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

M. Sugumaran¹ & K.M. Wong²*

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

**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 *Racemosae* clade, previously treated as *Fagraea* section *Racemosae* Benth. (Bentham 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), *Picrophloeus* 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 *Picrophloeus*), 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 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).


Small to medium-sized trees usually 1 to several metres tall, occasionally reaching to about 30 m tall. Trunk orthotropic, 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 dichotomically 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 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 exerted; anthers versatile, hastate; style not to slightly exert; 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

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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

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

3. 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

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

5. 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

6. 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

7. 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..................................................................................................................7. 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 acetuale parte angustia; parte dilatata quadruplice ad quinquens longiore lobi corollae) et pedunculis longioribus (2.8–6 cm longis) differt. – *Type*: Singapore, Bidaddari, 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 lanicate (the cilia or lacina 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 ellipsoidal; 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.). Inflorescence peduncle 2.2–3.5 cm long, 1–1.5 mm diam.; rachis in the distal half of the fruit-bearing part of the inflorescence 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.


**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 southern part 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

Sugumaran & Wong, Utania revised for the Malay Peninsula
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 laciniate (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-ovobate 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.). Inflorescence peduncle 7–8.5 cm long, 3–4 mm diam.; rachis in the distal half of the fruit-bearing part of the inflorescence 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 (fb), Derry 573 (SING); Selandel, 29 Apr. 1886 (fb), Alvins s.n. (SING). Negri Sembilan state: Senawang, 24 Nov. 1918 (fb, fl), Yakim CF 1896 (K, KEP, SING); Seremban, 1904 (leafy branch only), Moorsome 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); Kementfon R.F., 4 Sep. 1925 (leafy branches only), Hamid 10559 (SING); Mentakab, Kemasul F.R., 17 Mar. 1962 (fb), Mohazan 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), 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 Tunagul, 26 Jul. 1929 (fr), Harun 17503 (SING); Kuala Lumpur, Public Garden, Apr. 1916 (fb), 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.


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 narrowly 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 broadly-ovate 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.). Inflorescence 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, gynoecium; 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. Confinied 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 Panti 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), Burkhill 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); Panti F.R., 24 Jan. 1970 (fb), Everett FRI 13851 (KEP); Sungai Sedili, 26 Jul. 1939 (fb), Ngadinman SPN 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), Samuri et al. 17 (SING); ibid., 1 Feb. 2002 (fr), Samuri 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 0166277; fr on sheet 0166279), Low & Ali LYW 521 (SING); Chek Jawa, 28 Jan. 2003 (fb, fr), 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 Fabrictius*), 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 infructescence 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).


Small tree, c. 2 m tall. **Leaves** elliptic-ovate to elliptic-oblongate; (2.5–)3.5–7.9 cm long, (1–)2.5–3.4 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; 1.1–1.5 mm diam. **Inflorescence** terminal, a many-flowered panicle, 1–2.7 cm long; peduncle c. 1.8 cm long, c. 1 mm diam.; racis 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, 1.1–1.5 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 subcilindrical 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, 1.1–1.5 mm diam.; racis 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 specimens 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 (Walllich Cat. 1601.1) (holo:- K).

Fagraea racemosa var. grandis A.DC. (de Candolle 1845: 29). – Type: Malay Peninsula, Penang, no date (fl), Porter (Walllich 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-cuneate; 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 (1.3–1.4–7.5(–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 flowering 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), Holttum 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 Ternayan, 3 Sep. 1967 (fr), Cockburn 115955 (K, KEP); ibid., 6 Sep. 1967 (fr), Cockburn FRI 7032 (KEP). Melaka state: sin. loc., sin. dat. (fr), Alvis 137 (SING); Ayer Panas, 13 Aug. 1891 (fr), Holleinberg 854 (SING); Senda Rub. Est., 1 Jul. 1938 (fl), Teraya 3105 (KLU); Chabab, 27 Sep. 1885 (fb), Alvis 2344 (SING). Negri Sembilan state: Pasir Panjang, 3 Jun. 1919 (fr), Usof CF600 (SING); Pasoh F.R., 26 Jul. 1983 (fb), Roostag 907 (KEP); Serting Tengah, Kampung Jawa, 3 Sep. 1976 (fb, fr), Kuchummen FRI 18427 (KEP, KEP); Tampin, 28 Jul. 1915 (fb, fl), Mad NR SFN 1313 (SING). Pahang state: Bukit Sagu, 15 Oct. 1931 (fb, fr), Nuri 25168 (SING); Gunung Senyum, Jun. 1917 (fb, fr), Evans 13056 (SING); Kuala Tahan, 17 Jun. 1978 (fb, fl), Kong et al. 61 (SING); Kuala Yong, 8 Jul. 1970 (fb, fr), Everett FRI 14325 (KEP, SING); Pekan, 1891 (fb, fl), Ridley 2169a (SING); Bukit Serdang, 20 Jun. 1971 (fb, fl), Chin 1119 (KL); Rompin, 25 Jun. 1929 (fb, fl), Mohamend 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. 2008 (fb, fr), Soktorichev SING; Betong, Sep. 1892 (fr), Derry 1111 (SING); Grik, 17 Jun. 1924 (fb, fl), Burkill SFN 13841 (SING); Keledang Siong F.R., 13 Jul. 1978 (fr), Mohd Shah & Mahmud MS 4006 (KEP, KEP); Krian, Bukit Semenggol, 14 Sep. 2003 (fr), Sugumaran SM 11 (KL, SING); Pangkor Island, Telok Gedong, 10 Jul. 1955 (fb, fl), Burkill & Mohd Shah HMB 288 (SING); Taiping, 6 Jan. 1922 (fb, fr), Henderson SFN 10046 (SING); Ulu Bubong, 1866 (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), Kasmin 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 & Khai 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:** Takua Tum, 13 Jul. 1972 (fb, fl), Larsen et al. 30929 (KLU), (fb) (SING); Trang, Kwan Pra, 30 Jul. 1929 (fr), Rabih 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* (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* (previously *F. 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 typical corolla size is about 4–6 mm long. The 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 ellipsoidal; 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.). Inflorescence 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,
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); Nee Soon, 1 Jul. 1982 (fr), Dahlan 82-184, (SING, R.I); Bukit Mandai, 1897 (fb, fl), Burkill SM 206 (KLU), SM 207 (KLU); Tanjong Kopang, 1892 (fr), K.M.Wong & Sugau 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.

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