

Studies on Homalomeneae (Araceae) of Borneo XVII: two new species of granite-restricted *Homalomena* from NW Sarawak

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Homalomena caput-gorgonis S.Y. Wong and P.C. Boyce and *Homalomena succincta* S.Y. Wong and P.C. Boyce are described as taxonomic novelties respectively of the Selaburensis and Giamensis complexes from the foothills of Gunung Pueh, northwest Sarawak, where both are restricted to granite. Both species are illustrated from the Type collections. Identification keys to the species of the Giamensis and Selaburensis complexes are presented.

Keywords: Araceae; Homalomeneae; *Homalomena*; Malaysian Borneo; Gunung Pueh; granite

Introduction

Botanical investigation of the numerous mountain ranges of Sarawak continues to reveal further examples of geologically obligated, geographically isolated novel taxa. Here we describe two new species of *Homalomena*, *Homalomena caput-gorgonis* S.Y. Wong and P.C. Boyce and *Homalomena succincta* S.Y. Wong and P.C. Boyce, belonging respectively to the Selaburensis and Giamensis complexes, from the granites of Gunung Pueh, in northwest Sarawak.

The Gunung Pueh-Berumput massif straddles the border between Sarawak's Kuching Division (Sematan and Lundu districts) and Indonesian Kalimantan Barat (Sambas and Bengkayang regencies). Gunung Pueh-Berumput belongs to the same Upper Cretaceous granites and diorite system as Gunung Gading to the east, and the isolated Gunung Melanau in the far north. Despite repeated searches of the more easily accessible, and much-botanized, Gunung Gading, no other populations of these two novel species have been located.

Odoardo Beccari is credited as the first biologist to investigate Gunung Pueh (as "Mt Poe") during August 1866 (Beccari 1902, p. 161 et seq., & 1904, p. 98 et seq.), and indeed the Type locality "Mt Poe, Sarawak", is given for several of his Sarawak plants. However, according to Burt (1964), Beccari's Gunung Poe is not the same as that named as Gunung Pueh on modern maps, but is actually Gunung Berumput, a more south-easterly peak in the same range.

Geological confirmation for this and all of our field work is much assisted by Hutchison (1989, 2005) and Tate (2001).

Taxonomy

The Selaburensis Complex presently comprises four described species (Baharuddin and Boyce 2010; Ng et al. 2011; Wong et al. 2013; Boyce and Wong forthcoming). Recognition of *H. caput-gorgonis* requires reworking of the identification presented in Boyce & Wong (in press), as herewith:

Key to species of the *Homalomena Selaburensis* Complex

1. Petioles and peduncles glossy, smooth2
Petioles and peduncles matte, often scabridulous3
2. Leaf blades hastate, posterior lobes directed outwards; blade smooth, or only very weakly quilted; peduncle slender, up to 20 cm × 1.5 mm; pistillate zone equalling the staminate zone; spathe interior white at anthesis. Mulu (northeast Sarawak), shales*H. passa*
Leaf blades sagittate, posterior lobes directed inwards; blade quilted between the primary lateral veins; peduncle rather stout, up to 12.5 cm × 3 mm; pistillate zone about half as long as the staminate zone; spathe interior yellow at anthesis. Maliau Basin (Sabah), sandstones*H. galbana*
3. Inflorescence erect at anthesis; spathe 4.5 cm long; leaf blades adaxially semi-glossy, primary veins flush adaxially; petioles green. Western Malaysia, granites*H. curvata*
Inflorescence nodding at anthesis. Borneo..... 4
4. Inflorescences up to seven in a simple synflorescence; spathe c.6.5 cm long; leaf blades adaxially highly polished, abaxially matte pale green; petioles deep reddish brown; plants up to 55 cm tall. Southwest Sarawak, limestone*H. selaburensis*

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Inflorescences up to 30 together in a gorgonoid synflorescence; spathe c.5.5 cm long; leaf blades adaxially semi-glossy, abaxially matte olive-green; petioles green; plants up to 1 m tall. Gunung Pueh (northwest Sarawak), granites*H. caput-gorgonis*

Currently the *Homalomena Giamensis* Complex comprises three described species (Tung et al. 2010; Hoe et al. 2011; Ng et al. 2011; Wong et al. 2013). The new species described here can be incorporated into a modified identification key (after Wong et al. 2013), as here:

