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A REVISION OF VALLARIS BURM. F. (APOCYNACEAE)

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INTRODUCTION

The present publication is a monograph of the genus *Vallaris* based on herbarium material preserved in a number of European musea, four American, two Asiatic and two African herbaria, including all type specimens.

Unfortunately the author did not have the opportunity to study living specimens in the field.

The present paper shows the genus to consist of three species, restricted to Asia. Of these *V. solanacea* has the widest distribution. As of *V. glabra* the fruits are not yet known, the author hopes to have the opportunity to find these and study them upon his return to his home country, Indonesia*.

Almost all specimens studied are cited in the present paper.

GENERAL PART

HISTORY OF THE GENUS

BURMANN f. proposed the genus *Vallaris* in 1768 for a single species, *V. pergulana*, to accommodate RUMPHIUS' *Flos pergulanus* of 1747 (flos = flower, pergulanus = pertaining to a porch, hence porch-flower).

A year previous, however LINNAEUS did provide the combination *Pergularia glabra* for RUMPHIUS' plant, although it does not belong to the Asclepiadaceous genus *Pergularia* as it is delimitated today. As a result the Linnean name lingered in synonymy to BURMANN's name for considerable time. In 1819 ROEMER & SCHULTES illegitimately published *Emericia pergularia* based on *Vallaris pergulana* Burm. f. Two years later ROTH (1821) proposed the monotypic genus *Peltanthera* with *P. solanacea* as its type. This species was recognized as belonging to *Vallaris* by SPRENGEL in 1825 who provided the illegitimate new combination *V. heynii* for it, in honour of the collector of the type-specimen.

The two species recognized in *Vallaris* since 1825 and known as *V. pergulana* and *V. heynii* respectively, were provided with their correct epithets by O. KUNTZE in 1891 when he combined them as *V. glabra* and *V. solanacea*. Shortly before, in 1888, a third species of *Vallaris* was provided with the name *Beaumontia indecora* by BAILLON. This species served as type for the genus *Parabeaumontia* of PICHON (1948) until it was correctly referred to *Vallaris* by TSIANG & LI in 1973.

A fourth species, *V. grandiflora*, proposed by HEMSLEY in 1906 proves to be conspecific with *V. indecora*.

* After returning to Indonesia the author studied the material in the Bogor Herbarium which contained only duplicates from elsewhere.

Apart from the combinations treated above and assigned to the genus *Valaris*, several other combinations have been proposed in *Vallaris* by various authors. These should be referred to the genera *Beaumontia, Kibatalia, Pottsia* and *Vallariopsis* (*Apoc.*), to *Cryptolepis* (*Asclep.*) and to *Lepistemon* (*Convolvul.*) and are listed in this paper as excluded species.

GEOGRAPHICAL DISTRIBUTION

The three species that constitute the genus *Valaris* inhabit geographically separated areas as is shown on the distribution map. *V. indecora* occurs in S.W. China, *V. glabra* is restricted to Indonesia, while *V. solanacea* covers an extensive area between the other two, i.e. from India to Southern China.

V. glabra and *V. solanacea* are cultivated outside their home countries as well, notably in Africa and Europe.

RELATIONSHIP TO OTHER GENERA

According to PICHON (1950), *Vallaris* belongs to the tribe *Nerieae* of the subfamily *Apocynoideae* (*Echitoideae* of PICHON). As far as the present author could observe, it is closely allied to *Beaumontia, Kibatalia* and *Vallariopsis*. PICHON placed *Vallaris* together with *Beaumontia* in one of the nine subtribes of the *Nerieae*, and *Kibatalia* in an other. As he was not familiar with *Vallariopsis* he did not treat that genus in his classification. As the present author considers *Vallariopsis* to occupy a position more or less in between *Vallaris* and *Kibatalia*, the delimitation between the respective subtribes seems to be less sharp than it was supposed by PICHON. The subdivision of the *Nerieae* will be dealt with in more detail in forthcoming revisions of genera in this group.

TAXONOMIC PART

Vallaris Burm. f., Fl. Ind. 51. 1768; Hooker, Fl. Ind. 3: 650. 1882; Brown, Mem. Wern. Nat. Hist. Soc. 1: 63. 1809; Bor c.s., Some Indian Climbers and Shrubs: 207. 1954; Endlicher, Gen. Plant. 2: 584. 1838; Miers, Apoc. S. Am. 9. 1878 (as *Villaris*); Gamble, Fl. Prec. Mad.: 814. 1921; Boerlage, Fl. Ned. Ind. 2(2): 373, 397. 1899; Bakhuizen v.d. Brink f., in Backer c.s., Fl. Jav. 2: 243. 1965.

Type species: *Vallaris pergulana* Burm. f. (= *V. glabra* (L.) O. Kuntze).

Heterotypic synonyms: *Emericia* Roem. et Schult., Syst. Veg. 4: 401. 1819, partly, as for type species. Type species: *E. pergularia* Roem. et Schult. (= *V. glabra* (L.) O. Kuntze).

Peltanthera Roth, Nov. Pl. Sp. 132. 1821 (not Benth. 1876, which is a nomen conserv. in *Loganiaceae*). Type species: *P. solanacea* Roth (= *V. solanacea* (Roth) O. Kuntze).

Parabeaumontia Pichon, Bull. Mus. Nat. Hist. Nat. Paris ser. 2, 20: 382. 1948. Type species: *P. indecora* (Baill.) Pichon (= *V. indecora* (Baill.) Tsiang et P. T. Li).

Scandent or trailing *shrub* or mostly twining (not yet studied for *V. indecora*) climber. *Branches* pale grey-brown, with longitudinally fissured bark and large lenticels; with white latex (copied from TSIANG and LI for *V. indecora*). Branchlets terete, sparsely to densely pubescent, glabrescent. *Leaves* opposite, petiolate; those of a pair equal or less often unequal; petioles channeled above, sparsely to densely pubescent, those of a pair connate at the base into a very short ocrea, with long slender colleters in a single row in the axils; blade membraneous to papyraceous when dry, mostly elliptic, entire, mostly with some pubescence on both sides; costa often slightly impressed above, prominent beneath; tertiary venation conspicuous, reticulate, clear translucent dots in the leaves, which may be absent in *V. solanacea*. *Inflorescences* axillary or only in *V. solanacea* sometimes terminal, lax, up to as long as the leaves. Peduncle, branches and pedicels sparsely to densely pubescent; bracts sepal-like, and mostly of the same size, pubescent, deciduous, often still present when the first flower opens; leaving large leaf-scars, with some colleters in the axils. *Flowers* 5-merous, actinomorphic. *Sepals* probably always pale-green, free, the inner narrower than the outer, entire, imbricate in bud, pubescent outside, with or without colleters. *Corolla* white, creamy or pale-yellow, pubescent outside, except for the glabrous base, inside with a tomentose belt below the insertion of the stamens, which may be glabrous in *V. glabra*; tube funnel-shaped; limb spreading, entire, overlapping to the right. *Stamens* exserted, inserted where the corolla tube abruptly widens; filaments inside tomentose and with a subglobose swelling, which may be absent in *V. solanacea*, near the apex, outside with a bigger subglobose to ellipsoid pubescent swelling; anthers narrowly triangular, acuminate at the partially sterile apex, sagittate at the base, introrse; cells 2, dehiscent throughout by a longitudinal slit. *Pistil*: ovary almost disk-shaped, glabrous at the extreme base and hairy at the apex, composed of two separate carpels surrounded by an annular disk with about the same length and with the same indumentum. The two carpels united at the apex by the base of the style; style cylindrical, hirto-pubescent, only at the extreme apex more densely hairy in *V. solanacea*; clavuncula conical or only in *V. solanacea* sometimes ellipsoid, glabrous, blunt at the apex and topped by the stigma, which is composed of 5 short lateral and one short central lobes. Style and stigma falling off with the corolla, as the clavuncula adheres to the connectives of the anthers. In each cell one semiglobose placenta with at least 50 ovules. *Fruit* composed of two very narrowly ovate or very narrowly elliptic free carpels of which often only one develops. Carpels minutely sulcate when dry, several-seeded, not lenticellate; dehiscent throughout with an adaxial longitudinal slit. *Seed* dark brown, ellipsoid or nearly so, laterally compressed, granulate, pubescent, rounded at the base, with a raphe on one side and an apical coma directed towards the apex of the fruit, acuminate or slightly beaked at the apex; coma white, recurved; hairs simple; endosperm starchy, surrounding

