

Five new rain forest genera of Australasian Rutaceae

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KEY WORDS

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ABSTRACT

The new genera *Dinosperma* (Australia; four species), *Perryodendron* (Moluccas, New Guinea, and New Britain; one species), *Pitaviaster* (Australia; one species), *Crossosperma* (New Caledonia; two species), and *Dutaillioipsis* (New Caledonia; one species) are proposed. Three new species are described and six new combinations are established.

RÉSUMÉ

Les nouveaux genres *Dinosperma* (Australie ; quatre espèces), *Perryodendron* (Molouques, Nouvelle-Guinée et Nouvelle-Bretagne ; une es-pèce), *Pitaviaster* (Australie ; une espèce), *Crossosperma* (Nouvelle-Calédonie ; deux espèces), et *Dutaillioipsis* (Nouvelle-Calédonie ; une espèce) sont proposés. Trois nouvelles espèces sont décrites et six nouvelles combinaisons sont établies.

MOTS CLÉS

Rutaceae,
nouveaux genres,
Australasie.

In my continuing taxonomic study of Australasian-Malesian Rutaceae I have encountered nine species—four originally described in *Melicope* J.R. & G. Forst., two in *Euodia* J.R. & G. Forst., and three undescribed—which in their morphology appear to stand outside acceptable limits of previously described genera. The following new genera are proposed for these plants: (1) *Dinosperma*, which is endemic to eastern Australia, accommodates *M. melanophloia* C.T. White, *M. stipitata* C.T. White & Francis, *E. erythrococca* F. Muell., and a new species; (2) *Perryodendron*, which is monotypic and occurs in the Moluccas, New Guinea, and New Britain, accommodates *M. parviflora* C.T. White; (3)

Pitaviaster, which is monotypic and endemic to eastern Australia, accommodates *E. haplophylla* F. Muell.; (4) *Crossosperma*, which is endemic to New Caledonia, accommodates *M. velutina* Guillaumin and a new species; and (5) *Dutaillioipsis*, which is monotypic and endemic to New Caledonia, accommodates a new species.

If these new genera were to be placed in the classification proposed by ENGLER (1931), in what is the standard major work on the Rutaceae, *Dinosperma*, *Perryodendron*, and *Pitaviaster* would be assigned to the subfamily Rutoideae Engler, tribe Zanthoxyleae Hook. f., whereas *Crossosperma* and *Dutaillioipsis* would be put in the subfamily Toddalioidae Engl., tribe

Toddalieae Hook. f. There is doubt that ENGLER's circumscriptions of these taxa represent natural groupings, however (see, for example, HARTLEY 1981, 1982, and NG et al. 1987), so for the present the genera are simply compared to what appear to be their nearest relatives, without further reference to their subfamilial or tribal classification.

Inflorescences in the new genera are compound, usually with two or more orders of branching. The term thyriform is used to describe those in which the primary branches are opposite. Those described as paniculate have alternate primary branches.

The term testa is used to describe the part of the seed that is believed to be derived from the outer integument of the ovule. In *Perryodendron*, *Pitaviaster*, and *Dutailliopsis* the testa has an inner layer of dense, black sclerenchyma (the sclerotesta), and immediately internal to it is a zone of fragile, thin-walled cells which is believed to represent the inner integument. Seeds of *Dinosperma* and *Crossosperma* do not have a sclerotesta, and they seem to lack an inner integument.

Pollen of the new genera is described in my study of *Euodia* and *Melicope* (submitted for publication). It is not diagnostic.

DINOSPERMA T.G. Hartley, gen. nov.

Frutices vel arbores, trichomatibus simplicibus; foliis oppositis vel verticillatis (in surculis aliquot suboppositis vel alternis), pinnatis (1- vel 2-jugis), digitate 3-foliolatis, 1-foliolatis, vel simplicibus; laminis pellucido-punctatis, pinnatinerviis; inflorescentiis thyriformibus usque paniculatis, terminalibus vel terminalibus et axillaribus; floribus actinomorpha, bisexualibus; sepalis 4, basi vel usque 1/3 longitudine connatis, in fructu persistentibus; petalis 4, distinctis, anguste imbricatis vel valvatis, adaxialiter apice ± uncinatis, in fructu deciduis; staminibus 8, distinctis, alternatim ± inaequalibus, filamentis complanatis, sublinearibus usque oblanceolatis, apice acuto vel subulato, anthera ovoidea usque ellipsoidea, dorsifixis, introrsa; disco intrastaminali, annulari, pulvinato, vel columnari; gynoecio 4-loculato, 4-carpellato, carpellis basi vel usque 1/3 longitudine connatis et apicem versus a stylo junctis, placentatione axiali, ovulis in quoque loculo 2, subcollateralibus vel superpositis, stylo recto, filiis 4 cohaerentibus constanti, stigmate punctiformi vel capitellato; fructu ex folliculis 1-4 constanti, car-

pellis abortivis, si ullis, persistentibus, folliculis basi vel usque 1/6 longitudine connatis, exocarpio sicco vel subcarnoso, endocarpio basi adnato vel soluto et sub dehiscencia cum semine dimisso; seminibus in quoque folliculo 1 vel raro 2, ovoideis usque ellipsoideis; testa hebetata usque nitida, pergamentacea usque coriacea, laevi vel leviter rugulosa; endospermio obsoleto; cotyledonibus complanatis, in semine convolutis et plicatis; cotyledonibus in plantula epigeis, foliaceis, transverse ellipticis.

TYPE.—*Dinosperma melanophloia* (C.T. White) T.G. Hartley (= *Melicope melanophloia* C.T. White).

Shrubs or trees, trichomes simple. Leaves opposite or whorled (in occasional shoots subopposite or alternate), pinnate (with 1 or 2 pairs of leaflets), digitately 3-foliolate, 1-foliolate, or simple; blades pellucid-dotted, pinnately veined. Inflorescences thyriform to paniculate, terminal or terminal and axillary. Flowers actinomorphic, bisexual; sepals 4, connate at base or up to 1/3 their length, persistent in fruit; petals 4, distinct, narrowly imbricate or valvate, ± hooked adaxially at apex, deciduous in fruit; stamens 8, distinct, alternately ± unequal, filament flattened, sublinear to oblanceolate, acute or subulate at apex, anther ovoid to ellipsoid, dorsifixes, introrse; disc intrastaminal, annular, pulvinate, or columnar; gynoecium 4-loculate, 4-carpellate, carpels connate at base or up to 1/3 their length and joined subapically in the style, placentation axile, ovules 2 per locule, subcollateral or superposed, style straight, composed of 4 coherent styler elements, stigma punctiform or capitellate. Fruit of 1-4 follicles, the abortive carpels, if any, persistent; follicles connate at base or up to 1/6 their length, exocarp dry or subfleshy, endocarp adnate at base or separate and discharged with the seed at dehiscence. Seeds 1 or rarely 2 per follicle, ovoid to ellipsoid; testa dull to glossy, pergamentaceous to coriaceous, smooth or faintly wrinkled; endosperm obsolete; cotyledons flattened, convolute and folded. Cotyledons in the seedling epigeous, foliaceous, transversely elliptic.

ETYMOLOGY.—From the Greek *dinos*, whirl, and *sperma*, seed, referring to the convolute cotyledons.

Dinosperma is characterized mainly by its opposite or whorled leaves, terminal inflorescences,

bisexual flowers, 4-merous calyx and corolla, 8-merous androecium, 4-merous, subapocarpous gynoecium, 2-ovulate carpels, follicular fruit which at dehiscence (except in *D. erythrocca*) discharges the endocarp with the seed, pergamentaceous to coriaceous testa without sclerotesta, obsolete endosperm, and flattened cotyledons which in the seed are convolute and folded.

The endemic eastern Australian genera *Bosistoa* F. Muell. ex Benth., *Bouchardatia* Baill., and *Acradenia* Kippist (see HARTLEY 1977a, 1977b) are the closest relatives of *Dinosperma*, sharing with it, among other features, opposite leaves, terminal inflorescences, bisexual, obdiplostemonous flowers, subapocarpous gynoecium, follicular fruit which at dehiscence discharges the endocarp with the seed, pergamentaceous testa without sclerotesta, and obsolete endosperm. Unlike *Dinosperma*, their cotyledons are planoconvex and are neither convolute nor folded. Also, among other differences, *Bosistoa* has 5-merous flowers with 4-6 ovules per carpel, *Bouchardatia* has 6-8 ovules per carpel, and *Acradenia* has 5- or 6-merous flowers.

From the foregoing it is evident that the main diagnostic feature of *Dinosperma* is the convolute-folded posture of its cotyledons in the seed. Because in the seedling these cotyledons are epigeous and foliaceous (this is shown in the QRS sheet of Hyland 6470, *D. melanophloia*), their posture in the seed is probably adaptive, providing them with a large surface area which upon germination enables them to function more effectively as photosynthetic organs.

Elsewhere in the Rutaceae, embryos similar to those of *Dinosperma* are known in the Southeast Asian-southwestern Pacific genus *Micromelum* Blume, in which the cotyledons are irregularly

and complexly folded, and in the Neotropical subtribe Cuspariinae Engl., in which, according to KALLUNKI (1992), the cotyledons are commonly folded. Neither of these taxa are close relatives of *Dinosperma*. Among other differences, *Micromelum* has alternate leaves and indehiscent fruit, and genera of the Cuspariinae tend to have zygomorphic flowers, united petals, and basally appendaged anthers.

Dinosperma is unusually variable in its fruit. In *D. erythrocca* (F. Muell.) T.G. Hartley the exocarp is attractively colored (orange to red) and subfleshy and the endocarp and seed remain attached in the dehiscent follicle. In the other three species the exocarp is brown and dry and the endocarp is elastically discharged with the seed at dehiscence. In all four species the endocarp is cartilaginous except in the region of the axile placenta, where it is membranaceous. This membranaceous portion, the ventral endocarp (see Fig. 1E), is only partly distinct in *M. erythrocca*, whereas in the other species it separates from the rest of the endocarp, the dorsilateral endocarp (see Fig. 1D), and is more or less persistent on the discharged seed (with the drying of herbarium specimens it generally becomes detached).

In its attractively colored, subfleshy fruit and persistent seeds with coriaceous testa, *Dinosperma erythrocca* appears to be specialized for dispersal by arboreal birds. In the other species, where the seeds are expelled at dehiscence and have a thinner testa, dispersal may be effected by ants attracted to the ventral endocarp. This is a possibility because seeds of the rutaceous genus *Boronia* Sm., which are known to be ant-dispersed (BERG 1975), have a ventral endocarp which is essentially the same as that of *Dinosperma*, and it is the attractant.

Key to the species of *Dinosperma*

1. Leaves 1-bladed; follicles brown, dry 2
- 1'. Leaves, or most of them, compound; follicles orange to red, subfleshy 4. *D. erythrocca*
2. Leaves 5-17.5 cm long, the petiole 0.4-3.5 cm long, the blade acute to attenuate at base 3
- 2'. Leaves 15-30 cm long, the petiole 0.1-0.5 cm long, the blade narrowly cordate at base 3. *D. longifolia*
3. Main veins of leaves 8-10 per side; inflorescences 6-12 cm long; follicles 8-10 mm long, the endocarp sparsely pubescent 1. *D. melanophloia*
- 3'. Main veins of leaves 11-17 per side; inflorescences 1.5-3 cm long; follicles 10-15 mm long, the endocarp glabrous 2. *D. stipitata*

1. *Dinosperma melanophloia* (C.T. White)

T.G. Hartley, **comb. nov.**

Melicope melanophloia C.T. White, Bot. Bull. Dept. Agric., Queensland 20: 8, fig. on p. 9 (1918).—Type: *C.T. White s.n.*, Queensland, Wide Bay District, Kin Kin, Jan. 1917, fl., young fr. (holo-, BRI!; iso-, A!, MEL!, NY!).

Tree 3-10 m high. Young branchlets like the leaves glabrous. Leaves opposite (alternate in occasional shoots), 1-foliolate, 7-17.5 cm long; petiole 0.5-3.5 cm long, usually swollen distally; petiolule obsolete; leaflet blade subcoriaceous, elliptic, 6.5-16 × 2-7 cm, base acute to attenuate, margin entire, apex narrowly obtuse to acuminate, main veins 8-10 per side. Inflorescences thyriform to panicle, many- or sometimes several-flowered, hispidulous or sparsely so, 6-12 cm long, pedicels 0.6-3 mm long. Sepals puberulent, suborbicular to broadly ovate, 1-1.2 mm long; petals white, narrowly imbricate, short-sericeous abaxially, puberulent adaxially at least in distal 1/2, ovate-elliptic, 5.5-6.5 mm long; stamens 1/2-3/4 as long as petals, filament densely pilosulose at margin, otherwise sparsely pilosulose, at least adaxially, usually with a few papillate glands toward apex, narrowly oblong to lanceolate, subulate at apex, anther 0.5-1 mm long; disc glabrous, annular, about 0.6 mm high; gynoecium 2-2.5 mm long, ovary pubescent, style sparsely pilosulose in proximal 3/4, 1-1.5 mm long. Follicles erect or ascending, ellipsoid to obovoid, 8-10 mm long, obliquely truncate at apex and usually with upper-abaxial spur-like appendage to 0.8 mm long; exocarp brown, dry, tomentose; endocarp sparsely pubescent, discharged with the seed at dehiscence. Seeds 6-8.5 mm long; testa pergamentaceous, brown or blackish brown, lustrous, faintly wrinkled.—Fig. 1.

DISTRIBUTION AND ECOLOGY.—Northeastern to southeastern Queensland (Fig. 2A); rain forest (often dry) from 60 to 1000 m.

