Acacia Miscellany 5. A review of the *A. bivenosa* group (Leguminosae: Mimosoideae: Section *Phyllodineae*)

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Abstract

Chapman, A.R. & B.R. Maslin. *Acacia* Miscellany 5. A review of the *A. bivenosa* group (Leguminosae: Mimosoideae: Section *Phyllodineae*). Nuytsia 8(2): 249-283 (1992). A key is presented to the thirteen taxa comprising the *A. bivenosa* group. Three new species, *viz. A. didyma*, *A. startii* and *A. telmica*, and one new subspecies, *A. sclerosperma* subsp. *glaucescens*, are described. Descriptions are provided for six previously published species, namely *A. bivenosa* DC., *A. ligulata* A. Cunn. ex Benth., *A. rostellifera* Benth., *A. sclerosperma* F. Muell., *A. tysonii* Luehm. and *A. xanthina* Benth. *Acacia cupularis* is reinstated. All species, except *A. ampliceps* Maslin and *A. salicina* Lindl., are illustrated.

Introduction

This review of *Acacia bivenosa* DC. and its relatives is the fifth in a series of papers on the taxonomy of Australian *Acacia* species. The purpose of the series is to describe new taxa and to clarify the taxonomy of previously described taxa prior to their being published in the "Flora of Australia" account of the genus. Previous contributions in this series were published in Nuytsia 7(2) (1990).

The 12 species ascribed to the "*A. bivenosa* group" form a natural assemblage within section *Phyllodineae*. These species include the following: *A. ampliceps* Maslin, *A. bivenosa* DC., *A. cupularis* Domin, *A. didyma* A.R. Chapman & Maslin sp. nov., *A. ligulata* A. Cunn. ex Benth., *A. rostellifera* Benth., *A. salicina* Lindl., *A. sclerosperma* F. Muell. (comprising subsp. *sclerosperma* and subsp. *glaucescens* A.R. Chapman & Maslin subsp. nov.), *A. startii* A.R. Chapman & Maslin sp. nov., *A. telmica* A.R. Chapman & Maslin sp nov., *A. tysonii* Luehm. and *A. xanthina* Benth.

The most important morphological characters uniting the species are the following. Legumes woody or ± brittle and crustaceous; seeds with red and/or orange arils (except *A. xanthina*); inflorescences generally racemose (see *A. bivenosa* for discussion); flowers 5-merous; calyx gamosepalous, ± truncate, not thickened at the apex; bracteoles sessile, ± ovate; phyllodes commonly with a gland adjacent to the apical mucro (in addition to other gland(s) on the adaxial margin).

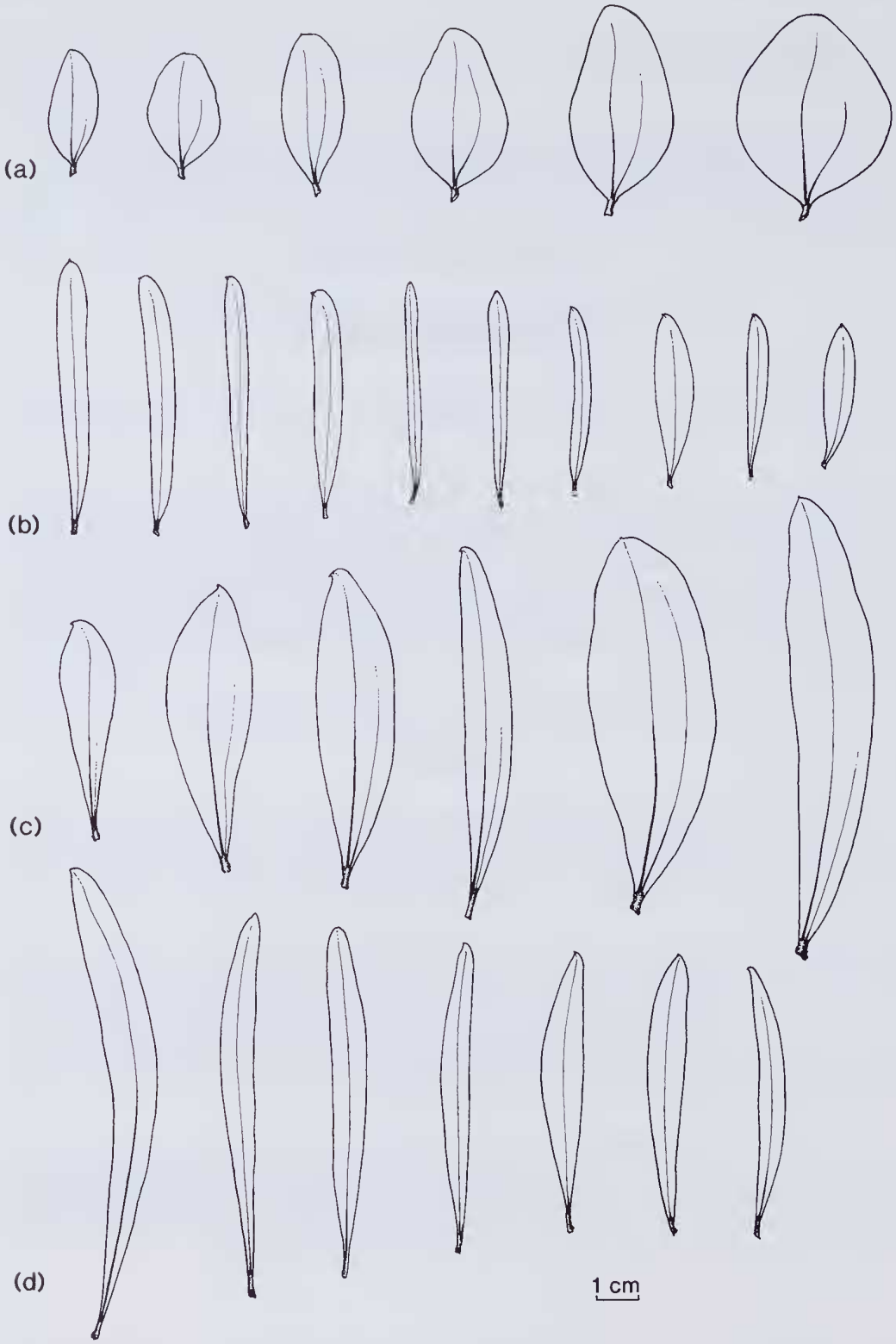

Figure 1. A range of mature phyllodes from a sample of plants in a single population of each of the following four species: (a) *A. startii* (Coral Bay, W.A.); (b) *A. ligulata* (Denham, W.A.); (c) *A. xanthina* (Coronation Beach, W.A.); (d) *A. rostellifera* (Hopetoun, W.A.).

Traditionally the number of nerves on each face of the phyllode has been regarded as important in the classification of *Acacia*. However, in the "*A. bivenosa* group" this is a variable character with some species being bi-nerved (e.g. *A. didyma*, *A. startii*, *A. telmica*), some uni-nerved (e.g. *A. ampliceps*, *A. cupularis*, *A. ligulata*, *A. salicina*, *A. sclerosperma*, *A. tysonii*) and some with both types (e.g. *A.bivenosa*, *A. rostellifera*, *A. xanthina*). The second nerve on specics in the last category is sometimes poorly developed.

Some species have wide geographic ranges which extend across more than one State (e.g. *A. ampliceps*, *A. bivenosa*, *A. cupularis*, *A. ligulata* and *A. salicina*). Of the remainder, the four new taxa, *A. didyma*, *A. sclerosperma* subsp. *glaucescens*, *A. startii* and *A. telmica*, have quite restricted distributions. Except for *A. salicina* all members of the group occur in Western Australia. Most of the species occur on calcareous sands in coastal habitats and/or along water courses in inland areas. *Acacia ligulata*, which is one of the most widespread species of *Acacia* in Australia, occurs on sandy soil in both coastal and inland areas.

A number of the species are quite variable within populations, especially with respect to phyllode and inflorescence characters. Figure 1 illustrates intrapopulational phyllode variation in four species of the "*A. bivenosa* group".

Hybridity appears to be common among certain members of the group, especially in the Pilbara region of Western Australia. Hybrids (or putative hybrids) are noted below for the following species-pairs: *A. bivenosa* x *A. ampliceps*, *?A. bivenosa* x *A. ligulata*, *A. bivenosa* x *A. sclerosperma* subsp. *sclerosperma*, *A. ligulata* x *A. sclerosperma* subsp. *sclerosperma*, *A. ligulata* x *A. tysonii*, *A.sclerosperma* subsp. *sclerosperma* x *A. ampliceps*, *A. sclerosperma* subsp. *sclerosperma* x subsp. *glaucescens* and *A. rostellifera* x *A. xanthina*. Some of these hybrids were examined in the field but no experimental work was conducted to confirm their status. We have no examples of hybrids occurring with species outside the group.

This study has clarified considerably the taxonomy of members of the "*A. bivenosa* group". However, further critical studies are needed to fully resolve the complex variation patterns within, and the relationships between, certain members of this group. In particular, the species *A. ligulata*, *A.bivenosa* and *A. rostellifera* require further attention.

Methods

All measurements were taken from dried material except where stated otherwise. Loan material from the following herbaria was examined and annotated: AD, BRI, DNA, MEL, NSW and PERTH. Herbarium abbreviations follow Holmgren *et al.* 1981, with the addition of KARR which represents the Pilbara Regional Herbarium, Karratha, Western Australia.

Key to taxa of the *A. bivenosa* group

1. Phyllodes with 1 nerve on each face
2. Heads white, cream or pale yellow; phyllodes thin and ± flaccid, often large (4-25 x 0.4-3 cm); branchlets usually pendulous (mostly inland, riverine species)
3. Heads 25-50-flowered; legumes 5-6 mm wide; branchlets yellow to yellow-brown; phyllodes drying light-green (W.A., N.T.) ..... 1. *A. ampliceps*
3. Heads 15-25-flowered; legumes 7-13 mm wide; branchlets dark grey to reddish brown; phyllodes drying grey-green (all mainland states except W.A.) ..... 7. *A. salicina*
2. Heads golden; phyllodes not flaccid, sometimes thick (thus wrinkled upon drying); branchlets not pendulous
4. Phyllodes shortly velutinous (hairs minute and appressed, silvery or pale yellow, especially prominent on new shoots); legumes 8-13 mm wide, prominently constricted between seeds, dark brown (inland W.A.) ..... 11. *A. tysonii*
4. Phyllodes glabrous (rarely puberulous with short patent hairs)
5. Phyllode apices not uncinate, rounded-obtuse with a minute ± central mucro; phyllodes narrowly linear, 3-7 cm long, 1-4(5) mm wide, l:w = 11-40; legumes 4-5mm wide, crustaceous; stems often red-brown (W.A., S.A., Vic.) ..... 3. *A. cupularis*
5. Phyllode apices ± uncinate or excentrically mucronulate, and often acute OR if otherwise then phyllodes not as above; legumes 5-20 mm wide; stems grey or yellow
6. Legumes 1-2 cm wide (W.A)
7. Phyllodes narrowly linear, 4.5-14 cm long, 1-4(5) mm wide, l:w = 24-130, green to sub-glaucous ... 8a. *A. sclerosperma* subsp. *sclerosperma*
7. Phyllodes narrowly elliptic to narrowly oblong-elliptic, 3-6 cm long, 6-17mm wide, l:w = 2-6, glaucous ..... 8b. *A. sclerosperma* subsp. *glaucescens*
6. Legumes < 1 cm wide
8. Phyllodes 2-5 cm long OR if longer then peduncles > 10 mm long
9. Peduncles > 10 mm long; phyllode l:w = 2-5, mucro straight or slightly incurved; legumes firmly crustaceous (northern and central Australia) ..... 2. *A. bivenosa*
9. Peduncles < 10 mm long; phyllode l:w > 5, mucro recurved to straight; legumes woody (all mainland states) ..... 5. *A. ligulata*
8. Not as above
10. Branches pruinose; phyllodes glaucous; aril cream (W.A.) ..... 12. *A. xanthina*
10. Branches not pruinose (although branchlets often scurfy); phyllodes green (rarely glaucous in *A. ligulata*); aril orange or red

11. Legumes firmly crustaceous; phyllodes thin, 5-11.5 cm long; glands 2[a] (southwest W.A) ..... 6. *A. rostellifera*

11. Legumes woody; phyllodes thick (thus usually wrinkled when dry), 3-7.5 cm long; glands 3[a] on at least some phyllodes (all mainland states) ..... 5. *A. ligulata*

1. Phyllodes with 2 (rarely 3) nerves on each face, the second and third nerves commonly poorly developed and not extending the entire phyllode length

12. Phyllodes all less than 6 cm long with l:w = 1-5

13. Peduncles in pairs along raceme axis; phyllodes orbicular to broadly elliptic, l:w = 1-2; legumes 12-15 mm wide, strongly curved to once-coiled; glabrous (restricted, W.A.) ..... 4. *A. didyma*

13. Peduncles singular along raceme axis; phyllodes elliptic to narrowly elliptic, l:w = 2-5; legumes 3-9 mm wide

14. Peduncles 6-10 mm long; branchlet apices with ± patent hairs; phyllodes dark green; heads golden, 16-25-flowered; legumes ±straight, 4-5 mm wide (restricted, W.A.) ..... 10. *A. telmica*

14. Peduncles 10-35 mm long; branchlet apices glabrous or with appressed hairs; phyllodes green or glaucous

15. Phyllodes glabrous; heads deep golden, 16-23-flowered; legumes not coiled, 5-9 mm wide (widespread, W.A., N.T., Qld.) ..... 2. *A. bivenosa*

15. Phyllodes tomentose at least on young growth; heads lemon-yellow with 30-55-flowered; legumes coiled, 3-4 mm wide (uncommon, W.A.) ..... 9. *A. startii*

12. Phyllodes 6 cm or more long OR if shorter then l:w greater than 5 (coastal W.A. species)

16. Phyllodes glaucous; branches pruinose; heads 7-10 mm diam. (dry); aril cream ..... 12. *A. xanthina*

16. Phyllodes green; branches not pruinose although branchlet extremities often scurfy; heads 5-7 mm diam.(dry); aril (where known) orange or red

17. Peduncles more than 10 mm long (restricted, W.A.) ..... 2. *A. bivenosa* (Airlie Island variant)

17. Peduncles less than 10 mm long ..... 6. *A. rostellifera*

Descriptions

1. Acacia ampliceps Maslin, Nuytsia 1 (4): 315 (1974). *Type*: 19 km N of Sandfire roadhouse (between Broome and Port Hedland) on Great Northern Highway W.A., 9 June 1972, *B.R. Maslin* 2702; (holo: PERTH; iso: BRI, CANB, K, NSW, NY).

[*A. salicina* auct. non Lindley: *in sched.* PERTH]

Illustrations. G.F. Craig, Pilbara Coastal Flora, 61 (1983), B.R. Maslin *op. cit.* 316, B.R. Maslin, Fl. Cent. Australia 120 (1981).

[a] including gland adjacent to the apical mucro.

Note. This species is adequately described in the above publications and in Turnbull (1986).

2. Acacia bivenosa DC., Prodr. 2: 452 (1825). -*A. binervosa* DC., Mem. Legum. 448 (1827), [misspelling for *A. bivenosa*]. *Type*: Nouvelle Hollande, côte occident.[sphalm."orient."], Mus. de Paris 1821 (holo: G-DC; iso: BM, P). (Figure 2A-C)

A. elliptica A. Cunn. ex Benth., London J. Bot. 1: 347 (1842). *Type*: Enderby Island, Dampier Archipelago, Western Australia, 25 Feb. 1818, *A. Cunningham* 158 (lecto: K, see discussion below; paralecto: Dirk Hartog Island, Western Australia, Jan. 1822, *A. Cunningham* 330, see *A. didyma*).

A. bivenosa var. *borealis* Hochr., Candollea 2: 376 (1925). *Type*: Ville de Broome, Western Australia, 4 Feb. 1905, *B.P.G. Hochreutiner* 2828 (holo: G).

