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A REVISION OF ALECTRYON (SAPINDACEAE) IN MALESIA

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SUMMARY

The genus *Alectryon* occurs with some 30 species in E. Malesia, Australia, New Zealand, New Caledonia, the New Hebrides, the Solomon Islands, Fiji, Samoa, and the Sandwich Islands. Radlkofer (in Engl., Pflanzenr. 98, 1933: 983–1002) divided the genus into six sections. As a whole these sections are mostly well recognisable, but a clear demarcation between at least some of them appears impossible. Preference is given here to a division into three or four subgenera, which seems more justified. As Mr. George K. Linney, Honolulu, is working on the Pacific representatives of this genus and as Ms. S.T. Reynolds, Brisbane, recently completed a revision of the Australian species, I restricted myself in the present paper to the Malesian taxa.

ALECTRYON

Alectryon Gaertn., Fruct. Sem. Pl. 1 (1788) 216, pl. 46; Radlk. in Engl., Pflanzenr. 98 (1933) 983; S.T. Reynolds, Austrobaileya 1 (1982) 472; op. cit. 2 (1987) 332. — T y p e: *A. excelsus* Gaertn.

Heterodendrum Desf., Mém. Mus. Hist. Nat. Paris 4 (1818) 8, pl. 3; Radlk. in Engl., Pflanzenr. 98 (1933) 1005 (*'Heterodendron'*); S.T. Reynolds, Austrobaileya 1 (1982) 481. — T y p e: *H. oleifolium* Desf. = *A. oleifolium* (Desf.) S.T. Reynolds.

Spanoghea Blume, Rumphia 3 (1847) 172. — L e c t o t y p e (S.T. Reynolds, 1982): *S. ferruginea* Blume = *A. ferrugineus* (Blume) Radlk.

Mahoe Hillebr., Fl. Hawaiian Isl. (1888) 86. — N e o t y p e (Radlkofer, 1890): *A. macrococcus* Radlk.

Trees or shrubs. *Indumentum* consisting of solitary simple hairs; no glandular scales. *Branchlets* terete. *Leaves* paripinnate, with 1–8 leaflets per side; true stipules absent but the lowermost pair of leaflets sometimes stipule-like; neither petiole nor rachis winged. *Leaflets* opposite or more rarely alternate, variably hairy to sometimes glabrous, lower side smooth; the base often oblique, then usually in the lower leaflets the acroscopic side, in the upper ones the basiscopic side stronger developed; margin entire or serrate, dentate, or crenate; nerves ending free or the upper ones looped and joined. *Inflorescences* axillary, rarely together pseudo-terminal, exceptionally ramiflorous; mostly a thyrsus or panicle, sometimes a raceme. *Flowers* unisexual or sometimes possibly bisexual, at least sometimes monoecious; actinomorphic. *Calyx* 4- or 5-, rarely 6-merous, from somewhat less than halfway to nearly completely connate, all sepals equal, hardly or not petaloid, hairy on both

sides or inside sometimes glabrous. *Petals* 4 or 5, about as long as to shorter than the calyx, short-clawed, with 2 scales without a crest, outside glabrous, margin ciliolate, inside hairy or glabrous; often absent. *Disk* complete, annular or ± lobed, without appendages, glabrous. *Stamens* (5–)8, exserted in male flowers; filament variably hairy or glabrous; anther basifixed, the base mostly deeply cleft, mostly glabrous, dehiscence latrorse or latro-introrse length-wise. *Pistil* sessile or short-stalked, densely hairy; ovary (1–)2–4(–5)-locular; style apical, columnar, mostly shorter than the ovary; stigma grooved or with recoiled lobes. *Ovules* 1 per locule, axillary near the base, erect, campylotropous, apotropous. *Fruits* sessile or short-stalked, 1- or more-lobed, capsular, dehiscing either with a loculicidal calyptra or septicidal, smooth or slightly warty, hairy or finally glabrous, inside glabrous or sometimes hairy. *Seed* black, partly covered by a red sarcotesta.

Distribution. See above under the introduction.

Ecology. Medium-sized to small trees or shrubs, often from monsoon forest, from forest edges, river banks, or coastal vegetations, often on limestone, mainly in the lowland but sometimes also montane. The seeds, with the contrasts of light yellowish-greenish capsules, the red sarcotesta, and the shining black testa, are probably mainly dispersed by birds.

Uses. Some species are good timber trees.

Note. *Alectryon* seems rather close to *Stadmannia* (incl. *Smelophyllum*) from the Mascarene Is., Madagascar, and SE. and S. Africa.

KEY TO THE SPECIES

1a. Ovary 3–5-locular; fruits half-globular, slightly lobed, septifragally dehiscent; seeds with a small sarcotesta around the hilum and the basal half enclosed by a cupular arilloid. (A. Subg. *Synalectryon*) 2
b. Ovary 1- or 2-, exceptionally in some flowers 3-locular; fruits with ± spreading lobes, dehiscent by an irregular calyptra; seeds for the greater part covered by a sarcotesta with only a narrow, lobed, free margin. (B. Subg. *Alectryon*) . . . 4
2a. Leaflets subglabrous . . . . . **3. A. kangeanensis**
b. Leaflets at least beneath on the midrib densely tomentellous 3
3a. Leaflets ± acuminate; nerves not distinctly connected; fruit wall hard, inside glabrous . . . . . **1. A. affinis**
b. Leaflets broadly rounded to slightly emarginate; nerves looped and joined; fruit wall pergamentaceous, inside hairy . . . . . **2. A. connatus**
4a. Lowermost pair of leaflets stipule-like: attached near the base and much smaller than the others . . . . . **9. A. repandodentatus**
b. Lowermost pair of leaflets not stipule-like 5
5a. Pistil 1-merous . . . . . **10. A. reticulatus**
b. Pistil 2- or 3-merous 6
6a. Leaflets entire; fruits: mostly only 1 lobe developed, 12.5–15 mm diam., the wall corky, c. 1.5–2 mm thick; seeds with a smooth sarcotesta 7
b. Leaflets nearly always incised; often 2 fruit lobes developed, these c. 8–10 mm diam., the wall woody, 0.5–1 mm thick; seeds with a papillose sarcotesta . . 8

7a. Leaflets with a fairly long, slender, and acute acumen; midrib above prominulous; branchlets hollow, inhabited by ants ..... **5. A. myrmecophilus**
b. Leaflets rounded at apex; midrib above slightly sunken; branchlets solid, without ants ..... **4. A. fuscus**
8a. Twigs strongly 5-grooved, 4–20 mm thick; petiole halfway 2.5–8 mm thick; leaflets up to 45 × 17 cm ..... **7. A. ferrugineus**
b. Twigs terete to slightly grooved, up to 5 mm thick; petiole halfway up to 2.5 mm thick; leaflets up to 16.5 × 6 cm 9
9a. Margin of leaflets mostly only in the upper half with some spaced teeth; fruits not or only slightly cordate ..... **8. A. glaber**
b. Margin of leaflets nearly from the base rather densely serrate-dentate; fruits deeply cordate ..... **6. A. cardiocarpus**

A. Subgenus **Synalectryon** (Radlk.) Leenh., *nov. stat.*

Alectryon sect. *Synalectryon* Radlk., Sapind. Holl.-Ind. (1879) 93. — L e c t o t y p e (present author): *A. connatus* (F. Muell.) Radlk.