ADDITIONAL SPECIMENS EXAMINED.—AUSTRALIA, QUEENSLAND.—Cook District: *Gray 962*, State Forest Reserve 144, Windsor Tableland, 1000 m, 17 July 1978, fr. (CANB); *Hartley & Hyland 14126*, Bridle Creek about 12 miles SE of Mareeba, 21 Nov. 1973,

fr. (CANB); *Hyland RFK 2566*, State Forest Reserve 607, Bridle logging area, 520 m, 6 Apr. 1972, fl. (CANB); *5471*, Rocky River, 80 m, 14 Sep. 1971, galled fr. (BISH, BRI, CANB, LAE, QRS); *5948*, State Forest Reserve 607, Bridle logging area, 520 m, 6 Apr. 1972, fl. (BRI, L, LAE, QRS); *6468*, State Forest Reserve 607, 17°00'S, 145°35'E, 480 m, 1 Nov. 1972, fr. (QRS); *6470*, State Forest Reserve 607, 17°00'S, 145°35'E, 500 m, 1 Nov. 1972, fr., seedlings (BRI, L, LAE, QRS); *W.T. Jones 2288*, Massey Creek, 12 Oct. 1962, fr. (CANB); *O'Farrell 78*, State Forest Reserve 607, Bridle logging area, 480 m, 26 May 1971, galled fr. (BRI, CANB, L, LAE); *L.S. Smith 11743*, upper Massey Creek 15 miles ENE of Coen, 350 ft., 11 Oct. 1962, fr. (CANB).—North Kennedy District: *Byrnes & Clarkson 3853*, Conway Range, Brandy Creek, 13 Apr. 1978, fl. (CANB).—Wide Bay District: *Forster 9123*, Farrels Scrub, Deep Creek road, 240 m, 13 Oct. 1991, old fr. (CANB); *Francis s.n.*, Kin Kin, Dec. 1919, fl. (A, UC); *Francis & White s.n.*, Kin Kin, Mar. 1916, fr. (A, NSW); *Hartley 15173*, Stony Creek near Didcot, 24 Oct. 1991 (CANB); *Petrie 304*, Amamoor, Oct. 1921, fl. (A, BRI); *Tracey s.n.*, Imbil (CANB).—Moreton District: *Thorpe s.n.*, Blackall Range near Palmwoods, 15 Jan. 1979, fl. (CANB).

Dinosperma melanophloia and *D. stipitata* are unique in the genus in their tendency to have distally swollen petioles (which I take as evidence that their leaves are 1-foliolate, i.e., reduced compound leaves, rather than simple) and spurred follicles. Although probably quite closely related, they are readily distinguishable on several characters. *Dinosperma melanophloia* has a higher number of main veins in its leaflet blades, larger inflorescences, flowers, and follicles, an annular (vs. columnar) disc, and sparsely pubescent (vs. glabrous) endocarp.

2. *Dinosperma stipitata* (C.T. White & Francis)

T.G. Hartley, **comb. nov.**

Melicope stipitata C.T. White & Francis, Proc. Roy. Soc. Queensland 37: 153, tab. 2 (1926).—Type: *Hayes s.n.*, Queensland, Cook District, Glenallyn, Malanda, fl. (holo-, BRI!).

Shrub or tree 2-15 m high. Young branchlets like the leaves glabrous. Leaves opposite or in whorls of 3 or 4, 1-foliolate, 5-17 cm long; petiole 0.4-1.2 cm long, usually swollen distally;

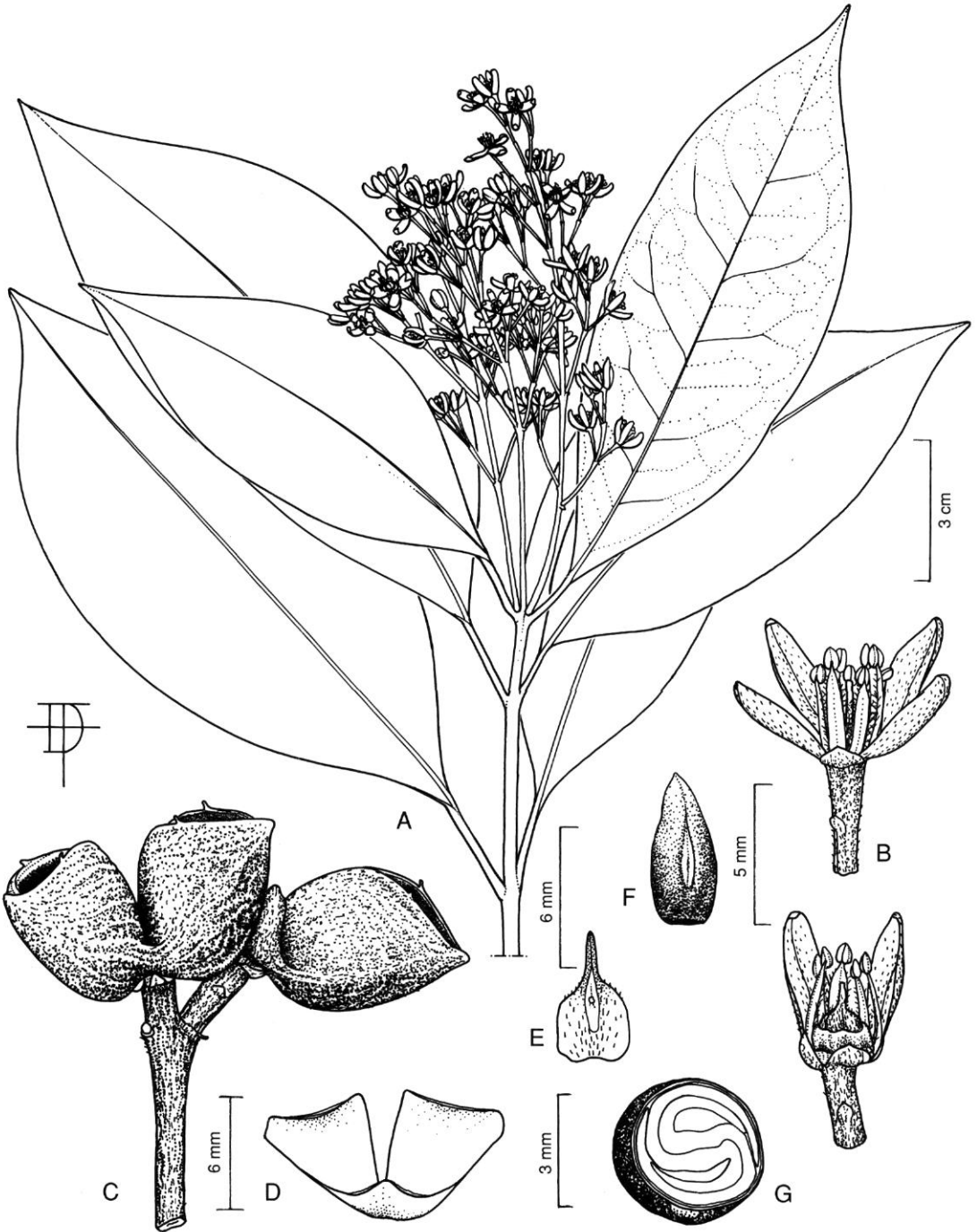


Fig. 1.—*Dinosperma melanophloia* (C.T. White) T.G. Hartley: **A**, flowering branchlet; **B**, flowers; **C**, fruits; **D**, dorsilateral endocarp; **E**, ventral endocarp; **F**, seed; **G**, transverse section of seed. (A, Hyland 5948, B, Hyland RFK 2566; C-G, Jones 2288).

petiolule obsolete; leaflet blade subcoriaceous, elliptic or elliptic-obovate, or narrowly so, 4.5-16 × 1-4.7 cm, base cuneate to attenuate or sometimes acute, margin entire, apex narrowly obtuse to acuminate, main veins 11-17 per side. Inflorescences thyriform, several- or sometimes few-flowered, glabrous to puberulent, 1.5-3 cm

long, pedicels 2.5-6 mm long. Sepals ciliate, otherwise glabrous to sparsely puberulent, ovate-triangular, 0.6-0.8 mm long; petals white or cream, valvate, densely puberulent at margin, otherwise glabrous to sparsely puberulent abaxially and pubescent abaxially, rather narrowly elliptic or elliptic-obovate, 4-6 mm long; sta-

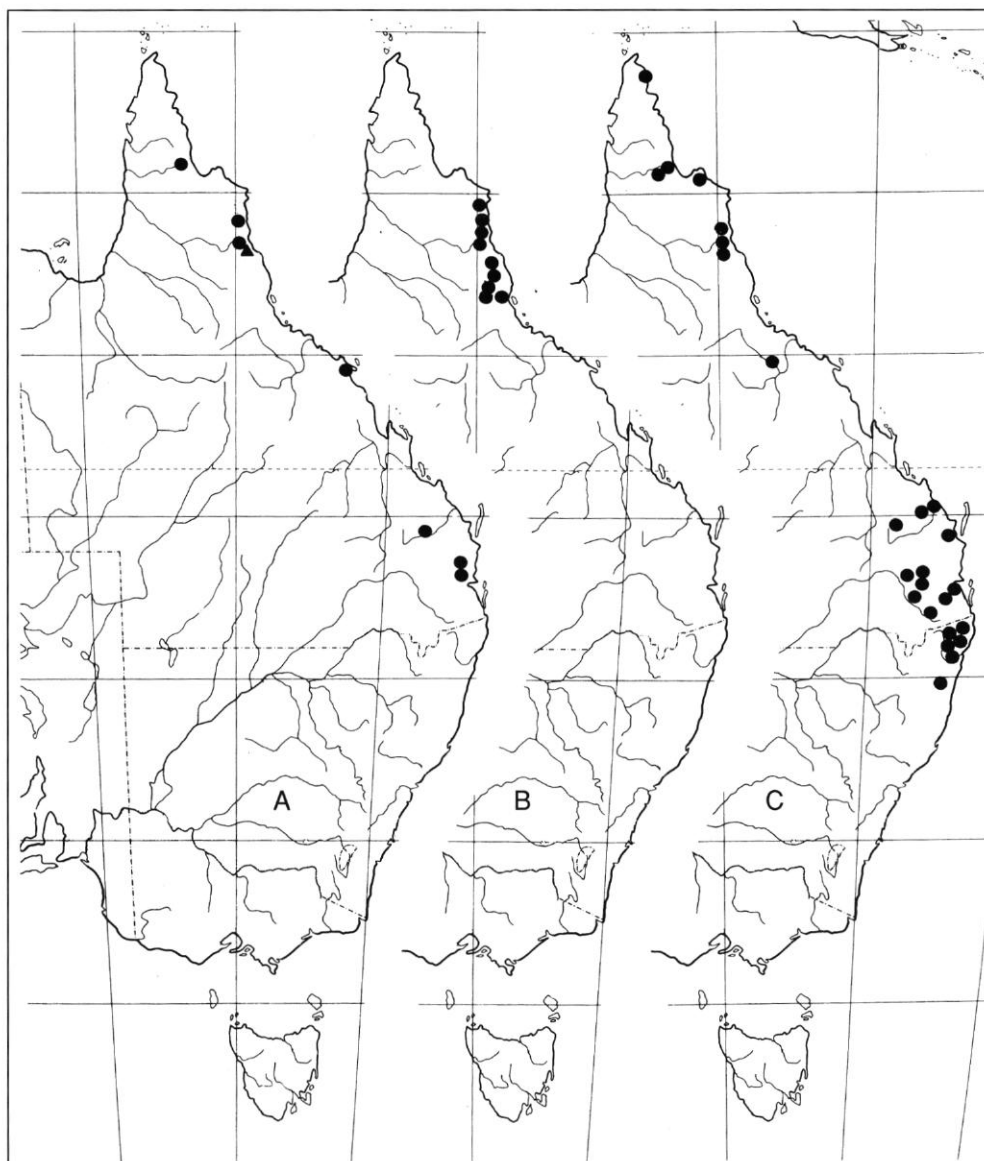


Fig. 2.—Distributions of *Dinosperma* species: **A**, *D. melanophloia* (C.T. White) T.G. Hartley (dots) and *D. longifolia* T.G. Hartley (triangle); **B**, *D. stipitata* (C.T. White & Francis) T.G. Hartley; **C**, *D. erythrocoeca* (F. Muell.) T.G. Hartley.

mens about as long as petals, filament densely pubescent at margin, otherwise glabrous abaxially and pubescent in proximal 1/2 adaxially, eglandular, lanceolate to oblanceolate, subulate at apex, anther 0.6–1 mm long; disc glabrous, columnar, 1–1.3 mm long (similar in size and stipe-like in fruit); gynoecium 2.5–3.5 mm long, ovary pubescent or sparsely so, style glabrous, 1.5–2.5 mm long. Follicles erect or ascending, broadly ellipsoid to obovoid, 10–15 mm long, rounded to \pm obliquely truncate at apex and often with upper-abaxial spur-like appendage to 2 mm long; exocarp brown or dark brown, dry, glabrate or rarely pubescent; endocarp glabrous, discharged with the seed at dehiscence. Seeds 8–11 mm long; testa subcoriaceous, reddish brown or blackish, dull to rather lustrous, nearly smooth.

DISTRIBUTION AND ECOLOGY.—Northeastern Queensland (Fig. 2B); rain forest from 230 to 800 m.

SELECTED SPECIMENS EXAMINED.—AUSTRALIA, QUEENSLAND.—Cook District: *Forster & Tucker* 4363, 6.8 km SE of Butchers Creek School, 500 m, 13 June 1988, old fr. (CANB); *Godwin* C 2581, head of Roaring Meg Creek, 2000 ft., May 1984, bud, fr. (BRI); *Hoogland* 8534, Davies Creek forestry road 10 miles ENE of Mareeba, 1650 ft., 6 July 1962, fl. (BRI, CANB); *Hyland* 6393, Timber Reserve 1230, Boonjie logging area, 720 m, 3 Oct. 1972, fr. (BRI, LAE, QRS); 6678, Boonjie logging area, 680 m, 7 Feb. 1973, fl. (BRI, LAE, QRS); *W.T. Jones* 1498, Davies Creek, 24 May 1960, fr. (CANB); *Kajewski* 1223, Boonjie, Ghurka Pocket, 800 m, 24 Sep. 1929, fr. (A, BRI, MEL, NSW, NY); *L.S. Smith* 5271, Davies Creek, 24 Aug. 1954, fr. (LAE); 10075, Mt. Lewis, Aug. 1957, fr. (BRI); 11113, Gap Creek about 38 km S of Cooktown, 230 m, 7 Sep. 1960, fr. (A, BRI, L); 12062, Lock Creek about 14 miles SE of Mareeba, 1700 ft., 20 Oct. 1962, fr. (A, BRI, L); *Webb & Tracey* 5605, end of Davies Creek road, 1400 ft., 23 Jan. 1962, fr. (CANB); 10873, Mt. Finnegan, 300–600 m, 25 Aug. 1972, fr. (BRI, CANB).—North Kennedy District: *Dallachy s.n.*, Rockingham Bay, fr. (MEL); *Hyland* RFK 1194, Kirrama, 650 m, 19 Oct. 1967, fr. (QRS); *L.S. Smith* 4734, Koolmoon Creek, 30 Sep. 1950, fr. (BISH, BRI, CANB, LAE).

