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Taxonomic revision of the genus *Flemingia* (Leguminosae: Papilionoideae) in India

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Abstract. Indian *Flemingia* species are grouped under five subgenera, namely *Chalaria*, *Flemingiastrum*, *Lepidocoma*, *Ostryodium* and *Rhynchosioides*. Here, we revise the taxonomy of the genus (excluding subg. *Rhynchosioides*) based on the study of live material and preserved specimens. We report 21 species and one variety (22 taxa) in India, of which one variety is endemic, i.e. *F. praecox* var. *robusta*. All the taxa have been described, illustrated and their ecology discussed. In the process, twelve binomials (*F. angustifolia*, *F. blancoana*, *F. chappar*, *F. congesta*, *F. grahamiana*, *F. latifolia*, *F. macrophylla*, *F. nudiflora*, *F. paniculata*, *F. stricta*, *F. wallichii* and *F. wightiana*) and one trinomial (*F. praecox* var. *robusta*) are lectotypified. *F. sericans* and *F. stricta* subsp. *pteropus* are proposed as new synonyms for *F. macrophylla* and *F. stricta*, respectively. *F. parviflora*, an Australian species, is recorded for India. *F. strobilifera* var. *nudiflora* is raised to the species level and a new combination proposed, i.e. *F. nudiflora*. *F. tiliacea* is relegated to the synonymy of *F. nudiflora*. A taxonomic key for the subgenera and species therein is provided for easy identification. Additionally, distributional maps for the genus and species are given.

Keywords: *Cajanus*, *Flemingia*, *Moghania*, Fabaceae, distribution, India, taxonomy.

INTRODUCTION

Flemingia Roxb. ex W.T.Aiton is a genus in the subtribe *Cajaninae* Benth. (Leguminosae Juss.: Papilionoideae DC.). It has been named after Dr. John Fleming (1747-1829), a friend and colleague of Roxburgh (Roxburgh 1820; Turner 2014) and President of the Bengal Medical Service from 1800. *Flemingia* is one of the wild relatives of the pigeonpea *Cajanus cajan* (L.) Huth. It is said that the genus *Cajanus* Adans. could only be handled after its relations to *Atylosia* Wight & Arn. and other wild relatives such as *Adenodolichos* Harms, *Baukea* Vatke, *Bolusafra* Kuntze, *Carissoa* Baker f., *Chrysoscias* E. Mey., *Dunbaria* Wight & Arn., *Eriosema* (DC.) Desv. and *Rhynchosia* Lour. had been studied (modified after van der Maesen 1986). These wild relatives are important from the point of view of conferring important traits

such as disease resistance and salt tolerance to *Cajanus cajan*.

Some species of the genus are economically important. *Flemingia vestita* (Grah.) Benth. ex Baker is a tuber crop in northern India. Inhabitants from Nepal, Himachal Pradesh and Khasi hills (Meghalaya) cultivate this species. Tubers are sold in the local market and eaten raw as a source of starch. *Flemingia grahamiana* Wight & Arn. is used in skin diseases (Sornay 1916). The liquid from boiled leaves and old stems of *Flemingia sootepensis* Craib. is drunk to increase women's breast milk production; and used in sauna baths. Raw or roasted tubers of *F. tuberosa* Dalzell are eaten by local people; it was useful to cure dysentery and leucorrhoea (Dymock et al. 1890). *Flemingia stricta* Roxb. and *F. semialata* Roxb. are used as host plants for the culture of the lac insect. The leaves of *F. strobilifera* (L.) W.T.Aiton are used as vermifuge in Java (Anonymous 1956). *Flemingia strobilifera* is occasionally grown in gardens as ornamental shrubs (Firminger 1930), as "wild hops". The roots of *F. bracteata* (Roxb.) Wight have been used to cure epilepsy and the wood of *F. chappar* Buch.-Ham. ex Benth. serves as tooth brush (Haines 1922). The glands from pods serve as a principal source of 'waras', an orange-red coloured dye, used for colouring silk (Anonymous 1956). Flemingin ($C_{12}H_{12}O_3$) is the principal pigment found in waras. It melts at 171–172°C to form orange-red needles that dissolve in cold alkali to give a deep orange-red solution (Anonymous 1956).

Flemingin + Alkali → Salicylic acid + o-Hydroxycinnamic acid.

Flemingia is distributed in the old world tropics (Mabberley 2017) and consists today of 44 species and two varieties (46 taxa) (modified after ILDIS 2005; The Plant List 2013). It is thought to have originated in the Indo-Burmese region (Mukerjee 1953). Bentham (1865) subdivided the genus in three sections: *Ostryodium* DC., *Chalaria* Wight & Arn. and *Flemingiastrum* DC. Baker (1876) reported five subgenera, namely *Chalaria* (Wight & Arn.) Baker, *Flemingiastrum* (DC.) Baker, *Lepidocoma* (Jungh.) Baker, *Ostryodium* (Desv.) Baker and *Rhynchosioides* Baker. Prain (1897) used only subg. 1. *Ostryodium* Desv. but then refers to "this section" in the following sentence of his publication, and refrains from further generic subdivisions, but maintains the species numbers as used by Baker (1876). Mukerjee (1953) treated these subgenera as sections and reported 26 species and seven varieties from India and Burma. As of now 28 species and one variety have been reported from India (modified after Gavade et al. 2019).

Flemingia shrubs or herbs can be easily recognized by a combination of characters such as unifoliolate or trifoliolate leaves, gland-dotted beneath blades, winged or grooved petiole, stipels and rachis absent, flowers in racemes or capitula, 5-toothed calyx, small and turgid pod with 1 or 2 rounded or ellipsoid seeds. As the genus is an important genetic resource, taxonomic revision is needed (Lewis et al. 2005). The present piece of work is an outcome of the taxonomic study conducted for more than nine years by the authors (Lekhak et al. 2011; Van der Maesen 2012; Gavade and Lekhak 2015; Gavade et al. 2016a, 2016b, 2017).

A revision of the subgenus *Rhynchosioides* has already been published (Gavade et al. 2019) and hence is not a part of the present publication. We follow Baker (1876) and consequently treat infrageneric taxa as subgenera. Various authors considered these as sections (Bentham 1865; Mukerjee 1953). Van der Maesen (1986) used sections in *Cajanus*. The present revision comprises taxonomic accounts of all the taxa in the genus *Flemingia* as presently reported in India except those in subgenus *Rhynchosioides* Baker. Descriptions, line illustrations and photoplates are provided here. The nomenclature for the all taxa has been resolved and results in lectotypification of twelve binomials (*F. angustifolia*, *F. blancoana*, *F. chappar*, *F. congesta*, *F. grahamiana*, *F. latifolia*, *F. macrophylla*, *F. nudiflora*, *F. paniculata*, *F. stricta*, *F. wallichii* and *F. wightiana*) and one trinomial (*F. praecox* var. *robusta*) as per the rules of ICN (Turland et al. 2018). A taxonomic key for easy identification of all taxa is also provided.

MATERIALS AND METHODS

This taxonomic account is based on the examination of plant materials collected from different parts of the country during 1975-1984* and 2012-2018, and the specimens housed at various herbaria (A*, ARUN, ASSAM, B*, BAMU, BARO, BK*, BKF*, BLAT, BM*, BNRH*, BR*, BRI*, BSA, BSD, BSHC, BSI, BSID, C*, CAL, CALI, DD, E*, G*, GH*, HBG*, ICRISAT*, JCB, K*, KFRI, L*, LE*, LD*, LINN*, LIV, LWG*, LY*, M*, MEL*, MH, N*, OXF*, P*, PBL*, PE*, RHT, S*, SBT*, SUK, TBGT, TCD*, US*, WII and the herbaria of Goa University, Goa; the University of North Bengal, New Jalpaiguri, West Bengal and the North-Eastern Hill University, Shillong, Meghalaya). The specimens of the herbaria marked with an asterisk * were loaned and studied by the second author. Live material is being maintained in the Botanic Garden, Shivaji University, Kolhapur. The recent voucher specimens of the collected species have been deposited in the Shivaji University Herbarium (SUK), Kolhapur, India. The detailed descriptions were made following the terminology of Hickey and King (2000). Blank maps were

made by using DIVA-GIS software (Hijmans et al. 2001). Details of location legends, symbols were added in the map using Adobe Photoshop 7.0.

HISTORY OF THE GENUS

The generic name *Flemingia* (Leguminosae) was validly published in Hortus Kewensis (Aiton 1812) with six species (*F. congesta* Roxb., *F. lineata* (L.) W.T.Aiton, *F. nana* Roxb., *F. semialata* Roxb., *F. stricta* Roxb. and *F. strobilifera* (L.) W.T.Aiton). Kuntze (1891) proposed a new name *Moghania* J.St.-Hil. for Roxburgh's plants named *Flemingia*. However, many workers did not follow that proposed name. Li (1944) published an article which proved that the name *Moghania* is the valid name for Roxburgh's genus *Flemingia*, a leguminous plant. He stated that "the name *Flemingia* was used by Roxburgh thrice, the name first appearing, in each case, in the works of another author. He used the name first in 1803, *Flemingia* Roxb. ex Rottler, neue Schrift. Ges. Naturf. Fr. 4: 202. 1803, accompanied by an ample description; this is placed as a synonym of *Thunbergia* Retz. of the Acanthaceae. He used the name a second time in 1812: *Flemingia* Roxb. ex W.T.Aiton, Hort. Kew. Ed. 11, 4: 349 (1812), and this has since been recognized and used by most authors for the leguminous genus under discussion. The name was again used, *Flemingia* Roxb. ex Wall. List No. 4361 (1831), in the synonymy of the gentianaceous *Canscora diffusa* (L.) R.Br., appearing as *Flemingia virgata* Herb. Roxb.; there was no description. A fourth homonym of this same generic name is *Flemingia* Hunter, proposed in 1802 or 1803, but not published until 1909, when unfortunately, Ridley in publishing Hunter's old manuscript did not eliminate the Hunterian new names. This *Flemingia* of Hunter from Penang represents a rubiaceous group and according to Ridley is apparently a synonym of *Webera* Schreb. (1791) = *Tarenna* Gaertn. (1788). Rottler's publication of *Flemingia* Roxb. in 1803 clearly invalidates Aiton's publication of the second and different *Flemingia* Roxb. (1812). Finally, Rudd (1970) proposed to conserve the commonly used and validly published name *Flemingia* Roxb. ex W.T.Aiton in the 12th International Botanical Congress (IBC) held in Leningrad, Russia (then Soviet Union) in 1975. Her proposal got accepted and conserved in 1973 (Voss 1973).

SYSTEMATIC TREATMENT

Flemingia Roxb. ex W.T.Aiton, Hort. Kew., ed. 2, 4: 3. 1812
Type: *Flemingia strobilifera* (L.) W.T.Aiton

Bas.: *Hedysarum strobiliferum* L.

Roxb., Pl. Coromandel 3(3): 44. t. 248. 1820; Roxb., Fl. Ind. 3: 337. 1832; Wight & Arn. Prodr. Fl. Ind. Orient. 1: 241. 1834; Wight, Icon. Pl. Ind. Orient. 1(1): 14, t. 267. 1840; Benth. in Pl. Jungh. 2: 244. 1852; Dalzell & A. Gibson, Bombay Fl. 75. 1861; Benth. Fl. Austral. 2: 269. 1864; Baker, in Hook. f., Fl. Brit. India 2: 227. 1876; Kurz, Forest Fl. Burma 2: 370. 1877; Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69(2): 436. 1897; Prain, Bengal Pl. 1:375. 1903; T. Cooke, Fl. Bombay 2: 389. 1902; Talbot, For. Fl. Bombay 1:417. 1909; Haines, Bot. Bihar Orissa 3: 267. 1922; Gamble, Fl. Madras 1: 376. 1928; Sanjappa, Legumes of India 175. 1992; Saxena & Brahman, Fl. Orissa 1: 524. 1994. Kothari in N.P. Singh et al., Fl. Maharashtra, Dicot. 2, 683. 2001.

(=) *Flemingia* Roxb. ex Rottler, Neue Schriften Ges. Naturf. Freunde Berlin iv. 202. 1803, *nom. rej.*
Type: *Flemingia grandiflora* Roxb. ex Rottler, *nom. illeg.*

(=) *Flemingia* W.Hunter ex Ridl., J. Straits Branch Roy. Asiat. Soc. 53: 83. 1909, *nom. illeg.*
Type: *Flemingia fragrans* W. Hunter ex Ridl.

(=) *Luorea* Neck. ex J.St.-Hil. in Nouv. Bull. Sci. Soc. Philom. Paris iii. No. 63: 193. 1812, *nom. rej.*
Type: not typified.

(=) *Maughania* J.St.-Hil., Nouv. Bull. Sci. Soc. Philom. Paris 3(64): 216. 1813.
Type: not typified.

(≡) *Ostryodium* Desv., J. Bot. Agric. 3: 119, t. 4. 1814.

Description

Erect herbs or shrubs, undershrubs or decumbent herbs up to 0.4–3.2 m tall, with branched stem; stems 2–40 mm in diameter, triangular when young, terete when mature, gland-dotted, hairy; hairs antrorse. Leaves unifoliolate or trifoliolate, 2–52 cm long, stipulate, petiolate; stipules 2, fused or separate 0.5–10 × 0.2–2.5 cm, straight or slightly falcate, acuminate with equal tips, persistent or caducous, basifixed, many nerved, gland-dotted, hairy; petioles 0.3–55 cm long, grooved or winged, gland-dotted, hairy; leaflets 1–3, 1.5–30 × 1–11 cm, ovate–lanceolate or linear–lanceolate or oblong–lanceolate or obovate–rounded, middle leaflets rounded or cordate or cuneate at base, lateral leaflets asymmetrical or oblique at base, apex acute or acuminate or obtuse, glabrous or hairy, dorsally gland-dotted; glands minute, orange-red, or black; petiolules 1–8 mm long, hairy,

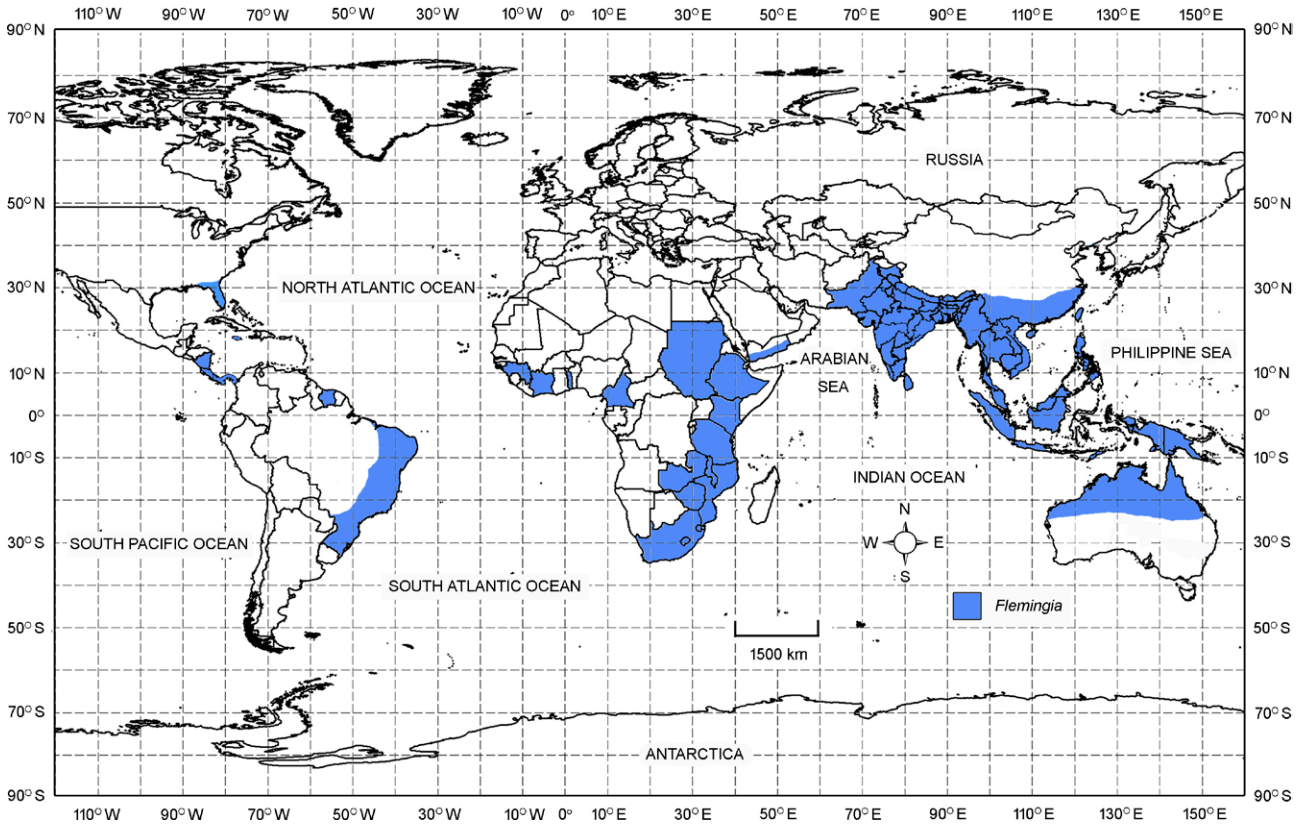
gland-dotted. Inflorescences solitary or geminate or axillary and terminal racemes or lax racemes or raceme comprising small cymes of 2–3 flowers enclosed by membranous bracts, in two series or capitulum or geminate. Flowers 6–17 mm long, pedicellate, bracteate; pedicels 1–3 mm long, hairy; bracts 1.6–2.8 × 2.2–4.2 cm, reniform, acute at apex, many nerved, papery, hairy, gland-dotted or ovate to lanceolate or rounded 0.4–16 × 2.5–3 mm; exterior bracts absent or present, small 2–2.2 × 1–1.2 mm, lanceolate, persistent. Calyx 4.5–11.5 mm long, hairy, gland-dotted; calyx tube 1–6.5 mm long, campanulate, hairy, gland-dotted; calyx teeth 5, 3–6 × 1–3 mm, linear to lanceolate, acute at apex, equal or subequal, lower one the longest, connate for 1/2–1/5 of its length, many nerved, hairy, gland-dotted. Corolla white, pink to purple, with pink or reddish striations; standard 5–15 × 4–15.5 mm, rounded, cordate, obovate, apex retuse, rounded, glabrous or hairy; clawed with 2 auricles; claw 1–2.5 mm long; auricle l–2 mm long or less than 1 mm; wing petals 5–13 × 1–5 mm, oblong, slightly falcate, hairy or glabrous, gland-dotted or without glands; claw 1.5–4.5 mm long; keel petals, 7–14 × 2–4 mm, boat-shaped, slightly falcate, fused at apex at lower side; claw 1.5–5.5 mm long. Stamens 10, diadelphous (9+1); staminal tube 3–6 × 1 mm; anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 1–4.5 mm long, that of free stamens 4–11 mm long. Ovary 1.5–2 × 1 mm, hairy, gland-dotted; ovules 1 or 2; style 4–8.5 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 6–17 × 4–7.5 mm, beaked, turgid, slightly septate between seeds or not, hairy, sparsely or densely gland-dotted; beak 1 mm long; glands orange-red or black or white (mealy), withering or disappearing post maturity. Seeds 1–2, 2.8–4 × 2–4 × 2–3 mm, rounded or ellipsoid, mottled or brown or black shiny; hilum granular, 1 mm long, position ± central.

Etymology

The generic name 'Flemingia' is after Dr. John Fleming (1747–1829), Roxburgh's friend and colleague, who compiled the Catalogue of Indian medicinal plants and drugs (Hindustani Press, Calcutta 1810).

Distribution

Flemingia is an old world genus. A few species occur in Africa: Burkina Faso, Cameroon, Ethiopia, Gam-



Map 1. Distribution of the genus *Flemingia*.

bia, Ghana, Guinea, Guinea Bissau, Ivory Coast, Kenya, Malawi, Mali, Mozambique, Senegal, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zaire, Zambia and Zimbabwe. Most species originate in Asia: Bangladesh, Bhutan, Brunei, Cambodia, China (provinces Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan and Yunnan), East Timor, India (Andaman and Nicobar Islands, Andhra Pradesh, Assam, Bihar, Chhattisgarh, Goa, Gujarat, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Nagaland, Rajasthan, Sikkim, Tamil Nadu, Telangana, Tripura, Uttar Pradesh, Uttarakhand and West Bengal), Indonesia (Irian Jaya, Java, Kalimantan, Lesser Sunda Islands, Moluccas, Sumatra), Laos, Malaysia (Peninsular Malaysia and Borneo), Myanmar, Nepal, Pakistan, Philippines, Japan (Ryukyu Islands), Sabah, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam, Papua New Guinea. Australia: Northern Territory, Queensland and Western Australia. A few species were introduced on purpose or inadvertedly to the Americas: the Caribbean (Barbados, Cayman Islands, Dominican Republic, Haiti, Jamaica, St. Vincent, Trinidad and Tobago). Central America: Nicaragua and Panama. Also some species reached the Pacific Ocean area: Bismarck Archipelago, Northern Marianas, Society Islands and South America (Brazil and Surinam) (Map 1).

Flowering and fruiting

Most months of the year.

Habitat and ecology

Most of the herbaceous species (*Flemingia gracilis*, *F. mukerjeeana*, *F. nilgheriensis* and *F. rollae*) grows on high altitude lateritic plateaus, i.e. above 1000 m asl. *F. tuberosa* grows on low altitude plateaus, i.e. up to 300 m asl, whereas *F. vestita* occurs on hill slopes, i.e. up to 1500-3200 m asl. All the other species are mostly shrubby in nature and grow either in deep moist forests, Sal (*Shorea robusta*) forests, along water streams, or on hill slopes and along roadsides. Some species grow amid herbs and shrubs on grasslands while others occupy forest borders and shola (deep valley) forests.

Affinities

Flemingia is closely related to *Cajanus*, *Cylista*, *Dunbaria* and *Rhynchosia*. It differs from *Cajanus* and *Dunbaria* in having only 1–2 ovules in the ovary and from *Cylista* in non-accrescent calyx teeth and from *Rhynchosia* by the presence of a small rigid ellipsoid pod and winged or grooved petiole. A bracketed dichotomous taxonomic key is provided below for easy identification of the Indian taxa:

Key to the subgenera of **Flemingia** in India

1. Herbs, prostrate or erect with herbaceous or tuberous roots, leaves 3-foliolate, flowers in long-peduncled heads or corymbs ..... subgenus *Rhynchosioides* (see Gavade et al. 2019)

1. Shrubs, undershrubs, erect or prostrate with woody roots, leaves 1- or 3-foliolate, flowers in axillary racemes or short-peduncled heads 2

2. Leaves 1-3-foliolate, bracts entire, ovate, small, not enclosing the flowers 3

2. Leaves 1-foliolate, bracts folded, reniform, large, enclosing the small racemes with flowers..... subg. *Ostryodium*

3. Leaves 1-foliolate (except *F. lineata*) ..... subg. *Chalaria*

3. Leaves 3-foliolate 4

4. Inflorescences in axillary racemes..... subg. *Flemingiastrum*

4. Inflorescences in dense globose heads .....subg. *Lepidocoma*

Flemingia subg. **Chalaria** (Wight & Arn.) Baker

Flemingia subg. *Chalaria* (Wight & Arn.) Baker in Hook f. Fl. Brit. India 2: 227. 1876.
Type: *Flemingia lineata* (L.) W.T. Aiton. (Map 2).

Erect shrubs, undershrubs, leaves simple or trifoliolate, bracts minute, caducous, flowers in lax panicled racemes, flowering axes visible.

Key to the species of subg. **Chalaria**

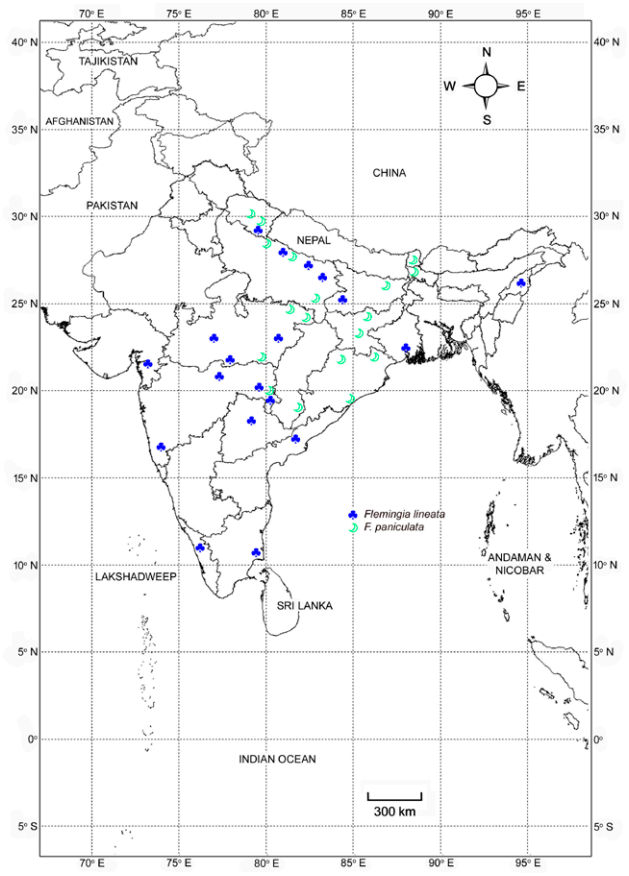
1. Leaves 1-foliolate ..... *F. paniculata*

2. Leaves 3-foliolate ..... *F. lineata*

Flemingia lineata (L.) W.T.Aiton, Hortus Kew., ed. 2. 4: 350. 1812

Bas.: *Hedysarum lineatum* L., Syst. Nat., ed. 10. 2: 1170. 1759.
Type: (Herb. Linn. 3 11.17 (S-G-10429 image!). Lectotype designated by Schrire (1997: 471).

Roxb., Fl. Ind. 3: 341. 1832; Wight & Arn., Prodr. Fl. Ind. Orient. 1: 242. 1834; Wight, Icon. Pl. Ind. Orient. 2(1): 1, t. 227. 1843; Benth. in Miquel, Pl. Jungh. 2: 245. 1852; Baker in Hook. f., Fl. Brit. India 2: 228. 1876; Kurz, Forest Fl. Burma 2: 372. 1877; Prain in J. Asiat. Soc. Ben-



Map 2. Distribution of subgenus *Chalaria* (Wight & Arn.) Baker in India.

gal, Pt. 2, Nat. Hist. 69(2): 438. 1897. Prain, Bengal Pl. 1: 377. 1903; T. Cooke, Fl. Bombay 2: 391. 1902; Gamble, Fl. Madras 1: 378. 1928; Sanjappa, Legumes of India 176. 1992; Saxena & Brahman, Fl. Orissa 1: 527. 1994. Kothari in N.P. Singh et al., Fl. Maharashtra, Dicot. 2: 686. 2001. (Figures 1, 23a, 24a, 25a and 26a).

(=) *Onobrychis lineata* Desv. J. Bot. Agric. 3: 80. 1814.
Type: not seen.

(=) *Flemingia blancoana* Llanos, Fragm. Pl. Filip. 80. 1851.
Type: Merrill, Sp. Blancoana (1918) 191, as topotype: Luzon, Bulacan Prov., Calumpit, s.d., *Blancoana 699* (lectotype designated here, L; isolectotype, W).

(≡) *Lespedeza lineata* (L.) Pers., Syn. Pl. 2(2): 318. 1807.

(≡) *Maughania lineata* (L.) Kuntze Revis. Gen. Pl. 1:199. 1891; Mukerjee, Bull. Bot. Soc. Bengal 6(1): 14. 1953. (as *Moghania lineata*).

Description

Erect small shrubs, up to 0.3–0.4 m tall, with profuse branching; stems 2–3 mm in diameter, young triangular, mature terete, hairy; hairs silky, antrorse. Leaves digitately trifoliolate, 2.5–6.5 cm long, stipulate, petiolate; stipules 2, 8–9 × 2–2.5 mm, lanceolate, acuminate with equal tips, fused when young, splitting at maturity, persistent, basifixed, many nerved, hairy; petioles 0.6–1.7 cm long, grooved, not winged, gland-dotted, hairy; leaflets 3, 2–4.6 × 1–2.8 cm, obovate to lanceolate, obtuse at apex, the central cuneate at base, lateral oblique at base, margin ciliate, apex mucronate, sparsely hairy on both surfaces, densely hairy on nerves; dorsally gland-dotted, glands orange-red; petiolules 1–2 mm long, hairy, gland-dotted. Inflorescences an axillary panicle; panicles lax 2–4 cm long, longer than the petiole. Flowers 6–6.5 mm long, pedicellate, bracteate; pedicels 1–2 mm long, hairy; bracts 1.5–2 × 1–1.5 mm, ovate to lanceolate, acuminate at apex, many nerved, hairy, gland-dotted. Calyx 4.5–5 mm long, hairy, gland-dotted; calyx tube 1.8–2 mm long, campanulate, hairy; calyx teeth 5, 3–3.5 × 0.8–1 mm, lanceolate, subequal, lower one the longest, connate for 1/3 of its length, hairy, many nerved, gland-dotted. Corolla pinkish; standards 5–5.5 × 4–4.5 mm, rounded, apex pointed, glabrous, clawed with 2 auricles; claw 1–1.5 mm long; auricles 1 mm or less than 1 mm; wing petals 8–8.5 × 1.8–2 mm, falcate; claw 1.5–2 mm long; keel petals 5–5.5 × 2–2.5 mm, slightly falcate, fused at apex at lower side; claw 1–1.5 mm long. Stamens 10, diadelphous (9+1); staminal tube 3–3.5 × 1 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 1–2 mm long, that of free stamens 4–4.5 mm long. Ovary 1.8–2 × 0.8–1 mm, gland-dotted, hairy; ovules 2; style 4–4.5 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 12–14 × 6–7 mm, beaked, turgid, slightly septate between seeds or not, densely hairy, densely gland-dotted; beak 1 mm long; glands mealy, withering post maturity. Seeds 2, 4 × 3 × 2.5 mm, brown, mottled, shiny, rounded to elliptic; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'lineata' refers to the straight line-like veins of leaflets.

Distribution

Asia: Bangladesh, Cambodia, India (Andhra Pradesh, Bihar, Kerala, Madhya Pradesh, Maharashtra, Nagaland, Tamil Nadu, Telangana, Uttar Pradesh, Uttarakhand and West Bengal), Indonesia, Laos, Malay-

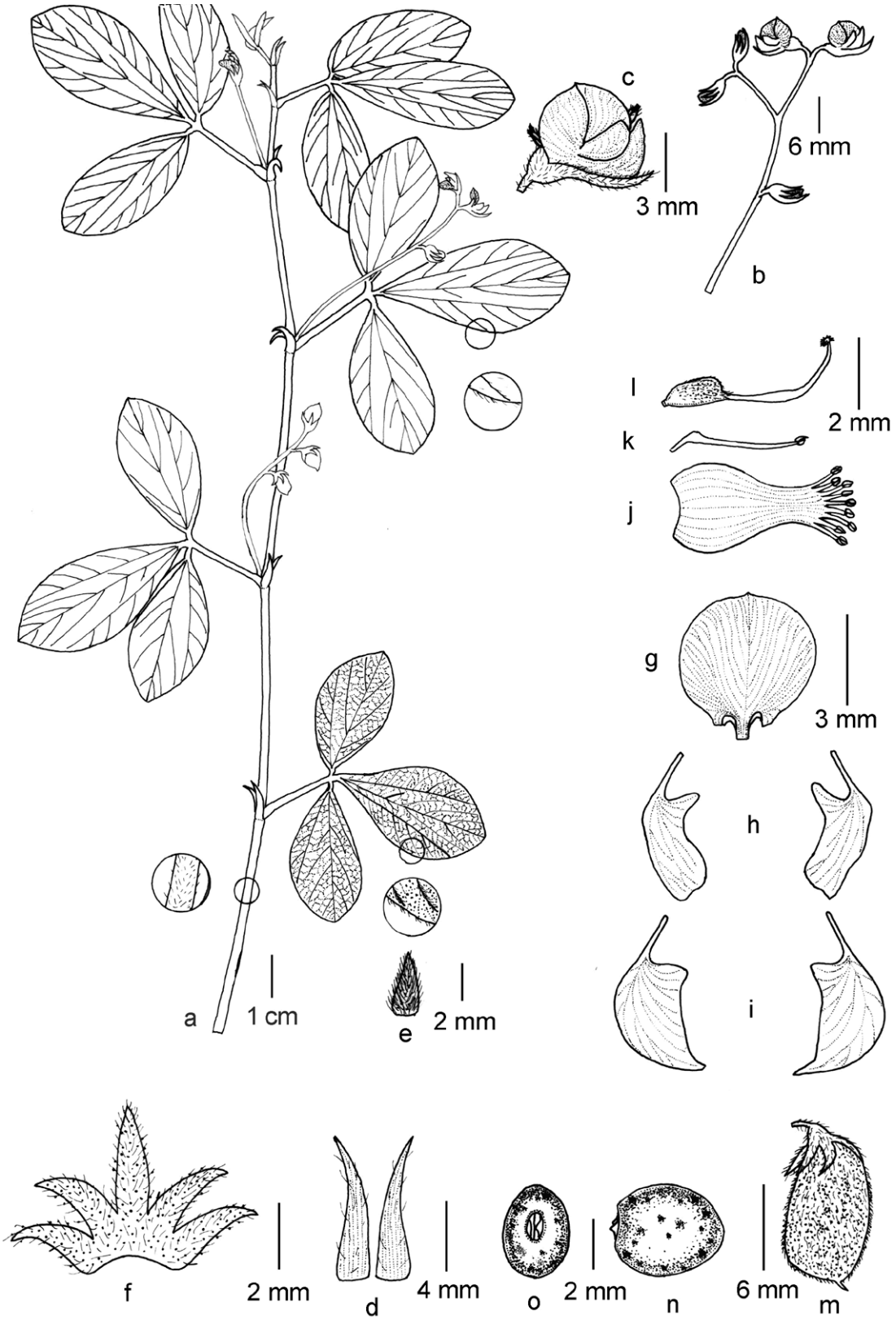


Figure 1. *Flemingia lineata* (L.) W.T.Aiton. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

sia, Myanmar, Sri Lanka, Thailand, Vietnam. Australia: Northern Territory, Queensland, West Australia.

Flowering and fruiting

November to March.

Habitat and ecology

Flemingia lineata is found on open grasslands at low altitudes of ca. 500–750 m asl. It grows in association with *Alternanthera tenella* Colla, *Argemone mexicana* L., *Chrozophora rottleri* (Geiseler) Spreng., *Crotalaria prostrata* Rottler, *Gliricidia sepium* (Jacq.) Kunth, *Iphigenia pallida* Baker, *Ledebouria revoluta* (L.f.) Jessop and *Polygala arvensis* Willd.

Selection of specimens examined

BANGLADESH: Sylhet, s.d., *F. De Silva s.n., Wallich Catalogue Number 5752g* (BR, K001122011); s.d., *J.G. Koenig s.n.* (LD1739365); *J.G. Koenig s.n.* (LD1740773). **INDIA**: s.d., *N.A. Dalzell s.n.* (CAL, DD); *C.L. Willdenow s.n.* (B-W 13780-020); s.d., W. Roxburgh, Wallich Catalogue Number 5752a (K001122005); s.d., *R. Wight s.n., Wallich Catalogue Number 5752i* (K001122008); 5 February 1809, *s.coll. s.n., Wallich Catalogue Number 5752c* (K001122007); Andhra Pradesh, East Godavari district, February 1885, *J.S. Gamble 16057* (CAL, MH); Bihar, Bhojpur district, Jaugarh, 16 December 1948, *H.F. Mooney 3166* (DD); 27 January 1949, *H.F. Mooney 3161a* (DD); Gujarat, Surat district, Varachha, 2 October 1977, *J.V. Joshi 423* (BARO); Kerala, Malabar, Concan region, 1860, *J.E. Stocks & J.S. Law s.n* (CAL,W); Madhya Pradesh, Betul district, Mohta, 6 February 1891, *J.F. Duthie 10374* (DD); Jabalpur district, Jabalpur, March 1902, *R.S. Hole 126* (CAL, DD); Sehore district, Budhni, 18 February 1905, *E. Moyes 261* (CAL); Maharashtra, Amravati district, Melghat, *Roger s.n.* (CAL); Chandrapur district, Ashriti, 6 January 1890, *J.F. Duthie 9407* (DD); 15 January 1890, *J.F. Duthie 9407* (DD); Ballarpur, 29 December 1889, *J.F. Duthie 9407* (DD); Gadchiroli district, Venkatapur, 15 January 1890, *J.F. Duthie 9407* (DD); 19 January 1890, *J.F. Duthie 9407* (DD); Jalgaon district, Bhusawal, 2 January 1917, *E. Blatter 10542* (BLAT, BSI); Kolhapur district, Shivaji University campus, Lead Botanic Garden, 29 March 2015, *S.K. Gavade 37* (SUK); 22 February 2016, *S.K. Gavade 130* (SUK); 6 February 2017, *S.K. Gavade & M.M. Lekhak 189* (SUK); Mumbai Suburban district, Bhandup, 19 November 1916, *s.coll. 11290* (BLAT); Nagaland, Naga Hills, s.d., *F. Kingdon-Ward 11262* (BM, CAL); Northern Madras Presidency, s.d., *P. Russell s.n.* (K001122009); Tamil Nadu, Nagapattinam district, Tharangambadi, s.d., *Anon. 181* (LINNHS1210-53-2); Telangana, Karimnagar district, Eklaspur, 31 December 1964, *G.V. Subbarao 22523* (MH); Uttar Pradesh, Bahraich district, Katarniaghat Wildlife Sanctuary, 9 December 1986, *K.K. Khanna & R. Saran 37679* (BSA, CAL); Uraital, 14 February 1965, *O.P. Misra 7992* (BSA); *G. Panigrahi 7992* (CAL); Balrampur district, Balrampur, February 1898, *Inayat Khan 20965* (DD); Lakhimpur Kheri district, Palia Kalan, 14 May 2006, *B.K. Shukla 66135* (BSA); Sant Kabir Nagar district, Maghar, 16 March 1814, *F. Buchanan-Hamilton s.n., Wallich Catalogue Number 5752h* (K001122012, K); Uttarakhand, Udham Singh Nagar district, Pantnagar, 11 April 2009, *D.S. Rawat 605* (BSA); West Bengal, Howrah district, Acharya Jagadish Chandra Bose Indian Botanic Garden, 15 December 1965, *R.L. Mitra 433* (CAL); 7 January 1815, *F. Buchanan-Hamilton, Wallich Catalogue Number 5752b* (K001122006); s.d., *s.coll. s.n., Wallich Catalogue Number 5752f* (K001122010).

Affinities

Flemingia lineata shows close resemblance to *F. procumbens* but differs from it in having upright stature, lax panicle, sparsely hairy leaflets and pods with mealy glands.

Taxonomic notes

Flemingia lineata was described by Linnaeus (1759) as *Hedysarum lineatum* L. in his 'Systema Naturae'. Persoon (1807) transferred this taxon from *Hedysarum* to *Lespedeza* Michx. and made a new combination *L. lineata* (L.) Pers. Aiton (1812) transferred *Lespedeza lineata* to *Flemingia*.

Nomenclatural notes

Linnaeus (1759), while describing *H. lineatum*, mentioned that he used Burmann's specimen. We could find the lectotype of *F. lineata* in S (Schrire 1997). In India all *F. lineata* concerns the var. *lineata*, elsewhere the other variety may occur: var. *glutinosa* Prain, from Myanmar to Australia.

Flemingia paniculata Wall. ex Benth. in Miquel, Pl. Jungh. 2: 245. 1852

Type: Myanmar, Ataran river, 29 January 1827, *N. Wallich, Wallich Catalogue Number 5759* (lectotype designated here, K001122038 image!); Myanmar, Ataran river, 11 March 1827, *N. Wallich, Wallich Catalogue Number 5759* (G, K001122037 image K!, syntypes); s.d., *N. Wallich, Wallich Catalogue Number 5759* (BM000958663 image!, syntype); India, Uttar Pradesh, Gorakhpur, 28

March 1814, F. Buchanan-Hamilton s.n., *Wallich Catalogue Number 5758* (K, K001122036 image!, syntypes).

Baker, in Hook. f., Fl. Brit. India 2: 22. 1876; Kurz, Forest Fl. Burma 2: 372. 1877; Prain, Bengal Pl. 1: 377. 1903; Haines, Bot. Bihar Orissa 3: 268. 1922; Babu, Herbac. Fl. Dehra Dun 149. 1977; Sanjappa, Legumes of India 177. 1992; Saxena & Brahman, Fl. Orissa 1: 530. 1994. (Figures 2, 23b, 24b, 25b and 26b).

(≡) *Maughania paniculata* (Wall. ex Benth.) H.L. Li, Amer. J. Bot. 31. 227. 1944; Mukerjee, Bull. Bot. Soc. Bengal 6(1): 14. 1953. (as *Moghania paniculata*).

Flemingia phursia Buch.-Ham. ex Wall., Numer. List n. 5758. 1831, *nom. nud.*

Maughania phursia Kuntze, Revis. Gen. Pl. 1: 199. 1891, *nom. nud.*, (as *Moghania phursia*).

Description

Erect shrubs, up to 0.8–1.5(-2) m tall, with branched stem; stems 5–10 mm in diameter, terete, hairy; hairs silky, antrorse. Leaves unifoliolate, 6–30 cm long, stipulate, petiolate; stipules 2, 8–9 × 2.5–3 mm, lanceolate, acuminate with equal tips, fused when young, splitting at maturity, caducous, basifixed, many nerved, hairy; petioles 3–6 cm long, grooved, hairy, gland-dotted; leaflet 1, 5–25 × 3.5–11 cm, broadly ovate, rounded or cordate at base, apex acuminate, glabrous on ventral surface, dorsally hairy, gland-dotted; glands orange-red; petiolules 3–6 mm long, hairy, gland-dotted. Inflorescences an axillary and terminal lax panicles, 4–8 cm long. Flowers 1.2–1.3 cm long, pedicellate, bracteate; pedicels 3–3.5 mm long, hairy; bracts 2.5–3 × 3.5–4 mm, ovate, acute at apex, many nerved, hairy, gland-dotted. Calyx 9–9.5 mm long, hairy, gland-dotted; calyx tube 1.5–2 mm long, campanulate, hairy; calyx teeth 5, 7.5–8 × 2–2.5 mm, lanceolate, subequal, lower one the longest, connate for 1/4 of its length, many nerved, hairy, gland-dotted. Corolla pale green with pink striations; standard 9–10 × 9–10 mm, rounded, apex retuse, glabrous, clawed with 2 auricles; claw 1.5–2 mm long; auricles 1 mm or less than 1 mm; wing petals 8–8.5 × 2–2.5 mm, oblong; claw 1.5–2 mm long; keel petals 7.5–8 × 3.5–4 mm, boat shaped, fused at apex at lower side; claw 1.5–2 mm long. Stamens 10, diadelphous (9+1); staminal tube 4.5–5 × 1 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 2.5–3 mm long, that of free stamens 6.5–7 mm long. Ovary 2–2.2 × 1 mm, gland-dotted, hairy; ovules 2; style 5–6 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 18–22 × 6–7.5 mm, beaked, turgid, slightly septate between seeds or not, hairy, sparsely gland-dotted; beak 1 mm long; glands orange-red, withering post maturity. Seeds 2, 3.5 × 3.5 × 2.5 mm, rounded, mottled, shiny; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'paniculata' refers to the paniculate type of inflorescence.

Distribution

Asia: Bangladesh, China (Yunnan), India (Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Orissa, Sikkim, Uttar Pradesh, Uttarakhand and West Bengal), Myanmar, Thailand, Vietnam.

Flowering and fruiting

February to March.

Habitat and ecology

Flemingia paniculata grows on hill slopes in damp forests at altitudes of ca. 700–800 m asl, outside India up to 1600 m. It grows in association with *Arthraxon lancifolius* (Trin.) Hochst., *Bauhinia macrophylla* Poir., *Bidens pilosa* L., *Colebrookea oppositifolia* Sm., *Dillenia pentagyna* Roxb., *Dioscorea pentaphylla* L., *D. pubera* Blume, *Globba racemosa* Sm., *Leea asiatica* (L.) Ridsdale, *Leucas decemdentata* (Willd.) Sm., *Oplismenus compositus* (L.) P.Beauv and *Smilax zeylanica* L.

