

## The taxonomy of some South Australian *Acacia* section *Phyllodineae* species (Leguminosae: Mimosoideae)

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### Abstract

Maslin, B.R. and Whibley, D.J.E. The taxonomy of some South Australian *Acacia* section *Phyllodineae* species (Leguminosae: Mimosoideae). *Nuytsia* 6(1):19-32 (1987). Two new *Acacia* section *Phyllodineae* DC. species, *A. alcockii* and *A. cretacea*, are described and illustrated. Both have restricted distributions on the Eyre Peninsula, South Australia. *Acacia cretacea* is considered endangered. *Acacia alcockii* may be of hybrid origin involving *A. anceps* DC. and *A. leiophylla* Benth. as parents. Descriptions are provided for *A. anceps*, *A. nematophylla* (hitherto considered conspecific with *A. calamifolia* Sweet ex Lindley) and *A. notabilis* F. Muell. Putative hybrids between *A. anceps* and *A. nematophylla* and *A. anceps* and *A. notabilis* are noted. A *lectotype* is selected for *A. notabilis*.

### Introduction

The main purpose of this paper is to validate new names for use in the forthcoming Flora of Australia account of *Acacia* section *Phyllodineae* DC. Two new South Australian species endemic to the Eyre Peninsula are described and illustrated, viz. *A. alcockii* and *A. cretacea*. Both species belong to an Australia-wide group whose members are characterized by 1-nerved phyllodes, globular flower-heads which are usually arranged in racemes and by long, often red-brown funicles which encircle the seeds. Other members of this group which are described and discussed here include *A. anceps* DC., *A. nematophylla* F. Muell. (until now considered conspecific with *A. calamifolia* Sweet ex Lindley) and *A. notabilis* F. Muell. Putative hybrids between *A. anceps* and *A. leiophylla* Benth., *A. nematophylla* and *A. notabilis* are discussed.

#### 1. *Acacia alcockii* Maslin and Whibley, sp. nov. Figure 1.

Frutex dumosus c. 3 m altus, saepe surculosus. Ramuli sursum subangulati, glabri. Phyllodia plerumque anguste elliptica vel oblanceolata, apice obtusa vel attenuata, basin versus attenuata, 6-9(10) cm x 8-16(21) mm, longitudo: latitudo = (3)5-8(11), tenuiter coriacea, recta vel leviter recurva, glabra, atroviridia, uninervia, nervis lateralibus sat indistinctis; pulvinus 2-6 mm longus. Racemi plerumque 2-4 cm longi, capitulis floriferis (2)5-11, pedunculis glabris (3)4-5 mm longis, pedunculis nonnullis simplicibus axillaribus 8-10 mm longis interspersis. Capitula florifera globularia, pallide flava, 25-40-flora. Flores 5-meri. Calyx gamosepalus. Legumen oblongum ad anguste oblongum, ad c. 9 cm longum sed saepe brevius, 10-17 mm latum, tenuiter coriaceo-crustaceum, glabrum. Semina transversalia, obloideo-ellipsoidea, 5-6 x c. 2.5 mm, nigra, funiculo filiformi pallide rubrobrunneo cincta.

*Typus*: Eyre Peninsula district, Lincoln National Park, 2.6 km N of Port Lincoln-Cape Donnington road towards Stamford Beach, Stamford Hill, South Australia, 18 Sept. 1983, J.D. Briggs 1211 (holo: PERTH; iso: AD, BRI, CBG, MEL, PERTH).

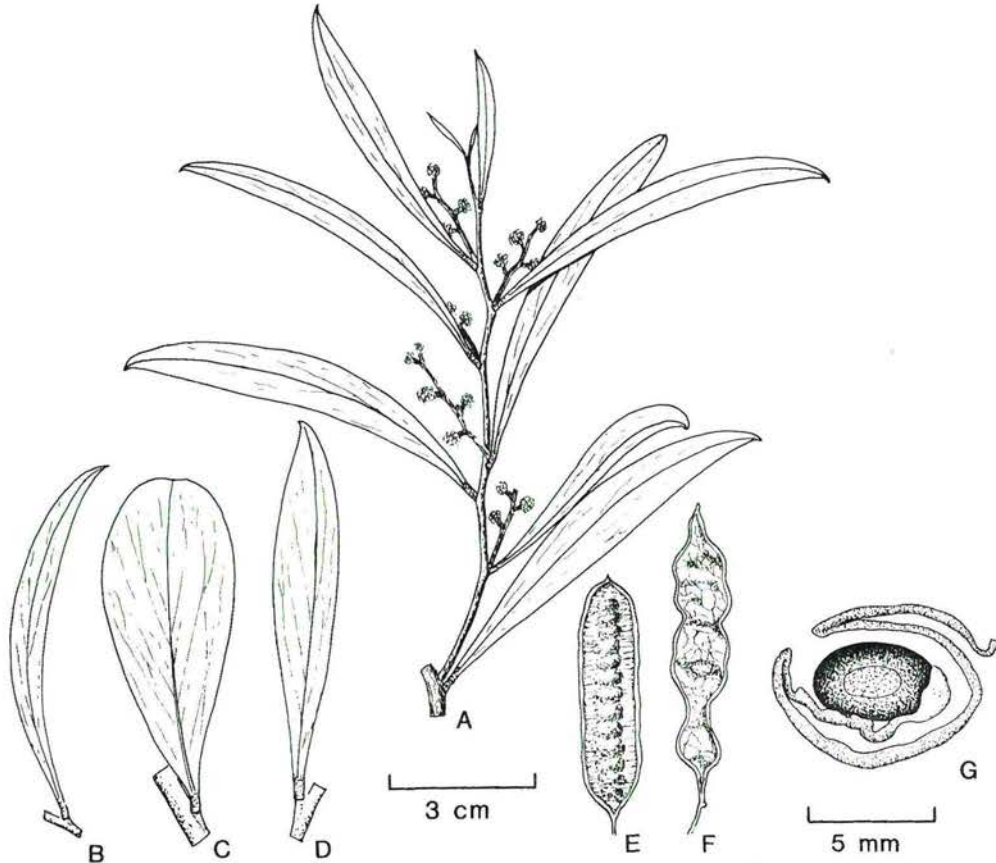


Figure 1. *Acacia alcockii*. A — Flowering branchlet. B to D — Phyllode variation. E — Legume (mature). F — Legume (immature). G — Seed showing light red-brown funicle encircling seed in a double fold. A from C.R. Alcock 1682; B from C.R. Alcock 1256; C from J.W. Wrigley WA/68 7645; D from C.R. Alcock 1656; E from C.R. Alcock 1682; F from K. Holliday s.n. (AD 984227395); G from E.M. Canning 5390 and S. Corbett.

