REINWARDTIA
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NOTES ON MALAYSIAN GRASSES—I*

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SUMMARY

This paper contains miscellaneous notes on grasses from Malaysia. One genus, 21 species, and 26 varieties are described as new. Many reductions to synonyms are made. Eight specific names are recombined under other generic names and 18 names of varieties, too, are recombined without change of rank. One subspecies and 2 varieties are raised to the rank of species, while 15 species are reduced to the rank of varieties.

AGROSTIS L.

1. AGROSTIS INFIRMA Buse *in* Miq., Pl. Jungh. 342. 1854 and AGROSTIS REINWARDTII Van Hall *ex* Buse *in* de Vriese, Pl. Ind. bat. orient. 98. 1857.

Both species, growing in the same localities, are often confused. The best character to separate them is found in the panicle-branches: these are smooth in *A. reinwardtii* and scabrous in *A. infirma*. The spikelets of *A. reinwardtii* are in general longer and nearly always awned; those of *A. infirma* are shorter and usually awnless or with a short included awn. There exist many intermediate forms, probably of hybrid origin. One of these may be the *A. rigidula* of Steudel (Syn. Pl. Glum. 1: 171. 1855), based on Zollinger 2589 from Java. The specimen I saw, bearing that number, has the scabrous panicle-branches of *A. infirma* and the awned spikelets with long acuminate glumes of *A. reinwardtii*.

2. AGROSTIS SUMATRANA Mez *in* Fedde, Repert. 17: 147. 1921.

The specimens, all from Sumatra, are characterised by a more or less contracted cylindrical panicle with yellowish spikelets, and the lemma with a 4 mm long geniculate awn. In my opinion this is not a separate species, and I reduce it to the rank of a variety: **Agrostis infirma** Buse var. **sumatrana** (Mez) Jansen, *comb. nov.*

3. AGROSTIS REINWARDTII var. BORNEENSIS (Stapf) Ohwi *in* Bull. Tokyo Sci. Mus. No. 18: 8. 1947.

Agrostis canina var. *borneensis* Stapf *in* Trans. Linn. Soc., Bot. 4: 246. 1894.

* The second Part was published first, *in* Acta bot. neerl. 1: 468-483. 1952.
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Typical specimens of *A. canina* and *A. reinwardtii* Buse, though both members of section *Trichodium* Trin. by their minute to obsolete palea, have a very different appearance, but this mountain form of Stapf is more or less a puzzle. The type in the Kew Herbarium (Haviland 1399) has the smooth glumes and the truncate, 5-nerved lemma (the lateral nerves slightly excurrent; awned just below the middle, the awn twice as long as the lemma and slightly bent) of *A. canina*, but it is densely cespitose without short rhizomes and without the sterile, trailing stolons; the dark purplish panicle is short and contracted, with short, smooth branches; the spikelets are rather long for such a small plant. I agree with Ohwi, that it seems more reasonable to consider it a high-mountain variety of the Malaysian *A. reinwardtii*, rather than a form of *A. canina*, which is distributed throughout Europe and through Asia from the Caucasus and Himalaya northwards. Besides the type, I saw collections from Mount Kinabalu (Clemens 29167, 29167a, 29167b, 27072 suppl.). The plants look very much like *A. kinabaluensis* Ohwi (*in* Bull. Tokyo Sci. Mus. No. 18: 8. 1947), but that species belongs to section *Vilfa* R. & Sch., with the palea about four-fifths as long as the lemma: Clemens 27072, 30312, 30273 (type; Herb. Bogor.), 29167d. Some of these exsiccatae are a mixture of two species.

4. Among the collections of the Bogor Herbarium I encountered the type specimens of *Agrostis steenisii* De Wit, the description of which was not published and got lost during the war. I give here a description of the type specimens:

Agrostis steenisii De Wit *ex* Jansen, *sp. nov.*

Gramen perenne, caespitosum, estoloniferum; culmi 15—20 cm alti, basi tantum foliati; foliorum laminae strictae, perrigidae, 5—10 cm longae, arcte involutae, ½—⅔ mm diametro, explicatae circa 1 mm latae, supra profunde sulcatae, subtus laeves, apice abrupte acutae; ligula late ovata, obtusa, hyalina, glabra, 1,5—2 mm longa; vaginae 1—2 cm, in culmo sitae tamen usque ad 7 cm longae, sulcatae, viridulae, laeves, glabrae; panicula exserta, 5—8 cm longa, anguste ovata, laxiuscula, sordide rubro-suffusa, ramis 1—2-nis, laevibus, 2—3 cm longis, supra medium ramulosis, pauci-spiculosis; spiculae lanceolatae, acuminatae, 4 mm longae; glumae subinequales, lanceolatae, acutissimae, prima uninervis dorso superne scaberula, secunda subtrinervis paulo brevior quam prima, dorso dimidio superiore scaberula; lemma ovatum, 2 mm longum, obtusum, 5-nerve, glabrum, paulo supra medium aristatum; arista circa 4 mm longa, leviter geniculata et torta, e spicula longe exserta, callo glabriusculo; palea nulla; stamina 3, antheris linearibus, 1,5 mm longis.

DISTRIBUTION.—Sumatra, Atjeh, Mt. Leuser (Losir), Van Steenis 8573, 8593 (in part), 8624 (*type;* Herb. Bogor.).

A small species from high mountain tops (3300 m altitude), with a very characteristic appearance: the dense, cushion-like tufts with the erect, rigid, involute blades give the plants the aspect of small porcupines.

ANTHOXANTHUM L.

1. ANTHOXANTHUM ANGUSTUM (Hitchc.) Ohwi *in* Bull. Tokyo Sci. Mus. No. 18: 81. 1947.

Hierochloë angusta Hitchc. *in* Brittonia 2: 118. 1936.

In the original description as a *Hierochloë*, Hitchcock states that the flower florets are staminate. In the type number (Brass 4412) and in the other specimens I have seen, there are no staminate florets: they are neuter and without a palea. This species is not a *Hierochloë* but an *Anthoxanthum*.

In Borneo Mrs. Clemens collected specimens (29176), resembling much the New Guinean *A. angustum*. They differ somewhat in appearance: the culms are not strictly erect but more reclining at the base and ascending, the culm-sheaths very loose and wide, much wider than the narrow, more or less folded blades, the panicle partly enclosed in the uppermost sheath. In the New Guinean type the second glume is rounded at the apex and abruptly cuspidate, but in the Bornean specimens this glume is regularly narrowed from base to tip. The latter specimens may be called **Anthoxanthum angustum** var. **borneense** Ohwi (in sched. Herb. Bogor. no. 26639; *type*) *ex* Jansen, *var. nov.—Gluma secunda apice sensim angustata.*

2. ANTHOXANTHUM LUZONIENSE Merr. *in* Philip. J. Sci. 1 (Suppl.): 178. 1906.

Nearly related to the widely distributed *A. odoratum* L., but a more glabrous species with the awn of the first sterile lemma very short. It is somewhat variable. Specimens from Celebes (Eyma 712 and Kjellberg 3036) have narrower, at the lower surface spreading-pilose, blades and sparingly pubescent sheaths. Other specimens from Celebes (Eyma 2272) are more robust, quite glabrous, with broader blades, a more open to slightly drooping panicle, and have the branches up to 6 cm long. They resemble *Hierochloë horsfieldii* (Kunth) Maxim. in appearance but are easily recognizable by the absence of creeping rhizomes.

3. **Anthoxanthum sumatranum** Jansen, *sp. nov.*

Perenne; culmi 30—40 cm alti, firmuli, stricti, infra medium 2—3-nodi, glabri, laeves, inferne foliati; foliorum vaginae striatae, laeves,

glabrae vel pilis minutis retrorsis puberulae, 5—15 cm longae; ligula glabra, truncata, 0,5—1,5 mm longa, minutissime ciliolata; laminae rigidae, erectae, convolutae, strictae, laeves, striatae, 7—15 cm longae, 1—2 mm diametro, explicatae 2—4 mm latae, supra valide elevato-costulatae et puberulae, apice sensim angustatae; panicula spiciformi-angustata, 5—10 cm longa, contracta, 1 cm lata, vix interrupta, ramis adpressis geminis, 1—3 cm longis, glabris; pedicellis brevissimis, pilis albis 0,5 mm longis sparsim pilosis; spiculae 5—5,5 mm longae, oblongae, stramineo-brunnescentes, lucidulae; gluma prima ovata, acuta, uninervis, glabra, 3—3,5 mm longa, hyalina, laevis; secunda oblonga, 5—5,5 mm longa, trinervis, laevis, glabra, hyalina, breviter cuspidata, apice subrotundato interdum erosulo; flosculi steriles epaleati neutri; lemmata anguste oblonga, obtusa, pilis fulvis obsita, 4—5 mm longa, bifida, inferius sub apice breviter recte aristatum, superius infra medium longe aristatum; arista in medio leviter geniculata, spicula sesquilongior; flosculus fertilis circa 2,5 mm longus, lucidus, glaber, muticus; lemma obtusum trinerve, palea aequilongum; stamina 2, antherae 3 mm longae; styli subexserti, 3 mm longi, quam stigmata angusta aequilongi.

DISTRIBUTION.—Endemic in North Sumatra: Atjeh, Mt. Leusir (Losir), Van Steenis 8479, 8675; and Mt. Kemiri, Van Steenis 9588 (*type;* Herb. Lugd. Bat.).

This species differs from the in Malaysia more common *A. luzoniense* Merr. in the narrow, rigid, involute blades, mainly at the base of the culms and in the remarkably short truncate ligule, 0.5—1.5 mm long. The short spike-like panicle is only 1 cm wide, with short, appressed branches. The awn of the upper sterile lemma is 8—9 mm long and slightly geniculate about the middle.

4. **Anthoxanthum papuanum** Jansen, *sp. nov.*—**Fig. 1.**

Perenne, caespitosum; culmi erecti, 20—30 cm alti, teretes, glabri; vaginae longiores quam internodia, striatae, glabrae vel leviter ciliatae parte superiore marginum, vaginae inferiores modice laxae patentesque; ligula obtusa, 2,5 mm longa, dorso minute pubescens; laminae lineares, planae vel innovationum laxe conduplicatae, subobtusae leviterque emarginatae, 10—12 cm longae, 2—3 mm latae, glabrae vel inferiores superne sparse pilosae; panicula breviter exserta vel basi vagina superiore inclusa, 5—7 cm longa, modice laxa, axe angulato glabra, rami inferiores 4—5 cm longi, oblique patentes, rami superiores breviores et magis adpressi, a basi apicem versus laxe spiculati; pedicelli 2—3 mm longi, imprimis apicem versus pilosi; spiculae virides, 6—7 mm longae, glumae modice latae et spiculam includentes, pellucido-chartaceae, laeves et glabrae; gluma prima uninervis, 4,5 mm longa, ovata, gradatim in apicem acutam angustata; gluma secunda spiculam aequans, subtrinervis, abrupte acuminata; lemmata sterilia circa 5 mm longa, dense ferrugineo-pilosa tamen apice pellucida; lemma sterile primum bifidum supra medium aristam rectam gerens, arista paulo longior quam lemma haud tamen exserta; lemma sterile secundum subaequale, infra medium aristatum; arista

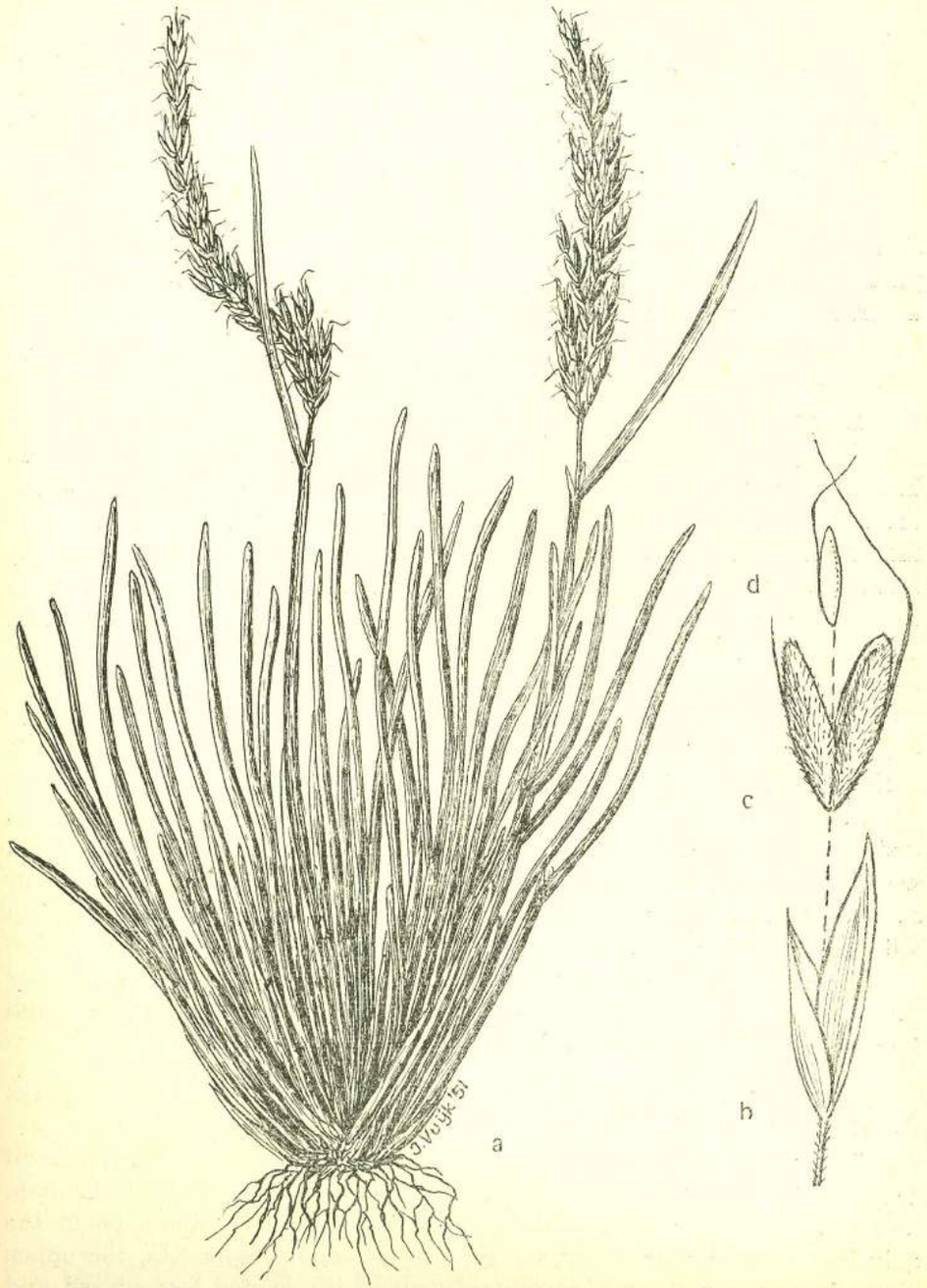

FIG. 1. *Anthoxanthum papuanum* Jansen: *a*, habit; *b*, glumes; *c*, sterile lemmas; *d*, fertile lemma.

geniculata, columna brunnea et leviter torta, 8—10 mm longa et e spicula exserta; lemma fertile 3 mm longum, brunneum, laeve et arista perfecta munitum in medio emergente, circa 5 mm longa, columna atra et dense contorta; palea angusta, indurata, lemmate incluso; antheras non vidi.

DISTRIBUTION.—Only known from New Guinea, Mt. Victoria, *anno* 1889, MacGregor *s. n.* (*type;* Melbourne Herb.).

A mountain grass (altitude not known), differing from the related *A. luzoniense* Merr. by the small stature, the erect innovations, the loose panicle, the long, hairy pedicels, and especially by the fertile lemma with a perfect, geniculate and twisted awn from the middle.

ARISTIDA L.

1. ARISTIDA ADSCENSIONIS L., Sp. Pl. 52. 1753.

Ridley (Fl. Mal. Pen. 5: 242. 1925) mentions this species from Setul. The specimens I saw in the Singapore and Kew Herbaria (Ridley 14856) are not *A. adscensionis* L. but the Indian species *A. setacea* Retz., a perennial robust plant, with the glumes 17 and 20 mm long, both distinctly awned (the awns 4—5 mm long), the central awn of the lemma up to 30 mm long. The latter species is more related to the Australian *A. personata* Henr., but clearly characterised by the dense panicle and the large, long-awned glumes.

The specimens from New Guinea (Wasi Kussa, *anno* 1890, MacGregor 36) called *A. adscensionis* L. in the Melbourne Herbarium represent *A. macroclada* Henr. (Crit. Rev. Aristida *in* Meded. Rijks Herb. Leiden No. 54A: 325. 1926; Monogr. Aristida *in ibid.* No. 58: 189. 1929), a species distributed in North Australia. The column of the lemma is 6 mm long, weakly twisted, bearing three subequal awns, 16—19 mm long, erect or somewhat spreading, not curved, and the upper glume 10 mm long, bifid with an awn in the sinus 1 mm long.

True *A. adscensionis* is in Malaysia only known from the Lesser Sunda Islands: Timor, Walsh 69; Sawu, *anno* 1924, Proppe *s. n.;* and Sumba, Monod de Froideville 1245, 1344, 1479, 2000, 2018.

2. ARISTIDA MERAUKENSIS Henr., Crit. Rev. Aristida *in* Meded. Rijks Herb. Leiden No. 54C: 725. 1933.

This species was described after specimens collected by Jaheri, April 1901, at Merauke, South New Guinea. Chase recorded it from Mabaduan, South-east New Guinea (Brass 6530, 6576). Brass' specimen 6530, the only one I saw, differs from the type in its smaller spikelets, the upper glume longer awned, and the central awn of the lemma less curved and about 20 mm long.

3. ARISTIDA POLYCLADOS Domin *in* Bibl. bot. Hft. 85: 358. 1915.

This species grows in Malaysia only on Sumba (Iboet 1, near Papti; 143, near Kendara; Monod de Froideville 1388, near Waingapoe; 2054, at Melolo). The specimens from Melolo are apparently very short-lived plants, growing together in groups in the coastal plain, becoming not higher than 30 cm with a short, few-flowered panicle, and the glumes and awns slightly shorter than in typical specimens.

ARTHRAXON P. B.

ARTHRAXON QUARTINIANUS (Rich.) Nash *in* N. Amer. Fl. 17: 99. 1912.

Alectoridia quartiniana Rich., Tent. Fl. Abyss. 2: 447 *t. 99.* 1851.

Arthraxon ciliaris P.B. subsp. *quartinianus* (Rich.) Hack., Androp. *in* DC., Monogr. Phan. 6: 356. 1889.

Arthraxon hispidus Merr. f. *quartinianus* (Rich.) Backer, Handb. Fl. Java Pt. 2: 75. 1928 (*"hispida"*).

This species has the inflorescence usually exserted with 3—10 racemes, up to 6 cm long.

DISTRIBUTION.—In Malaysia it is known from Sumatra, Java, Celebes, and the Philippines.

Var. **monostachyus** Jansen, *var. nov.*

A typo differt culmis brevissimis mollissimisque, laminis brevibus, anguste lanceolatis, panicula ad racemum unicum 2—3 cm longum reducta.

DISTRIBUTION.—A high mountain plant, on rocks between 2000—2400 m altitude on Lombok, Elbert 1194 (*type;* Herb. Lugd. Bat.), 1230, 1720.

ARUNDINELLA Raddi

1. ARUNDINELLA HOLCOIDES (Kunth) Trin. *in* Bull. Sc. Acad. Pétersb. 1: 71. 1836.

Brandtia holcoides Kunth, Rév. Gram. 2: 511 *pl. 170.* 1829; Enum. Pl. 1: 311. 1833.

Arundinella agrostoides Trin., Sp. Gram. Ic. 3: *pl. 265.* 1836; Miq., Fl. Ind. bat. 3: 520. 1857; Hook. f., Fl. Br. Ind. 7: 71. 1897; Merr., Enum. Philip. fl. Pl. 1: 52. 1923.

The type specimen in the Kew Herbarium has the panicle somewhat contracted, the branches fascicled, suberect, the spikelets glabrous and 2.5 mm long.

Var. **ciliata** (Roxb.) Jansen, *comb. nov.*

Holcus ciliatus Roxb., Fl. ind. 1: 318. 1820.

Arundinella ciliata Nees *ex* Miq., Analec. bot. ind. 2: 18. 1851.

The specimens from the Philippines have larger spikelets and the glumes bulbous-hairy (Loher 12710, B.S. 44647, Clemens 16244, 17337).

Clemens 51902 represents smaller plants with long spikelets, the panicle-axis, branches, pedicels, and glumes bulbous-hairy to hirsute.

2. **Arundinella humilior** (Hack.) Jansen, *comb. nov.*

Arundinella hispida (H.B.K.) O.K. subsp. *humilior* Hack. *in* Allg. bot. Z. 12: 179. 1906.

Arundinella miliacea f. *minor* Nees *in* Hook. J. Bot. 2: 102. 1850, nom. nud.
Arundinella montalbanica Elmer *in* Leafl. Philip. Bot. 10: 3807. 1939, nom. nud.

In the Leiden Herbarium I saw a type-duplicate (Cuming 667) of *Arundinella miliacea* f. *minor* Nees. The epithet 'miliacea' was not new but had been used before by Link for his *Acratherum miliaceum* Link (*in* Hort. berol. 1: 230. 1821). Nees made the new combination *A. miliacea* without mentioning Link's name or specimen and he gave no description. He only cited Cuming's number 667 for his forma *minor*.

Hackel (*in* Bull. Herb. Boissier II 4: 527. 1904) mentioned *Acratherum miliaceum* Link as a synonym of *Arundinella hispida* (H.B.K.) Hack., based on *Ischaemum hispidum* H.B.K. (Nov. Gen. Sp. 1: 194. 1815). This combination having already been effected by O. Kuntze (Rev. Gen. Pl. 1: 761. 1891), Hackel (*in* Allg. bot. Z. 12: 179. 1906) accepted the name *Arundinella hispida* (H.B.K.) O.K. He recorded as further synonyms: *Arundinella brasiliensis* Raddi (Agrost. bras. 37 *pl. 1.* 1823) and *Arundinella nepalensis* Trin. (Gram. panic. 62. 1821), by this uniting the forms of tropical America and Asia. This had already been done under the name *Arundinella brasiliensis* Raddi by Hooker f. (Fl. Br. Ind. 7: 73. 1897). In a memorandum Stapf wrote:

> I was never quite happy about that species nor was Sir Hooker. It gave us a great deal of trouble and Sir Hooker in the end stretched the conception of the species very much, in order to escape the necessity of making a number of species minutae, which we could not always have distinguished, working as we did in the herbarium. If this polymorphic *A. brasiliensis* of the Fl. Br. Ind. is broken up into several species, the name *A. brasiliensis* could not any longer be applied to one of the Indian forms and *A. nepalensis* Trin. should as far as I can make out have to stand for it.

Recent British agrostologists followed Stapf, but they met with the same difficulties; compare Bor (*in* Flora of Assam 5: 183. 1940), who writes: "*A. nepalensis* is a perennial grass and so variable, that it is almost impossible to give characters by which it may be known."

The Malaysian specimens in question do neither resemble the reed-like *A. nepalensis* from India, nor the American *A. hispida* with its large spikelets and scabrous to hispid glumes. They are small plants, 20—40 cm

tall, perennial with numerous innovation shoots, the blades setaceously involute and often glaucous, the nodes, at least the lower ones, hairy, the short panicle somewhat contracted, the greenish to yellowish spikelets often in pairs and less than 4 mm long, the nerves of the glumes smooth or minutely scabridulous. They make the impression of a separate species and in my opinion should be called *A. humilior* (Hack.) Jansen. This new combination is based on Hackel's name *A. hispida* f. *humilior*, given to plants from Formosa. Having seen better specimens from the Philippines Hackel later raised its rank from forma *humilior* to that of subspecies *humilior* (*l.c.*, 1907). Merrill (Enum. Philip. fl. Pl. 1: 52. 1923) followed him, including *A. miliacea* f. *minor* Nees (Cuming 667) and giving *A. filiformis* Janowski as a synonym. In my opinion Janowski's short description (*in* Fedde, Repert. 17: 85. 1921) relates certainly to another species, which is an annual grass with the lower glume 5-nerved and with a subcylindrical or fusiform panicle. I could not study the type (Loher 7228) but Loher 7176 and 1874 are perennial plants with a 3-nerved lower glume, quite agreeing with Cuming 667, Elmer 17433 (*A. montalbanica*), and Kneucker's Gram. exsic. 606. Like numerous other specimens from the Philippines (Santos 557, B.S. 1928, 2262, 30966, 35453, 46465, 46841, Clemens 16550, etc.) they belong to *A. humilior*. Besides in Formosa and the Philippines, this species is also found in Sumba (Iboet 423).

3. ARUNDINELLA FUSCATA Nees *apud* Buse *in* Miq., Pl. Jungh. 359. 1854; Miq., Fl. Ind. bat. 3: 519. 1857.

Arundinella nepalensis (*non* Trin.) *sensu* Backer, Handb. Fl. Java Afl. 2: 115. 1928.

Var. **celebica** Jansen, *var. nov.*

Glumae pilis patulis basi tuberculatis vestitae.

DISTRIBUTION.—Only seen from South-West Celebes, Bünnemeijer 11718 (*type;* Herb. Bogor.) ; and Java, Sindanglaja, O. Kuntze 4805 (Herb. New York Bot. Gard.).

This species has usually glabrous glumes, the first one ovate-oblong, 3.5—4 mm long, acute, 5-nerved, scabrous on the midnerve, the second one longer than the first, 5-nerved, scabrous on the upper half of the midrib. In variety *celebica* both glumes are clothed with spreading, long, whitish, tubercle-based hairs.

4. ARUNDINELLA LATIFOLIA (Ridl.) Ohwi, in sched. Herb. Bogor., nom. provis.

Trisetum latifolium Ridl. *in* Trans. Linn. Soc., Bot. 9: 250. 1916.

Ridley (*l.c.*) described *Trisetum latifolium* from New Guinea: Arfak Mountains, Gibbs 5900. In the Kew Herbarium I saw the type as well as another specimen from Mount Carstensz, Kloss *s.n.* Both are only fragments and certainly do not belong to *Trisetum* but to *Arundinella*. They are nearly related to *A. nepalensis* Trin. and probably identical with one of the forms of that very variable species. I did not see Kanehira & Hatusima 13506, recorded as *A. nepalensis* Trin. var. *contracta* Ohwi (*in* Bot. Mag., Tokyo **56**: 4. 1942). It belongs probably also to *A. latifolia* (Ridl.) Ohwi.

It seems better not to give a description of this doubtful species until more material is available.

5. ARUNDINELLA PUBESCENS Merr. & Hack. *ex* Hack. *in* Philip. J. Sci. 2: 419. 1907; Merr., Enum. Philip. fl. Pl. 1: 52. 1923; Ohwi *in* Acta phytotax. geobot. **10**: 272. 1941.

This species is based on a specimen from the Philippines (Palawan, B.S. 856). I did not see the type; all other specimens I saw in different herbaria under that name represented *A. humilior* (Hack.) Jansen. Ohwi cites *A. caespitosa* Janowski as a synonym. I do not agree with him. Janowski (*in* Fedde, Repert. **17**: 85. 1921) describes the blades: "laminae planae vel saepius filiformi-involutae, anguste lanceolatae, glabrae." But Merrill and Hackel say: "folia undique hirsuta, pilis patulis basi plerumque tuberculatis vestiti; laminae e basi rotundata lineari-lanceolatae, acutae, 4—7 mm latae, nervis crassiusculis parum prominulis percursae." Besides, Merrill & Hackel describe the first glume as 5-nerved, Janowski as 3-nerved. The type of *A. pubescens* being destroyed during the war, a decision must wait till additional specimens from Palawan are available.

6. ARUNDINELLA SETOSA Trin., Diss. 2: 63. 1824; Gram. panic. 245. 1826; Backer, Handb. Fl. Java Afl. 2: 114. 1928.

Arundinella stricta Nees *in* Kew Bull. 2: 102. 1850; Miq., Fl. Ind. bat. **3**: 520. 1857.

Arundinella tricuspidata Buse *in* Miq., Pl. Jungh. 360. 1854; Miq., Fl. Ind. bat. **3**: 519. 1857.

Arundinella zollingeri Steud. *in* Zoll., Verz. Hft. 1: 59. 1854, nom. nud.; Syn. Pl. Glum. **1**: 115. 1854; Miq., Fl. Ind. bat. **3**: 519. 1857.

This species, very variable in habit, is easily recognised by the upper lemma with the lateral nerves ending into 2—3 mm long bristles and the midnerve into a 6—9 mm long awn, kneed in the middle, with a brown, twisted column.

Var. **lasiostoma** (K. Schum.) Jansen, *comb. nov.*

Arundinella lasiostoma K. Schum. *ex* K. Schum. & Lauterb., Fl. deut. Schutzgeb. 174. 1901; ibid., Nachtr. 56. 1905.

I have studied some specimens of the type collection (Schlechter 18422) from New Guinea. The only difference I can find is the quite glabrous upper lemma (setulose at base in typical *A. setosa*). The tall culms, the wide blades hairy behind the ligule and at the base, the lower sheaths sometimes tubercle-based hairy, are inessential differences taking into consideration the variability of *A. setosa*.

DISTRIBUTION.—Only known from New Guinea, Schlechter 18422, Clemens 10459, 40656, D. Fryar 3671.

Var. **culionensis** Jansen, *var. nov.*

Panicula 30 cm longa vel longior, ramis solitariis distantibus, laevibus, oblique patentibus, ad 15 cm longis, paucas spiculas distantes paulo longiores gerentibus.

DISTRIBUTION.—Culion I. (Philippines), Bartlett 15532 (*type;* Herb. Univ. Michigan).

This variety has been recorded from the Philippines as *Arundinella mutica* Nees ex Steud. (Syn. Pl. Glum. **1**: 116. 1854).

The culm is about 150 cm high, the whole plant glabrous except for the margins of the sheaths and the upper surfaces of the blades behind the ligule. The panicle is up to 30 cm long with solitary, distant branches, agreeing in form with that of *A. mutica*, the rhachis more slender and less angled than in typical *A. setosa*. But it cannot be *A. mutica* as the tuberous base of the culm is quite glabrous and not woolly hairy as in the latter species; the panicle branches are quite smooth and not scabridulous as in *A. mutica*.

It seems better to consider it a variety of *A. setosa*.

BRACHIARIA Griseb.

1. Reeder (*in* J. Arn. Arb. **29**: 274. 1948) discusses *Brachiaria villosa* (Lam.) A. Camus, based on *Panicum villosum* Lam. (Tabl. encycl. **1**: 173. 1791). In his opinion Miss Camus has misapplied that name and it should be replaced by *Brachiaria coccosperma* (Steud.) Stapf ex Backer (Handb. Fl. Java Afl. 2: 147. 1928). According to Reeder the true *Panicum villosum* Lam. should have more obtuse glumes, mucronate lemmas, and the tip of the upper lemma clothed with white hairs on the margin near the apex. By courtesy of Miss A. Camus I could study a fragment of Lamarck's type. She nor I can find any difference with the Malaysian specimens and we

fail to see the white hairs on the tip of the fertile lemma. In our opinion *Panicum coccospermum* Steud. is a synonym of *Panicum villosum* Lam. and the correct name for the Malaysian plants is *Brachiaria villosa* (Lam.) A. Camus (*in* Lec., Fl. gén. Indo-Ch. 7: 433. 1922).

2. BRACHIARIA FUSIFORMIS Reeder *in* J. Arn. Arb. 29: 274 *pl. 1.* 1948.

This is a good species, differing from *B. villosa* in the longer, fusiform, and non-gibbous spikelets with very acute glumes, and in the more erect habit and the narrower blades. Described from New Guinea (Brass 3639, type), it was also collected on Timor (Bloembergen 3757a) and in the Philippines. The typical form has pilose spikelets, the hairs becoming longer towards the apex.

In many of the Philippine specimens the spikelets are much more hairy, the hairs forming an acute pencil-shaped crown at the top of the spikelet. Ohwi (*in* Bull. Tokyo Sci. Mus. No. 18: 5. 1947) describes the latter as *B. villosa* var. *pilicoronata* Ohwi. They do not belong to *B. villosa* but to *B. fusiformis* and should be named:

Brachiaria fusiformis var. **pilicoronata** (Ohwi) Jansen, *comb. nov.*

Top of the spikelets crowned by penicillate, long, white hairs.

DISTRIBUTION.—Philippines, B.S. 4281, 8214, 11606 (*type*; Herb. Bogor.), 41339, 44646; Aru Is., P. Trangan, Buwalda 5493.

This variety has also been confused with *Brachiaria argentea* (R. Br.) Hughes (*in* Kew Bull. 1923: 314). In the Kew Herbarium I compared the Malaysian specimens with the Australian type of *Panicum argenteum* R. Br. (no. 6095). They are quite different; the latter species has the spikelets much longer-pedicelled, the glumes less acute and much shorter, and the top of the spikelets hidden by an abruptly obtuse, silky fringe of spreading hairs.

Brachiaria holosericea (R. Br.) Hughes (*op. cit.* p. 315), in Malaysia only known from New Guinea (Brass 5910, 7810), has a similar obtuse fringe of spreading, silky hairs, but is easily distinguished by the awned lower lemma, the awn equalling and often exceeding the apical hairs.

3. BRACHIARIA PILIGERA (F. Muell.) Hughes var. INTERCEDENS (Domin) Hughes *in* Kew Bull. 1923: 315.

A large perennial, the culms decumbent at base, up to 1 m high. Panicle with 3—5 erect or at length spreading racemes, 4—5 cm long, the rhachis more or less flat and ribbon-like, about 1 mm wide. Spikelets ovoid, 5 mm long, alternate along the rhachis and rather distant, pubescent or with a small tuft of hairs at the apex.

This variety of an Australian species was once found in Celebes (Talaud Islands) and once in New Guinea (Papua). Both specimens have completely glabrous sheaths and blades (which are long hairy in typical *Brachiaria piligera*). They quite agree with the type of *Panicum intercedens* Domin (*in* J. Linn. Soc., Bot. 41: 271. 1912) which I saw in the Kew Herbarium.

Reeder (*in* J. Arn. Arb. 29: 273. 1940) considers *B. piligera* to be a variety of *Brachiaria subquadripara* (Trin.) Hitchc. I do not agree with him; both species are very much different, in habit as well as in the length and indument of the spikelets and the arrangement of the latter along the rhachis of the racemes.

4. BRACHIARIA LANCEATA Ohwi *in* Bull. Tokyo Sci. Mus. No. 18: 4. 1947.

This species is characterized by a triangular rhachis, the spikelets in pairs, unequally pedicelled, the pedicels 2 and 4 mm long, the blades broadly lanceolate with a cordate base. The type in the Bogor Herbarium (Tambajangan, Kangean Islands, Backer 27829) as well as the other specimens I saw from Java (Beumée 2221, Koorders 42437,[1] 42461, 42487) have glabrous spikelets, but a specimen from Timor (Walsh 37) has shortly puberulent spikelets. Ohwi (*l.c.*) described this as a new species: *Brachiaria timorensis* Ohwi.

I have compared the types of both, preserved in the Bogor Herbarium. The only difference I could see with *B. lanceata* are the not glabrous but very shortly puberulent spikelets. The other distinctions mentioned by Ohwi have little value. As the indument of the spikelets in the genus *Brachiaria* is always more or less variable, I consider *B. timorensis* only an unimportant variety: **Brachiaria lanceata** var. **timorensis** (Ohwi) Jansen, *comb. nov.*

The type specimen of this variety (Walsh 37) is in itself an example of the variability of the indument. Most of the sheaths are glabrous or subglabrous, but one branch of the same specimen has the sheaths sparsely clothed with spreading, 2—2.5 mm long hairs.

DISTRIBUTION of the variety.—Wetar, Bloembergen 3670a; Halmaheira, de Haan 621; Timor, Walsh 37 (*type;* Herb. Bogor.), Monod de Froideville 1107, 1448.

5. BRACHIARIA TANIMBARENSIS Ohwi *in* Bull. Tokyo Sci. Mus. No. 18: 5. 1947.

This species, only known from the Tanimbar Islands (Moluccas), based on Buwalda 4050, is related to *Brachiaria subquadripara* (Trin.)

[1] All Koorders's specimens are cited by their numbers without the addition of "*β*," as found on the labels.

Hitchc., both species having the first glume two fifths as long as the spikelets, quite glabrous, and very clasping. But in *B. tanimbarensis* this glume is 5—7-nerved and the second glume and lower lemma are long and densely pubescent to hirsute. The spikelets are about 3 mm long, solitary and subsessile. From *B. piligera* it differs in the much shorter, gibbous spikelets and the erect, adpressed, densely spikeled racemes.

6. BRACHIARIA REPTANS (L.) C. A. Gardn. & C. E. Hubb. *in* Hook. Ic. Pl. 34: *pl. 3363*. 1938.

This common weed is rather variable in habit. I saw an extreme form from the Philippines (Mt. Arayat, Pampanga, leg. Santos, June 1940). The specimens of this form have long and rather robust culms, broadly ovate blades clasping at base, the lower part of the margins with long, stiff, tubercle-based hairs, a copious panicle, and the pedicels with long, white hairs. They make the impression of a separate species, resembling *Brachiaria occidentalis* C. A. Gardn. & C. E. Hubb. (*l.c.*), but the latter species has much larger spikelets, 3—4 mm long (whereas the Philippine specimens have the spikelets about 2 mm long). Perhaps they merit a varietal name but I saw intermediate specimens uniting them with the typical form.

7. BRACHIARIA HOLOTRICHA Ohwi *in* Bull. Tokyo Sci. Mus. No. 18: 4. 1947.

This species is related to *Brachiaria ramosa* (L.) Stapf but the whole plant is grey-villous (not pale green and more or less glabrous), the blades are narrowly and loosely plicate, the spikelets more acute, pubescent and not puberulent, and the upper lemma is distinctly rugose. Besides the type from Java (Banjuwangi, Beguin 134, Herb. Bogor.), I saw a specimen from the Malay Peninsula (Pulu Penang, in Singapore Herb.).

8. BRACHIARIA SUBQUADRIPARA (Trin.) Hitchc.

In Koorders (ExkFl. Java), Merrill (Bibl. Enum. Born. Pl.; Enum. Philip. fl. Pl.), Backer (Handb. Fl. Java), and in numerous papers, *Panicum distachyum* L. (Mant. 1: 138. 1767) is recorded from Malaysia. The Indian type was received from Koenig and is preserved in the Herbarium of the Linnean Society. Besides this specimen I saw duplicate-types in the Herbarium at Leiden (Collection D. van Royen). In modern literature the species has been transferred to the genus *Brachiaria* under the name *B. distachya* (L.) Stapf (*in* Prain, Fl. trop. Afr. 9: 565. 1919).

Among the hundreds of specimens called *P. distachyum* from Malaysia, I found only a few representing genuine *B. distachya:* Malacca

(Hervey), Port Swettenham (Burkill 12840), and West Java, coastal plain near Palabuan Ratu (De Wit 4195). The other specimens represent *B. subquadripara* (Trin.) Hitchc. Hitchcock (*in* Lingnan Sci. J. 7: 21. 1928) based that name on *Panicum subquadriparum* Trin. (Gram. panic. 145. 1826; Sp. Gram. Ic. 2: *pl. 186*. 1829), accepting *B. distachya* and *B. subquadripara* as two different species. They can be opposed as follows:

B. distachya	*B. subquadripara*
Racemes mostly 2, the peduncle pilose near the summit.	Racemes more numerous on a glabrous peduncle.
Spikelets 2.5—2.8 mm long, broadest above the middle, apiculate at the apex.	Spikelets 3.5—4 mm long, broadest at the middle, narrowed upwards but not apiculate.
First glume 1 mm long.	First glume 2 mm long.
Upper lemma 2 mm long.	Upper lemma 2.6 mm long.
Dry habitats.	Damp grassfields and light shaded soil.
Figure in Henrard, Monogr. Digitaria on p. 191. 1950.	Figure in Henrard, Monogr. Digitaria on p. 192. 1950.

There is still a third name that presents nomenclatural difficulties. In 1830 Presl (Rel. Haenk. 1: 300) described a *Panicum miliiforme* Presl from Luzon (Philippines). An illustration of Presl's type in the Bernhardi Herbarium was published by Scribner (*in* Rep. Missouri bot. Gdn 10: 47. 1899). It shows a spikelet closely agreeing with Henrard's figure (Mon. Digitaria 192. 1950) by its narrow elliptic shape, widest at the middle and with an acute apex, the first glume about two fifths as long as the sterile lemma.

In 1921 Chase (*in* Contr. U. S. nat. Herb. 22: 35) made the combination *Brachiaria miliiformis*, citing a list of exsiccatae, representing that species in the United States National Herbarium. Most of these exsiccatae I could study. They belong to *B. subquadripara* (Trin.) Hitchc., a combination made by Hitchcock in 1928 (see above), who cited *P. miliiforme* Presl as a synonym. From this moment the American authors followed Hitchcock, e.g. Chase (*in* J. Arn. Arb. 20: 308. 1939) and Reeder (*in* J. Arn. Arb. 29: 273. 1948) in accepting *B. miliiformis* as a synonym of *B. subquadripara*.

Modern British authors do not agree with this American opinion. C. E. C. Fischer (*in* Gamble, Fl. Madras 10: 1768. 1934) tries to separate *B. miliiformis* from *B. distachya* by the longer blades and the acute apex of the spikelets. These characters are not always correlated and such specimens do not even deserve the varietal name, bestowed by the Japanese authors, *P. distachyum* L. var. *pseudo-distachyum* (Hayata) Honda (*in* Bot. Mag., Tokyo 37: 25. 1925) or *B. distachya* (L.) A. Camus var. *pseudo-*

distachya (Hayata) Ohwi (in sched. Herb. Bogor.), as these plants certainly do not belong to *B. distachya* but to *B. subquadripara*.

