Melaleuca laetifica Craven

PUBLICATION: in Craven & Lepschi, *Australian Systematic Botany* 12: 884 (1999)

DERIVATION: *laetifica*, from the Latin *laetus*, joyful, glad, pleasant and *-fex*, doer, maker, agent, in reference to the pleasing yellow flowers of this species

DESCRIPTION: *Shrub* 0.4–1 m tall. *Branchlets* glabrescent, puberulous to shortly pubescent overlaid with a sparser layer of longer, coarse pubescent hairs. *Leaves* alternate, 5.5–12 mm long, 0.5–1.5 mm wide, 6–20 times as long as wide, subsessile to rarely short-petiolate; blade glabrescent, pubescent, linear-obovate, linear or rarely linear-elliptic, in transverse section transversely elliptic, depressed obovate, circular, the base parallel (blade width equals petiole width) or very narrowly cuneate, the apex acute to rounded, obtusely shortly acuminate or rarely acuminate, the veins longitudinal, 3, *oil glands* moderately dense, distinct, more or less in rows. *Flowers* capitate, pseudoterminal, with 4–10 flowers apparently in monads, up to 23 mm wide. *Hypanthium* hairy, 2.5–3 mm long. *Calyx lobes* abaxially glabrous, 2–2.5 mm long, scarious throughout. *Petals* deciduous, 2.5–4 mm long. *Stamens* 12–20 per bundle; filaments yellow, cream, very pale lemon or creamy-yellow, ageing to pinkish, 9–11.5 mm long, the bundle claw 4–5(–6.5) mm long, 0.4–0.5 times as long as the filaments. *Style* 12–14 mm long. *Ovules* 15–25 per locule. *Infructescences* peg-fruited. *Fruit* 4–6 mm long, the calyx lobes weathering away or rarely replaced by sepaline teeth; cotyledons obvolute.

NATURAL OCCURRENCE: Western Australia: the Kalbarri – Hutt River district.

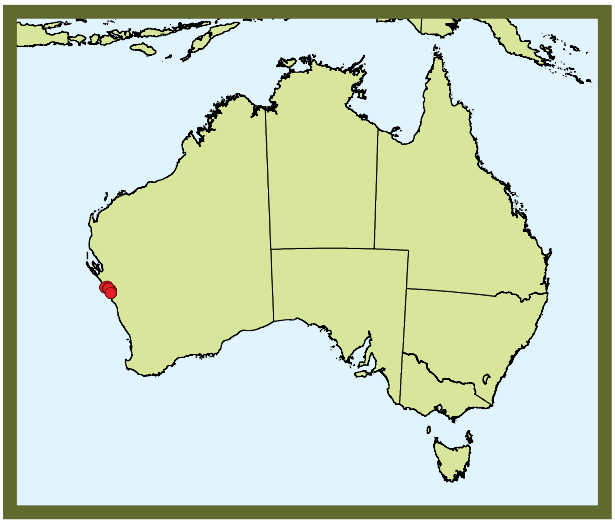
ECOLOGY: Recorded as occurring in heathland with low shrubs, sand plain, low open shrubland, on sandy clay, sandstone, and laterite with sand.

FLOWERING TIME: Recorded as flowering from August to February.

ESSENTIAL OILS: The oil obtained from this species contained significant amounts of both mono- and sesquiterpenes. The principal monoterpene was 1,8-cineole (24–49%) and this was accompanied by lesser amounts of α-pinene (1–5%), linalool (0.8–1.0%) and α-terpineol (1–4%). The principal sesquiterpenes were spathulenol (14–33%), globulol (2–4%), viridiflorol (1–2%) and α-cadinol (1–4%). There was also, however, a considerable number of oxygenated sesquiterpenes, in small amounts, which were not identified.

OIL YIELD: The oil yield (fresh weight, w/w) was 0.3%.

NOTES: Forms of this species with strongly coloured flowers provide a spectacular display and the species warrants further trialling in areas with a dry Mediterranean climate as a small ornamental shrub.



Melaleuca lanceolata Otto

PUBLICATION: in Nees, *Horae physicae Berolinenses collectae* 36 (1820)

DERIVATION: *lanceolata*, from the Latin *lancea*, a light spear, hence *lanceolatus*, lanceolate, in reference to the shape of the leaf blade

SYNONYMS: *Melaleuca lanceolata* subsp. *occidentalis* Barlow; *Melaleuca lanceolata* subsp. *planifolia* Barlow; *Melaleuca lanceolata* subsp. *thaeroides* Barlow

DESCRIPTION: *Shrub or tree* 1–10 m tall. *Branchlets* glabrescent, lanuginulose-puberulous to lanuginulose or rarely puberulous, often with some scattered longer pubescent hairs, rarely approaching sericeous-lanuginulose. *Leaves* alternate, 3.1–12.5 mm long, 0.7–1.9 mm wide, 3–9 times as long as wide, short-petiolate to rarely subsessile; blade glabrescent, lanuginulose to lanuginulose-puberulous, rarely with some puberulous hairs or at the base of the leaf/petiole with sericeous-lanuginulose hairs, very narrowly elliptic, linear-elliptic, very narrowly ovate, linear-ovate, narrowly elliptic or rarely narrowly ovate or linear, in transverse section transversely elliptic (often broady so), depressed obovate or transversely oblong, the base attenuate, the apex obtuse or sometimes rounded, the veins longitudinal, 3, *oil glands* moderately dense, obscure, more or less in rows. *Inflorescences* spicate, pseudoterminal and sometimes also upper axillary, with 3–12 triads, up to 23 mm wide. *Hypanthium* glabrous or glabrescent to hairy, 1.5–3.3 mm long. *Calyx lobes* abaxially glabrous, 0.5–1.5 mm long, scarious in a marginal band up to 0.2 mm wide or herbaceous to the margin. *Petals* deciduous, 1.5–3 mm long. *Stamens* 7–20 per bundle; filaments white, 4.5–7.5 mm long, the bundle claw 1.5–3 mm long, 0.3 times as long as the filaments. *Style* 3.9–9.5 mm long. *Ovules* 30–50 per locule. *Fruit* 3–7.5 mm long, the calyx lobes weathering away or sepaline teeth present (these occasionally reduced to a low rim around the apex of the fruiting hypanthium); cotyledons planoconvex.

NATURAL OCCURRENCE: Western Australia, South Australia, Queensland, New South Wales, Victoria: from southern Western Australia eastwards to southern South Australia, western Victoria, New South Wales and south-eastern Queensland.

ECOLOGY: Recorded as occurring in a wide range of vegetation types, including mallee woodland, closed tall *Melaleuca* woodland, samphire-grassland, brigalow–belah open forest, coastal *Melaleuca–Leptospermum* community, *Casuarina–Acacia* low open woodland with chenopods, coastal heathland, salmon gum woodland, on light brown sand, deep white sand on coastal dunes, on salt lake edge, yellow sand beside creek, red sand dunes, limestone on cliff top, brown clay loam with quartzite outcrops, grey sand over granite, stony calcareous hillside sand over laterite, and on black sandy soil.

FLOWERING TIME: Recorded as flowering from January to December.

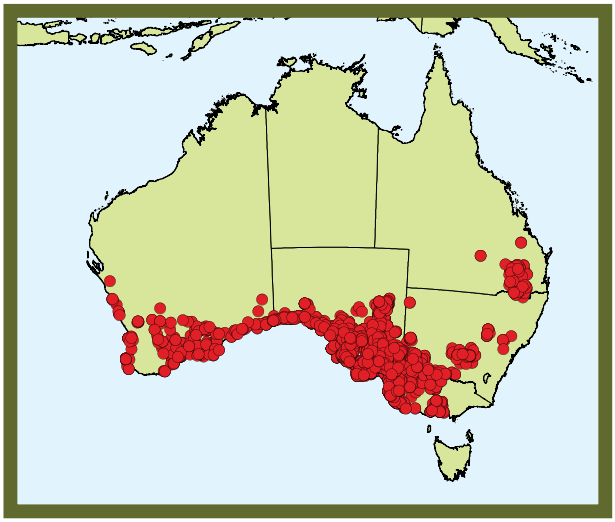
ESSENTIAL OILS: The oil from this species was monoterpenoid in character, though there were significant amounts of sesquiterpenes present. The principal monoterpenes identified were α-pinene (10–20%), 1,8-cineole (21–33%), limonene (3–5%) and α-terpineol (1–3%). A second collection gave α-pinene (7–13%) and 1,8-cineole (48–68%). The main sesquiterpenes encountered were globulol (3–8%), viridiflorol (2–5%) and spathulenol (11–15%).

OIL YIELD: The oil yield (fresh weight, w/w) was poor at <0.1%. The sample containing the larger proportion of 1,8-cineole gave a yield of 0.4%.

NOTES: *Melaleuca lanceolata* is a variable taxon and four subspecies have been proposed previously, i.e. *lanceolata*,

occidentalis, *planifolia* and *thaeroides*. There are certainly some distinctive morphs represented in the available collections but their taxonomic status needs to be clarified. Until the morphological and geographical limits of the morphs are more fully known, the complex is best treated as a single taxon.

The species is suitable for planting in a broad range of environments, from coastal areas that experience salt winds, to saline soil areas, and to calcareous soil regions. Care should be taken to obtain seed for propagating planting stock from an appropriate genotype to optimise performance.



Melaleuca lara Craven

PUBLICATION: in Craven & Lepschi, *Australian Systematic Botany* 12: 885 (1999)

DERIVATION: *lara*, from the Greek *laros*, agreeable, pleasant, lovely, in reference to the attractive flowers of this species

DESCRIPTION: ***Shrub*** 1–1.5 m tall. ***Branchlets*** glabrescent, pubescent. ***Leaves*** alternate, 4.5–8.5 mm long, 2.8–3.8 mm wide, 1.5–3 times as long as wide, subsessile to short-petiolate; blade glabrescent, ciliate with some sparse pubescent hairs on the adaxial and (rarely) abaxial surfaces of the blade also, obovate or elliptic, in transverse section transversely linear, the base cuneate, the apex rounded to obtuse or rarely acute, the veins longitudinal (some poorly developed reticulate veins are present also), 3, ***oil glands*** moderately dense, distinct, more or less in rows. ***Inflorescences*** capitate, pseudoterminal and sometimes also upper axillary, with 2–5 triads, up to 25 mm wide. ***Hypanthium*** hairy, 1.5–3 mm long. ***Calyx lobes*** abaxially glabrous or glabrescent, 0.7–1.5 mm long, scarious throughout or rarely scarious in a marginal band 1–1.1 mm wide. ***Petals*** deciduous, 1.9–3 mm long. ***Stamens*** 9–13 per bundle; filaments yellow, ageing to red, 8–10.5 mm long, the bundle claw 3–4.3 mm long, 0.3–0.5 times as long as the filaments. ***Style*** 12–15.5 mm long. ***Ovules*** c. 15–20 per locule. ***Infructescences*** pegfruited. ***Fruit*** 4–5.5 mm long, the calyx lobes weathering away; cotyledons obvolute.

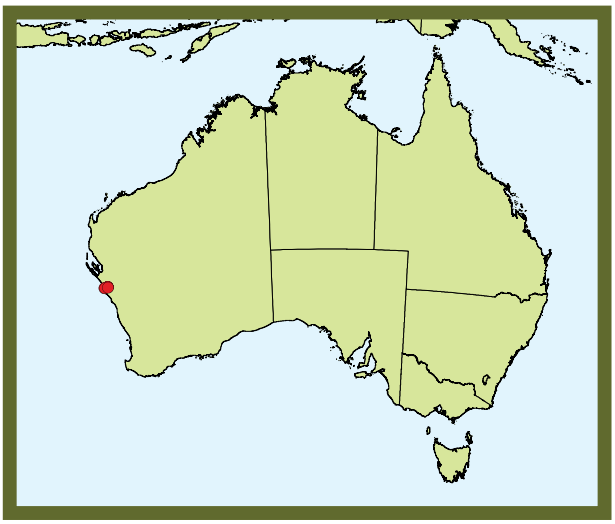
NATURAL OCCURRENCE: Western Australia: the Kalbarri district.

ECOLOGY: Recorded as occurring in heathland, sand plain over river gorge, and on sand.

FLOWERING TIME: Recorded as flowering in September and October.

ESSENTIAL OILS: This species produced a predominantly monoterpenoid leaf oil. The principal monoterpenes encountered were α-pinene (30.8%) and 1,8-cineole (28.1%). These were accompanied by lesser amounts of limonene (2.6%), α-terpineol (4.2%), linalool (1.7%) and β-pinene (1.8%). The principal sesquiterpenes encountered were globulol (4.9%), viridiflorol (2.4%), spathulenol (2.4%) and bicyclogermacrene (4.2%).

OIL YIELD: The oil yield (fresh weight, w/w) was 0.2%.



Melaleuca lasiandra F.Muell.

PUBLICATION: *Fragmenta phytographiae Australiae* 3: 115 (1862)

DERIVATION: *lasiandra*, from the Greek *lasio-*, *lasi-*, hairy, woolly, and *andros*, male, in reference to the hairy staminal filaments

DESCRIPTION: *Shrub or tree* 0.5–8 m tall; bark papery, white or grey-white. *Branchlets* hairy, sericeous to sericeous-pubescent. *Leaves* alternate, 12–50 mm long, 2–11 mm wide, 2–10.5 times as long as wide, short-petiolate; blade hairy, sericeous, narrowly obovate, narrowly elliptic, very narrowly obovate, very narrowly elliptic or obovate, in transverse section transversely linear, the base attenuate, the apex acuminate or acute, the veins longitudinal, 5–7, *oil glands* moderately dense or dense, distinct to rarely obscure, more or less in rows. *Inflorescences* spicate, pseudoterminal and sometimes also upper axillary, with 2–11 triads, up to 22 mm wide. *Hypanthium* hairy, 1.5–2.2 mm long. *Calyx lobes* abaxially hairy, 0.9–1.5 mm long, herbaceous to the margin to rarely scarious in a marginal band up to 0.3 mm wide. *Petals* caducous, 1.8–3 mm long. *Stamens* 6–20 per bundle; filaments hairy, yellow, white, cream, pale greenish or pinkish, 5–9 mm long, the bundle claw 1.2–4.2 mm long, 0.3 times as long as the filaments. *Style* 8–10.5 mm long. *Ovules* 50–60 per locule. *Fruit* 2–3 mm long, the calyx lobes weathering away or the basal portion of the sepals may become more or less woody and persist as a low woody ring or undulations around the aperture; cotyledons planoconvex.

NATURAL OCCURRENCE: Western Australia, Northern Territory, Queensland: from the Pilbara and Kimberley regions of Western Australia eastwards through the Northern Territory to western and south-central Queensland.

ECOLOGY: Recorded as occurring in shrubland, mixed woodland, sand plain, rocky gullies, flood plains, on sand, clayey soil, sand over limestone, sandy loam, sandy gravel, and at base of a granite outcrop.

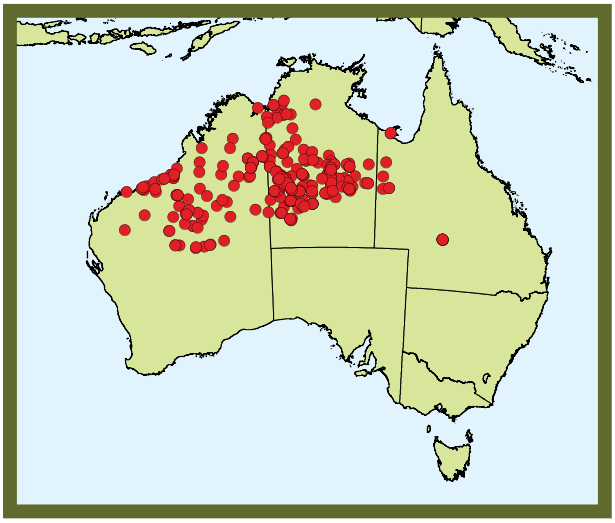
FLOWERING TIME: Recorded as flowering from January to September.

ESSENTIAL OILS: The leaf oil of this species was dominated by monoterpenes. The principal components were α-pinene (24–31%) and limonene (28–32%), with lesser amounts of β-pinene (8–11%), α-terpineol (2–4%), 1,8-cineole (0.1–5.0%) and terpinen-4-ol (1–2%). Sesquiterpenes did not contribute much to the oil, with the major compounds being globulol (0.7–8.0%) and spathulenol (0.2–3.0%). Benzaldehyde (1–2%) was also detected in the oil.

OIL YIELD: The oil yield (fresh weight, w/w) was 0.3%.

REFERENCES ON ESSENTIAL OILS: Brophy et al. 1988; Brophy and Doran 1996

NOTES: The hairy staminal filaments are a very diagnostic feature of *M. lasiandra*. The species was reported by Holliday (2004) to be in cultivation as an ornamental tree in Carnarvon, Western Australia, and it may well be suited for cultivation more widely in arid to semi-arid regions.



Melaleuca lateralis Turcz.

PUBLICATION: *Bulletin de la classe physico-mathématique de l'Académie Impériale des Sciences de Saint-Pétersbourg* 10: 339 (1852)

DERIVATION: *lateralis*, from the Latin *lateralis*, lateral, in reference to the inflorescences being inserted on the branchlets and branches below the leaves

DESCRIPTION: *Shrub* 0.5–1.5 m tall. *Branchlets* soon glabrescent, the lanuginulose to lanuginulose-puberulous to lanuginulose hairs ephemeral. *Leaves* alternate, 2–7 mm long, 0.5–1.3 mm wide, 2.4–6 times as long as wide, subsessile; blade soon glabrescent, the lanuginulose-puberulous to lanuginulose hairs ephemeral, linear-obovate, linear-elliptic, narrowly suboblong or rarely narrowly obovate, in transverse section depressed obovate or semicircular to transversely semielliptic, the base narrowly cuneate or attenuate, the apex obtuse, obtusely shortly acuminate, rounded or rarely bluntly acute, 1-veined, *oil glands* moderately dense, obscure, in rows. *Inflorescences* capitate, lateral, with 4–15 monads, up to 12 mm wide. *Hypanthium* glabrous (rarely with a few scattered puberulous hairs but effectively glabrous), 1–1.8 mm long. *Calyx lobes* abaxially glabrous, 0.3–0.6 mm long, herbaceous to the margin or scarious in a marginal band up to 0.3 mm wide. *Petals* deciduous, 1.2–2.3 mm long. Stamens 4–12 per bundle; filaments pink, reddish-pink or mauve, 4–5.5 mm long, the bundle claw 0.8–1.9 mm long, 0.2–0.4 times as long as the filaments. *Style* 5.5–7 mm long. *Ovules* 35–40 per locule. *Fruit* 2.6–3 mm long, the calyx lobes weathering away (although the woody bases of the lobes may be visible on younger fruits as small undulations); cotyledons planoconvex.

NATURAL OCCURRENCE: Western Australia: from the Stirling Range eastwards to the Lake King district.

ECOLOGY: Recorded as occurring in low mallee with heath understorey, tall shrubland, open mallee woodland, on sandy loam, sand over clay, and gravel.

FLOWERING TIME: Recorded as flowering from August to October.

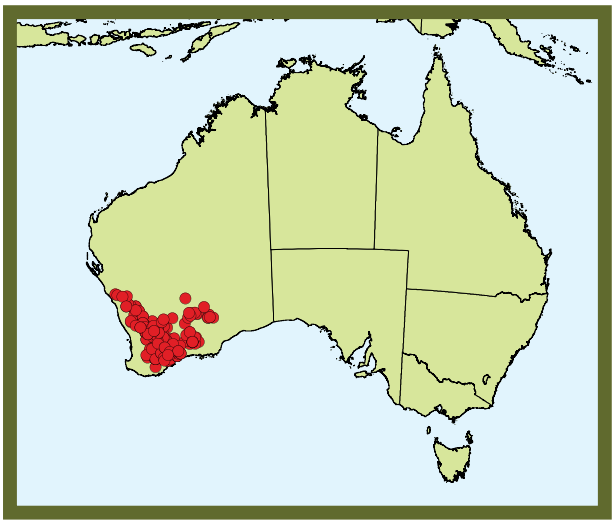
ESSENTIAL OILS: This species presented a monoterpenoid oil. The principal component was 1,8-cineole (64.8%) and this was accompanied by lesser amounts of limonene (7.3%), α-pinene (3%), β-pinene (1.4%), myrcene (1.7%) and α-terpineol (0.9%). Sesquiterpenes, while plentiful, did not contribute much to the oil. The main members were globulol (2.8%), viridiflorol (2.8%), spathulenol (1.1%), cubeban-11-ol (1%) and an unknown oxygenated sesquiterpene (1.3%).

OIL YIELD: The oil yield (fresh weight, w/w) was 0.1%.

NOTES: This species should be trialled more widely for use as an ornamental shrub as the clustered, pinkish to mauve flowers can be very showy.