Illustration. G.F. Craig, Pilbara Coastal Flora: 59 (1983).

Glabrous, usually dense, rounded or spreading shrubs 1-3 m tall. *Stems* usually much-branched from ground level, spreading to erect. *Bark* smooth, light to medium grey; *branches* smooth, red-brown; *branchlets* pale yellow-brown, often slightly pruinose. *Stipules* caducous, triangular, 1-1.2 mm long, 0.4-0.8 mm wide. *Phyllodes* usually narrowly elliptic to oblong-elliptic or obovate to oblanceolate, 2-5 cm long, 6-25 mm wide, l:w = 2-5, thin and smooth to sub-fleshy, upon drying finely wrinkled, patent to ascending, green or glaucous and occasionally slightly pruinose; usually 2-nerved, on narrow phyllodes and in Northern Territory and Queensland the adaxial nerve absent or visible for only 5-10 mm above pulvinus, marginal nerves often distinctly yellow; *apex* usually obtuse, occasionally slightly emarginate, commonly with a small, dark incurved to straight mucro; *pulvinus* 1-2 mm long, yellow-brown, smooth to finely wrinkled. *Glands* commonly 2 or 3, lowermost prominent and 1-12 mm above pulvinus, slightly raised with a yellow rim and a dark, concave, elliptic, often quite elongated central pore which is usually 0.3-1.5 mm long and 0.3-0.4 mm wide; distal glands smaller with one commonly adjacent to mucro and at least one other on margin above mid-point. *Racemes* 2-4 cm long, commonly with 6-7 heads, axes straight, mostly indeterminate with subsequent peduncles axillary, basal bracts caducous, broadly triangular, 1 mm long, 0.8-1 mm wide. *Peduncles* 1-3.5 cm long, basal peduncular bracts caducous, triangular to broadly so, 1-1.4 mm long, 0.4-1.5 mm wide. *Heads* globular, deep golden, 5-8 mm diam. (dry), to 10 mm diam. (fresh), usually 16-23-flowered, sub-dense, buds bright green. *Bracteoles* persistent, oblong to obovate, 0.6-1.4 mm long, 0.3-0.7 mm wide, light brown. *Flowers* 5-merous. *Calyx* 0.7-1.2 mm long, 1/3-1/2 length of corolla, gamosepalous, ± truncate although often slightly lobed to 0.2 mm or sinuate-toothed, tube membranous. *Corolla* 1.8-2.8 mm long, petals united for 1/2-2/3 their length, yellow, nerves not evident. *Ovary* sessile, style sub-lateral. *Legumes* sub-moniliform but constrictions not pronounced, to 8 cm long, 5-9 mm wide, with up to c. 8 articles, firmly crustaceous and breaking readily into 1-seeded articles, ± erect, straight, smooth, light brown. *Seeds* longitudinal in legume, oblong-elliptic, 4-6 mm long, 2.5-4 mm wide, compressed (1.5-2 mm thick), glossy, dark-brown; *pleurogram* fine, dark, with an opening towards hilum of 0.5-1 mm; *areole* oblong-elliptic, 2.5-4.5 mm long, 1-2 mm wide; *funicle* short, usually filiform, expanded into a thick, terminal, deep orange or red aril which is often attached sub-laterally.

Selected specimens examined. WESTERN AUSTRALIA: 1 mile [1.6 km] S of Tom Price turn-off, *H.Demarz* 4434 (PERTH - weeping variant); Iriya, Rawlinson Range, *A.C. Kalotas* 1848 (DNA, PERTH); Cable Beach, near Broome, *M. Lazarides* 6548 (DNA, PERTH); Airlie Island, *V. Long* VL165 (PERTH - Airlie Island variant); Upper Rudall River area, c. 122° 15' E, 22° 30' S, *B.R. Maslin* 2067a (ADW, BRI, NT, PERTH, SYD); between Tom Price and the Wittenoon-Nanutarra road along the Tom

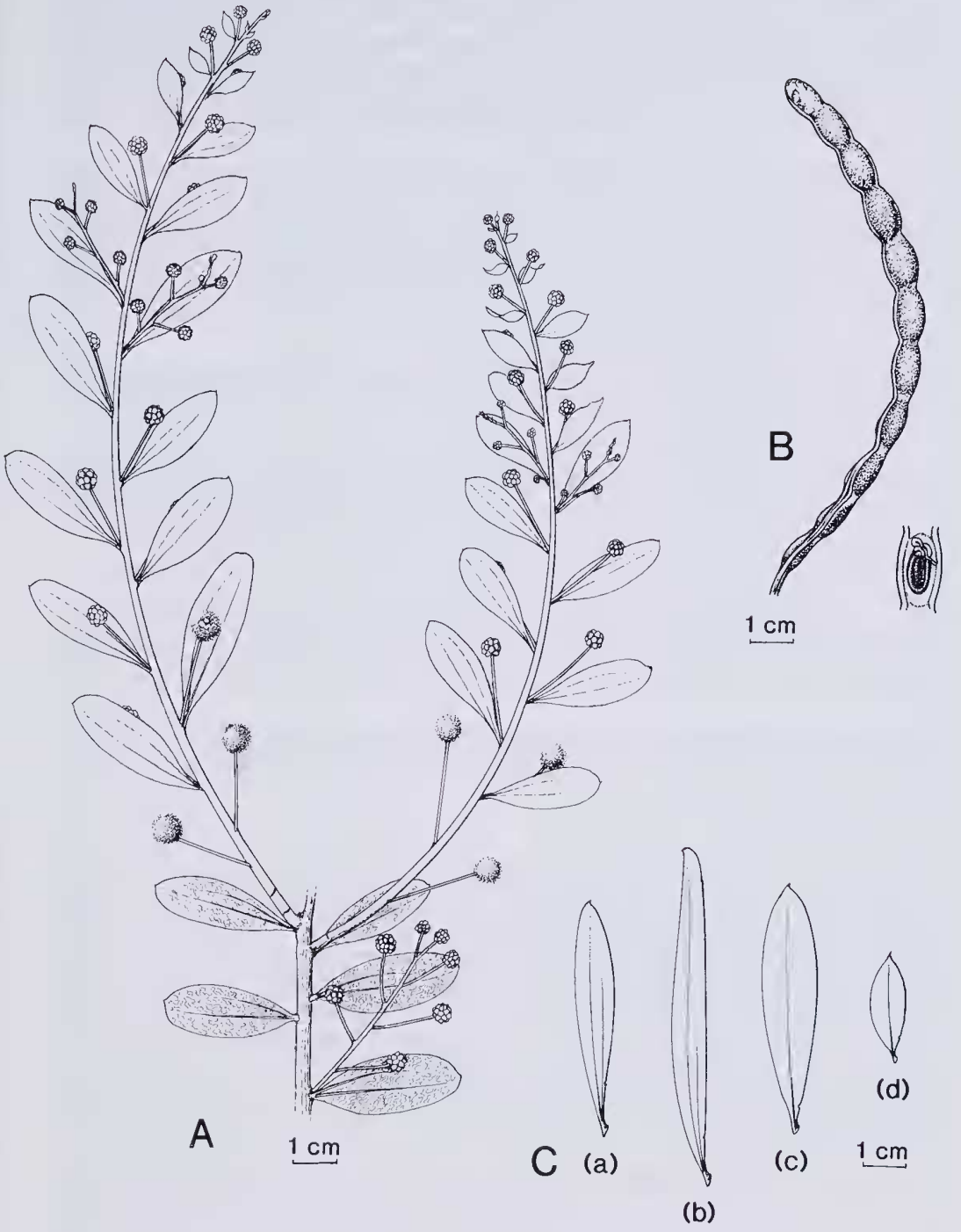

Figure 2. *Acacia bivenosa*. A - Habit (from *Maslin* 4590, PERTH). B - Legume and seed (from *Maslin* 5743, PERTH). C - Phyllode variation in *A. bivenosa*: (a) Hamersley Range (from *Ashby* 4161, PERTH); (b) Airlie Island (from *Long* 163, PERTH); (c) McDonnell Ranges, N.T. (from *Chippendale* 3370, PERTH); (d) Queensland (from *Ballingall* 1334, PERTH).

Price-Dampier railway line, *B.R. Maslin* 4667 (PERTH - Hamersley Range form); Burrup Peninsula, N of Dampier, *B.R. Maslin* 4740 (BRI, PERTH - weeping variant); c. 10.5 km S of Yardie Creek homestead on road to Ningaloo, *B.R. Maslin* 4752 (BRI, CANB, K, PERTH); Broadhurst Road, Karratha, *B.R. Maslin* 5742 (CANB, PERTH); Cape Range National Park, *B.R. Maslin* 6290 (CANB, PERTH); East Island, [Lacepede Islands], 5 Oct. 1949, *D.L. Serventy* (PERTH 00195553); Adele Island, Yampi Sound, Sept. 1949, *B. Shipway* (PERTH 00195553); 135.5 km SE of Fitzroy River on Great Northern Highway, *M. Cossatter & L. Thomson* LXT82 (PERTH); Dorre Island, *A.S.Weston* 10525 (PERTH).
NORTHERN TERRITORY: Tablelands Highway, 19° 34' S, 135° 57' E, *J. Brock* 334 (DNA); Palm Valley, *G. Chippendale* 2688 (DNA); 130 miles [209.2 km] WNW of Mt Doreen, *G. Chippendale* 3370 (DNA, PERTH); c. 18 km SE of Alice Springs, *L.A. Craven* 4310 (DNA); 15 km N of Barrow Creek, *D.Davidson* 19 (PERTH); Penny Springs, Kings Canyon, *G. Leach* 676 (DNA, PERTH); Mt Doreen Station, 8 mile Bore, *J.R. Maconochie* 1792 (BRI, DNA, PERTH); 40 miles [64.4 km] W of Alexandria Station, *R.A. Perry* 1565 (BRI, DNA, PERTH); 21 miles [33.8 km] NE of O.T. Station, 16° 35' S, 135° 20'E, *R.A.Perry* 1879 (BRI, DNA)
QUEENSLAND: Mt Isa, *F.D.Hockings* 55 (BRI); 90 km N of Boulia, *C. Macdonald* 533 (BRI); c. 40 km N of Jundah, *K.P. Nicolson* 301 (BRI); Mimosa Creek, 5 km NW of Duchess, *P. Ollerenshaw* 1248 & *D. Kratzing* (BRI); NW of Jundah, *L. Pedley* 4493 (BRI).

Distribution. Previously *A. bivenosa* was considered to be restricted to coastal NW Western Australia (Maslin and Pedley, 1982). However, as defined here the species extends eastwards north of the 25th parallel through the Northern Territory to Queensland. As discussed under *Affinities* below, outside Western Australia it is sometimes difficult to distinguish *A. bivenosa* from *A. ligulata*.

Habitat. Grows on a variety of soils, including coastal sand and inland rocky hillsides and gullies, in scrub, open scrub and open woodland, often associated with spinifex. In north-western Queensland *A.bivenosa* often occurs on stony hillsides and less commonly on limestone pavements.

Flowering and fruiting periods. Flowering specimens have been collected from April to November. Legumes with mature seeds have been collected from September to December.

Typification. The type sheet of *A. elliptica* at herb. Kew bears five twigs and one label: "Bay of Rest, Exmouth Gulf, and Dampiers Archipelago, Feby 158/1818, Dirk Hartog's Island Jany 330/1822;". In selecting a lectotype Pedley (1977) dismissed the lower sterile twigs, from Dirk Hartog Island, referring them tentatively to *A. xanthina*. These para-lectotypes are probably the first collection of our new species *A. didyma*. The remaining three twigs on the sheet are *A. bivenosa*. Of these, one bears a slip-on field label stating that it came from Dampiers Archipelago, another a slip-on label with Cunningham's number 158 while the third bears no label. Pedley chose the latter pair as the lectotype, presuming that one or both came from the Bay of Rest. However, inspection of Cunningham's unpublished 'List of Specimens' revealed a Latin diagnosis of his specimen 158 which showed that it was collected on 25 Feb. 1818 in the Islands of the Dampier Archipelago. Cunningham in his journal for that date specifically records the locality as Enderby Island, Dampiers Archipelago, repeats exactly the above-mentioned diagnosis for 158 and comments "A shrub frequently seen at the Bay of Rest and not in fl."

As all three twigs of *A. bivenosa* on the type sheet possess flowers we conclude that none were collected from the Bay of Rest. Hence it appears that Pedley was misled by the ambiguous label and that the collecting details for all three, including his lectotype, should be: Enderby Island, Dampiers Archipelago, Feb. 1818, *Cunningham* 158.

Phyllode nervature and inflorescences. In order to understand the relationship between *A. bivenosa* and its closest relative, *A. ligulata*, it is necessary to first discuss the variation in phyllode nervature and inflorescence structure within *A. bivenosa*. Traditionally *A. bivenosa* has been recognised on the basis of its 2-nerved phyllodes and long axillary peduncles. While these characters define "typical" *A.bivenosa* in W.A., elsewhere they commonly need to be used in combination with other attributes in order to distinguish the species from *A. ligulata* (see *Affinities* below). In circumscribing *A. bivenosa* the inflorescences are often more reliable than phyllode nervature.

(a) Phyllode nervature. Most plants of *A. bivenosa* from Western Australia have two-nerved phyllodes. However, on plants with narrow phyllodes and on many plants from the Northern Territory and Queensland, the second, adaxial nerve can be reduced and obscure or even absent. As discussed below, inflorescence characters are often important in enabling the identification of these plants as *A.bivenosa*. Pedley (1977) noted a correlation between the reduction in nerve number and decreasing phyllode width, however, this does not hold throughout the range of this species.

(b) Inflorescence structure. The definition of floral structures in *Acacia* requires much work in order to establish homologies and clarify terminology. For the purpose of this paper we have adopted the following terminology: *raceme* refers to inflorescences comprising a common axis supporting head-bearing peduncles, more correctly this structure should be called a raceme of heads; *axillary peduncle* refers to inflorescences comprising head-bearing peduncles arising from within the axil of phyllodes, without the development of a common axis.

The inflorescences of *A. bivenosa* are complex and comprise racemes and/or axillary peduncles with many specimens showing a mixture of the two inflorescence types (cf. Figure 2A). The racemes can be determinate or indeterminate, the latter growing out and with subsequent peduncles arising from within the axils of the phyllodes. Axillary peduncles may also arise on new shoots which are not derived directly from the racemes. Axillary peduncles are usually longer than those on axillary racemes.

(i) Determinate racemes. These may be up to 30 mm long with 6-10 peduncles. The raceme axis is subtended at the base by a few caducous brown bracts (normally leaving observable scars); the apex does not grow out. A few determinate racemes are commonly found on specimens bearing a preponderance of other inflorescence types.

(ii) Indeterminate racemes. Racemes that grow out as new shoots at the apex are common in *A. bivenosa*. The inflorescences produced on the new shoots usually comprise a single peduncle within the axils of phyllodes which may or may not reach maturity by the time the head reaches anthesis. The whole structure resembles a branchlet with the only indication of its developmental history being in the basal few peduncles which are not subtended by phyllodes (sometimes the peduncles drop, leaving only a scar on the branchlet).

(iii) Simple axillary peduncles. These are common in *A. bivenosa* and usually arise on indeterminate racemes as described above. Sometimes, however, simple axillary peduncles are developed synchronously with phyllodes on new shoots which are not associated with racemes. These closely resemble indeterminate racemes, the only obvious difference is that, being vegetative in origin, the base of the shoots always produces phyllodes which may or may not subtend simple axillary peduncles; i.e. there are no peduncles which lack subtending phyllodes.

