

REDUCTION OF THE GENUS *HEYNEA* ROXB. EX SIMS TO *TRICHILIA* P.BR. (MELIACEAE)

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(*Rijksherbarium, Leyden*)

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INTRODUCTION

The identification of some Indo-Chinese simaroubaceous plants reduced by Mr H. P. Nooteboom to *Heynea* led to a closer examination of the genus *Heynea*, its taxonomical status, the species names assigned to it, and its synonymy.

Up to the present day *Heynea* has almost unanimously been distinguished as a separate genus in the alliance of *Walsura* and *Trichilia*. BAILLON (1875) united *Heynea* with *Walsura* under the oldest generic name *Heynea*. In the same year KURZ (1875) also united them under the generic name *Walsura* and he was followed by HARMS (1897) who erroneously argued that *Walsura* should have precedence over *Heynea*. In the second edition of the *Natürliche Pflanzenfamilien* (1940) he again separated them keeping *Trichilia*, *Heynea*, and *Walsura* together as the subtribe *Trichiliinae*, including also the more distant *Ekebergia* and *Owenia* (l.c. 39). *Heynea* is closest to *Trichilia*, both genera differing from *Walsura* in the dehiscent, capsular fruit. The differences Harms gave for discriminating *Trichilia* and *Heynea* cannot be applied through overlapping of their characters and the main distinction that remains is geographical: *Trichilia* being a large, polymorphous genus developed in America, Africa, and also recorded from Madagascar and Mauritius, *Heynea* having only two species and known only from tropical Indo-Malaysia. In the past various other Malaysian or Polynesian species have been referred to *Trichilia*, but have appeared to belong to various other genera, mostly *Dysoxylum*; see under excluded species.

The geographical replacement is of course entirely unsatisfactory, the more so as the two Asiatic species of *Heynea* can easily be accommodated within the large genus *Trichilia*, viz in the sect. *Trichilia* (*Eutrichilia*) which occupies the entire range of the genus *Trichilia*.

We have then to examine the delimitation of *Trichilia* against *Walsura*, both large genera.

The only consistent difference between *Walsura* and *Trichilia* is the indehiscent fruit of the former and dehiscent capsule of the latter. There are no additional floral characters which can be used for a distinction.

However, there seems to be a curious wood-anatomical character, viz the occurrence of wood vessels in the pith of the twigs of *Walsura* and their absence in *Trichilia*.

This character has, as far as I know, first been mentioned by ENDERT (1928). I have verified it, as far as the material of *Trichilia* and *Walsura* in the Rijksherbarium permitted and have found it sound.

Heynea has a bitter substance throughout its tissues (leaf, bark, and seed); I have found bitter leaves in some species of *Trichilia*, but not in *Walsura*.

Further *Heynea* has leaves provided with glands underneath, very similar to those found in some *Simaroubaceae*. In an American *Trichilia* I have also found such glands, but in none of the *Walsura* species which I could examine.

The fact that *Heynea* also in these anatomical and phytochemical characters agrees with *Trichilia* is reason that we cannot separate it from that genus and consequently I am reducing it here.

This study was suggested and supervised by Prof. Dr. C. G. G. J. van Steenis. I am indebted to Dr. P. W. Leenhouts and Mr M. Jacobs for verifying some critical sheets and a few references at the Herbarium of the Royal Botanic Gardens, Kew. Dr. H. Santapau, Bombay, was so kind to fill the localities in India. I express my sincere thanks to the Directors of the Arnold Arboretum, Cambridge, Mass., and the Muséum d'Histoire naturelle, Phanérogamie, Paris, for the loan of certain type specimens.

