Taxonomic notes on the *Melaleuca leucadendra* (L.) L. group (Myrtaceae) in Queensland

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Summary

Bean, A.R. (2020). Taxonomic notes on the *Melaleuca leucadendra* (L.) L. group (Myrtaceae) in Queensland. ***Austrobaileya* 10(4): 645**–**655**. *Melaleuca oblivia* A.R.Bean and *M. stenostachya* subsp. *amplior* A.R.Bean are newly described, and *M. nervosa* subsp. *crosslandiana* (W.Fitzg.) Barlow ex Craven is reinstated. Distribution maps and illustrations are provided for all taxa discussed. An identification key for all Queensland members of the *M. leucadendra* group is included.

Key Words: Myrtaceae; *Melaleuca leucadendra*; *Melaleuca nervosa* subsp. *crosslandiana*; *Melaleuca nervosa* subsp. *nervosa*; *Melaleuca oblivia*; *Melaleuca stenostachya* subsp. *amplior*; Australia flora; Queensland flora; new species; new subspecies; identification key; distribution maps

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Introduction

The genus *Melaleuca* L. has around 290 species and is distributed throughout Australia, New Caledonia, Papua New Guinea, Indonesia and mainland south-east Asia (Brophy *et al*. 2013). Eighty species are currently recognised for Queensland, and occur in virtually all habitats except rainforest and mangroves.

Perhaps the most taxonomically difficult Queensland species belong to the *Melaleuca leucadendra* (L.) L. group, sometimes known as the broad-leaved paperbarks. Bentham (1867), with the material available to him, recognised just two species in the group, namely *M. lasiandra* F.Muell. and a polymorphic *M. leucadendra*. Blake (1968) brought order from taxonomic and nomenclatural chaos in a comprehensive and insightful monograph of the *M. leucadendra* group, where he accounted for around 100 published names relating to the group, including many that were misapplied, and described two new species. His study was based on both herbarium specimens and extensive field studies, and he discovered several important taxonomic characters that have proved to be of considerable value in distinguishing species. Byrnes (1984, 1985, 1986) revised the genus *Melaleuca* for northern and eastern Australia, and in the *M. leucadendra* group he named several new varieties and formas of existing species, most of which are no longer accepted. Barlow & Forrester (1984) suggested that *M. crosslandiana* W.Fitzg. should be made a subspecies of *M. nervosa* (Lindl.) Cheel (later validated by Craven (1999)) though subsequently sunk by Craven & Cowie (2013), and Barlow (in Craven & Barlow 1997) described three new Queensland taxa: *M. fluviatilis* Barlow, *M. cajuputi* subsp. *platyphylla* Barlow and *M. clarksonii* Barlow.

Fifteen species belonging to the *Melaleuca leucadendra* group are currently recognised for Queensland, and in this paper, *M. oblivia* A.R.Bean and *M. stenostachya* subsp. *amplior* A.R.Bean are newly described, and *M. nervosa* subsp. *crosslandiana* (W.Fitzg.) Barlow ex Craven is reinstated.

Accepted for publication 23 January 2020

Materials and methods

This paper is based on an examination of around 650 *Melaleuca* specimens held at BRI, and type specimen images on the JSTOR website. All measurements are based on dried herbarium material. Dimensions are inclusive, *viz*. 1.0–1.7 is given as 1–1.7.

In the specimen citations, common abbreviations are Mt (Mountain or Mount) and NP (National Park).

Distribution maps are provided for all the taxa taxonomically discussed and were compiled using DIVA-GIS Version 7.5.0, using geocodes given on the labels of the specimens examined.

A key to all *Melaleuca* species occurring in Queensland is available on the internet (Keybase 2019); however, a key to just the species in the *M. leucadendra* group is provided here.

Taxonomy

Key to taxa of the *Melaleuca leucadendra* group in Queensland[1]

1 Inflorescences and infructescences in globose or ellipsoidal heads, or short spikes < 30 mm long **2**
1. Inflorescences and infructescences spicate, spikes 30–150 mm long **3**

2 Adult leaf apex obtuse; hypanthium sparsely hairy with hairs 0.4–0.6 mm long; capsules 3.5–4.5 mm diameter; anther cells 0.4–0.5 mm long. . . . . **M. arcana**
2. Adult leaf apex acute; hypanthium densely hairy with hairs 0.1–0.3 mm long; capsules 2.5–3.3 mm diameter; anther cells 0.3–0.4 mm long. . . . . **M. saligna**

3 Larger leaves 25–35 mm long; stamens conspicuously hairy . . . . . **M. lasiandra**
3. Larger leaves 40–150 mm long; stamens glabrous 4

4 Young leaves with many short crisped hairs, and usually with some long straight hairs (spreading or appressed) **5**
4. Young leaves with straight appressed hairs only, often silky, or leaves glabrous **7**

5 Hypanthium and rachis sparsely to densely hairy, but surface of hypanthium/rachis readily visible with hand lens; fruits persistent for > 12 months. . . . . **M. fluviatilis**
5. Hypanthium and rachis with very dense white hairs, obscuring surface of hypanthium/rachis; fruits deciduous soon after maturity **6**

6 Inflorescence 17–23 mm across; anther cells 0.7–0.8 mm long; mainly in dune swales near the coast . . . . . **M. dealbata**
6. Inflorescence 30–45 mm across; anther cells 0.45–0.75 mm long; widespread in inland areas . . . . . ***M. nervosa** subsp. **nervosa**

7 Rachis and hypanthium glabrous **8**
7. Rachis hairy, and hypanthium usually hairy **11**

8 Stamen bundles 5–8 mm long; fruits 3–4 mm diameter; hairs on leaves 0.1–0.2 mm long . . . . . **M. clarksonii**
8. Stamen bundles 9–22 mm long; fruits 4.5–6.5 mm diameter; leaf hairs 0.2–0.8 mm long or absent **9**

[1]Only those taxa (indicated*) that are newly named or reinstated are dealt with in detail in the subsequent text.