Variants. The sympatric occurrence of plants with green phyllodes and those with glaucous phyllodes (e.g. *Maslin* 4752) is not unusual and has no taxonomic significance. Occasional plants in the Northern Territory and Queensland possess puberulous branchlets and raceme axes. In the Hamersley Ranges and on the islands of the Dampier Archipelago the plants of some populations bear phyllodes which are generally narrower than normal (5-12 mm wide), narrowly elliptic to oblanceolate, with apices obtuse to acute (e.g. *Maslin* 4667). Specimens from Airlie Island in particular are unusual (e.g. *V. Long* VL165). Their inflorescences and funicles are typical of *A. bivenosa*, but their phyllodes are 1 or 2-nerved with straight or slightly recurved tips. Most importantly the phyllodes are atypically long, i.e. (4)5-9 cm long, 5-10 mm wide, l:w = 6-12. Vegetative specimens of this Airlie Island variant are easily mistaken for *A. ligulata*.

A variant with pendulous branches is described by Maslin (1982); it occurs in the Pilbara in the Tom Price-Newman area, at Dampier and on the Burrup Peninsula (e.g. *Maslin* 2759). Further variation within the species is discussed under *Affinities* below.

Affinities. Bentham's (1864) concept of *A. bivenosa* included *A. xanthina* (cf. *Drummond* 1: 283 and *Preiss* 928) and *A. didyma* (cf. Dirk Hartog Island, *Cunningham* [330]). While it has affinity with these species, *A. bivenosa* can be readily distinguished from the more southerly *A. xanthina* by its shorter phyllodes and orange or red arils; and from *A. didyma* by the less rotund phyllodes with a definite mucro, peduncles alternate on rhachis and narrower and straight legumes.

In the Cape Range area *A. bivenosa* is sympatric with *A. startii* which bears similar phyllodes and inflorescence; the former is distinguished by the absence of an indumentum, by its deep golden heads with 15-25 flowers and by its broader and straight legumes.

Acacia bivenosa is very closely related to the widespread Arid Zone species *A. ligulata* and it is sometimes difficult to distinguish between them, particularly in south-central Northern Territory where

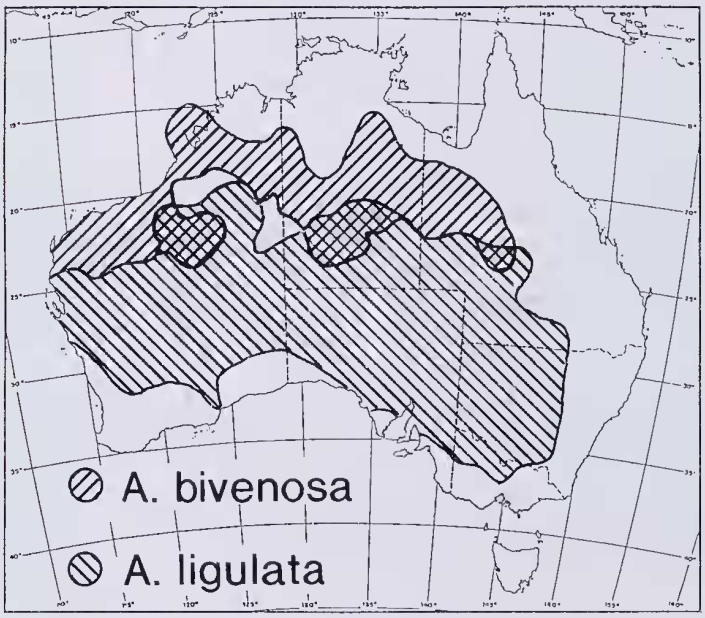

Figure 3. Distribution of *A. bivenosa* and *A. ligulata* indicating areas of geographic overlap between the two species.

their distributions overlap (cf. Figure 3). Pedley (1977) restricted the name *A. ligulata* to plants from the type locality in Shark Bay, W.A. Within *A. bivenosa sens.* Pedley he postulated clinal variation from SE-NW Australia and then, with some reservation, gave the clinal extremes subspecific rank. Consequently, the inland plants formerly called *A. ligulata* became *A. bivenosa* subsp. *wayi* and plants from N.W. Western Australia became subsp. *bivenosa.*

We consider that *A. bivenosa* and *A. ligulata* are best treated as distinct species. As noted previously (Maslin 1982: 79), if subspecific rank is applied, then other species in the group such as *A. rostellifera, A. cupularis* and *A. sclerosperma* would have to be included as subspecies within one highly polymorphic species, *A. bivenosa.* To adopt this approach would tend to compound the confusing range of variation which exists in each of the above taxa. We therefore regard it as prudent to apply specific rank to each of these five taxa until such time as a more thorough analysis of the variation can be undertaken. The six characters we use to distinguish *A. bivenosa* from *A. ligulata* are shown in Table1.

Typical *A. bivenosa* occurs in north-west W.A. (centred on the Pilbara region) and extends along the coast into the Kimberley region as far north as Adele Island. Specimens from these areas are readily recognised by their two-nerved phyllodes (nerves equally prominent or the adaxial one less pronounced) with l:w = 2-5, and by their inflorescences which comprise a mixture of racemes and long axillary peduncles (see discussion above). Other characters useful in recognising typical *A. bivenosa* include its usually glaucous phyllodes with the apical mucro often incurved.

Outside the range of "typical" *A. bivenosa* the phyllodes are commonly one-nerved or imperfectly two-nerved and the inflorescences are predominantly racemose (axillary peduncles few or absent). These variants, which are discussed in the following two paragraphs, have in the past commonly been referred to *A. ligulata.*

Plants from the east Kimberley, W.A., through the Northern Territory (north of about latitude 22°S) to north-west Queensland are included in *A. bivenosa* rather than *A. ligulata* because the phyllodes are usually glaucous, with l:w not above 5, have apical mucros which are either straight or shallowly upturned and peduncles commonly 15 mm or more long. In the past the Northern Territory representatives of this entity were often discriminated from both *A. bivenosa* and *A. ligulata,* and erroneously called *A. elliptica.* Pedley (1979) referred to the Queensland populations of this entity as a northern variant of *A. bivenosa* subsp. *wayi* (= *A. ligulata*), and his descriptions of the northern and southern variants of the taxon accord well with our accounts of *A. bivenosa* and *A. ligulata* respectively.

The Macdonnell Range region of the Northern Territory represents a zone of overlap between *A. bivenosa* and *A. ligulata.* Within this area there is a perplexing range of variation which may be due to hybridisation and consequently it is often difficult to place specimens with certainty, although by employing the phyllode l:w character as the primary discriminating attribute (cf. Table 1) specimens can usually be ascribed to one or other of the species. However, this is not a satisfactory taxonomic resolution and intensive population studies are required to elucidate the complex variation patterns within this region.

Davidson and Morton (1984) present data on varying dispersal strategies between two populations of *A. ligulata.* However, their 'Population 2' from Barrow Creek, N.T. (*Davidson* 19, PERTH) is *A.bivenosa.* Their work therefore provides evidence of a further character distinguishing the two species by suggesting that *A. ligulata* is ornithochorous while *A. bivenosa* is myrmecochorous.

Table 1. Characters distinguishing typical *A. bivenosa* from *A. ligulata*.

Character		*A. bivenosa*	*A. ligulata*
Phyllodes	- l:w	2 - 5	5 - 19
	- nerves per face	2 - the adaxial one occasionally obscure	1 only
	- mucro	incurved to straight	recurved to straight
Inflorescences		mostly simple axillary peduncles arising on indeterminate racemes or new shoots, rarely with some determinate	determinate racemes with 2-6 heads
Peduncles		(10)15-35 mm long	2-10(15) mm long
Funicle		short, filiform, abruptly expanded into the aril	thick, coiled, gradually expanded into the aril

Hybrids. *A. bivenosa* hybridises with *A. ampliceps*. These hybrids are recognised by their elongate, penninerved, 2-nerved phyllodes, with the basal gland adjacent to the pulvinus, by their racemes often with opposite peduncles and by their pale lemon heads (e.g. *Maslin* 5760). They occur in the Pilbara in the following 1:250,000 grid cells: E51-13, F50-2,6,7 and F51-5.

Putative hybrids between *A. bivenosa* and *A. sclerosperma* are recognised by their narrower, 1- or 2-nerved phyllodes and large, ± moniliform legumes with oblong articles (e.g. *Maslin* 4735). These hybrids occur in the Pilbara region on 1:250,000 grid cells : F50-2,3,7,9.

Acacia bivenosa may possibly hybridise with *A. ligulata* in areas where their geographic ranges overlap, e.g. Macdonnell Range area, N.T. (see *Affinities* above) and Rudall River, W.A.

Conservation status. This species is widespread and common and is not considered to be endangered.

3. Acacia cupularis Domin, Vestn. Kral. Ceske Spolecn. Nauk. Tr. Mat.-Prir. 2: 45 (1923). *Type*: Bridgetown to Kojonup and Slab Hut Gulley, Western Australia, 1910, *A.A. Dorrien-Smith* s.n. (holo: K; iso: PR [*sphalm.*'1900']). (Figure 4, E)

A. saligna (Labill.)H.L. Wendl. *pro parte*, as to excluded syntype, *fide* Maslin (1974b).

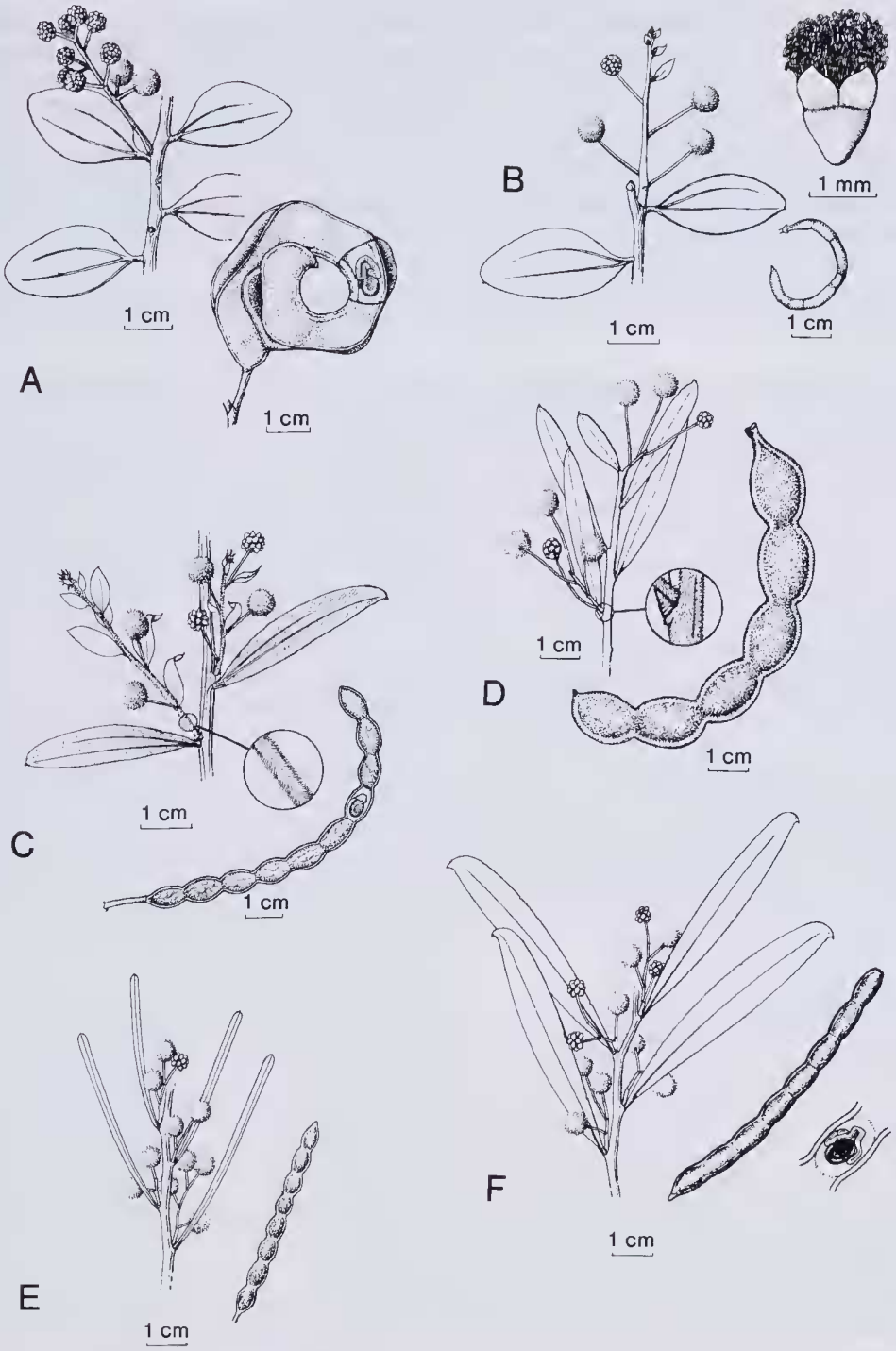

Figure 4. *Acacia didyma*. A - Habit (from *Maslin* 3699, PERTH) and legume (from *Stretch*, PERTH 00801895). *Acacia startii*. B - Habit, flower (both from *Start* 7, PERTH) and legume (from *Start* 65, PERTH). *Acacia telmica*. C - Habit and legume (both from *Chapman* 563, PERTH). *Acacia sclerosperma* subsp. *glaucescens*. D - Habit (from *Maslin* 3715a, PERTH) and legume (from *Ashby* 4536, PERTH). *Acacia cupularis*. E - Habit (from *Wilson* 7912, PERTH) and legume (from *Pullen* 10.058, PERTH). *Acacia ligulata*. F - Habit (from *Maslin* 4318, PERTH), legume and seed (both from *Blackwell* 51, PERTH).

A. salicina var. *minor* F.Muell., J. Proc. Linn. Soc. Bot. 3: 126 (1859). *Type*: St. Vincents' Gulf, S. Australia 16 Dec. 1847, *F. Mueller* s.n. (probable syn: MEL). Spencers' Gulf, S. Australia, *C. Wilhelmi* s.n.(n.v.).

A. salicina var. *wayi* Maiden [as *'Wayae'*], Trans. & Proc. Roy. Soc. South Australia 32: 277 (1908); *A.bivenosa* subsp. *wayi* (Maiden) Pedley, Austrobailcya 1: 28 (1977). *Type*: Kingscote, Kangaroo Island, S. Australia, Jan. 1907, *J.H. Maiden* s.n. (syn: K, MEL, NSW). Marion Bay, S. Australia, Sep. 1907, *R.S. Rogers* s.n. (syn: K). Cultivated, Botanic Gardens, Sydney, Dec. 1906, *J.H. Maiden* s.n. (syn: MEL). Other cited syntypes n.v.

Illustration. D.J.E. Whibley, Acacias of S. Australia 109, Figure B (left-hand phyllode) (1980), as *A.ligulata*.

Glabrous, open to sub-dense rounded shrubs 1-2.5 m tall, to 2.5 m wide. *Bark* smooth, grey; *branchlets* commonly dark red-brown, smooth, often slightly pruinose. *Stipules* caducous, triangular, to 1.4 mm long, 0.5 mm wide, scarious. *Phyllodes* narrowly linear, 3-7 cm long, 1-4(5) mm wide, l:w = 11-40, ± thick, finely longitudinally wrinkled when dry, flat, straight, ascending to erect, sub-distant, sub-glaucous to dark green; 1-nerved, midrib not prominent, pale yellow to light-brown when dry; lateral veins obscure; marginal nerves narrow, commonly golden (dry); *apex* rounded-obtuse with a minute ± central mucro; *pulvinus* 1-2 mm long, yellow-brown. *Glands* 2 or 3, lowermost 3-14 mm above pulvinus with raised yellow rim and a dark, concave elliptic pore, 0.6-0.8 mm long, 0.3-0.5 mm wide, another normally less prominent gland adjacent to mucro and a third (sometimes absent) on margin above mid-point. *Racemes* 1-7 mm long, with 2-3 heads, axes straight, occasionally growing out, basal bracts caducous, broadly ovate, 0.8-1.5 mm long, 0.7-1.5 mm wide. *Peduncles* 2-6 mm long, basal peduncular bracts caducous, scars only observed. *Heads* globular, mid-golden, 4-6 mm diam. (dry), to 8 mm diam. (fresh), 16-22-flowered, sub-dense. *Bracteoles* persistent, obovate, 0.8-1.5 mm long, 0.3-0.8 mm wide, light brown. *Flowers* 5-merous. *Calyx* 0.7-0.9 mm long, 1/3-1/2 length of corolla, gamosepalous, upper margin truncate to sinuate. *Corolla* 1.7-2.2 mm long, petals united for 1/2-2/3 their length, yellow. *Ovary* sessile, style sub-lateral. *Legumes* ± sub-moniliform, to 7 cm long, 4-5 mm wide, with up to 8 articles, crustaceous, breaking readily at constrictions, ± erect, smooth or finely longitudinally striate, commonly dark brown. *Seeds* longitudinal in legume, oblong, 3-5 mm long, 2.5-3 mm wide, 1-2 mm thick, dull, light brown; *pleurogram* fine, dark, with an opening towards hilum of 0.5-1 mm; *areole* oblong-elliptic, 2-3 mm long, 1-2 mm wide; *funicle* filiform, expanded into a thick, terminal, orange to scarlet aril.

