

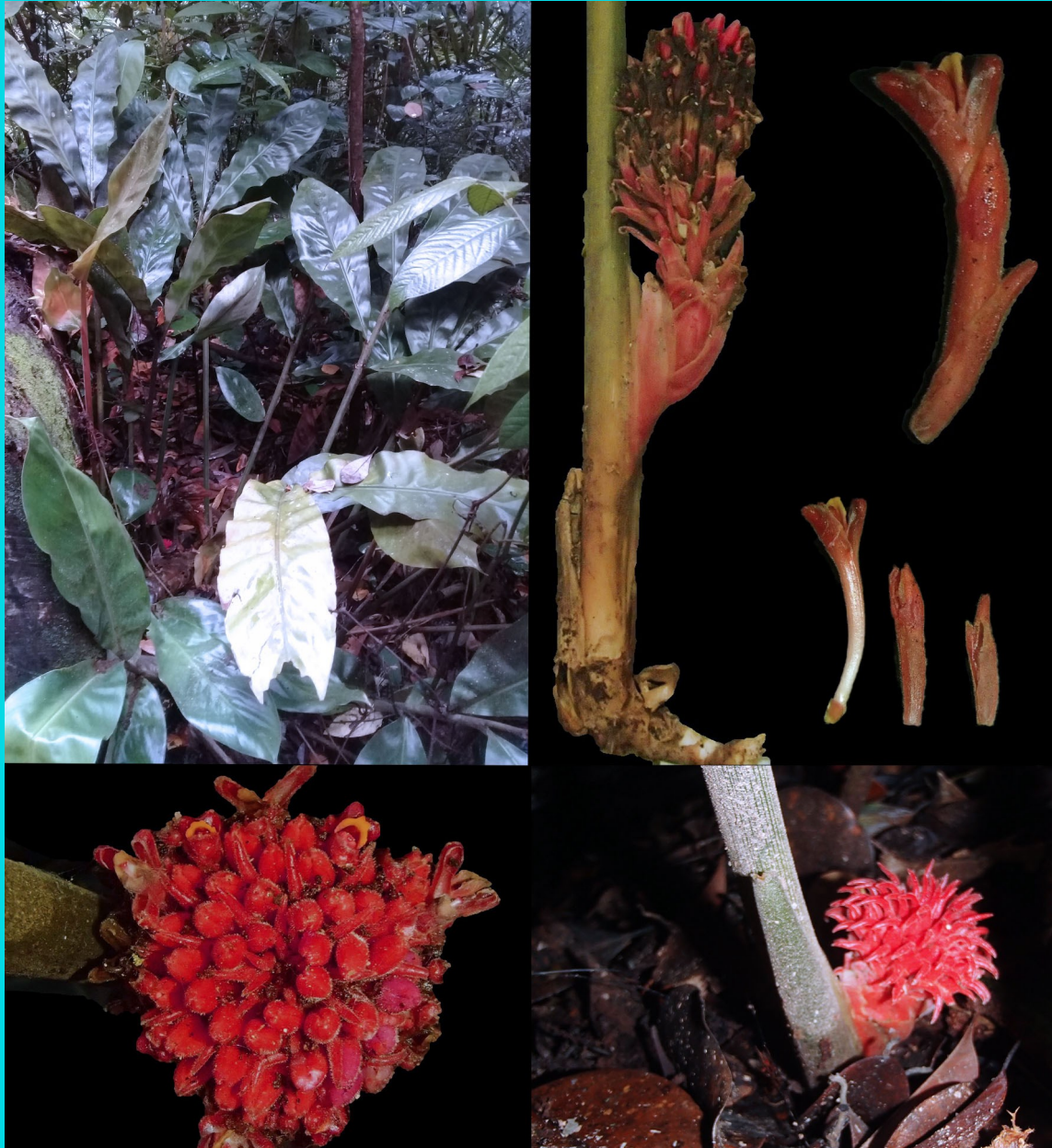


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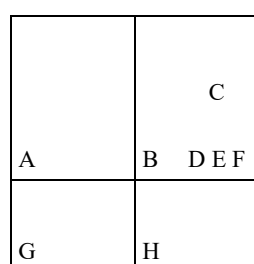
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Cover images: *Plagiostachys strobilifera* var. *conica* Salasiah & Meekiong. A. Habit. B. Inflorescence, lateral view. C. Whole flower, lateral view. D. Flower with calyx removed. E. Calyx. F. Bracteole. G. Inflorescence, aerial view. H. Young inflorescence. A–G. *Salasiah* 0003; H. *Salasiah et al.* 0014. Photos by Salasiah Mohamad.

