

## ADDITIONS TO HORSFIELDIA (MYRISTICACEAE) INCLUDING FOUR NEW SPECIES

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### SUMMARY

New facts about various of the hundred species recognized in the recent revision of the Asian-Malesian genus *Horsfieldia* (Myristicaceae), as well as the description of four new species in this genus (*H. urceolata*, *H. coryandra*, *H. elongata*, *H. discolor*) are presented.

### INTRODUCTION

Since my new account of *Horsfieldia* – published in the Garden's Bulletin of Singapore (1984, 1985, 1986) – was completed, the following noteworthy additions have become known. The number of each species refers to the number used in the above mentioned publications, or, in the case of the new species presented in this paper, the number added with 'bis<sup>1</sup>' or 'bis<sup>2</sup>' is that next to the species to which it keys out in the general key to the species. Through the four new species (*Horsfieldia urceolata*, *H. coryandra*, *H. elongata*, *H. discolor*) the number of species recognized by me in this genus has mounted to 104.

I thank Dr. R. C. Bakhuizen van den Brink for providing the translation into Latin of the diagnoses of the new species, and Mr. J. H. van Os for drawing figure 1.

**21. *Horsfieldia crux-melitensis*** Markgraf; de Wilde, Gard. Bull. Sing. 37 (1984) 142 & 166 (keys); *ibid.* 38 (1985) 90, fig. 13a–c.

Although of this species, according to the label of *LAE 73830*, ripening fruits were mentioned as red, fruit was only incompletely known to me because it is lacking in the duplicate in L. From the newly acquired collection *LAE 74846 Katik*, Morobe Prov., 8 May 1981, with female flowers and mature fruit, the description can be amplified as follows:

Small tree, to 7 m, bole 4 m, d.b.h. 6–8 cm. *Leaves*: to broadly obovate, c. 11 cm wide, the top very broadly rounded, ending in a narrow acute-acuminate tip c. 1 cm long. *Fruits*: 1–4 per infructescence, ellipsoid-ovoid, c. 1.4 × 0.8–0.9 cm, base broadly rounded, top c. 2 mm beaked, pseudostalk absent or up to c. 1 mm; pericarp 0.5(–1) mm thick, drying blackish, finely pubescent, partly glabrescent leaving fine brown punctation, without lenticels; seed ellipsoid.

The keys as published before, also that to fruiting specimens, remain unchanged, but in a newly constructed key presented here on page 462 the species is demarcated against its close allies, including two new species.

**23. *Horsfieldia squamulosa* de Wilde, Gard. Bull. Sing. 38 (1985) 93, fig. 1A (23), 13 g.**

As the original description of this species was based on material including some specimens at present referred to a new species, *H. coryandra*, the description then given of *H. squamulosa* is amended as follows:

Shrub or slender treelet, 2–10 m, d.b.h. to c. 10 cm. Twigs slender, terete, not ridged, towards the apex 1–2 mm diam., pubescent with rusty hairs 0.1(–0.2) mm; bark lower down glabrescent, finely striate, not cracked nor flaking, lenticels absent or few and inconspicuous. *Leaves* distichous, membranous or thinly chartaceous, oblong to lanceolate, 7–15 × 1.5–4 cm, base acute or attenuate, top acute-acuminate to long-tapering; blade above glabrous, drying blackish-brown, beneath glabrescent (with few minute hairs remaining on midrib), drying brown, not dotted; midrib above very slender, slightly raised; nerves 12–25 pairs, above indistinct, flat or slightly raised, distinct beneath with the marginal arches moderately distinct or indistinct; tertiary venation indistinct beneath; petiole slender, 7–12 × (0.5–)1 mm, glabrescent; leaf bud slender, 5–7(–10) × 0.5–1 mm, densely minutely rusty pubescent with hairs c. 0.1 mm. *Inflorescences* axillary to the leaves, small, compound (twice ramified) (lowest branch 2–5 mm from the base), moderately pubescent with hairs 0.1 mm or less, rather few-flowered; in male: c. 2 × 2 cm, with few branches, the flowers ultimately solitary or up to 3 together; bracts ellipsoid, c. 0.5–1 mm long, caducous; in female: 1–1.5 cm long, not or little branched, 1–3-flowered. *Flowers* 2-valved, completely thinly pubescent with stellate-dendroid hairs 0.1–0.2 mm long. *Male flowers*: perianth slightly flattened laterally, subglobose or broadly ellipsoid or broadly obovoid, 2.2–2.4 mm diam.; valves splitting the perianth to c. 1/8 (i.e. c. 0.2 mm deep only), perianth wall 0.7–0.8 mm thick, the valves at apex c. 0.2 mm thick; pedicel slender, not tapering, 3–3.5 mm long, at base not articulated, androecium club-shaped, the apex subacute to broadly rounded, 1.7–1.8 × 0.6–0.7 mm; anthers apically, mutually appressed, 4 (i.e. 8 thecae), c. 0.4 mm long, largely consolidated with the androphore, at apex slightly free or not; androphore in the lower 1/2–2/3 densely minutely pale brown pubescent with hairs less than 0.1 mm, the remaining apical part coarsely irregularly warted or wrinkled-bullate, glabrous; central column not excavated at apex. *Female perianth* subglobose, c. 1.8 mm diam., pedicel 2–2.5 mm long; valves 2, splitting the perianth for c. 1/8 only; perianth wall 0.4–0.5 mm thick; ovary ellipsoid-ovoid, c. 1.5 × 1(–1.1) mm, densely minutely pubescent; stigma minute, of two suberect lobes 0.1–0.2 mm. *Fruits* 1(–3) per infructescence, drying blackish, without lenticels, ovoid-ellipsoid, including the c. 2–3 mm long apiculum (rostrum) c. 1.6–1.7 × 0.9–1 cm, pseudostalk 4–5 mm; all thinly minutely pale brown stellate pubescent with hairs 0.1 mm or less, dry valves c. 0.5(–1) mm thick; stalk slender, slightly broadened to above or not, 8–12 mm long; perianth not persisting.

