



# Taxonomic notes on the broad-leaved paperbarks (*Myrtaceae*, *Melaleuca*), including the description of one new species from northern Australia and a key to all taxa

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## Key words

identification key  
*M. ferruginea*  
*M. nervosa*  
*Melaleuca*  
*Myrtaceae*  
taxonomy

**Abstract** *Melaleuca ferruginea* is newly described, *M. nervosa* subsp. *crosslandiana* is reduced to *M. nervosa*, and an amended identification key is provided for the *M. leucadendra* species group.

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## INTRODUCTION

Species of the *Melaleuca leucadendra* (L.) L. group of species, the broad-leaved paperbark group, are a distinctive feature of the northern Australian landscape. Occurring in seasonally wet woodlands, swamps, or riparian and swamp forest, the relevant species often form a monospecific tree component of the vegetation. Species are segregated in the environment by sometimes subtle variation in soil texture and depth and period of flooding while temporal differences in flowering may effect reproductive isolation. An enumeration of the then known species of the group was given in Craven (1999). Recent molecular work (Edwards et al. 2010) indicates that *M. cornucopiae* Byrnes, treated by Craven (1999) as a member of the broad-leaved paperbark group, does not belong there. Due to excessive morphological overlap with the typical subspecies, *M. nervosa* subsp. *crosslandiana* (W.Fitzg.) Barlow ex Craven should be included in that taxon, i.e., no infraspecific taxa are now being recognised within *M. nervosa* (Lindl.) Cheel. Following reconsideration of some anomalous specimens from floodplain and swamp habitats of the Northern Territory, a further species of broad-leaved paperbark is newly described below. A revised identification key to the complex is provided.

### 1. *Melaleuca ferruginea* Craven & Cowie, sp. nov.

Differt a *M. leucadendra* (L.) L. ramulis foliisque trichomatibus pubescentibus lanuginulosisque, hypanthio longiore (3–4 mm longo), et lobis calycis latissime triangularibus. — Typus: Cowie 7335 (holo CANB; iso AD, BRI, DNA, K, MEL, NSW, NY, PERTH, QRS), in dune swale, c. 22 km S of Cape Barrow, 13°50'45"S, 135°59'53"E, Northern Territory, Australia, 16 Oct. 1996.

**Tree** to 16 m tall; old outer bark white to brown, new bark reddish, soft, papery. **Branchlets** glabrescent, with an outer layer of pubescent hairs and a very dense understorey of lanuginulose hairs. **Leaves** alternate, distinctly dorsiventral, 70–160 mm long, 12–28 mm wide, 3.8–8.8 times as long as wide;

petiole 5–12 mm long; blade glabrescent, the indumentum as on the branchlets but pubescent hairs less frequent, narrowly elliptic, subfalcate or falcate, in transverse section transversely linear, the base narrowly cuneate or cuneate, the apex acute, narrowly acuminate or sometimes obtuse; the apex recurved, the venation of 5–7 longitudinal veins; oil glands obscure, scattered. **Inflorescence** a spike of triads, usually in the axils of distal leaves, occasionally several occurring at a branchlet apex (with some in the axils of the distal leaves and the others apparently terminal), sometimes the inflorescences are below the leaves, the rachis indumentum with pubescent and lanuginulose hairs, (17–)20–30 mm wide, with 10–15 triads. **Hypanthium** glabrescent, or remaining hairy, the indumentum with pubescent and lanuginulose (sometimes only pubescent hairs present), broadly vase-shaped or cup-shaped, 3–4 mm long, 3–4 mm wide. **Calyx** lobes 5, connate at the base, abaxially hairy, not costate, herbaceous in the proximal-central zone and scarious in a broad marginal band, the band c. 0.2 mm wide, very broadly triangular, 0.7 mm long. **Petals** glabrous (a few sparse cilia sometimes present), obscurely clawed, subcircular, 2.5–3.5 mm long. **Stamens** in 5 distinct bundles, or occasionally solitary free stamens occur between the bundles, 5–7 per bundle; filaments glabrous, white, 7–11 mm long, bundle claw 2–2.5 mm long; anthers oblong or elliptic, 0.7–1.1 mm long. **Ovary** wall adnate to the hypanthium for the proximal one-half, 3-locular; style glabrous, 7.5–11 mm long; ovules c. 40–120 per locule. **Fruit** not early dehiscent and apparently persisting for 1 year or more, cup- or squat barrel-shaped, 2–3.5 mm long, 3.3–5 mm wide, 0.6–0.8 times as long as wide, 1.8–2.5 mm wide at the orifice. **Seed** angular narrowly obovoid, 0.8–1 mm long, testa membranous, cotyledons about half the length of the embryo, obvolute.