Bushy *shrub* to c. 3 m tall, often suckering (especially if roots are disturbed). *Bark* mostly smooth, grey or brown at base of trunks, reddish on young branches. *Branchlets* terete but slightly angled at extremities, very finely nerved, straight to very slightly flexuose, rather slender, glabrous, sometimes marked with prominent, distant, raised leaf bases where phyllodes have fallen. *Stipules* persistent, triangular to deltate, minute, c. 0.5 mm long. *Phyllodes* usually narrowly elliptic to oblanceolate, slightly asymmetric, gradually narrowed towards the base, attenuate or abruptly narrowed to acute or obtuse apices, mucro usually present and uncinat, mostly 6-9(10) cm long and 8-21(30) mm wide but frequently interspersed with a few smaller phyllodes (4-5 cm x 5-8 mm), l:w = (2)3-10, straight to shallowly recurved, very thinly coriaceous, flexible, glabrous, dark green; *midrib* not overly prominent but slightly raised when dry, usually yellowish to light brown, central to slightly excentric; *lateral nerves* rather obscure, diverging from midrib at an acute angle, sparsely and openly longitudinally anastomosing; *marginal nerves* narrow, yellowish to light brown; pulvinus 2-6 mm long, drying finely wrinkled and dark brown or reddish brown. *Gland* situated on upper margin of the phyllode (3)8-12(20) mm above the pulvinus, circular or oblong, 0.3-0.6 mm long, sometimes very slightly raised above the margin which is sometimes very slightly indented at the gland, orifice shallow but distinct. *Inflorescences* 1(2) per node, racemose, very rarely interspersed with some simple axillary peduncles, racemes sometimes paniculately arranged. *Racemes* (1.5)2-4(5) cm long with (2)5-11 heads, the lowermost head inserted 8-18 mm above the base; raceme axes straight to very slightly flexuose, glabrous, very finely wrinkled when dry, base ebracteate. *Peduncles*

(3)4-5 mm long (on racemes) or 8-10 mm long (on simple, axillary inflorescences), glabrous, slender (0.5 mm diam. when dry) and finely longitudinally wrinkled when in flower but thicker (to 1.3 mm diam. when dry) and coarsely longitudinally wrinkled when in fruit; basal peduncular bracts 2, c. 0.5 mm long, thickened towards base, scarious and brown towards apices. *Flower-heads* globular, pale yellow, at anthesis c. 10 mm diam. when fresh but drying c. 5 mm diam., with 25-40 rather densely arranged flowers whose petals (in mature buds) are not contiguous (being separated by, but overtopping, the bracteoles). *Bracteoles* peltate, more or less equal in length to the calyx; *claws* linear, glabrous; *laminae* not prominently thickened, more or less circular, 0.3-0.5 mm diam., brown, readily observable in immature buds but at bud maturity overtopped by the flowers (and therefore less obvious), white-fimbriolate otherwise glabrous. *Flowers* 5-merous. *Calyx* c.  $\frac{2}{3}$  length of corolla, gamosepalous, divided for c.  $\frac{1}{2}$  its length into broadly triangular, moderately puberulous, slightly thickened, slightly inflexed lobes; calyx tube often light brown when dry, obscurely 5-nerved. *Petals* c. 1.5 mm long, united for c.  $\frac{1}{2}$  their length but readily splitting to base upon dissection, narrowly oblanceolate, obscurely 1-nerved, glabrous to sub-glabrous (hairs white and antrorsely appressed), acute and slightly thickened at apices. *Ovary* glabrous or densely white-villous, minutely stipitate. *Legumes* oblong to narrowly oblong, not prominently raised over seeds, straight-edged or slightly to moderately constricted between seeds but random deep constrictions do occur, to 9 cm long but often shorter, 8-17 mm wide, with up to 14 seeds per legume, finely and openly transversely reticulate, coriaceous to slightly crustaceous, occasionally more or less sub-woody, abruptly constricted at base into a thick stipe 2-3(5) mm long; margins somewhat thick. *Seeds* transverse in the legume, close together and not separated by pronounced partitions, oblongoid-ellipsoid but slightly narrowed at the hilar end, 5-6 mm long, c. 2.5 mm wide, somewhat compressed (c. 1.7 mm thick), dull but slightly shiny bordering the pleurogram, black; *pleurogram* fine, continuous; *areole* 3-4 mm long, c. 0.8 mm wide; *funicle* light red-brown, 40 mm long (expanded length), brittle when dry, usually with 2-3 short folds before encircling the seed in a "u"-shaped double fold, terminating in a yellowish, clavate *aril* which often extends c.  $\frac{1}{2}$ -way down one side of the seed.

*Specimens examined.* SOUTH AUSTRALIA: Memory Cove, Lincoln Flora and Fauna Reserve, C.R. Alcock 1226 (AD); "Pillie Lakes" (which is c. 15 km S of Port Lincoln, between Flinders Cairn and Stamford Hill), C.R. Alcock 1256 (AD, PERTH); West Point, Lincoln National Park, c. 30 km SSW of Port Lincoln, C.R. Alcock 1656 (AD, MEL); West Point, about 30 km [due] SSE of Port Lincoln, C.R. Alcock 1682 (AD); Salt Creek, c. 4 km SSE of Port Lincoln [near Northside Hill], C.R. Alcock 2564 (AD); West Point area, Lincoln National Park, C.R. Alcock 3278 (AD); Stamford Hill area, Lincoln National Park, C.R. Alcock 3279 (AD); Lincoln National Park, Stamford Hill, 34° 46' 30" S, 135° 56' 30" E; Memory Cove, R. Brown (Iter Austral. no. 4350) (K); Lincoln National Park, c. 42 km from Port Lincoln along Memory Cove track, E.M. Canning and S. Corbett, E.M.C. 5387 and 5390 (CBG 8210087 and 8210090); Stamford Hill, 1983, K. Holliday s.n. (AD 984227395); Near Billy Light Point, Port Lincoln, D.E. Symon 6693 (AD); Cape Donington Peninsula, Lincoln National Park, 34° 46' S, 136° 00' 31" E, F.J. Vickery s.n. (CANB 349307-349318) and F.J. Vickery and C. Chapman s.n. (CANB 346499 to 346502, dups. at PERTH); 30 mi [48 km] from Port Lincoln toward Memory Cove, J.W. Wrigley WA/68 7645 (AD — phyllodes abnormally broad).

*Distribution.* Extreme south-east Eyre Peninsula, South Australia where the species has been collected from two areas about 20 km apart. The northern populations occur at Stamford Hill, Cape Donington Peninsula and Pillie Lake within the Lincoln National Park and at Billy Light Point near Port Lincoln. From the southern extremity of the Park it has been collected from West Point and Memory Cove and near Jussieu Bay.

*Habitat.* Usually found in sand over limestone but sometimes in skeletal soil with quartz or deep sandy loam over granite. At Stamford Hill the species forms pure stands in open areas in tall *Eucalyptus gracilis* mallee (Briggs 1211). Near Cape Donington it occurs in mallee/ti-tree scrub dominated by *Eucalyptus foecunda*, *Melaleuca lanceolata* and *M. uncinata* (Vickery s.n. and Vickery and Chapman s.n.).

*Flowering and fruiting period.* The northern populations have two main flowering periods, late February-April and November (J. Briggs and C.R. Alcock, pers. comm.); herbarium specimens in flower have also been collected in June and September. The only flowering southern population specimen seen was collected in December. Legumes take 6-8 months to mature and specimens with mature seeds have been gathered in November and December.

*Affinities.* *Acacia alcockii* is placed in section *Phyllodineae* DC. on account of its globular flower-heads and 1-nerved phyllodes. Taxonomically the new species is placed between *A. anceps* DC. and *A. leiophylla* Benth. from which it can be distinguished by a combination of its racemose inflorescences and transverse seeds (see key under *A. anceps*). All three species occur within the Lincoln National Park. From data derived from comparative morphology it is possible that *A. alcockii* is of hybrid origin. However, it seems that the northern and southern populations of the species may have had different origins.

