

Micronesian Poaceae: Critical and Distributional Notes

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ABSTRACT - Taxonomic notes are presented on Micronesian species of *Cynodon*, *Echinochloa*, *Imperata*, *Isachne*, *Ischaemum*, *Lepturopetium*, *Oplismenus*, *Paspalum*, *Pennisetum*, *Polytrias* and *Pogonatherum*, *Saccharum*, and *Sorghum*, and distribution extensions in Micronesia are recorded for various species in other genera.

Introduction

In preparing the third part of our Geographical Checklist of Micronesian Vascular Plants it became evident that the Poaceae of Micronesia have never been critically studied, except for one or two genera, such as *Digitaria* and *Zoysia*. Not even general treatments have cited enough Micronesian specimens to give a basis for arranging and assigning correct names to our species. This task will be undertaken, of course, when we tackle this family for the Flora of Micronesia. However, in order to have reasonably correct names for our plants for the checklist, considerable review work had to be done. The results of this are presented in the series of short local taxonomic studies and the collection of distributional records presented below.

Taxonomic observations are offered on *Cynodon*, *Echinochloa*, *Imperata*, *Isachne*, *Ischaemum*, *Lepturopetium*, *Oplismenus*, *Paspalum*, *Pennisetum*, *Polytrias* and *Pogonatherum*, *Saccharum*, and *Sorghum*. It is not implied that these are the only genera needing study, but these are the ones where our conclusions are firm enough to be published, or where new names or combinations must be validated for use in the checklist or for other purposes. New distribution records are presented, in addition, in *Agropyron*, *Cymbopogon*, *Digitaria*, *Eriochloa*, *Eustachys*, *Leptochloa*, *Panicum*, *Paspalidium*, and *Setaria*.

1. *CYNODON* Rich.

Cynodon dactylon var. *parviglumis* (Ohwi) Fosberg and Sachet, n. comb.
Cynodon parviglumis Ohwi, Bot. Mag. Tokyo, 55:538, 1941; Fosberg et. al., Vascular plants of Palau 7, 1980.

This Micronesian taxon, *Cynodon parviglumis* Ohwi, has usually been disregarded, probably because of its resemblance to *Cynodon dactylon* (L.)

Pers., the common Bermuda grass, widely introduced throughout the tropics and warm-temperate parts of the globe. So far as we know it has never been formally reduced to *C. dactylon*. An examination of an isotype in Kyushu Herbarium in 1966 showed that its glumes were, indeed, conspicuously shorter than the spikelet, about 1/4 to 1/3 its length. Since then we have regarded it as distinct but, until now, have not studied substantial *Cynodon* material from Micronesia. Now we find that plants with similarly short glumes occur in Palau, Saipan, Rota, Agrigan, Pagan, Alamagan and Anatahan islands, as well as in Yap (type locality).

A certain amount of intergrading variation in glume-length, as well as in some of the minor features associated with glume-length in the original description, as well as observed variation in material of *Cynodon dactylon*, cause us to doubt the significance of these differences. Hence we are reducing it to the status of a variety. The combination, made above, was published invalidly by Ohwi, in synonymy, under *C. parviglumis*.

The type came from Yap, **Kanehira** and **Hatusima 4348** (FU, holotype). We now know the variety from the **MARIANAS**: Agrigan: **Falanruw 2163** (US), **2187** (US). Pagan: 10 m, **Anderson 583** (US, BISH, POM, NY, L, P); 50 ft., **Bonham 32** (US, BISH). Alamagan: **Falanruw 1961** (US). Anatahan: 10 m. **Raulerson 1135** (US, GUAM); 40 m, **Raulerson 1092** (US, GUAM). Saipan: **Hosaka 2920** (US, BISH, QLD, NY); 100 m, **Fosberg 25174** (US, BISH, POM, K, MO).

CAROLINE ISLANDS: Palau: Koror: Ngerebe'ed, **Hill 19** (US, BISH); **Otobed, PW-10129** (US); **Hosaka 3327** (US, BISH, L). Yap: **Kanehira** and **Hatusima 4348** (FU).

We do not know if this taxon can really be indigenous in Micronesia, nor whether it is restricted to there – probably not. Only a study of *C. dactylon* over its wide range will determine these points.

2. ECHINOCHLOA IN MICRONESIA

Plants of *Echinochloa* Beauv. in Micronesia have usually been referred to *E. colonum*, *E. crus-pavonis*, or *E. crus-galli*, with little agreement except on most specimens of *E. colonum*. Annotations by P. W. Michael on U. S. National Herbarium specimens, and a publication (1978) kindly sent by him, make it possible to identify these "barnyard grass" taxa much more satisfactorily, and to recognize five taxa in Micronesia. It is difficult, if not impossible, to determine whether members of this genus are indigenous in

Micronesia or have been accidentally introduced by man. *E. crus-pavonis* H.B.K. and *E. crus-galli* (L.) Beauv. var. *crus-galli* apparently do not occur in Micronesia. A simplified key, adapted from one given by Michael (1978) gives the principal distinguishing characters of the Micronesian taxa.

1. Coarse rhizomatous or stoloniferous perennial, ligule of prominent bristles, at least on lower leaves, spikelets with lower floret staminate - *E. picta*.
- 1'. Annuals or non-stoloniferous short-lived perennials, culms ascending, spreading, or somewhat decumbent, ligule lacking or represented by slight pubescence, lower floret empty (or rarely staminate in *E. colonum*).
 2. Spikelets regularly arranged, 2-3 mm long, awnless, racemes rarely with bristles - *E. colonum*.
 - 2'. Spikelets irregularly arranged on racemes, usually somewhat awned, racemes usually with bristles.
3. Spikelets ovate, 2.5-3 mm long, lower lemma convex, shiny, awns not conspicuous - *E. glabrescens*.
- 3'. Spikelets elliptic, lower lemma flattish, dull.
 4. Spikelets usually conspicuously awned, 3-3.5 mm long - *E. crus-galli* var. *hispidula*.
 - 4'. Spikelets usually shortly, scarcely, or not awned, 2-3 mm long, - *E. crus-galli* var. *austro-japonensis*.

Echinochloa colonum (L.) Link, Hort. Berol. 2:209, 1833.

Panicum colonum L., Syst., ed. 10, 870, 1759; Sp. Pl., ed. 2, 84, 1762. Kanehira, Enum. Fl. Pl. Micro. 271, 1935.

Very common in pioneer habitats, especially moist ones, on most or all high islands and some low ones. Known from Saipan, Tinian, Rota, Guam, Palau, Yap, Ulithi, Truk, Ponape and Kusaie.

Echinochloa crus-galli (L.) Beauv., Ess. Agrost. 53, 161, 1812.

Panicum crus-galli, L., Sp. Pl. 56, 1753.

This is an almost cosmopolitan species. Its var. *crus-galli* is not known

from Micronesia, but at least two varieties are found there. These seem to be Asiatic varieties and may even be indigenous.

Echinochloa crus-galli var. *austro-japonensis* Ohwi, Acta Phytotax. et Geobot., 11:38, 1942).

This has the inflorescence much less shaggy with awns than is usual for the next variety. It is, curiously, known in Micronesia only from low coral islands where it is a common weed in taro pits.

CAROLINE ISLANDS: Ulithi Atoll: Mogmog I., **Fosberg & Wong 25500** (US). Faraulap Atoll: Faraulap I., **Fosberg & Evans 47372** (US, BISH, CANB, L).

MARSHALL ISLANDS: Jaluit Atoll: Pinlep I., **Fosberg 39464** (US), **41407** (US).

GILBERT ISLANDS: Butaritari Atoll: Butaritari I., **Herbst & Allerton 2698** (US).

Echinochloa crus-galli var. *hispidula* (Retz.) Keng, Contr. Biol. Lab. Sci. Soc. China, Bot. Ser., 10:196, 1936.

Panicum hispidulum Retz., Obs. 5:18, 1788.

Echinochloa crus-galli ssp. *hispidula* (Retz.) Honda, Journ. Fac. Sci. Univ. Tokyo, III Bot. 3:267, 1930.

Panicum crus-galli sensu Volkens, 1901, non L.

Echinochloa crus-pavonis sensu auct. Micr., non (H.B.K.) Schult., Mant. 2:269, 1824.

This has rather spreading to ascending culms, inflorescences appearing shaggy with fairly long awns. It is the common form of the species in Micronesia, growing in edges of taro pits, moist roadsides, and other moist weedy places; known only from the Carolines. On Yap said to have been introduced by the Japanese as feed for livestock.

We prefer to use the varietal rank for such semi-geographical populations.

CAROLINE ISLANDS: Palau: s. l., **Ledermann 14348** (B), Babeldaob, Marukiyoku (Melekiok), **Takamatsu 1386** (US, BISH). Yap: s. l., **Wong 400** (US). Ulithi Atoll: Falalap I., **Fosberg 46503** (US, BISH). Woleai Atoll: Falalap I., **Evans 513** (US, BISH, POM, BRI); Falalis I., **Fosberg 47026** (US, BISH). Ifaluk Atoll: Falalap I., **Abbott & Bates 69** (US), **119** (US), **128** (US).

Echinochloa glabrescens Munro ex Hook. f., Fl. Br. Ind. 7:31, 1896.

This is in general appearance much like *E. crus-galli* var. *hispidulum* but, in addition to the convex shiny lemma its panicle has longer, more numerous branches, awns few and inconspicuous, rarely up to 3 mm, spikelets not purplish, somewhat hirsutulous or hispidulous. New to Micronesia.

CAROLINE ISLANDS: Ulithi Atoll: Mogmog I., Fosberg & Wong 25498 (US).

Echinochloa picta (Koen.) Michael, Phil. Jour. Weed Sci., 5:18, 1978.
Panicum pictum Koen., Naturf. 23:204, 1788.

This looks much like *E. crus-galli* var. *hispidula* but much coarser, spikelets larger, 3-5 mm long, purplish, awns short, only 2-3 mm long. New to Micronesia.

MARIANAS: Guam, Umatac, Fosberg 35650 (US).

3. IMPERATA IN MICRONESIA

Imperata Cyr. has been known from Micronesia since 1901 when Volkens reported *I. exaltata* Brongn. from Yap. Ohwi reported it from Babeldaob, Palau, in 1941, as *I. conferta* (Presl) Ohwi. Since that time this species has been found also on several other islands in Palau and on Saipan, Tinian and Guam, in the Marianas. At least on Palau, and possibly on Yap, it may be indigenous. In the Marianas it is probably adventive, as it was not found very early or in undisturbed habitats. A second species, *I. cylindrica* (L.) Beauv. has appeared in Guam and Tinian in recent years.

Imperata conferta (Presl) Ohwi, Bot. Mag. Tokyo, 55:549, 1941.

Saccharum confertum Presl, Rel. Haenk, 1:346, 1828 (type from Luzon).

Imperata arundinacea sensu Prowazek, non Cyr., Pl. Rar. Neap., 2:26, t. 11, 1792.

Imperata exaltata sensu Brongn. et auct. Micr., non (Roxb.) Brongn. in Duperrey, Voy. Coquille, 2 (2): 101, 1831.

Brongniart clearly described the slender plant found in Micronesia. However, he cited *Saccharum exaltatum* Roxburgh in synonymy, so Roxburgh's specimen automatically becomes the type and determines the ap-

plication of Brongniart's name. Ohwi correctly adopted the next available name in 1941, when he reported the species from Palau. It is now known from several islands in Micronesia as cited below.

It is a rather slender, erect grass to 2 m tall, culms usually solitary or few, with prop-roots from lower nodes, broad flat leaves, and a narrow fluffy plume-like panicle up to 20-30 cm long.

MARIANAS: Saipan, acc. Prowazek, *Deutsche Mar.* 114, 1913, as *I. arundinacea* is probably this. s.l., **Herbst & Falanruw 6894** (US). Tinian: 0.5 km SW of Laderan Lasso, on fine deeply weathered volcanic, clay **Fosberg 59882** (US, BISH). Sabana, **Herbst & Falanruw 6708** (US). Guam: Pipeline Road, near Pedonlisang, **Fosberg 59648** (US, BISH, POM, MO, K, BRI); Sasa River, **P.H. Moore 889** (US, GUAM); OSIR Road, Apra Harbor, **Stone 4717** (GUAM); Potts Jct., **Falanruw 956** (US).

CAROLINE ISLANDS: Palau: Babeldaob: Aimion, in monte Ngarua, **Tuyama** in 1937 (TI, in part); Aimeliik, **Kanehira & Hatusima 4551** (FU); Ngial, **Hosaka 3386** (US, BISH, K); Ngaramiskang R., **Timberlake 3144** (US). Koror: Ngerebe'ed, 5-10 m, **Fosberg 37079** (US, BISH). Aulupse'el: **Fosberg 32362** (US). Angaur: **Canfield 190** (US). Yap Island, acc. Volkens, *Bot. Jahrb.*, 31:355, 1901, specimen Volkens 520 not seen, probably destroyed (B); Kanif, **Takamatsu 1925** (US, POM, BISH); Rumung I., **Takamatsu 1901** (US, POM, BISH); southern Yap, near Tabunifi, 5m, **Cushing 378** (US).

Imperata cylindrica (L.) Beauv., *Ess. Agr.* 8, 165-7, pl. 5, f. 1, 1812.

Lagurus cylindricus L., *Syst. Nat.* ed. 10, 2, 78, 1759.

An erect, deeply rooted rhizomatous grass with bright green rather harsh straight flat leaves and erect, very narrow silvery plume-like panicles. It is a fire-resistant grass, and when the above ground parts are burned or cut off the plant immediately sends up inflorescences, followed by new leaves. It is called cogon in the Philippines, lalang in Malaya.

A small field of it was found on Guam, near Harmon Air Strip, August 6, 1969, and a small dense patch near San Jose Village, Tinian, July 20, 1980. It is hoped that it will not prove to be as persistent a weed here as farther west in the Pacific.

MARIANAS: Saipan: As Lito, 70 m, **Herbst & Falanruw 6894** (US); Ogso Laulau, 200 m, **Herbst & Falanruw 6907** (US). Tinian: San Jose Village, **Fosberg 59916** (US, BISH, POM, NY). Guam: Harmon Air Strip, Barrigada Hill Road, **Falanruw 1299** (US, GUAM).

4. *ISACHNE* R. BR. IN MICRONESIA

The genus *Isachne* seems, at least on cursory examination, to be in a serious state of confusion in the Indo-Pacific area. Whether this is inherent, as with genera like *Ischaemum* and *Digitaria*, or merely the result of insufficient, or insufficiently critical, study we cannot say without investigating far beyond the Micronesian area, which we are not now prepared to do. We have prepared a tentative key to the Micronesian taxa, with some descriptive notes and synonymy, and are here making two new combinations necessitated by this work.

Isachne R. Br. Prodr. Fl. Nov. Holl., 196, 1810.

The best recognition characters of this genus are the appearance of a *Panicum* but with subequal glumes enclosing two florets, either both bisexual or the lower one staminate, fruit enclosed in the indurate lemma.

Five species are known from Micronesia, all probably indigenous, two of them endemic.

Key to Micronesian *Isachne*

1. Florets in a spikelet dissimilar, lower one staminate, lemma of lower one not becoming indurate 2.
- 1'. Florets both hermaphrodite, indurate in fruit 6.
2. Spikelets 2-2.5 mm long 3.
- 2'. Spikelets 1-1.5 mm long (*I. miliacea*) 5.
3. Spikelets ovoid, glumes cucullate, obtuse *I. Ponapensis*
- 3'. Spikelets globose, glumes rounded apically
(*I. globosa*) 4.
4. Leaves glabrous *I. globosa* var. *globosa*
- 4'. Leaves pilose or at least somewhat
hairy *I. globosa* var. *ciliaris*
5. Leaves mostly 2-2.5 cm long, plant nearly glabrous,
panicle scarcely scabrous *I. miliacea* var. *miliacea*

- 5'. Leaves mostly 1.5-2 cm long, plant usually somewhat hairy, panicle scabrous *I. miliacea* var. *minutula*
6. Leaves lanceolate or linear-lanceolate, neither stiff, nor reflexed, nor venulose. *I. carolinensis*
- 6'. Leaves ovate to ovate-lanceolate, tending to be stiff and reflexed, venulose (*I. confusa*). 7.
7. Pubescence of glumes spreading *I. confusa* var. *confusa*
- 7'. Pubescence of glumes somewhat forward-pointing. *I. confusa* var. *purpurascens*

Isachne carolinensis Ohwi, Bot. Mag. Tokyo 55:540, 1941.

