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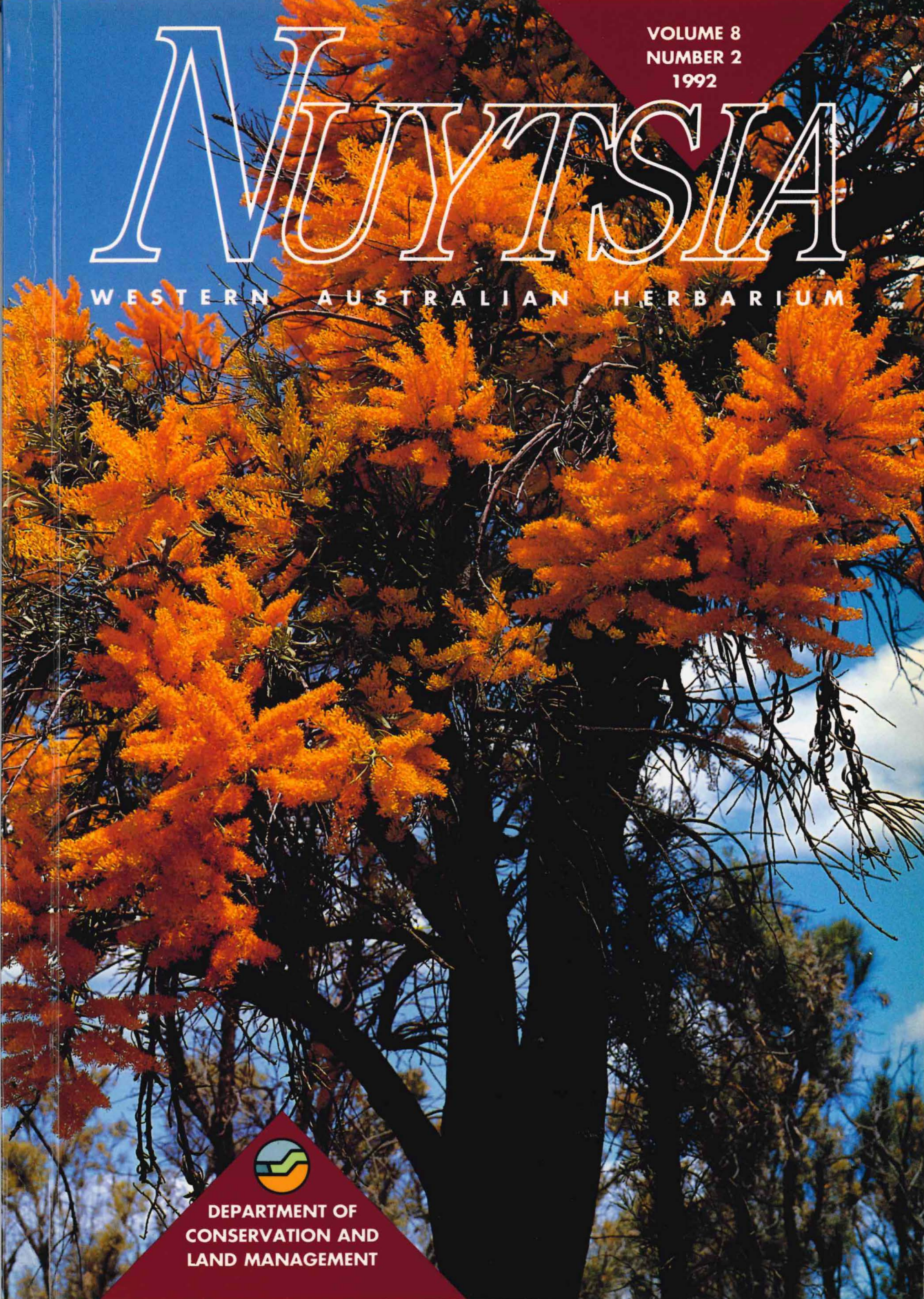

DEPARTMENT OF
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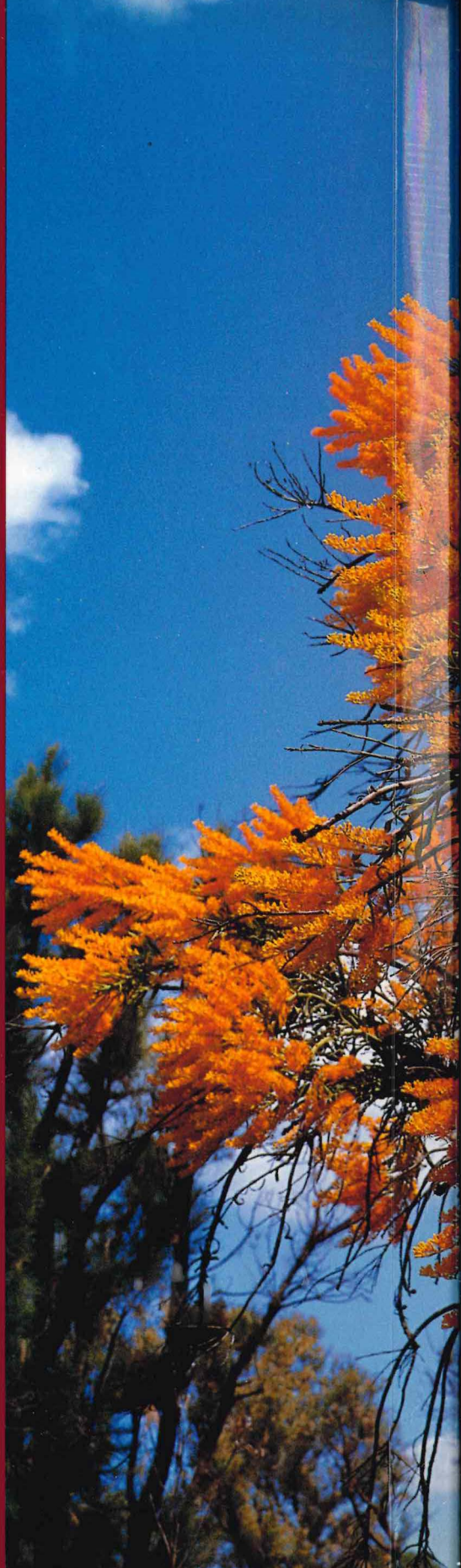

NUYTSIA

VOLUME 8 NUMBER 2 1992

Western Australian Herbarium
Department of Conservation and Land Management
Como, Western Australia

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Western Australian Herbarium,
Department of Conservation and Land Management,
PO Box 104, Como, Western Australia 6152

Cover

Nuytsia floribunda (Labill.) R. Br. ex Fenzl (Loranthaceae) — the Western Australian Christmas Tree is one of the few aborescent mistletoes in the world. This endemic tree is a semi-parasite common in sandy soil from the Murchison River to Israelite Bay. The journal is named after the plant, which in turn commemorates Pieter Nuijts, an ambassador of the Dutch East India Company, who in 1627 accompanied the "Gulde Zeepard" on one of the first explorations along the south coast of Australia.

Cover design by Sue Marais

Photograph A.S. George

Apatophyllum macgillivrayi (Celastraceae), a new species from south-west Western Australia

R.J. Cranfield and N.S. Lander

Western Australian Herbarium, Department of Conservation and Land Management,
PO Box 104, Como, Western Australia 6152

Abstract

Cranfield, R.J. & Lander, N.S. *Apatophyllum macgillivrayi* (Celastraceae), a new species from south-west Western Australia. Nuytsia 8(2): 191-194 (1992). A new species of *Apatophyllum* (Celastraceae) endemic to the Austin Botanical District of the Eremaean Botanical Province of Western Australia, namely *A. macgillivrayi* Cranfield & Lander, is described. A key to species of *Apatophyllum* and a map of their distribution is provided. The differences between *Apatophyllum* and the putatively related genus *Psammomoya* are briefly noted.

Introduction

A specimen collected in late 1989 during the North East Goldfield Survey carried out by members of the Western Australian Department of Agriculture's Division of Resource Management was recently submitted to the Western Australian Herbarium for identification. On superficial examination it appeared to be a species of *Hibbertia* Andr. (Dilleniaceae). More detailed examination showed it to be a new species of *Apatophyllum* McGillivray (Celastraceae), a genus previously unrecorded for Western Australia. *Apatophyllum* is thought to be related to the Western Australian endemic genus *Psammomoya* Diels & Loes (McGillivray 1971).

Taxonomy

Apatophyllum macgillivrayi Cranfield & Lander, sp. nov. (Figure 1)

Apatophyllum constablei affinis a qua sepalis longioribus, petalis longioribus, et fructibus longioribus differt.

Typus: near Scholl Range (27° 16' S, 121° 40' E), Western Australia (precise locality withheld), 6 December 1989, *H. Pringle* 2751 (holo: PERTH; iso: NSW).

Sub-shrub to 30 cm high, compact, glabrous, much branched. *Leaves* alternate, crowded, sessile, stipulate; stipules persistent, erect, twisting with age, subulate, 0.7-1.7 mm long, with 1-3 short lateral lobes, brown; lamina acicular, 3-12 x 0.4-0.5 mm, indurate, yellowish green, monosulcate abaxially, longitudinally ribbed with sclerenchymatous bundles, obscurely veined, pungent. *Inflorescence* axillary, pedunculate,

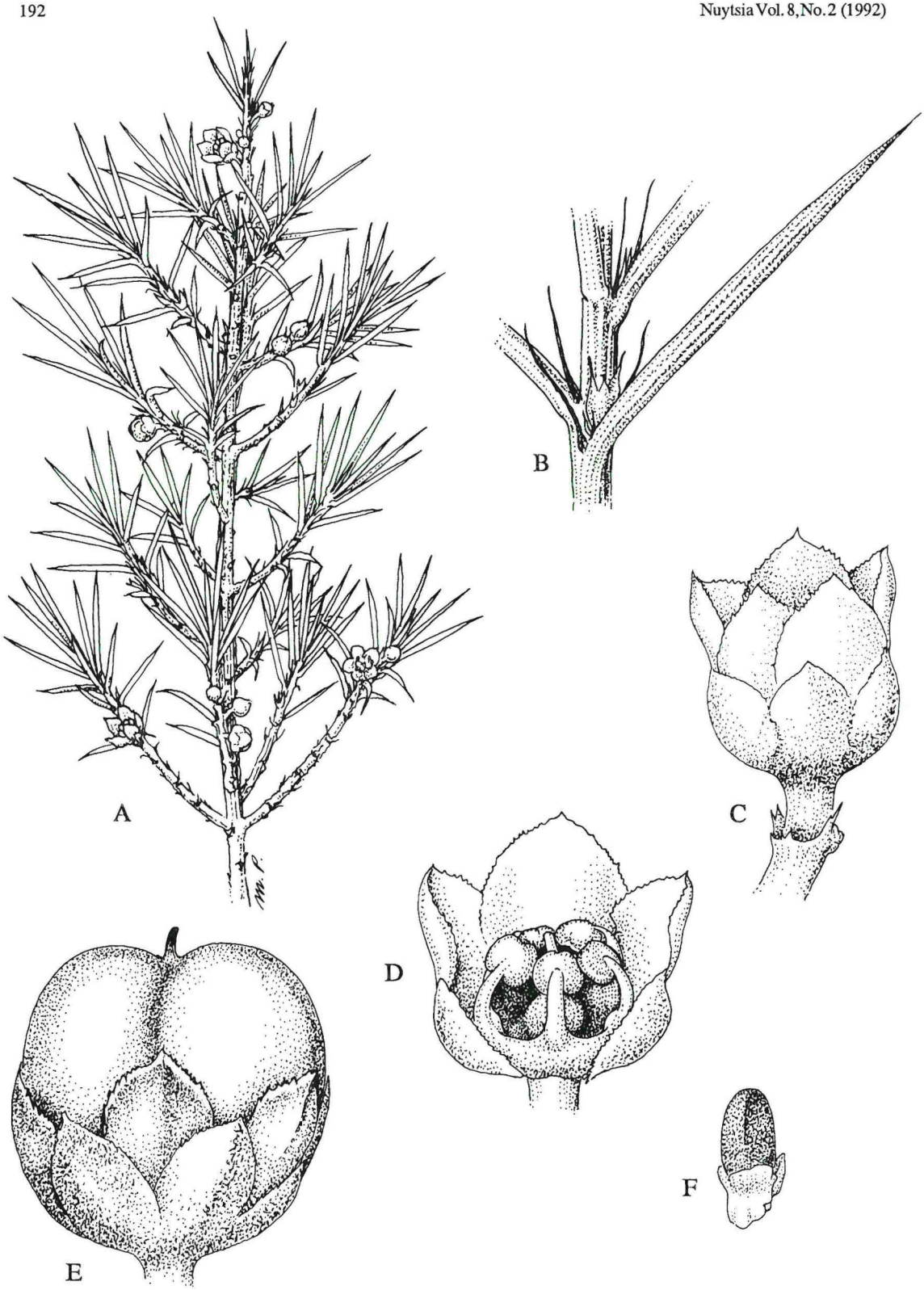

Figure 1. *Apatophyllum macgillivrayi*. A - Habit (x1.5). B - Leaf showing stipules (x6). C - Floral bud (x10). D - Flower after anthesis (x10). E - Capsule (x10). F - Seed with basal aril (x10). Drawn from the holotype.

1-flowered. *Peduncles* 0.5-1.5 mm long, elongating after anthesis; bracteoles 2, distal, opposite and basally connate, triangular, 0.5-1.6 mm long, greenish yellow, with membranous fimbriate margins and acuminate apices. *Flowers* axillary, solitary, pedicellate; pedicel 0.5-1 mm long. *Sepals* 5, imbricate, broadly ovate, 1.5 x 1-2 mm, greenish yellow; margin membranous, fimbriate; apex obtuse. *Petals* 5, imbricate, broadly ovate, 2-3.5 x 1.5-2 mm, greenish yellow; margin membranous, fimbriate; apex obtuse. *Stamens* 5, antisepalous, inserted on the rim of an erect, thin, fleshy, partially free, 0.2 mm high staminal disc; filaments linear, 0.5 mm long; anthers spherical, 0.5 x 0.4-0.6 mm, longitudinally dehiscent, basifixed, with oblong connective. *Ovary* surrounded and partially enclosed by the staminal disc, ovoid, 0.4-0.6 x 0.7-1 mm, 2-locular or 3-locular with 1 locule abortive; ovules 2 per locule, anatropous, c. 0.2 x 0.4 mm; style columnar, c. 1 mm long. *Fruit* a somewhat compressed, cordiform, bilocular, 1-seeded capsule, c. 5 x 4.5 mm, straw-coloured. *Seed* compressed obloid, c. 2 x 1 mm, brown, smooth; aril basal, cupular, white, chartaceous.

Distribution. Endemic to the Austin Botanical District of the Eremaean Botanical Province of Western Australia where it occurs on vacant Crown Land near the Scholl Range, Western Australia (Figure 2).

Habitat. Amongst low open *Callitris columellaris* shrubland on kaolinitic rubble beneath a low granite tor.

Conservation status. This species is known only from the type locality where it is abundant. It thus warrants the category 1R of Briggs & Leigh (1988).

Etymology. The specific epithet honours Mr Donald J. McGillivray, for many years Senior Botanist at the National Herbarium of New South Wales, who first described the genus *Apatophyllum* (McGillivray 1971).

Notes. This species is apparently most closely related to *A. constablei* McGillivray. The latter can be readily distinguished by its sepals, which are 0.9-1.2 x 0.7-0.9 mm; its petals, which are 1-2 x 0.5-0.7 mm; its fruit, which is 4-5 x 2-3 mm; and its seed, the surface of which is rugulose.

Key to species of *Apatophyllum*

1. Stipules lobed, 0.7-3 mm long
   2. Sepals narrowly ovate, 0.9-1.2 x 0.7-0.9 mm ..... *A. constablei* McGillivary
   2. Sepals broadly ovate, c. 1.5 x 1-2 mm ..... *A. macgillivrayi* Cranfield & Lander
1. Stipules entire, 0.2-0.3 mm long ..... *A. olsenii* McGillivray

Discussion

Of particular interest are the extraordinary disjunctions between the three species of *Apatophyllum*. Each species has a restricted distribution at locations widely separated from the others: near Glen Davis in New South Wales, at Many Peaks Range in Queensland, and at the Scholl Range in Western Australia respectively (Figure 1). The conclusion seems inevitable that these species are relictual.

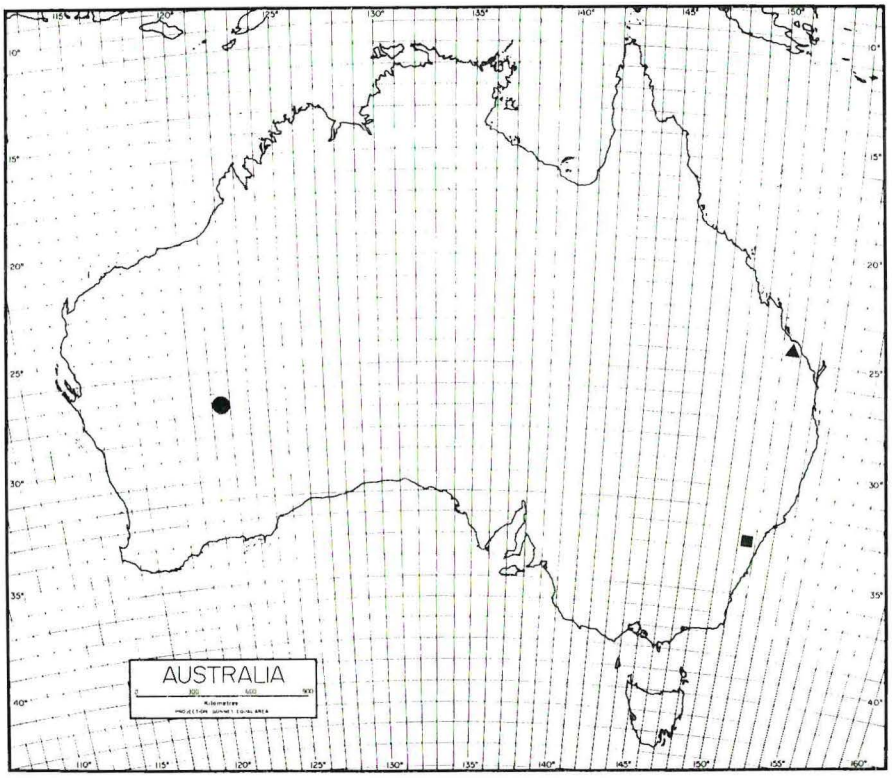

Figure 2. Distribution of *Apatophyllum constablei* (■), *A. macgillivrayi* (●), *A. olsenii* (▲) indicating occurrence in 1° x 1° squares.

The discovery of *Apatophyllum macgillivrayi* brings to two the number of Celastraceous genera occurring in south-western Western Australia, the other being the putatively related *Psammomoya*. Curiously, both *Apatophyllum* and *Psammomoya* are sub-shrubs.

Keighery (in press) has recently extended *Psammomoya* from two to four species. In our view, *Apatophyllum* and *Psammomoya* have not been succinctly distinguished in the literature (McGillivray 1971, Lander 1983, Jessup 1984, Keighery in press). Their known differences are brought together in the following synoptic key.

1 Leaves opposite, decussate and exstipulate, reduced to minute, deltoid or orbicular cataphylls ..... **Psammomoya**

1 Leaves alternate, spirally arranged, and stipulate, not reduced ..... **Apatophyllum**

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Nuytsia 8(2): 195-199 (1992)

Eucalyptus ordiana (Myrtaceae), a new species from the Kimberley, Western Australia

C.R. Dunlop[1] and C.C. Done[2]

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Abstract

Dunlop, C.R. and Done, C.C. *Eucalyptus ordiana* (Myrtaceae), a new species from the Kimberley, Western Australia. Nuytsia 8 (2): 195-199 (1992). A new species of *Eucalyptus* series *Subexsertae* is described and illustrated. The species is known only from populations just south of Kununurra, Western Australia.

