

A review of the *Eucalyptus calycogona* group (Myrtaceae) including the description of three new taxa from southern Australia

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Abstract

Nicolle, D. A review of the *Eucalyptus calycogona* group (Myrtaceae) including the description of three new taxa from southern Australia. *Nuytsia* 13(2): 303–315 (2000). *Eucalyptus* L'Hérit. series *Heterostemones* Benth. (Myrtaceae) is described and a key is provided for the seven species now recognized. *E. calycogona* Turcz. is described under a reduced circumscription and two new subspecies and a new species are described. *E. calycogona* subsp. *calycogona* occurs in the wheatbelt area of southern Western Australia and disjunctly in South Australia, mainly on Eyre Peninsula. New subspecies of *E. calycogona* described are: subsp. *spaffordii* Nicolle, restricted to Eyre Peninsula in South Australia; and subsp. *trachybasis* Nicolle, widespread in eastern South Australia and western Victoria, just extending into New South Wales. The new species *E. prolixa* Nicolle is endemic to the southern goldfields region of Western Australia, differing from *E. calycogona* in its mallee habit and larger, elongate fruits. Distribution maps and representative illustrations are provided for the newly described taxa.

Introduction

Eucalyptus calycogona was first described by Turczaninow (1852) from material collected in Western Australia by J. Drummond, the precise locality of which is unknown, but which would be in the far south-western part of the distribution of the species on account of the collector's known field travels (Erickson, 1969). Both the locality and the morphology of the type correspond to the smooth-barked mallee form of *E. calycogona* with relatively small and not strongly-ribbed buds and fruits, herein recognized as subsp. *calycogona*. Turczaninow's protologue also firmly establishes what is currently recognized as *E. calycogona*, including in the description "cupula tetragonis" referring to the quadrangular fruits which distinguish the species within *Eucalyptus* series *Heterostemones* Benth. (equivalent to Pryor & Johnson's (1971) informal *E. ser. Calycogonae*).

Taxonomy

***Eucalyptus* series *Heterostemones* Benth.**, *Flora Australiensis* 3: 190, 209 (1867). *Type: Eucalyptus gracilis* F. Muell.

A small series of seven species from southern Australia, distinguished by its combination of bisected cotyledons; stem pith glands absent; small tree (mallet) or mallee habit; axillary, unbranched inflorescences; inflexed staminal filaments, the outer filaments twisted, particularly manifest in flowers (cf. within buds), without anthers and longer than the fertile filaments; ovules in four vertical rows; the outer operculum dehiscing during bud development; and the somewhat ovoid seed with an almost smooth to quite smooth reticulum.

Key to the species of *Eucalyptus* series *Heterostemones*

1. Buds and fruit square in transverse section, at least on lower part of hypanthium
 2. Fruit oblong to urceolate in outline
 3. Mallet, fruit length:width ratio 2.5:1–4:1 ***E. prolixa***
 3. Mallee, fruit length:width ratio 1.5:1–2.5:1 ***E. calycogona***
 2. Fruit obconical to cupular in outline ***E. quadrans***
1. Buds and fruit round in transverse section
 4. Pedicels equal to or longer than bud length ***E. yilgarnensis***
 4. Pedicels shorter than bud length
 5. Fruit urceolate, much longer than broad ***E. celastroides***
 5. Fruit obconical to cupular to barrel-shaped
 6. Peduncles to 5 mm long ***E. brevipes***
 6. Peduncles > 5 mm long ***E. gracilis***

1. *Eucalyptus calycogona* Turcz., Bull. Cl. Phys.-Math. Acad. Sci. Saint-Petersburg 10: 388 (1852).
Type: Swan River Colony, Western Australia, 1849, *J. Drummond* 5: 184 (*holo*: KW; *iso*: BM, FI, K, MEL, PERTH, W).

Notes. Recognized within *E. series Heterostemones* by the mallee habit; the relatively large buds and fruits that are longer than wide, square in transverse section and have four longitudinal ribs or wings extending from the pedicel-hypanthium join to the top of the hypanthium. Staminal colour varies from white to dark pink. Three subspecies are herein recognized.