Isachne firmula sensu Hosokawa, 1935, 1937, non Büse, 1851.

A creeping plant, rooting at nodes, branches ascending, leaves mostly 3-10 cm long, somewhat pubescent to glabrescent, sheath short, margin ciliate, panicles 3-8 cm long sometimes slightly pilose at nodes, slightly to noticeably scabrous; spikelets 1.5-2.5 mm long, ovoid to ellipsoid, hispid or shortly hirsute, glumes bluntly acute or obtuse, 7-nerved, somewhat longer than lemmas, slightly cucullate, lemmas rounded at apex, lower one glabrous, upper sericeous.

Endemic in Ponape, well up in mountains.

CAROLINE ISLANDS: Ponape, s. l., Ledermann 13820 (US), 13674 (B); Nakao s. n. (KYO); Mt. Manalaut, Stone 1998 (GUAM); Hosokawa 8219 (US); Takamatsu 1096 (US); 800 ft., Glassman 2366 (US); Nipit, 400 m, Hatusima 10878 (FU, type); Mt. Nunoani, 10898 (FU); Hosokawa 5628 (US), 5666 (US); Metalanim, Nakao s. n. (KYO).

Isachne confusa Ohwi, Bull. Tokyo Sci. Mus. 18: 14, 1947.

Isachne rigida sensu auct. Micr., non Nees ex Steud. (1854).

Isachne rhignon sensu Ohwi (1941), non (Steud.) Ohwi (1941).

A stiff dwarf *Isachne* with harsh ovate venulose leaves, tending to be stiff and reflexed, margins hirsute-ciliate, broad open panicle with divaricate glandular branches, spikelets small, globose, glumes hispidulous-puberulent

outside. It is generally found in savannas and on open exposed peaks. Two varieties are known in Micronesia, one in Palau, Yap and Truk, the other from Ponape. *Isachne purpurascens* Glassman seems to be only a weak variety of *I. confusa*; the differences are as indicated in the key.

Isachne confusa is a member of a group of small, stiff-leaved species with strong veins, found throughout S. E. Asia to New Guinea and Australia. The type is from Bangka.

Isachne confusa Ohwi var. *confusa*.

Leaves ovate, reflexed, strongly veined, spikelets usually green, their pubescence spreading.

CAROLINE ISLANDS: Palau I.: Babeldaob I. S. of Ngardmau, 5 m, **Canfield 386** (US); Lake Ngardok, **Fosberg 32346** (US, BISH, K, QLD, POM); Garamiscan (Ngarumiskan or Almiokan) River, Garamiscan Colony, **Fosberg 25683** (US, BISH, L, A, POM); Nekken, **Fosberg 50589** (US, BISH, UC, P, MO); **Timberlake 3072** (US, BISH); Ngetpang, **Otobed PW-10146** (US); Aimiliik, **Kanehira and Hatusima 4572** (KYO, FU); Mt. Megilon, **Hosokawa 7121** (US). Yap I.: s. l. **Volkens 392** (US); SW of Tora Village, near E coast, 30 m. **Evans 284** (US, BISH); approach road to airport, 20 m, **Cushing 334** (US, GUAM); trail to Inuf, 20 m, **Cushing 432** (US); Fanalily, **Fosberg 60083** (US, BISH, SYD, A), **60074** (US, BISH, QLD); Tomil I., **Hosaka 3288** (US, BISH, POM, BM, MO). Truk Group: Wara (Moen), Mt. Witipen, **Hosokawa 8437** (US).

Isachne confusa var. *purpurascens* (Glassman) Fosberg and Sachet, n. comb.
Isachne purpurascens Glassman, Bish. Mus. Bull. 209-130, fig. 20, 21, 1952.

Leaves somewhat narrower and slightly shorter-hirsute than in var. *confusa*, pubescence on glumes shorter, sparser, more forward pointing. The slight difference in spikelet size overlaps with var. *confusa* and the latter also sometimes has purple glumes. The Truk sheet, **Hosokawa 8437**, is closer to var. *confusa* and is cited there, but serves to connect the two.

CAROLINE ISLANDS: Ponape; Mt. Ninani, 2550 ft., **Glassman 2888** (US, holotype); Mt. Trunanshapoi (Nanaraut-San), **Hosokawa 5982** (US, 2 sheets).

Isachne globosa (Thunb.) O. Kuntze, Rev. Gen. Pl. 778, 1891; Hosokawa,

Tr. Nat. Hist. Soc. Formosa, 24; 200, 1934; Kanehira, Enum. Fl. Pl. Micr. 269, 1935.

Milium globosum Thunb., Fl. Jap. 49, 1784.

Type from Japan; well distributed in south and east Asia, through Malesia to Australia and Micronesia.

A small species with linear-lanceolate to elliptic-lanceolate straight leaves, small inflorescences, spikelets appearing glabrous with the lower floret staminate, not indurate. Yap and Palau specimens are probably var. *globosa*.

Isachne globosa (Thumb.) O, Kuntze var. *globosa*.

Leaves glabrous.

CAROLINE ISLANDS: Palau Is.: Babeldaob I., "Malukyoku galdok Kaisyalu" (Melekiok, Lake Ngardok), **Hosokawa 7387** (US); Aimiliik, **Kanehira and Hatusima 4548** (KYO); Koror I., **Kanehira and Hatusima 4429** (KYO). Yap I., **Kanehira and Hatusima 4353** (KYO).

For Ponape records see *I. ponapensis* Hosokawa.

Isachne globosa var. *ciliaris* Ohwi, Bot. Mag. Tokyo, 55:540, 1941.

Plant with sheaths glabrous or glabrate below, hirtellous above, strongly ciliate, blades pilose on both surfaces; panicles long-pedunculate; spikelets about 2 mm long, very plump, glumes slightly shorter than lemmas, glabrous or slightly puberulent, with broad scarious margins; lemmas ciliate.

CAROLINE ISLANDS: Truk: Trowasi (Dublon), behind the mangrove, 1 m, **Hatusima 10710** (FU, isotype); Dublon I., 50 ft., **Hosaka 2759** (US, BISH, POM, K, MO, CANB, L).

Isachne miliacea Roth Nov. sp. 58, 1821.

This is a small plant with flat lanceolate to linear-lanceolate leaves, with glandular bands on the panicle branches. The spikelets have the lower floret staminate and not indurate, as in *I. globosa*, but the spikelets are larger than in that species.

I. miliacea as represented in the herbarium (US) from farther west is

impossibly variable. One variety (*I. miliacea* var. *stricta*) has been described and any serious study will result in more. Two obviously occur in Micronesia. How this species differs from *I. pulchella* Roth is not at all clear to us. The latter is even more variable, as represented in the herbarium. Bor (1960) separates the two on the size of the anthers, which might mean something, but mature ones are not usually available. If they were to be combined, *I. pulchella* would be the correct name. The two varieties distinguished below were described as distinct species, but have been united into one by many authors. They seem to us varietally distinct.

Isachne miliacea Roth var. *miliacea*

The Micronesian plant, referred here by us, is slender with vegetative parts nearly glabrous, except the ligule and margins of the sheath, the leaves mostly (2-)2.5-3.5 cm long, tending to be broadest near base, with apex long-tapering, slightly acuminate, the panicle tending to be open, up to 9 cm long, scarcely scabrous, spikelets scarcely hispid or scabrous.

Some Palau specimens examined belong here. A specimen from Yap, **Volkens 260**, has been referred here, but we have not seen it. When we identified **Stemmermann 3179a** (BISH) from Yap, we had not distinguished these varieties.

CAROLINE ISLANDS: Palau: "Aurukoron, Kurei," **Hosokawa 7070** (US); Babeldaob S. E. side, **Takamatsu 1404** (US, BISH); Koror I., s. 1., **Otobed PW-10130** (US); Ngerebe'ed, **Salsedo 310** (US); **Fosberg 32055** (US, BISH, POM); Makarakol (Malakal?), **Hosokawa 9275** (US).

Isachne miliacea var. *minutula* (Gaud.) Fosberg and Sachet, n. comb.

Panicum minutulum Gaudichaud, Bot. Voy. Uranie, 410, 1829.

Isachne minutula (Gaud.) Kunth, Rev. Gram., 2: t. 117, 1829.

Safford, Contr. U.S.N.H., 9:287, 1905.

Isachne miliacea sensu Merrill (1914), non Roth (1817).

A diminutive plant, creeping, rooting at nodes, nodes and leaves tending to be hirsute or hispid, hairs on leaves with pustulate base, leaf-blades tending to be elliptic-lanceolate, narrowed somewhat to base, acute, not ordinarily at all 1.5-2 (-2.5) cm long, panicle 1-4 cm long, with rather few spikelets, these notably hispid (or tomentulose or sericeous).

MARIANAS: "ex herb Petrop" s. l., s. coll. (P); s. l. **Gaudichaud s. n.**

(P. holotype); Guam: s. l. **Jacquinot** in 1841 (P, US); back of Piti, **McGregor 404** (US); SW slope, Alifan, **Anderson 338** (US, BISH, POM, MO); Mt. Lamlam area, 1000 ft., **G. C. Moore 227** (US). Falls of N. branch Inarajan River, **Stone et al. 5050** (GUAM); Cotal Conservation Area, Manengon, Tarzan river area, **Stone 5140** (GUAM).

CAROLINE ISLANDS: Palau: Babeldaob I.: Markyoku (Melekiok) **Hatusima 5061** (FU); Aimiliik, **Hatusima 4548** (FU); Koror I.: **Kanehira and Hatusima 4429** (FU). Yap Island: s. l. **Hatusima 4343** (FU); Tomil, **Hosaka 3250** (US, BISH, POM); Weloy Mun., Okau, **Falanruw 3405** (US).

Isachne ponapensis Hosokawa, Tr. Nat. Hist. Soc. Formosa, 24:200, 1934; Kanehira, Enum. Fl. Micr., 270, 1935; Ohwi, Bot. Mag. Tokyo 55:540, 1941; Glassman, Bish. Mus. Bull. 209: 128-129, 1952.

Isachne globosa sensu Hosokawa, 1935, 1937, non (Thunb.) O. Ktze (1891).

Plant decumbent at base, rooting at nodes, culms ascending; leaf blades 4-6.5 cm long, lanceolate, stiff, bluntly acute, very sparsely antrorse strigose on both surfaces, sheaths more densely so, especially at summit, strongly ciliate; panicles somewhat pubescent, up to 15 cm long; spikelets ovoid, 2-2.5 mm long, glumes obtuse or bluntly acute very convex, cucullate, glabrous or slightly pubescent especially near apex, florets dissimilar, lower staminate, pubescent, upper on short rachilla, hermaphroditic, sericeous.

Endemic to mountains of Ponape in wet, open areas.

CAROLINE ISLANDS: Ponape Island: Mt. Nanaraut, **Hosokawa 5989** (US, type fragment); 700 m. **Hatusima 11018** (FU, KYO); Mt. Seletereh, 1,900 ft., **Glassman 2741** (US).

5. REVIEW OF MICRONESIAN SPECIES OF *ISCHAEMUM* L.

Ischaemum is a tropical, subtropical, and warm temperate genus of Andropogoneae, found in most high islands of Micronesia and in a few of the low coral islands. Seven species have been credited to Micronesia but no key or other treatment has been proposed to distinguish these. Identification of *Ischaemum* taxa has been no better than guessing, for Micronesia as well as for most other Old World tropical areas. To be able even to provide a list for the Geographical Check List of Micronesian Monocotyledons has necessitated a hard look at not only the taxa reported from Micronesia but from surrounding areas and at the morphology of the genus. A summary of the

results of this examination is presented below.

Of the seven species reported from Micronesia four were based on Micronesian collections. These are *I. polystachyum* Presl (1830), *I. intermedium* Brongniart (1831), *I. paniceum* (Steud.) Chauvin (1854) and *I. longisetum* Merr. (1914). *I. digitatum* Brongn. (1831), from the Moluccas was published simultaneously with *I. intermedium*. *I. paniceum* was based on the same type collection as *I. intermedium*. The other species, *I. muticum* L. (1753) and *I. rugosum* Salisb. are widespread in the Indo-Pacific tropics. All of these species (except *I. paniceum*) have been described in detail and, one might think, should be clearly identifiable. Strictly speaking, all are separable by single characters. It is only when one looks at the whole plants that the situation becomes foggy. When the distinguishing characters are examined they appear trivial and tend to merge into each other. Applied strictly they sometimes separate plants that look alike and fail to separate ones that differ in various ways. If lack of intergradation were insisted upon as a criterion for specific separation, all of the Micronesian populations, possibly all those in the western Pacific, would have to be merged into a single enormous and polymorphic species.

The following sketch of the gross morphology of *Ischaemum* is based upon specimens from Micronesia and those studied as possibly being identical with or related to the Micronesian populations. It is intended to provide a basis for a tentative framework for arranging the known collections from the area. Further collecting may clarify or further confuse this framework or classification.

Vegetatively, *Ischaemum* is generally a creeping to decumbent or ascending, branched and often tangled herb, tending to root at nodes, culms slender to as much as 4-5 (rarely even more) mm thick. The nodes are glabrous to strongly hirsute or bearded, often only on one side. The leaves are generally linear-lanceolate varying to linear, lanceolate, oblong, or even rarely ovate. Sheaths are cylindrical to slightly compressed. Both sheaths and blades vary from glabrous to long hirsute-pilose. Pilosity is usually present at the base of the blade and summit of the sheath, even when the rest of the leaf is glabrous. Margins are commonly scabrous, ligule membranous, obtuse to truncate or somewhat lacerate or the margin hirsute.

The panicle in this genus is composed of one to six or more racemes, digitately or subdigitately arranged. These racemes, the essential feature of the genus *Ischaemum*, are each a series of indurated U or V shaped articles, one arm of each being a segment of the rhachis, the other a branch

("pedicel") bearing at its summit a staminate or rarely sterile spikelet. A second, so-called "sessile", spikelet is borne on a very short branch on the dorsal or abaxial side of the base of the U. These spikelets are articulated to the summits of their respective branches, as the next article is articulated to the summit of the rhachis segment. The articulations or calluses are very short fleshy intervals which dry up and break at maturity. The arrangement of the articles is distichous, with the "pedicellate" (hereafter called *lateral*) spikelets on alternate sides, the "sessile" (hereafter called *central*) spikelet appressed against and between the two arms of the U on the dorsal side of the raceme. The rhachis and its branches are triangular in cross section, the longest side of the triangle in the plane of the distichous arrangement. The two acute edges of each article tend to be ciliate, with ascending hairs on the outer edges, delicate spreading hairs on the inner edges, and, in some taxa, a tuft of hairs, or beard, at the base of the article on the dorsal or ventral sides just above the articulation. In most Micronesian species the inner edges of the article project inward slightly just above the base, giving the appearance of a circular pore with a gap in the upper side, closed by a convexity of the base of the second glume of the central spikelet.

The lateral spikelet has two well developed glumes, enclosing a membranous lemma, often but not always awned, the awn straight or somewhat geniculate, and a palea, which commonly encloses 3 stamens with linear-oblong anthers. The basal part of the lower glume encloses the base of the upper glume in a sharp fold of the margin.

The central spikelet likewise bears two dissimilar glumes, the basal part or almost the entire margins of the lower glume enclosing the corresponding part of the upper glume in a keel-like fold on either side. The exterior lower part of the lower glume, between these folds, is usually smooth, slightly indurate, and somewhat convex. The free part, or limb, is ordinarily triangular or ovate, often acuminate, usually with a wide or narrow membranous wing-like margin. The firm opaque central part of the limb ordinarily has several to many nerves, parallel or tending to converge toward the apex. These may in some species tend to anastomose somewhat. They may merely be visible on the outer surface or they may actually be raised, giving a striate appearance. The central nerve rarely may be raised enough to form a keel or crest. The central area may be slightly or conspicuously scabridulous or papillate-scabrous, rarely pilose, and the margins are usually scabrous-ciliate. The nerves may be greenish or purplish. The apical part varies from acute, or even obtusish, to more usually somewhat or quite acuminate. The tip is ordinarily slightly to notably bifid, rarely only very slightly so and then slightly hispidulous. The second or upper glume is involute and boat-shaped,

less prominently nerved, often carinate, usually acuminate. This spikelet is biflorous, the lower floret staminate, the lemma and palea hyaline, the latter binerved and enclosing three stamens. The upper flower is hermaphroditic, the lemma greenish, trinerved, bifid, bearing a mucro or more usually a prominent awn, this strongly twisted in basal part, distally once or rarely twice geniculate. The palea is binerved, concave, enclosing the two lodicules, three stamens, an ovary with two styles, the terminal portions exerted and plumose-stigmatic.

