



## The other ‘propeller plant’ – Notes on *Stenanthemum* Reissek (Rhamnaceae: Pomaderreae) and a key to the genus in Australia

Jürgen Kellermann<sup>a,b</sup> & Kevin R. Thiele<sup>c</sup>

<sup>a</sup> State Herbarium of South Australia, Botanic Gardens and State Herbarium, Hackney Road, Adelaide, South Australia 5000

Email: juergen.kellermann@sa.gov.au

<sup>b</sup> The University of Adelaide, School of Biological Sciences, Adelaide, South Australia 5005

<sup>c</sup> School of Biological Sciences, University of Western Australia, 35 Stirling Hwy, Crawley (Perth), Western Australia 6009

Email: kevin.thiele@uwa.edu.au

**Abstract:** Descriptions are provided for ten taxa of *Stenanthemum* Reissek published in the 19<sup>th</sup> century and their typification is clarified. Lectotypes are chosen for *St. divaricatum* (Benth.) Rye, *St. humile* Benth., *St. leucophractum* (Schltdl.) Reissek, *St. pimeleoides* (Hook.f.) Benth., *St. pumilum* (F.Muell.) Diels and *Cryptandra* subgen. *Solenandra* Reissek (a synonym of *Stenanthemum*). A key to all species and subspecies of the genus, which is endemic in Australia, is provided.

**Keywords:** Nomenclature, typification, identification key, Rhamnaceae, Pomaderreae, *Stenanthemum*, Australia

### Introduction

*Stenanthemum* Reissek contains c. 30 species, most endemic to Western Australia (Rye 1995, 2001, 2007), but eight species occur in other States, as outlined in Thiele (2007). The taxonomic history of the genus was discussed in Kellermann (2007) and Thiele (2007).

The genus was described by Reissek (1858), who included four species that were previously published in *Cryptandra* Sm.: *St. leucophractum* (Schltdl.) Reissek, *St. pomaderroides* (Reissek) Reissek, *St. coronatum* (Reissek) Reissek and *St. tridentatum* (Steud.) Reissek. The latter three were originally grouped in *Cryptandra* sect. *Solenandra* Reissek (1848). In subsequent years, however, *Stenanthemum* was not accepted by Ferdinand von Mueller, who included it in *Spyridium* Fenzl (Mueller 1862) or *Cryptandra* (Mueller 1875, 1882).

Hooker (1862) recognised the genus, albeit with a different circumscription, excluding species with a shorter floral tube; Bentham (1863) listed these short-tubed taxa under *Spyridium* in the *Flora Australiensis*, as *Sp. tridentatum* (Steud.) Benth., *Sp. divaricatum* Benth. and *Sp. complicatum* F.Muell. In addition to the first three *Stenanthemum* species of Reissek (1858) mentioned in the previous paragraph, Bentham’s (1863) treatment of *Stenanthemum* also included *St. pimeleoides* (Hook.f.) Benth., *St. humile* Benth. and *St. waterhousei* (F.Muell.) Benth. However, the latter species is actually a species of *Spyridium* Fenzl. (Kellermann 2007).

The concept of Hooker (1862) and Bentham (1863) was generally followed by subsequent authors, but Mueller (1875) still included the genus in *Spyridium* when describing *Sp. pumilum* F.Muell., a species that Diels & Pritzl (1904) transferred to *Stenanthemum* as *St. pumilum* (F.Muell.) Diels.

From the early years of the 20<sup>th</sup> century, *Stenanthemum* was not accepted any more by Australian botanists, with the species mostly subsumed under *Cryptandra* and *Spyridium* (e.g. Black 1926, 1952; Gardner 1931; Suessenguth 1953; Blackall & Grieve 1956; Curtis 1956; Willis 1973; Conn 1983; Canning & Jessop 1986). There was also a hiatus in the description of new species.

Rye (1995), in a re-evaluation of all genera of Rhamnaceae in Western Australia, re-instated *Stenanthemum* and described 21 new species and subspecies (Rye 1995, 2001, 2007). Bean (2004) published a new species from Queensland, *St. argenteum* A.R.Bean. Thiele (2007) clarified the generic limits between *Spyridium*, *Cryptandra* and *Stenanthemum*, reviewed all species occurring outside Western Australia, and described two new species.

While Rye (1995, 2001, 2007) provided detailed descriptions of all her new taxa, she did not give descriptions for already existing species. Thiele (2007) provided descriptions of two of these species, *St. leucophractum* and *St. pimeleoides*. A key to species in Western Australia was published by Rye (2007) and a key for the rest of Australia by Thiele (2007).

Rye (2001, 2007) also described an unusual taxon, *St. sublineare* Rye, which does not fully agree with the generic circumscription of *Stenanthemum*. The question as to whether this taxon should be separated into another genus, in view of a few unique characters noted by her, or remain in *Stenanthemum*, is the subject of current research.

In this paper, ten taxa of *Stenanthemum*, first published in the 19<sup>th</sup> century, are typified and provided with modern descriptions based on available material. A combined key for the whole of Australia is also presented here; this is also available on KeyBase (<https://keybase.rbg.vic.gov.au/>). Note that authorities for the taxa in the key can be found in APNI (2020).

McNeill (2014) clarified some misconceptions about holotypes and procedures for lectotypification, and his advice is followed in this paper. All type specimens have been examined; those that were seen online via JSTOR Global Plants and other websites are indicated by “photo seen”. Rye (1995) mentions some types for previously published species. This can be regarded as inadvertent typification, and her use of the term “type” or “holotype” is corrected to “lectotype” (Art. 9.10; Turland *et al.* 2018) in the species treatments below. This correction is possible, as before 2001 it was not necessary to use the phrase “here designated” when lectotypifying names (Art. 7.11).

The common name ‘propeller plant’ is applied to two species of Australian Rhamnaceae: the more widespread *Spyridium vexilliferum* (Hook.) Reissek from Tasmania, Victoria and South Australia (also called ‘helicopter bush’ and ‘winged spyridium’), and to *Stenanthemum pimeleoides*, endemic to Tasmania (which is also called ‘spreading stenanthemum’). In both cases the common name refers to the propeller-like white felty floral leaves that surround the inflorescence (Wapstra *et al.* 2010).

## Nomenclature

### *Stenanthemum* Reissek

*Linnaea* 29: 295 (1858). — *Spyridium* sect. *Stenanthemum* (Reissek) F.Muell., *Fragm.* 3: 77 (1863), *nom. inval.* — *Cryptandra* sect. *Stenanthemum* (Reissek) F.Muell., *Fragm.* 3: 77 (1862). Suess., *Nat. Pflanzenfam.* (2<sup>nd</sup> edn) 20d: 118 (1953). — **Type:** *Stenanthemum leucophractum* (Schltdl.) Reissek, *vide* Rye, *Nuytsia* 13: 496 (2001).

*Cryptandra* sect. *Stenocodon* Hook.f., *Bot. Antarct. Voy III (Fl. Tasman.)* 1: 75 (1855). — **Type:** *Cryptandra pimeleoides* Hook.f. ≡ *Stenanthemum pimeleoides* (Hook.f.) Reissek. (typification by monotypy).

*Cryptandra* subgen. *Solenandra* Reissek in Lehm., *Pl. Preiss.* 2: 288 (1848). — *Solenandra* (Reissek) Kuntze, *Revis. Gen. Pl.* 1: 120 (1891), *nom. illeg., nom. superfl., non* Hook.f. in Benth. & Hook.f., *Gen. Pl.* 2: 12, 43 (1873) (Rubiaceae). — *Cryptandra* sect. *Solenandra* (Reissek) T.Post & Kuntze, *Lex. Gen. Phan.* 150

(1903). — **Lectotype (here designated):** *Cryptandra pomaderroides* Reissek. ≡ *Stenanthemum pomaderroides* (Reissek) Reissek.

**Note.** Hooker (1855) segregated the only species of *Stenanthemum* in Tasmania (Tas.), described by him as *C. pimeleoides* Hook.f., in a separate section of *Cryptandra*, i.e. sect. *Stenocodon* Hook.f.

Kuntze (1891) published the superfluous *Solenandra* to replace *Stenanthemum*, since he was of the opinion that *Cryptandra* subgen. *Solenandra* Reissek should have retained its name when Reissek raised it to generic rank. By doing this, however, Kuntze created an illegitimate name due to the presence of the earlier homonym *Solenandra* Hook.f. (Rubiaceae).

