



Spyridium bracteatum, a new species from Kangaroo Island allied to *S. thymifolium* (Rhamnaceae: Pomaderreae)

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Abstract: *Spyridium thymifolium* Reissek and the new species *S. bracteatum* Kellermann & W.R.Barker are described and illustrated. The former species occurs on both Kangaroo Island and the adjacent Fleurieu Peninsula, South Australia; the new taxon is endemic to Kangaroo Island. Both species exhibit distinctly ‘tiled’ bracts in fruiting inflorescences. A lectotype is chosen for *S. thymifolium*.

Keywords: New species, typification, Rhamnaceae, *Spyridium*, South Australia

Introduction

Spyridium Fenzl is a genus of c. 45 species, mainly occurring in southern regions of Australia. It is one of the larger genera of Rhamnaceae in Australia and placed in the tribe Pomaderreae (Richardson *et al.* 2000; Medan & Schirarend 2004). There are around 12 taxa of *Spyridium* present on Kangaroo Island (KI); together with Eyre Peninsula (EP), where at least 15 taxa are present (State Herbarium of South Australia 2021), and south-western Western Australia (18 taxa; Western Australian Herbarium 1998-), KI is one of the centres of diversity of the genus.

For over 30 years, an entity was known from KI that did not fit any currently recognised taxa. Herbarium specimens were variously identified as *Spyridium thymifolium* Reissek, *S. vexilliferum* (Hook.) Reissek, *S. bifidum* var. *integrifolium* J.M.Black (a synonym of *S. bifidum* subsp. *wanillae* Kellermann & W.R.Barker from EP, but the name has also been misapplied to other taxa), or the specimens were given names of species that are not even present in South Australia, e.g. the Tasmanian species *S. obovatum* (Hook.) Benth.

A recent molecular phylogeny of all currently recognised species of *Spyridium* (Clowes *et al.* 2022) also included several samples of that entity, under the phrase name *Spyridium* sp. Kangaroo Island (W.R. Barker 7560) Kellermann. The results clearly separated the taxon from *S. thymifolium* and the other taxa mentioned above. In line with this new evidence, it is here described as a new species, *Spyridium bracteatum* Kellermann & W.R.Barker.

Characteristic of the new species is the presence of conspicuous ‘tiled’ bracts in the older inflorescence. These were first described and illustrated by Kellermann & Barker (2007, Fig. 1q): as fruits develop in the flower-head, it expands by 2–3 times its size, presumably to accommodate the enlarging ovaries in the developing fruits and to facilitate the release of the ripe fruitlets (the disseminules in *Spyridium*); the bracts in these enlarged heads appear in a typical ‘roof-tile’ pattern. While this phenomenon is not limited to the new taxon, it is most noticeable and striking in these plants. Other species with tiled bracts are, for example, *Spyridium coactilifolium* Reissek, *S. scabridum* (Tate) Kellermann & W.R.Barker (both described in Kellermann & Barker 2007) and *S. thymifolium* (described below).

Taxonomy

1. *Spyridium bracteatum* Kellermann & W.R.Barker, *sp. nov.*

A Spyridio thymifolio Reissek stipulis conjunctis et foliis angustioribus differt.

Holotypus: South Australia, Kangaroo Island, Playford Hwy, c. 3 km by road WNW of Shackle Road turnoff, 14 km direct ESE of Cape Borda, alt. 240–250 m, 6 Oct. 1982, W.R. Barker 4487 (AD98248005). **Isotypi:** B, CANB, MEL2334938, NY.

Spyridium sp. Kangaroo Island (W.R. Barker 7560) Kellermann in C. Clowes *et al.*, *Austral. Syst. Bot.* 35: 107 (2022).

Spyridium bifidum var. *integrifolium* auct. non J.M.Black: E.M. Canning in Jessop & Toelken, *Fl. S. Austral.* 2: 817 (1986).



Fig. 1. *Spyridium bracteatum*, holotype, W.R. Barker 4487 (AD98248005). Inset: close-up of two flower-heads, a younger one on the left, surrounded by felty floral leaves, and an older inflorescence with 'tiled' bracts on the right.



