. in Engl. *Pflanzenreich* 98d (IV. 165): 863. 1932.

PLATE 9

First described from a Gaudichaud collection in the Paris herbarium from the Marianas Islands.

A tree, 40 to 50 feet tall, collected north of Northwest Field, *Rodin* 800, December 2, 1945 (see pl. 9), *Steere* 7, 8, and 119, August 21 and October 22, 1945; 1 mile inland from Ritidian Point, *Markley & Necker* 153, September 13, 1945; in jungle at headwaters of Ylig River, *Rodin* 612, August 12, 1945. *Rodin* and *Steere* report the common name as "faia" and the former notes that it is commonly used for lumber on Guam.

This species is described in full with citation of specimens from Rota by Hosokawa.¹⁰

MALVACEAE

Gossypium barbadense L. Sp. Pl. 693. 1753.

First described from the Barbados Islands and now widely distributed in cultivation.

Collected one-half mile east of Barrigada in fertile soil in an open field, *Moore* 26, November 17, 1945.

Hibiscus schizopetalus (Masters) Hook. f. Bot. Mag. Curtis 106: pl. 6524. 1880.

Hibiscus rosa-sinensis var. *schizopetalus* Masters, Gard. Chron. n. ser. 12: 272. 1879.

First described from Zanzibar, now a widely cultivated ornamental shrub throughout the warmer parts of the world.

Collected in Talofofu village, elevation 315 feet, *Necker* 195, September 5, 1945.

Malvastrum coromandelinum (L.) Garcke, *Bonplandia* 5: 297. 1857.

Malva coromandelinum L. Sp. Pl. 687. 1753.

Collected in an open field, one-half mile west of Agana, *Moore* 2, November 16, 1945.

¹⁰ Trans. Nat. Hist. Soc. Formosa 25: 30. 1935.

MYRTACEAE

Eugenia reinwardtiana DC. Prodr. 3: 267. 1828.

Eugenia costenoblei Merr. Philippine Journ. Sci. 9. Bot.: 123. 1914.

First described from the Moluccas, now found along seashores from the Moluccas to Guam.

Kanehira (5, p. 380) first reduced Merrill's species, based on *Costenoble* 1172, to a synonym. Additional collections have been made from a tree 15 feet high, trunk about 6 inches in diameter, at Mogfog in central Guam, elevation 360 feet, *Gressitt & Hurlbut* 2012; from a small tree at the edge of woods, 1 mile west of Agana, *Moore* 307, February 23, 1946; and from a shrub at 90 feet elevation on the side of a solid coral bluff on Ypan Point, *Moore* 357, March 20, 1946.

ONAGRACEAE

Jussiaea suffruticosa L. Sp. Pl. 388. 1753.

First described from India, now widely distributed in the Tropics.

Collected in marshy soil 1 mile east of Piti, elevation about 45 feet, *Moore* 178, November 10, 1945; in the Agana River at Agana, *Necker* 55, September 1, 1945; in a slough 1½ miles north of Agat, *Necker* 60 and 66, August 24, 1945. The Necker specimens have been determined by P. A. Munz.

ARALIACEAE

Polyscias guilfoylei (Cogn. & March.) Bailey, Rhodora 18: 153. 1916.

Aralia guilfoylei Cogn. & March. Pl. Ornem. 2: pl. 58. 1874.

First described from the "South Sea."

A plant widely cultivated for its variegated leaves, recorded by Merrill (6, p. 126) on the basis of Safford's report (10, p. 186). *Safford & Seale* 1102, from Agana, June 26, 1900, in the U. S. National Herbarium, supports this report.

PRIMULACEAE

Lysimachia mauritiana Lam. Encyl. 3: 572. 1789.

A strand plant first described from Reunion Island in the Indian Ocean and now found from Mauritius to Japan, New Caledonia, and Hawaii.

Collected on a beach and rocky coral ledges east of Barrigada, *Steere* 126, October 27, 1945. This confirms Merrill's prediction (6, p. 127) that this species would be found on Guam.

OLEACEAE

Jasminum didymum Forst. Fl. Ins. Austr. Prodr. 3. 1786.

First described from the Society Islands.

Collected one mile inland from Uruno Point, *Necker* 235, September 4, 1945.

LOGANIACEAE

Fagraea galilal Gilg & Benedict, Bot. Jahrb. Engler 56: 555. 1921.

First described from Koror Island in the Palau Island group.

