

Studies on Homalomeneae (Araceae) of Sumatera III – A new species of *Furtadoa* – *Furtadoa indrae*

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ABSTRACT

Furtadoa indrae P.C.Boyce & S.Y.Wong, is described as a taxonomically novel species from Riau Province, Sumatera, and compared with the most similar species, West Sumateran *F. sumatrensis* M.Hotta. An identification key to the described species of *Furtadoa* is provided. *Furtadoa indrae* is figured in colour from living plants, and a comparative figure of the spadix of all three described *Furtadoa* species is presented.

KEY WORDS

Rheophyte, Araceae, Homalomeneae, Sumatera

INTRODUCTION

Furtadoa (Hotta 1981) was described with a single species: *Furtadoa sumatrensis* M.Hotta, based on collections from West Sumatera. Hotta differentiated *Furtadoa* from the very clearly allied *Homalomena* by unistaminate staminate flowers, each staminate flower with an associated pistillode, and basal

placentation. Additionally, *Furtadoa sumatrensis* has a small inflorescence (spathe c. 1–2 cm long) on a disproportionately long (c. 7 cm) slender peduncle. While the last is not unique to *Furtadoa*, similar occurrences are decidedly scarce in *Homalomena*. A close relationship between *Furtadoa* and *Homalomena* was subsequently evinced by molecular analyses (Cusimano et al., 2011; Nauheimer et al., 2012). In habitat *F. sumatrensis* is an obligate rheophyte *sensu* van Steenis (1981, 1987), and appears to be locally restricted in distribution. A study of pollen-flow revealed populations maintained genetically distinct identities in separate river valleys (Mori & Okada, 2001).

Hotta (1985) subsequently transferred a long-anomalous West Malaysian species of *Homalomena* into *Furtadoa* as *F. mixta* (Ridl.) M.Hotta. While spadix structure of *F. mixta* is unquestionably in agreement with *Furtadoa*, it otherwise differs markedly from

F. sumatrensis by being a mesophytic herb with the clusters of inflorescences carried beneath the leaves in much the same manner as species of *Homalomena* sect. *Chamaecladon*.

In April 2015 we received living material of four aroids which we assumed to belong to *Homalomena* of the section *Chamaecladon*. On establishment and flowering, three of them have, indeed, proven to belong to sect. *Chamaecladon*. The fourth, however, to our considerable surprise revealed itself to be a new species of *Furtadoa* M.Hotta, most similar to *F. sumatrensis* but clearly differentiated by the membranous leaf blades and the structure of the flowers, in particular the pistillate flowers.

Dimensions used in the descriptions are derived from fertile (i.e., mature) plants. Seedlings have overall smaller measurements.

KEY TO THE SPECIES OF *FURTADOA*

- 1a. Rheophytes; peduncle long (c. 6–9 × as long as spathe), inflorescences paired, carried above the foliage. Sumatera **2**
- 1b. Mesophytes; peduncle short (at most 3 × as long as spathe), inflorescences in fascicles of up to 7, carried at the base of the petioles. West Malaysia
 ***F. mixta* (Ridl.) M.Hotta**
- 2a. All staminate flowers associated with a pistillode; spadix conspicuously stipitate; pistils bottle-shaped rich green; stigma ¼ diam. of pistil; leaf blades thinly membranous on short (¼ leaf blade length) petiole ***F. indrae* P.C.Boyce & S.Y.Wong**
- 2b. Terminal portion of spadix comprised of staminate flowers lacking pistillodes; pistils globose, pale cream; stigma ½ diam. of pistil; leaf blades coriaceous on a long (¾ to exceeding leaf blade length) petioles. ***F. sumatrensis* M.Hotta**

Furtadoa indrae P.C.Boyce & S.Y.Wong, **sp. nov.** Type: Indonesia, Sumatera: Propinsi Riau, **Kabupaten** Kuantan Singingi, Kecamatan Kuantan Tengah, Taluk Kuantan, c. 0°31'55.06"S 101°34'58.44"E, c. 50 m asl, 16 Apr 2015, *Indra AR-5196* (holo ANDA!; iso BO, BOKR, SAR – all ethyl alcohol preserved!). **Figure 1, 2A.**

Diagnosis

Furtadoa indrae differs from *F. sumatrensis* by a markedly stipitate spadix (vs spadix sessile or at most very briefly stipitate (stipe <1 mm long)) with staminate flowers until the spadix tip each associated with a pistillode (vs terminal portion of spadix composed only of staminate flowers), bottle-shaped (vs globose) rich green (vs pale cream) pistils with a small stigma (stigma ¼ vs ½

diam. of pistil), and thinly membranous (vs coriaceous) leaf blades on short (petiole ¼ vs ¾ to exceeding leaf blade length) petioles.

