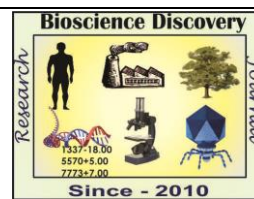


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Print & Online, Open Access, Research Journal Available on <http://jbsd.in>

ISSN: 2229-3469 (Print); ISSN: 2231-024X (Online)

Research Article



***Etilingera coccinea* (Blume) S. Sakai and Nagam. (Zingiberaceae – Alpinieae): an addition to the Flora of the Philippines, with notes on its distribution, phenology and ecology**

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Article Info

Received: 30-09-2017,

Revised: 26-11-2017,

Accepted: 21-12-2017

Keywords:

Alpinioideae, *Etilingera coccinea*, Mindanao, new record, Philippines, Zingiberaceae.

Abstract

Etilingera coccinea, a native to Java, Sumatra, Thailand, Malay Peninsula and throughout Borneo, was recently discovered in the Philippines. This increases the total number of *Etilingera* species in the Philippines to eight. A detailed description and photographic illustrations are provided, along with notes on its geographical distribution, phenology and ecology.

INTRODUCTION

Etilingera Giseke, belonging to family Zingiberaceae, is a relatively large genus represented by over 150 species, which are widely distributed from India, throughout SE Asia to the western Pacific Islands with the center of diversity in the evergreen equatorial tropics (Leong-Škorničková and Newman, 2015). So far only about 8 species are known to occur in the Philippine archipelago, including the two reported species presented only by photographs *Etilingera brevilabrum* (Valeton) R.M. Sm., and *Etilingera coccinea* (Blume) S. Sakai & Nagam (Pelser *et al.*, 2017; Naive, 2017a).

At present, there has been little taxonomic work on Philippine Zingiberaceae since Merrill's monograph in 1925, and studies on the ecology, distribution, and ethnobotany of the family are few and outdated. Further, many existing taxonomic treatments don't have keys, illustrations, or complete descriptions of species, making wild specimens in this taxon difficult to identify; such is the case in the genus *Etilingera* (Naive, 2017b).

During the first authors expedition in Sitio Lantawon, Barangay Aposkahoy, Calveria, Misamis Oriental last May 2016, he came across an *Etilingera* species which has a yellow long lip with an inrolled, red margin. He then collected some specimens to conduct further investigations and to know its identity. The same species was also found in Mt. Hamiguitan Range Wildlife Sanctuary last April 2017 and in forest patches of Barangay Kalasungay, Malaybalay City, Bukidnon on June 2017. After a careful examination of its morphological characters and a search of the relevant literature, it was then identified as *Etilingera coccinea* (Blume) S.Sakai & Nagam., a species native to Thailand, Java, Sumatra, Malay Peninsula, throughout Borneo (Lamb *et al.*, 2013), and a newly recorded species for the Philippines. Originally, it was first documented by Leonardo Co in the province of Isabela last May 29, 2001 and then by Julie Barcelona in the province of Camarines Norte last May 6, 2006 (Pelser *et al.*, 2017). However, no paper was published and no collection was made to formally report its extended distribution in the Philippines.

METHODOLOGY

In this paper, *Etilingera coccinea* is formally described and illustrated as a newly recorded species in Alpinieae, which was listed in *Co's Digital Flora of the Philippines*, however, no voucher specimens have been presented to support its extended distribution in the Philippines. High-resolution images of specimens from E, BO, AAU were consulted to confirm its identity. The herbarium acronyms follow Thiers (continuously updated). All measurements and descriptions were made from mature and living plants, herbarium specimens and spirit material preserved in FAA solution. The terminology in general follows Beentje (2016). The cited specimens were preserved in Central Mindanao University Herbarium (CMUH).

TAXONOMIC TREATMENT

Etilingera coccinea (Blume) S.Sakai & Nagam., *Edinburgh J. Bot.* **60**(2): 190. 2003. (**Fig. 1**)

Lectotype (designated by Sakai & Nagamasu 2003): — Java, humid forest, local name, Mantjieirian, Tepus or Tepus bener, *Kuhl van Hasselt* s.n., p.p. quoad infl. dexter.

Elettaria coccinea Blume, *Enum. Pl. Javae* 1: 53, 1827.

Achasma macrocheilos Griff., *Not. Pl. Asiat.* 3: 429, 1851.

Amomum gomphocheilos Baker, *Fl. Brit. India* [J. D. Hooker] 6(18): 236, 1892.

Amomum macrocheilos (Griff.) Baker, *Fl. Brit. India* [J. D. Hooker] 6(18): 232, 1892.

