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Bamboo diversity of Sulawesi, Indonesia

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Abstract. *Ervianti D, Widjaja EA, Sedayu A. 2019. Bamboo diversity of Sulawesi, Indonesia. Biodiversitas 20: 91-109.* Bamboo is one of the important plants in the world. Beside their economic important, bamboo also plays an important role in the environment for climate change. The purpose of this study was to inventory the bamboo diversity in Sulawesi. The methodology used in this study is by observing herbarium specimens kept in the Herbarium Bogoriense (BO) and field experience by the second author (EAW). The result showed that there are 39 species of 12 genera in Sulawesi, i.e. *Bambusa blumeana, B. glaucophylla, B. maculata, B. multiplex, B. tuldoides, B. vulgaris, Chloothamnus* sp., *Dendrocalamus asper, Dinochloa albociliata, D. aopaensis, D. barbata D. cordata, D. erecta, D. hirsuta, D. morowaliensis, D. petasiensis, D. pubiramea , D. truncata, Dinochloa* sp.1, *Dinochloa* sp.2, *Dinochloa* sp.3, *Dinochloa* sp.4, *Dinochloa* sp.5, *Dinochloa* sp.6, *Dinochloa* sp.7, *Dinochloa* sp.8, *Dinochloa* sp.9, *Fimbribambusa* sp., *Gigantochloa apus, G. atroviolacea, G. atter, Neololeba atra, Phyllostachys aurea, Racemobambos celebica, Schizostachyum brachycladum, S. latifolium, S. lima, Sphaerobambos subtilis*, and *Thyrsostachys siamensis.* Identification keys and descriptions are presented. This data reported will be used as basic information for bamboo conservation and bamboo industry.

Keywords: Bamboo, description, diversity, identification key, Sulawesi

INTRODUCTION

Bamboo is one of the important economic plants for rural people in Indonesia and some others developing countries. Besides these plants is economically important, bamboo is also useful environmentally for preserving the soil erosion, water conservation as well as absorbs greenhouse gases and release oxygen into the atmosphere (Wong 2004; IPCC 2006; Wang et al. 2013; Huang et al. 2014). There are about 1439 species of 116 genera of bamboo grow widely in the world (Clark et al. 2012). Widjaja (2018) reported that Indonesia has 176 species of 24 genera of bamboo.

The inventory of Sulawesi bamboos was started by Koorders (1898) when he made inventory list of the flora of North Sulawesi. He mentioned that there were 6 species of bamboo in the North Sulawesi, namely *Bambusa blumeana* Schult.f., *Bambusa lineata* Munro var. *rhumphiana* Kurz, *Dendrocalamus* sp., *Dinochloa cangkoreh* Buse, *Schizostachyum brachycladum* Kurz, and *Schizostachyum chiliantum* Kurz. He also mentioned there were 12 species could not be identified, but some of them are very closely related to the Javanese bamboo. Then, nobody studies on the bamboo in Sulawesi, although some botanists have collected bamboo specimens from Sulawesi like Eyma, Alston, Kjellberg, etc. Widjaja (1992) mentioned that there were 14 species of bamboo in North Sulawesi. The next inventory was carried out by Lasut (1996) in Bogani Nani Wartabone National Park, North Sulawesi. From these regions, there were 9 species of bamboo, namely *Bambusa vulgaris* Schard. *Dinochloa barbata* S. Dransf., *Dinochloa pubiramea* Gamble, *Dinochloa* sp.2, *Dinochloa pussila*, *Gigantochloa atter* (Hassk.) Kurz, *Neololeba atra* (Lindl.) Widjaja, *Schizostachyum brachycladum* Kurz (Kurz), and *Schizostachyum lima* (Blanco) Merr. Based on Widjaja's field work in periods 1990-1995, she published three new species of *Dinochloa* collected from Sulawesi, namely *D. albociliata, D. erecta,* and *D. truncata* (Widjaja 1997). Then, three new species of *Dinochloa* namely *Dinochloa aopaensis, D. morowaliensis*, and *D. petasiensis* (Widjaja 2009). Recently, Ervianti (2015) mentioned that there are 32 species of bamboo in Sulawesi only from the herbarium specimens kept in BO. Liana et al. (2017) found 8 species of bamboo in Selayar Island, South Sulawesi, namely *Bambusa blumeana* Schult.f., *Bambusa maculata* Widjaja, *Bambusa vulgaris* Schard., *Bambusa* sp.1, *Dendrocalamus asper* (Schult.) Backer, *Gigantochloa atter* (Hassk.) Kurz, *Schizostachyum brachycladum* Kurz (Kurz), and *Schizostachyum blumei* Nees.

The purpose of this study was to inventory the bamboo diversity in Sulawesi, and the description of each species will be presented including the identification key of those species. This study needs to be done to understand the bamboo diversity in Sulawesi, for bamboo identification and also for the bamboo industry that might be developed in Sulawesi.

MATERIALS AND METHODS

This research was carried by observing 722 bamboo herbarium specimens kept in the Herbarium Bogoriense (BO), Research Center for Biology, Indonesian Institute of Sciences (LIPI), Cibinong, West Java from March-June

2015. Species which are not found in the herbarium specimens but reported by EAW (Elizabeth A. Widjaja) during her field works 1976-2018 were included. The herbarium specimens used by Liana et al. (2017) could not be observed because they were kept in the Gadjah Mada University Herbarium, Yogyakarta. However, the identification of *Bambusa* sp. and *Schizostachyum blumei* is only based on their pictures and descriptions.

Morphological data from all herbarium specimens were collected, and from those data descriptions of each species was made. When the description was completed, followed by identification key based on the genera and the species. The identification of the herbarium specimens was done by using many references, such as Dransfield (1989, 1991, 1996), Widjaja (1987, 1997, 2001a, 2001b, 2005, 2009), Dransfield and Widjaja (1995), and Wong (1995). Beside that, the available type specimens kept in BO and other herbaria which can be accessed through the internet are also used to identify those species. The distribution map of bamboo species and vicinity is also provided based on coordinate point of the specimens using software ArcMap v. 10.2 for Ms. Windows (Bohms et al. 2014).

RESULTS AND DISCUSSION

Based on the study of the herbarium specimens and the field experiences, there are 39 species of bamboo found in Sulawesi from 12 genera. According to Liana et al. (2017), there are a new species of *Bambusa* sp. (Bulo batti) and *Schizostachyum blumei* (bulo) in Selayar Island, Sulawesi. The new species is. characterized by the culm is rounded, dark green with brown to black spot when mature and the erect blade. Based on those morphological characters, it is more closely to *Bambusa maculata*. Another species, *S. blumei* has never been collected from Sulawesi. Based on the description, it resembles to *S. lima*, which has a deflexed blade, easily caducous, with incurved auricle, whereas its leaf blade has small auricles (Widjaja 2001). The both latest characters have never found at *S. blumei*.

Most bamboo species are wild status. They grow in the primary or secondary forest, forest margin, and along the river bank in Sulawesi, except for 11 species are cultivated in the garden and near paddy field as ornamental plants or border plants, i.e. *Bambusa glaucophylla*, *Bambusa maculata*, *Bambusa multiplex*, *Bambusa tuldoides*, *Bambusa vulgaris*, *Dendrocalamus asper*, *Gigantochloa apus*, *Gigantochloa atter*, *Gigantochloa atroviolacea*, *Phyllostachys aurea*, *Thyrsostachys siamensis* (Sharma 1980). Those cultivated bamboos are mostly introduced species, although some species are not known exactly when they were introduced to Indonesia such as *Dendrocalamus asper* (probably from Myanmar and South China), *Gigantochloa apus* (probably from Myanmar), and *Gigantochloa atroviolacea*.

Based on the data collected, it was found that some species grow only in a certain area at Sulawesi. Among 39 species, there are 22 species are endemic to Sulawesi (56.4%), namely *Chloothamnus* sp.2, *Dinochloa albociliata*, *D. aopaensis*, *D. barbata*, *D. cordata*, *D. erecta*, *D. hirsuta*, *D. morowaliensis*, *D. petasiensis*, *D. truncata*, *Dinochloa* sp.1, *Dinochloa* sp.2, *Dinochloa* sp.4, *Dinochloa* sp.5, *Dinochloa* sp.6, *Dinochloa* sp.7, *Dinochloa* sp.8, *Dinochloa* sp.9, *Dinochloa* sp.10, *Fimbribambusa* sp., *Racemobambos celebica*, and *Sphaerobambos subtilis.* Based on this data, it could be predicted that Sulawesi is the center of *Dinochloa* diversity in Indonesia, because the number of species is more than other areas.

The key identification, description of each genus and species found in Sulawesi are presented below.

Key to the bamboo genera in Sulawesi

1 a. Simpodial rhizome with short neck ……..…… 2
b. Monopodial rhizome with long neck … *Phyllostachys*
2 a. Culms erect …… 3
b. Culms scrambling to climbing …… 8
3 a. Branches subequal …… *Schizostachyum*
b. Branches with one dominant lateral branch …….. 4
4 a. Branching in lower culm, culm not straight ..... *Bambusa*
b. Branching in mid to upper culm, culms straight …….. 5
5 a. Branching in upper culm only, secondary branches developing from the central (or sole) primary axis, big leaves .....…..…… *Neololeba*
b. Branching from mid culm upward, some of the secondary axes no more than one-half the diameter of the central (or sole) primary axis, small to big leaves …… 6
6 a. Diameter of culm less than 4 cm, often covered with the long persistent sheaths, small leaves ..... *Thyrsostachys*
b. Diameter of culm more than 5 cm, often covered with the persistent to deciduous sheaths, big leaves …..…..…. 7
7 a. Lower culm shorter than mid culm, aerial root in lower to mid culm, lower culm with velvety hair .... *Dendrocalamus*
b. Mid culm longer than lower culm, aerial root only in lower culm, lower culm hairy (not velvety) .....…..… ..... *Gigantochloa*
8 a. Culms climbing, scar sheath at the node base rough ……..…… ..... *Dinochloa*
b. Culms scrambling, without scar sheath ….....……... 9
9 a. Nodes with patella/knee ……...…… *Fimbribambusa*
b. Nodes without patella/knee ……...……...…… 10
10 a.Branches below the upper node, young culm white waxy, culm sheath with big rounded auricle with long bristle ….....…..... *Chloothamnus*
b. Branches on the upper node, young culm not waxy, culm sheath small with shorter bristle …….....…… 11
11 a.Branches long elongate with the development of the secondary branches, leaves blade linear ....….....…… ..... *Racemobambos*
b.Branches elongate without secondary branches, leaves blade narrow lanceolate ..……. *Sphaerobambos*

Description of each genus and species

***Bambusa* Schreb.**

Genera Plantarum ed. 8. (1789)

Closely tufted bamboo. *Culms* erect with a relatively thick wall. *Branch* complement with one dominant lateral branch and several secondary branches, usually smaller. *Culm sheath* covered with dark hairs, with well-developed auricle, blades erect, some erect becoming spreading and deflexed, triangular.

Distribution. Native to Southeast Asia, China, Taiwan, the Himalayas, New Guinea, Melanesia, and the North Australia. This genus also reported naturalized in other regions, e.g., Africa, Latin America, and various oceanic islands

Habitat. Any soil from the limestone, river bank, dry to wet climate.

Identification key to the species of *Bambusa*

1 a. Branching nodes with spines, deflexed blade ..... ……. ..... *B. blumeana*
b. Branching nodes without spines, erect blade or turning to deflexed afterward …….....……. 2
2 a. Young culms green or yellow with stripes …...……. 3
b. Young culms green without stripes ……...……. 4
3 a. Young culms green with yellow strips, mature culm with spotted brown, culm sheath blade as long as culms sheath proper or longer ..... *B. maculata*
b. Young culms green or yellow with green strips, mature culm without spotted brown, culm sheath blade shorter than culm sheath proper …….... *B. vulgaris*
4 a. Culms green, swollen nodes, culm sheath auricle ..... asymmetrical …….....……..... *B. tuldoides*
b. Culms green, straight, culm sheath auricle ..... symmetrical …...……..... 5
5 a. Culms sheath auricle curved outward, leaves with white strips …….....……. *B. glaucophylla*
b. Culms sheath auricle rim-like, leaves green..... ……. ..... *B. multiplex*

***Bambusa blumeana* Schult.f.**

Syst. Veg. 7: 1343 (1830)

Shoot orange covered with black hairs. *Culm* erect and zigzag, covered by white wax when young, up to 25 m tall. One lateral branch dominant, other branches smaller; spines in branch nodes. *Culm sheath* deciduous, auricle rounded sometimes folded out, with short bristle, blade deflexed. *Leaves* abaxially glabrous, apex acuminate, base truncate; *leafsheath* auricles rounded, short with bristles; ligules dentate, short with bristles.

Distribution. Sulawesi especially Maros, up to North Sulawesi, Sangihe and Selayar Islands. (Figure 1)

Habitat. The limestone, sandy soil, forest floor and edge of forest at 500-650 m asl.

Vernacular name. Kalaeng batu (Sangihe), koaëng tabada, oe watu, totoren batu, totoren oe watu, pepusunen (Minahasa), bulo totowang (Makassar), awo maduri, awo tara (Bugis), haduri, Uhu' Duri, Bulo Katinting (Selayar)

Specimens examined. North Sulawesi. Mt. Lokon, 4 Jan. 1895, *Koorders 19789* (BO); Sangihe, Sangihe-Talaud, Tambukan Tengah Islands, Biru Village, 27 March 1992, *EAW 4953* (BO).

