New Taxa and New Combinations in Asian Antidesma (Euphorbiaceae)
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New taxa and new combinations in Asian *Antidesma* (*Euphorbiaceae*)

PETRA HOFFMANN[1]

Summary. In a precursor to a revision of *Antidesma* in Malesia and Thailand, two new species, one new subspecies and two new varieties are described and illustrated. Seven species are reduced in rank to varieties, four of which are rheophytic forms of widespread species. The necessary new combinations are made and their types and full synonymies are given.

INTRODUCTION

Antidesma is a distinct and relatively homogeneous genus of dioecious shrubs and trees in the Old World tropics. The genus was last monographed in Engler's *Pflanzenreich* by Pax & Hoffmann (1922) who accepted 146 species. Later Airy Shaw published numerous articles (e.g. Airy Shaw 1973) and regional treatments of *Euphorbiaceae*, namely for Thailand (1971), Borneo (1975), Australia (1980a), New Guinea (1980b), Sumatra (1981), Central Malesia (1982) and the Philippines (1983). There he described 34 new species and 16 new varieties, but also synonymised a great number of names.

This paper is a precursor to the forthcoming revision of *Antidesma* in Malesia and Thailand (Hoffmann, in prep.) which will treat a total of 56 species and 13 infraspecific taxa. It will be the basis for the accounts of the genus in *Flora Malesiana*, *Flora of Thailand* and the *Tree Flora of Sabah and Sarawak.*

It speaks for Airy Shaw's thorough work that only five new taxa have to be newly described here for this large and diverse region. On the other hand, seven established species do not show sufficiently distinct character states to be maintained at the specific level. These species are here reduced to varieties and the necessary new combinations are made. Four of these varieties, *A. montanum* Blume var. *microphyllum* (Hemsl.) Petra Hoffm., *A. montanum* Blume var. *salicinum* (Ridl.) Petra Hoffm., *A. neurocarpum* Miq. var. *linearifolium* (Pax & K. Hoffm.) Petra Hoffm. and *A. tomentosum* Blume var. *stenocarpum* (Airy Shaw) Petra Hoffm. are rheophytes, differing only in their ecological behaviour as well as in their narrower leaves and smaller inflorescences, flowers, and fruits from three of the most common species in Western Malesia.

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NEW TAXA

Antidesma brevipes *Petra Hoffm.* **sp. nov.** *Antidesmati contracto* J. J. Sm. Novae Guineae et *A. coriaceo* Tul. Malesiae occidentalis similis; ab ambabus petiolis stipulisque brevioribus, foliis minoribus, foliorum costa media plana, floribus masculinis subsessilibus, sepalis inaequalibus ad dimidium longitudinis connatis, florum disco piloso; ab *A. contracto* etiam basi foliorum non distincte in petiolum falsum contractum decurrenti; ab *A. coriaceo* etiam florum disco pulvinato, staminibus duobus, pistillodio absenti differt. Typus: Indonesia, Sulawesi, Sulawesi Utara (Manado Distr.), N of Mt Klabat, Wiau complex, Mt Tuandei, Sani, 29 June 1956, *Forman* 316 (holotypus K!, isotypi L!, US!).

Tree, 15 m. *Young twigs* terete, shortly ferrugineous-hispid, soon becoming glabrous, first dark brown, soon becoming very light brown with a red tinge. *Stipules* caducous, not seen on mature leaves, deltoid, 1.5 × 0.6 mm, shortly ferrugineous-hispid. *Petiole* hardly channelled adaxially, 1.5 – 2 × 1.2 – 1.5 mm, glabrous, soon becoming whitish grey and rugose. *Leaf blade* oblong, apically acuminate (all tips damaged), basally acute, mostly concave, 5 – 8 × 1.7 – 2.8 cm, 2.8 – 3.3 times longer than wide, eglandular, coriaceous, glabrous, shiny adaxially, dull abaxially, midvein flat adaxially, tertiary veins reticulate, widely spaced, hardly prominent, drying dark reddish brown adaxially, bright reddish brown abaxially, domatia absent. *Male inflorescences* 2 – 3 cm long, axillary, simple, axis 0.4 mm wide, pilose. *Bracts* ovate to lanceolate, apically acute, 0.2 – 0.3 × 0.2 mm, pilose. *Male flowers* 2 × 1 – 1.5 mm. *Pedicel* 0.1 mm long, inarticulate, glabrous. *Calyx* 0.8 × c. 1 mm, conical to cup-shaped, sepals 4, fused for about half their length, deltoid, thick, apically acute, the abaxial lobe smaller than the other three, ferrugineous-hispid outside, nearly glabrous inside, margin entire. *Disc* cushion-shaped, fully enclosing the bases of the filaments, pilose. *Stamens* 2 (in one flower there are 3 stamens, 2 of which are inserted in the same disc excavation), episepalous with regard to the two lateral sepals, c. 1.5 mm long, c. 1 mm long exserted from the calyx, anthers 0.3 × 0.5 mm. *Pistillode* absent. *Female plants* unknown. Fig. 1.

DISTRIBUTION. Indonesia, Sulawesi (Celebes), only known from type locality.

ECOLOGY. Forest, at 700 m.

KEY CHARACTERS. Plant almost glabrous, young twigs light brown, petioles very short, leaves coriaceous, drying reddish brown, inflorescences simple, short, weak, sepals fused for about half of their length, disc hairy, stamens 2, pistillode absent.

SIMILAR SPECIES. *A. contractum* J. J. Sm. has longer petioles and stipules, larger leaves with a raised midvein and a distinctly decurrent leaf base, longer pedicellate staminate flowers, free sepals of equal size and a glabrous disc.

A. coriaceum Tul. differs in its longer petioles and stipules, larger leaves with an impressed midvein, sessile staminate flowers, free sepals of equal size, free, glabrous disc lobes, 3 – 5 stamens and the presence of a pistillode.

A. neurocarpum Miq. var. *hosei* (Pax & K. Hoffm.) Petra Hoffm. is distinguished by its glabrous disc and 3 – 5 stamens.

NOTE. It is unfortunate that this taxon is based on only one collection in staminate flower, but it differs from all previously described species in several