Twigs tomentellous, glabrescent; branchlets black or grey, glabrous. *Petiole* semiterete; rachis above flat, ± carinate; leaf axes tomentellous, glabrescent or not. *Leaflets* pergamentaceous, entire. *Inflorescences* axillary, a thyrsus, hairy, sparsely branched. *Calyx* 5-merous, connate for halfway or more, hairy on both sides. *Petals* 5, the plate rounded, ciliolate, scale woolly; corolla in male flowers sometimes absent. *Disk* especially in male flowers sometimes hardly developed. *Stamens* in male flowers 8 (always?), in female flowers sometimes less, glabrous. *Pistil* 3–5-merous; stigma grooved. *Fruits* short-stalked, half-globular, slightly lobed, the base slightly hollowed, the apex apiculate, dehiscence septifragal with cupular valves, wall either pergamentaceous or hard, inside glabrous or hairy. *Seeds* with a sarcotesta around the hilum and the basal half enveloped by the cupshaped arilloid.

D i s t r i b u t i o n. Apart from the three Malesian species two more species belong to this subgenus, viz. *A. coriaceus* (Benth.) Radlk. and *A. subcinereus* (A. Gray) Radlk., both from Queensland and New South Wales.*

1. **Alectryon affinis** Radlk.

Alectryon affinis Radlk. in Engl. & Prantl, Nat. Pflanzenfam. Nachtr. 3 (1907) 205; in Engl., Pflanzenr. 98 (1933) 1001. — L e c t o t y p e (present author): *W. Fitzgerald 30*, SE. New Guinea, Mulawa, 1895, fr. (M).

Shrub or treelet. *Twigs* grooved, 2.5 mm thick. *Leaves* 1–3-jugate; petiole 3–7.5 cm long, c. 1.5 mm thick; petiolules 2–4 mm long, above broadly grooved or flat. *Leaflets* opposite to sometimes alternate, 7–16 × 2.5–8 cm, 2–3.5 times as long as wide, widest in or slightly below the middle, above glabrous, beneath fairly densely short-hairy on midrib and nerves, in between sparsely appressed short-hairy to

* S.T. Reynolds, Austrobaileya 2 (1987) 337, divided *A. coriaceus* into two closely allied species, *A. coriaceus* and *A. semicinereus* (F. Muell.) Radlk.

Fig. 1. *Alectryon connatus* (F. Muell.) Radlk. a. Habit of a fruit bearing twig, × 0.5; b. & c. partly dehiscent fruit, × 2 (a. *R. Pullen 6895;* b. & c. *Byrnes & Clarkson 3622*).

glabrous; base equalsided or in upper leaflets the basiscopic side slightly more developed, acute to blunt, slightly attenuate; apex hardly to slightly acuminate, the acumen broad, rounded at the tip; midrib above flat to prominulous, nerves 0.5–1 cm distant, curved, ending free or the upper ones ± looped and joined near the margin, prominulous on both sides, intercalated veins few, veins and veinlets minutely reticulate, prominulous on both sides, veinlets beneath often inconspicuous. *Inflorescences* up to 16 cm long, sparsely hairy, peduncle 1–3.5 cm long, branches few, up to 4 cm long but mostly much shorter, cymules short-stalked, several-flowered, pedicels c. 2–5 mm long. *Calyx* 1 mm high. *Petals* 0.8 mm, on both sides glabrous. *Stamens* probably 7 or 8, filament 0.8 mm, anther 1.5 mm. *Fruits* 1 × 1.25 cm, slightly warty, outside very sparsely hairy to glabrous, inside glabrous, the wall hard, c. 0.5 mm thick.

Field notes. Tree c. 7.5 m tall, or erect shrub with spreading often pendulous branches c. 3 m high. Outer bark grey, shallowly fissured, inner bark red. Leaves green above, pale glaucous below. Flowers white to yellowish. Fruits yellowish-brown.

Distribution. SE. New Guinea (Central Prov., near Port Moresby).

Ecology. Rather dry forest on rocky slope at c. 570 m alt. Fl. and fr. Sept.

Specimens studied:
NEW GUINEA. Southeast: *Fitzgerald 23*, Dogura (M); *28*, Yampota (M); *30*, Mulawa (M); *Hartley 10716*, tributary of Laloki R. 2 miles E of Rouna, 147° 19' E, 9° 25' S (L).

2. Alectryon connatus (F. Muell.) Radlk. – Fig. 1.

Spanoghea connata F. Muell., Trans. Philos. Inst. Victoria 3 (1859) 26. — *Alectryon connatus* (F. Muell.) Radlk., Sitzungsber. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. München 8 (1878) 340; in Engl., Pflanzenr. 98 (1933) 1000; S.T. Reynolds, Austrobaileya 1 (1982) 473, fig. 37C. — Type: *Hill & Mueller*, Queensland, in wooded valleys near Moreton Bay (MEL sh. nr. 1535971).