TRICHILIA

P. Brown, Hist. Jam. 278. 1756; Linné, Syst. ed. 10. 1020. 1759; P. Wilson, N. Am. Fl. 25: 226. 1924; Harms, in E. & P. Nat. Pfl. Fam. 19b (1): 104. 1940; Stafleu & Rickett, Taxon 8: 303. 1959.—*Heynea* Roxb. [Hort. Beng. 33. 1814, "*Heynia*", nomen] ex Sims, in Curt. Bot. Mag. 41: t. 1738. 1815; Corom. Pl. 3: 56. 1820; DC., Prod. 1: 624. 1824; Juss., Mém. Mus. Hist. Nat. 19: 235. 1830; Don, Gard. Dict. 1: 685. 1831; Roxb., Fl. Ind. ed. Carey 2: 389. 1832; W. & A., Prod. 120. 1834; Meisn., Pl. Vasc. Gen. 1: 49. 1836; Endl., Gen. Pl. 1051. 1840; Miq., Fl. Ind. Bat. 1, 2: 542. 1859; Sum. 505. 1861; B. & H., Gen. Pl. 1: 336. 1862; Baill., Hist. Pl. 5: 497. 1875, pro parte, sect. *Euheynea*; Hiern, in Fl. Br. Ind. 1: 565. 1875; C. DC., Monogr. Phan. 1: 713. 1878; King, J. As. Soc. Beng. 64, ii: 86. 1895; Ridl., Fl. Mal. Pen. 1: 413. 1922; Craib, Fl. Siam. En. 1: 264. 1931; Harms, in E. & P. Nat. Pfl. Fam. ed. 2, 19b (1): 117. 1940.—*Walsura* Auct.: Kurz, J. As. Soc. Beng. 41, ii: 297. 1872; Adelbert, Blumea 6: 322. 1948; Kitamura, in Kihara, Fauna & Fl. Nepal. 170. 1955.—*Walsura* sect. *Heynea* Harms, in E. & P. Nat. Pfl. Fam. 3, 4: 303. 1896.—*Ailantopsis* Gagnep., Not. Syst. 11: 163. 1944, cf. Gagnep., ibid. 13: 63. 1947.—*Picroderma* Gagnep., ibid. 11: 165. 1944 (Nooteboom ms).

In the Paris Code the genus was still noted as a nomen genericum conservandum, but it was provided with a dagger indicating that this is unnecessary. RICKETT & STAFLEU (1959) have further elucidated this point and have shown that the type of the genus should be *Trichilia hirta* L.

KEY TO THE INDO-MALAYSIAN SPECIES

1. Terminal bud strigose-hairy. Ovary, capsule, and upper surface of leaflets glabrous; branches and underside of leaflets sometimes hairy. Filaments with two short linear toothlike appendages. A single, ovoid seed in each capsule . . . 1. *Trichilia connaroides*
1. Terminal bud velvet-hairy. Ovary, capsule, branches, and both surfaces of leaflets hairy. Filaments with two long appendages broadened, often lobed and ciliate at the end. Two orbicular, strongly compressed seeds in each capsule. . . 2. *Trichilia sinensis*