Selected specimens examined. WESTERN AUSTRALIA: Ongerup, *A.M. Ashby* 5261 (PERTH); Balladonia, *W.E. Blackall* 149 (PERTH); Bremer Bay, *P.E. Conrick* 1669 (PERTH); 53 km SE of Madura, *B. Downing* 111 (AD, CANB, MEL, PERTH); Tammin, *C.A. Gardner* 6536 (PERTH); Carracarrup area, 13 miles [20.9 km] S of Ravensthorpe, *B.R. Maslin* 987 (K, MEL, PERTH); Esperance, 1-2 miles [1.6-3.2 km] from ocean, *B.R. Maslin* 2544 (PERTH) and 2544a (CANB, K, MEL, PERTH); Albany, eastern shore of Oyster Harbour, *B.R. Maslin* 3767a (BRI, PERTH); Fitzgerald River National Park, near Hamersley River Crossing, *B.R. Maslin* 4056 (PERTH); 33 km from Morawa towards Three Springs, *B.R. Maslin* 4275 (AD, CANB, PERTH); 12 km N of Israelite Bay on track to Balladonia, *E.C. Nelson* ANU 16502 (CANB, PERTH); Middle Island, Recherche Archipelago, *A.S. Weston* 8672 & *M.E. Trudgen* (PERTH).
SOUTH AUSTRALIA: 3.5 km E of S.A.-W.A. State border, *R.J. Chinnock* 3347 (AD, PERTH); c. 5 km N of Bute on Wokurna Road, *B. Copley* 737 (AD); Lincoln pumping basin, 10 km E of Sleaford Mere, *L. Denis* 851253 (AD); sand dunes near Elliston, *N.N. Donner* 2414 (AD); Kangaroo Island, roadside near Birchmore Lagoon, *Hj. Eichler* 15447 (PERTH); Robe, c. 135 km NW of Mt Gambier, *D. Hunt* 1146 (AD); Mt Lofty Range, Eden, 12 May 1919, *E.H. Ising* (AD); Kulde, c. 40 km E of Murray Bridge, 25 Jan 1937, *E.H. Ising* (AD); Hincks National Park, *D. Symon* 6513 (AD); Innes National Park, Yorke

Peninsula, *D.E. Symon* 9635A (AD); The Coorong, c. 35 km S of Salt Creek, *J.Z.Weber* 7200 (AD); Mt Olinthus, bottom near gate, *D.J.E. Whibley* 7280 (AD).
VICTORIA: Little Desert, S of Kaniva, *A.C. Beauglehole* ACB18916 (MEL); Lake Albacutya, *A.C.Beauglehole* ACB18968 (MEL).

Distribution. Widespread in southern Australia. In southern Western Australia northerly outlying occurrences at Three Springs, generally distributed from Northam to Bruce Rock, and then from Kojonup and Albany E to Balladonia and near Israelite Bay, with scattered near coastal occurrences into South Australia. In southern South Australia scattered along the entire coast and near coast, extending throughout the Eyre Peninsula and Kangaroo Island. In inland western Victoria from Wyperfeld National Park S to Dimboola.

Habitat. Grows in sand, loam or sandy clay in "Mallee" communities and sometimes on dunes.

Flowering and fruiting periods. Flowering specimens have been collected from July to December with the main flowering period in September and October. Legumes with mature seeds have been collected in December and January with one collection in September.

Nomenclatural history. Discussed under *A. ligulata.*

Table 2. Characters distinguishing *A. cupularis* from typical *A. ligulata.*

Character	*A. cupularis*	*A. ligulata*
Branchlets	red-brown, smooth	yellow-brown, ribbed
Phyllodes - shape	linear	linear-elliptic
- width	1-4(5)mm	(3)4-14mm
- apex	rounded-obtuse, mucro central	acute to obtuse and uncinate
Raceme length	1-7mm	3-20(30)mm
Head diameter (dry)	4-6mm	7-9mm
Legumes - width	4-5mm	5-9mm
- texture	crustaceous	woody

Affinities. Plants of this species have hitherto usually been identified as *A. ligulata* or as *A. salicina* subsp. *wayi*. *A. cupularis* is recognised most reliably by its rounded obtuse phyllode apex which is not uncinate as commonly occurs in *A. ligulata* and by its narrower crustaceous legumes which break readily at constrictions between seeds. Furthermore *A. cupularis* usually has narrower phyllodes which are thinner and therefore not as coarsely wrinkled when dry (cf. Table 2). In South Australia, however, a few specimens of *A. ligulata* have been collected with atypically narrow phyllodes (2-3 mm wide) and small heads (5 mm diameter), thus resembling *A. cupularis*. *A. cupularis* bears some resemblance to *A.rostellifera* which is distinguished by its generally broader, uncinate or rostellate phyllodes, longer racemes and broader legumes. Superficially resembles *A. maxwellii* Maiden & Blakely which differs in having a prostrate habit, pubescent branchlets, phyllodes with an excentric mucro, generally fewer flowers per head, and peduncles 1-2 cm long.

Conservation status. Not considered rare or endangered.

4. Acacia didyma A.R. Chapman and Maslin sp. nov. (Figure 4A)

Species nova Sectionis *Phyllodineae*. Frutices densi rotundati vel arbores parvae, 1.5-4 m altae, ad 4 m latae. Ramuli glabri, teretes, parce pruinosi. Stipulae caducae. Phyllodia orbicularia ad late elliptica, 2-5 cm longa, 1.5-4 cm lata, ratione horum 1-2, subsucculenta demum, glabra, glauca, leviter pruinosa, binervata; apice obtuso, interdum emarginato, mucronulato; pulvino circa 2 mm longo; glandularibus duabus non prominentibus, glandulari inferna 1-8 mm supra pulvinum. Racemi 2-4 cm longi, plerumque 4-12-capitulati; axibus subcrassis, glabris. Pedunculi 5-10 mm longi, aliquantum crassi, didymi, glabri. Capitula globularia, aurea, 6-7 mm diametro in sicco ad 10 mm diametro in vivo, circa 20-floribus, subdensa. Flores 5-meri. Calyx longitudine 1/3-1/2 corollam aequans, gamosepalus, plus minusve truncatus. Petala 1/2-2/3 connata. Legumina curvissima ad laxe unicircinnata, ad 10 cm longa, 12-15 mm lata, coriacea-crustacea, plana, sed margine externo undulato, leviter pruinosa. Semina (pauca visa) longitudinalia in legumine, late oblonga-elliptica; arillo flavo-brunneo (in sicco).

Typus: 3.6 km west of Tamala homestead road, on Useless Loop Rd., Shark Bay, Western Australia, 31 August 1988, *A.R. Chapman* 601 (holo: PERTH; iso: CANB, G, K, MEL, NY).

[*A.bivenosa* auct. non DC.: Bentham, Fl. Austral. 2: 381 (1864), *pro parte*, as to *A. Cunningham* [330], Dirk Hartog Island]

[*A. elliptica* auct. non A. Cunn. ex Benth.: Bentham, London J. Bot. 1: 347 (1842), *pro parte*, as to *A.Cunningham* [330], Dirk Hartog Island]

[*A. xanthina* auct. non Benth.: B.R.Maslin and L.Pedley, W. Austral. Res. Notes 6: 126 (1982), as to grid cell 201]

Dense rounded shrubs or small trees 1.5-4 m tall, to 4 m wide. *Bark* fissured on older trunks, grey to light grey; *branchlets* glabrous, terete, finely ribbed, yellow-brown, moderately pruinose. *Stipules* caducous. *Phyllodes* orbicular to broadly elliptic, 2-5 cm long, 1.5-4 cm wide, l:w = 1-2, sub-fleshy with age and therefore very finely wrinkled upon drying, slightly undulate at least when dry, glabrous, glaucous, slightly pruinose; 2-nerved, nerves ± equally prominent, with one or two additional less prominent longitudinal nerves on broadest phyllodes, lateral nerves not prominent; *apex* obtuse, sometimes emarginate, mucronulate; *pulvinus* c. 2 mm long. *Glands* 2, not prominent, lowermost 1-8 mm

above pulvinus, yellow, concave, elliptic, 0.5-0.8 mm long, 0.4-0.5 mm wide, uppermost of similar size and adjacent to mucro. *Racemes* 2-4 cm long, commonly with 4-12 heads, axes determinate or occasionally growing out, sub-stout, glabrous, basal bracts caducous, c. three judging from scars. *Peduncles* 5-10 mm long, rather stout, twinned, glabrous, basal peduncular bracts absent at anthesis (?present in young buds). *Heads* globular, golden, 6-7 mm diam. (dry), to 10 mm diam. (fresh), c. 20-flowered, sub-dense. *Bracteoles* persistent, oblong-ovate, c. 1 mm long, 0.5 mm wide, membranous, fimbriolate otherwise glabrous. *Flowers* 5-merous. *Calyx* 1-1.5 mm long, 1/3-1/2 length of corolla, gamosepalous, ± truncate, sparsely fimbriolate. *Corolla* c. 2.5 mm long, petals united for 1/2-2/3 their length, smooth, glabrous, obscurely 1-nerved. *Ovary* sessile, glabrous, style sub-lateral. *Legumes* strongly curved to openly once-coiled, to 10 cm long, 12-15 mm wide, with up to 7 articles, coriaceous-crustaceous, flat but outer margin shallowly undulate (at least following dehiscence), scarcely raised over seeds, slightly constricted between seeds although occasionally more deeply so, smooth, glabrous, slightly pruinose. *Seeds* (few seen) longitudinal in legume, widely oblong-elliptic, 4.5 mm long, c. 4 mm wide, 2-2.5 mm broad, slightly shiny, dark brown to black; *pleurogram* very obscure, with an opening towards hilum of 1 mm; *areole* 2-3 mm long, 2-2.5 mm wide; *funicle* abruptly expanded into a large, thick, yellow-brown (dry) aril twice-folded below seed.

Other specimens examined. WESTERN AUSTRALIA: 1 mile [1.6 km] W of causeway, near Carrarang Station, *T.E.H. Aplin* 3432 (PERTH); Tamala Station, *J.S. Beard* 6802 (PERTH - 2 sheets); 3.8 km W of Tamala Homestead turn-off, Tamala Station, *R.J. Cranfield* 2544 (PERTH); Wallabi Island, Abrolhos Group, c. Oct. 1963, *A.R. Main* s.n. (PERTH 00152056); Tamala Station, Shark Bay District, *B.R. Maslin* 3699 (CANB, K, PERTH); NW of Tamala Homestead, Shark Bay area, *B.R. Maslin* 3702 (PERTH); False Entrance, Carrarang Station, May 1960, *R.W. Vollprecht* s.n. (PERTH 00152463); East Wallabi Island, *R.D. Royce* 6328 (PERTH); East Wallabi Island, 8 Sept. 1959, *G.M. Storr* (PERTH 00152064); Tamala Station, March 1987, *J. Stretch* s.n. (PERTH 00801895).

Distribution. Western Australia in the south western extremity of the Carnarvon Botanical District of the Eremaean Botanical Province and in the northern half of the Irwin Botanical District of the South-West Botanical Province (1:250,000 maps G49-8,12 and H49-4). Occurring on Dirk Hartog Island and Carrarang and Tamala Stations in the Shark Bay area and 200 km south-west on East Wallabi Island in the Houtman Abrolhos Group.

Habitat. A. didyma is the dominant small tree on a number of limestone ridges west of Tamala Homestead, occasionally forming dense groves. On the eastern side of East Wallabi Island the consolidated dunes overlying limestone support the greatest abundance of plant species, including *A. didyma*. There are no records of *A. didyma* on the consolidated dunes of West Wallabi Island, where the aeolianite is further from the surface (Storr 1965).

Flowering and fruiting periods. Flowering specimens have been collected in May, August, September and October. Legumes with mature seeds have been collected in August and immature legumes have been collected in October and November.

Affinities. Clearly distinguished from all other members of the *A. bivenosa* group by its racemes bearing twinned peduncles and by its large, strongly-curved to once-coiled flat legumes. *A. didyma* superficially resembles both the more northerly species *A. bivenosa* and *A. startii* and the more southerly *A. telmica* and *A. xanthina*, but is readily distinguished by the aforementioned characters and by its orbicular to widely elliptic phyllodes (l:w = 1-2). It should be noted that aril colour has not been observed in the field,

however, if cream coloured, then this would suggest affinity with *A. xanthina*. The first collection of this new species appears to have been that of Alan Cunningham from Dirk Hartog Island; this specimen (no. 330) represents one of the syntypes of *A. elliptica* (= *A. bivenosa*).

Etymology. From the Greek for twinned, referring to the peduncle arrangement on the raceme axis.

5. Acacia ligulata A. Cunn. ex Benth., London J. Bot. 1: 362 (1842). *Lectotype* (here selected): Dirk Hartog Island, Western Australia, 21 Jan. 1822, *A. Cunningham* 326 (K, see discussion below). *Paralectotype:* S.Coast, *Fraser*; n.v. (Figure 4F)

A. pallidiramosa Maiden & Blakely, J. Roy. Soc. W. Australia 13: 12 figs. 20-22 (1928). *Type:* Without locality, date or collector indicated but sheet annotated "Acacia cf. meissneri, 'Mohrunga Cannsigon', vide 15 bottle" (holo: NSW119772; iso: K, PERTH -fragment ex NSW).

[*A. salicina* auct., non Lindley: G. Bentham, Fl. Austral. 2: 367 (1864), *pro parte;* Maiden, Forest Fl. NSW, 4(9): 146 (1910)]

[*A. bivenosa* subsp. *wayi* auct., non (Maiden) Pedley: L. Pedley, Austrobaileya 1: 272 (1980), *pro parte,* as to the "southern variant".]

Illustrations. Maiden and Blakely, *loc. cit.*; Maiden, *op. cit.*, plate 149 (F-O); D.J.E. Whibley, Fl. S. Australia, Part 2: Fig.272B - excluding narrow, linear phyllode (1980); G.M. Cunningham *et al.*, Pl. W. New South Wales 365 (1981); B.R. Maslin, Fl. Cent. Australia, 120 (1981).