**Typification.** Reissek (1848) included three species in *Cryptandra* subgen. *Solenandra*, all of which are now in *Stenanthemum*: *St. pomaderroides*, *St. coronatum* and *St. tridentatum*. The first of these is designated as the lectotype. It has a glabrous ovary summit, as well as an inconspicuous floral disc, both of which are the defining characters of Reissek’s subgenus.

### 1. *Stenanthemum complicatum* (F.Muell.) Rye

*Nuytsia* 10: 282 (1995). — *Spyridium complicatum* F.Muell., *Fragm.* 3: 78 (1862). — *Cryptandra complicata* (F.Muell.) F.Muell., *Syst. Census Austral. Pl.* 61 (1883). — **Type citation:** “In planitiebus arenosis apud fodinas Geraldinae ad flumen Murchison. Oldfield.” — **Lectotype:** Sand plain, nr Yanarie / Murchison River, W.A., *s.d.*, *A.F. Oldfield s.n.* (MEL90946), *vide* Rye, *Nuytsia* 10: 282 (1995), as “holo”. **Isolectotype:** Murchison River, *A.F. Oldfield s.n.* (K001096741, Herb. F.Mueller, ex Herb. Hooker).

**Illustrations:** B.J. Grieve, *How to Know W. Austral. Wildfl.* (2<sup>nd</sup> edn) 2: 597 (1998).

Woody, straggling *shrub* to 2 m high, with densely rusty-pubescent young stems. *Leaves:* stipules broadly triangular, 1–3 mm long, free or shortly connate; petiole 1–5 mm long; lamina broadly obovate, (6–) 8–12 (–15) mm long, 4–8 mm wide, cuneate at base, flat or folded, apex obtuse to acute and recurved-apiculate, greyish-velvety above with short erect simple hairs, densely greyish- or rusty-villous or pubescent beneath. *Inflorescences* to 1 cm wide, with 10–50 flowers. *Flowers* densely white-woolly; free hypanthium tube 0.6–0.8 mm long, 0.8–1.5 mm diameter. *Sepals* 0.9–1.2 mm long. *Petals* 0.6–0.7 mm long, distinctly clawed. *Disc* inconspicuous. *Ovary* roof stellate-hairy; style 0.8–1.1 mm long. *Fruits* 2.5–3 mm long; seeds 1.5–1.7 mm long.

**Distribution.** Endemic to south-western Western Australia (W.A.), between Shark Bay and Mullewa, in shrublands and woodland on sand.

**Phenology.** Flowers and fruits Aug.–Oct.

**Key to *Stenanthemum* in Australia**

1. Ovary summit (around the style base inside the hypanthium tube) glabrous
  2. Sepals glabrous; low shrubs with lignotuber; W.A. . . . . . ***St. sublineare***
  - 2: Sepals pubescent, woolly or villous; lignotuber absent
    3. Low, densely-branched shrubs, stipules overlapping, sheathing the stems; sepals very densely white-woolly
      4. Inflorescences subtended by white-tomentose floral leaves; Tas. . . . . 7. ***St. pimeleoides***
      - 4: Inflorescences without subtending white-tomentose leaves; W.A.
        5. Leaves linear, revolute, the margins often more or less meeting; stipules and floral bracts reddish-brown . . . . . 4. ***St. humile***
        - 5: Leaves narrowly to broadly obovate, flat or folded, margins not recurved; stipules and bracts almost black
          6. Lamina 4–14 mm long, the upper surface greyish and covered with dense simple hairs when young, retaining hairs at least near midrib, often staying hairy
            7. Lamina 4–7 mm long; free hypanthium tube c. 1.5 mm long; Stirling Range . . . . . 9. ***St. pumilum*** subsp. ***pumilum***
            - 7: Lamina (7.5–) 9–14 mm long; free hypanthium tube 1.8–2.6 mm long; Darling Range near Perth to Highbury . . . . . ***St. pumilum*** subsp. ***majus***
            - 6: Lamina 8–17 mm long, the upper surface green, glabrous (even when young), sometimes with few hairs along the midvein . . . . . ***St. yorkense***
  - 3: Openly branched shrubs, erect or prostrate; stipules not sheathing the stems; sepals appressed-pubescent to moderately woolly or villous
    8. Stem leaves stellate-hairy above
      9. Free hypanthium tube < 2 mm long
        10. Flowers greyish woolly-hirsute; sepals 0.5–0.8 mm long; disc inconspicuous or if visible, then shallowly scooped between filaments; W.A. . . . . . ***St. stipulosum***
        - 10: Flowers silvery villous; sepals 1.2–1.4 mm long; disc conspicuous, deeply scooped between filaments; S.A. . . . . . ***St. arens***
      - 9: Free hypanthium tube > 2 mm long
        11. Lamina 2–8 mm long; stipules connate for part of their length; white felty floral leaves absent; W.A.
          12. Disc conspicuous; petioles 1–5 mm long . . . . . ***St. patens***
          - 12: Disc apparently absent; petioles 0.5–1 mm long . . . . . ***St. poicilum***
        - 11: Lamina (5–) 10–18 (–20) mm long; stipules free; inflorescences usually subtended by white floral leaves
          13. Flowers silvery-villous; central Australia . . . . . ***St. centrale***
          - 13: Flowers creamy-pubescent; south-west W.A. . . . . . 8. ***St. pomaderroides***
- 8: Stem leaves glabrous, papillose, scabrid or simple-hispid or -velvety above
  14. Leaf margins narrowly recurved or revolute; low spreading to prostrate shrubs
    15. Inflorescences subtended by white floral leaves; bracts broad; Tas. . . . . 7. ***St. pimeleoides***
    - 15: Inflorescences without white floral leaves; bracts broad or narrow-triangular; W.A.
      16. Leaves deeply emarginate with an acute lobe on both sides of the leaf apex; bracts narrow-triangular . . . . . 2. ***St. coronatum***
      - 16: Leaf apex rounded or slightly lobed; bracts broad, ± ovate . . . . . ***St. liberum***
  - 14: Leaf margins ± flat; ± erect shrubs
    17. Leaves distinctly emarginate or tridentate; W.A. . . . . . 10. ***St. tridentatum***
    - 17: Leaves acute to obtuse or shallowly emarginate, never tridentate
      18. Upper leaf surface smooth, glabrous, villous or velvety with short, erect hairs
        19. Lamina 10–15 mm long, velvety above; W.A. . . . . . ***St. newbeyi***
        - 19: Lamina 2–7 mm long, glabrous or sparsely villous above; S.A. . . . . . ***St. arens***
      - 18: Upper leaf surface finely papillose-tuberculate, glabrous or scabrid

