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PITTOSPORACEAE

R.A. Kerrigan, D.J. Dixon & I.D. Cowie

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PITTOSPORACEAE

R.A. Kerrigan, D.J. Dixon & I.D. Cowie

Trees, shrubs or climbers, sometimes spiny, often twining or flexuous; indumentum absent or of simple, T-shaped or clavate-glandular hairs. *Leaves* simple, alternate, crowded at leaf tips, entire or lobed, leathery; stipules absent. *Inflorescences* terminal or axillary, in short corymbs or cymose panicles, or solitary; bracteoles 2. *Flowers* bisexual or functionally unisexual, polygamous, superior. *Sepals* 5, free or connate. *Petals* 5, usually free or weakly connate at base. *Stamens* 5, alternate with petals, free or connate at base; anthers tetrasporangiate and dithecal, opening by longitudinal slits or terminal pores. *Gynoecium* of 2 (3–5) carpels united to form a compound, unilocular or seldom plurilocular ovary; style terminal, stigma capitate or lobed. *Ovules* several to numerous. *Fruit* a capsule or berry. *Seeds* numerous per fruit, often immersed in a viscid pulp.

A family with perhaps nine genera and *c.* 240 species in the tropics and warm temperate regions of the Old World. In Australia perhaps nine genera and *c.* 40 species occur naturally. Scarcely used for economic benefit, but some species used as cultivated ornamentals (*Hymenosporum*, *Pittosporum*) and timber (*Pittosporum*).

Taxonomic references: Cufodontis (1966); Cronquist (1981); Mabberley (2000, 2008); Hyland *et al.* (2003).

1	Shrub with spines on stems, more so on young shoots; fruit thin walled and brown, less than 10 mm long; lower leaf surface densely hairy	**Bursaria**
1:	Trees or shrubs without spines on stems; fruit woody or thin walled but more than 10 mm long; lower leaf surface glabrous or sparsely hairy	**2**
2	Hairs simple; flowers always bisexual; seeds not resinous	**Auranticarpa**
2:	Hairs if present T-shaped; flowers often functionally unisexual; seeds usually resinous	**Pittosporum**

AURANTICARPA L. Cayzer, Crisp & I. Telford

Small to medium sized *tree*; indumentum of simple hairs or glabrous. *Juvenile leaves* sometimes aristate, margins slightly crenulate or prominently sinuate and toothed or angular-dentate. *Adult leaves* simple, alternate, margins entire or undulate or slightly crenulate to angular-toothed. *Inflorescence* terminal, corymbose. *Bracts* varying from leaf-like to linear, caducous; bracteoles tiny, persistent. *Flowers* bisexual, aromatic. *Sepals* spreading from base, yellow-green. *Petals* spreading from base and not cohering, creamy white. *Anthers* sagittate. *Ovary* globose, with 2 or rarely more locules, often densely hairy on lower half; often on membranous receptacle with all parts ridged, almost fluted; nectary small at base of gynophore; style stout, stigma insignificant. *Fruit* pear-shaped to tetragonal, bright orange-red when fresh, sometimes paler or more yellow-orange. *Seeds* either solitary or few, angular-reniform to hemispherical, not sticky, black, glossy.

Genus of six species in northern Australia (W.A., N.T., Qld) and N.S.W.; one species in the N.T.

Taxonomic reference: Cayzer *et al.* (2000a).

A. melanosperma (F. Muell.) L. Cayzer, Crisp & I. Telford

Pittosporum melanospermum F. Muell.