1. ***Trichilia connaroides*** (W. & A.) Bentvelzen, comb. nov. — *Heynea trijuga* Roxb. [Hort. Beng. 33. 1814, nomen] ex Sims, in Curt. Bot. Mag. 41: t. 1738. 1815; Corom. Pl. 3: 56, t. 260. 1820; DC., Prod. 1: 624. 1824; Wall., Cat. n. 1258. 1829; Juss., Mém. Mus. Hist. Nat. 19: 235, t. 7, f. 17. 1830; Don, Gard. Dict. 1: 685. 1831; Roxb., Fl. Ind. ed. Carey 2: 390. 1832; W. & A., Prod. 120. 1834; Grah., Bomb. Pl. 31. 1839; Voigt, Hort. Suburb. Calc. 135. 1845; Dalz. & Gibs., Bomb. Fl. 38. 1861; Drury, Ind. Fl. 1: 166. 1864; Miq., Ann. Mus. Bot. Lugd. Bat. 4: 61. 1868; Brandis, For. Fl. 70. 1874; Hiern, in Fl. Br. Ind. 1: 565. 1875; C. DC., Monogr. Phan. 1: 713, t. 9, f. 6. 1878, incl. var. *bijuga* DC., var. *multijuga* DC., var. *pilosula* DC.; Talbot, Trees Bombay 42. 1894; King, J. As. Soc. Beng. 64, ii: 86. 1895; Pierre, Fl. For. Coch. 5: 355A, t. 355. 1897; Cooke, Fl. Bomb. 2: 214. 1905; Brandis, Ind. Trees 134, f. 135. 1906; Pellegrin, in Fl. Gén. I.-C. 1: 791. 1911; Fyson, Fl. Nilgiri 3: 22, fig. p. 303. 1920; Ridl., Fl. Mal. Pen. 1: 413. 1922; Osmaston, For. Fl. Kumaon 87. 1927; Craib, Fl. Siam. En. 1: 264. 1931, incl. f. *pubescens* (Kurz) Craib; Harms, in E. & P. Nat. Pfl. Fam. ed. 2, 19b (1): 117. 1940; Gagnep., Not. Syst. 13: 63. 1947, incl. var. *velutina* Gagnep.—*Heynea quinquejuga* Roxb. [Hort. Beng. 90. 1814, nomen; Wall., Cat. n. 1259. 1829, nomen] ex Don, Gard. Dict. 1: 685. 1831, non Spreng. 1827; Roxb., Fl. Ind. ed. Carey 2: 391. 1832; Voigt, Hort. Suburb. Calc. 135. 1845; Miq., Ann. Mus. Bot. Lugd. Bat. 4: 61. 1868.—*Heynea affinis* Juss., Mém. Mus. Hist. Nat. 19: 235, 275, descr. 1830; Wight, Cat. 22, n. 363. 1833; W. & A., Prod. 121. 1834; Walp., Rep. 1: 432. 1842; Drury, Fl. Ind. 1: 166. 1864; Beddome, Fl. Sylv. Madras 1: 134, t. 134. 1869.—*Zanthoxylon connaroides* W. & A., Prod. 148. 1834.—*Heynea connaroides* Voigt, Hort. Suburb. Calc. 136. 1845; Drury, Ind. Fl. 1: 166. 1864.—*Heynea sumatrana* Miq., Sum. 197, 505, descr. 1861; Ann. Mus. Bot. Lugd. Bat. 4: 60. 1868; C. DC., Monogr. Phan. 1: 714. 1878; K. & V., Bijdr. 3: 4. 1896; Merr., Philip. J. Sc. 4 Bot.: 273. 1909; Backer, Schoolfl. Java 216. 1911; Merr., En. Born. 323. 1921; En. Philip. 2: 380. 1923; Baker, J. Bot. 62 Suppl.: 20. 1924; Elmer, Leaf. Philip. Bot. 9: 3382. 1937.—*Heynea fruticosa* T. & B., Nat. Tijd. Ned. Ind. 25: 423. 1863; Kurz, J. As. Soc. Beng. 39, ii: 72. 1870, 'frutescens'.—*Walsura pubescens* Kurz, J. As. Soc. Beng. 41, ii: 297. 1872; For. Fl. Burma 1: 225. 1877.—*Walsura quinquejuga* Kurz, Prel. Rep. Veg. Pegu App. A: 33, App. B: 37. 1875.—*Walsura trijuga* Kurz, J. As. Soc. Beng. 44, ii: 148. 1875, incl. var. *pubescens*

(Kurz) Kurz; For. Fl. Burma 1: 225. 1877; Harms, in E. & P. Nat. Pfl. Fam. 3, 4: 303. 1896; Adelbert, Blumea 6: 322. 1948; in Backer, Bekn. Fl. Java (em. ed.) 7: fam. 148, p. 30. 1948; Kitamura, in Kihara, Fauna & Fl. Nepal. 170. 1955.—*Scutinanthe engleri* Elmer, Leaflet. Philip. Bot. 1: 298. 1908, cf. Merr., Philip. J. Sc. 4 Bot.: 273. 1909.—*Walsura sumatrana* H. J. Lam, Bull. Jard. Bot. Btzig III, 12: 422. 1932; Leenh., Fl. Mal. I, 5: 249. 1956.—*Ailantopsis poilanei* Gagnep., Not. Syst. 11: 163. 1944.—*Picroderma laotica* Gagnep., Not. Syst. 11: 166. 1944 (cf. Nooteboom ms).—*Walsura punctata* Suess., Mitt. Bot. Staatss. Münch. 2: 58. 1950, excl. var. *papillosa* Suess. & Heine; Heine, in Fedde Rep. 54: 231. 1951; Thesis 49, 118. 1953.

forma **connaroides**. — *Heynea connaroides* W. & A. — *Heynea trijuga* var. *pilosula* DC.—*Walsura pubescens* Kurz.—*Walsura trijuga* (Roxb.) Kurz var. *pubescens* (Kurz) Kurz.—*Heynea trijuga* f. *pubescens* (Kurz) Craib.—*Ailantopsis poilanei* Gagnep.—*Heynea trijuga* var. *velutina* Gagnep.