Collected at the edge of a woods on Mount Lamlam, elevation about 800 feet, *Moore* 260, January 20, 1946; also on Rota Island, *Necker* RS 4 and RS 5.

Merrill identified *Glassman* 233, collected also on Mount Lamlam and in the same month, as *F. sair* Gilg & Benedict. Both *F. galilal* and *F. sair* were described at the same time, although with separate type localities. Comparison of the two descriptions reveals insignificant differences. Kanehira (4) describes and illustrates these two species. *Moore* 260, here cited as *F. galilal*, closely matches Kanehira's illustration. Merrill has written: "In my opinion too many species have been proposed for the area. When sufficient material is available, more light may be thrown on the subject." Until this time comes it is just as well to recognize two species on Mount Lamlam, but with doubts as to their distinctness. It is possible that these and other species of this region will prove to be only variants of *F. berteriana* A. Gray.

APOCYNACEAE

Plumiera acuminata Ait. f. Hort. Kew ed. 2. 2: 70. 1811.

First described from the East Indies, now widely planted as an ornamental in warm regions.

Collected at an old house site 2 miles southwest of Agana, *Moore* 322, February 22, 1946.

ASCLEPIADACEAE

Telosma cordata (Burm. f.) Merr. Philippine Journ. Sci. 19: 372. 1921.

Asclepias cordata Burm. f. Fl. Ind. 72. pl. 27. f. 2. 1768.

Telosma odoratissima (Lour.) Coville, Contr. U. S. Nat. Herb. 9: 384. 1905.

First described from Java.

Merrill (6, p. 131) mentioned this species, as *Telosma odoratissima*, but did not cite *Safford* 1118, from cultivation at Agana. It is also

represented from Guam by *Nelson* 45, collected in 1914. Both specimens are in the U. S. National Herbarium.¹¹

BORAGINACEAE

Heliotropium anomalum Hook. & Arn. Bot. Beechey Voy. 66. 1841.

First described from the Society Islands.

Collected on the beach east of Barrigada, *Steere* 127, October 27, 1945.

VERBENACEAE

Lippia nodiflora (L.) Rich. in Michx. Fl. Bor. Amer. 2: 15. 1803.

Verbena nodiflora L. Sp. Pl. 20. 1753.

First described from Virginia and now widely distributed as a pantropic weed.

Collected in a lawn among grasses, one-half mile west of Agana, *Moore* 334, March 15, 1946.

RUBIACEAE

Borreria hispida (L.) Schum. in Engl. & Prantl, Pflanzenfam. 4⁴: 144. 1891.

Spermacoce hispida L. Sp. Pl. 102. 1753.

First described from Ceylon, now found from India to China, Formosa, the Philippines, and Malaya.

Collected in open place in red clay soil on Mount Tenjo, *Rodin* 527, December 17, 1944. The determination is tentative, pending more critical work on this genus.

Dentella repens J. & G. Forst. Char. Gen. Pl. 26. pl. 13. 1776.

First described without locality.

Collected in open fields at Agana, *Moore* 265 and 266, January 29, 1946, and *Seale* s. n., about 1900, in the Bishop Museum, Honolulu. These specimens have been examined by F. R. Fosberg, who cited the *Seale* specimen in 1940.¹² *Moore* 265 has pilose fruits, but those of No. 266 are glabrous. Since various specimens show both characters on the same plant, this conspicuous feature is not of taxonomic importance.

Hedyotis albido-punctata (Merr.) Fosb. Lloydia 3: 123. 1940.

Oldenlandia albido-punctata Merr. Philippine Journ. Sci. 9. Bot.: 147. 1914.

This species, based on *McGregor* 375, collected on Cabras Island on the west coast of Guam in October 1911, has been collected also on the beaches near Yona, *Rodin* 600, July 22, 1945, north of Agana Bay,

¹¹ For a critical treatment of the nomenclature of this species see Merrill, A commentary on Loureiro's "Flora Cochinchinensis." Trans. Amer. Phil. Soc. n. ser. 24³: 322. 1935.

¹² Notes on Micronesian Rubiaceae. Occas. Papers Bishop Mus. 15: 215. 1940.

Rodin 709, October 7, 1945, and east of Barrigada Village, *Steere* 130a and 143, October 27, 1945.

Hedyotis lacinata Kanehira, Trans. Nat. Hist. Soc. Formosa 25: 6. 1935.

First described from the Palau Islands.

Collected on Facpi Point on approach to Mount Lamlam, elevation 300 feet, *J. Gregory & Necker* 394, September 27, 1945. Identified by F. R. Fosberg, on the basis of the original description.