Geanthus coccineus Reinw., *Cat. Gew. Buitenzorg* (Blume) 29, 1823.

Hornstedtia macrocheilos (Griff.) Ridl., *J. Straits Branch Roy. Asiat. Soc.* 32: 147, 1899

Hornstedtia winkleri Ridl., *Bot. Jahrb. Syst.* 44(5): 530, 1910.

Achasma coccineum (Blume) Valetton, *Bull. Inst. Bot. Buitenzorg* 20: 93, 1904.

Amomum coccineum (Blume) K.Schum., (1899) 305 *Bot. Jahrb. Syst.* 27: 305, 1899.

Alpinia coccinea (Blume) D.Dietr., 12 *Syn. pl.* 1: 12, 1839.

Cardamomum coccineum (Blume) Kuntze, *Revis. gen. pl.* 2: 686, 1891.

Description: Large terrestrial rhizomatous herb. **Rhizome** 2–3.5 cm in diameter, long creeping, scales to 3.5–5 cm long, subcoriaceous, greenish to yellowish brown, darker in margins, dehiscent.

Leafy shoots up to 5 m long, arching, composed of up to 32 leaves, 10–20 cm between neighbouring leafy shoots, leafless part 0.5–0.8 m long; bulbous base 5–7 cm in diameter, yellowish brown; sheath striate, yellowish green, glabrous, margin glabrous; **ligule** 1.4 by 1.2 cm, entire, brown, triangular, papery, pubescent; **petiole** absent; **lamina** narrowly obovate, sessile, 71–73 by 14–14.5 cm, margin ciliate, apex acuminate. **Inflorescence** 13–14 cm long, embedded in the soil, with 14–17 flowers, 1–5 open at a time; **peduncle** 5–5.5 cm long, subterranean, glabrous, peduncular bracts subcoriaceous, puberulent, 2.5–2.8 by 1.3–1.5 cm, upper covering base of spike, pale brown, darker at margin and apex, apex pointed; **spike** (including flowers) 8–9 cm long, ovoid; **sterile bracts** 5–5.2 by 1.2–1.4 cm, coriaceous, ovate, pale brown to reddish cream, pubescent, apex pointed; **fertile bracts** cream with pale pink apex, 4–4.2 by 0.5–0.6 cm, narrowly obovate, semi translucent, papery, glabrous, apex acute; **bracteole** 3.3–3.5 cm long, pale red, semi translucent, glabrous, bilobed, lobules 0.7–0.8 cm long, close together. **Flower** 5–8 cm long; **calyx** 5–5.2 cm long, pale red, darker at apex, semitranslucent, apex trilobed, apices pointed, close together, tufted; **floral tube** 3.5–4 cm long, pale pink, darker at apex, glabrous; **corolla lobes** lanceolate, trilobed, cucullate, red, papery, glabrous, covering the anther and stigma, with numerous veins, apex rounded; **dorsal corolla lobe** 1.8–2 by 0.5–0.6 cm; **lateral corolla lobes** fused at base, 1.8–2 by 0.3–0.4 cm; **labellum** panduriform, trilobed, 3.7–4 by 1.3–1.6 cm, yellow with red involute margins, glabrous, lateral lobes erect, 0.5–0.6 cm across when flattened, central lobe extending, 3–3.5 cm beyond anther, apex deeply emarginate, incision c. 1 cm; **stamen** c. 1 cm long, pale red; **filament** shorter than anther, 0.4–0.5 by 0.2 cm, pale pink–whitish; **anther** c. 0.6–0.7 cm long, ± parallel-sided, widest in the middle, reddish pink, anther crest emarginate, incision c. 0.1–0.15 cm. **Ovary** cylindrical, 0.6–0.9 by 0.4–0.5 cm, densely sericeous; **epigynous gland** c. 0.5 cm long, embracing the base of the style, bilobed, split to base dorsally and halfway from apex on opposite side, apex lobes irregularly pointed; **style** 7–7.2 cm long, pubescent, whitish at base, red at apex; **stigma** c. 0.2 cm wide, pale pink; **Infructescence** partly embedded in the soil, head 4–5 by 5–5.5 cm, irregularly globose, bracts persistent, bearing up to 10 fruits per head; **young fruit** 1.5–1.7 by 1.5 cm, subglobular, densely pubescent.