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***ETLINGERA TJIASMANTOI* (ZINGIBERACEAE), A NEW SPECIES FROM CENTRAL SULAWESI**

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ABSTRACT

ARDIYANI, M., ARDI, W. H., SANTOSO, W. & POULSEN, A. D. 2020. *Etilingera tjiasmantoi* (Zingiberaceae), a new species from Central Sulawesi. *Reinwardtia* 19(2): 103–108. — A new species of *Etilingera*, *Etilingera tjiasmantoi* Ardiyani & Ardi, was discovered at Tentena, Central Sulawesi, and is described here. This species resembles *Etilingera flexuosa* A.D.Poulsen and *Etilingera mamasarum* A.D.Poulsen & Ardiyani but differs from both in having thecae dehiscing through their entire length and in the obovoid, glabrous and spineless fruits. The DNA barcode data, the line drawings of flower and fruit and the plate of *E. tjiasmantoi* were presented.

Keywords: DNA barcode, *Etilingera flexuosa*, *E. mamasarum*, Indonesia, Zingiberales.

ABSTRAK

ARDIYANI, M., ARDI, W. H., SANTOSO, W. & POULSEN, A. D. 2020. *Etilingera tjiasmantoi* (Zingiberaceae), sebuah jenis baru dari Sulawesi Tengah. *Reinwardtia* 19(2): 103–108. — Sebuah jenis baru dari marga *Etilingera*, *Etilingera tjiasmantoi* Ardiyani & Ardi, dari Tentena, Sulawesi Tengah telah dipertelakan. Jenis ini mirip dengan *Etilingera flexuosa* A.D.Poulsen dan *Etilingera mamasarum* A.D.Poulsen & Ardiyani tetapi berbeda dari keduanya pada karakter pembukaan kotak sari yaitu di sepanjang kotak sari dan buah berbentuk bulat telur sungsang, gundul, tanpa hiasan duri. Data barkode DNA, gambar bunga dan buah serta foto *E. tjiasmantoi* ditampilkan.

Kata kunci: Barkode DNA, *Etilingera flexuosa*, *E. mamasarum*, Indonesia, Zingiberales.

INTRODUCTION

Etilingera Giseke (Zingiberaceae) consists of more than 100 species distributed from India, Indo-China throughout Malesia to the Pacific Islands (Poulsen, 2006, 2007, 2012; Poulsen & Docot, 2018). A revision of the genus in Sulawesi (Poulsen, 2012) included 46 species (of which 36 were new to Science). Subsequent fieldwork in 2016 at Mamasa, West Sulawesi, led to the publication of *Etilingera mamasarum* A.D.Poulsen & Ardiyani (Ardiyani & Poulsen, 2019). Sulawesi is therefore currently known to harbour 47 species of the genus.

Several field trips focusing on the ginger family in Sulawesi were conducted in 2008-2009 (Poulsen, 2012), Gunung Gandang Dewata National Park, Mamasa, West Sulawesi in 2016 (Ardiyani & Poulsen, 2019), Gorontalo in 2013

and 2017, and Mamasa, West Sulawesi in 2019 (Ardi & Thomas, 2020). Even so, large areas of Sulawesi remain unexplored and even though especially the lowland forests of Sulawesi have been highly fragmented, these are likely to harbour additional undescribed species.

Moreover, the identification of ginger collections relies on them being of sufficient quality including pickling flowers and fruits in spirit. This is a procedure most collectors would not always follow and new species may already have been collected but it is impossible to describe them in sufficient detail.

During an exploration in March 2020 in Central Sulawesi by the first and second authors a collection was made of an *Etilingera* which did not match any of the 47 species currently known. We therefore propose a new species, which is described and illustrated in a colour plate and line

drawings below. We also provide its DNA barcode.