Key to species of the *Homalomena Giamensis* Complex

1. Spathe exterior lacking extrafloral nectaries; base of staminate zone much narrower than top of pistillate zone, transition between the zones abrupt; staminate portion of spadix with a constriction about half way along from the base, not coinciding with the spathe constriction, staminate flowers distal to constriction well defined; pistillate zone cylindrical. Siburan (southwest Sarawak), limestones*H. giamensis*
Spathe exterior, especially the lower spathe, with conspicuous extrafloral nectaries that dry pale brown or yellowish, transition between the pistillate and staminate zones gradual. Various geologies2
2. Spadix greatly exerted from the spathe at anthesis; spathe limb c.2 cm long. Sematan (northwest Sarawak), granites*H. succincta*
Spadix enclosed by the spathe at anthesis; spathe limb more than 4 cm long. Not associated with granites3
3. Base of staminate zone about the same width as the top of the pistillate zone; staminate constriction coinciding with the spathe constriction, staminate flowers distal to spadix constriction ill-defined; pistillate zone fusiform; spathe limb not hooded at pistillate anthesis; peduncle lacking extrafloral nectaries; inflorescences smelling of lemon. Matang (northwest Sarawak), sandstones*H. matangae*
Base of staminate zone much narrower than top of the pistillate zone; staminate constriction not coinciding with the spathe constriction, staminate flowers distal to spadix constriction well-defined; pistillate zone cylindrical; spathe limb hooded at pistillate anthesis; peduncle with conspicuous extrafloral nectaries; inflorescences smelling of lemon and *Mangifera odorata* fruit. Siburan (southwest Sarawak), limestones*H. baangongensis*

Homalomena caput-gorgonis S.Y. Wong & P.C. Boyce, sp. nov.

Diagnosis

Homalomena caput-gorgonis in appearance most closely approaches *H. selaburensis*, differing by the gorgonoid synflorescences carrying up to 30 inflorescences, the narrowly

(versus broadly) clavate interstice staminodes, the shorter spathe (5.5 versus c.6.5 cm long), the leaf blades adaxially semi-glossy (as opposed to highly polished), and abaxially matte olive-green (versus matte pale green). Additionally, *H. caput-gorgonis* is overall greater in stature, notably by the proportionately much longer petioles.

Type: Malaysian Borneo, Sarawak, Kuching Sematan, Kampung Temaga Dayak, Sungai Temaga, trail to Gunung Pueh, 1°46'58.6"N, 109°43'06.6"E, 23 March 2014, Wong Sin Yeng and P.C. Boyce AR-4659 (holo SAR!; iso SBC!). (Figure 1).

Description

Medium solitary evergreen, strongly aromatic (lime zest) mesophytic herbs to 1 m tall. Stem epigeal, erect, leafy, later the older parts leafless and decumbent with the active tip ascending. Leaves about six per module, c.8–10 together; modules subtended by a conspicuously two-keeled prophyll up to 13 cm long; petioles up to 70 cm long, sheathing for one fifth to one-quarter of their length, ascending to somewhat spreading, flexing slightly upwards at the 2–3 cm long pulvinus occurring about two-thirds along the petiole length, with one-third of the petiole lying distal to the pulvinus, petiole above the petiolar sheath weakly D-shaped in cross-section, petiole matte green, slightly scabridulous; petiolar sheath conspicuous, wings persistent, ± open, c.1.5 cm wide, the tips tapering and somewhat abruptly decurrent, stained dark brownish; blade thinly leathery, cordiform, up to 30 cm long × 27 cm wide, posterior lobes parallel, rounded, c.7 cm long, sinus obtuse, apex acute, tubular-mucronate for c.2 mm, adaxially semi-glossy olive-green, abaxially matte paler olive-green with conspicuous darker pellucid striate interprimary venation especially near the blade margin, these more conspicuous on younger leaves; midrib moderately conspicuous, impressed adaxially, rounded-raised abaxially; primary lateral veins c.10 per side, the lower three arising ± simultaneously and associated with the posterior lobes, impressed adaxially with the areas of the blade between slightly quilted, slightly raised abaxially; interprimary veins of two types, one type alternating with primaries and only slightly less conspicuous, the second type comprising conspicuous pellucid darker veins, these very numerous and sometimes branching just after they exit the midrib; secondary and tertiary venation ± invisible. Inflorescences up to 30 together, produced sequentially in a gorgonoid synflorescence, smelling powerfully of liquorice at pistillate anthesis; peduncle terete, slender, up to 17 cm × 2 mm, reddish greenish brown, spreading with the inflorescence nodding at anthesis, inflorescence with spathe opening ventrally relative to the peduncle; spathe spreading at pistillate anthesis, broadly ovate-ellipsoid, not constricted, c.5.5 × 3 × 1.5 cm deep at anthesis, tipped with a rostrum c.3 mm long, margins reflexing during anthesis, spathe medium green in bud, the exterior bright medium