**Distribution.** Papua New Guinea: Western District (about 5–6° S, 141° E).

PAPUA NEW GUINEA. Brass 7221; NGF 31888 Henty, Ridsdale & Galore; NGF 42995 Henty & Barlow.

**Ecology.** Primary and disturbed forest; ridge-crests, undulating land; forest bordering sago-swamp; locally plentiful in forest undergrowth; 100–200 m altitude. Flowers and fruit in July and August.

**Notes.** 1. Fieldnotes. Shrub or small tree, 2–10 m tall; numerous excurrent horizontal branches; or slender trees, with the branches  $\pm$  whorled, drooping. Bark recorded as brown, wood white, red exudate. Flowers yellow. Fruit orange or orange-yellow, 'conical', aril entire, red, not aromatic.

2. Apparently most closely related to *H. coryandra*, a here newly described species based mainly on specimens formerly included in *H. squamulosa*. *Horsfieldia coryandra* generally has similar leaves (though usually with coarser reticulation), but differs by a somewhat more elongate male perianth, a glabrous or almost glabrous androphore, and by the fruits with a pseudostalk of only c. 2 mm.

3. Vegetatively, *H. squamulosa* and its close ally *H. coryandra* much resemble *H. schlechteri* from the same region, especially in the foliage.

4. The present species forms with *H. crux-melitensis* and *H. clavata*, and two hereafter newly described species (*H. urceolata* and *H. coryandra*) a coherent group of species of small trees and shrubs with club-shaped androecium consisting of a relatively large androphore and small sessile anthers at the apex: the *clavata*-group (see De Wilde, l.c. 1984: 124, 130, fig. 1A 21–23). Somewhat resembling androecia have the remote species *H. pulverulenta*, *H. sterilis*, and *H. triandra*.

To accommodate the newly described species *H. urceolata* and *H. coryandra*, the portions of the two keys, to male flowering and to female flowering and fruiting specimens, pertaining to the species of the *clavata*-group as presented in l.c. 1984, have been adapted as follows:

*Key to the species of the clavata-group, based on male flowering specimens* (to replace leads 31 and 32 of the general key to the species, l.c. 1984: 142):

- 31 a. Mature male perianth together with the pedicel long-pear-shaped, i.e. the pedicel broadened to above and gradually passing into the perianth. Androphore glabrous ..... 32
- b. Male perianth globose or ellipsoid, distinctly marked off from the slender pedicel. Androphore glabrous or pubescent ..... 32<sup>1</sup>
- 32 a. Male pedicel and perianth together c. 10–12 mm long
  - 21. *H. crux-melitensis*
  - b. Male pedicel and perianth together c. 5 mm long ..... 22. *H. clavata*
  - 32<sup>1</sup> a. Male perianth subglobose or ellipsoid in outline, its wall c. 0.5–0.8 mm thick. Tomentum (of inflorescences, leaf bud, twig apex) of hairs 0.1–0.2 mm . 32<sup>2</sup>
  - b. Male perianth subglobose in outline, its wall 1–1.5 mm thick. Androphore glabrous. Pedicel c. 3 mm long. Tomentum of hairs c. 0.3(–0.4) mm
    - 23-bis<sup>1</sup>. *H. urceolata*
  - 32<sup>2</sup> a. Androphore (at least in the lower half) densely pubescent. Pedicel 3–3.5 mm long. Perianth in anthesis at apex opening for c. 1/8 only
    - 23. *H. squamulosa*
    - b. Androphore glabrous or with a few scattered hairs. Pedicel (3–)4–6.5 mm long. Perianth at apex opening for (1/6–)1/4 ..... 23-bis<sup>2</sup>. *H. coryandra*

*Regional key to the species of the clavata-group, based on female flowering and fruiting specimens (7. New Guinea, etc.) (to replace leads 21–24 of the key, l.c. 1984: 166):*

- 21 [a. Fruit at apex rounded, not apiculate; pseudostalk absent ... **36. H. pilifera**]  
     b. Fruit apiculate; pseudostalk up to 5 mm long ..... 22
- 22 a. Leaves broadly obovate to oblong, c. 12–20 × 5–11 cm. Pedicel broadening to above and gradually passing into the female perianth. Fruit, including up to 1 mm long pseudostalk and c. 2 mm long apiculum, c. 1.3–1.6 × 1 cm; fruit stalk 9–14 mm long, distinctly tapering ..... **21. H. crux-melitensis**  
     b. Leaves elliptic to lanceolate, 4.5–20 × 0.7–6 cm. Female pedicel well marked off from the perianth. Pseudostalk of fruit c. 1.5–5 mm; fruit stalk not or but little tapering, up to c. 10 mm long ..... 23
- 23 a. Pseudostalk of fruit c. 5 mm long; fruit excluding pseudostalk but including 2–3 mm long apiculum c. 1.6–1.7 × 0.9 × 1 cm ..... **23. H. squamulosa**  
     b. Pseudostalk of fruit c. 1.5–3 mm long ..... 24
- 24 a. Tomentum of inflorescences, leaf bud and twig apices composed of hairs c. 0.3 mm. Tertiary venation of leaves below coarse and distinct. (Female flowers not known; fruits not known with certainty, see notes; male perianth subglobose, very thickly walled.) ..... **23-bis<sup>1</sup>. H. urceolata**  
     b. Tomentum of hairs 0.1–0.2 mm. Tertiary venation generally less distinct. (Male perianth different.) ..... 24<sup>1</sup>
- 24<sup>1</sup> a. Fruit excluding the 1.5–2.5 mm long pseudostalk, but including the 0.5–2 mm long apiculum 1.2–1.5 × 0.8–1 cm. (Male perianth well-marked off from pedicel.) ..... **23-bis<sup>2</sup>. H. coryandra**  
     b. Fruit excluding the 1.5–2 mm long pseudostalk, but including the c. 2 mm long apiculum c. 1.3 × 1 cm. (Male flower different: pedicel thickening to above and gradually passing into the perianth.) ..... **22. H. clavata**

