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Cover images: *Dinochloa glabra* Widjaja & Ervianti, *spec. nov.* A. Culm sheath. B. Leaves. C. Leaf sheath. D. Inflorescence (1. Floret. 2. Palea. 3. Lemma. 4. Glume (a, b, c). 5. Lodicule (a, b, c). 6. Anthers. 7. Stigma. 8. Fruit). From *Widjaja EAW 8864* (BO), drawing by Wahyudi Santoso (BO).

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NEW SPECIES OF CLIMBING AND SCRAMBLING BAMBOO FROM SULAWESI, INDONESIA

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ABSTRACT

ERVIANTI, D., WIDJAJA, E. A. & SEDAYU, A. 2019. New species of climbing and scrambling bamboo from Sulawesi, Indonesia. *Reinwardtia* 18(2): 115–132 — Ten new species of Sulawesi bamboos are discovered, belonging to the climbing genus *Dinochloa* Büse and the scrambling *Fimbribambusa* Widjaja. These are *Dinochloa bungintimbensis* Widjaja & Ervianti, *D. glabra* Widjaja & Ervianti, *D. karaboensis* Widjaja & Ervianti, *D. khoonmengii* Widjaja & Ervianti, *D. kolakaensis* Widjaja & Ervianti, *D. mekonggensis* Widjaja & Ervianti, *D. multibrachiata* Widjaja & Ervianti, *D. sessilifolia* Widjaja & Ervianti, *D. wartabonei* Widjaja & Ervianti, and *Fimbribambusa soejatmiae* Widjaja & Ervianti. Identification keys, descriptions and illustrations of these species are presented.

Keywords: Bambusoideae, *Dinochloa*, *Fimbribambusa*, Sulawesi.

ABSTRAK

ERVIANTI, D., WIDJAJA, E. A. & SEDAYU, A. 2019. Jenis baru bambu memanjat dan serabutan dari Sulawesi, Indonesia. *Reinwardtia* 18(2): 115–132 — Sepuluh jenis baru bambu ditemukan di Sulawesi, termasuk dalam marga bambu memanjat *Dinochloa* Büse dan marga bambu serabutan *Fimbribambusa* Widjaja. Kesepuluh jenis baru bambu adalah *Dinochloa bungintimbensis* Widjaja & Ervianti, *D. glabra* Widjaja & Ervianti, *D. karaboensis* Widjaja & Ervianti, *D. khoonmengii* Widjaja & Ervianti, *D. kolakaensis* Widjaja & Ervianti, *D. mekonggensis* Widjaja & Ervianti, *D. multibrachiata* Widjaja & Ervianti, *D. sessilifolia* Widjaja & Ervianti, *D. wartabonei* Widjaja & Ervianti dan *Fimbribambusa soejatmiae* Widjaja & Ervianti. Kunci identifikasi, deskripsi dan gambar semua jenis yang baru disajikan.

Kata Kunci: Bambusoideae, *Dinochloa*, *Fimbribambusa*, Sulawesi.

INTRODUCTION

Most tropical bamboos have erect culms forming discrete clumps; however, there are some genera which have a climbing and scrambling habit, which help to place the bamboo genera. In Sulawesi, one may encounter the climbing habit in the genus *Dinochloa* Büse, and the scrambling habit in the genus *Fimbribambusa* Widjaja. Besides climbing with its twining culms, *Dinochloa* is characterized by its zig-zag culms and roughly wrinkled sheath base (Dransfield, 1981). *Dinochloa* occurs widely from West to Central Malesia. The highest diversity is in South East Asia with 33 species out of 38 species known

(Vorontsova *et al.*, 2016). Sulawesi has about 39 species of bamboo (Ervianti *et al.*, 2019), among these there are 19 species of *Dinochloa* and one species of *Fimbribambusa*. In Indonesia, *Dinochloa* is found in West Malesia, including Sumatra, Java, Kalimantan, and in East Malesia in Sulawesi and the Lesser Sunda Islands (LSI). Due to the highest *Dinochloa* diversity being there, it is suggested that Sulawesi is the centre of diversity of this genus. There was no information available on whether *Dinochloa* can be found east of Sulawesi, until a collection was made by Wita Wardhani and Wahyu Santoso *WT S 93* on their exploration of Tanimbar Island (Moluccas

IDENTIFICATION KEY TO THE GENERA

1. a. Culms climbing (basically twining), sheath base around each culm node with rough transverse wrinkles, culm nodes without patella..... *Dinochloa* Büse
- b. Culms scrambling, sheath around culm nodes smooth, patella typically well-developed around culm nodes..... *Fimbribambusa* Widjaja

province) on 22 April 2018. This island is administratively under the Lesser Sunda Islands, but much farther east than the main series of islands. Although that collection has the vegetative features of *Dinochloa*, unfortunately there were no inflorescences found.

Fimbribambusa is characterized by its scrambling habit, with a narrow to wide patella (a rim-like outgrowth around culm nodes). The culm sheath as well as the leaf sheath has horn-like auricles. These characters are also found in the genus *Temburongia* discovered by Dransfield & Wong (1996) in Brunei. The genus *Fimbribambusa* consists so far only two species which are spread over Java and New Guinea (Vorontsova *et al.*, 2016). However, there are some more species discovered in South Sulawesi and Alor Island (Lesser Sunda Islands). A new species of *Fimbribambusa* from Sulawesi is presented here. *Temburongia* and *Fimbribambusa* have much similarity in their vegetative characters but are distinguished by inflorescence characters mainly.

DINOCHLOA Büse

Dinochloa Büse in Miquel, Pl. Junghuhn: 388. 1854. Bentham in Bentham & Hooker, Gen. Plant. 4:1212 (1883); Gamble in Ann. Roy. Bot. Gard. Calcutta 7:111 (1896); Holttum in Gard. Bull. Sing. 16:81 (1958); Monod de Froideville in Backer & Bakhuizen v.d. Brink Jr. Fl. Java 3: 637 (1968).

TYPE SPECIES: *Dinochloa scandens* (Bl.) Kunth.

Culms climbing (basically twining), zig-zag, smooth or rough when young, usually purplish, rarely green, some covered by white wax. Culm node with very rough transversely wrinkled sheath base. *Branches* small, with the dominant branch mostly at first dormant but often developing later to culm-like proportions, especially when the main culm is broken. *Culms sheath* have rugose base with black hairs or whitish wax adaxially, auricles present or absent, having short to long bristle or glabrous; blades erect, spreading or deflexed, triangular with narrow attachment to the sheath to broadly ovate with wider attachment to the sheath. *Leaf* glabrous or pubescent on the lower surface, *leaf sheath* auricles present or absent; some with short to long bristles, or glabrous. *Inflorescences* indeterminate, pseudo-

spikelet typically small, less than 1 cm long, rachilla < 1–2 mm long, 1 floret, palea without keels; lodicules present or absent, stamens 6, filament free, stigma 3.

Distribution. Malesia (Borneo, Java, Lesser Sunda Islands, Malay Peninsula, Philippines, Sumatra, Sulawesi).

Habitat. Primary and secondary forests, on ultrabasic soil, limestone, volcanic soil; from lowlands up to 1,200 m asl.

1. *Dinochloa bungintimbensis* Widjaja & Ervianti, *spec. nov.* (Fig. 1)

Type: Indonesia, Sulawesi, Central Sulawesi, Morowali, Petasia Timur, Bungintimbe Village, 3 May 2005, *Widjaja EAW 7668* (Holo: BO-1917821, BO-1917823; Iso: BO-1917822 (BO, K).

Diagnosis. Distinguished by erect culm sheath blades, culm sheath auricles that are curved outward and with long bristles, culm sheath base with white hairs, and culm sheath broadly ovate blades that are longer than the sheath proper.

Culms climbing, nodes with rough sheath bases. *Culm sheaths* persistent, densely covered with white hairs, base hairy, margin hairy; sheath 6.8–7.6 × 2–3.1 cm, apex 1.8–3 cm long; auricles curved outward 2–3 mm long with long bristles up to 15 mm long; ligule lacinate 2–3 mm high, bristles short; blade erect, broadly ovate with cordate base, 6–10 cm long 1.5–5.6 cm wide near the base, about 0.5–1.3 cm wide at the junction with the sheath proper. *Leaves* with blades 10.6–31 × 2.5–5.6 cm, glabrous, apex acuminate, base somewhat rounded and briefly constricted, petioles 2–4 mm; *sheath* abaxially covered with white hairs, auricle strongly reflexed with long bristles up to 17 mm long; ligule lacinate, with bristles 5–6 mm long. *Inflorescence* not available.

Distribution. Central Sulawesi.

Habitat. Secondary forest, 953 m asl.

Etymology. Bungintimbe is the name of village where this species was first collected.