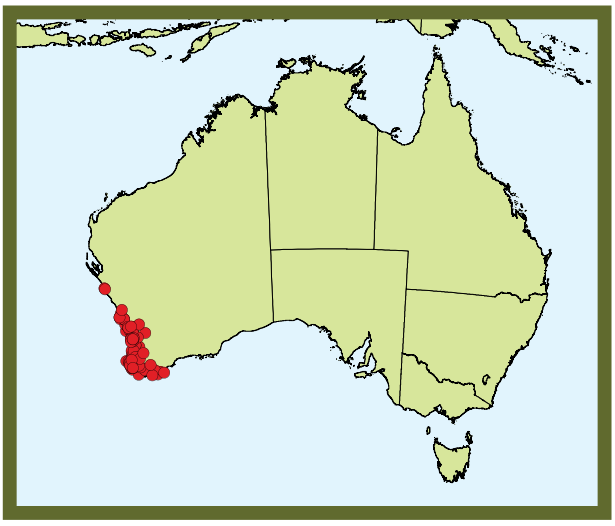
Melaleuca lateriflora Benth.

PUBLICATION: *Flora Australiensis* 3: 136 (1867)
DERIVATION: *lateriflora*, from the Latin *lateralis*, lateral, and *-florus*, flowered, in reference to the inflorescences being inserted on the branchlets and branches below the leaves
DESCRIPTION: *Shrub* 0.2–4 m tall. *Branchlets* soon glabrescent (the lanuginulose hairs ephemeral). *Leaves* alternate, 4–11.5 mm long, 0.7–1.7 mm wide, 5–12 times as long as wide, subsessile to short-petiolate; blade soon glabrescent (the lanuginulose-puberulous to lanuginulose hairs ephemeral), linear, linear-obovate, linear-ovate, very narrowly obovate or very narrowly ovate, in transverse section transversely narrowly elliptic, transversely elliptic, subcircular or flattened transversely semielliptic, the base broadly attenuate or narrowly cuneate, the apex obtusely shortly acuminate, acuminate, narrowly acute, acute or rounded, the veins longitudinal, 3, *oil glands* sparse, obscure, more or less in rows. *Inflorescences* capitate, lateral or pseudoterminal and then approaching interstitial, with 1–15 monads, up to 12 mm wide. *Hypanthium* glabrescent, 1–2 mm long. *Calyx lobes* abaxially glabrescent or glabrous, 0.6–1.2 mm long, herbaceous to (or almost to) the margin. *Petals* deciduous, 1.2–2.3 mm long. *Stamens* 6–13 per bundle; filaments white or creamy-white, 1.5–5.5 mm long, the bundle claw 0.2–0.3 mm long, 0.1–0.4 times as long as the filaments. *Style* 4–6 mm long. *Ovules* 15–40 per locule. *Fruit* 3–5.5 mm long, with sepaline teeth; cotyledons subobvolute (almost planoconvex).
NATURAL OCCURRENCE: Western Australia: from the East Yuna – Mullewa district south to the Stirling Range area and eastwards to the Coolgardie–Zanthus district.
ECOLOGY: Recorded as occurring in low open heath, dense low heath in open shrub mallee, on sand, and damp sandy loam.
FLOWERING TIME: Recorded as flowering from September to January.
ESSENTIAL OILS: The leaf oil from this species contained almost entirely monoterpenes. The principal components were 1,8-cineole (71–80%), α-pinene (4–16%), limonene (1–3%) and α-terpineol (1–6%). Sesquiterpenes contributed less than 5% in total to the oil, with spathulenol (0.7–2.0%) being the largest contributor.
OIL YIELD: The oil yield (fresh weight, w/w) was 0.5–1.8%.
REFERENCE ON ESSENTIAL OILS: Brophy et al. 1990
NOTES: *Melaleuca lateriflora* may be suitable for trialling as a component of mixed-species shelter belts.



Melaleuca ***lateritia*** A.Dietr.

PUBLICATION: *Allgemeine Gartenzeitung* 2: 257 (1834)
DERIVATION: *lateritia*, from the Latin *lateritius*, dark red, in reference to the flower colour
DESCRIPTION: *Shrub* 0.7–3 m tall. *Branchlets* glabrescent, lanuginose-pubescent and often with some lanuginulose hairs also. *Leaves* alternate, 6.5–24.5 mm long, 0.9–1.5 mm wide, 5.5–19 times as long as wide, short-petiolate to subsessile; blade glabrescent, sericeous-lanuginulose to lanuginulose-puberulous or lanuginulose, linear-elliptic, linear-obovate or linear, in transverse section flattened transversely semielliptic, sublunate, transversely narrowly elliptic or shallowly lunate, the base attenuate, the apex narrowly acute to acute or obtuse, the veins longitudinal, 3, *oil glands* dense, distinct to obscure, scattered. *Inflorescences* spicate, lateral, with 60–90 monads, up to 40 mm wide. *Hypanthium* glabrous, 1.8–2.2 mm long. *Calyx lobes* abaxially glabrous, 0.5–1 mm long, herbaceous to the margin or scarious in a marginal band up to 0.3 mm wide. *Petals* deciduous, 1.5–3 mm long. *Stamens* 6–15 per bundle; filaments orange-red to scarlet, 13.5–22 mm long, the bundle claw 1.3–2.5 mm long, 0.07–0.1 times as long as the filaments. *Style* 16.5–22 mm long. *Ovules* 65–80 per locule. *Fruit* 2.8–3.8 mm long, the calyx lobes weathering away.
NATURAL OCCURRENCE: Western Australia: from the Eneabba district south to the Albany district, with an isolated occurrence in the Kalbarri district.
ECOLOGY: Recorded as occurring in seasonally flooded swamp, open eucalypt forest, tall *Melaleuca* shrubland, low shrubland, open swamp woodland, on lake edges, clay pans, sand over clay, peaty soil, clay soil, and laterite.
FLOWERING TIME: Recorded as flowering from August to April.
ESSENTIAL OILS: This species produced a sesquiterpenic oil in poor yield. The principal components were aromadendrene (19.6%), globulol (13.0%), viridiflorene (6.0%), spathulenol (6.6%), β-selinene (4.9%), α-selinene (3.3%) and allo-aromadendrene (2.5%). Monoterpenes were poorly represented, with the main components being α-terpineol (3.5%) and 1,8-cineole (0.6%).
OIL YIELD: The oil yield (fresh weight, w/w) was <0.1%.
NOTES: This species has proved successful as an ornamental shrub in subtropical and temperate regions in Australia.



Melaleuca laxiflora Turcz.

PUBLICATION: *Bulletin de la classe physico-mathématique de l'Académie Impériale des Sciences de Saint-Pétersbourg* 10: 341 (1852)

DERIVATION: *laxiflora*, from the Latin *laxus*, loose, and *-florus*, flowered, in reference to the flowers being loosely or sparsely inserted in the inflorescence

DESCRIPTION: *Shrub* 0.4–2.5 m tall; bark fibrous, dark. *Branchlets* soon glabrescent, the lanuginulose or occasionally lanuginulose-puberulous hairs ephemeral. *Leaves* alternate, 4.5–28 mm long, 1.5–4.5 mm wide, 2.3–8.5 times as long as wide, subsessile; blade very soon glabrescent, the indumentum as on the branchlets, narrowly obovate, very narrowly obovate, narrowly elliptic or very narrowly elliptic, occasionally subfalcate, in transverse section transversely linear or sublunate, the base attenuate, cuneate or rarely rounded, the apex acuminate, obtusely shortly acuminate, acute or rounded, the veins longitudinal, 3, *oil glands* moderately dense or rarely dense, obscure to distinct, more or less in rows to in rows. *Inflorescences* spicate, lateral, with 6–20 monads, up to 23 mm wide. *Hypanthium* glabrous or glabrescent, 2–2.9 mm long. *Calyx lobes* abaxially glabrous or sometimes glabrescent, 0.9–1.2 mm long, scarious in a marginal band 0.2–0.3 mm wide. *Petals* deciduous, 2.3–3.5 mm long. *Stamens* 12–18 per bundle, the bundles occasionally reflexed; filaments mauve, pink or purple, 6–9 mm long, the bundle claw 3.7–5 mm long, 0.5–0.6 times as long as the filaments. *Style* 8–11.3 mm long. *Ovules* 70–80(–110) per locule. *Fruit* 3–5.2 mm long, with sepaline teeth; cotyledons planoconvex.

NATURAL OCCURRENCE: Western Australia: from the Mollerin district south and east to the Ongerup and Norseman districts.

ECOLOGY: Recorded as occurring in open eucalypt shrubland, mallee heathland, low shrubland, open eucalypt woodland with tall *Melaleuca* understorey, on sandy soil, clay loam over laterite, shallow granitic loam, sandy soil with laterite, and clay.

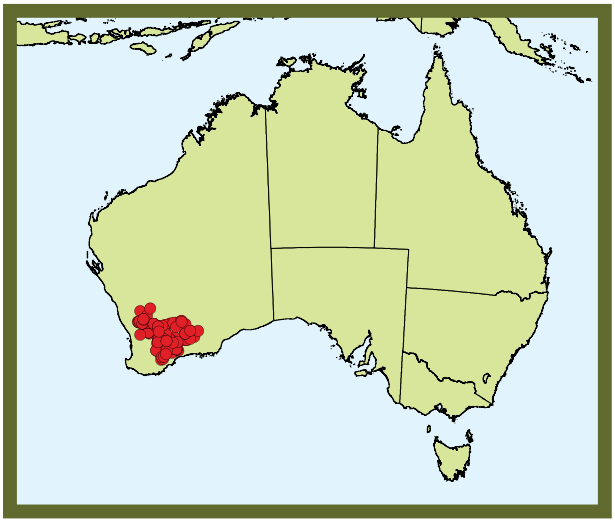
FLOWERING TIME: Recorded as flowering from October to December.

ESSENTIAL OILS: The leaf oil of this species was monoterpenoid in character. The principal components were 1,8-cineole (59–63%), α-pinene (10–15%), limonene (7–8%) and α-terpineol (1–2%). The main sesquiterpenes encountered in the oil were globulol (3–4%), bicyclogermacrene (1–3%) and aromadendrene (0.6–0.9%). All of the many other sesquiterpenes were less than 0.5% of the total oil.

OIL YIELD: The oil yield (fresh weight, w/w) was 0.6–0.8%.

NOTES: Species of the group that includes *M. laxiflora*, i.e. *M. camptoclada*, *M. ctenoides*, *M. depauperata*, *M. glaberrima*, *M. spicigera* and *M. subfalcata*, apparently freely hybridise with each other. Consequently, it is not always possible to identify a plant belonging to this group to a particular species.

Melaleuca laxiflora is relatively commonly cultivated as an ornamental shrub in dry and humid temperate regions of Australia.



Melaleuca lazaridis Craven

PUBLICATION: *Novon* 19: 445 (2009)

DERIVATION: *lazaridis*, in honour of Michael Lazarides (1928–2011), a co-collector of the type specimens of this species and who contributed significantly to our knowledge of the flora of northern Australia over four decades of collecting during CSIRO's land resources surveys

SYNONYM: *Callistemon lazaridis* (Craven) Udovicic & R.D.Spencer

DESCRIPTION: *Shrub* 1–4 m tall; bark fibrous, hard. *Branchlets* glabrescent, lanuginulose to sericeous-pubescent. *Leaves* alternate, 43–119 mm long, 4.5–17 mm wide, 7–17 times as long as wide, short- or long-petiolate; blade glabrescent, sericeous, narrowly elliptic, narrowly ovate, very narrowly ovate or very narrowly elliptic, in transverse section transversely linear, sublunate or obsublunate, the base very narrowly attenuate or very narrowly cuneate, the apex acute, the veins pinnate, 9–29, *oil glands* dense or moderately dense, distinct, scattered. *Inflorescences* spicate, pseudoterminal or interstitial, with 25–60 monads, 35–60 mm wide. *Hypanthium* glabrescent or hairy, 3.8–4.7 mm long. *Calyx lobes* abaxially hairy or glabrescent, 1.4–2 mm long, scarious in a marginal band 0.4–0.9 mm wide. *Petals* deciduous, 4.5–6.5 mm long. *Stamens* 48–59 per flower; filaments red, pink or mauve, 17–23 mm long; anthers yellow. *Style* 24–29 mm long. *Ovules* c. 150–300 per locule. *Fruit* 4.5–5.7 mm long, the calyx lobes deciduous; cotyledons obvolute.

NATURAL OCCURRENCE: Queensland: the Blackdown Tableland district.

ECOLOGY: Recorded as occurring in open forest, on top edge of escarpment, along creek beds, on pale brown sandy loam, skeletal sand over sandstone, weathered sandstone, and gravelly orange-brown sandy loam.

FLOWERING TIME: Recorded as flowering in June, August and September.

ESSENTIAL OILS: This species produced an oil dominated by monoterpenes. The principal components were 1,8-cineole (63.0%) and linalool (14.5%). There were lesser amounts of α-pinene (5.5%), α-terpineol (7.1%), limonene (3.0%) and β-pinene (1.0%). Sesquiterpenes, while present, contributed only minimal amounts to the oil, totalling less than 5%. The most prominent components were β-caryophyllene (1.0%), α-humulene (0.2%) and caryophyllene oxide (0.1%).

OIL YIELD: The oil yield (fresh weight, w/w) was 1.1%.

Melaleuca ***lecanantha*** Barlow

PUBLICATION: in Barlow & Cowley, *Australian Systematic Botany* 1: 113, fig. 8h (1988)

DERIVATION: *lecanantha*, from the Greek *lecano*, dish, and *anthos*, flower, in reference to the dish-like form in which the stamens are presented

DESCRIPTION: *Shrub* 0.2–2 m tall. *Branchlets* soon glabrescent, the lanuginulose hairs ephemeral. *Leaves* ternate or subternate, 3.7–7.5 mm long, 0.5–0.7 mm wide, 5–14 times as long as wide, subsessile; blade soon glabrescent, the lanuginulose hairs ephemeral, linear or linear-elliptic, in transverse section semicircular to transversely semielliptic, shallowly lunate or rarely depressed obovate, the base narrowly cuneate (often to almost parallel), the apex acuminate or acute, the veins longitudinal-pinnate, 5–9 pinnate veins, *oil glands* moderately dense, obscure to distinct, scattered. *Inflorescence* is a lateral monad (rarely 2). *Hypanthium* glabrous, 2.5–3.5 mm long. *Calyx lobes* abaxially glabrous, 1.2–1.5 mm long, scarious in a marginal band 0.2–0.4 mm wide. *Petals* deciduous, 3–3.8 mm long. *Stamens* 19–30 per bundle; filaments pink or lilac-mauve, 4.8–6 mm long, the bundle claw 2–3 mm long, 0.4–0.5 times as long as the filaments. *Style* 7–8 mm long. *Ovules* c. 75–110 per locule. *Fruit* 5–6 mm long, the calyx lobes typically weathering away (rarely some low blunt teeth may variably be present); cotyledons planoconvex.

NATURAL OCCURRENCE: Western Australia: from the Wongan Hills district south to the Nyabing district, and eastwards to the Southern Cross and Lake King districts.

ECOLOGY: Recorded as occurring in low heathland, high open shrubland, closed heath, woodland, on sandy clay, and sand over laterite.

FLOWERING TIME: Recorded as flowering in September and October.

ESSENTIAL OILS: Monoterpenes were the major contributor to this oil. The principal monoterpenes encountered were 1,8-cineole (45.8%) and α-pinene (9.1%). These were accompanied by lesser amounts of limonene (5.7%), myrtenol (1.9%), myrcene (1.4%) and β-pinene (0.9%). The major sesquiterpenes encountered were globulol (8.4%), viridiflorol (1.4%), cubeban-11-ol (2.3%), β-caryophyllene (2%), ledol (1.4%) and viridiflorene (1.1%).

OIL YIELD: The oil yield (fresh weight, w/w) was 0.5%.

Melaleuca ***leiocarpa*** F.Muell.

PUBLICATION: *Fragmenta phytographiae Australiae* 10: 55 (1876)

DERIVATION: *leiocarpa*, from the Greek *leio-*, smooth, and *karpos*, fruit, in reference to the fruiting hypanthia of this species being distinctively smooth

DESCRIPTION: ***Shrub*** 1–5 m tall; bark rough, furrowed, dark grey or grey-black. ***Branchlets*** glabrescent, sericeous-pubescent, rarely with some scattered lanuginulose-puberulous to more or less lanuginose-pubescent hairs also. ***Leaves*** alternate, 6–21.8 mm long, 1.5–5 mm wide, 2.5–8 times as long as wide, short-petiolate; blade glabrescent, sericeous to sericeous-pubescent, narrowly elliptic, very narrowly elliptic, linear-elliptic or elliptic, in transverse section transversely narrowly elliptic, transversely oblong, sublunate, transversely linear or rarely flattened transversely semielliptic, the base attenuate or narrowly cuneate, the apex acuminate or narrowly acuminate, the veins longitudinal, 3, ***oil glands*** moderately dense to sparse, obscure, scattered. ***Inflorescences*** spicate or capitate, pseudoterminal, with 3–14 monads, up to 28 mm wide. ***Hypanthium*** glabrous or hairy, 2–3.2 mm long. ***Calyx lobes*** abaxially glabrous or occasionally hairy, 1–1.8 mm long, scarious in a marginal band 0.4–0.5 mm wide or occasionally scarious throughout. ***Petals*** deciduous, 3–4 mm long. ***Stamens*** 11–22 per bundle; filaments lemon-yellow, 5.5–7 mm long, the bundle claw 2–3.5 mm long, 0.2–0.5 times as long as the filaments. ***Style*** 8–13 mm long. ***Ovules*** 80–100 per locule. ***Fruit*** 3.2–6.8 mm long, the calyx lobes deciduous; cotyledons subobvolute (almost planoconvex).

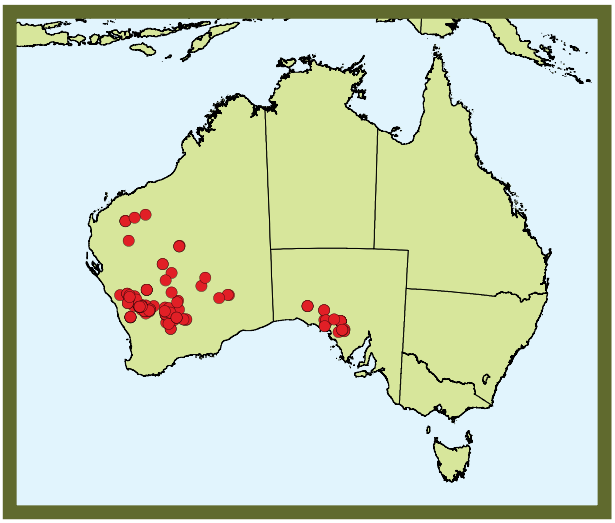
NATURAL OCCURRENCE: Western Australia, South Australia: the arid central-west of Western Australia and the south-central region of South Australia.

ECOLOGY: Recorded as occurring in scrubland, *Melaleuca* shrubland, mallee, sand plain, on dune crest, sand, sandstone, granite, sandy clay, and laterite.

FLOWERING TIME: Recorded as flowering from August to December.

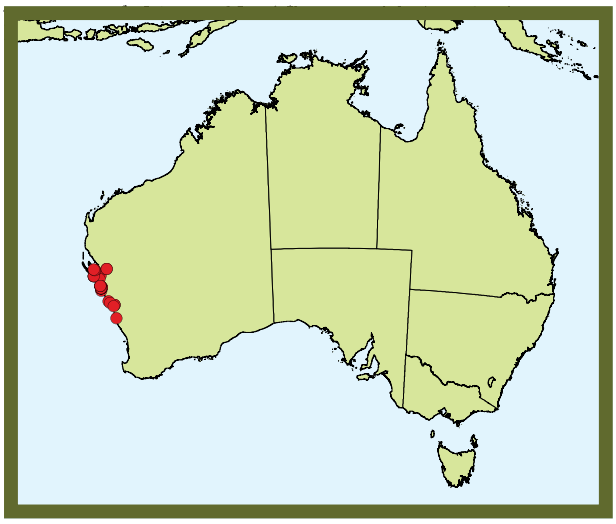
ESSENTIAL OILS: The oil from this species presented an overwhelmingly monoterpenoid oil. The principal component was α-pinene (51.8%) and this was accompanied by lesser amounts of limonene (17.2%), 1,8-cineole (11.6%), camphene (3.3%) and β-pinene (2.5%). Sesquiterpenes, of necessity, were not plentiful, with the principal members being spathulenol (3.0%), globulol (1.0%) and bicyclogermacrene (1.1%).

OIL YIELD: The oil yield (fresh weight, w/w) was 0.3%.



Melaleuca leiopyxis F.Muell. ex Benth.