**23-bis<sup>1</sup>. *Horsfieldia urceolata* de Wilde, *spec. nov.***

Frutex vel arbuscula, 1–5 m. Tomentum obtectum ramulorum apicibus compositum e pilis c. 0.3 mm longis. Perianthium masculinum subglobosum, carnosum, 1–1.5 mm crassum; pedicellis non attenuatis; androcio clavato, androphoro glabro. Fructus apiculo c. 1 mm longum incluso c. 1 × 0.9 cm, pedicello spurio 1.5–2 mm longo. – Typus: LAE 77053 Gideon (L.).

Shrub or treelet, 1–5 m. Twigs terete, not ridged, towards the apex c. 1.5 mm diam., pubescent with dark rusty-brown hairs (0.2–)0.3 mm; bark lower down glabrescent, brown, finely striate, neither cracked nor flaking, without or with few inconspicuous lenticels. *Leaves* distichous, membranous, oblong to lanceolate, broadest either at or above or below the middle, 6–18 × 1.5–7 cm, base attenuate to nearly rounded, top acute-acuminate; blade above glabrous, drying dark brown, beneath glabrescent with some scattered scaly-stellate hairs remaining for some time, drying brown, not dark-dotted; midrib above very slender, raised; nerves 12–15 pairs, with distinct marginal arches, nerves and arches leaving a distinct sunken pattern on the upper blade surface; tertiary venation usually distinct and forming a coarse network

beneath; petiole rather slender,  $6-10 \times 1-2$  mm, glabrescent; leaf bud slender, c.  $7 \times 1.5$  mm, densely rusty woolly-pubescent with hairs 0.2–0.3 mm. *Inflorescences* axillary to the leaves, small, compound (i.e. twice ramified), the lowest branch 2–3 mm from the base, densely rusty pubescent with hairs (0.2–)0.3 mm, rather few-flowered; in male: c.  $2-3 \times 2$  cm, with few branches, the flowers solitary or 2 or 3 together; bracts oblong-lanceolate, 1.5–2 mm, pubescent, caducous. *Flowers* 2-valved, pedicel and base of perianth pubescent by hairs 0.2–0.3 mm, the remainder of the perianth early glabrescent, drying dark brown or blackish. *Male perianth* subglobose or broadly ovoid, c. 2.5–3 mm diam., valves splitting the perianth to c.  $1/6$  (– $1/8$ ) (i.e. c. 0.2 mm deep only), perianth wall 1–1.5 mm thick, the valves towards the apex c. 0.2 mm; pedicel slender, not tapering, 1.5–3 mm long, at base not articulated; androecium club-shaped, the anther-bearing apex acutish,  $1.5-2 \times 0.6-0.7$  mm; anthers 4 (i.e. 8 thecae), sessile, mutually slightly touching, 0.3–0.4 mm long, at apex hardly projecting or not at all; androphore glabrous, with scattered tannin-dots, not or but indistinctly warty; central column at apex not excavated. *Female flowers* not seen. *Female inflorescences* (according to the infructescences of NGF 31751, a doubtful specimen, see notes) few-flowered, c. 2.5 cm long. *Fruits* 2 or 3 per infructescence, drying dark brown to blackish, subglobose (to broadly ellipsoid), including the minute, slender, bifid, c. 1 mm long apiculum (persisting style and stigmas) c. 1 mm long, pseudostalk 1.5–2 mm; all thinly pubescent with hairs 0.1–0.2 mm, neither with lenticels, nor warted; dry valves c. 0.5 mm thick; stalk slender, not conspicuously broadened to above, 7–8 mm long; perianth not persisting.

*Distribution.* Papua New Guinea: Milne Bay Prov. (c.  $10^{\circ}20'S-15^{\circ}10'E$ ): LAE 67148, 77053, and (possibly, see notes) Northern Prov. (c.  $8^{\circ}S-147^{\circ}50'E$ ): NGF 31751.

*Ecology.* Primary rainforest on sloping ground; *Lithocarpus*, *Anisoptera*, *Hopea*-dominated forest on ridges and slopes; 25–120 m altitude. Flowers in March and November, fruits in May.

*Notes.* 1. Fieldnotes. Shrub or low treelet. Leaves dull green above, pale or somewhat olive below, with olive-brown midvein. Flowers yellow. Fruit red, splitting in two, brilliant scarlet inside.

2. Part of the material had been formerly included by me in *H. squamulosa*. Our present species differs from that species and from the related *H. coryandra* by its subglobose thick-walled male perianth.

3. The fruiting specimen, NGF 31751 *Ridsdale* (formerly included by me in *H. squamulosa*) differs markedly from the type by having a rather different foliage, with the blades rather conspicuously tapering in the lower half, less distinct and less projecting tertiary venation, and rather more persisting tomentum on the lower surface. Possibly it represents a separate undescribed taxon, but more material is needed to decide on this.

4. Similar as with its related species, also the present one seems to be restricted to a different and conspicuously limited area of distribution.

5. Fruiting specimens of this and related species (*H. clavata*-group) may resemble *H. subtilis* and *H. schlechteri*, but these latter two have glabrous ovaries and fruit.

**23-bis<sup>2</sup>. *Horsfieldia coryandra* de Wilde, *spec. nov.***

*Horsfieldia squamulosa* auct. non de Wilde: de Wilde, Gard. Bull. Sing. 38 (1985) 93, p.p.

