

A JOURNAL ON TAXONOMIC BOTANY
PLANT SOCIOLOGY AND ECOLOGY

REINWARDTIA

Editors

SOEDARSONO RISWAN

MIEN A RIFAI

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Published by

HERBARIUM BOGORIENSE

BALAI PENELITIAN DAN PENGEMBANGAN BOTANI

PUSAT PENELITIAN DAN PENGEMBANGAN BIOLOGI - LIPI

BOGOR, INDONESIA

Reinwardtia Vol. 11, Part 2, 57 — 152

19 November 1997

10 ISSN 0034 - 365 X

NEW TAXA IN INDONESIAN BAMBOOS

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ABSTRACT

From a recent research on Indonesian bamboo germplasm it has become evident that there are at least 43 undescribed species (6 species of *Bambusa*, 3 species of *Dendrocalamus*, 4 species of *Dinochloa*, 13 species of *Gigantochloa*, 2 species of *Nastus*, 2 species of *Racemobambos*, 11 species of *Schizostachyum* and 2 species in the new monotypic genera *Parabambusa* and *Pinga*). Two new genera (*Fimbribambusa* and *Neololeba*) are here separated from *Bambusa* Schreb.

ABSTRAK

Berdasarkan hasil penelitian plasma nutfah bambu akhir-akhir ini di Indonesia diketahui bahwa ada 43 jenis baru (6 jenis *Bambusa*, 3 jenis *Dendrocalamus*, 4 jenis *Dinochloa*, 13 jenis *Gigantochloa*, 2 jenis *Nastus*, 2 jenis *Racemobambos*, 11 jenis *Schizostachyum* dan 2 jenis dalam marga monotipe *Parabambusa* dan *Pinga*). Dua marga baru (*Fimbribambusa* dan *Neololeba*) dipisahkan dari *Bambusa* Schreb.

INTRODUCTION

Although bamboos are very important plants in the rural areas of Indonesia, an overall study has never been attempted. Some partial accounts have been published by Boerlage (1895), Heyne (1927), Backer (1928), Burkill (1935), Verhoef (1957), and Monod de Froideville (1968). Although accounts of some Indonesian species are available, relatively little is known of the species in remote areas. This is mainly due to the few collections available as the results of insufficient explorations, and also because few scientists have taken an interest in this subject.

In preparing a *Field Guide to Indonesian Bamboos* three years of bamboo explorations were made in Indonesia to fill in the gaps in collections. An incredible amount of material has been accumulated and I discovered that at least 43 species were undescribed in *Bambusa*

Schreb. (6), *Dendrocalamus* Nees (3), *Dinochloa* Buse (4), *Gigantochloa* Munro (13), *Nastus* Juss. (2), *Racemobambos* Holttum (2), and *Schizostachyum* Nees (11) and in the new monotypic genera *Parabambusa* (1) and *Pinga* (1). Two new genera, *Fimbribambusa* (2) and *Neololeba* (5) are here proposed for species which were previously included in *Bambusa*.

When further explorations of remote areas are carried out, surely more new species will be found.

BAMBUSA Schreb.

Sympodial and closely tufted bamboos, erect to slightly zigzag (one species leaning on other trees), walls moderately thick to thick, usually glabrous and smooth when mature. Branch complement found just above the ground or above the middle of the culm with one dominant lateral branch and 1-several secondary branches at each node and usually with several smaller branchlets from the base of the branch complement.

Sheath of culm leaf covered by dark brown hairs, auricles prominent, lobe-like and bristly on the margin, sometimes glabrous; blades erect to spreading, usually triangular with a broad base.

Inflorescence indeterminate at lateral branches, with few to many pseudospikelets at each node. Pseudospikelets with 1-10 florets; florets separated by long, disarticulating rhachilla internodes; the 1 or 2 uppermost florets mostly imperfect, palea 2-keeled, apex not distinctly bifid; lodicules 3, margins hairy; stamens 6, filaments free; ovary obovoid, hairy and thickened at the apex; stigmas 3, plumose arising from the apical long, hairy style.

DISTRIBUTION. Widely distributed in tropical and subtropical Asia with nine species native to Indonesia. Five exotic species have been planted as ornamentals or erosion control for a long time already.

HABITAT. The species usually grow in open areas in the lowlands or on hill sides, or along river banks.

USES. Very useful for industry and are much used in the preparation of paper, pulp, furniture, or for building construction.

NOTES. This genus is characterized by its thick culms, the dominant primary branches with several branches borne on the lower part of the culm, and the large auricles of the culm sheaths. The main characters to distinguish this genus are the spikelets with long rhachilla internodes, 1 or 2 imperfect terminal florets, a keeled palea, and the presence of three lodicules.

1. *Bambusa glaucophylla* Widjaja, *n. sp.* (glaucus = white; phyllon = leaf)

Bambusa sp., Holttum, Gard. Bull. Singapore 16 :71. 1958; Wong, Bamboos Pen. Mai. :104. 1995; *Bambusa variegata* Hort., non Miq.

Folia viridia albo-vittata, culmi vaginae auriculae rotundatae extrinsecus parum curvatae setis brevibus, ligula integra margine minute pubescente. - TYPUS: *Widjaja s.n.* (BO-Holotype, K, L), Java, Bogor, Kedung Halang.

Shoots green, glabrous or covered by brown hairs.

Culms 5 m high, straight to slightly zigzag, green with brown hairs when young becoming glabrous, with erect tips; branching just above the ground, branches 3-5 at each node; internodes 20-25 cm long by 1.5-2.5 cm diameter; walls 5-8 mm thick.

Sheaths of culm leaves deciduous, 8-12 cm long, covered by brown to black hairs; auricles slightly curved outward, rounded, 2 mm high, edge with 2-3 mm long bristles; ligule entire, 1-2 mm high, glabrous to minutely hairy on the edge; blade erect, triangular, base narrow, adaxially glabrous.

Leaf sheath sometimes with black to white hairs; auricles rounded and out curved, 1-2 mm high, glabrous; ligule entire, 1 mm high, glabrous; blades 5-12 X 1-1.5 cm, glabrous, green with longitudinal white stripes.

Inflorescences unknown.

DISTRIBUTION. This bamboo of unknown provenance is commonly planted in gardens and city parks.

ECOLOGY. Humid tropical areas.

VERNACULAR NAME. Bambu putih (Indonesia).

USES. It is widely and commonly used as an ornamental or for hedges.

NOTES. Introduced in Java from Singapore in about 1970, Holttum (1958) considered it related to *Bambusa multiplex* (Lour.) Raeuschel ex J. A. & J. H. Schult. (synonym *Bambusa glaucescens* (Willd.) Sieber ex Munro, Trans. Linn. Soc., London 26 (1868) 89). As it is a very common ornamental in the tropics I hereby coin a name for it. I have not seen any species with the same combination of morphological characters, whereby it is easy to recognize. Wong (1995, Bamb. Pen. Mai., p. 104) mentioned that in horticultural circles in the Malay Peninsula and Singapore this species is called *Bambusa variegata* auct. non Siebold ex Miq.

Variiegated leaves as in this species are also found in *Gigantochloa luteostriata* which occurs widely in Eastern Kalimantan, but it differs from this in the slightly zigzag culms, the **culm** sheath auricles **curved outward and glabrous, and branches found in the basal part of the culm.**

SPECIMENS EXAMINED: Java, Bogor, Kedung Halang, *Widjaja s.n.* (BO, K, L); Singapore: Botanic Gardens, Lawn J, *Holttum SFN 41025* (K, L, US).

2. *Bambusa jacobsii* Widjaja, n. sp.

(M. Jacobs = well-known Malesian botanist and collector of this species)

Culmi vagina auriculis rotundatis extrinsecus curvatis, ligula glabra, folii lamina pubescens. *Bambusa vulgaris* proxima ut videtur, in culmis novellis pilis brunneis, culmi vagina pilis longis, folii lamina infra pubescenti differt. - TYPUS: *Widjaja 6707* (BO-Holotype, K, L), E. Java, Blambangan Nat. Park, Blok Pancur.

Shoots green, covered by brown to black hairs.

Culms 10-25 m high, zigzag, glabrous with erect tips; branches found in the upper part of the culm only; young culms covered by brown hairs, when old becoming glabrous and green; internodes 28-33 cm long by 55-10 cm diameter; wall 0.8-1.5 mm thick.

Sheaths of culm leaves persistent, sometimes deciduous, up to 22.6 cm long by 26.5 cm wide, covered by black or brown hairs when young, sheath apex upcurved in the middle; auricle lobes curved outward and extending up to the blade's base, 6-9 mm high, bristles 14 mm long; ligule irregularly denticulate, up to 5 mm high, glabrous; blade erect, triangular, up to 9.5 by 5.9 cm, abaxially with black or brown hairs, base broadly attached to the sheath apex (5.9 cm wide), adaxially glabrous.

Leaf blades 21.6-34 X 3-45 cm, pubescent beneath; auricles horn-like, curved outward, 2 mm high with a few 6-8 mm long bristles; ligule entire, 2 mm high, glabrous; sheaths with brown or white hairs.

Inflorescences unknown.

DISTRIBUTION. So far only known from the Blambangan National Park, East Java.

HABITAT. Lowland dry areas.

VERNACULAR NAMES. Pring manggong, pring jajang (Javanese).

USES. Unknown.

NOTES. This species is most similar to *Bambusa vulgaris* Schrad. & J.C. Wendl., but differs in many morphological characters such as young culms covered by brown hairs, pubescent leaves with longer bristles on the auricles.

Besides being used for this species, the vernacular name "pring manggong" is also applied to *Gigantochloa manggong* Widjaja, growing in the Meru Betiri National Park. Similarly the local people also call it "pring jajang", a vernacular name also applied to *Gigantochloa hasskarliana* (Kurz) Back, which also occurs in the Meru Betiri National Park. In Bali there is another species called "tiying jajang", which does not belong to this species, either; further study on "tiying jajang" is needed.

SPECIMENS EXAMINED: Blambangan Nat. Park, Blok Pancur, *Widjaja 6707* (BO, K, L, US), Besuki, Pancur, *Jacobs 4944* (L).

3. *Bambusa lako* Widjaja, *n. sp.* - Fig. 1 (lako = vernacular name, meaning black in Tetun)

Bambusa vulgaris in culmi vaginae lamina erecta similis. Haec bambusa nigra cognoscere potes culmis purpurascensibus ad nigris lineis viridibus ad flavidis vel viridibus lineis flavidis ubiveteribus, culmi vaginae auriculis extrinsecus curvatis setis longis. Folia lamina infra parum pubescens. — TYPUS: *Widjaja 6535* (BO-Holotype, K, L, US), East Timor, Viqueque.

Shoots green to orange with yellowish stripes or purplish covered by scattered brown hairs.

Culms 15 m high, straight; tips slightly pendulous; branches found at 1 m above the ground, 5-7 to a node; young culms with brown hairs, green with yellowish stripes, when old glabrous and purplish to black with green to yellowish stripes; internodes 25-35 by 3-8 cm diameter; walls 8-12 mm thick.

Culm leaves deciduous, covered by black to brown hairs, sheath 10-11.5 cm long, up to 19.5 cm wide; auricles rounded and crisped to the blade's base, slightly curved outward, 4-8 mm high, bristles 7-11 mm long; ligule denticulate, 2-3 mm high, glabrous; blade erect, triangular, 2.5-4.7 by 1.5-4.0 cm, base broad, adaxially glabrous.

Leaf blades 14.5-24.7 X 2.4-3.2 cm, slightly hairy beneath; auricles horn-like, 0.5-1 mm high, bristles 4 mm long; ligule entire to denticulate, 2 mm high.

Inflorescences unknown.

DISTRIBUTION. This species is only known from East Timor. It might be found on other islands of the Lesser Sunda Islands. People in Flores have reported that another black bamboo is found both there and in We tar, but its identity is not known.

HABITAT. Dry areas.

VERNACULAR NAMES. Au lako, au metan, au meta, or au lako meta (Tetun, East Timor).

USES. Culms are used for building structures (roofing and walls) and traditional furniture. Introduced to Australia in 1970 from Timor as an ornamental (Len Muller, Mount Mirinjo Farm, Queensland pers. com.).

NOTES. This bamboo was not in flower when it was collected, and inflorescences are needed for confirmation of its correct generic identity.

The local name "lako" (which means black in Tetun) is used as the epithet in reference to its black or purplish culms. The species is different from the well-known black bamboo that grows in Java (*Gigantochloa atroviolacea* Widjaja) and can be distinguished easily by the branches that appear on the lower culm, the prominent auricles of the culm sheaths and the yellowish to greenish stripes on the young culms. In my previous publication "Revision of Malesian *Gigantochloa*" (1987), I mentioned that the black bamboo in Mr. Wertz's garden at Mirkwood, Australia was *G. atroviolacea*. After examining the bamboo's slide that he sent to me it appeared that it is not that species, but *Bambusa lako*.

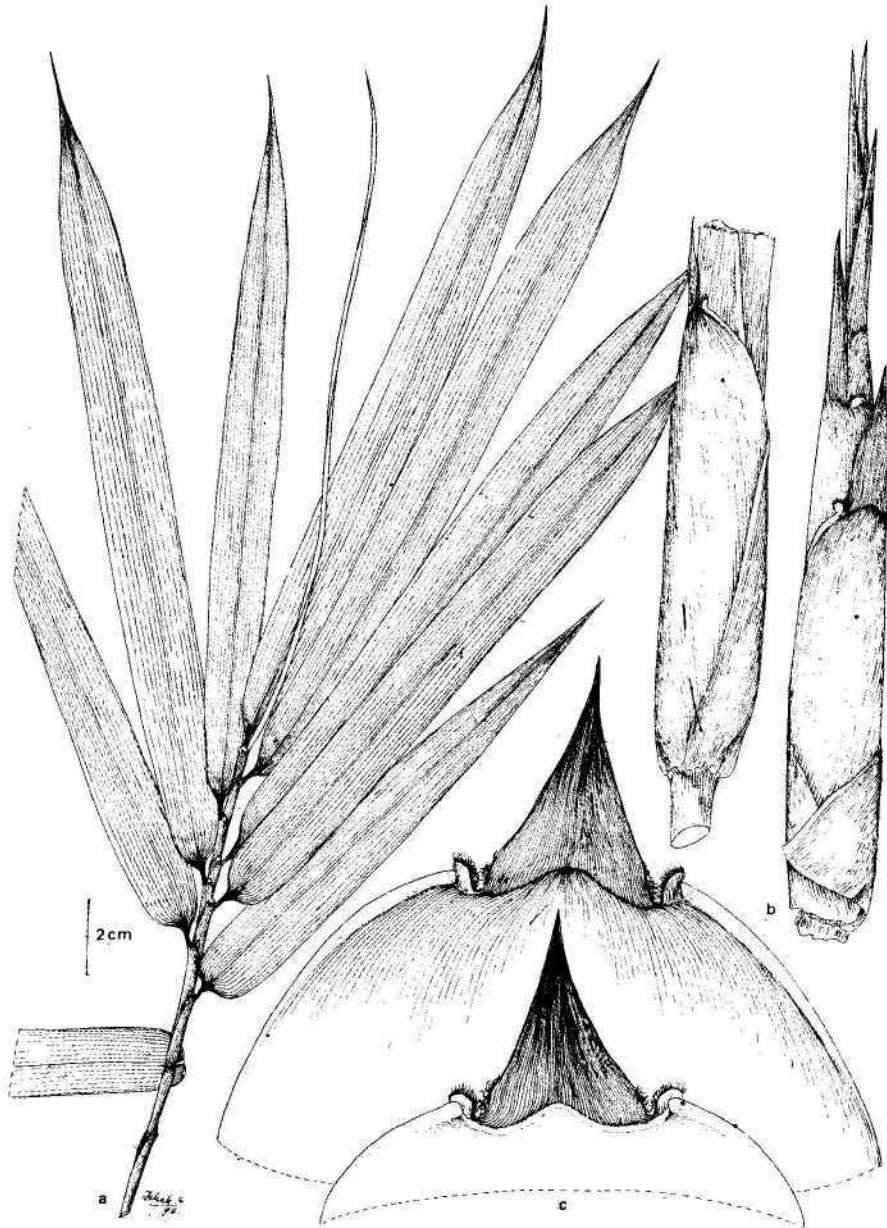


Fig. 1 *Bambusa lako* Widjaja: a. leaf; b. young shoot c. culm leaf. From Widjaja 6535.

SPECIMENS EXAMINED: East Timor: Baucau, *Widjaja* 6531, 6535 (BO, K, L, US); Iiquisa, Hatuliwa, *Widjaja* 6559 (BO, K, L, US).

4. *Bambusa maculata* Widjaja, *n. sp.* - Fig. 2 (maculatus = blotched, spotted)

Haec bambusa olim in *Bambusa vulgari* inclusa erat, sed in culmis novellis lineis **viridibus** flavisque, viridibus maculis brunneis ubi veteribus, culmi vagina auriculis **curvatis**, setis 14—15 mm longis, folii lamina ultra dimidio vaginae longitudinis erecta ad **patenti**, pseudospiculis longioribus, rhachilla glabra, antheris flavis differt. - TYPLJS: *Widjaja* 4881 (BO - Holotype, K, L, US), Moluccas, South Ternate, Tongde Village.

Shoots green with yellow stripes.

Culms 15 m high with pendulous tips; branching at about 1 m above the ground; young culms green with yellow stripes at the base, when old becoming green with brown spots; internodes 30-35 cm long by 4-7 cm diameter; walls 8-10 mm thick.

Culm leaves glabrous or with scattered dark hairs, persistent to deciduous, sheath 15-17 cm long, up to 16 cm wide, sheath apex upcurved in the middle; auricles curved outward, up to 5.5 mm high and 10 mm in lateral extent, bristles 14-15 mm long, extended up to the blade's base; ligule entire, 2 mm high, glabrous; blade erect to spreading, triangular, more than half as long as the sheath, 6.5-8.2 by 3.5-4.5 cm, base broadly attached to the sheath apex (c. 4 cm wide), base margin ciliate.

Leaf blades 22.5-37.5 X 1-4.5 cm, glabrous; auricles inconspicuous, glabrous; ligule denticulate, 1 mm high, glabrous.

Pseudospikelets 19-28 mm long, with 10 fertile and 1 sterile floret; rhachilla glabrous, 1-3 mm long; glumes 2, 3-4 mm long, acute; lemma 6-14 mm long, glabrous, acute; palea 4-11 mm long, acute, two-keeled, keels ciliate; lodicules 2-3 mm long, membranous, apex shortly ciliate; anthers yellowish, 8 mm long; ovary glabrous or slightly hairy; stigmas white.

DISTRIBUTION. Cultivated for many ages in Java especially on the borders of Central and East Java or Central and West Java. It grows wild abundantly in the Moluccas and also in the Lesser Sunda Islands (Sumbawa, Lombok, Sumba). It is planted in Bali for the furniture industry.

HABITAT. Preferring a dry climate and poor soil in the lowlands.

VERNACULAR NAMES. Buluh cina, buluh cino, buluh gading, buluh kadera, buluh kursi (Ternate, Halmahera), kalaeng ngusina (Sangir), pring tutul (Javanese), awi tutul (Sundanese).

USES. Next to its use for furniture the culms are much used for traditional music instrument, construction (wall and flooring) as well as for handicraft.

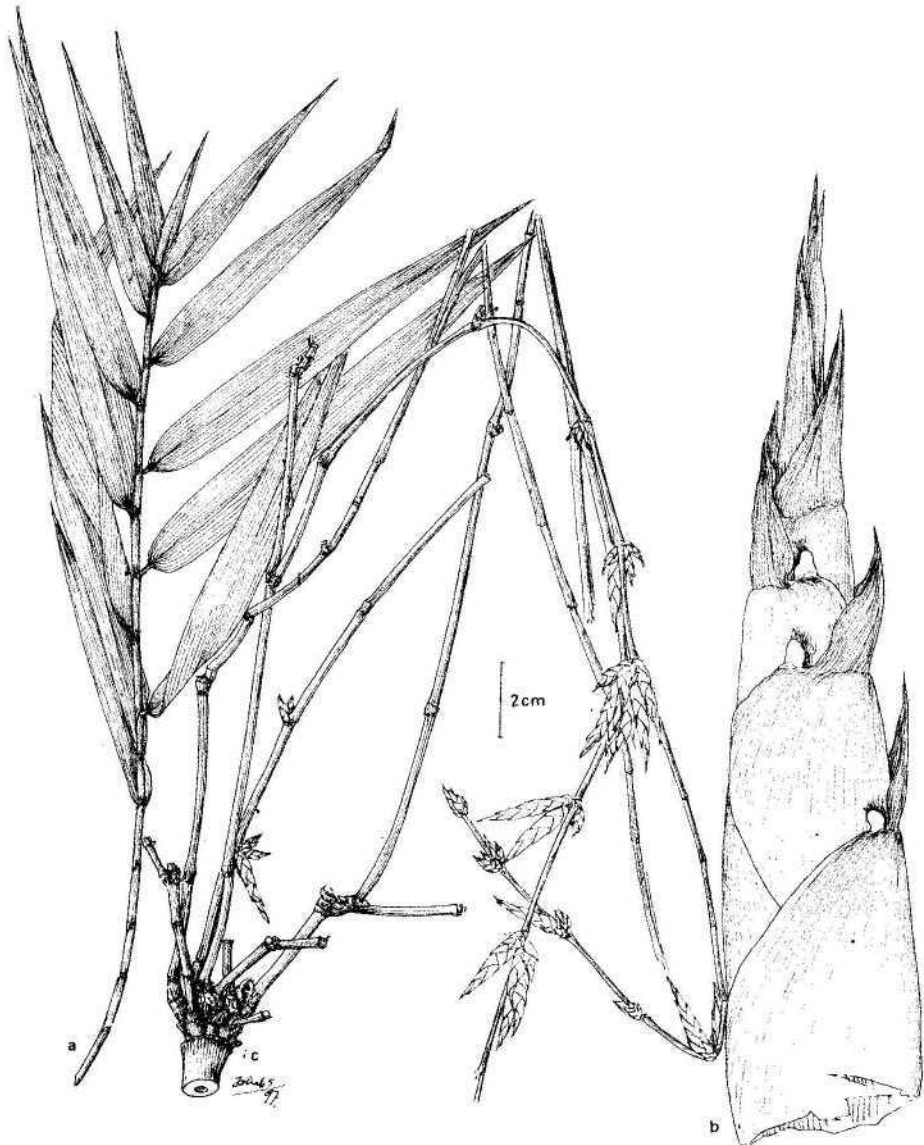


Fig. 2. *Bambusa maculata* Widjaja: a. leaf; b. young shoot; c. inflorescence. From Widjaja 4881.

NOTES. This species is well-known to many Indonesians because it is much used in the furniture (especially chair) industry, so that locally it is called 'buluh kursi'. It has been considered as part of *Bambusa vulgaris* Schrad. & J.C. Wendl. for a long time, but because of differences in the vegetative and generative characters, it is quite distinct. Kurz (1870) mentioned in a note that this would be a distinct var. *maculata* but he never described it.

SPECIMENS EXAMINED. Java: Bogor, Cibural, *Bakhuizen v. d. Brink 5349* (BO, K), Bandung, Padasuka, *Widjaja 11* (BO, K), *304* (BO), Bogor, *Heyrie 15* (BO), Yogya, Mlati, *Widjaja 60* (BO), Java, *Zollinger 1347* (P); North Celebes: P. Sangir, Tambulun Utara, Bowang Hulu, *Widjaja 4929* (K, L, US, BO); Moluccas: Halmahera: Tobelo, *Widjaja 4894; 4895* (K, L, US, BO), Tuhu Ma Loko, *Beguin 2210*, Ternate: Akebobotja, *Beguin 859* (BO), Laguna, *Beguin 718* (BO), Ratta Baru, *Beguin 651* (BO), Tongde, *Widjaja 4881* (BO, K, L, US)

5. *Bambusa riauensis* Widjaja, *n. sp.* - Fig. 3 (Riau = place of provenance)

Haec bambusa *Giganlochloa kuring* similis, in filamentis libris differt. Culmi vagina auriculis parvis rotundatis, extensio intrinsecus curvata, setae 7 mm longae, ligula dentata, setis brevibus vel glabra, lamina erecta basi angusta. — TYPUS: *Widjaja 4006* (BO-Holotype, K, L, US), Riau, Kerumpunan Nature Reserve, along the Kerumpunan River.

Shoots green covered by brown hairs.

Culms up to 10 m high, straight, green with yellow stripes, erect; tips pendulous; branches emerging from the middle of the culm; young culms with brown hairs, when old becoming glabrous and green with yellow stripes; internodes 45–55 cm long by 2–3 cm diameter; walls up to 4 mm thick.

Culm leaves persistent to deciduous, covered by white or black hairs, sheath 12.6–13.5 cm long, up to 7 cm wide, apex truncate or horizontal; auricles small, rounded, sheath extension curved inward, bristles 7 mm long; ligule irregularly dentate, membranaceous, 3–4 mm high, with short bristles or glabrous; blade erect, triangular, 7–12.4 by 2.5–3 cm, base narrowly attached to the sheath apex (1.5 cm wide), adaxially glabrous.

Leaf blades 15–26.4 X 16–3 cm, glabrous, sheath margin pale brown ciliate; auricles inconspicuous, less than 0.5 mm high, glabrous, sheath extension curved inward; ligule entire, 3 mm high, curved upward in the middle, glabrous.

Pseudospikelets 1–1.5 cm long, with 4 fertile and 1 sterile floret; rhachilla internodes 1–3 mm long, glabrous; glumes 3, 4–6 mm long; lemmas 8–9 mm long, acute; paleas 8–9 mm long, acute, two-keeled; anthers yellowish, 5–6 mm long; ovary glabrous; stigmas white.

DISTRIBUTION. Only known from Riau.

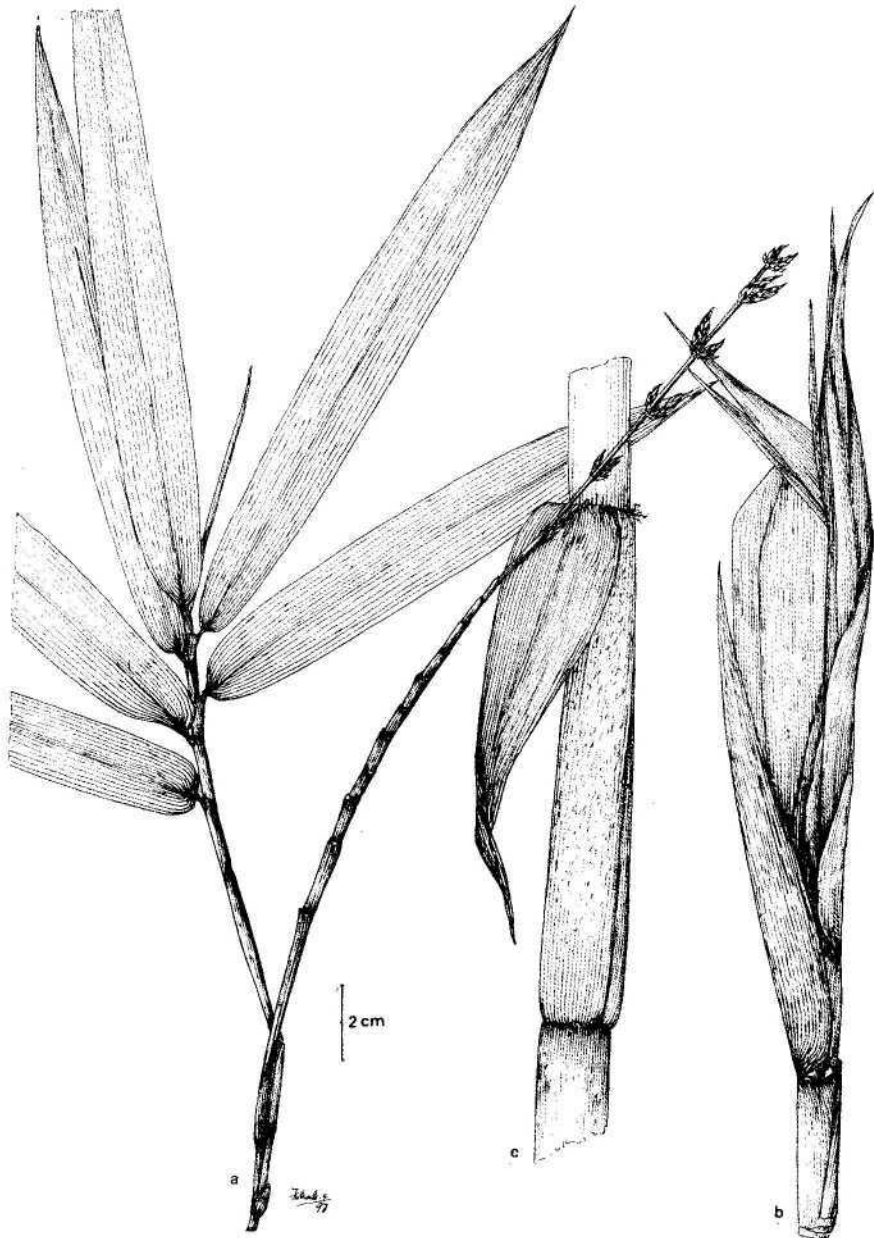


Fig. 3. *Bainbusa riauensis* Widjaja: a. leaf with inflorescence; b. young shoot; c. culm leaf. From Widjaja 4006.

HABITAT. This bamboo is only found in the lowlands along the river bank.

VERNACULAR NAME. Unknown.

USES. Unknown.

NOTES. This species somewhat resembles *Gigantochloa kuring* Widjaja but differs by the free filaments and glabrous ovary.

SPECIMEN EXAMINED: Riau, Kerumputan Nature Reserve, along the Kerumputan River, *Widjaja 4006* (BO, K, L, US).

6. *Bambusa viridis* Widjaja, *n. sp.* — Fig. 4 (*viridis* = green)

Bambusa vulgaris similissima, culmi vaginae pilis patentibus, auriculis extrinsecus curvatis, setis 3-4 mm longis, ligula integra glabra differt. - **TYPUS:** *Widjaja 6638* (BO-Holotype, K, L, US), Irian Jaya, Manokwari, Waropi.

Shoots green, glabrous or covered by brown hairs.

Culms 20 m high, straight or mostly slightly zigzag, green; branching 1.5 m above the ground; young culms covered with brown hairs, when old becoming glabrous, internodes 40-50 cm long by 3-5 cm diameter; walls 5-7 mm thick.

Culm leaves deciduous, covered by scattered brown hairs, sheath 7-11 by 35-5 cm, sheath apex raised upcurved in the middle; auricles curved outward, 3-5 mm high, bristles few, 3-4 mm long; ligule entire, 2 mm high, glabrous; blade erect, slightly undulate, triangular, 15-48 by 1-2 cm, base broadly attached to the sheath apex (2 cm wide), adaxially glabrous.

Leaf blades 8.4-29.7 X 1.2-4cm, glabrous; auricles curved outward, 2 mm high, bristles up to 9 mm long; ligule entire, 1-2 mm high, glabrous; sheaths with spreading hairs.

Inflorescence unknown.

DISTRIBUTION. Irian Jaya, Manokwari, Waropi.

HABITAT. It was found only once but abundant in the lowlands, on hills near Cenderawasih Bay.

VERNACULAR NAME. Unknown.

USES. Unknown.

NOTES. Very close to *Bambusa vulgaris* Schrad. & J. C. Wendl., but differing by the pubescence of the leaf sheath, the characters of its auricles, and the ligule.

SPECIMEN EXAMINED: Irian Jaya, Manokwari, Waropi, *Widjaja 6638* (BO, K, L, US).

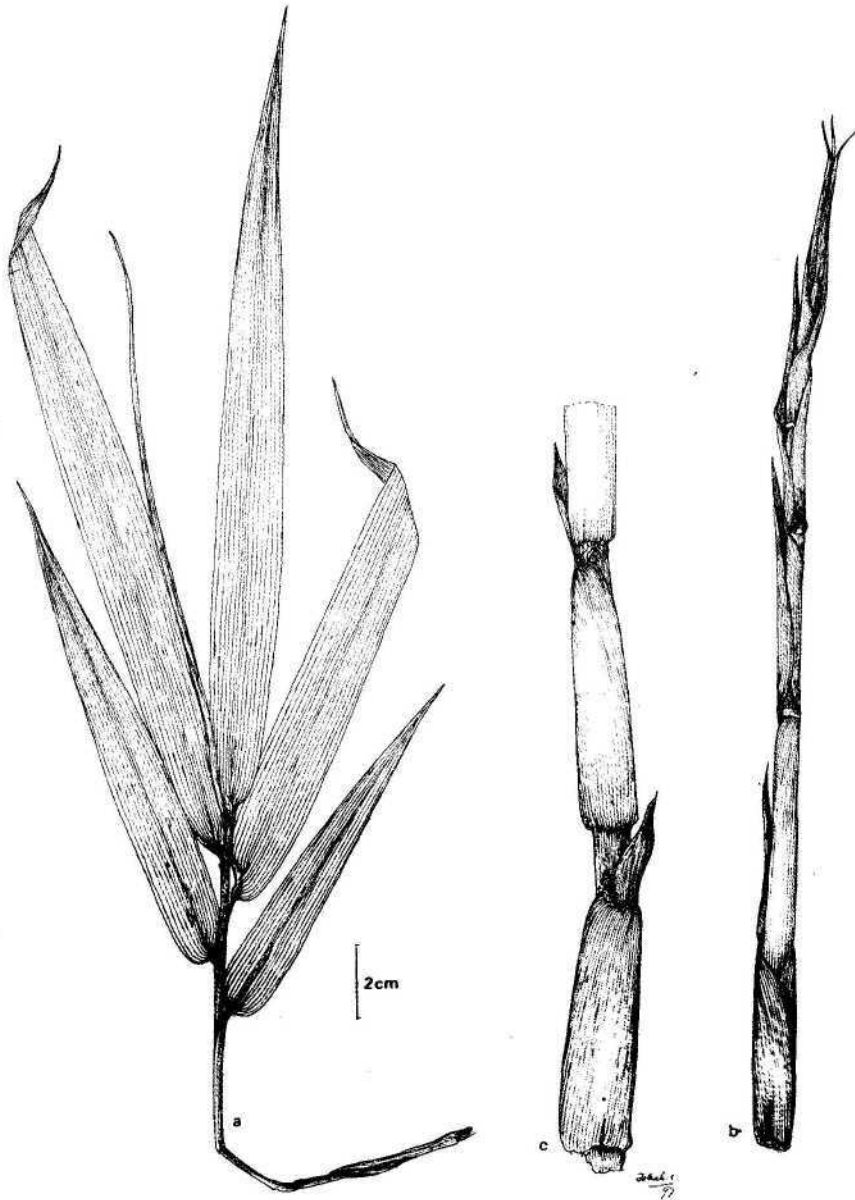


Fig. 4. *Bambusa viridis* Widjaja: a. leaf; b. young shoot; c. culm leaf. From Widjaja 6638.