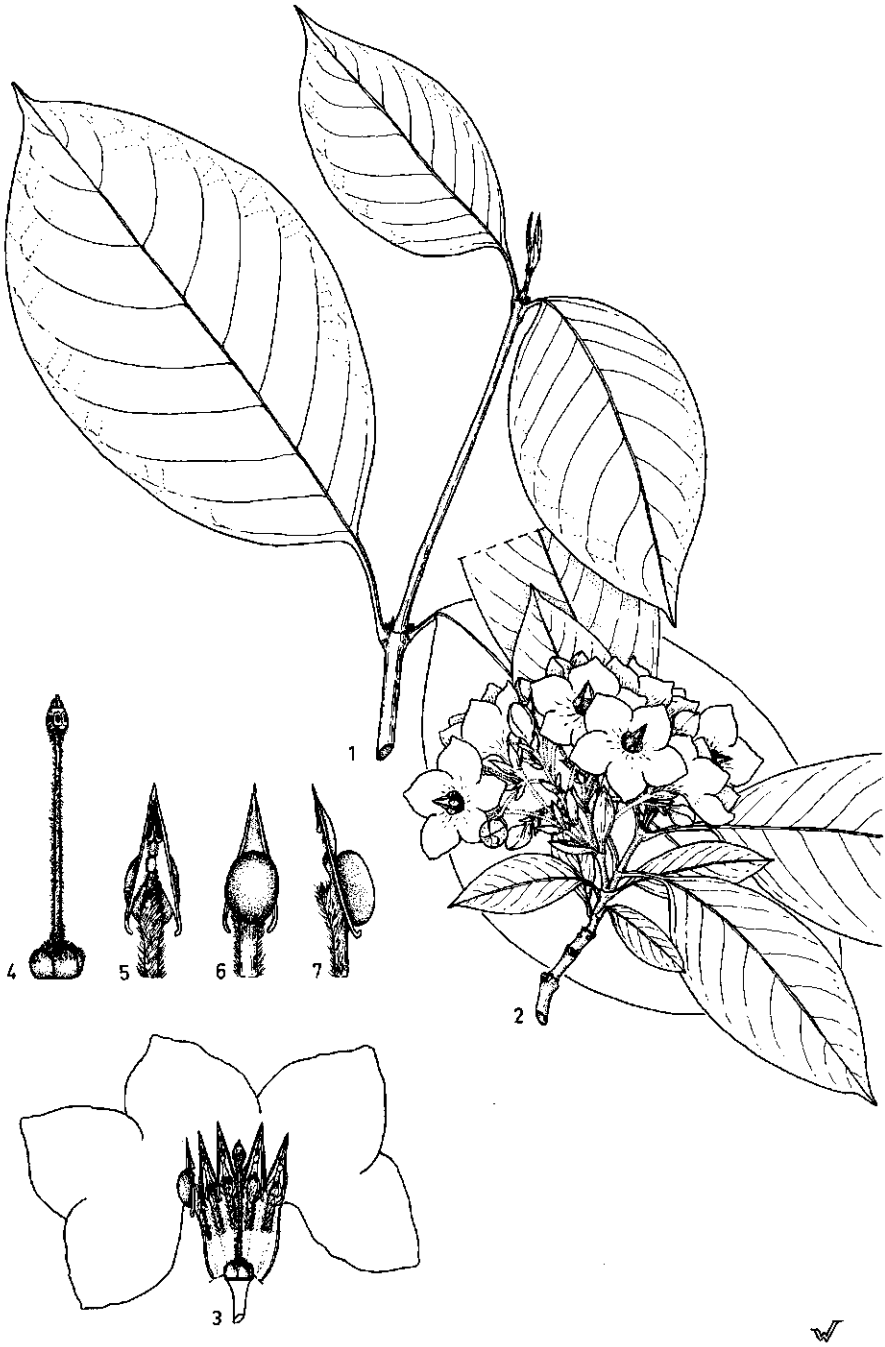


FIG. 1. *Vallaris glabra* (L.) O. Kuntze: 1. habit $\frac{2}{3}\times$; 2. habit $\frac{2}{3}\times$; 3. opened flower 2×; 4. pistil 4×; 5. anther ventrally 4×; 6. anther dorsally 4×; 7. anther laterally 4 × (1. *Blume s.n.*; 2–7. *Kostermans 19073*).

the embryo; embryo straight, white; rootlet directed towards the apex of the seed; cotyledon elliptic, rounded at the apex, subcordate at the base.

Distribution: 3 species in Asia from Kashmir to Southern China, and south to Peninsular India, Sri Lanka and Indonesia.

ETYMOLOGY

The name for *Vallaris* is derived from the latin word 'vallo' meaning 'to enclose' based on the fact that the species grown in Java is used for screen (BOR and RAIZADA, Indian climbers and shrubs: 208). 'Vallaris' (from vallo, to enclose); used for fences in Java' (G. DON 1837: 78).

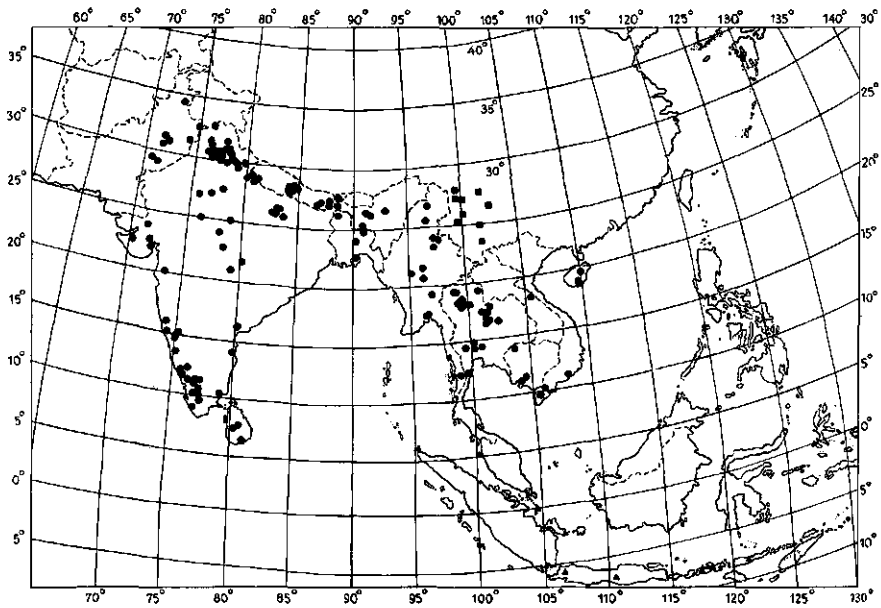
KEY TO THE SPECIES

1. Flowers large; sepals 9–15 × 2–7 mm; corolla tuba 13–15 mm long; inflorescence few-flowered; seed 19 mm long. Continental China **2. V. indecora**
– Flowers smaller; sepals 2–7 × 1–3 mm; corolla tube 5–10 mm long; inflorescence often many-flowered; (seed only known for *V. solanacea*) 2
2. Leaves 1.4–2 × as long as wide, 6.5–16 × 4–10 cm, mostly apiculate; inflorescence 3–40-flowered; sepals mostly spreading to recurved; seed unknown. Indonesia . . . . . **1. V. glabra**
– Leaves (1.7–)2.3–4 × as long as wide, 2–15 × 0.8–6 cm, mostly acuminate; inflorescence 3–20-flowered; sepals mostly erect or suberect; seed 9–10 mm long. Pakistan to China (Hainan) . . . . . **3. V. solanacea**

