

Diversity, Distribution and Some Notes on Gingers of Sayap-Kinabalu Park, Sabah

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ABSTRACT

A survey of gingers (Zingiberaceae) of Sayap-Sayap Kinabalu reveals an approximate total of 26 species (37 accessions) representing 11 genera from 4 tribes. The tribe Hedycheae is the least represented with only 1 species recorded. Between 2-3 species are suspected to be new or previously undescribed viz. Etlingera sp. b. Zingiberspp., Geocharis sp., ? and 1 -2 specimens of Zingiber may possibly be new varieties. An annotated list of gingers and its distribution in the areas surveyed is provided. The diversity of species decrease with increase in altitude. The overall diversity of gingers of Sayap is observed to be lower than the lowland forests.

INTRODUCTION

This survey is part of the general survey of the Flora of Sayap, the unexplored western region of Gunung Kinabalu. Gingers have always been associated with the well known spice and condiment, the ginger of commerce. Many wild species, especially species from Sabah and Sarawak, remained undescribed and to a large extent undocumented.

Zingiberaceae is one of the significant component of the herbaceous ground flora of Malaysian tropical forests. This family includes some medicinally important species in particular members of genera *Alpinia*, *Curcuma* and *Zingiber*. Detailed specifications to the family have been described in earlier reports and papers (Ibrahim, 1989, 1990, 1992). The diversity and distribution of gingers have been reported by the author for Tabin Wildlife Reserve, Gunung Danum and Tawau Hills, during the last four years. This is the fourth series of such report.

METHODS

The survey was conducted over three main trails namely Tepising trail, Wariu trail, Kemantis trail and one short trail along Gua Melayu. For each trail investigated, plants were collected, documented and processed for herbarium specimens. Fresh, viable rhizomes were collected for planting whenever possible. Occasionally, for very common species or for conservation purposes plants were not collected but recorded for their presence in a particular locality. The identification of genera and species follows Holttum (1950), Kam (1982) and Smith (1985, 1986, 1987, 1988, 1989).