**Distribution** — Australia (Northern Territory, floodplain and coastal swamp regions in the Top End).

**Habitat & Ecology** — Recorded as occurring on low areas beside billabong, in swale of coastal dunes, as scattered trees on floodplain, in seasonal sandy swamp, on outer edge of riparian forest, on levee bank beside creekline, in paperbark woodland, on a sandy chenier ridge, on a sandy drainage flat, and as forming a community near mangroves; usually in

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seasonally inundated habitats. Flowering: September, October; fruiting: most months.

Specimens studied. Barritt & Wightman 1932, Brocklehurst 648, Brocklehurst & Dunlop 456, 457, Cameron s.n. 1/10/1973, Cowie 7335 (type), Cowie & Mangion 7717, 7955, Dunlop & Cowie 9482, Dunlop & Taylor 6185, Dunlop & Wightman 9246, 9769, Scarlett 141, Waterhouse 9842, Waterhouse & Burgman 9602, Waterhouse & Sanderson 9528, Wightman 734, 1632, 7000.

Notes — 1. In ethnobotanical accounts of flora in the Northern Territory, this species is treated under the name 'Melaleuca sp. nov.', 'Melaleuca sp. (D120590)' and 'Melaleuca sp. ('red bark', D120590)' (Yunupingu et al. 1995, Blake et al. 1998, Puruntatameri et al. 2001; G. Wightman pers. comm.). In a floristic list of plants in the Alligator Rivers region of the Northern Territory, the species is listed as Melaleuca sp. D20720 (Brennan 1996). The specimen Waterhouse 9842 is listed as Melaleuca sp. nov. by Waterhouse & Puttock (1981) in their list of vascular plant species on the Jabiluka area, Northern Territory. Melaleuca ferruginea, as circumscribed above, apparently includes at least part of the taxonomic concept of the unpublished name M. dealbata subsp. glabrescens Barlow.

2. The specific epithet is derived from the Latin ferrugineus, rusty, light reddish brown, and refers to the new bark colour of this species.

3. Kenneally 10737, from near Broome in the Kimberley region of Western Australia, may also be referable to this species.

2. Melaleuca nervosa (Lindl.) Cheel

Melaleuca nervosa (Lindl.) Cheel (1944) 65. — Callistemon nervosum Lindl. (1848) 235. — Melaleuca leucadendron (L.) L. var. ? parvifolia Benth. (1867) 143, p.p. (as to C. nervosus). — Melaleuca leucadendron (L.) L. var. nervosa (Lindl.) Domin (1928) 457, nom. illeg. — Type: Mitchell 241 (holo CGE n.v.; iso BRI fragm, K, MEL, NSW n.v.), Australia, Queensland, Balmy Creek, July 1846.

Melaleuca crosslandiana W.Fitzg. (1906) 10. — Melaleuca leucadendron (L.) L. var. coriacea forma crosslandiana (W.Fitzg.) Cheel (1917) 298. — Melaleuca nervosa (Lindl.) Cheel subsp. crosslandiana (W.Fitzg.) Barlow ex Craven (1999) 23. — Type (fide Blake (1968) 43): Fitzgerald 1116 (lecto NSW; isolecto BRI), Australia, Western Australia, base of Mt Harris, June 1905.