1. Vallaris glabra (L.) O. Kuntze, Rev. Gen. Pl. 2: 27. 1891. **Fig. 1; Map 1**
Basionym: *Pergularia glabra* L., Mant. Pl. 2: 53. 1767.
Type: sin. loc., *herb. Linnaeus 306.1.* (LINN).
Heterotypic synonyms: *V. pergulana* Burm. f., Fl. Ind. 51. 1768, based on *Flos pergulanus* Rumph., Herb. Amb. 5: 51, pl. 29. 1747; Hasskarl, Flora 28: 299 ('267'). 1845. Hooker, Icon. Pl. 2, pl. 153. 1837 (as *V. pergularia*). Homotypic synonym: *V. indica* J. F. Gmel., Syst. Nat. 2: 391. 1791.
V. ovalis Miq., Fl. Ind. Bat. 2: 426. 1856. Type: Indonesia: Surakarta, *Horsfield s.n.*, fl. (K, holotype; BM, L, U, isotypes).

Evergreen; straggling or twining climber, up to 6 m high. *Leaves*: petiole 5–30 mm long; blade elliptic or obovate, 1.4–2 × as long as wide, 6.5–16 × 4–10 cm, sometimes some basal smaller, equal-sided and rounded or cuneate at the base, acuminate, apiculate or sometimes rounded at the apex, sparsely pubescent, especially on the midrib to glabrous above, sparsely to densely pubescent at least between the main veins and glabrescent beneath; 7–9 secondary veins

on each side. *Inflorescences* 3–40-flowered, coumpound-corymbose or nearly so, about 0.5 × 1 as long as the leaves, 3–10 × 3–8 cm. Peduncle 5–20 mm long; pedicel 15–30 mm long. *Flowers* fragrant and with about the same odour as a civet-cat or a pandan-wangi (*Pandanus* sp.). *Sepals* pale green (?), ovate or narrowly elliptic, 1.5–4 × as long as wide, 3–7 × 1.5–2.5 mm, mostly spreading to recurved, acuminate, puberulous inside, except for the basel 2–3 mm, with or without colleters, which are – if present – in 5 groups alternating with the sepals. *Corolla* creamy or white, glabrous or glabrate for 2–4 mm at the base, inside pubescent on the limb, furthermore tomentose or sometimes glabrescent from 2–3 mm above the base to the insertion of the stamens; tube 1–1.7 × as long as the calyx, 7–10 mm long, at the base 2–3 mm, then almost cylindrical up to near the middle and there abruptly widened, near the middle 2–3 mm and at the mouth 6–12 mm in diameter; limb 12–20(–28) mm in diameter; lobes ovate, 1–2 × as long as wide, 5–11 × 4–7 mm, obtuse. *Stamens* exserted for about 5–7 mm; filaments 3–3.5 mm long; anthers 4–6 × 1–1.5 mm, at the apex for 0.5 mm sterile, glabrous. *Pistil* 7–10 mm long; ovary 1–2 × 1.5–2 × 1–1.5 mm, velutinous or tomentose at the apex; style 6–8 mm long; clavuncula 1 × 0.5–1.5 mm. The clavuncula adheres not only to the connectives but also to the ventral side of the apex of the filaments. Placenta with about 50–60 ovules. *Fruit* unknown.



Map 1. ▲ *Vallaris glabra;* ■ *V. indecora;* ● *V. solanacea.*

Distribution: Indonesia; from Sumatra to Flores island.

Ecology: Monsoon high-forest or wet forest in mountain area. Altitude 0–600 m.

Uses: Malaysia: ornamental.

Vernacular names: INDONESIA: *Kerak nasi* (West Java, teste *Bakhuizen v.d. Brink 3195*); *Caracnasi* (Java, teste *Kleinhoff*); *Cajac nassi* (sin. loc. teste *Herbarium Linnaeus 306.1*); *Carack nassi* (Java, *Anonym. anno 1760*); *Karessa dangang* (Java, BLUME, 1826: 1042); *Carak nassi* (Java, *Burmann f. s.n.*); *Bunga Tonken* (Pulau Sabang, *Burchill 3228*); *Kerak nasi* (Sumatra. *Lörzing 16400*). MALAYSIA: *Kerak nasik* (Penang, *Haniff 235*); *Tikam seladam* (Kota bahau, *Corner 33402*).

Specimens examined:

INDONESIA: Pulau Sabang (fl. May) *Burchill 3228* (SING). Sumatra (fl.) *Forbes 1790 a* (BM. Java (fl.) *Kollmann, anno 1838* (NY); Surakarta, Sonkui (fl.) *Horsfield s.n.* (BM, K, L, U); sin. loc. *Anonym. anno 1760* (G), *Blume s.n.* (L.), (fl.) *Kleinhoff s.n.* (G, L); (fl.) *Zollinger 3620* (G, K, W); (fl.) *Herbarium Linnaeus* (LINN 306.1, type). Sumbawa, Mt. Batulante (fl. Nov.) *Kostermans 19073* (G, L, P); Bobonka (fl.) *Albert Colf 154* (L); ibid., Sultanat Bima (fl. Dec.) *Elbert 3643* (K, L), sin. loc. (fl. Nov.) *de Voogd 1923* (L). Flores, sin. loc. (fl. Nov.) *Weber s.n.* (L).

Cultivated: INDONESIA: N. Sumatra, Medan (fl. July) *Lörzing 16400* (K, L). Java, Bogor, Cisalak, Halte Parungkuda (fl. Jan.) *Bakhuizen v.d. Brink 3195* (L); ibid., Kampungbaru, Kedunghalangtalang (fl. Oct.) *Boerlage s.n.* (L); ibid. Hort. Bot. (fl. July) *Hallier 98 a* (G, L); ibid. (fl. Nov.) *Burmann f. s.n.* (L); ibid., *Merrill s.n.* (NY, US); ibid. (fl.) *Spire* (P); D.C.I. Jaya, Cibungur (fl. June) *Kuntze 5122* (NY).

