

Research Article

Amomum bungoensis: A New Species of *Amomum* (Zingiberaceae) from Sarawak, Malaysia

S. Aimi Syazana , K. Meekiong, N. Afifah, and M. Y. Syauqina 

Plant Science and Environmental Ecology, Faculty of Resource Science and Technology, UNIMAS, 94300 Kota Samarahan, Sarawak, Malaysia

Correspondence should be addressed to S. Aimi Syazana; aimisyazana67@gmail.com

Received 9 January 2018; Accepted 16 August 2018; Published 13 September 2018

Academic Editor: Muhammad Iqbal

Copyright © 2018 S. Aimi Syazana et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

A new species of *Amomum* Roxb. from Sarawak is described. *Amomum bungoensis* S. Aimi Syazana & Meekiong, sp. nov., shows similarity with *A. durum* S. Sakai and Nagamasu by having similar fruit characteristics but differs in labellum and anther crest of the flowers. Detailed description and photographs are provided.

1. Introduction

The gingers are widely distributed in the tropic and pantropic countries throughout the World, where they are thriving almost in all habitats. Up to date, 53 genera and more than 1377 species have been recorded since 1800s [1, 2]. Genus *Amomum* is the second largest genus after *Alpinia* Roxb. which it consists of 150-180 species throughout Southeast Asia [3]. Locally known as “Kapulaga” or “Buah Pelaga”, *Amomum* is the most valuable and expensive spices after Saffron and Vanilla in the world. This genus is well-known in Indian cuisine (as a flavoring agent) and also for medicinal values ever since ancient times. Sarawak, Malaysia, is very rich with gingers species.

Holtttum [4], in his revision of gingers of Peninsular Malaysia, stated that *Amomum* has very own unique characteristics. It has elongating pseudostem and inflorescence, absence of involucre sterile bracts, and broad yellow and white labellum with small red markings (the most common characteristic). The anther crest is usually distinctly trilobed. *Amomum*'s fruit can be categorized into two groups: capsulate and fleshy spiny berry. The very last revision on genus *Amomum* in Sarawak was by Sakai and Nagamasu [5] where they focused on *Amomum* species in Lambir Hills National Park (LHNP). They encounter twelve species with five new species that include *A. durum* [5]. According to Lamb et al.

[6], about 31 species of *Amomum* have been recorded and given names. But, up till now, no taxonomic revision has been made in Sarawak.

Recent explorations at Bungo Range National Park have made an addition to Sarawak *Amomum* species. During the identification process, the specimen has similar outstanding fruit characteristics with *A. durum*. However, after detailed examination on the specimens, we found that it differs from *A. durum*. Detailed descriptions on this novel species are described herein (Figure 1).

2. Materials and Methods

The study site was in Bungo Range National Park, Bau Division, Sarawak, Malaysia. Samples collected were examined and morphological studies were conducted in the Herbarium of Universiti Malaysia Sarawak (HUMS) and laboratory of Faculty of Resource Science and Technology, UNIMAS. The characteristics of stigma, stamen, ovary, and any specific features were examined using USB Digital microscope (500x). Herbarium samples collection was prepared following the standard protocols as suggested by Bridson and Forman [7]. Herbarium specimens were deposited in Herbarium of Forest Department Sarawak (SAR) and Herbarium of Universiti Malaysia Sarawak (HUMS).



FIGURE 1: *Amomum bungoensis* Aimi Syazana & Meekiong, sp. nov. A: part of leafy shoot; B: rhizome and stilt root; C: head of inflorescence and flower; D: labellum; E: bract; F: side lobe; G: infructescence; H: fruit [Drawing by Meekiong K.].

3. The New Species

***Amomum bungoensis* Aimi Syazana & Meekiong, sp. nov.**

Similar to *Amomum durum* by its large, showy and thick wall fruit, differ by its labellum and anther crest of the flower.

Type: Borneo, Malaysia, Sarawak, Bau Division, Bungo Range National Park, 7th December 2017, S. Aimi Syazana, K.

Meekiong, Afifah, N, Syaunina, M. Y. AS0122. (holo: SAR, para (AS0123): HUMS)

Description: Perennial herbs with distichous leaves, plant form clump, height less than 2 m (about 176 cm tall), has green stilt root, 7–8 plants per clump, 8–9 pairs of leaves per plant. **Leaves** elliptic and oblong-elliptic, 34.5–60.0 x 6–7.4 cm, apex caudate, base attenuate, margin entire, abaxial dull



FIGURE 2: *Amomum bungoensis* Aimi Syazana & Meekiong. (a) Plant with stilt roots; (b) inflorescence; (c) and (d) slightly corrugate leaves; (e) and (f) ligule; (g) fruits; (h) fruits of *Amomum durum*.

green, adaxial dark green with slightly corrugated. **Petiole** sessile or very short, c. 2–3 mm long, ligule bi-lobed, longer than petiole, c. 5–8 mm long, green with black at the margin. **Inflorescence** from rhizome or root-stock, imbricate type, inflorescence 5–10 cm long, or longer, head c. 2–4 cm diam., flower bracts greenish cream, boat shape, c. 2.5 cm; sericea; peduncle up to 5–10 cm long, pubescent. **Flower** orange; petals boat shape, translucent with orange dots, apex obtuse,

c. 1 mm long, 5 mm wide; labellum c. 10 mm long, 7 mm width, orange and darker toward the base and throat, apex acuminate; sepals boat shape, translucent creamish white, pubescent at the margin, 1.8 cm long. Stamen oblong with velvety externally, white, **anther crest** distinct trilobed. **Stigma** cup shaped abruptly widening, orange with cilia; style translucent with orange dots with head. **Infructescence** aggregate or clump, infructescence head c. 2–4 cm diam.,



