Studies on Hanguana (Commelinales, Hanguanaceae) for Sunda II: Five new forest species from Peninsular Malaysia and recircumscription of Hanguana malayana

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Studies on *Hanguana* (*Commelinales, Hanguanaceae*) for Sunda II: Five new forest species from Peninsular Malaysia and recircumscription of *Hanguana malayana*

Abstract


Field work in Peninsular Malaysia as part of the first author’s research into relationships and evolutionary polarity between *Hanguana malayana*, a widespread freshwater helophyte, and the numerous and mostly undescribed Sundaic forest species has to date resulted in the collection of five distinctive novel forest-dwelling *Hanguana* species. These are described here and figured in colour. Increased understanding of these and other forest species of *Hanguana* has enabled a concise delimitation of the taxonomically long-obfuscated colonial helophytic *H. malayana*, and this is here presented, and the species figured. The current taxonomy of *Hanguana* is summarised, and a key to the so-far described Peninsular Malaysian species is provided.

Additional key words: monocots, taxonomy, mesophytes, helophytes

Introduction

Although the taxonomy of *Hanguana* (*Hanguanaceae*) in Sunda remains beset with considerable confusion, field work in Malaysia is beginning to permit better understanding of the many taxonomic novelties and through this gradually establish a stable taxonomic platform from which to begin phylogenetic investigations of the genus *Hanguana* (Nurfazilah & al., in press).

Aside from making a start to bring taxonomic clarity to forest species of *Hanguana*, ongoing field work in Peninsular Malaysia has facilitated correction of several morphological misconceptions, ecological inexactitudes, and taxonomic and nomenclatural problems associated with *Hanguana malayana* (Jack) Merr.

Results

Taxonomy of *Hanguana*

The changes and novel additions proposed in this paper enable the current taxonomy of *Hanguana*, comprising 10 species, to be summarised as follows:


Type: *Hanguana kassintu* Blume

= *Susum* Blume ex Roem. & Schult., Syst. Veg. 7(2): 95. 1830. – Type: *Susum anthelminthicum* Blume ex Roem. & Schult.


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cultiviert im Botanischen Garten München; 21.10.1996 (M!).

3. **Hanguana exultans** Siti Nurfazilah, Mohd Fahmi, Sofiman Othman & P. C. Boyce, present paper.


**Notes.** — Backer (1951) followed Merrill (1915) in assigning **Hanguana kassintu** as a synonym of **H. malayana**, but provided no detailed discussion. In fact, it is obvious from the protologue discussion (Blume 1827) and from examination of the type collection that **H. kassintu** is a forest species fully distinct from **H. malayana**. Blume, who knew both taxa, was perfectly aware of this. That **H. kassinita** is distinct is also implied by Airy Shaw (1978), who, under the synonymy of **H. malayana**, cited: “**H. kassintu** auct., pro parte, vix Bl. Enum. Pl. Javae: 15 (1827)”. **H. kassintu** and the other Javan species will be the subject of another paper in this series.

5. **Hanguana major** Airy Shaw in Kew Bull. 35: 819. 1981. – Holotype: Malaysia, Sabah, Kinabalu, Mesilau River, 1500 m [converted from feet on the label], 5.2.1964, **Chew & Corner RSNB 4233** (K!).

**Notes.** — There are problems with the circumscription of **Hanguana major**. The plate accompanying the description does not feature any type elements and in fact represents two additional and furthermore novel taxa, with one (**Chai S 34089**) not cited in the material seen. As yet we have not examined all the cited material; a paper dealing with the taxonomy of **H. major** and the other species inadvertently included in the original publication awaits completion of this examination.


**Note.** — A full synonymy and revised circumscription is provided in the present paper below.

7. **Hanguana nitens** Siti Nurfazilah, Mohd Fahmi, Sofiman Othman & P. C. Boyce, present paper.

8. **Hanguana pantiensis** Siti Nurfazilah, Mohd Fahmi, Sofiman Othman & P. C. Boyce, present paper.

9. **Hanguana podzolicola** Siti Nurfazilah, Mohd Fahmi, Sofiman Othman & P. C. Boyce, present paper.

10. **Hanguana stenopoda** Siti Nurfazilah, Mohd Fahmi, Sofiman Othman & P. C. Boyce, present paper.