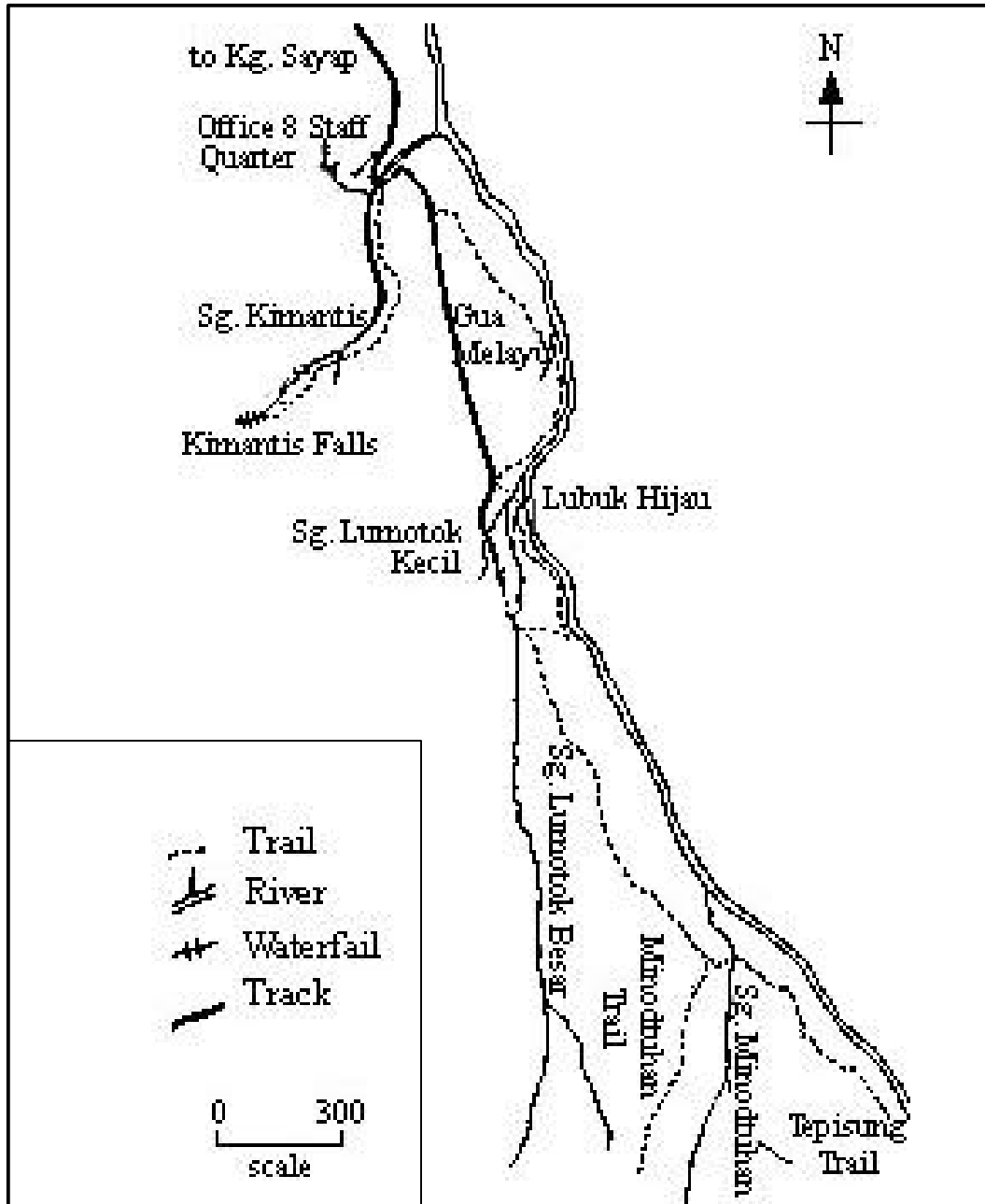


Figure 1: The main trails covered during the survey.

RESULTS AND DISCUSSION

An annotated list of gingers of Sayap-Sayap is presented. The survey reveals that there are at least 26 species from 11 genera representing 4 tribes. In order of abundance they are: Alpineae (15 species), Zingiberaceae (6 species), Globbeae (4 species) and Hedycheae (1 species). These figures account for at least 15% of the total species reported for Borneo.

The survey also showed that gingers are distributed in almost all the trails (Fig. 1) except for the Minodtuhan trail which is almost 400ft high. The trail to Tepisung after Sungai Minodtuhan, for instance, is rich in gingers although many of these plants are sterile. This trail is rather wet and rich in herbs such as Begonias, *Argostemma* spp., *Didymocarpus* spp. and other Gesneriads. Gingers are especially abundant along riverbanks as well as in areas which are wet, moist and shaded as observed for Wariu trail reaching up to Sungai Lumutuk Besar and the end region of Tepisung trail (Fig. 1). There are fewer species in the interior part of the forest and these are sparsely distributed. Although on the overall, the diversity of species is lower than the lowland forests, the present data might be slightly underestimated because many of the plants are sterile and identification of species is difficult.

Amongst the interesting and unique species observed were *Amomum sceletescens*, *Etilingera* sp. b (HI 863), *Zingiber* sp. a (HI 884), *Geocharis* sp.? *Amomum sceletescens* is unique in having its inflorescence bract tissues displaying a decaying habit giving a reticulated, netted appearance. It was reported from Gunung Kinabalu and described as a new species in 1990 by Rosemary Smith. This plant was also collected from Ligwagu and Ulu Mesilou (Smith, 1990).