PUBLICATION: *Flora Australiensis* 3: 160 (1867)
DERIVATION: *leiopyxis*, from the Greek *leio-*, smooth, and *pyxis*, box, hence fruit, in reference to the smooth fruiting hypanthia of this species
DESCRIPTION: *Shrub* 0.6–3 m tall. *Branchlets* glabrescent, with sparse longish pubescent hairs overlying shorter puberulous to pubescent hairs or with these hair types grading into one another. *Leaves* alternate, 7.5–16 mm long, 1–4.2 mm wide, 3–11 times as long as wide, subsessile to short-petiolate; blade glabrescent, pubescent to rarely sericeous-pubescent and usually with some shorter pubescent to puberulous hairs also, very narrowly obovate, narrowly obovate, very narrowly elliptic, linear-obovate, linear-elliptic, narrowly elliptic or linear, in transverse section transversely elliptic to transversely narrowly elliptic or transversely linear, the base attenuate, cuneate or narrowly cuneate, the apex obtusely shortly acuminate, acuminate or obtuse, the veins longitudinal, 3, *oil glands* moderately dense, distinct to obscure, scattered. *Inflorescences* capitate, pseudoterminal and sometimes upper axillary, with 3–4 triads, up to 26 mm wide. *Hypanthium* hairy, 2–3 mm long. *Calyx lobes* abaxially glabrous or hairy, 0.5–2 mm long, scarious throughout or rarely scarious in a marginal band 0.2–0.3 mm wide. *Petals* deciduous, 1.6–3 mm long. *Stamens* (8–)11–14 per bundle; filaments yellow, yellowish-white or cream, 7.3–10.8 mm long, the bundle claw (2.5–)3.5–5(–6.5) mm long, (0.3–)0.4–0.7 times as long as the filaments. *Style* 11.5–13.5 mm long. *Ovules* 15–20 per locule. *Infructescences* peg-fruited. *Fruit* 4.5–6.5 mm long, the calyx lobes weathering away or rarely replaced by sepaline teeth (these often becoming immersed in the hypanthium wall); cotyledons obvolute.
NATURAL OCCURRENCE: Western Australia: from the Shark Bay district to the Kalbarri–Geraldton district.
ECOLOGY: Recorded as occurring in low closed heath, scrub heathland, low woodland, on coastal sand plain, calcareous coastal dune, and limestone ridge.
FLOWERING TIME: Recorded as flowering from May to October.
ESSENTIAL OILS: This was a variable species with one chemotype dominated by linalool, a second dominated by 1,8-cineole and a third dominated by α-, β- and γ-eudesmol. Chemotype I had linalool (14–64%) as its major component, with α-pinene (5–23%), globulol (3–8%), viridiflorol (3–6%) and spathulenol (0.8–3.0%) as lesser components. Chemotype II had 1,8-cineole (61.1%) as principal component and α-pinene (10.5%), limonene (7.0%), globulol (3.9%) and α-terpineol (1.0%) also present. Chemotype III had γ-eudesmol (26.4%), α-eudesmol (20.5%) and β-eudesmol (21.4%) as principal components, with globulol (2.5%), 1,8-cineole (7.4%) and α-pinene (8.1%) also present.
OIL YIELD: The oil yields (fresh weight, w/w) were 0.3% for chemotype I, 0.8% for chemotype II and 0.4% for chemotype III.



Melaleuca ***leptospermoides*** Schauer

PUBLICATION: in Lehmann, *Plantae Preissianae* 1: 139 (1844)

DERIVATION: *leptospermoides*, from *Leptospermum*, a genus of Myrtaceae, and the Greek *-oides*, resembling, in reference to a perceived similarity between this species and a species of *Leptospermum*

DESCRIPTION: *Shrub* to 1.6 m tall. *Branchlets* glabrescent, more or less sericeous or rarely pubescent. *Leaves* alternate, 4.5–12 mm long, 1.3–6 mm wide, 1.5–7.5 times as long as wide, subsessile to short-petiolate; blade glabrescent to hairy, more or less sericeous or rarely pubescent, narrowly obovate to obovate or very narrowly obovate, in transverse section transversely linear, sublunate, transversely semielliptic or transversely narrowly elliptic, the base narrowly cuneate to cuneate or rarely attenuate, the apex obtuse, obtusely shortly acuminate, acute or rounded, the veins longitudinal (some weakly developed pinnate veins also occur), 3–5, *oil glands* moderately dense or dense, distinct to obscure, scattered to more or less in rows. *Inflorescences* capitate, pseudoterminal and sometimes also upper axillary, with 1–4 triads, up to 22 mm wide. *Hypanthium* hairy, 2.5–3 mm long. *Calyx lobes* abaxially hairy (very rarely glabrescent), 0.7–2 mm long, scarious in a marginal band 0.3–0.7 mm wide or scarious throughout. *Petals* caducous, 2.5–4 mm long. *Stamens* 8–12 per bundle; filaments purple, mauve, magenta or pink, 8–11 mm long, the bundle claw 2.5–5 mm long, 0.3–0.5 times as long as the filaments. *Style* 9.5–11.5 mm long. *Ovules* 15–25 per locule. *Infructescences* peg-fruited. *Fruit* 4–5 mm long, the calyx lobes weathering away or rarely replaced by weakly developed sepaline teeth; cotyledons obvolute.

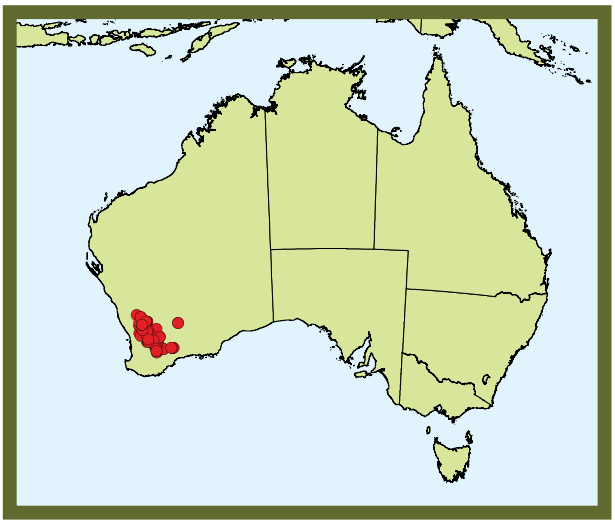
NATURAL OCCURRENCE: Western Australia: from the Cadoux–Brookton district south-eastwards to the Coolgardie – Lake King district.

ECOLOGY: Recorded as occurring in open heath with *Casuarina* and *Borya*, *Casuarina–Melaleuca* thicket, low shrubland, closed shrubland, low to medium heath, heath with *Actinostrobus*, broombush – *Eucalyptus leptopoda* tall shrubland, on yellowish sand over granite, yellow sand plain, lateritic sandy loam, whitish loam, brown clayey soil, and pale brown sand.

FLOWERING TIME: Recorded as flowering from September to November.

ESSENTIAL OILS: The oil from this species was composed mainly of monoterpenes. The principal components were 1,8-cineole (40–50%), α-pinene (14–20%) and α-terpineol (6–8%). These were accompanied by lesser amounts of β-pinene (0.8–5.0%), limonene (1–3%), linalool (0.5–2.0%) and terpinen-4-ol (0.8–2.0%). The major sesquiterpenes encountered were globulol (5–6%), viridiflorol (4–6%), spathulenol (13–5%) and bicyclogermacrene (1–3%).

OIL YIELD: The oil yield (fresh weight, w/w) was 0.2–0.5%.



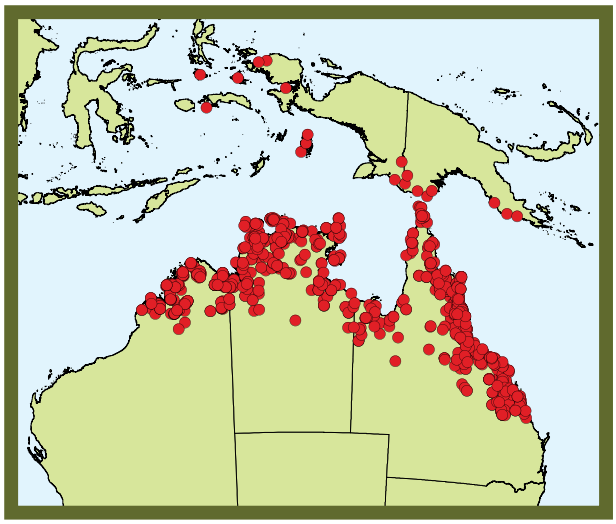
Melaleuca leucadendra (L.) L.

PUBLICATION: *Mantissa plantarum* 1: 105 (1767)
DERIVATION: *leucadendra*, from the Greek *leukos*, white, and *dendron*, tree, in reference to the whitish bark of this species
SYNONYM: *Myrtus leucadendra* L.
DESCRIPTION: *Tree or shrub* 2–43 m tall; bark papery, white, brownish-white or grey, pale cream, yellowish-grey or pale pink-brown. *Branchlets* soon glabrescent, the sericeous hairs ephemeral. *Leaves* alternate, 75–270 mm long, 6.5–40 mm wide, 3.5–16 times as long as wide, long-petiolate; blade soon glabrescent, the sericeous hairs ephemeral, narrowly ovate, very narrowly ovate or rarely narrowly elliptic or very narrowly elliptic, often subfalcate to falcate, in transverse section transversely linear, the base attenuate, the apex acute to narrowly acute or rarely acuminate, the veins longitudinal, 5–9, *oil glands* dense or moderately dense, distinct to obscure, scattered. *Inflorescences* spicate, pseudoterminal and often also upper axillary, sometimes lateral below the leaves, with 7–22 triads, up to 35 mm wide. *Hypanthium* glabrous or rarely hairy, 1.6–2.7 mm long. *Calyx lobes* abaxially glabrous, 0.8–2 mm long, scarious in a marginal band up to 0.5 mm wide or herbaceous to the margin. *Petals* early deciduous, 3–4 mm long. *Stamens* 5–12 per bundle; filaments cream to white or greenish-white (also recorded as red), 7–16 mm long, the bundle claw 1.2–5 mm long, 0.1–0.3 times as long as the filaments. *Style* 9–16 mm long. *Ovules* 80–130 per locule. *Fruit* 3.9–4.9 mm long, the calyx lobes deciduous; cotyledons obvolute.
NATURAL OCCURRENCE: Western Australia, Northern Territory, Queensland; also Indonesia, Papua New Guinea: from the Bonaparte Archipelago in Western Australia eastwards through much of northern Australia to the Shoalwater Bay district in Queensland. The species also occurs in Papua New Guinea and eastern Indonesia.
ECOLOGY: Recorded as occurring in riparian forest, swamp forest, monsoonal forest, swamp woodland, open *Melaleuca* forest, on lowland plains to sandstone gullies, on sandy soils, basalt soils, and silty clay loams.
FLOWERING TIME: Recorded as flowering from January to December.
ESSENTIAL OILS: This species occurred in three distinct chemotypes which were geographically based. The eastern provenances produced aromatic oils (chemotypes I and II) in all cases, while the western provenances produced an entirely terpenic oil (chemotype III). The eastern provenances produced two types of oil, one of which contained almost exclusively methyl eugenol and the second which was predominantly E-methyl isoeugenol. Chemotype I contained methyl eugenol (94–98%), with insignificant amounts of E-methyl isoeugenol (<1%). Chemotype II contained E-methyl isoeugenol (27–90%, the majority >70%), with lesser amounts of methyl eugenol (6–25%, the majority <10%) and Z-methyl isoeugenol (0.3–0.5%). In both chemotypes, germacrene-D (0.3–1.0%), β-caryophyllene (0.1–0.5%) and E-β-ocimene (trace–0.5%) were present. Progeny trials were carried out on both chemotypes and it was found that chemotype I bred true, while chemotype II produced approximately three-quarters chemotype I and one-quarter chemotype II. The western provenances produced an oil (chemotype III) that contained 1,8-cineole (10–45%), p-cymene (5–22%), α-pinene (4–19%), limonene (3–6%) and α-terpineol (trace–9%).

OIL YIELD: The oil yield of the aromatic chemotypes I and II (dry weight, w/w) was 1.0–2.5%, while that from the terpenoid chemotype, chemotype III, was 0.1–0.5%.

REFERENCES ON ESSENTIAL OILS: Brophy and Lassak 1988; Brophy and Doran 1996; Brophy 1999

NOTES: *Melaleuca leucadendra* is suitable for planting as a park tree or for roadside plantings in the tropics. It grows too big for all but very large gardens. It has been used as a source of timber for general construction as the trunk can develop a good size, as well as being used in Vietnam for woodchips and poles/piles.



Melaleuca ***leuropoma*** Craven

PUBLICATION: in Craven & Lepschi, *Australian Systematic Botany* 12: 888 (1999)

DERIVATION: *leuropoma*, from the Greek *leuros*, smooth, polished and *poma*, cover, lid, in reference to the glossy, coherent and caducous petals that are a distinctive feature of this species

DESCRIPTION: *Shrub* 0.3–1.4 m tall. *Branchlets* glabrescent or hairy, sericeous-pubescent to sericeous. *Leaves* alternate, 4–17 mm long, 0.6–1.5 mm wide, 3.8–19 times as long as wide, subsessile to sessile; blade glabrescent or hairy, sericeous to sericeous-pubescent, sometimes becoming somewhat lanuginose-sericeous or lanuginose-pubescent distally and also often becoming more or less crisped distally, linear, linear-obovate to linear-elliptic or very narrowly obovate, in transverse section depressed obovate, transversely elliptic to transversely narrowly elliptic or rarely subcircular, the base attenuate, parallel (blade width equals petiole width), narrowly cuneate or truncate, the apex acute to obtuse or obtusely shortly acuminate, the veins longitudinal, 3, *oil glands* moderately dense, distinct to rarely obscure, scattered to more or less in rows. *Inflorescences* capitate or shortly spicate, pseudoterminal and sometimes also upper axillary, with 3–12 triads, up to 22 mm wide. *Hypanthium* hairy, 1.2–2.7 mm long. *Calyx lobes* abaxially hairy, glabrescent or rarely glabrous, 0.4–1.4 mm long, scarious in a marginal band 0.2–0.4 mm wide, rarely herbaceous to the margin or scarious throughout. *Petals* caducous, 1.5–3 mm long. *Stamens* 7–11 per bundle; filaments pink, mauve, purple, pinkish-purple, whitish-mauve, yellow, cream or white, 6.5–12.5 mm long, the bundle claw 2–6.5 mm long, 0.3–0.6 times as long as the filaments. *Style* 8.5–12 mm long. *Ovules* 10–15 per locule. *Infructescences* globose to 'peg-fruited'. *Fruit* 2.5–4.5 mm long, the calyx lobes weathering away or sometimes replaced by sepaline teeth; cotyledons subobvolute (almost planoconvex) to obvolute.

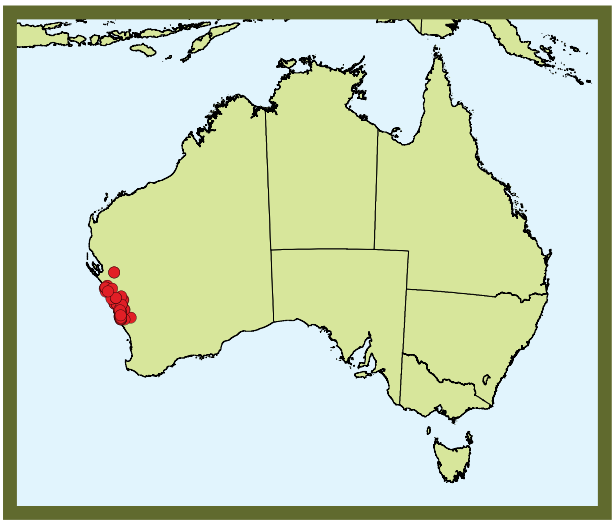
NATURAL OCCURRENCE: Western Australia: from the Kalbarri district south to the Gairdner Range – Moora district.

ECOLOGY: Recorded as occurring in heathland, eucalypt woodland, low open shrubland, high shrubland, sand plain, *Banksia* woodland, on sand, sand over laterite, sand over limestone, sand over sandstone, and sandy clay.

FLOWERING TIME: Recorded as flowering from September to March and in June.

ESSENTIAL OILS: The leaf oil of this species was dominated by monoterpenes. The principal components were α-pinene (40.2%) and 1,8-cineole (24.1%). These were accompanied by lesser amounts of β-pinene (3.9%), limonene (2.4%), linalool (2.8%) and α-terpineol (4.2%). Sesquiterpenes were not plentiful. The major sesquiterpenes were spathulenol (4.2%), globulol (2.3%) and viridiflorol (1.8%).

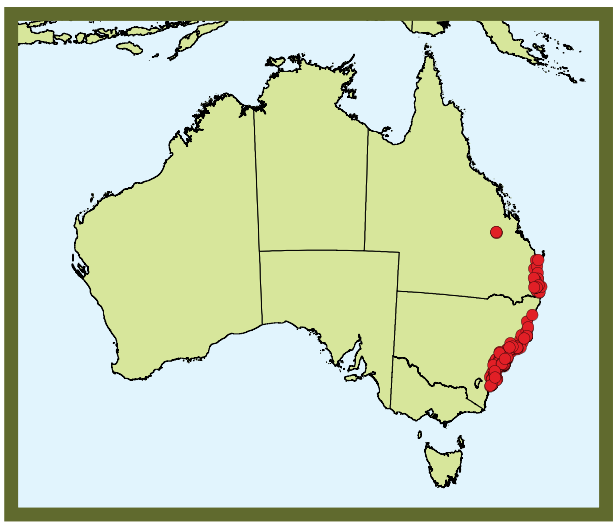
OIL YIELD: The oil yield (dry weight, w/w) was 0.5%.



Melaleuca linariifolia Sm.

PUBLICATION: *Transactions of the Linnean Society of London* 3: 278 (1797)

DERIVATION: *linariifolia*, from *Linaria*, a genus of Scrophulariaceae (now included in Plantaginaceae), and the Latin *folium*, leaf, in reference to a perceived similarity between the leaves of this species and those of *Linaria*



DESCRIPTION: *Tree or shrub* 2–10 m tall; bark papery, whitish or grey-brown. *Branchlets* soon glabrescent, the lanuginulose hairs ephemeral. *Leaves* decussate, 17–45 mm long, 1–4 mm wide, 8–19 times as long as wide, short-petiolate to subsessile; blade soon glabrescent, the lanuginulose hairs ephemeral, very narrowly elliptic to linear-elliptic, in transverse section transversely linear, the base attenuate to narrowly cuneate, the apex obtusely shortly acuminate or narrowly acute, the veins longitudinal, 3, *oil glands* dense or rarely sparse, distinct to obscure, scattered. *Inflorescences* spicate, pseudoterminal and sometimes also upper axillary, with 4–20 monads, up to 40 mm wide. *Hypanthium* glabrous, 1.5–2 mm long. *Calyx lobes* abaxially glabrous, 0.9–1.8 mm long, scarious in a marginal band 0.1–0.2 mm wide. *Petals* deciduous, 2.5–3.3 mm long. *Stamens* 32–73 per bundle; filaments white to cream, 8.8–24 mm long, the bundle claw (5.5–)8–16 mm long, 0.6–0.8 times as long as the filaments. *Style* 3.5–5.2 mm long. *Ovules* 85–120 per locule. *Fruit* 2.5–4 mm long, the calyx lobes weathering away; cotyledons planoconvex.

NATURAL OCCURRENCE: Queensland, New South Wales: from the Maryborough district in Queensland (with an

isolated population on the Blackdown Tableland) south to the Ulladulla district in New South Wales.

ECOLOGY: Recorded as occurring in swampy shrubland, low shrubby woodland, swampy open forest, dry sclerophyll woodland, open eucalypt forest, on sand, gravelly sand, and sandstone.

FLOWERING TIME: Recorded as flowering from October to February.

ESSENTIAL OILS: This species appearred to exist in three main chemotypes as did *M. alternifolia*. Chemotype I contained large amounts of 1,8-cineole (50–76%) and lesser amounts of α-pinene (2–7%), limonene (9–13%) and α-terpineol (7–10%). Chemotype II contained significant amounts of terpinen-4-ol (36%), γ-terpinene (20%) and α-terpinene (8%). A third chemotype contained terpinolene (42–55%) and 1,8-cineole (29–37%) as major components, with lesser amounts of α-pinene (2–3%), limonene (3–5%) and α-terpineol (2–4%).

OIL YIELD: The oil yield (fresh weight, w/w) was 1–2% for chemotypes I and II and 3.0–4.5% (dry weight, w/w) for chemotype III.

REFERENCES ON ESSENTIAL OILS: Southwell et al. 1992; Brophy and Doran 1996

NOTES: *Melaleuca linariifolia* is one of the sources of the terpinen-4-ol rich essential oil, Australian tea tree oil. As it is more widely distributed and has a greater ecological tolerance than the main source of tea tree oil, *M. alternifolia*, it has a greater potential for the selection of a tea tree–quality chemotype intended for planting beyond the present range of plantations of the latter. *Melaleuca linariifolia* is also a very popular ornamental shrub or tree in temperate regions of Australia.