These two sets of populations can generally be recognized by the following characters.

Northern populations: *phyllodes* 8-11(14) mm wide, l:w = 6-10, usually shallowly recurved (sometimes straight); *legumes* to 7-9 cm long, 8-12 mm wide, thinly to moderately coriaceous, straight-edged or slightly to moderately constricted between the seeds although random deep constrictions do occur.

Southern populations: *phyllodes* 12-21(30) mm wide, l:w = (2)3-7, usually straight (rarely shallowly recurved); *legumes* to 3.5-5 cm long, 12-17 mm wide, moderately coriaceous to slightly crustaceous, occasionally more or less sub-woody, straight edged (occasionally few or many deep constrictions on some legumes).

Detailed field studies of three of the northern populations were recently conducted by J. Briggs and F. Vickery. These populations are located at Port Lincoln, Stamford Hill (which comprises several hundred plants) and Cape Donnington Peninsula. Briggs (pers. comm.) reported that plants from these populations, do not show the range of morphological variation that one would expect from hybrid swarms. Furthermore, neither *A. anceps* nor *A. leiophylla* occur within several kilometres (? at least 15 km) of these populations. Nine seedlings raised by Briggs from seed collected from these populations showed no apparent morphological segregation. Seedlings of *A. anceps* and *A. leiophylla* were not examined. Pollen from the following 15 specimens was examined, *Alcock* 1256 (Pillie Lake), *Briggs* 1211 (Stamford Hill), *Vickery* s.n. CANB 349307 to 349318 (Cape Donnington Peninsula) and *Symon* 6693 (Billy Light Point). The only abnormalities were seen in the polyads of *Symon* 6693 where most were either asymmetric in shape or possessed grains with irregular, vestigial or no cytoplasm.

Comparable field studies have not been conducted on the southern populations. However, Briggs has visited Memory Cove where he observed *A. anceps* and *A. leiophylla* but not *A. alcockii*. Vickery, who knows the southern Lincoln National Park well, reported (via Briggs) that he has never seen anything resembling *A. alcockii* in the area. These observations suggest that the plants which are here attributed to *A. alcockii* from Memory Cove and West Point are not common and may indeed simply be spontaneous hybrids (probably between *A. anceps* and *A. leiophylla*). The pollen of *Canning* 5390 and *Corbett*, however, showed no irregularities. The other specimens from these southern areas were either in fruit or very young bud.

If *A. alcockii* is of hybrid origin then the above data suggest that the northern populations may be a stabilized hybrid derivative probably involving *A. anceps* and *A. leiophylla*. The southern populations, however, may represent spontaneous hybrids between these putative parents. Clearly, further detailed population studies are needed, especially for the southern populations. Such studies may show that it is preferable to restrict the name *A. alcockii* to the northern populations. However, on the basis of present evidence it is considered practical to broadly circumscribe the species to include both populations.

*Conservation status.* 2RC (Leigh et al. 1981) — rare but not considered endangered or vulnerable and represented within a national park.

*Etymology.* Named in honour of Mr R. Alcock who collected extensively on Eyre Peninsula between 1951 and 1970 while employed as a Weed Officer with Local Government.

2. *Acacia anceps* DC., Prodr. 2: 451 (1825), non Hook. (1837). Figure 2A-E.

*Type citation.* "in Novae-Holland. ora orientali. (v.s. ex Mus. Par.)" *Type*: Nouvelle Hollande, cote orientali, anonymous [presumably collected by *J. Leschenault* from near Ceduna in 1803, see note below] (holo: G-DC; iso: BM, P).

*A. pterigoidea* Seemann, Verh. K.K. Gartenbauges. Wein. 1846: 11 (1846). *Type*: Cultivated, P. Schmidt (n.v.).

*A. muelleri* Benth., Linnaea 26: 603 (1855); G. Bentham, Fl. Austral. 2: 355 (1864). *Type citation*: "Inter montes Dalton et Greenly". *Type*: Between mounts Dutton (sphalm. "Dalton") and Greenly, S.A. [probably collected by *C. Wilhelmi*, see note below] (holo: K; iso: MEL 615146).

*A. megaphylla* F. Muell. ex Benth., Linnaea 26: 604 (1855), nom. nud., pro syn. sub *A. muelleri*; F. Mueller, J. Proc. Linn. Soc. Bot. 3: 117 (1859).

*A. anceps* var. *angustifolia* Benth., Fl. Austral. 2: 355 (1864), *syn. nov.* *Type citation*: "S. coast, R. Brown; towards Spencer's Gulf, Warburton." *Type*: South coast, R. Brown, Iter Australiense, 1802-5, no. 4352 [presumably collected by *R. Brown* from Fowlers Bay, S.A., see note below] (syn: K).

*A. glaucescens* F. Cels, Ann. Fl. Pomone 1839-40: 30, pl. (1839), non Willd. (1806); *A. celsiana* Ser., Fl. Jard. 1: 483 (1849), *syn. nov.* *Type*: Cultivated, originating from Australia (n.v.).

[*A. retinodes* auct. non Schldl.: E.C. Nelson, J. Roy. Soc. W. Austral. 57: 110 (1974)].

Bushy spreading *shrub* to c. 3 m tall. *Branchlets* acutely angled at extremities, sometimes narrowly winged, often thick, dark red-brown, glabrous. *Phyllodes* usually elliptic to oblanceolate and obtuse, sometimes retuse, usually 3-7 cm long and 1-3 cm wide with l:w = 1.5-4.5, coriaceous, often slightly undulate, glabrous, glaucous or sometimes pale green; *midrib* and *marginal nerves* prominent, penninerved although often obscurely so; *pulvinus* either distinct and articulate or only partially articulate with the lower edge of the broad-based phyllodes continuous and shortly decurrent with branchlets. *Peduncles* axillary, initiated on developing new shoots, 1-2.5 cm long, stout, glabrous. *Flower-heads* globular, deep golden, c. 10 mm diam., densely 60-130-flowered. *Bracteole laminae* more or less circular, brown, golden (occasionally white)-fimbriolate. *Flowers* 5-merous. *Calyx* gamosepalous, c.  $\frac{3}{4}$  length of corolla. *Legumes* narrowly oblong, usually not or barely constricted between seeds, usually to 6 cm long, 10-15 mm wide, firmly crustaceous to woody, glabrous. *Seeds* transverse, c.  $\frac{1}{2}$  encircled by funicle.