Arbor parva, 1,5–6 m. Tomentum ramulorum apicibus obtectum compositum e pilis c. 0,1 mm longis. Perianthium masculinum ellipsoideum, carnosum, c. 0,5 mm crassum, pedicello non attenuato; androcio clavato, androphoro glabro vel pilis paucis oblecto. Fructus apiculo 0,5–2 mm longo incluso 1,2–1,5 × 0,8–1 cm; pedicello spurio 1,5–2,5 mm longo. – Typus: NGF 46892 (L), male flowers, fruit.

Shrub or treelet, 1.5–6 m (d.b.h. to c. 9 cm). Twigs slender, terete, not ridged, towards the apex 1.5–2 mm diam., pubescent with rusty hairs c. 0.1 mm long or less; bark lower down glabrescent, finely striate, neither cracked nor flaking, lenticels few and inconspicuous or absent. *Leaves* in two rows, membranous, elliptic-oblong to lanceolate, 5–20 × 0.7–5 cm, base (long-)attenuate or acute, top long acuminate (acumen often slender, to c. 3 cm long) or blade ± gradually narrowed from slightly above the middle; blade above glabrous, drying dark brown (sometimes slightly olivaceous), beneath glabrescent with some tomentum of scattered hairs 0.1 mm or less remaining on and near the midrib, drying brown or olivaceous brown, not dotted; midrib above very slender, flat or usually slightly raised; nerves 11–19 pairs (usually with some intercalary nerves not reaching the marginal nerve), above indistinct, flattish or sunken, nerves beneath distinct, with marginal nerve usually clearly arching and distinct; tertiary venation usually coarse and distinct; petiole slender, 6–14 × 0.5–1.5 mm, glabrescent; leaf bud slender, c. 7–12 × 1(–1.5) mm, densely pubescent with rusty hairs 0.1 mm or less. *Inflorescence* situated in between the leaves, small, compound, 2–3 times ramified, lowest branch 2–10 mm from the base, moderately grey-brown pubescent with hairs c. 0.1 mm or less, few- to moderate flowered; in male: c. 2–3 × 1.5–3 cm, with few branches, the ultimate flowers solitary or 2 or 3 together; bracts oblong, c. 1–2 mm long, caducous; female inflorescences 1–1.5 cm long, not or little ramified, few-flowered. *Flowers* 2-valved, including pedicel thinly pubescent with hairs c. 0.1(–0.2) mm or less, glabrescent in the apical portion. *Male flowers*: perianth slightly flattened laterally, in outline elliptic(–obovate) to elliptic-oblong, c. 2–3 × 1.5–2 mm, valves splitting the perianth to 1/6 to nearly 1/4; perianth wall 0.5–0.7 mm thick, towards the apex of the valves thinner, 0.2–0.3 mm; pedicel slender, ± well marked-off from the perianth (hence not tapering), (2.5–)4–6.5 mm long, at base not articulated; androecium club-shaped, the apex subacute (to bluntish), 1.5–2.5 × 0.6–0.8 mm; anthers apical of the androecium, mutually touching, 4 (i.e. 8 thecae), 0.5–0.7(–1) mm long, at apex free for c. 0.2–0.4 mm; central column not hollowed at apex; androphore glabrous or in the lower part with a few pale brown, scattered, minute hairs much less than 0.1 mm, the upper part with somewhat warted or wrinkled surface. *Female perianth* ellipsoid or ± fusiform, c. 2–2.5 × 1.5–2 mm, pedicel 2.5–3.5 mm; valves 2, splitting the bud c. 1/3; perianth wall 0.2–0.3 mm; ovary ovoid, c. 1.5 × 1.4 mm, densely minutely pubescent, style erect with 2 acutish lobes together c. 0.4 mm long. *Fruits* 1 or 2 per infructescence, drying blackish, without lenticels, broadly ellipsoid-ovoid, including the 0.5–2 mm long apiculum 1.2–1.5 × 0.8–1 cm, pseudostalk 1.5–2.5 mm; all thinly minutely pubescent with hairs 0.1 mm or less, dry valves c.

0.5(–1) mm thick; stalk (pedicel) lengthened to (5–)10–12 mm, not or hardly broadened to above; perianth not persisting.

**Distribution.** Papua New Guinea: Milne Bay Prov. (including Normanby I.), Northern District, Morobe District; at about 7–9°S to 147–151°E.

PAPUA NEW GUINEA. Carr 16192; LAE 70239, 71160; NGF 23574, 28894, 34088, 38093, 46892; Pullen 8287; Schlechter 17408 (n.v.; paratype *H. crux-melitensis*).

**Ecology.** Lower hill forest; *Castanopsis* forest on steep slopes, *Eucalyptus*-dominated forest, ridge-forest, river banks; c. 400–500 m altitude. Flowers and fruits throughout the year.

**Notes.** 1. Fieldnotes. An understory shrub or low tree, sometimes gregarious. Bark smooth, greenish brown or dark green, under bark red (red exudate), inner bark brown; wood cream turning brown on exposure. Flowers yellow or orange. Fruit green or yellow-green to orange; aril complete (orifice very small and folded away), thin, red.

2. This new species comes close to *H. squamulosa*, with similar, rather ellipsoid perianth, differing in some small characters in flower and fruit as given in the key on page 462. presented after the re-description of 23. *H. squamulosa*.

3. *Horsfieldia coryandra* as well as 23-bis<sup>1</sup>. *H. urceolata*, as separate species besides *H. squamulosa*, became evident after examining recently acquired specimens collected in the NGF and LAE series.

#### 49-bis. *Horsfieldia elongata* de Wilde, *spec. nov.* – Fig. 1.

*Horsfieldia* species ramulis siccis pallescentibus, *H. pallidicaulae* affinis. Folia disticha. Gemmae tomentosae, tomento e pilis ca. 0.1 mm longo composito. Perianthium masculum in alabastro ellipsoideum, 2–2.4 mm longum, valvis 3 vel 4, androecio ellipsoideo, ca. 1.8–2 × 1.3–1.5 mm, antheris 8 vel 9. – *Typus*: Stone 10779 (L).