Melaleuca linearifolia (Link) Craven

PUBLICATION: *Novon* 16: 472 (2006)

DERIVATION: *linearifolia*, from the Latin *linearis*, linear, and *folium*, leaf, in reference to the very narrow leaves of this species

SYNONYMS: *Metrosideros linearifolia* Link; *Callistemon linearifolius* (Link) DC.

DESCRIPTION: *Shrub* 1.5–4 m tall; bark flaking, hard, grey. *Branchlets* glabrescent, generally pubescent (ranging from short to very long and from straight to crisped). *Leaves* alternate, 29–152 mm long, 4–13 mm wide, 7–20 times as long as wide, short-petiolate; blade glabrescent, pubescent (ranging from short to very long and from straight to crisped), linear-elliptic, very narrowly elliptic or rarely linear-ovate, in transverse section transversely linear, broadly v-shaped, sublunate or strongly sublunate-curved, the base very narrowly attenuate, the apex acute, the veins pinnate, 17–35, *oil glands* sparse or moderately dense, distinct or obscure, scattered. *Inflorescences* spicate, interstitial (the distal leaves small and the inflorescence effectively pseudoterminal), with 30–90 monads, 35–55 mm. *Hypanthium* hairy, 3.2–5 mm long. *Calyx lobes* abaxially hairy, 1.5–2.7 mm long, herbaceous to the margin or scarious in a marginal band 0.3–0.4 mm wide. *Petals* deciduous, 3.2–6.6 mm long. *Stamens* 21–23 per flower; filaments red to dark crimson, 14–21 mm long; anthers reddish. *Style* 16–30 mm long. *Ovules* c. 200–300 per locule. *Fruit* 4.8–6 mm long, the calyx lobes deciduous; cotyledons obvolute.

NATURAL OCCURRENCE: New South Wales: the Nelson Bay – Sydney district.

ECOLOGY: Recorded as occurring in scrub on hill crests, scrubby river flats, ridge in open forest, dry sclerophyll forest along dry rocky creek, dry rocky summit in low open eucalypt woodland, on skeletal soil over porphyry, Hawkesbury sandstone, and granite.

FLOWERING TIME: Recorded as flowering in November.

ESSENTIAL OILS: This species produced an oil dominated by monoterpenes. The principal component was 1,8-cineole (61–63%) and there were lesser amounts of α-pinene (2–5%), myrcene (2–3%), limonene (8–9%), terpinen-4-ol (1–2%) and α-terpineol (8–11%). Sesquiterpenes contributed less than 10% to the oil, with the major components being β-caryophyllene (1–2%), globulol (0.7–2%), viridiflorol (0.5–1%) and spathulenol (1–2%).

OIL YIELD: The oil yield (fresh weight, w/w) was 0.3%.

REFERENCE ON ESSENTIAL OILS: Brophy et al. 1998, as *Callistemon linearifolius*

Melaleuca linearis Schrad. & Wendl.

TAXONOMY: Two varieties are recognised in this species: var. *linearis* and var. *pinifolia* (Wendl.) Craven

PUBLICATION: *Sertum Hannoveranum* 19, t. XI (1796), var. *linearis*; *Novon* 16: 472 (2006), var. *pinifolia*

DERIVATION: *linearis*, from the Latin *linearis*, linear, in reference to the very narrow leaves of this species; *pinifolia*, from *Pinus*, a genus of Pinaceae, and *folium*, leaf, in reference to the very narrow leaves

SYNONYMS: *Callistemon linearis* (Schrader & Wendl.) Sweet; *Callistemon rigidus* R. Br.; *Metrosideros pinifolia* Wendl.; *Callistemon pinifolius* (Wendl.) Sweet

DESCRIPTION: *Shrub* 0.6–5 m tall; bark fibrous, hard, grey. *Branchlets* glabrescent, pubescent overlaid with sericeous-pubescent hairs or sericeous-pubescent. *Leaves* alternate, 35–115 mm long, 0.7–2.7 mm wide, 20–90 times as long as wide, short-petiolate or subsessile; blade glabrescent, sericeous-pubescent, linear, linear-elliptic or linear-obovate, in transverse section broadly subreniform or sublunate, transversely broadly elliptic or semicircular, the base parallel (blade width equals petiole width) or very narrowly cuneate, the apex acute, the veins longitudinal (or longitudinal-pinnate when the leaves are flatter and broader), with 3 veins when longitudinal, *oil glands* dense or moderately dense (occasionally sparse), distinct, scattered. *Inflorescences* spicate, pseudoterminal or interstitial, with 20–90 monads, 40–65 mm wide. *Hypanthium* hairy or glabrescent, 3.4–4.9 mm long. *Calyx lobes* abaxially hairy or glabrescent, 1.5–2.5 mm long, herbaceous to the margin or scarious in a marginal band 0.4 mm wide. *Petals* deciduous, 3.2–7 mm long. *Stamens* 23–73 per flower; filaments red or greenish, 15–28 mm long; anthers reddish or yellow. *Style* 23–30 mm long. *Ovules* c. 200–500 per locule. *Fruit* 3.8–8.2 mm long, the calyx lobes deciduous; cotyledons obvolute.

NATURAL OCCURRENCE: **var. *linearis*:** Queensland, New South Wales: south-eastern Queensland extending south-westwards to the Coonabran–Narrabri region in New South Wales and also in the central coast – Nowra district of New South Wales. **var. *pinifolia*:** New South Wales: the Gilgandra–Kandos–Sydney district.

ECOLOGY: **var. *linearis*:** Recorded as occurring in open forest beside creek line, closed shrubland on soakage on rock slabs, open woodland, eucalypt woodland with a damp heathy shrub layer, dry sclerophyll forest, on sandy soil on sandstone, light yellow-brown gravelly sand/loam above creek bank, yellow alluvial sand, and sandy soil

with granite rocks. **var. *pinifolia*:** Recorded as occurring in dry sclerophyll forest, heath and scrub, open eucalypt woodland, on sandy clay soil over shale, yellowish sandy loam, sand, and sand on level sandstone ridge.

FLOWERING TIME: **var. *linearis*:** Recorded as flowering from October to December, and also in February. **var. *pinifolia*:** Recorded as flowering in October and November.

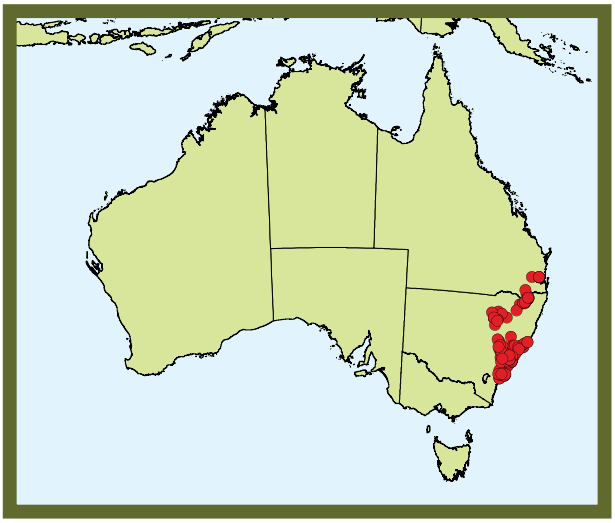
ESSENTIAL OILS: **var. *linearis*:** This variety produced an oil dominated by 1,8-cineole (62–66%). Other prominent monoterpenes in the oil were α-pinene (4–8%), limonene (7–9%), α-terpineol (8–9%), terpinen-4-ol (0.8–2.0%) and myrcene (2–3%). The main sesquiterpenes encountered were globulol, viridiflorol and spathulenol (all <0.5%). All told, the sesquiterpenes amounted to less than 10% of the total oil. **var. *pinifolia*:** This variety produced a monoterpenoid oil in which 1,8-cineole (55–67%) was the major component. There were lesser amounts of α-pinene (3–5%), myrcene (2–4%), limonene (7–9%), terpinen-4-ol (1–2%) and α-terpineol (8–10%). Sesquiterpenes did not contribute much in quantity to the oil, with the principal members being β-caryophyllene (0.4–2.0%), globulol (0.6–4.0%), viridiflorol (0.4–3.0%) and spathulenol (0.4–2.0%).

OIL YIELD: **var. *linearis*:** The oil yield was variable (fresh weight, w/w), being 0.1–1.0%. **var. *pinifolia*:** The oil yield (fresh weight, w/w) was 0.2–0.3%.

REFERENCE ON ESSENTIAL OILS: Brophy et al. 1998, as *Callistemon linearis*, *C. pinifolius*, *C. rigidus*

NOTES: The two varieties may be distinguished as follows: **var. *linearis*:** Leaves more than 1.3 mm wide; stamens (16–)23–33(–42) per flower. **var. *pinifolia*:** Leaves up to 1.3 mm wide; stamens 34–73 per flower.

The species is quite commonly cultivated as an ornamental shrub in subtropical and temperate regions of Australia.



Melaleuca linguiformis Craven

PUBLICATION: in Craven & Lepschi, *Australian Systematic Botany* 12: 888 (1999)

DERIVATION: *linguiformis*, from the Latin *lingua*, tongue, and *forma*, shape, in reference to the tongue-like shape of the leaves

DESCRIPTION: *Shrub* 1–5 m tall; bark, rough, hard. *Branchlets* glabrescent, lanuginulose-puberulous to lanuginulose hairs, rarely with some puberulous and pubescent hairs also. *Leaves* alternate, 3.3–6.3 mm long, 1.3–2.3 mm wide, 2–3.3 times as long as wide, subsessile to short-petiolate; blade glabrescent, lanuginulose to lanuginulose-puberulous, elliptic, ovate, narrowly elliptic or narrowly ovate, in transverse section flattened transversely semielliptic or semicircular, the base cuneate to rarely rounded, the apex acute to obtuse, the veins longitudinal, 3–5, *oil glands* moderately dense, obscure, more or less in rows. *Inflorescences* capitate or spicate, pseudoterminal, with 3–28 monads, up to 22 mm wide. *Hypanthium* hairy, 2.3–3.7 mm long. *Calyx lobes* abaxially glabrescent or glabrous, 1–1.5 mm long, scarious in a marginal band up to 0.3 mm wide or herbaceous to the margin. *Petals* deciduous, 2.3–3 mm long. *Stamens* 13–22 per bundle; filaments white to cream, 6.2–7.6 mm long, the bundle claw 1–2.2 mm long, 0.1–0.3 times as long as the filaments. *Style* 7.5–9.5 mm long. *Ovules* 40–80 per locule. *Fruit* 4.3–5.6 mm long, the calyx lobes weathering away (the extreme basal portion of the sepals may become woody and persist as a low ring on the hypanthium rim); cotyledons planoconvex.

NATURAL OCCURRENCE: Western Australia: the Salmon Gums – Wittenoom Hills district.

ECOLOGY: Recorded as occurring in low open mallee woodland with dense shrub understorey, shrubland with herbs and grasses, on sandy loam, sand over clay, and saline soils.

FLOWERING TIME: Recorded as flowering from September to November and in May.

ESSENTIAL OILS: Monoterpenes dominated the oil of this species. The principal components were α-pinene (29.7%) and 1,8-cineole (53.5%). These were accompanied by lesser amounts of limonene (4.0%) and α-terpineol (2.2%). Sesquiterpenes were, of necessity, not plentiful, with the principal members being spathulenol (1.7%) and globulol (0.4%). An unknown aromatic compound, molecular weight 236, was also present.

OIL YIELD: The oil yield (fresh weight, w/w) was 0.5%.

Melaleuca linophylla F.Muell.

PUBLICATION: *Fragmenta phytographiae Australiae* 3: 115 (1862)

DERIVATION: *linophylla*, derivation unclear but possibly from *Linum*, a genus of Linaceae, and the Greek *phyllon*, leaf, in reference to a perceived similarity between the leaves of this plant and those of a species of *Linum*

DESCRIPTION: *Shrub* 1.7–3 m tall. *Branchlets* glabrescent, sericeous-pubescent and often with some lanuginose-sericeous to lanuginose-pubescent or lanuginose hairs also. *Leaves* alternate, 10–55.5 mm long, 1–4 mm wide, 6–16 times as long as wide, short-petiolate to sessile; blade glabrescent, sericeous and often with some sericeous-pubescent, lanuginose-sericeous and lanuginose hairs also (rarely some lanuginulose hairs may also be present), very narrowly elliptic, in transverse section transversely linear, the base attenuate or rarely narrowly cuneate, the apex narrowly acuminate, the veins longitudinal, 5, *oil glands* dense, distinct, scattered. *Inflorescences* spicate, pseudoterminal and sometimes also upper axillary, with 30–70 monads, up to 8 mm wide. *Hypanthium* hairy, 0.8–1.1 mm long. *Calyx lobes* abaxially hairy or glabrous, 0.4–0.6 mm long, herbaceous to the margin or scarious in a marginal band up to 0.1 mm wide. *Petals* caducous, 1–1.5 mm long. *Stamens* 7–15 per bundle; filaments cream, 2.2–3.5 mm long, the bundle claw 1.5–2 mm long, 0.6–0.8 times as long as the filaments. *Style* 1–2 mm long. *Ovules* 15–20 per locule. *Fruit* 1–2 mm long, the calyx lobes deciduous; cotyledons planoconvex.

NATURAL OCCURRENCE: Western Australia: from the Karratha – Port Hedland district south to the Paraburdoo district.

ECOLOGY: Recorded as occurring along stream lines, on sand, alluvial gravel, and sandstone.

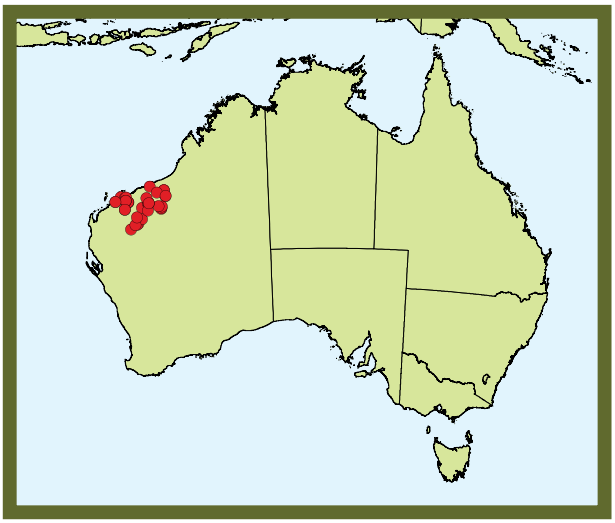
FLOWERING TIME: Recorded as flowering from August to October.

ESSENTIAL OILS: The leaf oil of this species was dominated by monoterpenes, with the principal component being 1,8-cineole (72–86%). Other monoterpenes present in lesser amounts were α-pinene (1%), limonene (2–5%) and α-terpineol (5–13%). Sesquiterpenes contributed very little to the oil, with the main components being globulol and spathulenol, both <1%.

OIL YIELD: The oil yield (fresh weight, w/w) was 1–2%.

REFERENCES ON ESSENTIAL OILS: Brophy and Doran 1996; Brophy 1999

NOTES: When the fruit are mature, the hypanthium wall splits, apparently to facilitate shedding of the seed. This also occurs in the related *M. dissitiflora*.



Melaleuca ***longistaminea*** (F.Muell.) Barlow ex Craven

PUBLICATION: in Craven & Lepschi, *Australian Systematic Botany* 12: 889 (1999)

DERIVATION: *longistaminea*, from the Latin *longus*, long, and *stamen*, stamen, in reference to the long stamens of this species

SYNONYM: *Melaleuca cardiophylla* var. *longistaminea* F.Muell.

DESCRIPTION: ***Shrub*** 0.3–2 m tall. ***Branchlets*** glabrous. ***Leaves*** alternate, peltate, 4.5–13.5 mm long, 3–11.5 mm wide, 1.2–2.3 times as long as wide, sessile; blade soon glabrescent, the marginal cilia ephemeral, ovate to broadly ovate, in transverse section transversely linear, sublunate or rarely strongly sublunate, the base truncate, subcordate or rounded, the apex acuminate, narrowly acuminate or rarely acute, the veins longitudinal, 11–19, ***oil glands*** sparse to moderately dense, obscure or distinct, more or less in rows to scattered. ***Inflorescences*** capitate, lateral, with 5–15 monads, up to 45 mm wide. Floral bract 1.5–2.7 mm long; bracteoles 1.5–1.8 mm long, elliptic, narrowly elliptic, or narrowly ovate, often asymmetric. ***Hypanthium*** glabrous or subglabrous, 2.3–4 mm long. ***Calyx lobes*** abaxially glabrous or subglabrous, costate, 1–2.5 mm long, scarious in a marginal band 0.2–0.4 mm wide. ***Petals*** deciduous, 3–3.7 mm long. ***Stamens*** 9–24 per bundle; filaments greenish-yellow or pale yellow, 15.5–26.5 mm long, the bundle claw 8.8–13.5 mm long, 0.5–0.6 times as long as the filaments. ***Style*** 19.5–27.5 mm long. ***Ovules*** 30–75 per locule. ***Fruit*** 3.5–6.5 mm long, with sepaline teeth; cotyledons obvolute.

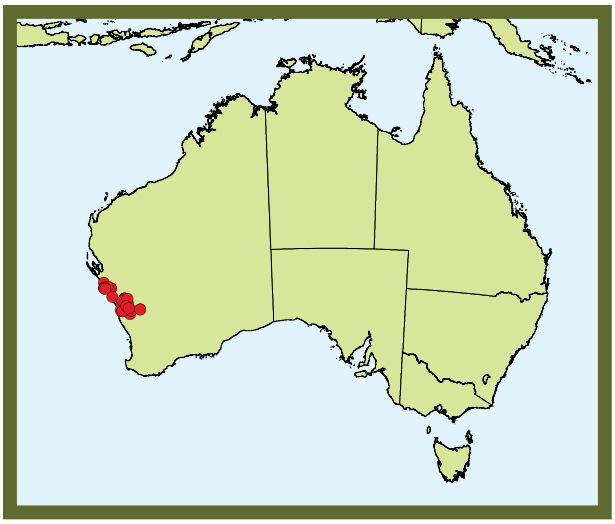
NATURAL OCCURRENCE: Western Australia: the Murchison River – Carnamah – Wongan Hills district.

ECOLOGY: Recorded as occurring in heathland, dense shrubland, scrubland, sand plain, on sand, sand over sandstone, and granite.

FLOWERING TIME: Recorded as flowering from June to October.

ESSENTIAL OILS: The oil of this species was dominated by sesquiterpenes. The principal sesquiterpenes encountered were spathulenol (4–29%), globulol (10–24%), viridiflorol (6–10%) and bicyclogermacrene (0.1–26%, in the bulk sample). These were accompanied by lesser amounts of allo-aromadendrene (3–9%), β-caryophyllene (2–9%) and cubeban-11-ol (2–4%). Monoterpenes were virtually absent from this oil, totalling less than 1% combined.

OIL YIELD: The oil yield (fresh weight, w/w) was <0.1%.



Melaleuca lutea Craven

PUBLICATION: in Craven, Lepschi & Cowley, *Nuytsia* 20: 30 (2010)

DERIVATION: *lutea*, from the Latin *luteus*, yellow, in reference to the flower colour of this species

SYNONYM: *Melaleuca citrina* Turcz.

DESCRIPTION: *Shrub* to 2 m tall. *Leaves* 5.8–24 mm long, 0.8–2.1 mm wide; short-petiolate or subsessile; blade hairy or glabrescent, narrowly obovate to linear-elliptic, in transverse section transversely linear to transversely narrowly suboblong or sublunate. *Inflorescences* spicate or capitate with 10–18 triads; bracteoles variably present on lateral flowers only (more or less obsolete). *Hypanthium* sericeous. *Calyx lobes* not costate, depressedly triangular, ovate or broadly elliptic, 0.4–0.7 mm long. Staminal ring present. *Stamens* 5–9 per bundle; filaments yellow, 3.3–6.1 mm long. *Style* 7.5–9 mm long. *Ovules* 8–13 per locule. *Fruit* 2.5–5.6 mm long.

NATURAL OCCURRENCE: Western Australia: from Porongurup National Park north of Albany east to the Hopetoun district.

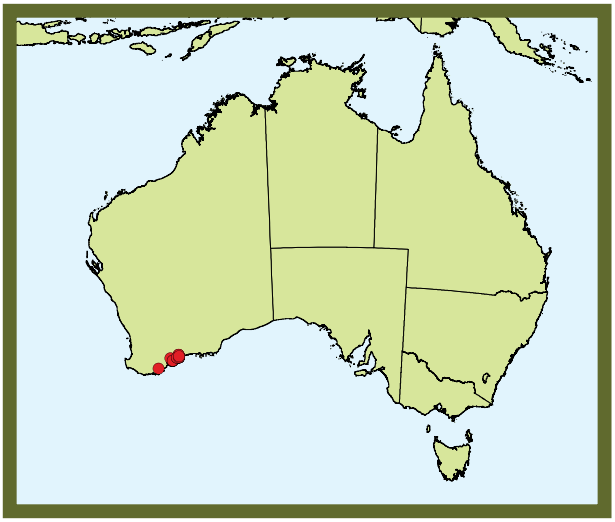
ECOLOGY: Recorded as occurring in open heath and shrublands; prefers sandy soils over quartzite substrates, often on steep slopes, and rocky outcrops.