Bor (*in* Fl. Assam 5: 272. 1940) differentiates the three species as follows:

Spikelets 2.5—2.8 mm long, obovoid-ovoid, gradually narrowed below, greatest width distinctly above the middle, rather abruptly acuminate-apiculate. Lower glume 1 mm long. Racemes usually 2, subconjugate. . . . . *B. distachya*

Spikelets 3.5—4 mm long, lanceolate-oblong, greatest width just at the middle, not abruptly acuminate nor apiculate, acute only. Lower glume 2 mm long. Racemes 3—4 or more, never conjugate. . . . . *B. subquadripara*

Spikelets 3.5—4 mm long, obovoid, elliptic-obovoid, plump with a short-acute or apiculate or somewhat obtuse apex (the fertile flower blowing up the tip and filling it up). Racemes 4—6. . . . . *B. miliiformis*

S. T. Blake (*in* Proc. roy. Soc. Queensl. 59: 159. 1948) compares *B. subquadripara* with *B. miliiformis* and states that the latter has plumper, more obovoid, short-acute to obtuse or apiculate spikelets, which are rather distinctly different from the more or less narrowly elliptic, sharply acute or acuminate spikelets of *B. subquadripara*. "Presl's species came from the Philippine Islands and the Australian plants agree with all the material seen from that region."

I do not agree with him. I studied numerous Philippine specimens, among them most of the specimens cited by Chase (*l.c.*) in 1921. I cannot see much difference with the cited figures of Scribner and Henrard (*op. cit.* p. 192). I did not come across plants with the plump, obovoid spikelets as described by Bor. Only in some specimens with long, loosely spikeled racemes the spikelets have a more or less obovate outline, but they are young and the plants seem to have grown in the shade. I do not doubt that there are plants as described by Bor. I saw some Indian specimens in the Kew Herbarium agreeing with Bor's description: the fertile flower blowing up the tip of the spikelets and filling it up. But do they represent *Panicum miliiforme* of Presl?

Presl gives the following description of the spikelet:

Locustae fere sesquialteram lineam longae, flavescentes. Gluma inferior 9-nervia, nervis extimis minimis; superior lanceolata, 7-nervia, acuta. Palea flosculi neutrius inferior lanceolata acuta, 5-nervis; superior aequilonga membranacea, binervia acutissima. Palea flosculi hermaphroditi flosculo neutro paulo brevior lanceolata, obsolete 3-nervia, transversum seriatum elevato-punctata, acuta; superior paulo brevior eodem modo tuberculata.—Presl (Rel. Haenk. 1: 300-301).

This description agrees with the figures of Scribner and Henrard, but does neither tell anything about the characteristic obovate outline of the spikelet nor about the apiculate tip.

Bor's "*B. miliiformis*" seems to be a separate Indian species, not identical with Presl's *Panicum miliiforme*, and should have another name.

Brachiaria subquadripara is more or less variable. Usually the spikelets are quite glabrous, rarely the second glume and sterile lemma are pubescent. The specimens showing the latter character I propose to call:

Var. **pubescens** Jansen, *var. nov.*

Differt a typo gluma secunda et lemmate sterili pubescentibus, vaginis et laminis foliorum magis pubescentibus.

DISTRIBUTION.—Buru, Namlea, A. H. Jansen 19 (*type;* Herb. Lugd. Bat.); New Guinea, Hisiu, Carr 11398.

Reeder (*in* J. Arn. Arb. 29: 273. 1948) mentions Carr's specimen as *B. quadripara* var. *piligera* (F. Muell.) Reeder, a name based on *Panicum piligerum* F. Muell. This is a misidentification, as *P. piligerum* [= *Brachiaria piligera* (F. Muell.) Hughes] certainly is a different species.

Another remarkable very hirsute specimen I saw from Sumatra. I propose for it the name:

Var. **hirsuta** Jansen, *var. nov.*

Differt a typo vaginis laminisque foliorum, rhachi et pedicellis hirsutis, pilis sparsis basi tuberculatis ad 2 mm longis.

DISTRIBUTION.—Sumatra, Bandarbaru, Lörzing 6153 (*type;* Herb. Lugd. Bat.).

The axils of the racemes usually are quite glabrous, but more rarely they are more or less pilose. An extreme form with densely pilose axils is Buwalda 2725 from Banten (Java).

BRACHYPODIUM P. B.

BRACHYPODIUM SYLVATICUM (Huds.) Beauv., Agrost. 155. 1812.

Var. LUZONIENSE (Hack.) Hara *in* Bot. Mag., Tokyo 52: 227. 1938.

Brachypodium sylvaticum subsp. *luzoniense* Hack. *in* Philip. J. Sci. 1 (Suppl.): 269. 1906.

The whole plant, including the spikelets is quite glabrous, only by exception the nodes are slightly hairy and the upper surface of the blades is sprinkled with short hairs; blades flat or loosely convolute when dry.

DISTRIBUTION.—Sumatra, Java, Lesser Sunda Is., Celebes, Philippines, Moluccas, and New Guinea.

A mountain plant from open slopes and mossy forests at 1600—2800 m altitude.

Var. **involutum** (Buse) Jansen, *comb. nov.*

Brachypodium involutum Buse *in* Miq., Pl. Jungh. 342. 1854.
Triticum involutum (Buse) Miq., Fl. Ind. bat. 3: 402. 1857.

Culms creeping at the base and rooting at the nodes; blades strongly setaceously involute; whole plant quite glabrous.

DISTRIBUTION.—Java: Mt. Tjareme (Tjerimai), Junghuhn *s. n.*; Mt. Papandajan, Docters van Leeuwen 13151.

A high-mountain form.

Var. **pubifolium** (Hitchc.) Jansen, *comb. nov.*

Brachypodium pubifolium Hitchc. *in* Brittonia 2: 108. 1936; Reeder *in* J. Arn. Arb. 31: 321. 1950.

Culms, sheaths, and internodes softly pubescent, the nodes adpressedly pubescent; blades flat, softly pubescent at the lower surface and villous at the upper surface.

DISTRIBUTION.—Only known from New Guinea, Brass 4650, 9310, 9827, Clemens 7433; and the Philippines, Santos B.S.31966.

BROMUS L.

1. BROMUS REMOTIFLORUS (Steud.) Ohwi *in* Acta phytotax. geobot. 4: 38. 1933.

Merrill (Enum. Philip. fl. Pl. 1: 92. 1923) recorded *Bromus pauciflorus* (Thunb.) Hack. from Luzon. Hackel (*in* Bull. Herb. Boissier 7: 713. 1889) based that name on *Festuca pauciflora* Thunb. (Fl. japon. 52. 1784), but he overlooked the earlier homonym *Bromus pauciflorus* Schumach. ex Hornem. (Fl. danica 8: *pl. 1383.* 1810) for a Danish specimen, the figure of which represents the well known species *Bromus erectus* Huds. Ohwi (*l.c.*), renamed the Japanese plant *Bromus remotiflorus* and based this combination on *Festuca remotiflorus* Steud. (Syn. Pl. Glum. 1: 315. 1854). Becherer (*in* Candollea 7: 520. 1938) came to the same conclusion.

This species is nearly related to *B. insignis* Buse (*in* Miq., Pl. Jungh. 347. 1854). Comparing the types of both species in the Leiden Herbarium I find the following principal differences:

B. remotiflorus	*B. insignis*
Culms hairy below the panicle.	Culms glabrous below the panicle.
Spikelets about 3 cm long.	Spikelets about 2 cm long.
Glumes very unequal.	Glumes subequal.
Rhachilla-joints scabrous.	Rhachilla-joints distinctly pubescent.

In the Bogor and Leiden Herbaria no Malaysian specimens of *B. remotiflorus* are represented. Of the specimens enumerated by Merrill (*l.c.*) I only saw Merrill 4714 from Luzon (in Herb. Univ. Calif.). This specimen is not a *Bromus* but *Brachypodium sylvaticum* (Huds.) Beauv. Therefore the occurrence of *B. remotiflorus* in Malaysia remains doubtful.

2. BROMUS INSIGNIS Buse.—**Fig. 2a, b.**

This species has long been considered an endemic of Java. Especially Dr. C. A. Backer collected and studied it from many localities. In his "Handboek voor de Flora van Java" (Afl. 2: 252. 1928) he gives an excellent description, laying stress on the variability of many characters, e.g.

Culms 40—175 cm high, glabrous or hairy at the top of the internodes.
Sheaths glabrous to covered with spreading, long hairs.
Ligule 1—3 mm long, truncate or irregularly denticulate.
Blades glabrous or hairy at the lower side or at both sides with long, spreading hairs.
Panicle 12—32 cm long, erect to nodding.
Branches whorled to singular, 5—15 cm long.
Spikelets 6—8-flowered.
Glumes glabrous or with puberulous margins, the first 1- or 3-nerved, the second 3- or 5-nerved.
The pubescent joints of the rhachilla 2—4 mm long.
Lemmas 8—14 mm long, glabrous to short-hairy.
Awn 4—8 mm long, straight or slightly flexuous.

This variability in form, dimensions, and indument is well known in many species of *Bromus* and has given rise to much confusion. When every deviation from the type should be called a new species, the number of *'species minutae'* would be impractically augmented and it would be impossible to separate them in the herbarium. Ohwi (*in* Bull. Tokyo Sci. Mus. No. 18: 11. 1947) describes two such 'species,' viz. *B. sundaicus* Ohwi and *B. ceramicus* Ohwi.

The type of the first consists of a few slender, small plants, with short, few-spikeled panicles, few-flowered spikelets, the joints of the rhachilla up to 4 mm long, whence the florets are rather distant. These specimens were collected by Van Steenis (10936) on a plain grazed by deer, East Java, Ijang Plateau. In my opinion they represent poorly developed forms of *B. insignis*. This species should be reduced to *B. insignis*.

The type of the second species was collected by Eyma (2246) in Ceram. It consists of slender and rather low plants with a few-spikeled, contracted, short panicle. The spikelets are less than 2 cm long, the florets densely placed on account of the short (scarcely 2 mm long) rhachilla-joints. The sheaths and blades are long-hairy. Although these characters fall within the variability of *B. insignis*, together they suggest a very different species. Up till now they are the only specimens collected in

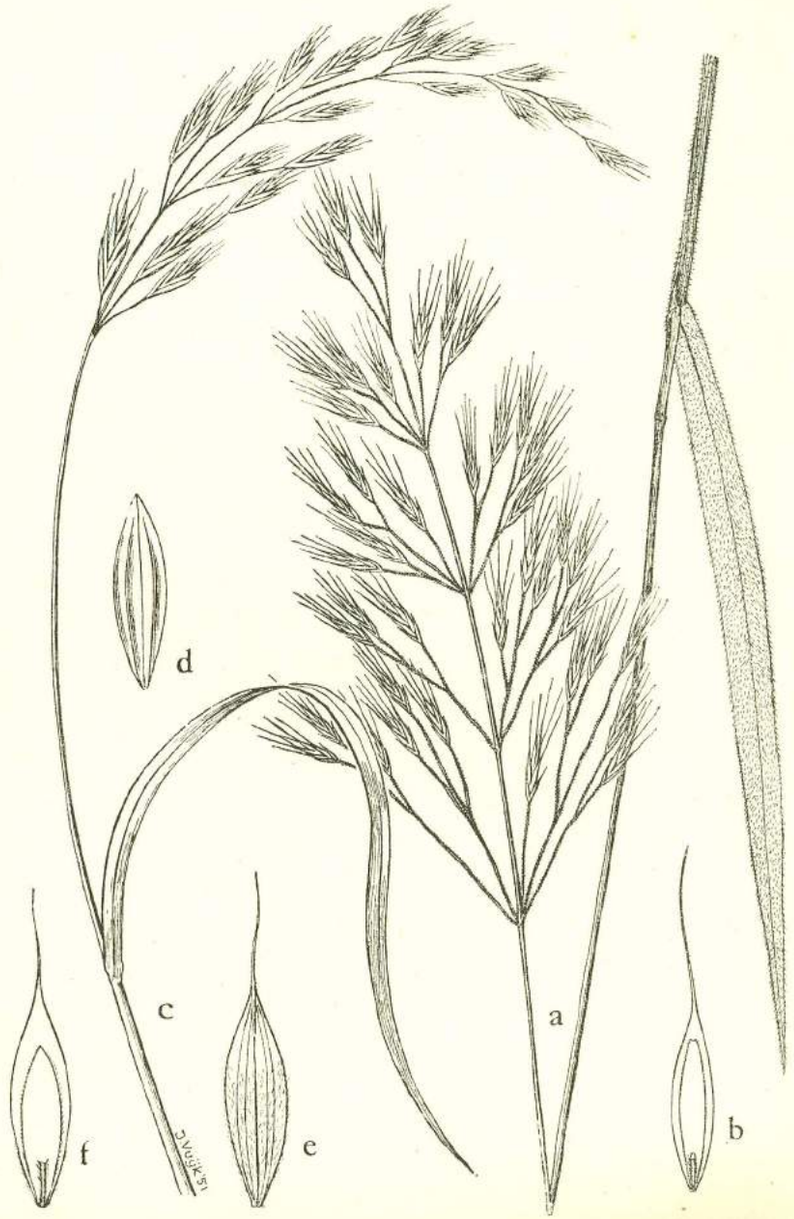

FIG. 2. *Bromus insignis* Buse: *a*, habit; *b*, floret with rhachilla-joint; *Bromus insignis* var. *kinabaluensis* Jansen: *c*, habit: *d*, second glume; *e*, lemma from the outside; *f*, floret with rhachilla-joint.

Ceram. I accept them as **Bromus insignis** var. **ceramicus** (Ohwi) Jansen, *comb. nov.*

A third high-mountain form has been collected by Clemens (29174, 30134, 30134bis) on Mount Kinabalu:

Culms, sheaths, and blades quite glabrous. Panicle narrow, about 15 cm long, few-spikeled. Spikelets purplish, rather large and flat. Glumes broadly ovate, deeply plicate, quite glabrous. Lemmas 12—14 mm long, when young puberulous all over, glabrous when mature, ending into a short, strong, straight awn, about 4 mm long.

The rhachilla-joints being distinctly pubescent these collections belong to the insignis group; they represent at least a distinct variety for which I propose the name:

Var. **kinabaluensis** Jansen, *var. nov.*—**Fig. 2c-f.**

Spiculae 2—3 cm longae, planae et latae; glumae ovatae, alte plicatae maturitate; lemmata omnino leviter puberula; arista circa 4 mm longa.

DISTRIBUTION.—Only known from Borneo, Upper Kinabalu, Clemens 29174 (*type;* Herb. Lugd. Bat.).

A fourth form of this species has been collected in New Guinea, Mount Wilhelmina, Brass & Meijer Drees 9825, and described as *Bromus scopulorum* Chase (*in* J. Arn. Arb. 24: 78. 1943). It is characterised by densely retrorsely pilose lower sheaths; nearly simple but elongate panicles, 12—18 cm long, narrow, lax, nodding; 2—3 cm long spikelets, 5—7-flowered; pubescent rhachilla-joints about 3 mm long; narrow glumes, acuminate; 10—13 mm long lemmas (7-nerved in the English description, 5-nerved in the Latin diagnosis), densely hirsute along the margins and at the very base, the back glabrous, the awn erect, straight, 5—7 mm long.

I did not see the type specimen, only a specimen of the type collection. The latter is in all dimensions much smaller than the description indicates: the narrow raceme-like panicle is only 8 cm long, bearing 4—7 spikelets. The spikelets are much smaller, but they have the pubescent rhachilla-joints about 3 mm long, hence the florets are rather distant; the lemmas much shorter, narrow, 5-nerved, but they have the densely hirsute margins and the glabrous back; the awns short and straight, 4—5 mm long. Taking into consideration the variability of *B. insignis,* I found many of the cited characters back in specimens of *B. insignis* from Java, e.g. the same retrorsely pilose lower sheaths in collections from Pasuruan (Backer 13318, 21589), and the same spikelet construction in collections from Mount Papandajan (Van Steenis 6790, etc.). The only character I did not find as clear and distinct in the Javan plants is that of the densely hirsute margins of the lemma. In the specimens of *B. insignis* I saw from

Java, the margins of the lemma are glabrous to sparingly pilose. It seems to me that this difference alone is not sufficient to distinguish the New Guinean specimens as a different species. I accept them as **Bromus insignis** Buse var. **scopulorum** (Chase) Jansen, *comb. nov.*—*Lemmata ad marginem dense hirsuta.*

CAPILLIPEDIUM Stapf[2]

1. The genus *Capillipedium* embraces a small number of closely allied species. The structure of the spikelet being very similar to *Bothriochloa* O.K., Ohwi (*in* Acta phytotax. geobot. 11: 162. 1942) united both genera. However, generally the panicle of *Capillipedium*, with its capillary branches bearing few-spikeled racemes, is so different from the panicle of *Bothriochloa*, with stouter, less divided branches bearing elongated, more than eight-jointed racemes, that as a rule both genera are distinguishable at a glance. It is more difficult to give reliable characters to separate the different species, as their floral characters are very similar. Moreover, the very fragile racemes of *Capillipedium* in many herbarium specimens are more or less broken up, so that it may be difficult to decide on the length and the number of spikelets of the racemes.

2. CAPILLIPEDIUM PARVIFLORUM (R. Br.) Stapf *in* Prain, Fl. trop. Afr. 9: 169. 1917.

Holcus parviflorus R. Br., Prod. 199. 1810.
Andropogon parviflorus (R. Br.) Domin *in* Bibl. bot. Hft. 85: 263. 1915.
Bothriochloa parviflora (R. Br.) Ohwi *in* Acta phytotax. geobot. 11: 166. 1942.

DISTRIBUTION.—This species extends from North-west India to Japan, Australia, Polynesia, and westwards to Abyssinia. In Malaysia it is known from Sumatra, Java, Bali, Flores, Celebes, the Philippines, and New Guinea.

It is the only one with a distinct tendency to marked racial differentiation, particularly in the eastern section of its area.

Usually the racemes are reduced to a triad of spikelets, one sessile, two pedicelled, rarely with an additional pair below them. Specimens with more than five spikelets are not known from Java and Sumatra.

Some of the Sumatra specimens have long hairs in the panicle-axils (Lörzing 4960, 9327, 9421, from Piso-piso) and differ in this respect from the Java specimens. The hairiness of the axils seem to be very variable. In the opinion of Miss A. Camus this hairiness is an important character,

[2] Mr. Ch. Monod de Froideville, who arranged this genus in the Bogor Herbarium, kindly permitted me to make use of his notes.

which she uses to separate *C. parviflorum* from *C. assimile* [= *C. subrepens* (Steud.) Henr.]. She wrote (*in* Lec., Fl. gén. Indo-Ch. 7: 312. 1922):

Rameaux de la panicule brièvement poilus aux aisselles: *C. parviflorum*.
Rameaux de la panicule longuement poilus aux aisselles: *C. assimile*.

On the other hand S. T. Blake [*in* Pap. Dept Biol. Univ. Queensl. 2 (3): 42. 1944] describes the panicle branches as glabrous or hairy in the axils. This situation holds also good for the Malaysian specimens.

Another remarkable specimen is Kjellberg 3023 from Celebes: it has the sheaths densely hirsute with tubercle-based hairs. In most Malaysian specimens the lowermost sheaths are always glabrous, the others glabrous with ciliate margins, the nodes hairy and sometimes villous on the collar. In Australia specimens with tubercle-based hairy sheaths appear to be more common. Blake, who studied R. Brown's specimens of *Holcus parviflorus* in the Melbourne Herbarium, states that the type is a decidedly hairy plant!

Ohwi (*in* Bull. Tokyo Sci. Mus. No. 18: 13. 1947) describes a variety, *Bothriochloa parviflora* var. *mutispicula* Ohwi, with all the spikelets muticous. Accepting the genus *Capillipedium*, it has to be called **Capillipedium parviflorum** var. **mutispiculum** (Ohwi) Jansen, *comb. nov.* It seems to be restricted to New Guinea. Besides the type from Mount Cycloop (Meijer Drees 80, 109), I saw specimens from Kanosia (Carr 11106) and from Morobe (D. Fryar 3945).

Specimens with more than five spikelets per raceme have been described under different names:

(a) *Capillipedium cinctum* (Steud.) A. Camus (*in* Lec., Fl. gén. Indo-Ch. 7: 313. 1922), based on *Andropogon cinctus* Steud. (Syn. Pl. Glum. 1: 398. 1855).

(b) *Capillipedium parviflorum* subsp. *capilliflorum* (Steud.) Henr. (*in* Blumea 3: 457. 1940), based on *Andropogon capilliflorus* Steud. (*op. cit.* p. 397).

(c) *Capillipedium spicigerum* S. T. Blake (*op. cit.* p. 43), a new species, based on a new type.—**Fig. 3.**

Each of the three epithets, cinctum, capilliflorum, and spicigerum, represents an uncertainty.

(a) *Capillipedium cinctum* of A. Camus is only part of the original *Andropogon cinctus* Steud.; the remainder is referred to *C. parviflorum sensu strictiore* with 3—5 spikelets per raceme. Steudel says: " . . . apice 3—5-floris; flosculis basi pilorum annulo cinctis." I saw Steudel's type from China (Fortune 13; Herb. Mus. Nat. Paris). It is the upper part of a

FIG. 3. *Capillipedium spicigerum* S. T. Blake: *a*, habit; *b*, raceme; *c*, lateral pair of spikelets; *d*, terminal triad of spikelets.

culm with one of the pilose nodes present. The spreading panicle is 16 cm long and 7 cm wide, short-pilose in the lower axils. The ultimate racemes are for the greater part 5-spikeled, only a few bear 3 spikelets. On the label is written in Steudel's handwriting: "ab *And. villosulo* haud distinctus." On the same sheet are two smaller panicles (Fortune 25) also with the name *Andropogon cinctus* written by Steudel. One of these has 3- and 5-spikeled racemes, the other only 3-spikeled racemes. I do not understand why Hackel placed *A. cinctus* Steud. among the synonyms of both *Androgopon micranthus* Kunth var. *genuinus* Hack., where it belongs, and *A. micranthus* Kunth var. *spicigerus* Hack.

(b) *Andropogon capilliflorus* Steud. Why does Hackel place this name among the synonyms of *A. micranthus* var. *genuinus* Hack. (with 3—5-spikeled racemes) and why does he take up for his plants with more-spikeled racemes) the later epithet spicigerus of Bentham? From Steudel's description the structure of the terminal racemes is not clear, and that is the very thing that matters. The name *Andropogon capilliflorus* Steud. was first published as a nomen nudum by Zollinger (Syst. Verz. Hft 1: 58. 1854). In the Paris Herbarium I saw Zollinger's cited specimen (no. 564) from Java with this name on the label in Steudel's handwriting. This is undoubtedly a specimen of *Capillipedium parviflorum* with 3-spikeled racemes and glabrous axis and axils! On the same label Steudel wrote: "eadem speciem ex Hrbo Mus. Lugd. Bat. ex Japonia habeo." These types from Japan (Siebold's collection under the name *Andropogon serratus* Thunb.) consist of flowering culms, rather robust, with large, capillary, spreading panicles. The racemes have mostly 7—9 spikelets, so that the aspect of the panicle is somewhat more dense. The internodes of the panicle-rhachis are ciliate like the pedicels, but this is a variable character, appearing also in many typical specimens of *C. parviflorum*. The mature sessile spikelets are about 4 mm long, slightly longer than in the typical specimens. The first glume is distinctly depressed along the middle. Stapf determined this material as "*Capillipedium parviflorum capilliflorum*." In Henrard's opinion it is a subspecies, called by him subspecies *capilliflorum* (Steud.) Henr. (*in* Blumea 3: 457. 1940). I agree with him. This form extends from Japan and China to Malaysia, Celebes, and the Philippines. I did not see specimens from Java.

(c) The epithet spicigera we find for the first time used in Bentham's "Flora australiensis" (7: 538. 1878). Bentham, after having studied R. Brown's *Holcus parviflorus*, made the combination *Chrysopogon parviflorus* (R. Br.) Benth. This plant should typically have 3 spikelets per raceme, but he described the variety *spicigera* with the

ultimate branches of the panicle bearing 1 or 2 sessile spikelets below the terminal one and each accompanied by a pedicellate male spikelet. This variety should thus have 5—7 spikelets per raceme. Hackel (Androp. *in* DC., Monogr. Phan. 6: 488. 1889) takes up Bentham's epithet and describes *Andropogon micranthus* Kunth var. *spicigerus* (Benth.) Hack. with 3—8-articulated racemes (7—17 spikelets). Hackel's concept of Bentham's variety was not based on Bentham's specimens, which he did not see, but probably on plants regarded by Henrard as *C. parviflorum* subsp. *capilliflorum*, not recorded from Australia.

S. T. Blake (*l.c.*) published a revision of the Australian species of *Capillipedium* and divided *C. parviflorum sensu amplo* into two species: *C. parviflorum* (R. Br.) Stapf and *C. spicigerum* S. T. Blake. In his key he characterizes them as follows:

Racemes 1—2-jointed (3—5 spikelets); lower glume of sessile spikelet with 2 pairs of intercarinal nerves and prominently depressed along the middle. *C. parviflorum*
Racemes 3—8-jointed (7—17 spikelets); lower glume of sessile spikelet with 8—9 nerves, only slightly depressed along the middle. . . . . *C. spicigerum*

The only specimens from Malaysia I can refer to *C. spicigerum* are Brass 11616, 11805, and 11845 from Netherlands New Guinea, Balim River, common on deforested slopes. They make quite a different impression from *C. capilliflorum* by the long, narrow, lanceolate, dark purplish panicle with more or less adpressed branches (which are not capillary spreading, nearly as long as wide, like in the panicle of *C. capilliflorum*). The capillary branches end into 3—8-jointed racemes (7—17 spikelets), the spikeled part 2—2.5 cm long.

Blake states that there are always 8—9 nerves in the first glume of the sessile spikelet. I do not think that that character is constant: in many spikelets I studied I only found two pairs of intercarinal nerves, but the cited specimens are rather young ones and then the nerves are not very distinct. There appear only few actual floral differences from *C. parviflorum*, but the plants are rather distinct in habit and the more-jointed racemes seem characteristic and constant. Taking into account the slight differences between all the species of *Capillipedium* and pending further study when more specimens will be available from other parts of its range, *C. spicigerum* is here provisionally considered to represent a good species.

3. CAPILLIPEDIUM ARACHNOIDEUM Henr. *in* Blumea 3: 451. 1941.

This species, described from Java, is mainly found in dry regions of Central and East Java:

SPECIMENS EXAMINED from EAST JAVA.—Madiun, 400 m, *Backer 2935;* Tengger Mts., 2000—2400 m, *Backer 8387;* Idjen Plateau, *Beguin 184* (*type;* Herb. Bogor.); foot of Mt. Idjen, 300 m, *Backer 30758;* foot of Mt. Baluran, 110 m, *Backer 24795;* ibid. 50—150 m, *Clason & van Slooten s.n.;* W Baluran, 70 m, *Rappard 248.*

The only specimen known from West Java is Van Steenis 4923.

Further it was collected on Sumatra (Boschbouwproefstation bb. 9023), Bali (Van Steenis 7739), Timor (Forbes 3463), and New Guinea (Schlechter 18450). In the opinion of Mr. Ch. Monod de Froideville, Brass 3558 and 4799 also belong to this species. I did not see these specimens.

Specimens with more than three spikelets per raceme are only known from the Philippines. They are described by Henrard (*op. cit.* p. 458) as subspecies *luzoniense* Henr. (Luzon, B.S.40508).

In the original description the base of the panicle is characterized as included in the uppermost sheath. This is not always the case. Backer's specimens mentioned above have the inflorescence on a short peduncle and quite free from the uppermost sheath. The only clear characteristic being the internodes, densely covered with tubercle-based hairs, perhaps it would be better treated as a variety of *C. parviflorum*. For the present I postpone a decision until more specimens for study are available.

4. CAPILLIPEDIUM ASSIMILE (Steud.) A. Camus *in* Lec., Fl. gén. Indo-Ch. 7: 31. 1922; Bor *in* Kew Bull. 1952: 165.

Andropogon assimilis Steud., Syn. Pl. Glum. 1: 397. 1854.
Andropogon montanus Hack., Monogr. Androp. 490. 1889, *non* Roxburgh.
Andropogon subrepens Steud., Syn. Pl. Glum. 1: 397. 1854.
Capillipedium subrepens (Steud.) Henr. *in* Blumea 3: 463. 1940.

Differing from the other species in its bamboo-like habit, a creeping rhizome, the culms decumbent, rooting and branching at the nodes with ascending flowering branches, the lower sheaths loose and slipping from the culm, and the glabrous nodes.

DISTRIBUTION.—This species is known from Sumatra, Java, Sumbawa, Flores, Celebes, and the Philippines.

Usually the racemes bear 3—5 spikelets, but in Java specimens occur with 3-, 5-, and 7-spikeled racemes in the same panicle.

Var. **glaucophyllum** (Henr.) Jansen, *comb. nov.*

Capillipedium subrepens (Steud.) Henr. var. *glaucophyllum* Henr. *in* Blumea 3: 463. 1940.
Andropogon glaucopsis Steud., Syn. Pl. Glum. 1: 397. 1855.
Capillipedium glaucopsis (Steud.) Stapf *in* Hook. f., Ic. Pl. *t. 3085.* 1922.

Upper nodes hairy; sheaths often with a woolly collar; blades glaucous to whitish.

DISTRIBUTION.—Known from Sumatra, Van Steenis 6250, 6575; Java, according to Hackel and Stapf, not seen; Timor, Forbes 3711; the Philippines, B.S.79903, 80207, etc.

5. KEY TO THE MALAYSIAN SPECIES OF CAPILLIPEDIUM

1. Culms decumbent on a creeping rhizome, branching at the nodes. Lower sheaths very loose and slipping from the culm. Nodes glabrous. . . . . *C. assimile*
1. Culms erect, firm, simple or sparingly branched, up to 1 m high and more. Lower sheaths tight. Nodes hairy.
   2. Internodes densely clothed all over with a hirsute coating of tubercle-based hairs. *C. arachnoideum*
   2. Internodes glabrous.
      3. Panicle capillary spreading, usually not much longer than wide. Lower glume of sessile spikelet with 2 pairs of intercarinal nerves and prominently concave along the middle.
         4. Racemes with 1—2 joints (3—5 spikelets). . . . . *C. parviflorum*
         4. Racemes with more joints (7—9 spikelets). Panicle denser. *C. parviflorum* subsp. *capilliflorum*
      3. Panicle more elongate, dense and narrow, up to 25 cm long and 5—7 cm wide. Racemes with 7—17 spikelets, the spikeled part 2—2.5 cm long. Lower glume of sessile spikelet usually 8—9-nerved, slightly depressed along the middle. *C. spicigerum*

CENTOTHECA Desv.

Centotheca schlechteri Pilg. *ex* Jansen, *sp. nov.*

Centotheca schlechteri Pilg., nom. nud. *in* sched. Schlechter Pl. Papuanae, 19396.

Gramen perenne, rhizoma parvum; culmi graciles, erecti, teretes, glabri, cum panicula 20—25 cm alti; vaginae internodia superantes, angustae, glabrae vel apice pilos sparsos basi tuberculatos gerentes, marginibus breviter sed dense diliatae; ligula 1 mm longa, obtusa; laminae 6—7 cm longae, 4—6 mm latae, anguste lanceolato-lineares, basi manifeste attenuatae, apice longe acuminatae, dense nervatae, nervulis transversalibus solum superficie inferiore notatae, glabrae vel pilis minutis scabrae, marginibus laeves; panicula erecta, 7—10 cm longa, rami capillares oblique erecti vel maturitate patentes, inferiores ad 5 cm longi, superiores breviores, solitarii vel raro binati, sparse positi per axem communem glabrum gracilem; spiculae magis minusve racemate dispositae, subsessiles vel breviter pedicellatae, nonnihil remotae, 3,5 mm longae, flosculum unum bisexuale continentes, rhachilla producta ad setam 1 mm longam, gerens flosculum abortivum ad glumam minutam reductum; gluma prima ovata, acuta 1—1,5 mm longa, 5-nervata; gluma secunda circa 2 mm longa, acutissima vel acuminata, a prima separata intervallo distincto, 3—5-nervata; lemma spiculam aequans, cymbiforme, acuminatum vel minute mucronatum, setis carens, multinervatum; palea 2 mm longa, anguste plicata, carinis duabus ciliatis approximatis.

DISTRIBUTION.—New Guinea, Kaiser-Wilhelmsland, in half-shade of mountain forest, Schlechter 19396 (*type;* Herb. N. York Bot. Gard.).

This species is characterized by narrow, linear-lanceolate blades, 4—6 cm wide and 6—7 cm long; minute cross-nerves only visible on the lower surface, and glabrous margins. The spikelets, about 3.5 mm long, have one perfect floret and a very reduced one on the prolonged rhachilla. I did not see any bristles on the lemma.

2. CENTOTHECA LONGILAMINA Ohwi *in* Bull. Tokyo Sci. Mus. No. 18: 10. 1947.

This species is closely related to *C. latifolia* (Osb.) Trin. and characterized by the broadly linear to narrowly lanceolate blades, 20—35 cm long, 2—2.5 cm wide, the margins in the lower part densely long-ciliate with rather rigid, greenish hairs. The spikelets in the specimens seen are strictly 2-flowered, the lemma about 4 mm long, obtuse or bidenticulate and rarely with a short mucro between the lobes, not reaching the tips of the lobes.

DISTRIBUTION.—The species extends, as far as known, from Malaysia to India. Besides the type specimen, Java, Bakhuizen van den Brink 3312, I saw specimens from Java, Mt. Gede (G. Beber), Junghuhn *s. n.* (Herb. Lugd. Bat.); Malay Peninsula, Robinson 6268, S.F.20039 & 38007; Tonkin, Ouonbii, Balansa; Hainan, Chun & Tso 43811; and India, Helfer 151.

CHIONACHNE R. Br.

CHIONACHNE BIAURITA Hack. *in* Philip. J. Sci. 1 (Suppl.) : 263, 320. 1906.

This species, endemic in the Philippines, is very variable in the hairiness of the sheaths. Clemens 15856 and Merrill 4282 are nearly glabrous plants with only the margins of the sheaths sparingly ciliate with short tubercle-based hairs. Clemens 17753 and 18647 are very hairy specimens with the leaf-sheaths and the sheaths in the inflorescence densely hirsute with long, rigid, tubercle-based hairs, irritating the skin.

CHLORIS Sw.

CHLORIS CLEMENTIS Merr. *in* Philip. J. Sci. 40: 181. 1929.

I only saw the type specimen (Herb. Univ. Calif. 347517). It has the general habit of *Ch. tenera* (Presl) Scribn. but is in the floral characters more allied to *Ch. cynodontoides* Balansa (*in* Bull. Soc. bot. France 19: 318. 1873). The latter species has the base of the spikes villous (they are quite glabrous in *Ch. clementis*), the spikelets longer with the second glume exceeding the spikelet (in *Ch. clementis* much shorter than the spikelet), the lemmas slightly scabrous, and the awn stronger and straight (in *Ch. clementis* slender and wavy).

CHRYSOPOGON Trin.

1. CHRYSOPOGON COLLINUS Ridl., Fl. Mal. Pen. 5: 208. 1925.

Besides Ridley's type from Setul (Haniff, S.F.649) I saw specimens from Pulau Tokong Burong (Corner 29784). This species also seems to occur in Sumatra. I saw specimens in the Leiden Herbarium from Bukit Serilla (Verboom 24) very much resembling them. These are higher, more slender with narrower blades, slightly larger spikelets, and longer awns. They more or less connect *Ch. collinus* with *Ch. montanus* Trin., a very variable species; compare Haines (Botany of Bissar and Orissa 1037. 1924). The typical form of the latter species has the pedicels of the male spikelets still shorter and with longer cilias. The glumes of the sessile spikelets are more differing in length, the second with a 2 cm long awn. The first glume of the pedicelled spikelets is 7-nerved and ends into an awn twice as long as the glume. When more material becomes available it might be advisable to consider *Ch. collinus* only as a variety of *Ch. montanus*.

2. CHRYSOPOGON TENUICULMIS Henr. *in* Blumea 4: 532. 1941.

This rare and characteristic species is only known from Sumba (Iboet 151, *type*), Lombok (Van der Veen 60, De Voogd 2658, Rensch 235, Elbert 976), and Timor (Monod de Froideville 1457, 1496). In *Chrysopogon* the lower glume of the sessile spikelet is usually unawned, whereas the second one is distinctly awned. In *Ch. tenuiculmis* the position is inverse: the lower glume is aristate, often bifid with two setae, the upper one is unawned. Most specimens seen have pilose sheaths and the blades sparsely long-hairy. Some specimens from Lombok (Elbert 976) and Timor (Sawu, Civiel gezaghebber 1) have quite glabrous sheaths and blades.

COELORHACHIS Brongn.

1. Henrard (*in* Blumea 4: 515-519. 1941) discussed this genus and sharply separated it from the allied genus *Rottboellia* by the pedicels being free from the rhachis (in *Rottboellia* fused with the rhachis).

Accepting his opinion I saw four species from Malaysia, which may be recognized by the following key:

KEY TO THE MALAYSIAN SPECIES OF COELORHACHIS

1. Coarse tall grasses, up to 2 m high with fascicled racemes, united in a large, leafy panicle. Sessile spikelets 4—5 mm long.
   2. First glume of the sessile spikelets chartaceous, distinctly winged, the margins scabrous or smooth. Pedicelled spikelets about 3.5 mm long. Racemes 6—8 cm long. . . . . *C. rottboellioides*
   2. First glume of the sessile spikelets coriaceous, slightly winged, the margins distinctly muricate. Pedicelled spikelets short and very reduced. Racemes 10—16 cm long. . . . . *C. glandulosa*
1. More tender grasses, less than 1 m high with solitary, slender racemes. Sessile spikelets 3 mm long.
   3. Joints of the racemes pyriform, the base with a row of short hairs. First glume of the sessile spikelets smooth, narrowed above the middle, with 2 erose wings in the upper part. . . . . *C. helferi*
   3. Joints of the racemes 3 mm long, clavate, quite glabrous. First glume of the sessile spikelets deeply quadrangularly pitted by the veins and cross-veins, without wings. . . . . *C. foveolata*

2. COELORHACHIS ROTTBOELLIOIDES (R. Br.) Henr. *in* Blumea 4: 519. 1941.

Ischaemum rottboellioides R. Br., Prod. 205. 1810.

DISTRIBUTION.—Extending from the Philippines through the Moluccas and Timor to New Guinea and Australia.

A rather variable species of which I saw the following varieties:

Var. COMMUTATA (Hack.) Henr. *in* Blumea 4: 519. 1941.

First glume of the sessile spikelets with tubercle-based hairs near the base.

DISTRIBUTION.—Seen from Sawu, New Guinea, and the Philippines, B.S.36298, 15590.

Var. **intermedia** (Hack.) Jansen, *comb. nov.*

Rottboellia ophiuroides var. *intermedia* Hack. *in* Philip. J. Sci. 1 (Suppl.): 265. 1906.

First glume of the sessile spikelets narrowly winged above the middle.
DISTRIBUTION.—Seen from the Philippines, Merrill 4667, Elmer 6393.

Var. **hirsuta** Jansen, *var. nov.*

Differt a typo vaginis, imprimis superioribus, laminisque utroque pilis basi tuberculatis dense hirsutis.
DISTRIBUTION.—New Guinea: Kanosia, Carr 11134; Baroka, Brass 3702.

3. COELORHACHIS GLANDULOSA (Trin.) Stapf *in* Ridl., Fl. Mal. Pen. 5: 204. 1925.

Rottboellia glandulosa Trin. *in* Mém. Acad. Sci. St. Pétersb. 6 (2): 250. 1833.

DISTRIBUTION.—Seen from the Malay Peninsula, Sumatra, Java, the Lesser Sunda Is., Borneo, the Philippines, Celebes, and the Moluccas.

This coarse, rather common species usually has glabrous spikelets. In the variety *bandanensis* (Buse) Henr. (*in* Blumea 4: 517. 1941) the

lower glume is pubescent. The only specimens I saw were those of the type-collection (Reinwardt, from Banda). More common are specimens with puberulent lower glumes. I saw them from Sumatra (Yates 826), Borneo, Sarawak (Beccari 578), and the Kay Islands (Beccari *s. n.*, *anno* 1873).

4. COELORHACHIS HELFERI (Hook. f.) Henr. *in* Blumea 4: 518. 1941.

Rottboellia helferi Hook. f., Fl. Br. Ind. 7: 158. 1897.
Mnesithea rupincola Ridl. *in* J. Straits Br. roy. As. Soc. 57: 116. 1910; Fl. Mal. Pen. 5: 206. 1925.

Only seen from the Malay Peninsula, Perak, Ridley 14357 (Herb. Singapore). This is the type of *Mnesithea rupincola* Ridl. It certainly is not a *Mnesithea* but a species of *Coelorhachis:* the spikelets are placed in pairs, the pedicels are quite free from the rhachis.

5. **Coelorhachis foveolata** (Holtt.) Jansen, *comb. nov.*

Rottboellia foveolata Holtt. *in* Gdns' Bull., Singapore 9: 297. 1947.

Only seen from the Malay Peninsula, Setul, Ridley 15231. This collection is the type of *Rottboellia foveolata* Holtt.

The sessile spikelets are 3 mm long, as long as the joints. The first glume is rigid, yellowish green, ovate, obtuse, neither keeled nor winged, the raised veins are connected by cross-veins forming series of irregular but distinct quadrangular pits, and the cross-walls are provided with minute, spine-like outgrowths. The pedicels of the much reduced pedicelled spikelets are quite free from the rhachis.

CYRTOCOCCUM Stapf

1. There has been considerable confusion in the interpretation of *Panicum patens* L. In the opinion of C. E. Hubbard (*in litt.*, 1948), Stapf misidentified another species as *Cyrtococcum patens* (L.) Stapf, while he identified the material of true *Panicum patens* L. as *Cyrtococcum radicans* (Retz.) Stapf. This was due to relying on a drawing of the type by Miss Hughes and not on the type itself (in the Linnean Herbarium sheet 80, 13) which bears "patens" in the hand of Linnaeus.

The two species are easy to distinguish:

Panicle very large and diffuse, profusely branched, up to 40 cm long and when mature up to 30 cm wide, the scattered spikelets very small, about 1.3 mm long. *C. accrescens*

Panicle much shorter, usually 15 cm long and as wide, more densely spikeled, the spikelets 1.6—1.7 mm long. . . . . *C. patens*

2. CYRTOCOCCUM ACCRESCENS (Trin.) Stapf *in* Hook. Icon. Pl. 31: 2 *pl. 3096*. 1922.

Panicum accrescens Trin., Sp. Gram. Ic. 1: *pl. 88*. 1827.
Cyrtococcum patens var. *latifolium* (Honda) Ohwi *in* Acta phytotax. geobot. 11: 47. 1924.

DISTRIBUTION.—Extending from India, China, and Japan to Polynesia.