9 Inflorescences 24–30 mm wide; new growth sparsely hairy . . . . . .**M. leucadendra**
9. Inflorescences 31–54 mm wide; new growth densely hairy **10**

10 Leaves 7–11 times longer than wide . . . . . .**M. viridiflora** var. **attenuata**
10. Leaves 2–7 times longer than wide . . . . . **M. viridiflora** var. **viridiflora**

11 Leaves narrow, 7–14 times longer than broad **12**
11. Leaves broad, 1.7–7 times longer than broad **16**

12 Inflorescences 12–16 mm wide **13**
12. Inflorescences 22–42 mm wide **14**

13 Larger leaves 3–8(–9) mm wide; fruit diameter 1.9–2.7(–3) mm . . . . . ***M. stenostachya** subsp. **stenostachya**
13. Larger leaves (7–)8–14 mm wide; fruit diameter 2.7–3.3 mm . . . . . ***M. stenostachya** subsp. **amplior**

14 Leaves 3-veined; fruits 2.7–3.3 mm diameter . . . . . ***M. oblivia**
14. Leaves 5–7-veined; fruits 3.6–5.2 mm diameter **15**

15 Inflorescences 75–90 mm long and 22–29 mm wide; anther cells 0.8–1.1 mm long; leaf hairs semi-persistent . . . . . .**M. argentea**
15. Inflorescences 40–60 mm long and 25–42 mm wide; anther cells 0.5–0.75 mm long; leaf hairs readily deciduous . . . . . **M. fluviatilis**

16 Inflorescences 16–18 mm diameter; fruits 3.2–3.7 mm diameter . . . . . **M. cajuputi** subsp. **platyphylla**
16. Inflorescences 23–54 mm diameter; fruits 3.5–7 mm diameter **17**

17 Longer leaves 120–180 mm long and 25–44 mm wide**. . . . M. viridiflora** var. **viridiflora**
17. Longer leaves 50–120 mm long and 8–25 mm wide **18**

18 Inflorescences 23–32(–40) mm wide; fruits 4–6 mm wide, persistent; absent from Burke and Gregory North districts . . . . . **M. quinquenervia**
18. Inflorescences 30–45 mm wide; fruits 3.5–4 mm wide, readily deciduous; Burke and Gregory North districts only . . . . . .***M. nervosa** subsp. **crosslandiana**

Melaleuca oblivia A.R.Bean **sp. nov.** with affinity to *M. stenostachya* S.T.Blake, but differing by the longer stamens and style, the inflorescences with widely spaced triads, the larger anthers, and the shorter hairs on the rachis and leaves**. Typus:** Queensland. Cook District: Mungkan Kandju National Park, 3 October 2008, *K.R. McDonald KRM7960 & J.W. Winter* (holo: BRI; iso: CANB, MEL, NSW, *distribuendi*).

Tree 5–15 m high. Bark grey to white, papery, persistent thoughout. Branchlets terete, grey to brown; hairs absent or sparse, appressed, straight. Leaves simple, entire, spirally arranged, not pendulous (*fide Neldner 2832 & Clarkson*); petioles ill-defined, 5–11 mm long, flattened; lamina linear to narrowly-oblanceolate, 57–129 × 6–13 mm, 7–12 times longer than wide, with 3 prominent raised longitudinal veins, any additional veins not extending for more than 50% of leaf length; oil glands sparse, 12–16 per mm^2; hairs simple appressed, silky, 0.1–0.25 mm long, sparse to dense on young laminae, becoming glabrous with age; apex acuminate to apiculate, base cuneate, margins flat. Inflorescences spicate, spikes 35–75 mm long, 26–34 mm wide; rachis with sparse to moderately dense patent to antrorse white straight hairs, 0.05–0.15 mm long; flowers in triads, 5–merous, sessile, bracteoles not seen; triads (3–)5–11 mm apart on the rachis. Hypanthium obconical to cupular, 1.5–1.9 mm long, with sparse patent white hairs *c.* 0.1 mm long; sepals hemispherical to deltate, 0.5–0.7 mm long, with several large globose oil glands, glabrous

to sparsely hairy on outer surface, glabrous to sparsely hairy on inner surface, deciduous; petals broadly obovate, 1.2–2.1 mm long, white, outer surface glabrous, inner surface glabrous, margin sometimes with a few hairs, oil glands linear to elliptical. Stamens white, in 5 bundles, 4–6 stamens per bundle, bundles 11–13 mm long, filaments glabrous; anthers versatile, 0.5–0.7 mm long. Ovary 3-locular; summit of the ovary densely hairy; style 10–16 mm long, glabrous; stigma slightly expanded. Mature fruits cupular, 2.5–3.0 mm long, 2.6–3.2 mm diameter, sessile, glabrous or glabrescent, valves of capsule enclosed. **Fig. 1A,B,E,G**.