Morinda umbellata L. var. *glandulosa* (Merr.) Fosb. Occas. Papers Bishop Mus. 15: 220. 1940.

Morinda glandulosa Merr. Philippine Journ. Sci. 9. Bot.: 146. 1914.

First described from Guam, based on Guam Experiment Station 36, in fruit, and 376, the type, in flower. An additional collection is *Moore* 42, a climbing shrub on the edge of woods, 1 mile south of Barrigada, November 25, 1945.

Timonius albus Volken, Bot. Jahrb. Engler 31: 475. 1901.

Previously recorded only from Yap.

A shrub collected on open grassland on Mount Tenjo, elevation 825 feet, *Moore* 215, January 5, 1946, and on Facpi Point on approach to Mount Lamlam, elevation 300 feet, *Necker* 390 and 398, September 27, 1945.

CUCURBITACEAE

Citrullus vulgaris Schrad. ex Eckl. & Zeyh. Enum. Pl. Afr. Austr. 279. 1834-37.

First described from Africa.

Collected near the cliff on Pati Point, elevation 480 feet, *Necker* 363, September 25, 1945.

COMPOSITAE

Bidens pilosa L. Sp. Pl. 832. 1753.

First described from America.

Collected in a clearing or on roadside on Haputo Point, *Johnson & Necker* 15, August 21, 1945.

Elephantopus mollis H. B. K. Nov. Gen. & Sp. 4: 26. 1820.

First described from eastern Venezuela.

Safford & Seale 1091, in the U. S. National Herbarium, undoubtedly represents the basis of Safford's (10, p. 268) and Merrill's (6, p. 154) inclusion of this species in the Guam flora as *E. scaber* L. This specimen has been redetermined by S. F. Blake as *E. mollis* H. B. K. Since additional recent collections also represent *E. mollis*, the existence of *E. scaber* L. in Guam is in much doubt.

Emilia javanica (Burm.) C. B. Robinson, Philippine Journ. Sci. 3. Bot.: 217. 1908.

Hieracium javanicum Burm. f. Fl. Ind. 174. pl. 57. f. 1. 1768.

First described from Java.

Collected in the central portion of the island, in the Agana Bay area, Moore 174, November 13, 1945; at Agat, Necker 62, August 24, 1945; on Mount Tenjo, Johnson, Markley & Necker 75, August 10, 1945, and Rodin 522, December 17, 1944; south of Piti, Necker 30, August 24, 1945, and 181, September 8, 1945; and on a dry hillside between Ylig and Sigua Valleys, Steere 58, September 23, 1945.

These red-flowered specimens have been determined by F. R. Fosberg, who believes the specimens cited by Merrill and Perry (9), Glassman 265 and 292, as *E. sonchifolia* (L.) DC. are *E. javanica*. He reports that the purple-flowered *E. sonchifolia* does occur in Guam, but is less frequent.

Wedelia biflora (L.) DC. in Wight, Contrib. Bot. Ind. 18. 1834.

Verbesina biflora L. Sp. Pl. ed 2. 1272. 1763.

First described from India.

This species is included in Merrill's enumeration (6, p. 154) on the authority of de Candolle's reference to a Haenke specimen from Guam and Safford's reference (10, p. 377) to this species under the name "*Stemmodontia biflora* (L.)." It is represented by Safford 1034, and also by Moore 336, March 17, 1946, from a coconut grove on the beach on the east coast between Togcha and Talofofa Bays.

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<i>Phaseolus marinus</i>	461	<i>Trema orientalis</i> var. <i>viridis</i>	459
<i>Philydrum lanuginosum</i>	457	<i>Tribulus cistoides</i>	452
<i>Phreatia samoensis</i>	459	<i>Triumfetta tomentosa</i>	452
<i>Phyllanthus acidus</i>	462	<i>Tristiropsis obtusangula</i> ... Plate 9,	462
<i>Pilea microphylla</i>	459	<i>Verbena nodiflora</i>	465
<i>Plumiera acuminata</i>	464	<i>Verbesina biflora</i>	467
<i>Poa amabilis</i>	452	<i>Vigna lutea</i>	461
<i>Polianthes tuberosus</i>	451	<i>marina</i>	461
<i>Pollinia praemorsa</i>	455	<i>Wedelia biflora</i>	467
		<i>Zephyranthes rosea</i>	451
		<i>Zingiber officinale</i>	452