Dense, rounded or infundibular shrubs or small trees to 3 m tall. *Bark* smooth, grey; *branchlet* extremities light brown or yellow, often with distinct yellow ribs, usually glabrous, occasionally slightly scurfy or pruinose. *Stipules* caducous, narrowly triangular, 3-3.5 mm long, 0.7-1.1 mm wide. *Phyllodes* usually linear to narrowly elliptic, 3-7.5 cm long, 4-14 mm wide, sometimes 2-3 mm in S.A., l:w = 5-19(-30 occasionally in S.A.), usually thick, smooth (fresh), usually wrinkled when dry, flat, patent to ascending, glabrous, green, infrequently glaucous; 1-nerved, midrib obvious, yellow, lateral nerves obscure or absent; *apex* acute to obtuse, often uncinate with a small, dark, recurved to straight mucro; *Glands* commonly 3, lowermost 2-20 mm above pulvinus, 0.5-1 mm long, 0.3-0.5 mm wide, with rim slightly raised, pore dark, concave, elliptic; another less prominent gland adjacent to mucro and commonly at least one other on margin above mid-point. *Racemes* 0.3-2(3) cm long, with 2-4(6) heads, axes straight, usually glabrous, predominantly determinate, or if growing out then never producing further heads, basal bracts caducous, ovate, 1-1.2 mm long, 1 mm wide. *Peduncles* 2-10(15) mm long, usually glabrous, basal peduncular bracts caducous, broadly ovate, c. 1.8 mm long, 2 mm wide. *Heads* globular, deep golden, 7-9 mm diam. (dry) to 12 mm diam. (fresh), 19-24-flowered, sub-dense. *Bracteoles* persistent, obovate-cuneate, 0.7-1.4 mm long, 0.4-1 mm wide, glabrous, light brown. *Flowers* 5-merous. *Calyx* 0.9-1.2 mm long, 1/3 length of corolla, gamosepalous, 5-angled, upper margin truncate. *Corolla* 2-3 mm long, petals united for 1/2-2/3 their length, yellow, nerves obscure. *Ovary* sessile, usually glabrous, style sub-lateral. *Legume* commonly straight-sided or slightly constricted between seeds, to 9 cm long, 5-9 mm wide, with up to 10 articles, thick, woody, patent to erect, light to medium brown, often with a depressed paler central longitudinal stripe when mature, glabrous. *Seeds* longitudinally in legume, oblong, usually 4-6 mm long, 3-5 mm wide, compressed (2 mm thick), shiny, brown; *pleurogram* with an opening toward hilum of 1-2 mm; *areole* oblong-elliptic, c. 3 mm long, 1-3 mm wide; *funicle* usually thickened and coiled at side of seed, expanding into a yellow-orange or red aril folded and attached centrally under seed.

Selected specimens examined. WESTERN AUSTRALIA: 2.5 miles [4 km] S of Menzies towards Kalgoorlie, *B.R. Maslin* 1931 (AD, DNA, K, MEL, NSW, PERTH); Tamala Station, *B.R. Maslin* 3695 (PERTH); Dirk Hartog Island, near Cape Inscription, *B.R. Maslin* 4294 (CANB, MEL, PERTH); 14 km N of Kumarina Roadhouse (between Meekatharra and Newman), Great Northern Highway, *B.R.Maslin* 4580 (PERTH); 30 km SW of Carnegie homestead on Gunbarrel Highway to Wiluna, *B.R. Maslin* 5633 (CANB, PERTH); Great Victoria Desert, 87 km S of Neale junction on road to Rawlinna, *B.R. Maslin* 5703 (BRI, PERTH); 19 km E of Greenough River on Geraldton-Mullewa road, *B.R. Maslin* 6253 (PERTH); Afghan Rock, 7 km E of Balladonia Motel, *K. Newbey* 7789 (PERTH); Uraryie Rock, 23 km SW of Zanthus, *K. Newbey* 8245 (PERTH); 15 km N of Two Sisters, 21° 22' 30" S, 121° 07' 30" E, *K. Newbey* 10376 (CANB, K, KARR, PERTH).
NORTHERN TERRITORY: Palm Valley, *G. Chippendale* 41 (BRI, DNA, PERTH); 36 miles [57.9 km] SW of Amaroo homestead, *G. Chippendale* 1410 (BRI, DNA, PERTH); Hull River, 5 miles [8 km] NW of Lasseter's Cave, *G. Chippendale* 4608 (DNA, PERTH); 57 km W of Uluru National Park, *P.E.Conrick* 864 (PERTH); Palm Valley, *N. Forde* 738 (DNA); 7.2 km N of Deep Well Town, *M.Lazarides* 5762 (PERTH); 22 miles [35.4 km] NE of Lucy Creek Station, *M. Lazarides* 5907 (BRI, PERTH); 27 miles [43.4 km] S of Alice Springs, *J.R. Maconochie* 1060 (DNA); 24° 45' S, 138° 00' E, Queensland - Northern Territory border, *D. O'Byrne* 16 (DNA); 34 miles [54.7 km] SSW of Napperby homestead, *R.E. Winkworth* 352 (BRI, PERTH).
SOUTH AUSTRALIA: c. 25 km S of Yardea homestead, *C.R. Alcock* 4057 (AD); Beetaloo Reserve, c. 20 km ESE of Port Pirie, *C.D. Boomsma* 217 (AD); Quorn, 6 Oct. 1940, *H.M. Cooper* (AD); 16 km NW of Ceduna, *N. Hall* H80/65 (BRI, PERTH); Hummock Hill, *P. Hudson* 2 (AD); 10 km E of Ooldea, *D.J.E.Whibley* 747 (AD); Strzelecki Track, c. 25 km NE of Tinga-tingana, *D.J.E. Whibley* 2374 (PERTH); c. 10 km W of Quinyambie homestead, *D.J.E. Whibley* 3511 (PERTH); c. 9 km W of Blanchetown, *D.J.E. Whibley* 3630 (PERTH); 17.4 km NE of Watson, *L.D. Williams* 9555 (AD).
QUEENSLAND: 127 km E of Birdsville towards Windorah, *M.E. Ballingall* 2225 (PERTH); Poeppel Corner, *D.E. Boyland* 252 (BRI); c. 160 km W of Windorah, *S.L. Everist* 4000 (BRI); 7 miles [11.3 km] W of Dynevor Downs, *L. Pedley* 2466 (PERTH); c. 19 km SSW of Eulo, *L.S. Smith* 6009 (BRI).
NEW SOUTH WALES: Menindee aerodrome, *E.F. Constable* NSW 35554 (DNA); 131 km W of Cobar, *I.V. Newman* 796 (PERTH).
VICTORIA: Redcliffs area, Flora & Fauna Reserve behind Stewart State School, *M.G. Corrick* 7376 (PERTH); 22.3 km N of Speed on the Sunraysia Highway, *N. Hall* H80/39 (PERTH).

Distribution. Widespread in central and southern arid Australia occurring in all mainland states. (1:250,000 maps F51-4 to 6,8 to 10,14,15; F52-1,5,12,15,16; F53-6,7,9 to 14; F54-14; G49-4,8,12; G50-1,3,4,6,10,14,15,16; G51-6 to 10,13,15; G52-1 to 4,6 to 10,12,15; G53 all cells except 10; G54 all cells except 3 and 15; G55-1; H50-1,2,4,6,12,15; H51-1,2,4,5,6,8,9,11,15; H52-2,4,6,12; H53-2,3,5 to 12,15,16; H54 all cells except 3; H55-1,5,7,9,10,13,14; I51-3; I53-2,3,4,6,8,12; I54 all cells except 13 and 14; I55-1,6,7,15; J55-1)

Habitat. Usually grows on red sand dunes. Often associated with mulga and mallee communities.

Flowering and fruiting periods. Flowering specimens have been collected mainly from May to October. Legumes with mature seeds have been collected mainly in December and January, also in May and October.

Typification. Cunningham's journal was referred to for the collecting number and date of collection of the lectotype of *A. ligulata*. From this it seems that the specimen was collected on 21 January 1822 and numbered 326 (not 325 as given on the lectotype sheet). We have seen only the Cunningham syntype of *A. ligulata*. Pedley (1977) discussed the specimens on the type sheet and we concur with his remarks except that the pencilled annotation on the label reads "4 325", not "4 323". Like Pedley we have been unable to locate the excluded syntype labelled "S. Coast Fraser".

Variation. Although phyllodes of *A. ligulata* are usually wrinkled when dry, on some specimens, especially if from the Northern Territory, they sometimes remain smooth. In South Australia some specimens have atypically narrow (2-3 mm) phyllodes with heads as narrow as 5 mm diam. (dry). The uncinate tip, however, is sufficient to distinguish these variants from *A. cupularis*. Plants from the lectotype locality at Shark Bay, W.A., differ slightly from those occurring further inland in that their phyllodes are narrowly oblong to linear, narrowed at base, 2.5-6.5 cm long, 4-12 mm wide, l:w = 5-10, rather thin, puncticulate (i.e. with minute brown peltate glandular hairs which senesce to leave obscure shallow depressions in the phyllode surface), and having racemes 4-10 mm long with (2)3-4(5) peduncles, heads 4-6 mm in diameter, ovary papillose,and seeds 3-4 mm long.

Affinities. A. ligulata has been commonly confused with *A. salicina*. Bentham (1864) considered them to be conspecific. Maiden (1910) followed Bentham, regarding *A. ligulata* as *A. salicina* and *A. salicina* as *A. salicina* var. *varians*. He also recognised a narrow-phyllode entity from S. Australia as *A. salicina* var. *wayae*. Black (1920) clarified the situation by reference to type material, concluding that *A. ligulata* was distinct from *A. salicina* and implying that *A. salicina* var. *wayae* was a maritime form of *A. ligulata*. We here regard var. *wayae* as a synonym of *A. cupularis* (see discussion under *A. cupularis* above). Pedley (1977) restricted the name *A. ligulata* to specimens from the type locality (i.e. Shark Bay), and referred all other material then known as *A. ligulata* to *A. bivenosa* subsp. *wayi* (based on *A. salicina* var. *wayae*). We consider, however, that *A. ligulata* is an Australia-wide species which is distinct from *A. bivenosa*, although the two are sometimes difficult to distinguish if using herbarium material (see discussion under *A. bivenosa*).

Acacia ligulata is very closely related to *A. rostellifera*. The main distinguishing characters are given in Table 3, however, most of these are subtle and qualitative. In areas of geographic overlap (e.g. east of Geraldton to near Morawa) it is sometimes difficult to apply the names with certainty.

The Shark Bay populations of *A. ligulata* (see *Variation* above) resemble the more southerly distributed *A. rostellifera* with regard to phyllode texture and the presence of sub-sessile peltate hairs but retain features of the more widespread inland populations of *A. ligulata* such as phyllode dimensions and legume texture. This suggests that the Shark Bay populations may be intermediate between *A.rostellifera* and the inland forms of *A. ligulata*. However, further study, especially field work, is necessary to determine the correct taxonomic position of this Shark Bay entity. If *A. ligulata sensu typico* is ultimately regarded as being conspecific with *A. rostellifera* then the name *A. pallidiramosa* would be available for the widespread remainder of the species here called *A. ligulata*. Unfortunately the type of *A. pallidiramosa* is poorly labelled and consists only of phyllodes and seeds; however, the funicle on many of these seeds shows the folding characteristic of *A. ligulata* as described above.

Hybrids. A. ligulata forms putative hybrids with *A. sclerosperma* subsp. *sclerosperma*; these hybrids bear the larger seeds and legumes typical of that species, the broader phyllodes of *A. ligulata*, and commonly have puberulous raceme axes and stems. It occurs in the following 1:250,000 grid cells: F50-2,4; F51-15 and G50-1. Specimens of *A. ligulata* with velutinous phyllodes and axes that come from the areas around Glenburgh and Meka Stations (G50-6 and 14) may be hybrids with *A. tysonii*. As discussed above, it is possible that *A. ligulata* also hybridises in places with *A. bivenosa*.

Conservation status. Widespread and common, not considered to be rare or endangered.

Table 3. Characters distinguishing typical *A. ligulata* from *A. rostellifera*.

Character		*A. ligulata*	*A. rostellifera*
Phyllodes	- texture	thick (and so usually macroscopically wrinkled when dry)	thin (thus smooth or imperceptibly wrinkled when dry)
	- surface	not puncticulate on mature phyllodes	usually puncticulate
	- length	3-7.5cm	5-11.5cm
	- glands	3 on at least some phyllodes (one apical, another above the pulvinus and a third near or above middle)	2 (one at apex and one on lower 1/3 of upper margin)
Legumes	- texture	woody, ± straight-sided or shallowly constricted between seed, commonly with diffuse pale medial stripe externally	firmly crustaceous, sub-moniliform, medial stripe absent

6. Acacia rostellifera Benth., London J. Bot. 1: 356 (1842). *Type*: Swan River, Western Australia, *s.dat., J. Drummond* 103 (holo: K, see discussion below). (Figure 5C)

A. subbinervia Meissner in Lehm., Pl. Preiss. 1: 16 (1844). *Type*: Rotenest [Rottnest] Island, Western Australia, 20 Aug. 1839, *L. Preiss* 924 (syn: C, G, GOET, HBG, L, LUND, M, NAP, NSW, P, STRAS, W). Swan River, Western Australia, *s.dat., J. Drummond* 285 (syn: G, K, P, W).

[*A. salicina* auct. non Lindley (1838): B.P.G. Hochreutiner, Candollea 2: 375 (1925), as to *Hochreutiner* 2880, Z.]

Illustration. M. Simmons, Acacias of Australia 1: 153 (1981).

Dense shrubs or trees to 6 m tall. *Bark* fissured and dark grey on main trunks, smooth and light grey on branches; *branchlets* green-brown with 3-4 yellow ribs, straight to slightly flexuose, glabrous, scurfy.

Stipules caducous, narrowly triangular, 2 mm long, 0.7 mm wide, scarious. *Phyllodes* linear to linear-elliptic or narrowly oblanceolate, 4.5-11.5 cm long, 3-17 mm wide, l:w = 4-30, rather thin, sometimes finely longitudinally wrinkled when dry, patent to ascending, glabrous, frequently puncticulate (i.e. with minute brown peltate glandular hairs which senesce to leave obscure shallow depressions in the phyllode surface), green; 1-nerved or imperfectly 2-nerved on broader phyllodes, lateral nerves obscure; *apex* uncinate to sub-uncinate, mucro dark brown, commonly acute, sometimes ± obtuse and excentrically rostellate; *pulvinus* 1-2 mm long, finely wrinkled. *Glands* 2, not prominent, lowermost 4-13 mm above pulvinus, slightly raised with a yellow rim and a dark, concave, elliptic pore 0.4-1 mm long, 0.4-0.6 mm wide, the uppermost adjacent to mucro. *Racemes* (0.5)1-3 cm long, with 2-9 heads, axes straight, glabrous or slightly pilose, determinate or occasionally some growing out and producing solitary peduncles in the axils, basal bracts caducous, broadly ovate, 1 mm long, 1 mm wide. *Peduncles* 3-8 mm long, glabrous, basal peduncular bracts early caducous, scars only seen. *Heads* globular, golden, 5-7 mm diam. (dry) to 10 mm diam. (fresh), 15-25-flowered, sub-dense. *Bracteoles* persistent, ovate to obovate, 0.5-1.2 mm long, 0.2-0.8 mm wide, fimbriolate. *Flowers* 5-merous. *Calyx* 0.8-1.3 mm long, 2/5-1/2 length of corolla, gamosepalous, commonly shallowly lobed or sinuate-toothed, fimbriolate. *Corolla* 2-2.5 mm long, petals united for c. 1/2 their length, yellow, nerves not evident. *Ovary* sessile, glabrous, style sublateral. *Legume* ± sub-moniliform, constricted between seeds and slightly raised over them, to 9 cm long, 5-7 mm wide, with up to 10 articles, firmly crustaceous, breaking readily at constrictions, straight, patent to erect, smooth, glabrous or appressed-puberulous at constrictions when young. *Seeds* longitudinal in legume, oblong to widely elliptic, 4-6 mm long, 3-4 mm wide, compressed (1-2 mm thick), dull or shiny, dark brown; *pleurogram* fine, dark, with an opening towards hilum of 0.5 mm; *areole* oblong-elliptic, 2-3.5 mm long, 1-1.5 mm wide; *funicle* short, expanded into a terminal orange or red aril twice-folded below seed and attached centrally to it.