***Bambusa glaucophylla* Widjaja**

Reinwardtia 11: 59 (1997)

Shoots green, glabrous or covered by brown hairs. *Culms* 5 m tall, 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. *Culm sheath* deciduous, covered by brown to black hairs; auricles slightly curved outward, rounded, with short to long bristles; ligule entire, glabrous to minutely hairy on edge; blade erect, triangular, base narrow, adaxially glabrous. *Leaves* green with longitudinal white stripes; *leafsheath* sometimes with black to white hairs, auricles rounded and out curved, glabrous; ligule entire, glabrous.

Distribution. Unknown provenance. It is commonly planted in gardens and city parks (Widjaja 1997) (Figure 2).

Habitat. Humid tropical areas.

Vernacular name. Bambu putih (Indonesia).

***Bambusa maculata* Widjaja**

Reinwardtia 11 (2): 63-65 (1997)

Shoot green with yellow stripped. *Culm* erect, green, with brown spots when old, branches one dominant lateral branches with several smaller branches. *Culm sheath* persistent sometimes deciduous, abaxially covered with black hairs, adaxially glabrous; auricles curved outward, long bristles; extended up to the blade's base, ligules laciniate; blade erect, triangular. On the upper culm, blade spreading to reflexed but not until the blade base. *Leaves* glabrous, apex acuminate, base angustate; *leafsheath* auricles inconspicuous, less than 1 mm high without bristles; ligules laciniate, less than 1 mm high.

Distribution. North, Central Sulawesi and Selayar (Figure 3).

Habitat. Primary and secondary forests.

Vernacular name. Kalaeng ngusina (Sangihe), Oro Batti, Tarri (Selayar)

Specimens examined. Winowangan, 30 July 1954, *Alston 16587* (AAH, B, BO); Sangihe Island, Sangihe-Talaud, Tambukan Utara, Bowang Hulu Village, 27 March 1992, *EAW 4939* (BO, K, L, US).

***Bambusa multiplex* (Lour.) Raeusch. ex Schult.**

Syst. Veg. 7: 1350 (1830)

Shoots green, glabrous. *Culm* erect, branches near the ground, 7-9 subequal branches. Young culms green covered white wax, glabrous. *Culms sheath* deciduous, glabrous, culm sheath auricle rim-like, short bristles, ligules laciniate, glabrous, blade erect. *Leaves* linear, abaxial rare hairy, whitish, *leafsheath* auricle small with short bristles.

Distribution. Cultivated all over Sulawesi (Widjaja 1994) (Figure. 4)

Habitat. Humid tropical areas.

Vernacular name. Bambu cina, bambu pancing (Indonesia)

***Bambusa tuldoides* Munro**

Trans. Linn. Soc. London 26: 93 (1868)

Shoots green covered with brown until black hairs. *Culms* erect, until 5 m tall with swollen nodes, branches one dominant with several smaller branches. Young culms glabrous and green. *Culms sheath* glabrous, deciduous, asymmetrical, auricle rounded with short bristles, culm sheath blade erect, ligules glabrous. *Leaves* glabrous; , *leafsheath* auricle incospicuous with bristles, ligule flat, glabrous.

Distribution. Cultivated all over Sulawesi (Widjaja 1994) (Figure 5).

Habitat. Humid tropical areas.

Vernacular name. Buddha belly, bambu blenduk (Indonesia)

***Bambusa vulgaris* Schrad. ex Wendl.**

Coll. Pl.2: 26 (1808)

Culm erect, glossy, green or yellow with green strips, inflated, branches one lateral branches dominant with several smaller branches. *Culm sheath* deciduous, densely hairy, hair black; auricles curved outward with bristles; ligules dentate irregular without bristles; blade erect, triangular. *Leaves* glabrous, apex acuminate, base truncate; *leafsheath* auricles rounded, without bristles; ligules laciniate, short.

Distribution. Cultivated all over Sulawesi (Figure 6).

Habitat. Humid tropical areas.

Vernacular name. Green variety: bulu minjak (Manado), pakayu (Totembuan), wowuhu woidu (Bolaang Mongondow), kalaeng ohose, kalahing (Sangihe), tahaki (Minahasa), bulo banua (Makassar). Yellow variety: bulo gading (Makassar), awo lagading (Bugis).

Specimens examined. **North Sulawesi**. var. *vulgaris* Winowangan, 4 Km. East of Menado, 3 July 1954, *Alston 16122* (AAH, BO, K, L); Sangihe Island, Sangihe-Talaud, Tambukan Utara, Bowang Hulu Village, 27 March 1992, *EAW 4942* (BO, K, L, US); var. *vitata* Bogani Nani Wartabone National Park, Trail to Poniki Mountain, 6 March 1996, *INH 006* (BO, K); Trail to Sinombayuga Mountain, 19 March 1996, *MTL 036* (BO, K); Near Melangodaa River, Bolaang Mongondow, 19 March 1996, *MTL 038* (BO, K).

Notes. The species consists of 3 varieties and the identification key to the variety is shown below. The herbarium specimen kept in BO mostly var. *vulgaris* and var. *vitata* (=var. *striata*). The collection of both varieties are also lacking because mostly both varieties are planted by people in their garden, or in the field as land border. The var. *wamin* is also cultivated in their gardens as ornamental plant and there is no herbarium specimen except reported by Widjaja (1994).

Identification key to the variety of *Bambusa vulgaris*

1 a. Culm swollen ..... *B.vulgaris* var. *wamin*
b. Culm straight 2
2 a. Culm green and glossy ..... var. *vulgaris*
b. Culm yellow or yellow with green stripes, not glossy .... var. *vitata*

***Chloothamnus* Buse**

Pl. Jungh. [Miquel] 3: 386 (1854)

Culms scrambling, branches with one dominant lateral branches and several smaller branches, the lateral branches elongated very long and climbing to another neighbouring tree. *Culm sheath* with blades spreading, triangular; culm sheath auricles rounded, with long bristle. *lLeaves sheath* auricles rounded.

Distribution. Southeast Asia (Borneo, Java, Sulawesi, Moluccas), Papuasia

Habitat. Mostly grown in the highland forest, ultrabasic soil, limestone.

Notes. Widjaja & Wong (2016) has published that the Malesian *Nastus* should be *Chloothamnus*. This statement is also clarified by Chokthaweepanich (2014) and followed by Wong & Dransfield (2016), Wong et al (2016) that the Malesian *Nastus* species to be a different major lineage from the African *Nastus*. Therefore the Malesian taxa can be recognized morphologically as three distinct genera: *Chloothamnus* Buse, *Ruhooglandia* S.Dransf. & KM Wong and *Widjajachloa* KM Wong & S Dransf. In the Plant List website, this genus is still put under the genus *Nastus.*

***Chloothamnus* sp.** (Figure 7a-b)

Shoot green covered with white wax. *Culm* erect on the base and scrambling upward, green, glossy, when the young cover with white wax, and becoming glossy when mature, branches one lateral branch dominant with several smaller branches, the lateral branches long elongated, but when the main culm cut off, the lateral branches as big as the main culm. *Culm sheath* caducous, blade spreading to deflexed, auricle big, curved outward with long bristle more than 10 mm. *Leaves* glabrous, linear, *leafsheath* auricles rounded, curved outward, small, without long bristles.

Distribution. Mt. Mekongga, from Tinukari village (Figure 7 C).

Habitat. Along the river bank.

Notes. This species has been put under the *Chloothamnus* at the time being, due to peculiar bud character. Further study on this species is needed.

Specimens examined. Southeast Sulawesi, North Kolaka, Wawo/Ranteangin, Tinukari village, 3 August 2009, *EAW 8863* (BO, K, L).

***Dendrocalamus* Nees**

Linnaea 9: 476 (1835)

Culms erect never climbing. Young culm covered with velvety brown hairs, some with white wax, branches with one dominant lateral branches and several smaller branches. *Culm sheath* with blades deflexed, triangular; culm sheath auricles rounded; *leafsheath* auricles rounded.

Distribution. India, Indochina, southern China, Southeast Asia (Malay Peninsula, Philippines, Sumatra, Jawa, Borneo, Sulawesi, Moluccas, New Guinea).

Habitat. Secondary forest or in cultivation.

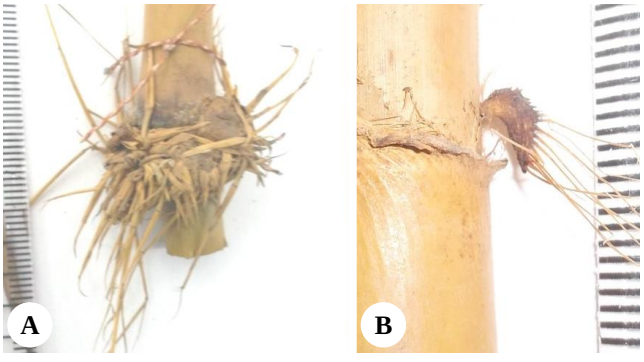


Figure 7. *Chloothamnus* sp. A. branch , B. Culm sheath auricle

***Dendrocalamus asper* (Schult.) Backer ex Heyne**

Nutt. Pl. Ned.-Ind.ed. 2,1: 301 (1927)

Shoot brown purplish with velvety hairs. *Culm* erect with drooping tips, thick walls, branches one lateral dominant with several smaller branches, 4-7 branches on the middle culm. Lower young culm covered with velvety brown hairs when young or glabrous. Upper young culm covered with white wax. *Culm sheath* deciduous, hairy, hairs brown to black; auricles rounded with bristles up to 5 mm long; ligules dentate irregular with bristles; blade deflexed, lanceolate or narrowly triangular. *Leaves* glabrous, apex acuminate, base breve angustate; *leafsheath* auricles rounded, bristles absent; ligules entire with bristles.

Distribution. All over Sulawesi, but based on the herbarium specimens, it is the only representative from North and South East Sulawesi (Figure 8).

Habitat. Riverside and garden.

Vernacular name. Buluh Jawa (Lotohe), tabadi, buluh patung (Sangihe), bambu pari/ buluh paring (Kendari), bulo patung, buloh jawa (Makassar), awo petung (Bugis).

Specimens examined. **Southeast Sulawesi**, Kendari, Abeli Village, Poasia, 21 June 1978, *EAW 472* (BO); **North Sulawesi**. Tombatoe Tonsawang Amoerang, Rano-Iapo, 1 April 1895, *Koorders 19773* (BO); Gorontalo, Kabila, Lotohe Village, 18 March 1992, *EAW 4873* (BO); Sangihe Island, Sangihe-Talaud, Bowang Hulu Village, 27 March 1992, *EAW 4941* (BO).

***Dinochloa* Buse**

In Miquel, Pl. Junghuhn: 388 (1854)

Culms climbing, zig-zag, smooth or rough when young, usually purplish, rarely green or green with white wax. Culm node with scar sheath and very rough base. *Branches* small, with the dominant branch dormant when the main culm was cut off, the dormant and dominant branch is developed can be big as the main culm. *Culms sheath* with rugose base; with black hairs or whitish wax adaxially, auricles present or absent; blades erect, spreading or deflexed, triangular-broadly ovate. *Leafsheath* auricle present or absent; glabrous or hairy.

Distribution. Myanmar, Indochina, Hainan, Andaman, Nicobar Islands, Malay Peninsula, Sumatra, Java, Borneo, Sulawesi, Lesser Sunda Islands, Philippines, Moluccas

Habitat. Primary and secondary forests, in the ultrabasic soil, limestone, volcanic soil, from the lowland up to 1200 m asl.

Identification key of *Dinochloa*

1 a. Culms sheaths blade erect 2
b. Culms sheaths blade deflexed 12
2 a. Culms sheath hairy to densely hairy at the sheath base ... 3
b. Culms sheath glabrous 5
3 a. Culm sheath auricle folded with short bristle .... *D. petasiensis*
b. Culm sheath auricles rounded to outward with long bristle 4
4 a.Culm sheath ligule with short bristle, abaxial leave blade glabrous ..... *Dinochloa* sp.6
b. Culm sheath ligule glabrous, abaxial leave blade covered with golden hairs ..... *D. albociliata*
5 a. Culm sheath auricle absent 6
b. Culm sheath auricle present 7
6 a. Leave petiole long, ligule entire ..... *D. truncata*
b. Leaves petiole short almost sessile, ligule laciniate .... *Dinochloa* sp.3
7 a. Culm sheath auricle not folded 8
b. Culm sheath auricle folded 9
8 a. Culm sheath auricle rounded with short bristle .... *Dinochloa* sp.1
b. Culm sheath auricle spreading without bristle .... *D. aopaensis*
9 a. Culm sheath auricle without bristle ..... *Dinochloa* sp.5
b. Culm sheath auricle with bristle 10
10 a. Culm sheath ligule with long bristle, leaves sheath auricle curved outward ..... *D. cordata*
b. Culm sheath ligule without bristle, leaves sheath auricle folded 11
11 a. Culm sheath auricle folded along the sheath apex, with long bristle ..... *D. erecta*
b. Culm sheath auricle folded and outcurved, with short bristle ..... *D. morowaliensis*
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 folded 15
14 a. Culms sheath covered with pale brown hairs, lodicules absent .... *D. hirsuta*
b. Culms sheath covered with golden brown hairs, lodicules present ..... *D. barbata*
15 a. Leaves sheath auricle inconspicuous without bristle .... *Dinochloa* sp.8
b. Leaves sheath auricle folded, with long bristle 16
16 a. Culm sheath ligule with long bristle .... *Dinochloa* sp.4
b. Culm sheath ligule with short bristle ... *Dinochloa* sp.9
17 a. Culm sheath auricle present ..... *D. pubiramea*
b. Culm sheath auricle absent 18
18 a. Petiole almost sessile, abaxial leaves blade glabrous .... *Dinochloa* sp.2
b. Petiole 3-6 mm long, abaxial leaves blade covered with pale hairs .... *Dinochloa* sp.7

***Dinochloa albociliata* Widjaja**

Reinwardtia 11 (2): 74-75 (1997)

Shoots green with white wax. *Culm* climbing, zigzag, usually solid, branches one dominant with smaller branches, or sometimes the main branch dormant, intravaginal; nodes base rough. *Culm sheath* deciduous, appressed with white to light brown hairs, auricle small with bristles. *Leaves* blade abaxially covered golden hairs, apex acuminate, base breve-angustate; *leafsheath* glabrous, auricles folded, with bristles, ligules entire to denticulate with bristles.