Fig. 2. *Spyridium bracteatum*. **A** Flower-head with densely felty floral leaves; **B** close-up of vegetative leaf on a young branch. — C. Clowes CC556 & M.W. Malcolm. Photos by C. Clowes.

Shrubs to 1.8 (–2) m high; young stems densely pubescent with rusty, spreading, long simple and stellate hairs, becoming ± matted and white or grey when older. *Leaves* alternate: *stipules* ovate, triangular to narrowly triangular, 1.1–3.7 (–4) mm long, fused for one quarter to half of their length (rarely abutting), reddish-brown, glabrous, with hairs along midrib and ciliate towards apex; *petiole* (1.1–) 1.8–2.6 (–4.3) mm long, stellate pubescent, becoming glabrous and papillose when old; *lamina* narrowly ovate to narrowly obovate to narrowly elliptic to oblong (broader in young plants), 6–17.6 mm long, 1.5–3.7 (–7) mm wide, base obtuse to cuneate, margins recurved, rarely revolute, apex obtuse or acute to bluntly acuminate, upper surface glabrous or occasionally with scattered long hairs, with only the midrib (often deeply) impressed, lower surface with a dense indumentum of white, ± matted flexuose stellate hairs, becoming grey when older, midrib also with long simple hairs, rusty when young, becoming white. *Floral leaves* usually 3–5 (–6): broader and sometimes rounder than stem-leaves, (4–) 4.5–9.5 mm long, 2–4.8 (–5.5) mm wide, covered with very dense, white, felty, stellate indumentum, becoming grey when old. *Inflorescence* a dense axillary head of more than 20 cymosely arranged ± sessile flowers, 5–8 mm diameter; *inflorescence axis* 11–25 mm long, densely pubescent

with rusty and white hairs; *bracts* broadly ovate, 2–3.5 mm long, outside mostly glabrous, with dense long cilia. *Flowers* white to cream. *Hypanthium*: free tube 0.5–0.7 mm long, 0.6–0.8 (–1.2) mm diameter, with a moderately dense indumentum of long simple hairs; base similarly pubescent. *Sepals* 0.4–0.7 (–1) mm long, with dense, erect, simple and stellate hairs, especially towards the tip. *Petals* (0.3–) 0.4–0.6 mm long, cucullate, distinctly clawed; limb:claw ratio c. 2:1. *Stamens* subequal to the petals, 0.3–0.4 mm long; *anthers* 0.15–0.2 mm long. *Disc* smooth, glabrous, forming an undulating ring at the summit of the hypanthium tube (or slightly below). *Ovary* inferior, carpels 3, summit with dense, erect stellate hairs; *style* (0.3–) 0.4–0.6 mm long, entire, slightly 3-lobed at apex. *Infructescence* conspicuously expanding in fruit, so ‘tiled’ bracts are visible. *Fruits* obovoid to ellipsoid, c. 1.3–1.5 (–2) mm long, 0.8–0.9 (–1.5) mm wide, consisting of 3 white papery fruitlets of which usually only 1 or 2 develop fully, torus in upper third to apical, fruit wall ± glabrous, dark brown; *seeds* flattened, obovoid to ellipsoid, c. 1.1–1.5 mm long, 0.7–1.1 mm wide, reddish brown with a darkened base. **Figs 1 & 2.**

Distribution & habitat. The species is endemic to KI, where it mainly occurs in the north-western part of the

Key to *Spyridium bracteatum* and morphologically similar species from Kangaroo Island

1. Stipules free, overlapping behind petiole (if abutting then leaves with hairs on the upper surface)
 2. Leaves broad: ovate, elliptic, or orbicular 2. *S. thymifolium*
 - 2: Leaves narrow: oblong, narrowly ovate to narrowly obovate, or narrowly elliptic
 3. Upper leaf surface villous to scabrous, with long simple hairs *S. scabridum*
 - 3: Upper surface glabrous, sometimes with a few antrorse simple hairs along the margins *S. vexilliferum*
- 1: Stipules fused for up to half of their length (if abutting then upper leaf surface glabrous)
 4. Upper leaf surface glabrous, sometimes with a few scattered hairs 1. *S. bracteatum*
 - 4: Upper surface covered with stellate hairs, sometimes simple or bifid hairs also present *S. coalitum*

island (Fig. 5). It grows in *Eucalyptus remota* woodland, *Eucalyptus obliqua*-*E. baxteri* stringybark woodland and dense shrublands or heathlands with a taller overstorey, on sandy loam and sand with laterite; some collecting notes indicate that it prefers damp habitats and waterlogged soils.

