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SPYRIDIUM ERYMNOCLADUM, A NEW SPECIES FROM EYRE PENINSULA, SOUTH AUSTRALIA, AND NEW STIPULE CHARACTERS IN AUSTRALIAN RHAMNACEAE

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Abstract

This new species is described and illustrated for the first time. It is characterised by the pair of stipules at each node being joined between the leaf they subtend and the branchlet for most of their length and consistently greatly overlapping the leaf base and stipular pair of the node above. It is currently known from two localities approximately 15 km apart in two different environmental associations. New characters involving two types of fusion of the stipules of each pair are used to clarify the affinities of this species and are of potential use in defining generic relationships of the Australian stellate-haired Rhamneae.

This new species of *Spyridium* is distinctive in the imbricate scarious brown stipular pairs which completely envelop the branchlets. It is described to make it available in a study of generic delimitation within the Australian Rhamnaceae by Dr Kevin Thiele of the Australian National Herbarium, Canberra, and to encourage investigation of its conservation requirements.

Spyridium erymnocladum W.R. Barker, *sp. nov.*

Species nova stipulis imbricatissimis ramos plane occulentibus in genere unica.

Holotypus: *D. Paull s.n.*, viii.1993, a few kilometres N of Karkarook, an abandoned, now demolished, railway siding halfway between Kielpa and Rudall. In low abundance. Mixed mallee spp. (*Eucalyptus incrassata*, *Euc. leptophylla*) with 5 m canopy with up to 7 m emergents; shrub layer with *Melaleuca uncinata* dominant; diverse ground layer [species list for site attached to specimen]; white sandy soil. AD99336201. *Isotypi*: CANB, PERTH.

Low woody *shrub* c. 30 cm high (*Hall 239*); *indumentum* eglandular, persistent, on branchlets, stipules, leaves, bracts and pedicels variously comprising antrorse, straight to wavy hairs c. 0.5–1 mm long and/or shorter stellate hairs with radiating arms c. 0.1–0.2 mm long; *branchlets* persistently densely tomentose with antrorse hairs c. 0.5–1 mm long covering shorter stellate hairs with arms c. 0.1–0.2 mm long, the indumentum exposed only after leaf drop and the decay of the stipules, finally losing indumentum and exposing an intricate transverse ribbing from the former attachment of the stipules and leaf. *Stipules* at successive nodes greatly imbricate, completely enclosing the branchlets, long-persistent, each pair fused along the margin between the leaf and branchlet over much of their length (c. 90%), the resulting pair broadly ovate, 3.5–4 mm long, with an abaxial channel marked by the stipular midribs and clasping the young leaf and two acuminate teeth separated by an apical cleft, dark brown, shiny, scarious, glabrous apart from the long antrorse hairs 0.4–1 mm long lining the margins and the short-armed stellate pubescence on the midribs. *Leaves* narrowly angled to branch, slightly spreading distally, the *petiole* largely hidden by the stipules below, slender, 0.8–1.5 mm long, pale, stellate-pubescent, with longer antrorse hairs at apex on abaxial side; *blade* linear through the revolute margins, 3.5–6.5 mm long, 0.8–1 mm wide, flexile, appearing uncinate from the apical cluster of antrorse hairs, without a mucro, the adaxial surface grey-green, not grooved, densely shortly stellate-pubescent, the abaxial surface occasionally exposed along midline, pale, long antrorse-