SPECIMENS EXAMINED.—I give here a shortened list of the exsiccatae seen by me from Malaysia. MALAY PENINSULA. Rather common, e.g. *S.F.19977*. SUMATRA. Less common, *Beccari 3864, Lätjeharms 3859*. JAVA and LESSER SUNDA IS. Rather common, Timor, *Monod de Froideville 1771*. BORNEO. *Bartlett 4059, Beccari 2514, Clemens 27595, 51048, Ramos 1161, Winkler 2514*. CELEBES. *Beguin 623*. PHILIPPINES. *Bartlett 13660, 14867, B.S.21992, 44677, 46079, 46163, 46948, 78310, 78464, 80696, Elmer 14476, 15360, Velasquez 401, 1099*. NEW GUINEA. *Brass 7889, Carr 11297, 12908, Jeswiet 175, Schlechter 14118*.

3. CYRTOCOCCUM PATENS (L.) A. Camus *in* Bull. Mus. Hist. nat., Paris 27: 118. 1921.

Panicum patens L., Sp. Pl. 53. 1753.
Panicum carinatum Presl, Rel. Haenk. 1: 309. 1830.

DISTRIBUTION.—Extending over the Indo-Malayan region to Polynesia.

SPECIMENS EXAMINED.—SUMATRA. Common, e.g. *Bünnemeijer 1319*. JAVA and LESSER SUNDA Is. Rather common, Sumba, *Iboet 478*. BORNEO. *Endert 1539, 4573*. PHILIPPINES. Common, most of the exsiccatae under the name *P. carinatum* Presl, *Kneucker 733, Elmer 18122, B.S.39715*, etc. NEW GUINEA. *Clemens 1429, Weinland 275*.

Depauperate forms of this species with blades 1—5 cm long, the panicle often reduced to a few short branches only, are known as *C. patens* var. *warburgii* (Mez) Reeder (*in* J. Arn. Arb. 29: 286. 1948), based on *Panicum warburgii* Mez (*in* Perkins, Fragm. Fl. Philip. 143. 1904); they hardly deserve this state.

Usually the spikelets of *C. patens* are quite glabrous, rarely the glumes and tips of the lemmas are hispid with minute hairs (B.S.48943).

4. CYRTOCOCCUM TRIGONUM (Retz.) A. Camus *in* Bull. Mus. Hist. nat., Paris 27: 118. 1921.

Panicum trigonum Retz., Obs. bot. 3: 9. 1783.

A rather small and low plant, the ascending culms up to 15 cm long. The small contracted panicle is few-spikeled. Spikelets relatively large, about 2 mm long. First glume usually glabrous, the second glume and lower lemma hispid or tuberculate-hispid.

DISTRIBUTION.—In Malaysia known from Sumatra, Java, the Lesser Sunda Is., Celebes, the Philippines, and New Guinea.

Var. **celebicum** Jansen, *var. nov.*

Differt a typo axe et ramis paniculae pilis longis albis distantibus sparse indutis.

DISTRIBUTION.—SW Celebes, Lombasang, Bünnemeijer 11770 (*type;* Herb. Lugd. Bat.).

Very similar specimens, slightly larger, but the axis and branches of the paniche also sprinkled with long hairs, have been collected by Elbert (664) on Lombok.

This variety should not be confused with *C. setigerum* (P.B.) Stapf, based on *Panicum setigerum* (non Retz.) P.B. (Fl. Oware 1: *pl. 49.* 1804). This African species is a much larger grass with a panicle up to 20 cm long, the capillary branches bearing 1—3 spikelets and like the axis loosely beset with long- and short-silky hairs, and the 2 mm long spikelets loosely long-silky hairy on the back.

DANTHONIA D.C.

1. DANTHONIA PILOSA R. Br., Prodr. 177. 1810.

A rather rare species in Malaysia, only recorded from high mountain-tops in Java and Celebes. Ohwi (in sched. Herb. Bogor.) considered the Java specimens to belong to a separate species. Comparing them with the Australian specimens at my disposal, they only differ in the glabrous and non-pilose blades. According to the Australian botanists the hairiness of the blades seems to be a very variable character and certainly not important enough to describe the Javan specimens as a new species.

The Celebes specimens are smaller in every part: the glumes 7—8 mm long, the lemmas 5—6 mm long. Besides, the hairy tufts along the margins of the lemma are reduced to a few hairs, the central awn is short, less twisted, and only slightly divergent. I accept them as:

Var. **bonthainica** Jansen, *var. nov.*

Spiculae minores; glumae 7—8 mm longae, flosculis superioribus vix longiores; lemmata subglabra, pilis penicillatis per margines ad pilos paucos reductis; arista centralis brevis, minus torta, plus minusve subdivergens.

DISTRIBUTION.—Celebes, Peak of Bonthain, between 2400 and 3000 m altitude, Bünnemeijer 11971 (*type;* Herb. Bogor.), and 12210.

2. DANTHONIA SCHNEIDERI Pilg. *in* Fedde, Repert. 17: 131. 1921; Hitchc. *in* Brittonia 2: 115. 1936.

I studied the type (Herb. Berol.) from Yunnan, C. Schneider 2342, and compared it with the New Guinean specimens at my disposal: Murray Pass, Brass 4649, part of the collection in the Herbarium of the New York Botanical Gardens, identified by Hitchcock.

These New Guinean specimens agree in shape and structure of the spikelets with the type specimens, but are much smaller in every dimension. The blades are stiff, short (10—15 cm long), convolute, sparingly pilose and not laxe, elongate (up to 35 cm long), flat, long-hirsute-pilose. The panicle is shorter, strictly erect, and the axis and branches more densely and longer pilose. The glumes are about 12 mm long and not up to 22 cm as in the type. The slender rhachilla-joints are only 1 mm long.

The type specimen makes the impression of a shade-form. The New Guinean specimens have been collected in dry open places. At first sight they seem to belong to a different species, but a separation should wait until more material is available.

3. **Danthonia mamberamensis** Jansen, *sp. nov.* — Fig. 4.

Gramen perenne, glabrum, dense caespitosum; culmi erecti, 20—35 cm alti, teretes, 2—3-nodi, nodi glabri, pleraque folia basalia; vaginae inferiores brev[illegible] et latiores, imbricatae, glabrae; vaginae culmi breviores quam internodia, laeves et glabrae; ligula annulus pilorum brevium est; laminae innovationum rigide erectae, tenaces, valde involutae, 20—30 cm longae, ca. 1,5 mm diametro, striatae, apice subacutae; laminae culmares breviores, molliores et minus erectae; panicula modice laxa

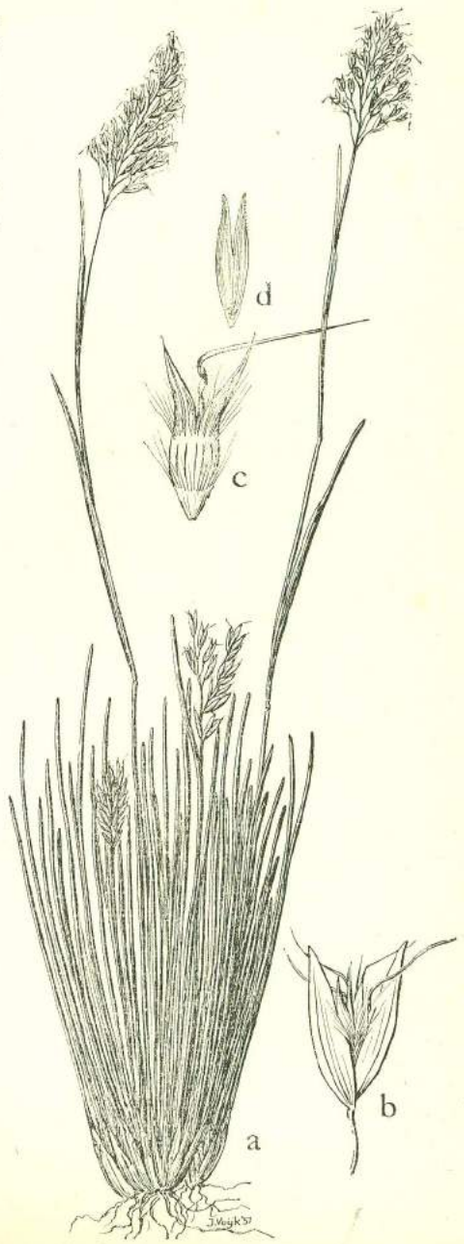

FIG. 4. *Danthonia mamberamensis* Jansen: *a*, habit; *b*, spikelet; *c*, lemma; *d*, palea.

vel plus minusve contracta, 5—6 cm longa, ramis inferioribus verticillatis, parte superiore racemiformis, rhachi et ramis glabra laevisque; pedicelli subflexiles, 2—4 mm longi vel longiores; spiculae viridescentes, pro rata parvae, 4-florae, 6—7 mm longae; glumae subaequales vel inferiores superiores paulo superantes, herbaceae, spiculam aequantes vel paulo longiores, lanceolatae, acutae, costa firma, nervis ceteris obscuris, glabrae et laeves; flosculi inferiores duo cum lobis lemmatis circa 4 mm longi; flosculi superiores minores; lemmata brevia et lata, distincte 5-nervia, corpus eorum lobos triangulares acutos magis minusve patentes aequans, marginibus ciliatis, dorso glabro, infra lobos tamen seriem densam pilorum longorum alborum gerentia; pili lobos subaequantes, circiter 2 mm longi; callus brevis pilosus; arista centralis 7—8 mm longa, parte inferiore plana et leviter torta, parte superiore geniculata vel reflexa; palea paulo longior quam lemma, acuta, minute pilosa; antherae minutae.

DISTRIBUTION.—New Guinea, Mt. Doorman, on flat dry ground in the region of the Mamberamo R., at 3200 m altitude, H. J. Lam 1682 (*type;* Herb. Lugd. Bat.).

This species has more or less the habit of *D. semiannularis*, but is easily distinguished by the short and broad, distinctly nerved lemma about 2 mm long, the triangular, spreading, not awned lobes about as long, and the thick, junciform, erect, glabrous, and smooth blades.

4. DANTHONIA ARCHBOLDII Hitchc. *in* Brittonia 2: 114. 1936.—**Fig. 5.**

I did not see the type (Brass 4194), but Brass 4624 (det. Hitchcock) agrees fairly well with the original description in the long, flat blades; the high culms; the large, spreading panicles, pilose in the axils; the small 3—4-flowered spikelets with the short, narrow, thinly membranous glumes; and the villous lemmas with the not twisted, divergent to recurved central awn and the short-awned lobes. The only character not mentioned by Hitchcock is the short, erect stolons, crowned with crowded innovation-shoots.

Brass & Meijer Drees 9822 (det. Chase) agrees with the former specimens, but has longer, more decumbent stolons with a dense cluster of innovation-shoots at each node. It is apparently a part of a more loosely cespitose specimen.

Hitchcock (*l.c.*) mentions specimens from "British New Guinea" (leg. MacGregor and Armit). In the Melbourne Herbarium I saw plants from that locality:

(a) "lower regions of British New Guinea," MacGregor 35; and

(b) summit of Mount Dayman, Armit, *anno* 1894, identified by F. von Mueller as *Danthonia arista non torta.*

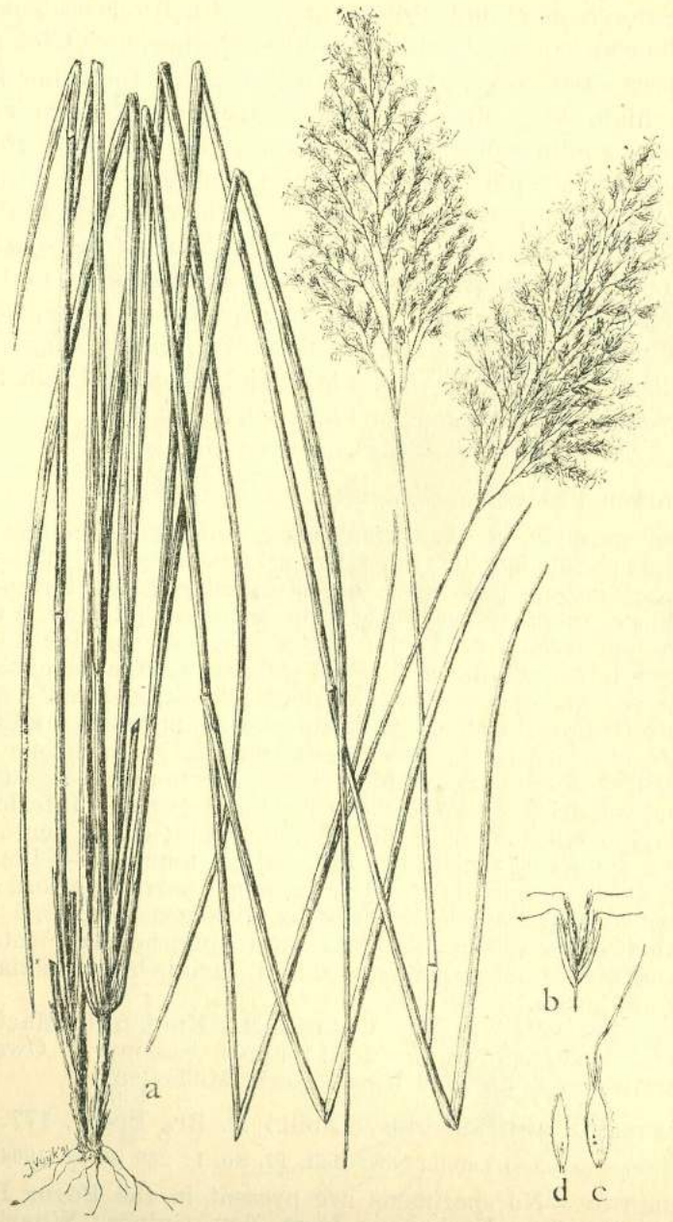

FIG. 5. *Danthonia archboldii* Hitchc.: *a*, habit; *b*, spikelet; *c*, lemma; *d*, palea.

These specimens do not possess subterranean parts, they are leafy culms only. The inflorescences and spikelets agree with Hitchcock's description.

The other specimens in the Melbourne Herbarium differ considerably from those cited above. They are much smaller, the culms being only 15—35 cm high, very densely caespitose; the tufts are surrounded by the hard, smooth, yellowish old sheaths; and they lack stolons. The rigid blades are strongly involute, quite glabrous, and taper into a long, scabrous, sharp point, erect to more or less curved. The panicle is short (3—6 cm), dense, ovoid, few-spikeled, the axils of the short branches glabrous. The spikelets are larger (10—12 mm) and up to 7-flowered. Like *D. archboldii* they have thinly membranous glumes. The villous lemmas are much longer, the body in the lower florets being 7 mm long, the awned lobes lanceolate, 4—5 mm long, and the central awn 10—12 mm long, not twisted but divergent or recurved.

I accept them as representing a new species:

5. **Danthonia macgregorii** Jansen, *sp. nov.*—**Fig. 6.**

Gramen perenne, dense caespitosum, caespituli vaginis veteribus flavescentibus rigidis laevibus cincti; culmi teretes, glabri, 15—35 cm alti, rigide erecti; vaginae plerumque ad basin aggregatae, teretes, glabrae, laeves, longiores quam internodia; ligula series est pilorum, 1 mm longa; laminae rigidae, erectae vel leviter curvatae, 10—20 cm longae, valde involutae, 1 mm latae, ad apicem longam scabram acutam attenuatae; panicula inferne vagina superiore inclusa, ovata, densa, erecta, 3—6 cm longa, 2—3 cm lata; ramis brevibus paucispiculatis appressis, axillis glabris; spiculae laterales breviter pedicellatae; spiculae rhomboideae vel ovato-lanceolatae, 10—12 cm longae (sine aristis), plerumque 7-florae; flosculae 3 inferiores superiores excedentes; corpus lemmatis inferioris 7 mm longum, omnino villosum pilis albis 1 mm longis; callus acutus 0,75 mm longus; lobi lemmatis lanceolati, in aristam tenuem 3—4 mm longam excurrentes; arista centralis 10—12 mm longa, parte inferiore applanata, non torta, parte superiore leviter flexilis, divergens usque ad recurvata; lemmata superiora gradatim breviora, supremum ad rudimentum aristatum reductum; palea oblonga, acuta, glabra, carinis minute ciliatis, corpus lemmatis subaequans.

DISTRIBUTION.—British New Guinea: Mt. Knutsford, MacGregor 34; Mt. Victoria, MacGregor, *anno* 1881; upper regions of Owen Stanley Range, MacGregor, *anno* 1889 (*type;* Herb. Melbourne).

6. DANTHONIA SEMIANNULARIS (Labill.) R. Br., Prodr. 177. 1810.

Arundo semiannularis Labill., Nov. Holl. Pl. Sp. 1: 268 *pl. 33.* 1804.

DISTRIBUTION.—No specimens are present in the Bogor Herbarium. Only seen in the Kew Herbarium from New Guinea: Wharton Range, Giulianetti *s. n;* and a fragment from Mt. Carstensz, Kloss, January 1913.

In New Guinea a mountain grass from 3000 m upwards.

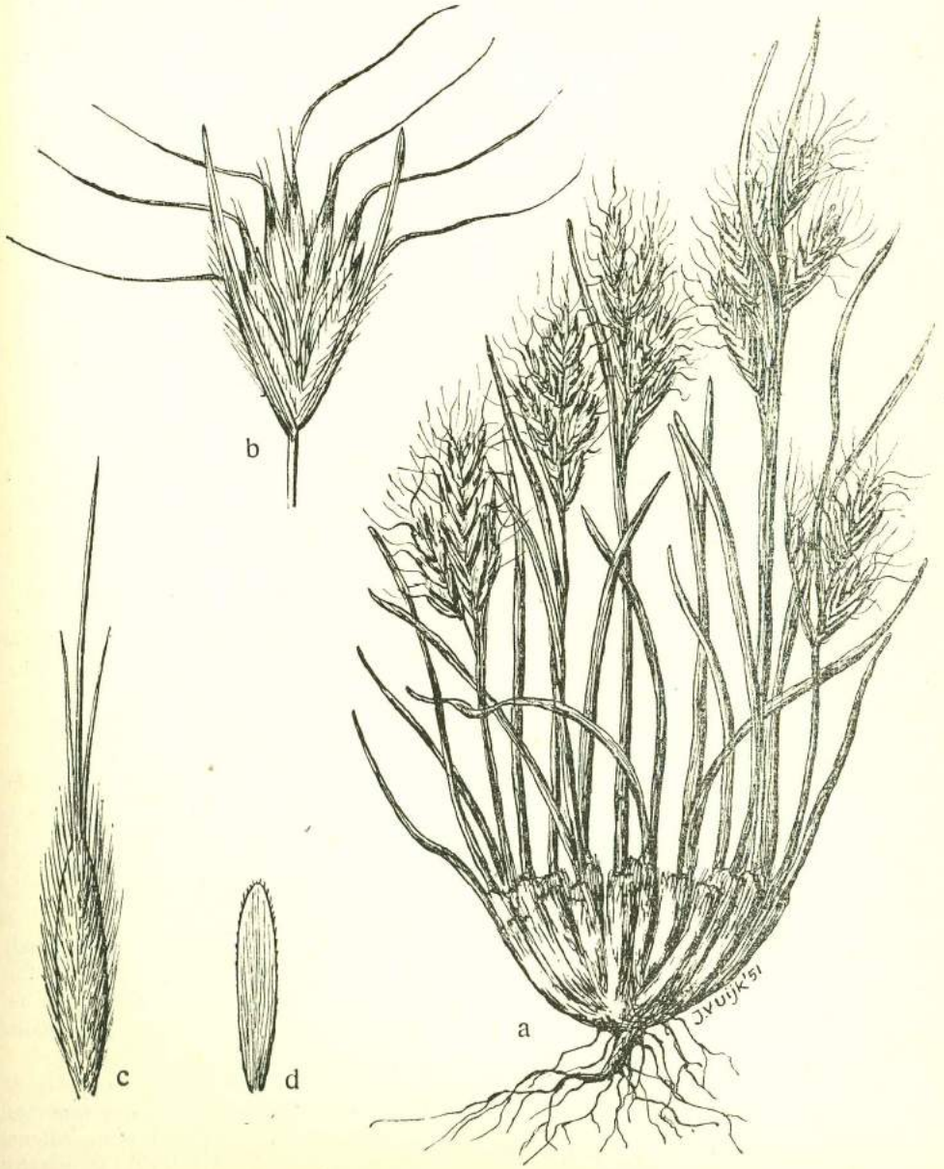

FIG. 6. *Danthonia macgregorii* Jansen: *a*, habit; *b*, spikelet; *c*, lemma; *d*, palea.

7. DANTHONIA VESTITA Pilg. *in* Bot. Jb. 62: 457. 1929; Hitchc. *in* Brittonia 2: 115. 1936; Reeder *in* J. Arn. Arb. 31: 322. 1950.

Easy to distinguish from the other New Guinean species by the strictly erect, setaceously involute, densely hirsute-villous blades and by the lemmas, hairy all over, the body 3 mm long, the lobes 4—5 mm long, tapering into an awn-like bristle.

DISTRIBUTION.—Endemic in New Guinea: Mt. Sarawaket, Keysser *s.n.* (*type*), Clemens 10044; Mt. Edward, Brass 4207; Mt. Knutsford, MacGregor, *anno* 1889.

In small tufts on open ground, at 3600—3800 m altitude.

8. KEY TO THE MALAYSIAN SPECIES OF DANTHONIA

1. Glumes tender, narrow, usually shorter than the florets (without the awns). Lemmas narrowly ovate, shortly bifid, hairy all over, with a slender, acute callus.
   2. Culms 60—90 cm tall. Blades flat or involute towards the tip. Panicle loose and open, 10—12 cm long, with long, many-spikeled, spreading branches, pilose in the axils. Spikelets small, 3—4-flowered. Glumes 5—6 mm long. Body of the lower lemmas 4—5 mm long, the awned lobes 2—3 mm long or reduced, central awn 5—8 mm long. . . . . *D. archboldii*
   2. Culms much shorter, 15—30 cm long. Blades rigidly involute with a long, scabrous, sharp tip, the basal blades strictly erect and surrounded by the old sheaths. Panicle ovate, dense, 3—6 cm long, with short, few-spikeled branches, glabrous in the axils. Spikelets larger, up to 7-flowered. Body of the lower lemma 7 mm long, the awned lobes 4—5 mm long, central awn 10—12 mm long. *D. macgregorii*
1. Glumes harder and broader, usually distinctly longer than the florets (without the awns). Lemmas more deeply bifid with a short, obtuse callus.
   3. Lemmas glabrous on the back and the sides, only hairy at the base and sometimes on the margins.
      4. Spikelets large, the glumes up to 20 mm long. Lower joints of the rhachilla 1.5 mm long or more. Bodies of the lower lemmas 6—7 mm long, at the base with long, white hairs, the lobes tapering into bristle-like awns up to 8 mm long, the central awn up to 20 mm long. Blades pilose. . . . *D. schneideri*
      4. Spikelets much shorter, the glumes 10 mm long or less. Lower joints of the rhachilla 0.5 mm long. Bodies of the lower lemmas 3—4 mm long, a tuft of hairs at the base and on the margins above the callus and often small marginal tufts, the lobes tapering into fine awns, 4 mm long or more, the central awn 8—12 mm long. Blades in the Malaysian specimens glabrous. *D. pilosa*
   3. Lemmas hairy all over or with a conspicuous ring of hairs below the lobes.
      5. Lemmas hairy all over, or the hairs indistinctly placed in 2 rows. Body of the lower lemmas 3 mm long, the lobes 4—5 mm long, lanceolate, tapering into an awn-like bristle. Blades setaceously involute, densely hirsute-villous. *D. vestita*
      5. Hairs on the lemma placed in distinct rows, the upper row just below the side-lobes.

6. Body of the lemmas very short and broad, 2 mm long, distinctly nerved, the spreading, triangular, awnless lobes about as long. Blades teretely involute, junciform, erect, glabrous, and smooth. . . *D. mamberamensis*
6. Body of the lower lemmas 3 mm long, indistinctly nerved, the lobes about 8 mm long, consisting chiefly of a slender awn. Blades narrow, more slender, usually glabrous. . . . . *D. semiannularis*

DICHANTHIUM Willemet

DICHANTHIUM ERECTUM Ohwi *in* Bull. Tokyo Sci. Mus. No. 18: 11. 1947.

Perennial on a short, hard rhizome without stolons; culms 30—50 cm high, simple, erect, very slender, many-noded, glabrous and smooth; sheaths shorter than the internodes, tight, terete, glabrous; ligule very short, nearly wanting; blades rather stiff, the lower erect, the upper obliquely spreading, linear, flat, 3—4 cm long, 2—3 mm wide, glabrous to sparsely hairy with long, soft hairs especially near the base; panicle reduced to 1 long exserted raceme; racemes 3—5 cm long, rather loosely spikeled, 5—10 articulated, the slender joints about 2.5 mm long, ciliate along the margins and at the tip; lower 2—4 spikelets male or reduced, muticous; sessile spikelets lanceolate to elliptic, 4.5—5 mm long, the base white-bearded; first glume as long as the spikelet, elliptic-lanceolate, glabrous, very narrowly winged and minutely ciliolate towards the tip, indistinctly 6—7-nerved; second glume as long, obtusish or minutely mucronate; sterile lemma 3 mm long, hyaline, nerveless; fertile lemma nearly reduced to a twice geniculated awn, 15—20 mm long; pedicels 1.5 mm long, ciliate along the margins and at the tip; pedicelled spikelets male or neuter, muticous (the first glume rarely with one or more pits).

This is the emendated description of Ohwi's type specimens from Timor (Walsh 45) in the Bogor Herbarium. On this sheet are specimens with unpitted and with 1—3-pitted pedicelled spikelets. Walsh 32 from Timor is apparently the same species. The specimens of this number in the Bogor Herbarium are not so strictly erect, the blades somewhat wider and especially the culm-blades are more spreading. On the sheet with the same number in the Herbarium of the British Museum, London, some of the specimens have unpitted pedicelled spikelets next to others where the spikelets have a series of pits.

DIMERIA R. Br.

1. DIMERIA ORNITHOPODA Trin., Fund. Agrost. 167. 1820.

Didactylon simplex Zoll. & Mor. *in* Mor., Syst. Verz. 100. 1845-1846.

Usually the number of racemes is 2. Very rarely some of the culms of a plant bear 3 racemes. I only saw one specimen with all the culms bearing 3—4 racemes (Luzon, Clemens 17636).

Most specimens belong to variety *tenera* Hack. [Androp. *in* DC., Monogr. Phan. 6: 80. 1889; *Dimeria tenera* Trin. *in* Mém. Acad. Sci. St. Pétersb. 6 (2) : 335. 1833], tender, low, gracile plants with long exserted inflorescences, the leaves mostly at the base.

From Java is known variety *ramosa* Hack. (*op. cit.* p. 82; *Didactylon ramosum* Zoll. & Mor., *op. cit.* p. 100) : plant much branched at the base, the culms ascending, with short but dense racemes, and spikelets 2 mm long.

More interesting is **Dimeria ornithopoda** var. **glabra** (Ridl.) Jansen, *comb. nov.* (*Dimeria glabra* Ridl., Fl. Mal. Pen. 5: 192. 1925). An error in his description must be corrected, the spikelets not being 1 inch, but 1 line long.

Slender plants with short racemes. Callus glabrous or with a few short hairs. Second glume somewhat broader than in the type. Awn of the fertile lemma reduced to wanting.

DISTRIBUTION.—I saw this variety from the Malay Peninsula, Burkill 4674; Sumatra, Bartlett 8342; Java; Borneo; and New Guinea, Brass 7850, 5984.

The last specimens are *Dimeria glabriuscula* F. M. Bailey as identified by Reeder (*in* J. Arn. Arb. 29: 326. 1948).

This might be a separate species. I could not study Bailey's type from Australia, only a New Guinean specimen, Brass 5984, cited by Reeder. This is a slender specimen, much taller than the common Malaysian plants. Reeder characterized it as having a narrowly winged second glume, the wing extending quite or nearly to the base. Ridley's type specimen of *Dimeria glabra* in the Kew Herbarium is very young, and the young spikelets have indeed a second glume with a very narrow wing. But in the more mature spikelets of Brass 5984, the glume is plicate and contracted, a keel is no more to distinguish.

2. DIMERIA DIPTEROS Reeder *in* J. Arn. Arb. 29: 324. 1948.

This species is nearly related to *Dimeria chloridiformis* (Gaud.) K. Schum. & Lauterb. from the Marianne Islands, with which it was confused by Hitchcock (*in* Brittonia 2: 124. 1936). I have compared Brass 4802 with a topotype of *D. chloridiformis* in the Kew Herbarium and I agree with Reeder, that the two are different species. They can be opposed as follows:

	D. dipteros	*D. chloridiformis*
Culms	quite glabrous.	short pubescent below the inflorescence.
Racemes	2—4.	4—5.
Rhachis	glabrous with long ciliate very broad wings.	pubescent all over, the ciliate wings narrower.
First glume	with a wing wider than the glume.	wingless, apiculate.
Second glume	with a wing 0.5 mm wide.	wingless or with a minute wing just below the tip.

DISTRIBUTION.—Only known from New Guinea, Brass 4802, 11738.

3. DIMERIA FUSCESCENS (*non* Trin.) *sensu* Ridl., Fl. Mal. Pen. 5: 191. 1925.

The specimen inserted in the Singapore Herbarium is *Eulalia trispicata* (Schult.) Henr. The "*D. fuscescens*" in the Kew Herbarium (Ridley 14880), however, is a true *Dimeria*. It is a rather high plant, the erect culm about 80 cm tall and nearly glabrous with bearded nodes. The panicle has 4 racemes, up to 15 cm long. The keels of both glumes are long ciliate. The broader second glume is winged, especially towards the tip. The sterile lemma is about 3 mm long, the fertile lemma slightly longer with an 11—16 mm long awn, the brown twisted column longer than the glumes. In my opinion this is *D. ciliata* Merr. (*in* Philip. J. Sci. 9: 262. 1914). The third specimen bearing the name of "*D. fuscescens* Ridley" is from Kedah (Vesterdal 181). It is *D. leptorhachis* Hack. (Androp. *in* DC., Monogr. Phan. 6: 89. 1889).

ECTROSIOPSIS (Ohwi) Jansen, *gen. & stat. nov.*[3]

Eragrostis P.B. sect. *Ectrosiopsis* Ohwi *in* Bull. Tokyo Sci. Mus. No. 18: 1. 1947.

This genus is more or less intermediate between *Eragrostis* L. and *Ectrosia* R. Br. In habit and structure of the laterally compressed many-flowered spikelets it agrees most with *Eragrostis*. The glumes are 1- or sub-3-nerved. The rhachilla is tough and long persistent or breaks up between the florets. In *Eragrostis* the lemmas are always muticous, but *in* Ectrosiopsis *the lower lemmas are subulate, the upper ones awned, the length of the awnlet increasing upwards*. The upper florets are usually male. In *Ectrosia* the upper florets differ much more from the lower: they are reduced to a long-awned glume or to an awn-like bristle. Besides,

[3] This generic name was already published in the author's "Notes on Malaysian Grasses II" (*in* Acta bot. neerl. 1: 474. 1952), without a bibliographical reference or a description, as "*Ectrosiopsis* (Ohwi) Jansen." Evidently the author intended this generic name as an isonym of Ohwi's subdivisional name cited above. A single new species, *Ectrosiopsis carvifolia* Jansen was described on the earlier occasion.—EDITOR.

the rhachilla disarticulates *between the upper glume and the lower lemma.*

DISTRIBUTION.—*Ectrosiopsis* is restricted to Malaysia and known to occur in the Philippines, Celebes, the Moluccas, and New Guinea.

1. KEY TO THE SPECIES OF ECTROSIOPSIS

1. Sheaths, blades, and culms (the panicle-axis included) pilose. Spikelets about 5-flowered. Glumes 1-nerved. Florets imbricate, the rhachilla not visible.
   2. Blades flat to slightly convolute, 2—3 mm wide. Panicle about 18 cm long, narrow, the axis, branches, and pedicels pilose with the long, white hairs of the pedicels enveloping the spikelets. Spikelets 6—7 mm long, purplish-green. Lower lemmas 2.5 mm long, subulate-acuminate. Upper lemmas 3—3.5 mm long, distinctly awned, the awn more than 1 mm long. . . . . *E. lasioclada*
   2. Blades setaceously involute, 1 mm wide when expanded. Panicle 5—8 cm long, about 1 cm wide, the short branches obliquely spreading. Spikelets 3—5 mm long, yellowish. Lower lemmas 2 mm long, ovate, very acute. Upper lemmas slightly longer, mucronate to shortly awned, the awnlet ½—⅔ mm long. *E. subtriflora*

1. Sheaths, blades, and culms glabrous. Spikelets up to 9-flowered. Glumes 1- or sub-3-nerved. Florets loosely imbricate, the rhachilla visible.
   3. Blades flat, soft, 3—4 mm wide. Panicle 15—20 cm long, with ascending to erect, loosely spikeled branches, the axils pilose. Spikelets up to 7-flowered, 5—7 mm long, yellowish-green. Glumes subequal, 1-nerved. Lower lemmas 2 mm long, broadly lanceolate and very acuminate. Upper lemmas slightly longer, tapering into an awnlet about 1 mm long. . . . . *E. aruensis*
   3. Blades folded or involute, rigid, 1—2 mm wide. Panicle up to 15 cm long, the solitary ascending branches rather rigid and densely spikeled with sometimes a few hairs in the axils. Spikelets purplish, to 9-flowered, 7—9 mm long. Glumes unequal, sub-3-nerved. Lower lemmas 3 mm long, subulate. Upper lemmas 3.5 mm long with a spreading awn, 1—1.5 mm long. . . . . *E. subaristata*

2. **Ectrosiopsis lasioclada** (Merr.) Jansen, *comb. nov.*

Eragrostis lasioclada Merr. *in* Philip. J. Sci. 1 (Suppl.): 382. 1906.

By courtesy of Dr. S. R. Swallen I received a fragment of the duplicate type (in Washington Herb.: Culion, Merrill 461, Dec. 1902; in Merrill's publication the type is cited as 416, probably a printer's error). A second specimen was found in the Bogor Herbarium among a lot of unlabelled grasses from the Philippines (?) without collector-name or number.

(*Ectrosiopsis lasioclada* may be the plant credited to the Philippines by F.-Villar as *Eragrostis ciliata* Nees.)

3. **Ectrosiopsis subtriflora** (Ohwi) Jansen, *comb. nov.*

Ectrosia subtriflora Ohwi *in* Bot. Mag. Tokyo 56: 1. 1942.
Eragrostis subtriflora (Ohwi) Ohwi *in* Bull. Tokyo Sci. Mus. No. 18: 1. 1947.

DISTRIBUTION.—Only known from Netherlands New Guinea, Waren, Kanehira & Hatusima 13165.

4. **Ectrosiopsis subaristata** (Chase) Jansen, *comb. nov.*

Eragrostis subaristata Chase *in* J. Arn. Arb. 20: 305. 1939.

DISTRIBUTION.—New Guinea: Middle Fly R., Brass 7879 (*type*); and Lower Fly R., Brass 8348. Moluccas: Aru Is., P. Trangan, Buwalda 5526a. SE Celebes: Rumbia, Elbert 3081.

5. **Ectrosiopsis aruensis** Jansen, *sp. nov.*

Perennis, dense caespitosa; culmi 50—60 cm alti, tenues, 3—4-nodi, glabri, erecti, nodis glabris; vaginae glabrae laeves, internodiis breviores, ore barbatae; ligula brevissima, truncata, ciliolata; laminae lineares, 10—20 cm longae, 2,5—4 mm latae, planae, molles, supra glaucescentes et minutissime scabrae, subtus virides et laeves, marginibusque quando juveniles sparsim longe pilosae; panicula demum exserta, linearis, laxiuscule plurispiculata, 10—20 cm longa, ramis ascendentibus vel erectis, solitariis, scabris, angulatis, axillis pilosis; pedicelli laterales 1—3 mm longi, nudi; spiculae anguste oblongae, compressae, pallide stramineae, 5—7 mm longae et 2 mm latae, 5—7-florae; glumae subequales, lanceolatae, acutae, uninerviae, circa 2 mm longae, deciduae, dorso carinis scabris; rhachilla diu persistens et valida, demum a basi decidua, eximie flexuosa, a latere visibilis, articulis circa 0,4 mm longis; lemmata maturitate a basi apicem versus gradatim decidentia, late lanceolata, minute scaberula, tenuiter trinervia, laxe imbricata, 2 mm longa, apice acuminata dorso in ⅔ parte superiore scabra, in flosculo summo acumine circa 1 mm longo quasi aristata; palea diu cum rhachilla persistens, 1,5 mm longa, carinis basi ciliolatis, plus minusve recurva; stamina 3, antherae atratae, ¼—⅓ mm longae.

DISTRIBUTION.—Only known from the Moluccas, Aru Is., P. Trangan, Buwalda 5306 (*type;* Herb. Bogor.), 5526.

ERAGROSTIS P.B.

1. ERAGROSTIS CHARIIS (Schult.) Hitchc. *in* Lingnan Sci. J. 7: 193. 1931; C. E. Hubb. *in* Kew Bull. 1949: 345.

Poa elegans Roxb., Fl. ind. 1: 339. 1820, *non* Poir. (1804).
Poa chariis Schult., Syst. veg. Mant. 2: 314. 1824.
Poa elegantula Kunth, Rév. Gram. 1: 114. 1829.
Eragrostis elegantula (Kunth) Steud., Syn. Pl. Glum. 1: 266. 1854, *non* Nees *apud* Miq., Analec. bot. ind. 2: 27. 1851; Ridl. *in* J. Straits Br. roy. As. Soc. 46: 221. 1906; Fl. Mal. Pen. 5: 248. 1925; Koord., ExkFl. Java 1: 158. 1911; Merr., Bibl. Enum. Born. Pl. *in* J. Straits Br. roy. As. Soc., Spec. No., 51. 1921.
Eragrostis luzoniensis Steud., Syn. Pl. Glum. 1: 266. 1854.
Eragrostis bahiensis (*non* Schult.) *sensu* Backer, Handb. Fl. Java Afl. 2: 243. 1928).

This glaucous perennial has caused much confusion. During 50 years the name *Eragrostis gangetica* Steud. (Syn. Pl. Glum. 1: 266. 1854) has been misapplied to this species, most authors accepting Stapf's identifi-

cation (*in* Fl. capensis 7: 617. 1900), where he had altered his previous identification as *E. elegantula* (Kunth) Steud. (Stapf *in* Hook. f., Fl. Br. India 7: 318. 1897).

C. E. Hubbard (*in* Kew Bull. 1949: 345) looked up the original description, examined the drawing (Roxburgh, Icones ined. *pl. 2111*) and discovered in the Herbarium of the British Museum an authentic specimen of *Poa gangetica* Roxb. This enabled him to identify it with *E. cambessediana* (Kunth) Steud. and *E. stenophylla* Hochst. ex Miq. (Analec. bot. ind. *in* Verh. 1e Kl. Kon. Ned. Inst. Amst., 3e Reeks, 4: 39. 1851). This is the species that has to bear the name *E. gangetica* (Roxb.) Steud.

The earliest name available for the species described in the "Flora of British India" as *E. elegantula* and in the "Flora Capensis" as *E. gangetica* appeared to be *Poa elegans* Roxb. (1820), but this name is antedated by the earlier *Poa elegans* Poiret (1804). On this account Schultes (*in* Syst. veg. 2: 314. 1824) changed *Poa elegans* Roxb. into *Poa chariis*. Later Kunth gave it the name *Poa elegantula* and treated *Poa chariis* as a synonym. Both epithets were transferred to *Eragrostis*. The first, *E. chariis* (Schult.) Hitchc. (*l.c.*) is the name adopted for the Malaysian specimens. They can be easily distinguished from *E. cumingii* Steud. by the deciduous palea, the more effuse and divided panicle and the longer-pedicelled spikelets.

DISTRIBUTION.—In Malaysia: Malay Peninsula, Sumatra, Java, the Lesser Sunda Is., Borneo, the Philippines, the Moluccas, and New Guinea.

2. ERAGROSTIS ELONGATA (Willd.) Jacq., Eclog. Gram. 3: *pl. 3*. 1818; Black, Fl. South Australia, 2nd Ed., 1: 119 *f. 152*. 1948.

Eragrostis elongata, based on *Poa elongata* Willd. (Enum. Hort. berol. 1: 108. 1809), the type of which was studied by Hubbard, is the same species as the later described *E. diandra* (R. Br.) Steud. (Syn. Pl. Glum. 1: 279. 1854), based on *Poa diandra* R. Br. (Prodr. 180. 1810). It is a common grass in most parts of Australia, also occurring in New Guinea and Morotai, but not elsewhere in Asia. The only specimens I saw of it from Malaysia are Schlechter, Plantae Papuanae 18418 (Kaiser-Wilhelmsland) and Kostermans 8 (Moluccas, Morotai). It is characterized by its narrow spike-like panicle, continuous or interrupted towards the base, with dense sessile clusters of 3—6 mm long and 2 mm wide spikelets. Glumes lanceolate, about 1 mm long. Rhachilla not articulate, the florets very imbricate. Lemmas short and broad, 1.5 mm long, whitish to purplish with conspicuous green lateral nerves, granulose-scabrous between the nerves. Palea persistent, shortly ciliate on the keels. Stamens 2, small, purple. Grain almost globular, 0.5—0.75 mm long.

By solving the question of *E. gangetica*, C. E. Hubbard, raised a new one. What are the correct names of the related Malaysian species, identified up till now with *E. elongata* by Koorders (ExkFl. Java 1: 158. 1911), Merrill (Bibl. Enum. Born. Pl. *in* J. Straits Br. roy. As. Soc., Spec. No., 158. 1921; Enum. Philip. fl. Pl. 1: 88. 1923), Jedwabnick (*in* Bot. Arch. 5: 248. 1925), Backer (Handb. Fl. Java Afl. 2: 240. 1928), Ohwi (in sched. Herb. Bogor.)?

On the advice of Dr. Hubbard, I have accepted the names *E. cumingii* Steud. and *E. zeylanica* Nees & Meyen.

Both species have a more open, interrupted panicle with the separate branches more or less spreading, often at right angles with the axis. The short-pedicelled spikelets are usually placed on one side or in small clusters from below upwards. The spikelets are flat when mature, with a longitudinal furrow between the rows of imbricate florets. Rhachilla-joints minute. Paleas somewhat curved and persistent when the fruits have fallen out. The anthers very minute, ½ mm long. Grain subglobose.

