

## New species in *Angophora* and *Eucalyptus* (Myrtaceae) from New South Wales

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### Abstract

Hill, K.D. (National Herbarium of New South Wales, Royal Botanic Gardens, Mrs Macquaries Road, Sydney, NSW 2000, Australia) 1996. New species in *Angophora* and *Eucalyptus* (Myrtaceae) from New South Wales. *Telopea* 7(2): 97–109. Two new species of *Angophora* (**A. inopina** and **A. exul**) and three new species of *Eucalyptus* (**E. aenea**, **E. dissita** and **E. fracta**) from New South Wales are described and illustrated. Distribution maps are provided, and conservation status is discussed. All species are regarded as rare or threatened.

### Introduction

Two new species of *Angophora* and three new species of *Eucalyptus* from New South Wales are described. All of the new species are classed as rare or threatened, and formal names are required in order to facilitate appropriate listing and action for conservation purposes.

#### 1. *Angophora inopina* K.D. Hill, sp. nov.

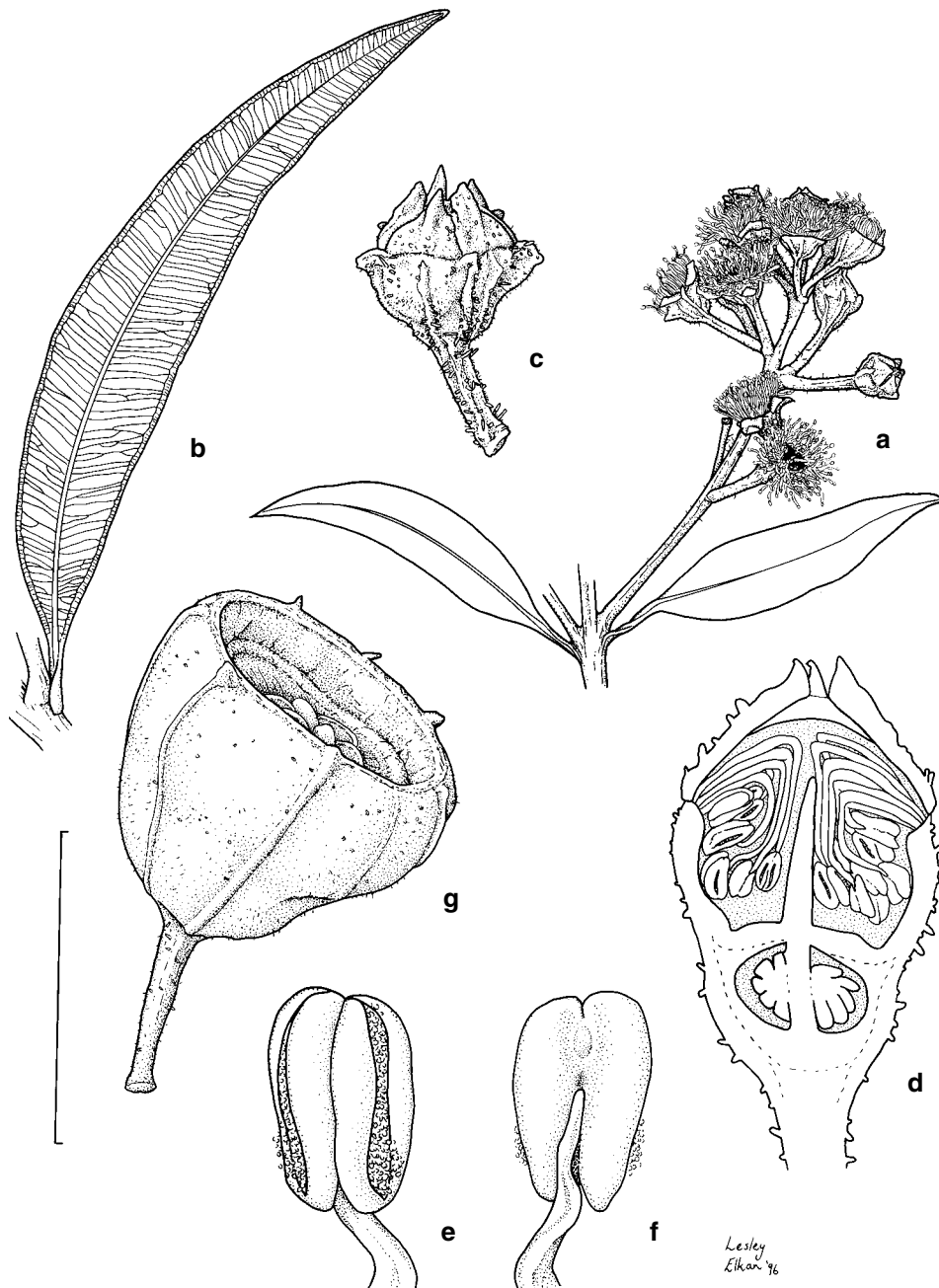
*A. bakeri* affinis sed foliis coriaceus, majoribus et latioribus, fructibus majoribus differt. *A. crassifolia* affinis sed foliis latioribus, pedicelli et petioli brevioribus differt.

Type: New South Wales: Central Coast: corner of Old Pacific Hwy and Arizona Rd, Charmhaven, K.D. Hill 4779 & L.C. Stanberg, 20 Dec 1995 (holo NSW; iso AD, BRI, CANB, MEL, K, MO).