MATERIALS AND METHODS

Morphological observations were made using living collections in the wild and herbarium specimens in BO. Measurements were made using a ruler and a calibrated eye piece under a dissecting microscope. DNA barcoding markers of the type specimen are *rbcL*, the Intergenic Spacers between *trnH* and *psbA* (Kress & Erickson, 2007), and the Internal Transcribed Spacers (ITS) (Kress *et al.*, 2005). The barcode procedures followed Kress & Erickson (2012). Sequencing were done in the 1stBase company. Sequences were deposited in the NCBI GenBank (Table 2).

RESULTS AND DISCUSSION

Etilingera tjiasmantoi Ardiyani & Ardi *spec. nov.* —TYPE: INDONESIA, Sulawesi, Central Sulawesi, Tentena Regency, road side between Tentena and Bada, 1,757 m, 01.79950° S, 120.47433° E, flowering and fruiting, 7 March 2020, *M. Ardiyani 1007 with Wisnu H. Ardi, Prima Hutabarat, Zulfadli, Roland Putra, Ofin* (Holotype BO). Figs. 1 & 2.

Etilingera tjiasmantoi is similar to *E. flexuosa* A.D.Poulsen and *E. mamasarum* A.D.Poulsen & Ardiyani in having entire ligules with ± emarginate apex, long petioles (around 4 cm), elongated elliptic to narrowly ovate laminas, pointed calyces, and ± pink flowers but *E. tjiasmantoi* differs from both in having thecae dehiscing through their entire length (*vs.* in upper part) and in the obovoid, glabrous and spineless fruits (*vs.* pyriform or round, pubescent and with small spines).

Rhizome short-creeping, 2.8 cm diameter, cream yellow, sericeous, rhizome scales to 5 cm long, reddish brown, apex mucronate, pubescent; stilt roots absent. *Leafy shoots* to 4.1 m long, in loose clump: *ca.* 20 cm between neighbouring leafy shoots, with *ca.* 16 leaves per shoot; base to 7 cm across, reddish brown, pubescent at the very base; sheath reddish brown, reticose, sericeous to pubescent, margin ciliate; ligule to 2.8–3.0 cm long, entire, apex truncate to slightly emarginate, reddish brown, hirsute in centre; petiole canaliculate, to 3.8–4.5 cm long, densely villose on near margin, yellowish green tinged brown; lamina narrowly ovate, 70 × 14 cm to 78 × 17 cm, length to width ratio 4.6–5, slightly plicate, dark green with reddish brown towards base of midrib, pale green towards apex, glabrous above,

yellowish green beneath, midrib light green tinged red, pubescent beneath; base cordate, oblique; apex acuminate; margin sometimes reddish brown, densely hirsute. *Flowering shoot* 15.5–20 cm long, arising from rhizome, with up to *ca.* 90 flowers, up to 4 open at a time; peduncle 8 cm long, ascending, peduncular bracts to 3.5 × 1 cm, acute, mucronate, cream tinged pink; spike (including flowers) 9 × 7 cm to 12 × 6 cm, bracteal part ovoid and flat-topped, above ground, flowers reaching to 2.0–2.5 cm above the supporting bracts; sterile bracts 5 × 3 cm, brown tinged yellow, apex acute, mucronate, glabrous; fertile bracts 3.5–3.9 × 1.1–1.3 cm, narrowly obovate, boat-shaped, apex acuminate-caudate, mucronate, cream yellow, reddish brown towards apex, pubescent; pedicel *ca.* 2.5 mm long (between base of bracteole and ovary); bracteole 2.2–2.4 cm long, white to pink at apex, transparent with two fissures 1.2–1.8 cm long, glabrous, pubescent at the very base, apex bilobed, each mucronate to 1 mm, reaching 11 mm below apex of calyx. Flower 4.8–5.2 cm long; calyx 3.3–3.5 cm long, reaching 18 mm above base of stamen and 8 mm short of apex of corolla lobes, pink, with 3 fissures of 5.5–7 mm, glabrous, apex tridentate, two of them pointed, spreading laterally to opposite sides of the flower; floral tube 12–15 mm long, pale pink, glabrous, tube inside glabrous; lobes pale pink, bright pink towards apex, glabrous, reaching 1–1.5 mm short of apex of anther; dorsal lobe 26 × 6 mm, spatulate, cucullate; lateral lobes 26 × 3.5 mm, narrower than dorsal lobe, spatulate, cucullate, attached straight to tube, inserted 1–2 mm below dorsal lobe; staminal tube 12 mm long, pale pink; labellum unevenly panduriform, 22 × 18 mm, bright pink, pale pink towards base, glabrous, lateral lobes involute, forming a semi-tube enclosing most of stamen, widest in middle, narrowing towards apex, central lobe slightly emarginate, margin unevenly serrate, recurved only when old, extending 4–5 mm (when flattened) beyond anther; stamen 18 mm long; filament 10 × 2.5 mm, pink; anther 7 × 3.5 mm, slightly broader at base, angled erect to 24°, pink, anther crest slightly emarginate; thecae dehiscent along their entire length, sericeous; ovary 2 × 3 mm, glabrous, whitish, slightly barrel-shaped; epigynous gland 4 mm long, cylindrical, bilobed, split to base adaxially, less than a half from apex on opposite side, glabrous; style 4 cm long, glabrous; stigma 1 mm wide, white, club-shaped, ostiole transverse elliptic *ca.* 1 mm, facing forwards. Infructescence above ground, head to 12.5 × 13 cm, globose, bracts, bracteole and calyx rigid and persistent, with *ca.* 35 fruits per head; pedicel to 4 mm long, fruit 2.3 × 2 cm, obovoid, 3-angled, yellowish brown, cream-yellow towards base, glabrous, pubescent near base of calyx remnant; seeds 4 mm diam., irregularly elliptic to round, black, aril white.

