

REVISION OF THE BURSERACEAE OF THE MALAYSIAN  
AREA IN A WIDER SENSE

VI<sup>1</sup>). Revision of the genus *Garuga* Roxburgh

by

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(Rijksherbarium, Leiden)

(Issued 18. XII. 1953)

In the Malaysian area proper this small genus is represented by one species only (*G. floribunda*), but it seemed preferable to extend this work to a revision of the whole genus.

The species of this genus are not easily distinguishable when sterile and the identification of such specimens is all too often made on geographical evidence.

At our disposal was material from the herbaria of Bogor, Calcutta, Edinburgh, Florence, Geneva, Honolulu (Bern. P. Bish. Mus.), Jamaica Plain (Arnold Arb.), Kepong, Kew, Leiden, London (Brit. Mus.), Melbourne, New York (Bot. Gard.) and Paris.

Except for the original literature in this revision only those references are given, which are not mentioned in Lam's revision of the Malaysian Burseraceae, Bull. Jard. Bot. Buitenz., Sér. 3. 12, 1932, 325—331. The material of *G. floribunda* investigated is also cited only as far as not mentioned by Lam, l. c.

Unless the presence of flowers or fruits is mentioned, the specimens quoted are sterile; months of flowering and fruiting are designated by roman numerals. The abbreviations of the herbaria are those of the "Index Herbariorum" (1952).

**GARUGA** Roxburgh, Hort. Beng. 1814, 33; Spach, Hist. nat. vég. 2, 1834, 245; Wight & Arnott, Prodr. Fl. Penins. Ind. Or. 1, 1834, 175; Endlicher, Gen. plant. 1839, 1137; Walpers, Ann. bot. syst. 3, 1853, 843 and 7, 1868, 546; Bentham & v. Müller, Fl. Austr. 1, 1863, 377; Drury, Handb. Ind. Fl. 1, 1864, 249; Marchand, Adansonia 7, 1867, 301 & 369; Brandis, For. Fl. N. W. & Centr. Ind. 1874, 62; Cooke, Fl. Pres. Bombay 1, 1903, 199; Duthie, Fl. Upp. Gang. Plain 1, 1, 1903, 148; Lam, Bull. Jard. Bot. Buitenz. Sér. 3, 12, 1932, 325—331. — *Capraria* Rumphius, Herb. Amb. 2, 1741, 139. — *Kunthia* Dennstedt, Schl. z. Hort. Ind. Malab. 1818, 30 (non *Kunthia* Humb. & Bonpl.). — *Fig. 1.*

Type species: *Garuga pinnata* Roxburgh.

<sup>1</sup>) I—IV in Blumea VII, 1, 1952, 154—170; V, this issue, p. 413—458.

**Distribution:** Continental South East Asia, Northern and Eastern Malaysia, Northern Australia, Western Pacific.

Shrubs or trees. Branchlets without resiniferous ducts in medulla. *Leaves* pinnate, stipulate and with gradual transitions from stipules to normal leaflets (stipules not seen in *G. forrestii*); petioles without or with some resiniferous ducts in medulla; leaflets ovate to oblong, sessile or petioluled, margin crenate-serrate, stipellae often present. *Inflorescences* axillary or lateral, conferted at tips of branchlets, appearing before leaves, tomentose, bracts deciduous. *Flowers* bisexual. Receptacle globose or cupular, woolly tomentose as are sepals and petals. *Sepals* 5, free, deltoid to subulate. *Petals* 5, free, ovate to lanceolate. *Stamens* 10, free, inserted at margin of receptacle, usually more or less didynamous, anthers dorsifix, filaments usually tomentose at base. *Disc* adnate to receptacle, glab-

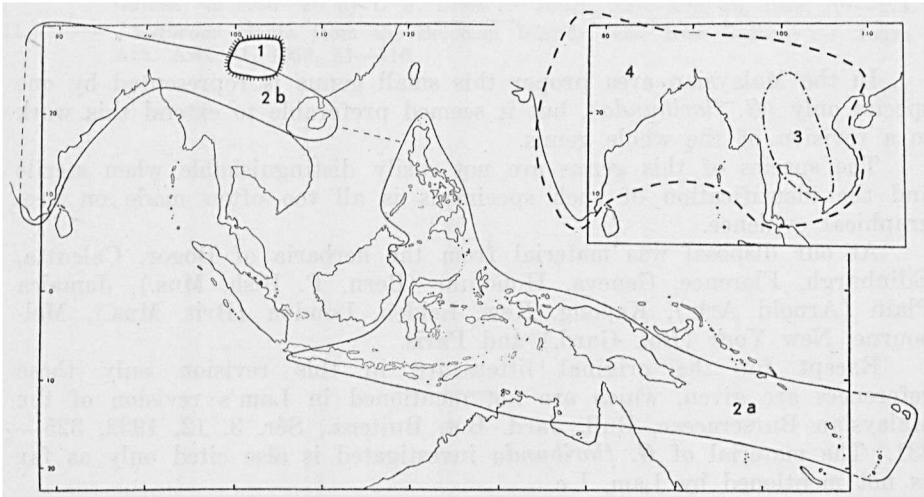


Fig. 1 — Distribution of *Garuga*-species — 1. *G. forrestii*; 2. *G. floribunda*, a. var. *floribunda*, b. var. *gamblei*; 3. *G. pierrei*; 4. *G. pinnata*.

rous, with 10 nectarial lobes between stamens. *Ovary* on short gynophore, 5-celled, style cylindrical, stigma 5-lobed. *Fruits* drupaceous, 1—5-seeded, pericarp carnos, pyrenes small, gibbous, bony, thick, cotyledons compound, contortuplicate in the seed.

#### Key to the species and varieties.

- 1a. Flowers 0.3—0.6 cm long; fruits 0.5—1 cm long, 0.5—1.2 cm in diam. . . . 2
- b. Flowers 0.6—0.8(—1) cm long; fruits 1—2.3 cm long, (0.9—)1.1—1.8 cm in diam. . . . . 4
- 2a. Inflorescences densely erect tomentose; flowers 0.3 cm long; infructescences with many filiform sterile pedicels; fruits more or less trigonous in cross-section; petioles without resiniferous ducts in medulla. — *West China* 1. *G. forrestii* Smith
- b. Inflorescences pubescent to glabrous; flowers (0.35—)0.4—0.6 cm long; fruits more or less circular in cross-section; medulla of petioles with usually two, rarely without or with one or more than two resiniferous ducts . . . . . 3

- 3a. Inflorescences (11—)18—37 cm long, peduncle (6.5—)9—14 cm long. — *Continental S.E. Asia, incl. Hainan*  
 2. *G. floribunda* Decaisne var. *gamblei* (King ex Smith) Kalkman
- b. Inflorescences 4—21(—30) cm long, peduncle 0.5—9 cm long. — *Philippines, N. Borneo, Celebes, Mid and East Java, to Samoa and Tonga, also N. Australia*  
 2. *G. floribunda* Decaisne var. *floribunda*
- 4a. Receptacle globose; stipellae extant or wanting; medulla of petioles without or with two resiniferous ducts. — *Yunnan, Thailand, Cambodja*  
 3. *G. pierrei* Guillaumin
- b. Receptacle cylindrical; stipellae wanting; medulla of petioles without resiniferous ducts. — *India (not in Ceylon), Sikkim, East Pakistan, Burma, South China, Thailand, Indo-China* . . . . . 4. *G. pinnata* Roxburgh

1. *G. forrestii* W. W. Smith, Not. Bot. Gard. Edinb. 13, 1921, 162; Handel-Mazzetti, Symb. Sin. VII, 3, 1933, 631. — *G. yunnanensis* Hu, Bull. Fan Mem. Inst. Peiping, Bot. Ser. 7, 1936. 212. — *Fig. 2.*

Type specimen: *Forrest 10745* in E, dupl. in A, K.

