

FLORAE MALESIANAE PRECURSORES X
NOTES ON MALAYSIAN AND SOME S. E. ASIAN
CYPERACEAE III¹⁾

by

J. H. KERN

(Flora Malesiana, Leiden)

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This third paper on Malaysian Cyperaceae chiefly discusses new and otherwise noteworthy species of *Fimbristylis*. In addition a key to the Malaysian species of the genus and a survey of their arrangement as accepted for the Flora Malesiana are given. A few new species are described from Siam and Indo-China.

I am greatly indebted to the Directors of the Herbaria who granted me the opportunity to study the collections of their institutions.

I. NOTES ON FIMBRISTYLIS

1. *Fimbristylis thomsonii* Boeck., *Linnaea* 37, 1871, 37; Merr., *En. Philip. Fl. Pl.* 1, 1923, 127. — *F. asperrima* (non Boeck.) Ridl., *Fl. Mal. Pen.* 5, 1925, 158, quoad specim. P. Rawei.

For the Malaysian area this species has only been recorded from the Philippines (Palawan). It occurs also in North and Central Sumatra and in the Malay Peninsula. Apparently it is everywhere very rare.

SUMATRA. N. Sumatra, Karo Plateau, grassy wilderness on E. Siosar, 1350—1500 m: *Lörzing* 8597 (BO, L); Mt Piso-Piso, NW of Toba-Lake, swampy to moist grassy localities, 1400 m: *Lörzing* 8389 (BO); W. Batuhuda, hilly country, moist grassy field, 1200 m: *Lörzing* 8023; Bosar Si Pinggan to Bangun Dolok, Asahan: *Hamel* 1196 (NY). Central Sumatra, Mt Sago, 1080 m: *Binnemeijer* 5715 (BO).

MALAY PENINSULA. Kedah, Rawei Island: *Ridley* 15720 (BM, K, SING).

PHILIPPINES. Palawan, Taytay, on dry open slopes bordering thickets: *Merrill* 9350 (BM, BO, K, L, NY, P, SING). Luzon, Bontoc Subprov.: *Vanoverbergh* BS 1183 (P; the same number in FI is *F. complanata*).

A specimen "Route to Merapi": *Horsfield s.n.* (SING) was collected in Central Java, or possibly in S. Sumatra (Palembang Highlands). It was referred to as *F. fusca* Benth. by Ridley in *J. As. Soc. Str. Br.* 59, 1911, 223.

2. *Fimbristylis consanguinea* Kunth, *En. Plant.* 2, 1837, 228; Steud., *Syn. Plant. Glum.* 2, 1855, 113. — *F. kraussiana* Hochst. ex Krauss, *Flora* 28, 1845, 757, pro synonym. (nom. inval.); Hook. f. in *Trimen, Handb. Fl. Ceylon* 5, 1900, 63; Chermeson, *Fl. Madag.*, fam. 29, 1937, 185. — *F. con-*

¹⁾ I in *Reinwardtia* 2, 1952, pp. 97—130; II in *Reinwardtia* III, 1954, pp. 27—66.

nectens Thwaites, En. Pl. Zeyl. 1864, 349. — *F. complanata* var. *kraussiana* (Krauss) C. B. Clarke, Fl. Br. Ind. 6, 1893, 646. — *F. horsfieldii* C. B. Clarke, Kew Bull. Add. Ser. 8, 1908, 25. — *F. paupercula* (non Boeck.) Kük., Candollea 6, 1936, 426. — *F. monticola* (non Steud.) Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 25.

As far as known *F. consanguinea* extends from S. Africa and Madagascar through India and Ceylon to Malaysia (W.—E. Java). In the herbaria it has often been confounded with the closely allied *F. complanata* (Retz.) Link, from which it can easily be distinguished by the characters given in the key on p. 152.

It occurs in swamps, swinging bogs, on margins of lakes between 1600 and 2300 m. None of the other Malaysian species of *Fimbristylis* reaches this altitude. In Ceylon *F. consanguinea* occurs also in the montane zone above 1200 m, in Madagascar it ascends to 1600 m.

The name *F. kraussiana* Hochst. ex Krauss was not validly published, since it was not accepted by its author, but considered to be synonymous with *F. complanata*. Besides, it is antedated by Kunth's binomial.

S. AFRICA. Cape of Good Hope: *Drège s.n.* (type coll.) (L).

CEYLON. *Thwaites CP 2967* (type coll. of *F. connectens* Thwaites) (K).

JAVA. W. Java, Mt Ipi, Tegal Primula, grassy plain, 2300 m: *Docters van Leeuwen 13353* (BO); Priangan, Mt Patuha near Telaga Patenggang, pool, 1650 m: *Backer 12789* (BO, K, L, SING, U); same locality, swampy margin of lake: *Backer 12817* (BO); Mt Patuha, Rantja Ulas, swamp, dominant: *Van Steenis 7424* (BO); Mt Papandayan, Tegal Pandjang, swampy valley, dominant, 2041 m: *Van Steenis 4217* (B, BO, L); same locality, Tegal Alun Alun: *Van Steenis 4292* (B, BO, L); Mt Djaya, N of Mt Papandayan, Tegal Mariuk, 2200 m: *Van Steenis 4557* (BO). Central Java, Mt Dieng, Telaga Balekambang, 2000 m: *Van Steenis 4533* (BO, L); Dieng: *Warburg 3541, 3542* (US); Dieng, Telaga Pengilan: *Ruttner 282* (BO); Mt Dieng, swamp, 2050 m: *Hochreutiner 2439* (B); Mt Prah: *Horsfield 1073* (BM, type of *F. horsfieldii* C. B. Clarke; SING). E. Java: Besuki, Yang Plateau, Taman Hidup, swampy grassland, in large clumps as *Carex nubigena* and *Rhynchospora glauca*, 1900 m: *Van Steenis 10907* (BO, L).

3. *Fimbristylis microcarya* F. v. M., *Fragm. Phyt. Austral.* 1, 1859, 200; Benth., *Fl. Austral.* 7, 1878, 316; S. T. Blake, *Univ. Queensl. Papers Dept. Biol.* 1, 3, 1937, 93; J. Arn. *Arb.* 35, 1954, 216. — *F. complanata* var. *microcarya* (errore "*microcarpa*") (F. v. M.) C. B. Clarke, *Fl. Br. Ind.* 6, 1893, 646; Domin. *Bibl. Bot.* 20, Heft 85, 1915, 462. — *F. autumnalis* var. *microcarya* (F. v. M.) Kük., *Bot. Jahrb.* 69, 1938, 258. — *F. quinquangularis, forma ablutens* Backer, Bekn. *Fl. Java* (em. ed.) 10, 1949, fam. 246, 26.

A very rare species in Malaysia, previously only reported from Papua by Kükenthal (1938) and Blake (1954). It was also collected in Java and the Philippines.

Although undoubtedly related to *F. complanata*, it strikingly resembles *F. quinquangularis* by its general habit and very small spikelets. *F. microcarya* lacks the bladeless cauline leaves of the latter and besides, it is recognizable by the dense fringe of short white hairs representing the ligule. (see p. 119), the acute glumes, and the nuts not densely verruculose but smooth or with only a few warts, and finely lineolate by the transversely linear-oblong outer cells superposed in 4—6 vertical rows on each face.

E. JAVA. Wonokitri near Surabaya, Gunung Sahari: *Dorgelo 1712* (L); precise locality unknown: *Backer c.s. 3269* (L).

PHILIPPINES. Luzon, Prov. of Rizal: *Ramos BS 12523* (BM, G, K, P); Prov. of Cavite, Mendez Nuñez: *Mangubat BS 1327* (NY, US).

NEW GUINEA. Papua, Port Moresby, *Carr 11847* (K, L, SING).

4. *Fimbristylis scaberrima* Nees in Wight, Contr. Bot. Ind. 1834, 102; Kunth, En. Plant. 2, 1837, 229; Steud., Syn. Plant. Glum. 2, 1855, 113; Boeck., Linnaea 37, 1871, 13, p.p.; Linnaea 38, 1874, 408; C. B. Clarke, Fl. Br. Ind. 6, 1893, 637; J. Linn. Soc., Bot. 34, 1898, 60.

This species is, according to Clarke (1898), endemic in Sylhet and probably only once collected. I have also seen it from Indo China and Malaysia. It has been repeatedly collected in Borneo, first by Teysmann, but it is much rarer in Sumatra and Java.

Because of its bifid style and biconvex nut Nees placed it in *Fimbristylis*, not in the genus *Trichelostylis* comprising our *Fimbristylis* spp. with trifold style. Accordingly Clarke referred it to Sect. *Dichelostylis*, in pointing to the fact that from the flattened top of the stem and the small spikelets it had been sometimes referred to *F. complanata*. The relations to the latter species can not be denied, but it shows a still closer affinity to *F. dura*, with which the Malaysian specimens were confounded.

INDIA. Sylhet: *Wallich 3507c* (type coll.) (L).

INDO CHINA. Cambodia: *Godefroy 50* (P).

SUMATRA. Res. Djambi, Lake Sipin near Djambi, dominant: *Rutten-Kooistra S 1* (BO, L).

W. JAVA. Banten, Rawa Bodjong, S. of road Tangerang-Serang, near Tigaraksa, edge of swamp forest: *Van Steenis 12565* (BO, L).

BORNEO: *Chaper s.n.* (P). W. Borneo, B. Singkadjang: *Teysmann 10944* (BO, L); margin of Sendabai Lakes near Tayan: *Main 1710* (exp. Polak) (BO, L); Lake Tayan: *Main 1749* (BO, L); Sungai Sendebai: *Main 1819* (BO, L, SING); near Selimbau, forest, common: *Main 1844* (BO, L). S. and E. Borneo, W. Kutei, Lahun, in open rapak forest, dominant: *Endert 1836* (B, BO, SING); Tandjong Isui, margin of lake, dominant: *Endert 1982* (BO, L).

5. *Fimbristylis pierotii* Miq., Ann. Mus. Lugd. Bat. 2, 1865, 145; Boeck., Linnaea 37, 1871, 32; C. B. Clarke, Fl. Br. Ind. 6, 1893, 642; Ohwi, Mem. Coll. Sc. Kyoto B 18, 1944, 65. — *F. pinetorum* Merr., Philip. J. Sc. 9, 1914, Bot. 266; En. Philip. Fl. Pl. 1, 1923, 125.

The specimens on which Miquel based this species (leg. Von Siebold, Bürger, Keiske, and Pierot) are all preserved in the Leiden Herbarium. I have chosen ⁴No 8. *Scirpus*. Tentsuki, Japonia, v. *Siebold*" as the lectotype (L, sub no 902.79—52).

Merrill 7664, the type collection of *F. pinetorum* Merr., and *Merrill Phil. Pl. 558*, distributed as *F. pinetorum*, are identical with the collections cited by Miquel.

The species ranges from India (NW. Himalaya, Simla, Kumaon), Korea, and Japan (Hondo, Shikoku, Kiushiu) to the Philippines (N. Luzon).

PHILIPPINES. Luzon, Benguet Subprov.: *Merrill BS 7664* (P, US), *Merrill Phil. Pl. 558* (Fl, G, U, US).

6. *Fimbristylis insignis* Thwaites, En. Pl. Zeyl. 1864, 349; C. B. Clarke, Fl. Br. Ind. 6, 1893, 645; Camus, Fl. Gén. I. C. 7, 1912, 118; S. T. Blake, J. Arn. Arb. 35, 1954, 215. — *F. thwaitesii* Boeck., Linnaea 37, 1871, 34. — *F. longispica* (non Steud.) Ridl., Fl. Mal. Pen. 5, 1925, 156, p.p. — *F. petrogena* Ohwi, Bot. Mag. Tokyo 56, 1942, 201.

Recorded by Clarke (1893) for Borneo and recently by Blake (1954) for Papua. It appears that *F. insignis* occurs at several remote localities almost throughout Malaysia. Outside this area it was collected in Ceylon, Siam, Tonkin, Cochin China, S. China, and tropical Australia. Dr Ohwi kindly sent me some photographs of the type specimen of *F. petrogena* Ohwi, preserved in the Kyoto Herbarium. I am convinced that it belongs to *F. insignis*, as I already supposed to be so on account of the original description.

Thwaites described the style as glabrous. However, in the specimens of CP 3317 (*type collection*) I have seen, the style is distinctly ciliate, as in most specimens examined. Sometimes I found the style thinly membranously margined, only in *Vesterdal 228* it is quite glabrous.

MALAY PENINSULA. Setul, heaths: *Ridley 14820* (BM, K, SING). Kedah: *Vesterdal 228* (C).

N. BORNEO: *Burbidge s.n.* (BM, K); Jesselton, open eroded hillside, 15 m: *R. H. Forster S 18* (K).

PHILIPPINES. Calamianes, between Culion and the "Negative Barrio", Culion Island: *Bartlett 15550* (GH). Luzon, Ilocos Norte Prov., Burgos: *Ramos BS 32811* (BO). Panay, Antique Prov.: *MacGregor 32233* (K, P, US).

Celebes. SE. Celebes, Timampu, rather common, 300 m: *Kjellberg 3748* (BO); Rumbia, Wambakowu, monsoon forest, 40—130 m: *Elbert 3088* (L).

NEW GUINEA. W. New Guinea, Hollandia: *Bain s.n.* (GH); Hollandia, open places in savannah: *Van Royen 4146* (L); Waren, 60 miles S of Manokwari, in open rocky grass-field by the sea-shore, very rare: *Kanehira & Hatusima 13182* (*type* of *F. petrogena* Ohwi) (KYO, n.v.; photographs in L). Papua, W. Div., Mai Kussa R.: *W. MacGregor in 1890* (acc. to Blake, 1954, n.v.). Misool, Sorong, near Fakal, steppe scattered, 40 m: *Pleyte 1120* (BO, K, L, SING).

7. *Fimbristylis falcata* (Vahl) Kunth, En. Plant. 2, 1837, 239; Miq., Fl. Ind. Bat. 3, 1856, 326; Boeck., Linnaea 37, 1871, 48; F.-Vill., Nov. App. 1882, 308. — *Scirpus falcatus* Vahl, En. Plant. 2, 1806, 275. — *F. brevifolia* Presl, Rel. Haenk. 1, 1828, 192, non R. Br., 1810. — *F. brachyphylla* Presl, Rel. Haenk. 1, 1830, 351, non Schult., 1827. — *Trichelostylis junciformis* Nees in Wight, Contr. Bot. Ind. 1834, 106. — *F. haenkei* Presl ex Dietr., Sp. Pl. 2, 1833, 161; Syn. Pl. 1, 1839, 201. — *F. junciformis* (Nees) Kunth, En. Plant. 2, 1837, 239; Miq., Fl. Ind. Bat. 3, 1856, 327; Boeck., Linnaea 37, 1871, 49; C. B. Clarke, Fl. Br. Ind. 6, 1893, 647; Philip. J. Sc. 2, 1907, Bot. 97; Camus, Fl. Gén. I. C. 7, 1912, 119; Merr., En. Philip. Fl. Pl. 1, 1923, 123, excl. syn. Retzii; Kük., Bot. Jahrb. 59, 1924, 50.

F. falcata is often confounded with *F. cymosa*, to which it is very similar in habit. It is easily distinguishable by the broad scarious margins of the glumes, the whitish (not blackish) nut, and the distinctly produced connective setulose at the top.

In Malaysia it is very rare, and up to the present only known from the localities cited below.

Outside Malaysia it is known from Madagascar, India, and Indo China.

PHILIPPINES: *Haenke*, (*Presl*, acc. to Clarke, 1907), not seen. Luzon: Ilocos Norte Prov., Burgos: *Ramos BS 32737* (BM, BO, P); Manila: *Calléry in 1840* (P).

NEW GUINEA. NE. New Guinea, Sepik Distr., Dagua Airstrip, W. of Wewak: *Pulsford ?* (L; the same number in BM is *F. dichotoma* Vahl); Morobe Distr., Vicinity of Kajabit Mission, grassland, 270 m: *Clemens 10750* (GH). New Britain, Gazelle Peninsula: *Lauterbach 247* (cited by Kükenthal, 1924, as 274?) (SING).

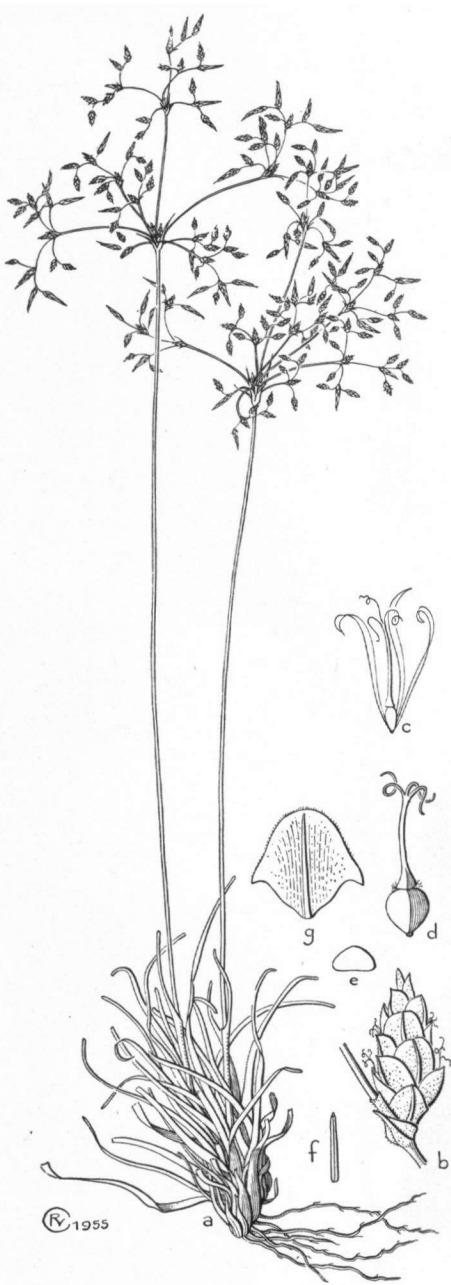


Fig. 1

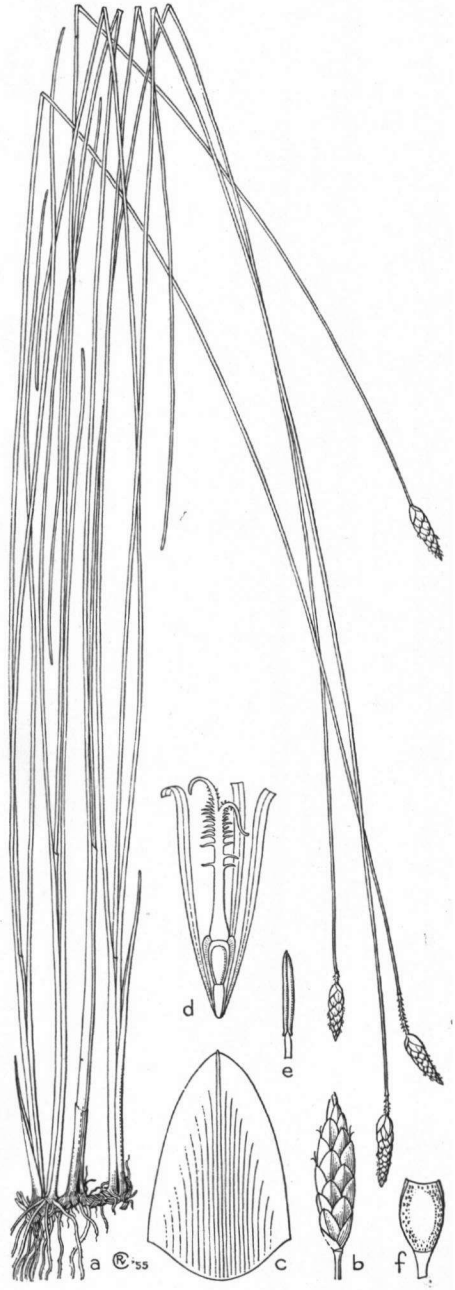


Fig. 2

8. *Fimbristylis lasiophylla* Kern, spec. nov. — *F. nigrobrunnea* (non Thwaites) Camus, Fl. Gén. I. C. 7, 1912, 120, p.p. — Sect. *Cymosae* Ohwi — Fig. 1.

Perennis, rhizomate repente crasso lignoso vaginis stramineis vel ferrugineis dissolutis circumdato. *Culmi* solitarii vel subsolitarii, erecti, rigidiusculi, obtusanguli, sulcati, glabri laevesque, ad basin vaginis 2—3 tubulosus usque ad 5 cm longis laminis brevibus $1\frac{1}{2}$ —2 cm longis praeditis cineti, 20—30 cm alti, 1 — $1\frac{1}{2}$ mm crassi. *Folia* basalia cinereo-viridia, culmo multo breviora, crassiuscula, rigida, erecta vel saepe falcata, plana, in sicco marginibus involutis, obtusiuscula vel abrupte acuminata, supra minute celluloso-reticulata glabra vel sparse pilosa, subtus pluristriata pilis albis oblique patentibus dense pubescentia, $1\frac{1}{2}$ — $2\frac{1}{2}$ mm lata; laminae intus ad basin eligulatae, sensim in vaginam transeuntes. *Anthela* composita, decomposita vel supradecomposita, late ovata, diffusa, laxa, multispiculata, 7—10 cm longa et lata. Bracteae involucrales brevissimae, oblique erectae, pubescentes, ima 1 — $1\frac{1}{2}$ cm longa. Anthelae radii 6—11, graciles, patentes, glabri laevesque, usque ad 7 cm longi. *Spiculae* solitariae, raro 2—4 aggregatae, ovatae vel oblongae, angulatae, acutiusculae, densiuscule pluriflorae, 3—6 mm longae, $1\frac{1}{2}$ —2 mm latae. Rhachilla distincte alata. *Glumae* spiraliter dispositae, membranaceae, undique imbricatae, adpressa, late ovatae, obtusae, paulo infra apicem minute mucronulatae, carinatae, pubescentes, in dorso ferrugineo tenuiter nervatae, nervo medio prominente, late hyalino-marginatae, $1\frac{1}{2}$ — $2\frac{1}{2}$ mm longae, $1\frac{1}{2}$ —2 mm latae. *Stamina* (2—)3, antheris linearibus 1 — $1\frac{1}{2}$ mm longis, connectivo in appendicem brevem glabram producto. *Stylus* tenuis, triqueter, ad basin pyramidato-incrassatus, sparse ciliatus vel fere glaber, 1 — $1\frac{1}{4}$ mm longus, stigmatibus 3 quam stylus longioribus. *Nux* obtuse compresso-trigona, obovata vel late elliptica, breviter stipitata, vix umbonulata, cellulis extimis transverse oblongis subimpressis minute cancellata, brunnea, 0.7—0.9 mm longa, 0.6—0.7 mm lata.

Allied to *Fimbristylis sericea* R. Br., but differing in several important characters. Like in *F. sericea* the leaves are densely pubescent on the under side; however, the hairs are not strongly appressed as in *F. sericea*, but obliquely patent. The dry leaves of *F. sericea* are revolute, those of *F. lasiophylla* involute. The much smaller spikelets of *F. lasiophylla* are nearly all solitary, sometimes only some of them are placed in clusters of 2—4. The much less distinctly nerved glumes are only $1\frac{1}{2}$ — $2\frac{1}{2}$ mm long., in *F. sericea* $2\frac{1}{2}$ —4 mm. The connective is smooth, not setulose at the top as is the case in *F. sericea*. The style is more slender, and there are always 3 stigmas, whereas in Asiatic *F. sericea* digynous flowers by far prevail. Accordingly the nuts are trigonous, not biconvex; they are much smaller and finely cancellate (smooth in *F. sericea*).

Possibly due to attack of a parasite the spikelets in *Clemens 3002*

Fig. 1. *Fimbristylis lasiophylla* Kern — a. Habit (spikelets partly elongate by attack of a parasite), $\times \frac{1}{2}$; b. spikelet, $\times 5$; c. deflorate flower, $\times 10$; d. nut (with style and stigmas), $\times 10$; e. transverse section of nut, $\times 10$; f. anther, $\times 10$; g. glume, $\times 10$. — From *d'Alleizette s.n.* (L).

Fig. 2. *Fimbristylis subalata* Kern — a. Habit, $\times \frac{1}{2}$; b. spikelet, $\times 1$; c. glume, $\times 5$; d. flower, $\times 5$; e. stamen, $\times 5$; f. nut, $\times 5$. — From *Brass 7846* (GH).

and 3224 are more or less comose by the strongly elongate sterile upper glumes. Such deformed spikelets often occur in *F. globulosa* (Retz.) Kunth, *F. dichotoma* (L.) Vahl, and *F. dura* (Zoll. et Mor.) Merr.

INDO CHINA. Annam, Toursane, Nov. 12, 1911: *Lecomte & Finet 954* (P); Toursane and vicinity, common in the dune region, May—July 1927: *J. & M. S. Clemens 5002, 5224* (U); environs de Nha-trang, sables près de la mer, 9—11 juin 1909: *Ch. d'Alleizette s.n. (type)* (L, sub no 951.74—626).

9. *Fimbristylis obtusata* (C. B. Clarke) Ridl., Fl. Mal. Pen. 5, 1925, 157. — *F. tenera* var. *obtusata* C. B. Clarke, Fl. Br. Ind. 6, 1893, 642; J. Linn. Soc. Bot. 34, 1898, 63; Ridl., J. Str. Br. R. As. Soc. 46, 1906, 224; Mat. Fl. Mal. Pen. 3, 1907, 94; Merr., Bibl. En. Borneo 1921, 62. — *F. nigrobrunnea* var. *thorelii* Camus, Not. Syst. 1, 1910, 248, p.p.; Fl. Gén. I. C. 7, 1912, 121, p.p.

A survey of the distribution of this species is given below. As for the Malay Peninsula, most records were already given by Ridley (1907).

F. nigrobrunnea var. *thorelii* Camus has nothing to do with *F. nigrobrunnea*. Of the specimens in the Paris Herbarium named as such by Camus, *Thorel 556* belongs to *F. obtusata*; *Balansa 2855* and *Thorel s.n.* I might refer to *F. straminea* Turr., with the type of which it agrees fairly well, except for the single stamen and the nut somewhat truncate-depressed at the top.

LOWER BENGAL: *Wallich, Kurz* (K).

LOWER BERMA. Rangoon: *Bouquet s.n.* (L).

COCHIN CHINA: *Thorel 556* (P).

SUMATRA: *Waitz s.n.* (most probably mislabelled) (L).

MALAY PENINSULA. Kedah, P. Langkawi: *Nauen s.n.* (SING). Pahang: *Ridley 1740c* (not seen). Malacca: *Ridley 1740a* (K, SING), *1740b* (BM). Johore: *Vesterdal 268* (SING). Penang: *Curtis 1867* (SING), *Didrichsen 3455* (C), *Nauen SF 37487* (BO, GH, K, SING), *Nur SF 4518* (K, SING), *5272* (BO, L, SING), *s.n.* (US). Singapore: *Hullett in 1894* (SING), *Nur s.n.* (SING), *Ridley 83* (K, SING), *1740* (SING), *8430* (K, SING), *s.n.* (SING), *Simclair s.n.* (BO, L).

BORNEO. Sarawak, Kuching: *Miss Hose 201* (SING), *s.n.* (SAR). W. Borneo: *Hallier 740* (BO). S. and E. Borneo: Bandjermasin: *Motley 85* (K). Br. N. Borneo: *Burbridge s.n.* (BM, K); Jesselton: *Topping 1456* (P, US); Mt Kinabalu, Dallas, 900 m: *Clemens 27681* (B, BM, BO, K, L, NY, SING).

10. *Fimbristylis schultzi* Boeck., Linnaea 38, 1874, 391; Benth., Fl. Austral. 7, 1878, 320 ("316"); S. T. Blake, Proc. R. Soc. Queensl. 58, 1947, 45. — *F. platystachys* Boeck., Linnaea 38, 1874, 390; Domin, Bibl. Bot. 20, Heft 85, 1915, 464. — *F. platystachys* var. *schultzi* (Boeck.) Domin, l. c.

The two *Fimbristylis* collections from the Lesser Sunda Islands I have here provisionally referred to *F. schultzi* Boeck., I am still puzzled at. In *Iboet 358a* from Sumba the mucros of the glumes are rather short, only slightly spreading, the nuts 0.6—0.7 mm long and 0.4—0.5 mm wide, not verruculose, almost elliptic in cross-section, blackish, with thick-walled hexagonal to transversely oblong impressed outer cells. In my opinion they perfectly agree with the type collection of *F. schultzi* (*Schultz 96*; K!). In *Van Steenis 7586* from Bali, however, the spikelets are strikingly squarrose by the longer recurved awns, the whitish nuts are slightly larger (0.75 × 0.65 mm), densely verruculose, and more equally trigonous.

The only Australian collection in the Leiden Herbarium distributed

as *F. schultzi* is *Specht 20* from N. Australia. In habit it is very similar to the Van Steenis collection, but not identical with the latter, the glumes, anthers, and style being larger, the upper margins of the glumes microscopically fimbriate-dentate, and the connective slightly bristly at the top. *Specht 20* seems to be identical with *Schultz 792*, the type collection of *F. platystachys* Boeck., as far as I can judge from the very young specimens of this collection in the Kew Herbarium. *F. schultzi* and *F. platystachys* were considered conspecific by Blake (1947).