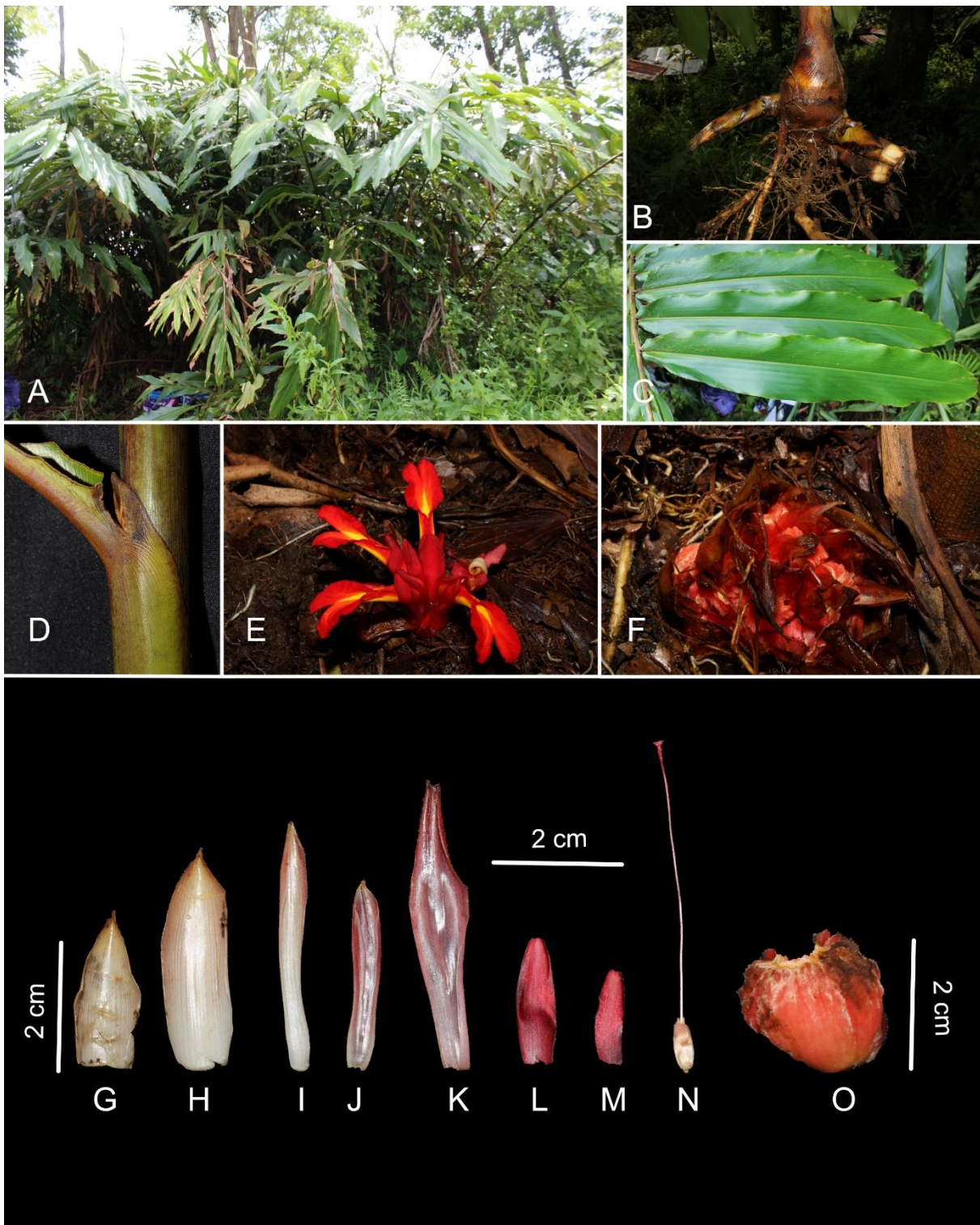


Figure 1. *Etilingera coccinea* A. Habit B. Rhizome C. Leaves D. Detail of ligule E. Inflorescence F. Infructescence G—N. Floral dissection. G. Peduncular sheaths H. Sterile bract I. Fertile bract J. Bracteole K. Calyx L Dorsal corolla lobe M. Lateral corolla lobe N. Ovary, style, stigma O. Young fruit. Photos by: MAK Naive

Distribution: Thailand, Java, Sumatra, Malay Peninsula, throughout Borneo and Philippines. Philippines: Isabela, Camarines Norte, Misamis Oriental, Davao del Norte, Davao Oriental, Bukidnon.

Ecology: Terrestrial herb. Growing in primary to secondary forest with bright lit to deeply shaded locations along the streams with moist to wet soil, at an elevation between 300 to 1,400 metres above sea level.

Phenology: Observed flowering and fruiting from April–August.