**Insertae sedis**


**Notes.** — Miquel’s protologue describes this plant in some detail, comparing it against Blume’s **Susum anhel- minthicum** (= **Hanguana malayana**). In particular he noted the marked disparity in size between the inner larger and outer smaller sepalas, the sepalas to be “laciniae” and also the much smaller fruit (“baccis multo minoribus”). The plant is also noted as being glabrous. In the continued absence of an authentic specimen it is impossible to ascribe Miquel’s epithet. Although assuming Miquel’s observation of laciniate tepals is correct, it is a feature otherwise not recorded in any **Hanguana** with which we are familiar. We are therefore in no doubt that it represents a distinct, almost certainly forest-dwelling taxon.

**Key to peninsular Malaysian Hanguana species**

1. Stoloniferous colonial helophytes  .................. 2
   – Clumping mesophytes lacking stolons  ................ 3
2. Leaves stiffly erect, acute; fruits ellipsoid, ripening glossy purple-red; stigma lobes flat, connate at base, the whole 3–4 mm diam. and almost obscuring the end of the fruit. Plants of open situations along muddy banks of large rivers, margins of freshwater bodies, and of freshwater swamp forest  ...... **H. malayana**
   – Leaves arching, long-attenuate; fruits globose, ripening semiglissary black; stigma lobes small, separate, erect, pointed. Plants of shaded peatswamp mires  ....  .................................................................................... **H. nitens**
3. Stigma inserted obliquely  .................. 4
   – Stigma terminal  ............................... 5
4. Fertile portion of infructescence not exceeding leaves, panicle dense, branches of the partial inflorescences ascending in fruit; plants sessile even in old age  .... .............................. **H. pantiensis**
   – Fertile portion of infructescence far exceeding leaves, panicle very open, branches of the partial inflores- cences spreading and forming regular tiers; plants de- veloping an erect, leafless stem up to 1.5 m tall  ....  .................................................................................... **H. podzolicola**
5. Inflorescence with caducous foliaceous bracts; par- tial inflorescences each with 2 or rarely 3 branches, spreading in fruit; fruits globose with a briefly stipi-
tate stigma, lobes connate basally, deep chocolate brown; fruit ripening white with conspicuous black speckles; old plants developing a short (to c. 25 cm) slender, leafless stem. Plants of well-drained slopes and low ridges in lowland humid, moist mixed dipterocarp forest on yellow clay soils . . . \textit{H. stenopoda} 

– Infructescence with persistent foliaceous bracts; partial inflorescences yellow with each 4–5 branches, these rather sharply ascending in fruit; fruits ventrally gibbose-ellipsoid, stigma sessile, comprising 3 free orange brown lobes; fruit ripening pale yellow without conspicuous black speckles. Plants of low-lying wet podzols in peatforest . . . . . . . . . . . . . . . . . . . . . \textit{H. exultans} 

New forest species from Peninsular Malaysia

\textit{Hanguana exultans} Siti Nurfazilah, Mohd Fahmi, Sofiman Othman & P. C. Boyce, sp. nov.

Holotypus: Malaysia, Johor Bahru, Kota Tinggi, Hutan Lipur Panti, 1°48′07.7″N, 103°57′20.2″E, 40 m, 20.4.2010, Siti Nurfazilah bt Abdul Rahman, P. C. Boyce & Ooi Im Hin HA-55 (KEP!).

\textit{Hanguanae stenopodae} maxime similis, facile inflorescentis partialibus omnibus ramis 4 vel 5, his fructu satis valde ascendentibus, tepalis interioribus fere diaphanis, infrutescentis bracteis persistentibus foliaceis, fructibus ventraliter gibbose-ellipsoidis, maturatone dilute luteis sine punctis conspicuis nigris, stigmate sessili, comprising 3 separate (not connate) orange-brown lobes. \textit{Seeds} not observed. — Fig. 1.

Ecology. — Low-lying wet (but not swampy) podzols under closed-canopy lowland humid moist peatforest.

