

Studies in Malaysian Gentianaceae, VI. A revision of *Utania* in the Malay Peninsula with two new species

M. Sugumaran¹ & K.M. Wong^{2,*}

¹Rimba Ilmu Botanic Garden, Institute of Biological Sciences, University of Malaya, 50603 Kuala Lumpur, Malaysia

²Singapore Botanic Gardens, 1 Cluny Road, Singapore 259569

*Author for correspondence: wkm2000@gmail.com

Background – *Utania* is a resurrected name for a monophyletic group previously placed as *Fagraea* section *Racemosae*, part of the *Fagraea* taxonomic complex, which currently includes five recognised genera.

Methods – A revision of the genus in the Malay Peninsula was carried out using conventional methods of herbarium taxonomy. The specimen holdings of the K, KEP, KLU, L and SING herbaria were consulted.

Results – Six species are recognised for *Utania* in the Malay Peninsula, including two new species, *U. austromalayensis* and *U. nervosa*. Three new combinations are made: *U. maingayi*, *U. peninsularis* and *U. racemosa*, the last for a species of Indo-China, Thailand, the Malay Peninsula and Sumatra, which does not extend to Borneo and eastwards.

Key words – Diagnostic key, *Fagraea* complex, Malaysia, Potalieae, Potaliinae, Singapore, Southeast Asia, taxonomy.

INTRODUCTION

In light of the molecular phylogenetic studies of the *Fagraea* complex by Sugumaran & Wong (2012), it was possible to circumscribe various genera based on monophyletic groups, each of which was distinguishable by a number of morphological characters. In the taxonomic framework proposed by Wong & Sugumaran (2012), the earliest valid name for the *Racemosa* clade, previously treated as *Fagraea* section *Racemosae* Benth. (Benth 1856: 99) in the broad concept of Leenhouts (1962), was identified as *Utania* Don (Don 1838: 663). Three other clades that were obtained in their analyses (viz., the *Fagraea*, *Gigantea* and *Elliptica* clades), and the isolated *F. crenulata* Maingay ex Clarke (Hooker 1883: 83) lineage, were, respectively, distinguished as *Fagraea* Thunb. sensu stricto (Thunberg 1782: 132), *Cyrtophyllum* Reinwardt (Reinwardt 1825: 8), *Picropheous* Blume (Blume 1826: 1019), and *Limahlania* K.M.Wong & Sugumaran (Wong & Sugumaran 2012: 491).

Among members of that complex, *Utania* appears to be very well distinguished from the other genera by Roux's tree architectural model (Hallé et al. 1978), in which the main orthotropic (stem) axis shows continuous growth with decussate phyllotaxis, and the branches are plagiotropic with the leaf pairs in a single plane. The distichously arranged leaves on the branches are easily observed even in herbarium material. In all the other genera of this complex, stem growth is

episodic and the branches variously form orthotropic complexes (*Fagraea* s.s. and *Picropheous*), or extend plagiotropically by apposition (*Cyrtophyllum*) or through modular growth (*Limahlania*); also the leaves on branches are decussate (Wong & Sugumaran 2012).

Species of *Utania* do not produce resin at their vegetative terminal buds or a gummy translucent or creamy latex in their fruit epidermis and fruit wall, as can be found in the other genera of the *Fagraea* s.l. complex. The inflorescence of *Utania* is generally a pendulous elongate panicle with cymose branching, in which the branch pairs are condensed and distinctly shorter than the rachis; here we use the term 'rachis' for the main inflorescence axis distal to the peduncle, as defined by Jackson (1928) and Beentje (2012). The other genera mentioned bear only a solitary flower or branched cymes where the basal branches are nearly as long as the rachis. Fruits of *Utania* (both fresh or dried) have a firm fruit wall and epidermis that does not come off easily, whereas in the other genera the fruit wall is relatively soft at maturity, with the epidermis coming off easily and often wrinkled in dried material.

Fagraea section *Racemosae* was revised for Borneo by Wong & Sugau (1996), and the required nomenclatural transfers to *Utania* for Bornean taxa are validated in Wong et al. (2013). The present contribution is a revision of the genus for the Malay Peninsula.

MATERIAL AND METHODS

The study was carried out using conventional herbarium approaches. Specimens at the K, KEP, KLU, L and SING herbaria (acronyms follow Thiers continuously updated) were examined, comparing key morphological attributes of both vegetative and reproductive (including inflorescence, flower and fruit) parts. In addition, JSTOR images of type specimens at BM, G-DC, K, L and SING were also checked.

When material includes flower buds, open flowers or fruits, this was noted and annotated in the specimen listings (see under each taxon below) as fb, fl or fr, respectively.

TAXONOMIC TREATMENT

Utania Don (Don 1838: 663); Wong & Sugumaran (2012: 492). – Type species: *Utania morindifolia* G.Don (Don 1838: 663) = *U. volubilis* (Wall.) Sugumaran (see below).

Kuhlia Reinwardt (Reinwardt 1825: 6), *nom. illeg.*, non Kunth (in Humboldt et al. 1825: 234). – Type species: *Kuhlia morindifolia* Reinw. (Reinwardt 1825: 7).

Kentia Steudel (Steudel 1840: 845), *nom. illeg.*, non Adanson (1763: 508). – Type species: *Kentia morindifolia* Steudel (Steudel 1840: 845).

Small to medium-sized trees usually 1 to several metres tall, occasionally reaching to about 30 m tall. Trunk ortho-

tropic, monopodial, with continuous growth; developing branches that are plagiotropic (Roux’s architectural model fide Hallé et al. 1978); bark becoming fissured in older trees. Vegetative shoot apices non-resinous. Leaves on orthotropic (stem) axes decussately arranged, those on plagiotropic branches distichously arranged; margin entire; petiolar sheaths of a leaf pair fused to form a shallow cup-like ochrea that loosely clasps the stem; petiolar base auricles absent. Inflorescence terminal, a many-flowered and branched pendulous cyme. Flowers bisexual, small to medium-sized, up to 25 mm wide at the mouth; calyx lobes 5; corolla white to creamy white, corolla lobes 5, overlapping to the right; stamens 5, typically not to slightly exserted; anthers versatile, hastate; style not to slightly exsert; stigma peltate. Fruit small to medium-sized, ellipsoid to broadly ellipsoid, up to 15 mm in diam.; colour at maturity pale to dark brown; without latex in fruit epidermis or fruit wall; epidermis not separating from pericarp (fruit surface firm and appearing smooth in herbarium specimens). Seeds numerous; placentation axile; polygonal; surface areolate.

Distribution and diversity – Indo-China (Cambodia, South Vietnam), Thailand, the Andaman and Nicobar Islands, Malay Peninsula, Sumatra, Java, Borneo, Celebes, Maluku, the Philippines and New Guinea. About fifteen species.

Habitat – Lowland forests below 1000 m elevation (including dryland tropical evergreen rainforest and seasonal forests, and periodically inundated tropical freshwater swamp

Key to Malay Peninsula species of *Utania*

- 1. Flowers with pedicels 6–18 mm long and calyx lobes 8–11 mm long and 6–10 mm wide; leaf margin distinctly recurved when dried.....2. *U. maingayi*
- 1. Flowers with pedicels up to 5 mm long and calyx lobes up to 6 mm long and 5 mm wide; leaf margin flat even after drying.....2
- 2. Leaves with 10–16 pairs of secondary veins; peduncle of mature inflorescence (bearing open flowers) 5–7 mm diam. and 0.8–1(–2) cm long; infructescence peduncle 5–8 mm diam.....3. *U. nervosa*
- 2. Leaves with 3–7 pairs of secondary veins; peduncle of mature inflorescence (bearing open flowers) 1–3(–4) mm diam. and (1–)3–8(–10) cm long; infructescence peduncle 1–4 mm diam.....3
- 3. Corolla narrowly funnel-shaped (corolla mouth less than to about 3 times the diam. of the lower narrowed part of the tube); corolla lobes very short, less than 3 mm long, only about 1/4 to 1/5 the length of the broadened upper part of the corolla tube.....1. *U. austromalayensis*
- 3. Corolla broadly funnel-shaped to campanulate (corolla mouth more than 3–4 times the diam. of the lower narrowed part of the tube); corolla lobes 5 mm long or more, more than half the length of the broadened upper part of the corolla tube.....4
- 4. Inflorescence branching to 1 order only on the lowest branching tier; corolla mouth 7–8 mm wide; leaf with 3–4 pairs of secondary veins, tertiary and higher-order veins not visible in dried specimens.....4. *U. peninsularis*
- 4. Inflorescence branching to 2 or more orders on the lowest branching tier; corolla mouth 10–17 mm diam.; leaf with 5–7 pairs of secondary veins, tertiary and higher-order veins distinct to at least faintly visible in dried specimens.....5
- 5. Rachis in the distal half of the flower-bearing part of the inflorescence and infructescence thinner than (or as slender as) the proximal rachis and peduncle; flowering and fruiting tiers above the basal 1–2 tiers always well-spaced, separated by clearly visible rachis lengths of 0.5 cm or more; calyx lobes spreading out from the corolla or fruit base in dried specimens.....6. *U. volubilis*
- 5. Rachis in the distal half of the flower-bearing part of the inflorescence and infructescence conspicuously thicker than the proximal rachis and peduncle; flowering and fruiting tiers above the basal 1–2 tiers typically closely spaced, without clearly visible rachis lengths between tiers; calyx lobes tightly clasping the corolla or fruit base in dried specimens.....5. *U. racemosa*

forest), as well as secondary vegetation; rarely in degraded open sites.