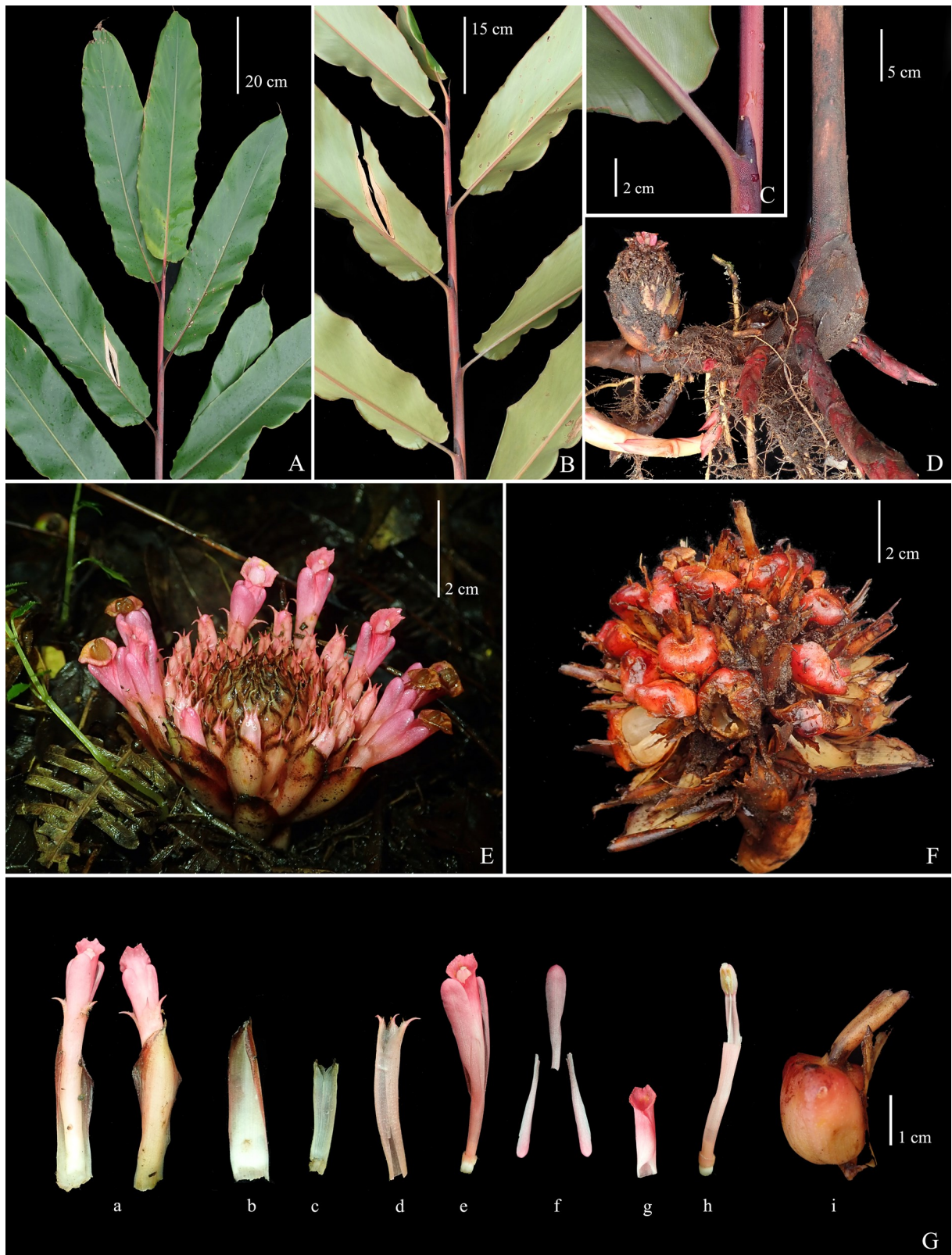


Fig. 1. *Etilingera tjiasmantoi* Ardiyani & Ardi *spec. nov.* A. Leaves (upper surface). B. Leaves (lower surface). C. Leaf base, ligule and petiole. D. Base of leafy shoot and inflorescence arising from the rhizome. E. Inflorescence with three freshly opened flowers. F. Infructescence. G. a. Two flowers with a fertile bract each. b. Bract. c. Bracteole. d. Calyx. e. Flower with bracteole and calyx removed. f. Corolla lobes. g. Labellum. h. Flower with calyx, corolla lobes and labellum removed. i. Fruit. From *M. Ardiyani et al.* 1007. Photos by M. Ardiyani & W.H. Ardi.