Distribution: West China (Yunnan, Szechuan).

Trees. Branchlets 0.5—0.8 cm thick, younger parts rather densely pubescent. *Leaves* densely tomentose in all parts, later on glabrescent, especially on upper side of leaflets, 5½—9½-jugate, lowest pairs of leaflets often much smaller and falling earlier; stipules not seen, nor any scars; petioles 5—8.5 cm long, medulla without resiniferous ducts; interjugae 2—3 cm long; stipellae present; leaflets sessile or subsessile, lanceolate to elliptic-oblong, 8—11.5 cm long, 2—4 cm wide, base rounded or broadly acute, apex gradually narrowed, margin serrate; nervation not very prominent, secondary nerves 10—16 and some more in the apex. *Inflorescences* unknown. *Flowers* (one or two flowers persistent on the infrutescences) ca 0.3 cm long. Receptacle tomentose outside, cupular, 0.2 cm long, 0.25 cm in diam. *Sepals* subulate, 0.2 cm long, 0.075 cm wide, tomentose outside, pubescent within. *Petals* ovate, 0.3 cm long, 0.15 cm wide, tomentose at either side. *Stamens* about as long as or shorter than sepals, filaments 0.1—0.15 cm long, tomentose at base. *Disc-lobes* quadrangular. *Gynaecium* reaching about as high as stamens, ovary sessile, globular, pilose, style cylindrical, pilose, stigma 5-lobed. *Infrutescences* lateral and axillary, at tips of branchlets, shorter than the leaves above them, 14—23 cm long, the whole densely pilose, slender, repeatedly branched, with many filiform sterile pedicels, peduncle short, 1.5—5(—7) cm long. *Fruits* 0.7—1 cm long, 0.6—0.8 cm in diam., acute and pointed, stalked, more or less trigonous in cross-section, more or less tomentose, one-seeded; pedicels 0.5—1 cm long, slender; receptacle spreading under the fruit, densely tomentose.

CHINA. Yunnan, Shunning, Hsiaopingkai: *Yü 15885* (A, E), fr. V; Region of Tungshan, Yangtze drainage basin, East of Likiang, on banks of Yangtze: *Rock 10458* (A), fr.; Descent to Yangtze from Eastern boundary of Lichiang Valley: *Forrest 10745* (A, E, K), fr. VIII, type of *G. forrestii* Smith; *ibid.* (f. Smith, l. c.): *Forrest 11410* (A, E), fr. IX; Kien-shuei Hsien: *Tsai 53278* (A), fr. IV, isotype of *G. yunnanensis* Hu; no loc.: *Forrest 16629* (CAL, K), fr.; *ibid.*: *Forrest 16913* (E), fr. IX; Szechuan, Hwei-li Hsien: *Yü 1624* (A), fr. X; Ping-shan Hsien: *Yü 3175* (A), fr. VI.

Remarks: This species is thusfar known from a restricted area, but it may well prove to be distributed in a larger part of China and adjacent regions. The inflorescences are very characteristic by being repeatedly and slenderly branched and densely pilose. The type specimen



Fig. 2. — *G. forrestii* W. W. Smith — a. branchlet with leaves and infrutescences; b. leaflet showing venation and indumentum; c. longitudinal section of flower; d. part of infrutescence, showing indumentum; e. fruit; f. ditto, cross-section: cav. cavity of embryo, e. c. endocarp (i. interior, e. exterior), m. c. mesocarp, p. c. pericarp. — dimensions in mm — from *Yü 15385*.

of *G. yunnanensis* shows hardly any difference from that of *G. forrestii*.

Trees of 6—15 m high, with greyish black, long fissured bark, the lower side of the leaflets lighter coloured than the upper one. The flowers are said to be white, the fruits green (immature). *Habitat*: known from rather high localities, up to 2100—2400 m, in open slopes and woods. *Flow. and fruit. times*: fr. in IV—VI and in VIII—X.

2. *G. floribunda* Decaisne, Nouv. Ann. Mus. Paris 3, 1834, 477; Walpers, Rep. bot. syst. 1, 1842, 559; Engler in DC, Mon. Phan. 4, 1883, 6; Vidal, Rev. plant. vasc. Fil. 1886, 79; Bailey, Syn. Queensl. Flora, Suppl. 1, 1886, 12; Bailey, Cat. Queensl. Pl. 1909, 85; Ewart & Davies, Fl. North. Terr. 1917, 158; Lam, Bull. Jard. Bot. Buitenz., Sér. 3, 12, 1932, 326, fig. 7 A; Cretzoiu, Fedde Rep. 36, 1934, 265; Burkill, Dict. Econ. Prod. Mal. Penins. 1, 1935, 1061 (sub *G. pinnata*); Sinia, Ann. Jard. Bot. Buitenz. 48, 1938, 85; Webber, Lilloa 6, 1941, 441—465; Lam in Backer, Flora van Java VI B, 1948, 3; Heyne, Nutt. pl. Indon., 3rd ed. 1950, 883 (also sub *G. pinnata*); Meyer Drees, Rep. For. Res. Inst. Bogor 33, 1950; Hildebrand, Rep. For. Res. Inst. Bogor 35, 1950; 43, 1950; 44, 1951; 45, 1951; 49, 1951; 50, 1951. — *Capraria* Rumphius, Herb. Amb. 2, 1741, 139. — *Guaiacum abilo* Blanco, Fl. Fil., 1st ed. 1837, 364. — *Icica abilo* (Blanco) Blanco, Fl. Fil., 2nd ed. 1845, 156. — *Garuga mollis* Turczaninow, Bull. Soc. Imp. Nat. Mosc. 31, 1, 1858, 475; Walpers, Ann. bot. syst. 7, 1868, 546; Vidal, Phan. Cuming. Phil. 1885, 101. — *Boswellia javanica* Turczaninow, Bull. Soc. Imp. Nat. Mosc. 36, 2, 1863, 612 (ex descr.). — *Garuga pacifica* Burkill, J. Linn. Soc. 35, 1901, 30; Setchell, Publ. Dept Mar. Biol., Carn. Inst. Wash. 20, 1924, 85; Christophersen, Bull. B. P. Bish. Mus. 128, 1935, 111. — *Garuga abilo* (Blanco) Merrill, Phil. Govt. Lab. Publ. 35, 1905, 75; Burkill, Dict. Econ. Prod. Mal. Penins. 1, 1935, 1061; Heyne, Nutt. pl. Indon., 3rd ed. 1950, 882. — *Garuga gamblei* King ex Smith, Rec. Bot. Surv. India 4, 1911, 262; Gamble, Fl. Pres. Madras 1, 1915, 169; Calder c. s., Rec. Bot. Surv. India 11, 1, 1926, 57; Cowan c. s., Trees N. Bengal 1929, 30; Merrill, Lingnan Sc. J. 14, 1, 1935, 17 (sub *G. pinnata*); Kanjilal c. s., Fl. Assam 1, 2, 1936, 222. — *Garuga littoralis* Merrill, Phil. J. Sc. 10, 1915, 27 (ex descr.), incl. var. *paucijuga* Merrill, l. c. p. 29 (ex descr.). — *Garuga clarkii* Merrill, Phil. J. Sc. 10, 1915, 29. — *Garuga spec.*, Christophersen, Bull. B. P. Bish. Mus. 128, 1935, 111. — *Fig. 3 a—b*.