The decision whether the Iboet and the Van Steenis collections are specifically distinct must be postponed until more material is available.

LESSER SUNDA ISLANDS. Bali, Gilimanuk, in grassy fields, 1 m: *Van Steenis 7586* (BO, L). Sumba, Waikolo, *Iboet 558a* (BO).

11. *Fimbristylis miliacea* L. var. *macrostachya* Kern, var. nov.

A typo differt spiculis majoribus 5—10 mm longis 3 mm latis, glumis c. $2\frac{1}{4}$ mm longis $1\frac{2}{5}$ mm latis, staminibus 3.

Because of the larger spikelets and the longer glumes this remarkable variety has been mistaken for *F. globulosa* (Retz.) Kunth. On account of the equitant leaves grooved on the inner margin¹), the narrowly hyaline-margined glumes, the rachilla not ragged by wings after the fall of the glumes, and the small nuts it belongs undoubtedly to *F. miliacea*.

Miquel, Fl. Ind. Bat. 3, 1856, 322, described *F. miliacea* var. *validior*, "umbellae radii primarii saepe 5, 2 majoribus bis-terve umbellato-proliferis, spiculis majusculis", based on a specimen from Sumatra, Padang, leg. *Junghuhn* (L). In this specimen I can not find any difference with typical *F. miliacea*.

JAVA. Central Java, Res. Semarang, Div. Grobogan, near Karangasem: *Koorders 28244B* (BO); Kesongo, on damp brackish clay: *Kooper, 650b, p. p.* (BO).

PHILIPPINES. Luzon, Prov. of Ilocos Norte, Burgos: *Eamos BS 27232* (type-coll., holotype in L) (BM, BO, L, NY, P).

12. *Fimbristylis aphylla* Steud. in Zoll., Syst. Verz. 1854, 61, nom. nud.; Syn. Plant. Glum. 2, 1855, 114. — *F. globulosa* var. *aphylla* (Steud.) Miq., Fl. Ind. Bat. 3, 1855, 322. — *F. quinquangularis* var. *crassa* Clarke, Fl. Br. Ind. 6, 1893, 644; Camus, Fl. Gén. I. C. 7, 1912, 115. — *F. quinquangularis* (non Kunth) Koord., Exk. Fl. Java 1, 1911, 200, p. p.; Backer, Onkruidfl. Jav. Suikerrietgr. 1928, 162, p. p.; Kük., Candollea 6, 1936, 425. — *F. salbundia* (non Kunth) Boeck., Linnæa 37, 1871, 44, quoad pl. jav.

If *F. globulosa* (Retz.) Kunth, *F. miliacea* (L.) Vahl, *F. quinquangularis* (Vahl) Kunth, *F. salbundia* (Nees) Kunth, and *F. anisoclada* Ohwi are accepted as specifically distinct, *F. aphylla* Steud. also deserves specific rank. Its relations to *F. quinquangularis* certainly are not closer than those to the other species of this intricate group. In habit it is most similar to *F. salbundia*; for the identification of both species ripe fruits are almost indispensable. The darker spikelets of *F. salbundia* angular by reason of the keeled glumes, and the (2—)3 stamens of the latter species (1—2 in *F. aphylla*) may serve as auxiliary characters. *F. aphylla* has been recorded from India and Further India; in Malaysia it seems to be

¹) Strictly speaking this inner margin is the upper side of the blade (see Chermeson, Bull. Soc. Bot. France 73, 1926, 260).

restricted to Sumatra and Java. The only specimen I have seen from the Philippines may be mislabelled.

It occurs in open wet places (swamps, rice fields) at medium altitudes (500—1500 m).

SUMATRA. N. Sumatra, Atjeh, Takengon: *Jochems 251* (L); 1200 m: *Van Steenis 5820* (BO); Gayu and Alaslans, Gayo Luas: *Van Daalen 221* (L); Karo plateau near Berastagi, wet rice-field, 1300 m: *Lörzing 6725* (BO); wet grassy place, 1250 m: *Lörzing 8436* (BO); swampy ground: *Bidley s.n.* (K); S. of Sibolangit, 650 m: *Lörzing 4245* (BO); Karolands, near Tandjung, 800 m: *Lörzing 8999* (BO); saddle Assahan, Porsea-Tutupan: *Lörzing 9935* (BO); Asahan, vicinity of Lumban Ria: *Rahmat si Boeca 7470* (GH, US), *7997* (GH); Adian Rindang, vicinity of Huta Tomuon Dolok: *Rahmat si Boeca 8733, 8757* (GH); vicinity of Aek Munte, 500 m: *Rahmat si Boeca 9117* (GH); hills ESE of Toba Lake, grassy wilderness, 1200—1400 m: *Lörzing 6643* (BO); W. Batuhuda, moist localities, 1200 m: *Lörzing 8030* (BO). Central Sumatra, Mt Talang-Laras Talang, rice-field, 1500 m: *Bünnemeijer 5186* (BO, L); roadside, 1400 m: *Bünnemeijer 5190* (BO); Mt Korinchi, 750—1400 m: *Bünnemeijer 8022, 8142* (BO), *8173* (B, BO, L, U), *Jacobson 2526* (BO), *Robinson & Kloss s.n.* (BM, K, SING); Lubu Gadang: *Matthew s.n.* (K). S. Sumatra, Benkulen, Udjung, 1000 m: *Rappard P 17a* (BO); Rambutan, 950 m: *Bünnemeijer 3425* (BO, L); Palembang, Bandang Agung, 500 m: *Van Steenis 3976* (BO, L, U).

JAVA: *Goering sect. II nr 149* (lectotype) (P); *Reinwardt s.n.* (U). W. Java, ad frontem pr. Bantar Peteh: *Zollinger 1609* (syntype) (FI, G, P); in paludibus pr. Prabakti: *Zollinger 3524* (syntype) (BM, F, G, GH, P); Priangan: *Warburg 11162* (US); Batavia: *Dirriohsen 3935* (C); Bukanagara, 1100 m: *Wisse 993* (BO); Bogor: *Hallier s.n.* (BO, L), *Raap 96* (L); Mt Salak, 1100 m: *Lam 2243, 2245* (BO); N. foot of Mt Salak, 750 m: *Kurz 330* (U); Telaga Saät, 1250 m: *Backer 24012* (BO, L); Tugu, 900 m: *Kurz 1842* (L); S of Leuwiliang, 1000 m: *Backer 25753* (BO); Nirmala, 1300 m: *Backer 10818* (BO, L, U); Pasawahan, 500 m: *Backer 25500* (BO, L); above Singaparna, 600 m: *Backer 3593* (BO, L); Tjipanas, 1000 m: *Kurz 1832* (L, P); Tjipajung: *Monod de Froideville s.n.* (BO); Megamendung: *Van Steenis 2243* (BO); Tjibodas, 1300—1400 m: *Bruggeman 619* (BO), *Van Steenis s.n.* (BO), *Kern 7632, 8149* (BO), *Sapiin 2154* (U); Takoka, 1000 m: *Koorders 14930 B* (BO); Sindanglaja: *O. Kuntze 4455* (US); Tjadasmalang, swampy places, 1000 m: *Bakhuizen v. d. Brink 2445* (BO); Wijkoopsbaai: *Junghuhn 412* (U); Mt Patuha, swamp, 1500 m: *Van Steenis 4431* (BO, L); Bandung, 800 m: *Van Steenis 1663* (BO), *Smith & Rant s.n.* (BO). Central Java: *Horsfield 1069* (BM); Wonosobo, 700 m: *Brinkman 298* (BO); Bandungun, 1000 m: *Kooper 513b* (BO); Kedu, Temanggung, 600 m: *Lörzing 404* (BO); Muntilan, 350 m: *Van Rijkcevorssel 16* (BO). E. Java, Madiun, Ngebel, 700 m: *Koorders 23295 B* (BO, L); SE. Java: *Forbes 893* (BM).

PHILIPPINES. Luzon, Bontoe Subprov. *Vanoverbergh 2162* (FI).

13. *Fimbristylis quinquangularis* (Vahl) Kunth, En. Plant. 2, 1837, 229; Steud., Syn. Plant. Glum. 2, 1854, 113; Miq., Fl. Ind. Bat. 3, 1856, 321; Boeck., Linnaea 37, 1871, 42; C. B. Clarke, Fl. Br. Ind. 6, 1893, 644; Philip. J. Sc. 2, 1907, Bot. 96; Ill. Cyp. 1909, t. 43, f. 4—6; Koord., Exk. Flora Java 1, 1911, 200, p.p.; 4, 1922, f. 257 & 258; Camus, Fl. Gén. I. C. 7, 1912, 114; Merr., En. Philip. Fl. Pl. 1, 1923, 125; Back., Onkruidfl. Jav. Suikerrietgr. 1928, 162, p.p., t. 170; Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, p. 26. — *Scirpus quinquangularis* Vahl, En. 2, 1806, 279. — *F. miliacea* (non Vahl) S. T. Blake, J. Arn. Arb. 35, 1954, 216.

S. T. Blake (1954) refers the Linnean epithet *miliaceus* to *F. quinquangularis* (Vahl) Kunth, whereas to his mind *F. littoralis* Gaud. is the correct name of the species hitherto generally known as *F. miliacea*. This undesirable change of names can legally be avoided; see Kern, Taxon 3, 1954, 246.

Little attention has been given to the taxonomic value of the ligule

in *Fimbristylis*. In *F. quinquangularis* and the allied species the ligule is absent as a rule; only in one of the two specimens of *Robinson 1894* in the Leiden Herbarium it is represented by a dense fringe of short hairs, like in *F. microcarya* F. v. M.

Because up to the present in Malaysian literature *F. aphylla* was not distinguished from *F. quinquangularis*, a survey of the materials examined is given.

F. quinquangularis occurs in open or lightly shaded wet places at low altitudes (0—500 m), unlike *F. aphylla* which is a plant of medium altitudes (500—1500 m).

SUMATRA. E. Coast Res., Sungei Diskin: *Jochems 3154* (BO); Belawan (Deli), coastal swamp, 0—2 m: *Lörzing 3432* (BO).

JAVA. W. Java, Banten, Bodjongmanik: *Koorders 40794 β* (BO); Bantardawa near Bandjar: *Backer s.n.* (BO); Kiara Pajung, N of Tjiandjur, swampy place, 500 m: *Backer 23945* (BO). Central Java, Cheribon, forestry Indramaju: *Van Steenis 6666* (BO); Indramaju, forestry Plosokerep: *Van Steenis 7493* (BO), *7529* (BO, L), *8171* (BO); Purwodadi, 175 m: *Coert 501* (BO, L); Semarang, rice-field: *Docters van Leeuwen s.n.* (BO); Djogjakarta, div. Kulon Progo, Dayakan, rice-field, 12 m: *Landbouwerlaar Djogja 24* (BO, L). E. Java, swampy places near Alkanaar: *Mousset 495* (BO); N. Kediri, teak-culture Tunglur, 125 m: *Grutterink 3164* (BO); Pasuruan, Karangassen: *Kooper 621* (L); Karangtengat: *Kooper s.n.* (L). Kangean Arch. Paliat, teak-forest, 10 m: *Backer 29331* (BO); Sabunten, swampy place, 10 m: *Backer 29858* (BO, L).

LESSER SUNDA ISLANDS. Timor, drying up pool: *Monod de Froideville 1714* (BO).

PHILIPPINES. Coron Island: *Ramos BS 41141* (P). Luzon, Prov. of Bulacan: *Ramos Phil. Pl. 1423* (BM, BO, G, GH, L, NY, P, SING); Manila: *Merrill BS 9808* (BM, K, P, NY, US); Luzon Central: *Loher 1340* (K); Prov. of Rizal: *Reillo BS 19300* (L, NY); Pangasinan Prov.: *Ramos BS 4853* (NY, P, US), *BS 4935* (P, SING, US). Samar, Matuguiano: *Edaño PNH 15619* (BM, L), *Gachalian PNH 15476* (L, SING); Mt Purog: *Edaño PNH 15397* (SING). Leyte, SW of Tacloban: *Glassman 521* (GH). Bohol: *Ramos BS 42927* (G, SING). Panay: *Copeland 100 p.p.* (K, US). Mindanao, Davao: *Copeland 586* (G, K p.p.; in BO, K p.p. & NY = *F. miliacea*).

CELEBES. S.E. Peninsula, Kandari, Lepo-lepo: *Beccari s.n.* (FI 12026); E. Celebes, Sukon, rice-fields: *Kaudern 412* (L).

MOLUCCAS. Buru: *Lahate 1564* (P). Amboina: *Robinson 1894* (BM, BO, GH, L, SING, US).

NEW GUINEA. W. New Guinea, S of Merauke, coastal swamp, 5 m: *Van Royen 4574* (L). Papua, Baroko, Mekeo Distr., Centr. Div., common, damp savannah flats, 30 m: *Brass 3733* (BO, GH, L, NY).

14. *Fimbristylis salbundia* (Nees) Kunth, En. Plant. 2, 1837, 230; Steud., Syn. Plant. Glum. 2, 1855, 113; Boeck., Linnaea 37, 1871, 44, p.p., haud quoad pl. jav.; C. B. Clarke, Fl. Br. Ind. 6, 1893, 646; J. Linn. Soc. 34, 1898, 69; S. T. Blake, J. Arn. Arb. 35, 1954, 216. — *Trichelostylis salbundia* Nees in Wight, Contr. Bot. Ind. 1834, 105. — *F. paludosa* Merr.. Philip. J. Sc. 9, 1914, Bot. 265; En. Philip. Fl. Pl. 1, 1923, 125. — *F. globulosa* (non Kunth) Ohwi, Bot. Mag. Tokyo 56, 1942, 202, non al.

Nees based his *Trichelostylis salbundia* on *Wallich 3499* and *3526*; the latter collection he also cited under *Trichelostylis complanata* (Retz.) Nees. Clarke (1893, 1898) pointed out the great confusion in these Wallich collections and based his conception of *F. salbundia* on *3526* of the Wallich Herbarium at Kew, which specimen I therefore propose to accept as the lectotype of the species.

F. salbundia, only reported from New Guinea by Blake (1954), ap-

pears to be rather widely distributed in Malaysia; *F. paludosa* Merr. is a synonym.

SUMATRA. Karo Plateau, Lau Bedimbo, E of Siosar, swamps, 1250 m: *Lörzing 8534* (BO); Mt Piso-Piso, NW of Toba Lake, moist grassland, 1400 m: *Lörzing 9370* (BO); Huta Gindjang, Toba: *Ruttner 128* (BO); Tapanuli, Dolok Margu, swinging bog, 1400 m: *Polak 90* (BO); Mt Korinchi, Sungei Kumbang, 1350 m: *Robinson & Kloss 118* (BM, SING, US).

PHILIPPINES. Luzon, Benguet Subprov.: *Merrill Phil. Pl. 551* (FI, G, U); *Williams 1239* (type of *F. paludosa* Merr.) (GH, K, NY, US); Baguio: *Elmer 6497* (BO, K, NY, P, US), *Clemens 51891* (GH, US).

CELEBES. Res. Menado, E of Lake Lindu, W. slope of Mt Ngilalaki, swamp, 1000 m: *Bloembergen 4099* (BO, L); Bolaang Mongondow, Danau Lake: *Kaudern 147* (L).

NEW GUINEA. W. New Guinea, Angi, Arfak Mts, in open marsh by Lake Giji, 1900 m: *Kamehira & Hatustma 13683* (BO). Papua, Centr. Div., Urunu, Vanapa Valley, small swamps, 1900 m: *Brass 4805* (BO, GH, K, L, US).

15. *Fimbristylis anisoclada* Ohwi, Blumea 8¹, 1955, 97 — Fig. 2.

The specimen on which this species is based (*Noerkas 218* from S. Celebes) lacks the basal parts. Van Steenis collected more complete material in Central Java. In the Paris Herbarium I found some specimens with well developed sterile shoots from Indo China. *F. anisoclada* is a perennial plant, with tufted stems up to 80 cm tall and about 2 mm thick, at the base clothed with 1—3 bladeless or almost bladeless, tubular, up to 20 cm long sheaths with a lanceolate appendage 2—3 cm long. The leaves of the sterile shoots are much shorter than the stems, erect, rigid, abruptly acuminate, smooth or very slightly scaberulous on the margins near the apex, 1—2 mm wide. In the Indochinese specimens the inflorescence is smaller than in the Malaysian ones, 5—9 cm long. The decision whether *F. anisoclada* and *F. salbundia* can be kept apart, must be postponed until more material is available.

COCHIN CHINA: *Godefroy s.n. in 1875* (P); prairies inondées près Saïgon: *Godefroy s.n. in 1874* (P).

JAVA. Central Java, Indramayu, forestry Plosokerep, 25 m: *Van Steenis 8198* (BO, L).

16. *Fimbristylis recta* F. M. Bail., 3rd Suppl. Syn. Queensl. Fl. 1890, 80; S. T. Blake, Proc. R. Soc. Queensl. 58, 1947, 44; J. Arn. Arb. 35, 1954, 211. — *F. macgillivrayi* C. B. Clarke, Kew Bull. Add. Ser. 8, 1908, 24.

S. T. Blake (1947) supposed the identity of *F. macgillivrayi* C. B. Clarke with *F. recta* F. M. Bail. I had the opportunity to study the type of *F. macgillivrayi* in the British Museum and a duplicate of it in the Paris Herbarium (Lizard Island, N. Coast of Australia, *MacGillivray 35*). There can be no doubt that the two are conspecific, so that *F. macgillivrayi* has accordingly been referred to the synonymy of *F. recta*. The style in *MacGillivray 35* is glabrous, not villous as Clarke indicated.

17. *Fimbristylis hispidula* (Vahl) Kunth, En. Plant. 2, 1837, 227; Boeck., Linnaea 37, 1871, 27. — *Scirpus hispidulus* Vahl, En. Plant. 2, 1806, 276. — *Isolepis exilis* Kunth in H. B. K., Nov. Gen. 1, 1815, 224. — *F. exilis* (Kunth) R. et S., Syst. Veg. 2, 1817, 98; C. B. Clarke, Fl. Trop. Afr. 8, 1902, 418; Nelves & Baldwin, Am. J. Bot. 39, 1952, 377, f. 49—57. — *Abildgaardia pubescens* Presl, Rel. Haenk. 1, 1828, 180, non *F. pubescens* Link. — *F. preslii* Kunth, En. Plant. 2, 1837, 228; Steud., Syn. Plant. Glum.

2, 1855, 108; F.-Vill., Nov. App. 1882, 308; Merr., En. Philip. Fl. Pl. 1, 1923, 127. — *F. clavinux* C. B. Clarke, Ill. Cyp. 1909, t. 41, f. 1—3.

The two collections cited below show some differences. In the specimens from Wetar, perfectly agreeing with the African specimens of *F. hispidula* in the Leiden Herbarium, the inflorescence is anthelate, consisting of 3—5 spikelets and subtended by small foliaceous bracts, the glumes are 3 mm long, the style is glabrous and about $1\frac{1}{4}$ mm long. The inflorescence of the Luzon specimens, however, usually consists of a single terminal spikelet, sometimes with 1—2 lateral additional ones, the glumes are 4 mm long, the style is slightly pubescent and 2 mm long. Undoubtedly the latter specimens represent Presl's *Abildgaardia pubescens*, the type-collection of which Presl localized "in Mexico et in Luzon" and Merrill (1923) supposed to be probably not Philippine.

F. hispidula is highly polymorphic, and forms with only 1 or 2 spikelets occur also in Africa. *F. hispidula* var. *submonostachya* Boeck., Linnaea 37, 1871, 28 was based on *Scirpus hispidulus* Vahl (Guinea, leg. Thonning) and *Abildgaardia pubescens*; *F. exilis* var. *oligostachya* C. B. Clarke, Fl. Trop. Afr. 8, 1902, 419 on specimens from Nile Land. Therefore I prefer to treat *F. hispidula* and *F. preslii* as being conspecific.

LESSER SUNDA ISLANDS. Wetar, near Tihu Lake, *Eucalyptus* forest and swamp, 425—500 m: *Elbert 4553* (L).

PHILIPPINES. Luzon, Ilocos Norte Prov., Burgos: *Ramos BS 32797* (BM, BO, K, L, NY, P, SING, US).

18. *Fimbristylis furva* R. Br., Prodr. 1810, 228; S. T. Blake, J. Arn. Arb. 35, 1954, 219.

Recorded by Blake from Papua. It has been also collected in the Aru Islands and the southern part of Dutch New Guinea.

W. NEW GUINEA. NE. of Kurik bivouac (NW of Merauke), in grassland among moderately tall grasses, 6 m: *Van Royen 4880, 4881* (L). ARU ISLANDS, P. Trangan, Kp. Ngaibos, savannah in hilly country, few m: *Buwalda 5556a* (BO, L).

19. *Fimbristylis lanceolata* C. B. Clarke, Kew. Bull. Add. Ser. 8, 1908, 25. — Descr. emend. — Sect. *Leptocladae* Ohwi. — Perennis, rhizomate brevissimo. *Culmi* fasciculati, valde compressi, ad basin incrassati, striati, glabri vel praesertim apicem versus sparse pilosi, laeves, (10—)20—40 cm alti, $\frac{3}{4}$ — $1\frac{1}{4}$ mm lati, ad basin vaginis 1—2 tubulosi sine laminis apice oblique fissis superne puberulis vel margine membranaceo ciliatis cincti. *Folia* basalia culmo breviora, erecta, rigidiuscula, plana, ad apicem obtusa vel abrupte acuminata, eligulata (basi laminae intus sensim in vaginam transeunte), glabra, $1\frac{1}{2}$ —3 mm lata, marginibus incrassatis sursum antrorse scaberulis; vaginae inferiores ferrugineae vel brunneae, striatae, marginibus membranaceis. *Anthela* simplex vel subcomposita, subcontracta, 2—9-spiculata, 2—4 cm longa, 2—7 cm lata. Bractee involucales 2—3, brevissimae, squamiformes, cuspidatae, 1—5 mm longae. Anthelae radii 1—5, denique patentes vel arcuate reflexi, compressi, laeves, $\frac{1}{2}$ —2 cm longi; radioli si adsunt brevissimi, c. $\frac{1}{2}$ cm longi. *Spiculae* solitariae, oblongae vel lineares, teretes, acutiusculae, laxae pluriflorae, 10—25 mm longae, 2 mm latae. Rhachilla alata. *Glumae* spiraliter dispositae, tenuiter membranaceae, adpressae, oblongo-ovatae, obtusissimae, apice inciso, paullo infra apicem mucronulatae, vix carinatae, 3—5-nerviae (nervo medio prominente, nervis

lateralibus obscuris), fulvae vel fuscae, 4—4½ mm longae, 2½—2¾ mm latae, dimidio superiore dense glanduloso-puncticulato, marginibus in parte superiore majore longe ciliatis. *Stamina* 3; antherae lineares, 2—2½ mm longae, connectivo in appendicem ovato-oblongam setis conspicuis cristatam producto. *Stylus* tenuis, triqueter, basi pyramidato-incrassato hispidulus, caetero glaber, 3—3¾ mm longus; stigmata 3, stylo multo breviora. *Nux* obtuse trigona, late obovata, breviter stipitata, haud vel vix umbonulata, dense verruculosa, primo alba denique nigricans, 0.9 mm longa, 0.7—0.8 mm lata, cellulis extimis longitudinaliter ellipticis vel oblongis.

The type specimen in the Paris Herbarium was marked by Clarke in 1888 "*Fimbristylis lanceolata*, sp. nov. This is the type of the new species." The publication was only done posthumously. The original description being very inadequate, I have drawn up the above emended description after the material cited below, thusfar the only collections known to me.

Clarke placed the species in the affinity of *F. merguensis* C. B. Clarke, with which it has nothing to do in my opinion. Its true place is near *F. furva* R. Br. and *F. macassarensis* Steud. It is remarkable for the elongate spikelets and the strongly compressed, almost ancipitous stems.

AUSTRALIA. Baie Rafles—Côte Nord de la Nouvelle Hollande, Voyage de l'Astrolabe et de la Zélée 1838—1840: *Le Guillou s.n. (type)* (P).

SE. CELEBES. Rumbia, Wambakowu, in monsoon forest, moist locality, alt. 40—130 m: *Elbert 3091* (L).

MOLUCCAS. Aru Islands, P. Trangan, Kampong Meroor, savannah, alt. few m: *Buwalda 5532* (BO, K, L, SING).

20. *Fimbristylis macassarensis* Steud., Syn. Plant. Glum. 2, 1855, 109; Miq., Fl. Ind. Bat. 3, 1856, 318. — *F. tenera* (non Schult.) C. B. Clarke, Philip. J. Sc. 2, 1907, Bot. 95; Merr., En. Philip. Fl. Pl. 1, 1923, 126. — *F. corniculata* Merr., Philip. J. Sc. 7, 1912, Bot. 231; En. Philip. Fl. Pl. 1, 1923, 122.

Steudel based this species on "*Zollinger 1019*" (should be 1059) from Celebes, of which collection I have only seen a specimen in the Paris Herbarium, determined by Steudel. Not before 1921 *F. macassarensis* was collected for the second time in Celebes by Bünnemeijer. His specimens perfectly agree with the type, except for the nuts densely verruculose in *Zollinger 1059*, smooth in *Bünnemeijer 10837*. In the Madura collection cited below, consisting of a few fruiting stems only, the nuts are verruculose.

In *Merrill 7359*, the type collection of *F. corniculata*, the leaves and spikelets are narrower, the anthers shorter, the style shorter and slightly fimbriate, and the (verruculose) nuts somewhat smaller. However, the Celebes plants and the Philippine ones are so nearly related that, at least provisionally, I prefer to treat them as geographical races of the same species. For a decision much more material is needed.

Merrill supposed *F. corniculata* to be allied to *F. tenera* Schult., to which species *Loher 760* (identical with *Merrill 7359*) was referred by Clarke in 1907. The bladeless cauline leaves, the long-ciliate glumes notched at the apex, the bristly connective, the style hispidulous at the base, and the bluish black nuts with longitudinally elliptic to oblong outer cells, unmistakably point, however, to the close affinity with *F. lanceolata* C. B. Clarke and *F. furva* R. Br.

MADURA. Regency Pamekasan, distr. Bunder, Tambhung, experimental field: *Adj. Landbouwcons. Pamekasan 2a*, p.p. (BO).

PHILIPPINES. Luzon, La Loma near Manila, in open grassland, 10 m: *Merrill BS 7359* (type coll. of *F. corniculata* Merr.) (BM, K, L, P, US); Luzon central: *Loher 760* (K).

CELEBES. S W. Celebes, near Makassar: *Zollinger 1059* (type coll.) (P); Mt Galesang near Malino, roadside, 310 m: *Bünnemeijer 10337* (BO, L).

21. *Fimbristylis cinnamometorum* (Vahl) Kunth, En. Plant. 2, 1837, 229; Steud., Syn. Plant. Glum. 2, 1855, 113; Boeck., Linnaea 37, 1871, 35; Kük., Mitt. Thür. Bot. Ver., N. F. 50, 1943, 9; S. T. Blake, J. Arn. Arb. 35, 1954, 220. — *Scirpus cinnamometorum* Vahl, En. Plant. 2, 1806, 278. — *F. cyperoides* R. Br., Prodr. 1810, 228; Kunth, En. Plant. 2, 1837, 244; C. B. Clarke, Fl. Br. Ind. 6, 1893, 650, Ill. Cyp. 1909, t. 44, f. 11—13; Benth., Fl. Austral. 7, 1878, 317. — *F. kamphoeveneri* Boeck., Bot. Jahrb. 5, 1884, 505.

Comparison of the type of *F. cyperoides* R. Br. in the British Museum with an isotype of *Scirpus cinnamometorum* Vahl in the Leiden Herbarium showed that they are conspecific, proving that Blake (1954) is right in treating them as synonymous. Clarke (1893, 649) referred *F. kamphoeveneri* Boeck. to *F. fusca* (Nees) C. B. Clarke. Obviously this was done on account of *Kamphoevener 2484*, cited by Clarke (J. Linn. Soc. 34, 1898, 72) under *F. fusca*. The type of *F. kamphoeveneri* is *Kamphoevener 2485* (KIEL), which I have not seen. However, a specimen of *Kamphoevener 2484* in the Copenhagen Herbarium (like 2485 from Teressa) undoubtedly belongs to *F. cinnamometorum*. It was annotated by Boeckeler as follows: "*Fimbristylis (Trichelost.) Kamphoeveneri* Böckl. in Engl. Bot. Jahrb. B. V H. 5, zu Herb. Kiliensi sub no 2485." From Boeckeler's description it is just as well clear, that *F. kamphoeveneri* does not belong to *F. fusca*: "foliis filiformi-setaceis . . . spiculis perangustis . . . squamis tenui-membranaceis granulis minutis ferrugineis conspersis . . . car. cancellata."

A survey of the New Guinea collections of *F. cinnamometorum* was given by Kükenthal (1943) and Blake (1954). The species occurs also in Sumatra and the Philippines.