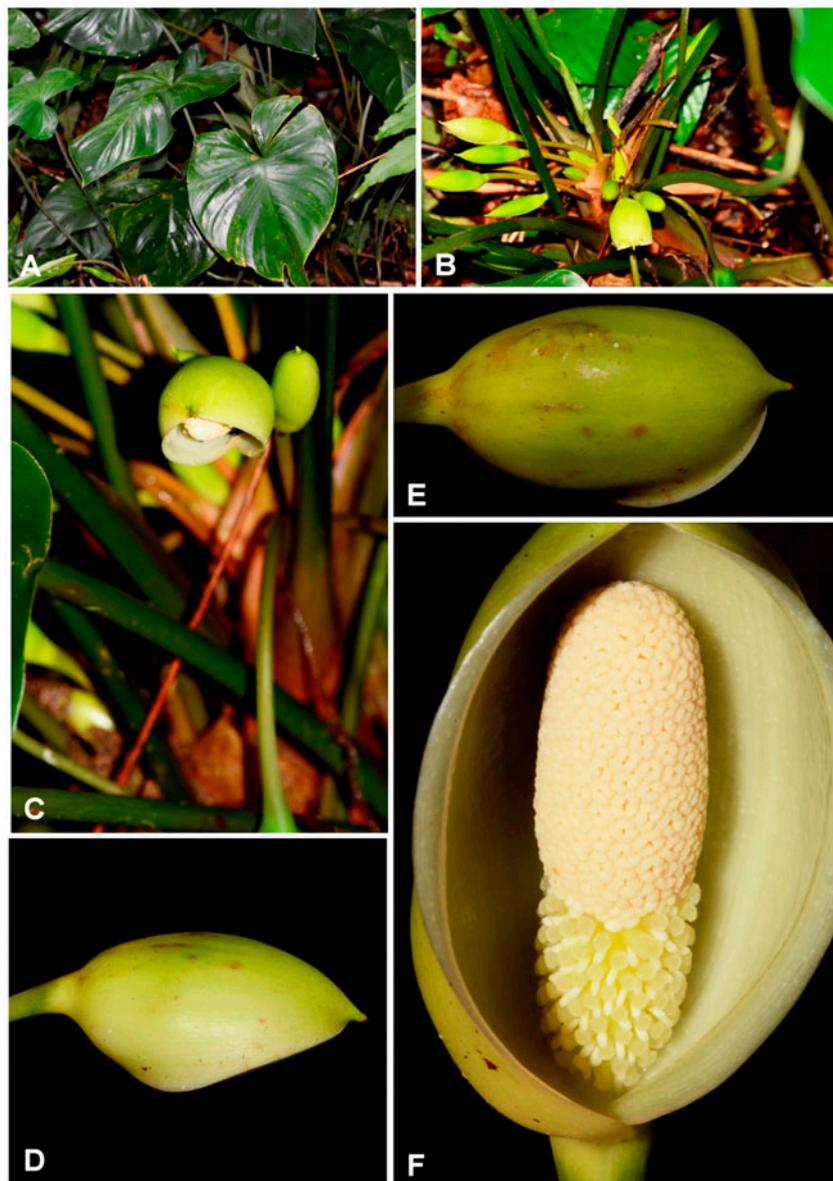


Figure 1. (A–F) *Homalomena caput-gorgonis* S.Y. Wong and P.C. Boyce. (A) Plants in habitat, Type locality; (B) gorgonoid synflorescence, viewed from above - note that there are three separate axes, each developing independently; (C) inflorescence at pistillate anthesis - note the nodding posture; (D) side view and (E) top view of inflorescences at onset of staminate anthesis; (F) inflorescence at pistillate anthesis - note the narrowly clavate interpistillar staminodes. All from *Wong Sin Yeng and P.C. Boyce AR-4659*. Photo credits: © P. C. Boyce.