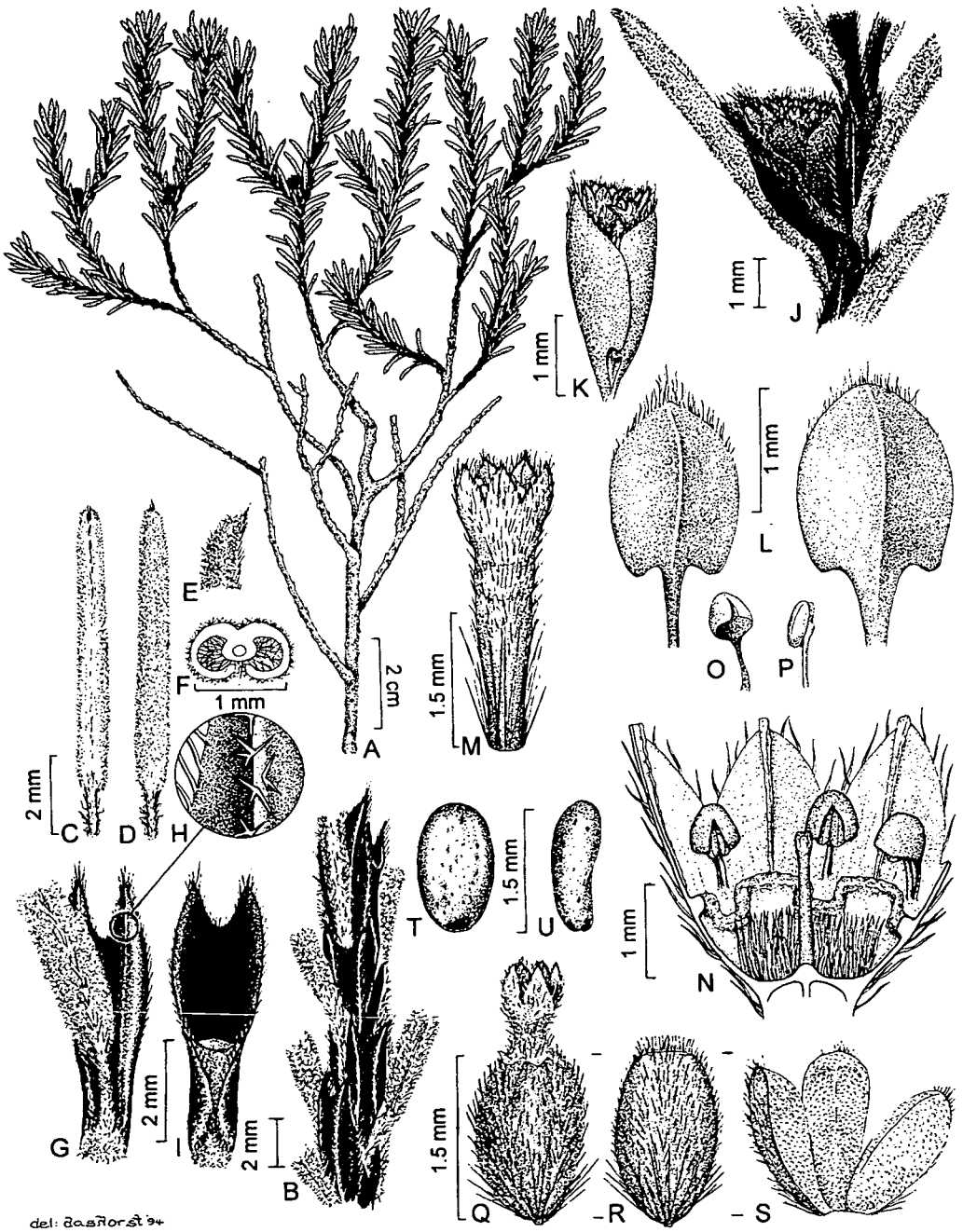

Fig. 1: *Spyridium erymnocladum*. A. branch; B, branch in close-up showing imbricate stipule pairs; C–F, leaf: C, abaxial side; D, adaxial side, E; apex in lateral view; F, transverse section; G–I, stipular pair, G, external view showing insertion of mature leaf and central channel, H, indumentum, I, internal view; J, inflorescence with inflorescence-subtending leaf and encircling brown bracts; K, L, petiolate brown bracts surrounding flowers; M, flower; N, upper half of flower in longitudinal section; O, petal; P, stamen; Q–S, fruit: Q, with persistent floral tube, R, prior to dehiscence, S, following dehiscence; T, U, seed. (*D. Paull AD99336201*).

pubescent. *Inflorescence* apparently axillary (but see Notes below), subtended by a normal leaf and stipular pair, surrounded by imbricate scarious brown bracts extending to the tip of the flowers; *bracts* shortly petiolate, concave, broadly ovate, acute, glabrous but for antrorse hairs along the margins. *Flowers* c. 7, externally covered by antrorse hairs, 1.5–2 mm long on pedicel, to 1 mm long on ovary, and to 0.5 mm long on floral tube and sepals; *pedicel* 0.3 mm long; *ovary* 1 mm long, narrow obovoid topped within floral tube by dense erect hairs 0.3 mm long; *floral tube* 0.8 mm long; *sepals* 0.7 mm long; *disc* 0.5 mm long, prominent; *petals* 0.5 mm long, spathulate, enclosing the anthers; *style* included, 0.9 mm long, shortly 3-lobed at apex. *Fruits* 1 or 2 per infructescence, ellipsoid, 2 mm long, antrorse-pubescent, topped by persistent floral tube, at length dehiscent from apex; *cocci*: not all 3 developing, the wall white, membranous, minutely white-papillose on the two inner sides, the outer side at least initially fused to ovary wall, lacking a basal hole; *seed* compressed ellipsoid, 1.5 mm long, 0.9 mm wide, shiny, dark brown, flecked with black; *caruncle* easily detached and left at base of coccus on removal of seed. Fig. 1.