Selected specimens examined. WESTERN AUSTRALIA: proposed Toolonga Nature Reserve, c. 10 km E of Murchison House Outstation towards North West Coastal Highway, *A. Burbidge* 60 (PERTH); 6 km inland of Point Malcolm, *R. Hnatiuk* 761133 (PERTH); Grandstand Rock Lookout, Kalbarri National Park, 13.2 km S of Kalbarri along the Ballinc-Kalbarri Road, *N. Hoyle* 535 (PERTH, Z); Garden Island, Jan. 1960, *J. Kelsall* (PERTH 00187011 and 00187119); 2 miles [3.2 km] W of Latham towards Coorow, *B.R. Maslin* 106 (PERTH); between Geraldton and Northampton, *B.R. Maslin* 2791 (PERTH); 3.2 km from Jurien towards Encabba, *B.R. Maslin* 3012 (PERTH); near Lake Indoon, c. 18 km SW of Eneabba, *B.R. Maslin* 3054 (BM, PERTH); near Rock Well, c. 6.5 km W of Yuna towards Geraldton, *B.R. Maslin* 3099 (K, PERTH); near Fitzgerald River crossing, Fitzgerald River National Park, *B.R. Maslin* 3480 (PERTH); near Leeman, between Jurien and Dongara, *B.R. Maslin* 3726 (MEL, PERTH); West Coast Highway between City Beach and Swanbourne, *B.R. Maslin* 3817 (AD, PERTH); 33.5 km E of Ravensthorpe towards Esperance, *B.R. Maslin* 3915 (CANB, K, PERTH); 27 km by road S of Kalbarri towards Port Gregory, *B.R. Maslin* 6264 (NY, PERTH); Cape Naturaliste Lighthouse, coastal dunes, *L. Nunn* 544 (PERTH); N side of Pink Lake, Middle Island, Recherche Archipelago, *A.S. Weston* 9851 (PERTH).

Distribution. South-west Western Australia along the coast of the Irwin, Darling and Eyre Districts, but extending inland to the northern extremity of the Avon District (1:250,000 maps G50-13; H50-1,5,6,9,13, 14; I50-2, 5,8,12 and I51-5,6,7,11). Coastal areas from near Zuytdorp National Park S to Cape Naturaliste and from Bremer Bay E to Israelite Bay, extending inland in the Geraldton area as far as Latham.

Habitat. Grows mainly on stable sand dunes in heath, scrub, mallee and woodland. Often forms dense monotypic stands.

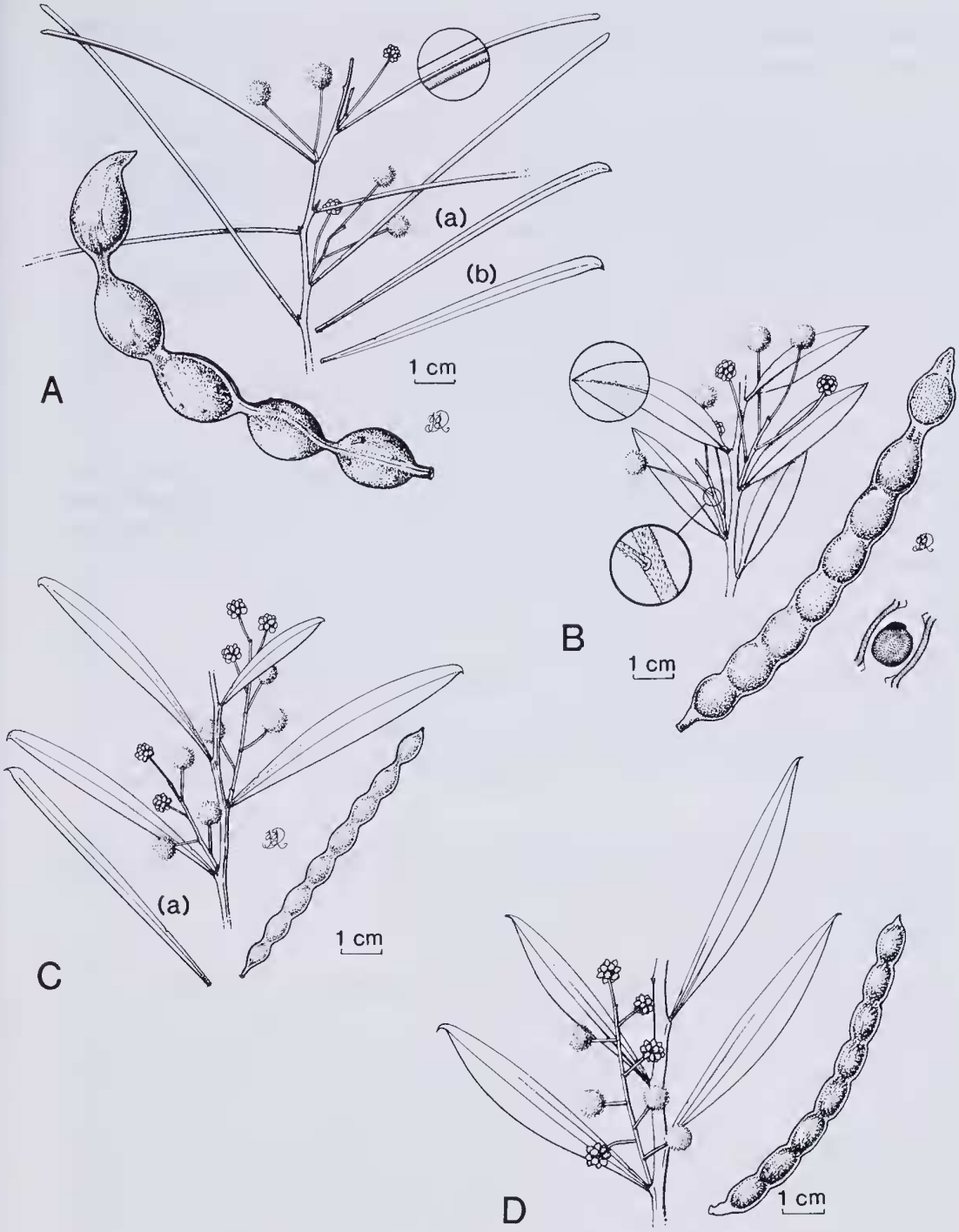

Figure 5. *Acacia sclerosperma* subsp. *sclerosperma*. A - Habit (from *Walker* 85, PERTH), legume (from *Demarz* D5795, PERTH); (a)-(b) - phyllode variation (from *Dixon* D1/84, PERTH and *Story* 8229, PERTH). *Acacia tysonii*. B - Habit (from *Gardner* 12652, PERTH), legume and seed (both from *Maslin* 5071, PERTH). *Acacia rostellifera*. C - Habit (from *Maslin* 3480, PERTH), legume (from *Royce* 6285, PERTH); (a) - phyllode of 'Murchison River variant' (from *Blackall* 4558, PERTH). *Acacia xanthina*. D - Habit (from *Andrews*, PERTH 00152935) and legume (from *Loeper*, PERTH 00516465).

Flowering and fruiting periods. Flowering specimens have been collected from July to October and in December. Legumes with mature seeds have been collected from December to March.

Typification. There is only one specimen at Kew that can be regarded as the type. It is annotated in Bentham's hand "rostellifera 103" and the sheet is stamped "Herbarium Hookerianum 1867". As with *A. xanthina*, the type is apparently a unicate suggesting that the specimen was one of Drummond's 1839 despatch to Hooker. The '103' is to be regarded as a Drummond collecting number although in the protologue this was not given (as was Bentham's practice at that time).

Variation. *A. rostellifera* is somewhat variable in phyllode shape and size; it is distinguished from its closest relatives by a combination of the following characters: branchlets scurfy, phyllodes thin, green, frequently puncticulate, 1-nerved or with a very faint second nerve, uncinate to sub-uncinate with a distinct mucro. Specimens from around the Murchison River have distinctly 1-nerved, narrow phyllodes (3-6 mm wide) and shorter racemes with consistently fewer heads than normal. This form may extend up into the Shark Bay area where it can be confused with *A. ligulata*.

Affinities. Narrow, green phyllode forms of *A. blakelyi* Maiden may resemble *A. rostellifera*, but are readily distinguished by their horizontally flattened phyllodes with the gland situated on the upper surface (not the upper margin as in *A. rostellifera*). See *A. cupularis*, *A. ligulata* and *A. xanthina* for further discussion.

Hybrids. See discussion under *A. xanthina*.

Conservation status. Not considered rare or endangered.

7. Acacia salicina Lindley in T. Mitch., Three Expcd. Australia, 1st edn. 2: 20 (1838). *A. salicina* var. *typica* Domin, Biblioth. Bot. 89: 255 (1926). *Type*: Sub-tropical New Holland [Lachlan River, 33° 15' S 147° 33' E, Queensland], 30 Mar 1836, *T.L. Mitchell* 45; (holo: CGE).

A. varians Benth. in T. Mitch., J. Exped. Trop. Australia 132 (1848); *A. salicina* var. *varians* (Benth.) Benth., Fl. Austral. 2: 367 (1864). *Type*: Sub-tropical New Holland [Balonne River SW of St. George, Queensland], 6 Apr 1846, *T.L. Mitchell* 104; (lecto: K *fide* L. Pedley, Austrobaileya, 1: 273 (1979), iso: CGE. syn: Subtropical New Holland, *T.L. Mitchell* 91 (CGE, K), 101 (A,K), 437 (A) and 489 (K)).

Illustrations. B.R.Maslin, Fl. Cent. Australia 120 (1981), M Simmons, Acacias of Australia 1: 111 (1981), D.J.E.Whibley, Acacias of S. Australia 107 (1980).

Note. This species is adequately described in the above publications and in Pedley (1980) and Turnbull (1986).

8. Acacia sclerosperma F. Muell., S. Sci. Rec. 2(7): 150 (1882). *Type:* Gascoyne River, Western Australia, 1881, *O. Jones* s.n. (holo: MEL).

A. spodiosperma F. Muell., Proc. Linn. Soc. New South Wales scr.2, 3: 164 (1888). *Type:* near Lake Austin, Western Australia, *s.dat.*, *H.S. King* s.n. (holo: MEL, PERTH - fragment ex MEL).

A. leucosperma F. Muell. ex E. Pritzel, Bot. Jahrb. Syst. 35: 302 (1904). *Type:* Hab in distr. Austin pr.

Carnarvon ad sinum Sharks Bay [Western Australia], in litoralibus arenoso-lutosis frequentissima, flor. m. Aug., *Diels* 3653; n.v.

Illustration. M. Simmons, Acacias of Australia 1: 171 (1981).

Dense, usually glabrous, spreading, rounded or infundibular shrubs to 4(6) m high and 4 m wide. *Bark* smooth, light grey to branchlets; *branchlets* straight, obscurely ribbed, glabrous or puberulous. *Stipules* caducous, ovate-triangular, 1.5 mm long, 0.6 mm wide, scarious, acute, mid-brown. *Phyllodes* narrowly linear to narrowly elliptic, 3-14 cm long, 1-17 mm wide, l:w = 2-130, thick, often wrinkled when dry, terete to flat, straight, green to glaucous; 4-nerved in all, 1-nerved per face when flat and then midrib thin and raised; *apex* (often absent through insect damage) acute, ± uncinate, commonly with a dark recurved to incurved mucro; *pulvinus* 1-2 mm long, yellow-brown, finely wrinkled and often somewhat quadrangular (dry) *Glands* not prominent, 2 or 3, lowermost 1-22 mm above pulvinus, pore 0.4-0.8 mm long, 0.2-0.4 mm wide, concave or slightly convex, elliptic, yellow-brown, apical gland adjacent to mucro and often obscure. *Racemes* 3-30 mm long with 2-5 heads, axes straight, occasionally growing out, basal bracts caducous, triangular, 0.6-0.8 mm long, 0.8 mm wide. *Peduncles* 4-15 mm long; basal peduncular bracts caducous, broadly ovate-triangular, 1.4 mm long, 1.4-1.5 mm wide, striate, brown. *Heads* globular, mid to deep golden, 4-7 mm diam. (dry), to 11 mm diam. (fresh), 15-25-flowered, sub-dense. *Bracteoles* persistent, obovate, 0.5-1.4 mm long, 0.4-0.7 mm wide, fimbriolate, light brown. *Flowers* 5-merous. *Calyx* 0.7-1.2 mm long, 1/3-1/2 length of corolla, gamosepalous, upper margin truncate or very slightly lobed. *Corolla* 1.4-2.5 mm long, petals united for 1/2-2/3 their length, yellow, nerves not evident. *Ovary* sessile, style sub-lateral. *Legumes* moniliform to sub-moniliform, 6-12 cm long, 1-2 cm wide, with up to 8 articles, woody, pendulous, smooth, often pruinose when young. *Seeds* longitudinal in legume, ± spherical, 7-10 mm long, 5-9.5 mm wide, 4-7 mm thick, glossy, dark brown to black; *pleurogram* fine, with an opening towards hilum of 0.5-1 mm; *areole* oblong-elliptic, 6-8 mm long, 3-6 mm wide; funicle short, ± filiform, straight, orange, expanded into a small, terminal, dark red, hemispherical to depressed-clavate aril.

8a. A. sclerosperma F. Muell. subsp. **sclerosperma** (Figure 5A)

Branchlets usually glabrous. Phyllodes narrowly linear, 4.5-14 cm long, 1-4(5) mm wide, l:w = 24-130, green to subglaucous; apex often uncinate with tip recurved. Racemes usually glabrous. Heads 15-20-flowered.

Selected specimens examined. WESTERN AUSTRALIA: Millstream, *M.I.H. Brooker* 2061 (B, CANB, PERTH); Pardoo Station, *N.T. Burbidge* 1509 (PERTH - 3 sheets); 97 km E of Mullewa towards Yalgoo (120 mile peg Mullewa-Yalgoo road), *A.C. Burns* 33 (CANB, PERTH); 16 km SE of Windidda Homestead, *R.J. Chinnock* 843 (NSW, PERTH); 5 km NE of Dalgety Downs, *R.J. Cranfield* 2058 (PERTH); Tamala turn-off, *H. Demarz* D5511 (PERTH); Lake Austin, *C.A. Gardner* 2256 (PERTH); 26 miles [41.8 km] N of Learmonth, *A.S. George* 2583 (PERTH); W of Telfer Mining Centre on road to Port Hedland, *E.M. Goble-Garratt* 85 (PERTH); 2.5 km N of Murchison River on North West Coastal Highway, *B.R. Maslin* 3144 (BM, BRI, PERTH); S branch of Gascoyne river, 150 km N of Meckatharra, Great Northern Highway, *B.R. Maslin* 4574 (CANB, MEL, PERTH); about 11 km NW of Newman on road to Rhodes Ridge, *B.R. Maslin* 4591 (CANB, PERTH); Karratha, northern end of townsite near Mystery Road, *B.R. Maslin* 4732 (BRI, PERTH); George River crossing, North West Coastal Highway between Roebourne and Whim Creek, *B.R. Maslin* 5753 (PERTH); Dorre Island, Shark Bay, *R.D. Royce* 5928 (PERTH); 35 km NNE of Salt Lake, 22 km N of Carnarvon on blow holes road, *R.A. Saffrey* 649 (BRI, MEL, MO, NSW, PERTH).

Distribution. Eremaean Botanical Province of Western Australia throughout the Carnarvon, Fortescue and Ashburton Botanical Districts, extending into Canning and the western half of Austin and also in the South-West Botanical Province in the northern half of Irwin and the northern tip of Avon (1:250,000 maps SF49-16; SF50 all maps; F51-5,6,9,13; G49-4,8,12; G50-1,2,5,6,7,8,9,10,11,12,13,15; G51-10; H50-1,2, 3,10). Occurs throughout the Pilbara and Murchison districts and extending E towards Telfer and S to Wongan Hills and near Mt Magnet with a disjunct occurrence near Lake Carnegie.

Habitat. Grows on coastal dunes, along creek banks and on flood plains in sand, limestone, loam and clay in thicket, scrub and riparian woodland.