***Additional specimens examined*: Queensland.** Cook District: Edward River Aboriginal Reserve, 2 km from Nutwood crossing, Oct 1980, *Clarkson 3526* (BRI); Weipa, back of rubbish tip, Oct 1981, *Morton AM1540* (BRI); 2 km N of Archer River, Oct 1984, *Gray 3652* (BRI); *c*. 25 km SSW of Aurukun and 0.5 km W of the Archer River, Oct 1982, *Clarkson 4547* (BRI); Stone Crossing, Wenlock River, Oct 1980, *Hyland 10774* (BRI); 1.5 km ESE of Aurukun on track leading to Watson River, Dec 1981, *Clarkson 4079* (BRI, CANB, CNS, K, NT, PERTH); between Cattle Creek and Coal Seam Creek on Lakeland to Laura Road, Oct 2000*, Jago 5765 & Wannan* (BRI, DNA); Batavia Downs, 6.4 km from Peninsula Development Road on track to lagoons on Wenlock River, Oct 1989, *Neldner 2832 & Clarkson* (BRI, CANB, CNS); *ibid*, Oct 1989, *Neldner 2833 & Clarkson* (BRI, CANB, CNS); Orchid Creek Station, W of Lockhart River, Oct 2013, *McDonald KRM14941 & Thompson* (BRI); 30 miles [48 km] SSE of 'Strathleven', Nov 1965, *Pedley 1842* (BRI); *c*. 24–26 km SE of Coen, on Laura – Coen road, Oct 1962, *Smith 12021* (BRI); Lama Lama NP, Goose Lagoon, Bull Swamp track, Jul 2016, *McDonald KRM18760* (BRI); 11 km ENE of Weipa mission, Jul 1974, *Specht W351 & Salt* (BRI); Oyala Thunstang NP, 6.2 km along Rokeby Road, Sep 2013, *McDonald KRM14849* (BRI); Running Creek Nature Refuge, start of timber extraction track near dam, Oct 2018, *McDonald KRM20804* (BRI); Running Creek Nature Refuge, 25.6 km along Lilyvale Road from Port Stewart Road junction, Oct 2018, *McDonald KRM20802* (BRI); 9 km N of Morehead River on Peninsula Development Road, Apr 1980, *Clarkson 3116* (BRI).

***Distribution and habitat*:** *Melaleuca oblivia* is endemic to Queensland where it is confined to Cape York Peninsula, extending from Batavia Downs to Laura and west to Kowanyama and Weipa (**Map 1**). It usually grows in woodland on sandy soils, but sometimes on clayey soils fringing lagoons. Associated species include *Eucalyptus tetrodonta* F.Muell., *E. brassiana* S.T.Blake, *Corymbia clarksoniana* (D.J.Carr & S.G.M.Carr) K.D.Hill & L.A.S.Johnson, *Melaleuca viridiflora* Sol. ex Gaertn., *Syzygium suborbiculare* (Benth.) T.G.Hartley & L.M.Perry, *Grevillea pteridifolia* Knight, *Acacia crassicarpa* A.Cunn. ex Benth. and *A. torulosa* Benth.

***Phenology*:** Flowers in September and October; fruits recorded for July, November and December.

***Affinities*:** The closest putative relative of *Melaleuca oblivia* on the basis of morphology is unclear. Several specimens had been previously identified as either *M. stenostachya* or *M. fluviatilis*, and it has similarities to both these species. *M. oblivia* differs from *M. stenostachya* subsp. *amplior* by the stamen bundles 11–13 mm long (5–8 mm long for *M. stenostachya* subsp. *amplior*); style 10–14 mm long (6–9 mm for *M. stenostachya* subsp. *amplior*); flower triads (3–) 5–11 mm apart (2–4 mm apart for *M. stenostachya* subsp. *amplior*); anther cells 0.5–0.7 mm long (0.3–0.4 mm for *M. stenostachya* subsp. *amplior*); leaf hairs 0.1–0.25 mm long (0.2–1.2 mm long for *M. stenostachya* subsp. *amplior*); rachis hairs patent to antrorse, 0.05–0.15 mm long (appressed, 0.3–0.7 mm long for *M. stenostachya* subsp. *amplior*); and the leaves 3-veined (usually 5-veined for *M. stenostachya* subsp. *amplior*).

Melaleuca oblivia differs from *M. fluviatilis* by the hairs on the young leaves consistently straight and appressed (usually with many crisped hairs for *M. fluviatilis*), the leaves 3-veined, veins raised (usually 5-veined, veins not raised in *M. fluviatilis*), the rachis hairs 0.05–0.15 mm long (0.2–0.5 mm long for *M. fluviatilis*), and the fruits 2.7–3.3 mm diameter (3.6–5.2 mm diameter for *M. fluviatilis*).