Type specimen: *Unknown coll.* (Leschenault de la Tour c. s., voyage in "Naturaliste" and "Géographe") s.n., from Timor, in G, dupl. in NY. (see Remarks).

*Distribution*: Continent of Asia (India, Sikkim, East Pakistan, West China, Hainan), North Borneo, Mid and East Java, Philippines, Celebes, Lesser Sunda Islands, Moluccas, New Guinea, Northern Australia, Western Pacific Islands (Solomon Islands, New Hebrides, Samoa, Tonga).

*Remarks*: *G. floribunda* and *G. gamblei* are here considered as varieties of one species, the differences being slight.

Trees. Branchlets 0.4—1 cm thick, glabrous except young parts, often rough by many leaf-scars. *Leaves* 4½—10½ (—15½)-jugate, usually pubescent when young and glabrate, but indumentum very variable, lowest pairs

of leaflets forming transitions to stipules and deciduous; stipules oblong, 0.5—0.8 cm long, deciduous; petioles not or hardly flattened at base, 4.5—12.5 cm long, 0.2—0.7 cm thick at base, medulla with (0—)2(—more) resiniferous ducts; interjugae 2—6 cm long; stipellae extant or wanting; leaflets elliptic, oblong-lanceolate or lanceolate, 5—19 cm long, 2—5.5(—7) cm wide, base oblique, rounded, sometimes more acute, apex gradually acuminate, margin crenate-serrate, sometimes nearly entire, petiolules 0.1—0.5 (—0.9) cm long, terminal ones 0.6—3.3 cm long; secondary and tertiary nervation not very prominent, secondary nerves 10—20. *Inflorescences*

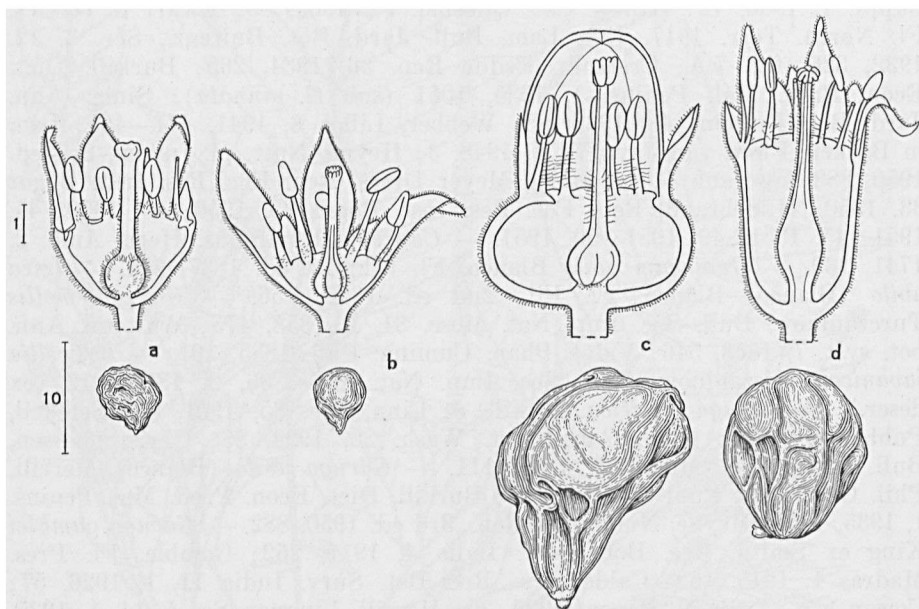


Fig. 3. — Flowers (longit. section) and fruits of *Garuga*-species — a. *G. floribunda*, var. *floribunda*; b. *G. floribunda* var. *gamblei*; c. *G. pierrei*; d. *G. pinnata* — dimensions in mm.

lateral or axillary, conferted at tips of branchlets, paniculate, 4—37 cm long, pubescent to glabrous; peduncle 0.5—14 cm long; bracts lanceolate to oblong, 0.3—1.2 cm long, deciduous. *Flowers* 0.35—0.6 cm long when adult. *Pedicels* 0.1—0.4 cm long, pubescent. *Receptacle* cupular, 0.15—0.2 cm long, 0.25—0.45 cm in diam., pubescent without. *Sepals* deltoid, 0.15—0.25 cm long, 0.1—0.2 cm wide, pubescent at either side, especially without. *Petals* ovate to oblong-lanceolate, 0.3—0.5 cm long, 0.1—0.2 cm wide, pubescent without, tomentose within, at least at base. *Stamens* slightly didynamous, the longer ones episealous, about as long as or longer than sepals, filaments 0.1—0.3 cm long, pubescent or tomentose at base. *Disc-lobes* deltoid to quadrangular. *Gynaecium* reaching same height as stamens, ovary globular, on a short gynophore, pilose to glabrous, style cylindrical, slightly tomentose to pilose, stigma 5-lobed. *Fruits* one- to five-seeded, 0.5—0.9 cm long, 0.5—1.2 cm in diam., sometimes densely pubes-

cent but usually glabrous or with some scattered hairs, sepals deciduous, receptacle persistent.

Var. *floribunda* — (synonymy as under species, except *Garuga gamblei* King ex Smith). — Inflorescences 4—21 cm, rarely up to 30 cm long, peduncle 0.5—9 cm long. — *Fig. 3 a*.

Distribution: North Borneo, Central and East Java, Philippines, Celebes, Lesser Sunda Islands, Moluccas, New Guinea, Northern Australia, Pacific Islands.

BORNEO. North Borneo, Semporna, Bod Gaya Is: *Orolfo 36376 = 3799* (BO, K, KEP), fr. III.

JAVA. East Java, Pasuruan, cultivated: *Backer 36479* (L), fr. X; Djember, G. Watangan: *NIFS Ja 4908* (A, L), fr. II.