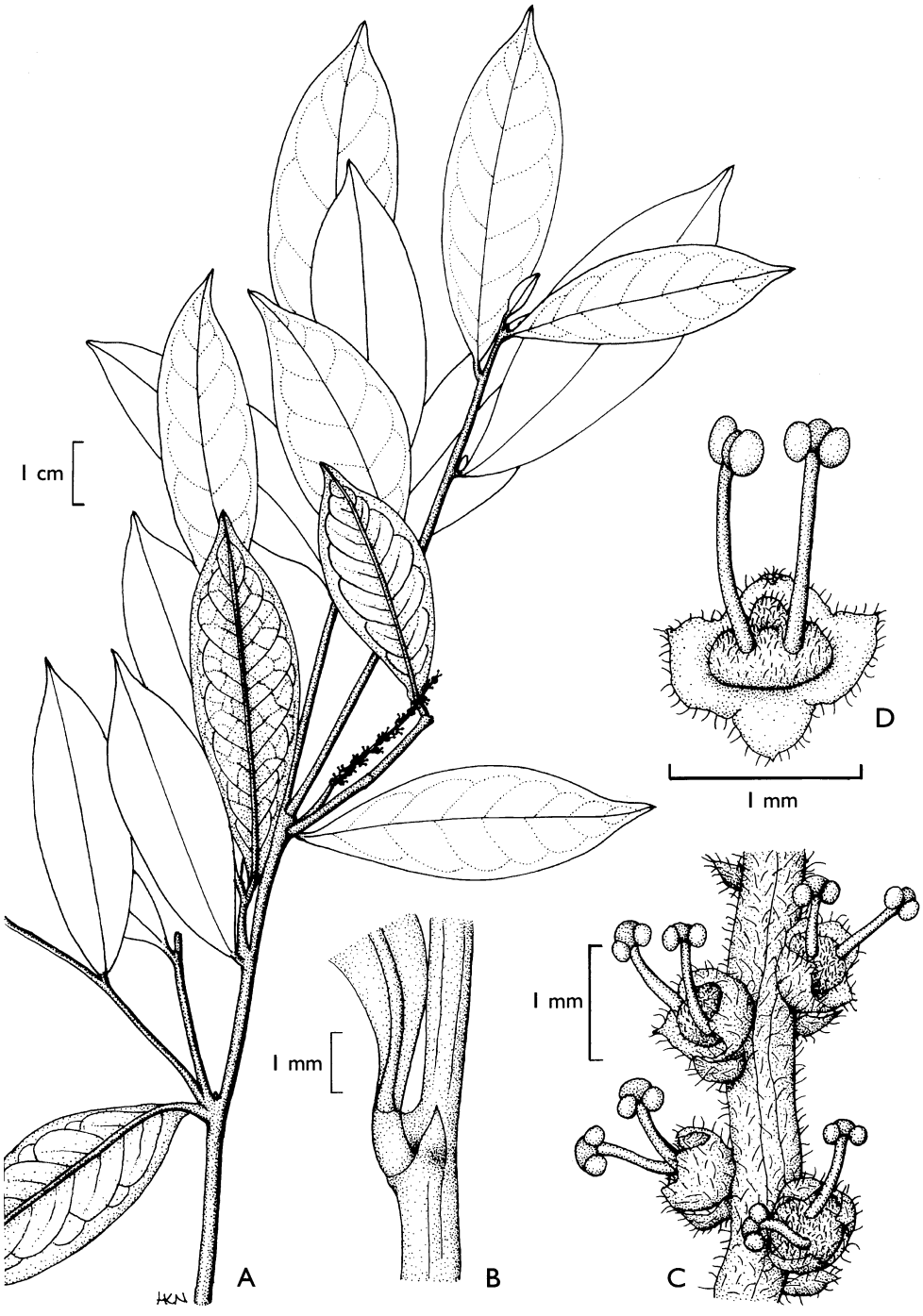

FIG. 1. *Antidesma brevipes*. **A** habit with staminate inflorescence; **B** part of branch with stipule; **C** part of staminate inflorescence; **D** staminate flower. From *Forman* 316. Drawn by Holly Nixon.

characters, the most outstanding of which are the very short petioles, the bistaminate flowers with an almost zygomorphic calyx and lacking a pistillode. Bistaminate flowers occur in only five other species of *Antidesma* in the *Flora Malesiana* area: *A. acidum* Retz. (syn. *A. diandrum* (Roxb.) Spreng.), which has relatively long pedicellate staminate flowers, *A. contractum* (see above), *A. petiolatum* Airy Shaw with very long petioles and very large leaves as well as *A. rhynchophyllum* K. Schum. and *A. spatulifolium* Airy Shaw, which differ, for example, in their thin petioles and thinner leaves with hairtuft-domatia. None of these species occurs in Sulawesi.

Antidesma bunius *(L.) Spreng.* var. **pubescens** *Petra Hoffm.* **var. nov.** a varietate typica ramulis juvenilibus petiolis pagina inferiore foliorum inflorescentiarum axibus bracteis calycibusque dense ferrugineo-pubescentibus differt. Typus: Thailand, Lampoon prov., Me Lee, not far from stream, 2100 ft, 25 April 1915, *Winit* 295 (holotypus K!). Paratypi: Thailand, Phetchabun prov., Nam naw, 3 May 1953, *Nilphanit* 10524 (K!); Phetchabun prov., Lom Kao, 8 May 1955, *Smitinand* 11761 (K!).

DISTRIBUTION. Northern Thailand, Lamphun and Phetchabun Provinces.

ECOLOGY. Evergreen forest by stream, at 700 – 1000 m.

KEY CHARACTERS. Differs from the typical variety by the dense ferrugineous indumentum of the young twigs, petioles, lower leaf side, inflorescence axis, bracts and calyx. Fig. 2.

NOTE. These specimens have been referred to by Airy Shaw (1971: 359) as *A.* cf. *nienkui* (Merrill & Chun 1935: 263, pl. 54; Chun & Chang 1965: 119; Li Ping-T'ao 1994: 62). Apart from the considerable disjunction, *A. bunius* var. *pubescens* differs from the type and only known specimen of *A. nienkui* from Hainan (*Chun & Tso* 43995 (A!, K!, NY!, P!)) by the shorter petioles and fused calyx lobes. Both taxa, however, have a similar dense ferrugineous indumentum in most parts, which distinguishes them from the nearly glabrous *A. bunius* var. *bunius*.

Antidesma edule *Merr.* var. **apoense** *Petra Hoffm.* **var. nov.** a varietate typica fructibus maioribus, infructescentiis simplicibus, petiolis brevioribus, foliis glabris valde coriaceis ellipticis vel obovatis differt. Typus: Philippines, Mindanao, North Cotabato prov., Kidapawan municipality, Mt Apo Geothermal Project Site B, 7°05'N, 125°14'E, 24 Oct. 1990, *Leonardo Co* 3142 (holotypus A!). Paratypi: ibid., *Leonardo Co* 3139 (A, L!, PNH, PUH).

DISTRIBUTION. Philippines, Mindanao, only known from the type locality.

ECOLOGY. Montane forest with average canopy height of c. 20 m, at c. 1400 m.

KEY CHARACTERS. Differs from the typical variety in its larger fruits, simple infructescence, shorter petioles and glabrous, thickly coriaceous, elliptic to obovate leaves. Fig. 3.

NOTE. The type and paratype are specimens in fruit and staminate bud, respectively. New collections in flower may thus provide additional differential characters. Moreover, *A. edule* var. *edule* has not yet been recorded from such high altitudes.

