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## DAVIESIA ARENARIA (FABACEAE), A NEW SPECIES FROM THE MALLEE LANDS OF SOUTH-EASTERN AUSTRALIA

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### Abstract

*Daviesia arenaria*, a new species from sandy soils of inland South Australia, New South Wales and Victoria, is described. It was previously confused with the widespread *D. ulicifolia* Andr. A diagnosis to separate the two species is given, along with an illustration, distribution map and notes on its ecology.

### Introduction

The new species is not a new discovery. It has long been confused with the widespread, closely related *D. ulicifolia*. The two species can easily be distinguished by three consistent morphological characters. *D. arenaria* typically occurs on deep sandy soils where it may be edaphically isolated from *D. ulicifolia*.

In 1864, Bentham included material of the new species in his concept of *D. ulicina* Sm. forma *ruscifolia* (A. Cunn. ex Benth.) Benth. (eg. Mueller's collection of 7 Oct 1851 from St Vincent's Gulf). However, the type of the base-name, *D. ruscifolia* A. Cunn. ex Benth., is a single collection from New South Wales near the present site of Canberra, which clearly belongs to *D. ulicifolia* (syn. *D. ulicina*). Hence there is no question of the new species being involved in the original concept of *D. ruscifolia*. Black (1924) raised the epithet *ruscifolia* to varietal level, but misapplied it to material wholly belonging to *D. arenaria*.

I am working towards a complete revision of the genus *Daviesia*, but will not complete it soon. Meanwhile, I am publishing *D. arenaria* in advance so that the name will be available for the new handbook to the Plants of western New South Wales by Cunningham et al., currently in press.

### *Daviesia arenaria* M.D. Crisp, sp. nov.

*D. ulicifoliae* Andr. arte affinis sed ob folia supra complicata et sulco centrale in longitudinem, vexillum omnino postice praeter ad centrum marroninum, carinam angustiorem et apice incurvam apiculatam acutam differt.

*D. ulicina* Sm. forma *ruscifolia* (A. Cunn. ex Benth.) Benth. pro parte, Flor. Aust. 2(1864)81; *D. ulicina* Sm. var. *ruscifolia* (A. Cunn. ex Benth.) J.M. Black, Flor. S. Aust. (1924)296; non *D. ruscifolia* A. Cunn. ex Benth., Comment. Legum. Gen. (1837)75.

**Holotype:** New South Wales, 31.5 km W of Euston along Sturt Highway towards Mildura (Victoria), 34° 26'S, 142° 28'E, M.D. Crisp 5720, 18.viii.1979, fl., photos, spirit material (CBG). **Isotypes:** AD, K, L, MEL, NSW.

The specific epithet refers to the sandy soils of its habitat.

**Shrub**, generally low, spreading and hummocky, to 1.5 m tall and 2.5 m broad; the vegetative parts rather stiffly pubescent or rarely glabrous. **Branchlets** numerous, divaricate, short, longitudinally ridged, rigid and spiny. **Leaves** alternate, ascending, sessile, articulate with the branchlet, commonly very broad-ovate and cordate, occasionally narrow- to broad-elliptic and attenuate towards the base, rarely obovate, cuspidate, pungent, rigid, 2.5-10 x 1.5-8 mm; upper surface grooved along the midrib and slightly folded upwards to give a V transection; lower surface with thickened, raised marginal nerves and midrib; lateral venation finely reticulate. **Flowers** 1(-2) per axil;