PHILIPPINES. Palawan, without loc.: *Natividad 23353* (A, BO, K), fr. IX; *ibid.*: *Cenabre, Baldemor & Aduiso 27976* (A); Luzon, Nueva Ecija Prov.: *Curran 8478* (P); Cagayan de Sulu: *Merrill 5301* (NY), fr. X; Masbate: *Clark 1700* (NY), fr. V—VI, *isotype* of *G. clarkii* Merr.

CELEBES. Manado, Bolaäng Mongondow, Langagon: *NIFS bb. 32486* (BO, L), fr. XI; Boalemo, Bilatto: *NIFS bb. 15047* (L); Poso, Kalora: *NIFS bb. 28739* (A, L); *ibid.*, Uekuli: *NIFS bb. 31482* (A, L), fr. II; Muna, Laiwaru: *NIFS bb. 32371* (BO, L); Raha, Wasalangka: *NIFS bb. 20250* (A, BO, L), fr. I; *ibid.*: *NIFS bb. 21336* (A, BO, L); Labunti: *NIFS bb. 32750* (BO, L).

LESSER SUNDA ISLANDS. Bali, Prapatagung: *Becking 42* (L); Lombok, west Lombok, Embung: *NIFS bb. 21398* (A, L), fl. IX; G. Rindjani, Sewela near Pringgabaja: *Elbert 2042* (L); Sumbawa, Bima: *Zollinger 3355* (A, L, P), fl. VIII; Flores, Ngada, Aimere: *NIFS bb. 21431* (BO), fl. IX; Timor, Kupang, Noëmina: *NIFS bb. 27067* (A, L); *ibid.*, no loc.: *de Vriese s.n.* (A, L), fr.; Timor, without loc.: *Spanoghe s.n.* (L), fl.; *ibid.*: *Zippelius s.n.* (L), fr.; *ibid.*: *Alfaro Cardoso 11/20* (NY), fr.; *ibid.*: *Unkn. coll. (Leschenault de la Tour c.s., voyage with "Naturaliste" and "Geographe") s.n.* (G, NY), fl., *type* of *G. floribunda* Decne, see Remarks.

MOLUCCAS. Sula Islands, Mangoli, Northern Mangoli: *NIFS bb. 29761* and *bb. 29870* (A, L); Sanana, Tandjung Balcha: *NIFS bb. 28775* (A, L); Wetar, Kali M. Lahela: *NIFS bb. 27235* (BO); Morotai, Tobelo: *NIFS bb. 33777 = Tangkilisan 83* (A, BO, L), fl. & fr. V; Ternate, Kapi, Dau Kambin: *Beccari s.n.* (FI), fl. IX; Ambon, no loc.: *Teysmann s.n.* (L), fr.; Tanimber Isl.: *Ignei-Otimmer: NIFS bb. 24265* (L).

NEW GUINEA. West New Guinea, Inanwatan, Tisa: *NIFS bb. 32633 = Lundquist 14* (BO, L); North New Guinea, Hollandia, Nimburan, Berap: *NIFS bb. 29002* (L); Aitape District, Aitape: *MaAdanam NGF 508* (L); *ibid.*, Tadjji Airstrip: *Smith NGF 1245* (L); Morobe District, Kajabit Mission: *Clemens 10873* (A), fr. XII; *ibid.*, Markham Valley: *Clemens 10805* (A), fr. X; Bulolo: *Womersley 3560* (A), fr. XI; *ibid.*: *Gray 3566* (A, L), fr. XI; *ibid.*: *Fryar 4011* and *4017* (A), fr. II; Yalu: *Unknown coll. NGF 220* (L); Nadzab near Lae: *Womersley 4628* (L), fr. X; Papua, Port Moresby: *Carr 11862* (BM, L), fr. IV; *ibid.*, Loloki River: *Brass 542* (A, K), fr. X; Papua, without loc.: *De Zeeuw 46* (M), fl. & fr. I.

AUSTRALIA. North West Coast, Port Nelson: *Cunningham 228* (BM), fl.; *ibid.*: *Cunningham s.n.* (K), fl.

PACIFIC. Solomon Isl., Guadalcanal, Matepona River: *Walker & White BSIP 14* (A), fr. VII; *ibid.*, no loc.: *Walker BSIP 298* (A), fl. VII; New Hebrides, Tanna Isl., Lenakel: *Kajewski 135* (A), fr. III; Efate: *Burton 32* (A), fl.; Hog Harbour: *Baker 2* (BM), fl. IX; Samoa Isl., Savaii, Salailula: *Christophersen 2847* (A, NY), fr. X, see Remarks; *ibid.*, Salailua-Lataitai: *Christophersen 2861* (A, NY); *ibid.*, Falelima-Siuvao: *Christophersen 3308* (BISH, K, NY), fr. XI, see Remarks; Samoa, without loc.: *Whitmee s.n.* (BM, E), fl.; *ibid.*: *Powell 19* (K), fl. & fr.; Tonga Isl., Vavau: *Crosby 291* (K), fl., *type* of *G. pacifica* Burk.; Tongatabu: *Setchell & Parks 15447* (NY); Tonga, without loc.: *McKern 98* (BISH).

Remarks: From Geneva (Herb. Delessert) I received a Timor specimen "Ex Herb. Mus. Paris", bearing no collector's name but with in Decaisne's handwriting: "*Garuga floribunda* Dne". I consider this the

type specimen. A duplicate of this specimen from the Torrey herbarium is in the New York Botanical Garden Herbarium.

The flowers of this variety are rather variable as to the indumentum: in sepals, petals, filaments and ovary it varies from densely tomentose to almost none. A glabrous ovary is especially found in Pacific specimens.

The specimens *Christophersen 2847* and *3308* (of which the latter was mentioned by Christophersen (l. c.) as *Garuga* species) have unusually large fruits (0.8—1.2 cm long, 0.7—1.2 cm in diam.). Possibly these specimens belong to a separate species or variety (*G. pacifica* Burk.) but for a definite decision specimens with flowers and fruits from the same tree, are needed, the differences in the flowers between the typical *G. floribunda* and the type of *pacifica* being, in my opinion, insufficient to justify a specific separation.

Trees, up to 35 m high, buttressed, with grey or brown flaking bark that exudes a colourless or white sap. Leaves paler underneath. Flowers yellowish; fruits green when immature, blue when ripe. *Habitat*: From sea level up to ca 400 m alt., in primary and secondary forests, in flat or sloping countries. *Vernac. names*: halo (Br. N. Born.); telur, kambing, kaju kambing, adju barru, bogu, wou, empo (Cel.); beru, wuru (Bali); ai-feu (Timor); héu (Wetar); kambing (Morotai); maruapisa (W. New Guin.); kagi-kagi (Papua); namalaous, nalü (N. Hebr.); mangau (Samoa); manau (Tonga). *Flow. and fruit. times*: In Born. fr. in III. In Java fl. in VII—XI, fr. in IX—III. In Philipp. fl. in III—VI, fr. in III—X. In Cel. and Kangean fl. in IX—X, fr. in XI—V. In Less. Sunda Isl. fl. in VIII—IX, fr. in IV (Sumba). In Moluccas fl. in IX—XI (Ternate), fr. in V (Morotai). In N. Guin. fl. in I (Papua), fr. in X—IV. In Pacific fl. in VII—IX, fr. in VII—III. In general, flowering at the end of the dry or the beginning of the wet season, leaves deciduous in the dry season, appearing again when the fruits ripen. *Uses*: the leaves are used as goat-fodder (Mol.), the fruits are edible. See further Heyne, l. c.