Distribution. Central Sulawesi (Figure 9).

Habitat. Disturbed forest, along the main road, in the valley and wet area, 550 m asl.

Specimen examined. Central Sulawesi. Between Kebun Kopi to Poso, 03 Jan. 1988, *EAW 3549* (BO).

***Dinochloa aopaensis* Widjaja**

Reinwardtia 12 (5): 435-436 (2008)

Shoot green with white wax, glabrous. *Culm* climbing, green and white waxy, *branches* one dominant lateral branch with smaller branches. Culm nodes bases rough. *Culm sheath* caducous, margin glabrous, membranous; sheath proper overlapping; auricles spreading along the sheath apex, bristles absent; ligules entire, bristles absent; blade erect, broadly ovate with long acuminate tips, base cordate. *Leaves* glabrous, abaxially covered scattered pale hairs, apex acuminate, base angustate; auricle small rounded without bristles; ligules entire without bristles.

Distribution. Southeast Sulawesi (Figure 10).

Habitat. Swamp, 47-143 m asl.

Specimens examined. **Southeast Sulawesi.** Konawe, Puriala Village, Mt. Tigacabang, Osundolo Samba, 24 July. 2005, *EAW 8027* (Holotype: BO, Isotypes: K, L); Kendari Sampara, 31 July. 2009, *EAW 8861* (BO, K).

***Dinochloa barbata* S.Dransf.**

Kew Bulletin 51 (1): 115-116 (1996)

Culm climbing, branches one dominant lateral branch with, 2-6 smaller branches. Culm nodes bases rough. *Culm sheath* persistent, adaxially cover with golden brown hairs, abaxially glabrous, base hairy, auricles curve outward with bristles; ligules dentate with long bristles up to 16 mm; blade deflexed, triangular-narrowly lanceolate with long tips. *Leaves* glabrous, apex acuminate, base angustate; *leafsheath* glabrous, auricles curve outward with very long bristles, ligules laciniate with long bristles.

Distribution. Central, North and Southeast Sulawesi (Figure. 11)

Habitat. 50-1400 m asl.

Vernacular name. Wolu palu (Central Sulawesi), augin boyod, bulu maraya, hulapa loudu, buluh tikus, boeloe ingkawak (North Sulawesi).

Specimens examined. **Central Sulawesi**. Palu, Polokaa, 1 May 1979, *Darnaedi 1492* (holotype K, isotype BO, KYO, L); Mt. Nokilalaki, Bukit Habuntu, 23 March 1975, *Meijer 9471A* (BO, K, L); South west Donggala, 15 May 1975, *Meijer 10121* (BO); Mt. Roroka Timbu, 10 May 1979, *de Vogel 5265* (BO, K, L). Donggala, Taweli, Bale, Mt. Kanora, 16 April 1983, *EAW 2090*; Nopu, Dongi dongi, Poso, 26 Dec. 1988, *EAW 2101*; **Southeast Sulawesi**. Kendari, Ranomeeto, Mt. Papalia, 13 Feb. 1986, *Amir 141*; **North Sulawesi**. Manado, Koelawi to Lindoe, 6 Nov. 1930, *Posthumus 2440*; Minahasa, Mt. Klabat, 27 April 1954, *Alston 16467*, 10 July 1996, *MTL 084* (BO), *MTL 085* (BO), *MTL 086* (BO), *MTL 087* (BO); Ratahan, 19 March 1992, *EAW 4876*; Bolaang Mongondow, Mt. Poniki, 2 March 1996, *INH 002* (BO), *INH 003* (BO); 3 March 1996, *MTL 018* (BO), *MTL 019* (BO), *MTL 020* (BO), *MTL 021* (BO); Mt. Kabila, 4 March 1996, *INH 001* (BO), *MTL 082* (BO); 4 July 1996, *MTL 079* (BO), *MTL 080* (BO), *MTL 081* (BO), *MTL 082* (BO); 11 Sep. 1997, *TU 3157* (BO); Mt. Sinombayuga, 17 March 1996, *MTL 030* (BO), *MTL 29* (BO); Mt. Gambuta, 17 March 1996, *MTL 053* (BO); between Tumpah river and Toraut River, 13 March 1996, *MTL 069* (BO), *MTL 071* (BO); Bogani Nani Wartabone National Park, 1 Oct. 1996, *INH 012* (BO), *INH 013* (BO), *INH 014* (BO).

***Dinochloa cordata* S. Dransf.**

Kew Bulletin 51 (1): 107-108 (1996)

Culm climbing, branches one dominant lateral branches with 2-3 branches smaller; nodes bases rough. *Culm sheath* deciduous, glabrous, base glabrous, auricles along the sheath apex with bristles; ligules laciniate with long bristles; blade erect, broadly ovate with long tips, base cordate. *Leaves* glabrous, apex acuminate, base breve-angustate; *leafsheath* glabrous, auricles curve outward with long bristles; ligules laciniate with very long bristles.

Distribution. Central and Southeast Sulawesi (Figure 12).

Habitat. 50-550 m asl.

Vernacular name. Ora (Southeast Sulawesi).

Specimens examined. **Southeast Sulawesi**. N shore of Lake Matano, Bonemaitu, 11 July 1979 *de Vogel 6209a* (Holotype: K, Isotypes: BO, L); 22 July 1976, *Meijer & Muchtar 11516* (BO, L); Soroako, 3 July 1979, *van Balgooy 3857* (BO, K, L); 15 July 1979, *Darnaedi 2259* (BO, K, KYO, L); Kendari, Ahuma-Umaha, 13 Oct. 1978; *Prawiroatmodjo & Maskuri 1116* (BO); Kolaka, Ladongi-Tirawuta, 17 Oct. 1978, *Prawiroatmodjo & Maskuri 1243* (BO); Poli poli-Tirawuta, 21 Oct. 1978, *Prawiroatmodjo & Maskuri 1394* (BO); Kendari, Mt. Khurui, 9 Feb 1986, *Amir 128* (BO); Suaka Margasatwa Toronipa, 22 June 1978, *Widjaja 495* (BO, K, L, SIN, US). **Central Sulawesi**. Northeast of Luwuk, 7 Oct. 1989, *Coode 5828* (BO, K, L); Luwuk area, between Batui and Seseba, 16 Oct. 1989.

***Dinochloa erecta* Widjaja**

Reinwardtia 11 (2): 74-77 (1997)

Shoot orange with white wax, glabrous. *Culm* climbing, young culm white wax, glabrous, branches one dominant lateral branches, intravaginal. Culm nodes bases rough. *Culm sheath* deciduous, glabrous, base glabrous; auricles folded with long bristles; ligules entire, glabrous; blade erect, broadly ovate and base cordate. *Leaves* glabrous, apex obtusus base truncate; *leafsheath* glabrous, auricles folded with long bristles, ligules laciniate with bristles.

Distribution. Central and Southeast Sulawesi (Figure 13).

Habitat. Lowland, limestones, 250 m alt.

Specimens examined. **Central Sulawesi**. Donggala, Gouda-gouda Village, 30 Jan 1988, *EAW 3542* (Holotype: BO, Isotypes: K, L, US, PNH), *EAW 3543* (BO, K ,L); Morowali, Petasia Timur, Bungintimbe Village, 3 May 2005, *EAW 7669* (BO, K, L); **Southeast Sulawesi**. Konawe Selatan District, Laepa Subdistrict, Anduna Village, 22 June 2010, *EAW 9024* (BO, K, L); North Kolaka District. Pasir Angin Subdistrict. On the way from Tinukari Village to Lasusua, 12 July 2010, *EAW 9100* (BO, K, L); Konawe Selatan District, Wolan Subdistrict, Protected Forest Wolasi, 14 April 2011, *EAW 94;70* (BO, K, L, US); Kolaka District, Watubangga Subdistrict, Lamedae Village, Nature Reverse Lamedai, 15 April 2011, *EAW* 9501 (BO, K, L, US).

***Dinochloa hirsuta* S.Dransf.**

Kew Bulletin 51 (1): 114-115 (1996)

Young shoots densely hairy with pale hairs. *Culm* climbing, *branches* one dominant, 2-4 branches, nodes bases rough. *Culm sheath* deciduous, adaxially covered with pale-golden hairs, base glabrous, margin hairy; auricles curve

with long bristles, ligules laciniate with long bristles; blade deflexed, triangular-narrowly lanceolate. *Leaves*, glabrous, apex acuminate, base breve-angustate; *leafsheath* cover with pale-golden hairs when young, margin hairy; auricles curve outward with bristles; ligules laciniate with bristle.

Distribution. South Sulawesi (Figure 14).

Habitat.10-100 m asl.

Vernacular name. Buloh

Specimens examined. **South Sulawesi**. Malili, Kp. Paweh, 17 Nov. 1976, *D. Darnaedi 1215* (BO, L); Luwu District, Palopo, Ds. Mario, 8 April 1984, *Ramlanto 121* (BO, K, L, S, Arb); Wae atue, Manurung, 7 km from Malili, 10 April 1984, *Ramlanto 136* (BO, K, L, S, Arb).

***Dinochloa morowaliensis* Widjaja**

Reinwardtia 12 (5): 436-437 (2008)

Culm climbing, young culm green with white waxy, branches one dominant lateral branch; nodes bases rough. *Culm sheath* caducous, with white waxy, base of culm sheath glabrous, hairy along the margin; auricles curved outward at the edge and deflexed along the sheath apex, with many bristles and long; ligules entire without bristles; blade erect, broadly ovate with long acuminate tips, base cordate, slightly swollen in the middle and inflated. *Leaves* blade adaxially covered with pale hairs, apex acuminate, base breve-angustate; *leafsheath* glabrous, auricles folded with bristles, ligules laciniate with bristles.

Distribution. Central Sulawesi (Figure 15).

Habitat.Lime stone, Secondary forest, 953 m asl.

Specimen examined. **Central Sulawesi**. Morowali, Petasia Timur, Bungintimbe Village, 3 May 2005, *EAW 7943* (BO, K, L)

***Dinochloa petasiensis* Widjaja**

Reinwardtia 12 (5): 438-439 (2008)

Culm climbing, young culm green with white waxy, *branches* one dominant. Nodes bases rough. *Culm sheath* caducous, glabrous, base with scattered hairs, sheath proper overlapping, the hiding basal sheath with scattered pale brown to white hairs till the scar sheath apex; auricles folded along the sheath apex with rarely short bristle; ligules entire, bristles absent; blade erect, broadly ovate with long acuminate tips, base cordate, apex acuminate with long tapering tip, slightly swollen in the middle and inflated. *Leaves* glabrous, apex acuminate, base breve-angustate; *leafsheath* glabrous, auricles folded with long bristles; ligules laciniate with long bristles.

Distribution. Central Sulawesi (Figure 16)

Habitat. Secondary forest, 953 m asl.

Specimen examined. **Central Sulawesi**. Morowali, Petasia Timur, Bungintimbe Village, 3 May 2005, *EAW 7941* (BO, K, L).

Dinochloa pubiramea Gamble

Philippine Journal of Science 5 (4): 279-280 (1910)

Culm climbing, branches one dominant, culm nodes bases rough. *Culm sheath* persistent, adaxially glabrous; auricles rounded with long bristles; ligules laciniate; blade deflexed, triangular. *Leaves* glabrous, apex acuminate, base breve-angustate; *leafsheath* with small rounded auricles with bristles; ligules laciniate with bristles.

Distribution. Gorontalo (Figure 17).

Habitat. Primary forest on the hill slopes, 185-810 m asl.

Vernacular name. Hulapa loudu (Gorontalo).

Specimens examined. **Gorontalo**. Pinogu Enclave to Taludaa, Bogani Nani Watabone National Park, 13 April 1996, *MTL 042* (BO), *MTL 046* (BO), *MTL 045* (BO); 23 April 1996, *MTL 060* (BO), *MTL 061* (BO).

***Dinochloa truncata* Widjaja**

Reinwardtia 11 (2): 78-79 (1997)

Shoot purplish with white wax. *Culm* climbing, young culm white wax and glabrous when mature, branches one dominant, 4-8 branches. Nodes with rough bases. *Culm sheath* deciduous, glabrous or sometimes with scattered brown hairs; auricle absent; ligules entire, bristles absent; blade erect, triangular, adaxially glabrous. *Leaves* glabrous, apex acuminate, base breve-angustate, petiole long more than 3 mm; *leafsheath* with inconspicuous auricles, bristles absent; ligules entire, glabrous, short.

Distribution. Gorontalo (Figure 18).

Habitat. Limestone, 50 m asl.

Vernacular name. Talelo udu (Gorontalo).

Specimen examined. **Gorontalo**. Tibawa, Molalahu Village, 18 March 1992, *EAW 4871* (Holotype: BO).

***Dinochloa* sp.1** (Figure. 19A-C).

Culm climbing, branches one dominant, 2-3 branches, nodes bases rough. *Culm sheath* persistent, adaxially glabrous; auricles rounded small less than 1 mm high with a few and short bristles; ligules laciniate glabrous, short; blade erect, broadly ovate and cordate base. *Leaves* apex acuminate, base breve-angustate, abaxial cover golden brown hairs; *leafsheath* with small rounded auricle with bristles; ligules laciniate, glabrous, short.

Distribution. Southeast Sulawesi (Figure 19d).

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

Specimens examined. **Southeast Sulawesi**, Kendari Sampara, 31 July 2009, *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, *EAW 8974* (BO, K, L).

