

Report to Davis Expedition Fund: Gingers of New Guinea



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Summary. An expedition supported by the Davis Expedition Fund was conducted in Papua New Guinea in April 2016 targeting all flowering wild species of the order Zingiberales. A total, of 34 species were collected, and at least 10 are likely to be new to science. This material will form an important basis for elucidating the flora of New Guinea and clarifying the evolutionary processes that lies behind its uniqueness.

Introduction

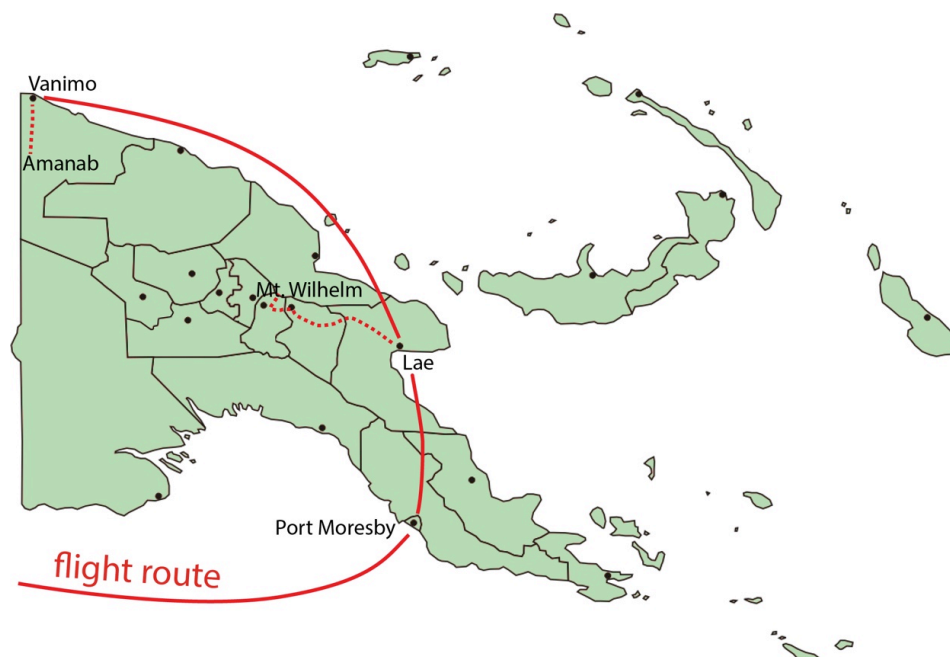
The ginger family (Zingiberaceae) consists of more than 1600 species distributed in all tropical regions (Fig. 1.). The highest diversity (53 genera) is found in the Indo-Pacific Region. Using molecular techniques, Kress et al. (2002) found that the most basal genera occur in Africa and Borneo, west of Wallace's Line (Wallace 1860; Fig. 1). My preliminary analyses indicate that the family originates west of this important biogeographical boundary and spread east in the mid Miocene to colonise and radiate on the islands that appeared from the ocean between Borneo and Australia due to tectonic movements (Hall 2012). Further sampling of the largest island east of Wallace's Line, New Guinea, is therefore highly desirable to provide stronger evidence of this hypothesis.

Ginger plants are often big and are not easy to collect. The flowers are often short-lived and delicate and require special care in order to make a collection useful for taxonomic revisions. Sadly, most of the herbarium material currently available is not of sufficient standard to be of much use other than providing a dot in the distribution map of one of the few well-understood species. Thus, it is essential to study the live plants in their natural habitats or in cultivation in botanical gardens in order to fully understand, describe and appreciate the species richness of gingers in SE Asia.

Fieldwork methodology

The collecting in the field followed standard techniques but extra care was taken to photograph details of the flowers and fruits, which will subsequently be pickled in alcohol. Leaf samples were dried in silica gel for later extraction of DNA. Herbarium collections were preserved in the field by using alcohol and later dried at the National Herbarium at the Forest Research Institute (PNG FRI) in Lae (LAE), the main counterpart. The first set was left in LAE and duplicates exported to the herbarium at the Royal Botanic Garden Edinburgh before leaving the country. Herbarium collections will be deposited at the national herbarium in Lae (LAE) and duplicates posted to Edinburgh (E) and other herbaria.

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Sites and counterpart

As proposed, two general areas were visited. The first at Amanab, Sandaun Province south of Vanimo, where collections were made close to the Indonesian border in mostly secondary forest of a logging concession area between 170 and 670 m above sea level. The second site was the forested upper slopes of Mount Wilhelm, the highest mountain of PNG, in Chimbu Province: Here gingers were collected in primary montane forests between 2850 and 3300 m. During the fieldwork, either Thomas Magun or Tiberius Jimbo, staff from the counterpart institution, PNG FRI, accompanied me in the field. In addition, staff from the provincial forest office or a local guide joined the fieldwork.



The Ginger Team at Lake Piunde (c. 3600 m) just below the summit of Mt. Wilhelm: Thomas Mundua, Axel Dalberg Poulsen, William Banda and Tiberius Jimbo (FRI).

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Results

In total, 35 collections were made representing 28 species of the family Zingiberaceae (gingers in a strict sense), three species of Costaceae and three species of Marantaceae.

In addition a few seeds were exported and some have germinated in the glasshouses in Edinburgh for later scientific studies and may be accessible to be seen by the public when the plants are mature.

It is estimated that 10 new species were collected during the expedition. The eight species of *Etilingea* collected during the fieldwork at Amanab serves as a good example to illustrate how poorly known the ginger flora of New Guinea is (see photo gallery below).



One collection (*Poulsen et al. 2995*) is clearly *E. labellosa* (K. Schum.) R.M. Sm. Another collection (*2997*) may match the type of *Amomum procurrens* Gagnep., which would then involve publishing a new combination. The remaining six collections probably represent new species to science, one of which (*2993*) matches a previous collection along the Kiunga–Tabubil road made in 2008. Another (*3010*) looks like a very good match to a collection from West Papua made simultaneously by Indonesian botanists and it is planned that the new species can be described jointly.

The samples of all species will be included in on-going revisions, described and molecular samples used in biogeographical and evolutionary analyses.

References

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