Introduction

That the Kimberley region may still be regarded as a botanical frontier is evidenced by the many new records and new taxa reported from expeditions and surveys in the last two decades. A brief historical sketch provided by Kenneally (1989) documents recent publications along with a general history of botanical exploration in the region. Published works dealing specifically with Kimberley eucalypts are summarised by Brooker and Done (1986). More recently, "Eucalyptus II"(Carr & Carr 1988) and the "Flora of Australia" account (Chippendale 1988) have been published, the latter drawing together all species with the exception of those described in "Eucalyptus II". Twelve new species are described for north western Australia in "Eucalyptus II"; all are members of series *Terminaliptera* (Chippendale 1988).

The species described here, *E. ordiana*, a member of series *Subexsertae*, was first discovered in 1981 on the shores of Lake Kununurra on the Ord River.

E. ordiana possesses characters grouping it with species of Blakeley's series *Subexsertae* (Blakely 1965, Chippendale 1988) and Pryor and Johnson's informal subgenus *Symphyomyrtus*, section *Exsertaria*, series *Albae* (Pryor & Johnson 1971). Characters of series *Subexsertae* include smooth deciduous bark, hemispherical to conical (rostrate in *E. ordiana*) compound opercula, and shortly pedicelled or sessile, relatively small cupular fruit. Valves are exsert or nearly so and ovules are arranged in rows of 4-8 on the placenta. Broad, poplar-like juvenile leaves are a feature of most species of the series. The yellow-brown seed of *E. ordiana* matches well the seed of the subgroup of species which includes *E. brevifolia*, *E. confluens*, *E. umbrawarrensis* and *E. leucophloia* as illustrated and described by Boland *et al.*(1980). The series is concentrated in the Kimberley and the northern part of the Northern Territory with the majority of species on sandstone or substrates derived from sandstone.

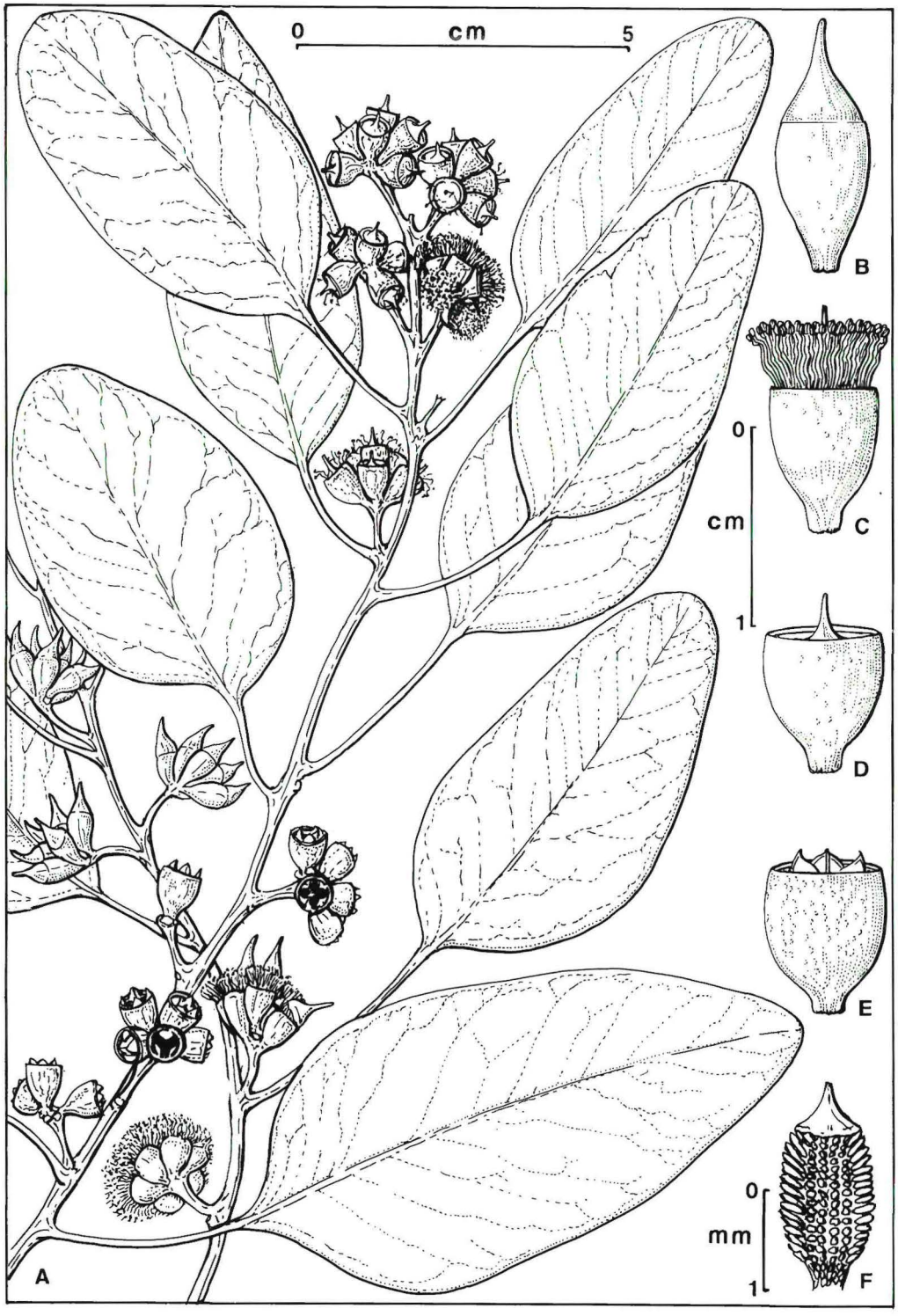

Figure 1. *Eucalyptus ordiana*. A - Flowering branch. B - Bud. C - Flower. D - Immature fruit. E - Fruit. F - Placenta section showing ovules and ovulodes. From *Done* 728.

Eucalyptus ordiana Dunlop & Done, sp. nov. (Figure 1)

Speciebus seriei *Subexsertae* affinis, praesertim *E. brevifolio*, a qua operculo longiore, constanter foliis latioribus et fructu minori differt.

Typus: Lake Kununurra, Ord River, 15° 54' S, 128° 45' E, *C. Done* 728, 9.i.1985 (holo: PERTH; iso: AD, BRI, CANB, CBG, DNA, K, MEL, NSW).

Seedlings lignotuberous; cotyledons reniform, 2-2.5 mm long, 4-5 mm wide; *seedling leaves* decussate for 3-7 or more pairs: first pair with petioles c. 2 mm long, blades narrowly lanceolate, 5-10 mm long, 1.5-3 mm wide, the subsequent pairs with progressively longer petioles and broader blades through to the adult form. Adult a single or multistemmed *tree* to c. 6 m high; stems to c. 20 cm diameter; bark smooth throughout, pruinose, weathering to a purplish colour. *Adult leaves* at first claret coloured, becoming glaucous; concolorous, the petiole and midrib pruinose; petioles 25-30 mm long; bases truncate, often slightly asymmetrical; blades ovate-lanceolate, ovate or rarely lanceolate; 55-130 mm long (including petioles), 18-55 mm wide; basal nerves at 50-60 degrees to midrib, lateral nerves at c. 40 degrees; intramarginal vein 1-5 mm from margin, higher orders of venation obscure; obtuse. *Umbels* solitary in the upper axils, 7-flowered; peduncles terete, 4-10 mm long, rarely longer. *Pedicels*, when present, 1-4 mm long. *Buds* pruinose or red or pink, the operculum paler than the hypanthium; sessile or shortly pedicellate, ellipsoid to fusiform, straight or slightly curved, c. 10 mm long. *Operculum* compound, rostrate, c. 5 mm long, ±equal in length to the hypanthium. Outermost *stamens* erect in bud, median and inner inflexed. *Anthers* versatile, oblong; gland apical, globular, extending slightly beyond the thecae. *Ovary* 4 or 3 locular; vertical rows of ovules 6, in two sets of 3. *Fruits* usually pruinose, cupular, smooth, c. 6 mm long, c. 6 mm wide; staminophore c. 0.5 mm wide, rim and disc slightly narrower; valves exsert. *Seed* yellow—brown, discoid or angular, finely reticulate, the areolae elongated; hilum ventral.

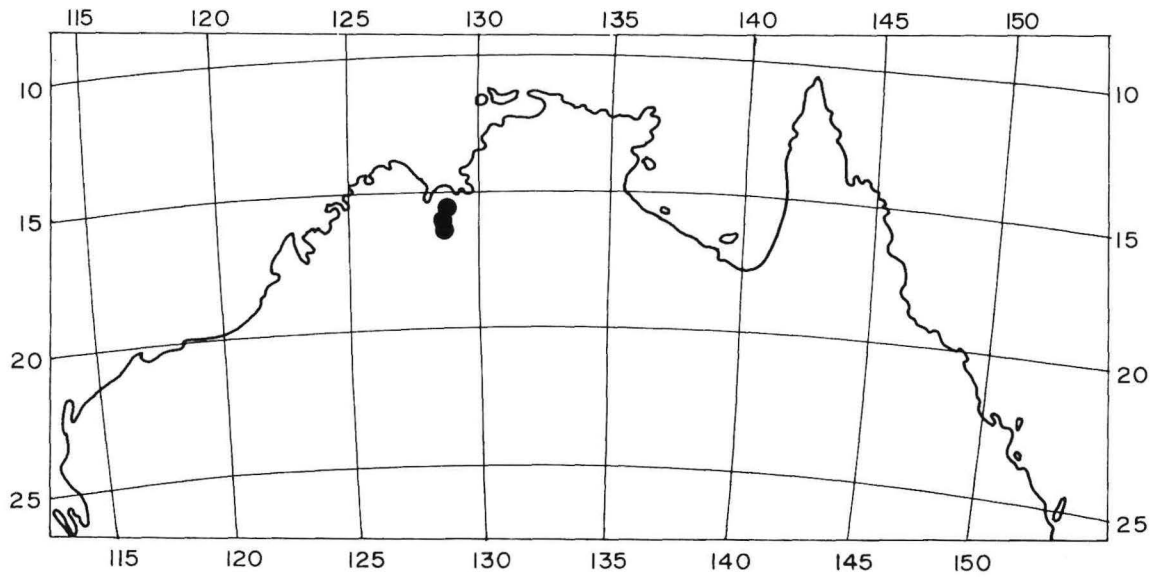

Figure 2. Distribution of *Eucalyptus ordiana*

Other specimens examined. (Note: the acronym CALM is an informal one used here for the plant collection held at the Conservation and Land Management office, Kununurra) WESTERN AUSTRALIA: Ord R., *C. Done* 467, 8.vi.1981 (DNA); Carr Boyd Ra., *C. Done* & *C. Dunlop* 561, 15.i.1982 (CALM); Carr Boyd Ra., *C. Done* 562, 15.i.1982 (CALM); Lake Kununurra, *C. Done* 608, 18.vi.1982 (CALM); 6 km south of Doon Doon Station, *C. Done* 729, 10.i.1985 (CANB, DNA, MEL, NSW, PERTH); Darwin (cult.), *C.R. Dunlop* 8890, 1.ii.1989 (DNA); Carr Boyd Ra., *P.J. White* 56, 27.viii.1988 (DNA).

Distribution. E. ordiana is known from six populations, all in close proximity to Kununurra, Western Australia (Figure 2).

Habitat. Shrublands and Low Open Woodlands on the upper slopes of sandstone ranges. Associated species include *Terminalia canescens*, *Triodia* spp., *E. brevifolia* and *E. confluens*.

Flowering period. Collected in flower in January, June and July.

Fruiting period. Fruit collected in January, June-August, October and November. In the absence of fire, indehisced fruits are probably present throughout the year.

Notes. Within series *Subexsertae*, *E. ordiana* is most closely allied with *E. brevifolia* and *E. leucophloia*. Seedling and intermediate leaves of these species are similar in size and shape; *E. ordiana* differs in the juvenile stages by having less markedly quadrangular stems. *E. ordiana* retains its broad foliage through to the adult stages and in this respect shows affinities with *E. mooreana*. In bud and fruit characters the combination of a rostrate operculum, a relatively small capsule and a thin disc serves to distinguish *E. ordiana* from *E. brevifolia* and *E. mooreana*. *E. leucophloia*, which has a narrow disc and an operculum described as hemispherical or conical to slightly rostrate (Brooker 1976), is readily recognised by the strongly exserted broad-based valves of the fruit.

Conservation status. The species does not occur in a conservation reserve but does not appear to be under immediate threat. With populations all within a range of 90 km, a coding of 2R would be appropriate by the Briggs and Leigh (1989) formula.

Etymology. The specific epithet is derived from the Ord River around which this species occurs.

Acknowledgements

We thank Ian Scott who first noticed this species and brought it to our attention. We are also grateful to Peter White for collecting seed and to Milton Andrews for the illustration. Mr Ken Hill of the New South Wales National Herbarium refereed the paper, making valuable comments as well as contributing extra data from specimens not seen by the authors.

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A taxonomic account of the genus *Calotropis* R.Br. (Asclepiadaceae) in Australia

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Abstract

Forster, P.I. A taxonomic account of the genus *Calotropis* R. Br. (Asclepiadaceae) in Australia. Nuytsia 8(2): 201-208 (1992). Two species of *Calotropis* R.Br., *C. procera* (Ait.) Ait. f. and *C. gigantea* (L.) Ait. f., occur naturalised in Australia.

Introduction

The Asclepiadaceae contains a wide range of showy ornamental plants of which taxa from several genera have been introduced into Australia as garden plants or accidentally as weeds. Two species from the genus *Calotropis* R. Br. represent such introductions and it is uncertain as to whether the most widespread of these, *C. procera* (Ait.) Ait. f. was introduced as a garden plant or from seed in packing of Afghan cameleers gear (Hall 1967).

As with many introduced plants, particularly those considered to be weeds, data in the form of herbarium records is often scant; this has certainly proved to be the case with *Calotropis*. When the last overall treatment of the Asclepiadaceae in Australia was published (Bentham 1869), no species of *Calotropis* were recorded as present in Australia. Based on herbarium records the naturalisations outlined below appear to have occurred within the last 50 years. While *C. procera* has been described and illustrated in a number of guides to weeds (e.g. Kleinschmidt & Johnson 1977), the second species, *C. gigantea* (L.) Ait. f. has not been listed to occur in Australia (e.g. Dunlop 1987), the chance references to it usually pertaining to *C. procera*. In addition, the author citations for both species are often incorrectly given, e.g. "C. procera (Willd.) R. Br. ex Ait." Thus it is considered timely with the preparation of a 'Flora of Australia' account of the Asclepiadaceae by the author, to provide a detailed taxonomic account of these plants in Australia, together with details of their general ecology. As *C. procera* is of some importance as a source of fodder during drought (Meadly 1971, Radunz *et al.* 1984) or as a possible fuel source (Airey *et al.* 1981, Erdman & Erdman 1981), it is essential that the plants of this genus in Australia are correctly identified.

Taxonomic History

The genus *Calotropis* was first described by Robert Brown (1810) in a preprint of Brown (1811). Brown did not list any species in these accounts. Aiton (1811) included both *Asclepias gigantea* L. and *A. procera* Ait. within *Calotropis*, and the latter is considered to be the type of the genus. Ali (1980)

considered that the genus 'consists of about four species'; however, apart from *C. procera* and *C. gigantea* which are widely cultivated or naturalised in the tropics, the other species are poorly known.

Materials & Methods

This account is based on herbarium holdings at AD, BRI, CANB, DNA, JCT, NE, PERTH and QRS and field collections made in northern Australia during 1988-1990.

Taxonomic Treatment

Calotropis R. Br., On Asclepiad. 28 (1810); Mem. Wern. Nat. Hist. Soc. 1: 39 (1811); Wight, Contrib. Bot. India 53 (1834); J.D. Hook., Fl. Brit. India 4: 17 (1883); Gamble, Fl. Madras 2: 834 (1923); Huber in Abeyw., Rev. Handb. Fl. Ceylon 1(1): 35 (1973).

Type: Asclepias procera Ait. (= *Calotropis procera* (Ait.) Ait. f.)

Erect, woody, perennial shrubs to small trees, latex white. Young foliage with dense white indumentum. Mature foliage with thick glaucous wax cover. Leaves opposite, somewhat fleshy. Calyx deeply 5-lobed. Corolla 5-lobed; lobes valvate in bud, free for about two-thirds of length. Staminal corona single, comprising 5 fleshy, laterally compressed lobes adnate to staminal column for entire length; basally with a recurved vesicle; apically with a pair of auricles. Stamens connate into staminal column; anthers with membranous terminal appendage. Pollinaria with 2 pollinia; pollinia pendulous, ellipsoid, lacking a pellucid germinating mouth; corpusculum ovate; caudicles unwinged, not geniculate. Style-head conical. Carpels glabrous. Follicles ovoid, inflated with air sac around seed producing region. Seeds flattened, ovate; comose at micropylar end.

Distribution. Three or four species occurring naturally in northern Africa, Arabia and tropical Asia, with two species widely naturalised in other tropical regions.

Key to species of *Calotropis* in Australia.

1a. Corolla 2.3-2.5 cm diameter; sepals 7-8 mm long ..... 1. **C. procera**

1b. Corolla 3-5.5 cm diameter; sepals 3-4 mm long ..... 2. **C. gigantea**

1. Calotropis procera (Ait.) Ait. f., Hort. Kew. ed 2, 2: 78 (1811); *Asclepias procera* Ait., Hort. Kew. 1: 305 (1789). *Lectotype:* N.J. Jacquin, Observationum botanicorum iconibus. part 3: t.69 (1768) [as *Asclepias gigantea*], *fide* Ali, Notes R.B.G. Edinb. 38: 290 (1980).

Two subspecies were recognised by Ali (1980) of which only subsp. *procera* is naturalised in Australia.

Woody erect shrub to 2.5 m. Stems cylindrical, up to 1 cm diameter on foliage bearing parts, glabrous; internodes up to 6 cm long, with a grey-green pruinose bloom. Leaves elliptic, up to 18 cm long and 15 cm wide; above venation obscure; below with 6 major secondary veins per side of midrib prominent; tip acute to rounded; base cordate to auriculate; petiole 3-4 mm long, 4-5 mm wide; extrafloral nectaries

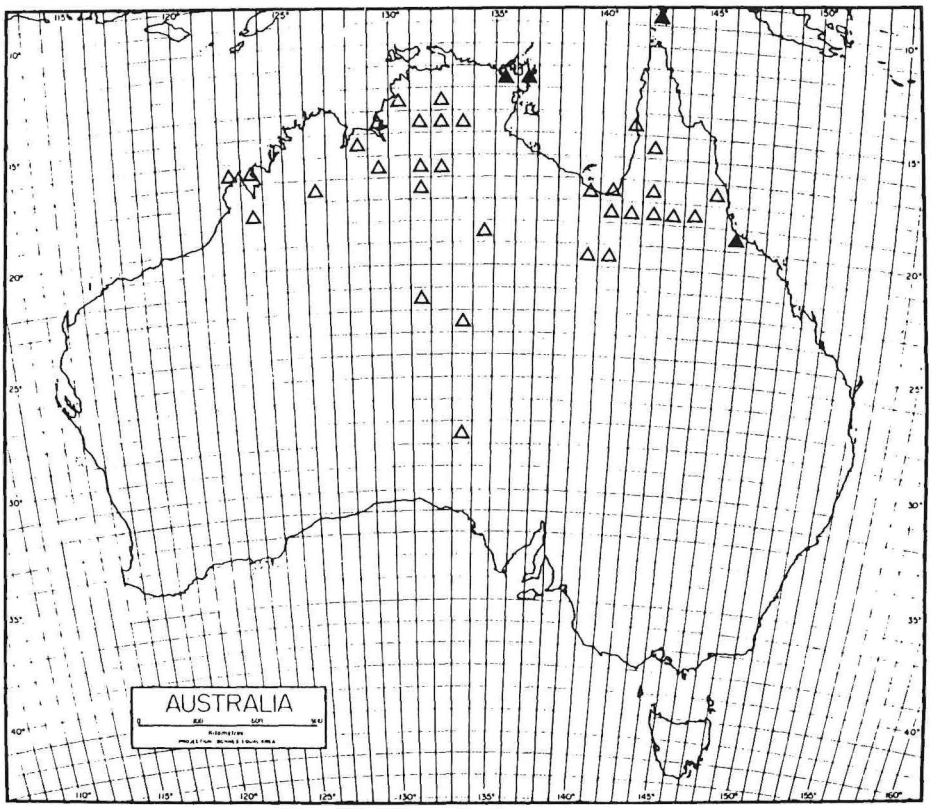
Figure 1. A-D - *Calotropis procera*, E-F - *C. gigantea*. A - habit of flowering branch. B & E - apical view of flower. C - side view of flower with part of corolla removed showing staminal column. D & G - side view of staminal corona and staminal column. F - side view of flower. (All actual size).