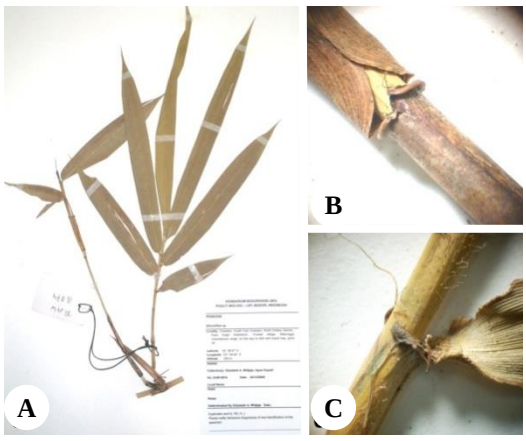


Figure 19. Herbarium specimen of *Dinochloa* sp.1; A. Leaves, B. Culm sheath; C. Leaf sheath

***Dinochloa* sp.2** (Figure 20 A-C).

Culm climbing, branches one dominant, 5-6 branches. Nodes bases rough. *Culm sheath* persistent, adaxially glabrous, base glabrous, auricles absent; ligules entire, without bristles; blade deflexed, triangular to narrowly lanceolate, base cordate. *Leaves* glabrous, apex acuminate, base angustate, petiole sessile or almost sessile. *Leafsheath* surface glabrous; auricles absent, ligules entire, very short with few bristles.

Distribution. North Sulawesi (Figure 20 D).

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

Vernacular name. Tali loudu.

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

Culm climbing. *Branches* one lateral branches dominant, with 2-3 smaller branches. Nodes bases rough. *Culm sheath* persistent, without hairs; auricles absent; ligules entire or laciniate without bristles; blade erect, triangular with narrowly base and acuminate apex. *Leaves* glabrous, apex acuminate, base breve angustate, petiole short almost sessile; *leafsheath* without auricles and bristles; ligules laciniate, short.

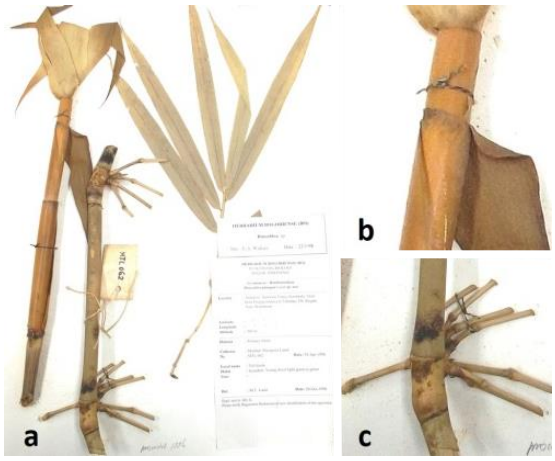


Figure 20. A. Herbarium specimen of *Dinochloa* sp.2.; B. Culm sheath auricle; C. Branch

Figure 21. A-B. Herbarium specimen of *Dinochloa* sp.3; C. Culm sheath auricle

***Dinochloa* sp.3** (Figure 21 A-C)

Distribution. Southeast Sulawesi (Figure 21 D).

Habitat. Secondary forest, 245 m asl..

Notes. This species resembles *D. truncata* Widjaja based on characters of erect blades, auricles and absent bristle of its culms sheath. However, it is differed by the absent of lodicules and the shorter floret, 4 mm long.

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

***Dinochloa* sp.4** (Figure 22 A-C)

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; auricles folded, bristles very long; ligules dentate irregular with long bristles; blade spreading to deflexed, triangular with long acuminate tips, base cordate. *Leaves* glabrous, apex acuminate, base angustatus; *leafsheath* glabrous; auricles folded with long bristles; ligules laciniate, with long bristles.

Distribution. Southeast and South Sulawesi (Figure 22 D).

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

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

Figure 22. A. Herbarium specimen of *Dinochloa* sp.4; B. Culm sheath; C. Leaf sheath.

Figure 23. A-B. Herbarium specimen of *Dinochloa* sp.5; C. culm sheath 5; D. leafsheath.

***Dinochloa* sp.5** (Figure 23 A-D)

Culm climbing, branches one dominant, nodes bases rough. *Culm sheath* deciduous, adaxially glabrous; auricles folded along the sheath apex without bristles; ligules laciniate glabrous, very short; blade erect, triangular with cordate base. *Leaves* glabrous, apex acuminate, base truncate; *leafsheath* with inconspicuous auricles, a few bristles; ligules laciniate, glabrous, very short.

Distribution. Southeast Sulawesi (Figure 23 E).

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

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

***Dinochloa* sp.6** (Figure 24 Aa-D)

Culm climbing, nodes bases rough. *Culm sheath* persistent, densely hairy covers with white hairs, base hairy, margin hairy; auricles curved outward with long bristles; ligules laciniate, bristles short; blade erect, broadly ovate with cordate base. *Leaves* glabrous, apex acuminate, base breve-angustate; *leafsheath* abaxially covered white hairs, auricle folded with long bristles; ligules laciniate, with bristles.

Distribution. Central Sulawesi (Figure 24 E).

Habitat. Secondary forest, 953 m asl.

Specimen examined. **Central Sulawesi**, Morowali, Petasia Timur, Bungintimbe Village, 3 May 2005, *EAW 7668* (BO, K).

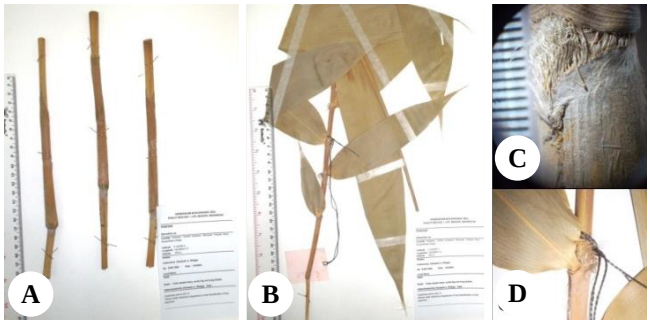


Figure 24. A-B. Herbarium specimen of *Dinochloa* sp.6; C. Culm sheath auricle; D. Leafsheath.

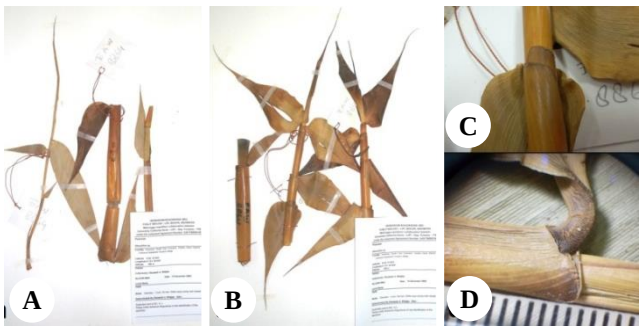


Figure 25. A-B. Herbarium specimen of *Dinochloa* sp.7; C. Culm sheath; D. Leafsheath

***Dinochloa* sp.7** (Figure 25 A=D)

Culm climbing, branches one dominant, nodes bases rough. *Culm sheath* deciduous, without hairs; auricles absent; ligules entire or laciniate without bristles; blade deflexed, triangular with long acuminate tips, base narrow. *Leaves* glabrous, apex acuminate, base breve-angustate; *leafsheath* with inconspicuous auricles with bristles; ligules dentate irregular.

Distribution. Southeast Sulawesi (Figure 25 E).

Habitat. Alluvium rocks, 100 m asl.

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

***Dinochloa* sp.8** (Figure 26 A-C)

Culm climbing. *Branches* one dominant, infravaginally. *Culm* covers white waxy. Nodes bases rough. *Culm sheath* persistent, cover with brown hairs; auricles folded and curve outward at the edge with long bristles; ligules dentate irregular with bristles; blade deflexed, triangular-narrowly lanceolate, base cordate. *Leaves* glabrous, apex acuminate, base breve-angustate, petioles; *leafsheath* with inconspicuous auricles with short bristles; ligules laciniate. *Inflorescence* not available.

Distribution. Southeast Sulawesi (Figure 26 D).

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

Specimens examined. **Southeast Sulawesi**, North Kolaka Wawo/Ranteangin, Tinukari Village, 3 Aug. 2009, *EAW 8863* (BO, K, L); North Kolaka District, Wawo Subdistrict, Tinukari Village, Masembo Forest of Mekongga Mountainous, 16 Dec. 2009, *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, *EAW 8904* (BO, K, L); North Kolaka district, Pasir Angin subdistrict, Tinukari, Mekongga mountainous range, forest Masembo, above Masembo river plot 2&11, 1 July 2010, *EAW 9072* (BO).

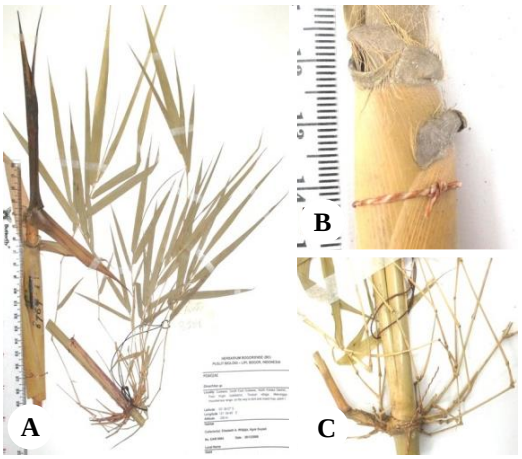


Figure 26. A. Herbarium specimen of *Dinochloa* sp.8; B. Culm sheath; C. Branch

***Dinochloa* sp.9** (Figure 27 A-C)

Culm climbing. Branches one dominant, many branches on each node, extravaginal. *Culm sheath* deciduous, adaxially cover with brown hairs; auricle folded with bristles; ligules dentate irregular with bristle; blade deflexed, triangular-broadly ovate. *Leaves*, apex acuminate, base breve-angustate, abaxial cover with pale hairs, adaxial glabrous; *leafsheath* cover golden brown hairs when young; folded auricle with long bristles; ligules laciniate, short with bristles.

Distribution. Central Sulawesi (Figure 27 D).

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

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

***Fimbribambusa* Widjaja**

Reinwardtia 11 (2): 80. 1997.

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; blades spreading to folded. *Leaves* glabrous, *leafsheath* auricle horn-like.

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 separated from the genus *Bambusa* due to its spreading crest on each node (fimbril or patella), the entire lodicules and the ovoid glabrous and not thickened ovary. In the plant list web site this genus is still put under the *Bambusa*.

***Fimbribambusa* sp**. (Figure 28 A-C)

Culm scrambling,with patella/knee in nodes, *branches* one lateral dominant branches with smaller branches. *Culm sheath* not available. *Leaves* glabrous, apex acuminate, base breve-angustate; *leafsheath* auricles horn-like with bristles, ligules dentate irregular, short without bristles.

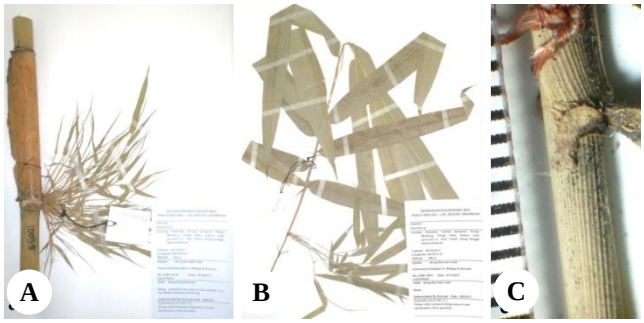


Figure 27. A-B. Herbarium specimen of *Dinochloa* sp.9; C. Leafsheath

Distribution. South Sulawesi (Figure 28 Dd).

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

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)

Identification key to *Gigantochloa*

1 a. Culms sheath persistent, auricle rim-like .... *Gigantochloa apus*
b. Culms sheath deciduous, auricle rounded to curved outward 2
2 a. Culms green, auricle rounded to curved outward .... *G. atter*
b. Culms purplish green, auricle rounded .... *G. atroviolacea*

***Gigantochloa* Kurz ex Munro**

Trans. Linn. Soc. 26: 133 (1868)

Culms erect, nodes with one dominant lateral branches and several smaller ones. *Culm sheath* with brown to black hairs; blade erect to deflexed, triangular to lanceolate; auricles rounded to inconspicuous. *Leaves* glabrous, *leafsheath* auricle rounded to inconspicuous. *Inflorescence* indeterminate.

Distribution. South and Southeast Asia, Indochina, Myanmar.

Habitat. Lowland up to highland 1500 m asl.

***Gigantochloa apus* (Schult.) Kurz**

Natuurk. Tijdschr.Ned.-Indië 27: 226 (1864)

Culm erect, branches one lateral branches dominant, with several smaller branches. *Culm sheath* persistent, covered with black hairs; auricles rim-like with bristles; ligules dentate; blade deflexed, triangular and narrowly bases. *Leaves* glabrous, apex acuminate, base angustatus; *leafsheath* auricles rounded, bristles absent; ligules entire, short.

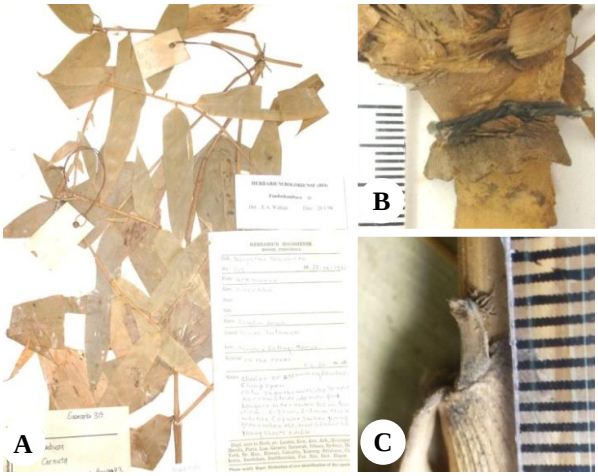


Figure 28. A. Herbarium specimen of *Fimbribambusa* sp.; B. Patella; C. Leafsheath

Distribution. Cultivated in the North and Central Sulawesi reported by Widjaja (1994) (Figure 29).