Tree to 8 m tall, often multi-stemmed. Bark persistent throughout, shortly fibrous. Juvenile leaves not seen. Adult leaves moderately glossy, coriaceous, mid-green, opposite, discolorous and paler beneath, lanceolate to broad-lanceolate, acute, 4–11 cm long, 0.8–2.6 cm wide; petioles robust, flattened, 0.5–0.8 cm long. Inflorescences compound, terminal; unit umbellasters 3–7-flowered. Peduncles setose, terete, 3–17 mm long. Pedicels setose, terete, 7–12 mm long. Mature buds setose, ribbed, globular to pyriform, 5–7 mm long, 5–7 mm diam. Fruits setose, vaguely ribbed, cup-shaped to pyriform, more or less truncate, usually 3-locular, 11–15 mm long, 9–12 mm diam. Valves broadly triangular, obtuse, enclosed, steeply raised. Fig. 1.

**Notes:** *A. inopina* is a member of the *A. bakeri* C. Hall complex, which also includes *A. crassifolia* (G. Leach) L.A.S. Johnson & K.D. Hill, *A. paludosa* (G. Leach) K. Thiele & Ladiges and *A. exul* (below). It can be distinguished within that group by the broad, coriaceous leaves with short, broad petioles (table 1). It is most similar to *A. crassifolia*, from which it is distinguished by the broader leaves (lower length:breadth ratio) with shorter petioles (lower blade:petiole ratio).

**Distribution:** a restricted species occurring between Charmhaven and Wyee in the Central Coast region of New South Wales (Fig. 2).



**Fig. 1.** *A. inopina*. **a**, adult leaves and inflorescence. **b**, adult leaf. **c**, bud. **d**, transverse section of bud. **e**, **f**, anther. **g**, fruit. (from Strong s.n., NSW 383911). Scale bar: a, b = 4 cm; c, g = 1.2 cm; d = 6 mm; e, f = 1.5 mm.

**Ecology:** locally frequent in open dry sclerophyll woodland of *Eucalyptus haemastoma* Sm. and *Corymbia gummifera* (Sol. ex Gaertn.) K.D. Hill & L.A.S. Johnson with some *E. capitellata* Sm. and a dense shrub understorey on deep white sandy soils over sandstone, often with some gravelly laterite.

**Conservation status:** 2R–.

The epithet is from the Latin *inopinus*, unexpected, in reference to the occurrence of this undescribed and previously uncollected species on a main road less than 100 km from Sydney.

**Selected specimens (from 3 examined):** New South Wales: Central Coast: Doyalson–Wyee road, 2.5 km E of Wyee, *Hill 4781 & Stanberg*, 20 Dec 1995 (NSW, BRI, CANB, MEL); along Arizona Rd, Charmhaven, *Strong s.n.*, 1 Jan 1995 (NSW 383911).

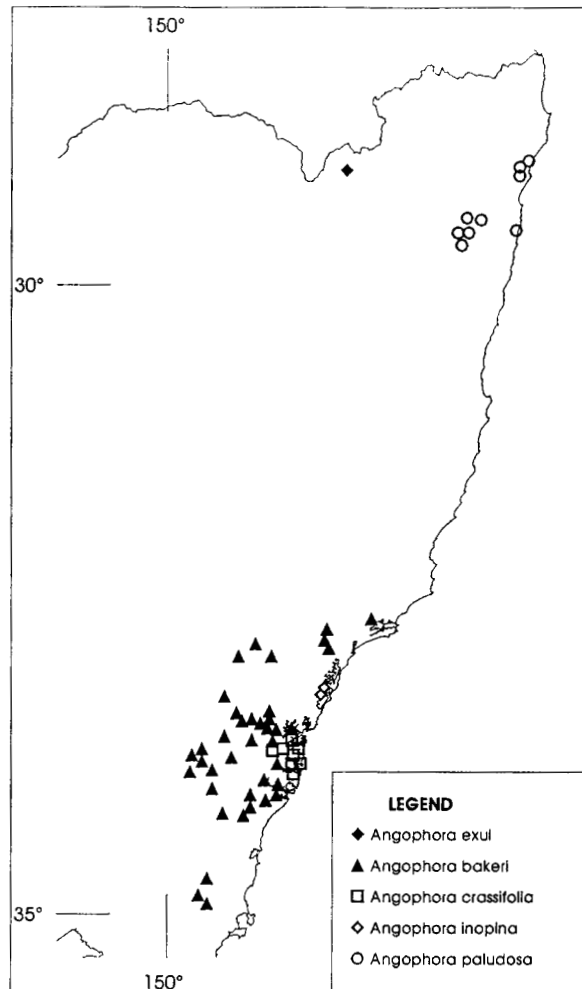


Fig. 2. Distribution of *A. bakeri*, *A. crassifolia*, *A. paludosa*, *A. inopina* and *A. exul*.

## 2. *Angophora exul* K.D. Hill, sp. nov.

*A. bakeri* affinis sed foliis angustioribus, petiolis longioribus differt.

Type: New South Wales: North Western Slopes: Gibraltar Rock, W of Tenterfield, K.D. Hill 4788, L.C. Stanberg & K.L. Wilson, 22 Feb 1996 (holo NSW; iso AD, BRI, CANB, K, MEL, MO, NY, P).

Tree to 8 m tall. Bark persistent throughout, shortly fibrous, shedding in plates. Juvenile leaves not seen. Adult leaves moderately glossy, chartaceous, mid-green, opposite, discolorous and paler beneath, linear to narrow-lanceolate, acuminate, 5–12 cm long, 0.4–0.7 cm wide; petioles slender, 0.7–1.2 cm long. Inflorescences compound, terminal; unit umbellasters 3–7-flowered. Peduncles terete, 6–11 mm long. Pedicels terete, 6–10 mm long. Mature buds ribbed, globular, 6–9 mm long, 6–9 mm diam. Fruits cup-shaped to obconical, usually 3-locular, 5–8 mm long, 5–7 mm diam. Stemonophore flat, < 0.2 mm wide. Disc vertically depressed, 1–1.5 mm wide. Valves broadly triangular, acute, enclosed, steeply raised. Fig. 3.