SUMATRA. E. Coast Res., Si Mandi Angin, on the Sungei Kanan: *Rahmat si Boeca 4081* (NY, US).

PHILIPPINES. Luzon, Ilocos Norte Prov., Burgos: *Ramos BS 32809* (BM, BO, GH, K, L, P, SING).

NEW GUINEA. W. New Guinea, Cyclop Mts: *Meijer Drees 88* (BO, L). Papua, see Blake (1954).

22. *Fimbristylis adenolepis* Kern, spec. nov. — Sect. *Fuscae* Ohwi — Fig. 3.

Herba annua, gracilis, glabra, radicibus fibrosis. Culmi fasciculati, erecti, setacei, angulato-costati, laeves, 5—12 cm alti, $\frac{1}{4}$ — $\frac{1}{3}$ mm crassi, ad basin foliati. Folia culmo 2—3-plo breviora, erecta, setacea, plana, obtusiuscula vel abrupte acuminata, laevia, supra celluloso-reticulata subtus nervosa, eligulata, usque ad 6 cm longa, c. $\frac{1}{2}$ mm lata, marginibus incrassatis; vaginae herbaceae, striatae, stramineae, marginibus membranaceis. Anthela simplex vel subcomposita, laxa, (1—)3—5-spiculata, usque ad 2 cm longa et lata. Bracteae involucales 2—3, foliis consimiles, erectae, inflorescentia breviores, ima $\frac{1}{2}$ —1 cm longa. Radii anthelae 1—3, filiformes, erecto-patentes, obtusanguli, compressi, laeves, usque ad 12 mm

longi. *Spiculae* solitariae, lanceolatae, valde compressae, acutiusculae, paucivel pluriflorae, 3—5 mm longae, 1 mm latae. Rhachilla anguste alata. *Glumae* distiche dispositae, tenuiter membranaceae, erectae, elliptico-ovatae,

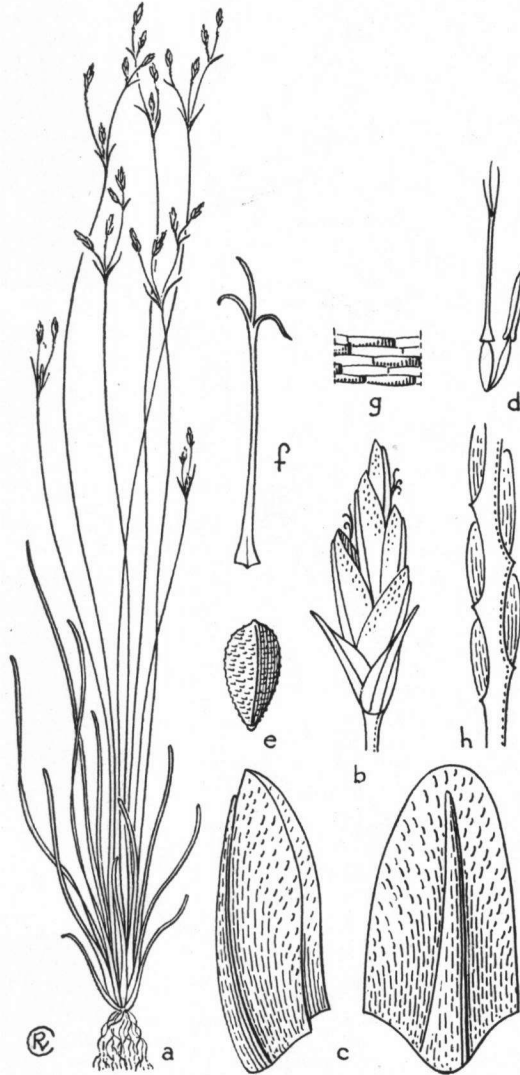


Fig. 3. *Fimbristylis adenolepis* Kern — a. Habit, $\times 1$; b. spikelet, $\times 10$; c. glumes, $\times 20$; d. young flower, $\times 20$; e. nut, $\times 20$; f. style and stigmas, $\times 20$; g. outer cells of nut; h. rhachilla, $\times 20$. — From Backer 27049 (BO).

obtusiusculae, muticae, acute carinatae (carina 3-nervia, nervo medio infra apicem evanescente), ferrugineae (marginibus dilutioribus), dense glanduloso-punctulatae, $1\frac{1}{2}$ —2 mm longae, 1 mm latae; inferiores 2 vacuae,

breviores, breviter cuspidatae. *Stamen* 1; anthera oblonga, 0.4—0.5 mm longa, connectivo in appendicem brevem rubram laevem producto. *Stylus* triqueter, basin versus pyramidato-incrassatus, glaber, 1—1 $\frac{1}{4}$ mm longus; stigmata 3, stylo multo breviora. *Nux* obtuse trigona, oblongo-ovovata, breviter stipitata, humiliter umbonulata, verruculosa, cellulis extimis transverse oblongo-linearibus lineolata, straminea, 0.6—0.75 mm longa, 0.25—0.3 mm lata.

On account of the transversely oblong-linear external cells of the nut, and the gland-dotted glumes, apparently related to *F. cinnamometorum* (Vahl) Kunth. The latter species, however, is a much larger, rhizomatous perennial, with horny lower leaf-sheaths, glumes 2 $\frac{3}{4}$ —4 mm long and 1 $\frac{1}{2}$ —2 mm wide, 3 stamens, linear anthers 1—2 mm long, a much longer style (3—3 $\frac{1}{2}$ mm), and more obovate somewhat larger nuts 0.75—0.9 by 0.4—0.7 mm.

INDO CHINA. Annam, Nha-trang and vicinity, March 11—26, 1911, C. B. Robinson 1071 (P). Cochin China. Bay Doc, bords de la mer, Sept. 23, 1875, Godefroy 815 (P).

SIAM. Surat, Khun Tale Lake, Jan. 13, 1935, Gunnar Seidenfaden 2326 (SING).

MALAYSIA. Kangean Archipelago, Kangean Island, Ardjasa, moist grassy field, abundant, 25 m, March 16, 1919; Backer 27049 [partly, mixed up with *F. fimbriatyloides* (F. v. M.) Druce and *F. obtusata* (Clarke) Ridl.] (BO, type; L).

23. *Fimbristylis fuscoides* C. B. Clarke in Ostenf., Bull. Herb. Boiss. 2, 1905, 719; Kew Bull. Add. Ser. 8, 1908, 25; Camus, Fl. Gén. I. C. 7, 1912, 124; Ridl., Fl. Mal. Pen. 5, 1925, 160. — *F. angustifolia* Ridl., J. R. As. Soc. Str. Br. 59, 1911, 223. — *F. erythradenia* Camus, Not. Syst. 1, 1910, 247; Fl. Gén. I. C. 7, 1912, 113.

I have seen specimens from Siam (Pattani: Kerr 7738) (SING), Indo China, and Malaysia; the Malaysian ones are enumerated below. The species is characteristic for sandy fields and sandy places on heaths at low altitudes. The type of *F. erythradenia* Camus from Cochin China: Thorel 506 (P) agrees with the specimens of *F. fuscoides* examined.

MALAY PENINSULA. Setul, sandy places on heaths: Ridley 14822 (type-coll. of *F. angustifolia* Ridl.) (BM, K, SING); Perlis, Bukit Ketri heath: Henderson 22960 (SING).

BILLETON: Riedel s.n. (FI, L); N of Manggar: Ham 2 (BO); Begandung, roadside: Vorderman s.n. (BO, L).

BORNEO. Labuan: Barber 356 (lectotype of *F. fuscoides* C. B. Clarke) (K), Beccari s.n. (FI, sheet nr 12024), Bp. Hose 95 (SING), Ridley 9042 (K, SING).

24. *Fimbristylis fusca* (Nees) C. B. Clarke, Fl. Br. Ind. 6, 1893, 649; Philip. J. Sc. 2, 1907, Bot. 98; Ridl., Mat. Fl. Mal. Pen. 3, 1907, 97 p.p.; Koord., Exk. Fl. Java 1, 1911, 200; 4, 1922, f. 262; Camus, Fl. Gén. I. C. 7, 1912, 123; Merr., En. Philip. Fl. Pl. 1, 1923, 123 p.p.; Ridl., Fl. Mal. Pen. 5, 1925, 160, p.p.; Backer, Bekn. Fl. Java 10, 1949, fam. 246, 18; S. T. Blake, J. Arn. Arb. 35, 1954, 211. — *Gussonea cyperoides* Presl, Rel. Haenk. 1, 1828, 183, t. 33, non *F. cyperoides* R. Br. — *Gussonea pauciflora* Brongn. in Duperr., Voy. Bot. 2, 1829, 171, t. 33, non *F. pauciflora* R. Br. — *Abildgaardia fusca* Nees in Wight, Contr. Bot. Ind. 1834, 95; Kunth, En. Plant. 2, 1837, 249; Steud., Syn. Plant. Glum. 2, 1855, 72; Boeck., Linnaea 37, 1871, 54. — *Abildgaardia cyperoides* (Presl) Nees in Wight, Contr. Bot. Ind. 1834, 95, in adnot.; Kunth, En. Plant. 2, 1837, 249.

— *Abildgaardia pauciflora* (Brongn.) Kunth, En. Plant. 2, 1837, 249; Steud., Syn. Plant. Glum. 2, 1855, 73; Miq., Fl. Ind. Bat. 3, 1856, 298. — *Rhynchospora ? anomala* Steud. in Zoll., Syst. Verz. 1, 1854, 61, nom. nud.; Syn. Plant. Glum. 2, 1855, 149; Miq., Fl. Ind. Bat. 3, 1856, 337. — *Isolepis longispica* Steud., Syn. Plant. Glum. 2, 1855, 104. — *F. subfusca* Camus, Not. Syst. 1, 1910, 248; Fl. Gén. I. C. 7, 1912, 123. — *F. rigidifolia* Ridl., J. Str. Br. R. As. Soc. 59, 1911, 223; Fl. Mal. Pen. 5, 1925, 159. — *F. stenochlaena* Kük., Mitt. Thür. Bot. Ver., N. F. 50, 1943, 11; S. T. Blake, J. Arn. Arb. 35, 1954, 220.

A highly variable species. *F. stenochlaena* Kük. was based on *Brass* 7840 from Papua. The specimens of this collection are more robust than is usually the case in *F. fusca*. In habit they are very similar to *F. eragrostis*, from which species they differ by the hairy glumes, and the much longer style with relatively short stigmas. Kükenthal distinguishes *F. stenochlaena* from *F. fusca* by the broader leaves (2 mm) with light-coloured sheaths, the twice as long spikelets, the regularly distichous, long-acuminate, narrower glumes, and the many-flowered spikelets with all flowers bisexual. Blake (1954, p. 223) characterizes *F. stenochlaena* by the 4—5 (not 3—4) mm long glumes, the 4 (not about 3) mm long style, the many-ribbed stems, the $1\frac{1}{2}$ —4 mm wide leaves, and the spikelets 2—3 (not $1\frac{1}{2}$ —2) mm wide. I am unable to find any difference in the glumes and nuts. The width of the leaves and the number of florets varies greatly in *F. fusca*, like in most *Fimbristylis* species. In the type collection of *F. fusca* (Wallich 3530) the glumes are $4\frac{1}{2}$ — $5\frac{1}{4}$ mm long and about 2 mm wide, the style 5 mm long. The flowers of *F. stenochlaena* are triandrous (like in *F. fusca*), not diandrous as Kükenthal indicates. A gradual series of forms intergrading between *F. fusca* and *F. stenochlaena* was recently collected in Dutch New Guinea by Van Royen. Like *F. stenochlaena*, *F. subfusca* Camus and *F. rigidifolia* Ridl. are in my opinion broad-leaved *F. fusca*, the floral characters being quite those of the last species.

NEPAL: Wallich 3530 (type-coll. of *Abildgaardia fusca* Nees) (L, P).

INDO CHINA. Cochín China: Pierre s.n. (type of *F. subfusca* Camus) (P).

SUMATRA. Atjeh, Isaq, grassfields in *Pinus* forest, 1000—1300 m: Van Steenis 6248 (BO, L). E. Coast Res., near Hopoan, Toba Lake, 1250 m: Lörzing 10132 (BO, L). W. Coast Res., Fort van der Capellen: Matthew s.n. (K).

MALAY PENINSULA. Setul, heaths: Bidley 14877 (type of *F. rigidifolia* Ridl.) (K, SING). Singapore, Holland Road, sandy fields: Ridley 11377 (BM, K, SING).

JAVA. W. Java, Tjikoya: Zollinger 700 (type-coll. of *Rhynchospora ? anomala* Steud.) (BM, FI, G, K, L, P); Tendjo, dry grassfield, 80 m: Baker 24022 (BO); Tjiteras, grassfield, 40 m: Baker 26503 (B, BO, K, L); forest-reserve Maribaja, N of Djasinga, grassfields and brushwood, 50 m: Van Steenis 11805 (BO, L); Djagabaja, grassy hills, 125 m: Beumée A 597 (BO); Banten, Genteng Lebak: Forbes 19 (BM); Indramayu, forestry Plokokerep, 30 m: Van Steenis 7485 (BO, L).

BORNEO: Barber 307 (K); Bandjermasin: Motley 621 (K).

PHILIPPINES. Palawan, Taytay: Merrill 9389 (BM, BO, GH, K, L, NY, P, SING). Luzon, Ilocos Norte Prov., Burgos: Ramos BS 32742 (BO, L, NY, SING); Cagayan Prov.: Ramos BS 7859 (NY, US); Prov. of Rizal, Bosoboso: Merrill 2785 (BM, BO, K, NY); Luzon central: Loher 1345 (K, US).

CELEBES. Swampy grassfield near S. Karadjae, NNE of Rapang, 75 m: Eyma 353 (BO, U), 354 (BO); Kolonedale, between Tomata and Kamba, in open vegetation especially in dry gravel hills: Eyma 4007 (BO, L, U).

MOLUCCAS. Ambon: Barclay s.n. (BM).

NEW GUINEA. W. New Guinea, grassfields E of aerodrome Andjai, 540 m: *Van Royen 3945, 3963, 5034* (L); Balim R., common among the grass on long-deforested slopes, 1600 m: *Brass 11744* (GH); Kurik bivouac, NW of Merauke, among low grasses, 6 m: *Van Royen 4887* (L). PAPAUA, W. div., Lake Daviumbu, Middle Fly R., wet grass plains: *Brass 7840* (type-coll. of *F. stenochlaena* Kük.) (BM, BO, GH, K, U).

Sine loco: *d'Urville s.n.* (type of *Isolepis longispica* Steud.) (P).

25. *Fimbristylis fulvescens* Thwaites, En. Pl. Zeyl. 1864, 434; C. B. Clarke, Fl. Br. Ind. 6, 1893, 650; J. Linn. Soc., Bot. 34, 1898, 72; Hook. f. in Trimen, Handb. Fl. Ceylon 5, 1900, 62. — *Abildgaardia fulvescens* Thwaites, En. Pl. Zeyl. 1864, 347. — *F. fusca* var. *longifolia* Boeck., Linnaea 37, 1871, 55. — *F. fusca* (non C. B. Clarke) Ridl., Mat. Fl. Mal. Pen. 3, 1907, 97, p.p.; Fl. Mal. Pen. 5, 1925, 160, p.p.

This species was based on *Thwaites CP 679*, of which I have seen specimens in the Kew, Leiden, and Paris Herbarium, unfortunately all without ripe fruits. Of the specimens cited below *Kunstler 1690* was referred to *F. fusca* by Clarke, as was *Curtis 2175* by Ridley. However, both collections perfectly agree with *F. fulvescens*, which species may be distinguished by its annual habit, the longer more gradually acuminate leaves, and the very small anthela $1\frac{1}{2}$ —2 cm long and 2—4 cm wide, with 2—5 rays each bearing only 1 spikelet (very rarely one of the rays with a very short secondary raylet). *Curtis 2175* bears mature nuts, which are oblong-obovate, sparsely verruculose, 1.25 mm long. In *F. fusca* the nuts are obovate, densely verruculose, at most 1 mm long. Whether the shape and size of the nut are reliable characters to distinguish between the two species, can only be decided when more mature material is available.

Boeckeler and Clarke attached much value to the pale colour of leaves and spikelets in *F. fulvescens*. The specimens of *CP 679* examined showed that at least the colour of the spikelets is very variable.

MALAY PENINSULA. P. Penang, Government Hill, 750 m: *Curtis 2175* (SING); same locality, shady soil, 600—750 m: *Kunstler 1690* (FI).

26. *Fimbristylis vanoverberghii* Kük. in Engl., Pflanzenr. Heft 101, 1936, 631. — *Cladium cyperoides* Merr., Philip. J. Sc. 7, 1912, Bot. 74, non *F. cyperoides* R. Br. — *Mariscus fallax* Fernald, Rhodora 25, 1923, 53 non Chermesz. (1919). — *F. fusca* (non C. B. Clarke) Merr., En. Philip. Fl. Pl. 1, 1923, 123, p.p. — *F. nigrobrunnea* (non Thwaites) Kük. in Fedde, Rep. 51, 1942, 192. — *F. fusca* var. *hispidissima* Kük., Mitt. Thür. Bot. Ver. N. F. 50, 1943, 11. — *Fig. 4.*

This is a true *Fimbristylis*, although it was originally placed in *Cladium* by Merrill, and referred to *Mariscus* Zinn. (= *Cladium* Crantz) by Fernald. It is related to *F. fusca* (Nees) C. B. Clarke, but readily distinguishable by the coriaceous, shining purplish basal leaf-sheaths, the very narrow leaf-blades with subulate apex, the shorter, more or less glabrescent glumes, and the shorter, much less slender style. Up to the present it was only known from the type-collection (*Vanoverbergh 273*) from Luzon.

SUMATRA. Mid-Habinsaran, between Sibosar and Parso, grasswilderness, 1100 m: *Lörzing 7782* (BO, L); between Mt Piso-piso and Toba Lake, near Tongging, grasswilderness, 1300 m: *Lörzing 8102* (BO); W. Batuhuda, hilly country, moist grassland, 1200 m: *Lörzing 8026* (BO).

PHILIPPINES. Luzon, Bontoc Subprov., Bauco, hillsides 1320 m: *Vanoverbergh 273* (type-collection) (K), s.n. (US).

NEW GUINEA. W. New Guinea, Kebar, grassy plain S of aerodrome Andjai,



Fig. 4



Fig. 5

540 m: *Van Royen 4972* (L) (very young). NE. New Guinea, Morobe Distr., Sattelberg, grassy hills by aerodrome: *Clemens 8286 A* (type-coll. of *F. fusca* var. *hispidissima* Kük.) (GH).

27. *Fimbristylis calcicola* Kern, spec. nov. — Sect. *Fuscae* Ohwi — Fig. 5.

Annual, radicibus fibrosis, glumis exceptis glabra, pallide viridis. Culmi dense fasciculati, erecti, pergraciles, acute quadrangulares, sulcati, laeves, 10—20 cm alti, $\frac{1}{4}$ — $\frac{1}{8}$ mm crassi, ad basin vaginis 1—2 tubulosis laminis brevibus praeditis $\frac{1}{2}$ — $2\frac{1}{2}$ cm longis cincti. *Foliorum laminae* culmo $\frac{1}{3}$ — $\frac{1}{2}$ breviores, rigidiusculae, falcatae, planae, anguste lineares, supra celluloso-reticulatae, subtus tenuiter nervatae, acutae vel subacutae, eligulatae, $\frac{1}{2}$ —1 mm latae; vaginae stramineae vel brunneae, opacae. *Anthela* simplex vel subcomposita, laxa, 3—9-spiculata, $1\frac{1}{2}$ —4 cm longa. Bracteeae involucrales 3—4, oblique erectae, setaceae, ad apicem magis minusve recurvatae, ad basin dilatatae scariosae, ima $\frac{1}{2}$ —1 cm longa. Anthelae radii 2—5, capillares, oblique patentes, saepe curvati, angulares, compressi, laeves, 1— $2\frac{1}{2}$ cm longi. *Spiculæ* solitariae, lanceolatae, oblongo-lanceolatae vel fere lineares, valde compressae, acutae, dense pluriflorae, 3—7 (denique usque ad 12) mm longae, 1— $1\frac{1}{4}$ mm latae. Rhachilla anguste alata. *Glumae* exacte distichae, membranaceae, oblique erectae, ovatae, acutae, muticae vel minute apiculatae, acute carinatae, carina fere recta, dense pubescentes, nervo unico in apicem excurrente, ferrugineae, marginibus dilutioribus, 1.5—1.75 mm longae, 1—1.2 mm latae; glumae inferiores 2 vacuae, minores. *Stamina* 2; antherae oblongo-lineares, 0.4—0.6 mm longae, connectivo in appendicem brevem ovatum producto. *Stylus* gracilis, triquetus, ad basin pyramidato-incrassatus, glaber, 1 mm longus, stigmatibus 3 quam stylus multo brevioribus. *Nux* obtuse trigona, oblongo-obovata, breviter stipitata, humiliter umbonulata, haud verruculosa, cellulis extimis transverse linearibus 3—4 serialibus longitudinaliter striata et transverse lineolata, primo alba denique brunnescens, 0.6—0.65 mm longa, 0.3—0.35 mm lata.

MALAY PENINSULA. Kedah, P. Langkawi, Batu Ayam, on limestone scree, Nov. 19, 1941: *E. J. H. Corner s.n.* (type) (SING).

28. *Fimbristylis fimbristylodes* (F. v. M.) Druce, Rep. Bot. Exch. Cl. Br. Isl. 1916, 1917, 623; S. T. Blake, J. Arn. Arb. 35, 1954, 221. — *Abildgaardia fimbristylodes* F. v. M., Fragm. Phyt. Austral. 8, 1874, 273. — *F. dallachyi* F. v. M. ex Benth., Fl. Austr. 7, 1878, 309; Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 18. — *F. lacei* Turr., Kew Bull. 1911, 348. — *F. disticha* (non Boeck.) Kük., Bot. Jahrb. 59, 1925, 50, an etiam 69, 1938, 258? — *F. straminea* (non Turr.) Ohwi, J. Jap. Bot. 14, 1938, 574; Mem. Coll. Sc. Kyoto Imp. Univ. B 18, 1944, 60, ex deser.

Among its allies *F. fimbristylodes* is well characterized by its nuts being abruptly truncate at the base. The leaves are strongly falcate all

Fig. 4. *Fimbristylis vanoverberghii* Kük. — a. Habit, $\times \frac{1}{2}$; b. spikelet, $\times 5$; c. glume, $\times 10$; d. style and stigmas, $\times 10$; e. nut, $\times 10$; f. anthers, $\times 10$; g. tip of leaf, $\times 10$. — From *Lörzing 7782* (BO).

Fig. 5. *Fimbristylis calcicola* Kern — a. Habit, $\times \frac{1}{4}$; b. spikelet, $\times 15$; c. glume, opened out, $\times 15$; d. glume, lateral view, $\times 15$; e. flower, $\times 15$; f. nut, $\times 15$; g. tip of anther, strongly enlarged; h. rhachilla, $\times 15$; i. tip of leaf, $\times 10$; j. cross-section of stem, $\times 15$. — From *Corner s.n.* (SING).

in the same direction (to the right or to the left), thus giving the rosette a peculiar twisted appearance. The distribution of the species is very insufficiently known. Probably it ranges from Queensland through Malaysia and Birma to S. Korea and the Riu Kiu Islands. I have not seen the specimens cited by Ohwi (1938, 1944), but the description can only refer to *F. fimbristyloides*; although closely related, *F. straminea* Turr. certainly is a distinct species.

BIRMA. Upper Chindwin Distr., Sittung, Tammu Road: *Lacee 4210* (syn-type of *F. lacei* Turr.) (K).

SUMATRA. E. Coast Res., Toba plateau: *Sohns 56* (BO); Karolands WSW of Mt Sinabung, near Tandjung, 825 m: *Lörzing 9023* (BO); Bila, vicinity of Rantau Parapat: *Bahmat si Boeca 1703* (BM, NY, US), *1898* (NY, P); Aer Kandis near Rantau Parapat: *Bahmat si Boeca 2649* (NY), *2806* (NY, US).

JAVA. West Java, Indramayu, Plosokerep, teak forest area, on moist swamp iron-ore, in open grassland, with *Drosera indica*, 10 m: *Van Steenis 7520* (L); near Terisi, 25 m: *Van Steenis 8208* (L). Central Java, Kediri, Kenongo: *Coert 1741 p.p.* (L). Madura, Arosbaya, *Imperata* fields, 25 m: *Backer 19297* (BO, L, U). Kangean Arch., Kangean I., Tjangkramaän, *Imperata* field, 20 m: *Backer 27695* (BO); Ardjasa, moist grassfield, 25 m, one specimen among *F. adenolepis* Kern: *Backer 27049 p.p.* (BO).

BR. N. BORNEO, Tenom, "Residency", burnt clearing paths, 240 m: *Gibbs 2771* (syn-type of *F. lacei* Turr.) (BM, K).

CELEBES. Res. Menado, subdiv. Kolone Dale, open barren way through plain, just beyond the Sokita, 50 m: *Eyma 3381* (L).

NEW GUINEA. W. New Guinea, Hollandia, hills, on paths, open localities, and in *Imperata* fields, 200 m: *Van Royen 4124* (L). NE. New Guinea, Ramu Valley: *Rogers 3008* (GH); Ramu R.: *Schlechter 13867* (K, P), *s.n.* (L); Samboga River, near Buna: *Baim s.n.* (BO). Papua, Centr. Div., Rona, Laloki R., common, wet places on open grassy hillside, 450 m: *Brass 3576* (BO, GH, L, NY).

AUSTRALIA. Queensland, ad oram Rockingham's Bay: *Dallaohy s.n. (type)* (K).

29. *Fimbristylis intonsa* S. T. Blake, J. Arn. Arb. 35, 1954, 221, f. 2. This species recently described from New Guinea, Papua (*Brass 7841, type-coll.*, in BM, GH, U!) occurs also in North Sumatra.

SUMATRA. E. Coast Res., Prapat, in *Themeda*-fields, scattered among tall grasses, 1000 m: *Beumée A 446* (BO); vicinity of Rantau Parapat, Bila: *Bahmat si Boeca 1796* (L, NY, US). Tapanuli, along the Toba trail north of the Asahan R., between Tutupan and Si Makkuk: *Bartlett 7535* (US); Asahan valley, above Wilhelmina waterfall, moist localities, 975 m: *Lörzing 10021 A* (BO).

30. *Fimbristylis disticha* Boeck., Linnaea 38, 1874, 393; C. B. Clarke, Fl. Br. Ind. 6, 1893, 651. — *F. fuscoides* (non C. B. Clarke) Camus, Fl. Gén. I. C. 7, 1912, 124.

The only records for Malaysia (NE. New Guinea), are those by Kükenthal (Bot. Jahrb. 59, 1924, 50; 69, 1938, 258). *Schlechter 13867* (K, P!) on which the first record was based, belongs to *F. fimbristyloides* (F. v. M.) Druce. The second record, based on *Clemens 4312*, which I have not seen, becomes very doubtful.

Balansa 189 from Tonkin, Ouonbi (P!), as *F. disticha* in Camus, Fl. Gén. I. C. 7, 1912, 125, appears to belong to the remote *F. leptoclada* Benth. On the other hand, *Godefroy 908* from Cochin China, Phu-quoc (P!), and *Pierre s.n.* from Cochin China (P!), represent typical *F. disticha*; both collections were referred to *F. fuscoides* C. B. Clarke (Camus l. c., 124) which is also quite distinct from *F. disticha*.

F. disticha ranges from India and S. China through Indo China and

Tenasserim to N. Sumatra. The Sumatran specimens agree perfectly with those of the type-collection (*Helper 6143/1*) in the Leiden Herbarium.

SUMATRA. Tapanuli, Lalang bench south of the Asahan R., between a point above Tangga and Parduaan, Habinsaran: *Bartlett 8049* (NY, US); Habinsaran Plateau, ESE of Toba Lake, open grassy plains, 1200–1400 m: *Lörzing 6506, 6507, 6646* (BO); Rahutbosi Dolok, 1200 m: *Van der Meer Mohr 151* (BO).

31. *Fimbristylis sieberiana* Kunth, En. Plant. 2, 1837, 237; Steud., Syn. Plant. Glum. 2, 1855, 118; Miq., Fl. Ind. Bat. 3, 1856, 326. — *F. ferruginea* (non Vahl) Decne, Nouv. Ann. Mus. Hist. Nat. Paris 3, 1834, 352; Herb. Timor. Descr. 1835, 34. — *F. ferruginea* var. *sieberiana* (Kunth) Boeck., Linnaea 37, 1871, 17; Chermezev, Fl. Madag. fam. 29, 1937, 181. — *F. paucispicata* F. v. M., Fragm. Phyt. Austral. 1, 1859, 197. — *F. ferruginea* var. *foliata* Benth., Fl. Austral. 7, 1878, 312, excl. syn. *F. arvensis* Vahl et *F. tristachya* R. Br., l. c.

Closely allied to *F. ferruginea* (L.) Vahl, but in my opinion a well characterized species. The differences between the two were already clearly given by Kunth (1837).