Intergrades between *E. calycogona* and the closely related *E. gracilis* F. Muell. have been postulated (Brooker & Kleinig 1996), and Maiden (1903) refers to "insensible gradations" between *E. gracilis* and *E. calycogona*, without citing localities or specimens. These reports have not been substantiated in the field by the author. The two taxa are distinguishable by bud and fruit characteristics, *E. gracilis* having much smaller buds and fruits that are terete in transverse section and barrel-shaped rather than urceolate fruits. *E. quadrans* Brooker & Hopper is also closely related to *E. calycogona* showing some morphological approach to it in its angular hypanthium. *E. quadrans* differs in its obconical, angular rather than ribbed, shorter buds and fruits. Intermediates between *E. quadrans* and *E. calycogona* (subsp. *calycogona*) have been recorded (M. French pers. comm.).

Key to the subspecies of *Eucalyptus calycogona*

1. Most adult leaves 14–24 mm wide, firm; fruit 6–9 mm wide, ribs very prominent subsp. ***spaffordii***
1. Most adult leaves 6–15 mm wide; fruit 3–7 mm wide, ribs less prominent

2. Bark smooth or rough only at very base subsp. **calycogona**
 2. Bark rough, tessellated for 0.5–2.5 m subsp. **trachybasis**

1a. *Eucalyptus calycogona* Turcz. subsp. **calycogona**

Mallee, usually erect-stemmed, 3–5 m tall, forming lignotubers. *Bark* smooth throughout, grey to light grey over light grey to cream, decorticating in short ribbons. *Seedling leaves* opposite for 5–7 pairs then alternate, shortly petiolate, narrow-lanceolate then narrow-elliptic, up to 20 mm long and 5 mm wide, \pm concolorous to slightly discoloured, dull, green. *Adult leaves* alternate, petiolate, narrow-lanceolate to lanceolate, 55–100 mm long, 7–13 mm wide, concolorous, glossy, green to dark green; reticulation sparse to moderate, with numerous island oil glands, lateral veins at 30–45° from midrib. *Inflorescences* axillary, unbranched, 7-flowered; peduncles terete to angular, 4–9 mm long; pedicels 2–4 mm long. *Buds* fusiform, 8–10 mm long, 3–5 mm diam., hypanthium with four vertical ribs; operculum equal in width to hypanthium, smooth, conical, apiculate. *Flowers* creamy white to dark pink. *Stamens* inflexed, outer stamens without anthers; fertile anthers on shorter filaments, versatile, cuboid to globoid, opening by pores and slits. *Ovules* in 4 vertical rows. *Fruits* pedicellate, urceolate, with four weak but distinct vertical ribs, 8–10 mm long, 4–6 mm diam.; operculum scar very narrow, level to ascending, to 0.8 mm wide; disc descending, valves 4, deeply enclosed in fruit. *Seeds* angular-ovoid, 0.8–1.8 mm long, somewhat glossy, tan-brown, with shallow longitudinal grooves and a very finely pitted to smooth reticulum; chaff glossy, orange-brown. (Figure 1)

Selected specimens examined. WESTERN AUSTRALIA (west to east): 15 km N of Lake Grace, 8 Aug. 1984, M.I.H. Brooker 8619 (AD, CANB, PERTH); 11.4 km NNW of Hyden towards Narembeen, 3 Oct. 1975, M.I.H. Brooker 4993 (AD, CANB, PERTH); 2.9 km E of Rabbit Proof Fence on Varley–Southern



Figure 1. *Eucalyptus calycogona* subsp. **calycogona** habit from between Darke Peak and Mangalo, Eyre Peninsula, South Australia.

Cross road, 1 Sep. 1988, *K. Hill* 3048 (CANB, NSW, PERTH); 98.5 km E of Hyden on Hyden–Norseman road (i.e. 11.7 km E of crossroads), 17 May 1988, *L.A.S. Johnson* 9101 & *M. Johnson* (NSW, PERTH); Frank Hann National Park, E of Lake King towards Ninety Mile Tank, 33°04'21"S, 120°13'01"E, 22 Nov. 1994, *D. Nicolle* 1112 (PERTH).