Identification key to *Dinochloa* in Sulawesi

1. a. Culms sheath blades erect 2
- b. Culm sheath blades reflexed 12
2. a. Culm sheath base scattered hairy to densely hairy..... 3
- b. Culm sheath glabrous 6
3. a. Culm sheath base densely covered by hairs..... 4
- b. Culm sheath base covered by scattered hairs..... 5
4. a. Culm sheath base covered by golden hairs, blade triangular *D. albociliata* Widjaja
- b. Culm sheath base covered by white hairs, blade broadly ovate *D. bungintimbensis* Widjaja & Ervianti
5. a. Culm sheath blade triangular, auricles absent *D. truncata* Widjaja
- b. Culm sheath blade broadly ovate, auricles small and deflexed with few bristles *D. petasiensis* Widjaja
6. a. Culm sheath auricles absent, leaves almost sessile *D. sessilifolia* Widjaja & Ervianti
- b. Culm sheath auricles present, leaves with petioles 7
7. a. Culm sheath auricles without bristle 8
- b. Culm sheath auricles with bristles 9
8. a. Culm sheath auricles strongly reflexed, leaf sheath auricles inconspicuous but with bristles
..... *D. khoonmengii* Widjaja & Ervianti
- b. Culm sheath auricles spreading, leaf sheath auricles rounded and without bristles*D. aopaensis* Widjaja
9. a. Culm sheath auricles small, rounded *D. mekonggensis* Widjaja & Ervianti
- b. Culm sheath auricles strongly reflexed 10
10. a. Culm sheath ligule with long bristles, leaf sheath auricles curved outward *D. cordata* S.Dransf.
- b. Culm sheath ligule without bristles, leaf sheath auricles strongly reflexed 11
11. a. Culm sheath auricle strongly reflexed glabrous, leaves glabrous *D. erecta* Widjaja
- b. Culm sheath auricle strongly reflexed along sheath apex, curved outward at the edge, with bristles, leaves abaxially densely pale brown hairy when young *D. morowaliensis* Widjaja
12. a. Culm sheath base hairy 13
- b. Culm sheath base glabrous 17
13. a. Culm sheath auricle curved outward 14
- b. Culm sheath auricle strongly reflexed 15
14. a. Culms sheath covered with pale brown hairs, abaxial leaf surface glabrous, lodicules absent
..... *D. hirsuta* S.Dransf.
- b. Culms sheath covered with golden brown hairs, abaxial leaf surface hairy, later glabrescent, lodicules present *D. barbata* S.Dransf.
15. a. Leaf sheath auricles inconspicuous with short bristles up to 2 mm *D. kolakaensis* Widjaja & Ervianti
- b. Leaf sheath auricles strongly reflexed with long bristles more than 3 mm 16
16. a. Culm sheath ligule with long bristle up to 21 mm *D. karaboensis* Widjaja & Ervianti
- b. Culm sheath ligule with short bristle, 5–12 mm *D. multibrachiata* Widjaja & Ervianti
17. a. Culm sheath auricles present, bristles long, ligule with bristles *D. pubiramea* Gamble
- b. Culm sheath auricles absent, without bristles, ligule without bristles 18
18. a. Leaves almost sessile, abaxial leaf surface glabrous *D. wartabonei* Widjaja & Ervianti
- b. Leaves with conspicuous petioles, abaxial leaf surface with pale hairs *D. glabra* Widjaja & Ervianti

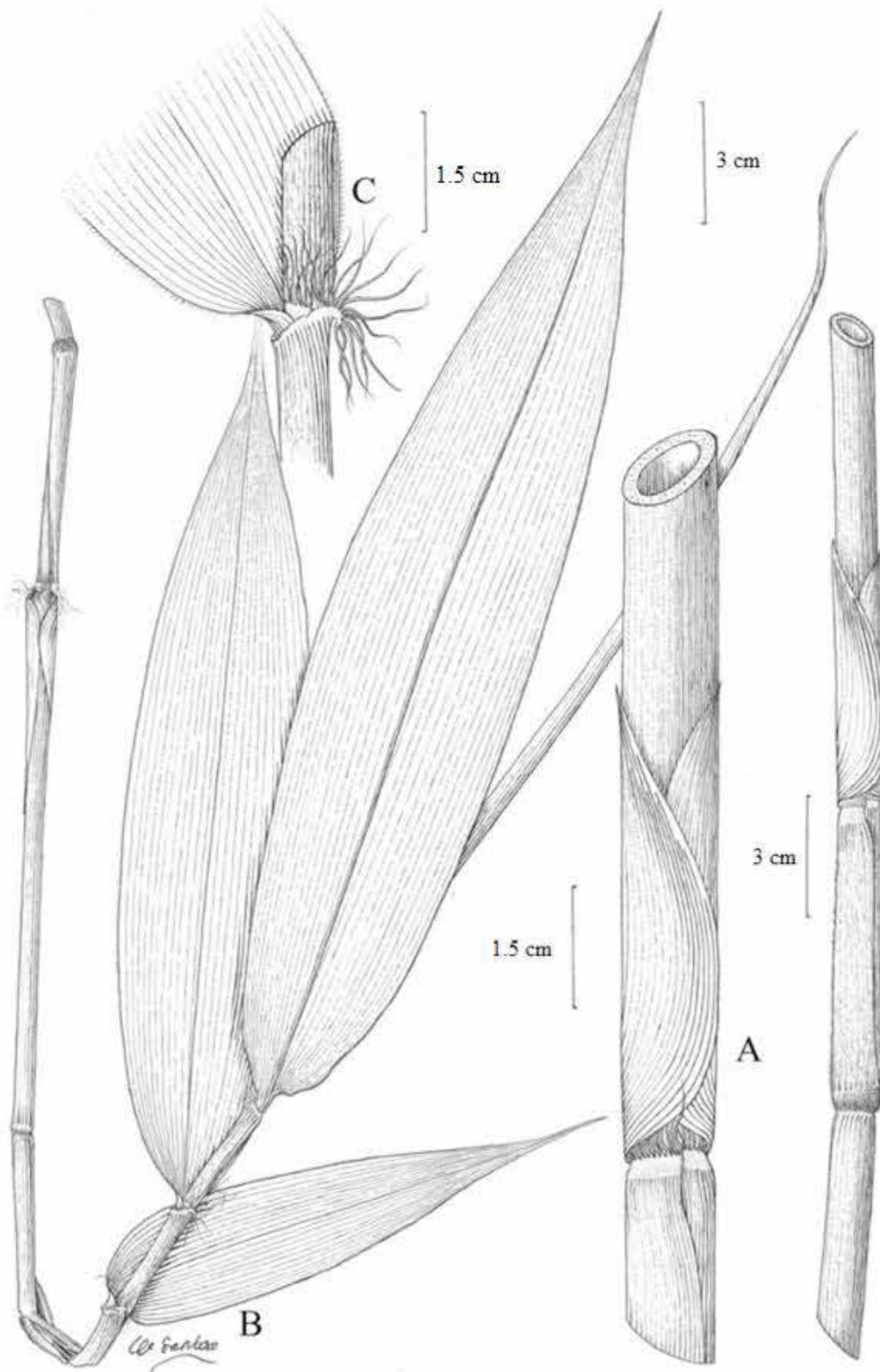


Fig. 1. *Dinochloa bungintimbensis* Widjaja & Ervianti, *spec. nov.* A. Culm sheath. B. Leaves. C. Leaf sheath. From Widjaja EAW 7668 (BO), drawing by Wahyudi Santoso (BO).

Notes. This species is similar to *D. albociliata* Widjaja based on the erect culm sheath blade, culm sheath base densely covered by hairs, auricles with long bristles, leaf sheath auricles strongly reflexed and with long bristles. However, it is distinguished by the culm sheaths being persistent and having white hairs on the back, hairy margins and broadly ovate blades.

Specimen examined. Known only from the type collection (above).

2. *Dinochloa glabra* Widjaja & Ervianti, *spec. nov.* (Fig. 2).

Type: Indonesia, Sulawesi, Southeast Sulawesi, Kolaka Utara District, Lasusua Subdistrict Tinukari Village, 16 Dec. 2009, *Widjaja EAW 8864* (Holo: BO-1917778, BO-1917782, BO-1917787, BO-1917789, Iso: BO-197777, BO-197779, BO-1917780, BO-1917781, BO-1917783, BO-1917784, BO-1917785, BO-1917786, BO-1917892, BO-1917793 (BO, K, L).

Diagnosis. Characterized by deflexed culm sheath blade, white wax in young culm sheath, culm sheath base glabrous, auricle absent and glabrous.

Culm climbing, diameter 1–2 cm, branches one dominant, nodes bases rough. *Culm sheath* deciduous, without hairs, white waxy in young culm sheath; sheath 8.3–11.4 × 5.8–6.5 cm, apex 3–4.2 cm long; auricles absent; ligules entire or lacinate 1–1.5 mm high without bristles; blade deflexed, triangular with long acuminate tips, base cordate, 10.1–13.5 cm long, 3.1–4.2 cm wide near the base, about 0.7–1.1 cm wide at the junction with the sheath. *Leaves* 5.8–29.1 × 1–6.3 cm, glabrous, apex acuminate, base somewhat rounded and briefly constricted, petioles 2–6 mm; *Leaf sheath* with inconspicuous auricles with bristles up to 7 mm long; ligules dentate irregular. *Inflorescence* pseudospikelets, 1 fertile floret, rachilla 1 mm long, floret 3.5–4 mm long; glumes 2, mucronate, 2–2.5 mm long; lemma 2.5–3 mm long, glabrous, acute; palea 3.5–4 mm, glabrous, acute; lodicules present, hairy, 1.5–2 mm long; anthers yellowish, filament free, 2 mm long; stigma 3, glabrous.

Distribution. Southeast Sulawesi.

Habitat. Alluvium rocks, 100 m asl.

Etymology. *Glabra* is taken from the glabrous culm sheath.

Notes. This species resembles to *D. wartabonei* by absent auricle on its culm sheath, glabrous culm sheath base, however, *D. glabra* can be

distinguished by leaves with long petiole, abaxial leaves covered by pale hairs. This species is also closely related to *D. glabrescence* by its deflexed culm sheath blade, white wax young culm, deciduous culm sheath, long leaves petiole, but it is differed by its glabrous lemma, and short floret.

Specimen examined. Southeast Sulawesi, Kolaka Utara District, Lasusua Subdistrict Tinukari Village, 16 Dec. 2009, *Widjaja EAW 8864* (BO, K, L).

3. *Dinochloa karaboensis* Widjaja & Ervianti, *spec. nov.* (Fig. 3).

Type: Indonesia, Sulawesi, South Sulawesi, Malili to Soroako near PLTA Karaboe, 12 July 2010, *Widjaja EAW 9101* (Holo: BO-1918528, BO-1918532, BO-1918534, Iso: BO-1918529, BO-1918530, BO-1918531, BO-1918533, BO-1918535 (BO, K, L).

Diagnosis. Distinguished by spreading to deflexed culm sheath blade, culm sheath base cover with brown hairs and strongly reflexed auricle with long bristle.