1. *Utania austromalayensis* M.Sugumaran, **sp. nov.**

Affinis *U. peninsularis* sed tubo corollae superne dilatato (parte dilatata aequante parte angusta; parte dilatata quadruplice ad quinquens longiore lobi corollae) et pedunculis longioribus (2.8–6 cm longis) differt. – Type: Singapore, Bidadari, Apr. 1897 (fb, fl, fr), *Ridley* 8453 (holo-: SING; iso-: K).

Small tree, c. 2 m tall. Leaves elliptic-ovate to elliptic-lanceolate; (4.3–)8–11(–14.7) cm long, (1.2–)3–5.5 cm wide; base cuneate rounded; apex acuminate-short caudate; margin flat; thin coriaceous; glabrous on both surfaces; midrib prominent below, sunken above; secondary veins 4–6 pairs, upper side faint, lower side faint to slightly prominent; tertiary veins inconspicuous; petioles 8–15 mm long, 1–2 mm diam. Inflorescence terminal, a many-flowered panicle, (2.4–)3.5–6(–9) cm long; peduncle 2.8–4.5(–6) cm long, 1–1.5 mm diam.; rachis in the distal half of the flower-bearing part of the inflorescence not conspicuously thicker than the proximal part and the peduncle, clearly visible; branch tiers closely spaced (except sometimes the lowest two tiers well-spaced, (0.5–)1–2(–2.5) cm apart), the basal 1–2 branch tiers most branched, typically to 1–2 orders, more distal tiers hardly so. Flower pedicel 2–4 mm long, 1–1.5 mm diam.; calyx (from the base to the lobe apices) 3–4 mm long, glabrous, calyx cup 3–3.5 mm diam., calyx lobes erect and tightly clasping the corolla tube, 2–3 mm long, 2–2.5 mm wide, margins glabrous to sparsely minute-ciliate or apparently lacinate (the cilia or lacinia just c. 0.1 mm long); corolla narrowly infundibular (the mouth less than to about 3 times the diam. of the lower narrowed part of the tube); white; lower subcylindrical part of the corolla tube 10–13 mm long, 2–3 mm diam., upper flared part of the tube slightly inflated, 10–12 mm long, 6–7 mm diam. at the top; corolla lobes broad-ovate to suborbicular, 2–2.5 mm long, 2.5–3 mm wide; stamens inserted at the upper portion of the lower narrowed tubular part of the corolla tube or the lowermost portion of the upper flared part of the corolla tube; filaments 15–16 mm long, slightly protruding to 5 mm from the corolla mouth in the open flowers; anthers 1.5–2 mm long, c. 1 mm wide, each theca somewhat ellipsoid; style 20–28 mm long, not to slightly protruding to 3 mm from the corolla mouth; stigma shallowly 2-lobed, the lobes broadly suborbicular and recurving when receptive (sometimes resembling a somewhat peltate structure c. 1 mm diam.). Infructescence peduncle 2.2–3.5 cm long, 1–1.5 mm diam.; rachis in the distal half of the fruit-bearing part of the infructescence not conspicuously thicker than the proximal part and the peduncle, clearly visible. Fruit apex beaked; smooth; when mature to 10–11 mm long, 7–10 mm diam.; the base tightly clasped by the calyx lobes. Seeds usually slightly elongated; 1–1.2 mm long, 0.5–1 mm diam. Fig. 1.

Habitat and distribution – Tropical evergreen lowland rainforest understory, on granitic and alluvial soils. Endemic to the southern half of the Malay Peninsula, uncommon.

Additional specimens studied – **Malaysia:** Johor state: Nam Heng, Sep. 1926 (fb, fl), *Teruya* 227 (SING); *ibid.*, Feb. 1927 (fl), *Teruya*

321 (SING); Pontian, Pengkalan Raja, 3 Jul. 1939 (fr), *Ngadiman* s.n. (SING). Pahang state: Tasik Bera, 30 Jul. 1970 (fr), *Soepadmo* KLU 11668 (KLU).

Singapore: sin. loc., sin. dat. (leafy branch only), *Cantley's Collection* s.n. (SING accession no. 080289) (SING); Changi, 1891 (fl, fr), *Ridley* 2783 (K, SING); Tampinis, Feb. 1894 (fb, fl), *Ridley* 5962 (SING); Tampinis Road, 17 Jun. 1890 (fb), *Goodenough* 1650 (SING).

Etymology – The Latin ‘austromalayensis’ refers to its distribution in the south of the Malay Peninsula.

Notes – Leenhouts (1962) in his account for the Malesian region, adopted a very broad concept for *Fagraea racemosa* (= *Utania racemosa*) where he dismissed a number of previously described species. Wong & Sugau (1996), in their account for Borneo, resurrected *F. peninsularis* (= *U. peninsularis*) among various other species from the synonymy of *F. racemosa* (*U. racemosa*). However, their concept of *F. peninsularis* (= *U. peninsularis*) (Wong & Sugau 1996) was mixed with material here considered to represent a different species (see also *U. peninsularis* below). The essential differences between these two species are as follows.

In *Utania peninsularis* the upper inflated part of the corolla tube is shorter than the lower narrowed tubular portion, whereas in *U. austromalayensis*, the two parts are about the same length. The peduncle is only up to 1.8 cm long in *U. peninsularis* but 2.8–6 cm long in *U. austromalayensis*. The number of secondary veins also differs between these two species: 3–4 pairs in *U. peninsularis* and 4–6 pairs in *U. austromalayensis*.

Material of this species has also been previously misidentified by King & Gamble (1908: 609) and Ridley (1923: 420) as “*F. ligustrina*” (not of Blume 1838).

2. *Utania maingayi* (Clarke) M.Sugumaran, **comb. nov.**

Fagraea maingayi C.B. Clarke in Hooker, The Flora of British India 4: 84. 1883 (Hooker 1883); King & Gamble (1908: 609); Ridley (1923: 419); Wong & Sugau (1996: 30). – Type: Malay Peninsula, 16 May 1864 (fb, fl), *Maingay* 1033 (holo-: K).

Small to medium-sized tree, usually to 5–15 m (occasionally to 30 m) tall; trunk to c. 15 cm diam.; bark slightly to deeply fissured, dark grey to dark brown. Leaves elliptic to elliptic-lanceolate; (6–)17–24(–28) cm long, (2.5–)6–9(–10.5) cm wide; base cuneate rounded; apex acuminate to short-caudate; margin recurved (in dried specimens); thick-coriaceous; glabrous on both surfaces; midrib prominent below, sunken above; secondary veins 6–8 pairs, faint on both sides; tertiary veins inconspicuous; petioles 1.2–2.4 cm long, (3–)5–7 mm diam. Inflorescence terminal, a many-flowered panicle, (7–)9–12(–15.5) cm long; peduncle (4–)5–8(–9) cm long, 2.5–4(–4.5) mm diam.; rachis in the distal half of the flower-bearing part of the inflorescence not conspicuously thicker than the proximal part and the peduncle, clearly visible; branch tiers well-spaced, 1.5–2.5 cm apart, the basal 1–2 branch tiers most branched, typically to (1–)2 orders, more distal tiers hardly so. Flower pedicel (6–)10–18 mm long, 2–4 mm diam.; calyx (from the base to the lobe apices) 9–13 mm long, glabrous, calyx cup 7–12 mm diam., calyx lobes