20-27 at lamina base. Cyme up to 10 cm long with 1-12 fascicles; bracts lanceolate, 8-13 mm long, 3.5-6 mm wide, glabrous or with scattered to sparse indumentum, tip shortly acuminate; peduncle up to 3.5 cm long, 2-7 mm diameter, glabrous, or with scattered to sparse indumentum and with a grey-green pruinose bloom. Flowers campanulate, 13-20 mm long, 23-25 mm diameter, with a slightly sweet scent; pedicels 15-27 mm long, 1-2.5 mm diameter, cream, glabrous or with scattered to sparse indumentum. Sepals ovate, 7-8 mm long, c. 5 mm wide, cream, glabrous, base of each sinus with 3-9 glands. Corolla tube cream, c. 5 mm long, 10-11 mm diameter; lobes lanceolate-ovate, 9-10 mm long, 9-10 mm wide, cream with purple tips internally, cream externally. Staminal corona 4-5 mm long, 9-10 mm diameter; each lobe c. 6 mm long, c. 1 mm wide at middle and 4 mm wide at outer edges, edges purple, cream next to staminal column. Staminal column c. 9 mm long and 5 mm diameter, cream; anther appendages truncate-obtuse, c. 3 mm long and 3.5 mm wide; alar fissure 0.75-1 mm long. Style-head c. 5 mm diameter, cream, extending 1 mm above anthers. Carpels c. 6 mm long and 3 mm wide. Pollinarium 2-2.1 mm long, 0.9-1 mm wide; pollinia oblong, 1.35-1.45 mm long, 0.55-0.6 mm wide; corpusculum oblong, 0.45 mm long, 0.1-0.15 mm wide, with a wing of tissue around edges that is a continuation of the caudicle tissue; caudicles 0.35-0.4 mm long, 0.05 mm wide. Follicle 10-12 cm long, 6-7 cm wide. Seed 8-8.5 mm long, c. 5 mm wide; coma 25-28 mm long, white. Figure 1A-D.

Selected specimens examined. WESTERN AUSTRALIA: Kununurra Racetrack, 15° 49'S, 128° 45'E, *P.I. Forster* 5906 (BRI,DNA,PERTH); One Arm Point, NE Dampierland, 16° 26'S, 123° 05'E, *B.J. Carter* 90 (PERTH); 60.4 km N of Halls Ck on road to Turkey Ck, 17° 47'S, 127° 48'E, *T.E. Aplin, R. Cranfield & J. Wheeler* 346 (PERTH).
NORTHERN TERRITORY: Peron Is, 13° 11'S, 130° 03'E, *T.S. Henshall* 812 (DNA); Injin Beach, Port Keats, 14° 13'S, 129° 26'E, *G. Wightman* 572 & *C. Dunlop* (DNA); 5 km W of Katherine on the Victoria Hwy, 14° 28'S, 132° 13'E, *N.F. Norris* 857 (DNA); Mouth of Keep River, 14° 59'S, 129° 11'E, *J. Russell-Smith* 7558 & *D. Lucas* (DNA); Ivanhoe Plain, Ord River Irrigation area, 15° 33'S, 128° 49'E, *M. Rankin* 2948 (DNA); 8 km N of Rosewood Stn turnoff, Duncan Hwy, 16° 23'S, 129° 03'E, *P.I. Forster* 5911 (BRI,DNA); Middle Ck, Victoria River Downs, 16° 23'S, 131° 14'E, *J. Must* 1577 (CANB,DNA); 21 km past Top Springs on Buchanan Hwy to Timber Ck, 16° 27'S, 131° 39'E, *P.I. Forster* 5899 (BRI,DNA); 85 km along Buchanan Hwy on way to Top Springs, 16° 46'S, 132° 40'E, *P.I. Forster* 5896 (BRI,DNA); c. 21 km N of Yuendumu, 22° 09'S, 131° 49'E, *P.K. Latz* 8806 (DNA); Simpson Gap N.P., 23° 42'S, 133° 48'E, *P.K. Latz* 8565 (DNA).
QUEENSLAND: Chillagoe, *S.T. Blake* 14737 (BRI); 10 km from Dimbulah on Petford road, 17° 10'S, 145° 00'E, *B. Hyland* 8468 (BRI,QRS); roadside outside Karumba, 17° 28'S, 140° 50'E, *V.J. Neldner* 2445 & *T.D. Stanley* (BRI); 40 Mile Scrub, c. 5 km N of the junction of Kennedy Hwy and Gulf Development road, 18° 07'S, 144° 49'E, *J.R. Clarkson* 2529 & *N.B. Byrnes* (BRI); 38 km from Georgetown on Croydon road, 18° 16'S, 143° 12'E, *P.I. Forster* 3841 (BRI); 1 km E of Georgetown, 18° 17'S, 143° 34'E, *P.I. Forster* 3820 (BRI); Boiler Ck, 10 km past Greenvale on Gregory Developmental road to The Lynd, 18° 58'S, 144° 54'E, *P.I. Forster* 3788 (BRI); 55 km from Mt Isa on Cloncurry road, 20° 48'S, 139° 59'E, *P.I. Forster* 6135 (BRI,DNA); 106 km from Mt Isa on Cloncurry road, near Duchess turnoff, 20° 44'S, 140° 27'E, *P.I. Forster* 6136 (BRI,DNA).
SOUTH AUSTRALIA: Beside Stuart Hwy, c. 70 km S of Marla, *N.G. Walsh* 1713 (AD,DNA).

Distribution. C. procera is widely distributed in northern tropical Australia, but is also naturalised in a few scattered localities in inland central Australia. Map 1.

Habitat. Plants are most commonly encountered on roadsides, however very large infestations may occur on black soil plains such as those on Victoria River Downs in the Northern Territory or on coastal dune systems in the south-eastern Gulf of Carpentaria.



Map 1. Distribution in Australia of *Calotropis procera* (open triangles) and *C. gigantea* (closed triangles), mapped within 1° x 1° grid squares.

Flowering period. Throughout the year with a concentration during the spring, summer and autumn months.

Fruiting period. 2-3 months after flowering.

Notes. Studies of *C. procera* within its natural range have found polymorphism both in floral morphology (Bhatnagar 1975) and germination (Amritphale *et al.* 1984). The flowers, in particular the coronal lobes of the Australian populations of *C. procera* are quite uniform in form and this may well indicate that the naturalised populations are a result of one or very few naturalisation events not encompassing the possible variation known for this species.

2. Calotropis gigantea (L.) Ait. f., Hort. Kew. ed. 2, 2: 78 (1811); *Asclepias gigantea* L., Sp. Pl. 214 (1753); Wight, Contrib. Bot. India 53 (1834); Wight, Ill. Ind. Bot. t. 155-156 (1850); J.D. Hook., Fl. Brit. India 4: 17 (1883); Huber in Abeyw., Rev. Handb. Fl. Ceylon 1(1): 35 (1973); Matthew, Ill. Fl. Tamilnadu Carnatic t. 437 (1982); Rani & Matthew, Fl. Tamilnadu Carnatic 2: 929-930 (1983).

Type: Herbarium Hermann 2: 74 (BM n.v.) *fide* Ali, Fl. Pakistan 150: 9 (1983).

Woody, erect shrub to 4 m. Stems cylindrical, up to 6 cm diameter on foliage bearing parts, glabrous; internodes up to 5 cm long, with glaucous white bloom. Leaves petiolate; lamina elliptic to oblong, up to 10 cm long and 8 cm wide, coriaceous, somewhat fleshy, glabrous; above venation obscure; below with 6 or 7 secondary veins per side of midrib prominent; tip acute to rounded; base cordate to auriculate; sessile or with petiole 0.2-0.7 mm long, c. 0.2 mm wide; extrafloral nectaries 19-20 at lamina base. Cyme up to 10 cm long with 1-3 fascicles of flowers; bracts lanceolate, 6-7 mm long, 2-3 mm wide, with scattered indumentum, tip acute; peduncle up to 3.2 cm long, 2-4 mm diameter, waxy glaucous or with scattered indumentum. Flower campanulate, 24-25 mm long, 30-55 mm diameter; pedicels 2.5-4 cm long, 1-2.3 mm diameter, with scattered indumentum. Sepals lanceolate-ovate to ovate, 5-7 mm long, c. 4 mm wide, ciliate, base of each sinus lacking extrafloral nectaries. Corolla tube 5-6 mm long, 14-15 mm diameter, glabrous; lobes ovate, fleshy, 15-17 mm long, 10-11 mm wide, glabrous, tips acute. Staminal corona 11-12 mm long, 14-15 mm diameter, consisting of 5 lobes fused for entire length to staminal column; each lobe broadly flanged, 11-12 mm long, 6-6.5 mm wide, with the base elongated into an upturned hook c. 5 mm long. Staminal column 14-15 mm long, 4.6-5 mm diameter; anther appendages truncate, c. 0.5 mm long and 2 mm wide; alar fissure c. 1.3 mm long. Style-head c. 2 mm diameter. Carpels 9-10 mm long, 2-2.1 mm wide. Pollinarium c. 2.5 mm long and 2.5 mm wide; pollinia oblong, 1.6-1.7 mm long, 0.6-0.65 mm wide; corpusculum c. 0.6 mm long and 0.32 mm wide; caudicles c. 0.3 mm long and 0.1 mm wide. Follicle 7-10 cm long and 2.5-4 cm wide, glabrous. Seeds 8-9 mm long, 5.5-6 mm wide; coma 20-25 mm long, white. Figure 1E-F.

Specimens examined. SRI LANKA, EASTERN PROVINCE: Trincomalee Distr., beach just S of Elizabeth Point *G. Davidse* 7533 (BRI).
PAPUA NEW GUINEA: Kulo, Papua, *L.J. Brass* 511 (BRI).
AUSTRALIA, NORTHERN TERRITORY: Milingimbi, 12° 06'S, 135° 55'E, *G. Wightman* 720 (DNA); NE Arnhemland: Nhulunbuy, 12° 10'S, 136° 46'E, *G. Wightman* 4267 (DNA).
QUEENSLAND: Dauan Is., Torres Strait, 9° 25'S, 142° 32'E, Sept. 1971, *M. Lawrie* [AQ004046] (BRI); Magnetic Island, Oct. 1957, *T.C. Grove* [AQ216435] (BRI); Cape Pallarenda, *T. Stanley* 80177 (BRI).
CULTIVATED: Botanic Garden, Rabaul, *C.E. Blise* 607 (BRI); Island in Lake, Botanic Gardens, Lae, *A.N. Millar* GH56 (BRI); Adel's Grove *via* Burketown, *A. deLestang* [AQ216413] (BRI); South Johnstone, *S.T. Blake* 15271 (BRI); Baker's Shop, Kilcoy, 26° 57'S, 152° 33'E, *P.I. Forster* 5020, *L.H. Bird & M.C. Tucker* (BRI); Mt Coot-tha Botanic Gardens, Brisbane, Apr. 1980, *P. Foot* [AQ420949] (BRI).

Distribution. Native to Sri Lanka, India, China and Malesia. In Australia the species is naturalised at a few localities in Arnhem Land, Northern Territory and in Torres Strait. There is one 50 year old collection from southern Papua New Guinea. It is frequently cultivated in tropical areas as a garden plant.

Habitat. In Australia, plants have been collected from the vicinity of human habitation in disturbed areas.

Flowering period. Throughout the year, but most abundantly during the summer months.

Fruiting period. Generally 3-4 months after fertilisation.

Notes. C. gigantea is sparingly naturalised in Australia and perhaps in Papuasia. Unlike *C. procera*, *C. gigantea* does not appear to represent a serious problem as a woody weed.

Ethnobotanical use. M. Lawrie recorded the name of "Del" being used for this plant on Dauan Island, whereas Wightman & Smith (1989, [recorded incorrectly as *C. procera*]) did not note any name being used at Milingimbi, Arnhem Land.

Pollination Biology

Both *C. procera* and *C. gigantea* are successful as naturalised plants within the Australian landscape, however, little information is available as to the reasons for this success. As with other plants of the Asclepiadaceae, fruit set is dependent on insect mediated cross-pollination of flowers. Studies both within the natural and naturalised habitats of these *Calotropis* species outside of Australia have revealed associations between different species of *Xylocopa* bees resulting in successful cross-pollination (Wanntorp 1974, Ramakrishna & Arekal 1979, Eisikowitch 1986, Willmer 1988). My fleeting encounters with these plants in northern Australia have not allowed detailed observations of the pollinators to be achieved, but it would be expected that a range of native Hymenoptera visit the flowers as found with naturalised *Gomphocarpus fruticosus* (L.) R. Br. (Forster, unpubl.). Near Chillagoe in Queensland, a single species of bee was seen visiting flowers for nectar, however, no individuals could be captured for examination to ascertain whether or not pollinaria were being transported. On Victoria River Downs, Northern Territory and near Mt Isa, the flowers of *C. procera* had large numbers of ants in attendance which were feeding on nectar. No pollinaria were seen attached to these ants and even if there had been, it is unlikely that these ants are efficient pollinators, if indeed they pollinate at all.

Acknowledgements

The illustration was provided by M. Saul. The Directors/Curators of the listed herbaria allowed material to be examined either at their institutions or on loan. Staff at DNA and QRS allowed extended use of facilities during visits. Dr M.P. Bolton, then of the Queensland Department of Lands discussed the distribution of *C. procera* in the southern Gulf of Carpentaria and provided a number of additional distribution records. The Australian Biological Resources Study provided funding during 1988 to 1990. This assistance is gratefully acknowledged.

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Nuytsia 8(2): 209-218 (1992)

Four new species of *Eucalyptus* (Myrtaceae) from Western Australia

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Abstract

Grayling, P.M., & Brooker, M.I.H. Four new species of *Eucalyptus* (Myrtaceae) from Western Australia. Nuytsia 8(2): 209-218 (1992). Four new species from the informal *Eucalyptus* subgenus *Symphyomyrtus* Pryor & Johnson are described and illustrated. *E. absita* is a member of the *E.* series *Porantheroideae* (Maiden) Chippendale; *E. balanites* has similarities to *E. decipiens* Endl. in the *E.* series *Micrantherae* Benth. *sensu* Chippendale (1988); *E. annuliformis* is closely related to *E. drummondii* Benth. in the *E.* series *Curviptera* Maiden; and *E. argutifolia* is a member of the *E.* series *Rufispermae* Maiden. All four species are known only from small populations in coastal and sub-coastal south-western Australia.

Introduction

Many new species of *Eucalyptus* in Western Australia have been discovered and described in the last twenty years. The majority of these have been found in remote or otherwise relatively inaccessible areas. It is somewhat surprising then to find new species of *Eucalyptus* within short distances of Perth. One example is *E. laeliae* Podger & Chippendale which occurs in the foothills of the Darling Range to the immediate east and south-east of Perth and which was published in 1968. *E. laeliae* occurs over a distance of 150 km, a relatively wide range but many of the species discovered since then have a more restricted distribution, e.g. *E. suberea* Brooker & Hopper and *E. lateritica* Brooker & Hopper which occur only in the Badgingarra-Mt Lesueur area.

In this paper we describe four new species of even more restricted distribution. They may be relicts but we cannot know if the recent extensive clearing of vegetation nearby has obliterated other occurrences.

Each of the new species is treated in keys and digests (informally) in Brooker & Kleinig (1990).

E. absita consists of four very small populations within 25 km of each other in the Badgingarra area. *E. annuliformis* is known only from Bidgerabbie Hill (n.b. 'Badgerabbie' in *Anon.* 1986) south-east of Dandaragan and appears to consist of one or possibly two individuals. *E. argutifolia*, which occurs as close to Perth as 11 km north of Wanneroo, is known from this and nine other small populations scattered northwards to the Hill River. *E. balanites* is known only from a single population about 0.5 ha. in area, south of Cadda Road, west of Badgingarra.

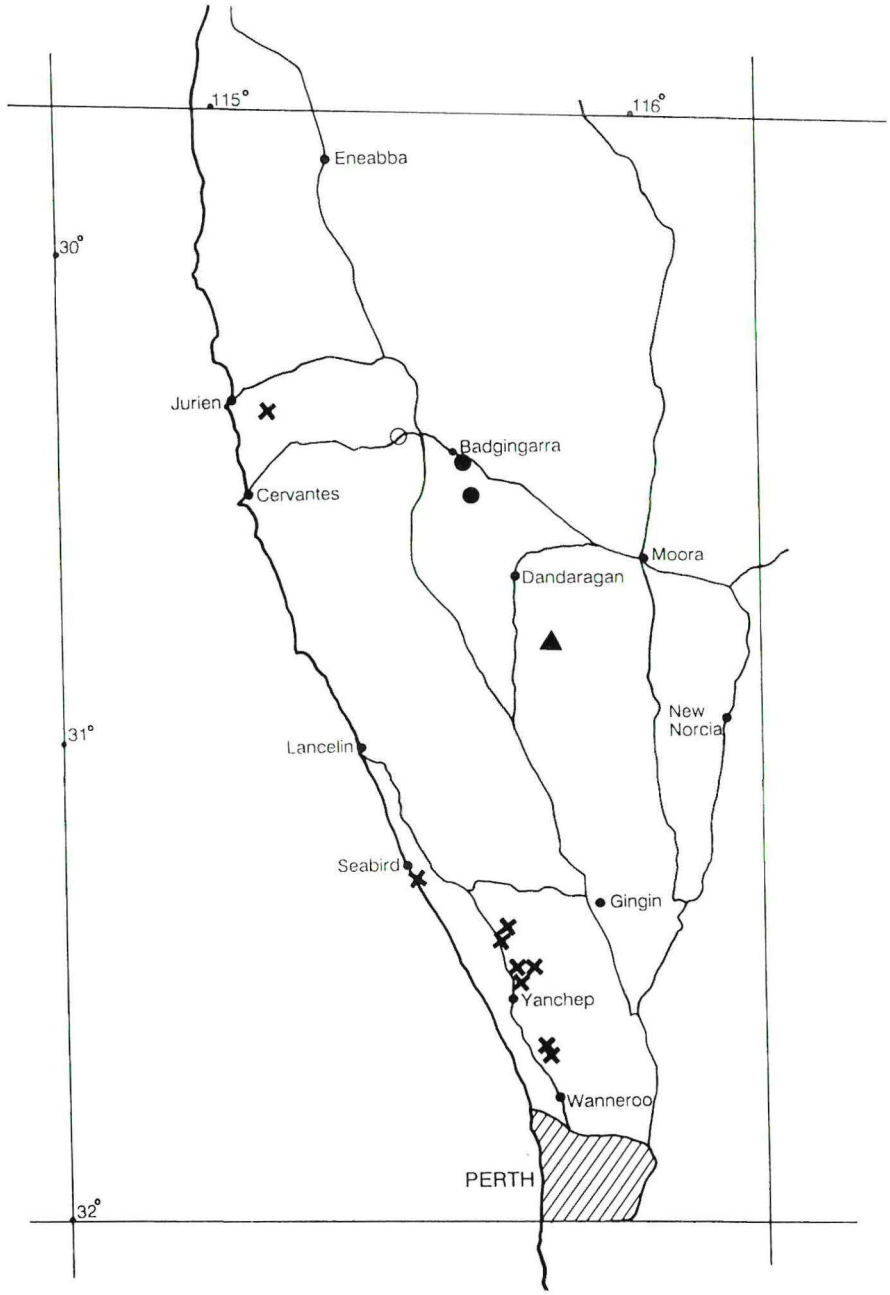

Figure 1. Distribution of *E. absita* (closed circle), *E. annuliformis* (triangle), *E. argutifolia* (cross) and *E. balanites* (open circle).