***Notes*:** *Melaleuca oblivia* is characterised by the slender, often oblanceolate trinerved leaves (non-pendulous according to *Neldner 2832 & Clarkson*), the short antrorse hairs on the rachis, the widely spaced triads of the inflorescence, and the small fruits. Some collectors (*Smith 12021*; *Neldner 2832 & Clarkson*; *Morton AM1540*) have described

Fig. 1. ***Melaleuca oblivia***. A. flowering branchlet ×0.5. B. fruiting branchlet ×0.5. E. leaf ×1. G. rachis and fruits showing indumentum ×10. ***M. stenostachya*** subsp. ***amplior.*** D. leaf ×1. F. fruiting branchlet ×2. H. rachis and flower buds showing indumentum ×10. ***M. stenostachya*** subsp. ***stenostachya***. C. leaf ×1.5. A, E from *McDonald KRM14849* (BRI); B from *Neldner 2832 & Clarkson* (BRI); C from *Fox IDF261* (BRI); D,H from *Stanton JPS3941 & Fell* (BRI); F from *Crisp 10277 & Morris* (BRI); G from *McDonald KRM7960 & Winter* (BRI). Scale bar = 10 mm at ×1 magnification. Del. N. Crosswell.

the bark as fibrous or somewhat fibrous, but other collectors describe it merely as 'paperbarked'.

***Conservation status*: Least Concern** (IUCN 2012). There are 17 known collections of *M. oblivia*, over a geographical range of 400 × 150 km, and it does not appear to be confined to a rare or unusual habitat.

***Etymology*:** From the Latin *oblivius* meaning 'sunk into oblivion', 'ignored' or 'forgotten'. This name is given because this species, first collected in 1962, has been apparently overlooked by taxonomists.

Melaleuca stenostachya S.T.Blake, *Contr. Queensland Herb.* 1: 50 (1968); *M. stenostachya* var. *stenostachya*, Byrnes, *Austrobaileya* 2: 74 (1984). **Type:** Queensland. Burke District: Croydon, 16 July 1954, *S.T. Blake 19566* (holo: BRI; iso: NSW).

Shrub or tree 3–12 m high. Bark grey to white, papery, persistent thoughout. Branchlets terete, grey to brown; hairs absent or sparse, appressed, eglandular. Leaves simple, entire, spirally arranged; petioles ill-defined, 1–2 mm long, flattened; lamina linear to elliptical or lanceolate, 35–90 × 3–14 mm, 4–15 times longer than wide, (3–)5(–7)-veined; oil glands moderately dense, *c*. 20 per mm^2; hairs simple appressed, silky, 0.2–1.2 mm long, dense on young laminae, becoming glabrous with age; apex acute, base cuneate, margins flat. Inflorescences spicate, spikes 30–45 mm long; rachis with dense appressed to antrorse white eglandular hairs, 0.3–0.7 mm long; flowers in triads, 5-merous, sessile, bracteoles very small, caduceus; triads 2–4 mm apart along the rachis. Hypanthium cylindrical to cupular, 1.2–1.6 mm long, with dense appressed white hairs 0.2–0.5 mm long; sepals ovate-truncate, 0.6–1.1 mm long, oil glands circular to elliptical, glabrous to densely hairy on outer surface, glabrous on inner surface, deciduous; petals broadly obovate, 1.1–1.9 mm long, white, hairs present on margin, otherwise glabrous, oil glands circular to elliptical. Stamens white, in 5 bundles, 5–9 stamens per bundle, bundles 5–8 mm long, filaments glabrous; anthers versatile, 0.3–0.4 mm long. Ovary 3-locular; summit of the ovary densely hairy; style 6–9 mm long, glabrous; stigma slightly expanded. Mature fruits globose-truncate, 1.9–3.3 mm long, 1.9–3.3 mm diameter, sessile, glabrous or glabrescent, valves of capsule enclosed.

***Notes*:** *Melaleuca stenostachya* is characterised by the short stamens, short cylindrical inflorescences, the appressed to antrorse silky hairs on the rachis, and the small fruits. The species is typified by a specimen from Croydon in north-western Qld, and plants from that region and into the NT have relatively narrow leaves with the hairs rather persistent. Specimens from Cape York Peninsula that conform florally to *M. stenostachya* are nevertheless distinct in appearance due to their quite broad leaves that lose their indumentum very quickly, and the somewhat larger fruits. These latter collections are here separated as *M. stenostachya* subsp. *amplior*.

Key to the subspecies of *Melaleuca stenostachya*

Fruit diameter 1.9–2.7(–3) mm; larger leaves 3–8(–9) mm wide, 35–65 mm long, indumentum semi-persistent; calyx lobes densely hairy . . . . . **M. stenostachya** subsp. **stenostachya**

Fruit diameter 2.7–3.3 mm; larger leaves (7–)8–14 mm wide, 50–90 mm long, indumentum quickly lost; calyx lobes glabrous or very sparsely hairy . . . . . **M. stenostachya** subsp. **amplior**

Melaleuca stenostachya subsp. **stenostachya** Larger leaves 35–65 mm long, 3–8(–9) mm wide, indumentum semi-persistent. Calyx lobes densely hairy. Fruits 1.9–2.7(–3) mm diameter. **Fig. 1C**.

***Additional selected specimens examined*: Northern Territory.** 24 miles [39 km] N of McArthur River Station, Jul 1948, *Perry 1776* (BRI); 32.1 km NNE of Pungalina Homestead on track to Calvert River mouth on Pungalina/Seven Emu Wildlife Sanctuary, Jul 2012, *Jensen 2660 & Kemp* (BRI). **Queensland.** Cook District: Entrance gate to Brooklyn, Bethel's Crossing track, a few km west of Mt Carbine, Feb 2006, *Kemp JEK6472* (BRI); Dorunda Station, opposite homestead airstrip, Jun 1990, *Neldner 2936 & Clarkson* (BRI, CANB, CNS, L); near Chillagoe, Apr 1936, *Blake 13564* (BRI). Burke District: S of Croydon on Mittagong Station, Jun 1999, *Fox IDF261* (BRI).