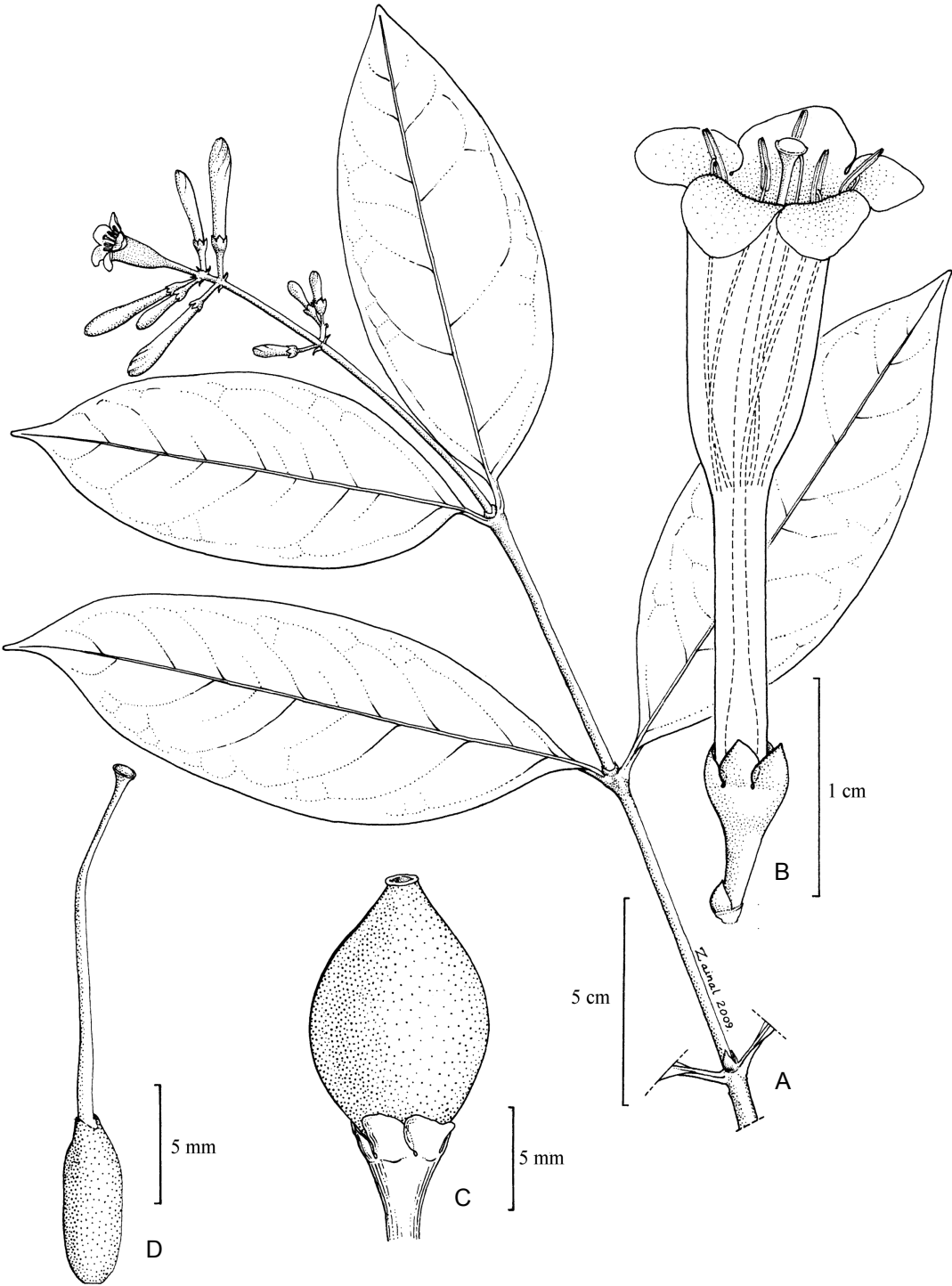


Figure 1 – *Utania austromalayensis*: A, leafy branch with an inflorescence; B, flower; C, fruit; D, gynoecium. All drawn from Ridley 8453 (SING).

erect and tightly clasping the corolla tube, 8–11 mm long, 6–10 mm wide, margins glabrous to sparsely minute-ciliate or apparently lacinate (the cilia or lacinia just c. 0.1 mm long); corolla broadly infundibular (the mouth more than 3–4 times the diam. of the lower narrowed part of the tube); cream to white; lower sub-cylindrical part of the corolla 3–4 mm long, 4–6 mm diam., upper flared part of the tube slightly inflated, (13–)15–18(–21) mm long, 17–22(–25) mm diam. at the top; corolla lobes broad-obovate to suborbicular, 12–14 mm long, 10–14 mm wide; stamens inserted at the upper portion of the lower narrowed tubular part of the corolla tube or the lowermost portion of the upper flared part of the corolla tube; filaments 19–23 mm long, not to slightly protruding to 3 mm from the corolla mouth; anthers 3–4 mm long, 1.5–2 mm wide, each theca somewhat ellipsoid; style 12–23 mm long, not protruding from the corolla mouth; stigma shallowly 2-lobed, the lobes broadly suborbicular and recurving when receptive (sometimes resembling a somewhat peltate structure 1–2 mm diam.). Infructescence peduncle 7–8.5 cm long, 3–4 mm diam.; rachis in the distal half of the fruit-bearing part of the infructescence not conspicuously thicker than the proximal part and the peduncle, clearly visible. Fruit ellipsoid, apex beaked; smooth; when mature to 15–18 mm long, 7–10 mm diam.; the base tightly clasped by the calyx lobes. Seeds usually slightly elongated; 1–1.2 mm long, 0.5–1 mm diam.

Habitat and distribution – Primary and secondary tropical evergreen lowland rainforests, on granitic and alluvial soils. Malay Peninsula and Sumatra, common.

Additional specimens studied – **Malaysia:** Kedah state: Koh Mai F. R., 1 Apr. 1938 (fb), *Kiah* SFN 35105 (K, SING). Melaka state: Sadanan Reserve, Jun. 1890 (fl), *Derry* 573 (SING); Selandar, 29 Apr. 1886 (fb), *Alvins* s.n. (SING). Negri Sembilan state: Senawang, 24 Nov. 1918 (fb, fr), *Yakim* CF 1986 (K, KEP, SING); Seremban, 1904 (leafy branch only), *Moorhouse* s.n. (SING). Pahang state: Aur F.R., *Compt.* 34, 10 May 1967 (fb), *Whitmore* FRI 3630 (K, KEP); Bentong, 19 Jul. 1958 (detached leaves only), *Ariffin* KEP 92362 (KEP); Jerantut, Hutan Simpan Tekai, 5 May 1999 (fb), *Teo & Emmanuel* KL 4892 (KEP); Taman Negara, Sungai Tanum, 8 May 1997 (fb, fl), *Chua et al.* FRI 40657 (KEP, SING); Kemanson F.R., 4 Sep. 1925 (leafy branches only), *Hamid* 10559 (SING); Mentakab, Kemasul F.R., 17 Mar. 1962 (fb), *Mohzan* KEP 99591 (K, KEP, SING); Sungai Telom, Bukit Cheraga, 26 May 1971 (fb), *Whitmore* FRI 20019 (KEP); *ibid.*, 26 May 1971 (fb, fl), *Zainuddin* FRI 14737 (K, KEP); Ulu Krau, Gunung Benom Game Reserve, 29 Apr. 1967 (fb), *Zahir* KEP 99108 (K, KEP). Perak state: Near Ulu Selangor, *sin. dat.* (fb, fl), *King's Collector* 8671 (K). Selangor state: Kajang, Bukit Tunggul, 26 Jul. 1929 (fr), *Harun* 17503 (SING); Kuala Lumpur, Public Garden, Apr. 1916 (fl), *Foxworthy* FMS 2362 (SING); Rantau Panjang, 10 Jun. 1927 (fb), *Strugnell* FMS 12787 (SING).

Notes – The flowers are fragrant (*Whitmore* FRI 20019). Among the six Peninsular Malaysian species in this genus, *U. maingayi* is the most easily distinguished. It has the largest flowers in this genus, with the corolla measuring about 3 cm long and 2.5 cm diam. at the mouth. The calyx is also the largest within the genus, measuring up to 1.3 cm long and up to 1.2 cm diam.