Zingiber sp. b, on the other hand, exhibit an interesting case of the inflorescence arising from the stem sheath at the axil of the petiole (inflorescence arising laterally from the stem sheath is characteristic of the genus *Plagiostachys*), in addition to its normal radical inflorescence. This is the first time such unique inflorescence feature was ever recorded for the genus *Zingiber*, although *Z. puberulum* of Peninsular Malaysia have been known to produce offsets or plantlets at the axil of the leaves. However, the unique feature observed for *Zingiber* sp. b (HI 884) could well be the result of some kind of mutation or malformation because it is not consistent with similar specimens (HI 865, S83) collected from other trails.

The plant tentatively identified as *Geocharis*? has a floral structure which appear to be affiliated to the *Plagiostachys* group but its radical inflorescence distinguished it from the genus *Plagiostachys*. This specimen may be undescribed. *Hedychium cylindricum*, the sole representative of the tribe Hedycheae in this area, is abundant and appears to be the dominant epiphytic ginger concentrating mainly along the whole stretch of Wariu trail right up to Tepisung trail. Some are huge plants towering over the rocks on the upper stream of Wariu trail, but none are in flower. It is also common in Gunung Kinabalu and some areas of Poring Hot Springs. *Globba brachyanthera* which is not as widespread as *G. pendula*, *G. franciscii* and *G. propinqua*, has a high potential to be developed into an ornamental plant.

ANNOTATED CHECKLIST OF GINGERS

ALPINEAE

Alpinia sp.a

Wariu trail on riverbanks including area near Sungai Wariu. Elev. 925- 960m *Halijah Ibrahim*, HI 871. Ht. 1.5-3m. Leaves glabrous, lanceolate. Remains of paniculated inflorescence with spherical shaped fruits.

Alpinia sp.b

Wariu trail in a valley, in forest shade. Elev. 940m. *Halijah Ibrahim*, NI 887. Ht. 0.6m. Leaves lanceolate. Fruits globose, orange in colour. Rhizome carrot colour.

Amomum sceletescens R.M. Smith.

Tepisung trail near riverbank. Elev. 1160m. Kemantis trail edge of forest. Elev. 900m. *Halijah Ibrahim*, HI 854. Ht 2.5m. Leaves glabrous. Inflorescence separate from leaves on an erect peduncle measuring up to 65 cm. Fruits, spherical and spiky.

Burbidgea sp.

End of Wariu trail near Lubok Hijau, epiphytic on a rock, fully shaded. Elev. 985m. Sungai Lumutuk trail, epiphytic on rocks near riverbank of Sungai Wariu. Elev. 965m. *Halijah Ibrahim*, HI 875, 885.

Mt. 1-1.2m. Leaves glabrous, Ovate to elliptic, aromatic. Inflorescence terminal with elongated shaped fruits (green).

Elettariopsis cf. *triloba* (Gagnep.) Loesen.

Tepisung trail, forest shade. Elev 1040m *Halijah Ibrahim*, HI 882

Ht. 0.3-0.4m 6 leaved shoots, Leaf sheaths closely clasping to form a pseudostem. Radical inflorescence with white flowers.

Elettariopsis triloba has not been recorded for Borneo by RM Smith Although this specimen is relatively smaller in its overall vegetative and floral structures it resembles closely to *E. triloba* of Peninsular Malaysia

Etlingera muluensis RM. Smith.

Near end of Tepisung trail on riverbank. Elev. 1170m. Wariu trail. on riverbank of Sungai Wariu. Elev. 960m. *Halijah Ibrahim*, HI 855, 870 Ht. 2.5-4m. Leaves large, elliptic ovate, glabrous. Inflorescence radical with blood red coloured bracts. Flowers yellowish orange with tip of labellum coloured blood red. Stilt roots.

*Etlingera muluensis**Etlingera punicea* (Roxb.) R.M. Smith.

Tepisung trail, near stream. Elev. 1140m. *Halijah Ibrahim*, HI 85 1. Ht. 2m. Inflorescence radical, flowers red, bracts pink.

Etlingera sp. a

Kemantis trail, periphery of trail in partially shaded areas. Elev 945m Wariu trail. On riverbank. Elev. 920m. *Halijah Ibrahim*. HI 859. 867 Ht. 3-3.5m. Leaves glabrous, leaf-base oblique to cordate. Inflorescence with short scape. Fruits red.