Little-branched small tree or shrub. Young twigs very dark-brown to blackish, hairy, lenticellate, obviously with flush-wise innovation; terminal bud small, consisting of scale-like organs, strigose-hairy. Pith of the twigs even, the parenchymatic cells often with lignified walls; rays thin; wood vessels on both sides accompanied by short, tangential bands of parenchyma 1–3 cell rows thick. Leaflets, bark (and seed) with a bitter substance; wood tasteless. Leaves c. 20–50 cm long; insertion and nodes of rachis very much shrinking in the herbarium; rachis angular; leaflets 1–5 pairs, ovate-oblong, acuminate, almost rounded to broad-acute at the unequal base, $4\frac{1}{2}$ –20 by $2\text{--}7\frac{1}{2}$ cm; upper surface glabrous, midrib slightly sulcate and ridged, nerves 5–16 pairs distinct, curved, not arched, but reticulately connected and not reaching the margin, nerves and veins with numerous small glands; undersurface mostly glaucous and provided with some scattered, flat, rather large glands, hairy, midrib prominent, nerves finely prominent, veins hardly visible to subdistinct; petiole terete, 5–15 cm; petiolules all articulated at the apex, $1\frac{1}{5}$ –2 cm. Inflorescence cymose, corymbiform, lax to condensed, axillary, long-peduncled, half as long as the leaves or exceeding them; bracts small, deciduous; peduncle angular, the first node with a whorl of 3–7 branches, the higher nodes with a decreasing number; lateral branches once or more with 2 branches 2nd order, the ultimate branchings dichotomous. Pedicels c. $1\frac{1}{4}$ –2 mm, articulated just above the insertion of 2 small persistent bracteoles which bear short-stipitate glands along their margin. Calyx 1 mm high, deeply 5-fid, imbricate in bud, lobes broad-triangular, acute to rounded or acuminate, variable within one inflorescence and even within one flower, often hairy outside; margin membranous, sometimes ciliate. Corolla white, $2\text{--}4\frac{1}{2}$ mm long. Petals 5, narrowly imbricate in bud, little spreading during anthesis, oblong, $\frac{1}{2}$ –1 mm wide, acute, incurved at apex, outside with 3 more or less prominent ribs, often hairy; margin membranous and sometimes ciliate. Staminal tube 10-(rarely 14)-fid,

cleft to below the middle; filaments alternating in length, $\frac{1}{2}$ – $1\frac{1}{2}$ mm, inside strigose-hairy, outside sometimes puberulous; anther basifixed, attached between 2 linear, acute, glabrous teeth about as long as it, c. 1 mm, whether or not glabrous, ovate, pointed, latrorse. Ovary glabrous, immersed in a fleshy annular disk, c. $\frac{1}{2}$ mm diam., 2-celled, exceptionally 3-celled; ovules 2 in each cell, axile, collateral, epitropous, anatropous; style short; stigma clavate, 2-lobed, about as large as the anthers. Young fruit with one developed cell with one seed, the other barren, and aborting with age. Mature capsule 1-celled, 2-valved almost to the base, globular, sometimes apiculate, c. 1–2 (– $2\frac{1}{2}$) cm diam.; pericarp fleshy and red (sec. coll.), in the dried state coriaceous and brown; endocarp shining, with very fine, dense, concentric lines. Seed 1, ovoid, attached basally, almost entirely enveloped by a rather thin, white, in sicco pale brown aril; testa in sicco thin, dark-brown, wrinkled; cotyledons equal or unequal; plumule very small.

Type specimen: Wight herb. prop. 553 (K).

Distribution: West Deccan, and from the Sikkim through Burma, Thailand, Indo-China, Hainan to the Malay Peninsula, Sumatra, Borneo, and the Philippines. Fig. 1.

Ecology: In rain-forests and along forest edges, obviously preferring an everwet climate, from the lowland up to c. 1000 m altitude.

