



Three species of *Cryptandra* (Rhamnaceae: Pomaderreae) from southern Australia allied to *C. tomentosa*

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Abstract: Two species of *Cryptandra* are described as new, *C. setifera* Kellermann and *C. sabulicola* Kellermann, and *C. campanulata* Schldl. is formally reinstated. The species are described and illustrated, synonymies are provided, as well as an identification key for the *C. amara-tomentosa* complex in Victoria and South Australia. Specimens of all three taxa have formerly been identified as *C. amara* Sm. or *C. tomentosa* Lindl., but are clearly separate from them.

Keywords: New species, Rhamnaceae, *Cryptandra*, South Australia, Victoria

Introduction

Cryptandra Sm. is a genus of about 60 species, mainly distributed in southern Western Australia and south-eastern Australia, with a few species occurring in the north of the continent. During the last 25 years, research on the genus was undertaken in Western Australia (Rye 1995, 2007; Rye & Trudgen 1995), Queensland (Bean 2004) and Victoria (Walsh & Udovicic 1999). The genus is currently being revised over its whole range of distribution, which has already resulted in the publication of new taxa (Kellermann 2006a, b; Kellermann & Udovicic 2007) and nomenclatural notes and typifications (Kellermann & Rye 2008).

During work on the *C. amara-tomentosa* complex, three taxa were recognised as morphologically distinct. This result was corroborated by preliminary molecular analyses of the tribe Pomaderreae (see Nge *et al.* 2019 & in press.). In this paper, two taxa are described as new and one is formally reinstated. All three species have been variously assigned to *C. amara* Sm. or *C. tomentosa* Lindl. over the years. A full resolution of the variation within *C. amara* and *C. tomentosa* is still being worked on, but the taxonomic changes published here are presented in advance so that names for the species are available. The presence of *C. myriantha* Diels in South Australia and Victoria was confirmed by Kellermann & Rye (2008); it is included in the key, below, as it can be confused with *C. tomentosa*.

The first new species, *Cryptandra setifera* Kellermann, is restricted to rocky habitats in the north of Eyre Peninsula, South Australia, extending to the Gawler Ranges. The second new species, *C. sabulicola*

Kellermann, is native to deep sands in northern Eyre Peninsula and on both sides of the South Australian-Victorian border, especially in and around Billiat Conservation Park (C.P.), Murray-Sunset National Park (N.P.) and the Big Desert. *Cryptandra campanulata* Schldl. grows in rocky habitats of the northern Mount Lofty Ranges and southern Flinders Ranges.

Materials & Methods

This study is based on herbarium specimens from AD, CANB, HO, MEL and NSW, as well as field observations and freshly collected material. Vegetative characters and fruits were measured from dry specimens; floral features were mainly taken from rehydrated material, but also from material preserved in 70% ethanol. The type specimen of *Cryptandra campanulata* was examined on JSTOR (2020).

Taxonomy

1. *Cryptandra setifera* Kellermann, *sp. nov.*

A Cryptandra campanulata Schldl. stipulis setosis adaxialibus, floribus brevibus, et fructibus toris medialis differt.

Holotypus: South Australia, Eyre Peninsula: Property of Bill & Kerry Campbell, hillside S of Urbana Weir Road, c. 250 m from road, NW facing slope, open woodland with *Allocasuarina*, *Acacia*, *Eucalyptus* & *Dodonaea*, red loamy sand over quartzite rock with exposed rock sheets and boulders, 1 m tall spiny shrub, branches entangled, 23 Oct. 2018, J. Kellermann 750 & F. Nge (AD285099). **Isotypi:** B, CANB, HAL, K, MEL, MO, NY, SI.

Cryptandra sp. Hiltaba (Anon. NPGA-8100) Kellermann in Lang *et al.*, *Fl. Surv. Hiltaba Station & Gawler Ra. Natl Park* 35–36, Figs 25, 26 (2013); Austral. Biol. Resources Study, *Hiltaba Nat. Res. & Gawler Ra. Natl Park 2012 Bush Blitz Surv.* 30 (2015).

Cryptandra amara auct. non Sm.: J.M.Black, *Fl. S. Austral. ed. 2, 3*: 552 (1952), *pro parte*.

Cryptandra amara var. *floribunda* auct. non Maiden & Betche: J.M.Black, *Fl. S. Austral. ed. 2, 3*: 552 (1952), *pro parte*; E.M.Canning in Jessop & Toelken, *Fl. S. Austral. 2*: 808 (1986), *pro parte*.

Cryptandra sp. Floriferous (W.R.Barker 4131) auct. non W.R.Barker: W.R.Barker, *J. Adelaide Bot. Gard. Suppl.* 1: 90 (2005), *pro parte*.