The two species may be separated as follows:

Annual. Spikelets 1.5—2 mm wide; lemmas 1.5—2 mm long. . . . . *E. cumingii*
Perennial. Spikelets 2—2.7 mm wide. Lemmas 2—2.5 mm long. . . . . *E. zeylanica*

3. ERAGROSTIS CUMINGII Steud., Syn. Pl. Glum. 1: 266. 1854.

Eragrostis distans Hack. *in* Govt Lab. Philip. Publ. No. 35: 81. 1906.
Eragrostis brownii (*non* Nees ex Steud.) *sensu* Backer, Handb. Fl. Java Afl. 2: 239. 1928.

A rather common species, locally very abundant, from sealevel to 2000 m altitude. It is very variable in habit, in dimensions, in the shape of the panicle, and in length and number of the florets.

For some extreme forms I propose the following names:

Var. **novoguineensis** Jansen, *var. nov.*

Culmi plus quam 1 m alti; laminae elongatae, angustae, subinvolutae, usque ad 40 cm longae; panicula 30—40 cm longa, internodiis axis circa 10 cm longis, ramis singularibus, patentibus horizontalibus, 3—4 cm longis.

DISTRIBUTION.—Only seen from New Guinea, on open sandy places and savannaland at low altitudes: Kanosia, Carr 11105 (*type;* Herb. Lugd. Bat.); Area R., Carr 11431; Lake Daviumbu, Brass 7520, 7853; Mabaduan, Brass 6541; Gaima, Brass 8349, and from Timor-laut (Tanimbar Arch.): Buwalda 4082, 4068.

Var. **rindjaniensis** Jansen, *var. nov.*

Culmi simplices, minus quam 10 cm alti; laminae minus quam 1 cm longae; panicula ad racemum depauperatum reducta; spiculae 1—8 mm longae.

DISTRIBUTION.—Only seen from Lombok, Mt. Rindjani, Elbert 1276 (*type;* Herb. Lugd. Bat.). Growing separately but in large quantities at about 2000 m altitude in bogs.

Var. **kisarensis** Jansen, *var. nov.*

A typo differt culmo superne et axe paniculae pilis basi tuberculatis sparse indutis; in axillis ramorum longe pilosa.

DISTRIBUTION.—Only seen from Kisar (Lesser Sunda Is.), Bloembergen 3840 (*type;* Herb. Bogor.).

4. ERAGROSTIS ZEYLANICA Nees & Mey. *in* Nov. Acta caes. Leop.-Carol. Suppl. 1: 204. 1843.

Very near to *E. cumingii* but perennial. (Often the herbarium specimens are rootless culms, lacking the rhizome, with no or few innovation-shoots, due to the careless way in which they were gathered.) The spikelets are larger, distinctly wider, and very flat when mature. The lemmas are longer and in side-view very acute. The lower part of the mature spikelets consists only of the rhachilla, set with silvery, curved paleas.

Many specimens from the Philippines have been distributed as *E. spartinoides* Steud. (Syn. Pl. Glum. 1: 265. 1854). In their typical form these plants grow in small but very dense tufts. They have very wiry culms, shorter and more adpressed panicle-branches, and smaller, dark spikelets. Taking into account the variability of the species, segregation even as a variety does not seem advisable.

5. ERAGROSTIS MALAYANA Stapf *in* Hook. f., Fl. Br. Ind. 7: 317. 1897.

This annual species is very near to *E. unioloides* (Retz.) Nees, but differs in the inconspicuous side-nerves of the short, mucronate lemma and in the persistent palea. The almost straight rhachilla bears 10—30 closely imbricate florets.

DISTRIBUTION.—It seems to be a rather rare species. I only saw specimens from the Malay Peninsula, Burkill 16131, S.F.5281 & 6450, J. Sinclair, *anno* 1949; Sumatra, Veearts van Sibolga 7; Banka, Bünnemeijer 2494; North Borneo, Beccari 872, Clemens 21314; Sumba, Monod de Froideville 2033.

6. ERAGROSTIS RIPARIA (Willd.) Nees *in* Mart. Fl. bras. 2: 512. 1829.

This perennial species is rather rare in Malaysia. Besides some specimens from the Philippines I saw some from British New Guinea, Fitzgerald 2a.

7. ERAGROSTIS WARBURGII Hack. *in* Bot. Jb. 13: 262. 1891.

Eragrostis timorensis Henr. *in* Fedde, Repert. 18: 240. 1922.

In section *Cataclastos* Stapf most of the species have the lateral nerves in the middle of the sides of the lemmas. There is a small group of species with these nerves very near to the margins of the lemmas. One of these species is a native of Malaysia, occurring in the Kangean Islands, Timor, south-eastern Celebes, the Kay Islands. It was described by Hackel (*l.c.*), the type having been collected by Warburg (20948) on Dula Island.

Henrard (*l.c.*) described *E. timorensis* as a new species from Timor; it was collected by R. Brown in 1803 at Kupang, the only record in about 150 years. Henrard compared his new species with the description of *E. warburgii*, of which he did not examine the type, and indicated differences with *E. warburgii* mainly in the structure of the panicle and in the shape of the lemmas. The type specimens of *E. timorensis* in the Leiden Herbarium have an elongate, narrow panicle, with whorled suberect branches, glabrous in the axils, enclosed at their base in the uppermost sheaths. The plants are very young. As I saw in some of the axils minute expanding-tubercles, it is possible that in older plants the branches might become more spreading.

By courtesy of Dr. K. Rechinger, director of the Vienna Herbarium, I could study Hackel's type of *E. warburgii*. It consists of rootless culms of a much older plant. The panicle is oblong, the solitary or mostly binate branches are more spreading, with here and there expanding-tubercles, and some hairs in the axils.

In later years more material from the Kay Islands has been collected (J. van den Berg 6). Together with the Kangean Islands and Celebes specimens they form a perfect link between the two extremes. Some of them have the panicle of the 'warburgii' type, but other specimens have contracted panicles with more stiff, erect branches, the difference with the 'timorense' type being very slight. Backer 29734 (Sabumba, Kangean Islands) has the branches in whorls but they are more spreading than in the 'timorense' type. In the fine specimens from south-eastern Celebes (Elbert 2924) the axils of the whorled branches are more hairy. It is possible to arrange a series, uniting the two panicle-structures by intermediate stages. As the variability of the shape of the panicle in many species of the *Cataclastos* group is well known, it seems to me that the differences, described above, are unessential and not constant enough for specific discrimination.

More or less the same variability reigns in the shape of the lemmas. Hackel described the lemma of *E. warburgii* as oblong, obtuse. Henrard

described the lemmas of *E. timorensis* as subtruncate, short-mucronate. Studying the whole material together, the tip of the lemma appears variable. When flattened out the lemmas are all more or less obtusish, from subtruncate to more pointed; in side-view many seem shortly mucronate. Now and then the central nerve is shortly excurrent, forming a minute, scaberulous mucro. In other spikelets, often in the same panicle, the side-nerves slightly exceed the lemma. The surface of the lemma is variable too: from quite smooth to minutely strigulose.

In my opinion the two types represent the same species, the differences discussed above are too trifling and too variable for specific distinction. The older name of Hackel being the correct one, *E. timorensis* Henr. becomes a synonym. *E. warburgii* can be easily distinguished from *E. ciliaris* (L.) R. Br., the second species of the *Cataclastos* group with the side-nerves of the lemma near the margin:

Panicle loose, from narrowly linear to spreading, up to 30 cm long. Pedicels 2—3 × as long as the spikelet. Lemmas obtusish to mucronate. Palea setose-pilose. *E. warburgii*

Panicle dense and interruptedly spike-like. Pedicels shorter than the spikelets. Lemmas oblong. Palea densely and conspicuously long-ciliate. . . . . *E. ciliaris*

8. Jedwabnick (*in* Bot. Arch. 5: 178. 1924) mentions *E. ciliaris* from the Philippines. I did not see a specimen from that region. The only Malaysian specimen I saw, is in the Herbarium at Wageningen (Herb. Vadense), leg. Molhuysen, Besuki, Java, April 1903, "in fruticetis." It was possibly introduced there or cultivated, and nobody ever found it again in Java since. Moreover, there is severe doubt about the Javan origin of the Molhuysen collection which contains quite a number of exotic species never traced again (*cf.* Van Steenis *in* Fl. mal. I 1: xxiii, xxviii. 1950).

9. ERAGROSTIS TENELLA (L.) P.B. *ex* R. & Sch., Syst. veg. 2: 576. 1817.

When Henrard (*in* Blumea 3: 423. 1940) discussed the name of *E. amabilis* (L.) Wight & Arn., he came to the conclusion that it was not allowed to apply the name *E. tenella* to it, because *Poa amabilis* L. has priority of place in Linnaeus' "Species Plantarum."

Hitchcock (Man. Grasses U.S. 147, 847. 1935) accepted the name *E. amabilis* for this annual grass with prominently ciliate paleae, and used *E. tenella* for another species, with scabrous-keeled paleae; the latter species has to be called *E. japonica* (Thunb.) Trin. Stapf (*in* Hook. f., Fl. Br. Ind. 7: 315. 1897) united *Poa amabilis* L. and *Poa tenella* L. under *E. tenella* var. *plumosa* (Retz.) Stapf, the types of both in the Linnean Herbarium representing the same species.

I asked the opinion of Dr. C. E. Hubbard about this question. The "International Rules of Botanical Nomenclature" (Ed. 1935; Art. 56) state, that when two or more groups of the same rank are united, the earliest legitimate name or epithet is retained. However, if the names or epithets are of the same date, the author who unites the groups has the right of choosing one of them. The author who first adopts one of them, definitely treating the other as a synonym, must be followed. Stapf treated *Poa amabilis* and *Poa tenella* as synonyms of *E. tenella* and his preference being the first, he must be followed. The mere fact that *Poa amabilis* appears on an earlier page than *Poa tenella* does not give it any preference, since the date (1753) is the same in both cases.

ERIANTHUS Michx.

1. **Erianthus beccarii** (Stapf) Jansen, *comb. nov.*

Spodiopogon beccarii Stapf *in* Kew Bull. 1898: 228. — Sumatra, Padang Highlands, Beccari 398.

Erianthus decus-sylvae Ridl. *in* J. Mal. Br. roy. As. Soc. 1: 110. 1923. — Sumatra, forest on West Hill, Berastagi, leg. Ridley.

Erianthus sumatranus Henr. *in* Fedde, Repert. 22: 349. 1926. — Sumatra, Sibolangit, Lörzing 6012.

DISTRIBUTION.—Endemic in Sumatra, Beccari 398, Lörzing 6012, 7807, 9433, Jeswiet 691, Van Steenis 8747, Bartlett 8631.

This species is not a *Spodiopogon* but belongs to *Erianthus* sect. *Ripidium* (Trin.) Henr. The first glume has the two lateral nerves longer and stronger than the intermediate nerves and the margins inflexed. There is no midnerve like in *Spodiopogon*. The fertile lemma is bidentate with the teeth variable in length, but not as deeply split as in *Spodiopogon*, which genus, moreover, differs in habit and structure of the panicle. The morphological characters given to distinguish and delimit the genera of the Saccharinae in the principal handbooks are all but illusory. Re-examination of this section is necessary to enable a better evaluation of the characters in use.

2. **Erianthus fallax** (Balansa) Jansen, *comb. nov.*

Saccharum fallax Balansa *in* J. de Bot. (ed. Morot) 4: 80. 1890.

In 1891 Hackel (*in* Oesterr. bot. Z. 41: 6) described the same species as *Erianthus chrysotrix*, a name also used by Hooker f. (Fl. Br. Ind. 7: 125. 1897). A. Camus (*in* Lec., Fl. gén. Indo-Ch. 7: 246. 1922) called it

Erianthus longifolius (Munro) A. Camus, a recombination of *Saccharum longifolium* Munro ex Benth. ("Notes on Gramineae" *in* J. Linn. Soc., Bot. 19: 66. 1861), but the latter name is a nomen nudum.

Bor (*in* Kew Bull. 1948: 162) included this species in the genus *Narenga* Bor (*in* Ind. Forester 66: 267. 1940) as *Narenga fallax* (Balansa) Bor; in his description and discussion of this genus (*in* Kanjilal & others, Flora Assam 5: 316-318. 1940) he indicates the upper lemma as awnless. As *E. fallax* has a perfect awn 4—7 mm long, this species cannot be transferred to *Narenga*.

DISTRIBUTION.—India, Indo-China, Malaysia (Sumatra and Borneo).

ERIOCHLOA Kunth

ERIOCHLOA PROCERA (Retz.) C. E. Hubbard *in* Kew Bull. 1930: 256.

Agrostis procera Retz., Obs. bot. 4: 19. 1786.
Milium ramosum Retz., Obs. bot. 6: 22. 1791.
Eriochloa ramosa (Retz.) O.K., Rev. Gen. Pl. 2: 775. 1891; Merr., Bibl. Enum. Born. Pl. *in* J. Straits Br. roy. As. Soc., Spec. No., 143. 1921; Enum. Philip. fl. Pl. 1: 58. 1923; Backer, Handb. Fl. Java Pt. 2: 133. 1928.
Eriochloa sundaica Miq., Fl. Ind. bat., Suppl. 606. 1862.

Eriochloa procera has often been confused with *E. punctata* (L.) Desv., but the latter species is perennial, has larger, 4—5 mm long spikelets, and the second glume shortly awned, whereas *E. procera* is an annual, has 3—4 mm long spikelets, and the second glume muticous. As in *E. procera* the first glume is wanting, the species is easily to distinguish from *E. polystachya* H.B.K., which has a minute but distinct first glume.

Ridley (Fl. Mal. Pen. 5: 223. 1925) mentioned specimens from the Malay Peninsula, under the name of *E. annulata* Kunth. As far as I have seen his specimens they represent *E. procera*.

Eriochloa procera is rather variable in the length of the panicle, the number of racemes, the indument, and the length of the pedicels. *Eriochloa ramosa* var. *involucrata* Hackel [*in* Philip. J. Sci. 1 (Suppl.): 349. 1906] was described with the pedicels densely hairy, the hairs more or less enveloping the spikelets. The specimens I saw have a looser panicle with spreading racemes and the hairs of the pedicels long, dense, and enveloping the base of the spikelet [Velasquez 292, Philippines; Yates 889, East Coast Sumatra; Veearts van Savoe *s.n.* in Herb. Bogor., Lesser Sunda Is.; Buwalda 4113, Timor-laut (Tanimbar Is.)]. Transferred to *E. procera*, this variety may be called **Eriochloa procera** var. **involucrata** (Hack.) Jansen, *comb. nov.*

EULALIA Kunth

1. This genus, a segregate of the large genus *Pollinia* Trin., comprises about 25 species, as treated by Hackel (Andropogonaceae); 11 of these have been recorded from Malaysia. They may be distinguished by the following key:

KEY TO THE MALAYSIAN SPECIES OF EULALIA

1. First glume 2-aristate, second glume 1-aristate. . . . . *Eu. milsumi* Ridl.
1. Glumes muticous.
2. Racemes with yellowish, fulvous to golden brown hairs.
3. Awn of the upper lemma imperfect, straight, 6 mm long. Plants with long creeping and branching rhizomes, short, erect, wiry culms, and acuminate, rigid blades. . . . . *Eu. ridleyi* (Hack.) Stapf
3. Awn of the upper lemma perfect, geniculate, longer. Plants cespitose on a short, knotty rhizome, or with slender, ascending stolons.
4. Culms with thick woolly base. Racemes thick, 5—7 cm long. Spikelets 5 mm long or more. . . . . *Eu. fulva* (R. Br.) O.K.
4. Culms with glabrous base.
5. Racemes yellowish hairy, up to 10 cm long, very fragile. Spikelets distant, 5.5 mm long. . . . . *Eu. velutina* (Hack.) O.K.
5. Racemes fulvous to dark brown, densely flowered. Spikelets shorter.
6. Racemes 2—4, short and slender. Awn 10—12 mm long, geniculate about the middle. . . . . *Eu. leschenaultiana* (Decne) Ohwi
6. Racemes 4—10, stiff and narrow. Awn up to 20 mm long, geniculate just above the glumes. . . . *Eu. leptostachys* (Pilg.) Henr.
2. Racemes silvery, greyish, or purplish hairy.
7. Spikelets 6—7.5 mm long. First glume with 4 nerves (2 between the keel-nerves).
8. Sheaths at base of culm glabrous. Awns up to 20 cm long. *Eu. quadrinervis* (Hack.) O.K.
8. Sheaths at base of culm tomentose. Awns up to 25 cm long. *Eu. lanipes* Ridl.
7. Spikelets shorter. First glume with only the 2 keel-nerves.
9. Annual, slender, 30—60 cm tall. Racemes 2—6, up to 6 cm long. *Eu. fimbriata* (Hack.) O.K.
9. Perennial, robust, up to 1 m tall. Racemes 10—20, 8—15 cm long.
10. Culm-base glabrous. . . . . *Eu. trispicata* (Schultes) Henr.
10. Culm-base tomentose. . . . . *Eu. lagopus* (Hack.) Henr.

2. EULALIA LESCHENAULTIANA (Decne) Ohwi *in* Bull. Tokyo Sci. Mus. No. 18: 2. 1947.

Until 1921 this species was generally named *Pollinia cumingii* Nees [*in* Hook. J. Bot. 2: 98. 1850; Miquel, Fl. Ind. bat. 3: 522. 1857; Hackel, Androp. *in* DC., Monogr. Phan. 6: 167. 1889; Merrill *in* Philip. J. Sci. 1 (Suppl.): 323. 1906]. It has been referred to *Eulalia* by Miss A. Camus (*in* Ann. Soc. linn. Lyon 68: 203. 1921) as *Eu. cumingii* (Nees) A. Camus.

Reeder (*in* J. Arn. Arb. 29: 335. 1948) followed her. But Miss Camus had overlooked *Andropogon leschenaultianus* Decne (Herb. timor. Descr. *in* Nouv. Ann. Mus. Paris 3: 357. 1834). Ohwi (*l.c.*) changed the name into *Eu. leschenaultiana,* without having seen the type. I examined the type of Decaisne's name in the Paris Herbarium. It certainly represents the plant generally named *Pollinia cumingii,* and Ohwi was right in his transfer.

This species extends from China to Micronesia. In Malaysia it is known from the Malay Peninsula, Borneo, the Philippines, Celebes, Timor, Sumba, and Sumbawa. I did not see any specimen from Java.

The plant recorded from Solor (Reinwardt 1283; Herb. Lugd. Bat.) by Buse (*in* De Vriese, Pl. Ind. bat. orient. 103. 1857) as *Ischaemum binatus* (Retz.) Buse is *Eu. leschenaultiana.* However, the type of this recombination and of its basinym, *Andropogon binatus* Retz., is not the same species, but represents *Ischaemum angustifolium* (Trin.) Hook. = *Eulaliopsis binata* (Retz.) C. E. Hubb.

Backer (Handb. Fl. Java Afl. 2: 43. 1928) who discussed *Pollinia fulva* R. Br. had not seen it from Java, but he had found specimens in the Bogor Herbarium from the Lesser Sunda Islands. His description and the localities cited indicate that his records are referable to *Eu. leschenaultiana.*

Pollinia fulva R. Br., transferred by O. Kuntze to *Eulalia,* is an Australian species, recorded from Flores. I saw the Flores specimens (Posthumus 3043 and Rensch 1548). They resemble *Eu. leschenaultiana* but differ in the more robust, erect culms with a thick, tomentose base, longer and more rigid blades, the sheaths distinctly hairy towards the top, the very thick, dense racemes, and the larger spikelets, about 5 mm long, lacking the sterile lemma. Ridley recorded this species from New Guinea. I did not see any specimen from this island. Misidentification with *Eu. leptostachys* (Pilg.) Henr. is probable, the latter species being endemic in New Guinea and known from many districts.

HIEROCHLOË R. Br.

HIEROCHLOË HORSFIELDII (Kunth) Maxim. *in* Bull. Acad. Sci. St. Pétersb. 32: 727. 1888.

Ataxis horsfieldii Kunth, Rév. Gram. 1: 22. 1829.

This perennial species is restricted to Java (from G. Tjareme eastward) and North Borneo (Mt. Kinabalu). It is a high-mountain species, occurring between 2000 and 3300 m altitude, with strongly branching rhizomes and striking by the fragrance of the fading leaves. In every spikelet I examined I found the first floret staminate with three anthers and the second floret neuter, reduced to the lemma and a very short, hyaline palea. The lower lemmas are two-lobed with a thin, short awn in the sinus. In none of the descriptions available to me I found anything about an awned fertile lemma. Yet, in many specimens the fertile lemma is distinctly awned and the awn variable in length in the spikelets of a single panicle (1—3 mm). Usually this awn is enclosed like the awns of the sterile lemmas, but sometimes these awns are exceeding the scales, giving the spikelet a distinct three-aristate appearance.

SPECIMENS EXAMINED.—JAVA. Priangan: Papandajan complex, G. Djaja, 2000 m, *van Steenis 4922.* Cheribon: *van der Meer Mohr 11.* Tegal: 2300 m, *Docters van Leeuwen 13358.* Banjumas: 2500 m, *Backer 502.* Probolinggo: 2200 m, *Backer 36957* (very long-awned). Pasuruan: 2000—2400 m, *Backer 8360, 8388.*

ISACHNE R. Br.

1. **Isachne albomarginata** Jansen, *sp. nov.*

Perennis; culmi subcaespitosi, 15—30 cm alti, tenues, glabri, erecti, basi tantum breviter ascendentes, nodis patule hirtulis, internodiis 2—4 cm longis; vaginae 1—2 cm longae, glabrae vel pilis patentibus breviusculis pilosae, margine ciliatae; ligula ciliolata; laminae lineari-lanceolatae, viridulae, 3—5 cm longae, 4—5 mm latae, firme herbaceae, acuminatae, basi contractae vel anguste rotundatae, margine manifeste albo-cartilagineo-scaberulae, subtus vix nervosae brevissime et adpresse puberulae, supra elevato-nervulosae, breviter hispido-pilosiusculae vel glabrescentes; panicula erecta, ovata, laxiuscula, 3—5 cm longa, ramis oblique patentibus, flexuosis, laevibus, filiformibus, 2—3 cm longis, pedicellis quam spiculam 2—3-plo longioribus, eglandulosis, apice vix incrassatis; spiculae purpurascentes, obovatae, 1—1,2 mm longae, apice rotundatae vel obtusissimae; glumae glabrae, membranaceae, obsolete 5-nerviae, prima 1—1,2 mm longa, secunda vix 1 mm longa; lemmata aequalia, ovata, puberula vel inferius tantum sparsim puberulum, albida, sursum purpurascentia, apice obtusa, dorso convexa, indistincte nervosa.

DISTRIBUTION.—Borneo, Mt. Kinabalu, Clemens 30270 (*type*), 28164, 29576, 32611, 34121; New Guinea, Mayr 476. Not very frequent on rocks and boulders along creeks and rivers, between 1000 and 2000 m altitude.

This species resembles small forms of *I. beneckei* Hack., but differs in the hirtulous nodes of the culm, the distinct, white-cartilagineous margins of the blades, the smaller obovate and not globose spikelets, and the obscurely nerved glumes.

Var. **hirsuta** Jansen, *var. nov.*

Vaginae laminaeque pilis rigidis longiusculis basi tuberculatis patenter pilosae.

DISTRIBUTION.—Borneo: Liang Gagang, Hallier 2897 (*type;* Herb. Lugd. Bat.), Winkler 1527; Mt. Kinabalu, Clemens 51053, 51223. Celebes: Koorders 17271, 19808.

2. ISACHNE ALBENS Trin., Sp. Gram. Ic. 1: 85. 1828.

This species, common in Malaysia in humid and shaded localities, is rather variable. Some of these variations have been described as separate species.

Var. **elatiuscula** (Ohwi) Jansen, *comb. nov.*

Isachne elatiuscula Ohwi *in* Bot. Mag., Tokyo 56: 5. 1942.

Panicle denser with densely flowered branches.
DISTRIBUTION.—New Guinea, Arfak Mts., Kanehira & Hatusima 14019 (*type*).

Var. **magna** (Merr.) Jansen, *comb. nov.*

Isachne beneckei Hack. var. *magna* Merr. *in* Philip. J. Sci. 1 (Suppl.): 350. 1906.
Isachne magna (Merr.) Merr. *in* Philip. J. Sci. 5: 327. 1910.
Isachne apoensis Elmer *in* Leafl. Philip. Bot. 7: 2676. 1915.

Blades with distinct, white-cartilagineous margins. Panicle very lax and divaricate, the spikelets more scattered.
DISTRIBUTION.—Philippines, endemic and rather common, Merrill 4541.

Var. **sylvestris** (Ridl.) Jansen, *comb. nov.*

Isachne sylvestris Ridl. *in* J. Straits Br. roy. As. Soc. 44: 206. 1905.

Differs from typical *I. albens* in the following characters: sheaths hispid with tubercle-based hairs; blades with the broad base denticulate-hispid; panicle-branches with numerous glandular rings and glumes more or less pubescent in the upper half.
DISTRIBUTION.—Malay Peninsula: endemic and rather rare in lowland woods, Telok Sera, Ridley 7265 (*type*); Rantau Panjang, Ridley 80. Sumatra: Lumbil, Rahmat si Toroes 1758.

3. ISACHNE ARFAKENSIS Ohwi *in* Bot. Mag., Tokyo 56: 4. 1942; Reeder *in* J. Arn. Arb. 29: 310. 1948.

Nearly related to *I. albens* Trin. but differing in the ovoid-pyramidal, more or less contracted panicle with a scabrous axis and rigid, scabrous branches; the somewhat larger spikelets with both glumes at maturity shorter than the spikelet; the firm, strongly nerved blades, appressedly pubescent on the lower surface.
DISTRIBUTION.—Described from New Guinea, Kanehira & Hatusima 13588 (*type;* Herb. Arn. Arb.). Brass collected it on Mt. Tafa, on open banks of a small stream. Reeder (*l.c.*) mentions other localities from New Guinea. In the Melbourne Herbarium is a specimen, collected in Papua by MacGregor in 1894.

4. **Isachne surgens** Jansen, *sp. nov.*

Perennis; culmi e basi longe ascendente vel repente erecti, graciles, firmuli, inferne 1 mm crassi, glabri, laeves, inferne ramosi et radicantes, 80—100 cm longi, nodis glabris; vaginae internodiis breviores, 15—30 mm longae, glabrae, margine ciliatae; ligula ad zonam incrassatam glabram reducta, ore parce ciliata; laminae lineari-lanceolatae, virentes, tenues sed firmulae, margine albo-cartilagineo scaberulae, supra nervis elevatis tenuibus sed distinctis aequalibus percursae, subtus costulis utrinque 2—3, inferne tantum elevatis, et nervulis tenuibus indistinctis percursae, utrinque scabrae, glabrae vel subtus pilosiusculae, magnitudine valde inaequalis, mediae 6—7 cm longae et 5—6 mm latae, superiores decrescentes, planae; panicula 4—5 cm longa, ramis patentibus, capillaribus, flexuosis, laeviusculis, solitariis, ad 2 cm longis, ramulis pedicellisque eglandulosis; spiculae 1,7 mm longae, sordide purpurascentes, glabrae, teretiusculae, oblongae; glumae obtusiusculae, obsolete 7-nerves, glabrae vel raro superne pilis 1—2 praeditae, oblongae, prima 1,7 mm longa, secunda 1,5 mm longa; lemma inferius anguste oblongum, glabrum, chartaceum, obsolete 5-nerve, apice obtusiusculum, gluma prima aequilongum, superius 1,2 mm longum, breviter stipitatum, appresse puberulum, obtusum vel apiculatum, gluma secunda aequilongum.
DISTRIBUTION.—Celebes, Peak of Bonthain, Bünnemeijer 11268 (*type*), 12207, along shaded roads at 1000—2700 m altitude.

This species belongs to section "*Eu-Isachne*" Honda, with the lemmas differing in texture, the first longer and softer than the second and often protruding above it. It has a straggling habit, the long, creeping, strongly branched culms giving it a bushy appearance. The purplish, oblong, obtusish spikelets distinguish it from *I. globosa* (Thunb.) O.K. and *I. diabolica* Ohwi, the latter species having obovoid to globose spikelets, rounded at the tips.

5. ISACHNE CLEMENTIS Merr. *in* J. Straits Br. roy. As. Soc. 76: 76. 1917.

This species, an endemic from North Borneo (Mt. Kinabalu) is like most mountain species rather variable in dimensions.

The typical form has the culms prostrate below, then rigidly ascending, 20—30 cm high, the rigid blades crowded at the base and distichously placed along the culm, with the margins denticulate by tubercle-based hairs. The spikelets are lanceolate when young and more or less gaping at maturity. The equal glumes are longer than the lemmas, obtuse, 3 mm long, glabrous or sparingly pilose towards the tip (Clemens 27077, 31688, 33806 = 32849, 33900).

An extreme form is:

Var. **vulcanica** (Merr.) Jansen, *comb. nov.*

Isachne vulcanica Merr. *in* Philip. J. Sci. 5: 169. 1910.

High-mountain plant of cushion-like habit, less than 10 cm high. Panicle reduced to a short spike with a few spikelets. Glumes purplish, with scattered tubercle-based hairs towards the tips.

Merrill described this variety as a separate species from the Philippines, Negros, on bare slopes of the Canlaon Vulcano (Merrill 6975), where the typical form of *I. clementis* apparently does not occur. The variety is also known from Mount Kinabalu.

6. ISACHNE CONFUSA Ohwi *in* Bull. Tokyo Sci. Mus. No. 18: 14. 1947.

This is the *I. rigida* Nees as interpreted by Hooker f. (Fl. Br. Ind. 7: 23. 1897) and accordingly by Gibbs (*in* J. Linn. Soc., Bot. 42: 185. 1914), Domin (*in* Bibl. bot. Hft. 85: 291. 1915), and Ridley (Fl. Mal. Pen. 5: 238. 1925). Henrard (*in* Blumea 3: 470-471. 1940), who discussed this species, came to the conclusion that *I. rigida* Nees (*ex* Miq., Fl. Ind. bat. 3: 461. 1855), with *Panicum rhignon* Steud. as a synonym, should be known as *I. pangerangensis* var. *rhignon* (Steud.) Henr. The species identified by Hooker as *I. rigida* had to be renamed and in 1947 Ohwi (*l.c.*) called it *I. confusa.*

DISTRIBUTION.—This species extends from India to Micronesia. From Malaysia I saw the following specimens: Malay Peninsula, Ridley 14874, Henderson 22962; Sumatra, Bünnemeijer 1577 (*type;* Herb. Bogor.); Borneo, Teysmann 8038, Ridley 9034, Gibbs 2583, Beccari 927; New Guinea (W. Division), Brass 5854, 7832. — Reeder (*in* J. Arn. Arb. 29: 311. 1948) also listed the Philippines. I did not see any specimen from these islands.

7. ISACHNE GLOBOSA (Thunb.) O.K., Rev. Gen. Pl. 2: 778. 1891.

Usually the glumes are similar, shorter than the spikelet, scabrous, obtuse, the tips rounded and more or less hyaline-margined.

Sometimes the glumes are very rough upwards along the nerves and provided with long hairs. This is variety *obscura* (Buse) Henr. (*in* Blumea 3: 465. 1940), which has the same distribution as the typical form.

Commonly both the lemmas are glabrous. In some specimens from Java (Backer 20.22, 2073) the upper lemma is puberulous on the whole surface.

For another remarkable form I propose the name:

Var. **daviumbuense** Jansen, *var. nov.*

Culmis robustis, suberectis, ad 120 cm altis distincta; margines vaginarum marginesque partis inferioris laminarum pilis basi tuberculatis dense pectinato-ciliati; pili ligulae plus quam 3 mm longi; glumae distincte breviores quam spiculae.

DISTRIBUTION.—I saw this robust hairy form only from New Guinea, Lake Daviumbu, Brass 7602 (*type;* Herb. Lugd. Bat.).

8. ISACHNE KINABALUENSIS Merr. *in* J. Straits Br. roy. As. Soc. 76: 77. 1917. — **Fig. 7.**

Isachne javana (*non* Nees apud Buse) *sensu* Ridl., Fl. Mal. Pen. 5: 238. 1925).

This mountain species is very variable in habit, the variation being induced by altitude combined with poor, rocky soil. On Gunung Losir (Sumatra) Van Steenis collected an instructive series of transitions between 1200 and 3400 m altitude.[4] At 1200 m altitude the culms are rigidly erect with distant, rigid, spreading blades, about 60 cm high, the panicle open, and the spikelets long-pedicelled. Gradually the height of the plants diminishes until, on the windswept spaces near the summit, they become dwarfed, densely tufted, 3—5 cm high, with the panicle reduced to a few spikelets. The blades of these specimens are small, very rigid, elevatedly nerved, the margins cartilagineous and denticulate-ciliate. At lower altitudes the blades are softer, less elevatedly nerved, the margins entire or minutely denticulate-ciliate near the base. It does not seem advisable to give these variations a name, although, seen without the transitions, the ultimate dwarf forms make the impression of a distinct species.

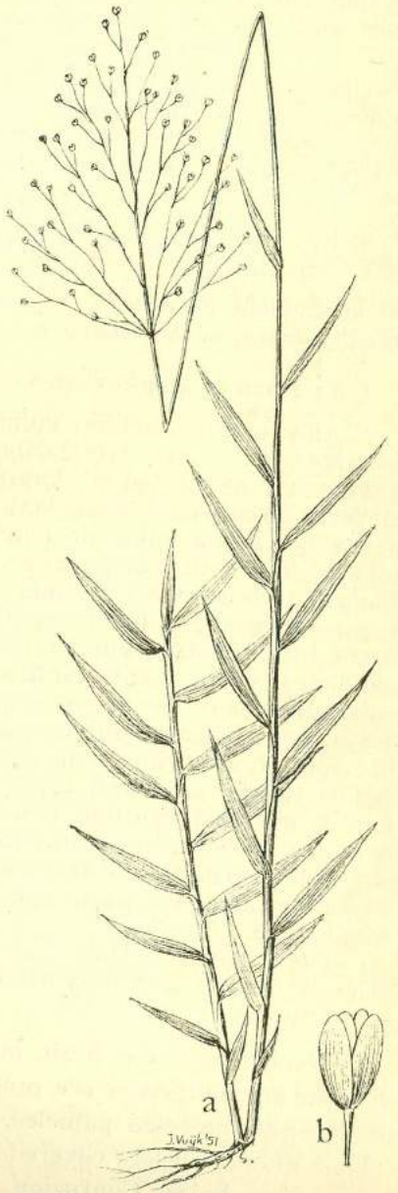

FIG. 7. *Isachne kinabaluensis* Merr.: *a*, habit; *b*, spikelet.

[4] They are figured in "Flora Malesiana" (I 4: xxvii *fig. 11.* 1948) under the name *I. pangerangensis.*

Analogous variations occur in *I. pangerangensis* Zoll. & Mor. Both species are closely related. They can be opposed as follows:

I. kinabaluensis	*I. pangerangensis*
Spikelets 2 mm long.	Spikelets 2.2 mm long.
Pedicels 6—15 mm long or more.	Pedicels short to very short.
Glumes equal, slightly shorter than the lemmas, rounded at the tips.	Glumes subequal, the first usually longer than the lemmas, often notched or apiculate by the inrolling of the margins.
Internode between the florets minute.	Internode between the florets very distinct.
Sheaths usually glabrous.	Sheaths usually hairy.
Blades rounded at the base.	Blades clasping at the base.

9. **Isachne langkawiensis** Jansen, *sp. nov.*

Annua, luteo-viridis; culmi erecti, graciles, 40—45 cm alti, teretes, pauciramosi, nodis inferioribus glabri, nodis superioribus tecti pilis vaginarum adjacentium; vaginae valde breviores quam internodia, inferiores circa 2 cm longae, laxiores, striatae, nervis pilos basi tuberculatos gerentes; ligula pilorum longiorum series; laminae lineares, 3—4 cm longae, 3—5 mm latae, planae, molles, 10—14-nervatae, nervis marginalibus distinctioribus, imprimis superne et prope basin pilis basi tuberculatis sparse indutae; panicula ovato-pyramidalis, perpatens, 6—8 cm longae, axe terete, glabro; rami patentes, rigidiores, vulgo solitarii, inferiores 3 cm longi, prope basin ramificantes et laxe spiculati; pedicelli spiculas superantes, ad apicem incrassati, sine zonis glandulosis; spiculae ovatae, 1,8—2 mm longae; glumae spiculam aequantes aut prima gluma paulo brevior; gluma prima tenuissima, obscure nervata, glabra; gluma secunda minus tenuis, pilis basi tuberculatis patentibus setiformibus circa 1 mm longis, nervos tegentibus dense hirsuta; lemmata valde inaequalia, atrobrunnea nitentia in maturitate; primum planum glabrumque, glumas superans; secundum ovatum, super rhachillam minutam positum, glumam secundam aequans, parte superiore per margines ciliatum; antherae 0,5 mm longae.

DISTRIBUTION.—Only known from the Malay Peninsula, Langkawi Islands, Corner & Nauen 37959 (*type;* Herb. Singapore), on limestone at low altitude.

Near *I. miliacea* Roth, but differing from that species in the erect, neither geniculate nor creeping culms, 40—45 cm high, the larger spreading, loosely spikeled panicles, the slightly larger spikelets with only the upper glume densely covered with spreading, bristle-like, tubercle-based, 1 mm long hairs. Confusion is possible with *I. miliacea* var. *javanica* (Buse) Henr., but the latter is a much lower and more tender plant, creeping at the base, with smaller panicles and smaller spikelets, both glumes loosely setulose-hispid, and the hairs very short and caducous.

10. ISACHNE KUNTHIANA (Wight & Arn.) Nees *ex* Miq., Fl. Ind. bat. 3: 460. 1855.

Isachne schmidtii Hack. *in* Schmidt, Fl. Koh Chang *in* Bot. Tidsskr. 24: 97. 1901.
Isachne semitalis Ridl., Fl. Mal. Pen. 5: 237. 1925.

The description by Miquel agrees with the numerous specimens I saw from Malaysia. The specimens from New Guinea (Brass 3405) are placed under *I. schmidtii* Hack. by Reeder (*in* J. Arn. Arb. 29: 311. 1948). According to Hackel's description *I. schmidtii* is only 6 cm tall and has the glumes twice as long as the lemmas. The specimens from Malaysia agree with his description in all characters except for their size. The species is very variable in this respect: I saw specimens from 5 cm to more than 30 cm tall. In my opinion *I. schmidtii* is a synonym of *I. kunthiana*.

11. ISACHNE MILIACEA Roth *ex* R. & Sch., Syst. veg. 2: 476. 1817.

DISTRIBUTION.—This species has been recorded from the Malay Peninsula, Sumatra, Java, the Lesser Sunda Is., Borneo, the Talaud Is., and the Philippines. It is locally abundant in shaded, damp spots and in forests at low altitudes.

Var. JAVANICA (Buse) Henr. *in* Blumea 3: 465. 1940.

Glumes setulose-hispid, the hairs very short and caducous.
DISTRIBUTION.—Java and Sumatra.

Var. **madurensis** Jansen, *var. nov.*

Culmi erecti vel breviter ascendentes, minus graciles; nodi glabri vel glabrescentes; laminae lineari-lanceolatae.
DISTRIBUTION.—Madura (NE of Java), Backer 20102 (*type;* Herb. Bogor.), 20190, 20615; Kangean Is., Backer 27365, 27709, 27057.

I saw a striking form from the Philippines, with shortly ovate, small blades, 6—8 mm long, 4—5 mm wide, with 18 parallel, anastomosing nerves. The culms are very thin and elegant, long creeping and extensively branching, forming mats. The panicles are 1—1.5 cm long with 10—12 spikelets. I propose to accept them as:

Var. **ovalifolia** Jansen, *var. nov.*

Laminae breviter ovatae, 6—8 mm longae, 4—5 mm latae, nervis 18 anastomosantibus; culmi tenuissimi et graciles, longe repentes et ramosi, caespites densos formantes; panicula 1—1,5 cm longa, 10—12-spiculata.
DISTRIBUTION.—Philippines, Luzon, B.S.46990 (*type;* Herb. Univ. Calif.).

This variety has the habit of *I. myosotis* Nees, with which species it may easily be confused. But *I. myosotis*, as a member of section *Pseudo-*

Isachne Ohwi has the lemmas similar, both reaching the same level at the top of the spikelet. On the other hand *I. miliacea*, as a member of section "*Eu-Isachne*" Honda, has very dissimilar lemmas, the first distinctly exceeding the second lemma and the glumes.

12. ISACHNE MYOSOTIS Nees *in* Hook. J. Bot. 2: 98. 1850.

Var. **micrantha** (Merr.) Jansen, *comb. nov.*

Isachne micrantha Merr. *in* Philip. J. Sci. 5: 168. 1910.

The specimens of *I. micrantha* Merr. I saw from the Philippines (F.B.16837, 16841, B.S.28708, all cited by Merrill, Enum. Philip. fl. Pl. 1: 59. 1923) are very near to *I. myosotis* in general habit and foliage. They differ only in the very small spikelets, about 1 mm long and some of them even less, this variety having the smallest spikelets of all the Malaysian *Isachnae*. The numerous specimens of typical *I. myosotis* I studied have the spikelets 1.2—1.4 mm long and according to Reeder (*in* J. Arn. Arb. 29: 312. 1948) the type specimen of *I. myosotis* has spikelets of 1.2—1.5 mm length. This difference, though striking, is of varietal rank and does not seem important enough to consider *I. micrantha* as a separate species.

13. ISACHNE OBTECTA Reeder *in* J. Arn. Arb. 29: 313 *pl. 4*. 1948.

Only known from New Guinea. Besides specimens from the type collection (Brass 7242) I saw in the Kew Herbarium a sheet with specimens, collected by Boden Kloss in Netherlands New Guinea, Mount Carstensz, in 1913, and named *I. miliacea* var. *stricta*. This is the *I. miliacea* Roth from New Guinea mentioned by Ridley (*in* Trans. Linn. Soc., Bot. 9: 247. 1916). But *I. miliacea* does not occur in New Guinea. Kloss's specimen is *Isachne obtecta* Reeder.

14. ISACHNE PANGERANGENSIS Zoll. & Mor. *in* Mor., Syst. Verz. 102. 1845; Miq., Fl. Ind. bat. 3: 462. 1857; Henr. *in* Blumea 3: 468. 1940.

Isachne monticola Buse *in* Miq., Pl. Jungh. 379. 1854.