Selection of specimens examined

INDIA, Bihar, Supaul district, Gaunha, 12 March 1955, *J.G. Srivastava 20098* (LWG); Chhattisgarh, Bastar district, Kotumsar, s.d., *A.N. Singh s.n.* (BSA); 19 February 1963, *G. Panigrahi & C.M. Arora 1183* (BSA); *G. Panigrahi 1183* (CAL); on the way to Darba, 11 February 1961, *N.P. Balakrishnan & A.N. Henry 12063* (MH); Surguja district, Sabag, 21 February 1976, *G. Sen Gupta 24098* (BSA); Jharkhand, Chota Nagpur region, 1886, *A. Campbell s.n.* (DD); Giridih district, Parasnath hills, April 1886, *A. Campbell 8278* (CAL); 20 September 2002, *V. Rajan & K.L. Maity 31723* (CAL); 19 March 2005, *V. Rajan & K.L. Maity 37844* (CAL); Hazaribagh district, Hazaribagh, 10 April 1884, *C.B. Clarke 3460d* (CAL); Madhya Pradesh, Seoni district, December 1914, *D.O. Watt 40* (DD); Karmajhiri, 19 March 1978, *L.K. Banerjee 28224* (BSA); Rewa district, Kanhaiya, 28 January 1971, *G. Sen Gupta 14419* (BSA); Sidhi district, Jir, 28 February 1917, *G. Sen Gupta 14694* (BSA); Maharashtra, Gadchiroli district, Goth, 4 April 2015, *S.K. Gavade & V. Kahalkar 40* (SUK); 1 February 2017, *S.K. Gavade 182*

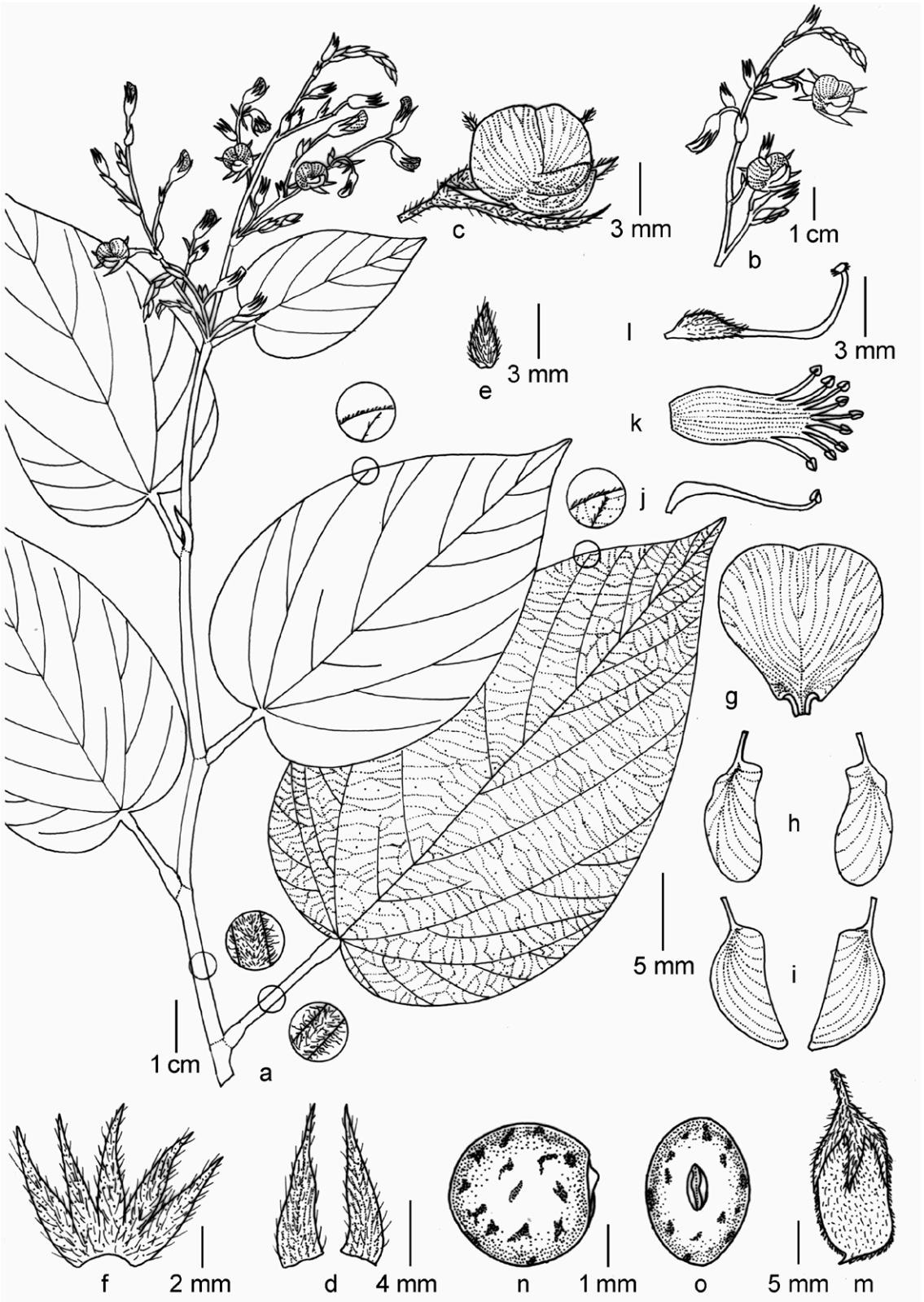


Figure 2. *Flemingia paniculata* Wall. ex Benth. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Free stamen. (k) Fused androecium. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

(SUK). Odisha, Ganjam district, Bhanjanagar, 2 March 1964, *S.L. Kapoor & party 63194* (LIV, LWG); Mayurbhanj district, Bhanjabasa, 13 February 1958, *G. Panigrahi 12298* (CAL); on the way to Bakua to Simlipal, 17 February 1985, *G. Panigrahi 12516* (CAL); Sambalpur district, Badrama, 24 March 1964, S.L. Kapoor & party 71378 (LWG); Sikkim, Gok, 10 March 1919, *G.H. Cave s.n.* (E, G); Rangeet river, 14 March 1876, *C.B. Clarke 27335C* (CAL); *127335g* (BM); East Sikkim, Rangpo, 24 February 1909, *Kari 508* (CAL); Uttar Pradesh, Bahraich district, Rampurwa, 15 March 1964, *G. Panigrahi 2904* (BSA); Bulandshahr District, Dharampur, 15 March 1964, *G. Panigrahi & O.P. Misra 2904* (CAL); Lakhimpur Kheri district, 25 March 1921, *S. Ram s.n.* (DD); 4 April 1898, *Inayat Khan 21505* (DD, K); Salukapur, 19 March 1980, *J.K. Maheshwari & party 400* (LWG); Lalitpur district, Madanpur, 23 September 1920, *S. Ram s.n.* (DD); Varanasi district, Ramnagar, Sitabani, 20 February 1922, *A.R. Osmaston 1180* (DD); Uttarakhand, Almora district, Someswar hills, 13 April 1963, *K. Thothathri 10046* (CAL); Dehradun District, Lacchiwalla, April 1901, *U. Kanjilal 912* (DD); 26 April 1901, *U. Kanjilal s.n.* (CAL); Rispana, 31 January 1965, *C.R. Babu 33862* (BSD); Hardwar district, Mohand, 10 April 1994, *K.K. Singh & A. Kumar 215770* (LWG); West Bengal, Darjeeling district, Darjeeling, 29 May 1962, *R.V. Sitholay 71321* (LWG); Kolkata district, Kolkata, s.d., *J.W. Helfer 69* (A, BM, BR, C, G, US, WAG); *J.W. Helfer 138* (CAL); Maldah district, Karja Danga, 27 April 1966, *R.M. Datta 225* (CAL).

Affinities

Flemingia paniculata looks like *F. chappar*, but differs from it in the absence of papery folded bracts, its paniculate inflorescence and ovate leaf blades.

Taxonomic note

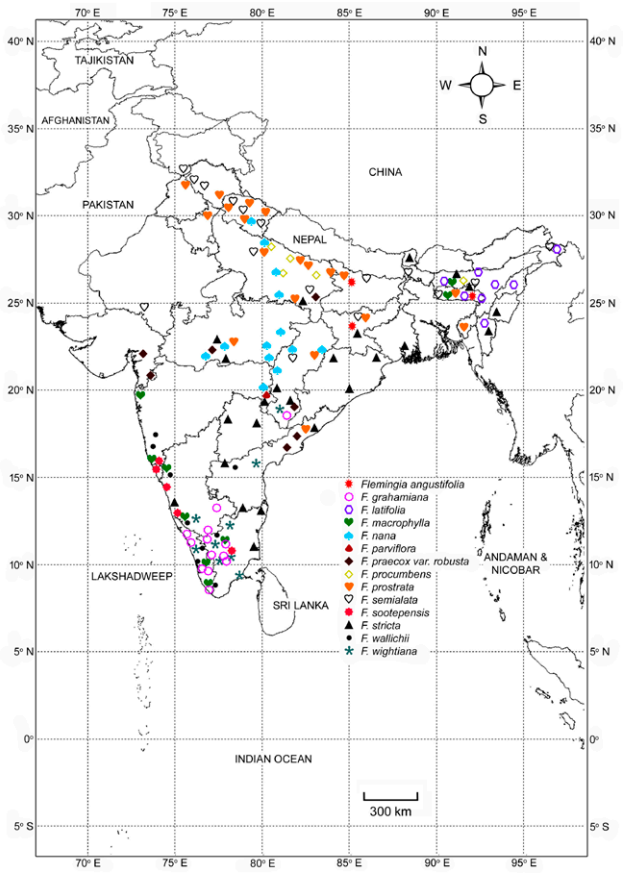
It is a very distinct species with unifoliolate leaves.

Nomenclatural notes

The binomial *F. paniculata* was proposed by Wallich (1831) and validly published by Bentham (1852) in Miquel's 'Plantae Junghuhnianae'. In the protologue Bentham cited Wallich Catalogue Number 5759 and *F. phursia* as synonym along with Wallich Catalogue Number 5758. In the search of type specimen, we could trace two sheets bearing Wallich Catalogue Number 5759 at K and one at BM (BM000958663). One of the sheets at K has two separate twigs with different barcodes (K001122037 and K001122038). The other sheet bears Wallich Catalogue Number 5758 (K001122036). The sheet at BM bears Wallich Catalogue Number 5759. The specimens with barcodes K001122037 and K001122038 were collected by Wallich from Ataran river, Myanmar, on different dates (Wallich 1831). The BM specimen was collected by Wallich from Ataran river, Myanmar but it bears no collection date (Wallich 1831). All these specimens serve as syntypes. As per articles 9.11 and 9.12 of Shenzhen Code (Turland et al. 2018), we selected and designated here the specimen K001122038 which matches well with the description given in the protologue as lectotype.

Flemingia subg. **Flemingiastrum** (DC.) Baker
Flemingia subg. *Flemingiastrum* (DC.) Baker, in Hook. f. Fl. Brit. India 2: 228. 1876. (Map 3).

Type: *Flemingia stricta* Roxb.
Erect (under-) shrubs, leaves trifoliolate, stipules caducous or persistent, flowers in axillary racemes, bracts small or large, axes not or hardly visible.



Map 3. Distribution of subgenus *Flemingiastrum* (DC.) Baker in India.

Key to the species of subg. **Flemingiastrum**

1. Leaflets linear, oblong or lanceolate, longer than 1.8 cm .. 2
1. Leaflets obovate, small, shorter than 1.8 cm 13
2. Leaflets twice as long as broad 3
2. Leaflets thrice as long as broad 10
3. Abaxial side of leaflets hairy 8
3. Abaxial side of leaflets glabrous 4
4. Stipules small, up to 2.6(-4) x 0.4(-0.5) cm; bracts shorter than flowers 5
4. Stipules large, up to 10 x 2.5 cm; bracts longer than flowers ..... *F. stricta*
5. Racemes longer than the petiole; petiole winged 6
5. Racemes shorter than the petiole; petiole grooved ..... *F. macrophylla*
6. Pod sparsely gland-dotted 7
6. Pod densely gland-dotted ..... *F. sootepensis*
7. Stipules, bracts and calyx grey tomentose, leaflets narrow-ovate-elliptic ..... *F. semialata*
7. Stipules, bracts and calyx conspicuously rusty tomentose, leaflets broad-ovate ..... *F. latifolia*
8. Pods not included within the calyx 9
8. Pods included within the calyx ..... *F. wallichii*
9. Stipules persistent ..... *F. grahamiana*
9. Stipules caducous ..... *F. wightiana*
10. Leaflets hairy, with acute or obtuse apex 11
10. Leaflets glabrous, with acuminate apex ..... *F. praecox* var. *robusta*
11. Leaflets linear-lanceolate 12
11. Leaflets oblong ..... *F. prostrata*
12. Inflorescence with 22-25 flowers, equal or longer than petiole ..... *F. angustifolia*
12. Inflorescence with 5-10 flowers, shorter than petiole ..... *F. parviflora*
13. Petioles shorter than leaflets ..... *F. procumbens*
13. Petioles longer than leaflets ..... *F. nana*

Flemingia angustifolia Roxb., Fl. Ind. 3: 341. 1832

Type: India, Uttar Pradesh, Ramnagar district, Sitabandi, s.d., *W. Roxburgh s.n.* (lectotype designated here, MEL; isolectotype DD). Syntype: without precise locality, s.d., *W. Roxburgh s.n.* (BR).

Benth. in Miquel, Pl. Jungh. 2: 245. 1852; Haines, Bot. Bihar Orissa 3: 269. 1922. (Figures 3, 23c, 24c, 25c and 26c).

Flemingia angustifolia Roxb., Hort. Bengal. 98. 1814, *nom. nud.*

Description

Erect small shrubs, up to 0.5–0.6 m tall, with branched stem; stems 3–4 mm in diameter, young triangular, mature terete, hairy. Leaves digitately trifoliolate, 6–12 cm long, stipulate, petiolate; stipules 2, 10–11 × 1.5–2 mm, lanceolate, falcate, acuminate with equal tips, fused when young, splitting at maturity, persistent, basifixed, many nerved, hairy; petioles 2.5–3.5 cm long, winged, hairy, gland-dotted; leaflets 3, 5–8 × 1.5–2.2 cm, linear lanceolate, acute or obtuse at apex, the central cuneate at base, lateral oblique at base, margin ciliate, hairy on both surfaces, densely hairy on veins, dorsally gland-dotted; glands black; petiolules 1–2 mm long, hairy, gland-dotted. Inflorescences an axillary and terminal raceme; racemes 1–3 in cluster, 2–4.5 cm long, equal or longer than the petiole. Flowers 7–8 mm long, pedicellate, bracteate; pedicels 1.2–1.5 mm long, hairy; bracts 3–3.5 × 1.5–2 mm, ovate to lanceolate, acuminate at apex, many nerved, hairy, gland-dotted. Calyx 8–8.5 mm long, hairy, gland-dotted, hairs antrorse; calyx tube 1–1.2 mm long, campanulate, hairy; calyx teeth 5, 5–7 × 0.8–1 mm, lanceolate, subequal, lower one the longest, connate for 1/5 of its length, many nerved, hairy, gland-dotted. Corolla pink with striations; standard 5–5.5 × 3–3.5 mm, elliptic, apex retuse with a point, glabrous, clawed with 2 auricles; claw 1–1.2 mm long; wing petals 5–5.2 × 1.2–1.5 mm, oblong, falcate; claw 1.8–2 mm long; keel petals 6–6.2 × 1.8–2 mm, boat shaped, fused at apex at lower side; claw 1.8–2 mm long. Stamens 10, diadelphous (9+1); staminal tube 3–4 × 0.8 mm; anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 1.2–2.2 mm long, that of free stamens 5–5.2 mm long. Ovary 1.5–1.8 × 0.5–0.8 mm, gland-dotted, hairy; ovules 2; style 4–4.5 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 11–12 × 4–4.5 mm, beaked, turgid, slightly septate between seeds or not, hairy, sparsely gland-dotted; beak 0.8–1 mm long; glands black, withering post matu-

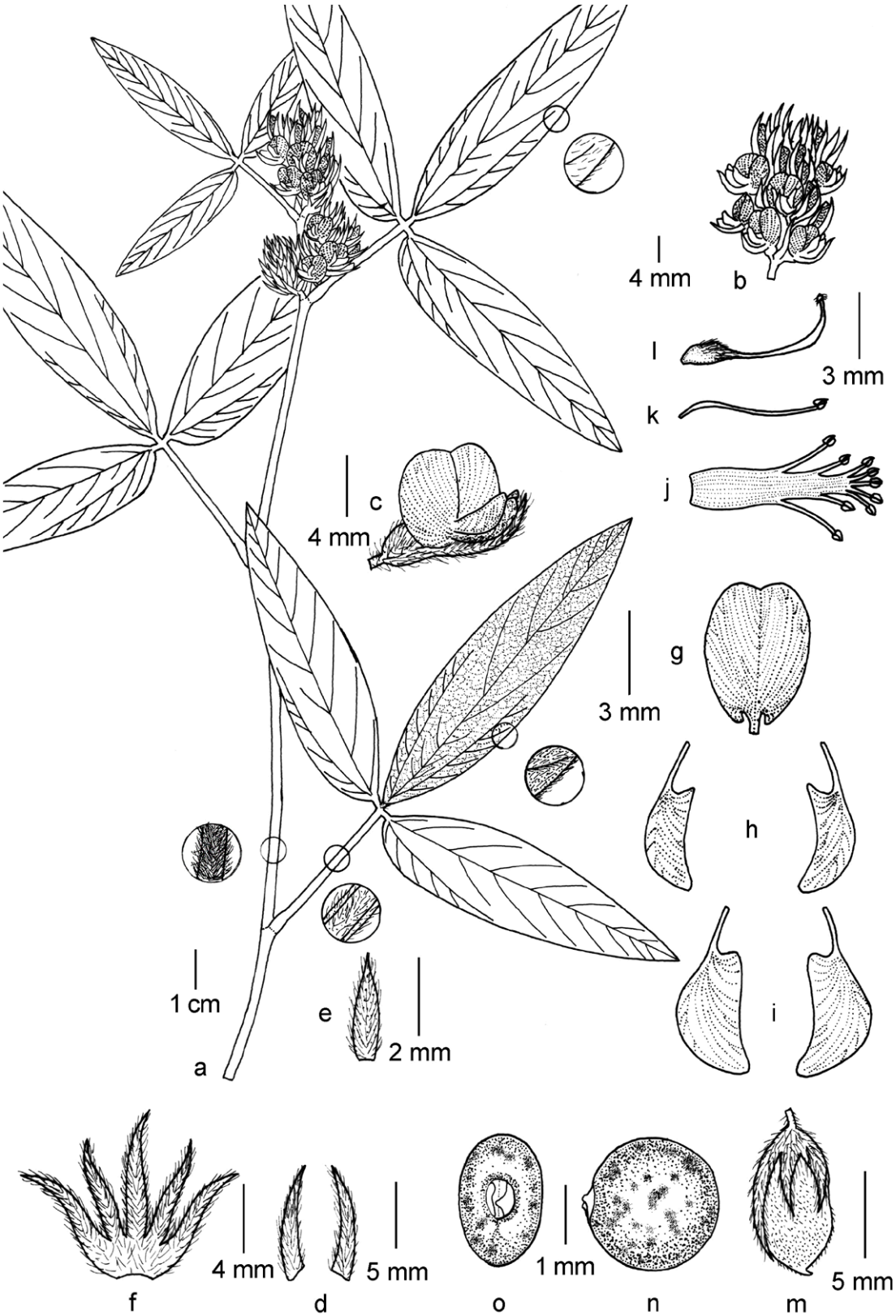


Figure 3. *Flemingia angustifolia* Roxb. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

rity. Seeds 2, 2.5 × 2.5 × 2 mm, brown, mottled, shiny, rounded; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'angustifolia' refers to its narrow leaflets.

Distribution

Asia: India (Meghalaya and Jharkhand).

Flowering and fruiting

October to December.

Habitat and ecology

Flemingia angustifolia is found in open grassy hill slopes as well as in *Pinus* forests at high altitude of ca. 1400–1600 m asl. It grows in association with *Ageratum conyzoides* L., *Crotalaria pallida* Aiton, *Pinus kesiya* Royle ex Gordon, *Themeda* species, *Thysanolaena* species.

Additional specimens examined

INDIA, Meghalaya, Khasi Hills, July 1878, *J.L. Lister 1102* (CAL); Thoyung, 14 March 1885, *C.B. Clarke 37550* (CAL); East Khasi Hills district, on the way to Shillong to Jowai, 20 December 2005, *K.V.C. Gosavi 115* (SUK); Shillong, 21 October 1872, *C.B. Clarke 18667A* (CAL); *C.B. Clarke 18667B* (CAL); 18 August 1885, *C.B. Clarke 38916B* (CAL); 3 September 1885, *C.B. Clarke 40327B* (CAL); West Jaintia Hills district, Jowai to Shongpung, 8 November 1938, *G.K. Deka 17509* (ASSAM); Jharkhand, Ranchi district, Ranchi, 8 September 1896, *W. Kerr s.n.* (CAL).

Affinities

Flemingia angustifolia shows close resemblance to *F. prostrata* but differs from it in its upright stature, linear leaflets, and inflorescence equal or longer than the petiole.

Taxonomic note

Flemingia angustifolia was synonymized under *F. prostrata* by Mukerjee (1953). Both *F. angustifolia* and *F. prostrata* were described by Roxburgh (1832) in his seminal work 'Flora Indica'. Haines (1922) had pointed out that *F. prostrata* and *F. angustifolia* are different species. A critical study of the circumscription of *F. angustifolia* lends support to Haines's view and hence we have treated *F. angustifolia* as a distinct species.

Nomenclatural notes

The binomial *Flemingia angustifolia* appeared in Roxburgh's 'Flora Indica' in 1832. While describing the species, he mentioned that "this species grows in vicinity of Hurdwar (Haridwar, Uttarakhand) and discovered by Hardwicke". It seems that this plant or its seeds were sent to Roxburgh by Hardwicke from Hurdwar.

A search of type specimens in the herbaria revealed five sheets. Of these, three at BR collected by Roxburgh do not bear locality details, and one sheet each at MEL and DD collected by Roxburgh from Sitabani, Uttar Pradesh India is without precise locality. All these specimens serve as syntype. As per articles 9.11 and 9.12 of Shenzhen Code (Turland et al. 2018) we have selected and designated here the specimen from MEL as lectotype.

Flemingia grahamiana Wight & Arn., Prodr. Fl. Ind. Orient. 1: 242. 1834

Type: India, East Peninsular region, s.d., *R. Wight 816* (lectotype designated here, MH000020489 image!; isolectotypes CAL0000012298, E00157783 image!).

Benth. in Miquel, Pl. Jungh. 2: 245. 1852; Baker, in Hook. f., Fl. Brit. India 2: 228. 1876; Gamble, Fl. Madras 1: 378. 1928; Verdcourt, Fl. Trop. East Africa, Leguminosae 4, Papil. part 2: 806-807. 1971; Verdcourt, Kew Bulletin 31: 175. 1976; Sanjappa, Legumes of India 175. 1992. (Figures 4, 23d, 24d, 25d and 26d).

(=) *Flemingia pycnantha* Benth., Linnaea 24: 643. 1852.
Type: India, Nilgiri hills, s.d., *R.F. Hohenacker 1211* (BM, G00365319 image!, G00385323 image!, K, MEL, WAG).

(≡) *Maughania grahamiana* (Wight & Arn.) Kuntze, Revis. Gen. Pl. 1: 199. 1891; Mukerjee, Bull. Bot. Soc. Bengal 6(1): 16. 1953. (as *Moghania grahamiana*)

Description

Erect shrubs, up to 0.6–1.2 m tall, with profuse branching; stems 3–10 mm in diameter, triangular when young, terete when mature, hairy; hairs silky, antrorse. Leaves digitately trifoliolate, 10–20 cm long, stipulate, petiolate; stipules 2, 16–20 × 2.5–3 mm, lanceolate, acuminate with equal tips, fused when young, splitting when in maturity, persistent, basifixed, many nerved, hairy; petioles 2.5–6 mm long, winged, gland-dotted, hairy; leaflets 3, 4.5–13 × 3–7 cm, obovate, acute or obtuse at apex, the central cuneate at base, laterals oblique at base, margin ciliate, apex mucronate, sparsely hairy on both surfaces, densely hairy on nerves; dorsally gland-dotted, glands orange-red or black; petiolules 1–4 mm long, hairy, gland-dotted. Inflorescences

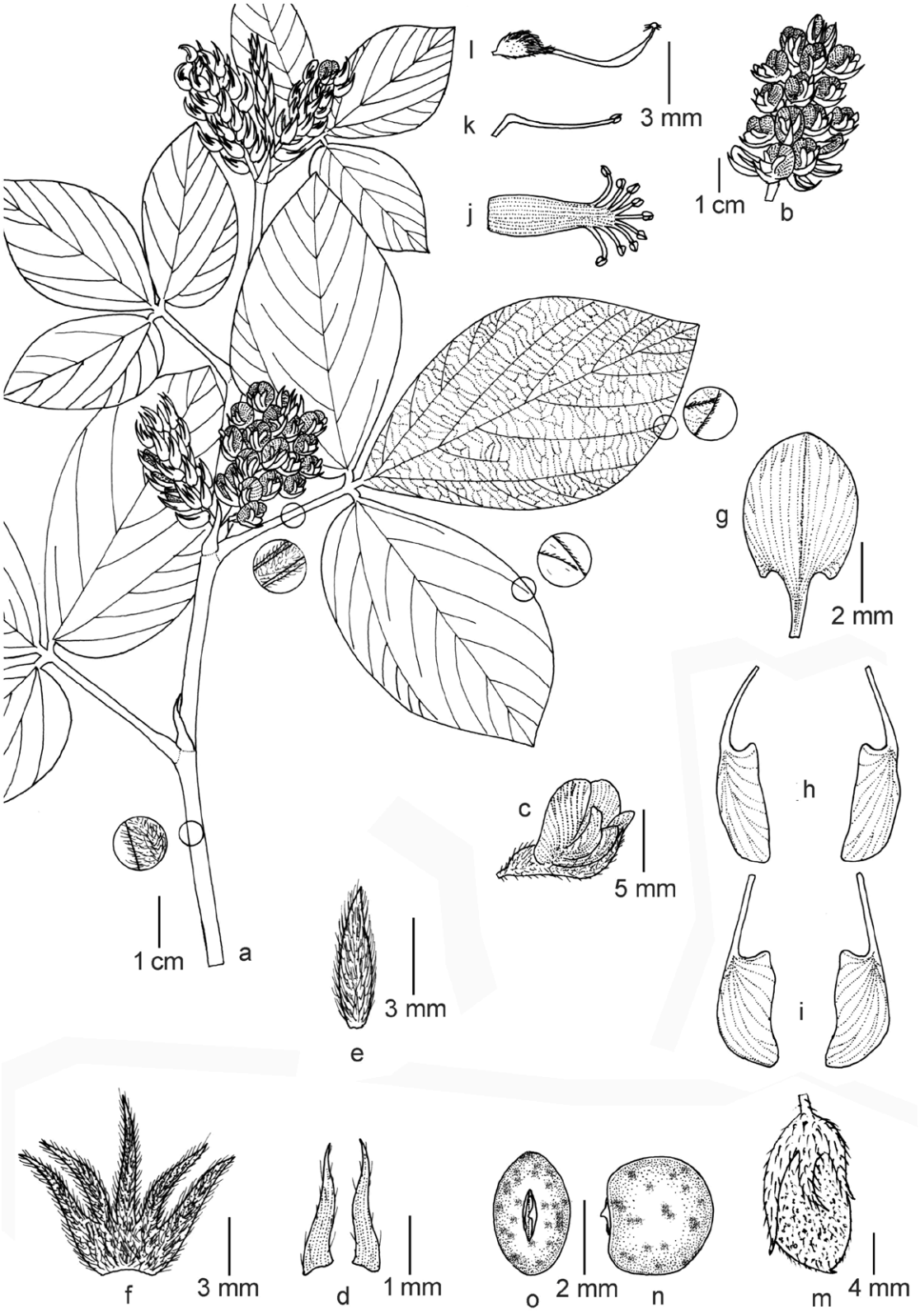


Figure 4. *Flemingia grahamiana* Wight & Arn. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

an axillary and terminal raceme; racemes 2–5 in cluster, ovate dense, capitate, 2–4 mm long, equal or longer than the petiole. Flowers 10–11 mm long, pedicellate, bracteate; pedicels 2–2.5 mm long, hairy; bracts 5–5.2 × 1.2–1.5 mm, linear to lanceolate, acuminate at apex, many nerved, hairy, gland-dotted. Calyx 10–10.5 mm long, hairy, gland-dotted; calyx tube 2.5–3 mm long, campanulate, hairy; calyx teeth 5, 7–7.5 × 0.8–1 mm, subequal, lanceolate, lower one the longest, connate for 1/3 of its length, many nerved, hairy, gland-dotted. Corolla white with green striations; standard 7–7.5 × 4–4.2 mm, rounded to elliptic, apex obtuse, glabrous, clawed with 2 auricles; claw 2.8–3 mm long; auricles 1 mm or less than 1 mm; wing petals 8–8.5 × 1.8–2 mm, oblong, slightly falcate; claw 3–3.2 mm long; keel petals 7.8–8 × 2–2.5 mm, slightly falcate, fused at apex at lower side; claw 3.5–3.8 mm long. Stamens 10, diadelphous (9+1); staminal tube 4.5–5.5 × 1 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 1–2 mm long, that of free stamens 6–6.5 mm long. Ovary 1.8–2 × 0.8–1 mm, gland-dotted, hairy; ovules 2; style 5–5.5 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 16–17 × 6–6.5 mm, beaked, turgid, slightly septate between seeds or not, densely hairy, sparsely gland-dotted; beak 1 mm long; glands orange-red, withering post maturity. Seeds 2, 4 × 3 × 2.5 mm, brown, mottled, shiny, rounded; hilum granular, 1 mm long, position ± central.

Etymology

Specific epithet '*grahamiana*' honours Robert Graham (1786–1845), a Scottish physician and botanist.

Distribution

Africa: Kenya, Uganda to Zimbabwe and South Africa. Asia: India (Chhattisgarh, Karnataka, Kerala and Tamil Nadu).

Flowering and fruiting

December to April.

Habitat and ecology

Flemingia grahamiana is found on hill slopes at an altitude of ca.1300–2300 m asl. It grows in association with *Breynia retusa* (Dennst.) Alston, *Elaeagnus conferta* Roxb., *Flueggea leucopyrus* Willd., *Lantana camara* L., *Mimosa pudica* L., *Phyllanthus* species, *Polygala arvensis* Willd., *Smilax zeylanica* L., *Stachytarpheta jamaicensis* (L.) Vahl, *Strobilanthes kunthiana* T.Anderson ex Benth., etc.

Selection of specimens examined

INDIA, Chhattisgarh, Dantewada district, Bailadila hills, Malingar valley, 20 March 1977, *L.J.G. van der Maesen 2741* (CAL, ICRISAT, WAG); Jashpur district, 2 May 1964, *C.P. Arora 3819* (BSA); Karnataka, Chamarajanagara district, Bandipur National Park, 28 January 1965, *B.D. Naithani 23208* (CAL, MH); Biligiriranga-na Hills, Honnametti, 1 February 1971, *R.R. Rao 1258* (JCB); Tumkur district, Pavagada, 7 February 1964, *J.L. Ellis 18580* (CAL); Kerala, Ernakulam district, Kodanad, reserve forest, 12 November 1970, *E. Vajravelu 36851* (MH); Idukki district, Devikulam, December 1910, *A.K. Meebold 6691* (CAL); *A.K. Meebold 3361* (CAL); Lockhart Gap, 10 October 1963, *K.M. Sebastine 17483* (MH); Vattavada, 29 March 1978, *V.P.K. Nambiar 450* (KFRI); Kannur district, on the way to Theethunda-malai to Chandanathode, *J.L. Ellis 29465* (MH); on the way to Varayadu to Eravikulam, 20 October 1989, *P. Bhargavan 91853* (BSID); Kollam district, Chandanathope, Jheethunda Malai top, 4 December 1967, *J.L. Ellis 29465* (CAL); Kottayam district, Vagamon, 20 February 2008, *K.V. Krishnaraj 61802* (TBGRI); Kozhikode district, Pavangad, *J.L. Ellis 18580* (MH); Palakkad district, Siruvani, 18 December 1956, *K. Subramanyam 1790* (CAL); Trivandrum district, Hut road to Poovar, 22 July 1998, *S.D Biju 38293* (TBGRI); Wayanad district, 3 October 1983, *C.N. Mohanan 79931* (MH); East Peninsular region, s.d., *R. Wight 803* (GH, HBG, K); Tamil Nadu, Anaimalai Hills, 15 January 1912, *C.E.C. Fischer 3286* (CAL); Konalar, 16 November 1980, *M. Chandrabose 57778* (CAL, MH); Poonachi, 14 October 1901, *C.A. Barber 3783* (MH); Nilgiri hills, January 1848, *R. Wight s.n.* (BR, C, CAL, K, MEL, P); December 1885, *J.S. Gamble 16919* (BSI); 19 May 1907, *G.A. Gammie 453* (BSI); Neddiwuttum, s.d., *G. King 1321* (CAL); Coimbatore district, Ayinigiri betta, Geddesal, 15 March 1931, *K.C. Jacob 364* (MH); Gudalur, 10 January 1903, *C.A. Barber 5554* (MH); Siruvani, 18 December 1956, *K. Subramanyam 1790* (MH); Dindigul district, Silver Cascade, 5 March 1978, *D.K. Hore 612* (CAL); Kodaikanal, 21 March 1847, *s.coll. s.n.* (MH); May 1941, *s.coll. s.n.* (RHT); 19 March 1950, *D. Daniel, S. Roy & J.S. Rao 93870* (MH); 15 March 1956, J. Pallithanam 1443 (RHT); 15 September 1956, J. Pallithanam 2158 (RHT); Palni Hills, Berijam road, 6 December 1986, *K.M. Matthew & M. Charles 47738* (RHT); Kookal, 19 October 1987, *K.M. Matthew 50806* (RHT); Mahilkundram, 6 July 1987, *K.M. Matthew 49891* (RHT); 19 December 1989, *K.M. Matthew 54077* (RHT); Perumalmalai hills, 24 October 1977, *M. Chandrabose 51655* (CAL, MH); 30 October 1985, *K.M. Matthew & N. Rajendran 42420* (RHT); on the way Shembaganur to Periyakulam, 5 December

1986, *M. Charles 47678* (RHT); Coolie path, 10 January 1985, *S.J. Britto 40861* (RHT); on the way to Shembaganur to Kodaikanal, Levinge path, December 1956, *K.M. Matthew 207* (RHT); *K.M. Matthew & M. Charles 47725* (RHT); 14 November 1984, *K.M. Matthew 40841* (RHT); Shembaganur, Charlier's path, 29 October 1985, *K.M. Matthew & N. Rajendran 42377* (RHT); Vadakavanchi, 29 November 1985, *K.M. Matthew & N. Rajendran 43478* (RHT); on the way to Vandaravu, 25 October 1988, *K.M. Matthew 53612* (RHT); Vembadi Peak, 19 November 1985, *K.M. Matthew et al. 42764* (RHT); 7 December 1986, *K.M. Matthew & M. Charles 47793* (RHT); 27 August 1987, *K.M. Matthew & N. Rajendran 50415* (RHT); 4 November 1987, *K.M. Matthew & K.T. Matthew 51063* (RHT); Madurai district, Madurai, 14 April 1985, *K.M. Matthew & S.J. Britto 41231* (RHT); Picnic shola, 19 September 1968, *D.B. Deb 31006* (MH); Nilgiris district, Coonoor, 8 March 1878, *C.B. Clarke 10511* (CAL); November 1883, *J.S. Gamble 13267* (CAL, DD); October 1889, *J.S. Gamble 21426* (MH, DD); s.d., *G. King 1355* (CAL); Mudumalai National Park and Wildlife Sanctuary, 18 November 1958, *K.M. Sebastine 7370* (MH); Benne forest, 19 January 1961, *B.V. Shetty 11930* (MH); Upper Tiger Shola, 19 January 1957, *K.M. Sebastine 2058* (CAL, MH); s.d., *G. King 1044* (CAL); Theni district, Meghamalai, Eravangalar, 11 January 1986, *K. Ravikumar 2932* (MH); Salem district, Shevaroy hills, Yercaud, 11 July 2016, *S.K. Gavade 134* (SUK); 19 January 2017, *S.K. Gavade 170* (SUK); 2 February 2017, *S.K. Gavade & M.M. Lekhak 187* (SUK).

Affinities

Flemingia grahamiana shows close resemblance to *F. wightiana* but differs from it in having sparsely hairy, obovate, acute or obtuse leaflets, persistent stipules and linear to lanceolate bracts. The tell-tale character to distinguish *F. grahamiana*, the orange to red glandular dots on calyx tube and calyx teeth and pods quite more conspicuous than the glands on other species, tend to wear away in time, upon drying, handling etc.

Taxonomic note

Flemingia grahamiana was described by Wight and Arnott (1834) from East Peninsular India. Bentham (1852) described a new species, *F. pycnantha* based on Hohenacker's collection from Nilgiri hills. After studying the protologue and type specimens, we realized again that *F. pycnantha* is conspecific to *F. grahamiana*. Mukerjee (1953), Sanjappa (1992) and some online databases (ILDIS 2005; The Plant List 2013) earlier synonymised *F. pycnantha* under *F. grahamiana*.

Nomenclatural notes

Wight and Arnott (1834) while describing *F. grahamiana* mentioned Wight catalogue Number 816 in the protologue. In search of type specimens we could trace three specimens, one each at CAL (CAL0000012298), E (E00157783) and MH (MH000020489). These specimens were collected by Wight from the East Peninsular region, India. As per articles 9.11 and 9.12 of Shenzhen Code (Turland et al. 2018), we selected and designated here the specimen MH000020489 as the lectotype. This specimen is the most complete and matches well with the description provided in the protologue.

Flemingia latifolia Benth. in Miquel, Pl. Jungh. 2: 246. 1852

Type: Indonesia, Central Java, Ungaran, s.d., *Junghuhn s.n.* (lectotype designated here, K000980309 image!).

Kurz, Forest Fl. Burma 2: 375. 1877; Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69(2): 441. 1897. (Figures 5 and 23e).

(=) *Flemingia congesta* var. *latifolia* Baker, in Hook. f., Fl. Brit. India 2: 228. 1876.
Type: India, Khasia, 2-3000 ft, s.d., *J.D. Hooker & T. Thomson s.n.* (CAL0000012304!).

(≡) *Maughania macrophylla* var. *latifolia* Kuntze, Revis. Gen. Pl. 1: 199. 1891.

(≡) *Maughania latifolia* (Benth.) Mukerjee, Bull. Bot. Soc. Bengal 6(1): 17. 1953 (as *Moghania latifolia*).

Description

Erect shrubs, up to 3–3.2 m tall, with profuse branching; stems 5–15 mm in diameter, young triangular, mature terete, hairy; hairs golden yellow to rusty brown, antrorse. Leaves digitately trifoliolate, 11–21 cm long, stipulate, petiolate; stipules 2, 21–26 × 3–4 mm, ferrugineous, lanceolate, acuminate with equal tips, fused when young, splitting at maturity, caducous, broad, basifixed, many-nerved, hairy; petioles 4–7 cm long, winged, gland-dotted, hairy; leaflets 3, 7–14 × 3–5.2 cm, ovate to lanceolate, acuminate at apex, the central cuneate at base, lateral oblique at base, margin ciliate, apex mucronate, hairy on both surfaces, densely hairy on veins, dorsally gland-dotted; glands orange-red; petiolules 4–6 mm long, hairy, gland-dotted. Inflorescences an axillary and terminal raceme; racemes 3–4 in cluster, 3–8 cm long, equal or longer than the

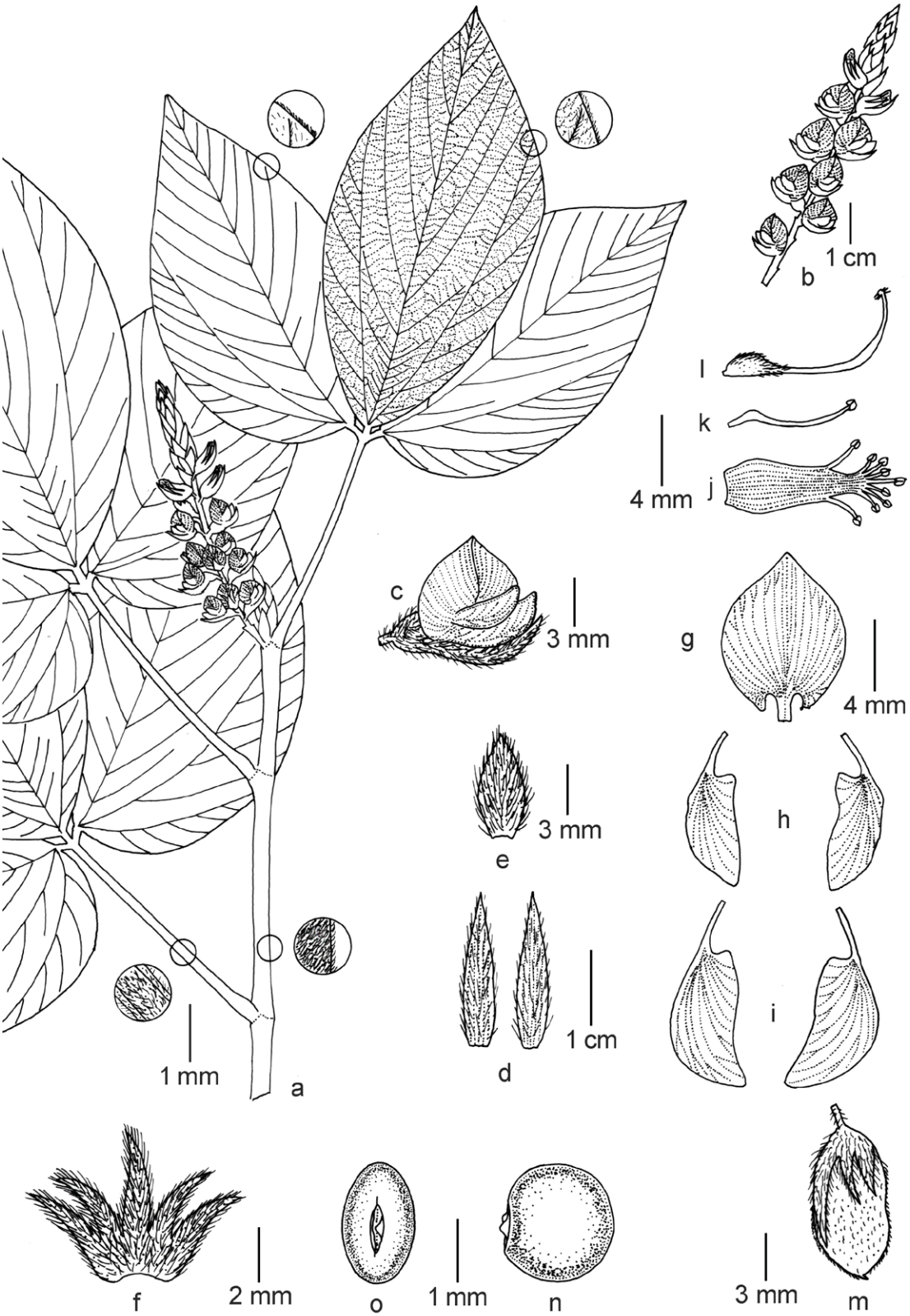


Figure 5. *Flemingia latifolia* Benth. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

petiole. Flowers 1.3–1.5 cm long, pedicellate, bracteate; pedicels 2–2.5 mm long, hairy; bracts 6–8 × 4–4.5 mm, ovate acute at apex, many nerved, hairy, gland-dotted. Calyx 1–1.1 cm long, hairy, gland-dotted; calyx tube 2–2.5 mm long, campanulate, hairy; calyx teeth 5, 5.2–8 × 1.8–2 mm, lanceolate, subequal, lower one the longest, connate for 1/5 of its length, many nerved, hairy, gland-dotted. Corolla purple; standard 7.5–8 × 6–6.5 mm, rounded to elliptic, apex pointed, glabrous, clawed with 2 auricles; claw 1.8–2 mm long, auricles 1 mm or less than 1mm; wing petals 8.5–9 × 2–2.5 mm, oblong, slightly falcate; claw 2.8–3 mm long; keel petals 8–8.5 × 3–3.5 mm, falcate, fused at apex at lower side; claw 3–3.2 mm long. Stamens 10, diadelphous (9+1); staminal tube 4.8–5 × 1 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 0.8–1.8 mm long, that of free stamens 7–8 mm long. Ovary 2–2.2 × 1 mm, gland-dotted, hairy; ovules 2; style 8–9 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 12–13 × 5–5.5 mm, beaked, turgid, slightly septate between seeds or not, hairy, gland-dotted; beak 1 mm long; withering post maturity. Seeds 2, 2.5 × 2.5 × 2.5 mm dark brown, globose; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'latifolia' refers to its broad-sized leaflets.

Flowering and fruiting

July to December.

Habitat and ecology

Flemingia latifolia is found on hill slopes at high altitude of ca. 1000–1200 m asl. In Yunnan, China, it occurs at 3000 m in Java, Indonesia at low altitude of 20 m.

Distribution

China (Kwangtung and Yunnan), India (Arunachal Pradesh, Assam, Meghalaya and Mizoram), Indonesia (Java), Laos, Myanmar and Vietnam.

Selection of specimens examined

INDIA, Arunachal Pradesh, Anjaw district, on the way to Hayuliang to Donliang, 22 November 1957, *R.S. Rao 10740* (ASSAM); Assam, East Karbi Anglong district, Garampani Wildlife Sanctuary, 30 October 1956, *G. Panigrahi 4218* (ASSAM); 17 October 1979, *K. Haridasan 4143* (ASSAM); Goalpara district, Amguri experimental area, 22 November 1983, *D. Nath 13247* (ASSAM); Golaghat district, on the way to Kohora to Animora, 24 November 1964, *S.K. Kataki 41694* (ASSAM); Sonitpur district, Bura Chapori Wildlife Sanctuary, 31 May 2005, *M. Bhoumik 110117* (ASSAM); Meghalaya, Pungtong, Pangtum forests, 5 November 1938, *S.R. Sharma 18222* (ASSAM); Umleswar forest, 26 November 1949, *B.B. Syam 22889* (ASSAM); East Khasi Hills district, Khasia, 2 November 1850, *J.D. Hooker & T. Thomson s.n.* (CAL, GH, K); 25 October 1972, *N. Gour 53601* (ASSAM); Beadon falls, 16 August 1913, *U. Kanjilal 2428* (ASSAM); Jaintia Hills district, 21 km from Raling (or Ralang) to Garampani, 21 November 1979, *G. Remanandan 4698* (ICRISAT, WAG); on the way to Jowai to Raliang, 24 January 1957, *G.K. Deka 5112* (ASSAM); Ri Bhoi district, Nongpoh, *H. Deka 17186* (ASSAM); Mizoram, Lushai hills, Lamphai to Myanmar border, 19 January 1963, *D.B. Deb 31039* (ASSAM); Nagaland, Naga hills, s.d., *Masters 1013* (CAL).

Affinities

Flemingia latifolia shows affinities towards *F. macrophylla* but differs from it in having racemes equal or longer than the petiole, large sized stipule, distinctly winged petiole, broad ovate to lanceolate leaflets and rusty tomentose bracts.

Taxonomic note

Baker (1876) treated *Flemingia latifolia* as a variety under *F. congesta*, i.e. *F. congesta* var. *latifolia* in the Flora of British India. While replacing the generic name *Flemingia* by *Moghania*, Kuntze (1891) considered *F. latifolia* as a variety under *F. macrophylla*, i.e., *M. macrophylla* var. *latifolia*. But other workers such as Kurz (1877), Prain (1897), Mukerjee (1953) treated *F. latifolia* at the rank of species. After studying the type specimen and protologue, we have also concluded that *F. latifolia* is a distinct species.

Nomenclatural notes

Flemingia latifolia was described by Bentham in Miquel's Plantae Junghuhnianae (Bentham 1852). He mentioned "Hab. in Javae mont. Ungaran, altit. 3-4000 ped., ad Djati kalangan...(Jungh.)", which indicates that he used Junghuhn's specimen while describing the species. Our search for original material in relevant herbaria led to the tracing of a single sheet at K (K000980309) which matches well with the protologue. Hence, as per articles 9.11 and 9.12 of Shenzhen Code (Turland et al. 2018) we have designated Junghuhn's specimen (K000980309) as the lectotype.

Flemingia macrophylla (Willd.) Kuntze ex Merr., Philipp. J. Sci., C 5: 130. 1910

Bas.: *Crotalaria macrophylla* Willd. Sp. Pl., ed. 4 [Willdenow] 3(2): 982. 1802.
Type: India, without precise locality, 1797, *J.G. Klein 13260* (lectotype designated here, B-W 13260-010 image!).

Gandhi in Saldanha & Nicolson, Fl. Hassan Distr. 254: 1976; Sanjappa, Legumes of India 176. 1992; Saxena & Brahman, Fl. Orissa 1: 528. 1994; M.R. Almeida Fl. Maharashtra 2: 78. 1998; Kothari in N.P. Singh et al., Fl. Maharashtra, Dicot. 2: 686. 2001. (Figures 6, 23f, 24e, 25e and 26e).

(=) *Flemingia congesta* Roxb., in W.T. Aiton, Hortus Kew., ed. 2. 4: 349. 1812.

Type: India, without precise locality, s.d., *W. Roxburgh s.n.* (lectotype designated here, K001121990 image!; isolectotype BR0000005173655 image!, BR0000005196890 image!, BR0000005173327 image!).

Fl. Ind. 3: 340. 1832 (as *Flemingia conjesta*); Wight & Arnott, Prodr. Fl. Ind. Orient. 1: 241. 1834 [10 Oct 1834]; Wight, Icon. Pl. Ind. Orient. 2(1): 7, t. 390. 1843; Benth. in Pl. Jungh. 2: 246. 1852; Baker, in Hook. f., Fl. Brit. India 2: 228. 1876; Kurz, Forest Fl. Burma 2: 374. 1877; Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69(2): 439. 1897; T. Cooke, Fl. Bombay 2: 392. 1902; Prain, Bengal Pl. 1: 378. 1903; Talbot, Forest Fl. Bombay 1: 419. 1909; Haines, Bot. Bihar Orissa 3: 270. 1922; Gamble, Fl. Madras 1: 378. 1928.