DENDROCALAMUS Nees

Sympodial and densely tufted bamboos. Shoots covered by black or white hairs, with or without white wax. Young culms usually with white waxy powder.

Culms erect, at least 8 cm diameter, tips pendulous. Branches usually absent in the lower part of the culm, found at midculm nodes, one lateral branch dominant, some spp. have long, dominant lateral branches that scramble over nearby trees.

Sheaths of culm leaves usually covered by pale to dark brown hairy, blade triangular, base usually narrow, auricles present, sometimes inconspicuous.

Inflorescences indeterminate at the leafless ends of lateral branches, pseudospikelets composed of 1-8 florets. Each floret with a sterile apical floret on an elongated extension of the rhachilla, lodicules absent, stamens 6, filaments free, ovary obovoid, apex thickened and hairy, with 1 hairy stigma.

DISTRIBUTION. Mainly found in tropical Asia, the centre of diversity being on the mainland. In Indonesia 10 spp. have been found, of which 5 have been introduced [*D. brandisii* Kurz, *D. giganteus* Munro, *D. latiflorus* Munro, *D. membranaceus* Munro, and *D. strictus* (Roxb.) Nees], 4 are local endemics (*D. bengkalisensis* Widjaja, *D. buar* Widjaja, *D. hait* Widjaja, and *D. hirtellus* Ridl.), and one is widely distributed [*D. asper* (Schult.f.) Back.].

HABITAT. 0-1500 m alt. Wet and humid areas, also in dry areas with a monsoon season. The native species grow mostly in open disturbed forests in valleys.

USES. Because of the large diameter of the culms, they are very much used in construction, as pillars, or water pipes. Recently, the furniture industry has requested large quantities of large diameter culms for raw material. This genus contains the most important species for edible shoot production in Indonesia as well as in Thailand, South China, the Himalayas, India, and Bangladesh.

NOTES. Characterized by the white waxy powder on the young culms, mature ones with pendulous tips, a dominant middle branch, and the small to inconspicuous auricles of the culm leaves. The generative characteristic of this genus is having short rhachilla internode, absent lodicules, free filaments and obovoid ovary with thickened and hairy apex.

1. *Dendrocalamus bengkalisensis* Widjaja, n. sp.
(bengkalis = place of provenance)

Dendrocalamo hirtello similis, culmi vaginae auriculis rotundatis, pilis 7-25 mm longis, ligula c. 2 mm longa, pilis ad 2 mm longis, folii lamina pubescenti differt. —
TYPUS: *Widjaja 3995* (BO-Holotype, K, L), Riau, Ds. Pinggir Nature Reserve.

Shoots orange, covered by white hairs or glabrous.

Culms straight with pendulous tips, the dominant primary branch of lateral branches very long and scrambling in neighbouring trees; young culms green, with white wax and white hairs, becoming green with age and glabrous; internodes 35-40 cm long by 4-6 cm diameter, walls 8 mm thick.

Sheaths of culm leaves deciduous, covered by white hairs, 18.5-19.3 cm long, up to 24.5 cm wide, sheath apex recessed then upcurved in the middle; auricles rounded, 7-9 mm high, bristles 7-25 mm long; ligule denticulate, 2 mm high, bristles up to 2 mm long; blade deflexed, triangular, 14.3-15.3 by 2.3-2.7 cm, base narrowly attached to the sheath apex (1.5 cm wide), adaxially glabrous.

Leaf blades 17-31.5 X 15-6.8 cm, pubescent on the lower surface; auricles 1 mm high, rounded, bristles 17 mm long; ligule entire, 1 mm high, glabrous.

Inflorescences unknown.

DISTRIBUTION. Only known from the Desa Pinggir Nature Reserve, Bengkalis.

HABITAT. Wet areas of lowland at 150 m above sea level disturbed forest.

VERNACULAR NAME. Unknown.

USES. Unknown.

NOTES. Known from the type only, and distinguished by its culm leaves with rounded auricles, long bristles of the culm leaves, and the pubescent leaf blades.

SPECIMEN EXAMINED: Riau, Bengkalis, Desa Pinggir Nature Reserve, *Widjaja* 3995 (BO, K, L).

2. *Dendrocalamus buar* Widjaja, *n. sp.*— Fig. 5 (buar = vernacular name)

Dendrocalamo pendulo similissimus, culmi vaginae auriculis ad laminae basin crispato—adnatis, ligula setosa differt. Folia lamina setis paucis in auriculis inconspicuis. Antherae flavidae. -TYPUS: *Widjaja* 3810 (BO-Holotype, K, L, US), Lampung, Balik Bukit, Kubuperahu, Bukit Barisan National Park.

Shoots orange, covered by white hairs and white wax.

Culms 15-20 m high, straight and erect at base, afterwards scrambling; primary lateral branches scrambling to neighbouring trees; young culms covered by white wax and whitish hairs, becoming glabrous, green when old; internodes 30-50 cm long by 6-10 cm in diameter, walls 4-6 mm thick.

Culm leaves sheaths 17-20.2 cm long, deciduous, scatteredly covered by white or sometimes brownish hairs and scattered white wax, auricles rim-like and crisped lobes to the blade's base, 1-3 mm high, bristles 12-18 mm long; ligule denticulate and irregular, 7-19 mm high, bristles

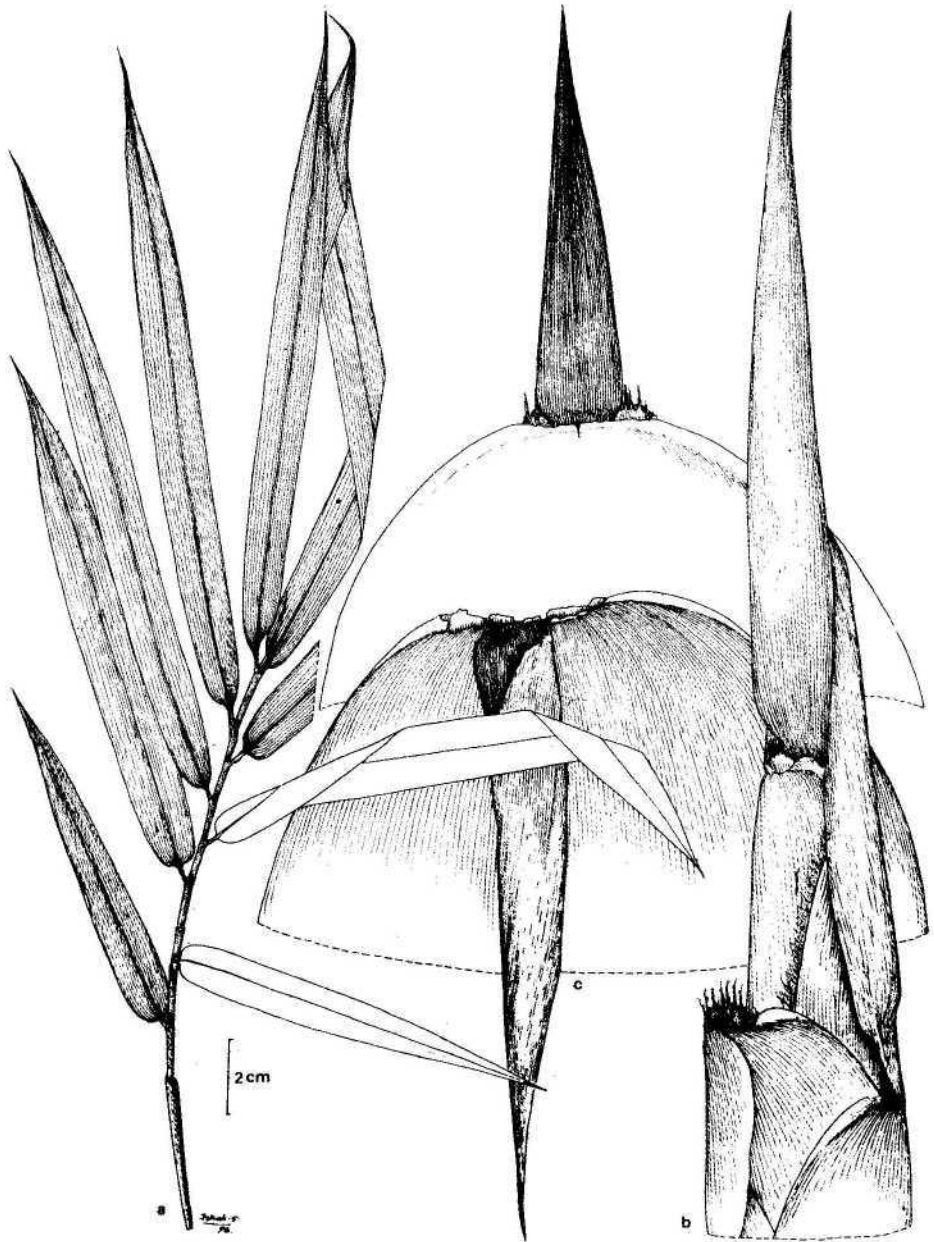


Fig. 5. *Dendrocalamus buar* Widjaja: a. leaf; B. young shoot; c. culm leaf. From *Widjaja 3810*.

4-15 mm long; blade erect to deflexed, triangular, 9-21 by 1.2-2.8 cm, base narrow, adaxially glabrous.

Leaf blades 18-29 X 1.3-2.7 cm, glabrous; auricles small to inconspicuous, 1 mm high, bristles few, 1-2 mm long; ligule entire, 1 mm high, glabrous.

Pseudospikelets 6-9 mm long, with 1 fertile floret; glume 1, c. 5 mm long, acuminate; lemma 6 mm long, glabrous, mucronate; palea 7 mm long, acute, without keels, glabrous; anthers yellowish; ovary hairy at the apex, stigma white.

DISTRIBUTION. Only known from the Bukit Barisan National Park, North Lampung.

HABITAT. Alluvial soil, in humid lowland forest at the altitude 650 m above sea level.

VERNACULAR NAMES. Buluh buar (Lampung), bambu kukui (Bengkulu).

USES. Unknown.

NOTES. Known from some collections at Bukit Barisan National Park only, and distinguished by its culm leaves with rimlike auricle and crisped lobes to the blade's base with denticulate and irregular ligules and long bristle.

SPECIMENS EXAMINED: Lampung, Bukit Barisan National Park, *Widjaja 3810* (BO, K, L, US), Lampung liwa, 13 km from Sekincau, *Widjaja 3273* (BO).

3. *Dendrocalamus hait* Widjaja, *n. sp.*

(hait = vernacular name which means hooked to other neighbouring plants)

Dendrocalamo bengkalisensi similissimus, culmi vaginae ligulis praelongis glabris, folii lamina glabra, auriculis setis brevibus differt. - **TYPUS:** *Widjaja 3933* (BO—Holotype, K, L), North Sumatra, Sipirok, Ramba Sihasur, Sipirok Nature Reserve.

Shoots orange, covered by white hairs.

Culms 20 m high, straight to scrambling; tips pendulous; dominant branches long and scrambling to nearby trees, branches 8 per node; culm white waxy, white hairy when young, becoming glabrous, green when old; internodes 35-44 cm long by 4.5-5.5 cm in diameter; walls up to 8 mm thick.

Culm leaves sheaths white-hairy and waxy, sheath up to 19 by 21.5 cm, deciduous, sheath apex recessed in the middle then horizontal; auricles rounded, 5 mm high, bristles 10-15 mm long; ligule irregular, 10 mm high, glabrous; blade erect to deflexed, triangular, 2.3-5 by 4.5-6.4 cm, base broadly attached to the sheath apex (3-4.5 cm wide), adaxially glabrous.

Leaf blades 9.9-20.2 X 1.2-1.5 cm, glabrous; auricles small or sometimes inconspicuous, bristles 6 mm long; ligule entire, 1-2 mm high, glabrous.

Pseudospikelets 5 mm long, each with 1 fertile floret; rhachilla glabrous, up to 1 mm long; glumes 2, 2-4 mm long, acuminate; lemma 5 mm long, acuminate, glabrous; palea 5 mm long, acuminate, without keels, glabrous; anthers yellowish, 6 mm long; ovary glabrous to hairy; stigma white.

DISTRIBUTION. Only known from a very limited area in Ramba Sihasur Village, Sipirok Nature Reserve (N. Sumatra).

HABITAT. Forest margins and in open forest at 700 m alt.

VERNACULAR NAME. Buluh hait (Sipirok).

USES. Culms are used for walls.

SPECIMENS EXAMINED: North Sumatra, Sipirok, Ramba Sihasur, Sipirok Nature Reserve, *Widjaja 1949* (BO, US); 3933 (BO, K, L, US).

DINCHLOA Buse

Open tufted climbing bamboos.

Culms zigzag, usually solid or with a small lumen, internodes very rough or smooth, covered by white wax when young, becoming smooth and green; nodes not swollen; a primary dominant lateral branch (usually dormant) may become as large as the main culm when that is damaged, with several secondary branches developing from its base.

Culm leaves mostly glabrous, sometimes covered by brown to dark hairs, with a distinctive hard, rugose and coarse, glabrous or hairy of basal sheath or sheath girdle; auricles absent or present, then often with long bristles; blade broadly ovate to ovate-lanceolate, erect to deflexed, usually glabrous, purplish or green, covered by white wax when young. Leaf blade small to large, smooth, glabrous or hairy; auricles present or not.

Inflorescences usually on large leafless branches or terminating one, indeterminate, spikelets with 1 floret consisting of a lemma, a palea without keels, lodicules present or not, stamens 6, filaments free, ovary glabrous, stigmas 3. Fruit globose to obclavate, smooth or rugose, pericarp thick and fleshy when young, endosperm reduced, scutellum large.

DISTRIBUTION. 29 spp in South East Asia, 12 in Indonesia.

HABITAT. Found scattered in the lowland up to 1200 m alt., abundant in dipterocarp and secondary forests, and in forest margins.

USES. Not used very often, mainly for rope when better plants cannot be found.

NOTES. This genus is characterized by the climbing habit with zigzag internodes, very rough below the node, and culm leaves with a rugose sheath base. In *Dinochloa prunifera* S. Dransf. the drupe is up to 30 mm long.

1. *Dinochloa albociliata* Widjaja, n. sp. - Fig. 6
(albus = white; ciliatus = ciliate, with fine, eyelashes-like hairs)

Dinochloa barbata in indumento denso pilis aureis ad culmi laminae basin similis. Culmi vaginae auriculis 2-3 mm longis, pilis c. 12 mm longis, ligula Integra glabra, lamina erecta. Folia lamina auriculis c. 2 mm altis, plicatis, pilis ad 20 mm longis crispis, ligula integra ad denticulata, pilis ad 16 mm longis, lodiculae desunt. - TYPUS *Widjaja 3548* (BO—Holotype), Central Sulawesi, Donggala District, on the way from Rante Tungo to Triangin, foothill of G. Tambusisi.

Shoots green with white wax.

Young culms white waxy, glabrous, turning green when old; with small lumen.

Culm leaves deciduous; sheath 7 cm long with appressed white to light brown hairs, at base densely covered by golden hairs, margins white ciliate; auricles 2—3 mm high, bristles 12 mm long; ligule entire, 2 mm high, glabrous; blade erect, triangular, 9-10 by 3-3.3 cm, base cordate, narrowly attached (7 mm wide) to the sheath, adaxially glabrous.

Leaf blades 20.2-36.3 x 3.2-3.7 cm, slightly coarse or rough at the basal leaf of the lower surface; sheath puberulous and ciliate in the marginal area; auricles folded, 2 mm high, bristles curled, up to 20 mm long; ligule entire to denticulate, 1 mm high, bristles up to 16 mm long.

Pseudospikelets 4 mm long; glumes 2, 2-2.5 mm long, mucronate; lemma up to 3 mm long, acute, glabrous; palea up to 3 mm long, acute, glabrous; lodicules absent; anthers yellowish, 1 mm long; stigmas white.

DISTRIBUTION. C. Sulawesi, G. Tambusisi.

HABITAT. Lowland at 550 m alt.

VERNACULAR NAME. Unknown.

USES. Unknown.

NOTES. This species resembles *D. barbata* S. Dransf. by having culm leaves with a densely hairy base. However, it differs by its glabrous culm leaf ligule, erect blade, and the entire leaf blade ligule with up to 16 mm long bristles.

SPECIMENS EXAMINED. Central Sulawesi, Donggala, on the way from Rante Tungo to Triangin, hill of G. Tambusisi, *Widjaja 3548* (BO); *3549* (BO, K, L).

2. *Dinochloa erecta* Widjaja, n. sp. - Fig. 7
(erect = erect)

Dinochloa palawanensi culmi folii lamina erecta, ligulae omnes integrae glabraeque similis, in culmi vaginae auriculis glabris plicatis differt. Folia lamina auriculis plicatis margine setis paucis ad 16 mm longis. Pseudospiculae 3 mm longae. - TYPUS: *Widjaja 3542* (BO-Holotype, K, L), Central Sulawesi, Donggala District, Gouda-gouda Village.



Fig. 6. *Dinochloa albociliata* Widjaja: a. leaf; b. young shoot; c. inflorescence. From Widjaja 3548.



Fig. 7. *Dinochloa erecta* Widjaja: a. leaf; b. young shoot; c. inflorescence; d. culm leaf. From Widjaja 3542.

Shoots orange with white wax, glabrous. Young culms white waxy, glabrous.

Culm leaves glabrous, deciduous; sheath 5.5-6 cm long, margin light-brown ciliate; auricles folded, up to 2 mm high, glabrous; ligule 1-1.5 mm long, entire, glabrous; blade erect, broadly ovate, 4.5-5 by 3-3.5 cm, base narrowly attached to the sheath apex (9 mm wide), adaxially glabrous.

Leaf blades 20.5-26.7 X 2.4-4 cm; auricles folded, less than 1 mm tall, bristles few on its edge and curly, up to 16 mm long; ligule entire, 1 mm high, glabrous; sheath glabrous.

Pseudospikelets 3 mm long; glumes 2, 1.5-2 mm long, mucronate; lemma 2.5 mm long, acute, glabrous; palea 2.5 mm long, acute, glabrous; anthers yellowish, 2 mm long; stigmas white.

DISTRIBUTION. Central Sulawesi.

HABITAT. Lowland limestone area, 250 m alt.

VERNACULAR NAME. Unknown.

USES. Unknown.

NOTES. This species resembles *D. albociliata* Widjaja by the erect blades of the culm leaves, all auricles folded and bristly, and the glabrous ligules of the culm sheath, while those of the leaf sheaths are bristly. However, it differs by the glabrous base of the culm sheaths, and the smaller, 3 mm long pseudospikelets.

SPECIMENS EXAMINED. Central Sulawesi, Donggala, Gouda-gouda Village, *Widjaja* 3542 (BO, K, L); 3543 (BO, K, L).

3. *Dinochloa glabrescens* Widjaja, *n. sp.* (*glabrescens* = becoming hairless or nearly so)

Dinochloa scandenti proxima, culmi folii basi glabra, folii lamina sine auriculis differt. - TYPUS: *Gusdorf* 276 (BO- Holotype), Sumatra, Lampung, Kuta Agung.

Shoots purplish, white-waxy. Culms glabrous; lumen small.

Culm leaves glabrous, deciduous; sheath 11-11.9 cm long, base glabrous; auricles absent; ligule entire, 1.5 mm long, glabrous; blade reflexed, 8-9.3 by 1.7-2 cm near the base, narrower at the junction with the sheath apex, adaxially glabrous.

Leaf blades 15.5-19.5 X 3-4.8 cm, glabrous, smooth; auricles absent; ligule entire, 0.5-0.8 mm long, glabrous; base attenuate or asymmetric, rounded at one side and the other angular; sheath glabrous, smooth.

Inflorescence internodes smooth, glabrous; pseudospikelets 2 mm long; glumes 2, 1 mm long, shortly mucronate; lemma up to 1.5 mm long, glabrous; palea up to 1.5 mm long, acute, glabrous; lodicules absent; anthers yellowish, 1 mm long.

DISTRIBUTION. Sumatra, Lampung.

HABITAT. Lowland at c. 600 m alt.

VERNACULAR NAME. Buluh gelong (Malay).
USES. Unknown.

NOTES. Dransfield (1981) mentioned that *D. scandens* would occur widely in Western Malesia; however after careful examination she concluded that *D. scandens* proper is found only in West Java (Dransfield 1996). The present species was originally included in this, but it is very different because of the glabrous basal sheath and blade, and the absent auricles of the leaf blades..

SPECIMEN EXAMINED. Sumatra, Lampung, Kuta Agung, *Gusdorf276* (BO).

4. *Dinochloa truncata* Widjaja, *n. sp.* — Fig. 8 (truncatus = ending very abruptly as if cut straight across)

Dinochloa palauxmensis culmi vaginae auricularum absentia, laminis erectis similis, in folii laminae auricularum absentia, ligulis glabris differt. Pseudospiculae 3 mm longae, lodiculis 3 membranaceis. - TYPUS: *Widjaja, 4871* (BO-Holotype, K, L-Isotype), North Sulawesi, Gorontalo, Ds. Molelehu, Kec. Tobawa.

Shoots purplish with white powdery wax, glabrous. Young culms white waxy, glabrous, turning green and glabrous when old; internodes 15-20 cm long by 2 cm in diameter.

Culm leaves deciduous, glabrous or sometimes with scattered appressed brown hairs; sheath apex truncate, 8.5-10 cm long; auricles absent; ligule entire, 1.5 mm high, glabrous; blade erect, triangular, 6-7 by 1.5-2 cm, base narrow (7 mm wide), adaxially glabrous.

Leaf blades 12-20 X 1.5-3.3 cm, glabrous; auricles inconspicuous, glabrous; ligule entire, 1 mm high, glabrous.

Pseudospikelets 3 mm long; glume 1, 1.5 mm long, mucronate; lemma up to 2 mm long, mucronate, glabrous; palea up to 2 mm long, acute, glabrous; lodicules 3, membranous, 0.5 mm long, ciliate; anthers yellowish, 1.5 mm long; stigmas white.

DISTRIBUTION. N. Sulawesi, Gorontalo.

HABITAT. Forest margin.

VERNACULAR NAME. Talelo udu (Gorontalo language, means Buluh tikus = mouse bamboo).

USES. Unknown.

NOTES. This species is characterized by the truncate, glabrous culm sheaths, and the glabrous blades.

SPECIMEN EXAMINED: North Sulawesi, Gorontalo District, Tobawa Subdistrict, Molelehu Village, *Widjaja 4871* (BO, K, L).

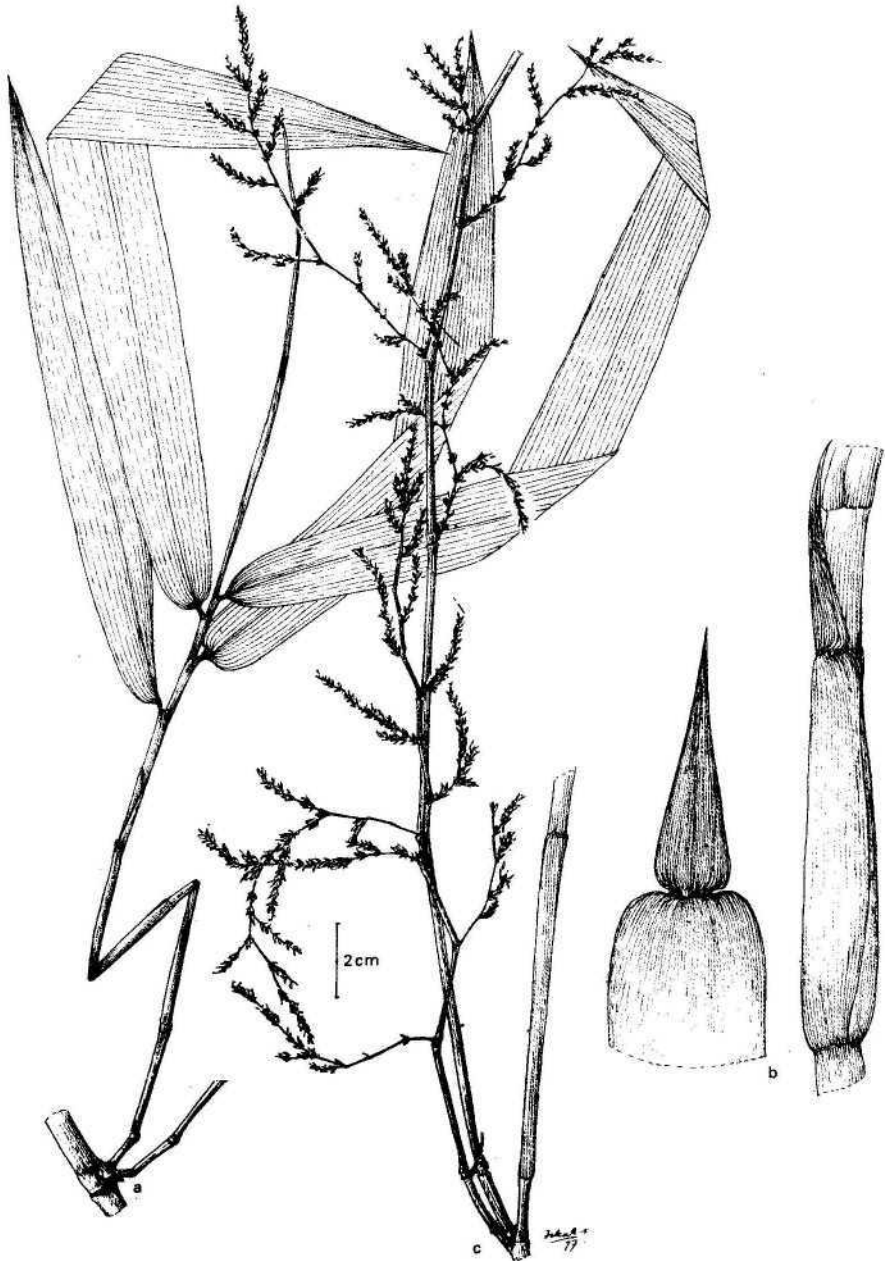


Fig. 8. *Dinochloa truncata*. Widjaja: a. leaf; b. young shoot & culm leaf; c. inflorescence. From Widjaja 4871.

FIMBRIBAMBUSA Widjaja, *gen. nov.*

(fimbria = fringe; bambusa = genus name)

Bambusa Schreb. in patella patenti in quoque nodo, lodiculis integris, ovario ovoideo glabro non incrassato differt. - TYPE SPECIES: *Fimbribambusa horsfieldii* (Munro) Widjaja.

Sympodial, loosely tufted to scrambling bamboos. Shoots light green to dark green with very dense white wax, without hairs.

Culms erect when young, when older and taller the culm tips and the branches scramble over nearby trees. The branch complement consists of one dominant branch with 4-9 smaller branches at each node, or of only a single lateral branch, which sometimes remains dormant until the main culm is damaged; nodes with a short to long blackish circumaxial ridge or patella.

Auricles of culm leaves stiff, linear, horn-like, bristles short to long; ligule entire, glabrous; blades of culm leaves spreading to deflexed.

Leaf blades broadly lanceolate; pseudopetioles short; auricles stiff, linear, horn-like with short to long bristles, sometimes developed only on one side; ligule entire, glabrous.

Inflorescences on leafless branches or terminating leafy branches, indeterminate, each node bearing a sometimes sheathlike bract enclosing the young inflorescence, which drops off at maturity. Each node has several tufted pseudospikelets without short rhachilla internodes when mature. Each pseudospikelet consists of two prophylls, one sessile pseudospikelet, 2 or 3 shortly pedicels bearing 2 or 3 pseudospikelets with rudimentary floret consisting of lemmas only, or a normal pseudospikelet which pedicel elongates or not; each node bears 25 tufted pseudospikelets and few small prophylls. Each pseudospikelet has 2 or 3 fertile and 1 sterile floret. Rhachilla internode tardily disarticulating. Lemma hirsute or glabrous. Palea two-keeled, keels ciliate, apex shortly bifid. Lodicules 2 or 3, membranous, apex entire, glabrous or slightly ciliate. Stamens 6, filaments free. Ovary ovoid, not thickened at the apex, glabrous or hairy. Style apical, long-hairy; stigmas 3, plumose, white.

DISTRIBUTION. East Java, New Guinea, and perhaps South Sulawesi and the Philippines.

ECOLOGY. Dry soil, lowlands, up to 950 m alt.

USES. Unknown.

NOTES. The two species of this genus (*F. horsfieldii* and *F. microcephala*) previously have been included in *Bambusa* Schreb., but they differ by the spreading crest on each node, the entire lodicules, and the ovoid, glabrous and not thickened ovary.

There is a collection from Maros, S. Sulawesi Soejatmi Sunarko SS 319 ("bambu nanap") (BO) with larger leaves with truncate bases and glabrous horn-like auricles. It possibly is an undescribed species. The leaf size is identical with a scrambling bamboo found in Luzon, the

Philippines (known as "lopa" in the Isniai language), which Gamble (1910, Philip. J. Sc. 5(4):267-281) referred to as *B. cornuta* Munro; but that species has leaf blades with long-bristled auricles. This species needs further collections including culm leaves, branch complement, and inflorescences to ascertain its taxonomic status. It is very distinct from the two known species and is characterized by internodes 40–45 cm long by 3–3.5 cm diameter and pseudospikelets with 4–6 fertile florets.

Temburongia S. Dransf. & Wong (1996) also has a patella at each culm node, a short petiole, and leaf blades with a stiff and linear auricle, but it differs from *Fimbribambusa* by the indeterminate inflorescence and 2 or 3 pseudospikelets per node.

KEY TO THE SPECIES

1. a. Patella 2–3 mm long. Culm leaf auricles 5–8 mm with a few bristles up to 6 mm long. Leaf blade auricles without bristles or with a few bristles up to 7 mm long. Lemma hirsute.....1. *Fimbribambusa horsfieldii*
- b. Patella 3–6 mm long. Culm leaf auricles 3–5 mm long, glabrous. Leaf blade auricles with bristles up to 3 (–5) mm long. Lemmas glabrous.....2. *Fimbribambusa microcephala*

1. *Fimbribambusa horsfieldii* (Munro) Widjaja, *comb. nov.*

Bambusa horsfieldii Munro, Trans. linn. Soc. 26: 115. 1868. Type: Java, *Horsfield s.n.* (BM-Holotype).

Bambusa cornuta Munro, Trans. linn. Soc. 26: 113. 1868; Kurz, Ind. For. 1: 336 (*Ccornuta*), 341 (*Ccorniculata*), sphalm.). 1876. Type: Java, *Horsfield 193* (BM-Holotype).

Culms up to 30 m high; branching above the ground, 7–9 branches at each node; young culms with white wax, becoming glabrous and green when old; internodes up to 30 cm long by 2–5 cm diameter; walls up to 3 mm thick; patella 2–3 mm long.

Culm leaves deciduous, sheath 8–18 by 5–7 cm, apex horizontal; auricles 5–8 mm long, bristles few, up to 6 mm long; ligule entire, 2 mm high, glabrous; blade spreading to deflexed, triangular ovate, 8.5–10 by 0.9–1.2 cm, base narrowly attached to the sheath apex (0.5 cm wide).

Leaf blades 6–23 by 2–6 cm, glabrous, base acuminate; auricles 5–9 mm long, bristles absent to few on the apex, up to 7 mm long; ligule 1–2 mm high.

Inflorescence terminating leafy or leafless branches. The apical pseudospikelet with a long pedicel. Pseudospikelets 9–12 mm long;

prophyll hirsute on the back and one keel, asymmetric, keels ciliate; internodes 1-4 mm long, glabrous or short-hairy. Glumes 2 or 3, 5 mm long, acute, glabrous. Lemmas 5-8 mm long, apically usually hirsute on the back, acuminate with a long pointed end. Paleas acute, 3-8 mm long, keeled, keels not prominently ciliate or ciliate at the base only. Lodicules 2, up to 2 mm long, apex entire or with ciliate. Ovary glabrous. Anthers yellowish, 1-3 mm long. Stigmas white.

DISTRIBUTION. East Java.

ECOLOGY. Lowland dry and open forest, 50-500 m alt.

VERNACULAR NAMES. Bambu nanap, pring embong (East Java).

USES. Locally used for string. Young shoots edible.

NOTES. Munro (1868) stated that in Java there were two species of *Bambusa* with horn-like auricles, *B. cornuta*, arborescent, and *B. horsfieldii*, scrambling. Actually they represent the same species as was noted by Monod de Froideville (1968): when the plant is still young the culms are erect or arborescent, later the upper parts of the culms become scrambling.

Bambusa corniculata was an orthographic error for '*cornuta*' by Kurz; it was clearly not intended as a new name.

SPECIMENS EXAMINED: Java: *Horsfield 193* (BM); *Horsfield s.n.* (BM); *Zollinger 2431* (K), *2631* (P); Jember, Sukamade, Meru Betiri National Park, *Widjaja 3616* (BO); Jember, Ambulu, Meru Betiri National Park, *Widjaja 6705* (BO, K, L); Pasuruan: Sumber Tangkil, *Koorders 23693* (BO, K, L), G. Lamongan, boven Tiris, *Jeswiet s.n.* (BO); Besuki, Curahmanis, G. Boto, *Backer 36670* (L), oost van Jember, *Backer s.n.* (BO); Besuki, Mt. Puger, *Buwalda 7265* (BO, K, L), G. Puger, Watangan, *Backer 17829* (BO); Merubetiri gebied, Z.O. Jember, *Hoogewerf 27* (L).

2. *Fimbribambusa microcephala* (Pilger) Widjaja, *comb. nov.*

Dendrocalamus microcephalus Pilger in Engl. Bot. Jahrb. 52: 175. 1914. - *Bambusa microcephala* (Pilger) Holttum, Kew Bull. 21: 276277. 1967 - Holotype: *Schlechter 16403* (B-holo, presumably lost). - Neotype: *Schlechter 14212* (K-Isoneotype), Morobe Prov., near Bulu (from Ramu to the coast), 700 m.

Bambusa brassii A. Camus, J. Arn. Arb. 9: 145. 1928. - Type: *Brass 715* (P-Holotype, K-Isotype), Papua New Guinea, Central Prov., Borabese.

Culms up to 14 m high; branches 4-8 at each node, subequal when the main dominant branch is dormant, or elongated and as large as the main culm; internodes 30-45 cm long by 2-3 cm diameter; patella 3-6 mm long; walls 3-4 mm thick.