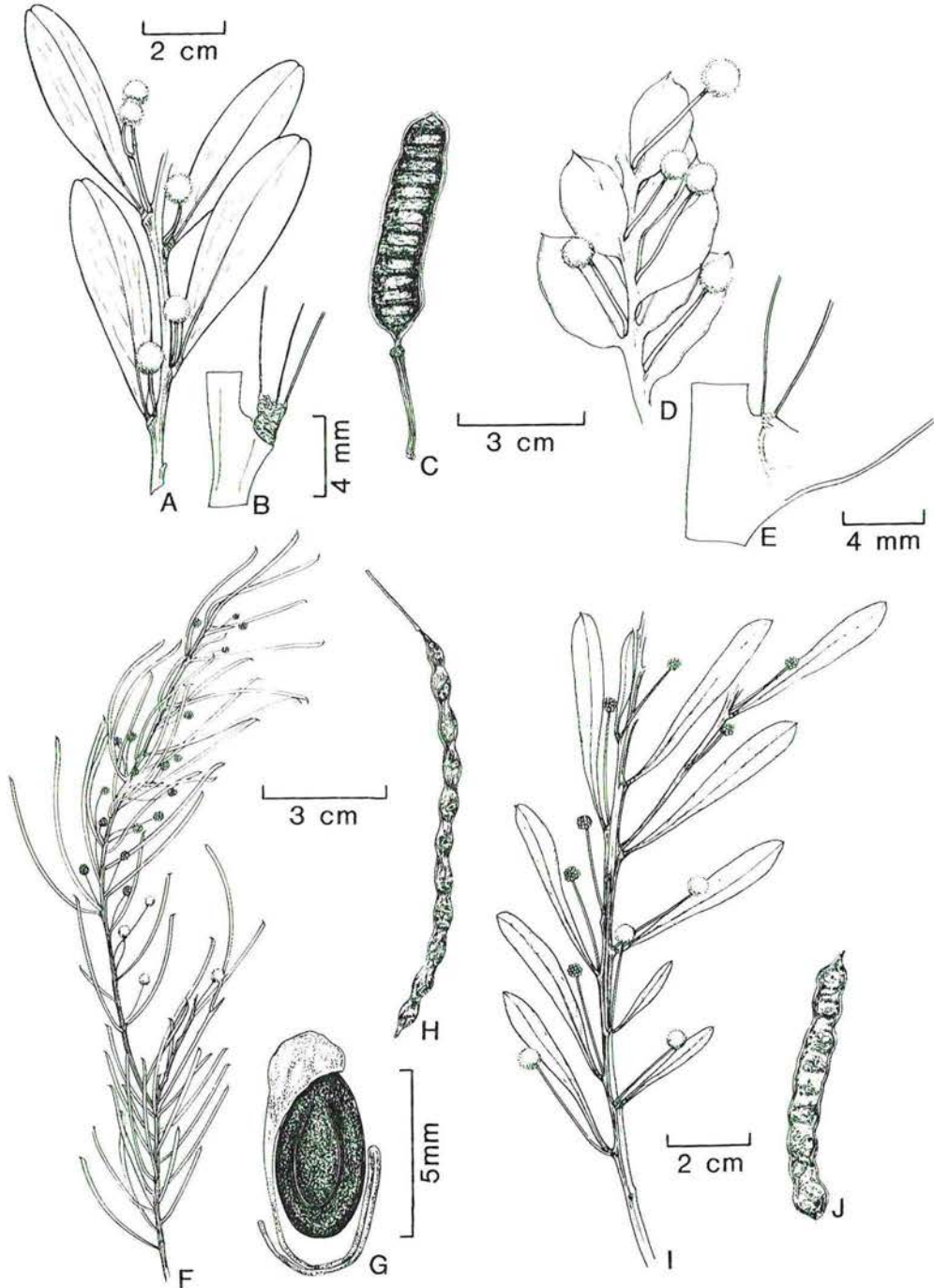


Figure 2. *Acacia anceps* (A-E). A — Flowering branchlet. B — Phyllode base (enlarged) showing distinct, articulate pulvinus. C — Legume with transverse seeds. D — Flowering branchlet. E — Phyllode base (enlarged) showing very reduced pulvinus and lower edge of phyllode continuous with branchlet. *A. nematophylla* (F-H). F — Flowering branchlet. G — Seed (longitudinal) showing reddish brown funicle  $\frac{3}{4}$  encircling seed. H — Legume. *A. anceps* x *nematophylla* (I-J). I — Flowering branchlet. J — Legume. A from A.S. George 8565; B from I.O. Maroske s.n. (MEL 104130); C from H.H.D. Griffith s.n. (AD 96748215); D and E from J.B. Cleland s.n. (AD 96705036); F from J.W. Wrigley WA/68 7632; G and H from J.B. Cleland s.n. (AD 96921030); I and J from I. Brown s.n. (AD 98006133).

*Distribution.* Principally confined to coastal areas of Western Australia and South Australia from Middle Island (Recherche Archipelago, W.A.) east to the southern Eyre and Yorke peninsulas as far as Sturt Bay, S.A.

*Selected specimens examined.* WESTERN AUSTRALIA: Twilight Cove, A.S. George 8565 (PERTH); Middle Island, A.S. Weston 8932 (PERTH); Eucla, 1882, J. Oliver s.n. (MEL).

SOUTH AUSTRALIA: Port Lincoln, 17 Dec. 1941, J.B. Cleland s.n. (AD 96705036) and 10 Oct. 1907, H.H.D. Griffith s.n. (AD 96748215); Streaky Bay, Sept. 1963, I.O. Maroske s.n. (MEL 104130); Ceduna, near Cape Thevenard, B.R. Maslin 4817 (PERTH); Hincks National Park, J.R. Wheeler 1091 (AD); Sturt Bay, D.J.E. Whibley 5531 (AD).

*Type specimens.* The holotype of *A. anceps* at herb. G-DC is a specimen sent to De Candolle from herb. P in 1821. The collecting locality is given as the east coast of New Holland. Annotations on isotypes at herb. P show that a duplicate was also sent to Robert Brown, viz. "Envoyé à Mr. Brown no. 9". On the herb. BM specimen someone has suggested that the gathering was made by J. Leschenault (who was one of the botanists on the French expedition under the command of N. Baudin). In February 1803 Baudin's expedition visited Murat Bay near the present-day township of Ceduna at the northern extremity of Eyre Peninsula, South Australia. As *A. anceps* occurs in this region it is quite possible that the type was collected by J. Leschenault from this locality.

The one syntype of *A. anceps* var. *angustifolia* that I have seen (at herb. K) also originated from herb. BM. This specimen has a Robert Brown label bearing the Iter Austral. no. 4352; the only locality data given is "S. Coast". According to Maiden and Blakely (1927: 172) there is a specimen of no. 4352 at herb. NSW which is labelled in Brown's handwriting "...near Bay III [Fowlers Bay, South Australia, fide Stearn 1960], South Coast, 1802...". I have not seen the herb. NSW specimen nor have I been able to locate at herb. BM a Robert Brown specimen labelled as having been collected from Bay III. Fowlers Bay is about 100 km north-west of Ceduna and *A. anceps* does occur in this general area (see hybrid no. 3 below). Morphologically this syntype of var. *angustifolia* is very similar to the holotype of *A. anceps* (both represent the oblanceolate, pulvinate variant of this species which is discussed below).

The holotype of *A. muelleri* at herb. K is a specimen originating from the Sonder Herbarium and its label suggests that F. Mueller was the collector. However, Mueller probably never visited the west coast of the Eyre Peninsula (D. Kraehenbuehl, pers. comm.), the area from where the type was said to have been gathered (viz. between mounts Dutton and Greenly). In all likelihood this gathering was made by C. Wilhelmi because another sheet at Kew, supporting specimens (not types) matching the holotype of *A. muelleri*, is annotated: "Port Lincoln propes, west-coast. Legit. C. Wilhelmi. exam. Dr. ferd. Mueller." Wilhelmi collected from southern Eyre Peninsula from 1851-1852 and again in 1854 (D. Kraehenbuehl, pers. comm.).