Descriptions

Eucalyptus absita Grayling & Brooker, sp. nov. (Figures 1 & 2). Brooker, M.I.H. & Kleinig, D.A. "Field Guide to Eucalypts" Vol. 2: 25, 401 (1990).

Frutex "mallee" ad 4 m altus *Eucalypto cupreae* Brooker & Hopper ined. affinis a qua foliis juvenilibus distincte deltoideis glaucisque, ambito fructus tenue, disco fructus conspicue lato depressoque et hieme florenti differt.

Mallee to 4 m tall with affinity to *Eucalyptus cuprea* Brooker & Hopper *ined.* from which it differs in the distinctly deltoid glaucous juvenile leaves, thin-rimmed fruit with the disc conspicuously broad and depressed, and the winter flowering.

Typus: SE of Badgingarra (30° 30' S, 115° 38' E), 10 June 1986, *M.I.H. Brooker* 9349 (holo: PERTH; iso: AD, CANB, MEL, NSW).

Mallee to 10 m tall with fibrous (box-type) grey-brown to yellowish bark for up to 2 m, smooth grey over coppery or greenish above, or whole stems smooth (see *Notes*). *Pith* of branchlets lacking oil glands. *Cotyledons* reniform (see *Notes*). *Seedling leaves* opposite for 2-4 pairs, petiolate, ovate to deltoid, to 4.5 x 3.7 cm, green to blue-grey, dull. *Juvenile leaves* petiolate, alternating, elliptical, to 8 x 6 cm, green to blue-grey, dull. *Adult leaves* on petioles to 2 cm long, alternating, lanceolate to broadly lanceolate, to 10.5 x 3.3 cm, concolorous, green, glossy; intramarginal vein less than 0.2 cm from leaf edge; reticulation very dense; apparently glandless, or with extremely sparse intersectional oil glands, generally situated near the midrib. *Inflorescences* axillary, unbranched, often appearing as terminal panicles due to the presumed early loss of leaves or bracts which subtend the peduncles, 7-flowered; peduncles slightly angular, 0.5-1.1 cm long. *Buds* pedicellate, clavate, 0.4-0.5 x 0.3-0.4 cm; outer operculum abscising early in bud development, but often adhering to the apex of the inner operculum until shortly before flowering; inner operculum hemispherical, apiculate. *Stamens* inflexed, the outer ones without anthers (staminodes), and considerably longer than the inner whorls; anthers subversatile, basifixed, globose, opening by terminal pores; filaments white. *Ovules* in 4 vertical rows. *Fruit* pedicellate, obconical to cupular, 0.4-0.5 x 0.3-0.5 cm; rim thin, disc obliquely descending, valves usually 4 (rarely 3 or 5), enclosed, their tips often fused and shed as a circumscissile lid. *Seed* dark grey-brown, compressed-ovoid, with very shallow reticulum.

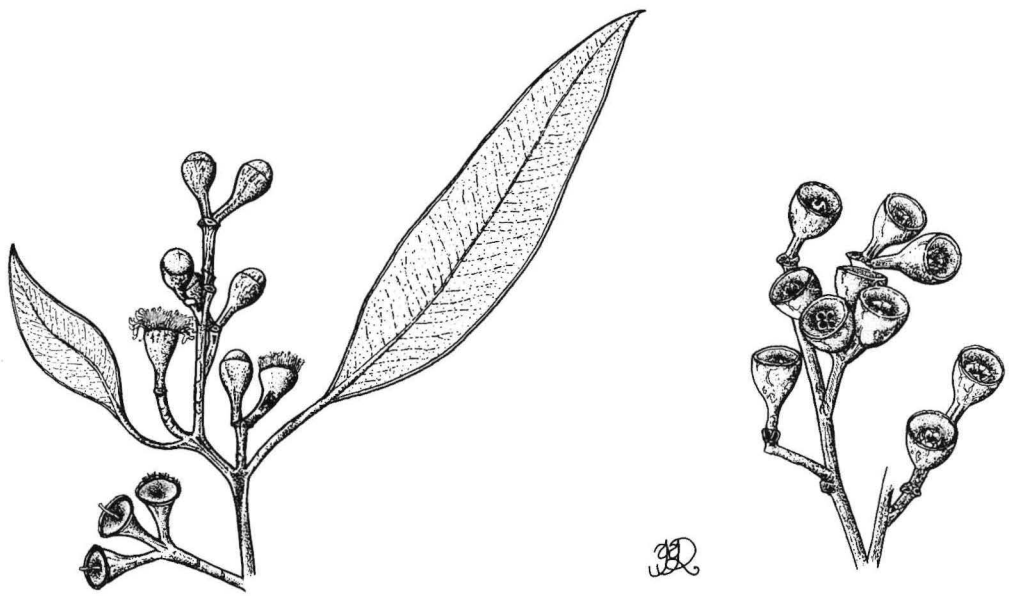

Figure 2. Buds and fruit of *E. absita* (*M.I.H. Brooker* 9349).

Other specimens examined. WESTERN AUSTRALIA: Type locality, 10 June 1986, *M.I.H. Brooker* 9350, juvenile leaves only (AD, CANB, MEL, NSW, PERTH); Type locality, 17 May 1986, *A.H.Popplewell* s.n. (PERTH); Koonah Road, 11 April 1991, *P.M. Grayling* 479 (PERTH, CANB); Badgingarra-Dandaragan Road, 11 April 1991, *P.M. Grayling* 491 (PERTH, CANB). *E. absita* x *E. loxophleba* Benth.: Koonah Road, 11 April 1991, *P.M. Grayling* 475 (PERTH, CANB), *P.M. Grayling* 480 (PERTH, CANB); Badgingarra-Dandaragan Road, 11 April 1991, *P.M. Grayling* 486 (PERTH, CANB).

Distribution & habitat. E. absita, as described, is known only from three small stands approximately 10 km apart between Old Badgingarra and Dandaragan. The type population is on a road verge, and the largest population occurs approximately 1.7 km to the north, in a paddock from which all other vegetation has been cleared apart from some clumps of *E. loxophleba* Benth., and is subjected to browsing by stock. The southernmost population consists of a single plant, also in a paddock. At these localities the soils are white sands and the natural vegetation, where it remains, consists of heath communities dominated by members of Myrtaceae and Proteaceae. A fourth population of somewhat similar mallees (see *Notes*) approximately 15 km to the north-west of the type population, near the Brand Highway north of Badgingarra, is growing in heavier sand, on a floodplain adjacent to the Hill River.

Conservation status. Coded 2VCi (vulnerable and represented in a conservation reserve) in Briggs & Leigh (1988). However as no populations are known by the authors to occur within conservation areas, this coding appears to be in error. We recommend a revised code of 2E (endangered), considering the type population has been partly uprooted in road construction while the larger population, occupying less than 0.25 ha., occurs wholly on private farmland.

Flowering period. April-July.

Etymology. The specific epithet refers to the remoteness of this species from the large numbers of box species (*E.* series *Porantheroideae*) in eastern Australia. The nearest box species are the geographically restricted *E. cuprea* Brooker & Hopper *ined.* from north of Geraldton (Brooker & Kleinig 1990), and the relatively widespread *E. petraea* Carr & Carr from Freeman's Road, north-west of Tardun. (L. *abitus*- away from the place).

Notes. E. absita belongs in ser. *Porantheroideae* because of the following combination of characters - apparently terminal inflorescences (Johnson 1972), two opercula, adnate anthers, and reniform cotyledons. It differs from *E. cuprea* for reasons given in the diagnosis and from *E. petraea* by the dull glaucous juvenile leaves, the smaller buds and fruit, and fewer loculi. The other Porantheroid box in southern Western Australia, *E. lucasii* Blakely, has smooth bark and dull leaves in all growth stages. We are unable to relate *E. absita* to any other species in the large and disparate series *Porantheroideae*.

The three southern populations, from one of which the type specimen was taken, consist of mallees with rough bark at the base of the stems. These plants flower profusely each year and produce an abundance of viable seeds. A fourth population in contention, north of Badgingarra shows many characters in common with *E. absita*, including the possession of staminodes. It consists of mallees to 2 m tall, which differ from the type population in their bark, which is entirely smooth, and also in adult leaf characters: the intramarginal vein is situated relatively distant from the leaf edge, the side-veins form a more acute angle with the midrib, and oil glands, although sparse, are more common in the leaves, and are occasionally present in the pith of branchlets, particularly at nodes. The plants in this population produce only a very small number of flowers each year, and although the pollen fertility is similar to that of the other populations (Grayling 1989) no viable seeds have so far been collected. We consider

this population to be closely related to *E. absita*, and a search for possible cytological or genetic explanations for its morphological departures and its failure to produce seeds forms the basis of further studies by the senior author.

In the glasshouse trials so far conducted, reniform cotyledons have been produced by the vast majority of germinating seeds, a result expected from a member of series *Porantheroideae*. However, a small proportion of seeds collected from the fertile populations of *E. absita*, and seeds collected from *E. loxophleba* plants growing in close proximity to *E. absita* produce seedlings with cotyledons intermediate in shape between the reniform of *E. absita* and the bisected of *E. loxophleba*. It is thought that these seedlings are F1 hybrids between the two species. A group of five plants growing with *E.absita* and *E. loxophleba*, and another two plants near the southernmost population of *E. absita*, show many characters intermediate between the two species. These plants produce seed lots of high viability, which when germinated produce cotyledons ranging in shape from reniform to bisected. Further studies using morphometric techniques, electrophoretic examination of isoenzymes and gas chromatographic analysis of leaf-oils (Grayling 1989), have provided additional support for the suggestion that hybridity between these two species is occurring, despite their taxonomic diversity in belonging to different sections (Pryor & Johnson 1971, Griffin *et al.* 1988).

Eucalyptus annuliformis Grayling & Brooker, sp. nov. (Figures 1 & 3). Brooker, M.I.H. & Kleinig,D.A. "Field Guide to Eucalypts" Vol. 2: 28, 261 (1990).

Frutex "mallee" rarissimus, *Eucalypto drummondii* Benth. affinis a qua cortice cinereo, alabastris majoribus (ad 2 x 1.3 cm) deficientibus glaucedinem, operculis rostratis, et margine fructuum plano annuliformique postremo descendenti differt.

Extremely rare mallee with affinity to *Eucalyptus drummondii* Benth. from which it differs in the grey bark, larger non-glaucous buds (to 2 x 1.3 cm), rostrate opercula and disc of fruit flat and annular, finally descending.

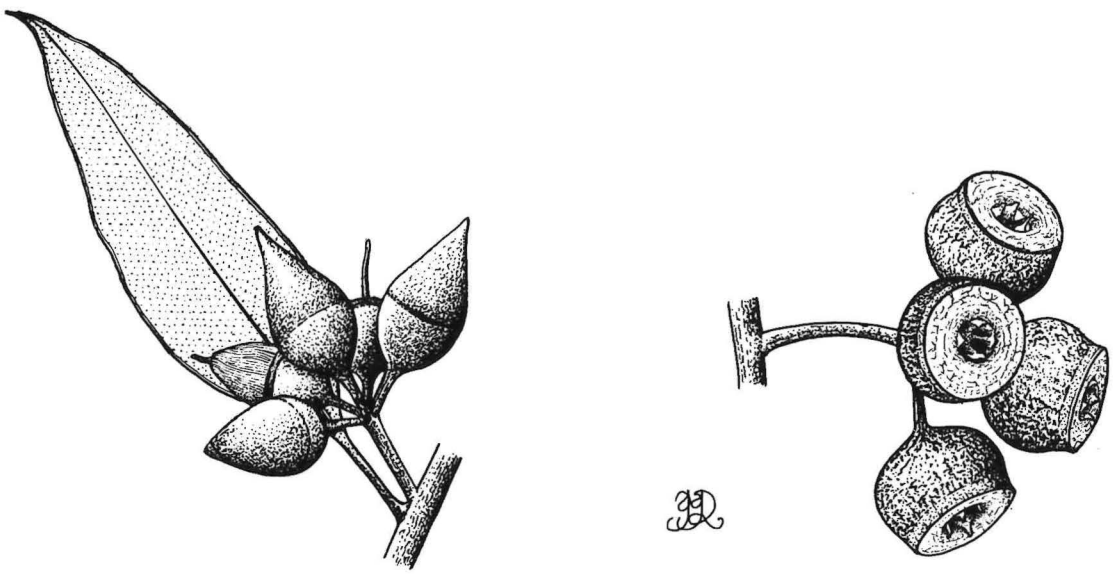

Figure 3. Buds (*P.M.G.* s.n.) and fruit (*M.I.H.B.* 9351) of *E. annuliformis*.

Typus: SE of Dandaragan (30° 49' S, 115° 47' E), 10 June 1986, *M.I.H. Brooker* 9351, *A.H. Popplewell & B.A. Rockel,* (holo: PERTH; iso: MEL, NSW).

Mallee to 3 m tall with smooth grey bark. *Cotyledons* and *seedling leaves* not seen. *Juvenile leaves* petiolate, alternating, broadly elliptical to ovate, apiculate, 5-7 x 2-3.5 cm, grey-green, dull. *Adult leaves* petiolate, alternating, elliptical to broadly lanceolate, to 6.5 x 2.2 cm, concolorous, green, dull; side veins very numerous; reticulation dense with scattered, intersectional oil glands. *Inflorescences* axillary, unbranched, 7-flowered; peduncles slender, terete, to 1.7 cm long. *Buds* pedicellate, ovoid, to 2 x 1.3 cm; outer operculum shed early in bud development; inner operculum conical, slightly beaked. Outer *stamens* erect, inner ones inflexed, all fertile; anthers versatile, dorsifixed, ovoid, opening by longitudinal slits; filaments white. *Ovules* in 4 vertical rows. *Fruit* pedicellate, hemispherical, to 1.1 x 1.4 cm; rim thick, disc broad, to 0.3 cm across, annular and finally inward-sloping. *Seed* not seen.

Other specimen examined. WESTERN AUSTRALIA: Type locality, 9 July 1987, *M.I.H. Brooker* 9701 (CANB, MEL, NSW, PERTH).

Distribution & habitat. The species is known only from 1 or 2 plants on Bidgerabbie Hill. This is a rocky laterite slope with a shallow white sandy soil and associated vegetation consists of open *Eucalyptus calophylla* woodland with a dense low shrub layer dominated by Proteaceae species and *Macrozamia riedlei*.

Conservation status. Endangered, coded 2E, according to the criteria of Briggs & Leigh (1988).

Flowering period. May-September.

Etymology. The specific epithet refers to the disc of the fruit, which when compared to that of *E.drummondii*, is relatively broad and flat (L. *annulus* - ring, *formis* - form).

Notes. E. annuliformis belongs in ser. *Curviptera* because of the following combination of characters - axillary inflorescences, two opercula, leaves with dense reticulation and intersectional oil glands, and general similarity in buds and fruit (e.g. conspicuous broad disc) to other species in the series. It differs from *E. drummondii* by the characters given in the diagnosis.

E. annuliformis consists of a straggly clump of one or two individuals covering about 10 m in diameter. Geographically restricted species are a feature of ser. *Curviptera* and *E. annuliformis* is in a category of rareness with *E. carnabyi* Blakely & Steedman ex Blakely (three populations, c. 10 plants), *E. impensa* Brooker & Hopper *ined.* (1 population, c. 10 plants) and *E. rhodantha* Blakely & Steedman var. *petiolaris* Blakely & Steedman (1 population, fewer than 5 plants).

E. annuliformis may be of hybrid origin with *E. drummondii* as a parent but on morphological grounds no other parent is discernible. Although it flowers profusely, and produces a large number of fruit, no viable seeds have yet been collected. The pollen fertility is low (20-40%), and the morphology of apparently fertile pollen grains shows a departure from the tricolpate morphology common in the genus (Grayling 1989). Fertile grains commonly possess 4 or 5 colpi, and are approximately 1.5 times larger in diameter than those of *E. drummondii*. Similar pollen grain irregularities have been observed in *E.caesia* Benth. subsp. *magna* Brooker & Hopper (Grayling 1989) and in various polyploid species of *Leptospermum, Verticordia* and *Melaleuca* (Rye 1980). Although cytological and isoenzyme studies have been hampered by the unavailability of seeds from *E. annuliformis*, we hope that further studies using pollen and vegetative material will give us some idea of its genetic integrity.

Eucalyptus argutifolia Grayling & Brooker sp. nov. (Figures 1 & 4). Brooker, M.I.H. & Kleinig, D.A. "Field Guide to Eucalypts" Vol. 2: 24, 27, 317 (1990).

Frutex "mallee" ad *E.* seriem *Rufispermas* pertinens. Cortex laevis. Folia adulta viridia nitentiaque. Inflorescentiae axillares, non-ramosae; pedunculi crassi leviter complanati, ad 0.8 cm longi. Alabastra subsessilia vel breviter pedicellata, ovoidea, ad 0.8 x 0.4 cm; opercula interiora hemisphaerica; stamina inflexa, omnia fertilia; antherae versatiles oblongae. Fructus plus minusve sessiles, cylindrici. Semina nitentia rubra.

Typus: Parrot Ridge, N of Yanchep, Western Australia (31° 29' S, 115° 44' E), 9 April 1987, *M.I.H. Brooker* 9581 & *S.D. Hopper* (holo: PERTH; iso: AD, CANB, MEL, NSW).

Mallee to 4 m tall, with smooth, grey to pale coppery bark. *Pith* of branchlets glandular. *Cotyledons* reniform. *Seedling leaves* opposite for 2-4 pairs, petiolate, ovate to oblong, to 3 x 2 cm, green, dull. *Juvenile leaves* petiolate, alternating, broadly elliptical to orbicular, apiculate, to 7 x 6 cm, green, glossy. *Adult leaves* petiolate, alternating, ovate to broadly lanceolate, apiculate, 6-10 x 2-4 cm, concolorous, green, glossy; reticulation very dense, veinlets fine, with scattered intersectional oil glands. *Inflorescences* axillary, unbranched, 7(11)-flowered; peduncles stout, terete or flattened, 0.5-0.8 cm long. *Buds* shortly pedicellate, ovoid to cylindrical, 0.8-1.2 x 0.5-0.6 cm, outer operculum shed early in bud development, inner operculum hemispherical, slightly ribbed. *Stamens* inflexed, all fertile; anthers versatile, oblong, opening by longitudinal slits; filaments white. *Ovules* in 4 vertical rows. *Fruit* sessile or shortly pedicellate, cupular to cylindrical, often with longitudinal ridges extending to the pedicel, 0.7-1.2 x 0.6-0.8 cm; rim thin to moderately thick; disc obliquely descending; valves 4 or 5, to rim level. *Seed* lustrous ruby-red to red-brown, flattish, with shallow reticulum.

Other specimens examined. WESTERN AUSTRALIA: Wabling Hill (31° 25' S, 115° 40' E), 16 May 1984, *M.I.H. Brooker* 8608 & *P.M. Grayling* (CANB, PERTH), 16 May 1984, *M.I.H. Brooker* 8613 (CANB, PERTH), 27 July 1984, *M.I.H. Brooker* 9461, 9462 (AD, CANB, MEL, NSW, PERTH); Type locality, 9 April 1987, *M.I.H. Brooker* 9582 & *S.D. Hopper* (AD, CANB, MEL, PERTH); SSE of Seabird (31° 17'S, 115° 26' W), 2 November 1988, *M.I.H. Brooker* 10140 & *I.J. Foster* (AD, CANB, MEL, NSW, PERTH), *A. Napier* & *A. Kelly* 355(1) (PERTH).

Distribution & habitat. E. argutifolia is known from ten populations scattered between Wanneroo and the Hill River. Typical sites are slopes or gullies close to the summits of limestone ridges, where soils are shallow, well-drained grey sands with outcrops of weathered limestone.

