

***Dinochloa scandens* (POACEAE-BAMBUSOIDEAE):
DISTRIBUTION, HABITAT PREFERENCE, AND
NOTES ON SYNONYMY**

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Abstract. The distribution of *Dinochloa scandens* is unclear. World bamboo checklists suggest it is relatively widespread in Malesia. Here we clarify issues with herbarium specimen identification. Besides, a synonym name of *D. scandens*, namely *D. macrocarpa* collected from the Philippines, needs to be reviewed. The study aims to provide information on distribution and to review the synonym of *D. scandens*. The habitat preferences of *D. scandens* are also presented. We carried out targeted fieldwork at Gunung Halimun-Salak National Park in West Java in 2019 and extensive examination of herbarium specimens from Herbarium Bogoriense and online portals to accurately circumscribe this species. All data were analyzed descriptively. Distribution, altitude, and rainfall maps for *D. scandens* were produced with ArcGIS Pro. Our examination on the specimens suggests that *D. scandens* is indeed endemic to West Java and Banten Provinces in Indonesia. This bamboo species can be found in lowland to mountain forests with an altitude of 20-1400 m, in areas with annual rainfall between 3000-4000 mm. We support *D. macrocarpa* as an accepted name for a bamboo species from the Philippines and remove it from synonymy with *D. scandens* due to clear differences in the fruit compared to specimens of *D. scandens* across its range.

Keywords: bamboo, *Dinochloa macrocarpa*, *Dinochloa scandens*, distribution, habitat preference

Citation

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INTRODUCTION

Dinochloa Buse (Poaceae-Bambusoideae) is a genus of wild climbing bamboo found mainly in Malesia but also the Andaman Islands and Southern Thailand. Most *Dinochloa* species have a narrow distribution and are commonly found in disturbed forests. *Dinochloa* is easily identified by its climbing habit, solid culms, very small clusters of spikelets, and

comparatively large fruit (Dransfield, 1981). The climbing habit in *Dinochloa* is very different from the habit of other bamboos. The culms twine to the neighbor tree trunk (always twining to the right), however, the culms become zigzagged if there is no support for climbing. The lower part of the older culm-sheath of *Dinochloa* is very rough and thick (the term “girdle” is often used), this is not visible on young culm-sheaths. The climbing habit and “girdle” feature on *Dinochloa*

are very useful to identify the genus.

Dinochloa was published in 1854 by Buse, the type species being *D. tjankorreh* Buse (see Buse, 1854). Nowadays, the accepted name of *D. tjankorreh* is *D. scandens* (Blume ex Nees) Kuntze (see Kuntze, 1891; Dransfield, 1994; Dransfield & Widjaja, 1995; Vorontsova et al., 2016). At first glance, a sterile *D. scandens* can be identified by its purplish and smooth young shoot, culm with solid or with small lumen up to 15 mm in diameter, internodes rather rough with appressed hairs when young and becoming smooth and glabrous when mature. Culm-sheaths are glabrous or sometimes have white hairs, a very small or inconspicuous auricle, and a very short ligule

Dransfield (1994, 1996), Dransfield & Widjaja (1995), Damayanto (2018), and Widjaja (2019) mentioned that *D. scandens* has a limited distribution area in Java. However, Vorontsova et al. (2016), a database of Plant of the World (POWO) website (<http://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:399398-1>), the Global Biodiversity Information Facility (GBIF) (<https://www.gbif.org/species/4149851>) and some studies (Priyadi et al., 2010; Cleary, 2016; Jamun et al., 2020; Sharief & Panda, 2020; Sujarwanta & Zen, 2020a, 2020b) suggest that *D. scandens* can be found outside of Java (e.g. Sumatra, Borneo, Lesser Sunda Islands, the Andaman Islands, Nicobar Islands, and Thailand). Whether *D. scandens* is a Java endemic or more widespread needs to be confirmed.

In addition, *D. macrocarpa* Elmer collected from the type locality at Magallanes (Mt. Giting-giting) (the correct name is Mt. Guiting-Guiting), Sibuyan Islands, Province of Capiz (now Romblon Province), in the Philippines (Elmer, 1915) was reported as a synonym of *D. scandens* (Vorontsova et al., 2016). This contradicted the statements of

Dransfield (1994, 1996), Dransfield & Widjaja (1995), Damayanto (2018), and Widjaja (2019), who stated that *D. scandens* was endemic to western Java. A study, therefore, is needed to clarify the distribution and synonyms of *D. scandens*. We also explore the habitat preferences (annual rainfall and topography) of *D. scandens*. The results hopefully can be useful in habitat conservation of *D. scandens*.

MATERIALS AND METHODS

This study consisted of herbarium specimen examination and targeted fieldwork. The herbarium specimens of *D. scandens* deposited at Herbarium Bogoriense (BO), Research Center for Biology, Indonesian Institute of Sciences (LIPI) and online portals were examined. Coordinates were compiled from the data of BO specimens and other digital specimens that were available at portal online databases such as BioPortal (<https://bioportal.naturalis.nl/>), JSTOR (<https://plants.jstor.org/>) GBIF (<https://www.gbif.org/>), HerbWeb (<https://apps.kew.org/herbcat/gotoHomePage.do>), iDigBio (<https://www.idigbio.org/portal/search>), POWO (<http://powo.science.kew.org/>) and Tropicos (<https://www.tropicos.org/home>). Collection localities lacking coordinates were matched to locations in the Encyclopaedia of Malesian Collectors (Steenis-Kruseman, 1950) or the website <http://nationaalherbarium.nl/FMCollectors/QuickSearch.htm> and coordinates gathered using Google Maps (<https://www.google.com/maps>). The initial status of accepted species names followed Vorontsova et al. (2016) or websites such as IPNI (ipni.org) and POWO (powo.science.kew.org). Code of the herbarium followed website <http://sweetgum.nybg.org/science/ih/> or Girmansyah et al. (2006, 2018) and Holmgren et al. (1981). Furthermore, the type

specimen of *D. macrocarpa* was examined and compared with specimens of *D. scandens*.