- 20. Leaves narrowly obovate with a straight apex, folded only when young, soon flat; margins  $\pm$  recurved; inflorescences not subtended by white felty floral leaves; W.A. . . . ***St. reissekii***
- 20: Leaves narrowly to broadly obovate, mostly folded; apex recurved; margins flat; white floral leaves present, at least in some flower-heads
- 21. Leaves shining silvery beneath, never rusty; northern Qld . . . . . ***St. argenteum***
- 21: Leaves rusty beneath (at least when young)
- 22. Lamina 5–20 mm long; indumentum of flowers creamy; W.A. . . . . 8. ***St. pomaderroides***
- 22: Lamina 3–9 mm long; indumentum of flowers white or greyish
- 23. Young stems villous; leaves densely villous beneath; sepals 1–1.2 mm long; eastern Australia . . . . . 5. ***St. leucophractum***
- 23: Young stems pubescent; leaves densely silky beneath with longer hairs along veins and margins; sepals 1.5–2 mm long; W.A. . . . . ***St. bremerense***
- 1: Ovary summit pubescent
- 24. Free hypanthium tube 2.5–3.0 mm long; W.A. . . . . ***St. limitatum***
- 24: Free hypanthium tube < 1.5 mm long
- 25. Leaves distinctly bilobed to tridentate or with sharp teeth either side of the apex; apex  $\pm$  straight
- 26. Leaves glabrous to papillose or scabrid above
- 27. Leaf margins recurved to revolute; leaves narrow-obtriangular to almost flabellate; apex often deeply bilobed; W.A.
- 28. Plants often spinescent; inflorescences 1–3-flowered, strictly lateral . . . . . 3. ***St. divaricatum***
- 28: Plants not spinescent; inflorescences 2–15-flowered, terminal and lateral
- 29. Flowers with an indumentum of short appressed hairs; bracts and stipules sparsely hairy; lamina 1–2 (–5) mm wide . . . . . ***St. emarginatum***
- 29: Flowers, bracts and stipules with long spreading hairs; lamina 3–5 mm wide . . . . . ***St. radiatum***
- 27: Leaf margins  $\pm$  flat; leaves obovate to broadly obovate; apex notched or emarginate or with several teeth either side of the apex
- 30. Sepals villous; W.A. . . . . ***St. nanum***
- 30: Sepals pubescent
- 31. Mature leaves hairy above; W.A., S.A., Vic. . . . . ***St. notiale*** subsp. ***notiale***
- 31: Mature leaves glabrous above; W.A. . . . . 6. ***St. notiale*** subsp. ***chamelum***
- 26: Leaves pubescent to hispid above
- 32. Leaves greyish stellate-hoary above, with or without overlying longer simple hairs
- 33. Leaf margins distinctly recurved, apex deeply bilobed, leaves not folded; flowers without a free hypanthium tube; W.A. . . . . ***St. bilobum***
- 33: Leaf margins flat or with slightly recurved margins, entire to recurved apiculate, usually folded; hypanthium tube to 0.4 mm long; W.A., S.A., Vic. . . . . ***St. notiale*** subsp. ***notiale***
- 32: Leaves simple-hispid above
- 34. Leaves flat or slightly recurved; sepals pubescent; disc above ovary roof level, shallowly scooped between the stamens
- 35. Leaves with 1–2 teeth on either side of the apex; petiole 0.3–1 mm long; lamina 2–4 (–10) mm long; W.A. . . . . ***St. intricatum***
- 35: Leaves usually entire, rarely with 1 tooth on either side of the apex (tridentate); petiole 0.5–2 mm long; lamina (3–) 5–8 (–13) mm long; W.A., S.A., Vic. . . . . ***St. notiale*** subsp. ***notiale***
- 34: Leaves distinctly recurved; sepals villous; disc  $\pm$  level with ovary roof; W.A. . . . . ***St. cristatum***
- 25: Leaves obtuse to acute and recurved-apiculate
- 36. Leaves glabrous and tuberculate above
- 37. Hypanthium densely woolly with white or greyish, spreading hairs; W.A., central Australia (N.T.) . . . . . ***St. petraeum***
- 37: Hypanthium villous or sericeous with  $\pm$  appressed, silvery or rusty hairs; W.A. . . . . ***St. mediale***
- 36: Leaves hairy above, although hairs may be tubercle-based
- 38. Stipules fused for  $\pm$  half of their length; W.A., S.A., Vic. . . . . ***St. notiale*** subsp. ***notiale***
- 38: Stipules free to the base or nearly so; W.A. . . . . 1. ***St. complicatum***

**Note.** This species shares with *Stenanthemum petraeum* Rye the densely hairy ovary summit, but differs in its more hairy stipules, greener leaves with minute patent simple hairs on the upper surface (cf. glabrous-tuberculate). The two species also occur in different habitats, with *St. complicatum* growing in sandy soils and *St. petraeum* preferring stony slopes. *Stenanthemum complicatum* is closely related to *St. stipulosum* Rye and *St. newbeyi* Rye.

**Typification.** The name was inadvertently lectotypified by Rye (1995). A duplicate of the specimen, sent by Mueller to Hooker, is in the Kew Herbarium.

### **Selected specimens examined**

WESTERN AUSTRALIA. Tamala Rd on Nanga Station, Shark Bay, 26 Aug. 1973, *E.C. Nelson ANU17196* (CANB, PERTH); 25 km NE of Yuna, 8 Sep. 1962, *F.W. Went 51* (PERTH); ca 5 km N of Herald Bay outcrop, Dirk Hartog Island, 4 Sep. 1972, *A.S. George 11504* (CANB, PERTH); Kalbarri Natl Park, management track to sandpit, off road to Nature's Window & The Loop, 11 Sep. 2001, *J. Kellermann 240* (AD); Bindoo Hill Nature Reserve, 14 Sep. 2001, *J. Kellermann 267* (AD, CANB, MEL, PERTH).

## **2. *Stenanthemum coronatum* (Reissek) Reissek**

*Linnaea* 29: 295 (1858). — *Cryptandra coronata* Reissek in Lehm., *Pl. Preiss.* 2: 288–289 (1848). — *Spyridium coronatum* (Reissek) F.Muell., *Fragm.* 9: 137 (1875). — *Solenandra coronata* (Reissek) Kuntze, *Revis. Gen. Pl.* 1: 121 (1891), as “*coronatum*”. — **Type citation:** “Ad Swan River (Drummond. coll. II. No. 722).” — **Lectotype:** W.A., *J. Drummond 722* (MEL227036), *fide* B.L.Rye, *Nuytsia* 10: 282 (1995), as “type”. **Isolectotypes:** Western Australia, *J. Drummond 722* (2<sup>nd</sup> coll.) (BM000050758); Swan River, *J. Drummond 722* (K001096705, ex Herb. Bentham; K001096706, ex Herb. Saunders); Nouvelle Hollande occidentale, R. des cygnes (Swan River), 1843, *J. Drummond 722* (P06786201, photo seen); ?W (*n.v.*).

**Illustrations:** B.L. Rye, *Nuytsia* 10: 285, fig. 8A–C (1995); B.J. Grieve, *How to Know W. Austral. Wildfl.* (2<sup>nd</sup> edn) 2: 593 (1998).

Low spreading *shrub* to 10 cm high with sparsely stellate-hairy young stems. *Leaves:* stipules narrowly triangular, 2–3.5 mm long, connate for up to half of their length; petiole 1–1.5 mm long; lamina broadly obovate, 4–5 mm long, 3–4 mm wide, cuneate at base, with narrowly revolute margins, deeply emarginate with an acute lobe on either side of the apex, glabrous and scabrid above, villous below. *Inflorescences* to 1 cm wide, with 5–10 flowers. *Flowers* densely white-villous; free hypanthium tube c. 3 mm long, 1–1.2 mm diameter. *Sepals* 1.2–1.6 mm long. *Petals* 0.8 mm long, distinctly clawed. *Disc* conspicuous. *Ovary* roof glabrous; style 3.5–4 mm long. *Fruits* 2–2.3 mm long; seeds 1.5–1.7 mm long.

**Distribution.** Endemic to south-western W.A. between Bindoon and Narrogin, in woodland on laterite.

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

**Note.** Populations from the northern part of the range tend to have coarser and/or longer hairs on the upper surface of the leaves. The species is closely related to *Stenanthemum nanum* Rye and *St. limitatum* Rye. It shares with them leaves that are toothed on each side of the apex and a disc that is deeply scooped between the stamen traces. This disc type is also present in *St. mediale* Rye and *St. reissekii* Rye.

**Typification.** The name was inadvertently lectotypified by Rye (1995). Duplicates of the Drummond specimen are in several herbaria, though only the label on the BM specimen mentions the 2<sup>nd</sup> collection, as indicated in the protologue. The date on the P specimen is also consistent with Drummond's 2<sup>nd</sup> collection (Barker 2004). Reissek worked in Vienna and it is possible that a specimen is in W, but none has been seen.

### **Selected specimens examined**

WESTERN AUSTRALIA. Mokine Nature Reserve, 17 km SW of Northam, 6 June 1985, *G.J. Keighery & J.J. Alford 448* (PERTH); Mercer Rd, Talbot State Forest, SW of York, 21 Sep. 2001, *J. Kellermann 307 & F. Hort* (MEL, PERTH); Dryandra State Forest, 25 Nov. 1987, *D.M. Rose 541* (PERTH).

## **3. *Stenanthemum divaricatum* (Benth.) Rye**

*Nuytsia* 10: 284 (1995). — *Spyridium divaricatum* Benth., *Fl. Austral.* 1: 427 (1863); *Cryptandra divaricata* (Benth.) F.Muell., *Syst. Census Austral. Pl.* 61 (1883), *nom. illeg., non* Reissek in Lehm., *Pl. Preiss.* 2: 286 (1848). — **Type citation:** “W. Australia. Dirk Hartog's Island, *Milne*; Murchison river, *Oldfield*”. — **Lectotype (here designated):** Murchison River, W.A., *A.F. Oldfield s.n.* (MEL227041). **Isolectotypes:** K000732051 (ex Herb. Hooker, photo seen); MEL2277040. **Residual syntype:** Dirk Hartog Island, Voyage of H.M.S. Herald, *W.G. Milne s.n.* (K000732050, ex Herb. Hooker, annotated by Bentham, photo seen).