**Notes:** another member of the *A. bakeri* group, *A. exul* is distinguished by the very narrow leaves with long, slender petioles (table 1). Forms of *A. floribunda* in nearby woodlands show unusually narrow leaves for the species, and are thought to represent products of introgressive hybridisation with *A. exul*. The latter may in fact be in danger of losing its genetic integrity through such hybridisation.

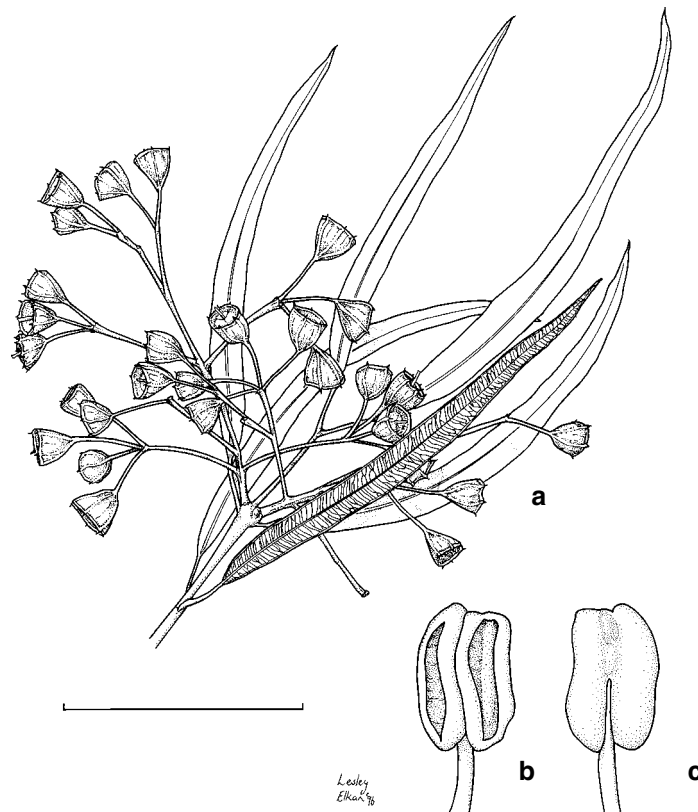


Fig. 3. *A. exul*. a, adult leaves, inflorescence and spent flowers. b, c, anther. (from Hill 4788 et al.). Scale bar: a = 4 cm, b, c, = 1.5 mm.

**Distribution:** known only from a single small stand on Gibraltar Rock, west of Tenterfield (Fig. 2).

**Ecology:** a rare species occurring only on open scree on a ridge of acid volcanic outcrops.

**Conservation status:** 2R–.

The epithet is from the Latin *exul*, an exile, from the remote occurrence of this species from other species of the *A. bakeri* group.

**Selected specimens (from 3 examined):** New South Wales: North Western Slopes: Rock of Gibraltar, 31 km W of Tenterfield, *Roberts s.n.*, 29 Jul 1992 (NSW 370740).

*A. floribunda* – *A. exul* intergrades:

New South Wales: North Western Slopes: Gibraltar Rock, *Hill 4785, Stanberg & Wilson*, 22 Feb 1996 (NSW).

**Table 1.** Comparison of species in the *Angophora bakeri* complex.

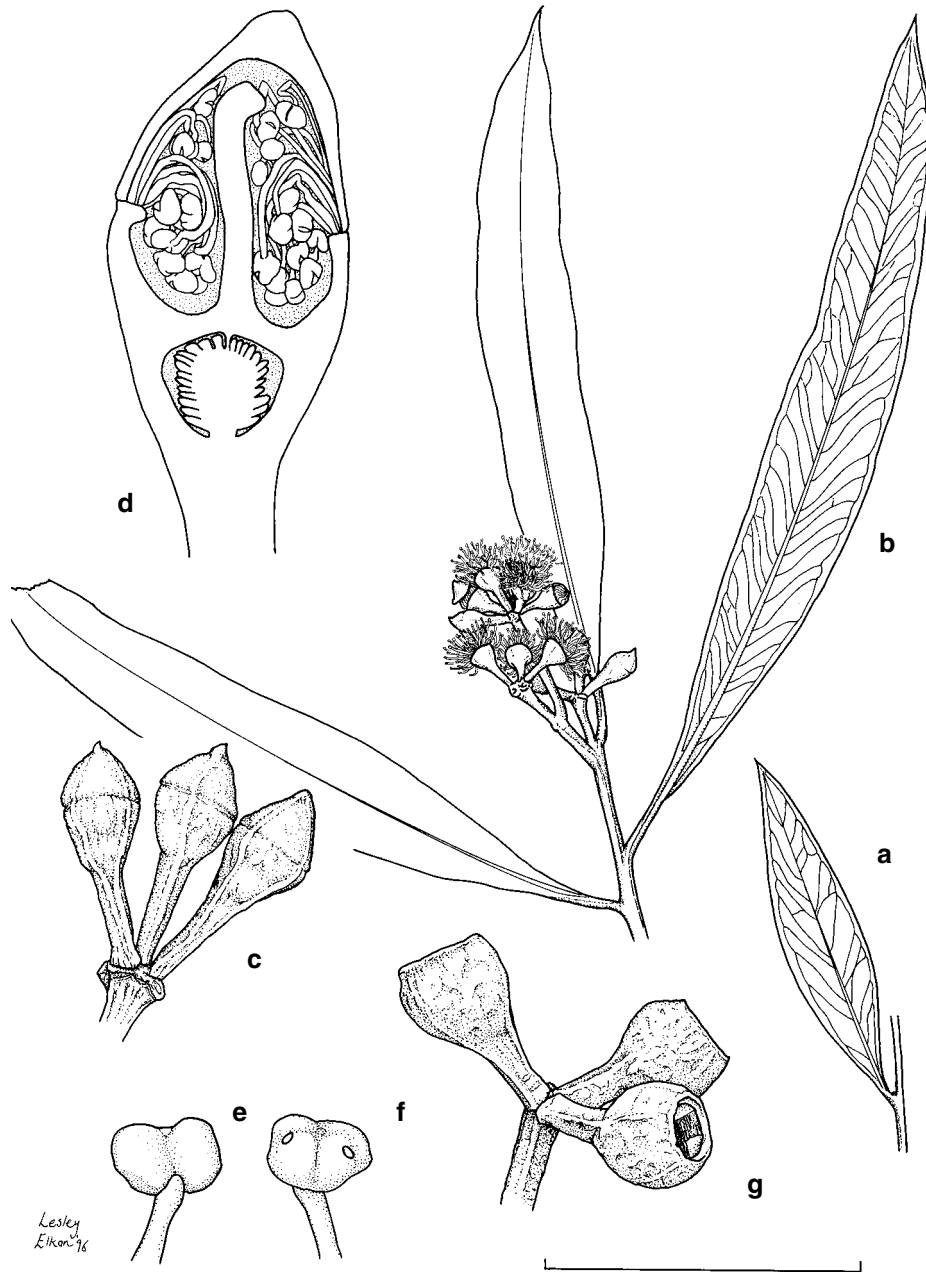
	<i>A. bakeri</i>	<i>A. crassifolia</i>	<i>A. paludosa</i>	<i>A. inopina</i>	<i>A. exul</i>
<b>Adult leaf</b>	lanceolate	lanceolate	lanceolate	broad-lanceolate	narrow-lanceolate
<b>cm long</b>	6–10 ×	7–11 ×	7–11 ×	4–11 ×	5–12 ×
<b>cm wide</b>	0.5–1.0	0.7–1.5	0.8–1.5	0.8–2.6	0.4–0.7
<b>l:b</b>	8–12:1	7–10:1	7–9:1	4–7:1	12–17:1
<b>Lamina:petiole</b>	12–18:1	10–12:1	13–18:1	8–14:1	7–10:1
<b>Texture</b>	chartaceous	coriaceous	chartaceous	coriaceous	chartaceous
<b>Petiole mm</b>	3–8	6–10	4–8	5–8	7–12
<b>Pedicel mm</b>	4–11	10–15	4–9	7–12	6–10
<b>Fruit mm</b>	8–10 × 8–10	10–14 × 9–14	7–10 × 7–11	11–15 × 9–12	5–8 × 5–7