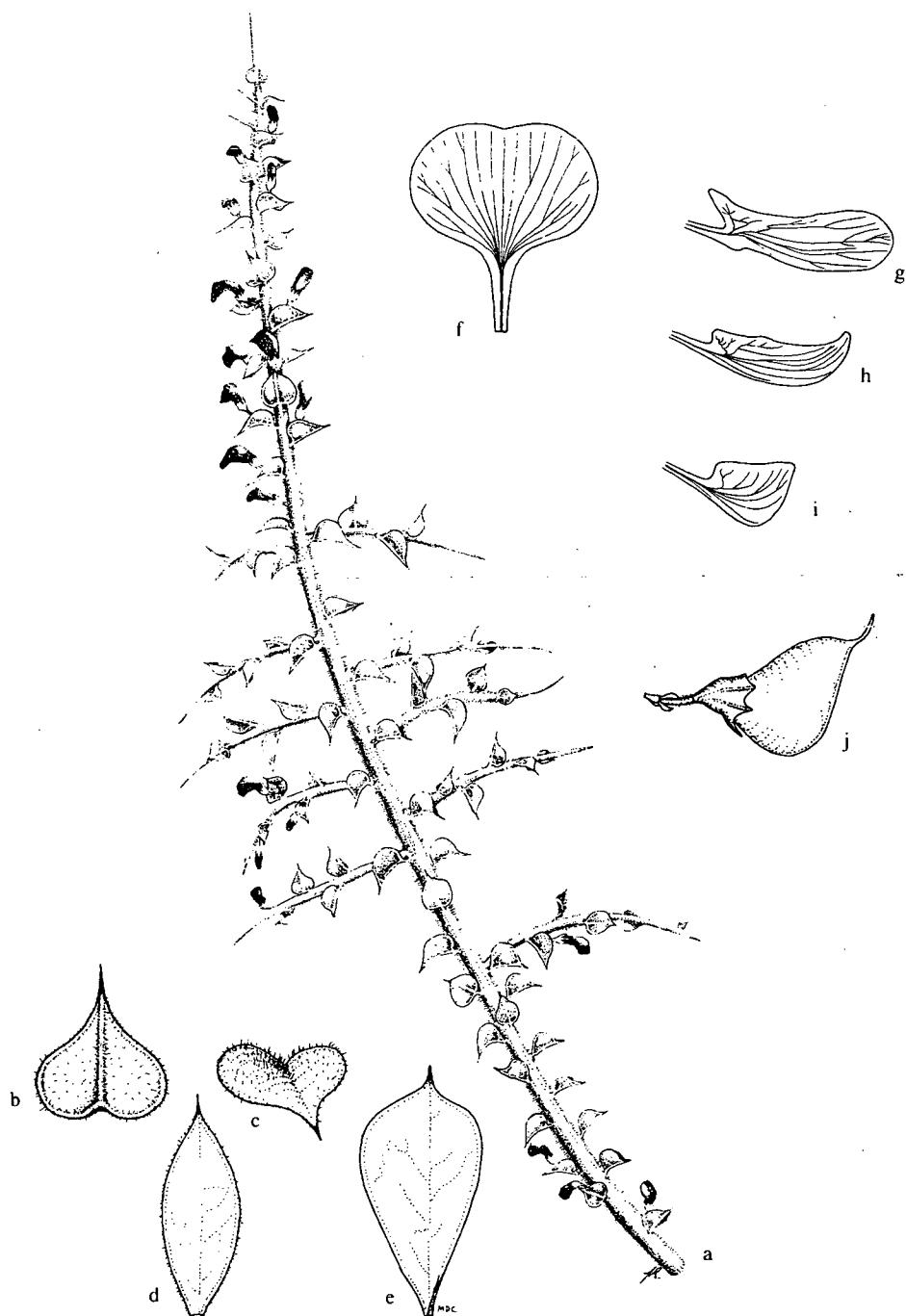
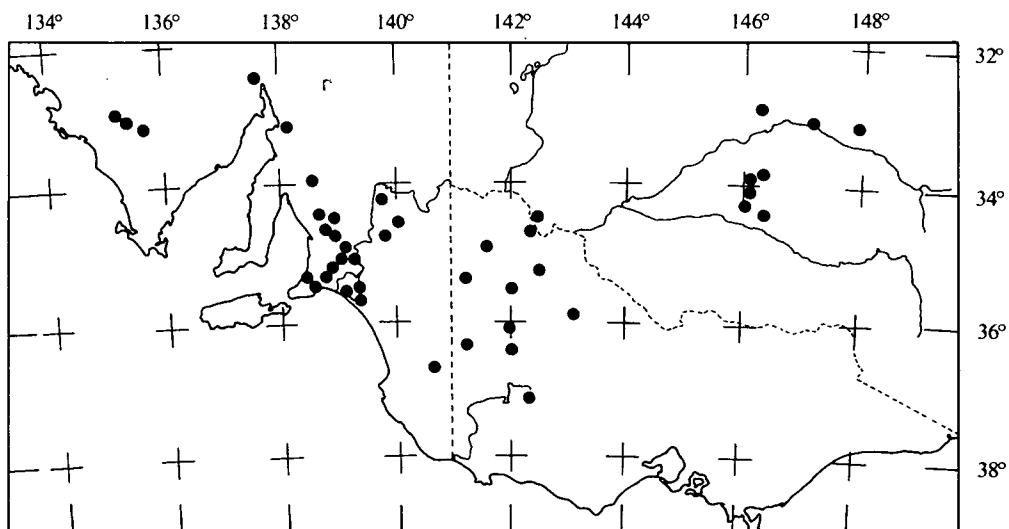