Leenhouts (1962) considered this species part of his *Fagraea racemosa* in spite of these differences. *Utania maingayi* also differs from typical specimens of *U. racemosa* in the following characteristics. The main axis of the inflorescence

is clearly seen and not hidden by flowers or flower groups in *U. maingayi* and the flowers or flower groups are in distinct tiers. The leaves of *U. maingayi* are typically oblong to lanceolate or obovate, and the secondary veins are sometimes inconspicuous and fading as they approach the leaf margin. In *U. racemosa*, the main axis of the inflorescence is largely obscured from view by the dense arrangement of flowers or flower groups, the leaves are mostly elliptic-ovate, sometimes lanceolate, and the secondary veins are always prominent on the lower leaf surface, often clearly looping near the margin.

3. *Utania nervosa* K.M.Wong & M.Sugumaran, *sp. nov.*

Affinis *U. racemosa*, sed venis folii secundariis paribus 10–16 pedunculisque inflorescentiarum crassioribus (5–7 mm in diam.) differt. – Type: Singapore, Pulau Ubin, 1997 (fb, fl), *Lai* LJ157 (sheet marked 1/2 with a leaf-pair on a twig portion, sheet marked 2/2 with inflorescence and leaves on a twig) (holo-: SING).

Small tree, usually 1–5 m tall; trunk to c. 6 cm diam.; bark smooth to slightly fissured, grey-brown to dark brown. Leaves elliptic to elliptic-ovate; (13–)20–31(–40) cm long, (6–)11–15(–18) cm wide; base cuneate to subcordate; apex acuminate-short caudate; margin flat; thick-coriaceous, lamina very often strongly bullate between the secondary veins when growing in hot open sites; glabrous on both surfaces; midrib prominent below, slightly sunken above; secondary veins 10–16 pairs, upper side faint, lower side prominent; tertiary veins faint; petioles 5–12 mm long, 4–7 mm diam. Inflorescence terminal, a many-flowered panicle, (3.5–)4–8(–10) cm long; peduncle 0.8–1(–2) cm long, robust, 5–6(–7) mm diam.; rachis in the distal half of the flower-bearing part of the inflorescence not conspicuously thicker than the proximal part and the peduncle, typically obscured from view by densely crowded flowers; branch tiers very closely spaced (except sometimes the lowest two tiers well-spaced, 0.5–1 cm apart), the basal 1–2 branch tiers most branched, typically to 3(–4) orders, more distal tiers hardly so. Flower pedicel 2–3 mm long, 2–3 mm diam.; calyx (from the base to the lobe apices) 5–7 mm long, glabrous, calyx cup 4–6 mm diam., calyx lobes erect and tightly clasping the corolla tube, 3–4 mm long, 3–5 mm wide, margins glabrous; corolla broadly infundibular (the mouth more than 3–4 times the diam. of the lower narrowed part of the tube); creamy-yellow to white; lower subcylindrical part of the corolla tube 11–15 mm long, 3–4 mm diam., upper flared part of the tube slightly inflated, 10–11 mm long, 15–18 mm diam. at the top; corolla lobes broad-obovate to suborbicular, 9–10 mm long, 7–8 mm wide; stamens inserted at the upper portion of the lower narrowed tubular part of the corolla tube or the lowermost portion of the upper flared part of the corolla tube; filaments 10–15 mm long, not protruding from the corolla mouth; anthers 3–4 mm long, 1–2 mm wide, each theca somewhat ellipsoid; style 22–25 mm long, not to slightly protruding c. 1 mm from the corolla mouth; stigma shallowly 2-lobed, the lobes broadly suborbicular and recurving when receptive (sometimes resembling a somewhat peltate structure 1–1.5 mm diam.). Infructescence peduncle 0.5–1.6 cm long, 5–7(–8) mm diam.; rachis in the distal half of the

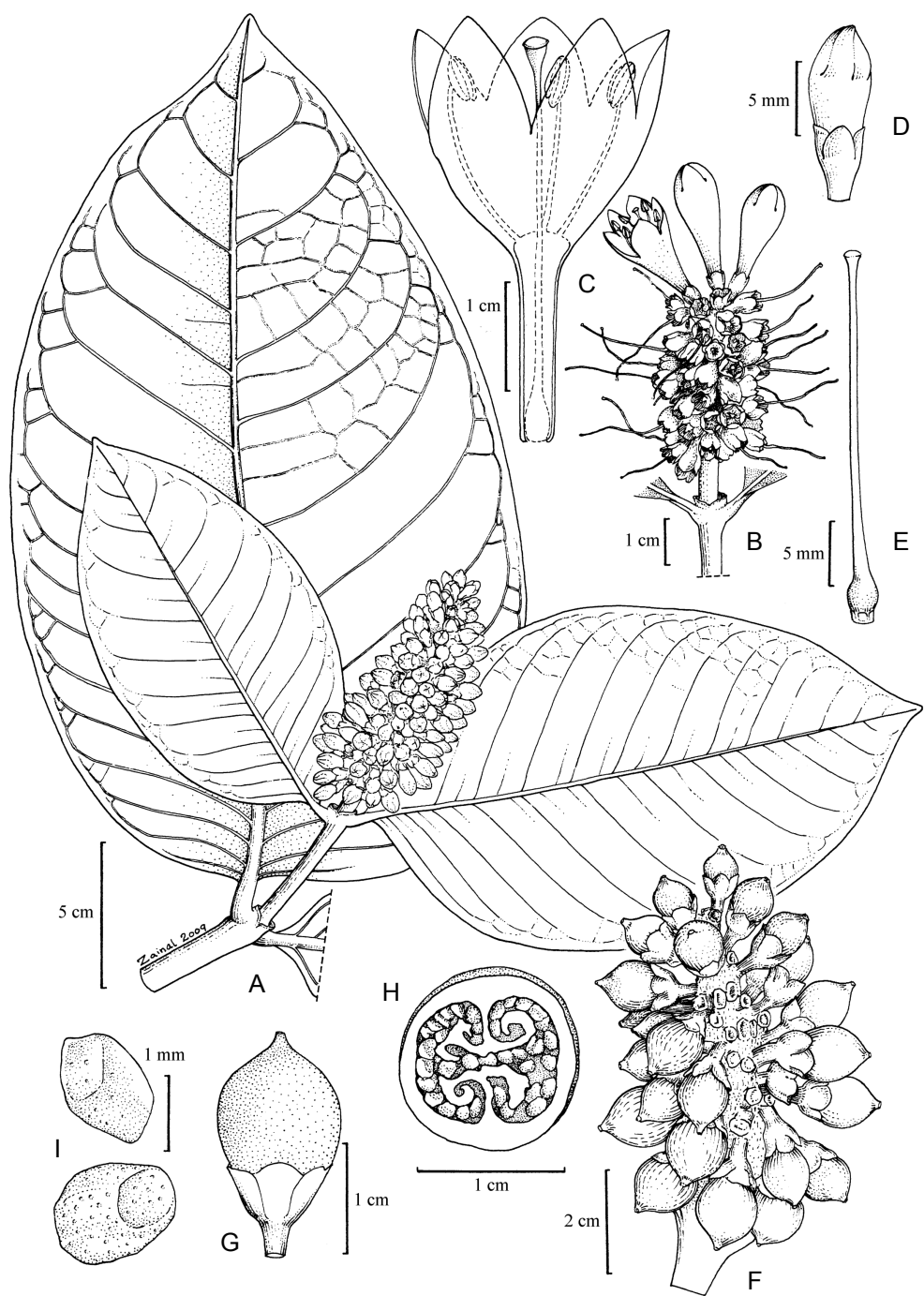


Figure 2 – *Utania nervosa*: A, leafy branch with an inflorescence; B, an inflorescence; C, flower; D, flower bud; E, gynoeceium; F, an infructescence; G, fruit; H, transverse section through mature fruit; I, seeds. A–E from *Lai* LJ 157 (holotype SING), F–I from *Sugumaran et al.* SM 201 (KLU).

fruit-bearing part of the infructescence not conspicuously thicker than the proximal part and the peduncle, typically obscured from view by the very closely spaced fruiting tiers. Fruit apex beaked; smooth; when mature to 14–18 mm long, 8–13 mm diam.; the base tightly clasped by the calyx lobes. Seeds usually slightly elongated; 1.5–2 mm long, 0.5–1 mm diam. Fig. 2.

Habitat and distribution – Tropical freshwater swamp forest and dryland tropical evergreen lowland forest, in forest understory and fringes, on alluvial soils. Confined to the southern half of the Malay Peninsula, with highly localised populations threatened by habitat changes including agricultural development. We have been able to verify good populations still intact in Pulau Tekong, Pulau Tekong Kechil and Pulau Ubin (including Chek Jawa) (Singapore).