SOUTH AUSTRALIA (west to east): Eyre Highway between Kimba and Kyancutta, Eyre Peninsula, 33°12'20"S, 136°11'36"E, 23 July 1995, *D. Nicolle* 1407 (AD); c. 3 km NE of the Kallimba entrance on the Darke Peak–Curtinye road, c. 16 km SSE of Kimba, 29 Aug. 1983, *J.D. Briggs* 1098 (AD, CANB); between Darke Peake and Mangalo, Eyre Peninsula, 33°29'19"S, 136°26'15"E, 16 Feb. 1996, *D. Nicolle* 1688 (AD, CANB); road between canoe tree and Tonkin's Currency Creek Winery, Fleurieu Peninsula, 35°21'37"S, 138°49'11"E, 28 May 1995, *D. Nicolle* 1362 (AD); road between canoe tree and Tonkin's Currency Creek Winery, Fleurieu Peninsula, 11 Apr. 1993, *D. Nicolle* 383 (CANB).

Distribution and habitat. Subsp. *calycogona* occurs in mallee and low woodland vegetation and, like the other subspecies of *Eucalyptus calycogona*, it generally occurs on locally heavier soils. It is restricted to three disjunct regions (Figure 2):

1. Central and southern wheatbelt areas of Western Australia, from north-east of Esperance west to the Lake Grace area, where it may be associated with *E. flocktoniae* (Maiden) Maiden (subsp. *flocktoniae*), *E. pileata* Blakely, *E. depauperata* L. Johnson & K. Hill, *E. densa* Brooker & Hopper (subsp. *densa*) and *E. oleosa* F. Muell. ex Miq. (subsp. *corvina* L. Johnson & K. Hill).
2. Eyre Peninsula in South Australia, especially from Kyancutta to Cummins and eastwards to Spencer Gulf, where it may be associated with *E. phenax* Brooker & Slec, *E. incrassata* Labill., *E. leptophylla* F. Muell. ex Miq., *E. oleosa*, *E. cretata* Brooker & P. Lang, *E. porosa* F. Muell. ex Miq. and *E. peninsularis* Nicolle.
3. Fleurieu Peninsula in South Australia, from Newland Head north-eastwards to near Strathalbyn.

Flowering period. July to November.

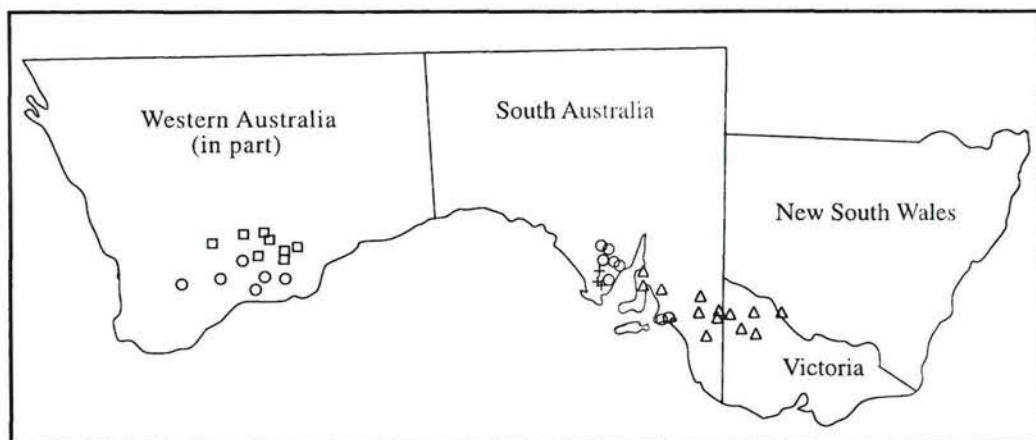


Figure 2. Map of southern Australia showing the distribution of *Eucalyptus calycogona* subsp. *calycogona* O, *trachybasis* Δ and *spaffordii* + and *Eucalyptus prolixa* □.