Flowering and fruiting periods. Flowering specimens have been collected from April to October and specimens with mature seeds have been collected mainly in October and December.

Variation. In the southern half of its range, some plants of otherwise typical *A. sclerosperma* subsp. *sclerosperma* have puberulous branchlets and raceme axes. They have been collected in the following 1:250.000 grid cells: F51-13; G49-4; G50-6,7,8,10,15; H50-2,3.

Hybrids. *A. sclerosperma* subsp. *sclerosperma* forms putative hybrids with a number of closely related taxa, including subsp. *glaucescens*. Hybrids with *A. ligulata* possess the broader phyllodes of that species but have the distinctive large legumes and seeds of subsp. *sclerosperma* (see Fig. 5A); in cells F51-15 and G50-1 the axes are puberulous as well, but further north in grid cells F50-2,4 the axes are glabrous. Elsewhere in the Fortesque Botanical District subsp. *sclerosperma* hybridises readily with two taxa, the hybrids generally characterised by the large, oblong ± moniliform legume segments. Hybrids with the cream-flowered *A. ampliceps* exhibit the divergent secondary venation and broader phyllodes of this species and pale lemon flowers (occurring on grids F50-2,6,7,15) and hybrids with *A.bivenosa* often show the second nerve typical of the phyllodes of this taxon (occurring on grids F50-2,3,7,9).

Affinities. See above. May superficially resemble *A. scirpifolia* which is distinguished by racemes enclosed when young by conspicuous brown bracts and the axis commonly growing out at anthesis, legumes coriaceous-crustaceous, reticulately-nerved and arils yellow-brown (dry).

Conservation status. Not considered rare or endangered.

8b. A. sclerosperma F. Muell. subsp. **glaucescens** A.R. Chapman and Maslin subsp. nov. (Figure 4D)

Subspecies nova Sectionis *Phyllodineae*. Haec subspecies a subsp. *sclerosperma* differt ramulis puberulis, interdum glabris; phyllodibus anguste ellipticis ad anguste oblongo-ellipticis, infrequenter anguste oblongo-lanceolatis, 3-6 cm longis, 6-17 mm latis, ratione horum 2-6, glaucis; surculis novis viridis; apicibus acutis mucrone stricto vel incurvo; axibus racemorum plerumque puberulis; capitulis 20-25-floribus.

Typus: 37 km N of Overlander Roadhouse on North West Coastal Highway to Carnarvon, Western Australia, *Maslin* 3715A (holo: PERTH; iso: CANB, K, PERTH).

Branchlets puberulous, sometimes glabrous. *Phyllodes* narrowly elliptic to narrowly oblong-elliptic, infrequently narrowly oblong-lanceolate, 3-6 cm long, 6-17 mm wide, l:w = 2-6, glaucous, new

shoots green; *apex* acute with mucro straight or incurved. *Raceme axes* usually pubcrulous. *Heads* 20-25-flowered.

Selected specimens examined. WESTERN AUSTRALIA: between Edaggee Station turn-off and Woodleigh Station on North West Coastal Highway, *T.E.H. Aplin* 3568 (MEL, MO, PERTH); few miles S of 26th Parallel, *A.M. Ashby* 1564 (PERTH); 8.5 km from beach on track W from North West Coastal Highway, 46 km N of Overlander Roadhouse, *A.R. Chapman* 578 (BRI, NSW, PERTH) and 579 (MEL, PERTH); 9.5 km from beach on track W from North West Coastal Highway, 46 km N of Overlander Roadhouse, *A.R. Chapman* 580A (K, PERTH) and 580B (CANB, PERTH); 29 miles [46.7 km] N of the Overlander, North West Coastal Highway, *A.S. George* 10361 (CANB, PERTH); Pells Range, Bidgemia Station, *A. Holm* s.n. (PERTH); 48 km N of Overlander Roadhouse on North West Coastal Highway, *B.R. Maslin* 2775 (PERTH); 31 km N of Overlander Roadhouse on North West Coastal Highway, *B.R. Maslin* 2777; 516 mile peg [c. 71.5 km S of Carnarvon], North West Coastal Highway, *E.Parkin* C.4 (PERTH) and Jan. 1973, *E. Parkin* s.n. (PERTH - 2 sheets).

Distribution. North-west Western Australia in the south central part of the Carnarvon Botanical District (1:250,000 maps G50-5, 9). Restricted to S of Carnarvon from Edaggee S to Woodleigh Station.

Habitat. Grows on sand, sandy loam and stony soil in open scrub sometimes associated with chenopods or hummock grassland.

Flowering and fruiting periods. Flowering specimens have been collected in July and August. Specimens bearing legumes with mature seeds have been collected in November and January.

Hybrids. Hybridisation with *A. sclerosperma* subsp. *sclerosperma* produces numerous intermediates bearing various combinations of their respective phyllode characters, especially those of dimension and colour; occurring around the 26th parallel on the North West Coastal Highway (G50-9).

Conservation status. 2R using the criteria of Briggs & Leigh (1988).

Etymology. The subspecific epithet refers to the glaucous phyllodes which renders this entity very distinctive in the field.

9. Acacia startii A.R. Chapman and Maslin, sp. nov. (Figure 4B)

Species nova Sectionis *Phyllodineae*. Frutices densi, rotundati, multum ramosi, 1-2 m alti; cortice saepe calcarea. Ramuli appresso-tomentulosi ad extremitates, glabrescentes. Stipulae caducae, triangulares, scariosae. Phyllodia ovata ad elliptica vel anguste elliptica, 2-5.5 cm longa, 8-23 mm lata, ratione horum 2-4, coriacea, glabrata, viridia, aliquando glauca, juvenibus lacteo-viridibus propter indumentum tomentulosum, manifeste binervata; apice obtuso mucronulato; pulvino 2-4 mm longo; glandibus non prominentibus, plerumque duabus, glande infima 1-7 mm supra pulvinum. Racemi breves; axibus plerumque repullulantibus, tomentosis. Pedunculi 1-2.5 cm longi. Capitula globularia, citrina, 6-8 mm diametro in sicco ad 9 mm diametro in vivo, 30-55-floribus, densa. Flores 5-meri. Calyx longitudine circa 1/2 corollam aequans, gamosepalus, truncatus. Petala 1/2-2/3-connata. Legumina curvissima ad laxe unicircinnata, aliquantum constricta inter semina, ad 7 cm longa, 3-4 mm lata, crustacea, tomentulosa sed pilis sparsis aetate. Semina longitudinalia in leguminc, oblonga; arillo aurantiaco-rubro (in sicco).

Typus: 16.6 km east from Yardie Creek road along track to Sandy Point No.2, Cape Range National Park, Western Australia, 30 August 1988, *A.R. Chapman* 596 (holo: PERTH; iso: CANB, G, K, MEL, NSW, NY).

Dense, rounded, much-branched shrubs 1-2 m tall. *Bark* smooth, light grey, often chalky extending to branchlets; *branchlets* yellow-brown, appressed-tomentulose at extremities, glabrescent. *Stipules* caducous, triangular, 1.5-2.5 mm long, 0.8-1.3 mm wide, scarious. *Phyllodes* ovate to elliptic or narrowly elliptic, 2-5.5 cm long, 8-23 mm wide, l:w = 2-4, coriaceous, patent to ascending, glabrescent, green, occasionally glaucous, milky-green on young growth due to tomentulose indumentum; prominently 2-nerved, occasionally 3-nerved on broader phyllodes, lateral nerves obscure; *apex* obtuse, mucronulate; *pulvinus* 2-4 mm long, brown. *Glands* not prominent, commonly 2, lowermost 1-7 mm above pulvinus, often slightly raised with a yellow-brown, flat or convex, elliptic pore 0.3-1.1 mm long, 0.3-0.4 mm wide; distal glands smaller and often darker, one commonly adjacent to mucro. *Racemes* short, usually growing out, the distal peduncles commonly subtended by phyllodes which do not mature until after anthesis; axes tomentose, basal bracts about 4 early caducous, ovate, 2-5 mm long, 1-2 mm wide, obtuse, scarious, striate, brown. *Peduncles* 1-2.5 cm long, tomentose, rarely glabrous, subtended at base by 1 or 2 caducous peduncular bracts to 5 mm long, 2-3 mm wide, scarious, striate, brown. *Heads* globular, lemon yellow, 6-8 mm diam. (dry), to 9 mm diam. (fresh), 30-55-flowered, dense. *Bracteoles* persistent, oblong to ovate, 0.5-1.5 mm long, 0.3-1.5 mm wide, fimbriolate. *Flowers* 5-merous. *Calyx* 1-1.5 mm long c. 1/2 length of corolla, gamosepalous, truncate to very shallowly sinuate. *Corolla* 2-2.7 mm long, petals united for 1/2-2/3 their length, nerves not evident. *Ovary* sessile, puberulous, style sub-lateral. *Legumes* strongly curved to openly once-coiled, somewhat constricted between seeds, to 7 cm long, 3-4 mm wide, with up to 8 articles, crustaceous, tomentulose but hairs becoming sparse with age. *Seeds* longitudinal in legume, oblong, 5-6 mm long, 2-3 mm wide, compressed (1-2 mm thick), glossy, dark brown; *pleurogram* fine, dark, with an opening towards hilum of 0.5-1 mm; *areole* oblong-elliptic, 3-4 mm long, 1-1.5 mm wide; *funicle* short, filiform, expanded into a thick, terminal orange-red (dry) aril twice-folded below seed.

Other specimens examined. WESTERN AUSTRALIA: Learmonth Road, 5 miles [8 km] N of Warroora turn-off, *J.S. Beard* 3521 (PERTH); Rough Range, *J.S. Beard* 3549 (PERTH); 24.1 km S of turn-off to Coral Bay on Exmouth Road, *A.R. Chapman* 587 (AD, MO, PERTH); 13.2 km E along Bullara-Giralia Road from Exmouth Road, *A.R. Chapman* 593 (CANB, KARR, PERTH); 16.6 km E along Bullara-Giralia Road from Exmouth Road, *A.R. Chapman* 595 (BM, BRI, PERTH); 16.6 km E from Yardie Creek Road along track to Sandy Point No. 2, Cape Range National Park, *A.R. Chapman* 597 (KARR, PERTH); Tropic of Capricorn, North West Coastal Highway, 31 Oct. 1983, *W.B. Edgecombe* s.n. (PERTH 00189308); Barrabiddy Creek, Minilya River, *C.A. Gardner* 3278 (PERTH - 2 sheets); Cape Range National Park, 3 Aug. 1987, *P.C. Ryan* D (PERTH 00886440); 5 km E of Bullara Homestead, *A.N. Start* 7 (CANB, K, PERTH - 2 sheets); approx. 10 km E of Bullara Homestead on Bullara-Giralia Road, *A.N. Start* 16 (PERTH - 2 sheets) and *A.N. Start* 65 (CANB, K, MEL, NSW, PERTH - 2 sheets).

Distribution. North-west Western Australia at the north west extremity of the Carnarvon Botanical District (1:250,000 maps F49-12, 16 and F50-9, 13). Occurs from the Cape Range National Park S to the Minilya River.

Habitat. Grows on plains and hills on loam often associated with limestone in low scrub and open low scrub often with *Triodia* sp. and other *Acacia* spp. such as *A. bivenosa* DC., *A. sclerosperma* F.Muell. subsp. *sclerosperma*, *A. tetragonophylla* F.Muell. and *A. pyrifolia* DC.

Flowering and fruiting periods. Flowering specimens have been collected in July and August.

Specimens bearing legumes with mature seeds have been collected in October.

Affinities. Often sympatric with the related *A. bivenosa* but distinguished by its tomentulose indumentum, usually non-glaucous phyllodes, lemon-yellow heads with a greater number of flowers and coiled, narrower legumes. *A. startii* resembles the more southerly distributed species *A. telmica* and *A. didyma* with respect to phyllode dimensions but may be distinguished by the tomentulose young phyllodes, lemon-yellow 30-55-flowered heads and the narrow, coiled legumes.

Conservation status. 3RC using the criteria of Briggs & Leigh (1988). Although rare this species is not currently considered endangered or vulnerable. The largest population of 3-4000 individuals (M.E.Trudgen, pers. comm.) exists in the Cape Range National Park, with other localities appearing much more restricted. Changing land use practices may see these smaller populations threatened.

Etymology. Named in honour of Dr A.N. (Tony) Start who provided valuable field observations and specimens which convinced us of the specific differences between it and *A. bivenosa*.

10. Acacia telmica A.R. Chapman and Maslin sp. nov. (Figure 4C)

Species nova Sectionis *Phyllodineae*. Frutices densi, rotundati, 1-3 m alti, 1.5-5 m lati. Ramuli teretes, puberuli, surculis novis pubescentibus. Stipulae caducae, triangulares-lanceolatae. Phyllodia elliptica ad anguste elliptica, (1.5)2-4(5.5) cm longa, (6)8-20 mm lata, ratione horum 2-4, atro-viridia vel subglauca, phyllodia matura plus minusve glabra, phyllodia immatura pilis appressis et margines integros et nervos principales longitudinales saepe tegentibus, binervata; apice obtuso, interdum acuto, mucronulato; pulvino 1-2 mm longo, puberulo; glandularibus non prominentibus, glandulari infima 6-10(20) mm supra pulvinum. Racemi 1.5-2.5 cm longi, 3-5-capitulati; axibus plerumque repullulantibus, puberulis. Pedunculi 0.6-1 cm longi, sparsim puberuli. Capitula globularia, aurea, 5-8 mm diametro in sicco ad 12 mm diametro in vivo, 18-25 floribus, subdensa. Flores 5-meri. Calyx longitudine circa 1/3 corollam aequans, gamosepalus. Petala 1/2-2/3 connata. Ovarium dimidio superiore papillatum. Legumina submoniliformia, ad circa 5 cm longa, 4-5 mm lata, crustacea, antrorse strigulosa, glabrata. Semina longitudinalia in legumine, oblonga-elliptica; arillo aurantiaco (aurantiaco-brunneo in sicco).

Typus: South-east margin of Lake Logue, Western Australia, 25 August 1988, *A.R. Chapman* 564 (holo: PERTH; iso: AD, BM, BRI, CANB, G, K, MEL, MO, NSW, NY, P).

Dense rounded shrubs 1-3 m tall, 1.5-5 m wide, commonly few-branched at base. *Bark* smooth, grey; *branchlets* terete, finely ribbed, straight, yellow-green to brown, puberulous, pubescent on new shoots, hairs ± patent. *Stipules* caducous, triangular-lanceolate, 1.5-4 mm long, 0.6-1 mm wide, scarious, yellow-brown. *Phyllodes* elliptic to narrowly elliptic, (1.5)2-4(5.5) cm long, (6)8-20 mm wide, l:w = 2-4, scarcely thickened, very finely wrinkled when dry, patent to inclined, straight, dark green or sub-glaucous; mature phyllodes ± glabrous except pulvinus puberulous, these hairs may extend some distance (up to 1/3) along margins and main nerves; immature phyllodes with scattered minute, circular or cruciform dark red resin dots, hairs appressed and often covering margins and main longitudinal nerves; commonly 2-nerved, midrib rather prominent except towards apex, central or slightly nearer lower margin, a second less pronounced longitudinal nerve often situated midway between midrib and adaxial margin, lateral nerves very obscure, marginal nerves narrow, yellow; *apex* obtuse, sometimes acute, with a dark, central, minute mucro; *pulvinus* 1-2 mm long, puberulous, yellow-brown. *Glands* not prominent, lowermost 6-10(20) mm above pulvinus, with a raised rim and a concave, elliptic pore 0.7-1 mm long, 0.5-0.7 mm wide; occasionally with an additional, obscure gland adjacent to mucro. *Racemes*

1.5-2.5 cm long, with 3-5 heads, axes commonly growing out, straight, puberulous, basal bracts caducous, ovate-triangular, 1-1.2 mm long, 0.8-1 mm wide. *Peduncles* 0.6-1 cm long, sparsely puberulous, basal peduncular bracts solitary, caducous, ovate-triangular, c. 1 mm long, 0.6 mm wide. *Heads* showy and prolific, globular, golden, 5-8 mm diam. (dry) to 12 mm diam. (fresh), 18-25-flowered, sub-dense. *Bracteoles* persistent, obovate to cuneate, sessile, 0.7-1 mm long, 0.3-0.6 mm wide, fimbriolate, light-brown. *Flowers* 5-merous. *Calyx* 0.6-0.9 mm long, c.1/3 length of corolla, gamosepalous, slightly lobed, ciliolate. *Corolla* 1.8-2.4 mm long, petals united for 1/2-2/3 their length, glabrous, yellow, nerves scarcely evident. *Ovary* sessile, papillate over upper half, style sub-lateral. *Legumes* sub-moniliform, to c. 5 cm long, 4-5 mm wide, crustaceous, breaking readily at constrictions, often finely longitudinally wrinkled, antrorsely strigulose especially at constriction, glabrescent, brown. *Seeds* longitudinal in legume, oblong-elliptic, 3.5-4 mm long, 3 mm wide, compressed (1.5-1.7 mm thick), slightly shiny, grey-brown, tissue bordering pleurogram slightly darkened, periphery lighter; *pleurogram* obscure, continuous, or occasionally with a narrow opening towards hilum; *areole* oblong-elliptic, 2.3-3 mm long, 1-1.3 mm wide; *funicle* short, expanded into a thick, usually orange (orange-brown when dry) aril, which is green (brownish when dry) near hilum and possesses short lateral lobes.