Tree to 10 m or shrub; bark tessellated; indumentum of simple hairs sparse on new shoots and peduncles, glabrescent with age. *Petiole* 6–27 mm long, channelled. *Juvenile leaves* with coarsely dentate margins, teeth spinescent. *Adult leaves* with the lamina elliptic, obovate, linear-oblanceolate or oblanceolate, 57–140 mm long, 10–53 mm wide, base cuneate, margins entire to slightly undulate, apex rounded with prominent mucro. *Inflorescence* terminal, paniculate. *Flowers* bisexual, aromatic. *Pedicel* to 5 mm long; bracts and bracteoles persisting, *c.* 1–2 mm long. *Sepals* 5, ovate, to 2 mm long, margins sparsely pubescent. *Petals* 5, oblanceolate, to 8 mm long, twisting and spreading, sparsely pubescent on outer surface, white or

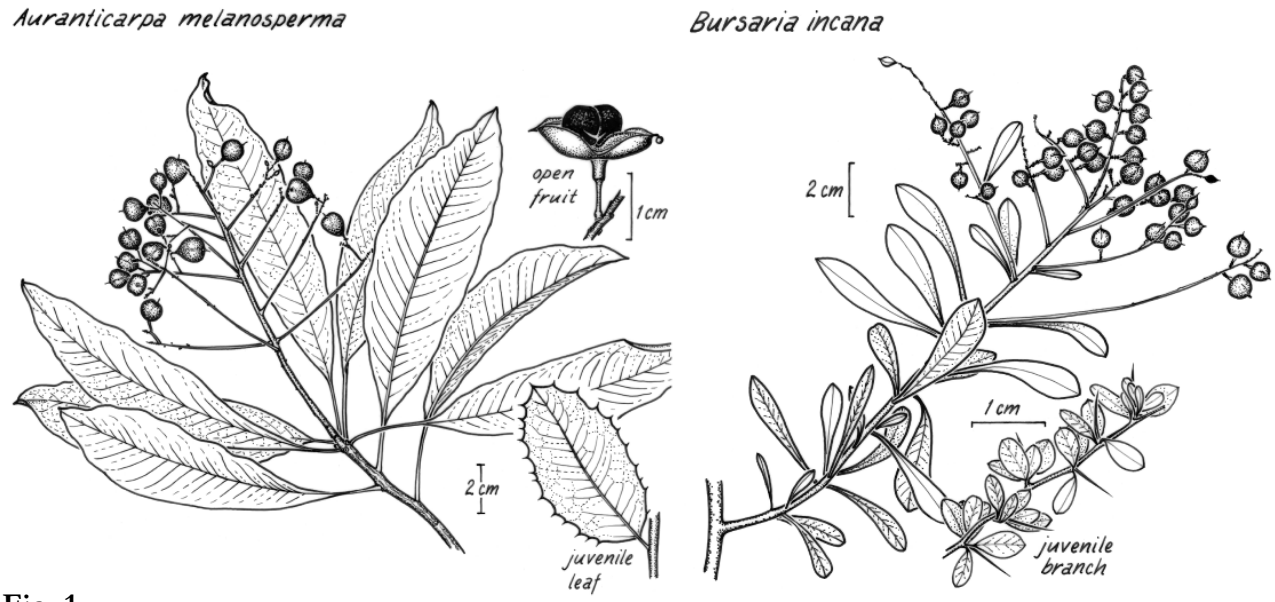

Fig. 1

cream. *Stamens* to 8 mm long; anthers orange. *Ovary* globular to ovoid, to *c.* 2.5 mm long, slender, stipitate, ridged, densely hairy, 2-locular, on a wide frilly receptacle; style short, stigma insignificant. *Fruit* pear-shaped, slightly flattened, 9–13 mm long (including stipe), thin walled, rugulose, orange-yellow. *Seeds* 1–3, angular, ridged. *Flowering*: Jan.–Sept. *Fruiting*: Jan.–Oct.

Fig. 1 (*Cowie 7865* & *5864*; *Hearne 589*; *Wilson 1289*); Pl. 1 (unvouchered).

Australia (N.T., Qld). In the N.T. most populations occur around Darwin, in Litchfield N.P. and the Douglas Daly region but the species extends south to Nitmiluk N.P. and east to Kakadu N.P. and central Arnhem Land. Mainly found in open eucalypt woodlands or mixed forest and occasionally adjacent creeks and rivers; often on sandy soils.