Habitat. Volcanic rocks.

Vernacular name. Kalaeng Jawa (Sangihe).

Specimen examined. **North Sulawesi**. Talengan Village, Tambukan tengah, Sangihe Island, Sangihe-Talaud, 27 March 1992, *EAW 4954* (BO).

***Gigantochloa atter* (Hassk.) Kurz**

Natuurk. Tijdschr.Ned.-Indië 27: 226.1864.

Culm erect, branches one lateral branches dominant with several smaller branches. *Culm sheath* deciduous, covered with brown or black hairs; auricles rounded with short bristles; ligules dentate; blade deflexed, triangular and narrowly bases. *Leaves*, glabrous, apex acuminate, base angustatus; *leafsheath* auricles rounded, bristles absent; ligules entire, less than 1 mm high. *Inflorescence* not available.

Distribution. North, Central, Southeast and South Sulawesi (Figure 30).

Habitat. Primary and secondary forests, 5-950 m asl.

Vernacular name. Buluh Pring (Bantimurung), Parin (Rantepao), Bambu Bonda (Poasia), Wolo Awo (Donggala), Talelo (Tibawa), Buluh Pagar (Bolaang mongondow), Amut (Ratahan), Kalaeng Pitung (Sangihe), Bulu Ajer (Minahasa).

Specimens examined. **North Sulawesi.** Minahasa, Manado, 22 April 1895, *Koorders 19809* (BO); *Koorders 19810* (BO); Molalahu Village, Tibawa, 18 March 1992, *EAW 4869* (BO); Minahasa, Ratahan, 19 March 1992, *EAW 4875* (BO); Manado, Baikang Village, Moko, 19 Macrh 1992, *EAW 4877* (BO); Bolaang Mongondow, trail to Mt. Poniki, 19 March 1992, *INH 013* (BO); Trail to enclave, Bogani Nani Wartanabe National Park, 15 April 1996, *INH 008* (BO, K, L); Bolaang Mongondow, trail to Poniki Mountain, 2 March 1996, *MTL 007* (BO); *MTL 009* (BO); *MTL 010* (BO); *MTL 013* (BO); *MTL 014* (BO); 6 March 1996, *INH 005* (BO); Bolaang Mongondow, Mt. Sinombayuga, 19 March 1996, *MTL 039* (BO, K); Sangihe-Talaud, Sangihe Island, Bowang Hulu Village, Tambukan, 2 Nov. 2002, *EAW 4940* (BO); **Cental Sulawesi.** Donggala District, Taweli Bale, 16 June 1983, *EAW 2069* (BO); Banggai Islands, Bulgagi Utara, Teluk Panentera, Coastal Karst, 16 Sept. 2014, *Deden 1902* (BO). **Southeast Sulawesi.** Kendari, Poasia, Abeli Village, 21 June 1978, *EAW 473* (BO); **South Sulawesi**. Lombasang, 9 May 1921, *Bunnenmeijer 11460* (BO); Maros, 29 Sept. 1975, *Soejatmi Soenarko* 337 (BO); Bantimurung, 12 Feb. 1975, *EAW 131* (BO); Tana toraja, Laang tanduk, 20 Feb. 1977, *EAW 242* (BO); 21 Feb. 1977, *EAW 245* (BO).

***Gigantochloa atroviolacea* Widjaja**

Reinwardtia 10: 323 (1987)

Shoots blackish green covered brown-black hairs. *Culms* erect, until 15 m high, branches grow far away from the ground, one dominant branches. Young culms with brown-black hairs, when old glabrous and purplish. *Culms sheath* deciduous covered brown-black hairs, culm sheath auricles rounded bristles, ligules short, glabrous, culm sheath blade deflexed. *Leaves* glabrous, leafsheath auricle small, glabrous; ligules 2 mm high, glabrous.

Distribution. Cultivated in Parigi, Central Sulawesi (Widjaja 1994) (Figure 31).

Habitat. Humid tropical areas.

Vernacular name. Bambu hitam (Indonesia).

***Neololeba* Widjaja**

Reinwardtia 11 (2): 112 (1997)

Culm erect, one dominant lateral branches with few smaller branches. *Culms sheath* covered with golden brown hairs; auricle rounded with long bristles. *Leaves* blades large with auricles. Inflorescence indeterminate.

Distribution. South Mindanao (Philippines), North Sulawesi, Sangihe Talaud, Moluccas, New Guinea, Solomon Islands, Australia (Queensland).

Habitat. wet areas, along the river bank, forest margins, lowland up to 1500 m asl.

***Neololeba atra* (Lindl.) Widjaja**

Reinwardtia 11 (2): 114-116 (1997)

Culm erect. Branches one lateral branches dominant, with 1-3 branches, intravaginal. *Culm sheath* persistent, covered with brown hairs; auricles rounded with long bristles; ligules dentate irregular with bristles; blade erect, triangular, base cordate. *Leaves* glabrous, apex acuminate, base angustatus; *leafsheath* auricles rounded with long bristles; ligules laciniate, short with bristles. *Inflorescence* indeterminate.

Distribution. North Sulawesi (Figure 32).

Habitat. Primary and secondary forests, 50-545 m asl.

Vernacular name. Bulu nanap, Tomula laudu, Bualo (Bolang Mongondow), Nena (Sangir).

Specimens examined. **North Sulawesi**. Minahasa, 10 April 1895, *Koorders 19602* (BO); Mt. Kawatak, 6 July 1954, *Alston 16237* (BO); Bolaang Mongondow, Dumoga Bone National Park, Toraut, 3 March 1985, *de Vogel & Vermeulen* (BO); Sangihe-Talaud, Sangihe Island, Duripa Marange, Tambukan Utara, 27 March 1992, *EAW 4943* (BO); Totabuan, Bogani Nani Wartabone, 26 June 1995, *TU 4804* (BO); Bolaang Mongondow, trail to Mt. Poniki, 2 March 1996, *MTL 006* (BO); *MTL* 012 (BO); Bolaang mongondow, trail to Mt. Sinombayuga, 20 March 1996, *MTL 041* (BO); Pinogu enclave to Taludaa, Bogani Nani Wartanabe National Park, 23 April 1996, *MTL 058* (BO); *MTL 059* (BO); Between Tumpah River and Torout River, Bogani Nani Wartanabe National Park, 13 June 1996, *MTL 075* (BO); Bolaang Mongondow, trail to Mt. Kabila, 3 July 1996, *MTL 076* (BO); *MTL 077* (BO); *MTL 078* (BO); Mainakum area, Bogani Nani Wartanabe National Park, 26 May 2002, *TU 4658*.

***Phyllostachys* Sieb. et Zucc.**

Abh. Akad. Muench. 3 (2): 745. t.5 (1843)

Culm erect, straight, monopodial, two asymmetrical branches. Under the branches near nodus always find the groove in young or old culms. *Culms sheath* thin and deciduous with fine auricle and long bristles.

Distribution. China and Japan, elsewhere introduced.

Habitat. Area with the cool climate.

***Phyllostachys aurea* Rivière & C.Rivière**

Bull. Soc. Acclim. France III, 5: 716 (1878)

Culms erect. Monopodial. *Shoots* green with the black spot in a sheath. Culms various high, the top internodes shorter and swollen. Two asymmetrical branches grow flat. Under the branches near nodus always find the groove in young or old culms. Young culms covered white wax. *Culms sheath* deciduous, thin with a rarely black spot, auricles inconspicuous, ligules short, culms sheath blade linear, small, reflexed to deflexed. *Leaves* abaxial with hairs, without auricle, long bristles, ligule short without bristles.

Distribution. Cultivated mostly at the city of Sulawesi (Figure 33).

Habitat. Humid tropical areas.

Vernacular name. Bambu cendani (Indonesia).

***Racemobambos* Holttum**

Gard. Bull. Sing. 15: 267 (1956)

Culm scrambling, culms glabrous, wall thin. One dominant lateral branches with smaller branches. *Culm sheath*, auricles small with bristles. *Leafsheath* auricle small or inconspicuous with long bristles. Inflorescences determinate.

Distribution. Malay Peninsula, Borneo, Sulawesi, Moluccas, New Guinea, New Britain, New Ireland, Solomon Island

Habitat. Montane forest, except two species grow in the lowland at Sabah.

***Racemobambos celebica* S. Dransf.**

Kew Bull. 47: 707-709 (1992)

Culm scrambling. *Branches* one lateral branches dominant. *Culm sheath* deciduous, ligules laciniate, short without bristles, blade erect. *Leaves*, blade abaxially covered with pale hairs, adaxially glabrous, apex acuminate, base breve-angustate; *leafsheath* auricles inconspicuous with bristles; ligules laciniate, short without bristles. *Inflorescence* determinate.

Distribution. Central and South Sulawesi (Figure 34).

Habitat. Primary and secondary forests, 1624-2251 m asl.

Vernacular name. Unknown.

Specimens examined. **South Sulawesi**. Enrekang, Latimojong. 23 Nov. 1969, *Sands 575* (Holotype: K, Isotype: BO, KEP, L, SIN); **Central Sulawesi**, Ranobulu, Danau Tambing, 4 Nov. 2013, *EAW 10020* (BO); Roroka Timbu Mountain, 15 May 1979, *Balgooy 3307* (BO); Poso, Lore Utara slope Rorekatimbu Mountain, 28 Dec. 1988, *EAW 3509* (BO).

Identification key to *Schizostachyum*

1 a. Culms sheath blade erect .... *Schizostachyum brachycladum*
b. Culms sheath blade deflexed 2
2 a. Culms sheath without auricle, with long bristly, leaf sheath auricle not seen, with long bristly ..... *S. lima*
b. Culms sheath with rounded auricle, with shorter bristly, leaf sheath auricle rounded with shorter bristly … …… ..... *S.latifolium*

***Schizostachyum* Nees**

Agros. Bras.: 534 (1829)

Culm erect, pendulous tips. Branches subequal. *Culm sheath* covered by pale to brown hairs; auricles present, bristly or absent; ligule with or without bristles. *Leafsheath* auricles present or absent, with or without bristles. *Inflorescences* indeterminate, pseudospikelets slender.

Distribution. Southern China through Southeast Asia to the Pacific Islands.

Ecology. Lowland up to the highland, 1500 m asl., at the limestone and volcanic soil.

***Schizostachyum brachycladum* Kurz**

J. Asiat. Soc. Bengal, Pt. 2, Nat. His. 39: 89 (1870)

Culm erect, green or yellow with green stripes. *Branches* typically a cluster of slender subequal branches, intravaginal. *Culm sheath* persistent sometimes deciduous, covered with golden brown hairs, inflated; auricles rounded with bristles; ligules laciniate, short, ciliate; blade erect, broadly triangular. *Leaves* green or green with yellow strips, adaxially covered with pale hairs, apex acuminate, base breve-angustate; *leafsheath* auricles rounded with long bristles; ligules dentate, short. *Inflorescence* indeterminate.

Distribution. North, South and Southeast Sulawesi (Figure 35).

Habitat. Secondary forest, agricultural land, 5-955 m asl.

Vernacular name. Bulu nasi (Winowangan), tulmonipi (Buton), bualo, tomula, (Bolaang Mongondow), bambu bonda kecil (Poasia), tambelang (Sangihe), hulape loudu (Lombongo Suwawa), telak (Kendari), rames/ toru (Ratahan), tallang (Rantepao), tula (Kobaena).

Specimens examined. **North Sulawesi**: Minahasa, 22 May 1895, *Koorders 19805* (BO); Pasir Pandjang, 8 km from Tanawako, 2 July 1954, *Alston 16184* (BO); Winowangan, 3 July 1954, *Alston 16206* (BO); Kolongan, 5 km from Totelu, 30 July 1954, *Alston 16588* (BO); Pindol, Lolak, Bolaang mongondow, 21 Nov. 1974, *J.Dransfield 3832* (BO); Manado, Sawangan, Tondano, 10 Feb. 1985, *Koorders 19814* (BO); Minahasa, Ratahan, 19 March 1996, *EAW 4874* (BO); Bolaang Mongondow, trail to Mt. Poniki, 1 March 1996, *MTL 003* (BO); 2 March 1996, *MTL 011* (BO); Bolaang Mongondow, trail to Mt. Sinombayuga, 4 March 1996 *INH 003* (BO); 15 March 1996, *MTL 023* (BO); *MTL 024* (BO); *MTL 026* (BO); 18 March 1996, *MTL 031* (BO); *MTL 033* (BO); *MTL 034* (BO); *HTB 003* (BO); HTB *004* (BO); *MTL 035* (BO); 19 March 1996, *HTB 005* (BO); Bolaang Mongondow, trail to Mt. Gambuta, 17 April 1996, *MTL 052* (BO); Gorontalo, Lombongo Suwawa, 27 April 1996, *INH 010* (BO); Pinogu enclave to Taludaa, Bogani Nani Watabone National Park, 22 April 1996, *MTL 056* (BO); Bolaang Mongondow, trail to Mt. Poniki, 2 June 1996, *INH 011* (BO); Between Tumpah River and Torout River, Bogani Nani Wartanabe National Park, 12 June 1996, *MTL 068* (BO); Bolaang Mongondow, trail to Mt. Kabila, 5 July 1996, *MTL 083* (BO); Sangihe-Talaud, Sangihe Island, Talengan Village, Tambukan tengah, 27 March 1997, *EAW 4945* (BO); *EAW 4961* (BO); Gorontalo, Jati Village, Tenggale Nature Reserve, 20 Sept. 2002, *Rugayah 665* (BO); **Southeast Sulawesi**: Kendari, Abeli, Poasia, 21 June

1978, *EAW 474* (BO); Kendari, Tapulaga Village, 22 June 1978, *EAW 501* (BO); Kobaena Island, Rahadopi, 3 July 1978, *EAW 719* (BO); Kendari, Ahuma, Una'aha, 13 Nov. 1978, *S.Prawiroatmojo & Maskuri 1151* (BO); Kolaka, Ladongi, Tiarawuta, 18 Nov. 1978, *S.Prawiroatmojo & Maskuri 1286* (BO); 19 Nov. 1978, *S.Prawiroatmojo & Maskuri 1334* (BO); Kolaka, Poli-polia, 25 Nov 1978, *S.Prawiroatmojo & Maskuri 1571* (BO); Boeton Island, Kaboengka, 14 Feb. 1929, *Kjellberg 216* (BO); Toli-toli, Sibalutan River, Tel. Bondo 11 March 1985, *Ramlanto & Zainal Fanani 739* (B0); Luwuk area, 6 Nov. 1989, *Coode 5800* (BO); Pulubala Village, Tibawa, 18 March 1992, *EAW 4870* (BO); Molalahu Village, Tibawa, 18 March 1992, *EAW 4868* (BO); Buton Utara, Game Reverse Maligano Ronta km 9 SE Sulawesi, 30 April 2003, *Tahan Uji 4753* (BO); Boeton Island, Kaboengka, 14 Feb. 1929, *Kjellberg 216* (BO); **South Sulawesi**: Makale, 1914, *Rachmat 935* (BO); Rantepao, 21 Feb. 1977, *EAW 246* (BO).