Conservation status. Although the distributional range of this newly circumscribed typical subspecies has been significantly reduced, *E. calycogona* subsp. *calycogona* is not considered to be under threat. It is common and well represented in conservation reserves on Eyre Peninsula in South Australia. While apparently of more scattered occurrence in Western Australia, it is known to occur in Frank Hann National Park and Lake Magenta Nature Reserve. A small population of the eastern outlier of subsp. *calycogona* on Fleurieu Peninsula is known on the cliffs immediately east of Newland Head Conservation Park.

Notes and affinities. *E. calycogona* subsp. *calycogona* is distinguished within the species by the smooth bark; the small leaves, buds and fruits; buds and fruits with weak to moderately prominent ribs and the white to dark pink staminal filaments. Previously included with it in *E. calycogona* sens. lat. were the rough-barked mallees of eastern South Australia, Victoria and New South Wales (subsp. *trachybasis*); populations with coarse leaves, buds and fruit in central Eyre Peninsula previously referred to as var. *staffordii* Blakely (subsp. *spaffordii*); and steep-branched mallets with very elongate fruits from the Western Australian southern goldfields (*E. prolixa*).

On Eyre Peninsula *E. calycogona* subsp. *calycogona* commonly has staminal filaments coloured various shades of pink; elsewhere it only rarely has coloured filaments. In Western Australia, *E. calycogona* subsp. *calycogona* is partly sympatric with the closely related *E. celastroides* Turcz. subsp. *virella* Brooker, which differs in its rough, persistent bark and smaller, non-ribbed fruits that are terete, not square, in transverse section. Intergrades between the two taxa are known in the west of the distribution of *E. calycogona* subsp. *calycogona*, such as west of Lake Grace.

1b. *Eucalyptus calycogona* subsp. *trachybasis* Nicolle, subsp. nov.

A subspecies typica cortice non-decorticato, leviter tessellato, basi, habitu effusiore, foliis adultis leviter latoribus, alabastris fructibusque majoribus differt.

Typus: Taillem Bend–Loxton Highway between Mindarie and Wanbi, 34°48'31"S, 140°13'11"E, South Australia, 30 July 1994, D. Nicolle 984 (*holo:* AD; *iso:* CANB, NSW).

Spreading or straggly *mallee* 2–6 m tall, forming lignotubers. *Bark* rough for 0.5–2.5 m, thick, finely fissured, weakly to prominently tessellated, brown to grey or dark grey, then smooth above, dull, grey over olive-cream to pale yellow-white, decorticating in short ribbons. *Seedling leaves* opposite for 2 or 3 pairs then alternate, petiolate, narrow-lanceolate then narrow-elliptic, up to 35 mm long and 8 mm wide, ± concolorous to slightly discolourous, dull, green. *Adult leaves* alternate, petiolate, lanceolate, 45–90 mm long, 8–15 mm wide, concolorous, glossy, green to dark green; reticulation sparse to moderate, with numerous large island oil glands, lateral veins at 35–55° from midrib. *Inflorescences* axillary, unbranched, 7-flowered; peduncles terete to angular, 5–11 mm long; pedicels 3–5 mm long. *Buds* fusiform, 10–12 mm long, 3.5–5.5 mm diam., hypanthium with four ribs; operculum equal in width to hypanthium, smooth, conical, apiculate. *Flowers* creamy white to less commonly pale pink. *Stamens* inflexed, outer stamens without anthers; fertile anthers versatile, cuboid to globoid, opening by pores and slits. *Ovules* in 4 vertical rows. *Fruits* pedicellate, urceolate, with four weak ribs, 8–13 mm long, 4–7 mm diam.; operculum scar very narrow, level to ascending, to 0.8 mm wide; disc descending, valves 4, deeply enclosed in fruit. *Seeds* angular-ovoid, 1–2 mm long, slightly glossy, tan-brown, with shallow longitudinal grooves and a very finely pitted to smooth reticulum; chaff glossy, orange-brown. (Figures 3, 4)



Figure 3. *Eucalyptus calycogona* subsp. *trachybasis* habit from south of Pinnaroo, South Australia.