Fig 1. *Daviesia arenaria*. a, flowering branchlet, nat. size; b, typical leaf, from below,  $\times 3$ ; c, same, obliquely from above,  $\times 3$ ; d & e, leaves showing variation in shape and pubescence,  $\times 3$ ; f, standard,  $\times 4$ ; g, wing,  $\times 4$ ; h, keel  $\times 4$ ; j, legume,  $\times 3$ . *D. ulicifolia*. i, keel,  $\times 4$ . (a-c & f-h from M. D. Crisp 5720 (type); d from D. N. Kraehenbuehl 479; e from G. R. Harris s.n., ADW21554; i from J. H. Helmsley 6243 [MEL]; j from L. Haegi 687.)

pedicel 2-3 mm long, with several imbricate barren bracts towards the base, stiffly pubescent or glabrous. *Calyx* articulate with the pedicel, oblique-campanulate, 2.5-3.5 mm long, abruptly contracted at the base into the c. 0.5 mm receptacle; lobes subequal, triangular, acute, minutely fimbriate at the margins, c. 1 mm long, each with a raised midnerve extending up from the base of the tube; upper 2 lobes slightly broader and lowermost one slightly longer than the others. *Corolla* papilionaceous; *standard* 6-7 x 5-6 mm, thickened and sigmoid along a line running up the claw to the base of the lamina; lamina depressed-ovate, shortly decurrent with the 1-2 mm claw, orange-pink in front, intense maroon on the back, except for a yellow central line on both sides; *wings* narrow-obovate, falcate, rounded at the apex, auriculate at the base, 6-7 mm long including the 2 mm claw, maroon in the upper half; *keel-petals* connate along the lower margin except the claws, narrow-elliptic, incurved, beaked, slightly auriculate, slightly saccate near the centre, 6-7 mm long including the 2 mm claw, maroon in the upper half. *Stamens* more or less uniform, completely free; *anthers* basifixated, transverse-broad-elliptic in outline. *Ovary* shortly stipitate, narrow-elliptic, attenuate into the incurved style; ovules 2; stigma terminal, minute. *Legume* exserted from the calyx, compressed, asymmetrically transverse-obtriangular, beaked with persistent style, sigmoid along upper suture, 6-7 x c. 4 mm, dehiscing elastically; *seed* 1, ellipsoid, conspicuously arillate, c. 3 mm long, brown with black markings. Fig. 1.

#### *Distribution*

Widespread in mallee districts of south-eastern Australia, from near Minnipa on the Eyre Peninsula (South Australia), south-east to the Grampians (Victoria), and east to Bogan Gate in New South Wales, (Map 1).



Map 1. Distribution of *Daviesia arenaria*.