Tree or sometimes shrub. *Twigs* grooved, 1.5–4 mm thick. *Leaves* 1–3-jugate; petiole 1–4.5 cm long, strongly flattened as is the rachis; petiolules 0(–3) mm long, above broad and flat. *Leaflets* opposite to alternate, 4.5–12.5 × 1.75–5 cm, 1.5–3 times as long as wide, widest in or exceptionally above the middle, above glabrous or sparsely hairy on midrib, nerves, and veins, beneath at first hairy all over, glabrescent, mostly with the exception of midrib and nerves; base equalsided to oblique, then the basiscopic side broadest, acute to blunt, attenuate or not; apex rounded to slightly emarginate; midrib above angular to rounded, nerves 0.75–1 cm distant, nearly straight, lower ones ending free, upper ones looped and joined near the margin, prominulous on both sides, intercalated veins often strongly developed, veins rather laxly reticulate, veinlets beneath densely reticulate. *Inflorescences* 6–12 cm long, fairly densely hairy, peduncle 1.5–3 cm long, pedicels c. 1 mm long. *Calyx* c. 1 mm high. *Petals* 0.5–1 mm, inside with some woolly hairs; in male flowers sometimes absent. *Stamens* in male flowers 8, in female flowers 5, filament up to 1.5 mm, anther 1.5 mm. *Fruits* 0.5–0.8 × 1–1.2 cm, outside sparsely tomentellous, inside sparsely woolly, the wall thin-pergamentaceous.

Field notes. Tree up to 20 m high by 20 cm d.b.h. Outer bark greyish, ± irregularly flaky, becoming smooth; under bark green; inner bark pale reddish brown with fine cream concentric bands; wood pinkish cream. Leaves above light to dark glossy green, beneath ± glaucous. Fruits green to yellow, tinged with red; aril red, seeds black.

Distribution. Australia (Queensland) and SE. New Guinea (Central Prov., nar Port Moresby).

Ecology. Low monsoon scrub in the lowlands. Fr. mainly April–July.

Malesian specimens studied:
NEW GUINEA. Southeast: *Pullen 6895*, Central Prov., Tavai Creek, along Rigo Rd. c. 44 miles SE of Port Moresby.

3. Alectryon kangeanensis Leenh.

Alectryon kangeanensis Leenh., Blumea 32 (1987) 222. — Type: *C.A. Backer 29552*, Kangean Archipelago, Is. of Paliat, 5-v-1919, fl. fr. (L; iso in BRI, K, SING, U, UC).

Twigs grooved, 3.5–4.5 mm thick. *Leaves* 1–3-jugate; petiole 1–5 cm long, strongly flattened as is the rachis; petiolules 0–2 mm long, above broad and flat.

Leaflets opposite to alternate, 8–15 × 2.5–5 cm, 2.5–4 times as long as wide, widest below to about or sometimes above the middle, glaucous below, on both sides mostly with some scattered hairs on the midrib; base equalsided to slightly oblique, acute; apex narrowly rounded; midrib above angular, nerves 0.5–1.5 cm distant, slightly curved, all or the lower ones excepted looped and joined near the margin, above hardly, beneath distinctly prominent, intercalated veins often well developed, veinlets densely reticulate but on both sides hardly visible. *Inflorescences* 10–15 cm long, fairly densely hairy, peduncle 2–6 cm long, pedicels c. 3 mm long. *Calyx* c. 1 mm high. *Petals* 0.5 mm, scale densely hairy. *Stamens:* filament in male flowers 2 mm long; anther 1.5 mm long, dehiscence latrorse. *Fruits* 0.75 × 1 cm, outside sparsely tomentellous, inside glabrous, the wall pergamentaceous.

Distribution. Kangean Archipelago; known from the type only.

Ecology. Altitude 50 m. Fl. and young fr. in May.

Note. The present species resembles fairly strongly *A. coriaceus* (Benth.) Radlk. from NE. Australia.

B. Subgenus **Alectryon**

Twigs variably hairy, mostly ± glabrescent; branchlets grey to black, sometimes brown, glabrous or sometimes hairy. *Petiole* terete to semiterete or sometimes triangular in cross section; rachis mostly terete, often angular above, sometimes flat and strongly ribbed, or triangular in cross section; leaf axes hairy or sometimes glabrous. *Leaflets* mostly variably pergamentaceous, sometimes either herbaceous or papyraceous or thin-coriaceous; margin mostly serrate, dentate, or crenate at least in the upper half, rarely entire. *Inflorescences* axillary or exceptionally ramiflorous, a usually sparsely branched panicle or thyrsus, sometimes a raceme, densely hairy to sometimes nearly glabrous. *Calyx* 4- or 5-, rarely 6-merous, the sepals from somewhat less than halfway to nearly completely connate, hairy on both sides or on the outside only. *Corolla* exceptionally present, isomerous, plate of petals kidney-shaped, inside woolly. *Stamens* 5–8; filament variably hairy or sometimes glabrous; anther glabrous or sometimes sparsely ciliate. *Pistil* 2-, rarely 1-, exceptionally in some flowers 3-merous; stigma lobed or sometimes grooved. *Fruits* sessile, lobed, the ± spreading lobes often slightly carinate and shouldered, the wall woody or corky, dehiscence with an irregular calyptra. *Seeds* from around the hilum till near the apex with a narrow to mostly very broad strip of mostly strongly papillose sarcotesta with a lobed free margin.

Distribution. Like the genus with the exception of the Solomon Is., Fiji, Samoa, and the Sandwich Is.; about 20 species.

4. **Alectryon fuscus** Radlk.

Alectryon fuscus Radlk., Philipp. J. Sci. 8 (1914) Bot. 461; in Engl., Pflanzenr. 98 (1933) 999. — Type: *G.P. Ahern 747*, Philippines, Luzon, Prov. of Bataan, Mariveles, -i-1902, fr. (M; iso in BO, NY).

Tree? *Twigs* terete, 2.5–4 mm thick, blackish. *Leaves* 2–4-jugate; petiole semiterete, 2.5–5 cm long, 2 mm thick; petiolules 3–5 mm long, above grooved; axes glabrous or petiole and rachis puberulous, especially above. *Leaflets* (sub)opposite, 6.5–12 × 3–4 cm, 2–3.5 times as long as wide, widest about to slightly below the middle, pergamentaceous; glabrous or beneath on the base of the midrib with some hairs; base equalsided, blunt to acute; margin entire; apex rounded; midrib slightly grooved above; nerves 0.75–1 cm distant, patent, curved, mainly ending free, above inconspicuous, beneath prominulous; intercalated veins variably developed, veins and veinlets finely reticulate, prominulous on both sides. *Inflorescences* axillary, together pseudoterminal, widely branched thyrses, 10 cm long, puberulous. *Flowers* unknown. *Stigma* with 2 spreading lobes. *Fruits* 2-merous but mostly only 1 lobe developed, lobes nearly globular, c. 15 × 12.5 mm, fulvous-tomentellous, glabrescent, smooth; wall corky, c. 1.5 mm thick. *Seeds:* aril smooth.

Distribution. The Philippines (Luzon).

Ecology. In thickets and forests at low altitude. Fr. Jan. (ripe?).