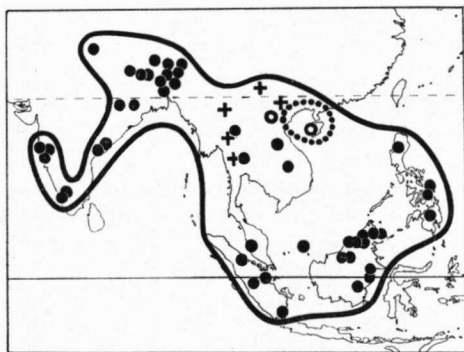


Fig. 1. Geographical distribution of the genus *Trichilia* in Indo-Malaysia (delineated). *T. connaroides* f. *connaroides* (+), *T. connaroides* f. *glabra* Benth. (●), *T. connaroides* var. *microcarpa* (Pierre) Benth. (○), *T. sinensis* Benth. (delineated by dotted line).

forma *connaroides*. Undersurface of leaflets and twigs hairy.

Distribution: Burma, Indo-China, and S. China (Yunnan).

Numbered specimens examined: Henry 9358A; Poilane 1671, 1900, 27144.

Note: Through the diligence of Mme Tardieu-Blot I have been able to examine the three Poilane collections. The one which bears flowers (27144) had in 3 flowers examined constantly 14 stamens.

Notes: As appears from the synonymy the species has been described under several names, but more recently Harms and others have

come to the conclusion that probably only one species is concerned with which I entirely agree. The oldest name for it is *Heynea trijuga* Roxb. ex Sims. *H. quinquejuga* Roxb. ex Spreng. differs only in the number of pairs of leaflets; HIERN (1875) was the first to unite it with *H. trijuga*, but C. DE CANDOLLE (1878) kept it as a variety. I do not believe it can be maintained, as the number of jugae differs often even in one specimen (1-3 pairs, 3-5 pairs, etc.).

DE JUSSIEU (1830) distinguished *H. affinis* by the smaller leaves, larger petals and not-hairy twigs; there is, however, a large variability in the first two characters and they cannot serve for the distinction of taxa. I have maintained the third character on the level of a forma. MIQUEL (1868) was the first to reduce *H. affinis* to *H. trijuga*.

KURZ (1870) accepted *Heynea sumatrana* as distinct from *H. trijuga* and united it with *H. quinquejuga*. HARMS (1896) and MERRILL (1909) expressed doubt about the specific separation and HARMS (1940, 1941) finally merged them under the oldest name *H. trijuga*. One of the main characteristics of *H. sumatrana* is the blunt calyx teeth, but this proved to be very variable even in one specimen (and also in its type specimen). Similarly the number of nerves, the shape of the fruit, and the degree of hairiness of the flowers varies too much to allow for distinction of infraspecific taxa.

Heynea fruticosa T. & B. differs from *H. sumatrana* only in the branching of the inflorescence, in having more than three branches from one node of the rachis. Miquel reduced it to *H. sumatrana*, retaining it as a variety, but the more abundant material now at hand makes such a distinction impossible.

Walsura pubescens Kurz has been reduced to *W. trijuga* by KURZ (1875) himself as var. *pubescens*; CRAIB (1931) could only hold it up as a forma.

The description of *Walsura punctata* Suess. has been a lapsus; examination of isotypes of the Clemens numbers showed the exact conspecificity, the presence of glands on the leaves and absence of wood vessels in the pith. The var. *papillosa* Suess. & Heine, however, is an *Aphanamixis*, under which name it was rightly distributed (Clemens 28649 = 28688). The Leyden duplicate has only fruits, 3-valved as is normal in this genus.

Nomenclature: As in the genus *Trichilia* the epithets *trijuga*, *quinquejuga*, and *affinis* are already occupied, the epithet *connaroides* must be used, which is unfortunate as this was described only with fruit. Dr. P. W. Leenhouts could verify at Kew that the type certainly belongs to the species treated here.

Another unfortunate thing is that *T. connaroides* belongs to the pubescent form which is much less common and less widely distributed than the glabrous one; this necessitates the distinction of a new *f. glabra*.

Uses: BURKILL (1935), citing Gimlette, says that the fruits are possibly poisonous to birds. Thieves would use the seed with opium

(opium dross) and betel nuts to stupify their victims. According to Cantley a decoction of the leaves will help against cholera. Boorsma stated that a decoction of the bark extract kills frogs.

forma **glabra**, nov. forma.

