
Short Notes

Wild Gingers (Zingiberaceae) at Sungai Kangkawat, Imbak Canyon Conservation Area (ICCA), Sabah

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Abstract

This study was carried out during the Geographic Borneo Expedition in 2018 (28 September - 3 October 2018) with the objective to assess the diversity of gingers (Zingiberaceae) at Sungai Kangkawat, Imbak Canyon Conservation Area (ICCA). Four tracks were surveyed, namely, Sungai Kawang, Nepenthes, South Rim and Pelanjau. Any ginger clump along these tracks were visually searched and sampled. The plants (stems, leaves and rhizomes) together with their flowers and fruits, if present, were collected, labelled and kept in a ziplock bag for herbaria preparation and identification. Information on ecology, habitat and location coordinates of each species were also recorded. Species identification was carried out using published taxonomic keys and pictures of the plants. There were 11 genera found along Sungai Kawang track, seven along Nepenthes track, three along South Rim track, and five along Pelanjau track. Previous unpublished expedition report stated that there were 48 ginger species in ICCA. However, in the present study, only 28 known species from 11 genera were found. The low number of species was associated with difficulty to identify the ginger samples, as many were lacking flowers, probably due to the lapse of the flowering season.

Keywords: Zingiberaceae, Sabah, flower

Introduction

Imbak Canyon Conservation Area (ICCA) is situated in the central area of Sabah, about 300 km from Kota Kinabalu. It is located at the west of Danum Valley Center and north of Maliau Conservation Centre, the two biodiversity important forests in Sabah. ICCA covers a total area of about 30,000 hectares, encompassing two ridge-top virgin jungle virgin jungle reserves, which are rich in biodiversity and unique in geology and geomorphologic attributes. ICCA is still under exploration with respect to physical environment and biodiversity. There were three (2004, 2009 and 2011) previous explorations and expeditions to ICCA, which were organized to study the flora, fauna communities and physical environments of the area.

In Sabah, there are 152 known species from 13 genera of gingers (Gobilik & Yusof, 2005). There could still be many new reports or new species to be found, but the specimens are not yet well described and identified or collected. Zingiberaceae consists of more than 1500 species and 53 genera, which mostly can be found in the tropics. Borneo has nearly 19 genera with new genus is still reported.

In an expedition to ICCA in 2004, Gobilik et al. (2005) reported that there were 48 species of gingers in that area, but the report was not published by the expedition committee as expedition proceedings. Hence, the list of gingers in ICCA is yet to be available to the public. During the ICCA's Sungai Kangkawat Borneo Geographic Expedition in 2018, gingers were again surveyed, and published in the present paper, with the hope that the information will be made available for the general knowledge of conservationists about ginger composition in ICCA specifically at Sungai Kangkawat.

Methodology

The gingers were surveyed at the study area along four tracks, namely, Sungai Kawang, Nepenthes, South Rim and Pelanjau trails (Figure 1) during the expedition (Sungai Kangkawat, ICCA Geographic Borneo Expedition, 28 September - 3 October 2018). Various sterile species, flowering and fruiting wild ginger species were sampled randomly along these trails. The collected plants with their flowers if present, fruits, leaves and rhizomes were photographed and pressed for herbaria preparation (Appalasamy et al., 2019) and identification. The habitat and location coordinates were recorded for each of the species. The fertile and sterile Zingiberaceae plants were identified using keys and pictures.

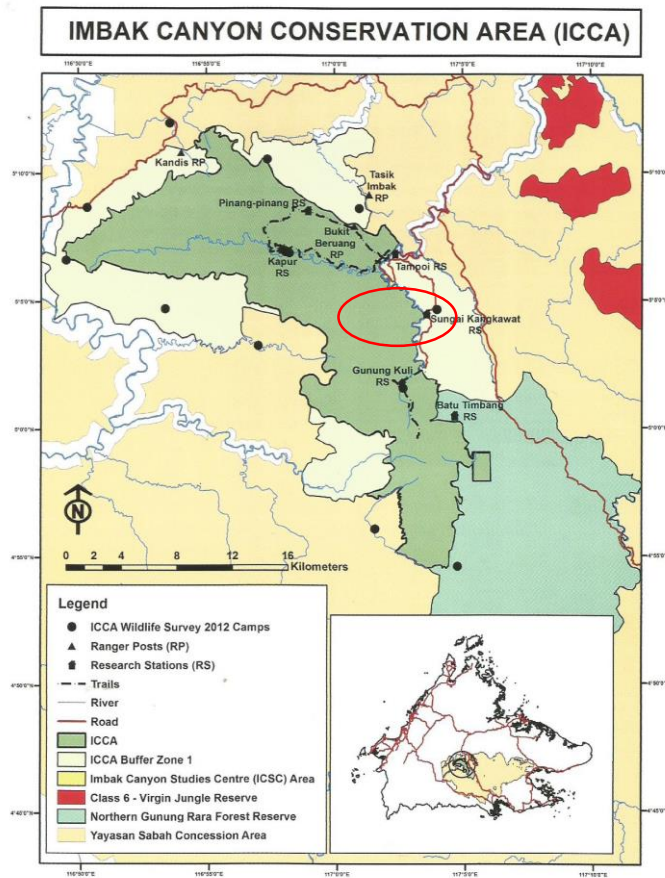


Figure 1. The map and location of Imbak Canyon Conservation Area (ICCA) in Sabah. The red circle indicates area covered during the survey.