Culm climbing, young shoot green with white wax, branches one dominant, 2–3 branches, intravaginal. Nodes bases rough. *Culms sheath* deciduous, adaxially glabrous, base cover with brown hairs, sheath 3.8–6.3 × 1.2–4.1 cm, apex 1.7–2.5 cm long; auricles strongly reflexed 2–4 mm high, bristles very long up to 21 mm; ligules dentate irregular with long bristles up to 15 mm long; blade spreading to deflexed, triangular with long acuminate tips, base cordate, 3.2–6.5 cm long, 1.2–2.0 cm wide near the base, about 0.4–0.7 cm wide at the junction with the sheath. *Leaves* 16.6–26.2 × 1.9–3.4 cm, glabrous, apex acuminate, base angustatus; petioles 3–5 mm; *leaf sheath* glabrous; auricles strongly reflexed 1–2 mm high with long bristles up to 21 mm; ligules lacinate, with long bristles up to 12 mm long. *Inflorescence* pseudospikelets, 1 fertile floret, rachilla 1–2 mm long, floret 3.2 mm long; glumes 2, mucronate, 2.8–3 mm long; lemma 2.8–3.2 mm long, hairy, acuminate; palea 2.1 mm long, glabrous, acute; lodicules absent; anthers 6, filament free, yellowish, 1 mm long.

Distribution. Southeast and South Sulawesi.

Habitat. Secondary and swamp forest, 140–143 m asl.

Etymology. Karaboe is the place where species was collected; in the nearby a water general electricity power was built.

Notes. This species is very similar to

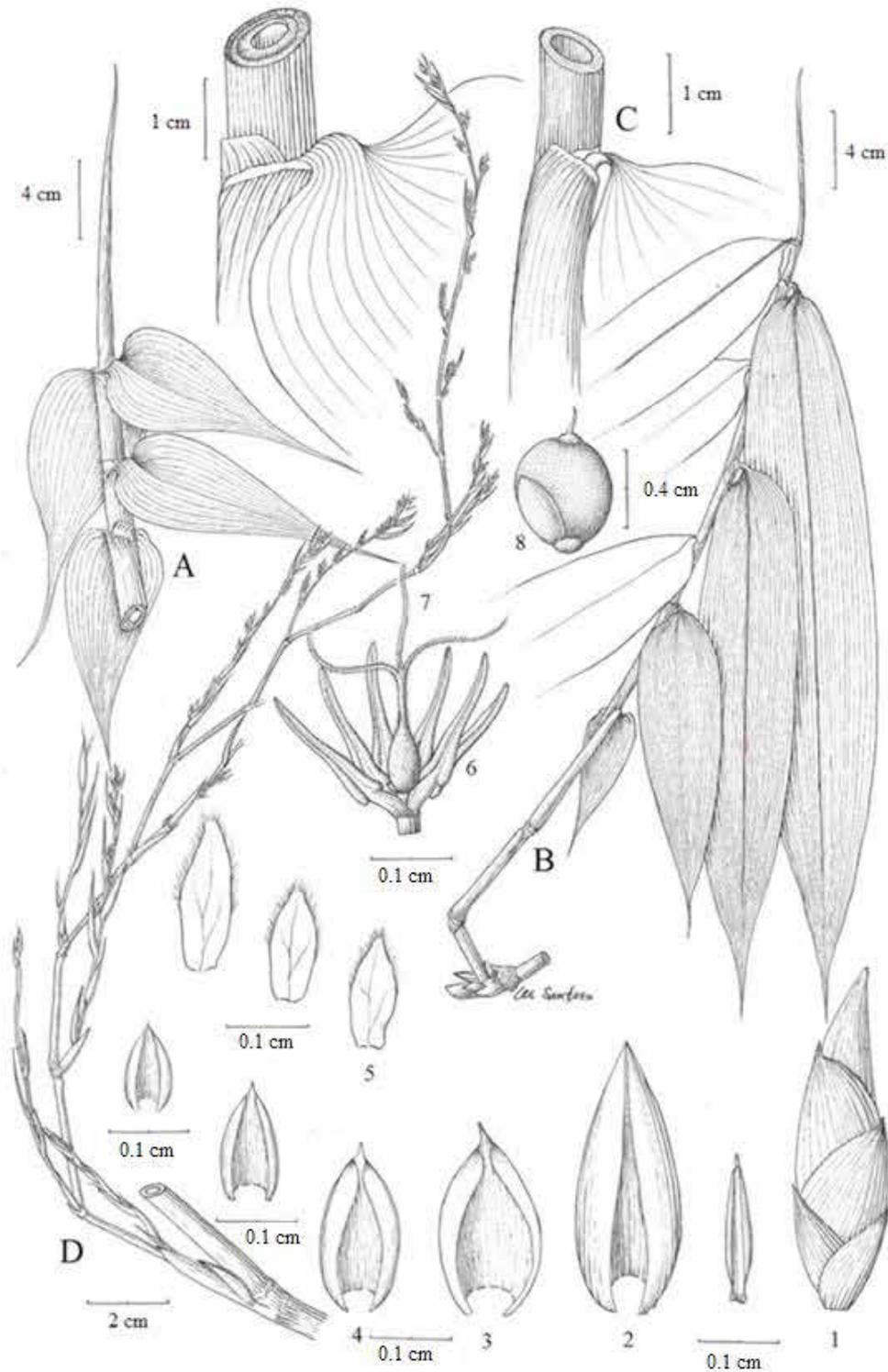


Fig. 2. *Dinochloa glabra* Widjaja & Ervianti, *spec. nov.* A. Culm sheath. B. Leaves. C. Leaf sheath. D. Inflorescence (1. Floret. 2. Palea. 3. Lemma. 4. Glume. 5. Lodicule. 6. Anthers. 7. Stigma. 8. Fruit). From Widjaja EAW 8864 (BO), drawing by Wahyudi Santoso (BO).

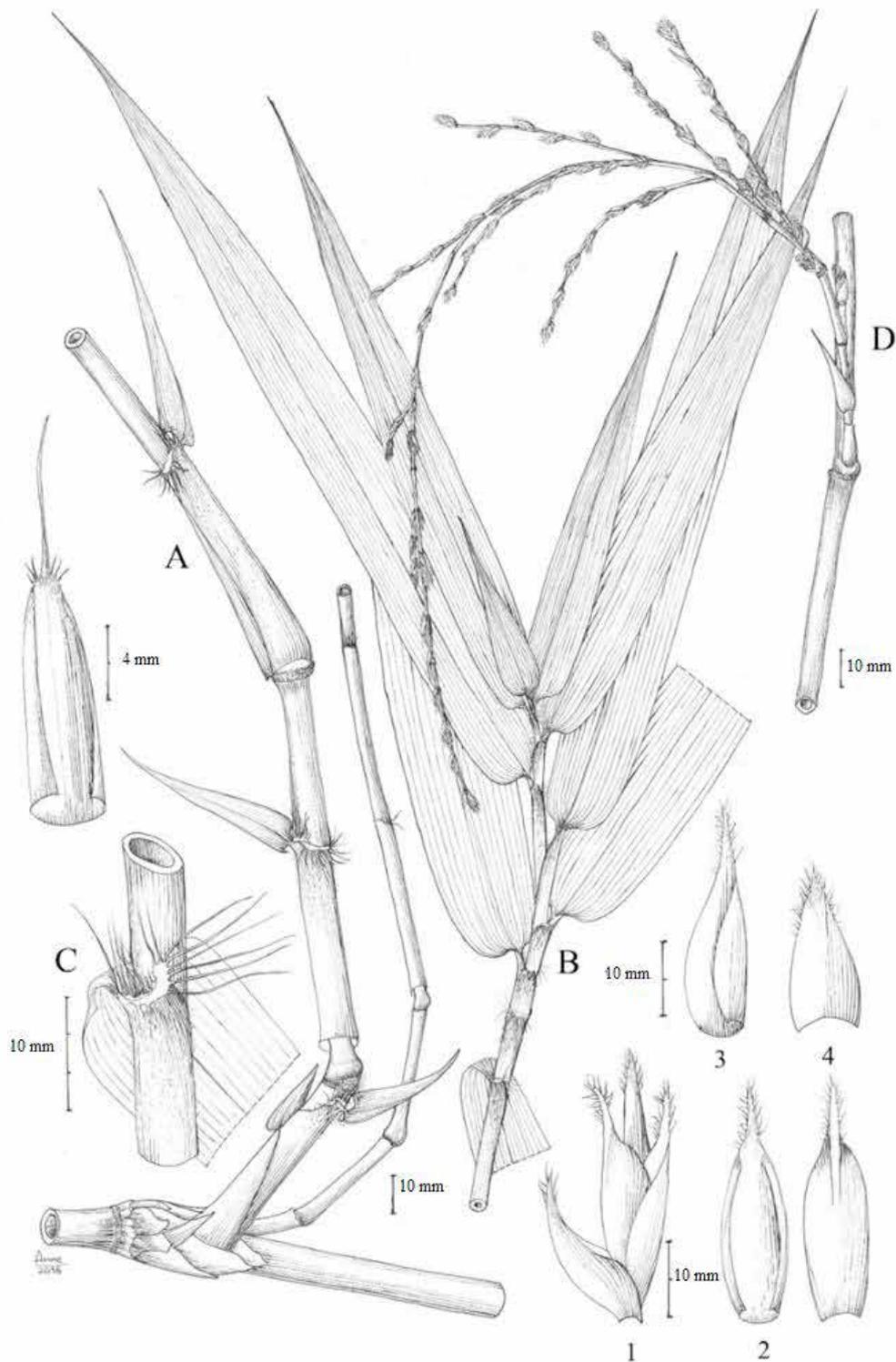


Fig. 3. *Dinochloa karaboensis* Widjaja & Ervianti, *spec. nov.* A. Culm sheath. B. Leaves. C. Leaf sheath. D. Inflorescence (1. Floret. 2. Palea. 3. Lemma. 4. Glume). From *Widjaja EAW 9101* (BO), drawing by Anne Kusumawaty (BO).