Targeted plant collection took place in October 2019, at Cikaniki Resort Station, Gunung Halimun-Salak National Park, West Java, Indonesia. Bamboo samples were collected following McClure (1945) and processed as herbarium specimens following Djarwaningsih et al. (2002). Supporting data, such as coordinates, altitude, habitat, local name, uses, were recorded and photographs of field specimens were taken. Samples were processed and stored at BO. Furthermore, study of the living collection of *D. scandens* was also conducted. Bamboo materials were identified by comparing with herbarium specimens stored in BO and using literature such as Dransfield (1981, 1989, 1992, 1996), Widjaja (1997, 2001a, 2001b, 2009), Widjaja et al. (2004), Dransfield & Widjaja (2000), and Ervianti et al. (2019).

Dinochloa scandens distribution maps across elevation and annual rainfall

gradients were plotted using ArcGIS Pro software. Habitat preference was taken as the range of environmental variables covered by the distribution of specimens.

RESULTS AND DISCUSSION

Ninety-four sheets of 35 herbarium specimens, as well as one living collection of *D. scandens*, were examined. These specimens were derived from fieldwork and those already stored in Herbarium Bogoriense (BO), Herbarium Royal Botanic Gardens, Kew (K), and National Herbarium Nederland (L), and living plant collections in Bogor (Table 1). Most of the sheets of *D. scandens* were observed from BO collections (84 sheets or 89%) and the others from L (9 sheets or 10%) and K (1 sheet or 1%). The oldest collection of *D. scandens* was from 1899 and the newest 2019 (Figure 1). Based on Figure 1, only one new collection was added in BO after 2000 (a collection from 2019 fieldwork).

Table 1. Observation matrix of herbarium specimens and living collection of *Dinochloa scandens*

Collector	Collection Number	Collection Date	Location		Coordinates Prediction	Altitude (m asl)	Herbaria Code
			Recorded on the Specimen	Current Location			
C. A. Backer	1292	13 Jun. 1911	Java, Bantam, G. Kencana, G. Kendeng	Banten, Lebak, Gunungkencana	6°33'32.4"S, 106°03'47.2"E	300	BO
C. A. Backer	8731	17 Aug. 1913	Java, Preanger Regentschappen, G. Tjikoraj, Z. O. Helling, Pasir Walang Boven Nanggerang	West Java, Garut, Mt. Cikuray	7°19'29.6"S, 107°51'31.7"E	950-1000	BO
C. A. Backer	8731	1913	Java, Pasir Walang, Nanggerang	Banten, Lebak, Pasir Walang	6°50'09.0"S, 106°13'34.1"E	-	BO
C. A. Backer	11068	24 Dec. 1913	Java, Batavia, Nirmala	West Java, Bogor, Nanggung, Malasari Village, Nirmala	6°44'00.8"S, 106°29'59.9"E	1100	BO
C. A. Backer	22941*	09 Sep. 1917	Java, Preanger Regentschappen, Tjoeroeg Djanggot, Cidadap, Cibeber	West Java, Cianjur, Cibeber	6°55'37.5"S, 107°08'55.7"E	900	BO

Collector	Collection Number	Collection Date	Location		Coordinates Prediction	Altitude (m asl)	Herbaria Code
			Recorded on the Specimen	Current Location			
C. A. Backer	25819	31 Aug. 1918	Java, G. Batoe, Cianten, Lewiliang, Buitenzorg	West Java, Bogor, Leuwiliang, Cianten	6°43'27.5"S, 106°36'18.9"E	1000	BO
C. G. G. J. v. Steenis	5465	03 Sep. 1933	Java, G. Besar, Cianjur	West Java, Cianjur, Mt. Besar	7°01'07.6"S, 107°07'48.6"E	1370	BO
C. G. G. J. v. Steenis	11773	11 Mar. 1940	West Java, G. Besar, No van Gedeh, Desa Ciharang, Kampung Tunggilis, naar top	West Java, Cianjur, Mt. Besar	7°01'07.6"S, 107°07'48.6"E	1000-1350	BO, L
C. L. Blume	s.n.	-	Java	West Java, probably Bogor, Megamendung	6°40'55.7"S, 106°53'33.1"E	-	BO
C. L. Blume	s.n.	-	Java	West Java, probably Bogor, Megamendung	6°40'55.7"S, 106°53'33.1"E	-	K
E. A. Widjaja	21	30 Nov. 1975	West Java, G. Kempul, Cianten	West Java, Bogor, Leuwiliang, Cianten	6°43'29.2"S, 106°36'17.0"E	-	BO
E. A. Widjaja	1806	18 Dec. 1982	West Java, Bogor, G. Salak, Cibitung	West Java, Bogor, Cibitung	6°37'22.3"S, 106°41'34.0"E	-	BO
E. A. Widjaja	3609	12 Nov. 1989	Java, Sukabumi, Lengkong	West Java, Sukabumi, Lengkong	7°06'23.4"S, 106°39'40.5"E	-	BO
E. A. Widjaja	7157	24 Apr. 1998	West Java, Bogor, Leuwiliang, Purwabakti Village, Garehong-Keneng, G. Halimun	West Java, Bogor, Pamiarahan, Purwabakti	6°43'29.1"S, 106°38'06.7"E	946	BO
E. A. Widjaja	7428	25 May 2000	Jawa, Bogor, Kecamatan Pamiarahan, Desa Purabakti, Kampung Padajaya, G. Halimun foot near Cianten tea plantation	West Java, Bogor, Pamiarahan, Purwabakti	6°42'55.3"S, 106°36'47.7"E	940	BO
E. A. Widjaja	7430	25 May 2000	Jawa, Bogor, Kecamatan Pamiarahan, Desa Purabakti, Kampung Padajaya, G. Halimun foot near Cianten tea plantation	West Java, Bogor, Pamiarahan, Purwabakti	6°42'55.3"S, 106°36'47.7"E	940	BO
E. A. Widjaja	s.n.	1983	West Java, Cigombong, Sukaraja, Sukabumi	West Java, Bogor, Cigombong (Jl. Raya Sukaraja-Sukabumi)	6°44'56.7"S, 106°47'26.6"E	-	BO