#### *Representative specimens* (total examined 89)

SOUTH AUSTRALIA: Spring Gully [Conservation] Park, Clare, R. Bates 349, ix.1978, fl. (AD); pine forest between Gawler town and Light River, H. H. Behr 190, xi.18?, fl. (MEL); 20 km north-east of Blanchetown on Waikerie rd, 34° 16'S, 139° 48'E, L. Haegi 687, 5.x.1975, fr. (AD, P, PR, RSA); roadside, Naracoorte-Bordertown rd, near The Gap, D. Hunt 5, 31.viii.1961, fl. (AD); near Yatala Vale, D. N. Kraehenbuehl 479, 25.ix.1961, fl. (AD, NSW, W); sand scrub, Tanunda, D. N. Kraehenbuehl 655, 22.ix.1962, fl. (AD, MEL, NSW); St Vincents Gulf, F. Mueller s.n., 7.x.1851, fl. & fr. (MEL); between Kimba and Minnipa, K. B. Warnes 116, 31.viii.1969, fl. (AD).

NEW SOUTH WALES: Shepherds Hill, Euabalong West., *G.M. Cunningham & P.L. Milthorpe s.n.*, 2.ix.1974, fl. (NSW, Soil Conserv. Serv. N.S.W.); 1 mile [1.5 km] east of Bogan Gate on Forbes-Condoblin rd, *M.D. Tindale & C.K. Ingram s.n.*, 3.x.1956, fl. (NSW).

VICTORIA: 10 km S of Murrayville, Big Desert, *A.C. Beaglehole 57061*, 19.xi.1977, fr. (CBG, MEL); 90 km SSW of Mildura, 2.7 km WSW of Mt. Crozier, 35° 54'S, 141° 40'E, *M.D. Crisp 3387*, 11.x.1977, fl., fr., photo (CBG); near Moora-Moora Reservoir, Grampians, *P. Mathews s.n.*, 3.i.1977, fr. (MEL).

CULTIVATED: National Botanic Gardens, Canberra (ex. N.S.W., 36 km from Euston along rd to Mildura, *M.D. Crisp 3281*, x.1977), *M.D. Crisp 5667*, 19.ii.1979, seedling (CBG).

#### *Affinity*

The closest relative of *D. arenaria* is *D. ulicifolia*. The latter is the most widespread and one of the most variable species in the genus. It extends from Cape York south to Tasmania and west to the Great Victoria Desert. There are at least 6 morphologic-geographic forms which show variation mainly in the leaf and inflorescence. Comparisons of all these forms with *D. arenaria* give consistent differences between the two species in three characters.

The leaf of *D. ulicifolia* varies in shape and size, but always the upper surface is convex (to nearly flat) with a prominent raised midrib. Its standard is infused with brownish pink towards the centre but is always paler (yellow to orange) towards the margins on the back. Most importantly, the keel is broader, more or less obtuse and not incurved or apiculate at the apex (Fig. 1).

In addition, the leaves of *D. ulicifolia* are never cordate, although in two forms they are ovate-acuminate. The plants are rarely pubescent, the inflorescence in some forms is umbelliform with up to 4 flowers, while the standard-lamina is not usually decurrent with the claw, and is sometimes cordate.

#### *Ecology*

*Daviesia arenaria*, although widespread, is seldom common. It typically occurs on deep sand, often on the crests of dunes, in association with mallee vegetation. At the type locality, the vegetation is dominated by the mallees *Eucalyptus dumosa* A. Cunn. ex Schau. and *E. foecunda* Schau., while the understorey is characterised by *Triodia* hummock-grasses. *D. arenaria* plants sprout vigorously from the base after fire, and appear to favour openings in the vegetation canopy.

In the wetter limits of its range, the new species is found in open-forest dominated by *Callitris* spp. or eucalypts such as *E. dealbata* A. Cunn. ex Schau. and *E. sideroxylon* A. Cunn. ex W. Woolls (N.S.W.) or *E. leucoxylon* F. Muell. and *E. macrorhyncha* F. Muell. (S.A.). In such places it may extend to skeletal soils on ridge-tops.

*D. arenaria* is not presently in danger of extinction. It occurs in the Wyperfeld and Hattah Lakes National Parks in Victoria. However, it can no longer be found in the localities close to Adelaide. The species is in cultivation in the National Botanic Gardens.