*Variation.* Two phyllode variants are recognized within *A. anceps* but morphologically they intergrade and are here not considered worthy of formal rank. The most widespread variant is one that has been collected from Middle Island (Western Australia) east to near Streaky Bay (northern Eyre Peninsula, South Australia) and Sturt Bay (southern Yorke Peninsula, South Australia). It is characterized by rather long, oblanceolate phyllodes which are not continuous with the branchlets and which have well developed pulvini that are articulate at their bases (Figure 2A-B). This variant includes the types of both *A. anceps* and *A. anceps* var. *angustifolia* but in the past it usually went under the latter name, fide Whibley (1980: 64). Of more restricted distribution is a second variant which differs from the first in its less elongate, elliptic phyllodes whose lower edges are clearly continuous and shortly decurrent with the branchlets and whose pulvini are very reduced (Figure 2D-E). Also, it tends to have

thicker, more acutely angled branchlets. This variant has been collected mainly from the vicinity of Port Lincoln (southern Eyre Peninsula, South Australia). In many parts of the southern Eyre and Yorke peninsulas plants have been collected which are morphologically intermediate between these two extremes and in some cases both phyllode types are present on the same specimen. The type of *A. muelleri* appears to represent this intermediate form. *Acacia pterigoidea* and *A. glaucescens* are also probably referable to this form.

*Hybridity.* Judging principally from morphological evidence derived from herbarium specimens it appears as though *A. anceps* hybridizes with a number of related taxa. Only rarely were we able to examine these taxa in the field. Our purpose here is to draw attention to these putative hybrids and thus lay a foundation for future studies.

1. *A. anceps* x *nematophylla*. See *A. nematophylla* below.
2. ? *A. anceps* x *leiophylla*. See *A. alcockii* above.
3. ? *A. anceps* x *notabilis*.

Some specimens from Streaky Bay and Fowlers Bay (northern Eyre Peninsula) possess characters which suggest they are somewhat intermediate between *A. anceps* and *A. notabilis*. Many of these specimens have previously been determined as *A. notabilis* at herb. AD and mapped as such by Whibley (1980: 122). Their coarsely angular branchlets, thickly coriaceous phyllodes, golden fimbriolate bracteole laminae and calyx lobes and more or less woody legumes clearly relate them to *A. anceps*. However, a few characters suggest intergradation with *A. notabilis*, viz. inflorescences a mixture of axillary peduncles and racemes, phyllodes occasionally with 2 glands and/or sub-attenuate. Although *A. anceps* occurs in the same general area as these putative hybrids, current collections show *A. notabilis* to be distributed considerably further east. Specimens referable to this possible 80/72 hybrid are *C.R. Alcock* 3395 (AD), N. Hall 80/72 (MEL, PERTH), *A.E. Orchard* 3142, (AD), *Veitch* s.n. (AD 96716196) — all Streaky Bay area, *A.E. Orchard* 3144 (AD) — Fowlers Bay. Specimens with oblanceolate, obtuse phyllodes superficially resemble *A. alcockii* (southern Eyre Peninsula — see above) but are distinguished by their larger flower-heads (50-60-flowered), golden-fimbriolate bracteoles and more or less woody legumes.

#### Key to *A. anceps* and some allied taxa (including putative hybrids)

- 1a. Flowering peduncles never racemously arranged; legumes coriaceous-crustaceous to woody.....2
- b. Flowering peduncles all or some arranged in racemes of 1(2) or more flower-heads; legumes as above or firmly chartaceous.....3
  - 2a. Phyllodes 0.7-1.5 mm wide, flat or terete, never continuous with branchlets; flowers 28-41 per head; legumes 5-6 mm wide; seed longitudinal (S.A., not common.).....*A. nematophylla*
  - b. Phyllodes 1-3 cm wide, flat, sometimes continuous; flowers 60-130 per head; legumes 10-15 mm wide; seeds transverse (W.A., S.A.).....*A. anceps*
  - c. Some or all above characters intermediate (S.A., rare) *A. anceps* x *nematophylla*
    - 3a. Phyllodes 1-5 mm wide, 3-10 cm long, flat or terete; *racemes* with (1)2-4(13) flower-heads; flowers 25-40 per head; legumes 3-6 mm wide, coriaceous to crustaceous; seeds longitudinal (S.A., N.S.W., Vic.).....*A. calamifolia*
    - b. Phyllodes all or mostly more than 5 mm wide, flat.....4
      - 4a. Legumes 5-6 mm wide, firmly chartaceous to slightly coriaceous; seeds longitudinal; bracteole laminae c. 1 mm diam., golden-fimbriolate; phyllodes falcate, thinly coriaceous, 10-13 cm long and 15-22 mm wide (S.A.).....*A. leiophylla*

- b. Legumes broader; seeds transverse; bracteole laminae smaller.....5
  - 5a. Phyllodes 4-5.5(6.5) cm long, rather thickly coriaceous; flowers 50-60 per head; bracteoles golden-fimbriolate; peduncles mostly axillary, a few arranged in axillary racemes, legumes woody to sub-woody (S.A., rare)? *A. anceps* x *notabilis*.
  - b. Phyllodes 6-13 cm long; flowers 25-40 per head; bracteoles white-fimbriolate; peduncles mostly arranged in racemes, sometimes a few axillary.....6
    - 6a. Phyllodes rather thickly coriaceous, more or less straight, glaucous to grey-green; flower-heads bright golden; legumes firmly chartaceous to slightly coriaceous. (S.A., N.S.W., Vic.).....*A. notabilis*
    - b. Phyllodes thinly coriaceous, straight or shallowly recurved, dark green; flower-heads pale yellow; legumes thinly coriaceous-crustaceous .....*A. alcockii*

### 3. *Acacia cretacea* Maslin and Whibley, sp. nov. Figure 3.

Frutex fusiformis vel arbor parva 3.5-4(5) m alta, corona plerumque effusa aperta. Ramuli pruinosi glabri. Phyllodia plerumque anguste elliptica ad anguste oblanceolata, obtusa, plerumque 7-10 cm x 9-18 mm longitudo : latitudo = 4.5-9, tenuiter ad moderate coriacea, ad extremos ramulos sat congesta, ascendencia vel erecta, recta, glabra, griseo-iridia ad glauca, uninervia, tenuiter penninervia. Racemi plerumque 2-4 cm longi, capitulis floriferis (3)5-9(14-20), axibus pruinosis et glabris. Pedunculi 4-11(17) mm longi, pruinosi, glabri. Capitula globosa, citrina ad aurea, 35-45(55)-flora. Flores 5-meri. Calyx gamosepalus. Legumen angustissime oblongum, ad 9(10) cm x 5-6 mm, solide chartaceum ad tenuiter coriaceum, juvenile pruinose, glabrum. Semina longitudinalia, 5-7 x 3-3.5 mm, nigra, funiculo rubescente semicirculari vel circulari cincta.

*Typus*: NE of Coolanie, Eyre Peninsula, S.A., 19 Oct. 1983, *J.D. Briggs* 1391 (holo: PERTH; iso: AD, CBG, K).