Tree c. 8 m. Twigs terete, not lined or ridged, towards the top 1.5–2 mm diam., early glabrescent from pale brown tomentum of hairs c. 0.1 mm, bark of twigs lower down ± coarsely striate, drying pale, greyish, lenticels present, older bark not flaking. *Leaves* in 2 rows, ± membranous, oblong-lanceolate, broadest at or above the middle, 13–21 × 3.5–6 cm, base long-attenuate, top rounded or bluntish to subacute; upper surface glabrous, dull, drying brown-olivaceous, lower surface drying slightly paler, glabrous (very early glabrescent), without blackish dots; midrib above slender, flat; nerves 15–18 pairs, sunken or flattish, rather inconspicuous; tertiary venation forming a coarse network, indistinct; petioles 10–20 × 1.5–2.5 mm, glabrous, drying blackish; leaf bud slender, 10–12 × 1.5–2 mm, densely pale brown pubescent by hairs c. 0.1 mm long. *Inflorescences* axillary to the lower leaves, thinly pubescent by pale brown stellate hairs c. 0.1 mm; in male: small, ± slender, rather few-flowered, once or twice ramified, 1.5–2.5 × 1–2 cm, common peduncle 1–5 mm long, flowers solitary or 2 or 3 together; bracts ± elliptic, densely pale brown villous by hairs c. 0.1 mm, caducous; flowers 3- or 4-valved, perianth glabrous or glabrescent from scattered hairs less than 0.1 mm, pedicel with scattered minute hairs, at base not articulated. *Mature male perianth* in bud (± ovoid-)jellipsoid, 2–2.4

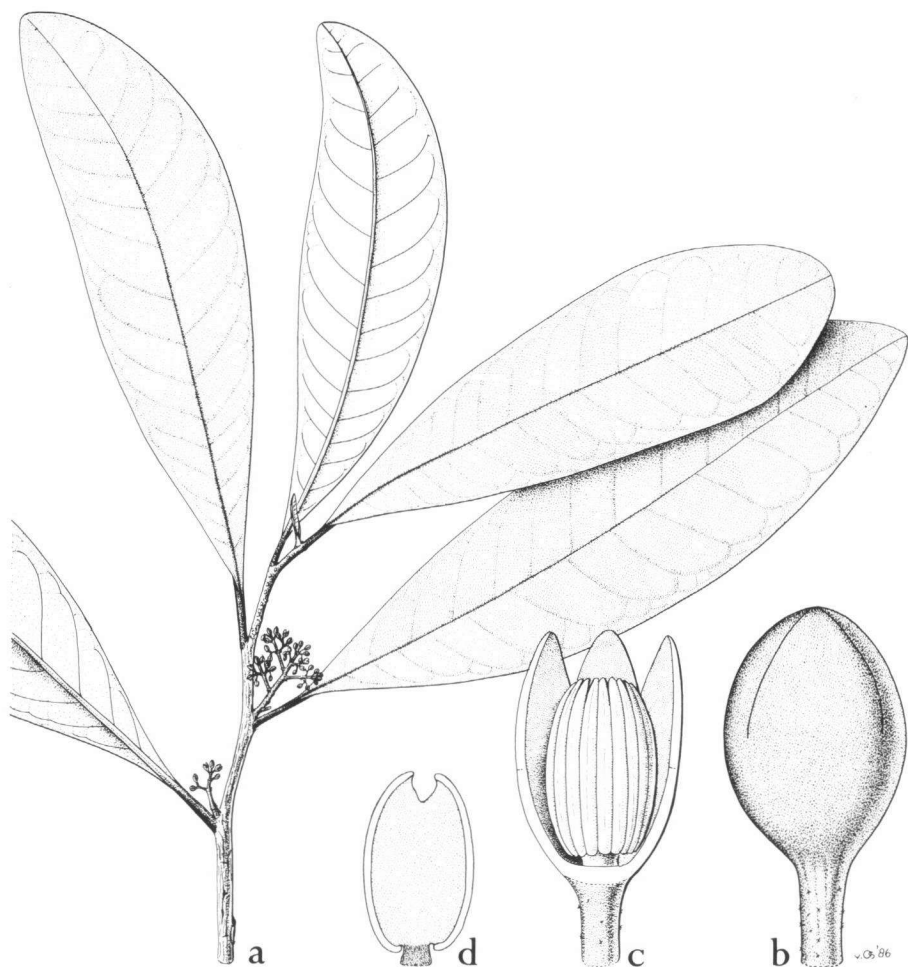


Fig. 1. *Horsfieldia elongata* de Wilde. a. Habit of branchlet with male inflorescences,  $\times 0.5$ ; b. mature male flower bud; c. ditto, longitudinally opened, showing androecium; d. androecium, longitudinal section, half-schematic; b-d.  $\times 12.5$  (all from Stone 10779, type).

$\times 1.5$ – $1.8$  mm, top narrowly rounded, base rounded, (sub)glabrous, valves at suture  $0.1$ – $0.2$  mm thick, splitting the bud in anthesis to  $1/3$ – $1/2$ –( $2/3$ ); pedicel ( $0.5$ )– $1$ – $2$  mm long. *Androecium* nearly sessile, ellipsoid,  $1.8$ – $2 \times (1.3$ )– $1.5$  mm, in transverse section subcircular; anthers mutually  $\pm$  appressed, 8 or 9, almost completely sessile, free at apex for c.  $0.1$ –( $0.2$ ) mm only; central column solid except narrow apical excavation c.  $0.2$ –( $0.3$ ) mm deep; androphore narrow,  $0.2$ – $0.3$  mm long. Female inflorescences and flowers, and fruits not seen.