Distribution

S. erymnocladum is known from two collections made in 1986 and 1993 from north-eastern Eyre Peninsula from sites approximately 10-15 km apart between the towns of Cleve and Darke Peak.

Ecology

Under Laut's (1977) classification of South Australian environments these collections come from the Hambidge (*Paull s.n.*) and Mt Desperate (*Hall 239*) environmental associations of the Wirrula environmental province. The collectors' notes confirm the different ecologies of the two localities. Unlike the *Paull* collection (see under Holotypus), *Hall 239* was found in low frequency confined to a hill top in sandy loam and ironstone amongst the regenerating shrubs *Calytrix tetragona, Hakea cycloptera, Acacia farinosa* and *Eremophila gibbifolia*. The height of this vegetation and presumably the *Spyridium* itself was unusually low as both were in a state of regeneration soon after a fire (Mrs T. Hall, pers. comm. Feb. 1994).

Conservation status

The frequency of occurrence of the species requires clarification. As it apparently occupies two habitat types and tracts of native vegetation have survived in the region it is likely to be more widespread. On the present information it seems advisable to rate it as vulnerable, with a 2V rating under the systems of Lang & Kraehenbuehl (1987) and Briggs & Leigh (1988).

Notes

The species epithet derives from the Greek *erymnos*, fenced, and *klados*, branch, alluding to the conspicuous overlapping stipules which completely shield the branchlets, a feature unknown amongst other members of the genus.

This is not *Cryptandra uncinata*, long a puzzling species described from South Australia. The latter has been shown by Davies (1987; confirmed by Dr R.J. Chinnock, pers. comm., Jan. 1994) to be *Eremophila sturtii* (Myoporaceae).

Dr K. Thiele's observation (pers. comm. Dec. 1994) that inflorescences of other species of *Spyridium* are terminal, with subsequent production of a shoot from an axil below it giving the impression of an axillary inflorescence, is confirmed in this species. In the two specimens seen, the inflorescences, all at fruiting stage, are single on each leaf-bearing branchlet, with a new shoot of similar length produced past each.

Specimens examined

SOUTH AUSTRALIA. EYRE PENINSULA: *T. Hall 239*, 16.x.1986. W of main Cleve – Kimba road in Campoona Hill area, c. 1 km NE or SE of High Bluff, on W side of N–S vehicular track. AD; *D. Paull s.n.*, see Holotypus.

Stipule characters in Australian Rhamneae and the relationships of *S. erymnocladum*

New characters in stipule morphology have been useful in assessing the relationships of *S. erymnocladum*. They are likely to prove useful in the re-evaluation of generic delimitation in the stellate-haired Rhamneae, a group confined to Australasia (Suessenguth 1953). Other unpublished work by Dr B.L. Rye (pers.comm. 1994; partly in Rye 1995) and Dr K. Thiele (pers. comm. 1994) involving characters in the inflorescence and fruit indicates that these genera must be redefined. In particular, this incomplete survey of stipule arrangement further calls into question current generic delimitation of the two allied genera *Spyridium* and *Cryptandra*, which, following Suessenguth (1953), is based solely on the greater length of the floral tube (hypanthium) in the latter. Previously Conn (1983) called the limits of these genera into question, while Barker & Lang (1987) alluded to the possibility that floral characters separating these genera may have evolved more than once as adaptations to different modes of pollination.

The closest affinities of *S. erymnocladum* apparently lie with species currently placed in both *Cryptandra* and *Spyridium* in which the two stipules subtending each leaf are fused along their adjacent margins in between the leaf and branch. The combined stipular pair forms a distinctive channel which clasps the younger leaves. Species with this feature include *Cryptandra waterhousii* (Fig. 2E), *C. leucophracta, Spyridium leucopogon, S. phylicoides, S. eriocephalum* (the generic type, Fig. 2D), *S. tridentatum* of South Australia, *S. subochreatum, S. halmaturinum* (in part) and *S. bifidum*. In none of these species do the stipules subtending adjacent leaves overlap to completely obscure the branch as in *S. erymnocladum*. Stipules are free in other species of *Spyridium*, including *S. spathulatum, S. nitidum, S. vexilliferum, S. coactilifolium, S. halmaturinum* (in part), *S. parvifolium, S. thymifolium* (Fig. 2C), *S. phlebophyllum* and *S. tricolor* (Barker & Rye 1993, fig. 1B). Other species of *Cryptandra*, such as *C. tomentosa, C. propinqua, C. ericifolia* (the generic type, Fig. 2F) and *C. amara*, exhibit a second type of stipular fusion. In this case stipules of each pair are not united between the leaf and branch, but are fused on the abaxial side of the branch below the point of attachment of the leaf.