The bushfires in 2019/20 burned most of the known habitat of *Spyridium bracteatum* (Fig. 5). Post-fire vegetation surveys on KI in May 2021 also made one collection with seedlings (*Lang et al. SHSA-560*) from Flinders Chase National Park (N.P.). Further surveys are required to examine the regeneration of the taxon, but the closely related *S. thymifolium* tends to regrow from seed in large numbers after bushfires (e.g. after the 2006 fire in Cox Scrub Conservation Park; pers. obs.).

Phenology. Flowering in Nov.–Feb. and Apr.; fruits recorded in Aug., Oct.–Feb.

Affinities. *Spyridium thymifolium* can be distinguished from *S. bracteatum* by its ovate-elliptic to orbicular leaves, which are usually larger and with \pm flat to recurved margins, longer petioles, and larger, free, but overlapping stipules. Compared to *S. thymifolium*, the flower heads are usually larger and the number of floral leaves is greater in *S. bracteatum*.

Spyridium bracteatum is also similar to *S. coalitum*, which differs in its smaller leaves with a slightly recurved and notched tip and the presence of stellate (rarely simple) hairs on their upper surface. A few specimens appear to be hybrids between *S. bracteatum* and *S. coalitum* (e.g. Borda Rd, 3 km E of Harveys Return, 11 Nov. 1994, *B.M. Overton 2499*, AD99610155). The large inflorescences in *Spyridium bracteatum* with c. 5 floral leaves are similar to those of *S. bifidum* subsp. *wanillae*, but that taxon occurs on Eyre Peninsula and has long simple hairs on the upper surface of the leaves.

Notes. The stipules of the new species are usually fused for about half of their length. A few specimens display stipules that are abutting, but not fully fused. Abutting free stipules can also be found in *S. scabridum*, but that species is easily distinguished by the presence of long, simple hairs on the upper surface of the leaf.

The new species typically has leaves with a glabrous upper surface and a deeply impressed midvein, but no secondary veins are visible (or only faintly so); the indumentum on the lower surface consists of dense, white, matted hairs that become dirty grey, when older; hairs on the floral leaves often also turn grey in older inflorescences.

A fruit from one specimen examined (*J. Kellermann 510* & *I.M. Kellermann Williams*) contained two dissimilar seeds, the first of which was reddish brown (as described above), the second seed was light coloured with dark mottling, similar to *S. thymifolium* (below).

Etymology. The epithet is Latin and refers to the bracts of the inflorescence, which are very conspicuous once the flower-head expands during fruiting.

Selected specimens examined (c. 100 seen)

SOUTH AUSTRALIA. **Kangaroo Island.** Western River headwaters, Watter's mail box, on E-W road, 3.2 km direct E of turnoff from Western River Cove Rd, c. 4.5 km direct NE of junction of Playford and West End Hwys, 7 Oct. 1982, *W.R. Barker 4489* (AD, BM, KW, MEL, MPU, NE, US); c. 10.5 km by road NNW of Karatta along Church Rd, c. 1.5 km by road NW of Baxters Rd turnoff, 8 Oct. 1982, *W.R. Barker 4520* (AD, NSW, K); c. 24 km E of Jump Off Rd to Cape Torrens on Playford Hwy, 29 Sep. 1995, *W.R. Barker 7560* (AD, CANB, MEL, MO, SI); 8.6 km E of Jump Off Rd, 29 Sep. 1995, *W.R. Barker 7561* & *F. Udovicic* (AD \times 2, CHR, G, GH, HBG, KUN, L, M, MEL, P, W; population collection); Playford Hwy, road reserve, S side of road, 28 Dec. 2018, *C. Clowes CC556* & *M.W. Malcolm* (AD, MELU); 7 km E of Cape Borda by road along Playford Hwy, 12 Apr. 1973, *L. Haegi 408* (AD); West End Hwy intersection with Church Rd, Flinders Chase N.P., W side, 15 Oct. 2009, *J. Kellermann 510* & *I.M. Kellermann Williams* (AD, B, BAA, CANB, MEL); Playford Hwy, *J. Kellermann 518* (AD, CANB, MEL); 3 km direct W of Rocky River Visitor Centre, Flinders Chase N.P., 9 May 2021, *P.J. Lang, T.M. Spokes* & *E. Biffin SHSA-560* (AD, seedlings); Roadside vegetation at Graingers Lagoon property, on Church Rd, 1.5 km E of Brookland Park, 30 Sep. 1995, *F. Udovicic 254* (AD, E, MEL, PERTH).