(=) *Flemingia sericans* Kurz, J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 43(3): 186. 1874; Kurz, Forest Fl. Burma 2: 373. 1877; Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69(2): 442. 1897, **syn. nov.**
Type: Myanmar, Prome, 1826, *N. Wallich, Wallich, Catalogue Number 5748b* (K-W001121999 image!).

(≡) *Maughania macrophylla* (Willd.) Kuntze, Revis. Gen. Pl. 1: 199. 1891; Mukerjee, Bull. Bot. Soc. Bengal 6(1): 16. 1953 (as *Moghania macrophylla*).

Description

Erect shrubs, up to 1.8–2.4 m tall, with branched stem; stems 10–15 mm in diameter, young triangular, mature terete, hairy; hairs silky, antrorse. Leaves digitately trifoliolate, 30–52 cm long, stipulate, petiolate; stipules 2, 20–25 × 3–4 mm, lanceolate, acuminate with equal tips, fused when young, splitting at maturity, persistent, basifixed, many nerved, hairy; petioles 10–16 cm long, grooved, gland-dotted, hairy; leaflets 3, 20–36 × 8–10 cm, ovate to lanceolate, acuminate at apex, the central cuneate at base, lateral oblique at base, margin ciliate, apex mucronate, glabrous on both surfaces, except on veins, dorsally gland-dotted; glands orange-red; petiolules 6–8 mm long, hairy, gland-dotted. Inflorescences axillary and terminal racemes; racemes 2–5 in cluster, 3–6 cm long, shorter than the petiole. Flowers 1–1.2 cm long, pedicellate, bracteate; pedicels 1.5–2 mm long, hairy; bracts 3.5–4 × 1.5–2 mm, ovate acuminate at apex, many nerved, hairy, gland-dotted. Calyx 11–12 mm long, hairy, gland-dotted; calyx tube 2–2.5 mm long, campanulate, hairy; calyx teeth 5, 6–8 × 1.5–2 mm, lanceolate, subequal, lower one the longest, connate for 1/5 of its length, many nerved, hairy, gland-dotted. Corolla pale pink with striations; standard 8–9 × 6–7 mm, rounded to obovate, apex pointed, glabrous, clawed with 2 auricles; claw 1.5–2 mm long; auricles 1 mm or less than 1 mm; wing petals 7–7.5 × 1.5–2 mm, oblong; claw 2.5–3 mm long; keel petals 9.5–10 × 2.5–3 mm, falcate, fused at apex, at lower side; claw 2.5–3 mm long. Stamens 10, diadelphous (9+1); staminal tube 5–5.5 × 1–1.5 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 2–4 mm long, that of free stamens 8–8.5 mm long. Ovary 1.8–2 × 1 mm, gland-dotted, hairy; ovules 2; style 7.5–8 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 15–16 × 6–7 mm, beaked, turgid, slightly septate between seeds or not, hairy, sparsely gland-dotted; beak 1 mm long; glands orange-red, withering post maturity. Seeds 2, 4 × 3 × 2.5 mm, brown, mottled, shiny, orbicular; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'macrophylla' refers to its large-sized leaves.

Distribution

Africa: introduced in Mauritius, Uganda. America: introduced in Florida, Guadeloupe. Asia: Bangladesh, Bhutan, China (Hainan, Kwangsi, Kwangtung, Szechwan, Yunnan), India (Assam, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Punjab, Tamil Nadu and West Bengal), Indonesia (Java, Kalimantan, Seram, Sumatra), Malaysia, Myanmar, Nepal, Philippines, Taiwan, Thailand, Vietnam. Australia (Queensland).

Flowering and fruiting

December to April.

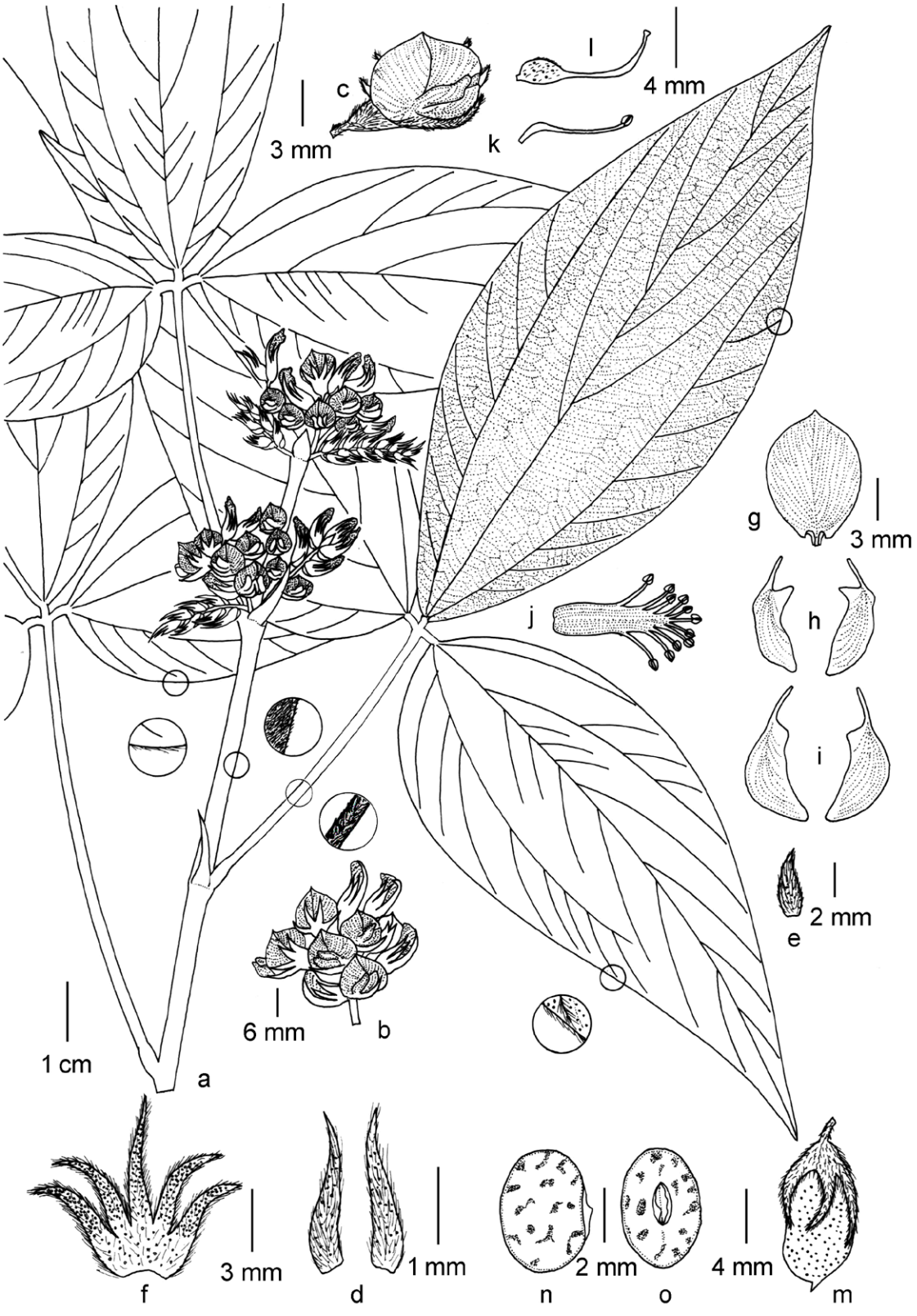


Figure 6. *Flemingia macrophylla* (Willd.) Kuntze ex Merr. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

Habitat and ecology

Widely dispersed, *Flemingia macrophylla* is commonly found in evergreen forests at an altitude of ca.150–650 m asl. It grows in association with *Clausena indica* Oliv., *Connarus monocarpos* L., *Flemingia bracteata* (Roxb.) W.T.Aiton, *F. strobilifera* (L.) R.Br., *F. wallichii* Wight & Arn., *Holigarna grahamii* Kurz, *Leea indica* (Burm.f.) Merr., *Macaranga peltata* Boiv. ex Baill., *Memecylon umbellatum* Burm.f., *Syzygium cumini* (L.) Skeels and *Urena lobata* L.

Selection of specimens examined

BANGLADESH, Chittagong, *H. Bruce 5746d* (K001121992); Sylhet, *F. De Silva & H. Bruce 5747e* (K001121993); 57 km S of Teknaf, 16 March 1979, *L.J.G. van der Maesen 3775* (ICRISAT, WAG). **INDIA**, Assam, Goalpara, 10 November 1806, *Buchanan & Hamilton 5747a* (K001121989); *Buchanan & Hamilton 5747b* (K001121990); *Buchanan & Hamilton 5747c* (K001121991); Karnataka, Belgaum district, Hemmadaga village, *N.V. Malpure 3906* (SUK); 13 March 2016, *S.K. Gavade & N.V. Malpure 132* (SUK); 23 January 2017, *S.K. Gavade 180* (SUK); Dakshina Kannada, Shiradi Ghat, 30 January 1969, *C. Saldanha 12628* (JCB); Kerala, Idukki district, between Meenkuthi and Anakulam, 10 December 2003, *K.K.N. Nair 4450* (KFRI); Gavi, 21 January 2009, *M.V. Krushnaraj 61888* (TBGRI); Kollam district, Arippa, Kulathupuzha Range, Quilon, 5 August 1981, *N. Sasidharan 1401* (KFRI); Thiruvananthapuram district, Bonaccord, 22 December 1988, *M. Mohanan 7940* (TBGRI); Palode, 21 January 1992, *A. Nazarudeen 13676* (TBGRI); Maharashtra, Bombay, *N.A. Dalzell s.n.* (CAL, K); Malabar & Konkan region, *J. Stocks & J. Law s.n.* (BM, CAL, K); *A. Gibson 7* (CAL); Thane district, Shahapur research garden, 23 June 1967, *K.V. Billore 111073* (BSI); Sindhudurg district, hill near Kunkawale 8-miles from Malvan, 16 February 1966, *M.Y. Ansari 108309* (BSI); Pulas forest, Chafeli, 12 February 1970, *B.G. Kulkarni 120057* (BSI); Tamil Nadu, Salem District, Yercaud, Vallaikadai and Cauvery Peak ±1250 m, 18 March 1976, *K.M. Matthew & V. Alphonse 1798* (RHT016752); West Bengal, Sonepur Chowpathi, 29 August 1982, *L.J.G. van der Maesen 4894* (ICRISAT, WAG); **MALAYSIA**, Penang, 1822, *N. Wallich 5747f,* (K001121994); Meghalaya, s.d., *s.coll. s.n.* (NEHU); **MYANMAR**, Taunggyi, 16 March 1980, *L.J.G. van der Maesen 4210* (ICRISAT, WAG); without precise locality/Amherst, Moulmeyn, Martabania, 26 January 1827, *N. Wallich 5747g* (K001121995, K001121996, K001121997, LE).

Affinities

Flemingia macrophylla shows affinities towards *F. semialata*, *F. sootepensis* and *F. latifolia* but differs from them in having racemes shorter than the petiole, grooved petiole and large ovate-lanceolate leaflets.

Taxonomic notes

Flemingia macrophylla (Willd.) Kuntze ex Merr. was described by Willdenow in 1802 as *Crotalaria macrophylla* Willd. Roxburgh (1814) described *Flemingia congesta* (= *Flemingia macrophylla*), which was validated by Aiton (1812). While describing *F. congesta*, Roxburgh was not aware of Willdenow's plant. Kuntze (1891) suggested that the generic name *Flemingia* be replaced by *Moghania*. Consequently, he made a new combination for *C. macrophylla*, i.e., *Moghania macrophylla*. He also mentioned that *F. congesta* by Roxburgh is a heterotypic synonym of *C. macrophylla* (≡ *F. macrophylla*) Willdenow's plant. Prain (1897) noticed this and he stated that Kuntze failed to make clear what *F. macrophylla* signified. However, he gave credit to Kuntze for a new combination, i.e. *F. macrophylla* Kuntze. Subsequently, Merrill (1910) made it clear that *F. macrophylla* and *F. congesta* are the same plant. Merrill (1910) mentioned that as per his request, Harms studied the type of *C. macrophylla* (≡ *F. macrophylla*) of Willdenow along with some specimens of *F. congesta* from the Philippines and found them identical. Prior to Merrill (1910), many botanists have used Roxburgh's name *F. congesta* in their respective work (Wight and Arnott 1834; Wight 1843; Bentham 1852; Kurz 1877; Prain 1897, 1903; Cooke 1902) instead of *F. macrophylla*. Haines (1922) and Gamble (1928) also used the name *F. congesta*.

The species *Flemingia latifolia* Benth., *F. nana* Roxb. ex W.T.Aiton, *F. prostrata* Roxb. junior ex Roxb., *F. semialata* Roxb. ex W.T.Aiton and *F. sootepensis* Craib. have been synonymised or relegated as subspecies or varieties under *F. macrophylla* by many botanists and taxonomic databases (Babu 1977; Sanjappa 1992; The Plant List 2013) but as per Prain (1897) and Mukerjee (1953) these species are distinct. We follow Prain (1897) and Mukerjee (1953) in our treatment.

Nomenclatural notes

In search of type specimens we could trace a single specimen at B. This sheet was studied by Harms and bears the collection number 13260 (Merrill 1910). This sheet matches well with the protologue of *F. macrophylla* and depicts all the diagnostic characters and hence as per articles 9.11 and 9.12 of Shenzhen Code (Turland et al. 2018) has been designated as lectotype here.

In the case of the binomial *Flemingia congesta* we could trace four specimens of which one is at K and the other three are at BR. The specimens from BR are of Roxburgh and were purchased by Martius, the founder of Flora Brasiliensis from Linnean Society of London in 1863 (Forman 1997). As per articles 9.11 and 9.12 of Shenzhen Code (Turland et al. 2018), the specimen at K (K001121990) having Roxburgh handwriting as '*Hedysarum trinervium*' is selected and designated here as a lectotype (per articles 9.11 and 9.12 of Shenzhen Code (Turland et al. 2018). The specimens from BR (BR0000005173655, BR0000005196890, BR0000005173327) become isolectotypes.

Flemingia nana Roxb., in W.T.Aiton, Hortus Kew., ed. 2. 4: 349. 1812

Type: flowering specimen in Roxburgh drawing number 1622 (K image!, lectotype designated by Gavade et al., 2016b: 74):). Wallich Catalogue Number 5748a, *Roxburgh s.n.* (K-W001121998 image!, syntype)

Fl. Ind. 3: 339. 1832; Wight & Arn., Prodr. Fl. Ind. Orient. 1: 242. 1834; Wight, Icon. Pl. Ind. Orient. 2(1): 7, t. 389. 1843; Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69(2): 441. 1897; Prain, Bengal Pl. 1: 378. 1903; T. Cooke, Fl. Bombay 2: 334. 1902; Talbot, Forest Fl. Bombay 1: 419, 1909. (Figures 7, 23g, 24f, 25f and 26f).

(≡) *Flemingia congesta* var. *nana* (Roxb.) Baker, in Hook. f., Fl. Brit. India 2: 230. 1876.

(≡) *Maughania nana* (Roxb.) Mukerjee, Bull. Bot. Soc. Bengal 6(1): 20. 1953 (as *Moghania nana*).

(≡) *Flemingia macrophylla* var. *nana* M.R. Almeida, Fl. Maharashtra 2: 77. 1998.

Flemingia nana Roxb., Hort. Bengal. 56. 1814, *nom. nud.*

Description

Dwarf suffruticose shrubs, 10–15 (-30) cm in height on a woody rootstock; stems unbranched, 5–7 mm in diameter, young triangular, mature terete, hairy; hairs silky, antrorse. Leaves digitately trifoliolate, 20–44 cm long, stipulate, petiolate; stipules 2, 13–14 × 2–2.5 mm, lanceolate, acuminate with equal tips, fused when young, splitting at maturity, persistent, basifixed, many nerved, hairy; petioles 20–28(-55) cm long, distinctly winged, gland-dotted beneath, hairy; leaflets 3, 9–18 × 5–13 cm, broadly obovate, acute at apex, the central cuneate at base, lateral oblique at base, margin ciliate, apex mucronate, glabrous on both surfaces, except on veins, dorsally gland-dotted; glands orange-red; petiolules 2–7 mm long, hairy, glandular. Inflorescences axillary racemes; racemes 2–5 in cluster, shorter than petiole. Flowers 9–10 mm long, pedicellate, bracteate; pedicels 2–3 mm long, hairy; bracts 3–3.5 × 1–1.5 mm, ovate to lanceolate, acuminate at apex, many nerved, hairy, gland-dotted. Calyx 5–5.5 mm long, hairy, gland-dotted; calyx tube 1.5–2 mm long, campanulate, hairy; calyx teeth 5, 4–5 × 1–1.5 mm, lanceolate, subequal, lower one the longest, connate for 1/4 of its length, many nerved, hairy, gland-dotted. Corolla pink with red striations; standard 5–5.5 × 5–5.2 mm, rounded, apex slightly pointed, glabrous, clawed with 2 auricles; claw 1–1.7 mm long; auricles 1 mm or less than 1 mm; wing petals 5–5.5 × 1.5–1.6 mm, oblong; claw 1–1.7 mm long; keel petals 6–6.5 × 2–2.5 mm, falcate, fused at apex at lower side; claw 1.5–2 mm long. Stamens 10, diadelphous (9+1); staminal tube 4–4.5 × 1 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 1.5–1.8 mm long, that of free stamens 6.5–7 mm long. Ovary 2–2.5 × 1 mm, gland-dotted, hairy; ovules 2; styles 4.5–5 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, (10-)12–13 × 5–5.5 mm, beaked, turgid, slightly septate between seeds or not, hairy on margin, densely gland-dotted; beak 1–2 mm long; glands orange-red, withering post maturity. Seeds 2, 3 × 2.5 × 2.5 mm brown, mottled, ellipsoid; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'nana' refers to its dwarf and stunted habit.

Distribution

Asia: India (Chhattisgarh, Madhya Pradesh, Maharashtra, Uttar Pradesh and Uttarakhand).

Flowering and fruiting

October to March-April.

Habitat and ecology

Flemingia nana occurs in deciduous and mixed forests. It is also found in Sal forests. It grows in open areas, roadsides and along dried water streams at an altitude of ca. 100–500 m asl. It grows in association with *Asparagus racemosus* Willd., *Casearia tomentosa* Roxb., *Celastrus paniculatus* Willd., *Curculigo orchioides* Gaertn., *Desmodium gangeticum* (L.) DC., *Diospyros melanoxylon* Roxb., *Hemidesmus indicus* (L.) R.Br.,

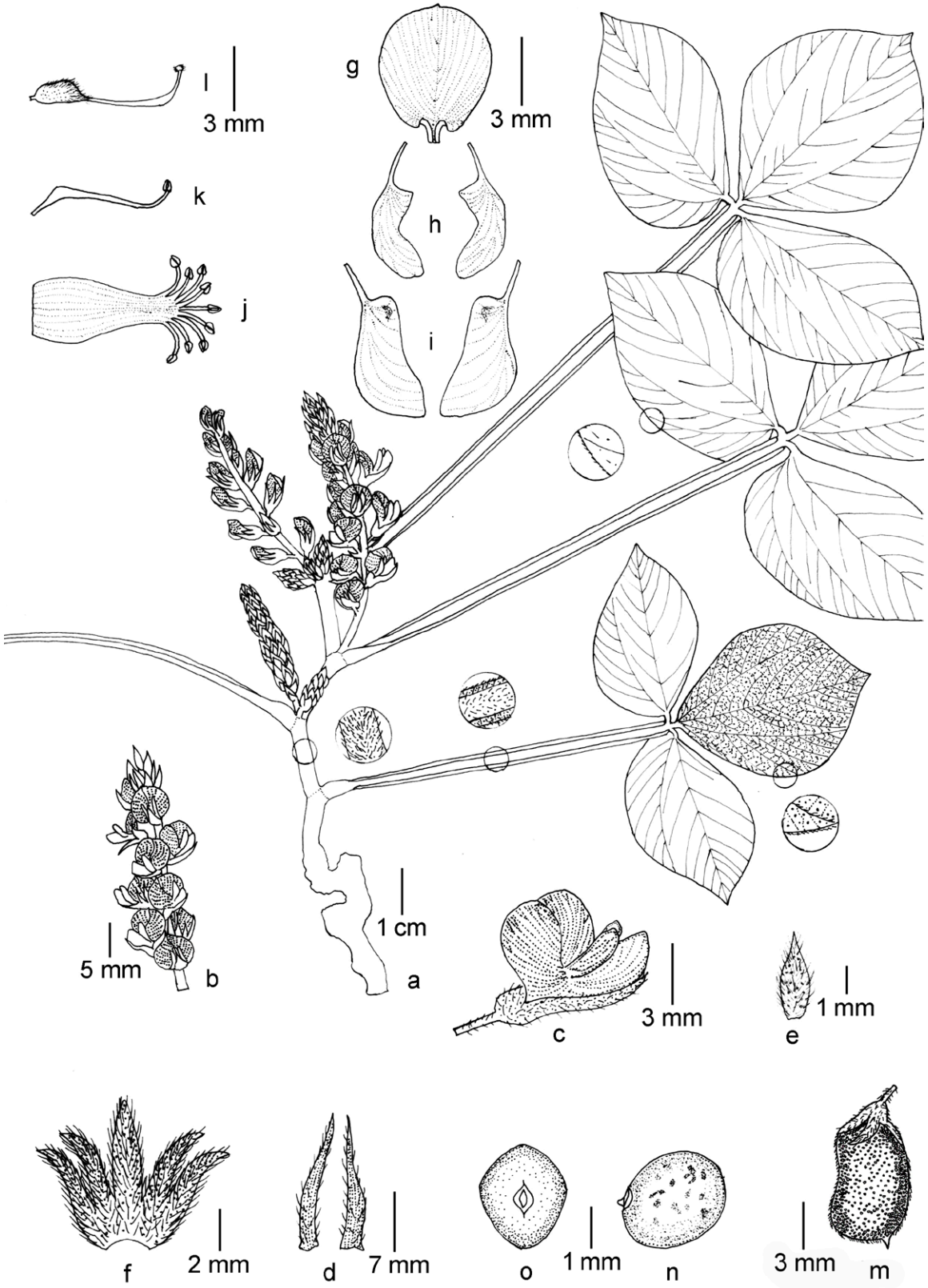


Figure 7. *Flemingia nana* Roxb. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

Hemigraphis hirta T.Anderson, *Lagerstroemia parviflora* Roxb., *Leucas montana* Spreng., *Sida cordifolia* L. and *Tectona grandis* L.f.

Selection of specimens examined

INDIA, Chhattisgarh, Mungeli District, Achanakmar Wildlife Sanctuary, 11 September 2015, *S.K. Gavade & A.P. Tiwari 92* (SUK); Raigarh District, Khondra village, 9 September 2015, *S.K. Gavade & A.P. Tiwari 90* (SUK); 24 October 2016, *S.K. Gavade 148* (SUK); Rajnandgaon district, Lumerkhari, 14 April 1974, *P.C. Pant 2039* (BSA); Karnataka, North Kanara district, 2 April 1884, *W.A. Talbot 960* (K); Madhya Pradesh, Balaghat district, Paraswada, 21 January 1991, *B. Lal 8938* (NBRI); Hoshangabad District, Bori-Satpura Tiger Reserve, January 2004, *Sarnam Singh 103796* (BSD); Khandawa district, Sundardev forest, 2 January 2016, *S.K. Gavade & M. Shaikh 122* (SUK); Mandla district, Kanha Tiger Reserve, November 2003, *Sarnam Singh 103600*; Umaria district, Bandhavgarh National Park, March 2004, *Surendra Singh 105655* (BSA); Maharashtra, Chandrapur district, Torgaon, 26 December 2014, *S.K. Gavade & V. Kahalkar s.n.* (SUK); 26 January 2015, *S.K. Gavade 10* (SUK); 14 February 2016, *S.K. Gavade 126* (SUK); Uttar Pradesh, Chitrakoot district, 14 November 1957, *M.A. Rao 3747* (BSD); Lakhimpur Kheri district, 20 April 1998, *Inayat Khan 21507* (CAL); Uttarakhand, Lucknow district, Kishanpur Wildlife Sanctuary, 14 May 2017, *S.K. Gavade & H. Singh 193* (SUK); Nainital district, Ramnagar, 21 April 1958, *M.A. Rao 5294*; *M.A. Rao 2304* (BSD); on the way Seljam to Lalkua, 28 April 1958, *M. A. Rao 5425* (BSD).

Affinities

Flemingia nana is very distinct from all other *Flemingia* species in having a dwarf suffruticose habit, broadly obovate leaves, petiole longer than leaflets. Leaves of the species fall down post fruiting.

Taxonomic note

Flemingia nana is a very distinct species. It was validly published by Aiton (1812) in Hortus Kewensis. Baker (1876) treated *Flemingia nana* as a variety under *F. congesta* (≡ *F. macrophylla*), i.e. *F. congesta* var. *nana* Baker. Almeida (1998) also treated *Flemingia nana* a variety under *F. macrophylla*, i.e., *F. macrophylla* var. *nana*. However, many botanists (Prain 1897; Cooke 1902; Talbot 1909; Mukerjee 1953) agreed with Roxburgh and recognized *Flemingia nana* as a distinct species. We also treat *F. nana* at specific rank.

Nomenclatural notes

In search of type specimens we found only one sheet, having Wallich Catalogue Number 5748a at K (K-W001121998), collected by Roxburgh (Wallich 1831) having Roxburgh's handwriting as '*Hedysarum brevis*'. However, the sheet bears only a stem with many fruits. It lacks the long petiole and obovate middle leaflet, characteristic of *F. nana*. Hence, the specimen is not showing good characters. Roxburgh's drawing number 1622 from Flora Indica was, therefore, designated lectotype (Gavade et al. 2016b) as it depicts the diagnostic characters of the species mentioned in the protologue.

Flemingia parviflora Benth., Fl. Austral. 2: 269. 1864 (Figures 8, 23h, 24g, 25g and 26g).

Type: Australia, Queensland, Brisbane River, August 1855, *F. Mueller, s.n.* (lectotype designated here, K); Australia, Queensland, Brisbane River, July 1855, *F. Mueller, s.n.* (syntype, MEL54414); On the road to Mount Elliot, *J. Dallachy, s.n.* (syntypes, K, MEL54415); Shoal water Bay, 26 August 1802, *R. Brown 4140* (syntypes, BM000810777, BRI-AQ0425022, NT and K), Burdekin river, s.d., *E.M. Bowman s.n.* (syntype, MEL54417); Lynedoch valley (Lynd River), May 1845, *F.W.L. Leichhardt s.n.* (syntype, MEL54416).

(≡) *Maughania parviflora* Kuntze, Revis. Gen. Pl. 1: 199. 1891.

Description

Erect shrubs, up to 30-45 cm tall, with branched stem; stems 3–4 mm in diameter, young triangular, mature terete, hairy, hairs silky, antrorse. Leaves digitately trifoliolate, 10–20 cm long, stipulate, petiolate; stipules 2, 7–10 × 1.5–2 mm, persistent, separate, lanceolate, acuminate with equal tips, falcate, basifixed, many nerved, hairy; petioles 3–5 cm long, grooved, gland-dotted, hairy; leaflets 3, 6–14 × 2–2.8 cm, linear to lanceolate, acuminate at apex, the central cuneate at base, lateral oblique at base, margin ciliate, apex mucronate, hairy on both surfaces, densely hairy on veins, dorsally gland-dotted; glands black; petiolules 1–2 mm long, hairy, gland-dotted. Inflorescences an axillary or terminal raceme; racemes solitary, 1.8–2 cm long, shorter than the petiole. Flowers 1–1.2 cm long, pedicellate, bracteate; pedicels 2–2.5 mm long, hairy; bracts 2–2.5 × 1–1.2 mm, ovate to lanceolate, acuminate at apex, many nerved, hairy, gland-dotted. Calyx 9–10 mm long, hairy, gland-dotted; calyx tube 1.5–2 mm long, campanulate, hairy; calyx teeth 5, 4.5–8 × 0.8–1 mm, lanceolate, subequal,

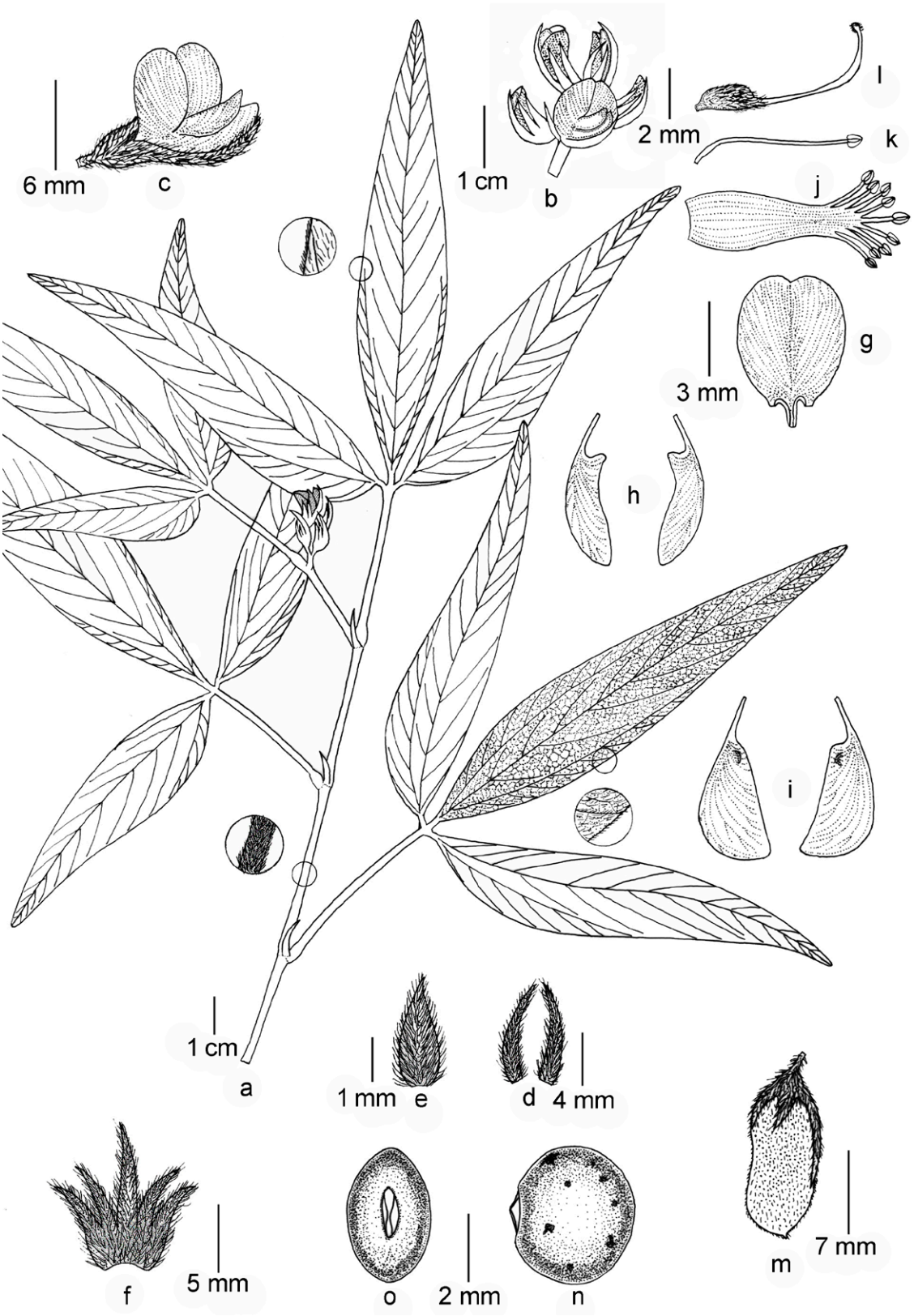


Figure 8. *Flemingia parviflora* Benth. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

lower one the longest, connate for 1/5 of its length, hairy, many nerved, gland-dotted. Corolla pink with purple striations; standard 6–6.5 × 5–5.5 mm, rounded, apex retuse, glabrous, clawed with 2 auricles; claw 1.2–1.5 mm long, auricled; auricles 1 mm or less than 1 mm; wing petals 6–6.2 × 1.5–1.8 mm, oblong, slightly falcate; claw 1.8–2 mm long; keel petals 6.8–7 × 2.5–3 mm, boat-shaped, fused at apex at lower side; claw 1.8–2 mm long. Stamens 10, diadelphous (9+1); staminal tube 4.8–5 × 1 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 1–2 mm long, that of free stamens 6–6.2 mm long. Ovary 1.8–2 × 0.8–0.1 mm, gland-dotted, hairy; ovules 2; style 5.2–5.5 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 12–14 × 4–5 mm, beaked, turgid, slightly septate between seeds or not, hairy, sparsely gland-dotted; beak 0.5 mm long; glands black, withering post maturity. Seeds 2, 3.8 × 3.5 × 2.5 mm, brown, mottled, shiny, rounded; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'parviflora' refers to small-sized flowers of the species.

Distribution

Flemingia parviflora was known from Northern Australia only (ILDIS 2005). It has not been reported earlier from India. We collected *F. parviflora* from Gadchiroli district, Maharashtra state.

Flowering and fruiting

August to January.

Additional specimens examined

INDIA, Maharashtra, Gadchiroli district, September 2017, *V. Kahalkar s.n.* (SUK).

Affinities

Flemingia parviflora is allied to *F. angustifolia* and *F. prostrata* but differs from them in its habit, long leaflets, large-sized flowers and pods.

Nomenclatural note

While describing *Flemingia parviflora*, Bentham (1864) cited five specimens that were collected by Bowman, Brown, Dallachy, Leichhardt and Mueller from Queensland, Australia. In search of the type specimens we found ten specimens. Four specimens are of Brown (BM000810777, BRI-AQ0425022, NT and K), two of Dallachy (MEL54415 and K), two of Mueller (K and MEL54414) and one each of Bowman (MEL54417), Leichhardt (MEL54416). All these specimens constitute syntypes. As per articles 9.11 and 9.12 of Shenzhen Code (Turland et al. 2018), to narrow down the type to one specimen, MEL54417 is selected and designated here as lectotype.

Flemingia praecox C.B.Clarke ex Prain var. **robusta** (Mukerjee) An. Kumar, Nation. Acad. Sci. Lett. 5(8): 249. 1982

Type: India, Maharashtra, Gadchiroli district, Yenkatapur, 19 January 1890, *J.F. Duthie 9408* (lectotype designated here, DD!; isolectotype DD!). Syntypes: India, Maharashtra, Thana district, Thana forest, s.d., *L.J. Sedgwick & T.R.D. Bell 3634* (BLAT) (not found).

Bennet, J. Econ. Taxon. Bot. 4(2): 592. 1983; Sanjappa, Legumes of India 178. 1992; Pullaiah & Chennaiah, Fl. Andhra Pradesh 1: 282. 1997. (Figures 9, 23i, 24h, 25h and 26h).

(≡) *Maughania praecox* var. *robusta* Mukerjee, Bull. Bot. Soc. Bengal 6(1): 15. 1953. (*Moghania praecox* var. *robusta*).

Description

Erect shrubs, up to 1–3 m tall, with branched stem; stems 8–10 mm in diameter, young triangular, mature terete, hairy. Leaves digitately trifoliolate, 30–35 cm long, stipulate, petiolate; stipules 2, 18–20 × 2.5–3 mm, lanceolate, acuminate with equal tips, fused when young, splitting at maturity, caducous, basifixed, many nerved, hairy; petioles 4–11 cm long, distinctly winged, gland-dotted, hairy; leaflets 3, 8–24 × 2–4 cm, linear lanceolate, acuminate at apex, the central cuneate at base, lateral oblique at base, margin ciliate, apex mucronate, glabrous on both surfaces, except on veins, dorsally gland-dotted; glands orange-red; petiolules 3–4 mm long, hairy, gland-dotted. Inflorescences an axillary and terminal raceme; racemes solitary, 4–6 cm long, equal or shorter than the petiole. Flowers 9–9.5 mm long, pedicellate, bracteate; pedicels 1.8–2 mm long, hairy; bracts 5–6 × 2–2.5 mm, ovate to lanceolate, acuminate at apex, many nerved, hairy, gland-dotted. Calyx 7–7.5 mm long, hairy, gland-dotted; calyx tube 1.5–2 mm long, campanulate, hairy; calyx teeth 5, 3–5 × 0.8–1 mm, lanceolate, subequal, lower one the longest, connate for 1/3 of its length, many nerved, hairy, gland-dotted. Corolla pale yellow with bluish striations; standard 7–7.5 × 5.2–5.5 mm, rounded, apex blunt, glabrous, clawed with 2 auricles; claw 1–1.5 mm long; auricles 1 mm or less than 1

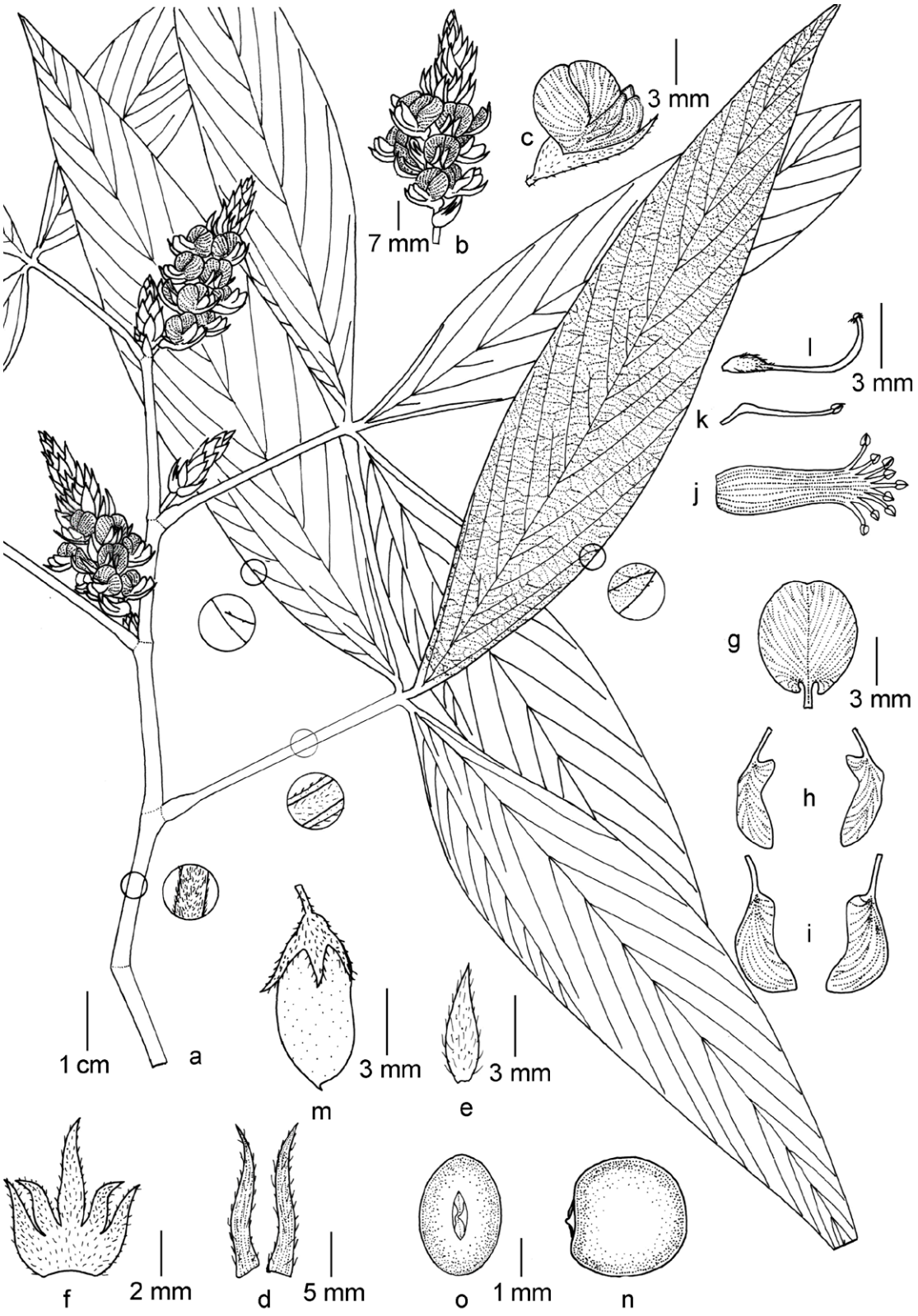


Figure 9. *Flemingia praecox* var. *robusta* (Mukerjee) An. Kumar. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

mm; wing petals 6–6.5 × 1.5–2 mm, oblong, falcate; claw 2–2.2 mm long; keel petals 7–7.2 × 2–2.5 mm, falcate, fused at apex; claw 2–2.2 mm long. Stamens 10, diadelphous (9+1); staminal tube 5–5.5 × 1 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 1–1.5 mm long, that of free stamens 6–6.5 mm long. Ovary 1.5–1.8 × 0.5–0.8 mm, gland-dotted, hairy; ovules 2; style 5.5–6 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 12–13 × 6–7 mm, beaked, turgid, slightly septate between seeds or not, hairy, sparsely gland-dotted; beak 1 mm long; glands black, withering post maturity. Seeds 2, 3 × 3 × 2.5 mm, brown, mottled, shiny, rounded; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'praecox' refers to the flowering that occurs before the appearance of leaves and the varietal epithet 'robusta' refers to its stout habit.

Distribution

Asia: India (Andhra Pradesh, Chhattisgarh, Gujarat, Madhya Pradesh and Uttar Pradesh).

Flowering and fruiting

February to March.

Habitat and ecology

Flemingia praecox var. *robusta* is found along the streams in semi evergreen forests at low altitude of ca. 100–250 m asl. It grows in association with *Barleria cristata* L., *Buchanania cochinchinensis* (Lour.) M.R.Almeida, *Dalbergia paniculata* Roxb., *Cassia fistula* L., *Dendrocalamus strictus* Nees, *Dioscorea bulbifera* L., *Mallotus philippensis* (Lam.) Mull.Arg., *Saccopetalum tomentosum* Hook.f. & Thomson, *Triumfetta rotundifolia* Lam. and *Ventilago madraspatana* Gaertn.

Selection of specimens examined

INDIA, Andhra Pradesh, East Godavari district, Marudranalli, 21 February 1956, *S.K. Wagh 1638* (BLAT); *S.K. Wagh 1639* (BLAT); *S.K. Wagh 1640* (BLAT); *S.K. Wagh 1664* (BLAT); West Godavari district, Roy Gudem, 19 February 1987, *D. Narasimhan 85505* (BSID); Gujarat, Dang district, Pimpari, 30 December 1957, *R. Asrana 5394* (BLAT); Waghai, 11 February 1956, *D.P. Panthaki 2513a* (BLAT); Vadodara district, Baroda, Botanical garden and arboretum, The Maharaja Sayajirao University, 30 January 2017, *R.J. Desai s.n.* (SUK); 25 February 2017, *K.S. Rajput s.n.* (SUK); Chhattisgarh, Bastar district, Darba, 11 February 1961, *N.P. Balakrishnan & A.N. Henry 12066* (MH); Kotumsar, 19 February 1963, *G. Panigrahi & C.M. Arora 1113* (BSA); Madhya Pradesh, Khandwa district, Dhama, 2 January 2016, *S.K. Gavade & M. Shaikh 212* (SUK); Uttar Pradesh, Chandauli district, Chakiya forest, 11 February 1959, *M.A. Rau 8230* (BSD).

Affinities

Flemingia praecox var. *robusta* is allied to *F. praecox* var. *praecox* but differs from it in its large leaflets and robust habit.

Taxonomic note

Flemingia praecox var. *robusta* is a distinct variety described by Mukerjee (1953) based on the collection made by Duthie, Sedgwick and Bell from Maharashtra.

Mukherjee (1993) reported *Flemingia praecox* var. *praecox* from Bastar in the Flora of Madhya Pradesh. However, he did not provide any specimen details. Thorough examination of specimens at BSA and other Indian herbaria did not lead to the tracing of any specimen of *F. praecox* var. *praecox*. Hence, we are of the opinion that *F. praecox* var. *praecox* may not be occurring in India. The type of var. *praecox* is reported from Chittagong, Bangladesh.

Nomenclatural notes

Flemingia praecox var. *robusta* was described by Mukerjee (1953) from Peninsular India. He cited Chanda, Yenkatapur, *J.F. Duthie 9408 A* 'Type in Herb. CAL'. We could not locate the type specimen at CAL. However, we could locate two specimens labeled as *Duthie 9408* at DD. These specimens serve as isotypes. Of these specimens, one is selected designated as lectotype as per articles 9.11 and 9.12 of Shenzhen Code (Turland et al. 2018). Mukerjee also mentioned that the specimen 3634 was collected by Sedgwick & Bell from Thana forest. However, this specimen could not be located at CAL or any Indian herbaria.

Flemingia procumbens Roxb., Fl. Ind. 3: 338. 1832; Wight, Icon. Pl. Ind. Orient. 2(1): 9, t. 408. 1843

Type: flowering specimen in Roxburgh drawing number 1893 (K image!, lectotype designated by Gavade et al. 2016b: 74).

Benth. in Miquel, Pl. Jungh. 2: 245. 1852; Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69(2): 442. 1897. Sanjappa, Legumes of India 178. 1992. (Figures 10, 23j, 24i, 25i and 26i).

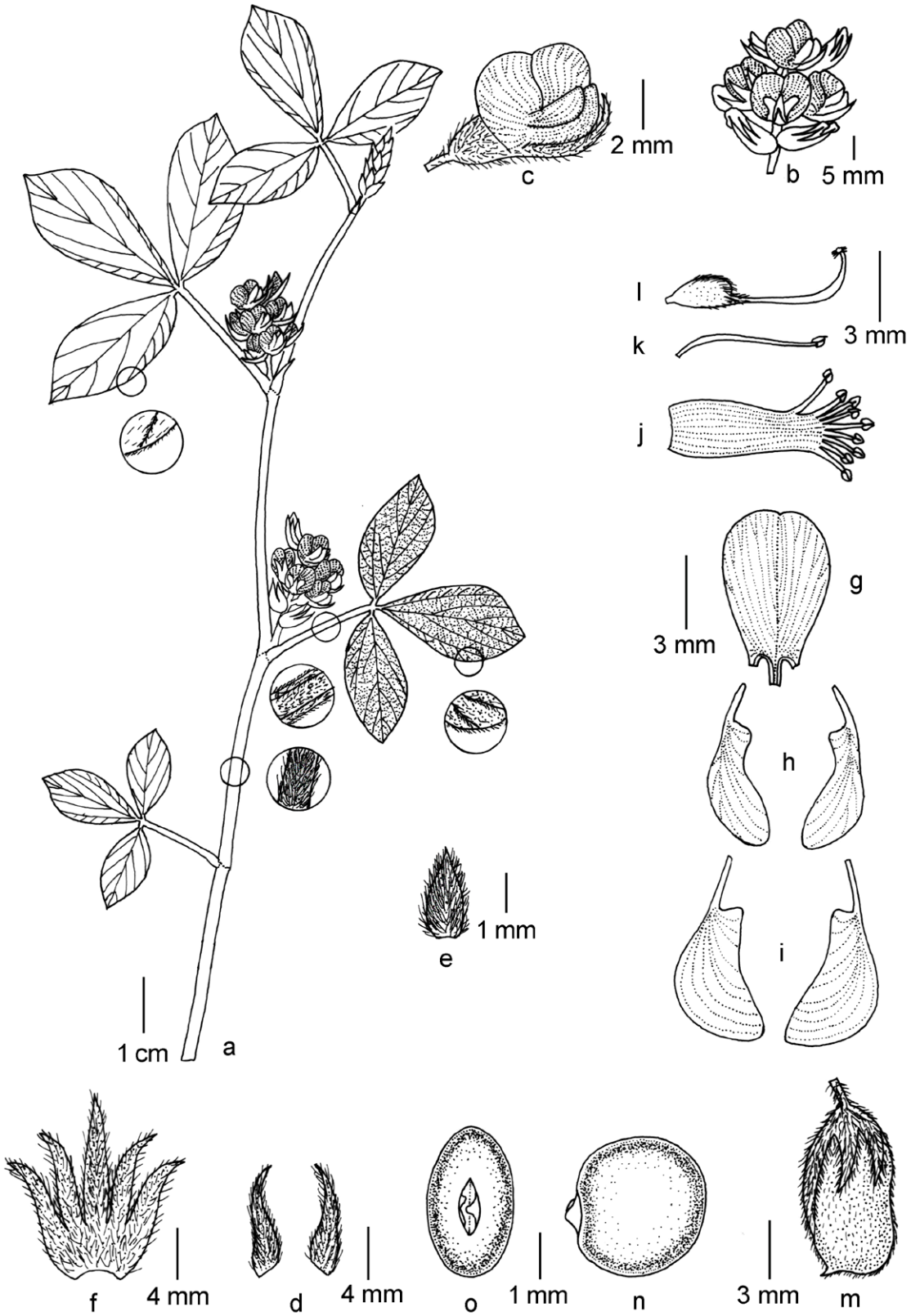


Figure 10. *Flemingia procumbens* Roxb. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

(≡) *Maughania procumbens* (Roxb.) Mukerjee, Bull. Bot. Soc. Bengal 6(1): 20. 1953 (as *Moghania procumbens*).