FLOWERING TIME: Recorded as flowering from September to November.

ESSENTIAL OILS: The leaf oil of this species gave a predominantly sesquiterpenic oil, though there were significant monoterpenes present. The principal sesquiterpenes encountered were γ-eudesmol (4–8%), α-eudesmol (8–16%), β-eudesmol (10–21%) and elemol (3–16%), with a lesser amount of spathulenol (2–4%). The main monoterpenes encountered were terpinen-4-ol (1–9%), 1,8-cineole (4–8%), linalool (3–6%), geraniol (1–5%), p-cymene (0.1–3.0%) and γ-terpinene (0.7–3.0%). There were many other monoterpenes present in amounts of less than 2%.

OIL YIELD: The oil yield (fresh weight, w/w) was 0.7%.

NOTES: The name *Melaleuca citrina* (Curtis) Dum.-Cours. was published 50 years before the publication of *M. citrina* Turcz. and, under the rules of the International Code of Botanical Nomenclature (McNeill et al. 2012), the latter name has to be replaced. The replacement name is *M. lutea*. The species is relatively commonly cultivated as an ornamental shrub in temperate regions of Australia.



Melaleuca ***macronychia*** Turcz.

TAXONOMY: Two subspecies are recognised in this species: subsp. *macronychia* and subsp. *trygonoides* K.J.Cowley

PUBLICATION: *Bulletin de la classe physico-mathématique de l'Académie Impériale des Sciences de Saint-Pétersbourg* 10: 340 (1852), subsp. *macronychia*; in Cowley, Quinn, Barlow & Craven, *Australian Systematic Botany* 3: 180 (1990), subsp. *trygonoides*

DERIVATION: *macronychia*, from the Greek *makros*, long, and *onyx*, fingernail, claw, talon, in reference to the dried leaves being somewhat similar in shape to a very long, narrow, human fingernail; *trygonoides*, from the Greek *trygon*, stingray, and *-oides*, resembling, in reference to the leaf shape being reminiscent of the outline shape of a stingray

DESCRIPTION: *Shrub* 1.8–5 m tall. *Branchlets* glabrescent, pubescent to sericeous-pubescent, usually with some lanuginose-sericeous and lanuginulose hairs also. *Leaves* alternate, 9–28 mm long, 2.1–15.5 mm wide, 1.4–10 times as long as wide, short-petiolate; blade glabrescent, lanuginose-sericeous to sericeous (or diminutive states thereof) or sericeous-pubescent, less often pubescent or lanuginose-pubescent hairs (or diminutive states thereof) may also be present, narrowly obovate to obovate, sometimes very narrowly elliptic or rarely narrowly elliptic, in transverse section transversely linear, the base cuneate or attenuate, the apex acuminate, acute or obtusely shortly acuminate, the veins longitudinal-pinnate, 3–7 pinnate veins, *oil glands* moderately dense or dense, distinct to obscure, scattered. *Inflorescences* spicate, lateral, with 10–80 monads, up to 60 mm wide. *Hypanthium* glabrous or glabrescent, 1.4–2.3 mm long. *Calyx lobes* abaxially glabrous or glabrescent, 1–2.1 mm long, scarious in a marginal band 0.1–0.4 mm wide. *Petals* deciduous, 3–6 mm long. *Stamens* 15–25 per bundle; filaments crimson, or crimson tipped and yellow-clawed, 16–27 mm long, the bundle claw 10.5–15 mm long, 0.5–0.7 times as long as the filaments. *Style* 16–27 mm long. *Ovules* (50–)100–180 per locule. *Fruit* 2.5–4.3 mm long, the calyx lobes weathering away or the basal portion of the lobes may become woody and persist as blunt teeth or undulations on the hypanthium rim; cotyledons planoconvex (sometimes almost subobvolute).

NATURAL OCCURRENCE: **subsp. *macronychia*:** Western Australia: from the Kalannie district to the Hyden district. **subsp. *trygonoides*:** Western Australia: the Coolgardie – Lake Johnston – Widgiemooltha district.

ECOLOGY: **subsp. *macronychia*:** Recorded as occurring in closed mallee shrubland, scrubland, on coarse sand, granitic sand, sandy clay and gravel, and granite silt. **subsp. *trygonoides*:** Recorded as occurring in *Acacia* thickets, seasonal stream lines, on loamy sand, and granitic sandy soils.

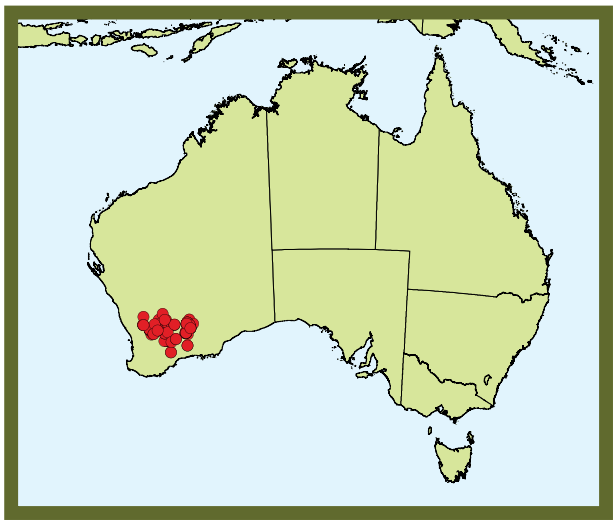
FLOWERING TIME: **subsp. *macronychia*:** Recorded as flowering from March to July and from October to December. **subsp. *trygonoides*:** Recorded as flowering in February and from July to October.

ESSENTIAL OILS: **subsp. *macronychia*:** The leaf oil of this subspecies was dominated by monoterpenes. The principal component was 1,8-cineole (70–74%) and there were lesser amounts of α-pinene (6–11%), limonene (9–12%) and α-terpineol (2–3%). Sesquiterpenes did not contribute much to the oil, with the main components being globulol and spathulenol (both <0.5%). **subsp. *trygonoides*:** The leaf oil of this subspecies was dominated by monoterpenes. The principal component was 1,8-cineole (73.3%). This was accompanied by lesser amounts of α-pinene (7.4%), limonene (9.6%) and α-terpineol (2.4%). Sesquiterpenes were neither plentiful nor abundant, with the principal members being globulol, viridiflorol and spathulenol (each <0.3%).

OIL YIELD: **subsp. *macronychia*:** The oil yield (fresh weight, w/w) was 0.2–0.5%. **subsp. *trygonoides*:** The oil yield (fresh weight, w/w) was 0.4%.

NOTES: The two subspecies are distinguished as follows: **subsp. *macronychia*:** Leaf blade narrowly obovate, obovate, very narrowly elliptic or narrowly elliptic; leaves 2.5–10 times as long as wide; staminal ring absent. **subsp. *trygonoides*:** Leaf blade broadly elliptic or elliptic; leaves 1.4–2 times as long as wide; staminal ring present (but weakly developed).

The typical subspecies is grown as an ornamental shrub in temperate regions of Australia where it has proved to be successful and long-flowering.



Melaleuca manglesii Schauer

PUBLICATION: in Lehmann, *Plantae Preissianae* 1: 135 (1844)

DERIVATION: *manglesii*, in honour of James Mangles (1786–1867), a dealer in seeds and herbarium specimens of Western Australian plants

DESCRIPTION: *Shrub* 1–1.5 m tall. *Branchlets* glabrescent, pubescent or with pubescent and lanuginulose to lanuginulose-puberulous hairs overlaid with long pubescent hairs. *Leaves* alternate, 3–7.5 mm long, 1–1.6 mm wide, 2.3–6.5 times as long as wide, subsessile to short-petiolate; blade glabrescent, pubescent, very narrowly obovate, narrowly obovate or elliptic to narrowly elliptic, in transverse section transversely semielliptic, or rarely transversely narrowly elliptic, sublunate or depressed obovate, the base narrowly cuneate, the apex rounded to obtuse, the veins longitudinal, 3, *oil glands* dense or moderately dense, obscure to distinct, in rows to more or less in rows. *Inflorescences* capitate, pseudoterminal and sometimes also upper axillary, with 2–8 triads, up to 22 mm wide. *Hypanthium* hairy, 1.7–2 mm long. *Calyx lobes* abaxially hairy or rarely glabrescent or glabrous, 0.6–1.4 mm long, scarious throughout or scarious in a marginal band 0.6–0.9 mm wide. *Petals* caducous, 1.8–2.5 mm long. *Stamens* 5–7 per bundle; filaments mauve, 7–10 mm long, the bundle claw 1.5–3.7 mm long, 0.2–0.6 times as long as the filaments. *Style* 8.5–10.5 mm long. *Ovules* c. 15–20 per locule. *Infructescences* peg-fruited. *Fruit* 2.8–4 mm long, the calyx lobes weathering away or rarely replaced by sepaline teeth; cotyledons planoconvex.

NATURAL OCCURRENCE: Western Australia: the Cowcowing Lakes – Meckering – Kellerberrin district.

ECOLOGY: Recorded as occurring in mixed scrubland, on laterite, and sand.

FLOWERING TIME: Recorded as flowering from August to November.

ESSENTIAL OILS: The leaf oil of this species contained both mono- and sesquiterpenes. The principal monoterpenes were 1,8-cineole (34.5%) and α-pinene (22.0%). These were accompanied by lesser amounts of limonene (2.0%), γ-terpinene (1.1%), β-pinene (0.9%) and α-terpineol (5.4%). The principal sesquiterpenes were viridiflorol (7.4%), globulol (4.0%), spathulenol (3.1%), viridiflorene (2.4%) and bicyclogermacrene (3.7%).

OIL YIELD: The oil yield (fresh weight, w/w) was 0.5%.

Melaleuca marginata (Sond.) Hislop, Lepschi & Craven

PUBLICATION: *Nuytsia* 21: 153–154 (2011)

DERIVATION: *marginata*, from the Latin *margo*, margin, apparently in reference to the distinctive leaf margin

SYNONYMS: *Astroloma marginatum* Sond.; *Melaleuca coronicarpa* D.A.Herb.

DESCRIPTION: *Shrub* 0.3–2.5 m tall; bark flaking, grey or white. *Branchlets* glabrescent, pubescent to puberulous. *Leaves* alternate, 5–14.6 mm long, 1–6.6 mm wide, 1.4–11 times as long as wide, sessile; blade early glabrescent, with marginal cilia and also pubescent to puberulous hairs, ovate, narrowly ovate, very narrowly ovate, broadly ovate or subulate, in transverse section sublunate, strongly sublunate, transversely linear or lunate, the base rounded, cuneate, truncate or subcordate to cordate, the apex acuminate or narrowly acuminate, the veins longitudinal, 7–17, *oil glands* sparse, obscure or distinct, more or less in rows. *Inflorescences* capitate, lateral, with 1–25 monads, up to 30 mm wide. *Hypanthium* hairy, 1.5–2.6 mm long. *Calyx lobes* abaxially hairy or glabrous, costate, 0.9–2 mm long, scarious in a marginal band 0.1–0.2 mm wide. *Petals* deciduous, 2.1–3.5 mm long. *Stamens* 10–22 per bundle; filaments white or cream, 6–11.5 mm long, the bundle claw 4.2–7.5 mm long, 0.5–0.7 times as long as the filaments. *Style* 7.2–11.2 mm long. *Ovules* 40–45 per locule. *Fruit* 2.7–4 mm long, the calyx lobes persistent; cotyledons planoconvex.

NATURAL OCCURRENCE: Western Australia: from the Moresby Range district south-eastwards to the Ongerup, Koorda and Grass Patch districts.

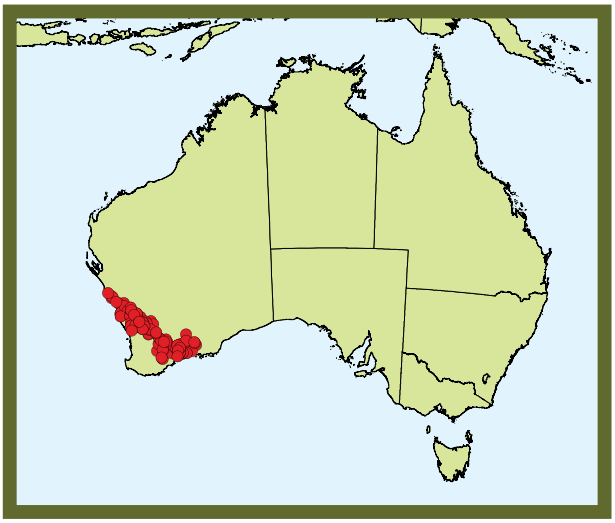
ECOLOGY: Recorded as occurring in open woodland, mallee–*Melaleuca* scrub, shrubland, low open heath, on clay, sand, red-brown loam, sandy loam over laterite, and sand over granite.

FLOWERING TIME: Recorded as flowering from July to September.

ESSENTIAL OILS: The leaf oil of this species was dominated by sesquiterpenes. The principal components were bicyclogermacrene (17–20%), viridiflorene (7–10%), globulol (17–18%), viridiflorol (8–10%), cubeban-11-ol (4–6%) and spathulenol (2–5%). The principal monoterpenes were α-pinene (1–4%) and 1,8-cineole (trace–0.5%); no other monoterpene being >0.1%.

OIL YIELD: The oil yield (fresh weight, w/w) was <0.1%.

NOTES: This Western Australian wheatbelt species was described as *M. coronicarpa* in 1931 and until very recently was known by this name. The species, however, had been first described in 1845 when it was then placed in the genus *Astroloma* (Ericaceae) and it was only in 2011 that the necessary nomenclatural correction was made.



Melaleuca megacephala F.Muell.

PUBLICATION: *Fragmenta phytographiae Australiae* 3: 117 (1862)

DERIVATION: *megacephala*, from the Greek *megas*, large, great, and *kephale*, head, in reference to the large inflorescences of this species

DESCRIPTION: *Shrub* 0.4–3.3 m tall; bark rough. *Branchlets* glabrescent, pubescent. *Leaves* alternate, 5.5–20.5 mm long, 3.5–10.5 mm wide, 1.2–3.3 times as long as wide, short-petiolate; blade glabrescent, pubescent to sericeous-pubescent and often becoming lanuginose-pubescent distally, obovate to broadly obovate or elliptic to broadly elliptic, in transverse section transversely linear, the base attenuate or cuneate, the apex acute, obtusely shortly acuminate, acuminate, broadly acute or obtuse to rounded, the veins longitudinal, 3–5(–7), *oil glands* moderately dense, obscure to distinct, scattered. *Inflorescences* capitate, pseudoterminal and sometimes also upper axillary, with 4–12 triads, up to 50 mm wide. *Hypanthium* hairy, 2–3.5 mm long. *Calyx lobes* abaxially glabrous or hairy to glabrescent, 1–3 mm long, scarious throughout or rarely scarious in a marginal band 0.2–0.5 mm wide. *Petals* deciduous, (2–)3–5 mm long. *Stamens* (10–)12–16 per bundle; filaments yellow to white, creamy-yellow or lemon, (7–)14.5–16.5 mm long, the bundle claw (3–)5.5–8 mm long, 0.4–0.5 times as long as the filaments. *Style* (8.5–)16.5–19 mm long. *Ovules* c. 10–15 per locule. *Infructescences* globose. *Fruit* 4.5–7 mm long, with weakly developed sepaline teeth; cotyledons obvolute.

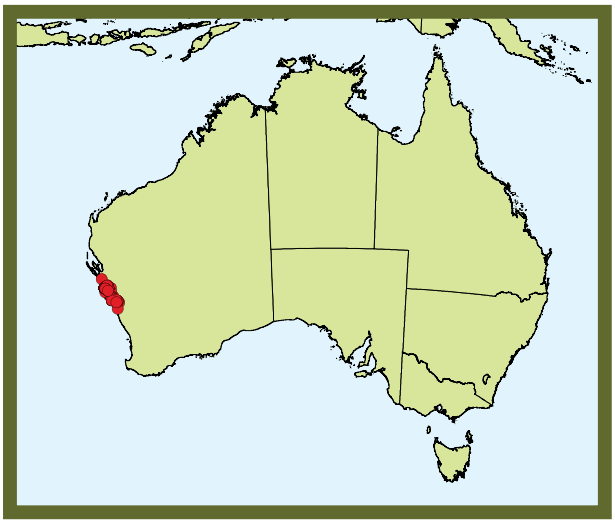
NATURAL OCCURRENCE: Western Australia: the Kalbarri–Geraldton district.

ECOLOGY: Recorded as occurring in scrubland, mixed heathland, low open forest, coastal sand plain, on sand, lateritic soil, sand over limestone, sandstone, rocky loam, and clayey sand.

FLOWERING TIME: Recorded as flowering in January and from June to November.

ESSENTIAL OILS: This species produced an oil with significant amounts of both mono- and sesquiterpenes. The principal monoterpenes encountered were α-pinene (30.7%), linalool (11.4%) and geraniol (2.7%). These were accompanied by a series of esters—geranyl acetate (7.5%), geranyl isobutyrate (4.7%) and geranyl propionate (1.3%). The principal sesquiterpenes encountered were bicyclogermacrene (7.5%), globulol (8.7%), viridiflorol (3.6%) and cubeban-11-ol (2.6%).

OIL YIELD: The oil yield (dry weight, w/w) was 0.4%.



Melaleuca megalongensis Craven & S.M.Douglas

PUBLICATION: in Craven, *Novon* 19: 446 (2009)
DERIVATION: *megalongensis*, from the locality Megalong Valley, New South Wales
SYNONYM: *Callistemon megalongensis* (Craven & S.M.Douglas) Udovicic & R.D.Spencer
DESCRIPTION: *Shrub* to 5 m tall; bark subpapery, medium soft, flaking or peeling. *Branchlets* glabrescent, sericeous. *Leaves* alternate, 35–55 mm long, 3.5–5 mm wide, 8.8–12.5 times as long as wide, short-petiolate; blade glabrescent, sericeous, narrowly elliptic to narrowly obovate, in transverse section transversely linear (and usually thickened at the margin and midrib), the base very narrowly cuneate, the apex narrowly acute to narrowly acuminate, the veins pinnate, c. 15–24, *oil glands* moderately dense, distributed throughout the lamina, distinct or obscure, scattered. *Inflorescences* spicate, pseudoterminal, with 25–60 monads, 30–40 mm wide. *Hypanthium* hairy, 3.3–3.5 mm long. *Calyx lobes* abaxially glabrescent, 1.7–2 mm long, scarious in a marginal band c. 0.5–0.7 mm wide. *Petals* deciduous, 3.3–3.7 mm long. *Stamens* free, c. 45–50 per flower, mid magenta-pink, 9.5–14 mm long; anthers dark reddish. *Style* 17–19 mm long. *Ovules* numerous. *Fruit* 6 mm long, the calyx lobes deciduous; inner distal wall of staminophore without reflexed, free antesepalous triangular processes. Seeds with concavoconvex cotyledons.

NATURAL OCCURRENCE: New South Wales: Megalong Valley.
ECOLOGY: Recorded as occurring on spring-fed (and winter-wet) flats with *Lomandra*, surrounded by open eucalypt forest with *Leptospermum*, *Hakea* and *Acacia*, growing mainly in the interzone between the flat and the forest.
FLOWERING TIME: Recorded as flowering in November and December.
ESSENTIAL OILS: This species produced a monoterpenoid leaf oil that was dominated by 1,8-cineole (74–76%). This was accompanied by lesser amounts of α-pinene (2–3%), limonene (8–10%) and α-terpineol (7–8%). Sesquiterpenes contributed less than 3% of the oil, with spathulenol (0.3–0.5%) being the principal contributor.
OIL YIELD: The oil yield (dry weight, w/w) was 1.2–1.3%.

Melaleuca micromera Schauer

PUBLICATION: in Lehmann, *Plantae Preissianae* 1: 146 (1844)

DERIVATION: *micromera*, from the Greek *mikros*, small, little, and *-merus*, referring to parts or number, an apparent reference to the very small leaves of this species

DESCRIPTION: *Shrub* 1.2–4 m tall. *Branchlets* hairy, lanuginulose to lanuginulose-puberulous. *Leaves* ternate, peltate, 0.9–1.5 mm long, 0.7–1.3 mm wide, 1.1–1.3 times as long as wide, sessile; blade soon glabrescent, the marginal lanuginulose to lanuginulose-puberulous or puberulous cilia ephemeral, broadly elliptic, subcircular or rarely broadly ovate, in transverse section shallowly lunate to crescentic, the base rounded to truncate, the apex acuminate or acute, *oil glands* sparse, distinct or rarely obscure, more or less in rows or scattered. *Inflorescences* subcapitate, pseudoterminal or lateral, with 3–18 monads, up to 10 mm wide. *Hypanthium* glabrous, 1–1.8 mm long. *Calyx lobes* abaxially glabrous, 0.5–1 mm long, herbaceous to the margin or scarious in a marginal band c. 0.1 mm wide. *Petals* deciduous, 0.9–1.6 mm long. *Stamens* 3–5 per bundle; filaments yellow, 1.7–4 mm long, the bundle claw 0.3–1.2 mm long, 0.1–0.4 times as long as the filaments. *Style* 6 mm long. *Ovules* 15–40 per locule. *Fruit* 2.5–3 mm long, with sepaline teeth or the calyx lobes weathering away.