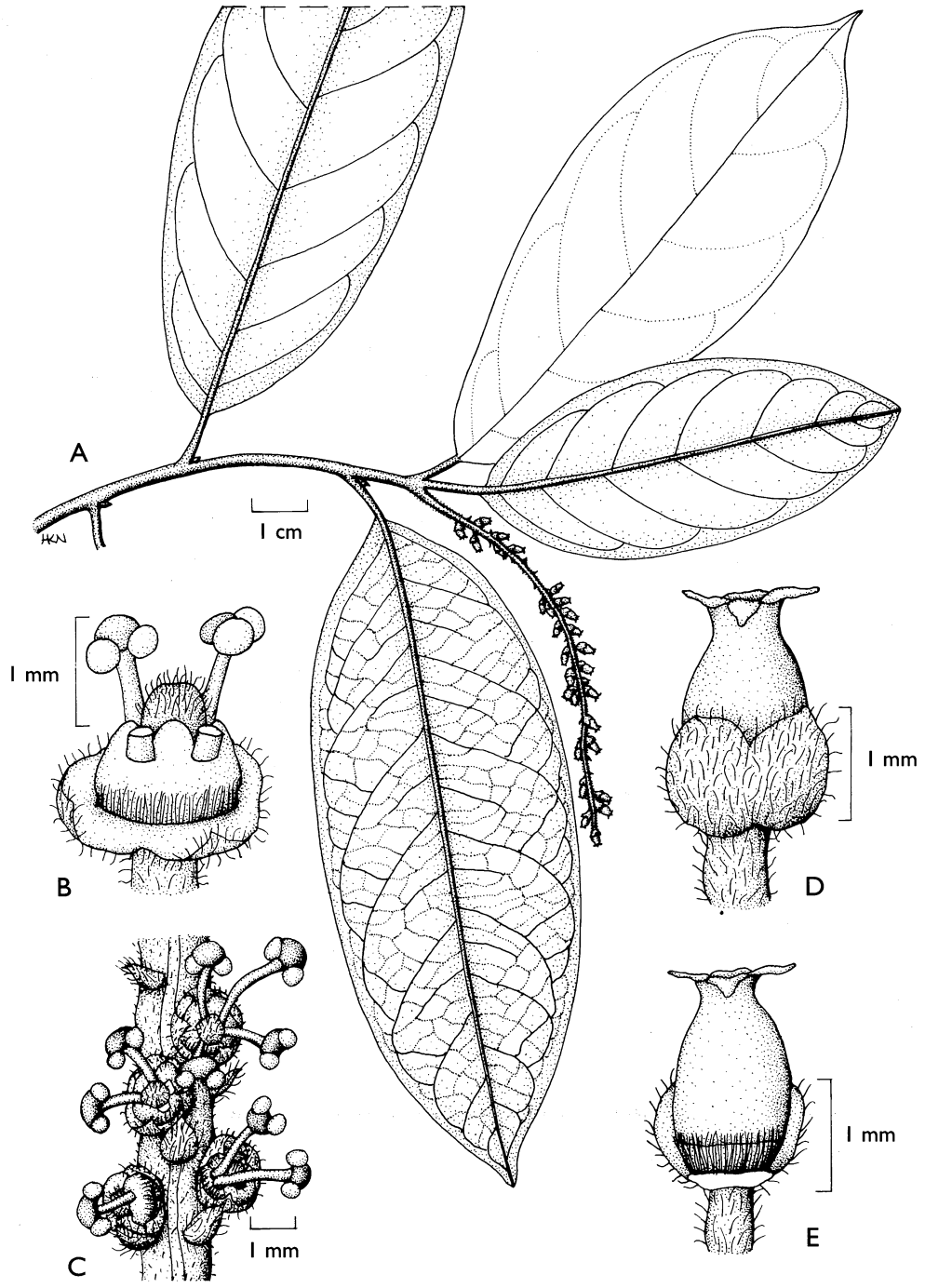

FIG. 2. *Antidesma bunius* var. *pubescens*. **A** habit with pistillate inflorescence; **B** staminate flower; **C** part of staminate inflorescence; **D** pistillate flower; **E** pistillate flower, calyx partly removed. **A, D – E** from *Winit* 295; **B – C** from *Nilphanit* 10524. Drawn by Holly Nixon.

Antidesma elbertii *Petra Hoffm.* **sp. nov.** *Antidesmati montano* Blume et *A. velutinoso* Blume similis; ab ambabus florum masculinorum calycibus conicis, sepalis longioribus connatis, disco apice pubescenti latere glabro sepalis aequilongo basi constricto, inflorescentiis simplicibus vel raro pauciramosis interdum caulinis, fructibus paullo longioribus; ab *A. montano* etiam ovariis fructibusque hirsutis stylis lateralibus vel subterminalibus, foliorum indumento densius hirsuto; ab *A. velutinoso* etiam bracteis brevioribus, venis secundariis reticulatis vel haud percurrentibus distantibus, sepalis staminibusque paucioribus differt. Typus: Indonesia, SE Sulawesi, Rumbia region, Lawankudu river, 150 – 497 m, 21 Sept. 1909, *Elbert* 3139 (holotypus L!). Paratypi: SULAWESI, S Sulawesi, Mamuju Kab., Kaluku Kec., Desa Sondoang, Dusun Rea, c. 100 m, disturbed forest, open place, common, on slope, 2 Feb. 1993, *Afriastini* 2001 (K!, L!); C Sulawesi, Luwuk area, NE of Luwuk, on road from Kayutanyu to Siuna, 0°51'S, 123°00'E, c. 60 m, disturbed forest in river valley, raised coralline limestone, 7 Oct. 1989, *Coode* 5838 (AAU!, K!, L!); ibid., 8 Oct. 1989, *Coode* 5844 (K!, L!); SE Sulawesi, Kolaka area, Gunung Watuwila foothills, above Sanggona, 'Mokuwu camp', valley of Mokuwu river, 3°48'S, 121°39'E, c. 200 m, disturbed forest in river valley, 30 Oct. 1989, *Coode* 6068 (K!, L!); SE Sulawesi, Rumbia region, Wambako?roe, 4°23'S, 121°55'E, 40 – 130 m, monsoon forest, humid, 9 Sept. 1909, *Elbert* 3079 (L!); Manado prov., camp Totok close to Ratatotok, 200 m, primary forest, fertile volcanic sand, 18 March 1895, *Koorders* 16797 b (BO!); S Sulawesi, SW peninsula, NE of Makassar within 54 – 60 km on the road, 5°01'S, 119°35'E, 4 July 1976, *Meijer* 10811 (L!); SE Sulawesi, Kolaka, Tirawuta, Ladongi Mt, 3°54'S, 121°14'E, 150 m, primary forest, 17 Oct. 1978, *Prawiroatmodjo & Maskuri* 1233 (K!, L!); SE Sulawesi, Kolaka, Tirawuta, Polipolia, 4°08'S, 121°50'E, 100 m, primary forest, 21 Oct. 1978, *Prawiroatmodjo & Maskuri* 1417 (K!, L!); SE Sulawesi, around Opa [Aopa] swamp, W side, hills W of Polipolia, 4°05'S, 122°00'E, 20 – 250 m, primary forest, 22 Nov. 1978, *Prawiroatmodjo & Soewoko* 1887 (L!); C Sulawesi, Gunung Gindopo, Basidondo, Toli-Toli, Tungkuan river, 1°02'N, 120°49'E, 250 m, river bank, 8 March 1985, *Ramlanto & Zainal Fanani* 675 (K!, L!); S Sulawesi, Malili, Oesoe, 2°34'S, 121°04'E, 28 Oct. 1931, *s. coll.* CEL/III 32 (L!); C Sulawesi, Sopu valley, c. 60 km SSE of Palu, margin of concession PT Kebun Sari near Berdikari, 1°03'S, 120°03'E, 650 m, somewhat disturbed primary forest c. 40 m high, sloping terrain, on deep clayey soil derived from granite, 30 May 1979, *de Vogel* 5625 (L!); Manado Distr., Bolaang Mongondow, Dumoga Bone National Park, Toraut Dam, along the Toraut river, 0°34'N, 123°54'E, 220 m, slightly disturbed primary forest 35 m high, on bank near the water, 13 March 1985, *de Vogel & Vermeulen* 6508 (K!, L!, NY!); ibid., 14 March 1985, *de Vogel & Vermeulen* 6517 (L!); Manado Distr., Lama, Dumoga Bone proposed National Park, Doloduo, Tumokang, 0°34'N, 123°54'E, 300 m, ridge top, 20 Sept. 1984, *Whitmore & Sidiyasa* 3465 (K!, L!). LESSER SUNDA ISLANDS, Sumbawa, Bima, NTB, Rora, Padende, Mt Lahio, 1150 m, mountain slope, 21 Sept. 1982, *Sarkat Danimihardja* 2119 (L!). MOLUCCAS, Bacan Isl., Gunung Sibela near Waiaua, 0°45'S, 127°32'E, 250 m, very open disturbed forest near river bank, to 60 m and much regeneration of trees to 5 m high, sloping hill side, deep clayey soil mixed with stones, bedrock grey schists, 27 Oct. 1974, *de Vogel* 3699 (K!, L!).