FIGURE 3: *Amomum bungoensis* Aimi Syazana & Meekiong. (a) Fruit surface of *Amomum durum*; (b) fruit surface of *Amomum bungoensis*; (c) labellum; (d) cup-shaped stigma; (e) deeply trilobed anther crest; (f) ovary; (g) seed; (h) cross-section of seed.

peduncle 4.5–9 cm long; fruits rounded shape with persistent calyx, reticulate ornamentation, 3–5 fruits per peduncle, light greenish yellow with persistent bracteoles at the base, fruity smell. *Seeds* yellowish orange colour, irregular shape, covered with aril, 3 locules, 59–60 seed per fruit.

Distribution and habitat: So far recorded only from the type locality, Bungo Range National Park, Kuching, Sarawak.

Etymology: The epithet given after the type locality, Bungo Range National Park.

Notes: At the first glance, the infructescence of the new species, *A. bungoensis*, is closely similar to *A. durum* that we discovered in Long Banga. Both have large and showy infructescence and thick fruit-walls. Closed examination revealed that specimen from Bungo Range National Park has several distinguishing morphological characteristics, i.e., elliptic and oblong-elliptic leaf with caudate apex, being bilobed with tomentose and black stripes at the margin of the ligule, orange flower, a widening cup-shaped stigma with cilia, and distinct trilobed (Table 1, Figures 2 and 3). Other than that, they differ in labellum and also anther crest of

the flower (examination and observation have been made using USB digital microscope). Field observations noted that *A. bungoensis* has green stilt root above ground. Besides, inflorescence bract is in green together with peduncle bracts.

4. Discussion and Conclusion

Amomum durum was first collected and described from LHNP by Sakai and Nagamasu [5] during their study on Zingiberales in Sarawak and since then was reported only from the type locality. The LHNP is lowland dipterocarp forest covered with clayey or sandy soils and, according to their report, most of the Zingiberaceae species found in LHNP were from the genus *Amomum* and *Etilingera*. The species from both genera were tall with leafy shoots that can reach 4 m height [5]. Recently, during the Heart of Borneo Scientific expedition, we discovered *A. durum* in Long Banga area, Ulu Baram. With that, the distribution of *A. durum* now extended toward the south, to Ulu Baram areas. The areas are mostly mountainous with average of 430 m altitudes

TABLE 1: Distinctive characteristics of *A. durum* and *A. bungoensis*.

	<i>Amomum durum</i>	<i>Amomum bungoensis</i>
Leaf	Lanceolate to linear	Elliptic, oblong-elliptic
Leaf apex	Acuminate	Caudate
Ligule	Deeply bi-lobed, pubescent, membranous	Bi-lobed, tomentose, black line at the margin
Flower	Creamy white	Orange
Stigma	Cup-shaped open upward with hair at the opening	Cup-shaped abruptly widening with cilia
Anther crest	Obscurely trilobed	Distinct trilobed

and are rich with plants species diversity including gingers, particularly from the genus *Amomum* [8]. *Amomum durum* has unique and distinct characteristics that make them easier to identify which are the large, showy brown fruits (Figure 2).

It is very clear that the *Amomum* diversity in Sarawak is tremendous. Many undescribed species have been discovered recently and all are waiting for further verifications. Many more in the forests are still waiting to be discovered. With this new discovery, the number of *Amomum* species in Sarawak now has been increased to 33 species.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

Acknowledgments

The authors would like to thank Universiti Malaysia Sarawak (UNIMAS) for the facilities and accommodations throughout the project.

References

- [1] W. John Kress, L. M. Prince, and K. J. Williams, "The phylogeny and a new classification of the gingers (Zingiberaceae): evidence from molecular data," *American Journal of Botany*, vol. 89, no. 10, pp. 1682–1696, 2002.
- [2] J.-J. Kong, Y.-M. Xia, and Q.-J. Li, "Inflorescence and flower development in the Hedychieae (Zingiberaceae): *Hedychium coccineum* Smith," *Protoplasma*, vol. 247, no. 1, pp. 83–90, 2010.
- [3] Y.-M. Xia, W. J. Kress, and L. M. Prince, "Phylogenetic analyses of *Amomum* (Alpinioideae: Zingiberaceae) using ITS and matK DNA sequence data," *Systematic Botany*, vol. 29, no. 2, pp. 334–344, 2004.
- [4] R. E. Holttum, "The Zingiberaceae of the Malay Peninsula," *Gard. Bull. Singapore*, vol. 13, 1996.
- [5] S. Sakai and H. Nagamasu, "Systematic studies of Bornean Zingiberaceae I. *Amomum* in Lambir Hills, Sarawak," *Edinburgh Journal of Botany*, vol. 55, no. 1, pp. 45–64, 1998.
- [6] A. Lamb, J. Gobilik, M. Ardiyani, and A. D. Poulsen, *A Guide to Gingers of Borneo*, Natural History Publication, Kota Kinabalu, Malaysia, 2016.
- [7] D. Bridson, *The Herbarium Handbook*. Royal Botanic Gardens, L. Forman, Ed., Kew, UK, 1992.
- [8] K. Meekiong, A. Ampeng, A. Sapuan et al., *The Heart of Borneo Series 4: Long Banga (Where the Beat Goes On)*, Forest Department Sarawak, Sarawak, Malaysia, 2017.



Hindawi

Submit your manuscripts at
www.hindawi.com

