

SHORT COMMUNICATION

New record of *Plagiostachys albiflora* Ridl. (Zingiberaceae) in the Philippines

Florfe M. Acma^{1,2*}, Noe P. Mendez^{1,2}, Noel E. Lagunday^{1,2}, Victor B. Amoroso^{1,2}

¹ Department of Biology, College of Arts and Sciences, Central Mindanao University, University Town, Musuan, 8710 Bukidnon, Philippines

² Center for Biodiversity Research and Extension in Mindanao (CEBREM), Central Mindanao University, University Town, Musuan, 8710 Bukidnon, Philippines; * flmacma@gmail.com

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Abstract

A Philippine specimen of *Plagiostachys albiflora* Ridl. (Zingiberaceae) which was previously recorded only from the Malay Peninsula and Borneo was recently discovered in Mt. Malambo, Brgy. Datu Salumay, Marilog District, Davao City, Philippines. The specimen, described herein, constitutes the first record of the said species in the Philippines. Further, *P. albiflora* is the only non-endemic species among the Philippine *Plagiostachys* and is an addition to the seven known endemic species in the country. Existing populations of the species are rare and under severe threats due to anthropogenic activities and therefore call for immediate conservation initiatives.

Keywords: Alpinioideae, ginger flora, new distribution locality, Mt. Malambo, Davao

Introduction

Zingiberaceae consists of herbaceous perennial plants that grow well in humid tropical and subtropical areas and mostly distributed in Southeast Asia (Larsen & Larsen 2006) with 1,500 species in 53 genera (Kress et al. 2002; Lamb et al. 2013). A new classification of Zingiberaceae, which was based on morphological characters and molecular phylogeny by Kress et al. (2002) comprises 4 subfamilies and 6 tribes viz., Siphonochiloideae (Siphonochileae), Tamijioideae (Tamijieae), Alpinioideae (Alpinieae, Riedelieae), and Zingiberoideae (Zingibereae, Globbeae).

The genus *Plagiostachys* is characterized by its spike inflorescence which penetrates laterally from the leafy shoot (Julius et al. 2010). This genus is poorly known due to early disintegration of the inflorescence of many species into a mucilaginous mass which makes studies of herbarium specimens' difficult (Larsen et al. 1999).

Members of the genus are distributed in the Malesian region with the center of diversity in Borneo with 15 species (Julius et al. 2008; Lamb et al. 2013). In the Philippines, there are seven known species in this genus and all are endemic to the country (Pelser et al. 2011). Aside from the protologues (Ridley 1909; Elmer 1915), few studies had been done on this genus worldwide (Smith 1985; Cowley 1999; Sakai & Nagamasu 2003; Gobilik et al. 2005; Julius et al. 2008) and to the best of the authors' knowledge, no recent studies on *Plagiostachys* were conducted in the Philippines.

Recent botanical expedition in May 2018 documented six populations of *Plagiostachys albiflora* Ridl. from Mt. Malambo, Brgy. Datu Salumay, Marilog District, Davao City, Philippines. *P. albiflora* has glabrous capsules with mucilaginous inflorescence, which places this species under the subclade B among the three subclades of *Plagiostachys* in the molecular analysis of Julius et al. (2008). The species is a new addition to the ginger

flora of the Philippines and is an addition to the seven previously known endemic *Plagiostachys* in the country, viz., *P. corrugata* Elmer, *P. elegans* Ridl., *P. escritorii* Elmer, *P. lata* Elmer, *P. parviflora* (C.Presl) Ridl., *P. philippinensis* Ridl. and *P. rolfei* (K.Schum.) Ridl. (Ridley 1909; Elmer 1915; Pelser et al. 2011 onwards). However, *P. albiflora* is the only non-endemic species of *Plagiostachys* in the Philippines as this species is previously recorded in the Malay Peninsula and Borneo (Lamb et al. 2013). A full description of the species is presented herein along with its phenology, updated distribution, habitat and ecology, and threats and conservation implications.

Methods

The documentation of *P. albiflora* in May 7-12, 2018 was part of the research project on inventory and assessment of Flora in Marilog Forest Reserve, Southern Mindanao, Philippines (Fig. 1).