Sheath of culm leaves deciduous, 20-23.5 by 8-14.5 cm, sheath apex recessed in the middle; glabrous, white waxy, auricles 3-5 mm long, glabrous; ligule entire, 1.5-3 mm high, glabrous; blade spreading to deflexed, triangular, 13-21.5 by 2.0-3.5 cm, base narrow.

Leaf blades 23-32 by 3-10.4 cm, glabrous, apex acuminate, bieve attenuate to truncate at the base; auricles 2-6 mm long, bristles up to 3 (-5) mm long; ligule 1-2 mm high.

Inflorescence terminating leafy branches. Pseudospikelet clusters with up to 5 tufted pseudospikelets. The apical pseudospikelet of each tuft not elongated. Pseudospikelets 8-10 mm long; internodes glabrous, 1-4 mm long. Glume 1, acuminate, apex pointed. Lemmas 5.5-6.5 mm long, acuminate, glabrous. Paleas 6-7 mm long, acute, minutely ciliate on the keels. Lodicules 3, 2 mm long, apex entire or with few short hairs. Anthers yellowish. Ovary slightly hairy on the apex. Stigmas white.

DISTRIBUTION. Irian Jaya and Papua New Guinea.

ECOLOGY. Stony, limestone areas in humid lowlands, up to 950 m alt.

VERNACULAR NAMES. Uriena (Hatam), kes (Soughb), tahang, haga (Bulolo), sasa kosa (Vandamen).

USES. Culms are locally used for string. Young shoots used as a raw vegetable.

SPECIMENS EXAMINED: Irian Jaya: Manokwari, Ransiki, Sesum, *Widjaja 6637* (BO, K); Manokwari, Wasior, Rado, *Widjaja 4578* (BO, K); Papua New Guinea: Morobe Prov., above Boana, *M. S. Clemens 8606* (L, K); near Bulolo, *Millar & Hollum NGF 15784* (K, L, LAE); Bulolo, Watut, Manke, *Widjaja 6624, 6625* (BO, LAE); Central Prov., Borabese, Brass *713* (K), *715* (K, P); Astrolobe Range, *White 328* (K).

GIGANTOCHLOA Kurz ex Munro

Sympodial and densely tufted bamboos, moderately thick, erect. Branches borne on the mid culm. Nodes with one dominant branch and several smaller ones.

Culms usually with short aerial roots from the basal nodes of the culm, basal internode shorter than those of the midculm, but relatively longer than those of species of *Dendrocalamus*.

Culm leaves caducous, sometimes persistent, with dark brown to brownish hairs; auricles firm, mostly low but sometimes laterally elongated, dark brown when young with or without marginal bristles; blade narrow or ovate-oblong, sometimes green or leaf-like.

Inflorescences on leafless flowering branches, indeterminate. Glumes 2-3. Pseudospikelets with 2-4 fertile florets and an imperfect apical floret represented by the longest, empty, epaleate lemma, rhachilla internode absent. Palea 2-keeled, keels ciliate, bifid. Stamens 6, filaments connate into a tube. Lodicules 3 if present or absent, membranous, apex ciliate. Ovary obovoid, hairy at the apex. Style 1, white. Stigma 1, hairy, white.

DISTRIBUTION. A genus of about 36 species in South and South East Asia, Indo-China and Burma. In Indonesia this genus is distributed as far as Manokwari and Yapen Island (Irian Jaya). Some species have been introduced and cultivated elsewhere.

ECOLOGY. In the wild, the species grow scattered in the lowlands and in the highlands up to 1500 m alt. They mostly grow abundantly after logging.

USES. This genus is very useful, its species are employed for many purposes, e.g. building structures (walls, roofs, flooring, scaffolding), chopsticks, toothpicks, and in handicraft (basketry and bric-a-brac).

NOTES. This genus is characterized by the erect culms with relatively longer basal internodes than in *Dendrocalamus* Nees, basal nodes bearing short aerial roots; culm leaf with pale to brown hairs, auricles small. Thirteen species new to science are described here.

1. *Gigantochloa calcicola* Widjaja, *n. sp.* ~ Fig. 9 (calx = lime; colere = to dwell)

Gigantochloa achmadii in culmi vaginae auriculis cornuatis, ligula denticulata longe setosa similis, in culmis viridibus flave striatis, culmi vaginae auriculis glabris. ligula ad 2 mm longa, folii vaginae auriculis oris similibus sursum curvatis differt. —TYPUS: *Widjaja 3934* (BO—Holotype, K), Sumatra, Padang Sidempuan District, Sipirok Subdistrict, Sipirok Nature Reserve.

Young shoots green with yellow stripes, covered by brown hairs.

Culms up to 10 m high, straight, tips pendulous; branching far above the ground; young culms with scattered brown hairs, when old glabrous and green, only the lower parts with yellow stripes; internodes 20-35 cm long by 1-2 cm in diameter; walls up to 6 mm thick.

Culm leaves deciduous, covered by brown hairs; auricles rounded and horn-like, slightly curved outward, up to 2 mm high, glabrous; ligule denticulate, up to 2 mm high, bristles up to 7 mm long; blade deflexed, narrow at the base, triangular, pubescens on the lower surface.

Leaf blades 17-35.5 by 2-3 cm, slightly hairy beneath; auricles rimlike and curved upward, glabrous; ligule entire, up to 2 mm high, glabrous.

Inflorescences not seen.

DISTRIBUTION. E. Sumatra, Sipirok.

ECOLOGY. Along lowland river banks on limestone or alluvial soils, 650 m alt.

VERNACULAR NAME. Buluh mario (Batak Tapanuli).

USES. Unknown.

NOTES. Differing from all other species by the green with yellow striped culms, the culm leaves with horn-like and glabrous auricles, and the denticulate and long-bristly ligules.

SPECIMEN EXAMINED. Sumatra, Padang Sidempuan District, Sipirok Subdistrict, Sipirok Nature Reserve, *Widjaja 3934* (BO, K).

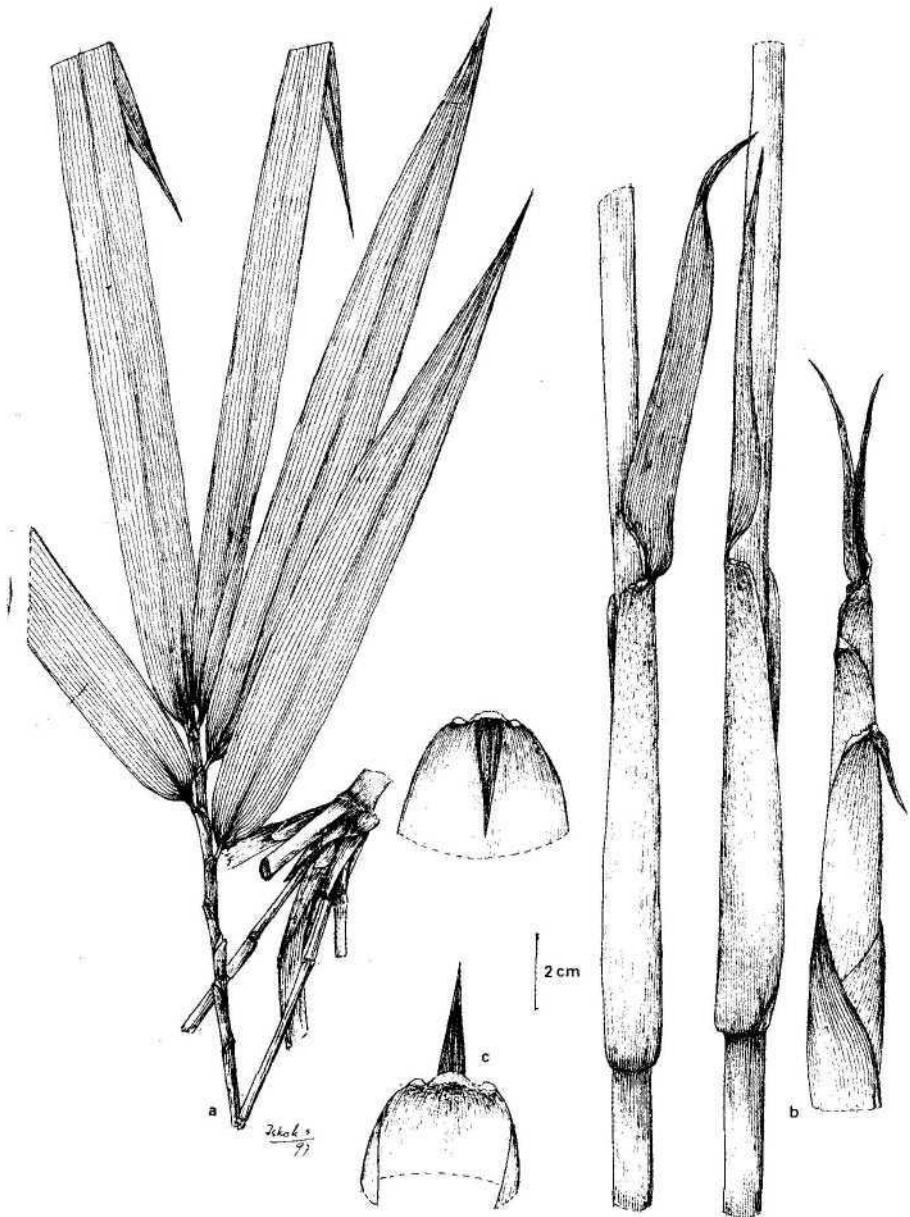


Fig. 9. *Gigantochloa calcicola* Widjaja: a. leaf; b. young shoot; c. culm leaf. From Widjaja 3934.

2. *Gigantochloa hirtinoda* Widjaja, n. sp. - Fig. 10
(hirtus = covered by moderately long, patent, stiff hair; nodus = node)

Gigantochloa thoi in nodis pilis nigris circumdatis, ligulis omnibus integris similis, in culmi vaginae auriculis minoribus setis brevioribus, folii lamina glabra, auriculis oris similibus longe setosis differt. -TYPUS: *Widjaja 3990* (BO-Holotype), Sumatra, Bengkalis District, Mandau Duri Subdistrict, Tanah Putih Village.

Young shoots green, covered by black hairs.

Culm straight, up to 15-20 m long; young culms with black hairs on the node, when old glabrous and green; internodes 45-55 cm by 6-8 cm in diameter; walls up to 10 mm thick.

Culm leaves deciduous, covered by brown hairs, sheath up to 17 by 5.5 cm; auricles rounded, up to 2 mm high, bristles up to 9 mm long; ligule denticulate, up to 1 mm high, bristles up to 3 mm long; blade deflexed, triangular, 12.5-14.5 by 2-2.5 cm, base narrowly attached to the sheath apex (7 mm wide), adaxially slightly hairy.

Leaf blades 17.5-31.8 by 2.8-4 cm, glabrous; auricles rim-like, up to 1 mm high, bristles up to 7 mm long; ligule entire, up to 1 mm high, glabrous; sheath with scattered brown hairs, margins white-ciliate.

Pseudospikelets c. 14 mm long. Fertile florets 3. Glumes 3, 2-6 mm long. Lemmas 8-12 mm long, acuminate, glabrous. Paleas 7-9 mm long, apex bifid and acuminate, glabrous. Lodicules absent. Anthers yellowish, c. 6 mm long. Stigmas white.

DISTRIBUTION. Sumatra, Bengkalis, said to have been introduced originally from North Sumatra.

ECOLOGY. Dry lowland areas, 10 m alt.

VERNACULAR NAME. Unknown.

USES. Culm is used for making basketry and handicraft.

NOTES. This species is distinguished by the hairy nodes of the young culms, the culm leaves with small, lobe-shaped, long-bristly auricles, and a shortly bristled ligule.

SPECIMEN EXAMINED. Sumatra, Bengkalis District, Mandau Duri Subdistrict, Kp. Tanah Putih, *Widjaja 3990* (BO).

3. *Gigantochloa kuring* Widjaja, n. sp. - Fig. 11
(kuring = vernacular name means stripes)

Gigantochloa wrayi similissima, culmi vaginae auriculis humilibus oris similibus, ligula brevi pilis brevibus, folii vaginae auriculis minutis rotundatis extensions intrinsecus curvata pilis brevibus, ligula pilis brevibus differt. -TYPUS: *Widjaja 4075* (BO-Holotype, K, L, US), Sumatra, Batang Hari District, Jambi Luar Kota Subdistrict, Ds. Selat.

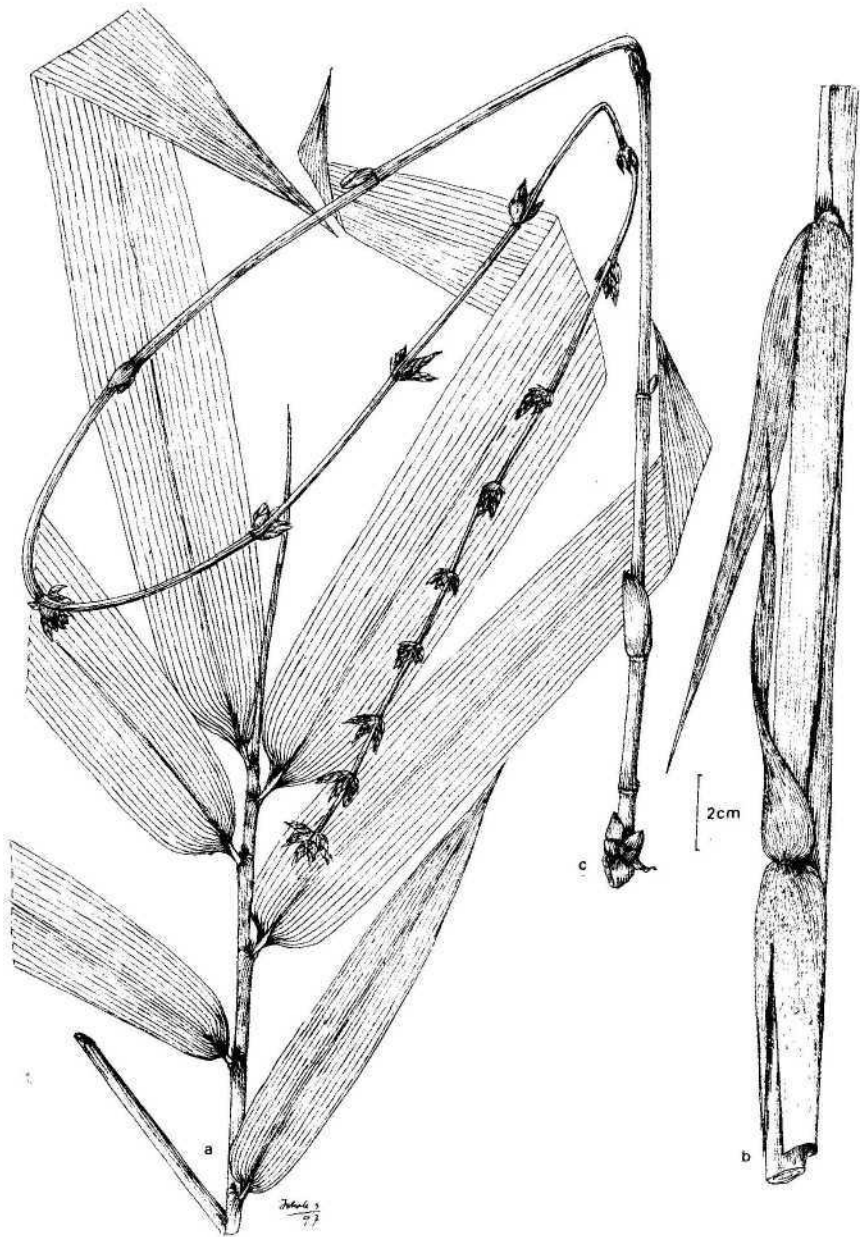


Fig. 10. *Gigantochloa hirtinoda* Widjaja: a. leaf; b. young shoot; c. inflorescence. From Widjaja 3990.

Shoots green, often with yellow to pinkish stripes, or orange, covered by brown to blackish hairs.

Culms up to 25 m high, straight; young culms with white wax, and covered by scattered black hairs, when old glabrous green with yellow stripes, or green with pinkish or purplish stripes; internodes 30-49 cm long by 2-7 cm in diameter; walls 8-10 mm thick.

Culm leaves persistent, basal sheaths hairy with appressed black hairs, sheath 10.5-16 cm long, sheath apex slightly upcurved in the middle; auricles rim-like, up to 4 mm high, bristles up to 7 mm long; ligule denticulate, 2-3 mm high, bristles up to 4 mm long; blade deflexed, triangular, 4.5-14.5 by 1.5-3.5 cm, base narrowly attached to the sheath apex (0.8-1.2 cm wide), adaxially slightly hairy.

Leaf blades 12.3-23.9 by 1.6-2.2 cm, glabrous; auricles small and rounded, sheath extension curved inward, 1-2 mm high, bristles up to 3 mm long; ligule denticulate, up to 2 mm high, bristles 2-3 mm long.

Pseudospikelets 10-17 mm long. Fertile florets 3 or 4. Glumes 2, 6-8 mm long, mucronate, margin with brown cilia. Lemmas 9-13 mm long, acuminate, margin brown hairy, otherwise glabrous. Paleas 8-12 mm long, two-keeled, apex bifid, keels brown ciliate, otherwise glabrous. Lodicules absent. Anthers magenta, 5-6 mm long.

DISTRIBUTION. Sumatra, Eastern part of the Bukit Barisan Range.

ECOLOGY. Lowlands, common along riverbanks, also in dry areas, 50-150 m alt.

VERNACULAR NAMES. Buluh elang, Bultfh koreng, Buluh kuring, Buluh kuring hitam, Buluh kuring biasa (Malay).

USES. Locally very useful for building purposes and in traditional basketry.

NOTES. This bamboo is characterized by green shoots with yellow to pinkish stripes, low rim-like auricles of the culm leaf with long bristles, ligule short with short bristles, and leaf sheath auricles small and rounded with the extension curved inward.

Two kinds of this bamboo are recognized in the field by the local people based on their culm colour, i.e. "buluh kuring hitam" (green bamboo with yellow to pinkish and purplish stripes) and "buluh kuring biasa" (green bamboo with yellow stripes).

SPECIMENS EXAMINED: Sumatra: Kampar District, Kampar Kiri Subdistrict, Ds. Rakit Gedang, *Widjaja* 4004 (BO, K, L, US); Bungo Tebo District, Muara Bungo Subdistrict: Sungai Arang Village, 4 km from Muara Bungo to Rantau Pandan, *Widjaja* 4047 (BO, K, L, US); Sungai Mengkuwang, 4 km to Bangko, *Widjaja* 4051 (BO, K, L); Tanjung Jabung District, Nipah Panjang subdistrict, **Berbak Wildlife Reserve**, Sungai Air Hitam Dalam, Sematang Nyangnyit, *Widjaja* 4060 (BO, K, L, US); 4061 (BO, K); Batanghari District, Jambi Luar kota Subdistrict: Penyengat Rendah Village, *Widjaja* 4071 (BO, K); Ds. Selat, *Widjaja* 4074 (BO, K); 4075 (BO, K).

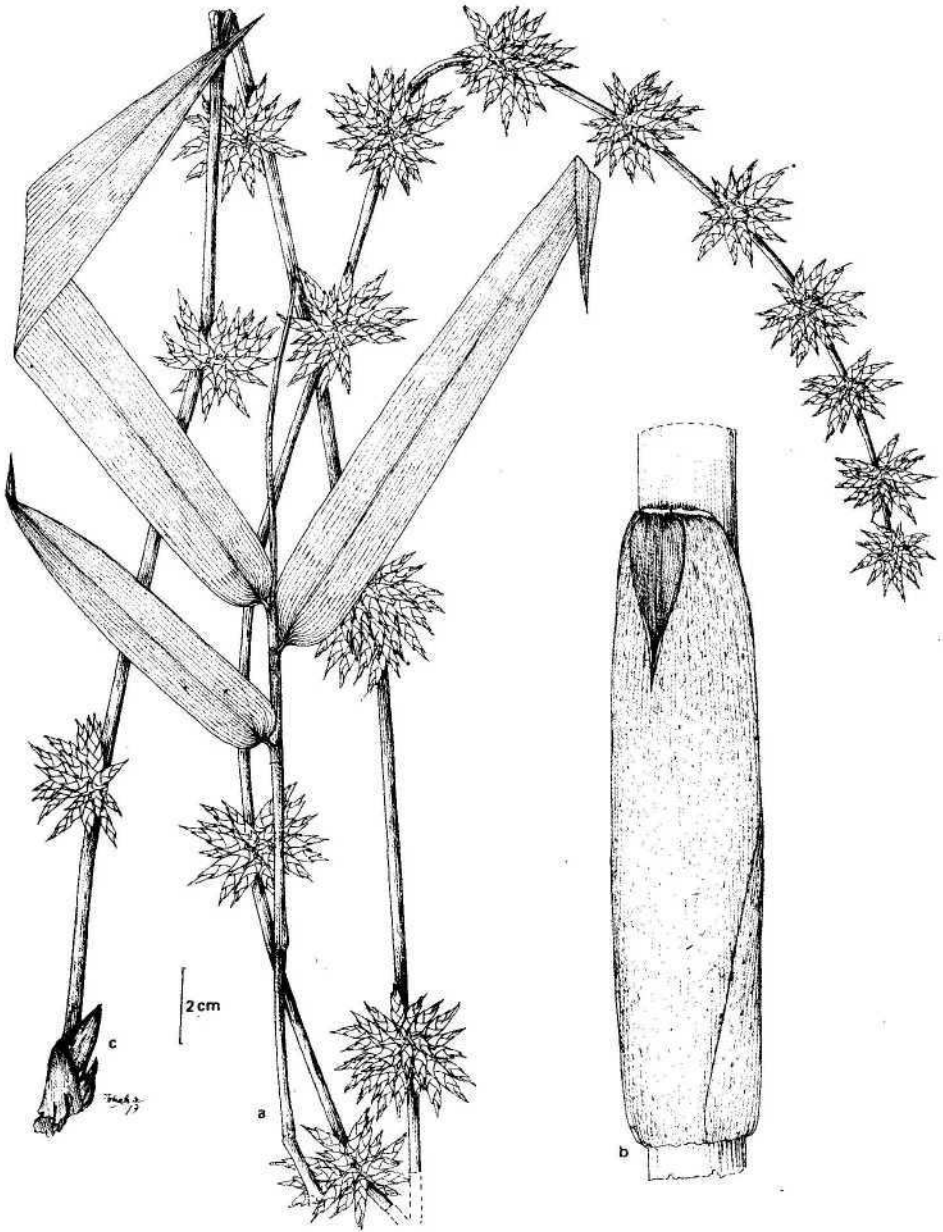


Fig. 11. *Gigantochloa kuring* Widjaja: a. leaf; b. young shoot; c. inflorescence. From Widjaja 4075.

4. *Gigantochloa longiprophylla* Widjaja, n. sp. - Fig. 12 (longus = long; prophyllum = prophyll)

Haec species *Gigantochloa robiista* similis culmi vaginae auriculis setis longis, folii lamina pubescenti, auriculis rotundatis setosis. *Gigantochloa robusta* culmi vaginae auriculis glabris, folii vagina pubescenti, ligulis glabris, prophyllis longis carinatis, pseudospiculis parum pubescentibus, rhachis internodiis pubescentibus. Haec species *Gigantochloa latifolia* in ramis floriferibus prophyllis longis similissima. - TYPUS: *Widjaja 4081* (BO-Holotype, K, L), Sumatra, Musi-Banyuasin District, Banyung Lencir Subdistrict, Km 11. Asia Log Area.

Shoots green, densely covered by long black hairs.

Culms straight; young culms with black hairs, when old glabrous and green; internodes 30-40 cm long by 6-8 cm in diameter; walls 8-10 mm thick.

Culm leaves deciduous, covered by black hairs; complete sheaths not seen: apex recessed in the middle; auricles rounded, 2-3 mm high, bristles up to 19 mm long; ligule entire, up to 2 mm high, glabrous; blade deflexed, triangular, 23.5-28.5 by up to 4.7 cm, base narrowly attached to the sheath (1.8 cm wide), adaxially slightly hairy.

Leaf blades 13.3-33.5 by 1.8-3.5 cm, pubescent below; auricles small, up to 1 mm high, bristles few, 7-12 mm long; ligule entire, 1-2 mm high, glabrous; sheath minutely hairy.

Pseudospikelets 7-14 mm long, slightly hairy. Fertile florets 2 or 3. Rhachis internodes hairy. Prophylls 7-9 mm long, 1-keeled, hairy on the keel and back. Glumes 2 or 3, 6-9 mm long, mucronate, margin whiteciliate. Lemmas 10-11 mm long, acuminate, glabrous. Paleas 8-9 mm long, apex bifid, two-keeled, glabrous. Lodicules absent. Anthers yellowish, 6-7 mm long. Ovary hairy. Stigma white.

DISTRIBUTION. S. Sumatra, Bayung Lencir along S. Panerokan and S. Kandang.

ECOLOGY. Forest margins at low altitude about 50-150 m alt.

VERNACULAR NAME. Unknown.

USES. Unknown.

NOTES. This species closely resembles *G. robusta* Kurz by the culm leaves with rounded auricles with long bristles, and the pubescent leaf blades with rounded and bristly auricles.

Gigantochloa robusta has culm leaves with glabrous ligules, leaf blades with glabrous ligules and hairy sheaths and the long and keeled hairy prophylls and the slightly hairy pseudospikelets with hairy rhachilla internodes. This species is very similar to *Gigantochloa latifolia* by having flowering branches with long prophylls.

SPECIMENS EXAMINED. Sumatra, Musi Banyuasin District, Bayung Lencir Subdistrict, Sungai Kandang, *Widjaja 4081* (BO, K, L, US); Pajar Village, Sungai Panerokan Km. 49, *Widjaja 4082* (BO, K); Asia Log area Km. 11, *Widjaja 4087* (BO, K, L).

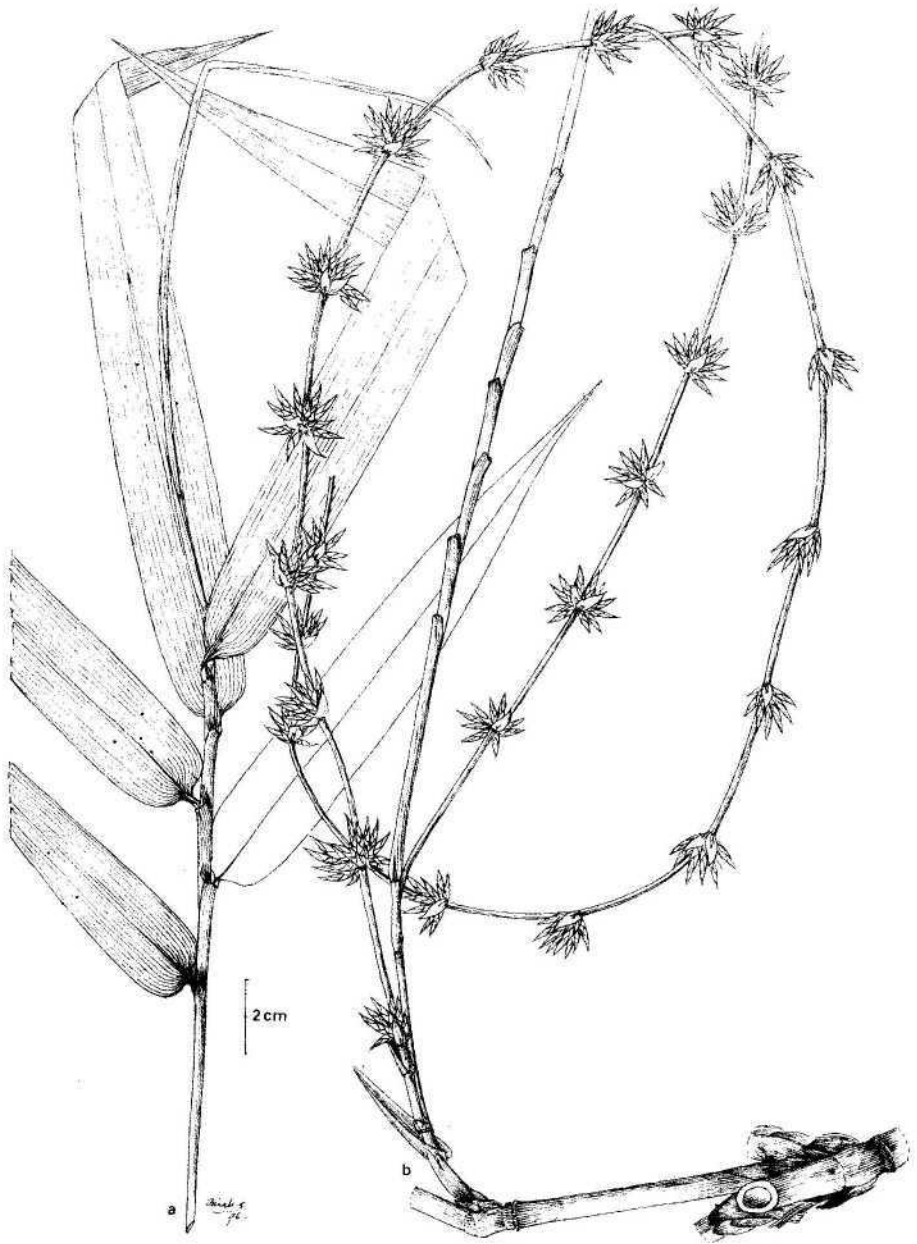


Fig. 12. *Gigantochloa longiprophylla* Widjaja: a. leaf; b. inflorescence. From *Widjaja* 4081.

5. *Gigantochloa luteostriata* Widjaja, *n. sp.* - Fig. 13
(luteus = golden; striatus = striped)

Gigantochloa apus in culmi laminis persistentibus similis, in culmi vaginae auriculis lobiformibus glabris, ligula integra glabra. Foliae vaginae auriculis lobi-formes, cum sineve setis brevibus, ligula integra glabra, lamina variegata. -TYPUS: *Widjaja 4834* (BO-Holotype), South Kalimantan, Banjar District, Loksado Subdistrict, Bayumbung, Madang Village.

Young shoots green and slightly pinkish, covered by white and brown hairs.

Culms up to 10 m high, straight; young culms with white and brown hairs, when old glabrous and green; internodes 30-40 cm long (-60) by 2-5 (-7) cm in diameter; walls up to 8 mm thick.

Culm leaves persistent, covered by black and brown hairs; sheath 12-12.5 cm long; auricles lobe-shaped, 2-3 mm high, glabrous; ligule entire, 2-2.5 mm high, glabrous; blade deflexed, easily deciduous, narrowly lanceolate, 6.3-7 by 1.2-1.5 cm, base narrow, adaxially slightly hairy.

Leaf blades 12.3-27.9 by 2.9-4.8 cm, green with whitish or yellowish stripes, slightly hairy beneath; auricles small and rounded, 1-2 mm high, bristles 1-2 mm long; ligule entire, up to 2 mm high, glabrous.

Pseudospikelets 9-21 mm long. Fertile florets 2. Glumes 4, 7-16 mm long, mucronate. Lemmas 17-21 mm long, acuminate, ciliate along the margin. Paleas 14-18 mm long, apex bifid, keels ciliate. Lodicules absent. Anthers magenta, c. 9 mm long. Stigmas white.

DISTRIBUTION: East to South Kalimantan.

ECOLOGY. Along lowland riverbanks on limestone or alluvial soils, locally abundant, 10-100 m alt.

VERNACULAR NAMES. Buluh tali, paring tali (Dayak, Banjar).

USES. Culms are used for making basketry and bric-a-brac of daily use.

NOTES. Formerly misidentified as *G. apus* (Schult.) Kurz due to the same vernacular name, but very different by the culm leaves with small lobe-shaped, glabrous auricles and an entire ligule. It does resemble *G. apus* by the leaf blades with small lobe-shaped auricles and an entire ligule. The leaves are variegated when the culm is still young, but they become green with age.

SPECIMENS EXAMINED. Kalimantan: East Kalimantan: Kutai District, Loa Kulon Subdistrict, Jembaian Village, *Widjaja 4796* (BO, K, L); Kotabangun Subdistrict, Sungai Kedang, *Widjaja 4800* (BO, K, L, US); South Kalimantan: Banjar District, Karangatan Subdistrict, Mandiangin Barat Village, *Widjaja 4821* (BO, K, L); Lumpanye Village, *Widjaja 4828* (BO, K); Loksado Subdistrict, Bayumbung, Madang Village, *Widjaja 4831* (BO, K, L); *4834* (BO); Central Kalimantan: Barito Selatan District, Duom Tengah Subdistrict, Rodok Village, *Widjaja 4837* (BO, K, L).



Fig. 13. *Gigantochloa luteostriata* Widjaja: a. leaf; b. young shoot; c. inflorescence with the branching complement; d. culm leaf. From *Widjaja 4834*.

6. *Gigantochloa magdntea* Widjaja, n. sp. - Fig. 14
(magenteus = violet brown, maroon)

Gigantochloa alter auriculis rotundatis vel parum extrinsecus curvatis, culmi ligula glabra integra, folii auriculis humilibus firmis, ligula integra similis, in pilis appressis brunneis, culmi vagina pilis rigidis atro-brunneis, margine atro-brunnee ciliato, pseudospiculis gracilibus floribus fertilibus 3, lemmatis paleisque atro-brunnee ciliatis differt. - TYPUS: Widjaja 4722 (BO-Holotype), Sumatra, Bengkulu Utara District, Kurotidur Village.

Young shoots green, covered by brown hairs.

Culms up to 10 m high, straight; young culms with appressed black hairs under the node, when old glabrous and green; internodes 35-40 cm long by 5-6 cm in diameter; walls 8 mm thick.

Culm leaves deciduous, covered by appressed, brown hairs; sheath 12-13 cm long; auricles rounded, slightly curved outward, up to 2 mm high, bristles 3-4 mm long; ligule entire, 1-2 mm high, glabrous; blade deflexed, triangular, up to 2.5 by 0.8 cm wide, base narrow, adaxially glabrous.

Leaf blades 15.8-25.2 by 1.9-2.2 cm, glabrous; auricles low, firm or small lobe-shaped, up to 0.5 mm high, glabrous; ligule entire, up to 1 mm high, glabrous; sheath with erect dark brown hairs, margins with dark brown cilia.

Pseudospikelets 10-15 mm long. Fertile florets 3. Glume 1, up to 4 mm long, mucronate, margins with brown cilia. Lemmas 7-10 mm long, acuminate, margins with brown cilia. Paleas 5-10 mm long, apex bifid, two-keeled, glabrous. Lodicules absent. Anthers magenta, c. 3 mm long. Stigmas white.

