Spyridium burragorang (Rhamnaceae), a new species from New South Wales, with new combinations for *Spyridium buxifolium* and *Spyridium scortechinii*

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Abstract

K.R. Thiele[1] and J.G. West (Australian National Herbarium, Centre for Plant Biodiversity Research, GPO Box 1600, Canberra, ACT 2601, Australia. [1]Corresponding author) 2004. Spyridium burragorang *(Rhamnaceae), a new species from New South Wales, with new combinations for* Spyridium buxifolium *and* Spyridium scortechinii. Telopea *10(4) 823–829. Spyridium* comprises c. 40 species from southern temperate Australia, characterised by cymose inflorescences, a distinctive floral disk, and schizocarpic fruits in which an indehiscent, papery pyrene containing the seed is shed as the disseminule. Three species from New South Wales, previously included in *Cryptandra*, belong in *Spyridium* where they form a small, distinctive group. One of these, **Spyridium burragorang** K.R.Thiele, is described as new, while new combinations are provided for **Spyridium buxifolium** (Fenzl) K.R.Thiele and **Spyridium scortechinii** (F.Muell.) K.R.Thiele.

Introduction

The Australian and New Zealand genera *Pomaderris* Labill., *Siegfriedia* C.A.Gardner, *Cryptandra* Sm., *Spyridium* Fenzl, *Stenanthemum* Reissek and *Trymalium* Fenzl form a natural tribe in Rhamnaceae (tribe Pomaderreae Reissek ex Endl.; see Richardson et al., 2000) characterised by a stellate indumentum on at least some vegetative or floral parts (a few species in some of these genera lack stellate hairs, but this is almost certainly a secondary loss). However, taxonomic boundaries between genera in this group have been unstable and ill-defined for many years. Bentham (1863: p. 410) noted that '… most [genera], even the most natural ones, are difficult to characterize. The differences in their flowers and fruits are very trifling; they often pass into one another by the finest gradations, and habit, foliage and inflorescence must often be relied upon for fixing generic limits'. Such difficulties have been reiterated by subsequent authors (e.g. Conn, 1983; Wheeler, 1987).

Mueller (1882) followed Hooker (1855) in the most extreme rearrangement of species, by reducing *Trymalium*, *Spyridium* and *Stenanthemum* to synonymy under a very broadly defined *Cryptandra*, and accepting only the two genera *Cryptandra* and *Pomaderris*. Subsequent authors (e.g. Rodway, 1903; Black, 1926; Ewart, 1930) mostly disregarded this with respect to *Trymalium* and *Spyridium*, although species of *Stenanthemum* remained in *Cryptandra* (or *Spyridium*) until Rye (1995) reinstated the genus.

Such taxonomic fluidity may be expected to result in misplaced taxa and confusion over generic boundaries. Work towards a *Flora of Australia* treatment of Rhamnaceae has allowed an assessment of morphological characters across the family as a whole. While a complete reappraisal of generic concepts in the group awaits a DNA sequence analysis to elucidate areas where morphological characters are inadequate, some

misplacements are clear. This paper transfers two species currently misplaced in *Cryptandra* to *Spyridium*, and describes a related species as new.

Spyridium and *Cryptandra*

Spyridium and *Cryptandra* each comprise c. 40 species mostly from southern-temperate Australia, with centres of species diversity in south-eastern Australia, South Australia and south-western Western Australia. Some species of *Cryptandra* (at least as currently circumscribed) extend north into the subtropics.

Traditionally, *Spyridium* and *Cryptandra* have been defined on the basis of a single character of floral morphology, *Cryptandra* flowers having a distinct hypanthium tube and *Spyridium* flowers having only a very short tube or apparently lacking a hypanthium altogether. The hypanthium, however, varies widely and there is a continuous grade in both genera from species in which the tube is very short or indistinct to species in which it is distinct.

A survey of characters throughout the Australian Rhamnaceae, however, shows that three other morphological features can very adequately separate species of *Cryptandra* sensu stricto[1] from *Spyridium* (Table 1; see also Mueller, 1862; Barker, 1995; Coates & Kirkpatrick, 1999).

Although a formal cladistic analysis of these characters is not presented here, the disseminule structure of *Spyridium* and the inflorescence, floral disk and stipule morphology of *Cryptandra* are putative synapomorphies, as each is unique in the tribe Pomaderreae, and indeed in the entire family.