Shrubs, 0.3–1.2 m high, with abundant spinescent short-shoots. *Indumentum* on young stems of dense stellate and simple hairs, white, stems soon becoming glabrous. *Stipules* (0.4–) 1–2.8 mm long, persistent, narrowly to broadly triangular, acute to attenuate, long-acuminate with a long drawn-out ± curly tip when young, connate at the base of the petiole, glabrous or sparsely hairy abaxially (outside), adaxially with dense long coarse simple hairs or bristles, ciliate, light brown when young, later darker; *petiole* (0.1–) 0.4–1.1 mm long, glabrous. *Leaves* alternate or in fascicles, shortly petiolate; *lamina* narrowly ovate to linear, entire, 1.3–5 (–7) mm long, 0.3–1 mm wide; base cuneate to obtuse; margins revolute (almost terete); apex acute to bluntly acuminate, straight (rarely incurved); abaxial

(lower) surface obscured by margins, densely stellate hairy, with stellate or simple hairs along midrib; adaxial surface glabrous or with very short fine erect simple hairs. *Inflorescences* axillary, comprising single flowers surrounded at base by 6–9 bracts, arranged in little-branched ± elongate conflorescences of up to 20 flowers. *Bracts* persistent, ovate to orbicular, 1.3–2.3 mm long, brown, obtuse to acute, sparsely pubescent, especially in upper half; margins entire or torn and ragged, ciliate. *Flowers* white, sessile; *hypanthium* shortly tubular, 1–1.5 mm long, 2.3–2.9 mm in diameter, covered outside with sparse to moderately dense antrorse simple hairs overlying dense small stellate hairs; base with dense stellate hairs. *Sepals* 1.8–2.1 mm long, erect, keeled, persistent on fruit, with a similar indumentum as hypanthium. *Petals* 0.8–1.0 mm long, erect, cucullate, ± clawed. *Stamens* 0.7–1 mm long, shorter than or subequal to petals, erect to incurved; *anthers* 0.3–0.5 mm long. *Disc* inconspicuous, forming a narrow ring around the ovary, densely stellate-pubescent. *Ovary* inferior to almost so; roof densely pubescent with stellate hairs; *carpels* 3; *style* 1–1.6 mm long, glabrous, shortly 3-lobed. *Fruit* a schizocarp, obovoid to ellipsoid, 2.7–3.5 mm long, brown with white to grey indumentum; torus in middle third; *fruitlets* dehiscing by a longitudinal slit on the inner face. *Seeds* 1.7–1.8 mm long, dark fawn to light brown, uniformly coloured, darker at base; *aril* c. 0.4 mm long, at base of seed, pale yellowish, translucent. **Fig. 1.**

Preliminary key to the *Cryptandra amara-tomentosa* complex in Victoria and South Australia

- 1. Leaves mostly flat, glabrous on both sides apart from a few simple hairs along the midrib **C. amara**
- 1: Leaves recurved to revolute, glabrous above (sometimes muricate, especially on the distal half of the leaf), densely tomentose below
 - 2. Leaf apex conspicuously recurved, plants without spinescent short shoots **2. C. sabulicola**
 - 2: Leaf apex straight, plants spinescent or not
 - 3. Flower with hypanthium tube > 2.5 mm long, with 5 ridges along the tube, covered in dense stellate and simple hairs; torus ± basal in fruit **3. C. campanulata**
 - 3: Flower with hypanthium tube < 2 mm long, not or scarcely ridged, moderately to densely pubescent to glabrous; torus in middle of fruit
 - 4. Stipules to 2.8 mm long, with a long drawn-out curly tip when young (later breaking off), glabrous abaxially (outside), with dense coarse simple hairs present on adaxial surface; plants densely spinescent **1. C. setifera**
 - 4: Stipules to 2 mm long, acute to acuminate, but not long drawn-out when young, usually with hairs abaxially, especially in centre, glabrous or sparsely hairy adaxially; plants spinescent or not
 - 5. Hypanthium tube with persistent indumentum on tube and base; indumentum of stems and flowers of stellate hairs overlain by simple hairs . . . **C. tomentosa** var. **2 = C. sp. Floriferous (W.R.Barker 4131)**
 - 5: Hypanthium tube glabrous or glabrescent, at least toward base
 - 6. Indumentum on stems and flowers usually of moderately dense to dense minute stellate hairs, occasionally with simple hairs; hypanthium tube fully glabrous or glabrous at base, at least in fruit **C. tomentosa** var. **1 = C. tomentosa s.str.**
 - 6: Indumentum on stems of strigose simple hairs, early glabrescent; hypanthium tube fully glabrous; sepals with sparse to medium short antrorse simple hairs, very occasionally with stellate hairs **C. myriantha**



Fig. 1. *Cryptandra setifera* growing in rocky hills near Urbana Weir Road, near Cleve and Calwell, Eyre Peninsula (type locality). **A** Habit. **B** Flowering branchlet with long spinescent short-shoot. — A J. Kellermann 751 & F. Nge, B JK 750 & FN. Photos by J. Kellermann.

Illustrations: Lang *et al.*, *Fl. Surv. Hiltaba Station & Gawler Ra. Natl Park* 37, Figs 25, 26 (2013), photographs, as *Cryptandra* sp. Hiltaba.

Distribution and habitat. *Cryptandra setifera* occurs in rocky, sometimes skeletal soils, mainly over quartzite or granite, rarely on sandstone or limestone, on rocky outcrops and with cobble strew. It grows in heath and scrubland on hills and higher altitudes of northern Eyre Peninsula from the western Gawler Ranges to Port Augusta, with two records from as far east as Wilpena Pound in the Flinders Ranges (Fig. 5).

Phenology. Flowers June–Nov.; fruits Aug.–Nov.