DISTRIBUTION. Sumatra, Bengkulu, Kurotidur.

ECOLOGY. Along a road in a wet area, 200 m alt.

VERNACULAR NAME. Unknown.

USES. Unknown.

NOTES. This species is distinguished by its rounded or slightly outward curved, bristly auricles, culm leaves with glabrous, entire ligules, and the slender pseudospikelet with 3 fertile florets with dark brown ciliate lemmas and paleas.

SPECIMEN EXAMINED. Sumatra, Bengkulu Utara District, Ds. Kurotidur, *Widjaja 4722* (BO).

7. *Gigantochloa membranoidea* Widjaja, n. sp. - Fig. 15
(membrana = membrane; oideus = resembling, having the form of a membrane)

Gigantochloa papyracea culmi vaginae margine papyraceo, auriculis rotundatis longe setosis, folii vaginae auriculis minutis longe setosis, in culmi lamina erecta differt.

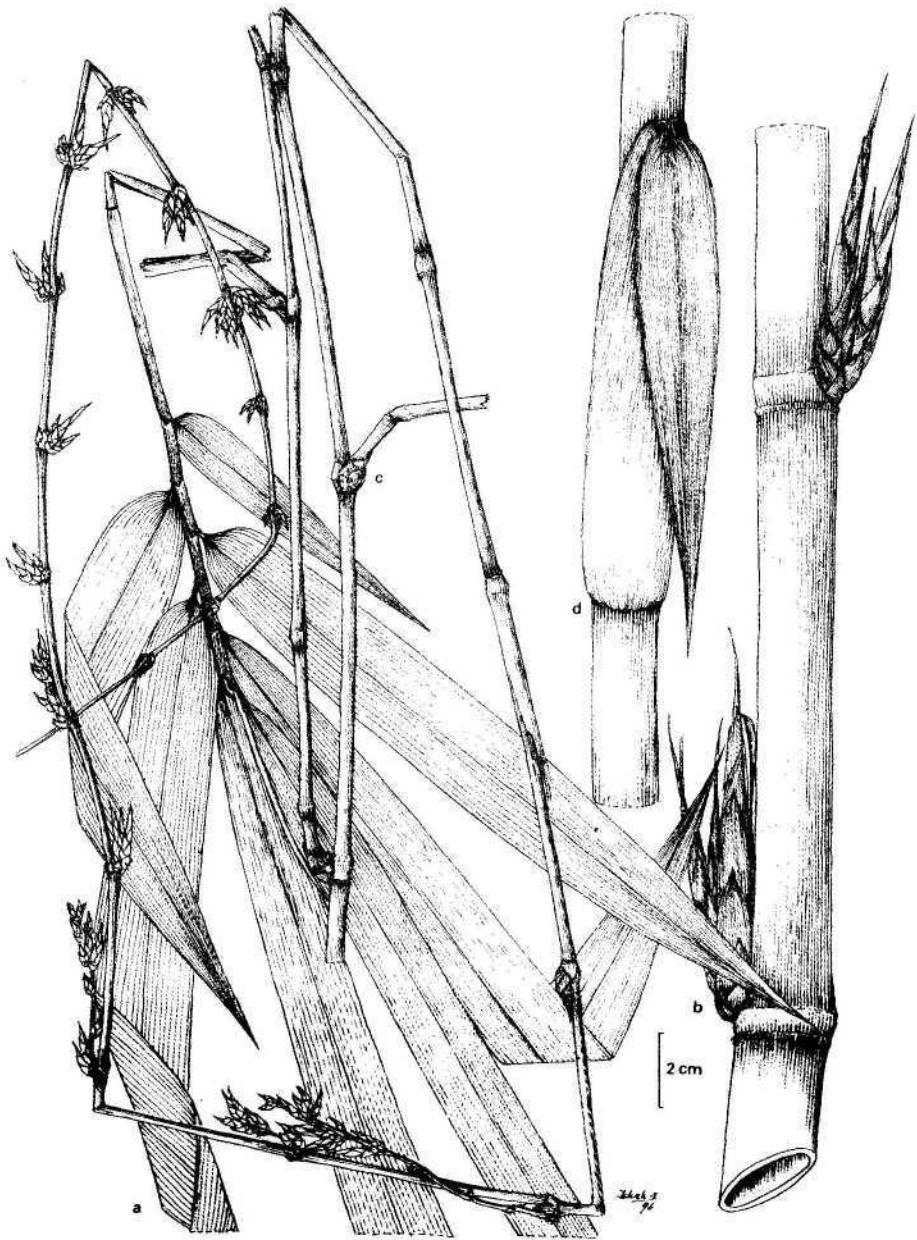


Fig. 14. *Gigantochloa magentea* Widjaja: a. leaf; b. young branch; c. inflorescence; d. culm leaf. From Widjaja 4722.

- TYPUS: *Widjaja 4085* (BO-Holotype), Musi-Banyuasin District, Bayung Lencir Subdistrict, Asia Log Timber Corporation.

Young shoots green with white wax.

Culm up to 10 m high, straight; young culms with white wax, when old glabrous and green; internodes 30-40 cm long by 3-5 cm in diameter; walls up to 15 mm thick.

Culm leaves deciduous; sheath 16.8-17 cm long, apex margin papery; auricles rounded, 5 mm high, bristles 15-20 mm long; ligule denticulate, up to 2 mm high, glabrous; blade erect, triangular, 10-14 by 1.5-2 cm, base narrow.

Leaf blades 15.5-29 by 2.5-3 cm, hairy below; auricles small, bristles up to 7 mm long; ligule up to 1 mm high, entire, glabrous.

Pseudospikelets 10-12 mm. Fertile florets 4. Glumes 2-3, c. 11 mm long, apex pointed. Lemmas c. 13 mm long, acuminate. Paleas c. 7 mm long, apex bifid, slightly hairy. Anthers yellow, c. 6 mm long.

DISTRIBUTION. S. Sumatra, Bayung Lencir Subdist.

ECOLOGY. Lowlands, at about 500 m alt.

VERNACULAR NAME. Unknown.

USES. Young culm is eaten by the elephants.

NOTES. This species resembles *Gigantochloa papyracea* Widjaja by the culm leaves with the apical margin of the sheath being papery. Although it is also has white wax on the culm it cannot be included in *Dendrocalamus* Nees because of the united filaments and the absent of rhachilla internodes.

SPECIMENS EXAMINED. Sumatra: Musi-Banyuasin District, Bayung Lencir Subdistrict, Asia Log Timber area, km 11, *Widjaja 4085* (BO); Sungai Kondang, km. 20, *Widjaja 4084* (BO, K, L); *Widjaja 4089* (BO, K).

8. *Gigantochloa papyracea* Widjaja, *n.sp.* (papyraceus = papery, not chartaceous)

Gigantochloa prurienti in novellis aurantiacis, pilis longi appressis brunneis ad atris, folii vaginae auriculis oris similibus lobi-formibus, lamina infra pubescenti similis, in culmi vaginae margine papyracea, auriculis setosis, ligula integra, folii vagina glabra differt. -TYPUS: *Widjaja 3959* (BO-Holotype), W. Sumatra, Agam District, Batang Palupuh Nature Reserve.

Young shoots orange, covered by long and appressed brown to black hairs.

Culms straight, up to 15 m tall; young culms with black hairs, when old glabrous and green; internodes 40-55 cm long by 5-8 cm in diameter; walls up to 10 mm thick.

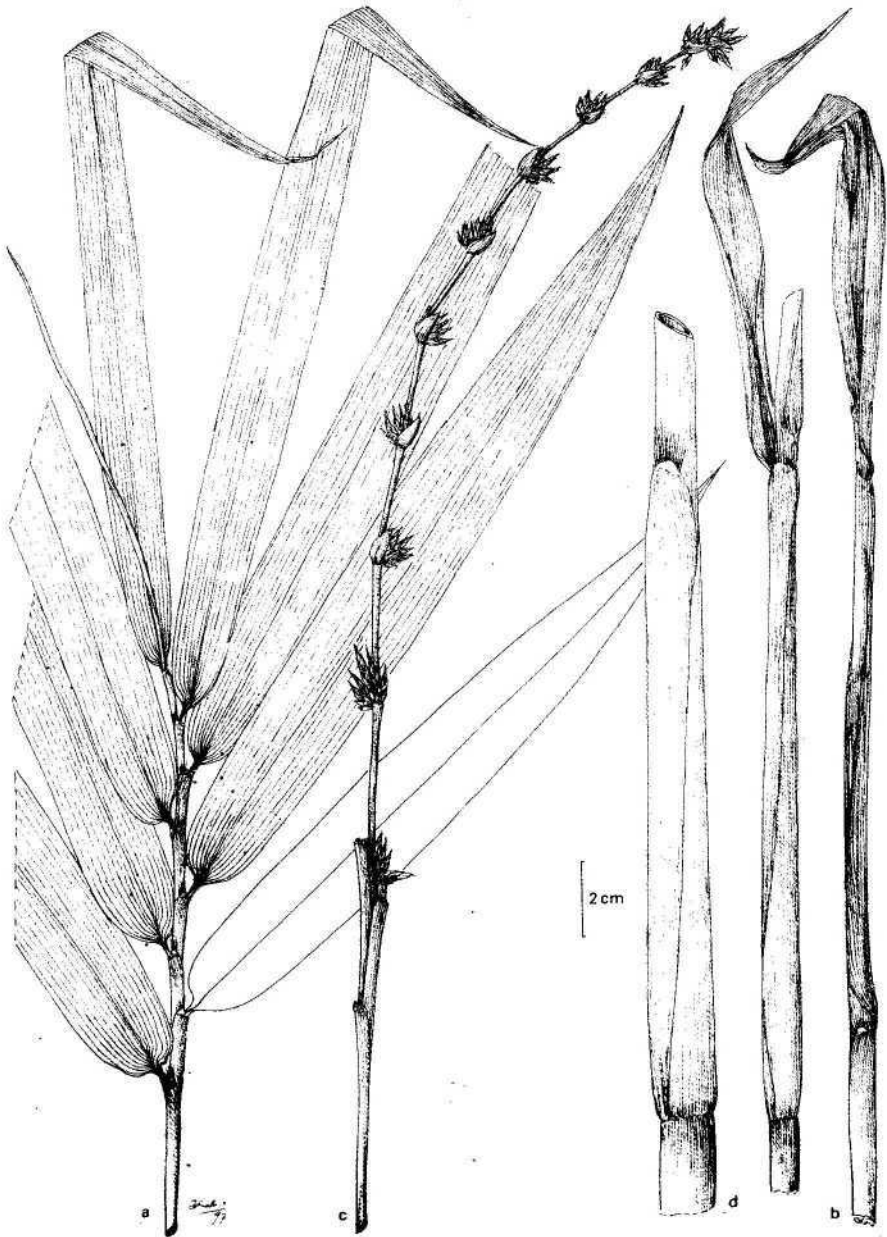


Fig. 15. *Giganlochloa membranoidea* Widjaja: a. leaf; b. young shoot; c. inflorescence; d. culm leaf. From Widjaja 4085.

Culm leaves deciduous, covered by long, appressed, brown to black hairs, sheath up to 20 by 28 cm, recessed in the middle; auricles rim-like or lobe-shaped along the sheath apex, up to 4 mm high, bristles up to 12 mm long; ligule irregularly serrate, up to 2 mm high glabrous or with up to 5 mm long, scattered bristles; culm leaf base with long and dense, **brown** to dark brown hairs; blade deflexed, broadly lanceolate, 20-25.5 by 5-6 cm, base narrow, adaxially slightly hairy; sheath apex raised at the margin, margins papery.

Leaf blades 27.3-30.7 by 2.2-3.7 cm, slightly hairy on the lower surface; auricles absent or small, lobe-shaped and rounded, up to 1 mm **high**, bristles few, 1-2 mm long; ligule entire, up to 2 mm high, glabrous.

Inflorescences not seen.

DISTRIBUTION. West Sumatra, Agam District, Batang Palupuh Nature Reserve.

ECOLOGY. Lowlands, 250 m alt.

VERNACULAR NAME. Buluh soriak (Padang).

USES. Unknown.

NOTES. This is one of the species in this genus which has culm **sheaths with** a papery margin by which it resembles *Dendrocalamus* Nees, but it differs from that by the absence of white wax on the young culms.

SPECIMENS EXAMINED. Sumatra, Agam District, Batang Palupuh Nature Reserve., *Widjaja* 3959 (BO); 3960 (BO, K, L, US).

9. *Gigantochloa pubinervis* Widjaja, *n. sp.* - Fig. 16 (pubes = softly hairy, nervus = nerve)

Gigantochloa alter similis culmi vaginae auriculis rotundatis, ac *G. prurienti* propinqua culmi vaginae auriculis rotundatis, lamina pubescenti, in culmi vaginae auriculis ligulaeque setosis, folii vagina pubescenti ciliataque, auriculis inconspicuis glabris, ligula integra differt. -**TYPUS:** *Widjaja* 4064 (BO-Holotype, K), Riau, Tanjung Jabung District, Nipah Panjang Subdistrict, Berbak Wildlife Reserve, Sungai Air Hitam Dal am, Sematang Nyanyit.

Shoots green covered by **brown** to black hairs.

Young culms with brown hairs, when old glabrous and green; internodes 30-47 cm long by 2.5-8 cm in diameter; walls 6-8 mm thick.

Culm leaves deciduous, covered by brown to black hairs; sheath up to 22 cm long, sheath apex upward and joined to the blade; auricles **rounded**, curved outward, up to 4 mm high, bristles fine, 2-3 mm long; **ligule** denticulate, up to 2 mm high, bristles up to 5 mm long; blade deflexed, broadly ovate, 13.5-16.6 by 3-3.5 cm, base narrow, adaxially **with brown** hairs.

Leaf blades 15.5-30 by 2.7-5.9 cm, pubescent on the lower surface **especially at the base of the blade and along the main nerve; auricles**

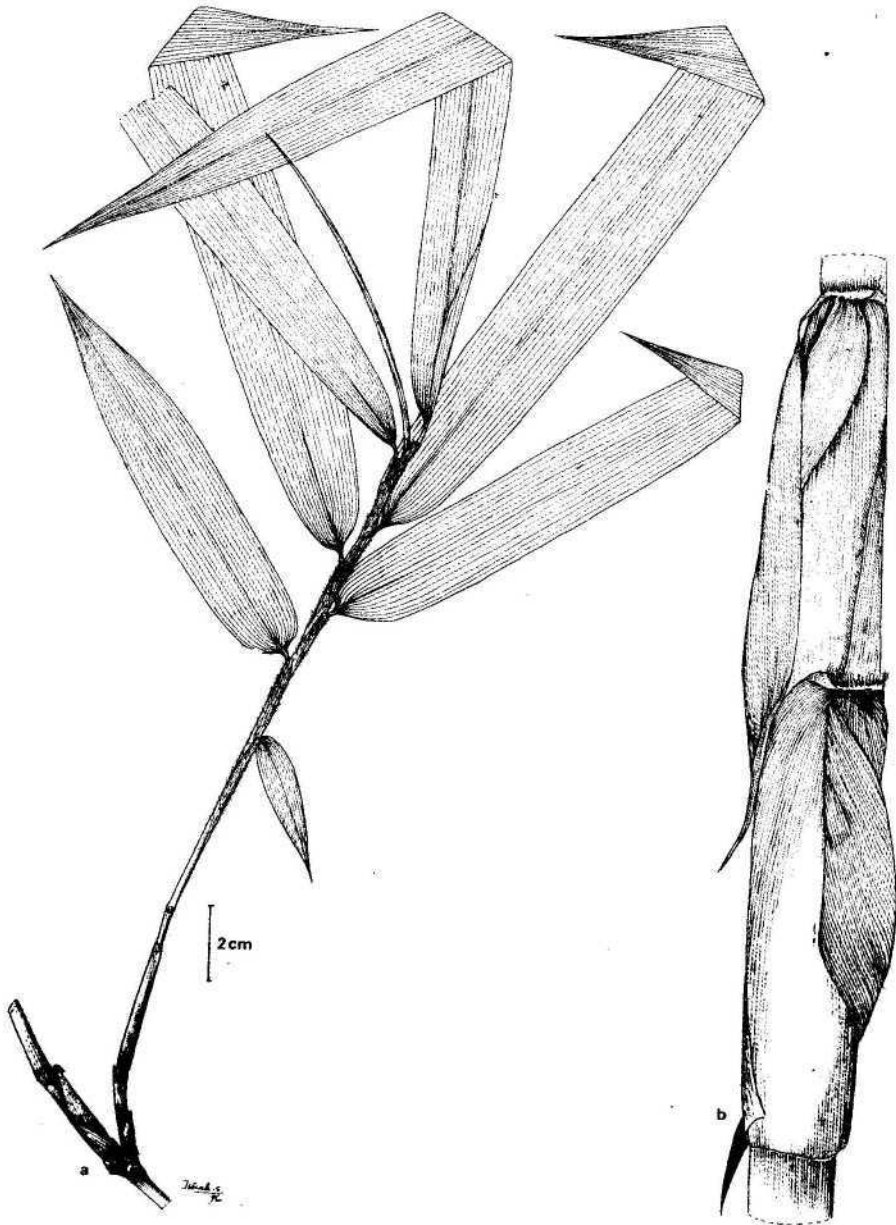


Fig. 16. *Gigantochloa pubinervis* Widjaja: a. leaf; b. young shoot. From Widjaja 4064.

inconspicuous or as small lobes, up to **1 mm high, glabrous; ligule** entire, up to **2 mm** high, glabrous; sheath covered by **brown to white hairs**, margin white-ciliate.

Inflorescences not seen.

DISTRIBUTION. Riau, Nipah Panjang.

ECOLOGY. Open forest in dry areas, 10-50 m alt.

VERNACULAR NAME. Buluh awi (Malay).

USES. Culms used for making basketry and also building structure.

NOTES. Distinct by the pubescent leaf blade and the white to brown hairy margins of the leaf sheaths, rounded and bristled auricle of its culm leaf. When the inflorescence of this species can be collected and a study on the variation of *G. alter* in the field is done, the status of this species might change into an infraspecific level.

SPECIMENS EXAMINED. Riau, Tanjung Jabung District, Nipah Panjang Subdistrict, Berbak Wildlife Reserve, Sungai Air Hitam Dalam, Sematang Nyanyit, *Widjaja 4064* (BO, K).

10. *Gigantochloa pubipetiolata* Widjaja, *n. sp.* - Fig. 17 (pubes = softly hairy; petiolus = stalk of the leaf)

Gigantochloa ligulata in ligulis omnibus longis similis, in culmi vaginae auriculis rotundatis extrinsecus curvatis pilis longis. Folia pseudo-petiolus pubescens, auriculae minutae lobi-formes, ligula setis brevibus. -TYPUS: *Widjaja 3994* (BO-Holotype), Sumatra, Bengkalis District, Mandau Duri Subdistrict, Desa Pinggir Nature Reserve. Sterile.

Young shoots green, covered by brown hairs.

Culms straight, up to 15 m long; tips pendulous; young culms with appressed, brown hairs, when old glabrous and green; internodes 40-50 cm long by 6-8 cm in diameter; walls up to 8 mm thick. Young branches hairy with appressed, darkbrown hairs.

Culm leaves deciduous, with long, appressed, brown hairs; sheath 11-12.5 cm long; auricles rounded, curved outward, up to 3 mm high, bristles 4-6 mm long; ligule lacerate, up to 5 mm high, bristles up to 3 mm long; blade erect, broadly ovate, 11-14.5 by 2.5-3 cm, base **narrow**, adaxially slightly hairy; extension of the sheath apex curved inward, margins ciliate.

Leaf blades 23.3-37.5 by 4.2-6.3 cm, glabrous; pseudopetiole hairy; auricles lobeshaped, up to 1 mm high, curved outward and joined to the sheath apex, glabrous; ligule dentate, up to 3 mm high, bristles up to 1 mm long.

Inflorescence not seen.

DISTRIBUTION. Riau, Bengkalis, Desa Pinggir Nature Reserve.

ECOLOGY. Dry area of open lowland forest, 50 m alt.

VERNACULAR NAME. Unknown.

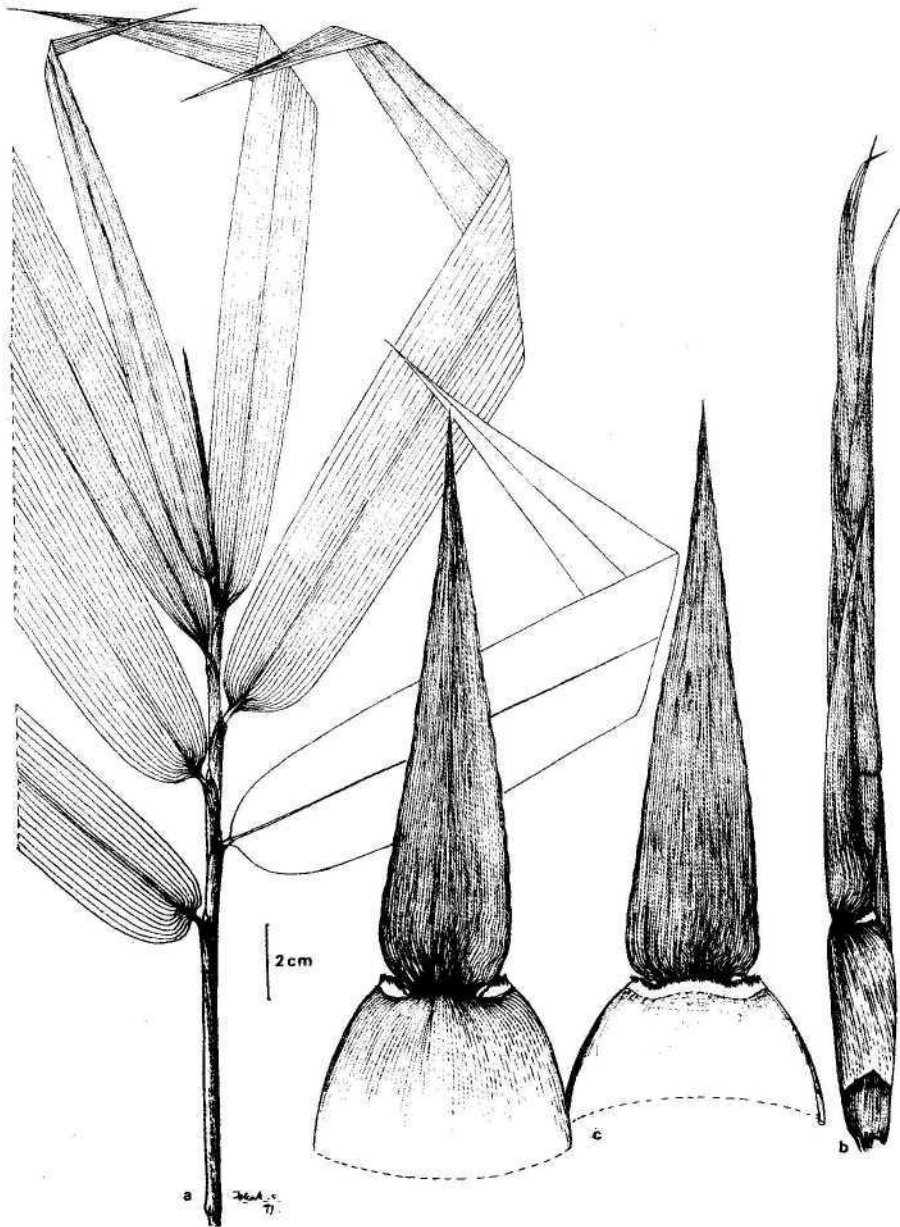


Fig. 17. *Gigantochloa pubipetiolata* Widjaja: a. leaf; b. young shoot; c. culm leaf. From Widjaja 3994.

USES. Unknown.

NOTES. This species is distinguished by the hairy petiole and the long ligule of the leaf sheath.

SPECIMEN EXAMINED. Riau, Bengkalis District, Mandau Duri Subdistrict, Desa Pinggir Nature Reserve, *Widjaja 3994* (BO).

11. *Gigantochloa serik* Widjaja, *n. sp.*- Fig. 18 (serik = vernacular name)

Gigantochloa hasskarliana similissima culmi laminis persistentibus, sed auriculis suis minutis lobi-formibus glabris, folii vagina albo-pubescenti, auriculis ligulaque setis brevibus tenuibus differt. -TYPUS: *Widjaja 3972* (BO-Holotype, K, L, US), Sumatra, Tanah Datar District, Lembah Anai Nature Reserve.

Shoots green to dark purplish green, covered by brown to black hairs.

Culms 10-15 m high, straight; young culms with black hairs, when old glabrous and green; internodes 25-45 cm long by 2-6 cm in diameter; walls 6-8 mm thick.

Culm leaves persistent, covered by appressed black hairs; sheath 15-17 cm long; auricles small, lobe-shaped, 1-2 mm high, glabrous; ligule entire, 1 mm high, bristles absent or up to 8 mm long; blade deflexed, narrowly lanceolate, 2.5-13.5 by 0.6-1.3 cm; base narrow, adaxially slightly hairy; sheath apex margin curved inward or outward.

Leaf blades 15.3-27.2 by 2-3.4 cm, glabrous to slightly hairy on the lower surface; auricles small, lobe-shaped, 1-1.5 mm high, bristles absent to few, 3-4 mm long; ligule entire, up to 1 mm high, bristles up to 4 mm long; sheath covered by white hairs.

Pseudospikelets 19-35 mm long. Fertile florets 3. Rhachis internodes slightly hairy. Glumes 2, 10-11 mm long, mucronate, margin dark brown ciliate. Lemmas 15-21 mm long, slightly hairy on the back or only below the acuminate apex, margin dark brown ciliate. Paleas 12-20 mm long, apex bifid, slightly hairy, two-keeled, keels ciliate. Lodicules absent. Anthers magenta, 8-11 mm long, apex pointed. Ovary hairy at the apex.

DISTRIBUTION. Sumatra, common in Central, South and West; Riau.

ECOLOGY. Alluvial soil in wet areas, 50-400 m alt.

VERNACULAR NAMES. Buluh munti, Buluh serik, Buluh sorik (West Sumatra).

USES. Young culms are used for making 'lemang' (a kind of food made of glutinous rice in culms), old culms for basketry.

NOTES. This species is distinguished by the small lobe-shaped, glabrous auricles of the persistent culm leaf, the pubescent leaf blade, and the hairy leaf sheaths.

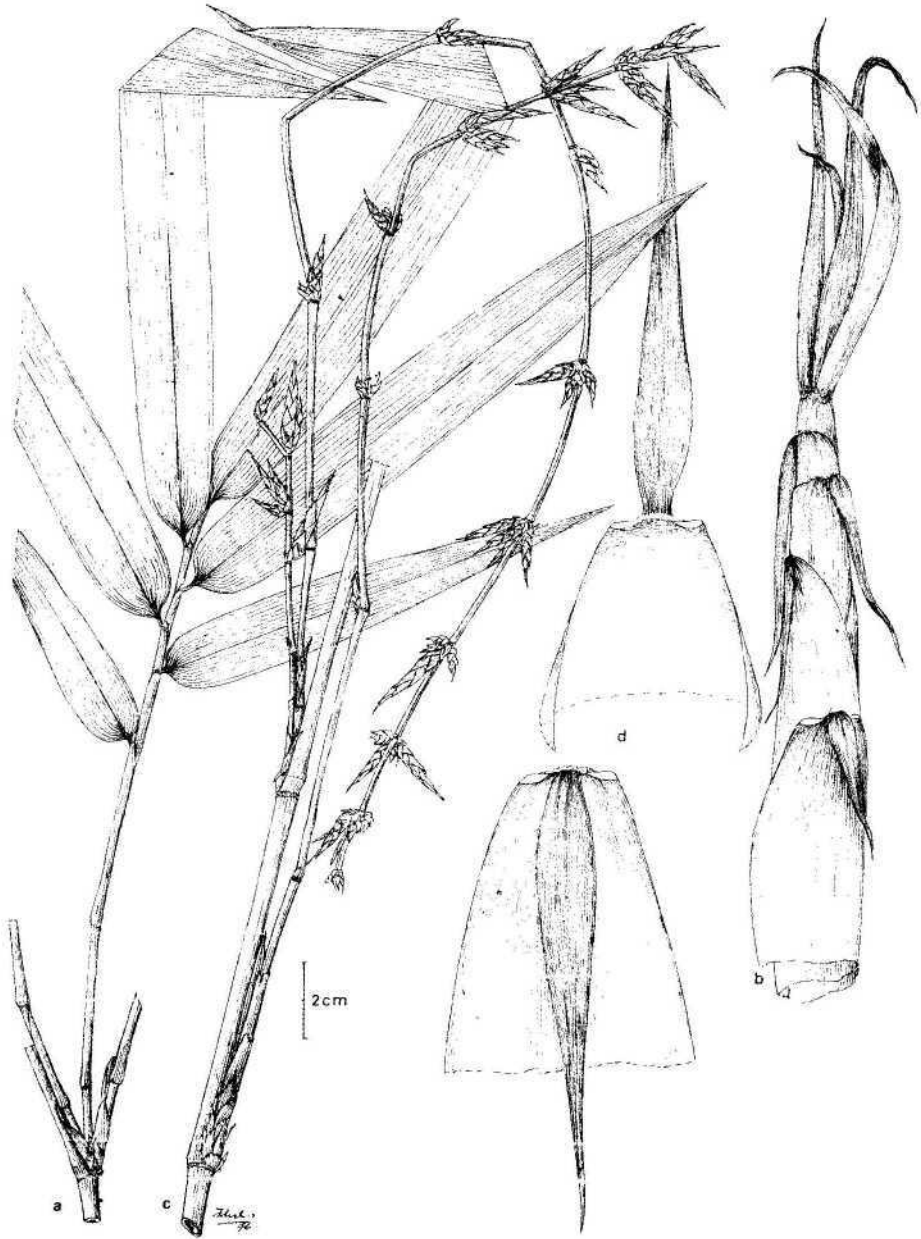


Fig. 18. *Gigantochloa serik* Widjaja: a. leaf; b. young shoot; c. inflorescence; d. culm leaf. From Widjaja 3972.

SPECIMENS EXAMINED: Sumatra: Palembang, Lahat District, Tebing Tinggi Subdistrict, Lubuk Kelumpang Village, *Widjaja 3844* (BO, K,L); West Sumatra: Tanah Datar District, Lembah Anai Nature Reserve, *Widjaja 3972* (BO, K, L, US); *3973* (BO, K, L); Pasaman District, Panti Subdistrict, Rimbo Panti Nature Reserve, *Widjaja 3976* (BO, K, L,US); Riau, Indragiri Hulu District, Singingi Subdistrict, Petai Village, Bukit Rimbang - Bukit Baling Wildlife Reserve, *Widjaja 4024* (BO, K, L).

12. *Gigantochloa tomentosa* Widjaja, n. sp. - Fig. 19 (tomentosus = velvety hairy)

Gigantochloa pruriensis in culmi vaginae auriculis minutis rotundatis glabris, folii lamina pubescenti similissima, in folii auriculis minutis lobi-formibus, ligula integra, pseudospiculis 12-30 mm longis differt. Rhachis internodia pubescentia, lemmatum apices parum pubescentes iis *Gigantochloae robustae* et *G. levis* similia. -TYPUS: *Widjaja 4094* (BO-Holotype, K, L), Sumatra, Riau Archipelago, Bintan Timur Subdistrict, Gesak Village Km. 18.

Young shoots green-orange, covered by brown hairs.

Culm straight, up to 15 m long; young culms with brown hairs, when old glabrous and green; internodes 35-45 cm long by 6-8 cm in diameter, with brown hairs below the node; walls up to 10 mm thick.

Culm leaves deciduous, covered by brown hairs; auricles rounded, up to 2 mm high, glabrous; ligule entire, up to 1 mm high, glabrous; blade spreading, triangular, adaxially slightly hairy.

Leaf blades 9.1-18.1 by 1.2-2.2 cm, pubescent beneath; auricles small lobe or horn-like, up to 1 mm high, glabrous; ligule entire, up to 1 mm high, glabrous; sheath with brown hairs.

Pseudospikelets 12-30 mm long. Fertile florets 4. Rhachis internodes hairy. Glumes 4, 4-10 mm long, apex mucronate and slightly hairy, with dark brown cilia on the margins. Lemmas 14-18 mm long, apex slightly hairy, acuminate with pointed tips. Paleas 9-15 mm long, apex deeply bifid, two-keeled, keels with brown to white ciliate. Lodicules absent. Anthers magenta, 6-9 mm long, pointed apex up to 2 mm long. Stigma white.

DISTRIBUTION. Riau, Bintan Island.

ECOLOGY. Humid lowlands, 5-50 m alt.

VERNACULAR NAME. Unknown.

USES. The culms are used for making basketry and for building structures.