Dinosperma stipitata is most nearly related to *D. melanophloia* (q.v.).

The two northernmost collections (*L.S. Smith*

11113, from Gap Creek, and *Webb & Tracey* 10873, from Mt. Finnegan) differ from the other fruiting material seen in having pubescent (v.s. glabrate) exocarp. This appears to be their only differential feature and it is a minor one.

The GODWIN collection from Cook District is exceptional in that it has the characteristics of a rheophyte. It has unusually narrow leaflet blades $4.5\text{--}7 \times 1\text{--}1.4$ cm and was taken from shrubby plants growing along a permanent stream in rain forest.

3. *Dinosperma longifolia* T.G. Hartley, *sp. nov.*

Arbor ca. 4 m alta; ramulis novellis ut petiolis hirsutulis vel sparse hirsutulis; foliis oppositis vel verticillatis (in quoque nodo 3 vel 4), simplicibus, 15–30 cm longis, apicem versus ramulorum \pm confertis; petiolo 0.1–0.5 cm longo; lamina subcoriacea, glabra vel fere glabra, anguste elliptica usque oblanceolata, $15\text{--}30 \times 4\text{--}7.5$ cm, basi anguste cordata, margine integra, apice acuta vel subacuminata, venis primariis utrinsecus 23–27; inflorescentiis paniculatis, multifloris, 18–30 cm longis, axe et ramis hispidulis, pedicellis glabris vel fere glabris, 2–3 mm longis; alabastris solis visis; sepalis ciliolatis, aliter glabris vel fere glabris, late ovatis, ca. 1 mm longis; petalis (colore ignoto) anguste imbricatis, glabris, ovato-ellipticis, ca. 2 mm longis; staminibus petala fere aequantibus, filamento margine dense pilosuloso, aliter abaxialiter glabris et adaxialiter in 1/2–1/3 distali pilosuloso, apicem versus glandes papillatis paucis praedito, sublineari, apice acuto, anthera ca. 0.5 mm longa; disco glabro, annulari, ca. 0.3 mm alto; gynoecio glabro, ca. 1 mm longo, stylo ca. 0.5 mm longo; folliculis divaricatis, asymmetrice obovatis, ca. 20 mm longis, apice oblique truncatis; exocarpio brunneo, sicco, glabro; endocarpio glabro, sub dehiscencia cum semine dimisso; seminibus maturis ignotis.

TYPE.—*Nicholson* 4018, Australia, Queensland, Cook District, State Forest Reserve 607, Freshwater Creek, 11 Jan. 1966, bud, fr. (holo-, BRI!; iso-, QRS!).

Tree about 4 m high. Young branchlets like the petioles hirsutulous or sparsely so. Leaves opposite or in whorls of 3 or 4, simple, 15–30 cm long, \pm crowded toward branchlet apices; petiole 0.1–0.5 cm long; blade subcoriaceous, glabrous or nearly so, narrowly elliptic to oblanceolate, $15\text{--}30 \times 4\text{--}7.5$ cm, base narrowly cordate, margin entire, apex acute or subacuminate, main veins 23–27 per side. Inflorescences paniculate, many-

flowered, 18-30 cm long, axis and branches hispidulous, pedicels glabrous or nearly so, 2-3 mm long. Flowers only seen in bud; sepals ciliolate, otherwise glabrous or nearly so, broadly ovate, about 1 mm long; petals (color unknown) narrowly imbricate, glabrous, ovate-elliptic, about 2 mm long; stamens nearly as long as petals, filament densely pilosulose at margin, otherwise glabrous abaxially and pilosulose in distal 1/2-2/3 adaxially, with a few papillate glands toward apex, sublinear, acute at apex, anther about 0.5 mm long; disc glabrous, annular, about 0.3 mm high; gynoecium glabrous, about 1 mm long, style about 0.5 mm long. Follicles divaricate, asymmetrically obovate, about 20 mm long, obliquely truncate at apex; exocarp brown, dry, glabrous; endocarp glabrous, discharged with the seed at dehiscence. Mature seeds unknown.—Fig. 3.

DISTRIBUTION AND ECOLOGY.—Known only from the type locality, in northeastern Queensland (Fig. 2A); rain forest at about 1000 m.

ADDITIONAL SPECIMENS EXAMINED (from the type locality).—*Dansie* 2193, 6 Dec. 1961 (BRI).

Dinosperma longifolia is at once recognizable by its large, basally cordate, nearly sessile leaves, large inflorescences, and large follicles. As far as known, the plant is correctly placed in *Dinosperma*, but the seeds at hand are very immature and their embryo, which is minute, does not show the convolute cotyledons that are characteristic of the genus. Thus, the identification is somewhat uncertain.

It is hoped that placing this rare and unusual plant on the record will result in its rediscovery. Unfortunately, it is quite likely that the type locality is now flooded by an artificial lake (D.I. NICHOLSON, in litt.).

4. *Dinosperma erythrocarpa* (F. Muell.) T.G. Hartley, **comb. nov.**

Euodia erythrocarpa F. Muell., *Fragm.* 1: 28 (1858).—*Melicope erythrocarpa* (F. Muell.) Benth., *Fl. Austral.*

1: 360 (1863).—Lectotype (here designated): *Hill & Mueller s.n.*, Australia, Queensland, Moreton District, Moreton Bay, fr. (MEL!).

Tree 9-23 m high. Young branchlets like the leaf rachises and petioles glabrous or sparsely hispidulous. Leaves opposite (subopposite or alternate in occasional shoots), pinnate (with 1 or 2 pairs of leaflets) or digitately 3-foliolate (occasional leaves 1- or 2-foliolate), 5-20 cm long; proximal segment of rachis and petiole 1-5 cm long; petiolule in lateral leaflets obsolete or up to 7 mm long, in terminal leaflet 1.5-20(-30) mm long; leaflet blades subcoriaceous, glabrous or nearly so, ovate to elliptic, or narrowly so, 3-10 (-12) × 1-3(-5) cm, base acute to subattenuate, ± inequilateral in lateral leaflets, margin entire or inconspicuously glandular-crenulate, apex obtuse to acute or sometimes subacuminate, main veins 10-17 per side. Inflorescences thyrsiform, several- or many-flowered, nearly glabrous to hispidulous or puberulent, 3.5-9 cm long, pedicels 1.5-5 mm long. Sepals ciliolate, otherwise nearly glabrous or sparsely puberulent, ovate or ovate-triangular, 0.8-1 mm long; petals greenish cream, cream, or pale yellow, valvate, puberulent abaxially, especially toward margin, pubescent adaxially, especially in distal 1/2, elliptic to obovate, or narrowly so, 3.5-4 mm long; stamens about 3/4 as long as petals, filament ciliate or nearly glabrous, eglandular, gradually tapering from rather narrow base to subulate apex, anther 0.5-0.6 mm long; disc glabrous to appressed-pubescent, pulvinate, about 0.5 mm high; gynoecium 1.5-2 mm long, ovary glabrous to rather sparsely pubescent, style sparsely pilosulose in proximal 1/2-2/3, 1-1.5 mm long. Follicles divaricate, ellipsoid, 6-8.5 mm long, rounded or obtuse at apex; exocarp orange to red, subfleshy, glabrous or glabrate; endocarp glabrous, adnate at base, with the seed persistent in dehiscent follicle. Seeds 3.5-4.5 mm long; testa coriaceous, black or bluish black, glossy, smooth or faintly wrinkled.

DISTRIBUTION AND ECOLOGY.—Northeastern Queensland to northeastern New South Wales (Fig. 2C); rain forest (often dry) from 60 to 1000 m.

SELECTED SPECIMENS EXAMINED.—AUSTRALIA, QUEENSLAND.—Cook District: *Dockrill* 553, between Iron Range and Portland Roads, 60 m, 12 Oct. 1972, fl., fr. (BRI, QRS); *Fell & Stanton* 3206, Cape

Melville National Park, Altonmoui Range, 60 m, 8 May 1993, bud (CANB); *Fell et al.* 3225, Brown Peak, 160 m, 9 May 1993, fl. (CANB); *Flecker Nth Qld. Herb.* 13285, Coen, Mt. White, 19 July 1949,

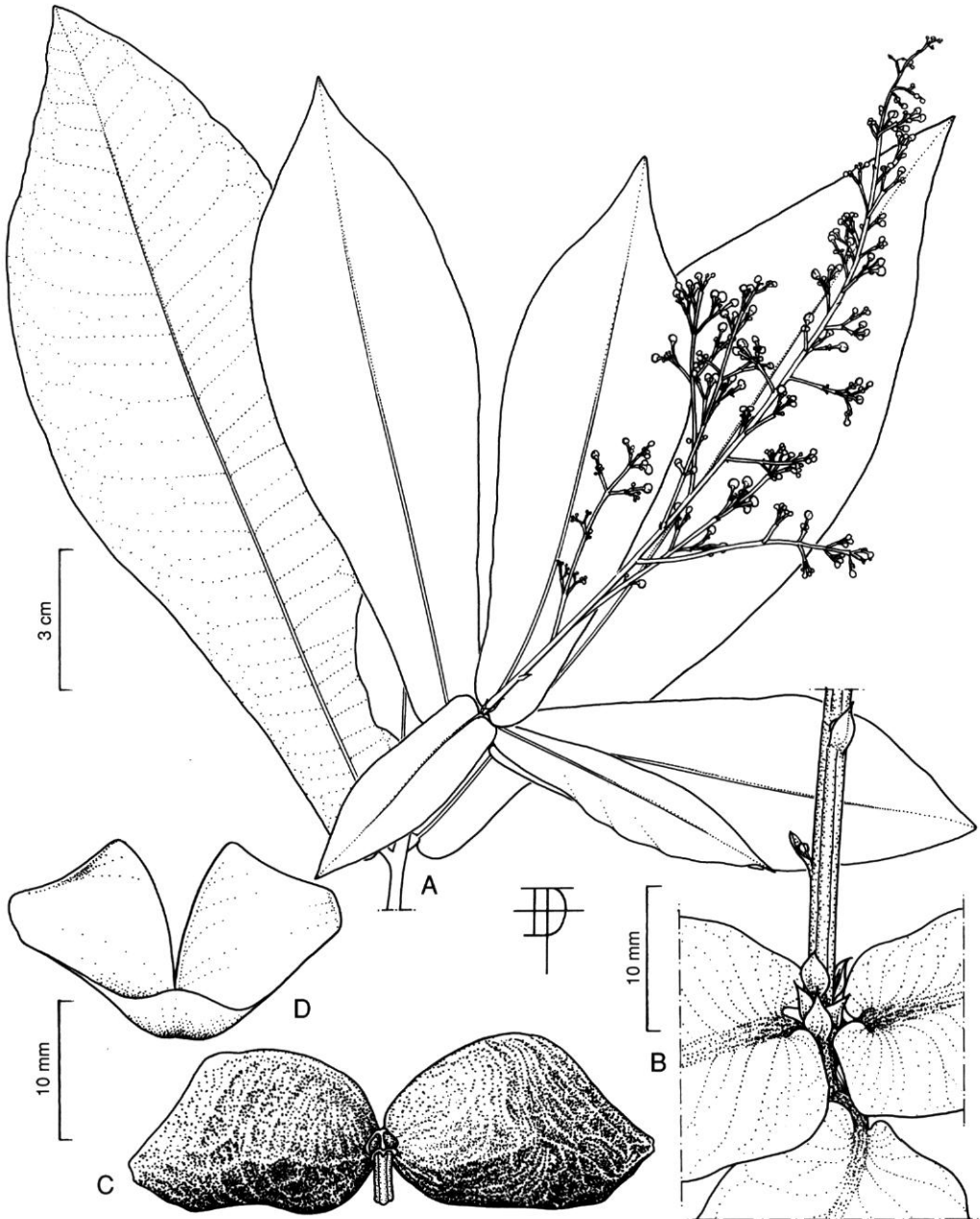


Fig. 3.—*Dinosperma longifolia* T.G. Hartley: A, flowering branchlet; B, detail of leaf bases; C, fruit; D, dorsilateral endocarp. (All from *Nicholson* 4018).

fl., fr. (NY); *Hartley & Hyland 14121*, Bridle Creek 12 miles SE of Mareeba, 21 Nov. 1973, fl., fr. (CANB); *Hyland RFK 865*, State Forest Reserve 194, 17°15'S, 145°25'E, 1000 m, 26 Sep. 1967 (QRS); *RFK 949*, State Forest Reserve 191, 17°25'S, 145°30'E, 700 m, 29 Sep. 1967, bud, fr. (QRS); *RFK 1000*, State Forest Reserve 185, 17°10'S, 145°40'E, 760 m, 4 Oct. 1967, fl. (QRS); *3693*, Atherton, 9 Apr. 1964, fr. (L); *6816*, Rocky River, 75 m, 6 Sep. 1973, fl., fr. (CANB, QRS); *Nicholson s.n.*, State Forest Reserve 185, Python logging area, 610 m, 3 Oct. 1967, fl., fr. (BRI, L, QRS); *O'Farrell 5*, State Forest Reserve 185, Platypus logging area, 720 m, 20 Apr. 1971 (BRI, CANB, L, QRS); *Sanderson 247*, State Forest Reserve 185, Downfall logging area, 720 m, 18 June 1973 (QRS); *L.S. Smith 3354*, Juara Creek between Kairi and Danbulla, 19 Aug. 1947, bud (CANB, LAE); *Stocker 654*, State Forest Reserve 191, Wongabel, 760 m, 7 Apr. 1971, fr. (BRI, L, LAE, NSW, QRS); *Webb & Tracey 13371*, Speewah road SW of Kuranda, 400 m, July 1973 (CANB).—North Kennedy District: *Hyland 6061*, Barrabas Scrub, 300 m, 16 May 1972, fl., fr. (BRI, L, QRS).—Wide Bay District: *C. Moore s.n.*, Wide Bay, fr. (MEL!), syntype; *L.S. Smith 4118*, Bingera, Oct. 1948 (BRI); *4169*, Burnett Heads road, 29 Oct. 1948, fl. (BRI).—Burnett District: *Bancroft s.n.*, Eidsvoll, fr. (A, BRI, NSW); *Grove 110*, Nanango, May 1918 (BRI).—Darling Downs District: *F.M. Bailey s.n.*, Gladfield, fr. (NSW); *Longman 1*, Toowoomba, fr. (BRI); *Tryon 87*, Bunya Mts., Nov. 1890, fr. (BRI).—Moreton District: *Clemens s.n.*, Yarraman Forest Reserve, 1400 ft., Aug. 1944, fr. (A, NY, UC, US); *Jessup 179*, upper Brookfield, 31 Mar. 1979, fr. (CANB). NEW SOUTH WALES.—North Coast District: *Baeuerlen s.n.*, Lismore, May 1894 (NSW); *Beckler s.n.*, Clarence River, fr. (MEL, W); *Floyd s.n.*, Kangaroo River State Forest, Burns Scrub, 27 Sep. 1973 (CFSHB); *W.T. Jones 3159*, Unumgar, 20 Feb. 1966, fr. (CANB); *McLean s.n.*, Casino, Apr. 1918, fr. (BRI).