LESSER SUNDA ISLANDS. Timor: *Leschenault* (K, L, P); W. Timor, Tjamplong, 250 m: *Proppe 24* (BO); Port. Timor, Caicoli, brackish marsh behind Dili, in erect tufts as those of a *Juncus*, c. 1 m tall: *Van Steenis 17988* (L).

PHILIPPINES. Mindanao, Cotabato Prov., Buayan: *Ramos & Edaño BS 85126* (GH).

AUSTRALIA. Upper Victoria River: *F. v. Müller* (type of *F. paucispicata* F. v. M.; lectotype of *F. ferruginea* var. *foliata* Benth.) (K); Springsure, *Wuth* (K).

32. *Fimbristylis pubisquama* Kern, nom. nov. — *F. compressa* Boeck., Linnaea 38, 1874, 387; C. B. Clarke, Fl. Br. Ind. 6, 1893, 639; Camus, Fl. Gén. I. C. 7, 1912, 108, non R. et S., Syst. Veg. 2, 1817, 100.

Only one Indochinese collection of this rare species has been reported by Camus. In the Paris Herbarium I have seen the collections cited below. The species has to be renamed on account of Roemer and Schultes's earlier homonym.

INDO CHINA. Cochin China: *Thorel 465* (P), *Pierre s.n.* (P); marais aux environs de Saigon, juin 1864: *Lefèvre 485* (P).

33. *Fimbristylis tristachya* R. Br., Prodr. 1810, 226; Kunth, En. Plant. 2, 1837, 242; Steud., Syn. Plant. Glum. 2, 1855, 108. — *F. marianna* Gaudich. in Freye, Voy. Bot. 1826, 413, excl. varr.; Kunth, En. Plant. 2, 1837, 236; Steud., Syn. Plant. Glum. 2, 1855, 109; Merr., En. Philip. Fl. Pl. 1, 1923, 124; Kük., Bot. Jahrb. 59, 1924, 5; S. T. Blake, J. Arn. Arb. 35, 1954, 212. — *F. bispicata* var. *monostachya* Nees in Hook. J. Bot. 6, 1854, 29. — *F. polymorpha* var. *c* Boeck., Linnaea 37, 1871, 16. — *F. nutans* (non Vahl) Naves, Nov. App. 1882, 307; Vidal, Phan. Cum. Philip. 1885, 156; Rev. Pl. Vasc. Filip. 1886, 284. — *F. maxima* K. Schum. in Schum. & Hollr., Fl. Kaiser Wilh. Land 1889, 24, non Schum. & Laut., Fl. Deut. Schutzgeb. Süds. 1901, 196. — *F. subbispicata* (non Nees) C. B. Clarke, Philip. J. Sc. 2, 1907, Bot. 92, incl. var. *caesia* quoad specim. cit.; Merr., En. Philip. Fl. Pl. 1, 1923, 126. — *F. annamica* Camus, Not. Syst. 1, 1910, 245; Fl. Gén. I. C. 7, 1912, 95. — *F. alleizettei* Camus, Not. Syst. 1, 1910, 291; Fl. Gén. I. C. 7, 1912, 112. — *F. marianna* var. *foenea* Kük. in Fedde, Rep. 16, 1920, 432; Merr., En. Philip. Fl. Pl. 1, 1923, 124. — *F. podocarpa* (non Nees) Ridl., Fl. Mal. Pen. 5, 1925, 155. — *F. schoenoides*

(non Vahl) Backer, Onkruidfl. Jav. Suikerrietgr. 1928, 159, p.p.; Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 23, p.p.

Fimbristylis tristachya extends from India to Micronesia and Australia. It is widely distributed in Malaysia, but was generally confounded with the allied *F. schoenoides* (Retz.), from which it can always be distinguished by the characters given in the key on p. 155. It is much nearer to and possibly not specifically distinct from *F. subbispicata* Nees & Mey. ex Nees, occurring in E. Asia (China, Korea, Formosa, Japan, Riu Kiu Islands).

MARIANNAS: *Gaudichaud s.n.* (type of *F. mariantha* Gaudich.) (P).

INDO CHINA. Tonkin, Quang Yen: *d'Alleizette 514* (type of *F. alleizettei* Camus) (P). Annam, Lang-bian: *André s.n.* (type of *F. annamica* Camus) (P).

SUMATRA. E. Coast Res., Si Mandi Angin, on the Sungei Kanan: *Rahmat si Boeca 4080* (NY, US).

MALAY PENINSULA. Setul, heaths: *Ridley 14878* (BM, K, SING). Perlis, Kanga: *Ridley 14879* (SING), *s.n.* (BM). Kedah, Alor Sta, rice-fields, *Ridley 14876* (BM, K, SING). Selangor, Ampang: *Hume 7533, 7547, 7591* (K, SING); Kuala Lumpur, swamps: *Hume 7711* (SING); Selak S. Road: *Seimund s.n.* (K). Singapore: *Corner s.n.* (SING), *Holtum SF 37793* (BO, SING), *Sinclair SF 38906* (BO, L, SING).

JAVA. W. Java, Cheribon, forestry Indramayu, 20—30 m: *Van Steenis 6693* (BO, L, SING); forestry Plosokerep, 30 m: *Van Steenis 7484* (BO, K, L), *7510* (BO, L). E. Java, Madiun, Gendingan, grassfield in teak forest, 70 m: *Backer 30377*; Surabaya, G. Sahari, grassfield, 30 m: *Backer 26545* (BO, L); Darmo: *Dorgelo 1644 p.p.* Madura, experimental field: *Landbouwoopz. Tundjung 7* (BO); hills SW of Ketapangdaja, *Imperata* field, 100 m: *Backer 19914* (BO, L); between Sampang and Rapa, *Imperata* field, 50 m: *Backer 20056* (BO); hills NW of Rapa, grassfields, 175 m: *Backer 20245* (BO); Pamekasan, 25 m: *Beumbe A 887* (BO).

LESSER SUNDA ISLANDS. E. Sumba, Lea plain, swampy grassland, 500 m: *De Voogd 2521* (BO). Port. Timor, plateau of Fuiloro (Lautem), site of Mehara, on grassflats: *Van Steenis 18094* (L).

BORNEO: *Barber 251* (K); Labuan: *Hose 94* (S), *s.n.* (SAR).

PHILIPPINES: *Loher 747* (K). Palawan, Taytay: *Merrill 9322* (BO, GH, K, L, NY, P, SING). Busuanga, Malbato: *Marohe 420* (P). Luzon: *Cuming 1413* (BM, FI, G, K, P). Ilocos Norte Prov., Burgos: *Ramos 32690* (K, P); Bangui: *Ramos BS 27625* (BO, K, L, NY, P, US); Cagayan Prov.: *Ramos 7894* (US); Isabela Prov.: *Clemens 18020bis* (L, NY), *Ramos BS 8074* (NY); Prov. of Bulacan: *Ramos Phil. Pl. 1447* (BM, BO, G, GH, L, NY, P, SING); Manila: *Merrill 9796* (BO, K, NY, P), *Rogerson 1003* (US); Albay Prov., Pili Hot Springs: *Mearns BS 2885* (BO, NY). Bohol: *Ramos 42936* (G, SING). Guimara Is., Salvacion, Iloilo Prov.: *Soriano PNH 16398* (L). Mindanao, Davao Prov., Tibanban: *Edaño PNH 11025* (L).

CELEBES. SW. Celebes, NNE of Rapang, 75 m: *Eyma 357* (BO, L, U); Wadjo, grassfields: *Van Steenis 10373* (BO). SE. Celebes, Rumbia: *Elbert 3076* (L); Pundidaha, *Imperata* field, 100 m: *Kjellberg 1189* (BO, L).

NEW GUINEA. W. New Guinea, hills near Kubaju R., swamp, 240 m: *Van Royen 4490* (L); Andjai, *Imperata* fields, 540 m: *Van Royen 3964* (L); prob. Dompta: *Anang s.n.* (BO, L). NE. New Guinea, grassy hills on Augusta R.: *Hollrung 836* (type-coll. of *F. maxima* K. Schum.) (BO, P). Papua, W. Div., Wuroi, Oriomo R., common all through savannahs, 10—30 m: *Brass 5734* (BO, GH, L); Lake Daviumbu, common on wet grass plains: *Brass 7847* (BM, BO, GH, U), *7878* (BM, BO, GH, K, U).

AUSTRALIA. Littora Novae Hollandiae intra tropicum: *B. Brown 5941* (type) (K).

34. *Fimbristylis alata* Camus, Not. Syst. 1, 1910, 244, f. 13. 1—2; Fl. Gén. I. C. 7, 1912, 94, f. 14, 1—2.

Camus based this species on three Indochinese collections, all preserved in the Paris Herbarium: Laos, Phuoc-than: *Thorel*; Laos, Bassac: *Thorel*; Cochinchina, Ti-tinh: *Talmy*. His description is inaccurate in several

respects. I fail to see the slender stolons described, the glumes are not fimbriate on the margins, there were never 2 stamens in the flowers I examined, the nut is not longitudinally striate, and there are always 2 stigmas. Besides, the specimens being not conspecific, Camus's description represents, moreover, a mixture of characters pertaining to two clearly distinct taxa.

In *Thorel s.n.* from Bassac, apparently an annual plant, the spikelets are 1—3 cm \times 3 mm, the glumes very broadly ovate, about 4 mm long and wide, the ovary is broadly winged in the upper part with the wings adnate to the lower part of the style, the style is glabrous, up to 2 mm long, the anthers are $1\frac{1}{2}$ — $1\frac{3}{4}$ mm long, and the nut is distinctly winged, about $1\frac{3}{4}$ mm long, with a stipe about $\frac{1}{4}$ mm long.

In *Thorel s.n.* from Phuoc-tan and in *Talmy s.n.* from Ti-tinh, both perennials with a woody rhizome, the spikelets are $1\frac{1}{2}$ — $3\frac{1}{2}$ cm \times 4—5 mm, the glumes ovate, 6—7 mm long, $4\frac{1}{2}$ —5 mm wide, the wings of the ovary not adnate to the style, the style is fimbriate in the upper half, $3\frac{1}{2}$ —4 mm long, the anthers are $2\frac{1}{2}$ —3 mm long, the nut is indistinctly winged, 2 mm long, with a stipe $\frac{1}{2}$ — $\frac{3}{4}$ mm long.

To the Talmy specimens Camus remarked "fruit très jeune et non ailé pour cette cause." However, the wings are more distinctly visible in immature nuts than in mature ones. In the ovary they are thinly membranous and finely transversely striate, in the mature nuts they are indurate and often only discernible by the transverse striation different from the reticulation of the nut proper.

I choose *Thorel s.n.* from Bassac for the lectotype of *F. alata* Camus, and I appoint *Thorel s.n.* from Phuoc-tan to be the type of a related new species, *F. subalata* Kern.

INDO CHINA. Laos, Bassac, expédition du Mé-Kong: *Thorel s.n. in 1866—68* (lectotype) (P; dupl. in L).

35. *Fimbristylis subalata* Kern, spec. nov. — Sect. *Dichelostylis* Benth. — Fig. 2.

Herba perennis, glabra, rhizomate lignoso breviter repente, vaginis ovatis striatis fuscis cincto, usque ad 4 cm longo. Culmi approximati vel fasciculati, tenues, obtuse trigoni, striato-sulcati, laeves, ad basin vaginis fuscis cincti, 50—65 cm alti, c. 1 mm crassi. Folia pauca, culmo subbreviora, erecta, rigida, filiformia, acuta, laeves vel ad apicem scaberula, $\frac{1}{2}$ — $\frac{3}{4}$ mm lata, marginibus involutis; ligula brevis, truncata, membranacea. Inflorescentia 1-spiculata. Spicula erecta, elliptica vel oblonga, teres, acuta, multiflora, ferruginea, $1\frac{1}{2}$ — $3\frac{1}{2}$ cm longa, 4—5 mm lata. Rhachilla anguste alata. Glumae spiralter dispositae, chartaceae, adpressae, ovatae, obtusae, muticae vel inconspicue apiculatae, vix carinatae, nervo medio prominente, utrinque nervulis lateralibus c. 10 percursae, 6—7 mm longae, $4\frac{1}{2}$ —5 mm latae, marginibus in parte superiore scariosis. Stamina 3, antheris linearibus $2\frac{1}{2}$ —3 mm longis. Stylus compressus, basi leviter dilatatus, dimidio superiore fimbriatus, $3\frac{1}{2}$ —4 mm longus, 0.3—0.4 mm latus, stigmatibus 2 quam stylus brevioribus. Ovarium membranaceo-alatum. Nux biconvexa, obovata, gynophoro conspicuo $\frac{1}{2}$ — $\frac{3}{4}$ mm longo stipitata, ad apicem indistincte alata et insertione styli 0.6—0.8 mm lato emarginata, laevis,

cellulis minutis hexagonalibus indistincte reticulata, 2 mm longa, 1.2—1.3 mm lata.

SIAM. Kanchanadit, Surat, in savannah, 5 m: *A. Kerr 15148* (K, L).

INDO CHINA. Laos, Phuoc-than: *Thorel s.n. in 1862—66 (type)* (P); Cochinchina, Ti-tinh: *Talmy s.n.* (P). Cambodia, Kadal, kil. 21 de Kampot, route de Réam, herbe en bordure de la route, sol sableux peu inondé: *Poilane 27350 p.p.* (P).

NEW GUINEA. Papua, Western Div., Lake Daviumbu, Middle Fly R., small wiry tufts, scattered on wet grass plains, Sept. 1936: *Brass 7846* (GH).

36. *Fimbristylis caesia* Miq., Fl. Ind. Bat. 3, 1856, 315. — *F. subbispicata* Nees var. *caesia* (Miq.) C. B. Clarke, Philip. J. Sc. 2, 1907, Bot. 92, haud quoad specim. cit. — *F. monostachya* (non Hassk.) Backer, Onkruidfl. Jav. Suikerrietgr. 1928, t. 174, non al. — Descr. emend. — Sect. *Dichelostylis* Benth.

Herba glabra, probabiliter annua. *Culmi* fasciculati, erecti, obtuse compresso-trigoni, striati, laeves, ad basin foliati, 20—40 cm alti, $\frac{1}{2}$ —1 mm crassi. *Folia* culmo multo breviora, plana, apice obtusa, marginibus superne scabra, caeterum laevia, supra celluloso-reticulata subtus pluristriata uncostulata, glaucescentia, 1—1 $\frac{1}{4}$ mm lata, laminis intus ad basin ligula truncata brevissima ciliolata a vagina distincte separatis; vaginae pallide virentes, laeves, striatae, vix carinatae, 2—5 cm longae. *Anthela* 1—3-spiculata; radii si adsunt brevissimi, usque ad 1 cm longi. Bractee involucales glumaceae vel setaceae, 3—10 (rarius usque ad 40) mm longae. *Spiculae* solitariae, oblongo-ovatae, teretes, acutissimae, densiuscule pluriflorae, saepe tortae, pallide stramineae et brunneo-variegatae, 10—20 mm longae, 3—4 mm latae. Rhachilla anguste alata. *Glumae* spiraliter dispositae, chartaceae, adpressae, late deltoideo-ovatae, obtusae, mucronulatae, vix carinatae, plurinerviae, marginibus scariosis, $4\frac{1}{2}$ —5 mm longae, 4 mm latae. *Stamina* 3, antheris linearibus 1 mm longis, connectivo in appendicem brevem hyalinam laevem producto. *Stylus* compressus, latiusculus, basi leviter dilatatus, 2 mm longus, marginibus dimidio superiore ciliatis; stigmatibus 2 quam stylus multo brevioribus. *Nux* biconvexa, obovato-elliptica, gynophoro conspicuo $\frac{3}{4}$ mm longo stipitata, ad apicem insertione styli c. 0.5 mm lato truncato-emarginata, cellulis extimis minutis rotundis haud impressis reticulata, straminea, 1 $\frac{1}{2}$ —2 mm longa, 1.1—1.3 mm lata.

A well characterized species, neglected or misunderstood since it was published by Miquel. *Loher 747*, which according to Clarke (1907) "appears to match exactly the authentic example of *F. caesia* Miq." belongs to *F. tristachya* R. Br.

JAVA, in oryzetis: *Bhume s.n.* (L). W. Java, Batavia (= Djakarta): *Junghuhn 532 (type)* (L), *s.n.* (U); between Dawuhan and Kalari, among grasses along roadside, rather dry, 50 m: *De Wit 4095* (L). Central Java, Cheribon, Nunuk-Tjihaur, brushwood and grassy plains: *Van Steenis 12516* (BO, L, SING); Semarang, near Kedungdjati, edge of rice-field on heavy clay, 75 m: *Beumée A 223* (BO); Surakarta, dry road-side, abundant, 110 m: *Backer 30562* (BO, L). E. Java, Purwodadi, very common, 175 m: *Coert 500* (BO, L); Surabaya, old rice-field: *Dorgelo 1664, p.p.* (L); Tampung, Kedawung, E of Pasuruan, heavy blackish brown brackish moist clay: *Kooper s.n.* (L).

PHILIPPINES. Luzon, Manila: *MaoGregor 70* (K); Pangasinan Prov.: *Ramos BS 4930* (L, NY, P, US); Prov. of Rizal, San Pedro Macati: *Merrill Phil. Pl. 507* (FI, G, U, US).

37. *Fimbristylis bisumbellata* (Forsk.) Bub., Dodec. 1850, 30; C. E. C. Fischer, Kew Bull. 1935, 149; Fl. Madras 11, 1936, 1898, in corrig.; Ohwi, Mem. Coll. Sc. Kyoto Imp. Univ. B 18, 1944, 85. — *Scirpus bisumbellatus* Forsk., Fl. Aeg.-Arab. 1, 1775, 15. — *F. dichotoma* Vahl, En. Plant. 2, 1806, 287, p.p.; Kunth, En. Plant. 2, 1837, 225, p.p.; Boeck., Linnaea 37, 1871, 12, p.p.; C. B. Clarke, Fl. Br. Ind. 6, 1893, 635; Philip. J. Sc. 2, 1907, Bot. 93; Koord., Exk. Fl. Java 1, 1911, 199; Camus, Fl. Gén. I. C. 7, 1912, 102, p.p. — *Scirpus pallescens* Roxb., Fl. Ind. 1, 1820, 229. — *F. pallescens* (Roxb.) Nees in Wight, Contr. Bot. Ind. 1834, 101; Steud., Syn. Plant. Glum. 2, 1855, 111.

F. bisumbellata, widely distributed in the Old World Tropics and extending to the temperate regions, is extremely rare in Malaysia. It is only once recorded, viz for the Philippines by Clarke (1907) as *F. dichotoma*, which record Merrill (1923) wrongly referred to *F. annua* (All.) R. & S. (= *F. dichotoma* Vahl, non Clarke).

Clarke, l. c., is of the opinion that *F. bisumbellata* is only distinguishable from *F. dichotoma* by characters of trifling importance. However, I always find the much smaller spikelets, the smaller, membranous, mucronate, sharply keeled glumes, the much shorter style, and the smaller nut sufficiently differentiating characters.

MALAYA, probably Borneo: *Lobb s.n.* (BM); wrongly localized!

JAVA: *Labillardière s.n.* (FI); res. Surabaya, Modjokerto, along Brantas R., 15 m: *Badermacher s.n.* (L).

PHILIPPINES. Luzon, Prov. of Cagayan: *Castillo BS 22716* (BM); Isabela Prov.: *Clemens 16532* (NY); Nueva Ecija, Carranglang, sandy river bar: *Merrill 261* (BO, US); Luzon central: *Loher 1542* (P, US).

38. *Fimbristylis merrillii* Kern, spec. nov. — *F. squarrosa* (non Vahl) Merr., En. Philip. Fl. Pl. 1, 1923, 126, p.p. — *F. annua* var. *gracilis* Backer, Onkruidfl. Jav. Suikerrietgr. 1928, 160, p.p.; Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, p. 21, p.p. — Sect. *Fimbristylis* — Fig. 6.

Annua. *Culmi* fasciculati, erecti, tenues, compresso-trigoni. laeves. sursum saepe parce pubescentes vel glabrescentes. ad basin foliati, (2—)15—30(—40) cm alti, $\frac{1}{2}$ —1 mm crassi. *Folia* culmo 2—3-plo breviora, plana, acutiuscula vel obtusiuscula, supra celluloso-reticulata, subtus nervata interdum pubescentia, 5—15 cm longa, 1—2 mm lata, marginibus saepe ciliolato-puberulis apicem versus spinuloso-scabris, laminis intus ad basin serie ciliolarum a vagina separatis; vaginae plerumque glabrescentes, in parte priore membranaceae, ferrugineae. *Anthela* simplex vel composita, diffusa, laxa, plurispiculata, rarissime ad spiculam singulam reducta, plerumque 3—5 (—10) cm longa et lata. Bractee involucrales 1—3, oblique erectae, quam inflorescentia breviores vel ei longitudine aequales, ad basin dilatatam plerumque ciliato-puberulae, ima 1—3(—6) cm longa. Anthelae radii pauci vel plures (usque ad 8), graciles, oblique ascendentes, glabri laevesque, 1—4(—8) cm longi. *Spiculae* solitariae, ovatae vel ovato-oblongae, teretes, acutae. densiuscule pauci-pluriflorae, 3—7 mm longae, $1\frac{1}{2}$ —2 mm latae. Rhachilla anguste alata. *Glumae* spiraliter dispositae, undique imbricatae, adpressae, subchartaceae, late ovatae. acutiusculae, minute mucronulatae vel submuticae, vix carinatae, glabrae laevesque, nitidae, $1\frac{1}{2}$ —2 mm longae, c. $1\frac{1}{2}$ mm latae, dorso trinervio, lateribus rufo-brunneis, marginibus vix albo-scariosis. *Stamina* 1(—2), antheris oblongis vel breviter linearibus,

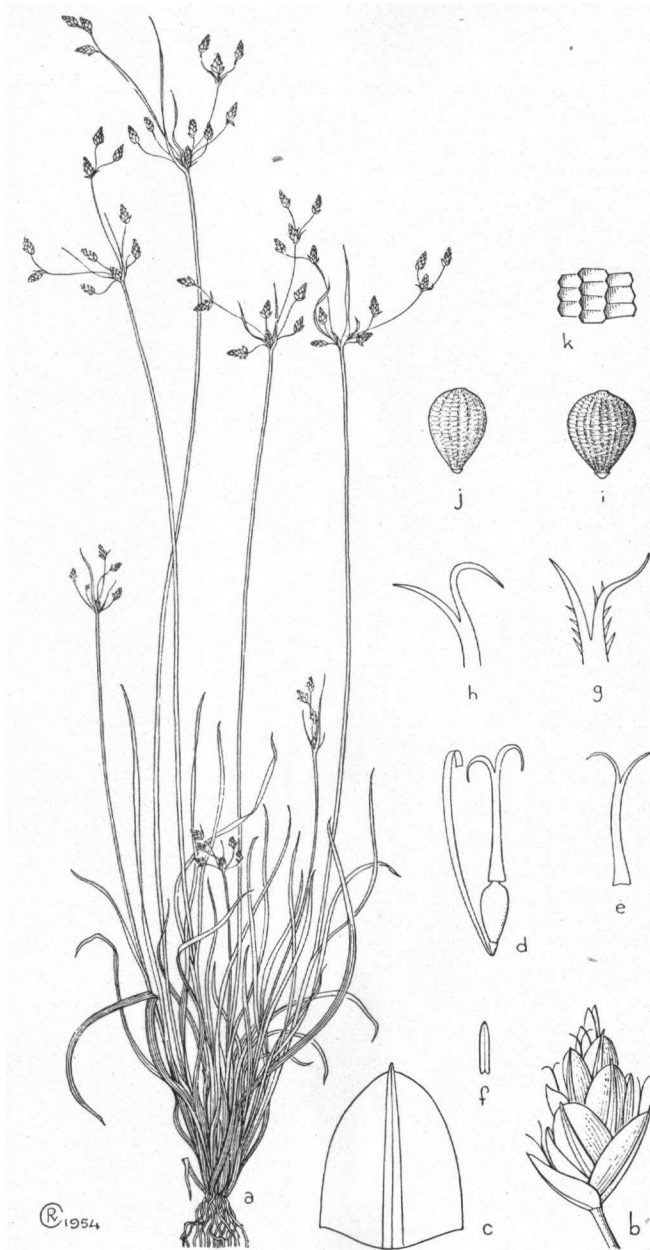


Fig. 6. *Fimbristylis merrillii* Kern — a. Habit, $\times \frac{2}{5}$; b. spikelet, $\times 6$; c. glume, $\times 12$; d. flower, $\times 12$; e. style and stigmas, $\times 12$; f. anther, $\times 12$; g-h. stigmas, $\times 25$; i-j. nuts, $\times 12$; k. outer cells of nut. — From Ramos 1431 (NY).

$1\frac{1}{3}$ — $1\frac{1}{2}$ mm longis. *Stylus* tenuis, compressus, basin versus dilatatus, marginibus non vel vix extenuatus, glaber vel ad bifurcationem ciliis 1—4 perparce ciliatus, $\frac{3}{4}$ —1 mm longus, stigmatibus 2 tenuibus brevibus. *Nux* biconvexa, obovata vel late obovata, breviter stipitata, umbonulata, non vel parce verruculosa, primo albida, denique straminea vel brunnescens, 0.6—0.9 mm longa, 0.5—0.7 mm lata, utrinque longitudinaliter 5—6(—9)-striata, transverse multilineolata, cellulis extimis impressis transverse oblongis trabeculata.

I have taken up the name provisionally given by Palla in 1913 to some specimens of this species in the Herbarium of the New York Botanical Garden, labelled "Philippines". All other data concerning these specimens lacking, I have chosen *Ramos Phil. Pl. 1431* as the type collection.

Fimbristylis merrillii is closely related to *F. dichotoma* (L.) Vahl, from which it is apparently markedly distinct, however. It is much smaller in all its parts, with narrower leaves, and can be at once distinguished by the narrower spikelets only $1\frac{1}{2}$ —2 mm wide and the glabrous or almost glabrous style. The only extra-Malaysian collection I have seen is from Yunnan.

CHINA. Yunnan, marais, Chouang che teou près Ta pin tze: *Delavay 4821* (L, P).

SUMATRA. Atjeh, Ketol Valley, 800—1000 m: *Jochems s.n.* (L).

JAVA. Without precise locality: *Zollinger it. seo. 3796* (BM, FI, G, P). West Java, Tjidjantung near Djakarta, cassava-plantation, 40 m: *Beumée 900* (BO); Bogor: *Bocrlage s.n.* (L); Palabuan Ratu, 10 m: *Koorders 34680 B* (BO); Indramayu, Plosokerep, teak forest area, on moist swamp iron-ore in open grassland, with *Drosera indica*, 10 m: *Van Steenis 7520a* (BO). Central Java, Pekalongan, forestry Margasari, teak forest, swampy places and shallow pools, 100 m: *Beumée 5198* (BO); Semarang, bank of Kali Garam, swamp, 60 m: *Docters van Leeuwen 1218* (BO, L); Semarang, Bangkok, hills, among grasses: *Docters van Leeuwen s.n.* (BO); Klaten, Ngupit Estate: *Ostendorf s.n.* (BO). East Java, between Bangil and Modjokerto, rice-field, 15 m: *Backer 37195* (L); Grisee: *Dorgelo 3304* (L); Kediri: *Coert 1741 p.p.* (L); W. Baluran, temporarily moist localities in open savannah, 50 m: *Rappard 142* (BO). Madura. Tanah merah, dry rice-field, 50 m: *Backer 19377* (BO); same locality, *Imperata* field, 50 m: *Backer 19402* (BO); between Rapa and Karang Pinang, *Imperata* fields, 100—180 m: *Backer 20113* (BO, L); Pagantenan, sandy fields, 300 m: *Backer 20599* (BO); hilly country N of Sumenep, rice-field, 50 m: *Backer 20725* (BO). Kangean Archipelago. Kangean Isl., Tambajangan: *Backer 27477b* (BO); Paliat Isl., teak forest, 10 m: *Backer 29639* (BO, L).

LESSER SUNDA ISLANDS. Tenimber, P. Jamdena, 15 km ENE of Otimmer, *Melaleuca* forest surrounded by primary forest with wild cattle, low; *Buwalda 4547* (K).

PHILIPPINES. Luzon, Prov. Bataan, Lamao R., Mt Mariveles: *Williams 45 & 64* (NY); Zambales Prov.: *Baïm s.n.* (GH); Prov. of Bulacan: *Ramos Phil. Pl. 1431* (type-coll., holotype in NY) (BM, BO, G, GH, L, NY, P, SING), *Ramos 1443 p.p.* (2 specimens among *F. podocarpa* Nees) (BO); Prov. of Bulacan, Angat: *Ramos 21739* (BO, K, P); Prov. of Rizal: *Ramos BS 12539* (BM, P); Prov. Laguna, Los Banos, 90 m: *Holman 54* (GH). Panay, Prov. Ilo-Ilo, Miagas: *Vidal 3984* (K). Mindanao, vicinity of Tanculan, Bukidnon Subprov.: *Féñx BS 26093* (NY, US).