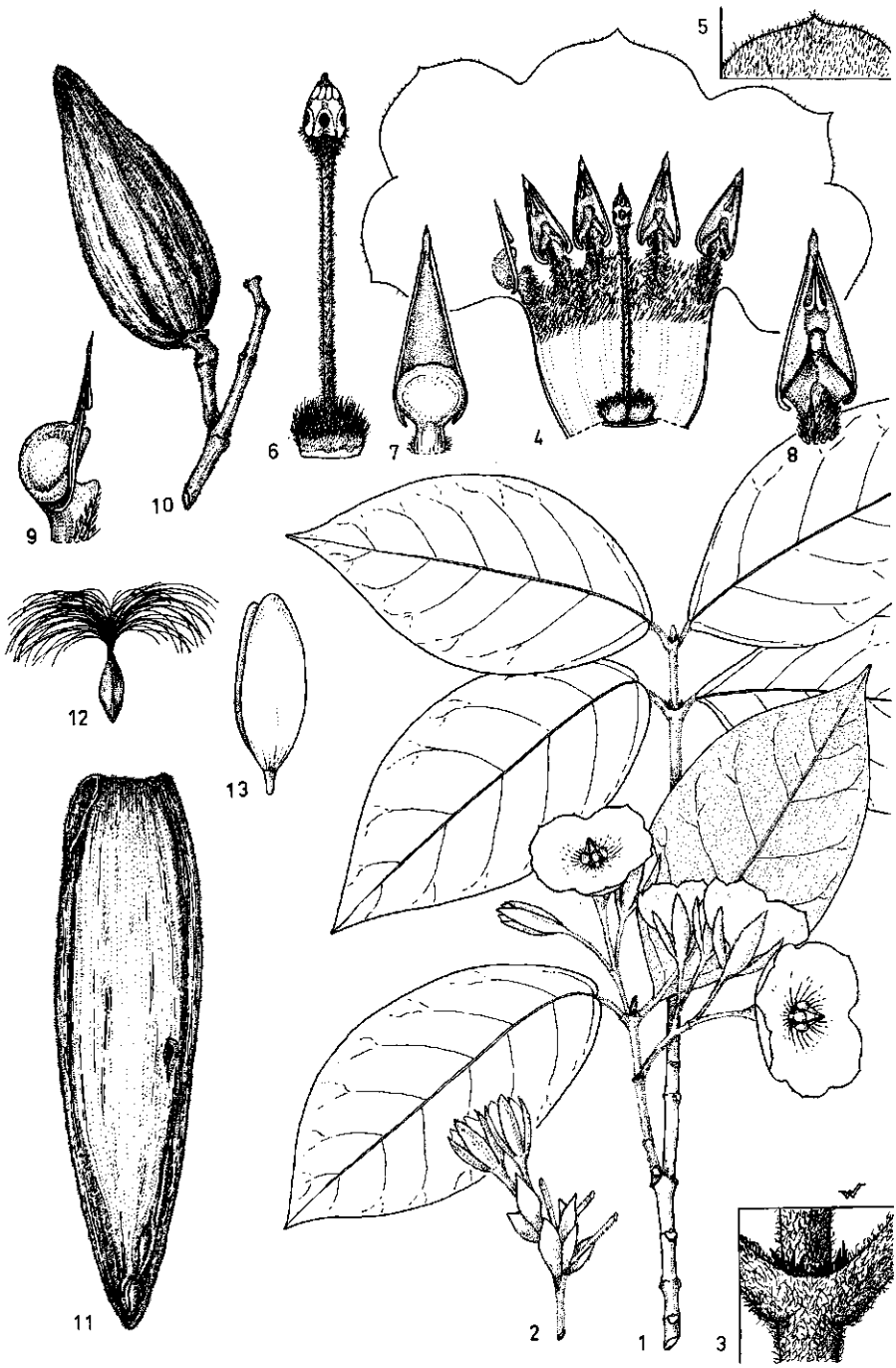
MALAYSIA: Kota bahau (fl. Apr.) *Corner 33402* (K, SING); Penang (fl. Feb.) *Haniff 235* (UC); sin. loc. (fl. Apr.) *Herb. Maingay 1723* (K); sin. loc. (fl. Dec.) *Nongehi 39* (SING).

PHILLIPPINE ISLANDS: Manilla (fl.) *Perrottet s.n.* (G, L).

SRI LANKA: sin. loc. (fl. Apr.) *Macrae 547* (BM).

THAILAND: Bangkok (fl. June) *Kerr 8980* (BM, K); ibid. canal bank (fl. March) *Marcan 2016* (BM); ibid. (fl. March) *Surapat 185* (US); ibid. Palace Garden (fl.) *Herb. Wight 2534* (E, K) ; ibid. (fl. Apr.) *Kerr s.n.* (BM).

Note. In Februari 1921 BAKHUIZEN V.D. BRINK planted in the Bogor Botanic Garden a cutting of *V. glabra* which he had obtained on Mt. Salak. It flowered in September 1962, but no herbarium specimen of it was preserved. Nevertheless, there is little doubt that it is correctly named. A corresponding dot has therefore been placed on the distribution map and is the only one for which no specimen has been seen.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2. Vallaris indecora (Baill.) Tsiang et P. T. Li., Acta Phytotax. Sin. 4, 11: 375. 1973; Flora Rep. Pop. Sin. 63: 141. 1977, pl. 47; Anonym., Icon. Corm. Sin. 3: 843. 1974. **Fig. 2; Map 1**

Basionym: *Beaumontia indecora* Baill., Bull. Soc. Linn. 1: 759. 1888.

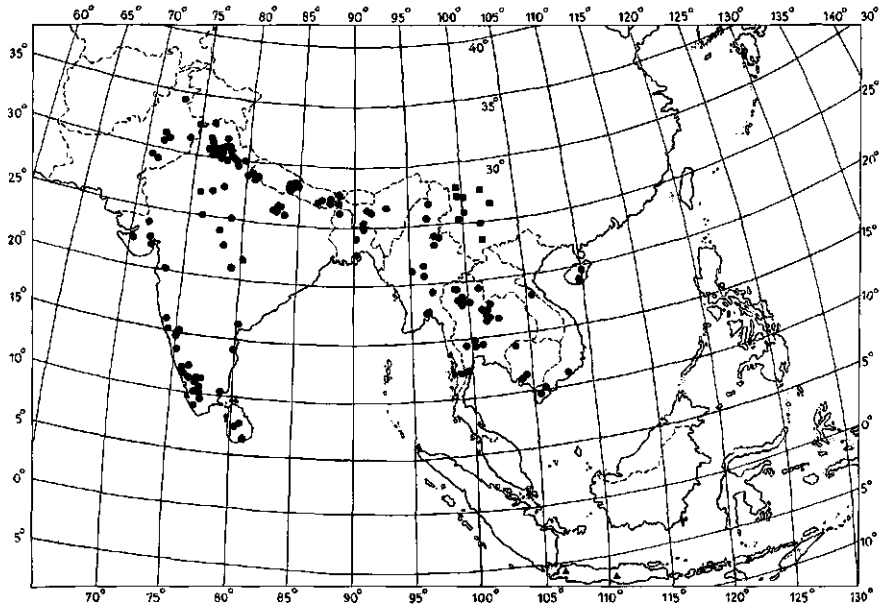
Type: China: Yünnan, *Delavay 2549* (P, holotype).

Homotypic synonym: *Parabeaumontia indecora* (Baill.) Pichon, Bull. Mus. Nat. Hist. Nat. Paris ser. 2, 20: 382. 1948; Pichon, Mem. Mus. Nat. Hist. 1: 60. 1950.

Heterotypic synonym: *Vallaris grandiflora* Hemsl. et Wils., Kew Bull. 5: 162. 1906; Tsiang, Sunyatsenia 2: 173. 1934; Handel-Mazzetti, Symb. Sin. 7: 992. 1936; Wilson, Pl. Wils. 3: 342. 1917. Type: China: Yünnan, Tung valley, *Wilson 4108* (K, holotype; P, isotype).

Deciduous, trailing or scandent *shrub* 2–6 m high. *Leaves*: petiole 1–6 mm long; blade elliptic or obovate, 1.5–2.5 × as long as wide, 7–14 × 3–9 cm, often some basal smaller, equal-sided and cuneate or rounded at the base, acuminate, apiculate, or in basal leaves often obtuse or rounded at the apex, sparsely pubescent, especially on the midrib, to glabrous above, beneath sparsely to densely pubescent and glabrescent, and at least with some hairs on the main veins; 6–8 secondary veins on each side. *Inflorescences* 3–4-flowered, umbellate or nearly so, about half as long as the leaves, 3–5 × 3–5 cm. Peduncle 7–15 mm long; pedicels 7–20 mm long. *Flowers* with an unpleasant odour. *Sepals* pale green (?), oblong, 1.9–6 × as long as wide, 9–15 × 2–7 mm, acute, glabrous inside, with 5 colleters in the whole calyx alternating with the sepals. *Corolla* creamy or pale yellow, glabrous for 6–7 mm at the base, inside pubescent on the limb, furthermore inside tomentose from 3 mm above the base to the insertion of the stamens (glabrous at the base); tube 1–1.5 × as long as the calyx, 13–15 mm long, at the base 5 mm, then almost cylindrical up to near the middle and there abruptly widened, near the middle 6–8 mm and at the mouth 22–26 mm wide; limb about 30–40 mm in diameter; lobes hemi-orbicular, 0.4–0.7 as long as wide, 4–8 × 10–16 mm, rounded. *Stamens* exserted for about 3 mm; filaments 3–4 mm long; anthers 6–8 × 2.5–3 mm, at the apex for 0.5 mm sterile, glabrous. *Pistil* 9.5–12 mm long; ovary 1 × 2.5–4 × 1.5–2.5 mm, velutinous or tomentose at the apex; style 7–10 mm long; clavuncula 1.5–2 × 1.5 mm. Placenta with about 50 ovules. *Fruit*: carpels dark brown; 6.5–11 × 1.5–3 cm. *Seed* rhomboid or ellipsoid, 19 × 7 × 5.5 mm; coma about as long as the seed; endosperm creamy; embryo large; rootlet 3 × 1 mm; cotyledons 11 × 5 mm.