**Illustrations:** B.L. Rye, *op. cit.*, 283, fig. 7L–Q (1995); B.J. Grieve, *How to Know W. Austral. Wildfl.* (2<sup>nd</sup> edn) 2: 593 (1998).

Small, much-branched, often spinescent *shrub* to 20 cm high, with sparse, greyish, simple and/or stellate hairs on young stems and leaf undersurfaces. *Leaves:* stipules broadly triangular to rectangular, 0.8–1.2 mm long, connate; petiole 0.3–1 mm long; lamina flabellate to narrowly obovate, 3–8 mm long, 1.5–4 mm wide, cuneate at base, apex tridentate, with recurved to revolute margins, smooth and glabrous above. *Inflorescences* apparently lateral, to 0.5 cm wide, with 1–3 flowers. *Flowers* moderately to densely pubescent with greyish simple and/or stellate hairs; free hypanthium tube 0.1–0.2 mm long, 0.7–0.9 mm



**Fig. 1.** *Stenanthemum humile*, growing in Kwongan bushland, Hi Vallee Farm, Badgingarra (W.A.). **A** Flowering plant; **B** close up of flowering branches; **C** flower-heads, not surrounded by white floral leaves. — J. Kellermann 195 (AD). Photos by J. Kellermann.

diameter. *Sepals* 0.7–1 mm long. *Petals* 0.5–0.6 mm long, indistinctly clawed. *Disc* inconspicuous. *Ovary* stellate-hairy; style 0.4–0.5 mm long. *Fruits* c. 2 mm long; seeds 1.2–1.3 mm long.

**Distribution.** Endemic to W.A. in the vicinity of Shark Bay, in shrub-steppe communities on sand.

**Phenology.** Flowers and fruits Aug.–Sept.

**Note.** This species and *St. patens* are the only taxa of *Stenanthemum* with spinescent branches. *Stenanthemum divaricatum* is closely related to *St. emarginatum* Rye, which differs in the more acute apical lobes of the leaves and a much denser indumentum on the lower surface.

**Typification.** The type specimens from Murchison River were collected by Augustus Oldfield. He collected in the service of Mueller (George 2009); the main set of specimens is preserved at MEL, with many duplicates in K and other institutions. The lectotype is the best preserved specimen, it contains several flowering branches, which display the typical spinescent branches.

#### **Selected specimens examined**

WESTERN AUSTRALIA. Quoin Bluff, Dorre Island, Aug. 1977, *A.S. Weston 10609* (PERTH); 6 miles [9.7 km] N of

Quobba Homestead, Sep. 1970, *A.S. George 10154* (CANB, PERTH); Herald Bay, Dirk Hartog Island, Sep. 1972, *A.S. George 11501* (CANB, PERTH).

#### **4. *Stenanthemum humile* Benth.**

*Fl. Austral.* 1: 436 (1863). — *Cryptandra humilis* (Benth.) F.Muell., *Syst. Census Austral. Pl.* 61 (1882). — *Solenandra humilis* (Benth.) Kuntze, *Revis. Gen. Pl.* 1: 121 (1891). — **Type citation:** “Between Moore and Murchison rivers, *Drummond, n. 91* (the same number as *Spyridium polycephalum*, but probably from a different set).” — **Lectotype (here designated):** Between Moore & Murchison Rivers, 1853, *J. Drummond 91* (K000732089 ex Herb. Hooker, photo seen). **Isolectotypes:** Interior North of Swan River, between Moore & Murchison Rivers, 1850–51, *J. Drummond 91 (4<sup>th</sup> coll.)* (NY00415074, photo seen); Australie, *J. Drummond 91* (P04448396, ex Herb. Drake, photo seen); Between Moore & Murchison Rivers, 1854, *J. Drummond 91* (PERTH01599348 ex BM). **Possible isolectotype:** Swan River, *J. Drummond 91 (3<sup>rd</sup> coll.)* (LD1025262 *n.v.*, det. B.L. Rye).

**Illustrations:** B.J. Grieve, *How to Know W. Austral. Wildfl.* (2<sup>nd</sup> edn) 2: 594 (1998).



**Fig. 2.** *Stenanthemum leucophractum*, the type species of the genus. **A** Plant flowering in Cox Scrub Conservation Park (near Adelaide, S.A.); **B** fruiting plant growing in the Big Desert (Vic.); **C** close up of flowering branches, Wanilla Settlement Reserve (Eyre Peninsula, S.A.); **D, E** flower-heads, surrounded by white felty floral leaves, from Cox Scrub (D) and Wanilla (E). — A, D J. Kellermann 655 & F. Nge (AD), B JK 934 & FN (AD), C JK 747 & FN (AD), E JK 743 & FN (AD). Photos by J. Kellermann.

Low, erect *shrub* to 20 cm high with white-woolly young stems, lower leaf surfaces and flowers. *Leaves*: stipules ovate or rectangular, 4–6 mm long, almost fully connate, densely sheathing the stems; petiole 1.5–3.5 mm long; lamina linear or (occasionally) narrowly obovate to narrowly elliptic, (3–) 6–10 (–11) mm long, 1–2 (–4) mm wide, narrowly cuneate at base, with strongly revolute margins, apex obtuse, scabrid above. *Inflorescences* 1–1.5 cm wide, with up to 50 flowers. *Flowers* white to cream; free hypanthium tube 2.5–5 mm long, 0.8–1.5 mm diameter, moderately woolly. *Sepals* 0.7–1 mm long, densely woolly outside, inside with a red spot. *Petals* 0.5–0.6 mm long. *Disc* apparently absent. *Ovary* roof glabrous; style 3.2–5 mm long. *Fruits* 2–2.4 mm long; seeds 1.2–1.4 mm long. **Fig. 1.**

**Distribution.** Endemic to south-western W.A. between Three Springs and Regans Ford with an outlier near Perth, in low heath, shrubland or open woodland, usually on white sand over laterite.

**Phenology.** Flowers and fruits Aug.–Nov.

**Note.** This species is closely related to *St. pumilum*, with which it shares the prominently woolly sepals and

less hairy floral tubes, but most obviously differs by its linear leaves. *Stenanthemum yorkense* Rye is also similar, but differs in its more open habit, stipules with broader closer acuminate points, larger leaves with the bright green upper surface opening fully, and longer flowers.

**Typification.** Bentham (1863) described the species from a sheet at K, designated here as the lectotype. As stated in the protologue, the specimen label does not mention which of Drummond's collections it belongs to. Duplicates of the Drummond collection are in several herbaria, but the dates are different on each of the specimens seen. The specimens in LD and NY also indicate that they are from Drummond's 3<sup>rd</sup> and 4<sup>th</sup> collection, respectively; these collection trips were undertaken in 1844/45 and 1847 (Barker 2004). However, these years are not mentioned on any of the specimens examined; the dates on the specimens are most likely when the specimens were received by the institutions.

#### **Selected specimens examined**

WESTERN AUSTRALIA. 7 km S of Regans Ford, 23 Sep. 1966, *E.M. Bennett 1315* (PERTH); 16 km SW of Three Springs on road to Encabba, 30 Sep. 1966, *E.M. Bennett*

1414 (PERTH); Hi Vallee Farm of Don & Joy Williams, on 4WD track in native bushland, 8 Sep. 2001, *J. Kellermann 195* (AD, BAA, PERTH); Watheroo Natl Park, W of Watheroo, 4 Oct. 1971, *R.D. Royce 9582* (PERTH); Pioneer Park, Forrestfield, 19 Sep. 2010, *K.R. Thiele 4055* (PERTH).

### 5. *Stenanthemum leucophractum* (Schltdl.) Reissek

*Linnaea* 29: 295 (1858). — *Cryptandra leucophracta* Schltdl., *Linnaea* 20: 640–642 (1847). — *Spyridium leucophractum* (Schltdl.) F.Muell., *Fragm.* 3: 77 (1862). — *Solenandra leucophracta* (Schltdl.) Kuntze, *Revis. Gen. Pl.* 1: 121 (1891), as “*leucophractum*”. — *Trymalium leucophractum* F.Muell. ex Reissek, *Linnaea* 29: 295 (1858), *nom. inval., pro syn.* — **Type citation:** “Auf der Sandplaine genannten sandig-kalkigen Gegend, Januar”. — **Lectotype (here designated):** Sandplaine, [*H.H. Behr s.n.* {157}] (HAL0098601, photo seen). **Isolectotype:** *H.H. Behr s.n.* {157} (HAL0107594, photo seen).