Collector	Collection Number	Collection Date	Location		Coordinates Prediction	Altitude (m asl)	Herbaria Code
			Recorded on the Specimen	Current Location			
G. G. Hambali	722	15 Jun. 1975	West Java, Ga. Malang, Takoka Nat. Res.	West Java, Cianjur, Takokak	7°07'47.8"S, 107°00'03.1"E	1100	BO
H. Wiriadinata & W. S. Hoover	31193	22 Feb. 2000	West Java, Mount Salak, Facing East, Upper Lido Village	West Java, Bogor, Cigombong	6°43'32.8"S, 106°46'40.8"E	1000-1200	BO
H. Wiriadinata, W. S. Hoover & J. Hunter Hallier	31339	07 Mar. 2000	West Java, Mt. Halimun Nat. Park Cikaniki	West Java, Mt. Halimun National Park, Cikaniki	6°44'47.5"S, 106°32'13.7"E	1000-1400	BO
J. v. B. Waalkes	468	19 Sep. 1951	Java, Mount Salak, Prope Tjoeroeg	West Java, Bogor, Mt. Salak	6°42'46.1"S, 106°44'34.4"E	-	BO
leg. ign.	s.n.	-	Java, Pulau Panaitan (Prinseneiland) between Tg. Manik and N. Coast (W. Peninsula)	Banten, Pandeglang, Panaitan Island	6°35'20.2"S, 105°12'24.3"E	20	BO, L
leg. ign.	s.n.	-	Java, Mount Salak, Prope Tjoeroeg	West Java, Mt. Salak	6°43'09.5"S, 106°44'13.1"E	-	BO
N. Wirawan	s.n.	31 Dec. 1963	S. W. Java, Ujungkulon Nature Reserve, Gunung Pajung	Banten, Pandeglang, Ujungkulon Nature Reserve	6°49'04.4"S, 105°15'59.5"E	400	BO
R. C. Bakhuizen v/d Brink	1617	12 Jun. 1916	Java, Preanger, Cidadap, Cibeber	West Java, Cianjur, Cibeber	6°55'13.0"S, 107°05'20.7"E	1000	BO, L
R. C. Bakhuizen v/d Brink	4393	23 Jul. 1920	Java, Res. Batavia, G. Limoes (Boerangrang)	West Java, Burangrang	6°46'19.4"S, 107°34'17.0"E	1200	BO
S. H. Dalimunthe	20	9 Oct. 2019	West Java, Cikaniki Resort Station	West Java, Cikaniki Resort Station	6°44'47.2"S, 106°32'16.2"E	1000-1200	BO
S. H. Koorders	15093	16 Feb. 1984	Java, Preanger, Boschterrein Takoka, Distr. Djampang-Wetan, Afd. Tjiandjoer	West Java, Cianjur (Jampang Wetan)	6°48'07.3"S, 107°08'30.6"E	1000	BO, L
S. H. Koorders	32907	07 Apr. 1899	Java, Tjiandjoer / Preanger, Tokoka	West Java, Cianjur	6°48'54.1"S, 107°08'07.3"E	1000	BO
S. H. Koorders	41410	09 Jun. 1912	Java, Goenoeng Kantjang, Distr. Lebak Kidoel, Res. Bantam	Banten, Lebak, Gunungkencana	6°34'43.0"S, 106°01'59.4"E	-	BO
W. F. Winckel	220	03 Jul. 1918	Java, Preanger, G. Beser, Tjidadap, Tjibeber	West Java, Cianjur, Cibeber	6°56'26.6"S, 107°08'06.4"E	1000	BO, L
W. F. Winckel	449	26 Oct. 1919	Java, Preanger, Tjadas Malang, Cibeber	West Java, Cianjur, Cadas Malang	7°03'01.0"S, 107°10'01.0"E	1000	BO, L
W. F. Winckel	1741	20 Oct. 1923	Java, Preanger, Goenoeng Boeled, Cidadap, Cibeber	West Java, Cianjur, Mt. Buleud	7°05'48.4"S, 107°03'15.0"E	1000	BO, L

Collector	Collection Number	Collection Date	Location		Coordinates Prediction	Altitude (m asl)	Herbaria Code
			Recorded on the Specimen	Current Location			
W. Meijer	2949	20 Aug. 1954	West Java, W. of Djasinga, Forest-Reserve Djanglope	West Java, Bogor, West Part of Jasinga	6°28'50.4"S, 106°24'56.4"E	900	BO
Living collection	-	-	-	West Java, Bogor, Bogor Botanic Gardens, LIPI	6°36'00.0"S, 106°47'44.0"E	270	-

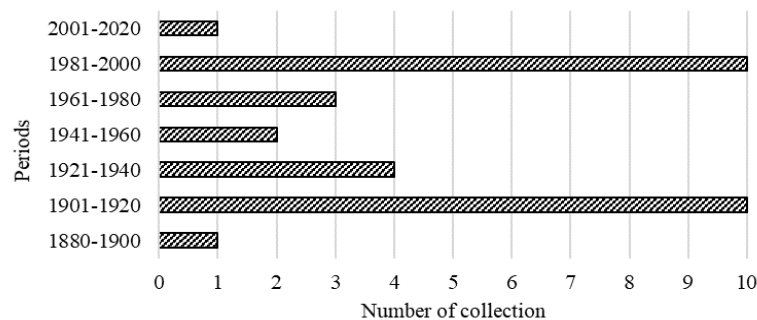


Figure 1. Number of herbarium specimens of *Dinochloa scandens* during twenty years time periods

Taxonomic Account

Dinochloa scandens (Blume ex Nees) Kuntze, Revis. Gen. Pl. 2: 773 (1891). Type: Java, Megamendung, *Blume s.n.* (L holotype).