D. multibrachiata based on the characters of leaves sheath auricle strongly reflexed with long bristle, culm sheath auricle strongly reflexed, culm sheath base hairy and culm sheath blade deflexed. *D. karaboensis* is differed by culm sheath ligule with long bristle.

Specimens examined. Southeast Sulawesi. Konawe, Puriala Village, Mt. Tigacabang, Osundolo Samba, 24 July 2005, *Widjaja EAW 8010* (BO, K, L); **South Sulawesi,** Malili to Soroako near PLTA Karaboe, 12 July 2010, *Widjaja EAW 9101* (BO, K, L).

4. *Dinochloa khoonmengii* Widjaja & Ervianti, *spec. nov.* (Fig. 4).

Type: Indonesia, Sulawesi, Southeast Sulawesi, North Kolaka District, Lalolae Subdistrict, Tinodo Village. On the way from Tinukari Village to Lasusua, 11 July 2010, *Widjaja EAW 9074* (Holo: BO-1919726, BO-1919729, Iso: BO-1919727, BO-1919728 (BO, K).

Diagnosis. Characterized by erect culm sheath blade, auricles strongly reflexed along the sheath apex without bristles and culm sheath base glabrous, leafsheath auricle inconspicuous with bristle.

Culm climbing, *branches* one dominant, nodes bases rough. *Culm sheath* deciduous, adaxially glabrous, sheath 6.4–7.8 × 2.6–4.9 cm, apex 3.0–3.7 cm long; auricles strongly reflexed along the sheath apex without bristles; ligules laciniate glabrous, very short; blade erect, triangular with cordate base, 5.7–7.2 cm long, 3.9–4.8 cm wide near the base, about 0.7–1.1 cm wide at the junction with the sheath. *Leaves* 4.5–22.5 × 0.6–1.6 cm, glabrous, apex acuminate, base truncate; *leaf sheath* with inconspicuous auricles, a few bristles up to 4 mm; ligules laciniate, glabrous, very short. *Inflorescence* not available.

Distribution. Southeast Sulawesi.

Habitat. Secondary forest, alluvium and sediment rocks, 100 m asl.

Etymology. Wong Khoon Meng is the bamboo-ologist who based in Singapore Botanical Gardens, who dedicated his life on bamboo study.

Notes. This species is similar to *D. aopaensis* Widjaja by culm sheath auricle present, without bristles, erect sheath blade, and glabrous culm sheath base. However, it is differed by culm sheath auricle spreading, and leafsheath auricle rounded without bristle.

Specimen examined. Southeast Sulawesi, North Kolaka District, Lalolae Subdistrict, Tinodo Village. On the way from Tinukari Village to Lasusua, 11 July 2010, *Widjaja EAW 9074* (BO, K).

5. *Dinochloa kolakaensis* Widjaja & Ervianti, *spec. nov.* (Fig. 5).

Type: Indonesia, Sulawesi, North Kolaka District, Pasir Angin Subdistrict, Tinukari Village, Mt. Mekongga range, on the way to bird and insect trap, point 1, 20 Dec. 2009, *Widjaja EAW 8904* (Holo: BO-1917879, BO-1917880, Iso: BO-1917881 (BO, K, L).

Diagnosis. Characterized by deflexed culm sheath blade, auricles strongly reflexed, culm sheath base hairy and curve outward at the edge with long bristles, leaf sheath auricle inconspicuous.

Culm climbing, covers white waxy. *Branches* one dominant, infravaginally. Nodes bases rough. *Culm sheath* persistent, cover with brown hairs, sheath 7.6–11.1 × 2.6–9.0 cm, apex 1.5–3.8 cm long; auricles strongly reflexed and curve outward at the edge up to 3 mm with long bristles up to 18 mm; ligules dentate irregular, 1.5–2 mm, bristles up to 13 mm long; blade deflexed, triangular–narrowly lanceolate, base cordate, 3.7–14.4 cm long, 1.0–2.4 cm wide near the base, about 0.4–1.0 cm wide at the junction with the sheath. *Leaves* 4.7–17.3 × 0.7–1.0 cm, glabrous, apex acuminate, base somewhat rounded and briely constricted, petioles 0.5–1 mm; *leaf sheath* with inconspicuous auricles, short bristles up to 2 mm long; ligules laciniate, short. *Inflorescence* not available.

Distribution. Southeast Sulawesi.

Habitat. Aluvium and metamorf rocks at 180–250 m asl.

Etymology. Kolaka is the district where this species was collected.

Notes. This species very similar with *Dinochloa multibrachiata* Widjaja & Ervianti and *D. karaboensis* Widjaja & Ervianti based on deflexed culm sheath blade, culm sheath base cover with brown hairs, culm sheath auricle strongly reflexed, but it differed by leaves sheath auricle strongly reflexed, with long bristle.

Specimens examined. Southeast Sulawesi, North Kolaka District, Wawo Subdistrict, Tinukari Village, Masembo Forest of Mekongga Mountainous, 16 Dec. 2009, *Widjaja EAW 8875* (BO); North Kolaka District, Pasir Angin Subdistrict, Tinukari Village, Mt. Mekongga range, on the way to bird and insect trap, point 1, 20 Dec. 2009, *Widjaja EAW 8904* (BO, K, L); North Kolaka district, Pasir Angin subdistrict, Tinukari, Mekongga mountainous range, forest Masembo, above Masembo river plot 2 & 11,

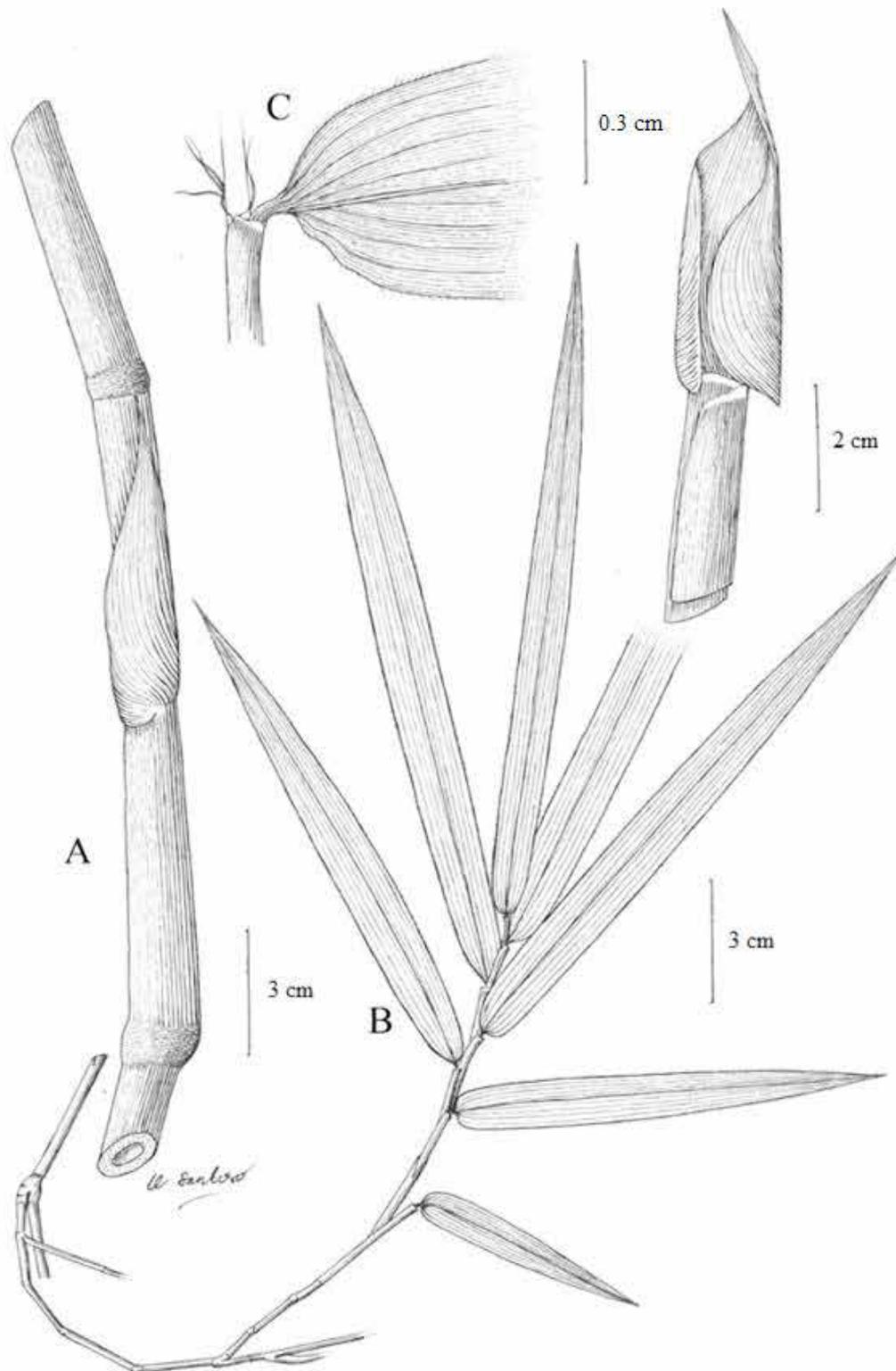


Fig. 4. *Dinochloa khoonmengii* Widjaja & Ervianti, *spec. nov.* A. Culm sheath. B. Leaves. C. Leaf sheath. From Widjaja EAW 9074 (BO), drawing by Wahyudi Santoso (BO).