At present we recognize seven species of *Ischaemum* in Micronesia. Of these one includes four varieties, two of the others two varieties each. Three of these varieties are proposed as new. Three others are the "nominated" varieties of species, and two others were formerly regarded as full species.

These taxa may be distinguished by use of the following key. Short characterization of the taxa, with synonymy, and citations of Micronesian specimens, are given below.

Key to the Micronesian species of *Ischaemum*

1. Lower part of lower glume of central spikelet
transversely corrugated *I. rugosum* var. *segetum*
- 1'. Lower part of glume not corrugated 2
 2. Lower smooth indurate part of lower glume of central
spikelet half or usually more than half the length of
the glume, limb of this glume not strongly striate,
racemes stiffly appressed together (*I. muticum*) 3
 - 2'. Lower smooth part of lower glume half or usually
less than half length of glume, limb striate or
scarcely so 4
3. Spikelets entirely without awns, or if these
present reduced to mucros less than 3 mm
long *I. muticum* var. *muticum*
- 3'. At least some spikelets in panicle with short
awns *I. muticum* var. *aristuliferum*

4. Nerves of limb of lower glume of central spikelet 3-5, racemes 25
- 4'. Nerves of limb of glume of central spikelet usually 6 or more, usually prominent and scabrous, limb usually appearing striate 6
5. Awns conspicuous, on central and lateral spikelets, nerves of limb of glume of central spikelet not or scarcely anastomosing *I. setaceum*
- 5'. Awns small, inconspicuous, nerves of limb green, tending to anastomose, not raised or scabrous *I. indicum*
6. Racemes appearing copiously long-hairy (*I. longisetum*) 7
- 6'. Racemes not appearing copiously hairy 8
7. Awns conspicuous, mostly 2 - 3.5 cm long, limb of lower glume of central spikelet strongly nerved, striate *I. longisetum* var. *longisetum*
- 7'. Awns not very conspicuous, 8 - 15 mm long, nerves of limb 6 - 8, scaberulous, not prominent, limb not appearing striate *I. longisetum* var. *raulersoniae*
8. Spikes 2, plants slender, leaves linear, mostly less than 1 cm wide *I. timorense*
- 8'. Spikes 3 or 4 or more, plants robust, leaves mostly more than 1 cm wide, tending to be linear-lanceolate (*I. polystachyum*) 9
9. Limb of lower glume of central spikelet distally pilose *I. polystachyum* var. *polystachyum*
- 9'. Limb of lower glume at most scaberulous, puberulent or papillose 10

10. Limb of lower glume of central spikelet broadly white-margined, its apex not or scarcely bifid, lightly hirsutulous nerves not usually prominent *I. polystachyum* var. *intermedium*
- 10'. Limb of lower glume narrowly margined, apex definitely bifid, not hirsutulous, nerves usually prominent, surface appearing striate 11
11. Leaf-sheaths prominently long-hirsute, limb of lower glume of central spikelet winged, the wing purplish with white edge *I. polystachyum* var. *billii*
- 11'. Sheaths only slightly long-hirsute on edges and summits, limb narrowly margined *I. polystachyum* var. *chordatum*

Ischaemum L., Sp. Pl. 1049, 1753. Lectotype - *I. muticum* L.

Ischaemum indicum (Houtt.) Merr., Jour. Arn. Arb. 19:320, 1938.

Pbleum indicum Houtt., Nat. Hist. II, 13:198, t. 90, f. 2, 1782.

Slender, ascending to 0.5 m in dense patches or clumps, nodes somewhat bearded on one side; leaves glabrous except for slight pilosity at base of blades, these lanceolate or linear-lanceolate, 5-10 cm long, 8-15 mm wide, ligule somewhat hispid-ciliate; racemes 2, closely appressed, base enclosed by bracteal leaf, green, not at all purplish; rachis joints 3 mm long, long-ciliate, hairs ascending; glume of central spikelet 5 mm long with broad white wing-margins above acute or more or less obtuse, irregularly serrulate, nerves green, few, irregular, slightly anastomosing, awns spreading, short and very slender.

Found from Yap to Ponape in the Caroline Islands, most collections from atolls, if not native at least very well-established.

CAROLINE ISLANDS: Yap, s. l. **Wong 523** (US). Truk: Moen I., Mt. Takeum, 850 ft. **Hosaka 2711** (US). Murilo Atoll, Ruo I., **Evans 1177** (US, BISH, POM, NY). Losap Atoll, Losap I. **Evans 1334** (US). Lukunor Atoll, Oneap I., **Anderson 2096** (US, BISH, POM); Lukunor I., **Anderson 2148** (US, BISH, POM). Satawan Atoll, Moch I., **Anderson 969** (US, BISH, POM).

Ischaemum longisetum Merr., Phil. Jour. Sci., Bot., 9:52, 1914.

A fairly sturdy plant, tufted, upright to ascending, glabrous or nearly so except inflorescence, leaves narrowly lanceolate; racemes 2, stout, up to 10 cm long, appearing very hairy.

It is endemic to the Marianas Islands, where it has two varieties.

This is very close to *Ischaemum byrone* (Trin.) Hitchc. of Hawaii (and possibly southern Polynesia), further study may show it to be only a variety.

Ischaemum longisetum Merr. var. *longisetum*

Awns mostly 2 - 3.5 cm long, limb of glume of central spikelet strongly striate.

Found on Saipan, Rota and Guam (type locality), usually on coastal limestone.

MARIANAS: Saipan: s. l., **Stephens 44** (US). Raurau, **Hatusima 10687** (FU); Mt. Tapotchau, E. slope, 25 feet, **Hosaka 2972** (US, BISH, POM); Bird (Sukimi) Island Beach, **Evans 2324** (US, BISH, POM. NY). Tinian: Chiget Bay, **D. R. Smith** (Falanruw's) **1289** (US, GUAM) sterile, probably this. Rota: Sabana, **Necker RS-32** (US). Guam: s. l. **Marche 95** (P, POM); Cabras Island, **McGregor 502** (US, holotype); Marine Beach near Yona, **Stone 4425** (GUAM); Tagachan Bay, **Stone 3985** (US, GUAM); Ypan Point, **Stone 4302** (US, GUAM); Asiga, Maloloj, **Falanruw 1571** (US, GUAM).

Ischaemum longisetum var. *raulersoniae* Fosberg and Sachet n. var.

Ischaemum sp. of Fosberg et al., Smithsonian Contr. Bot. 22:13, 1975.

Aristae 7 - 10 mm, maxime 15 mm, longae.

Plant robust, somewhat more so than is usual for var. *longisetum*, somewhat decumbent at base and rooting at lowest nodes; spikes usually 2, 5-7 cm long when well developed, usually somewhat purplish, appearing copiously silk-villous from the hairs on the edges of the pedicels and rhachis, which reach 5 mm, awns much shorter and less conspicuous than in var. *longisetum*, 8 to 15 mm long, limb of glume of central spikelet not strongly

striate, nerves 6 - 8, scaberulous.

This northern Marianas population is clearly close to var. *longisetum* but differs in a number of characters. Further study may show that it is sufficiently distinct to be given specific rank. Named for Dr. Lynn Raulerson, who drew our attention to its distinctness, after collecting it on Pagan.

Endemic to the northern Marianas volcanoes, probably on most of them.

MARIANAS: Asuncion: Upper SW slope of volcano, 1500 ft, **Falanruw 2310** (GUAM); **2298** (GUAM) (an unusually slender plant). Pagan: s. l. July 30, 1934, **Hosokawa 7952** (US, holotype, GUAM, isotype), **7952a** (US); slope of inner cone of caldera, Mt. Pagan, 502 m, **Falanruw 3276** (US); W side of isthmus at Salafai, on W coast N of Puntan Diablo, 10-40 m. **Raulerson 1059** (US, GUAM); inside Mt. Pagan, SW side, **Villagomez 3 KJV** (US, GUAM); crater floor, **P. H. Moore 379** (US, GUAM). Alamagan: summit, **Hosokawa 7911**; Sarigan: behind village, **Evans 2365** (US, BISH, POM, NY). Anatahan: coastal grassland, **Hosokawa 7843, 7869**.

Ischaemum muticum L., Sp. Pl. 1049, 1753.

Rather coarse plant with racemes stiff and tightly appressed, rhachis branches minutely ciliate or glabrous, spikelets muticous or with short inconspicuous awns, lower glume of central spikelet smooth and indurate half or usually more than half-way to summit, limb not strongly striate.

A widespread Indo-Pacific species with two not very distinct varieties in Micronesia.

Ischaemum muticum L. var. *muticum*

Awns absent or reduced to mucros less than 3 mm long.

We know the typical form of this species from Palau, Truk, and Nomwin, in the Caroline Islands. We have not seen **Volkens 438** from Yap, so cannot confirm its presence there.

CAROLINE ISLANDS: Palau: Babeldaob I., Ngial, **Hosaka 3391** (US, BISH); Koror I., **Otobed PS-10111** (US); Ngebekure, **Blackburn 210**

(US), plant usually slender; Ngarakabesang I., W. side near old Japanese seaplane base, 1 - 20 m, **Fosberg 25628** (US, BISH, P, UC); Malakal I., 15 m, **Fosberg 47588** (US, BISH); Angaur I., Lake C, **Stemmermann 3377** (BISH); 0.5 mi E of boat basin, 1 m, **Canfield 215** (US); W coast S of phosphate works, 1 m, **Fosberg 31963** (US, BISH, POM, BRI).

Truk: s. l. **Wong 240** (US); **Ledermann 10423** (B); **Hosokawa 6497** (US); Moen I., **Niering 779** (US); **Hosaka 2696** (US, BISH, TI, MO); 50-100 m, **Evans 758** (US, BISH, POM, BRI); S of Moen village, **Anderson 736** (US, BISH, POM, K, BRI); Natsushima I., **Takamatsu 114a** (BISH), **301** (US); Tol. I., Munien, **Hosokawa 8338** (US, POM); Pis I., 1 - 2 m, **Fosberg 24681** (US, BISH, NY, L).

Nomwin Atoll: s. l. **Evans 1056** (US).

Ischaemum muticum var. *aristuliferum* Fosberg and Sachet, n. var.

A var. *muticum* aristulis in spiculis differt.

Differs from var. *muticum* in the presence of small awns, up to 6-8, rarely 10, mm long, not or scarcely geniculate.

This population, known from Palau, Yap and Ponape closely resembles typical *I. muticum* in its closely appressed racemes, indurated part of the lower glume at least half the total length of the glume, and limb not noticeably striate or scaberulous. In its awns and occasional longer limb of lower glume it suggests *I. polystachyum* var. *chordatum*. It could conceivably have originated by introgression from that species. Although recognizable as *I. muticum* on inspection it is difficult to be sure of by use of the key. In the past it has usually been called *I. chordatum*. The absence of var. *muticum* from Yap and Ponape is a point against hybrid origin.

CAROLINE ISLANDS: Palau: Kayangel Atoll, Ngayangel I., **Gressitt 41** (US); Babeldaob I.: Garamiscan Colony; Ngarumiscang River, **Fosberg 25725** (US holotype, BISH, TI, CANB, UC isotypes); Koror I., **Stone 4603** (US, GUAM). Ngarakabesang I., near old Japanese seaplane base, 1 - 20 m, **Fosberg 25623A** (US); Urukthapel I., road up to lighthouse, **Fosberg 32033** (US, BISH, MO, BRI, K, POM).

Yap: s. l., **Wong 523** (US); Dinay, main N-S road, **Cushing 302** (US); 0.5 km S of Dulucan, SW end, 10 m, **Alvis 95** (US, BISH, POM, NY); Tomil I., 100 ft., **Hosaka 3249** (US, BISH, MO).

Ponape: Meohikku, 2-0 ft., **Hosaka 3484** (US, BISH, L, A. POM); Mt. Peipalap, 900 ft. **Glassman 2317** (US); Kamal, **Hosokawa 6107** (US); near Colonia, **Stone 1962** (GUAM).

This may be the best disposition of a robust specimen from Ponape, Nanpil River below Reservoir, **Fosberg & Falanruw 58416** (US, BISH, K, POM, BRI, MO). It matches *I. muticum* with awns, but the inner edges of the rachis segments are copiously ciliate, the outer edges scarcely so.

Ischaemum polystachyum J. S. Presl in C. B. Presl., Rel. Haenk., 1:328, 1830 (sensu lato); Ohwi, Bot. Mag. Tokyo, 55:551, 1941.

Ischaemum digitatum Brongn. in Duperrey, Voy. Coquille, Bot. 2:70, 1831.

Ischaemum digitatum var. *polystachyum* (Presl) Hack. in DC., Mon. Phan. 6:233, 1889; Merr., Phil. Jour. Sci. Bot., 9:51, 1914.

Ischaemum intermedium Brongn. in Duperrey, Voy. Coquille, Bot. 2:73, 1831. Ohwi, l. c.; Burcham, Contr. U. S. Nat. Herb., 30:433, 1948.

Spodiopogon chordatum Trin., Mem. Acad. Petersb., 6 (2): 303, 1832.

Ischaemum chordatum (Trin.) Hack. ex. Warb., Bot. Jahrb., 13:260, 1890.

Andropogon mariannae Steud. Syn. Pl. Glum., 1:382, 1854.

Andropogon paniceus Steud., op. cit. p. 375.

Plant decumbent, elongate, branched, forming tangled masses, flowering culms usually erect or ascending; leaf-sheath glabrous to long-hirsute, summit usually hirsute, blade glabrous or sparsely hirsute, margins scabrous; inflorescence of 2 - 5, rarely more, racemes, these digitately arranged, somewhat spreading, usually brownish or purplish, margins of segments somewhat to conspicuously ciliate, hairs on outer margins ascending, those on inner margins spreading; central spikelet usually broadest below middle, with a geniculate awn, twisted at base, lateral spikelet with a smaller awn, often not or scarcely geniculate, often inconspicuous or lacking; lower glume of central spikelet with lower smooth indurate part usually less than half length of spikelet, limb acute to usually acuminate, often striate.

In the broad sense adopted here this species has usually been called *I. digitatum*, *I. chordatum* or *I. digitatum* var. *polystachyum* but for the aggregate *I. polystachyum* has priority at the specific level.

The species is widespread in the western Pacific and polymorphic. The Micronesian plants seem to fall into four varieties, three of which have usually been regarded as species. The differences are slight, tenuous, and

inconstant. It will be interesting to see how well these varieties stand up when the key is tried out in the field.

Ischaemum polystachyum Presl var. *polystachyum*

Ischaemum digitatum var. *polystachyum* (Presl) Hack. in DC., Mon. Phan.6(1):233, 1889.

Plants rather coarse, to 0.5 m tall, nodes bearded; racemes several; awns of lateral spikelets much smaller than those of central ones; limb of lower glume of central spikelet pilose, striate, acuminate; apex bifid, margin very narrow.

We have only seen two collections of this, one of them a fragment of the type. The variety is known only from the Marianas. The type was said by Merrill to come from Guam, but the label says "Mariana Haenke" and in the original publication, "Hab. in ins. Marianis". Otherwise it is known only from Rota. The pilose limb of the lower glume is distinctive, not found in other Micronesian taxa.

MARIANAS: s. l. *Haenke* (US, fragment of type). Rota: Sabana, 1400 ft., Hosaka 3036 (US, BISH, POM, NY, L).

Ischaemum polystachyum var. *chordatum* (Trin.) Fosberg & Sachet, n. comb.

Spodiopogon chordatum Trin., Mem. Acad. Petersb., 6(2):303, 1832.

Ischaemum timorense var. \S *chordatum* (Trin.) Hack. in DC., Mon. Phan., 6(1):231, 1889.

Rarely slender to often robust, forming tangles, nodes glabrous to somewhat bearded; sheaths scarcely to conspicuously hirsute; racemes not usually conspicuously hirsute, rachis joints scarcely to somewhat ciliate on outer margins; limb of lower glume acuminate, striate, not at all pilose, but somewhat scabrous or papillose, nerves usually more than six, margins narrowly to moderately winged, apex at least slightly bifid.