**Distribution.** Malaya; only known from the type: *B.C. Stone 10779* (University of Malaya), Pahang, Fraser's Hill, start of Pine Tree Hill trail, c. 4000 ft altitude, small tree, flowers yellowish, 4 June 1972.



Notes. 1. The specimen was formerly pre-identified as cf. *Gymnacranthera* and only recently came to my attention.

2. The new species obviously belongs to the group of species with pallid bark of twigs and often dispersed leaves, like 47. *H. atjehensis*, 48. *H. sucosa*, 49. *H. pallidicaula* and 50. *H. sparsa*. Our present species has the leaves distichous. It keys out besides *H. pallidicaula* from Borneo, to which it obviously is closely related, as in the amendment given below.

*Key to the species, based on male flowering specimens* (to replace leads 77a & b of the general key to the species, l.c. 1984: 147–148):

- 77 a. Pedicels articulated at base. Androecium strongly depressed-globose, with the apical cavity broad and with flattish bottom, reaching to nearly halfway deep into the androecium. *Malaya, Sumatra* ..... 48. *H. sucosa* subsp. *sucosa*
- b. Pedicels not articulated at base. Androecium ellipsoid to slightly depressed-globose, with the apical cavity small and narrow ..... 77<sup>1</sup>
- 77<sup>1</sup> a. Perianth globose or subglobose, 1.5–2(–2.2) mm long, androecium subglobose or short-ellipsoid, c. 1 mm long. Leaves either distichous or dispersed. *Borneo* (up to 700 m alt.) ..... 49. *H. pallidicaula*
- b. Perianth ellipsoid, c. 2–2.4 mm long, androecium ellipsoid, 1.8–2 mm long. Leaves distichous. *Malaya* (at c. 1300 m alt.) ..... 49-bis. *H. elongata*

*Regional key to female flowering and fruiting specimens* (3. *Malaya, Singapore*) — In this key (l.c. 1984: 153–154) the present new species would key out between 48. *H. sucosa* subsp. *sucosa* and 50. *H. sparsa*. The first species is distinct by pedicels articulated at base (and in the male flowers quite different by smaller perianth and depressed-globose androecium), the latter species differs by leaves dispersed in 3–5 rows (and male flowers with subglobose perianth and subglobose stalked androecium).

## 76. *Horsfieldia disticha* de Wilde, Gard. Bull. Sing. 39 (1986) 10.

This species was described on a single fruiting specimen from Brunei, *Sinclair & Kadim 10453*, but a male specimen with very immature inflorescences, *SAN 17446 Smythies, Wood & Ashton*, also from Brunei, was discovered in L among specimens identified by Sinclair as *Gymnacranthera eugeniifolia* var. *griffithii*. According to the field label this collection has duplicates in A, BO, BRI, K, KEP, SING, but when in K, I could not find the specimen.

This second collection is similar in habit of twigs and leaves with the type. It was collected in the Kuala Belait District, Badas State Land, 13 April 1957, in lowland forest (50 ft alt.), annotated as a tree 55 ft tall.

The twigs have remarkably conspicuous, pale, scattered lenticels, contrasting with the dark drying colour of the bark of the twig. As said before, the inflorescences are too immature to describe, but they possibly will not grow longer than c. 3 cm. They bear not yet shed ovate to elliptic bracts 4(–5) mm long which are, like the inflorescences, clothed with dense tomentum of shaggy rusty-red hairs up to 0.5 mm long.

The immature male flower buds including pedicels hardly reach 1 mm; they are 3-valved, glabrous, and possibly would resemble those of e.g. *H. polyspherula*. It is not impossible that one of the duplicate specimens may contain flowers in a further developed stage.

**85. *Horsfieldia borneensis* de Wilde, Gard. Bull. Sing. 39 (1986) 27.**

Of this species female inflorescences and flowers had not been described, but now they have become known through *S 43041 Rena George et al.*, collected in E. Sarawak, 5th Division, 19 Sept. 1980, along ridge; tree 25 m tall, flowers deep yellow; Iban name: 'kumpang balau'. The locality falls within the gap between the original localities in W. Sarawak and Sabah.

The description of *H. borneensis* can be extended as follows:

*Female inflorescences* stout, densely rusty pubescent by dendroid hairs 0.2–0.4 mm, situated on the older wood well below the leaves (branches c. 1.5 cm thick), rather many-flowered, once or twice ramified, 8–10 × 4–5 cm (infructescences up to 13 cm long), common peduncle c. 15 × 5–7 mm, the flowers solitary or 2–4 together, bracts caducous. *Female perianth* subglobose or broadly ellipsoid, c. 3–3.5 × 3 mm, glabrous, valves 3, at suture c. 0.3 mm thick, splitting the perianth in anthesis to c. 1/3; pedicel thickish, glabrous, 1–1.5 mm long, at base distinctly articulated; ovary subglobose to broadly ovoid-ellipsoid, c. 2(–2.5) × 2 mm, glabrous, stigma 2-lipped, short, c. 0.2 mm high, descending c. 1.5 mm down the ovary.

**93. *Horsfieldia obscura* de Wilde, Gard. Bull. Sing. 39 (1986) 42.**

This species was described on two male flowering collections from limestone in NE. Kalimantan, viz. *Kostermans 6044* (from Berouw) and *13773* (from Sankularang; type), whereas a third collection from Sarawak, in fruit (*S 36305*), was supposed to belong to the same species.

After the treatment of this species (l.c.: 44) there followed an enumeration of eight 'entities', A–H, describing a number of fruiting collections which are supposedly different from, but still of the same alliance of *H. obscura*, because they would presumably key out in the general key close to *H. obscura* if additional male flowers were known, and because they key out in the same place as *H. obscura* in the regional key for fruiting specimens.