***Schizostachyum latifolium* Gamble**

Ann.Roy.Gard. (Calcutta). 7: 117 (1896)

Culm erect, *branches* typically a cluster of slender subequal branches. *Culm sheath* persistent, covered with pale brown hairs; auricles rounded without bristles; ligules laciniate, short, ciliate; blade deflexed, lanceolate. *Leaves* glabrous, apex acuminate, base angustate; *leafsheath* auricles rounded with long bristles; ligules laciniate, short. *Inflorescence* indeterminate.

Distribution. South and North Sulawesi (Figure 36).

Habitat. Volcanic rocks, 850 m asl.

Vernacular name. Buro momo (Sangihe).

Specimens examined. **West Sulawesi**: Bussu, Sumarorong, Polmas, 17 Feb. 1986, *R. Yusuf & S. Wahyono 87* (BO); **North Sulawesi**: Sangihe-Talaud, Sangihe Island, Biru Village, Tambukan tengah, 27 March 1992, *EAW 4948* (BO); **South Sulawesi**: Between Maros and Comba, 2 Nov. 1992, *Soejatmi Soenarko 380* (BO).

***Schizostachyum lima* (Blanco) Merr.**

Amer. J. Bot. 3: 62 (1916)

Culm erect. *Branches* typically a cluster of slender subequal branches. *Culm sheath* persistent, covered with brown hairs; auricles absent, with long bristles; ligules dentate, short with bristles; blade deflexed, lanceolate. *Leaves* glabrous, acuminate, base angustatus; *leafsheath* covered with pale hairs; auricles inconspicuous, with bristles; ligules laciniate with bristles. *Inflorescence* indeterminate.

Distribution. All over Sulawesi (Figure 37).

Habitat. Secondary forest, agricultural land, 50-800 m asl.

Vernacular name. Bulu tui (Bolaang Mongondow), Buro roroh (Sangihe), Wulo-Talaksih (Kendari), Dama (Moronene, Kabaena), Buloh (Rantepao), Buluh karisa (Maros).

Specimens examined. **Southeast Sulawesi**: Kendari, 24 Feb. 1929, *Kjellberg 433* (BO); Poehara, 7 March 1929, *Kjellberg 703* (BO); Wawotobi, Paralahi, 17 March 1975, *Kjellberg 885* (BO); Tawanga, Langona, 23 March 1929, *Kjellberg 962* (BO); Between Palu and Parigi, km 35 from Palu, Northern Peninsula, 17 April 1975, *Meijer 9402* (BO); Kabaena Island, Teomokole, 1 July 1978, *EAW 667* (BO); Kendari, Kp. Baini, Ds. Sampara, 17 July 1978, *EAW 837* (BO); Ahuma, Una'aha, 13 Nov 1978, *S.Prawiroatmojo & Maskuri 1154* (BO); **Central Sulawesi**: Mt. Nokilalaki, NE Side Lindu Lake, 24 April 1975, *Meijer 9744* (BO); **South Sulawesi**: Pangeh, between Maros and Camba, 3 Nov. 1975 *Soejatmi Soenarko 384* (BO); Tana Toraja, Rantepao, Laang Tanduk, 20 Feb 1977, *EAW 240* (BO); Molalahu Village, Tibawa, 18 March 1992, *EAW 4872* (BO); **North Sulawesi**: Sangihe-Talaud, Sangihe Island, Duripa Marange Village, Tambukan Utara, 27 March 1992, *EAW 4944* (BO); Bolaang mongondow, trail to Mt. Sinombayuga, 15 March 1996, *MTL 022* (BO);18 March 1996, *HTB 001* (BO); 19 March 1996, *MTL 040* (BO); Trail to Pinogu enclave Bogani Nani Wartabone National Park, 4 April 1996, *MTL 049* (BO); Bolaang Mongondow, Tumpah River (trail to water fall), Bogani Nani Wartabone National Park, 13 June 1996, *MTL 074* (BO).

***Sphaerobambos* S. Dransf.**

Kew Bull. 44 (3): 428 (1989)

Culm erect or scrambling, culms straight or slighty zig-zag. One dominant branches at lower nodes. *Inflorescences* indeterminate.

Distribution. North Borneo (near Mt. Kinabalu), Davao (Philippines), Kolonodale (Central Sulawesi).

Habitat. Forest margins on ultramafic soil, limestone, grow in the lowland up to the highland.

***Sphaerobambos subtilis* S. Dransf.**

Kew Bull. 44 (3): 432-434 (1989)

Culm scrambling, branches one lateral branch dominant. *Culm sheath* not available, but sheath on the branch with erect blade, triangular. *Leaves* glabrous, apex acuminate, base breve-angustate; *leafsheath* auricles inconspicuous with bristles; ligules dentate, very short without bristles. *Inflorescence* indeterminate.

Distribution. Southeast Sulawesi (Figure 38).

Habitat. Limestone.

Specimen examined. **Central Sulawesi**. Kolonodale-Wiu, 19 Aug. 1983, *Eyma 3436* (Holotype K, isotypes BO, L).

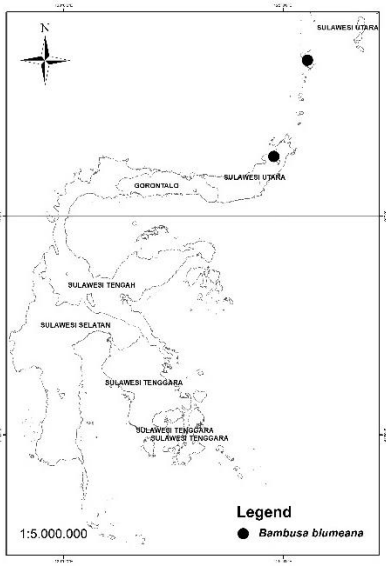
***Thyrsostachys* Gamble**

Indian Forester 20: 1 (1894)

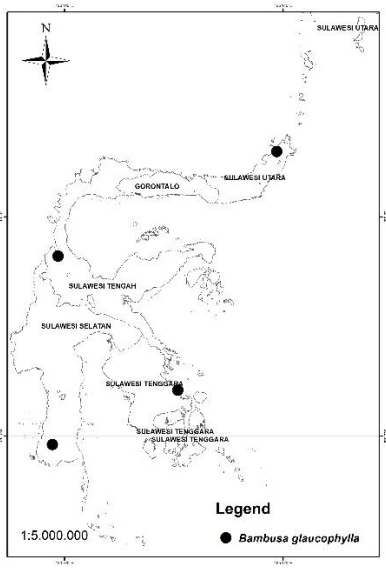
Culms erect, straight, branching above, often covered with the long persistent sheaths. *Culms sheaths* elongate, thin, culms sheath blade narrow. *Leaves* usually small to moderate sized. *Inflorescence* a large compound panicle, the spikelet sessile or stalked in the axis of prominent bracts.

Distribution. Myanmar, Thailand, Indochina. Cultivated in Peninsular Malaysia and Indonesia.

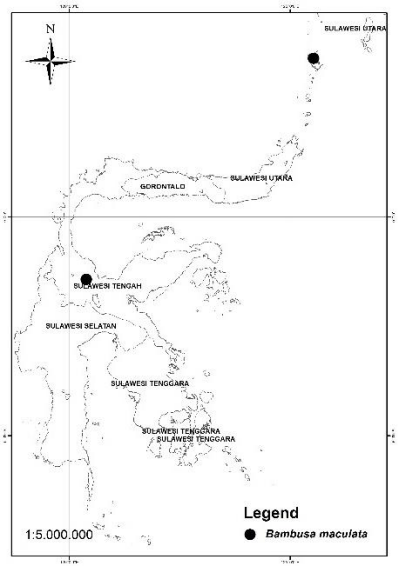
Habitat. Lowland up to 1500 m asl.



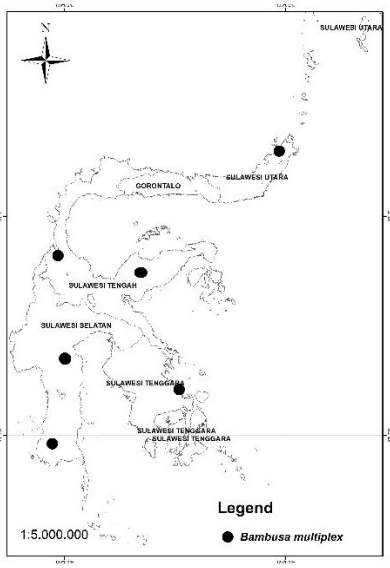
1. *Bambusa blumeana*



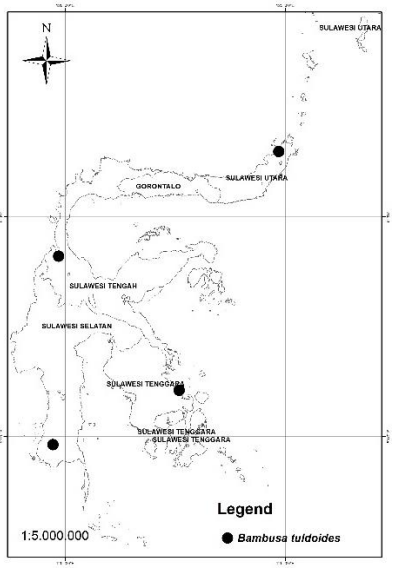
2. *Bambusa glaucophylla*



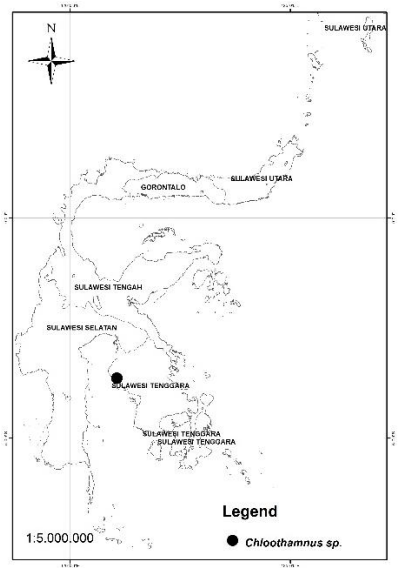
3. *Bambusa maculata*



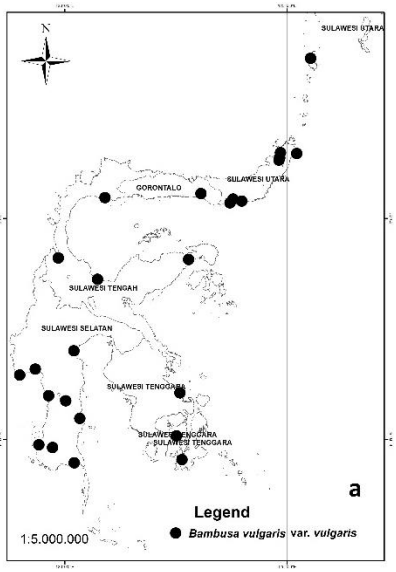
4. *Bambusa multiplex*



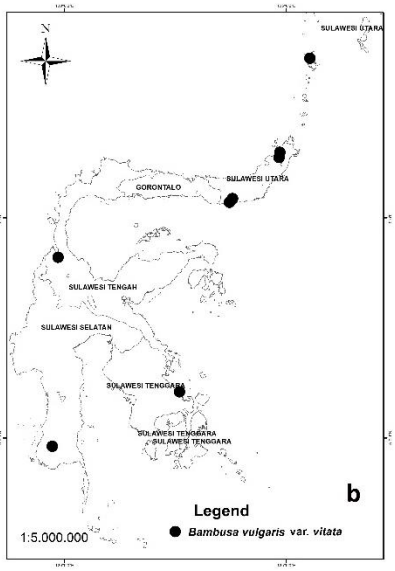
5. *Bambusa tuldoides*



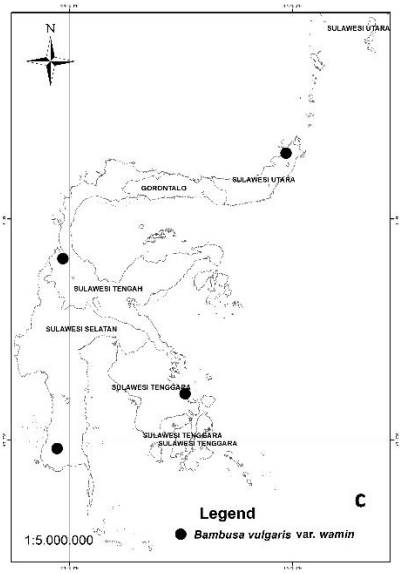
7. C. *Chloothamnus* sp.