BURSARIA Cav.

Shrubs to medium trees; stems spinescent, more so on young shoots; indumentum of simple hairs or glabrous. *Juvenile leaves* with dentate margins, sometimes almost lobed, rarely almost entire. *Adult leaves* alternate, occasionally petiolate but mostly sessile, margins entire, thickened, slightly recurved, occasionally lobed. *Inflorescence* terminal, solitary or paniculate. *Bracts* caducous; pedicels difficult to distinguish from peduncles. *Flowers* usually bisexual and protandrous or unisexual, aromatic. *Sepals* more or less persistent, spreading from base, creamy green. *Petals* spreading from base, creamy white. *Anthers* slightly sagittate. *Ovary* stipitate, very compressed, usually with 2 locules, hairy or glabrous; style stout, stigma insignificant, always slightly cleft. *Fruit* purse-shaped, usually compressed, chartaceous, sometimes persistent and woody, and loculicidally and part septicidally dehiscent, eventually brown. *Seeds* 1–6 per loculus, kidney-shaped, flat, dark red-brown.

Australian genus of eight species. Represented in all States and with one species in the N.T.

Taxonomic reference: Cayzer *et al.* (1999).

B. incana Lindl.

Small *tree* to 8 m; bark light to dark grey or brown, rough, platey; indumentum of dense simple hairs on new shoots, peduncles and lower surface of leaves, more or less persistent. *Juvenile leaves* usually clustered on short shoots with axillary spines to 7 mm long. *Adult leaves* with an indistinct petiole 0–2 mm long; lamina oblanceolate to narrowly elliptic, 7–83 mm long, 1–19 mm wide; base long-attenuate, margin entire, slightly recurved, apex rounded to acute, mucronate, spines usually absent, abaxial surface tomentose. *Inflorescence* appearing umbellate or cymose, terminal on very short axillary shoots, sometimes appearing umbellate or cymose. *Flowers* bisexual. *Pedicel* to 2 mm long; bracteoles triangular *c.* 1 mm

long. *Sepals* ovate, widely elliptic or obovate, 1–2 mm long, densely pubescent. *Petals* free, oblanceolate, 5–7 mm long, spreading from base, glabrous, white. *Stamens* 4.5–11 mm long. *Ovary* 2–4 mm long, mostly glabrous but more or less hairy at base; style short, stigma insignificant. *Fruit* widely elliptic to orbicular, 6–9 mm long, 5.5–10 mm wide, dehiscing partly along both septum and locules, thin walled, smooth, brown. *Seeds* 1–3 per loculus, flat with occasional T-shaped hairs. *Flowering*: Feb.–Apr., Sept. *Fruiting*: Apr.–Sept.

Fig. 1 (*Dunlop 8548*; *Brennan 4069*).

Australia (N.T., Qld). In the N.T. known from scattered patches from Port Keats to Bulman. Grows in *Eucalyptus miniata*/*E. tetrodonta* woodland or on the margins of *Allosyncarpia* forest, usually on sandy soils of varying depths; occasionally elsewhere.

PITTOSPORUM Banks & Sol.

Shrubs or slender trees; indumentum of T-shaped hairs, white, clear, golden-brown or rusty, glabrescent; spinescent short shoots rare (absent in N.T. material examined). *Juvenile leaves* toothed to lobed, becoming entire. *Adult leaves* simple, alternate, margins usually entire. *Inflorescence* terminal, rarely axillary, paniculate. *Bracts* and bracteoles few, insignificant, rapidly caducous. *Flowers* usually functionally unisexual and species dioecious, rarely some flowers bisexual and plants andromonoecious, all flowers on prominently lobed or entire nectary glands and variably aromatic. *Sepals* spreading, rarely coherent in a cup; colour similar to petals. *Petals* usually barely cohering in a tube towards the middle of the throat or rarely at base, strongly reflexed or recurved at apex, or free, white-cream, yellow, green or deep maroon, often streaked yellow. *Male flowers* usually appearing bisexual with slender pistils; stamens exserted, anthers oblong to ovoid, rarely sagittate. *Female flowers* obviously unisexual, the usually sagittate anthers small and shrivelled; ovary globose, unilocular, often densely hairy on lower half; style very short, stigma prominently lobed or capitate. *Bisexual flowers* if present, usually similar to male flowers but with more pistil development. *Fruit* capsular, globose, pear-shaped or cylindrical, unilocular, thick, woody and rugulose, usually yellow-orange. *Seeds* numerous, angular, bright red or orange, often immersed in a viscid resin.

