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Gunung Mulu National Park: A Heaven for Aroiders

Wong Sin Yeng[1] and Peter C. Boyce[2]

It is a breathtaking experience when you first visit Gunung Mulu National Park in Miri, NE Sarawak. Mulu is truly a wonder of nature and Mulu's status as a World Heritage Site underlines its outstanding conservation value. But an equally astounding experience is seeing for yourself how rich Gunung Mulu National Park is with aroids. Over a seven-day field trip we made to the lowland areas of the park in August 2006, we encountered ca 80 species of aroids in 18 genera and these just from the most readily accessible day-trip trails.

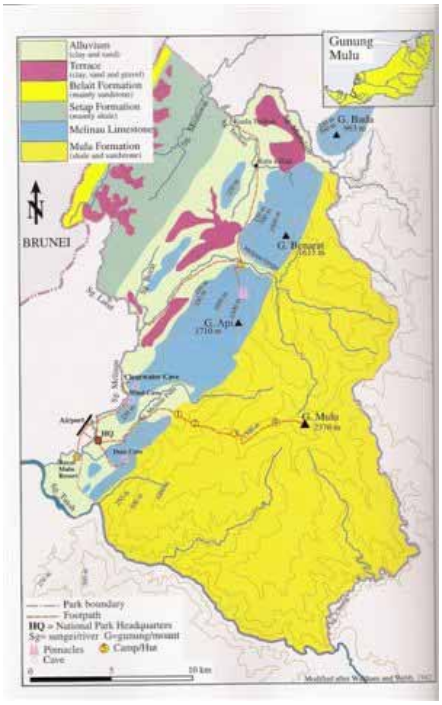

Fig. 1: Geological Map of Mulu National Park.

As shown on the geological map (**Fig. 1**), Mulu's geology consists of several different rock types. Each rock type has distinctive properties which ultimately result in the dramatic differences seen in Mulu's landscapes, soil and vegetation types. The Gunung Mulu massif occupies the entire southeastern half of the park and is made up of shales (claystones which split into thin layers) and interbedded sandstones. Together these sedimentary rocks comprise the Mulu Formation, which has an enormous thickness, estimated to be some 4000 to 5000 m. Microfossils indicate an age of between 40 and 90 million years (Late Eocene to Late Cretaceous). Sandy soils have developed on the Mulu formation rocks. Then there are the limestones, the spectacular line of mountains comprising Gunung Buda, Gunung Benarat, Gunung Api, and the southern limestone hills that make up the Melinau Limestone Formation which in combination are the geology for which Mulu is most famous; the Pinnacles are part of this limestone. Further up to the north, is the Setap formation which joined up with Brunei's Setap formation, made of shales (Hazebroek & Abang Kashim, 2002). These interesting mixed geologies may explain the richness of the flora for the national park. Sadly, since the last big 1977 Royal Geographic Society Expedition, there have been rather little serious botanical activities carried out for the park.

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5th August 2006.

Day of arrival and trail to Deer and Lang Caves and trail to Paku Waterfall.

We arrived at the park in the morning of 5th August 2006 after an overnight stay at Miri engendered by there being no connecting flight on the same day to Mulu. Aside from the authors, our team comprised Aida Shafreena from UNIMAS and Jeland Ak Tisai and Mael ak Late, employees of Malesiana Tropicals. Aida with help from Jeland targeted gingers, and the authors with Mael concentrated on aroids. After an initial briefing meeting to explain to the park manager and his wife, Brian and Sue Clark and their chief guides the purpose of our trip and to show them our letter of permission from the Sarawak Forestry Corporation, we hurriedly dumped our bags at the guesthouse, and kicked off for a half day of field work to undertake an initial survey of the main trail to Deer Cave.