Melaleuca nervosa (Lindl.) Cheel forma latifolia Byrnes (1984) 74. — Type: Blake 16344 (holo BRI), Australia, Northern Territory, about SE of Brocks Creek, July 1946.

Note — There is too great a degree of overlap in morphological features to warrant the continued recognition of M. crosslandiana at any rank. 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. Both species have lanuginulose hairs on the branchlets and leaves.

KEY TO THE MELALEUCA LEUCADENDRA SPECIES GROUP (based on Craven 1999)

- 1. Staminal filaments hairy . . . . . M. lasiandra F.Muell.
- 1. Staminal filaments glabrous . . . . . 2
- 2. Hypanthium distinctly hairy (at least in bud) . . . . . 3
- 2. Hypanthium glabrous or effectively so . . . . . 18
- 3. Leaf blade indumentum with at least some of the hairs lanuginulose or sericeous-lanuginulose (whether or not also with pubescent to sericeous or sericeous-pubescent hairs) . . . . . 4
- 3. Leaf blade indumentum without lanuginulose or sericeous-lanuginulose hairs (the hairs sericeous, sericeous-pubescent or pubescent) . . . . . 9

- 4. Calyx lobes very broadly triangular (0.7 mm long) . . . . . M. ferruginea Craven & Cowie
- 4. Calyx lobes broadly ovate, ovate, subcircular or triangular . . . . . 5
- 5. Stamens 5–8 mm long . . . . . 6
- 5. Stamens 10–25 mm long . . . . . 7
- 6. Calyx lobes 0.5–0.8 mm long; triads clustered (less than 1 hypanthium diameter apart) . . . . . M. saligna Schauer
- 6. Calyx lobes 0.9–1.5 mm long; triads scattered (more than 1 hypanthium diameter apart) or sometimes partly clustered . . . . . M. dealbata S.T.Blake
- 7. Calyx lobes 1.9–2.5 mm long; petals 5.1–7 mm long . . . . . M. triumphalis Craven
- 7. Calyx lobes 0.5–1.5 mm long; petals 1.5–3.5 mm long 8
- 8. Leaf oil glands more or less in rows; leaves 5–20 times as long as wide, the blade 5–19 mm wide; hypanthium 1.3–2 mm long; stamens 3–9 per bundle . . M. fluviatilis Barlow
- 8. Leaf oil glands scattered; leaves 1.6–10.2 times as long as wide, the blade 5–40 mm wide; hypanthium 1.8–3.5 mm long; stamens 3–7 per bundle . . . . . M. nervosa (Lindl.) Cheel
- 9. Inflorescence up to 30 mm wide . . . . . 10
- 9. Inflorescence more than 30 mm wide . . . . . 17
- 10. Inflorescence up to 20 mm wide . . . . . 11
- 10. Inflorescence more than 20 mm wide . . . . . 13
- 11. Triads scattered (at least 1 hypanthium diameter apart, sometimes within an inflorescence some of the triads are closer) . . . . . M. stenostachya S.T.Blake
- 11. Triads clustered (less than 1 hypanthium diameter apart) . . . . . 12
- 12. Leaf blade apex acuminate, narrowly acute or acute . . . . . M. sericea Byrnes
- 12. Leaf blade apex usually obtuse, sometimes acute, rounded, obtusely shortly acuminate or retuse . . . . . M. arcana S.T.Blake
- 13. Calyx lobes herbaceous in the proximal-central zone and scarious in a narrow marginal band; leaves 4.8–14 times as long as wide . . . . . M. argentea W.Fitzg.
- 13. Calyx lobes herbaceous in the proximal-central zone and scarious in a broad marginal band; leaves 1.3–9.7 times as long as wide . . . . . 14
- 14. Older leaves with the secondary venation distinct and about as prominent as the major veins . . . . . 15
- 14. Older leaves with the secondary venation more or less obscure . . . . . M. quinquenervia (Cav.) S.T.Blake
- 15. Leaves (17–)25–50(–60) mm wide (leaves 1.3–6.5 times as long as wide; stamens (8–)9–12(–15) per bundle . . . . . M. cajuputi Powell subsp. platyphylla Barlow
- 15. Leaves (6–)10–28(–39) mm wide . . . . . 16
- 16. Leaves (6–)10–16(–26) mm wide, 2.8–9.7 times as long as wide; stamens (6–)8–11(–14) per bundle . . . . . M. cajuputi Powell subsp. cajuputi
- 16. Leaves (15–)19–28(–39) mm wide, 2.2–2.9 times as long as wide; stamens (4–)6–8(–10) per bundle . . . . . M. cajuputi Powell subsp. cumingiana (Turcz.) Barlow
- 17. Young shoots with the hairs completely appressed; hypanthium (1.8–)3–3.5 mm long; petals (2.7–)4–5.3 mm long; inflorescence axis sericeous or pubescent (occasionally glabrous) . . . . . M. viridiflora Sol. ex Gaertn.
- 17. Young shoots with at least some spreading-ascending to spreading hairs; hypanthium 1.5–2.5 mm long; petals 2.5–3.5 mm long; inflorescence axis pubescent . . . . . M. quinquenervia (Cav.) S.T.Blake