Description

Procumbent shrubs, up to 30–45 cm long, branched; stems 2–3 mm in diameter, young triangular, mature terete, hairy; hairs silky, antrorse. Leaves digitately trifoliolate, 7.4–8.6 cm long, stipulate, petiolate; stipules 2, 7–8 × 1–1.5 mm, lanceolate, acuminate with equal tips, fused when young, splitting at maturity, persistent, basifixed, many nerved, hairy; petioles 2–3 cm long, winged, gland-dotted, hairy; leaflets 3, 4.9–5.4 × 2.1–2.4 cm, obovate, acute or acuminate at apex, the central cuneate at base, lateral oblique at base, margin ciliate, hairy on both ventral surfaces; dorsally glabrous, densely hairy on nerves, gland-dotted; glands orange-red; petiolules 2–3 mm long, hairy, gland-dotted. Inflorescences an axillary, solitary raceme; racemes 3–5.5 mm long, longer than the petiole. Flowers 8–9 mm long, pedicellate, bracteate; pedicels 2–2.2 mm long, hairy; bracts 2.2–2 × 1.2–2 mm, ovate to lanceolate, acuminate at apex, many nerved, hairy, gland-dotted. Calyx 7–7.5 mm long, hairy, gland-dotted; calyx tube 1.2–1.5 mm long, campanulate, hairy; calyx teeth 5, 6.2–6.5 × 0.8–1 mm, lanceolate, subequal, lower one the longest, connate for 1/6 of its length, many nerved, hairy, gland-dotted. Corolla whitish pink with pink striations; standards 6–7 × 3.5–4 mm, narrowly cordate, apex retuse, glabrous, clawed with 2 auricles; claw 0.8–1 mm long, auricled; auricles 1 mm or less than 2 mm; wing petals 5–6 × 1.2–1.5 mm, falcate; claw 1.8–2 mm long; keel petals 6–6.5 × 2–2.2 mm, slightly falcate, fused at apex at lower side; claw 2–2.5 mm long. Stamens 10, diadelphous (9+1); staminal tube 4.5–5 × 1 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 1–1.5 mm long, that of free stamens 6–6.5 mm long. Ovary 2–2.2 × 1.2–1.5 mm, gland-dotted, hairy; ovules 2; style 4.8–5 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 10–12 × 4.5–5 mm, beaked, turgid, slightly septate between seeds or not, densely hairy, densely gland-dotted; beak 1 mm long; glands orange-red, withering post maturity. Seeds 2, 3.5 × 3.5 × 2.5 mm brown, mottled, shiny, rounded; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'procumbens' refers to its procumbent habit.

Distribution

Asia: India (Assam and Uttar Pradesh).

Flowering & fruiting

April to May.

Habitat and ecology

Flemingia procumbens is found growing in Sal forests in shady places. It occasionally occurs in grasslands at low altitudes of ca. 150–200 m asl. It grows in association with *Bridelia retusa* (L.) A.Juss., *Crotalaria* species, *Desmodium triflorum* (L.) DC., *Hemidesmus indicus* (L.) R.Br. ex Schult., *Grewia asiatica* L., *Sida cordata* (Burm.f.) Borss.Waalk., *Shorea robusta* C.F.Gaertn. and *Trichodesma zeylanicum* (Burm.f.) R.Br.

Selection of specimens examined

INDIA, Assam, Brahmaputra plains, *S. Kurz s.n.* (CAL); Uttar Pradesh, Nepal frontier district, Morkatwa, 26 April 1900, Inayat Khan 23620 (LY); Bahraich district, Nand nala, 15 April 1900, *Inayat Khan 23620a* (DD); Gorakhpur district, Chanmokha, 3 April 1898, *Harsukh 21515a* (CAL); 10 & 17 April 1898, *Inayat Khan 21515* (DD, K leg. *Duthie*); 17 April 1898, *Harsukh 21515b* (CAL, DD); Lucknow district, Chandan Chowki, 23 April 1964, *C.L. Malhotra 31545* (BSD); Kishanpur Wildlife Sanctuary, 14 May 2017, *S.K. Gavade & H. Singh 192* (SUK); Lakhimpur Kheri district, Ambara, 10 April 1898, *Inayat Khan 21515* (DD); Dudhwa National Park, April 1985, *L.A. Rodgaro 3875* (WII).

Affinities

Flemingia procumbens shows close resemblance to *F. lineata* but differs from it in its prostrate habit, rather herbaceous branches sprouting from a woody rootstock, having a solitary raceme, hairy leaflets on ventral side, with acute or acuminate apex and orange-red coloured glands on pod.

Taxonomic note

Flemingia procumbens is a distinct species, rarely found.

Nomenclatural notes

The binomial *Flemingia procumbens* was first proposed by Roxburgh in Flora Indica (1832). Wight (1846) used the same name for his plant that was collected from Nilgiri hills. This plant was totally different from Roxburgh's plant. Wight (1846) realized his mistake and corrected the error and spelled the name as *Flemingia neilgherrensis* on a slip that is attached with the type sheets of *F. nilgheriensis* (Cooke 1902).

While describing *Flemingia procumbens*, Roxburgh stated that this plant is native of the mountains of north

of Oude and Rohilcund (now a part of Uttar Pradesh state, India). The protologue does not indicate the type. We could not trace any original specimens of Roxburgh in the relevant herbaria; however, the flowering specimen in Roxburgh's drawing number 1893 from Flora Indica tallies well with characters mentioned in the protologue such as "procumbent, middle leaflet obovate, raceme axillary usually single and about the length of leaf, legumes oval, besprinkled with garnet-coloured glands". In order to fix the application of the name, this illustration was selected as the lectotype.

Flemingia prostrata Roxb. Junior ex Roxb., Fl. Ind. 3: 338. 1832

Type: flowering specimen in Roxburgh drawing number. 1894 (K image!, lectotype designated by Do et al. 2018). Syntype: India, s.d., *s.coll. s.n., Wallich Catalogue Number 5749b* (K-W001122001).

Benth. in Miquel, Pl. Jungh. 2: 245. 1852; Kurz, Forest Fl. Burma 2: 374. 1877; Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69(2): 440. 1897. Prain, Bengal Pl. 1:378. 1903; Haines, Bihar Orissa 3: 269. 1922; Sa Ren & Gilbert, Fl. China 10: 232-237. 2010. (Figures 11, 23k, 24j, 25j and 26j).

(=) *Flemingia lamontii* Hance, J. Bot. 16: 10. 1878
Type: China, West River, prov. Cantonensis, May 1875, *J. Lamont 19479* (BM000958665 image!).

(=) *Flemingia philippinensis* Merr. & Rolfe, Philipp. J. Sci., C 3: 103. 1908
Type: Philippines, District of Lepanto, Luzon, November 1905, *E.D. Merrill 4460* (P00709073 image!).

(≡) *Maughania prostrata* (Roxb. Junior ex Roxb.) Mukerjee, Bull. Bot. Soc. Bengal 6(1): 19. 1953 (as *Moghania prostrata*)

Flemingia prostrata Roxb., Hort. Bengal. 56. 1814, *nom. nud.*

Description

Prostrate shrubs, branched stems up to 0.5–1 m long, 3–4 mm in diameter, young triangular, mature terete, hairy; hairs silky, antrorse. Leaves digitately trifoliolate, 7–12 cm long, stipulate, petiolate; stipules 2, 7–9 × 1.5–2 mm, lanceolate, acuminate with equal tips, falcate, fused when young, splitting at maturity, persistent, basifixed, many nerved, hairy; petioles 2.8–5.2 cm long, grooved, gland-dotted, hairy; leaflets 3, 4–8 × 2–3 cm, oblong lanceolate, acute or obtuse at apex, the central cuneate at base, lateral oblique at base, margin ciliate, apex mucronate, hairy on both surfaces, densely hairy on veins, dorsally gland-dotted; glands orange-red; petiolules 1–2 mm long, hairy, gland-dotted. Inflorescences an axillary and terminal raceme; racemes 1–2 in cluster, 2–5 cm long, equal or shorter than the petiole. Flowers 9–10 mm long, pedicellate, bracteate; pedicels 2–2.5 mm long, hairy; bracts 4–5.5 × 1.5–2.5 mm, ovate to lanceolate, acuminate at apex, many nerved, hairy, gland-dotted. Calyx 9–10 mm long, hairy, gland-dotted; calyx tube 1.5–2 mm long, campanulate, hairy; calyx teeth 5, 7–7.5 × 0.8–1 mm, subequal, lower one the longest, lanceolate, connate for 1/5 of its length, hairy, many nerved, gland-dotted. Corolla whitish pink with pink striations; standard 5–6.5 × 5–5.5 mm, rounded, apex blunt, glabrous, clawed with 2 auricles; claw 1–1.5 mm long; auricles 1 mm or less than 1 mm; wing petals 5.5–6 × 1.5–2 mm, oblong, falcate; claw 1.5–2 mm long, auricled; keel petals 6–6.5 × 2.5–3 mm, boat shaped, fused at apex; claw 1.5–2 mm long. Stamens 10, diadelphous (9+1); staminal tube 4–5 × 1 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 1–2 mm long, that of free stamens 5.5–6 mm long. Ovary 1.8–2 × 0.8–1 mm, gland-dotted, hairy; ovules 2; style 5–5.5 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 11–12 × 4–4.5 mm, beaked, turgid, slightly septate between seeds or not, hairy, sparsely gland-dotted; beak 0.5–0.8 mm long; glands orange or black, withering post maturity. Seeds 2, 2.8 × 2.8 × 2 mm, brown, mottled, shiny, rounded; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'prostrata' refers to the prostrate habit of this species.

Distribution

India (Andhra Pradesh, Assam, Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Jharkhand, Madhya Pradesh, Meghalaya, Odisha, Punjab, Tripura, Uttar Pradesh and Uttarakhand), Bangladesh, China (Hupeh, Kiangsi, Kwangtung, Kweichow, Sechuan, Yunnan), Myanmar, Ryukyu Islands, Taiwan, Thailand, Vietnam.

Flowering and fruiting

January to July.

Habitat and ecology

Flemingia prostrata is found on open grassy hill slopes as well as in *Pinus* forests at high altitude of

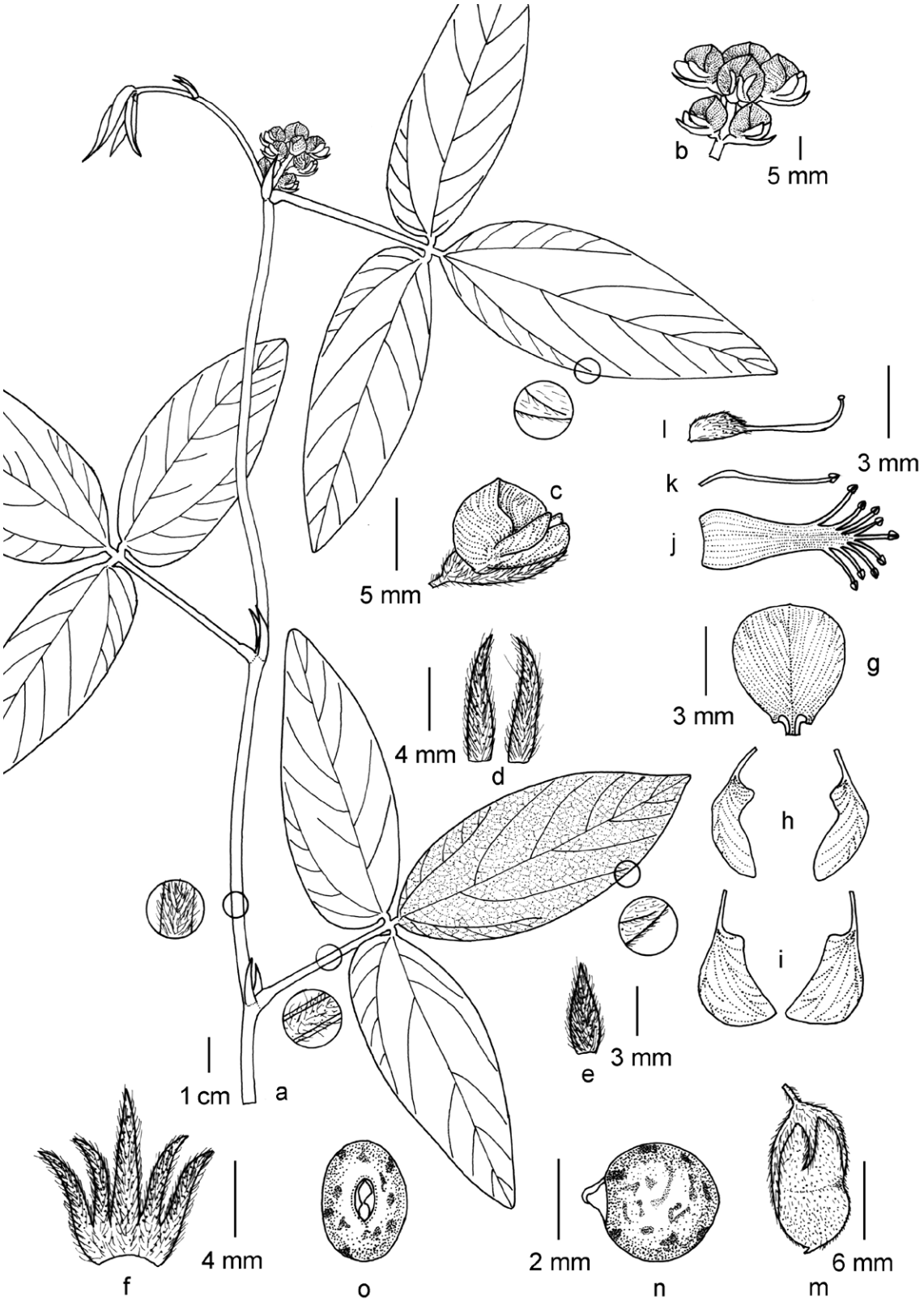


Figure 11. *Flemingia prostrata* Roxb. Junior ex Roxb. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

ca.1400–1600 m asl, elsewhere from 100-1930 m. It grows in association with *Ageratum conyzoides* L., *Crotalaria pallida* Aiton, *Pinus kesiya* Royle ex Gordon, *Themeda* species and *Thysanolaena* species.

Selection of specimens examined

INDIA, Sukhanaghar, *F. Buchanan-Hamilton s.n., Wallich Catalogue Number 5749a* (K001122000); Andhra Pradesh, Visakhapatnam district, Araku Valley, 15 September 1961, *N.P. Balakrishnan 825* (CAL); *N.P. Balakrishnan 572* (CAL); Assam, 23 October 1955, *R.S. Rao 1476* (ASSAM); Kamrup district, Lukikhas forest, 26 June 1964, *A.S. Rao 39120* (ASSAM); Bihar, Champaran district, Manguraha forest, 12 April 1963, *K. Thothathri 10041* (CAL); Naurangia, 12 September 1965, *S.P. Banerjee 452* (CAL); Chhattisgarh, Raigarh district, Dharamjaigarh, 24 December 1964, *C.M. Arora 7210* (BSA, CAL); Haryana, Yamuna Nagar district, Kalesar forest reserve, 28 December 1919, *R.N. Parker s.n.* (BSD); 29 December 1919, *R.N. Parker s.n.* (DD); Himachal Pradesh, Shimla district, near Shimla, 11 October 1984, *P.K. Hajara 76811* (BSD); Jharkhand, Giridih district, Nimiaghat, 18 October 1982, *G.N. Tribedi 726* (BSA); Madhya Pradesh, Hoshangabad district, on the way Madai to Pachmarhi, 3 May 2001, *B.K. Sinha 54459* (BSA); Jabalpur, Kisti, 14 April 1983, *J. Lal & A. Kumar 34699* (BSA); Meghalaya, East Khasi Hills district, s.d., *G. Mann s.n.* (ASSAM); West Jaintia Hills, on the way to Jowai, 22 November 1969, *N.P. Balakrishnan 50128* (ASSAM); on the way to Jowai to Shangpung, 8 November 1938, *G.R. Deka 17509* (ASSAM); Odisha, Maharajganj district, Domakhand, 24 January 1968, *J.K. Maheshwari 81544* (LWG). Punjab, Hoshiarpur district, 19 July 1971, *O.P. Misra 44605* (BSD); Jawar, 6 September 1970, *O.P. Misra 41734* (BSD); Tripura, West Tripura, Agartala, 26 August 1957, *D.B. Deb 1022* (CAL); Uttar Pradesh, Allahabad district, Lehari, 1 November 1963, *C.M. Arora 1432* (BSA); Bahraich district, Abdullah Ganj, 5 July 1954, *V. Chandra & party 11943* (LWG); 28 November 1954, *P. Singh 16590* (LWG); 17 November 1964, *G. Panigrahi & C.M. Arora s.n.* (CAL); Chakiya forest block, 11 February 1959, *M.A. Rau 8230* (BSA); Murthia gate, 12 March 1964, *G. Panigrahi & C.M. Arora 2888* (CAL); Nishan Gara, 20 November 1964, *G. Panigrahi & C.M. Arora 6458* (BSA); on the way to Sujauli to Dharampur, 20 November 1964, *G. Panigrahi & C.M. Arora 6458* (CAL); Balrampur district, Sohelura, 16 October 2005, *K.K. Khanna 48086* (BSA); 17 October 2005, *K.K. Khanna 54956* (BSA); Gonda district, Balrampur, February 1898, *Inayat Khan 20964* (DD); Kushinagar district, Mathauli, 15 April 1992, *S.L. Kapoor 57* (LWG); Suhelwa Wildlife Sanctuary, 29 November 1954, *G.S. Srivastava 16684* (LWG); *G. Saran & Party 16684* (LWG); Lakhimpur Kheri district, 5 June 1900, I*nayat Khan 23619* (DD); 4 April 1898, *Inayat Khan 21510a* (DD); Daibhor, 23 April 1898, *Harsukh 21509* (DD); Dudhwa National Park, near Salukapur rest house, 20 October 1994, *B.P. Uniyal 88935* (BSD); Gola, 4 April 1898, *Inayat Khan 21510* (DD); Gola camp number 2, 7 May 2006, *B.K. Shukla 65978* (BSA); Mailam, 18 April 1964, *C.L. Malhotra 31452* (BSD); Pilibhit district, Bargad, 24 May 1898, *Inayat Khan 21511* (DD); Mala forest, 6 December 1946, *D.D. Avasthi 318* (LWG); Uttarakhand, Rajaji National Park, November 1986, *SSRB 1198* (WII); Almora district, Almora, s.d., *D.D. Avasthi 1258* (LWG); Gairar, 17 October 1975, *J.N. Vohra 57980* (BSD); on the way Almora to Kalmatia, 2 October 1967, *T.A. Rao 4707* (BSD); Dehradun district, Dehradun, December 1956, *T.A. Rao 1239* (BSD); Lachhiwala, 5 October 1922, *K. Ram s.n.* (DD); Mussoorie, November 1995, *W.A. Rodgers 4627* (WII); Rispana, 1 November 1964, *C.R. Babu 34615* (BSD); Thano, December 1935, *N.L. Debverma s.n.* (DD); Timli, 15 October 1949, *S.K. Jain s.n.* (LWG); 24 October 1949, *R. Singh s.n.* (LWG); Chamoli district, Nandaprayag, 26 August 1978, *G. Panigrahi 65413* (BSD); Haridwar district, Dholkhand forest, 7 May 1994, *A. Prakash 214578* (LWG); Nainital district, Ramnagar, 21 April 1958, *M.A. Rau 5282* (BSD); Garhwal division, Pharkot reserve forest, 5 December 1919, *B.B. Osmaston 1133* (DD); Trisul, 20 October 1970, *B.D. Naithani 42275* (BSD); Kumaon division, Baram Gori valley, 24 April 1962, *U.C. Bhattacharya 21221* (BSD); Jim Corbett National Park, 9 November 1970, *P.C. Pant 43085* (BSD); on the way Sarpduli to Dhikala road, 27 November 1972, *K.P. Janardhanan 51232* (BSD); Sitabani, 11 February 1922, *B.B. Osmaston 1188* (DD); Pithoragarh district, Lekghati, 13 October 2013, *M. M. Lekhak s.n.* (SUK); 1 August 2015, *S.K. Gavade & M.M. Lekhak 84* (SUK); 17 June 2016, *S.K. Gavade & M.M. Lekhak s.n.* (SUK); 2 August 2016, *S.K. Gavade & M.M. Lekhak s.n* (SUK); 19 September 2016, *S.K. Gavade & M.M. Lekhak 143* (SUK); 8 July 2017, *S.K. Gavade & M.M. Lekhak 195* (SUK); 6 July 2018, *S.K. Gavade & M.M. Lekhak 214* (SUK); Milankuli, 12 September 1983, *B. Baon 75030* (BSD); Askot, 29 May 1984, *J.F. Duthie 2835* (DD); 3 September 1971, *C.M. Arora 45509* (BSD); Tehri Garhwal district, Tehri, 22 January 1942, *M.B. Raizada 15630* (DD); Udham Singh Nagar district, Khatima, 22 October 1986, *K.K. Singh 5929* (LWG).

Affinities

Flemingia prostrata shows affinities towards *F. angustifolia* but differs from it in its oblong lanceolate leaflets, inflorescence shorter than the petiole and

prostrate habit. The seedlings of *Flemingia praecox* var. *robusta* look similar to those of *F. prostrata*.

Taxonomic note

Flemingia lamontii was described by Hance (1878) from China, while *Flemingia philippinensis* was described by Merrill and Rolfe (1908) from the Philippines. After studying the protologue and types of *F. lamontii* and *F. philippinensis*, it was found that these species are conspecific to *F. prostrata* (see also Sa Ren & Gilbert 2010).

Nomenclatural notes

Do et al. (2018) designated a lectotype for the binomial *Flemingia prostrata*. They selected the flowering specimen in Roxburgh drawing number 1894 as lectotype. The binomial *Flemingia prostrata* was given by Roxburgh Junior, son of Roxburgh and the taxon was described by Roxburgh in 'Flora Indica'. While searching the original material of *F. prostrata* we found a sheet at K (K-W001122001) and a coloured plate. The sheet bears Roxburgh's handwriting as '*Hedysarum* a new, undetermined species' which is filed under *F. capitata* at K. This could have been chosen by Do et al. (2018) as the type.

Flemingia semialata Roxb., in W.T. Aiton, Hortus Kew., ed. 2. 4: 349. 1812

Type: India, without precise locality, s.d., *W. Roxburgh s.n.* (K001121982 image!, lectotype designated by Gavade et al. 2016b: 76; isolectotype BR0000005172993 image!).

Roxb., Pl. Coromandel 3(3): 45. t. 249. 1820; Roxb., Fl. Ind. 3: 340. 1832; Wight & Arnott, Prodr. Fl. Ind. Orient. 1: 241. 1834; Wight, Icon. Pl. Ind. Orient. 2(1): 1, t. 226. 1843; Benth. in Miquel Pl. Jungh. 2: 245. 1852; Kurz, Forest Fl. Burma 2: 374. 1877; Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69(2): 441. 1897; Prain, Bengal Pl. 1: 378. 1903; Haines, Bihar Orissa 3: 269. 1922; Gamble, Fl. Madras 1: 378. 1928; Sanjappa, Legumes of India 178. 1992; Kothari in N.P. Singh et al., Fl. Maharashtra, Dicot. 2: 688. 2001. (Figures 12, 23l, 24k, 25k and 26k).

(≡) *Flemingia congesta* var. *semialata* Baker, in Hook. f., Fl. Brit. India 2: 229. 1876.

(≡) *Maughania semialata* (Roxb.) Mukerjee, Bull. Bot. Soc. Bengal 6(1): 16. 1953. (as *Moghania semialata*).

Flemingia semialata Roxb., Hort. Bengal. 56. 1814, *nom. nud.*

Hedysarum semialatum Roxb., Numer. List n. 5746g. 1831, *nom. nud.*

Description

Erect shrubs, up to 1.2–1.5 m tall, with profusely branched stem; stems 8–10 mm in diameter, young triangular, mature terete, hairy; hairs silky, antrorse. Leaves digitately trifoliolate, 5–22 cm long, stipulate, petiolate; stipules 2, 13–14 × 2–2.5 mm, lanceolate, acuminate with equal tips, fused when young, splitting at maturity, persistent, basifixed, many nerved, hairy; petioles 2–7 cm long, distinctly winged, gland-dotted, hairy; leaflets 3, 3–13 × 2–5.5 cm, broadly lanceolate, the central cuneate at base, lateral oblique at base, margin ciliate, apex mucronate, glabrous on both surfaces, except on veins, dorsally gland-dotted; glands orange-red; petiolules 2–5 mm long, hairy, gland-dotted. Inflorescences axillary and terminally branched racemes; racemes 1–5 per axil. Flowers 10–13 mm long, pedicellate, bracteate; pedicels 1–2 mm long, hairy; bracts 3–3.5 × 1–1.5 mm, ovate to lanceolate, acuminate at apex, many nerved, hairy, gland-dotted. Calyx 9–10 mm long, hairy, gland-dotted; calyx tube 1.5–2 mm long, campanulate, hairy; calyx teeth 5, 3.5–6 × 1–1.5 mm, lanceolate, subequal, lower one the longest, connate for 1/4 of its length, many nerved, hairy, gland-dotted. Corolla pale green with pink striations; standard 9–10 × 7–8 mm, rounded to elliptic, apex retuse, glabrous, clawed with 2 auricles; claw 1.8–2 mm long; auricles 1 mm or less than 1 mm; wing petals 7–8 × 2–2.5 mm, oblong; claw 1.8–2 mm long; keel petals 9–10 × 3–4 mm, falcate, fused at apex at lower side; claw 2.5–3 mm long. Stamens 10, diadelphous (9+1); staminal tube 6.5–7 × 1 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 2–2.5 mm long, that of free stamens 8–9 mm long. Ovary 2–2.5 × 1 mm, gland-dotted, hairy; ovules 2; styles 6–7 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 13–14 × 6–7 mm, beaked, turgid, slightly septate between seeds or not, hairy, sparsely gland-dotted; beak 1 mm long; glands orange-red, withering post maturity. Seeds 2, 3 × 3 × 3 mm black, shiny, rounded; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'semialata' refers to its half or partially winged petiole.

Distribution

Asia: Bangladesh, China (Guangdong, Hongkong, Szechwan, Yunnan), India (Assam, Arunachal Pradesh, Chhattisgarh, Himachal Pradesh, Jammu and Kashmir,

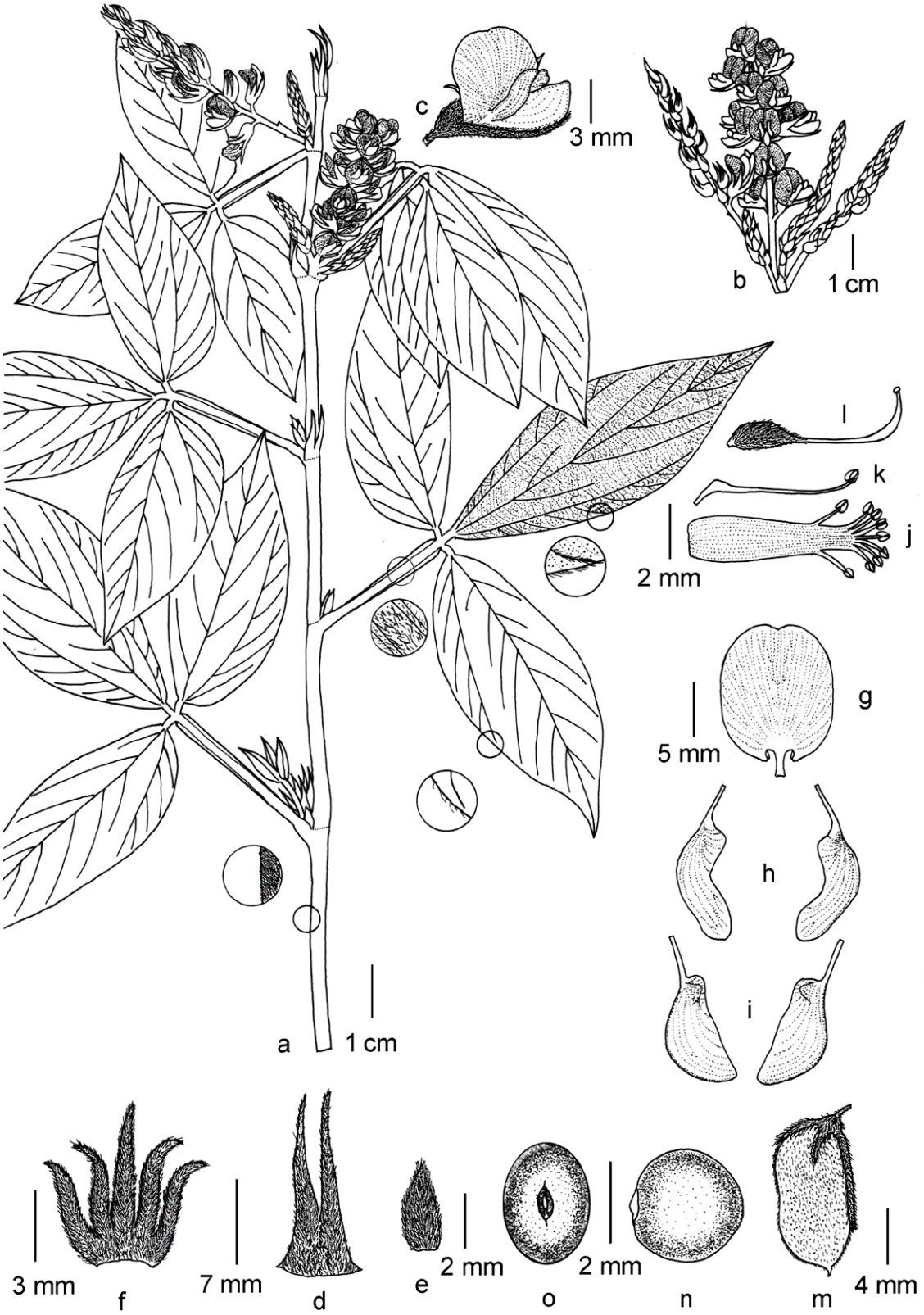


Figure 12. *Flemingia semialata* Roxb. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

Jharkhand, Madhya Pradesh, Meghalaya, Nagaland, Rajasthan, Sikkim, Uttarakhand and West Bengal), Laos, Myanmar, Sri Lanka, Vietnam. Australia: introduced in Queensland. Africa: introduced in PR Congo..

Flowering and fruiting

August to March.

Habitat and ecology

Flemingia semialata occurs in Sal forests. It also grows in moist forests at altitudes of ca. 500–1000 m asl, in Yunnan up to 2600 m asl. It grows in association with *Ageratum conyzoides* L., *Ampelocissus tomentosa* (Roth) Planch., *Ardisia* species, *Bauhinia vahlii* Wight & Arn., *Costus speciosus* (J.Koenig) Sm., *Dioscorea pubera* Blume, *Grewia eriocarpa* Juss., *Millettia extensa* (Benth.) Benth. ex Baker, *Shorea robusta* C.F.Gaertn., *Syzygium cumini* (L.) Skeels, *Urena lobata* L., *Zingiber* species, etc.

Selection of specimens examined

INDIA, Arunachal Pradesh, Anjaw district, Hayuliang, 22 November 1957, *R.S. Rao 10740* (CAL); 25 November 1958, *R.S. Rao 10812* (CAL); Assam, Kamrup district, Lukithan forest, 26 June 1964, *A.S. Rao 39120* (CAL); s.d., *Simons s.n.* (MH); Bihar, Madhubani district, Mailam, 8 December 1960, *C.L. Malhotra 13398* (BSD); Chhattisgarh, Bilaspur District, s.d., *P. Lal 78901* (BSD); Mungeli district, Lamni, 11 September 2015, *S.K. Gavade & A.P. Tiwari 93* (SUK); Eastern Himalaya, Rongsong, 18 November 13, *G.H. Cave s.n.* (CAL); Himachal Pradesh, Kangra district, Baijnath, 23 September 1960, *M.A. Rau 12640* (BSD); Mangland stream, 29 September 1891, *J.H. Lace 1062* (CAL); Mandi district, 25 September 1984, *S.K. Shrivastav 76139* (BSD); Palampur, 20 October 1984, *P.K. Hajara 76928* (BSD); Madhya Pradesh, Anuppur district, Amarkantak, Maa Ki Bagiya area, *S.L. Bondya & A.N. Shukla 62011* (BSA); 28 October 1960, *J.K. Maheshwari 4268* (CAL), *J.K. Maheshwari 4349* (CAL), *J.K. Maheshwari 4348* (CAL); Sonmala, 15 November 1984, Madhukar 7208 (BAMU); *V.N. Naik 7208* (BAMU); Bastar district, Kutumsar, s.d., *A.N. Singh s.n.* (BSA); Hoshangabad District, Bori Wildlife Sanctuary, November 1988, *W.A. Rodgers 7009* (WII); Mandla district, Kanha Tiger Reserve, 12 September 1982, *J. Lal & A. Kumar 33178* (BSA); Meghalaya, East Khasi Hills district, North-Eastern Hill University, 22 December 2016, *S.K. Gavade 154* (SUK); Shillong, Beadon Falls, 16 August 1918, *U. Kanjilal 2428* (ASSAM); Khasi hills, s.d., *D. Griffith 1108* (DD); s.d., *Gustav Mann s.n.* (DD); Shillong, 26 November 1962, *S. Chaterjee 25235* (CAL); 22 December 2016, *S.K. Gavade 200* (SUK); Pyangtong, 5 November 1938, *S.R. Sharma 18222* (ASSAM); West Jaintia Hills, on the way to Jowai, 15 September 1976, *U. Chatterjee & N.C. Soha 13632* (CAL); Sutnga, 19 November 1969, *N.P. Balakrishnan 50016* (CAL); Khasia Hills, s.d., *J.D. Hooker & T. Thomson s.n.* (MH); Jammu and Kashmir, Reasi district, Katra, 19 October 1986, *A. Swami 1033* (BSD); Jharkhand, Giridih district, Parasnath hills, 30 October 1953, *F.H.W. Kerr 2394A* (BM), 9 October 1995, *S.K. Mukerjee 3914* (CAL); on the way to Hazaribagh to Parasnath, 28 December 1906, H.H. Haines 596 (DD); s.d., *Thomson s.n.* (DD); Latehar district, Netarhat, 28 September 1981, *M.K. Manna & U.P. Saradar 1027* (CAL); Nagaland, Kohima, 22 October 1884, *C.B. Clarke 41738* (US); Rajasthan, Udaipur, October 1963, *L.N. Vyas s.n.* (BSD); Sikkim, 15 October 1870, *C.B. Clarke 13170* (CAL), Mongpo, 5 October 1884, *C.B. Clarke 36454 D* (US), Rangeet river, 3 January 1922, *G.H. Cave s.n.* (CAL); Uttarakhand, Almora district, Chiphluwa forest, March 1951, *D.D. Awasthi 1585* (DD); Ranikhet, 4 November 1917, *H.G. Champion s.n.* (DD); Chamoli District, Nandkeshari, 6 October 1963, *U.C. Bhattacharya 31078* (BSD); Tapovan, September 1980, *B.D. Naithani 53757* (BSD); Dehradun district, Chandrabani, 10 October 2015, *S.K. Gavade 107* (SUK); Dehradun, 4 October 1957, *Y. K. Sarin 3436* (BSD); 1881, *Duthie 1538* (DD); September 1882, *Duthie 2515* (DD); behind the bungalow number 09, *R. Dayal 2653* (DD); Bindal Rao, 22 September 1956, *T.A. Rao 944* (BSD); Chandrabani, 10 October 2015, *S.K. Gavade & P.B. Yadav 99* (SUK); s.d., *K.M.M. Dakshini s.n.* (BSD); Karvapani, March 1898, *U. Kanjilal s.n.* (DD); Lachhiwala, 22 September 1989, 9019 (DD); 7 November 1903, *R.S. Hole s.n.* (DD); Mussoorie, s.d., October 1899, *Duthie s.n.* (DD); Mussoorie, Kempty Falls, 9 October 1960, *H.O. Saxena 1393* (DD); near Birpur, September 1939, *M.B. Raizada s.n.* (DD); near Genetic Nursery, 22 September 1972, *H.B. Naithani 3905* (DD); Sahastradhara, 15 September 1962, *S.K. Malhotra 23818* (BSD); Mathurawala, 3 January 1962, *S.K. Malhotra 19158* (BSD); Mohand, October 1984, *V.S. Murty & A.K. Goal 1115* (BSD); Mothronwala swamp, 12 September 1958, *K.M.M. Dakshini 6215* (BSD); Bimdai, 4 September 1964, *C.R. Babu 34038* (BSD); Rajpur, 30 October 1960, *H.O. Saxena 1437* (DD); 10 September 1961, *H.O. Saxena 2204* (DD); Tiri, 22 January 1942, *M.B. Raizada 15636* (DD); Thano, 2 November 1904, *R.S. Hole s.n.* (DD); Wildlife institute campus, 18 September 1993, *Babu & Shyamlal 4965* (WII); Rispana, 20 September 1964, *C.R. Babu 34798* (BSD); Rajaji National Park, 1984, *W.A. Rodgers 3177* (WII); Nainital district, Jim Corbett National Park, on the way to Sultan, 9 October 1980, *P.C. Pant 72414* (BSD); 15 April 1971, *P.C. Pant 43538* (BSD); Ranibagh, 2 December 1980, *U. Singh 743* (BSA); Pauri Garhwal

district, Adwani road, 20 October 1975, *H.B. Naithani 419* (DD); Pithoragarh district, Gori valley, Baramgaon, 27 August 1900, *Inayat Khan 24334* (DD); Lekghati, 13 October 2013, *M.M. Lekhak s.n.* (SUK); 10 August 2015, *S.K. Gavade & M.M. Lekhak s.n.* (SUK); 1 September 2015, *S.K. Gavade & M.M. Lekhak s.n.* (SUK); 20 September 2015, *S.K. Gavade & M.M. Lekhak 95* (SUK); 13 February 2016, *S.K. Gavade & M.M. Lekhak 125* (SUK); Shandev, September 1990, *B. Balodi 79223* (BSD); Dafia Dhura, 29 August 1973, *C.M. Arora 50095* (BSD); 5 September 1973, *C.M. Arora 52404* (BSD); Rudraprayag district, Gaurikund, *K. Ram 8959* (DD); on the way to Phata to Triyuginarayan, 23 September 1958, *M.A. Rau 8520* (BSD); Uttarkashi district, Naitwar, 13 August 1996, *B. Balodi 89748* (BSD); 17 September 1995, *B. Balodi 88607* (BSD); on the way to Mori to Naitwar, 17 September 1995, *S. Singh 89827* (BSD); Uttar Pradesh, Lakhimpur Kheri district, Dudhwa National Park, 29 October 1979, *U. Shukla 69988* (BSD); December 1986, *W.A. Rodgers 5723* (WII); Saharanpur district, Saharanpur, 10 June 1845, *Thomson s.n.* (DD); Shahjahanpur district, Shahjahanpur, 1877, *Duthie s.n.* (DD); Siwaliks, 18 January 1899, *U. Kanjilal s.n.* (DD); West Bengal, Darjeeling district, Darjeeling, 20 September 1875, *J.S. Gamble 509e* (DD); s.d., *J.D. Hooker & T. Thomson s.n.* (MH); East Bengal, s.d., *D. Griffith 1669* (DD).

Affinities

Flemingia semialata shows close affinities towards *F. macrophylla* and *F. sootepensis* but differs from *F. macrophylla* in its branched raceme, which is longer than the leaf petiole, winged petiole and shiny black seeds. It differs from *Flemingia sootepensis* in having sparsely gland-dotted pod and calyx and shiny black seeds.

Taxonomic note

Flemingia semialata was validly published by Aiton (1812) in Hortus Kewensis. Baker (1876) treated *F. semialata* as a variety under *F. congesta* (≡ *F. macrophylla*), i.e. *F. congesta* var. *semialata*. However, many botanists (Wight 1843; Prain 1897; Haines 1922; Gamble 1928; Mukerjee 1953; Sanjappa 1992) agreed with Roxburgh and recognised *Flemingia semialata* as a distinct species. We also keep *F. semialata* at specific rank.

Nomenclatural notes

Roxburgh described *Flemingia semialata* based on the plants that were growing in Calcutta Botanic Garden. The plants were obtained from the seeds sent by Dr. Buchanan from Nepal (Roxburgh 1832). A search for the type revealed four specimens in relevant herbaria, namely at BR (BR0000005172993), K (K-W001121982) and OXF (OXF00006050, OXF00006051). The specimen at BR was purchased by Martius, the founder of Flora Brasiliensis, from Linnean Society of London in 1863 (Forman 1997). The specimen at K (K-W001121982) bearing the Wallich's catalogue number 5746a, was collected by Roxburgh (Wallich 1831). The other two specimens at OXF also bear a stamp as 'Roxburgh', but the annotations are not by Roxburgh. Hence, they have not been considered here as a part of original material. Among the two specimens, the specimen with annotation "*Hedysarum semialatum*, a new species from Napaul" by the original author was chosen as the lectotype (Gavade et al. 2016b). The specimen at BR (BR0000005172993) serves as the isolectotype.

Flemingia sootepensis Craib, Bull. Misc. Inform. Kew 1911(1): 43

Type: Thailand, (formerly Siam). Chiang Mai, Doi Suthep mountain range, 600–900 m, 16 January 1910, *Kerr 934* (K000980302 image!, lectotype designated by Gavade et al. 2017: 283; isolectotype BM000958671 image!, BM000958672 image!, C10021947 image!, CAL!, E00157794 image!, K000980303 image!, K, P00709078 image! and TCD0016124 image!). Syntypes: Thailand (formerly Siam), Chiang Mai, Doi Sootep mountain range, 1 January 1905, *Hosseus 309* (M0168856 image! and P00709079 image!). (Figures 13, 23m, 24l, 25l and 26l).

Description

Erect shrubs, up to 1.5–2 m tall, with branched stem; stems 0.5–1 cm in diam., mature terete, young angled, hairy; hairs white silky. Leaves digitately trifoliolate, 15–29 cm long, stipulate, petiolate; stipules 2, 18–20(-28) × 2–3(-4) mm, lanceolate, acuminate with equal tips, fused when young, separating at maturity, caducous, basifixed, many nerved, hairy; hairs silky, antrorse; petioles 3.5–7 cm long, distinctly winged, gland dotted beneath, hairy; hairs antrorse; leaflets 3, 11.5–21.6 × 2.7–6.5 cm, lanceolate, the central cuneate at base, lateral oblique at base, margin ciliate, apex mucronate, sparsely hairy on ventral surface, dorsally glabrous, except on veins, gland dotted below; glands orange-red when fresh; petiolules 3–6 mm long, hairy, glandular. Inflorescence axillary raceme; racemes up to 3–6 in cluster. Flowers 0.9–1 cm long, pedicellate, bracteate; pedicels 1–2 mm long, hairy; bracts 4-6 × 2 mm, ovate, acute at apex, many nerved, hairy, margin ciliate. Calyx 7–8 mm long, hairy, dotted with glands; calyx tube 1–1.5 mm long, campanulate, hairy; calyx teeth 5, 6–7 × 1–1.5 mm, lanceolate, subequal, connate for 1/4 of its

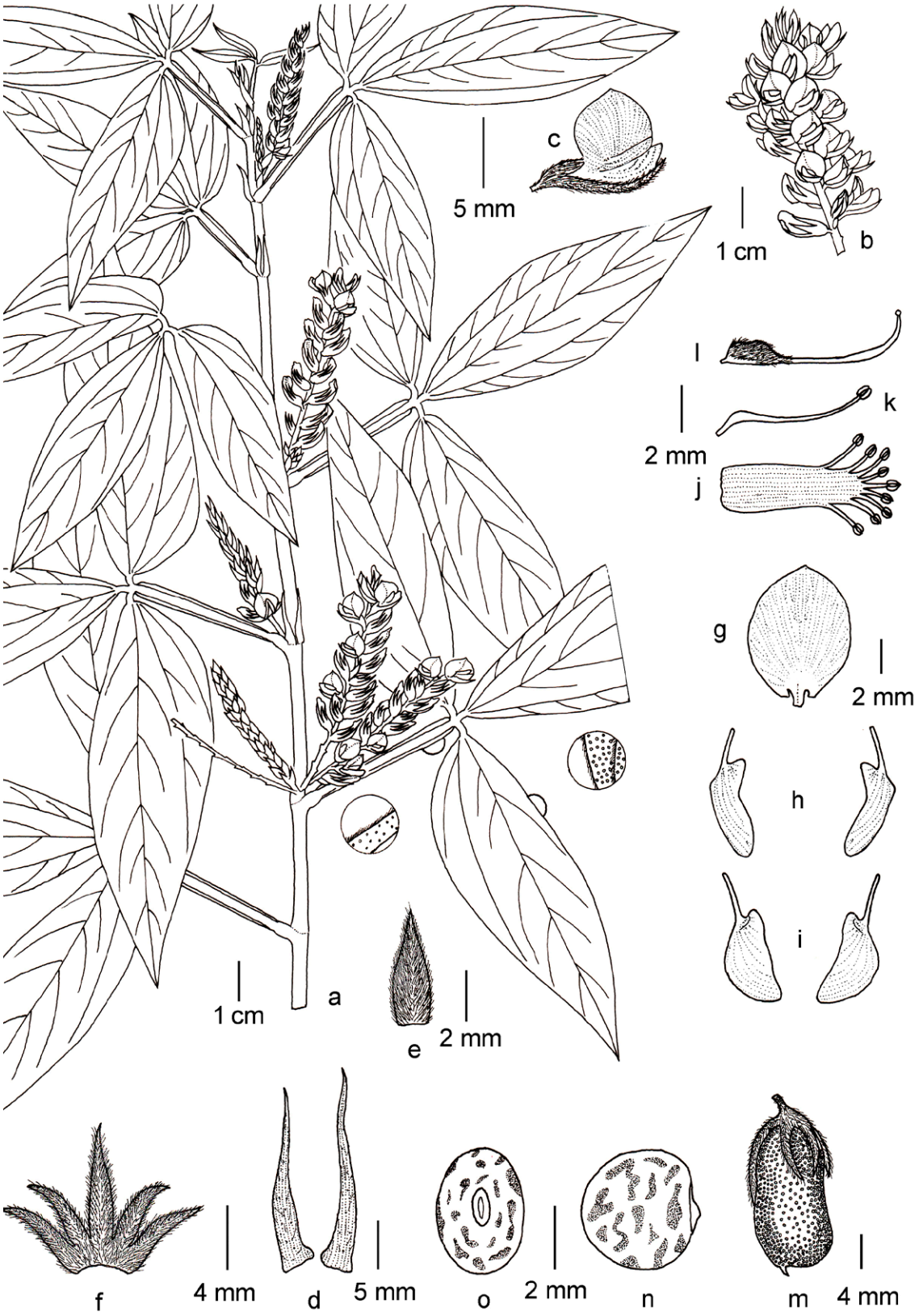


Figure 13. *Flemingia sootepensis* Craib. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

length, hairy, many nerved, gland dotted more densely at the tip. Corolla pale green with pink or orange striations, often reported as white; standard 8–6 mm, elliptic, apex slightly pointed, glabrous, clawed with 2 auricles; claw 1.5 mm; auricles 1 mm or less; wing petals 7 × 2 mm, oblong; claws 2 mm long; keel petals 8 × 3.5 mm, fused at apex, falcate; claws 2–2.5 mm long. Stamens 10, diadelphous (9+1); staminal tube 4–5 × 1 mm long, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 1–2.5 mm long, that of free stamens 6–6.5 mm long. Ovary 2 × 1 mm, glandular, hairy; ovules 2; styles 4–5 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 1.6 × 0.6 cm, beaked, turgid, septate between seeds, tomentose, glandular; beak less than 1 mm long; glands orange-red, falling post maturity. Seeds 2, 3 × 3 × 2 mm brown, mottled, shiny, rounded; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'sootepensis' is named after the type locality Chiang Mai, Doi Sootep mountain range.