Selected specimens examined. SOUTH AUSTRALIA (west to east): Bute to Port Broughton Rd, 33°44'08"S, 137°58'47"E, 13 Sep. 1995, *D. Nicolle* 1486 (AD, CANB, NSW); c. 15 km from Bute on Port Broughton Rd, 2 July 1967, *B. Copley* 1356 (AD); 13.1 km N of Mallala towards Balaklava, (34°20'S, 138°29'E), 19 July 1975, *G. Chippendale* 1350 & *M.J. Brennan* (AD); Tailem Bend–Loxton Highway just N of Mindarie, 34°48'53"S, 140°13'01"E, 30 July 1994, *D. Nicolle* 985 (AD, CANB); just W of Lameroo on highway, 35°19'28"S, 140°29'58"E, 27 Dec. 1993, *D. Nicolle* 732 (AD); near Keith, 21 Aug. 1950, *J.W. Green* 188 (AD); 10 km N of Pinnaroo towards Paruna (35°08'S, 140°56'E), 3 Aug. 1976, *J.D. Turner* 19 & *H. Vos* (AD).

VICTORIA (west to east): 13.2 km W of Murrayville towards Pinnaroo, (35°15'S, 141°02'E), 23 July 1975, *G. Chippendale* 1383 & *M.J. Brennan* (AD); 20 km N of Rainbow to Hopetoun, (35°49'S, 142°08'E), 15 Sep. 1977, *J.D. Turner* 118 (AD, PERTH, MEL, NSW); Wyperfeld National Park, Ginap Track, 2 miles [3 km] W of Eagle Track Junction, 3 Oct. 1968, *A.C. Beauglehole* 28875 (AD, NPA); 12 km E of Ouyen to Manangatang, 16 Sep. 1977, *J.D. Turner* 122 (AD, PERTH, MEL, NSW).

NEW SOUTH WALES: 14.5 km from Tooleybuc towards Koraleigh, 35°07'33"S, 143°24'14"E, 13 Dec. 1999, *D. Nicolle* 2896 (AD, CANB).

Distribution and habitat. Widespread but scattered in the Mid North and Murray Mallee regions of South Australia, extending into adjacent areas of Victoria and just into New South Wales near Koraleigh (Figure 2). It occurs in mallee shrubland in red-brown loams, occasionally as the dominant plant. Associated species include *E. socialis* F. Muell. ex Miq., *E. dumosa* A. Cunn. ex Oxley, *E. oleosa* (subsp. *oleosa*) and *E. phenax* (subsp. *phenax*). Brooker (1986) considered it surprising that *E. calycogona* (subsp. *trachybasis*) was absent from most of New South Wales that is inhabited by several other mallee species common with that taxon in Victoria. The same could be said of *E. gracilis* in Western Australia and *E. brevipes* Brooker (a very restricted mallee of the northern wheatbelt of Western Australia), both also of *E. ser. Heterostemones* and both surprisingly do not extend further into apparently similar habitats in Western Australia.



Figure 4. Holotype of *Eucalyptus calycogona* subsp. *trachybasis* (D. Nicolle 984).

Parsons & Rowan (1968) found that in the eastern part of its range, *E. calycogona* (subsp. *trachybasis*) is found on heavier soils than the related *E. gracilis*, the spatial separation being a possible explanation for the lack of hybrids between these two species. A similar situation occurs in Western Australia with *E. calycogona* and *E. prolixa* occurring on generally heavier (more clayey) soils than the related *E. gracilis*, *E. brevipes*, *E. celastroides* and *E. quadrans*. *E. calycogona* subsp. *trachybasis* and *calycogona* are allopatric although plants of subsp. *calycogona* on north-eastern Eyre Peninsula do show some tendency towards subsp. *trachybasis* with occasional plants having some persistent bark around ground level. These plants are not considered to be intergrades but are subsp. *calycogona* with possibly some past genetic influence from subsp. *trachybasis*.

Flowering period. July to October.

Conservation status. Widespread and not considered to be at risk. Abundant in reserves such as Ngarkat and Scorpion Springs Conservation Parks in South Australia and Wyperfeld National Park in Victoria.