Results and Discussion

There were 11 genera of gingers found along Sungai Kawang track, seven along Nepenthes track, three along South Rim track, and five along Pelajau track. In total, there were 28 species and 11 genera of gingers found at the study area (Table 1 and Figure 2). There were nine species of *Boesenbergia* found, but all specimens were sterile and thus, identification to species was difficult. *Plagiostachys* was also found to have more species (four species), but were also already at fruiting stage. It was followed by *Amomum* with three species (Figure 2).

Table 1. The genera and species of gingers at the study area.

Genus	Species	Trail	Collection number
<i>Zingiber</i> Mill.	<i>Z. flammeum</i> Theilade & Mood	Kawang	SA16
	<i>Z. pseudopungens</i> R. M. Sm.	Kawang	L & A 01
<i>Etilingera</i> Giseke	<i>E. fimbriobracteata</i> (K. Schum.) R. M. Sm.	Pelajau	SA30
	<i>E. brevilabrum</i> (Valeton) R. M. Sm.	Kawang	SA17
<i>Alpinia</i> Roxb.	<i>A. ligulata</i> K. Schum.	Kawang	SA08
	<i>A. aquatica</i> (Retz.) Roscoe	Kawang	L & A 02
<i>Amomum</i> Roxb.	<i>Amomum coriaceum</i> R.M. Sm.	Kawang	SA14
	<i>Amomum laxisquamosum</i> K. Schum.	Kawang	SA20
<i>Elletaria</i> Maton	<i>Amomum oliganthum</i> K. Schum.	Pelajau	SA33
	<i>Elletaria</i> sp. 1	Kawang	L & A 03
	<i>Elletaria</i> sp. 2	Kawang	L & A 04
<i>Plagiostachys</i> Ridl.	<i>P. longicaudata</i> Julius & A. Takano	Kawang	SA09
	<i>Plagiostachys breviramosa</i>	Kawang	SA10
	<i>Plagiostachys</i> sp. 1	Kawang	SA12
<i>Boesenbergia</i> O. Kuntze	<i>Plagiostachys</i> sp. 2	Kawang	SA37
	<i>Boesenbergia</i> sp. 1	Kawang	L & A 05
	<i>Boesenbergia</i> sp. 2	Kawang	L & A 06
	<i>Boesenbergia</i> sp. 3	Kawang	L & A 07
	<i>Boesenbergia</i> sp. 4	Kawang	L & A 08
	<i>Boesenbergia</i> sp. 5	Kawang	L & A 09
	<i>Boesenbergia</i> sp. 6	Nepenthes	L & A 10
	<i>Boesenbergia</i> sp. 7	Nepenthes	L & A 11
<i>Hedychium</i> Konig.	<i>Boesenbergia</i> sp. 8	South Rim	L & A 12
	<i>Boesenbergia pulchella</i> (Ridl.) Merr.	South Rim	L & A 13
<i>Burbedgia</i> Hook f.	<i>Hedychium muluense</i> R.M. Sm.	South Rim	L & A 14
<i>Globba</i> L.	<i>B. pauciflora</i> Valeton	Kawang	SA22
<i>Hornstedtia</i> Retz.	<i>G. pendula</i> Roxb.	Kawang	SA15
	<i>Hornstedtia</i> sp. 1	Kawang	SA21

Note: Initial denote collector. L & A = Lam Ye Fan & Nur Azizun Rusdi; SA = Suganthi Appalasamy