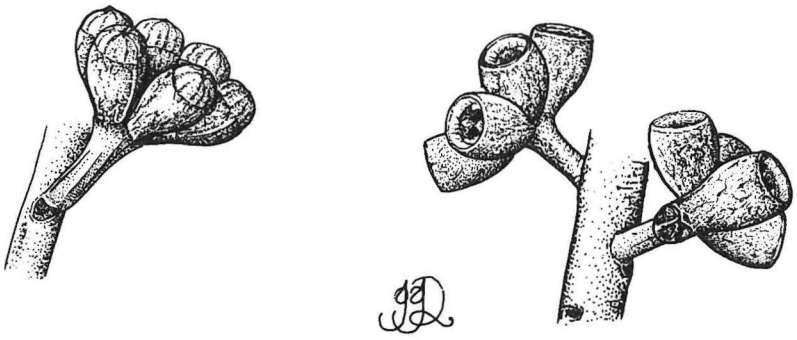

Figure 4. Buds and fruit of *E. argutifolia* (*M.I.H. Brooker* 9581).

Conservation status. Coded 2VCi (vulnerable and represented in a conservation reserve) in Briggs & Leigh (1988). However as no populations are known by the authors to occur within conservation areas, this coding appears to be in error. We recommend a revised code of 2E (endangered), considering that the two patches of *E. argutifolia* on Wabling Hill have been damaged by road-making, and that six of the ten known populations occur on limestone mining leases.

Flowering period. March-April.

Etymology. The specific epithet refers to the contrasting appearance of the few specimens intermixed with *E. foecunda* Schauer when first seen on Wabling Hill. (L. *argutus* - clear, bright, sharp).

Notes. E. argutifolia belongs in ser. *Rufispermae* Maiden because of the following combination of characters - axillary inflorescences, two opercula, oil glands in pith, reniform cotyledons, inflexed stamens, cuboid versatile anthers, and flattish lustrous ruby-red seeds. It differs from *E. obtusiflora* DC. (syn. *E. dongarraensis* Maiden & Blakely) in the rounder juvenile leaves, broader glossy green adult leaves with fewer oil glands, and non-glaucous buds and fruit with shorter, stouter pedicels. From *E.anceps auct. pl.* it differs in the rounder juvenile leaves, broader, glossier adult leaves, blunt opercula and larger buds and fruit. *E. anceps* (R.Br. ex Maiden) Blakely, as to type, is probably *E. rugosa* R.Br. ex Blakely which belongs in another series (Brooker & Kleinig 1990).

The Wabling Hill population consists of two clumps separated by about 20 m. While the plants bear large numbers of flower buds and flower profusely, no seeds have ever been obtained. This is in contrast to most of the other sites where viable seeds are set in reasonable abundance.

Eucalyptus balanites Grayling & Brooker, sp. nov. (Figures 1 & 5). Brooker, M.I.H. & Kleinig, D.A. "Field Guide to Eucalypts" Vol. 2: 27, 223 (1990).

Frutex "mallee" erectus ad 5 m altus *Eucalypto decipienti* Endl. affinis a qua cortice incohaerenti aspero, foliis juvenilibus ellipticis, raro emarginatis, alabastris balanoideis operculis majoribus hemisphaericis, antheris globoideis, et fructibus majoribus cupulatis differt.

Erect mallee to 5 m tall with affinity to *Eucalyptus decipiens* Endl. from which it differs by the loose rough bark, the elliptical juvenile leaves which are rarely emarginate, the acorn-like buds with the usually rounded opercula, the globoid anthers, and the usually cupular fruit.

Typus: 11 km W of Brand Highway on Cadda Road (30° 24' S, 115° 23' E), 3 February 1985, *M.I.H.Brooker* 8810 & *P.M. Grayling* (holo: PERTH; iso: CANB, NSW).

Erect mallee to 5 m tall with pale grey to yellowish, thin, flaky, rough bark to small branches. *Cotyledons* bisected. *Seedling leaves* opposite for 6-10 pairs, petiolate, oblong to elliptical, to 4.5 x 2.5 cm, green, dull. *Juvenile leaves* alternating, petiolate, elliptical, rarely emarginate, to 6.3 x 3.5 cm, green, dull. *Adult leaves* alternating, petiolate, lanceolate to narrowly lanceolate, to 10 x 2 cm, green, concolorous, dull or slightly glossy; side veins very numerous; reticulation dense with numerous, irregular, intersectional oil glands. *Inflorescences* axillary, unbranched, 11-flowered, peduncles terete, 1-2 cm long. *Buds* on short stout pedicels, ovoid, to 1 x 0.7 cm; outer operculum shed early in bud development; inner operculum hemispherical, less often obtusely conical, apiculate, narrower than hypanthium or constricted at join; hypanthium obconical to cupular, commonly with two longitudinal ridges extending to pedicel. *Stamens* inflexed, all fertile; anthers versatile, basifixed, globoid, opening by broad lateral slits; filaments white. *Style* twisted near base. *Ovules* in 4 vertical rows. *Fruit* very shortly

pedicellate, hemispherical, less often cupular, to 0.9 x 0.9 cm; rim thick, disc annular, valves usually 4, slightly exserted. *Seed* dark grey, compressed-ovoid, with very shallow reticulum, with longitudinal grooves.

Other specimens examined. WESTERN AUSTRALIA: Type locality, 2 June 1985, *M.I.H. Brooker* 9025 (CANB, MEL, NSW, PERTH), 4 November 1985, *M.I.H. Brooker* 9064 (CANB, NSW, PERTH), 10 July 1986, *M.I.H. Brooker* 9385 (CANB), 10 July 1986, *M.I.H. Brooker* 9390 (CANB, MEL, NSW, PERTH).

Distribution & habitat. The species is known only from one stand of 50-100 plants on the northern edge of Badgingarra National Park. The site is in gently sloping sandy heathland, with much surface laterite gravel. Associated eucalypt species are *E. lane-poolei* Maiden and *E. todtiana* F.Muell.

Conservation status. Coded 2VCi (vulnerable, and represented in a conservation reserve) in Briggs & Leigh (1988). The only known population occurs along the boundary of, but entirely within

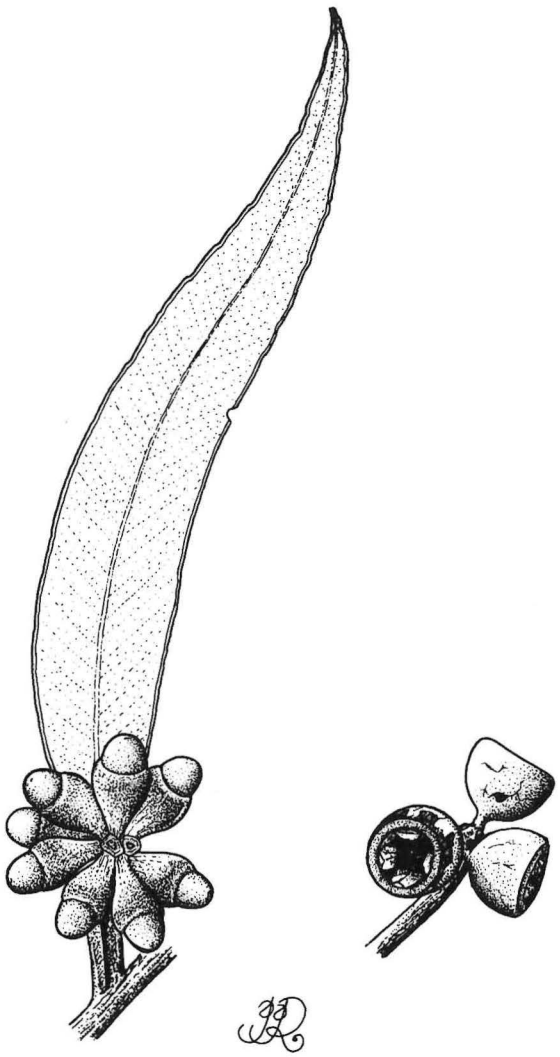

Figure 5. Buds (*M.I.H.B.* 9025) and fruit (*M.I.H.B.* s.n.) of *E. balanites*.

Badgingarra National Park. It is not considered to be in danger but will inevitably suffer temporarily from periodic bushfires. Its conservation coding could be amended to 2VCit.

Flowering period. October-February.

Etymology. The specific epithet refers to the shape of the buds, which resemble acorns (Greek *balanites* - like an acorn).

Notes. E. balanites belongs in ser. *Micrantherae* Benth. *sensu* Chippendale (1988). The species has affinity with *E. decipiens* Endl. from which it differs by the characters given in the diagnosis, and in its edaphic preference, *E. decipiens* generally being found on calcareous soils. *E. decipiens* is to be segregated in another series, the circumscription of which is in preparation (Brooker & Hopper unpublished). It will be of little value to outline the new series as the study is incomplete. We do, however, anticipate the separation of the *E. falcata* and *E. decipiens* groups of species, and *E. balanites* will be placed in the latter group.

The species may be of hybrid origin, with *E. decipiens* and *E. lane-poolei* as the most likely parents (Grayling 1989), but if so there is no significant segregation in the seedlings and it appears to be stabilized. The degree of pollen fertility is low and highly variable between plants (2-40%), and relative to the number of flowers produced, the fruit-set is extremely low. Observations of the contents of mature fruit have shown that each fruit contains, apart from chaff, a single fully-formed seed coat which in 60% of cases contains no embryo.

Acknowledgements

We are grateful to John Rainbird for his line drawings, to Garry Brown for the map, and to Alf Popplewell for drawing our attention to *E. absita* and *E. annuliformis*. Much of the work was the subject of the senior author's post-graduate studies at the University of Western Australia, and we thank Dr S.H. James for his contribution.

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New species of *Triodia* and *Plectrachne* (Poaceae) from the Kimberley

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Abstract

Jacobs, S.W.L. New species of *Triodia* and *Plectrachne* (Poaceae) from the Kimberley. Nuytsia 8 (2): 219-223 (1992). Two new species of *Triodia*, *T. burbidgeana* and *T. epactia*, and two new species of *Plectrachne*, *P. caroliniana* and *P. bunglensis*, are described. The two *Triodia* species are related to *T. pungens*, *P. caroliniana* to *P. schinzii*, and *P. bunglensis* to *P. bynoei*. All are being described for the forthcoming "Flora of the Kimberley Region".

Introduction

While preparing Flora treatments of the genera *Monodia* S.W.L. Jacobs, *Triodia* R. Br. and *Plectrachne* Henr. for the forthcoming "Flora of the Kimberley Region" it became clear that at least five taxa present did not have names. One of these, a species of *Triodia*, is being described by Bryan Simon. Of the four described here I have examined populations of three in the field.

Descriptions were based on specimens from PERTH, NSW, and SYD, and from field examination.

Triodia

Triodia burbidgeana S.W.L. Jacobs, sp. nov.

T. pungenti affinis sed lobis lemmatis minutis, habitu laxiore, differt.

Typus: Pool above Big Mertens Falls, Mitchell Plateau, 14° 49' S, 125° 42' E, Western Australia, 31 May 1988, *S.W.L. Jacobs* 5812 & *P.G. Wilson* (holo: NSW).

Resinous *perennial* forming loose hummocks with culms to 1.5 m tall. *Sheaths* to 8 mm wide, ± loose, persistent, glabrous; orifice with straight hairs to 5 mm long but these usually matted with resin; blade to 50 cm long. *Inflorescence* paniculate, ± open, to 40 cm long. *Spikelets* 4-7-flowered, 4-8 mm long, pedicellate; pedicels from shorter than the spikelet to 3-4 times the length. *Glumes* ovate, mostly obtuse, often with an apical notch, subequal, 3.5-4.5 mm long; lower 5-nerved; upper 3-nerved. *Lemmas* 3-4 mm long, glabrous except along the margins, nerves in 3 groups of 3; lobes 3, minute, subequal. *Palea* slightly shorter than to subequal to the lemma. *Caryopsis* not seen.

Other specimens examined. WESTERN AUSTRALIA: Surveyors Pool, Mitchell Plateau, *J.S. Beard* 8239 (PERTH); near Solea Falls, Drysdale River, *A.S. George* 13750 (PERTH); Surveyors Falls, Mitchell Plateau, *A.S. George* 13137 (PERTH); Carlia Creek, base of Carson Escarpment, *A.S. George* 13835, 13923 (PERTH); Morgan Falls, 15° 02' S, 126° 40' E, *A.S. George* 14070 (PERTH); Cracticus Falls, 14° 47' S, 127° 05' E, *K.F. Kenneally* 4176 (PERTH); Lake Argyle, *K.F. Kenneally* 7528 (PERTH).

Distribution. Found throughout the Gardner District of the Northern Botanical Province.

Habitat. Stony ranges and gorges.

Flowering period. Mainly during or shortly after the Wet.

Conservation status. Preserved in Drysdale River National Park and common on the Mitchell Plateau. Since its habitat is not under undue pressure from grazing, it is reasonably secure under present management regimes.

Etymology. Named in honour of Nancy Tyson Burbidge who, amongst her numerous contributions to Australian systematic botany, provided much of our knowledge on the genus *Triodia.*

Notes. This is *Triodia* sp. *B* of the "Flora of the Kimberley Region". Related to *T. pungens* but differing in the minute lemma lobes, more open habit, and rocky habitat.

Triodia epactia S.W.L. Jacobs, sp. nov.

T. pungenti affinis sed inflorescentia angustiore densioreque, foliis glaucis, habitatione (in thiniis calcareis), differt.

Typus: Behind beach, southern end of 80 Mile Beach, near turnoff, Western Australia, 3 August 1970, *R.C. Carolin* 7581 (holo: NSW; iso: SYD).

Hummock-forming resinous *perennial* with culms to c. 1 m tall. *Sheaths* 4-6 mm wide, ± loose, persistent, glabrous; orifice with a few short hairs though these mostly matted with resin; ligule c. 1 mm long, membranous, ciliate with short hairs; blade glaucous, to c. 30 cm long, becoming curved with age. *Inflorescence* narrow, to c. 30 cm long, the spikelets arranged racemosely and densely along alternate or whorled lateral branches usually less than 2.5 cm long. *Spikelets* shortly pedicellate, 5-8-flowered, to 10 mm long. *Glumes* ovate to elliptic, acute, 3-nerved, subequal, 2.5-4 mm long. *Lemmas* c. 4 mm long, hairy along the margins and the midrib especially towards the base, callus hairy, nerves 3 or in 3 groups; lobes 3, subequal, 1-1.5 mm long. *Palea* extending c. half way up the lobes. *Caryopsis* not seen.

Other specimens examined. WESTERN AUSTRALIA: 'Anna Plains' Station, *N.T. Burbidge* 1454 (PERTH); 'Wallal Downs' Station, 80 Mile Beach, *N.T. Burbidge* 1494a (PERTH); Cape Keraudren, *R.D. Royce* 1952 (PERTH).

Distribution. Restricted to the 80 Mile Beach of the Dampier District in the Northern Botanical Province.

Habitat. Calcareous coastal sand dunes.

Flowering period. Apparently flowering in response to rain.

Conservation status. Of restricted habitat and distribution; apparently not threatened by current land management practices.

Etymology. Named for its maritime habitat, the latinised form of the Greek adjective *epaktios* meaning "coastal".

Notes. This is *Triodia* sp. *C* of the "Flora of the Kimberley Region". Closely related to *T. pungens* but differing in the more contracted inflorescence, the glaucous foliage, and the calcareous dune habitat.

The key below summarises the distinctions between the new species and *T. pungens*.

1. Lemma lobes <1 mm long ..... *T. burbidgeana*
1.* Lemma lobes >1 mm long 2
2. Leaves glaucous; inflorescence tight and compact though sometimes interrupted, spikelets racemose and loosely or compactly secund along alternate lateral branches or alternate clusters of lateral branches ..... *T. epactia*
2.* Leaves bright green; inflorescence open and loose, spikelets not conspicuously racemose or secund along alternate lateral branches ..... *T. pungens*

Plectrachne

Plectrachne caroliniana S.W.L. Jacobs, sp. nov.

P. schinzii affinis sed aristis glumisque brevioribus, lemmatibus glabris plerumque longioribus, differt.

Typus: Drysdale River, 50 miles [80 km] NNW of 'Gibb River' Homestead, Western Australia, 30 August 1954, *M.Lazarides* 4816 (holo: NSW; iso: PERTH(2), CANB).

Hummock-forming resinous *perennial* with culms to c. 1.5 m tall, frequently much branched at the base. *Sheaths* 2-5 mm wide, smooth, persistent, margins glabrous; orifice with straight hairs to 4 mm long; ligule a row of hairs to 4 mm long; blade to c. 40 cm long but often much shorter, with stomatal grooves not distributed uniformly over the abaxial surface, more or less pungent-pointed, glabrous, longer older leaves may be curved. *Inflorescence* paniculate, open, to 25 cm long, the branches more or less erect except at anthesis. *Spikelets* shortly to distinctly pedicellate, 12-20 mm long (including awns), 3-5-flowered, lowest 1-3 fertile. *Glumes* linear-lanceolate, subequal, long-acute, translucent, 3-5-nerved, 9-12 mm long. *Lemmas* thickened below, the entire portion 5-7 mm long, usually sparsely hairy; lobes 3, each tapering gradually into an awn, lobe + awn 9-10 mm long, the central usually a few mm longer than the laterals; callus 1-2 mm long. *Palea* as long as entire portion of lemma, bitextured, chartaceous below, membranous above. *Caryopsis* not seen.

Other specimens examined. WESTERN AUSTRALIA: 158 miles [250 km] from Broome on Great Northern Highway towards Fitzroy Crossing, *R.C. Carolin* 7475 (SYD); Cape Leveque to One Arm Point Track, *K.F. Kenneally* 10656 (PERTH).

Distribution. Recorded from near the Drysdale River in the west of the Gardner District, and to the south of the Kimberley in the Dampier District, both in the Northern Botanical Province.

Habitat. Sandy soils.

Flowering period. Flowering during the Wet.

Conservation status. Does not appear particularly common from the collections but has been confused with both *P. schinzii* and *P. pungens*, two widespread and common species. Status unknown.

Etymology. Named in honour of Roger C. Carolin, for his contributions to, and beneficial influence on, Australian plant systematics.

Notes. This is *Plectrachne* sp. *A* of the "Flora of the Kimberley Region". Similar to *P. schinzii* but differing in having shorter awns and glumes, and lemmas glabrous and generally longer.

Plectrachne bunglensis S.W.L. Jacobs, sp. nov.

P. bynoei affinis sed aristis longioribus, lemmatibus plerumque longioribus, inflorescentia contracta, differt.

Typus: Piccaninny Creek Gorge, 15 km SE of Bungle Bungle Outcamp, Bungle Bungle Range, NE Kimberley, 17° 27' S, 128° 25' E, Western Australia, 4 April 1985, *M.I. Blackwell* BB60 (PERTH).

Hummock-forming resinous *perennial* with culms to c. 1.5 m tall. *Sheaths* 2-5 mm wide, with scattered hairs, persistent; orifice and collar pilose with hairs to 3 mm long but these frequently matted with resin; ligule a row of hairs to 3 mm long often matted with resin; blade to c. 40 cm long but often much shorter, with the 'soft' type of anatomy, more or less pungent-pointed, glabrous except sometimes for a few hairs extending up the abaxial surface from the collar. *Inflorescence* dense and narrow, to 30 cm long and 2 cm wide (including awns), the branches erect. *Spikelets* shortly pedicellate, 10-20 mm long (including awns), 3-5-flowered, lowest 1 fertile. *Glumes* linear-lanceolate, subequal, long-acute, translucent, 1-nerved, 5-7 mm long. *Lemmas* not thickened below, the entire portion 2-3 mm long, narrow-ovate, hairy on the midrib and margins, 3-awned, the awns unequal; central awn the longest, to 20 mm long; lateral awns usually unequal, 0-5 mm. *Callus* less than 0.5 mm long, poorly developed. *Palea* subequal to entire portion of lemma, uniform in texture. *Caryopsis* ± cylindrical, 2 mm long, embryo c. 25% the length.