FIG. 2. *Vallaris indecora* (Baill.) Tsiang et P.T. Li: 1. habit $\frac{2}{3}$ ×; 2. portion of inflorescence in flower bud $\frac{2}{3}$ ×; 3. leaf base with colleters 4 ×; 4. opened flower 2 ×; 5. apex corolla lobe outside 2 ×; 6. pistil 4 ×; 7. anther dorsally 4 ×; 8. anther ventrally 4 ×; 9. anther laterally 4 ×; 10. immature fruit $\frac{2}{3}$ ×; 11. fruit $\frac{2}{3}$ ×; 12. seed $\frac{2}{3}$ ×; 13. embryo 2 × (1, 3–9. *Forrest 9931;* 2. *G. Forrest 25465;* 10. *J. F. Rock 3070;* 11–13. *G. Forrest 28010*).



Map 1. ▲ *Vallaris glabra;* ■ *V. indecora;* ● *V. solanacea.*

Distribution: China: Yünnan, Sichuan (Szechwan), Guizhou (Kweichow). Altitude: 650–3000 m.

Ecology: Thickets or forest in the mountains, on riverbanks or on dry places.

Uses: Used as medicine against worm disease according to TSIANG & LI (1973).

Specimens examined:

CHINA: Yünnan: Beyenjing (fl. May) *Handel-Mazzetti 1113* (W); Kuti (fl.) Ten 264 (W); Pe Yen Tsin (fl. March, fr. July) *Ten 63* (A, E); Ha Che Fang (fr. July) *Ten s.n.* (C); Hou Ti (fl.) *Ten s.n.* (C); Yangpi valley (fl. May) *Forrest 9931* (A, BM, E, K, UC, W), (fl. Apr.) *12374* (BM, E, K); ibid. (fl. March) *McLaren 171 c* (A, BM, E, K); ibid. (fl. Apr.) *Ten 384* (E, UC); Tong Shan (fl., fr. Sept.) *Forrest 11515* (A, E), (fl. July) 12661 (E, K); Chung Tien Plateau (fl. July) *Forrest 12680* (E, K); N. of Yung Chang Fu (fl., fr. Apr.) *Forrest 25465* (E, K); Tali Range (fr. Sept.) *Forrest 28010* (E); Tung Valley (fl., fr, Apr.) *Wilson 4108* (K, P, type of *Vallaris grandiflora*); sin. loc. (fl. May) *Delavay 2549* (P, type); (fl., fr. Aug.) *Forrest 13152* (E, K); Sichuan (Szechwan): sin. loc. (fl., fr. May) *Handel-Mazzetti 503* (W). Guizhou (Kweichow): Bien Sen Kiao (fr.) *Cavalerie 1797* (P).

3. Vallaris solanacea (Roth) O. Kuntze, Rev. Gen. Pl. 2: 417. 1891.

Fig. 3; Map 1

Basionym: *Pelthanthera solanacea* Roth, Nov. Pl. Spec. 133. 1821.

Type: India: sin. loc., *Heyne in herb. Roth* (L, lectotype).

Homotypic synonym: *Vallaris heynei* Spreng., Syst. Veg. 1: 635. 1825.

Heterotypic synonyms: *Echites dichotoma* Roxb., Fl. Ind. 2: 19. 1832. Type: India: Bengal, sin. loc., *Roxburgh s.n.* (K, holotype; BM, E, G, isotypes). Homotypic synonym: *Vallaris dichotoma* (Roxb.) Wall. ex A. DC., Prod. 8: 400; Wight, Icon. Pl. Ind. Or. pl. 438, 31. 1841.

Vallaris assamensis Griff., Not. Pl. Asiatic. 4: 77. 1854. Type: India: sin. loc., *Griffith s.n.* (K, lectotype).

Glabrous, climbing, often twining *shrub*, up to 10 m high. *Leaves*: petiole 2–20 mm long, glabrescent; blade papyraceous when dry, very variable in size, elliptic to narrowly elliptic, (1.7–)2.3–4 × as long as wide, 2–15 × 0.8–6 cm, equal- or subequal-sided, cuneate or rounded at the base, acuminate, apiculate or acute at the apex, sparsely to densely pubescent, especially on the midrib, to glabrous above, beneath densely pubescent to almost glabrous and then at least with some hairs on the main veins; 5–12 secondary veins on each side. *Inflorescence* 3–20-flowered, compound-corymbose or nearly so, about 0.5–1 × as long as the leaves, 3–10 × 2–6 cm. Peduncle 5–30 mm long; pedicels 5–25 mm long; bracts medium-sized, about as long as or sometimes 2–3 × as long as the sepals. *Flowers* fragrant. *Sepals* pale green, ovate or narrowly elliptic, 1.7–4 × as long as wide, 2–7 × 1–3 mm, mostly erect or suberect, acuminate; inside sparsely to densely pubescent or glabrate, with 1–10 colleters on the whole calyx or without colleters. *Corolla* white, creamy or pale yellow, glabrous for 1–3 mm at the base, and on the limb sparsely to densely pubescent or glabrescent, furthermore inside tomentose from 0.5–3 mm above the base to the insertion of the stamens, glabrous or glabrescent at the base; tube 1–3.2 × as long as the calyx, 5–10 mm long, at the base 2–3 mm, then almost cylindrical up to near the middle and there abruptly widened, near the middle 2–4 mm and at the mouth 6–13 mm wide; limb 14–22 mm in diameter; lobes hemi-orbicular to ovate, 0.5–1.8 × as long as wide, 3–10 × 3–9 mm, slightly acuminate or rounded. *Stamens* 3.5–6 mm exserted; filaments 2–3.5 mm long; anthers 2–4 × 0.7–1.5 mm, at the apex for 0.1–0.5 mm sterile, glabrous or with some straight hairs on the extreme base. *Pistil* 5.5–9.5 mm long; ovary 0.75–1.5 × 0.75–2 × 0.75–2 mm, velutinous or tomentose at the apex; disk 0.5–1 × 1–2 × 1–2 mm, velutinous, densely hirto-pubescent or glabrous at the extreme apex, entire or lobed, with or without very small holes; style 4–8 mm long, hirto-pubescent except for the extreme apex which is velutinous or tomentose; clavuncula conical or ellipsoid, 1–1.5 × 0.75–1.5 mm. Placenta with 200–300 ovules. *Fruit*: carpels green, greenish or light brown, 8–14 × 1.5–3.5 cm. *Seed* ellipsoid, 9–10 × 3.5–5 × 2–3 mm; coma 3–4 × as long as the seed; endosperm creamy or yellow; embryo medium-sized, yellowisch of dark yellow; rootlet 1.5–2 × 0.5–1 mm; cotyledons 6–7 × 3–4 mm.