Dinosperma erythrocoeca is characterized mainly by its compound leaves and attractively colored, subfleshy fruit with persistent endocarp and seeds.

The common name for *Dinosperma erythrocoeca* is *tingle tongue*, which refers to a property of the bark to produce a tingling sensation when placed in the mouth. Also, the bark is reputed to have irritating effects on the eyes of axemen cutting the trees. BANCROFT (1891) tested the plant—presumably a decoction of the bark—on frogs and found that it caused reflex excitability followed by paralysis and death. In a chemical analysis of the bark JONES & WHITE (1930)

found that the monoterpenoid elemicin was the principal constituent (90 percent) of the essential oil and that the triterpenoid lupeol was also present, but not in the oil. They believed elemicin to be the substance responsible for the above-mentioned effects on humans.

PERRYODENDRON T.G. Hartley, **gen. nov.**

Arbor, trichomatibus simplicibus; foliis oppositis, 1-foliolatis; petiolo saepe distaliter tumido; petiolulo obsoleto; foliolii lamina pellucido-punctata, integra, pinnatinervi; inflorescentiis thyrsiformibus, axillaribus; floribus actinomorpha, bisexualibus, in alabastro globosis vel late ovoideis; sepalis 4, basi connatis, in fructu persistentibus; petalis 4, distinctis, valvatis, adaxialiter apice uncinatis, recurvis, in fructu persistentibus; staminibus 8, distinctis, alternatim parum inaequalibus, filamento sublineari, apice subulato, anthera late ellipsoidea, dorsifixae, introrsa; disco intrastaminali, late complanato, 8-crenulato; gynoecio 4-loculato, 4-carpellato, carpellis in disco partim inclusis, in 1/4 proximali connatis et apice a stylo junctis, placentatione axiali, ovulis in quoque loculo 2, collateralibus, stylo recto, filiis 4 cohaerentibus constanti, stigmatibus capitellato, 4-lobato; fructu ex folliculis 1-4 constanti, carpellis abortivis, si ullis, persistentibus, folliculis in 1/4 proximali connatis, divaricatis, late compresso-ellipsoideis, exocarpio brunneo, sicco, endocarpio cartilagineo, saltem dorsaliter adnato; seminibus in quoque folliculo 1 vel raro 2, compresso-ellipsoideis, post dehiscientiam persistentibus; testa hebetata, aliquanto tenui et fragili, parte interior nigra, sclerenchymata; endospermio copioso; embryone recta, cotyledonibus complanatis, ellipticis.

TYPE.—*Perryodendron parviflorum* (C.T. White) T.G. Hartley (= *Melicope parviflora* C.T. White).

ETYMOLOGY.—For Dr. Lily May PERRY (1895-1992), in recognition of her contributions to Papuan botany.

Perryodendron parviflorum (C.T. White) T.G. Hartley, **comb. nov.**

Melicope parviflora C.T. White, J. Arnold Arbor. 10: 226 (1929).—Type: *Brass 689*, New Guinea, Papua, Central Province, Iawarere, 1000 ft., 24 Nov. 1925, fl. (holo-, BRI!; iso-, A!, P!).

Tree 5-45 m high, trichomes simple. Young branchlets like the petioles strigillose-puberulent

or glabrate; terminal bud puberulent to densely appressed-pubescent. Leaves opposite, 1-foliolate, 6-18 cm long; petiole often swollen distally, 0.5-2 cm long; petiolule obsolete; leaflet blade subcoriaceous, glabrous or glabrate, pellucid-dotted, pinnately veined, elliptic to obovate or suborbicular, $5.5-17 \times 2.5-8$ cm, base acute to subatten-

uate, margin entire, apex rounded to short-acuminate. Inflorescences thyrsiform, axillary, many-flowered, 7.5-20 cm long, axis and branches nearly glabrous to densely strigillose-puberulent, pedicels sparsely to densely strigillose-puberulent, 1.5-3.5 mm long. Flowers actinomorphic, bisexual, globose to broadly ovoid in bud; sepals

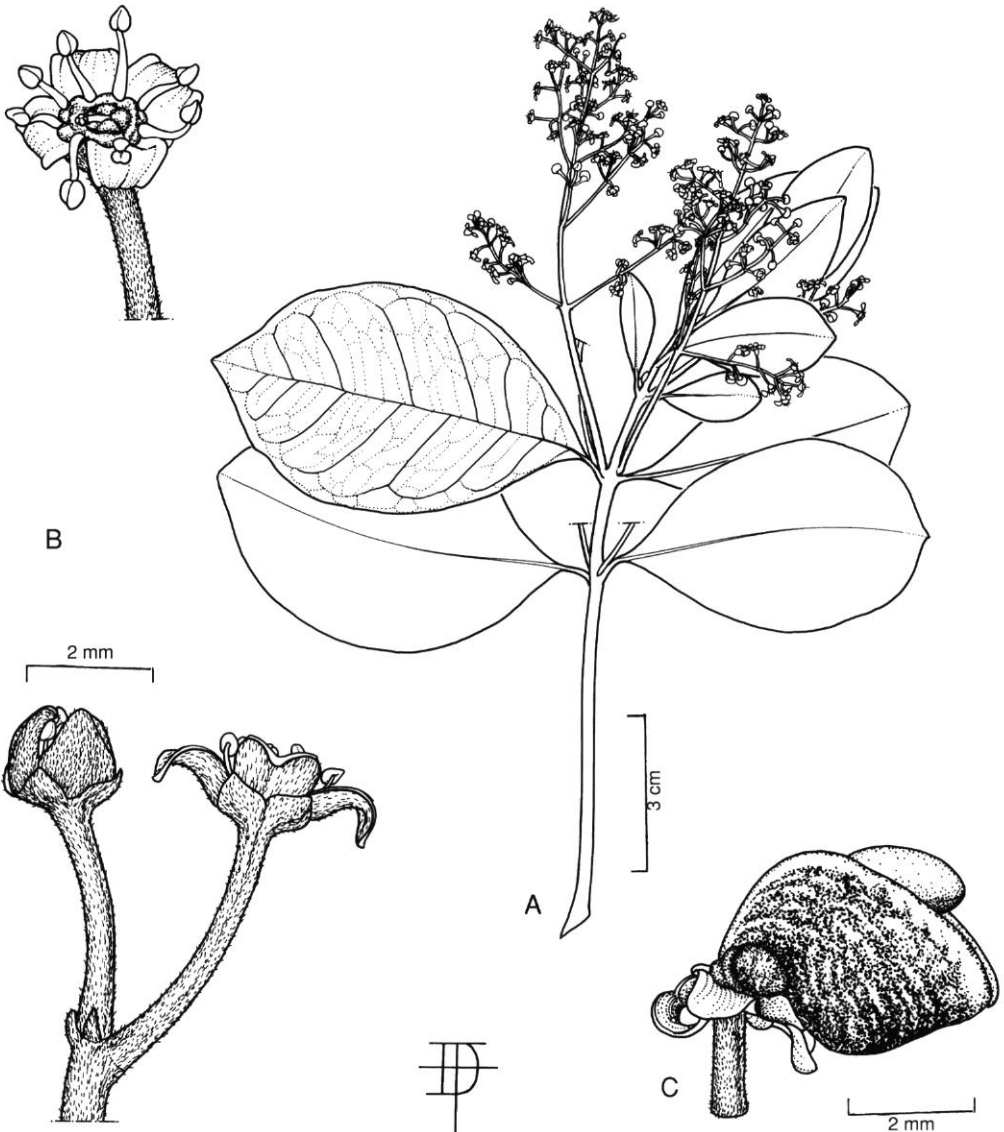


Fig. 4.—*Perryodendron parviflorum* (C.T. White) T.G. Hartley: **A**, flowering branchlet; **B**, flowers; **C**, fruit. (A, B, *Sayers NGF 21546*; C, *Aët & Idjan (Exp. van Dijk) 692*).

4, connate at base, sparsely to densely strigillose-puberulent, broadly ovate or ovate-triangular, 0.6-0.7 mm long, persistent in fruit; petals 4, white to green or yellowish green, distinct, valvate, glabrous to densely strigillose-puberulent abaxially, glabrous to puberulent adaxially, ovate, 1.4-1.5 mm long, hooked adaxially at apex, recurved, persistent in fruit; stamens 8, distinct, alternately slightly unequal, the anteseptalous ones 1-1.3 mm long, filament glabrous, sublinear, subulate at apex, anther broadly ellipsoid, 0.3-0.4 mm long, dorsifixed, introrse; disc intrastaminal, glabrous, broadly flattened, 8-crenulate; gynoecium 4-loculate, 4-carpellate, 0.5-0.7 mm long, carpels partially embedded in the disc, connate in proximal 1/4 and joined apically in the style, ovary pubescent, placentation axile, ovules 2 per locule, collateral, style straight, glabrous, composed of 4 coherent stylar elements, 0.2-0.4 mm long, stigma capitellate, 4-lobed. Fruit of 1-4 follicles, abortive carpels, if any, persistent; follicles connate in proximal 1/4, divaricate, broadly compressed-ellipsoid, 4-4.5 mm long, exocarp brown, dry, wrinkled, glabrate, endocarp cartilaginous, adnate at least dorsally. Seeds 1 or rarely 2 per follicle, compressed-ellipsoid, about 3 mm long, persistent after dehiscence; testa dull, brown to blackish, minutely granulate, rather thin and brittle, with inner layer of dense, black sclerenchyma; endosperm copious; embryo straight, cotyledons flattened, elliptic.—Fig. 4.

DISTRIBUTION AND ECOLOGY.—MOLUCCAS (Halmahera), New Guinea, and New Britain (Fig. 5); primary and secondary rain forest; near sea level to 1800 m.

SELECTED SPECIMENS EXAMINED.—MOLUCCAS: *Pleyte* 340, Halmahera, Gunung Sembilan, 600 m, 29 Sep. 1951, fl. (A, K, L). NEW GUINEA.—Division Vogelkop: *Kalkman* BW 6274, Beriat, about 12 km S of Teminaboean, 10 m, 23 Apr. 1958, fr. (A, CANB); *Koster* BW 1480, Salawati Island, Kaloal, 8 m, 19 Oct. 1956, galled fr. (CANB, L); *BW* 11788, Oemboei, near Andai, 30 m, 13 Nov. 1961, fl. (CANB, L, LAE); *Mangold* BW 2259, Onderaf, Ransiki, Lehoema, 1800 m, 12 Feb. 1957 (L, LAE); *Menusefer* BW 8179, Noeni, 60 m, 17 May 1960, fl. (CANB, L, LAE); *Schram* BW 7614, Wariki, about 50 km W of Manokwari, 5-10 m, 6 Aug. 1958, fl. (CANB, L).—

Division Geelvink Bay: *Aët & Idjan* (*Exped. van Dijk*) 692, Japen Island, Sei Papoma, 24 Aug. 1939, fr. (BO, L); *Koster* BW 11127, Japen Island, Samberbaba, 8 m, 7 July 1961, fl. (A, L, LAE); *BW* 15510, Mios Num Island, 10 m, 4 Aug. 1962 (L); *Kostermans & Soegeng* 888, Biak Island, Parieri, 50 m, 10 Sep. 1966, galled fr. (CANB, L); *Moll* BW 9645, Biak Island, Mansforbo, 40 m, 20 Nov. 1959, fr. (CANB, LAE, SING).—Division Jayapura: *Kostermans & Soegeng* 83, Hollandia, 100 m, 29 July 1966, fr. (CANB, L); 152, Hollandia, 100 m, 4 Aug. 1966, fl. (CANB, L); *van Royen & Sleumer* 6349, Dozai-Dafonsoero path, 450 m, 1 Aug. 1961 (L).—Division Fak Fak: *Versteegh* BW 7598, Genofa Mt., 1000 m, 26 Aug. 1960 (L, LAE).—Western Province: *Pullen* 7313, upper Fly River 2 miles N of Kiunga, 300 ft., 14 Sep. 1967, galled fr. (CANB, L).—Morobe Province: *Sayers* NGF 21546, Bugaiau, 4000 ft., 6 Jan. 1965, fl. (CANB).—Central Province: *Brass* 3915, Ononge road, Dieni, 500 m, Apr.-May 1933, fl., galled fr. (A, BO, L, NY, UC, US).—New Britain: *Croft & Katik* NGF 15593, Mt. Klangal, 25 miles NNE of Gasmata, 800 m, 16 May 1973, fl. (BISH, CANB, LAE); *Frodin* NGF 26910, Mt. Tangi, 3000 ft., 30 May 1966, fl. (A, CANB).