### 3. *Eucalyptus aenea* K.D. Hill, sp. nov.

*E. viridi* affinis sed foliis adultis et juvenilibus latioribus, cortice trunci laevi differt.

Type: New South Wales: Central Western Slopes: Death Adder rock, near Gungah, *K.D. Hill 4806, L.C. Stanberg & M. Sharp*, 12 Mar 1996 (holo NSW; iso AD, BRI, CANB, K, MEL, MO, NY).

Slender mallee to 5 m tall. Bark smooth to base, shedding in ribbons, grey-brown, bronze and dark grey. Juvenile leaves blue-green, dull, disjunct–opposite, lanceolate, 5–8 cm long, 0.7–1.8 cm wide; petioles 0.5–1.0 cm long. Adult leaves glossy yellow-green, disjunct–opposite, similifacial, lanceolate, acute or apiculate, 5–11 cm long, 0.9–1.8 cm wide; petioles 0.6–1.0 cm long. Inflorescences axillary, single or occasionally compound; umbellasters 7-flowered. Peduncles terete, 4–7 mm long. Pedicels terete, 1–3 mm long. Mature buds ovoid, 4–6 mm long, 2–3 mm diam. Calyptra conical or hemispherical, acute, obtuse or rounded, 1/2 as long to about as long as hypanthium. Outer calyptra persistent to anthesis. Stamens irregularly flexed, all fertile. Anthers adnate, basifixed, cuboid to globoid, opening by lateral pores. Fruits cup-shaped, 3–4-locular, 3–5 mm long, 3–5 mm diam. Calyptra scar and stemophore flat, < 0.2 mm wide. Disc steeply depressed, 1–1.5 mm wide. Valves broadly triangular, obtuse, enclosed, strongly raised. Fig. 4.



**Fig. 4.** *E. aenea*. **a**, juvenile leaf. **b**, adult leaves and inflorescence. **c**, inflorescence and buds. **d**, transverse section of bud. **e**, **f**, anther. **g**, fruit. (a from Hill 4808 *et al.*, b-g from Hill 4806 *et al.*). Scale bar: a = 6 cm, b = 4 cm, c, g = 1.2 cm, d = 6 mm, e, f = 1.5 mm.

**Notes:** the mallee habit, the predominantly axillary inflorescences and the persistent outer calyptra place *E. aenea* nearest to *E. viridis* R. Baker. It is distinguished by the relatively broader adult and juvenile leaves, the blue-green juvenile leaves (juvenile leaves of *E. viridis* are green and up to  $9 \times 0.5$  cm; adult leaves are up to  $10 \times 0.8$  cm), and the wholly smooth bark. *E. viridis* is generally a plant of drier environments west of the dividing range.

**Distribution:** known only from a few small stands in the Goulburn River National Park (Fig. 5).

**Ecology:** locally dominant but very restricted, occurring in small stands on shallow soils on the higher flanks of low sandstone ridges. *E. sideroxylon* A. Cunn. ex Woolls occurs in slightly lower sites adjacent and sometimes within the mallee community, and *E. sparsifolia* Blakely and *E. fibrosa* F. Muell. occur on the tops of the sandstone ridges. The understorey is composed of a variety of scleromorphic shrub species.

**Conservation status:** 2RC.

The epithet is from the Latin *aenaeus*, bronze, from the frequently bronze-coloured bark.