Distribution

Asia: China (Guangdong, Yunnan), India (Goa, Karnataka and Maharashtra), Laos, Malaysia (Penang), Myanmar and Thailand.

Flowering and fruiting

India: January to March. Elsewhere: October to December.

Habitat and ecology

The species is found along roadsides and on hill slopes in southern parts of the Western Ghats. It also grows in semi-evergreen forests and along streams at 160-1600 m asl. Common associates are *Abutilon persicum* (Burm.f.) Merr., *Ageratum conyzoides* L., *Bambusa bambos* (L.) Voss, *Caryota urens* L., *Eupatorium odoratum* L., *Flemingia strobilifera* (L.) W.T.Aiton, *Helicteres isora* L., *Hemidesmus indicus* (L.) R.Br., *Holigarna grahamii* Kurz, *Ischaemum* species, *Lantana camara* L., *Leucas stelligera* Wall. ex Benth., *Rungia elegans* Dalzell & A.Gibson, *Selaginella* species, *Sida acuta* Burm.f., *Strobilanthes callosa* Nees, *Thespesia lampas* (Cav.) Dalzell & A.Gibson and *Triumfetta pilosa* Roth.

Selection of specimens examined

INDIA, Goa, North Goa district, Mopa Village, 12 July 2015, *S.K. Gavade & M.M. Lekhak 75* (SUK); Karnataka, Uttara Kannada district, Ulvi forest, 5 November 2015, *S.K. Gavade, 130* (SUK); Kerala, Malappuram district, Calicut University campus, 12 February 1982, *A. Rajini, 178* (CALI); Nilambur, 14 January 1989, *N.B. Shreedevi 903* (CALI); Thiruvananthapuram district, Attayar, 22 December 1987, *N. Mohanan 9142* (CALI); Bonacaud, 22 December 1988, *N. Mohanan, 7940* (CALI); Neyyar, 16 November 1988, *M. Beena, 3905* (CALI); 16 November 1988, *M. Sebastian, 1507* (CALI); Maharashtra, Kolhapur district, Tillarinagar, 14 December January 2014, *S.K. Gavade & M.M. Lekhak 9* (SUK); 20 January 2015, *S.K. Gavade 19* (SUK); 15 February 2015, *S.K. Gavade 28* (SUK); 15 March 2015, *S.K. Gavade 36* (SUK!); Tamil Nadu, Salem district, Yercaud, 16 December 1982, *V.T. Nanadkumar s.n.* (CALI). **THAILAND**, Chaiyaphum, 15 December 1971, *C.F. van Beusekom et al. 4313* (BKF, C, L); Chiang Mai, Ban Lawm, 12 January 1991, *J.F. Maxwell 62* (L); Ban Mae Yang Ha, 21 December 1990, *J.F. Maxwell et al. 84* (L); Doi Chiang Dao, 25 December 1921, *N. Put 4539* (L); 28 December 1962, *K. Bunchuai 1275* (L); 10 January 1975, *R. Geesink, P.H. Hiepko & C. Phengklai 8207* (L); 6 January 1989, *J.F. Maxwell 25* (L); Doi Pha Hom Pok National Park, 25 February 1958, *T. Sørensen 1631* (C, L); Doi Suthep-Pui National Park, 8 February 1957, *T. Smitinand 3772* (L); 28 October 1958, *T. Sørensen 5951* (L); 21 November 1987, *J.F. Maxwell 1469* (L); 23 January 1988, *J.F. Maxwell 86* (L); 5 March 1990, *J.F. Maxwell 279* (L); 22 December 1992, *J.F. Maxwell 847* (L); 10 January 1994, *N. Fukuoka & H. Koyama 62123* (L); Fang, 11 January 1975, *R. Geesink 8221* (L); Mae Sao, 11 February 1983, *H. Koyama et al. 33376* (L); 4 January 1991, *J. F. Maxwell 35* (L); Payap, 16 December 1965, *E. Hennipman 3373* (L); Chiang Rai, Doi Huay Nam Rin, 23 December 1994, *J.F. Maxwell 1302* (L); Kuhn Jae National Park, 18 November 1997, *J.F. Maxwell 1374* (L); Kanchanaburi, 15 November 1971, *C.F. van Beusekom 3785* (L); Lampang, Doi Kuhn Dahn National Park, 24 December 1993, *J.F. Maxwell 1531* (L); 28 December 1993, *J.F. Maxwell 1568* (L); Jae Sawn National Park, 2 December 1995, *J.F. Maxwell 1236* (L); 14 February 1996, *J.F. Maxwell 205* (L); Phayao, Doi Luang National Park, 22 December 1997, *O. Petrmitr 179* (L); 26 December 1997, *O. Petrmitr 205* (L); 23 January 1998, *O. Petrmitr 259* (L); 8 March 1998, *J.F. Maxwell 234* (L); 13 February 2001, *J.F. Maxwell 67* (L); 14 November 2001, *W. Sankamethawee 342* (L); 5 April 2003, *K. Kansuntisukmongkol 223* (L); 20 February 2004, *J.F. Maxwell 94* (L); 22 April 2004, *R. Pooma, K. Phattarahirankanok, S. Sirimongkol & M. Phupath 4553* (L); 1 February 2006, *J.F. Maxwell 88* (BKF, L); 1 February 2006, *P. Suvarnakoses 991* (L).

Affinities

Flemingia sootepensis resembles *F. macrophylla* in its habit, inflorescence type, leaf shape, stipule shape and pod shape. However, it differs from the latter in petiole structure, leaflet size and more slender shape, long-acuminate leaflet apex, longer inflorescence, stipule nature and denser glands on the pod. Niyomdham (1992) treated *Flemingia sootepensis* as a variety of *F. macrophylla*, i.e. *F. macrophylla* var. *sootepensis* (Craib) Niyomdham. Based on the perusal of protologue and examination of live specimens of *F. macrophylla*, we decided that *F. sootepensis* is a distinct species.

Nomenclatural notes

Flemingia sootepensis Craib was described by Craib (1911), two specimens, viz. Kerr 934, Hosseus 309 were indicated in the protologue. In search of the type, we could trace eight specimens of Kerr (BM000958671, BM000958672, CAL, E00157794, K000980302, K000980303, P00709078 and TCD0016124) at BM, CAL, E, K, P and TCD respectively. Two more Hosseus's specimens (M0168856 and P00709079) were found at M and P. All these nine specimens were collected from Chiangmai, in evergreen jungle on Doi Suthep, Thailand (Craib 1911). These specimens serve as syntypes and can be considered as original material. Of these, the specimen at K with the barcode number K000980302 agrees well with the description provided in the protologue and was designated as the lectotype (Gavade et al. 2017). The duplicates of Kerr's specimen at BM (BM000958671 and BM000958672), CAL, E (E00157794), K (K000980303), P (P00709078), TCD (TCD0016124) are isolectotypes. Hosseus's specimens at M (M0168856) and P (P00709079) serve as syntypes.

Flemingia stricta Roxb., in W.T. Aiton, Hort. Kew., ed. 2. 4: 349. 1812

Type: India, without precise locality, s.d., *W. Roxburgh s.n.* (G00365326 image!, lectotype designated here; isolectotype G00365327 image! and K000900609 image!)

Roxb., Pl. Coromandel 3(3): 44. t. 248. 1820; Roxb., Fl. Ind. 3: 342. 1832; Wight & Arnott, Prodr. Fl. Ind. Orient. 1: 241. 1834; Wight, Icon. Pl. Ind. Orient. 2(1): 2, t. 329. 1843; Benth. in Miquel, Pl. Jungh. 2: 245. 1852; Baker, in Hook. f., Fl. Brit. India 2: 228. 1876; Kurz, Forest Fl. Burma 2: 375. 1877; Prain, Bengal Pl. 1: 377. 1903; Haines, Bihar Orissa 3: 269. 1922; Gamble, Fl. Madras 1: 378. 1928; Sanjappa, Legumes of India 178. 1992; Saxena & Brahman, Fl. Orissa 1: 531. 1994. (Figures 14, 23n, 24m, 25m and 26m).

(=) *Flemingia stricta* subsp. *pteropus* (Baker) K.K. Khanna & An. Kumar, Indian J. Forest. 24 (2): 223 (2001) **syn. nov.**

Type: Myanmar, Bago, Thondan [Thongdan], on Pegu river, 6 February 1854, *J. McClelland s.n.* (K001097316 image!).

(≡) *Maughania stricta* (Roxb.) Kuntze, Revis. Gen. Pl. 1: 199. 1891; Mukerjee, Bull. Bot. Soc. Bengal 6(1): 15. 1953 (as *Moghania stricta*).

Flemingia stricta Roxb., Hort. Bengal. 56. 1814 *nom. nud.*

Description

Erect shrubs, up to 1–3.2 m tall, with branched stem; stems 10–15 mm in diameter, young triangular, mature terete, hairy; hairs silky, antrorse. Leaves digitately trifoliolate, 25–38 cm long, stipulate, petiolate; stipules 2, 9–10 × 2–2.5 cm, lanceolate, acuminate with equal tips, fused when young, splitting at maturity, persistent, basifixed, many nerved, hairy; petioles 6–10 cm long, distinctly winged, gland-dotted, hairy; leaflets 3, 17–30 × 7–11 cm, broad lanceolate, acuminate at apex, the central cuneate at base, lateral oblique at base, margin ciliate, apex mucronate, glabrous on both surfaces, except on veins, dorsally gland-dotted; glands orange-red; petiolules 6–7 mm long, hairy, gland-dotted. Inflorescences an axillary and terminal raceme; racemes 1–2 in cluster, 9–12 cm long, equal or longer than the petiole. Flowers 1.3–1.5 cm long, pedicellate, bracteate; pedicels 3–4 mm long, hairy; bracts 15–16 × 2.5–3 mm, linear, acute at apex, many nerved, hairy, gland-dotted. Calyx 10–11 mm long, hairy, gland-dotted; calyx tube 3–4 mm long, campanulate, hairy; calyx teeth 5, 7–8 × 2–3 mm, lanceolate, subequal, lower one the longest, connate for 1/4 of its length, hairy, many nerved, gland-dotted. Corolla pale yellow with red striations; standard 1–11 × 8.5–9 mm, rounded, apex retuse, glabrous, clawed with 2 auricles; claw 1.8–2 mm long; auricles 2, 1 mm or less than 1 mm; wing petals 8.8–9 × 2.8–3 mm, oblong, falcate; claw 2.8–3 mm long; keel petals 1–11 × 4–4.5 mm, falcate, fused at apex; claw 2.8–3 mm long. Stamens 10, diadelphous (9+1); staminal tube 7.5–8 × 1–1.5 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 2–3 mm long, that of free stamens 9.5–10 mm long. Ovary 2–2.4 × 1– 1.5 mm, gland-dotted, hairy; ovules 2; style 9–10 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 16–17 × 7–7.5 mm, beaked, turgid, slightly septate between seeds or not, hairy, sparsely gland-dotted; beak 1 mm long; glands black, withering post maturity. Seeds 2, 4 × 4 × 3 mm brown, mottled, shiny, rounded; hilum granular, 1 mm long, position ± central.

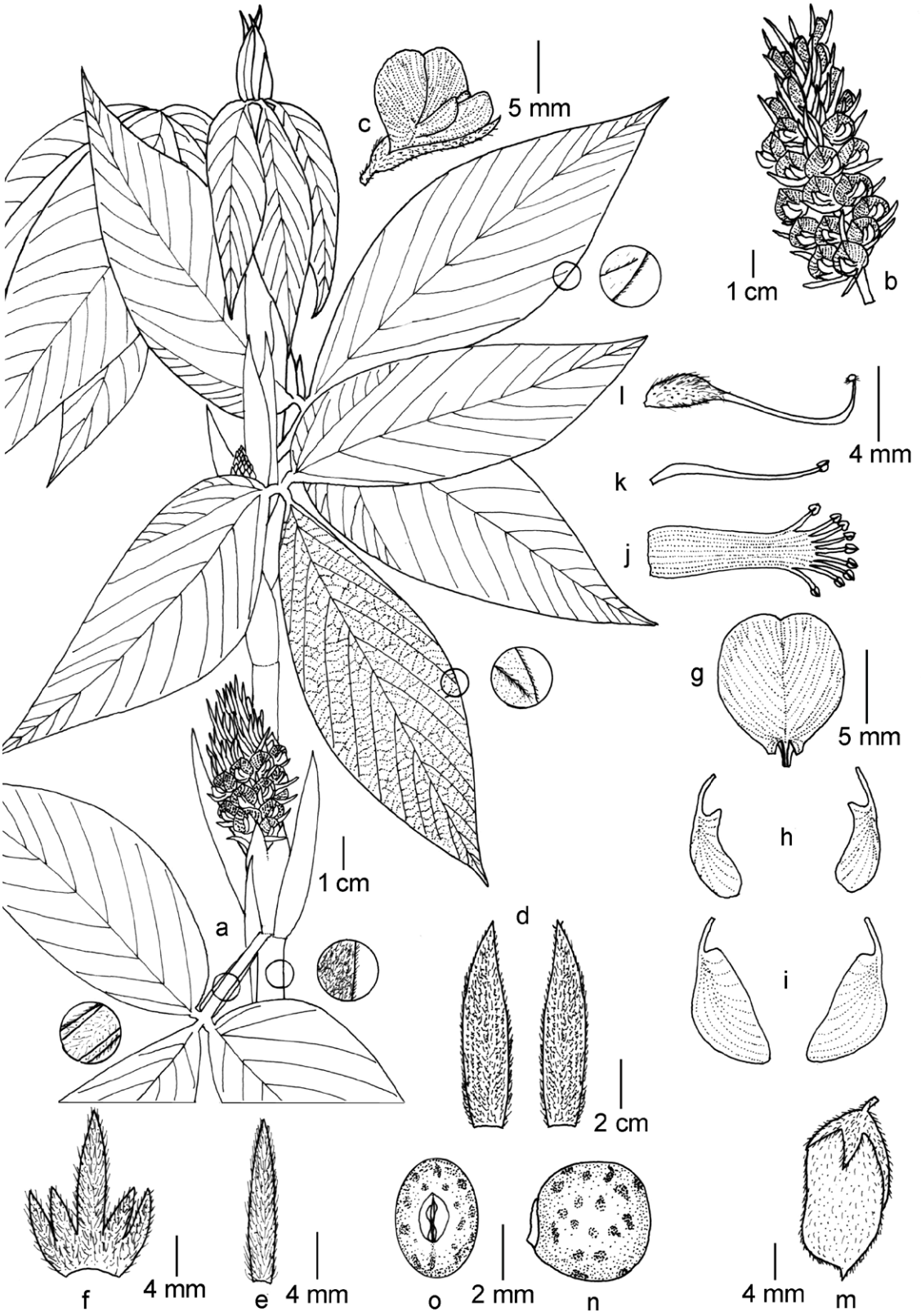


Figure 14. *Flemingia stricta* Roxb. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

Etymology

The specific epithet 'stricta' refers to the straight and tall habit.

Distribution

Bangladesh, Cambodia, China (Guangdong, Yunnan), India (Andhra Pradesh, Assam, Chhattisgarh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Orissa, Uttar Pradesh, Sikkim, Tamil Nadu, Telangana, Tripura and West Bengal), Indonesia (Java), Jamaica, Laos, Myanmar, Thailand, Vietnam.

Flowering and fruiting

January to April.

Habitat and ecology

Flemingia stricta is found along the streams in forests of ca.150–650 m asl. It grows in association with *Cyperus pangorei* Roxb., *Lasia spinosa* (L.) Thwaites and *Polygonum glabrum* Willd., etc. In Myanmar, altitude varies from 20 to 1000 m asl.

Selection of specimens examined

INDIA, Andhra Pradesh, Chittoor district, Satyavedu, 14 July 2008, *MVS & VSR 31010* (BSID); East Godavari district, Sesharagi hills, 14 February 1947, *Narayanswami & party 122* (CAL); Ethakonda, 11 February 1947, *Narayanswami & party 122* (CAL); Kurnool district, Gundla Brahmeswara, *B. Ravi Prasad Rao & B. Sadasivaiah 34153* (BSID); Visakhapatnam district, near Chintapalli, 7 March 1962, *D. C. S. Raju 65* (CAL); Assam, April 1902, *A.C. Chatarjee 5342* (BSI); Goalpara district, Duma Duar, December 1890, *Dr. King's collector s.n.* (CAL); Hojai district, Lumding, 20 February 1901, N. Gill 65 (CAL); Kamrup Metropolitan district, Guwahati, s.d., *J. W. Master 678* (CAL); Chhattisgarh, Bastar district, s.d., *A.N. Singh s.n.* (BSA); Dantewada district, Bailadila, 13 February 1963, *G. Panigrahi & Arora 6839* (BSA); Jashpur district, Narayanpur, 5 October 1941, *H.F. Mooney 1955* (DD); Narayanpur district, Abujmarh, 22 May 1963, *G.P. Roy 31984* (BSA); Jharkhand, Chota Nagpur, s.d., *J.J. Wood s.n.* (CAL); Karnataka, Uttara Kannada district, Sirsi forest, 23 February 2016, *S.K. Gavade s.n.* (SUK); 4 February 2017, *S.K. Gavade 184* (SUK); Madhya Pradesh, Betul district, Dharakhoh reserve forest, 16 April 1997, *A. Kumar 51090* (BSA); Hoshangabad district, Pachmarhi, Mahadev, 27 December 1962, *G. Panigrahi 6587* (CAL); Maharashtra, Gadhchiroli district, Bamhani,16 February 2015, *V. Kahalkar & S.K. Gavade 26* (SUK); *S.K. Gavade 129* (SUK); Manipur, Imphal East district, Nambar forest, February 1906, *A. Meebold 5342* (BSI); Tengnoupal district, Moreh, 22 January 1953, *D.B. Deb 686* (CAL); Meghalaya, East Khasi Hills, Borapani, 23 February 2016, *S.K. Gavade 131* (SUK); 3 February 2017, *S.K. Gavade 183* (SUK); Thoyung, 15 March 1885, *C.B. Clarke 37587 A* (CAL); West Garo Hills, s.d., *T.D. Srivastav 1646* (CAL); Mizoram, Mamit district, 27 February 1984, *D.B. Deb 3422* (CAL); Orissa, Ganjam district, Khondbunta, February 1884, *J.S. Gamble 13793* (CAL, K); Jajapur district, Jaraka, 19 March 1964, *S. Kapoor & party 71300* (NBRI); Mayurbhanj district, Bhanjabasa, 13 February 1958, *G. Panigrahi 12272* (CAL); *12268* (CAL); on the way to Jenabil to Kabatghai, 27 November 1979, *A.R.K. Sastri & S.G.R. Singh 12344* (BSID); Sambalpur district, Ushakothi Wildlife Sanctuary, 24 March 1964, *S. Kapoor & party 71390* (NBRI); Peninsula, s.d., *R. Wight 801* (CAL); Uttar Pradesh, Allahabad, Botanical Survey of India, Central Regional Centre garden, 8 November 1962, *M.J. Hanfi 5302* (BSA); *C.M. Arora 5302* (BSA); 6 February 1963, *O.P. Mishra 5331* (BSA); 30 January 2016, *A.P. Tiwari 123* (SUK); Sikkim, 15 May 1901, *Dr. Prain's Collector 104* (CAL); Tamil Nadu, Chennai district, on the way to Bokoi hills, Lakshmipuram, s.d., *N. Rama Rao & D. Narasimhan 84231* (BSID); Nagapattinam district, Tharangambadi, s.d., *B. Heyne Wallich Catalogue Number 5745C* (K-W001121978); Telangana, Medak district, Gouraram, 20 February 1983, *P.V. Sreekumar & N. Rama Rao 76956* (BSID); Warangal district, Mallur Gutta, 22 February 2002, *R.K. Premanath 110966* (BSID); Tripura, Khowai district, Teliamura, 21 February 1960, *D.B. Deb 2249* (CAL); North Tripura district, on the way to Hmanpui, 22 January 1960, *D.B. Deb 27006* (CAL); West Tripura, Agartala, Abhoynagar, 27 December 1914, *P.M. Debbarman 385* (CAL); Charilan, 4 March 1960, *D.B. Deb 2489* (CAL); West Bengal, Kolkata district, Botanical Garden Calcutta, s.d., *Anon s.n.* (LINN-HS1212-1); s.d., *F. Buchanan-Hamilton, Wallich Catalogue Number 5745a* (K-W001121975 and 001121976); s.d., *s.coll. Wallich Catalogue Number 5745d* (K-W001121979); Darjeeling district, Peshok, 1900, *G.H. Cane 165* (CAL); Jalpaiguri district, Apalchand Forest, 21 February 1975, *J.K. Sikdar 28* (CAL); Chapramari Wildlife Sanctuary, s.d., *Jayasree, Bhattacharjee & party 32432* (CAL); Puruliya district, Badgaon, 13 March 1964, *S.N. Biswas 57* (CAL); s.d., R. Thompson 102 (CAL); s.d., *s.coll. 485* (CAL); s.d., s.coll. *Wallich Catalogue Number 5745B* (K-W001121977).

Affinities

Flemingia stricta is closely related to *F. praecox* but differs from it in its large stipules, broad lanceolate leaves and robust inflorescence. The general appearance is like *F. macrophylla*.

Taxonomic note

Flemingia stricta is a very distinct species. Baker (1876) described a new variety under *F. stricta*, i.e. *F. stricta* var. *pteropus* Baker. Khanna and Kumar (2001) raised the rank of this variety and made it *F. stricta* subsp. *pteropus*. However, it seems that they did not see the type (*McClelland s.n.*, housed at K) of *F. stricta* var. *pteropus*. The specimen Anand Kumar 51090, was studied critically by us. We have found that it is conspecific to *F. stricta*. So, *F. stricta* subsp. *pteropus* Khanna & Kumar is proposed here as a new synonym of *F. stricta*.

Nomenclatural notes

Flemingia stricta was described by Roxburgh in his "Plants of the Coast of Coromandel" which was published in 1820. Aiton (1812) published *F. stricta* Roxb. in his "Hortus Kewensis; or, a Catalogue of the Plants Cultivated in the Royal Botanic Garden at Kew" and he ascribed the name and its description to Roxburgh so the correct name is *F. stricta* Roxb. as per Article 46, example 24 of ICN (Turland et al. 2018).

In search of the type specimen we could locate three specimens, one at K (K000900609) and two at G (G00365326 and G00365327) and an illustration of Roxburgh which can be considered as an original material. All the three specimens were collected by Roxburgh and bear Roxburgh's handwriting as '*Hedysarum strictum*'. The specimen at G (G00365326) is complete and better than the other two. As per articles 9.11 and 9.12 of Shenzhen Code (Turland et al. 2018), specimen at G (G00365326) is selected and designated here as lectotype.

Flemingia wallichii Wight & Arn., Prodr. Fl. Ind. Orient. 1: 242. 1834

Type: India, East Peninsular region, s.d., *B. Heyne, Wallich Catalogue Number 5746g* (K-W001122002 image!, lectotype designated here; isolectotype K).

Benth. in Miquel, Pl. Jungh. 2: 245. 1852; Baker, in Hook. f., Fl. Brit. India 2: 229. 1876; Kurz, Forest Fl. Burma 2: 374. 1877; T. Cooke, Fl. Bombay 2: 393. 1902; Talbot, Forest Fl. Bombay 1: 420. 1909; Gamble, Fl. Madras 1: 379. 1928; Sanjappa, Legumes of India 179. 1992. (Figures 15, 23o, 24n, 25n and 26n).

(≡) *Maughania wallichii* Kuntze, Revis. Gen. Pl. 1: 199. 1891; Mukerjee, Bull. Bot. Soc. Bengal 6(1): 18. 1953 (as *Moghania wallichii*).

Description

Erect shrubs, up to 1.2–1.8 m tall, with profuse branching; stems 4–5 mm in diameter, young triangular, mature terete, densely hairy; hairs silky, antrorse. Leaves digitately trifoliolate, 4–16 cm long, stipulate, petiolate; stipules 2, 9–10 × 3.5–4 mm, lanceolate, acuminate with equal tips, fused when young, splitting at maturity, caducous, basifixed, many nerved, hairy; petioles 2–5 cm long, slightly winged, gland-dotted, hairy; leaflets 3, 3.2–12 × 1–4.5 cm, obovate to lanceolate or rhomboid, acute at apex, the central cuneate at base, lateral oblique at base, margin ciliate, apex mucronate, hairy and dorsally gland-dotted; glands orange-red; petiolules 2–3 mm long, hairy, gland-dotted. Inflorescences an axillary and terminal raceme; racemes 2–4 in cluster, capitate, 3–6 cm long, equal or longer than the petiole. Flowers 14–15 mm long, pedicellate, bracteate; pedicels 2–3 mm long, hairy; bracts 4–5 × 3–4 mm, ovate, acute at apex, many nerved, hairy, gland-dotted. Calyx 1.1–12 mm long, hairy, gland-dotted; calyx tube 1–2 mm long, campanulate, hairy; calyx teeth 5, 7–10 × 1–2 mm, subequal, lower one the longest as well as broader, lanceolate, connate for 1/6 of its length, hairy, many nerved, gland-dotted. Corolla pink; standard 8.5–9 × 6.5–7 mm, rounded, apex mucronate, glabrous, clawed with 2 auricles; claw 2–2.5 mm long; auricles 1 mm or less than 1 mm; wing petals 9–9.5 × 2.5–3 mm, falcate; claw 2–2.5 mm long; keel petals 9.5–1 × 3.5–4 mm, slightly falcate, fused at apex; claw 2.5–3 mm long. Stamens 10, diadelphous (9+1); staminal tube 6.5–7 × 1 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 1.5–2.5 mm long, that of free stamens 8.5–9 mm long. Ovary 1.8–2 × 0.8–1 mm, gland-dotted, hairy; ovules 2; style 8.5–9 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 15.5–16 × 7.5–8 cm, included within calyx, beaked, turgid, slightly septate between seeds or not, densely hairy, sparsely gland-dotted; beak 1 mm long; glands orange-red, withering post maturity. Seeds 2, 4 × 4 × 3 mm, brown, mottled, shiny, rounded; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'wallichii' honours Nathaniel Wallich (1786-1854), a Danish physician and botanist, who worked in India from 1807-1846.

Distribution

Asia: China (Yunnan), India (Andhra Pradesh, Karnataka, Kerala, Maharashtra and Tamil Nadu), Laos, Myanmar and Vietnam.

Flowering and fruiting

November to March.

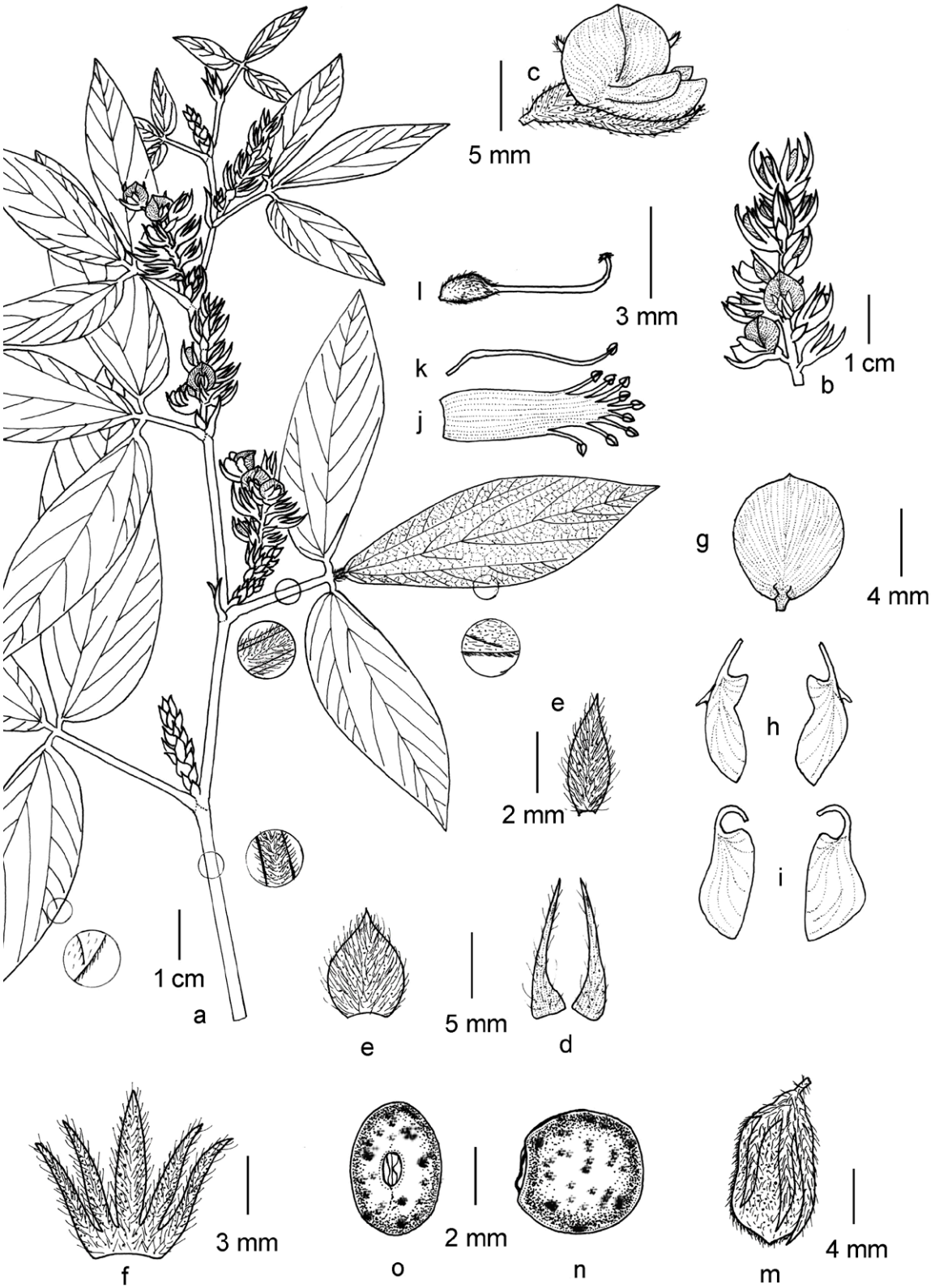


Figure 15. *Flemingia wallichii* Wight & Arn. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

Habitat and ecology

Flemingia wallichii grows in dry deciduous forests and open grasslands as well as slopes of small mountains at an altitude of ca. 800–900 m asl. It grows in association with *Acacia concinna* DC., *Asparagus racemosus* Willd., *Clerodendrum viscosum* Vent., *Flemingia strobilifera* (L.) W.T.Aiton, *Gnidia glauca* (Fresen.) Gilg, *Lantana camara* L., *Mallotus philippensis* (Lam.) Mull.Arg., *Moullava spicata* (Dalzell) Nicolson, *Stachytarpheta jamaicensis* (L.) Vahl, *Terminalia elliptica* Willd. and *Ziziphus rugosa* Lam. In China, it is reported from 1600-1900 m asl.

Additional specimens examined

INDIA, Andhra Pradesh, Prakasam district, Gundlakamma, 1 April 1965, *J.L. Ellis 23843* (MH); Karnataka, Belgaum district, Hemmadaga, 4 November 2015, *S.K. Gavade 113* (SUK); 12.5 km E of Kunkumbi, 29 January 1980, *Kameswara Rao 39* (ICRISAT, WAG); 12.5 km S of Kunkumbi, *id. 55* (ICRISAT, WAG); Chamarajanagar district, Gopalaswamy Hills, 3 February 1979, *K.P. Sreenath & P. Prakash 5710* (JCB); Dharwad district, Dharwad, December 1918, *Sedgwick's Collector 4972* (CAL); Handibhadangnath, 6 March 2015, *S.K. Gavade & M.M. Lekhak 32* (SUK); Kodagu district, Brahmagiri hills, *R.H.B. s.n.* (MH); Uttara Kannada district, 10 May 1884, *W.A. Talbot s.n.* (BSI); Dandeli, 1888, *W.A. Talbot s.n.* (BSI); s.d., February 1892, *s.coll. s.n.* (BSI); Kerala, Idukki district, Puliyanmala, 1 February 2012, *M.V. Krushnaraj 71523* (TBGRI); Vagamon, 20 February 2008, *M.V. Krishnaraj 61802* (TBGRI); Kollam district, Chandanthode, 22 December 1979, *V.S. Ramachandran 65337* (MH); 24 February 1979, *V.S. Ramachandran 61361* (MH); Palakkad district, Parambikulam tiger reserve, *K.M. Sebastine 15667* (MH); Maharashtra, Kolhapur district, Panhala, 1 January 2015, *S.K. Gavade 18* (SUK); 16 January 2015, *S.K. Gavade 19* (SUK); Man Parale, 31 July 2016, *S.K. Gavade s.n.* (SUK); Satara district, Bhalekarwadi, 29 December 2014, *S.K. Gavade 17* (SUK); *S.K. Gavade 114* (SUK); *S.K. Gavade 168*; Tamil Nadu, Coimbatore district, Siruvani, 3 January 1978, *N.C. Nair 41473* (MH); Nilgiris district, on the way to Nadugani to Gudalur, 24 February 1973, *E. Vajravelu 43721* (MH).

Affinities

Flemingia wallichii is allied to *F. grahamiana* but differs from it in having obovate to lanceolate or rhomboid leaves, ovate bracts, pinkish corolla and pod which is included within the calyx.

Taxonomic note

Flemingia wallichii has been synonymized under *F. macrophylla* by some online databases (ILDIS 2005; The Plant List 2013). But many earlier workers such as Baker (1876), Kurz (1877), Cooke (1902), Talbot (1909), Gamble (1928), Mukerjee (1953) and Sanjappa (1992) treated *F. wallichii* as a distinct species. Critical analysis of live specimens, type and protologue confirm that *F. wallichii* is a distinct species.

Nomenclatural notes

Flemingia wallichii was described by Wight and Arnott (1834) from East Peninsular India based on Heyne's collection having Wallich Catalogue Number 5746g. We could trace the type at K (K-W001122002). This specimen (K-W001122002) is designated as lectotype [as per articles 9.11 and 9.12 of Shenzhen Code (Turland et al. 2018)] as it tallies with the description provided in the protologue.

Flemingia wightiana Graham ex Wight & Arn., Prodr. Fl. Ind. Orient. 1: 242. 1834

Type: India, East Peninsular region, s.d, *R. Wight 815* (E00157782 image!, lectotype designated here; isolectotype K001122004 image!, MH00002049 image!).

Benth. in Miquel Pl. Jungh. 2: 245. 1852; Baker, in Hook. f., Fl. Brit. India 2: 229. 1876; Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69(2): 441. 1897; Gamble, Fl. Madras 1: 379. 1928; Sanjappa, Legumes of India 176. 1992; Saxena & Brahman, Fl. Orissa 1: 533. 1994. (Figures 16, 23p, 24o, 25o and 26o).

(=) *Flemingia ferruginea* Benth. & Hook.f. Gen. Pl. 1(2): 544. 1865.
Type: Myanmar, Tong Dong, 1826, Wallich Catalogue Number 5750 (K001122003 image!).

(≡) *Flemingia congesta* var. *wightiana* Baker, in Hook. f., Fl. Brit. India 2: 229. 1876.

(≡) *Maughania wightiana* (Graham ex Wight & Arn.) Mukerjee, Bull. Bot. Soc. Bengal 6(1): 16. 1953 (as *Moghania wightiana*)

Flemingia wightiana Graham, Numer. List n. 5751. 1831, *nom. nud.*

Description

Erect shrubs, up to 1.2–1.6 m tall, with profuse branching; stems 3–10 mm in diameter, young triangular, mature terete, hairy; hairs silky, antrorse. Leaves digitately trifoliolate, 10–22 cm long, stipulate, petiolate;

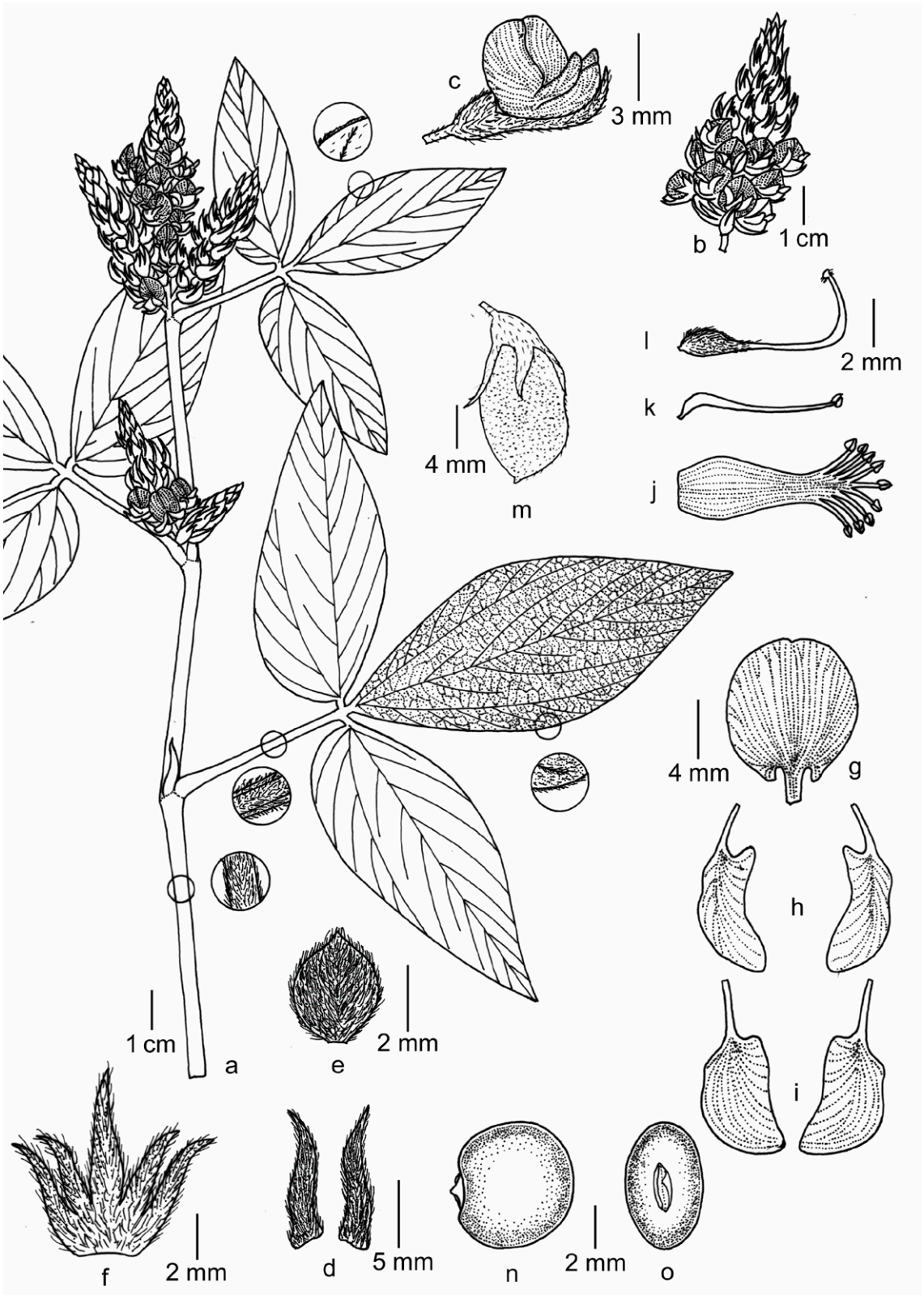


Figure 16. *Flemingia wightiana* Graham ex Wight & Arn. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

stipules 2, 10–11 × 3–3.5 mm, lanceolate, acuminate with equal tips, fused when young, splitting at maturity, caducous, basifixed, many nerved, hairy; petioles 2.5–6 cm long, grooved, not distinctly winged, gland-dotted, hairy; leaflets 3, 7–14 × 3–6 cm, oblong to lanceolate, acute at apex, the central cuneate at base, lateral oblique at base, margin ciliate, apex mucronate, hairy and gland-dotted on both surfaces, dorsally densely tomentose; glands orange-red; petiolules 2–4 mm long, hairy, gland-dotted. Inflorescences an axillary and terminal raceme; racemes 2–5 in cluster, densely imbricate, cone like, 2–8 cm long, equal or longer than the petiole. Flowers 1–1.1 cm long, pedicellate, bracteate; pedicels 1.5–2.5 mm long, hairy; bracts 2.5–3 × 1.5–2.5 mm, rounded, acute at apex, many nerved, hairy, gland-dotted. Calyx 9–10 mm long, hairy, gland-dotted; calyx tube 2–2.5 mm long, campanulate, hairy; calyx teeth 5, 5–7 × 1.5–2 mm, lanceolate, subequal, lower one the longest, connate for 1/4 of its length, hairy, many nerved, gland-dotted. Corolla white with pink striations; standard 8–8.5 × 5.5–6 mm, rounded, apex slightly retuse, glabrous, clawed with 2 auricles; claw 2–2.5 mm long; auricles 1 mm or less than 1 mm; wing petals 8–8.2 × 2–2.2 mm, oblong; claw 2–2.5 mm long; keel petals 7–8 × 2.5–3 mm, slightly falcate, fused at apex; claw 2–2.2 mm long. Stamens 10, diadelphous (9+1); staminal tube 5.5–6 × 1 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 1–2 mm long, that of free stamens 6.5–7 mm long. Ovary 1.8–2 × 0.8–1 mm, gland-dotted, hairy; ovules 2; style 6–7 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruit a pod, 1.6–1.7 × 6–6.5 cm, beaked, turgid, slightly septate between seeds or not, densely hairy, sparsely gland-dotted; beak 1 mm long; glands orange-red, withering post maturity. Seeds 2, 4 × 3 × 2.5 mm black, rounded; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'wightiana' honours Robert Wight (1796-1872), a British surgeon and botanist.

Distribution

Asia: Bhutan, India (Andhra Pradesh, Chhattisgarh, Karnataka, Kerala, Orissa and Tamil Nadu).

Flowering and fruiting

December to April.

Habitat and ecology

Flemingia wightiana is found on hill slopes at an altitude of ca. 1200–1400 m asl. It grows in association with *Argyreia cuneata* Ker Gawl., *Asparagus racemosus* Willd., *Bambusa bambos* (L.) Voss, *Curculigo orchioides* Gaertn., *Dioscorea bulbifera* L., *Lantana camara* L., *Pterocarpus marsupium* Roxb., *Rubus niveus* Thunb., *Stachytarpheta jamaicensis* (L.) Vahl, *Strobilanthes kunthiana* T.Anderson ex Benth., *Syzygium cumini* (L.) Skeels, *Terminalia cuneata* Roth etc.

Additional specimens examined

INDIA, *R. Wight 802* (C, GH, LE, MEL, W); Andhra Pradesh, Chittoor district, Talakona, 13 March 1987, *D. Ranga Charyalu 1343* (CAL); Prakasam district, Nallamalas Hills, Gundlakamma river area, 1 April 1965, *J.L. Ellis 23843* (CAL); Chhattisgarh, Dantewada district, Bailadila, 12 February 1963, *G. Panigrahi 6991* (CAL), *G. Panigrahi 6870* (CAL); Karnataka, Chamarajanagar district, Gopalaswamy Hills, 3 February 1979, *K.P. Sreenath & P. Prakash 5720* (CAL); Gundal dam, 6 July 1930, *V. Narayanaswami 3665* (MH); Kerala, Idukki district, Mannavan Chola, 25 February 2003, *M.B. Reena 89074* (MH); Palakkad district, Chulliyar dam, 5 February 1990, *K. Ravikumar 92524* (MH, BSID); Puthur plateau, *K.M. Matthew 54732* (RHT); Sholayur, above Eswaran estate, 23 April 1977, *E. Vajravelu 49751* (MH); Tamil Nadu, Anaimalai Hills, s.d., *s.coll. s.n.* (MH); Coimbatore district, Kurudi malai, 6 October 1970, *M.V. Vishwanathan 789* (MH); Rangaswamy koil, 24 January 1931, *R. Raju & Naganathan 4920* (MH); Sowripalayam, Palani road, 21 March 1985, *K.M. Matthew 41184* (RHT); Velliangiri, 23 February 1932, *S.R. Raju & Ratnavelu 293* (MH); Dindigul district, Mannavanor, 2 December 1985, *K.M. Matthew & N. Rajendran 43557* (RHT); Pallangi Kombai, 9 February 1992, *K.M. Matthew 54715* (RHT); Sirumalai, 7 February 1959, *J. Pallithanam 4348* (RHT); Vilpatti to Palani path, 22 March 1987, *K.M. Matthew 48667* (RHT); Dharmapuri district, Chitteri Hills, Peria Bettumalai, 12 August 1978, *K.M. Matthew 16396* (RHT); 9 January 1980, *K.M. Matthew 25609* (RHT); Krishnagiri district, Guthirayan hills, 22 March 1980, *K.M. Matthew 27248* (RHT); Nilgiris district, Bokkapuram reserve forest, 19 February 1972, *B.D. Sharma 39859* (MH); Kottakombai, 30 July 1970, *E. Vajravelu 35167* (MH); Kukal shola, 3 December 1970, *G.V. Subbarao 37443* (MH); Mudumalai National Park and Wildlife Sanctuary, Benne forest, 19 January 1961, *B.V. Shetty 11930* (CAL); on the way Anaikatti to Ebbanad, 14 March 1972, *G.V. Subbarao 40218* (MH); on the way from Kodanad to Kotagiri, 25 October 1956, *K. Subramanyam 1156* (CAL); *K. Subramanyam 1154* (MH); Ramanathapuram district, Mudaliaruthu, 20 February 1979, *S.R. Srinivasan 61008* (CAL); *N.C. Nair 61008* (MH); Salem district, on the way to Karadu to Yercaud,

Lady's seat, 22 January 1966, *S. Karthikeyan 26984* (CAL); Palamalai, 19 February 1986, *K.M. Matthew 44131* (RHT); 12 January 1987, *K.M. Matthew 48278* (RHT); 4 February 1996, *K.M. Matthew 55081* (RHT); Yercaud, Shevaroy hills, 11 July 2016, *S.K. Gavade 135* (SUK); 19 January 2017, *S.K. Gavade 172* (SUK); 2 February 2017, *S.K. Gavade 188* (SUK); Shevaroy Temple, 31 October 1981, *K.M. Matthew, S.J. Britto & N. Rani 28535* (RHT); Tirunelveli district, on the way to Neterikal, 21 September 1916, *s.coll. s.n.* (MH); Mahendragiri, March 1884, *J.S. Gamble 13718* (DD); Tiruppur district, Kilanavayal to Manjampatti hills track, 5 February 1986, *K.M. Matthew & N. Rajendran 44018* (RHT); West Bengal, Jaldapara National Park, 17 December 1995, *S. Chanda & S.K. Mandal 1197* (CAL).