Other specimens examined. WESTERN AUSTRALIA: c. 65 km S of Geraldton, 50 yards [46.2 m] from Milo road near Dongara, *A.M. Ashby* 5037 (PERTH); SE of Lake Logue on causeway, 12.5 km W of Brand Highway on Eneabba-Leeman Road, *A.R. Chapman* 563 (CANB, K, MEL, PERTH) and 563A (PERTH); 7.2 km along Milo Road S of Dongara-Mullewa Road, *A.R. Chapman* 604 (AD, BM, BRI, CANB, K, MEL, MO, NSW, PERTH); 6.1 km along Milo Road W of Warradong Road, *A.R. Chapman* 605 (BRI, CANB, MEL, NSW, PERTH); Lake Logue, March 1976, *C. Chapman* s.n. (PERTH 00172286); Lake Logue, *C.A. Gardner* 9108 (PERTH - 3 sheets) and 9378 (PERTH - 6 sheets); 1 km W of Lake Indoon, causeway across S end of Lake Logue, *E.A. Griffin* 802 (PERTH, TLF); 1 km W of Lake Indoon, *E.A. Griffin* 924 (PERTH, TLF); Lake Indoon, W of Encabba, *B.R. Maslin* 4278 (PERTH); 5 miles [8 km] S of Strawberry, *K. Newbey* 2106 (PERTH); S of Irwin on a side road, *G. Phillips* for *A.M. Ashby* 4893 (PERTH).

Distribution. South-west Western Australia in the southern part of the Irwin Botanical District (1:250,000 map H50-5) in the Irwin-Strawberry area and in the Lake Logue-Lake Indoon area.

Habitat. Grows on sand, loam and loamy clay in low-lying seasonally moist areas in eucalypt woodland and mallee associated with other *Acacia* spp. including *A. saligna* (Labill.) H.L.Wendl., *A. blakelyi* Maiden, *A. erinacea* Benth. and *A. tetragonophylla* F.Muell.

Flowering and fruiting periods. Flowering specimens have been collected from July to early September. Legumes with mature seed have been collected in December.

Variation. Occasional individuals in the Lake Logue population have cream coloured rather than orange arils. Such variation is uncommon within *Acacia* species but may in this case be attributed to gene flow from *A. xanthina* which is common on limestone ridges in the area. *A. xanthina* is the only member of the *A. bivenosa* group to consistently exhibit cream-white arils.

Affinities. Clearly a member of the *A. bivenosa* group on account of its inflorescence, carpological features and the presence of a gland adjacent to the apical mucro. Geographically close to *A. rostellifera* and *A. xanthina* but readily distinguished by phyllode dimensions and the presence of an indumentum. These characters render it superficially similar to the more northerly distributed *A. startii* which has, however, a very different legume.

Conservation status. 2VC according to the criteria of Briggs & Leigh (1988). The Lake Logue populations are on reserved land, however, the Strawberry populations 80 km to the north appear vulnerable with at most a few hundred plants restricted to remnant native vegetation on road verges and surrounded by cleared farmland. Further populations may exist at suitable intermediate localities, especially around lakes to the north of Lake Logue.

Etymology. From the Greek *telmatos*, meaning 'of standing water', alluding to the species apparent preference for habitats which are seasonally waterlogged.

11. Acacia tysonii Luehm., Victorian Naturalist 13: 112 (1896) [as tysoni]. (Figure 5B)

Type: Mt Narryer, Murchison River, Western Australia, *I. Tyson* s.n. (holo: MEL; iso: E, K, PERTH).

Compact, rounded shrubs to 3 m or small trees to 6 m tall. *Bark* fibrous at base, smooth, grey on branches; *young branchlets* red-brown, densely puberulous, with distinct yellow ribs. *New shoots* silvery-green due to indumentum. *Stipules* caducous, triangular, 0.2 mm long, 0.2 mm wide, scarious. *Phyllodes* narrowly elliptic to oblong, 2-4.5 cm long, 4-10 mm wide, l:w = 4-7, ± thin, smooth, shortly velutinous, grey-green to glaucous; 1-nerved, midrib and marginal nerves prominent, yellow-brown, lateral nerves distant, spreading, often obscure; *apex* obtuse with a dark mucro; *pulvinus* 1-2 mm long, often red-brown; *Glands* 1 or rarely 2, lowermost 1-5 mm above pulvinus with a raised brown rim and dark, concave, circular to elliptic pore 0.4-0.6 mm long, 0.4 mm wide; distal gland when present adjacent to mucro. *Racemes* 5-20 mm long, with 2-4 heads, axes growing out or often with more distal peduncles subtended by young phyllodes, puberulous, basal bracts not seen. *Peduncles* 1-2.5(3) cm long, puberulous, basal peduncular bracts not seen. *Heads* globular, bright golden, 5-8 mm diam. (dry) to 11 mm diam. (fresh), 25-30-flowered, sub-dense. *Bracteoles* persistent, oblong to obovate, 0.6-1.1 mm long, 0.1-0.5 mm wide, fimbriolate. *Flowers* 5-merous. *Calyx* 0.8-1.3 mm long, 1/3-1/2 length of corolla, gamosepalous, ± truncate, fimbriolate. *Corolla* 2-3 mm long, petals united for 1/2-2/3 their length. *Ovary* sessile, glabrous, style sub-lateral. *Legumes* moniliform with distinct constrictions between seeds, 5-10 cm long, 8-13 mm wide, with up to 8 articles, crustaceous, smooth, red to dark brown, margin paler. *Seeds* longitudinal in legume, spherical, 7-8 mm long, 6-7 mm wide, compressed (3-5 mm thick), dull, mid-brown; *pleurogram* with an opening towards hilum of 2 mm; *areole* 4-5 mm long, 3-4 mm wide, slightly darker; *funicle* filiform, expanding into a simple hemispherical, dark red (dry) aril.

Selected specimens examined. WESTERN AUSTRALIA: W of Mt Magnet, *A.M. Ashby* 5227 (BRI, MEL, NSW, PERTH); Ninghan Station (between Wubin and Paynes Find), *B.R. Maslin* 4237 (CANB, PERTH); Lake Auld, Great Sandy Desert, *A.S. Mitchell* 1070 (PERTH).

Distribution. Occurs in Western Australia from Gascoyne Junction and Peak Hill S to Morawa and Mouroubra (1:250,000 maps G50-7,10,11,14,15; H50-2,3,6,7), with a possible disjunct occurrence at Lake Auld. The single sterile collection from Lake Auld on the edge of the Great Sandy Desert (*Mitchell* 1070, PERTH) is well outside the known range and flowers and fruit are needed for conclusive identification, however, a number of closely related taxa (e.g. *A. bivenosa* and *A. ligulata*) are distributed throughout the arid zone and this apparent disjunction may be due to insufficient collecting activities.

Habitat. Grows in sand, loam and clay, usually associated with calcrete or limestone in shrubland.

Flowering and fruiting periods. Flowering specimens have been collected from June to September with the main flowering period in August and September. Legumes with mature seeds have been collected from October to December.

Affinities. A. tysonii is superficially similar to *A. sclerosperma* subsp. *glaucescens* which is, however, more coastal and differs in indumentum, gland number, inflorescence and size of legume and seed.

Hybrids. Specimens with longer, thicker phyllodes from the area around Glenburgh Station (G50-6) and Meka Station (G50-14) may be hybrids with *A. ligulata.*

Conservation status. Not considered rare or endangered.

12. Acacia xanthina Benth., London J. Bot. 1: 355 (1842). (Figure 5D)

Type: Swan River, Western Australia, *s.dat., J. Drummond* 102 (holo: K).

[*A. bivenosa* auct. non DC. : Benth., Fl. Austral. 2: 381 (1864), as to *Drummond* 1: 283 and *Preiss* 928.]

Illustration. M. Simmons, Acacias of Australia 2: 189 (1988).

Dense shrubs or small trees to 4 m tall. *Bark* grey, fissured on main trunk of mature plants, otherwise smooth and often pruinose; *branchlets* glabrous, light brown, pruinose. *Stipules* caducous, 2-2.5 mm long, 0.7-1 mm wide, scarious. *Phyllodes* usually narrowly elliptic to broadly so, 6-10(13) cm long, 6-20(25) mm wide, l:w = 3-15(20), thin, glabrous, glaucous; 2-nerved, the adaxial nerve less pronounced than the midrib or occasionally absent; lateral nerves obscure; *apex* ± acute and uncinate with a small mucro; *pulvinus* 1-2 mm long. *Glands* 2, lowermost 2-5 mm above pulvinus, raised with a golden margin and darker, concave, broadly elliptic pore 0.5-1.5 mm long, 0.5-1 mm wide; distal gland smaller and adjacent to mucro. *Racemes* 2-7 cm long, with 3-9 heads, axes robust, glabrous, commonly determinate, basal bracts early caducous, broadly ovate, 2 mm long, 1.5 mm wide, scarious, brown. *Peduncles* 5-12 mm long, robust, glabrous, basal peduncular bracts paired, very early caducous, ovate-triangular, 1-1.5 mm long, 0.5 mm wide, scarious, brown. *Heads* globular, golden, 7-10 mm diam. (dry) to 12 mm diam. (fresh), 18-20-flowered, sub-dense. *Bracteoles* persistent, 1-1.2 mm long, 0.7-0.9 mm wide, fimbriolate. *Flowers* 5-merous. *Calyx* 1-1.5 mm long, 1/2-2/3 length of corolla, gamosepalous, ± truncate. *Corolla* 2-3 mm long, petals united for c. 1/2 their length. *Ovary* sessile, glabrous, style sub-lateral. *Legumes* sub-moniliform, to 11 cm long, 5-7 mm wide, with up to 10 articles, firmly crustaceous, ± erect, glabrous. *Seeds* longitudinal in legume, oblong-elliptic, 5 mm long, 3-4 mm wide, compressed (2 mm thick), dull, black; *pleurogram* fine, dark, with an opening towards hilum of 0.5-1 mm; *areole* 3 mm long, 1.5 mm wide; *funicle* expanded into a cream aril (drying yellow-brown).

Selected specimens examined. WESTERN AUSTRALIA: just N of Geraldton, *A.M. Ashby* 4629 (CANB, K, PERTH); Three Springs-Mingenew, *J.S. Beard* 1963 (PERTH); 12.8 miles [20.6 km] S of Kalbarri on track past coastal gorges, *R. Cumming* 1751 (PERTH); Swan River, *J. Drummond* 283 (BM, K, OXF, P - given as coll. 1, no. 283); Lecman, *E.A. Griffin* 577 (CANB, MEL, PERTH); just W of Lake Logue, W of Eneabba, *E.A. Griffin & M.I. Blackwell* 2883 (PERTH); North Fremantle, 1 Sept. 1897, *R.Helms* s.n. (PERTH 00153885); between Lancelin and Ledge Point, early Jan. 1986, *G. Loeper* s.n.

(PERTH 00516465); Reabold Hill, Perth Metropolitan Area, *B.R. Maslin* 2305 (PERTH); Drummonds Cove, N of Geraldton, *B.R. Maslin* 4291 (PERTH); Coronation Beach, 13.7 km N of Geraldton, *M.McDonald* MM87 (PERTH); near Fremantle, *L. Preiss* 928 (FI, GOET, HBG, K, LUND, MEL, MO, NY, P, STRAS); Narrows Bridge area, Perth Waters, *R.D. Royce* 8285 (PERTH).

Distribution. South-west Western Australia in the Irwin Botanical District and the northern half of the Drummond Subdistrict of the Darling Botanical District (1:250,000 maps G50-13, H50-1, 5, 6, 9, 10, 14 and I50-2). Coastal and near coastal areas from S of Kalbarri, S to Fremantle and inland near Mingenew.

Habitat. Mostly found on limestone ridges adjacent to coastal sand dunes. Grows on sand over limestone in thicket, scrub, mallee, woodland and low forest.

Flowering and fruiting periods. Flowering specimens have been collected between August and October. Legumes with mature seeds have been collected between November and January.

Typification. The holotype is regarded as *Drummond* 102 which is mounted on a sheet with *Drummond* 283 at herb. Kew. We do not regard the latter as a type because it does not accord with the protologue in that its racemes are not paniculately arranged. Furthermore, judging from Erickson (1969) no. 283 belongs to one of the fifteen sets of plants despatched by Drummond to Hooker in May 1842 and therefore would not have been available to Bentham at the time of preparing his description. This is supported by the fact that no.283 is distributed among a number of European herbaria, whereas no.102 is a unicate and probably belongs to Drummond's 1839 collection which was not divided into sets.

Variation. Specimens from the northern end of the range near Kalbarri differ in their linear-elliptic, consistently one-nerved phyllodes to 13 cm long. Elsewhere phyllodes are normally two-nerved with the adaxial one fainter.

Affinities. Previously sometimes confused with *A. bivenosa* (see under this species for discussion). Closely related to and commonly parapatric with *A. rostellifera* which occurs on coastal sand dunes, whereas *A. xanthina* appears on adjacent inland limestone ridges. The principle distinguishing features are given in Table 4. *A. xanthina* is most readily recognised by its pruinose branchlets, cream arils and phyllodes usually broader with 2 rather prominent longitudinal nerves. Broad glaucous phyllode forms of *A. blakelyi* Maiden may resemble *A. xanthina* but are readily distinguished by their horizontally flattened phyllodes with the gland situated on the upper surface (not the upper margin as in *A. xanthina*).

Hybrids. Near Leeman the habitat specificity between *A. xanthina* and *A. rostellifera* breaks down in disturbed sites along road verges and the two species apparently hybridise.

Conservation status. Not considered rare or endangered.

Table 4. Characters distinguishing *A. xanthina* from *A. rostellifera*.

Character		*A. xanthina*	*A. rostellifera*
Branches		conspicuously pruinose	not pruinose although scurfy at extremities
Phyllodes	- colour	glaucous never puncticulate	green usually puncticulate
	- shape	narrowly elliptic, infrequently linear-elliptic	linear to linear-elliptic or narrowly oblanceolate
	- width	6-20(25) mm	3-17 mm
	- l:w	3-15(20)	4-30
	- nerves	2 (infrequently one)	1 (sometimes imperfectly two-nerved)
	- gland	2-5 mm above pulvinus	4-13 mm above pulvinus
Racemes		2-7 cm long	1-3 cm long
Head diam. (fresh)		10-12 mm	8-10 mm
Aril colour (fresh)		cream	orange-red

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