

## *Hapaline appendiculata* (Araceae: Caladieae) Rediscovered

PETER C. BOYCE, JELEND AK KISAI AND JEPOM AK TISAI

Malesiana Tropicals, Suite 9-04, Tun Jugah Tower,  
No. 18, Jalan Tunku Abdul Rahman,  
93100 Kuching, Sarawak, Malaysia

### Abstract

*Hapaline appendiculata* Ridl., a species endemic to Sarawak, Borneo, and hitherto known from only three collections, has recently been recollected. An expanded description for the species, first ever published field photographs and a key to *Hapaline* in Borneo is presented.

### Introduction

Recent and on-going fieldwork in Sarawak continues to reveal a wealth of novel aroid species and has led to the rediscovery of numerous others known from fewer than five collections. One such recent discovery was that of *Hapaline appendiculata* Ridl., an aroid known from just three previous collections, all fragmentary, and thus seemingly representing one of the rarest aroids in Borneo.

### Hapaline

*Hapaline* is a genus of seven published species occurring from Myanmar to China (Yunnan) and south to western Sarawak. All species so far discovered are diminutive to moderate-sized, slender, tuberous or stoloniferous, clump-forming, terrestrial and seasonally dormant or (rarely) evergreen herbs. See Boyce (1996) for an extensive commentary and generic description.

*Hapaline* is superficially similar to species of the genus *Typhonium* Schott (tribe Areae), most notably in the sagittate leaves with prominently reticulate venation. In Borneo there are only three *Typhonium* species, all introduced and all associated exclusively with ruderal habitats whereas *Hapaline* is only found in natural forest. Elsewhere in the range of *Hapaline* (e.g., Thailand) there are strikingly similar species of *Typhonium* in natural habitats and confusion is possible between these and *Hapaline*. In these instances the floral characters to distinguish *Typhonium* include the naked spadix appendix (spadix appendix covered in synandrodes: *Hapaline*), the inflated, convolute lower spathe (lower spathe clasping the female flower

zone: *Hapaline*), free male flowers (stamens fused into synandria: *Hapaline*) and the female flower zone free (fused to the abaxial lower spathe surface: *Hapaline*).

***Hapaline appendiculata* Ridl.**

*Hapaline appendiculata* Ridl., J. Straits Branch Roy. Asiat. Soc. 49 (1908 ('1907')) 47; Bogner, Pl. Syst. Evol. 144 (1984): 62 (1984); Boyce, Kew Bull. 51(1) (1996) 63-82 (1996). **Type:** Sarawak, Kuching Division, Puak, Sept. 1890, *Ridley 12411* (holotype SING!; isotype K!).

Slender, tuberous, seasonally dormant perennial herb up to 25 cm tall. **Stem:** tuberous,  $\pm$  cylindric, *c.* 1.5 x 1 cm; plants frequently producing two to five slender (*c.* 3 mm diam.) stolons to 30 cm long, these rooting terminally and forming additional tubers. **Roots** *c.* 0.25–0.33 mm in diam., mostly spreading through the leaf litter-soil interface. **Leaf** prophyll linear, up to 9 x *c.* 4 mm, acute; cataphylls oblong-lanceolate to linear triangular or triangular, up to 10 cm x 5 mm, attenuate to acute, prophyll and cataphylls at first membranous and pale green, soon darkening and drying papery; petiole 2.5–18 cm x 1–2 mm; leaf blade ovate to hastate or subsagittate, 10–21 x 3.5–8.5 cm, thinly coriaceous or coriaceous, even on the same plant, pale to dark green, occasionally with various greyish to pale green blotchy or/ or cloudy markings adaxially, abaxial surface much paler, sometimes suffused reddish purple in which case primary mid-vein and primary lateral veins on abaxial surface purple-red, margins smooth, apex acute to acuminate, posterior lobes rounded to subacute, divergent to almost parallel, sometimes  $\pm$  absent. **Inflorescence** (1)2–4 together held level with or below the leaves; peduncle 4–25 cm x 0.25–0.5 mm; spathe 2–7 cm long; spathe limb elliptic, 1.6–2.6 cm x 5–7 mm, apex acute to briefly attenuate, base decurrent into lower spathe; lower spathe margins clasping the ovaries, 4–8 x *c.* 1.5 mm; spadix 2.5–3.5 cm x 0.25–1 mm, free portion cylindric, up to 14 mm long, tapering apically into a greatly attenuated appendix to 9 mm long composed of connate synandrodes. **Flowers** synandria irregularly elongate in plan view, 2–3 x 0.5–1 mm; ovaries bottle-shaped, 1.5 x 0.7 mm, two or three in a single row aligned longitudinally along the spadix axis; stigma capitate, *c.* 0.2 mm in diam., papillose; style very short. **Infructescence** carried on declinate to reflexed peduncle, enclosed by the persistent lower spathe, 2 cm x 4 mm, few-berried; berries more or less globular, ripening pale green, *c.* 4 mm in diam, stigmatic remains persistent, not prominent. **Seed** ellipsoid, *c.* 3 x 2 mm, glossy pale brown with a conspicuous white oily raphe.