Notes. — \textit{Hanguana exultans} is most similar to \textit{H. stenopoda} although readily distinguished by the nearly transparent inner tepals, infructescence with persistent foliaceous bracts, partial inflorescences each with 4–5 branches rather sharply ascending in fruit, ventrally gibbose-ellipsoid fruits with a sessile stigma comprising 3 separate (not connate) orange brown lobes and the fruit ripening pale yellow without conspicuous black speckles.

Older plants of \textit{Hanguana exultans} do not develop the slender, short, naked stem typical for \textit{H. stenopoda}. There are also ecological differences: \textit{H. exultans} is a plant of low-lying wet podzols in peatforest, whereas \textit{H. stenopoda} is restricted to well-drained slopes and low ridges in lowland humid, moist mixed dipterocarp forest on yellow clay soils.

\textit{Hanguanae niiens} Siti Nurfazilah, Mohd Fahmi, Sofiman Othman & P. C. Boyce, sp. nov.

Holotypus: Malaysia, Johor Bahru, Mersing, Hutan Simpanan Lenggor, 2°15′72.7″N, 103°43′76.7″E, 55 m, 18.4.2010, Siti Nurfazilah bt Abdul Rahman, P. C. Boyce & Ooi Im Hin HA-48 (KEP!).

\textit{Hanguanae malayanae} superficialiter habitu stolonifero colonialis similis, sed facie foliis araucinis (non rigide erectis) gravius nitida viridibus, lamina conspicue longa (ad 1/3–1/4 folii longitudine) pseudopetiola lata plicata, apice longe attenuato, fructibus globosis maturatione semimitido nigris, stigmatibus lobis separatis erectis acutis distinguenda.
Medium-sized, glabrous, dioecious stoloniferous helophyte to c. 1 m tall; stem terete, rhizomatous with the terminal portion ascending, up to c. 1.5 cm diam., subwoody, the older portions clothed in dense fibrous degraded leaf bases; stolons up to 45 cm long (although usually less), c. 1.5 cm diam., semi-erect or creeping, or burrowing through liquid peat, enveloped by appressed petiolar sheaths, these deep green and foliaceous towards the stolon active tip, older leaf portions turning glossy chestnut brown and eventually partially or completely decaying into fibres. Leaves up to 1.35 m long, up to 16 together, long-pseudopetiolute, ± erect, innovations sometimes very sparsely flocculose abaxially along the midrib, soon glabrescent, with age entirely glabrous; leaf blade 45–100×5–8 cm, narrowly lanceolate, leathery, dark shining green when fresh, drying dull olive-green, the base decurrent on the pseudopetiole, tip long-attenuate; pseudopetiole accounting for c. 2/3–3/4 of the leaf length, ± V-shaped in cross-section, margins sharp, petiolar sheath margins drying papery; midrib acutely raised abaxially, flush to slightly impressed adaxially, blade irregularly but prominently plicate when fresh, densely longitudinally veined, with numerous close-set very fine cross-veinlets. Female and male inflorescences a moderately stout pedunculate panicul, erect at anthesis, subtended by a fully developed foliage leaf, with up to 15 patently branched thyrsoid or spicate partial inflorescences plus a terminal spike; bract subtending proximal partial inflorescences very narrowly triangular, foliaceous, 5–24 cm long, 0.5–2 cm wide, bract subtending distal-most partial inflorescences small to minute, ovate, apiculate; median branches longer than lateral branches, up to 15 cm long and c. 3 mm wide, rectangular in cross section at the base, angle further up, lateral branches approximately 3.5 cm long; terminal spike c. 9 cm long, all branches weakly ascending; peduncle and scape together up to 80 cm tall, lower part of peduncle up to 1.5 cm diam., the whole inflorescence weakly flocculose, glabrescent or nearly so in part, pale green with areas of purple-brown speckles and spots when fresh, drying deep brown with remaining hairs pale brown, visible portion of peduncle up to 30 cm long; bract marking onset of scape large, foliaceous, sterile, c. 60 cm long, 9 cm wide, narrowly triangular, base clasping, tip long-attenuate. Male flowers not observed. Female flowers ± distant, mostly solitary, occasionally in small clusters, especially towards the tips of branches, sessile with a broad base in the axil of a short, broad bract; tepals shortly connate at the base, green, outer 3 tepals c. 1×2.5 mm, inner tepals c. 2×2.5 mm; staminodes not observed; ovary broadly ovoid-globose, pale green, ripening through yellow-green to black; stigma sessile, 3-lobed, c. 2 mm diam., lobes separate, erect, acute-pointed, matte black. Infructescence erect. Ripe fruit globose, c. 4 mm diam., semiglossy black, stigma remains matte black. Seeds hemispherical, deeply excavated, with the pit margins incurved, c. 3 mm diam. — Fig. 2.

