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REINWARDTIA

A JOURNAL ON TAXONOMIC BOTANY, PLANT SOCIOLOGY AND ECOLOGY

ISSN 0034 – 365 X | E-ISSN 2337 – 8824 | Accredited 792/AU3/P2MI-LIPI/04/2016

2017 16 (1)

REINWARDTIA

A JOURNAL ON TAXONOMIC BOTANY, PLANT SOCIOLOGY AND ECOLOGY

Vol. 16 (1): 1 – 48, June 15, 2017

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Cover images: *Catanthera keris* Veldk. (1. Inflorescences; 2. Close up flower; 3. Flower bud), *Medinilla squillula* Veldk. (4. Habit; 5. Branches; 6. Fascicle of uniflorous Infructescences), *Medinilla uninervis* Veldk. (7. Habit. Note 1-nerved leaves; 8. infructescence; 9. Immature and mature fruits), *Medinilla zoster* Veldk. (10. Habit; 11. Inflorescences; 12. Flower). Photo credits: Bangun 223, Lowry & Phillipson 7287, Mahroji, Fabanyo & Soleman 69, Callmander, *et al*. 1067.

The Editors would like to thank all reviewers of volume 16(1):

Agus Susatya - University of Bengkulu, Bengkulu, Indonesia
Agus Sutanto - Indonesian Tropical Fruit Research Institute (ITFRI), West Sumatra, Indonesia
Axel D. Poulsen - Royal Botanic Garden Edinburgh, Edinburgh, Scotland, UK
Andrew Powling - School of Biological Sciences, University of Portsmouth, Portsmouth, UK
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REINWARDTIA
Vol 16 No 1, pp: 19 – 24

A NEWLY DESCRIBED AND RECORDED INFRASPECIFIC TAXA OF *MUSA BORNEENSIS* BECC. (MUSACEAE) FROM SULAWESI, INDONESIA

Received November 4, 2016; accepted February 23, 2017

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ABSTRACT
SULISTYANINGSIH, L. D. 2016. A Newly described and recorded infraspecific taxa of *Musa borneensis* Becc. (Musaceae) from Sulawesi, Indonesia. *Reinwardtia* 16 (1): 19 – 24. — A new variety of *Musa borneensis*, *M. borneensis* var. *donggalaensis* Sulis. is proposed based upon specimens from Donggala, Central Sulawesi, Indonesia. Endemic status of *M. borneensis* was rejected. The description, distribution map and the identification key are provided.

Key words: *Musa borneensis*, Musaceae, new variety, Sulawesi.

ABSTRAK
SULISTYANINGSIH, L. D. 2016. Varietas dan catatan baru *Musa borneensis* Becc. (Musaceae) dari Sulawesi, Indonesia. *Reinwardtia* 16 (1): 19 – 24. — Varietas baru dari *Musa borneensis*, *M. borneensis* var. *donggalaensis* Sulis. dipertelakan berdasarkan spesimen dari Donggala, Sulawesi Tengah, Indonesia. Status endemik *M. borneensis* disanggah. Pertelaan, peta distribusi dan kunci identifikasi disajikan.

Kata kunci: *Musa borneensis*, Musaceae, varietas baru, Sulawesi.

INTRODUCTION

Bananas belong to Musaceae, a small family which consists of three genera, *Ensete* Bruce *ex* Horan, *Musa* L. and *Musella* (Franchet) H.W. Li. In general, bananas (*Musa* L.) are grouped into wild seeded bananas that consist of approximately 70 species (Häkkinen, 2008) and edible seedless bananas consisting of approximately 500 cultivars (Valmayor *et al*., 2002). Indonesia is the center of bananas origin (Simmonds, 1966) as well as of its diversity (Daniells *et al*., 2001). At least 325 cultivars have been recorded in Indonesia (Valmayor *et al*., 2002), unfortunately only 12 wild banana species has been documented (Nasution & Yamada, 2001). Presumably, there are wild banana species that have not been recorded and well documented.

Wild banana species grow widespread in almost all large islands in Indonesia, such as Sumatra, Java, Lesser Sunda Islands, Kalimantan, Sulawesi, Moluccas and Papua. Biogeographycally, Sulawesi has a unique characteristic because it is located in the Wallacea line which is the transition region between Asia and Australia. Sulawesi is also known to have a large number of endemic flora and fauna (Mittermeier *et al*., 2005). Musaceae that have been reported as an endemic flora in Sulawesi are *M. celebica* Warb. *ex* K. Schum. and *M. acuminata* Colla var. *tomentosa* (K. Sch.) Nasution (Nasution, 1991; Nasution & Yamada, 2001).