Var. *gamblei* (King ex Smith) Kalkman, nov. stat. — *Garuga gamblei* King ex Smith, Rec. bot. surv. India 4, 1911, 262; for bibliography see under species. — Inflorescences (11—)18—37 cm long, peduncle (6.5—)9—14 cm long. — *Fig. 3 b*.

Type specimen: *Kari 4169* in E.

*Distribution*: India, Sikkim, East Pakistan, West China, Hainan. Sofar not known from Burma, Thailand, and Indo-China.

INDIA. North West Prov., Bharut: *Wallich 8485 E* (E), fl.; Hardwar (mixed with Sylhet specimens): *Wallich 8485 D* (K, L), fl.; Madras, Nilgiris: *Gardner s.n.* (K), fr.; *ibid.*, Serurghal: *Lawson s.n.* (K), fl. & fr. III; Kodaikanal Region, Palney Hills: *Uhl s.n.* (Anglade collection) (A), fr.; Bengal, Darjeeling, Chumbati, Daris Hills: *Gamble 600 A* (K), fr. IV; Chumbati: *Gamble 600 D* (CAL), fr. IV.

SIKKIM. Tista Valley: *Ribu 4998* (E, K), fl. IV; above †Surtie: *King s.n.* (K), fr. VI; near Sittong: *Kari 4169* (E), fl. IV, type of *G. gamblei* King ex Sm.; no loc.: *King 2385* (CAL), fr. †VII.

EAST PAKISTAN. Sylhet (mixed with Hardwar specimens): *Wallich 8485 D* (K, L), fl.

CHINA. Yunnan, Che-li Hsien, Kuen-ger: *Wang 79216* (A), fr. X; *ibid.*, Maankung-han, Dah-meng-lung: *Wang 78602* (A); Hainan, Yaichow: *Hou 70547* (K, NY), fl. III—VII; Ch'ang-kiang Distr., Ka Chik Shan & vic.: *Lau 1436* (BM, NY), fl. III; Ngai Distr., Naam Shan Leng, Pakatas: *Lau 234* (B, E, NY), fr. VII; *ibid.*, Pak Kok Nam: *Lau 324* (B, E, K, NY).



**Remarks:** Trees up to 18 m high. Flowers fragrant, pale yellow with dark brown anthers and blue stigma. Fruits green. *Habitat:* in thickets and forests, on dry or moist places, from 200—1500 m alt. *Flow. and fruit. times:* In India fl. in III, fr. in III—IV. In Sikkim fl. in IV, fr. in VI—VII. In Yunnan fr. in X, in Hainan fl. between III—VII. *Uses:* In Hainan the wood is used for more expensive furniture (*Lau 324*).

3. *G. pierrei* Guillaumin, Rev. gén. de Bot. 19, 1907, 164; Lam, Bull. Jard. Bot. Buitenz. Sér. 3, 12, 1932, 331, fig. 7 C. — *G. pinnata* Roxb. var. *pierrei* (Guill.) Cretzoiu, Acta Fauna et Flora Univ., Ser. 2, vol. 1, 9, 1933, 6. — *Fig. 3 c.*

Type specimen: *Pierre 909* in P, dupl. in A, K.

Distribution: Yunnan, Thailand, Cambodia.

Trees. Branchlets 0.4—0.8 cm thick, glabrous except tips. *Leaves* 5½—8½-jugate, glabrous or slightly pubescent, lowest pairs of leaflets showing transitions to stipules; petioles hardly flattened, 4.5—6.5 cm long, 0.2—0.3 cm thick, medulla with two or without resiniferous ducts; stipules elliptic-oblong, ca 0.3 cm long, deciduous; interjugae 2—3 cm long; stipellae wanting or extant; leaflets ovate-elliptic to elliptic-oblong, 4—10 cm long, 2—4 cm wide, base oblique, rounded to broadly acute, apex shortly, broadly and bluntly acuminate to more gradually narrowed, margin crenate-serrate; petiolules 0—0.3 cm long, terminal ones 0.2—2.5 cm long; secondary nerves 10—15 and some more in the apex. *Inflorescences* shortly paniculate, 6—17 cm long, pubescent, peduncle short, 1—7 cm long. *Flowers* 0.6—0.7 cm long; pedicels 0.1—0.4 cm long, pubescent. Receptacle bulging, 0.3 cm long, 0.5—0.6 cm in diam., pubescent without. *Sepals* deltoid, 0.25—0.3 cm long, 0.15—0.2 cm wide, pubescent at both sides. *Petals* oblong-lanceolate, 0.4—0.5 cm long, 0.15—0.175 cm wide, pubescent without, long tomentose within, especially at base. *Stamens* monodynamous, about as long as sepals, filaments 0.2—0.25 cm long, long tomentose at base. *Disc-lobes* deltoid-trapeziform. *Gynaecium* reaching about same height as or higher than stamens, ovary globular, more or less 5-lobed, glabrous, on a short or moderate gynophore, style more or less pilose, cylindrical, stigma 5-lobed. *Fruits* glabrous, 1—2.3 cm long, (0.9—)1.2—1.6 cm in diam.

CHINA. Yunnan, Che-li Hsien, Sheau-meng-yeang: *Wang 75604* (A), fr. VIII, see Remarks.

THAILAND (Siam). Tripagodas (Birma border): *Kostermans 358* (L), fr. (and some fl.) V.

INDO CHINA. Cambodia, Prov. Samrongtong, Mt Sehval: *Pierre 909* (A, K, isotypes of *G. pierrei* Guill.), fl. IV; Prov. † Upong, Kuang Kepoen: *Pierre 909a* (a added by Lam, see Lam l. c.) (K), fr. V; *ibid.*, Roleak Kam Chieu: *Pierre 909c* (c added by me) (NY).

**Remarks:** Cretzoiu, l. c., reduces this species to a variety of *G. pinnata*. It resembles the latter very much, indeed, but is distinguished from it by its bulging receptacle and its larger fruits. This is why I prefer keeping the two species apart.

The specimen *Wang 75604* has rather small fruits and resembles *G. pinnata*, but it shows stipellae which are not known in that species.

Trees up to 25 m high, with flaking grey-brown bark. Fruits green. *Flow. and fruit. times:* fl. in IV, fr. in V (Thailand, Camb.) and in VIII (Yunnan).