Spindly, usually single-stemmed *shrub* or *small tree* 3.5-4(5) m tall, crowns open and straggly, rarely bushy, trunks slender, sometimes suckering from base, phyllodes concentrated towards the ends of the sometimes arching to sub-pendulous branches. *Bark* smooth, grey to red-brown on lower parts of trunks. *Branchlets* finely nerved, terete but slightly to prominently angular towards their apices, glabrous, conspicuously pruinose, marked with distant, prominent, raised leaf bases which are evident on mature branches where phyllodes have fallen. *New shoots* reddish. *Stipules* triangular, minute, c. 0.5 mm long. *Phyllodes* narrowly elliptic to narrowly oblanceolate but some occasionally broadly linear, apices rather abruptly narrowed and obtuse, with a minute, straight or uncinat mucro, (6)7-10(11) cm long, usually 9-18 mm wide but occasionally a few reaching 45 mm, length to width ratio usually 4.5-9 but a few to 2.5, thinly to moderately coriaceous, sometimes very finely wrinkled when dry, rather crowded, ascending to erect, usually straight although occasionally a few very slightly arcuate-recurved or more rarely arcuate-incurved, slightly undulate especially when broad, glabrous, greyish medium-green but glaucous when young; *midrib* central to very slightly excentric, reasonably pronounced, slightly raised when dry, often yellow (although often drying light brown); *marginal nerves* reasonably pronounced, yellow (often drying light brown); lateral nerves numerous, fine but reasonably evident when dry, diverging from the midrib at a very acute angle, openly anastomosing; *pulvinus* terete, 1.5-2 mm long, light to dark brown and wrinkled when dry, often pruinose. *Gland* not very prominent, situated on upper margin of the phyllode at distal end of pulvinus to 4 mm above it, occasionally slightly raised, c. 0.5 mm diam.

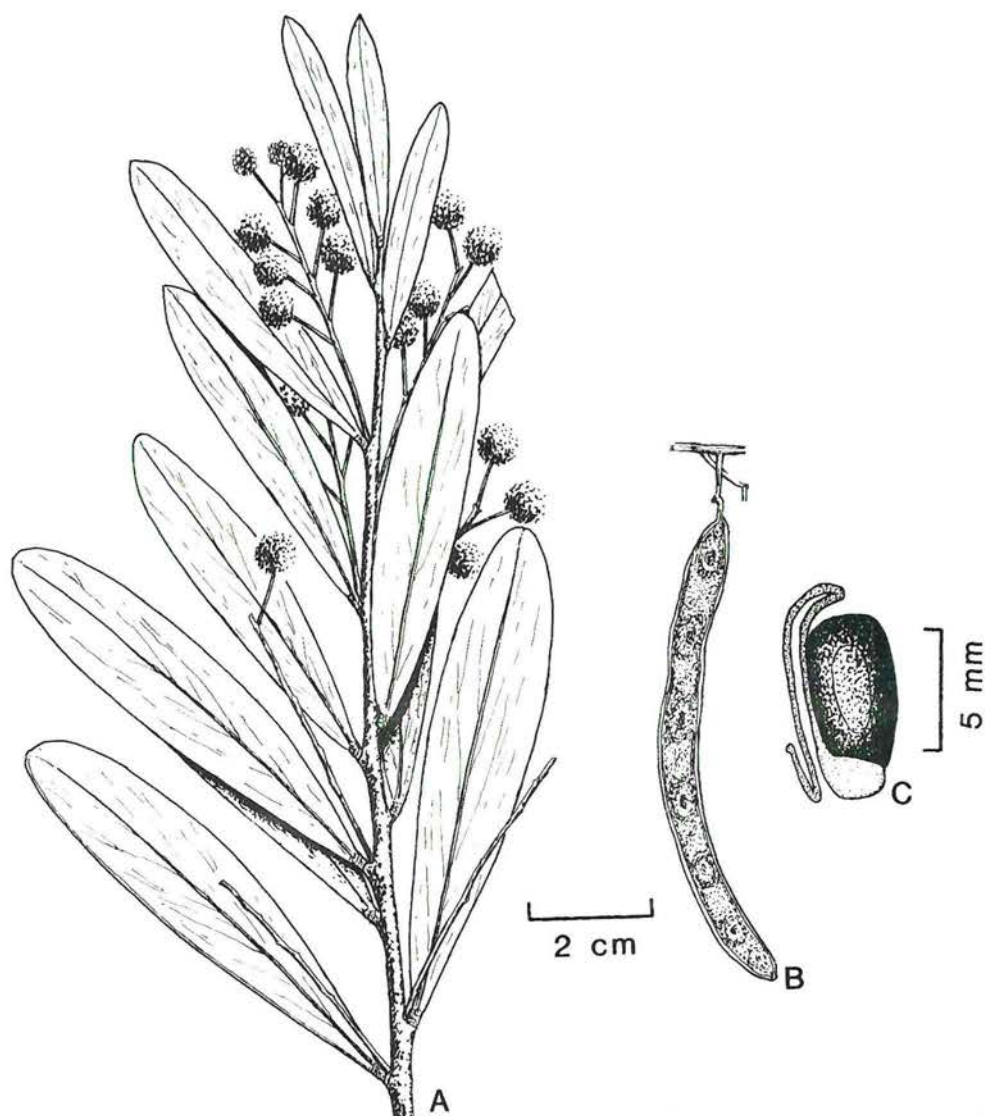


Figure 3. *Acacia cretacea*. A — Flowering branchlet. B — Legume. C — Seed showing reddish brown funicle  $\frac{1}{2}$  encircling seed. A from M. Simmons 1722; B from D.J.E. Whibley 7316; C from B. Copley 3898.

*Inflorescences* 1-2 per node, very fragrant, racemose, rarely interspersed with a few simple peduncles. *Racemes* (1)2-4(6) cm long, with (3)5-9(14-20: B. Copley, pers. comm.) heads; raceme axes straight or slightly flexuose, somewhat angular, glabrous, pruinose, sometimes growing out, base ebracteate. *Peduncles* 4-11(17) mm long, mostly alternate but the lower 2 sometimes opposite, finely longitudinally sulcate when dry, glabrous, pruinose; receptacle capitate; *basal peduncular bract* 1, persistent, ovate to narrowly ovate, 0.5-1 mm long, glabrous. *Flower-heads* globular, 4-5 mm diam. when dry, to 10 mm diam. when fresh, lemon yellow to golden yellow, with 34-45(55) densely arranged flowers, the buds conspicuously pruinose. *Bracteoles* sub-peltate, 1.2-1.5 mm long, glabrous; *claws* narrowly linear, glabrous; *laminae* observable between flowers but not overly prominent in the bud, not thickened, more or less circular and usually minutely apiculate, pruinose. *Flowers* 5-merous, glabrous. *Calyx*  $\frac{3}{4}$  the length of corolla, gamosepalous, divided for c.  $\frac{1}{4}$  its length into oblong, rounded lobes; calyx tube

turbinate, membranous, with 5 light brown stripes (sepal nerves) with white, diaphanous tissue between them. *Petals* c. 1.7 mm long, free to base, narrowly obovate and abruptly acute, not reflexed at anthesis, nerveless. *Ovary* sessile. *Legumes* very narrowly oblong, gently raised over the seeds and usually very slightly constricted between them although occasionally a few random deep constrictions occur, to 9(10) cm long, 5-6 mm wide, with up to 10 seeds per legume, firmly chartaceous to slightly coriaceous, straight to very slightly curved, glabrous, pale brown, conspicuously pruinose at least when young, very obscurely reticulate, apex abruptly acute, basal stipe c. 5 mm long. *Seeds* longitudinal with aril facing apex of legume, oblongoid, 5-7 mm long, 3-3.5 mm wide, rather turgid to somewhat compressed (2-2.5 mm thick), slightly shiny, black; *pleurogram* very obscure, either continuous or with a narrow opening towards the hilum; *areole* c. 2.5-3.5 mm long, 1.3-1.5 mm wide; *funicle* thickly filiform, c. 15 mm long (expanded length), light brown to reddish brown and very brittle when dry, usually with a short fold (which frequently extends over top of the aril) near attachment to legume and then extending below seed to  $\frac{1}{2}$  or wholly encircle it before doubling back and terminating in a thickened, yellow, clavate *aril*.