Etlingera sp. b

Kemantis trail. Moist area in forest shade. Elev. 915m *Halijah Ibrahim*, HI 863. Ht. 2-3m. Leaves large, glabrous. Prominent and attractive radical inflorescence. Inflorescence bracts light yellowish green turning red on maturity. Flowers red, labellum yellow with red tip.

Geocharis ? sp.

Kemantis trail, by the stream near waterfall. Elev. 935m. *Halijah Ibrahim*, HI 861. Ht 3-3.2m. Leaves large, glabrous. Inflorescence radical, upright. Inflorescence scape 9 cm, with inflorescence rachis extending to 28 cm long. Flowers, small and tough; yellowish orange in colour. Fruits red, turning maroon on maturity. Prominent stilt roots.

Hornstedtia sp a

Tepisung trail Along riverbank, rocky habitat. Elev 1100m *Halijah Ibrahim*. NI 856 Ht. 1.5-2m. Leaves glabrous. Inflorescence bracts light green with red margins. Rhizome woody, with prominent stilt roots.

Hornstedtia sp. b.

Kemantis trail. On slope, near waterfall. Elev. 980m *Halijah Ibrahim*, HI 858.

Young plant, ht 1.5m. Leaves glabrous, elliptic, lanceolate *Hornstedtia* sp. C. Wariu trail. On riverbank, rocky habitat. Elev 945m *Halijah Ibrahim*. HI 869. Ht. 4-4.2m Leaves large, glabrous upper side; hairy underneath; leaf base oblique. Inflorescence radical; inflorescence bracts reticulate, reddish brown. Flowers red with yellow lip. Rhizome woody with prominent stilt roots

Plagiostachys sp. a.

Kemantis trail. Forest floor. Elev. 915m *Halijah Ibrahim*, HI 864. Ht 1.4m Leaves large, leathery. Fruits arising laterally from stem. A similar species is found in Poring Hot Spring.

Plagiostachys sp. b.

Entrance of Tapisung trail, in forest shade, on riverbank. Elev 1010m. Gua Melayu. Partly shaded. Elev. 915m. *Halijah Ibrahim*, HI 880, 886. Ht. 1-1.7m. Leaves glabrous, leaves lower down being more ovate. Inflorescence small, mucilaginous with very small flowers. Labellum light yellow with red stripes, at the sides.

GLOBBEAE

Globba brachyanthera K. Schum.

Kemantis trail, on riverbanks (near base camp). Elev. 910m. Entrance of Tapisung trail. Forest shade. Elev. 1010m. *Halijah Ibrahim*, HI 877, 878 Ht 0.3-0.6m. Leaves slightly hairy. Inflorescence and cincinni white in colour. Some with inflorescence rachis up to 9cm Flowers white, fruits white.



Globba brachyanthera

Globba franciscii Ridl.

Wariu trail. Forest shade. Elev. 900m. *Halijah Ibrahim*, HI 866.

Ht. 0.5-0.7m. Leaves lanceolate-caudate. Flowers orange, anther with two appendages. A pair of small appendages on the filament.

Globbo pendula Roxb.

Wariu trail. Forest shade. Elev. 85m. *Halijah Ibrahim*, HI 874.

Ht. 1m. Clear veins on upper leaf surface. Inflorescence with long rachis up to 38cm. Flowers orange with 2 anther appendages

Globba propinqua Ridl.

Tepisung trail, forest floor. Elev. 1100m Wariu trail, on riverbank - wet, fully shaded habitat. Elev 985m. *Halijah Ibrahim*, HI 857, 872. Ht 0.5m. Leaves glabrous, dark green with purplish tinge underneath. Inflorescence curve downwards. Flowers yellowish orange with four anther appendages. Sterile bracts mid-green.

HEDYCHEAE

Hedychium cylindricum Ridl.