Taxonomic studies that reveal the morphological diversity of wild bananas in Central, North and South Sulawesi has been done by Nasution (1991) and Sulistyaningsih (2013). However, in general the systematic studies of wild banana species in Sulawesi are still rare. It can be seen from the number of identified Musaceae specimen in Herbarium Bogoriense (BO). It is approximately only 26% of Musaceae specimens from Sulawesi that stored in BO have been identified (Sulistyaningsih, 2013).

MATERIALS AND METHODS

This study was done by exploration method conducted in Donggala, Central Sulawesi. The species was described by completing the entire INIBAP Musa Descriptor List (IPGRI-INIBAP/ CIRAD, 1996) with some modification followed the traditional banana taxonomy approach (Simmonds, 1966). Relevant parts of the specimens were deposited as a holotype at Herbarium Bogoriense (BO).

RESULTS AND DISCUSSIONS

Borneo which consist of three countries: Brunei, Indonesia (Kalimantan) and Malaysia (Sabah and Sarawak) being a part of the center of bananas diversity. Häkkinen (2004) stated that Borneo has a large number of endemic wild banana species and their number may now total 20, though only 15 species have been previously described. *Musa borneensis* is one of the wild bananas that housed

Fig. 1. *Musa borneensis* var. *donggalaensis* Sulis, var. nov. A. Habitus; B&G. Infructescence; C. Male bud; D. Petiole base; E. & F. Auricle on the petiole base

in Borneo and firstly described by Odoardo Beccari. He is Italian botanist who described four wild bananas from Borneo in his classic book "Nelle Forestre di Borneo" (Beccari, 1902). The type specimen collected from Sarawak, Malaysia (P.B. n. 3356). *Musa borneensis* characterized by the curved-patent petiole, heavily wrinkled, large inflorescence auricles, ovoid and imbricate male bud, obpyriform and tuberculate seeds. Six varieties of *M. borneensis* have been described before, namely: var. *alutacea*, *borneensis*, *flavida*, *lutea*, *phoenica* and *sarawakensis* (Häkkinen & Meekiong, 2005). The discovery of *Musa borneensis* that growing wildly in Sulawesi enlarge the distribution area and automatically rejected the endemic status of this species. The field key identification of *Musa borneensis* to variety level also have been revised considerably.

Field key identification of *Musa borneensis* to variety level

1a. Plant 3.5 meter or below……..…..2
b. Plant more than 3.5 meter……...….3
2a. Pseudostem sap milky, colour lower surface leaf medium green and shiny, male bud ovoid and red-purple, peduncle slightly hairy ….....4
b. Pseudostem sap watery red-purple, colour lower surface leaf green and dull, male bud rounded and pink-purple, peduncle hairless …….var. *phoenica*
3a. Pseudostem light green to medium-green, leaf-base pointed on both sides, male bud yellow ……5
b. Pseudostem purple-brown, sparse black-purple blotches at petiole base, leaf base rounded on both sides, male bud pink-purple ……. ……..var. *sarawakensis*
4a. Pseudostem colour purple brown, petiole bases winged and not clasping the pseudostem, heavily corrugated auricles with sparse red purple blotches, leaf bases symmetric, one side rounded and one pointed ….....var. *borneensis*
b. Pseudostem colour medium green, petiole bases winged and clasping the pseudostem, corrugated auricles with sparse brown blotches, leaf bases asymmetric, both sides pointed .....var. *donggalaensis*
5a. Male bud bract revolute before falling …….. 6
b. Male bud bract not revolute before falling ……..... var. *alutacea*
6a. 26 hands, 5–6 fruits per hand ……. var. *flavida*