A recently acquired fruiting collection from Sarawak, 2nd Division, *S 44033*, was readily recognized as belonging also in the same alliance, and this induced me to compare once again the material of *H. obscura* as well as all the specimens enumerated under A–H. The specimen *S 44033* in L is a short leafy twig, with a large brown-black wrinkled fruit. Its twig has, for a *Horsfieldia*, a remarkably pale colour of the bark, a feature also mentioned for some of the entities enumerated in 1986. I now feel it justified to describe a new species, 93-bis. *H. discolor*, on the basis of pale twigs and large fruits, uniting these mutually most resembling specimens. In this way, *H. obscura* is now restricted to its originally designated two male flowering specimens, and the fruit characters then given should be deleted from the descrip-

tion; also the presumed fruiting collection is here tentatively removed to the newly described species. *Horsfieldia obscura* is well characterized by its male flower characters, but will be mainly differentiated from *H. discolor* (of which male flowers are not known yet) by its twig apex drying dark brown and conspicuously lenticellate already in a young stage. See further the comments on entity G as enumerated below, and those under *H. discolor*. The originally recognized eight entities A–H (l.c.: 44, 45) will be briefly commented on once more below:

- A – Both specimens have been used to describe the new species 93-bis. *H. discolor*.
- B – *Kostermans 4355* vegetatively most resembles *H. laticostata*, but because of its very much larger fruits it possibly represents a new species. It might be possible that the perianth is persistent under the fruit.
- C – Both cited specimens have been included in *H. discolor*; see the notes under that species.
- D – At present included in *H. discolor*; see there.
- E – The cited specimen with female flowers and fruit (fruits not in L) is with some doubt referred to the new species, *H. discolor*; see there.
- F – As noted before, *S 28083* most likely represents a new, yet undescribed species. It has large leaves and large fruits on a rather large inflorescence of c. 8 cm.
- G – *Chew Wee Lek CWL 687*, from limestone at c. 500 ft in Kuching District, Sarawak, is in fruit (mature fruit small, c  $3 \times 2$  cm). Vegetatively, by colour and texture of the stem and by texture and venation of the leaves, it comes close to *H. obscura*. It might, however, represent an undescribed related species as well.
- H – Both cited specimens, from montane areas, have rather pale twigs; as suggested before, they possibly represent a new, yet undescribed species.

### 93-bis. *Horsfieldia discolor* de Wilde, *spec. nov.*

*Horsfieldia* species ramulis praecociter glabrescentibus, ortis e tomento composito ex pilis c. 0,1 mm longis, cortice pallide brunnea, striata, lenticellis inconspicuis. Folia glabra, subtus epunctata. Flores ignoti. Fructus glabri, magni, in sicco subglobosi usque ad ellipsoidei, c. 5,5–8(–9) × 4–6,5 cm, pericarpio 10–20 mm crasso. – Typus: *Kostermans 7414* (L; iso BO, n.v.), fr.

Tree 10–18 m. Twigs terete, not ridged in between the bases of the petioles, towards the apex (2–)3–4 mm diam., at first thinly covered with dull rusty to dark brown tomentum of scaly-stellate hairs c. 0.1 mm high, soon glabrescent; bark at first rather pale, pale grey-brown to straw, coarsely longitudinally striate, bark lower down coarsely striate, pale brown to grey brown, neither cracking nor flaking; lenticels absent or few or many (see the notes), shallow and not or little contrasting and hence inconspicuous. *Leaves* in 2 rows, thinly chartaceous, extremely brittle when dry, oblong to oblong-lanceolate, broadest at about the middle, (9–)13–18 × (3.5–)4–7.5 cm, base attenuate, top ± short attenuate with acute or acute-acuminate tip, upper surface drying olivaceous-brown to dark brown, lower surface early glabrescent (glabrous), drying bright brown, without larger non-traumatic dots; midrib above flat, very slender; nerves 10–13 pairs, above flat, very slender and inconspic-

uous, the lateral arches indistinct; tertiary venation indistinct on both surfaces; petioles drying dark brown and rather contrasting with the pale colour of the twigs, early glabrescent, rather slender,  $10-15 \times 2-3$  mm; leaf bud lanceolate, c.  $10 \times 2$  mm, with dense dull tomentum of scale-like hairs 0.1 mm or less. Male inflorescences and flowers not known. *Female inflorescences* and *flowers* not known (but see the notes). *Infructescences* rather coarse, short, little or not ramified, 1.5–3.5 cm long, early glabrescent, bearing 1 or 2 (or 3) fruits. *Fruit* subglobose to ellipsoid, glabrous, drying brown to blackish brown, somewhat wrinkled and without or with but a few wart-like lenticels,  $5.5-8(-9) \times 4-6.5$  cm, pericarp 10–20 mm thick; stalk 2–5 mm long; seed ellipsoid-(oblong), (with the aril) c. 4–4.5 cm long, aril lacinate at apex for c.  $1/4-1/5$ ; perianth not persisting under the fruit.

*Distribution*. Borneo (E. Kalimantan, type; probably Sarawak and Sabah, see notes).

BORNEO. Sarawak (doubtful, see notes): *S* 23348, 32763, 36305, 44033. – Brunei (doubtful, see notes): *BRUN* 766 *Ashton*. – Sabah (doubtful, see notes): *Sinclair & Kadim* 9278. – E. Kalimantan (E. Kutei): *Kostermans* 7414 (type), 7461.

*Ecology*. Forest on loam-soil over sandstone, up to 900 m altitude; doubtful specimens from alluvial forest (riverbank forest) and karengas forest on sandy soils. Fruits in July (E. Kalimantan), March, June and November.

*Notes*. 1. Fieldnotes. Low to medium tree; bark recorded as red-brown, light brown, or black, rather smooth with longitudinal surface marks or fissures, strips 1–2 cm wide, c. 0.5–1 mm thick, once recorded as lenticellate; living bark (inner bark) red-brown or orange-brown, 5–7 mm thick, soft, exuding clear pink (or red) resin; (sap)wood soft, white or yellow, with reddish streaks. Fruit large ( $9 \times 6$  cm in *Sinclair* 9278), orange-yellow to orange-red, with the inner layer pink, aril bright orange to red; fresh seed (*Sinclair* 9278) c.  $5.5 \times 3$  cm, brown.