green, glossy, at anthesis exterior green and interior greenish white with scattered minute paler glands. Spadix about three-quarters the length of the spathe, c.4 cm long including the brief stipe; stipe obliquely inserted on the peduncle, c.3 mm long on its shortest side, c.2 mm diameter, glossy pale green; pistillate flower zone about one-third the length of the spadix, c.1.2 × 0.8 cm; pistils densely arranged, almost cylindrical, c.1 × 0.6 mm, pale green; style very short, slightly narrower than the ovary; stigma almost equalling the ovary in width, capitate, greyish white, papillate at pistillate anthesis; interpistillar staminodes narrowly clavate, slightly exceeding the height of the associated pistil, ivory-white; staminate flower zone contiguous with the pistillate

flower zone, c.2.2 cm × c.7 mm, very slightly fusiform, blunt, ivory; staminate flowers three to four staminate, stamens each with two anthers; stamens elongate-globose, connective embedded and ± invisible; thecae opening by a conspicuous lateral slit. Infructescence pendent, spathe fully persistent and turning deep green, ellipsoid, c.5.6 × 2.2 cm; fruit and seeds not observed.

Distribution

Homalomena caput-gorgonis is so far known only from one restricted area of the foothill eastern approaches to Gunung Pueh, northwest Sarawak. Investigation of the southern end of the Gunung Pueh-Berumpit massif

is required to establish whether the range of the *H. caput-gorgonis* is genuinely limited.

Ecology

Homalomena caput-gorgonis occurs on soil on the tops and upper sides of large granite boulders under lowland humid forest between 80 and 100 m altitude.

Etymology

From Latin *caput*, (head), and Gorgon (Latin *gorgonis* derived from Greek, Γοργώ – *gorgo* – meaning dreadful), literally ‘head of the Gorgon’. In Greek mythology the gorgons were the sisters Medusa, Stheno and Euryale, whose hair was made of living, venomous snakes. The trivial epithet is coined by way of allusion to the diagnostic synflorescences of the new species.

Notes

The gorgonoid synflorescences (sensu Ray 1987, 1988) are among the most elaborate yet known for the aroids, with large plants producing about 30 inflorescences per flowering event.

In the habitat, plants of *H. caput-gorgonis* occur in large numbers, with the middle of colonies excluding all other herbaceous plants, although along the colony margins they are often intermixed with *Homalomena lunduensis* Furtado, another granite-obligated species.

***Homalomena succincta* S.Y. Wong & P.C. Boyce, sp. nov.**

Diagnosis

Homalomena succincta belongs to the Giamensis Complex by the combination of the persistent petiolar sheath persistent, cordiform, glossy bright green somewhat rubbery leaf blade, by the lower spathe longer than spathe, and staminate flower zone producing amber-coloured resin droplets, and the fruiting spathe remaining green. It uniquely differs from all described species by the much reduced spathe limb, and with the staminate portion of the spadix almost completely exerted from the spathe during anthesis.

Type: Malaysian Borneo, Sarawak, Kuching Sematan, Kampung Temaga Dayak, Sungai Temaga, trail to Gunung Pueh, 01°46'58.6" N, 109°43'06.6" E, 23 March 2014, Wong Sin Yeng and P.C. Boyce AR-4655 (holo SAR! iso SBC). (Figure 2).

Description

Evergreen, glabrous strongly aromatic (celery – butylphthalide?) herbs to c.60 cm tall. Stem pleioanthic, erect to long-decumbent with the active tip ascending, up to 3 cm thick, pale brown with the exposed axillary buds green,