Etymology. The epithet is derived from Greek *trachys*—rough and *basis*—base, referring to the persistent rough bark on the lower stems of this subspecies, contrasting with the smooth bark of subsp. *calycogona* and *spaffordii*.

Notes and affinities. *E. calycogona* subsp. *trachybasis* differs from subsp. *calycogona* in the persistent, rough bark on the lower stems, the more spreading, straggly habit, the slightly broader adult leaves and the larger buds and fruits.

E. calycogona subsp. *trachybasis* is the eastern variant of *E. calycogona* and is geographically separate from the other two subspecies. Plants of subsp. *trachybasis* sometimes attain the same height as typical plants of subsp. *calycogona* and *spaffordii*, but they are usually spreading and have more crooked, spreading stems unlike the erect, straight stems of the other two subspecies. The rough bark character readily distinguishes subsp. *trachybasis* from the other subspecies of *E. calycogona*. It also has somewhat larger buds and fruits than subsp. *calycogona* and marginally larger leaves. The rough bark of this subspecies is usually somewhat tessellated, like that of other rough-barked taxa in the series, viz. *E. gracilis*, *E. celastroides* and *E. yilgarnensis* (Maiden) Brooker.

1c. *Eucalyptus calycogona* Turcz. subsp. *spaffordii* Nicolle, subsp. nov.

Eucalyptus calycogona Turcz. var. *spaffordii* Blakely, Key Eucalypts 265 (1934). Type: Yeelanna, South Australia, June 1917, W.J. Spafford s.n. (syn: NSW).

A subspecies typica foliis juvenilibus latioribus, foliis adultis crassioribus latioribus, alabastris fructibusque majoribus et valde costatis differt.

Typus: between Cummins and Yeelanna, Eyre Peninsula, 34°11'53"S, 135°43'41"E, South Australia, 16 February 1996, D. Nicolle 1682 (*holo:* AD; *iso:* CANB, PERTH).

Erect-stemmed *mallee* 2–4 m tall, forming lignotubers. *Bark* smooth throughout, light grey to grey over cream, decorticating in ribbons. *Seedling leaves* opposite for many pairs, shortly petiolate, broad-lanceolate, 16–22 mm wide, 4–7 mm long, ± concolorous to slightly discolorous, dull, green. *Adult leaves* alternate, petiolate, lanceolate, 75–105 mm long, 13–24 mm wide, firm (to 1 mm thick), concolorous, glossy, dark green; reticulation moderate, oil glands numerous, irregular, mostly island, lateral veins at 25–35° from midrib. *Inflorescences* axillary, unbranched, 7-flowered; peduncles angular, 10–17 mm long; pedicels tapering to fruit, 5–9 mm long. *Buds* fusiform, 12–15 mm long x 4–7 mm diam., hypanthium with four sharp ribs or wings; operculum equal in width to hypanthium, smooth, conical, apiculate. *Flowers* white. *Stamens* inflexed, outer stamens without anthers; fertile anthers versatile, cuboid to globoid, opening by pores and slits. *Ovules* in 4 vertical rows. *Fruits* pedicellate, ovoid to urceolate (not including ribs), with four wings extending to pedicel, 11–13 mm long, 6–9 mm diam.; operculum scar very narrow, level to ascending, to 0.8 mm wide; disc level to descending, valves 4, deeply enclosed in fruit. *Seeds* compressed-ovoid, to 2 mm long, glossy, tan-brown, with a finely pitted reticulum; chaff orange-brown. (Figures 5, 6)

Selected specimens examined. SOUTH AUSTRALIA: Yeelanna, Eyre Peninsula, (34°09'S, 135°45'E), 5 June 1967, C. Boomsma s.n. (AD); 6 km N of Cummins on Yeelanna road, Eyre Peninsula, 9 Aug. 1992, D. Nicolle 86 (CANB); N of Yeelanna towards Lock, Eyre Peninsula, 34°10'39"S, 135°43'42"E, 17 July 1994, D. Nicolle 949 (AD, CANB); Mt Pillowerta, Eyre Peninsula, near Todd Valley, (34°09'S, 135°57'E), 11 Nov. 1952, J.D. Purdy s.n. (AD).