Additional specimens studied – **Malaysia:** Johor state: Gunung Pantu F.R., 29 Apr. 2008 (leafy branch only), Sugumaran *et al.* SM 204 (KLU), SM205 (KLU); Jason Bay, 25 Oct. 1965 (fr), Carrick 1411 (SING); Kuala Sedili New Road, 9 Aug. 1959 (fb, fl), Burkill HMB 1961 (SING); *ibid.*, 28 Jun. 1959 (fb), Kadim & Nur 249 (SING); Mawai, 3 Jun. 1936 (fb), Corner s.n. (SING); Batu Piatu, 28 Apr. 2008 (fr), Sugumaran *et al.* SM 201 (KLU); Pantu F.R., 24 Jan. 1970 (fb), Everett FRI 13851 (KEP); Sungai Sedili, 26 Jul. 1939 (fb), Ngadiman SFN 36874 (SING).

Singapore: Pulau Tekong, 2 Mar. 2007 (fb, fr), Gwee *et al.* SING 2007-225, (SING); *ibid.*, 1998 (fb, fl), Lai LJ396 (SING); *ibid.*, 31 Oct. 2001 (fb, fl), Samsuri *et al.* 17 (SING); *ibid.*, 1 Feb. 2002 (fr), Samsuri *et al.* 365 (SING); Pulau Tekong Kechil, 29 Nov. 2002 (leafy branch only), Gwee *et al.* 23 (SING); Pulau Ubin, 17 Jun. 1890 (fb), Goodenough 1146 (SING); 6 Oct. 2012 (fb, fl on sheet 0166278; fr on sheet 0166279), Low & Ali LYW 521 (SING); Chek Jawa, 28 Jan. 2003 (fb, fl), Gwee *et al.* GAT 217 (SING); *ibid.*, 23 Sep. 2003 (fb, fr), GAT 339 (SING).

Notes – The flowers are fragrant. The plants are frequently infested with red weaver ants (*Oecophylla smaragdina* Fabricius), as noted in the field in Mawai, Johor (Sugumaran *et al.* SM 201), and also in Singapore collections (Gwee *et al.* GAT 339, Lai LJ 157).

Material of *U. nervosa* was misidentified as *Fagraea racemosa* by Leenhouts (1962). In fact, *U. nervosa*, described here, does have some resemblances to *U. cuspidata* (Blume) K.M.Wong, M.Sugumaran & Sugau (Wong *et al.* 2013) and *U. spicata* (Baker) K.M.Wong, M.Sugumaran & Sugau (Wong *et al.* 2013) from Borneo, as well as *U. racemosa* (below), but there are clear characters to tell these three species apart.

Utania nervosa is easily distinguished from *U. cuspidata* and *U. racemosa* by its greater number of secondary veins (10–16 pairs in *U. nervosa*, compared to only 5–7 pairs in *U. cuspidata* and *U. racemosa*). In *U. nervosa*, the inflorescence peduncle is massive, 5–6 mm diam., but more slender in the others (only 2–3 mm diam. in *U. cuspidata* and *U. spicata*; 2–3(–4) mm diam. in *U. racemosa*). It is also much shorter (only 0.8–2 cm long) than in *U. cuspidata* (11.5–23 cm long). In *U. nervosa* (and also *U. cuspidata* and *U. racemosa*), the mature fruits are tapered at both ends (spindle-shaped) but in *U. spicata* they are apically more rounded (somewhat top-shaped).

There are other differences. *Utania nervosa* has branches on the stem that are stiff and ascending compared to long, limply pendulous branches in mature trees of *U. spicata*.

Utania nervosa inflorescences have more branching orders, (2–)3–4 orders, whereas *U. spicata* inflorescences have less, only up to 1–2 orders; consequently the inflorescence in *U. nervosa* typically has a greater number of closely packed flowers than in the other species. Flower pedicels are much shorter (2–3 mm long) in *U. nervosa* but longer (7–20 mm long) in *U. cuspidata*. In *U. nervosa*, the calyx lobes in dried material are tightly clasping the corolla or fruit base but loosely clasping or spreading in *U. spicata*. In *U. nervosa*, the corolla lobes are much longer and wider (9–10 mm × 7–8 mm) than in *U. spicata* (3–4 mm × 4–5 mm).

4. *Utania peninsularis* (K.M.Wong & Sugau) M.Sugumaran, comb. nov.

Fagraea peninsularis K.M.Wong & Sugau, Sandakania 8: 33. 1996 (Wong & Sugau 1996), excl. Ridley 2783 (= *Utania austromalayensis*). – Type: Malaysia, Johor, Segamat Wildlife Reserve, eastern boundary, 1 Jun. 1970 (fb, fl, fr), Loh FRI 17131 (holo-: KEP; iso-: K).

Small tree, c. 2 m tall. Leaves elliptic-ovate to elliptic-oblongate; (2.5–)5.5–7(–9.3) cm long, (1–)2.5–3(–4.2) cm wide; base cuneate; apex caudate; margin flat; thin coriaceous; glabrous on both surfaces; midrib prominent below, sunken above; secondary veins 3–4 pairs, faint on both sides; tertiary veins inconspicuous; petioles 10–17 mm long, 1–1.5 mm diam. Inflorescence terminal, a many-flowered panicle, 1–2.7 cm long; peduncle c. 1.8 cm long, c. 1 mm diam.; rachis in the distal half of the flower-bearing part of the inflorescence not conspicuously thicker than the proximal part and the peduncle, clearly visible; branch tiers closely spaced (except sometimes the basal two tiers well-spaced, 4–5 mm apart), all branch tiers with only 1 branching order. Flower pedicel 3–4 mm long, 1–1.5 mm diam.; calyx (from the base to the lobe apices) 5–6 mm long, glabrous, calyx cup 3–4 mm diam., calyx lobes erect and tightly clasping the corolla tube, 2–3 mm long, 2–3 mm wide, margins glabrous; corolla broadly infundibular (the mouth more than 3–4 times the diam. of the lower narrowed part of the tube); white; lower subcylindrical part of the corolla tube c. 8 mm long, c. 2 mm diam., upper flared part of the tube slightly inflated, c. 6 mm long, c. 7 mm diam. at the top; corolla lobes broad-obovate to suborbicular, 5–6 mm long, 3–4 mm wide; stamens inserted at the upper portion of the lower narrowed tubular part of the corolla tube or the lowermost portion of the upper flared part of the corolla tube; filaments 6–7 mm long, slightly protruding to 2 mm from the corolla mouth; anthers not seen; style 17–19 mm long, slightly protruding to 3–5 mm from the corolla mouth in the open flower; stigma shallowly 2-lobed, the lobes broadly suborbicular and recurving when receptive (sometimes resembling a somewhat peltate structure c. 1 mm diam.). Infructescence peduncle 1–1.5 cm long, 1–1.5 mm diam.; rachis in the distal half of the fruit-bearing part of the infructescence not conspicuously thicker than the proximal part and the peduncle, clearly visible. Fruit apex beaked; smooth; when mature to 10–14 mm long, 7–9 mm diam.; the base tightly clasped by the calyx lobes. Seeds usually slightly elongated; 1–1.2 mm long, 0.5–1 mm diam.

Habitat and distribution – Tropical lowland evergreen rainforest, on sandstone-derived and alluvial soils. Endemic to the southern half of the Malay Peninsula, very rare.

Additional specimen studied – **Malaysia:** Pahang state: Rompin, 15 Jul. 1928 (fr), *Soh* FMS 15425 (K, SING).

Notes – King & Gamble (1908: 609) and Ridley (1923: 420) identified material of this as “*Fagraea ligustrina*” (not of Blume 1838). Leenhouts (1962) considered this as part of a very variable *Fagraea racemosa*, which is here reinterpreted (see Key provided in this paper and *Utania racemosa* below).

5. *Utania racemosa* (Jack ex Wall.) M.Sugumaran, comb. nov.

Fagraea racemosa Jack ex Wall. in Roxburgh, *Flora Indica* 2: 35. 1824 (Roxburgh 1824); Wong & Sugau (1996: 37). – Type: Malay Peninsula, Penang, no date (fb, fl), *Jack* (Wallich Cat. 1601.1) (holo-: K).

Fagraea racemosa var. *grandis* A.DC. (de Candolle 1845: 29). – Type: Malay Peninsula, Penang, no date (fl), *Porter* (Wallich, Cat. 1601.2) (holo-: K; iso-: BM, G-DC).