Distinguishing characters. The species is unique in the *C. amara-tomentosa* complex in having dense long coarse hairs or bristles on the inside of the stipules. While hairs on the inside of the stipules occur in other species (e.g. *C. sabulicola*, below), the hairs in *C. setifera* are much longer, coarser and denser than in other taxa. In its fiercely spinescent habit, the species is similar to *C. campanulata*, but that taxon grows not as tall and differs in having very long-tubular flowers with five ridges and fruits with a basal torus (vs. shorter flower tubes and a torus in the middle third of the fruit).

Notes. The taxon was first segregated during earlier work on the *Cryptandra amara-tomentosa* complex under the tag name ‘*Cryptandra* hairy armpits’, in

reference to the hairs on the back of the stipules, and some specimens in several herbaria are labelled as such. It was also collected during the 2012 Bush Blitz expedition to Hiltaba Station and the western Gawler Ranges (Lang *et al.* 2013; Bush Blitz 2015), where it was assigned the phrase name *Cryptandra* sp. Hiltaba (*Anon. NPGA-8100*) Kellermann.

Conservation status. The species is found in several reserves in the northern half of Eyre Peninsula, including the Gawler Ranges N.P. and Carappee Hill C.P. It also grows in private conservation areas like Hiltaba and Secret Rocks Nature Reserves (Lang *et al.* 2013; DEWNR 2014). Its conservation status should be assessed.

Etymology. From the Latin *setifer* (bearing bristles), in reference to the coarse hairs on the inner surface of the stipules.

Selected specimens examined (over 120 seen)

SOUTH AUSTRALIA. Paney Stn, quadrat four, [Gawler Ranges Survey,] 10 Oct. 1985, *Anon. NPGA-7682* (AD); Hiltaba Stn, Hiltaba site, quadrat four, [Gawler Ranges Survey,] 25 Oct. 1985, *Anon. NPGA-8100* (AD); Uno Range, 8 Nov. 1979, *P.E. Conrick 205* (AD); Kyancutta, 26 Aug. 1969, *B. Copley 2602* (AD); c. 40 km W of Iron Knob and c. 10 km SE of Siam Stn, 15 Aug. 1967, *M. Fagg 397* (AD); SW side of Hummock Hill, E end of Whyalla, 11 June 2006, *C. Garrett s.n.* (AD193660); Pile Pudla Res., hill E of picnic

ground, on top of hill, west facing slope, near quartzite ridge, 18 Oct. 2018, *J. Kellermann 664 & F. Nge* (AD, MEL, NSW); Property of B. & K. Campbell, hillside south of Urbana Weir Road, c. 250 m from road, NW facing slope, 23 Oct. 2018, *J. Kellermann 751 & F. Nge* (AD); Just S of summit [of] hill on ridge SW of Peeweena Bore, Hiltaba Stn, 14 Nov. 2012, *J. Kellermann, P.J. Lang & H. Cross BS838-169* (AD, B, BM, CANB, KUN, MEL); 3.5 km W of Old Paney [Homestead], Old Paney–Scrubby Peak [track], 28 July 2001, *F. Kutsche UGGR07/01 84* (AD); 1.1 km direct SSW of Spring Hill, Thurlga Stn, 16 Aug. 2000, *P.J. Lang & L.M.B. Heard BS1-10076*; 4.6 km direct SSW of Mt St Mungo, Hiltaba Stn, 19 Aug. 2000, *P.J. Lang & L.M.B. Heard BS1-10190*; Wilpena Pound, c. 40 km NNW of Hawker, 15 Sep. 1977, *Robinson s.n.* (AD97747723); 5.3 km WSW of Eburnbanie Hill, Yardea Station, 17 Aug. 2000, *A.C. Robinson & L.A. Kajar BS1-10683* (AD); Hundred of Buckleboo, E side of Sec. 70, c. 45 km WNW of Kimba, 2 Aug. 1959, *K.D. Rohrlach 372* (AD; B, L *n.v.*); On Peterlumba and near vicinity Buckleboo Stn, 15 Aug. 1959, *K.D. Rohrlach 420* (AD; BM, K *n.v.*); S side of Caraptee Hill (reserve), c. 35 km SW of Kimba, 30 Aug. 1959, *K.D. Rohrlach 463* (AD; K *n.v.*); Middleback Range, NE of Iron Dutchess, 20 Sep. 1981, *D.J.W. Whibley 7682* (AD).

2. *Cryptandra sabulicola* Kellermann, *sp. nov.*

A Cryptandra recurva Rye *foliis glabris longioribusque, fructibus et seminibus largioribus differt.*

Holotypus: South Australia, Murray: Dingo Range, ca. 32 km NW of Pinnaroo [Pinnaroo is ca. 142 km E of Murray Bridge], 31 Aug. 1961, *N.N. Donner 282* (AD96211242). **Isotypi:** B, CANB, K, KW, MEL, MO, NY, SI.