This variety is variable and hard to define, extending over a vast range in the western Pacific and Malesia, as defined here possibly containing more than one entity. Careful biosystematic study would be required to reveal these convincingly. This is the plant usually referred to as *I. digitatum* or *I. digitatum* var. *polystachyum*. *Spodiopogon chordatum* was described from the Marianas and Carolines. We have not seen Trinius specimens, but

have little doubt that the Marianas element belongs to var. *polystachyum*. We hereby select the Caroline specimen as representing var. *chordatum*. Since we have not seen the syntype specimens we cannot formally lectotypify *S. chordatum* Trin. The specimens are probably in Leningrad.

CAROLINE ISLANDS: Palau: s. l. **Richardson 51** (US); Babeldaob I.: central Ngeremlengui Mun., just N of upper Ngarmiskari River, 15 m, **Canfield 608** (US); Gaspan (Ngatpang), **Hosokawa 9643** (US); Arumongsogen, near Arumaten, **Hosokawa 6779** (US, fragment); Medorme village, Aimeliik, **Timberlake & Johannes 3027** (US), **3036** (US); Nekken Forest Station, Aimeliik, **Timberlake & Johannes 3003** (US). Koror I., N section, **Hosaka 3343** (US, BISH); Ngarmid, 25 m, **Fosberg 47502** (US, BISH). Malakal I.: road from Koror to docks, **Evans 561** (US, BISH, POM, NY). Araka-besan (Ngarakabesang) I., W side near old Japanese seaplane base, **Fosberg 25656** (US, BISH). Aulupse'el I., 0-5 m, **Fosberg 32366** (US, BISH). Yap: Tomil, 100 ft., **Hosaka 3283** (US, BISH); 1/2 mi NE of pond near Derikan, 20 m, **Fosberg 46594** (US); ridge above Nimar, NN W of Colonia, 60 m, **Fosberg 46521** (US, BISH); Mt. Matade, 160 m, **Fosberg 25534** (US, BISH); near Tabunifi, S Yap, 5 m, **Cushing 380a** (US).

Ponape: s. l. **Ledermann 13915** (B). A slender form approaching *I. indicum*, but with the racemes of *I. polystachyum* and spikelets long and shaped like those of var. *chordatum*, but with fewer and less prominent nerves, awns very inconspicuous, is probably best placed here pending a thorough study of the genus in Ponape.

Ischaemum polystachyum var. *hillii* Fosberg and Sachet, n. var.

Vaginae foliorum valde villosae; racemae articulis valde ciliatis, limba glumae inferiorae centralis spiculae alata, valde papilloso-scabrida, apice bifido.

Sheath very pilose, rachis joints strongly ciliate; limb of lower glume of central spikelet broadly winged, striate and strongly papilloso-scabridulous, apex deeply bifid.

This specimen is distinct enough to suggest that it represents a separate population rather than a casual variation.

CAROLINE ISLANDS: Palau: Koror, Ngerebeched, 90 ft., **Hill 6** (US, holotype, GUAM, isotype).

Ischaemum polystachyum var. *intermedium* (Brongn.) Fosberg and Sachet, n. comb.

Ischaemum intermedium Brongn. in Duperrey, Bot. Voy, Coquille, 2:73, 1831; Fl. Deutsch, Schutzgeb. Suds., 170, 1901; Ohwi, Bot. Mag. Tokyo, 55:551, 1941; Burcham, Contr. U. S. Nat. Herb., 30:433, 1948. Glassman, Bish. Mus. Bull. 131, 1952.

Andropogon paniceus Steud., Syn. Pl. Glum., 1:375, 1854 (based on same collection as *Ischaemum intermedium* Brongn.)

Plant slender to robust, nodes at least slightly barbate; leaves glabrous except hirsute base of blade and summit of sheath; inflorescence of 2 - 4 racemes, segments with outer margins notably villous, hairs ascending; central spikelet with awn about twice length of spikelet, to 1 cm, limb of glume acute to somewhat acuminate, apex scarcely or not bifid, ending in several short stiff hairs, margin broadly winged, central portion scarcely striate, nerves few, tending to be slightly anastomosing, scarcely scabrous or papillate.

This variety is usually regarded as a distinct species, and could be so maintained except that in all characters it intergrades with var. *chordatum*. The number of racemes is usually 2 in the specimens we have seen, except **Cushing 448** from Yap. The best character seems to be the very broadly winged glume of the central spikelet with few (6 or less) nerves. The outline of this spikelet is, because of the wide margins of the limb, broadest at or slightly above the middle.

Reported widely from Micronesia, New Guinea, Moluccas, and the Philippines, but we have studied material only from the Carolines. The type is the d'Urville collection in Paris from Ualan (Kusaie).

CAROLINE ISLANDS: Palau: Babeldaob I., upper Ngarumiscang River, **Fosberg 25726** (US, BISH, POM, NY). Koror I., **Otobed PW-10091** (US). Pelilju I., acc. Burcham 1948.

Yap: summit of Mt. Matade, 150 m, **Cushing 448** (US). Ifaluk Atoll, Falalap I., **Fosberg 47253** (US, BISH, POM, NY). Ponape: Not (Net) Distr.: Nanpil, lower part of Tawenjokola River, 100 m, **Fosberg 26249** (US, BISH, POM, NY); Colonia, **Fosberg 26304a** (US). Ualan (Kusaie), **d'Urville** (P, 2 sheets, syntypes, US, fragment).

Ischaemum rugosum Salisb. Ic. 1:t.1, 1791.

Widespread species reported from Guam and Palau. Our plants seem to belong to var. *segetum* (Trin.) Hack.

Ischaemum rugosum var. *segetum* (Trin.) Hack. Mon. Phan., 6(1):208, 1889.

Ischaemum segetum Trin., Mem. Acad. Petersb., 6(3):294, 1832.

Large but rather slender plants, nodes bearded, leaves with blades up to 15 - 20 cm long, to 10 - 12 mm wide, lightly appressed villous, sheaths ciliate, appressed villous especially toward summit and around mouth; raceme single, somewhat exerted, to 11 cm long, with well-exerted awns, rhachis joints prominently ciliate; glume of central spikelet oblong, about 3/4 indurated, this portion strongly transversely rugose, limb ovate, obtuse to somewhat acute, hirsute-ciliate toward apex, striate but not prominently so, greenish.

This is widespread in South Asia and rare in Micronesia, probably introduced. The transverse wrinkles on the glumes are diagnostic for Micronesian plants.

MARIANAS: Guam: s. l., **G.E.S. 213** (US), **Nelson 212** (BISH).

CAROLINE ISLANDS: Palau: Babeldaob I., Ngardok, **Hatusima 5025** (FU).

Ischaemum setaceum Honda, Bot. Mag. Tokyo, 17:122, 1923; 38:54, 1924.

Slender, ascending to erect; leaves small, linear-lanceolate, blades to 7 cm long, sparingly long pilose, especially at base, sheaths glabrous; racemes 2, 2.5 - 5 cm long, rhachis segments copiously long-pilose on outer angles, base of short pedicel of central spikelet bearded; glume of central spikelet about 4 mm long, lower indurate part about 1/4 the length of the glume, limb acuminate, apex bifid, central part with 3-5 nerves thinly and minutely scabrid, narrow margined; both central and lateral spikelets notably awned.

A Formosan species, now first recorded from Micronesia.

CAROLINE ISLANDS: Ponape: s. l., **Ledermann 13558** (B); Nanna Kawort, **Nakao** in 1941 (KYO); bet. Nanpil and Palikir, 100 - 150 m, **Fosberg 26273** (US); Langar, **Hollier 123** (HBG).

Ischaemum timorense Kunth, Rev. Gram., 1:369, pl. 98, 1839; Enum. Pl. 1:512, 1833.

A slender, usually creeping grass with linear leaves, mostly 10 mm or less wide, rarely to 15 mm, more or less glabrous except somewhat long-

pilose, sheath glabrous or sparingly pilose; racemes 2, usually (2-) 4 - 6 (-7) cm long, rachis segments about 3 cm, long-ciliate, central spikelet with lower glume lanceolate to narrowly ovate, lower indurate part rather convex, sides of indurate part usually produced along edges, limb narrowly ovate, margin narrow to broad, acuminate, somewhat striate, not strongly scabrous, somewhat purplish, awn of lateral spikelet shorter than that of central spikelet.

Apparently common in the Carolines, though it has not been reported earlier. A slender creeping plant with two racemes.

CAROLINE ISLANDS: Palau: s. l. **Ledermann 14093** (B); Babeldaob I.: Gaspan (Ngatpang), **Stone 4617** (GUAM). Peliliu, 20 ft., **Burcham 151** (US). Yap: Tomil, 100 ft., **Hosaka 3286** (US, BISH, POM); S. Yap, **Cushing & Cushing 340b** (US). Woleai Atoll: Sholiap (Saliap) I., **Fosberg 47039** (US, BISH, POM), **47036** (US). Truk: Moen I., E. ridge of Mt. Winipwen, **Fosberg 60260** (US). Ponape: Kolonia, **Fosberg 58561** (US, BISH); Agriculture Station, **Fosberg 60529** (US, BISH); Sekele, SW of Kolonia, **Fosberg 58457** (US, BISH).

Ischaemum barbatum [Retz.?] was reported from Rota by Gaudichaud, Bot. Voy. Uranie 82, 1826, but with no descriptive information. We have no idea what plant this may have been.

6. *LEPTUROPETIUM* MORAT IN MICRONESIA

Mrs. Janet Lamberson, in July 1976, collected an unfamiliar grass in Eniwetok, northern Marshall Islands. It has somewhat the habit of *Lepturus repens* (Forst. f.) R. Br. but differs in a number of features.

It was called *Chloris* sp. by St. John, but after we saw the specimens this did not seem to us a good disposition of it. It resembled no *Chloris* known from Micronesia, but since it came from near an airport could well be a recent introduction. After showing it to several grass specialists in or visiting Washington with no results, we sent it to Dr. Dennis Anderson, monographer of *Chloris*. He returned it, saying it was nothing he had seen before. After comparing it with a sheet of the recently described *Austrochloris* Lazarides, at Anderson's suggestion, and finding they had only superficial similarity, we sent it to Dr. Derek Clayton at Kew. He likewise had no suggestion and the plant lay for a couple of years unidentified. Then Clayton called our

attention to the recent publication of *Lepturopetium* Morat (1981) from Ile des Pins, New Caledonia, suggesting that this was probably our plant.

We were fortunately able to borrow an isotype of *Lepturopetium kuniense* Morat, type and only species of this genus, from the Laboratoire de Phanérogamie, Muséum d'Histoire Naturelle, Paris. We are glad to acknowledge the kindness of the Paris herbarium authorities for enabling us to arrive at an interim solution to this problem.

The occurrence of a previously unknown grass on Eniwetok, a low coral atoll, is unexpected and unlikely. The following notes are therefore of more than usual interest.

Lepturopetium Morat, *Adansonia*, 20:377, 1981.

A wiry grass with the habit of *Lepturus* R. Br. but differing in various details, especially in spikelets with 2-3 florets, and with a distinct lower glume. Its author places it in the tribe Chlorideae, where, indeed, several of its characters would indicate that it belongs. A consideration of its entire morphology suggests that perhaps the separation of the tribe Leptureae from the Chlorideae might well be reconsidered.

The following notes were made during a reexamination of an isotype of *Lepturopetium kuniense* Morat, the type and only species of the genus. Then follows a comparison of *L. kuniense* with the Eniwetok plant, and a description of the latter, which in our judgment is best considered a second species of *Lepturopetium*. Some speculations are then presented bearing on a possible origin for this genus and its two species.

Lepturopetium kuniense Morat, *Adansonia*, 20:378, 1981.

Stems decumbent, branched, rooting at the 2-3 lower nodes, stems compressed, nodes glabrous; leaves with sheaths sparsely villous above, on some leaves rather densely so; ligule densely short hirsute or hirsute-ciliate, blade scabrous above on nerves, margins scabrous and tending to be unfolded or unrolled; spike single, with spikelets distichously arranged, the subsecund arrangement emphasized by Morat not evident to us; rachis smooth, flattened, edges flat perpendicularly to flattening of the rachis, sinuous. Spikelets semi-embedded in rachis, no trace of articulations in rachis (one spikelet seems to have become detached for study and lost, apparently disarticulated below glumes), attachment glabrous; lower glume an ovate-triangular uninerved hyaline scale, upper glume broadly lanceolate, acuminate, strongly nerved, callus at base of lemma somewhat hirsute, lemma of

fertile floret definitely bifid and awned (midnerve prolonged), awns in central part of spike longer and somewhat geniculate and curved, lemma margins enfolded around palea, palea margins finely ciliate, sterile floret similar but reduced, borne on a somewhat elongated, hairy rhachilla, containing at least a rudimentary pistil; fruit unavailable.

NEW CALEDONIA: Ile des Pins, vers Baie des Kounie, Schmid 2103 (P, isotype, photo in US).

Lepturopetium marshallense Fosberg and Sacht

Ab *L. kuniense* differt caule vix compresso, vagina foliae glabra, ligula reducta, lamina basi longe-pilosa, spicis plerumque binis, rhachide scabro, spicula triflora, flosculis fertilis 2, sterili 1, gluma infra majori, scabra.

Wiry grass, lower stems and culms only slightly compressed; leaves with sheaths glabrous, ligule very short, very short-ciliate, hairs 0.2 mm long, not hirsute-ciliate, base of blade up to 2.8 mm wide, infolded and inrolled, scabrous above, papillose beneath on nerves, very scabrous beneath near apex; spikes long-exserted, 1-3 on a peduncle, mostly paired, erect, rhachis spinulose-scabrous or scabrous-ciliate on margins, scabrous dorsally, appressed hirsute below attachment of spikelets, these 10-16 on a spike, appressed to rhachis in shallow grooves, with 2 well developed florets and one much reduced upper one; glumes unequal, lower 2 mm or slightly more long, ovate-lanceolate, acuminate, falcate, concave, 1-nerved, scabrous toward tip, membranous portions purple, one margin exposed, the other between lemma and rhachis, upper glume 4.5-6 mm long, ovate-lanceolate, acuminate or shortly awn-tipped, central portion greenish, with 3-4 principal nerves, 2-3 faint ones between principal ones, nerves slightly scaberulous, acumen more strongly so, wing margin broad, thin, purple; callus below lower floret hirsute, lower floret with lemma slightly indurate, slightly bilobed, scabrous distally, hirsutulous at apex, with a scabrous awn about 2.8-3 mm long, one nerve from about half-way up, excurrent as the awn, an oblique pit or thin shrunken area at base, palea very thin, hyaline margin ciliate, apex blunt, enclosing 3 stamens, 2 dark purple pistils; second floret on a short rhachilla, with a thinner but similar lemma with an equal or shorter awn, similar palea, well-formed stamens and pistil; rhachilla slightly prolonged, glabrous, ending in a minute sterile floret with reduced lemma (and palea?) but no rudiments of stamens or pistil; fruit not seen.

The new species differs especially in its less compressed stems, glabrous sheaths, reduced ligule, long hairs on base of blade, mostly paired spikes

with scabrous rhachis, spikelets with 2 fertile and one sterile florets, scabrous, larger lower glume, less regularly nerved upper glume.

It is known only from the two sheets of the type collection, cited below. This is a flat disturbed area of coral sand and gravel, the scene of severe fighting during World War II, and of much military activity since, due to testing of atomic weapons and use as missile-range target.

MARSHALL ISLANDS: Eniwetok Atoll, near M-Boats, north of runway, center of Medren (Parry) Islet, 22 July [19]76, **Lamberson s. n.** (US, holotype, K, isotype).

It seems scarcely likely that this species could be an endemic on Eniwetok, a low coral atoll, but we have seen no other specimens. It may have been brought accidentally by human agency, or on the feet of seabirds, but from where?

We have discussed with colleagues the possibility that both species of *Lepturopetium* may be hybrids between *Lepturus repens* and one or more species of *Chloris*. *Lepturus* was growing with both *Lepturopetium* species. No *Chloris* were recorded, but *C. inflata* is found everywhere in the Pacific. Such a hybridization might account for our not finding any caryopses, though, of course this may merely be the result of the specimens being too young.