Small tree, usually to 3–4 m (occasionally to 15 m) tall; trunk to c. 18 cm diam.; bark smooth to slightly flaky or fissured, grey-brown to dark brown. Leaves elliptic-ovate to elliptic-lanceolate; (6–)13–25(–30) cm long, (4–)6–13(–20) cm wide; base cuneate rounded; apex acuminate-short caudate; margin flat; coriaceous, often bullate when growing in hot open sites; glabrous on both surfaces; midrib prominent below, sunken above; secondary veins 5–7 pairs, upper side faint, lower side prominent; tertiary and higher-order veins distinct to faint but always visible in dried specimens; petioles 5–12 mm long, 2–5 mm diam. Inflorescence terminal, a many-flowered panicle, (2–)9–13(–17) cm long; peduncle (1.3–)4–7.5(–10) cm long, 2–3(–4) mm diam.; rachis in the distal half of the flower-bearing part of the inflorescence distinctly thicker than the proximal part and the peduncle, typically obscured from view by the very closely spaced flowers; branch tiers very closely spaced (except sometimes the lowest two tiers well-spaced, 0.5–2(–3.5) cm apart), the basal 1–2 branch tiers most branched, typically to (2–)3 orders, more distal tiers hardly so. Flower pedicel 3–4(–5) mm long, 2–2.5 mm diam.; calyx (from the base to the lobe apices) 4–6(–8) mm long, glabrous, calyx cup 4–6 mm diam., calyx lobes erect and tightly clasping the corolla tube, 2.5–4(–5) mm long, 2.5–4(–4.5) mm wide, margins glabrous to sparsely minute-ciliate or apparently lacinate (the cilia or lacinia just c. 0.1 mm long); corolla broadly infundibular (the mouth more than 3–4 times the diam. of the lower narrowed part of the tube); cream to white; lower subcylindrical part of the corolla tube 6–9(–10) mm long, (2–)3–4(–5) mm diam., upper flared part of the tube slightly inflated, (4–)6–10(–12) mm long, 10–12(–17) mm diam. at the top; corolla lobes broad-obovate to suborbicular, 5–6(–11) mm long, 4–6(–10) mm wide; stamens inserted at the upper portion of the lower narrowed tubular part of the corolla tube or the lowermost portion of the upper flared part of the corolla tube; filaments 11–17(–20) mm long, slightly protruding to 6–8 mm from the corolla mouth; anthers 1.5–2 mm long, 0.5–1 mm wide, each theca somewhat ellipsoid;

style 15–20(–25) mm long, slightly protruding to 3–5 mm from the corolla mouth in the open flower; stigma shallowly 2-lobed, the lobes broadly suborbicular and recurving when receptive (sometimes resembling a somewhat peltate structure 0.8–1.2 mm diam.). Infructescence peduncle (2.2–)3.5–7(–8.2) cm long, 2–3(–4) mm diam.; rachis in the distal half of the fruit-bearing part of the infructescence distinctly thicker than the proximal part and the peduncle, typically obscured from view by the very closely spaced fruiting tiers above the basal 1–2 tiers. Fruit apex beaked; smooth; when mature to (7–)10–12(–15) mm long, (8–)9–10(–11) mm diam.; the base tightly clasped by the calyx lobes. Seeds numerous; usually slightly elongated; 1–1.2 mm long, 0.5–1 mm diam.

Habitat and distribution – Seasonal forest and tropical evergreen lowland rainforest, including secondary forest. Indo-China (Cambodia, South Vietnam), Thailand, Malay Peninsula and Sumatra.

Additional specimens studied – **Malaysia:** Johor state: Endau, Kampung Hubong, 18 Jul. 1959 (fb), *Kadim & Noor* KN 350 (SING); Endau Road, Kampung Hubang, 14 Jul. 1959 (fb), *Burkill* HMB 1883 (SING); Gunung Panti, 14 Jul. 1968 (fb, fl), *Burkill* HMB 4551 (SING); Kota Tinggi, 14 Jul. 1968 (fb, fl), *Burkill* HMB 4555 (K, SING); Kota Tinggi, Dec. 1892 (fr), *Ridley* 4206 (SING); Sedili River, 17 Jul. 1932 (fb, fl), *Corner* 25949 (K, SING); Sungai Labong, 9 Jul. 1931 (fb, fl), *Holtum* SFN 24949 (SING). Kedah state: Selama, Sungai Terap, 21 May 1938 (fb, fl), *Henderson* SFN 35437 (K, KEP). Kelantan state: Gua Musang, Sungai Galas, 18 Jul. 1935 (fb, fl, fr), *Henderson* SFN 29731 (SING); Pasir Putih, Hutan Lipur Jeram Pasu, 16 Jun. 2008 (fb), *Lim et al.* s.n. (KLU); Sungai Lebir, Kuala Teryna, 3 Sep. 1967 (fr), *Cockburn* KEP 115955 (KEP); *ibid.*, 6 Sep. 1967 (fr), *Cockburn* FRI 7032 (KEP). Melaka state: sin. loc., sin. dat. (fr), *Alvins* 137 (SING); Ayer Panas, 13 Aug. 1891 (fr), *Holinberg* 854 (SING); Senda Rub. Est., 1 Jul. 1938 (fl), *Teruya* 3105 (SING); Chabau, 27 Sep. 1885 (fb), *Alvins* 2344 (SING). Negri Sembilan state: Pasir Panjang, 3 Jun. 1919 (fr), *Usof* CF600 (SING); Pasoh F.R., 26 Jul. 1983 (fb), *Rogstad* 907 (KEP); Serling Tengah, Kampung Jawa, 3 Sep. 1976 (fr), *Kochummen* FRI 18427 (KEP, SING); Tampin, 28 Jul. 1915 (fb, fl), *Md Nur* SFN 1313 (SING). Pahang state: Bukit Sagu, 15 Oct. 1931 (fr), *Nur* 25168 (SING); Gunung Senyum, Jun. 1917 (fb, fl), *Evans* 13056 (SING); Kuala Tahan, 17 Jun. 1978 (fb, fl), *Keng et al.* 61 (SING); Kuala Yong, 8 Jul. 1970 (fb, fl), *Everett* FRI 14325 (KEP, SING); Pekan, 1891 (fl, fr), *Ridley* 2169a (SING); Bukit Serdam, 20 Jun. 1971 (fb, fl), *Chin* 1119 (KLU); Rompin, 25 Jun. 1929 (fb, fl), *Mohamed* FMS 14981 (KEP). Penang state: Botanic Gardens, 9 Sep. 1968 (fr), *Hardial* 654 (SING); Penang Hill, Jun. 1898 (fb, fl), *Ridley* 9354 (K, SING); Tasik Glugor, 15 Jun. 1921 (fb, fl), *Burkill* SFN 6543 (SING). Perak state: sin. loc., Aug. 1909 (fb, fl, fr), *Ridley* 14255 (SING); *ibid.*, sin. dat. (fb), *Scortechini* s.n. (SING); Batang Melaka, Sep. 1892 (fr), *Derry* 1111 (SING); Grik, 17 Jun. 1924 (fb, fl), *Burkill* SFN 13841 (SING); Keledang Siong F.R., 13 Jun. 1978 (fr), *Mohd Shah & Mahmud* MS 4006 (KEP, SING); Krian, Bukit Semenggol, 14 Sep. 2003 (fr), *Sugumaran* SM 11 (KLU, SING); Pangkor Island, Telok Gedong, 10 Jul. 1955 (fb, fl), *Burkill & Mohd Shah* HMB 288 (SING); Taiping, 6 Jan. 1922 (fb, fl, fr), *Henderson* SFN 10046 (SING); Ulu Bubong, 1886 (fb, fr), *King's Collector* 10085 (SING). Selangor state: Bukit Lagong F.R., 5 May 1976 (fb), *Chan* FRI 23951 (KEP); Dusun Tuah, May 1891 (fb), *Ridley* s.n. (SING); Kuala Lumpur, 1891 (fb), *Ahmad* 2766 (SING); Pantai Valley, 3 Jun. 1960 (fb, fl), *Kasim* 1095 (KLU); Sungai Buloh, 3 Jun. 1972 (fb), *Stone* 10765 (KLU); Gading F.R., 19 Jul. 1969 (fb), *Chan* FRI 11236 (KEP); University of Malaya Campus, 14 Jan. 1968 (fb), *Stone* 7532 (KLU). Terengganu state: Kemaman, Chukai, 1 Feb. 1932 (fb, fl), *Corner* s.n. (SING); Kuala Terengganu, Pulau

Duyung Besar, 27 Aug. 1983 (fb, fl, fr), *Hume* 107 (KLU); Sungai Ajil, Kampung Bukit Kolam, 8 Jul. 1953 (fb, fl), *Sinclair & Kiah* SFN 39854 (SING); Sungai Loh, 6 Jul. 1968 (fb, fl), *Cockburn* FRI 10732 (KEP); Ulu Terengganu, Sekayu, Bukit Lanjut, 18 Sep. 1969 (fr), *Loh* FRI 13478 (KEP, SING).