CELEBES. Bt Parangpeda, near Bonto Parang, among grasses and in brushwood, 70 m: *Bünnemeijer 10682* (BO, L); NNE of Rapang, pasture near S. Karadjae, 75 m: *Eyma 347* (BO, L); Pare-pare, 0 m: *Kjellberg 3739a* (BO).

NEW GUINEA. Papua, Kanosia, by small stream in open savannah land, 15 m: *Carr 11198* (L, NY), *11264* (BM, K, L, NY).

39. *Fimbristylis tenuinervia* Kern, spec. nov. — Sect. *Fimbristylis* — Fig. 7.

Probabiliter annua. *Culmi* dense fasciculati, erecti, graciles, obtuse

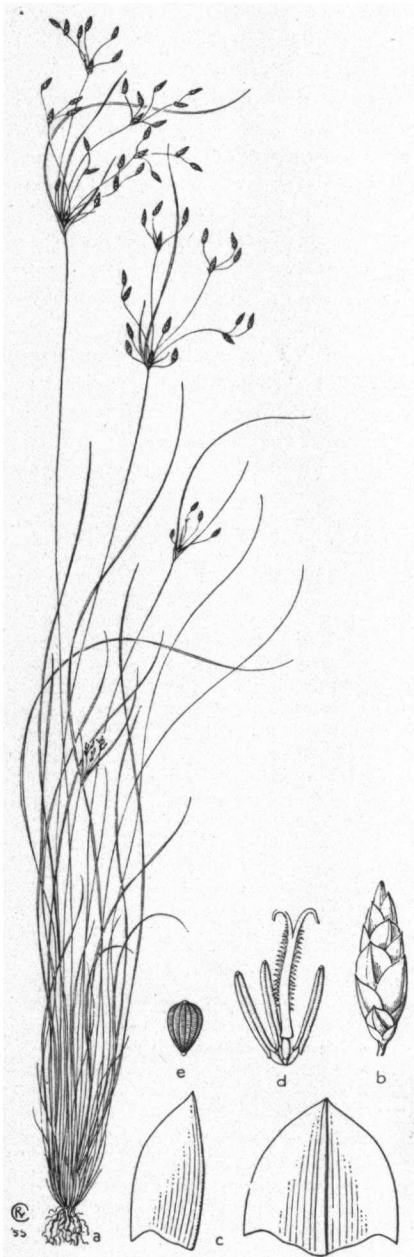


Fig. 7. *Fimbristylis tenuinervis* Kern —
 a. Habit, $\times \frac{1}{2}$; b. spikelet, $\times 5$;
 c. glumes, $\times 10$; d. flower, $\times 10$;
 e. nut, $\times 10$. — From Rogerson 1005
 (US).

trigoni, subcompressi, tenuiter sulcati, glabri laevesque, ad basin foliati, 15—35 cm alti, c. $\frac{1}{2}$ mm crassi. *Foliorum laminae* culmo $\frac{1}{3}$ breviores vel ei longitudine aequales, subfiliformes, acutae, glabrae, c. 1 mm latae, intus ad basin serie pilorum alborum a vagina separatae, marginibus saepe involutis apicem versus antrorse parce scaberulis; vaginae glabrae vel parce puberulae, in parte priore pallide membranaceae, usque ad 5 cm longae, ore oblique fisso fimbriato, dorso ecarinato. *Anthela* composita vel subdecomposita, rarius simplex, perlaxa, (3—)10—35-spiculata, (2—)3—7 cm longa. Bracteae involucrales 3—5, foliis consimiles, erecto-patentes, ad basin dilatam scarioso-marginatae, glabrae vel ciliolatae, ima usque ad 10 cm longa. Anthelae radii (2—)5—7, tenues, erecto-patentes, glabri laevesque, usque ad 4 cm longi; pedicelli filiformes, usque ad 1 cm longi. *Spiculae* solitariae, oblongo-lanceolatae, teretes, acutissimae, densiuscule pluriflorae, nitide brunneae, 4—5 mm longae, $1\frac{1}{4}$ — $1\frac{1}{2}$ mm latae. Rhachilla anguste alata. *Glumae* spiraliter dispositae, undique imbricatae, adpressae, subchartaceae, late ovatae, apiculatae vel minute mucronulatae, vix carinatae, glabrae, in parte superiore rufo-brunneae, basin versus dilutiores, $2\frac{1}{4}$ — $2\frac{3}{4}$ mm longae, 2— $2\frac{1}{2}$ mm latae, nervo medio prominente, lateribus utrinque tenuiter 5—8-nervulosis et saepe a lineis 2—3 fuscis percursis, marginibus scariosis; glumae inferiores 2—3 vacuae, multo breviores. *Stamina* 3, antheris linearibus (1—) $1\frac{1}{4}$ — $1\frac{1}{2}$ mm longis, luteis, connectivo in appendicem brevem albo-hyalinam laevem producto. *Stylus* tenuis, compressus, basin versus vix dilatatus, dimidio superiore fimbriatus, $1\frac{1}{4}$ — $1\frac{3}{4}$ mm longus, stigmatibus 2 quam stylus brevioribus. *Nux* biconvexa, anguste obovata, breviter stipitata (gynophoro c. 0.1 mm longo), cellulis extimis transverse ob-

longo-linearibus impressis trabeculata, utrinque longitudinaliter 4—6-striata, transverse multilineolata, humiliter umbonulata, alba vel pallide straminea, 0.7—0.9 mm longa, 0.5—0.6 mm lata.

Like the preceding this species belongs to the intricate section *Fimbristylis* [type species: *F. dichotoma* (L.) Vahl]. From the latter species it can be distinguished at once by the very small, narrow spikelets, the almost filiform leaf-blades, and the many-nerved glumes. By the size of its spikelets it has much more resemblance with the following allies of *F. dichotoma* with trabeculate nuts: *F. bisumbellata* (Forsk.) Bub., *F. perlaxa* Ohwi, *F. merrillii* Kern and *F. trichophylla* Ridl.

F. bisumbellata has broader leaves, angular spikelets, 3-nerved much smaller thinly membranous distinctly mucronate keeled glumes, 1(—2) stamens with much smaller anthers, narrower style, and smaller broadly obovate or obovate nuts.

In *F. perlaxa* the spikelets are somewhat larger, the glumes membranous, keeled, 3-nerved, the 2 stamens have oblong anthers $\frac{1}{3}$ — $\frac{1}{2}$ mm long, and the nut is broadly elliptic, almost orbicular, with 15—18 longitudinal ribs on each face.

F. merrillii is characterized by the smaller glumes, the quite or almost glabrous shorter style, the 1(—2) stamens with oblong anthers $\frac{1}{3}$ — $\frac{1}{2}$ mm long, the 3-nerved glumes, and the obovate or broadly obovate nuts.

F. trichophylla has a less developed inflorescence, somewhat broader spikelets 2—2 $\frac{1}{2}$ mm wide, the appendage of the connective setulose, the nut oblong-obovate, indistinctly trabeculate with 10—12 vertical rows of cells on each face; the leaves have no ligule.

Loher 756, 757, and 758 in the Kew Herbarium mounted on the same sheet, were all determined by Clarke in 1898 as "*F. diphylla*, Vahl forma *Malasica*" with the remark "With a very narrow nut, perhaps as good a claim to specific separation as several species hereabout can shew." In my opinion *Loher 756* represents ordinary *F. dichotoma*, and *Loher 758* belongs to *F. alboviridis* C. B. Clarke. Clarke's remark can only refer to *Loher 757*. *Loher 758* in the Paris Herbarium is identical with *Loher 757* in Kew. It is also determined by Clarke as *F. diphylla* Vahl forma *Malasica*. As far as I know this name was never published.

PHILIPPINES. Luzon, near Wack-Wack Country Club, 3 miles east of Manila, in dense mats on moist meadows, Aug. 5, 1945, *Clark T. Rogerson 1005 (type)* (US); Luzon central: *Loher 757* (K), *758* (P; the same number in K is *F. alboviridis* C. B. Clarke).

40. *Fimbristylis podocarpa* Nees & Mey. ex Nees in Wight, Contr. Bot. Ind. 1834, 98, p.p. typ.; Nov. Act. Ac. Nat. Cur. 19, Suppl. 1, 1843, 77, p.p.; C. B. Clarke, Fl. Br. Ind. 6, 1893, 638; Philip. J. Sc. 2, 1907, Bot. 94; Ill. Cyp. 1909, t. 42, f. 5—6; Koord., Exk. Fl. Java 1, 1911, 199; Camus, Fl. Gén. I. C. 7, 1912, 107; Merr., En. Philip. Fl. Pl. 1, 1923, 125. — *F. squarrosa* (non Vahl) Zoll., Syst. Verz. 1. 1854, 61, p.p. (specim. glaucescentia). — *F. diphylla* var. *pluristriata* C. B. Clarke, Fl. Br. Ind. 6, 1893, 637; Ill. Cyp. 1909, t. 42, f. 3—4. — *F. diphylla* (non Vahl) K. Schum. & Laut., Fl. Deut. Schutzgeb. Süds. 1901, 196, quoad Lauterbach 348. — *F. annua* var. *podocarpa* (Nees) Kük., Bot. Jahrb. 59, 1924, 48. — *F. diphylla* var. *podocarpa* (Nees) Kük., Bot. Jahrb. 69, 1938, 257.

Recorded by Clarke from "Malaya" (1893) and Luzon (1907). Kükenthal (1924) recorded it from New Britain (*Dahl s.n.*, not seen), and in 1938 from Papua, Central Division, Kanosia (*Carr 11034*); the specimens of the latter collection in the Leiden and New York Herbarium, however, belong to *F. dichotoma* (L.) Vahl.

F. diphylla var. *pluristriata* was said by Clarke (1893) to be a very common southern, especially Malay form. I fail to distinguish between the specimens named by Clarke as *F. podocarpa*, and those he referred to *F. diphylla* var. *pluristriata*. There are, for instance, two sheets of *Zollinger 413* in the Geneva Herbarium, one of which Clarke labelled "*F. podocarpa*, Nees", the other "*F. diphylla*, Vahl forma *pluristriata*, with numerous striae to the nut", both determinations dated July 1888; the specimens are quite identical.

MALAY PENINSULA. Pahang, Simpai Sat, Ulu Tembeling, low alt.: *Henderson SF 22083* (BO, NY, SING).

JAVA. West Java, ad vias pr. Tjikoya: *Zollinger 413* (FI, G, GH, L, P), 1591 (P); Cheribon, forestry Indramayu, grassfields, 20—30 m: *Van Steenis, 6692* (BO, GH, L, SING). East Java, Purwodadi, 175 m: *Coert 499* (BO, L). Kangean Arch., Gelaman, swampy edge of ricefield, 20 m: *Backer 27124* (BO); Ardjasa, edge of ricefield, 25 m: *Backer 27364* (BO).

PHILIPPINES. Luzon, Prov. of Pangasinan, Labrador, Mt San Isidro: *Fénix 30022* (K, NY, P); Prov. of Bulacan: *Ramos Phil. Pl. 1443* (BM, BO, G, GH, L, P, SING); Prov. of Rizal, Morong: *Ramos BS 1388* (BO, GH, NY, US); Manila: *Loher 766* (K), *Merrill BS 8013* (K, US), *Merrill BS 9799b* (NY). Bohol: *Ramos BS 42938* (P). Leyte, 1½ miles SW of Tacloban: *Glassman 514* (GH). Panay, Capiz Prov., Jamindan: *Ramos & Edaña BS 31001* (BM, P).

NEW GUINEA. NE. New Guinea, Morobe Distr., Bulolo R., 2 miles above Wau, 900 m: *Van Royen 4309* (= *NGF 5891*) (L). New Britain, Gazelle Peninsula: *Lauterbach 348* (BO, L).

41. *Fimbristylis alboviridis* C. B. Clarke. Fl. Br. Ind. 6, 1893. 638; J. Linn. Soc. 34, 1898. 60. — *F. annua* var. *pluristriata* Backer, Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, 21, non *F. diphylla* var. *pluristriata* C. B. Clarke.

Clarke based this species on specimens from E. Bengal: *Griffith 6313*, *Jenkins 212*, and *J. D. Hooker 230, 203*. Of these, I choose *Jenkins 212* (K) for the lectotype. Considered to be endemic in Assam, *F. alboviridis* appears to be rather widely distributed in Malaysia. However, it is rare everywhere.

According to Clarke the outermost cells of the nut are arranged in 25—30 longitudinal series on each face. This is neither the case in the specimens determined by Clarke, nor in any of the Malaysian ones. I have always found (12—)16 vertical rows of cells.

MALAY PENINSULA. Kedah, kp. Naka, 30 m: *Holltum 28411* (SING); Selangor, Jinjang: *Sinclair SF 40131* (BM, BO, L, SING).

JAVA. W. Java, Djakarta, Kebajoran, grassfield, 30 m: *Backer 33599* (BO); Weltevreden: *Backer s.n.* (BO); Djakarta, near Duri station: *Backer s.n.* (BO). E. Java, Grati near Pasuruan, 10 m: *Backer 7693* (BO, L); G. Semongkrong near Pasuruan, dry field, 25 m: *Backer 24224* (BO); same locality, 50 m: *Van Slooten 2428* (BO, K, L).

PHILIPPINES. Luzon, Murcia: *D. F. Merrill 20* (US); Luzon central: *Loher 758* (K; the same number in P is *F. tenuinervia* Kern).

42. *Fimbristylis trichophylla* Ridl., Fl. Mal. Pen. 5, 1925, 155; Henders., J. Mal. Br. R. As. Soc. 17, 1939, 86.

No less than three species of *Fimbristylis* are peculiar to the limestone rocks of P. Langkawi, viz *F. trichophylla* Ridl., *F. malayana* Ohwi, and *F. calcicola* Kern. Typical *F. trichophylla*, a very slender plant with thread-like stems and leaves hanging over the rocks or decumbent, seems to be restricted to P. Langkawi.

MALAY PENINSULA. Kedah, Langkawi, Telok Apan: *Haniff & Nur 7077* (type-coll., holotype in SING) (BM, BO, K, SING); Langkawi, Pulau Dayang, Bunting, tufted in limestone crevices at top of hill, always hanging or decumbent in tresses in soil among limestone-rocks in dry places, 240 m: *Corner SF 37858* (BM, BO, K, L); Langkawi, Pulau Chupau, on ledges of limestone: *Corner s.n.* (SING, K); Langkawi, Selat Panchor, on limestone rocks in open places, 60 m: *Henderson SF 29062* (BO, GH, K, SING).

On several other limestone rocks in the Malay Peninsula, however, there occurs a *Fimbristylis* agreeing in almost every detail with *F. trichophylla*, but remarkable by the erect stems not drooping or decumbent, and the broader and stricter leaves. It may be distinguished as:

***F. trichophylla* Ridl. var. *erecta* Holttum ex Kern. — *F. sp. prox. F. fusca* Henders., J. Mal. Br. R. As. Soc. 17, 1939, 86.**

Culmi erecti, teretes vel obtuse trigoni. Folia rigidiora, 1—1½ mm lata. Inflorescentia amplior, composita vel subdecomposita, rarius simplex, usque ad 20-spiculata. Antherae 1½—2 mm longae.

The Pulu Langkawi specimens of var. *erecta* have densely pubescent stems and leaves, the others are glabrous. Of the specimens cited below *SF 22259* is somewhat doubtful, the spikelets being slightly larger, the nuts broader, and the appendage of the connective smooth.

MALAY PENINSULA. Kedah, Langkawi, Batu Ayam, on limestone screes: *Corner & Nauen SF 37847* (type-coll., holotype in SING) (BM, BO, K, L, SING); Gunong Baling: *Corner & Nauen s.n.* (SING). Kelantan, Gua Teja, S. Betis, on dry limestone, 210 m: *Henderson SF 29683* (SING, K). Pahang, summit Gunung Senyum, 480 m: *Henderson SF 22259* (K, SING). Selangor, Bukit Takun, near Kanching, on the limestone rocks, 150 m: *Nur SF 34378* (SING).

43. *Fimbristylis rigidula* Nees in Wight, Contr. Bot. Ind. 1834, 99; in Hook. J. Bot. Kew Misc. 6, 1854, 29; Steud., Syn. 2, 1855, 116; C. B. Clarke, Fl. Br. Ind. 6, 1893, 640; Philip. J. Sc. 2, 1907, Bot. 95; Ill. Cyp. 1909, t. 42, f. 7—8; Merr., En. Philip. Fl. Pl. 1, 1923, 125, p.p. min. — *F. ferruginea* (non Vahl) Vidal, Phan. Cum. Philip. 1885, 156; Rev. Pl. Vasc. Filip. 1886, 284, p.p.

The first record for the Philippines is that of Nees (1854), based on *Cuming 1396* (396 is obviously a misprint). Of the specimens cited by Merrill (1923) I have not seen *Ramos BS 7856*; *MacGregor BS 32233* and *Ramos BS 32811* belong to *F. insignis* Thwaites. Only *MacGregor BS 14226* is true *F. rigidula*. Some additional collections are enumerated below.

PHILIPPINES. Luzon: *Cuming 1396* (BM, FI, G, K); Prov. of Nueva Vizcaya, vicinity of Dupax: *MacGregor BS 14226* (BM, K, L, P); Nueva Ecija, wet open soil near Carranglang: *Merrill 214* (BO). Mindanao, Cotabato Prov., Buayan: *Ramos & Edaña BS 85193* (GH).

44. *Fimbristylis semarangensis* Ohwi, Blumea 8, 1955, 106, f. 8 — *F. annua* var. *gracilis* Backer, Onkruidfl. Jav. Suikerrietgr. 1928, 160, p.p.; Bekn. Fl. Java (em. ed.) 10, 1949, fam. 246, p. 21. p.p.

In the Bogor Herbarium I found another collection of this species, not seen by Ohwi. It agrees in all details with the type, and was also collected on saline soil.

CENTRAL JAVA. Rembang, mudwells Kesongo, low alt.: *Van Steenis 17455* (BO, L).

45. *Fimbristylis griffithii* Boeck., Flora 43, 1860, 241. — *F. aestivalis* var. *glaberrima* Boeck., Linnaea 37, 1871, 11, saltem p.p. — *F. aestivalis* (non Vahl) C. B. Clarke, Fl. Br. Ind. 6, 1893, 637, p.p.; J. Linn. Soc. 34, 1898, 59, p.p.; Ridl., Mat. Fl. Mal. Pen. 3, 1907, 92; Fl. Mal. Pen. 5, 1925, 155. — *F. dichotoma* (non Vahl) Camus, Fl. Gén. I. C. 7, 1912, 102, p.p. — ? *F. aestivalis* f. *glabra* Kük., Bot. Jahrb. 59, 1924, 49.

Boeckeler's type specimen (Bengal, leg. *Griffith*) in the Berlin Herbarium got lost during the war. The original description perfectly matching the specimens cited below, I have appointed a neotype: *Griffith 6331* in the Kew Herbarium.

Boeckeler, l. c., compared his specimen with the description of *F. limosa* Poepp. et Kunth ex Kunth, a species unknown to him. Later he annotated the specimen of *F. griffithii*, *Kamphoevener 2785* in the Copenhagen Herbarium, as follows: "*Fimbristylis (Eufimbr.) aestivalis* (Vahl) β *glaberrima* = *F. limosa* Poepp. et Kunth." I have not seen the S. American *F. limosa*. It seems, however, very doubtful whether it is conspecific with *F. griffithii*, as Kunth, En. Plant. 2, 1837, 225, ascribes obovate-pyriform often verruculose nuts and purplish leaf-sheaths to it. In Clarke's opinion *F. limosa* might be regarded as a variety of *F. aestivalis*, but it should be borne in mind, that Clarke did not distinguish at all between *F. griffithii* and *F. aestivalis*, two clearly distinct species.

F. aestivalis, occurring in Sumatra, W. and C. Java, N. Celebes, and the Philippines, is unknown from the Malay Peninsula. All specimens of "*F. aestivalis*" cited by Ridley, and all specimens from the Malay Peninsula in the Singapore Herbarium, belong to *F. griffithii*. I have not seen *Ridley 43* from Pahang, cited by Clarke (1898).

F. aestivalis f. *glabra* Kük. was based on *Ledermann 7321* from NE. New Guinea. I have not seen this collection.

BENGAL. Calcutta: *Rel. Helfer. 145* (C, L) (possibly wrongly localized).

BIRMA and Malay Peninsula: *Griffith 6331* (neotype) (K); Lower Birma, Hlawga Lake, near or in water: *U Thein Lwin 44* (K).

ANDAMANS. S. Andamans, Putalang stream: *Prain's coll. 65* (U); Tenasserim and Andamans: *Helfer 6309* (K, L).

SIAM. Lower Siam, Champawn: *Hamiff & Nur 4563* (SING).

INDO CHINA. Tonkin, Haiphong, sur le bord des mares: *Balansa 212* (P). Annam, Tourane and vicinity: *Clemens 3546* (P). Cochin China: *Thorel 507* (P); Saigon: *Germain 101* (P), *Leconte & Finet 2025* (P); Coy Cong: *Pierre s.n.* (P).

SUMATRA. Central Sumatra, near Langgan: *Koorders 21430* β (BO); Djambi, Sipin Lake: *Rutten-Kooistra 86* (BO, L).

MALAY PENINSULA: *Griffith 6311* (K); Perak, Kuala Temango: *Bidley s.n.* (SING); Tanjong Malim: *Ridley s.n.* (SING); Sambelong (= Sembilan): *Kamphoevener 2785* (C). Kelantan, Kota Bharu: *Ridley s.n.* (K). Trengganu, Bendi: *Eastados 41* (SING). Pahang: *Ridley 2* (SING), 45 (BM); Bintong: *Burkill & Hamiff 16800* (SING); Kuala Pahang: *Bidley s.n.* (SING); Kuala Tambeling: *Bidley s.n.* (SING); Pekan, on sandy roadside: *Burkill & Hamiff 17118* (SING); Katapang: *Ridley 1268* (SING); Tasek Bera, on edge of lake: *Henderson SF 24105* (BO, NY, SING). Malacca: *Alvins 1153* (SING), *Griffith s.n.* (FI). Singapore: *Burkill*

SF 6641 (BO, L, SING), Cantley 3065 (SING), Hullett s.n. (K), Ridley 1739, s.n. (SING).

JAVA. W. Java: Tjibinung, low meadows near lake, 90 m: *Van Steenis 3070* (BO, L); Nusagede in Lake of Pendjalu, 720 m: *Koorders 44334* β (BO, L); Tjipaku: *Boerlage s.n.* (L).

BORNEO: *Barber 88* (K). Sarawak, Tubao: *Beccari PB 3736* (FI, G, K, P); Kapit, Upper Bejang R., riverbanks: *Clemens 21348* (BM, BO, GH, K, L, NY). West Borneo, Pontianak: *Main 1813* (BO), *Moh. Enoch 318* (BO, L). S. and SE. Borneo, Bandjermassin: *Motley 540* (K); Sampit, along river, 5 m: *Buwalda 7902* (BO, L); Hayup: *Hubert Winkler 2557* (BM, BO, K, P, SING). E. and NE. Borneo: Mahakam R. near Melak, riverbank, 40 m: *Posthumus 2044* (BO). Br. N. Borneo: Penampang, wet padi-area, edge of path: *Forster 84* (K).

CELEBES. Menado, near Taripa, swamp: *Eyma 4029* (BO, L, SING, U); Kendari, Puhara, swampy bank, 50 m: *Kjellberg 738* (BO, L).

MOLUCCAS. W. Ceram, Waeasamoe-Telaga Sawau, 1-2 m: *Eyma 2953* (BO).

W. NEW GUINEA. Prauwen bivouac, riverbank, 60 m: *Lam 891* (BO, K, L, SING); near Prauwen bivouac, in swamp, 90 m: *Lam 1115* (BM, BO, K, L, SING); Bernhard bivouac, 50 m: *Meijer Drees 544* (BO, K, L); Merau R., NE. of Merauke, between Kweel and Un, loamy river bank and in the water, 40 m: *Van Royen 4638* (L); near Bupul, margin of shallow marshy lake, 40 m: *Van Royen 4805* (L).

46. *Fimbristylis squarrosa* Vahl, En. Plant 2, 1806, 289; Kunth, En. Plant. 2, 1837, 224; Steud., Syn. Plant. Glum. 2, 1855, 110; Boeck., Linnaea 37, 1871, 10; C. B. Clarke, Fl. Br. Ind. 6, 1893, 635; Camus, Fl. Gén. I. C. 7, 1912, 101, f. 16, 3-6.

In Malaysia only:

var. *esquarrosa* Makino, Bot. Mag. Tokyo 17, 1903, 47. — *F. velata* R. Br., Prodr. 1810, 227; Kunth, En. Plant. 2, 1837, 243; Benth., Fl. Austral. 7, 1878, 309. — *F. propinqua* R. Br., Prodr. 1810, 227; Kunth, En. Plant. 2, 1837, 243. — *F. makinoana* Ohwi, J. Jap. Bot. 14, 1938, 578; Mem. Coll. Sc. Kyoto Imp. Univ. B 18, 1944, 83.

F. squarrosa is intimately related to *F. aestivalis* (Retz.) Vahl, with which species *F. von Mueller*, Fragm. Phyt. Austral. 9, 1875, 11, united it. Typical *F. squarrosa* is characterized by the $\frac{1}{2}$ -1 mm long recurved mucros of the glumes giving the spikelets a squarrose aspect, and by the long pendent hairs of the style-base closely appressed to the nut. In var. *esquarrosa*, however, the mucros are as short as those of *F. aestivalis*, so the long trichomes of the style-base (absent or very short in *F. aestivalis*) remain the only reliable character to distinguish between the two species. The style of *F. squarrosa* is slightly longer and the nut usually somewhat larger than those of *F. aestivalis*, and the plant is usually coarser, but these characters are too trifling to depend on. The length of the mucros being the only difference I can find between *F. squarrosa* and its var. *esquarrosa*, I think the taxonomical value of the latter is over-estimated in giving it specific rank. According to N. Tanaka (see Ohwi, 1944) the chromosome number in *F. squarrosa* is $n=10$, in var. *esquarrosa* $n=12$.

The species is new for Malaysia. The collections mentioned by Merrill, En. Philip. Fl. Pl. 1, 1923, 126, belong partly to *F. aestivalis* (Merrill 9566, *Phil. Pl.* 2093), partly to *F. merrillii* (*Fénix BS 26093*).

The Sumatra and Java plants grew together with *F. aestivalis*.

SUMATRA. Samosir, Toba Lake, near Pangururan, moist sandy locality: *Lörzing 7701, p.p.* (BO, L); Toba Lake, near Balige: *Lörzing 8054* (BO).

JAVA. Res. Priangan, Mt Patuha, Telaga Patengan, marshy meadows at margin of lake, 1600 m: *Van Steenis 7450* (BO, L).

PHILIPPINES. Luzon, Prov. of Cagayan: *Curran FB 16783* (BO, L, US).

47. *Fimbristylis gracilentia* Hance, J. Bot. London 6, 1868, 89; C. B. Clarke, J. Linn. Soc. Bot. 36, 1903, 237; Camus, Fl. Gén. I. C. 7, 1912, 103. — *F. thorelii* Camus, Not. Syst. 1, 1910, 246; Fl. Gén. I. C. 7, 1912, 105.

New for Malaysia. The distribution of this species is insufficiently known. A survey of all specimens examined is given below.

CHINA. In arenosis graminosis insulae Danorum, Whampoa: *Hance 13227* (BM, type; P); Canton: *Sampson 919* (BM).

INDO CHINA. Tonkin, entre Bat-bac et le mont Bavi: *Balansa 2786* (P). Annam, bords du Song-Cau, Lang-Luong (Song-Ca-Lan): *Broumiche 320* (P). Cochinchina: *Pierre s.n.* (P); *Thorel 537* (type of *F. thorelii* Camus) (P).

MALAYSIA. N. Sumatra, between Aek Bila and Aek Marbau, open place in forest, 150 m: *Lörzng 9751* (BO); vicinity of Rantau Parapat, Bila, Sum. E. C.: *Rahmat si Boeca 1721* (NY, US).