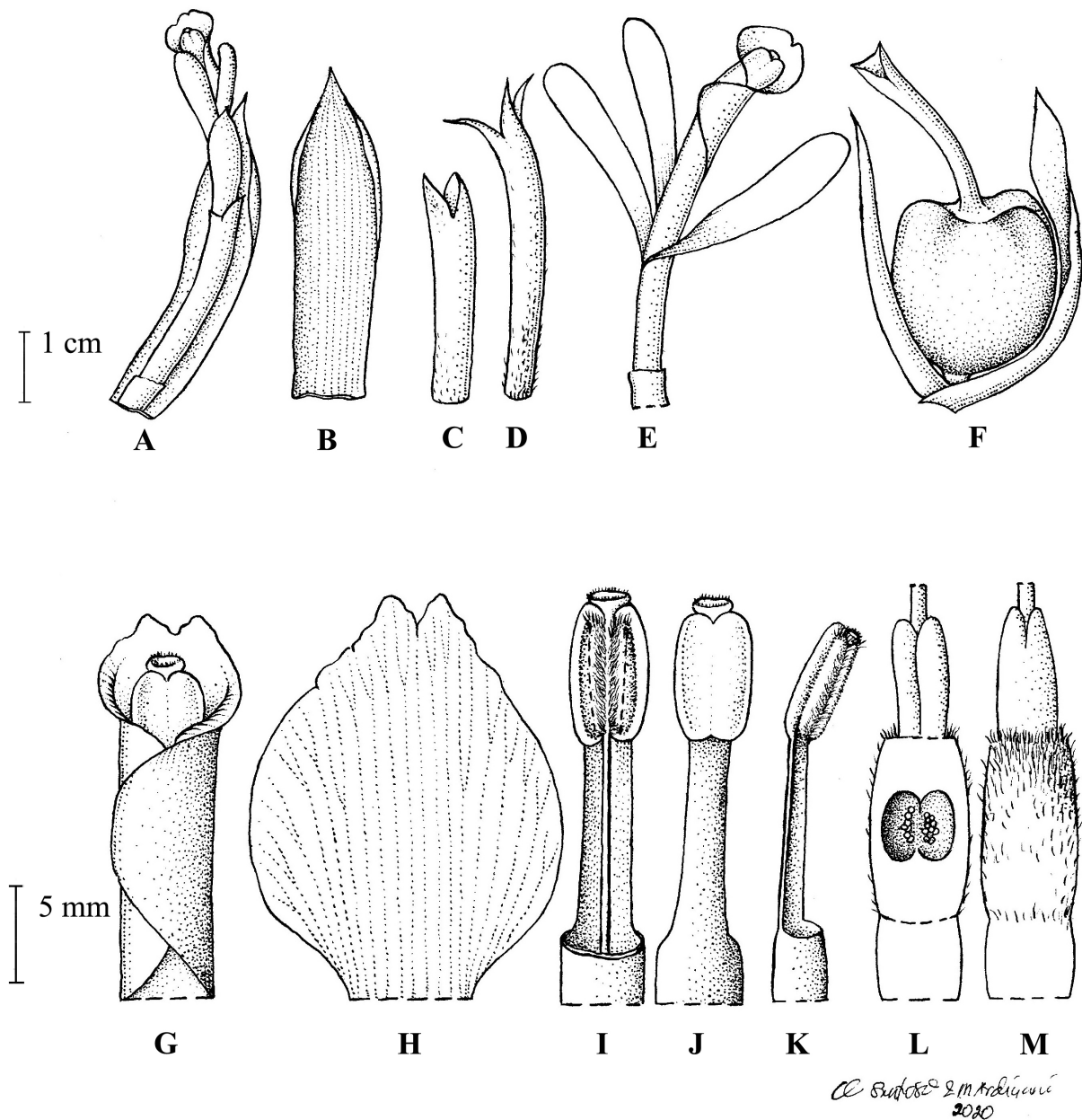


Fig. 2. Line drawing of *Etlingera tjiasmantoi* Ardiyani & Ardi *spec. nov.* A. Fertile bract and flower. B. Fertile bract. C. Bracteole. D. Calyx. E. Flower with bracteole and calyx removed. F. Fruit with persistent bract, bracteole and calyx. G. Labellum and stamen, dorsal view. H. Labellum flattened, dorsal view. I. Stamen, ventral view. J. Stamen, dorsal view. K. Stamen, lateral view. L. Ovary and epigynous gland, dorsal view, lengthwise section of locules. M. Epigynous gland, ventral view. From M. Ardiyani *et al.* 1007, drawn by W. Santoso & M. Ardiyani.

Distribution. Only known at the type locality in Tentena, Central Sulawesi.