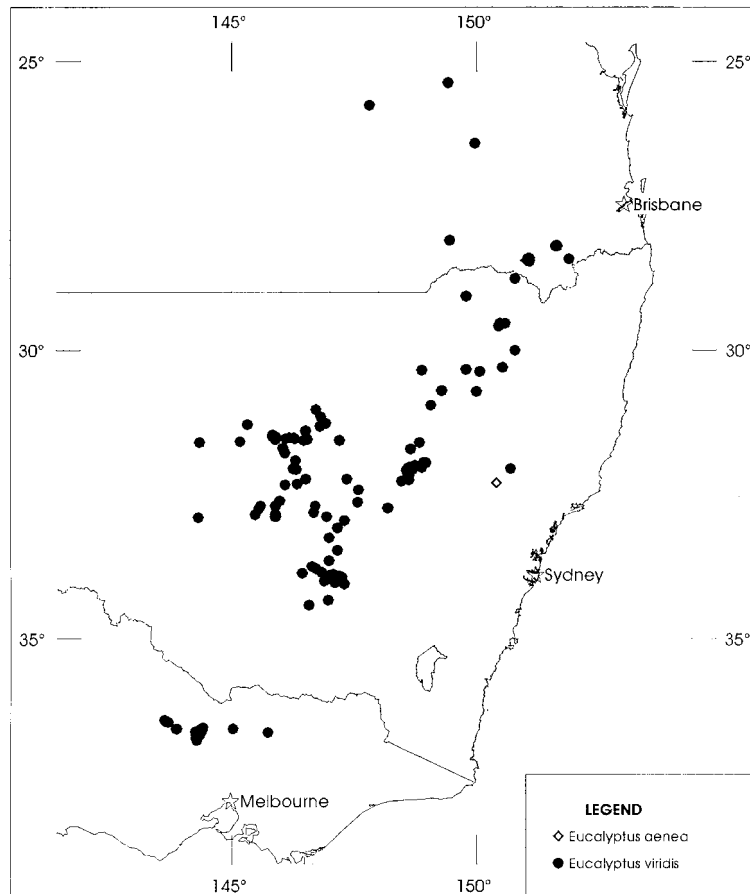


Fig. 5. Distribution of *E. aenea* and *E. viridis*.

**Selected specimens (from 16 examined):** New South Wales: Central Western Slopes: Flaggs Rd area, eastern edge of Goulburn River Natl Park, *Bell s.n.*, Mar 1995 (NSW 398812); Death Adder Rock, eastern part of Goulburn River Natl Park, *Bell S1, S2, S3, S4, S5*, 20 Jun 1995 (NSW); Death Adder Rock, near Gungal, *Hill 4807, 4808, Stanberg & Sharp*, 12 Mar 1996 (NSW); 800 m E of Death Adder Rock, near Gungal, *Hill 4811, 4812, Stanberg & Sharp*, 12 Mar 1996 (NSW)

#### 4. *Eucalyptus dissita* K.D. Hill, *sp. nov.*

*E. moorei* affinis sed foliis adultis et juvenilibus latioribus differt.

Type: New South Wales: Northern Tablelands: Surveyors Creek track, *K.D. Hill 4792, L.C. Stanberg & K.L. Wilson*, 22 Feb 1996 (holo NSW; iso AD, BRI, CANB, K, MEL, MO).

Slender mallee to 4 m tall. Bark smooth to base, shedding in ribbons, pale green, yellow-brown and grey. Juvenile leaves blue-green, dull, opposite on early nodes, becoming disjunct-opposite, lanceolate, 2.5–7 cm long, 0.6–1.4 cm wide, sessile on early nodes, becoming petiolate, petioles to 0.7 cm long. Adult leaves glossy mid-green, disjunct-opposite, simlifacial, lanceolate, acute or apiculate, 4–8 cm long, 0.7–1.8 cm wide; petioles 0.4–1.0 cm long. Inflorescences axillary; umbellasters many-flowered (more than 11). Peduncles terete, 4–8 mm long. Pedicels terete, 0.5–1.5 mm long. Mature buds fusiform, 4–7 mm long, 1.5–2.5 mm diam. Calyptra conical, acute, about as long as hypanthium. Stamens irregularly flexed, all fertile. Anthers versatile, reniform, opening by confluent diagonal slits. Fruits globular to truncate-globular, 3-, rarely 4-locular, 3–5 mm long, 3–5 mm diam. Calyptra scar and stemonophore flat, < 0.2 mm wide. Disc level, < 1 mm wide. Valves broadly triangular, obtuse, level with stemonophore, slightly raised. Fig. 6.

**Notes:** *E. dissita* has been included in *E. moorei* Maiden & Cabbage (e.g. Hill 1991), from which it is readily distinguished by its broader adult and juvenile leaves (lower length:breadth ratios; Table 2) and longer petioles. *E. serpentinicola* in the same species complex also has narrower juvenile and adult leaves and shorter petioles than *E. dissita*. The foliage of living plants of *E. dissita* is also held in a stiff, erect manner, in contrast to the more lax foliage of *E. moorei* and *E. serpentinicola*. *E. latiuscula*, also in the same complex, has broader juvenile and adult leaves and shorter petioles than *E. dissita* (Table 2).