Perryodendron is characterized mainly by its opposite, 1-foliolate leaves, bisexual flowers, 4-merous calyx and corolla, 8-staminate androecium, broadly flattened disc, subapocarpous, 4-carpellate gynoecium, follicular fruit, adnate endocarp, exalate seeds, and dull, rather thin, brittle testa with inner layer of dense, black sclerenchyma.

Tetractomia Hook. f., which ranges from Sumatra and the Malay Peninsula eastward to the Solomon Islands (see HARTLEY 1979), is quite clearly the closest relative of *Perryodendron*, sharing with it a number of features including opposite, 1-foliolate leaves, bisexual, 4-merous flowers with broadly flattened disc, and follicular fruit with adnate endocarp. Unlike *Perryodendron*, among other differences, its testa is winged and is much thinner (but nevertheless has a scleroteca, except in the wing) and its androecium is composed of 4 stamens alternating with 4 staminodes.

PITAVIASTER T.G. Hartley, *gen. nov.*

Frutex vel arbor, trichomatibus simplicibus; foliis oppositis, 1-foliolatis; petiolo plerumque distaliter tumido;

petiolulo obsoleto; foliolii lamina pellucido-punctata, integra, pinnatinervi; inflorescentiis thyrsiformibus, axillaribus; floribus actinomorpha, bisexualibus; sepalis 4, basi vel usque 1/3 longitudine connatis, in fructu persistentibus; petalis 4, distinctis, valvatis, adaxialiter apice uncinatis, in fructu deciduis; staminibus 4, distinctis, filamento sublineari, apice subulato, anthera ovoidea usque ellipsoidea, dorsifixae, intrastamina-

li, annulari; gynoecio 4-loculato, 4-carpellato, carpellis apice a stylo junctis, aliter distinctis, placentatione axiali, ovulis in quoque loculo 2, collateralibus, stylo recto, filiis 4 cohaerentibus constanti, stigmate punctiformi, postremo inconspicue 4-partito; fructu drupaceo, 1-carpellato (carpellis abortivis deciduis), 1-seminalis, ovoideo usque ellipsoideo, 15-20 mm longo, exocarpio nigro, carnoso, mesocarpio ligneo, endocarpio cartilagineo; semine ovoi-

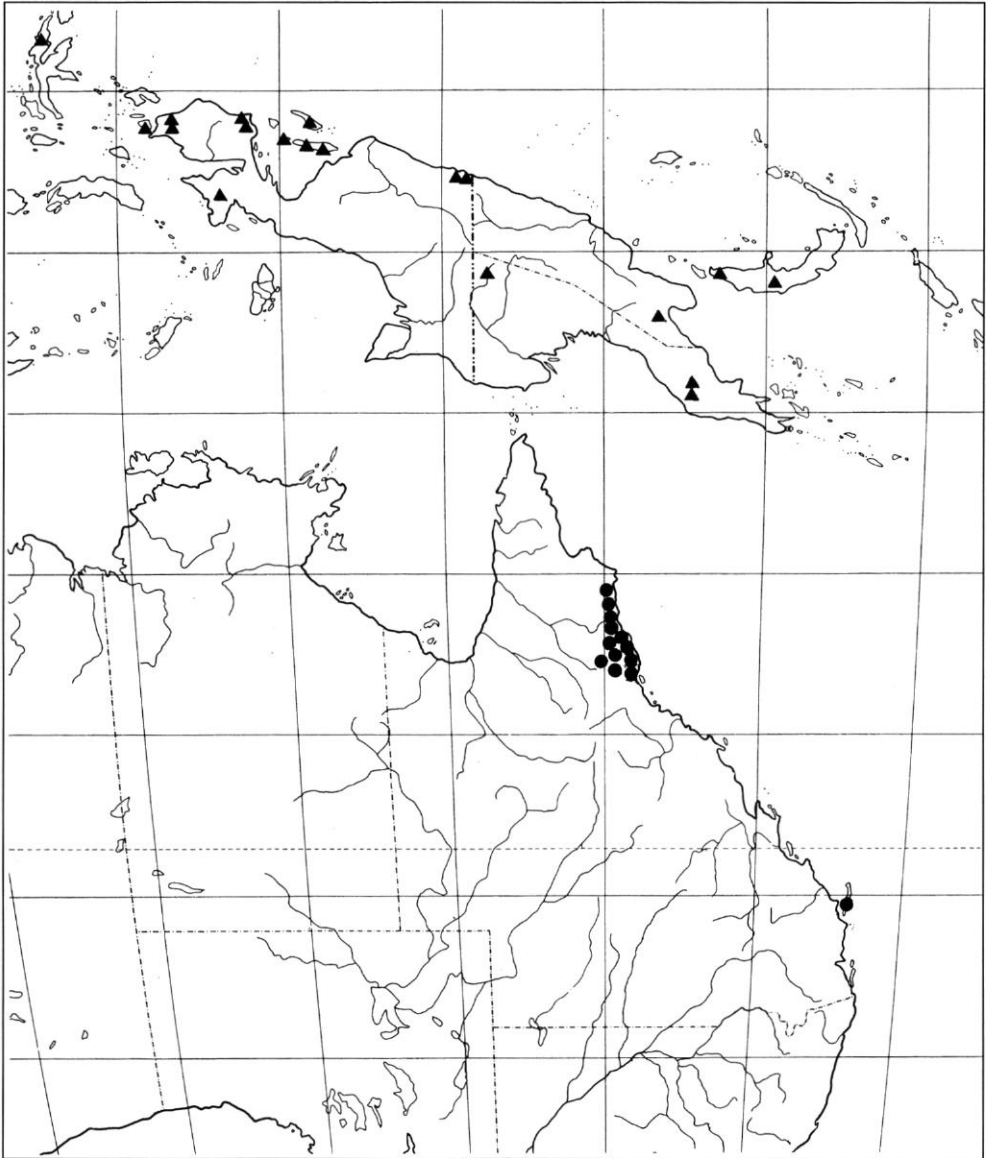


Fig. 5.—Distributions of *Perryodendron parviflorum* (C.T. White) T.G. Hartley (triangles) and *Pitaviaster haplophyllus* (F. Muell.) T.G. Hartley (dots).

deo, 8-10 mm longo; testa tenuissima et fragili, parte interior nigra, sclerenchymata; endospermio copioso; embryo recta, cotyledonibus complanatis, ovatis.

TYPE.—*Pitaviaster haplophyllus* (F. Muell.) T.G. Hartley (= *Euodia haplophylla* F. Muell.).

ETYMOLOGY.—From *Pitavia* and the Latin suffix *-aster*, incomplete resemblance, referring to the state of similarity to that genus.

Pitaviaster haplophyllus (F. Muell.) T.G. Hartley, **comb. nov.**

Euodia haplophylla F. Muell., *Fragm.* 5: 179 (1866).—*Acronychia haplophylla* (F. Muell.) Engl. in Engl. & Prantl, *Nat. Pflanzenfam.* III. 4: 180 (1896).—Type: *Dallachy s.n.*, Australia, Queensland, North Kennedy District, in montibus litoralibus apud sinum Rockingham Bay, 17 Nov. 1865, fl. (holo-, MEL!).

Acronychia tetrandra F. Muell., *Fragm.* 9: 104 (1875).—*Jambolifera tetrandra* (F. Muell.) Kuntze, *Revis. Gen. Pl.* 1: 102 (1891); nom. illeg. superfluous.

Shrub or tree 2.5-13 m high trichomes simple. Young branchlets like the petioles nearly glabrous or transiently strigillose; terminal bud appressed-pubescent or sericeous-pubescent. Leaves opposite, 1-foliolate, 9-26 cm long; petiole usually swollen distally, 1-3 cm long; petiolute obsolete; leaflet blade chartaceous or subcoriaceous, glabrous or nearly so (or rarely sparsely pubescent below), pellucid-dotted, pinnately veined, elliptic to obovate, or narrowly so, 8-23 × 3-9 cm, base acute to attenuate, margin entire, apex acuminate or sometimes acute. Inflorescences thyrsiform, axillary, nearly glabrous to strigillose, several- or many-flowered, 2.5-14 cm long, pedicels 2.5-4.5 mm long. Flowers actinomorphic, bisexual; sepals 4, connate at base or up to 1/3 their length, puberulent, ovate-triangular, 0.8-1 mm long, persistent in fruit; petals 4, white to yellow, distinct, valvate, puberulent abaxially, sericeous-pubescent adaxially at least at middle, ovate to elliptic, 2-2.5 mm long, hooked adaxially at apex, deciduous in fruit; stamens 4, distinct, about 3/4 as long as petals, filament sparsely pilosulose, sublinear, subulate at apex, anther ovoid to ellipsoid, 0.6-1 mm long, dorsifixed,

introrse; disc intrastaminal, glabrous, annular; gynoecium 4-loculate, 4-carpellate, 1-1.2 mm long, carpels joined apically in the style, otherwise distinct, ovary hirsutulous or pilosulose, placentation axile, ovules 2 per locule, collateral, style straight, glabrous, composed of 4 coherent stylar elements, 0.6-0.8 mm long, stigma punctiform, finally becoming inconspicuously 4-parted. Fruit a 1-seeded, 1-carpellate drupe (3 of the 4 carpels abortive and deciduous), ovoid to ellipsoid, 15-20 mm long, exocarp black, fleshy, glabrous, mesocarp woody, endocarp cartilaginous. Seed ovoid, 8-10 mm long; testa black or brownish black, very thin and fragile, with inner layer of dense, black sclerenchyma; endosperm copious; embryo straight, cotyledons flattened, ovate.—Fig. 6.

DISTRIBUTION AND ECOLOGY.—Northeastern Queensland and a single station in southeastern Queensland (Fig. 5); rain forest and borders; near sea level to 1100 m.

SELECTED SPECIMENS EXAMINED.—AUSTRALIA, QUEENSLAND.—Cook District: *Blake 9771*, foot of Mt. Bartle Frere, Josephine Creek, 60-90 m, 2 Oct. 1935, fl., fr. (CANB); *15023*, Babinda, 300-400 ft., 25 July 1943, fl., fr. (BRI, MEL); *15206*, Boonjie, 2300-2400 ft., 25 Aug. 1943, fl., fr. (A, BRI, MEL); *Brass 20254*, Annan River, upper Parrot Creek, 500 m, 15 Sep. 1948, fl. (BRI, CANB); *33930*, Mt. Lewis, 3500 ft., 3 Nov. 1968, fl. (QRS); *Gray 1275*, State Forest Reserve 933, Little Pine logging area, 100 m, 8 Feb. 1979, fr. (CANB); *Hartley & Hyland 14095*, Keoughs, Scrub, Heberton, 20 Nov. 1973, fl., fr. (CANB); *Henry Nth Qld. Herb. 3855*, Millaa Millaa, 25 Sep. 1937, fl. (QRS); *Hyland 7789*, State Forest Reserve 191, Barron, 800 m, 14 Oct. 1974, fr., seedlings (QRS); *Irvine 1573*, 1 mile N of Crater National Park, 920 m, 10 Sep. 1975, fl. (CANB); *W.T. Jones 1319*, Little Mulgrave River, 19 Aug. 1959, fl. (CANB); *Kajewski 1153*, Gadgarra Reserve, 800 m, 27 July 1929, fl., fr. (A, BRI, K, NY); *1236*, Boonjie, 700 m, 28 Sep. 1929, fl. (A, BRI, NY); *Ladbrook 48*, Johnstone River, Oct. 1917, fr. (BRI); *Michael 397*, Innisfail, fl. (BRI); *Moriarty 1127*, Boonjie, 760 m, 6 Sep. 1972, fl., fr. (CANB); *1959*, State Forest Reserve 755, North Johnstone logging area, 520 m, 3 Mar. 1976, fl. (CANB); *Risley 116*, Reserve 310, Swipers logging area, 600 m, 2 Oct. 1973, fl. (QRS); *Rudder 3651*, State Forest Reserve 10, 15 miles E of Atherton, 600 m, 30 Dec. 1965, fr. (L); *Sanderson 506*, Mt. Lewis, North Mary logging area, 1000 m, 16 Oct. 1973, fl. (QRS); *Sayer 109*,

Russell River, 1886, fl., fr. (MEL); *Schodde 4182*, Forest Reserve 99, Herberton Range, 3000 ft., 12 Oct. 1964, fl. (AD, CANB); *L.S. Smith 12061*, Lock Creek about 14 miles SE of Mareeba, 1700 ft., 20

Oct. 1962, fl. (CANB); *Thorne 20711*, Palmerston National Park, 22 Apr. 1959, fl. (CANB); *Webb 868*, Malanda, 26 Aug. 1945, fl. (CANB); *C.T. White 10690*, Mt. Spurgeon, Sep. 1936, fl. (A, BM, BRI);