Specimens studied:

PHILIPPINES. Luzon: *Ahern 747*, Prov. of Bataan, Mariveles (BO, M, NY); *Paraiso FB 25472*, Prov. Ilocos Sur (K).

5. Alectryon myrmecophilus Leenh.

Alectryon myrmecophilus Leenh., Blumea 32 (1987) 223. — Type: *L.J. Brass 29489*, NE. New Guinea, Morobe Prov., Gurakor, 9-v-1959, fr. (L).

Tree. *Twigs* deeply grooved, up to c. 8 mm thick, fairly densely to sparsely hairy, glabrescent, branchlets redbrown to black. *Leaves* 2–4-jugate; petiole semiterete to terete, 6–11 cm long, 2–2.5 mm thick; petiolules 3–10 mm long, above hollowed; axes fairly densely tomentellous, especially on the upper side of petiole and rachis, glabrescent. *Leaflets* subopposite to alternate, 7.5–20 × 3.5–7 cm, 2–3 times as long as wide, widest in the middle, papyraceous to pergamentaceous; glabrous or beneath slightly puberulous on midrib and nerves; base equalsided, acute to rounded, slightly attenuate; margin entire; apex tapering into a rather long and slender acute acumen; midrib above slightly raised; nerves 1–1.5 cm distant, spreading, curved, ending free, above slightly sunken, beneath prominent; intercalated veins exceptional, veins mainly transverse, veinlets laxly reticulate, rather inconspicuous. *Inflorescences* axillary, a widely branched thyrsus up to c. 25 cm long, branched from the base with up to c. 10 cm long obliquely patent branches, the flowers in stalked rather many-flowered cymules, fairly densely minutely hairy. *Calyx* 0.8 mm high, somewhat less than halfway connate, inside glabrous or sericeous. *Petals* if present 5, unguiculate, the plate (probably including scale) kidney-shaped, 0.5 × 0.7 mm, outside glabrous, inside woolly. *Stamens:* filament short, anther 1 mm long. *Pistil* 2- or rarely 3-merous. *Fruits* mostly only one lobe developed, obovoid-globular, 16 × 14 mm, slightly carinate towards the style remnant, furthermore smooth, densely ferruginous-tomentellous, the wall corky, c. 2 mm thick. *Seeds:* aril smooth.

Field notes. Tree up to 18 m high by 30 cm d.b.h. Bark dark brown or grey green, smooth; inner bark 3 mm thick, deep straw; wood white. Branches inhabited by ants. Petiole and petiolules dark brown, leaflets dark green. Flowers white.

Distribution. Moluccas (Kai Is.) and NE. New Guinea (Morobe Prov.).

Ecology. On river banks in forest at c. 650–1000 m alt. Fl. June, Dec.; fr. Sept.

Note. The collection *Jaheri 445* from the Kai Is. probably belongs to this species. It differs in the following characters: leaflets widest below the middle, the base slightly oblique, midrib above slightly sunken, nerves c. 0.75 cm distant, the fruit lobes 20 × 15 mm, fulvous tomentellous, the wall 4 mm thick.

NEW GUINEA. Northeast, Morobe Prov.: *Brass 29489*, Gurakor; *NGF 4077, 5279, 7406, 7420*, Bulolo; *45253*, Lae-Mumeng Rd., 6° 55' S, 146° 35' E.

6. Alectryon cardiocarpus Leenh.

Alectryon cardiocarpus Leenh., Blumea 32 (1987) 221. — Type: *C. Versteegh BW 4804*, NW. New Guinea, Hamadi near Hollandia, 10-viii-1957, fr. (L; iso in BO).
Alectryon reticulatus auct. non Radlk.: Rehder, J. Arnold Arbor. 14 (1933) 63.

Tree. *Twigs* terete, 4–5 mm thick, glabrescent. *Leaves* 3–5-jugate; petiole slightly flattened above, 6–7.5 cm long, 1.5–2.5 mm thick; petiolules 4–10 mm long, above broad and flat with midrib raised; axes hairy, glabrescent. *Leaflets* (sub) opposite, 6.5–16.5 × 2.5–6 cm, 2–3.25 times as long as wide, widest about to below the middle, stiff-pergamentaceous; either glabrous, or sparsely hairy on both sides of the midrib, sometimes also with a few hairs on the nerves beneath; base hardly to very oblique, the acroscopic side broader and/or lower attached than the basiscopic side, rounded to acute, slightly attenuate or not; margin serrate-dentate from near the base; apex acute, mucronate; midrib above prominulous; nerves c. 1–1.5 cm distant, obliquely patent, slightly curved, ending in marginal teeth, prominulous on both sides; intercalated veins hardly developed, veins and veinlets laxly reticulate. *Inflorescences* axillary, panicles, up to c. 6 cm long, with few obliquely patent to patent, up to 6 cm long branches, rather many-flowered, densely hairy, the peduncle c. 5 mm long, the pedicels very short. *Calyx* 1–1.2 mm high, nearly completely connate, inside sparsely hairy mainly at the base. *Corolla* absent. *Stamens:* filament 0.8–1.75 mm long, anther 1.25 mm long. *Pistil* 2-merous, stigma apparently grooved. *Fruits* 2-lobed, deeply cordate especially when young, smooth, the lobes globular, c. 8 mm in diam., densely fulvous-tomentellous, the wall c. 0.5 mm thick.

Field notes. Tree up to 11 m by 20 cm d.b.h. Bark moderately smooth, conspicuously patchy grey, green, fawn and/or brown or brown with white patches; inner bark cream; blaze pinky brown, rather watery next to the sapwood; wood straw to white. Leaflets above glossy light green, below pale green. Flowers pink to orange brown. Fruits greenish brown, seeds black with a dark red aril.

Distribution. New Guinea.

Ecology. In monsoon scrub and secondary forest, on coastal limestone rock, river banks, and slopes, from sea level to 40 m alt. Fl. May–June; fr. Aug.

N o t e. The present species is doubtless close to *A. ferrugineus;* it differs primarily by the small deeply cordate fruits. Furthermore, as a whole *A. ferrugineus* is far more coarse and more hairy, and the hairs are ferruginous, whereas in *A. cardiocarpus* they are rather fulvous.

S p e c i m e n s s t u d i e d:

NEW GUINEA. Northwest: *BW 4804*, Hamadi near Hollandia. — Southeast, Central Prov.: *Brass 1618*, Bongwina R.; *LAE 70407*, Subdist. Abau, c. 10 km E of Kupiano; *Pullen 6718*, Rubulogo Creek area c. 18 miles N of Port Moresby.