NOTES. This species is characterized by its pubescent and small, lobe or horn-like leaf auricles and the 12-30 mm long spikelets. It is very similar to *G. pruriensis* Widjaja by its pubescent leaf blades, culm leaves with small rounded and glabrous auricles, but different by the leaf blades with small lobe-shaped auricles, an entire ligule, and 12-30 mm long pseudospikelets. The hairy rhachilla internodes and slightly hairy

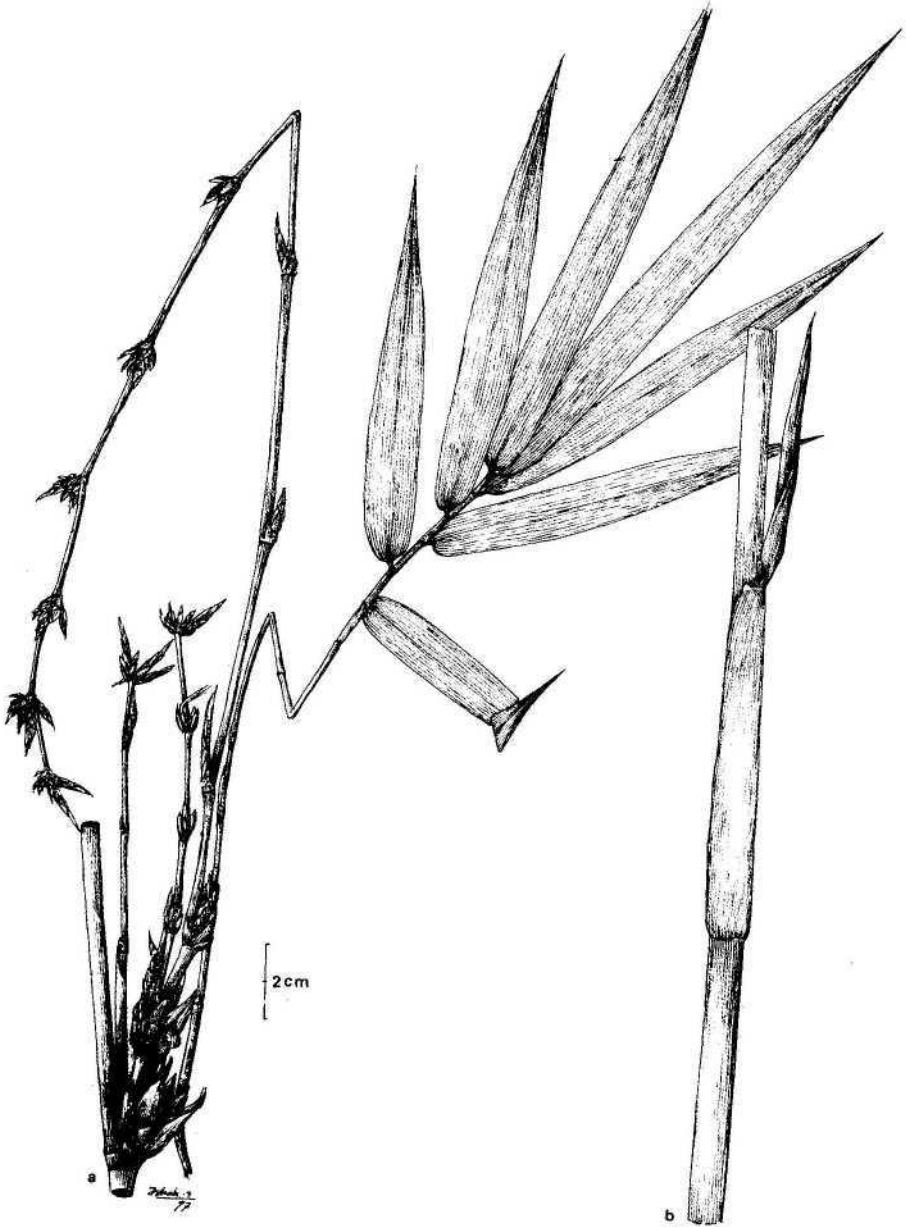


Fig. 19. *Gigantochloa tomentosa* Widjaja: a. leaf with inflorescence; b. culm leaf. From *Widjaja 4094*.

apex of the lemmas resemble those of *G. robusta* Kurz and *G. levis* (Blanco) Merr.

SPECIMEN EXAMINED. Sumatra, Riau Archipelago, Bintan Timur Subdistrict, Gesak Km. 18, *Widjaja 4094* (BO, K, L).

13. *Gigantochloa velutina* Widjaja, n. sp. - Fig. 20
(velutinus = velvety)

Gigantochloa thoi in pilis atrobrunnee velutinis sub nodis, culmi vaginae auriculis minutis lobi-formibus, folii lamina pubescenti, in culmi vaginae ligula brevi denticulata longe pilosa, folii vagina pubescenti differt. -**TYPUS:** *Widjaja 3952* (BO-Holotype), Sumatra, Tapanuli Selatan, Padang Sidempuan Timur Subdistrict, Panumpuan Village.

Young shoots brownish, covered by scattered brown hairs.

Culms straight, up to 20 m tall; young culm with white wax and scattered brown hairs, when old glabrous and green; internodes 35–44 cm long by 6–8 cm in diameter; walls up to 10 mm thick, with dark brown velvety hairs below the node.

Culm leaves deciduous, covered by scattered black and brown hairs, sheath up to 11 by 9 cm; auricles lobe-shaped, up to 4 mm high, bristles up to 15 mm long; ligule denticulate, up to 1 mm high, bristles 10–12 mm long; blade deflexed, ovate, up to 13 cm by 2.2 cm, base narrowly attached to the sheath apex (1 cm wide), adaxially slightly hairy; sheath apex margin ciliate.

Leaf blades 15.6–30.8 by 2.8–4.5 cm, hairy below; auricles lobe-shaped, up to 1 mm high, bristles up to 9 mm long; ligule entire, up to 1 mm high, glabrous; sheath with white hairs, margins ciliate.

Inflorescence not seen.

DISTRIBUTION. North Sumatra, Padang Sidempuan Timur Subdistrict, Panumpuan Village.

ECOLOGY. Lowlands at 250 m alt.

VERNACULAR NAME. Buluh hariman (Malay).

USES. Unknown.

NOTES. This species is distinguished by the dark brown velvety hairs under the culm nodes and the auricles of the leaf blades and culm leaves with long bristles.

SPECIMEN EXAMINED. Sumatra, Tapanuli Selatan District, Padang Sidempuan Timur Subdistrict, Panumpuan Village, *Widjaja 3952* (BO).

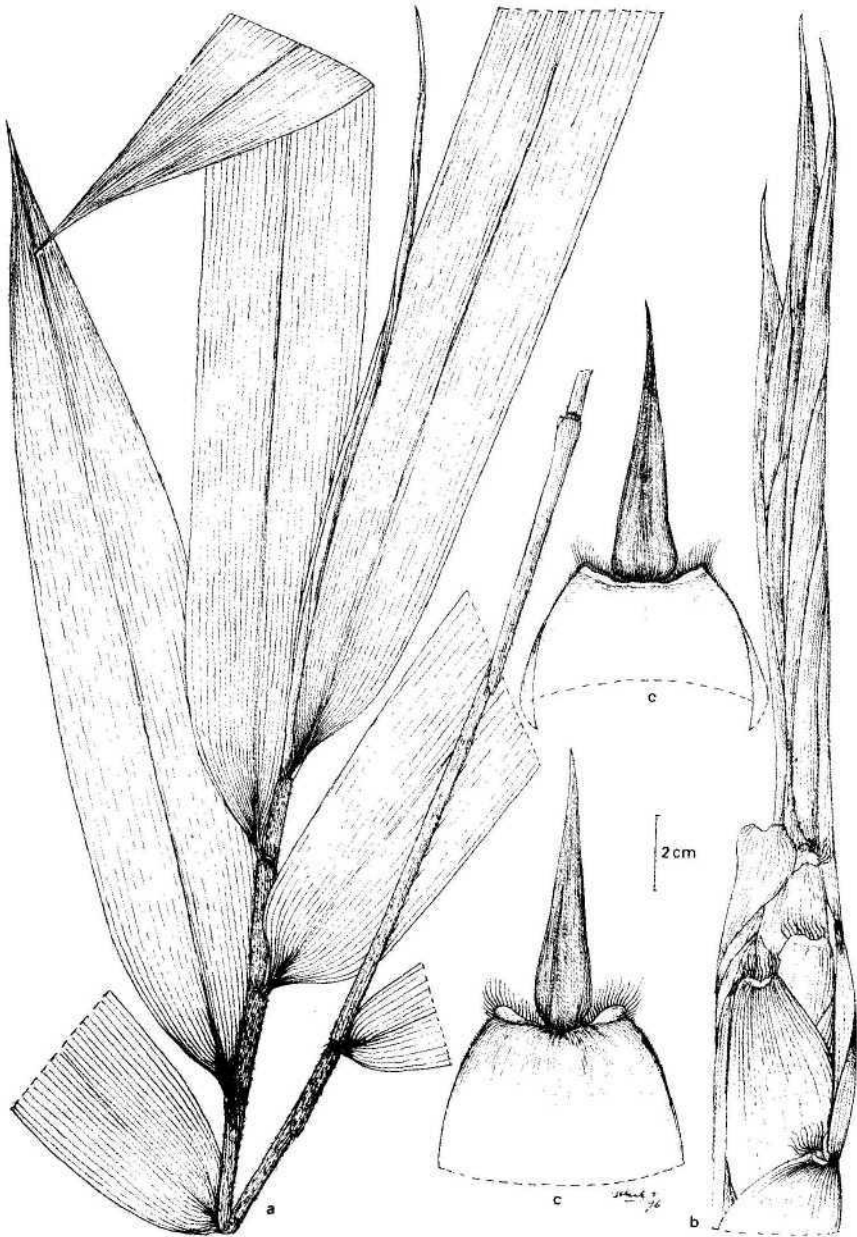


Fig. 20. *Gigantochloa velutina* Widjaja: a. leaf; b. young shoot; c. culm leaf. From Widjaja 3952.

NASTUS JUSS.

Erect to scrambling bamboos; branches subequal or with one primary dominant branch and several subequal branches developing from one single bud from its base (*Nastus elatus*, *Nastus elegantissimus*, or *Nastus productus*). The primary dominant branches will branch again distally, the secondary subequal branches will not branch only produce 3 or 4 internodes.

Culms slender, mostly small. Culm sheaths papery.

Inflorescences determinate, usually on leafy branches. Pseudospikelets: glumes 5, the upper one longest, separated by well-developed rhachilla internodes or without rhachilla internodes. Fertile floret 1, with or without an extension of the rhachilla bearing an imperfect terminal floret. Lemma as long as the glumes. Palea grooved down the back with or without 2-keels, apex bifid. Lodicules 3, unequal. Stamens 6, filaments free. Ovary narrowly cylindrical.

DISTRIBUTION. About 15 species found in the world, 9 of them grow in Indonesia. Widely distributed in Malesia, extending to the West up to Madagascar and Reunion.

ECOLOGY. Usually found in mountainous areas.

USES. Not many uses of this genus are recorded, but it is known that the culm are occasionally employed in making flutes and arrow heads. Generally shoots are not eaten because of the bitter taste, but those of *N. elatus* are commonly used as a vegetable even when raw.

1. *Nastus elatoides* Widjaja, *n. sp.* - Fig. 21 (elatoides = resembling to *Nastus elatus*)

Naslo elato culmis erectis similis, in culmi vaginae auriculis extrinsecus curvatis, appendiculis cornuatis setisque longis, ligula denticulata glabra, lamina erecta ad patentis differt. Folia lamina auriculis minutis extrinsecus curvatis, ligula integra glabra.

-**TYPUS:** *Widjaja 6648* (BO-Holotype, K, L, US), Irian Jaya, Paniai District, Kamu Subdistrict, Idadagi Village.

Loosely tufted bamboo. Young shoots green with white wax and appressed white hairs.

Culms erect, 12 m long; tip drooping to the ground; internodes 70-80 cm long by 2-10 cm in diameter; walls 2-3 mm thick. Branches subequal or one primary branch dominant with 2-5 secondary ones.

Culm leaves caducous, sheath 10.5-15.8 cm long, covered by appressed white hairs; auricles outcurved and curled up to the base of the blade, up to 5 mm long, bristles up to 18 mm long; ligule denticulate, up to 1 mm long, glabrous; blade erect to spreading, narrowly ovate, 10.5-17.5 by 2-3 cm, base narrow.

Leaf blades 30.4-38.5 by 4.5-5 cm, glabrous; auricles up to 1 mm long, outcurved; ligule entire, up to 1 mm high; leaf sheath glabrous.

Inflorescence not seen.

DISTRIBUTION. Irian Jaya, Paniai District, Kamu Subdistrict.

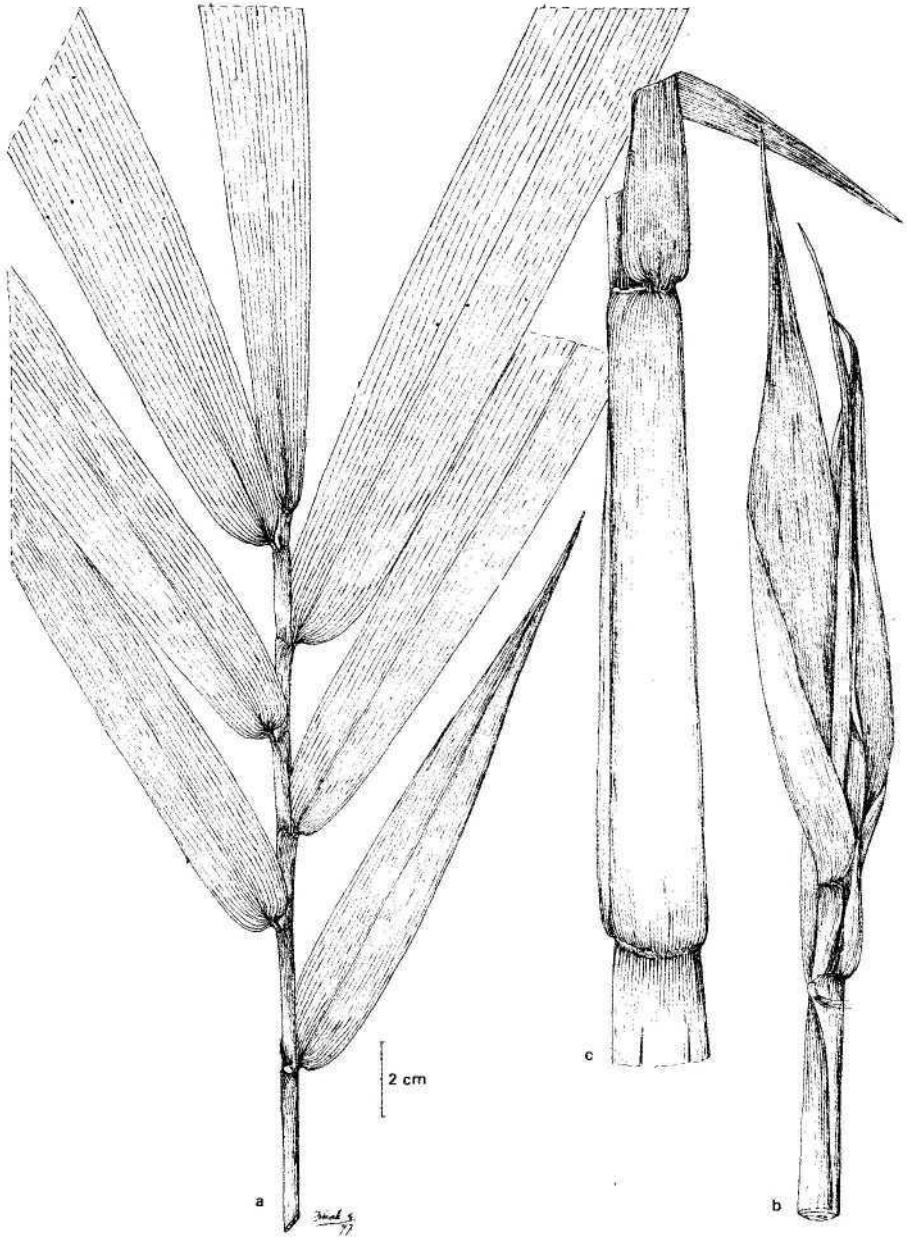


Fig. 21. *Nastus elatoides* Widjaja: a. leaf; b. young shoot; c. culm leaf. From *Widjaja 6648*.

ECOLOGY. Margin of humid forest, above 1500 m alt.

VERNACULAR NAME. Domo (Monamani).

USES. This is the only bamboo found in this mountainous area of which the culm can be used for containers in cooking.

NOTES. This species is similar to *N. elatus* Holtt. the only other erect species of this genus which is common in New Guinea, differing by its culm leaves with outcurved auricles with a horn-like appendage and long bristles, a denticulate and glabrous ligule, and erect to spreading blade.

SPECIMEN EXAMINED. Irian Jaya, Paniai District, Kamu Subdistrict, Idadagi Village, *Widjaja* 6648 (BO, K, L, US).

2. *Nastus glaucus* Widjaja, *n. sp.* - Fig. 22 (glaucus = bluish, greenish grey, seagreen)

Nasto rudimenlifero in foliis glaucis similis, in culmi vaginae auriculis glabris inconspicuis, ligula denticulata pilis brevibus differ!. - TYPUS: *Widjaja* 6403 (BO—Holotype), Irian Jaya, Jayawijaya District, Kurulu Subdistrict, Uwosilimo Village.

Loosely tufted bamboo, tips scrambling. Young shoots green with appressed brown to whitish hairs.

Culms 15 m long, green, glossy, glabrous; internodes 30—40 cm long by 0.5-2 cm in diameter; walls thin, up to 2 mm thick.

Culm leaves caducous, covered by appressed white-brown hairs; sheath 16.8-21 by 3.5-9.2 cm, with brownish to white hairs, top frequently recessed in the middle; auricles inconspicuous, without bristles; ligule up to 2 mm long, denticulate, bristles up to 4 mm long; blade deflexed, triangular, 7.2-12.5 by 0.8-1.5 cm, base narrowly attached to the sheath apex (0.4 cm wide).

Leaf blades lanceolate, 11.1-17.2 by 12—2 cm, glaucous, glabrous; auricles inconspicuous, or if any upward, glabrous; ligule up to 1 mm long, entire, glabrous.

Inflorescences not seen.

DISTRIBUTION. Irian Jaya, Jayawijaya District, Kurulu Subdistrict.

ECOLOGY. Margins of humid forest above 1500 m alt.

VERNACULAR NAME. Jeluaka (Dani).

USES. The thin culm is used for making "pikon" (a kind of Jew's harp and a local bamboo musical instrument).

NOTES. This species is characterized by the culm leaves with a denticulate, bristly ligule, and the small, lanceolate leaf blades with inconspicuous, glabrous auricles.

SPECIMEN EXAMINED. Irian Jaya, Jayawijaya District, Kurulu Subdistrict, Uwosilimo Village, *Widjaja* 6403 (BO, K, L).

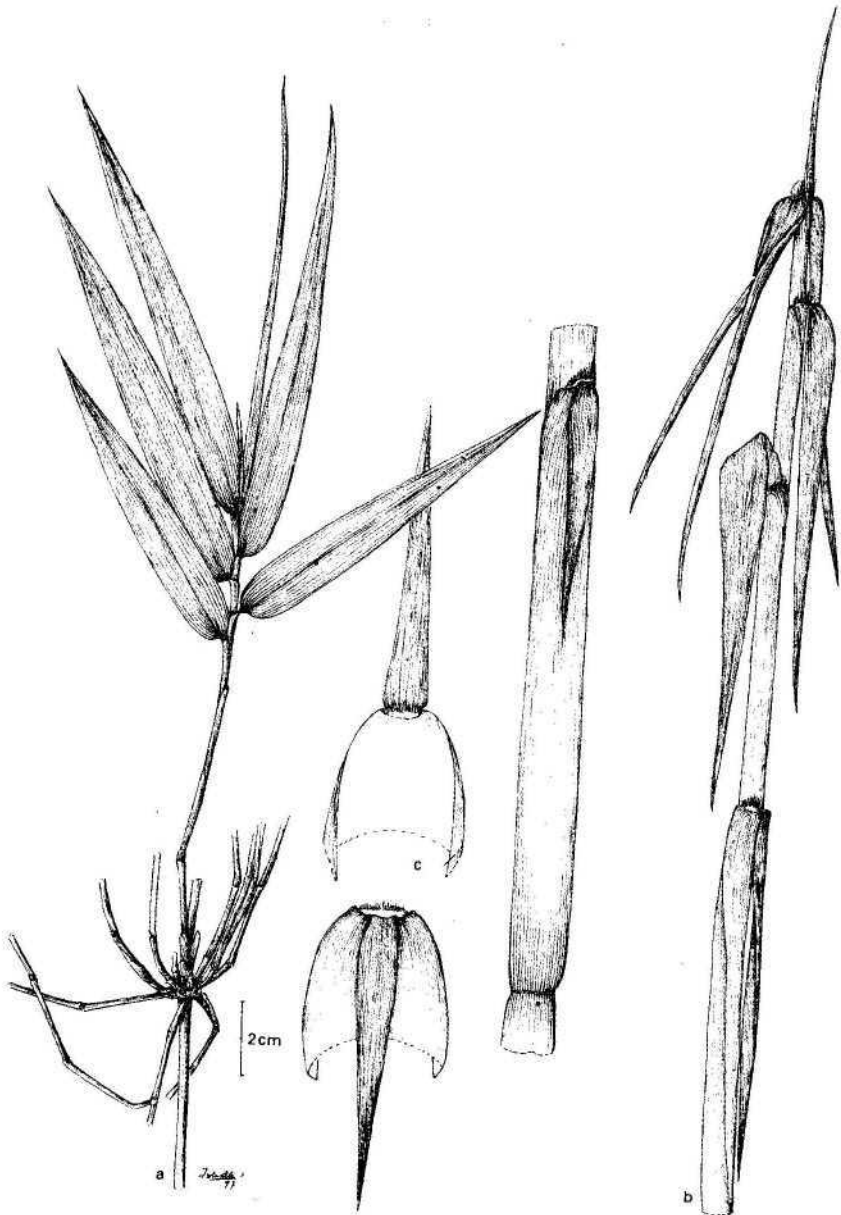


Fig.22. *Nastus glaucus* Widjaja: a. leaf; b. young shoot; c. culm leaf. From *Widjaja 6403*.

NEOLOLEBA Widjaja, *gen. nov.*
(loleba = vernacular name)

Species 5 huius generis olim in *Bambusa* inclusae, ramorum complemento compresso tantum in culmi tenuis parte superiore evoluto, inflorescentia indeterminata, pseudospiculis planis compressisve interdum tortis, lodicularum absentia, rhachillae internodiis brevibus, floris sterilis apicalis absentia, ovario elongato pubescenti different. -TYPE SPECIES: *Neololeba atra* (lindl.) Widjaja.

Sympodial, loosely or densely tufted bamboo.

Culms erect to scrambling; with 3 to several relatively long internodes (30-80 cm in length); Branching in the upper part after the long internode. Primary dominant branch 1, elongated, at least 50 cm or more long branching again distally. Secondary branches 1-5, subequal, with 2-4 internodes, not branched distally, each apparently terminated by leaf blades or an inflorescence.

Culm leaves persistent to caducous, covered with light brown hairs, sheath scar rugose or densely hairy, auricles conspicuous or lobe-like with or without bristles.

Leaf blades large with or without auricles, erect or folded with or without bristles.

Inflorescences indeterminate, terminating on the leafy branches which elongated and segmented, up to 60 cm long, each node producing a bract subtending a cluster of pseudospikelet. Each cluster of pseudospikelet consists of 1 sessile pseudospikelet with 2-4 pseudospikelets with short pedicels and one terminal pseudospikelet with a long pedicel. Pseudospikelets sessile, fertile florets 3-12, rhachilla internodes short, flat or compressed. Lodicules absent. Stamens 6, filaments free. Ovary gradually tapering upwards to a flat style. Stigmas 3, unequal, white.

DISTRIBUTION. Five species are presently known from South Mindanao, North Sulawesi, Moluccas, New Guinea, Solomon Islands, and Australia (Queensland).

ECOLOGY. Usually growing in wet areas, e.g. along river banks, and also in forest margins from the lowlands to the highlands, sometimes in open areas.

USES. Culms are used for basketry, and various other handicrafts, waterworks, blow pipes, or arrow heads.

NOTES. This genus is characterized by the erect to scrambling and thin culms, branching only in the upper part and compressed, internodes below the branches longer than above them. Pseudospikelets are flat or compressed, sometimes twisted. It is somewhat similar to *Bambusa* Schreb., but separated by its very specific branching system, flat pseudospikelets, clustered pseudospikelet, short rhachilla internodes, absent terminal floret, absent lodicules, and an elongated, hairy ovary.

The generic name has been taken from *Leleba* which was used by Rumphius (Hb. Amb. 4: 1, t. 1. 1743) for a group of species, but that name cannot be used because of *Leleba* Nakai, a quite different genus. *Leleba* Rumphius has been mentioned previously in a note by Roemer & Schultes (Syst. Veg. 7, 2: 1345. 1830), but they clearly not intended it as an accepted generic name.

KEY TO THE SPECIES

1. a. Leaf blade auricles and ligule with long bristles..... 2
 b. Leaf blades auricles and ligule glabrous..... 3. *N. glabra*
2. a. Culm leaves with inconspicuous auricles, bristles more than 15 mm long
 5. *N. inaurila*
 b. Culm leaves with rounded auricles, bristles less than 15 mm long
 3
3. a. Leaf blade auricles inconspicuous. Pseudospikelets less than 10 mm long,
 with 3 florets..... 1. *N. amahussana*
 b. Leaf blade auricles small, rounded. Pseudospikelets more than 10 mm long,
 with more than 3 florets..... 4
4. a. Culm leaf auricles up to 2 mm long. Leaf blade ligule denticulate.
 Pseudospikelets with 6 florets. Lemma hirsute on the back
 4. *N. hirsuta*
 b. Culm leaf auricles more than 5 mm long. Leaf blade ligule entire.
 Pseudospikelets with more than 6 florets. Lemma glabrous on the back
 2. *N. atra*

1. *Neololeba amahussana* (Lindl.) Widjaja, *comb. nov.*

Bambusa amahussana Lindl., Penny Cyclopaedia 3:357. 1835. - *Leleba amahussana* Rumph., Hb. Amb. 4:3. 1743. *nom. inval.*

Bambusa rumphiana Kurz, J. Roy. As. Soc. Beng. 39(2):86. 1870, *nom. superfl.*

Bambusa atra Lindl. var. *amahussana* (Lindl.) Merrill, Interpr. Rumph. Herb. Amb.:99. 1917. - Neotype: Ambon, Amahoeseo, C. B. Robinson 35 (K, BO, L).

Loosely tufted bamboo, erect at base, ends scrambling.

Culms 2 -3 (8) m high; wall up to 3 mm thick.

Culm leaves covered by pale hairs; sheaths incompletely known, auricles rounded with easily broken bristles; ligule with few, easily broken bristles; blade erect, narrow, adaxially glabrous.

Leaf blades 30—45 by 6-8 cm, glabrous; auricles inconspicuous, bristles up to 16 mm long; ligule denticulate, 1-2 mm high, bristles up to 15 mm long.

Pseudospikelets 6-7 mm long, flat. Fertile florets 3. Rhachilla internode glabrous, 0.5-1 mm long. Glumes 3, about 4 mm long, mucronate. Lemmas 3.5-4.5 mm long, mucronate, glabrous. Paleas 4.5-5 mm long, acute, two-keeled, keels ciliate. Anthers yellowish, c. 2 mm long. Ovary elongated. Stigmas unequal.

DISTRIBUTION. Known from a few collections from Ambon and Seram.

ECOLOGY. Lowlands, 50-565 m alt.

VERNACULAR NAME. Bambu nitu (Ambon), wala'buwa (Alune).

USES. Unknown.

NOTES. According to Holttum (Kew Bull. 21: 273-274. 1967) Robinson's specimen has 2-3 m tall culms, but it may become up to 8 m long.

SPECIMENS EXAMINED. Java: Cult. Hort. Bog. XI L 6, 19 Mar. 1894 (K); *Ohwi s.n.* (BO); Ambon, Amahoesoe, *C. B. Robinson 35* (BO, K, L); Seram, *Eyma 1794* (K), *Letela, Ira Sukarno 157* (BO), *Ds. Rumberu, Kairatu, Widjaja 3371* (BO); India: Cult. Hort. Calc. No. 71, 25 Feb. 1898 (K).

2. *Neololeba atra* (Lindl.) Widjaja, *comb. nov.*

Bambusa atra Lindl., Penny Cyclopaedia 3:357. 1815. -*Arundarbor tenuis nigra* Rumph., Hb. Amb. 4: 1, t. 1. 1743. *nom. inval.* -Epitype: Ambon, Caju Poeti, *Robinson 33* (K, L, BO).

Bambusa lineata Munro, Trans. Linn. Soc. 16:118. 1868. —*Leleba lineata* s. *virgata* Rumph., Hb. Amb. 4:3. 1743, *nom. inval.*

Dendrocalamus forbesii Ridl. J. Bot. 24:360. 1886. -*Bambusa forbesii* (Ridl.) Holttum, Kew Bull. 21:271272. 1967. -Type: Sogere, *Forbes 153* (SING-Holotype, BM, L).

Gigantochloa novoguineensis Rendle in Gibbs, Dutch NW. New Guinea : 199. 1917. -Type: Manokwari, *Gibbs 6270a* (K-Holo, BM).

Densely tufted bamboo, erect. Young shoots green to purplish green, covered by white, light brown to brown hairs, sometimes glabrous.

Culms 8-12 m high, straight, tips erect; branching only in the upper part, intravaginal; branches 1-3 at each node, one dominant, sometimes only one branch present with 1 to 2 smaller branches, appressed to the base; young culms with white and brown hairs, when old glabrous and green to purplish; internodes 30-80 cm long by 2-4 cm diameter; walls up to 4 mm thick.

Culm leaves up to 15 cm long, covered by white, brown or black hairs, persistent, sheath 10.5-18.5 by 4-6.5 cm; auricles rounded, up to 12 mm high, bristles 8-10 mm long; ligule irregular, 1-2 mm high, bristles up to 8 mm long; blade erect, triangular, 5-10.2 by 0.9-2.2 cm, base narrowly attached to the sheath apex (0.5-0.6 cm wide), adaxially glabrous.

Leaves 30-55 by 5-9.5 cm, glabrous; auricles small, 1-2 mm high, bristles 5-15 mm long; ligule entire, up to 1 mm high, bristles **up** to 10 mm long.

Pseudospikelets up to 20 mm long, flat, somewhat twisted. Fertile florets 7-12. Rhachilla internodes glabrous, 1-1.5 mm long. Glumes 2, 5-7 mm long, mucronate with a long pointed acumen. Lemmas 4-11 mm long, acuminate with a long-pointed acumen, glabrous. Paleas 9-12 mm long, acute, two-keeled, keels ciliate. Anthers yellowish, 4.5 mm long.

DISTRIBUTION. Northern Sulawesi, Philippines (Mindanao, Davao), Moluccas (Ternate, Ambon, Seram, Halmahera), New Guinea, and Australia (Queensland). This species has been planted in several botanical gardens in India.

ECOLOGY. Wet tropical areas along river banks, from the lowlands up to 1500 m alt.

VERNACULAR NAMES. North Sulawesi: Nena (Sangir), Alen (Binong). Moluccas: Loleba, Tirak (Seram), Wala' we (Alune/Wemale, Seram), Ute popa or Ute aul mette, Ute aul, Ute aul tuni (Hila, Ambon), Bambu suar (Honem), Perat (Iha), Wemo ma dorooe (Halmahera), Todoku (Tobelo, Halmahera), Wonomo (Sahu); New Guinea: Irian Jaya: Holeba (Sentani), Sasa (Wasior, Manokwari), Akoya (Ransiki), Warire (Yapen), Sasa karier, Ayuk (Manokwari).

USES. The green variety has been used for quite a long time by the Moluccan and Sangir peoples as raw material for traditional basketry and other handicrafts. It is regarded better than the black variety. In West New Guinea people also use the culms for arrowheads, spears, and sometimes water containers.

NOTES. In the field *Neololeba atra* could not be distinguished from *Bambusa forbesii* and their morphological variation is overlapping. There it is also very similar to *N. hirsuta* and *N. amahussana*, but it differs by having shorter pseudospikelets and hirsute lemmas.

Locally 2 varieties are recognized, i.e. "loleba putih" (Indonesian) ("ute aul tuni" by Ambonese) and "loleba hitam" (or "ute popa" or "ute aul mette" by the Ambonese). The first variety has green culms, the second dark green ones with purplish black stripes.

SPECIMENS EXAMINED. Java: Culta Hort. Bot. Bog.: *Ohwi s.n.* (BO); XI L. 12, Comm. Dr. Treub s.n. (K); *Forman 537* (K); XI L. 14 (K); *Forman 14* (K, BO); *Widjaja 1724* (BO); XI L. 7, *Forman 15* (K); Comm. Dr. Treub (K); XI L. 8, *Carocci-Buzi 161* (K, BO); no collector (K); *Kurz s.n.* (BO); *Soderstrom 2568* (L); Celebes: Central Celebes, Mt. Nokilalaki, Km 96 south of Donggala, *Meijer 10048* (BO), Manado, Oost afdeling Poso Tuschen, Bivak I Borone, along Balingala River, *Eyma 3715* (BO, L), Moluccas: *Beguïn 1094* (BO); West Seram, Kairatu Subdistrict, Rumbelu Village, *Widjaja 3371* (BO, K, L); *3375* (BO); *3393* (BO, K); Maraina Bivak I, Kobipototot, south slope of Mt. Seahari, *Eyma 2116* (K); Riring Botoe sore, Sapalewa Cave, *Eyma 2630* (K, L); East Seram, Geser, Dogah, *Mogea & Ramlanto 836* (BO); Ambon, Hila Village, *Widjaja 3433* (BO); *3434* (BO, K, L); *3435* (BO, K); *3436* (BO, K); *3437* (BO, L); Caju Poeti, *Robinson 33* (K); Way Tommo, *Robinson 32* (K, BO); Lateri, *Robinson 34* (K); Halmahera, Soa Tobarooa, *Beguïn 1989* (BO); *1987* (BO); *2116* (BO); Ternate, Toramadiaki, *Beguïn 1432* (BO); Laguna, *Beguïn 716* (BO); Obi, Laeiwaei, Boeton, *Nedi 487* (expeditie de Haan) (K); Buru, Keramat, *Arinasa 764* (BO); Upper slopes of peak Djailolo, *Alston 16873* (BO);

New Guinea: Irian Jaya: Jayawijaya District, Tiom Subdistrict, Mapanduma Village, *Widjaja* 3450 (BO, L); Halfway between Mt. Carstensz and the sea, *Raynal* 17752 (K); Fakfak, Mimika Timur, Mapurujaya, *Widjaja* 2895 (BO); Jayapura, Sentani, C.A. Cyclops, *Widjaja & Hamzah* 2969 (BO); Manokwari, *Gibbs* 6270a (K, L); Gunung Meja park, *Widjaja & Hamzah* 3132 (BO); Tembaga Pura mile 48, *Widjaja* 2203 (BO); *Widjaja & Hamzah* 3192 (BO); Biak, Adibai, *Widjaja & Hamzah* 3188 (BO); Near Parigi, *Kostermans & Soegeng* 978 (BO,L); Mamberamo, Atkens River, *Dorters van Leeuwen* 11381 (BO, K, L); Rouffaer River, *Docters van Leeuwen* 9796 (BO, K, L); Utakwa expedition to Mt. Carstensz, *Kloss s.n.* (K); Western District, Kiunga, 5 miles N.W. of Kiunga on Rumaginae Rd., *Streiman et.al.* LAE 51869 (BO); Sepiek Gebiet, *Ledermann* 9727 (L); Morobe District, Nordostliches Nieu Guinea, *Clemens* 953 (L); Near Bulolo, *Millar & Holttum* NGF 13783 (K); Bulolo, Amampi creek below Dengalu vilage, *Millar* NGF 23008 (K); Wau Subdistrict, 5 mile of NW. Bulolo, *Streimann* NGF 45419 (K, BO); Central Division, Mapulu, *Brass* 5402 (BO); Kaiser Wilhelmiland, *Hollrung* 864 (BO); West New Britain, Kaudrian District, Fullerborn Harbour Subdistrict, *Clunie* LAE 63970 (L); Australia: N. Queensland, Mirkwood, *Wertz & Guyatt s.n.* (BO).