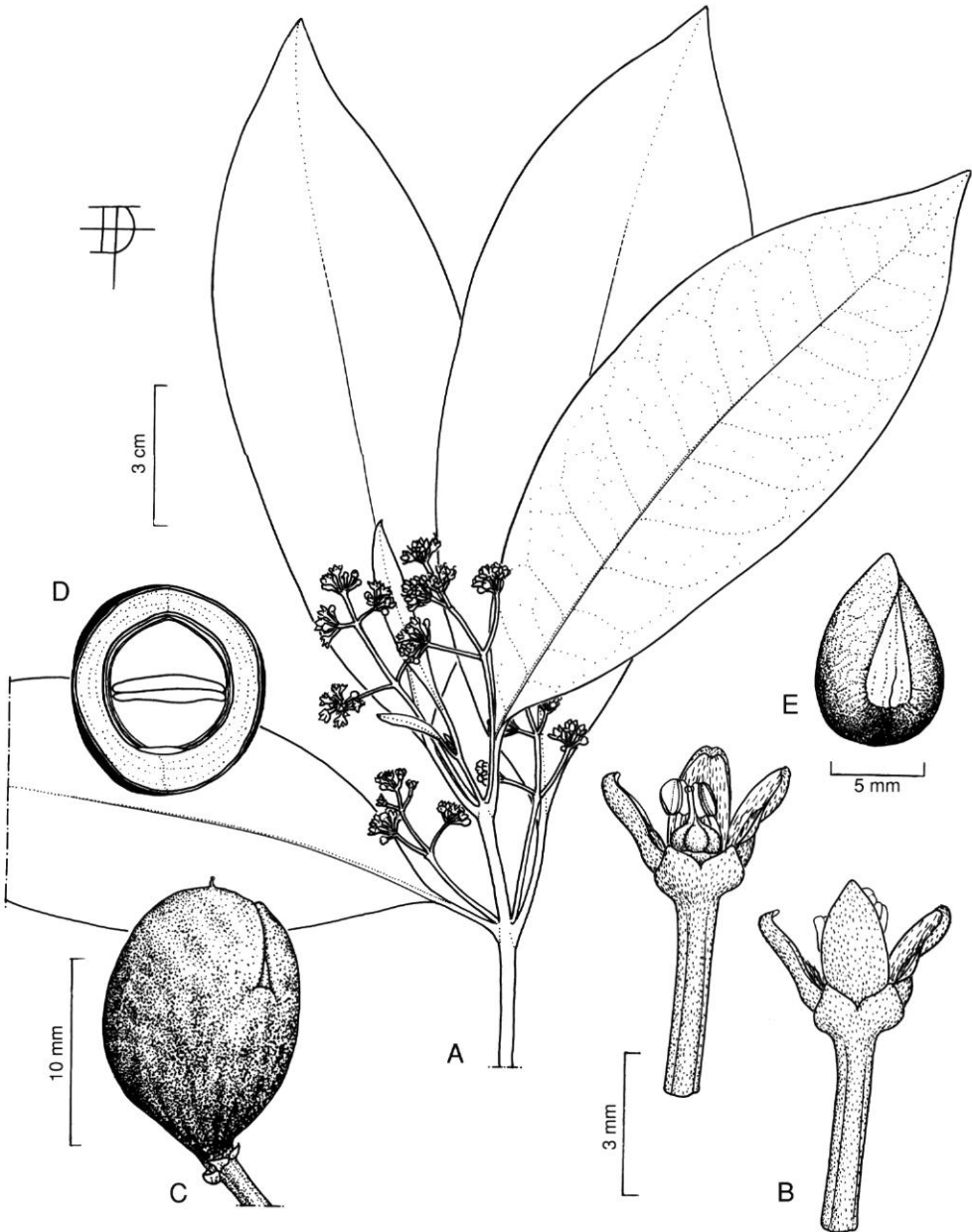


Fig. 6.—*Pitaviaster hapiophyllus* (F. Muell.) T.G. Hartley: **A**, flowering branchlet; **B**, flowers; **C**, fruit; **D**, transverse section of fruit; **E**, seed. (A, *Risley 116*, B, *Schodde 4182*; C-E, *Rudder 3651*).

11684, Etty Bay, 7 Dec. 1941 (A, BRI).—North Kennedy District: *Blake* 9892, E of Ravenshoe, 990 m, 14 Oct. 1935, fl. (BRI); *Dallachy* s.n., Rockingham Bay, fl., fr. (BM, BRI, CANB, GH, K, L, W); *Dockrill* 1270, State Forest Reserve 251, Charmillin logging area, 750 m, 29 Sep. 1976, fl. (CANB).—Wide Bay District: *Williams* s.n., Fraser Island, 1 km SE of Lake Allom, 29 Aug. 1986, fr. (CANB).

Pitaviaster is characterized mainly by its simple trichomes, opposite, 1-foliolate leaves, bisexual flowers, 4-merous calyx and corolla, 4-staminate androecium, 4-carpellate gynoecium in which the carpels are joined only in the style, punctiform stigma, comparatively large, black, fleshy, drupaceous, 1-carpellate fruit in which the three abortive carpels are deciduous, thin, fragile testa with inner layer of dense, black sclerenchyma, copious endosperm, and flattened, ovate cotyledons.

Acronychia J.R. & G. Forst., which ranges from eastern Australia and New Caledonia northward to Taiwan and the Himalayas (see HARTLEY 1974, 1991), appears to be the nearest relative of *Pitaviaster*, sharing with it a number of characteristics including simple trichomes, opposite, 1-foliolate leaves, bisexual flowers, 4-merous calyx and corolla, 4-carpellate gynoecium, punctiform stigma, fleshy, drupaceous fruit, testa with inner layer of dense, black sclerenchyma, copious endosperm, and flattened, ovate cotyledons. Unlike *Pitaviaster*, among other differences, its androecium is 8-staminate, its carpels are connate at base or up to their full length, its fruit is practically always 4-carpellate (it is apparently never 1-carpellate, and any carpels that are abortive are persistent), and its testa, particularly the sclerotesta, is much thicker.

The rutaceous genus *Pitavia* Molina, which is monotypic and endemic to Chile, is similar to *Pitaviaster* in general appearance, having opposite or whorled, simple leaves, axillary inflorescences, rather small, 4-merous flowers, and fruit composed of 1-4 fleshy, apocarpous drupes 15-20 mm long. Unlike *Pitaviaster*, among other differences, it has functionally unisexual, 8-staminate flowers, gland-tipped carpels, a thick, fleshy testa, scant endosperm, and plano-convex cotyledons.

CROSSOSPERMA T.G. Hartley, **gen. nov.**

Arbores apparenter dioeciae, trichomatibus simplicibus; foliis oppositis, digitate 3- vel 5-foliolatis (foliolis infimis in foliis 5-foliolatis redactis), saltem foliolo terminali petiolulato; foliolorum laminis pellucido-punctatis, integris, pinnatinerviis; inflorescentiis thyrsiformibus, axillaribus, ramigeris, vel cauligeris; floribus actinomorphis, functionaliter unisexualibus; sepalis 4, basi vel usque 1/2 longitudine connatis, in fructu deciduis; petalis 4, distinctis, imbricatis, in fructu deciduis; staminibus (in floribus ♀ aliquantum redactis) 8, distinctis, alternatim inaequalibus, filamento sublinearis, apice subulato usque filiformi, anthera ovoidea (in floribus ♀ complanata), dorsifixae, introrsa; disco intrastaminali, in floribus ♂ anguste ovoideo usque ellipsoideo, in floribus ♀ (ubi cognito) dolliformi; gynoecio omnino syncarpo, stipitato, in floribus ♂ magnopere redacto, in floribus ♀ (ubi cognito) 4-loculato, 4-carpellato, late stipitato, ovario inconspicuo 4-lobato, ambitu suborbiculari, placentatione axiali, ovulis in quoque loculo 1, stigmatibus subsessilibus, late peltato, complanato, 4-lobato, lobis emarginatis; fructu valde aromatico, drupacea, omnino syncarpo, 4-usque 8-loculato, late stipitato, epicarpio carnoso, endocarpio tenuiter cartilagineo, 4-8 pyrenis lateraliter complanatis 2-valvis formanti; seminibus in quoque loculo 1 vel interdum 2, lateraliter complanatis, asymmetrice obovato-triangularibus; testa rubiginosa, tenui, carnosa, dorsaliter margine fimbriato-alatis, ala usque 2.5 mm lata; endospermio obsoleto; embryone recto, cotyledonibus complanatis, asymmetrice et late ovatis.

TYPE.—*Crossosperma cauliflora* T.G. Hartley.

Trees, apparently dioecious, trichomes simple. Leaves opposite, digitately 3- or 5-foliolate (lowermost leaflets reduced in 5-foliolate leaves), at least the terminal leaflet petiolulate; leaflet blades pellucid-dotted, entire, pinnately veined. Inflorescences thyrsiform, axillary, ramigerous, or cauligerous. Flowers actinomorphic, functionally unisexual; sepals 4, connate at base or up to 1/2 their length, deciduous in fruit; petals 4, distinct, imbricate, deciduous in fruit; stamens (in ♀ flowers somewhat reduced) 8, distinct, alternately unequal, filament sublinear, subulate to filiform at apex, anther ovoid (flattened in ♀ flowers), dorsifixed, introrse; disc intrastaminal, in ♂ flowers narrowly ovoid to ellipsoid, in ♀ flowers (as far as known) barrel-shaped; gynoecium completely syncarpous, stipitate, in ♂ flowers greatly reduced, in ♀ flowers (as far as known) 4-loculate, 4-carpellate, broadly stipitate, ovary inconspicuously 4-lobed, suborbicular in outline, placentation axile, ovules

1 per locule, stigma subsessile, broadly peltate, flattened, 4-lobed, the lobes emarginate. Fruit a strongly aromatic, completely syncarpous, broadly stipitate, 4- to 8-loculate drupe, epicarp fleshy, endocarp thinly cartilaginous, forming 4-8 laterally flattened, 2-valved pyrenes. Seeds 1 or sometimes 2 per locule, laterally flattened, asymmetrically obovate-triangular; testa reddish brown, thin, fleshy, fimbriate-winged at dorsal margin, the wing up to 2.5 mm wide; endosperm obsolete; embryo straight, cotyledons flattened, asymmetrically and broadly ovate.

ETYMOLOGY.—From the Greek *krossos*, fringe, and *sperma*, seed, referring to the fimbriate-winged seed.

Functionally carpellate flowers are not known for *Crossosperma velutina* (Guillaumin) T.G. Hartley. This represents a rather major gap in our knowledge of the genus because they certainly would not have the consistently 4-loculate, 4-carpellate, 4-ovulate functional gynoeceum seen in *C. cauliflora*. This is evident in the fruit of *C. velutina*, which, unlike the consistently 4-loculate, 4-seeded drupe seen in *C. cauliflora*, is 4- to 8-loculate with 1 or sometimes 2 seeds per locule. The structure of the functionally staminate flowers of *C. velutina* seemingly has little to offer toward a resolution of this problem. The rudimentary ovary, which is minute, was found to have 4 or 5 locules in a few of the flowers examined (in most of the flowers there were no carpelary locules), but in none of the locules were rudimentary ovules visible.

As far as known, *Crossosperma* is characterized mainly by its opposite, digitately compound leaves, non-terminal inflorescences, functionally unisexual flowers, 4-merous calyx and corolla, 8-merous androecium, 1-ovulate carpels, broadly peltate stigma, strongly aromatic, fleshy, syncarpous, drupaceous, broadly stipitate fruit with thinly cartilaginous pyrenes, and flattened seeds with fleshy, fimbriate-winged testa, obsolete endosperm, and broad, flattened cotyledons. Also diagnostic is a condition seen in the functionally staminate flowers in which the stipitate rudimentary gynoeceum is subtended by a narrowly ovoid to ellipsoid disc.

The most exceptional feature of the genus is its combination of indehiscent fruit and winged seeds. Elsewhere in the Rutaceae this condition is apparently known only in the Malesian genus *Monanthocitrus* Tanaka (see STONE & JONES 1988; STONE 1985; SWINGLE 1967), which in having armed branchlets, alternate leaves, and pluriovulate carpels is not a close relative of *Crossosperma*.

The seeds of *Crossosperma* are tightly contained in flattened, 2-valved pyrenes. Although the winged testa is suggestive of specialization for wind dispersal, it is probably nothing more than a manifestation of the seed's growth within the narrow confines of the pyrene. There is no evidence that it has its origin in a wind-dispersed ancestor. The only rutaceous genera known to have winged, wind-dispersed seeds are *Flindersia* R. Br., which occurs in Australia, New Caledonia, New Guinea, and the Moluccas, *Chloroxylon* DC. (southern India, Ceylon, and Madagascar), *Dictyoloma* A. Juss. (South America), and *Tetractomia* Hook. f. (Malesia), and they are not close relatives of *Crossosperma*. Among other differences (in addition to their dehiscent fruit), *Flindersia*, *Chloroxylon*, and *Dictyoloma* tend to have alternate, pinnately compound leaves (bipinnate in *Dictyoloma*), and their carpels are 4- to 8-ovulate (or sometimes 2-ovulate in *Flindersia*), and *Tetractomia* has 1-foliolate leaves, bisexual flowers, a flattened disc, and seeds with a sclerotesta. Data are from the literature for *Chloroxylon* (CAPURON 1961, 1967) and *Dictyoloma* (ENGLER 1931).

Seemingly the closest relative of *Crossosperma*—although it differs markedly in having pinnately compound leaves, terminal inflorescences, a 5-merous calyx, corolla, and androecium, only slightly flattened seeds with sclerenchymatous, exalate testa and somewhat copious endosperm—is the eastern Asian genus *Phellodendron* Rupr. Among other features, it is similar to *Crossosperma* in having opposite leaves, functionally unisexual flowers, 1-ovulate carpels, a broadly peltate functional stigma, a stipitate rudimentary gynoeceum subtended by a \pm columnar disc, strongly aromatic, fleshy, syncarpous, drupaceous, short-stipitate fruit with thinly cartilaginous pyrenes, and seeds with flattened cotyledons.

Key to the species of *Crossosperma*

1. Inflorescences ramigerous or cauligerous; gynoecium and fruit glabrous 1. *C. cauliflora*
- 1'. Inflorescences axillary; gynoecium (as far as known) pubescent; fruit with at least sparse, minute trichomes toward base 2. *C. velutina*

1. *Crossosperma cauliflora* T.G. Hartley, sp. nov.