Pollen preparations stained with cotton blue, were made of both these species by Mr. Royce Oliver. *L. marshallense* showed no pollen or almost none in a number of anthers. *L. kuniense* had some fertile pollen but a large proportion was sterile. Professor G. Ledyard Stebbins kindly examined these preparations and said they were certainly compatible with the theory of hybrid origin of these populations. He attempted on the basis of morphological differences from *Lepturus repens* to get an indication of what the putative other parent would have been like. We then compared the results with grasses known to occur or to have occurred on Eniwetok. None of them suggested even a possibility of providing the non-*Lepturus* characters of the *Lepturopetium* species under study.

We do not suggest abandoning this generic concept because of the suggestions made above. It is a definable reality, and even if hybrid origin should be demonstrated, it might serve as a demonstration of one of the

behavior of this interesting group.

It seems rather unlikely that the two known localities are its total range. Its strong resemblance to the very common *Lepturus repens* may have caused it to go unnoticed in the numerous available coral limestone habitats on the hundreds of islands in the Indo-Pacific region. Perhaps the publication of a second species of *Lepturopetium* may stimulate more careful observation with the possibility of locating further localities for it.

7. OPLISMENUS IN MICRONESIA

Oplismenus Beauv. is a difficult genus wherever it is found, and the Micronesian ones are no exception. Although the plants vary widely in appearance, and although it is not especially difficult to sort the Micronesian ones, if fertile, into taxa on general appearance, to define these taxa critically one must resort to using characters that are scarcely convincing.

The genus is a small one, with a total of less than a dozen species, and it has a characteristic habit that makes it easy to recognize though less so to describe. Its stems are leafy, creeping or decumbent, with spicate or racemously branched panicles, these terminal and tending to be somewhat ascending, spikelets panicoid with glumes and lemmas usually awn-tipped or at least mucronate (in one species the sterile lemma is muticous), leaf-blades held horizontally, thin, lanceolate to ovate or elliptic, often with a notably undulate appearance.

Oplismenus has been treated taxonomically twice in recent years (Davey and Clayton, Kew Bull, 33:147-157, 1978; Scholz, Phanerog. Monogr., 13:1-213, 1981). We have used both of these treatments in attempting to interpret the Micronesian taxa. Neither treatment seems completely satisfactory for our local populations, though in broad outlines both are improvements over previous dispositions of our several forms.

As treated by Davey and Clayton our plants fall simply into two species, *O. compositus* and *O. birtellus*, with no populations of lesser rank recognized. Scholz' treatment segregates out numerous subspecies and varieties into considerably more species in the genus. Our plants fall, though not very clearly, into the same two species, *O. compositus* and *O. birtellus*, in Scholz' arrangement, but it is by no means obvious how *O. aemulus* (R. Br.) R. & S. is different from *O. birtellus* except the awns seem very short or lacking. Many of Scholz' taxa seem to have little or no geographical coherence; she cites very little Pacific Islands material and none from Micronesia. Her

keys to the "subspecies" in *O. birtellus* do not yield convincing groups when applied to our material. So, our solution has been to sort the available Micronesian specimens into recognizable populations, then to apply the names used by Scholz or by Ohwi, whose work with eastern Asiatic plants has frequently proven applicable in Micronesia. Since we cannot appreciate the basis for Scholz' distinction between her varieties and her subspecies, we have chosen to use the rank of **varietas** and to make the appropriate nomenclatural combinations where they do not already exist.

Our key to Micronesian taxa will work, we think, with most fertile specimens. Our disposition of sterile specimens amounts to little more than educated guessing, but fits the general distributional pattern. There are, to the best of our knowledge, no taxa of *Oplismenus* peculiar to Micronesia. Experimental work would be desirable to determine how well the varieties, and even the species, retain their distinctness when grown under uniform cultural conditions.

Key to Micronesian Taxa of *Oplismenus*

1. Raceme branches (rhaches) usually 1.5 cm or longer, spikelets loosely arranged, leaves elliptic or ovate, at least 3-4 cm long - (*O. compositus*) 2
- 1'. Raceme branches usually less than 1.5 cm long, spikelets crowded, leaves narrow or broad - (*O. birtellus*) 3
2. Sterile lemma blunt. *O. compositus* var. *compositus*
- 2'. Sterile lemma shortly mucronate. *O. compositus* var. *patens*
3. Leaves 4-9 cm long, narrowly ovate or elliptic, or, in Micronesian plants, lanceolate, raceme branches developed, straight, ascending or appressed to rhachis, not or seldom tending to be reflexed. *O. birtellus* var. *birtellus*
- 3'. Leaves lanceolate, ovate-lanceolate or narrowly elliptic, raceme branches very short or reduced to fascicles or to single spikelets 4
4. Raceme branches or fascicles of several spikelets, becoming smaller distally, lower ones tending to be reflexed, leaves usually 1.5-3 cm long *O. birtellus* var. *imbecillis*

- 4'. Fascicles reduced to 1-2 (-3) spikelets, leaves usually 1-2 cm long *O. birtellus* var. *microphyllus*

Since most of the distinctions between the taxa are brought out in the key, no descriptions are provided for them, except for brief comments where needed.

Oplismenus compositus (L.) Beauv., Ess. Agrost., 54, 169, 1812; Davey and Clayton, Kew Bull., 33:147-157, 1978; Ohwi, Bot. Mag. Tokyo, 55:547, 1941; Scholz, Phan. Monogr., 13:85-100, 1981.

Panicum compositum L., Sp. Pl. 57, 1753.

The two varieties that we recognize in Micronesia are both included by Scholz in subsp. *compositus*, but to direct attention to a plant with a feature that is an exception to one of the diagnostic characters of *O. compositus*, we are recognizing var. *patens* for our present purpose. It may be only a forma, or the result of introgression of genes from *O. birtellus*. Specimens that we have examined in herbaria elsewhere cannot be placed to variety without reexamination, which is impractical at present.

Oplismenus compositus (L.) Beauv. var. *compositus*

Plant not especially hirsute, leaves mostly well over 5 cm long; raceme branches elongate, ascending to erect, rachis of branch usually over 1.4 cm long.

This is by far the most common Micronesian form and is found usually in shade.

MARIANAS: Asuncion: SW slope, 400 ft., **Falanruw 2313** (US, GUAM). Agrigan: S side of island, **Fosberg 31605** (US, BISH, BRI, MO, POM). Alamagan; Asongsong Village, **Fosberg 31735** (US). Anatahan: N coast, below 60 m, **Falanruw 1964** (US, BISH); trail from W anchorage, 15 m, **Raulerson 1121** (US, GUAM). Guguan: W. slope, 175 m, **Falanruw 3123** (US). Saipan: s. l. **Kanehira & Hatusima 4311** (FU). Rota: s. l., **Necker R-73** (US); slopes above as Malote, 250 m, **Fosberg 31874** (US); below and NW of Mt. Taipingot, 1-5 m, **Raulerson 1486** (US, GUAM); back from Poniya Pt. to water caves, **Evans 2201** (US, BISH, K, P). Guam: **G.E.S. 198** (US).

CAROLINE ISLANDS: Babeldaob, Ngaraard, **Otobed PW-10169** (US). Yap: s. l., **Wong 182** (US, POM), **417** (US, POM); near Garguei, **Cushing 406**

(US, GUAM); trail from Catholic Mission to Mt. Matade, 30 m, **Cushing 472** (US, GUAM). Ulithi Atoll; Mogmog I., **Fosberg and Wong 25514** (US, BISH, POM, MO, P, BRI). Ifaluk Atoll: Ifaluk I., **Fosberg 47224** (US, BISH, POM, CANB, BRI, L, P). Truk: s. l., **Wong 182** (US, POM); Moen I., 500 ft., **Hosaka 2705** (US, BISH, POM); E end, 100-200 m, **Evans 777** (US, BISH, POM, BRI); Leul village, **Anderson 744** (US, BISH, MO, POM); Udot I., Monowe, 50 m, **Fosberg 60223** (US, BISH, POM, L, UC, KYO); Pis I., **Fosberg 24635** (US, BISH, CANB, L, NY). Nukuoro Atoll: Nukuoro I., **Fosberg 26229** (US, BISH, POM, L). Lukunor Atoll: Oneap I., **Anderson 2097** (US, BISH, POM, NY, L); Paifo I., **Anderson 2194** (US, BISH, POM, NY), Ponape: s. l., **Ledermann 13653a** (B) (? raceme branches too short); Metalanim, **Nakao** in 1941 (KYO); vic. Colonia, **Glassman 2579** (US); Sokehs (Jokaj), **Fosberg 58469** (US, BISH); 300 ft., **Hosaka 3509** (US, BISH, MO, NSW, L). Kusaie: S base Mt. Matante (Buache), 1-50 m, **Fosberg 26563** (US, BISH, POM, K, BRI); Mt. Tefayet, 500 ft., **Glassman 2690** (US). Mokil Atoll: **Glassman 2605** (US).

MARSHALL ISLANDS: Majuro Atoll: Laura, **Stone 1434** (GUAM); **Fosberg 26980** (US, BISH, TI, POM, CANB, K). Arno Atoll: Ine I., **Stone 1112** (POM). Jaluit Atoll: **Nakao** in 1941 (KYO).

Oplismenus compositus var. *patens* (Honda) Ohwi, Fl. Jap. 149, 1953.

Oplismenus patens Honda, in Fedde, Repert. Sp., Nov., 20:360, 1924. Sterile lemma shortly mucronate.

This is tentatively maintained though the differences are slight. It may be a result of introgression of genes from *O. birtellus*.

MARIANAS: Sarigan I., above village, 150-250 m, **Evans 2390** (US, BISH, POM, NY). Guam: s. l. **Clemens** in 1911 (US); Ritidian Pt., 400 ft., **Hosaka 3095** (US, BISH, POM, BRI); just S of North Field, 150 m, **Fosberg 32632** (US, BISH, POM, MO, L).

CAROLINE ISLANDS: Murilo Atoll: Ruo I., **Evans 1175** (US).

Oplismenus birtellus (L.) Beauv., Ess. Agrost., 54, 1812, Davey and Clayton, Kew Bull., 33:147-157, 1978; Scholz, Phan. Mon., 13:101-155, 1981.

Panicum birtellum L., Syst. ed. 10, 870, 1759.

A very polymorphic pantropical species, interpreted very inclusively by

Davey and Clayton, as well as by Scholz. Davey and Clayton do not maintain the numerous included variations and populations as formal named taxa. Scholz takes the opposite viewpoint, but her subordinate taxa frequently do not seem to have any geographical reality. We find it expedient to give names to such populations as can be reasonably distinguished morphologically. We tentatively distinguish three such taxa in Micronesia, here considered varieties.

Oplismenus birtellus (L.) Beauv. var. *birtellus*

Prostrate to slightly ascending, leaves (of Micronesian plants) lanceolate, 4-9 cm long, subglabrous, panicle branches 1-1.5 cm long, erect or almost so, glumes and lemmas mucronate to shortly awned, panicle and spikelets somewhat hirsute.

MARIANAS: Rota: Tatgua Dist., 5m, **Herbst & Falanruw 6751** (US).

Guam: Barrigada, 400-600 ft., **G. C. Moore 201** (US).

CAROLINE ISLANDS: Ponape: s. l., **Ledermann 13808** (B); Retau-neppichi, **Hosokawa 5577** (US).

Oplismenus birtellus var. *imbecillis* (R. Br.) Fosberg and Sachet, n. stat.

Orthopogon imbecillis R. Br., Prodr., 194, 1810.

Oplismenus imbecillis (R. Br.) R. and S., Syst., 2:487. 1817; Glassman, Bish. Mus. Bull. 132, 1952; Hosokawa, Jour. Soc. Trop. Agr. Taihoku, 7:319, 1935.

Oplismenus undulatifolius sensu auct. Pacif.; Merrill and Perry, Jour. Arn. Arb., 27:323, 1946, non (Ard.) Beauv., Ess. Agrost., 54, 1812.

Oplismenus undulatifolius var. *imbecillis* (R. Br.) Hack. Govt. Lab. Publ. Manila, 25:82, 1905; Ohwi, Bot. Mag. Tokyo, 55:546, 1941.

Oplismenus birtellus subsp. *imbecillus* (R. Br.) Scholz, Phan, Monogr., 13:127, f. 31, 1981.

This we take to be the common narrow, small-leaved form with raceme branches reduced to fascicles or very condensed often reflexed spikes, usually smaller distally.

However, if Scholz' figure 31, drawn from **R. Brown 6133** (LE) truly

represents the type of *Orthopogon imbecillis* R. Br. (Scholz indicates that **R. Brown 6133** (K) is the holotype, with isotypes in LE and E) this name should apply to what we here call *O. birtellus* var. *microphyllus*, with raceme branches reduced to 1 or 2 spikelets. However, until we have seen Brown's British Museum and Kew specimens, we prefer to apply this name in the more usual sense as described above, and as accepted by Parham in A. C. Smith, Fl. Vit. Nova 1; 344, 1979.

This variety is widespread in both the Marianas and Caroline high islands, with one sterile specimen that seems to belong here from Nukuoro Atoll.

MARIANAS: Asuncion: S slope below 500 m, **Falanruw 3057** (US) (sterile, probably goes here, but with some doubt because of very narrow leaves and black nodes). Anatahan: above SW anchorage, **Raulerson 1094** (US). Tinian: W coast, **Hosaka 2860** (US, BISH, POM, K). Rota: Track up Mt. Tapingot, **Evans 2209** (US). Guam: Mt. Lamlam, **Anderson 316** (US, BISH, POM); Falls of the Ugum R. "Talofofa Falls", **Stone 3965** (US, GUAM); 2-3 km NW Yona, 100-130 m, **Fosberg 35299** (US, BISH, POM, BRI, P); Manengon, Tarzan Falls, **Stone 4522** (GUAM).

CAROLINE ISLANDS: Palau: Babeldaob: Airai Waterfalls, 1.5 mi due N of airfield, Kumekumeyel R., 10 m, **Canfield 263** (US); Mt. Liusalmonogui, Almonogui, **Hosaka 6877** (US); W coast, Itau, 1-10 m, **Fosberg 32411** (US, BISH, POM, MO, BRI); Ngarakabesang I., **Hardy 107** (US, BISH); Koror, **Kanehira and Hatusima 4450** (FU); Malakal I., 50-100 m, **Evans 604** (US, BISH, K, MO); Kattewe I. (?), **Hosokawa 9172** (US). Nukuoro Atoll: **Niering 740** (US). Yap: near Goanpan, Dalipepinbau Mun., **Fosberg 60112** (US, BISH, POM, MO, CANB, L, K, TI). Ponape: s. l., **Ledermann 13607** (B); Mt. Tolotum, 1200 ft., **Glassman 2843** (US); Nepit, **Hatusima 11128** (FU).

Oplismenus birtellus var. *microphyllus* (Honda) Fosberg and Sachet n. comb.

Oplismenus microphyllus Honda, Monogr. Poaceae Jap. 274, 1930 [or Jour. Fac. Sci. Univ. Tokyo Sect. 3, Bot., 3:274, 1930]

Oplismenus undulatifolius var. *microphyllus* (Honda) Ohwi, Bot. Mag. Tokyo, 55:547, 1941.

Oplismenus birtellus ssp. *microphyllus* (Honda) Scholz, Phan. Monogr., 13:137, 1981.

Probably a very reduced form of var. *imbecillis*, with raceme branches reduced to one or two, rarely more, spikelets and leaves usually 2cm or less long. Possibly not a true taxonomic entity, but quite recognizable. Until some experimental work can be done we are following Honda, Ohwi and Scholz in distinguishing it.

In Micronesia known from Sarigan, Guam, Yap and Ponape.

MARIANAS: Sarigan: NW coast, slope above sea, 0-20 m, **Falanruw 1789** (US); Guam: Mt. Lamlam, 1000 ft., **G. C. Moore 228** (US); Chalandao Mt., 1 km SE of Jumujong Manglo Mt., 320 m, **Fosberg 35374** (US, BISH, MO, L, BRI).

CAROLINE ISLANDS: Yap: s. l. **Kanehira and Hatusima 4336** (FU); Moloai I., **Hosokawa 8990** (US). Ponape: s. l., **Nakao** in 1941 (KYO).

8. ON CERTAIN *PASPALUM* SPECIES IN MICRONESIA

Paspalum L. is a genus well represented in most tropical and warm temperate moist climates. Micronesia is no exception. No less than twelve species are on record from these islands. No attempt is made here to treat those of the Micronesian species, mostly exotics, that present no taxonomic problems or distributional extensions. Seven species are discussed and one new variety is proposed. A full treatment will be offered in the Flora of Micronesia installment that includes the Poaceae.