Small rheophytic herb up to c. 10 cm tall, vegetative tissues somewhat aromatic (terpenoids). **Stem** epigeal, creeping and rooting along its length, in time branching to form small patches with the older portions leafless, c. 3 mm diam. **Leaves** numerous, densely arranged along the stems, tufted at the active tips; **petiole** 1–2.5 cm long, rather slender, subterete, ventrally longitudinally weakly ridged, dorsally shallowly sulcate, medium green, sheathing in the lower ⅓–½; **wings of sheath** fully attached, c. 5–10 mm long, stiffly membranous, initially convolute, later (on older petioles) spreading and then wings often undulate-crisped, glabrous; **blade**

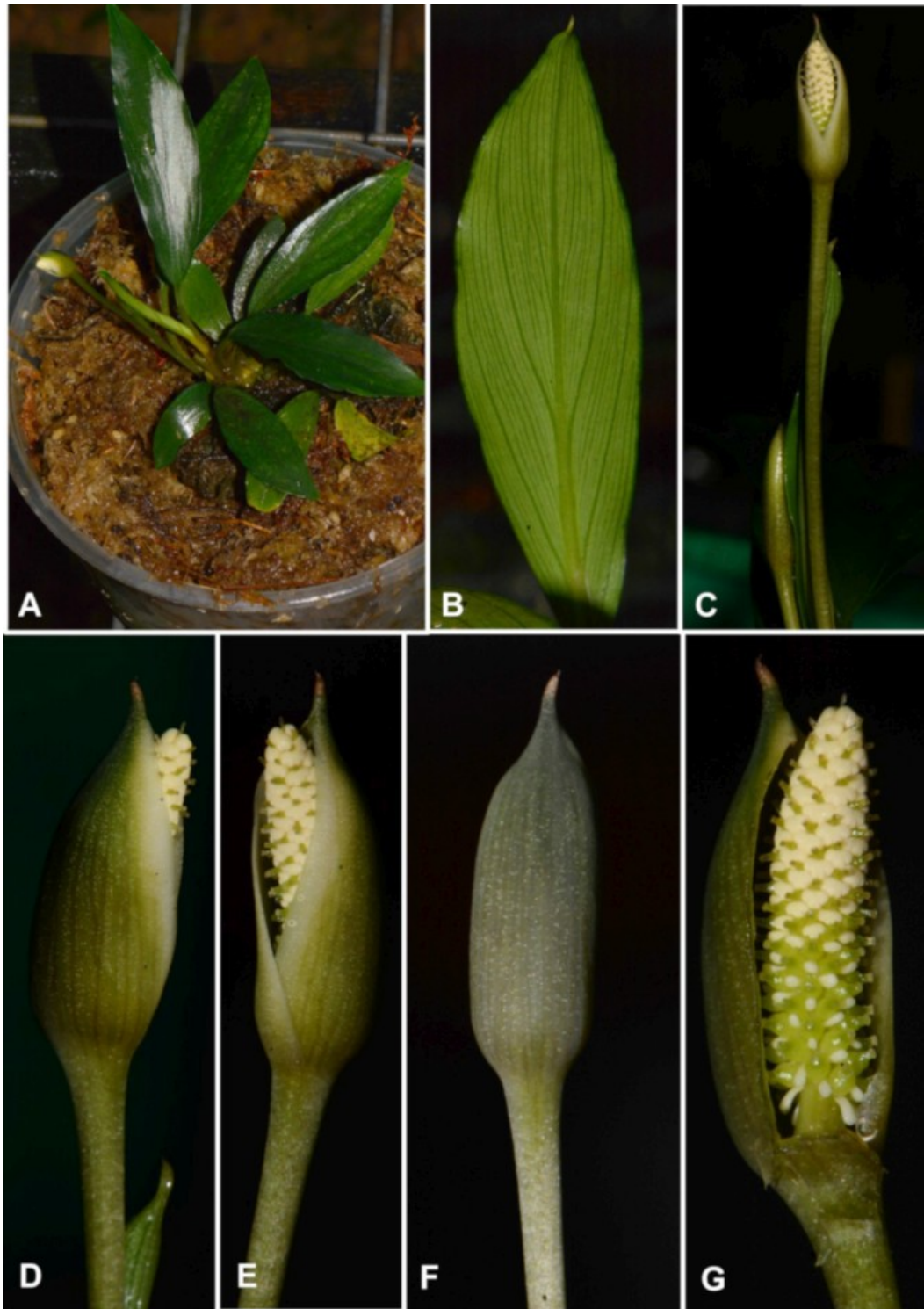


Figure 1. *Furtadoa indrae* P.C.Boyce & S.Y.Wong. **A.** Cultivated plant. **B.** Leaf blade, abaxial surface showing pellucid veins. **C.** Inflorescence at pistillate anthesis, developing inflorescence, and the first foliage leaf of the replacement shoot. **D–G.** Inflorescence at pistillate anthesis. **G.** Spadix at pistillate anthesis, nearside portion of spathe artificially removed. **A–G** from AR-5196. Images © P.C. Boyce.