Genus of *c.* 100 species, with 20 in Australia (N.T., Qld, N.S.W.); two species and one subspecies in the N.T.

The brightly coloured seeds are typically dispersed by birds.

Taxonomic reference: Cayzer *et al.* (2000b).

1	Leaves 6–14 mm wide (arid zone only)	**P. angustifolium**
1:	Leaves more than 14 mm wide (monsoonal tropics)	**2**
2	Indumentum of brown to ferruginous hairs; fruit not woody, with fewer than 20 seeds	**P. ferrugineum** subsp. **ferrugineum**
2:	Indumentum of sparse hyaline hairs, fruit woody, with more than 20 seeds	**P. moluccanum**

P. angustifolium Lodd.

P. phillyreoides auct. non DC.

Tree to 10 m; bark thick, fissured, fibrous or flaky, indumentum of hyaline T-shaped hairs (appearing simple) on new shoots and peduncles, glabrescent with age. *Petiole* 5–19 mm long, channelled. *Lamina* linear, narrowly elliptic, oblanceolate or falcate, 42–120 mm long, 6–14 mm wide, base cuneate, apex acute, acuminate, mucronate, discolorous, pendulous. *Inflorescence* terminal or appearing axillary on very short shoots. *Flowers* functionally unisexual but appearing bisexual. *Pedicel* 5–12 mm long. *Sepals* ovate, *c.* 1.5–3.5 mm long, sparsely pubescent. *Petals* linear or oblanceolate, 8–10 mm long, cohering in throat then recurved, glabrous, creamy white to pale yellow. *Male flowers* in groups of 4 with small pistil; stamens *c.* 5.5–6 mm long. *Female flowers* solitary or paired; staminodal anthers narrow and yellow-brown; ovary ellipsoidal, *c.* 5 mm long, incompletely bilocular or trilocular, villous,

sometimes only at base; style short, stigma flat, bifid or trifid, capitate. *Capsule* globular-ovoid, laterally compressed, tardily dehiscent, 8–21 mm long, 8–16 mm wide, dry, woody, rugose, sparsely pubescent, yellow-orange. *Seeds* numerous, angular to sub-reniform, immersed in sticky mess, red-brown. *Flowering*: May–Sep. *Fruiting*: Mar.–Dec.

Fig. 2 (*Brown 3274*).

Australia (all mainland States). In the N.T., a widespread but never common species of open woodland and *Acacia* shrublands in the southern region and extending north to the Barkly Tableland and Victoria River region.