7. Alectryon ferrugineus (Blume) Radlk.

Spanoghea ferruginea Blume, Rumphia 3 (1847) 173. — *Nephelium ferrugineum* (Blume) F. Muell., Descr. Notes Papuan Pl. 1 (1876) 21. — *Alectryon ferrugineus* (Blume) Radlk., Sapind. Holl.-Ind. (1879) 14; in Engl., Pflanzenr. 98 (1933) 995. — L e c t o t y p e (present author): *Zippelius 158a*, New Guinea (L).

Alectryon strigosus Radlk., Sitzungsber. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. München 20 (1890) 255; in Engl., Pflanzenr. 98 (1933) 991. — T y p e: *J. Chalmers s.n.*, SE. New Guinea, fl. fr. (MEL, not seen).

Jagera latifolia Radlk., Sitzungsber. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. München 20 (1890) 264. — T y p e: *W. Sayer s.n.*, SE. New Guinea, Mt Obree, Bourawarri, 1887, fl. (M; iso in MEL).

Alectryon mollis Radlk. in K. Schum. & Lauterb., Nachtr. Fl. Schutzgeb. Südsee (1905) 308; in Engl., Pflanzenr. 98 (1933) 992. — T y p e: *Hellwig 3*, NE. New Guinea, Kelana, -vii-1888, bud (B, not seen, prob. lost; iso in BO, K).

Alectryon macrophyllus Kanehira & Hatusima, Bot. Mag. Tokyo 52 (1938) 413, fig. 3. — T y p e: *Kanehira & Hatusima 4034*, NE. New Guinea, Salamaua, 8-ii-1937, fl. fr. (FU, not seen).

Tree or shrub. *Twigs* strongly 5-grooved, 0.4–2 cm thick, fairly densely hairy, mostly finally glabrescent. *Leaves* 2–8-jugate; petiole terete to sometimes semiterete or triangular in cross section, 2–29 cm long, 2.5–8 mm thick; petiolules 1–10 mm long, above flattened or sometimes either broadly grooved with or without a median rib, or terete; axes variably hairy, ± glabrescent. *Leaflets* opposite to sometimes alternate, 5.5–45 × 3–17 cm, 1.75–3.5 times as long as wide, widest in, below, or sometimes somewhat above the middle, sometimes slightly falcate, pergamentaceous or sometimes either herbaceous, or thin-coriaceous; mostly above densely hairy on midrib and nerves, beneath sparsely hairy all over, to glabrous; base slightly to strongly oblique, in lower pairs of leaflets broader at the acroscopic side, in central leaflets nearly equalsided, in upper leaflets basiscopic side broader, subcordate or rounded to acute, sometimes slightly attenuate; margin dentate to serrate at least in the upper half, rarely subentire; apex rounded to acute-acuminate; midrib above prominulous or sometimes flat; nerves 0.75–2.5 cm distant, oblique-patent to widely spreading, curved to nearly straight, ending free in the marginal teeth or not, above prominulous to sometimes grooved, beneath prominent; intercalated veins variably developed; veins and veinlets laxly to densely reticulate, either prominulous on both sides or only beneath. *Inflorescences* axillary or sometimes ramiflorous, panicles or thyrses, up to 30 cm long, with mostly few, patent, up to 12 cm long, often densely flowered branches, densely hairy, the peduncle up to 2 cm long, the pedicels 0–1.5

mm long. *Calyx* 0.75–1.5 mm high, from about 1/3 to highly connate, inside hairy. *Corolla* absent (but see note). *Stamens:* filament 0.5–2.25 mm, anther 1.25–2 mm. *Pistil* 2-merous with a lobed stigma. *Fruits* 2-lobed but sometimes only 1 lobe developed, carinate and angled to shouldered, fairly densely hairy but finally glabrescent, the lobes about globular, c. 8–10 mm diam., the wall 0.5–0.75 mm thick.

Field notes. Tree up to 20 m by 25 cm d.b.h. but mostly much smaller, or shrub; sometimes with slight buttresses; bark smooth, brown or grey to black, sometimes patched. Leaves pale brownish green. Flowers pale green, cream, yellow, or brown; calyx pinkish or brown; filaments white, anthers yellowish, later brown.

Distribution. Moluccas and New Guinea (mainly the eastern half).

Ecology. In primary and secondary forests, often along edges, on stream

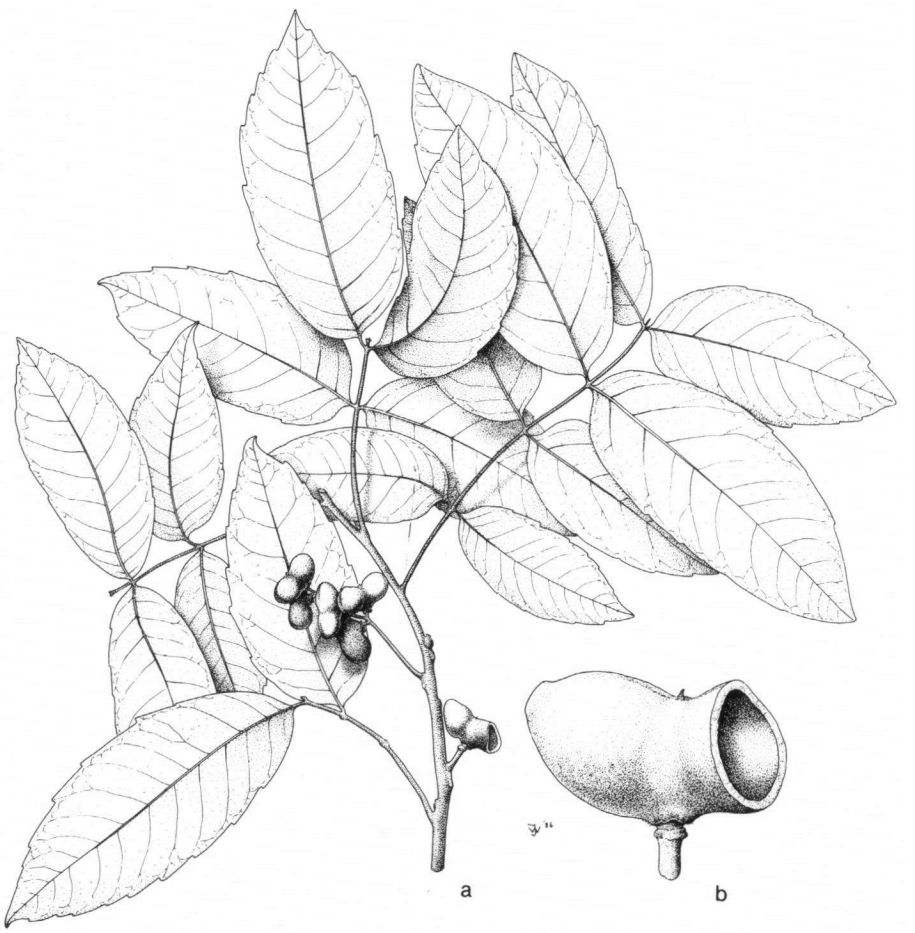

Fig. 2. *Alectryon glaber* (Blume) Radlk. a. Habit of a fruit-bearing twig, × 0.5; b. half dehiscent fruit, × 2 (*Alston 16075*).