On the basis of these characters, three species of *Cryptandra* from New South Wales, *C. scortechinii*, *C. buxifolia* and the undescribed *C.* sp. A *sensu* Harden (1990) are misplaced and are here transferred to *Spyridium*. All three species have the typical *Spyridium* inflorescence, floral disk and disseminule structure. The three are morphologically closely related, sharing an unusual leaf shape and flowers with a longer free hypanthium tube than other *Spyridium* species (the latter feature explaining their misplacement in *Cryptandra*). Preliminary DNA sequence analyses of the Australian stellate-haired Rhamnaceae support the placement of these species in *Spyridium* (J. Kellermann, June 2004, pers. comm.) and confirms their close relationship as a small monophyletic clade.

Spyridium burragorang *K.R.Thiele,* **sp. nov.**

Type: Wollondilly River, 2 Sep. 1994, *K.R.Thiele 2509*; holo: CANB; iso: AD, MEL, NSW, PERTH**.** (exact details withheld for conservation purposes).

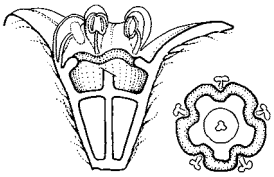
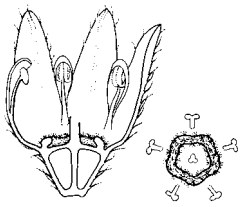
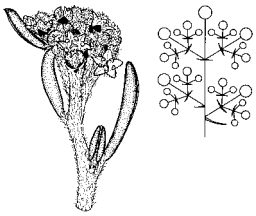
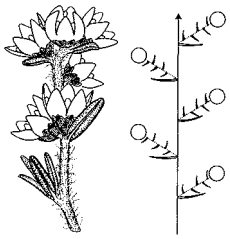
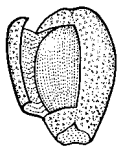
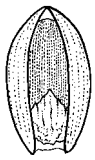
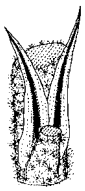
Cryptandra sp. A, G.J. Harden, in G.J. Harden, *Flora of New South Wales* 1: 371 (1990).

Species nova combinatione sequenti distinguenda foliis oblongis vel anguste oblongis, hypanthio tubuliformi 1.8-2.5 mm longo pilis stellatis solum dispositis distaliter, et disco breviter coalito circum basim tubi hypanthii.

Evergreen shrub 0.2–1.5 m high, diffusely multi-stemmed from base. Young stems densely and shortly greyish- or yellowish-stellate, sometimes with intermixed long, curved or flexuose, simple hairs, the stellate indumentum persisting to older stems of current season's growth. Leaves alternate, distinctly discolorous; lamina oblong to narrowly oblong, (10–)15–25(–30) mm long, (3–)4–6 mm wide, entire, with narrowly recurved to revolute margins, smooth, glabrous and dark green above, densely and closely greyish stellate-pubescent beneath, sometimes also with sparse, ± straight,

[1] *Cryptandra* as currently circumscribed contains a number of misplaced taxa, particularly from Western Australia; these will be reassigned once DNA sequence analyses make their affinities clear.

Table 1. Diagnostic characters in *Spyridium* and *Cryptandra* s.s.. (Features in bold text are unique to the respective genera and are considered to be synapomorphies)

Spyridium	***Cryptandra***
	
Floral disk glabrous, lining the hypanthium and forming a shelf-like projection notched adjacent to the staminal filaments	**Floral disk usually pubescent, forming a sinuate annulus around the base or summit of the ovary**
	
Flowers arranged in loose or dense compound cymose inflorescences, with cymose bracts	**Inflorescence comprising a single flower subtended by several to many spirally-arranged bracts**
	
Disseminule an indehiscent pyrene with a thin and papery (often ± translucent) wall covered with a crystal layer, the seed loose within the pyrene and lacking an aril*	Disseminule a seed, the pyrenes ± persistent in the mature fruit, splitting along their inner face to release the arillate seed
	
Stipules membranous or chartaceous, free from each other and lying between the petiole and stem	**Stipules indurate, connate around the base of the petiole**

* *Trymalium* also sheds an indehiscent pyrene as disseminule, but in that genus the pyrene wall is crustaceous rather than thin and papery, and lacks the crystal layer of *Spyridium*.