P. ferrugineum W.T. Aiton subsp. **ferrugineum**

Tree to 10 m tall, dioecious; bark finely fissured; indumentum of tortuous light brown to ferruginous T-shaped hairs (appearing simple) covering leafy twigs, leaves and inflorescences, denser on new growth, glabrescent with age. *Petiole* 9–20 mm long. *Lamina* oblanceolate, obovate or elliptic, 40–138 mm long, 15–51 mm wide, base narrowly cuneate to cuneate, apex acuminate to acute, lower surface with venation raised and prominent. *Inflorescence* umbellate, axillary or pseudoterminal. *Flowers* unisexual. *Pedicel* 2.9–6.2 mm long, densely pubescent. *Sepals* lanceolate, free, 2.9–3.1 mm long, sparsely pubescent with ciliate margins. *Petals* narrowly elliptic, 7.3–9.5 mm long, cohering at throat, with apices free and reflexed, glabrous, cream to yellow. *Male flowers* with pistil to 3.7 mm long and pubescent with light brown hairs; stamens 5–6.3 mm long. *Female flowers* not seen; staminodal anthers shrivelled and not exceeding the stigma; ovary globular, not compressed, with golden-brown hairs; style less than 2 mm long, stigma capitate. *Capsule* ovoid, laterally compressed, 7.8–9.4 mm long, 8.3–9.4 mm diam., bullate, sparsely pubescent, glabrescent. *Seeds* 3–5 mm long, 2.3–3.6 mm wide, angular, red-brown to black, shiny and resinous. *Flowering*: *c.* May–Oct. *Fruiting*: *c.* Apr.–Oct.

Fig. 2 (*Brennan 5760*); Pl. 2 (*Stuckey 702*).

South-east Asia, Australia (N.T., Qld), Papua New Guinea and Solomon Islands. In the D.R. it has been recorded from Berry Springs, Litchfield N.P., and the Tiwi Islands but it has a broader Top End distribution, extending from the Fitzmaurice River to Kakadu N.P. It is found in eucalypt woodland, rainforest, *Allosyncarpia* forest and riparian vegetation on basalt, sand, sandstone and alluvium.

Cayzer *et al.* (2000a) noted that, as currently defined, *P. ferrugineum* is a complex of species requiring investigation throughout its range. They recognised three subspecies as occurring in Australia, the only one in the N.T. being subsp. *ferrugineum*.

P. moluccanum (Lam.) Miq.

Tree to 7 m tall; bark smooth; indumentum of hyaline T-shaped hairs (appearing simple) sparse on new shoots and peduncles, glabrescent with age. *Petiole* 7–24 mm long, channelled. *Lamina* oblanceolate, narrowly elliptic, obovate or elliptic, 67–145 mm long, 25–54 mm wide, base cuneate, apex acute to obtuse, discolorous. *Inflorescence* terminal or axillary in terminal leaves, branched umbels or panicles. *Flowers* unisexual, plants dioecious. *Pedicel* to 5.5 mm long. *Sepals* connate for three-quarters of its length, *c.* 1.8–2.0 mm long, lobes obtuse, sparsely pubescent. *Petals* oblanceolate, *c.* 7–8.7 mm long, free and reflexed for upper one-third, glabrous, white, pungent. *Male flowers* with pistil compressed and to 4.2 mm long, some hairs on ovary stalk; stamens to 5.5 mm long. *Female flowers* with staminodal anthers shrivelled and not exceeding the stigma; ovary globular-obovoid, 5.5–6 mm long, not compressed, with hairs at base; style short, stigma bilobed. *Capsule* globular, laterally compressed, becoming fully reflexed when dehisced, 14–22 mm long, woody, bullate or rugose, sparsely pubescent, orange-brown. *Seeds* numerous, sticky, orange-red, drying black, irregular. *Flowering*: May–Aug. *Fruiting*: Mar.–Aug.

Fig. 2 (*Rankin 2599*; *Taylor 20*); Pl. 3 (unvouchered).

Australia (N.T., W.A.), Malaysia, Timor, Philippines, Sulawesi, Moluccas, Java and the Lesser Sunda Islands. In the N.T. seemingly confined to the D.R. where it mainly grows on stabilised coastal sand-dunes in semi-deciduous vine thicket or on laterite ledges, known localities including Cape Gambier (Melville Island), Lee Point, Shoal Bay and Gunn Point.