Perennial, forming cushion-like tufts or mats, with short stems, densely obtected by mostly hirsute sheaths. Ligule a glabrous or partly ciliate rim. Blades distichous, rigid, elevatedly nerved on both sides, the margins setulose-ciliate or serrulate with tubercle-based hairs. Panicle short (2—3 cm), branches subsolitary with few short-pedicelled spikelets. Spikelets obovate, obtuse, slightly longer than 2 mm and as broad at maturity. Glumes subequal, the first in the closed spikelets slightly longer than the florets, in the mature spikelets usually as long as the florets, distinctly 5—7-nerved, appearing apiculate or notched by the inrolling of the margins when dry; upper glume usually obtuse, 5-nerved; both glumes

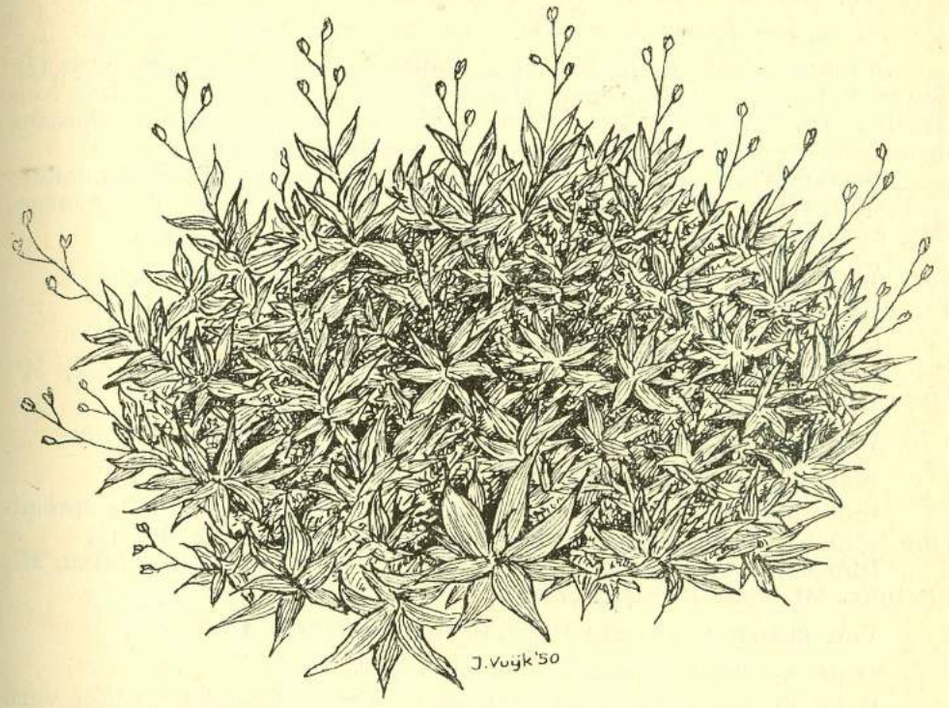

FIG. 8. *Isachne pangerangensis* Zoll. & Mor.: habit (type); spikelets; blade.

glabrous or hairy towards the tips. Lemmas subequal, the first slightly longer, the second distinctly pedicellate on the terete rhachilla.

This is a description of the typical specimens from the high mountain-tops. The species is very variable. At lower altitudes the plant assumes a looser habit, with longer, ascending culms, rooting at the lower nodes, and with much larger panicles. From the many variations the following have got a name:

Var. FIRMULA (Buse) Henr. *in* Blumea 3: 471. 1940. — **Fig. 9a.**

Isachne firmula Buse *in* Miq., Pl. Jungh. 379. 1854.

A much larger and higher plant. Culms ascending and rooting at the lower nodes, up to 45 cm long. Panicle 6—8 cm long, more or less contracted, many-spikeled. Blades less rigid, the nerves thinner. Sheaths usually more or less glabrous, ciliate only along the margins.

DISTRIBUTION.—Sumatra (Mt. Talakmau, Mt. Salang, Mt. Singgalang); Java (Mt. Gede, Mt. Papandajan, Mt. Kawi, Mt. Welirang, Mt. Ungaran, Mt. Lawu); Malay Peninsula (Mt. Kerban).

Var. **marginata** (Buse) Jansen, *comb. nov.* — **Fig. 9b.**

Isachne firmula var. *marginata* Buse *in* Miq., Pl. Jungh. 379. 1854.

Like variety *firmula* but plants hairy all over.

DISTRIBUTION.—Sumatra (Padang Highlands); Java (Tjibodas, Mt. Papandajan, Idjen Mts.).

Var. RHIGNON (Steud.) Henr. *in* Blumea 3: 471. 1940. — **Fig. 9c.**

Panicum rhignon Steud., Syn. Pl. Glum 1: 95. 1854.

Habit like in variety *firmula*, but smaller. Panicle with stiffly spreading branches, bearing short-pedicelled, usually drooping spikelets.

DISTRIBUTION.—Sumatra (Mt. Talakmau); Java (Mt. Papandajan, Mt. Patuha, Mt. Ipis, Diëng Highland).

Var. RHABDINA (Steud.) Henr. *in* Blumea 4: 530. 1941.

Panicum rhabdinum Steud., Syn. Pl. Glum. 1: 96. 1854.

Habit like in variety *firmula*. Panicle virgate. Blades lanceolate with scabrous, cartilagineous margins. Glumes often hairy.

DISTRIBUTION.—The commonest form from lower altitudes. Sumatra, Bünnemeijer 950; Java (Tjibodas, Mt. Papandajan, Diëng Highland, Mt. Sumbing, Mt. Merbabu, Mt. Lawu, Mt. Ardjuno, Mt. Semeru, Ijang Highland).

15. ISACHNE PAUCIFLORA Hack. *in* Govt Lab. Philip. Publ. No. 35: 80. 1906.

Related to *I. myosotis* Nees, but differing in the shorter sheaths, the elongate internodes, and the larger spikelets. The indument of leaves and spikelets is very variable. Plants with quite glabrous glumes were described as *I. beneckei* var. *depauperata* Hack. [*in* Philip. J. Sci. 1 (Suppl.): 350. 1906] on which *I. depauperata* (Hack.) Merr. (Enum. Philip. fl. Pl. 1: 58. 1923) is based. Transferred to *I. pauciflora*, they must be named: **Isachne pauciflora** var. **depauperata** (Hack.) Jansen, *comb. nov.*

16. ISACHNE SAXICOLA Ridl., Fl. Mal. Pen. 5: 237. 1925.

Isachne javana var. *saxicola* Ridl. *in* J. Fed. Mal. St. Mus. 6: 196. 1915.

Related to *I. kunthiana* (Wight & Arn.) Nees by the glumes exceeding the florets, but differing in the more rigid habit, the lanceolate, spinulose-

FIG. 9. Varieties of *Isachne pangerangensis* Zoll. & Mor.: *a*, var. *firmula* (Buse) Henr.; *b*, var. *marginata* (Buse) Jansen; *c*, var. *rhignon* (Steud.) Henr.; all, habit and spikelet.

ciliate blades, the shorter spikelets gaping at maturity, and the glumes only shortly exceeding the florets. The sheet with specimens from Pahang (S.F.28851) shows all sorts of transitions between glabrous and very hairy plants. Like *I. pangerangensis* Zoll. & Mor. and *I. kinabaluensis*

Merr., this species shows a wide range of variability: in swampy places the culms are 40—50 cm long (Holttum 27998), in dry habitats the dwarf specimens are 10—15 cm high, with much narrower and more rigid blades (Ridley 15932).

17. Key to the Malaysian species of Isachne

1. Lemmas differing in texture and usually in size, the lower lemma herbaceous to membranaceous, usually longer than the chartaceous upper lemma ("*Eu-Isachne*" Honda).
   2. Difference in texture between the lemmas very striking, the lower compressed, grooved on the back. Mostly slender, creeping plants with weak culms and small blades.
      3. Blades lanceolate-ovate, the base cordate and clasping, the white-cartilagineous margins undulate. Spikelets 1.2—1.5 mm long. . . . . *I. dispar*
      3. Blades linear to linear-lanceolate, the base contracted or rounded.
         4. Culms erect, 40—45 cm high. Spikelets 1.8 mm long, the upper glume densely hirsute with 1 mm long, tubercle-based, spreading bristles. *I. langkawiensis*
         4. Culms geniculate or creeping at base, much lower. Spikelets smaller, both glumes glabrous, scabrous, or minutely hairy.
            5. Culms with hirtulous nodes (rarely the upper subglabrous). Panicle-branches with glandular bands. Spikelets 1.2—1.7 mm long. *I. miliacea*
            5. Culms with glabrous nodes. Panicle-branches without glandular bands. Spikelets 1—1.2 mm long. . . . . *I. pulchella*
   2. Difference in texture between the lemmas not striking, the lower convex on the back. Larger plants with stronger culms and longer blades.
      6. Spikelets terete-oblong, 1.7 mm long. Culms straggling, strongly branching, 80—100 cm long. . . . . *I. surgens*
      6. Spikelets obovate to globular. Culms ascending, then erect.
         7. First lemma longer than the second, exceeding the glumes when the spikelet is closed.
            8. Spikelets globular, 2—2.5 mm long. Pedicels with glandular bands. Hairs of the ligule 2—3 mm long. Panicle up to 12 cm long. *I. globosa*
            8. Spikelets not globular, elliptic to obovate, shorter than 2 mm.
               9. Spikelets 1.5—1.7 mm long. Nodes glabrous. Sheaths glabrous. Blades narrowly lanceolate, scabrous or with a few scattered, stiff hairs. The 2 florets separated by a flattened obdeltoid rhachilla. Lemmas glabrous and glossy. . . . . *I. brassii*
               9. Spikelets 1.6—1.8 mm long. Nodes bearded. Sheaths papillose-pilose. Blades lanceolate, tomentose (at least on the lower side). The 2 florets separated by a terete rhachilla. Lemmas papillose-roughened and puberulous. . . . . *I. villosa*
         7. First lemma not longer than the second, both reaching the same level. Both glumes shorter than the spikelet. Culms robust, 50—70 cm high. Blades broadly lanceolate, 12—15 cm long, the base clasping. Panicle spreading, up to 20 cm long. . . . . *I. diabolica*
1. Lemmas not differing in texture, subequal to equal, chartaceous to coriaceous (*Pseudo-Isachne* Ohwi).

10. Panicle with 15—25, horizontally spreading, short (1—2 cm long) branches, bearing 2—4, globose, hispid, 1 mm long spikelets. . . . . *I. confusa*
10. Panicle with less than 10 branches or when there are more, they are much longer than 3 cm.
    11. Culms weak, creeping and branching, the flowering branches ascending, 5—20 cm high. Panicle not longer than 5 cm. (See also *I. pangerangensis*.)
        12. Glumes distinctly longer than the lemmas.
            13. Glumes 2.5—3.5 mm long, up to twice as long as the lemmas, on the nerves and towards the tips tuberculate-hispid. Blades ovate, with undulating margins. . . . . *I. kunthiana*
            13. Glumes 2—2.5 mm long, glabrous. Spikelets widely gaping at maturity. Blades lanceolate, stiff, with cartilagineous, spinulose-ciliate margins. . . . . *I. saxicola*
        12. Glumes as long as or shorter than the lemmas.
            14. Spikelets about 1.8 mm long. Sheaths very short, less than half as long as the internodes. Glumes obtuse or appearing apiculate by the inrolling of the margins, more or less densely hispid. Semi-aquatic plants with creeping, elongate culms. . . . *I. pauciflora*
            14. Spikelets 1—1.3 mm long. Sheaths more than half as long as the internodes. Glumes elliptic, glabrous or minutely hairy towards the rounded tip. Annual plants in small tufts. . . . *I. myosotis*
    11. Cespitose: culms erect or with a short-ascending base, usually much higher than 20 cm. Panicle longer, up to 30 cm.
        15. Spikelets 1—1.7 mm long.
            16. Culms usually not higher than 30 cm, the nodes at least partly pilose.
                17. Spikelets globular, 1.5—1.7 mm long and as wide. Lemmas densely pubescent, very convex. Blades scabrous to puberulous on the lower surface, the margins not thickened. *I. beneckei*
                17. Spikelets elliptic to obovate, 1—1.2 mm long. Lemmas more or less puberulous. Blades with distinctly white-cartilagineous margins, usually glabrous. . . . . *I. albomarginata*
            16. Culms higher, up to 150 cm long, the nodes glabrous.
                18. Panicle contracted.
                    19. Panicle up to 20 cm long, stiff, densely spikeled. Spikelets about 1 mm long. . . . . *I. stricta*
                    19. Panicle 6—8 cm long, with erect rigid branches. Spikelets 1.5 mm long, florets completely covered by the glumes. *I. obtecta*
                18. Panicle open and spreading.
                    20. Panicle-axis, branches, and pedicels smooth. Panicle large, effuse, lax. Spikelets about 1.5 mm long. . . . *I. albens*
                    20. Panicle-axis, branches, and pedicels distinctly scabrous. Panicle shorter, ovate to pyramidal, the branches more rigid. Spikelets 1.5—1.8 mm long. . . . . *I. arfakensis*
        15. Spikelets 1.8—3 mm long.
            21. Spikelets about 3 mm long. Glumes slightly longer than the lemmas. Culms rigidly erect, 20—30 cm long. Blades crowded at

the base and distichously placed along the culm, rigid, clasping, the margins denticulate with tubercle-based hairs. . . *I. clementis*

21. Spikelets shorter, 2—2.2 mm long.
    22. Culms, sheaths, blades, and glumes hispid with very short, tubercle-based hairs. Both glumes shorter than the lemmas. *I. trachycaula*

    22. Plants not hispid with short, tubercle-based hairs, very variable in size and appearance, 10—60 cm high. Blades very variable, often the lower very rigid, elevatedly nerved, the margins cartilagineous and denticulate-ciliate. (Plants of high altitudes.) At lower altitudes the plants are much higher, the panicles larger, the blades softer and not denticulate.
        23. Spikelets 2 mm long, long-pedicelled. Glumes equal, slightly shorter than the lemmas, rounded at the tips. Internode between the florets minute. Blades rounded at the base. Sheaths glabrous. Panicle-branches smooth. *I. kinabaluensis*

        23. Spikelets 2.2 mm long, short-pedicelled. Glumes subequal, the first slightly longer than the lemmas, often notched or apiculate by the inrolling of the margins, strongly nerved. Internode between the florets distinct. Sheaths usually hairy. Blades clasping. Panicle very variable in size and form: at high altitudes 1—2 cm long with only a few spikelets; at lower altitudes up to 9 cm long, more or less stiffly spreading or virgate, the branches usually scabrous. . . . . *I. pangerangensis*

ISCHAEMUM L.

1. ISCHAEMUM APRICUM Ridl., Fl. Mal. Pen. 5: 203. 1925.

Perennial, long-creeping and rooting at the nodes, with scrambling, suberect flowering branches up to 1 m long. Culms terete, glabrous, the nodes white-bearded. Lower sheaths loose, dropping from the culm, shorter than the internodes, glabrous. Ligule membranous, 1—1.5 mm long, truncate, ciliate. Blades linear, not narrowed at the base, acuminate, hairy on both sides, flat or loosely folded, 12—20 cm long, 6—8 mm wide. Racemes 2, appressed, erect, densely spikeled, about 8 cm long, 4.5 mm wide, on a short, glabrous peduncle, green to purplish. Joints and pedicels concave at the inner side, leaving a round pore between them; joints 2—2.5 mm long, like the pedicels more or less flat, with rather long, whitish hairs along the edges, the callus shortly bearded. Sessile spikelets about 6 mm long. First glume ovate-lanceolate, sparsely hairy on the edges and shortly ciliate towards the apex, the lower half indurate, glabrous and smooth with obsolete nerves, the upper half striately nerved with 2 deep, transverse wrinkles, broadly winged, the wings forming two obtuse lobes above the apex proper of the glumes, sometimes the midnerve produced into a short bristle. Second glume boat-shaped, keeled with a narrow wing, ending into an awn-like tip. Lemmas lanceolate, hyaline, shorter than

half the length of the glumes. Upper lemma bifid with a perfect awn about 7 mm long, geniculate below the middle, the column loosely twisted. Pedicelled spikelets similar to the sessile ones or a little shorter, the first glume with a single wing.

This is the description of the specimen in the Singapore Herbarium, from Penang (Burkill 4629), in which I corrected some slight errors committed by Ridley (*l.c.*). The species is very near to *Ischaemum aristatum* L., principally differing in the broadly winged first glume with two deep wrinkles in the upper half and in the rather long-awned second glume.

2. ISCHAEMUM AUSTRALE R. Br., Prodr. 205. 1810.

The specimens cited below are characterized by the long, narrow, and rather stiff middle blades of the culm, the upper blades being very reduced, and the basal ones less than 1 dm long and rather wide. The sessile spikelets are variably awned even in the same raceme: most of the spikelets have a short, included awn, but in some spikelets the awn is much longer and somewhat flexuous.

DISTRIBUTION.—In Malaysia only known from New Guinea: Merauke (Versteeg 1970); and Wissel Lake region (Eyma 5058).

3. ISCHAEMUM BARBATUM Retz., Obs. bot. 6: 35. 1791.

Ischaemum aristatum L., as understood by Hackel (Androp. *in* DC., Monogr. Phan. 6: 202. 1889) and by Hooker f. (Fl. Br. Ind. 7: 126. 1897), appears not to be identical with the type, collected by Osbeck in China. The true *I. aristatum*, in the opinion of C. E. C. Fischer (*in* Gamble, Fl. Madras 10: 1721. 1934; *in* Kew Bull. 1935: 144), is the grass up to 1934 universally called *I. ciliare* Retz. (Obs. bot. 6: 36. 1791).

Hackel (*l.c.*) divided his *I. aristatum* into two subspecies: subspecies *imberbe* (Retz.) Hack., based on *I. imberbe* Retz. (*op. cit.* p. 35), a superfluous name; and subspecies *barbatum* (Retz.) Hack., based on *I. barbatum* Retz. (*op. cit.* p. 35, where Retzius mentioned the type specimen from Java, leg. Wennerberg). I agree with Ohwi (*in* Acta phytotax. geobot. 11: 175. 1942) that the species known as *I. aristatum* in Malaysian botany ought to be called *I. barbatum* Retz.

This species is a very variable one.

The culms, being usually erect, robust, up to more than 1 m high, may also be decumbent and ascending, very slender, 20—30 cm high. The sheaths are usually glabrous, sometimes pubescent and more rarely hirsute with long, bulbous-based hairs. The length of the ligule varies from 1—8 mm. The blades are usually glabrous, more rarely pubescent on one or both surfaces; usually they are narrowed towards the base, but sometimes the base is as broad as the sheath. The length of the racemes varies from 3—12 cm or more. The thick, obtuse-triangled joints are always rather short and thick, from quite glabrous to hirtulous or ciliate on one or on

all the sides. The callus is always hairy but the density and length of the hairs are variable. The sessile spikelets (the callus included) are usually 7—8 mm long, but sometimes their length varies between 6 and 9 mm. The first glume of the sessile spikelets, always coriaceous in the lower two-third to three-fourth part, varies from quite glabrous and smooth to densely villous with long, white hairs. The number of nodules on the lower part of the margins is also variable, as are their length and their depth; more rarely the nodules are wanting or minutely developed in a small number of spikelets. The sessile spikelets always bear a perfect awn, the loosely twisted column varying from not to distinctly exceeding the glumes, the subule from weakly to strongly twisted.

The extreme variations are certainly distinct; however, they are connected by a complete series of intermediates. It seems better to me not to divide this species into a number of microspecies, but to wait until a monographic study of the whole genus should finally clear the difficulties. To some of the Malaysian forms varietal names have been given:

Var. **imbricatum** (Munro ex Hack.) Jansen, *comb. nov.*

Meoschium imbricatum Munro *ex* Hack., Androp. *in* DC., Monogr. Phan. 6: 203. 1889 in syn.

Ischaemum aristatum subsp. *imberbe* var. *imbricatum* (Munro) *ex* Hack., Androp. *in* DC., Monogr. Phan. 6: 203. 1889; Hook. f., Fl. Br. Ind. 7: 127. 1897.

Ischaemum imbricatum (Munro) Stapf *ex* Ridl., Fl. Mal. Pen. 5: 200. 1925.

Spikelets glabrous, except the hairy callus. Culms stout, erect. Sheaths glabrous or nearly so. Ligule rather long. First glume of sessile spikelets 2—3-noduled on each side, the opposite nodules often united to transversal ridges.

DISTRIBUTION.—Malay Peninsula, Sumatra, Java.

Var. **gibbum** (Trin.) Jansen, *comb. nov.*

Ischaemum gibbum Trin. *in* Mém. Acad. Sci. St. Pétersb. VI 2: 293. 1833.

Ischaemum aristatum subsp. *imberbe* var. *gibbum* (Trin.) Hack., Androp. *in* DC., Monogr. Phan. 6: 304. 1889.

Spikelets rather small and glabrous. Less robust. Sheaths glabrous. Ligule rather short. Joints of the racemes ciliate on all the sides. Column of awn exserted.

DISTRIBUTION.—Philippines (endemic).

Var. **lodiculare** (Nees) Jansen, *comb. nov.*

Meoschium lodiculare Nees *in* Hook. & Arn., Beech. Voy. 246. 1838.

Ischaemum aristatum subsp. *barbatum* var. *lodiculare* (Nees) Hack., Androp. *in* DC., Monogr. Phan. 6: 205. 1889.

Spikelets with long, white hairs. Joints of the racemes ciliate on all the sides. Sheaths usually long-hirsute, the nodes bearded.

DISTRIBUTION.—Borneo: Karimata Arch., Mondi 138. New Guinea: Atasrip 129, Brass 6253, 8815; Cycloop Mts., Meijer Drees 104.

Var. **arundinaceum** (F. Muell.) Jansen, *comb. nov.*

Ischaemum arundinaceum F. Muell. *ex* Benth., Fl. austral. 7: 519. 1878; Hack., Androp. *in* DC., Monogr. Phan. 6: 215. 1889; Chase *in* J. Arn. Arb. 20: 313. 1939.

Spikelets glabrous and smooth without any undulation.

The specimens I have seen are characteristic by their strict, erect, robust culms, the very stiff, dark blades, and by the whole plant being quite glabrous except for the short-hairy callus of the dark brown spikelets.

DISTRIBUTION.—New Guinea: Lake Daviumbu, Brass 8259; Gaima, Tarara, Brass 8751; Wissel Lake district, Eyma 4738; Sorong, Pleyte 906.

4. ISCHAEMUM BECCARII Hack., Androp. *in* DC., Monogr. Phan. 6: 247. 1889.

Perennial, cespitose. Culms 40—70 cm tall, erect, terete, wiry, glabrous and smooth, usually leafed up to the panicle, not branched. Lower sheaths very short, overlapping; middle and higher sheaths longer but shorter than the internodes, terete, narrow, glabrous. Blades narrowly linear, setaceously acuminate, slightly narrowed at the base, 10—16 cm long, up to 4 mm wide, glabrous and smooth. Racemes binate or rarely single, 4—6 cm long, erect, pilose, green; joints slightly shorter than the sessile spikelets, linear, triangular, the outer margins greyish woolly ciliate, the cilia longer than the width of the joint. Pedicels similar and parallel to the joints, forming an elongate pore. Sessile spikelets 5—6 mm long (the hairy callus included), lanceolate. First glume soft, not or slightly indurate, lanceolate, minutely toothed, slightly winged towards the apex, the back flat, glabrous except for some hairs at the base, obscurely 4-nerved, the nerves when young scarcely visible. Second glume about as long as the first, acuminate, 3-nerved, glabrous. Fertile lemma rather long, hyaline, 2-lobed with a slender, subperfect awn in the sinus, 7—8 mm long, the short, twisted column not exserted. Pedicelled spikelets shorter and narrower, the first glume winged at one side, the upper lemma with a tender, 4 mm long awn.

DISTRIBUTION.—Only known from North Borneo, Serawak, Beccari 3820, Clemens 21880. [The specimen from the Malay Peninsula cited by Ridley (Fl. Mal. Pen. 5: 204. 1925), is a *Dichanthium* species.] Along roadsides and forest-clad mountain slopes.

Hackel described the panicle of *I. beccarii* as having only one raceme. This is indeed the case in his type in the Geneva Herbarium, a poor specimen of Beccari 3820. The other specimens of the type collection I saw in the Florence Herbarium are much more developed. Every culm bears two racemes, like in the specimens of Clemens 21880 I saw in the Kew Herbarium. All these specimens are higher than Hackel indicates but they possess the characteristic flat, obscurely nerved, and not or minutely indurate first glume of the sessile spikelets. Hackel considered this species

a connecting link between subgenus "*Eu-Ischaemum*" and subgenus *Sehima*. In my opinion the Beccari specimens of the Herbarium of Florence make the impression of a true *Ischaemum*, related to *I. celebicum* Jansen and *I. timorense* Kunth.

5. **Ischaemum celebicum** Jansen, *sp. nov.* — Fig. 10.

Gramen perenne; culmi erecti, robusti, inferne lignosi et ad 8 mm crassi, plus quam 1 m alti, teretes, glabri laevesque, internodiis inferioribus sulcatis, nodis glabris, e nodis superioribus ramificantes, ramis usque ad paniculam foliatis; vaginae breviores quam internodia, teretes, glabrae, marginibus hyalinae, inferiores a culmo solutae; ligula 1,5—2 mm longa, minute ciliata; laminae lineares, inferiores ad 20 cm longae et minus quam 1 cm latae, superiores multo breviores et angustiores, glabrae vel parte superiore pilis sparsis indutae; panicula paulo exserta; racemi binati, 3—4 cm longi, circiter 4 mm lati, virides, pilosi, fragiliores; articuli breviores quam spiculae sessiles, lineares, triangulares, margine exteriore dense et breviter ciliati, ciliis griseis latitudinem articuli aequantibus; pedicelli articulis similes et paralleli, ab articulis tamen pori elongato separati; spiculae sessiles 6 mm longae (callo brevipiloso incluso), lanceolatae; gluma prima spiculam aequans, lanceolato-acuta, conspicue bifida, minute alata vel marginata ad apicem, omnino glabra, parte inferiore dorsi convexa et magis minusve indurata, nitens, sine nervis discretis, parte superiore plana, striata nervis 7—9 scabris et anastomosantibus; gluma secunda glumam primam aequans, navicularis, acuminata, 3-nervata; lemma fertile hyalinum, bilobatum, sinu arista gracili subperfecta geniculata circa 1 cm longa munitum, columna aristae haud longe exserta; spiculae pedicellatae sessilibus manifeste breviores et angustiores; gluma prima margine uno solo minute alata; gluma secunda acuta et parte superiore leviter carinata; lemma superius aristam mollem rectam 4—6 mm longam gerens.

DISTRIBUTION.—Only known from SW Celebes, Mt. Lompobatang (Peak of Bonthain), Bünnemeijer 11047, 11328, 11689 (*type;* Herb. Lugd. Bat.), 12506, Van Steenis 10401. Along roadsides at 950 m altitude.

More or less intermediate between *I. beccarii* Hack. and *I. timorense* Kunth. With the first it agrees in the erect habit, but the culms are much more robust, woody, and very thick below, the long internodes polished and shining, the nodes glabrous, and the culms branching only in the upper part. Like *I. timorense* it has the racemes paired and the tip of the first glume bifid. The lower part of the first glume is indurate (not soft as in *I. beccarii* and not broadly inflated as in *I. timorense*), glabrous, smooth, and shining. The pedicels run parallel to the joints, leaving an elongate pore as in *I. beccarii*, and not a round pore as in *I. timorense*. The joints are not woolly hairy as those of *I. beccarii*, but densely short-hairy.

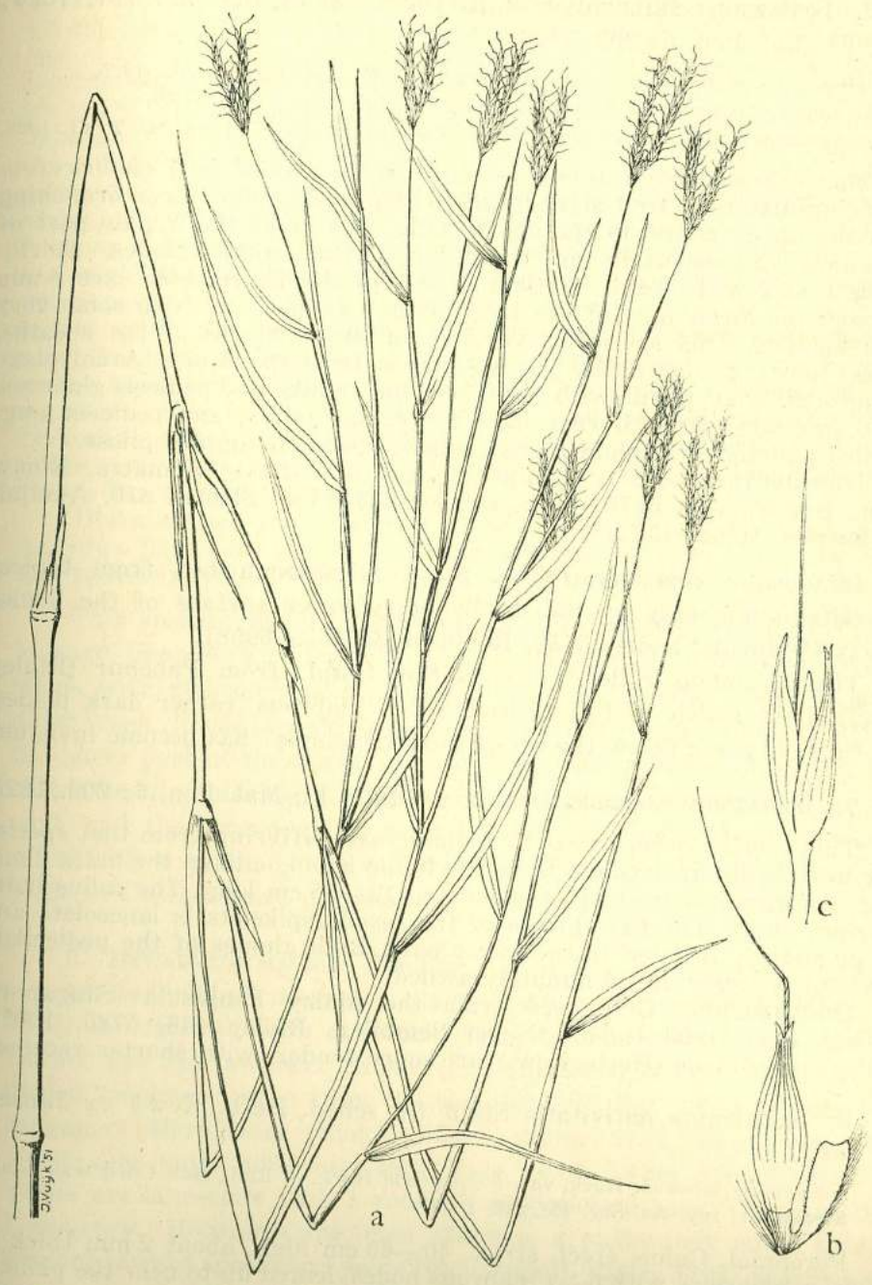

FIG. 10. *Ischaemum celebicum* Jansen: *a*, habit; *b*, sessile spikelet; *c*, pedicelled spikelet.

6. ISCHAEMUM FEILDINGIANUM Rendle *in* J. of Bot. 22: 101. 1894; Ridl., Fl. Mal. Pen. 5: 202. 1925.

Ischaemum commelynifolium Stapf *ex* Ridl., Fl. Mal. Pen. 5: 202. 1925.
Ischaemum maculatum Stapf *ex* Ridl., Fl. Mal. Pen. 5: 202. 1925.
Ischaemum aristatum var. *enodulosum* Backer, Handb. Fl. Java Afl. 2: 61. 1928.

This characteristic species is more or less allied to *I. imbricatum* Stapf, but differs at first sight in its strictly erect, stout culms, branching from the upper nodes, in the overlapping sheaths in the middle part of the culm, and especially in the triangular-lanceolate blades, shortly petiolate and with deeply cordate base. The sessile spikelets are 8 mm long and the lower part of the first glume is smooth or with some very small nodules. This species is variable in the hairiness of the sheaths, blades, joints, and pedicels. The specimens from the Riouw Archipelago are quite glabrous plants with even the callus, joints, and pedicels glabrous. Some specimens from Borneo have the callus, joints, and pedicels long-bearded and the first glume of the sessile spikelets slightly pilose.

DISTRIBUTION.—Malay Peninsula, Holttum 15034; Sumatra, Riouw Arch., Bünnemeijer 5879; Java, Danser 6434, Van Slooten 810, Amdjah 47; Borneo, Mondi 138.

Ischaemum commelynifolium Stapf is distinguished from typical *I. feildingianum* only by the woolly hairy lower surface of the blades (Malay Peninsula, Ridley 5152, Robinson & Kloss 5958).

The specimens called *I. maculatum* Stapf, from Panchur (Ridley 10945), have nearly glabrous sheaths and glabrous, rather dark blades. The "purple patch below the tip of the first glume" has become invisible.

7. ISCHAEMUM MACRURUM Stapf *ex* Ridl., Fl. Mal. Pen. 5: 203. 1925.

This species is very near to *I. timorense*, differing from that species only in several minor characters. The ligule is long-ciliate, the hairs 2 mm long. The racemes are more slender and 12—15 cm long. The callus hairs are very short. The first glume of the sessile spikelets is lanceolate and not or slightly inflated in the lower part. Both glumes of the pedicellate spikelets are subulate to minutely awned.

DISTRIBUTION.—Only seen from the Malay Peninsula: Singapore, Hullett, *anno* 1893 (*type*); Negri Sembilan, Ridley 448, 5780, 10013. Ridley's specimens (Herb. Kew.) are more tender, with shorter racemes.

8. **Ischaemum nativitatis** Stapf (in sched. Herb. Kew.) *ex* Jansen, *sp. nov.*

Ischaemum foliosum Hack. var. *leiophyllum* Hack. *in* Ridl., Bot. Christmas Island *in* J. Straits Br. roy. As. Soc. 45: 243. 1905.

Perennial. Culms erect, strict, 40—60 cm high, about 2 mm thick at the base, glabrous, with 6—7 glabrous nodes, leafed up to near the panicle. Sheaths shorter than the internodes, glabrous, smooth and narrow, the upper ones with long-ciliate margins. Ligule membranous, rounded, about 1.5 mm long. Blades dark green, spreading, linear, 6—10 cm long, 4—5 mm wide, flat, long-pointed, slightly narrowed at the base, glabrous. Panicle shortly exserted, with 2 racemes. Racemes 4—5 cm long, yellowish hairy, rather fragile. Joints triangular, short, about 1—1.5 mm long, pubescent, the yellowish hairs 2—3 mm long. Pedicels slightly longer than the joints, of the same shape and as hairy. Sessile spikelets with the callus 4—5 mm long, the callus densely hairy with the hairs two thirds as long as the spikelet. First glume more or less flat on the back, with 3 strong nerves between the keels, with serrulate wings in the upper half, the apex bifid; the lower part slightly indurate, glabrous and smooth, the upper part softer and scabrous. Second glume as long as the first, more convex and acute, ending into a spreading awn, 6—8 mm long, often with a hyaline tooth at the base of the awn, glabrous or with some long hairs at the base. Upper lemma shorter than the glumes, hyaline, bifid with a perfect awn in the sinus, geniculate and twisted, 14—16 mm long. Pedicelled spikelets slightly shorter than the sessile ones. Both glumes pilose at the base, acute, awned, the awn 2—4 mm long. Awn of the upper lemma like that of the sessile spikelet.

DISTRIBUTION.—Only known from Christmas Island (Ridley 6, 6a, Andrews 23). Only on rocks above the sea; it does not grow inland. The spikelets, when fallen off, are drifted along the coast by the wind.

This species, though related to *I. foliosum* Hack. (Androp. *in* DC., Monogr. Phan. 6: 222. 1889) differs from that species in the strictly erect culms with glabrous nodes, the glabrous sheaths, the longer ligule, the dark green, linear blades, which are glabrous or only slightly hairy on the lower part of the upper surface, the longer racemes, the first glume of the sessile spikelets with two distinct, serrulate wings in the upper part, and the second glume with a 6—8 mm long, spreading awn and often with a hyaline tooth at the base of the awn; both glumes of the pedicelled spikelet are pilose at the base only.

9. ISCHAEMUM MAGNUM Rendle *in* J. of Bot. 32: 102. 1894.

In the original diagnosis the type from Singapore (Feilding, *anno* 1892) is described with muticous spikelets. The specimens I saw from Borneo are also awnless. Ridley (Fl. Mal. Pen. 5: 201. 1925) mentions awned specimens, even from the type locality. But his specimens in the Singapore Herbarium (Blakan Mati, Ridley 3781; Serangoon, Ridley 10938) are quite muticous; they have up to 18 cm long racemes. The blades are lanceolate with a rounded subpetiolate base. They are typical *I. magnum*. Holttum's specimen 15250 is a moderately small specimen. The only awned specimen I saw (Tebingtinggi, Ridley 1102) is very old and damaged and difficult to identify. It may belong to *I. imbricatum* Stapf.

10. ISCHAEMUM MERRILLII Hack. *in* Philip. J. Sci. 1 (Suppl.) : 266. 1906.

Ischaemum arundinaceum var. *radicans* Hack. *in* Philip. J. Sci. 1 (Suppl.) : 266. 1906.

The specimens I saw of the type collection of *I. merrillii* (Luzon, Merrill 4622) and of *I. arundinaceum* var. *radicans* (Luzon, Merrill 4624) are very similar. I do not see any important character to separate them.

In the young spikelets the nerves in the first glume of the sessile spikelets go down nearly to the base. When mature the lower part becomes indurate and apparently nerveless, the upper part slightly reticulate by minute cross-nerves.

DISTRIBUTION.—Endemic in the Philippines, B.S.861, 11658, 11674, 30186, etc., Clemens 7234, 7235, 7236, etc., Williams 1197.

11. ISCHAEMUM POLYSTACHYUM Presl, Rel. Haenk. 1: 328. 1830, sensu lato.

Ischaemum digitatum Brongn. *in* Duperry, Bot. Voy. Coquille 70 *pl. 13.* 1831; Hack., Androp. *in* DC., Monogr. Phan. 6: 233. 1889.

In Hackel's time the date of publication of Duperry's work was supposed to be 1829. But pages 41-88 were published April 2, 1831, nearly a year later than Presl's name (*l.c.*), so that the latter has priority.

Ischaemum polystachyum sensu stricto has the nodes and the sheaths strongly bearded and pubescent with often tubercle-based hairs. *Ischaemum digitatum* Brongn. *sensu stricto* has the nodes and the sheaths quite glabrous. However, the many intergrading forms make the two "species" indistinguishable.

Ischaemum intermedium Brongn. (*in* Duperry, Bot. Voy. Coquille 73. 1831) should have the first glume of the sessile spikelets with an entire apex and the pedicellate spikelets with a perfect awn. In my experience the shape of the tip of the first glume is very variable: I saw entire and bifid glumes in the same specimen. The presence and length of the awn in the pedicellate spikelets is variable too; Carr 11736 (New Guinea, Velya) is a quite muticous specimen.

Ischaemum todayense Elmer (*in* Leafl. Philip. Bot. 7: 2678. 1915) is a large, glabrous form of *I. polystachyum* with broad blades, large spikelets, the joints and pedicels shortly ciliate on the inner margin, the first glume obscurely two-toothed, and the awn straight and shortly exceeding the spikelet (Elmer 10521).

Ischaemum plumosulum Stapf (*ex* Ridl., Fl. Mal. Pen. 5: 201. 1925; type from Kota Tinggi, Ridley 15405), is *I. polystachyum* with only two more or less branched racemes. I saw similar specimens from Penang (S.F.4763) and from Lombok (Elbert 1455).

Pollinia rupestris Ridl. (Fl. Mal. Pen. 5: 199. 1925; type from Batu Pahat, Ridley 11018) does not represent a *Pollinia* species but is a poor specimen of *I. polystachyum*.

Until a monographic study of this difficult genus will finally have resolved these questions, I consider all these forms to be components of a variable species to be known by the earliest name published: *I. polystachyum* Presl.

12. ISCHAEMUM PUBESCENS Merr. *in* Philip. J. Sci. 9: 264. 1914.

Very similar to *I. imbricatum* Stapf but characterized by the prominently pilose leaves and sheaths, the white-ciliate racemes, the shorter joints, the obscure marginal undulations and the punctulate inner side of the purple-flecked first glume of the sessile spikelets, and the narrow wing of the first glume of the pedicelled spikelets.

DISTRIBUTION.—Only known from the Philippines, B.S.21639 (*type*) and New Guinea in open grasslands at low altitudes, in New Guinea here and there one of the most abundant grasses on deforested slopes, often dominant on sandy soil.

The New Guinean specimens (Brass 11617, 11732) are distinctly less hairy on sheaths and blades than the Philippine ones, the uppermost blades of Brass 11617 even being quite glabrous.

13. ISCHAEMUM TIMORENSE Kunth, Rév. Gram. 1: 369 *pl. 98.* 1829.

Ischaemum ciliare (*non* Retz.) *sensu* Miq., Fl. Ind. bat. 3: 497. 1857.

A very variable species in dimensions and habit. Sometimes the plant is flowering the first year and apparently annual. Then the culms are only 20—30 cm long, very slender and weak, the blades more or less petiolate and shortly ovate-lanceolate, the racemes only 2 cm long (Sumatra, Junghuhn; Java, Müller 21, Backer 7952, etc.). Another extreme form is represented by specimens from Surabaja (Dorgelo 1813) with the flowering shoots more than 1 m long, the long, linear blades narrowed at the base, the dark purplish racemes 8—10 cm long. Rarely the panicle bears three racemes (Beccari, Piante Born. 1043). The spikelets are very uniform, only varying in length. When mature, the lower coriaceous part of the first glume of the sessile spikelets is very convex and more or less inflated, enveloping the lower part of the spikelet. The narrow, striate upper part is much softer and distinctly bifid.

ISEILEMA Anders.