Melaleuca stenostachya subsp. **amplior** A.R.Bean **subsp. nov.**, differing from *M. stenostachya* subsp. *stenostachya* by the larger (50–90 × 7–14 mm), quickly glabrescent leaves and the often larger fruits. **Typus:** Queensland. Cook District: 11.8 km E of Bromley on the track to Carron Valley, 10 July 1990, *J.R. Clarkson 8889 & V.J. Neldner* (holo: BRI; iso: CANB, DNA, K).

Leaves 50–90 mm long, (7–)8–14 mm wide, indumentum quickly lost. Calyx lobes glabrous or very sparsely hairy. Fruits 2.7–3.3 mm diameter. **Fig. 1D,F,H**.

Additional selected specimens examined (from 49 total): **Queensland**. Cook District: Hammond Island, Torres Strait, Mar 2006, *Waterhouse BMW7362* (BRI, CANB, NSW); Pulu Islet, off western shore of Mabuiag Island, Torres Strait, Apr 2009, *Fell DGF10015* (BRI, CNS); Tip of Cape York, car park, Sep 2006, *Crisp 10277 & Morris* (BRI, CANB); Base of Mt Bremer, western side, Feb 1994, *Stanton JPS3941 & Fell* (BRI); Mosquito Point, N of Pascoe River, Dec 1977, *Webb & Tracey 13574* (BRI, CNS); Weipa 'Jump Up' road, 1 km along road from Coen intersection, May 1989, *Armstrong BF53* (BRI); 12 km E of Strathhaven Homestead on the Musgrave – Edward River Road, Oct 1980, *Clarkson 3470* (BRI, CANB, CNS, K, L, MO, NSW, NT, PERTH, PRE); Orchid Creek Station, Fox Creek, SW of Lockhart River, Cape York Peninsula, Apr 2014, *McDonald KRM15651 et al.* (BRI); 12.2 km N of old road junction on road to Portland Roads, Jul 1991, *Neldner 3578 & Clarkson* (BRI, CANB, CNS, DNA); 0.8 km E of the Koolatah turnoff on the Oroners – Sefton road, Jun 1981, *Clarkson 3767* (BRI, CNS, K, MO, NSW, NT, PERTH); 6.7 km E of the Peninsula Development Road on the road to Iron Range, Jul 1985, *Clarkson 6123* (BRI, CANB, CNS, DNA, PERTH); Cape Griffith ridge, Iron Range NP, NE Cape York Peninsula, Jun 1990, *Fell DF2125* (BRI); Orchid Creek Station, Dolphin Mountain; SW of Lockhart River, Cape York Peninsula, Apr 2014, *Forster PIF41132 et al.* (BRI, MEL, NSW); S approach to Rosser Creek on the Gamboola – Strathleven Road, Jul 2003, *Fox IDF2277* (BRI, DNA, NSW); Peninsula Development Road, 16.3 km S of Coen, Feb 1999, *Jago 5138 & Wannan* (BRI, CANB); Flinders Island, Jun 1995, *Le Cussan 582* (BRI); Chuula Lagoon, Kaanju Nation, Central Cape York, Jun 2005, *Smith 4886 & Claudie* (BRI); *c*. 8 km SE of Laura on Peninsula Development Road, Jul 1985, *Barlow 3893 & Thiele* (BRI, CANB); Cooktown, Jan 1958, *Blake 20221* (BRI); Lakeland Downs, *c*. 24 km S of Roadhouse on Peninsula Development Road, Oct 2009, *Halford & Petoe BGQLD0658* (BRI).

***Distribution and habitat*:** *Melaleuca stenostachya* subsp. *amplior* is endemic to Queensland where it occurs from the islands of the Torres Strait, south to Cooktown and Lakeland Downs (**Map 2**). It inhabits hills or sandy flats in open woodland or woodland dominated by eucalypts, or by *Melaleuca viridiflora*. It is also known from windswept granite headlands along the east coast.

***Phenology*:** Flowers are commonly recorded from January to April, and there is a single flowering record from June; fruits are recorded from April to December.

***Notes*:** Some *Melaleuca stenostachya* specimens from southern Cape York Peninsula, including Cooktown, Mount Carbine and Lakeland Downs, are intermediate in their leaf width and fruit diameter, and are difficult to assign to either subspecies.

The type specimen of *Melaleuca stenostachya* var. *pendula* Byrnes is referrable to *M. saligna* Schauer. The form of *M. saligna* from northern Cape York Peninsula is very similar to *M. stenostachya* subsp. *amplior* in leaf size and shape, inflorescence diameter, and sometimes inflorescence length, but they differ markedly in the indumentum of the inflorescence rachis and hypanthium; in *M. saligna* the hairs are short and erect, while in *M. stenostachya* they are long and appressed.

The distribution map for *Melaleuca stenostachya* in Brophy *et al*. (2013) shows two occurrences in southern New Guinea. It is not known if these records are specimen-based; certainly there are no New Guinea records on the *Australasian Virtual Herbarium*

(AVH 2019), nor are there any New Guinea specimens at BRI, or at CANB (B. Lepschi *pers. comm*. March 2019).

***Conservation status*: Least Concern** (IUCN 2012). *Melaleuca stenostachya* subsp. *amplior* is widespread and relatively common.

***Etymology*:** The epithet is from the Latin *amplior* meaning 'larger'. This is given in reference to the leaves that are usually both longer and broader than in *M. stenostachya* subsp. *stenostachya*.