Tepisung trail. Epiphytic on rocks, fallen logs along river banks. Elev 1160m. Wariu trail. Elev. 925m. *Halijah Ibrahim*, HI 852. Ht. 0.9-1m. Leaves glabrous. Dehisced fruits orange within, rhizome fleshy.

ZINGIBEREAE

Zingiber pseudopungens R.M. Smith

Tepisung trail, along riverbank. Elev. 1160m. Kemantis trail. on fallen logs by the stream. Elev. 920-930m. *Halijah Ibrahim*, HI 853, 860, 862. Ht. 1.5-2m. Leaves glabrous upperside; with appressed hair underneath; elliptic lanceolate in shape, sessile. Ligule papyraceous. Inflorescence bracts greenish turning pink, peach or red on maturity. The inflorescence bracts are distinct in having spine like tips and frilled margins.



Zingiber pseudopungens

Zingiber sp. a

Kemantis trail. Forest floor, among leaf litter at the base of a tree trunk. Elev. 895m. Tepsung trail. Forest shade. Elev. 1070m. *Halijah Ibrahim*, HI 865, 883, 884. Ht. 0.5-1m. Leaves glabrous, ovate elliptic. Inflorescence radical with short scape. In specimen HI 884 inflorescence was observed arising from the leaf sheath along the frond. Inflorescence bracts range from cream to yellow. Flowers peach in colour. The specimens with the accession no. of HI 865 appears to be closely affiliated to *Z. griffithii* of Peninsular Malaysia in its leaf morphology and inflorescence structure. It may be the Bornean variety of the Peninsular Malaysian *Z. griffithii* or a new species allied to it.

*Zingiber* sp. a*Zingiber* sp. b

Wariu trail. Forest shade, riverbank of Sungai Wariu Elev 925m. *Halijah Ibrahim*, HI 868. Ht 2-2.2m. Leaves glabrous, elliptic lanceolate Inflorescence radical, inflorescence bracts green. No flowers

Zingiber sp.c

Wariu trail Forest shade. Elev 985m *Halijah Ibrahim*, HI 873.

Ht. 1m. Leaves glabrous, inflorescence bracts red, flowers light orange. This specimen appears to be allied to *Z. puberulum* in its leaf and inflorescence characters, however, the absence of bracteole in the flowers suggest that it could be a variety of *Z. griffithii*.

Zingiber sp. d

End of Wariu trail near Sungai Lumutuk Besar. Forest shade, near riverbank. Elev. 985m. *Halijah Ibrahim*, HI 876 Ht. 1.5m Leaves large, fleshy, glabrous, ovate elliptic. Inflorescence bracts orangish pink. Flowers light orange Except for large size, the inflorescence and floral structures are similar to *Zingiber* sp. a (HI 865).

Zingiber sp. e

Entrance of Tepsung trail, forest shade, on rocks. Elev 1010m. *Halijah Ibrahim*, HI 879, 881. Ht. 1-2m Leaves glabrous, darker green on the upper surface. Inflorescence bracts blood red in colour, flowers light orange. Except for its blood red inflorescence bracts and narrower and darker green leaves, the inflorescence and flower structure are similar to *Zingiber* sp. a (HI 865).

CONCLUSION

Species which are commonly believed to be indicators of disturbed forests such as *Costus speciosus*, *Etilingera littoralis* and *E. punicea* are few or absent in this area, implying that the trails surveyed are rather undisturbed. Nearly 40% of the species surveyed so far, are similar to those found in Gunung Kinabalu and Poring. Of the 26 species documented in this report, at least 30% are potential ornamentals, a few species, in particular *Zingiber* spp may prove to be important resources for medicinal essential oils and 1 to 2 species may be edible. The village folks of Sayap have reported that certain wild specimens of *Zingiber* are useful in the treatment of snakebites. To ensure sustainable utilization of these zingiberaceous plants and other herbs, it is important to conserve the area and its flora.

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