Thailand: Takuapah, 13 Jul. 1972 (fb, fl), *Larsen et al.* 30929 (KLU), (fb) (SING); Trang, Kwan Pra, 30 Jul. 1929 (fr), *Rabil* 253 (SING).

Notes – *Utania racemosa* (previously *Fagraea racemosa*) has been confused with the related *U. volubilis* (previously *F. volubilis*, see following species). As noted by Wong & Sugau (1996), the material of *U. volubilis* in Wallich's collection in Kew contained both *U. volubilis* and *U. racemosa*, as two separate herbarium sheets with the same number "1600" that have been labelled "*F. volubilis* Jack". They noted that the sheet marked "1600.E Bencoolen" on its bottom left is to be regarded as the type of *F. volubilis* Wall. (= *U. volubilis*), whereas the other sheet marked "1600 Herb. Finl." is *F. racemosa* (= *U. racemosa*) and is to be dismissed from the typification of *F. volubilis* (= *U. volubilis*). Wong & Sugau (1996) have also pointed out Ridley's earlier comment (Ridley 1894) that some of Jack's specimens distributed by Wallich as from Penang could in fact have originated from Sumatra. They suggested that, as both these species occur in Penang as well as in Sumatra, there could have been some confusion of material during the distribution of Bencoolen (Sumatra) and Penang specimens, or material under "1600" could originally have been a mixed collection.

Utania racemosa does not extend to Borneo or eastwards. Herbarium material that has been confused with this species from Borneo is distinguishable as *U. volubilis*, as demonstrated in the key provided here. Other taxa from farther east, including New Guinea, are also distinguishable by such characters as the length of the inflorescence, the number and length of inflorescence branches, and their spacing on the rachis, as well as individual calyx and corolla characteristics. However, the proper identification of these other taxa would require careful consideration of the various names that have been previously applied, and their typification, and must wait a future undertaking as these studies are beyond the Sundaland phytogeographical region.

Utania racemosa is itself a morphologically variable species in its floral as well as leaf characters but nonetheless is clearly distinguishable from the other species in the Malay Peninsula. The leaf sizes are generally big, up to 30 cm long and 14–20 cm wide, and the shape is elliptic-ovate to elliptic-lanceolate. The typical calyx size is about 4–6 mm long. The internode length between the lowest flowering node (closest to the peduncle) and the following flowering node tends to be variable even within the same plant. All the subsequent internodes are very short so that the inflorescence appears to be very condensed distally. Thus, most of the inflorescence main axis is hidden by the flower clusters and not easily visible. The first internode length, expressed as a percentage of the total inflorescence rachis length measured from fifteen inflorescences on a single plant growing in the University of Malaya's Rimba Ilmu Botanic Garden, showed a range of 11–60%. Thus the within-species variation in some characters may have obscured differences in other characters with various other species.

6. *Utania volubilis* (Wall.) M. Sugumaran in Wong & Sugumaran (2012: 493). – *Fagraea volubilis* Wall. in Roxb. (Roxburgh 1824: 36); Wong & Sugau (1996: 40). – Type: Sumatra, Bencoolen, sin. dat. (fr), *Jack* (Wallich, Cat. 1600 E) (holo-: K).

Kuhlia morindifolia Blume (Blume 1826: 777). – *Fagraea morindifolia* (Blume) Blume (Blume 1838: 32, t. 73). – *Utania morindifolia* (Blume) Don (Don 1838: 663). – Lectotype (designated by Wong & Sugumaran 2012): Java, sin. dat. (fl), *Anonymous (probably Blume)* s.n. (lecto-: L sheet no. 908.127-731, barcode L0005046; isolecto-: L sheet no. 908.127-721, K).

Fagraea racemosa var. *pauciflora* King & Gamble (King & Gamble 1908: 609). – *F. pauciflora* (King & Gamble) Ridley (Ridley 1923: 419, f. 110). – Type: Malay Peninsula, Perak, Larut, sin. dat. (fl), *King's Collector* 1926 (lecto-: SING, designated here; isolecto-: K).

F. racemosa auct. non Jack ex Wall. in Roxb. (Roxburgh 1824): Leenhouts (1962) pro parte.

Small tree, usually to 2–4 m (occasionally to 8 m) tall; trunk to c. 6 cm diam.; bark smooth to slightly fissured, grey-brown to dark brown. Leaves elliptic to elliptic-lanceolate; (8.5–)15–24(–26) cm long, (3.8–)6–8(–10.6) cm wide; base cuneate rounded; apex acuminate-short caudate; margin flat; thin coriaceous; glabrous on both surfaces; midrib prominent below, sunken above; secondary veins 5–7 pairs, upper side faint, lower side prominent; tertiary veins faint; petioles 1–1.8(–2.2) cm long, (1.5–)2–3 mm diam. Inflorescence terminal, a many-flowered panicle, (3–)10–16(–22.8) cm long; peduncle (2–)3–5.5(–6.8) cm long, 1.5–2 mm diam.; rachis in the distal half of the flower-bearing part of the inflorescence not conspicuously thicker than the proximal part and the peduncle, clearly visible; branch tiers well-spaced, (1.3–)2–2.8(–3.8) cm apart, the basal 1–2 branch tiers most branched, typically to 2–(3) orders, more distal tiers hardly so. Flower pedicel 2–4(–5) mm long, 1.5–2 mm diam.; calyx (from the base to the lobe apices) 4–6 mm long, glabrous, calyx cup 4–6(–7) mm diam., calyx lobes spreading out from the base of the corolla tube, 3–4 mm long, 3–4 mm wide, margins glabrous; corolla broadly infundibular (the mouth more than 3–4 times the diam. of the lower narrowed part of the tube); cream to creamy-yellow; lower subcylindrical part of the corolla tube 7–10 mm long, 3.5–4 mm diam., upper flared part of the tube slightly inflated, 8–10(–15) mm long, 12–14(–16) mm diam. at the top; corolla lobes broad-obovate to suborbicular, 6–7(–10) mm long, 5–7(–8) mm wide; stamens inserted at the upper portion of the lower narrowed tubular part of the corolla tube or the lowermost portion of the upper flared part of the corolla tube; filaments 11–13 mm long, not or slightly protruding to 3 mm from the corolla mouth; anthers 1.8–2 mm long, 1–1.2 mm wide, each theca somewhat ellipsoid; style 17–20 mm long, not to slightly protruding to 2 mm from the corolla mouth in the open flower; stigma shallowly 2-lobed, the lobes broadly suborbicular and recurving when receptive (sometimes resembling a somewhat peltate structure 1–1.2 mm diam.). Infructescence peduncle 4–6 cm long, 1.5–2 mm diam.; rachis in the distal half of the fruit-bearing part of the infructescence not conspicuously thicker than the proximal part and the peduncle,

clearly visible. Fruit apex beaked; smooth; when mature to 11–14 mm long, 9–11 mm diam.; calyx lobes spread out and do not clasp the base in dried materials. Seeds usually slightly elongated; 1–1.2 mm long, 0.5–1 mm diam.

Habitat and distribution – Tropical evergreen lowland rainforests, including secondary forests and forest fringes, on granitic, sandstone-derived, volcanic, limestone and alluvial soils. Malay Peninsula, the Andaman and Nicobar Islands, Sumatra, Java, Borneo, Celebes, Maluku, Philippines, New Guinea and Solomon islands, relatively common.