Figure 2. Spadix of *Furtadoa* compared. **A.** *Furtadoa sumatrensis* M.Hotta. **B.** *Furtadoa indrae* P.C.Boyce & S.Y.Wong. **C.** *Furtadoa mixta* (Ridl.) M.Hotta. **A.** from AR-4044; **B.** from AR-5196; **C.** from Zulhazman *s.n.* Images A & B © P.C. Boyce; image C © Zulhazman H., used with permission.

narrowly elliptic, 2–7 cm long, 0.5–1.5 cm wide, semi-glossy dark blue-green adaxially, much paler green abaxially, base cuneate, tip acute, terminal tubule c. 1 mm long; **midrib** abaxially prominent, adaxially slightly sunken; **primary lateral veins** c. 3 on each side of the midrib, diverging at 20°, adaxially somewhat incised, abaxially slightly raised are conspicuously darker-pellucid than surrounding tissue; **interprimary venation** much finer than primary lateral veins, with numerous subparallel or weakly anastomosing veins closely spaced between each pair of primary veins; all other veins invisible. **Inflorescence** paired, subtended by a short 2-keeled green prophyll; **peduncle** terete, exceeding the foliage, up to c. 6.5 cm long, c. 1.5 mm diam., pale olive green mottled darker green. **Spathe** 1.3 cm long, including 2 mm terminal rostrum, unstricted; **spathe limb** ovate, tip rostrate, gaping at pistillate anthesis, clasping slightly during staminate anthesis, closing completely and persisting until fruit ripening, exterior medium olive green. **Spadix** cylindrical, very slightly forward-curved at anthesis, c. 1 cm long, including stipe; **stipe** conical, c. 2 mm long, greenish; **pistillate flower zone** cylindrical, slightly less than half length of spadix, c. 4 mm long; **pistils** somewhat congested, bottle-shaped, c. 1 mm diam., rich green, stylar portion darker; **stigma** button-like, c. 1/4 diameter of ovary, papillate; **interpistillar staminodes** clavate, all except lowermost row c. 1/2 height of associated pistil, c. 0.5 mm long, glossy white, interpistillar staminodes of basal row exceeding height of associated pistil, downwards-curved, c.

1.2 mm long, waxy white; **sterile interstice** absent; **staminate flower zone** tapering cylindrical, about half length of spadix, c. 5 mm long; **staminate flowers** consisting of a solitary stamen and a pistillode; **stamens** c. 0.5 mm diam., with 2–3 thecae, thecae pores on the ventral side of the flower with respect to the spadix axis, cream; **pistillodes** comprised of an atrophied ovary and a well-developed style topped with a vestigial stigma; **Fruiting spathe, fruits, and seeds** not observed.

Ecology — Growing on semi-shaded riverside rocks along a small forest river.

Distribution — *Furtadoa indrae* is known only from the type locality. Given its diminutive stature and the overall general resemblance of many of the smaller rheophytic aroids it is likely it may be overlooked elsewhere.

Eponymy — The trivial epithet recognizes the sharp eyesight and botanical expertise of its finder, Encik Indra.

Notes — *Furtadoa indrae* is an unexpected and timely discovery. Currently the authors are undertaking a phylogenetic study of *Homalomena*, including analyses of placement of species assigned to *Furtadoa* and their relationships, if any, to *Homalomena monadra* M.Hotta (Hotta, 1993), a species, uniquely for *Homalomena*, with unistaminate staminate flowers, but lacking the associated pistil present in *Furtadoa*, and with parietal (not basal) placentation.

References

- Cusimano N [et al., 2011], J. Bogner, S.J. Mayo, P.C. Boyce, Wong S.Y, M. Hesse, W.L.A. Hettterscheid, R.C. Keating & J.C. French. 2011. Relationships within the Araceae: comparisons of morphological patterns with molecular phylogenies. *Am. J. Bot.* 98: 654–668.
- Hotta, M. 1981. A new genus of the family Araceae from West Sumatra. *Acta Phytotax. Geobot.* 32: 142–146.
- Hotta, M. 1985. New species of the genus *Homalomena* (Araceae) from Sumatra with a short note on the genus *Furtadoa*. *Gard. Bull. Singapore* 38: 43–54.
- Hotta, M. 1993. *Homalomena monandra*, a new species of Aroid from West Sumatra. *Acta Phytotax. Geobot.* 44: 93–96.
- Mori, Y. & H. Okada. 2001. Reproductive biology and pollen flow of a rheophytic aroid, *Furtadoa sumatrensis* (Araceae) in the Malesian wet tropics. *Pl. Syst. Evol.* 227: 37–47.
- Nauheimer, L [et al., 2012], D. Metzler & S.S. Renner. 2012. Global history of the ancient monocot family Araceae inferred with models accounting for past continental positions and previous ranges based on fossils. *New Phytologist* 195: 938–950.
- van Steenis C.G.G.J. 1981. *Rheophytes of the world: an account of the flood-resistant flowering plants and ferns and the theory of autonomous evolution*. Alpena aan den Rijn. and Rockville: Sijthoff & Noordhoff.
- van Steenis C.G.G.J. 1987. Rheophytes of the world. Supplement. *Allertonia* 4 (Supplement): 267–330.