Habitat & Ecology. Grows in secondary forest by the road between Tentena and Bada, near a waterfall and a stream at about 1,700 m asl.

Etymology. The epithet honours Mr. Wewin Tjiasmanto who funded the botanical trip to

Central Sulawesi, and who is greatly concerned for wildlife, taxonomy, exploration and conservation.

Phenology. Flowering and fruiting recorded in March.

Local name & uses. Not available.

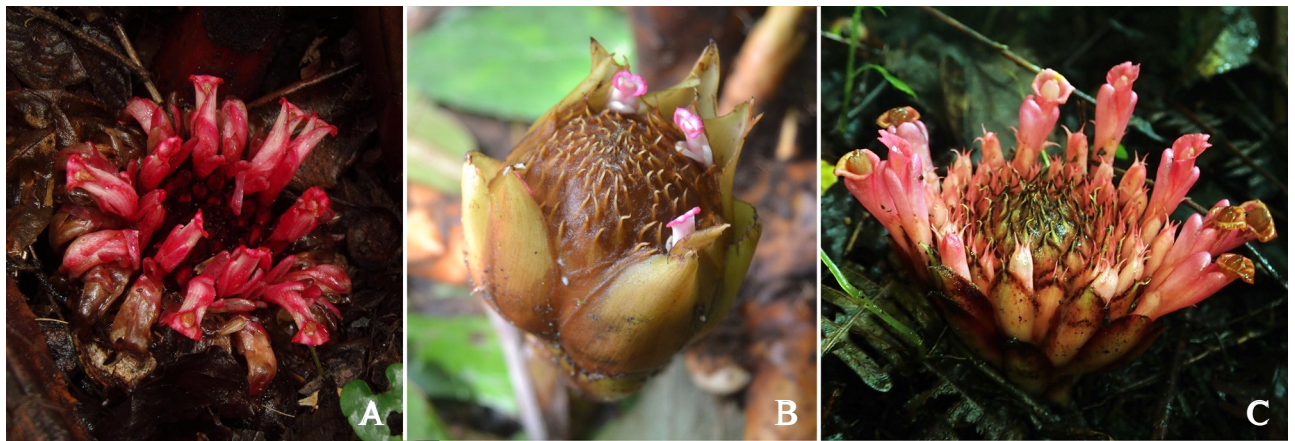


Fig. 3. Inflorescences of *Etilingera* species. A. *Etilingera flexuosa* (Poulsen *et al.* 2655, the type). B. *E. mamasarum* (Ardiyani *et al.* Sulbar 004, the type). C. *E. tjiasmantoi* (M. Ardiyani *et al.* 1007, the type). Photos by A. D. Poulsen, M. Ardiyani & W. H. Ardi.