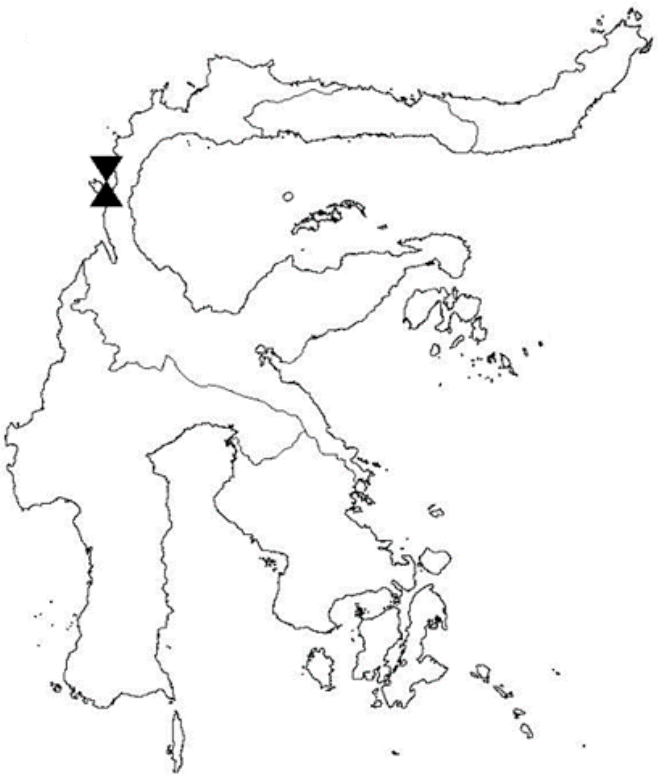

Fig. 2. Distribution map of *Musa borneensis* var. *donggalaensis* in Sulawesi

b. 36 hands, 4–8 fruits per hand …… var. *lutea*

Musa borneensis var. donggalaensis Sulis. *var. nov*. – Fig. 1. — Type: Indonesia, Central Sulawesi, Palu, Donggala, April 2013. Elizabeth *EAW 10045* (Holo: BO).

Musa borneensis var. *donggalaensis* is closely related to var. *borneensis*, developing slender plant, corrugated auricles with sparse brown blotches, inflorescences that are at first horizontal and later becoming pendulous, green and slightly hairy peduncle, ovoid with red purple colour male bud, not revolute before falling, slightly lax fruit bunch, uniseriate, slightly curved fruit.

Plant slender, suckering freely, close to parent, growing vertical. Mature pseudostem 3 – 3.5 m high, slender, sheaths medium green with sparse brown blotches, predominant underlying color green-yellow with sparse brown purple pigmentation, shiny, sap milky. *Petiole* up to 100 cm long, petiole canal leaf wide with erect margin, petiole bases winged and clasping the pseudostem and corrugated auricles with sparse brown blotches auriculated. *Leaf* habit erect, lamina up to 200 cm long, 60 cm wide, oblong, slightly narrowed towards the apex, roundly truncate at the tip, color of upper surface green, lower surface medium green, both surfaces shiny, leaf bases asymmetric, both sides pointed, midrib dorsally light green and ventrally yellow with very corrugated lamina. *Inflorescence* first horizontal then pendulous, peduncle 60 cm long, 5 cm in diameter, slightly hairy and green in colour. *Male bud* ovoid, 12 – 14 cm long, 7.5 – 11.5 cm wide, bracts inserted on the axis, imbricate, apex obtuse with green tips, red purple, not revolute before falling, shiny. *Male flowers* on average 5 per bract in one row, falling with the bract; compound tepal 2.7 – 4.5 cm long, 0.8 – 1.5 cm wide, upper part white and yellow at the base, with 5-toothed apex; free tepal 1 – 2.1 cm long, 0.5 – 1.4 cm wide, translucent white, oblong, upper part serrate, apex triangular and developed; stamen 5, 2.2 – 4 cm long, 0.1 – 0.3 cm wide, yellow; filaments 0.5 – 1 cm long, white; anther 1.5 – 2.2 cm long, yellowish; style straight; anthers and style exserted; stigma cream; ovary arched. *Fruit* bunch slightly lax, with 12 hands per bunch and 4 – 7 fruits per hands on average, uniseriate; individual fruit 5.5 – 9 cm long, 2 – 2.5 cm diameter, slightly curved, pedicel 0.6 – 0.8 cm, fruit apex blunt-tipped, without relictual floral remains, immature fruit peel light green, mature fruit peel yellow. *Seeds* obpyriform, tuberculate, *ca.* 4 – 6 mm diameter, 100 – 120 seeds per fruit.

Distribution and habitat. Grow wildly on the coast South-West of Donggala, Central Sulawesi (Fig. 2.).

Etymology. The epithet name refer to Donggala, the place where the specimen was collected.