Uses: The pith of the leafy shoot is used as a condiment in Borneo and Java and is also eaten as vegetables. The fruits are edible, and the seed oil has a characteristic aroma (Lamb *et al.*, 2013).

Specimens examined: PHILIPPINES, Northern Mindanao: Misamis Oriental, Claveria, Sitio Lantawon, along the stream, elev. 1,050 m, 23 May 2016, *MAKN 025* (CMUH00010956 with spirit collection); Bukidnon, Malaybalay City, Barangay Kalasungay, along the stream, elev. 783 m, 26 June 2016, *MAKN 026* (CMUH000955 with spirit collection).

Photographic images studied:

PHILIPPINES, Luzon: Camarines Norte Prov. Labo Municipality, Barangay Tulay na Lupa, Mt. Labo, en route to Nasimangan River, Logged-over lowland dipterocarp forest, 14 0 20.28 N, 122 44 37.92 E, 6 May 2006 [http://131.230.176.4/imgs/BarcelJF/r/Zingiberaceae_Etlingera_coccinea_66583.html last accessed 7 April 2017]; Isabela Prov. Northern Sierra Madre Natural Park, 17 3 32.00 N, 122 25 48.01 E, 29 May 2001 [http://131.230.176.4/imgs/benctan/r/Zingiberaceae_Etlingera_coccinea_24864.html last accessed 7 April 2017].

Notes: Description was based on a living plant collected from Barangay Kalasungay, Malaybalay City, Bukidnon (*MAKN 025*) and Claveria, Misamis Oriental (*MAKN 026*).

Acknowledgement

The authors would like to acknowledged the following for their valuable help in this manuscript; Dr. Axel Dalberg Poulsen, Dr. Daniel Geiger, Dr. Hidenobu Funakoshi, Tristan Seranillos, Grace Abaquita, Mrs. Charisma Hampel & Jim Cootes.

REFERENCES

- Beentje, H.** 2016. *The Kew Plant Glossary, an illustrated dictionary of plant terms* (Second edition). Royal Botanic Gardens, Kew: Kew Publishing.
- Kasarkar AR and Kulkarni DK.** 2011. Phenological studies of Family Zingiberaceae with special reference *Alpinia* and *Zingiber* from Kolhapur region, *Bioscience Discovery*, **2**(3): 322-327.
- Leong-Škorničková J. and M.F. Newman.** 2015. *Gingers of Cambodia, Laos and Vietnam*. Singapore: Singapore Botanic Gardens, National Parks Board, in association with Royal Botanic Garden Edinburgh and Pha Tad Ke Botanical Garden.
- Ly Ngoc-Sam, Truong Ba-Vuong, Le Thi Huong.** 2016. *Zingiber ottensii* Valetton (Zingiberaceae) — a newly recorded species for Vietnam. *Bioscience Discovery*, **7**(2): 93-96.
- Naive, M.A.K.** 2017a. *Etlingera hamiguitanensis* (Zingiberaceae; Alpinioideae), a new ginger species from Davao Oriental, Philippines. *Taiwania*, **62**(4): 340-344.
- Naive MAK.** 2017b. Zingiberaceae of Kalatungan Mountain Range, Bukidnon, Philippines. *Bioscience Discovery*, **8**(2): 311-319.
- Pelser PB, JF Barcelona, and DL Nickrent (eds.).** 2017. *Co's Digital Flora of the Philippines*. Available from: www.philippineplants.org (accessed: 24 October 2016).
- Poulsen, AD.** 2006. *A Guide to Gingers of Borneo*. Natural History Publications (Borneo), Kota Kinabalu.
- Sakai, S and H Nagamasu.** 2003. Systematic studies of Bornean Zingiberaceae: IV. Alpinioideae of Lambir Hills, Sarawak. *Edinburgh Journal of Botany*, **60**: 181-216.
- Thiers, B. (continuously updated).** *Index Herbariorum*: A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. Available from: <http://sweetgum.nybg.org/science/ih/> (last accessed on 4 Jan. 2017).
- ZRC.** 2017. *Zingiberaceae Resource Centre*. Available from: <http://padme.rbge.org.uk/ZRC/> (last accessed: 24 October 2016).

How to cite this article

Mark Arcebal K. Naive, Roquen O. Pabillaran and Irene G. Escrupulo. 2018. *Etlingera coccinea* (Blume) S. Sakai and Nagam. (Zingiberaceae – Alpinieae): an addition to the Flora of the Philippines, with notes on its distribution, phenology and ecology. *Bioscience Discovery*, **9**(1): 107-110.