appressed, simple hairs along the midrib, veins and leaf margins; venation penninerved, obscure; base cuneate to obtuse; apex obtuse, minutely apiculate, straight to recurved; petiole 2–4 mm long; stipules 3–6 mm long, persistent, scarious, triangular to narrowly triangular or rectangular, acute, free, glabrous except along the midrib, dark reddish-brown to almost black. Inflorescences comprising terminal, loose or dense, cymose panicles to 1 cm long by 2 cm wide with 30–50 flowers, subtended by whitish floral leaves; inflorescence axes densely stellate-pubescent like the young stems; bracts rich brown, 3–5 mm long, persistent, ovate or triangular, acute, ciliate on the margins, densely pubescent along the midrib, otherwise ± glabrous. Flowers bisexual, sessile, white or cream, 5-merous. Hypanthium tube 1.8–2.5 mm long, 0.8–1.0 mm diameter, sparsely greyish-pubescent or -villous, with mixed simple and stellate hairs; stellate hairs restricted to the distal third. Sepals 1.0–1.2 mm long, spreading, densely pubescent with short, greyish, stellate hairs overtopped by a few long, flexuose, loosely appressed or spreading simple hairs. Petals 0.6–0.7 mm long, erect, cucullate, clawed. Stamens erect, 0.5–0.6 mm long including the 0.4–0.5 mm long anthers. Disk conspicuous, shortly lining the hypanthium tube at the base, smooth, glabrous, notched adjacent to the bases of the staminal filaments and with broad, obtuse, ± free, emarginate lobes between the filament bases. Ovary inferior at anthesis, remaining so after anthesis; ovary roof stellate-pubescent; carpels 3; style glabrous, 2.0–2.6 mm long, with an obscurely 3-lobed stigma. Fruit maturing c.12 months after flowering, a black or grey, obovoid or ellipsoid, schizocarpic capsule c. 2 mm long; pyrenes indehiscent, pale reddish-brown covered with pale crystals, shed from the capsule at maturity. Seed 1.8–2.0 mm long, uniformly reddish-brown; aril lacking or nearly so. (Fig. 1).

Derivation of epithet: Derived from the place name 'Lake Burragorang'.

Distribution and habitat: Endemic to New South Wales in the Wollondilly and adjacent Nattai River valleys, particularly around the upper parts of Lake Burragorang, at 150–300 m altitude. Found on dry, low ridges in *Eucalyptus crebra* forest with a shrubby understorey, in shallow soil over soft sandstone. Often moderately common, but very restricted and most populations cover only a small area. Flowers June–July; fruits the following year.

Notes: *Spyridium burragorang* is closely related to *S. buxifolium* (Fenzl) K.R.Thiele, which differs in having broadly elliptic, acute leaves, pale brown stipules, a hypanthium tube that is densely stellate-pubescent to the base, and in lacking whitish floral leaves. It is also related to *S. scortechinii* (F.Muell.) K.R.Thiele, which differs in its smaller leaves, denser inflorescences lacking whitish floral leaves, and white-woolly flowers.

Spyridium burragorang was first collected by George Caley during one of several expeditions through the Burragorang Valley, following the route of the explorer Barralier. In 1806 Caley travelled upstream along the Wollondilly River to Douglas Flat (Andrews, 1996), the site of one of the main current populations of *Spyridium burragorang*. The specimen collected by Caley bears a label annotated 'Dicky Robinson's, September 1808'. No references to 'Dicky Robinson's' can be found, and the date is presumably in error, as Caley's last expedition from Sydney was in 1807 (Webb, 1995). No further collections are known until those collected in the mid-1960's.

Conservation Status. Although geographically restricted, the species is relatively secure. All populations are in National Parks or restricted-access catchment areas. A conservation code of 2RCa (following the codes of Briggs & Leigh, 1996) is suggested.