Cryptandra amara var. *floribunda* *auct. non* Maiden & Betche: *J.M.Black, Fl. S. Austral. ed. 2, 3: 552* (1952), *pro parte.*

Cryptandra tomentosa *auct. non* Lindl.: *J.M.Black, Fl. S. Austral. 3: 370* (1926), *pro parte; ed. 2, 3: 551* (1952), *pro parte; J.H.Willis, Handb. Pl. Victoria 2: 372* (1973), *pro parte; E.M.Canning in Jessop & Toelken, Fl. S. Austral. 2: 810* (1986), *pro parte.*

Cryptandra tomentosa var. 2: *N.G.Walsh & Udovicic, Fl. Victoria 4: 112* (1999), *pro parte.*

Cryptandra sp. *Floriferous (W.R.Barker 4131) auct. non* W.R.Barker: *W.R.Barker, J. Adelaide Bot. Gard. Suppl. 1: 90* (2005), *pro parte.*

Shrubs, 0.3–1.2 m high, without spinescent short-shoots. *Indumentum* on young stems of dense stellate and simple hairs, white to rusty, stems becoming glabrous when older. *Stipules* (0.6–) 1–2.6 (–3.6) mm long, persistent, narrowly to broadly triangular, acute (some attenuate), connate at the base of the petiole, glabrous to moderately hairy abaxially (outside), adaxially with a few simple hairs, sparsely ciliate, brown; *petiole* 0.1–0.6 mm long, glabrous, some with stellate hairs on the abaxial side. *Leaves* alternate or in fascicles, shortly petiolate; *lamina* narrowly ovate to linear to narrowly obovate, entire, 2–5 mm long, 0.4–1.1 mm wide; base cuneate to obtuse; margins revolute; apex acute to acuminate, strongly recurved;

abaxial surface largely obscured by margins, densely stellate-hairy with some simple hairs, with stellate and longer simple hairs along midrib; upper surface glabrous to sparsely muricate (especially on the distal half of the leaf). *Inflorescences* axillary or terminal, comprising single flowers surrounded at base by c. 5 bracts, arranged in little-branched ± elongate conflorescences of up to 20 flowers. *Bracts* persistent, ovate to orbicular, 1–1.2 mm long, brown, obtuse, glabrous to pubescent; margins entire or torn and ragged, ciliate. *Flowers* white, sessile; *hypanthium* shortly tubular, 0.5–0.8 mm long, 1.8–2.6 mm in diameter, covered with sparse to moderately dense antrorse simple hairs overlying dense small stellate hairs; base similarly pubescent. *Sepals* 1–1.5 mm long, erect (rarely spreading), keeled, persistent on fruit, with a similar indumentum as hypanthium. *Petals* 0.6–0.9 mm long, erect to incurved, cucullate, distinctly clawed. *Stamens* 0.6–0.8 mm long, shorter than or subequal to petals, erect to incurved; *anthers* 0.2–0.3 mm long. *Disc* inconspicuous, forming a narrow ring around the ovary, densely stellate pubescent. *Ovary* inferior to almost so; roof densely pubescent with stellate hairs; *carpels* 3; *style* 0.7–1 mm long, glabrous, shortly 3-lobed. *Fruit* a schizocarp, obovoid to ellipsoid, 2.2–3 mm long, brown to yellowish-brown with grey indumentum; torus in middle to upper third; *fruitlets* dehiscing by a longitudinal slit on the inner face. *Seeds* 1.5–1.8 mm long, fawn to light brown, uniformly coloured, darker at base; *aril* c. 0.9 mm long, at base of seed, pale yellowish, translucent. **Figs 2, 3E–I.**

Distribution and habitat. *Cryptandra sabulicola* occurs in deep sandy soils on sand hills, sand dunes and swales, in mallee vegetation, heath and scrubland in the northern half of Eyre Peninsula, from Yumbera C.P. to Pinkawillinie C.P. and Munyaroo C.P., in the Murray mallee in South Australia, especially in and around the Billiat Wilderness Protection (W.P.A.) and the adjacent Murray-Sunset N.P., Wyperfeld N.P., Big Desert Wilderness Park and Big Desert State Forest in Victoria, as far east as Hattah-Kulkyne N.P. (Fig. 5).

Phenology. Flowers Aug.–Oct.; fruits Oct.–Nov.

Distinguishing characters. The species can be immediately recognised within the *C. amara-tomentosa* complex by its recurved leaf apices. In Victoria and South Australia it can be confused with *C. tomentosa* var. 2 (Walsh & Udovicic 1999), which has similar flowers, but that species has straight leaves.

The Western Australian *C. recurva* Rye also has strongly recurved leaf apices, but is a smaller shrub and the adaxial leaf surface is densely pubescent with minute stellate hairs and appears grey-green, compared to the green, glabrous to sparsely muricate adaxial leaf surface in *C. sabulicola*. A few specimens of *C. recurva* have glabrous leaves, but these are consistently smaller (2–3.8 mm long, 0.5–0.8 mm wide; Rye 1995) and the stipules are also shorter (0.5–1 mm long). In addition,