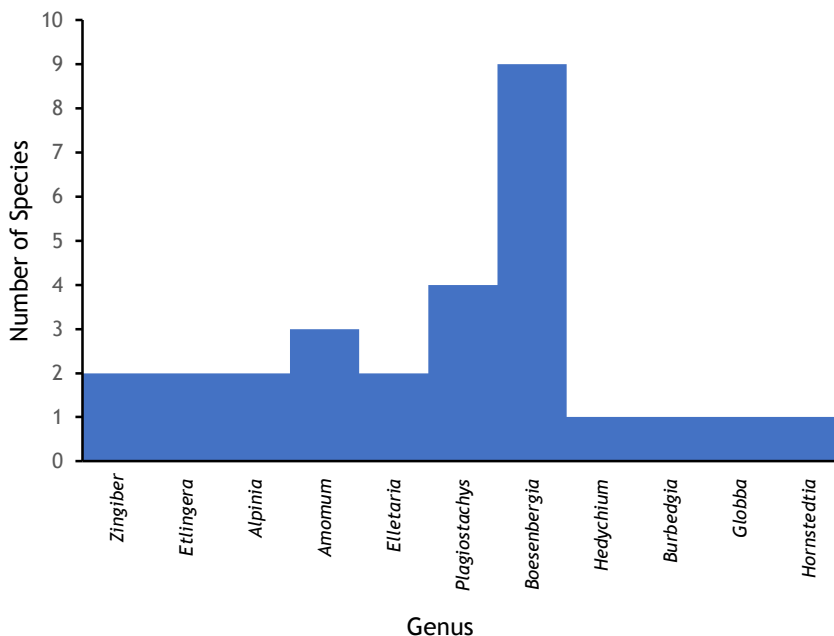


Figure 2. The number of species in every genus found in the study area.

The presence of flowers and fruit capsules enabled the identification of the *Amomum* species. All specimens of the genera *Elletaria* and *Hornstedtia* were not successfully identified to species level due to lack of flowers or fruits. A few of the species were described in Figure 3. The list of gingers in Table 1 will be the first formal publication of such information for ICCA.

In Sabah, there were 13 genera of Zingiberaceae reported (Gobilik & Yusof, 2005) and this study successfully found 11 genera in ICCA which indicates the importance of this area as a biodiversity important forest. However, in contrast with the previous study in ICCA which reported 48 species of Zingiberaceae, this current study only list 28 species. This could be due to the collection of samples which were restricted to fertile plants during this expedition. In addition, the expedition was focused in Kawang, Pelajau, Nepenthes and South Rim trails which were unexplored before this.

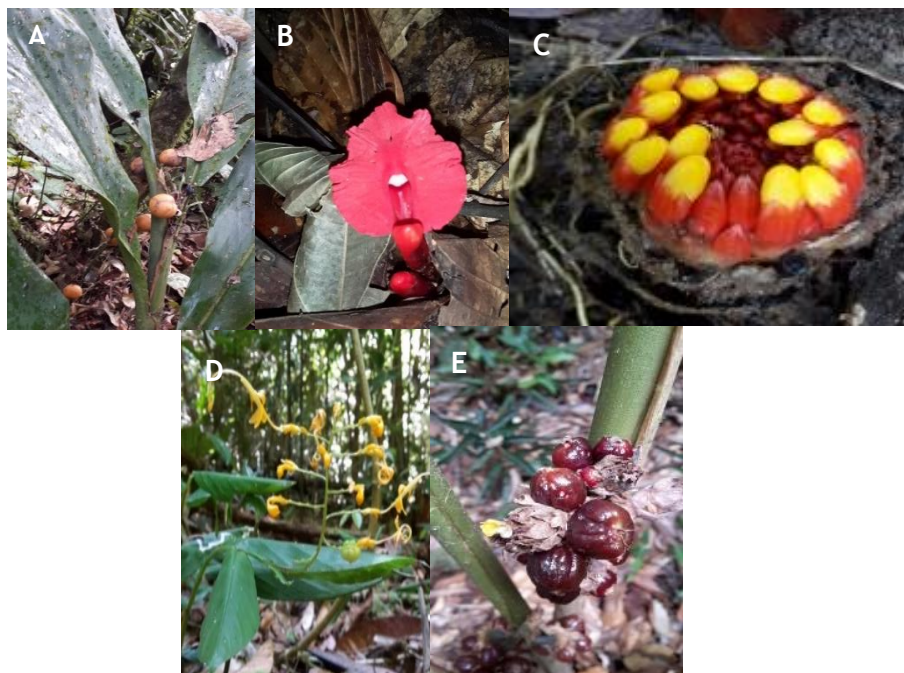


Figure 3. Pictures of a few species found at the study area. A. *Alpinia ligulata*; commonly found in lowland to hill forest (1000m). The capsules are brown and soft in texture. B. *Etlingera brevilabrum*; commonly found in wet lowland area. Flowers are always far (1 m) away from the mother plants connected by long rhizomes; fruits forms underground. C. *Etlingera fimbriobracteata*; this species is a profound ‘coloniser’ along the ridges of forest with leafy shoots reaching to 3-4 m. The inflorescences are bright yellow, emerging around or near the leaf bases, usually covered or buried under leaf litters. D. *Globba pendula*; commonly found in wet lowland area. A common sighting around waterfall area. Some species with aromatic odor. E. *Plagiostachys* sp. 1; this species found to be growing in clusters of a few leafy shoots with bright reddish fruits. The flowers are minute, yellowish white inflorescence. The red fruits usually about 1.5cm long with oblong to pear shaped.

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