NATURAL OCCURRENCE: Western Australia: the Tunney – Stirling Range – Green Range district and the Perup district.

ECOLOGY: Recorded as occurring in jarrah forest, and on gravelly clay.

FLOWERING TIME: Recorded as flowering from August to October.

ESSENTIAL OILS: This species produced an oil dominated by monoterpenoids. The principal component was 1,8-cineole (54.2%). This was accompanied by lesser amounts of α-pinene (9.2%), limonene (7.3%), α-terpineol (1.6 %) and linalool (1.3%). Sesquiterpenes were varied and present in small amounts, with the principal components being globulol (2.0%), spathulenol (3.1%), γ-eudesmol (1.6%), α-eudesmol (3.7%) and β-eudesmol (4.4%).

OIL YIELD: The oil yield (dry weight, w/w) was 2.1%.

NOTES: The leaves of this species are extremely small and this, coupled with the heads of yellow flowers, makes the species an interesting ornamental subject. It appears to be reasonably hardy in cultivation in temperate Australia.

Melaleuca microphylla Sm.

PUBLICATION: in *Rees' Cyclopaedia* 23: no. 9 (1812)

DERIVATION: *microphylla*, from the Greek *mikros*, small, little, and *phyllon*, leaf, in reference to the small leaves of this species

DESCRIPTION: *Shrub* 2–5 m tall; bark papery, grey-white. *Branchlets* rapidly glabrescent, the lanuginulose and puberulous hairs ephemeral. *Leaves* alternate, 3–8 mm long, 0.3–0.6 mm wide, 6–13 times as long as wide, subsessile; blade rapidly glabrescent, the lanuginulose and puberulous hairs ephemeral, linear-elliptic or linear, in transverse section depressed obovate or rarely subcircular, the base attenuate to narrowly cuneate or parallel (blade width equals petiole width), the apex obtuse to rounded or rarely acute, 1-veined, *oil glands* sparse, obscure, scattered. *Inflorescences* spicate, pseudoterminal, with 10–50 monads, up to 22 mm wide. *Hypanthium* glabrous, 1–1.8 mm long. *Calyx lobes* abaxially glabrous, 0.5–1 mm long, scarious in a marginal band 0.05–0.2 mm wide. *Petals* deciduous, 1–2.2 mm long. *Stamens* 4–10 per bundle; filaments yellow, white, cream or creamy-green, 5–11 mm long, the bundle claw 3.5–4.2 mm long, 0.4–0.6 times as long as the filaments. *Style* 8–11 mm long. *Ovules* 30–50 per locule. *Fruit* 2–3 mm long, with sepaline teeth; mature seeds not seen.

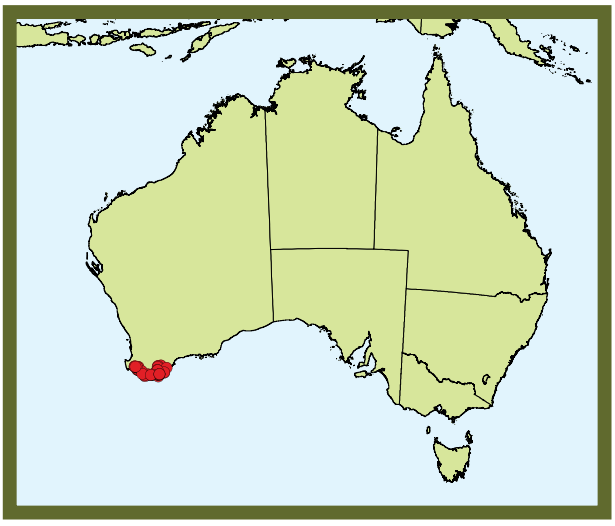
NATURAL OCCURRENCE: Western Australia: from the Manjimup district to the Manypeaks district.

ECOLOGY: Recorded as occurring in dense shrubland, tall eucalypt forest, along stream lines, karri forest, open eucalypt woodland, on wet sandy loam, stony soil, and clay.

FLOWERING TIME: Recorded as flowering from September to November.

ESSENTIAL OILS: The leaf oil of this species was dominated by monoterpenes. The principal component was 1,8-cineole (87–94%). This was accompanied by lesser amounts of α-pinene (1–3%), limonene (2–3%) and α-terpineol (0.8–2.0%). Sesquiterpenes did not contribute much to the oil, with the principal components being globulol (trace–0.8%) and spathulenol (0.1–1.0%).

OIL YIELD: The oil yield (fresh weight, w/w) was 0.3%.



Melaleuca minutifolia F.Muell.

PUBLICATION: *Transactions of the Philosophical Institute of Victoria* 3: 45 (1859)

DERIVATION: *minutifolia*, from the Latin *minutus*, very small, minute, and *folium*, leaf, in reference to the very small leaves of this species

DESCRIPTION: *Shrub or tree* 1–15 m tall; bark papery or fibrous, white to grey. *Branchlets* glabrous. *Leaves* decussate, peltate, 1.2–4.5 mm long, 0.6–1.1 mm wide, 1.2–5.8 times as long as wide, sessile; blade glabrescent or glabrous, the indumentum consisting of ephemeral marginal cilia, angular-obovate to angular-elliptic or oblong, in transverse section lunate or strongly lunate, the base truncate or rarely broadly cuneate, the apex acuminate to narrowly acute, the veins longitudinal, c. 5–7, *oil glands* sparse to moderately dense, distinct or rarely obscure, in rows. *Inflorescences* spicate, pseudoterminal or interstitial, with 1–10 dyads, up to 15 mm wide. *Hypanthium* glabrous, 1–2 mm long. *Calyx lobes* abaxially glabrous, costate, 0.8–1.2 mm long, scarious in a marginal band 0.2–0.3 mm wide. *Petals* deciduous, 1.4–2.1 mm long. *Stamens* 8–16 per bundle; filaments white or creamy-white, 5–8 mm long, the bundle claw 3–4.3 mm long, 0.5–0.6 times as long as the filaments. *Style* 6–8 mm long. *Ovules* 20–30 per locule. *Fruit* 2–3 mm long, the calyx lobes persistent (the extreme basal portion may become woody and persist as a low ring or as small undulations on the hypanthium rim); cotyledons obvolute.

NATURAL OCCURRENCE: Western Australia, Northern Territory: from the Drysdale River district in Western Australia, eastwards to south-western Arnhem Land in the Northern Territory.

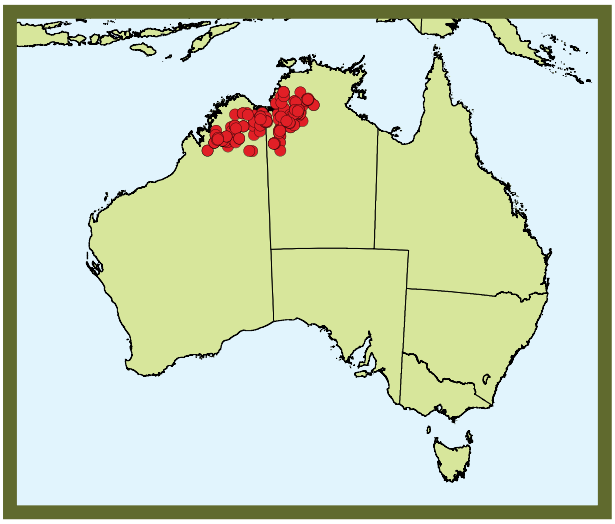
ECOLOGY: Recorded as occurring in open forest, open woodland, shallow sedge swamp, mixed scrub, on sandy or clay soils, granite or limestone hills, lateritic sand, sandstone, and alluvial soil.

FLOWERING TIME: Recorded as flowering from August to June.

ESSENTIAL OILS: The leaf oil of this species contained more sesquiterpenes than monoterpenes. The main monoterpene present was α-pinene (16–20%) and no other monoterpene accounted for more than limonene (0.3%). The main sesquiterpenes encountered in the oil were aromadendrene (3–11%), bicyclogermacrene (7–10%), allo-aromadendrene (2–3%), viridiflorene (2–3%), β-caryophyllene (1–5%), globulol (6–8%), spathulenol (5–7%), γ-eudesmol (7–11%), α-eudesmol (5–7%) and β-eudesmol (8–12%).

OIL YIELD: The oil yield (fresh weight, w/w) was 0.6%.

REFERENCES ON ESSENTIAL OILS: Brophy and Doran 1996; Brophy et al. 2008



Melaleuca ***monantha*** (Barlow) Craven

PUBLICATION: in Craven & Lepschi, *Australian Systematic Botany* 12: 891 (1999)

DERIVATION: *monantha*, from the Greek *monos*, one, single, and *anthos*, flower, in reference to the one-flowered floral unit

SYNONYM: *Melaleuca minutifolia* subsp. *monantha* Barlow

DESCRIPTION: *Tree or shrub* 1.5–7 m tall; bark papery, whitish. *Branchlets* glabrous. *Leaves* decussate, peltate, 0.9–3 mm long, 0.5–1 mm wide, 1.7–4.3 times as long as wide, sessile; blade glabrescent or glabrous, the indumentum consisting of ephemeral marginal cilia, oblong, angular-obovate, narrowly angular-obovate, broadly angular-obovate or angular-elliptic, in transverse section lunate, the base truncate or rarely broadly cuneate, the apex acuminate or rarely approaching acute, the veins longitudinal, c. 5–7, *oil glands* dense or moderately dense, obscure, in rows. *Inflorescences* spicate, pseudoterminal (and sometimes upper axillary also or instead) or interstitial, with 1–8 monads, up to 12 mm wide. *Hypanthium* glabrous, 1.3–1.8 mm long. *Calyx lobes* abaxially glabrous, costate, 0.5–0.7 mm long, scarious in a marginal band up to 0.2 mm wide or herbaceous to the margin. *Petals* deciduous, 1.2–1.6 mm long. *Stamens* 6–14 per bundle; filaments white, 4.5–6.8 mm long, the bundle claw 2–3.5 mm long, 0.3–0.5 times as long as the filaments. *Style* 5–6 mm long. *Ovules* c. 20 per locule. *Fruit* 2–3.2 mm long, with sepaline teeth (these eventually weathering away); cotyledons obvolute.

NATURAL OCCURRENCE: Queensland: from the Palmer River district south to the Mt Sturgeon district.

ECOLOGY: Recorded as occurring in open eucalypt forest, grassy eucalypt woodland, grasslands, on granite, clay, loamy soil, and sandstone.

FLOWERING TIME: Recorded as flowering from October to February and in June.

ESSENTIAL OILS: The leaf oil of this species was primarily monoterpenoid in nature, though there were significant amounts of sesquiterpenes present. The principal monoterpenes were α-pinene (20–55%) and β-pinene (15–30%). These were accompanied by lesser amounts of limonene (3–4%), terpinen-4-ol (1–2%) and α-terpineol (4–7%). The main sesquiterpenes identified were β-caryophyllene (1–5%), spathulenol (2–7%), γ-eudesmol (0.5–2.0%), α-eudesmol (0.3–2.0%) and β-eudesmol (1–4%).

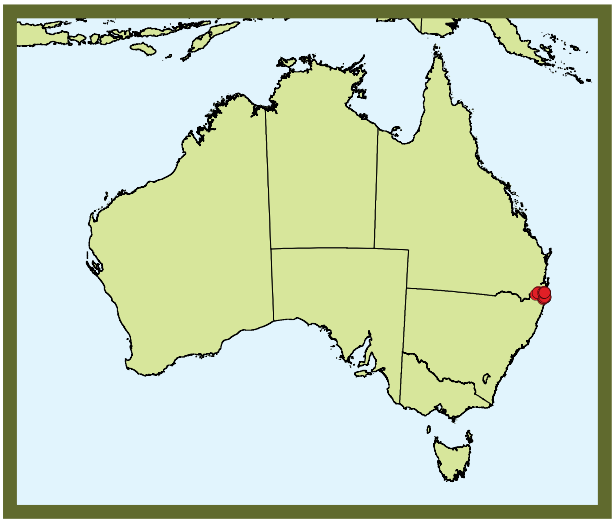
OIL YIELD: The oil yield (dry weight, w/w) was 0.1–0.2%.

REFERENCE ON ESSENTIAL OILS: Brophy et al. 2008

Melaleuca ***montana*** (S.T.Blake) Craven

PUBLICATION: *Novon* 16: 472 (2006)
DERIVATION: *montana*, from the Latin *mons*, mountain, hence montane, pertaining to mountains, in reference to the species occurring in such regions
SYNONYM: *Callistemon montanus* S.T.Blake
DESCRIPTION: *Tree or shrub* 1–8 m tall. *Branchlets* glabrescent, velutinous, sometimes matted. *Leaves* alternate, 37–112 mm long, 5–12 mm wide, 5–12 times as long as wide, short- to long-petiolate; blade glabrescent, velutinous, sometimes matted, narrowly obovate, narrowly elliptic, very narrowly obovate, very narrowly elliptic or narrowly ovate, in transverse section transversely linear or obsublunate, the base very narrowly attenuate, very narrowly cuneate or attenuate, the apex acute or very shortly acuminate, the veins pinnate, 11–21, *oil glands* sparse, obscure, scattered. *Inflorescences* spicate, interstitial, with 15–30 monads, 50–65 mm wide. *Hypanthium* glabrous, 3.8–5.5 mm long. *Calyx lobes* abaxially hairy or glabrescent, 1.8–3.2 mm long, herbaceous to the margin. *Petals* deciduous, 4.2–6.2 mm long. *Stamens* 27–47 per flower; filaments red to crimson, 20–26 mm long; anthers purple. *Style* 18–32 mm long. *Ovules* c. 100–150 per locule. *Fruit* 6.2–8.6 mm long, the calyx lobes at length deciduous; cotyledons obvolute.

NATURAL OCCURRENCE: Queensland, New South Wales: the border ranges area.
ECOLOGY: Recorded as occurring in stunted eucalypt forest, heath, undergrowth of *Eucalyptus–Casuarina* forest, mountain heathland on cliff top, cliff edge in moist tall forest, on rhyolite, and sandstone.
FLOWERING TIME: Recorded as flowering in December and January, and in April and May.
ESSENTIAL OILS: This species gave an oil, in very low yield, that contained more sesquiterpenes than monoterpenes. The principal monoterpene was α-pinene (4–25%), and p-cymene (1–2%), terpinolene (1–2%) and α-terpineol (1–2%) were the only other monoterpenes present at more than 1%. The principal sesquiterpene was β-caryophyllene (16–30%), with lesser amounts of α-humulene (2–4%), E,E-α-farnesene (1–5%), globulol (3–6%),viridiflorol (4–6%), spathulenol (3–7%) and caryophyllene oxide (2–3%).
OIL YIELD: The oil yield (fresh weight, w/w) was <0.1%.
REFERENCE ON ESSENTIAL OILS: Brophy et al. 1998, as *Callistemon montanus*
NOTES: *Melaleuca montana* is cultivated to some extent as an ornamental shrub in temperate Australia where it is likely to be useful in situations where a bushy form is required. Florally, however, it may not be superior to *M. citrina*.



Melaleuca ***montis-zamia*** Craven

PUBLICATION: *Novon* 19: 447 (2009), as *montis-zamiae*
DERIVATION: *montis-zamia*, from the Latin *mons*, mountain, and Zamia, in reference to this species occurring at the locality Mt Zamia, Queensland
SYNONYM: *Callistemon montis-zamia* (Craven) Udovicic & R.D.Spencer
DESCRIPTION: ***Shrub or tree*** 2.5–4 m tall. ***Branchlets*** glabrescent, sericeous. ***Leaves*** alternate, 37–92 mm long, 2.5–9 mm wide, 9.5–15 times as long as wide, short- to long-petiolate; blade glabrescent, sericeous, very narrowly elliptic, very narrowly ovate or narrowly elliptic, in transverse section transversely linear or sublunate, the base very narrowly attenuate or very narrowly cuneate, the apex acute or very shortly acuminate, the veins pinnate, 18–27, ***oil glands*** dense or moderately dense, distinct, scattered. ***Inflorescences*** spicate, pseudoterminal or interstitial, with 10–40 monads, 30–45 mm wide. ***Hypanthium*** glabrous or hairy, 3–3.4 mm long. ***Calyx lobes*** abaxially hairy or glabrescent, 1–1.3 mm long, scarious in a marginal band 0.3 mm wide or herbaceous to the margin. ***Petals*** deciduous, 3.1–4.7 mm long. ***Stamens*** 40–58 per flower; filaments red, 14–17 mm long; anthers yellow. ***Style*** 12–20 mm long. ***Ovules*** c. 200 per locule. ***Fruit*** 3.4–4.9 mm long, the calyx lobes deciduous; cotyledons obvolute.
NATURAL OCCURRENCE: Queensland: the Springsure district.
ECOLOGY: Recorded as occurring in riparian scrub, on a cliff top, and on an ephemeral watercourse.
FLOWERING TIME: Recorded as flowering in August and September.

ESSENTIAL OILS: The leaf oil of this species was dominated by monoterpenes. The principal components were α-pinene (4–35%, the majority >25%) and 1,8-cineole (48–80%). These were accompanied by lesser amounts of limonene (2–6%), linalool (1–4%) and α-terpineol (4–7%). Sesquiterpenes were virtually absent from this oil.
OIL YIELD: The oil yield (fresh weight, w/w) was 0.3–0.4%.
REFERENCE ON ESSENTIAL OILS: Brophy et al. 1998, as *Callistemon chisholmii*
NOTES: The correct spelling of the specific epithet, i.e. *montis-zamia*, was altered by editorial staff during the publication process and unfortunately not detected in the proof stage. The literal translation of the epithet is 'of the mountain Zamia', not 'of the mountain of Zamia'.

Melaleuca ***nanophylla*** Carrick

PUBLICATION: in Carrick & Chorney, *Journal of the Adelaide Botanic Gardens* 1: 300, fig. 13 (1979)

DERIVATION: *nanophylla*, from the Greek *nanos*, dwarf, little, and *phyllon*, leaf, in reference to the very small leaves

DESCRIPTION: *Shrub or tree* 3–6 m tall; bark papery or rough and stringy. *Branchlets* glabrous. *Leaves* alternate, peltate, 0.8–2.6 mm long, 0.6–1.2 mm wide, 1.3–2.3 times as long as wide, sessile; blade glabrous, angular-obovate to broadly angular-obovate, obovate to broadly obovate, sub-oblong or broadly ovate, in transverse section sublunate or depressed obovate, rarely approaching subreniform, the base rounded to truncate, the apex obtuse to acute, obtusely shortly acuminate, rounded or shortly acuminate, the veins longitudinal, 5, *oil glands* moderately dense, obscure to rarely distinct, in rows. *Inflorescences* spicate or capitate, interstitial, with 1–9 triads (or sometimes monads), up to 10 mm wide. *Hypanthium* glabrous, 1.2–1.5 mm long. *Calyx lobes* abaxially glabrous, costate, 0.4–0.7 mm long, scarious in an indistinct marginal band 0.1–0.2 mm wide. *Petals* deciduous, 1.4–1.7 mm long. *Stamens* 6–12 per bundle; filaments white to pale yellow, 4.5–5 mm long, the bundle claw 2.4–2.7 mm long, 0.5 times as long as the filaments. *Style* 5.5 mm long. *Ovules* c. 5–8 per locule. *Fruit* 2–2.3 mm long, the calyx lobes with weakly developed sepaline teeth; mature seeds not seen.

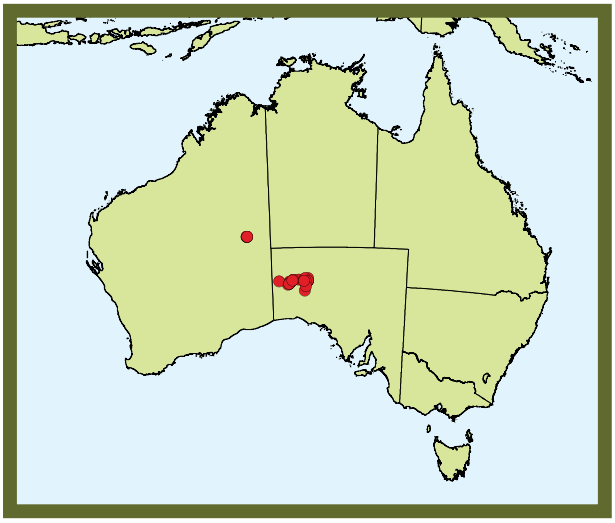
NATURAL OCCURRENCE: Western Australia, South Australia: the Van der Linden Lakes district in Western Australia and the Emu district in South Australia.