Paspalum cartilagineum Presl, Rel. Haenk. 1:21, 1830; Reeder, Jour. Arn. Arb., 29:298-299, 1948; BOR, Grasses Ind. Burma, Ceyl. 335, 1960; Stone, Micronesica, 6:217-218, 1970 [1971].

This species has been considered a synonym of *P. scrobiculatum L.* by Reeder, l. c., because the "key character" of an indurate sterile lemma is not constant, some specimens showing both indurate and membranous sterile lemma on the same plant. Actually, we have one sheet, **Hosaka 3131** (US), from Guam, that has the sterile lemmas entirely membranous, but that came from a colony that otherwise shows them partly indurate and partly membranous. Bor, l. c., maintains *P. cartilagineum* because he has found that "the indurated lower lemma is a good character in the Indian specimens." Stone maintains it but is not certain whether it should be considered distinct from *P. scrobiculatum*. However, he includes in it material with 3 or 4 rows of spikelets, which we now tentatively place in *P. longifolium* Retz. We have in the past regarded it as belonging to *P. scrobiculatum* but we now

think the latter is a different species, not known from Micronesia.

If the inconstant difference in the consistency of the sterile lemma were its only character we would probably regard it as a variety of *P. commercialis*, but the plants that fall here on the basis of their indurate sterile lemmas are also quite distinct in appearance, coarse and rooting at lower nodes, and with larger inflorescences and spikelets. Plants of this sort are widely distributed in Micronesia, and part of Haenke's material, syntypes of Presl's species, came from the Marianas, the rest from Luzon, collected in 1792, so it may very well be indigenous. We have material from both Marianas and Caroline archipelagoes.

Among these specimens are several with a very remarkable character, which, if constant, would probably cause it to be regarded as a distinct species. The first (lower) glume, typically absent in *Paspalum*, is in these specimens usually present, varying from small and ovate-triangular to as large as and the same shape as the sterile lemma. We are proposing the plants showing this feature as a variety, so far observed only from Micronesia.

Paspalum cartilagineum Presl var. *cartilagineum*

Plants lacking a first glume (one or two racemes seen with a single lower glume on the lowest spikelet), are known in Micronesia from Marianas: Pagan, Saipan, Rota, Guam; and from the Carolines: Palau and Ponape.

Paspalum cartilagineum var. *biglumaceum* Fosberg and Sachet, var. nov.
Type from Rota, Marianas, **Necker RS-292** (US).

Glumae inferiores plerumque praesentia, trinervatae.

Decumbentes. In the group related to *P. scrobiculatum* this feature has not, to our knowledge, been previously reported.

MARIANAS: Rota I., Sabana, Nov. 1, 1945, **Necker RS-292** (US, holotype).

CAROLINE ISLANDS: Truk, s. l. 125 ft., **Wong 245** (US). Ponape: Kiti Distr., Ron Kiti, **Nakao** in 1941 (KYO); Metalanim Distr., Sapalap, **Glassman 2764** (US).

Paspalum longifolium Roxb., Fl. Ind. 1:283, 1820; Schum. & Lauterb., Fl. Deutsch. Schützg. Süds. 176, 1901; Hosokawa, Tr. Nat. Hist. Soc. Formosa, 24:201, 1934; Jour. Soc. Trop. Agr. Taihoku Univ., 7:316, 1935; Ohwi, Bot. Mag. Tokyo, 55:545, 1941; Glassman, Bish. Mus. Bull. 132, 1952.

Paspalum kora sensu Presl, Rel. Haenk. 1:216, 1830, non Willd., Sp. Pl. 1:332.

This species has been variously reported from Micronesia, but some of the specimens so named seemed too similar to *P. orbiculare*. Applying the criteria of a very wide rhachis of the raceme, small spikelets, and at least the middle portions of the racemes with four rows of spikelets, we have been able to document the occurrence of *P. longifolium* in Rota, Guam, Palau, Truk and Ponape. From Presl's description of what he interpreted as *P. kora*, which seems to have been this, it must have occurred from a long time back in the Marianas. We have it from Rota and Guam. Published records from Guam and Nauru (Nawodo) are without documentation. **Wong 245** (US) thus determined from Truk, on examination turned out to belong to a variety of *P. cartilagineum*, described above as var. *biglumaceum*.

Paspalum notatum Flugge, Monogr. Pasp. 106, 1810.

This tropical American grass, first mentioned from Guam by Bryan, may be documented by a collection collected at the Department of Agriculture by **Stone 4182a** (GUAM). It is a medium statured *Paspalum* with a pair of long divergent racemes and rather large spikelets. It was probably introduced for pasture purposes. This specimen resembles Mexican rather than West Indian plants.

MARIANAS: Guam: Potts junction, 480 ft., **Fosberg 59641** (US, BISH, POM, NY); Barrigada, **Stone 4853** (GUAM); Agana Springs, **P. H. Moore 808** (US, GUAM); Pauliluc River, just N of Inarajan, 1-2 m, **Fosberg**

This common species, described from the Society Islands and widely distributed in the Indo-Pacific area, was described as having "floribus duplici ordine secundis orbiculatis leuibus." It is ordinarily quite glabrous, though a *Paspalum orbiculare* f. *villosa* [sic] Däniker has been described from New Caledonia, as "differt a typo foliis molliter villosis."

A specimen sent by Demei Otobed from Palau has villous sheaths and minutely glandular-villous upper glume and sterile lemma. It can scarcely be Däniker's forma *villosa*, as it does not have the leafblades in any degree softly villous. Since it differs strikingly from the common form in its pubescence characters we are describing it as a new variety.

Paspalum orbiculare var. *otobedii* Fosberg & Sachet, n. var.

Folii vagina villosa, gluma et lemma sterilis minute glanduloso-villosae.

Plant of medium to somewhat coarse habit, glabrous except for occasional slight pilosity at nodes and more at base of blade just behind or above the ligule, leaf margins minutely scabrous, raceme rhachis 1.5-2 mm wide, margin somewhat undulate and minutely scabrous, midnerve not sharply distinct, racemes 4-6 cm long, spikelets in 2 rows, broadly elliptic, subimbricate, lower glume usually present (sometimes absent or partly so in some racemes) from small and ovate-triangular to as large as and the same shape as the sterile lemma, membranous, weakly trinerved.

The presence of a first glume in this variety is not unique in *Paspalum*, as it is said to be occasional in *P. distichum* L. and according to A. Chase is occasional in a number of American species, and is frequent in her sect.

CAROLINE ISLANDS: Palau: Koror, **Otobed PW-10090** (US, holotype).

Paspalum paniculatum L., Syst., ed. 10(2): 855, 1759.

A pan-tropical species, not previously recorded from Micronesia, which may be distinguished by its broad, lance-linear, flat, sparsely pilose leaves, many racemes scattered on an elongate rhachis, spikelets pedicellate on a narrow rhachis, suborbicular, less than 1.5 mm long, sparsely villosulous. It was first collected on Guam in 1963 and has become somewhat common since on the larger Marianas in semi-shaded roadsides and other disturbed places.

MARIANAS: Saipan: Ogso Laulau, 200 m, **Herbst & Falanruw 6909** (US). Tinian: San Jose Village, 15 m, **Herbst & Falanruw 6785** (US). Rota: Tatgua Distr., 70 m, **Herbst & Falanruw 6694** (US). Guam: Potts Junction,

480 ft., **Fosberg 59641** (US, BISH, POM, NY); Barrigada, **Stone 4853** (GUAM); Agana Springs, **P. H. Moore 808** (US, GUAM); Pauliluc River, just N of Inarajan, 1-2 m, **Fosberg 58188** (US, BISH, POM, K).

Paspalum setaceum Michx., Fl. Bor. Am. 1:48, 1803.

The plants of this species, which had become established in Kwajalein prior to 1956, and have become common on Guam and spread to Rota and Majuro, have leaves up to 20 mm wide, glabrous or essentially so, and spikelets 1.7-2.6 mm long, elliptic to suborbicular. This would place them in var. *ciliatifolium* according to Banks' revision of this species and its relatives. Its present status in Micronesia is as follows.

Paspalum setaceum var. *ciliatifolium* (Michx.) Vasey, Contr. U. S. Nat. Herb., 3:17, 1892; Banks, Sida, 2:274, 278-280, 1966.

Paspalum ciliatifolium Michx., Fl. Bor. Am. 1:44, 1803.

Well established and spreading during the last 25 years, especially in open sandy places. It was first found in Micronesia on Kwajalein along the airstrip and on weedy roadsides.

MARIANAS: Rota: near Mochong Beach, N. coast N of airport, 3-4 m, **Fosberg & Moore 58241** (US, BISH, POM, NY, L); park NW of Mt. Tapingot, 0-5 m, **Raulerson 1493** (US, GUAM). Guam: Tarague Beach, 2-3 m, **Fosberg 59816** (US, BISH); Barrigada, **Fosberg 59636** (US, BISH, L); Agana, back of beach, **Fosberg & Evans 46207** (US, BISH, MO, NY, A, CANB, UC); S entrance to Andersen Air Force Base, 170 m, **Fosberg 46223** (US, BISH, POM, MO, L, K, BRI); Nason Beach, Tumon Bay, 1 m, **Fosberg 43497** (US, BISH, POM, TI, P, BM).

MARSHALL ISLANDS: Kwajalein Atoll; Kwajalein I., Feb. 5, 1956, **Fosberg 36641** (US, BISH, POM), **39488** (US, BISH), **48025** (US, BISH, POM, NY, L), **48045** (US, BISH, CANB, MO, POM). Majuro Atoll: E end of atoll by old airport, **Fosberg 58815** (US).

9. *PENNISETUM POLYSTACHION*, VIVIPAROUS FORM

Pennisetum polystachion (L.) Schultes, Mant. 2:46, 1824.

Panicum polystachion L. Syst. Nat. ed. 10, 2:870, 1759.

Cenchrus retusus Sw. Prodr. 26, 1788.

Pennisetum setosum Rich. in Pers., Syn. 1:72, 1805.

Tropical grasses do not commonly exhibit vivipary ("vegetative apomyxis") as a mode of reproduction, though this does occur in certain other tropical plant groups, e. g. *Rhynchospora rubra*, *Agave*, *Fourcraea*, *Alpinia*. In particular, we have not previously seen or heard of its occurrence in *Pennisetum*. Bor, in his discussion of vivipary (1960 p. 21) does not mention it in *Pennisetum*. Hence it was with interest that, in 1980, we observed it to be frequent in a large stand of *P. polystachion* at DanDan in the volcanic area of Guam (Fosberg 59748). At about the same time a viviparous inflorescence was collected on Anae Island, a small rocky islet just off the west coast of Guam (Tsutsui 25), and another from Tinian, farther north in the Marianas (Fosberg 59907). This, incidentally, was the first time the species was collected in Tinian. Though in recent years it has been found on several other islands in Micronesia (Fosberg et al., 1980), on Guam it has been known since at least the early 1950s (Fosberg, 1960) and has been a dominant species in waste places, clearings, and roadsides on the northern, limestone half of the island since the early 1950s. It invaded disturbed areas in the volcanic soil savannas of southern Guam beginning in the late 1960s, and in 1968 Stone collected a viviparous plant south of Agat dump near the Sagua River (Stone 4264) on volcanic hills. The three Guam collections of viviparous plants were all from volcanic soil, while that on Tinian was on limestone. Two collections made in Ulithi in 1965 (Fosberg 46498, 46499) from two separate clumps of this species, had many spikelets on No. 46499 modified as described above, those on No. 46498 all normal. These were growing on coral sand and gravel.

We have examined a large series of specimens of this species usually filed as *Pennisetum setosum* Sw. from Asia, Africa, South America, the West Indies, and Mexico. Not one showed any viviparous spikes. A tendency in this direction does not seem to be characteristic of this species. Whether a mutation or constellation of mutations happened to become established in the Marianas population, which is thought to be a relatively recent introduction, or whether a particular set of environmental factors permitted the expression of a factor already present is not certain. The fact that the collections come from four quite different habitats seems to make the latter possibility unlikely. Actually, viviparous plants were seen at a number of places on Guam during the summer of 1980, but no records were made, as the occurrence was not then realized to be unusual.

Mrs. Margie V. C. Falanruw writes (1982) that when she was a child in Guam (1950s) she used to see viviparous inflorescences of this species and associated them with wet places.

The fact that this phenomenon appears to be at least uncommon in *Pennisetum* suggests that a description of its morphological expression would be appropriate. Such is offered below. To refer to it we will name it as a forma, though we do not regard this as very significant, taxonomically.

Pennisetum polystachion f. *viviparum* Fosberg and Sachet, n. forma.

Pseudospica vivipara, spiculis frequens mutatis in plantulas adventitias.

Plants with pseudospikes all or in part viviparous, the spikelets replaced by or changed into adventitious plantlets.

MARIANAS: Tinian, 1-15 m N of San Jose village, **Fosberg 59907** (US, BISH, POM). Guam: just SW of NASA Station, Dan Dan, 80 m, **Fosberg 59748** (US, holotype, BISH, POM, isotypes); S of Agat Dump near Sagua River, 100 m June 16, 1962, **Stone 4204** (US, GUAM); Anae Island, **Tsutsui 25** (US).

CAROLINE ISLANDS: Ulithi Atoll, Falalap I., near air strip, 1-2 m, July 22, 1965, **Fosberg 46499** (US, BISH, DAV, L).

This forma commonly, but not consistently, has some or all of its pseudospikes modified to bear small plantlets emerging from the spikelets. The floret is replaced by a tiny shoot beginning as a leaf with sheath and blade, both notably pilose, the blade also scabrous margined. Other leaves grow from within the sheath forming a small plant which presumably becomes detached and falls to the ground. No plants were observed, however, at that stage of maturity. The glumes and lemmas of the spikelet become variously enlarged and the glumes, at least, green and leaflike in texture, pilose, up to 1 or even 1.5 cm long, and with scarious margins, linear lanceolate. The lemmas, one or both, enlarge somewhat, are narrowly ovate, completely hyaline, 5-7 nerved. Various degrees of enlargement of glumes and lemmas were observed on different spikelets in the same pseudospike of the specimen **Tsutsui 25**. A spikelet with only the glumes enlarged was observed to have two of the largest bristles of the pseudospikelet enlarged, somewhat broadened toward the base and slightly greenish. It would be of great interest to observe the detailed ontogeny of these organs and of the adventitious plantlet in living condition, as well as to have cytological observations made on this viviparous form and on normal plants of the species.

10. *POLYTRIAS* HACK AND *POGONATHERUM* BEAUV.

Polytrias amauro (Büse) O. Ktze. has been recognized, as such or under a synonym, from Guam since World War II. In looking at the available speci-

mens in US we realized that two plants were involved. They turned out to belong to two genera. The two species are distinguished below.

Pogonatherum crinitum (Thunb.) Kunth, Enum. Pl. 1:478, 1833.

Andropogon crinitus Thunb., Fl. Jap. 40, Tabl. 7, 1784.

This is a small, very slender, wispy tufted grass with solitary greenish or brownish racemes with long spreading capillary yellowish awns. It grows in rock crevices, eroded places, and damp bare places in the volcanic areas of Guam. It is not uncommon on Guam but has been infrequently collected. It is here newly reported from Micronesia, though it has been known there for some years under the name *Polytrias amaura*, with which it has been confused. It differs from this in its single, rather than paired, sessile spikelets with very long extremely fine awns, two to a spikelet.

Polytrias is similar in habit and in its brownish racemes, which are paired and with short rather than long awns. All of the Guam material cited below was determined as *Polytrias amaura*, which also occurs on Guam (see next item below). *Pogonatherum* is widespread from India to Japan and New Guinea, and may be an introduction in Guam, but may well be native, as it is inconspicuous and may have been previously overlooked.

MARIANAS: Guam: Ugum River Valley, **P. Moore 956** (US, GUAM); S tributaries of Maulap River W of and above Fena Reservoir, 100 m, **Fosberg 59807** (US, BISH); Almagosa Springs, Mt. Almagosa, Naval Magazine, **Stone 4335** (US); banks of Tarzan River, 75 m, **Evans 1565** (US, BISH).

Polytrias amaura (Büse) O. Kuntze, Rev. Gen. Pl. 788, 1891; Walker and Rodin, Contr. U.S.N.H. 30:455, 1949; Stone, Micronesica 6:237, 1971.