2. *Spyridium thymifolium* Reissek

Linnaea 29: 289 (1858). — *Spyridium coactilifolium* var. *integrifolium* Benth., *Fl. Austral.* 1: 431 (1863). — **Type citation:** “Encounter Bay Nov. 1847 (Dr. F. Müller)”. **Lectotype (here designated):** Encounter, Austral. Austr., Nov. 1847, [*C. Stuart s.n.*] (W0015421, attributed to “F. Müller”). **Isolectotypes:** Encounter Bay, Nov. 1849 [*sic*, 1847], *C. Stuart s.n.* (MEL 2104786, labelled as “Trymalium (Pomaderris?) Stuartii Ferd.Mill. pro parte”). **Possible isolectotype:** Encounter Bay, S. Australia, *s.dat.*, *Anon. s.n.* (K000618737, ex Herb. Hooker, with detailed drawing of flower, labelled as “Pomaderris / Trymalium stuarti F.Müller” and as “*Spyridium coactilifolium* Reiss. var. *integrifolium*”).

Spyridium stuartii Reissek & F.Muell., *Linnaea* 29: 289 (1858), as “*stuarti*”. — **Type citation:** “Encounter Bay Nov. 1847 (Dr. F. Müller)”. **Lectotype:** Encounter Bay, Nov. 1847, [*C. Stuart s.n.*] (MEL 2104271, labelled as “*Spyridium stuartii* Reiss. & Muell.”), *vide* Kellermann & W.R.Barker, *Muelleria* 30: 56 (2012). **Isolectotypes:** Encounter Bay, *s.dat.*, *C. Stuart s.n.* (MEL 2104272A, top specimen, labelled as “*Spyridium Stuartii* F. Muell.”); Encounter Bay, Nov. 1847, [*C. Stuart s.n.*] (W0015422, attributed to “F. Müller”).

Trymalium stuarti F.Muell. ex Reissek, *Linnaea* 29: 289 (1858), *nom. inval. pro syn.* (listed by Reissek under both, *S. thymifolium* and *S. stuartii* as a synonym).

Cryptandra obovata auct. non (Hook.) Hook.f.: Tate, *Handb. Fl. Extratrop. S. Austral.* 97 (1890), *pro parte*.



Fig. 3. *Spyridium thymifolium*. **A** Shrub growing in Cox Scrub C.P., Fleurieu Peninsula; **B** flowering branches; **C**, **D** close-up of flower heads, surrounded by densely felty floral leaves. — A, B J. Kellermann 660 & F. Nge, C, D JK 656 & FN. Photos by J. Kellermann.