Arbor 6-8 m alta; ramulis novellis puberulis; gemma terminali velutina; foliis 5-foliolatis, 40-47 cm longis; petiolo adaxialiter saltem basi versus puberulo, aliter glabro, 14-16 cm longo; petiolulo terminali 30-35 mm longo; foliolorum laminis coriaceis, glabris vel subtus in costa sparse puberulis, obovatis, in foliolo terminali 22-28 × 12-13 cm, basi in foliolis lateralibus acutis usque attenuatis, in foliolo terminali attenuatis, apice rotundatis usque anguste obtusis vel subacutis; inflorescentiis ramigeris vel cauligeris, pluri- vel multifloris, 3-7 cm longis, axe et ramis puberulis vel sparse puberulis, pedicellis fere glabris vel sparse puberulis, 1-1.5 mm longis; floribus ♂ vel ♀; sepalis basi vel usque 1/2 longitudine connatis, glabris vel fere glabris, 0.8-1 mm longis, parte libera ovata vel ovato-triangulari; petalis albis, glabris vel abaxialiter in 1/2 proximali sparse strigillosis, ellipticis, ca. 3 mm longis; filamentis staminum margine et adaxialiter in 1/2-3/4 proximali pilosulosis; staminibus antesepalis in floribus ♂ 3-3.5 mm longis (in floribus ♀ ca. 2.5 mm longis), anthera ca. 0.5 mm longa (in floribus ♀ ca. 0.4 mm longa); disco glabro, in floribus ♂ ca. 1 mm longo, in floribus ♀ ca. 0.5 mm longo; gynoecio glabro, in floribus ♂ stipite ca. 0.8 mm longo, ovario ca. 0.3 mm diam., stigmatibus ca. 0.15 mm lato, in floribus ♀ stipite ca. 0.3 mm longo, ovario ca. 1.5 mm diam., stigmatibus ca. 2 mm lato; fructu 4-loculato, rubello, glabro, tetragono, ambitu suborbiculari, ca. 30 mm diam. (stipite ca. 5 mm longo excepto) seminibus in quoque loculo 1, ca. 15 × 10 mm.

TYPE.—*MacKee* 26830, Nouvelle-Calédonie, Ponérihouen, pente est du Mt. Aoupinié, 500-600 m, 21 June 1973, fr. (holo-, P!; iso-, NOU, P).

Tree 6-8 m high. Young branchlets puberulent; terminal bud velutinous. Leaves 5-foliolate, 40-47 cm long; petiole puberulent adaxially at least toward base, otherwise glabrous, 14-16 cm long; terminal petiolule 30-35 mm long; leaflet blades coriaceous, sparsely puberulent on midrib below or glabrous, obovate, in terminal leaflet 22-28 × 12-13 cm, base in lateral leaflets acute to attenuate, in terminal leaflet attenuate, apex rounded to narrowly obtuse or subacute. Inflorescences ramigerous or cauligerous, several- or many-flowered, 3-7 cm long, axis and branches puberulent

or sparsely so, pedicels nearly glabrous or sparsely puberulent, 1-1.5 mm long. Flowers ♂ or ♀; sepals connate at base or up to 1/2 their length, glabrous or nearly so, 0.8-1 mm long, the free portion ovate or ovate-triangular; petals white, sparsely strigillose in proximal 1/2 adaxially or glabrous, elliptic, about 3 mm long; staminal filaments pilosulose in proximal 1/2-3/4 at margin and adaxially; antesepalous stamens in ♂ flowers 3-3.5 mm long (about 2.5 mm long in ♀ flowers), anther about 0.5 mm long (about 0.4 mm long in ♀ flowers); disc glabrous, in ♂ flowers about 1 mm long, in ♀ flowers about 0.5 mm long; gynoecium glabrous, in ♂ flowers the stipe about 0.8 mm long, the ovary about 0.3 mm diam., the stigma about 0.15 mm wide, in ♀ flowers the stipe about 0.3 mm long, the ovary about 1.5 mm diam., the stigma about 2 mm wide. Fruit 4-loculate, reddish, glabrous, 4-angled, suborbicular in outline, about 30 mm diam. (stipe about 5 mm long excepted). Seeds 1 per locule, about 15 × 10 mm.—Fig. 7E,F.

DISTRIBUTION AND ECOLOGY.—Known only from the type locality, in central New Caledonia (Fig. 8); rain forest from 500 to 600 m; on soil derived from graywacke.

ADDITIONAL SPECIMENS EXAMINED (both from the type locality).—*MacKee* 26612, 500-600 m, 27 Apr. 1973, fl. ♂ (P); 31222, 550 m, 10 May 1976, fl. ♀, young fr. (CANB).

Crossosperma cauliflora is characterized mainly by its ramigerous or cauligerous inflorescences, its 4-loculate fruit, and its glabrous disc, gynoecium, and fruit.

In the specimens at hand the branchlets have been cut in such a way that the leaf arrangement cannot be determined. This problem was resolved by Madame Christiane TIREL, who examined the duplicates housed at P and reported (in litt.) that in *MacKee* 26830 and 31222 the arrangement is shown to be opposite.

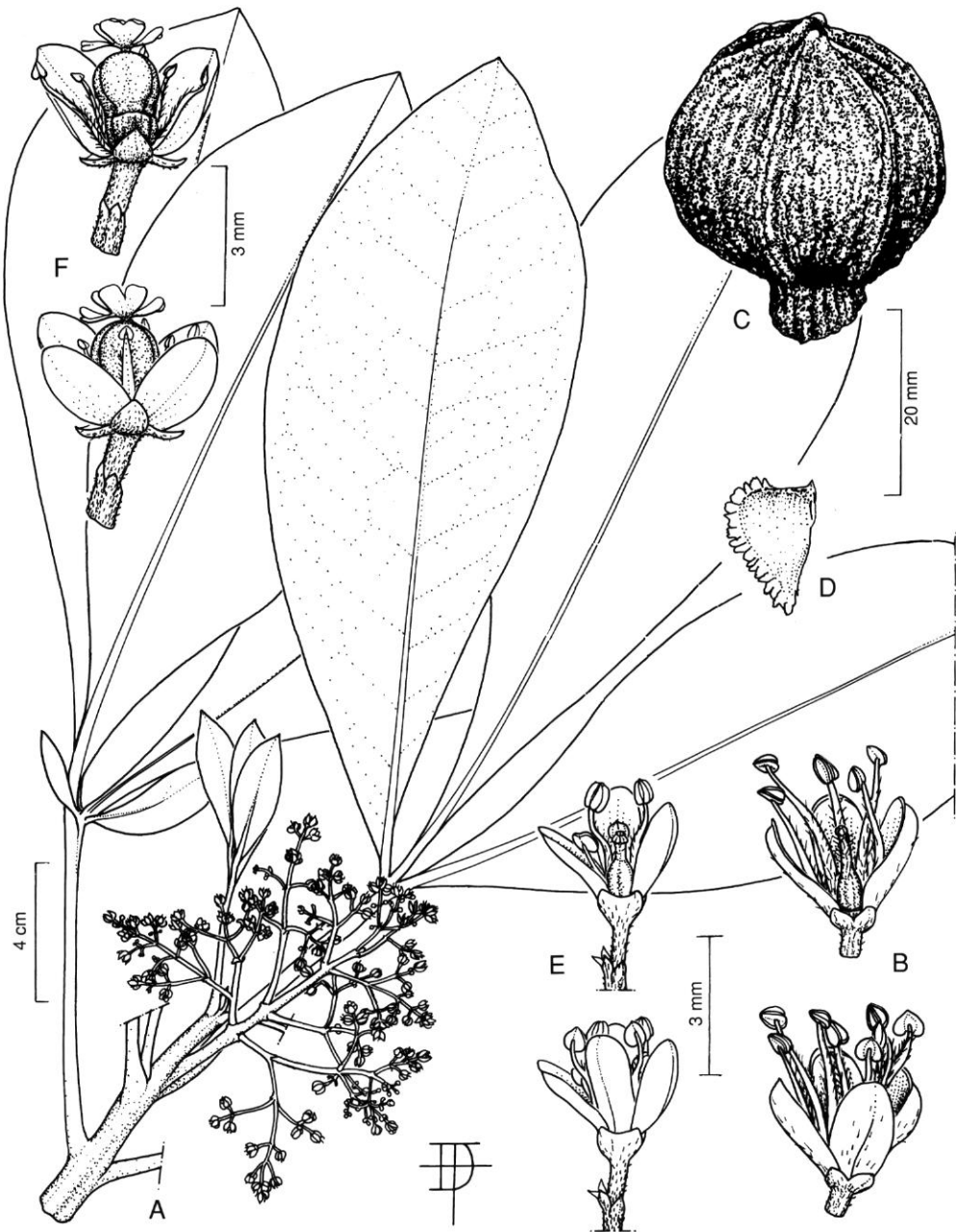


Fig. 7.—*Crossosperma velutina* (Guillaumin) T.G. Hartley: **A**, flowering branchlet; **B**, functionally staminate flowers; **C**, fruit; **D**, seed.—*Crossosperma cauliflora* T.G. Hartley: **E**, functionally staminate flowers; **F**, functionally carpellate flowers. (**A**, **B**, McPherson 5821; **C**, **D**, MacKee 32612; **E**, MacKee 26612; **F**, MacKee 31222).

2. *Crossosperma velutina* (Guillaumin) T.G.

Hartley, **comb. nov.**

Melicope velutina Guillaumin, Mém. Mus. Natl. Hist. Nat., sér. B, Bot. 8: 68 (1957).—Type: *Baumann-Bodenheim* 15267, Nouvelle-Calédonie, Mois de Mai, 350 m, 16 Aug. 1951, bud ♂ (holo-, P!; iso-, L, NY!).

Tree 3-15 m high. Young branchlets and terminal bud velutinous. Leaves 3- or 5-foliolate, 16-56 cm long; petiole velutinous at least adaxially toward base, 5.5-17 cm long; terminal petiolule 8-35 mm long; leaflet blades coriaceous, nearly glabrous or velutinous (at least on midrib) below, glabrous or with puberulent to short-velutinous midrib above, obovate or oblanceolate (in reduced leaflets sometimes elliptic), in terminal leaflet 10-35 × 3.5-15 cm, the base in lateral leaflets acute to attenuate, often inequilateral, in terminal leaflet narrowly cuneate to attenuate, apex acute or sometimes rounded, emarginate, obtuse,

or subacuminate. Inflorescences axillary, many-flowered, 9-13 cm long, axis and branches puberulent or short-velutinous, pedicels puberulent or sparsely so, 0.6-1.5 mm long. Flowers ♂: sepals connate at base or up to 1/2 their length, sparsely puberulent, 0.6-1 mm long, the free portion ovate-triangular or triangular; petals white, nearly glabrous or sparsely puberulent abaxially, glabrous adaxially, elliptic, about 3 mm long; staminal filaments pilose in proximal 1/2-3/4, especially adaxially; antesealous stamens 3-4 mm long, anther 0.6-0.8 mm long; disc pubescent distally, otherwise glabrous, 1-1.5 mm long; rudimentary gynoecium pubescent, stipe 0.6-1 mm long, ovary about 0.15 mm diam., stigma about 0.15 mm wide. Fruit 4- to 8-loculate, yellow, sparsely pubescent or with at least sparse, minute trichomes toward base, 4- to 8-angled, suborbicular in outline, 20-35 mm diam. (stipe 6-10 mm long excepted). Seeds 1 or sometimes 2 per locule, 11-15 × 8-10 mm.—Fig. 7A-D.

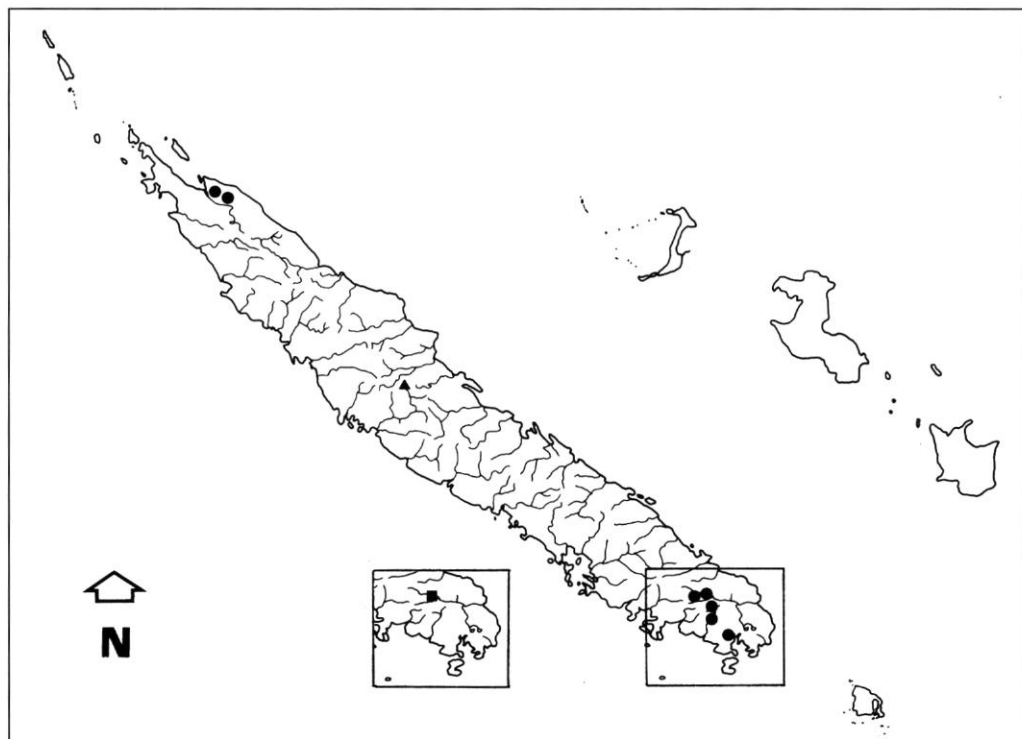


Fig. 8.—Distributions of *Crossosperma cauliflora* T.G. Hartley (triangle), *C. velutina* (Guillaumin) T.G. Hartley (dots), and *Dutaillopsiopsis gordonii* T.G. Hartley (square).