However, before we even reached the trail we spent some time investigating the large area of open forest surrounding the Headquarters itself and this proved to be a botanically interesting place. In fact, it took us quite a while to progress from the Headquarters since the surrounding areas contained numerous indigenous aroids including *Alocasia sarawakensis* M. Hotta (**Figs. 2, 3** & **4**) with its distinctive abaxially raised venation and clusters of white inflorescences, *A. princeps* W. Bull, *A. reginae* N.E.Br. (a beautiful species endemic to Mulu – **Fig. 5**), the shale-associated *A. longiloba* Miq. 'watsoniana' and *Pothos mirabilis* Merr. A new species of *Homalomena* we encountered during a previous field trip at Bukit Satiam, Bintulu Division was present with striking red petioles and was shedding pollen heavily (**Figs. 6** & **7**); we observed male anthesis to last for more than two days.

Other common aroids in the area of the Headquarters included plenty of *Amorphophallus hewittii* Alderw. (very common throughout Sarawak), *A. rugosus* Hett. & A. Lamb, and the distinctive *A. angulatus* Hett. & A.Vogel with angled petioles sometimes forming an intercalary bulbil at the junction of the lamina. Also present were the ubiquitous *Schismatoglottis motleyana* (Schott) Engl., and *S. colocasioidea* M. Hotta (treated by Hay & Yuzammi (2000) as a synonym of *S. trifasciata* but always distinct and stable in the field) and an unidentified *Schismatoglottis* with bluish green leaves, often with plantlets formed on the abaxial surface of the leaf. *Aglaonema nitidum* (Jack) Kunth and *A. simplex* (Blume) Blume are everywhere in Mulu and during our visit were usually present with inflorescences and infructescences on the same plant.

Fig. 2: *Alocasia sarawakensis* M. Hotta.

Fig. 3: *Alocasia sarawakensis*, note distinctive abaxially raised venation.

Fig. 4: *Alocasia sarawakensis*, showing clustered inflorescences.

Fig. 5: *A. reginae* L.Linden ex N.E.Br.

Fig. 6: *Homalomena* with striking red petioles.

Fig. 7: *Homalomena* shedding pollen heavily, male anthesis lasted for more than two days.

Fig. 8: *Lasia spinosa* (L.) Thwaites.

Fig. 9: *Phymatarum borneense* M. Hotta.

Fig. 11: *Anadendrum*, one of several new species at Mulu.

Among the climbing aroids, numerous *Rhaphidophora* were notable, including *R. latevaginata* M. Hotta, *R. foraminifera* (Engl.) Engl., *R. elliptica* Ridl., a species similar to *R. elliptifolia* Merr. but with leaves much narrower and the shoot tips lacking fibrous debris, the widespread and very variable *R. korthalsii* Schott, the swamp-forest associated *R. lobbii* Schott and the usually rare, in Borneo, *R. sylvestris* (Blume) Engl. were quite common on the trees. All of the herbaceous aroids are plants obtained from the park and planted at the Headquarters as part of the education programme, while some of the aroid climbers were there originally and some, planted. So often in Sarawak, you see exotic plants planted to attract tourists, here the use of local indigenous species is a good indication that the park is superbly managed and maintained.