4. *G. pinnata* Roxburgh, Hort. Beng. 1814, 33; Sprengel, Syst. veget. 2, 1825, 313; Wallich, Cat. 1828, nr 8485; Spach, Hist. nat. vég. 2, 1834, 245; Wight & Arnott, Prodr. Fl. Penins. Ind. Or. 1, 1834, 175 (excl. syn. *G. madagascariensis* DC); Hamilton, Trans. Linn. Soc. 17, 1835, 190; Walpers, Rep. bot. syst. 1, 1842, 559; Walpers, Ann. bot. syst. 3, 1853, 843; Drury, Handb. Ind. Fl. 1, 1864, 249; Beddome, Fl. sylv. 1, 1869, 118; Brandis, For. Fl. N.W. & Centr. Ind. 1874, 62; Engler in DC, Mon. Phan. 4, 1883, 5 (incl. var. *sikkimensis* Engl. and var. *obtusa* Engl.); Prain, J. As. Soc. Beng. 62, 2, 1893, 39; Duthie, Fl. Upper Gangetic Plain 1, 1, 1903, 148; Gage, Rec. bot. surv. Ind. 3, 1, 1904, 34; Prain, Rec. bot. surv. Ind. 3, 2, 1905, 186; Brandis, Ind. trees 1906, 131; Craib, Contr. Fl. Siam 1912, 35; Gamble, Fl. Pres. Madras 1, 1915, 169; Fischer, Rec. bot. surv. Ind. 9, 1, 1921, 46; Cowan c.s., Trees N. Bengal 1929, 30; Lam, Bull. Jard. Bot. Buitenz., Sér. 3, 12, 1932, 330, fig. 7 B; Cretzoiu, Fedde Rep. 36, 1934, 265; Burkill, Dict. Econ. Prod. Mal. Penins. 1, 1935, 1061; Kanjilal c.s., Fl. Assam 1, 2, 1936, 221; Sinia, Ann. Jard. Bot. Buitenz. 48, 1938, 85, 92; Webber, Lilloa 6, 1941, 441—465; Bal, Rec. bot. surv. Ind. 6, 10, 1942, 45. — *Katou-Kalesjam* Van Rheede tot Draakenstein, Hort. Ind. Malabar. 4, 1673, 69. — *Sorbus Spuria Malabarica* Ray, Hist. Plant. Univ. 2, 29, 1688, p. 1643; Plukenett, Almagesta 1696, 355. — *Kunthia cochinen-sis* Dennstedt, Schl. z. Hort. Ind. Malab. 1818, 30. — *Garuga ? kengkar* Hamilton, Trans. Linn. Soc. 17, 1835, 191. — *Garuga ? khamar* Hamilton, l. c. p. 191. — *G. pinnata* Roxb. var. *genuina* (Roxb.) Cretzoiu (sic!), Acta Fauna et Flora Univ., Ser. 2, vol. 1, 9, 1933, 6. — Fig. 3 d.

Type specimen: *Roxburgh s.n.* in K, dupl. in BM.

Distribution: South East Continental Asia: India (not in Ceylon), Sikkim, East Pakistan, Burma, South China, Thailand, Indo China. Trees. Branchlets 0.5—0.8 cm thick, glabrous except the pubescent younger parts, often rough because of the large leaf scars. Leaves  $4\frac{1}{2}$ — $11\frac{1}{2}$ -jugate, pubescent when young, glabrate, lowest pairs of leaflets showing transitions to stipules; stipules spatulate to linear, 0.5—1 cm long, deciduous; petioles hardly flattened at base, (5—)6.5—11.5 cm long, 0.2—0.3 cm wide at base, medulla without resiniferous ducts; interjugae 2—4 cm long; stipellae wanting; leaflets usually sessile or subsessile, sometimes with a short petiolule (up to 0.2—0.4 cm), elliptic or oblong to lanceolate, base oblique, usually rounded, sometimes broadly or more narrowly acute, apex contracted into an usually long and narrow acumen, margin serrate-crenate, 5.5—14.5 cm long, 2—5.5 cm wide; nervation usually not very prominent, especially above; secondary nerves 10—15 and some more in the apex. Inflorescences lateral, conferted at tips of branchlets, paniculate, 7.5—19(—22) cm long, pubescent when young, usually more or less glabrescent when older; peduncle (1—)2—6 cm long; bracts deciduous. Flowers 0.6—0.8 cm long, when open; pedicels 0.1—0.3 cm long, pubescent. Receptacle cylindrical, 0.3—0.45 cm long, 0.35—0.45 cm in diam., pubescent outside. Sepals deltoid, 0.25—0.35 cm long, 0.15—0.25 cm wide, rather long tomentose at both sides. Petals oblong, 0.5—0.55 cm long, 0.15—0.2 cm wide, tomentose at both sides. Stamens slightly didynamous (longer ones episepalous), reaching same height as gynaeceium, filaments 0.25—0.3 cm long, about half as long as petals, with long hairs at base. Disc-lobes trapezi-

form to deltoid. *Ovary* globular, on a short gynophore, pilose as is the cylindrical style, stigma 5-lobed. *Fruits* irregularly globular, 1.1—1.5 (—1.8) cm long, (0.9—)1.1—1.8 cm in diam., one- to five-seeded, pericarp carnose, sometimes pubescent, calyx deciduous, receptacle persistent, small, annular.

INDIA. Bombay, North Konkan, Karjat: *Fernandes 254* (A), fl. & fr. IV; Belgaum, Durga: *Ritchie 1016* (E, K), fl. III; *ibid.*: *Ritchie s.n.* (E), fr. VIII; North Kanara, Kumta-Sirsi Road, Katgal: *Fernandes 222* (A), fl. III; no loc.: *Geburne 50* (K); *ibid.*: *Law s.n.* (K), fl. & fr.; Mysore, no loc.: *Hamilton s.n.* (BM), fl.; Punjab: Pentapotamica, between Bargodam and Kalka, beneath Kasauli: *Drummond 3111* (E), fl. V & fr.; *ibid.*, between Bargodam and Kasauli: *Drummond 3112* (E), fr. V; Siwalik and Jaunsar Div., Lacchiwala: *Ram Chandra Sethi 31* (A), fl. & young fr. V; *ibid.*, Kaluwala: *Habib Baksh 28* (NY), fl. V; North West Prov., Dehra Dun and vic., Bindal Nala: *Umrao Singh 336* (NY), fr. V; *ibid.*, Mohand Pass: *Stewart 11121* (NY), fl. VIII; Upper Gangetic Plain, Distr. Gorakhpur: ? *Harsukh 21385 b* (A, K), fl. IV; *ibid.*, Gonda: ? *Harsukh 21387* (K), fr. V; *ibid.*, Kheri: *Inayat 21386 b* (K), fl. IV; Cosala, Rudrapur: *Hamilton 1048* (E), type of *G. ? kengkar* Ham; *ibid.*, Gorakhpur: *Hamilton 1049* (E), fl. IV, type of *G. ? khamar* Ham; Nizam's Dominions, Hyderabad, Kodmial: *Edwards 3* (K), fl. II; Madras, Ganjam Distr., Mohiri Hills: *Gamble 14211* (K), fl. III; Karnool, Nala Malai: *Beddome s.n.* (BM), fl. & young fr.; Vizianagram: *Campbell s.n.* (E), fl. II; no loc.: *Bourne s.n.* (K), fl. IV; Bengal (see also under East Pakistan), Chota-Nagpore, Kumandi Res., Palamau: *Gamble 8779* (K); Orissa, Tangli, Khurdha: *Gamble 9306* (K), fl. II; Singbhum: *Haines 190* (K), fl. & fr. IV; Northern Bengal, Madhepur Jungle: *Biswas 1547* (A, NY); Calcutta, Botanic Gardens: *Wallich 8485 F* (E, K), fl.; Assam, Gauhati: *Chatterjee s.n.* (A), fr. IV—V; *ibid.*, Jata Hill: *Prain's coll. s.n.* (A); no loc.: *Jenkins s.n.* (L), fl.; Andaman Isl., Long Island: *Parkinson 660* (K), fr. VII; East Indian Peninsula, without loc.: *Wight 398* (K, L), fl.; *ibid.*: *Wight 2324* (L, NY), fl., type of var. *obtusata* Engl.; *ibid.*: *Roxburgh s.n.* (BM, K), fl., type of *G. pinnata* Roxb.