Synonyms: *Bambusa scandens* Blume ex Nees in Flora 7: 291 (1824) (basionym); *Nastus tjankorreh* Schult.f., Syst. Veg. 7(2): 1358 (1830) (*nom. superfl.* or superfluous name); *Dinochloa tjankorreh* Buse in Miquel, Pl. Jungh., prepr.: 388 (1854) (*comb. superfl.* or superfluous combination name); *Chusquea amplopaniculata* Steud., Syn. Pl. Glumac. 1(3): 337 (1854) (a synonym by Clark, 1986); *Schizostachyum parviflorum* Munro, Trans. Linn. Soc. London 26(1): 153 (1868) (a synonym by Munro, 1868).

Description (Figure 2-3): Climbing or twining with zig-zag culm. Young shoots purplish, glabrous, or occasionally with white wax, blade erects first then deflexed and easily fall. Culms purplish-green when young becoming green with age, solid or with small lumen, 9–20 mm diameters, internodes 17–24 cm long and slightly rough

when young becoming glabrous. Branch complements consist of a primary branch and several secondary branches. The primary branch becomes dormant and develops into a full-size culm when the apex of the main culm is broken. Culm-sheaths caducous, usually glabrous or sometimes covered with pale hairs, 8–14 cm long and 4–5 cm wide near the base, narrower at the junction with the blade; the lower part of the culm-sheath (girdle) rough and thick; auricles inconspicuous up to 1 mm high, glabrous or rarely with bristles; ligule entire, 1–1.5 mm long; blades easily fall, erect first then deflexed, 5–8 cm long, wide near the base. Leaf-blades purplish-green when young becoming green with age, 11–19.5 cm × 1.3–4 cm, glabrous; auricles small, less than 1 mm high, with bristles 2–5 mm long; ligule entire up to 1 mm high. Inflorescences are 120–50 cm long. Spikelets 3.5–4 mm long. Fruits are not available but Dransfield (1996) mentioned about 7 mm long, globose, and smooth.

Vernacular names and uses: The vernacular name of this species is *awi*

cangkoreh, *cangkoreh* or *cangkore* (Sundanese). The local people often use this bamboo as rope when there are no other plants that can be used in the forest (Widjaja, 2001b). The culms are also used for making handicrafts and rough baskets to carry stones from the rivers. The water of the culm of this bamboo is traditionally used as cough medicine, eye drops (Partasmita et al., 2017; Setiawati et al., 2017), treat conjunctivitis, and anti-inflammatory (Priyadi et al., 2010). In Mt. Halimun, West Java, *D. scandens* is known as a host of leafhoppers *Cofana yukawai* Kamitani, 2004 (Hemiptera: Auchenorrhyncha: Cicadellidae) (Kamitani et al., 2004).

Notes: Holotypespecimen of *D. scandens* is collected from Megamendung, Javaby Blume (without number collection) and deposited in L (Dransfield, 1996). Unfortunately, this holotype was not available in portal databases of Herbarium L that can be accessed at BioPortal (<https://bioportal.naturalis.nl/>).

Specimens examined: Indonesia. Java. West Java Province: Megamendung (probably), *C. L. Blume s.n.* (BO, K); Preanger, Cidadap, Cibeber, 1000 m asl, 12 June 1916, *R. C. Bakhuizen v/d Brink 1617* (BO, L); Res. Batavia, G. Limoes (Boerangrang), 1200 m asl, 23 July 1920, *R. C. Bakhuizen v/d Brink 4393* (BO); Preanger, Boschterrein Takoka, Distr. Djampang-Wetan, Afd. Tjiandjoer, 1000 m asl, 16 February 1894, *S. H. Koorders 15093* (BO, L); Preanger Regentschappen, G. Tjikoraj, Z. O. Helling, Pasir Walang boven Nanggerang, 950-1000 m asl, 17 August 1913, *C. A. Backer 8731* (BO); Preanger Regentschappen, Tjoeroeg Djanggot, Cidadap, Cibeber, 900 m asl, 9 September 1917, *C. A. Backer 22941* (BO), Preanger, Goenoeng Boeled, Cidadap, Cibeber, 1000 m asl, 20 October 1923, *W. F. Winckel 1741* (BO, L); Preanger, Tjadas Malang, Cibeber, 1000 m asl, 26 October 1919, *W. F. Winckel 449* (BO, L); Preanger, G.