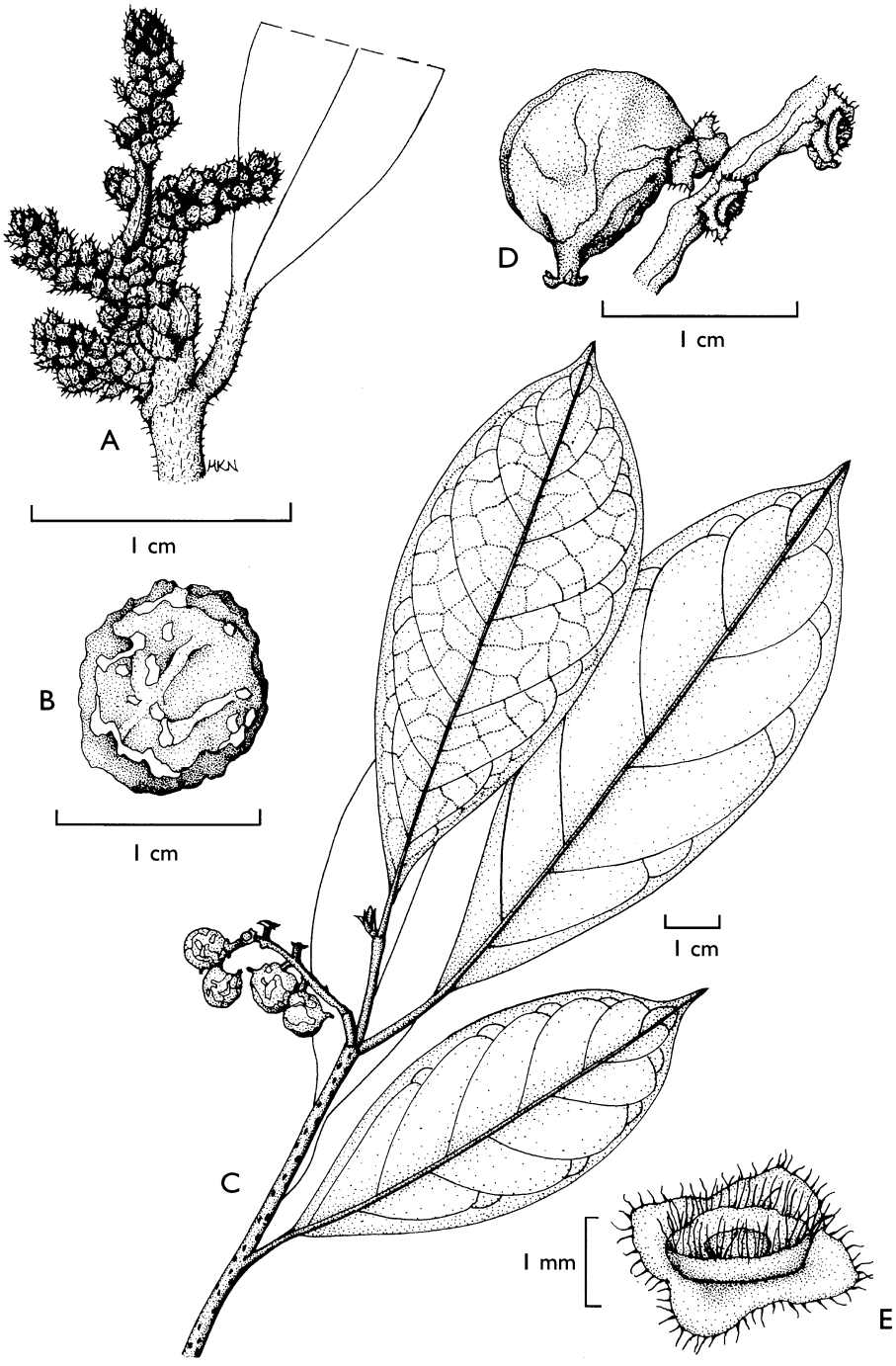

FIG. 3. *Antidesma edule* var. *apoense*. **A** young staminate inflorescence; **B** sculptured endocarp; **C** habit with infructescence; **D** part of infructescence; **E** pistillate calyx after fruit abscission. **A** from *Leonardo Co* 3139; **B – E** from *Leonardo Co* 3142. Drawn by Holly Nixon.