**Illustrations:** W.R. Barker *et al.*, *J. Adelaide Bot. Gard.* 11: 70, fig. 2 (1988), as *Cryptandra leucophracta*; G.R.M. Dashorst & Jessop, *Pl. Adelaide Plains & Hills* 101: pl. 43, fig. 2 (1990); G.J. Harden, *Fl. New S. Wales* 1: 370 (1990), as *C. leucophracta*; N.G. Walsh & T.J. Entwisle, *Fl. Victoria* 4: 113, fig. 191 (1999).

Small, spreading *shrub* to 0.4 m (rarely to 1 m) high, with rusty or greyish densely villous or pubescent young stems. *Leaves:* stipules narrowly triangular, 2–4 mm long, connate to less than half of their length; petiole 0.5–2 mm long; lamina obovate to broadly obovate, 3–6 (–10) mm long, 2–6 mm wide, cuneate at base, flat or folded, apex obtuse and recurved-apiculate, rarely acute, glabrous and tuberculate above, grey or rusty and appressed-villous beneath. *Inflorescences* to 1 cm wide, with 15–40 flowers, subtended by whitish floral leaves. *Flowers* white or greyish woolly-hirsute; free hypanthium tube 2.5–3.5 mm long, 0.8–1 mm diameter. *Sepals* 1–1.2 mm long. *Petals* 0.5–0.6 mm long, distinctly clawed. *Disc* apparently absent. *Ovary* roof glabrous; style 3.5–4.0 mm long. *Fruits* 2.0–3.0 mm long; seeds 1.5–1.8 mm long. (Description first published in Thiele 2007.) **Fig. 2.**

**Distribution.** Widespread in mallee scrub from Eyre Peninsula and Kangaroo Island, South Australia (S.A.), to north-western Victoria (Vic.), with an outlying population between Mount Hope and Ardlethan, New South Wales.

**Phenology.** Flowers and fruits Sep.–Dec.

**Common name.** White stenanthemum (FNCV 1923), white cryptandra (Ewart 1931), rusty poison (Canning & Jessop 1986).

**Note.** The species is similar to *St. arens* K.R.Thiele, which differs in having densely stellate hairy stem leaves and flowers with a shorter hypanthium tube (0.9–1.2 mm long).

**Typification.** This species was described from specimens collected by Behr in the Barossa Valley, South Australia, around 1845. Behr presented all his specimens to Schlechtendal in Halle, who enumerated and described among them three species of Rhamnaceae (see also Kellermann 2020).

There are two sheets of *Stenanthemum leucophractum* in HAL (Heuchert *et al.* 2017), both with ample material. The sheet with the label mentioning the collection locality “Sandplaine” (sandy plain) is selected as the lectotype.

### Selected specimens examined

SOUTH AUSTRALIA. Vivonne Bay, Kangaroo Island, 9 Oct. 1982, *W.R. Barker 4543* (AD, CANB); Site 31 near Springton, c. 4.3 km W of Springton, 3 Oct. 1984, *E.N.S. Jackson 5526* (AD, MEL, NSW); Rocky Bend Flora Reserve, 12 Sep. 2019, *J. Kellermann 862 & E. Biffin* (AD, MEL).

VICTORIA. Pink Lakes State Park, 20 Oct. 1986, *E.A. Chesterfield 1828* (MEL); Little Desert, McDonald Hwy, c. 8 km from Nhill Rd turnoff, 16 Aug. 2001, *J. Kellermann 147, N.G. Walsh & I.R. Thompson* (AD, B, NY); Big Desert, Murrayville Nhill Rd, 13 km South of Murray Hwy, 16 Oct. 2019, *J. Kellermann 917 & F. Nge* (AD, MEL).

NEW SOUTH WALES. 4 km W of Kamarah, 13 Nov. 1975, *M.D. Crisp 1523* (AD, BISH, CBG at CANB, MEL, NSW); 20 km E of Goolgowi, 16 Dec. 1960, *R. Filson 3517* (AD, CANB, MEL).

### 6. *Stenanthemum notiale* subsp. *chamelum* Rye

*Nuytsia* 10: 294 (1995). — *Cryptandra tridentata* var. [ $\beta$ ] *tomentosa* Reissek in Lehm., *Pl. Preiss.* 2: 289 (1848). — **Type citation:** “In arenosis inter fructices densos ad latus meridionale montis „Eliza” (Perth). 25 Sept. 1839. Herb. Preiss. No. 1216.” — **Lectotype:** In arenosis inter fructices densos ad latus meridionale montis „Eliza,” (Perth), 25 Sep. 1839, *L. Preiss 1216* (LD1067791, annotated by Reissek, photo seen), *vide* Rye, *Nuytsia* 10: 294 (1995), as “type”. **Isolectotypes:** MEL2099097 (ex Herb. Sonder), MEL2099098 (ex Herb. Sonder), MO-2176043 (photo seen), P06786200 (ex Herb. Steudel, photo seen), S10-12730 (photo seen), ?W (*n.v.*).

**Illustration:** B.L. Rye, *Nuytsia* 10: 288 (1995), fig. 9P–S; B.J. Grieve, *How to Know W. Austral. Wildfl.* (2<sup>nd</sup> edn) 2: 596 (1998); E.M. Bennett, *Perth Pl.* 153, fig. 10–12 (2005), photographs.

Prostrate *shrub* to 20 cm high, with greyish or rusty, sparsely to (rarely) densely stellate-pubescent young stems. *Leaves:* stipules ovate to broadly triangular, 0.8–2 mm long, connate for about a third to half of their length; petiole 0.5–2.0 mm long; lamina obovate to broadly obovate, 6–12 mm long, (3–) 5–7 mm wide, cuneate at base, the margins  $\pm$  recurved, apex tridentate or emarginate, glabrous and scabrous above, pubescent to villous beneath with grey or rusty, simple and/or stellate hairs. *Inflorescences* to 0.8 cm wide, with 10–20 flowers. *Flowers* densely greyish-pubescent or villous

with simple and/or stellate hairs; free hypanthium tube to 0.4 mm long, 0.6–1.2 mm diameter. *Sepals* 0.8–1.2 mm long. *Petals* 0.5–0.7 mm long, distinctly clawed. *Disc* conspicuous. *Ovary* roof stellate-hairy; style 0.6–0.7 mm long. *Fruits* 2–2.2 mm long; seeds 1.1–1.5 mm long.

**Distribution.** Endemic to south-western W.A., on the coastal plain between Lancelin and Perth, in heath and shrubland usually over limestone.

**Phenology.** Flowers and fruits throughout the year.

**Note.** *Stenanthemum notiale* Rye is closely related to *St. intricatum* Rye, which differs in its smaller leaves with shorter petioles and different indumentum on the upper surface of the leaves. The sepals and hypanthium tube of *St. intricatum* are of a similar length, in contrast to the two subspecies of *St. notiale*, which have a very short hypanthium tube.

The typical subspecies differs from subsp. *chamelum* in its more erect habit and leaves with simple and/or stellate hairs on the upper surface. The leaves of subsp. *chamelum* always have 1–3 teeth on either side of the apex, whereas subsp. *notiale* has a mixture of entire and 3-toothed leaves.

**Typification.** In the protologue of *Stenanthemum notiale* subsp. *chamelum*, Rye (1995) inadvertently lectotypified by listing one specimen of *Cryptandra tridentata* var. *tomentosa* from LD as “type”. Preiss’s top set of specimens is held at LD; duplicates of Preiss 1216 are in several herbaria, the isolectotype at P is from Ernst Gottlieb von Steudel’s herbarium.

#### Selected specimens examined

WESTERN AUSTRALIA. Between Lancelin and Guilderton, 1 Dec. 1974, *R. Pullen* 9786 (CANB, PERTH); 5 km W of Moore River along Old Bennie’s Rd, Moore River State Forest, 5 Sep. 1978, *J. Dodd* 18 (PERTH); Yanchepp, 21 May 1963, *A.S. George* 4379 (PERTH); Nilgen Nature Reserve, E of Lancelin, by the road to Mimegarra, 27 Sep. 1991, *W. Greuter* 22261 (B, PERTH).