Shrubs to 1.5 m high; young stems densely pubescent with white and rusty, spreading, long simple and stellate hairs. *Leaves* alternate: *stipules* broadly ovate to broadly triangular, 2–6.4 mm long, free and overlapping behind petiole, reddish-brown to almost black, glabrous, with hairs along midrib and ciliate towards apex; *petiole* 1.8–7 mm long, stellate pubescent; *lamina* ovate to broadly ovate or elliptic, 7.3–29 mm long, 3.2–22.5 mm wide (larger in young plants), base obtuse to cordate, margins flat to slightly recurved, apex acute to acuminate, sometimes emarginate, upper surface glabrous with only the midrib and secondary veins apparent, lower surface with a dense indumentum of white and rusty simple and stellate hairs, becoming grey when older, margin, midrib and veins with longer rusty hairs (the hairs on the margin usually visible from above). *Floral leaves* usually 2 or 3: broader and smaller than stem-leaves, (2.5–) 3.5–8 (–15) mm long, (2–) 3.5–7 (–12) mm wide, covered with a very dense, white, felty stellate indumentum. *Inflorescence* a dense axillary head of 10–30 cymosely arranged ± sessile flowers, 3–8 mm diameter; *inflorescence axis* (4–) 5.5–29 mm long, densely pubescent with rusty and white hairs; *bracts* broadly ovate to orbicular, 2.5–4 mm long, outside mostly glabrous, with dense long cilia. *Flowers* white to cream, sometimes slightly yellowish. *Hypanthium*: free tube 0.3–0.7 mm long, 0.6–1.4 mm diameter, with moderately dense, long simple hairs over minute stellate hairs; base similarly pubescent. *Sepals* 0.3–0.6 mm long, with dense, erect simple and stellate hairs, especially towards the tip. *Petals* 0.25–0.4 mm

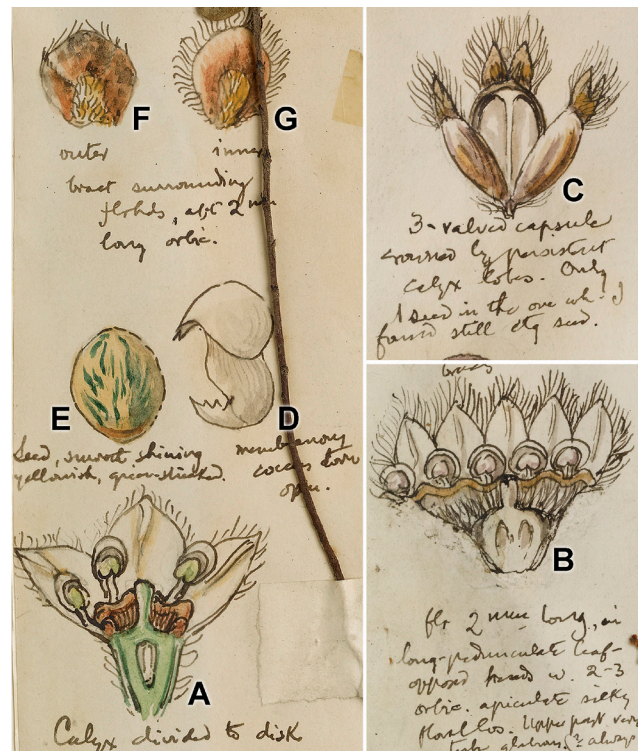


Fig. 4. *Spyridium thymifolium* illustrations by J.M. Black on specimens from his own herbarium. **A**, **B** Cross section through flowers; **C** fruit, splitting into 3 fruitlets; **D** opened white papery fruitlet; **E** light coloured seed with dark mottling and darkened base; **F**, **G** inflorescence bracts. — A, D–G Square waterhole, H.H.D. Griffiths s.n. (AD97611140A); B, C near Victor Harbor, Anon. s.n. (AD97611139A). Ink and watercolour drawings by J.M. Black.

long, cucullate, shortly clawed; limb:claw ratio c. 3:1. *Stamens* subequal to the petals, c. 0.3 mm long; *anthers* 0.1–0.2 mm long. *Disc* smooth, glabrous, forming an undulating ring at the summit of the hypanthium tube (or slightly below). *Ovary* inferior, carpels 3, summit with dense, erect stellate hairs; *style* 0.3–0.6 mm long, entire, slightly 3-lobed at apex. *Infructescence* conspicuously expanding, so tiled bracts are visible. *Fruits* obovoid to ellipsoid, c. 1.8–2 mm long, 1.2–1.6 mm wide, consisting of 3 white papery fruitlets of which usually only 1–2 develop fully, torus in upper third, fruit wall ± glabrous, dark brown; *seeds* flattened obovoid to ellipsoid, 1.2–1.4 mm long, 0.9–1 mm wide, fawn with dark green to black mottling, base brown. **Figs 3 & 4.**