Shrub or treelet, up to 9 m, diameter up to 7 cm. Bark dark purplish, thin, sapwood white, heartwood very dark red, wood very hard. *Young twigs* terete, densely pale yellow to ochraceous-spreading-hirsute, brown. *Stipules* persistent, linear to narrowly deltoid, 3 – 7 × 0.5 – 1.2 mm, densely hirsute. *Petiole* channelled adaxially, 3 – 8 × 1 – 2 mm, densely spreading-hirsute. *Leaf blade* oblong, oblong-ovate or elliptic, apically acuminate-mucronate, basally acute to rounded, (5 –)9 – 13(– 20) × (2.5 –)3.5 – 5(– 7) cm, (1.8 –)2.5 – 3(– 3.8) times longer than wide, eglandular, membranaceous to chartaceous, glabrous except along the major veins, more rarely pilose all over adaxially, spreading-hirsute all over abaxially, especially along the veins, shiny to dull adaxially, dull to moderately shiny abaxially, midvein impressed adaxially, tertiary veins reticulate to weakly percurrent, usually widely spaced, drying olive-green, greyish or dark reddish green, lighter abaxially. *Male inflorescences* 4 – 6 cm long, axillary, simple or branched once, axis spreading-hirsute. *Bracts* lanceolate, 0.5 – 0.7 × 0.2 – 0.3 mm, hirsute, margin sometimes glandular. *Male flowers* 2 – 3 × c. 2 mm. *Pedicel* 0.2 – 1 mm long, inarticulate, glabrous to pilose. *Calyx* 0.8 – 1 × 0.8 – 1 mm, conical, sepals 4, fused for $^1/_3$ – $^2/_3$ of their length, deltoid, apically acute, hirsute outside, glabrous inside, margin fimbriate to almost lacerate, sometimes glandular. *Disc* cushion-shaped, enclosing the bases of the filaments (deeply inserted) and pistillode (shallowly inserted), about as long as wide (0.7 – 0.8 mm), constricted at the base, glabrous at the sides, whitish pubescent to sparsely pilose apically, hairs 0.2 – 0.3 mm long, extending to the length of the pistillode. *Stamens* 4, 2 – 2.5 mm long, 1.5 – 2 mm long exserted from the calyx, anthers 0.3 – 0.5 × 0.3 – 0.5 mm. *Pistillode* obconical to cylindrical, slightly crateriform apically, c. 0.3 × 0.2 – 0.3 mm, exserted from the sepals, pilose. *Female inflorescences* (4 –)7 – 8 cm long, cauline to terminal, simple, more rarely branched once (consisting of up to 6 racemes in CEL/III 32), axis 1.2 mm wide, spreading-hirsute. *Bracts* narrowly deltoid, 0.7 – 1 × 0.2 – 0.5 mm, spreading-hirsute. *Female flowers* 2 – 3 × 1 – 1.5 mm. *Pedicel* 0.2 – 0.5 mm long, spreading-hirsute. *Calyx* c. 1 × 1.5 – 2 mm, sepals 4 – 5, free to fused for up to $^1/_2$ of their length (then calyx conical), c. 0.5 mm wide, deltoid to semiorbicular, apically acute to rounded, hirsute outside, glabrous inside but long hairs at the base, margin entire to erose, sometimes glandular-fimbriate. *Disc* shorter than the sepals, glabrous or sparsely hirsute. *Ovary* globose to lens-shaped, spreading-hirsute, style lateral to subterminal, thin, very distinct, stigmas 3 – 6, c. 0.5 mm long, not particularly thin. *Infructescences* (4 –)8 – 23 cm long (in CEL/III 32: 2 – 3 cm long), axis 1 – 2 mm wide. *Fruiting pedicel* 1 – 3 mm long, spreading-hirsute. *Fruits* lens-shaped to ellipsoid, often distinctly (2 mm long) beaked, laterally compressed, basally symmetrical to slightly asymmetrical, with a lateral style, 6 – 8 × 4 – 6 mm, spreading-pilose to nearly glabrous, usually conspicuously and coarsely white-pustulate, reticulate when dry. Fig. 4.

DISTRIBUTION. Indonesia: Sulawesi, Lesser Sunda Islands (Sumbawa) and Moluccas (Bacan).

ECOLOGY. In forests in river valleys, often damp, up to 60 m tall, primary to disturbed vegetation; on deep clayey soil derived from granite, coralline limestone and volcanic sand; at 20 – 1150 m.

KEY CHARACTERS. Indumentum of most parts densely spreading-hirsute with long hairs; staminate calyx conical, its lobes fused for about half of their length; staminate disc pubescent on top, glabrous at the sides, extending to the same length as the calyx lobes, constricted at the base; ovaries and fruits compressed parallel to the suture with lateral styles; fruits, and often also other parts of the plant, conspicuously and coarsely white-pustulate.

SIMILAR SPECIES. *A. montanum* differs in its cup- to bowl-shaped staminate calyx with free to halfway fused lobes, its glabrous (or rarely shortly and evenly hairy), flat to hemispherical staminate disc which is shorter than the calyx and never constricted at the base, its glabrous fruits with terminal styles which are not compressed, as well as in the indumentum of the lower leaf surface.

A. velutinosum has longer bracts, free sepals and a glabrous disc in both sexes, a flat to hemispherical staminate disc which is shorter than the calyx and never constricted at the base, more sepals and stamens as well as percurrent, closely spaced secondary veins.

NOTE. This geographically well-defined but morphologically variable species has been collected all over Sulawesi both in staminate and pistillate flower or fruit, respectively. It has no outstanding morphological characters allowing instant recognition but differs consistently in several characters from the two most similar species *A. montanum* and *A. velutinosum.* Staminate and pistillate material is easily matched by the spreading-hirsute indumentum of most plant parts, including the lower leaf surface and the general habit of the plant.

Antidesma riparium *Airy Shaw* subsp. **ramosum** *Petra Hoffm.* **subsp. nov.** a subspecie typica inflorescentiis ramosis brevioribus differt. Typus: Indonesia, New Guinea, Irian Jaya, Vogelkop Peninsula, Aifat river valley, Soererem camp above river, 24 Oct. 1961, *P. van Royen & Sleumer* 7056 (holotypus K!, isotypus L!).

DISTRIBUTION. New Guinea, only known from the type locality.

ECOLOGY. Forest, on bank of river, at 530 m.

KEY CHARACTERS. Differs from *A. riparium* subsp. *riparium* by its branched, shorter inflorescences and its allopatric, more eastern distribution. Fig. 5.

NOTE. Unfortunately this is again based on a single collection, which is in young fruit. This specimen from Irian Jaya corresponds in all but the inflorescence characters with *A. riparium* var. *riparium* which so far has not been collected east of Sulawesi.

NEW COMBINATIONS

A. excavatum *Miq.* var. **indutum** *(Airy Shaw) Petra Hoffm.* **comb. nov.**

A. moluccanum Airy Shaw var. *indutum* Airy Shaw, Kew Bull. 33: 16 (1978), **synon. nov.** Type: NE New Guinea, Morobe Distr., Huon Peninsula, between Masba Creek and Pependango, 3 km S of Pindiu, in tall secondary forest on gentle slope, 840 m, 17 May 1964, *Hoogland* 8977 (holotype K!, isotypes A!, CANB! L!).