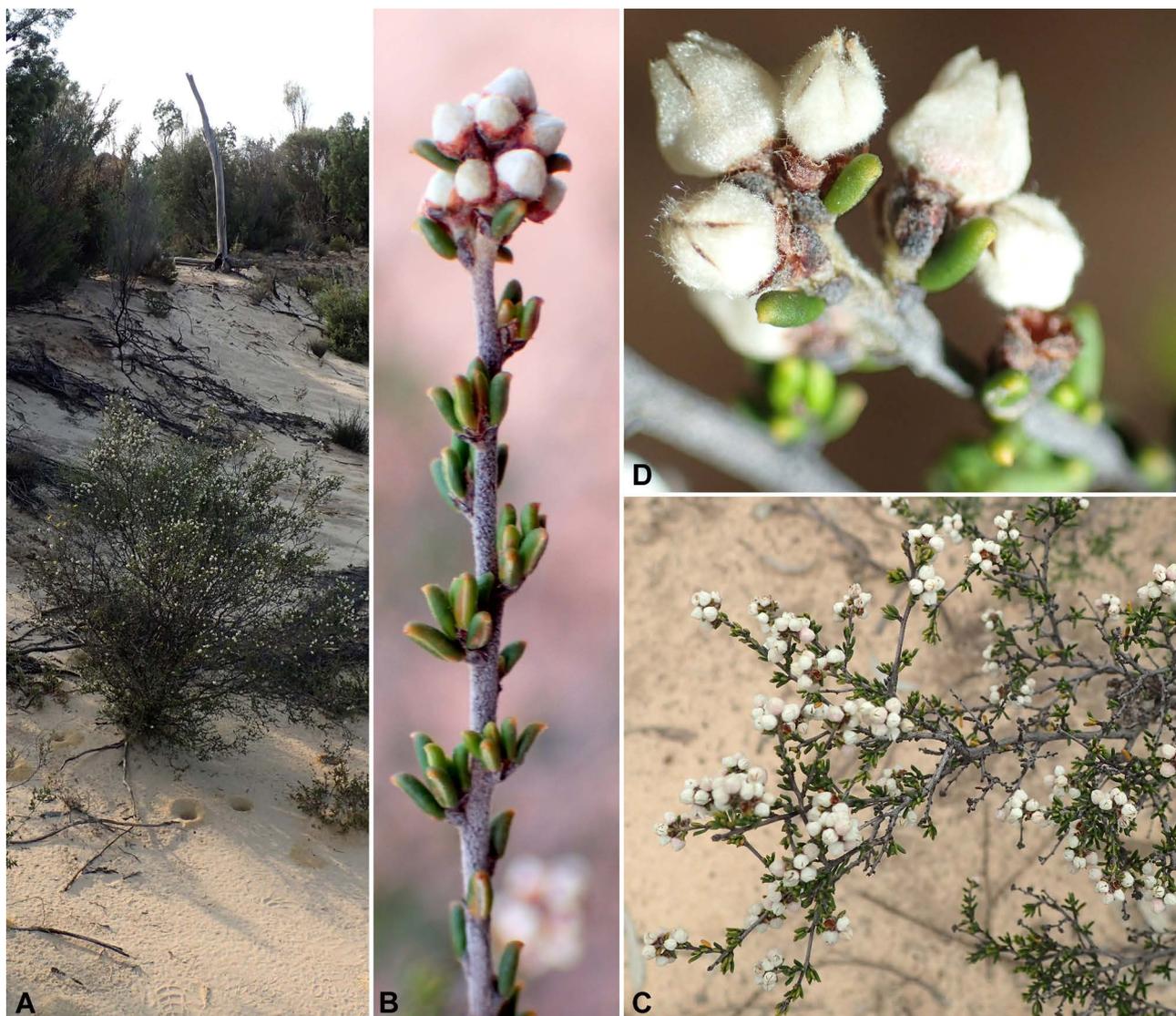


Fig. 2. *Cryptandra sabulicola* in the Big Desert, Victoria (A, D), and Billiat Wilderness Protection Area, South Australia (B, C). **A** Shrub growing in deep sand. **B** Branchlet with buds, showing leaves with recurved apices. **C** Flowering branches. **D** Close up of flowers. — A J. Kellermann 915 & F. Nge, B JK 795 & FN, C JK 905 & FN, D JK 908 & FN. Photos by J. Kellermann.

fruits and seeds of *C. sabulicola* are larger than in *C. recurva* (which has fruits 2–2.5 mm long and seeds 1.3–1.5 mm long).

Notes. As plants with recurved leaf apices have not been recognised as distinct in the past, specimens of *Cryptandra sabulicola* were variously identified as *C. amara* or *C. tomentosa* or varieties of these two species. During the last 15 years, I have labelled specimens in several Australian herbaria as ‘*Cryptandra* recurved apex’.

Conservation status. The species is locally common in areas with deep sand and is conserved in several parks and reserves, as listed above. Its conservation status should be assessed.

Etymology. From the Latin *sabulum* (sand) and *-cola* (dweller), as the species is restricted to sandy soils.

Selected specimens examined (over 100 seen)

SOUTH AUSTRALIA. Yumbarra C.P., 4 Sep. 1984, *D. Keane* 25 (AD, BRI); Pinkawillinie C.P., Stringer Hwy, S side of road, c. 100 m west of park boundary, 19 Oct 2018, *J. Kellermann* 679 & *F. Nge* (AD, MEL, PERTH); Intersection of Bell/Broadbent/Hen and Chicken/Wilke Roads, 23 Oct. 2018, *J. Kellermann* 756 & *F. Nge* (AD, BM); Les Franklin Road, c. 1 km S from Guidera Road, 23 Oct. 2018, *J. Kellermann* 769 & *F. Nge* (AD, CANB, NSW); Bakara C.P., track into Park, E of Start Road, 26 Aug. 2019, *J. Kellermann* 788 & *F. Nge* (AD); Billiat W.P.A., E of Billiat Hwy, 27 Aug. 2019, *J. Kellermann* 795 & *F. Nge* (AD); Zadow Road, W side, c. 50 m from road, 5 Oct. 2019, *J. Kellermann* 904 & *F. Nge* (AD, MEL); Billiat W.P.A., W of Billiat Hwy, 50 m from road, *J. Kellermann* 905, 906 & *F. Nge* (AD; AD, MEL, KUN); Pureba C.P., S boundary on new electric dingo fence, *P.J. Lang* BS113-32 (AD); 10.1 km direct WSW of Pinkawillinie, Pinkawillinie C.P., 27 Nov. 2002, *A.C. Robinson* & *J.T. McDonald* BS128-1554 (AD); Peebinga C.P. E, 5 Oct. 1992, *A.G. Spooner* 13583 (AD); 15 km N of