Conservation status. This species is currently only found in the type locality which is beside the main road between Tentena and Bada. The surrounding forests are still in good condition. Nevertheless, in the future, it is prone to land degradation due to anthropogenic activities since it is not in a protected area. The IUCN Assessment (IUCN, 2020) is categorized as Vulnerable D2.

Notes. *Etilingera tjiasmantoi* is mostly similar to *E. mamasarum* and *E. flexuosa* from which it differs by the anther dehiscence and glabrous, shiny and spineless fruits. In addition, there are differences between one of each of the two species (Table 1).

Table 1. Morphological characters of *Etilingera flexuosa*, *E. mamasarum* and *E. tjiasmantoi*. The character not shared with any of the other two is shown in bold.

Characters	<i>Etilingera flexuosa</i> (Poulsen, 2012)	<i>E. mamasarum</i> (Ardiyani & Poulsen, 2019)	<i>E. tjiasmantoi</i>
Flower (extending above bract)	Extending 1.5–3 cm above the bracts	Reaching to 0.5 cm below the supporting bracts	Extending 2.0–2.5 cm above the bracts
Flower (orientation)	Flexed	Not flexed	Not flexed
Calyx (shape)	Pointed	Pointed, spreading laterally to opposite sides of the flower	Pointed, spreading laterally to opposite sides of the flower
Labellum (shape)	Ovate	Unevenly panduriform	Unevenly panduriform
Anther (shape)	Broadest in centre	Slightly broader at base	Slightly broader at base
Anther (angle)	Angled (140-)180°	Erect	Erect to angled 24°
Theca (dehiscence)	In upper half (3–3.5 mm from bottom for 2.5–4 mm to 0.5 mm below apex)	Dehiscent for ca. 4 mm from 2 mm above base	Dehiscent along the entire length of the thecae
Ovary (shape)	Obconical to cylindrical (widest above the middle)	Barrel-shaped	Barrel-shaped
Fruit (shape)	Pyriform	Round	Obovoid 3-angled
Fruit (ornament)	Pubescent, soft-spiny in upper half	Pubescent esp. in upper part; spines in upper third, spines to 4 mm long, curved	Glabrous, pubescent near the base of calyx remnant, spineless.

Table 2. DNA barcoding of *E. tjiasmantoi*

Species	NCBI GenBank Accession No.		
	<i>rbcL</i>	ITS	<i>trnH-psbA</i>
<i>Etilingera tjiasmantoi</i>	MT975342	MT984267	MT975343

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CONTENTS

G. G. HAMBALI, DIAH SULISTARINI & RUGAYAH. <i>Dracaena jiewhoei</i> (Asparagaceae), a new endemic species from Sumatra, Indonesia	75
DEDY DARNAEDI & LYNN CLAYTON. Nantu <i>Platynerium grande</i> (Polypodiaceae), a new generic record of <i>Platynerium</i> in Sulawesi, Indonesia	81
SITI SUNARTI. <i>Syzygium tinombalum</i> (Myrtaceae), a new species from Central Sulawesi, Indonesia	87
FURQON AL MUZAKKI, TATIK CHIKMAWATI & ALEX HARTANA. The resurrection of <i>Schizostachyum biflorum</i> McClure (<i>Bambusoideae</i>)	93
SELIM MEHMUD & HIMU ROY. Anatomical studies on <i>Wallichia nana</i> Griff., a wild palm of Assam, India	97
MARLINA ARDIYANI, WISNU HANDOYO ARDI, WAHYUDI SANTOSO & AXEL DALBERG POULSEN. <i>Etilingera tjiasmantoi</i> (Zingiberaceae), a new species from Central Sulawesi	103
SALASIAH MOHAMAD & MEEKIONG KALU. <i>Plagiostachys strobilifera</i> var. <i>conica</i> (Zingiberaceae), a new variety from Sarawak, Borneo	109

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