Melaleuca nervosa (Lindl.) Cheel, *J. Proc. Roy. Soc. New South Wales* 78: 65 (1944); *Callistemon nervosum* Lindl., in Mitchell, *J. Exped. Trop. Australia* 235 (1848); *M. leucadendron* var. ? *parvifolia* Benth., *Fl. Austral.* 3: 143 (1867), *pro parte; M. leucadendra* var. *nervosa* (Lindl.) Domin, *Biblioth. Bot*. 89: 457 (1928). **Type:** Queensland. Balmy Creek, July 1846, *T. Mitchell 241* (holo: CGE, *n.v.*; iso: BRI (fragm.), MEL 602745, MEL 602746, NSW (fragm.)).

Melaleuca nervosa (Lindl.) Cheel subsp. **nervosa**, Craven in I. Southwell & R. Lowe (ed.) *Behind the names: the botany of tea tree, cajuput and niaouli. Tea tree: the genus Melaleuca*: 23 (1999).

M. nervosa f. *latifolia* Byrnes, *Austrobaileya* 2: 74 (1984). **Type:** Northern Territory. About SE of Brock's Creek, 6 July 1946, *S.T. Blake 16344* (holo: BRI).

Leaves 45–83 mm long, 7–44 mm wide, 1.7–6.3 times longer than wide, with a dense cover of crisped hairs, and sometimes scattered antrorse to patent straight silky hairs on young leaves, mature leaves persistently hairy or glabrescent.

***Additional selected specimens examined*: Papua New Guinea.** Tarara, Wassi Kussa River, Dec 1936, *Brass 8407* (BRI); Morehead – Arufi road, Morehead subdistrict, Nov 1972, *Henty & Foreman NGF49420* (BRI, CANB, L). **Western Australia.** 10 miles [16 km] along track from main road to Mt Elizabeth Station, Jul 1973, *Aplin 5647* (BRI, PERTH); 12 miles [19 km] NE of Kalumburu Mission, Sep 1954, *Lazarides & Speck 4895* (BRI, CANB). **Northern Territory.** 37 miles [60 km] S of Oenpelli, Jul 1972, *Adams 2792* (BRI, CANB, K); Darwin area, Jul 1973, *Dunlop 3180* (BRI, CANB, DNA, NSW); Maude Creek, Jul/Aug 1911, *Spencer s.n.* (BRI [AQ43237]); 21 km W of Nimbuwah Rock, Jun 1972, *Symon 7969* (AD, BRI, CANB, K); 15 miles [24 km] NNE of Maranboy, Sep 1961, *Speck 1626* (BRI, CANB); near Margaret River, Sep 1946, *Blake 17082* (BRI, PE). **Queensland.** Cook District: Lotus Bird Lodge, Violetvale Station, Jul 2000, *Wannan 1897* (BRI, CANB); Kings Plains Station, entrance road, Nov 2016, *McDonald KRM18881* (BRI, CANB). Burke District: 187 km NW of Burketown on Woologorang Station, May 2008, *Thompson MORN123 & Wilson* (BRI); Croydon, Jul 1954, *Blake 19564* (BRI); S of Croydon, on Mittagong Station, Jun 1999, *Fox IDF261* (BRI). North Kennedy District: *c*. 20 km W of Greenvale towards Lynd Junction, May 1992, *Doust 281 & Brown* (BRI, NSW). South Kennedy District: 21.6 km N of Mirtna Homestead, May 1991, *Neldner 3111 & Thompson* (BRI). Mitchell District: Prairie, May 1936, *Blake 11587* (BRI). Leichhardt District: 29.1 km S of Emerald, Aug 1961, *Coaldrake QB213* (BRI). Port Curtis District: Kassman Drive NNE of Rosedale, Jun 1995, *Bean 8700* (BRI). Wide Bay District: 10.6 km S of Bundaberg, May 1972, *Chopping M72-1* (BRI).

***Distribution and habitat*:** *Melaleuca nervosa* subsp. *nervosa* occurs in the northern Kimberley region of Western Australia, the 'Top End' of the Northern Territory, adjacent to the Gulf of Carpentaria, and the eastern half of Queensland, as far south as Bundaberg. It is also present in the Western Province of Papua New Guinea (**Map 3**). It is commonly an understorey tree in eucalypt or *Melaleuca* woodland in areas that are inundated seasonally. The soils are generally sandy. Near the coast, it may inhabit quite steep hills and ridges.

***Notes*:** *Melaleuca nervosa* subsp. *nervosa* intergrades with *M. nerovsa* subsp. *crosslandiana* in the Aramac – Muttaburra area, the Croydon area and perhaps elsewhere.

Melaleuca nervosa subsp. **crosslandiana** (W.Fitzg.) Barlow ex Craven, *Behind the names: the botany of tea tree, cajuput and niaouli. Tea tree: the genus Melaleuca*: 23 (1999); *M. crosslandiana* W.Fitzg., *The Western Mail (Perth)* 21 (1066): 10, 25 (1906); *M. leucadendra* f. *crosslandiana* (W.Fitzg.) Cheel in Ewart & Davies, *Fl. Northern Terr.* 298 (1917). **Type:** Western Australia. Base of Mt Harris, June 1905, *W. Fitzgerald 1116* (lecto: NSW, *fide* Blake 1968: 43; isolecto: BRI, NSW).