Table 1. Morphological characters of infraspecific taxa of *Musa borneensis*

No	Character	var. *borneensis*	var. *flavida*	var. *alatucaea*	var. *lutea*	var. *phoenica*	var. *sarawakensis*	var. *donggalaensis*
1	Plant	Small; slender	Tall; robust	Tall; robust	Tall; robust	Small; slender	Tall; robust	Small; slender
2	Suckers	Close to parent plant	Close to parent plant	Close to parent plant	Close to parent plant	Close to parent plant	Far from parent plant	Close to parent plant
3	Mature pseudostem colour	Purple brown	Medium green	Light green to yellow	Medium green	Red to purple	Purple brown	Medium green with sparse brown blotches
4	Pseudostem appearance	Shiny	Waxy	Shiny	Shiny	Shiny	Shiny	Shiny
5	Sap colour	Milky	Milky	Red purple	Light yellow	Watery red-purple	Red purple	Milky
6	Petiole canal leaf	Open with erect margins	Wide with erect margins	Open with straight erect margins	Wide open with erect margin	Open with straight erect margins	Wide with erect margins	Wide with erect margin
7	Petiole bases	Winged and not clasping the pseudostem	Winged and not clasping the pseudostem	Winged and clasping the pseudostem	Winged and clasping the pseudostem	Winged and clasping the pseudostem	Winged and clasping the pseudostem	Winged and clasping the pseudostem
8	Auricles	Heavily corrugated auricles with sparse red purple blotches	Heavily corrugated auricles with sparse blue blotches	Heavily corrugated auricles with extensive black purple blotches	Heavily corrugated auricles with extensive brown blotches	Corrugated auricles with sparse black purple blotches	Corrugated auricles	Corrugated auricles with sparse brown blotches
9	Leaf habit	Erect, lamina up to 360 cm × 75 cm	Erect, lamina up to 500 cm × 90 cm	Erect, lamina up to 450 cm × 95 cm	Intermediate, lamina up to 400 cm × 80 cm	Erect, lamina up to 360 cm × 86 cm	Erect, lamina up to 350 cm × 80 cm	Erect, lamina up to 200 cm × 60 cm
10	Colour of upper surface leaf	Green and shiny	Medium green and dull	Green and shiny	Medium green and shiny	Green and shiny	Green and shiny	Green and shiny
11	Colour of lower surface leaf	Medium green and shiny	Light green and dull	Light green and dull	Medium green and shiny	Green and dull	Medium green and dull	Medium green and shiny
12	Leaf bases	Symmetric; one side rounded, one pointed	Asymmetric; both sides pointed	Asymmetric; both sides pointed	Asymmetric; both sides pointed	Asymmetric; both sides rounded	Asymmetric; both sides rounded	Asymmetric; both sides pointed
13	Midrib	Dorsally light green, ventrally yellow, with very corrugated lamina	Dorsally light green to yellow, ventrally yellow with large purple-brown blotches, with very corrugated lamina	Dorsally light green, ventrally yellow, with very corrugated lamina	Dorsally light green, ventrally yellow, with very corrugated lamina	Dorsally purple to blue, ventrally yellow, with very corrugated lamina	Dorsally light green to yellow, ventrally yellow, with very corrugated lamina	Dorsally light green, ventrally yellow, with very corrugated lamina
14	Inflorescence	First horizontal then pendulous	Horizontal	First horizontal then pendulous	First semi horizontal then pendulous	First horizontal then pendulous	First horizontal then pendulous	First horizontal then pendulous

Table 1. Morphological characters of infraspecific taxa of *Musa borneensis* (continued)