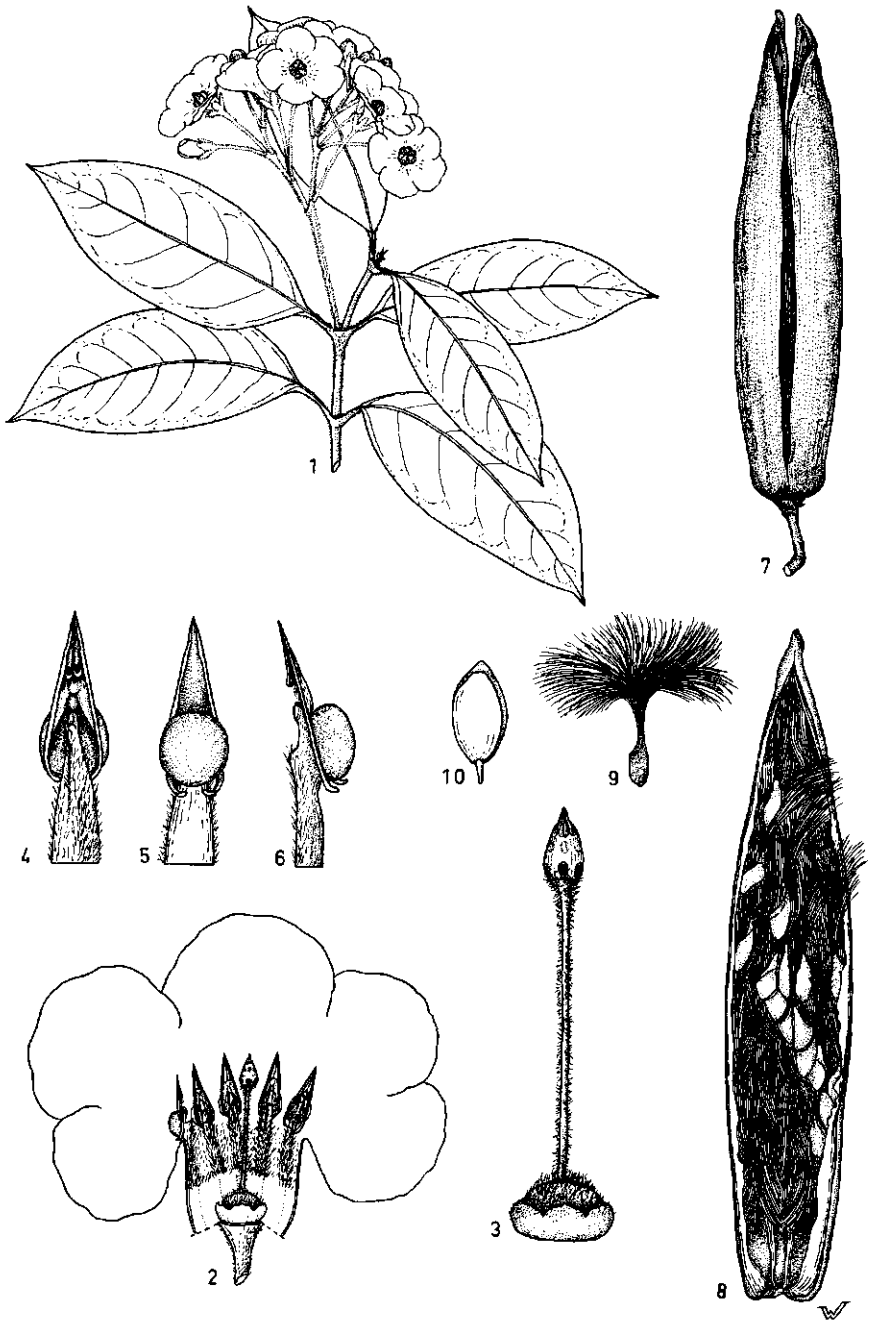
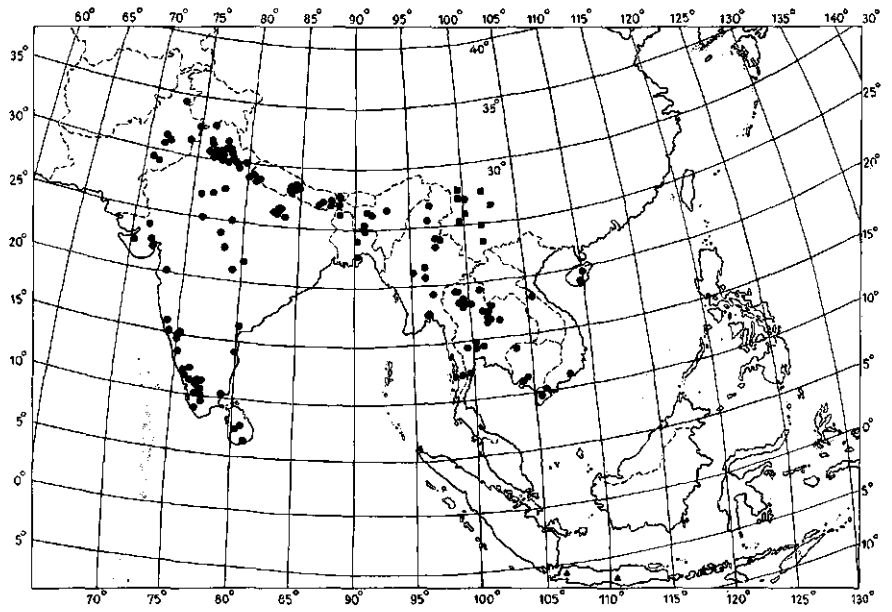


FIG. 3. *Vallaris solanacea* (Roth) O. Kuntze: 1. habit $\frac{2}{3}$ ×; 2. opened flower 3×; 3. pistil 8 ×; 4. anther ventrally 8 ×; 5. anther dorsally 8 ×; 6. anther laterally 8 ×; 7. fruit $\frac{2}{3}$ ×; 8. openend fruit with seeds $\frac{2}{3}$ ×; 9. seed $\frac{2}{3}$ ×; 10. embryo 2 × (1–6. *S. K. Lau 1427;* 7. *D. H. Nicholson 2846;* 8–10 *C. L. Tso 23013*).



Map 1. ▲ *Vallaris glabra;* ■ *V. indecora;* ● *V. solanacea.*

Distribution: Tropical Asia from Pakistan to the Hainan Island in China.

Ecology: Forest, bush or thicket, often on stream banks. Altitude: 0–2700 m.

Uses: Roots used as medicine in Thailand (teste: *Native collector 218*). Branches used for making baskets in India (teste: *U. Sing 140*).

Vernacular names: NEPAL: *Dudhe Lahara* (teste *Makin 139*). INDIA: *Dudhkal* (teste *Hart 39*); *Dudhi kel* (teste *Mahan Lal Punj 87*); *Chamari kibel* (teste *U. Singh 140*). BURMA: *Ginbok* (teste *Cubitt 221*). THAILAND: *Saitan* (teste *Native collector 86*); *Mai Khao Fuen* (teste *Native collector 99*); *Khun Fun* (teste *Native collector 218*); *Oom Foom* (teste *Dee 418*); *Dok Fan Fuem* (teste *Suvarnasudhi 528*); *Yadiang yoi* (teste *Luang Vanpruk 424*). LAOS: *Khua Ngonbe* or *Khuna nganbe* (teste *Spire 12*). KAMPUCHEA: *Var kambor* (teste *Gourgand s.n.*); ibid. (teste *Mus. Marseille s.n.*).

A selection of the about 400 specimens examined:

PAKISTAN: Kallewalla (fl. March) *Gandhe 76* (SING); Dooduah (fl. March) *Hamilton s.n.* (BM); Serajmyas (fl.) *Hamilton s.n.* (BM); Gairal (fl. Apr.) *Pant 43654* (G).