18. Calyx lobes puberulous on the abaxial surface . . . . .  
 . . . . . *M. dealbata* S.T.Blake
18. Calyx lobes glabrous on the abaxial surface . . . . . 19
19. Calyx lobes herbaceous in the proximal-central zone and  
 scarious in a narrow marginal band or the lobes herbaceous  
 almost throughout . . . . . 20
19. Calyx lobes herbaceous in the proximal-central zone and  
 scarious in a broad marginal band . . . . . 21
20. Stamens 6–7 mm long; leaves 30–110 mm long, 3.3–9  
 times as long as wide; bark hard . . . *M. clarksonii* Barlow
20. Stamens 7–16 mm long; leaves 75–270 mm long, 3.5–16.1  
 times as long as wide; bark papery *M. leucadendra* (L.) L.
21. Leaf blade narrowly ovate, very narrowly ovate, rarely nar-  
 rowly elliptic or very narrowly elliptic (often falcate to sub-  
 falcate); leaves 3.5–16 times as long as wide; petals with  
 elliptic oil glands (occasionally long elliptic glands form an  
 apparently linear gland) . . . . . *M. leucadendra* (L.) L.
21. Leaf blade elliptic to very narrowly elliptic, obovate to  
 very narrowly obovate (rarely broadly elliptic or ovate  
 or very narrowly ovate or approaching falcate); leaves  
 usually 1.3–8.5 times as long as wide (in some forms of  
*M. viridiflora* 4.8–15.7 times as long as wide with the blade  
 very narrowly elliptic or narrowly elliptic or narrowly to very  
 narrowly obovate); petals with linear, elliptic, circular to  
 subcircular, or oblong oil glands . . . . . 22
22. Stamens 9.2–10 mm long, the bundle claw 0.2–0.4 times  
 as long as the stamens . . . . .  
 . . . . . *M. cajuputi* Powell subsp. *platyphylla* Barlow
22. Stamens (9.5–)10.5–23 mm long, the bundle claw 0.06–  
 0.2(–0.5) times as long as the stamens . . . . . 23
23. Hypanthium (1.8–)3–3.5 mm long; petals (2.7–)4–5.3 mm  
 long; inflorescence axis sericeous or pubescent (occasion-  
 ally glabrous) . . . . . *M. viridiflora* Sol. ex Gaertn.
23. Hypanthium 1.5–2.5 mm long; petals 2.5–3.5 mm long;  
 inflorescence axis pubescent . . . . .  
 . . . . . *M. quinquenervia* (Cav.) S.T. Blake

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