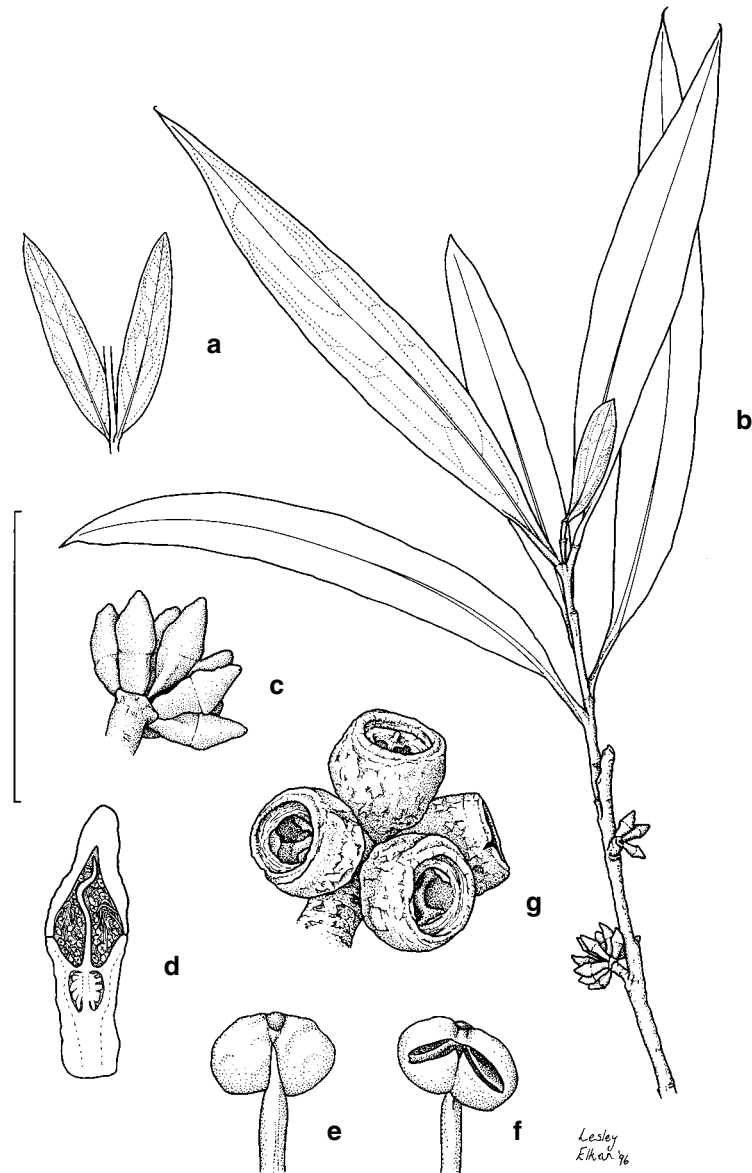
**Table 2. Comparison of species in the *Eucalyptus moorei* complex.**

	<i>E. moorei</i>	<i>E. serpentinicola</i>	<i>E. latiuscula</i>	<i>E. dissita</i>
<b>Juvenile leaf</b>	narrow-lanceolate	narrow-lanceolate	ovate to elliptic	lanceolate
<b>Adult leaf</b>	narrow-lanceolate to lanceolate	linear to narrow-lanceolate	lanceolate to broad-lanceolate	lanceolate to broad-lanceolate
<b>cm long</b>	4–10 ×	4–12 ×	5–9 ×	4–8 ×
<b>cm wide</b>	0.5–1.0	0.4–1.0	0.7–1.7	0.7–1.8
<b>l:b</b>	8–10:1	10–12:1	5–8:1	4–7:1
<b>Petiole mm</b>	2–5	2–7	2–6	4–10
<b>Lamina:petiole</b>	18–22:1	16–25:1	15–25:1	8–12:1



**Distribution:** known only from a few small stands in the Gibraltar Range National Park in the New England region of north-eastern New South Wales (Fig. 7).

**Ecology:** locally dominant in small patches around the edges of swamps, on gritty sandy soils over granite just above the level of permanent water. *E. ligustrina* DC., *E. radiata* Sieber ex DC. subsp. *sejuncta* L.A.S. Johnson & K.D. Hill and *E. acaciiformis* Deane & Maiden occur in adjacent woodland, with some *E. radiata* subsp. *sejuncta* also



**Fig. 6.** *E. dissita*. **a**, juvenile leaves. **b**, adult leaves and inflorescence. **c**, inflorescence and buds. **d**, transverse section of bud. **e**, **f**, anther. **g**, fruit. (a from Hill 4793 *et al.*, b, c, d, g from Williams *s.n.*, NSW 340500, e, f from Hill 4795 *et al.*). Scale bar: a = 6 cm, b = 4 cm, c, g = 1.2 cm, d = 6 mm, e, f = 1.5 mm.

among the *E. dissita* population. The near-swamp habitat is similar to that of *E. moorei*, whereas the geographically nearer and also closely related *E. serpentinicola* L.A.S. Johnson & Blaxell occurs on dry elevated sites.

**Conservation status:** 2RC.

The epithet is from the Latin *dissitus*, lying apart, in reference to the wide separation from the sister species *E. moorei*.

**Selected specimens (from 6 examined):** New South Wales: Northern Tablelands: Surveyors Creek track, Hill 4793, 4794, 4795 Stanberg & Wilson, 2 Feb 1996 (NSW); 65 km NE of Glen Innes, Roberts *s.n.*, 17 Jun 1989 (NE, NSW 397167, BRI); Surveyors Creek Trail, off the Mulligans Hut road, c. 41 miles (66 km) NE of Glen Innes, Williams *s.n.*, 29 May 1974 (NE, NSW 340500).

### 5. *Eucalyptus fracta* K.D. Hill, *sp. nov.*

*E. siderophloiae* affinis sed foliis juvenilibus minoribus et latioribus, statura minore differt.

Type: New South Wales: North Coast: Broken Back Range, K.D. Hill 4776, L.C. Stanberg & T. Tame, 6 July 1995 (holo NSW; iso AD, BRI, CANB, K, MEL, MO).