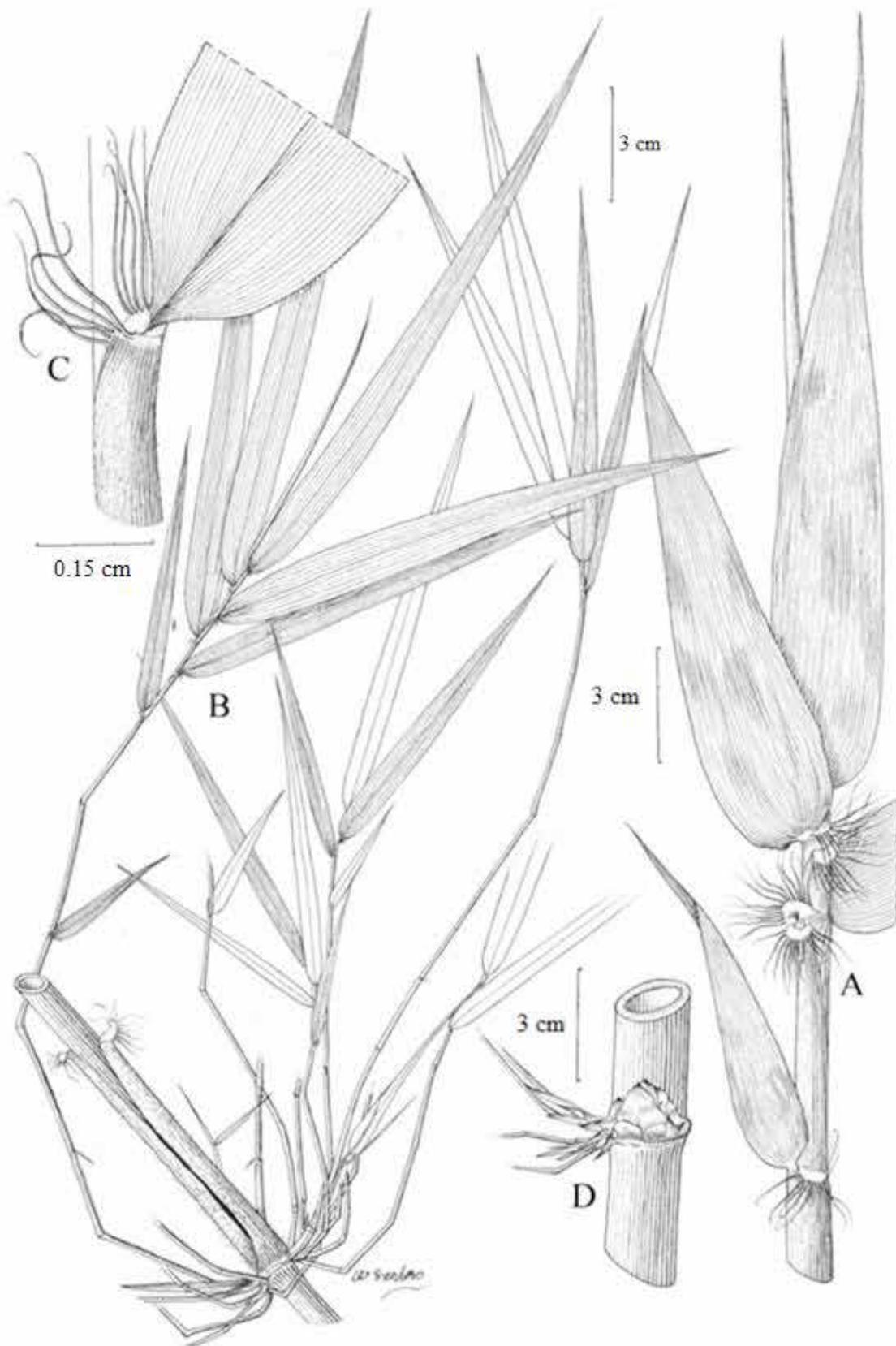


Fig. 5. *Dinochloa kolakensis* Widjaja & Ervianti, *spec. nov.* A. Culm sheath. B. Leaves. C. Leaf sheath. D. Branch. From *Widjaja EAW 8904* (BO), drawing by Wahyudi Santoso (BO).

July 2010, *Widjaja EAW 9072* (BO).

6. *Dinochloa mekonggensis* Widjaja & Ervianti, *spec. nov.* (Fig. 6).

Type: Indonesia, Sulawesi, North Kolaka District, Pasir Angin Subdistrict, Tinukari Village, Mekongga Mountainous Range, On the way to Bird and Insect Trap, Point 34, 24 Dec. 2009, *Widjaja EAW 8974* (Holo: BO-1919381, BO-1919495, Iso: BO-1920648, BO-920647 (BO, K, L).

Diagnosis. Characterized by erect culm sheath blade, rounded auricle with short bristle and culm sheath base glabrous.

Culm climbing, diameter less than 0.5 cm, branches one dominant, 2–3 branches, nodes bases rough. *Culm sheath* persistent, adaxially glabrous, sheath 2.5–4.0 × 0.8–2.0 cm, apex 1–1.5 cm long, base glabrous; auricles small rounded less than 1 mm high with a few and short bristles up to 2 mm long; ligules lacinate glabrous, short, 1 mm high; blade erect, broadly ovate with long acuminate tips, base cordate, 1.1–2.7 cm long, 0.7–1.3 cm wide near the base, about 0.2–0.4 cm wide at the junction with the sheath, glabrous. *Leaves* 6.3–19.9 × 0.6–2.4 cm, apex acuminate, base somewhat rounded and briefly constricted somewhat rounded and briefly constricted, petioles 1–2 mm long, abaxial cover golden brown hairs; *leaf sheath* auricle small rounded and strongly reflexed outward, with long bristles up to 8 mm long; ligules lacinate, short, glabrous. *Inflorescence* not available.

Distribution. Southeast Sulawesi.

Habitat. Secondary and primary forests, 47–250 m asl.

Etymology. Mekongga is a mountainous area in S.E. Sulawesi, where this species was collected.

Notes. This species is related to *D. palawanensis* (Gamble) S. Dransf. based on erect culm sheath blades, culm sheath ligule without bristle, leaf sheath auricle small with long bristle and also has small leaves, but it differed by small rounded culm sheath auricle with a few and short bristle.

Specimens examined. Southeast Sulawesi, Kendari Sampara, 31 July 2009, *Widjaja EAW 8862* (BO, K); North Kolaka District, Pasir Angin Subdistrict, Tinukari Village, Mekongga Mountainous Range, on the way to Bird and Insect Trap, Point 34, 24 Dec. 2009, *Widjaja EAW 8974* (BO, K, L).

7. *Dinochloa multibrachiata* Widjaja & Ervianti, *spec. nov.* (Fig. 7).

Type: Indonesia, Sulawesi, Central Sulawesi. Poso, Pamuna Utara, Batalumpa, Bukitmuda Village, 06 May 2005, *Widjaja EAW 7673* (Holo: BO-1917834, BO-1917836, Iso: BO-917831, BO-1917832, BO-1917833, BO-1917835 (BO, K, L).

Diagnosis. Distinguished by extravaginally branches, deflexed culm sheath blade, culm sheath base cover with brown hairs, culm sheath auricles strongly reflexed out with long bristles, leaf sheath auricle also strongly reflexed out.

Culm climbing. *Branches* one lateral dominant, many branches on each node, hairy on young branches, extravaginally. *Culm sheath* deciduous, adaxially cover with brown hairs, sheath 6.7–12.3 × 2.1–4.6 cm, apex 1.4–2.8 cm long; auricle strongly reflexed up to 2 mm high, bristles 5–12 mm long; ligules dentate irregular 1–3 mm high with bristle up to 6 mm; blade deflexed, triangular, broadly ovate, base cordate, 5.3–2.5 cm long, 0.8–2.4 cm wide near the base, about 0.2–0.8 cm wide at the junction with the sheath. *Leaves* 5–31.1 × 0.5–3.2 cm, apex acuminate, base somewhat rounded and briefly constricted, petioles 0.5–3 mm long, abaxial cover with pale hairs, adaxial glabrous; *leaf sheath* cover golden brown hairs when young; strongly reflexed auricle with long bristles 3–10 mm long; ligules lacinate short, bristles up to 8 mm. *Inflorescence* not available.

Distribution. Central Sulawesi.

Habitat. Primary and secondary forests, metamorph and sediment rocks at 460–625 m asl.

Etymology. The specific epithet *multibrachiata* shows that this species has many branches.

Notes. This species very similar with *D. karaboensis* Widjaja & Ervianti based on deflexed culm sheath blade, culm sheath cover with brown hairs, culm sheath auricle with long bristle, leaf sheath auricle with bristle, but it differed by culm sheath ligule with short bristle

Specimens examined. Central Sulawesi. Poso, Pamuna Utara, Batalumpa, Bukitmuda Village, 06 May 2005, *Widjaja EAW 7673* (BO, K, L); Parigi Montong, Parigi Utara, Kebon Kopi Pancuran 4, Km. 7 Tobali, Pangi Bingga Nature Reserve, 04 Nov. 2013, *Widjaja EAW 10037* (BO, K, L), *Widjaja EAW 10038* (BO, K, L).