Other specimens examined. WESTERN AUSTRALIA: Piccaninny Creek Gorge, Bungle Bungle Range, *M.I. Blackwell* BB466 (PERTH); between Njitparriya and Dilmariyu, 17° 21' S, 128° 21' E, Bungle Bungle Range, *S.J. Forbes* 2573 (PERTH); 17° 22' S, 128° 22' E, Bungle Bungle Range, *K.F. Kenneally* 9254 (PERTH); Cathedral Gorge, 17° 29' S, 128° 22' E, Bungle Bungle Range, *K.A. Menkhorst* 821 (BRI, DNA).

Distribution. Restricted to the Bungle Bungle Range in the Hall District of the Northern Botanical Province.

Habitat. Sandstone cliffs and gorges.

Flowering period. Flowering and fruiting in response to rain.

Conservation status. Restricted to the Bungle Bungle National Park. Status unknown.

Etymology. Named for the known region of occurrence, the Bungle Bungle Range.

Notes. This is *Plectrachne* sp. *B* of the "Flora of the Kimberley Region". Similar to *P. bynoei* but differing in having longer awns, a usually larger lemma, and a narrow compact inflorescence.

The key below distinguishes the new species from related species.

1. Glumes >9 mm long; basal section of lemma thickened 2
1.* Glumes <9 mm long; lemma uniform in texture, sometimes thickened below in *P. mollis* 4
2. Callus of fertile floret <0.5 mm long; entire part of lemma 2-3 mm long, often divided to within 1 mm of thickened base ..... *P. pungens*
2.* Callus of fertile floret >1 mm long; entire part of lemma 3-4 mm long, usually with >1 mm undivided above thickened base 3
3. Longest awns 9-10 mm long; glumes 9-12 mm long; entire portion of lemma glabrous, 5-7 mm long ..... *P. caroliniana*
3.* Longest awns >12 mm long; glumes > 12 mm long; entire part of lemma usually hairy, 4-6 mm long ..... *P. schinzii*
4. Longest (central) awn of lowest lemma >10 mm long; inflorescence dense, the branches appressed to main axis; only recorded from the Bungle Bungle Range ..... *P. bunglensis*
4.* Longest (central) awn of lowest lemma <10 mm long; inflorescence more or less open, the branches flexuose 5
5. Leaves mostly 0.5 mm or less in diameter when folded; paleas bitextured, chartaceous below, membranous above ..... *P. mollis*
5.* Leaves mostly 1 mm or more in diameter when folded; palea uniform in texture ..... *P. bynoei*

Acknowledgements

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Taxonomic review of the *Grevillea drummondii* Meissn. species group (Proteaceae)

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Abstract

Keighery, G.J. Taxonomic review of the *Grevillea drummondii* Meissn. species group (Proteaceae). Nuytsia 8(2): 225-230 (1992). The *Grevillea drummondii* Meissn. group previously considered as two species, *G. fistulosa* and *G. drummondii* (with three subspecies) is shown to consist of five closely related allopatric species. One new species *Grevillea fuscolutea* Keighery is described, and a new combination *Grevillea centristigma* (McGillivray) Keighery is made.

Introduction

The purpose of this paper is to investigate the taxonomic status of the disjunct population of *Grevillea* on Mt Lindesay, previously placed in *Grevillea fistulosa* by McGillivray (1986). To enable correct placement of this species, it proved necessary also to investigate all collections placed in *Grevillea drummondii* by McGillivray (1986). A new key to the group is provided.

Key to the *Grevillea drummondii* group

1a. Perianth with a ring of reflexed hairs in the throat 2

1b. Perianth glabrous inside, flowers red ..... 5. *G. fistulosa*

2a. Outer surface of perianth glabrous, flowers red-purple and greenish-cream ..... 1. *G. drummondii*

2b. Outer surface of perianth covered by hairs, flowers orange-yellow

3a. Leaves linear, 40-80 mm long, undersurface densely tomentose ..... 4. *G. fuscolutea*

3b. Leaves ovate-obovate, 19-45 mm long, undersurface glabrous or sparsely hairy with long white hairs 4

4a. Inflorescence of 13-18 flowers, leaves glabrous underneath ..... 2. *G. pimeleoides*

4b. Inflorescence of 5-7 flowers, leaves sparsely hairy underneath ..... 3. *G. centristigma*

1. Grevillea drummondii Meissn. in Lehm., Pl. Preiss, 1:536(1845). *Lectotype*: Ad Flumen Cygnorum, *Preiss* 2623 (iso: MEL).

Low spreading, densely branched *shrub* to 30 x 30 cm, single stemmed at base, branchlets densely pubescent with a mixture of white and ferruginous hairs, becoming glabrous at length, main stem 5-7 mm wide. *Leaves* narrow obovate, with a short black mucrone, 3-6 mm wide, 14-33 mm long, narrowed at base but not forming a distinct petiole, margins very slightly incurved, midrib prominent above and below, sparsely hairy above, with long white hairs below, becoming glabrous with age. *Flowers* in a sub-terminal condensed raceme of 6-8 flowers, rachis pubescent 3-4 mm long. *Bracts* linear, acute, 2-3 mm long, both surfaces white tomentose, caducous. *Pedicels* 1-2 mm, reddish, glabrous. *Bracteoles* ovate, c. 0.75 mm long, apex acute, pubescent. *Perianth* 4-5 mm long, pink, limb white, recurved section green, swollen below middle, limb globular recurved, glabrous, inside glabrous except for a ring of hairs in the throat. *Gynoecium* 4-5.5 mm long. *Style* pink, flattened, sparsely hirsute. *Ovary* densely pubescent with white hairs, 1-1.5 mm long. *Stipe* c. 1.5 mm long, sparsely pubescent, torus oblique. *Nectary* ±1 mm long, yellow. *Pollen presenter* becomes pink-purple as stigma matures, orbicular, lateral and vertical glabrous, stigmatic area a small area below centre on ventral side. *Fruit* fusiform, 9-10 mm long, closely tomentose. *Seed* elliptic, margins tightly inrolled, c. 6 mm long.

Specimens examined. WESTERN AUSTRALIA: Bolgart, Aug. 1963, *B. Jarrey* (PERTH); 2.2 miles [3.5 km] E of Calingiri, *S. Patrick* 288 (PERTH); 71 mile peg Geraldton Highway, *R.D. Royce* 3840 (PERTH); 74.5 miles on Geraldton Highway, *A.S. George* 14166 (CANB, K, MEL, NSW, PERTH); 73.8 miles on Geraldton Highway, *R. Garraty* 157 (PERTH, NSW); 75 mile peg Geraldton Highway; *H.Demarz* 6137 (KPBG, PERTH); 82 mile peg, Geraldton Highway, *C.A. Gardner* 16237 (PERTH); Bindoon to Moore River, Sept. 1966, *C.A. Gardner* s.n. (PERTH); Cataby, *D.K. Coughran* 0111 (PERTH); Yandan Hill, *G.J. Keighery* 10711 (PERTH).

Distribution. Found in a small area between Calingiri (31° 09' S, 116° 14' E) and Cataby (30° 45' S, 115°31'E), in southern Western Australia. *Grevillea drummondii* grows under *Eucalyptus wandoo* woodland, *E. lane-poolei* woodland, or rarely in low heath on massive laterite or lateritic loam soils.

Flowering period. July to September.

Conservation status. Grevillea drummondii is an uncommon species known from scattered localities between Bolgart and Calingiri with an isolated occurrence at Yandan Hill. *G. drummondii (sens. lat.)* has previously been gazetted as rare flora, and its restriction to the type form in this paper, may require its status to be re-assessed to rare.

Notes. Grevillea drummondii differs from all other members of the group in having glabrous flowers that are multicoloured (red and green and white sections).

2. Grevillea pimeleoides W.V. Fitzg. J. Proc. Mueller. Bot. Soc. Western Australia 1: 37(1902). *Lectotype*: Rocky spots on hillside between Smiths Mill and Helena River, July 1901, *W.V. Fitzgerald* s.n. (PERTH). *Grevillea drummondii* subsp. *pimeleoides* (W.V. Fitzg.) McGillivray. New Names in *Grevillea* (Proteaceae): 5(1986).

Erect, open or dense *shrub* to 2 m tall and 1 m wide, single stemmed at base, with an indumentum of hairs, new growth pubescent, pale ferruginous. *Branchlets* angular to terete, densely tomentose at first, at length almost glabrous. *Leaves* ovate-obovate, obtuse with a short black mucrone, 0.5-1 mm long,

11-15 mm wide, 30-43 mm long, narrowed to a petiole of 3-5 mm, margins scarcely recurved, midrib prominent above and below, upper surface pubescent when young, becoming green and almost glabrous with maturity, edges with long white hairs, 1-3 mm long, lower surface pale green, glabrous. *Flowers* in a sub-terminal condensed raceme of 13-18 flowers, rachis pubescent, 4-5 mm long. *Bracts* linear, acute, 3-4 mm long, both surfaces white tomentose, caducous while inflorescence in bud. *Pedicels* 4-5 mm, pale yellow green, hirsute. *Bracteoles* ovate, c. 1 mm long, apex acute, pubescent. *Perianth* orange-yellow, 7-9 mm long, sparsely pubescent with white hairs, slightly swollen below middle, limb globular, recurved, covered with dense white hairs, inside glabrous except for a ring of hairs in the throat. *Gynoecium* 7-8 mm long. *Style* yellow, flattened, sparsely pubescent. *Ovary* densely pubescent with white hairs, 1.5-2 mm long. *Stipe* c. 2 mm long, sparsely pubescent, torus oblique. *Nectary* c. 1 mm long, yellow. *Pollen presenter* becomes red as stigma matures, orbicular, lateral and vertical, sparsely hirsute all over dorsal surface, stigmatic area a small cone below centre on ventral side. *Fruit* fusiform, 17-22 mm long, closely tomentose. *Seed* elliptic, margins tightly inrolled, 9 mm long, base acute.

Specimens examined. WESTERN AUSTRALIA: 42 mile [67 km] peg Albany Highway, *K.R. Newbey* 1427 (PERTH); Sullivans Rock, *E. Wittwer* 2130 (PERTH); 34 km SE Armadale, *D.J. McCutcheon* 3464 (PERTH); 40 miles [64 km] south of Perth, 30 Sept. 1968, *M.E. Phillips* (PERTH); Helena Valley, *J. Seabrook* 347 (PERTH); 3 km from Mundaring Weir, Aug. 1933, *E.T. Bailey* s.n. (PERTH); Smiths Mill, Aug. 1901, *Diels & Pritzel* s.n. (PERTH); Reserve 23981, Glen Forest, *A.S. George* 14613 (PERTH); 2 miles [3 km] from Mundaring Weir, *A.S. George* 116565 (PERTH, CANB, K, NSW, NY); near Araluen, 25 Nov. 1965, *F. Lullfitz* s.n. (PERTH); Gleneagle, *A.H. Larner* 3 (PERTH); Glen Forest, *E. Pritzel* 517 (PERTH); Mundaring, *J. Havel* 587 (PERTH); Mundaring Weir, Aug. 1920, *C.A. Gardner* s.n. (PERTH); Helena River, Glen Forest, no date, *C.A. Gardner* s.n. (PERTH); 2 miles [3 km] south of Helena River towards Southern Mill, July 1901, *W.V. Fitzgerald* (PERTH).

Distribution. Confined to valleys of the Helena River, and around granites of the Monadnocks in the northern jarrah *(Eucalyptus marginata)* forest between Mundaring (31° 54' S, 116° 10' E) and Mt Cooke (32° 25' S, 116° 18' E). Usually under eucalypt forest on lateritic loam over granite.

Flowering period. July to November.

Conservation status. Despite having a very limited range, all populations are enclosed by State Forest and the Monadnocks reserve, and it seems secure.

Notes. Grevillea pimeleoides is usually a tall open shrub, single stemmed at base. It differs from its closest relative *G. centristigma* in habit, the number of flowers in the inflorescence (13-18 versus 5-7), leaf length (30-43 mm versus 19-26), perianth size (7-9 mm versus 4-6 mm), leaf pubescence and the stigmatic position.

3. Grevillea centristigma (McGillivray) Keighery comb. et stat. nov. *basionym*: *Grevillea drummondii* subsp. *centristigma* McGillvray. New Names in *Grevillea* (Proteaceae) 5 (1986). *Type*: 24 km SE of Pemberton on road to Northcliffe, *P.G. Wilson* 6289 (holo: PERTH; iso: BH, NSW, MEL).

Erect or spreading few or much branched *shrub* to 40 x 40 cm. Plants multi-stemmed or single stemmed at base, with an indumentum of hairs, new growth pubescent, ferruginous. *Branchlets* angular to terete, densely tomentose at first, at length almost glabrous. *Leaves* ovate-obovate, with a short black pungent mucrone, 0.5-1 mm long, (3)5-6 mm wide, 19-22(26) mm long, narrowed to a petiole of 2-3 mm, margins recurved, midrib prominent above and below, upper surface sparsely hairy when young, becoming almost glabrous when mature, lower surface pale green with long white hairs. *Flowers* in condensed axillary and sub-terminal racemes of 5-7 flowers, rachis pubescent, 2-3 mm long. *Bracts*

linear, acute, 2-3 mm long, both surfaces white, tomentose, caducous while inflorescence in bud. *Pedicels* 2-3 mm long, pale green, hirsute. *Bracteoles* ovate, c. 0.5 mm long, apex acute, pubescent. *Perianth* orange-yellow, 4-6 mm long, sparsely pubescent with white hairs, swollen below middle, limb globular recurved, sparsely covered with long white hairs, inside glabrous except for a ring of hairs in the throat. *Gynoecium* 5-6 mm long. *Style* yellow, flattened, sparsely hirsute. *Ovary* densely pubescent with white hairs, c. 1 mm long. *Stipe* 1.5-2 mm long, sparsely pubescent, torus oblique. *Nectary* c. 0.5 mm long, yellow. *Pollen presenter* becoming reddish as stigma matures, orbicular, lateral and vertical, sparsely hirsute all over dorsal side, stigmatic cone central on ventral side. *Fruit* fusiform, 8-10 mm long, densely tomentose. *Seed* 6-7 mm long, margins inrolled, apex acute.

Specimens examined. WESTERN AUSTRALIA: Last Bottle Rock, *N.G. Marchant* 79/58 (PERTH); Collie, *L.W.J. Dodd* 8/63 (PERTH); Shannon Rock, *B.G. Briggs* 6553 (PERTH, NSW); Collie, June 1916, *F.W. Wakefield* s.n. (PERTH); Whicher, *G.W.J. McCutcheon* 820 (PERTH); Barrabup Pool, West of Nannup, *G.J.Keighery* 8085 (PERTH); NW of Walpole to Pemberton road, 15 Nov. 1977, *H. Dempster* s.n. (PERTH); Shannon Rock, 29 April 1980, *A. Annels* s.n. (PERTH); Shannon Rock, *R.D. Royce* 4296 (PERTH); Worsley, 17 km NW of Collie, *K.J. Atkins* 180 (PERTH); East of Noggerup on Grimwade road, *G.J. Keighery* 4077 (PERTH).

Distribution. Confined to the southern jarrah forest and granite rocks of the karri forest of southern Western Australia between the Whicher Range (33° 40' S, 115° 25' E), north to Collie (33° 59' S, 116° 09'E) and south to Walpole (34° 59' S, 116° 44' E). Grows in Eucalypt forest (usually *E. marginata/E.calophylla*) on lateritic loam soils often edging granite rocks.

Flowering period. April to November; probably sporadically all year with a spring peak.

Conservation status. This is the most widespread of all species of the *G. drummondii* complex, and its range is entirely contained by State Forest, the Shannon National Park and the proposed Whicher Range Nature Reserve.

Notes. Closely related to *G. pimeleoides*, but differing in those characters outlined under that species, it can be argued that this taxon could be left as a subspecies of *G. pimeleoides*, or as part of a complex of subspecies including *G. fistulosa*. The discovery that *G. fuscolutea* is (on floral characters) part of the *G. drummondii* group rather than *G. fistulosa* means that either the circumscription of *G. drummondii* is widened to include *G. fistulosa* as another subspecies or the group is split into a series of 5 closely related species. This course is followed here, as no integration in any character sets has been observed between the taxa suggesting they are best recognised as separate entities.

Grevillea centristigma has a "less prominent wing" around the pollen presenter giving the stigma a central position.

4. Grevillea fusculotea Keighery sp. nov.

Differt a *G. fistulosa* flores lutea, perianthium cum annulus fauce pili internus.

Typus: Western Australia [Menzies Botanical District, precise locality withheld], 10 April 1989, *G.J. Keighery* 11271 (holo: PERTH; iso: CANB, MEL, K)

Open erect *shrub* to 1.2 m tall and 1.5 m wide, with an indumentum of hairs, new growth densely ferruginous (young leaves yellow-green). *Branchlets* angular to terete, densely tomentose at first, at length almost glabrous. *Leaves* oblanceolate-linear, with a short black mucrone 0.5-1.5 mm long, 7-12 mm wide, 41-78 mm long, narrowed to a petiole of 3-5 mm, margins recurved, midrib prominent above and below, with a prominent marginal vein, upper surface hirsute when young, becoming dark green and almost glabrous, lower surface white, densely tomentose with matted hairs. *Flowers* in axillary sub-umbellate racemes, usually 5 flowers on very short peduncles, rachis densely pubescent. *Bracts* linear, acute, 3-4 mm long, abaxial surface white tomentose, adaxial brown, glabrous, caducous when inflorescence in bud. *Pedicels* 4-6 mm long, orange-ferruginous, hirsute. *Perianth* yellow with deep orange hairs, 6-8 mm long, swollen below middle, limb globular recurved, and covered with dense white hairs, inside glabrous except for a ring of hairs in the throat. *Gynoecium* 7-9 mm long. *Style* yellow with orange-red hairs, 6-7 mm long. *Ovary* densely hirsute with white hairs, c. 1 mm long. *Stipe* c. 0.5 mm long, sparsely pubescent, torus oblique. *Nectary* c. 1 mm long, yellow. *Pollen presenter* becomes orange as stigma matures, orbicular, lateral and vertical, sparsely pubescent on dorsal side, stigmatic area a small cone below centre on ventral side. *Fruit* not seen.

Other specimens examined. WESTERN AUSTRALIA: all from type locality; *Survey Team*, D.W. 80 (PERTH), *Forests Dept*, 30 April 1980 (PERTH), *A.P. Brown* 269 (PERTH).

Distribution. Restricted to a large granite monadnock, NE of Denmark. Grows in shallow brown-black loam over granite on the upper slopes where it is emergent from low heath.

Flowering period. April to October; perhaps all year with a spring peak.

Conservation status. The species is locally abundant but is known only from the type locality and could be considered vulnerable (catagory 2V: Briggs & Leigh 1988).

Etymology. The name alludes to the reddish-brown new growth and the yellow flowers. (Greek: *fusco* - dark brown, *lutea* - yellow).

Notes. Grevillea fuscolutea is related to *G. fistulosa*, and was included in this species by McGillivray (1986). It shares the long narrow leaves, white tomentose below with recurved or revolute margins and the new growth densely ferruginous. However, it has a ring of hairs in the throat, a major character used by George (1974) to differentiate *G. fistulosa* from *G. drummondii*. Also the species has yellow not red flowers which are more swollen in the middle, other characters which link *G. fuscolutea* to the *G. drummondii* complex.

This is a very attractive plant, with its greyish-green foliage and ferruginous new growth. It should prove as attractive a horticultural subject as the widely grown *G. pimeleoides*.

5. Grevillea fistulosa A.S. George, Nuytsia 1: 371(1974). *Type*: Middle Mt Barren, Fitzgerald River, W.A., 23 Sept. 1925, *C.A. Gardner* 1861 & *W.E. Blackall* (holo: PERTH; iso: CANB, K, MEL).