banks, sometimes periodically flooded or in swampy places, often on limestone, at up to 1950 m altitude, but mostly below 300 m. Fl. and fr. throughout the year.

Note. Contrary to all other flowering specimens, *Clemens 8498* from NE. New Guinea, Morobe Prov., Boana, has flowers with petals, though strongly reduced ones: 0.8 mm long and with the scale only represented by a rim of hairs.

Specimens studied:

MOLUCCAS. Halmaheira: *Forsten s.n.*, Gilolo, near Singanoli (L sh. nr. 908.269-541). — Ternate: *Forsten s.n.* (L sh. nr. 908.269-521). — Ceram: *Rutten 2165*, East, Wai Boelo.

NEW GUINEA. Vogelkop Peninsula: *Aet 66*, Anakasi near Babo. — Southwest: *Aet 329*, Najaja, near Oeta; *538*, Sg. Aëndoea near Oeta; *Reksodihardjo 207*, Merauke Dist., Maro R., village Tambat. — Southeast: 20 collections. — Northeast: 36 collections. — D'Entrecasteaux Islands: *Brass 25923*, Fergusson Is., Lamalele; *27257*, ditto, Agamoia; *25606*, Normanby Is., Lebudowa; *LAE 52612*, ditto, Miadeba.

8. Alectryon glaber (Blume) Radlk. – Fig. 2.

Spanoghea glabra Blume, Rumphia 3 (1847) 174. — *Alectryon glaber* (Blume) Radlk., Sapind. Holl.-Ind. (1879) 14; in Engl., Pflanzenr. 98 (1933) 993. — Type: *Spanoghe 52*, Lesser Sunda Islands, P. Roti, fr. (L).

Alectryon serratus Radlk., Sapind. Holl.-Ind. (1879) 15, 48; in Engl., Pflanzenr. 98 (1933) 994. — Type: *Zollinger 2726*, Java, fr. (FI; iso in BO, P).

Alectryon sphaerococcus Radlk., Sapind. Holl.-Ind. (1879) 15, 49; in Engl., Pflanzenr. 98 (1933) 992. — Type: *Beccari it. sec. 2*, SE. Celebes, Kandari, -iv-1874, fr. (FI, not seen).

Alectryon excisus Radlk., Philipp. J. Sci. 8 (1914) Bot. 460; in Engl., Pflanzenr. 98 (1933) 994. — Type: *G.P. Ahern 470*, Philippines, Luzon, Tinago Island, 1901, fr. (M; iso in BO).

Alectryon inaequilaterus Radlk., Philipp. J. Sci. 8 (1914) Bot. 459; in Engl., Pflanzenr. 98 (1933) 990. — Type: *E.D. Merrill 5393*, Philippines, Sulu Islands, Ubian Island, 12-x-1906, fr. (M).

Alectryon ochraceus Radlk., Philipp. J. Sci. 8 (1914) Bot. 460; in Engl., Pflanzenr. 98 (1933) 994. — Type: *H.M. Curran FB 17455*, Philippines, Negros, -ix-1909, fr. (M).

Alectryon ferrugineus auct. non Radlk.: Koord., Versl. Minahassa (1898) 401. — *Alectryon celebicus* Radlk. [in Engl. & Prantl, Nat. Pflanzenfam. Nachtr. 3 (1907) 205, *nom. nud.*] Feddes Repert. Spec. Nov. Regni Veg. 18 (1922) 341; in Engl., Pflanzenr. 98 (1933) 989. — Type: *S.H. Koorders 18817*, Celebes, Prov. Minahassa, 13-iv-1895, fr. (M; iso in BO, L).

Tree or sometimes shrub. *Twigs* slightly grooved to terete, up to 5 mm thick, mostly early glabrescent. *Leaves* 2–5(–7)-jugate; petiole semiterete to terete, 1–8.5 cm long, (0.5–)1–2 mm thick; petiolules 1–8 mm long, terete or above flattened to hollowed with 1 or 3 ribs; axes fairly densely hairy to subglabrous. *Leaflets* opposite to sometimes alternate, 4–14 × 1–5.5 cm, 2–4.5 times as long as wide, widest in to often below the middle, pergamentaceous to papyraceous; mostly glabrous to above on the midrib, beneath on midrib and nerves slightly hairy, exceptionally (*A. celebicus*) above tomentose on midrib and nerves, very sparsely in between, beneath hairy all over; base equalsided to oblique, in lower leaflets the acroscopic, in upper ones the basiscopic side stronger developed, acute to (broadest side) rounded, mostly slightly attenuate; margin mostly only slightly serrate, dentate, or crenate, mainly in the upper half, sometimes entire; apex rounded to acute; midrib above prominulous; nerves 0.5–2 cm distant along the midrib, spreading to fairly steep, curved to nearly straight, either ending free, or ending in marginal teeth, or looped and joined

near the margin, prominulous on both sides or rarely above flat; intercalated veins variably developed, veins and veinlets laxly to minutely reticulate, either prominulous on both sides or sometimes beneath hardly visible. *Inflorescences* axillary, racemes, panicles, or sometimes thyrses, up to 9 cm long, simple or with some up to 4 cm long branches, few-flowered, hairy, the peduncle 0.75–2.5 cm long, the pedicels 1–1.5 mm long. *Calyx* c. 1 mm high, high-connate, inside hairy. *Corolla* absent. *Stamens:* filament short, anther 1.2 mm. *Pistil* 2-merous (exceptionally 3-merous) with a lobed stigma. *Fruits* 2-lobed and then often cordate but sometimes only 1 lobe developed, carinate and shouldered to sometimes slightly grooved, densely to sparsely fulvous or sometimes ferruginous tomentose or tomentellous, the lobes about globular, 0.9–1 × 0.75–0.9 cm, the wall 0.5–1 mm thick.