Beser, Tjidadap, Tjibeber, 1000 m asl, 3 July 1918, *W. F. Winckel 220* (BO, L); Ga. Malang, Takoka Nat. Res., 1100 m asl, 15 June 1975, *G. G. Hambali 722* (BO); G. Batoe, Cianten, Lewiliang, Buitenzorg, 1000 m asl, 31 August 1918, *C. A. Backer 25819* (BO); Cigombong, Sukaraja, Sukabumi, 1983, *E. A. Widjaja s.n.* (BO); Mount Salak, facing east, upper Lido Village, 1000-1200 m asl, 22 February 2000, *H. Wiriadinata & W. S. Hoover 31193* (BO); Mt. Halimun Nat. Park Cikaniki, 1000-1400 m asl, 7 March 2000, *H. Wiriadinata, W. S. Hoover & J. Hunter 31339* (BO); Mount Salak, *Leg. Ign. s.n.* (BO); Pasir Walang, Nanggerang, 1913, *C. A. Backer 8731* (BO); Batavia, Nirmala, 1100 m asl, 24 December 1913, *C. A. Backer 11068* (BO); G. Beser, no van Gedeh, Desa Ciherang, Kampung Tunggilis, near top, 1000-1350 m asl, 11 March 1940, *C. G. G. J. v. Steenis 11773* (BO, L), G. Beser, Cianjur, 1370 m asl, 3 September 1933, *C. G. G. J. v. Steenis 5465* (BO); Mount Salak, Prope Tjoeroeg, 2 May 1895, *Hallier s.n.* (BO); Bogor, Kecamatan Pamijahan, Desa Purabakti, Kampung Padajaya, G. Halimun foot near Cianten tea plantation, 940 m asl, 25 May 2000, *E. A. Widjaja 7428* (BO); Bogor, Kecamatan Pamijahan, Desa Purabakti, Kampung Padajaya, G. Halimun foot near Cianten tea plantation, 940 m asl, 25 May 2000, *E. A. Widjaja 7430* (BO); Leuwiliang, Purwabakti Village, Garehong-Keneng, G. Halimun, 946 m asl, 24 April 1998, *E. A. Widjaja 7157* (BO); Bogor, G. Salak, Cibitung, 18 December 1982, *E. A. Widjaja 1806* (BO), G. Kempul, Cianten, 30 November 1975, *E. A. Widjaja 21* (BO); Sukabumi, Lengkong 12 November 1989, *E. A. Widjaja 3609* (BO); W. of Djasinga, forest-reserve Djanglope, 900 m asl, 20 August 1954, *W. Meijer 2949* (BO); Tjiandjoer, 1000 m asl, 7 April 1899, *S. H. Koorders 32907* (BO); Mount. Salak, Prope Tjoeroeg, *Leg. Ign. s.n.* (BO); Cikaniki Resort



Figure 2. *Dinochloa scandens*: habit (A), a tip of the young culm (B), culm-sheath of the young shoot (C), a tip of the young shoot (D), young culm with purplish-green color (E), mature culm with green color (F), mature culm-sheath without blade due to falling early (G), detail of culm-sheath auricles (H), culm-sheath with a blade attached (I), detail of culm-sheath ligule (J), girdle (K) [Photos: Syadwina H. Dalimunthe (A), I Putu Gede P. Damayanto (B, I, J, K), and Irfan Martiansyah (C-H)]

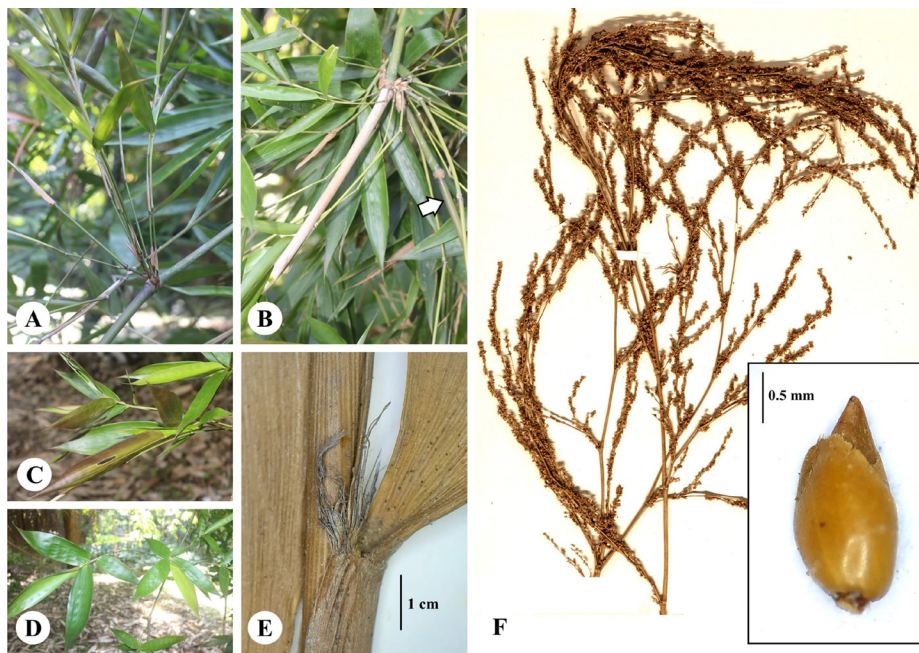


Figure 3. *Dinochloa scandens*: primary branch dormancy (A), primary branch developed into a full-size culm when the apex of the main culm is broken (B), young leaves with purplish-green color (C), mature leaves with green color (D), detail of leaf-sheath auricles with bristles (E), inflorescences (F) and spikelet (inset) [Photos: Irfan Martiansyah (A-D), I Putu Gede P. Damayanto (E, inset F), and Biportal, 2021 (F)]

Station, 9 October 2019 *S. H. Dalimunthe* 20 (BO). Banten Province: Ujungkulon Nature Reserve, Gunung Pajung, 400 m asl, 31 December 1963, *N. Wirawan s.n.* (BO); Goenoeng Kantjangan, Distr. Lebak Kidoel, Res. Bantam, 9 June 1912, *S. H. Koorders 41410* (BO); Bantam, G. Kencana, G. Kendeng, 300 m asl, 13 June 1911, *C. A. Backer 1292* (BO); Pulau Panaitan (Prinseneiland) between Tg. Manik and n. coast (w. peninsula), 20 m asl, 19 September 1951, *J. v. B. Waalkes 468* (BO, L).