Stipule morphology should assist in defining species groups and their relationships within the Australian stellate-haired Rhamneae. Free stipules are found not only in some species of *Spyridium* but also in *Pomaderris, Trymalium* and *Siegfriedia* (Fig. 2B) and widely disparate genera such as *Rhamnus* (Fig. 2A). Among these *Siegfriedia* and some species of *Pomaderris* share with *Rhamnus* the presumably plesiomorphic (primitive) state of the stipules being quite separate on either side of the leaf. In other species of *Pomaderris*, those of *Spyridium* listed above with free stipules, and *Trymalium* the stipules overlap between the leaf and the branchlet. *Cryptandra leucophracta* and *C. waterhousii*, through possession of stipules fused between the leaf and the branch, appear more closely related to the species of *Spyridium* with this trait than to the other listed species of *Cryptandra*. The former species also shares the apparent synapomorphies of most species of *Spyridium* of the persistent brown bracts which surround the inflorescence and a leaf-like inflorescence-subtending bract, which from the very dense white stellate pubescence is white on the upper side in contrast to the upper side of the leaves which through their sparser indumentum are grey-green in colour. Stipular fusion below the point of leaf attachment is a separate synapomorphy of the group of species of *Cryptandra* which includes the generic type. Whether these states of stipular placement and degree of fusion evolved only once will be gauged on how they correlate with other character transformations in cladistic analyses.

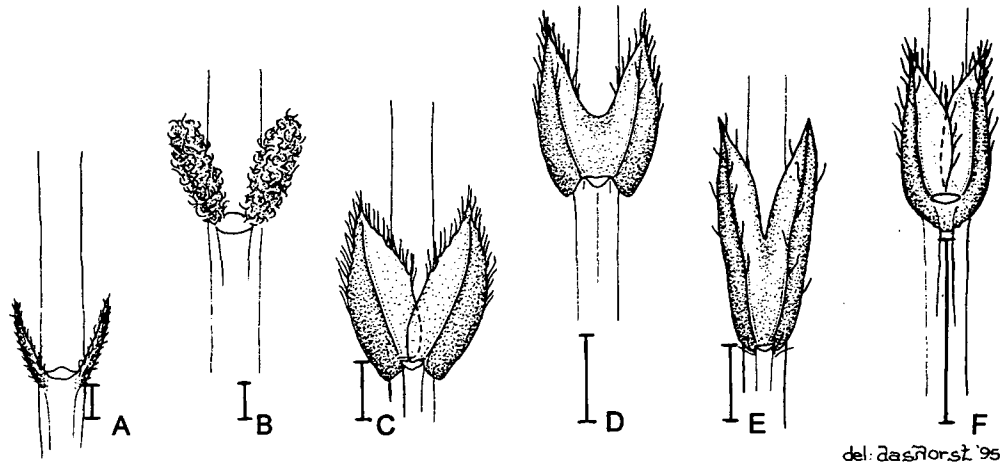

Fig. 2: Stipules in Rhamnaceae (with leaf removed and indumentum on branchlets not shown), indicating the two ways in which fusion between stipules subtending the same leaf has developed in Australian genera. A, *Rhamnus alaternus* (*D.E. Symon AD98663570*); B, *Siegfriedia darwinioides* (*A.S. George 9305*); C, *Spyridium thymifolium* (*D.J.E. Whibley 9014*); D, *Spyridium eriocephalum* var. *eriocephalum* (*W.L. Quinn 58*); E., *Cryptandra waterhousii* (*L.D. Williams 12821*); F, *Cryptandra ericifolia* (*Anon. AD98005086*). Scales = 1 mm.

With a generic revision pending, where should the new species be placed: in *Spyridium* with its closest relatives, which include the generic type, even though hypanthium length character at present used to delimit the two genera would indicate that it should be placed in *Cryptandra*, or alternatively in *Cryptandra*, the older name which would be taken up were the *Cryptandra-Spyridium* clade combined under one genus? The new generic system of Australian stellate haired Rhamneae is likely to involve recognition of further genera than currently recognised (Dr K. Thiele, pers.comm. Dec. 1994). Accordingly, I have chosen the former course of action, to name the species under the present two-generic system with what are considered its closest relatives.

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