48. *Fimbristylis spicigera* Kern, sp. nov. — *Fig. 8.*

Perennis, omnibus partibus glabra. *Culmi* stricte erecti, rigidi, fasciculati, obtusanguli, sulcati, glabri laevesque, 10—25 cm alti, 1—1 $\frac{1}{3}$ mm crassi, ad basin foliati, inferne vaginis 3—5 cm longis eincti. *Folia* culmo 2—3-plo breviora, erecta, capillacea, involuta, supra celluloso-reticulata subtus leviter striata, acuta, ad basin 1 mm apicem versus $\frac{1}{2}$ mm lata, eligulata, marginibus incrassatis apicem versus antorse scaberulis, vaginis striatis ferrugineis in parte priore membranaceis. *Anthela* stricte erecta, angusta, laxa, 8—20-spiculata, 6—14 cm longa. Bracteae involucrales 2—3, foliis consimiles, quam inflorescentia breviores, erectae, ad basin dilatatae scarioso-marginatae, ima usque ad 9 cm longa. Anthelae radii 2—3, erecti, glabri laevesque, spiciformes. *Spiculae* solitariae, sessiles, erectae, rhachidi adpressae, bracteolis 2 brevibus $\frac{1}{2}$ —2 cm longis suffultae, lineares, in sectione transversa rhomboideae, acutae, multiflorae, 10—15 mm longae, 1 mm latae. *Glumae* spiritaliter subquadrifariam dispositae, tenuiter membranaceae, erectae, adpressae, oblongo-ovatae vel ellipticae, carinatae, 2—2 $\frac{1}{2}$ mm longae, 1—1 $\frac{1}{4}$ mm latae, nervo medio prominente in mucronem $\frac{2}{3}$ — $\frac{1}{2}$ mm longum desinente, dorso ferrugineo, lateribus hyalinis. *Stamina* (2—)3, antheris oblongis $\frac{1}{3}$ (demum ad $\frac{1}{2}$) mm longis, connectivo in appendicem brevem glabram producto. *Stylus* tenuis, compressus, ad basin dilatatus, glaber, 1—1 $\frac{1}{4}$ mm longus, stigmatibus 2 quam stylus paullo brevioribus. *Nux* biconvexa, valde compressa, elliptica vel subobovata, breviter stipitata, haud umbonulata, laevis, pallide brunnea, 0.75—0.85 mm longa, 0.45—0.5 mm lata, cellulis extimis minutis rotundis vel ellipticis indistincte reticulata.

Mainly characterized by the inrolled thread-like leaves, the stiffly erect stems, and the very narrow anthela consisting of only 2(—3) erect spike-like branches with appressed spikelets. This peculiar appearance of the inflorescence is caused by the fact that consistently only one of the lateral axes is developed, each subordinate axis seemingly forming a prolongation of the main axis.

This species and the two following ones are related to those of Sect. *Pogonostylis*. They are, however, apparently perennials and in future it may be necessary to accommodate them into a separate section.

SIAM. Paknam Songkram, Nakawn Panom, on sand-bank in river, alt. c. 200 m, May 7, 1932, *A. F. G. Kerr 21366* (K, type; L).

INDO CHINA. Laos, Luang-Prabang, expédition du Mé-Kong 1866—68: *Thorel*



Fig. 8. *Fimbristylis spicigera* Kern — a. Habit, $\times \frac{1}{2}$; b. spikelet, $\times 5$; c. glume, $\times 10$; d. nut, $\times 10$; e. deflorate flower, $\times 10$. — From Kerr 21366 (K).

Fig. 9. *Fimbristylis arenicola* Kern — a. Habit, $\times \frac{1}{2}$; b. spikelet, $\times 5$; c. deflorate flower, $\times 10$; d. glume, $\times 10$; e. stamen, $\times 10$; f. base of leaf-blade, $\times 2\frac{1}{2}$. — From Kerr 21361 (K).

2901 (L, P); entre Luang-Prabang et Vientiane, avril 1913: *Joseph s.n.* (L, sub no 951.86—265).

49. *Fimbristylis arenicola* Kern, sp. nov. — *Fig. 9.*

Perennis. *Culmi* erecti, graciles, fasciculati, striato-sulcati, glabri laevesque, 15—25 cm alti, $\frac{2}{3}$ —1 mm crassi, ad basin foliati, inferne vaginis 3—6 cm longis cincti. *Folia* culmo duplo breviora vel longitudine ei subaequalia, erecta, plana, supra celluloso-reticulata subtus striata, acuta, 1—1 $\frac{1}{2}$ mm lata, eligulata, sparse puberula, marginibus antrorse scaberulis, vaginis striatis puberulis ferrugineis in parte priore membranaceis. *Anthela* composita vel decomposita, laxa, 20—30-spiculata, 5—10 cm longa, 2—5 cm lata. Bractee involucales 3—4, foliis consimiles, inflorescentia breviores vel paene eiusdem longitudinis, erectae, ad basin dilatata scarioso-marginatae, ima 3—6 cm longa. Anthelae radii 5—8, oblique erecti, glabri laevesque, usque ad 6 cm longi. *Spiculae* solitariae, lineares, angulatae, acutae, multiflorae, ferrugineae, 5—10(—15) mm longae, 1—1 $\frac{1}{4}$ mm latae. *Glumae* spiraliter dispositae, tenuiter membranaceae, erectae, adpressae, oblongo-ovatae, carinatae, 2 mm longae, 1 mm latae, nervo medio prominente in mucronem $\frac{1}{10}$ — $\frac{1}{5}$ mm longum desinente, dorso ferrugineo, lateribus hyalinis. *Stamina* 3, antheris linearibus 0.75—0.85 mm longis, connectivo in appendicem brevem glabram producto. *Stylus* tenuis, compressus, ad basin dilatatus, fimbriatus, 1 $\frac{1}{4}$ mm longus, stigmatibus 2 quam stylus brevioribus. *Nux* biconvexa, valde compressa, obovata, breviter stipitata, haud umbonulata, laevis, brunnea, 0.6—0.7 mm longa, 0.45 mm lata, cellulis extimis minutis rotundis vel hexagonalibus indistincte reticulata.

Closely related to the preceding species, but the stems more slender, less rigid, the leaf-blades flat, and hairy like the sheaths, the inflorescence broader, regularly anthelate (the rays not spiciform), the spikelets not rhomboid in cross-section, the mucros shorter, the anthers longer, the style fimbriate, and the nut slightly smaller.

SIAM. Paknam Songkram, Nakawn Panom, on sand-bank in river, alt. c. 200 m, May 7, 1932: *A. F. G. Kerr 21361 (type)* (K).

50. *Fimbristylis brunneoides* Kern, sp. nov. — *Fig. 10.*

Perennis, omnibus partibus glabra. *Culmi* fasciculati, erecti, graciles, obtusanguli, sulcati, laeves, 5—12 cm alti, $\frac{1}{3}$ — $\frac{1}{2}$ mm crassi, ad basin foliati. *Folia* culminibus subaequilonga, erecta, capillacea, supra celluloso-reticulata, subtus paucinervata, acuta, eligulata, $\frac{1}{3}$ — $\frac{1}{2}$ mm lata, marginibus incrassatis involutis, vaginis ferrugineis in parte priore membranaceis. *Anthela* composita, laxa, angusta, 7—16-spiculata, 5—7 cm longa. Bractee involucales 3—4, foliis consimiles, inflorescentia breviores vel paene eiusdem longitudinis, erectae, ad basin dilatata scarioso-marginatae, ima usque ad 6 cm longa. Anthelae radii 4—5, filiformes, glabri laevesque, usque ad 4 cm longi. *Spiculae* solitariae vel 2—3 aggregatae, erectae, anguste lineares, angulatae, acutae, laxe pluriflorae, 15—25 mm longae, $\frac{3}{4}$ —1 mm latae. *Glumae* spiraliter dispositae, tenuiter membranaceae, erectae, adpressae, lanceolatae, carinatae, in dorso ferrugineo tenuiter 3—5-nervatae, 3 mm longae, 1—1 $\frac{1}{4}$ mm latae, nervo medio prominente in mucronem 1 mm longum desinente, lateribus hyalinis. *Stamina* 1—2, antheris linearibus 0.6—0.75 mm longis, connectivo in appendicem brevem glabram producto. *Stylus* compressus, tenuis, ad basin vix dilatatus, glaber, 1 $\frac{1}{2}$ —1 $\frac{3}{4}$ mm

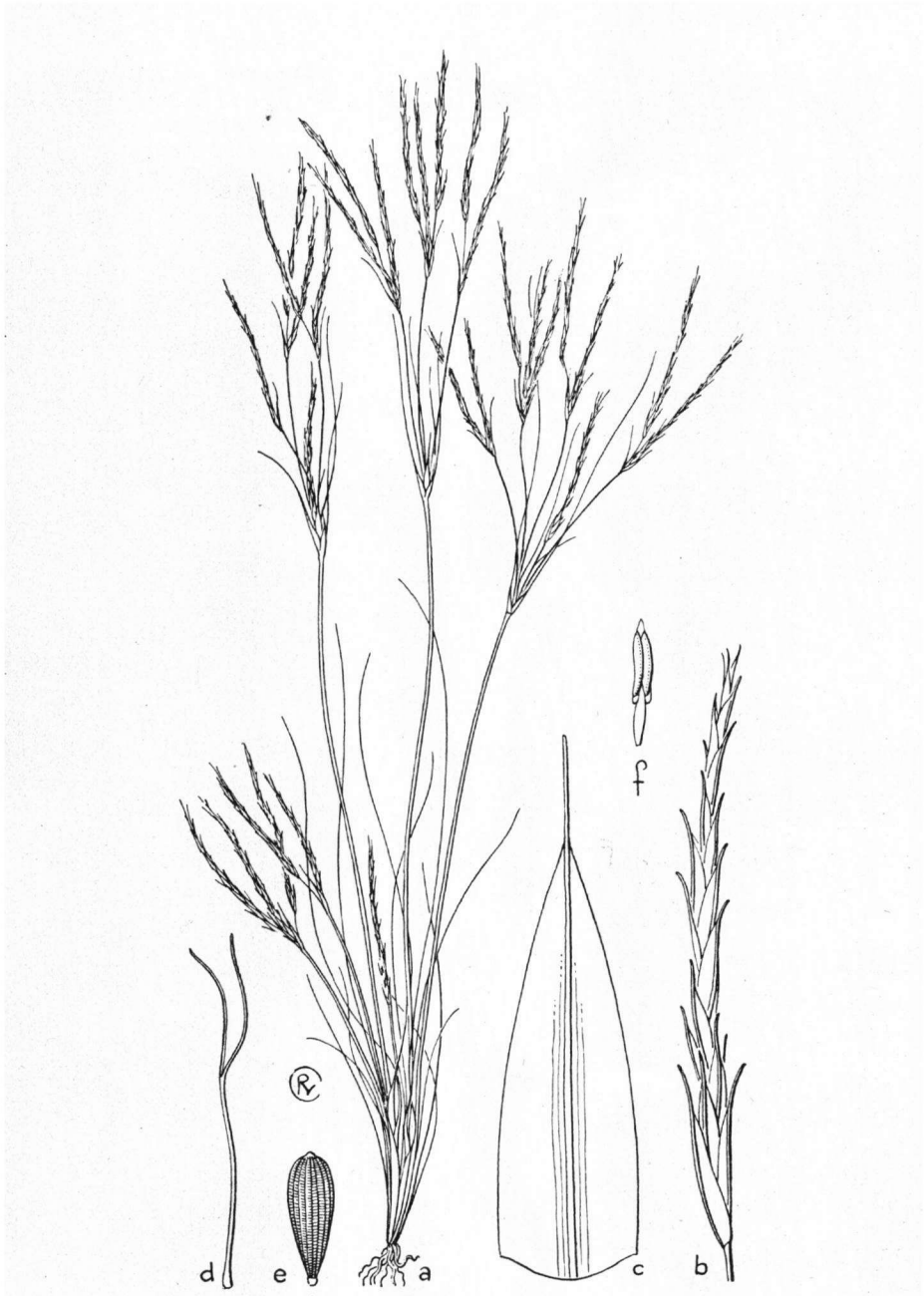


Fig. 10. *Fimbristylis brunneooides* Kern — a. Habit, slightly reduced; b. spikelet, $\times 4$; c. glume, $\times 17$; d. style and stigmas, $\times 17$; e. nut, $\times 17$; f. stamens, $\times 20$. — From Kerr 21359 (K).

longus, stigmatibus 2 quam stylus paullo brevioribus. *Nux* plano-convexa, compressa, oblongo-ovata, breviter stipitata, haud vel vix umbonulata, fusca, 0.8—0.9 mm longa, 0.3—0.4 mm lata, cellulis extimis impressis transverse oblongo-linearibus, in facie convexa 7—8-serialibus, in facie plana 3—4-serialibus, trabeculata.

The habit is that of *F. brunnea* C. B. Clarke ex E. G. Camus, to which species it is certainly closely allied; it differs by the compound inflorescence, the somewhat narrower spikelets, the longer glumes with longer mucros, the longer style and anthers, and the very narrow nut. In *F. brunnea* the anthera is simple, consisting of 3—5 almost sessile digitately arranged spikelets, the glumes are c. $2\frac{1}{2}$ mm long with a mucro $\frac{1}{2}$ — $\frac{3}{4}$ mm long, the style is 1 mm long, the anthers are oblong only $\frac{1}{3}$ mm long, and the nut is more obovate, (0.4—)0.5 mm wide. Whereas in the allied *F. spicigera* and *F. arenicola* the nuts are smooth with roundish to elliptic not impressed outer cells, they are distinctly trabeculate by the transversely oblong-linear impressed outer cells both in *F. brunnea* and *F. brunneoides*.

SIAM. Paknam Songkram, Nakawn Panom, on sand-bank in river, alt. c. 200 m, May 7, 1932: *A. F. G. Kerr 21359 (type)* (K).

51. *Fimbristylis acicularis* R. Br., Prodr. 1810, 226; Benth., Fl. Austral. 7, 1878, 301. — *Gramen polytrichum* Rumph., Herb. Amb. 6, 1750, 17, t. 7, f. 1. — *F. setacea* Benth. in Hook. Lond. J. Bot. 2, 1843, 239; Steud., Syn. Plant. Glum. 2, 1855, 106; C. B. Clarke, Fl. Br. Ind. 6, 1893, 632, p.p.; Philip. J. Sc. 2, Bot., 1907, 91; Koord., Exk. Fl. Java 1, 1911, 198; Valek. Sur., Nova Guinea 8, 1912, 702; Merr., En. Philip. Fl. Pl. 1, 1923, 126; S. T. Blake, J. Arn. Arb. 35, 1954, 208. — *F. acuminata* var. *pumila* Nees in Hook. J. Bot. Kew Misc. 6, 1854, 29. — *Abildgaardia brevifolia* Steud., Syn. Plant. Glum. 2, 1855, 72; Miq., Fl. Ind. Bat. 3, 1856, 297. — *Isolepis cochleata* Steud., Syn. 2, 1855, 100. — *F. acuminata* var. *setacea* (Benth.) Miq., Fl. Ind. Bat. 3, 1856, 314; Benth., Fl. Austral. 7, 1878, 301; Kük., Bot. Jahrb. 59, 1924, 47; *ibid.* 69, 1938, 257. — *F. acuminata* var. *minor* Nees ex Boeck., Linnaea 37, 1871, 4; Rolfe, J. Bot. 24, 1886, 59, in nota (sphalm. "*F. acutifolia* var. *minor*"). — *F. bursifolia* (sphalm.) Vidal, Phan. Cum. Philip. 1885, 156; Rev. Pl. Vasc. Filip. 1886, 284. — *F. setacea* var. *brevifolia* (Steud.) C. B. Clarke, Fl. Br. Ind. 6, 1893, 632.

There is much confusion about this species, both with regard to its distribution and nomenclatorial.

Up to the present the Malaysian plants were generally known as *F. setacea* Benth. This binomial was based on a Barclay collection from Ambon in the Kew Herbarium. Bentham was well aware of the fact that his new species "diagnosis *F. acicularis*, Br. paucis verbis differt", and added: "stamina non vidi". In the Flora Australiensis he reduced *F. setacea* to a variety of *F. acuminata* Vahl (which was already done by Miquel in 1856!) and gave the following key (p. 298):

Stamen 1. Style glabrous *F. acicularis*
 Stamens 3. Style ciliate *F. acuminata* (var. *setacea*)

The descriptions in the *Flora Australiensis*, p. 301 do not give any other difference. In the type-collection of *F. acicularis* in the British Museum the style is distinctly fimbriate in the upper part. It may be remarked that this is quite in accordance with Brown's diagnosis: "stylo basi dilatata nuda". The number of stamens in all specimens of *F. setacea* (also in those of Ambon) is 1 or 2.

I am unable to find any reliable difference between the type collection of *F. acicularis* R. Br. and that of *F. setacea* Benth. The two binomials appear to be synonymous, and *F. acicularis* is the correct name.

According to Blake, the correct trinomial of this plant, if treated as a variety of *F. acuminata*, would be *F. acuminata* var. *minor* Miq. However, Miquel did not make this combination; the mistake goes back to Clarke (1893). The correct varietal name would be *F. acuminata* var. *pumila* Nees (1854), based on *Cuming* 675, "culmo capillari caryopsi duplo minore." In my opinion *F. acicularis* undoubtedly deserves specific rank; it should not be treated as a variety of *F. acuminata* Vahl, even less referred to the synonymy of the latter species, as was done by Clarke (*Fl. Br. Ind.* 6, 1893, 631). The type of *F. acuminata* Vahl (C!) represents a clearly distinct species, widely distributed in SE. Asia.

Clarke (1893) gives the distribution of "*F. setacea*" as follows: S. Burma, *Kurz*, Singapore, *Kurz*, *Ridley*; Amboyna, N. Australia. The Birma and Singapore collections cited represent dwarfish specimens of *F. acuminata*. This is also the case with *Ridley* 107, 10011 (wrongly as 1011), and 10829, cited by *Ridley* as *F. setacea*, and with all records in the *Flora of the Malay Peninsula*.

I have never seen *F. acicularis* from the Western part of Malaysia nor from the Asiatic continent. The species extends from N. Australia through New Guinea, the Moluccas, and Celebes to the Philippines.

PHILIPPINES. Luzon, Kias, Prov. Benguet: *Williams* 1968 (NY); Camp Stotsenburg (Mt Pinatubo), Pampanga Prov.: *Elmer* 22358 (BM, BO, C, G, GH, K, L, NY, P, SING); Angat, Prov. of Bulacan: *Ramos* BS 21740 (BO, GH, P, SING); Manila: *Barthe* s.n. (P); Prov. of Rizal: *Ahern's coll.* FB 3390 (BO, K, NY, US); Prov. Laguna, *Cuming* 675 (type-coll. of *Abildgaardia brevifolia* Steud., *F. acuminata* var. *pumila* Nees, and *F. acuminata* var. *minor* Boeck.) (BM, C, FI, G, GH, K, L); Mt Mayon, Albay Prov.: *Robinson* BS 6450 (P); Mayon Volcano, Albay Prov., secondary forest partly open along trail: *Mendoza* PNH 18357 (L).

CELEBES. Makassar, kp. Sambungdjawa: *Noerkas* (exp. v. *Vuuren*) 33 (BO, L).

MOLUCCAS. Halmahera, Mt Dukono, W. Tobelo, crater field: *Beguín* 2312 (BO). Buru, Wai Eken-Kabut, swampy *Imperata* field, 250 m; *Toxopeus* 516 (BO). Ambon: *d'Urville* s.n. (P); *Barclay* s.n. (type of *F. setacea* Benth.) (K); *Robinson Pl. Rumph. Amb.* 438 (BM, BO, GH, K, L, NY, P, SING); Waai, beach: *Ramt* 619 (BO, L).

NEW GUINEA. W. New Guinea, ora australis: *Koch* (L, 909.90—40). Papua, Western Division, Lake Daviumbu, Middle Fly R., savannahs, abundant on hard-pans and swamp margins: *Brass* 7531 A (GH, U); Daru Island, abundant in flattened tufts on damp soil in savannah-forests: *Brass* 6245 (GH). NE. New Guinea, Ramu R.: *Schlechter* 13879 (BO); between Malolo-Mission and Salamaua: *Clemens* 4297 (GH); Samboga River, near Buna: *Baim* s.n. (BO). Aru Islands, P. Trangan, savannah: *Buwalda* 5357 (BO, L).

AUSTRALIA. Endeavour River, 1770: *Banks & Solander* (type) (BM).

Sine loco: *d'Urville* s.n. (type of *Isolepis cochleata* Steud.) (P).

II. KEY TO THE MALAYSIAN SPECIES OF FIMBRISTYLIS

- 1a. Spikelets terete or angular, not strongly laterally compressed. Glumes spiral throughout 2
- b. Spikelets strongly laterally compressed. Glumes (at least in young spikelets) distichous, the distichous arrangement in mature spikelets sometimes less pronounced by torsion of the rhachilla 73
- 2a. Nut oblong-linear in outline (with almost parallel sides), subcylindrical, hardly compressed 3
- b. Nut orbicular, obovate, oblong-obovate, pyriform, or turbinate, biconvex or 3-sided 4
- 3a. Leaves reduced to bladeless sheaths. Stems terminated by a single spikelet, 10—60 cm tall. Spikelet 6—15 × 4—6 mm. Glumes muticous, 4—5 mm long. Nut (without gynophore) 1½—2 mm long, trabeculate; gynophore conspicuous, ½—1 mm long. — *Throughout Malaysia, very local* *F. tetragona* R. Br.
- b. Leaves capillary. Stems 2—5 cm tall. Inflorescence usually with several spikelets, rarely reduced to a single one. Spikelets 3—6 × 2—3 mm. Glumes mucronate, the blade about 1 mm long. Nut ½—¾ mm long, obscurely transversely lineolate, sessile or almost so, when young covered with 2 rows of prominent clavate glands. — *Madura, Bawean, E. Borneo, Philippines, C. Celebes, Papua* *F. dipsacea* (Rottb.) C. B. Clarke
- 4a. Stigmas 3 (rarely in a few flowers 2). Nut trigonous of triquetrous, if dorsoventrally compressed with a raised, dorsal angle 5
- b. Stigmas 2. Nut strongly dorsoventrally compressed, 2-sided, biconvex or planoconvex 40
- 5a. Glumes with long-ciliate margins 6
- b. Glumes not (or only microscopically) ciliate 11
- 6a. Stems terminated by a single spikelet 8—20 × 5—6 mm. Stem scabrous. Glumes 5—7 × 3¼—4 mm. Nut about 1½ mm long and wide, pyriform. Leaves 2—3 mm wide. — *Papua* *F. recta* F. M. Bail.
- b. Spikelets often more than 1, always much smaller. Stem smooth or only slightly scaberulous. Glumes and nuts smaller 7
- 7a. Nut turbinate, often slightly depressed at the apex, with about 10 transverse wrinkles, about 1 × 1 mm. Leaves setaceous, hispidulous. Spikelets 1—5 to the stem. Glumes densely short-pubescent, with strong midnerve. — *Wetar, Luzon* *F. hispidula* (Vahl) Kunth
- b. Nut neither turbinate nor transversely wrinkled, smooth or verruculose, smaller. Leaves glabrous. Spikelets usually 3 or more to the stem 8
- 8a. Glumes not gland-dotted. Stems 10—30 (—50) cm tall, the base clothed with 2—3 bladeless sheaths. Leaves 1½—4 mm wide. Inflorescence with 4—25 spikelets. Spikelets 4—8 × 2 mm. Glumes 2¼—3 × 2 mm. Nut purplish black, 0.6—0.7 × 0.4—0.5 mm. — *New Guinea, Aru Islands* *F. furva* R. Br.
- b. Glumes densely gland-dotted 9
- 9a. Cauline leaves not reduced to bladeless sheaths. Spikelets in clusters, 2—3 mm long, dark brown. Glumes 1¼—1½ mm long. Anthers ½—¾ mm long, with smooth connective. Style ½—¾ mm long. Nut verruculose, whitish to stramineous, 0.7—0.9 × 0.5—0.7 mm. — *Sumatra, Malay Peninsula, Borneo, Philippines, Moluccas* *F. leptoclada* Benth.
- b. Cauline leaves reduced to bladeless sheaths. Spikelets solitary, 5—25 mm long, ferruginous to fuscous. Glumes 2—4½ mm long. Anthers 1—2½ mm long; connective setulose at the top. Style 1—4 mm long. Nut blackish 10
- 10a. Spikelets oblong to linear, 10—25 mm long. Glumes 4—4½ mm long. Style 3—3¼ mm long. Nut 0.9 mm long. — *SE. Celebes, Aru Islands* *F. lanceolata* C. B. Clarke
- b. Spikelets ovate to oblong, 5—10 mm long. Glumes 2—3 mm long. Style 1—2 mm long. Nut ½—¾ mm long. — *Madura, Luzon, Celebes* *F. macassarensis* Steud.
- 11a. Stem terminated by a single spikelet, rarely a lateral one added 12
- b. Inflorescence with 3—numerous spikelets 16

- 12a. Spikelet pseudolateral because of the erect involueral bract as though continuing the stem. Nut truncate and quasi-tridentate at the apex. Leaves setaceous. — *NE. New Guinea* (not seen) **F. fenestrata** Kük.
- b. Spikelets exactly terminal. Nut neither truncate nor quasi-tridentate 13
- 13a. Lower 1—3 (empty) glumes more than half as long as the spikelet, 4—6 mm long 14
- b. Lowest glume much shorter than the spikelet, $1\frac{1}{2}$ — $2\frac{1}{2}$, mm long 15
- 14a. Sheaths of the cauline leaves disintegrating in front into fine herringbone-shaped fibres. Spikelet 7—9 × 3 mm. Glumes 1-nerved. Stamens 3; anthers 2— $2\frac{1}{2}$ mm long. Style 3—4 mm long. Nut 1 × 0.7 mm. — *Papua*
- F. dictyocolea** S. T. Blake
- b. Leaf-sheaths not disintegrating into fibres. Spikelet 3—6 × 1— $1\frac{1}{2}$ mm. Glumes several-nerved. Stamens 1—2(—3); anthers $1\frac{1}{4}$ — $1\frac{1}{2}$ mm. Style $1\frac{1}{2}$ — $2\frac{1}{4}$ mm long. Nut 0.75—0.9 × 0.5—0.6 mm. — *Sumatra and adjacent islands, Malay Peninsula, Borneo, Anambas & Natuna Islands, Moluccas, New Guinea.*
- F. pauciflora** R. Br.
- 15a. Cauline leaves reduced to bladeless sheaths. Spikelets 3—4 mm wide. Glumes 2— $2\frac{2}{3}$, mm long. *See 21a.* **F. globulosa** (Retz.) Kunth
- b. Leaves well developed, broadly linear, obtuse, $1\frac{1}{2}$ —2 mm wide. Spikelet $1\frac{1}{2}$ mm wide. Glumes $1\frac{1}{2}$ mm long. *See 35a.* **F. obtusata** (C. B. Clarke) Bidl.
- 16a. Spikelets all or nearly all solitary 17
- b. Spikelets clustered, some solitary ones often added 36
- 17a. Cauline leaves (at least the upper one) reduced to bladeless or shortly apiculate sheaths 18
- b. Cauline leaves with well developed blades, or all leaves basal 25
- 18a. Leaves equitant, laterally compressed, finely striate without prominent midrib, the outer margin thin, the inner margin (see note p. 117) distinctly grooved. Spikelets numerous, 2—5 × $1\frac{1}{2}$ —2 mm. Rhachilla wingless. Glumes obtuse, mucicous, narrowly hyaline-margined, about $1\frac{1}{2}$ × 1 mm. Stamens 1—2. Nut verruculose, transversely lineolate by the transversely oblong-linear outer cells, about $\frac{1}{4}$ — $\frac{1}{3}$, mm. — *Throughout Malaysia* **F. miliacea** (L.) Vahl
- Spikelets 5—10 × 3 mm. Glumes $2\frac{1}{4}$ × $1\frac{1}{4}$, mm. Stamens 3
- var. **macrostachya** Kern
- b. Leaves not equitant, dorsoventrally compressed, with prominent midrib and rib-like margins, or all reduced to bladeless sheaths 19
- 19a. Nut pyriform, coarsely tuberculate, about $1\frac{1}{4}$, × 1 mm. Glumes with about 1 mm long mucro. Spikelets (1—)3—5(—9), oblong to linear-lanceolate, 6—10 × 2 mm. Rhachilla broadly winged. Stamens 2. — *Papua*
- F. signata** S. T. Blake
- b. Nut obovate, smooth or verruculose, smaller. Glumes mucicous or minutely apiculate 20
- 20a. Stems obtusangular, not deeply grooved 21
- b. Stems acutangular, deeply grooved 22
- 21a. All leaves of the flowering stems reduced to bladeless sheaths. Spikelets 1—numerous, globose, 3—4 mm wide. Rhachilla narrowly winged. Glumes 2— $2\frac{2}{3}$, mm long, mucicous, the midnerve ending somewhat below the apex. Stamens 2—3. Nut verruculose, with transversely oblong outer cells in 12—15 vertical rows on each face, 0.75—1 × 0.6—0.8 mm. Stigmas often 2, and then nut biconvex (see 46a). — *Throughout Malaysia* **F. globulosa** (Retz.) Kunth
- b. Only the upper 1—2 leaves of the flowering stems reduced to bladeless sheaths. Spikelets numerous, lanceolate, $1\frac{1}{4}$, mm wide. Rhachilla broadly winged. Glumes about 2 mm long, apiculate by the midnerve ending in the apex. Stamens 3. Nut densely verruculose, 0.6—0.7 × 0.5 mm; outer cells transversely elliptic. — *Central Java* **F. subdura** Ohwi
- 22a. Nut obovate, densely verruculose; outer cells transversely linear, in 4—6 vertical rows on each face 23
- b. Nut broadly obovate, smooth or very sparsely verruculose; outer cells transversely elliptic to oblong, in 9—11 vertical rows on each face 24
- 23a. Annual, flaccid. Flowering stems with well developed basal leaves. Spikelets angular, $1\frac{1}{4}$ — $1\frac{1}{2}$, mm wide. Glumes rather prominently keeled, apiculate by the

