

Studies on Schismatoglottideae (Araceae) of Borneo XVIII: Additional observations on *Schottariella mirifica*

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ABSTRACT

Schottariella mirifica, the sole species of a Bornean endemic genus, is known from four localities on the Kanowit and Ai river catchments of western Sarawak, Malaysian Borneo. Based on recent fieldwork we here present expanded ecological information, and new morphological data, including descriptions and illustrations of the previously unknown mature infructescence.

KEY WORDS

Araceae, *Schottariella mirifica*, Sarawak, Malaysian Borneo, Fruits.

INTRODUCTION

In publishing *Schottariella mirifica* P.C.Boyce & S.Y.Wong (Boyce & Wong, 2008, 2009) the description of fruiting material was based on an incompletely fertilized sub-mature infructescence, and a damaged persistent lower spathe from plants in cultivation. This resulted in incomplete information as to the posture of the peduncle/spathe at fruit maturity in nature. These morphologies are of considerable taxonomic significance in the Schismatoglottideae (see, e.g., Boyce & Wong,

2008; Bogner & Hay, 2000; Hay & Yuzammi, 2000; Wong & Boyce, 2010; Wong et al., 2009; Wong et al., 2011). Field trips sampling *Schottariella* has all hitherto been at times of high water (*landas* or wet season), and thus the extent of the known wild populations impossible to ascertain. However, a visit to the type locality of *S. mirifica* in August 2011 coincided with an extended period of dry weather such that river levels were very considerably lower than on previous visits. This enabled a much more extensive survey of the site than had been previously possible.

ECOLOGY

Schottariella mirifica is restricted to vertical clay-mud banks, several meters high, along forest streams draining into larger rivers (**Plate 1A**). Except at times of low water levels assessment of *Schottariella* populations is both difficult and somewhat dangerous; in Sarawak deep-water 'feeder' streams close to big rivers frequently harbor estuarine crocodiles.

To date *Schottariella mirifica* is known from four populations. Only at that the type locality (Sungai Matob) are populations extensive and the plants abundant. The



Plate 1. *Schottariella mirifica* P.C.Boyce & S.Y.Wong. **A.** Type locality habitat at low water, Sungai Matob. *Schottariella* occurs on the vertical mud banks. At high water the river overtops these banks. **B.** Plants in locality at Pakan. Note the silt deposition on the leaves. Images: A. © P.C.Boyce; B © M.Lo, used with permission.

recently found population on the Sungai Pakan is the next most populous, but at very much smaller level as compared with that at Sg. Matob. The Matob population is very close to rural habitation and thus

potentially subject to disturbance. However, since the nearby indigenous peoples communities are dependent on the river for fresh water, and fishing and on the forest in general for hunting and gathering

non-timber forest produce the site is effectively well-stewarded

The Sungai Matob drains into the Batang (big river) Kanowit. *Schottariella mirifica* occurs for a distance of several kilometers along the Sg. Matob, and is by a considerable margin the dominant obligate rheophyte on the Sg. Matob. Next most common, although substantially less abundant, is *Schottarium sarikeense* (Bogner & M.Hotta) P.C.Boyce & S.Y.Wong. Other obligate rheophytic species occurring as scattered individuals or very small colonies are *Bucephalandra molleyana* Schott, *Ooia grabowskii* (Engl.) S.Y.Wong & P.C.Boyce, and an unidentified *Piptospatha*. The facultative rheophyte *Schismatoglottis tecturata* (Schott) Engl. is present in places, but never abundant. Higher up the banks out of the rheophytic zone although still subject to periodic inundation occur *Homalomena griffithii* (Schott) Hook.f. and two undescribed *Schismatoglottis* belonging to the Calyptrata Group (*sensu* Hay & Yuzammi, 2000).

Based on the distribution of plants our ecological observations confirmed that plants of *Schottariella* are frequently completely submerged by fast-flowing water but at other times are subjected to desiccating conditions. In cultivation plants have been shown to revive completely from almost completely leaflessness resulting from a protracted period of root dryness.