Iseilema maculatum Jansen, *sp. nov.* — **Fig. 11.**

Gramen tenue, annuum; culmi (cum inflorescentia) 25—40 cm alti, erecti, graciles, teretes, glabri; vaginae saepe basi culmi aggregatae, flabellatae, imbricatae, laxae latioresque marginibus hyalinae, compressae, carinatae; ligula obtusa, scariosa, ciliata, ad 1 mm longa, postice pilis rigidis fasciculatis praedita; laminae flaccidae, breves, anguste lineares, si planae 1,5 mm latae, saepe conduplicatae, glabrae vel ad basin pilis basi tuberculatis sparse indutae; inflorescentia perangusta spathata, 8—20 cm longa, nodis 3—5 distantibus; racemi primo spathis inclusi, deinde exserti et denique a pedunculis disarticulati; spathae tenues, angusti, glabri, 16 mm longi; pedunculi racemorum capillares, ad plus quam 1 cm longi, infra spiculas pilis albis 1,5—2 mm longis dense coronati; spiculae involucrales masculae, ovato-lanceolatae, circa 4 mm longae et 1 mm latae, abrupte in pedicellum brevem, latum, planum, glabrum, contractae, transverse furcatae iunctione; gluma prima ovato-lanceolata, acuta, spiculam aequans, modice plana, manifeste 5—7-nervata, marginibus inflexa, glabra, purpureo-maculata; gluma secunda glumam primam subaequans, dorso tenuior convexiorque, 3-nervata; lemma paulo brevius, hyalinum; antherae 2 mm longae, atro-violaceae; spicula bisexualis 4 mm longa, lanceolata, acuminata; gluma prima viridis sine maculis purpureis, minute bilobata, dorso convexa, coriacea, glabra, nitens; gluma secunda lanceolata, acuminata, marginibus hyalina, obscure trinervis; lemma superius hyalinum, lineare, bilobatum, circa 2 mm longum, arista tenui 18—20 mm longa, medio manifeste geniculata munitum, columna laxe contorta; spiculae pedicellatae masculae, pedicellis longe ciliatis, 2,5—3 mm longis; glumae 4,5 mm longae, sparse purpureo-maculatae, minute ciliatae per margines ad apicem acutum.

DISTRIBUTION.—Only known from Wetar, Lesser Sunda Islands, Elbert, Sunda Exped. 4685 (*type;* Herb. Lugd. Bat. 941.215-87).

In dry *Eucalyptus* savannahs near the coast, up to 50 m altitude.

A tender, annual grass, up to 40 cm high, with short, flaccid, conduplicate blades, mostly crowded at the base, with flabellate sheaths. Spathes and glumes not glandular. Glumes of the male spikelets covered with purplish spots. Sessile spikelet 4 mm long, the awn 18—20 mm long, strongly geniculate, the column twisted.

LEPTASPIS R. Br.

1. LEPTASPIS ANGUSTIFOLIA Summerh. & C. E. Hubb. (*in* Kew Bull. **1927**: 40, 78) was mentioned from New Guinea by Miss Chase (*in* J. Arn. Arb. **20**: 307. 1939), citing Brass 8584. Comparison of the type of *L. angustifolius* in the Kew Herbarium with Brass' specimen shows that

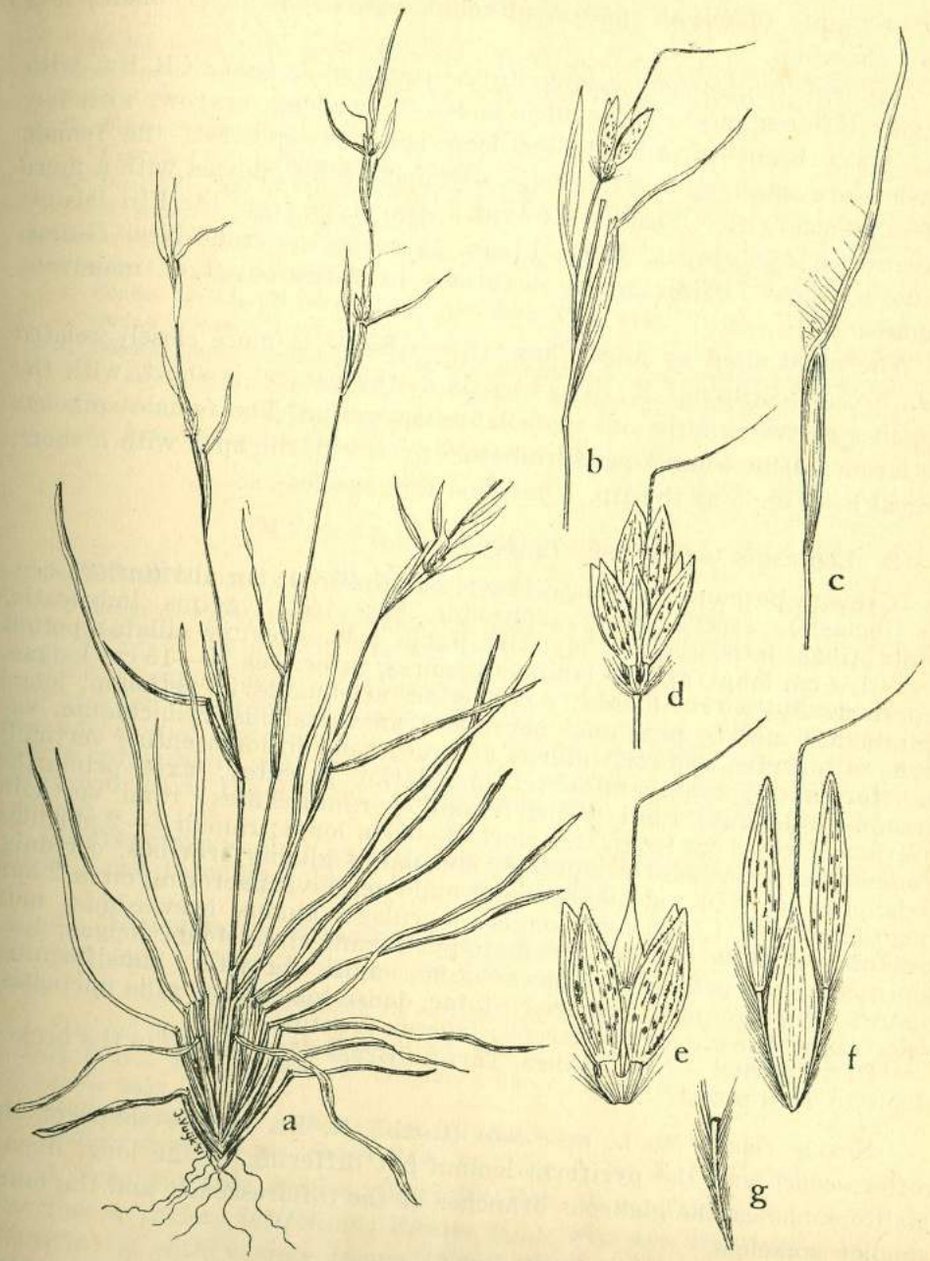

FIG. 11. *Iseilema maculatum* Jansen: *a*, habit; *b*, raceme; *c*, spathiform leaf; *d*, inflorescense; *e*, involucral spikelets; *f*, triad of one bisexual and two pedicelled male spikelets; *g*, pedicel.

they are quite different species, although both have linear blades less than 1 cm wide.

Leptaspis angustifolia belongs to the group of *L. banksii* R. Br., with elongate inflorescences. The panicle is 10—15 cm long, narrow, with few erect strict branches, 1.5—2.5 cm long and few spikeled; the female spikelets are small, up to 3 mm long, asymmetrically gibbous with a more or less lateral orifice. Besides the type and syntype from the Fiji Islands [Greenwood 548 (*type*), 550], I saw this species from New Guinea (Kanosia, Carr 11078), where it grows in forest-edges of mangrove swamps.

The plant cited by Miss Chase (Brass 8584) is more closely related to *L. urceolata* (Roxb.) R. Br. The axis of the panicle is short, with the branches in two whorls and umbellately spreading. The female spikelets are larger, about 4 mm long, turbinately pyriform, the apex with a short, conical beak open at the tip. I describe this species as:

2. **Leptaspis tararaensis** Jansen, *sp. nov.*

Gramen perenne rhizomate brevi; culmi 40—45 cm alti (inflorescentiis inclusis), erecti, glabri, subsolidi, basi tecti vaginis imbricatis, equitantibus, latis, glabris, striatis; ligula ruga breviter ciliata; petioli angusti, 4 cm longi, glabri; laminae lineares, inferiores 10—15 cm longae, superiores 30—40 cm longae, 8 mm latae, attenuatae in petiolum, longe acuminatae, nervis proximis, nervulis transversalibus trabiculatae, superne et margine scabrae, inferne glabrae; rami inflorescentiae verticilli duo formantes, magis minusve umbellatim patentes; axis primarius circa 4 cm longus; rami glabri, rigidi et ramificantes; rami verticilli inferioris circa 8 cm longi, superioris 4—6 cm longi; ramuli 1—2 spiculas ♀ agentes et spiculas ♂ complures; spiculae ♂ glumis brevibus, deciduis, atris, pilis brevibus indutis, lemmate nullo vel naviculaeformi, circa 2 mm longo, antheris 1,5—2 mm longis; spiculae ♀ glumis brevissimis, mox deciduis, lemmate inflato, turbinato-pyriformi, circa 4 mm longae, basi contractae in pedicellum incrassatum, apice breviter cuneiformiter rostrato, hiantes apice, obscure costatae, dense tomentosae pilis uncinatis; palea angusta lemmati adhaerens; fructus ignotus.

DISTRIBUTION.—New Guinea, Tarara, Brass 8584 (*type*), in the broken shade of rain-forest.

Nearly related to *L. urceolata* (Roxb.) R. Br. by the shape of the inflorescence and the pyriform lemma but differing in the long, linear, glabrous blades, the glabrous branches of the inflorescence, and the much smaller spikelets.

3. The Malaysian species of this genus may be identified by the following key:

KEY TO THE MALAYSIAN SPECIES OF LEPTASPIS

1. Utricles turbinately pyriform with a terminal orifice. Axis of panicle short, the branches more or less umbellately spreading (when mature), in 1 or 2 whorls, very stiff.
   2. Blades obovate-oblong, 8—20 cm long, 3—6 cm wide. Utricles 7—8 mm long. Branches of inflorescence usually clothed with uncinate hairs. *L. urceolata*
   2. Blades linear, 15—40 cm long, 8 mm wide at most. Utricles 4 mm long. Branches of inflorescence quite glabrous. . . . . *L. tararaensis*
1. Utricles asymmetric, more or less globose with a more lateral orifice. Axis of panicle elongate, the distant branches solitary or 2—3-nate.
   3. Blades linear, 20—45 cm long, less than 1 cm wide. Utricles about 3 mm long. Ovary pilose. . . . . *L. angustifolia*
   3. Blades much broader and shorter, lanceolate to ovate. Utricles 5—7 mm long.
      4. Lower branches 2—3-nate, obliquely spreading, 4—12 cm long. Blades oblong to ovate. Ovary glabrous. . . . . *L. cochleata*
      4. Branches solitary, erect, 1—5 cm long. Blades lanceolate. Ovary pilose. *L. banksii*

MICROSTEGIUM Nees ex Lind.

MICROSTEGIUM CLAVIGERUM (Back.) Henr. *in* Blumea 3: 453. 1940.

Pollinia clavigera Back. *apud* Heyne, Nutt. Pl. (reissue Gram.) 1: 110. 1922; 2nd Ed. 1: 168. 1927; Handbl. Fl. Java Afl. 2: 47. 1928.

Very near *M. eucnemis* (Nees) Henr., but the blades are much shorter and broader than those of that species, the raceme is solitary (in the type specimens) and more white-hairy, the sessile spikelets larger with much longer callus hairs, the first glume very narrowly grooved and hairy on the lower part, the pedicels longer, and the pedicelled spikelets more reduced.

DISTRIBUTION.—Only known from Madura, Backer 21177 (*type;* Herb. Bogor.) and from East Java, Van der Pijl 485.

2. MICROSTEGIUM CILIATUM (Trin.) A. Camus *in* Ann. Soc. linn. Lyon 68: 201. 1921; Henr. *in* Blumea 3: 453. 1940; Ohwi *in* Acta phytotax. geobot. 11: 157. 1942; Reeder *in* J. Arn. Arb. 29: 337. 1948.

Pollinia ciliata Trin. *in* Mém. Acad. Sci. St. Pétersb. VI 2: 306. 1833; Hack., Androp. *in* DC., Monogr. Phan. 6: 176. 1889; Backer, Hand. Fl. Java Afl. 2: 48. 1928, var. *typica* Back.

Pollinia ciliata var. *glabrata* Ridl., Fl. Mal. Pen. 5: 198. 1925.

Pollinia monantha var. *elmeri* Hack. *in* Philip. J. Sci. 3: 167. 1908.

A very variable species. Ohwi (*in* Bot. Mag., Tokyo 56: 10. 1943) described a variety *latifolium;* Reeder (*l.c.*), who saw the type specimen, identified it with variety *laxum* (Nees) Reeder [*Pollinia laxa* Nees *ex* Steud., Syn. Pl. Glum. 1: 451. 1854 = *Pollinia ciliata* var. *laxa* (Nees) Hack., *l.c.*]. This variety differs from the species by having the rhachis-

joints only very shortly ciliate, the first glume bidentulate, the second glume bearing a capillary awn 1—4 mm long. The awn of the upper lemma is slender, flexuous, and 8—20 mm long.

Pilger (*in* Nat. PflFam., 2. Ausg., 14: 122. 1940) mentioned *M. calochloum* (Laut. & Schum.) Pilg. from North-east New Guinea. I did not see a specimen that matched the description. By the completely glabrous rhachis it seems to be related to *M. glabratum* (Brongn.) A. Camus, but the anthers should be minute (0.3 mm), much smaller than those of the latter species. The remainder of the description applies very well to *M. ciliatum*.

3. MICROSTEGIUM GENICULATUM (Hayata) Honda, Mon. Poac. Japon. 410. 1930.

Pollinia geniculata Hayata, Ic. Pl. formos. 7: 73. 1918.
Pollinia hendersonii C. E. Hubb. *in* Kew Bull. 1927: 79.
Microstegium hendersonii (C. E. Hubb.) C. E. Hubb. *in* Hutchins., Fam. fl. Pl. 2: 227. 1934.

The drawing of the upper lemma by Hayata (*l.c.*) is not correct. This lemma is not shortly bifid with the awn in the sinus, but entire and extending into the capillary, flexuous, up to 35 mm long awn.

4. MICROSTEGIUM MONTANUM (Nees) Henr. *in* Blumea 3: 455. 1940.

Var. **hirsutum** Jansen, *var. nov.*

Differt vaginis, imprimis inferioribus, pilis patentibus longis basi tuberculatis hirsutis.

DISTRIBUTION.—Java, Van Breemen 44 (*type;* Herb. Bogor.), Danser 6756, Van Steenis 4865.

5. **Microstegium steenisii** Jansen, *sp. nov.* — **Fig. 12.**

Culmi decumbentes, 50—80 cm alti, tenues, glabri, ad nodos pilosuli, inferne pauciramosi; vaginae glabrae vel apice pilosula, 2—7 mm longae, striatae, internodiis breviores; laminae lanceolatae, planae, glabrescentes vel sparsim pilosiusculae, 4—5 cm longae, 6—8 mm latae, apice acuminatae, basi subrotundatae; ligulae 0,5—0,7 mm longae, breviter pilosulae; racemi 2—4, tenues, fasciculati, 4—5 cm longi; articuli tenues, sursum vix incrassati, margine sparsim pilis albis 1—1,5 mm longis ciliati; callo pilis albis 1—1,5 mm longis densiuscule ciliato;

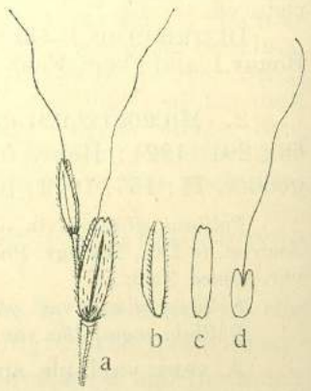

FIG. 12. *Microstegium steenisii* Jansen: *a*, pair of spikelets; *b*, second glume; *c*, sterile lemma; *d*, fertile lemma

spiculae sessiles lanceolatae, pallidae, fere 5 mm longae; gluma prima herbacea, acuta, bimucronata vel subintegra, 4-nervia, nervis tenuibus sed distinctis, dorso glabra, margine pilis albis 1—1,5 mm longis sparsim praedita, carina sursum scaberula; gluma secunda aequilonga, acuta, trinervia, margine pilis albis 1—1,5 mm longis sparse praedita; lemma sterile hyalinum, lanceolatum, longitudine spiculam subaequans, enervium; lemma fertile hyalinum, oblanceolatum, glabrum, $^3/_5$ spiculae aequans, apice $^1/_4$ bifidum, inter lobos arista capillari pallida 12—15 mm longa imperfecta leviter flexuosa vix torta praeditum; palea oblonga, hyalina, $^1/_3$ lemmatis aequilonga, plana; antherae 3, 1,5 mm longae; ovarium glabrum; styli distincti, fere 1 mm longi; pedicelli tres partes articulorum aequantes, albopilosi; spiculae pedicellatae sessilibus similes.

DISTRIBUTION.—Java, Priangan, Mt. Papandajan, Tegal Pandjang, 2040 m altitude, Van Steenis 4320 (*type;* Herb. Bogor.).

This species is more or less similar in habit to *M. dispar* (Nees) Henr., but the latter has softly white-pilose spikelets and a perfect awn with a brown column. The lower lemma of *M. steenisii* is about as long as the glumes, as in *M. nudum* (Trin.) A. Camus, but the latter species has slender and glabrous rhachis-joints. *Microstegium steenisii* on the contrary has firm and ciliate rhachis-joints. It differs from *M. spectabilis* (Trin.) A. Camus in the much longer spikelets, less numerous racemes, and the much narrower and shorter blades.

6. **Microstegium tenue** (Trin.) Jansen, *comb. nov.*

Pollinia tenuis Trin. *in* Mém. Acad. Sci. St. Pétersb. VI 2: 307. 1833.

DISTRIBUTION.—In Malaysia only known from the Philippines, B.S. 4310, 4382, 15679, etc.

Hackel (Androp. *in* DC., Monogr. Phan. 6: 181. 1889) described the racemes as 1—1.5 cm long. The fragment of the type I saw (Manila, Chamisso ex Herb. Hack.) has indeed a filiform culm, ending into two racemes, 1 and 1.5 cm long, and is very similar to the specimens distributed from the Philippines as *Dimeria ornithopoda* Trin. (B.S.3286). The other specimens I saw, have more and longer racemes, up to 4 cm long and the spikelets are slightly longer, too.

MNESITHEA Kunth

1. KEY TO THE MALAYSIAN SPECIES OF MNESITHEA

1. First glume of the sessile spikelets glabrous and smooth, neither narrowed nor winged towards the tip. Annular collar below the spikelets glabrous. Culms glabrous, with glabrous nodes. . . . . *M. laevis*
1. First glume of the sessile spikelets hairy, acute or acuminate. Culms subglabrous to pubescent, with bearded nodes.

2. Racemes 12—18 cm long. Annular callus below the spikelets white-hairy. First glume of the sessile spikelets cancellate, acuminate, and winged in the upper part. Culms, sheaths, and blades usually densely pubescent. . . *M. mollicoma*
2. Racemes 3.5—8 cm long. Sheaths glabrous.
3. Racemes 4 mm wide. Between the joint and the sessile spikelet is a round pore. Lower ¾ of the first glume covered with long tubercle-based hairs. Annular collar glabrous. . . . . *M. geminata*
3. Racemes 2—3 mm wide; no round pore present. The whole first glume covered with short, tubercle-based hairs. Annular collar densely short-hairy. *M. triflora*

2. MNESITHEA LAEVIS (Retz.) Kunth, Rév. Gram. 1: 154. 1829; Backer, Handb. Fl. Java Afl. 2: 71. 1928.

Rottboellia laevis Retz., Obs. bot. 3: 11. 1783.
Rottboellia perforata Roxb., Pl. coromand. 2: *pl. 182*. 1798; Koord., ExkFl. Java 1: 109. 1911.
Ophiurus perforatus (Roxb.) Trin. *in* Mém. Acad. Sci. St. Pétersb. VI 2: 246. 1833; Hack., Androp. *in* DC., Monogr. Phan. 6: 319. 1889.

DISTRIBUTION.—Central and East Java; Celebes.

Some of the Celebes specimens (Eyma 361) differ from the quite glabrous specimens from Java in having the culms and blades slightly hirsute with spreading, tubercle-based hairs. They may be named:

Var. **hirta** Jansen, *var. nov.*

A typo differt culmis foliisque leviter hirsutis pilis patentibus basi tuberculatis.
DISTRIBUTION.—Celebes, Eyma 361 (*type;* Herb. Bogor.).

3. MNESITHEA MOLLICOMA (Hance) A. Camus *in* Bull. Mus. Hist. nat. Paris 25: 57. 1919.

Rottboellia mollicoma Hance *in* J. of Bot. 9: 134. 1871.
Mnesithea pubescens Ridl. *in* J. Straits Br. roy. As. Soc. 44: 207. 1905.

Hackel (Androp. *in* DC., Monogr. Phan. 6: 297. 1889) mentioned this species with a question-mark, copying the description of Hance. He did not see the type and placed the plant with some doubt between the species with adnate pedicels in his subgenus *Coelorhachis*. Hance did not mention these pedicels. The species certainly is neither a *Rottboellia* nor a *Coelorhachis*. Miss A. Camus (*l.c.*) transferred it to *Mnesithea* and gave an ample description (*in* Lec., Fl. gén. Indo-Ch. 7: 387. 1922). This description agrees with Hance's type from China and with the specimens of Balansa (Tonkin) and Pierre (Cochin China) cited by her, except for the base of the blades. Hance stated: "foliis e basi rotundato-cordata . . ."; Hackel: "foliis basi cordatis, late lanceolato-linearibus . . . "; and Miss Camus: "feuilles largement lancéolées-linéaires, cordées à la base . . ."

Neither the type nor the other specimens I have seen do possess blades with cordate bases and Hackel and Miss Camus evidently copied an error from Hance's description.

The blades are linear-lanceolate, the lowest up to 40 cm long, broadest (8—15 mm) somewhat below the middle, narrowing towards the base and passing with a slightly rounded base into the nearly as wide sheaths.

This question is not without importance, for the diagnosis of *Mnesithea pubescens* Ridley (*l.c.*) from the Malay Peninsula corresponds with that of *Mnesithea mollicoma* and does not mention cordate bases of the blades. I studied Ridley's type from Johore (Ridley 11017): it agrees with Hance's type from China (Herb. Kew.). Both have the base of the blades as described above.

The numerous other specimens I saw from the Malay Peninsula, East Sumatra, and Java are all alike, only differing mutually somewhat in the density of the hairiness of culms, sheaths, blades, and nodes. Especially the specimens from East Sumatra are less hairy resembling in that respect *M. laevis* (Retz.) Kunth, but differing from the latter species in the silky, annular callus below the spikelets and the shape and surface of the glume (obtuse, neither narrowed nor winged towards the tip, glabrous, smooth, or minutely foveolate in *M. laevis*, winged and curved towards the tip, tomentose, and distinctly cancellate in *M. mollicoma*).

Ridley's name should be reduced to a synonym of *M. mollicoma*.

4. MNESITHEA GEMINATA (Hack.) Ridl., Mat. Fl. Mal. Pen. 3: 163. 1907; Fl. Mal. Pen. 5: 206. 1925.

Rottboellia geminata Hack., Oesterr. bot. Z. 41: 48. 1891.

Ridley's description is insufficient.

The upper part of the culm and the blades are softly puberulous. The nodes are bearded but not with reflexed hairs. The first glume of the sessile spikelets bears tubercle-based hairs not only at the base but up to ¾ of its length. This species is characterized by the rather broad raceme, 4 mm wide and 6—8 cm long, with the joints shorter than the sessile spikelets and strongly clavate, leaving a round pore between the joint and the sessile spikelets.
DISTRIBUTION.—Only seen from the Malay Peninsula. Ridley (*l.c.*) mentions Borneo, but I did not see any specimen from there.

5. **Mnesithea triflora** (F. T. Hubbard) Jansen, *comb. nov.*

Rottboellia triflora F. T. Hubbard *in* Philip. J. Sci. 9: 257. 1914; Merr., Enum. Philip. fl. Pl. 1: 40. 1923.

DISTRIBUTION.—Endemic in the Philippines.

MYRIOSTACHYA Hook. f.

MYRIOSTACHYA WIGHTIANA (Nees) Hook. f., Fl. Br. Ind. 7: 327. 1897.

Leptochloa wightiana Nees *ex* Steud., Syn. Pl. Glum. 1: 209. 1854.

The number of florets is variable, usually 4—8 but going up to 20. The length of the glumes is also variable and differs like the number of florets even in the spikelets of the same panicle.

Hooker f. (*op. cit.* p. 328) described a variety *longispicula* with the spikelets 8—20-flowered and up to 13 mm long. The highest number of florets I saw in the specimens cited by Hooker from Ceylon and Penang was 13! These specimens are very similar to plants, collected by Lörzing (no. 9131) at Serdang in Sumatra. Ohwi (in sched. Herb. Bogor.) named them variety *sumatrana* and distinguished them by the keels of the palea, scabrous towards the tips. He did not mention the number of florets. I studied the keels of all the specimens I have seen. They are always close together and slightly thickened and vary from nearly glabrous and smooth, to scabrous, aculeolate-scabrous, or minutely ciliolate towards the tips. These slight differences in the indumentum of the keels do neither correspond with the differences in the number of florets nor with any other character. The incongruity of these characters is so evident, that it is not worthwhile to discriminate between these varieties.

OPLISMENUS P.B.

1. OPLISMENUS UNDULATIFOLIUS (Arduino) P.B. var. IMBECILLIS (R. Br.) Hack. *in* Govt Labs. Phil. Publ. No. 35: 81. 1906; Merr., Enum. Philip. fl. Pl. 1: 72. 1923; Bibl. Enum. Born. Pl. *in* J. Straits Br. roy. As. Soc., Spec. No., 72. 1921.

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

Oplismenus undulatifolius [*non* (Ard.) P.B.] *sensu* Koord., ExkFl. Java 1: 138. 1911; Merr., Enum. Philip. fl. Pl. 1: 72. 1923; Backer, Handb. Fl. Java Afl. 2: 174. 1928; Hitchc. *in* Brittonia 2: 123. 1936.

R. Brown's type of *Orthopogon imbecillis* (It. Austral. 6133; Herb. Kew.) consists of two branches. One of these has very reduced racemes, only the lower glume of the spikelets awned, and the other scales muticous like in the figure of Trinius (Sp. Gram. Ic. *pl. 191*). The other branch has somewhat longer racemes, slightly longer spikelets, and both glumes awned, the awn of the first glume much longer than the awn of the second. The type sheet asserts the variability of the species in this respect.

Nearly all of the numerous Malaysian specimens I have seen, are glabrous plants, with only the margins of the sheaths ciliate. The blades

are linear-lanceolate, asymmetrical, often one of the sides undulate, glabrous, somewhat glaucous, and more or less stiff. The development of the panicle is very variable: usually spike-like with distant clusters of a few spikelets, but on another branch of the same plant the panicle may be much more developed and the lower racemes 1 cm long and more. Usually the lower or both glumes are awned and the lemmas muticous; more rarely the lower lemma bears a short awn.

Compared with the *O. undulatifolius* from southern Europe, there are striking differences: in the European plant the sheaths are covered with spreading, long hairs; the blades ovate-lanceolate, pale green, and much softer; the racemes, especially the lower, longer; and the spikelets usually three-awned, both glumes and the lower lemma bearing an awn (Trinius, Sp. Gram. Ic. *pl. 192*). At first sight the European and Australian specimens appear very different, but a series of intergrading forms unites both extremes.

In some of the Philippine specimens the nodes of the main axis bear two racemes (Cuming 532; Herb. Lugd. Bat., etc.).

2. OPLISMENUS HIRTELLUS (L.) P.B., Agrost. 54. 1812.

Panicum hirtellum L., Syst. nat., Ed. 10, 870. 1759.

Though distributed throughout the tropics, I saw from Malaysia only specimens from New Guinea, where it seems common in the Morobe District. A very variable species, best characterized by the short-awned lemma and the densely flowered racemes. It is closely allied to the American *O. setarius* (Lam.) R. & Sch., which has narrower leaves, smaller spikelets, and the awn of the lower lemma longer.

3. OPLISMENUS COMPOSITUS (L.) P.B., Agrost. 54. 1812.

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

This species is burdened with an enormous list of synonyms and names for all sorts of variations. It is best characterized by its luxurious growth, the distant racemes up to more than 10 cm long, the approximate, but not crowded, rather large spikelets, the long-awned glumes, and the muticous lower lemma. Especially the hairiness of the culms, sheaths, and blades is very variable. An extreme form in this respect is Clemens 27594a from Mount Kinabalu, North Borneo: this specimen is very densely woolly-hairy, especially in the panicle, the yellowish-whitish hairs being 2—3 mm long; but Clemens 5167 from the same locality forms a connecting link with the normal form. Some of

these varieties may be hybrids with *O. undulatifolius*, e.g. S.F.26751 from the Malay Peninsula and B.S.76779 from the Philippines; no ripe grains are present.

4. OPLISMENUS BURMANNI (Retz.) P.B., Agrost. 54. 1812.

Panicum burmanni Retz., Obs. bot. 3: 10. 1783.

On dry soil the racemes are usually shorter and strikingly white-villous. This form is called variety *lanatus* (Buse) Backer (Handb. Fl. Java Afl. 2: 172. 1928); *Orthopogon burmanni* (Retz.) R. Br. var. *lanatus* Buse (*in* Miq., Pl. Jungh. 370. 1854). The greater part of the Malaysian specimens belong to this variety which is locally abundant on shady, rather dry soil.

ORYZA L.

1. **Oryza longiglumis** Jansen, *sp. nov.* — **Fig. 13b.**

Gramen perenne; culmi erecti, graciles, ad 120 cm alti vel altiores, teretes glabri; vaginae quam internodia breviores, teretes et carinulatae parte superiore, inferiores latae et a culmo solutae, superiores angustae, striatae, glabrae, nodis glabris; ligula 2—3 mm longa, tenuis, lacerata, glabra; laminae lineares, planae, ad 30 cm longae, 6—8 mm latae, magis minusve griseo-virides, longe acuminatae, basi contractae; panicula ad 20 cm longa, parte basali in vagina superiore inclusa, laxe contracta, rami inferiores longiores 2—3-nati oblique patentes, superiores breviores solitarii autem; axes ramique angulati, graciles, glabri laevesque; pedicelli variabilis longitudine, 4—12 mm longi, apice incrassati; spiculae lineari-oblongae, 7—8 mm longae, 1,5—2 mm latae, aristatae; cupula infraspicularis leviter 2-lobata, altitudine aequalis latitudini; callus circa 1,5 mm longus, glaber; glumae setiformes, paulo supra pedem calli emergentes spiculas conspicue superantes, 10—14 mm longae; lemma et paleae dorso haud vel vix granulatae oculo inermi; lemma abrupte aristatum, arista gracili, minute scabrum et ad 26 mm longum, carinis et nervis principalibus minute spinulosum, imprimis parte superiore; palea breviter cuspidata; caryopsis ignota.

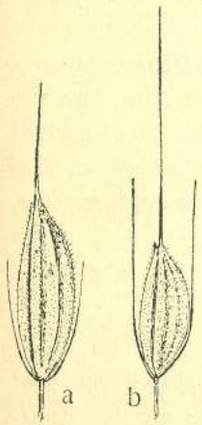

FIG. 13. Spikelets of *Oryza ridleyi* Hook f. (*a*), and *Oryza longiglumis* Jansen (*b*).

DISTRIBUTION.—Only known from New Guinea, Western Division, Tarara, Brass 8721 (*type;* Herb. Lugd. Bat.), in a small swamp along a river, at low altitude.

Closely related to *Oryza ridleyi* Hook. f. (fig. 13a), but differing in the shorter ligule, the shape of the panicle, the smaller and longer-awned

spikelets, and especially in the very long, bristle-like glumes, 10—14 mm long (and not 5—7 mm long as in *O. ridleyi*).

2. ORYZA STENOTHYRSA K. Schum. *in* K. Schum. & Lauterb., Fl. deut. Schutzgeb. 57. 1905.

I did not see the type which was probably destroyed during the war. According to the ample description by Prodoehl (*in* Mez, Bot. Arch. 1: 232. 1922) this species may be only a synonym of *Oryza ridleyi* Hook. f.

OTTOCHLOA Dandy

Ottochloa grandiflora Jansen, *sp. nov.* — **Fig. 14.**

Gramen perenne; culmi ascendentes, puberuli, e nodis infimis radicantes, e nodis inferioribus et mediis ramosi; rami floriferi erecti, 30—50 cm alti, inferne circa 2,5 mm lati, nodis glabris; vaginae breviores quam internodia, 3—4 cm longae, latiores, striatae, teretes, glabrae, marginibus dense ciliatae; ligula truncata, brevissima, dense ciliata; laminae lanceolato-lineares, ad basin manifeste contractae, apice longe acuminatae, planae, 10—15 cm longae, 8—15 mm latae, dense nervatae (nervis numerosis), utrinque glabrae et laeves; panicula erecta, angusta usque ad subspiciformis, 10—15 cm longa; ramis paucis, adpressis, ad 2 cm longis, distantibus, scabris, 4—6-spiculosis; pedicelli inequales, 2—5 mm longi, apice cupuliformes; spiculae totae mox cadu-

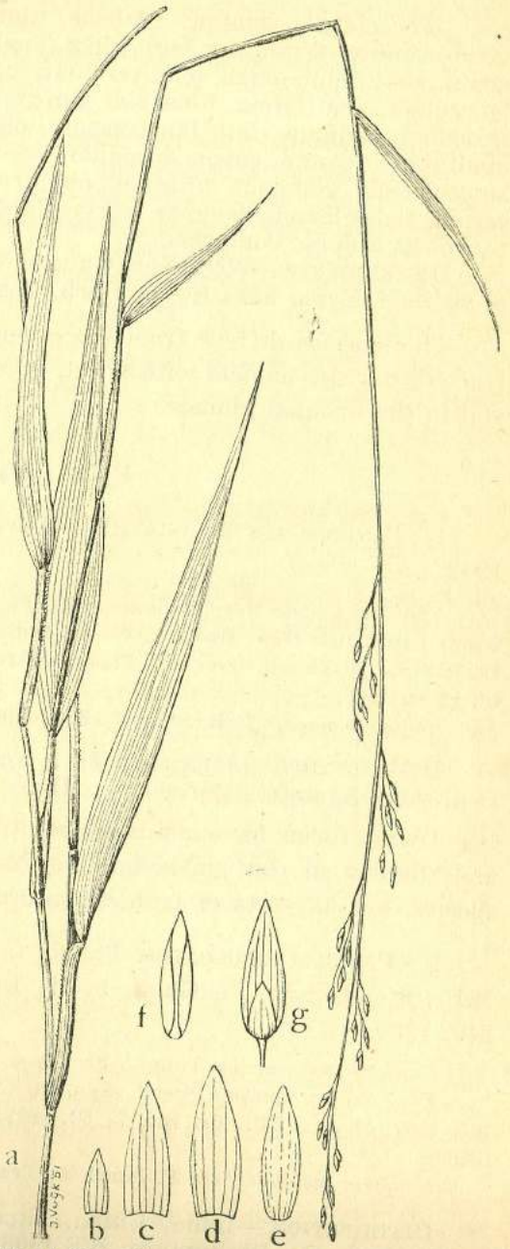

FIG. 14. *Ottochloa grandiflora* Jansen: *a*, habit; *b*, first glume; *c*, second glume; *d*, sterile lemma; *e*, fertile lemma, dorsal side; *f*, fertile lemma, ventral side *g*, spikelet.

cae, lanceolatae, acutae, glabrae, dorso modice compressae, pallide viridescentes, 6 mm longae; gluma prima plerumque adaxialis, ovata, acuta, 1—1,5 mm longa, tenuiter subtrinervia; gluma secunda 4 mm longa, lanceolata, acutissima, 5-nervia, margine hyalina; lemma inferius sterile flosculam aequans, late lanceolatum, obtusiusculum, 5-nervium, margine hyalinum; lemma superius paulo brevius quam inferius, chartaceum, lanceolatum, glabrum, nitidum, obscure nervatum, interdum basi bisulcatum; palea lemma aequans, nervis duobus obsoletis, marginibus hyalinis; caryopsis a dorso compressa.

DISTRIBUTION.—West New Guinea, Wissel Lake region, at about 1800 m altitude, Eyma 5294 (*type;* Herb. Bogor.).

This species differs from the other species of the genus in the contracted, narrow panicle with short, erect branches, in the long spikelets, and in the unequal glumes.

PANICUM L.

1. PANICUM AUSTRO-ASIATICUM Ohwi *in* Acta phytotax. geobot. 11: 45. 1942.

Panicum humile Nees *ex* Steud., Syn. Pl. Glum. 1: 84. 1854, *non* Thunb. *ex* Trin., Gram. panic. 164. 1826; Hook. f., Fl. Br. Ind. 7: 48. 1897; Ridl., Fl. Mal. Pen. 5: 224. 1925; Stapf *in* Thiselt.-Dyer c.s., Fl. trop. Afr. 9: 693. 1920; Merr., Enum. Philip. fl. Pl. 1: 64. 1923.

Panicum vescum R. R. Stew. *in* Brittonia 5: 452. 1945.

DISTRIBUTION.—Africa; India; Formosa; China; Malaysia: Malay Peninsula, Sumatra, Borneo (*sec.* Hook. f., not seen), and the Philippines.

Dwarf forms have a stunted habit, more contracted, shorter panicles, and slightly shorter spikelets. They make the impression of a separate species, but all sorts of transitions occur.

2. PANICUM BISULCATUM Thunb. *in* Nov. Act. Soc. Sci. upsal. 7: 141. 1815; Steud., Syn. Pl. Glum. 1: 99. 1854; Honda, Monogr. Poac. japon. 249. 1930.

Panicum grossarium Thunb., Fl. japon. 48. 1784 (*non* L.).

Panicum acroanthum Steud., Syn. Pl. Glum. 1: 87. 1854; Miq., Prod. Fl. japon. 163. 1867; Hook. f., Fl. Br. Ind. 7: 52. 1897; Quisumbing *in* Philip. J. Sci. 41: 315. 1930.

Panicum melananthum F. Muell. *in* Trans. Vict. Inst. 1: 47. 1855.

DISTRIBUTION.—India, China, Japonia, Australia. In Malaysia only known from the Philippines, B.S.49069, 49704.

Often confused with *Panicum elegantissimum* Hook. f. (Fl. Br. Ind. 7: 52. 1897). The two species may be opposed as follows:

P. bisulcatum.	*P. elegantissimum.*
Culms creeping at the base and rooting at the nodes, the erect flowering branches up to 70 cm high.	Culms erect, up to 1 m high.
Blades quite glabrous, with contracted base, 10—15 cm long.	Blades soft-hairy all over, subradical, strict, up to 30 cm long.
Sheaths quite glabrous.	Sheaths with a hairy mouth.
Spikelets long-pedicelled, usually sparsely pubescent, about 2 mm long.	Spikelets short-pedicelled, glabrous, about 2.5 mm long.
First glume obtuse, inserted very near to the second.	First glume acute, inserted far below the second.

3. PANICUM BREVIFOLIUM L., Sp. Pl. 59. 1753; Koord., ExkFl. Java 1: 133. 1911; Merr., Bibl. Enum. Born. Pl. *in* J. Straits Br. roy. As. Soc., Spec. No., 45. 1921; Enum. Philip. fl. Pl. 1: 61. 1923; Backer, Handb. Fl. Java Afl. 2: 160. 1928.

Panicum ovalifolium Poir. *in* Lam., Encycl. méth. Suppl. 4: 279. 1816; Ridl., Fl. Mal. Pen. 5: 227. 1925.

DISTRIBUTION.—Africa and tropical Asia; probably introduced in Malaysia: Malay Peninsula, West and Central Java, Borneo, and the Philippines.

Though usually this species is subglabrous to sparingly hairy, more hairy specimens occur here and there, e.g. the specimens from Semangkok, Malay Peninsula (Ridley 12046) have the blades long-hairy on both sides, the hairs reaching along the culm into the panicle. They have been described by Ridley (Fl. Mal. Pen. 5: 228. 1925) as *Panicum hirtifolium* Ridl. As this hairiness is the only differential character with *P. brevifolium*, this taxon may better be classed as **Panicum brevifolium** var. **hirtifolium** (Ridl.) Jansen, *comb. nov.*

4. PANICUM COSTATISPICULUM Ohwi *in* Bull. Tokyo Sci. Mus. No. 18: 14. 1947.

A remarkable species, conspicuous by its brown colour and the strongly 11-nerved upper glume and lower lemma.

DISTRIBUTION.—Only known from Sumatra, Toba Lake region, Lörzing 6605.

5. PANICUM CAPILLIPES Benth., Fl. austral. 7: 484. 1878; Hughes *in* Kew Bull. 1923: 324.

DISTRIBUTION.— An Australian species; in Malaysia only found on the Aru Islands, Moluccas, Buwalda 5305.

6. PANICUM LUZONIENSE Presl, Rel. Haenk. 1: 308. 1830.

Very variable in size. Small, ruderal specimens resemble *P. capillare* L., a North American species not known from Malaysia. Large, stout plants resemble *P. cambogiense* Balansa, but may be recognised by the shape and outline of the panicle and the slightly smaller, somewhat turgid spikelets.

7. PANICUM MACROCLADUM Chase *in* J. Arn. Arb. 20: 308. 1939; Reeder *in* J. Arn. Arb. 29: 270. 1948.

DISTRIBUTION.—Only known from New Guinea, MacGregor 18, MacFarlane 18, Brass 6350, 6568.

Apparently closely related to *P. mindanaense* Merr., but differing in being much coarser and taller, with papillose-hirsute sheaths, longer blades, and larger spikelets.

8. PANICUM MINDANAENSE Merr. *in* Philip. J. Sci. 1 (Suppl.): 360. 1906.

Reeder (*in* J. Arn. Arb. 29: 269. 1948) described a variety *pilosum*, differing from the typical form in having the sheaths and blades densely pilose; it was collected by Kanehira & Hatusima (no. 13093) in New Guinea. This variety may be confused with *P. macrocladum* Chase, but the latter has papillose-hirsute sheaths and blades. The same specimen (Kanehira & Hatusima 13093) had been called *P. apertispiculum* Ohwi (in sched. Herb. Bogor.).

9. PANICUM MILIARE Lam., Tabl. Encycl. méth. Bot. 1: 173. 1791.

Cultivated in Malaysia and running wild. By various authors the wild form is called *P. psilopodium* Trin. Especially C. E. C. Fischer (*in* Gamble, Fl. Madras 10: 1780. 1934) tries to differentiate between both species. In the material at my disposal the only differences with the cultivated forms are: the lower culms, the often more glabrous and more slender blades, the more spreading and capillary branches of the panicle, and the slightly shorter, deciduous spikelets, but there are numerous intermediate forms.