- shortly excurrent midnerve, about 1 mm long. Stamen 1. Nut very obtusely trigonous, $0.4-0.5(-0.7) \times 0.3-0.4(-0.5)$ mm. — *Almost throughout Malaysia*
- F. quinquangularis** (Vahl) Kunth
- b. Perennial, rhizomatous, stiff. Leaves of the flowering stems all reduced to bladeless sheaths. Spikelets terete, $1\frac{1}{2}-2$ mm wide. Glumes hardly keeled, mucicous, about $1\frac{1}{2}$ mm long. Stamens 1-2. Nut obtusely trigonous, $0.7-0.75 \times 0.4-0.5$ mm. — *Sumatra, Java, Philippines* **F. aphylla** Steud.
- 24a. Inflorescence 2-4 cm long, rarely longer. Involucral bracts very short, up to $1\frac{1}{2}$ cm long. Spikelets elliptic, $3-4 \times 2$ mm. Glumes 2 mm long. Stamens (2-3); anthers $\frac{2}{4}-1$ mm long. Style 1 mm long. Nut $0.8-0.9 \times 0.6-0.7$ mm. *Sumatra, Philippines, Celebes, New Guinea* **F. salbundia** (Nees) Kunth
- b. Inflorescence 12-20 cm long, rarely shorter. Lower involucral bracts 4-8 cm long. Spikelets ovate, $2-3 \times 1-1\frac{1}{2}$ mm. Glumes $1\frac{1}{2}-1\frac{3}{4}$ mm long. Stamens 1-2; anthers $\frac{1}{2}-\frac{2}{3}$ mm long. Style $\frac{2}{3}-\frac{3}{4}$ mm long. Nut $0.6-0.75 \times 0.6$ mm. — *Central Java, Celebes* **F. anisoclada** Ohwi
- 25a. Ligule a dense fringe of short hairs 26
- b. Ligule absent; leaf-sheaths on the inner side gradually passing into the blades 30
- 26a. Stems obtusely trigonous, slightly compressed. Spikelets $2-2\frac{1}{2}$ mm wide. Glumes $3-4$ mm long, 7-9-nerved. Nut $1\frac{1}{4}-1\frac{1}{2}$ mm long, verrucose. Leaves rigid, $2-4$ mm wide. Stamens 3; anthers $1\frac{1}{2}$ mm long. Style abruptly thickened at the base, $1\frac{1}{4}-2$ mm long. — *N. and C. Sumatra, Malay Peninsula, Philippines* **F. thomsonii** Boeck.
- b. Stems strongly compressed, ancipitous. Spikelets 1-2 mm wide. Glumes 1-3 mm long, 3-nerved. Nut usually shorter than 1 mm (only in *F. consanguinea* with smooth nuts 1-1.2 mm) 27
- 27a. Spikelets very small, about 1 mm wide. Glumes 1 mm long. Style $\frac{1}{2}$ mm long. Nut $0.5-0.6 \times 0.3-0.4$ mm, finely lineolate by the transversely linear-oblong outer cells superposed in 4-6 vertical rows on each face. Leaves flaccid, 1-2 mm wide. Stamen 1; anther $\frac{1}{4}$ mm long. — *E. Java, Philippines, New Guinea* **F. microcarya** F. v. M.
- b. Spikelets larger, $1\frac{1}{2}-2$ mm wide. Glumes 2-3 mm long. Style 1-2 mm long. Nut $\frac{3}{4}-1\frac{1}{2} \times \frac{1}{2}-\frac{3}{4}$ mm 28
- 28a. Stems and leaves very narrow, $\frac{1}{3}-\frac{1}{2}$ mm wide. Margins of the glumes hardly hyaline. Anthers $\frac{1}{2}$ mm long. Style $1\frac{1}{2}$ mm long. Nut smooth, 0.8×0.7 mm; outer cells transversely elliptic. — *W. New Guinea* **F. capilliculmis** Ohwi
- b. Stems 1-4 mm wide, leaves 1-5 mm wide. Margins of the glumes whitish hyaline. Anthers $1-1\frac{1}{2}$ mm long 29
- 29a. Inflorescence compound or decomposed, with many spikelets. Leaf-sheaths compressed, sharply keeled on the back; leaf-blades 3-5 mm wide. Stems 2-4 mm wide. Glumes $2-2\frac{1}{2}$ mm long. Anthers about 1 mm long. Style $1-1\frac{1}{4}$ mm long. Nut verruculose, $0.7-0.8$ mm long. — *Throughout Malaysia, 0-1000 m alt.* **F. complanata** (Retz.) Link
- b. Inflorescence subsimple, with few spikelets. Leaf-sheaths hardly compressed, rounded on the back; leaf-blades 1-2 mm wide. Stems $1-1\frac{1}{2}$ mm wide. Glumes $2\frac{2}{3}-3$ mm long. Anthers about $1\frac{1}{2}$ mm long. Style $1\frac{1}{4}-2\frac{1}{4}$ mm long. Nut smooth, $1-1.2 \times 0.75$ mm. — *Java, 1600-2300 m alt.* **F. consanguinea** Kunth
- 30a. Spikelets 2-4 mm wide. Style 2-5 mm long 31
- b. Spikelets 1-2 mm wide. Style $\frac{1}{2}-1\frac{1}{2}$ mm long 33
- 31a. Stems solitary on the creeping rhizome. Glumes mucicous, castaneous, $4\frac{1}{2}-6 \times 3\frac{1}{2}$ mm. Leaves rigid, 1-2 mm wide. Spikelets $7-15 \times 3-4$ mm. Anthers $2-2\frac{1}{2}$ mm long. Nut broadly obovate, verruculose, $1-1\frac{1}{2} \times 1$ mm. — *Philippines* **F. pierotii** Miq.
- b. Stems tufted on the very short, not creeping rhizome. Glumes apiculate or mucronulate, stramineous to brown 32
- 32a. Glumes spiral throughout, $4\frac{1}{2}-6 \times 3-4\frac{1}{2}$ mm. Style $3\frac{1}{2}-5$ mm long; stigmas shorter than the style. Leaves rigid, (1-)2-4 mm wide. Nut obovate, more or less verruculose, $1-1.25 \times 0.9-1$ mm. — *Malay Peninsula, Borneo, Philippines, Celebes, New Guinea* **F. insignis** Thwaites

- b. Glumes at least in some spikelets distichous or subdistichous. Style 2—2½ mm, stigmas about as long. Nut 0.8—1 × 0.6—0.75 mm. See 79a.
- F. eragrostis** (Nees) Hance
- 33a. Stems strongly compressed, ancipitous in the upper half. Leaves 4—7 mm wide. Lowest involucrel bract overtopping the inflorescence. External cells of the nut transversely oblong-linear. Glumes acute or apiculate, 1½—2 × 1½ mm. Anthers ¼—1 mm long. Style ¼—1 mm long. Nut finely transversely lineolate by the oblong-linear outer cells, 0.7—0.9 × 0.5—0.6 mm. — *Sumatra, Malay Peninsula, W. and C. Java, Borneo* **F. dura** (Zoll. et Mor.) Merr.
- b. Stems not or only slightly compressed, not ancipitous. Leaves at most 3 mm wide. Lowest involucrel bract much shorter than the inflorescence. External cells of the nut roundish to transversely elliptic 34
- 34a. Leaves stiff, coriaceous. Glumes mucicuous. 1½—2¼ × 1¼—1¾ mm, the midnerve evanescent below the apex. Nut blackish, 0.65—0.8 × 0.5—0.7 mm. Spikelets slightly angular, 3—6 × 2 mm. Anthers ¼—1 mm. Style ½—1 mm; stigmas in Malaysia usually 2, rarely 3. — *Throughout Malaysia F. cymosa* R. Br.
- b. Leaves weak, grass-like. Midnerve of the glumes ending in the apex or slightly excurrent. Nut whitish to stramineous 35
- 35a. Annual with stems 5—15 cm tall. Leaves 1½—2½ mm wide. Inflorescence simple or subcompound, with (1—)3—4 spikelets. Spikelets 4—8 × 1¼—1½ mm. Glumes broadly ovate, about 1½ mm long and wide. Style ¼ mm long. Nut densely verruculose, 0.6—0.75 × 0.5—0.6 mm. — *Malay Peninsula, Borneo*
- F. obtusata** (C. B. Clarke) Ridl.
- b. Perennial with stems 40—50 cm tall. Leaves 2½—3 mm wide. Inflorescence decompound or supradecompound, with numerous spikelets. See 21b.
- F. subdura** Ohwi
- 36a. Small annual with setaceous 10—25 cm tall stems and very narrow (about 1 mm wide) leaves. Inflorescence a single hemispherical head. Glumes mucronate from the sinus of the bilobed apex. Nut 0.6—0.75 × 0.45—0.65 m. — *Lesser Sunda Islands* **F. schultzei** Boeck.
- b. Perennials with stouter stems and broader leaves. Inflorescence with well developed rays and several clusters of spikelets, rarely almost capitate. Glumes mucicuous, or mucronulate from the apex 37
- 37a. Leaves densely silky pubescent on the under side. Glumes pubescent. See 69a.
- F. sericea** R. Br.
- b. Leaves and glumes glabrous 38
- 38a. Spikelets 5—15 × 3—4 mm. Glumes 3½—5 × 2¼—4 mm. Style 2½—3 mm long. Leaves rigid (2—)3—5 mm wide. Nut verruculose to nearly smooth, about 1 × 1 mm. — *Malay Peninsula* **F. nigrobrunnea** Thwaites
- b. Spikelets and glumes smaller. Style shorter 39
- 39a. Nut whitish to stramineous, 0.85—1 × 0.7—0.85 mm. Connective of the anthers distinctly produced, setulose at the top. Glumes with conspicuous scarios margins, triangular-ovate, acute or minutely apiculate, 2—2¼ × 2—2½ mm. — *Philippines, New Guinea, New Britain* **F. falcata** (Vahl) Kunth
- b. Nut blackish, 0.65—0.8 × 0.5—0.7 mm. Connective shortly produced, smooth. See 34a. **F. cymosa** R. Br.
- 40a. Nut coarsely rugulose by transverse wavy ridges. Stems with a single terminal spikelet only. Leaves reduced to bladeless or very shortly laminate sheaths 41
- b. Nut smooth, verruculose, or trabeculate (i. e. with several longitudinal ribs connected by numerous crossbars), but not coarsely rugulose 43
- 41a. Spikelets broadly ovate, obtuse to rather acute, usually more or less inclined, 3—5 mm wide. Style tongue-shaped, 0.5—0.7 mm broad. Nut with 3—5 transverse ridges, 1¼—1½ × 1—1¼ mm. Glumes 3½—4½ × 3—3½ mm. Stamens 3; anthers 1½—2 mm long. — *Sumatra, Malay Peninsula, Borneo, New Guinea*
- F. nutans** (Retz.) Vahl
- b. Spikelets lanceolate or oblong-ovate, acuminate or very acute, erect, 2—3½ mm wide. Style less than ½ mm wide. Nut with 5—8 transverse ridges 42
- 42a. Spikelets 6—12 × 2—3½ mm. Glumes 3½—4½ × 2¼—4 mm, stramineous to brownish. Stamens 2—3; anthers ¼—1¼ mm long. Nut broadly obovate to orbicular, 1¼—1¾ mm long and wide, dirty stramineous to brownish. —

- Sumatra and adjacent islands, Malay Peninsula, Java, Madura, Lesser Sunda Islands (Tenimbar), Borneo, Philippines* *F. acuminata* Vahl
- b. Spikelets 4—6 × 1—2 mm. Glumes $2\frac{1}{2}$ — $3\frac{1}{4}$ × 1—2 mm, paler. Stamens 1—2; anthers about $1\frac{1}{2}$ mm long. Nut obovate, 0.75—0.9(—1) × 0.55—0.65(—0.8) mm, white to pale stramineous. — *Philippines, Celebes, Moluccas, New Guinea*
F. acicularis R. Br.
- 43a. Stems strongly flattened, ancipitous. Rhachilla broadly winged. Leaves 3—5 mm wide; ligule absent. Inflorescence supradecomposed. Lowest involucre bract as long as or longer than the inflorescence. Spikelets 4—7(—12) × 2— $2\frac{1}{2}$ mm. Glumes spiral to subdistichous, 2— $2\frac{3}{4}$ × $1\frac{1}{2}$ mm. Stamens 3; anthers $\frac{3}{4}$ —1 mm. Nut obovate or broadly obovate, smooth or sparsely verruculose, 0.75—0.8 × 0.55—0.75 mm. — *S. Sumatra, W. Java, Borneo* *F. scaberrima* Nees
- b. Stems not ancipitous. Rhachilla not or only narrowly winged 44
- 44a. Glumes ovate-oblong or oblong-lanceolate, more than twice as long as broad. Stems usually terminated by a single spikelet 45
- b. Glumes ovate to orbicular, less than twice as long as broad 46
- 45a. Leaves setaceous, $\frac{1}{2}$ —1 mm wide. Spikelets 1(—3) to the stem, ovate-ellipsoid to oblong, terete, 5—15 × 2—3 mm. Glumes mucicous, hardly keeled, $2\frac{1}{2}$ —3 × 1— $1\frac{1}{2}$ mm. Stamens 1—2; anthers 0.8—1 mm long. Style 1 mm long. Nut cuneate-obovate, rounded at the apex, smooth or sparsely verruculose, 0.8—1 × 0.5—0.6 mm, greyish brown. — *Malay Peninsula, Sumatra, Java, Madura, Philippines*
F. polytrichoides (Retz.) R. Br.
- b. Leaves capillary, $\frac{1}{4}$ — $\frac{3}{8}$ mm wide. Spikelet 1 to the stem, oblanceolate or narrowly oblong, angular, 5—7 × 2 mm. Glumes mucronulate, sharply keeled, about 3 × 1 mm. Stamens 1—3; anthers 1— $1\frac{1}{2}$ mm long. Nut narrowly obovate, umbonulate, smooth, 0.7—0.8 × 0.5 mm, whitish. — *Celebes*
F. celebica Ohwi
- 46a. Base of the stems clothed with bladeless subinflated sheaths. Spikelets globose, solitary, 3—4 mm wide. Glumes mucicous. Nut verruculose with transversely oblong outer cells in 12—15 vertical rows on each face. See 21a.
F. globulosa (Retz.) Kunth
- b. Blades of the cauline leaves well developed, rarely the upper one very short, or all leaves basal. Other characters not united 47
- 47a. Ligule a fringe of short hairs, sometimes membranous 48
- b. Ligule absent; leaf-sheaths on the inner side gradually passing into the blades 61
- 48a. Glumes hairy, at least in the apical part 49
- b. Glumes glabrous 50
- 49a. Lower sheaths coriaceous, shining brown to castaneous, upper ones ciliolate at the mouth, otherwise glabrous. Blades of the cauline leaves rigid, short, 2—10 cm long, $\frac{1}{2}$ — $1\frac{1}{2}$ mm wide. Involucral bracts usually shorter than the inflorescence. Spikelets acute. Glumes ovate to oblong, 3— $4\frac{1}{2}$ × $2\frac{1}{2}$ —3 mm, puberulous in the apical part, ferruginous. Style 0.25 mm wide. Nut obovate to oblong-obovate, shortly stipitate, 1— $1\frac{1}{4}$ × $\frac{3}{4}$ —1 mm. — *Throughout Malaysia*
F. ferruginea (L.) Vahl
- b. Lower sheaths not coriaceous, stramineous to ferruginous, the upper ones pilose especially towards the top, sometimes glabrescent. Blades of the cauline leaves grass-like, up to 35 cm long, $1\frac{1}{2}$ —2 mm wide. Lowest involucre bract usually overtopping the inflorescence, up to 10 cm long. Spikelets obtuse. Glumes very broadly ovate, 3— $4\frac{1}{2}$ mm long and wide, densely tomentose in the apical part, usually castaneous. Style about 0.4 mm wide. Nut broadly obovate to orbicular, distinctly stipitate, $1\frac{1}{4}$ — $1\frac{1}{2}$ × $1\frac{1}{10}$ — $1\frac{1}{4}$ mm. — *Lesser Sunda Islands (Timor), Philippines (Mindanao)* *F. sieberiana* Kunth
- 50a. Nut smooth, distinctly stipitate by the conspicuous gynophore $\frac{1}{4}$ — $\frac{3}{4}$ mm long. Glumes many-nerved. Stamens 3 51
- b. Nut trabeculate, usually shortly stipitate, only in *F. podocarpa* with a conspicuous gynophore 54
- 51a. Apex of the nut broadly emarginate by the 0.5—0.8 mm wide style-scar 52
- b. Apex of the nut rounded or umbonulate, not emarginate 53
- 52a. Annual (?), stems tufted. Leaves 1— $1\frac{1}{4}$ mm wide. Spikelets 1—3 to the stem, 10—20 × 3—4 mm. Glumes $4\frac{1}{2}$ —5 × 4 mm. Anthers 1 mm long. Ovary not

- winged. Style 2 mm long. Nut $1\frac{1}{2}$ —2 mm long; style-scar about $\frac{1}{2}$ mm wide. — *Java, Luzon* **F. caesia** Miq.
- b. Perennial, stems approximate on the short-creeping rhizome. Spikelet 1 to the stem, 15—35 \times 4—5 mm. Glumes 6—7 \times $4\frac{1}{2}$ —5 mm. Anthers $2\frac{1}{2}$ —3 mm long. Ovary membranously winged. Style $3\frac{1}{2}$ —4 mm long. Nut 2 mm long; style-scar 0.6—0.8 mm wide. — *Papua* **F. subalata** Kern
- 53a. Inflorescence with 1—2(—3) spikelets which are 3—4 mm wide. Glumes very broadly ovate, $2\frac{1}{2}$ —3 mm long. Anthers $\frac{3}{4}$ mm long. Style $1\frac{1}{4}$ — $1\frac{1}{2}$ mm long. — *Sumatra, Malay Peninsula, Java and adjacent islands, Tenimbar, Borneo, Philippines* **F. schoenoides** (Retz.) Vahl
- b. Inflorescence with (1—)3—7(—11) spikelets which are (4—)5—6 mm wide. Glumes broadly ovate, 4—5 mm long. Anthers $1\frac{1}{2}$ — $2\frac{1}{2}$ mm long. Style 3— $3\frac{3}{4}$ mm long. — *Throughout Malaysia* **F. tristachya** R. Br.
- 54a. Style glabrous or with a few (3—4) short ciliae at the top only, $\frac{1}{4}$ —1 mm long. Spikelets $1\frac{1}{2}$ —2 mm wide. Glumes $1\frac{1}{2}$ —2 mm long. Nut 0.6—0.9 \times 0.5—0.7 mm; outer cells in 5—9 vertical rows on each face. — *Sumatra, Java and adjacent islands, Tenimbar, Philippines, Celebes, New Guinea* **F. merrillii** Kern
- b. Style fimbriate at least in the upper half. Other characters not united 55
- 55a. Spikelets 1— $1\frac{1}{2}$ mm wide 56
- b. Spikelets 2—4 mm wide 57
- 56a. Spikelets angular. Glumes membranous, sharply keeled, mucronulate, with nerveless sides. Stamen 1; anther $\frac{1}{2}$ mm long. Style $\frac{3}{4}$ —1 mm long. Nut obovate to broadly obovate, 0.6—0.7 \times 0.4—0.55 mm; outer cells in 5—9 vertical rows on each face. — *E. Java, ? Borneo, Luzon* **F. bisumbellata** (Forsk.) Bub.
- b. Spikelets terete. Glumes subchartaceous, hardly keeled, with finely nerved sides. Stamens 3; anthers 1— $1\frac{1}{2}$ mm long. Style $1\frac{1}{4}$ — $1\frac{3}{4}$ mm long. Nut narrowly obovate, 0.7—0.9 \times 0.5—0.6 mm; outer cells in 4—6 vertical rows on each face. — *Luzon* **F. tenuinervia** Kern
- 57a. Nut oblong-obovate, 1.25—1.5 \times 0.7—0.9 mm; outer cells in 12—16 vertical rows on each face. Glumes distinctly many-nerved almost over the whole breadth, oblong-obovate, 3— $4\frac{1}{2}$ \times $1\frac{1}{2}$ —3 mm. Stamens 3; anthers $1\frac{1}{2}$ — $1\frac{3}{4}$ mm; connective distinctly produced, papillose-setulose at the top. — *Philippines (Golo)* **F. lineatisquama** Ohwi
- b. Nut obovate, broadly elliptic or almost orbicular, in *F. dichotoma* rarely almost oblong-obovate, but then the outer cells in 5—10 vertical rows on each face. Sides of the glumes nerveless or only faintly nerved 58
- 58a. Outer cells of the nut in 5—10 (rarely some more) vertical rows on each face. Spikelets 5—10(—20) \times $2\frac{1}{2}$ —3(—5) mm. Glumes very broadly ovate to oblong-obovate, 2—3 (— $4\frac{1}{2}$) mm long. Stamens 1—3; anthers $\frac{1}{2}$ —1(— $1\frac{1}{4}$) mm. Style 2—4 mm long. Nut obovate to broadly obovate, with small gynophore. — *Throughout Malaysia* **F. dichotoma** (L.) Vahl
- b. Outer cells of the nut in (12—)15—24 vertical rows on each face. Other characters not united 59
- 59a. Spikelets ($2\frac{1}{2}$ —)3—4 mm wide. Glumes with strong midnerve and several obscure lateral nerves, $3\frac{1}{4}$ — $3\frac{1}{2}$ mm long. Stamens 2; anthers about $\frac{3}{4}$ mm. Style $1\frac{1}{4}$ — $1\frac{1}{2}$ mm. Nut broadly elliptic to suborbicular, prominently stipitate; gynophore $\frac{1}{5}$ — $\frac{1}{2}$ mm long and wide, 1.1—1.5 \times 0.9—1.4 mm; outer cells in 16—24 vertical rows on each face. — *Malay Peninsula, Java, Kangean Arch., Philippines, New Guinea, ? New Britain* **F. podocarpa** Nees
- b. Spikelets 2— $2\frac{1}{2}$ mm wide. Glumes 2— $2\frac{1}{4}$ mm long. Anthers $\frac{1}{3}$ — $\frac{1}{2}$ mm long. Gynophore inconspicuous. Outer cells of the nut in 12—18 vertical rows on each face 60
- 60a. Inflorescence very loose, 8—15 cm long. Spikelets light brown, 2 mm wide. Stamens 2. Nut broadly elliptic, almost orbicular, 0.75—0.8 \times 0.65 mm, not verruculose. — *Moluccas (Ceram), W. New Guinea* **F. perluxa** Ohwi
- b. Inflorescence loose, 2—7 cm long. Spikelets greyish green, brownish variegated. Stamen 1. Nut obovate, 1—1.2 \times 0.75—0.9 mm, verruculose. — *Malay Peninsula, Java, Luzon* **F. albiviridis** C. B. Clarke
- 61a. Nut when young covered with 2 rows of prominent clavate glands. Small annual with capillary leaves, squarrose spikelets, and glumes with a recurved awn almost

- as long as the blade. *See 3b*. **F. dipsacea** (Rottb.) C. B. Clarke
- b. Nut without clavate glands. Spikelets not or only slightly squarrose, the mucro of the glumes if present much shorter than the blade 62
- 62a. Spikelets small, 1—1½ mm wide. Small annuals with thinly membranous glumes 1—2 mm long, 1(—2) anthers, ½—1 mm long style, ½—¾ mm long nut 63
- b. Spikelets larger, 2—4 mm wide. Other characters not united 67
- 63a. Inflorescence capitate, subglobose or hemispherical, ½—1 cm across. Glumes mucous or apiculate, 1 × 1 mm. Nut suborbicular, about ½ mm long and wide. — *Malay Peninsula* **F. argentea** (Rottb.) Vahl
- b. Inflorescence anthelate, with well developed rays, larger. Glumes mucronulate. Nut elliptic to obovate, usually slightly larger 64
- 64a. Base of the style with long pendent hairs covering at least the upper half of the nut. — *N. Sumatra, Java, Luzon* **F. squarrosa** Vahl var. *esquarrosa* Makino
- b. Base of the style glabrous or with very short, not pendent hairs 65
- 65a. Glabrous. Leaves 1—2 mm wide. Base of the stem clothed with 1—2 very shortly laminate sheaths. Style glabrous. — *Sumatra, Malay Peninsula, W. Java, Borneo, Celebes, Moluccas, New Guinea* **F. griffithii** Boeck.
- b. More or less hairy. Leaves ½—1 mm wide. Cauline leaves with well developed blades. Style fimbriate, at least at the top 66
- 66a. Inflorescence loose, 1—5 cm long. Lowest involucrel bract somewhat shorter to slightly longer than the inflorescence. Rays of the inflorescence obliquely patent, glabrous. Glumes about 1½ mm long. Style ½—¾ mm long. Nut ½—⅔ mm long. — *Sumatra, Java, Philippines, Celebes* **F. aestivalis** (Retz.) Vahl
- b. Inflorescence very loose, 3—10 cm long. Lowest involucrel bract up to twice as long as the inflorescence. Rays of the inflorescence obliquely erect, densely puberulous. Glumes about 2 mm long. Style 1—1¼ mm long. Nut ¼ mm long. — *N. Sumatra* **F. gracilentia** Hance
- 67a. Stems terminated by a single spikelet up to 2 cm long and 3—4 mm wide. Glumes mucronulate, 1-nerved, about 5 × 3 mm. Stamens 3; anthers 2 mm long. Style fimbriate in the upper half, 4—4½ mm long. Nut obtriangular-obovate, verruculose, 1.15—1.2 × 0.85 mm. — *Lesser Sunda Islands (Wetar)* **F. wetarensis** Ohwi
- b. Inflorescence with 3—numerous, smaller spikelets 68
- 68a. Rhizome creeping 69
- b. Rhizome not creeping 70
- 69a. Leaves densely silky pubescent beneath. Spikelets in clusters of 3—6, angular, 2½—3 mm wide. Glumes keeled, pubescent. Connective setulose at the top. Style 1½—1¾ mm long. Nut 1—1½ × ⅓—1 mm. — *Malay Peninsula, Banka, Java, Madura, Borneo* **F. sericea** R. Br.
- b. Leaves glabrous or hairy, but not silky-pubescent. Spikelets solitary or a few in twos, terete, 3—4 mm wide. Glumes hardly keeled, glabrous. Connective smooth. Style 2—3 mm long. Nut 1½—1¾ × 1⅓—1¼ mm. — *Luzon, Mindanao* **F. rigidula** Nees
- 70a. Leaves rigid, coriaceous. Nut blackish. Involucrel bracts very short, much shorter than the inflorescence. *See 34a* **F. cymosa** R. Br.
- b. Leaves weak, grass-like. Nut white to stramineous, brownish in *F. trichophylla*. Involucrel bracts usually overtopping the inflorescence 71
- 71a. Nut oblong-obovate, 1—1.5 × 0.5—0.65 mm. Anthers with bristly appendage of the connective. Leaves filiform, sometimes up to 1 mm wide. Glumes obscurely many-nerved, 2⅓—3 × 2—2⅓ mm. Stamens 3; anthers 1—1½ mm long. Style 1½—2⅓ mm long. Outer cells of the nut in 10—12 vertical rows on each face. — *Malay Peninsula* **F. trichophylla** Ridl.
- b. Nut obovate to broadly obovate. Connective smooth. Leaves flat, 1—2 mm wide 72
- 72a. Rays of the inflorescence scaberulous-pilose. Style retrorsely hispidulous at the base. Glumes apiculate by the slightly excurrent midnerve. Outer cells of the nut transversely linear-oblong. — *Lesser Sunda Islands (Sumba)* **F. sumbaensis** Ohwi
- b. Rays of the inflorescence smooth. Style with glabrous base. Glumes mucous, midnerve not reaching the apex. Outer cells of the nut roundish to transversely elliptic. — *Central Java* **F. semarangensis** Ohwi