2. As partly explained under 93. *H. obscura* (see foregoing species) the present new species *H. discolor* is described on a part of the fruiting material which was in 1986, as different ‘entities’, enumerated under that species. A recently acquired fruiting specimen from Sarawak, *S* 44033 *Bernard Lee*, keyed out in the same alliance. This specimen has the twigs of a rather conspicuous pale colour, a feature in common with part of the above-mentioned ‘entities’, which induced me to recognize the new species. *Horsfieldia discolor* is known only in fruit, and characterized by the pale colour of the bark of the young twigs, contrasting with the dark brown or blackish drying colour of the petioles. Obviously, it is closely related to *H. obscura* (known only from two male flowering specimens), which differs by the twigs drying brown and densely set with rather conspicuous lenticels. In the present new species lenticels are almost absent, or in a number of tentatively included specimens (see note 3) few or abundant, but never very contrasting and conspicuous. Furthermore, *H. obscura* is from limestone, whereas our present new species seems associated with sandy and alluvial soils, and with sandstone substratum.

3. The description of the new species is based on two identical collections, namely those of entity A enumerated under *H. obscura* as published in 1986, both from sandstone on the Peak of Balikpapan, E. Kutei, at altitudes of 700 and 900 m respec-

tively. Of the other cited specimens it is not sure that they belong to the same species; they are from distant areas, Sabah, Brunei, and Sarawak, and either almost agree or differ to some measure with the type, some even added here with doubt. These additional specimens are briefly discussed below:

- *BRUN 766 Ashton* from Brunei is rather identical with the type; the twigs are of a pale colour but differ by more abundant, small and inconspicuous lenticels; the leaves are larger and have c. 23 nerves which are rather raised above. It was formerly included in entity C.
- *S 23348* from E. Sarawak (4th Division) was formerly also included in entity C. It differs from the foregoing one by a stouter habit and larger leaves (also with c. 23 slightly raised nerves) measuring to c. 30 × 10 cm.
- *S 32763* from karengas forest at c. 800 m in E. Sarawak (5th Division) looks almost identical to the type. It has the same pale twigs with few or no lenticels, similar leaves (including size and number of nerves) and almost similar fruit, c. 5.5 × 4 cm when dry. Vernacular name: 'bidarak' (Murut lang.). Formerly it was in entity D under *H. obscura*.
- *Sinclair (& Kadim) 9278* from Ranau, Sabah, was formerly in entity E under *H. obscura*. It rather agrees with the type of *H. discolor* by the palish twigs, although differing from it by the presence of many small inconspicuous lenticels and by smaller leaves with c. 12 flat or little-raised nerves. This collection has large fruit, when fresh c. 9 × 6 cm (not in L), and female flowers: female inflorescences are rather branched, 4–5 mm long, many-flowered, perianth c. 3 mm long, early glabrescent, 2- or 3-valved, cleft to c. 1/3, ovary broad-ellipsoid, c. 2 mm diam., glabrous.
- The recently acquired specimen *S 44033* from W. Sarawak (Lingga, 2nd Division) has the twigs with rather pale bark and many small inconspicuous lenticels; the leaves are medium-sized (with c. 15 nerves, flat and inconspicuous above); it has an enormous fruit on a c. 3 cm long infructescence: 8 × 4.5 cm when dry.
- *S 36305* from E. Sarawak (Kapit, 7th Division, at c. 700 m altitude) was formerly tentatively included in *H. obscura*, as the sole fruiting specimen. Because of its pale twigs with few small lenticels I now think that it can better be removed from that species as it obviously better agrees with the newly described *H. discolor* and its allied specimens enumerated above.

4. *Horsfieldia discolor*, being in the group of species with pale twigs, keys out most likely in the vicinity of *H. obscura*, and can be inserted in the keys to the species offered in Gard. Bull. Sing. 37 (1984) as follows:

*Amendment of the General key to the species* (l.c.: 148):

- 77 b. Pedicel not articulated at base. Androecium ellipsoid to slightly depressed globose, the apical cavity small and narrow (male flowers not known in *H. discolor*). *Borneo* ..... 77<sup>1</sup>
- 77<sup>1</sup> a. Fruit 4 cm long or less ..... 49. *H. pallidicaula*
- b. Fruit 5 cm long or more ..... 93-bis. *H. discolor*

*Amendment of the Regional key to the species (l.c.: 160):*

- 25 b. Twigs stouter, c. 3–10 mm diam. Leaves 13–35 cm long, the lower surface not conspicuously contrasting in colour ..... 28
- 28 a. Fruit 5 cm long or more ..... **93-bis. *H. discolor***  
 b. Fruit c. 2 cm long or less ..... 28<sup>1</sup>  
 (leading to 69. *H. carnosa* and 52. *H. tristis*).
- 29 a. *Species from lowland limestone, up to c. 700 m alt. in NE. Kalimantan.* Leaves membranous. Fruit not known ..... **93. *H. obscura***  
 b. *Mountainous species; c. 800–1800 m alt. (Sarawak, Sabah).* Leaves membranous or coriaceous. Fruit 5 cm long or less ..... 30  
 (leading to 92b. *H. subalpina* subsp. *kinabaluensis* and 94. *H. xanthina*).

## INDEX

Numbers refer to the species numbers as used in the revision of *Horsfieldia* published in Gard. Bull. Sing. 37, 38, 39 (1984–1986) or those as intercalated herein in the present Additions. New species are printed in bold type. Synonym in *italics*.

## Horsfieldia

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*crux-melitensis* Markgraf: 21  
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*squamulosa* de Wilde: 23  
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