*Specimens examined.* SOUTH AUSTRALIA: *J.D. Briggs* 1390 (AD, CBG) and 1392 (AD, CBG, MEL, PERTH); *B. Copley* 3896 (AD), 3897 (AD, MEL), 3898 (AD, PERTH); *P. Copley* 362 (AD); 9 July 1968, *I.J. Duggin* s.n. (AD 96904005); 3 February 1962, *W.S. Reid* s.n. (AD 97609087 ex ADW); *M. Simmons* 1722 (CANB, PERTH); 22 July 1971, *M. Smith* s.n. (AD 97135211 and 97135212); 3 February 1962, *South Australian Pastoral Board* s.n. (AD 97630321 and 98025053); *D.J.E. Whibley* 5691, 7313 and 7316 (all AD).

*Distribution.* Endemic in northeast Eyre Peninsula, South Australia, where it occurs in a very restricted area north of Cowell.

*Habitat.* Low shrubland and mallee scrub on deep red sand in gently undulating country with low sand ridges. Some associated species include *Eucalyptus incrassata*, *Melaleuca uncinata*, *Triodia irritans*, *Phebalium bullatum*, etc. (J.D. Briggs, pers. comm.).

*Flowering and fruiting period.* Seemingly with a long flowering period. Specimens in flower (often also with mature or immature legumes) have been collected from July to February. Mature legumes have been collected in January, February and October.

*Affinities.* *Acacia cretacea* belongs to a group of *Acacia* section *Phyllodineae* DC. species characterized by usually racemose inflorescences and by seeds which are partly or wholly encircled by their reddish, filiform funicle. This is an Australia-wide group and on the Eyre Peninsula is represented by the following species: *A. anceps* DC., *A. alcockii* Maslin and Whibley, *A. calamifolia* Sweet ex Lindley, *A. gillii* Maiden and Blakely, *A. leiophylla* Benth., *A. nematophylla* F. Muell. ex Benth. and *A. notabilis* F. Muell. *Acacia cretacea* is distinguished from all these species by its prominently pruinose branchlets, inflorescences and legumes. Its growth habit is similar to the more southerly distributed *A. gillii* which is readily distinguished by its prominently flexuose, non-pruinose branchlets, usually longer phyllodes (7-17 cm) which are mid-green and shallowly curved, larger flower-heads (43-72-flowered) and longer legumes (to 15 cm) which are not pruinose. *Acacia notabilis* which grows in the same general area as *A. cretacea* (but the two are not sympatric) is readily recognized by its coriaceous phyllodes, non-pruinose branchlets and broad legumes (8-12 mm wide) with transverse seeds. *Acacia steedmanii* Maiden and Blakely (Western Australia) resembles the new species in its pruinose branchlets and general phyllode, inflorescence and carpological features. However, *A. steedmanii* is distinguished from *A. cretacea* by its (2)3-4 glands per phyllode, shorter, stouter peduncles (4-5 mm long), dark brown to black, fimbriolate bracteoles and its not (or only slightly) pruinose legumes.

*Conservation status.* Endangered (Leigh et al. 1981). Known only from a few hundred plants occurring along a road verge and on adjacent lease-hold land within a very restricted area (about 4 x 2 km).

*Etymology.* *Cretaceus* (L.) — chalk-white. Refers to the conspicuously pruinose branchlets, inflorescences and legumes.

4. *Acacia nematophylla* F. Muell. ex Benth., *Linnaea* 26: 612 (1855). Figure 2F-H.

*Type citation.* "Boston Point Novae Hollandiae australioris (F. Müll.)". *Type:* Boston Point, S.A., *C. Wilhelmi* (holo: K; iso: C, K, MEL 615302, 615306, 615307, 615310 — see note below).

Bushy shrub to c. 2.5 m tall. *Branchlets* angled at extremities, glabrous. *Phyllodes* narrowly linear, (14) 20-40 mm long, 0.7-1.5(2) mm wide, ascending to erect, straight to shallowly curved, uncinately, flat to terete, usually drying finely wrinkled, glabrous, grey-green, 4-nerved in all; *midrib* impressed or sometimes (when phyllodes flat) slightly raised; *pulvinus* distinct and articulate. *Peduncles* axillary, 1 per node, 4-15 mm long, glabrous, base ebracteate. *Flower-heads* globular, 28-41-flowered. *Flowers* 5-merous. *Calyx* gamosepalous. *Legumes* linear, raised over seeds and slightly to moderately constricted between them, to 11 cm long, 5-6 mm wide, coriaceous-crustaceous to sub-woody, glabrous, longitudinally rugose. *Seeds* longitudinal, oblongoid to ellipsoid, 4.5-5 mm long, c. 2.5 mm wide, black,  $\frac{1}{2}$ - $\frac{3}{4}$  encircled by the filiform, reddish brown *funicle*.

*Distribution.* Coastal dunes of S.A. from near Drummond Point to Point Boston (southern Eyre Peninsula) and Innestone to Sturt Bay (southern Yorke Peninsula). Also recorded from Venus Bay (c. 125 km N of Drummond Point) and Myponga on the Fleurieu Peninsula.

*Selected specimens examined.* SOUTH AUSTRALIA: Near Sleaford Mere, about 15 km SW of Port Lincoln, 9 Nov. 1968, *J.B. Cleland* s.n. (AD 96921030); Myponga, *R.B. Filson* 3002 (MEL); About 2 km S of Whalers Well Swamp, Coffin Bay Peninsula, *T.R.N. Lothian* 3709 (AD); Sturt Bay, c. 15 km S of Warooka, *B.R. Maslin* 4538 (PERTH); 13.5 km S of Port Lincoln silo, *L.D. Williams* 9713 (AD); 12 mi [19 km] from Port Lincoln along Memory Cove road, *J.W. Wrigley* WA/68 7632 (AD 97302081).