No	Character	var. *borneensis*	var. *flavida*	var. *alatucaea*	var. *lutea*	var. *phoenica*	var. *sarawakensis*	var. *donggalaensis*
15	Peduncle	Slightly hairy; green-yellow	Hairless; medium green with sparse blotches	Hairy; light green to yellow with pink-purple lines	Slightly hairy; purple to black	Hairless; purple brown with blue blotches	Hairless; light green-yellow	Slightly hairy; green
16	Male bud	Ovoid; 14.5 cm × 12.5 cm; imbricate; red-purple; not revolute before falling	Ovoid; 18 cm × 14 cm; imbricate; dorsally yellow shiny, ventrally pale yellow; revolute before falling	Rounded to ovoid; 14 cm × 12 cm; imbricate; yellow; deflexed but not rolled	Rounded or cordate; 17 cm × 16 cm; imbricate; dull yellow; revolute before falling	Rounded; 10 cm × 10 cm; imbricate; dorsally pink-purple, ventrally yellow; not revolute before falling	Rounded or cordate; 17 cm × 11 cm; imbricate; dorsally pink-purple, ventrally yellow; revolute before falling	Ovoid; 14 cm × 11.5 cm; imbricate; red-purple; not revolute before falling
17	Male flowers	On average 5 per bract; one row; compound tepal 4 cm long, upper part cream & yellow at the base, with 5-toothed apex; free tepal 2.5 cm long, translucent white, oblong; Stamen 5; filament 1.1 cm long, cream; anthers 1.3 cm long, white, anthers and style exserted; stigma tinted with purple; ovary arched.	On average 5 per bract; one row; compound tepal 7.5 cm long, pale yellow, with 3-toothed apex; free tepal 5.6 cm long, translucent white, lanceolate; Stamen 5; filament 1.4 cm long, cream; anthers 2.1 cm long, white, anthers and style exserted; stigma tinted with purple; ovary arched.	On average 6 per bract; one row; compound tepal 4 cm long, upper part light green & cream to orange at the base, with 2-toothed apex; free tepal 2.5 cm long, translucent white, ovale; Stamen 5; filament 1 cm long, white; anthers 1.4 cm long, pink-purple, anthers and style at the same level; stigma cream; ovary arched.	On average 5 per bract; one row; compound tepal 7 cm long, white to yellow, with 3-toothed apex; free tepal 5.5 cm long, translucent white, lanceolate; Stamen 5; filament 2.8 cm long, cream; anthers 2.3 cm long, white, anthers and style inserted; stigma cream; ovary straight.	On average 6 per bract; one row; compound tepal 4.7 cm long, upper part light green & cream to yellow at the base, with 2-toothed apex; free tepal 4.4 cm long, opaque white, oval; Stamen 5; filament 1.8 cm long, cream; anthers 2.2 cm long, rusty brown, anthers and style inserted; stigma purple-blue; ovary arched.	On average 5 per bract; one row; compound tepal 5.5 cm long, cream to yellow, with 5-toothed apex; free tepal 4.6 cm long, cream, oval; Stamen 5; anthers and style exserted; stigma pink-purple; ovary straight.	One row; compound tepal 4.5 cm long, upper part white & yellow at the base, with 5-toothed apex; free tepal 2.1 cm long, translucent white, oblong; stamen 5; filament 1 cm long, white; anthers and style exserted; stigma cream; ovary arched.
18	Fruits	Fruit bunch compact; 20 hands and 5-8 fruits per hand on average; uniseriate; individual fruit 14 cm long, slightly curved.	Fruit bunch truncated cone, compact; 26 hands and 5-6 fruits per hand on average; uniseriate; individual fruit 14 cm long, curved.	Fruit bunch compact; 8 hands and 6 -8 fruits per hand on average; uniseriate; individual fruit 8 cm long, straight.	Fruit bunch truncated cone, compact; 36 hands and 4-8 fruits per hand on evarage; uniseriate; individual fruit 6-12 cm long, curved to straight.	Fruit bunch lax; 7 hands and 5-7 fruits per hand on average; uniseriate; individual fruit 12 cm long, stright.	Fruit bunch truncated cone, lax; 12 -26 hands and 5-9 fruits per hand on average; uniseriate; individual fruit 9 cm long, stright.	Fruit bunch slightly lax; 12 hands and 4-7 fruits per hand on average; uniseriate; individual fruit 9 cm long, slightly curved
19	Seeds	120-130 seeds per fruit	80-90 seeds per fruit	80-100 seeds per fruit	100-120 seeds per fruit	40-50 seeds per fruit	80-90 seeds per fruit	100-120 seeds per fruit

Notes. Similar to var. *borneensis* but differs by its pseudostem colour, its petiole canal leaf and bases, its auricles, its leaf bases, its male flower and its fruit bunch and individual fruit shape. The petiole canal leaf of this variety similar to var. *flavida* and var. *sarawakensis*. The petiole bases similar to var. *alatucaea*, var. *lutea*, var. *phoenica* and var. *sarawakensis*. The leaf bases similar to var. *flavida*, var. *alatucaea*, var. *lutea*, var. *phoenica* and var. *sarawakensis* (Table 1).

Additional specimen examined. Donggala, *W. Meijer 10103* (BO!), leaf, fruit.

ACKNOWLEDGEMENTS

I would like to thank Prof. Elizabeth A. Widjaja who collected the specimen. I also thank the editors and the reviewers whose knowledgeable suggestions and comments improved this paper.

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