In habitat, most plants bear evidence of considerable silt-deposition on the leaf blades (**Plate 1B**), the result of heavily silt-laden flood water flowing back from the large rivers into which the forest streams drain and then, as water levels slowly fall, depositing out their silts. Leaf blade silt-deposition is also a feature of rheophytic *Phymatarum borneense* M.Hotta, and occurs in the two rheophytic *Rhaphidophora* on Borneo (*R. beccarii* (Engl.) Engl. & *R. typha* P.C.Boyce) but is otherwise a rare event among rheophytes.

ADDITIONAL MORPHOLOGICAL DATA

Several new morphological observations were made possible by this extended survey.

Roots

Schottariella produces only a weakly ramified network of spreading surface roots as compared with other obligate rheophytic Schismatoglottideae. Instead *S. mirifica* produces numerous highly elastic robust taproots that penetrate deep into the earth bank and appear to anchor the plants more effectively than would surface roots, which presumably would be easily dislodged from the loose mud of the bank surface by water turbulence. It is interesting to note that all rheophytic Schismatoglottideae found primarily on rocks have extensive spreading surface roots, whereas the very few species that favor looser substrates, such as *Schottariella* and *Phymatarum borneense*, produce taproots and much reduced surface roots.

Stems

In the original description of *Schottariella* the stems were described as “condensed, (very rarely elongated and forming a decumbent to weakly creeping rhizome)”. It has now been observed that plants on the lower part of the river banks (i.e., nearer to the water) habitually have the stem ‘climbing’ up to 50 cm, for the most part naked, with only the uppermost portion with a few scattered leaves and then terminated by a loose rosette. Although long-term study is required to verify, it is tempting to regard that these elongating stems are a mechanism to enable leaf rosette to reach an optimum minimum position above the water. Despite diligent searching, stem elongation of this nature was never encountered of plants higher up the banks.

Leaves

Large plants have up to 50 leaves in a dense rosette (**Plate 1A**). The longest leaves [petiole + blade] observed were 40.5 cm long (vs. 26 cm long in the original description). However, these were plants of exceptional stature. The span of measurements given in the original description still encompasses the majority of the population at the type locality.



Plate 2. *Schottariella mirifica* P.C.Boyce & S.Y.Wong. **A.** Young infructescences with the peduncle arching. **B.** plant with ripe infructescence. Note the peduncle has extended considerably as compared with the immature infructescence (top middle), and is pendent. Note, too, the scoop-shaped persistent spathe. **C.** Dorsal view of persistent spathe of mature infructescence. Note the strongly oblique, impressed peduncle insertion strongly oblique. **D.** Ripe infructescence, ventral view; the sunken stigmatic remains are clearly visible. Images: A. © P.C.Boyce.

Infructescence

New field observations have enabled compilation of a complete description of the infructescence. The following text is intended to replace the infructescence description given in Boyce & Wong (2008).

Fruiting spathe peduncle initially arching (**Plate 2A**), later considerably extending (up to 25 cm) and becoming fully pendent (**Plate 2B**), the mouth of the persistent spathe held downwards with the convolution ventral in respect to the peduncle; persistent very unequally funnel-form (scoop-shaped – see **Plate 2A & D**), 1.5–3 cm long, 1–1.3 cm wide across the mouth, peduncle insertion strongly oblique, dorsally impressed, spathe free margins obliquely declined towards the convolution, exterior glossy green with deeper green longitudinal veins, the free margins brown-scarred from the shedding spathe limb; infructescence obliquely stoutly ellipsoid, almost the entire ventral surface adnate to the persistent lower spathe; berries gibbous-cylindric (those closest to the peduncle) to ellipsoid-oblong (the majority), 1–1.8 mm long, 1–1.5 mm diam., ripening medium glossy green, stylar portion somewhat contracted; stigmatic remains sunken with a conspicuous raised acute rim, dull pale brown.

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