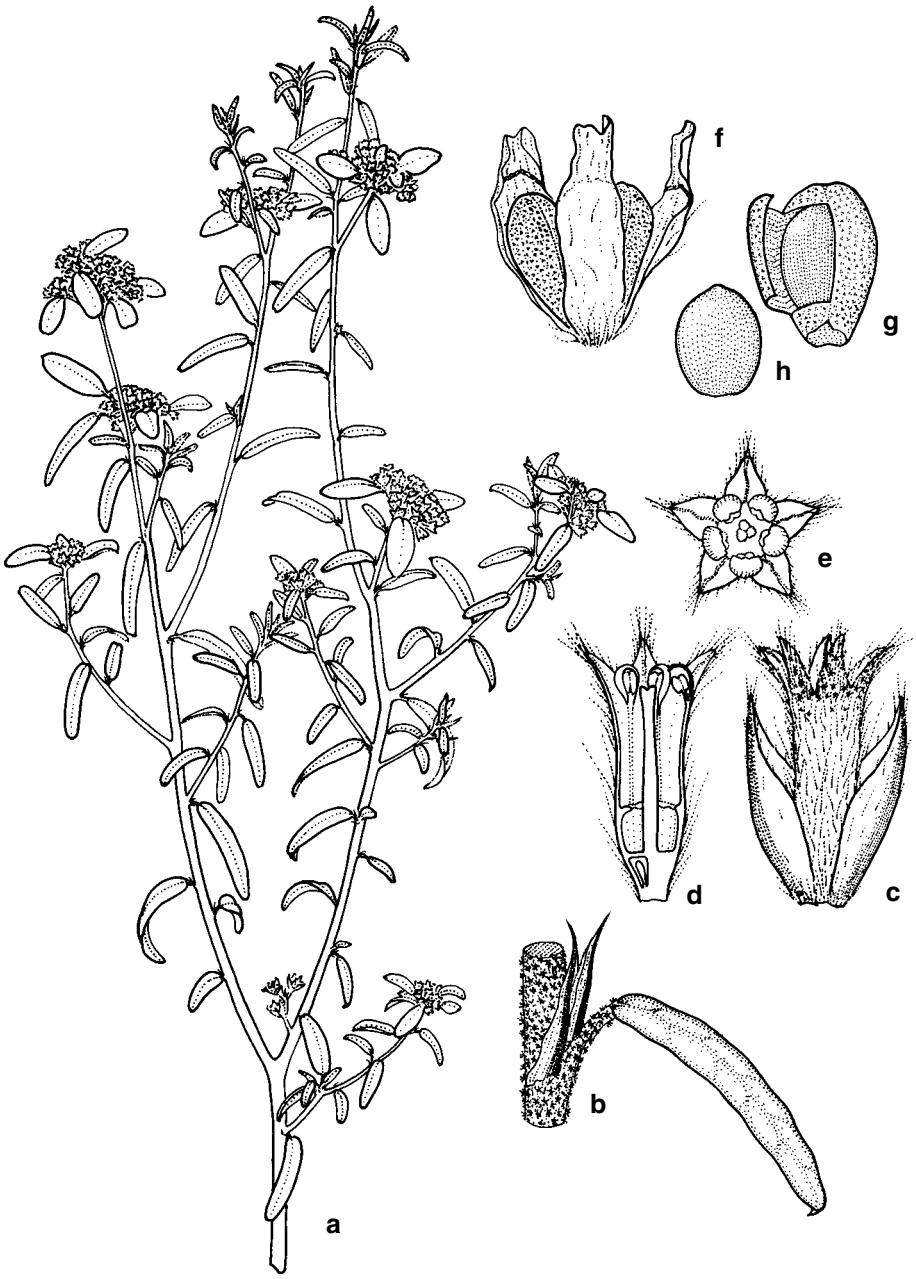


Fig. 1. Spyridium burragorang a, habit × 0.5; **b**, leaf and stipule × 5; **c**, flower with bracts × 10; **d**, flower in LS × 10; **e**, flower from above × 10; **f**, fruit, showing pyrenes within the schizocarpic hypanthium × 10; **g,** pyrene, opened to show the seed × 10; **h**, seed × 10.

Other specimens examined (exact details withheld for conservation purposes): NSW 'Dicky Robinson's', Sep 1808, *G. Caley s.n.* (NSW); Burragorang Valley, 26 Feb 1967, *L.A.S. Johnson & A Rodd 441* (CANB, NSW); Nattai River, 29 Jun 1974, *I. Olsen 2162* (NSW); E of Warragamba Dam, Feb 1969, *R. Mitchell s.n.* (CANB, NSW); Between Tonalli R. and Byrnes Ck, 17 Aug 1966, *R. Mitchell 411* (NSW).

New Combinations

Spyridium buxifolium *(Fenzl) K.R.Thiele*, **comb. nov.**

Cryptandra buxifolia Fenzl in S.F.L.Endlicher, *Enum. Pl.* 23 (1837).

Type: New South Wales, *A. Cunningham s.n.*; **lecto**: K (Hunter's River) (!)- **here designated**; syn (!): K, BRI 70463, BRI 70464, CBG 7800636 at CANB, CBG 7800637 at CANB.

Spyridium scortechinii *(F.Muell.) K.R.Thiele*, **comb. nov.**

Cryptandra scortechinii F.Muell., *Australas. Chem. Druggist* 6: 72 (1884); *Stenanthemum scortechinii* (F.Muell.) Maiden & Betche, *Proc. Linn. Soc. New South Wales* 27: 57 (1902).

Type: On the Severn, *B. Scortechini s.n.*; holo: MEL 2223246; iso: NSW(!).

Acknowledgments

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