- 73a. Stigmas 2. Nut biconvex. *See 43a.* **F. scaberrima** Nees
 b. Stigmas 3. Nut trigonous or triquetrous 74
- 74a. Spikelets all sessile, congested into a globose head, stellately spreading, falling off as a whole, 5—6 × 1 mm. Leaves reduced to 2—3 bladeless or shortly laminate sheaths. Stamens 3; anthers linear, 2—3 mm long. Style 4—4½ mm long. Nut ellipsoid or obovoid, 1½—1¾ × 1 mm. *Bangka, P. Lingga, Malay Peninsula, Anamba Islands, Philippines (Culion, Busuanga)*
 F. thouarsii (Kunth) Merr.
 b. Inflorescence anthelate, with distinct rays, or consisting of 1 terminal spikelet only, rarely almost capitate. Rhachilla persistent, glumes acropetally caducous 75
- 75a. Nut 2—3 × 1¼—2 mm, coarsely tuberculate. Spikelets 1—2(—3) to the stem, 8—15(—30) × 4—6 mm. Leaves ½—1 mm wide. Glumes 4½—5 × 4—4½, mm. Style fimbriate almost to the base, 2—4 mm long. — *Throughout Malaysia*
 F. monostachyos (L.) Hassk.
 b. Nut much smaller, smooth or verruculose. Spikelets usually several to numerous 76
- 76a. Glumes glabrous and smooth 77
 b. Glumes either puberulous-scaberulous by short hairs at least in the apical part, or beset with reddish glands 80
- 77a. Spikelets clustered, shining dark brown. Leaves (2—)3—5 mm wide. Involucral bracts stiff, erect, the longest 1—1½ cm. Rays of the inflorescence recurved, up to 3 cm long. Glumes 3¾—5 × 2¼—4 mm. Stamens 3; anthers 1½—2 mm long. Style 2½—3 mm long. Nut about 1 × 1 mm. — *Malay Peninsula*
 F. nigrobrunnea Thwaites
 b. Spikelets solitary 78
- 78a. Leaves narrow, ½—1 mm wide, with long-acuminate setulose tip. Outer leaf-sheaths coriaceous, shining fuscous to purplish. *See 84a.*
 F. vanoverberghii Kük.
 b. Leaves broader, with rounded, shortly apiculate apex. Outer leaf-sheaths stramineous to light brown 79
- 79a. Leaves 2—3 mm wide. Spikelets 2—3 mm wide. Glumes 3—4 mm long, mucronulate from the apex. Stamens 3; anthers 1½—2 mm long. Style 2—2½ mm long. Nut 0.8—1 × 0.6—0.75 mm. — *Lesser Sunda Islands (Timor), New Guinea, Aru Islands* **F. eragrostis** (Nees) Hance
 b. Leaves 1½—2 mm wide. Spikelets 1½ mm wide. Glumes 1½—2 mm long, minutely apiculate just below the apex. Stamens 2—3; anthers about ½ mm long. Style 1—1½ mm long. Nut 0.6—0.7 × 0.35—0.45 mm. — *N. Sumatra*
 F. disticha Boeck.
- 80a. Glumes gland-dotted. Leaves very narrow, less than 1 mm wide 81
 b. Glumes hairy. Leaves broader, 1½—2 mm wide (except in *F. vanoverberghii*) 83
- 81a. Nut smooth, 0.6—0.75 × 0.4—0.5 mm, the outer cells almost isodiametric. Connective produced into a subulate ¼, mm long appendage. Spikelets 4—6 × 1—1½, mm. Glumes 3—3¾ × 1½ mm. Anthers 1—1¼ mm long. Style glabrous except for the retrorse hairs at the base, 2½—3½ mm long. — *Malay Peninsula, Billiton, N. Borneo* **F. fuscoides** C. B. Clarke
 b. Nut verruculose, transversely lineolate by the linear outer cells. Connective only shortly produced 82
- 82a. Perennial with short-creeping rhizome. Stems 25—50 cm tall. Glumes 2¼—4 mm long. Stamens 3; anthers 1—2 mm long. Style 3—3½ mm long, shortly hairy at the base. Nut obovate to obovate-elliptic, 0.75—0.9 × 0.4—0.7 mm. — *N. Sumatra, Luzon, New Guinea* **F. cinnamometorum** (Vahl) Kunth
 b. Annual with fibrous roots. Stems 5—12 cm tall. Glumes 1½—2 mm long. Stamen 1; anther about ½ mm long. Style 1—1¼, mm long, glabrous. Nut oblong-obovate, 0.6—0.75 × 0.25—0.3 mm. — *Kangean Arch.*
 F. adenolepis Kern
- 83a. Glumes 3—6 mm long, anthers 1¼—2 mm, style 2½—4½ mm. Perennials, rarely annuals, with 20—50 cm tall stems 84
 b. Glumes 1½—3 mm long, anthers ½—¾, mm, style 1—1¼, mm. Annuals with 5—20 cm tall stems 87
- 84a. Outer leaf-sheaths coriaceous, shining fuscous to purplish. Leaves ½—1 mm wide with long-acuminate setulose tip. Stems glabrous or pilose, leaves more or

- less hispid especially on the under side. Spikelets 5—8 \times 2—2½ mm. Glumes 3—4 \times 2½—3 mm, often glabrescent. Style 2½—3 mm long. Nut 1.1 \times 0.75—0.8 mm, sparsely verruculose. — *N. Sumatra, Luzon, New Guinea*
F. vanoverberghii Kük.
- b. Outer leaf-sheaths membranous or herbaceous, dull pale green to brownish. Leaves 1—3 mm wide, without setulose tip 85
- 85a. Nut smooth, 0.65—0.75 \times 0.4—0.5 mm. Glumes 3—4 mm long. Stems at the base with 1—2 bladeless or shortly laminate sheaths. Anthers 1¼ mm long. Style 3 mm long. — *Malay Peninsula (P. Langkawi)* . . . **F. malayana** Ohwi
- b. Nut verruculose, larger. Glumes 4—6 mm long. Style 4—6 mm long . . . 86
- 86a. Perennial. Leaves much shorter than the stem (often scarcely ¼ as long), abruptly pointed, (1—)2(—)4 mm wide. Inflorescence compound to supra-decompound, up to 10 cm long, with many to numerous spikelets. Nut obovate, densely verruculose, 0.9—1 mm long. — *Sumatra, Malay Peninsula, Java, Philippines, Celebes, Moluccas, New Guinea* **F. fusca** (Nees) C. B. Clarke
- b. Annual. Leaves longer, as long as ½—¾ stem, more gradually acuminate. Inflorescence simple (very rarely one of the rays with a short secondary ray), 1½—2 \times 2—4 cm, with 3—6 spikelets. Nut oblong-obovate, sparsely verruculose, 1.25 \times 0.7 mm. — *Malay Peninsula (P. Penang)* . . . **F. fulvescens** Thwaites
- 87a. Outer cells of the nut transversely oblong-linear. Nut oblong-obovate to ellipsoid, 0.6—0.65 \times 0.3—0.35 mm. Spikelets 3—7(—10) \times 1—1¼ mm. Glumes 1½—1¾ mm long. Stamens 2. Style 1 mm long. — *Malay Peninsula (P. Langkawi)*
F. calcicola Kern
- b. Outer cells of the nut hexagonal. Nut obovate or broadly obovate, 0.65—0.8 \times 0.45—0.6 mm 88
- 88a. Glumes broadly ovate when opened out, 1½—1¾ mm long. Nut cuneate at the base, not truncate. Stamens 3. Style 1 mm long. — *N. Sumatra, Papua*
F. intonsa S. T. Blake
- b. Glumes ovate-lanceolate, 2½—3 mm long. Nut truncate at the base. Stamens (1—)2. Style 1½—1¾ mm long. — *N. Sumatra, W. and C. Java, Madura, Kangean Arch., N. Borneo, Celebes, New Guinea*
F. fimbriatylodes (F. v. M.) Druce

III. CLASSIFICATION OF THE MALAYSIAN SPECIES OF FIMBRISTYLIS

In outline the arrangement accepted here agrees with that of Ohwi in *J. Jap. Bot.* 14, 1938, 571. The limits of the subgenera proposed being far from well-marked, I have contented myself with the distinction of a series of sections. It has been attempted to trace all sectional names available and to typify them in such a way, that the old names can be maintained, though generally they encompass a narrower concept than originally accepted by their authors.

Some of the trigynous species tend to digyny (*F. cymosa*, *F. globulosa*, *F. sericea*, and to a lesser extent *F. pauciflora*). *F. scaberrima* is digynous throughout; it has been placed next to *F. dura*, to which it shows affinity in almost every respect. Attention is drawn to the taxonomic value of the ligule.

A system not based on the thorough knowledge of all species of the genus will inevitably show shortcomings in many respects. For instance, I am well aware that the insertion of *F. recta* in sect. *Leptocladae* and of *F. wetarensis* in sect. *Neodichelostylis* is highly disputable.

1. Nut orbicular, obovate, oblong-obovate, pyriform, or turbinate, 3-sided or biconvex.
2. Stigmas 3; style triquetrous, usually glabrous. Nut trigonous or triquetrous (see above remark).
3. Glumes spiral.
 4. Nut smooth or verruculose.
 5. Glumes not ciliate.
 6. Inflorescence anthelate or capitate.
 7. Cauline leaves with well developed blades.
 8. Ligule a dense fringe of short hairs. Sect. 1. **Trichelostylis**
 8. Ligule absent.
 9. Rather stout perennials Sect. 2. **Cymosae**
 9. Small annuals Sect. 3. **Tenerae**
 7. Cauline leaves (at least the upper one) reduced to bladeless sheaths Sect. 4. **Miliaceae**
 6. Inflorescence consisting of a single terminal spikelet
 - Sect. 5. **Heleocharoides**
 5. Glumes long-ciliate Sect. 6. **Leptoclaadae**
 4. Nut coarsely tuberculate Sect. 7. **Signatae**
3. Glumes distichous.
 10. Rhachilla persistent. Glumes acropetally caducous. Inflorescence anthelate or reduced to a single spikelet.
 11. Nut large, pyriform, tuberculate Sect. 8. **Abildgaardia**
 11. Nut small, obovate, smooth or verruculose Sect. 9. **Fuscae**
 10. Rhachilla caducous; spikelets falling off as a whole. Inflorescence capitate. Leaves reduced to bladeless sheaths Sect. 10. **Actinoschoenus**
2. Stigmas 2; style flat, usually fimbriate. Nut biconvex. Glumes spiral.
 12. Inflorescence anthelate, with many spikelets.
 13. Ligule a dense fringe of short hairs, or membranous.
 14. Nut smooth, not trabeculate Sect. 11. **Dichelostylis**
 14. Nut trabeculate Sect. 12. **Fimbristylis**
 13. Ligule absent.
 15. Spikelets terete or slightly angular, 2—4 mm wide
 - Sect. 13. **Rigidulae**
 15. Spikelets angular, 1—1½, mm wide Sect. 14. **Pogonostylis**
 12. Inflorescence consisting of a single terminal spikelet, rarely 1 or 2 lateral spikelets added.
 16. Nut not rugulose. Leaf-blades well developed Sect. 15. **Neodichelostylis**
 16. Nut rugulose by transverse ridges. Leaves reduced to bladeless sheaths
 - Sect. 16. **Nutantes**
1. Nut oblong-cylindrical. Glumes spiral. Stigmas 2(—3).
 17. Inflorescence consisting of a single spikelet. Spikelet terete. Leaves reduced to bladeless sheaths Sect. 17. **Mischospora**
 17. Inflorescence anthelate. Spikelets angular or squarrose. Leaf-blades well developed Sect. 18. **Dipsaceae**

Sect. 1. **Trichelostylis** (Lestib.) Boeck., *Linnaea* 37, 1871, 23. — *Trichelostylis* Lestib., *Ess. Fam. Cyp.* 1819, 40. — *Isolepis* sect. *Trichelostylis* (Lestib.) Endl., *Gen. Plant.* 1836, 118. — *Fimbristylis* subgen. *Trichelostylis* (Lestib.) A. Gray, *Man. Bot.*, ed. 5, 1867, 567. — Type species: *F. autumnalis* (L.) R. et S. — Malaysian species: 1. *F. thomsonii* Boeck.; 2. *F. complanata* (Retz.) Link; 3. *F. consanguinea* Kunth; 4. *F. capilliculmis* Ohwi; 5. *F. microcarya* F. v. M.

Sect. 2. **Cymosae** Ohwi, *J. Jap. Bot.* 14, 1938, 571. — Type species: *F. cymosa* R. Br. — Malaysian species: 6. *F. subdura* Ohwi; 7. *F. dura* (Zoll. et Mor.) Merr.; 8. *F. scaberrima* Nees; 9. *F. pierotii* Miq.; 10. *F. insignis* Thwaites; 11. *F. falcata* (Vahl) Kunth; 12. *F. cymosa* R. Br.; 13. *F. sericea* R. Br.

Sect. 3. **Tenerae** Kern, sect. nov. — *Annuae*, *parvae*. *Culmi* *tenues*,

ad basin foliati. Foliorum laminae bene evolutae, intus ad basin sensim in vaginam transeuntes, eligulatae. Inflorescentia anthelata vel capitata. Glumae spiralliter dispositae, apiculatae vel mucronatae, haud fimbriatae. Stylus triquetus, glaber, stigmatibus 3. Nux trigona, obovata. — Type species: *F. tenera* Schult. — Malaysian species: 14. *F. obtusata* (C. B. Clarke) Ridl.; 15. *F. schultzii* Boeck.

Sect. 4. **Miliaceae** Ohwi, J. Jap. Bot. 14, 1938, 572. — *Fimbristylis* sect. *Globulosae* Ohwi, l.c. — Type species: *F. miliacea* (L.) Vahl. — Malaysian species: 16. *F. globulosa* (Retz.) Kunth; 17. *F. miliacea* (L.) Vahl; 18. *F. aphylla* Steud.; 19. *F. quinquangularis* (Vahl) Kunth; 20. *F. salbundia* (Nees) Kunth; 21. *F. anisoclada* Ohwi.

Sect. 5. **Heleocharoides** Benth., Fl. Austral. 7, 1878, 301. — Type species: *F. pauciflora* R. Br. — Malaysian species: 22. *F. dictyocolea* S. T. Blake; 23. *F. pauciflora* R. Br.

Sect. 6. **Leptocladae** Ohwi, J. Jap. Bot. 14, 1938, 572. — Type species: *F. leptoclada* Benth. — Malaysian species: 24. *F. recta* F. M. Bail.; 25. *F. leptoclada* Benth.; 26. *F. hispidula* (Vahl) Kunth; 27. *F. furva* R. Br.; 28. *F. lanceolata* C. B. Clarke; 29. *F. macassarensis* Steud.

Sect. 7. **Signatae** Kern, sect. nov. — Culmi tenues, ad basin vaginis aphyllis cincti. Inflorescentia anthelata. Spiculae solitariae, angulatae. Rhachilla alata. Glumae spiralliter dispositae, carinatae, mucronatae. Stylus triquetus, stigmatibus 3. Nux pyriformis, tuberculata. — Type species: *F. signata* S. T. Blake. — Malaysian species: 30. *F. signata* S. T. Blake.

Sect. 8. **Abildgaardia** (Vahl) Benth., Fl. Austral. 7, 1878, 299. — *Abildgaardia* Vahl, En. Plant. 2, 1806, 296. — *Cyperus* sect. *Abildgaardia* (Vahl) Endl., Gen. Plant. 1836, 119. — Type species: *F. monostachyos* (L.) Hassk. — Malaysian species: 31. *F. monostachyos* (L.) Hassk.

Sect. 9. **Fuscae** Ohwi, J. Jap. Bot. 14, 1938, 571. — Type species: *F. fusca* (Nees) C. B. Clarke. — Malaysian species: 32. *F. nigrobrunnea* Thwaites; 33. *F. eragrostis* (Nees) Hance; 34. *F. cinnamometorum* (Vahl) Kunth; 35. *F. adenolepis* Kern; 36. *F. fuscoideus* C. B. Clarke; 37. *F. fusca* (Nees) C. B. Clarke; 38. *F. fulvescens* Thwaites; 39. *F. malayana* Ohwi; 40. *F. vanoverberghii* Kük.; 41. *F. calcicola* Kern; 42. *F. fimbristylloides* (F. v. M.) Druce; 43. *F. intonsa* S. T. Blake; 44. *F. disticha* Boeck.

Sect. 10. **Actinoschoenus** (Benth.) Kern, comb. nov. — *Actinoschoenus* Benth. in Benth. & Hook., Gen. Plant. 3, 1883, 1058. — *Arthrostylis* subgen. *Actinoschoenus* (Benth.) Kük. in Fedde, Rep. 53, 1944, 197. — Type species: *F. thoursii* (Kunth) Merr. — Malaysian species: 45. *F. thoursii* (Kunth) Merr.

Sect. 11. **Dichelostylis** Benth., Fl. Austral. 7, 1878, 299. — *Fimbristylis* sect. *Ferrugineae* Ohwi, J. Jap. Bot. 14, 1938, 573, p.p. — Type species: *F. ferruginea* (L.) Vahl. — Malaysian species: 46. *F. ferruginea* (L.) Vahl; 47. *F. sieberiana* Kunth; 48. *F. tristachya* R. Br.; 49. *F. schoenoides* (Retz.) Vahl; 50. *F. subalata* Kern; 51. *F. caesia* Miq.

Sect. 12. **Fimbristylis**. — *Fimbristylis* sect. *Eufimbristylis* Boeck., Linnaea 37, 1871, 3. — *Fimbristylis* sect. *Dichotomae* Ohwi, J. Jap. Bot. 14, 1938, 573. — Type species: *F. dichotoma* (L.) Vahl. — Malaysian species: 52. *F. dichotoma* (L.) Vahl; 53. *F. bisumbellata* (Forsk.) Bub.; 54. *F. mer-*

rillii Kern; 55. *F. tenuinervia* Kern; 56. *F. podocarpa* Nees; 57. *F. lineatisquama* Ohwi; 58. *F. perlaxa* Ohwi; 59. *F. alboviridis* C. B. Clarke.

Sect. 13. *Rigidulae* Kern, sect. nov. — Culmi ad basin foliati. Folia eligulata, lamina intus sensim in vaginam transeunte. Spiculae solitariae, teretes vel subangulatae. Glumae spiraleriter dispositae, non vel vix carinatae. Stylus compressus, stigmatibus 2. Nux biconvexa, reticulata vel obsolete trabeculata. — Type species: *F. rigidula* Nees. — Malaysian species: 60. *F. trichophylla* Ridl.; 61. *F. rigidula* Nees; 62. *F. sumbaensis* Ohwi; 63. *F. semarangensis* Ohwi.

Sect. 14. *Pogonostylis* (Bertol.) Pax in Engl. & Prantl, Nat. Pfl. Fam. 2, 1887, 113. — *Pogonostylis* Bertol., Fl. Ital. 1, 1833, 312. — *Fimbristylis* sect. *Squarrosae* Ohwi, J. Jap. Bot. 14, 1938, 573. — Type species: *F. squarrosa* Vahl. — Malaysian species; 64. *F. griffithii* Boeck.; 65. *F. aestivalis* (Retz.) Vahl; 66. *F. squarrosa* Vahl; 67. *F. gracilentata* Hance; 68. *F. argentea* (Rottb.) Vahl.

Sect. 15. *Neodichelostylis* Camus, Fl. Gén. I. C. 7, 1912, 89 — *Fimbristylis* sect. *Ferrugineae* Ohwi, J. Jap. Bot. 14, 1938, 573, p.p. — Type species: *F. polytrichoides* (Retz.) R. Br. — Malaysian species: 69. *F. polytrichoides* (Retz.) R. Br.; 70. *F. celebica* Ohwi; 71. *F. wetarensis* Ohwi.

Sect. 16. *Nutantes* Ohwi, J. Jap. Bot. 14, 1938, 573. — Type species: *F. nutans* (Retz.) Vahl. — Malaysian species: 72. *F. acuminata* Vahl; 73. *F. nutans* (Retz.) Vahl; 74. *F. acicularis* R. Br.

Sect. 17. *Mischospora* (Boeck.) Camus, Fl. Gén. I. C. 7, 1912, 89. — *Mischospora* Boeck., Flora 43, 1860, 113. — *Fimbristylis* sect. *Tetragonae* Ohwi, J. Jap. Bot. 14, 1938, 571. — Type species: *F. tetragona* R. Br. — Malaysian species: 75. *F. tetragona* R. Br.

Sect. 18. *Dipsaceae* Ohwi, J. Jap. Bot. 14, 1938, 571. — Type species: *F. dipsacea* (Rottb.) C. B. Clarke. — Malaysian species: 76. *F. dipsacea* (Rottb.) C. B. Clarke.

Species of doubtful place: 77. *F. fenestrata* Kük.

IV. NOTES ON SOME OTHER CYPERACEAE

1. *Scirpus beccarii* Boeck., Bot. Jahrb. 7, 1886, 275.

Boeckeler published this species in an article "Neue Cyperaceen von Argentinien, Mexiko, Alaska und dem Kilimandscharo." Not before I saw a sheet of the type collection (*Beccari* 357) in the Kew Herbarium, I realized that the species in question is native in Malaysia. Beccari collected it on Mt Singgalang (Sumatra). In the Bogor Herbarium there are several Sumatran collections perfectly agreeing with the Beccari plants. The species was placed by Boeckeler in the affinity of *S. varians* and *S. supinus*, presumably on account of the pseudolateral inflorescence. Its true relationship, however, is with *S. fluitans* L. The latter widely spread species occurs at high altitudes on the Javan mountains, and has also been recorded from Papua. Malaysian *S. fluitans* hardly differs from the European; the leaves are slightly broader with more distinct cross-nerve, the glumes somewhat larger with often purplish sides, and the nuts slightly larger. In Sumatra *S. fluitans* is apparently lacking; here it is replaced by *S. beccarii*, strongly resembling it in almost every respect, and mainly

characterized by the pseudolateral inflorescence consisting of 1 or 2 spikelets subtended by an erect up to $1\frac{1}{2}$ cm long involucre bract. Remarkable is the inconstancy of the number of stigmas (2 or 3 in flowers of the same spikelet). In accordance with this inconstancy the nuts are plano-convex, strongly compressed with a raised dorsal angle, or sharply triquetrous.

SUMATRA. Atjeh, Gajolands, Mt Losir, in and along a brooklet, 3300 m: *Van Steenis 8639* (BO); Mt Kemiri, in tufts on dry soil and submerged in brooklet, 3150—3314 m, *Van Steenis 9666* (BO). Ophir Distr., NW. slope of Mt Talamau, in tufts on moist plain, common, 2750 m: *Bünnemeijer 860* (BO). Mt Singgalang: *Beccari 357* (type coll.) (K); in brushwood near the lake, common, 2800 m: *Bünnemeijer 2902* (BO); shore of lake, in tufts, 2800 m: *Docters van Leeuwen 3977* (BO, L).

2. *Cyperus iria* L. var. *flavescens* Benth., Fl. Austral. 7, 1878, 276.

Cyperus iria var. *rectangularis* Kük. in Engl., Pflanzenr. Heft 101, 1935, 153 is recorded from India, and in an approaching form from N.S. Wales. The Indian collections represent a markedly distinct species, which I described in Reinwardtia 1, 1952, 463 as *C. alulatus* Kern. At that time I had not seen any Australian specimen of var. *rectangularis*. Also according to Blake (in Black, Fl. S. Australia, 2nd ed. 1, 1948, 143) the South Australian specimens of *C. iria* have rather longer, wider, and more spreading spikelets than the typical form, and approach var. *rectangularis* Kük.

Bentham (1878) described *C. iria* var. *flavescens*, not accounted for in Kükenthal's monograph, with fewer but longer 12—16-flowered spikelets, and assuming nearly the aspect of *C. flavescens* L. This variety is based on collections from Central Australia (*Gosse*; Charlotte Waters, *Giles*; near Mount Murchison, *Bonney*), two of which I could study in the Kew Herbarium. They strikingly resemble *C. alulatus* by the many-flowered wide-spreading spikelets. However, all other characters being those of *C. iria*, they certainly belong to the latter species.

The correct name of the Australian variety therefore is: *Cyperus iria* L. var. *flavescens* Benth., whereas *C. iria* var. *rectangularis* Kük. (lectotype *Duthie 23284*) is synonymous with *C. alulatus* Kern.

I have seen *C. iria* var. *flavescens* from W. Australia (*N. T. Burbidge, 139, Lefroy 3*), Northern Territory (*R. Helms s.n., R. A. Perry 713*), Central Australia (*Jess Chalmers 31, Giles s.n., Gosse 11*), Queensland (*S. L. Everist 2801, 3953*). It is to be expected to occur in New Guinea.

3. *Cyperus sphacelatus* Rottb., Descr. et Ic. 1773, 26; Kern, Reinwardtia 2, 1952, 107.

The first records for Malaysia (Sumatra, Malay Peninsula, New Guinea) I published in 1952. Recently the species was also collected in Borneo.

BORNEO. Labuan Island, padang near aerodrome: *Van Steenis 17862* (BO, L). NE. Borneo, Nunukan, N of Tarakan, few m alt., *W. Meijer 2453a* (L).

4. *Rhynchospora gracillima* Thwaites, En. Pl. Zeyl. 1864, 435; Boeck., Linnaea 37, 1873, 597; Kurz, J. As. Soc. Beng. 45, II, 1876, 159; Clarke, Fl. Br. Ind. 6, 1893, 671; Ill. Cyp. 1909, t. 71, f. 6—7; Kük., Bot. Jahrb. 75, 1951, 273. — *R. kamphoeveneri* Boeck., Bot. Jahrb. 5, 1884, 508.

Among the *Fimbristylis* material in the Bogor, the Leiden, and the Kew Herbaria I found some specimens of this *Rhynchospora* species

collected in Sumatra. Up to the present it was not yet recorded from Malaysia. Its range extends from tropical Africa to S. Asia (S. China, Ceylon, Khasia, Nicobars, Malaysia).

SUMATRA. Atjeh, subdiv. Takengon, near kp. Kutarajang, old secondary forest, 900 m: *Japing* 19 (BO). Tapanuli, Asahan valley above Wilhelmina waterfall, moist places, not rare, 975 m: *Lörzing* 10021 (BO). W. Sumatra, Fort van der Capellen, on open grassy hill, *Matthew s.n.* (K).

CELEBES. Res. Menado, subdiv. Kolonedale, between Tomata and Kamba: *Eyma* 4014 (L).

NEW GUINEA. W. New Guinea, prob. Dompta: *Anang s.n.* (BO, L).

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 - sect. *Abildgaardia* (Vahl) Benth. III: 8
 - sect. *Actinoschoenus* (Benth.) Kern III: 10
 - sect. *Cymosae* Ohwi III: 2
 - sect. *Dichelostylis* Benth. III: 11
 - sect. *Lichotomae* Ohwi III: 12
 - sect. *Dipsaceae* Ohwi III: 18
 - sect. *Eufimbristylis* Boeck. III: 12
 - sect. *Ferrugineae* Ohwi III: 11, 15
 - sect. *Fimbristylis* III: 12
 - sect. *Fuscae* Ohwi III: 9
 - sect. *Globulosae* Ohwi III: 4
 - sect. *Heleocharoides* Benth. III: 5
 - sect. *Leptocladae* Ohwi III: 6
 - sect. *Miliaceae* Ohwi III: 4
 - sect. *Mischospora* (Boeck.) Camus III: 17
 - sect. *Neodichelostylis* Camus III: 15
 - sect. *Nutantes* Ohwi III: 16
 - sect. *Pogonostylis* (Bertol.) Pax III: 14
 - sect. *rigidulae* Kern III: 13
 - sect. *Signatae* Kern III: 7
 - sect. *Squarrosae* Ohwi III: 14
 - sect. *Tenerae* Kern III: 3
 - sect. *Tetragonae* Ohwi III: 17
 - sect. *Trichelostylis* (Lestib.) Boeck. III: 1
 - *semarangensis* Ohwi I: 44
 - *setacea* Benth. I: 51
 - *var. brevifolia* (Steud.) C. B. Clarke I: 51
 - *sieberiana* Kunth I: 31
 - *sp. prox. Fimbr. fusca* Henders. I: 42
 - *spicigera* Kern I: *48
 - *squarrosa* Vahl I: 46
 - *var. esquarrosa* Makino I: 46
 - *squarrosa* (non Vahl) Merr. I: 38
 - *squarrosa* (non Vahl) Zoll. I: 40
 - *stenochnaena* Kük. I: 24
 - *straminea* (non Turr.) Ohwi I: 28
 - *straminea* Turr. I: 9
 - *subalata* Kern I: *35
 - *subbispicata* (non Nees) C. B. Clarke I: 33
 - *var. caesia* (Miq.) C. B. Clarke I: 36
 - *subfusca* Camus I: 24
 - *subgen. Trichelostylis* (Lestib.) A. Gray III: 1
 - *tenera* (non Schult.) C. B. Clarke I: 20
 - *tenera* Schult.
 - *var. obtusata* C. B. Clarke I: 9
 - *tenuinervia* Kern I: *39
 - *thomsonii* Boeck. I: 1
 - *thorelii* Camus I: 47
 - *thwaitesii* Boeck. I: 6
 - *trichophylla* Ridl. I: 42
 - *var. erecta* Holtum ex Kern I: 42
 - *tristachya* R. Br. I: 33
 - *vanoverberghii* Kük. I: 26
 - *velata* R. Br. I: 46

- Gramen polytrichum* Rumph. I: 51
Gussonea cyperoides Presl I: 24
 — *pauciflora* Brongn. I: 24
Isolepis cochleata Steud. I: 51
 — *exilis* Kunth I: 17
 — *longispica* Steud. I: 24
 — *sect. Trichelostylis* (Lestib.) Endl. III: 1
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 — *? anomala* Steud. I: 24
 — *gracillima* Thwaites IV: 4
 — *kamphoeveneri* Boeck. IV: 4
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 — *beccarii* Boeck. IV: 1
 — *bisumbellatus* Forsk. I: 37
 — *cinnamometorum* Vahl I: 21
 — *falcatus* Vahl I: 7
 — *hispidulus* Vahl I: 17
 — *pallescens* Roxb. I: 37
 — *quinguangularis* Vahl I: 13
Trichelostylis Lestib. III: 1
 — *complanata* (Retz.) Nees I: 14
 — *junciformis* Nees I: 7
 — *salbundia* Nees I: 14