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## Table of Contents





# Geological Perambulations

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Figure 1. *Schismatoglottis multinervia* M.Hotta is restricted to limestone outcrops at Mulu N.P., NE Sarawak.

Figure 2. *Schismatoglottis hayi* S.Y.Wong & P.C.Boyce is closely similar to *S. multinervia*, and is found only on heavily forested limestone at Niah Caves N.P.

Of all ecologically significant factors, geology is possibly one of the least well-studied and documented, and certainly least well-understood aspects of tropical Araceae. By way of example, despite the relative abundance of limestone-related floristic studies in Malaysia (e.g., Ping & Kiew, 1997; Kiew *et al.*, 2004) these published accounts contain only limited information concerning Araceae, despite the fact that aroids constitute a major floristic element of the biodiversity of tropical limestones. Although data relating to aroid geological preferences are noted in various revisionary accounts for tropical Asia including for *Alocasia* (Hay, 1998, 1999), *Piptospatha* (Wong et al., 2009), and *Schismatoglottis* (Hay & Yuzammi, 2000; Wong 2010) so far only Boyce & Wong (2009) have published specifically on the aroids and their associated geology. The only other publication that we are aware of is from Brazil, another country with an enormously rich and diverse aroid flora, where Gonçalves (2010) published specifically on aroids and their geology. Nonetheless, fieldwork in Borneo over the past few years has begun to provide a wealth of data on the often highly localized species that are restricted to specific habitats.

To start with limestone formations, a particularly striking feature of these remarkable ecologies is that often a particular limestone outcrop harbours its own unique species, but other such formations have related but different species that are themselves locally unique. For example, *Schismatoglottis multinervia* M.Hotta (Figure 1), is unique to limestone formations at Mulu National Park in NE Sarawak and is most closely related to *S. hayi* S.Y.Wong & P.C.Boyce (Figure 2), a recently described species occurring only on the limestones at Niah Caves N.P., some 130 km to the west of Mulu. Other such examples of sibling species involving the extraordinarily rich Mulu limestones are *Alocasia reginae* N.E.Br. (Mulu – Figure 3) and *A. reginula* A.Hay (from Bukit Tabin, Sabah – Figure 4), and the even more complex situation presented by the Mulu endemic *Amorphophallus julaihii* Ipor, Tawan & P.C.Boyce (Figure 5) which is related to no fewer than four other species, each associated with a specific limestone area: *A. niahensis* P.C.Boyce & Hett. (Niah Cave N.P. – Figure 6), *A. juliae* P.C.Boyce & Hett. (Merirai, central Sarawak – Figure 7), *A. eburneus* Bogner (Padawan/Penrissen limestones, SW Sarawak – Figure 8), and *A. brachyphyllus* Hett. (Bau limestones, W.Sarawak – Figure 9).

Although limestone aroid floras are indubitably fascinating, and provide much information pertaining to vicariance events and other evolutionary processes, other tropical geologies are as rich, or indeed richer. In recent years, studies focusing on shales and more recently granite have begun to reveal a wealth of geologically endemic taxa.