10. PANICUM MONTANUM Roxb., Fl. ind. 1: 313. 1820.

Panicum cordatum Buse *in* Miq., Pl. Jungh. 376. 1854.

Usually this species is more or less glabrous. The following variety has rarely been collected.

Var. **pubescens** (Boerl.) Jansen, *comb. nov.*

Panicum cordatum Buse var. *pubescens* Boerl. *in* Ann. Jard. bot. Buitenz. 8: 59. 1890.

Blades with the upper surface densely hairy by tubercle-based hairs, the hairs on the lower part of the margins about 3 mm long. Axils of the panicle long-hairy. Upper glume and lower lemma pubescent.

DISTRIBUTION.—Java, Buitenzorg (= Bogor), Boerlage *s.n.*; Celebes, Bünnemeijer 10705.

In the Philippines many low and tender specimens have been collected (e.g. Merrill 554, Williams 134, Elmer 7635); they possess wiry, thin culms, narrower blades with the bases slightly cordate, and a rather short, very diffuse, and few-spikeled panicle, and have been referred to *Panicum luxurians* Willd. They make the impression of a distinct species, but when studying abundant material, the inconstancy of these characters is so evident that it seems not worthwhile to regard them as a distinct taxon.

11. PANICUM OBLONGISPICULUM Ohwi *in* Bull. Tokyo Sci. Mus. No. 18: 15. 1947.

The type specimen in the Bogor Herbarium (Sumatra, Atjeh, Van Steenis 8779) is only a fragment, probably the top of an elongate culm, bearing a panicle and three leaves. It resembles much the top-part of *Panicum sarmentosum* Roxb. The spikelets however are rather different: they are longer (3 mm), have a much smaller first glume at most one third as long as the spikelets. The palea is wanting in the lower lemma and the tip of the upper lemma is slightly pilose.

12. PANICUM PERAKENSE (Hook. f.) Merr. *in* Philip. J. Sci. 11: 52. 1916; Bibl. Enum. Born. Pl. *in* J. Straits Br. roy. As. Soc., Spec. No., 46. 1921; Ridl., Fl. Mal. Pen. 5: 226. 1925.

Panicum humidiorum Ham. var. *perakense* Hook. f., Fl. Br. Ind. 7: 54. 1897.
Panicum parvispiculatum Ohwi *in* Bull. Tokyo Sci. Mus. No. 18: 14. 1947.

DISTRIBUTION.—In Malaysia a rare grass: Malay Peninsula, Ridley 14386; Sumatra, Tapanuli, Bartlett 4743; Borneo, Clemens 28275, 51562, Jaheri 131, Endert 1484, 2124, B.S.2048.

The type sheet of *P. parvispiculatum* Ohwi (*l.c.*) in the Bogor Herbarium (Endert 1484) contains several distal parts of elongate culms. The panicles are very mature and nearly all the spikelets have dropped, the few remaining being very moulded. These small, 1.3 mm long, blunt spikelets match those of *P. perakense* Merr. The only difference with the latter species is in the shape of the panicle, which has retained the contracted shape characteristic of young specimens of *P. perakense*. In general the Bornean specimens of the present species seen by me have more contracted panicles with shorter branches than the specimens from India, the Malay Peninsula, and Sumatra. I do not doubt that *P. parvispiculatum* is a synonym of *P. perakense*.

13. PANICUM SARMENTOSUM Roxb., Fl. ind. 1: 311. 1820.

Panicum incomtum Trin., Gram. panic. 200. 1826.
Panicum myrianthum Buse *in* Miq., Pl. Jungh. 374. 1854.

Roxburgh described *P. sarmentosum* from plants growing in the Calcutta Botanic Garden and introduced there from Sumatra. Trinius described *P. incomtum* from the Philippines. The two descriptions indicate a difference in habit of the panicle: open with smooth branches in *P. sarmentosum*, contracted and implicate with viscid branches in *P. incomtum*. Miss Chase (*in* J. Arn. Arb. 20: 311. 1939) considered the two species as different and Blake [*in* Proc. roy. Soc. Queensl. 59: 158. 1948] is of the same opinion. Reeder (*in* J. Arn. Arb. 29: 271. 1948) on the other hand considers them as members of one wide-ranging polymorphic species. I completely agree with him. I have studied numerous specimens from the Malaysian region and observed various degrees of variation between the two extremes.

Var. **parvispiculatum** Jansen, *var. nov.*

Spiculae minutissimae, circa 1,5 mm longae.
DISTRIBUTION.—Celebes, Kendari, leg. Beccari, Herb. Firenze 12128 (*type*).

The small spikelets are similar to those of *P. perakense* (Hook. f.) Merr. The latter species however has strictly erect, unbranched culms, a glabrous panicle-axis, and a very reduced palea in the lower lemma.

14. PANICUM SUISHAENSE Hayata, Icon. Fl. formos. 7: 62. 1918.

Panicum trypheron (*non* Schultes) *sensu* Hook. f., Fl. Br. Ind. 7: 47. 1897, partim; Merr., Enum. Philip. fl. Pl. 1: 69. 1923, partim.

Nearly related to *P. trypheron* Schultes (Syst. veg. Mant. 2: 244. 1822), but differing in the numerous, long, erect basal blades and the long-hairy pedicels, the hairs deciduous when the spikelets are mature.

15. PANICUM TRACHYRHACHIS Benth., Fl. austral. 7: 490. 1878; Hack. *in* Bot. Jb. 13: 258. 1890.

Panicum virgatum (*non* L.) *sensu* F. Muell., Desc. Notes Papuan Pl. 1: 47. 1876.

DISTRIBUTION.—Australia. In Malaysia only known from Timor, leg. Zeye, *sec.* Hackel (not seen); Celebes, De la Savinierre 613 (Herb. Jard. Bot. Brux.); Buru, A. H. Jansen 17; New Guinea, *sec.* Hackel (not seen).

PASPALIDIUM Stapf

PASPALIDIUM PUNCTATUM (Burm. f.) A. Camus *in* Lec., Fl. gén. Indo-Ch. 7: 419. 1922.

This subaquatic species I saw from the Malay Peninsula, Sumatra, Java, Borneo, Celebes, and the Philippines. In some Philippine specimens the nodes of the main axis bear two racemes in stead of one (e.g. Cuming 532; Herb. Lugd. Bat.). Usually the second glume attains ¼—⅓ the length of the spikelet. Rarely the second glume is nearly as long as the spikelet. This is

Var. **longiglume** Jansen, *var. nov.*

Gluma secunda spiculae subaequilonga.
DISTRIBUTION.—Java, Backer 21378, 22843 (*type;* Herb. Bogor.), 32164.

PASPALUM L.

1. PASPALUM COMMERSONII Lam., Encycl. méth. 1: 175. 1791; Ridl., Fl. Mal. Pen. 5: 218. 1925; Henr. *in* Blumea 3: 441. 1940.

Paspalum metzii Steud., Syn. Pl. Glum. 1: 21. 1854.

(i). In the group of species segregated from *P. scrobiculatum* L. it is difficult to find workable differential characters. Especially about the status of *P. commersonii* Lam. and *P. metzii* Steud. there exists much difference of opinion.

Alston (*in* Trim., Fl. Ceylon, Suppl. 313. 1931), Ohwi (in sched. Herb. Bogor.) and Monod de Froideville (*in litt.*) lay much stress on the difference in colour of the stigmas, white in *P. metzii*, purplish in *P. commersonii*. The other differential characters they mention (length of the peduncle, number of racemes, etc.) are too variable to be taken into account. On the other hand, Stapf (*in* Prain, Fl. trop. Africa 9: 573. 1919), when discussing *P. commersonii*, did not mention the colour of the stigmas nor did Steudel in his diagnosis of *P. metzii*.

Even when this difference in colour should be acceptable for living plants, it is impossible to use it in the herbarium; e.g. in the specimens of the type collection of *P. metzii* (Hohenacker 923) I have seen, the old stigmas are not white but have become dark brown. This difference in colour being the only differential character, I consider *P. metzii* as a synonym of the rather variable *P. commersonii*.

(ii). Usually this species is quite glabrous. A rather rare variety is:

Var. **hirsutum** Jansen, *var. nov.*

A typo differt vaginis imprimis per margines papilloso-hirsutis; laminis foliorum pilis longis sparse hirsutis.
DISTRIBUTION.—Malay Peninsula, S.F.4787 (*type*); Java; Borneo, Motley 127; Philippines, B.S.3140.

(iii). The difference between *P. commersonii* and *P. scrobiculatum* is not always very clear. Some Malaysian specimens have the low, reclining habit and the small number of rather short racemes of *P. commersonii* together with the large, plump spikelets of *P. scrobiculatum*. As they are apparently perennial they should be referred to:

Var. **turgidum** (Buse) Jansen, *comb. nov.*

Paspalum scrobiculatum var. *turgidum* Buse *in* De Vriese, Pl. Ind. bat. orient. 113. 1857.

DISTRIBUTION.—I have seen this variety from Java, Sumba, and Sumbawa.

(iv). The first glume is rarely well developed, ½—⅔ as long as the spikelet, hyaline, and indistinctly 1—3-nerved (Timor, Monod de Froideville 1141, 1432).

2. PASPALUM CARTILAGINEUM Presl, Rel. Haenk. 1: 216. 1830.

This has always been a critical species and up till now there exists much difference of opinion about its taxonomic status. Recently Summerhayes and C. E. Hubbard (*in* Kew Bull. 1933: 257), in their account of the grasses of the Fiji Islands, regarded it as a variety of *P. orbiculare* Forst. Henrard (*in* Blumea 3: 442. 1940) considered it a separate species. Reeder (*in* J. Arn. Arb. 29: 298. 1948) united it with *P. scrobiculatum* L. *sensu lato* (= *P. commersonii* Lam. in my opinion). The three species have more or less the same appearance but differ in the length, the shape, and the structure of the spikelets.

In *P. orbiculare* the spikelets are small, not longer than 2 mm, oval, broadest at the middle, green, distinctly apiculate and not rounded at the top, with 3-nerved glume and lower lemma.

In *P. commersonii* the spikelets are rounded and obtuse at the top, brownish, with the glume and lower lemma 5—7-nerved, and at maturity with dark brown lemmas.

In *P. cartilagineum* the spikelets are about 2 mm long, obovate, slightly broader above the middle, with the lemma of the lower floret cartilagineously indurated, polished and glassy.

Reeder based his conclusion on the fact, that in a single specimen both indurate and membranous lower lemmas may be present. I did not observe this in the isotypes I examined. When the spikelets are young the induration of the lower lemma is not very pronounced, but when they are mature the glassy lemma has a very characteristic, indurated appearance. I agree with Henrard's conclusion and consider *P. cartilagineum* Presl a separate species.

3. PASPALUM DISTICHUM L., Syst. nat., Ed. 10, 2: 855. 1759.

This wide-spread tropical and subtropical species is very rare in Malaysia. I only saw it from Celebes (Yoshida 38) and Buru (A. H. Jansen 7).

White (*in* Proc. roy. Soc. Queensl. 34: 15. 1935) mentions *Paspalum distichum* var. *littorale* (R. Br.) Bailey from New Guinea. I did not see the specimens and confusion with the related *P. vaginatum* Sw. is not impossible. The Bornean specimen distributed as *P. littorale* R. Br. (Beccari 3528) is *P. vaginatum* Sw.

4. PASPALUM LONGIFOLIUM Roxb., Hort. bengal. 7. 1814, nomen nudum; Fl. ind. 1: 280. 1820.

Typical specimens are easily recognized by the long blades, the long panicle with up to 18 racemes and a row of fine hairs at the base of the racemes, the broad rhachis, and the usually crisp-pubescent, 3-nerved scales of the apiculate spikelets, placed in 4 rows.

Ridley (Fl. Mal. Pen. 5: 217. 1925) described a *Paspalum platycoleum*. According to the specimens cited it agrees with the common form of *P. longifolium*. The raceme-axils are not quite glabrous (Ridley, *l.c.*) but have a few long white hairs (Selangor, Port Swettenham, Bangson).

Usually the sheaths of *P. longifolium* are glabrous. Plants with hirsute sheaths are described as variety *hirsutum* Boerl. (*in* Ann. Jard. bot. Buitenz. 8: 49. 1890; var. *trichocoleum* Hack. *in* Philip. J. Sci. 3: 167. 1908; Merr., Enum. Philip. fl. Pl. 1: 56. 1923; Hitchc. *in* Brittonia 2: 121. 1936).

Remarkable specimens have been collected in the Philippines and East Sumatra. The culms are much lower, the blades shorter, the panicle bearing only 2—4 racemes, 3—3.5 cm long and nearly glabrous at the base of the racemes. The minutely puberulent or glabrescent spikelets are placed in 2 rows except in the middle of the racemes, where they are placed in 3—4 rows. The spikelets have the typical shape and the 3-nerved outer scales of *P. longifolium*. These specimens resemble at first sight *P. orbiculare*.

I have named them

Var. **pseudo-orbiculare** Jansen, *var. nov.*

Culmi circa 40 cm alti; panicula 2—4 racemis composita, racemis 3—3,5 cm longis, basi glabris vel pilis 1—2 praeditis; spiculae biseriatae, medio racemorum tri- vel quadriseriatae, fere glabrae.

DISTRIBUTION.—Philippines, Santos 5 (*type;* Herb. Univ. Michigan), Elmer *s.n.* (March 1917, Prov. of Benguet), Velasquez 274; East Sumatra, Yates 507; Sumba, Monod de Froideville 1808; West Borneo, Polak 721.

5. PASPALUM DECUMBENS Swartz, Prodr. Veg. ind. occ. 22. 1788.

Paspalum vaginiflorum Steud., Syn. Pl. Glum. 1: 19. 1854.

This species, characterized by its solitary racemes, strongly plano-convex spikelets with the first glume developed and the second about half as long as the spikelet, is widely distributed in tropical America. It has been collected at Bogor (Monod de Froideville 979) and has probably been introduced.

POA L.

The species of the genus *Poa* are in Malaysia usually restricted to high mountainous regions. Especially New Guinea and North Borneo are rich in endemic species. Of the Eurasian or cosmopolitan species only *Poa annua* L., *Poa pratensis* L., and *Poa trivialis* L. are represented and have probably been introduced.

Among the material I studied for the Flora Malesiana I found still some new species. The following is an enumeration and discussion of all the known species.

1. POA ANNUA L., Sp. Pl. 68. 1753.

DISTRIBUTION.—Malay Peninsula, Sumatra, Java, and Philippines. Between 900 and 3000 m altitude.

2. POA ARCHBOLDII Hitchc. *in* Brittonia 2: 109. 1936.

DISTRIBUTION.—Endemic in New Guinea (Mt. Albert Edward). At 3600 m altitude.

3. **Poa borneensis** Jansen, *sp. nov.* — Fig. 15.

Gramen perenne, dense caespitosum sine stolonibus aut rhizomatibus; culmi erecti, stricti, 20—30, raro ad 40 cm alti, 3—4-nodosi, glabri laevesque, innovationibus dense fasciculatis per culmum dispositis; vaginae laeves, striatae, basi leviter purpurascentes; ligula hyalina, glabra, lanceolato-triangularis, ad 4 mm longa; laminae filiformes, conduplicatae vel involutae, erectae, 5—15 cm longae et 0,5—0,75 mm latae, glabrae laevesque; panicula denique exserta, 3—5 cm longa, ramis oblique patentibus per anthesin, contracta postea; rami inferiores 2—3-nati, circa 1 cm longi, superiores binati et breviores, magis minusve dense spiculati fere ad basin; spiculae breviter pedicellatae, purpureo-maculatae, nitentes, 1—2-flosculosae, 3—4 mm longae; gluma prima 1,5 mm longa, latior et peracuta, gluma secunda lanceolata, 2,5 mm longa, utraque gluma laevis vel minute scaberula per partem superiorem carinae, 1-nervata vel 3-nervata (cum duobus nervis lateralibus brevibusque obscuris); lemma peracutum, glabrum, herbaceum, 3,5 mm longum, nervis lateralibus tenuissimis; palea lemma aequans, bicarinata, peracuta, carinis punctulato-scabra; antherae luteae, 0,5 mm longae, oblongae.

DISTRIBUTION.—Only known from British North Borneo, higher parts of Mt. Kinabalu, on wet rocks and in open scrub between 2000 and 4000 m altitude, Clemens 51527 (*type;* Herb. Univ. Calif. no. 557540).

This species is related to *Poa epileuca* Stapf, but differs in the much higher culms, the larger and looser panicles, and especially in the up to 4 mm long ligule. The type specimen is about 40 cm tall with obliquely spreading panicle-branches. Clemens 27787, 30315, and 30341 are lower plants from higher altitudes, with narrower blades, and the panicles more contracted and only slightly exserted.

4. POA BRASSII Hitchc. *in* Brittonia 2: 110. 1936.

Poa luzoniensis (*non* Merr.) *sensu* Ridl. *in* Trans. Linn. Soc., Bot. 9: 251. 1916.

DISTRIBUTION.—Endemic in New Guinea, Mt. Tafa, on old landslides and along roadsides, Brass 4874 (*type*).

I saw two other specimens: Brass 9844 and Clemens 12417 (det. Chase). These do not quite agree with the description of Hitchcock. The culms are more reclining, the glumes scabrous, and the lemmas punctulate-scabrous on the nerves.

5. POA CALLOSA Stapf *in* Kew Bull. 1899: 116.

This species is nearly related to *Poa epileuca* Stapf, but differs in the very smooth, callous blades, in the less acuminate and distinctly 5-nerved lemmas, and in the keels of the palea being sharply rough. The type specimen

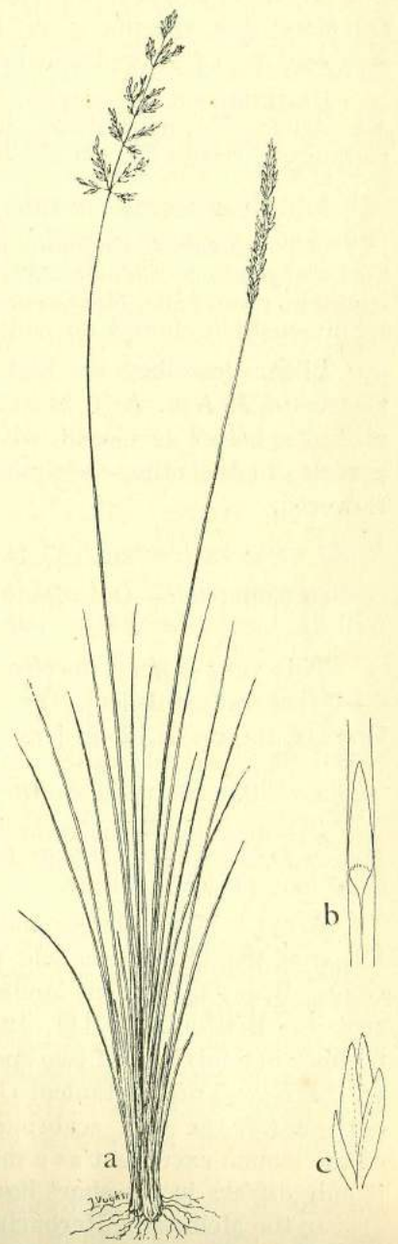

FIG. 15. *Poa borneensis* Jansen: *a*, habit; *b*, ligule; *c*, spikelet.

in the Kew Herbarium, collected by Giulianetti, has 1—2-flowered spikelets; the specimens of Brass, MacGregor, and Wissel have the spikelets 3—4-flowered and longer than the second glume.

DISTRIBUTION.—Endemic in New Guinea: Mt. Scratchley, Giulianetti; Mt. Albert Edward, Brass 4208; Mt. Knutsford, MacGregor 32; Mt. Carstensz, Wissel 25. On shallow soil between 3600 and 4100 m altitude.

6. POA CRASSICAULIS Pilg. *in* Bot. Jb. 62: 458. 1929.

DISTRIBUTION.—Endemic in New Guinea: Mt. Saruwaged (Sarawaket), Keysser 4, Clemens 9913; Mt. Albert Edward, Brass 4469; Mt. Victoria, *anno* 1889, MacGregor *s.n.*; Owen Stanley Range, MacGregor 23. In pin-cushion clumps on ridges and edges about 4000 m altitude.

Pilger described the high alpine dwarf form of this species. Miss Chase (*in* J. Arn. Arb. 24: 82. 1943) mentioned specimens from lower altitudes, better developed, with longer blades and culms, and a 8 cm long panicle. In the other specimens I saw, most of the spikelets are three-flowered.

7. POA CRUTTWELLII C. E. Hubb. *in* Kew Bull. 1949: 474.

DISTRIBUTION.—Only known from New Guinea, Mt. Simpson, Cruttwell 61, on the knife-edge summit among rocks at 2990 m altitude.

This very elegant species differs from *P. nivicola* Ridl. in the large 4—6-flowered spikelets, the 6—7 mm long and prominently 7-nerved lemmas, the up to 12 cm long panicle, and the very short ligule.

8. POA EGREGIA Chase *in* J. Arn. Arb. 24: 79. 1943.

DISTRIBUTION.—Endemic in New Guinea, Mt. Wilhelmina, Brass & Meijer Drees 10040, 10068, 10206, 10347. In wet grassy spots between 4000 and 4100 m altitude.

Brass & Meijer Drees 10347, not identified in the Harvard representation of the Third Archbold Expedition, evidently belongs to *P. egregia* Chase. Brass 4479 from Mount Albert Edward was identified by Hitchcock (*in* Brittonia 2: 111. 1931) as *P. keysserii* Pilg. Apparently this number is a mixture of two species. The specimen I saw in the Herbarium of the New York Botanical Garden is certainly not *P. keysserii* but *P. egregia* (*cf.* the very scabrous glumes with a dentate apex, the midrib of the lemma excurrent as a mucro, and the very loose, drooping panicle); it only differs in the short ligule, about 2—3 mm long.

In the Melbourne Herbarium is a small collection, made by MacGregor in 1889 on the summit of the Owen Stanley Range (no. 33), on Mount Knutsford (no. 39), and which contains some unnumbered sheets. They

represent fragments of a cespitose species of which the erect, more or less flabellately distichously arranged and rather flat shoots are covered for more than 10 cm with long, overlapping, loose, papery sheaths; the blades are flat to loosely convolute at the end; the spikelets rather large, two- to three-flowered; the lemmas 5.5—6.5 mm long; all the scales distinctly punctulate-scabrous; and the midrib of the lemma excurrent in a short mucro. Compared with a specimen from the type collection (Brass & Meijer Drees 10206) they are very similar to *P. egregia* and might be referred to that species, but the base of the florets is not webbed, only very short-hairy to glabrous. The specimens are rather mature and old, and the woolly hairs may have fallen off. Perhaps, when more specimens are available, the description of Miss Chase should be emendated; our knowledge of the variability of the New Guinean species is much obstructed by the scarcity of the material available. There is a close affinity to the genus *Festuca*. *Poa egregia* might be referred to *Festuca* but the cottony hairs at the base of the floret and the boat-shaped leaf-tips make it advisable to retain it as a *Poa*.

9. POA EPILEUCA (Stapf) Stapf *in* Hook. Ic. Pl. *pl. 2607* (in obs.). 1899; Merr., Bibl. Enum. Born. Pl. *in* J. Straits Br. roy. As. Soc., Spec. No., 52. 1921.

Deyeuxia epileuca Stapf *in* Trans. Linn. Soc., Bot. 2: 4. 1894.
Poa papuana Stapf *in* Hook. Ic. Pl. *pl. 2607*. 1899.
Poa minimiflora Stapf *in* Hook. Ic. Pl. *pl. 2608*. 1899.

DISTRIBUTION.—Known from Borneo: Mt. Kinabalu, Clemens 10607, etc. Celebes: Rante Mario, Eyma 869. New Guinea: Mt. Scratchley, Giulianetti; Mt. Albert Edward, Brass 4209, etc.; Mt. Victoria, MacGregor; Owen Stanley Range, MacGregor; Mt. Wilhelmina, Brass & Meijer Drees 10074. Rather common in open wet places and alpine meadows between 2000 and 4000 m altitude.

Poa epileuca differs from the related *P. wisselii* Jans. and *P. borneensis* Jans. in the narrow, subsetaceous blades, the short ligule which is obsolete, to ⅔ mm long, and is moreover characterized by the narrow, subchartaceous, smooth lemmas with obsolete intermediate nerves and not excurrent midrib. The upper part of the culm and the panicle-axis are usually glabrous and smooth, but in Clemens 51198 and 51408 these parts are minutely pubescent. The sheaths are very narrow and tight, but Brass & Meijer Drees 10074 has broader sheaths.

The type of *P. papuana* Stapf (in Herb. Kew.) differs from *P. epileuca* only in the more scabrous blades, especially towards the tips. The type of *P. minimiflora* Stapf (in Herb. Kew.) differs from *P. epileuca* only in

the slightly smaller spikelets, and the continuation of the rhachilla bearing here and there a second floret. Both these differences are so trifling and the inconstancy of these characters is so evident, that it does not seem advisable to split up the available material into three separate species.

A specimen in the Melbourne Herbarium (Owen Stanley Range, MacGregor, *anno* 1889) was called *Festuca pusilla* monstr. *uncinata* by F. von Mueller. It represents *P. epileuca* with viviparous spikelets.

10. POA ERECTIFOLIA Hitchc. *in* Brittonia 2: 111. 1936.

DISTRIBUTION.—Endemic in New Guinea: Mt. Albert Edward, Brass 4326, 4420; Mt. Knutsford, MacGregor 24, 31; Owen Stanley Range, MacGregor 30; Mt. Wilhelmina, Brass & Meijer Drees 9945. Often the dominant grass on wet, open summits, at about 3700 m altitude.

Brass 9945, at least the specimen in the Leiden Herbarium, has longer, broader, more junciform, and pungent blades, which are smooth like the sheaths.

The specimens from Mount Knutsford differ in having the glumes very scabrous with minute hairs, the lemmas punctulate-scabrous all over. They may be called **Poa erectifolia** var. **scabriflora** Jansen, *var. nov.: glumis scaberrimis pilis minutis distincta; lemmata omnino punctulato-scabrata.* (MacGregor 24, *type.*)

The spikelets resemble those of *P. nivicola* Ridl., but they do neither possess the cottony hairs nor the ciliolate nerves at the base of the lemma.

11. POA KEYSSERII Pilg. *in* Bot. Jb. 62: 460. 1929.

DISTRIBUTION.—Endemic in New Guinea: Mt. Saruwaged, Keysser *s.n.;* Mt. Albert Edward, Brass 4479, partly. Common in forest glades from 3600 to 4000 m altitude.

Similar in habit to *P. saruwagetica* Pilger, but the spikelets are larger and more scabrous, the glumes more acute, and the lemmas less obtuse.

The type in the Berlin Herbarium is lost.

In the Bogor Herbarium (no. 26831) there are two specimens of *Poa frutecitorum* Ohwi (in sched.). They may represent depauperate forms of *P. keysserii* and were collected by Clemens (May 22, 1939) on Mount Sarawaket at 3300 m altitude.

12. **Poa lamii** Jansen, *sp. nov.* — **Fig. 16.**

Gramen perenne, dense caespitosum, innovationibus extravaginalibus erectis; culmi graciles, rigide erecti, 25—40 cm alti, teretes, glabri, laeves; folia plurima basales, tantummodo 1 vel 2 per culmum; vaginae inferiores breves, imbricatae, vaginae superiores 4—5 cm longae, quam internodia longa breviores, glabrae, laevesque; ligula lanceolata, acuta, hyalina, 2—2,5 mm longa, glabra; laminae anguste involutae vel setaceae, glabrae et laeves, basales rigide erectae, 10—15 cm longae, minus quam 1 mm latae, folia culmorum 1—2 cm longa, adpressa; panicula erecta, 4—6 cm longa, axe laevi, nodis 4—6; rami capilliformes, flexiles, laeves, denique reflexi, apicem versus 1—4 spiculas gerentes, spiculae laterales breviter pedicellatae; spiculae 4—5 mm longae, late ovatae et lateraliter compressae, 3-(raro 2-)flosculosae, segmenta rhachillae gracilia, minute pilosa; glumae subaequales, paulo breviores quam spicula, acutae, laeves, 3-nerviae vel gluma secunda obscure 5-nervia; lemmata 3 mm longa, 5-nervia, acuta, glabra vel basi pilos 1—2 breves gerentes; palea paulo brevior quam lemma, carinis scabra; segmentum terminale rhachillae circa 2 mm longum; antherae 1,5 mm longae.

DISTRIBUTION.—Endemic in New Guinea: Mt. Doorman, Lam 1664 (*type;* Herb. Lugd. Bat. 949,297-477), and a young specimen, Lam 1638. In boggish places at 3500 m altitude.

Related to *P. erectifolia* Hitchc. but differing in the more elegant habit; the narrower, quite smooth blades; the capillary, wavy, at last reflexed panicle-branches, bearing 1—4 spikelets towards the end; the 3—5-nerved glumes shorter than spikelet; the hairy rhachilla-segments; and often by the 1—2 hairs at the base of the lowest lemma.

13. POA LANGUIDIOR Hitchc. *in* Brittonia 2: 111. 1936.

DISTRIBUTION.—Endemic in New Guinea: Mt. Albert Edward,

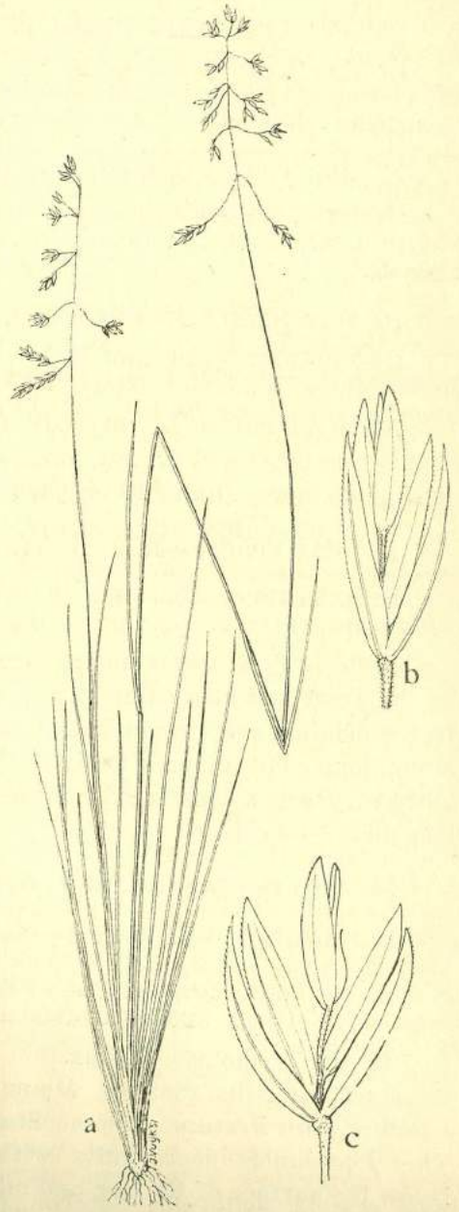

FIG. 16. *Poa lamii* Jansen: *a*, habit; *b*, closed spikelet; *c*, mature spikelet.

Brass 4238; Mt. Wilhelmina, Brass & Meijer Drees 10073. On alpine grassland and in open forests between 3600 and 4000 m altitude.

14. POA LONGIRAMEA Hitchc. *in* Brittonia 2: 112. 1936.

DISTRIBUTION.—Endemic in New Guinea: Mt. Albert Edward, Brass 4393; Murray Pass, Brass 4195 and 4571. In open grasslands from 2800 to 3600 m altitude.

15. POA LUNATA Chase *in* J. Arn. Arb. 24: 81. 1943.

DISTRIBUTION.—Endemic in New Guinea: Mt. Wilhelmina, Brass & Meijer Drees 10067. Common in small clumps under rocks at 4000 m altitude.

16. POA MULTINODIS Chase *in* J. Arn. Arb. 24: 81. 1943.

DISTRIBUTION.—Endemic in New Guinea: Lake Habbema, Brass 9854. In wet forest glades at 3200 m altitude.

An error has to be corrected in the original description (*l.c.*): the glumes are not 3 and 3.7 mm long, as mentioned there, but 1 and 1.3 mm or slightly more; figure 10 on page 81 is correct.

17. POA NIVICOLA Ridl. *in* Trans. Linn. Soc., Bot. II 9: 251. 1916.

DISTRIBUTION.—Endemic in New Guinea: Mt. Carstensz, Boden Kloss, *s.n.*

Ridley's type specimen (in Herb. Mus. Brit.) is very characteristic by the short and long culms in the same tuft (the panicles at two levels). In the original description Ridley says "ligula nulla" but I found it 2.5—3 mm long. The glumes are not "pubescent," only punctulate-scabrous with very asperulous nerves. The panicle-branches are not "2—4 mm" long but 2—4 cm.

18. POA PILATA Chase *in* J. Arn. Arb. 24: 82. 1943.

DISTRIBUTION.—Endemic in New Guinea: Mt. Wilhelmina, Brass & Meijer Drees 10153, 10205; Lake Habbema, Brass 9554, 9580; Mt. Knutsford, MacGregor 32. One of the characteristic plants of open alpine peatbogs, between 3200 and 4150 m altitude.

In the Melbourne Herbarium are some sheets of a *Poa*, collected by MacGregor in 1889 on Mount Knutsford, where it grew densely together with *Festuca papuana* Stapf; one of the sheets is numbered 32. This *Poa* builds dense tufts with the subterranean culms branching below the surface of the bog and more than 1 cm thick by the dense cover of withered sheaths and blades. The sheaths are very closely imbricate, the stiff, filiform, pungent blades very crowded, giving the plants above

the surface of the bog the appearance of a young pine-tree. In my opinion the plants are identical with *P. pilata* Chase, but the blades are 8—12 cm long, much longer than Miss Chase indicated, the lower blades more erect, the upper shorter blades horizontally spreading. The panicle, too, is larger than she indicated; it is up to 4 cm long, with short, minutely scabrous branchlets. Most of the spikelets are two-flowered with a prolongation of the rhachilla; some spikelets have even three or four florets and lack such a prolongation. It might be the form of *P. pilata*, when this species grows at lower altitudes.

19. POA PRATENSIS L., Sp. Pl. 67. 1753.

Poa luzoniensis Merr. *in* Philip. J. Sci. 1 (Suppl.): 180. 1906.

A very variable Eurasian species, in Malaysia only collected in the Philippines. *P. luzoniensis* is also mentioned by Ridley from New Guinea (in Trans. Linn. Soc., Bot. II 9: 251. 1916), but his specimens belong to *P. brassii* Hitchc.

20. POA SARUWAGETICA Pilg. *in* Bot. Jb. 62: 459. 1929; Chase *in* J. Arn. Arb. 24: 79. 1943; Reeder *in* J. Arn. Arb. 31: 321. 1950.

DISTRIBUTION.—Endemic in New Guinea: Mt. Saruwaged, Keysser *s.n.*; Mt. Wilhelmina, Brass & Meijer Drees 9844; Sambanga Mts., Clemens 9218. An alpine species between 2400 and 3600 m altitude.

21. POA TRIVIALIS L., Sp. Pl. 67. 1753.

An Eurasian species introduced in Java.

22. **Poa turfosa** Jansen, *sp. nov.* — **Fig. 17.**

Gramen perenne, dense caespitosum; culmus stricte erectus, nodis 3, teres vel leviter compressus, scaber imprimis parte superiore; folia plurima ad basin aggregata, innovationibus extravaginalibus oblique patentibus; vaginae inferiores breves, aggregatae, imbricatae, glabrae, laeves, laxiores; vaginae superiores scabrae, longae (ad 10 cm), breviores quam internodia; ligula obsoleta; laminae planae, lineares, inferiores circa 10 cm longae et 2 mm latae, obtusae, apice cucullatae; laminae superiores brevissimae (2—3 cm), laxe conduplicatae; panicula exserta, 5—6 cm longa, pyramidalis, ut axis ramique atropurpurea; rami 2-nati, nodis subdistantibus, rigide patentes vel reflexi, inferiores circa 3 cm longi, superiores breviores, scaberrimae, 3—5 spiculas ad apicem gerentes; spiculae subsessiles vel breviter pedicellatae, circa 5 mm longae, 3-flosculosae; glumae acutae, nervo medio scabrae, prima sub-3-nervata, dimidium spiculae aequans, secunda sub-5-nervata et primam superans; lemma basi sine pilis lanuginosis, omnino glabrum, indistincte 5-nervatum parte superiore, peracutum, 3 mm longum; articuli rhachillae 0,5 mm longi, minute scabri, prolongationes pergraciles; antherae minus quam 1 mm longae; caryopsis ignota.

DISTRIBUTION.—Endemic in New Guinea: Mt. Wilhelmina, Brass & Meijer Drees 9929 (*type;* Herb. Lugd. Bat.). Scattered on bare, peaty ground on edges of dying forest, at 3720 m altitude.

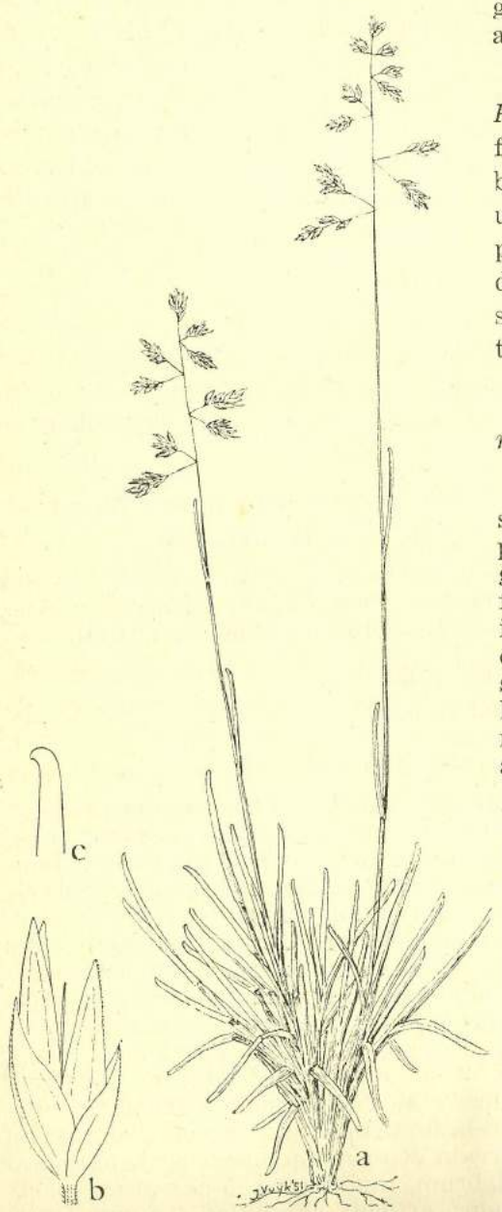

FIG. 17. *Poa turfosa* Jansen: *a*, habit; *b*, spikelet; *c*, tip of a blade.

Near to *P. lamii* Jansen and *P. erectifolia* Hitchc. but differing from both species in the flat blades, the scabrous culms and upper sheaths, the dark purplish panicle with stiff branches, the densely two- to three-flowered spikelets, and the glumes shorter than the spikelet.

23. **Poa wisselii** Jansen, *sp. nov.*

Gramen perenne, dense caespitosum; culmi erecti, stricti, pergraciles, ad 15 cm alti, striati, glabri laevesque, usque ad medium foliati; vaginae modice latae, imbricatae, inferiores in fibras dissolutae, superiores distincte striatae et leviter compressae; ligula obsoleta; laminae magis minusve distichae, lineares, planae, ad 10 cm longae et 2—2,5 mm latae, obtusae, apice leviter cucullatae, obtusae; panicula depauperata, 2—2,5 cm longa, angusta, ramis scaberrimis, minus quam 1 cm longis, 2—3-natis, 4—6-spiculosis, spiculis approximatis; pedicelli brevissimi et scabri; spiculae 1-flosculosae, oblongae, circa 2,5 mm longae; glumae ovatae, carinatae, quam spicula multo breviores, acutae, glabrae, prima ⅓ spiculae aequans, 1-nervata, secunda paulo longior et sub-3-nervata; lemma oblongum, spiculam aequans, carinatum, subchartaceum, laeve nervis lateralibus obsoletis, nervo medio in mucronem minutam producto; palea paulo brevior quam

lemma, glabra, sulcata; continuatio rhachillae brevis; antherae circa 1 mm longae; caryopsis oblonga, hilo basali.

DISTRIBUTION.—Endemic in New Guinea: Mt. Carstensz, Wissel 25a (*type;* Herb. Bogor. no. 26830).

Near to *P. epileuca* (Stapf) Stapf by the small stature, the obsolete ligule, and the subchartaceous lemma, but differing in the wide lower sheaths withering into fibres, the flat blades, and the very acute lemma with the midrib excurrent into a minute mucro.