Living plants examined: Bogor Botanic Gardens, Research Center for Plant Conservation and Botanic Gardens, LIPI, Bogor, 6°36'00" S, 106°47'44" E, 270 m asl.

Additional specimen examined (*Dinochloa macrocarpa*): the Philippines, Island of Sibuyan, Province of Capiz, Magallanes (Mt. Giting-Giting), March 1910, *A. D. E. Elmer 12059* (F code V0046690F, V0046691F; K code K000290819, K000290820; NY code 380691).

Distribution

Based on herbarium specimen data (Table 1), *D. scandens* distributed in the western part of Java (Province of West Java and Banten), Indonesia (Figure 4). Most populations can be found around Bogor, Sukabumi, and Cianjur in West Java Province. The easternmost area where this species can be still found is around Purwakarta (Cahyanto et al., 2018) and Garut, West Java Province, while the westernmost area is Panaitan Island, Banten Province. This species has never been previously reported growing outside the mainland of the island of Java. The distribution of *D. scandens* on Panaitan Island is a new record.

Vorontsova et al. (2016), POWO, GBIF and some others (i.e. Priyadi et al., 2010; Cleary, 2016; Jamun et al., 2020; Sharief & Panda, 2020; Sujarwanta & Zen, 2020a, 2020b) suggest that *D. scandens* can be found

outside of Java (e.g. Sumatra, Borneo, Lesser Sunda Islands, the Andaman Islands, Nicobar Islands, and Thailand). The information of *D. scandens* in POWO and GBIF, however, is outdated. For example, the specimen of *Brand 24573(K)* from Lahad Datu, Malaysia (Borneo) which was used as a reference for determining distribution areas of *D. scandens* in the POWO and GBIF database is a new species, *D. darvelana* S. Dransf. (see Dransfield, 1989).

Further studies by Dransfield have also shown that some specimens of *Dinochloa* from Malaysia, previously identified as *D. scandens* (Dransfield, 1981), belong to *D. robusta* S. Dransf. (Dransfield, 1992) and *D. malayana* S. Dransf. (Dransfield, 1996). Several *Dinochloa* specimens from Indonesia (Central and East Java), previously suspected as *D. scandens*, have been identified later as *D. matmat* S. Dransf. & Widjaja (Dransfield & Widjaja, 2000). It appears that Priyadi et al. (2010) and Vorontsova et al. (2016) missed this information and reported *D. scandens* to be widely distributed.

Jamun et al. (2020) stated that *D. scandens* was found in East Nusa Tenggara, Lesser Sunda Islands and is used in medicine by local communities. Unfortunately, they did not provide photographs and descriptions of the species. It could be that the species is not *D. scandens*, but *D. kostermansiana* S. Dransf., the member of *Dinochloa* reportedly found in East Nusa Tenggara (Dransfield, 1996; Widjaja, 2001a; Damayanto, 2016, 2017; Damayanto et al., 2018). Furthermore, Sujarwanta & Zen (2020a, 2020b) stated that *D. scandens* was found in Lampung, Sumatra. However, the photographs presented were less clear and the description of the species was also lacking some details. We suspect that this species could be *D. glabrescens* Widjaja that is found in Lampung (Widjaja, 1997; Damayanto, 2018). Cleary (2016) stated that

D. scandens occurred in East Kalimantan (Borneo), however, there is no description or photograph available. This information needs to be evaluated since some *Dinochloa* species occurred there (see Dransfield, 1981, 1989).

Dinochloa scandens collected from West Java were reportedly introduced to the Baturaden Botanic Gardens, Central Java (Sukma & Lianah, 2019). This report, however, needs to be evaluated - the description and photograph provided by Sukma & Lianah (2019) are insufficient to accurately identify the species. In East Java, Mudiana et al. (2020) mentioned that *D. scandens* was found in Alas Purwo. Unfortunately, the photographs provided were unclear and there was no species description available. It is suspected that this species is *D. matmat* reported occurring in Central and East Java (Dransfield & Widjaja, 2000).

Dinochloa scandens was reported to occur in the Nicobar (Sharief & Panda, 2020) and Andaman Islands, India (Veenakumari et al., 1997), nevertheless species description and photographs are lacking. Based on the Checklist of the Grasses of India (Kellogg et al., 2020), *D. scandens* was reportedly native to Indonesia and was cultivated in Andaman and Nicobar Islands. However, Kumari (2019) reported that the presence of *D. scandens* in the Indian species checklist was doubtful. The cultivation of *D. scandens* in Andaman and Nicobar Islands is still questionable since *D. scandens* is a wild bamboo and is considered less useful compared to *Bambusa*, *Dendrocalamus*, and *Gigantochloa*. Thus, the possibility of *D. scandens* being cultivated is very low. Kellogg et al. (2020) also included *D. andamanica* Kurz in their checklist. On the other hand, Naithani et al. (2000) has transferred *D. andamanica* to variety *D. scandens* var. *andamanica* (Kurz) Naithani. Ohrnberger (1999) mentioned that *D. scandens* Damayanto et al.

name was misapplied to *D. andamanica*. It needs further study to clarify the existence of *D. andamanica* or *D. scandens* var. *andamanica* in Andaman and Nicobar Islands.