Distribution and habitat. Restricted to central Eyre Peninsula, mainly in the Yeelanna–Cummins area, occurring in mallee communities (Figure 2). It has also been recorded in the nearby Koppio Hills. Recorded associated species include *E. peninsularis*, *E. pileata*, and *E. diversifolia* Bonpl. (subsp.



Figure 5. Holotype of *Eucalyptus calycogona* subsp. *spaffordii* (D. Nicolle 1682).

diversifolia). *E. calycogona* subsp. *calycogona* and *spaffordii* are completely sympatric and few intergrades are known, however, considering the differences between these two subspecies are quantitative and individuals with coarse leaves, buds and fruits of subsp. *calycogona* and *trachybasis* elsewhere approach subsp. *spaffordii* in leaf, bud and fruit morphology, it is here maintained at an infraspecific rank.

Flowering period. Flowers recorded in July.

Conservation status. Most populations occur in remnant vegetation along roadsides and railway reserves and the taxon is not known to occur in any conservation reserves. The conservation status 2R is recommended using criteria of Briggs & Leigh (1996).

Etymology. Named after the collector of the type, W.J. Spafford (see notes below).

Notes and affinities. This taxon was first recognized by Blakely (1934). Unfortunately Blakely cited the type specimen in error as collected by W.J. Stafford instead of correctly W.J. Spafford, and in doing



Figure 6. *Eucalyptus calycogona* subsp. *spaffordii* habit from between Cummins and Yeelanna, Eyre Peninsula, South Australia.

so, named the variety *staffordii* Blakely. As the taxon is here recognized as a subspecies, the opportunity is taken to correct the name to subsp. *spaffordii*.

E. calycogona subsp. *spaffordii* differs from subsp. *calycogona* in the broader juvenile leaves, the broader and thicker adult leaves, and the much larger and more prominently ribbed buds and fruit; from subsp. *trachybasis* in the smooth bark, more erect habit, broader juvenile leaves, the broader and thicker adult leaves, and the larger and more prominently ribbed buds and fruit; and from *E. prolixa* in the mallee habit, the coarser leaves and the wider, more prominently ribbed buds and fruits.

2. *Eucalyptus prolixa* Nicolle, *sp. nov.*

Affinis *E. calycogonae* sed characteribus sequentibus distinguitur: habitu arborescenti (forma "mallet"); alabastris fructibusque elongatioribus differt.

Typus: Daniell Railway Siding, Esperance road, Western Australia, 31 March 1968, S.G.M. Carr 615 & D.J. Carr (*holo*: PERTH 04918576; *iso*: CANB, NSW).

Erect-stemmed *mallet* 6–10 m tall, with a steep branching habit, not known to form lignotubers. *Bark* smooth throughout, grey over coppery-red, decorticating in short ribbons. *Seedling leaves* opposite for 4–6 pairs then alternate, shortly petiolate, narrow-lanceolate to narrow-elliptic, up to 27 mm long and 9 mm wide, slightly discolorous, dull, green. *Adult leaves* alternate, petiolate, lanceolate, 65–92 mm long, 8–16 mm wide, concolorous, glossy, green; reticulation moderate with many large, mostly island oil glands, lateral veins at 30–50° from midrib. *Inflorescences* axillary, unbranched, 7-flowered; peduncles angular, 5–14 mm long; pedicels 2.5–10 mm long. *Buds* fusiform,

12–14 mm long, 3–4 mm diam., hypanthium with four ribs; operculum equal in width to hypanthium, smooth, conical, apiculate. *Flowers* creamy white. *Stamens* inflexed, outer stamens without anthers; fertile anthers versatile, cuboid to globoid, opening by pores and slits. *Ovules* in 4 vertical rows. *Fruits* pedicellate, urceolate, with four distinct ribs, 12–17 mm long, 3.5–6 mm diam.; operculum scar very narrow, level to ascending, to 0.8 mm wide; disc descending, valves 4, deeply enclosed in fruit. *Seeds* ovoid to compressed-ovoid, 1.0–1.6 mm long, slightly glossy, tan-brown, with a finely pitted to smooth reticulum; chaff orange brown. (Figures 7, 8)