Affinities

Flemingia wightiana is allied to *F. grahamiana* but differs from it in having a grooved petiole and densely tomentose and oblong lanceolate leaves.

Taxonomic note

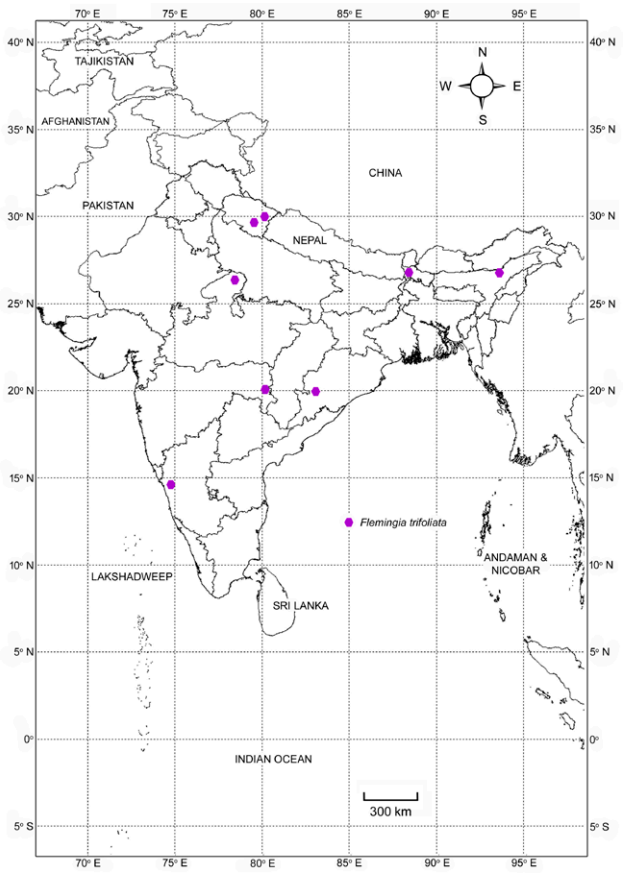
Flemingia wightiana was treated as a variety under *F. congesta* (*F. congesta* var. *wightiana*) by Baker (1876). Prain (1897), Gamble (1928) and Mukerjee (1953) followed Wight and Arnott (1834) and treated *F. wightiana* at the rank of species. We agree with Wight and Arnott (1834) and consider this taxon as a distinct species.

Nomenclatural notes

The binomial *Flemingia wightiana* was first proposed by Graham (Wallich 1831) in Wallich catalogue based on Wight's collection which was later validly published by Wight and Arnott (1834). In the protologue, Wight and Arnott (1834) mentioned Wallich catalogue Number 5751 and 815. In search of type specimens, we could trace three specimens, one each at E (E00157782), K (K001122004) and MH (MH00002049). All the three specimens were collected by Wight from East Peninsular region, India and serve as syntypes. As per articles 9.11 and 9.12 of Shenzhen Code (Turland et al. 2018), we selected and designated the specimen E00157782 from E which is most complete and matches well with the description provided in the protologue, as the lectotype.

Flemingia subg. **Lepidocoma** (Jungh.) Baker

Flemingia subg. **Lepidocoma** (Jungh.) Baker in Hook. f. Fl. Brit. India 2: 229. 1876 (Map 4).



Map 4. Distribution of subgenus *Lepidocoma* (Jungh.) Baker in India.

Type: *Lepidocoma trifoliatum* Jungh.

Erect shrubs, leaves trifoliolate, inflorescence dense globose heads, bracts large, involucrate.

Flemingia trifoliata (Jungh.) C.Y. Wu, J. W. China Border Res. Soc. 16. 175. 1946 (Figure 17, 23q and 24p).

Bas.: *Lepidocoma trifoliatum* Jungh., Reisen durch Java 338. 1845
Type: Indonesia, Java, Mt. Lawu and Solo river, s.d., *Junghuhn 107* (K001081985 image!, lectotype designated by van der Maesen 2012).

Van der Maesen, Webbia 67(1): 33-36. 2012.

(=) *F. capitata* Zoll. ex Miquel, Fl. Ind. Bat. 1: 166. 1855.
Type: Indonesia, Java, southern plains, *Zollinger & Moritzi 2670* (BM, G).

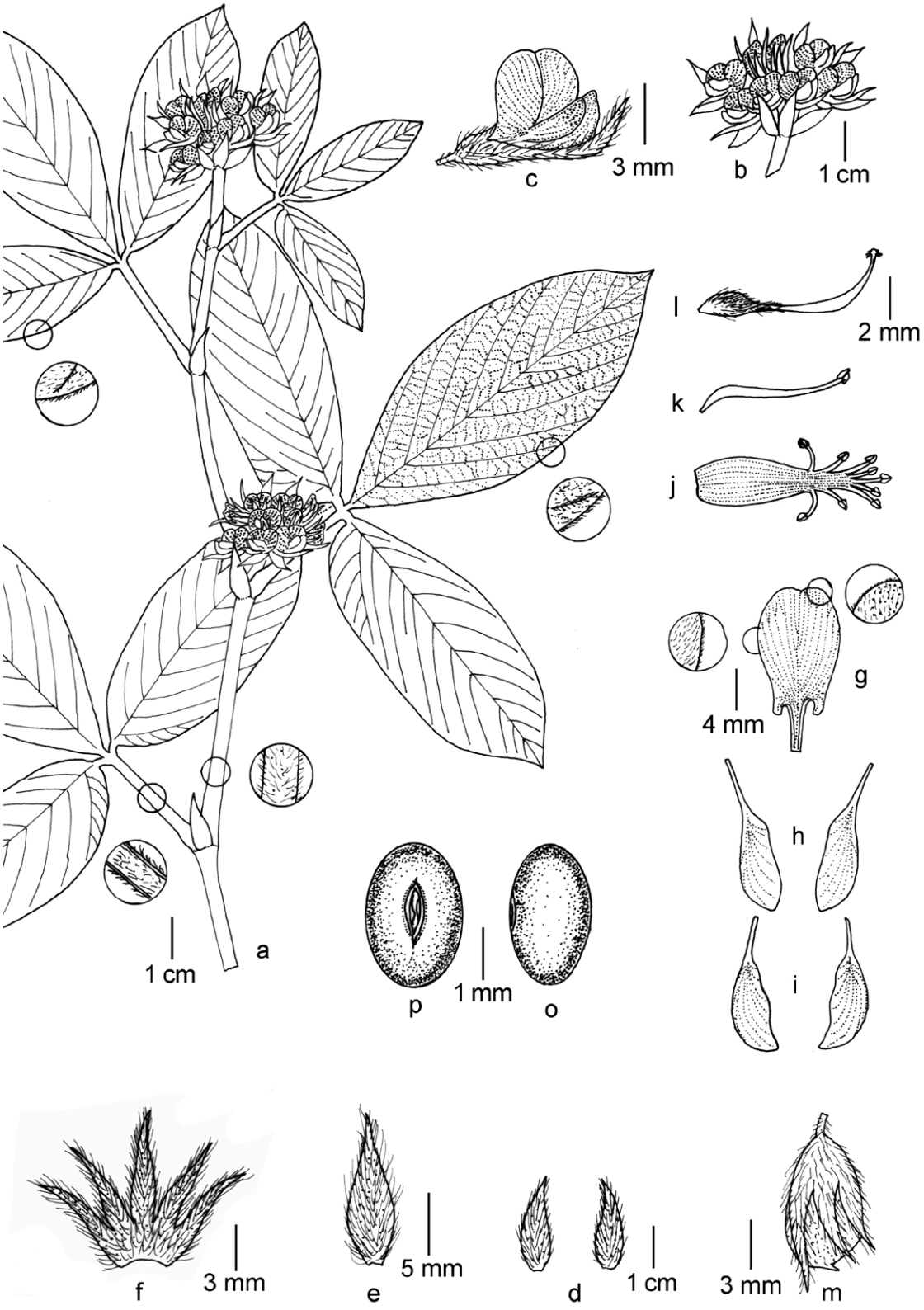


Figure 17. *Flemingia trifoliata* (Jungh.) C.Y.Wu (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

(≡) *Flemingia involucrata* Benth., in Miquel, Pl. Jungh. 2: 246. 1852.

(≡) *Maughania involucrata* Kuntze, Revis. Gen. Pl. 1: 199. 1891; Mukerjee, Bull. Bot. Soc. Bengal 6(1): 21. 1953 (as *Moghania involucrata*).

Baker, in Hook. f., Fl. Brit. India 2: 229. 1876; Prain, Bengal Pl. 1: 377. 1903; T. Cooke, Fl. Bombay 2: 393. 1902; Talbot, Forest Fl. Bombay 1: 421. 1909; Haines, Bihar Orissa 3: 270. 1922; Sanjappa, Legumes of India 176. 1992; Saxena & Brahman, Fl. Orissa 1: 527. 1994; Kothari in N.P. Singh et al., Fl. Maharashtra, Dicot. 2: 685. 2001 (Figure 17, 23q, 24p).

Lespedeza involucrata Wall., Numer. List n. 5742.1831, *nom. nud.*

Flemingia capitata Zoll. & Mor., Nat. Geneesk. Archief III: 64. 1864, *nom. nud.*

Description

Erect shrubs, up to 0.8–1.5 m tall, with branched stem; stems 4–5 mm in diameter, young triangular, mature terete, hairy. Leaves digitately trifoliolate, 8–13 cm long, stipulate, petiolate; stipules 2, 20–22 × 2–2.5 mm, lanceolate, acuminate with equal tips, fused when young, splitting at maturity, persistent, basifixed, many nerved, hairy; petioles 1–3.5 cm long, grooved, gland-dotted, hairy; leaflets 3, 5–8 × 2.5–3.5 cm, elliptic to obovate, shortly acuminate at apex, the central cuneate at base, lateral oblique at base, margin ciliate, apex mucronate, hairy on both surfaces, densely hairy on veins, dorsally gland-dotted; glands orange-red; petiolules 2–3 mm long, hairy, gland-dotted. Inflorescence an axillary and terminal raceme; racemes 2–4 in cluster, 4–6 cm long, capitate, equal or longer than the petiole. Flowers 1–1.5 cm long, pedicellate, bracteate; pedicels 1–2 mm long, hairy; bracts 8–1 × 3–4 mm, ovate, acuminate at apex, many nerved, hairy, gland-dotted. Calyx 12–14 mm long, hairy, gland-dotted; calyx tube 2.5–3 mm long, campanulate, hairy; calyx teeth 5, 12–13 × 0.8–1 mm, lanceolate, subequal, lower one the longest, connate for 1/5 of its length, hairy, many nerved, gland-dotted. Corolla purple or mauve; standard 10–12 × 7–8 mm, obovate, apex retuse, hairy, gland-dotted dorsally, clawed with 2 auricles; claw 3–4 mm long; auricles 1 mm or less than 1 mm; wing petals 9–10 × 2.5–3 mm, oblong; claw 3–3.5 mm long; keel petals 9–10 × 2.5–3 mm, boat shaped, fused at apex; claw 4.5–5 mm long. Stamens 10, diadelphous (9+1); staminal tube 6–6.5 × 1 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 2–4 mm long, that of free stamens 8–9 mm long. Ovary 1.8–2 × 0.8–0.1 mm, gland-dotted, hairy; ovules 2; style 8–9 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 7–8 × 3.5–4 mm, beaked, turgid, hairy, sparsely gland-dotted; beak 0.5–0.8 mm long; glands orange, withering post maturity. Seeds 1, 2 × 3 × 2 mm, black, rounded; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'trifoliata' refers incorrectly to its compound leaf having three leaflets (it should have been "trifoliolata").

Distribution

Asia: Cambodia, China, India (Assam, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Sikkim, Uttarakhand and West Bengal), Indonesia, Laos, Myanmar, Papua New Guinea, Thailand, Vietnam. Australia: Northern Territory, Queensland and West Australia

Flowering & fruiting

April to July.

Habitat and ecology

It grows in damp grasslands and open forests having sandy clay at altitudes of ca. 300–1200 m asl, elsewhere at lower altitudes from 40 m. It grows in association with *Imperata* species.

Additional specimens examined

AUSTRALIA, Queensland, Cook district, Near Cooktown, SE end of Airfield, 15 May 1970, *S.T. Blake 23247* (L1957924). **INDIA**, Dhupdora, 18 November 1802, *F. Buchanan-Hamilton 1694, Wallich Catalogue Number 5742a* (E00157792 & K-W001121968); Assam, s.d., *Jenkins s.n.* (DD); Nagaon district, Kaziranga National Park, 3 December 1912, *U.N. Kanjilal 1996* (ASSAM); Karnataka, Uttara Kannada district, Birchy, 27 November 1889, *W.A. Talbot 2061* (BSI, DD); Dandeli, 5 January 1888, *W.A. Talbot 1584* (BSI, DD); Nincholi, April 1854, W.A. Talbot s.n. (BSI, DD); Kumaon, s.d., R. *Blinkworth s.n., Wallich Catalogue Number 5742b* (K-W001121969); Madhya Pradesh, Bhind district, Baran, October 1951, *C.E. Hewett 21* (DD); Maharashtra, Chandrapur district, Palmi, 21 December 1889, *J.F. Duthie 9405* (BSI & DD); Odisha, Kalahandi district, Molipodar, 23 December 1948, *H.F. Mooney 3315* (DD); Nuapada district, Khariar, 16 April 1949, *H.F. Mooney 3315* (DD); 3 October 1949, *H.F. Mooney 3691* (DD); Uttarakhand, Nainital district, Haldwani, Joula-

sal, 29 November 1925, *B.B. Osmaston 1274* (DD); West Bengal, Darjeeling District, Naxalbari, 10 December 1878, *J.S. Gamble 327c* (DD). **INDONESIA**, Java Barat, Indramayu, Plosokerep, 3 May 1936, *van Steenis 8168* (L0898706).

Affinities

Flemingia trifoliata shows resemblance to *F. gracilis*, *F. nilgheriensis* and *F. rollae* in having head or capitate type of raceme. It can be differentiated from afore mentioned species by its larger leaflets, larger inflorescence and 0.8–1.5 m tall erect nature.

Taxonomic note

Flemingia trifoliata is a very distinct species.

Nomenclatural notes

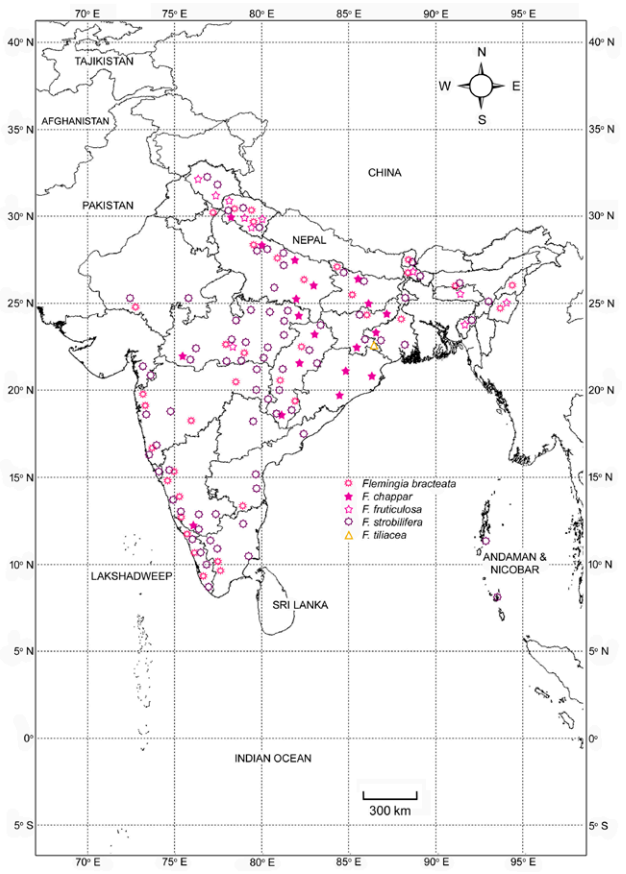
Wallich (1831) proposed a new name *Lespedeza involucrata* in his catalogue without any description based on the collection of Buchanan-Hamilton (5742a) and Blinkworth (5742b). Junghuhn (1845) made a new name *Lepidocoma trifoliatum* based on his collection from Indonesia for the same taxon. Bentham (1852) made a new combination *Flemingia involucrata* based on the Wallichian name *Lespedeza involucrata*. But *L. involucrata* is a *nomen nudum*, which bears no description at all. So the combination made by Bentham has to be changed by using epithet trifoliata of Junghuhn's binomial *L. trifoliatum* as it was validly published with ultra short description which is valid according to article 36 of ICN (van der Maesen 2012). This was done by Wu in 1946; however, the new combination *F. trifoliata* was overlooked until van der Maesen's publication in 2012. Van der Maesen (2012) noticed the new combination made by Wu (1946) during the Flora Malesiana treatment.

Flemingia subg. **Ostryodium** (Desv.) Baker

Flemingia subg. **Ostryodium** (Desv.) Baker in Hook. f. Fl. Brit. India 2: 226. 1876 (Map 5).

Erect or diffuse shrubs, leaves unifoliolate, bracts thin membranous, large folded.

Type: *Hedysarum strobiliferum* L.



Map 5. Distribution of subgenus *Ostryodium* (Desv.) Baker in India.

Key to the species of subg. *Ostryodium*

1. Leaflets ovate or linear-lanceolate, apex acute..... 2
1. Leaflets cordate, apex acuminate.....*F. chappar*
2. Erect shrubs 3
2. Trailing shrubs.....*F. fruticulosa*
3. Bracts persistent 4
3. Bracts caducous .....*F. nudiflora*
4. Plant tall up to 1.2–3.2 m in height; leaflets ovate with 12–20 mm long petiole, lateral veins 7-8(-10) pairs..... .....*F. strobilifera*
4. Plant tall up to 0.8–1 m in height; leaflets linear-lanceolate with 2–4 mm long petiole, lateral veins 4-6 pairs..... .....*F. bracteata*

Flemingia bracteata (Roxb.) Wight, Icon. Pl. Ind. Orient. 2(1): 14, t. 268. 1843

Bas.: *Hedysarum bracteatum* Roxb, Fl. Ind. 3: 351. 1832
Type: flowering specimen in Roxburgh drawing number 1612 (K image!, lectotype designated by Ali 1977: 225). Syntypes: India, witout precise locality, s.d., *W. Roxburgh s.n.* (BR0000005172306 image!, BR0000005172634 image!, BR0000005172962 image!, BR0000005172979 image!, BR0000005173303 image!, and E00157788 image!, K),

Benth. in Miquel, Pl. Jungh. 2: 245. 1852; Kurz, Forest Fl. Burma 2: 372. 1877; Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69(2): 437. 1897; T. Cooke, Fl. Bombay 2: 391. 1902; Prain, Bengal Pl. 1: 377. 1903; Talbot, Forest Fl. Bombay 1:418. 1909; Haines, Bot. Bihar Orissa 3:268. 1922; Gamble, Fl. Madras 1: 378. 1928; Saxena & Brahman, Fl. Orissa 1: 525. 1994. (Figure 18, 23r, 24q and 25p).

(≡) *Flemingia strobilifera* var. *bracteata* Baker, in Hook. f., Fl. Brit. India 2: 227. 1876

(≡) *Maughania strobilifera* var. *bracteata* Kuntze, Revis. Gen. Pl. 1: 199. 1891. (*Moghania strobilifera* var. *bracteata*).

(≡) *Maughania bracteata* Mukerjee, Bull. Bot. Soc. Bengal 6(1): 11. 1953. (as *Moghania bracteata*).

Flemingia chlorostachys Wall., Numer. List n. 5756. 1831, *nom. nud.*

Description

Erect shrubs, up to 0.8–1m tall, with branched stem; stems 3–6 mm in diameter, young triangular, mature terete, hairy; hairs silky, antrorse. Leaves unifoliolate, 10–19 cm long, stipulate, short petiolated; stipules 2, 17–20 × 1.5–2 mm, ensiform, falcate, acuminate with equal tips, fused when young, splitting at maturity, persistent, basifixed, many nerved, hairy; petioles 3–27 mm long, grooved, hairy, gland-dotted; leaflets 1, 7–17 × 2.8–5.2 cm, linear lanceolate, rounded or cordate at base, apex acute, glabrous on both surfaces, hairy on nerves dorsally, lateral nerves in 4-6 pairs; gland-dotted; glands minute, orange-red; petiolules 2–4 mm long, hairy, gland-dotted. Inflorescences an axillary and terminal racemes; racemes consisting of small cymes enclosed by membranous bracts, in two series. Flowers 10–11 mm long, pedicellate, bracteate; pedicels 1.5–2 mm long, hairy; bracts 1.7–2 × 2.2–3 cm, broadly orbicular-ovate, mucronate at apex, many nerved, papery, hairy, gland-dotted; exterior bracts small, 5–5.5 × 1.5–2 mm, lanceolate, persistent. Calyx 5–6 mm long, hairy, gland-dotted, hairs antrorse; calyx tube 1.5–2 mm long, campanulate, hairy; calyx teeth 5, 3.5–4 × 0.8–1 mm, lanceolate, subequal, lower one the longest, connate for 1/3 of its length, many nerved, hairy, gland-dotted. Corolla cream or pinkish; standard 7.5–8 × 11–12 mm, rounded to obcordate, apex retuse, glabrous, clawed with 2 auricles; claw 1.5–2 mm long; auricles 1 mm or less than 1 mm; wing petals 7–7.5 × 3–3.5 mm, oblong, slightly falcate; claw 2–2.5 mm long; keel petals 6–6.5 × 3–3.5 mm, boat-shaped, slightly falcate, fused at apex at lower side; claw 2–2.5 mm long. Stamens 10, diadelphous (9+1); staminal tube 4.5–5 × 1– 1.5 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 2–2.5 mm long, that of free stamens 5–5.5 mm long. Ovary 1.8–2 × 1 mm, gland-dotted, hairy; ovules 2; styles 5–5.5 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruit a pod, 1.1–1.2 × 6–6.5 mm, beaked, turgid, slightly septate between seeds or not, hairy, sparsely gland-dotted; beak 1 mm long; glands orange-red, withering post maturity. Seeds 2, 3 × 3 × 2 mm, rounded, mottled, shiny; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'bracteata' refers to its thin, dry, membranous bracts.

Distribution

Asia: China (Kwangtung, Yunnan), India (Assam, Bihar, Chhattisgarh, Goa, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Nagaland, Orissa, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh, Uttarakhand and West Bengal), Myanmar, Nepal, Thailand, Vietnam.

Flowering and fruiting

September to February.

Habitat and ecology

Flemingia bracteata is commonly found along the roadsides in mixed forests and also on hill slopes of open forests at an altitude of ca. 400–1000 m asl. It grows in association with *Amorphophallus* species, *Byttneria herbacea* Roxb., *Cajanus scarabaeoides* (L.) Thouars, *Gardenia resinifera* Roth, *Grewia hirsuta* Vahl, *Leea asiatica* (L.) Ridsdale, *Murdannia nudiflora* (L.) Brenan, *Phoenix acaulis* Roxb., *Phyllanthus virgatus* G. Forst., *Shorea robusta* C.F.Gaertn. and *Vigna sublobata* (Roxb.) Bairig., Panda, B.P. Choudhury & Patnaik.

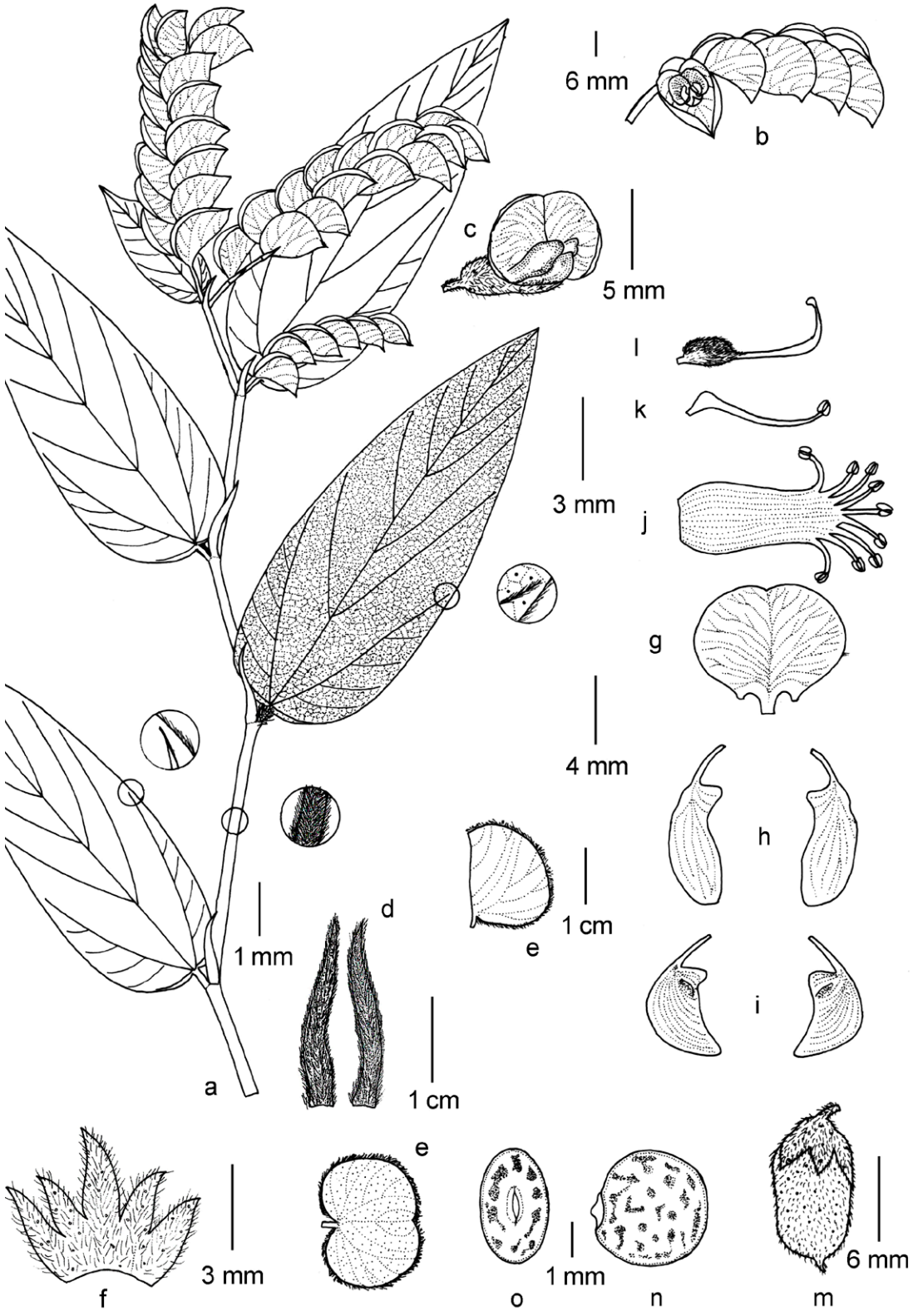


Figure 18. *Flemingia bracteata* (Roxb.) Wight. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

Additional specimens examined

INDIA, 5 January 1990, *J.F. Duthie 9406* (BSI); January 1882, *W.A. Talbot 150* (CAL); Andhra Pradesh, Chittoor district, Lakshmipuram, Sumigoda, 22 October 1986, *N.R. Rao & D. Narasimhan 84395* (BSID); Assam, s.d., *Simson s.n.* (DD); Goalpara district, Dudnai, 16 December 1960, *G. Panigrahi 22647* (ASSAM); Kamrup district, Hatigaon, 27 January 1933, *D. Nath 13246* (ASSAM); Khasi and Jaintia Hills, 6 December 1938, *S.R. Sharma 17186* (ASSAM); Bihar, Madhubani, Ganguli, 23 February 1961, *S.S. Ramam 824* (CAL); West Champaran district, Bhikhna Thori, 16 March 1958, *J.G. Srivastava 48969* (LWG); Chhattisgarh, Bastar district, Kanger Ghati National Park, 15 September 2002, *A.K. Jha & K.K. Khanna 56106* (BSA); 15 January 2004, *A.K. Jha 57425* (BSA); Bilaspur district, Bilaspur, 22 February 1957, *P.C. Nanda 1189* (CAL); Jashpur district, Jashpur Nagar, 26 December 1964, *C.M. Arora 7242* (CAL); 9 July 1990, *B. Lal & R.L.S. Sikarwar 8616* (LWG); Mungeli district, Achanakmar Wildlife Sanctuary, 11 September 2015, *S.K. Gavade & A.P. Tiwari 91* (SUK); Raigarh district, Khondra village, 9 September 2015, *S.K. Gavade & A.P. Tiwari 89* (SUK); Goa, South Goa, Ordofond, 18 April 1963, *K.C. Kanodia 88127* (BSI); on the way to Ordofond to Bhatpal, 11 November 1962, *S.R. Rolla 84677* (BSI); Haryana, 11 December 1997, *S. Kumar 93240* (BSD); Yamuna Nagar district, Kalesar National Park, 28 December 1919, *R.N. Parker s.n.* (DD); 29 December 1919, *R.N. Parker s.n.* (DD); Jharkhand, Chota Nagpur, December 1881, *J.S. Gamble s.n.* (DD); Giridih district, Parasnath, 5 October 1956, *V. Chandra & party 33800* (LWG); 2 October 1873, *C.B. Clarke 20233B* (CAL); September 1949, *R.C. Bhardwaj s.n.* (DD); Karnataka, Chikkamagaluru district, Baba Budangiri, 22 October 1964, *R.S. Raghavan 103811* (BSI); 2 December 1978, *S.R. Ramesh & K.R. Keshava Murthy 4800* (JCB); Kodagu district, Abbey Falls, 20 October 1963, *A.S. Rao 94968* (BSI); Brahmagiri hills, 15 November 1978, *V.S. Ramachandran 58746* (MH); December 1907, *E. Blatter 10349* (BLAT); Nagarhole National Park, 2 November 1963, *A.S. Rao 95445* (BSI); Uttara Kannada district, Anmod, 6 February 1950, *J. Fernandez 983* (BLAT); Castle Rock, 24 October 1902, *G.A. Gammie 15883* (BSI); 18 December 1953, *H. Santapau 17648* (BLAT); Dandeli, 25 December 1955, *D.P. Panthaki 2449* (BLAT); *D.P. Panthaki 2450* (BLAT); 26 December 1955, *D.P. Panthaki 2475* (BLAT); Gund, 27 December 1955, *D.P. Panthaki 2484* (BLAT); 4 November 1962, *H.K. Mazumdar 163* (BARO); Ramanguli, 8 January 1951, *J. Fernandez 2063* (BLAT); Sirsi, October 1991, *C. McCann 34579* (BLAT); Shivamogga district, Jog Falls, 16 January 1950, *J. Fernandes 747* (BLAT); 18 January 1950, *J. Fernandes 788* (A,BLAT); Someshwara Wildlife Sanctuary, 6 February 1961, *R.S. Raghavan 69377a* (BSI); Kerala, Alappuzha, Microwave Station, 8 November 1981, *V.S. Raju 71208* (MH); Idukki district, Kulamavu, 24 September 1978, *B. Ramanujan 58746* (MH); Kuttikkanam, 27 November 1967, *K. Vivekananthan 29382* (CAL); 24 September 1972, *B.D. Sharma 41647* (MH); on the way to Kuttikkanam to Peermade, 27 November 1962, *K. Vivekananthan 29382* (MH); Peermade, 2 November 1970, *Sreedaran Nambiar M.K. 144* (CALI); 9 December 1970, *Sivadasan M. 548* (CALI); 9 December 1970, *Prabhakaran A. 1549* (CALI); Vandiperiyar, 26 August 1985, *K.M. Matthew 18505* (RHT); Kollam district, on the way to Punalur to Chalakodu, 5 May 1976, *Jose A. 18333* (CALI); Kozhikode district, Kadalundi, 6 June 1989, *Babu A. 44363* (CALI); Pavangad, 28 October 1945, *J.L. Ellis 25748* (CAL & MH); Malappuram district, Nilambur, s.d., *Kadeejakutty 275* (CALI); 9 December 1988, *Santa S. 3651* (CALI); 10 December 1988, *Jayakumar E. 2114* (CALI); *Premlatha 3251* (CALI); Vatakara, 11 December 1990, *Bindu A. 3012* (CALI); Palakkad district, Kanjirakadavu, 14 January 1981, *P. Matthew 25692* (CALI); Nelliyampathy, 12 December 1996, *K. Radha Laxman 29025* (TBGT); on the way to Valiyaparathode, 15 January 1980, *N.C. Nair 65470* (CAL); Pathanamthitta district, Kakki, 30 July 1991, *S. Binu 2132* (TBGT); on the way to Pampa dam to Anathode, 28 January 1986, *K.M. Matthew 18761* (RHT); Pannikkunnur, 26 January 1992, *R. Chandrasekaran 96677* (MH); Wayanad district, Chandanathode, 18 November 1982, *N. Sasidharan 2554* (KFRI); Wyanad forest, 6 November 1985, *Breezy George 7420* (CALI); 21 September 1990, *Preena G. 4604* (CALI). Madhya Pradesh, 3 March 1980, *S.K. Das Das 961* (CAL); Anuppur district, Kapil Dhara, 27 October 1960, *J.K. Maheshwari 4175* (CAL); Balaghat district, Baihar, 9 February 1949, *R.L. Fleming 826* (DD); on the way to Nagarwada to Lamta, 12 January 1961, *J.K. Maheshwari 4436* (CAL); Seta Dongi, 10 May 1958, *H. Santapau 22491* (BLAT); Chhindwara district, Patalkot, 1 October 1985, *R.P. Dwivedi 2945* (LWG); Dindori district, Dhurkuta, 27 February 1984, *B. Lal & party 2383* (LWG); *B.S. Kalakoti 2383* (LWG); Hoshangabad district, Pachmarhi, 18 February 1891, *J.F. Duthie 10375* (CAL, DD); Little falls, 10 October 1969, *V.N. Naik 552* (BAMU); Rajat Prapat, 20 September 2002, *R. Sharma 56592* (BSA); Jabalpur district, Jabalpur, s.d., *R.S. Hole s.n.* (DD); December 1901, *Forest Division Officer 57* (CAL); Kaimur Range, 10 February 1959, *K.M. Sebastine 7695* (CAL, MH); Mandla district, Bichhiya, 7 February 1961, *J. Joseph 12236* (MH); Kanha National Park, 9 March 1962, *J.K. Maheshwari 4720* (CAL); 11 March 1962, *J.K. Maheshwari 4809* (CAL); 12 March 1962, *J.K. Mahesh-*

wari s.n. (CAL); Surguja district, Bargaon, 20 July 1990, *B. Lal & R.L.S. Sikarwar* 8753 (LWG); Lakhanpur, 5 November 1998, *V. Kumar & M.K. Shukla 608* (LWG); Maharashtra, Bombay, 25 December 1953, *Kaul & party 5867* (LWG); Kolhapur district, Parale Maan, 3 September 2016, *S.K. Gavade 138* (SUK); Mumbai Suburban district, Borivali National Park, 29 October 1955, *P.S. Herbert 860* (BLAT); 19 February 1956, *P.S. Herbert 1398* (BLAT); *P.S. Herbert 1409* (BLAT); *P.S. Herbert 1410* (BLAT); *P.S. Herbert 1411* (BLAT); 24 October 1956, *P.S. Herbert 2542* (BLAT); Nashik district, Trimbakeshwar, 10 November 1976, *V.N. Naik 2905* (BAMU); Osmanabad district, Osmanabad, 10 October 1964, *N.V. Ingle s.n.* (BAMU); Pune district, Khandala, 15 March 1945, *H. Santapau 6125* (BLAT); 29 January 1955, *P.V. Bole 1311a* (BLAT); Raigad district, Matheran, 10 January 1959, *N.A. Irani 2781* (BAMU); Rambagh picnic spot, 26 February 1959, *N.A. Irani 2989* (BLAT); Thane district, Khardi, 22 February 1903, *G.A. Ryan 526* (BSI); Meghalaya, Ri Bhoi district, on the way to Umsning to Noonmati, 11 May 1965, *J. Joseph 37572* (ASSAM); Manipur, Imphal East district, Imphal, 9 April 1962, *J.G. Srivastava 81989* (LWG); Nagaland, Naga Hills district, Naga hills, 1935, *N.L. Bor 2856* (DD); Odisha, Kandhamal district, Kandhamal, 11 December 1962, *G.S. Rao 30150* (ASSAM); Mayurbhanj district, Simlipal National Park, *S.L. Kapoor & party 73139* (LWG); on the way to Baliguda to Kotagad, *S.L. Kapoor & party 64927* (LWG); Rajasthan, Sirohi district, Mount Abu, Gomukh, 14 April 1960, *S.K. Jain 62112* (BSI); Sikkim, s.d., *S. Kurz s.n.* (CAL); East Sikkim, Majitar, 2 January 1994, *G.P. Sinha 8578* (BSHC); South Sikkim district, Jorethang, 5 December 1996, *S.K. Jana 18958* (BSHC); Manpur, 4 January 1994, *G.P. Sinha 10759* (BSHC); Melli, 17 December 1981, *P. Chakraborty 1970* (CAL); 18 December 1981, *P. Chakraborty 1970* (BSHC); Tamil Nadu, Coimbatore district, Anaimalai hills, Kadamparai, 9 December 1913, *C.E.C. Fischer 3672* (CAL); Dindigul district, Kodaikanal, 12 February 1982, *Geetha H. 36095* (CALI); 10 March 1982, *Manimohan P. s.n.* (CALI); Sirumalai, December 1937, *s.coll. s.n.* (RHT); Madura District, on the high way, 6 September 1925, *K.C. Jacob 17527* (MH); Nilgiris district, Gudalur, 11 March 1969, *D.B. Deb 31652* (MH); Telangana, Yadadri-Bhuvanagiri district, 6 December 1984, *R.R.V. Raju 2380* (BSID); Uttar Pradesh, Bahraich district, 26 November 1987, *K.K. Singh & team 6911* (LWG); Murtiha forest range, 10 November 2002, *S.D. Maluja 224587* (LWG); Nishan Gara, 12 November 2002, *S.D. Maluja 224634* (LWG); 4 October 1956, *H. Pirson 1474* (BLAT); 12 February 1965, *O.P. Misra 7945* (BSA, CAL); 26 November 1987, *K.K. Singh 6911* (LWG); Balrampur district, Soheleva, 18 October 2005, *K.K. Khanna 59964* (BSA); East Soheleva, 9 January 2007, *K.K. Khanna 68703* (BSA); Gorakhpur district, Campierganj, 20 January 2007, *K.K. Khanna 66548* (BSA); Lakhimpur Kheri district, Dhyanpur, 8 August 1980, *J. K. Maheshwari & party 277* (LWG); Mailani, 17 December 1960, *C.L. Malhotra 13376* (BSD); Pilibhit district, Mala forest, 9 December 1949, *D.D. Awasthi 304* (DD); Saharanpur district, Datt, 19 June 1955, *J.G. Srivastava 6981* (LWG); Sant Kabir Nagar district, Bakhira Bird Sanctuary, 19 January 2007, *K.K. Khanna 68534* (BSA); Sonbhadra district, Pipri dam site area, 11 March 1970, *G. Panigrahi 12078* (BSA); Uttarakhand, Champawat district, Reetha Sahib, 29 October 2012, *K. Ambrish 120879* (BSD); Dehradun district, Chandrabani forest, 10 October 2015, *S.K. Gavade 106* (SUK); Dehradun, s.d., *Janson s.n.* (DD); August 1895, *P.W. Mackinnon s.n.* (CAL); August 1996, U. C. Kanjilal s.n. (DD); 13 March 1954, *G.S. Srivastava 6864* (LWG); 22 October 1991, *A. Prakash & party 210609* (LWG); Kandoli, 29 September 1961, *S.K. Malhotra 17386* (BSD); Karwapani, 06 December 1956, *T.A. Rao & Y.K. Sarin 1237* (BSD); Lachhiwala, 5 October 1922, *K. Ram s.n.* (DD); 8 December 1956, *G.S. Puri 40041* (BSI); 12 November 1968, *B.D. Naithani 38541* (BSD); Laxman Siddh, 6 October 1973, *H.B. Naithani s.n.* (DD); Mothrowala, 12 September 1958, *K.M.M. Dakshini 6218* (BSD); Nakronda, 2 February 1957, *M.A. Rao 1614* (BSD); Rajaji National Park, 1984, *W.A. Rodgers 2835* (WII); Rajpur, 10 December 1956, *G.S. Puri 10121* (BSI); 9 December 1960, *H.O. Saxena 15019* (DD); Rispana, 30 August 1964, *C.R. Babu 34002* (BSD); Timli forest, 11 December 1954, *V. Chandra & party 43033* (LWG); Haridwar district, Motichur, 13 December 1912, *A.E. Osmaston 16* (DD); 14 November 1995, *A. Prakash 107867* (LWG); Nainital district, Haldwani, 1 March 1953, *Kaul & party 19613* (LWG); Jim Corbett National Park, 16 September 1970, *P.C. Pant 43296* (BSD); 19 November 1972, *K.P. Janardhanan 51101* (BSD); 28 September 1972, *K.P. Janardhanan 51276* (BSD); Bijrani, 22 October 2000, *H.C. Pande 222004* (LWG); Dhikala, 14 September 1970, *P.C. Pant 43233* (BSD); Gargia, 6 September 1970, *P.C. Pant 43020* (BSD); Malani, 5 November 1999, Tariq Hussain, *217212* (LWG); Sandigaon, 23 December 1999, T.S. Rana, *B. Datt & H.C. Pande 220236* (LWG); Ramnagar, T.B. forest, *V. Chandra & party 47847* (LWG); Pithoragarh district, 17 November 1989, *B. Datt 202537* (LWG); Bansagar, s.d., *B. Balom 75661* (BSD); Bastiyadhar, 14 November 1989, *B. Datt 202448* (LWG); Garhwal, 1869/70, *G. King s.n.* (CAL); Kumaon, 1871, *G. King s.n.* (CAL); West Bengal, Alipurduar District, Chilapata forest, Banya-6, 15 December 1995, *S. Chandra & S.K. Mandal 1148* (CAL); Darjeeling district, Darjeeling, 14 December 1876, *C.B. Clarke 31731*

(CAL); Sukna, 9 November 1976, *J.S. Gamble 1759b* (DD).

Affinities

Flemingia bracteata is allied to *F. strobilifera* but differs from it in the presence of narrow cordate leaflets, short petiole, ensiform persistent stipules and broadly orbicular-ovate bracts.

Taxonomic note

Flemingia bracteata is a distinct species but Baker (1876) and Kuntze (1891) treated it as a variety under *F. strobilifera*. Subsequent workers, viz. Kurz (1877), Prain (1897, 1903), Cooke (1902), Talbot (1909), Haines (1922), Gamble (1928), Mukerjee (1853) and Saxena and Brahman (1994) treated *F. bracteata* as a distinct species. Sanjappa (1992) and Kothari (2001) and Do and Gao (2020) synonymised *F. bracteata* under *F. strobilifera*. Our findings have revealed that *F. bracteata* is a distinct species and not conspecific to *F. strobilifera* although they are looking quite similar. Determinations often resulted in *F. strobilifera*.

Nomenclatural notes

Ali (1977) lectotypified the binomial *Flemingia bracteata* and designated Roxburgh's drawing number 1612 as type. *Flemingia bracteata* is based on *Hedysarum bracteatum* which was described by Roxburgh in 1832. In 'Flora Indica', Roxburgh (1832) mentioned that this species was sent to the Calcutta Garden by Dr. W. Carey from Dinajpoor (Dinajpur, now in Bangladesh). Further, he added that the species is a native of Bengal and grows luxuriantly and flowers in winter. However, while describing the species, Roxburgh did not indicate the type. In the search of type specimens in relevant herbaria (BM, BR, E, K (K-W), LIV, OXF and LINN), we found five herbarium sheets in BR which were purchased by Martius, founder of 'Flora Brasiliensis', from LINN (Forman 1997). All these sheets had been collected by Roxburgh and constitute original material. Two sheets (BR0000005172306 and BR0000005172962) bear the label upon which "*Hedysarum bracteatum*" is written in Roxburgh's handwriting. One of the sheets (BR0000005173303) is labeled as "Kusrunt, lanced leaves, flowering in August, *Hedysarum bracteatum*". Another two sheets (BR0000005172634 and BR0000005172979) bear only the stamp of Martius herbarium. Additionally, one specimen at E (E00157788) also bears a label upon which "*Hedysarum bracteatum*" is written in Roxburgh's hand and hence it also forms a part of the original material. All the sheets mentioned above serve as syntype.

Flemingia chappar Buch.-Ham. ex Benth. in Miquel Pl. Jungh. 2: 244. 1852

Type: India, West Bengal, Calcutta Botanical Garden, s.d., *s.coll. s.n., Wallich Catalogue Number 5757b* two specimens (Thuan mentions locality as Inde Orientale), first-step lectotype designated by Thuan 1979: 142; K-W001122032 image!, second-step lectotype designated here; isolectotypes K-W001122039 image!, L0018981 image! and P00709067 image!). Syntypes: Myanmar, Taong Dong, 24 November 1826, *N. Wallich, Wallich Catalogue Number 5757d* (BM000958674 image!, E00157796 image!, K-W001122034 image! and K-W001122035 image!). India, Uttar Pradesh, Barabanki district, Ganjariya, 22 November 1810, *F. Buchanan-Hamilton s.n., Wallich Catalogue Number 5759a* (E00157797 image! and K-W001122030 image!); Raebareli district, Lalganj, s.d., *F. Buchanan-Hamilton s.n., Wallich Catalogue Number 5759a* (K-W001122031 image!). Uttarakhand, Dehradun, April 1825, *N. Wallich, Wallich Catalogue Number 5757c* (K-W001122033 image!).

Baker, in Hook. f., Fl. Brit. India 2: 227. 1876; Kurz, Forest Fl. Burma 2: 371. 1877; Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69(2): 438. 1897; Prain, Bengal Pl. 1:377. 1903; Haines, Bot. Bihar Orissa 3: 267. 1922; Gamble, Fl. Madras 1: 378. 1928; Babu, Herbac. Fl. Dehra Dun 148. 1977; Sanjappa, Legumes of India 175. 1992. (Figure 19, 23s, 24r and 25q).

(≡) *Maughania chappar* (Buch.-Ham. ex Benth.) Kuntze, Revis. Gen. Pl. 1: 199. 1891; Mukerjee, Bull. Bot. Soc. Bengal 6(1): 13. 1953. (as *Moghania chappar*).