A. olivaceum K. Schum. in K. Schum. & Hollrung, Fl. Kais. Wilh. Land: 76 (1889), **synon. nov.** Type: New Guinea, Kaiser Wilhelmsland, Lagerberg der 2. Augusta-

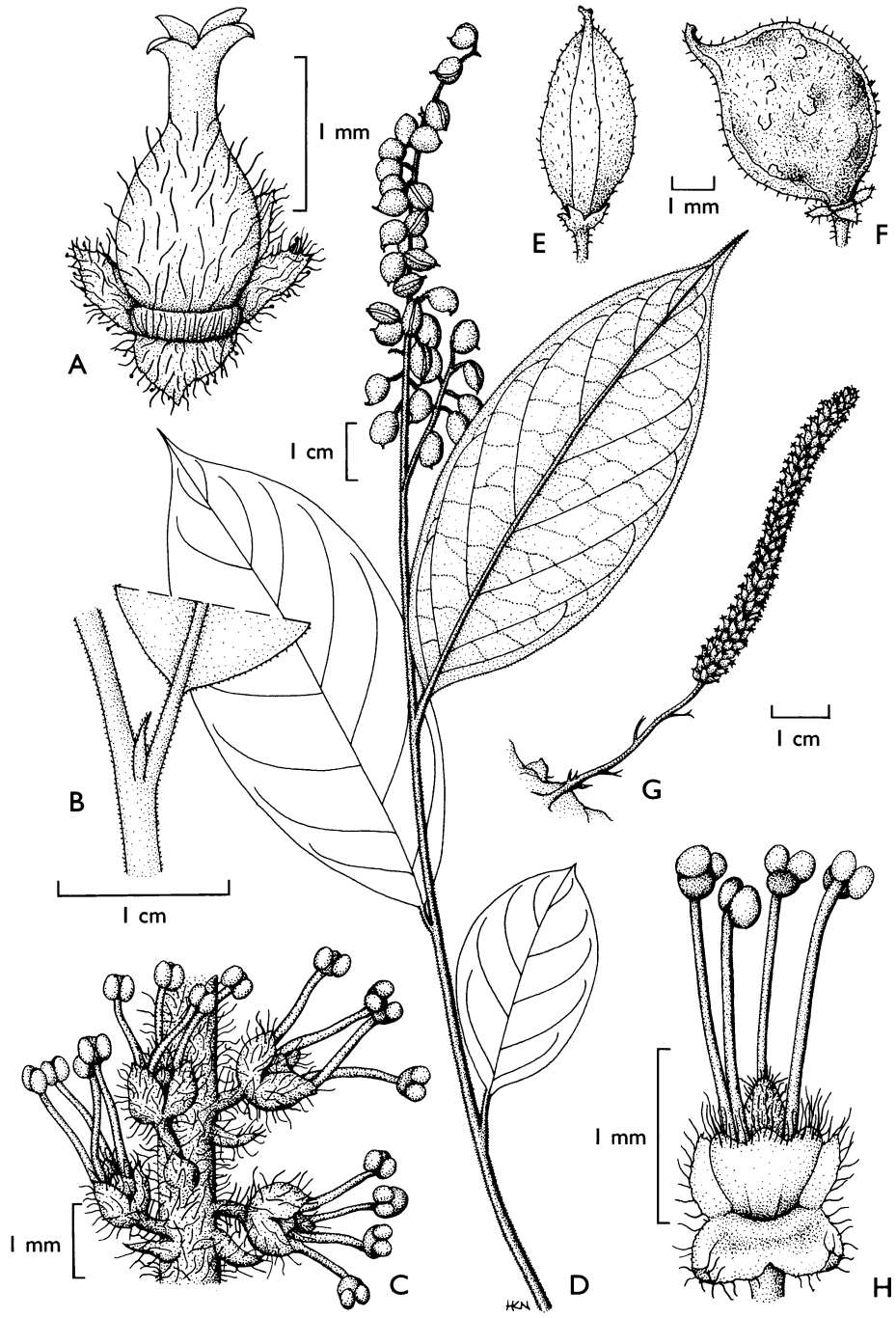

FIG. 4. *Antidesma elbertii*. **A** pistillate flower; **B** part of branch with stipule; **C** part of staminate inflorescence; **D** habit with infructescence; **E** fruit in dorsal view; **F** fruit in lateral view; **G** cauline pistillate inflorescence; **H** staminate flower, calyx partly removed. **A – B & G** from *Coode* 5838; **C & H** from *Elbert* 3139; **D – F** from *Ramlanto & Zainal Fanani* 675. Drawn by Holly Nixon.

Station, *Hollrung* 757 [lectotype (here designated) WRSL!, isolectotypes BO, K!, L!, MEL!, P!].

NOTE. The name *A. excavatum* was treated as a synonym of *A. celebicum* Miq. by Pax & Hoffmann (1922: 129) following the observations of Müller Argoviensis (1866: 256). The type of *A. excavatum* in the Miquel Herbarium in Utrecht has obviously not been consulted by Airy Shaw, and the name *A. excavatum* was not included in his account of the *Euphorbiaceae* of Central Malesia (1982: 5 – 7), nor in that on the *Euphorbiaceae* of New Guinea (1980b: 208 – 219). The type of *A. excavatum*, however, is distinct from *A. celebicum*, and the former taxon is very common and widespread in Eastern Malesia. The name has priority over its many synonyms, including *A. moluccanum* Airy Shaw. There will be 16 synonyms listed under *A. excavatum* in the forthcoming revision (Hoffmann, in prep.), most of them new.

In Airy Shaw's key (1980b: 210) several species are distinguished solely by the indumentum of the lower leaf surface; all these are forms of *A. excavatum*. The distinction cannot be maintained at the specific level, as transitions between glabrous and continuously pubescent lower leaf surfaces can be observed. Plants with a densely pubescent lower leaf surface, found only in New Guinea, the Solomon and Aru Islands, are here recognised as the single variety of *A. excavatum*.

A. montanum *Blume* var. **wallichii** *(Tul.) Petra Hoffm.* **comb. nov.**

A. oblongifolium Blume var. *wallichii* Tul., Ann. Sci. Nat., Bot., Sér. 3: 221 (1851). Type: India or., prope Pavoy [probably meaning Tavoy], fruct., *Wallich* s.n. (holotype CGE!). Synonymised with *A. martabanicum* C. Presl by Pax & Hoffmann (1922: 141) and Airy Shaw (1971: 357).

A. martabanicum C. Presl, Epimel. Bot.: 232 (1849), **synon. nov.** Type: Martabania ad Moulmine, *Helfer* s.n. (holotype PRC!). There is a possible isotype: 'Tenasserim and Andamans, *Herb. Helfer* Kew Distribution No. 4947' at Kew, and a staminate specimen with large stipules labelled: 'India orientalis in Bengalia circa Calcuttam, 1836 – 38, *Helfer* no. 19' in G and BO (ex Prague).

[= *A. oblongum* Wall. mss. ex Hook. f., Fl. Brit. India 5: 364 (1887), *nom. nud.* (*non* (Hutch.) Keay, basionym: *Maesobotrya oblonga* Hutch. 1912)].

NOTE. *Antidesma montanum* is the most common and widespread of all *Antidesma* species. While many names will be subsumed under *A. montanum* in the forthcoming revision (Hoffmann, in prep.), some seem to deserve taxonomic recognition at the level of variety.