Illustrations. J.M. Black, *Fl. S. Austral.* 2nd edn, 3: 548, Fig. 706 (1952); J.P. Jessop & H.R. Toelken, *Fl. S. Austral.* 818, Fig. 430E (1986); A. Prescott, *It's Blue With Five Pet. Adelaide* 143, Fig. 4 (1988), 2nd edn, 145, Fig. 4 (2012); G.R.M. Dashorst & J.P. Jessop, *Pl. Adelaide Plains Hills* 100, pl. XLIII, Fig. 10 (1990); W.R. Barker, *J. Adelaide Bot. Gard.* 21, Fig. 2C (1995), stipule only; A. Prescott, *It's Blue With Five Pet. Kangaroo Isl.* 50, Fig. 7 (1995).

Distribution & habitat. The species mainly occurs on the Fleurieu Peninsula and extends to Kangaroo Island (Fig. 5). It often grows on light-coloured sandy soils and sandy loam, sometimes with lateritic or limestone pebbles; a few collections are from rocky soils. *Spyridium thymifolium* is found in heathland, open scrubland and occasionally in forests and woodlands.

Phenology. Flowering and fruiting mainly in Sep.–Feb., and also during other times of the year.

Affinities. The species can have quite broadly ovate to almost orbicular leaves, similar to *Spyridium phlebophyllum* (F.Muell.) F.Muell. from the Flinders Ranges, but that species can easily be recognised by the raised veins on the upper leaf surface. *Spyridium tricolor* W.R.Barker & Rye has rounder, thicker leaves with an emarginate apex and larger inflorescence bracts (Barker & Rye 1993). *Spyridium parvifolium* (Hook.) Benth ex F.Muell. also has similarly shaped leaves, but these are usually smaller in South Australian plants and have impressed secondary veins and hairs on the upper surface; that species also has more open inflorescences and less dense flower-heads (see Kellermann 2006). Typical for *S. thymifolium* is also that the rusty hairs along the leaf margin are usually visible from above (Fig. 3C). Characters to distinguish it from *S. bracteatum* are listed above.

Typification. The typification and history of *Spyridium thymifolium* and *S. stuartii* Reissek & F.Muell. were discussed in Kellermann & Barker (2007). The authors indicated that type material of *S. thymifolium* should be sought in W, where Reissek worked, but they had not seen specimens from that herbarium. We have now located the specimen through the Jacq database

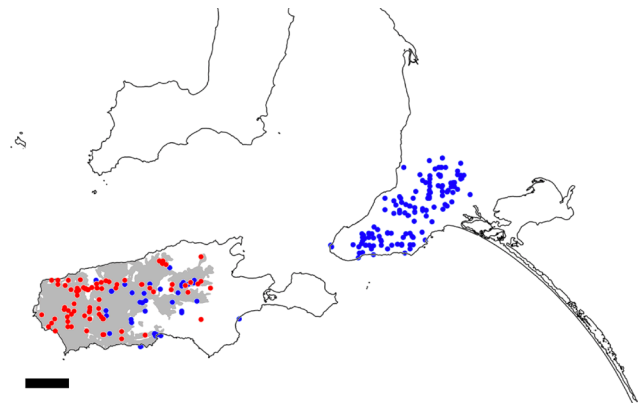


Fig. 5. Distribution map for *Spyridium bracteatum* (red) and *S. thymifolium* (blue), from specimens examined. The approximate area burnt during the 2019/20 Kangaroo Island bushfires is shaded in grey. Scale bar = 20 km.

(<https://herbarium.univie.ac.at/database/>) and it is here designated as the lectotype of the species.

Stuart “collected around Adelaide, Sturt R. [i]v[er], lower Murray R. & Encounter Bay” (George 2009: 255) between July 1847 and March 1848; as such, the date on the isolectotype of *Spyridium thymifolium* at MEL must be in error.

Common name. Thyme-leaved spyridium (Canning & Jessop 1986).

Etymology. The epithet is Latin and refers to the resemblance of the leaves to those of the well-known herb of the genus *Thymus* L. (thyme).