with conspicuous adventitious roots, these often penetrating the petiole bases of the active tip, internodes to c.3.5 cm long. Leaves up to 10 together, modules starting with a conspicuous two-keeled short-duration prophyll, this pale green, glossy; petioles erect to somewhat spreading, 50–60 cm long × 7–10 mm wide at mid-point, sub-terete with the distalmost portion very shallowly channelled and very weakly D-shaped, pulvinate one-quarter to one-half of the way back from leaf blade insertion, glossy medium green with obscure and scattered longitudinal short pale green ridges; petiolar sheath c.20 cm long, about one-third of petiole length, persistent, equal at both sides, wings up to 10 mm wide, semi-closed, with one side incurved, rather abruptly decurrent at apex, glossy medium green; blade narrowly triangular-ovate-cordate, c.30 cm long × 18–20 cm wide, rather stiffly rubbery-leathery, semi-glossy bright green adaxially, paler abaxially, base narrowly cordate, posterior lobes subtriangular c.6 cm long, obtuse, inner margins incurved, tip acute, ultimately mucronate for c.3 mm, mucro green; midrib raised abaxially, c.1 cm wide at base, c.6 mm wide at centre, adaxially flush with blade, and c.14 mm at the sinus, c.8 mm at the centre; primary lateral veins about eight on each side, diverging at 40°–90° from the midrib, adaxially impressed, abaxially raised, curved sharply towards the apex when near the margin; interprimary veins raised, c.1 mm in width, alternating somewhat irregularly with primaries, posterior lobes each with two or three primary lateral veins; secondary and tertiary venation not visible, all veins running into a thickened intermarginal vein. Inflorescences up to seven together, erect, smelling of absinthe at pistillate anthesis, declinate post-anthesis, first inflorescence subtended by foliage leaf, the next by two-keeled, soon degrading, pale green prophyll c.11 cm long × c.1.4 mm wide; peduncle c.20 cm long × 5.5–8 mm wide, glossy medium green with very obscure paler longitudinal striae, terete. Spathe c.6.5 cm long, lower spathe inflating at onset of pistillate anthesis; spathe limb opening wide; lower spathe exterior pale lime-green, interior of entire spathe glossy white and appreciably slimy at anthesis; lower spathe ovoid-ellipsoid, c.4 cm long × 2.5 cm wide at pistillate anthesis, constricted at the junction of the spathe limb coinciding with the lowermost fertile staminate flowers; spathe limb c.2 cm long × 1.5 cm wide at pistillate anthesis, ovate-triangular, margins recurved, terminal mucro c.1.5 mm. Spadix stipitate, c.7 cm long (post-staminate extension), shorter than spathe before anthesis, interstice and staminate portion rapidly extending at onset of anthesis and spadix exceeding spathe limb by c.2 cm; stipe c.5 mm long × 6 mm wide, very slightly stout-fusiform, inserted obliquely on peduncle, glossy greenish white; pistillate zone c.3 cm long (long side), 2.5 cm (short side) × c.1 cm wide, about half the length of spadix, cylindrical, obliquely inserted on stipe; pistils globose-cylindrical, 1.7–2 mm in diameter, 2–3.3 mm tall, the majority densely arranged, those distal on the zone slightly laxly arranged, yellowish white; style barely differentiated; stigma umbonate-capitate, very slightly