Additional specimens studied – **Malaysia:** Johor state: Gunung Panti, 23 Jun. 1963 (fb), *Burkill* HMB 3179 (SING); Gunung Panti Recreational Forest, 29 Apr. 2008 (leafy branch only), *Sugumaran et al.* SM 206 (KLU), SM 207 (KLU); Tanjong Kopang, 1892 (fr), *Ridley* s.n. (SING). Kedah state: sin. loc., 1939 (fb, fl), *Nauen* SFN 35807 (SING); Gunung Jerai, 12 Jun. 1966 (fb, fl), *Whitmore* FRI 386 (KEP). Pahang state: Tasik Bera F.R., 20 Jul. 1972 (fr), *Chan* FRI 16924 (KEP, SING); Ulu Rompin, 16 May 1919 (fb), *Yeob* FMS 3226 (SING). Perak state: Gopeng, Jun. 1883 (fb, fl), *King's Collector* 4308 (SING); Maxwell Hill, 30 Oct. 1969 (fb), *Kochummen* FRI 2926 (KEP); *ibid.*, 25 Aug. 1971 (fr), *Kochummen* FRI 16435 (KEP); Taiping, Waterfall, Aug. 1909 (fb, fl), *Ridley* 14254 (SING).

Singapore: Bukit Mandai, 1897 (fb, fl), *Ridley* 8913 (SING); Bukit Panjan, 1906 (fb, fl), *Ridley* 125471 (SING); Bukit Timah, 1906 (fb, fl), *Ridley* 12434 (SING); Mandai Forest, 31 May 1914 (fl), *Burkill* 285 (SING); Nee Soon, 1 Jul. 1982 (fr), *Maxwell* 82-184, (SING, KLU); Nee Soon pipeline, 30 May 2005 (fb, fl), *Dahlan* 2005-211 (SING); Selitar, 1814 (fb), *Mat* s.n. (SING).

Notes – The flowers are fragrant (*Ridley* 125471, *Whitmore* 386). No particular specimen was indicated as the type by King & Gamble (1908) for their *F. racemosa* var. *pauciflora* (later recombined by *Ridley* (1923) as *F. pauciflora*), although the specimens cited by them are now regarded as syntypes. Wong & Sugau (1996) correctly referred this name to the synonymy of *F. volubilis* (= *U. volubilis*), but did not lectotypify King & Gamble's name. The long list of synonyms for *F. volubilis* (= *U. volubilis*) is treated in full by Wong & Sugau (1996).

Utania volubilis var. *microcalyx* (K.M.Wong & Sugau) K.M.Wong, M.Sugumaran & Sugau (Wong et al. 2013), which can be distinguished from *U. volubilis* var. *volubilis* by its smaller calyx (4–5 mm long, 3.5–4.5 mm diam.), does not occur in Peninsular Malaysia. It is known so far only from Borneo and Moluccas.

As mentioned by Wong & Sugau (1996), it is somewhat unfortunate that the epithet *volubilis* (Latin, twining) has to be adopted for this species, which has the habit of an erect shrub or tree. Wong & Sugau surmised that Wallich could have come up with this name due to the long infructescence in Jack's Sumatran (Bencoolen) specimen, which resembles the pendulous blooms common in garden vines.

ACKNOWLEDGEMENTS

We thank the Keepers and Curators of the K, KEP, KLU, L and SING herbaria for permission to consult reference materials and loans of specimens. Dr. L.G. Saw, Dr. R.C.K. Chung, Dr. R. Kiew (Kepong); Dr. D. Middleton, S. Lee (Singapore); Dr. Noorma Wati Haron and Dr. K.T. Yong (University of Malaya) are thanked for facilitating study of

material under their care. Y.W. Low and Ali Ibrahim (SING) provided assistance in the field and herbarium. We thank Robert Teo (NParks) for facilitating observations on Pulau Ubin. The late Professor C. Puff (University of Vienna) had very kindly helped with the Latin diagnosis used, and Zainal Mustafa (University of Malaya) prepared the line illustrations. We are grateful to Dr. Mary Endress and Professor Lena Struwe for critical comments that have helped improve our manuscript. A Fundamental Research Grant (FS 264/2007C) from the University of Malaya helped finance a baseline phylogenetic study, on which the present revision is partly based. The National Parks Board, Singapore, provided facilities for the preparation of this paper.

REFERENCES

- Adanson M. (1763) Familles des Plantes. Vol. 2. Paris, Chez Vincent.
- Beentje H. (2012) The Kew plant glossary. Revised edition. Kew, Royal Botanic Gardens Kew.
- Bentham G. (1856) Notes on Loganiaceae. *Journal of the Linnean Society, Botany* 1: 52–114. <http://dx.doi.org/10.1111/j.1095-8339.1856.tb00636.x>
- Blume C.L. (1826) Bijdragen tot de Flora van Nederlandsch Indië. Part 14: 731–850; Part 16: 943–1066. Batavia [Jakarta], Lands Drukkerij. <http://dx.doi.org/10.5962/bhl.title.395>
- Blume C.L. (1838) Rumphia. vol. 2. Amstelodam [Amsterdam], C.G. Sulpke. <http://dx.doi.org/10.5962/bhl.title.51502>
- Candolle A.L.P.P. de (1845) Prodromus systematis naturalis regni vegetabilis. Vol. 9. Paris, Sumptibus Sociorum Treuttel et Würtz. <http://dx.doi.org/10.5962/bhl.title.286>
- Don G. (1838) A general system of gardening and botany. Vol. 4. London, J.G. & F. Rivingston. <http://dx.doi.org/10.5962/bhl.title.16519>
- Hallé F., Oldeman R.A.A., Tomlinson P.B. (1978) Tropical trees and forests, an architectural analysis. Berlin, Springer-Verlag.
- Hooker J.D. (1883) The Flora of British India. Vol. 4. London, L. Reeve & Co. <http://dx.doi.org/10.5962/bhl.title.54393>
- Humboldt F.H.A. von, Bonpland A.J., Kunth K.S. (1825) Voyage aux régions équinoxiales du Nouveau Continent, fait en 1799–1804, partie 6, Botanique. Sect. 3, Nova genera et species plantarum. 7, Part 33: 177–236. Lutetiae Parisiorum [Paris], sumtibus Librariae Graeco-Latino-Germanico.
- Jackson B.D. (1928) A glossary of botanic terms. New York, Hafner Publishing Co. Inc. <http://dx.doi.org/10.5962/bhl.title.6304>
- King G., Gamble J.S. (1908) Materials for a Flora of the Malayan Peninsula. *Journal of the Asiatic Society of Bengal* 74: 603–612.
- Leenhouts P.W. (1962) Loganiaceae. In: Steenis C.G.G.J. van (ed.) Flora Malesiana. Series 1 Vol. 6: 293–336. Groningen, Wolters-Noordhoff Publishing.
- Reinwardt C.G.C. (1825) Nova plantarum indicarum genera. Sylloge plantarum novarum 2: 1–15.
- Ridley H.N. (1894) The botanists of Penang. *Journal of the Straits Branch, Royal Asiatic Society* 25: 163–167.
- Ridley H.N. (1923) The Flora of the Malay Peninsula. Vol. 2. London, L. Reeve & Co.
- Roxburgh W. (1824) Flora indica, or, Descriptions of Indian plants. Vol. 2. Serampore, Mission Press. <http://dx.doi.org/10.5962/bhl.title.589>

- Steudel E.G. (1840–1841) *Nomenclator botanicus*. Stuttgart, J.G. Cotta. <http://dx.doi.org/10.5962/bhl.title.655>
- Sugumaran M., Wong K.M. (2012) Studies in Malesian Gentianaceae, I. *Fagraea* sensu lato—complex genus or several genera? A molecular phylogenetic study. *Gardens' Bulletin Singapore* 64: 301–332.
- Thiers B. (continuously updated) *Index Herbariorum*: A global directory of public herbaria and associated staff. New York Botanical Garden's Virtual Herbarium. <http://sweetgum.nybg.org/ih/> [accessed 11 Mar. 2014].
- Thunberg C.P. (1782) Beskrifning på et nytt och vackert örte genus, kalladt *Fagraea ceilanica*. *Kongliga Vetenskaps Academiens Handlingar* 3: 132–134, tab. IV.
- Wong K.M., Sugau J.B. (1996) A revision of *Fagraea* (Loganiaceae) in Borneo, with notes on related Malesian species and 21 new species. *Sandakania* 8: 1–93.
- Wong K.M., Sugumaran M. (2012) Studies in Malesian Gentianaceae, II. A taxonomic framework for the *Fagraea* complex, including the new genus *Limahlania*. *Gardens' Bulletin Singapore* 64: 483–497.
- Wong K.M., Sugumaran M., Sugau J.B. (2013) Studies in Malesian Gentianaceae, V. The *Fagraea* complex in Borneo: New generic assignments and recombinations. *Gardens' Bulletin Singapore* 65: 235–239.

Manuscript received 4 Feb. 2014; accepted in revised version 11 Mar. 2014.

Communicating Editor: Elmar Robbrecht.