3. *Neololeba glabra* Widjaja, n. sp. - Fig. 23 (glaber = glabrous)

Neololeba alra similis, in auriculis omnibus inconspicuis, ligulis omnibus glabris differt. -TYPUS: *Widjaja* 6656 (BO-Holotype), Irian Jaya, Fakfak District, Mapurujaya Subdistrict, on the way to Tembapapura, mile 34.

Loosely tufted bamboo, ends scrambling. Young shoots green covered by white to brown hairs.

Culms 5-8 m high, straight; branching only in the upper part, branches 1-3 at each node; tips pendulous to the ground; young culms with white hairs, when old green and glabrous; internodes up to 40 cm long by 0.5—1 cm diameter; walls 2—3 mm thick, very rough under the nodes.

Culm leaves persistent, covered by white to brown hairs, sheath 5-6 cm long, up to 3 cm wide; auricles rim-like, bristles up to 7 mm long; ligule entire, glabrous; blade erect, narrowly triangular, 2.5-4 by 0.4—1.9 cm, narrowly attached to the sheath apex, adaxially glabrous.

Leaf blades 19.5-27.4 by 2.2-3 cm, base truncate, glabrous; auricles inconspicuous, glabrous; ligule entire, 12 mm high, glabrous.

Inflorescences unknown.

DISTRIBUTION. Irian Jaya, so far only found on the way to Tembapapura.

ECOLOGY. Swampy area, between 400-500 m alt.

VERNACULAR NAME. Unknown.

USES. Unknown.

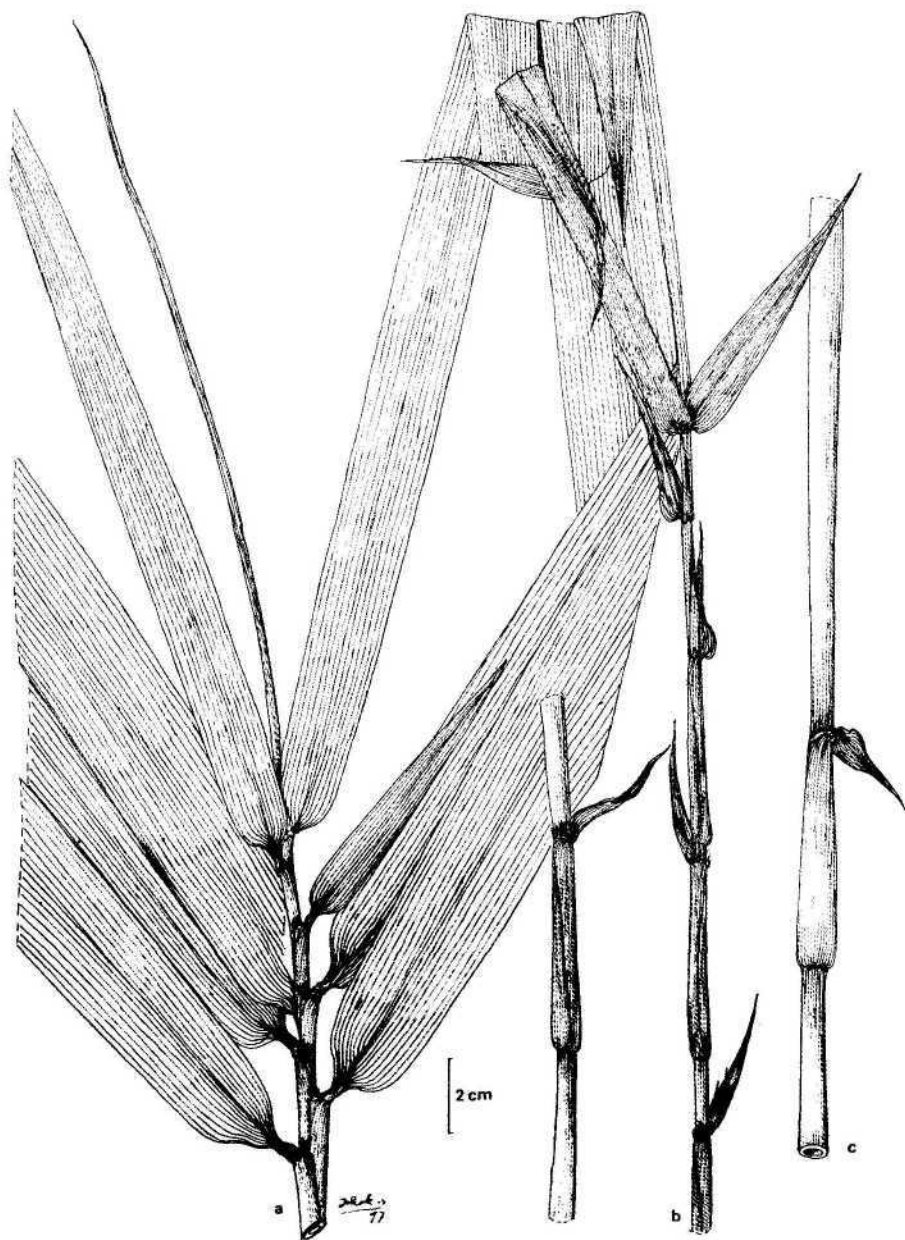


Fig. 23. *Neololeba glabra* Widjaja: a. leaf; b. young shoot; c. culm leaf. From Widjaja 6656.

NOTES. This species is similar to *Neololeba atra* (Lindl.) **Widjaja** by the branch complements which appear only in the upper part of the culm, persistent culm leaves, leaf blade base truncate, blades broad, differing by the inconspicuous auricles and glabrous ligules of the culm leaves and leaf blades.

SPECIMEN EXAMINED. Irian Jaya, Fakfak District, Mapurujaya Subdistrict, on the way to Tembapapura from Timika, mile 34, *Widjaja 6656* (BO).

4. *Neololeba hirsute* (Holtum) Widjaja, *comb. nov.*

Bambusa hirsua Holtum, Kew Bull. 21:271. 1967. -TYPUS: Millar & HoUtum NGF 15795 (LAE-Holotype, BO, K, L, BRI, SING, NSW), Lae, near District Commissioner's house.

Densely tufted and erect bamboo. Young shoots green, covered by brown to black hairs.

Culms 4-7 m high, straight; tips erect; branching only in the upper part, branches 1-3 (-5) at each node; young culms with white hairs, when old glabrous and green; internodes up to 75 cm long by 2.5 cm diameter; walls 2-4 mm thick.

Culm leaves persistent, covered by white hairs, sheath 7-7.9 by up to 6 cm, sheath apex upcurved in the middle; auricles rounded, up to 2 mm high, bristles up to 10 mm long; ligule denticulate, up to 2 mm high, bristles up to 6 mm long; blade erect, triangular, 8.5-9.2 by 24-3 cm, base narrowly attached to the sheath apex (0.6-0.8 cm wide), adaxially glabrous.

Leaf blades 16.5-37 by 3-5 cm, glabrous; auricles rounded, 1-2 mm high, bristles up to 17 mm long; ligule denticulate, 1-2 mm high, bristles up to 12 mm long; sheath hirsute.

Pseudospikelets c. 16 mm long. Fertile florets 6. Rhachilla internodes glabrous, 1.5-2 mm long. Glumes 2, 4-5 mm long, mucronate, acumen long-pointed. Lemmas 7-9 mm long, hirsute on the back, acuminate, acumen long-pointed. Paleas 7-9 mm long, acute, two-keeled, glabrous. Anthers yellowish, up to 4 mm long.

DISTRIBUTION. Originally this species was only known from the type locality (Lae), but it had also been found in Jayapura (*K. Gjellerup 374*), and recently, in the Toppo (Nabire) area.

ECOLOGY. Lowlands in open wet forest, 10-750 m alt.

VERNACULAR NAME. Unknown.

USES. Unknown or probably for ornamental plant.

NOTES. Except for the hirsute leaf sheath and lemmas, this species is similar to *N. atra*.

SPECIMENS EXAMINED: Papua New Guinea, Lae, Morobe, *Widjaja 6618* (BO, LAE); Lae, near Commissioner House, *Millar & Holtum NGF 15795* (LAE, K, L), *Widjaja 6629* (BO, LAE); Irian Jaya, Nabire, Toppo, *Widjaja 6651* (BO, L); Jayapura, *Gjellerup 374* (K).

5. *Neololeba inaurita* Widjaja, n. sp. - Fig. 24
(a = without; auris = ear)

Neololeba atra in ramificationis systema comparanda, culmi folii laminis erectis, auriculis ligulisque longesetosis similis, in auriculis omnibus inconspicuis differt. Pseudospiculae floribus 5 vel 6, rhachillae internodiis glabris. -TYPUS. *Widjaja 6654* (BO Holotype), Irian Jaya, Fakfak District, Mapurujaya Subdistrict, on the way to Tembagapura from Timika, mile 34.

Densely tufted, erect bamboo. Young shoots green, covered by brown hairs.

Culms up to 8 m high, straight; branching only in the upper part, **branches 1-3** at each node; young culms with white to brown hairs, **when old glabrous and green**; internodes 50-60 cm long by 1-2 cm diameter; walls 2-4 mm thick.

Culm leaves deciduous, covered by white to light brown hairs, sheath **11-12** by 6-7 cm, sheath apex horizontal; auricles inconspicuous, bristles up to 20 mm long; ligule entire, bristles up to 19 mm long; blade **erect, triangular**, 8-10 by 2.7-3.3 cm, base narrowly attached to the sheath apex (5-7 mm wide), adaxially glabrous.

Leaf blades glabrous; auricles inconspicuous, bristles up to 17 mm long; **ligule** entire, 1-2 mm high, bristles up to 19 mm long.

Pseudospikelets 15-19 mm long. Fertile florets 5 or 6. Rhachilla internodes glabrous, c. 1 mm long. **Glumes 2**, c. 8 mm long, mucronate, acumen long-pointed. **Lemmas 9-11 mm long**, acuminate, acumen long-pointed, glabrous. **Paleas 9-11 mm long**, acute, two-keeled, glabrous. **Anthers yellowish**, c. 4 mm long.

DISTRIBUTION. Irian Jaya, once collected.

ECOLOGY. Found at c. 500 m alt.

VERNACULAR NAME. Unknown.

USES. Unknown.

NOTES. This species is characterized by culm and leaf sheaths with long-bristled (inconspicuous) auricles and ligules. It is very similar to *Neololeba atra*.

SPECIMEN EXAMINED. Irian Jaya, Fakfak District, Mapurujaya subdistrict, on the way to Tembagapura from Timika, mile 34, *Widjaja 6654* (BO).

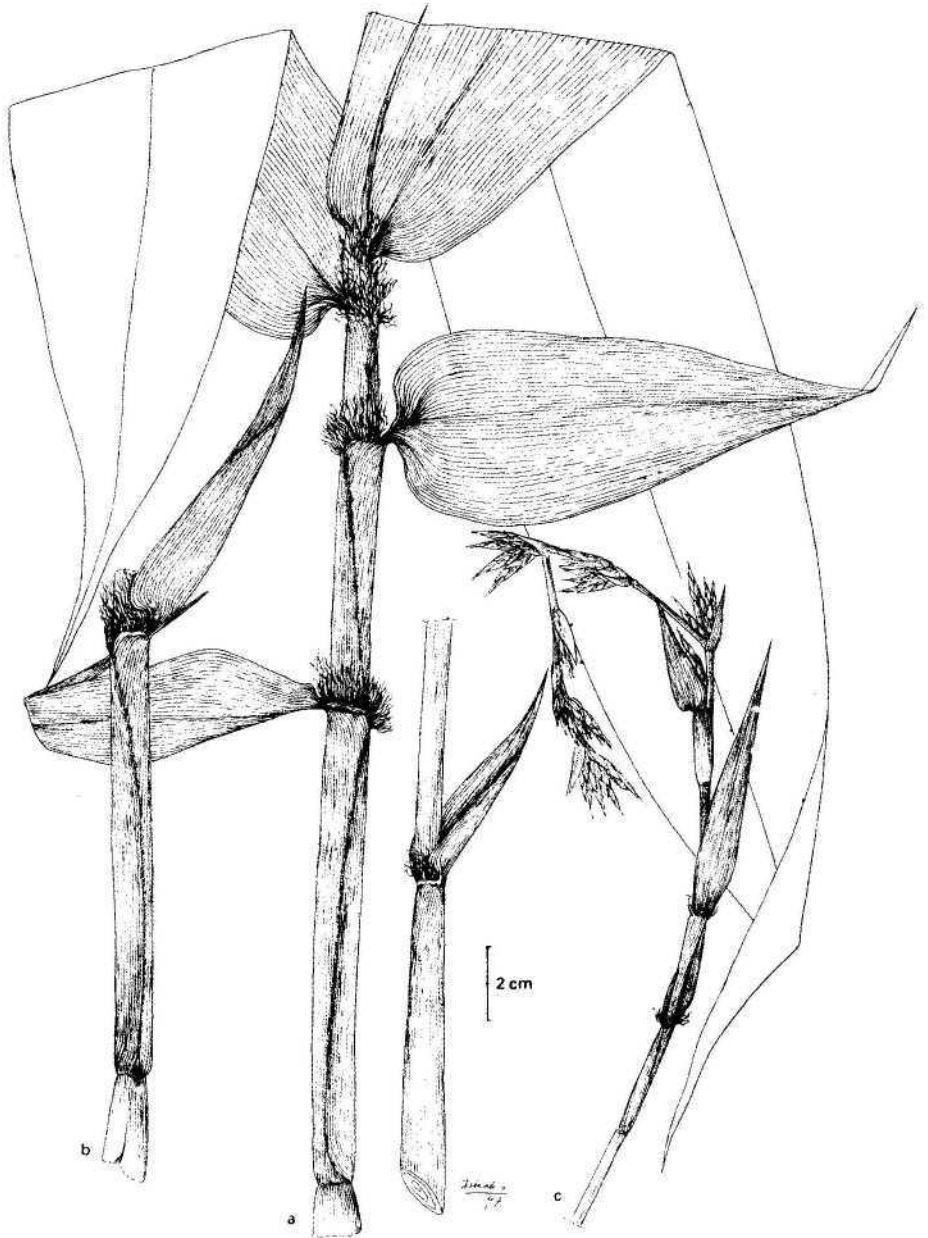


Fig. 24. *Neololeba inaurila* Widjaja: a. young shoot; b. culm leaf; c. inflorescence, from Widjaja 6654.

PARABAMBUSA Widjaja, *gen. nov.*
(para = close to; bambusa = genus *Bambusa*)

Neololeba in ramorum complemento e culmi medio parte evoluto, ramo primario dominant, secundariis 3-5 e basi sua evolutis, inflorescentia terminali similis, in ramis secundariis non iterum ramosis, auriculis rotundatis setosis differt. —TYPE SPECIES: *Parabambusa kaini* Widjaja.

Sympodial bamboo.

Culms erect in the lower part, distally scrambling. Branch complement developing from the midculm with one primary dominant branch and 3–5 secondary branches originating from its base. Each node of the primary branch producing the third branches which do not branch again. Secondary branches with 2-4 short internodes and terminated by leaf blades or an inflorescence.

Culm leaves with developed auricles and bristly, girdle-like sheath scars very rough; blade erect.

Inflorescences indeterminate, on leafless branches or terminating a leafy branch which elongates and each node producing a bract subtending a cluster of pseudospikelets. Each pseudospikelet with a small prophyll bud; slightly flattened to slender with up to 12 fertile florets. Lodicules absent. Stamens 6, filaments free. Ovary gradually tapering upwards to a flat style. Stigmas 3, white.

DISTRIBUTION. One species in New Guinea (Yapen Island).

***Parabambusa kaini* Widjaja, n. sp.** - Fig. 25
(kaini = vernacular name)

Vaginae cingulum pilis albis, culmi vagina auriculis rotundatis, 23 mm altis setis usque 10 mm longis, ligula denticulata usque 3 mm longa, pseudospiculae graciles 25-52 mm longae, lemmatibus fertilibus 5-12. - Type: *Widjaja 6642* (BO-Holotype, K, L, US), Irian Jaya, Yapen-Waropen District, Kainui, S. Enaweni.

Loosely tufted bamboo, distally scrambling. Young shoots green to purplish green, covered by white hairs.

Culms 15-20 m high, straight in the lower part, branching far above the ground, branches 3-5 at each node; young culms with white wax and hairs, when old glabrous, green; internodes 50-65 by 1-3 cm diameter; walls 2–4 mm thick.

Culm leaves glabrous, deciduous, base very rough, sheath 12-13 cm long; auricles rounded, 2-3 mm high, bristles 6-10 mm long; ligule denticulate, 2–3 mm high, bristles up to 15 mm long; blade erect, triangular, papyraceous, 13.5-14.5 by 4.5-5.5. cm, margin undulate, base narrowly attached to the sheath apex (5 mm wide), adaxially glabrous.

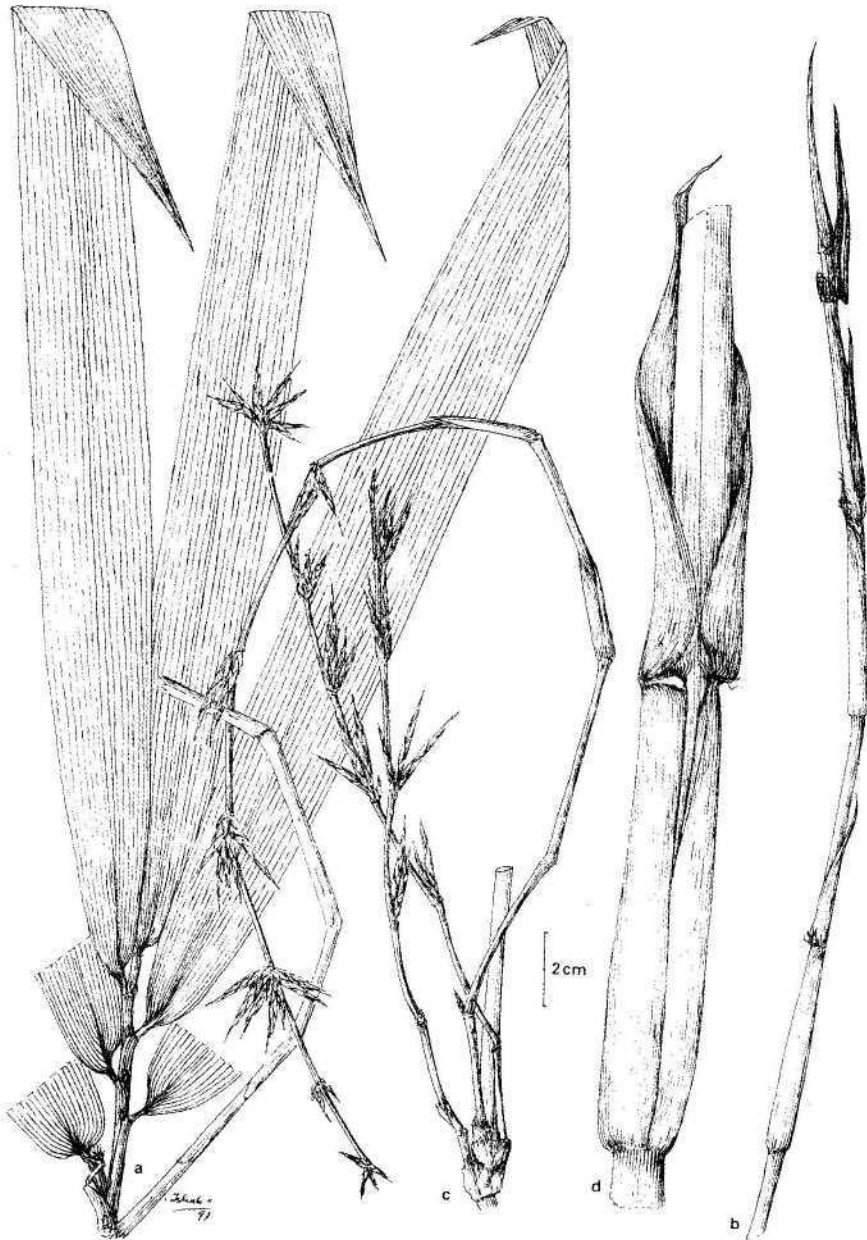


Fig. 25. *Parabambusa kaini* Widjaja: a. leaf; b. young shoot; c. inflorescence; d. culm leaf. From Widjaja 6642.

Leaf blades 26.5-31 by 3.9-6 cm, glabrous; auricles as small lobe, 0.7 mm tall, bristles dense, 5-8 mm long; ligule denticulate, 1 mm high, bristles c. 8 mm long.

Each node of the inflorescence with up to 10 clustered pseudospikelets on short and glabrous pedicels. Pseudospikelets 25-52 mm long, slender, with 5-12 fertile florets; rhachilla internodes glabrous, 1-3 mm long. Glumes 2. Lemmas 9.5-12.5 mm long, acuminate, acumen longpointed, margin ciliate, otherwise glabrous. Paleas 10-13.5 mm long, acute, two-keeled, glabrous.

DISTRIBUTION. Irian Jaya, Yapen Island.

ECOLOGY. On clay wet soil along a river bank in the lowlands, 50 m alt.

VERNACULAR NAME. Wairiro kaini (Japen).

USES. Culms are used for rope.

NOTES. This species is characterized by the white to brown hairs on the sheath of the culm leaf and especially by the white hairs on the girdlelike scar of the sheath with rounded and long-bristled auricles. This species is very similar to *Bambusa solomonensis*, but differs by having longer pseudospikelets with up to 12 florets and a long-pointed acumen of the lemma, and leaf blades with small-lobed auricles with long bristles.

SPECIMEN EXAMINED: Yapen-Waropen District, Kainui, S. Enaweni, *Widjaja 6642* (BO Holotype, K, L, US).

PINGA Widjaja, *gen. nov.*
(pinga = vernacular name)

Neololeba in ramorum complement*) e culmi medio parte evoluto, ramo primario dominanti 1, secundariis 1 vel 2 minoribus e gemma solitaria e basi sua evolutis similis, in culmi vaginae marginibus papyraceis, pseudospiculis gracilibus differt. —TYPE SPECIES: *Pinga marginata* Widjaja.

Sympodial bamboos with scrambling branches. Branching complement developing at the midculm, consisting of a primary dominant branch with 1 or 2 smaller secondary branches at each node developing from a single bud, the primary branches branching again, rather long, and scrambling.

Culm leaves sheath margin papery, sheath scar rugose; auricles rounded, bristly; ligule entire, glabrous; blade erect.

Inflorescences indeterminate, terminating the leafy branches; each node producing a bract subtending a cluster of 1 sessile pseudospikelet and several pseudospikelets with short pedicels, terminated by one pseudospikelet with a long pedicel, pseudospikelets slender without sterile florets; rhachilla internode slightly hairy. Palea two-keeled,

glabrous. Lodicules absent. Stamens 6, filaments free. Ovary glabrous, stigmas 3.

DISTRIBUTION. One species in New Guinea, known from a single collection only (Manokwari).

NOTES. This genus is similar to *Neololeba* Widjaja by the presence of a branch complement developing at the midculm with a primary dominant branch and 1 or 2 smaller secondary branches originating from a single bud at its base. It differs by the papery margins of the sheath of the culm leaf and the slender pseudospikelets. It is somewhat reminiscent of *Bambusa* Schreb. by the rhachilla internodes and glabrous ovary.

***Pinga marginata* Widjaja, n. sp. - Fig. 26**

(margo = edge, referring to the papyraceous margins of the sheaths of the culm leaves)

Neoleleba similis, in culmi vaginae marginibus papyraceis ciliatis, auriculis rotundatis breviter setosis, ligula integra pilis paucis tenuibus munita, lamina ereeta late ovata, pseudospiculis gracilibus differt. Folia lamina auriculis rotundatis breviter setosis, ligula integra longe setosa. -TYPUS. *Widjaja 6631* (BO-Holotype, K, L, MAN), Irian Jaya, Manokwari District, Ransiki Subdistrict, Nuhwey Village.

Loosely tufted bamboo. Young shoots purplish, glabrous.

Culms 15-20 m high, straight at base, tips drooping to the ground; branching c 1m above the ground; young culms glabrous, green, glossy; internodes 35-50 cm long by 1-2.5 cm diameter; walls 2-4 mm thick. Mature nodes producing aerial roots.

Culm leaves deciduous; sheaths 10-10.8 cm long, margin ciliate, papery; auricles rounded, up to 3 mm high, bristles up to 6 mm long; ligule 1 mm long, entire, with fine short hairs and 2-3 long hairs up to 10 mm long or glabrous; blade erect, papery, broadly ovate, 6.5-7 by 3-3.5 cm, base narrow (c. 0.5 cm wide, attached to the sheath apex), adaxially glabrous.

Leaf blades 17.5-40.7 by 1.7-3.3 cm, glabrous; auricles rounded, 0.5-1 mm high, bristles up to 7 mm long; ligule entire, up to 1 mm high, bristles up to 15 mm long; base almost rounded, asymmetric with a short petiole.

Pseudospikelets 4-5 mm long, fertile florets 5-7; rhachilla internodes slightly hairy. Glumes 2, 1.5-2.5 mm long. Lemmas 3.5-4.5 mm long, acuminate, glabrous. Palea 4-5 mm long, acute, two-keeled, glabrous. Anthers yellowish, c. 2 mm long. Stigmas white.

DISTRIBUTION. Once found in Irian Jaya, Manokwari, Ransiki, Nuhwey.

ECOLOGY. Wet lowland area.

VERNACULAR NAME. Pinga (Hatam).

USES. Culms are used for rope.

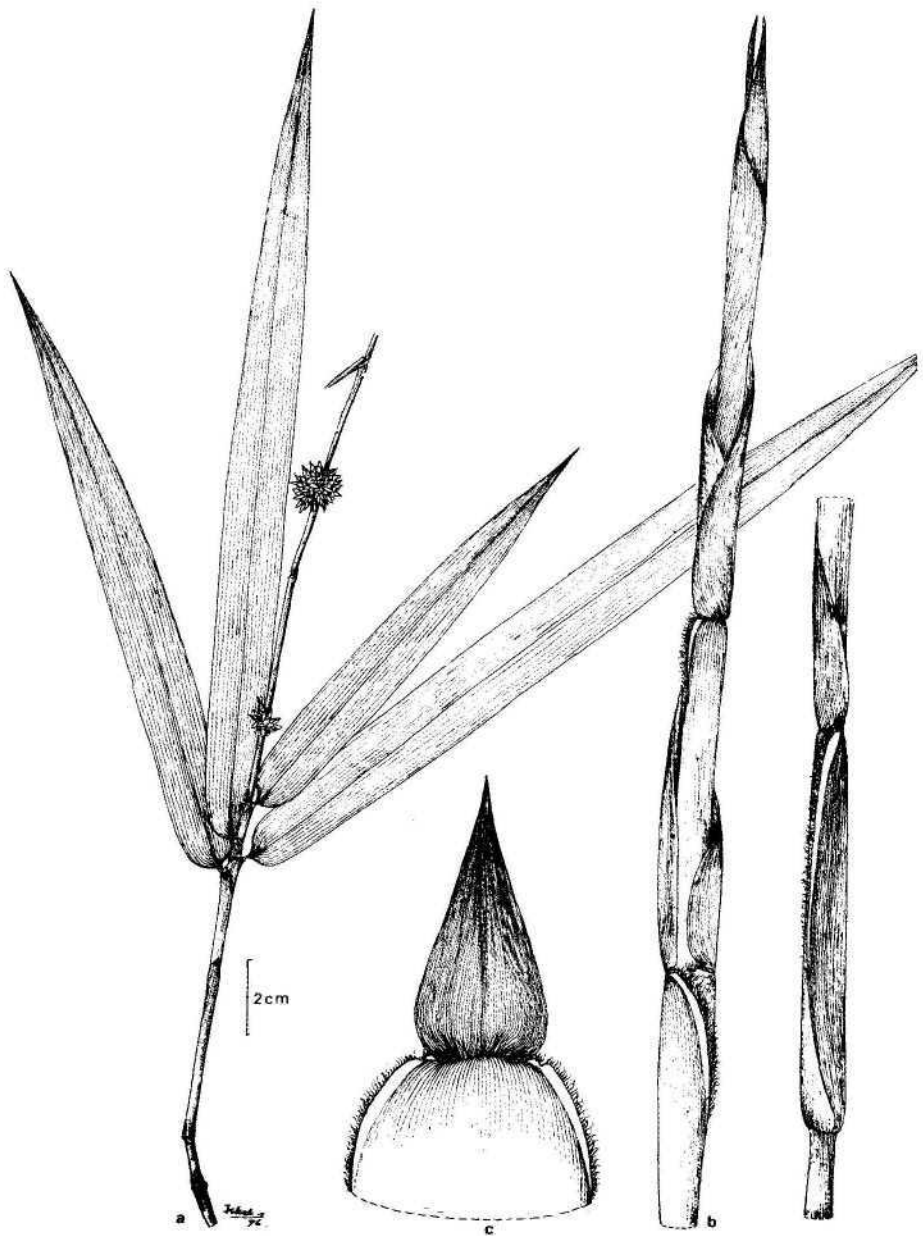


Fig. 26. *Pinga marginata* Widjaja: a. leaf with inflorescence; b. young shoot; c. culm leaf. From *Widjaja 6631*.

NOTES. This species is characterized by the culm leaves with a papery and ciliate margin, the rounded auricles with short bristles, the entire ligule with few fine hairs or glabrous, and the erect and broadly ovate blade.

SPECIMEN EXAMINED: Manokwarf, Ransiki, Ds. Nuhwey, *Widjaja 6631* (BO, K, L, MAN), *Widjaja 6633* (BO).

RACEMOBAMBOS Holttum

Sympodial, loosely tufted, scrambling bamboos; culms glabrous, somewhat pubescent below the nodes, thin-walled, straight or slightly curved. Branches at the midculm several to many, the primary branch dormant or elongated, secondary branches smaller or subequal, 3-9 in each group, not elongated nor branching again.

Culm leaves thin, papery, glabrous, narrowing upwards, occasionally with light brown to pale hairs, auricles small with or without bristles; blades narrow, erect to deflexed.

Leaf blades rarely sessile, usually petiolate, glabrous, very rarely pubescent, sheaths glabrous, margins glabrous or hairy, auricles small with long bristles.

Inflorescences determinate, terminating leafy branches, axis glabrous or hairy. Pseudospikelets glabrous or hairy, with 3-8 fertile and 1 rudimentary terminal floret. Glumes 2 or 3. Lodicules present or not. Stamens 6, filaments free.

DISTRIBUTION. About 16 species in the Malay Peninsula, Borneo, Palawan, Sulawesi, Seram, New Guinea, New Ireland, and the Solomon Islands.

ECOLOGY. Usually found in forest margins or secondary forests of montane forest.

USES. Culms are used for making blow pipes, arrow heads, and for kindling.

NOTES. *Racemobambos* is characterized by the long branches with a primary dominant and several smaller or subequal branches terminated by an inflorescence.

1. *Racemobambos rupicola* Widjaja, *n. sp.* - Fig. 27 (rupes = rock; cola = inhabitant; growing on rocks)

Racemobambos congesta in auriculis setosis similis, in folii lamina longiore auriculis setis longioribus differt. -TYPUS: *Widjaja 6644* (BO-Holotype, K, L, US), Irian Jaya, Nabire District, Kamu Subdistrict, Ekamanida Village.

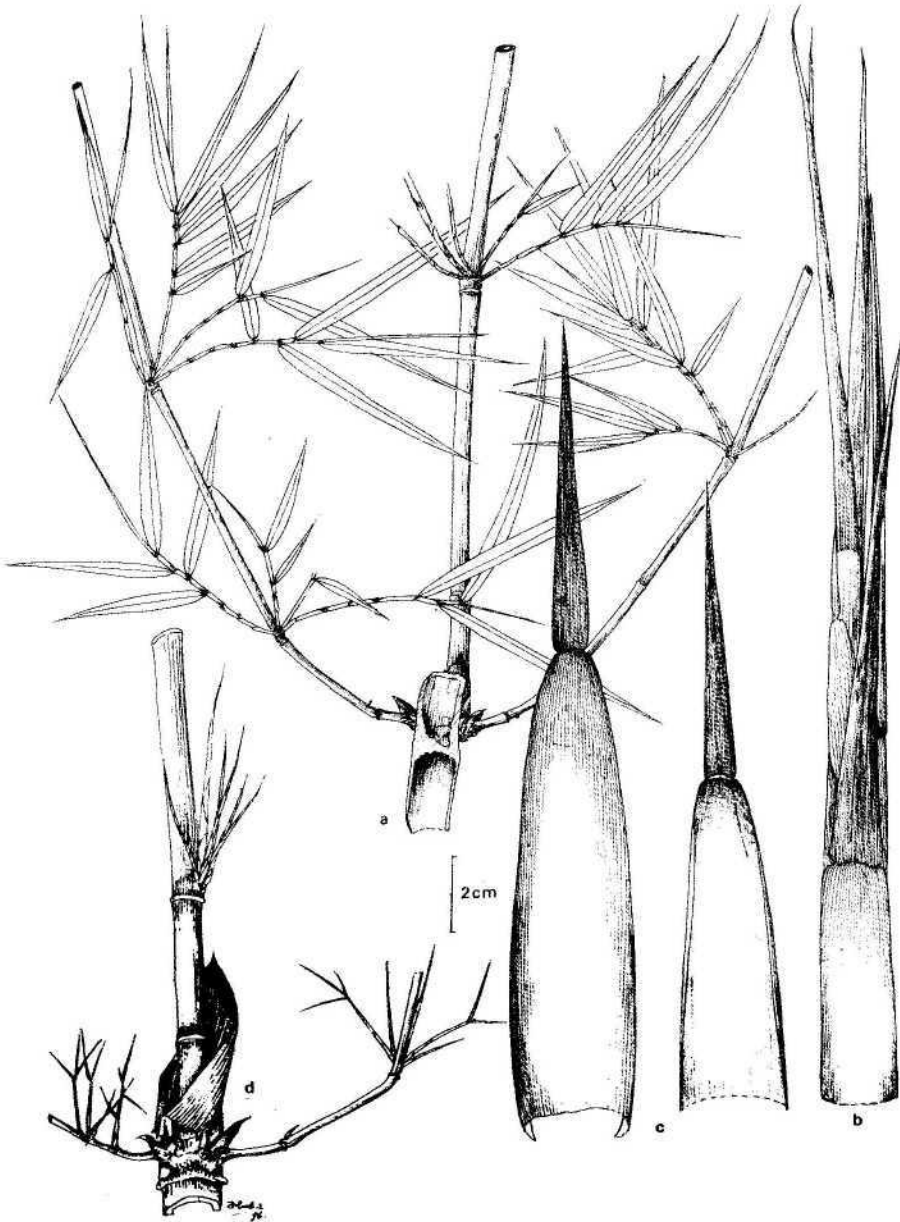


Fig. 27. *Racemobambos rupicola* Widjaja: a. leaf; b. young shoot; c. culm leaf; d. branching complement. From Widjaja 6644.