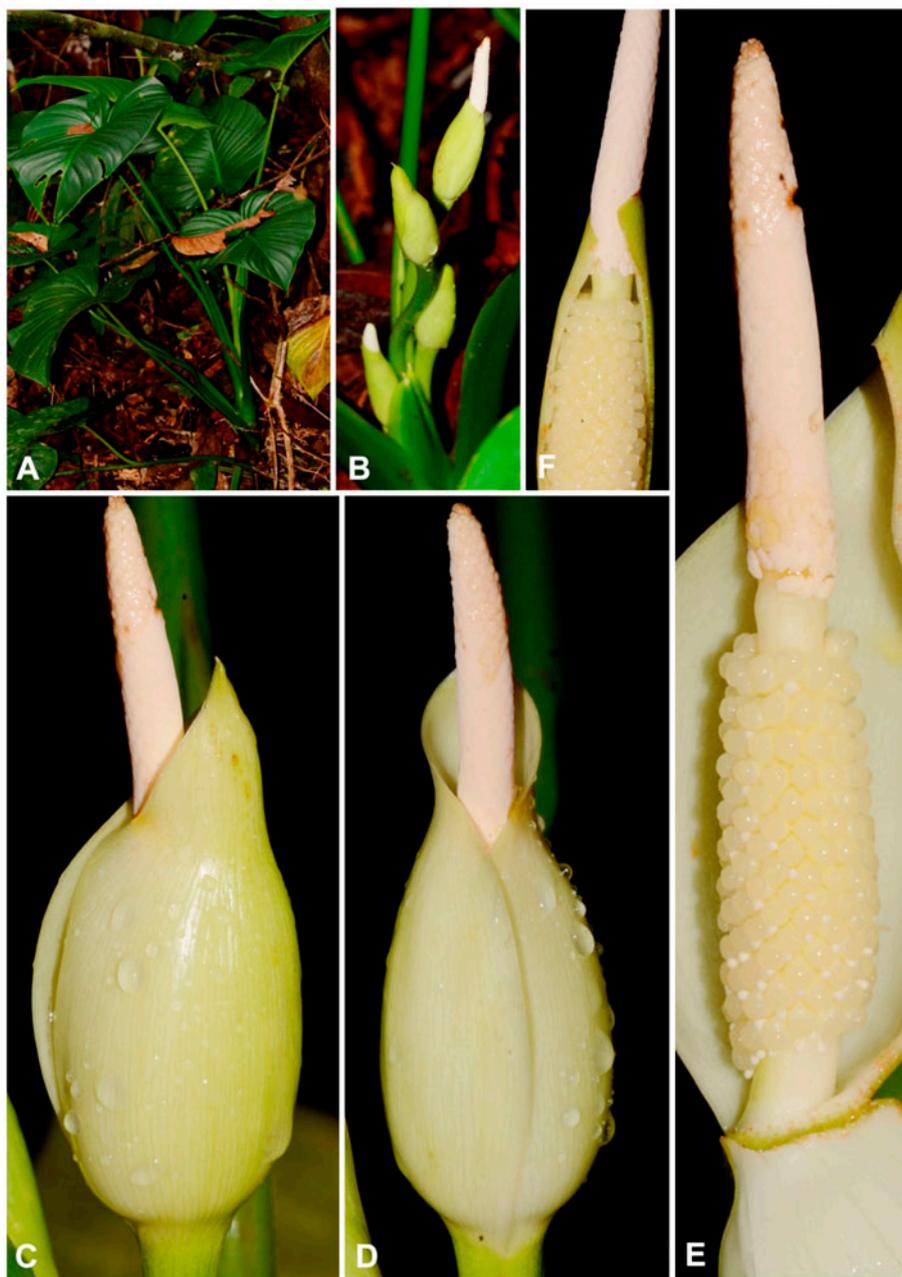


Figure 2. (A–F) *Homalomena succincta* S.Y. Wong and P.C. Boyce. (A) Plants in habitat, Type locality; (B) emerging inflorescences - note the much-extended spadix visible in the uppermost (post-anthesis) and lowermost (onset of anthesis) inflorescences; (C, D) inflorescence at pistillate anthesis - note the much reduced spathe limb, and the greatly extended spadix, also note the resin exudate from the distal part of the staminate flower zone; (D) side view and (E) inflorescence at pistillate anthesis, nearside spathe artificially removed - note the conspicuous naked interstice between pistillate and staminate flower zones, also, the resin exuded from the staminate flower zone; (F) inflorescence post-anthesis showing the position of the lowermost staminate flowers in relation to the spathe limb. All from Wong Sin Yeng & P.C. Boyce AR-4655. Photo credits: © P. C. Boyce.

smaller than ovary diameter, centre slightly impressed, wet with a white jelly-like coating at pistillate anthesis; interpistillar staminodes, slender-stipitate, equalling the associated pistils, tip abruptly globose, c.0.7 mm in diameter, waxy white; suprapistillar interstice zone conspicuous, 5–6 mm long, naked, medium green; staminate zone c.3.5 long \times 7 mm wide, about half the length of spadix, tapering cylindrical with a very slightly constricted area

about one-third along from the base; yellowish resin copiously produced from between the staminate flowers after c.4 h after onset of pistillate anthesis; staminate flowers 1.7–2 mm diameter, trapezoid, each comprising three or four truncate stamens, each overtopped by a large flat connective; lowermost few staminate flowers sterile, these staminodes irregularly globose polygonal, each comprising a single sterile anther, c.0.8 mm long \times c.1.5 mm

wide, waxy white; pollen extruded in strings and mixing with the exuded resin, white. Infructescences up to seven together, declinate to pendent, spathe entirely persistent, medium green with conspicuous dark green longitudinal intermittent striae; peduncle green with pale green longitudinal intermittent striae, otherwise smooth; fruits and seeds not observed.

Distribution

Homalomena succincta is known only from the Type locality in the foothill approaches to Gunung Pueh. Overall similar plants are known from almost entirely exposed granite at Gunung Gading, but have yet to be encountered fertile to confirm placement and identity.

Ecology

Homalomena succincta occurs along riverbanks above flood level under lowland humid mixed dipterocarp forests in deep soils over granite, at an altitude of about 80 m.

Etymology

From Latin, *succincta* (fem.) – compact, brief, in reference to the much reduced spathe limb that is diagnostic for this novelty.

Notes

Homalomena succincta is remarkable for the much reduced spathe limb, by which characteristic alone it is unique in the genus, and unusual in the family.

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