Description

Erect shrubs, up to 0.8–1 m tall, with branched stem; stems 4–10 mm in diameter, terete, hairy; hairs silky, antrorse. Leaves unifoliolate, 7–16 cm long, stipulate, petiolate; stipules 2,8–9 × 2.5–3 mm, lanceolate, acuminate with equal tips, fused when young, splitting at maturity, basifixed, caducous, many nerved, hairy; petioles 2–4 cm long, terete, hairy, gland-dotted; leaflets 1, 5–13 × 6–10 cm, broadly cordate, rounded or cordate at base, apex acuminate, glabrous on both surfaces, hairy on nerves dorsally, gland-dotted; glands orange-red; petiolules 3–5 mm long, hairy, gland-dotted. Inflorescences an axillary and terminal raceme; racemes comprising small cymes enclosed by membranous bracts, in two series. Flowers 10–11 mm long, pedicellate, bracteate; pedicels 2–3 mm long, hairy; bracts 2.5–2.6 × 4–4.2 mm, reniform, mucronate at apex, many nerved, glabrous, gland-dotted. Calyx 4–5 mm long,

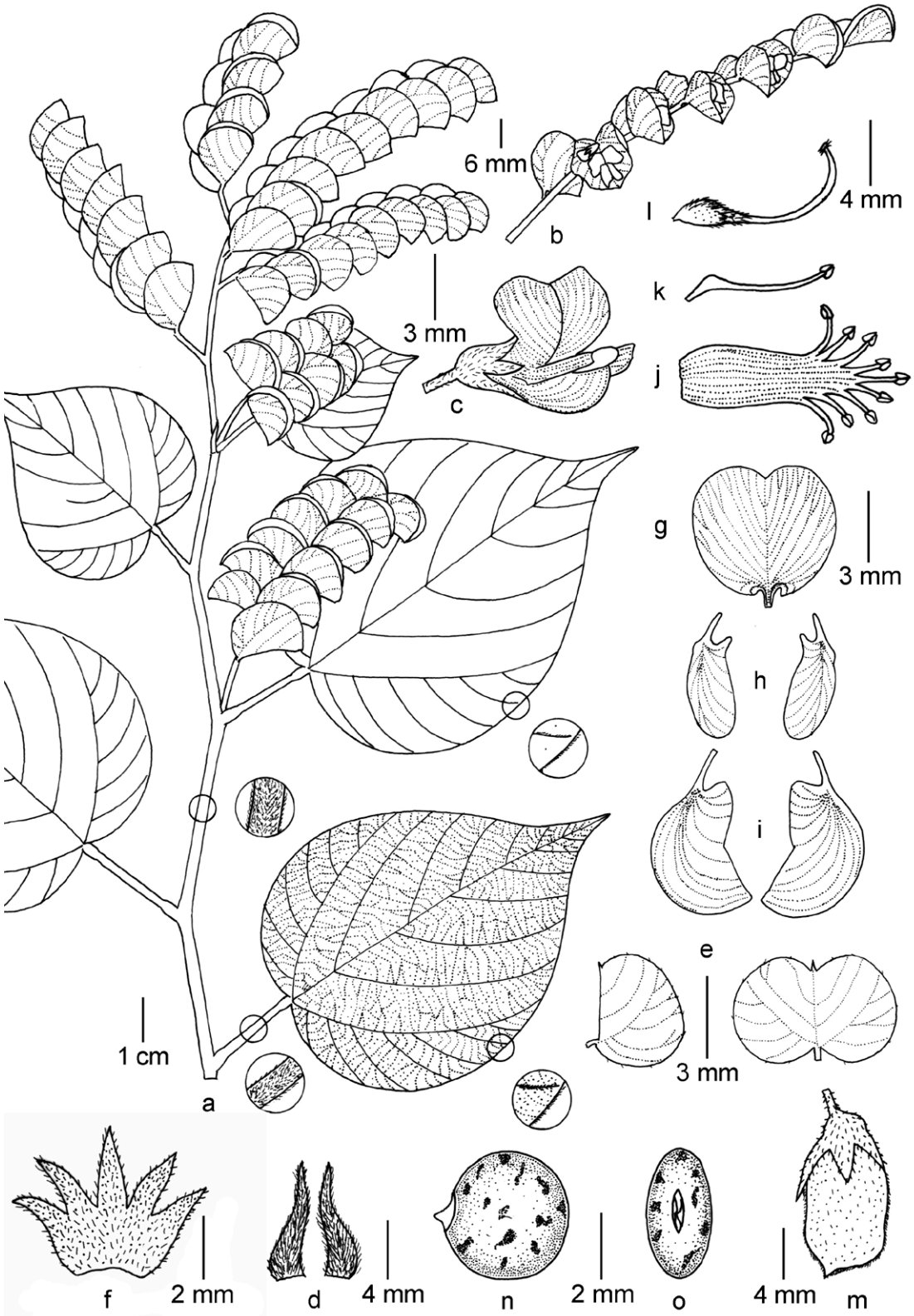


Figure 19. *Flemingia chappar* Buch.-Ham. ex Benth. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

hairy, gland-dotted; calyx tube 1.5–2 mm long, campanulate, hairy; calyx teeth 5, 2–3 × 0.8–1 mm, lanceolate, subequal, lower one the longest, connate for 1/2 of its length, many nerved, hairy, gland-dotted. Corolla white with green striations; standard 6–6.5 × 6–6.5 mm, rounded to obovate, apex retuse, glabrous, clawed with 2 auricles; claw 1.5–2 mm long; auricles 1 mm or less than 1 mm; wings petals 6–6.5 × 2–2.5 mm, oblong; claw 1.5–2 mm long; keel petals 9–9.5 × 4–4.5 mm, boat-shaped, slightly falcate, fused at apex at lower side; claw 2–2.2 mm long. Stamens 10, diadelphous (9+1); staminal tube 7–7.5 × 1 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 2–2.5 mm long, that of free stamens 8–8.5 mm long. Ovary 0.8–2 × 1 mm, gland-dotted, hairy; ovules 2; styles 7–7.5 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 1.2–1.4 × 6–6.5 mm, beaked, turgid, slightly septate between seeds or not, hairy, sparsely gland-dotted; beak 1 mm long; glands orange-red, withering post maturity. Seeds 2, 4 × 4 × 2.5 mm, rounded, mottled, shiny; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'chappar' refers to its thin, dry, membranous bracts.

Distribution

Asia: Cambodia, India (Bihar, Chhattisgarh, Karnataka, Jharkhand, Madhya Pradesh, Odisha, Uttar Pradesh, Uttarakhand and West Bengal), Myanmar, Nepal, Thailand.

Flowering and fruiting

December to March.

Habitat and ecology

Flemingia chappar is found on hill slopes in open forests at an altitude of ca. (300-) 600–1000 m asl. It grows in association with *Bauhinia malabarica* Roxb., *B. vahlii* Wight & Arn., *Cassia fistula* L., *Ficus racemosa* L., *Pueraria tuberosa* (Roxb. ex Willd.) DC., *Shorea robusta* C.F.Gaertn. and *Terminalia alata* B.Heyne ex Roth.

Additional specimens examined

INDIA, December 1907, *A. Meebold s.n.* (BSI); s.d., *R.C. Srivastava 43360* (BSA); Chota Nagpur, November 1880, *J.S. Gamble 8764* (CAL); s.d., *J.J. Wood s.n.* (CAL); Bihar, Muzaffarpur district, Motipur, 12 March 1964, *G. Panigrahi 2845* (BSA, CAL); 22 November 1964, *G. Panigrahi & O.P. Mishra 6532* (BSA); 7 December 1986, *K.K. Khanna & R. Saran 38561* (BSA, CAL); Nalanda district, Palaman, 25 September 1981, *M.K. Mano & P. Sahaddar 958* (BSA); Chhattisgarh, Balrampur-Ramanujganj district, Ramanujganj, 15 March 1974, *G.S. Gupta 18807* (BSA); Jashpur district, Jashpur, 21 April 1965, *G. Panigrahi & C.M. Arora 8804* (BSA & CAL); Jashpur Nagar, 4 May 1964, *C.M. Arora 3893* (BSA & CAL); Kutma nala, 31 March 1976, *N.C. Balakrishnan 24402* (BSA); on the way to Kunkuri to Lawakera, 14 February 1974, *N.C. Balakrishnan 19900* (BSA); Raigarh district, Dharamjaygarh, 22 December 1964, *C.M. Arora 7151* (BSA, CAL); Sukhamuda, 9 February 1974, *N.C. Balakrishnan 19781* (BSA); Kumarata, Pataklota forest, 15 June 2016, *S.K. Gavade 133* (SUK); 1 January 2017, *S.K. Gavade 169* (SUK); 26 January 2017, *S.K. Gavade 181* (SUK); Surguja district, Ambikapur, 17 November 1972, *G.S. Gupta 17120* (BSA); Pratappur, s.d., *A.K. Srivastava s.n.* (BSA); Sabag, 21 February 1976, *G.S. Gupta 24105* (BSA); Karnataka, Kodagu district, Abbey Falls, *T.A. Rao & B.C. Banerjee 11719* (CAL); Jharkhand, Dumka district, Silingi, Bonsloi river, 21 December 1957, *G. Panigrahi 12078* (CAL); Giridih district, Parasnath hills, 13 October 1982, *G.N. Tribedi 708* (CAL); 21 November 1891, *D. Prain 129805* (CAL); Gumla district, Kurdega, 20 February 1981, *K.C. Malick 9746* (CAL); Hazaribagh district, Canary hills, 10 November 1964, *K.K. Kanodia 1050* (CAL); Hazaribagh, 9 October 1873, *C.B. Clarke 21036* (CAL); Sahibganj district, Borio, 12 December 1957, *G. Panigrahi 11705* (CAL); Singhbhum district, Goelkera, 27 December 1960, *G.V.S. Rao 22740* (CAL); Tholkabad, s.d., *B.L. Jain s.n.* (BARO); Madhya Pradesh, Sidhi district, Kushmi, 22 December 2015, *A.P. Tiwari 119* (SUK); Singrauli district, on the way to Mohgarhi to Kushanhiya, 24 February 1971, *G.S. Gupta 14578* (BSA, CAL); Sarai reserve forest, 30 January 1971, *G.S. Gupta 14476* (CAL); Dhar district, Barda, 21 January 1964, *G. Panigrahi & V.N. Singh 2407* (CAL); on the way to Barda to Chitrangi, 21 January 1964, G. Panigrahi 2407 (BSA); Odisha, s.d., *G. Panigrahi s.n.* (ASSAM); Angul district, Satkosia wildlife sanctuary, 16 November 2002, *D. Hazra & D. Das 19322* (BSID); Balasore district, Kuldiha wildlife Sanctuary, 24 January 1986, *Anitha M.P. 5339* (CALI); *Baby Jaylekha 7940* (CALI); Gettha P. 6734 (CALI); *Jeena Majeed 8346* (CALI); *Naseem P.A. 5563* (CALI); *Vaisa A.K. 7036* (CALI); 25 January 1986, *Breezy George 7566* (CALI); *Karthiayani K.P. 6349* (CALI); 27 January 1986, *Neena C. 8960* (CALI); Raj Nilgiri, 25 January 1986, *A.K. Pradeep 5934* (CALI); Dhenkanal district, Ramial dam site, 19 March 1975, *A.R.K. Sastry 11105* (BSID); Ganjam district, Gullery, January 1884, *J.S. Gamble 13733* (CAL); Mayurbhanj district, Bhanjabasa, 13 February 1958, *G. Panigrahi 123225* (CAL); Manchabandha, 12 December 1940, *s.coll. s.n.* (DD); Sambalpur district, Hatigirdha, 4 November

1986, *S. Panda & A.P. Das 276* (CAL); Usakulhi reserve forest, 25 February 1987, *S. Panda & A.P. Das 539* (CAL); *S. Panda & A.P. Das 567* (CAL); Uttar Pradesh, Allahabad district, Lehari, 1 November 1963, *C.M. Arora 1430* (BSA); Bagpat district, Tikri forest, 9 October 2004, *s.coll. 107206* (LWG); Bahraich district, Chakiya forest block, 11 February 1959, *M.A. Rau 8234* (BSA, BSD); Nishan Gara, 1 October 1956, *H. Pirson 1426* (BLAT); on the way to Rupaidiha to Chakiya, 7 February 1965, *O.P. Mishra 7706* (BSA, CAL); Balrampur district, West Soheleva, 10 January 2007, *K.K. Khanna 68722* (BSA); Balrampur, February 1848, *Inayat Khan 20968* (DD); Gonda district, Narhena, 30 May 1898, *Harsukh 21514* (CAL); Gorakhpur district, Campierganj, 20 January 2007, *K.K. Khanna 66526* (BSA); Chamokha, 4 April 1898, *Harsukh 21513a* (CAL); Gorakhpur, 23 March 1898, *Inayat Khan 21513* (DD); Gorakhpur T. Ghats, 24 November 1987, *K.K. Singh & party 6921* (LWG); Pakari, 6 November 1963, *C.M. Arora 1562* (BSA); Jaunpur district, Gulra, 29 November 1954, *Hiralal 16671* (LWG); Lakhimpur Kheri district, Andesh Nagar, 7 December 2004, *B.K. Shukla 61464* (BSA); Mailani, 2 November 1905, *R.S. Hole s.n.* (BSD, DD); 17 December 1960, *C.L. Malhotra 13375* (BSD); Maharajganj district, Domakhand, 24 January 1968, *J.K. Maheshwari 81534* (LWG); Madhulia, 15 January 1992, *S.L. Kapoor 8* (LWG); Madwalia forest, 26 February 2004, *B. Datt 222353* (LWG); Mirzapur district, Hati nala, 11 December 1961, *U.C. Bhattacharya 18347* (BSA, BSD); 23 December 1970, *G. Panigrahi 13647* (BSA); Rampur district, Abdullaganj, 5 July 1954, *V. Chandra & party 11941* (LWG); Shravasti district, Bhinga, Bankatwa, 6 March 2010, *S.D. Maliya 226679* (LWG); Sonbhadra district, Pipri Dam Forest, 11 March 1970, *G. Panigrahi 12071* (BSA); Uttarakhand, Garhwal district, Kansrao, February 1942, *M.B. Raizada s.n.* (DD); Haridwar district, Motichur, 14 November 1995, *A. Prakash 107865* (LWG); December 1895, *J.S. Gamble 25637* (CAL, DD); 19 December 1912, *B.B. Osmaston 15* (DD); *B.B. Osmaston 8237* (DD); *B.B. Osmaston 8235* (DD); Tirsal forest, February 1989, *A. Smythes s.n.* (DD); West Bengal, Bankura district, Biharinath hill, 12 June 1910, *S. Kurz s.n.* (CAL); Manbhum district, Manbhum, s.d., *J. Campbell s.n.* (CAL); Medinipur district, Rangamati, 2 March 1975, *S.K. Moti 1165* (CAL); Purulia district, Ayodhya hills, 16 May 1963, *U. Chatterjee 54* (CAL); 25 December 1958, *G.S. Gupta 2063* (CAL); Upper dam, 6 March 1997, *T.K. Paul 704* (CAL).

Affinities

Flemingia chappar is allied to *F. paniculata* but differs from it in the presence of papery folded bract, racemes comprising small cymes and cordate leaflets.

Taxonomic note

Flemingia chappar is a very distinct species.

Nomenclatural notes

The binomial *Flemingia chappar* was proposed by Buchanan-Hamilton (Wallich 1831) in Wallich catalogue which was later validly published in 'Plantae Junghuhnianae' by Bentham (1852). While describing the species, Bentham cited the specimen with Wallich Catalogue Number 5757 in the protologue.

Thuan (1979) in his treatment of *Flemingia* in Flore du Cambodge, Laos, Vietnam mentioned "Wallich 5757B, Inde orientale (holo-, K; iso-, P)". According to Art. 9.10 of the ICN (Turland et al. 2018), this is an error to be corrected, and this should be regarded as the selection of a lectotype. Similarly, the duplicates at K, L and P should serve as isolectotypes. While searching for the type, we could locate twelve specimens of Wallich Catalogue Number 5757, viz. 5757a, 5757b, 5757c and 5757d (Wallich 1831). We found that there are three sheets of 5757a which were collected by Buchanan-Hamilton. Out of these three, one at E (E00157797) was collected from Gunjoriya (now Gunjaria, Uttar Pradesh) and two at K (K-W001122030 and K-W001122031) were collected form Lalganj (Uttar Pradesh). One sheet each pertaining to 5757b were located at K, L and P. The first sheet at K (K-Wall.) has two specimens, viz. K-W001122032 and K-W001122039. Sheets at L (L0018981) and P (P00709067) were collected from Calcutta Botanic Garden by an unknown collector. The sheet bearing collection number 5757c at K (K-W001122033) which is from Dehradun, India, was collected by Wallich. Collection number 5757d is represented by four specimens mounted on three sheets: one sheet each at BM (BM000958674) and E (E00157796). The third at K bears two specimens (K-W001122034 and K-W001122035). These four specimens were collected by Wallich from Taong Dong, Myanmar. Thuan's mention of 5757b as holotype should be considered as a first-step typification according to Art. 9.17 Ex.14. of the Shenzhen Code (Turland et al. 2018). Consequently, the designation is here narrowed by selecting the specimen (K-W001122032) referred by Thuan as "holotype" as second step lectotype as per Art. 9.17 of ICN (Turland et al. 2018). The duplicates of 5757b (K-W001122039, L0018981 and P00709067) become isolectotypes. The remaining specimens serve as syntypes.

Flemingia fruticulosa Wall. ex Benth. in Miquel, Pl. Jungh. 2: 245. 1852

Type: Nepal, without precise locality, 1821, *s.coll. s.n. Wallich catalogue Number 5756a* (K001122023 image!, lectotype designated by Ali 1977: 225; isolectotype CAL163049!, CAL163050!, BM000884630 image!, G00365320 image!). Syntype: India, Himachal Pradesh, Sirmore, s.d., *G. Govan s.n., Wallich catalogue Number 5754 b* (K001122024 image!). (Figure 20 and 23t).

Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69(2): 438. 1897.

(≡) *Flemingia strobilifera* var. *fruticulosa* (Wall. ex Benth.) Baker, in Hook. f., Fl. Brit. India 2: 227. 1876.

(≡) *Maughania fruticulosa* (Wall. ex Benth.) Mukerjee, Bull. Bot. Soc. Bengal 6(1): 12. 1953 (as *Moghania fruticulosa*).

Description

Trailing shrubs, up to 40–60 cm long, with branched stem; stems 2.5–4 mm in diameter, terete, hairy; hairs silky, antrorse. Leaves unifoliolate, 5.4–7.4 cm long, stipulate, petiolate; stipules 2, 10–11 × 1.8–2 mm, lanceolate, acuminate with equal tips, fused when young, splitting at maturity, persistent, basifixed, many nerved, hairy; petioles 2–3 cm long, grooved, gland-dotted, hairy; leaflets 1, 5.4–7.4 × 3.2–14.6 cm, ovate to elliptic, cordate or subcordate at base, apex acute, glabrous on both surfaces, hairy on nerves dorsally, gland-dotted; glands orange-red; petiolules 2–2.5 mm long, hairy, gland-dotted. Inflorescences an axillary and terminal raceme; racemes comprising 3-4 flowers enclosed by membranous bracts, in two series. Flowers 8–9 mm long, pedicellate, bracteate; pedicels 1.5–2 mm long, hairy; bracts 2–2.5 × 3–3.8 mm, persistent, reniform, retuse, mucronate at apex, many nerved, hairy, gland-dotted. Calyx 5.5–6.5 mm long, hairy, gland-dotted; calyx tube 1.8–2 mm long, campanulate, hairy; calyx teeth 5, 3–4 × 0.8–1 mm, lanceolate, subequal, lower one the longest, connate for 1/3 of its length, many nerved, hairy, gland-dotted. Corolla white; standard 6–6.5 × 7–7.5 mm, cordate, apex retuse, glabrous, clawed with 2 auricles; claw 1.5–2 mm long; auricles 1 mm or less than 1 mm; wing petals 6.5–7 × 2.5–2.8 mm, oblong; claw 2.5–2.8 mm long, auricled; keel petals 6.5–7 × 3–3.5 mm, boat shaped, slightly falcate, fused at apex at lower side; claw 2–2.2 mm long. Stamens 10, diadelphous (9+1); staminal tube 5–5.5 × 1 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 1.5–2 mm long, that of free stamens 6.5–7 mm long. Ovary 1.5–1.8 × 0.8–1 mm, gland-dotted, hairy; ovules 2; styles 6.5–7 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 10–1.2 × 5–5.5 mm, beaked, turgid, slightly septate between seeds or not, hairy, sparsely gland-dotted; beak 1 mm long; glands orange-red, withering post maturity. Seeds 2, 2.5 × 2.5 × 2.5 mm, rounded, mottled, shiny; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'fruticulosa' refers to its trailing shrubby habit.

Distribution

Asia: China (Yunnan), India (Himachal Pradesh, Madhya Pradesh, Manipur, Meghalaya, Tripura, Uttar Pradesh, Uttarakhand and West Bengal), Nepal, Pakistan.

Flowering and fruiting

June to December.

Habitat

Flemingia fruticulosa is found on hill slopes at high altitude (20-3750 m asl).

Selection of specimens examined

INDIA, Himachal Pradesh, Chamba district, Dalhousie, s.d., *C.B. Clarke 33A* (CAL); 10 September 1874, *C.B. Clarke 22076* (CAL); September 1880, *J.K. Dummoa 20* (DD); Panchpula, 21 September 1984, *Harender 11946* (BSD); on the way Ura chouki to Chamba, s.d., *J.H. Lace 1439* (CAL); Chamoli district, Gwaldam, 26 September 1963, *U.C. Bhattacharyya 30806* (BSD); Nandkeshari, 6 October 1963, *U.C. Bhattacharyya 31091* (BSD); Kangra district, 21 September 1896, *G.A. Gammie 18659* (DD); Mandi district, Sundar Nagar, 29 August 1977, *S.K. Murti & P. Prasad 62183* (BSD); Sirmaur district, Sarhan, 8 September 1974, *J.N. Vohra 54330* (BSD); Shillai, 7 August 1986, *R.S. Karki 82235* (BSD); Shimla district, Shimla, s.d., *s.coll. s.n.* (DD); August 1884, *J.R. Drummond 2521* (DD); Waterfall, 26 August 1877, *J.S. Gamble 4903B* (CAL); 13 September 1954, *R. Singh 15855* (LWG); 22 August 1977, *Maveli s.n.* (DD); Theog, 28 July 1958, *H. Lal & party 51787* (LWG); Madhya Pradesh, Hoshangabad district, Bori Wildlife Sanctuary, Kobra Nallah, 7 February 1978, *P.C. Pant 27246* (BSA); Manipur, s.d., *D.B. Deb s.n.* (CAL); 20 March 1952, *D.B. Deb 244* (CAL); Meghalaya, West Garo Hills, Garo hills, November 1926, *J.G. Saler 3907* (DD); North West Himalaya, s.d., *D. Brandis 3834* (CAL); October 1905,

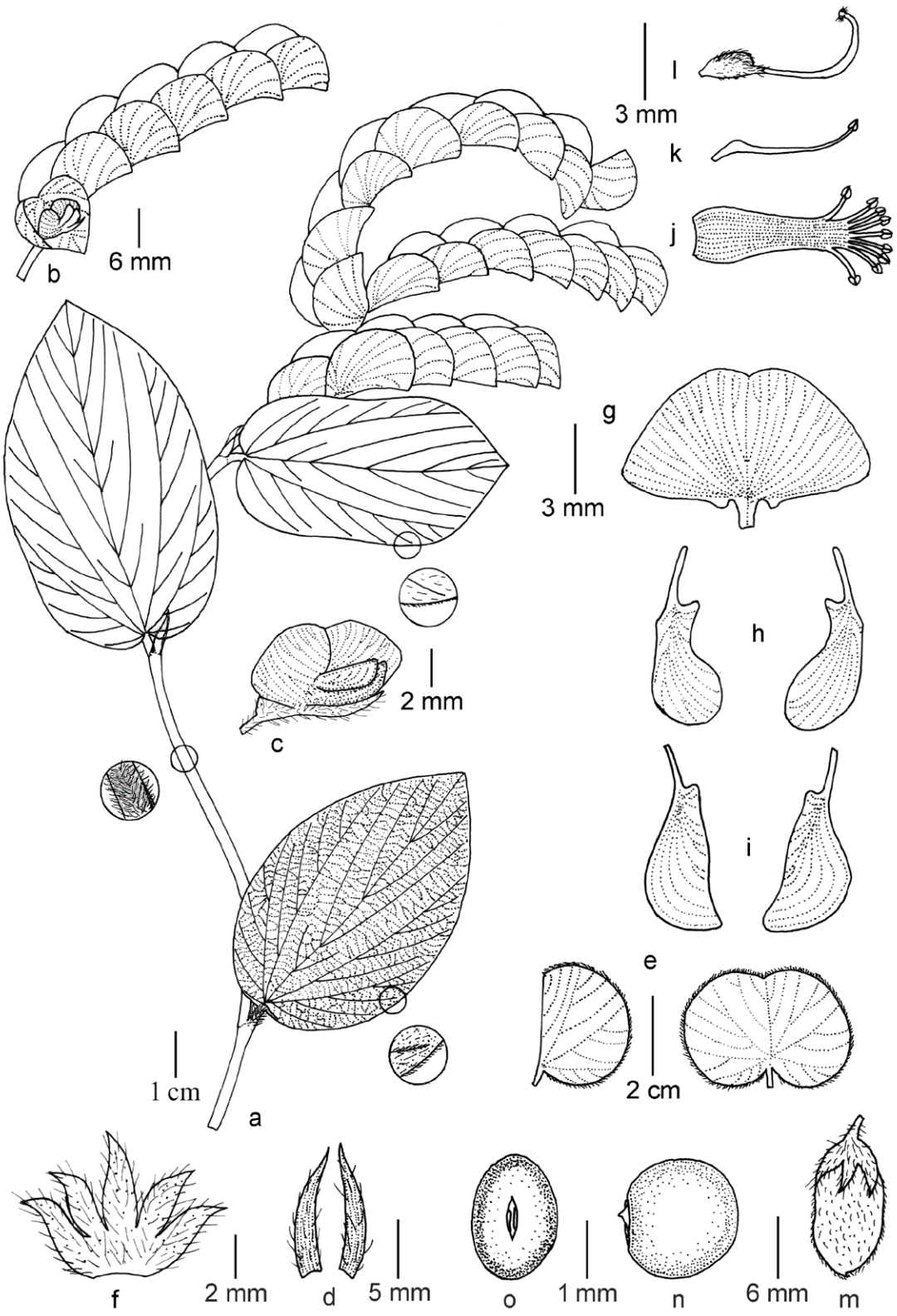


Figure 20. *Flemingia fruticulosa* Wall. ex Benth. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

A.K. Meebold 1446 (CAL); Tripura, 28 February 1961, *D.B. Deb 2808* (CAL); West Tripura, Agartala, 21 February 1960, *D.B. Deb 2558* (CAL); Uttar Pradesh, Mau district, Chakra, 28 September 1936, *M.B. Raizada 7421* (DD); Uttarakhand, Almora district, Almora, 2 October 1957, *T.A. Rao 4706* (BSD); Dinapani, 13 October 1975, *J.N. Vohra 57898* (BSD); on the way to Agar to Newalgaon, 21 September 2000, *B.P. Uniyal 96820* (BSD); on the way to Girgam to Tejam, 17 November 1958, *J.G. Srivastava & party 53897* (LWG); Ranikhet, 4 October 1914, *A.E. Osmaston 444* (DD); 2 November 1967, *K.M. Balapure & party 90146* (LWG); 30 September 1975, *B.M. Wadhwa 57245* (BSD); Bageshwar district, Kausani, 5 December 2013, *K. Ambrish 121043* (BSD); Loharkhet, 19 September 1957, *T.A. Rao 4190* (BSD); 25 September 2002, *O. Kakri 98638* (BSD); Dehradun district, Chakrata, 25 September 1958, *K.C. Sahni 26796* (DD); Karwapani, 6 December 1956, *T.A. Rao & Y.K. Sarin 1237* (CAL); Mussoorie, July 1845, *P.W. Mackinnon s.n.* (CAL); July 1897, *J.F. Duthie 147* (DD); 8 September 1960, *H.O. Saxena 1141* (DD); 4 November 1960, *H.O. Saxena 1488* (DD); 23 September 1961, *H.O. Saxena 2270* (DD); January 1985, *W.A. Rodgers 3689* (WII); Thangam, September 1993, *B. Balodi & M. Singh 86760* (BSD); Kumaon, s.d., *R. Strachey & J.E. Winterbottom 4* (BM000958664); Nainital district, Ahuora, October 1950, *T. D'Souza s.n.* (BLAT); Nainital, s.d., *C. Maries 32* (CAL); April 1883, *J.F. Duthie 3955* (DD); September 1876, *Davidson s.n.* (DD); Pauri Garhwal district, s.d., *s.coll. s.n.* (BSD); 19 August 1978, *G. Panigrahi 64993* (BSD); Bagrigar, 27 October 1967, *K.M. Balapue & party 91295* (LWG); Pauri, 11 September 1972, *H.B. Naithani 3688* (DD); Pithoragarh district, 19 August 1988, *T. Husain 207854* (LWG); Askot, 3 September 1971, *C.M. Arora 45506* (CAL); Dafia Dhura, 2 September 1973, *C.M. Arora 53244* (BSD); Didihat, 30 September 1925, *C.M. Arora & R. Prasad 56662* (BSD); Maitli, 1 October 2001, *M.S. Pundir 97036* (BSD); Patela village, 13 October 1982, *R.P.S. Pundir 798* (ICRISAT, WAG); Rudraprayag district, Gauri Kund, 10 October 1965, *N.C. Nair 35846* (BSD); 18 September 1975, *A.S. Rao 56329* (BSD); Kaliphat Malla, 20 October 1914, *Hira Singh 276* (DD); Madhyamaheshwar, 1 September 1974, *K.M. Balapure 101533* (LWG); Tehri Garhwal district, Deolong, 22 September 1979, *A.K. Goal 67969* (BSD); Jarmala, Tans forest, 4 September 1955, *K.C. Sahni 21874* (DD); Kamaserai, 10 October 1979, *G. Singh 1082* (CAL); on the way to Jakhmolla, 19 October 1970, *B.D. Naithani 42224* (BSD); near Rangalgarh, 25 September 1954, *K.G. Sahani 21433* (DD); 26 September 1954, *K.G. Sahani 21466* (DD); Uttarkashi district, Barkot, 19 September 1995, *S. Singh 89981* (BSD); 28 July 2002, *K.N. Nair & B. Datt 223200* (LWG); on the way to Naitwar, 1 October 1995, *B. Balodi 89729* (BSD); on the way to Naitwar to Lachhar, 30 September 1990, *T. Husain 212462* (LWG); Mahidanda, 27 October 1966, *M.A. Rao 33564* (BSD); Naitwar, 30 December 1995, *T.S. Rane & B. Datta 215892* (LWG); West Bengal, Darjeeling district, Darjeeling 1955, *S. Sinha & party 224* (LWG).

Affinities

Flemingia fruticulosa is allied to *F. strobilifera* but differs from it by its trailing habit, short petiole, ovate-elliptic leaflets and persistent stipules.

Taxonomic note

Flemingia fruticulosa was described as a distinct species in 1852. Baker (1876) considered *F. fruticulosa* as a variety under *F. strobilifera*. Sanjappa (1992) synonymised *F. fruticulosa* under *F. strobilifera*. After critical analysis of type and protologue, we have come to the conclusion that *F. fruticulosa* is distinct and should be considered at the rank of species.

Nomenclatural notes

Ali (1977) typified the binomial *Flemingia fruticulosa* and designated Wallichian specimen 5754a (K001122023) as type in the Flora of West Pakistan. The binomial *Flemingia fruticulosa* first appeared in Wallich's catalogue (1831). Bentham (1852) validly published the name based on Wallich's specimen (Wallich 5754). Bentham did not mention any type in the protologue. He mentioned only the catalogue number 5754. Wallich's types are mainly at K (K-W) and considerable sets are at BM, CAL, E and G (Stafleu and Cowan 1988). The search for Wallich's type led to the finding of seven sheets in different herbaria [BM, CAL, E, G and K (K-W)]. Two sheets were found at CAL (CAL163049 and CAL163050). These sheets were collected by Wallich from Nepal and bear catalogue numbers 5754 and 5754a, respectively. Two sheets are present at K (K-W) of which one sheet 5754a (K001122023) is Wallich's collection from Nepal in 1821 while the second sheet 5754b (K001122024) was collected by Dr. Govan from Sirmore (now Sirmaur, Himachal Pradesh). Amongst the other three sheets, the first sheet was traced at BM which bears two different gatherings. The left handed upper specimen 5754a (BM000884630) was collected by Wallich from Nepal while the right handed lower specimen (BM000958664) was collected by Strachey and Winterbottom from Bintai, Kumaon. Another sheet (G00365320) traced at G is a duplicate of Wallich's collection from Nepal. The sheet at E has annotations in pencil handwriting as "should be 5754". This sheet hence cannot be taken as an original material. The sheet at K

(K-W) (K001122023) is well preserved and shows annotations which exactly match with the details given in Wallich's Catalogue. The remaining sheets which were collected by Wallich from Nepal must be considered as isolectotypes and the specimen collected by Dr. Govan from Sirmore constitutes a syntype.

Flemingia strobilifera (L.) W.T. Aiton, Hortus Kew., ed. 2. 4: 350. 1812

Bas.: *Hedysarum strobiliferum* L., Sp. Pl. 2: 746. 1753; Roxb, Fl. Ind. 3: 351. 1832
Type: Sri Lanka, without precise locality, s.d., *P. Hermann s.n.* (BM000621979 image!, lectotype designated by Fawcett & Rendle, 1920: 75).

Wight & Arn. Prodr. Fl. Ind. Orient. 1: 243. 1834; Wight, Icon. Pl. Ind. Orient. 1(1): 14, t. 267. 1840; Benth. in Miquel, Pl. Jungh. 2: 244. 1852; Baker, in Hook. f., Fl. Brit. India 2: 227. 1876; Kurz, Forest Fl. Burma 2: 371. 1877; Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 69(2): 437. 1897; Prain, Bengal Pl. 1:377. 1903; T. Cooke, Fl. Bombay 2: 390. 1902; Talbot, Forest Fl. Bombay 1: 418. 1909; Haines, Bot. Bihar Orissa 3: 268. 1922; Gamble, Fl. Madras 1: 377. 1928; Sanjappa, Legumes of India 179. 1992; Saxena & Brahman, Fl. Orissa 1: 532. 1994. Kothari in N.P. Singh et al., Fl. Maharashtra, Dicot. 2, 685. 2001. (Figures 21; 23u; 24s; 25r).

(≡) *Zornia strobilifera* Pers., Syn. Pl. 2(2): 319. 1807.

(≡) *Maughania strobilifera* (L.) J.St.-Hil. ex Kuntze, Revis. Gen. Pl. 1: 199. 1891; Mukerjee, Bull. Bot. Soc. Bengal 6(1): 10. 1953 (as *Moghania strobilifera*).

Description

Erect shrubs, up to 1.2–3.2 m tall, with branched stem; stems 4–40 mm in diameter, young triangular, mature terete, hairy; hairs silky, antrorse. Leaves unifoliolate, 7–20 cm long, stipulate, petiolate; stipules 2, 7–17 × 2–3 mm, slightly falcate, acuminate with equal tips, fused when young, splitting at maturity, caducous, basifixed, many nerved, hairy; petioles 12–20 mm long, grooved, gland-dotted, hairy; leaflet 1, 6–18 × 3.4–8 cm, broad ovate, rounded or cordate at base, apex acuminate, glabrous on both surfaces, hairy on nerves dorsally, lateral nerves (6)8-10 pairs; gland-dotted; glands minute, orange-red; petiolules 2–5 mm long, hairy, gland-dotted. Inflorescences an axillary and terminal raceme; racemes comprising small cymes of 2–3 flowers enclosed by membranous bracts, in two series. Flowers 8–10 mm long, pedicellate, bracteate; pedicels 2–2.2 mm long, hairy; bracts 1.6–2.8 × 2.6–3 cm, reniform, acute at apex, many nerved, papery, hairy, gland-dotted; exterior bracts, small 2–2.2 × 1–1.2 mm, lanceolate, persistent; Calyx 6–7 mm long, hairy, gland-dotted; calyx tube 1–1.5 mm long, campanulate, hairy; calyx teeth 5, 3–5.2 × 1–1.5 mm, subequal, lower one the longest, lanceolate, connate for 1/5 of its length, hairy, many nerved, gland-dotted. Corolla white with pink striations; standard 8–8.5 × 7–7.5 mm, obcordate, apex retuse, glabrous, clawed with 2 auricles; claw 1 mm long; auricles 1 mm or less 1 mm; wing petals 5–6 × 1–1.5 mm, oblong, slightly falcate; claw 1.5–2 mm long; keel petals 7–7.5 × 2–2.5 mm, boat shaped, slightly falcate, fused at apex at lower side; claw 2–2.2 mm long. Stamens 10, diadelphous (9+1); staminal tube 5–6 × 1 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united stamens 1.5–2 mm long, that of free stamens 6–7 mm long. Ovary 1.8–2 × 1 mm, gland-dotted, hairy; ovules 2; styles 6–6.2 mm long, glabrous, swollen at middle; stigma globose, hairy. Fruits a pod, 1.2–1.3 × 6–7 mm, beaked, turgid, slightly septate between seeds or not, hairy, sparsely gland-dotted; beak 1 mm long; glands orange-red, withering post maturity. Seeds 2, 3 × 3 × 2.8 mm, rounded, mottled, shiny; hilum granular, 1 mm long, position ± central.

Etymology

The specific epithet 'strobilifera' refers to its thin, dry, membranous cone-like bracts that enclose flowers and fruits completely.

Distribution

Asia: Bangladesh, Bhutan, Brunei, Cambodia, Caroline Islands, China (Hubei, Yunnan), Guam, India (Andaman and Nicobar Islands, Andhra Pradesh, Assam, Bihar, Chhattisgarh, Goa, Gujarat, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Nagaland, Rajasthan, Sikkim, Tamil Nadu, Telangana, Tripura, Uttar Pradesh, Uttarakhand and West Bengal), Indonesia (Java, Lesser Sunda Islands, Kalimantan, Moluccas, Sulawesi, Sumatra, Timor), Malaysia, Myanmar, New Caledonia, Nepal, Papua New Guinea, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, Vietnam. Australia (Queensland). Central America.

Flowering and fruiting

January to April.

Habitat and ecology

Flemingia strobilifera is a common species that grows throughout India. It is found to be growing along

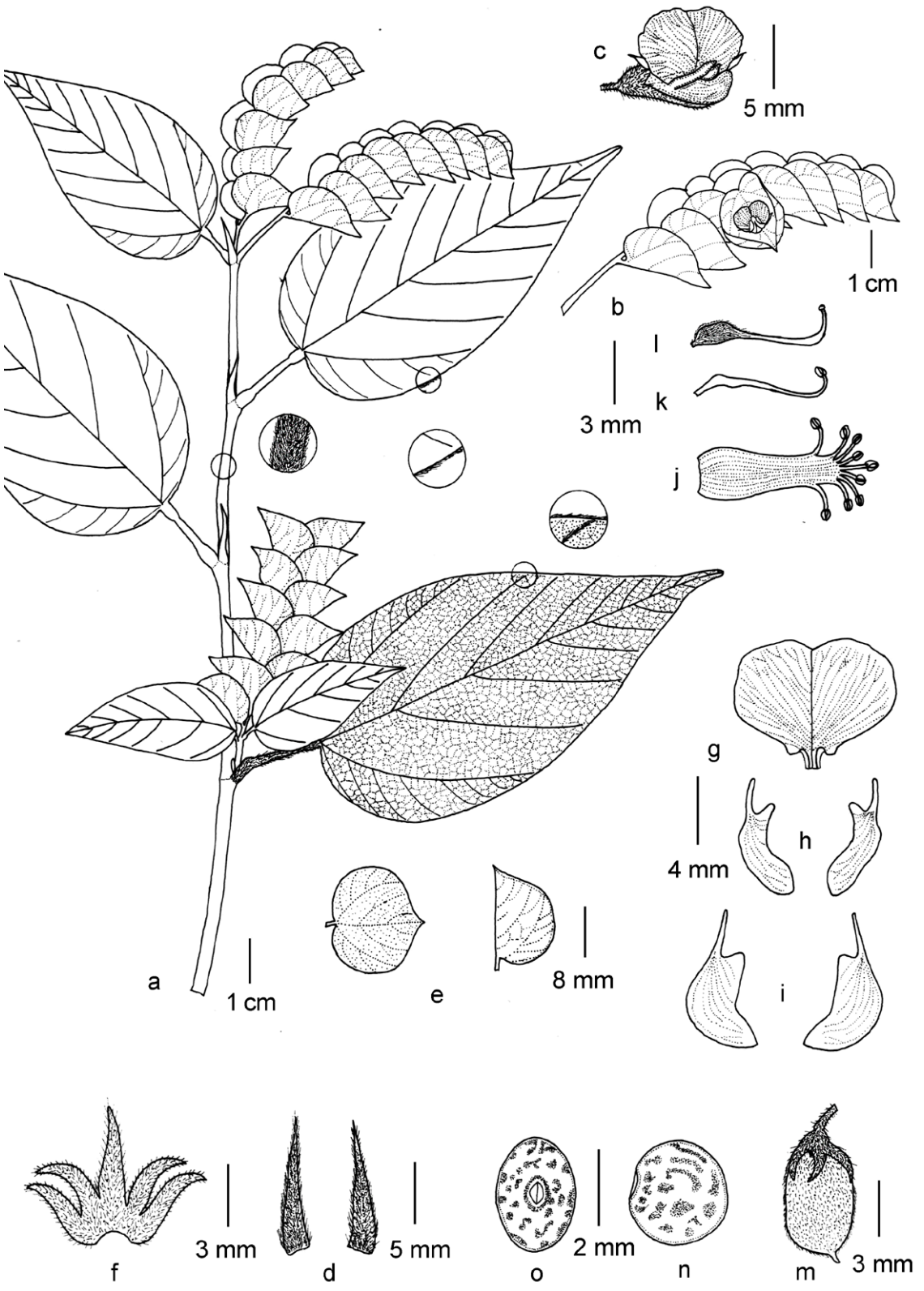


Figure 21. *Flemingia strobilifera* (L.) W.T.Aiton. (a) Habit. (b) Inflorescence. (c) Flower. (d) Stipules. (e) Bract. (f) Calyx, dorsal view. (g) Standard. (h) Wing petals. (i) Keel petals. (j) Fused androecium. (k) Free stamen. (l) Gynoecium. (m) Fruit. (n) Seed, lateral view. (o) Seed, dorsal view.

the roads, in open forests and grasslands at an altitude of ca. 600–1500 m asl. On Malesian islands, it is reported from sea level upwards. It grows in association with *Achyranthes aspera* L., *Amorphophallus* species, *Clematis gouriana* Roxb. ex DC., *Diploclisia glaucescens* (Blume) Diels, *Flemingia sootepensis* Craib, *Haplanthodes verticillatus* (Roxb.) R.B.Majumdar, *Leea indica* (Burm. f.) Merr., *Pavetta tomentosa* Roxb. ex Sm., *Rubia cordifolia* L., *Synedrella nodiflora* Gaertn., *Terminalia chebula* Retz., *Triumfetta* species and *Zingiber neesanum* (J. Graham) Ramamoorthy.