SIKKIM. Banks of Tista: *King's coll. s.n.* (L), fr. VIII; no loc.: *Hooker s.n.* (BM, L), fr., type of var. *sikkimensis* Engl.

EAST PAKISTAN (see also under India, Bengal). Bengal, Chittagong: *Cowan 29* (E), fl.; *ibid.*, ? Ruybhony: *Cowan 1406* (E), fl. & fr.; *ibid.*, Kaptai: *Hooper 25873* (E); Chittagong Hill Tracts: *King's coll. 4* (E); *ibid.*, Rangamati: *Gamble 7929* (A), fl. III.

BURMA. Upper Burma, Maymyo: *Lace 3114* (K), fl. IV; *ibid.*: *Lace 3187* (E), fr. V; Kaing Res., Pyinmana: *Burma For. Sch. Herb. Ser. 6* (KEP), fl. II; *ibid.*: *Burma For. Sch. Herb. s.n.* (K), fl. & fr. IV; Southern Shan State, Saga: *Abdul Khalil s.n.* (A); Paunglaung: *Burma For. Sch. Herb. Ser. 56* (NY), fl. III; Burma, towards Casneir: ? *Griffith 1136* (K), fl. VIII & IX.

CHINA. Yunnan, Fo-Hai: *Wang 74680* and *74726* (A), fr. VI; *ibid.*: *Wang 76199* (A), fr. VII; Che-li Hsien, Ban-chiou-chian: *Wang 79702* (A), fr. X; *ibid.*, Sheau-meng-yeang: *Wang 75563* (A), fr. VIII; *ibid.*, Sheau-bang-chou-chian: *Wang 79651* (A), fr. IX; *ibid.*, Dahmeng-lung: *Wang 77664* (A), fr. VIII; Kwang-si, Kwei-loo, S. Hin Yen: *Ching 7290* (NY), fr. IX.

THAILAND (Siam). Kankiang Radburi: *Teysmann 5951* (L), fl.: Lakon: *Kerr 4002* (L), fl. II; Kwae Noi Basin, Distr. Wangka: *Kostermans 990* (L), fr. V.

INDO CHINA. Tonkin, Route des Rochers Notre Dame: *Pételot 6402* (A, NY), fl. III; Annam, Nha-trang and vic.: *Robinson 1500* (BM), fl. III; Cambodja, Kompong Cham: *Béjaud 432* (A, NY), fl. VII; Cochinchina, Bienhoa, Bao Chiang: *Pierre 909b* (b added by me) (BM), fr. VII.

SOUTH ASIA. Taepel: *unknown coll. 839* (L), fr. IV; Moalmyne and Akran: *Wallich 8485 C* (K), fl.; Kalahandi State: *Haines 5530* (K), fr. V; Sukanagur: *Hamilton 1046/1* (E), fl. IV; Dumuriyagunj: *Hamilton 1046/2* (E); Magadha, Kororiya: *Hamilton 2530* (or *2538*) (E); Kalesar: *Lace 48* (E), fl. IV; Simachallam: *Cleghorn s.n.* (E), fr. II; Phandowala: *Hans Raj Dutt 20* (NY), fl. IV & fr. X; no loc.: *Ritchie s.n.* (E); *ibid.*: *Cleghorn s.n.* (E); *ibid.*: ? *Jameson 446* (E), fl.; *ibid.*: *Beddome s.n.* (BM), fl.

Remarks: Shrubs or small to moderate-sized trees, not higher than 15 m. Bark grey, rough (one record only), leaflets lighter beneath, flowers

yellowish, fruits green, turning yellow. *Habitat*: in thickets and (not very dense?) forests, from 100—1500 m alt., but most records from 800—1050 m. *Vernac. names*: shemat (Bombay), amra (Punjab), gargu (Nizam's Dom.), chinyok (Burma), majoin kien (Thailand). *Flow. and fruit. times*: In India fl. in II—V and VIII, fr. in IV—VIII. In Sikkim fr. in VIII. In East Pakistan fl. in III. In Burma fl. in II—IV and VIII—IX, fr. in IV—V. In South China fr. in VI—X. In Thailand fl. in II, fr. in V. In Indo-China fl. in III and VII, fr. in VII. *Uses*: No records of uses are found on the labels, but according to Kanjilal c.s. (l.c.) and other authors the bark is used for tanning and the leaves as fodder for buffaloes etc. Roxburgh and others say that the fruits are edible and usually pickled.

#### Excluded species.

*Garuga madagascariensis* De Candolle, Prod. 2, 1825, 81. — *Cupania chapelieriana* Cambessedes, Mém. Mus. Paris 18, 1829, 44. — *Jagera madagascariensis* Blume, Rumphia 3, 1847, 155. — *Tina madagascariensis* (DC) Radlkofer, Sitzber. d. math.-phys. Classe d. k. b. Akad. Wiss. Münch. 9, 1879, 662 (non *T. madagascariensis* DC, Prod. 1, 1824, 614); Engler in DC, Mon. Phan. 4, 1883, 7; Choux, Cat. Plant. Madag., Sapind. 1931, 13. = *Tina chapelieriana* (Cambessedes) Kalkman, nov. comb. (Sapind.). (Types not examined).

*Garuga javanica* Blume, Bijdragen 1826, 1165; Walpers, Rep. bot. syst. 1, 1842, 559. — *Jagera speciosa* Blume, Rumphia 3, 1847, 155. — *Jagera javanica* Blume, Mus. bot. Lugd.-Bat. 1, 15, 1850, 227.

= *Jagera javanica* (Blume) Blume (Sapindaceae). Type specimen: ?Korthals s.n. (L, nrs 908.270—346/356).

*Garuga* ? *pharhad* Hamilton, Trans. Linn. Soc. 17, 1835, 191. The type specimen (*Hamilton 1047* [E] from Cicata, Tilautta) is sterile, but does very probably not belong to *Garuga*.

#### List of collectors' numbers.

Numbers in parentheses refer to the number of the species in the present article.