Erect *shrub* to 2 m tall, with an indumentum of hairs, new growth densely ferruginous. *Branchlets* angular-striate, densely tomentose at first, at length almost glabrous. *Leaves* oblanceolate-linear, with a short black mucrone 0.5-1.0 mm long, 6-15 mm wide, 40-70 mm long, narrowed to a petiole of c. 5 mm long, margins incurved, often inrolled (at least when dry) giving the leaves a tubular aspect; midrib prominent above and below, with a prominent marginal vein, upper surface hirsute when young,

becoming dark green and almost glabrous, lower surface white, densely tomentose with matted hairs. *Flowers* in a sub-terminal condensed raceme of 4-7 flowers, rachis pubescent, 2-3 mm long. *Pedicels* 1-3 mm long, hirsute. *Bracts* linear, acute, 3-4 mm long, abaxial surface white tomentose, adaxial glabrous, caducous while inflorescence in bud. *Pedicels* 4-8 mm long, reddish, hirsute. *Perianth* red, 6-8 mm long, slightly swollen below middle, sparsely hirsute, limb globular, recurved, more densely hirsute, inside glabrous. *Gynoecium* 6-9 mm long. *Style* red, 6-7 mm long, sparsely hirsute. *Ovary* densely hirsute, c. 1 mm long. *Stipe* c. 0.5 mm long, sparsely pubescent, torus oblique. *Nectary* c. 1 mm long, yellow. *Pollen presenter* orbicular, lateral, sparsely pubescent dorsal side, stigmatic area a small cone below centre on ventral side. *Fruit* fusiform, densely tomentose, 15-21 mm long. *Seed* elliptic, margins tightly inrolled, 7-9 mm long, base acute.

Specimens examined. WESTERN AUSTRALIA: 3 km N of Thumb Peak, *K.R. Newbey* 2720 (PERTH); Whoogarup Range, *C.A.Gardner* 2967 (PERTH); Thumb Peak Range, *A.S. George* 7119 (PERTH); Middle Mt Barren, *A.S.George* 19903 (PERTH); Mt Woolbernup, *M.I.H. Brooker* 2727 (PERTH); West face of Thumb Peak, *R.D. Royce* 9257 (PERTH); NE side of Whoogorup Range, *A.S. George* 1912 (PERTH); N of Hamersley River, 14 miles (22 km) from Phillips River Crossing, *E. Wittwer* (KPBG, PERTH).

Distribution. Endemic to Fitzgerald River National Park, apparently to the middle peaks (Whoogarup Range, Thumb Peak, Woolbernup and Mid Mt Barren) as it has not been recorded for West or East Mt Barren. *Grevillea fistulosa* grows in mallee heath or tall heath/shrubland on shallow sandy clay soils over metamorphosed sandstone.

Flowering period. July to December.

Conservation status. All known localities (6) are within Fitzgerald River National Park.

Notes. Grevillea fistulosa is the only purely red-flowered species of the group, occurring on metamorphic sandstones relatively isolated from the nearest allied species *(G. fuscolutea)*. This species also has considerable horticultural potential.

Acknowledgements

Sue Patrick first drew the author's attention to the problems of *G. drummondii* when it was gazetted rare flora. Type material at MEL was consulted with the aid of the curator and an Australian Biological Resources Study Grant. Jan Rayner, as usual, transformed the manuscript into a paper.

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Stylidium lateriticola (Stylidiaceae), a new species from the Perth Region, Western Australia

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Abstract

Kenneally, Kevin F. *Stylidium lateriticola* (Stylidiaceae), a new species from the Perth Region, Western Australia. Nuytsia 8(2): 231-235 (1992). A new species of *Stylidium* (Stylidiaceae) endemic to the Perth Region, namely *S. lateriticola* Kenneally is described and illustrated.

Introduction

The genus *Stylidium* Sw. ex Willd. is best developed in the south-west of Western Australia where over 140 species occur. Most species flower during the spring months (September-November). A rarely collected summer flowering species was brought to my attention by Gwen Abbot and Joanna Seabrook. This undescribed species is endemic to the Perth Region (as defined by Marchant & Perry 1981) and is confined to areas of massive hardcap laterite of the Darling Range. It was referred to as *Stylidium* sp. *A* in the "Flora of the Perth Region " (Marchant *et al.* 1987).

Taxonomy

Stylidium lateriticola Kenneally, sp. nov. (Figures 1-3)

Stylidium bulbiferi affinis a qua imprimis differt habito magis fruticoso, erecto, scapis pilis simplicibus et pilis glandulosis ornatis, inflorescentia paniculata multiflora, ovulis paucis, chromosomatum numero n = 11 (in *S. bulbifero* n = 14).

Typus: Termination of Moola Road, 2 km past intersection with Thomas Road, Helena Valley, 30 km E of Perth on Darling Scarp, (31° 55'S 116° 06'E), 3 January 1984, *K.F. Kenneally* 8864 (holo: PERTH; iso : CANB, K, MEL, NSW, PERTH).

Stoloniferous, erect, bushy perennial herb to 0.4 m high with 2 or 3 ascending branches arising from apical rosettes. *Leaves* scattered and clustered into apical rosettes, linear to plano-convex, 5-15 x 0.5-1 mm, spreading, usually obtuse. *Inflorescence* a narrow panicle; peduncle 10-40 mm long, pilose with white, simple or glandular hairs; floral axis 15-30 mm long, glandular-pilose; pedicels slender, c. 1 mm long. *Hypanthium* narrowly ellipsoid to narrowly cylindric, 2.5-4 mm long, densely glandular-hairy;

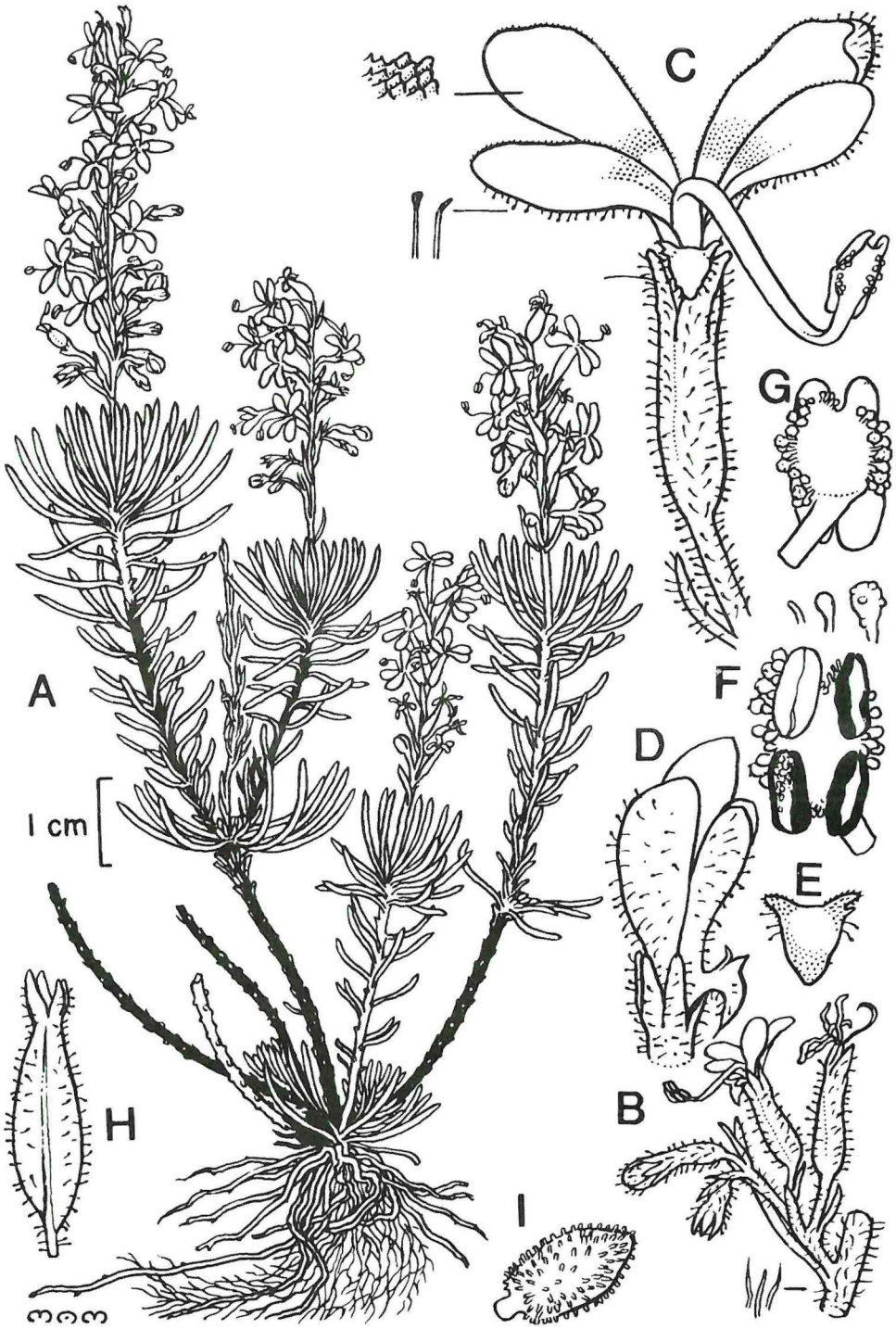

Figure 1. *Stylidium lateriticola*. A - flowering plant, B - part of inflorescence, C - flower, D - lateral view of flower showing labellum, E - labellum, F - column (dorsal view), G - column (ventral view), H - capsule, I - seed. Drawn from the type.

calyx lobes free, narrowly triangular, c. 1 mm long, acute. *Corolla* pink, with 2 deep pink bands in the throat, occasionally all white, 5-7 mm long; lobes almost equal, paired laterally, sparsely glandular-pilose outside and minutely papillose inside; labellum deltoid with small lateral appendages; throat usually bare. *Capsule* narrowly ellipsoid, c. 5 mm long. *Seeds* 2 to 3, ellipsoid c. 1 mm long, light brown, papillate. *Chromosome number* n = 11 (S.H. James, pers. comm.).

Other specimens examined. WESTERN AUSTRALIA: Corner Gale Road and Jindong-Treeton Road, S of Busselton, 15 January 1986, *A.H. Burbidge* 3965 (PERTH, CANB); Sabina Road, 3.1 km NE of Ridge Road, Whicher Range, 16 January 1986, *A.H. Burbidge* 3967 (PERTH, MEL); 20 km N of Boddington, Bannister Hill, 22 January, 1979, *M.D. Crisp* 5398 (CANB, NSW, PERTH); Swan View, December 1923, *C.A. Gardner* 785 (PERTH); Mt Cooke, 45 km S of Perth, February 1972, *S.H. James* 72.2/1 (PERTH); Mt Wells Tower Site, Dwellingup, February 1989, *J.L. Robson* 327 (PERTH); Diefer Road, Helena River catchment, 18 March 1984, *Joanna Seabrook* s.n. (PERTH); Termination Moola Road, Glen Forrest, December 1981, *Joanna Seabrook* s.n. (K, PERTH); Brookton Shire, 31 December 1981, *K.J. Wallace* 921 (PERTH).

Distribution. Occurs in the Darling Range between the Helena Valley and Mt Cooke. Extends south to Dwellingup and east to Brookton.

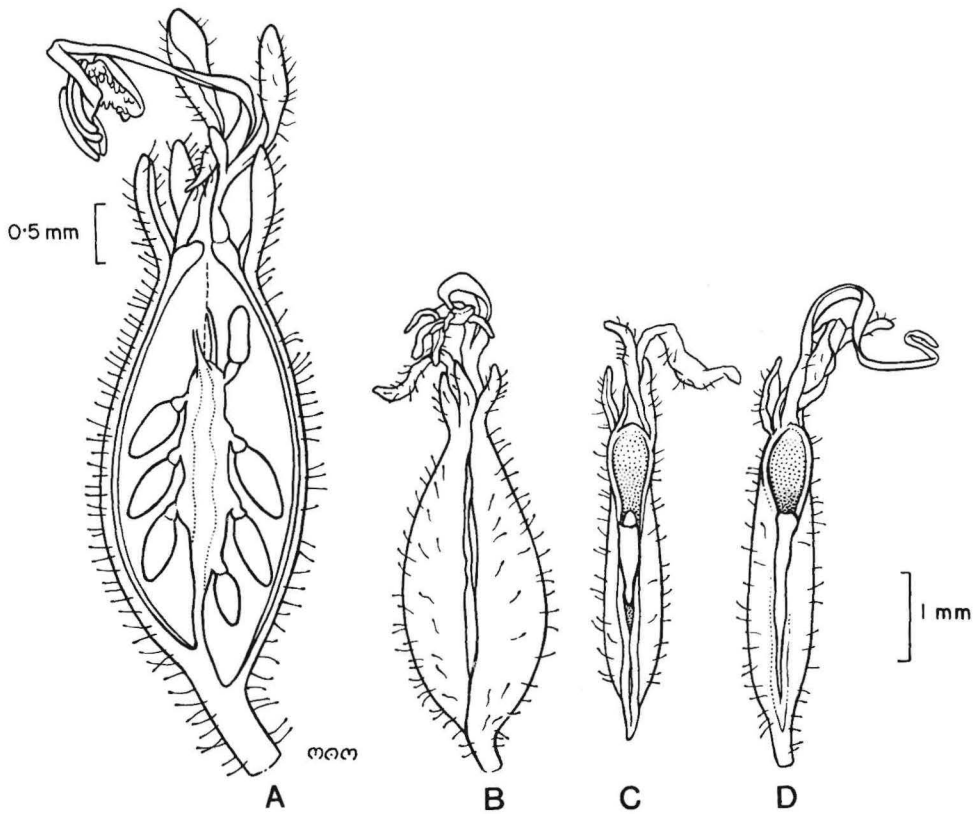

Figure 2. *Stylidium lateriticola.* A - capsule showing placentation, B - D - mature capsule showing splitting into 2 valves (C & D) parallel to the dissepiment (shown as a dotted line in A). Drawn from the type.

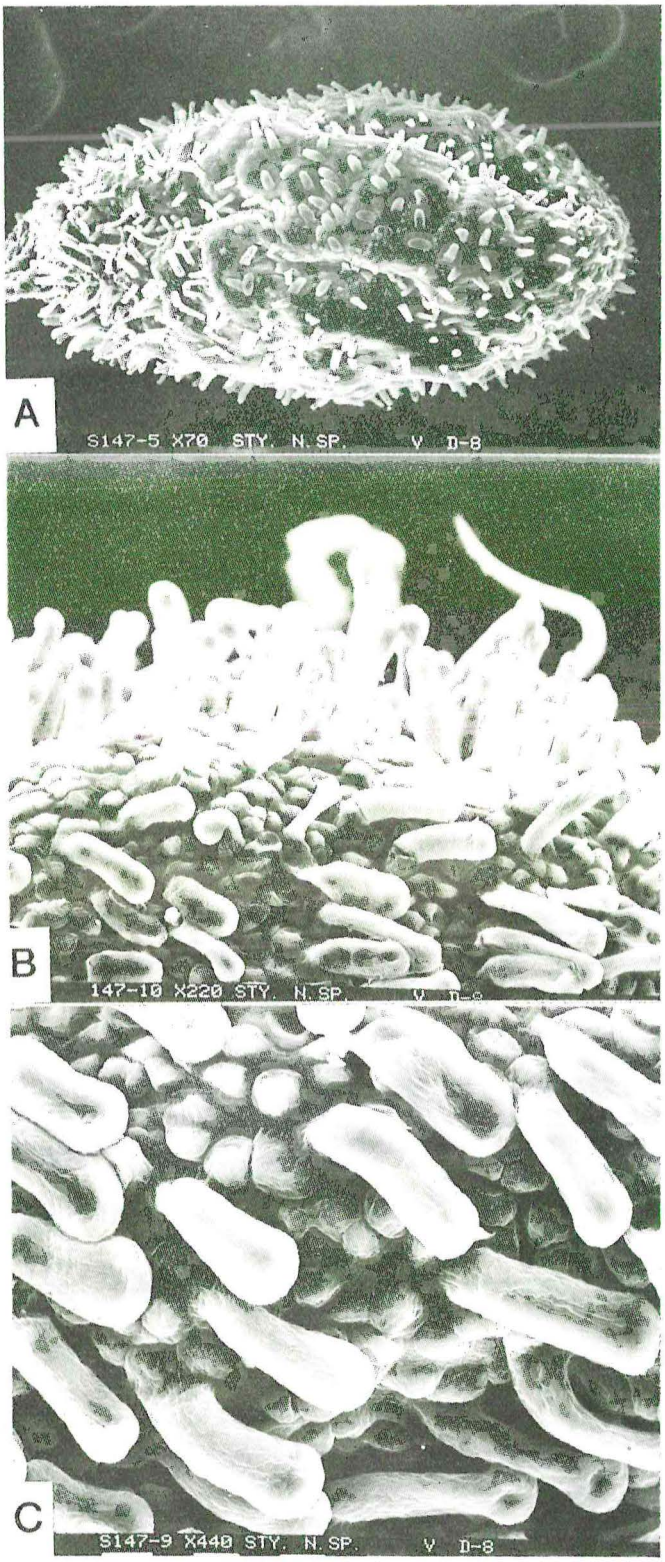

Figure 3. SEM photos of a seed showing clavellate papillae. From the type.

Ecology. The species occurs on massive hardcap laterite, often on the edge of breakaways. The associated vegetation is Jarrah *(Eucalyptus marginata)*/Marri *(Eucalyptus calophylla)* low open forest with a dense understorey of *Banksia grandis.*

Flowering period. December through to January.

Etymology. The specific epithet alludes to the preference of this species for skeletal soil over massive hardcap laterite.

Discussion

Stylidium lateriticola differs from its closest relative *Stylidium bulbiferum* by its more shrubby, erect habit, the presence of simple pilose and glandular hairy scapes and the many-flowered paniculate inflorescence, low ovule number, summer flowering pattern and different chromosome number (n = 11 in *S. lateriticola* and n = 14 in *S. bulbiferum*).

Acknowledgements

I wish to thank Joanna Seabrook and Gwen Abbott for drawing this species to my attention. I thank Paul Wilson for the latin diagnosis, Margaret Menadue for the illustrations and Dr John Kuo (Electron Microscopy Centre, University of Western Australia) for the SEM photographs. Dr S.H. James, Botany Department, University of Western Australia kindly provided the chromosome counts.

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Nuytsia 8(2): 237-239 (1992)

A new graniticolous species of Myriophyllum (Haloragaceae)

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Abstract

Orchard, A.E., A new graniticolous species of *Myriophyllum*. (Haloragaceae). Nuytsia 8(2): 237-239 (1992). A new species, *Myriophyllum lapidicola*, is described from a granite outcrop in the goldfields region of Western Australia.

Introduction

In my recent revision of Australian *Myriophyllum* (Orchard 1986) I documented the large increase in numbers of known taxa over the last 15 years and observed that "Further exploration, particularly in semi-arid areas with ephemeral creeks and waterholes, will undoubtedly push the number of Australian species of the genus to more than 40 in the future [from its present 37]". This prediction has started to be realised with the discovery of a previously unknown species in a rockhole in a granite outcrop near Chiddarcooping Nature Reserve, NNE of Merredin, Western Australia. The new species is described below.

Myriophyllum lapidicola Orchard, sp.nov. (Figure 1)

Herba annua aquatica; caules infirmi, sparsim ramosi, ad nodos radicantes. Folia alterna, in pagina aquae natantia; petioli c. 7-10 mm longi, laminae integrae, obovatae, 7-10 mm longae, 4-7 mm latae. Flores solitarii in axillas foliorum superorum, bisexuales. Bracteolae chloro-hyalinae, ovatae, c. 0.6 mm longae. Sepala 4, ovata, 0.4 mm longa. Petala 4, rubra, cucullata, c. 1.2 mm longa. Stamina 4; filamenta 0.4-0.6 mm longa; antherae rubrae, oblongae, c. 0.9 mm longae. Styli 4. Ovarium ovoideum, 4-loculare. Fructus viridis, cylindricus, 3.3 mm longus, 1.6 mm latus; mericarpia infirme tuberculata ad basim, basis styli persistentis incrassata dens lignosus terminalis formans.