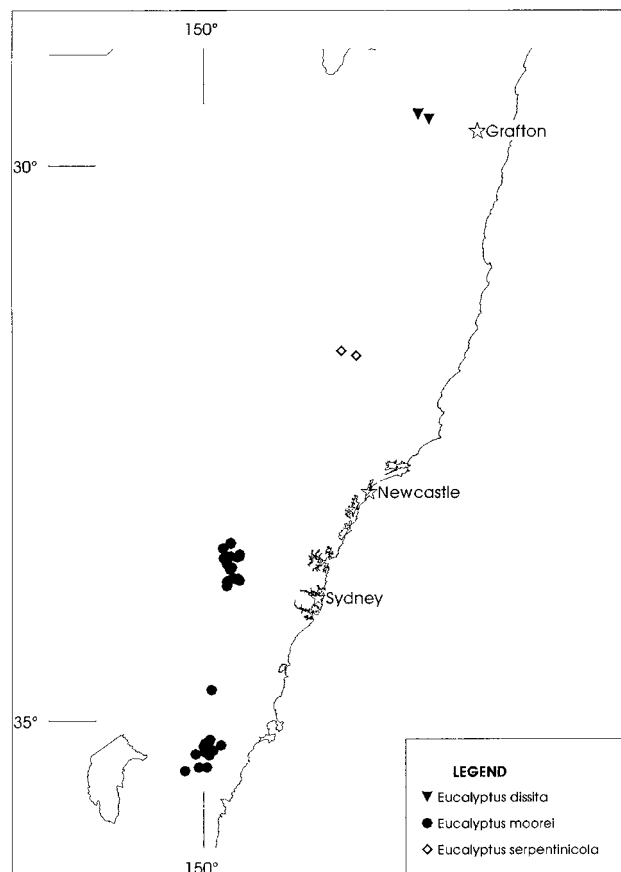
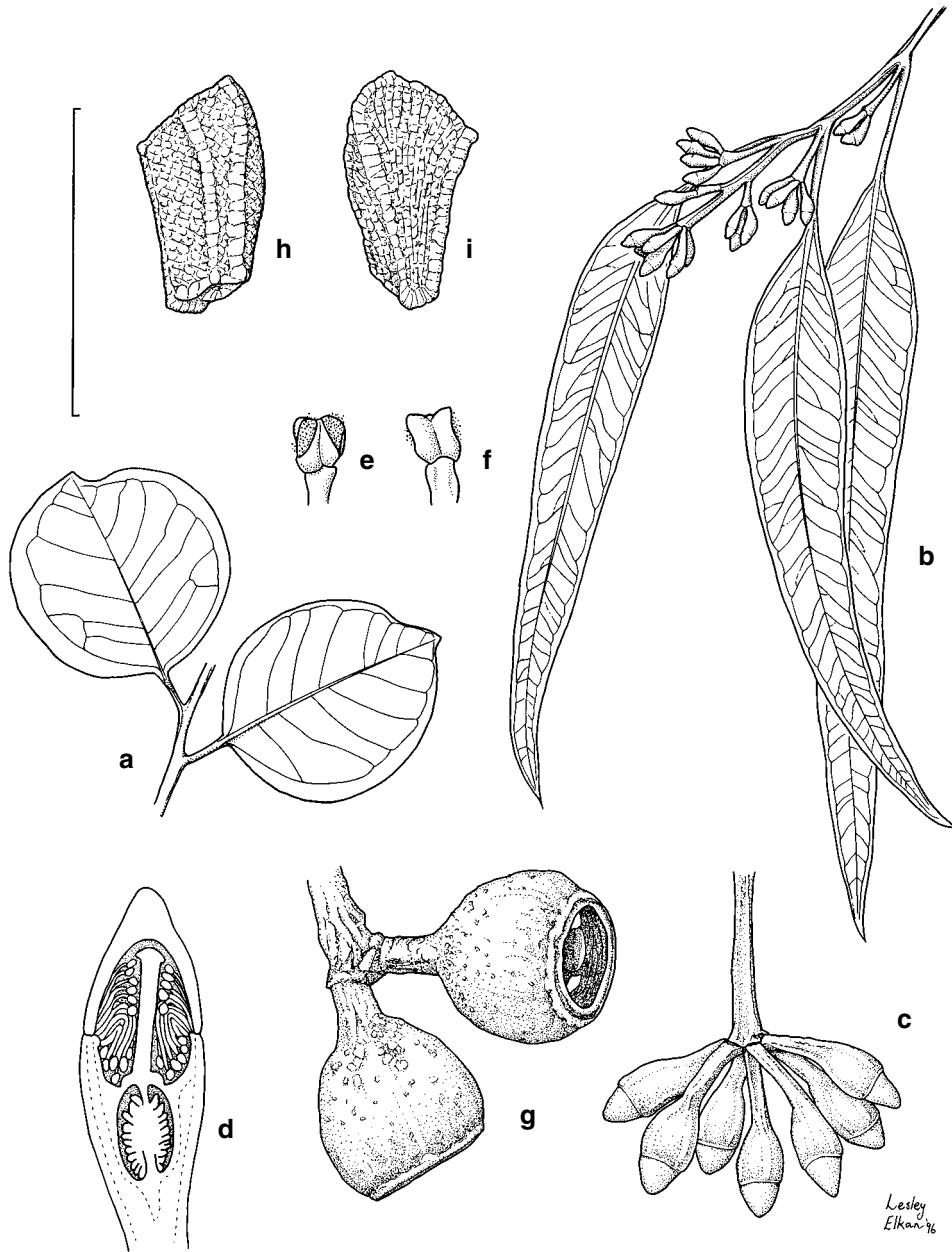


Fig. 7. Distribution of *E. dissita*, *E. serpentinicola* and *E. moorei*.