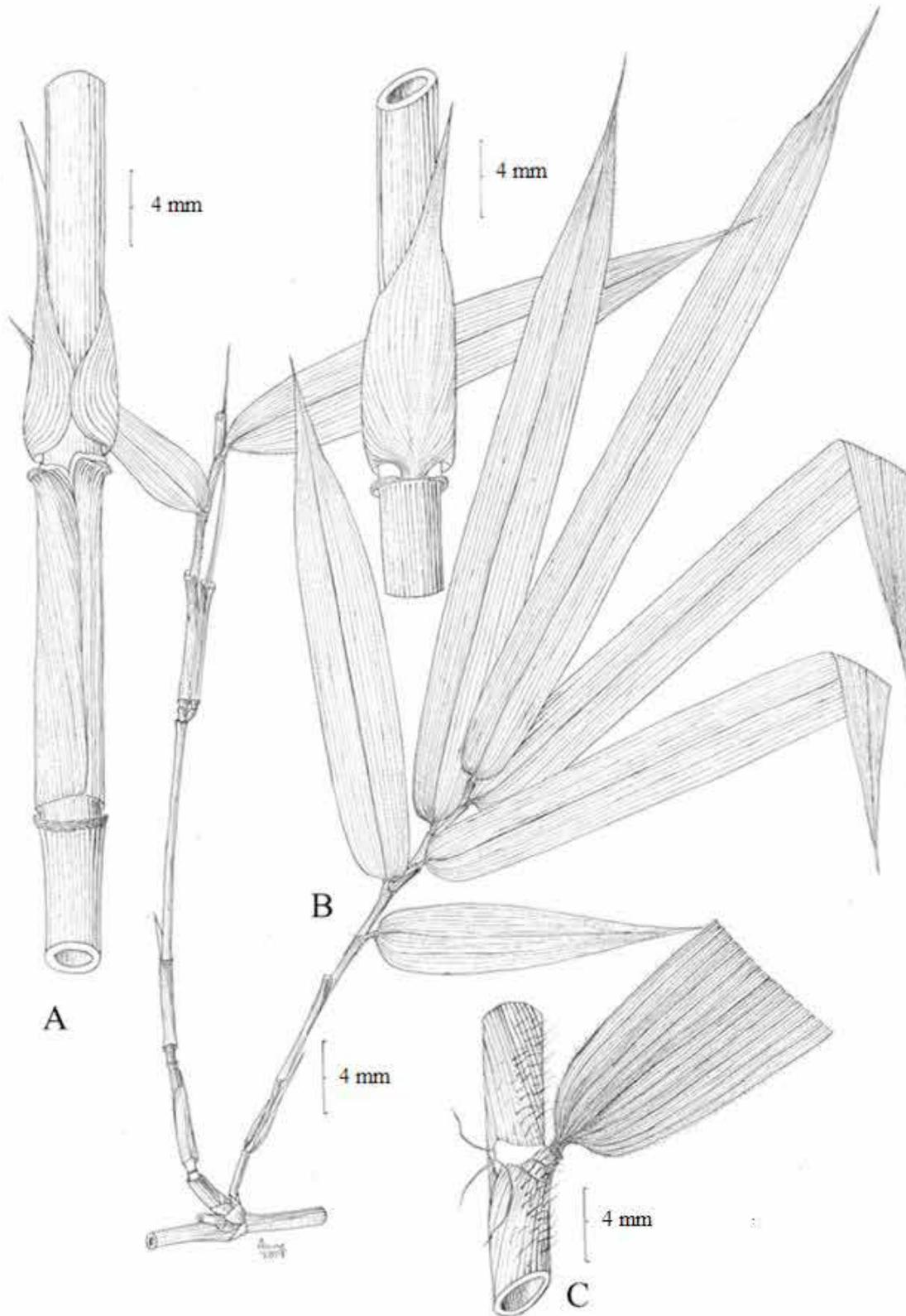


Fig. 6. *Dinochloa mekonggensis* Widjaja & Ervianti, *spec. nov.* A. Culm sheath. B. Leaves. C. Leaf sheath. From Widjaja EAW 8974 (BO), drawing by Anne Kusumawaty (BO).

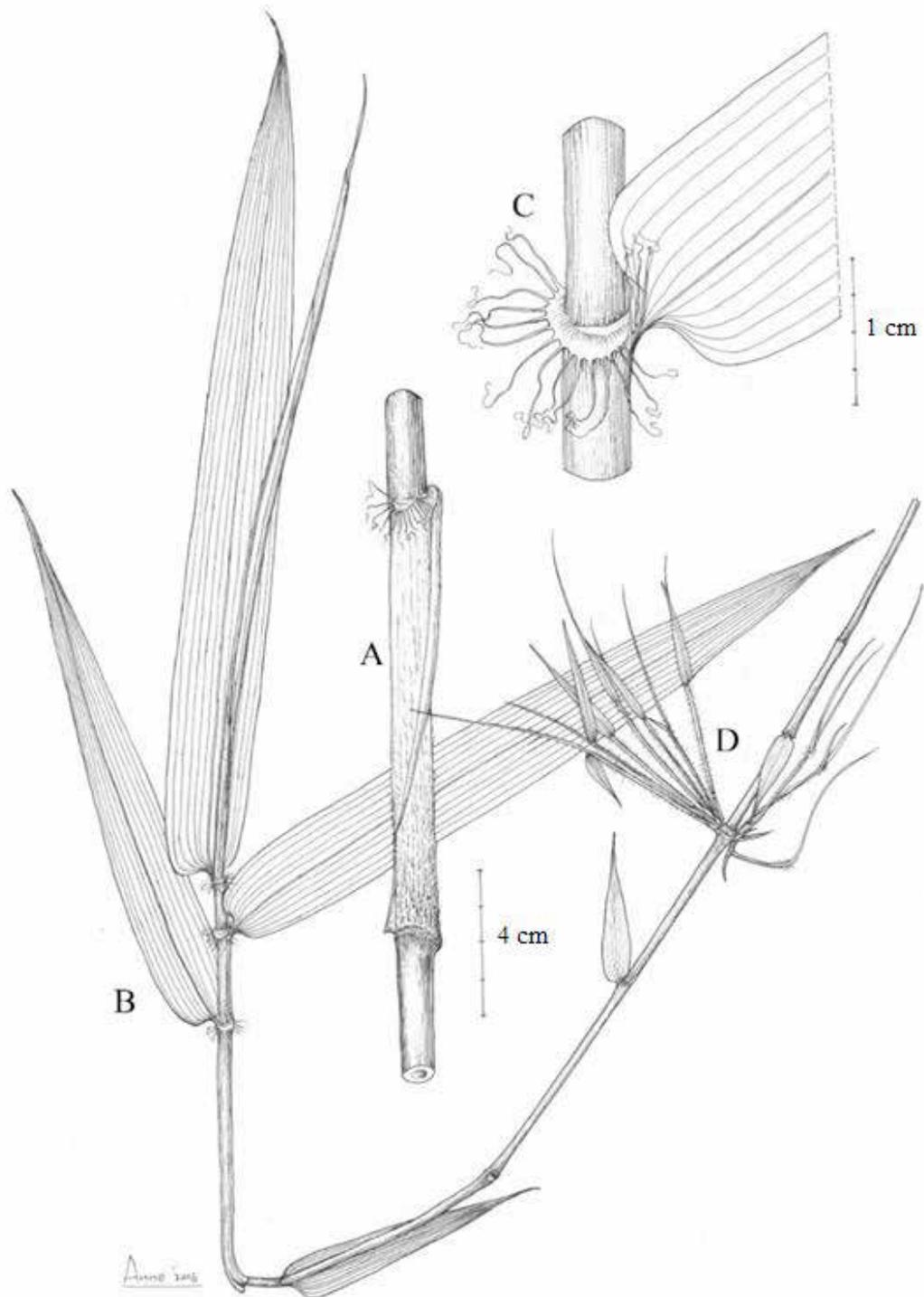


Fig. 7. *Dinochloa multibrachiata* Widjaja & Ervianti, *spec. nov.* A. Culm sheath. B. Leaves. C. Leaf sheath. D. Branch. From *Widjaja EAW 7673* (BO), drawing by Anne Kusumawaty (BO).

8. ***Dinochloa sessilifolia*** Widjaja & Ervianti, *spec. nov.* (Fig. 8).

Type: Indonesia, Sulawesi, Southeast Sulawesi, North Kolaka District, Lasusua Subdistrict, on the way from Tinukari Village to Lasusua, 11 July 2010, *Widjaja EAW 9075* (Holo: BO-1919730, BO-1919731, BO-1919734, Iso: BO-1919732, BO-1919733 (BO, K, L)

Diagnosis. Characterized by its erect culm sheath blade, with absent culm sheath auricle and glabrous base sheath, sessile leaves.

Culm climbing. *Branches* one lateral branches dominant, with 2–3 smaller branches. Nodes bases rough. *Culm sheath* persistent, without hairs, sheath 5.2–9.2 × 1.3–4.2 cm, apex 1.3–2.1 cm long; auricles absent; ligules short, entire or lacinate without bristles; blade erect, cordate with narrowly base and acuminate apex, 5.6–8.8 cm long, 1.4–3.2 cm wide near the base, about 0.5–0.8 cm wide at the junction with the sheath. *Leaves* 3–6 × 11.3–30 cm, glabrous, apex acuminate, base somewhat rounded and briefly constricted; *leaf sheath* without auricles and bristles; ligules lacinate, short, glabrous. *Inflorescence* pseudospikelets, 1 fertile floret, rachilla 12 mm long, floret 3.5–4 mm long; glumes 2, mucronate, 1.5–2 mm long; lemma 2.5–3 mm long, glabrous, mucronate; palea 3.5–4 mm, glabrous, acute; lodicules absent; anthers 6 yellowish, 2–2.5 mm long, filament free; stigma 3, glabrous.

Distribution. Southeast Sulawesi.

Habitat. Secondary forest, 245 m asl.

Etymology. *Sesillifolia* means the leaves is sessile.

Notes. This species is closely related to *D. khoonmengii* Widjaja & Ervianti based on its erect blades, culms sheath base glabrous. However, it is differed from *D. khoonmengii* by culm sheath auricle absent, leaves petiole almost sessile.

Specimen examined. Southeast Sulawesi, North Kolaka district, Lasusua Subdistrict, on the way from Tinukari Village to Lasusua, 11 July 2010, *Widjaja EAW 9075* (BO, K, L).

9. ***Dinochloa wartabonei*** Widjaja & Ervianti, *spec. nov.* (Fig. 9).

Type: Indonesia, Sulawesi, Gorontalo, Bogani Nani Wartabone National Park, Trail to Pinogu enclave to Taludaa, 24 April 1996, *Lasut MTL 062* (Holo: BO-0033635).