INDIA: Bashar State (fl. Apr.) *Lace 845* (E); Minggaon, Dharwar Distr. (fl. March) *Sedgwick 2351* (K); Simla via Kangra and Jamu to Kashmir, *Mill s.n.* (GH); Kangra distr. (fl., fr. Apr.) *Hart 39* (E); Kalka (fl. June) *Rich 572* (K); Suni (fl. Apr.) *Collet 465* (K); Punjab, Kangra, Bhadwar (fl., fr. Apr.) *Koelz 4150* (A, NY, U); Punjab, Kalesar (fl. Apr.) *Lace 42* (E); Kalsi and Bindal Nala (fl. Apr., fr. Aug.) *Kapur 74 (US); Dehra Dun* (fl. Apr.) *Haines 2715* (K); Kowlagarh, Dehra Dun (fl. Apr.) *Sing 140* (A, NY, UC, W); Ambari, Dehra Dun Distr. (fl. Apr.) *Gamble 22849* (K); M. Bhabar, Kumaon (fl.) *Strachey et al., s.n.* (BM, BR, GH, K, P); Lachiwala, Siwalik and Jaunsar

Division (fl. Dec., fr. Feb.) Sharma 8 (US); Punjab (fl.) *Drummond 25512* (G, K, P, UC); ibid., Rasmas below Ajmerghar (fr. July) *Drummond 25515* (K); ibid., Simla hills (fl.) *Drummond 25480* (K); ibid., Kalka hills (fl.) *Drummond 25516* (K); Sadhura (fl.) *Edgeworth 46* (K); Gorakpur (fl. Apr.) *Hamilton 746* (E); Saugor (fl. March) *Misra 74* (SING); District Kheri, Ambara (fl. Apr.) *Inayat 22144* (K); Deoria, Raj Nandgar, Central Province (fl. Nov.) *Haines 3368* (K); Belgaum East (fl. Jan.) *Ritchie 1114* (E, K); Southern Maratha and North Canara (fl.) *Young Jan. 1882* (BM); Bombay (fl.) *Concon s.n.* (K); Dharwar (fl.) *Ladwa s.n.* (UPS); Maisor and Carnatic (fl.) *Thomson s.n.* (M); ibid. (fl.) *Stocks s.n.* (K, L, NY, P, S, UPS); Travancore (fl. Jan.) *Yeshoda 669* (A, NY); Sikkim, Manahari (fl. Apr.) *Ribu 710* (W); Pankabari (fl. Apr., May) *Lacaita 15801* (BM, P); Assam, Rani Kamrup (fr.) *Mann Jan. 1891* (M, U); Nowgong (fl.) *Beddome March 1885* (BM); ibid. (fl. March) *Clarke 43221* (G, K); ibid., Gauhati (fl. March) *Chatterjee s.n.* (G, P); Merpu (fl.) *Griffith 1076* (K, lectotype of *Vallaris assamensis*); Bengal, Siliguri (fl. Feb.) *Clarke 27005* (K); ibid., Terai (fl. March) *Mukerjee 1435* (S); Bengal, *Roxburg s.n.* (BM, E, G, K, type of *Echites dichotoma*); Madras, Novara (fl.) *Iclink s.n.* (W); ibid., Thekkumalai, near Mankara rest house (fl. Apr.) *Subramanian 229* (L); ibid., Kondapalle, Kiskua distr. (fl.) *Lushington s.n.* (K); ibid., Nilgiris Hills (fl.) *Watt s.n.* (E); ibid., Pulney Hills, Penjakulam (fl.) *Anglade 876* (K); ibid., Kodaikanal (fl.) *s.n.* (A); sin.loc. (fl.) *Kuntze May 1885* (K, NY); sin. loc.(fl.) *Heyne in herb. Roth s.n.* (L, type); Hardwar (fl., fr. Apr.) *Wallich 396* (K); Bannagar (fl. Feb. 1808) *Herb. Hamilton in herb. Wallich 1621 F* (K-W); Gorakhpur (fl. Apr. 1814) *Herb. Hamilton in herb. Wallich 1621 F* (K-W); Batarampur (fl. March 1811) s.n. (K-W); sin.loc. (fl.) *Herb. H.B. b. in herb. Wallich 1621 H* (K-W).

NEPAL: Doti (fl. Apr.) *Dobremez 1908* (BM, G); Nawal Parasi (fl. Apr.) *Makin 139* (BM); Mahakali zone, 25 km W. of Dhangarhi (fr. Dec.) *Nicholson 2846* (BM, US); Bhui (fl. Apr.) *Dobremez et al. 2537* (BM, G); Rapti Khola 32 km E. of Nepalganj (fl. Apr.) *Stainton 4203* (BM, E); Rapti valley, Lothar (fl. March) *Stainton 5280* (BM); Beni, Kali valley (fl. May) *Stainton et al. 5442* (BM); Ranipauwa, N. of Beni (fl. May) *Stainton et al 600* (BM, E); Gokarna (fl. Apr.) *Pradhan et al. 4448* (US); Deorali (fl. Apr.) *Zimmermann 158* (G, K); Buri Gandaki River (fl. Apr.) *Gardner 214* (BM); Mechizone, Jhapa Distr. (fl. March) *Nicholson 3081* (BM, US); Dharan to Dankuta (fl. Apr.) *Banerjee et al. 3152* (BM).

SRI LANKA: Pallewela, Badula distr. (fl. Sept.) *Balakrishnan et al. NBK 805* (K, US); sin. loc., *Koening s.n.* (BM); *Thwaites 152* (K), *2519* (BM, G, K, P, W); *Walker 112* (E, K, L, P, W); *Wight s.n.* (E).

BANGLADESH: Sylhet (fl., fr.) *herb. Jussieu s.n.* (P): Chittagong (fl. Apr.) *Cowan s.n.* (E).

BURMA: Bhamo (fl.) *Cubitt 221* (E); Hsipaw (fl. May) *Dickason 6106* (A); Pokokku Distr. (fl. March) *Oliver 63* (K); Yamethin (fl. Feb.) *Collett 339* (K); Taong Dong bank of Irawady (fl.) *Wallich s.n.* (K); Sanpannagon (fl. March) *Lace 5716* (E, K); Pegu (fl. Aug.) *Kurz 2365* (K).

THAILAND: Chiang Mai valley (fl. June) *Hosseus 811* (M, P); Den Chai, Pre (fl. March) *Kerr 3162* (BM, K); Muang Lamphun, Me Lee (fl. March) *Winit 236* (BM, E, K); Sing Buri (fl. May) *Haines 372* (K); Saraburi, Sahn Lahn Forest (fl. March) *Maxwell 75-339* (L); Upper Pran River (fl. Apr.) *Ladell* 237 (K); Ban Sichan (fl. Apr.) *Suvarnasudhi 528* (P); Wang Saphung (fl. March) *Kerr 8759* (BM, C, K, P, UC); Phu-Krading (fl. Feb., Sept.) *Native coll. 86* (P), *99* (P); Nam Phong (fl. Feb.) *Native coll. 218* (P); Sitarn, Loie (fl. Jan.) *Dee 418* (K); Ban Mak (fl. Mar.) *Luang Vanpruk 424* (K).

LAOS: Heonipan (fl. Apr.) *d'Orleans s.n.* (P); Cua Rao, *Spire 12* (K, P); sin. loc. (fl.) *Counillon s.n.* (P).

VIETNAM: Dalat (fl. March, Apr.) *Squires 804* (A, BM, K, M, NY, S, SING); Mekong Delta (fl.) *Harmand s.n.* (P).

KAMPUCHEA (CAMBODJA): Wat Phnom (fl.) *Coudrec s.n.* (P); Samrongtong Province (fl. Apr.) *Pierre 539* (P); S. of Phnom Bhangor, Kompong Speu (fl. Jan.) *Poilane 14583* (P); sin. loc. (fl.) *Magnen et al. s.n.* (P); *Gourgand s.n* (P); *Mus. Marseille s.n.* (P).