Leaves 45–85 mm long, 5.5–19 mm wide, 4.1–9.7 times longer than wide, with appressed straight silky hairs on young leaves, mature leaves generally glabrous.

***Additional selected specimens examined*: Western Australia.** 3 miles [5 km] E of Broome, Jul 1966, *Moore 80* (BRI); Beagle Bay Mission, Kimberleys, Sep 1959, *Lazarides 6560* (BRI, CANB); 5 miles [8 km] SE of Gordon Downs Station, Jul 1949, *Perry 2467* (BRI, CANB); Salt Creek, *c*. 14 km N of Sandfire Roadhouse, then 27 km due E of Great Northern Highway, Jun 1981, *Kenneally 7575* (BRI, PERTH); 6 miles [10 km] SE of Blina Station, Kimberleys, Apr 1960, *Lazarides 6511* (BRI, CANB); New Cockatoo sand site, CSIRO Kununurra, Jul 1978, *Andrew 46* (BRI, DNA). **Northern Territory.** 16 miles [26 km] N of Helen Springs Station, Aug 1948, *Perry 1900* (BRI, CANB); 8 miles [13 km] N of Renners Springs, Jul 1956, *Forde 244* (BRI); near Tennant Creek, Jun 1946, *Blake 15986* (BRI); 35 miles [56 km] SSE of Victoria River Downs, Jun 1949, *Perry 2145* (BRI, CANB); 88.4 miles [142.2 km] N of Top Springs Store, Oct 1957, *Chippendale 3877* (BRI, NT); Bunda Station, Jun 1994, *Egan 4149* (BRI, DNA, MEL); 21 miles [34 km] ENE of Tipperary Homestead, Jul 1961, *Lazarides 6692* (BRI, CANB). **Queensland.** Burke District: Hells Gate roadhouse, in camping ground, Jun 2006, *Thompson WES787 & Hogan* (BRI); 45 km W of Normanton on Armstrong Creek, May 1970, *Webb & Tracey 13518* (BRI); Just S of Vena Park on track to Iffley, Jul 1999, *Fox IDF528* (BRI); *c*. 5 km NE of Solway Downs Homestead, *c*. 90 km directly NW of Richmond, Nov 1999, *Johnson & Turpin s.n.* (BRI [AQ745942]); 17 km NW of Gunpowder on Bar Creek Station, May 2006, *Booth 4503 & Kelman* (BRI, NSW); Wattle Paddock, 'Middle Park', N of Richmond, Jun 1999, *Bean 14998* (BRI). Gregory North District: Wills River, N of Boulia, May 2006, *Johnson & Edginton s.n.* (BRI [AQ742392]); Mort River crossing, 5 km ENE of Digby Peaks, Sep 1977, *Purdie 1043* (BRI). Mitchell District: N of Muttaburra, Aug 1994, *Fensham 1816* (BRI); 38 miles [61 km] S of Corinda, Jun 1949, *Everist 3877* (BRI).

***Distribution and habitat*:** *Melaleuca nervosa* subsp. *crosslandiana* has a wide distribution from Broome, Western Australia to Aramac, Queensland. It extends north to Douglas, Northern Territory, and south almost to Boulia in Queensland (**Map 3**). It inhabits sandy flats or hillsides, or in the driest parts of its range, watercourses. The associated species are generally small eucalypts (*Eucalyptus* spp. or *Corymbia* spp.).

***Notes*:** Blake (1968) included *Melaleuca crosslandiana* W.Fitzg., described from the Kimberley region of Western Australia, as a synonym of *M. nervosa* (Lindl.) Cheel. Then, in a valuable paper on the indumentum patterns of the *M. leucadendra* group, Barlow & Forrester (1984) showed that *M. nervosa* was divisible into two geographical races based on the indumentum morphology of the leaves, and that the race from the more arid regions included the type of *M. crosslandiana*. Barlow proposed these races as subspecies (determinavit slips dated 1984). Craven (1999) subsequently made the necessary combination, but in his key he separated the two subspecies using leaf width, leaf shape and *persistence* of the leaf indumentum. None of these characters was suggested by previous workers as being significant, while the very useful and consistent indumentum morphology difference was ignored. Craven & Cowie (2013) again relegated *M. crosslandiana* to synonymy with *M. nervosa*, saying that there is "too great an overlap in morphological features to warrant the continued recognition of *M. crosslandiana* at any rank". They stated that both *M. crosslandiana* and *M. nervosa* "have lanuginulose hairs on the branchlets and leaves". This is incorrect. The crisped (or lanuginulose) hairs are lacking in *crosslandiana*. They also stated that "the only non-overlapping feature that serves to distinguish *M. crosslandiana* from *M. nervosa* apparently is the occurrence of appressed hairs on the branchlets and leaves in the former species, and even this is not constant with spreading-ascending hairs also occurring". This I also believe to be incorrect – it is *M. nervosa sens. str.* that can have spreading-ascending hairs, especially in specimens from the Top End of the Northern Territory, while *M. crosslandiana* has consistently appressed straight hairs. Hence the separation between *M. nervosa* subsp. *crosslandiana* (leaves with appressed straight silky hairs) and *M. nervosa* subsp. *nervosa* (leaves with strongly crisped hairs, with or without spreading straight hairs) is straight forward and consistent, except for some minor intergradation at the geographical junction. Subspecies rank for *crosslandiana* is here considered eminently suitable.