Here we show that *D. scandens* is an endemic species to the western part of Java (Banten and West Java Province) and the satellite island of Panaitan, concurrent with the previous work of Dransfield (1994, 1996), Dransfield & Widjaja (1995), Damayanto (2018), and Widjaja (2019). From this study, *D. scandens* in West Java were found in several mountainous protected forest areas (Mount Gede-Pangrango National Park and Mount Halimun-Salak National Park). These national parks should support the continued existence of *D. scandens* in West Java. The conservation of *D. scandens* has been conducted in Indonesia. *Dinochloa scandens* was reportedly planted in Cibodas Botanic Gardens at area XX.A.22-22a-22b, 25, 26, 27, 28 and XX.B. 22-22a collected from West Java (Sujarwo et al., 2019) and Bogor Botanic Gardens at area XIII.K.14 collected from West Java (Ariati et al., 2019). Solikin (2004) reported *D. scandens* was cultivated in Purwodadi Botanic Gardens at area XII.J.I. 42, without information on the origin of the collection. However, according to Lestarini et al. (2012) and Makoyana (2021), there were no *D. scandens* in Purwodadi Botanic Gardens cultivated and there is also no data on plant species planted in area XII.J.I. 42.

Habitat Preference

Based on notes of herbarium specimen, *D. scandens* is largely a forest species found on ridge slopes, humid mountains, in primary lowlands, secondary forests and near the beach. *Dinochloa* is rarely found in undisturbed primary rainforests. *Dinochloa* becomes abundant in gaps or at forest margins by roadsides when the forest is disturbed by

road-constructions or logging (Dransfield, 1996). Therefore, *D. scandens* is easily found on the ridge slopes of the forest and

secondary forests which have frequent gaps in the forest canopy. This species grows in sandy and limestone soils (Widjaja, 2001b).

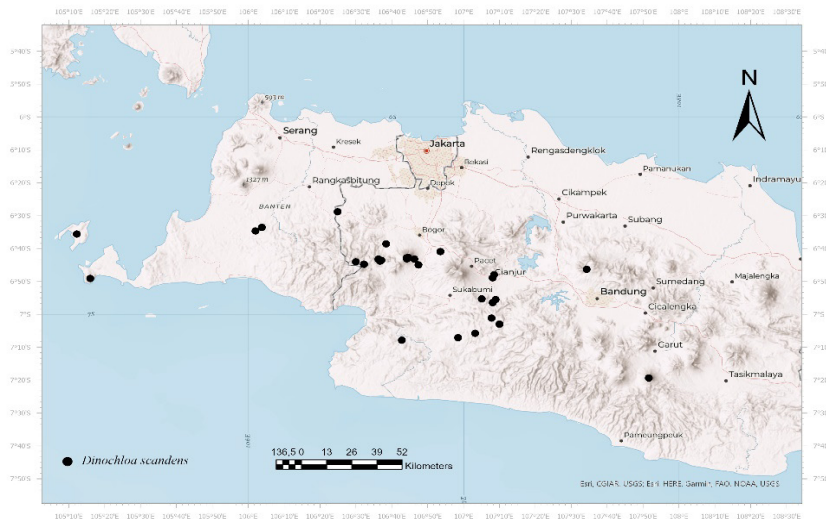


Figure 4. Distribution of *Dinochloa scandens* in the western part of Java and vicinity island, Indonesia

This species is found in lowland to mountain forests at 20 m asl (Panaitan Island, Banten Province) to 1400 m asl (West Java), but mostly found at 800-1200 m asl (Figure 5-6). Broken down into political region, *D. scandens* is distributed between 20-1000 m asl and 200-1400 m asl in Banten Province and West Java Province, respectively. Most plants in West Java, however, were recorded in the highlands, between 700-1000 m asl. This altitude distribution is following those of *Dinochloa* spp. in Sulawesi, the center of *Dinochloa* species diversity (Ervianti et al., 2019), where they can be found at 47-953 m asl (Widjaja, 2009; Ervianti et al., 2019).

Generally, *D. scandens* is distributed in an area with annual rainfall between 2000-4000 mm (Figure 7). In Banten Province, this species has been distributed in an area with 3000-4000 mm/year. In West Java Province, the species was distributed in the area with an annual rainfall of 2000-4000 mm. However,

most records were found in an area with an annual rainfall of 2000-3000 mm. In Sulawesi, *Dinochloa* species reportedly grow in areas with an annual rainfall of 1000-3000 mm (Ervianti, 2015). Therefore, it is likely that the area with an annual rainfall of 2000-3000 mm is the most suitable habitat for *D. scandens*.

Notes on Synonymy

Vorontsova et al. (2016) include *D. macrocarpa* Elmer (see Elmer, 1915) as a synonym of *D. scandens*. The type specimen of *D. macrocarpa* [Elmer 12059 (F!, K!, NY!)] was collected from Magallanes (Mt. Giting-giting; the correct name is Mt. Guiting-Guiting), Sibuyan Islands, Province of Capiz (now Romblon Province), the Philippines (Elmer, 1915) (Figure 8). Dransfield & Widjaja (1995), however, suggested that the records of *D. scandens* in the Philippines, Borneo and Peninsular Malaysia were based upon incorrect identification.

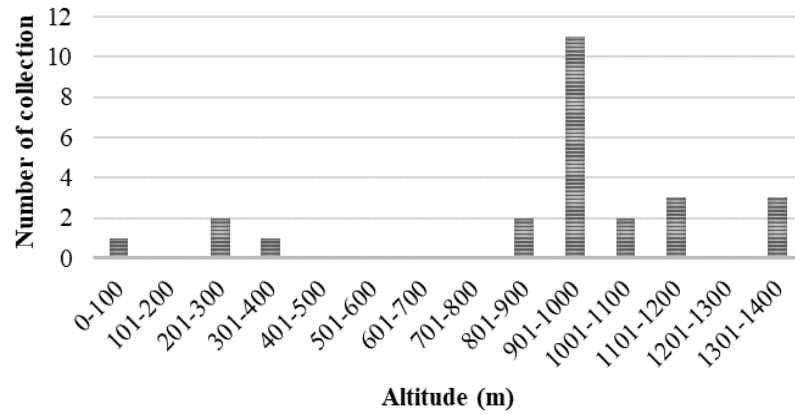


Figure 5. Altitude distribution of *Dinochloa scandens* based on specimen herbarium and living plant collections