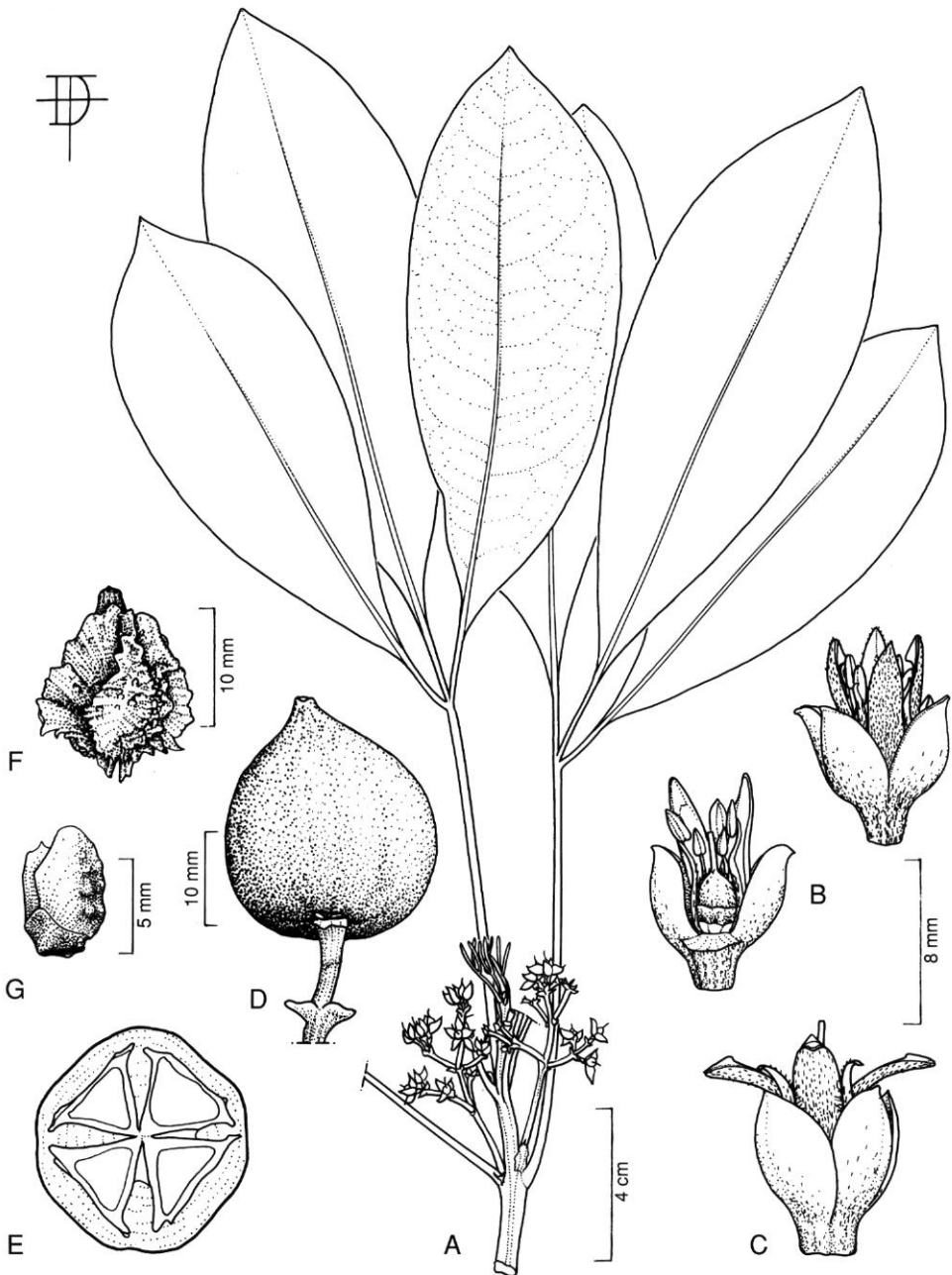


Fig. 9.—*Dutaillopiopsis gordonii* T.G. Hartley: **A**, flowering branchlet; **B**, flowers at anthesis; **C**, post-anthesis flower; **D**, fruit; **E**, transverse section of fruit showing endocarp; **F**, outer surface of endocarp; **G**, seed. (A-C, Veillon 5993; D-G, McPherson 5844).

DISTRIBUTION AND ECOLOGY.—Disjunct between northern and southern New Caledonia (Fig. 8); rain forest from 150 to 700 m; on ultrabasic soil except in the north.

ADDITIONAL SPECIMENS EXAMINED.—NEW CALEDONIA: *MacKee* 32612, Riv. Bleue, 150 m, 9 Jan. 1977, fr. (CANB); *McPherson* 4194, below Mandjéla, 600 m, 23 Sep. 1981, fr. (CANB); 4474, Riv. Bleue, 150 m, 15 Dec. 1981, fr. (CANB); 5821, valley of Riv. des Pirogues, 350 m, 4 Oct. 1983, fl. ♂ (CANB); 6576, Mandjéla, 600-700 m, 12 May 1984, fl. ♂ (CANB); *Nothis* 571, Ouégoa, Forêt du Bonhomme, 9 Aug. 1967, fr. (NOU); *Rigault* (leg. *Dagostini & Favier*) 40, Riv. Bleue, 8 Sep. 1992, fl. ♂ (CANB); *Veillon* 2031, Riv. Bleue, 150 m, 12 Sep. 1969, fl. ♂ (CANB, NOU); 4400, Riv. Bleue, 200 m, 27 Aug. 1980, bud ♂ (CANB); 4406, Forêt Nord, 200 m, 21 Jan. 1981, fr. (CANB); 5364, hte. Riv. des Pirogues, 16 Dec. 1982, fr. (CANB); 5937, Riv. Bleue, 14 Nov. 1985, fr. (CANB).

Crossosperma velutina is characterized mainly by its axillary inflorescences, its 4- to 8-loculate fruit, and its possession of indumentum on the disc, rudimentary gynoecium, and fruit. As mentioned, its functionally carpellate flowers are unknown.

The collections from northern New Caledonia (*Nothis* 571, *McPherson* 4194 and 6576) have leaflet blades that are nearly glabrous, whereas in those from the southern part of the island the blades are velutinous below, at least on the midrib. There also appears to be a marked phenological difference, with flowering occurring in May in the north and in September-October in the south. These dissimilarities may be taxonomically significant, but on the data at hand I prefer to recognize only one taxon.

DUTAILLIOPSIS gordonii T.G. Hartley, **gen. et sp. nov.**

Arbor 8-10 m alta, trichomatibus simplicibus; ramulis novellis ut petiolis, petiolulis, et pedunculis glabris et glaucis; gemma terminali glabra; foliis oppositis, suboppositis, vel verticillatis (in quoque nodo 3), digitate 3-foliolatis, 25-42 cm longis; petiolo 10-17 cm longo; petiolulis 5-40 mm longis; foliolorum laminis subcoriaceis, glabris, pellucido-punctatis, pinnatinerviis, elliptico-obovatis, obovatis, vel oblanceolatis, 13-21 × 4-9 cm, basi attenuatis, in foliis lateralibus inaequilateralibus,

marginis integris, apice acutis; inflorescentiis thyrsiformibus, axillaribus, plurifloris, 3-7 cm longis, axe glabro, ramis fere glabris usque puberulis, pedicellis appresse pubescentibus, 2.5-3 mm longis; floribus actinomorpha, bisexualibus; sepalis 4, basi connatis, glabris vel basin versus sparse pubescentibus, ovatis, ca. 5 mm longis, in fructu deciduis; petalis 4, cremeis, distinctis, valvatis, abaxialiter appresse pubescentibus, adaxialiter in 1/3 proximali sparse pubescentibus, anguste ellipticis, ca. 8 mm longis, adaxialiter apice uncinatis, recurvescentibus, in fructu deciduis; staminibus 4, distinctis, antesepalis, cum staminodiis 4 distinctis alternantibus, ca. 7 mm longis (staminodiis ca. 5 mm longis), filamento in 1/2-3/4 proximali pubescenti, sublineari, apice subulato (filamento in staminodiis idem), anthera ellipsoidea, ca. 2 mm longa, obtuse mucronata, dorsifixata, introrsa (anthera in staminodiis complanata, ca. 1 mm longa); disco intrastaminali, glabro, pulvinato, inconspicue 8-lobato, ca. 1 mm alto; gynoecio omnino syncarpo, 4-loculato, 4-carpellato, glabro, ovario conoideo, ca. 1.5 mm longo, placentatione axiali, ovulis in quoque loculo 2, superpositis, stylo recto, 2-4 mm longo, stigmatibus punctiformi; fructu omnino syncarpo, drupaceo, 4-loculato, flavo-aurantiaco, glabro, ovoideo usque subgloboso, ca. 25 mm longo, apice abrupte angustato, epicarpio carnoso, endocarpio duro-cartilagineo, pagine exterior manifeste serrato-alata et acute tuberculata, pagina interior foveata sed aliter laevigata; seminibus in quoque loculo 1, ± triquetris, ambitu asymmetricis ellipticis, 7-8 mm longis, asperis, in parte chalazali nigris et paulo amplificatis, aliter rubiginosis vel nigricantibus, funiculo luteo, carnoso, persistenti; testa exterior tenui, subcarnosa, testa interior crassa, nigra, sclerenchymata; endospermio copioso; embryo recta, cotyledonibus complanatis, ellipticis.

TYPE.—*McPherson* 5844, New Caledonia, Rivière Bleue Reserve, 150 m, 7 Oct. 1983, fr. (holo-, CANB; iso-, MO, P).

Tree 8-10 m high, trichomes simple. Young branchlets like the petioles, petiolules, and peduncles glabrous and glaucous (the bloom exfoliating and usually becoming black); terminal bud glabrous. Leaves opposite, subopposite, or in whorls of 3, digitately 3-foliolate, 25-42 cm long; petiole 10-17 cm long; petiolules 5-40 mm long; leaflet blades subcoriaceous, glabrous, pellucid-dotted, pinnately veined, elliptic-obovate, obovate, or oblanceolate, 13-21 × 4-9 cm, base attenuate, inequilateral in lateral leaflets, margin entire, apex acute. Inflorescences thyrsiform, axillary, several-flowered, 3-7 cm long, axis glabrous, branches nearly glabrous to puberulent, pedicels appressed-pubescent, 2.5-3 mm long.

Flowers actinomorphic, bisexual; sepals 4, connate at base, sparsely pubescent toward base or glabrous, ovate, about 5 mm long, deciduous in fruit; petals 4, cream, distinct, valvate, appressed-pubescent abaxially, sparsely pubescent in proximal 1/3 adaxially, narrowly elliptic, about 8 mm long, hooked adaxially at apex, becoming recurved, deciduous in fruit; stamens 4, distinct, antesealous, alternating with 4 distinct staminodes, about 7 mm long (staminodes about 5 mm long), filament pubescent in proximal 1/2-3/4, sublinear, subulate at apex (filament the same in staminodes), anther ellipsoid, about 2 mm long, obtusely mucronate, dorsifixed, introrse (anther in staminodes flattened, about 1 mm long); disc intrastaminal, glabrous, pulvinate, inconspicuously 8-lobed, about 1 mm high; gynoecium completely syncarpous, 4-loculate, 4-carpellate, glabrous, ovary conoidal, about 1.5 mm long, placentation axile, ovules 2 per locule, superposed, style straight, 2-4 mm long, stigma punctiform. Fruit a completely syncarpous, yellow-orange, 4-loculate drupe, ovoid to subglobose, about 25 mm long, apex abruptly narrowed; epicarp fleshy; endocarp hard-cartilaginous, outer surface manifestly serrate-winged and sharply tuberculate, inner surface pitted but otherwise smooth and polished. Seeds 1 per locule, \pm triquetrous, asymmetrically elliptic in outline, 7-8 mm long, rough, black and somewhat enlarged at chalazal end, otherwise reddish brown or blackish, with yellow, fleshy, persistent funiculus; testa with thin, subfleshy outer layer and thick inner layer of dense, black sclerenchyma; endosperm copious; embryo straight, cotyledons flattened, elliptic.—Fig. 9.

ETYMOLOGY.—From *Dutaillyea* and the Greek *opsis*, likeness, referring to the similarity to that genus. The specific epithet commemorates Gordon MCPHERSON of Missouri Botanical Garden, who collected the type.

DISTRIBUTION AND ECOLOGY.—Known only from the type locality, in southern New Caledonia (Fig. 8); rain forest from 150 to 200 m; on ultrabasic soil.

ADDITIONAL SPECIMENS EXAMINED.—(all from

the type locality): *Veillon* 5895, 180 m, 5 Jan. 1985, bud (CANB); 5993, 170 m, 9 Apr. 1986, fl. (CANB); 7269, 200 m, 20 June 1990, fr. (CANB).

Dutailloipsis is characterized mainly by its simple trichomes, opposite or whorled, digitately 3-foliolate leaves, bisexual flowers, 4-merous calyx and corolla, 8-merous androecium consisting of 4 distinct stamens alternating with 4 distinct staminodes, punctiform stigma, syncarpous, drupaceous, 4-loculate fruit, and manifestly sculptured endocarp.

The endemic New Caledonian genus *Dutaillyea* Baill. (see HARTLEY 1984) appears to be the closest relative of *Dutailloipsis*, sharing with it a number of features including opposite, digitately 3-foliolate leaves, bisexual flowers, 4-merous calyx and corolla, 8-merous androecium consisting of 4 distinct stamens alternating with 4 staminodes, small stigma, and syncarpous, drupaceous, 4-loculate fruit. Unlike *Dutailloipsis*, among other differences, its trichomes are compound (stellate to lepidote), its staminodes are epipetalous, and its endocarp is not sculptured.

In its sharply sculptured endocarp and thick sclerostea *Dutailloipsis* is highly specialized for endozoochory. I have not seen similar endocarp elsewhere in the Rutaceae.

Acknowledgements

I wish to thank the directors and curators of the herbaria mentioned in the text for making specimens in their care available to me. Sincere thanks are also extended to Jean-Marie VEILLON, who made special trips afield to collect the flowering material of *Dutailloipsis*, to Madame Christiane TIREL, who, as mentioned, provided helpful information on duplicates of *Crossosperma* housed at P, and to Donald FORTESCUE, who prepared the line drawings.

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