Upon entering the main trail to Deer and Lang Caves, there are proper elevated wooden boardwalks all the way to the caves, passing through alluvial soils, in places seasonally inundated forest with limestone outcrops. A small population of *Lasia spinosa* (L.) Thwaites (**Fig. 8**), with deeply divided leaves on prickly petioles and curiously thick-spongy textured twisted spathes the colour of an overripe banana, can be seen at the beginning of the main trail on inundated alluvium. We were particularly excited to encounter another new species belonging to the *Schismatoglottis nervosa* Ridl. Complex, which we had anticipated finding before this trip based on our research in other isolated limestone areas on the alluvium. The Mulu element has thick leaves, a leaf abaxial surface not glaucous and a soon-caducous petiolar sheath. Only one patch of this plant was found, and we suspect that this species might be washed out possibly from the limestones of Mulu massif; certainly several of the *S. nervosa* complex are limestone associated; currently the first author is in the process of preparing a manuscript on these odd terpenoid-smelling aroids. And at last, the first author gets her first view of the last genus in the tribe of Schismatoglottideae, *Phymatarum borneense* M. Hotta (**Fig. 9**), a monotypic genus. It occurs on mud banks and is very common here in Mulu, in fact too common, on every mud bank, for sure there is a whole population of *P. borneense*. It is similar to the genus *Schismatoglottis* with constricted spathe except for the pollen being extruded from a pair of thecae horns. On the limestones by the side of the path, we saw *Schismatoglottis multinervia* M. Hotta (**Fig. 10**), with leaves with cordate base and venation arising almost 90° from the midrib before abruptly curving towards the leaf apex. It is very similar to another species (as yet undescribed) at Niah National Park, but with vegetative tissue not emitting a resinous smell when crushed. Other novelties on the limestones along this trail include another new *Schismatoglottis* near to *Schismatoglottis patentinervia* Engl. with 90° venation from the midrib but primary venation not as closely spaced and a curious species in the *Schismatoglottis asperata* Engl. group with pellucid veins.

This first day we decided to divert to Paku Waterfall trail instead of following the main trail to Deer and Lang Caves in order to investigate the freshwater seasonally inundated forest. Soon we encountered an *Anadendrum* in flower with a distinctive marcescent petiolar sheath (**Fig. 11**). In Borneo there are several

Fig. 10: *Schismatoglottis multinervia* M. Hotta.

Fig. 12: *Scindapsus latifolius* with petiolar sheath and prophyll/cataphyll debris.

species of this taxonomically difficult genus and none appears to have a name. More *Schismatoglottis motleyana* c.f. with pale yellow leaves formed large colonies on the forest floor. Climbers were represented by *Scindapsus treubii* Engl. with a strongly oblique leaf; the gigantic *S. latifolius* M. Hotta (**Fig. 12**), looking similar to *S. glaucescens* from west Sarawak but differing in being green on both sides of the leaves, with the primary veins very prominent, and remarkable petiolar sheath and prophyll/cataphyll degrading to form stinging debris [this is a plant you would consider twice before trying to collect... speculation as to the function of these stinging properties was discussed by Boyce (1993)]; and *Scindapsus crassipes* Engl., a stout climbing hemiepiphyte with scattered leaves on climbing stems that periodically give rise to fans of foliage from which arise the yellow inflorescences. Other climbers included the common and very widespread *Pothos scandens* L. and a handsome *P. mirabilis* (**Fig. 13**) in flower. In more exposed swampy areas *Homalomena rostrata* Griff, a helophyte, occurred. Although not so common here, it is very widespread in Niah National Park, Bintulu Division. Another genus, *Cryptocoryne longicauda* Engl. occurred submerged in the water with the leaves floating on the surface and remarkable cobra-like inflorescences (**Fig. 14**). Along the mud banks we further encountered a few plants of the rheophyte *Rhaphidophora beccarii* (Engl.) Engl. although here, as elsewhere in Mulu, it seems that the mud-bank rheophytic habitat is more-or-less dominated by *Phymatarum*. Soon after that we reached a large *Baccaurea* (Euphorbiaceae) tree with dozens of large fruits carried on the trunk like monstrous bunches of grapes and being thirsty savoured the extremely sour but curiously thirst-quenching fruits. After such a refreshing moment, we felt like could continue more field work but we decided to return as it was getting dark. Mael marked the spot. By now we were starving and so when we reached the Headquarters, went for laksa (a local delicacy, spicy rice noodle soup) at the canteen. It was good but quite expensive at RM 8 per bowl, where in Kuching the cost is only RM 3.50. But considering that there is no land transport to this part of the world, the high cost was easily forgiven.

to be continued in the next issue....

Fig. 13: *Pothos mirabilis* Merr.

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Fig. 14: *Cryptocoryne longicauda* Engl.