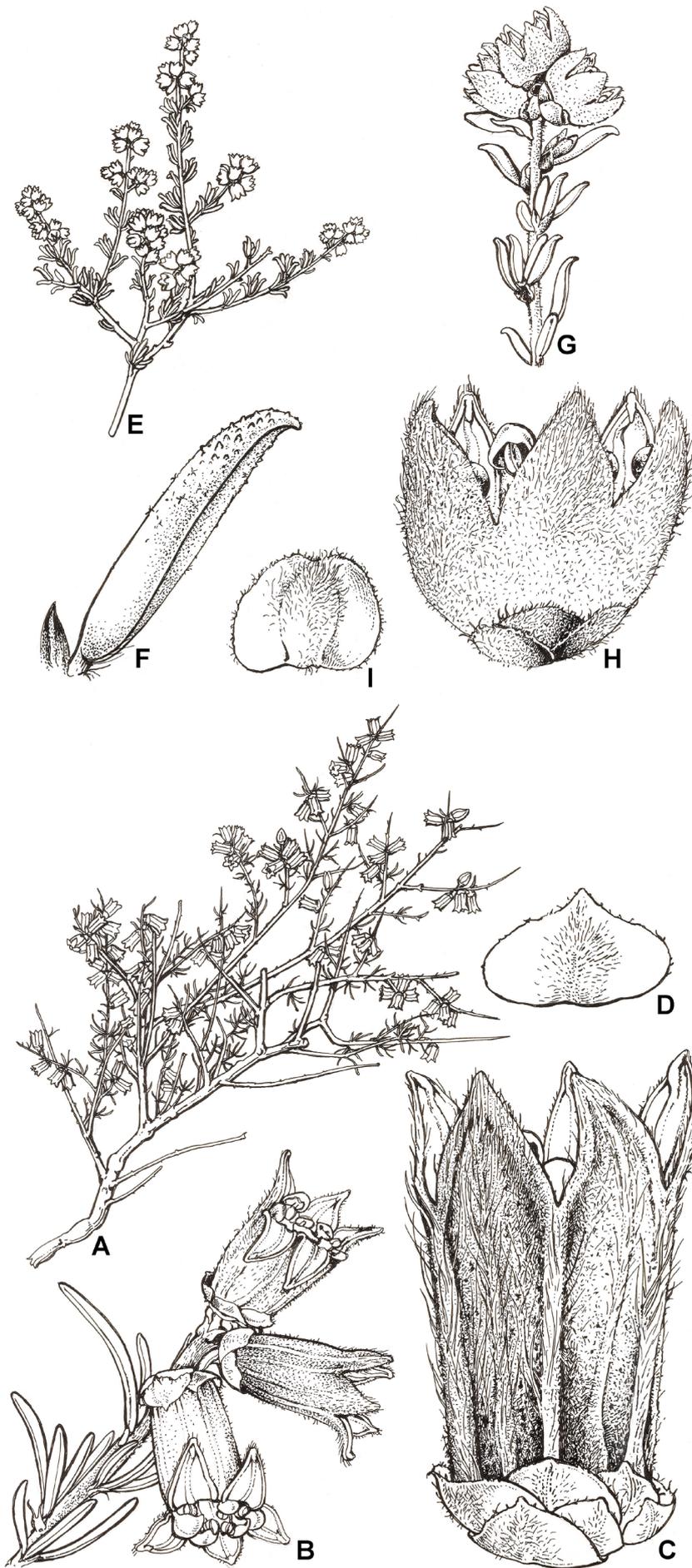


Fig. 3. A–D *Cryptandra campanulata*: **A** Habit $\times 0.6$; **B** flowering branchlet $\times 4$; **C** flower $\times 13$; **D** bract $\times 10$. E–I *C. sabulicola*: **E** Habit $\times 0.6$; **F** leaf $\times 13$; **G** flowering branchlet $\times 4$; **H** flower $\times 13$; **I** bract $\times 10$. — A A.G. Spooner 13242 (AD99233210), B–D B. Copley 3464 (AD97143260), E M.G. Corrick 6374 (AD98023206), F–I D.G. Cameron 8722 (MEL0581322). Illustration by Anita Barley.