Distribution. — Malaysia, Johor Bharu.

Ecology. — Blackwater mires over saturated deep peat along margins of closed-canopy lowland humid moist peatswamp forest at altitudes of 40–50 m.

Notes. — Hanguana nitens by its stoloniferous, colonial habit is superficially similar to H. malayana, but may be readily distinguished by arching (not stiffly erect), deep glossy green leaves, with the blade conspicuously long-pseudopetiolute (up to 2/3–3/4 of the leaf length) and weakly plicate with a long-attenuate tip, and globose fruit ripening semiglossy black with separate, erect, pointed stigma lobes.

So far, Hanguana nitens is known from three sites. At the type locality it is abundant, occurring as several moderately extensive female stands, and a single isolated male population. The second known locality, Hutan Simpan Panti, consists of a much smaller single population of female plants. The third site, at Hutan Lipur Panti, is a relict, very much depleted unsexed population critically threatened by an adjacent building development.

Etymology. — Latin “nitens” = shining, polished, in allusion to the remarkably lustrous leaf blade.

Other material seen. — MALAYSIA: JOHOR BAHRU, Kota Tinggi, Hutan Simpan Panti, 1°52’22.6”N, 103°54’75.5”E, 19.4.2010, Siti Nurfazilah bt Abdul Rahman, P. C. Boyce & Ooi Im Hin HA-51 (KEP); Johor Bahru, Kota Tinggi, Hutan Lipur Panti, 1°48’07.7”N, 103°57’20.2”E, 20.4. 2010, Siti Nurfazilah bt Abdul Rahman, P. C. Boyce & Ooi Im Hin HA-57 (KEP).

Hanguana pantiensis Siti Nur Fazil, Mohd Fahmi, Soffian Othman & P. C. Boyce, sp. nov.

Holotypus: Malaysia, Johor Bahru, Kota Tinggi, Hutan Lipur Panti, 1°48’07.7”N, 103°57’20.2”E, 40 m, 19.4.2010, Siti Nur Fazil, Abdul Rahman, P. C. Boyce & Ooi Im Hin HA-56 (KEP!).

Hanguanae podzolicola maxime similis, aetate sine culmo longo efoliato, pedunculo breviore, inflorescentiae parte fertili foliis non excedenti, paniculae structura confertioe, inflorescentiae partialis ramis fructu ascendenti-bus (non effusio) differt.

Solitary robust, herbaceous, dioecious mesophyte to c. 2 m tall. Leaves up to 1.6 m long, up to 16 together, spreading, flocculose abaxially, the outermost leaves arching with the tips touching the ground, bases imbricate; leaf blade up to 84×13.5 cm, narrowly elliptic, base decurrent, tip long-attenuate with a conspicuous apicule to 5 mm, deep green semiglossy when fresh, drying dull olive-green abaxially, silver-green adaxially; pseudopetiolule up to 15 cm long, 1 cm wide, accounting for c. 1/4 of the entire leaf length, shallowly channelled, the margins...
somewhat sharp, longitudinally folded inwards, lower-most part of petiolar sheath with margins erose-marcescent; midrib prominently round-raised abaxially, especially in the lower middle part of the leaf blade, impressed adaxially, drying flush adaxially and all other venation prominent minutely tessellate-sriate in most specimens. Female and male inflorescences not observed, although, based on fruiting material and observations of inflorescence architecture, almost certainly erect at anthesis. Infructescence erect, dense-paniculate, not exceeding the leaves, comprising up to 13 partial, whorled, thyroid or more rarely spicate infructescences plus a terminal spike; peduncle and scape together up to 70 cm tall, conspicuously very pale brown flocculose, especially the scape, dark green when fresh, drying dark brown, visible portion of peduncle up to 20 cm long; bract seemingly marking start of scape foliaceous, sterile, lanceolate-elliptic, soon falling (but more investigation needed); subtending bract of partial infructescences similar to that marking the start of the scape, diminishing in size distally along the infructescence, the largest c. 48 × 10 cm, the smallest 18 × 3 mm; partial infructescences each comprising up to 12 branches arising simultaneously from the axil of the subtending bract, median and lateral branches almost equal in length, up to 14 cm long, 1 – 2 mm wide, somewhat flattened. — Type locality “Panti” + Latin “ensis” = originating from, referring to the type and only known locality.