Abdul Khalil s.n. (4); Aduviso, see Cenabre etc.; Alfaro Cardosa 11/20 (2a); Analan, see McAnalan; Anglade, see Uhl.

Backer 36479 (2a); Baker 2 (2a); Bakhsh, see Habib Bakhsh; Baldemor, see Cenabre etc.; Beccari s.n. (2a); Becking 42 (2a); Beddome s.n. (4); Béjard 432 (4); Biswas 1547 (4); Bourne s.n. (4); Brass 542 (2a); BSIP 14 (2a), 298 (2a); Burma For. Sch. Herb. 6 (4), 56 (4), s.n. (4); Burton 32 (2a).

Campbell s.n. (4); Cardosa, see Alfaro Cardosa; Carr 11862 (2a); Cenabre, Baldemor & Aduviso 27976 (2a); Chatterjee s.n. (4); Ching 7290 (4); Christophersen 2847 (2a), 2861 (2a), 3308 (2a); Clark 1700 (2a); Cleghorn s.n. (4); Clemens 10805 (2a), 10873 (2a); Cowan 29 (4), 1406 (4); Crosby 291 (2a); Cunningham 228 (2a), s.n. (2a); Curran 8478 (2a).

Drummond 3111 (4), 3112 (4).

Edwards 3 (4); Elbert 2042 (2a).

Fernandes 222 (4), 254 (4); Forrest 10745 (1), 11410 (1), 16629 (1), 16913 (1); Fryar 4011 (2a), 4017 (2a).

Gamble 600 A (2b), 600 D (2b), 7929 (4), 8779 (4), 9306 (4), 14211 (4); Gardner s.n. (2b); Geburne 50 (4); Gray 3566 (2a); Griffith 1136 (4).

Habib Bakhsh 28 (4); Haines 190 (4), 5530 (4); Hamilton 1046/1 (4), 1046/2 (4), 1048 (4), 1049 (4), 2530 (or 2538) (4), s.n. (4); Hans Raj Dutt 20 (4); Harsukh 21385b (4), 21387 (4); Hooker s.n. (4); Hooper 25873 (4); How 70547 (2b).

- Inayat 21386b (4).  
 Jameson 446 (4); Jenkins s.n. (4).  
 Kajewski 135 (2a); Kari 4169 (2b); Kern, see McKern; Kerr 1002 (4); Khalil, see Abdul Khalil; King 2385 (2b), s.n. (2b); King's coll. 4 (4), s.n. (4); Kostermans 358 (3), 990 (4).  
 Lace 48 (4), 3114 (4), 3187 (4); Lau 234 (2b), 324 (2b), 1436 (2b); Law s.n. (4); Lawson s.n. (2b); Leschenault de la Tour c.s. s.n. (2a); Lundquist 14 (2a).  
 McAnalan NGF 508 (2a); McKern 98 (2a); Merrill 5301 (2a).  
 Natividad 23353 (2a); NGF 220 (2a), 508 (2a), 1245 (2a); NIFS (bb. numbers) 15047, 20250, 21336, 21398, 21431, 24265, 27067, 27235, 28739, 28775, 29002, 29761, 29870, 31482, 32371, 32486, 32633, 32750, 33777 (all 2a), Ja 4908 (2a).  
 Orolfo 3799 (2a), 36376 (2a).  
 Parkinson 660 (4); Parks, see Setchell & Parks; Pételot 6402 (4); Pierre 909 (3), 909a (3), 909b (4), 909c (3); Powell 19 (2a); Prain's coll. s.n. (4).  
 Ram Chandra Sethi 31 (4); Ribu 4998 (2b); Ritchie 1016 (4), s.n. (4); Robinson 1500 (4); Rock 10458 (1); Roxburgh s.n. (4).  
 Setchell & Parks 15447 (2a); Singh, see Umrao Singh; Smith NGF 1245 (2a); Spanoghe s.n. (2a); Stewart 11121 (4).  
 Tangkilisan 83 (2a); Teysmann 5951 (4), s.n. (2a); de la Tour, see Leschenault de la Tour; Tsai 53278 (1).  
 Uhl s.n. (Anglade coll.) (2b); Umrao Singh 336 (4).  
 de Vriese s.n. (2a).  
 Walker BSIP 298 (2a); Walker & White BSIP 14 (2a); Wallich 8485 C (4), 8485 D (2b), 8485 E (2b), 8485 F (4); Wang 74680 (4), 74726 (4), 75563 (4), 75604 (3), 76199 (4), 77664 (4), 78602 (2b), 79216 (2b), 79651 (4), 79702 (4); White, see Walker & White; Whitnee s.n. (2a); Wight 398 (4), 2324 (4); Womersley 3560 (2a), 4628 (2a).  
 Yü 1624 (1), 3175 (1), 15885 (1).  
 De Zeeuw 46 (2a); Zippelius s.n. (2a); Zollinger 3355 (2a).  
 Unknown coll. NGF 220 (2a), 839 (4), s.n. (2a).

### Index.

Accepted taxa in romans, synonyms in italics. New taxa etc. marked with \*. Number in parentheses refer to the number of the species in the present article.

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*Capraria* Rumph.

*Cupania chapelieriana* Camb. (Excl. spp.)

*Garuga* Roxb.

- *abito* (Blanco) Merr. (2)
- *clarkii* Merr. (2)
- *floribunda* Decne (2)
- — var. *floribunda* (2)
- — \*var. *gamblei* (King ex Sm.) Kalkm. (2)
- *forrestii* Smith (1)
- *gamblei* King ex Sm. (2)
- *javanica* Bl. (Excl. spp.)
- ? *kengkar* Ham. (4)
- ? *khamar* Ham. (4)
- *littoralis* Merr. (2)
- — var. *paucijuga* Merr (2)
- *madagascariensis* DC. (Excl. spp.)
- *mollis* Turcz. (2)
- *pacifica* Burk. (2)
- ? *parhad* Ham. (Excl. spp.)
- *pierrei* Guill. (3)
- *pinnata* Roxb. (4)
- — var. *genuina* Cretz. (4)
- — var. *obtusa* Engl. (4)

- Garuga pinnata* Roxb. var. *pierrei* (Guill.) Cretz. (3)  
 — — var. *sikkimensis* Engl. (4)  
 — *yunnanensis* Hu (1)  
*Guaiacum abilo* Blanco (2)  
*Ioica abilo* (Blanco) Blanco (2)  
*Jagera javanica* Bl. (Excl. spp.)  
 — *javanica* (Bl.) Bl. (Excl. spp.)  
 — *madagascariensis* Bl. (Excl. spp.)  
 — *speciosa* Bl. (Excl. spp.)  
*Katou-Kalesjam* van Rheede t. Draakenst. (4)  
*Kunthia* Dennst.  
*Kunthia* H. & B.  
*Kunthia cochinchinensis* Dennst. (4)  
*Sorbus spuria malabarica* Ray (4)  
 \**Tina chapelieriana* (Camb.) Kalkm. (Excl. spp.)  
 — *madagascariensis* DC. (Excl. spp.)  
 — *madagascariensis* (DC.) Radlk. (Excl. spp.)