Selection of specimens examined

INDIA, s.d., B. Heyne s.n., *Wallich Catalogue Number 5753c* (K-W001122018); s.d., *W. Roxburgh s.n., Wallich catalogue Number 5753* (K-W001122015); s.d., R. *Wight 799* (CAL, GH, LE, W); *G. King s.n.* (CAL); April 1903, *H.H. Haines 616* (CAL); 25 July 1936, *J.W. Helfer 149* (CAL); 14 November 1953, *D.B. Deb 1223* (CAL); Andaman and Nicobar Islands, March 1897, *R.L. Heinig s.n.* (BSA, CAL); 12 December 1900, *R.L. Heinig 216* (CAL, US); 20 March 1901, *D. Prain's collector 43* (CAL); Kamorta district, Kamorta, April 1952, *B. Subramanyam 23194* (DD); Nicobar district, KamortaIsland, 22 May 1977, *N. Bhargava 5038* (CAL); Katchal, 22 April 1974, *P. Chakraborty 1133* (CAL); Malacca, 1 March 1974, *N.G. Nair 926* (CAL); North and Middle Andaman district, Long island, 24 February 1936, *S. Gupta 6033* (DD); February-March 1934, *K. Ram 3694* (DD); South Andaman district, Jirkatang, 25 January 1978, *N.G. Nair 926* (CAL); South Andaman, 12 December 1900, *R.L. Heinig 216* (DD); Andhra Pradesh, Nellore district, on the way to Koruturu, 7 March 1962, *D.C.S. Raju 88* (CAL); Prakasam district, Gundlakamma, 30 March 1965, *J.E. Ellis 23802* (MH); Visakhapatnam district, Galikonda, 16 March 1965, *G.V. Subba Rao 22661* (MH); 51 km to Sileru from Chintapalli, 24 March 1977, *L.J.G. van der Maesen 2722* (ICRISAT, WAG); Assam, 1879, *F.E.L. Fischer 235* (CAL); 1879, *F.E.L. Fischer 8180* (ASSAM); Cachar district, Borail Wildlife Sanctuary, 17 February 2012, *A.B. Hussain 892* (ASSAM); Goalpara district, *Gustav Mann s.n.* (ASSAM); Damra, December 1890, *G. King s.n.* (CAL); Goalpara, February 1879, *O. Mann s.n.* (DD); on the way Dudhnai, 16 December 1960, *G. Panigrahi 22647* (CAL); Kamrup district, Chandubi Lake, 20 October 1965, *A.S. Rao 42484* (ASSAM); Sivasagar district, Gargaon, 2 March 1914, *U.N. Kanjilal 3532* (ASSAM, CAL); Meteka, 1 March 1913, *U. Kanjilal 2124* (ASSAM); Sivasagar, 1891, *S.E. Peal 374* (CAL); Bihar, Muzaffarpur district, Motipur, 7 December 1986, *K.K. Khanna & S. Saran 38563* (BSA, CAL); West Champaran district, Gobardhana, 14 November 1963, *B.V. Shetty 289* (CAL); Chhattisgarh, Balrampur-Ramanujganj district, Ramanujganj, 16 March 1974, *G.S. Gupta 18902* (BSA); Bastar district, Cave area, 28 December 1971, *C.R. Das 15008* (BSA); on the way to Teerathgarh falls, *N.P. Balakrishnan & A.N. Henry 11896* (CAL); Bilaspur district, Sadapani, 20 April 2005, *S.L. Bondya, S. Mishra & A.N. Shukla 62392* (BSA); Dantewada district, Abujmarh, 6 March 1984, *G.P. Roy & S.K. Dixit 35536* (CAL); 17 November 1984, *G.P. Roy & S.K. Dixit 36219* (BSA, CAL); Bailadila, 13 February 1963, *G. Panigrahi 6836* (BSA, CAL); 15 February 1963, *G. Panigrahi & C.M. Arora 1012* (BSA, CAL); Jashpur district, Jashpur Nagar, 26 December 1964, *G. Panigrahi & C.M. Arora 7242* (BSA); Kondagaon district, Kondagaon, 5 January 1972, *C.R. Das 15100* (BSA); Mungeli district, Achanakmar Wildlife Sanctuary, Jalda forest, 23 April 2005, *S.L. Bandya, S. Misra & A.N. Shukla 62460* (BSA); Kirdijhar, 17 January 2005, *K.P. Singh, G.P. Sinha & S.L. Bondya 62929* (BSA); Lamni, 13 February 1972, *G. Panigrahi 15415* (BSA, CAL); Rudra Ganga, 31 December 2004, *S.L. Bondya, A.N. Shukla 62063* (BSA); Sadapani forest, *S.L. Bondya, S. Misra & A.N. Shukla 62392* (BSA); Narayanpur district, Markabeda, 6 March 1984, *G.P. Roy & S.K. Dixit 35536* (BSA); Raigarh district, Boro, 8 February 1974, *N.C. Radhakrishnan 19770* (BSA); 4 April 1976, *N.C. Radhakrishnan 24568a* (BSA); Panchakki, 9 July 1990, *B. Lal & R.L. S. Sikarwar 8616* (LWG); Rajnandgaon district, Niwaspur, 6 November 1974, *P.C. Pant 21589* (BSA); Surguja district, Ambikapur, 16 November 1972, *G.S. Gupta 17114* (BSA); Batparganala, 26 March 1974, *G.S. Gupta 20069* (BSA); Kalyanpur, 19 November 1999, *S.B. Pathak & V. Kumar 721* (BSD); Goa, Chota Dudhsagar falls, 2 March 1970, *K.C. Sahani 1644* (DD); Gujarat, 2 February 1962, *S.J. Bedi 1084* (BARO); Dang district, Dang, s.d., *A. Asrana 5427* (BLAT); 2 April 1958, *Deshmukh 32363* (CAL); Waghai, 23 October 1955, *D.P. Panthaki 2346* (BLAT); 11 February 1956, *D.P. Panthaki 2524* (BLAT); *D.P. Panthaki 2525* (BLAT); N.A. Irani 1698 (BLAT); 24 December 1957, A. Asrana 5238 (BLAT); Kheda district, Sunda, 22 December 1963, *G.L. Shah 10736* (BLAT); Navsari district, Unai, 8 March 1954, *H. Santapau 18213* (BLAT); Surat District, Varachha, 2 October 1976, *s.coll. 470* (BARO); Himachal Pradesh, Kangra district, Nihari, 2 October 1977, *P. Lal 63290* (BSD); Jammu & Kashmir, Rajouri district, Sunderbani, 22 September 1996, *B.P. Uniyal 92356* (BSD); Jharkhand, Chota Nagpur Plateau, 22 October 1873, *C.B. Clarke 20984* (CAL); Giridih district, Parasnath hills, 21 October 1934, *K. Bisvas 2136* (CAL); 19 November 2003, *V. Ranjan & K.L. Maity 33616* (CAL); Saraikella and Kharaswan district, Chandil hills, 19 January 2001, *D. Das 28678* (CAL); Karnataka, Belgaum district, Belgaum, 30 January 1980, *L.J.G. van der*

Maesen 3999 (CAL,WAG); Bhimgargh, 1 February 2017, *S.K. Gavade 185* (SUK); Castle Rock, 1 February 2017, *S.K. Gavade 186* (SUK); Chorla, 29 January 1980, K.K. Rao 55 (CAL); 7 March 1997, *M.K. Janarthanam & S. Rajkumar 599* (GOA); Khanapur, s.d., *B.S. Ahuja 47607* (BSI); Kankumbi, 29 January 1980, *K.K. Rao 38* (CAL); Shirasangi, 10 April 1998, *M.P. Nayar 153026* (BSI); Chikkamagaluru district, Bharatnall, 21 October 2017, *S.K. Jain 28234* (CAL); Hassan district, Bisle, 23 April 1958, *S.D. Mahajan 34899* (BSI); Kodagu district, Nagarhole National Park, 6 February 1979, *P. Prakash & K.P. Sreenath 5996* (JCB); Sampaje, 29 January 1976, *B.C. Banerjee 11405* (CAL); Mysore district, Marnhalli, February 1908, *A. Meebold 8472* (CAL); Shimoga district, Agumbe, 10 March 1960, *R.S. Rao 61266* (CAL); Jog falls, 7 May 1956, *G.S. Puri 2081* (BSI); Onake Abbi Falls, 6 March 1984, *G.P. Roy & S.K. Dixit 35536* (CAL); Sitanadi, 9 November 1960, *R.K. Arora 2763* (CAL); Kodachadri hills, 8 March 1979, *K.R. Keshava Murthy & B.R. Ramesh 6182* (CAL); Someshwara Wildlife Sanctuary, 6 February 1961, *R.S. Raghavan 69403* (CAL); Udupi district, Mookambika Wildlife Sanctuary, 20 December 2007, *P.G. Diwakar & R.K. Singh 193756* (BSI); Uttara Kannada district, Castle Rock, 21 December 1953, *S.J. Kapadia 427* (BLAT); Dandeli, 25 December 1955, *D.P. Panthaki 2447* (BLAT); *D.P. Panthaki 2448* (BLAT); Devimane Ghats, 26 March 1949, *J. Fernandes 237* (A, BLAT); Kadra, 2 March 1951, *J. Fernandes 2204* (A, BLAT); on the way to Dandeli to Gund, 9 February 1980, *K.P. Sreenath & S.R. Ramesh 10815* (CAL); Uttara Kannada, 1882, *W.A. Talbot s.n.* (DD); Yellapura, 27 December 1955, *D.P. Panthaki 2485* (BLAT); 28 December 1955, *D.P. Panthaki 2485* (BLAT); Kerala, Idukki district, Kulamavu, 24 September 1981, *C.N. Mohanan & B. Ramanujan 71934* (CAL); Kurisumala, 13 September 1984, *V.T. Antony 754* (MH); Thekkady, 22 December 1974, *K. Vivekananthan 45648* (MH); Kottayam district, Kanjirappally, December 1910, *A. Meebold 19912792* (CAL); Malappuram district, Calicut University campus, 25 December 1986, *V. Usha 3175* (CALI); Nilambur, 21 January 1953, *K.M. Vaid 23438* (DD); 2 January 1957, *M.B. Raizada s.n.* (DD); 3 January 1957, *M.B. Raizada s.n.* (DD); Poolakkaparai, 25 February 1970, *J.L. Ellis 33567* (CAL); Palakkad district, Kodumudi, 1 February 1989, *A.N. Kumar 1496* (MH); Kumbidi, 9 March 1982, *C. Sathish Kumar 10501* (CALI); Palakkad, 22 December 1916, *s.coll. 14224* (MH); Pathanamthitta district, Maniyar, s.d., *A.N. Kumar 1496* (CALI); Moozhiar, 23 December 1988, *N. Anukumar 1216* (CAL); Thiruvananthapuram district, on the way to Agasthyarkoodam, 20 February 1979, *M. Mohanan 59306* (CAL); Thrissur district, Kollathirumedu, 12 November 1988, *N. Sasidharan 4994* (KFRI); on the way to Poringalkuthu to Sholaiyar forest, 25 November 1982, *K. Ramamurthy 75512* (CAL, MH); Poringalkuthu, 4 February 1984, *K. Ramamurthy 72752* (CAL); Peechi, 9 January 1984, *N. Sasidharan & C. Renuka 2556* (KFRI); Poringalluttu, 4 February 1984, *K. Ramamurthy 72752* (MH); Vazhachal falls, 14 January 1953, *J. Fernandes 144* (BLAT); Wayanad district, 25 January 1986, *V.A. Jessy 2298* (CALI); Wayanad, 25 January 1986, *Jessy V.A. 2298* (CALI); Chandanthode, November 1937, *N.L. Bor 8511b* (DD); Lakkidi, 20 March 1984, *R.T. Balakrishnan 40056* (CAL); Madhya Pradesh, Anuppur district, on the way to Pasan to Semera, February 1972, *S.K. Murthy 15349* (CAL); Balaghat district, Lamta, 14 January 1961, *J.K. Maheshwari 4498* (CAL); Mukki, 24 January 1961, *S.K. Jain* (BSA); 23 September 1973, *V.J. Nair 18978* (BSA); Supkhar, 25 September 1973, *V.J. Nair 18426* (BSA); Betul district, Bori, 23 December 1962, *G. Panigrahi 6359* (BSA, CAL); Chhindwara district, Chhota Mahadev falls, 9 May 1958, *H. Santapau 22433* (BLAT); Pench river, 23 March 1975, *L.K. Banerjee 22226* (BSA); Dhar district, on the way to Barda to Chitrangi, 21 January 1964, *G. Panigrahi 2410* (BSA); Hoshangabad district, Bee falls, 12 November 2000, *K.K. Khanna & A. Kumar 53664* (BSA); on the way to Madai, 25 October 1970, *G. Panigrahi 12922* (BSA, CAL); Indore district, Indore, 6 April 1911, *W. Biscoe 2767* (DD); Jabalpur district, Baghraji, 10 March 1962, *K.M. Sebastian 13904* (BSA); Jabalpur, January 1903, *R.S. Hole s.n.* (CAL); Kaimur range, 10 February 1959, *C.M. Arora 1498* (BSA); Katani district, Antaria, 14 April 2005, *S.L. Bondya, S. Misra & A.N. Shukla* 62288 (BSA); 30 September 2005, *S.L. Bondya & A.N. Shukla 63510* (BSA); Khargone district, Berehha forest, 14 February 1987, *M. Prasad 39514* (BSA); Mandla district, Kanha Tiger Reserve, 12 September 1982, *J. Lal & A. Kumar 33175* (BSA); on the way to Motinala to Bhiradongri, 16 January 1961, *S.K. Jain 2922* (BSA); Narsinghpur district, Narsinghpur, 29 January 1978, *P.C. Pant 27017* (BSA); Panna district, Pandav falls, 15 March 1983, *R. Lal 34116* (BSA); 26 November 2003, *N.R. Suman 58218* (BSA); Panna National Park, s.d., *N.R. Sunnar & R. Kumar 52052* (BSA); Rewa district, 13 November 1971, G.S. Gupta 16270 (BSA); Kharra, 13 November 1971, *G.S. Gupta 16270* (BSA); Sagar district, Rahatgarh, 2 March 1960, *K. Subramanyam 10146* (BSA, CAL, MH); Satna district, Maihar, Tons river bank, 19 March 1994, *R. Prasad 47697* (BSA); Sehore district, Budhni, 28 January 1945, *E. Moyes 231* (CAL); Sidhi district, Gandhigram, 22 October 1962, *G. Panigrahi 5565* (BSA); Kanhaigarh, 28 January 1971, *G.S. Gupta 14420* (CAL); Marvai hills, 23 January 1971, *G.S. Gupta 14274* (BSA); Mohgashi, 24 February 1971, *G.S. Gupta 14573* (CAL); Seoni district, Aurapani, 15 February 1972, *G.*

Panigrahi 15479 (BSA, CAL); Karmajhiri, 17 March 1978, *L.K. Banerjee 28599* (BSA); Shahdol district, on the way to Pasan to Semara, 11 February 1972, *G. Panigrahi 15349* (BSA); Singrauli district, Dhawai, 21 January 1964, *G. Panigrahi 2410* (CAL); Mara, 12 December 1995, *S.K. Srivastava 47993* (BSA); Umaria district, Bandhavgarh National Park, 13 January 1997, *S.K. Srivastava 45666* (BSA); Umaria mala, 19 January 1971, *G.S. Gupta 14151* (BSA); Maharashtra, Bombay, 22 February 1951, *J. Fernandes 2168* (CAL); Concan, s.d., *J.E. Stocks s.n.* (CAL, MH); Bhandara district, Nagzira wildlife sanctuary, Tiger road, 18 November 2002, *D.N. Patil 182853* (BSI); Chandrapur district, Chincholi, 15 January 1891, *J.F. Duthie 10376* (DD); Yenkatapur, 19 January 1890, *J.F. Duthie 9403* (CAL); *J.F. Duthie 9406* (DD); Colaba district, Penu, February 1917, *E. Blatter 11313* (BLAT); Gondia district, Navegaon National Park, 2 February 1956, *P.S. Herbert 1340* (BLAT); 24 November 2002, *D.N. Patil 183204* (BSI); Kolhapur district, Ajara, s.d., *N.B. Gaikwad s.n.* (SUK); Gaganbawda, 2 August 2015, *S.K. Gavade 86* (SUK); Lead Botanical Garden, 10 February 2015, *S.K. Gavade 24* (SUK); Patgaon, 27 April 1966, *B.G. Kulkarni 108524* (BSI); Ramghat, 28 January 1980, *N.K. Rao 16* (CAL); Tillarinagar, 18 February 2015, *S.K. Gavade 28* (SUK); Mumbai Suburban district, Borivali, 14 January 1955, *D.P. Panthaki 2206* (BLAT); Sanjay Gandhi National Park, 12 February 1955, *P.S. Herbert 542* (BLAT); 2 February 1956, *P.S. Herbert 1338* (BLAT); *P.S. Herbert 1339* (BLAT); Nashik district, Brahmagiri, s.d., *s.coll. s.n* (BLAT); Harsul, 7 February 1983, *P.C. Narasimhan 165393* (BSI); Igatpuri, 4 January 1917, *E. Blatter 12376* (BLAT); 27 December 1958, *G.L. Shah 10202* (BLAT); *G.L. Shah 10203* (BLAT); *H. Santapau 22951* (BLAT); Pune district, Bhimashankar, 25 February 1961, *K.P. Janardhanan 69268* (BSI); Khandala, 7 May 1912, *s. coll. 10991* (BLAT); March 1917, *s. coll. 11936* (BLAT); *H. Santapau 11148* (BLAT); 26 December 1940, *H. Santapau 1024* (BLAT); 23 January 1942, *H. Santapau 102106* (DD); 29 December 1942, *H. Santapau 1431* (BLAT); 31 December 1942, *H. Santapau 1475* (BLAT); 23 January 1943, *H. Santapau 1505* (BLAT); *H. Santapau 1506* (BLAT); 21 March 1943, *H. Santapau 1727* (BLAT); 16 January 1944, *H. Santapau 3588* (BLAT); 15 March 1944, *H. Santapau 3795* (BLAT); *H. Santapau 3796* (BLAT); 20 January 1945, *H. Santapau 5780* (BLAT); 28 February 1945, *H. Santapau 6055* (BLAT); *H. Santapau 6056* (BLAT); *H. Santapau 6057* (BLAT); *H. Santapau 6058* (BLAT); 16 February 1946, *H. Santapau 8659* (BLAT); *H. Santapau 8660* (BLAT); 26 December 1951, *H. Santapau 13981* (BLAT); *H. Santapau 13981* (BLAT); 29 January 1955, *P.V. Bole 1311* (BLAT); 23 March 1958, *Y.A. Merchant 554* (BLAT); 21 March 1959, *P.S. Toor 52530* (BSI); 12 January 1961, *S.J. Saldanha 6551* (BLAT); 25 February 1961, *C.J. Saldanha 6552* (BLAT); Nandgaon, 29 January 1964, *B. Reddy 95764* (CAL); on the way to Ambavane to Dongarwadi, 2 February 1964, *B. Reddy 95915* (CAL); on the way to Ambavane to Lonavala, 21 December 1963, *B. Reddy 93204* (CAL, MH); 2 February 1964, *B. Reddy 95915* (BSI); on the way to Pune to Bhimashankar, 26 February 1961, *K.P. Janardhanan 69631* (BSI); on the way to Pune to Mumbai, 16 February 1957, *S.K. Jain 11857* (BSI); Lohagad, October 1918, *E. Blatter 10616* (BLAT); Pune, College of Science, s.d., *s.coll. s.n.* (BLAT); Purandar, December 1917, *E. Blatter 11767* (BLAT); 27 December 1944, *H. Santapau 5685* (BLAT); 23 December 1945, *H. Santapau 8193* (BLAT); Warak, 21 March 1963, *S.R. Rao 87318* (BSI); Raigad district, Matheran, s.d., *S. Pandey s.n.* (BLAT); 28 March 1918, *E. Blatter 10741* (BLAT); 31 March 1957, *G.S. Puri 14038* (BSI); 20 January 1962, *U. Nanda 530* (BLAT); *U. Nanda 559* (BLAT); 6 December 1958, N.A. Irani 2624 (BLAT); 25 March 1998, *s.coll. 10026* (BLAT); Panorama point, 25 March 2004, *S.G. Pradhan & S.K. Das Das 188993* (BSI); hill point, 16 February 2006, *S.C. Majumdar & S.K. Das Das 190940* (BSI); on the way Nesal to Matheran, 24 January 1949, *J. Fernandes 60* (BLAT); Ratnagiri district, Kumbharli Ghat, 17 February 1979, *R.K. Kochhar 154319* (BSI); on the way to Ratnagiri to Dajipur, 28 June 1957, *G.S. Puri 20115* (BSI); Ratnagiri, February 1922, *R.D. Geland 357* (BLAT); Satara district, Koyna Wildlife Sanctuary, 8 February 1979, *R.K. Kochhar 153026* (BSI); 12 February 1979, *R.K. Kochhar 158355* (BSI); Mahabaleshwar, s.d., *T. Cooke s.n.* (BLAT); 8 April 1951, *H. Santapau 12384* (BLAT); 16 March 1997, *M. Ezekiel 12851* (BLAT); on the way to Pratapgad, 19 February 1964, *K.C. Kanodia 87075* (BSI); Sindhudurg district, Amboli Ghat, 18 May 1965, *R.D. Pataskar 105237* (BSI); Chaukul, 30 April 1966, *B.G. Kulkarni 108561* (BSI); Dukanwad, 13 February 1970, *B.G. Kullear 120075* (BSI); Ghonsari, 4 March 1970, *B.G. Kullear 120418* (BSI); Konal, 30 April 1971, *B.G. Kulkarni 129420* (BSI); Nandos, March 2001, *N.D. Gawade 2303* (BLAT); *N.D. Gawade 2304* (BLAT); *N.D. Gawade 2305* (BLAT); Thane district, Kasara, 14 April 1957, 14 April 1957, *S.K. Jain 14741* (BSI); Mumbra, 26 January 1954, *K.V. Shenoy 2069* (BLAT); *K.V. Shenoy 2078* (BLAT); *K.V. Shenoy 2086* (BLAT); *K.V. Shenoy 2103* (BLAT); 30 March 1954, *K.V. Shenoy 2517* (BLAT); Manipur, 31 August 1952, *D.B. Deb 510* (CAL); Bishnupur district, Bishnupur, February 1906, *A. Meebold s.n.* (CAL); Meghalaya, Garo Hills, s.d., *T.D. Srinivasan 1529* (CAL); *T.D. Srinivasan 1960* (CAL); Khasi hills, 19 February 1885, *C.B. Clarke 37280* (CAL); East Khasi Hills district, Barapani, 11 September 1970, *A.S. Rao 38639* (CAL); West Jaintia Hills district, Dawki,

2 March 1938, G.K. Deka 16357 (ASSAM); Jowai, December 1893, *G. King s.n.* (CAL); Nagaland, Naga hills, 29 September 1948, *S.K. Mukerjee 3544* (CAL); Odisha, Rayagada district, Hatipathar, s.d., *G. Panigrahi 20667* (CAL); Sambalpur district, 4 November 1986, Hatigirdha, S. Panda & A.P. Das 256; Kapildhara, 7 April 1988, *S. Panda & A.P. Das 1091* (CAL); Sundergarh district, 23 April 2005, *S.L. Bondya, S. Mishra & A.N. Shukla 62460* (BSA); Rajasthan, Kota district, Sitabari forest, 17 May 1965, *B.M. Wadhawa 9321* (CAL); Sirohi district, Mount Abu, *s.coll. 12073* (BLAT); Sikkim, West Sikkim district, on the way to naya bazaar to Soreng, 10 February 1996, *B.K. Sukla 18605* (BSHC); Tamil Nadu, Coimbatore district, Coimbatore, 13 January 1951, *S.K. Jain & R.C. Bhardwaj 22606* (DD); Nilgiris district, Kodamalai, 11 December 1962, *G.V.S. Rao 30150* (CAL); Mudumalai National Park and Wildlife Sanctuary, 18 November 1958, *K.M. Sebastine 7365* (CAL); Benne forest, 20 January 1961, *B.V. Shetty 11949* (CAL, MH); Pandalur, 11 January 1903, *C.A. Barber 5595* (CAL, MH); Pudukkottai District, Kodivayal, 26 February 1973, *E. Vajravelu 43733* (MH); Telangana, Warangal District, Jakaram, 26 January 2001, *R.K. Premanath 112711* (MH); Pakhal, 26 February 1963, A.N. Henry 15934 (MH); 24 March 1999, R.K. Premanath 108252 (MH); Tripura, West Tripura district, Agartala, s.d., *D.B. Deb 1341* (CAL); Uttar Pradesh, Barabanki district, Banki, 22 February 1966, *G. Panigrahi & R. Saran 10553* (BSA); Bahraich district, Dharmapur, 15 March 1964, *G. Panigrahi & O.P. Misra 2902* (CAL); Nishangarh, 12 February 1965, *O.P. Misra 7945* (BSA); Rupaidiha, 6 February 1965, *O.P. Misra 7880* (BSA, CAL); Sahore, 9 March 1964, *G. Panigrahi & O.P. Misra 2787* (BSA, CAL); Suhelwa, 12 May 1917, *S. Ram 577* (DD); Lakhimpur Kheri district, 1 May 1898, *Inayat Khan 21512* (CAL, DD); Dhyanpur, 8 March 1980, *J.K. Maheshwari & party 277* (LWG); Gola Gokarannath, 5 December 2004, *B.K. Shukla 61343* (BSA); *B.K. Shukla 61391* (BSA); Mailani, 17 December 1960, *C.L. Malhotra 13376* (BSD); Gorakhpur district, Phareuda reserve forest, 31 October 1963, *C.M. Arora 1416* (BSA & CAL); Jalaun district, Dhamna, 15 March 1964, *G. Panigrahi 2902* (BSA); Pilibhit district, Mahof, 10 December 2004, *B.K. Shukla 61565* (BSA); Sonbhadra district, Pipri, 11 March 1970, *G. Panigrahi 12078* (BSA); Renusagar, 24 December 1970, *G. Panigrahi 13670* (BSA); Hathinala forest, 12 March 1970, *G. Panigrahi 12083* (CAL); Uttarakhand, Dehradun district, Dehradun, 16 January 1942, *M.B. Raizada 15604* (DD); 3 May 1993, *A. Prakash 210499* (LWG); 4 March 1999, P.*W. Mackinnon s.n.* (CAL); Raipur, 16 November 1977, *L.J.G. van der Maesen 2981* (CAL); Lakhamandal, 12 November 1968, *B.D. Naithani 38541* (BSD); Lachhiwala, April 1937, M.B. Raizada s.n. (DD); Haridwar district, Chilla Wildlife Sanctuary, 19 November 1995, *A. Prakash 215717* (LWG); Nainital district, Haldwani, 28 May 1919, *R. Singh 11022* (DD); Jim Corbett National Park, Sultan, 15 November 1972, *K.P. Janardhanan 50113* (CAL, BSD); Kopa Basanta, 6 February 1989, *H. Singh 7840* (LWG); West Bengal, Howrah district, Calcutta Botanical Garden, *F. Buchanan-Hamilton s.n.*, *Wallich Catalogue Number 5753b* (K-W001122016 and K-W001122017); Jalpaiguri district, Murti, 4 December 1996, *J. Bhattacharya 24470* (CAL); Nadia district, Hanskhali, 23 February 1975, *J.K. Sikdar 100* (CAL); Purulia district, on the way to Baghmundi to Ajodhya hills, 19 June 1968, *K.C. Malick 493* (CAL).

Affinities

Flemingia strobilifera and *F. bracteata* show close similarities in their morphology. However, *F. strobilifera* differs from *F. bracteata* by ovate unifoliolate leaves, long petiole, lanceolate caducous stipules, and semi-reniform bracts.

Taxonomic note

Baker (1876) treated *Flemingia bracteata*, *F. fluminalis*, *F. fruticulosa* as varieties under *F. strobilifera*, but Mukerjee (1853) treated *F. bracteata*, *F. fluminalis* and *F. fruticulosa* as species again. Sanjappa (1992) synonymized *F. bracteata* and *F. fruticulosa* under *F. strobilifera*. After studying the type, protologue and live specimens of *F. bracteata*, *F. fluminalis*, *F. fruticulosa* and *F. strobilifera*, we have come to conclusion that these species are different from each other and have to be treated at distinct specific rank.

Nomenclatural notes

Linnaeus (1753) described *Flemingia strobilifera* based on a specimen collected by Hermann from Sri Lanka. In 1920, Fawcett and Rendle lectotypified the binomial *F. strobilifera* and designated Hermann's specimen as lectotype.

Flemingia nudiflora (Haines) S.K. Gavade, Maesen & Lekhak, **comb.** et **stat. nov.** (Figure 22).

Bas.: *Flemingia strobilifera* var. *nudiflora* Haines, Haines, Bot. Bihar Orissa 3: 268. 1922.
Type: India, Bihar, Singbhum, Saitba Forest, March 1916, *H.H. Haines 4655* (K image!, lectotype designated here).

(=) *Flemingia tiliacea* Niyomdham, Nordic J. Bot. 343. 1992. **syn. nov.**

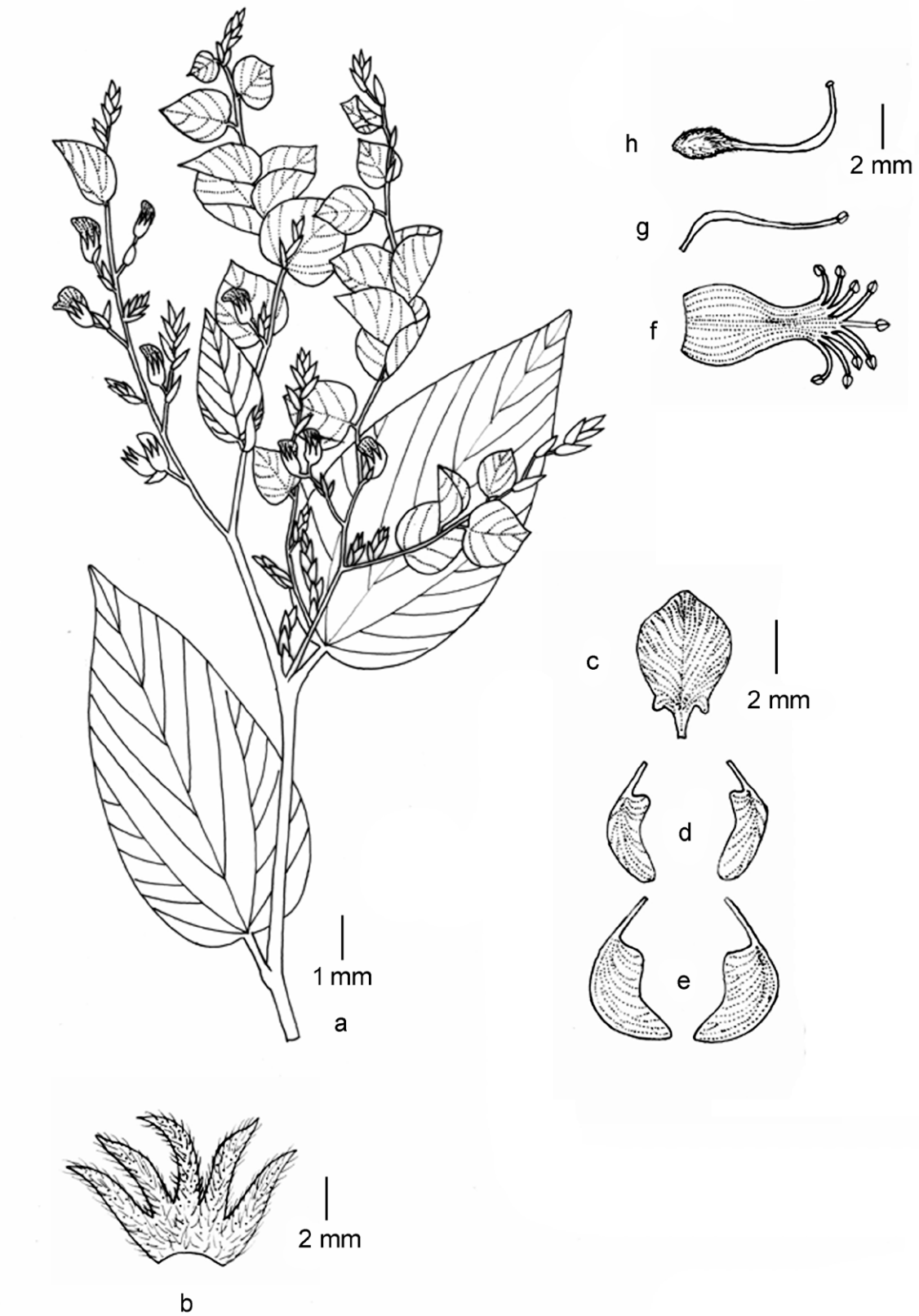


Figure 22. *Flemingia nudiflora* (Haines) S. K. Gavade, Maesen & Lekhak. (a) Habit. (b) Calyx-dorsal view. (c) Standard. (d) Wing petals. (e) Keel petals. (f) Fused androecium. (g) Free stamen. (h) Gynoecium.

Type: Thailand, Chiang Mai prov., between Hue San and Chiang Rai, at 525 m, 6 January 1922, *J.F.C. Rock 1819* (holotype A image!; isotype US image!).

Description

Erect shrubs, 1–2 m tall, with branched stem; stem 4–6 mm in dimeter, young triangular, mature terete, hairy; hairs silky, antrorse. Leaves unifoliolate, 6–17.5 cm long, stipulate, petiolate; stipules 2, 5–10 mm long, ensiform, acuminate with equeal tips, fused when young, splitting at maturity, caducous, basifixed, many nerved, hairy; petioles 5–25 mm, hairy; leaflets 1, 5–15 × 2.5–6 cm, narrowly ovate to oblong, truncate or rounded to cordate at base, apex acute to acuminate, base truncate or rounded to cordate, glabrous on ventral surface, dorsally hairy, hairy on nerves, lateral nerves in 7–9 pairs; gland-dotted; petiolules 2–4 mm long, hairy. Inflorescences terminal and axillary panicles of either 1 or else 5–20 cm long flowers of short panicles at first hidden by foliaceous bracts. Flowers 8–9 mm long, pedicellate, bracteate, pedicel 2 mm long, hairy; bracts 1.5–3 × 2–3 cm, folded, broadly orbicular-ovate, mucronate at apex, many nerved, papery, hairy, gland- dotted; basal bracts ovate-acuminate, striate. Calyx 5–6.5 mm long hairy, gland-dotted, hairs antrorse; calyx tube 1.5–2 mm long, campanulate, hairy; calyx teeth 5, 3.5–4.5 × 1–1.5 mm, lanceolate, equal, connate for 1/3 of its length, many nerved, hairy, gland-dotted. Standards 6–6.5 × 4–4.5 mm, broadly obovate, emarginate; glabrous, clawed with 2 auricles; claw 1 mm long; auricles less than 1 mm; wing petals 5.5–6 × 2–2.5 mm, oblong, slightly falcate; claw 2–2.5 mm long; keel petals 6–6.5 × 3–3.5 mm, oblong, falcate, fused at apex at lower side; claw 1.5–2 mm long. Stamens diadelphous (9+1); staminal tube 5–6 × 1– 1.5 mm, anthers uniform, less than 1 mm long, basifixed, filaments of united anthers 1.2–2 mm, that of free 5.5–6 mm long; Ovary 1.5–2 × 1 mm, gland-dotted, hairy; ovules 2; styles 3–3.5 mm long, glabrous, swollen at middle; stigma globose, hairy. Stigma capitate. Fruits unknown.

Distribution

Asia: India (Andaman and Nicobar Islands and Bihar), Thailand (Chiang Mai).

Flowering

January to March.

Taxonomic notes

Haines (1922) described a new variety under *F. strobilifera*, i.e. *F. strobilifera* var. *nudiflora* Haines from Bihar, India. We raised the varietal rank of *Flemingia strobilifera* var. *nudiflora* to species level and made the new combination *F. nudiflora*. *Flemingia tiliacea* was described by Niyomdham from Thailand in 1992. In the protologue, Haines mentioned the collection locality (Singbhum, Saitba Forest) of the specimen without any collection number. The specimen Haines 4655 housed at K bears the label 'Singbhum, Saitba Forest' indicating that this is an original material. Niyomdham used the same specimen as paratype along with the holotype J.F.C. Rock 1819. After critical examination, both *Flemingia nudiflora* and *F. tiliacea* are identical in their morphology. Hence, we propose *Flemingia tiliacea* as a new synonym for *F. nudiflora*.

The terminal inflorescences are similar to that of *F. strobilifera*, but with slightly larger almost glabrous bracts that hardly cover the flowers which are situated close to the petiole of the foliaceous bracts. The more basal inflorescences have no foliaceous bracts, or these may have fallen off, giving this species the looks of *F. paniculata* Wall. ex Benth. The (simple) leaves of *F. nudiflora* are similar to those of *F. strobilifera*, narrower ovate-elliptic than the ovate leaf blade of *F. paniculata*. The label of H.H. Haines 4655, the type of *F. nudiflora* indeed mentions *Flemingia strobilifera* × *paniculata*? and this describes the situation perfectly.

Nomenclatural notes

Flemingia strobilifera var. *nudiflora* was described by Haines (1922) from Singbhum, Bihar. While describing the variety, he mentions a specimen 'Haines 4655'. In search of a type we could locate a single sheet at K. The sheet is well matched with the protologue and hence as per articles 9.11 and 9.12 of Shenzhen Code (Turland et al. 2018) designated as lectotype.

Specimens examined

INDIA: Andaman and Nicobar Islands, S. Andamans, 28 January 1904, *C.G. Rogers 47* (K, LY); Assam, 1891, *G. King's collector s.n.* (CAL, US).

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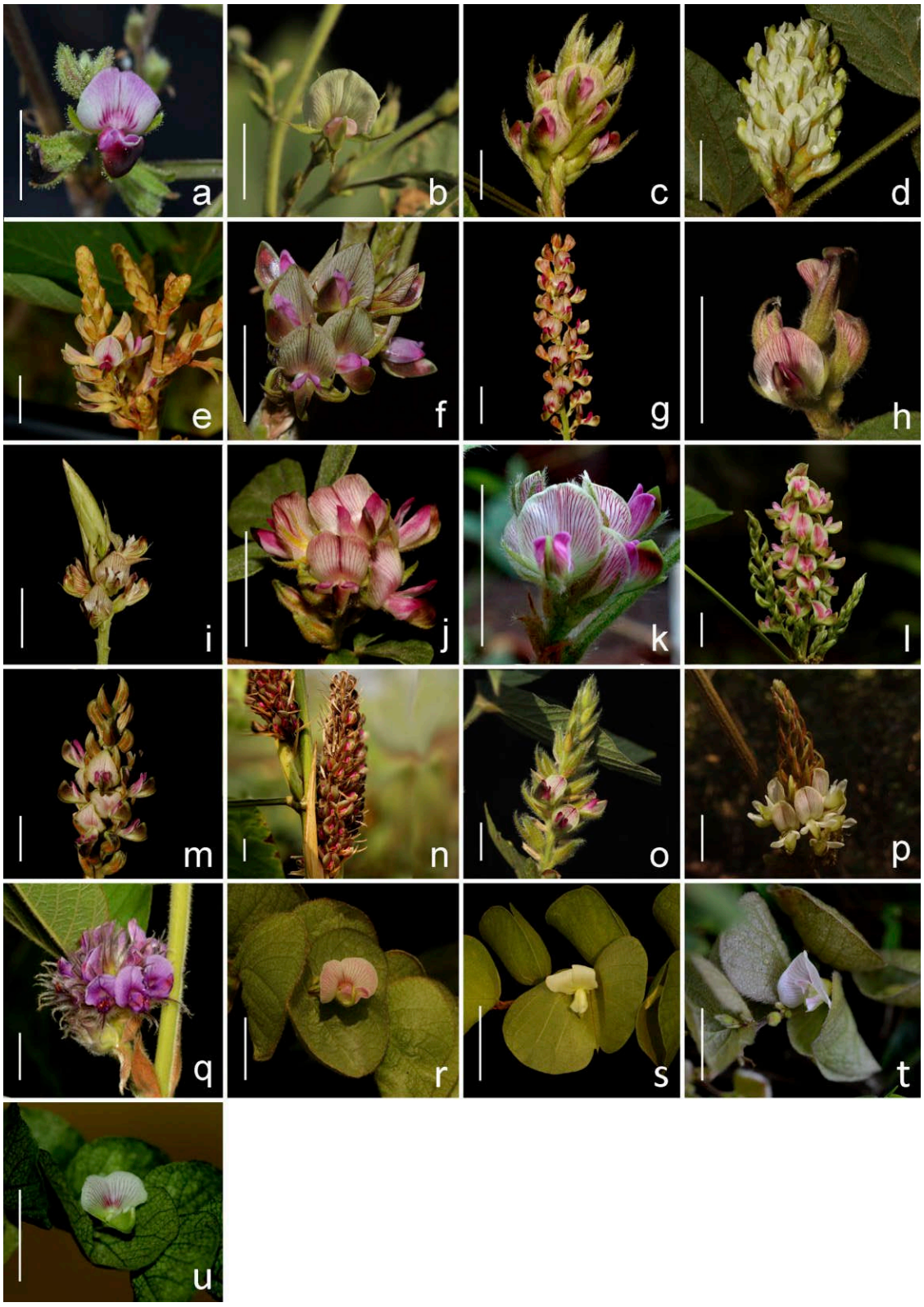

Figure 23. Inflorescence diversity in *Flemingia*. (a) *F. lineata*; (b) *F. paniculata*; (c) *F. angustifolia*; (d) *F. grahamiana*; (e) *F. latifolia*; (f) *F. macrophylla*; (g) *F. nana*; (h) *F. parviflora*; (i) *F. praecox* var. *robusta*; (j) *F. procumbens*; (k) *F. prostrata*; (l) *F. semialata*; (m) *F. sootepensis*; (n) *F. stricta*; (o) *F. wallichii*; (p) *F. wightiana*; (q) *F. trifoliata*; (r) *F. bracteata* ; (s) *F. chappar* ; (t) *F. fruticulosa* ; (u) *F. strobilifera*. Scale bars = 1 cm.

Figure 24. Infructescence diversity in *Flemingia*. (a) *F. lineata*; (b) *F. paniculata*; (c) *F. angustifolia*; (d) *F. grahamiana*; (e) *F. macrophylla*; (f) *F. nana*; (g) *F. parviflora*; (h) *F. praecox* var. *robusta*; (i) *F. procumbens*; (j) *F. prostrata*; (k) *F. semialata*; (l) *F. sootepensis*; (m) *F. stricta*; (n) *F. wallichii*; (o) *F. wightiana*; (p) *F. trifoliata*; (q) *F. bracteata*; (r) *F. chappar*; (s) *F. strobilifera*. Scale bars = 2 cm.

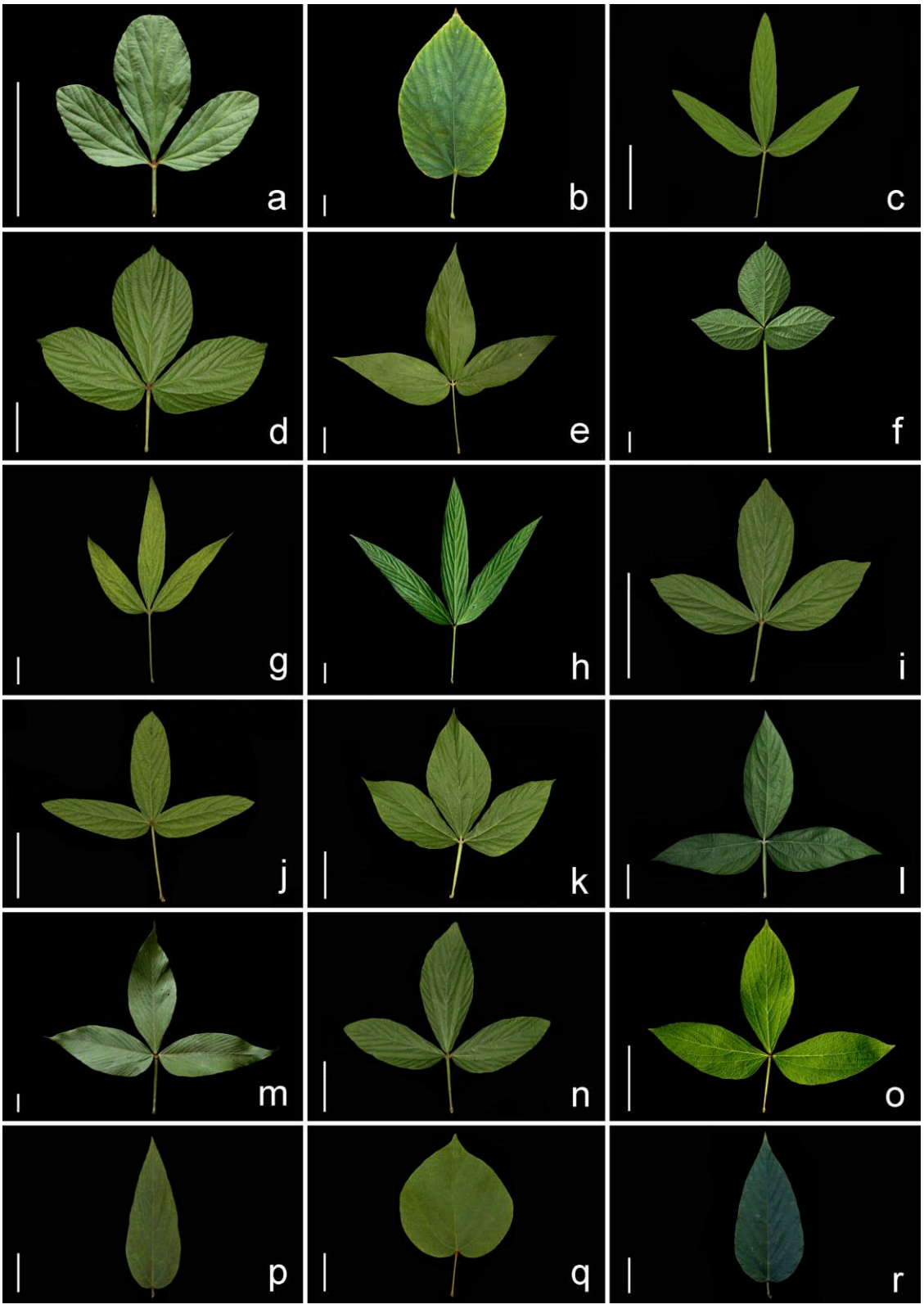

Figure 25. Leaf variation (ventral surface) in *Flemingia*. (a) *F. lineata*; (b) *F. paniculata*; (c) *F. angustifolia*; (d) *F. grahamiana*; (e) *F. macrophylla*; (f) *F. nana*; (g) *F. parviflora*; (h) *F. praecox* var. *robusta*; (i) *F. procumbens*; (j) *F. prostrata*; (k) *F. semialata*; (l) *F. sootepensis*; (m) *F. stricta*; (n) *F. wallichii*; (o) *F. wightiana*; (p) *F. bracteata*; (q) *F. chappar*; (r) *F. strobilifera*. Scale bars = 4 cm

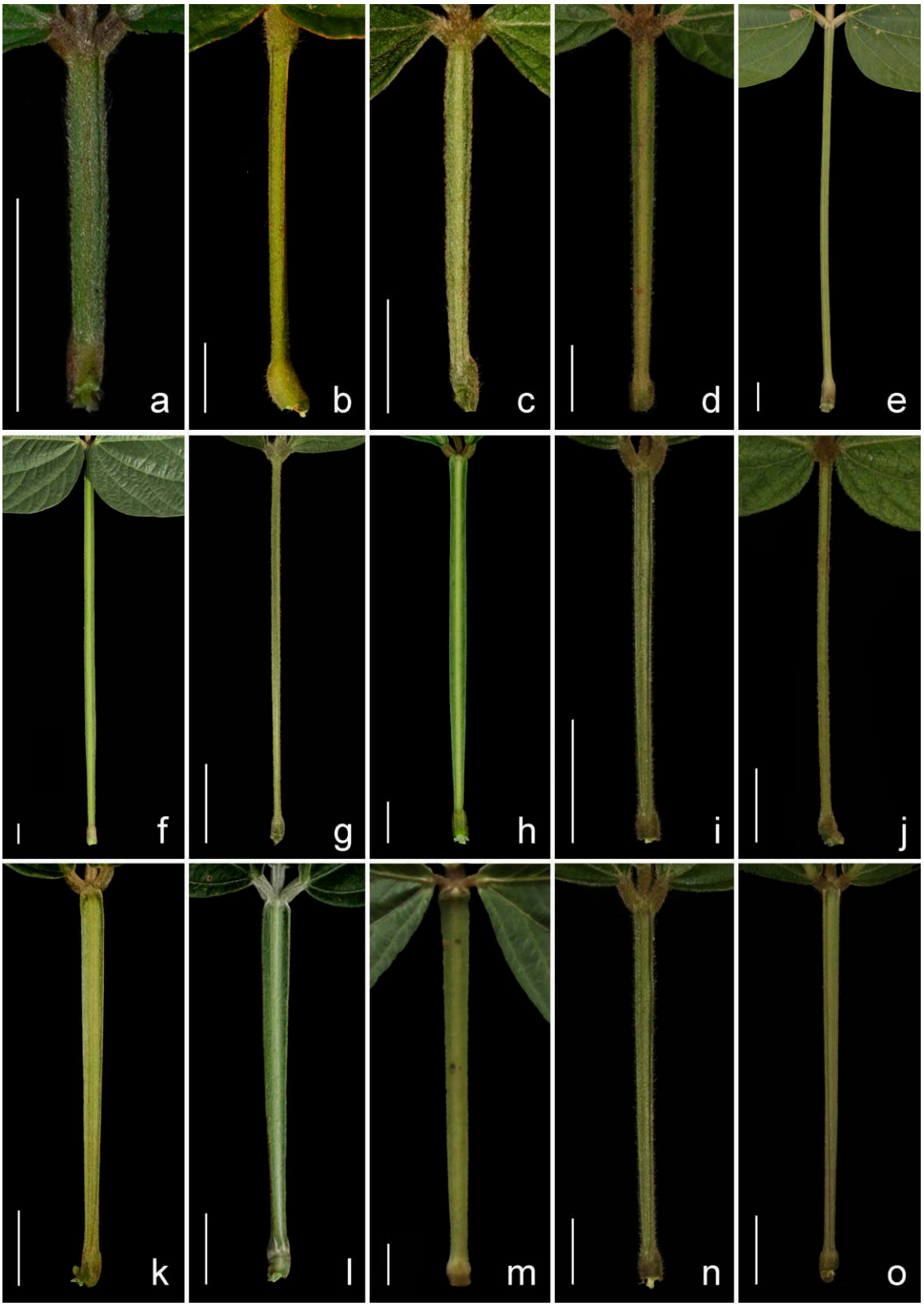

Figure 26. Petiole variation (ventral surface) in *Flemingia*. (a) *F. lineata*; (b) *F. paniculata*; (c) *F. angustifolia*; (d) *F. grahamiana*; (e) *F. macrophylla*; (f) *F. nana*; (g) *F. parviflora*; (h) *F. praecox* var. *robusta*; (i) *F. procumbens*; (j) *F. prostrata*; (k) *F. semialata*; (l) *F. sootepensis*; (m) *F. stricta*; (n) *F. wallichii*; (o) *F. wightiana*. Scale bars = 1 cm

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