Loosely tufted, scrambling bamboo. Young shoots green, covered by brown to black hairs.

Branch tips pendulous; culms covered by brown hairs, glabrous when mature; internodes up to 25 cm long by 2-3 cm in diameter; walls thin, up to 3 mm thick.

Culm leaves glabrous, deciduous; sheath 16.3-18.5 cm long; auricles inconspicuous, glabrous; ligule entire, up to 1 mm high, without bristles; blades erect, triangular, 9.8-15 by 1.3-1.8 cm, base broad, connected directly to the sheath's apex, adaxially glabrous.

Leaf blades 5.5—12.5 by 0.3-0.5 cm, glabrous; auricles inconspicuous, up to 1 mm high, bristles up to 10 mm long; ligule entire, up to 1 mm high, glabrous.

Inflorescence unknown.

DISTRIBUTION. Irian Jaya, Nabire District, Kamu.

ECOLOGY. Open areas in forest margin, humid and alluvial and rocky soil above 1500 m alt.

VERNACULAR NAME. Idee (Monamani).

USES. Used for cooking, walls, and kindling.

NOTES. This species is very similar to *R. congesta* (Pilg.) Holtt. by the bristly auricles of the leaf blade. However, the present species has a longer leaf blade with longer bristles on the auricles.

SPECIMEN EXAMINED. Irian Jaya, Nabire District, Kamu Subdistrict, Ekamanida Village, *Widjaja 6644* (BO, K, L, US).

2. *Racemobambos sessilis* Widjaja, *n. sp.* - Fig. 28 (sessilis = to sit; to lie still)

Racemobambos muliramosa culmis infra nodos breviter pilosis, nodo utraque ramis numerosis similis, in folii lamina longiore basi inflata, auriculis longe setosis, pseudospiculis sessilibus brevibus floribus fertilibus 5-8, rhachillae internodiis pubescentibus brevibus, lodiculis desentibus differt. Quoque *R. congesta* in folii lamina longa auriculis longe setosis, pseudospiculis 5 plus ultra floribus fertilibus, rhachillae internodiis 2-3 mm longis similis, in folii lamina sessili basi inflata, pseudospiculis longioribus, rhacillae internodiis pubescentibus, lodiculis desentibus differt. A *R. rupicola* in pubescentia infra nodos, foliis sessilibus basi inflata, folii vagina marginibus pubescentibus distincta. -TYPUS: *Widjaja 6646* (BO-Holotype), Irian Jaya, Nabire District, Kamu Subdistrict, Ekamanida Village.

Loosely tufted, scrambling bamboo. Young shoots green and slightly purplish, glabrous.

Branches subequal or the main lateral branches dormant, with 7—14 subequal secondary branches at each node; internodes 40-50 cm long by up to 0.5 cm in diameter; walls up to 2 mm thick, pubescent with brownish hairs below the node.

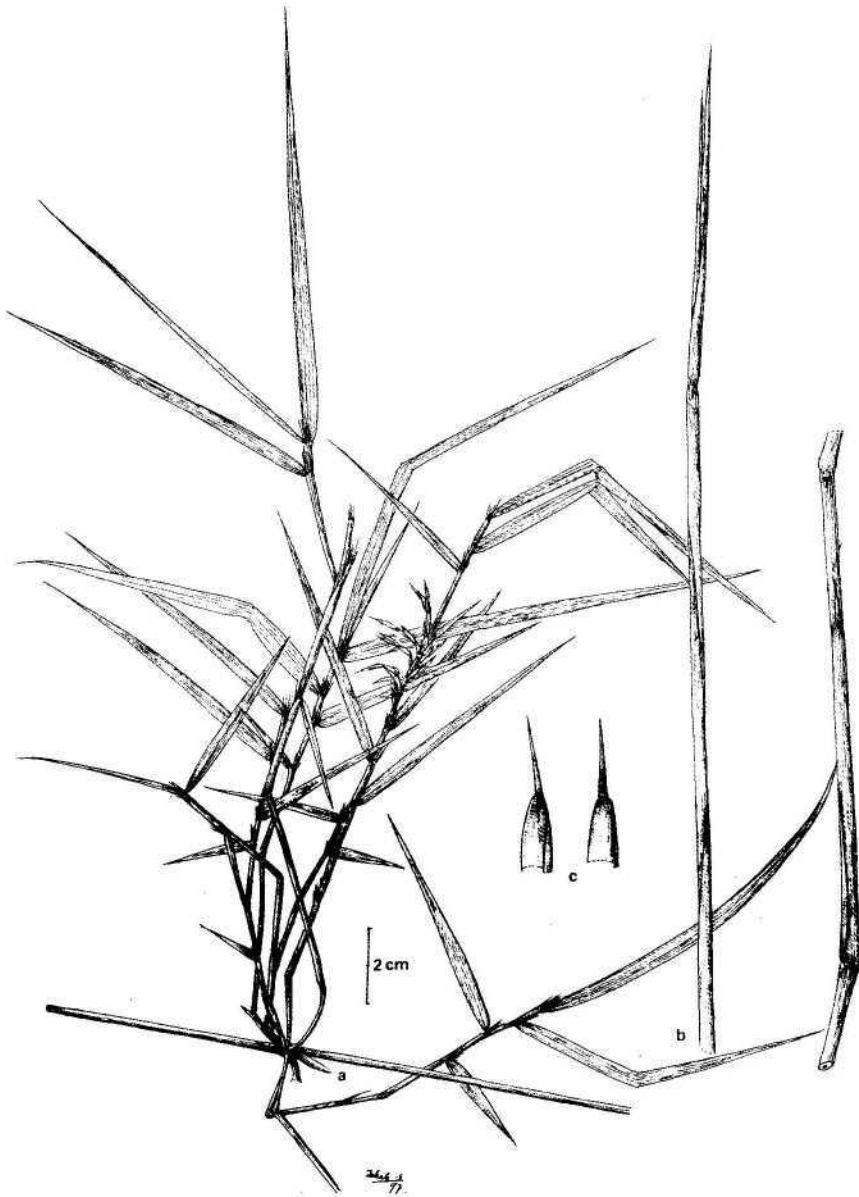


Fig. 28. *Racemobambos sessilis* Widjaja: a. leaf; b. young shoot; c. culm leaf. From Widjaja 6646.

Culm leaves covered by white and black hairs, deciduous; sheaths 8.5-12.5 cm, margin with cilia when young, glabrous afterwards; auricles inconspicuous, bristles up to 12 mm long; ligule entire, up to 1 mm high, without bristles; blades erect, triangular, 1.3-6.5 cm by 1-2 mm, base 2 mm wide connected directly to the sheath's apex.

Leaf blades sessile, 4.5-15.5 by 0.3-0.5 cm, glabrous; base swollen; auricles small, bristles 8-13 mm long; ligule very small, inconspicuous, bristles usually few, up to 8 mm long; sheath margins hairy. Pseudospikelets purplish, subtended by a thin prophyll, pseudospikelet 24-28 mm long; rhachilla internodes 2-3 mm long, hairy. Fertile florets 5-8. Glume 1, c. 8 mm long, mucronate. Lemmas 8-10 mm long, mucronate. Paleas 6-7 mm long, slightly keeled. Lodicules absent. Filaments free, anthers yellow, c. 3 mm long. Ovary glabrous but for the slightly hairy apex. Stigmas white.

DISTRIBUTION. Irian Jaya, Nabire District, Monamani; Jayawijaya District, Pass Valley.

ECOLOGY. Growing on the slopes of hills at 1400-2500 m alt.

VERNACULAR NAMES. Kagu (Monamani), saposna (Dani), enggani (Yani).

USES. Unknown.

NOTES. This species can be distinguished from *R. pubescens* by the pubescence below the node, the sessile leaves with a swollen base, and the hairy margins of the leaf sheath.

SPECIMENS EXAMINED. Irian Jaya, Nabire District, Kamu Subdistrict, Ekamanida Village, *Widjaja 6646* (BO, K, L, US), Jayawijaya District, Pass Valley, *Widjaja 6498* (BO, K, L).

SCHIZOSTACHYUM Nees

Sympodial, densely tufted bamboos, erect with pendulous tips (except *S. terminate* Holtt. which is scrambling). Culm thin-walled, green to yellowish green or yellow with green stripes, slightly pale brown to whitish hairy and with white wax when young, internodes long, nodes prominent. Branch complement subequal, borne from the mid culm upwards (except in *S. terminate* with dominant lateral branches which may become very long and scrambling).

Culm leaves covered by pale to brown hairs, auricles present, bristly, or absent, ligule usually short, sometimes long, with or without bristles.

Leaf blades with bristly auricles, ligule short, with or without brisi V.s.

Inflorescences indeterminate, terminating leafy branches. Pseudospikelets cylindrical and slender, with 1 or 2 (-4) fertile florets and a terminal rudimentary one. Lemmas with long-pointed acumen. Palea as long as lemma or longer than lemma. Lodicules 3 or absent (in *S. bamban* Widjaja, *S. cornutum* Widjaja, *S. lutescens* Widjaja, *S. mampouw* Widjaja, *S. silicatum* Widjaja). Stamens 6, filaments usually

free, sometimes fused into a tube, anthers apiculate. Ovary slender-ovoid, glabrous (hairy in *S. bamban*, *S. cornutum*, *S. lutescens*, *S. mampouw*), gradually narrowing upward. Stigmas 3, hairy.

DISTRIBUTION. About 45 to 50 species from South China through South East Asia, then throughout Malesia to the Pacific, c. 24 spp. in Indonesia. Some species previously reported for the Malay Peninsula have now also been found in Sumatra and Kalimantan.

ECOLOGY. Usually growing in wet hilly areas or on hill slopes, wild in disturbed or loggedover forests.

USES. Some species are used for building structures (*S. brachycladum* (Munro) Kurz], traditional musical instruments [*S. lima* (Blanco) Merr., *S. iraten* Steud.], and also basketry (*S. bamban* Widjaja, *S. flexuosum* Widjaja).

NOTES. Characterized by the thin culms, subequal branches, leaf blades with bristly auricles, and terminal inflorescences.

1. *Schizostachyum aequiramosum* Widjaja, *n. sp.*
(aequus = equal; ramosum = branching)

Schizostachyo grandis, *S. brachycladoque* culmis magnis simile, **in culmi foliis** deflexis, internodiis longioribus, folii ligula esetosa valaë differt. -**TYPUS:** *Widjaja 6703* (BO-Holotype), East Java, Jember, Ambulu, Curah Nongko.

Densely tufted and erect bamboo.

Culms 10–12 m high, branching far above the ground; internodes 65–130 by 5–8 cm in diameter, walls up to 4 mm thick.

Culm leaves persistent or tardily caducous, easily damaged; auricles inconspicuous, bristles easily broken; blades deflexed, triangular, base broad.

Leaf blades 12.6–24.4 by 2.5–4.6 cm, slightly hairy beneath; auricles inconspicuous, bristles up to 6 mm long; ligules entire, up to 1 mm high, bristles up to 2 mm long.

Inflorescence unknown.

DISTRIBUTION. Meru Betiri National Park (East Java), only a few clumps left.

ECOLOGY. Lowland dry areas.

VERNACULAR NAMES. Pring andeng, pring wuluh andeng (Javanese).

USES. Culms used for various purposes such as walls.

NOTES. A complete culm leaf was not seen. Culms large, almost as large as in *S. grande* Ridl. and *S. brachycladum* (Munro) Kurz, but very different by the culm leaves with deflexed blades.

SPECIMEN EXAMINED. East Java, Jember, Ambulu, Curah Nongko, *Widjaja 6703* (BO).

2. Schizostachyum atrocingulare Widjaja, *n. sp.* - Fig. 29
(atro = black; cingularis = girdle-like)

Schizostachyo undulato culmi folii lamina erecta basi lato, apice longe acuminato, vaginae laminaeque articulo in medio convexo simile, in culmi vaginae auriculis minutis, ligula longe setosa integra, lamina marginibus integris differt. Praeterea *S. iraten* nodis vaginae cicatrice cingulari prominenti, auriculis longe setosis, ligula integra, lamina erecta apice longo angusto differt. - TYPUS: *Widjaja* 3899 (B0-Holotype), Sumatra, Kerinci Subdistrict, Kuto Rendah Village.

Densely tufted bamboo. Young shoots green, covered by white and brown hairs.

Culms up to 15 m high, branching at the midculm; young culms with scattered brown hairs, when old glabrous and grey or whitish green; internodes 45-60 cm long by 2-4 cm in diameter; walls up to 4 mm thick; nodes often with a conspicuous black of girdle scar-after the sheath has dropped off.

Culm leaves deciduous, covered by white and brown hairs; sheath 12.3-13 cm long, junction horizontal, convex in the middle; auricles rounded, extending along the sheath apex up to the base of the blade, 2-4 mm high, bristles curly, 11-15 mm long; ligules entire, up to 1 mm high, glabrous; blade erect, triangular, 8.5-11.5 by 2.5-3.5 cm, base broad, junction with the sheath narrow, apex tapering to a long tip, adaxially slightly hairy.

Leaf blades 15-23 by 2.5-3.4 cm, glabrous; auricles inconspicuous, bristles up to 12 mm long; ligules denticulate, less than 1 mm high, bristles up to 7 mm long; sheath with scattered light brown hairs along the keel.

Inflorescences unknown.

ECOLOGY. Hill slopes, along river banks in the highland, 750 m alt.

VERNACULAR NAMES. Buluh serik (this name is also used for other species).

USES. Culms are used for making flutes.

NOTES. This species is characterized by the grey green culms with a prominent girdle-like scar on the nodes. **Thereby somewhat similar to *S. iraten*** Steud. It is easily recognized by the culm leaves with prominent, long-bristled auricles, an entire ligule, and an erect blade with a long narrow tip.

SPECIMEN EXAMINED. Sumatra, Kerinci Subdistrict, Kuto Rendah Village, *Widjaja* 3899 (B0).

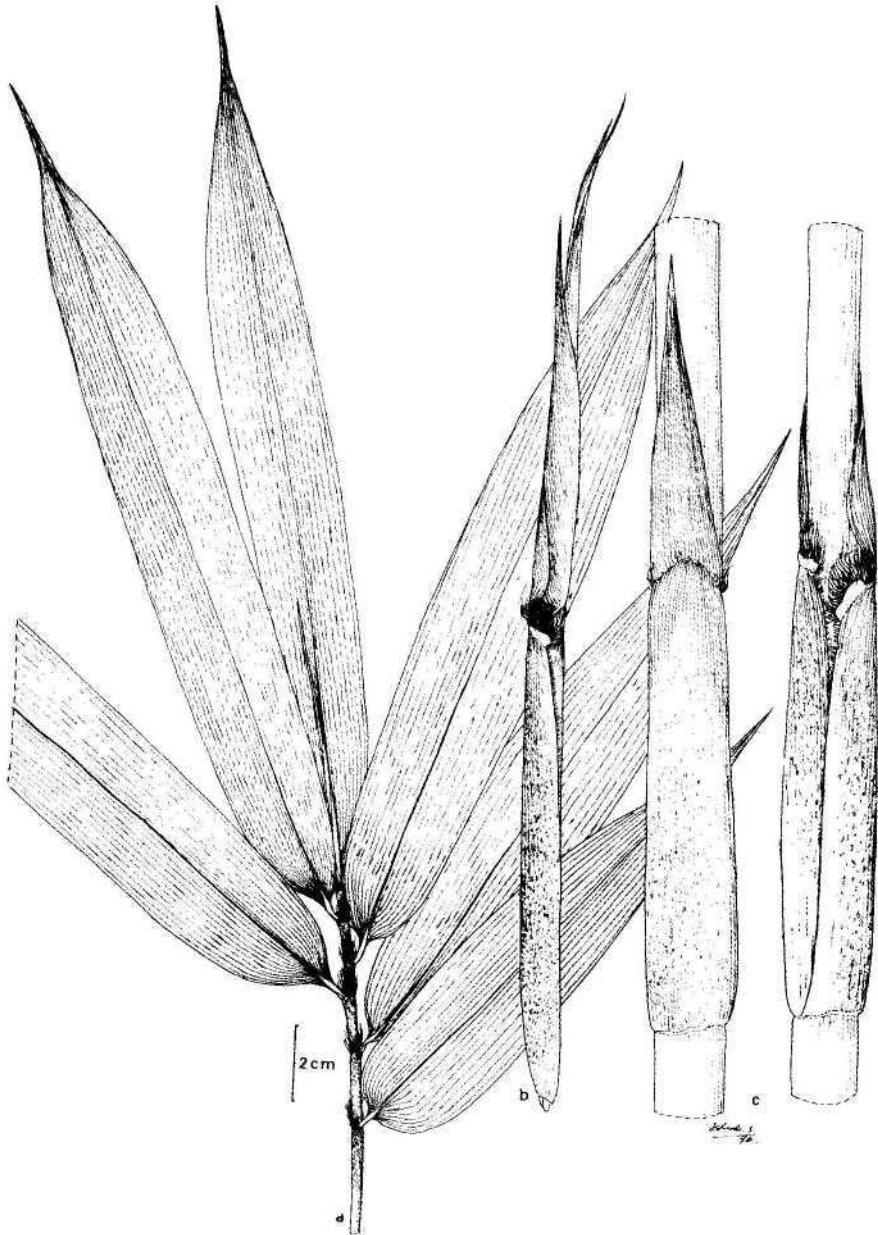


Fig. 29. *Schizostachyum atrocingulare* Widjaja: a. leaf; b. young shoot; c. culm leaf.
From Widjaja 3899.

3. *Schizostachyum bamban* Widjaja, *n. sp.* (bamban = vernacular name)

Schizostachyo undulato in culmi folii lamina erecta ad parum patenti basi triangulari simile, in hac lamina in apice longo angusto protracta, auriculis oris similibus, ligula setosa, pseudospiculis flore 1 fertili, lodiculis absentibus differt. - TYPUS: *Widjaja 3841* (BO-Holotype), Sumatra, Lahat, Sukarame.

Densely tufted bamboo. Young shoots green, covered by white hairs.

Culms up to 10 m high, branching far above 1.5 m from the ground; internodes 40-80 cm long by 2-8 cm in diameter; walls 4-6 mm thick; covered with brown hairs below the nodes.

Culm leaves deciduous, covered by white hairs; sheath 13-16 by up to 29.5 cm, junction of the apex horizontal or slightly recessed in the middle; auricles inconspicuous to rim-like, bristles up to 10 mm long; ligules denticulate, up to 1 mm high, bristles up to 3 mm long; blades erect and slightly concave, narrowly triangular, hairy, 12-26.5 by 15-2.5 cm, base broadly attached to the sheath apex (1.4-2 cm wide), apex tapering to a long narrow tip; slightly wavy, adaxially slightly hairy.

Leaf blades 14.5-30 by 3-5 cm, glabrous; auricles inconspicuous, bristles up to 6 mm long; ligules denticulate, up to 1 mm high, bristles up to 2 mm long.

Pseudospikelets 7-10 mm long, with 1 fertile floret. Rhachilla internode c. 3 mm long. Lemmas 10-11 mm long, acuminate, glabrous. Paleas 8-42 mm long, bifid, without keels, glabrous. Lodicules absent. Ovary hairy. Anthers yellowish, c. 4 mm long. Stigmas white.

DISTRIBUTION. South Sumatra (Kubu Perahu and Lahat).

ECOLOGY. Wet lowland areas.

VERNACULAR NAMES. Buluh bamban, buluh kerbau.

USES. Culms are used in making traditional basketry.

NOTES. Somewhat similar to *S. pleianthemum* S. Dransfield by the culm leaves with **an erect** to slightly spreading, narrowly triangular blade, **auricles rim-like to** inconspicuous with up to 10 mm long bristles.

SPECIMENS EXAMINED: Sumatra, Lampung Utara District, Balik Bukit Subdistrict, **Kubu Perahu Village**, *Widjaja 3808* (BO, US); *Widjaja 3809* (BO, K, L); Lahat District, **Sukarame Subdistrict**, *Widjaja 3839* (BO, K, L, US); *Widjaja 3841* (BO, K, L).

4. *Schizostachyum castaneum* Widjaja, *n. sp.* - Fig. 30 (castanea = chestnut coloured)

Schizostachyo brachyclado culmi folii lamina erectis late triangulari simile, in culmi vagina basi pubescenti, auriculis longis setosis, lamina in apice angusto longo protracta, folii lamina auriculis extrinsecus curvatis oris similibus differt. - TYPUS: *Widjaja 6676* (BO-Holotype), Bali, Tabanan.

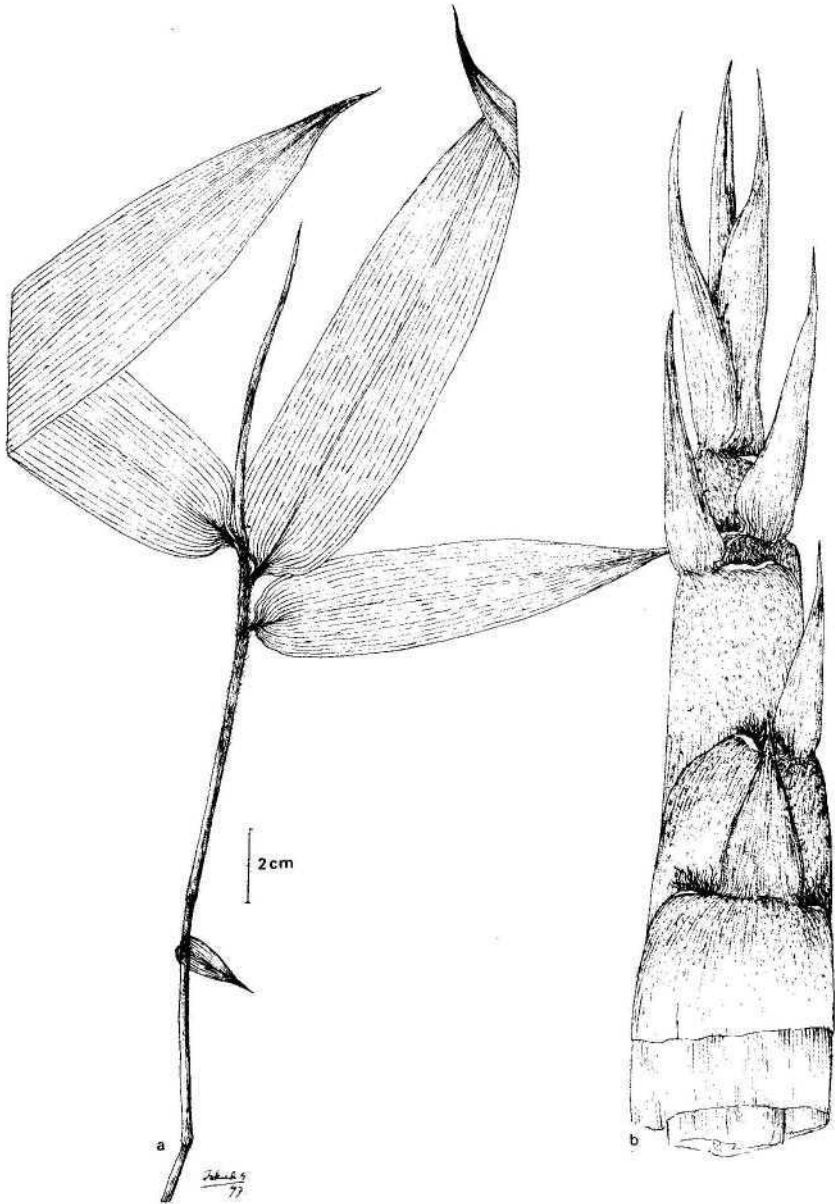


Fig. 30. *Schizosiachyum castaneum* Widjaja: a. leaf; b. young shoot. From *Widjaja 6676*.

Densely tufted bamboo, erect. Young shoots green with densely brown to chestnut-coloured hairs.

Culms up to 15 m high; branching above 1.5 m from the ground; young culms with white to brownish scattered hairs, with a whitish ring below the nodes; internodes 45-70 cm long by 4.5-6 cm in diameter; walls thin, up to 3 mm thick.

Culm leaves tardily caducous, sheaths 10-17 cm long, densely covered by brown hairs, pubescent especially at base; auricles up to 2 mm high, extending along the sheath apex up to the blade base, easily broken, bristles 4-11 mm long; ligules up to 1 mm high, denticulate, bristles up to 1 mm long; blades erect, concave, ovate-oblong, 5-7 by 2.3-2.7 cm, green, base broadly triangular, but narrower than the sheath apex, apex tapering to a narrow tip, adaxially slightly hairy.

Leaf blades 15.5-24 by 3-4.5 cm, hairy beneath; auricles curved outward, rim-like, up to 1 mm high, 4 mm wide, bristles 7-9 mm long; ligules entire, up to 1 mm high, glabrous; sheaths densely covered by white to pale brown hairs.

Inflorescences unknown.

DISTRIBUTION. Bali, Tabanan District.

ECOLOGY. Lowlands in humid and wet areas.

VERNACULAR NAME. Tying kedampal (Balinese).

USES. Culms are used as walking sticks in a traditional ceremony and to collect coconuts.

NOTES. This species is characterized by the erect culm leaf blades with outcurved auricles. It resembles *S. bamban* Widjaja by the erect culm leaf blades tapering to a narrow tip, but it differs by their broader **triangular** base, and leaf blades with outcurved auricles.

SPECIMENS EXAMINED. Bali, Tabanan, *Widjaja* 6674 (BO, K); Singaraja, Baturiti, Botanical Garden Ekakarya, *Widjaja* 6676 (BO, L).

5. *Schizostachyum cornutum* Widjaja, *n. sp.* (*cornutum* = horn-shaped)

Schizostachyo latifolio culmi folii lamina erecta ad patenti, auriculis rotundatis setosis similissimum, in culmis novellis glabris, ligulis setosis, folii lamina auriculis cornuatis longe setosis, ligula setosa differt. -TYPUS: *Widjaja* 3977 (BO-Holotype), West Sumatra, Agam District, Palupuh Village.

Densely tufted bamboo. Young shoots green, glabrous.

Culms branching above 1.5 m from the ground; young culms with white wax below the nodes and scattered white hairs, when old glabrous and green; internodes up to 60 cm long by 2-3 cm in diameter, walls up to 3 mm thick; nodes often with a conspicuous black girdle-like scar left by the sheath.

Culm leaves deciduous, glabrous, sheath 12.5-14.5 by up to 9 cm, apex horizontal; auricles rounded and folded, up to 4 mm high, bristles 7-8 mm long; ligule denticulate, up to 6 mm high, bristles up to 12 mm long; blades erect to spreading, triangular, 12-17 by 12-18 cm, base narrowly attached to the sheath apex (1 cm wide), adaxially glabrous.

Leaf blades 17-30 by 4.7-5.3 cm, glabrous; auricles rounded or horn-like, 1-2 mm high, bristles 8-9 (-12) mm long; ligules entire, up to 1 mm high, bristles up to 3 mm long.

Pseudospikelets 14-17 mm long, with 1 or 2 fertile florets. Rhachilla internodes glabrous, c. 4 mm long. Glumes 2 or 3, c. 8 mm long, acuminate, glabrous. Lemmas c. 10 mm long, apex white-hairy, acuminate, acumen long-pointed, margins ciliate. Paleas c. 12 mm long, apex 2-pointed, keels 2, glabrous. Lodicules absent. Ovary hairy. Anthers yellowish, c. 6 mm long. Stigmas white.

DISTRIBUTION. West Sumatra, Agam District.

ECOLOGY. Lowlands.

VERNACULAR NAME. Unknown.

USES. Unknown.

NOTES. This species is very similar to *S. latifolium* Gamble by the culm leaves with erect to spreading blades, with rounded and bristly auricles, differing by the glabrous shoots, the upward pointing culm sheath auricles, a bristly ligule and leaf blades with horn-like, long bristly auricles and a bristly ligule.

SPECIMEN EXAMINED. Sumatra, Agam District, Palupuh Village, *Widjaja 3977* (BO, K).

6. *Schizostachyum cuspidatum* Widjaja, *n. sp.*

(*cuspidatus* = terminating in a sharp point)

Schizostachyo undulato in culmi vagina auriculis rotundatis longe setosis, ligula integra simile, in culmi folii lamina in apice angusto longo, folii lamina auriculis extrinsecus curvatis, ligula longe setosa differt. -TYPUS: *Widjaja 3893* (BO-Holotype), Sumatra, Kerinci District, Keliling Danau Subdistrict, Kerulu Village, Tempedak Community Forest

Loosely tufted bamboo. Young shoots green covered by brown hairs.

Culms up to 15 m high, branching above 1.5 m from the ground; young culms with white wax below the nodes, when old glabrous and green; internodes 75-90 cm long by 4-6 cm in diameter; walls thin, up to 5 mm thick.

Culm leaves deciduous, covered by light brown hairs, base of sheaths densely so with pale to dark brown hairs; sheaths 15.1-16.4 cm long, junction horizontal, convex in the middle; auricles extending to the blade base, rounded, up to 10 by 15 mm, bristles up to 15 mm long; ligules entire, 2-3 mm high, glabrous; blades erect, 14-17.2 by 3-3.5 cm,

base broadly triangular, apex tapering to a narrow long tip; adaxially slightly hairy.

Leaf blades 19-33 by 4.3-6 cm, glabrous; auricles rounded and curved outward, up to 2 mm high, bristles up to 16 mm long; ligule denticulate, up to 2 mm high, bristles up to 7 mm long.

Inflorescences unknown.

DISTRIBUTION. Sumatra, Kerinci District.

ECOLOGY. Humid highland areas at 1000 m alt., especially on alluvial soil.

VERNACULAR NAME. Buluh tangkal (Kerinci).

USES. Commonly used for daily purposes such as for making basketry, sieving, and also in traditional handicraft.

NOTES. This species is very similar to *S. undulatum* S. Dransfield by the culm leaves with rounded, long-bristly auricles and an entire ligule. but differing by the leaf blades with outcurving auricles and long-bristly ligule.

SPECIMEN EXAMINED. Sumatra, Kerinci District, Keliling Danau Subdistrict, Kerulu Village, Tempedak Community Forest, *Widjaja 3893* (BO).

7. *Schizostachyum flexuosum* Widjaja, *a. sp.* - Fig. 31 (flexuosus = a bent)

Schizostachyo lalifolio in culmi folio pilis albis ad dilute brunneis, lamina lanceolata ad lineari, pseudospiculis floribus 3 fertilibus, lodiculis 3 simile, in culmi sine cera, culmi vaginae auriculis rotundatis extrinsecus curvatis, ligula denticulata setis brevibus, folii auriculis extrinsecus curvatis setosis, Ligula brevi setis longis differt. — TYPUS: *Widjaja 4853* (BO-Holotype, K, US), West Kalimantan, Sejangkung Subdistrict, Sejangkung Village.

Loosely tufted bamboo. Young shoots green, with scattered appressed light brown hairs.

Culms up to 15 m high or more, glabrous, smooth; internodes 60-80 cm long by 2-4 cm in diameter, walls up to 2 mm thick.

Culm leaves with appressed white to pale brown hairs; sheath c. 15 cm long, base densely white-hairy; auricles rounded to outcurved, c. 5 mm long, bristles c. 3 mm long; ligule denticulate, c. 3 mm tall, bristles c. 1 mm long; blades spreading, narrowly lanceolate to linear, c. 13.4 by 2 cm, base narrow, adaxially hairy.

Leaf blades 14-36 by 2.2-4.7 cm, glabrous; auricles curved outward, c. 1 mm tall, bristles c. 5 mm long; ligule 1 mm long, bristles c. 12 mm long.

Pseudospikelets up to 30 mm long, glabrous. Glumes 2, c. 13 mm long, acuminate, acumen long-pointed. Lemmas c. 20 mm long, acuminate, acumen long-pointed, glabrous. Paleas c. 19 mm long, acuminate, shortly two-pointed. Lodicules 3, c. 4 mm long, membranous, apex without cilia. Anthers yellowish, c. 6 mm long. Stigmas white.

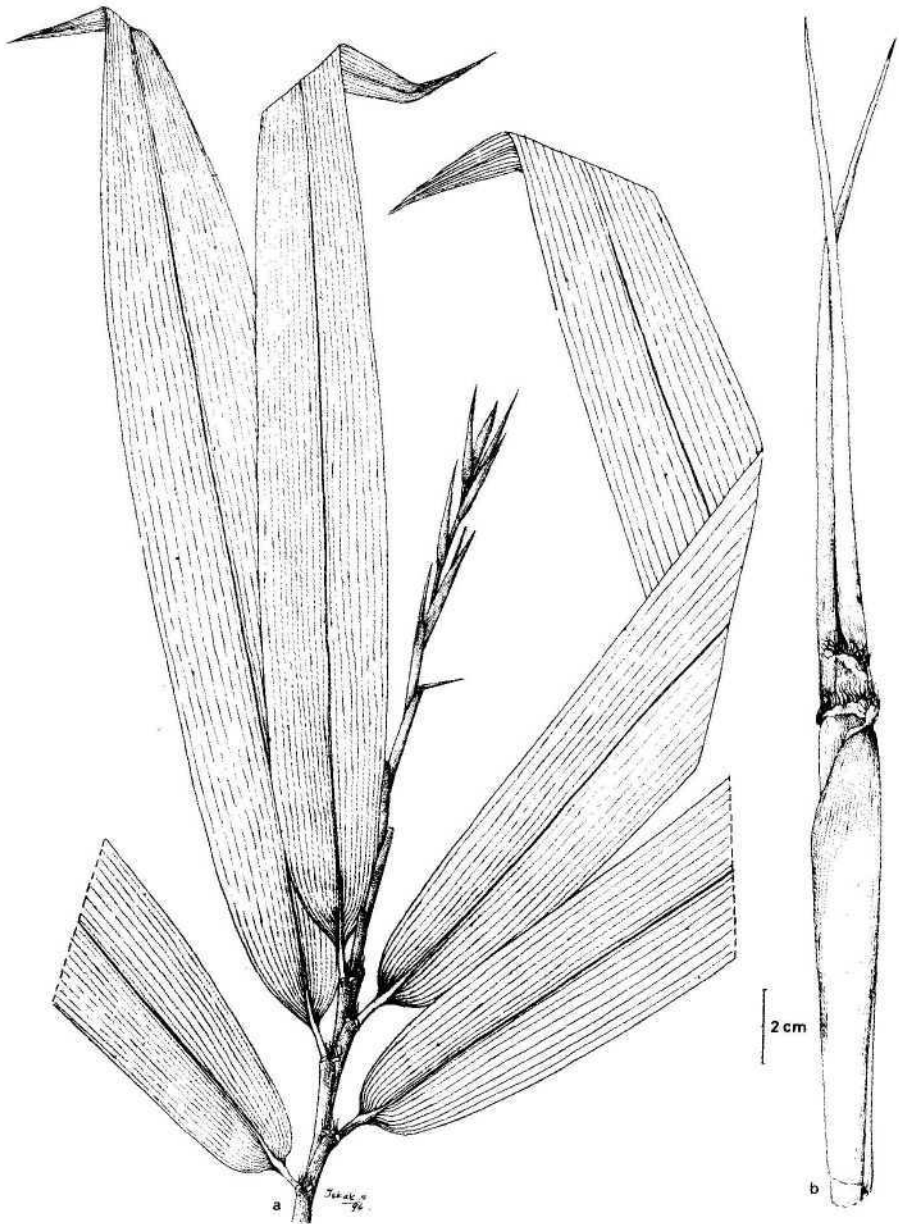


Fig. 31. *Schizoslachyum flexuosum* Widjaja: a. leaf with inflorescence; b. young shoot. From Widjaja 4853.