Diagnosis. Distinguished by deflexed culm

sheath blade, glabrous culm sheath base and short leaves petiole.

Culm climbing, branches one dominant, 5–6 branches. Nodes bases rough. *Culm sheath* persistent, adaxially glabrous, base glabrous; sheath ca. 11.4 × 6 cm; auricles absent; ligules entire, 1–1.5 mm high without bristles; blade deflexed, triangular to narrowly lanceolate, base cordate, about 1.1 cm wide at the junction with the sheath. *Leaves* 19–21.5 × 1.0–1.2 cm, glabrous, apex acuminate, base angustate; petiole sessile or almost sessile. *Leaf sheath* surface glabrous; auricles absent, ligules entire, very short with few bristles. *Inflorescence* not available.

Distribution. North Sulawesi .

Habitat. Primary forest along the river bank at 305 m asl.

Vernacular name. Tali loudu.

Etymology. It is named after the famous local heroin Nani Wartabone from Gorontalo. Bogani Nani Wartabone is the famous national park in the North Sulawesi, where this species was collected.

Notes. This species related to *D. glabra* Widjaja with having culm sheath deflexed, culm sheath base glabrous, culm sheath auricle absent, without bristle, ligule without bristle. But this species has short petioles, almost sessile, abaxial leaves blade glabrous.

Specimen examined. North Sulawesi. Trail to Pinogu enclave to Taludaa. Bogani Nani Wartabone National Park, 24 April 1996, *Lasut MTL 062* (BO, K).

FIMBRIBAMBUSA Widjaja

Fimbribambusa Widjaja, *Reinwardtia* 11: 81. 1997. TYPE SPECIES: *Fimbribambusa horsfieldii* (Munro) Widjaja.

Culms scrambling, culm erect when young, when older and taller the culm tips and the branches scramble over nearby trees, nodes with a short to long patella, branches with one dominant branches developed when the main branch was cut off, with several smaller branches grow before the lateral branches developed. *Culm sheath* auricles horn-like; bristle short to long or glabrous; blades spreading to deflexed. *Leaves* glabrous, broadly lanceolate, *leaf sheath* auricle horn-like, short to long bristle; ligule entire, glabrous. *Inflorescence* on leafy branches, indeterminate, each node with one sessile pseudospikelet, 2–3 shortly pedicelle bearing 2–3 pseudospikelet. Each pseudospikelet consists of two prophylls, one sessile pseudospikelet. Each pseudospikelet has 2–3

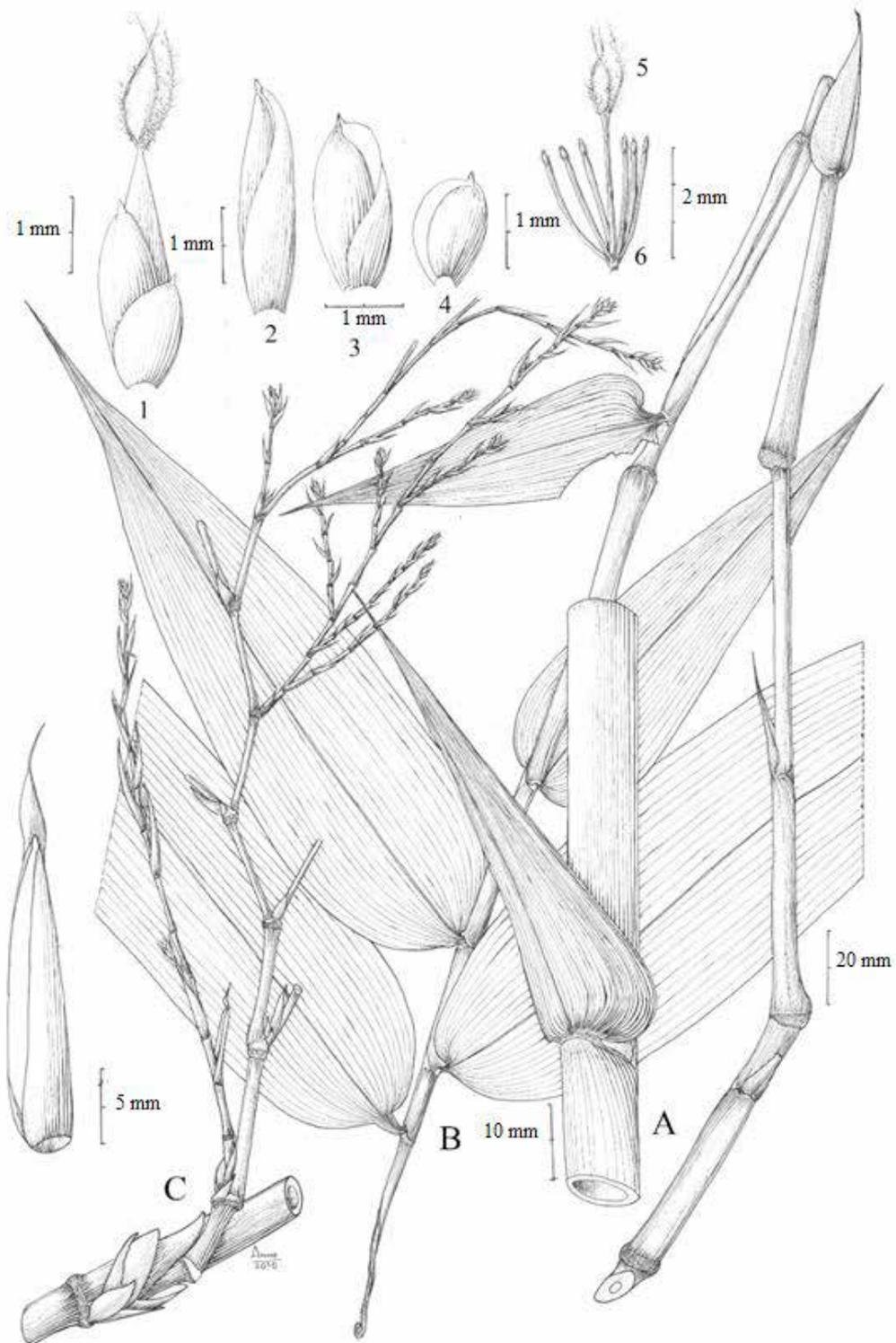


Fig. 8. *Dinochloa sessillifolia* Widjaja & Ervianti, *spec. nov.* A. Culm sheath. B. Leaves. C. Inflorescens. 1. Floret. 2. Palea. 3. Lemma. 4. Glume. 5. Stigma. 6. Anthers. From *Widjaja EAW 9075* (BO), drawing by Anne Kusumawaty (BO).

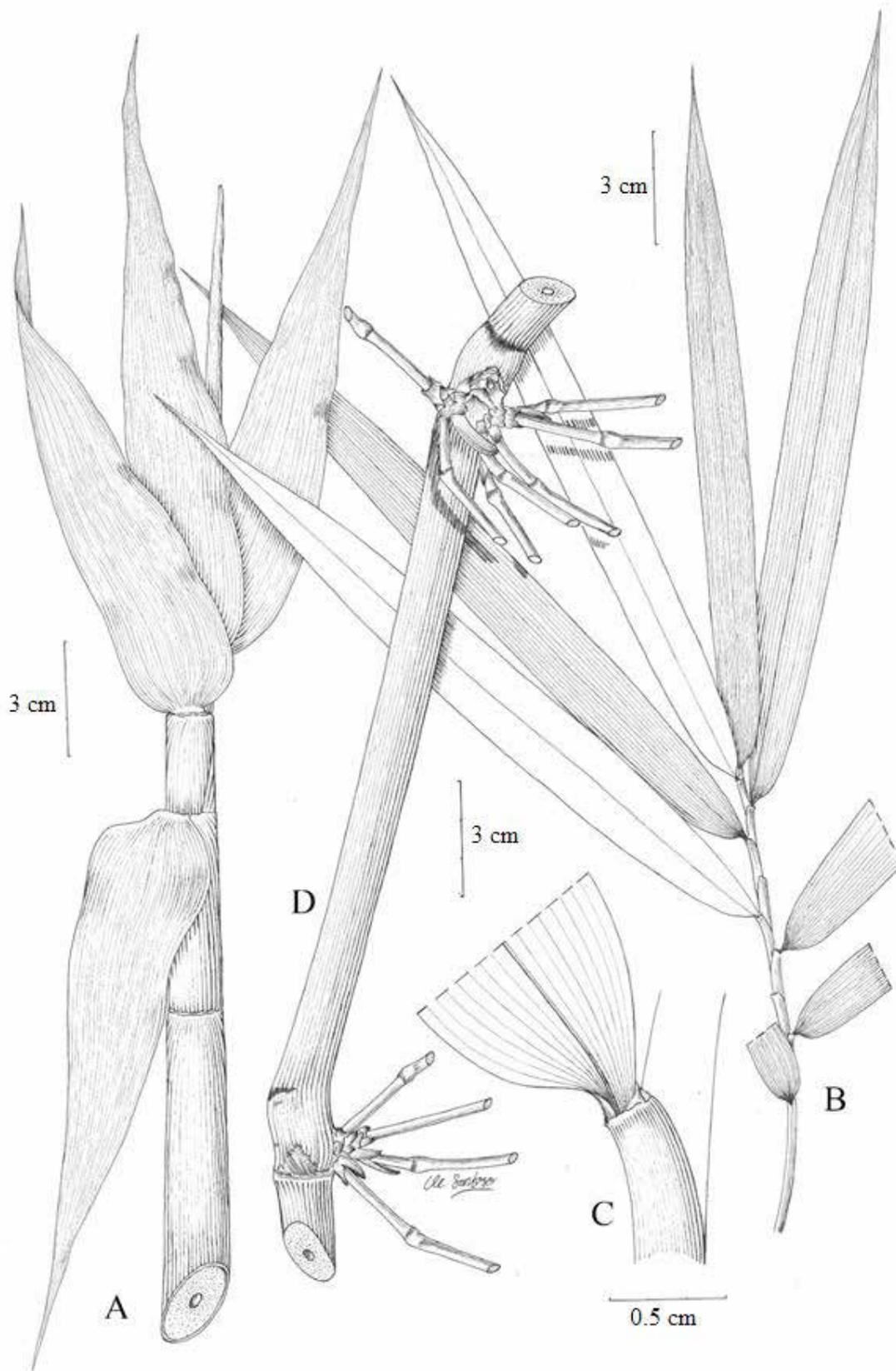


Fig. 9. *Dinochloa wartabonei* Widjaja & Ervianti, *spec. nov.* A. Culm sheath. B. Leaves. C. Leaf sheath. D. Culm. From *Lasut MTL 062* (BO), drawing by Wahyudi Santoso (BO).