*Type specimens.* The holotype of *A. nematophylla* at herb. Kew is annotated "Boston-point, Dr. F. Mueller". The specimen originated from the Sonder Herbarium and the sheet is stamped Herbarium Benthamianum 1854. An isotype of this taxon, also at herb. K (duplicates at MEL), shows that the plant was in fact collected by C. Wilhelmi, not F. Mueller. This Kew isotype sheet is stamped Herbarium Hookerianum 1867 and is annotated (in Mueller's hand) "Boston Point, Port Lincoln. Legit. Carl Wilhelmii exam. Dr. ferd. Mueller". Although Bentham determined this specimen as *A. nematophylla* he seemingly did not do so prior to the publication of the protologue otherwise C. Wilhelmi would presumably have been given as the collector. Above Bentham's annotation someone has written "*A. calamifolia* Sweet var." and underlined the species name in red. This underlining indicates that the specimen was examined by Bentham prior to the publication of *Acacia* in *Fl. Austral.* vol. 2 (see footnote on p. 8 of *Fl. Austral.* vol. 1, 1863). In *Fl. Austral.* vol. 2 (1864) Bentham included the name *A. nematophylla* under *A. calamifolia*, presumably following Mueller (1863: 12).

The Murray scrub specimens referred to in the protologue of *A. nematophylla* are *A. wilhelmiana* F. Muell. (fide Court 1972: 160).

*Affinities.* Until now this name has been included in synonymy under *A. calamifolia* Sweet ex Lindley, fide Bentham (1864, 1875), Court (1972), Whibley (1980). *Acacia nematophylla* is certainly closely related to the highly variable *A. calamifolia* but they can be distinguished by their inflorescences and to some extent their phyllodes. The two species are allopatric with *A. nematophylla* occurring on coastal dunes and *A. calamifolia* inland. In *A. nematophylla* the peduncles are almost always solitary in the axils of the phyllodes. Only very rarely at a few nodes near the base of some branchlets are the subtending phyllodes absent (distal nodes on these branchlets possess solitary peduncles in axils of phyllodes). In most cases it is clear that the phyllodes were once present since a scar occurs on the branchlet on the abaxial side of the peduncle. In the very few cases where scars cannot be observed the phyllodes may have dropped early in their development. Even if phyllodes were never developed at these nodes the structure does not have the general appearance of a raceme which has grown out. In *A. calamifolia* the peduncles are arranged in axillary racemes. Often, however, some of these racemes grow out and on the new growth the peduncles are solitary in phyllode axils as in *A. nematophylla*. The racemes are commonly 1-4 mm long with 2-4 peduncles but they sometimes reach up to 4 cm long with 13 peduncles.

The phyllodes of *A. calamifolia* are very variable but generally they fall into one of two categories, namely, linear (usually 3-10 cm x 1-1.5 mm) and terete to flat, or narrowly oblanceolate (usually 3.5-6 cm x 2-5 mm) and flat. In *A. nematophylla* the phyllodes are frequently shorter than this but where overlap occurs (with phyllodes of the first category above) they tend to dry more coarsely wrinkled than those of *A. calamifolia*.

The differences between *A. nematophylla* and *A. calamifolia* may seem slight. However, when taken in combination the inflorescence, phyllode and geographic attributes argue for the separation of the two taxa. The differences between them appear to be as significant as differences between some other species in this Australia-wide taxonomic group (e.g. *A. calamifolia* from *A. x grayana* J.H. Willis, *A. leptopetala* Benth. from *A. meisneri* Lehm. ex Meissner) and therefore specific rank is considered appropriate for *A. nematophylla*.

*Acacia nematophylla* is also allied to *A. anceps* and, as discussed below, the two species appear to hybridize in some places. The differences between the two species are given in the key under *A. anceps*.

*Hybrids.* Probable hybrids between *A. nematophylla* and *A. anceps* are recorded from a few localities on southern Yorke and Eyre Peninsulas. These plants possess various combinations of characters which are intermediate between the two putative parents, viz. phyllode width and texture, legume width, number of flowers per head (Figure 2I-J). The localities from which these probable hybrids have been collected are: Sturt Bay, Yorke Peninsula (*I. Brown* s.n., AD 98006133, 98006136, 98006137; *B. Copley* 2929, NSW and 2933, NSW; *B.R. Maslin* 4540, PERTH); 28 mi [45 km] from Yorketown towards Foul Bay, Yorke Peninsula (*M.E. Phillips* SA/66 429, AD); Lincoln Flora and Fauna Reserve, Eyre Peninsula (*C.R. Alcock* C138 and 1257, AD). These putative hybrids resemble oblanceolate phyllode forms of *A. calamifolia* (which are often erroneously called *A. microcarpa* var. *linearis* J. Black) in phyllode shape and size but are readily distinguished by their axillary, ebracteate peduncles which are not arranged in short racemes and also by their phyllodes which lack recurved apical mucros.

##### 5. *Acacia notabilis* F. Muell., Fragm. 1:6 (1858). Notable Wattle; Flinders Wattle.

*Type citation.* "In vicinitate portus Lincoln. C. Wilhelmi. Ad montes Flinders Range in deserto." *Lectotype* (here selected): Spencers Gulf near Port Lincoln, S.A., *C. Wilhelmi* s.n. (MEL 616151). *Para-lectotypes*: Flinders Range, S.A., Oct. 1851, *F. Mueller* s.n. (K, MEL 616149 and 616150, PERTH-fragment from MEL 616149).

Bushy spreading *shrub* to 3 m tall, rarely taller. *Branchlets* slightly angled at extremities, dark red-brown, glabrous. *Phyllodes* narrowly elliptic to oblanceolate or narrowly oblanceolate, usually 6-13 cm long and 8-25 mm wide with l:w = 4-10, coriaceous, glabrous, glaucous to dull green; *midrib* and *marginal nerves* prominent, obscurely penninerved; *pulvinus* prominent and 4-6 mm long. *Racemes* usually 2-6 cm long with 4-16 flower-heads, axes glabrous. *Peduncles* 2.5-6 mm long, rather stout, glabrous. *Flower-heads* globular, occasionally oblongoid in bud, bright golden, 27-36-flowered. *Bracteole laminae* evident in buds, dark brown to black, white-fimbriolate. *Flowers* 5-merous. *Calyx* gamosepalous. *Legumes* narrowly oblong, to 7 cm long, 8-13 mm wide, firmly chartaceous to slightly coriaceous, convex on opposite sides over alternate seeds, glabrous, stipitate. *Seeds* transverse, oblongoid-ellipsoid, 4.5-5.5 mm long, 3-3.5 mm wide, black, encircled by the filiform, red-brown *funicle*.

*Distribution.* South Australia, Victoria and New South Wales. In S.A. ranging from Tintinara (South-eastern Region) north through the Lofty Ranges and northern Yorke Peninsula to Arkaba Station (Flinders Range) and then east to Gawler Ranges and near Cummins (southern Eyre Peninsula). Less common in N.S.W. and Victoria. In N.S.W. recorded for Broken Hill and near Menindee and in Victoria from Nathalia and near Meringur.

A number of South Australian specimens previously included under *A. notabilis* have now been transferred to either *A. alcockii* or ? *A. anceps* x *notabilis* (see above).

*Affinities.* Allied to *A. anceps* from which it is distinguished by its shorter peduncles which are arranged in axillary racemes, smaller flower-heads and firmly chartaceous to slightly coriaceous legumes (see key under *A. anceps*). Possible hybrids between these two species are discussed under *A. anceps*. Also allied to *A. beckleri* Tind. from which it is readily distinguished by its glabrous peduncles (not densely minutely tomentellose) and transverse seeds (not longitudinal). The N.S.W. specimen cited by Bentham (1864) under *A. notabilis* is *A. beckleri*.

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