Var. *wallichii* is only known from peninsular Burma and Thailand (cf. also Airy Shaw 1971: 357). It is distinguished from the type variety by its larger, broadly ovate, foliaceous stipules and its often more abundantly branched pistillate inflorescences, which tend to be terminally condensed. The variety cannot be identified without stipules.

A. montanum *Blume* var. **microphyllum** *(Hemsl.) Petra Hoffm.* **comb. & stat. nov.**

A. microphyllum Hemsl. in Forbes & Hemsl., J. Linn. Soc., Bot. 26: 432 (1894); Airy

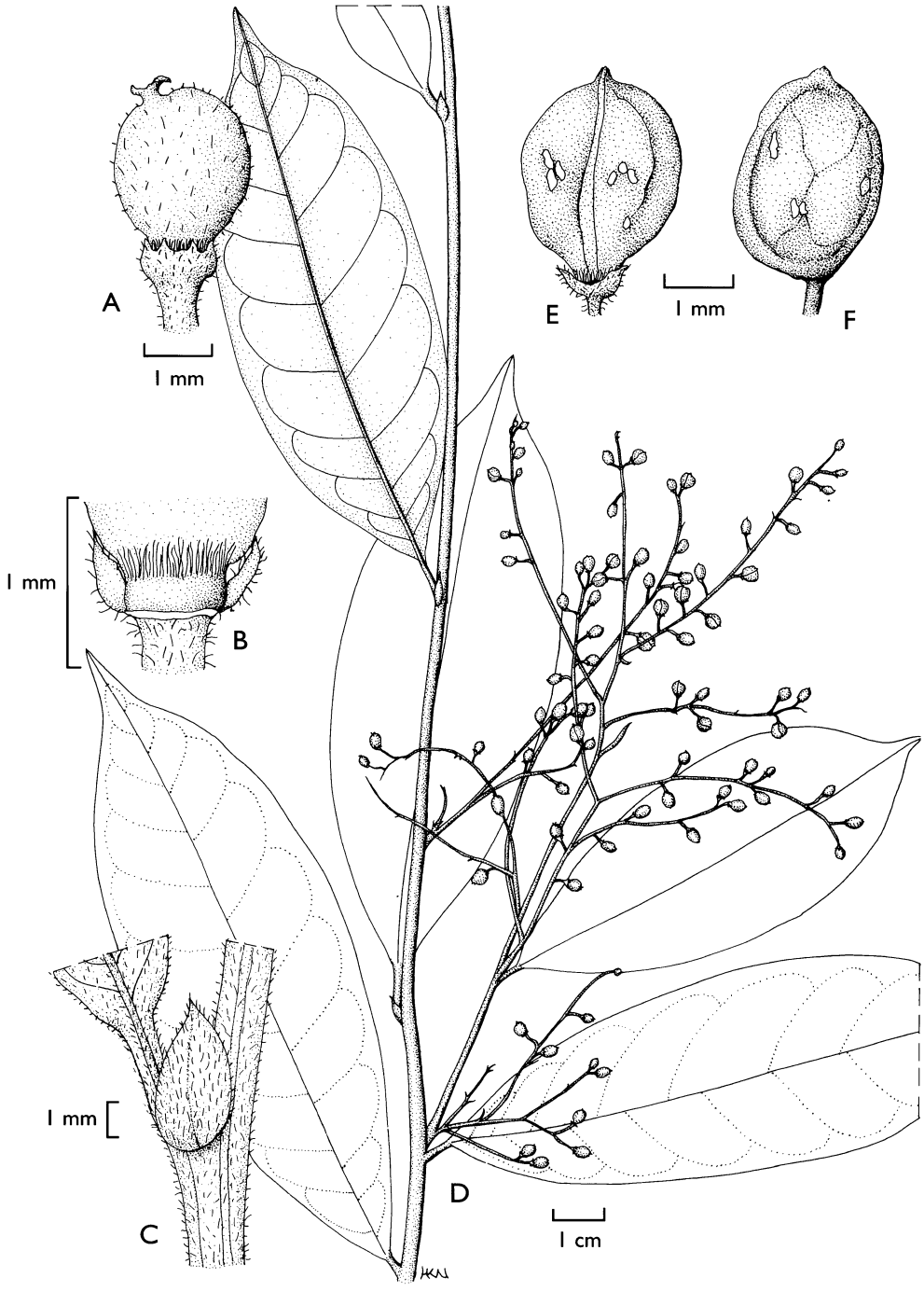

FIG. 5. *Antidesma riparium* subsp. *ramosum*. **A** very young fruit; **B** disc, calyx partly removed; **C** part of branch with stipule; **D** habit with young infructescence; **E** fruit in dorsal view; **F** fruit in lateral view. From *P. van Royen & Sleumer* 7056. Drawn by Holly Nixon.

Shaw, Kew Bull. 28: 276 (1973). Type: China, Szechuan, Hokiang, *Faber* 97 (K!, NY!).

A. wattii Hook. f., Fl. Brit. India 5: 366 (1887), **synon. nov.** Type: Munipur, *Watt* s.n. (K!, CAL). The type at Kew bears the name *A. wattii* in Hooker's handwriting and drawings of the flowers by his hand. Type in CAL *fide* Mandal & Panigrahi (1983: 256).

A. seguinii H. Lév., Repert. Spec. Nov. Regni Veg. 9: 460 (1911), 'seguini'. Syntypes: China, Kouy-Tchéou [Guizhou], Distr. de Tchen-Lin, bords du fleuve à la cascade de Hoang-Ko-Chan, 10 juin 1898, *Séguin* s.n. (E); fleuve Hoa-Kiang, juin 1905, *Esquirol* 505 (E, K!); Tchai-Choui-Ho, juill. 1909, *Esquirol* 1586 (A!, E, K!). Synon. nov. in Airy Shaw (1971: 357).

A. pseudomicrophyllum Croizat, J. Arnold Arbor. 21: 496 (1940), **synon. nov.** Type: Hainan, Po-ting, in forest, Nov. 1936, *S. K. Lau* 28228 (holotype A!). The type and only collection is a poor specimen with one detached fruit. Croizat wrote in the protologue: '...the difference [from *A. microphyllum*] being that in Hemsley's species the primary veins are distinctly ascending, while in the new species they are very broadly spreading, the anastomoses being arranged subparallel with the margins of the leaf'. Li Ping-T'ao (1994: 53) maintained this species and keyed it out against *A. microphyllum* on account of this character as well as leaf shape and indumentum, which in my view are indistinguishable in *A. microphyllum* and *A. pseudomicrophyllum*. The course of the lateral veins does not justify specific distinction, as it is variable in the examined material and depends much on the width of the leaves. All other characters correspond perfectly with *A. microphyllum*.

NOTE. Var. *microphyllum* is a very small-leafed rheophytic variety of *A. montanum*. It differs only slightly from var. *salicinum* (see below), mainly in leaf size and shape, and may have to be subsumed under this variety when the genus is revised for India, China, Burma, Laos and Vietnam.