DISTRIBUTION. West Kalimantan.

ECOLOGY. Wet lowlands.

VERNACULAR NAME. Kauayan (in Sejangkung; the same vernacular name is also used for species of bamboo in the Philippines, "kauayan" meaning "bamboo" in Tagalog).

USES. Culms are used for various handicrafts and making mats.

NOTES. This species is somewhat similar to *S. blumei* Nees but differing by culm leaves with rounded auricles, up to 30 mm long spikelets, and the presence of lodicules. It is similar to *S. latifolium* Gamble by the culm leaves with white to pale brown hairs, a lanceolate to linear blade, and florets with 3 lodicules, but differing by the glabrous spikelets.

SPECIMEN EXAMINED. West Kalimantan, Sejangkung Subdistrict, Sejangkung Village, *Widjaja 4853* (BO, K, US).

8. *Schizostachyum glaucocladum* Widjaja, *n. sp.* - Fig. 32
(glaukos = bluish green; klados = branch, shoot)

Schizostachyo gracili Peninsulae Malayanae folii lamina auriculis minutissimis setosis, ligula Integra, lamina erecta basi late triangulari, pseudospiculis flore 1 fertili similis, in culmis altissimis, culmi vaginae auriculis oris similibus breviter setosis differt. -TYPUS: *Widjaja 4824* (BO-Holotype), South Kalimantan, Padang Betung Subdistrict, Madang Village.

Densely tufted and erect bamboo. Shoots green, covered by white wax and a few scattered appressed light brown to white hairs at the base of the internodes.

Culms up to 15 m high, branching above 1.5 m from the ground; young culms white waxy, when old glabrous and green; internodes 25-35 cm long by 1-2 cm in diameter; walls 3-4 mm thick.

Culm leaves glabrous, sometimes with scattered brown hairs on the base of the sheath; sheath 8-9 cm long, junction with the blade horizontal, margin brown-ciliate; auricles rim-like, extending along the sheath apex to the base of the blade, easily broken, up to 1 mm tall, bristles up to 4 mm long; ligule entire, bristles 1-2 mm long, easily broken; blades erect, triangular, 5-7.5 by 3-3.6 cm, more than half the sheath length, base broad, adaxially slightly hairy.

Leaf blades 13-20.2 by 1.1-1.7 cm, slightly hairy on one of the margins; auricles very small, bristles 5-7 mm long; ligule 0.4 mm high, entire, glabrous.

Inflorescences with 5 or 6 clusters of 11-19 mm long pseudospikelets with 1 fertile floret. Glumes 2, c. 8 mm long, acuminate, acumen pointed. Lemmas c. 11 mm long, acuminate, acumen long-pointed. Paleas c. 12 mm long, apex shortly two-pointed, without keels, glabrous.

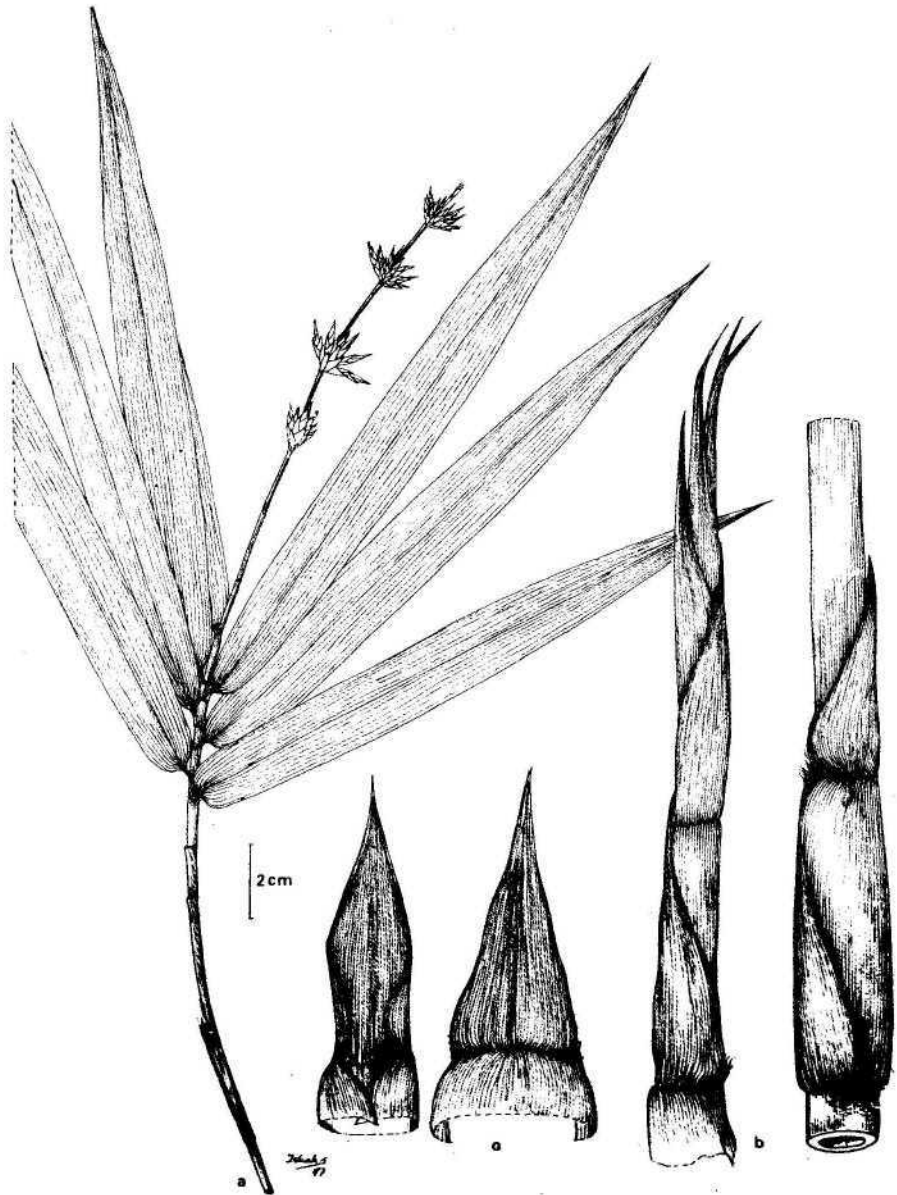


Fig. 32. *Schizostachyum glaucocladum* Widjaja: a. leaf with inflorescence; b. young shoot; c. culm leaf. From Widjaja 4824.

Lodicules 3, c. 4 mm long, membranous, apex not ciliate. Anthers yellowish, c. 5 mm long. Stigmas white.

DISTRIBUTION. South Kalimantan.

ECOLOGY. Lowlands in disturbed forest, locally abundant.

VERNACULAR NAME. Kalae (Madang).

USES. This species never grows large culms, but people plant this for the culms, used as fishing rods, which are exported in large quantities to neighbouring provinces.

NOTES. The culm sheaths of this species are very similar to those of *S. brachycladum* (Munro) Kurz, but the latter has blades more than half the length up to almost as long as the sheaths. It is similar to *S. gracile* (Munro) Holtt. from the Malay Peninsula by the leaf blades with very small, bristly auricles, an entire ligule, an erect blade with a broadly triangular base, pseudospikelets with 1 fertile floret, but differing by the very high and erect culms, and culm leaves with rim-like, short-bristly auricles.

SPECIMEN EXAMINED. South Kalimantan, Padang Betung Subdistrict, Madang Village, *Widjaja 4824* (BO).

9. *Schizostachyum lutescens* Widjaja, *n. sp.* - Fig. 33 (*lutescens* = becoming pale yellow)

Schizostachyo mampouw in folii lamina infra sparse pubescenti, ligula integra, pseudospiculis flore 1 fertili similis, in folii lamina auriculis setosis extrinsecus curvatis, lemmatis marginibus glabris ad albociliatis differt. -TYPUS: *Widjaja 3920* (BO-Holotype), Sumatra, Jambi, Padang Panjang Subdistrict, Kuto Lawah Village.

Sympodial bamboo, culms densely tufted. **Young** shoots green covered by brown hairs.

Culms straight, 20 m high, branching above 1.5 m from the ground; young culms with white hairs and scattered brown hairs, when old glabrous and green; internodes 45-60 cm long by 2-4 cm in diameter, walls thin, 3 mm thick.

Culm leaves unknown.

Leaf blades 13-22 by 2.7-4.4 cm, slightly hairy on the lower surface; auricles small, curved outward, up to 1 mm high, bristles 12-14 mm long; ligules entire, up to 1 mm high, glabrous.

Pseudospikelets c. 17 mm long, with 1 fertile floret. Rhachilla internode glabrous, c. 2 mm long. Glume 1, c. 14 mm long, acuminate, margin white ciliate. Lemmas c. 12 mm long, apex acuminate, acumen long-pointed, glabrous or margin ciliate. Paleas c. 9 mm long, apex two-pointed, glabrous. Lodicules absent. Ovary hairy. Anthers yellowish, c. 3 mm long. Stigmas white.

DISTRIBUTION. Sumatra, /Jambi.

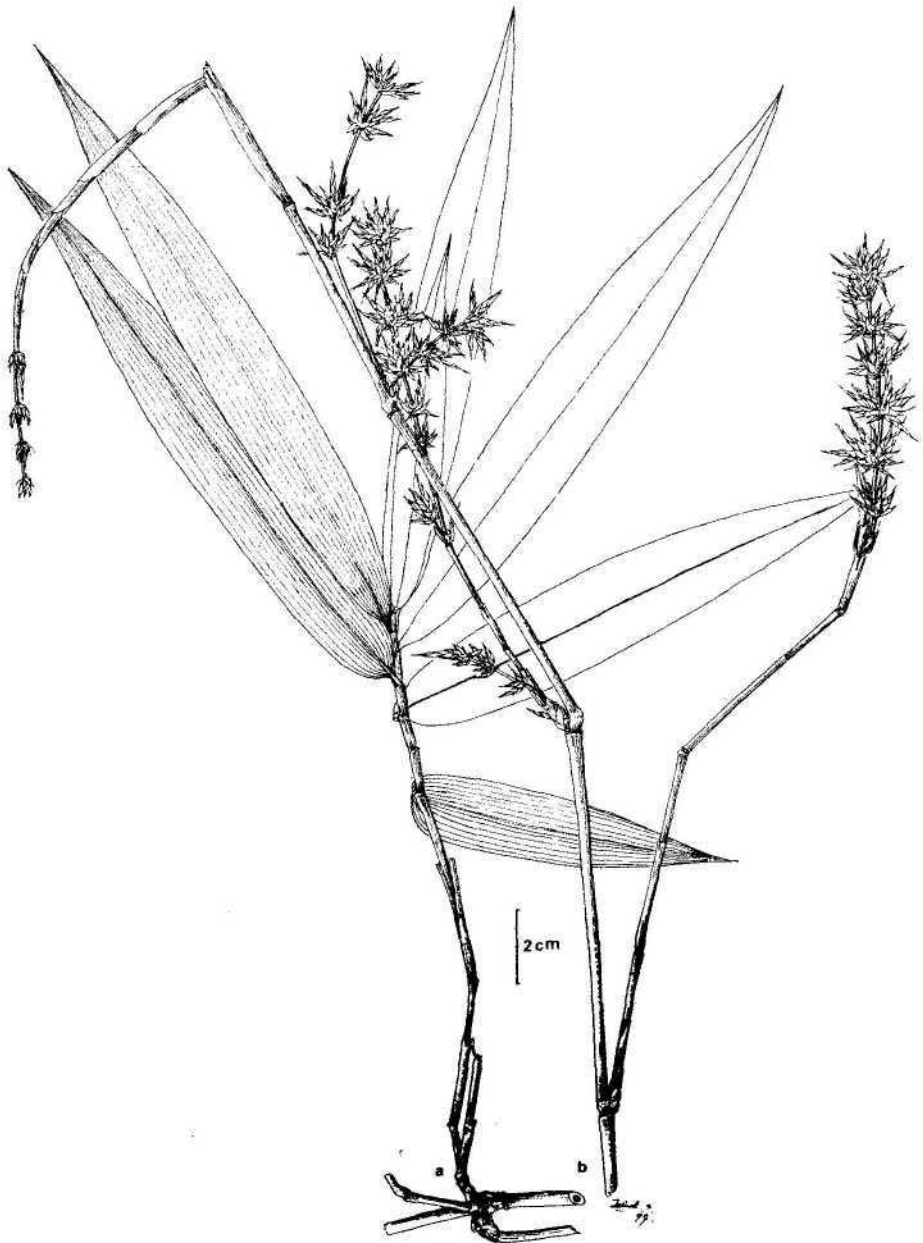


Fig. 33. *Schizostachyum lutescens* Widjaja: a. leaf; b. inflorescence. From *Widjaja 3920*.

ECOLOGY. Lowlands, 50 alt., forest clearing.

VERNACULAR NAME. Unknown.

USES. Unknown.

NOTES. This bamboo is characterized by the leaf blades with bristly, outward curved auricles, and glabrous to white-ciliate lemma margins. It is similar to *S. mampouw* Widjaja by the slightly hairy lower surface of the leaf blade, the entire ligule, and pseudospikelets with 1 fertile floret.

SPECIMEN EXAMINED. Sumatra, Jambi, Padang Panjang Subdistrict, Kuto Lawah Village, *Widjaja 3920* (BO, K).

10. *Schizostachyum mampouw* Widjaja, *n. sp.*
(mampouw = vernacular name)

Schizostachyo bamban in culmi folii vagina auriculis oris similibus setosis, ligula setosa, folii lamina auriculis inconspicuis setosis, pseudospiculis flore 1 fertili simile, in folii lamina pubescenti, ligula glabra differt. Praeterea *Schizostachyo pleianthemo* culmi folii auriculis setosis, folii lamina auriculis setosis, ligula Integra simile, in folii vagina pubescenti, pseudospiculis flore 1 fertili, lodiculis absentibus differt. -TYPUS: *Widjaja 3837*(BO-Holotype), Sumatra, Lahat District, Sukarame Subdistrict.

Densely tufted bamboo, erect. Young shoots green covered by brown hairs.

Culms 10—15 m high, branching above 1.5 m from the ground; internodes 30-60 cm long by 2.5-3 cm in diameter; walls 5-8 mm thick.

Culm leaves deciduous, covered by white to brown hairs; sheath 9.5-10 by up to 6.7 cm, junction of the apex horizontal, dark brown; auricles rim-like or slightly curved outward, 1-2 mm high, bristles up to 14 mm long; ligules irregular dentate, up to 1 mm high, bristles 2—3 mm long; blades erect, narrowly triangular, 6.5-9.5 by up to 1.5 cm, dark brown at base, gradually pale brown upward, junction with the sheath apex narrow, adaxially slightly hairy.

Leaf blades 19.5-33 by 2.4- 5 cm, slightly hairy on the lower surface; auricles inconspicuous, bristles up to 9 mm long; ligules entire, up to 1 mm high, glabrous; sheaths covered by white hairs.

Inflorescences terminal. Pseudospikelets 8-16 mm long, with 1 fertile floret. Rhachilla internode c. 2 mm long. Glumes 2, 5-8 mm long, acuminate. Lemmas 9-10 mm long, acuminate, glabrous. Paleas 10-15 mm long, apex two-pointed, without keels, glabrous. Lodicules absent. Ovary hairy. Anthers yellowish. Stigmas white.

DISTRIBUTION. West Sumatra to Jambi, Sukarame, Lahat (South Sumatra), Nipahpanjang, and Tanjung Jabung (Riau).

ECOLOGY. Lowland areas on fertile soil.

VERNACULAR NAMES. Buluh mampouw, Buluh mape, Buluh mpe, Buluh mumpo (Malay).

USES. Crystals found in the culm are gathered as "biga" and exported to Singapore. It is said that these are used to cure asthma.

NOTES. The buluh mampouw has been known since A.L. van Hasselt made an expedition in 1877—1878 in Central Sumatra and published his paper "Lijst van de hout, bamboe, en rotan soorten van Midden Sumatra" (Hasselt, 1884), but no botanical name had yet been published for it.

SPECIMENS EXAMINED: Sumatra, Bengkulu, Kapahiang Subdistrict, Tebat Mone Village, *Widjaja 3453* (BO, L); Lahat District, Sukarame, *Widjaja 3837* (BO); *Widjaja 3843* (BO, K, L); Lubuk Unggau District, Kerinci Seblat National Park, Batu Ampar, *Widjaja 3866* (BO, L); Tanjung Jabung District, Nipah Panjang Subdistrict, Berbak Nature Reserve, Sungai Palas, *Widjaja 4067* (BO, L).

11. *Schizostachyum silicatum* Widjaja, *n. sp.* (silicatum =consist of silica)

Schizostachyo irralum Kurz sensu Backer similis in foliorum laminis infra breviter pubescenti, culmi foliorum laminis deflexis, inflorescentiae axe communi breviter pubescenti, paleae apice duobus dentibus longis, stigmatibus albis, sed in culmi vaginis apice truncato, lodiculis absentibus differt. Aliquantum *S. irralen* Steud. sensu Monod similis in foliorum laminis infra breviter pubescenti, vaginae margine ciliato, sed culmi foliorum laminis deflexis facile deciduis, lodiculis absentibus, stigmatibus albis differt. — TYPUS: *Kurz s.n.* (BO-Holotype), Sumatra, Priaman.

Densely tufted bamboo. Young shoots green covered by white to brown hairs.

Culms 7-12 m high, branching above 1.5 m from the ground; young culms with white hairs, when old with scattered white hairs and green; internodes 65—75 cm long by 1–3 cm in diameter; nodes not prominent; walls up to 3 mm thick.

Culm leaves persistent; sheath 12.3-21 cm long, covered by white to brownish hairs, apex truncate, margins pale brown to brown ciliate, junction horizontal; auricles inconspicuous, bristles easily breaking off; ligule denticulate, up to 1 mm high, with few, fine bristles that easily break; blades deflexed, early caducous, linear to narrowly triangular, 6.5-14.8 by 0.4—1.3 cm, more than half as long as to slightly shorter than the sheath, base narrow, adaxially slightly hairy.

Leaf blades 18.5-27.5 by 2.2-4 cm, hairy beneath; sheaths slightly hairy when young, especially the apex, margin ciliate; auricles outcurved but easily broken, 1–2 mm long, bristles up to 6 mm long; ligule up to 1 mm high, entire, glabrous.

Inflorescences with 4-6 clusters of 1-several pseudospikelets; main axis shortly hairy. Pseudospikelets 12-20 mm long, glabrous, with 1 fertile floret. Rhachilla internode slightly hairy, c. 5 mm long. Lemmas C 12 mm long, acuminate, acumen short, glabrous. Paleas c. 14 mm

long, apex with two long-pointed tips, glabrous. Lodicules absent. Anthers yellowish to greenish, 6-6.5 mm long. Stigmas white.

DISTRIBUTION. Sumatra, Java, and Bali.

ECOLOGY. Forest margins in humid tropics, along village roads, river banks, and hill slopes in the lowland.

VERNACULAR NAMES. Awi tamiyang (Sundanese), Bambu suling (Indonesia), Bambu tamiyang sonoh (Sumatra), Buluh (Malay), Pring wuluh (Javanese), Tiyang ouluh (Balinese).

USES. Used for flutes and other traditional household utilities.

NOTES. Dransfield [Kew Bull. 38 (2): 332. 1983] stated that the bamboo called "tamiang" by the Javanese belongs to *S. iraten* Steud. According to Backer (1928) this has erect blades and purplish stigmas. Field experience showed that two kinds of bamboo are included under the local names "bambu tamiang" or "bambu suling", one with erect blades and one with deflexed blades. Both groups grow widely in Java on hill slopes, along roads, or even in disturbed forests or open areas.

The species with erect blades resembles *S. iraten* Steud. sensu Backer by the leaf blades shortly hairy beneath and sheaths with ciliate margins, while the second one as can be seen from the description given above, differs by the deflexed, easily deciduous blades of the culm leaves, the horizontal junction of the sheath apex with the blade, a short-hairy main axis, pseudospikelets with 1 fertile and 1 sterile floret, paleas with two-pointed tips, absent lodicules, and white stigmas.

The stigma colours, position of the culm leaves blades of the specimen used by Steudel (1856) (*Zollinger 3531* written by Zollinger (1854) as 2531) in describing *S. iraten* Steud. could not be seen. Therefore, this is distinguished from the above taxon by a short-hairy main axis of inflorescence and 1 fertile and 1 sterile floret.

Schizostachyum silicatum is also similar to *S. jaculans* Holtt. by having deflexed culm leaf blades, 1 perfect floret, and paleas with two apical points, absent lodicules, but it differs by the non-prominent nodes and the bristles of the ligule of the leaf blades. *Schizostachyum silicatum* is also close to *S. irratum* Kurz sensu Backer (1928) by the reflexed blades of the culm leaves, the hairy leaf blades with ciliate sheaths, the short-hairy main axis, paleas with two-pointed tips, and white stigmas, but it differs by the truncate sheath apex and the absent lodicules.

Kurz specimens (*Kurz s.n.*, BO, annotated "tamiyang sonoh") collected from Sumatra showed that they belong to this species. On his label Kurz noted that these specimens belong to his unpublished "*Schizostachyum iraten* var. *silicata* mih." Kurz (1876, p. 73) mentioned that "it possesses the longest joints amongst Javanese bamboos; the halm are very firm to

the touch very rough on account of their richness in silica", no doubt the reason he called *S. iralen* var. *silicata*. Therefore, I have adopted this epithet here.

Schizostachyum irratun Kurz was spelled in three different ways ("irratun, iratten, irraten") in Kurz's publication of 1876, these are orthographic variants of *S. iraten* Steud. Neither Backer (1928) nor Monod de Froideville (1968) ever saw Kurz's material and therefore it was uncertain to them what he had before him.

The description of the culm leaf is taken from the specimen collected by *Widjaja 6701* from Java, Lumadjang District, Senduro Subdistrict, Bruno Village.

SPECIMENS EXAMINED. Sumatra: Pariaman, *Kurz s. n.* (BO). Java: Lumadjang District, Senduro Subdistrict, Bruno Village, *Widjaja 6701* (BO, K, L); Jember, Ambulu, Curah Nongko villages, *Widjaja 6704* (BO); Purwodadi, G. Baung, *Toyib 15* (BO); Kudus, Piji Wetan, Ds. Lau, *Widjaja 1712* (BO); Leuwiliang, Pasir Kuda, Cilameh, near Ciputih, *Bakhuizen v. d. Brink 7249* (BO); Bogor, Jasinga, *Widjaja 1727* (BO); Batavia, Palered, G. Bongkok, *Bakhuizen v. d. Brink 6277* (BO); Bali: Tabanan, *Widjaja 6675* (BO).

DOUBTFUL SPECIMENS

There are some specimens **which at present cannot be placed under any genus. They are climbing and scrambling bamboos, with or without girdle-shaped sheath scars, and a branch complement with or without dominant branches. Because of the absence of inflorescences and pseudospikelets, the identity of these species is cannot be ascertained and they may even represent unknown genera.**

1. Group 1 - Fig. 34

Loosely tufted bamboo. Young shoots green, glabrous.

Culms climbing, up to 20 m high; tips drooping to the ground; branches 4–30 to a node, subequal when the primary dominant branch is dormant, the subequal branches having 2–4 internodes and terminated by leaves and not branching again distally; young culms with appressed white hairs, when old glabrous and green; internodes 12–25 cm long, below the node very rough due to appressed pale hairs; walls so thick that the culms become almost solid.

Culm leaves with a very rough and densely hairy girdle-like sheath scar, hairs light brown, sheath covered by appressed white hairs, sheath



Fig. 34. Group 1: a. leaf; b. young shoot. From *Widjaja 6650*.

early deciduous, 4.8-6.7 by up to 3 cm; auricles inconspicuous, glabrous; ligules entire, up to 1 mm high, glabrous; blades erect, slightly wavy, triangular, 4.8-6 by 1.5 mm, base broadly attached to the sheath apex (1.2 mm wide), adaxially slightly hairy.

Leaf blades 15-20 by 0.5-1 cm, slightly hairy on the lower surface; auricles inconspicuous or very small and easily broken, up to 1 mm high, bristles up to 6 mm long; ligules entire, up to 1 mm high, bristles 10 mm long.

Inflorescences not seen.

DISTRIBUTION. New Guinea: Irian Jaya Province, Nabire District, between Nabire to Toppo and Chaban; Papua New Guinea, Central Province, Sogeri, Eilogi.

ECOLOGY. Wet limestone areas, 300-800 m alt.

VERNACULAR NAME. Unknown.

USES. Unknown.

NOTES. Holttum (Kew Bull. 21, 1967, 292) regarded the sterile *Womersley & Simmonds* specimen as 'probably an undescribed species of *Nastus*'. However, because of the rough girdle-like sheath scar this does not seem to be a *Nastus*, and the only genus with such a scar girdle is *Dinochloa*, but the present taxon has subequal secondary branches which do not branch again distally.

This species is characterized by very rough internodes due to appressed pale hairs, inconspicuous and glabrous culm leaf auricles, with an entire, glabrous ligule, and an erect blade, slightly undulated on the blade.

SPECIMENS EXAMINED: New Guinea: Irian Jaya Province, Nabire, Km 37 on the way to Toppo, *Widjaja 6650* (BO, K, L, US), Chaban, 35 km inward of Nabire, *Kanehira & Halusima 1911* (BO); Papua New Guinea, Central Province, Eilogi near Sogeri, *Womersley & Simmonds NGF 7122* (BO, LAE, K).

2. Group 2. - Fig. 35

Loosely tufted and scrambling bamboo. Young shoots purplish, glabrous with white wax.

Culms scrambling, glabrous, glossy; tips drooping to the ground; **branching above 1.5 m from the ground**, branches 5-7 to a node, one lateral branch dominant over the other smaller ones or the main dominant branch dormant and developing only after the main culm is damaged; young culms with white wax, glabrous when old and green; internodes 25-30 by 2-3 cm in diameter; wall up to 5 mm thick.

Culm leaves glabrous, deciduous; sheath 8-12 cm long, glabrous, glossy and shiny; auricles rounded, deflexed and crisped to the blade base, easily broken, 7 mm high, bristles up to 20 mm long; ligules entire, up to 1 mm high, glabrous; blades erect, later spreading, finally

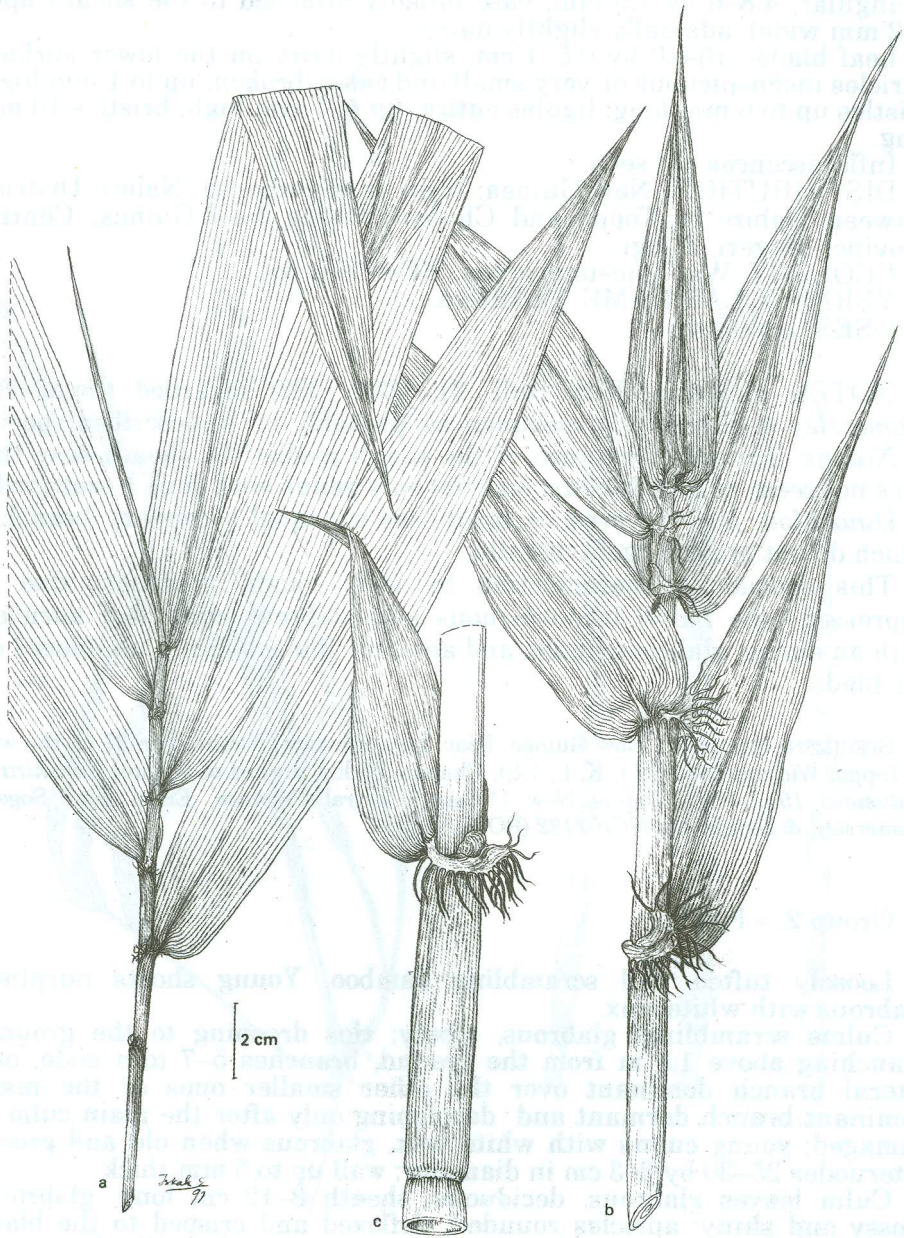


Fig. 35. Group 2: a. leaf; b. young shoot; c. culm leaf. From *Widjaja 6647*.

deflexed, 10-16.5 by 2-4.5 cm; apex undulate, broadly ovate, base narrower than the sheath apex (0.5-1.3 cm wide), adaxially slightly hairy.

Leaf blade 14.5-27 by 2.7-3.7 cm, glabrous; auricles 2 mm high, folded, bristles 5-9 mm long when young, auricles broken or 1 mm high and glabrous when old; ligules entire, 0.5 mm high, glabrous.

Inflorescences not seen.

DISTRIBUTION. Only two specimens were collected so far from Irian Jaya, Paniai District, and Papua New Guinea, Morobe Prov., Buano.

ECOLOGY. Forest margin in a stony area, near a stream or along a river in the highlands, 1000-1500 m alt.

VERNACULAR NAME. Buka (Kamu village).

USES. Locally used for making knives and arrow heads.

NOTES. These specimens are characterized by their glabrous culms with white wax becoming glabrous and glossy when old, and the culm leaf and leaf blade with large, rounded lobed and folded auricles with long bristles. Based on the branching complement, these specimens are very similar to *Racemobambos*, but the leaves are too large.

SPECIMENS EXAMINED: Irian Jaya Province: Paniai District, Kamu Subdistrict, Ds. Ekamanida, Monamani, *Widjaja 6647* (BO, K, L, US); Papua New Guinea: Morobe Province, Buano, Kareo, *Widjaja 6612* (BO, LAE), *Widjaja 6615* (BO, LAE).

ACKNOWLEDGEMENTS

This paper is the results of field work done between 1990 and 1993 with a grant from IDRC (Project: Bamboo Germplasm (Indonesia) number 3-P-90-0036). This publication was made possible with the aid of a grant from the IDRC, which is gratefully acknowledged here.

I would like to express my gratitude to the Directors and Keepers of the following Herbaria: Rijksherbarium/Hortus Botanicus, Leiden, The Netherlands (L), the Royal Botanic Gardens, Kew, Great Britain (K), the Natural History Museum, London (BM), the Smithsonian Institution, Washington, U.S.A. (US), the Papua New Guinea Forest Research Institute, Lae (LAE), the Herbarium Manokwariense, **Manokwari**, Indonesia (MAN), and the Herbarium Bogoriense, Bogor, Indonesia (BO) for allowing me to examine the specimens in their **keeping** and the use of their research facilities.

I am under deep obligation to Dr. J. F. Veldkamp (Leiden) for kindly **preparing** the Latin descriptions and checking the English as well as

helpful suggestions made during the writing of this paper. Moreover, I have to thank Dr. Soejatmi Dransfield (Kew), Dr. Mien A. Rifai (BO) for constructive discussions and valuable assistance, and Mr. Iskak Samsuodin (BO) for preparing the illustrations

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**Published with the financial assistance from IDRC,
Project Bamboo Germplasm (Indonesia)
Number 3-P-90-0036**

NEW TAXA IN INDONESIAN BAMBOOS

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Reprinted from

REINWARDTIA

VOL. 11 (2) (1997) : 57-152. 19 November 1997

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