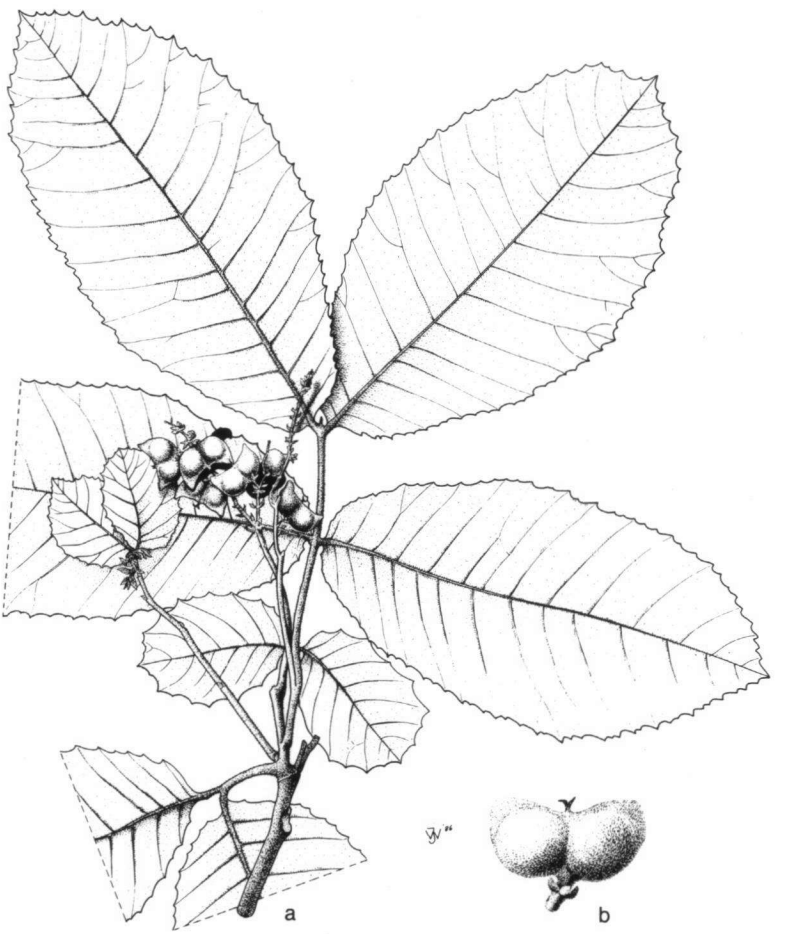

Fig. 3. *Alectryon repandodentatus* Radlk. a. Habit of a fruit-bearing twig, × 0.5; b. fruit, × 1.5 (*R. Pullen 6871*).

Field notes. Tree up to 30 m by 30 cm d.b.h., or sometimes shrub; stem slightly fluted, with rather inconspicuous thick buttresses. Bark pale brown or ash grey, smooth. Flowers greenish. Fruits brownish; aril red.

Distribution. E. Java, the Lesser Sunda Is., the Philippines, Celebes, and the Kai Is.

Ecology. Preferably on coral limestone cliffs along the sea shore, also more inland on limestone ridges; from sea level to 1000 m. Fl. Feb., April, May; fr. Feb.–Nov.

Specimens studied:

JAVA. East, incl. also Nusa Barung: 8 collections.

LESSER SUNDA ISLANDS. Sumbawa: *Kostermans 18376*, West, Mt Baulanteh, between Batudulang and Pusu. — Flores: *Schmutz 2712, 2795*, W. Manggarai, Nunang. — Roti: *Spanoghe 52*.

PHILIPPINES. Palawan: *PNH 80773*, Quezon, Lipuun Point. — Mindoro: *Bartlett 13807*, near Puerto Galera; *Santos 5172*, Oriental Prov., Puerto Galera Bay, Mahabang Parang Cave. — Luzon: *Ahern 470*, Tinagi Is. — Negros: *FB 17455*. — Sulu Islands: *Herre 1216*, Sibutu Is., Sitankai-Tumindao Is.; *Merrill 5393*, Ubina Is. — Mindanao: *BS 11643*, Zamboanga Prov.

CELEBES. North: *Koorders 18817*, Prov. Minahassa; *NIFS 2*, Menado, Palu; *Pesik 2*, ditto. — Central: *van Balgooy 2990*, Tawaelia-Parigi Rd., c. 8 km E of Tawaelia; *Meijer 10211*, Wayungan near Palu; *Tantra 1511*, Sopu Valley 80 km SE of Palu. — Southeast: *Kjellberg 496*, Kendari. — P. Lembeh: *Alston 16075*.

MOLUCCAS. Ceram: *Kato et al. C-8287*, East, 8 km S of Bula. — Kai Islands: *Jaheri 431*.

9. Alectryon repandodentatus Radlk. – Fig. 3.

Alectryon repandodentatus Radlk., Bot. Jahrb. Syst. 56 (1920) 274; in Engl., Pflanzenr. 98 (1933) 992; S.T. Reynolds, Austrobaileya 1 (1982) 479, fig. 37E. — Type: *Loher s.n.*, SE. New Guinea, Port Moresby, 9-iv-1910, fr. (M).

Treelet. *Twigs* terete, 3–5 mm thick, fairly densely shortly fulvous-hairy; branchlets glabrous. *Leaves* 1–3(–4)-jugate, the lowermost pair of leaflets often stipule-like; petiole terete, 0.75–4 cm long; petiolules 0–5 mm long, terete; axes densely pilose. *Leaflets* opposite, 1.5–15 × 1–10 cm, basal pair stipule-like and much smaller than the others, middle and upper pairs either of about the same size or the upper one distinctly bigger, 1.25–2 times as long as wide, widest in or in the upper leaflets above the middle, fairly thin to sometimes stiff pergamentaceous, sometimes ± bullate; midrib and nerves on both sides densely hairy, in between above very sparsely, beneath rather sparsely hairy; base equalsided to often variably oblique, in the basal pair the acroscopic side stronger developed to in extreme cases the basiscopic side not developed at all, in the upper pair the basiscopic side stronger developed, basal pair often strongly falcate, the base rounded to slightly cordate, sometimes blunt to acute; margin dentate; apex rounded or sometimes blunt, apiculate; midrib prominent and rounded on both sides; nerves about 0.75–1.5 cm distant, ± obliquely patent, slightly curved to nearly straight, ending in marginal teeth, above slightly, beneath a bit more prominent; veins and veinlets above rather densely, beneath more laxly reticulate. *Inflorescences* axillary, widely branched panicles 3–10 cm long with up to 7 cm long, spreading, racemoid branches, densely hairy. *Calyx* 4-merous, 1.5 mm high, somewhat less than halfway connate, inside sparsely hairy