Koonibba, c. 35 km NW of Ceduna, 11 Sep. 1960, *D.J.E. Whibley* 587 (AD; UC *n.v.*)

VICTORIA. Wyperfeld N.P., c. 1 mile [1.6 km] S of Moorong Rise, 12 Nov. 1968, *A.C. Beauglehole* 29531 (AD, MEL); Vicinity of junction of Murray Valley Hwy and park entrance road, Hattah-Kulkyne N.P., 30 Aug. 1977, *D.G. Cameron* 8722 (AD, MEL, NSW); Big Desert, 13 km S of Murrayville on road to Nhill, Oct. 1979, *M.G. Corrick* 6374 (AD, MEL); Murray-Sunset National Park, SW corner, NE of intersection with Bellbird Bore Road and S boundary track, on top of sand dune, 5 Oct. 2019, *J. Kellermann* 907, 908 & *F. Nge* (AD, MEL; AD, MEL, NSW); Big Desert, 10 m W of Murrayville-Nhill Road, 13 km South of Murray Hwy, flat between dunes, 6 Oct. 2019, *J. Kellermann* 915 & *F. Nge* (AD, MEL); Annuello Flora and Fauna Res., *s. dat.*, *J.N. MacFarlane* 3498 (MEL); Last Hope Track, approx. S of Spectacle Lake, 20 Sep. 2014, *R.W. Purdie* 9610 (MEL; CANB *n.v.*).

3. *Cryptandra campanulata* Schldl.

Linnaea 20: 639–640 (1847). — **Type citation:** “Vom steinigen Ostabhange des Gebirges gegen den Murray-Scrub”. **Holotype:** South Australia, Northern Lofty: Vom steinigen Ostabhange des Gebirges gegen

den Murray scrub, July, *s.anno* [1845], *H.H. Behr s.n.* [156] (HAL0098383, photo seen), *vide* B.Heuchert *et al.*, *Schlechtendalia* 31: 49 (2017).

Cryptandra amara *auct. non* Sm: Benth., *Fl. Austral.* 1: 440 (1863), *pro parte*.

Cryptandra amara var. *longiflora* *auct. non* F. Muell. ex Maiden & Betche: *J.M. Black, Fl. S. Austral.* 3: 370 (1926); E.M. Canning in Jessop & Toelken, *Fl. S. Austral.* 2: 808 (1986).

Cryptandra sp. Long hypanthium (*C.R. Alcock* 10626) *W.R. Barker, J. Adelaide Bot. Gard. Suppl.* 1: 90 (2005).

Shrubs, 0.3–1 m high, spinescent. *Indumentum* on young stems of dense stellate and occasional simple hairs, white-greyish, sometimes rusty, stems soon becoming glabrous. *Stipules* (0.4–) 1–1.9 mm long, persistent, narrowly triangular to linear-filiform, acute to attenuate, connate at the base of the petiole, glabrous or sparsely hairy abaxially (outside), adaxially glabrous, light brown when young, later dark brown; *petiole* (0.1–) 0.2–0.7 (–1) mm long, stellate-pubescent. *Leaves* alternate or in fascicles, shortly petiolate; *lamina* narrowly elliptic to narrowly ovate to linear, entire, (2–) 2.3–5.5 (–8) mm long, 0.3–0.7 mm wide; base



Fig. 4. *Cryptandra campanulata* growing in Mokota Conservation Park (A, B) and near Black Springs (C), South Australia. **A** The species as major component of iron-grass grassland. **B** Flowering spinescent branches. **C** Close up of flowers. — A, B *J. Kellermann* 983 & *L. Williams*, C *JK 981* & *LW*. Photos by *J. Kellermann*.

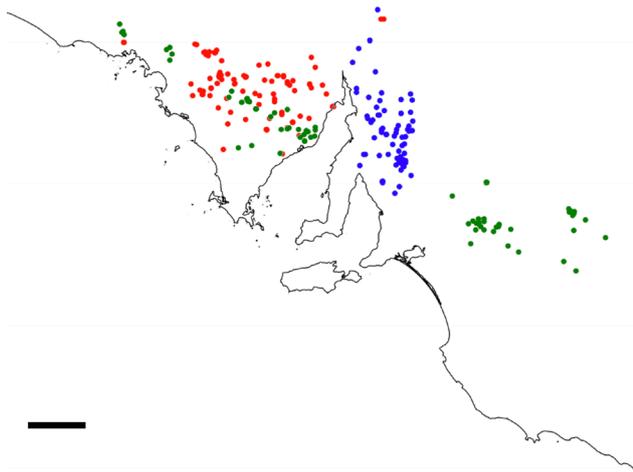


Fig. 5. Distribution map of *Cryptandra setifera* (red), *C. sabulicola* (green) and *C. campanulata* (blue) in southern Australia, from herbarium specimens examined. Scale bar = 100 km.

narrowly cuneate to cuneate; margins revolute to recurved; apex acute or apiculate, sometimes blunt, straight or incurved, with a dark brown tip; abaxial surface obscured by margins, densely stellate-hairy, with stellate or simple hairs along midrib; adaxial surface glabrous to tuberculate. *Inflorescences* axillary, comprising single flowers surrounded at base by 6–8 bracts, arranged in little-branched ± elongate confluences of up to 20 flowers. *Bracts* persistent, broadly ovate, orbicular or broadly cordate, 1.2–2 mm long, brown, obtuse to acuminate, entire, ± ciliate, glabrous to sparsely pubescent, especially in centre. *Pedicel* 0.2–1.2 mm long, densely pubescent. *Flowers* white; *hypanthium* long-tubular, 2.8–4.3 mm long, 2.3–3.2 mm in diameter, with distinct ridges along the tube between the sepals, covered with sparse to moderately dense antrorse simple hairs overlying medium to dense small stellate hairs; base similarly pubescent. *Sepals* 1.4–2.2 mm long, erect or slightly spreading, keeled, persistent on fruits, with a similar indumentum as hypanthium. *Petals* 0.8–1.2 mm long, erect, cucullate, not or indistinctly clawed. *Stamens* 0.6–1.1 mm long, shorter than or subequal to petals, erect; *anthers* 0.4–0.7 mm long. *Disc* inconspicuous, forming a narrow ring around the ovary, densely stellate-pubescent. *Ovary* ± superior; roof densely pubescent with stellate hairs; *carpels* 3; *style* 1.2–2 mm long, glabrous, shortly 3-lobed. *Fruit* a schizocarp, obovoid or ellipsoid, 3–4.3 mm long, brown with grey indumentum; torus in lower third to basal; *fruitlets* dehiscent by a longitudinal slit on the inner face. *Seeds* 2.3–2.6 mm long, dark reddish brown, uniformly coloured, darker at base; *aril* c. 0.5 mm long, at base of seed, pale yellowish, translucent. **Figs 3A–E, 4.**