_Hanguana pantiensis_ Siti Nurfaizilah, Mohd Fahmi, Sofiman Othman & P. C. Boyce, sp. nov. Holotypus: Malaysia, Johor Bahru, Mersing, Hutan Simpanan Lenggor, 2°15’72.7’’N, 103°43’76.7’’E, 55 m, 18.4.2010, Siti Nurfaizilah bt Abdul Rahman, P. C. Boyce & Ooi Im Hin HA-50 (KEP!).

_Hanguanae pantiensi_ maxime similis in stigmatis inser-tione obliqua, sed paniculae structura plurime aperta, inflorescentiae partialis fructu ramis effusis (non valde ascendentibus), praeterea individuis vetioribus caule erecto efoliato evoluerentibus distinguenda.

Solitary robust, herbaceous, dioecious mesophyte to c. 2 m tall, stem erect, with age becoming leafless to 1.5 m with a terminal crown of leaves. Leaves up to 1.5 m long, up to 15 together, spreading, bases imbricate; leaf blade up to 80 × 13 cm, narrowly elliptic, base decurrent, tine long-attenuate with a conspicuous apicule to 7 mm, stiffly chartaceous and deep green when fresh, drying somewhat softer and dull olive-green abaxially, silver-green adaxially; pseudopediole c. 45 cm long, 2 cm wide, accounting for up to 1/3 of the entire leaf length, shallowly channelled, the margins very sharp, especially about half way along the length; petiolar sheaths hyaline when fresh, drying medium-brown and ultimately marcescent; midrib pronouncedly round-raised abaxially, channelled adaxially; lesser venation very obscure when fresh, drying closely and conspicuously longitudinally-raised striate with pronouncedly reticulate lesser venation, with the marginal veins drying darker adaxially and overtopping the leaf blade to form the apicule. Female and male inflorescences not observed, although, based on fruiting material and observations of inflorescence architecture, almost certainly erect at anthesis. Infructescence solitary, erect, comprising up to 11 partial, whorled, thyrsoid or more rarely spicate infructescences plus a terminal spike; peduncle and scape together up to 80 cm tall, conspicuously very pale brown flocculose, green when fresh, drying dark brown, visible portion of peduncle up to 30 cm long; bract seemingly marking start of scape foliaceous, sterile, lanceolate-elliptic, soon falling (but more investigation needed); bract subtending partial infructescences similar to that marking the start of the scape, diminishing in size distally along the infructescence, the largest c. 41 × 5.5 mm, the smallest 25 × 5 mm; partial infructescences each comprising of 9 branches, branches arising simultaneously from the axil of the subtending bract, median and lateral branches almost equal in length, 10–18 cm long, 1–2 mm wide, somewhat flattened. Female flowers scattered, mainly solitary, occasionally in groups of 2, sessile, all with an associated minute bracteole; perianth of 6 opaque, green tepals, outermost c. 1.5 × 2 mm, ovate, softer and dull olive-green abaxially, silver-green adaxially; stigma 3-lobed, lobes not connate, c. 1 mm, raised, dark brown. Seeds not observed. — Fig. 3.

Distribution. — Only known from the type locality, where it is abundant.

Ecology. — Well-drained flat and slightly undulating areas of lowland closed canopy humid moist peatforest. 40–60 m.

Notes. — _Hanguana pantiensis_ is one of a group of species, all novel, in which early in development the ovary bends longitudinally to produce a fruit with the stigma obliquely to sublaterally inserted. _H. pantiensis_ is most similar to _H. podzolicola_, differing by the much shorter peduncle, with the fertile portion of the inflorescence not exceeding the leaves, the denser panicle structure, with the branches of the partial inflorescence ascending (not spreading) in fruit and by not developing a tall, leafless stem with age.