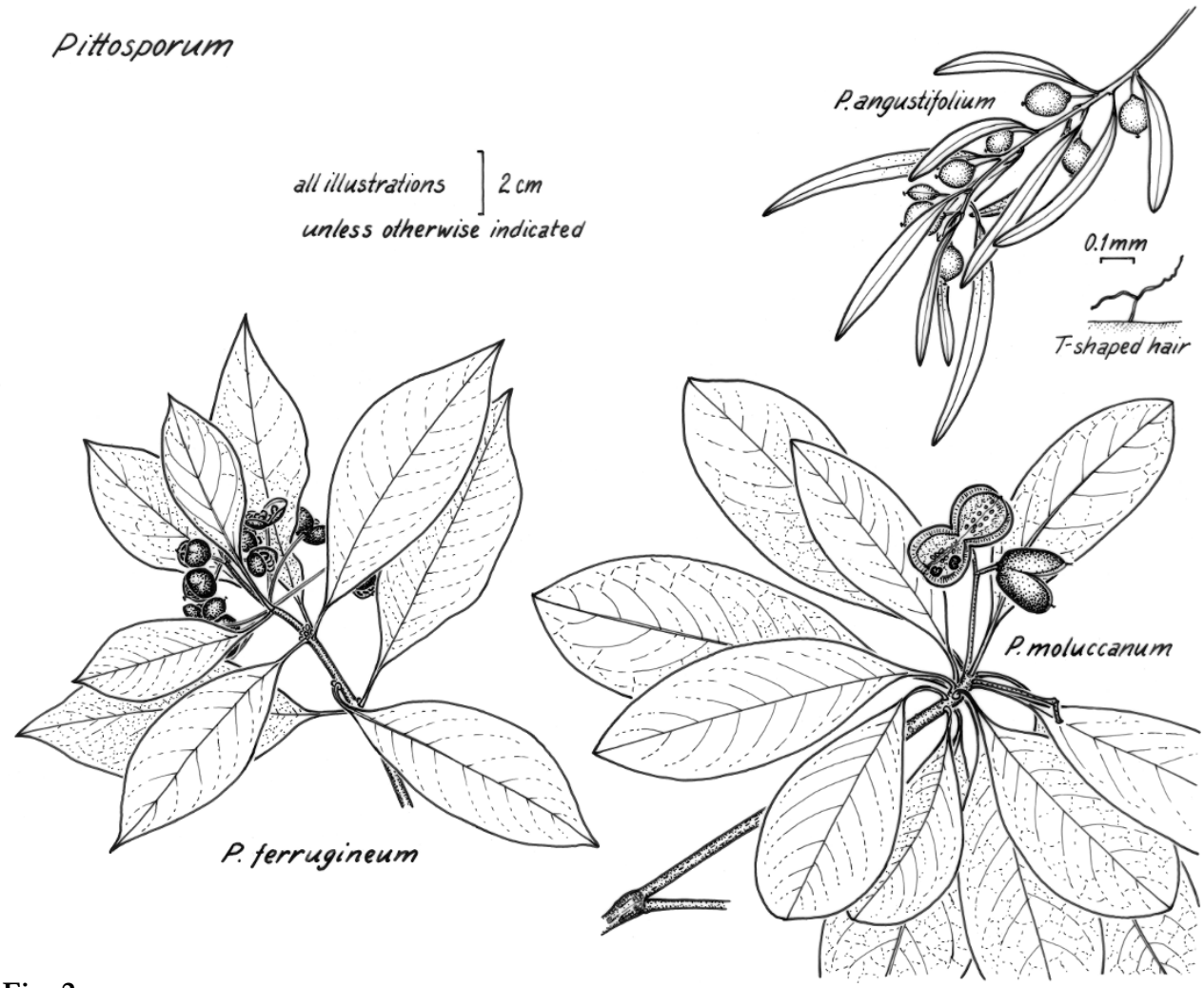

Fig. 2

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Pl. 1 *Auranticarpa melanosperma* (Photos: B.M. Stuckey)

Pl. 2 *Pittosporum ferrugineum* subsp. *ferrugineum* (Photos: B.M. Stuckey)

Pl. 3 *Pittosporum mollucanum* (Photo: J. Brock)