Acknowledgements

I thank Nicole Crosswell for the illustrations.

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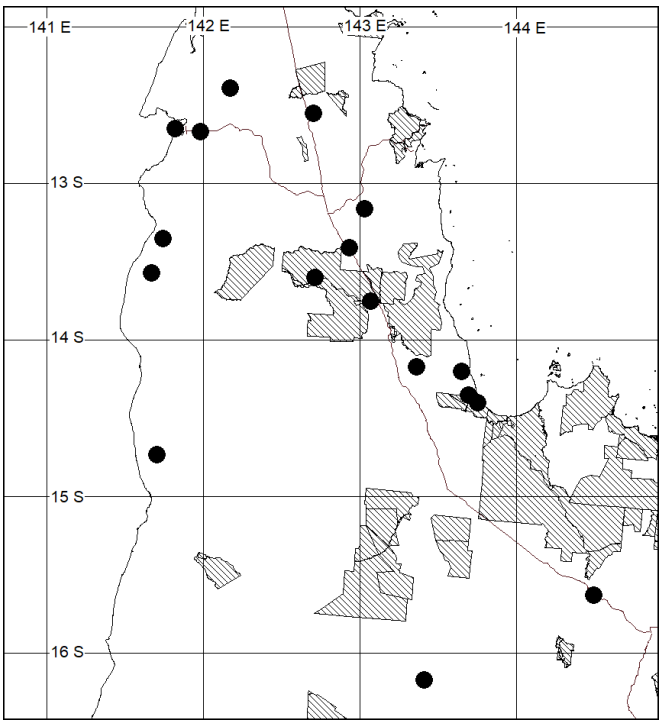
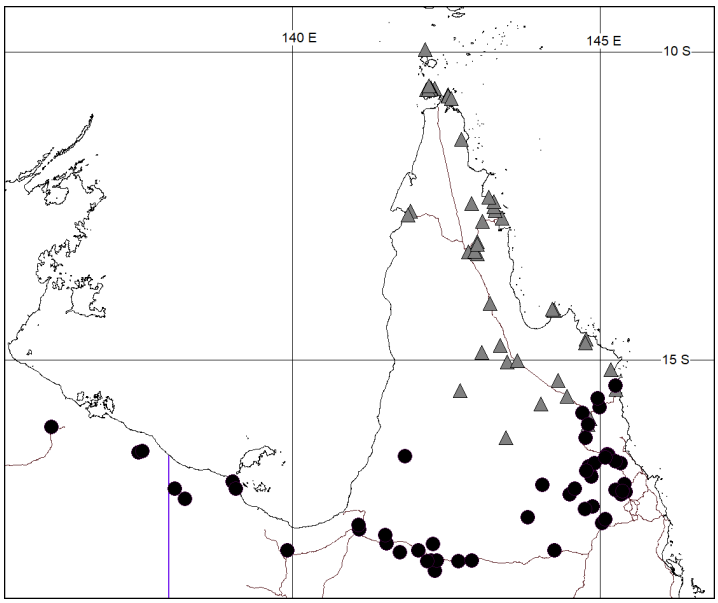
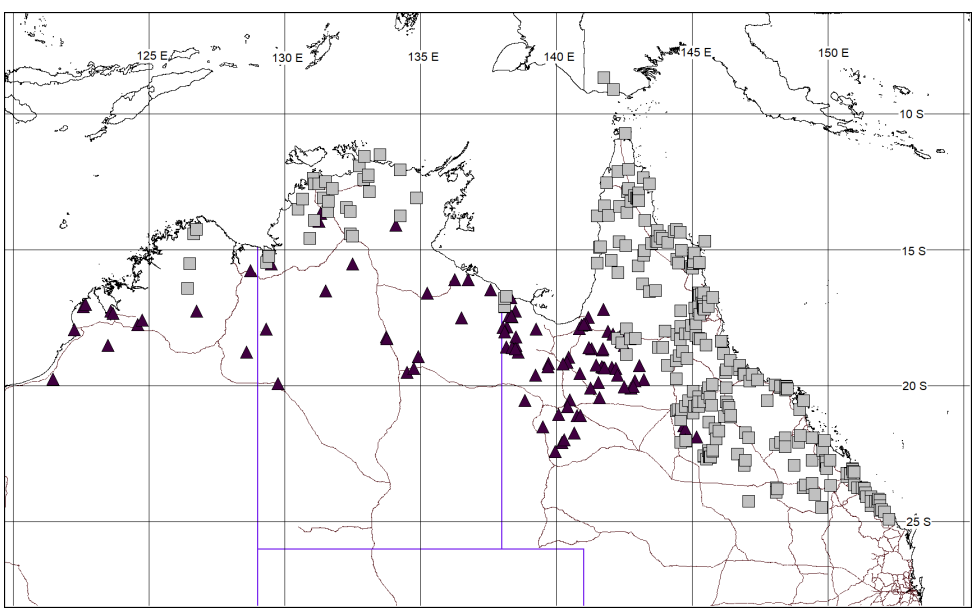


Map 1. Distribution of ***Melaleuca oblivia***.



Map 2. Distribution of ***Melaleuca stenostachya*** subsp. ***stenostachya*** ● and ***M. stenostachya*** subsp. ***amplior*** ▲.



Map 3. Distribution of ***Melaleuca nervosa*** subsp. ***nervosa*** ■ and ***M. nervosa*** subsp. ***crosslandiana*** ▲.