24. KEY TO THE MALAYSIAN SPECIES OF POA

1. Plants annual. Branches of panicle smooth. . . . . *P. annua*
1. Plants perennial. Branches of panicle usually scaberulous.
   2. Base of florets webbed with cottony hairs.
      3. Glumes distinctly punctulate-scabrous, the nerves asperulous.
         4. Midnerve of lemma excurrent in a short mucro. Ligule 6—8 mm long. *P. egregia*
         4. Midnerve of lemma not excurrent, the tip more or less hyaline. Ligule much shorter.
            5. Spikelets 9—12 mm long, 4—6-flowered. Lemma prominently 7-nerved, 6—7 mm long. Panicle up to 12 cm long, with 3—5-nate branches. Ligule 0.5—1 mm long. . . . . *P. cruttwellii*
            5. Spikelets 6—7 mm long, 2—3-flowered. Lemma 5-nerved, 4—5 mm long. Panicle very loose, with 1—2-nate branches, naked in the lower half, with few spikelets towards the end. Ligule 2—3 mm long. *P. nivicola*
      3. Glumes and lemmas usually smooth, rarely slightly scabrid.
         6. First glume 3-nerved. Lemmas obtuse. Panicle purplish variegated. *P. saruwagetica*
         6. First glume 1-nerved. Lemmas hyaline at the tips. Panicle green.
            7. Panicle up to 20 cm long. Spikelets 3—5-flowered. Blades flat.
               8. Anthers short, ⅓ as long as the floret. Panicle open and nodding, with elongated branches, bearing spikelets only in the upper half. *P. brassii*
               8. Anthers ⅔—¾ as long as the floret. Panicle branches usually divided in the lower half. Base of lemma strongly webbed, its nerves minutely hairy in the lower part.
                  9. Cespitose. Sheahts usually rough. Ligule 3—6 mm long. *P. trivialis*
                  9. With long rhizomes. Sheaths smooth. Ligule 0.5—1.5 mm long. *P. pratensis*
            7. Panicle much shorter, at most 10 cm long. Spikelets 2—3-flowered. Blades involute or firmly conduplicate.
               10. Ligule 1—3 mm long. Spikelets 2-flowered. Glumes 2,5—3 mm long. Lemma 5-nerved, 4 mm long. . . . . *P. archboldii*
               10. Ligule obsolete. Spikelets larger, 3-flowered. Glumes 5—5,5 mm long. Lemma 7-nerved, 5 mm long. . . . . *P. keysserii*

2. Base of florets not webbed, glabrous or rarely with 1—2 hairs.
   11. Panicle large, more than 10 cm long, with long, capillary branches.
      12. Blades more or less rigid, usually folded or involute. Pedicels slightly pubescent. Spikelets 3—4-flowered. Culms erect. Ligule up to 2 mm long. . . . . *P. longiramea*
      12. Blades flaccid, soft, flat. Pedicels glabrous. Spikelets 2-flowered. Culms weak, ascending. Ligule longer. . . . . *P. languidor*
   11. Panicle shorter. Lower plants from more exposed higher places.
      13. Rhizomes slender. Culms decumbent, with numerous nodes. Blades soft, flat or folded. Panicle 6—8 cm long, with stiffly spreading or reflexed branches. . . . . *P. multinodis*
      13. Densely cespitose. Culms erect, with few nodes.
         14. Lemmas 3,5—4 mm long, somewhat lunate. Terminal rhachilla-segment nearly as long as palea. Panicle narrow. . . *P. lunata*
         14. Lemmas shorter, not lunate. Terminal rhachilla-segment much shorter than palea. Panicle spreading.
            15. Spikelets about 5 mm long. Anthers 1—2 mm long. Stiff, erect grasses, 30—45 cm high. Panicle 5—6 cm long.
               16. Blades flat. Culms and upper sheaths scabrous. Panicle dark purplish, with stiff branches. Spikelets densely 2—3-flowered. Glumes much shorter than the spikelets. *P. turfosa*
               16. Blades involute.
                  17. Lower glume 3-nerved, distinctly shorter than the spikelet. Panicle-branches capillary, at last reflexed, bearing 1—4 spikelets towards the end. Spikelets usually 3-flowered. Base of lemma glabrous or with 1—2 hairs. Rhachilla-segments minutely hairy. Sheaths and blades smooth. . . . . *P. lamii*
                  17. Lower glume 1-nerved or rarely sub-3-nerved, about as long as the spikelet. Panicle-branches divided from the base, the branches adpressed. Spikelets usually 2-flowered. Base of lemma quite glabrous; rhachilla-segments glabrous. Blades and sheaths slightly scabrous. . . . . *P. erectifolia*
            15. Spikelets much shorter, about 2 mm long, usually 1—2-flowered. Anthers 0.5 mm long. Panicle shorter.
               18. Blades very short, usually 1—2 cm long. Culms less than 10 cm high. Panicle about 1 cm long.
                  19. Blades flat and obtuse, about 3 mm wide. Sheaths distichously overlapping. Panicle with few pubescent branches. Lemma obtuse, 5-nerved. . . *P. crassicaulis*
                  19. Blades convolute, 0.5 mm wide, acute, squarrose, and very numerous at base of the culm. Panicle dwarfed, often reduced to 1—4 erect spikelets. Lemma acute, the intermediate nerves obscure. . . . . *P. pilata*
               18. Blades longer. Culms higher. Panicle larger.
                  20. Ligule obsolete, or up to ⅔ mm long.
                     21. Spikelets 2—4-flowered. Blades rigid and firm, callous at base, glabrous and smooth. Lemma distinctly sub-5-nerved, about 3 mm long. *P. callosa*
                     21. Spikelets 1-flowered or rarely with a second imperfect floret. Lemma subchartaceous, with obsolete lateral nerves, 2—2.5 mm long.
                        22. Blades conduplicate to setaceous, 1—1.5 mm wide when expanded. Lemmas acute. *P. epileuca*
                        22. Blades flat, 2—3 mm wide, linear. Midnerve of lemma minutely excurrent. . . *P. wisselii*
                  20. Ligule elongate, up to 4 mm long. . . *P. borneensis*

POGONATHERUM P.B.

Kunth (Rév. Gram. *pls. 161, 162.* 1829) illustrated two forms of *Pogonatherum saccharoideum* P.B. (Agrost. 56, 176. 1812), the latter name based on *Saccharum paniceum* Lam. (Encycl. méth. 1: 595. 1783). The two plates represent different forms which he considered conspecific. In 1833 Kunth (Enum. Pl. 478) changed the name into *P. crinitum*. Taking into account the synonyms given, he remained of the same opinion regarding his concept of the species.

Hackel (Androp. *in* DC., Monogr. Phan. 6: 192. 1889) took up again the name *P. saccharoideum* P.B. and separated the plant illustrated by Kunth on plate 161 as variety *monandrum* (Roxb.) Hack. In 1906 Hackel changed the name according to the rules of nomenclature into *P. paniceum* (Lam.) Hack., and, in schedae (Gram. exsicc., Kneucker 603), he considered his former variety *monandrum* to be a distinct species, *P. crinitum* (Thunb.) Kunth.

A. Camus (*in* Lec., Fl. gén. Indo-Ch. 7: 279. 1922) and Bor (*in* Kanjilal & others, Fl. Assam 5: 346. 1940) followed Hackel. They opposed the two species as follows:

P. paniceum	*P. crinitum*
Spikelets 2.5—3 mm long.	Spikelets 2 mm long.
Callus hairs 1—1.5 mm.	Callus hairs 2 mm.
Lower floret present.	Lower floret wanting.
First glume slightly longer than the second.	First glume distinctly longer than the second.
Awn 15—18 mm.	Awn 18—25 mm.
Fertile floret with 2 stamens or rarely with 1 stamen.	Fertile floret with 1 stamen or rarely with 2 stamens.

Henrard (in sched. Herb. Lugd. Bat.) united all the Malaysian specimens as *P. paniceum*, while Ohwi (in sched. Herb. Bogor.) follows Hackel in dividing the material into two species.

Miss Chase (*in* J. Arn. Arb. **31**: 130. 1950), in a revision of the genus, described three species. The first, *P. rufibarbatum* with 4—5 mm long spikelets, does not occur in Malaysia. She discriminated between the other two species as follows:

P. paniceum	*P. crinitum*
Spikelets 2.5—3 mm long.	Spikelets 2 mm long.
Callus hairs about 0.5 mm long.	Callus hairs about as long as the spikelet.
Lower floret usually staminate.	Lower floret reduced or obsolete.
Fertile floret with 2 stamens.	Fertile floret with 1 stamen, rarely with 2 stamens.
Plants robust with hard, knotty base or a short, hard rhizome.	Plants usually slender, often in dense hard tufts, but not robust and knotty at base.

When studying the numerous specimens from Malaysia in several herbaria it is easy to split off the two extreme forms at sight:

(i) Robust bushy plants, the culms up to 70 cm high and more, knotty in the lower part where the blades have fallen off, very much branching from the higher nodes, with few large and loose racemes, and long spikelets. Miss Chase (*l.c.*) called them *P. paniceum*.

(ii) Low, slender, usually densely tufted plants, the thin culms not branched, the blades flat, soft, bright-green, linear-lanceolate, contracted in a very short petiole, and with numerous racemes with short spikelets and long awns. Miss Chase (*l.c.*) called them *P. crinitum*.

However, the characters used to separate these two "species" are not sharp and decisive: there are numerous intermediate specimens. The shape, hairiness, and relative length of callus and spikelet is variable. The state of reduction of the lower floret is variable even in the same raceme, like the number of stamens. In the opinion of Backer, who studied thousands of specimens in Java, these differences are mainly a matter of the age of the plant and modifications due to environmental conditions. When the plants are young, they are low and tender with soft, flat blades, numerous racemes, short spikelets, and long awns. When they become older (usually in the second year and later), the lower blades fall off, leaving a knotty, higher and harder culm branching profusely above, with narrow, more or less involute, hard and dark blades and less but longer and looser racemes with slightly longer spikelets.

In the herbarium the two extremes make the impression of separate species. However, like so often with variable plants, the numerous intergrading forms make it impossible to give a decision about most of the specimens. It seems better to me to unite them under the earliest name, *P. paniceum* (Lam.) Hack.

PSEUDOPOGONATHERUM A. Camus

Pseudopogonatherum egregia (Reeder) Jansen, *comb. nov.*

Eulalia irritans (R. Br.) O.K. var. *egregia* Reeder *in* J. Arn. Arb. **29**: 336. 1948.

Reeder, when describing *Eulalia irritans* var. *egregia*, apparently had only a fragment at his disposal, from which the long awns, with the exception of the lowest one, had fallen off. In the Melbourne Herbarium I saw two complete specimens and a fragment from the type collected by MacGregor (*anno* 1890). Nearly all the numerous spikelets possess a 5 cm long, twisted and bent awn, long-hairy along the column. Some of these awns had broken off and accompanied the specimen on the sheet. Not the absence of the awn is the discriminating character, but the flat, wide blades, the long white-velvety racemes, and the long pedicels, spikelets, and awns. The amplified description runs as follows:

Valde affinis *Pseudopogonathero irritanti* tamen recedit foliis inferne planis, ad 7 mm latis, supra pilis longis rigidis albis tectis, superne involutis; racemi ad 15 cm longi; internodia racemi et pedicelli longissime et dense ciliati (racemi niveo-velutini); pedicelli 2—3 mm longi, infra spiculas barbati pilis plus quam 2 mm longis; spiculae brunneae, pallidiores quam in *P. irritanti* et 3,5 mm longi vel longiores; arista bicurvata; gluma secunda gracilior et longior quam in *P. irritanti;* lemma fertile munitum arista 5 cm longa vel longiora, pili columnae albi 3,5 mm longi.

DISTRIBUTION.—New Guinea, Western Division, Wai-Kussa R., MacGregor, *anno* 1890 (*type;* Melbourne Herb.).

SACCHARUM L.

SACCHARUM ROBUSTUM Brandes & Jeswiet *ex* Grassl *in* J. Arn. Arb. **27**: 234. 1946.

The name *Saccharum robustum* was provisionally given by Brandes & Jeswiet to a plant collected during an expedition in New Guinea (Laloka River, in 1928) and written on the herbarium labels. In the opinion of Grassl this species would be readily distinguishable by the reduced fertile lemma, the sparser and shorter hairs on rhachis and callus, the smaller spikelets, and the much larger size of the plants themselves. Reeder (*in* J. Arn. Arb. **29**: 330. 1948) after having examined all available specimens from New Guinea, asserts that these distinctions have little substantial value.

I could study the type material of Jeswiet (in Herb. Vadense = Wageningen). There is no complete specimen; the herbarium specimens are only fragmentary, consisting of inflorescences, parts of the culm, and leaves.

The first glume is coriaceous with inrolled, hyaline, ciliate margins, 1- or sub-3-nerved, minutely scabrous at the apex. The sterile lemma is well developed and as long as the spikelet. The fertile lemma is absent or sometimes present and then reduced to a bristle-like structure, 1—2 mm long, the degree of reduction being variable in a single inflorescence. The lodicules are glabrous to minutely ciliate. The hairiness of the main panicle-axis also is variable. The spikelets of Jeswiet's specimens are about 3 mm long, shorter than the usual length of the spikelets in *Saccharum spontaneum* L.

Reeder (*l.c.*) also recorded the variability of this latter character. He reduced *S. robustum* to a synonym of the variable species-complex *S. spontaneum*.

I am inclined to agree with him. It may be that they are distinct biological races, but taxonomically they cannot be distinguished. A final decision about the status of *S. robustum* is postponed until further adequate collections, field-data, and eventually the results of breeding experiments will be available.

SCHIZACHYRIUM Nees[5]

Hackel (Androp. *in* DC., Monogr. Phan. 6: 363. 1889) accepted *Andropogon brevifolius* Sw. to represent a polymorphous species comprising a number of variations. Modern authors have split it into several micro-species, of which two occur in Malaysia: *Schizachyrium brevifolium* (Sw.) Nees = *Andropogon brevifolius* var. *genuinus* Hack. (*op. cit.* p. 363) and *Schizachyrium fragile* (R. Br.) A. Camus, based on *Andropogon fragilis* R. Br. (Prodr. 202. 1810; Hackel, *op. cit.* p. 362). The two species may be characterized as follows:

S. brevifolium	*S. fragile*
Blades distinctly obtuse.	Blades sub-acute.
Peduncle of the racemes after flowering as long as or longer than the spathe.	Peduncle of the raceme after flowering much shorter than the spathe.
Sessile spikelets 2—3 mm long.	Sessile spikelets 4—4.5 mm long.
Pedicelled spikelets with glabrous pedicels.	Pedicelled spikelets with ciliate pedicels.
	Plants generally much higher and more robust.

The peduncle of the racemes behaves in a different way in the two species. Before flowering the racemes are totally included by the narrow spathes. In *S. brevifolium* the peduncle lengthens with the dried spathe rolled around its base. In *S. fragile* the peduncle remains short, the spathe

[5] Mr. Ch. Monod de Froideville, who arranged this genus in the Bogor Herbarium kindly permitted me to make use of his notes.

becomes boat-shaped, enveloping the raceme for the larger part. Both species are variable.

Henrard (*in* Blumea 1: 308. 1935) made the combination *S. brevifolium* subsp. *paradoxum* (Buse) Henr., based on *S. paradoxum* Buse (*in* Miq., Pl. Jungh. 359. 1854), and characterized the taxon by the very small and muticous sessile spikelets (2 mm long) and the pedicelled spikelets reduced to a glume, 0.5 mm long with an awnlet as long. The type specimen is from Sumatra, Padang (Junghuhn *in* Herb. Lugd. Bat.). Similar specimens I saw from the Malay Peninsula, North Borneo, the Philippines, Celebes, and New Guinea. All these plants have the same short and muticous sessile spikelets; however, the pedicelled spikelets are not awned but mucronate to quite muticous. Henrard (*l.c.*) calls them subspecies *paradoxum* var. *inerme* Henr. The typical form of subspecies *paradoxum* is only known from the original locality, already cited. Variety *inerme* has a wider distribution. As far as the scanty material permits, it is possible to arrange a continuous series in which the reduction of the pedicelled spikelets varies from shortly awned to mucronate and even quite muticous. It seems preferable to take all these variations together and to enlarge the description of the subspecies: pedicelled spikelets reduced to a glume, 0.5 mm long with an awnlet as long, or mucronate to quite muticous.

Another variation concerns the aspect of the inflorescence. Sometimes the uppermost culm-internode just below the spathe is short. This gives the plants a stiff appearance. In other specimens this internode may be long and the inflorescence becomes loose. Monod de Froideville (*in litt.*, 1950) proposes the names variety *contractum* for the stiff form and variety *laxum* for the loose form. As there are numerous intermediate forms it does not seem advisable to distinguish these varieties by name.

Schizachyrium fragile (R. Br.) A. Camus is known from East Java, the Kangean Islands, Sumba, Timor, Celebes, the Philippines, and New Guinea. Merrill (Enum. Philip. fl. Pl 1: 45. 1925) described *A. fragilis* var. *malayanus* Merr.: "a typo differt spiculis pedicellisque omnino glabris." I saw the isotype of Merrill 8012; further Loher 1864, 14424, Ramos & Edaño 49502, and Clemens 95 from the Philippines. From New Guinea I saw King 1092, cited by Merrill, Kanehira & Hatusima 13390, and Brass 5985 from eastern New Guinea, identified by Hitchcock as *Andropogon brevifolius* Sw. From Celebes I saw Gouv. Veearts Watampone 16 (in part, mixed with *S. brevifolium* subsp. *paradoxum*) and Kjellberg 1165, 3723. They may be called **Schizachyrium fragile** var. **malayanum** (Merr.) Jansen, *comb. nov.*

Hackel [*in* Philip. J. Sci. 1 (Suppl.) : 267. 1906] described *Andropogon fragilis* var. *luzoniensis:* "differt a typo gluma 1 in spicula hermaphrodita hirtula, pedicello spiculae tabescentis glabro." I studied the isotypes of Merrill 4386 and 4468. However, they have no glabrous, but ciliate, pedicels like in *Schizachyrium fragile* var. *fragile*. They only differ from Brown's type of *Andropogon fragilis* in the hairy back of the first glume of the sessile spikelets. Moreover, they have a very long-hairy callus, distinctly longer than in other forms of *S. fragile* seen by me. Under *Schizachyrium* they should be called **Schizachyrium fragile** var. **luzoniense** (Hack.) Jansen, *comb. nov.*

Rendle (*in* J. Linn. Soc., Bot. **36**: 372. 1905) had already described from Kwantung *Andropogon fragilis* var. *sinensis:* "spiculis sessilis gluma in dorso ad medium pilosa, non velut in species glabra." In his remarks, however, Rendle says: "Hackel describes the rhachis-joints as glabrous, whereas they bear a row of white hairs on the outer edge, the hairs being almost as long as the joint." This remark in which he reproached Hackel is not quite correct. As far as I could observe the rhachis-joints are normally glabrous in the East and South Asiatic specimens. The only specimens I saw with long white-ciliate joints are those of Hance (in Herb. Kew. 1388, Whampoa and formerly sent from Amoy), the type of *Andropogon fragilis* var. *sinensis* Rendle. Such specimens with ciliate joints and pilose first glume of the sessile spikelets should be called: **Schizachyrium fragile** var. **sinense** (Rendle) Jansen, *comb. nov.* I did not see this remarkable combination of characters in any Malaysian specimen.

These varieties can be distinguished as follows:

	rhachis-joints	1st glume, sess. spkl.	pedicel, ped. spkl.
var. *fragile*	glabrous	glabrous	ciliate
var. *malayanum*	glabrous	glabrous	glabrous
var. *luzoniense*	glabrous	pilose on the back	ciliate
var. *sinense*	ciliate at one side	pilose on the back	ciliate

KEY TO THE MALAYSIAN SPECIES OF SCHIZACHYRIUM

1. Culms delicate, prostrate or ascending, freely branching. Annual plants with usually flat blades. Sessile spikelets 2—4.5 mm long.
   2. Sessile spikelets 2—3.5 mm long. Blades obtuse. Peduncle of the racemes at maturity longer than the spathe.
      3. Sessile spikelets 3—3.5 mm long, with a perfect awn. . . . *S. brevifolium*
      3. Sessile spikelets 2 mm long, muticous. . . . *S. brevifolium* ssp. *paradoxum*
   2. Sessile spikelets 4—4.5 mm long. Blades subacute. Peduncle of the racemes at maturity much shorter than the spathe.
      4. Pedicels of the pedicelled spikelets ciliate along the margins.
         5. First glume of sessile spikelet glabrous on the back. . . . . *S. fragile*
         5. First glume of sessile spikelet pilose on the back. *S. fragile* var. *luzoniense*
      4. Pedicels of the pedicelled spikelets glabrous. . . *S. fragile* var. *malayanum*
1. Culms strictly erect. Perennial plants with flat or complicate blades. Sessile spikelets 6—8 mm long.
   6. Culms 60—100 cm high with elongate branches. Blades 15—30 cm long and 2—4 mm wide, flat or loosely complicate. Racemes 8—12 cm long, partly included in a narrow spathe. Sessile spikelets 7—8 mm long. . . *S. sanguineum*
   6. Culms 20—30 cm high, in small tufts, simple or with some short branches from the uppermost nodes. Blades short and very narrow, complicate or involute (2 mm wide when expanded). Racemes very hairy, 3—4 cm long, nearly included in a wide, inflated spathe. Sessile spikelets 6 mm long. . . . *S. obliquiberbe*

SETARIA P. B.

1. SETARIA PALLIDE-FUSCA (Schum.) Stapf & C. E. Hubb. *in* Kew Bull. **1930**: 259; *in* Prain, Fl. trop. Africa 9: 815. 1930; C. E. Hubb. & Vaugh., Grass. Maurit. & Rodriguez 68 *f. 11a.* 1940; Reeder *in* J. Arn. Arb. **29**: 303. 1948.

Panicum pallide-fuscum Schum., Beskr. Guin. Pl. 78. 1827.

Panicum lutescens Weigel var. *flavum* (Nees) Backer *in* Heyne, Nutt. Pl. Ned. Ind. (reissue Gram.) 1: 204. 1922; Handb. Fl. Java Afl. 2: 142. 1928.

Panicum rubiginosum Steud., Syn. Pl. Glum. 1: 50. 1854 (Cuming 551).

Setaria rubiginosa (Steud.) Miq., Fl. Ind. bat. 3: 467. 1855; Ridl., Fl. Mal. Pen. 5: 234. 1925.

Setaria pilifera (*non* Desv.) *sensu* Llanos, Fragm. Pl. Philip. 34. 1851.

Setaria glauca P.B. subsp. *subtesselata* Buse *in* Miq., Pl. Jungh. 369. 1854; Boerl. *in* Ann. Jard. bot. Buitenz. 8: 63. 1890.

Setaria flava (*non* Kunth) *sensu* Merr. *in* Philip. J. Sci. 7: 56. 1914.

Setaria geniculata (*non* P.B.) *sensu* De Wit *in* Bull. bot. Gdns Buitenz. III 18: 181. 1949.

This annual species, probably of African origin and spread over tropical Asia, Malaysia, and Australia, is nearly related to *Setaria geniculata* (Lam.) P.B. The latter is a perennial, rhizomatous species of American origin. The absence or presence of rhizomes is the only morphological distinction. However, they differ cytologically, the chromosome number of *S. pallide-fusca* being 2n = 18, that of *S. geniculata* 2n = 72. In the herbarium, one often sees specimens lacking the rhizomes, due to the inadequate way in which they were collected, as the rhizome and culm easily break apart. If these specimens of *S. geniculata* are carefully examined, one can usually find the scar from which the rhizome broke off. These herbarium specimens mimic the annual *S. pallide-fusca* and have often been taken for that species. Among the hundreds of Malaysian

specimens I have seen, I did not meet a single rhizomatous specimen. In my opinion they all belong to *S. pallide-fusca*.

Setaria pallide-fusca is very variable; many of the differences in general appearance are due to the varying length and colour of the bristles. Extreme forms were described by Buse (*l.c.*).

Var. **breviseta** (Buse) Jansen, *comb. nov.*

Setaria glauca subsp. *subtesselata* Buse var. *breviseta* Buse *in* Miq., Pl. Jungh. 369. 1854.

The panicle is very slender and elegant, the bristles very short, often not even exserted beyond the spikelets.

DISTRIBUTION.—Java, Sumatra.

Var. **ictura** (Buse) Jansen, *comb. nov.*

Setaria glauca subsp. *subtesselata* Buse var. *ictura* Buse *in* Miq., Pl. Jungh. 369. 1854.

The panicles are large and broad, caused by the very long, coloured bristles which are 3—4 times as long as the spikelets, giving the panicle a silky appearance.

DISTRIBUTION.—Java.

Intermediate forms are numerous through the whole of Malaysia.

2. SETARIA SURGENS Stapf *in* Kew Bull. **1909**: 265, emend. Reeder *in* J. Arn. Arb. **29**: 304. 1948.

DISTRIBUTION.—Endemic in New Guinea: Merauke, Versteegh 1907; Okaba, Branderhorst 60; Fly R., MacGregor 6, 11, 13 (Herb. Melbourne); Hisiu, Carr 11382.

This species belongs to a group characterized by an acuminate first glume and apiculate lower and upper lemmas. It is closely related to *S. apiculata* (Scribn. & Merr.) K. Schum. from Australia, but may be distinguished by its more densely flowered, rather short panicles and smaller spikelets which are obovate to elliptic and about 2.5 mm long, those of *S. apiculata* being broadly ovate and 3—3.5 mm long.

A third species of this group is:

3. **Setaria roemerii** Jansen, *sp. nov.* — **Fig. 18.**

Gramen annuum, laxe caespitosum; culmi erecti vel inferne leviter geniculati, ad 80 cm alti, superne striati et minute pubescentes infra paniculam; vaginae tenues, inferiores magis minusve compressae et a culmo distantes, multo breviores quam internodia, glabrae; ligula series dense pilorum plus quam 1 mm longorum fulvorum; laminae lineares, vaginas aequilatae, 10—20 cm longae, 4—6 cm latae, in apicem acutam gradatim attenuatae, planae, virides, ad basin pilos longos sericeos et per

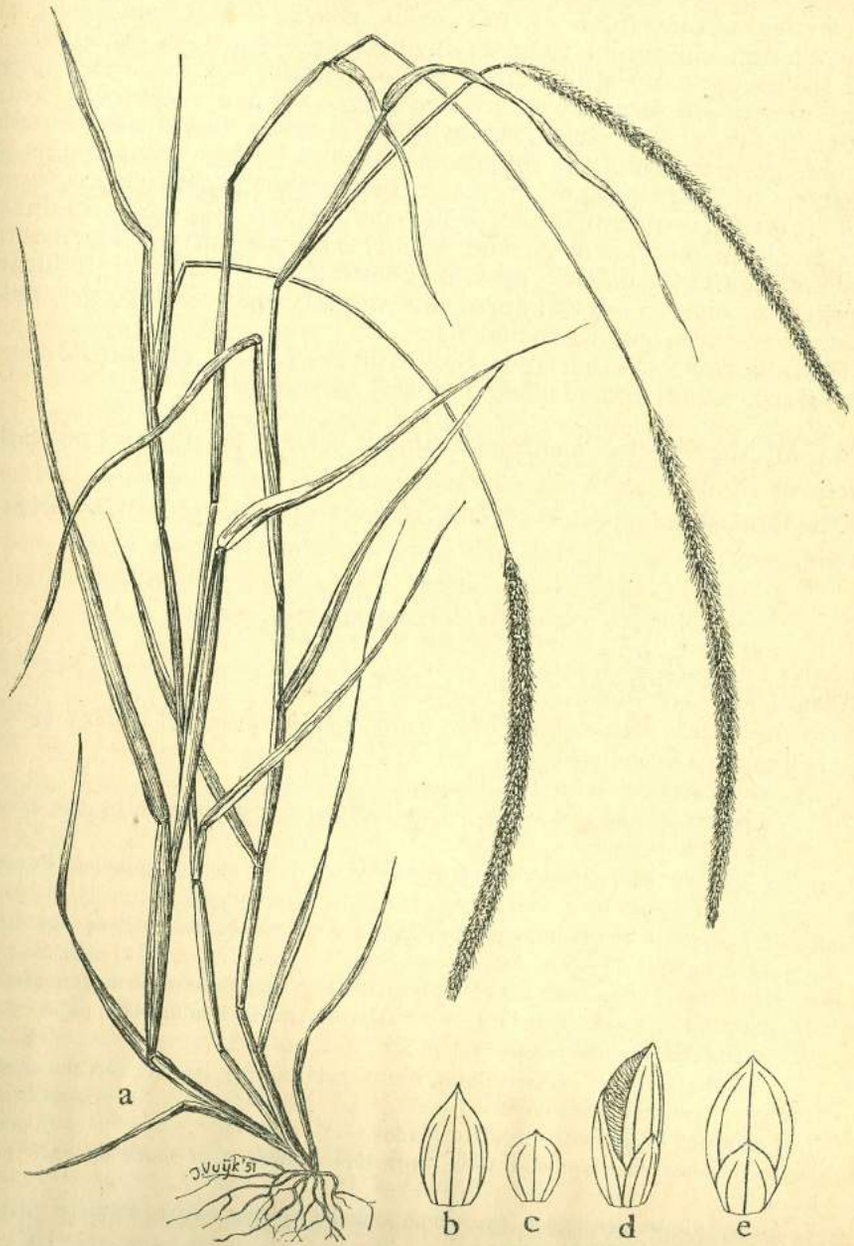

FIG. 18. *Setaria roemerii* Jansen: *a*, habit; *b*, second glume; *c*, first glume; *d*, spikelet (lateral); *e*, spikelet (ventral).

margines irregulariter dispositos gerentes; panicula contracta, cylindracea, longissima et angusta, 13—15 cm longa, 4—6 mm lata, erecta vel apice leviter nutans, fulva vel flavescens, rhachi leviter tomentosa, rami ad involucram simplicem reducti; involucrum setis 6—8 gracilibus, antrorse scaberulis compositum, circiter duplo longior quam spicula; spiculae aspectu dorsali ellipticae, circiter 3 mm longae vel paulo longiores; glumae membranaceae, prima parva, ⅓ spiculae aequans, ovata vel rotundata, 3-nervia, apice truncata vel rotundata; secunda ⅔ spiculae aequans, basi amplectens, sub-5-nervia, nervo medio in mucronem parvum excurrente; lemma inferius membranaceum, 5-nervium, dorso planum, acuminatum, nervo medio in mucronem parvum excurrente, paleam parvam hyalinam includens; lemma superius brevius quam lemma inferius, induratum, acutissimum, aspectu laterali dorso curvatum, transverse rugosum, paleam angustam texturae similis includens.

DISTRIBUTION.—Netherlands New Guinea, L. S. A. M. von Römer 611 (*type;* Herb. Lugd. Bat.), along a forest path.

4. All the species mentioned above belong to the section *Setaria* (*Eusetaria* Stapf).

The Malaysian species of this section may be identified with the following key:

KEY TO THE SPECIES OF SETARIA SECT. SETARIA

1. Bristles retrorsely scabrous. . . . . *S. adhaerens*
1. Bristles antrorsely scabrous.
2. Bristles below each spikelet 5 or more. Spikelets usually solitary or with a rudimentary second one.
3. Annual grasses with flat blades.
4. Second glume and lower lemma apiculate or mucronate by the excurrent central nerve.
5. Spikelets elliptic. First glume ⅓ as long as the spikelet. Panicle up to 15 cm long, slender. . . . . *S. roemerii*
5. Spikelets broadly ovate. First glume ½—⅔ as long as the spikelet. Panicle 2—3 cm long, very dense. . . . . *S. surgens*
4. Second glume and lower lemma neither apiculate nor mucronate.
6. Spikelets 3.5 mm long, very turgid. Upper lemma and palea strongly transversely rugose. . . . . *S. glauca*
6. Spikelets 2—2.5 mm long, less turgid. Upper lemma and palea slightly transversely rugose . . . . . *S. pallide-fusca*
3. Perennial grass with involute blades. . . . . *S. montana*
2. Bristles below each spikelet 1—3. Spikelets usually 3 or more on each panicle-branch.
7. Upper floret persistent, the whole spikelet falling entire. Panicle cylindrical, erect, dense. (Wild grass.). . . . . *S. viridis*
7. Upper floret disarticulating from the rest of the spikelet; panicle large, usually lobed and nodding. (Cultivated grass.). . . . . *S. italica*

5. SETARIA LAXA Merr. *in* Philip. J. Sci. 1 (Suppl.): 366. 1906.

Panicum chamaeraphoides Hack. *in* Koord., ExkFl. Java 1: 136. 1911; *in* Allgem. bot. Z. 20: 164. 1914.

Setaria chamaeraphoides (Hack.) Backer *in* Heyne, Nutt. Pl. Ned. Ind., Ed. 2, 1: 203. 1922.

A variable species. The Philippine specimens seen by me are nearly glabrous; most of the spikelets are solitary and the bristle subtending the spikelets is often wanting. The specimens from Sumatra, Java, and the Lesser Sunda Islands have usually sheaths and blades with tubercle-based hairs, the axis of the panicle more pilose and the spikelets usually in clusters of 4—6 with as many bristles.

A remarkable form is:

Var. **navitatis** Jansen, *var. nov.*

A typo differt culmis decumbentibus et prostratis, foliis angustis involutis, panicula paucispiculosa, 4—6 cm longa, spiculis solitariis; seta infraspiculari longissima, spicula quadruplo longiore.

DISTRIBUTION.—Christmas Island, Ridley 99 (*type;* Singapore Herb.).

The whole plant is glabrous, even the margins of the sheaths; the only hairs visible are those of the ligula.

SORGHUM Moench

1. SORGHUM NITIDUM (Vahl) Pers., Syn. Pl. 1: 101. 1805; Hitchc. *in* Brittonia 2: 129. 1936; C. E. Hubb. *in* Hook. Ic. Pl. 24: 5 *pl. 3364*. 1938; Reeder *in* J. Arn. Arb. 29: 357. 1948.

Holcus nitidus Vahl, Symb. Bot. 2: 102. 1791.

Andropogon nitidus (Vahl) Kunth, Rév. Gram. 1: 166, 1829; Merrill, Enum. Philip. fl. Pl. 1: 47. 1923.

Poa amboinica L., Mant. 2: 557. 1771, quoad Rumph., Herb. amb. 6: 19 *pl. 7 fig. 3;* cf. C. E. C. Fischer *in* Kew Bull. 1934: 398.

Andropogon amboinicus (L.) Merr., Interpr. Rumph. Herb. amb. 88. 1917; Backer, Handb. Fl. Java Afl. 2: 99. 1928.

Andropogon serratus Thunb., Fl. japon. 41. 1784; Hack., Androp. *in* DC., Monogr. Phan. 6: 521. 1889; Merr., Bibl. Enum. born. Pl. *in* J. Straits Br. roy. As. Soc., spec. Nr. 42. 1921; Enum. Philip. fl. Pl. 1: 48. 1923; K. Schum. & Lauterb., Fl. deut. Schutzgeb. 172. 1901.

Andropogon tropicus Spreng., Syst. veg. 1: 287. 1825.

Sorghum tropicum (Spreng.) Buse *in* Miq., Pl. Jungh. 359. 1854.

Andropogon fuscus Presl, Rel. Haenk. 1: 342. 1830.

Sorghum fuscum (Presl) Miq., Fl. Ind. bat. 3: 359. 1854.

This is the most common species of *Sorghum* in Malaysia, with a long history and an intricate synonymy. It is a variable species that may be subdivided into three varieties:

Var. NITIDUM.

Holcus nitidus Vahl, Symb. bot. 2: 102. 1791, s. str.

Andropogon serratus var. *nitidus* Hack., Androp. *in* DC., Monogr. Phan. 6: 521. 1889.

Sessile spikelets about 4—4.5 mm long, usually quite muticous. Rarely all the sessile spikelets are awned or more often part of the sessile spikelets only.

DISTRIBUTION.—Common throughout Malaysia.

Var. PARVIFLORUM (Hack.) Ohwi *in* Bull. Tokyo Sci. Mus. No. 18: 4. 1947.

Andropogon serratus var. *genuinus* subv. *parviflorus* Hack., Androp. *in* DC., Monogr. Phan. 6: 521. 1889.

Sessile spikelets 3.5—4 mm long, usually awned, the awn up to 20 mm long.

DISTRIBUTION.—Sumatra, Java, Lesser Sunda Islands, Celebes, Philippines, New Guinea.

Var. MAJUS (Hack.) Ohwi *in* Bull. Tokyo Sci. Mus. No. 18: 3. 1947.

Andropogon serratus var. *genuinus* subv. *major* Hack., Androp. *in* DC., Monogr. Phan. 6: 521. 1889.

Sessile spikelets 3.5—4 mm long, usually awned, the awn up to 20 25 mm long.

DISTRIBUTION.—Java, Indramaju, Van Steenis 8185; Sumba, Monod de Froideville 1336, 1309; Amboina, Boerlage 61, 390, 657, Botter 37; Buru, A. H. Jansen 6; New Guinea, Misool, Pleyte 1149.

2. SORGHUM TIMORENSE (Kunth) Buse *in* De Vriese, Pl. Ind. bat. orient. 103. 1857; Miq., Fl. Ind. bat. 3: 752. 1858.

Andropogon tropicus var. *timorensis* Kunth, Rév. Gram. 1: *pl. 97.* 1829; Enum. Pl. 1: 503. 1833.

Andropogon fulvum Reinw. *ex* Buse *in* De Vriese, Pl. Ind. bat. orient. 103. 1857, in syn. sub *Sorghum timorense.*

Sorghum junghuhnii Miq., Ind. bat. 3: 753. 1858.

Andropogon australis Spreng. subsp. *plumosus* Hack. var. *timorensis* (Kunth) Hack., Androp. *in* DC., Monogr. Phan. 6: 523. 1889.

Buse (*l.c.*) described *Sorghum timorense* (Kunth) Buse, based on Reinwardt's specimens from Timor (type in Herb. Lugd. Bat.). The same taxon had been described by Kunth as *Andropogon tropicus* var. *timorensis*. Hackel, who did not see the type of Kunth's variety, considered it a variety of his subspecies *plumosus* under *Andropogon australis*. It is characterized by its large spikelets and by the shape and length of the callus: short and obliquely obtuse in *S. timorense*, long, acute, and usually curved to more or less beaked in *S. plumosum* P.B. Especially when the spikelets are mature these differences are very striking. As the species is rather rare and up to now only short descriptions have been published, I give here the description of the type specimens.

Perennial, building large tufts. Culms terete, glabrous or pubescent just below the panicle, 60—150 cm high. Sheaths narrow, terete, the lower much shorter than the internodes, glabrous to appressed pilose, the nodes, especially the upper ones, densely white-bearded. Ligule membranous, 0.5—1 mm long. Blades linear to elongate-linear, rather stiff, not narrowed at base, 10—30 cm long, 4—10 mm wide, glabrous to sparsely covered with tubercle-based hairs, the margins scabrous. Panicle erect, 15—35 cm long, the axis terete, glabrous. Branches in whorls, the lower 3—5-nate and 4—8 cm long, naked below, smooth or minutely scabrous, obliquely spreading at maturity, capillary or wavy, often long-hairy at base. Racemes 5—9-spikeled, the joints 5—6 mm long, the margins densely often brownish ciliate, slightly clavate at the tips. Sessile spikelets 7—9 mm long, broadly lanceolate, acute with a short, rectangular, obtuse callus. Glumes with 5—8 very thin nerves, usually densely fulvous-hairy on the back. Upper lemma deeply 2-lobed, with a 40—50 mm long, geniculate awn in the sinus, the column yellow to brown, often ciliate. Pedicels 4—5 mm long, similar to the joints. Pedicelled spikelets slightly shorter than the sessile ones, male ones often muticous.

DISTRIBUTION.—Timor: Reinwardt 1356 (*type*); Coepang (Kupang), R. Brown *s.n.*, Forbes 4092, Monod de Froideville 1269, 1277, 1455, 1456; Celebes, Beguin 46; Buru, A. H. Jansen 3, Brongniart, *sec.* Hackel, not seen.

A rare grass building large tufts on dry ground at low altitudes.

This species is somewhat variable as to the degree of hairiness. Usually the sheaths are glabrous or sparingly appressed pilose and only the upper nodes are bearded. In 1914 A. H. Jansen collected some specimens on Buru, that were named *Andropogon australis* subsp. *plumosus* Hack. var. *timorensis* Hack. subvar. *villosissimus* by Hackel (*in litt.*); this name has not been published. The specimens are very robust with large, freely branching panicles and elongate blades; the sheaths are densely long-silky hairy, the white hairs 4 mm long and more. All the nodes are densely long-white-bearded, the hairs appressed to the culm. They may be named **Sorghum timorense** var. **villosissimum** (Hack.) *ex* Jansen, *var. nov.*

Varietas culmis valde validis, paniculis magnis, ramosissimis, foliis elongatis, vaginis foliorum dense longe sericeis pilis 4 mm longis vel longioribus, nodis dense et longe albobarbatis pilis culmo appressis distincta.

3. SORGHUM PLUMOSUM (R. Br.) P.B., Agrost. 132, 165, 178. 1812.

The specimens up to now recorded from Malaysia are somewhat doubtful as to their status. The culms are robust and more than 1 m high.

The panicle is long and full, with many-branched whorls, somewhat contracted. The callus of the rather young spikelets is acutish, but not so long and not curved as in typical *Sorghum plumosum*. They seem more or less intermediate between *S. timorense* (Kunth) Buse and *S. nitidum* var. *majus* (Hack.) Ohwi. Similar specimens have been collected by Monod de Froideville on Timor (Sekon, 1069) and Sumba (1888, 1993). The spikelets are too young for a sure identification.

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New names and the final members of new combinations are in **bold face** type.

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ETUDE SUR LES RAPPORTS ENTRE LES GENRES UITTIENIA, DANSERA ET DIALIUM (Légum.-Caesalp.)

R. L. STEYAERT*

SUMMARY

1. On the basis of a detailed comparison of all characters, the genera *Uittienia* and *Dansera* are joined to *Dialium* as subgenera. This brings the number of subgenera in this genus to four, viz., *Dialium*, *Dansera*, *Uittienia*, and *Arouna*.

2. *Dansera* and *Uittienia* are close to the subgenera *Dialium* and *Arouna* respectively, but one or two characters of each put them both as intermediates between the latter two.

3. Subgenera *Dialium* and *Arouna* remain in their previously described geographic distributions, but *Uittienia* appears to have a close relationship with *Arouna*. A point of phylogeny is left open here for further consideration when further data will be available.

4. The trimery of flowers in *Dansera* is abnormal for both the genus *Dialium* and the tribe Cassieae, but it might bring proof that the connexion of *Dialium hexasepalum* Harms with the genus was previously unduly questioned by the author. The type and only known specimen of the latter species was destroyed during the war; collections of new specimens would, therefore, be of the highest interest.

Grâce à l'amabilité du Chef de l'Herbarium Bogoriense, j'ai eu l'avantage de pouvoir examiner les échantillons des genres *Uittienia* et *Dansera*, conservés au Jardin Botanique de Bogor (Buitenzorg) ; qu'il veuille agréer mes sincères remerciements pour sa grande obligeance.

Comme l'étude dans laquelle Van Steenis décrit les nouvelles espèces et les nouveaux genres l'avait déjà signalé, les deux genres présentent des affinités très marquées envers le genre *Dialium;* tous les caractères tant principaux que secondaires évoquent ce dernier, à l'exception des fleurs de *Dansera*. Les comparaisons de Van Steenis ne se sont toutefois établies qu'avec le groupe asiatique du genre *Dialium*. La comparaison avec le groupe afro-américain et l'analyse comparée de tous les caractères que nous avons pu faire par rapport aux subdivisions du genre *Dialium* proposées (R. L. Steyaert *in* Bull. Soc. roy. Bot. Belg. 84: 29-45. 1951) confirment davantage ce rapprochement. Le tableau ci-joint résume les observations. Elles justifient à notre avis, l'inclusion d'*Uittienia* et *Dansera* comme sous-genres dans le genre *Dialium*. Ces nouveaux sous-

*Attaché à l'I.N.E.A.C.