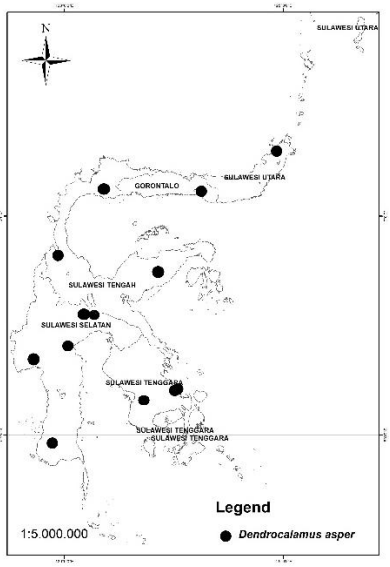
6. A. *Bambusa vulgaris* var. *vulgaris*



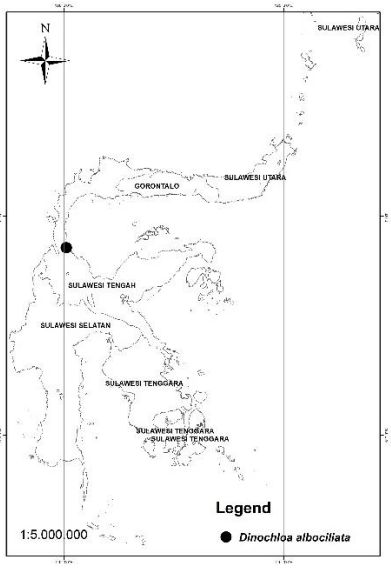
6. B. *Bambusa vulgaris* var. *vitata*



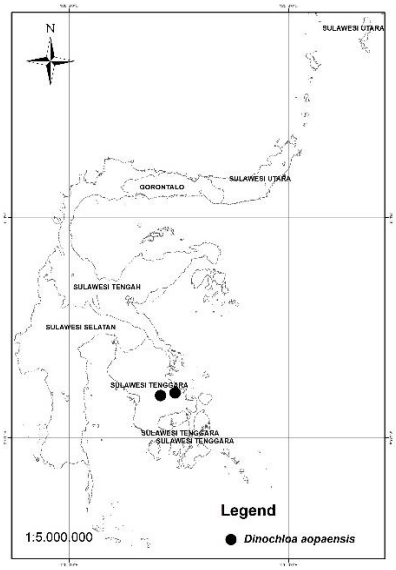
6. C. *Bambusa vulgaris* var. *wamin*



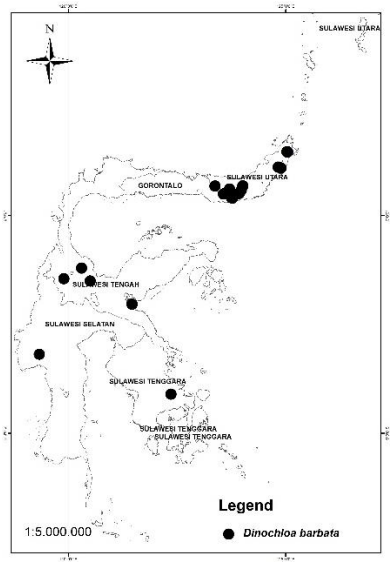
8. *Dendrocalamus asper*



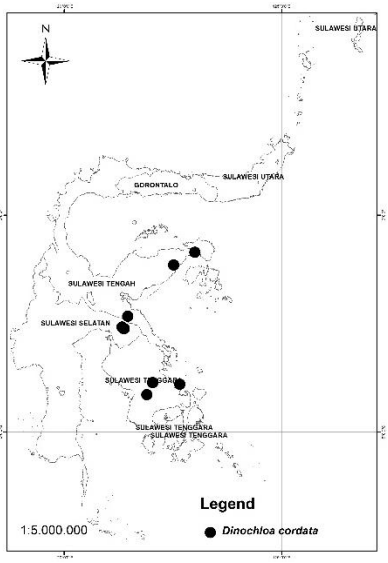
9. *Dinochloa albociliata*



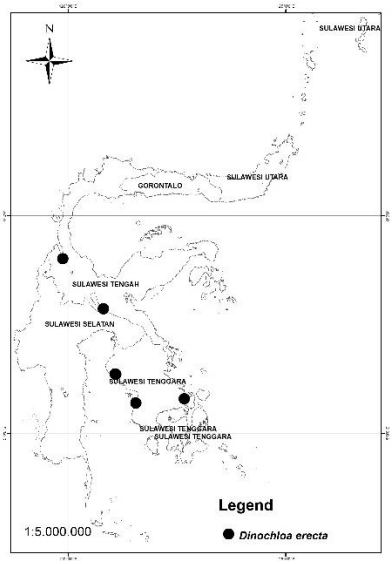
10. *Dinochloa aopaensis*



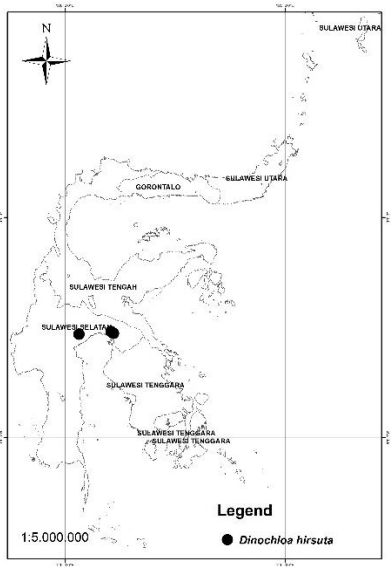
11. *Dinochloa barbata*



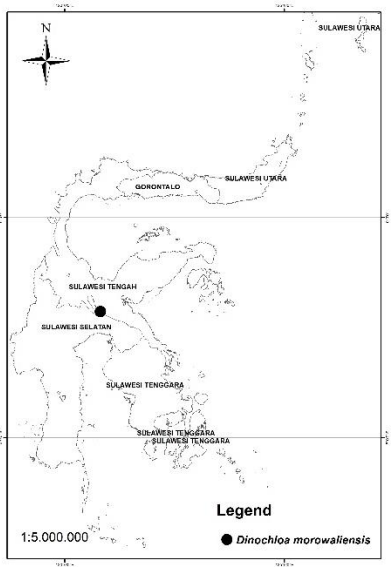
12. *Dinochloa cordata*



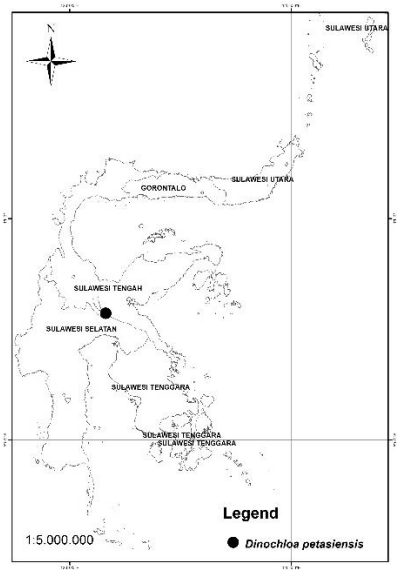
13. *Dinochloa erecta*



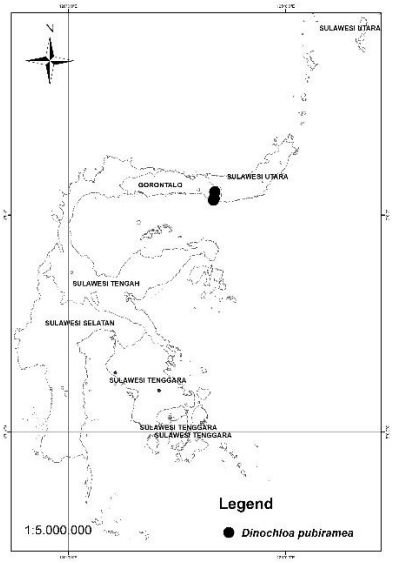
14. *Dinochloa hirsuta*



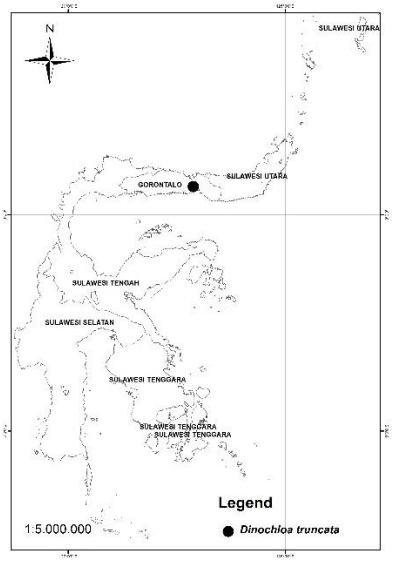
15. *Dinochloa morowaliensis*



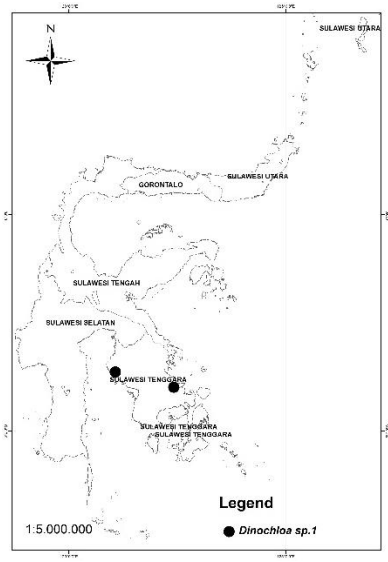
16. *Dinochloa petasiensis*



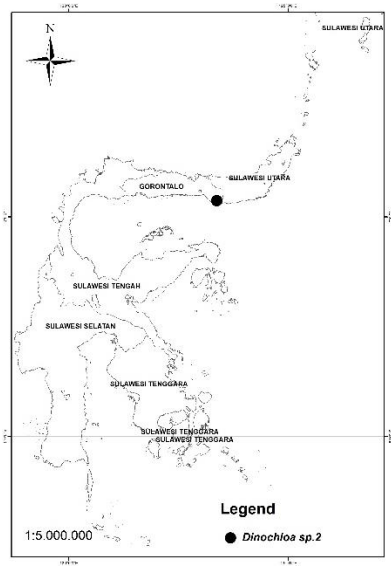
17. *Dinochloa pubiramea*



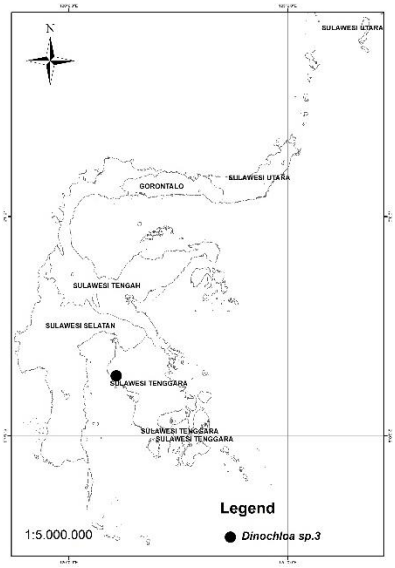
18. *Dinochloa truncata*



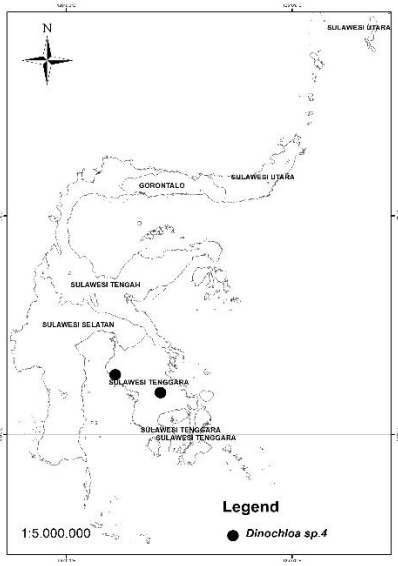
19. *Dinochloa* sp.1



20. D. *Dinochloa* sp.2



21. D. *Dinochloa* sp.3



22. D. *Dinochloa* sp.4

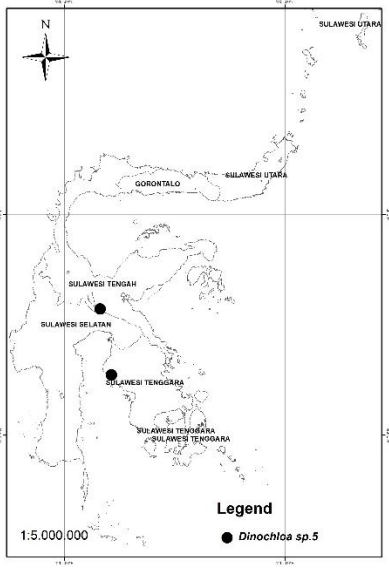
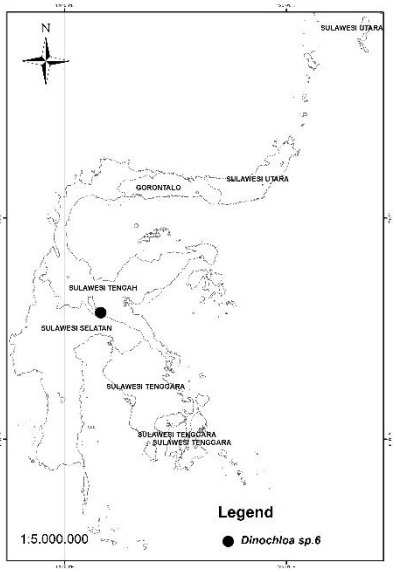