Andropogon amaurus Büse in Miq., Pl. Jungh. 360, 1854.

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

Pollina praemorsa Nees, Jour. Bot. Kew Misc., 2:98, 1850 (nom. nud.)

This small slender grass has been reported from Guam since 1949, on the basis of **G. C. Moore 287**, but most other specimens assigned here are *Pogonatherum* (see above). It can now also be recorded from Palau.

MARIANAS: Guam: Harmon, 0.1 km SE of jct. of Barrigada Hill Road and Marine Drive, **Falanruw 1093** (US, BISH, POM, GUAM): 1/2 mile west [sic] of Agana, Agana Bay area, **G. C. Moore 287** (US).

CAROLINE ISLANDS: Palau: Koror, **Otobed PW-10018** (US, BISH).

11. *SACCHARUM SPONTANEUM* IN MICRONESIA

Saccharum spontaneum L. was long regarded as the wild ancestor of sugar cane (*Saccharum officinarum* L.). This idea has been generally abandoned, though volunteer sugar-cane seedlings occasionally occur that much resemble *S. spontaneum*.

Plants generally referred to *S. spontaneum* occur over a vast area, from south Asia to Tahiti and the Caroline islands. The most common plant of this affinity, which is a common weed in south and southeast Asia and probably should be referred to *S. spontaneum* L. var. *spontaneum* if varieties are distinguished in the species, is a densely caespitose plant with slender canes and very narrow harsh leaves. Just how far this plant got into the Pacific islands without the aid of man is a difficult question.

Plants possibly native in Palau and Yap seem to be close to this form, while a quite different variety (or species) is apparently native in the eastern Carolines. Reports of *S. spontaneum* ssp. *indicum* Hack. have been on record since at least 1935, based on collections made in 1933 (Hosokawa 1935) in Palau, but few collections were made earlier. Ledermann did not find it in 1914, and Volkens did not mention it from Yap in 1901. Only much more recently did it turn up in the Marianas, though similar seedlings of sugar cane were probably present, and were seen in 1950 on Saipan. It seems a safe assumption that it was not present in the Marianas before the 1960's, and doubtful but possible that the Palau populations are native.

The central and eastern Caroline Islands populations are here referred to var. *insulare* discussed below.

Saccharum spontaneum L., Mantissa Pl. II, 183, 1771.

Two varieties are distinguishable in Micronesia.

Saccharum spontaneum L. var. *spontaneum*

Saccharum spontaneum ssp. *indicum* Hackel, Mon. Phan., 6:115, 1891.

This coarse bunch-grass was well established in savannas in Palau and Yap in the 1930's and 1940's. It was collected in Saipan in 1950 and established itself in Guam somewhat later, where it has been slowly spreading in open and semi-open places ever since. In no place in Micronesia does it yet form large stands as in the Philippines and mainland Asia, where it sometimes constitutes a weed problem.

MARIANAS: Saipan: S of Garapan, 2 m, **Fosberg 31284** (US, BISH,

POM, CANB, P). Guam: End of Harmon Field, 65 m, **Fosberg 46219** (US, BISH, POM, NY, L); near Tumon High School, **Stone 4287** (US, GUAM); above Tenjo Vista, 150 m, **Fosberg 35220** (US, BISH, POM, MO); base of Orote Peninsula, 2 m, **Fosberg 35292** (US); Orote Peninsula, central upland, 20 m, **Fosberg 35580** (US, BISH, POM, MO, BRI, TI); Agana Swamp, **P. H. Moore 830** (US).

CAROLINE ISLANDS: Palau: Babeldaob I.: Ngatpang, **Takamatsu 1307** (US); Aimeliik, Imulsubech, **Timberlake & Payne 3132** (US); **Timberlake 3094** (US), **Timberlake 3117** (US). Ngarakabesan I., **Fosberg 25648** (US, BISH, POM, NY, L). Koror I.: s. l. **Stone 4606** (US), **4589** (US), Ngermid Village, **Salsedo 306** (US). Malakal I.: **Timberlake 3131** (US). Peliliu I.: 2-4 m, **Fosberg 47634** (U.S. BISH, POM, NY, L).

Saccharum spontaneum var. *insulare* (Brongn.) Fosberg and Sachet, n. comb.

Saccharum insulare Brongn. in Duperrey, Voy. Coquille, Bot. 2:99, 1829 [1831].

Brongniart's species has commonly been reduced to *S. spontaneum* L. without qualification. Hackel, in D. C. Mon. Phan., 6:115, 1891, even placed it in the synonymy of *Saccharum spontaneum* ssp. *indicum* var. *genuinum* (=var. *spontaneum*). It was based on a collection by Lesson from "Ins. Oualan" (Kusaie), which we have examined in Paris.

We know the plant from Kusaie, Ponape, and Truk, though the Truk specimens are not very adequate. It differs from the widespread very narrow-leaved var. *spontaneum* in broader leaf-blades, and especially in what appear to be dimorphic canes, the sterile ones very leafy, the fertile having longer internodes enclosed in sheaths with at least upper blades reduced and caducous. When first collected in Ponape (**Fosberg 26254**), all fertile canes seen were bare of blades while still in flower. As seen in Kusaie (**Fosberg 26644**) and at a different season in Ponape (**Fosberg 58356**), the blades were still attached, but were fewer and smaller than on the sterile canes present at the same time. The best way to distinguish var. *insulare* in sterile condition seems to be by the green part of the blade being clearly wider, on each side, than the well-developed white midrib, while in var. *spontaneum* the green part is as narrow or narrower than the midrib and soon becomes closely involute when dry. Brongniart described the rachis and panicle branches of the *Lesson* specimen as glabrous. We did not record this character on the Paris material, but our own material from all three

islands has them appressed villous.

From herbarium studies it is not easy to be certain if the Western Caroline and Truk populations show any tendency to be intergrading between var. *spontaneum* from farther west and var. *insulare*. The Palau and Yap populations, and also that on Truk, could profitably be studied with the characters of var. *insulare* in mind.

CAROLINE ISLANDS: Kusaie (Kosrae, Oualan): s.l., **Lesson** in 1825 (P, type); valley of Lela Harbor, 1-5 m, **Fosberg 26644** (US, BISH, POM, NY, L). Ponape: s. l., **Hallier 122** (HBG); vic. Kolonia, **Glassman 2434** (US); **Fosberg 58356**; Nanpil, **Riesenberg 44** (BISH); lower Tawenjokola River, **Fosberg 26254** (US, BISH, POM, NY, L); Metalanim, **Gabung 4** (US). Truk: Moen, S slope Mt. Tonachau, **Fosberg 26052** (US, BISH); Muan Village, west coast, 15 m, **Fosberg and Pelzer 26022** (US, BISH). Suigato, **Takamatsu 25** (US); Ulalu (Ramomum) **Wong 304** (US).

12. *SORGHUM* IN MICRONESIA

The genus *Sorghum* Moench contains, in its sect. *Sorghum* subsect. *Sorghum* (sect. *Arundinacea* Snowden), one of those complexes of wild and long-cultivated plants that have proven extremely refractory to deal with botanically. J. D. Snowden, in 1936, provided a definitive treatment of the cultivated plants of this group in his book, *The Cultivated Races of Sorghum*. This must certainly be the starting point for any subsequent work on this group, whether or not one agrees fully with the author's taxonomic concepts and judgments.

Snowden divided his sect. *Eu-Sorghum* (now according to the International Code of Botanical Nomenclature properly called sect. *Sorghum*) into two subsections on the basis of whether the plants produced rhizomes or not. This may be a natural division, though based only on a single feature, and one which is not present on many herbarium collections. It, however, separates species such as *S. halepense* and *S. sudanense* which seem in other features very close to each other, and thus is not very convincing.

In subsect. *Sorghum* most of the cultivated forms fall into series *Sativa* Snowden, the grain and sugar sorghums. It is in this group that most of the taxonomic difficulties occur and where the widest divergences of opinion exist. Stapf, Snowden, and many other workers, especially agronomists, have preferred to recognize as separate species a great many of what, by many other workers, might be called cultivars. Most of these species include

varieties and races based on differences in color and slight variations in size and shape of spikelets and grains. Snowden recognizes 31 such species with a multitude of infraspecific taxa, and presents a complicated but more or less workable key to the species.

Other workers, recognizing how intricately these species and their included lower taxa are entwined with each other, prefer to consider this vast array as a single species with many subdivisions. The preferred name for this collective species seems to be, *S. bicolor* (L.) Moench, though if the name *Holcus saccharatus* L. could be satisfactorily typified it would take precedence. It is now, because of the difficulty in typification, generally considered a *nomen dubium*.

The varieties of *Sorghum bicolor*, mostly regarded as species by Snowden, are troublesome, both taxonomically and nomenclaturally. If they were not, themselves, collective in nature, it might be simplest to call them cultivars with non-Latin names. However, almost all of them contain each a number of cultivars. Hence we prefer to regard the principal ones as botanical varieties. Most of them have varietal names under *Sorghum vulgare* Pers., but the epithet *bicolor* is earlier than *vulgare* and must be used.

Using Snowden's work it is possible to identify the Micronesian forms of *S. bicolor* with some confidence. Most of them lack varietal names under *S. bicolor*, so the appropriate combinations for those known from Micronesia are proposed below.

Three species of *Sorghum* have been introduced into Micronesia - *S. halepense*, *S. sudanense* (both grass sorghums), and *S. bicolor*, of which six varieties are present, and possibly a seventh, var. *technicum* though we have no specimens to confirm a sight record of its occurrence in 1952. It may have been the somewhat similar var. *obovatum* (see below). A key to the taxa of *Sorghum* that have occurred in or have been recorded from, Micronesia, is offered. Since these plants were mostly cultivated or persisting from cultivation, some of them may well have disappeared. The two grass sorghums, *S. halepense* and *S. sudanense*, certainly still persist, and in some abundance.

Sorghum Moench, Meth. Pl. 207, 1794.

Coarse annual or perennial grasses, rhizomatous or not, culms usually erect, leafy; inflorescence paniculate with branches verticillate at lower nodes, branches repeatedly ramified and ultimately bearing short racemes of

spikelets; spikelets in pairs or triads, one sessile and the others pedicellate, the sessile one fertile, the pedicellate narrower and staminate or sterile, persistent or deciduous; glumes of sessile spikelets both developed, lower lemma ordinarily sterile, the upper floret hermaphroditic, with 3 stamens, style with 2 stigmatic branches, caryopsis or grain included or often partially or almost completely exerted.

Key to Micronesian Taxa of *Sorghum*

1. Plants with spreading rhizomes - (*S. halepense*) 2
- 1'. Plants without rhizomes 4
 2. Spikelets with sharply acute or acuminate apices *S. halepense* var. *propinquum*
 - 2'. Spikelets with blunt or toothed apices (*S. halepense* var. *halepense*) 3
3. Lemmas awned *S. halepense* var. *b. f. halepense*
- 3'. Lemmas not awned *S. halepense* var. *b. f. muticum*
 4. Leaves 1-2 (-3) cm wide, spikelets broadly lanceolate or elliptic-lanceolate, panicles slender, loose *S. sudanense*
 - 4'. Leaves 1.5-5 cm wide, usually 2 or more cm, spikelets elliptic to ovoid or obovoid (*S. bicolor*) 5
5. Plants dwarfed, 1 m or less tall, panicles reddish *S. bicolor* var. *subglabrescens*
- 5'. Plants taller, panicles not usually reddish 6
 6. Spikelets notably obovoid, apical part hirsute and subtruncate 7
 - 6'. Spikelets ellipsoid or ovoid, or if obovoid, pointed 8
7. Spikelets 3-4 mm long *S. bicolor* var. *rotundulum*

- 7'. Spikelets 4-5.5 mm long.....*S. bicolor* var. *subglobosum*
8. Lower part of panicle bare of racemes..... 9.
- 8'. Lower part of panicle floriferous 10.
9. Panicle 30-50 (-80) cm long, rhachis not prominent
except sometimes near base *S. bicolor* var. *technicum*
- 9'. Panicle 10-30 (-40) cm long, rhachis prominent
to middle or near apex *S. bicolor* var. *obovatum*
10. Sessile spikelet elliptic, at least twice as
long as wide..... *S. bicolor* var. *transiens*
- 10'. Sessile spikelet ovate, not much longer
than wide..... *S. bicolor* var. *cafer*

Sorghum bicolor (L.) Moench, Meth. Pl. 207, 1794 (sensu lato).

Holcus bicolor L., Mantissa Pl. 2:381, 1771.

Sorghum vulgare Pers., Syn. Pl. 1:101, 1805.

Annuals (sometimes persisting more than one season by clumping and forming adventitious roots), stems thick and filled with pith; up to 2-several meters tall; leaves broad, flat, to 1 m long, 2-5 (-10) cm wide, glabrous except around the junction of blade and sheath and along margin of sheath; panicle erect or peduncle recurved, loose to very compact, much branched, variously villous or tomentose to subglabrous; racemes with 1-8 nodes; spikelets elliptic, ovate or obovate, glumes from thin to subindurate, equal or subequal, lemmas thin, hyaline, grains variously shaped but often well-exserted from glumes, white to variously colored, endosperm abundant, mealy to hard.

At least six or seven varieties have been found in Micronesia, cultivated or persisting from cultivation, but it is not known how many still occur there; none are important economic crops in Micronesia. Collected under various conditions on both high islands and atolls.

Sorghum bicolor var. *cafer* (Koern.) Fosberg and Sachet, new comb.

Andropogon sorghum var. *cafer* Koern., Handb. Getreideb. 1:307, 1885.

Sorghum caffrorum (Retz.) Beauv., Ess. Agrost. 131, 178, 1812.

Sorghum vulgare var. *caffrorum* (Retz.) Hubb. and Rehder, Bot. Mus. Leaflet. Harvard 1:10, 1932.

The earliest varietal name applied to this taxon was *Andropogon sorghum* var. *arduini* Alefeld (1866) based on *Sorghum arduini* Jacq. (1814), but this cannot be transferred to *S. bicolor* because of the existing *S. bicolor* var. *arduini* (Koern.) Snowden (1935), based on *Andropogon sorghum* var. *arduini* Koern. The next earlier epithet is supplied by *Andropogon sorghum* var. *cafer* Koern. (1885). The epithet *caffrorum* was only placed in varietal rank in 1932.

Commonly called Cafer-corn or Kafir-corn. Known in Micronesia at least since 1966.

MARIANAS: Tinian: Peipeinimsru, 20 m, **Herbst & Falanruw 6807** (US). Rota: planted at Agriculture Station 30 m, **Evans 2223** (US). Guam: E end of Cabras Island, weedy roadside, 10 m, **Sachet 1715** (US, BISH); s. l., **McGregor 513** (US).

Sorghum bicolor var. *obovatum* (Hack.) Fosberg and Sachet, new comb. *Andropogon sorghum* ssp. *sativus* var. *obovatus* Hack., in DC. Mon. Phan., 6:514, 1889 (pro parte.)

Sorghum dochna var. *obovatum* (Hack.) Snowden, Kew Bull., 1935: 237, 1937.

Sorghum vulgare var. *technicum* sensu Fosberg, Atoll Res. Bull. 39:4, 1955, non *Andropogon sorghum* var. *technicus* Koern. 1873.

Mistaken for broom-corn when found growing spontaneously on Eniwetok in 1946.

MARSHALL ISLANDS: Eniwetok Atoll, Engebi I., **Fosberg 24383** (US, BISH, POM, MO, K, CANB, NY, L); Runit I., **Taylor 46-1305** (US).

Sorghum bicolor var. *rotundulum* (Snowden) Fosberg and Sachet, new comb.

Sorghum miliiforme var. *rotundulum* Snowden, Kew Bull., 1935:237, 1935.

Persisting from cultivation in the Marianas, Caroline and Marshall Islands after World War II in 1946.

MARIANAS ISLANDS: Rota: Shinaparu, 150 ft., **Hosaka 3049** (US, BISH).

CAROLINE ISLANDS: Yap I., s. l., **Wong 520** (US); Woleai Atoll, Utagal I., **Wong 7** (US). Truk: Moen: Muan Village, 15 m, **Fosberg & Pelzer 26020** (US, BISH, MO, BRI, L).

MARSHALL ISLANDS: Jaluit Atoll, Jaluit I., Sydney Pier area, **Fosberg 26705** (US, BISH, K, CANB, POM, MO). Majuro Atoll, east end, **Fosberg 26932** (US, BISH, POM, BRI, L).