A total of 21 plots were established in Mt. Malambo and all herbaceous plants and vines found within the plots were counted and recorded. Morphological descriptions of the vegetative and reproductive parts of *P. albiflora* were done using fresh plant samples while the microscopic examinations were done in the laboratory utilizing the spirit collections of the flowers. Online e-flora of the Philippines (Pelser et al. 2011 onwards), digitized plant specimens available in Global Plants on JSTOR, protologues (Ridley 1909; Elmer 1915), checklists and related literature (Larsen et al. 1999; Maknoi & Sirirugsa 2002; Poulsen 2006; Larsen & Larsen 2006; Julius et al. 2008; Julius et al. 2010; Lamb et al. 2013) were used for identification and comparison of the species. Voucher specimens were prepared and deposited at the CMUH.

Taxonomy

Plagiostachys albiflora Ridl. Journ. Roy. As. Soc. S. Br. 50: 150. 1908 (Fig. 2). Terrestrial clumping herb and reached a height of 1-1.5 m. Rhizome thick, brownish-white, 21-27 cm long, 4.7-6.2 cm in diameter. Leaves narrowly

lanceolate to obovate, green, glabrous, 25-57 cm long by 9-11 cm wide in upper leaves, narrower, 20-25 cm long by 8-10 cm wide in lower leaves, base cuneate, apex caudate, margin entire; ligule bilobed, glabrous both surfaces, abaxial lighter, greenish-brown, 0.7-1.2 cm long by 1.1-1.3 cm wide; petiole glabrous, green, groove, 1.5-1.9 cm long; leaf sheaths glabrous.

Inflorescence penetrates laterally from the leaf sheath, 7-14 cm above ground, 5.3-7.6 cm long by 2.8-3.9 cm wide; peduncle hairy, 0.8 cm. Bracts oblong, creamy-white to brown towards the top, pink towards the base. Calyx ovate, glabrous, white with red apex, 3-tooth, 0.7-1.4 cm long. Corolla tube white, glabrous, 5.3-6.9 mm long; corolla lobes lanceolate, boat-shaped, apex rounded to acute, white with pinkish in the tip, 4.2 × 8.6 mm. Labellum obovate, white with yellow in the middle and red lines on either side and red rays toward the margins, hairy at base, 7.6-8.4 cm long by 6.7-8.4 cm wide, decaying. Pistil: stigma 2 mm long × 1.6 mm wide, style 3 mm long. Stamen: anther white, 4.2-4.8 mm long by 1.6-1.9 mm wide, filament white, 1.7-2.6 mm long. Fruits obovate to globose, green, 6-8 cm long × 5 cm wide. Seeds white, numerous. The Philippine materials are smaller compared to the materials from Borneo.

Phenology: Flowering and fruiting stages of this species were observed between the months of April to June.

Uses: The fruits are edible (Kulip et al. 2000) and sap from the stem is applied to mouth ulcers and solution of the stem is taken for high blood and diabetes (ITTO Project 2017). However, there are no reported uses of this plant from the people of the adjacent communities where this species was recorded.

Propagation: The species can be easily propagated using rhizomes. Three rhizomes were brought to Bukidnon (adjacent province) for *ex situ* conservation and had 100% survival under garden conditions in Central Mindanao University of Musuan, Bukidnon, Philippines.

Ecology and habitat: Populations of *P. albiflora* was discovered several meters away from the population of *Mitrastemon yamamotoi* Makino (Mitrastemonaceae), a recently recorded species in the Philippines by Amoroso et al. (2018).