Foliolis ramulis glabris.

Typus: M. D. Sulit PNH 21471 (L).

Synonymy: *Heynea trijuga* Roxb. ex Sims.—*Heynea quinquejuga* Roxb. ex Don, non Spreng.—*Heynea affinis* Juss.—*Heynea sumatrana* Miq.—*Heynea fruticosa* T. & B.—*Walsura trijuga* (Roxb.) Kurz.—*Walsura quinquejuga* (Roxb.) Kurz.—*Scutinanthe engleri* Elm.—*Walsura sumatrana* (Miq.) H. J. Lam.—*Picroderma laotica* Gagnep.—*Walsura punctata* Suess., excl. var. *papillosa* Suess. & Heine.

Distribution: Almost throughout the range of the species, but absent from S. China and Hainan.

Numbered specimens examined: Angian BNB 10300; Ashton BRUN 5404, 5734; Clemens 21086, 28064, 28201, 28366, 29662, 30185, 32479; Cuadra SAN A 903; Edaño BS 41684; Elmer 9179, 14054; Enggoh BNB 7274, 10209, 10532; Forbes 1998, 2574; bb 12235, 29411; Garrett 1131, 1182, 1237; Griffith KD 1061; Hallier 4477; Haviland 2875; Hohenacker 492 (erroneously distributed with a printed label reading "*Mallea rothii* Juss." which is a quite different plant); King's coll. 3497; Kostermans 5126, 9985; Lörzing 16503; Meijer SAN 20258; Miranda FB 18845; Pierre 4253; Ramos 1172; Reillo BS 15422; SAN 19981; Schiffner 2122; Sinclair SF 39828; van Steenis 1280; Sulit PNH 14448, 21471; Teysmann 1567; Thorel 9948; Wight KD 416; Hub. Winkler 2654; Wood SAN 16212, SAN A 3685, 4551, 4800; Wyatt Smith KEP 80396.

Note: As the type of the species is the pubescent form, the glabrous form is in need of a new name. The form is rather distinct but does not show a special geographical pattern of distribution.

var. **microcarpa** (Pierre) Bentvelzen, comb. nov.—*Heynea trijuga* var. *microcarpa* Pierre, Fl. For. Coch. 5: 355A. 1897; Pellegrin, Fl. Gén. I.—C. 1: 783. 1911; Dunn, J. Linn. Soc. 39: 455. 1911; Merr., Lingnan Sc. J. 5: 104. 1927; Harms, in E. & P. Nat. Pfl. Fam. ed. 2, 19b (1): 117. 1940.—*Walsura trijuga* var. *microcarpa* (Pierre) H. H. Hu, J. Arn. Arb. 5: 299. 1924.

Differs from f. *connaroides* by the small fruits, c. $\frac{1}{2}$ cm in diam.

Type: Balansa 4040 (P).

Distribution: North Indo-China and Hainan.

Numbered specimens examined: Balansa 4040; C. T. Lei 172, 501; Tsang Wai Tak 417.

2. **Trichilia sinensis** Bentvelzen, nom. nov.—*Heynea velutina* How & Chen, Act. Phytotax. Sin. 4: 45. 1955, non *Trichilia velutina* DC. 1878.

Small tree or shrub, 1–3 m high. Young twigs very dark-brown to blackish, hairy, lenticellate, with flush-wise innovation; terminal bud small, consisting of scales at both sides velvet-hairy. Pith of the twigs even, the parenchymatic cells often with lignified walls; wood rays thin; vessels on both sides accompanied by short, tangential bands of