A. montanum *Blume* var. **salicinum** *(Ridl.) Petra Hoffm.* **comb. & stat. nov.**

A. salicinum Ridl., Fl. Malay Penins. 3: 228 (1924); Airy Shaw, Kew Bull. 28: 276 (1973), **synon. nov.** Type: Peninsular Malaysia, Kelantan, Kelantan R., *Ridley* s.n. [lectotype (here designated) K!]. Original Syntypes: Pahang, Kuala Lipis, *Machado* 11556 (K!); Perak, Plus R., *Wray* 546 (K!, SING!); Dindings, Bruas, *Burn-Murdoch* 261 (K!). Ridley mixed habitat information with specimen citation and did not cite collection numbers in his protologues which makes it somewhat difficult to identify the most suitable specimen for lectotypification. The *Wray* specimen is annotated as '*Antidesma moritzii*, Muell, var? *salicifolia*, Hemsl., but although duplicated in SING, it does not bear Ridley's handwriting. The *Ridley* specimen bears the genus name and the collection data in Ridley's handwriting, but '*salicifolium* Miq.' may have been added in another hand. Ridley stated at the end of the protologue of *A. salicinum* why in his opinion *A. salicifolium* Miq. from Sumatra (which in fact is a synonym of *A. neurocarpum* Miq.) is distinct from his new species. The two remaining syntypes are of poor quality.

NOTE. *A. salicinum* was described only because it has lanceolate leaves as opposed to the elliptic leaves of *A. montanum*. In the following paragraph, however, Ridley described *A. salicinum* var. *latius* with wider leaves. Airy Shaw (1973: 276) called *A. salicinum* 'the stenophyllous extreme of the *A. montanum* Bl. complex' and *A. salicinum* var. *latius* 'an almost perfect link between the two' (i.e. *A. salicinum* and *A. montanum*). There are no qualitative differences in the generative parts between the types of the names concerned. *A. salicinum* is here considered to be but a rheophytic variety of *A. montanum*, occurring mainly in the Malay Peninsula but also in Bangladesh, Borneo, Sumatra and Vietnam.

A. neurocarpum *Miq.* var. **hosei** *(Pax & K. Hoffm.) Petra Hoffm.* **comb. & stat. nov.**

A. hosei Pax & K. Hoffm. in Engl., Pflanzenr. 81: 138 (1922), **synon. nov.** Type: Borneo, Sarawak, Baram Distr., Miri R., *Hose* 549 [lectotype (here designated) K!, isolectotypes BM!, E!, L!].

A. plumbeum Pax & K. Hoffm. in Engl., Pflanzenr. 81: 133 (1922). Type: Borneo, Sarawak, Kutcin [Kuching], *Beccari* PB 154 [lectotype (here designated) K!, isolectotype P!].

A. hosei Pax & K. Hoffm. var. *microcarpum* Airy Shaw, Kew Bull. 28: 271 (1973), **synon. nov.** Type: Borneo, Sarawak, *Anderson* S 20204 (holotype K!, isotypes L!, SAR!).

A. neurocarpum Miq. var. *angustatum* Airy Shaw, Kew Bull. 28: 270 (1973). Type: Sarawak, 3rd Division, Bukit Raya, Kapit, shale ridge, mixed dipterocarp forest, alt. 400 m, 13 Nov. 1964, *Suib* S 22269 (holotype K!, isotypes A!, L!, SAR!).

A. hosei Pax & K. Hoffm. var. *angustatum* (Airy Shaw) Airy Shaw, Kew Bull., Addit. Ser. 4: 212 (1975), **synon. nov.** (type as above). This variety was described for its narrow leaves (4.6 to 5.8 times longer than wide), based on a specimen with ventrally and dorsally compressed fruits (therefore in *A. neurocarpum*). It was later transferred to *A. hosei* because of its small stipules.

NOTE. Both *A. neurocarpum* and *A. hosei* are well-established names in Borneo and some may feel that it is not justifiable to reduce this taxon in rank. However, while the typical representatives of both taxa are usually easy to tell apart, all possible states of transition and combinations of character states exist between the two. Airy Shaw (1973: 272) himself stated that 'The dividing line between the *A. hosei* complex and the closely related *A. neurocarpum* Miq. is also sometimes by no means clear.' In the circumscription adopted here, var. *hosei* differs from the type variety in the narrower and thicker, falcate stipules, more coriaceous leaves, weaker rufous indumentum, often pedicellate staminate flowers and less hairy calyx lobes.

A. neurocarpum *Miq.* var. **linearifolium** *(Pax & K. Hoffm.) Petra Hoffm.* **comb. & stat. nov.**

A. linearifolium Pax & K. Hoffm. in Engl., Pflanzenr. 81: 130 (1922); Airy Shaw, Kew Bull. 28: 275 (1973), **synon. nov.** Type: Borneo, Sarawak, *Beccari* PB 3831 [lectotype (here designated) K!].

NOTE. Like *A. montanum* var. *salicinum* and var. *microphyllum*, this is a rheophytic form of a well-known and widespread species, this time *A. neurocarpum*. It occurs in the northern part of Borneo and differs from the type variety only in its narrower leaves and often shorter petioles, inflorescences, pedicels and fruits; it differs from var. *hosei* also by its foliaceous stipules. Airy Shaw (1973: 275) discussed the similarities of *A. linearifolium* and *A. neurocarpum*, but maintained the former as a species.

A. tomentosum *Blume* var. **stenocarpum** *(Airy Shaw) Petra Hoffm.* **comb. & stat. nov.**

A. stenocarpum Airy Shaw, Kew Bull. 23: 281 (1969), **synon. nov.** Type: Borneo, Sarawak, 3rd Division, Upper Rejang R., Belaga, Nov. 1892, *Haviland* 2186 (holotype K!).

A. leptodictyum Airy Shaw, Kew Bull. 36: 635 (1981), **synon. nov.** Type: Borneo, Sabah, Ranau Distr., ab. 13 km from Kampong Merungin, 2 – 30 m, 12 Nov. 1975, *Leopold & Saikeh* SAN 82444 (holotype K!, isotype L!). The type and the only other collection of this variety from Sabah, *Meijer* SAN 129649, differ from the specimens from Sarawak in their more reticulate, less percurrent tertiary venation and the basally convex leaf margin. However, the total number of collections of this taxon is too small to be certain of the stability of these characters, and the differences are too subtle to recognise two distinct rheophytic varieties of *A. tomentosum*.

NOTE. This is yet another rheophytic variety of a common *Antidesma* species. Airy Shaw (1973: 275) also discussed the close affinity of *A. stenocarpum* and *A. tomentosum*, but continued to regard the former as a good species. *A. stenophyllum* Merr., which he considered to be related to *A. stenocarpum* and therefore equally close to *A. tomentosum*, is clearly a narrow-leafed form of *A. pendulum* Hook. f. and will be subsumed under this name in the forthcoming revision (Hoffmann, in prep.).

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