ECOLOGY: Recorded as occurring on the edge of clay pans, gypseous flats, calcareous outcrops, and on sandy clay.

FLOWERING TIME: Recorded as flowering in May, and in August and September.

ESSENTIAL OILS: The leaf oil of this species contained almost equal amounts of terpenes and β-triketones. The principal components of the oil were α-pinene (40.1%) and flavesone (43.5%). These were accompanied by lesser amounts of the terpenes β-pinene (1.1%), β-caryophyllene (1.4%) and viridiflorene (0.7%) and the β-triketones isoleptospermone (0.8%), leptospermone (1.3%) and a homoleptospermone (0.4%).

OIL YIELD: The oil yield (w/w, dry weight) was 0.8–1.7%.



Melaleuca ***nematophylla*** F.Muell. ex Craven

PUBLICATION: in Craven & Lepschi, *Australian Systematic Botany* 12: 892 (1999)

DERIVATION: *nematophylla*, from the Greek *nema*, thread, and *phyllon*, leaf, in reference to the long, thin leaves of this species

DESCRIPTION: *Shrub* 0.4–3.5 m tall; bark coarse, papery. *Branchlets* glabrous or glabrescent, pubescent or rarely shortly sericeous. *Leaves* alternate, 55–155 mm long, 0.7–1.5 mm wide, 5.5–180 times as long as wide, sessile; blade glabrous or sometimes glabrescent (and then sericeous-pubescent to pubescent and occasionally with some lanuginose-pubescent hairs also, or rarely shortly sericeous), linear, in transverse section circular, the base truncate, the apex narrowly acuminate or narrowly acute, the veins longitudinal, (1–)3, *oil glands* dense, distinct to obscure, scattered. *Inflorescences* capitate or shortly spicate, sometimes also upper axillary, with 10–20 triads, up to 55 mm wide (often 25–30 mm wide). *Hypanthium* hairy, 1.8–2.5 mm long. *Calyx lobes* abaxially glabrous, (0.2–)0.4–0.9(–1) mm long, scarious in a marginal band 0.2–0.5 mm wide or scarious throughout. *Petals* deciduous, 2.5–3.5 mm long. *Stamens* 7–13 per bundle; filaments mauve, pink, magenta or purple (fading to pink or white), 9.5–16 mm long, the bundle claw 2.5–6 mm long, 0.3–0.4 times as long as the filaments. *Style* 13–18 mm long. *Ovules* c. 8–10 per locule. *Infructescences* globose. *Fruit* 3–6 mm long, the calyx lobes weathering away; cotyledons obvolute.

NATURAL OCCURRENCE: Western Australia: from the Kalbarri–Mullewa district to the Three Springs – Perenjori and Manning Range – Bungalbin districts.

ECOLOGY: Recorded as occurring in dense low shrubland, eucalypt woodland, heathland, tall shrubland, sand plain, on sand, laterite, stony clay loam, and sandstone.

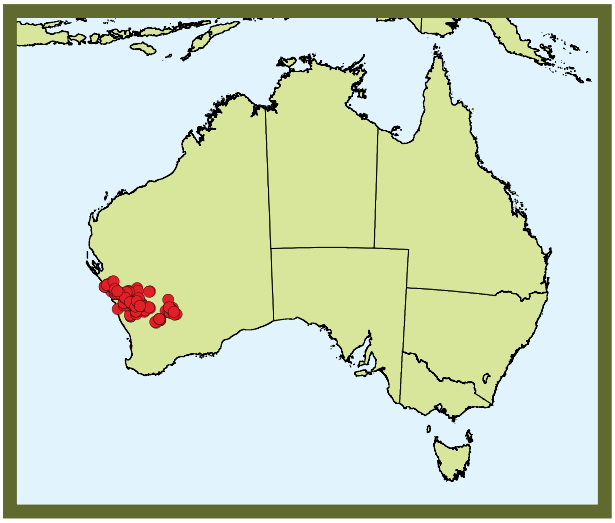
FLOWERING TIME: Recorded as flowering from July to December.

ESSENTIAL OILS: There was some variation in the leaf oils of this species but in all cases the oils were dominated by monoterpenes. The principal component in one sample was α-pinene (71.3%), and this was accompanied by

lesser amounts of limonene (11.2%), α-terpineol (3.0%) and β-pinene (2.4%). Sesquiterpenes were, of necessity, of little importance. The main sesquiterpenes encountered were viridiflorol (2.4%), globulol (1.1%), β-caryophyllene (0.7%) and spathulenol (0.6%). Two other samples, while containing predominantly monoterpenoid oils, differed in the main components. In these plants, the principal components were α-pinene (26–30%) and 1,8-cineole (14–27%), and these were accompanied by lesser amounts of the monoterpenes limonene (2–4%) and fenchol (0.5–5.0%) and the sesquiterpenes bicyclogermacrene (6–10%), germacrene-D (1–5%), globulol (3–10%), viridiflorol (1–4%) and spathulenol (1–3%).

OIL YIELD: The oil yield (fresh weight, w/w) was 0.1–0.3%.

NOTES: Previously, specimens of this species were incorrectly identified as *M. filifolia*. It is now known that the names *M. filifolia* and *M. nematophylla* apply to two very different plants. *Melaleuca nematophylla* is reasonably common in cultivation in temperate areas of Australia and is a very attractive ornamental shrub.



Melaleuca ***nervosa*** (Lindl.) Cheel

PUBLICATION: *Journal and Proceedings of the Royal Society of New South Wales* 78: 65 (1944)

DERIVATION: *nervosa*, from the Latin *nervus*, sinew, tendon, but in botany the word is applied to the veins in organs such as leaves, and in the present species is in reference to the distinctive leaf veins

SYNONYMS: *Callistemon nervosus* Lindl.; *Melaleuca crosslandiana* W.Fitzg.; *Melaleuca nervosa* subsp. *crosslandiana* (W.Fitzg.) Barlow ex Craven; *Melaleuca nervosa* f. *latifolia* Byrnes

DESCRIPTION: *Tree or shrub* 1–15 m tall; bark papery to fibrous, grey, grey-white, white, pale brown, dark brown or creamy. *Branchlets* glabrescent, with lanuginulose hairs overlaid by long pubescent hairs or sericeous. *Leaves* alternate, 30–115 mm long, 5–40 mm wide, 1.6–10 times as long as wide, subsessile or long-petiolate; blade glabrescent, lanuginulose or sericeous-lanuginulose hairs overlaid by long pubescent to sericeous-pubescent hairs, narrowly elliptic, narrowly obovate, elliptic, obovate, very narrowly elliptic, very narrowly obovate, broadly obovate or broadly elliptic, in transverse section transversely linear, the base attenuate, the apex acuminate, narrowly acuminate, obtusely shortly acuminate or acute to obtuse, the veins longitudinal, 3–7, *oil glands* moderately dense, obscure to rarely distinct, scattered. *Inflorescences* spicate, pseudoterminal and sometimes also upper axillary, with 6–20 triads, up to 48 mm wide. *Hypanthium* hairy, 1.8–3.5 mm long. *Calyx lobes* abaxially hairy or rarely glabrescent, 0.5–1.3 mm long, herbaceous to the margin or scarious in a marginal band up to 0.4 mm wide. *Petals* deciduous, 2–3.1 mm long. *Stamens* usually in 5 bundles and with a staminal ring, sometimes not 5-bundled or grouped but inserted upon a staminal ring, or rarely the filaments free and inserted directly on the hypanthium apex, when in bundles with 3–7 per bundle; filaments green, greenish-yellow, yellow, lime, greenish-cream, creamy-yellow, white or red, 13–23 mm long, the bundle claw (0–)0.4–2.6 mm long, c. 0.2 times as long as the filaments. *Style* 10–26.5 mm long. *Ovules* c. 40–80 per locule. *Fruit* 3–4 mm long, the calyx lobes deciduous; cotyledons obvolute to subobvolute (almost planoconvex).

NATURAL OCCURRENCE: Western Australia, Northern Territory, Queensland; also Papua New Guinea: from the Kimberley region of Western Australia, eastwards to the northern and central Northern Territory and to north-eastern Queensland. The species also occurs in southern Papua New Guinea.

ECOLOGY: Recorded as occurring in grassland, shrubland, eucalypt forest, open woodland, seasonal swamp, creek banks, open forest, and *Melaleuca* swamp on sand, gravel, alluvium, cracking clay, stony soil, sandy clay, and sandy loam over sandstone.

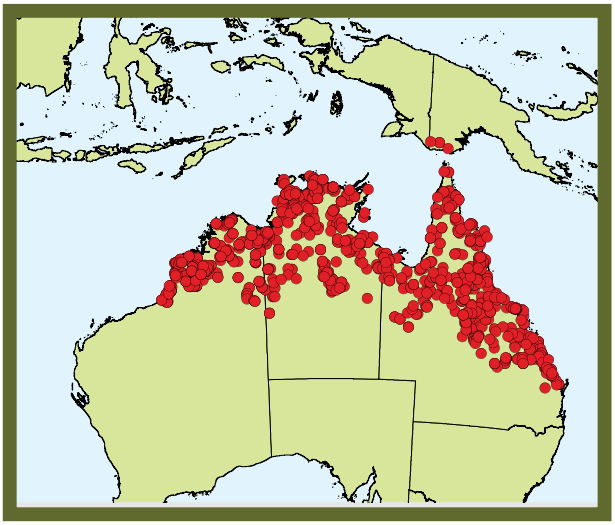
FLOWERING TIME: Recorded as flowering almost throughout the year but possibly the main flowering is from March to November.

ESSENTIAL OILS: The leaf oil of this species was variable, presenting a mixture of mono- and sesquiterpenes. The principal monoterpenes encountered were 1,8-cineole (6–36%), limonene (4–10%), linalool (2–16%), α-terpineol (3–6%) and β-pinene (1–6%). The main sesquiterpenes identified were bicyclogermacrene (0.4–2.0%) and the alcohols globulol (4–13%), viridiflorol (2–10%), spathulenol (3–15%) and cubeban-11-ol (1–5%).

OIL YIELD: The oil yield (fresh weight, w/w) was 0.2–0.5%.

REFERENCES ON ESSENTIAL OILS: Brophy et al. 1988; Brophy and Doran 1996

NOTES: This species should be investigated more widely by horticulturists as there are several flower colour variants and it should be possible to develop a range of cultivars for ornamental purposes in tropical and subtropical regions.



Melaleuca ***nesophila*** F.Muell.

DESCRIPTION: *Fragmenta phytographiae Australiae* 3: 113 (1862)

DERIVATION: *nesophila*, from the Greek *nesos*, island, and *phileo*, to love, in reference to the first specimens of this species being found on an island

DESCRIPTION: *Shrub or tree* 1–3 m tall. *Branchlets* rapidly glabrescent, the sericeous to sericeous-pubescent to rarely pubescent hairs ephemeral. *Leaves* alternate, 10.5–26.5 mm long, 3.8–9 mm wide, 2.2–4.2 times as long as wide, short-petiolate; blade rapidly glabrescent, the sericeous to sericeous-pubescent hairs ephemeral, obovate to narrowly obovate or narrowly elliptic to elliptic, in transverse section transversely linear, the base attenuate, the apex obtusely shortly acuminate or acute to rounded, the veins longitudinal, 5, *oil glands* moderately dense, obscure, scattered. *Inflorescences* capitate or shortly spicate, pseudoterminal and sometimes also upper axillary, with 2–20 triads, up to 30 mm wide. *Hypanthium* glabrous, 1.5–2 mm long. *Calyx lobes* abaxially glabrous, 0.4–0.8 mm long, scarious in a marginal band 0.1–0.3 mm wide. *Petals* deciduous, 1.8–2.3 mm long. *Stamens* 7–10 per bundle; filaments purple to mauve or pink, 7–9(–14) mm long, the bundle claw 1.2–3.5 mm long, 0.2–0.4 times as long as the filaments. *Style* 10–11(–13) mm long. *Ovules* c. 10–15 per locule. *Infructescences* globose. *Fruit* 3–5 mm long, with sepaline teeth; cotyledons obvolute.

NATURAL DISTRIBUTION: Western Australia: the Gairdner River – East Mt Barren district and adjacent offshore islands.

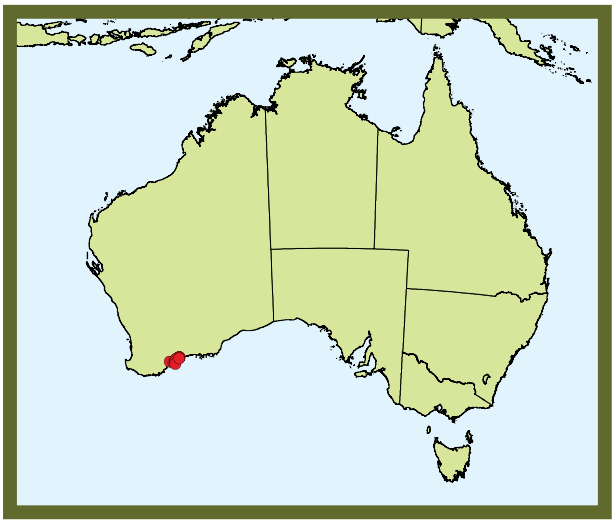
ECOLOGY: Recorded as occurring in dense scrubland, on sand among quartzite rocks, loamy sand over quartzite, and sand hills.

FLOWERING TIME: Recorded as flowering from July to September and from December to March.

ESSENTIAL OILS: The leaf oil from this species contained a majority of monoterpenes. The principal components were 1,8-cineole (45.2%), α-pinene (9.3%), limonene (3.5%) and α-terpineol (4.4%). These were accompanied by the sesquiterpenes elemol (7.9%), γ-eudesmol (7.5%), α-eudesmol (4.4%) and β-eudesmol (7.3%).

OIL YIELD: The oil yield (fresh weight, w/w) was 0.9%.

NOTES: Despite this species coming from a relatively small region on the southern coast of Western Australia, it has proved to be a very hardy and adaptable plant and is planted widely in dry and humid temperate Australia.



Melaleuca ***nodosa*** (Sol. ex Gaertn.) Sm.

PUBLICATION: *Transactions of the Linnean Society of London* 3: 276 (1797)

DERIVATION: *nodosa*, from the Latin *nodus*, knot, swelling, hense *nodosus*, knotty, apparently in reference to the shape of the infructescence

SYNONYM: *Metrosideros nodosa* Sol. ex Gaertn.

DESCRIPTION: ***Shrub or tree*** 0.2–11 m tall; bark papery or smooth becoming flaky, white or dark grey. ***Branchlets*** glabrescent or rarely glabrous, sericeous-pubescent to pubescent (sericeous hairs often also present, very rarely the indumentum of sericeous hairs only). ***Leaves*** alternate, 8–27(–41.5) mm long, 0.5–1.5(–3.5) mm wide, 6.5–30(–70) times as long as wide, subsessile to short-petiolate; blade glabrescent or rarely glabrous, the indumentum as on the branchlets, linear or linear-elliptic to very narrowly elliptic, in transverse section transversely elliptic to transversely narrowly elliptic, transversely linear or very rarely approaching depressed obovate or transversely oblong, the base narrowly cuneate to attenuate or parallel (blade width equals petiole width), the apex narrowly acuminate, the veins longitudinal, 3, ***oil glands*** moderately dense, obscure to distinct, scattered to sometimes more or less in rows. ***Inflorescences*** capitate, pseudoterminal and sometimes also upper axillary, or sometimes lateral, with 4–7 triads, up to 17 mm wide. ***Hypanthium*** hairy, 0.8–1.2 mm long. ***Calyx lobes*** abaxially glabrous, 0.2–0.4 mm long, scarious throughout or scarious in a marginal band 0.15–0.2 mm wide. ***Petals*** deciduous, 1.2–1.7 mm long. ***Stamens*** 4–7 per bundle; filaments yellow, pale yellow, creamy-yellow or whitish-yellow, 5–8.5 mm long, the bundle claw 1.8–3.2 mm long, 0.3–0.4 times as long as the filaments. ***Style*** 6–9 mm long. ***Ovules*** 10–15 per locule. ***Infructescences*** globose. ***Fruit*** 1.8–4 mm long, the calyx lobes weathering away; cotyledons obvolute.

NATURAL OCCURRENCE: Queensland, New South Wales: from the Blackdown Tableland district in Queensland south to the Sydney district in New South Wales, both in coastal regions and on the tablelands.

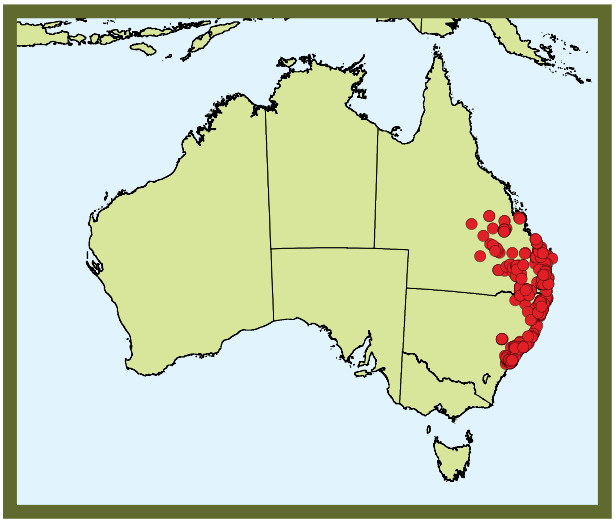
ECOLOGY: Recorded as occurring in heathland, forest understorey, edge of deciduous vine thicket, shrubland, swampy open forest, mixed open forest, on sand, sandy clay, gravelly sandy loam, granite, basalt, and silt over quartz and clay.

FLOWERING TIME: Recorded as flowering in April and from July to January.

ESSENTIAL OILS: This species presented a monoterpenic oil. The principal components were sabinene (10–12%), 1,8-cineole (19–21%), γ-terpinene (11–12%), terpinen-4-ol (18–20%) and α-terpineol (3–4%). The numerous sesquiterpenes present were in proportions of less than 1%. The principal members were globulol (0.8–0.9%), viridiflorol (0.6–0.7%) and spathulenol (0.2–0.3%). One collection (LAC 9988) presented oils in which α-pinene (>25%) and 1,8-cineole (>52%) were the principal components.

OIL YIELD: The oil yield (fresh weight, w/w) was 0.8–1.3%.

NOTES: *Melaleuca nodosa* is variable in the shape and size of its leaves and the broad- and flat-leaved forms are particularly distinctive; the variation is not considered to be taxonomically significant.



Melaleuca ochroma Lepschi

PUBLICATION: in Craven, Lepschi & Cowley, *Nuytsia* 20: 30–31 (2010)

DERIVATION: *ochroma*, from the Greek *ochroma*, paleness, in reference to the colour of the flowers

DESCRIPTION: *Shrub* 0.7–2.5 m tall; bark hard, fibrous. *Branchlets* glabrescent, densely to very densely lanuginulose to lanuginose-pubescent. *Leaves* alternate, 13.5–19 mm long, 1–1.3 mm wide, 11–17 times as long as wide, short-petiolate; blade glabrescent, densely to very densely lanuginulose to lanuginose-pubescent, linear, though narrowly obovate when young, in transverse section shallowly lunate, the base truncate, the apex acute and pungent, the veins obscure, *oil glands* densely distributed, distinct, scattered. *Inflorescences* spicate, axillary, with 17–35 monads, 13–19 mm wide, bracteoles absent. *Hypanthium* puberulous, 1.2–2.2 mm long. *Calyx lobes* abaxially hairy, pubescent to sericeous-pubescent, not costate, triangular or broadly ovate, 1.4–1.6 mm long, scarious in a marginal band 1–3 mm wide, otherwise herbaceous. *Petals* deciduous, 2.4–3.5 mm long. *Stamens* 13–24 per bundle; filaments pink to mauve, 4.3–7.2 mm long, the bundle claw 4.1–4.6 mm long, 0.9–1.7 times as long as the filaments. *Style* 6.5–7.2 mm long. *Ovules* 66–79 per locule. *Fruit* 3–4.4 mm long, with the distal rim flat or more or less so. Seeds brown with coriaceous testa, cotyledons planoconvex.

NATURAL OCCURRENCE: Western Australia: the Mt Holland – Hyden district.

ECOLOGY: Recorded as occurring in *Melaleuca* shrubland with emergent mallee eucalypts, very open mallee over dense shrubs of *Melaleuca lateriflora*, *M. sapientes* and *Grevillea huegelii*, *Eucalyptus wandoo* woodland, on brown clay, whitish sandy-clay, brown clay loam, and sandy loam.

FLOWERING TIME: Recorded as flowering in October and November.