parenchyma, 1–3 cell rows thick. Leaflets, wood, bark, and seeds tasteless. Leaves 20–50 cm long; rachis angular, velvet-hairy; leaflets 2–3 pairs, ovate-oblong, acuminate, almost rounded to broad-acute at the unequal base, 6–14 by 1–7 cm; upper surface appressed-pubescent, midrib slightly sulcate, and ridged; nerves 6–9 pairs distinctly curved, not arching but reticulately connected and not reaching the margin, nerves and veins with numerous small glands; undersurface mostly glaucous, velvet-hairy, midrib prominent, nerves finely prominent, veins hardly visible to subdistinct; petiole terete, 5–10 cm, petiolules articulate at the apex, 0.2–0.5 cm long. Inflorescence cymose, corymbiform, lax, axillary, long-peduncled but not exceeding the leaves; bracts small, caducous, peduncle angular, each node with 2, 3 or 4 branches, the ultimate ones dichotomous. Pedicels 2–4 mm, articulated just above the insertion of 2 small, persistent bracteoles which bear short-stipitate glands along their margin. Calyx 1 mm high, deeply 5-fid, lobes imbricate in bud, broad-triangular, acute to rounded, variable within one inflorescence and even within one flower, hairy outside. Corolla white, 3–4 mm long. Petals 5, narrowly imbricate in bud, little spreading during anthesis, oblong, acute, outside sometimes hairy, margin membranous, ciliate. Staminal tube 10-fid, cleft to below the middle; filaments alternatingly somewhat differing in length, c. $1\frac{1}{2}$ mm, inside strigose-hairy, outside glabrous; anthers basifixed, attached between two long appendages, the latter irregularly lobed, broadened, and ciliate at the apex. Ovary short-hairy, immersed in a fleshy annular disk, c. $\frac{1}{2}$ mm diam., 2-celled; ovules 2 in each cell, axile, collateral, epitropous-anatropous; style short; stigma clavate, 2-lobed, about as large as the anthers. Young fruit with one developed cell with two seeds, the other barren and aborting with age. Mature capsule 1-celled, 2-valved almost to the base, globular, apiculate, 0.6–1.2 cm diam., green velvet-hairy outside; pericarp in the dried state coriaceous and green-brown; endocarp shining with very fine, dense, concentric lines. Seeds 2, orbicular, strongly compressed, attached basally, almost entirely enveloped by a rather thin, in sicco pale brown aril; testa in sicco thin, black brown, wrinkled; cotyledons unequal, plumule small.

Type: F. C. How 71711 (isotype in A).

Distribution: North Indo-China and China (Kwangsi and Hainan).

Numbered specimens examined: F. C. How 71711; S. K. Lau 27981; W. T. Tsang 23811, 29970; C. Wang 34158.

EXCLUDED SPECIES

Heynea cochinchinensis Baill., Adans. 11: 265. 1876; C. DC., Monogr. Phan. 1: 715. 1878 = *Walsura cochinchinensis* Harms, in E. & P. Nat. Pfl. Fam. 3, 4: 302. 1896; Pierre, Fl. For. Coch. 5: 354B. 1897.

Heynea multijuga Bl., Bijdr. 4: 168. 1825; Spreng., Syst. Veg. 4, 2: 252. 1827; Juss., Mém. Mus. Hist. Nat. 19: 235. 1830; Don, Gard. Dict. 1: 685. 1831 = *Dysoxylum blumei* Miq., Fl. Ind. Bat. 1, 2: 542. 1859, nom. illeg. = *Dysoxylum multijugum* (Bl.) Adelb., Blumea 6: 318. 1948.

Heynea quinquejuga Spreng., Syst. Veg. 4, 2: 252. 1827, non Roxb. ex Don. = See under *Trichilia rufinervis* Bl.

Heynea trifolia Juss., Mém. Mus. Hist. Nat. 19: 235, 274, descr. 1830 = *Walsura piscidia* Roxb., Fl. Ind. ed. Carey 2: 387. 1832, sec. W. & A., Prod. 120. 1834; C. DC., Monogr. Phan. 1: 634. 1878 ('*trifoliata*') = *Walsura trifolia* (Juss.) Harms, in E. & P. Nat. Pfl. Fam. ed. 2, 19b (1): 119. 1940.

Trichilia alliacea Forst. f., Prod. 33. 1786; Spreng., Syst. Veg. 4, 2: 252. 1827.—*Hartighsea forsteri* Juss., Mém. Mus. Hist. Nat. 19: 265. 1830, nom. illeg. = *Dysoxylum forsteri* C. DC., Monogr. Phan. 1: 508. 1878, non *Dysoxylum alliaceum* Bl. 1825.

Trichilia arborescens (Bl.) Spreng., Syst. Veg. 4, 2: 252. 1827.—*Goniocheton arborescens* Bl., Bijdr. 4: 176. 1824 = *Dysoxylum arborescens* (Bl.) Miq., Ann. Mus. Bot. Lugd. Bat. 4: 24. 1868.