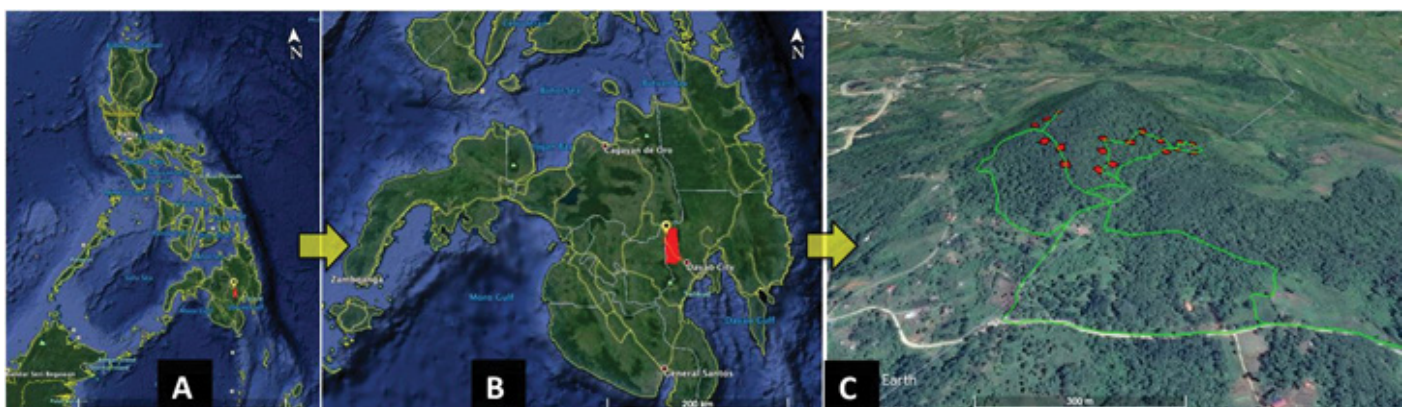


Figure 1. Study site spot map (yellow balloons). A) Philippines, B) Mindanao Island (Marilog District, Davao City-red), C) Transect route (green paths). Red polygons—20 × 20 m established plots for extensive floristic inventory (©2018 Google, image©2018 CNES/Airbus).



Figure 2. *Plagiostachys albiflora* Ridl. A) habit, B) leaf blade, C) leaf apex, D) leaf base, E) petiole (pe) and ligule (li), F) inflorescence (inset: flower), H) infructescence.

P. albiflora was observed in the slope area in the shade of a mixed dipterocarp forest dominated by *Lithocarpus* spp. (Fagaceae) and *Canarium* spp. (Burseraceae). Moreover, the area was dominated by several plant species, such as *Alsophila fuliginosa* Christ (Cyatheaceae), *Angiopteris palmiformis* (Cav.) C. Chr. (Marattiaceae), *Musa textilis* Nées (Musaceae), *Arisaema polyphyllum* (Blanco) Merr. (Araceae), *Calamus mollis* Blanco (Arecaceae), *Medinilla* sp. (Melastomataceae) and *Mackinlaya celebica* (Harms) Philipson (Araliaceae). Other ginger species observed near the area were *Alpinia alpina* (Elmer) R.M.Sm., *Etilingera fimbriobracteata* (K.Schum.) R.M.Sm., *Etilingera philippinensis* (Ridl.) R.M.Sm., *Hornstedtia lophophora* Ridl. and *Plagiostachys* sp. The habitat preference of this species is also similar to that of the other ginger species

from other genera (Larsen et al. 1999; Acma 2010; Acma & Mendez 2018).

The area lies at coordinates 7°22'40" N 125°19'38" E near Bukidnon boundary with a cool climate owing to its relatively high elevation of 1,200 masl. The mountain has clayish soil having 82.15% clay, pH of 4.60 and organic matter of 6.73% according to the report of Acma (2010).

Distribution: Widespread in the Malay Peninsula and Borneo (Lamb et al. 2013), but recorded in Mt. Malambo, Barangay Datu Salumay, Marilog District, Davao City, Philippines as this present study reports.

Specimen examined: Philippines. Mindanao, Davao City, Marilog District, Barangay Datu Salumay, Mt. Malambo, 1350 masl, 9 May 2018, V.B. Amoroso 10783 with Acma and Mendez (CMUH).

Threats and conservation implications: The populations of *P. albiflora* were found only in two out of 21 established plots in Mt. Malambo. Failure of seedlings to survive could be a possible reason for its few populations. The very small population of the species could also be attributed to the habitat loss due to anthropogenic disturbances. Its occurrence in fragmented and disturbed habitats call for urgent conservation initiatives.

Conclusion and Recommendations

The documentation of *P. albiflora* in Mt. Malambo is the first record of this species in the Philippines hence, in addition to the seven known endemic species of *Plagiostachys* in the country. Further, the species is so far the only non-endemic species of *Plagiostachys* in the Philippines. More botanical explorations are needed to determine its geographical range and understand the population size of the Philippine *Plagiostachys*. The authors also recommended that *in situ* and *ex situ* conservation efforts be undertaken and the propagated plantlets be introduced to botanical gardens for further monitoring and future studies.

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