*Distribution:*. Endemic to Sarawak with four collections to date, these only



**Plate 1.** *Hapaline appendiculata* Ridl. 1. A typical flowering individual at Tringgus (Boyce, Kisai & Tisai AR-1017). Note the greatly elongated appendix comprised of fused synandrodes; 2. A form with little or no posterior leaf lobe development; 3. An example of the leaf variegation present at Tringgus.

from Kuching Division (three collections) and Kapit Division (one collection).

*Other specimens seen:* SARAWAK. Kuching Division: Krokong, Kampung Tringgus, Sungai Bong, 01° 15' 22.8"; 110° 05' 53.9", 4 March 2005, P.Boyce, Jelend & Jepom AR-1017 (SAR, UNIMAS); Bau, Bidi, 6 Dec. 1905, Hewitt 476 (SING!). Kapit Division: Belaga, Long Linau, near Punan Lusong to Long Jakah, 8 Sept. 1978, Burt & Woods 11477 (E!).

*Ecology:* Lowland evergreen moist valley forest on shales and basalt. Only recorded altitude c. 150 m asl (Tringgus). Both Bornean *Hapaline* are associated with shale and basalt whereas all other *Hapaline* species (all extra-Bornean) are restricted to karst limestone. Hewitt 476 is purportedly from a limestone habitat (Bidi). However, repeated visits to the site by the authors have failed to refind *Hapaline* and it is possible that the locality data are in error.

*Notes:* Based on the paucity of collections, *Hapaline appendiculata* appears to be one of the rarest aroids in Borneo. However, considering its diminutive size, the periodically dormant nature of the plant and the fact that aroids have received scant attention from field workers since Ridley's time, it is equally possible that it is simply overlooked during fieldwork. It is worth noting that the Kuching and Kapit collections of *H. appendiculata* are 340 km apart with much of the intervening forest botanically unexplored.

*Hapaline appendiculata* was not visible during several previous visits by the authors to Tringgus although on the trip that lead to the collection discussed here it was abundant and flowering gregariously.

The method of seed dispersal is unknown although the oily raphe suggests ant dispersal, as occurs in other aroid genera with similar seed, e.g., *Biarum* Schott and *Eminium* Schott (both Mediterranean). The first author has observed morphologically similar seed of *Zingiber pseudopungens* R.M.Sm. and *Z. pachysiphon* B.L.Burt & R.M.Sm. (Zingiberaceae) being carried by solitary foraging ants of the genus *Campanotus*.

*Hapaline appendiculata* differs from *H. celatrix* P.C.Boyce (Brunei) by its seasonally dormant habit, thinly coriaceous leaves and greatly elongated sterile appendix. The habitat of *H. celatrix* is briefly seasonally-dry riverine forest on shale. Both known localities of *H. celatrix* are more exposed (higher light levels) and presumably less humid for at least part of each day than the habitats of *H. appendiculata*. In neither locality is *H. celatrix* abundant.



**Plate 2.** *Hapaline appendiculata* Ridl. 4. A form with hastate concolorous leaves; 5. Showing the range of variation in leaf shape and markings present at Tringgus. These individuals were collected within 20 metres of one another.

### Key to the Two Species of *Hapaline* in Borneo

- 1a. Spadix sterile apex greatly elongated, exceeding spathe limb; foliage thinly coriaceous..... *H. appendiculata*  
 1b. Spadix sterile apex not greatly elongated, not exceeding spathe limb; foliage thickly coriaceous. . . . . *H. celatrix*

### Acknowledgements

The collaboration and support of the Sarawak Forestry Department, the Sarawak Biodiversity Centre, in particular Datin Eileen Yen Ee Lee, the Forest Research Centre (Kuching), notably L.C.J. Julaihi, and UNIMAS, in particular Assoc. Prof. Isa Ipor, is gratefully acknowledged. Thanks are due to Datuk Amar (Dr) Leonard Linggi Tun Jugah, Graeme Brown and Dr Timothy Hatch of Malesiana Tropicals Sdn Bhd for their support and funding of fieldwork in Sarawak.

### References

- Bogner, J. 1984. On *Hapaline appendiculata* and *Phymatarum borneense*, two rare *Araceae* from Borneo. *Plant Systematics and Evolution*. **44**: 59—66.  
 Boyce, P.C. 1996. *Hapaline* (Araceae: Aroideae: Caladieae). *Kew Bulletin*. **51**: 63-82.