Illustrations: J.M. Black, *Fl. South Australia* 3: 364, Fig. 161B, C (1926); *ed.* 2, 3: 544, Fig. 702B, C (1952); E.M. Canning in J.P. Jessop & H.R. Toelken,

Fl. South Australia 2: 809, Fig. 427C (1986); all as *C. amara* var. *longiflora*.

Distribution and habitat. This species grows in shallow soils over rocks such as quartzite, granite, sandstone, limestone or shale, in the southern Flinders Ranges and northern Mt Lofty Ranges. *Cryptandra campanulata* is the most frequently encountered woody species in iron-grass grasslands (Turner 2012); it also occurs in heath and shrubland vegetation (Fig. 5).

Phenology. Flowers May–Nov.; fruits Sep.–Nov.

Distinguishing characters. *Cryptandra campanulata* can be recognised by its abundant spinescent short-shoots and long tubular flowers that have five ridges on the outside (see under *C. setifera* for other distinguishing characters). Bentham (1863) synonymised the species with *C. amara*, however, that species can be readily distinguished from *C. campanulata* by its flat leaves.

Note. The name *C. amara* var. *longiflora* has been previously applied to the species, but that variety from New South Wales is no longer recognised and is now a synonym of *C. amara*. Walsh & Udovicic (1999) stated that “South Australian plants referred to [...] that variety [...] warrant recognition as a distinct entity”. For a few years (2005–2011), the phrase name *Cryptandra* sp. Long hypanthium (*C.R. Alcock 10626*) W.R. Barker was used for the species (Barker & Lang 2012).

Cryptandra campanulata was first collected by German naturalist Hans Herrmann Behr in the Barossa Valley around 1845, during his first stay in Australia (Bretag 2016). When he returned to Germany, Behr gave his extensive botanical collections to D.F.L. von Schlechtendal in Halle, who studied and described them in two publications (Schlechtendal 1847, 1848). Heuchert *et al.* (2017) examined the types of all taxa published by Schlechtendal and concluded that the specimen of *Cryptandra campanulata* at HAL can be considered as the holotype, as no other duplicates are known to exist (see also McNeill 2014).

Conservation status. The species is listed as ‘Rare’ in the South Australian *National Parks and Wildlife Act 1972*. It is found in several reserves, such as Mt Remarkable N.P., Telowie Gorge C.P., Caroon Creek C.P. and Mokota C.P.

Etymology. From the Latin *campanulatus* (bell-shaped), in reference to the large tubular flowers.

Selected specimens examined (over 80 seen)

SOUTH AUSTRALIA. Parnaroo, 20 km E of Ucolta and 30 km E of Peterborough, 17 Sep. 1986, *C.R. Alcock 10626* (AD, B, BAA, BM, CANB, HAL, MEL); Roadside near Bethel, 14 June 1999, *R.J. Bates 52993* (AD, BAA); Caroon Creek C.P., Aug. 2005, *R.J. Bates 65653* (AD); Mt Gullet Creek area, 2 km W of Mt Remarkable N.P., Mambray Creek Stn, 1 May 1983, *G. Coombe 156* (AD); Railway Res. above

Lochiel turnoff on Bute to Snowtown Road, 6 Nov. 1966, *B. Copley 858* (AD; *B. n.v.*); 3 miles [4.8 km] E of Blyth, 27 June 1971, *B. Copley 3464* (AD); Flagstaff Road, c. 2.5 km E of Barrier Hwy, N side of road, 8 July 2020, *J. Kellermann 981* & *L. Williams* (AD, K); Mokota C.P., NW corner on White Hill Road, near Gate 1, 9 July 2020, *J. Kellermann 983* & *L. Williams* (AD, HAL); Freeling cemetery, bushland area on W side, 1.3 km direct ENE Freeling (Post Office), 30 Sep. 1993, *P.J. Lang 2155* (AD, KUN); 0.9 km direct NNE of 'Old Belcunda', c. 300 m off White Hill Road beside small creekline, 31 Oct. 2003, *J.T. McDonald* & *A.R. Graham BS162-498* (AD); 2.1 km direct SSE of Mt Lock summit, 3 Nov. 2004, *N.R. Neagle* & *P. Mahoney BS162-3028* (AD); Black Springs Hill, 1 Aug. 1992, *A.G. Spooner 13242* (AD); Low hill top by old shearers quarters at Franklyn, 26 July 1991, *D.E. Symon 15075* (AD; CANB, MEL *n.v.*).

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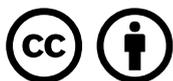
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