Sorghum bicolor var. *subglabrescens* (Steud.) Fosberg and Sachet, new comb.

Andropogon subglabrescens Steud., Syn. Pl. Glum, 1:393, 1854.

Sorghum glabrescens (Steud.) Schweinf. and Ascherson, in Schweinf., Beitr. Fl. Aethiop 301, 306, 1867.

"Milo Maize" found once in Guam.

MARIANAS: Guam, edge of Barrigada Hill, Barrigada-Harmon Road, **Stone 4753** (GUAM).

Sorghum bicolor var. *subglobosum* (Hack.) Snowden, Kew Bull. 1935:237, 1935.

Andropogon sorghum ssp. *sativus* var. *subglobosus* Hack. in DC., Mon. Phan. 6:515, 1889.

The Tinian plant, persisting from cultivation, is close to what we referred to *S. bicolor* var. *rotundulum*, but the spikelets are somewhat longer and buff-colored; the panicle is larger and less compact.

MARIANAS: Tinian, Camp Churo (Tiuro), 100 m, **Fosberg 24939**

(US, BISH).

Sorghum bicolor var. *technicum* (Koern.) Stapf ex Holland, Kew Bull. Add. Ser., 9:789, 1922.

Andropogon sorghum var. *technicus* Koern., Syst. Ubers. Cereal. 20, 1873, nom. nud.; Koern. in Koern. and Wern., Handb. Getreidebau, 1:307, 308, 1885.

Sorghum vulgare var. *technicum* (Koern.) Fiori and Paoletti, Fl. Anal. Ital. 1:46, 1896.

Sorghum dochna var. *technicum* (Koern.) Snowden, Kew Bull., 1935, 225, 1935.

What we regarded as broom-corn was seen, but unfortunately not collected on Wake Island in 1952, persisting around an old Japanese garden, but had apparently disappeared by 1961. It is possible that the plant was *S. bicolor* var. *obovatum* but this cannot be determined now. This was also reported from Guam by Stone (1971) but we have not examined the specimens.

Sorghum bicolor var. *transiens* (Hack.) Fosberg and Sachet, new comb.

Andropogon sorghum subsp. *sativus* var. *transiens* Hack. in DC., Mon. Phan. 6:508. 1889.

Sorghum aterrimum var. *transiens* (Hack.) Snowden, Kew Bull., 1935: 228, 1935.

What seems to be this was found once in Micronesia, growing along a roadside at sea level in Palau.

CAROLINE ISLANDS: Palau: Malakal I., 1 m, **Evans 562** (US, BISH, K, POM).

Sorghum halepense (L.) Pers., Syn. Pl. 1:101, 1805.

Holcus halepensis L., Sp. Pl. 1047, 1753.

Andropogon halepensis (L.) Brotero, Fl. Lusit., 1804.

This is a wild species, though also sometimes planted for forage. Once introduced, its tough and abundant rhizomes make it hard to get rid of. It

is commonly called Johnson grass. It is somewhat variable and three subordinate taxa have been introduced into Saipan by the Germans for forage.

Sorghum halepense (L.) Pers. var. *halepense* f. *halepense*

This is the form with the sessile spikelets, bluntish and minutely toothed at the apex, and with the lemma shortly awned.

In Micronesia it is not common, having only been collected in the Marianas.

MARIANAS: Saipan: S slope Mt. Tapotchau, 100 ft., **Hosaka 2901** (US, BISH). Rota: As Malote, 250 m, **Fosberg 31860** (US, BISH, POM).

Sorghum halepense var. *halepense* f. *muticum* (Hack.) Hubb. in Hook f., Icon. Pl. 34: Pl. 3364, adnot, 4, 1938.

Andropogon sorghum ssp. *halepensis* var. *sorghum* subvar. *muticus* Hack. in DC., Mon. Phan., 6:562, 1889.

This differs from f. *halepense* only in the lack of awns. It is the common form in Micronesia, found on most high islands.

MARIANAS: Saipan: Kannat Laulau, above Magicienne Bay, 75 m, **Fosberg 31266** (US, BISH); S of Garapan, **Fosberg 25216** (US, BISH, A, BRI, K). Tinian: Masalog Ridge, 200 ft., **Hosaka 2833** (US, BISH, MO). Rota: **Evans 2002** (US, BISH, A, POM, BRI, L). Guam: s. l. **McGregor 491** (US); College campus, **Pedrus 43** (US); 1 km back of Ylig on Cross Island Road, 90 m, **Fosberg 39240** (US, BISH, POM, MO, CANB); between Barrigada and Mangilao, **Stone 4054** (US, GUAM).

CAROLINE ISLANDS: Palau: Koror, **Blackburn E 16** (US); **Stone 4585** (GUAM); Ngliaklolubed, 50 m, **Fosberg 32321** (US, BISH). Ponape: vicinity of Colonia, **Glassman 2909** (US); **Fosberg 58563** (US, BISH, POM, NY).

Sorghum halepense var. *propinquum* (Kunth) Ohwi, Bot. Mag. Tokyo, 550, 1941.

Andropogon affinis Presl, Rel. Haenk., 1:343, 1830 (non R. Br. 1810).

Andropogon propinquus Kunth, Enum. 1:502, 1833.

Andropogon halepensis var. *propinquus* (Kunth) Merr., Phil. Jour. Sci.

Bot. Suppl., 1:336, 1906; 9:53, 1914.

Sorghum propinquum (Kunth) Hitchc., Lingnan Sci. Jour. 7:429, 1931; Bor, Grasses India, Burma, Ceylon 221, 223, 1960.

This is recognized as either a variety or as a separate species by most writers who treat the grass sorghums. Bor distinguishes it by the acute or acuminate rather than minutely tridentate tip of the lower glume of the sessile spikelet. Ohwi, 1941, reported it from Saipan and Palau. We saw the specimens on which these reports were based in 1952, but at that time were not aware of the rather trivial distinction between this and var. *balepense*, so our report is based only on Ohwi's determinations. We consider the specimen, **McGregor 491**, which Merrill (1914) reported from Guam, as *Andropogon halepensis* var. *propinquus*, to be *S. halepensis* var. *balepensis* f. *muticus* because of the tridentate lower glumes.

We are tentatively admitting var. *propinquum* on the basis of Ohwi's identifications until such time as we can reexamine these specimens.

MARIANAS: Saipan, **Kanehira 911** (FU), **965** (FU), **1002** (FU); **Kanehira and Hatusima 4266** (FU).

CAROLINE ISLANDS: Palau, Koror, **Kanehira 210** (FU).

Sorghum sudanense (Piper) Stapf, in Prain, Fl. Trop. Afr., 9:112, 1917; Hubb. in Hook f. Icones Pl. 34: pl. 3364, 1938; Hortus Third, 1061, 1976.

Andropogon sorghum ssp. *sudanensis* Piper, Proc. Biol. Soc. Wash., 28: 128, 1916.

Often considered a variety of *Sorghum vulgare* (*S. bicolor*), Sudan grass is almost indistinguishable from *S. halepense* except that it does not produce rhizomes. Its leaves are commonly considerably wider than those of *S. halepense*. We are admitting it as a species following Stapf, Hubbard, and Hortus Third. It is extensively used as a pasture grass on the Tinian Ranch.

MARIANAS: Tinian: NW of Chalan Fanalauan (=Famalauan), **Fosberg 59915** (US, BISH, POM, BRI). Guam: Road from Nimitz Hill to Mt. Alutom and Mt. Tenjo, 260 m, **Fosberg 43457** (US).

NEW DISTRIBUTIONAL RECORDS IN MICRONESIA

Agropyron repens (L.) Beauv., Ess. Agrost. 102, 146, 180, pl. 20, f. 2, 1812.

Triticum repens L., Sp. Pl. 86, 1753.

Quack-grass, a widespread weed of cultivated and fallow land, may be reported from the Caroline Islands, Ifaluk Atoll, Ifaluk Islet, on the basis of a single depauperate plant collected June 14, 1965, on the edge of a taro pit by **Evans 529** (US). This is essentially a temperate zone species and may not persist in tropical lowlands.

Cymbopogon citratus (DC.) Stapf, Kew Bull., 1906:322, 1906.

Andropogon citratus DC., Cat. Hort. Monsp. 78, 1813, nom. nud.; DC. ex Nees, Allg. Gartenz. 3:267, 1835.

Lemon grass has not been reported previously from Yap. It is a rather coarse grass with very aromatic leaves, doubtless escaped from cultivation.

CAROLINE ISLANDS: Yap I., one small patch in savanna N of airport, **Falanruw 3210** (US).

Digitaria bicornis (Lam.) R. and S., Syst. 2:470, 1817; Veldkamp, Blumea 21:25, 30-32, 1973.

Panicum bicornis Lam., Encyl. 1:176, 1791.

This has not been recorded, to our knowledge, from Micronesia. However, those specimens referred to *Digitaria ciliaris* (Retz.) Koel. which have "heteromorphic spikelets", that is, having the pedicelled spikelets much more strongly hairy than the sessile ones, go to *D. bicornis* according to Veldkamp's recent treatment (1973). Although Veldkamp cites no specimens from Micronesia, the following would seem to belong here.

MARIANAS: Agrigan I.: S side of island, **Fosberg 31606** (US, BISH, POM, NY, L); Pagan I., near Salt Water Lake, west side of island, **Fosberg 31366** (US, BISH, POM); Guguan I., **Falanruw 1801** (US); Tinian: Masalog Ridge, 200 ft., **Hosaka 2836** (US, BISH, POM); Camp Churo, N central part of island, 100 m, **Fosberg 24813** (US, BISH, POM). Rota: W of as Malote, 150 m, **Fosberg 31897** (US, BISH, POM).

CAROLINE ISLANDS: Palau Is., Ngarakabesang I., **Takamatsu 1867a** BISH); Yap, Tomil, **Hosaka 3297** (US, BISH, POM, NY); Ponape: between Nipit and Retau, **Hatusima 10922** (FU).

WAKE ISLAND: **Fosberg 34936** (US); **Brankamp** in 1936 (BISH); **Lyons 10** (BISH).

Ectrosiopsis Jansen, Reinwardtia 2: 267, 1953.

This small New Guinean-Malesian genus is close to *Eragrostis* but differs in its lemmas which are awned, becoming progressively more so upward, and in its habit and aspect, as well as less evident characters. So far as known its species inhabit savannas and sandy places. Extension of its distribution to Micronesia adds another to the number of floristic connections between Micronesia and the New Guinea-east Malesian region.

Ectrosiopsis subaristata (Chase) Jansen, Reinwardtia 2:269, 1953.

Eragrostis subaristata Chase, Jour. Arn. Arb. 20:269, 1939.

This species, previously known from New Guinea, Moluccas and Celebes, has not previously been reported from Micronesia. It is a small, erect, somewhat tufted grass; the lemmas, besides being shortly awned, have a curious oblique thin spot near the base.

CAROLINE ISLANDS: Yap Island: one mile E of the Tageren Canal, Tomil-Gagil, 40 m, **Fosberg & Cushing 46328** (US).

Eriochloa procera (Retz.) Hubb., Kew Bull., 1930:256, 1930.

Agrostis procera Retz., Obs. Bot., 6:22, 1791.

This grass differs from *Panicum* in having the basal internode of the rachilla enlarged to a button-like thickened disk, first glume lacking, and second glume appressed hirsute, subequal with sterile lemma. It is a loosely tufted grass, culms ascending to erect, branches of inflorescence racemose, pedicels distichously arranged. It has not previously been recorded from Micronesia.

CAROLINE ISLANDS: Palau: Koror I., **Otobed PW-10006** (US, BISH). Truk: Moen I., Moen Village, **Fosberg 60321** (US, BISH, POM, K).

Eustachys petraea (Sw.) Desv., Nouv. Bull. Soc. Philom., Paris 2:189, 1810; Fosberg and Falanruw, Micronesica, 11:77-78, 1975.

This West Indian grass has been in Micronesia only a relatively few years. It appeared in Saipan in 1965, Kwajalein in 1966, and in Guam at least by 1968 (Fosberg and Falanruw 1975). Now it may be reported from Tinian, Rota, Palau, Truk, Ponape, Majuro, and Tarawa. Since it has usually been found around airports and such installations it is presumed to have been carried around by airplanes, with the fruits adhering to the landing gear or to people's shoes or clothing.

MARIANAS: Tinian: Taga Beach, 5 m, **Fosberg 59888** (US, BISH, BM, TI, BRI, NY). Rota: Near Machong Beach, N coast, **Fosberg & Moore 58248** (US, BISH, POM, K, MO, BRI); road up to Sabana, 260 m, **Raulerson 1584** (US); Palie Distr., 200 m, **Herbst & Falanruw 6732** (US); Tatgua Distr., 70 m, **Herbst & Falanruw 6690** (US).

CAROLINE ISLANDS: Truk: Moen I., Moen Village, **Fosberg 60307** (US, BISH, POM, MO). Ponape: Takatik, near Mobil Oil Facility, Feb. 1, 1979, **Falanruw 3236** (US). Palau: Angaur, just north of phosphate drying plant, 8 m, in 1977, **Canfield 189** (US).

MARSHALL ISLANDS: Majuro Atoll, air terminal, in 1979, **Falanruw 3200** (US); east end of atoll by old airport, in 1978, **Fosberg 58812** (US).

GILBERT ISLANDS: Tawara Atoll: Tanaea I., causeway between Bonrik and Tanaea, **Raulerson 3644** (US).

Leptochloa panicea (Retz.) Ohwi, Bot. Mag. Tokyo, 55:311, 1941.

Poa panicea Retz., Obs. Bot., 3:11, 1783.

A slender, tufted grass, culms subdecumbent at base, erect, inflorescence a racemosely arranged panicle of long very slender spikes or spiciform racemes, glumes well-developed, persistent, spikelets with about 4 florets. This has not, apparently, been previously recorded from Micronesia.

MARIANAS: Saipan: Chalan-Tarhoho, 10 ft., **Hosaka 2990** (US, BISH, POM, CANB). It is probably introduced but this is not certain.

Panicum antidotale Retz., Obs. Bot., 4:17, 1786.

A pasture grass of medium stature, more slender and smaller than *P. maximum* Jacq., imported by the Tinian Ranch Co. from Australia and established in pastures in Tinian, commonly called "blue panicum." It is widely distributed according to Bor (1960) from "Madras, northwestern India, Afghanistan, and Persia westward." Said by him to be of dubious fodder value, but is apparently eaten by the cattle on Tinian.

MARIANAS: Tinian, Carolinas Ridge, July 18, 1980, **Fosberg 59847** (US).

Paspalidium flavidum (Retz.) A. Camus in LeCompte, Fl. Gen. Indo-Chine, 7:419, 1922.

Panicum flavidum Retz., Obs. Bot. 4:15. 1786.

This is a slender ascending or erect grass, similar in general appearance to *Paspalum* but with a much more delicate inflorescence with racemes erect,

appressed to the rhachis, rather remotely spaced, and only about 1-1.5 cm long. It resembles *Echinochloa colonum* but has the racemes more remotely distributed. It was first found in Guam in 1963, in Truk in 1980. It is a casual weed along paths and in lawns.

MARIANAS: Guam: 1 mi W of Inarajan, N of Adonao Hill, **Fosberg 46293** (US); E of Merizo, **Fosberg 43406** (US, BISH, POM, K, MÖ, CANB); just SW of NASA Station, Dan Dan, 80 m, **Fosberg 59752** (US, BISH).

CAROLINE ISLANDS: Truk, Moen I., Agriculture Substation, Nantaku, **Fosberg 60362** (US).

Setaria sphacelata (Schum.) Stapf and Hubb., Kew Bull., 1929: 184, 195, 1929; in Prain, Fl. Trop. Afr., 9:795, 1930.

Panicum sphacelatum Schum., Beskr. Guin. Pl. 78, 1827.

This grass resembles *Setaria pallide-fusca* (Schum.) Stapf and Hubb. but has a much longer spike, 5-20 cm, and somewhat shorter, not so bright yellow bristles. It is a rather coarse perennial, rooting at the nodes.

It has turned up in Palau and Saipan. In Saipan it is said by the collector to have been imported from Taiwan.

MARIANAS: Saipan, **Sproat** in 1964 (US, GUAM).

CAROLINE ISLANDS: Palau: Koror, **Otobed P-10117** (US).

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