#### 7. *Stenanthemum pimeleoides* (Hook.f.) Benth.

*Fl. Austral.* 1: 436 (1863), as “*pimelioides*”. — *Cryptandra pimeleoides* Hook.f., *Fl. Tasman.* 1: 75, t. 12A (1855). — *Solenandra pimeleoides* (Hook. f.) Kuntze, *Revis. Gen. Pl.* 1: 121 (1891), as “*pimelodes*”. — **Type citation:** “East coast, Kelvedon, at Great Swan Port, Backhouse. Spring Bay, Gunn.” — **Lectotype (here designated):** Spring Bay, East Coast, 1 Apr. 1840, *R.C. Gunn* 1041/1842 (K001096731 & K001096732, on one sheet, ex Herb Hooker). **Isolectotypes:** BM000050767; NSW515587. **Residual syntype:** Kelvedon, Gt Swan Port, East Coast, [*Backhouse s.n.*] (K001096733, ex Herb. Hooker).

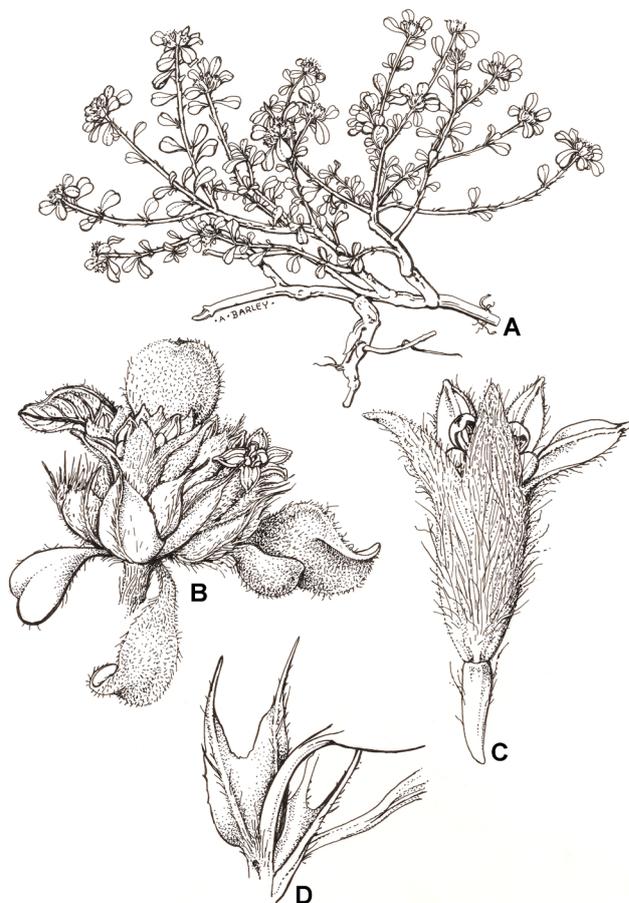
**Illustrations:** J.D. Hooker, *Fl. Tasman.* 1: pl. 12 (1855); M. Stones & W. Curtis, *Endem. Fl. Tasman.*

2: opp. 72, fig. 72 (1969); M. Cameron, *Guide Fl. Pl. Tasman.* 87, fig. 206 (1981), photograph.

Prostrate, small *shrub* with greyish- or rusty-villous young stems. *Leaves:* stipules narrowly triangular, 2.5–7 mm long, connate behind the petiole, often overlapping and sheathing the stems; petiole 1–2.5 mm long; lamina obovate to almost flabellate, 2–7 mm long, 2–6 mm wide, cuneate at base, with narrowly recurved margins, apex obtuse, glabrous and minutely tuberculate above, appressed-sericeous to villous below. *Inflorescences* to 1 cm wide, with 10–50 flowers, subtended by a few white floral leaves. *Flowers* densely white- or greyish-woolly; free hypanthium tube 2.4–2.7 mm long, 0.8–1.2 mm diameter, glabrous at base. *Sepals* 0.8–1.2 mm long. *Petals* 0.6–0.7 mm long, distinctly clawed. *Disc* apparently absent. *Ovary* roof glabrous; style (2.2–) 3.5–3.8 mm long. *Fruits* 2–2.5 mm long; seeds 1.2–1.4 mm long. (Description first published in Thiele 2007.) **Fig. 3.**

**Distribution.** Endemic to Tasmania, on the east coast between Orford and Bicheno, in heathland and forest (see also TPP 2009).

**Phenology.** Flowers Dec.–Feb.; fruits all year.



**Fig. 3.** *Stenanthemum pimeleoides*, illustrated from a specimen collected near Swansea (Tas.). **A** Habit  $\times 0.6$ ; **B** inflorescence with felty floral leaves  $\times 3.7$ ; **C** flower  $\times 10$ ; **D** connate pair of stipules with petiole  $\times 10$ . — A.M. Buchanan 4796 (MEL). Line drawing by Anita Barley.

**Common name.** Propeller plant, spreading stenanthemum (Wapstra *et al.* 2010).

**Note.** The species shares with *Stenanthemum humile* and *St. pumilum* stipules that sheath the stem, but *St. pimeleoides* has broader (obovate) leaves and prominent floral leaves, similar to *St. leucophractum*.

**Typification.** The lectotype has two barcodes, but it is unclear to which of the five branches these belong. The whole sheet is here selected as the lectotype as all branches seem to be part of the same gathering by Gunn. A pencil drawing is also attached to the sheet, which was the basis of the plate in Hooker (1855). Duplicates of this collection are at BM and NSW. A sheet at K with three branches is a residual syntype, and even though no collector is written on the label, it must be the Backhouse specimen mentioned in the protologue.

#### **Selected specimens examined**

TASMANIA. Near Freestone Hill, 20 km N of Swansea, 11 Dec. 1984, *A.M. Buchanan 4796* (BRI, HO, K, MEL, NT); Coles Bay Rd, Apsley Bridge, 1 km ESE of Llandaff, 25 Jan. 1989, *F.E. Davies 1238* (AD, CBG at CANB, HO, MEL); 7 miles [11.3 km] from Tasman Hwy along Lake Leake turnoff, 19 Nov. 1952, *R. Melville 2525, J. Willis, H. Barber & D. Paton* (K, MEL, NSW); Tom Gibson Reserve, approx. 700 m NW of main entrance on Bartons Rd, 16 Nov. 2016, *M.F. de Salas 1766* (HO).

### **8. *Stenanthemum pomaderroides* (Reissek) Reissek**

*Linnaea* 29: 295 (1858). — *Cryptandra pomaderroides* Reissek in Endl. & Fenzl, *Nov. Stirp. Dec.* 4: 29 (1839). — *Solenandra pomaderroides* (Reissek) Kuntze, *Revis. Gen. Pl.* 1: 121 (1891), as “*pommaderodes*”. — **Type citation:** “*In Novae-Hollandiae austro-occidentalis interioribus legit* cl. Roë.” — **Syntype:** Interior of Western Australia, *J.S. Roe s.n.* (W *n.v.*, *fide* B.L. Rye, pers. comm.).

**Illustrations:** B.J. Grieve, *How to Know W. Austral. Wildfl.* (2<sup>nd</sup> edn) 2: 598 (1998).

Erect *shrub* to 1.5 m high with densely rusty-pubescent young stems. *Leaves:* stipules ovate or triangular, 3–6 mm long, free; petiole 2–4 mm long; lamina obovate, (5–) 12–18 (–20) mm long, (3–) 5–8 (–10) mm wide, flat, cuneate at base, incurved or folded, apex acute to emarginate and recurved-apiculate, muricate, scabrous or tuberculate, glabrous or stellate-hairy above, greyish-villous below usually with rusty hairs along the veins. *Inflorescences* to 1.5 cm wide, with 10–30 flowers, often subtended by white floral leaves. *Flowers* creamy-pubescent; free hypanthium tube 2.2–4.5 mm long, 1–1.5 mm diameter. *Sepals* 1.1–1.4 mm long. *Petals* 0.7–0.8 mm long, distinctly clawed. *Disc* inconspicuous. *Ovary* roof glabrous; style 3–5 mm long. *Fruits* 2.8–3.2 mm long; seeds 1.6–2 mm long.

**Distribution.** Endemic to south-western W.A., in shrubland and woodland, both on sandy soils and in rocky places, between Kalbarri and Wyalkatchem.