**Fig. 8.** *E. fracta*. **a**, juvenile leaves. **b**, adult leaves and inflorescences. **c**, inflorescence and buds. **d**, transverse section of bud. **e**, **f**, anther. **g**, fruit. **h**, **i**, seed. (a,b from Hill 4776 *et al.*, c, d from Tame 3505, g, h, i from Wiecek 494 *et al.*, e, f from Tame *s.n.*, NSW 392958). Scale bar: a = 6 cm, b = 4 cm, c, g = 1.2 cm, d = 6 mm, e, f = 1.5 mm.

Tree or mallee to 8 m tall. Bark hard ironbark to branches c. 7 cm diam., then smooth, whitish. Small branchlets slightly glaucous. Juvenile leaves blue-green, dull, disjunct-opposite, orbiculate, later ovate, 3–6 cm long, 2.5–3.5 cm wide; petioles 0.5–0.8 cm long. Adult leaves dull to slightly glossy grey-green, disjunct-opposite, simlifacial, lanceolate, acuminate, 7–11 cm long, 1–2.5 cm wide; petioles 0.8–1.8 cm long. Inflorescences compound, often axillary; umbellasters 7-flowered. Peduncles terete, 6–10 mm long. Pedicels terete, 1–5 mm long. Mature buds fusiform, 6–8 mm long, 2–3 mm diam. Calyptra conical, acute or apically rounded, slightly shorter than to about as long as hypanthium. Outer calyptra shed long before anthesis. Stamens irregularly flexed, all fertile. Anthers adnate, basifixed, cuboid to globoid, opening by lateral pores. Fruits cup-shaped, 3–4-locular, 5–8 mm long, 5–7 mm diam. Calyptra scar and stemonophore flat, < 0.2 mm wide. Disc vertically depressed, 1–1.5 mm wide. Valves broadly triangular, acute, steeply raised, level with stemonophore or slightly exerted. Fig. 8.

**Notes:** *E. fracta* is nearest to *E. siderophloia* Benth., from which it can be distinguished by the smaller habit (*E. siderophloia* is a forest tree to 45 m tall) and the smaller and more rounded juvenile leaves (juvenile leaves are ovate, later broad-lanceolate to lanceolate, to 12 × 4 cm in *E. siderophloia*). Fruits tend to be broader (fruits are obconical

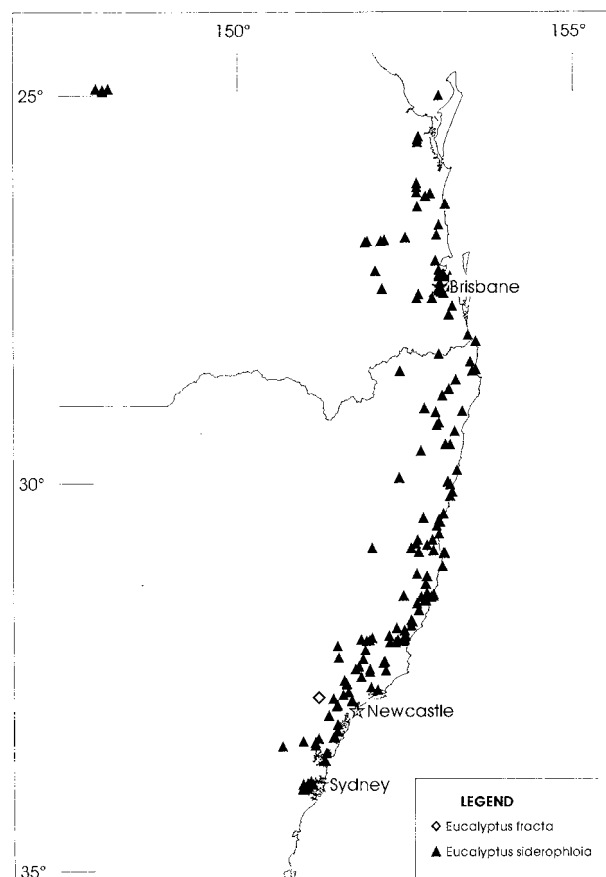


Fig. 9. Distribution of *E. fracta* and *E. siderophloia*.

in *E. siderophloia*). Buds are also usually smaller (buds 6–8 × 3–4 mm in *E. siderophloia*), with the calyptra rounded or obtuse and shorter relative to the hypanthium (the calyptra is acute and frequently longer than the hypanthium in *E. siderophloia*). *E. siderophloia* is also a plant of deeper and generally more fertile soils.

**Distribution:** known only from parts of the northern escarpment of the Broken Back Range, near Cessnock (Fig. 9).

**Ecology:** locally frequent but restricted to shallow soils along the upper escarpment of a steep sandstone range. This species is the dominant tree in a narrow band along the upper edge of the escarpment. Associated species in slightly deeper soils include *E. sparsifolia* Blakely, *E. punctata* DC., *Corymbia maculata* (Hook.) K.D. Hill & L.A.S. Johnson and *Angophora euryphylla* (L.A.S. Johnson ex G. Leach) L.A.S. Johnson & K.D. Hill.

**Conservation status:** 2R-.

The epithet is from the Latin *fractus*, broken, in reference to the species' occurrence in the Broken Back Range.

**Selected specimens (from 12 examined):** New South Wales: North Coast: Broken Back Range, Hill 4772, 4773, Stanberg & Tame, 06 Jul 1995 (NSW, BRI, CAMB, MEL); Broken Back Range, track W of Broken Back Trig out to Mans Head Point, Wiecek 494, 495, 497, Richards & Tame, 05 Apr 1993 (NSW); N end of Broken Back Range, Tame 2046, 2407, Oct 1987 (NSW); Broken Back Range, Tame 3504, 27 Sep 1992 (NSW); far northern end of Broken Back Range, Tame 3505, 27 Sep 1992 (NSW).

**Cult.:** Hunter Region Botanic Garden (grown from seeds collected from Broken Back Range), Tame s.n., Jun 1995 (NSW 392958).

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