Trichilia bijuga Labill., Sert. Austrocal. t. 54. 1824; Spreng., Syst. Veg. 4, 2: 252. 1827 = *Hartighsea billardieri* Juss., Mém. Mus. Hist. Nat. 19: 228. 1830, nom. illeg. = *Dysoxylum bijugum* (Labill.) Seem., Fl. Vit. 37. 1865 (?).

Trichilia excelsa (Bl.) Spreng., Syst. Veg. 4, 2: 252. 1827 = *Dysoxylum excelsum* Bl., Bijdr. 4: 176. 1825.

Trichilia glandulosa Sm., in Rees, Cycl. 36: no 10. 1817 = *Synoum glandulosum* (Sm. in Rees) A. Juss., Mém. Mus. Hist. Nat. 19: 227, t. 15. 1830.

Trichilia humilis Zipp. ex Miq., Ann. Mus. Bot. Lugd. Bat. 4: 4. 1868, nom. in syn., inval. = *Munronia javanica* Benn.

Trichilia macrocarpa (Bl.) Spreng., Syst. Veg. 4, 2: 252. 1827 = *Dysoxylum macrocarpum* Bl., Bijdr. 4: 175. 1825.

Trichilia mollissima (Bl.) Spreng., Syst. Veg. 4, 2: 252. 1827 = *Dysoxylum mollissimum* Bl., Bijdr. 4: 175. 1825.

Trichilia nervosa Vahl, Symb. 1: 31. 1790 = *Sandoricum koetjape* (Burm. f.) Merr.

Trichilia pentandra Blanco, Fl. Filip. 355. 1837 = *Chisocheton pentandrus* (Blanco) Merr.

Trichilia rimosa Blanco, Fl. Filip. ed. 3, 2: 99. 1878 = *Aglaia rimosa* (Blanco) Merr.

Trichilia rufinervis Bl., Bijdr. 4: 164. 1825 = *Heynea quinquejuga* Spreng., Syst. Veg. 4, 2: 252. 1827, nom. illeg. = *Aglaia longifolia* T. & B., Nat. Tijds. Ned. Ind. 27: 42. 1864 = *Aglaia winckelii* Adelb., Blumea 6: 321. 1948 = ***Aglaia rufinervis*** (Bl.) Benthelzen, comb. nov. (typus in L.).

Trichilia similis Spreng., Syst. Veg. 4, 2: 252. 1827 = *Dysoxylum simile* Bl., Bijdr. 4: 174. 1825.

Trichilia spectabilis Forst. f., Prod. 33. 1786 = *Hartighsea spectabilis* Juss., Mém. Mus. Hist. Nat. 19: 263. 1830 = *Dysoxylum spectabile* Hook. f., Handb. New Zeal. Fl. 41. 1867.

Trichilia spinosa Willd., Sp. 2: 554. 1800 = *Turraea virens* (non L.) Hell., Act. Holm. 294, t. 10–11. 1788 = *Limonia monophylla* Roxb. (non L.) Pl. Corom. 1: 59. 1795 = *Atalantia spinosa* (non (Bl.) Koord.) Tanaka, Bull. Mus. Hist. Nat. II, 2: 162. 1930 = *Atalantia mono-*

phylla DC., Prod. 1: 535. 1824, cf. Swingle in Webber c.s., The Citrus Industry 325. 1948. (*Rutaceae*).

Trichilia tripetala Blanco, Fl. Filip. 354. 1837 = *Aphanamixis tripetala* (Blanco) Merr.

Trichilia venosa Spreng., Syst. Veg. 3: 68. 1827 is not mentioned by Summerhayes; according to Ind. Kew. = *Sandoricum indicum* = *S. koetjape* (Burm. f.) Merr.

Trichilia volubilis Blanco, Fl. Filip. ed. 2: 249. 1845 = *mixtum* cf. Merr., Sp. Blanc. 194. 1918.

Trichilia sp.: Baker, Fl. Maur. 47. 1877 is according to Summerhayes, Trans. Linn. Soc. Lond. II, Zool. 19: 273. 1931 = *Xylocarpus moluccensis* (Lamk) Roem.

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