**Phenology.** Flowers and fruits Aug.–Nov.

**Note.** Plants from the vicinity of Kalbarri National Park differ from typical plants in having somewhat narrower leaves that are finely stellate-hairy above, rather than glabrous and tuberculate. They may prove to be a distinct taxon. The species is close to *Stenanthemum reisekii* and *St. poecilum* Rye, which have smaller leaves and inflorescences, and connate stipules.

**Typification.** The taxon was described from a collection by John Septimus Roe, who undertook several expeditions through Western Australia. Barbara Rye (pers. comm.) examined the type of *Cryptandra pomaderroides* from W in preparation for Rye (1995): the specimen corresponds with the southern form of the species. It is unclear if duplicates are at other herbaria, such as K, as we have not been able to trace any others. However, as we have not seen this specimen, we refrain from designating a lectotype.

#### **Selected specimens examined**

WESTERN AUSTRALIA. Manmanning, 23 Oct. 1992, *L.A. Craven 8890 & F.A. Zich* (AD, BRI, CANB, MEL, PERTH); Wilding Rd NW of Wongan Hills, 16 Sep. 2001, *J. Kellermann 286* (AD, BAA, MEL); Kalbarri Natl Park, “The Loop” at Murchison River Gorge, 28 Sep. 1989, *B. Nordenstam & A.A. Anderberg 121* (MEL, NSW, PERTH); 9.2 miles [14.8 km] W of Bindi Bindi on Bindi Bindi-Ballidu Rd, 28 Sep. 1971, *S. Paust 1024* (PERTH); 0.6 km S along Billeroo Rd from Carnamah–Bunjil Rd, 27 Aug. 2011, *K.R. Thiele 4195* (PERTH).

### **9. *Stenanthemum pumilum* (F.Muell.) Diels**

in Diels & E.Pritzel, *Bot. Jahrb. Syst.* 35: 356 (1904). — *Spyridium pumilum* F.Muell., *Fragm.* 9: 137 (1875). — *Cryptandra pumila* (F.Muell.) F.Muell., *Syst. Census Austral. Pl.* 61 (1882). — *Stenanthemum leucocephalum* Domin, *Věstn. Král. České Společn. Nauk, Tř. Mat.-Přír.* 2: 64 (1923), *nom. illeg., pro syn.* — *Stenanthemum pumilum* subsp. *pumilum*: Rye, *Nuytsia* 16: 378 (2007) — **Type citation:** “*In cacuminibus petraeis montium Stirling’s Range, altitudine 3000’. F.M.*” — **Lectotype (here designated):** North of Stirling’s Range / High rocky part of Stirlings Range, Oct. 1867, *F. Mueller s.n.* (MEL2290284, annotated as “holotype”). **Isolectotype:** Stirling Range, *F. Mueller s.n.* (K000732088, “Com. 12/1884”, photo seen).

**Illustration:** B.L. Rye, *Nuytsia* 10: 301, fig. 12G–H (1995); B.J. Grieve, *How to Know W. Austral. Wildfl.* (2<sup>nd</sup> edn) 2: 597 (1998).

Compact *shrub* to 10 cm high, but mostly 2–5 cm high, with silvery or rusty, simply pubescent or pilose young stems. *Leaves:* stipules broadly triangular or ovate, 2.5–3.5 mm long, connate for more than half of

their length, ± sheathing the stems; petiole 1–1.5 mm long; lamina narrowly ovate to broadly obovate, 4–7 mm long, 1.4–2.5 mm wide, cuneate at base, with ± flat margins, conduplicate at first then opening at centre and sometimes at base but with the apex usually remaining closed, densely appressed-pilose below, minutely hispid above. *Inflorescences* 6–10 mm diam., with 10–30 flowers. *Flowers* white-woolly with long, crisped hairs; free hypanthium tube c. 1.5 mm long, 1–1.4 mm diameter, moderately woolly with an almost glabrous base. *Sepals* 1–1.2 mm long, densely woolly. *Petals* 0.5–0.6 mm long. *Disc* apparently absent. *Ovary* roof glabrous; style 1.6–2.2 mm long. *Fruits* (1.6–) 1.8–2.3 mm long; seeds c. 1.4–1.5 mm long.

**Distribution.** Endemic to the eastern Stirling Range in the south-western Botanical Province of W.A. The typical subspecies grows in low heath on gravel, with one record in rocky sandy soil in *Eucalyptus* shrubland and one from massive laterite.

**Phenology.** Flowers and fruits Sep.–Oct.

**Note.** The species is related to *Stenanthemum humile*, with which it shares prominently woolly sepals contrasting with less hairy floral tubes. It is also very close to *St. yorkense*, which differs in its more open habit, larger leaves and longer flowers.

**Typification.** The species was described by Mueller (1875) from collections that he made in W.A. Two type sheets of this species are known: the one from MEL contains three complete plants with labels written by Mueller; the sheet in K was forwarded by Mueller in 1884 and is a duplicate of the MEL collection.

#### **Selected specimens examined**

WESTERN AUSTRALIA. Warrangup Hill, Stirling Range, Oct. 1928, *C.A. Gardner 2200* (PERTH); Stirling Range Scenic Drive, NE of Mondurup, Sep. 1971, *A.S. George 10918* (PERTH); Chester Pass, East Stirlings, 16 Sep. 1963, *E. Wittwer 212* (PERTH).

### **10. *Stenanthemum tridentatum* (Steud.) Reissek**

*Linnaea* 29: 295 (1858). — *Cryptandra tridentata* Steud. in Lehm., *Pl. Preiss.* 1: 186 (1845). — *Spyridium tridentatum* (Steud.) Benth., *Fl. Austral.* 1: 427 (1863); *Cryptandra tridentata* var. *pubescens* Reissek in Lehm., *Pl. Preiss.* 2: 288 (1848), *nom. inval.* — **Type citation:** "In N. Holl. occ. austr. Herb. Preiss. No. 2421." — **Lectotype:** In Australia occidentali, *L. Preiss 2421* (LD1067820, photo seen), *fide* Rye, *Nuytsia* 10: 304 (1995), as "type". **Isolectotypes:** MEL268670, P06786195 (ex Herb. Steudel, photo seen).

**Illustrations:** B.L. Rye, *Nuytsia* 10: 292, fig. 10F–J; B.J. Grieve, *How to Know W. Austral. Wildfl.* (2<sup>nd</sup> edn) 2: 594 (1998).

Spreading, intricate *shrub* to 35 cm high with sparsely stellate-hairy young stems. *Leaves:* stipules broadly

triangular or rectangular, 1–1.5 mm long, connate for much of their length; petiole 0.5–1 mm long; lamina obovate to flabellate, 2–5 mm long, 2–3 mm wide, narrowly cuneate at base, flat or folded, emarginate, apex tridentate or variably toothed, densely stellate-hairy when young, finally smooth and glabrous. *Inflorescences* with 1–3 flowers. *Flowers* densely stellate-hairy; hypanthium without a free tube, c. 1 mm diameter. *Sepals* 0.9–1.1 mm long. *Petals* 0.5–0.6 mm long, distinctly clawed. *Disc* conspicuous. *Ovary* roof glabrous; style 0.5–0.9 mm long. *Fruits* ± glabrous, 1.8–2.2 mm long; seeds 1.4–1.6 mm long.

**Distribution.** Endemic to south-western W.A. between Gunyidi and Tambellup, in woodlands and shrublands mostly on sandy soil.

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

**Note.** Many other species with tridentate or toothed leaf apices have been misidentified as this species. Taxa most closely related to *Stenanthemum tridentatum* are *St. divaricatum* and *St. emarginatum*. All three species share a sparsely hairy lower part of the hypanthium tube, but *St. divaricatum* and *St. emarginatum* tend to have more papillose young stems, shorter hairs on the ovary summit and paler mottled seeds. Other related species include *St. intricatum* and *St. notiale*.

**Typification.** The name was inadvertently lectotypified by Rye (1995). The isolectotype in P is from Steudel's own herbarium.

#### **Selected specimens examined**

WESTERN AUSTRALIA. Near Gunyidi, 18 Sep. 1978, *J.W. Green 5502* (PERTH); Between Katanning and Tambellup, c. 7 km S of Broomehill, 31 July 1959, *Hj. Eichler 15909* (AD); West River, 26 Oct. 1961, *C.A. Gardner 13770* (PERTH); Jingaring Nature Reserve, 30 km NW from Pingelly, 22 Sep. 2001, *J. Kellermann 321* (AD); 100 miles [160 km] N of Perth on Geraldton Hwy, 17 July 1953, *R. Melville 4099* & *J. Calaby* (K, MEL, NSW).