CHINA: Hainan: Ka Chick Shan, Chang Kiang distr. (fl. March) *Lau 1427* (A, NY, P, W); Nam Shan Ling, Yaichow (fr. Jan.) *Tso 23013* (A, K, NY, P, US); Yaichow (fl. July) *Liang 61876* (NY, P, UC, US); Loktung (fl. June) *Lau 27078* (A); sin. loc. (fl. May) *Wang 32775* (A, NY, US).

Cultivated: JAMAICA: Hope Garden (fl. March) *Kuntze 11* (K). GREAT BRITAIN: Kew Gardens (fl. Apr.) *Pearson H 885/62* (K); *H 1364/68* (K). ZIMBABWE: Harare (Salisbury) (fl. Sept.) *Biegel 4686* (PRE). SOUTH AFRICA: Transvaal, Soutpansberg Rd. (fl. Oct.) *Codd* (PRE); ibid. (fl. Nov.)

Schlieben s.n. (PRE); Pretoria, *Repton 4853* (PRE). INDIA: Madras, Chingleput Distr. (fl. Nov.) *Gamble s.n.* (K); Hort. Bot. Calcutta (fl., fr.) *Griffith s.n.* (P); ibid. (fl.) *Voigt s.n.* (C); Banjara Hills, near Bhagyanagar Stadion (fl. Apr.) *Van der Maesen 3790* (K, WAG); Poona (fl.) *Anonym. s.n.* (E); near Suni (fl. Apr.) *Watt 10047* (E); Chaduar, Bhorelli (fl. Apr.) *Yandell 27* (K, L); Cokagen Park (fl. Apr.) *Haines 2715* (K); Travancore, Museum Park (fl. March) *Erlanson s.n.* (NY); Camp Dhumera, Gurdaspur (fl.) *Ram 307* (A, NY). SRI LANKA: Muppane (fl.) *Alston 2462* (K, UC); sin.loc. (fl. Apr.) *Gills 7911* (S). NEPAL: Biratnagar, Dharan Bazar (fl. Apr.) *Stainton 11* (BM, E). BURMA: Rangoon (fl. June) *Smith 101* (GH); ibid. (fl. May) *Meebold 15555* (S). THAILAND: Bangkok (fl. March) *Kerr s.n.* (BM). INDONESIA: Bogor Bot. Garden (fl. Nov.) *Merrill s.n.* (NY); ibid (fl.) *Spire s.n.* (P).

EXCLUDED SPECIES

Vallaris? anceps Wall., Cat. no. 1622. 1828, nom. nud. = *Trachelospermum anceps* Dunn et R. Williams, Kew Bull. 1930: 343. 1920 = *Vallaris arborea* Fischer, Kew Bull. 1927: 92. 1927 = *V. anceps* (Dunn et R. Williams) Fischer, Kew Bull. 1931: 28. 1931 where cited as *V. anceps* (Wall.) Fischer = *Kibatalia anceps* (Dunn et R. Williams) Woodson, Sunyatsenia 3: 101. 1936.

Vallaris augustifolia Merr., Phillip. Journ. Sci. Bot. 7. 335. 1912 (Nov.) = *V. gitingensis* (Elmer) Merr., Phillip. Journ. Sci. Bot. 10: 70. 1915 = *Kickxia gitingensis* Elmer, Leaf. Phillip. Bot. 4: 1455. 1912 (March) = *Kibatalia gitingensis* (Elmer) Woodson, Phillip. Journ. Sci. 60: 216. 1936.

Vallaris clavata (Roxb.) G. Don, Gen. Syst. Veg. 4: 79. 1837. Genus uncertain, no type specimen found.

Vallaris controversa Spreng., Syst. Veg. 4: 65. 1827 = *Lepistemon binectariferus* (Wall. ex Roxb.) O. Kuntze, Rev. 2: 446. 1891 (*Convolv.*).

Vallaris daronensis (Elmer) Merr., Phillip. Journ. Sci. Bot. 10: 70. 1915 = *Holarrhena daronensis* Elmer, Leafl. Phillip. Bot. 4: 1455. 1912. (as *Halorrhena*). Type: Mindanao: District of Davao, *Elmer 11912* (K, holotype) = *Kibatalia daronensis* (Elmer) Woodson, Phillip. Journ. Sci. 60: 218. 1936.

Vallaris divaricata (Lour.) G. Don, Gen. Syst. 4: 79. 1837 = *Strophanthus divaricatus* (Lour.) Hook. et Arn., Bot. Cap. Beech Voy. 5: 199. 1837.

Vallaris lancifolia Hook. f., Fl. Brit. Ind. 2: 651. 1882. Type: Malaysia: Malaca: sin. loc., *Maingay 1102* (K, holotype) = *Vallariopsis lancifolia* (Hook. f.) Woodson, Phillip, Journ. Sci. 60: 228. 1936.

Vallaris laxiflora Bl., Bijdr. 1043. 1826. Type: Indonesia: Java: sin. loc., *Blume 2159* (L, holotype) = *Pottsia laxiflora* (Bl.) O. Kuntze.

Vallaris macrantha Ridley, Journ. Fed. Mal. Stat. Mus. 10: 101. 1922 = **Beaumontia macrantha** (Ridley) Rudjiman, **comb. nov.** Type: Thailand: Tapli, *Kloss 6649* (K, holotype) = *B. rosea* Fischer, Kew Bull. 316. 1929. Type: Burma: Bausanpan, *Parkinson 7751* (K, holotype). Both specimens compared at Kew, no doubt about that they belong to a single species.

Vallaris maingayi Hook. f., Fl. Brit. 3: 651. 1882. Type: Malaysia: sin. loc., *Maingay 1084* (K, holotype) = *Kibatalia maingayi* (Hook. f.) Woodson, Phillip. Journ. Sci. 60: 213. 1936.

Vallaris sinensis (Lour.) G. Don, Gen. Syst. 4: 79. 1837 = *Cryptolepis sinensis* (Lour.) Merr., Phillip. Journ. Sci. 15: 254. 1919 (*Asclep.*).

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A Cambridge, Massachussetts - USA: Arnold Arboretum.
BM London, Great Britain: British Museum (Natural History).
BP Budapest, Hungary: Botanical Department of the Hungarian History Museum.
BR Bruxelles, Belgium: Jardin Botanique de l'Etat.
C København, Denmark: Botanical Museum and Herbarium.
CAL Calcutta, India: Central National Herbarium.
E Edinburgh, Great Britain: Royal Botanic Garden.
G Genève, Switzerland: Conservatoire et Jardin Botaniques
GH Cambridge, Massachusetts - USA: Gray Herbarium of Harvard University.
K Kew, Great Britian: The Herbarium and Library.
KEP Kepong, Malaysia: Forest Research Institute.
L Leiden, The Netherlands: Rijksherbarium.
LINN London, Great Britain: The Linnean Society of London.
M München, Federal Republic of Germany: Botanische Staatssammlung.
NY New York, New York - USA: The New York Botanical Garden.
P Paris, France: Muséum National d'Histoire Naturelle, Laboratoire de Phanérogamie.
PRE Pretoria, South Africa: National Herbarium, Botanical Research Institute.
S Stockholm, Sweden: Botanical Department, Naturhistoriska Riksmuseum.
SING Singapore, Republic of Singapore: Herbarium and Library, Botanic Gardens.
SRGH Harare (Salisbury), Zimbabwe: National Herbarium and Botanical Garden.
U Utrecht, The Netherlands: Botanical Museum and Herbarium.
UC California, USA: Herbarium Department of Botany, University of California.
W Wien, Austria: Naturhistorisches Museum.
WAG Wageningen, The Netherlands: Department of Plant Taxonomy and

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REGISTER

Synonyms are in *italics*. Page number of principal entries in **bold face;** those of figures in *italics*. New combinations are listed as **comb. nov.**