Selected specimens examined. WESTERN AUSTRALIA (west to east): 1.4 miles [2 km] W of Bullabulling, 7 Mar. 1967, G. Chippendale 111 (AD, CANB, PERTH); Bremer Range track, 32°15'46"S, 120°31'52"E, 21 Apr. 1998, D. Nicolle 2281 (PERTH); Hyden–Norseman track, 10 km E of Mt Day turnoff, 12 Nov. 1987, A. Taylor 126 & A. Napier (PERTH); W of Coolgardie on highway, 31°01'20"S, 120°50'43"E, 15 Aug. 1997, M. French 249 (PERTH); Woodline, c. 100 km S of Coolgardie, 2 Sep. 1926,



Figure 7. Holotype of *Eucalyptus prolixa* (S.G.M. Carr 615 & D.J. Carr).



Figure 8. *Eucalyptus prolixa* habit from north of the Bremer Range, Western Australia.

J.B. Cleland s.n. (AD); 24.5 and 35.1 km W of Cave Hill on track to Victoria Rock road, 30 Mar. 1997, *M. French* 174 (PERTH); Norseman–Hyden road, 5.1 km W of Coolgardie–Norseman road, 32°01'04"S, 121°36'45"E, 18 Apr. 1997, *R. Davis* 3048 (PERTH); 4.5 miles [7 km] W along (L) turnoff, 6.4 miles [10 km] N of Norseman, 11 Nov. 1970, *J. Baker* 50 (AD, CANB, PERTH); 24.2 miles [39 km] S of Norseman, 13 Nov. 1970, *J. Baker* 60 (AD, CANB, PERTH); car park area at Jimberlana Hill, 5.9 km NE of Norseman, 16 Apr. 1995, *B.J. Lepschi* 554 & *T.R. Lally* (CANB, PERTH).

Distribution and habitat. Endemic to Western Australia, restricted to the goldfields, from east of Norseman westwards to Bullabulling, especially abundant in the area bounded by Mt Day, south of Norseman and Coolgardie (Figure 2). Its eastern and western distributional limits are poorly known. It grows in clay-loams usually in broadly undulating landscapes. Recorded associated eucalypt species include *E. cylindrocarpa* Blakely, *E. dundasii* Maiden, *E. tenuis* Brooker & Hopper, *E. urna* Nicolle, *E. salubris* F. Muell., *E. salmonophloia* F. Muell., *E. pterocarpa* P. Lang ex C. Gardner and *E. protensa* L. Johnson & K. Hill.

Flowering period. Poorly known.

Conservation status. Widespread and fairly abundant in the uncleared vegetation between Hyden and Norseman and not considered to be under any short-term threat.

Etymology. From the Latin *prolixus* – stretched out long, with two intended meanings; referring firstly to the slender mallet habit of this species and secondly referring to the more elongate fruits compared to *E. calycogona*.

Notes and affinities. *E. prolixa* is distinguished from *E. calycogona* by the steep-branched mallet habit and the very elongate but slender fruits, longer even than in *E. calycogona* subsp. *spaffordii*, but not as coarse and lacking the prominent ribbing (i.e. not winged) on buds and fruits of that subspecies. In the southern part of its range, *E. prolixa* and *E. calycogona* (subsp. *calycogona*) are sympatric, although usually parapatric at a more local level, probably due to slight differences in preferred habitat, *E. prolixa* usually occurring on locally somewhat heavier soils than *E. calycogona*. No intergrades or hybrids between the two species are known.

Acknowledgements

I would like to thank staff at the State Herbarium of South Australia for support and continuing access to the herbarium and Neville Marchant and staff at the Western Australian Herbarium for efficiently and enthusiastically making specimen loans available to me. Thanks also to Ian Brooker (CSIRO, Canberra) for many discussions and correcting the Latin diagnoses, Peter White (CALM, Perth) for helpful comments and Malcolm French of Perth for his welcome hospitality and field assistance in Western Australia.

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