_Hanguana pantiensis_ is abundant at the type locality, forming dense pure stands. At the time of collection several female plants were fruiting, and numerous plants with spent inflorescences suggested that male plants were common.
Hanguana stenopoda

Siti Nurfazilah, Mohd Fahmi, Sofian Othman & P. C. Boyce, sp. nov.

Holotypus: Malaysia, Pahang, Rompin, Taman Negeri Endau Rompin, 2°37'37.2''N, 103°19'83.3''E, 12.5.2010, Siti Nurfazilah bt Abdul Rahman, Mohd Fahmi Bin Abu Bakar & P. C. Boyce HA-60 (KEP!)

Hanguanae exultanti similis, inflorescentios partialibus omnibus ramos 2 raro 3, fructus maturatus, tepalis interioribus opace viridibus, infructesceneces each with 2 or rarely 3 branches, these spreading in fruit, globose fruits with a briefly stipitate stigma, in most partial infructescences each comprising of 3 branches, the terminal one a single spike, branches arising simultaneously from the axil of the subtending bract, median branch usually longer than lateral branches, 5–7 cm long, c. 1.5 mm wide, weakly angled, lateral branches approximately 1/5 of the length of median branch, although branches subequal in distalmost partial infructescences. Female flowers mainly in scattered groups of 2 to 3, lowestmost flowers of each branch occasionally solitary, all mainly sessile, very occasionally pedicellate to c. 0.5 mm, all with an associated minute bracteole; perianth of 6 tepals, outer tepals 1.2 × 1.9 mm, ovate, inner tepals c. 2.5 × 2.5 mm, ovate, all clasping fruits in fresh material and medium green, outer with a narrow dark red margin, inner only red at the base. Ripe fruit compressed-globose, c. 5 × 4.2 mm, glossy white with conspicuous black speckles; stigma 3-lobed, lobes connate to form a clover-leaf, c. 1.9 mm diam., very shortly stipitate, matte black. Seeds not observed. – Fig. 5.

Distribution. — Malaysia, Pahang, known only from the type locality.

Ecology. — Lowland humid, moist mixed dipterocarp forest on yellow clay soils with a moderate leaf litter layer at altitudes of 60–125 m.

Notes. — Hanguana stenopoda resembles H. exultans, differing by the opaque green inner tepals, infructescences with caducous foliaceous bracts, partial inflorescences each with 2 or rarely 3 branches, these spreading in fruit, globose fruits with a briefly stipitate stigma, in which the lobes are conuate basally and deep chocolate brown, and the fruit ripening white with conspicuous black speckles. In age, H. stenopoda develops a short, slender, leafless stem.

Hanguana stenopoda is restricted to well-drained slopes and low ridges in lowland humid, moist mixed dipterocarp forest on yellow clay soils with a moderate leaf litter layer.
Etymology. — Greek στένος (stenos) = slender, and Latin podos = a foot, referring to the short, slender stem that develops in older individuals.

Other material seen. — Malaysia, Pahang, Temerloh, Gunung Benom, Krau Wildlife Sanctuary 3°49′29.8″N, 102°12′84.6″E, 125, 13.5.2010, Siti Nurfaizilah bt Abdul Rahman, Mohd Fahmi Bin Abu Bakar & P. C. Boyce HA-61 (KEP).