Figure 23. E. *Dinochloa* sp.5



24. D. *Dinochloa* sp.6

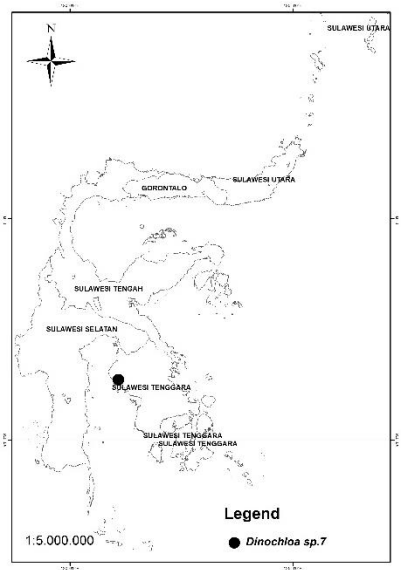
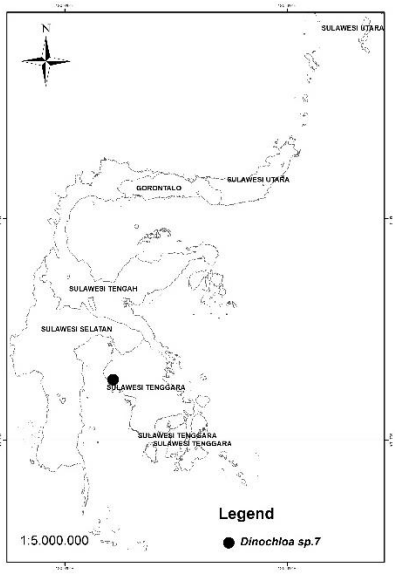
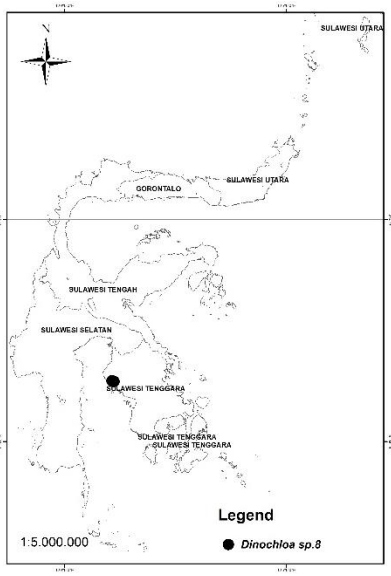


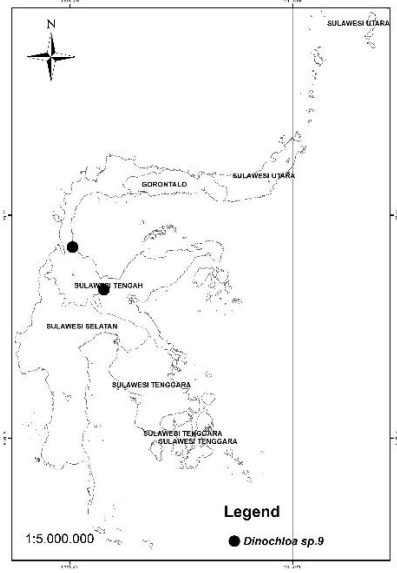
Figure 25. E. *Dinochloa* sp.7



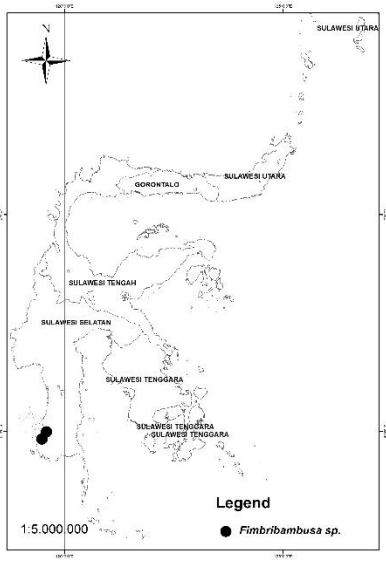
26. D. *Dinochloa* sp.8



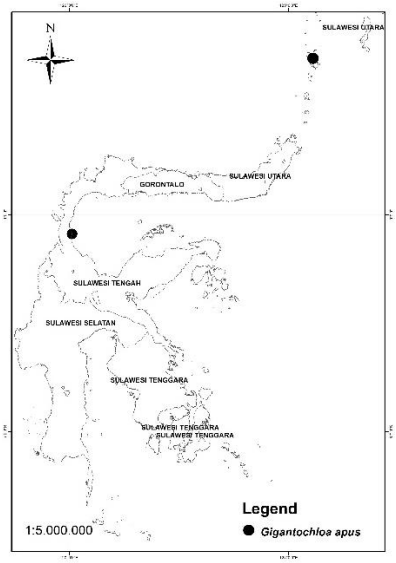
26. D. *Dinochloa* sp.8



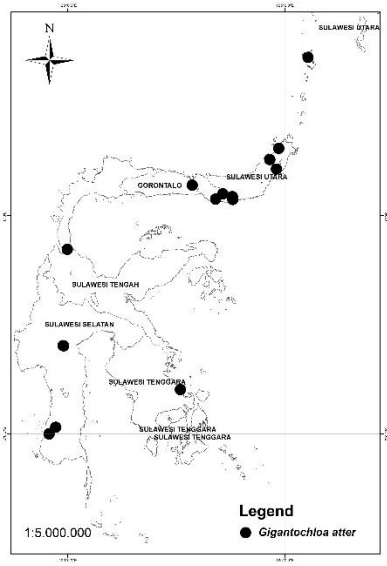
27. D. *Dinochloa* sp.9



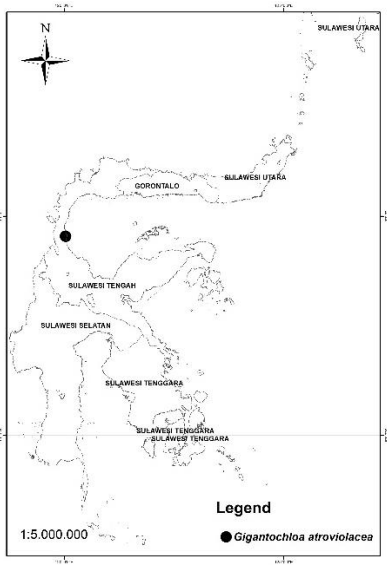
28. D. *Fimbribambusa* sp.



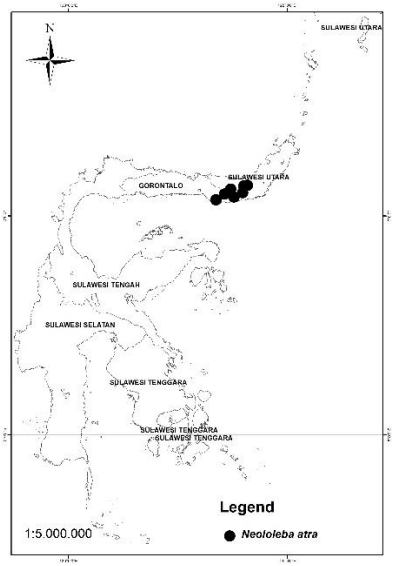
29. *Gigantochloa apus*



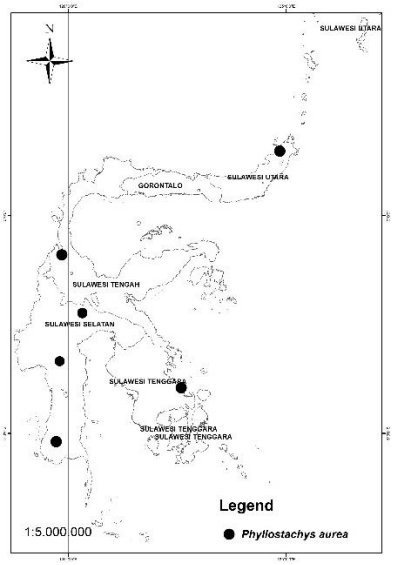
30. *Gigantochloa atter*



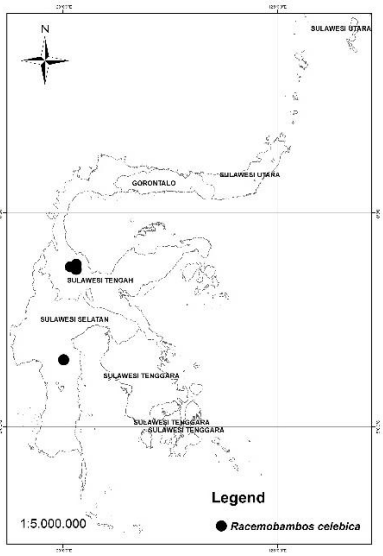
31. *Gigantochloa atroviolacea*



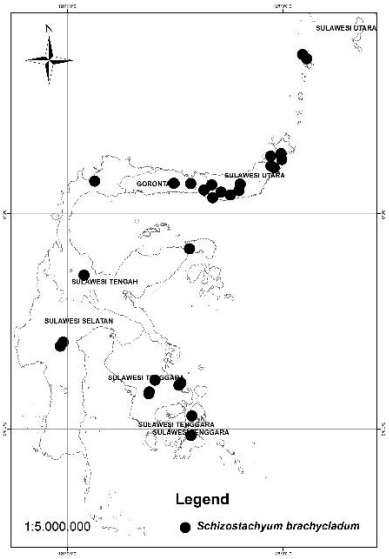
32. *Neololeba atra*



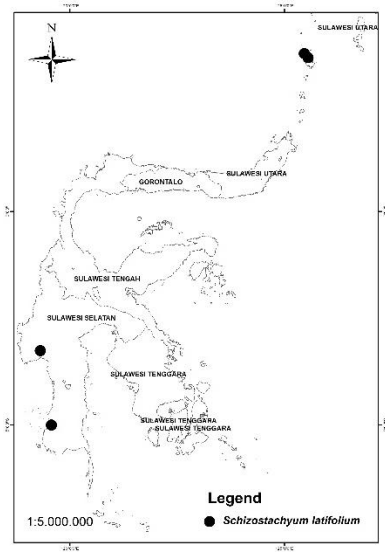
33. *Phyllostachys aurea*



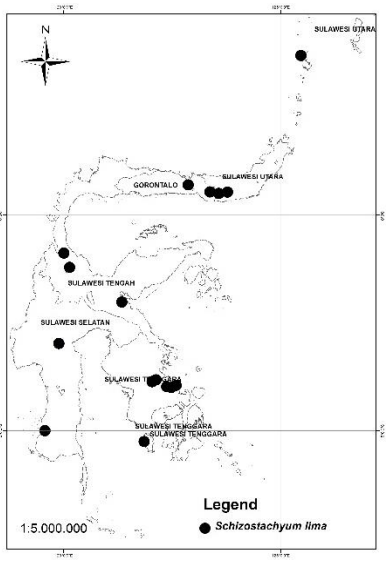
34. *Racemobambos celebica*



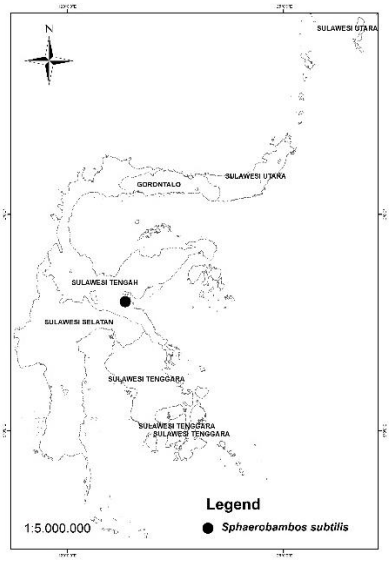
35. *Schizostachuym brachycladum*



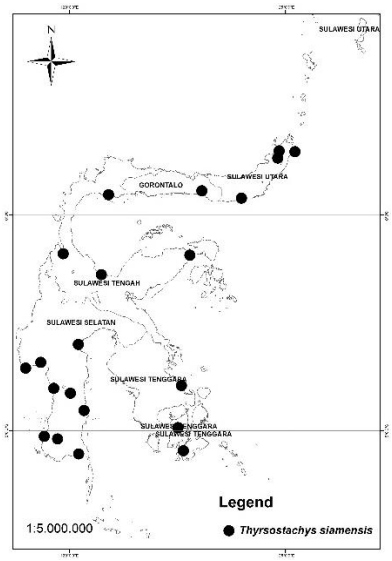
36. *Schizostachuym latifolium*



37. *Schizostachuym lima*



38. *Sphaerobambos subtilis*



39. *Thyrsostachys siamensis*

Figure 1-39. Distribution map of Bamboo in Sulawesi, Indonesia

***Thyrsostachys siamensis* Gamble**

Ann. Roy. Bot. Gard. (Calcutta) 7: 59 (1896)

Culm erect, straight, not branching till high up covered with the persistent old culm sheaths otherwise greyish-green, nodes not prominent with a white ring below the nodes. Branches far away from the ground, one dominant lateral branches, pale green when young, greyish-green when old, covered with wax, glabrous. *Culms sheath* persistent, covered white wax, auricle inconspicuous, glabrous; ligules flat, short, glabrous; culms sheath blade erect and deciduous. *Leaves* linear, glabrous, whitish, l*eafsheath* auricle inconspicuous, ligules glabrous and flat, < 1 mm high.

Distribution. Sulawesi (Widjaja 1994) (Figure 39).

Habitat. Highland and lowland.

Vernacular name. Bambu Jepang, Bambu Payung.

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