Selected specimens examined (c. 250 seen)

SOUTH AUSTRALIA. Southern Lofty. Mt Billy Conservation Park (C.P.), Gate 1, middle track, all around the first junction, 14 Nov. 2015, C. Clowes CC285 & T. Schuster (AD, MELU); Cox Scrub C.P., 27 Dec. 2015, J.R. Guerin 256 & D.J. Duval (AD, K); Martins Res. (Forestry SA), 10.9 km direct ESE of Delamere, 24 Feb. 2000, R.S. Johnson & B.M. Routley BS117-857 (AD); Parson’s Res., Waitpinga, 24 Nov. 1970, D. Hunt 3247 (AD); Bullock Hill C.P., near sign, corner of Haines Rd and fire track, 3 Feb. 2008, J. Kellermann 447 & A. Kellermann (AD, B); Cox Scrub C.P., on walking track, c. halfway uphill, N end of park, 3 Feb. 2008, J. Kellermann 457 (AD, K, LE, MEL); Cox Scrub C.P., S end, 24 Feb. 2008, J. Kellermann 461 & I.M. Kellermann Williams (AD, MEL; seedlings); Cox Scrub C.P., E side of Bond Rd, J. Kellermann 462 & I.M. Kellermann Williams (AD, B, BAA, CANB, E, HBG, M, MEL, NY); Cox Scrub C.P., fire track at S end in recently burned area, 14 Oct. 2018, J. Kellermann 660 & F. Nge (AD, B, MEL, W); Roadside vegetation adjoining S side of Congeratina Native Forest Res. (N side of Range Rd), 9 Oct. 2002, P.J. Lang BSOP-546 (AD, KUN, NSW); Hundred of Myponga, Sect. 73, 45.5 km direct SSW of Myponga, 23 Nov. 1999, P.J. Lang & D.M. Armstrong BS117-399 (AD, W); Stipiturus C.P., 6 Aug. 2009, D.E. Murfet 6552 (AD); Wilson Hill, off Range Rd between Victor Harbor and Cape Jervis, 29 Oct. 1999, J.G. West 5432 (AD, CANB, MEL); c. 20 km towards Victor Harbor, from Cape Jervis turnoff, 13 Oct. 1963,

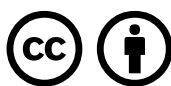
D.J.E. Whibley 1279 (AD, MO, NY, SI). **Kangaroo Island.** E of Pardana, 30 Sep. 1995, *W.R. Barker 7567*, *F. Udovicic*, *R.M. Barker & J.G. West* (AD, MEL); Playford Hwy, 12.8 km E of Gosse Ritchie Rd, 12 Dec. 2006, *D.J. Duval 728*, *T.S. Te*, *E.A. Pilman & M.J. Thorpe* (AD, K); Road on W side of Harriet River, c. 1 km after South Coast Hwy, 14 Oct. 2009, *J. Kellermann 504A* (AD, B, NY); Hundred of Newland, Sect. 135, 10.5 km direct NNE of Mt Taylor, 9 Apr. 1991, *P.J. Lang D-8283* (AD); Tin Hut Creek junction with Playford Hwy, S side of Hwy, 15 Nov. 2006, *T.S. Te 093 & D.J. Duval* (AD, K); Playford Hwy, 5.1 km E of intersection with South Coast Rd, 30 Sep. 1995, *F. Udovicic 256* (AD, CANB, E, MEL, PERTH, SI).

Acknowledgments

Kat Ticli (AD) is thanked for scoring the vegetative characters of the two species, for taking images of herbarium specimens and mapping the two species. We thank Barbara Rye (PERTH) and Brendan Lepschi (CANB) for reviewing the manuscript, and Llywela Williams (Adelaide) for checking the final version. Jürgen Kellermann's fieldwork on KI was facilitated by accommodation at the University of Adelaide Flinders-Baudin Research Centre. 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. Catherine Clowes was supported by a Holsworth Wildlife Research Endowment (The Ecological Society of Australia), and the Hansjörg Eichler Scientific Research Fund (Australasian Systematic Botany Society).

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