Hanguana malayana recircumscribed


Large to massive colonial stoloniferous dioecious helophytes to c. 3 m tall, exceptionally reaching 4 m; stem terete, robustly rhizomatous with the terminal portion ascending, up to c. 15 cm diam., although usually somewhat less, spongy, the older portions clothed in dense fibrous degraded leaf bases; stolons up to 2.5 m long (usually less), c. 2 cm diam., creeping or burrowing through liquid mud, or floating on the surface of water, enveloped by appressed sheath, these foliaceous towards the stolon active tip, which finally dissolve into fibres. Leaves exceptionally up to 3.5 m long, more usually about 1.5–2 m, up to 20 together, stiffly erect, occasionally fleetingly flocculose abaxially when young, otherwise glabrous; lower leaves briefly pseudopetiolate, higher leaves (of flowering plants) remote, smaller; on shorter petioles, pedunculate and scapose bracts sessile or subsessile with a broad base, small, passing into fertile bracts; lower leaf sheaths long and broad, stem clasping, deeply split on the anterior side, gradually narrowing into the petiole; leaf blade (20–)45–200(–300) × 4–15 cm, lanceolate, somewhat spongy-leathery, medium to dark green, sublustrous when fresh, drying spongy-chartaceous and medium straw-coloured, base acute to decurrent on the pseudopetiole, tip acute; pseudopetiole accounting for c. 1/3 of the leaf length, ± flat to shallowly V-shaped, margins sharp, lowermost part of petiolar sheath margins later marcescent; midrib rather thick, blade densely longitudinally veined, with numerous close-set thin cross-veinlets, between the longitudinal veins very densely and finely longitudinally striate, not or only very obscurely plicate. Female and male inflorescences a stout pedunculate panicle erect at anthesis and subtended by a fully developed foliage leaf, with up to 10 whorls of 1–10 × patently branched thyroid or spicate partial inflorescences plus a terminal spike; branches arising simultaneously from the axil of the subtending bract, median branches usually longer than lateral branches, although branches subequal in distal-most units; partial male inflorescences 30.5 cm long, c. 4 mm wide, weakly angled, lateral branches approximately 29 cm long, c. 2.1 mm wide, thinner and longer than those of female inflorescences, rather distinctly yellowish, with a greater number of flowers, branches initially ascending, later drooping at post-anthesis prior to withering; partial female inflorescences stout and short, 18 cm long, c. 4 mm wide, weakly angled, lateral branches approximately 11 cm long and c. 3 mm wide, green, ascending; peduncle and scape together often more than 2 m tall, lower part of peduncle up to 3 cm diam., the whole weakly to rather densely flocculose, soon glabrescent or nearly so, medium green, visible portion of peduncle up to 50 cm long; bract marking onset of scape large, foliaceous, fertile, or sterile, broadly lanceolate-elliptic, up to 20 cm long, base clasping, tip long-acute. Flowers of both sexes ± distant, either solitary or in small clusters, sessile with a broad base in the axil of a short, broad bract and tepals shortly connate at the base, green or yellowish or the inner tepal dotted red. Male flowers with 3 outer tepals c. 1 mm long and 3 inner tepals c. 1.5 mm long, fornicate; stamens 6, on the base of the perianth, about as long as the inner tepals; filaments filiform from a broader base, c. 2 mm long; anthers small, c. 1 mm, with longitudinal slits, inserted in a basal cleft; pistilode small, stigmas 3, erect, shortly clavate. Female flowers with outer 3 tepals c. 2 mm long and inner tepals c. 3 mm long; staminodes 6, c. 0.5 mm long, inserted on the base of the perianth, those opposite the outer sepals minute, narrowly triangular, 3 others much longer and broader, rounded, dorsally compressed; ovary broadly ovoid-globose, stigma sessile, deeply divided into 3 spreading broadish short arms. Infructescence erect, comprising up to 10 partial infructescences each subtended by a semipersistent bract up to 20 cm long, although these diminishing in size distally along the infructescence, the smallest c. 10×2 cm. Ripe fruit dark shining purple-red, ellipsoid, c. 1×5 mm, stigma...
3-lobed, lobes connate to form a clover-leaf almost obscuring the end of the ovary, c. 3 mm diam., matte black. Seeds not observed. – Fig. 6–7.

Distribution. — Equatorial tropics from Sri Lanka to western Micronesia (Palau), south as far as northern Australia and north to the Philippines (Luzon). Absent from the area between the Wallace and Webber lines.

Ecology. — Plants of open lowland situations along muddy banks of large rivers, margins of freshwater bodies, and of freshwater swamp forest.

Notes. — Nurfazilah & al. (in press) have highlighted that the Flora Malesiana account for Hanguana (Backer 1951) contains numerous misconceptions with the result that the circumscription of H. malayana has been subject to considerable and quite unnecessary confusion. Field observations in Malaysia leave us in no doubt that H. malayana is both morphologically and ecologically clearly circumscribed, as defined in the above key.

It is interesting to note that Ridley (1907, 1924) was clearly aware that the circumscription of Hanguana in Peninsular Malaysia was in need of critical study. Unfortunately, Ridley (1907) unaccountably applied the name Susum malayanum to the forest species (in the broad sense), while for the open habitat helophyte he used the (now synonymous) S. anthelmintica.