### **Acknowledgments**

We thank Barbara Rye (PERTH) for providing information on type specimens that she has examined and for reading through a draft of this paper. Two referees provided welcome feedback, which improved the manuscript. During fieldwork in W.A., almost 20 years ago, Don & Joy Williams allowed JK and his family to roam freely on their Hi Vallee property (Badgingarra) and provided accommodation in the shearing shed. The project "A new phylogeny of the Australian Rhamnaceae, revision of *Cryptandra* and *Spyridium*, and completion of the *Flora of Australia* treatment of the family" is supported through funding from the Australian Government's Australian Biological Resources Study (ABRS) National Taxonomy Research Grant Programme. The line drawing was prepared by Anita Barley, also funded by ABRS.

## References

- Australian Plant Census* [APC] (continuously updated). IBIS database. (Centre for Australian National Biodiversity Research, CANBR, & Council of Heads of Australasian Herbaria: Canberra). <https://biodiversity.org.au/nsl/services/APC> [accessed: 1 Dec. 2020].
- Australian Plant Name Index* [APNI] (continuously updated). IBIS database. (CANBR: Canberra). <https://biodiversity.org.au/nsl/services/APNI> [accessed: 16 Dec. 2020].
- Barker, R.M. (2004). James Drummond's plant collections today – a global dispersal. In: Davies, S.J.J.F. (ed.), *The Drummond Symposium: A review of the work of James Drummond, the first Government Botanist in Western Australia*, pp. 40–57. (Curtin University of Technology: Perth). [*Department of Environmental Biology, Bulletin* 27].
- Bean, A.R. (2004). New species of *Cryptandra* Sm. and *Stenanthemum* Reissek (Rhamnaceae) from northern Australia. *Austrobaileya* 6: 917–940.
- Bentham, G. (1863). Rhamneae. In: *Flora Australiensis, a description of plants of the Australian Territory* 1: 409–445. (L. Reeve & Co.: London).
- Black, J.M. (1926). Rhamnaceae. In: *Flora of South Australia* 3: 364–371. (Government Printer: Adelaide).
- Black, J.M. (1952). Rhamnaceae. In: *Flora of South Australia* (2<sup>nd</sup> edn) 3: 544–553. (Government Printer: Adelaide).
- Blackall, W.E. & Grieve, B.J. (1956). Rhamnaceae. In: *How to know Western Australian wildflowers* 2: 327–338. (University of Western Australia: Nedlands).
- Canning, E.M. & Jessop, J.P. (1986). Rhamnaceae. In: Jessop, J.P. & Toelken, H.R. (eds), *Flora of South Australia* 2: 807–821. (Government Printer: Adelaide).
- Conn, B.J. (1983). Rhamnaceae. In: Morley, B.D. & Toelken, H.R. (eds), *Flowering plants in Australia*, pp. 226–227. (Rigby: Adelaide).
- Curtis, W.M. (1956). Rhamnaceae. In: *The Student's Flora of Tasmania* 1: 108–117. (Government Printer: Hobart).
- Diels, L. & Pritzel, E. (1904). Rhamnaceae. In: *Fragmenta phytographiae Australiae occidentalis: Beiträge zur Kenntnis der Pflanzen Westaustraliens, ihrer Verbreitung und ihrer Lebens-Verhältnisse. Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 35: 349–359.
- Ewart, A.J. (1931) [1930]. *Flora of Victoria*. (Government Printer: Melbourne).
- Field Naturalists' Club of Victoria [FNCV] (1923). *A census of the plants of Victoria with their regional distribution and the vernacular names as adopted by the Plant Names Committee of the Field Naturalists' Club of Victoria*. (Field Naturalists' Club of Victoria: Melbourne).
- Gardner, C.A. (1931). Rhamnaceae. In: *Enumeratio plantarum Australiae occidentalis* 3: 76–77. (Government Printer: Perth).
- George, A.S. (2009). *Australian botanist's companion*. (Four Gables Press: Kardinya).
- Heuchert, B., Braun, U., Tkach, N., Marx, D. & Röser, M. (2017). Biography of D.F.L. von Schlechtendal and type material of his new taxa preserved in the herbarium of Martin Luther University Halle-Wittenberg (HAL) and other botanical collections. *Schlechtendalia* 31: 1–143.
- Hooker, J.D. (1855) [1860]. Rhamneae. In: *Flora Tasmaniae* 1: 69–78. (Reeve: London). [*The botany of the Antarctic voyage of H.M. discovery ships Erebus and Terror in the years 1839–1843*, Part. III].
- Hooker, J.D. (1862). Rhamneae. In: Bentham, G. & Hooker, J.D. (eds), *Genera plantarum* 1: 371–386. (A. Black: London).
- Kellermann, J. (2007). Re-instatement of *Spyridium waterhousei* from Kangaroo Island, South Australia, with a short history of the tribe Pomaderreae (Rhamnaceae). *Journal of the Adelaide Botanic Gardens* 21: 55–62.
- Kellermann, J. (2020). Three species of *Cryptandra* (Rhamnaceae: Pomaderreae) from southern Australia allied to *C. tomentosa*. *Swainsona* 33: 125–134.
- Kuntze, C.E.O. (1891). Rhamnaceae. In: *Revisio generum plantarum* 1: 117–121. (Arthur Felix: Leipzig; Dulau & Co.: London; et al.).
- McNeill, J. (2014). Holotype specimens and type citations: General issues. *Taxon* 63: 1112–1113.
- Mueller, F. (1862). Rhamnaceae. *Fragmenta Phytographiae Australiae* 3: 62–86.
- Mueller, F. (1875). Rhamnaceae. *Fragmenta Phytographiae Australiae* 9: 135–141.
- Mueller, F. (1882). *Systematic census of Australian plants with chronologic, literary, and geographic annotations*, Part I: *Vasculares*. (M'Carron, Bird & Co.: Melbourne).
- Reissek, S. (1848) [1846–1847]. Rhamneae: synopsis specierum Novae Hollandiae austro-occidentalis. In: Lehmann, J.G.C. (ed.), *Plantae Preissianae* 2: 279–291. (Meissner: Hamburg).
- Reissek, S. (1858). *Plantae Muellierianae: Rhamneae*. *Linnaea* 29: 265–296.
- Rye, B.L. (1995). New and priority taxa in the genera *Cryptandra* and *Stenanthemum* (Rhamnaceae) of Western Australia. *Nuytsia* 10: 255–305.
- Rye, B.L. (2001). A taxonomic update of *Stenanthemum* (Rhamnaceae: Pomaderreae) in Western Australia. *Nuytsia* 13: 495–507.
- Rye, B.L. (2007). New species and keys for *Cryptandra* and *Stenanthemum* (Rhamnaceae) in Western Australia. *Nuytsia* 16: 325–384.
- Suessenguth, K. (1953). Rhamnaceae. In: Engler, H.G.A. & Prantl, K.A.E. (eds), *Die Natürlichen Pflanzenfamilien* (2<sup>nd</sup> edn) 20d: 7–173. (Duncker & Humblot: Berlin).
- Thiele, K.R. (2007). Two new species of Australian *Stenanthemum* (Rhamnaceae). *Journal of the Adelaide Botanic Gardens* 21: 63–70.
- Threatened Species Section [TPP] (2009). *Listing Statement for Stenanthemum pimeleoides (propeller plant)*. (Department of Primary Industries & Water, Tasmania: Hobart). <https://dpiw.tas.gov.au/Documents/Stenanthemum-pimeleoides.pdf> [accessed: 1 Dec. 2020].
- Turland, N.J., Wiersema, J.H., Barrie, F.R., Greuter, W., Hawksworth, D.L., Herendeen, P.S., Knapp, S., Kusber, W.-H., Li, D.-Z., Marhold, K., May, T.W., McNeill, J., Monro, A.M., Prado, J., Price, M.J. & Smith, G.F. (eds.) (2018). *International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code) adopted by the Nineteenth International Botanical Congress Shenzhen, China, July 2017*. (Koeltz Botanical Books: Glashütten). [*Regnum Vegetabile* 159].
- Wapstra, M., Wapstra, A. & Wapstra, H. (2010). *Tasmanian plant names unravelled*. (Fullers Bookshop: Launceston).
- Willis, J.H. (1973) [1972]. *A handbook of plants in Victoria*, Vol. 2. (Melbourne University Press: Carlton).