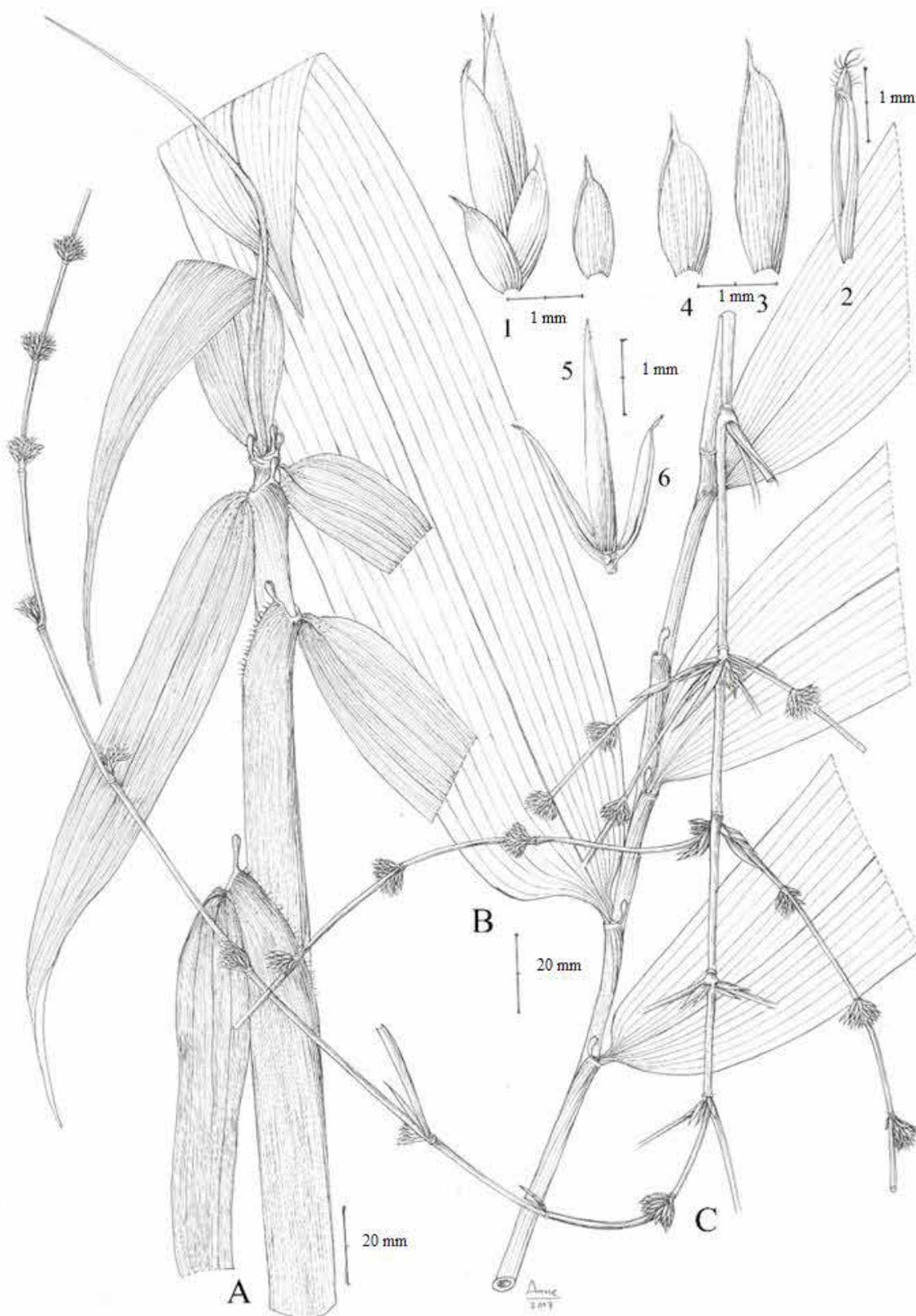


Fig. 10. *Fimbribambusa soejatmiae* Widjaja & Ervianti, *spec. nov.* A. Culm sheath. B. Leaves. C. Inflorescens (1. Floret. 2. Palea. 3. Lemma. 4. Glume. 5. Stigma. 6. Anthers). A From Widjaja EAW 9015 (BO), B,C (1,2,3,4,5,6) from Widjaja EAW 4 (BO), drawing by Anne Kusumawaty (BO).

fertile floret and 1 sterile floret. Lemma hirsute or glabrous, palea two-keeled, glabrous or hairy margin, lodicules present.

Distribution. East Java, South Sulawesi, Luzon, Papua, Papua New Guinea, Alor.

Habitat. Dry soil, lowland up to 950 m asl.

Notes. Widjaja (1997) has clarified that *Bambusa horsfieldii* Munro (syn. of *Bambusa cornuta* Munro) and *Bambusa microcephala* (Pilger) Holttum has been excluded from the genus *Bambusa* due to its spreading crest on each node (fimbriol or patella), the entire lodicules and the ovoid glabrous and not thickened ovary, and they were accommodated in *Fimbribambusa*.

10. ***Fimbribambusa soejatmiae*** Widjaja & Ervianti, *spec. nov.* (Fig. 10).

Type: Indonesia, Sulawesi, South Sulawesi. Maros, Bantimurung Subdistrict, Cagar Alam Karenta, Taman Nasional Bantimurung Bulusaraung, *Widjaja EAW 4* (Holo: BO-1917884); Maros, Bantimurung Subdistrict, Patunuang Asue Village, Along the road after Biseang Labboro Bridge, 22 June 2010, *EAW 9015* (Holo: BO-1917828, Iso: BO-1917829, BO-1817830 (BO, K, L).

Diagnosis. Distinguished by scrambling bamboo, culm with patella/ knee, culm sheath blade deflexed, auricle horn like, stiff, glabrous; Leaf sheath auricle horn-like, stiff with long bristle.

Culm scrambling. *Culm* with patella/knee in nodes, 3–5 mm long. *Branches* one lateral dominant branches with smaller branches. *Culm sheath* glabrous, sheath 16.2–21.8 × 6.8–10.1 cm, apex 1.4–2.1 cm long; auricle horn like, stiff, 2–5 mm high, glabrous; ligules entire, 1–2 mm high, glabrous; blade deflexed, lanceolate, base ovate, 17–19.5 cm long, 2–2.7 cm wide near the base, about 0.5–0.6 cm wide at the junction with the sheath. *Leaves* 5.8–32.5 × 1.2–10.1 cm, glabrous, apex acuminate, base somewhat rounded and briefly constricted to truncate, petiole 2–5 mm long; *leaf sheath* auricles horn-like, stiff, 3–5 mm high, bristles 2–6 mm long; ligules dentate irregular, 1 mm high without bristles. *Inflorescence* indeterminate, pseudospikelets, 6–7 mm long, 1 fertile floret and 1 sterile floret, rachilla 1 mm long, floret 5–6 mm long; glumes 2, mucronate, 2–2.5 mm long; lemma 5–5.5 mm long, hairy, mucronate; palea two-keeled, 5.5–6 mm long, apex bifid, glabrous; lodicules absent; style hairy; anthers yellowish, filament free, 2–3 mm long; stigma 3.

Distribution. South Sulawesi.

Habitat. On the rocks, limestone, 20 m asl.

Etymology: Dr. Soejatmi Dransfield is the bambooologist who based at the Royal Botanical Gardens Kew, she dedicated her time only on bamboo study of Madagascar, Malesia, Thailand and other part of the world.

Vernacular name. Bambu nana (Maros).

Specimens examined. South Sulawesi. Maros, Tompok Balang, 27 Sept. 1975, *Soejatmi Soenarko 319* (BO); Sw Peninsula, NE of Makassar within 54–60 km on the road, 4 July 1976, *Meijer 10821* (BO, L, US); Maros, Bantimurung Subdistrict, Cagar Alam Karenta, Taman Nasional Bantimurung Bulusaraung, *Widjaja EAW 4* (BO); Maros, Bantimurung Subdistrict, Patunuang Asue Village, Along the road after Biseang Labboro Bridge, 22 June 2010, *Widjaja EAW 9015* (BO, K, L).

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REFERENCES

- DRANSFIELD, S. 1981. The Genus *Dinochloa* (Graminae – Bambusoidea) in Sabah. *Kew Bulletin* 36(3): 613–633.
- DRANSFIELD, S. & WONG, K. M. 1996. *Temburongia*, a new genus of bamboo (Graminae–Bambusoideae) from Brunei. *Sandakania* 7: 49–57.
- ERVIANI, D., WIDJAJA, E. A. & SEDAYU, A. 2019. Bamboo diversity of Sulawesi, Indonesia. *Biodiversitas* 20(1): 91–109.
- VORONTSOVA, M. S., CLARK, L. G., DRANSFIELD, J., GOVAERTS, R., & BAKER, W. J. 2016. *World checklist of bamboos and rattans*. INBAR – International Network for Bamboo and Rattan & the Board of Trustees of the Royal Botanic Gardens, Kew.
- WIDJAJA, E. A. 1997. New taxa in Indonesian bamboo. *Reinwardtia* 11(2): 57–152.