Backer (1951) stated the fruit to be shining red. This is incorrect; the ripe fruit is dark shining purple-red, as stated by Dassanayake & al. (1999).

Diligent searches of relevant herbaria have failed to turn up Jack’s collection of Veratrum malayanum [= Hanguana malayana]. As alluded by Steenis-Kruseman (2006) there are difficulties and obscurities associated with Jack’s herbarium, not least because “an important part of his botanical notes and collections was lost by the fire of the ship ‘Fame’ on which Raffles embarked for Europe in 1824”. It might be argued that the type is lost and thus neotypification is justifiable. However, given that Jack material periodically turns up in ‘expected’ places (e.g. Cowan (1954) “methodically searched the Herb. Edinburgh [E] for Jack specimens and found 64 in all (incl. 1 dupl.). No record of how and when they were acquired was found …”), we are reluctant to take this step. As a compromise, we have opted to epitypify Wallich EIC 3717, a Pinang collection as was Jack’s, and beyond any doubt well-representative of the species.

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References


Fig. 1. *Hanguana exultans* – A: flowering plant in habitat; B: infructescence, note the rather sharply ascending branches; C: detail of the ventrally gibbose-ellipsoid fruits ripening pale yellow with a sessile stigma comprising 3 separate (not connate) orange brown lobes; D: median leaf and inflorescence of *H. pantiensis* (left) compared with *H. exultans* (right). – A–D: Siti Nurflazila & al. HA-55; images © Rosazlina Bt Rusly.
Fig. 2. *Hanguana nitens* – A: plants in habitat, note the arching (not stiffly erect) leaves; B: portion of a mature plant showing a stolon and the conspicuous, long (2/3–1/4 of the leaf length) pseudopetiole; C: plicate leaf blade; D: portion of an immature infructescence, compare the separate, erect, pointed stigma lobes with those of *H. malayana* (Fig. 7B); E: ripe fruits. – A–E: Siti Nurfazilah & al. HA-48; images © Rosazlina Bt Rusly.
Fig. 3. *Hanguana pantiensis* – A: plant in habitat, note the dense panicle carried down in the leaves; B: detail of infructescence, note the dense panicle with branches of the partial inflorescences ascending; C: ripe fruits, with the stigma obliquely to sublaterally inserted by longitudinally bending of ovary; D: leaf bases showing litter-trapping. – A–D: Siti Nurfazilah & al. HA-56; images © Rosazlina Bt Rusly.
Fig. 4. Hanguana podzolicola – A: plant in habitat showing the tall, leafless stem produced by older plants; B: detail of infructescence, note the open nature of the panicle and the spreading branches of the partial inflorescences; C: ripe fruits, with the stigma obliquely to sublaterally inserted by longitudinally bending of ovary; D: median leaf and inflorescence. – A–D: Siti Nurfaizilah & al. HA-49; images © Rosazlina Bt Rusly.
Fig. 5. *Hanguana stenopoda* – A–B: plants in habitat; B: detail of infructescence, note the partial inflorescences each with only 2 or rarely 3 branches and that the subtending bracts have fallen; D: ripe fruits with opaque tepals, briefly stipitate stigma, with the lobes connate, deep chocolate brown, and the fruit with conspicuous black speckles. – A–D: Siti Nurfazilah & al. HA-60; images © Siti Nurfazilah Bt Abdul Rahman.
Fig. 6. *Hanguana malayana* – A: plants in habitat in Maludam N. P., Sarawak, note the stiffly erect leaves and the stolons floating on the water surface; B: detail of semi-terrestrial stolons in habitat, Perak. – A: image © Mike Lo; B: image © Siti Nurfazilah Bt Abdul Rahman.
Fig. 7. *Hanguana malayana* – A–B: female plants, note the short, robust branches, the green partial inflorescences, the ellipsoid fruits, and the large sessile stigma almost obscuring the end of the fruit; C–D: male inflorescences, note the much longer, more slender rather yellowish branches of the male inflorescence; after anthesis these branches droop prior to withering. – Images © Siti Nurfazilah Bt Abdul Rahman.