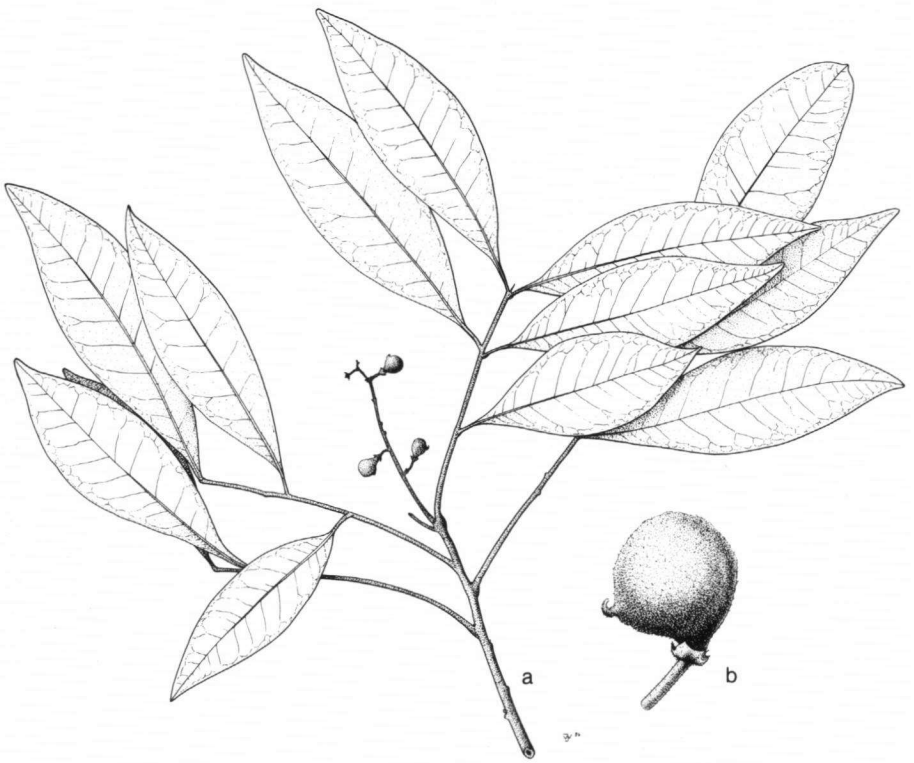

Fig. 4. *Alectryon reticulatus* Radlk. a. Habit of a fruit-bearing twig, × 0.5; b. fruit, × 3 (*Hartmann s.n.*). All drawings are by J.J.A.M. Wessendorp (L).

mainly on the lobes. *Corolla* absent. *Stamens* 6 or 7; filament 2.5 mm long; anther 1–1.25 mm long. *Pistil* 2-merous, stigma slightly 2-lobed. *Fruits* 2-lobed, the lobes globular, c. 5–7 mm diam., above with a rib from the style on, on the backside of the lobe developing into a triangular to falcate, up to 7 mm long wing, densely shortly fulvous hairy.

Field notes. Treelet, up to 10 m by 20 cm d.b.h., but often much smaller. Bark smooth, light grey or grey and brown patched.

Distribution. SE. New Guinea (Central Prov., around Port Moresby) and the Murray Is. in Torres Strait.

Ecology. Mainly in coastal monsoon scrub, in and along the mangrove, also along the beach and in savannahs, on sandy as well as on rocky hills, from sea level to c. 150 m altitude. Fl. March, May and Aug.; fr. April, May, Aug. and Oct.

Specimens studied:

NEW GUINEA. Southeast: 23 collections. — Murray Is.: *Lawrie 29* (BRI).

10. Alectryon reticulatus Radlk. – Fig. 4.

Alectryon reticulatus Radlk., Sitzungsber. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. München 20 (1890) 255; in Engl., Pflanzenr. 98 (1933) 993; *non* Rehder, J. Arnold Arbor. 15 (1933) 63 (= *A. cardiocarpus* Leenh.). — T y p e: *Unknown coll. s.n.* , SE. New Guinea, islands in the Gulf of Papua, before 1886, fr. (M)..

Tree or shrub? *Twigs* angular or terete, 1–2.5 mm thick, subglabrous, glabrescent. *Leaves* with 2 or 3 leaflets per side; petiole semiterete, 2–3.5 cm long; petiolules (0–)3–5 mm long, above grooved with a fine rib; axes subglabrous. *Leaflets* alternate, 5–9 × 2–3 cm, 2.5–3 times as long as wide, widest in the middle, pergamentaceous; the midrib beneath sparsely appressedly short-hairy, furthermore glabrous; base equalsided or in upper leaflets slightly oblique, acute, attenuate; margin entire; apex not or slightly acuminate, narrowly rounded to slightly emarginate; midrib above prominulous; nerves c. 0.5–1 cm distant, spreading, nearly straight, vaguely looped and joined towards the margin, prominulous on both sides; intercalated veins well developed, veins and veinlets laxly reticulate, prominulous on both sides. *Inflorescences* axillary, a slender thyrsus up to 11 cm long, in fruit still slightly hairy; peduncle 1 cm, one or two patent side branches near the base, furthermore bearing (sub)sessile cymules. *Flowers* unknown. *Calyx* probably 5-merous, sepals fairly high connate, outside slightly hairy. *Pistil* 1-merous. *Fruits* subglobular, c. 7.5 mm diam., with a small stylar hook lateral halfway, stigma not lobed, wall rugose, subglabrous, hard, c. 0.5 mm thick.

D i s t r i b u t i o n. Islands in the Gulf of Papua and the Torres Strait.

N o t e. Apparently nearest to *A. unilobatus* S.T. Reynolds which is known from a few localities in Queensland only.

S p e c i m e n s s t u d i e d:

NEW GUINEA. Southeast: *Unknown coll. s.n.* , Gulf Prov., islands in the Gulf of Papua (M).

AUSTRALIA. Queensland: *Hartmann s.n.* , islands of Torres Strait (MEL sh. nr. 1537050).