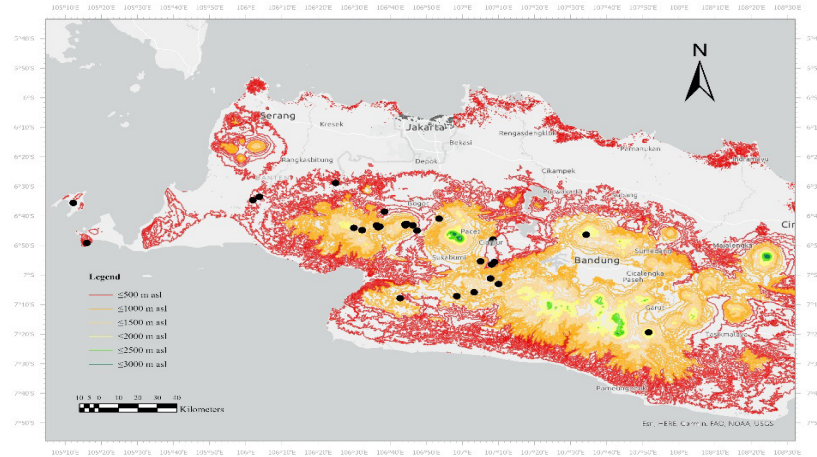


Figure 6. Overlapping maps of altitude and species distribution of *Dinochloa scandens*

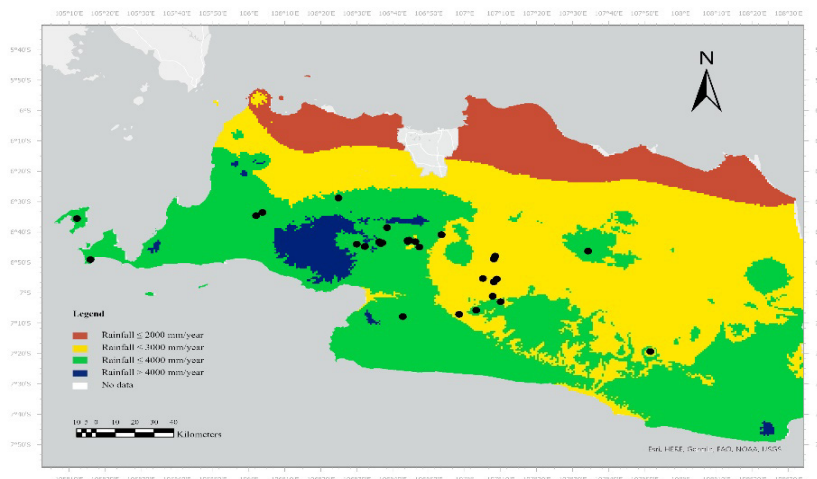


Figure 7. Overlapping maps of annual rainfall and species distribution of *Dinochloa scandens*

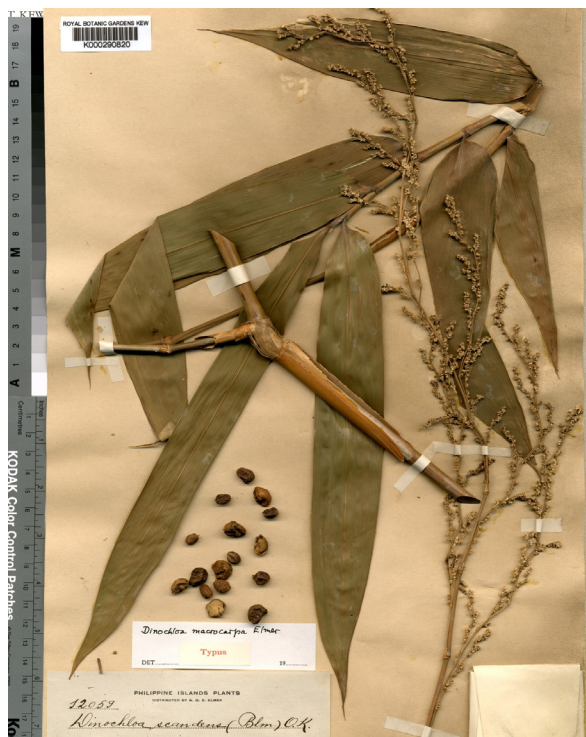


Figure 8. The type specimen of *Dinochloa macrocarpa* (Elmer 12059, specimen code: K000290820) stored in Herbarium of Royal Botanic Gardens, Kew (K), England (Herbweb, 2021)

The fruits of *D. macrocarpa* are bigger (at least 1.25 cm long when mature) than those of *D. scandens* (about 7 mm long). Furthermore, the fruit shape of *D. macrocarpa* is subglobose or ellipsoid, while that of *D. scandens* fruits is globose (see Elmer, 1915; Dransfield, 1996). In *Dinochloa*, the fruits provide the most useful diagnostic characters (Dransfield, 1981), presumably more important than the flowers (Dransfield, 1996). Hence, we suggest that *D. macrocarpa* is morphologically distinct from *D. scandens* and propose *D. macrocarpa* as an accepted name for a bamboo species from the Sibuyan Islands of the Philippines, concurrent with the previous work of Elmer (1915) and Ohrnberger (1999).

Dinochloa scandens is endemic to West Java and Banten Provinces, Indonesia. This bamboo can be found in lowland to mountain forests with an altitude of 20-

1400 m and an annual rainfall of 3000-4000 mm. Most populations occur between 800-1200 m and in areas of annual rainfall between 2000-3000 mm. We support *D. macrocarpa* as an accepted name for a bamboo species from the Philippines – removing it from synonymy with *D. scandens*.

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