ESSENTIAL OILS: This species produced a leaf oil that was rich in monoterpenes. The principal component was terpinen-4-ol (43.9%). This was accompanied by lesser amounts of 1,8-cineole (14.4%), γ-terpinene (12.4%), α-terpinene (6.3%), p-cymene (4.0%) and α-terpineol (4.2%). Sesquiterpenes were, by necessity, not plentiful, with the major compounds being globulol (0.8%), viridiflorol (0.7%) and spathulenol (0.8%).

OIL YIELD: The oil yield (fresh weight, w/w) was 0.6%.

NOTES: This species, because of the high terpinen-4-ol content of its leaf oil, might warrant further investigation. One would, however, have to find specimens that produced much higher (e.g. ×3) oil yields for the species to have any economic potential.

Melaleuca ***oldfieldii*** F.Muell. ex Benth.

PUBLICATION: *Flora Australiensis* 3: 150 (1867)

DERIVATION: *oldfieldii*, in honour of Augustus F. Oldfield (1821–1887), who collected plant specimens in south-eastern and south-western Australia, and who collected the type specimens of this species

DESCRIPTION: *Shrub* 2–4 m tall. *Branchlets* glabrescent, with generally pubescent hairs (short, often more or less recurved, hairs overlaid with an intergrading layer of usually retrorse pubescent hairs). *Leaves* alternate, 9.5–34 mm long, 3.5–7 mm wide, 2.4–5 times as long as wide, short-petiolate; blade glabrescent, pubescent to sericeous-pubescent on the margin (rarely almost lanuginose-pubescent) and shortish pubescent on the blade surface, narrowly obovate to obovate, in transverse section transversely linear, the base attenuate, the apex acuminate, the veins longitudinal, 5, *oil glands* moderately dense or dense, obscure, more or less in rows. *Inflorescences* capitate, pseudoterminal, with 4–9 triads, up to 32 mm wide. *Hypanthium* hairy, 1.5–2 mm long. *Calyx lobes* abaxially hairy, 0.9–1.8 mm long, scarious throughout. *Petals* caducous, 1.8–3.8 mm long. *Stamens* 8–12 per bundle; filaments yellow, 9–13.5 mm long, the bundle claw 3.5–6.2 mm long, 0.4–0.5 times as long as the filaments. *Style* 13–15 mm long. *Ovules* c. 15–20 per locule. *Infructescences* globose. *Fruit* c. 4–6 mm long; the calyx lobes weathering away; cotyledons obvolute.

NATURAL OCCURRENCE: Western Australia: the Kalbarri district.

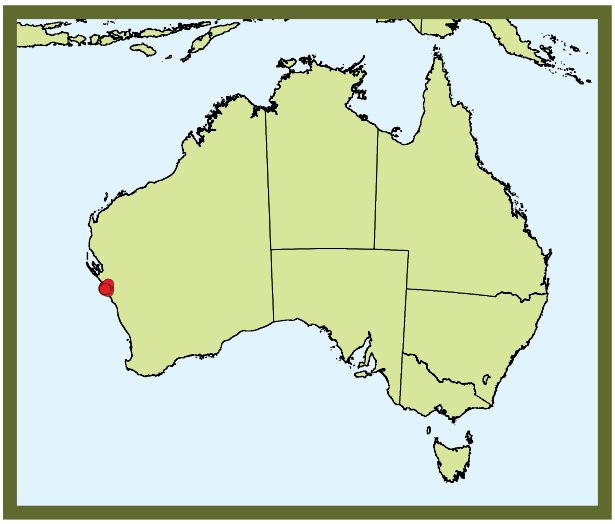
ECOLOGY: Recorded as occurring in sand plain, woodland, and on sandy clay.

FLOWERING TIME: Recorded as flowering in November.

ESSENTIAL OILS: The leaf oil of this species was dominated by 1,8-cineole (82%). There were lesser amounts of α-pinene (3.5%), myrcene (1.8%), limonene (2.0%), terpinen-4-ol (1.0%) and α-terpineol (1.6%). Sesquiterpenes did not contribute much to the oil, with the principal members being bicyclogermacrene (2.4%), globulol (2.8%), viridiflorol (1.7%), spathulenol (1.7%) and cubeban-11-ol (0.7%). No other sesquiterpene reached 0.5% of the total oil.

OIL YIELD: The oil yield (fresh weight, w/w) was 0.5%.

NOTES: The name *M. oldfieldii* has been misapplied previously to each of two quite different species, i.e. *M. campanae* and *M. fabri*. *Melaleuca oldfieldii* is a plant that should be trialled further as an ornamental shrub as the combination of glossy leaves and bright yellow flowers gives an extremely attractive effect. It should be suitable for acid to neutral soils in temperate regions of Australia.



Melaleuca ***orbicularis*** Craven

PUBLICATION: in Craven & Lepschi, *Australian Systematic Botany* 12: 893 (1999)

DERIVATION: *orbicularis*, from the Latin *orbis*, circle, disk, in reference to the leaf blades being generally circular in shape

DESCRIPTION: ***Shrub*** 0.3–2.5 m tall. ***Branchlets*** glabrescent to hairy, pubescent or rarely approaching sericeous-pubescent or rarely lanuginose to lanuginose-pubescent grading to pubescent. ***Leaves*** alternate, 3.5–8 mm long, 2–10.5 mm wide, 0.7–2.2 times as long as wide, subsessile to short-petiolate; blade glabrescent to hairy, pubescent to sericeous-pubescent and often becoming lanuginose-pubescent to lanuginulose-puberulous distally and on the margin, less often some lanuginose-sericeous to rarely sericeous hairs may also occur or the indumentum be of lanuginose-pubescent to lanuginose-sericeous hairs with lanuginose hairs grading to sparser longish pubescent to sericeous-pubescent hairs, broadly ovate (often very broadly so), subcircular, transversely broadly elliptic, broadly elliptic, elliptic or broadly obovate, in transverse section transversely linear or sublunate, the base rounded, cordate, subcordate, attenuate or cuneate, the apex obtusely shortly acuminate, obtuse to rounded or acute, the veins longitudinal (some weakly developed pinnate veins are also present), (3–)7, ***oil glands*** dense or moderately dense, distinct to obscure, scattered. ***Inflorescences*** capitate, pseudoterminal and sometimes also upper axillary,with 2–8 triads, up to 30 mm wide. ***Hypanthium*** hairy, 1.8–2.5 mm long. ***Calyx lobes*** abaxially hairy or glabrescent or glabrous, 0.6–2 mm long, scarious throughout or scarious in a marginal band 0.3–0.5 mm wide. ***Petals*** caducous (sometimes tardily so), 2–3 mm long. ***Stamens*** 5–12 per bundle; filaments mauve, pink, purple, mauve-pink or pink-purple, often ageing to white, 6.5–12.5 mm long, the bundle

claw (1.5–)2.5–4.5(–5.5) mm long, 0.2–0.5 times as long as the filaments. ***Style*** 9–15.5 mm long. ***Ovules*** 15–25 per locule. ***Infructescences*** peg-fruited to globose. ***Fruit*** 3–5 mm long, the calyx lobes weathering away; cotyledons obvolute.

NATURAL OCCURRENCE: Western Australia: from the Coorow district to the Wongan Hills – Cowcowing Lakes district.

ECOLOGY: Recorded as occurring in heathland, tall open shrubland, sand plain, open eucalypt forest with tall *Melaleuca* understorey, mallee shrubland, tall dense shrubland, on sand, sandy clay, laterite, sand over laterite, sand over granite and laterite, and sandy loam.

FLOWERING TIME: Recorded as flowering from July to January.

ESSENTIAL OILS: The leaf oil of this species contained significant amounts of both mono- and sesquiterpenes in its variable oil. The principal monoterpenes were linalool (7–34%), α-pinene (14–24%), 1,8-cineole (0.3–20%) and α-terpineol (0.7–3.0%). The main sesquiterpenes present were γ-eudesmol (6–14%), α-eudesmol (5–7%), β-eudesmol (12–18%) and globulol (1–4%).

OIL YIELD: The oil yield (fresh weight, w/w) was 0.2–0.3%.

Melaleuca ***ordinifolia*** Barlow

PUBLICATION: in Quinn, Cowley, Barlow & Thiele, *Nuytsia* 8: 342, fig. 4b (1992)

DERIVATION: *ordinifolia*, from the Latin *ordo*, line, row, methodical arrangement, and *folium*, leaf, in reference to the regular arrangement of the leaves

DESCRIPTION: ***Shrub*** 0.3–1.5 m tall. ***Branchlets*** glabrescent, lanuginulose. ***Leaves*** decussate (crowded in 4 longitudinal rows), 3–7 mm long, 0.8–1.5 mm wide, 3.8–5.5 times as long as wide, subsessile; blade glabrescent, lanuginulose, very narrowly ovate or rarely very narrowly elliptic, in transverse section sublunate, shallowly lunate, lunate or flattened transversely semielliptic, the base attenuate or parallel (blade width equals petiole width), the apex obtuse, the veins longitudinal, 3, ***oil glands*** moderately dense, obscure to distinct, more or less in rows. ***Inflorescences*** subcapitate to capitate, lateral, with 1–6 monads, up to 15 mm wide. ***Hypanthium*** hairy, 1.5–2.1 mm long. ***Calyx lobes*** abaxially hairy or glabrescent, 0.6–1.1 mm long, herbaceous to the margin. ***Petals*** deciduous, 1.5–2 mm long. ***Stamens*** 8–12 per bundle; filaments white, 6–6.5 mm long, the bundle claw 1–1.4 mm long, 0.2 times as long as the filaments. ***Style*** 6.8–8 mm long. ***Ovules*** 25–30 per locule. ***Fruit*** 3–4.2 mm long, the calyx lobes persistent or weathering away; cotyledons planoconvex.

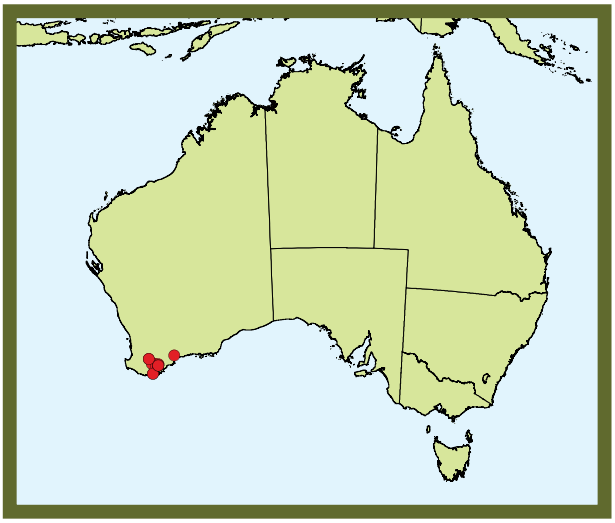
NATURAL OCCURRENCE: Western Australia: the Stirling Range and the Hamersley River district.

ECOLOGY: Recorded as occurring in sparse heathland, shrub mallee, eucalypt woodland, on sandy loam, gravelly sand, loamy sand over sandy clay, and loamy clay over granite.

FLOWERING TIME: Recorded as flowering in September and October.

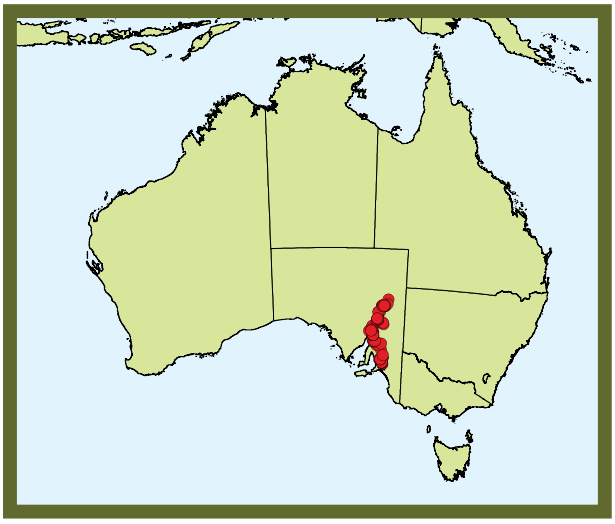
ESSENTIAL OILS: This species produced a leaf oil, in very low yield, in which monoterpenes were in the majority, though there was a significant sesquiterpene presence. The principal monoterpene was 1,8-cineole (40.1%) and it was accompanied by lesser amounts of α-pinene (6.5%) and limonene (5.0%). The principal sesquiterpenes encountered were globulol (13.0%), viridiflorol (3.7%), cubeban-11-ol (3.4%), β-caryophyllene (2.3%) and epiglobulol (2.9%).

OIL YIELD: The oil yield (fresh weight, w/w) was <0.05%.



Melaleuca orophila Craven

PUBLICATION: *Novon* 16: 472 (2006)
DERIVATION: *orophila*, from the Greek *oros*, mountain, and *philos*, loving, hence mountain loving, in reference to the occurrence of this species in mountainous areas
SYNONYM: *Callistemon teretifolius* F.Muell.
DESCRIPTION: *Shrub* 0.5–2 m tall. *Branchlets* glabrescent, sericeous or pubescent. *Leaves* alternate, 44–143 mm long, 0.8–1.7 mm wide, 3.5–14 times as long as wide, subsessile or short-petiolate; blade glabrescent, sericeous, linear, in transverse section circular, subcircular or transversely elliptic, the base parallel (blade width equals petiole width), the apex acute or very shortly acuminate, the veins longitudinal, 3, *oil glands* moderately dense, distinct or obscure, scattered. *Inflorescences* spicate, interstitial or effectively pseudoterminal, with 12–55 monads, 40–55 mm wide. *Hypanthium* hairy to glabrous, 3–4.8 mm long. *Calyx lobes* abaxially hairy or glabrescent (sometimes hairy on the margin only), 1.5–2.1 mm long, scarious in a marginal band 0.4–0.6 mm wide. *Petals* deciduous, 3.5–7.4 mm long. *Stamens* 25–42 per flower; filaments red or yellow-green, 17–23 mm long; anthers red. *Style* 22–27 mm long. *Ovules* c. 400 per locule. *Fruit* 5.5–7.1 mm long, the calyx lobes deciduous; cotyledons obvolute.
NATURAL OCCURRENCE: South Australia: the Flinders Ranges – northern Mt Lofty Range area.
ECOLOGY: Recorded as occurring in mallee and sclerophyll scrub, woodland with shrubs, rocky mountain summit, and on a quartzite ridge.
FLOWERING TIME: Recorded as flowering from September to December.
ESSENTIAL OILS: This species produced an oil with significant amounts of both mono- and sesquiterpenes present. The principal monoterpenes were 1,8-cineole (19.4%), terpinen-4-ol (3.4%), limonene (1.9%) and α-terpineol (7.5%). The principal sesquiterpenes present included bicyclogermacrene (4.5%), globulol (9.2%), viridiflorol (5.8%), spathulenol (2%), viridiflorene (1.6%) and E,E-α-farnesene (1.2%). Nonanal (2.3%) was also present.
OIL YIELD: The oil yield (fresh weight, w/w) was <0.1%.
REFERENCE ON ESSENTIAL OILS: Brophy et al. 1998, as *Callistemon teretifolius*
NOTES: The new specific epithet was required as *teretifolia* is preempted in *Melaleuca* by *M. teretifolia* Endl. This very ornamental bottlebrush species should be more widely grown in semi-arid to arid regions of temperate Australia.



Melaleuca ***osullivanii*** Craven & Lepschi

PUBLICATION: in Craven, Lepschi, Broadhurst & Byrne, *Australian Systematic Botany* 12: 265 (2004)

DERIVATION: *osullivanii*, in honour of Wayne O'Sullivan (1958–) who greatly assisted studies on the broombush complex in Western Australia through participation in field studies and contributing many herbarium collections

DESCRIPTION: *Shrub* to 3 m tall; bark papery, flaking-peeling. *Branchlets* glabrescent, sericeous and lanuginulose or sericeous-lanuginulose. *Leaves* ascending or spreading-ascending, 28–73 mm long, 0.7–0.9 mm wide, 35–90 times as long as wide, petiole 0.2–1 mm long; blade glabrescent, appressed to ascending sericeous or sericeous-lanuginulose and lanuginulose, linear, in transverse section transversely broadly elliptic, transversely elliptic or subcircular, in lateral view straight or incurved, the base very narrowly cuneate or parallel, the apex narrowly acuminate or aristate, *oil glands* scattered. *Inflorescences* capitate, with 4–9 triads. *Hypanthium* 1–2 mm long, 0.9–1.2 mm wide. *Calyx lobes* 5, free, abaxially glabrous, 0.2–0.3 mm long. *Petals* caducous, broadly ovate to subcircular, 0.7–1.2 mm long, the oil glands elliptic to circular. *Stamens* 3–5 per bundle; filaments creamy white, 3.3–5.7 mm long, the bundle claw 1.7–2.8 mm long, 0.5–0.6 times as long as the filaments. *Style* 5.5–8.2 mm long. *Ovules* 14–17 per locule. *Infructescences* longer than wide (rarely as wide as long or shorter than wide), 6.5–8 mm wide, the constituent fruits closely packed and not retaining a significant separate

identity (the fruiting hypanthia closely packed for their full length). Seeds 0.5–0.9 mm long, the cotyledons planoconvex.

NATURAL OCCURRENCE: Western Australia: from the Perth district southwards to the Busselton district.

ECOLOGY: Recorded as occurring on grey-brown sand with *Melaleuca cuticularis*, *Hakea*, sedges and weeds; on grey sandy loam over sandy clay in winter-wet area; on dark silty sand in *Melaleuca* shrubbery with samphire; on brown clay over massive laterite with *Kunzea*, *Hakea*, *Grevillea* and *Loxocarya*; on sand over clay on low rises in wetland; on grey clay with heathland and *Melaleuca*; on pale grey sand over laterite with *Melaleuca* and introduced grasses; on white sand with *Melaleuca* and introduced grasses; and on pale grey sand with *Melaleuca*, *Eucalyptus calophylla* and *Hakea*.

FLOWERING TIME: Recorded as flowering in November and December.

ESSENTIAL OILS: The leaf oil of this species presented a mix of sesquiterpenes and monoterpenes, with the former predominating. The principal sesquiterpenes encountered were spathulenol (10–18%), globulol (3–5%), T-muurolol (4–8%), α-cadinol (4–8%), ledol (3–5%), an unknown $C_{15}H_{24}O$ (7–13%) and allo-aromadendrene (1–4%). The principal monoterpene was α-pinene (5–14%), with other monoterpenes being less than 0.6% of the total oil.

OIL YIELD: The oil yield (fresh weight, w/w) was 0.2–0.5%.

REFERENCE ON ESSENTIAL OILS: Brophy et al. 2006b

Melaleuca ***oxyphylla*** Carrick

PUBLICATION: in Carrick & Chorney, *Journal of the Adelaide Botanic Gardens* 1: 304, fig. 15 (1979)

DERIVATION: *oxyphylla*, from the Greek, *oxys*, sharp, acute, and *phyllon*, leaf, in reference to the shape of the leaf apex

DESCRIPTION: *Shrub* 1–2 m tall. *Branchlets* soon glabrescent, the lanuginulose hairs ephemeral. *Leaves* decussate, 5.5–12 mm long, 1.2–1.7 mm wide, 4–8 times as long as wide, short-petiolate; blade soon glabrescent, the lanuginulose hairs ephemeral, very narrowly elliptic or narrowly elliptic (occasionally approaching narrowly to very narrowly ovate-elliptic), in transverse section transversely linear, the base attenuate, rounded or narrowly cuneate, the apex acuminate to acute, the veins longitudinal, 3, *oil glands* moderately dense, obscure to rarely distinct, scattered. *Inflorescences* capitate, lateral, with 1–5 monads, up to 18 mm wide. *Hypanthium* glabrous, 1.5–2 mm long. *Calyx lobes* abaxially hairy, 0.6–1.1 mm long, scarious in a marginal band 0.2–0.4 mm wide. *Petals* deciduous, 2–3.2 mm long. *Stamens* 9–15 per bundle; filaments cream or creamy-yellow, 6–9 mm long, the bundle claw 3.3–6.3 mm long, 0.6–0.7 times as long as the filaments. *Style* 6–10 mm long. *Ovules* 40–50 per locule. *Fruit* 3.5–4 mm long, with sepaline teeth; cotyledons planoconvex.

NATURAL OCCURRENCE: South Australia: from the Minnipa district south-east to the Cowell district.

ECOLOGY: Recorded as occurring in creek beds, and clay flats.

FLOWERING TIME: Recorded as flowering from September to November.

ESSENTIAL OILS: The leaf oil of this species was overwhelmingly monoterpenoid in character. The principal monoterpene was 1,8-cineole (68–72%). This was accompanied by lesser amounts of α-pinene (3–9%), limonene (7–9%), terpinen-4-ol (0.7–2.0%) and α-terpineol (3–4%). The principal sesquiterpenes encountered were spathulenol (1–2%), globulol (0.8%) and viridiflorol (0.3%).

OIL YIELD: The oil yield (fresh weight, w/w) was 0.6–1.0%.