Typus: WNW of Chiddarcooping Nature Reserve, Western Australia, 11 September 1989, *R.J. Cranfield* 7805 & *P. Spencer* (holo: PERTH).

Annual aquatic *herb*. *Stems* weak, sparsely branched, 25-30 cm long, rooting at the nodes. *Leaves* alternate, widely spaced, confined to the upper parts of the stems and floating on the surface of the water. Petioles c. 7-10 mm long; lamina entire, semi-succulent, obovate, 7-10 x 4-7 mm, with a distinct terminal hydathode and obscure ± parallel venation. *Flowers* solitary in the axils of the upper leaves, bisexual. *Bracteoles* green-hyaline, ovate, c. 0.6 mm long. *Sepals* 4, green to reddish, ovate, 0.4 x 0.25 mm. *Petals* 4, red, hooded, c. 1.2 mm long, becoming reflexed, persistent on the developing fruit until near maturity. *Stamens* 4, antisepalous; filaments 0.4-0.6 mm long; anthers red, oblong, c. 0.9 x 0.4 mm. *Styles* 4, c. 0.15

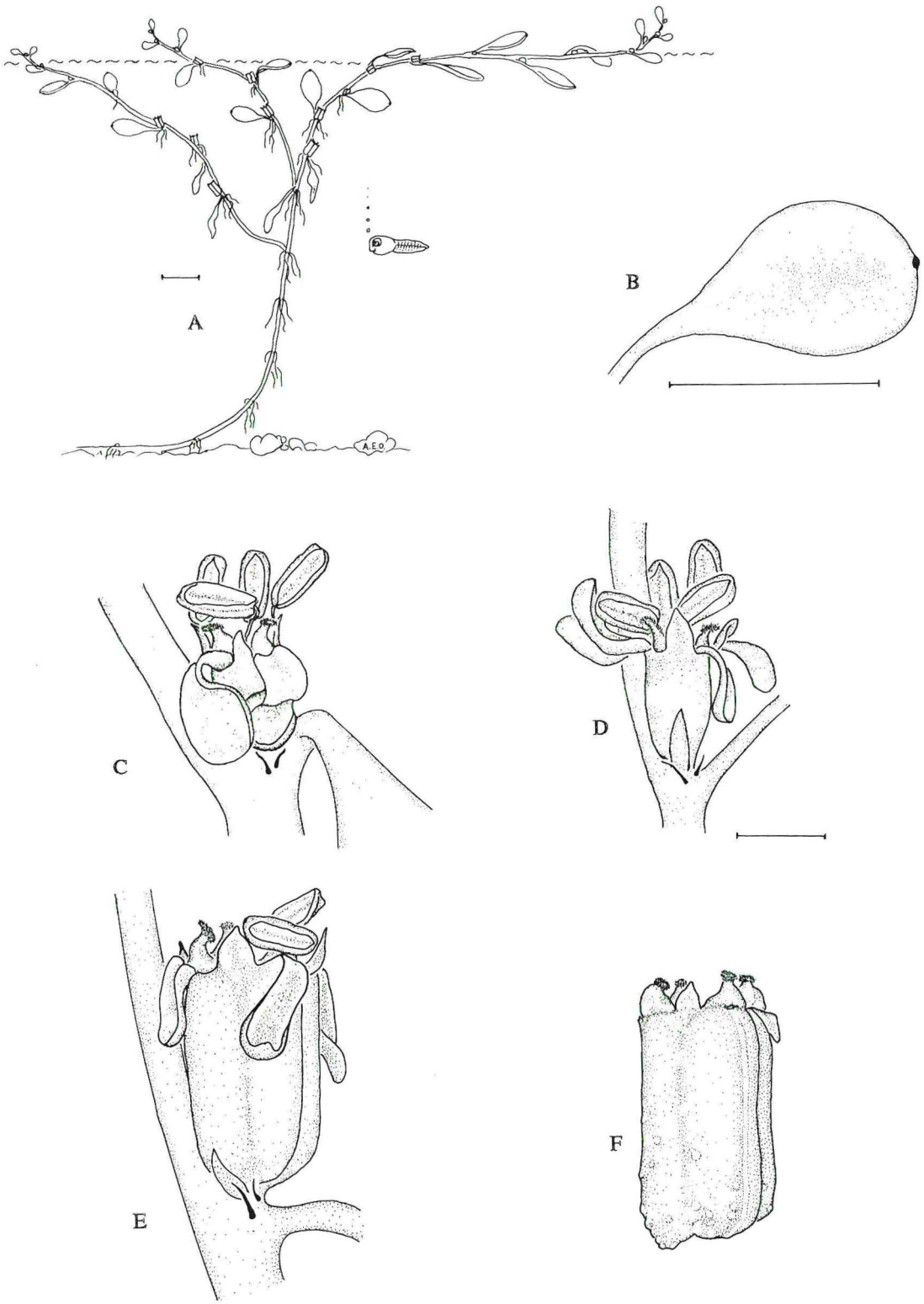

Figure 1. *Myriophyllum lapidicola*. A- Habit. B- Leaf. C-F - Development of flower into fruit. All from *R.J. Cranfield* 7805 & *P. Spencer* (PERTH). Scale bars represent 1 cm (A & B) or 1 mm (C-F).

mm long, extending with age, stigma fimbriate. *Ovary* green, ovoid, c. 0.6-0.7 mm long. *Fruit* green, cylindrical, 3.3 mm long, 1.6 mm in diameter, splitting at maturity into 4 mericarps. *Mericarps* cylindrical with a faint dorsal rib, weakly tuberculate at base, base of the persistent style thickening to form a woody terminal tooth.

Specimens examined. Known only from the type collection.

Distribution and habitat. Known only from a single, hung pool on a granite outcrop WNW of Chiddarcooping Nature Reserve, NNE of Merredin. The plant is aquatic with the subfleshy leaves floating on the surface of the water, presumably to expose the flowers for aerial pollination. Fruits develop quickly, apparently under water.

Flowering and fruiting period. September.

Affinities. Myriophyllum lapidicola is closely related to *M. petraeum*, a species also confined to sinkholes in granite outcrops, with a range abutting that of the current species (Coolgardie/Southern Cross south-eastwards to Mt Rugged/Boyatup Hill). The two taxa are very similar in their ecology, habit, and fruit shape, but *M. lapidicola* is distinguished from *M. petraeum* by its petiolate, obovate leaves (sessile and linear to oblanceolate in *M. petraeum*), bisexual (*vs* unisexual) flowers with 4 sepals and 4 stamens (male flowers in *M. petraeum* with no sepals and 8 stamens), and by its much larger fruit.

Conservation status. In view of the extremely specialised and limited habitat of this species, its conservation status must be assessed as 1E (Briggs & Leigh 1988).

Etymology. The specific epithet is a noun in apposition, meaning "dwelling on [granite] rocks", a reference to its specialised habitat.

Acknowledgements

I am grateful to Ray Cranfield for bringing this species to my attention, and to the Curator, Western Australian Herbarium, for the loan of material.

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Nuytsia 8(2): 241-243 (1992)

Triodia pascoeana (Poaceae), a new species from the western Kimberley

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Abstract

Simon, B.K. *Triodia pascoeana* (Poaceae), a new species from the western Kimberley. Nuytsia 8 (2): 241-243 (1992). *Triodia pascoeana,* from the limestone and associated areas of the western Kimberley, is diagnosed and described as new. It is compared with some other species of *Triodia,* and its ecology is discussed briefly.

Introduction

As a member of the Kimberley Research Project, Western Australia, 1988, I made a collection of grasses in areas of the western Kimberley. Among the specimens collected was a large non-resinous species of *Triodia* in the area of the Napier Range near Yammera Gap. Subsequent correspondence with Surrey Jacobs, of the Royal Botanic Gardens, Sydney, a specialist in the ecology and taxonomy of *Triodia,* established this to be a new species.

Triodia pascoeana B. Simon, sp. nov. (Figure 1)

Species *Triodia microstachya* R. Br. affinis, sed culmis minoribus robustis et non resinaceis, paniculis densioribus et pluribus multis spiculis.

Typus: Western Australia, Dampier District: NE slope of Napier Range 3 km N of the Gibb River road on track that passes 'Napier Downs' homestead near Yammera Gap, 17° 51' S, 124° 48' E, 13 April 1988, *B.K. Simon* 3909 (holo: BRI; iso: BRI, PERTH, CANB, DNA, K, NSW).

Hummock-forming, non-resinous *perennial,* to 2 m tall and 5 m diam. *Leaves*: sheath 4-5 mm wide, ± loose, persistent, glabrous; ligule a ciliolate fringe to 0.2 mm long; blade stiff, pungent, to 30 cm long. Inflorescence a panicle to 40 cm long, the spikelets racemosely arranged on the numerous whorled to scattered branches which are ± appressed except at anthesis. *Spikelets* 4-6-flowered, shortly pedicellate, 4-6 mm long. *Glumes* lanceolate, acute to aristate, scabrid along the midnerve, unequal; lower glume 2-2.5 mm long; upper glume 3-3.5 mm long. *Lemmas* 2-2.5 mm long, 3-nerved, glabrous, with 3 minute, subequal lobes. *Palea* subequal to the lemma.

Other specimen examined. WESTERN AUSTRALIA: 39 miles [63 km] E of Fitzroy Crossing on main road, 23 July 1970, *R.C. Carolin* 7408 (SYD, photo BRI).

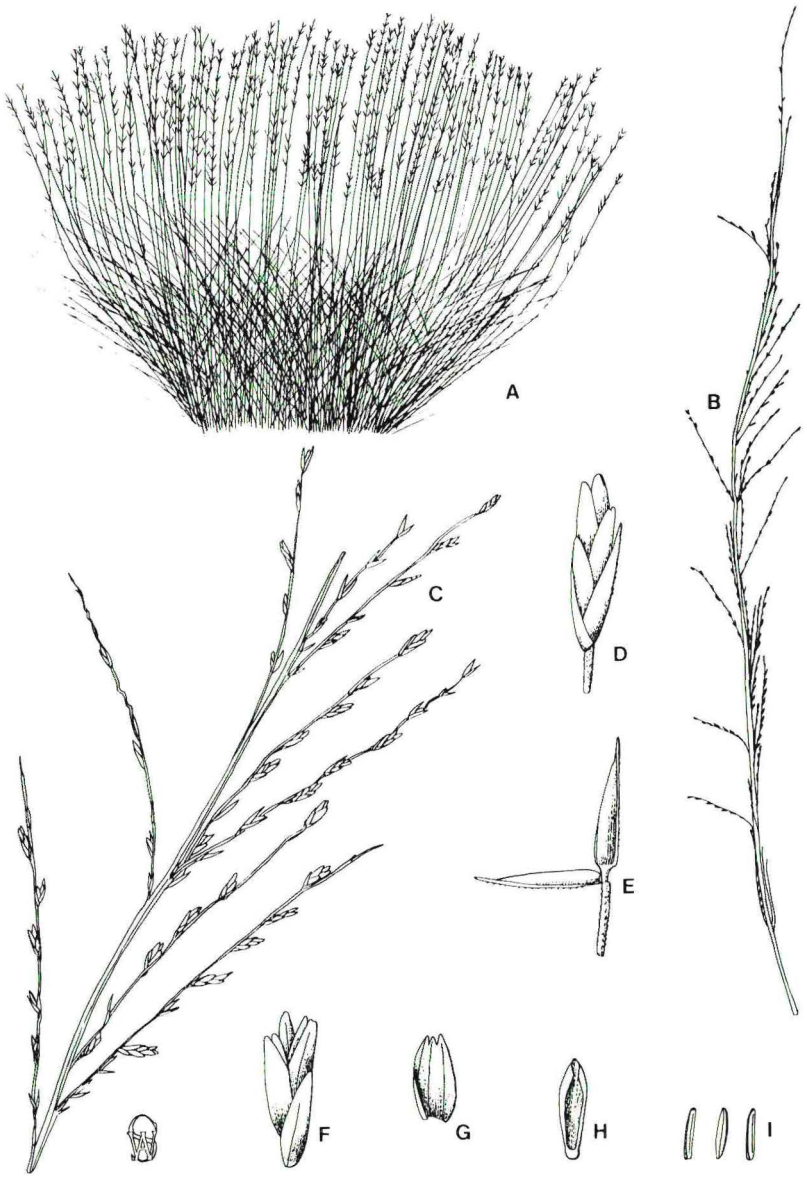

Figure 1. *Triodia pascoeana*. A - habit x 0.08. B - inflorescence x 0.5. C - portion of inflorescence x 1. D - spikelet. E - glumes. F - spikelet with glumes removed. G - lemma. H - palea. I - anthers. D-I, all x 8. Drawn from type specimen.

Distribution. On the limestone ranges of the western Kimberley and along the watercourses and associated floodplains leading from these ranges.

Habitat. Limestone ranges and gorges, and watercourses leading from limestone ranges. It grows together with *Triodia intermedia* and the two species are co-dominant understorey species in the savanna parkland and tree savanna on the summit and limestone gorges of the range. *Adansonia gregorii, Lysiphyllum cunninghamii* and *Eucalyptus papuana* are the dominant woody species with which it is associated. *T. pascoeana* also grows in watercourses and floodplains leading from the limestone ranges and in this habitat the dimensions of the hummocks and spikelets (Jacobs, in press) are somewhat larger. According to Jacobs it is the largest of all *Triodia* species and the only one growing on good alluvial soil.

Flowering period. Mainly during and shortly after the Wet.

Conservation status. A fairly common species in the limestone ranges and watercourses. Its habitat is not under pressure from grazing so its status is reasonably secure.

Etymology. It is named in honour of the late David Pascoe, Director of Operations, Kimberley 88. David organized the day-to-day running of the project very efficiently. He passed away on 29 July 1989 after an illness, bravely borne. He is survived by his wife, Jennie, who was Radio Operator and First Aid Officer on the project.

Notes. The species has very small spikelets for a species of *Triodia* and is fairly common in the area of collection. The very fine panicles of this *Triodia* species are unlike those of other species of *Triodia*. The spikelets have some resemblance to those of *T. microstachya* in that the apex of the lemma has three minute teeth, but in that species the culms are resinous and the panicle is denser and has many more spikelets.

Acknowledgements

I thank the Linnaean Society of London and the Royal Geographical Society, together with their sponsors, for the opportunity of taking part in the Kimberley Research Project, Western Australia, 1988. In particular I thank Professor Andrew Goudie (University of Oxford) and Martin Sands (Royal Botanic Gardens, Kew), leader and deputy-leader respectively, Bruce Maslin (Western Australian Herbarium) for overseeing the shipment of botanical specimens back to Brisbane and Clyde Dunlop (Conservation Commission of the Northern Territory) for providing transport to the Kimberley from Darwin and for the use of collecting equipment. I am grateful to Surrey Jacobs for exchange of information concerning this species and for supplying a photocopy and a few spikelets of *R.C. Carolin* 7408. I thank my colleagues at the Queensland Herbarium and William Smith for the line illustration (Figure 1).

Reference

Jacobs, S.W.L. (in press) *Triodia*. *In* J.R. Wheeler (ed.), "Flora of the Kimberley Region".

Philotheca citrina (Rutaceae), a new species from Western Australia

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Abstract

Wilson, Paul G. *Philotheca citrina* (Rutaceae), a new species from Western Australia. Nuytsia 8(2): 245-248 (1992). A new species of *Philotheca*, that comes from the Austin Botanical District of Western Australia, is described and illustrated. Its relationship to other species of *Philotheca* and of *Eriostemon* sect. *Nigrostipulae* is discussed.

Introduction

In 1985 a new species of *Philotheca* was collected during a survey of the Murchison River basin in the Austin Botanical District (Beard 1980) by the Rangeland Management Branch of the Western Australian Department of Agriculture. The area was visited in September 1989 by Sue Patrick and Ray Cranfield of the Western Australian Herbarium who were able to relocate the plant and investigate its distribution and ecology: this account is largely based on their collections and notes.

Philotheca citrina Paul G. Wilson, sp. nov. (Figure 1)

Fruticus ramosissimus ad 1.3 m altus. Ramuli friabiles inter decurrentias foliares sparse et minute puberuli. Folia in ramulis juvenilibus congesta, alterna, ut videtur exstipulata; lamina anguste clavata curvata c. 10 mm longa, 1-1.5 mm lata, supra aliquantum sulcata, manifeste undulato verrucosa, glabra vel basi versus sparse et minute puberula, apice obtuso-apiculato. Flores solitarii ad ramulos terminales. Pedunculus brevissimus crassus, resinosus, glaber. Pedicellus supra pedunculum articulatus, 2-4 mm longus, glaber. Sepala ovata 4-5 mm longa, glabra, in centro glandulosa. Petala late elliptica, obtusa, c.10 mm longa, crassa, glanduloso punctata, intra minute tomentosa, extra glabra. Stamina pyramidalia, ad 7.5 mm longa; filamenta crassa, in 2/3 parte inferiore connata aliter libra, intra praeter apicem dense lanato pilosa, extra modice pilosa. Discus absens vel minutus, non visa. Ovarium depresso globosum; stylus teres glaber. Fructus non visa.

Typus: NNE of Curbur Station Homestead, Western Australia (precise locality withheld), 26° 23' S, 115° 58' E, 30 Aug. 1989, *R.C. Cranfield* 7665 and *S. Patrick* (holo: PERTH; iso: CANB, K, MEL, NSW).

Much branched *shrub* to 1.3 m high. *Branches* brittle, when young pale green, resinous, and sparsely and minutely puberulous between glabrous leaf decurrencies, becoming grey to black with age. *Leaves* dense on young branches, alternate, bright green, exstipulate or rarely with extremely

minute c. 2-celled stipules; lamina narrow clavate, curved, c. 10 mm long, 1-1.5 mm wide, somewhat narrowed towards base, flattened and indefinitely sulcate above, rounded below, conspicuously undulate verrucose with globular subepidermal glands, glabrous, or sparsely and minutely puberulous on adaxial surface near base; apex obtuse but apiculate with a pale brown necrotic tip. *Flowers* solitary and terminal to branches or to short branchlets. *Peduncle* short (to 1 mm long), thick, reddish brown and resinous, exceeding pedicel in diameter, glabrous; bracteoles not observed. *Pedicel* articulate on peduncle, narrow turbinate below, broad turbinate above, 2-4 mm long, glabrous. *Sepals* ovate, acute to obtuse, 4-5 mm long with a minute necrotic apiculum, thick and glandular verrucose in centre, thin towards margin, glabrous. *Petals* free, broad elliptic, obtuse, c. 10 mm long, very pale greenish yellow, thick, minutely tomentose within, glabrous outside, glandular punctate. *Stamens* pyramidally arranged, to 7.5 mm long, the antesepalous slightly longer than the antepetalous; *filaments* thick, united in lower 2/3, otherwise free, linear, densely woolly pilose within except towards tip, moderately pilose outside, inflexed at tip; *anthers* oblong elliptic c. 1.5 mm long, minutely white apiculate; pollen pale orange. *Disc* not apparent. *Ovary* depressed globular, glabrous; *style* terete, glabrous, red with green apex; *stigma* minutely 5-lobed. *Fruit* not seen.

Additional specimen examined. WESTERN AUSTRALIA: Curbur Station, *A.L. Payne* 120 (PERTH).

Distribution. Only known from the type locality in the Austin Botanical District, Western Australia.

Habitat. Found in pockets of soil in cracks on a low red granite outcrop. Associated species on the outcrop were *Acacia aneura* Benth., *A. quadrimarginea* F. Muell., *A. palustris* Luehm., *Calytrix divergens* Craven, *Eremophila clarkei* F. Muell., *E. latrobei* F. Muell., and *Ptilotus obovatus* (Gaudich.) F.Muell. The surrounding plain was covered with Mulga *(Acacia aneura)* shrubland.

Conservation status. Philotheca citrina was found to be plentiful on the one granite outcrop which extended for almost one kilometre; it was not found on other outcrops in the region but no search was made in the country lying to the north of Curbur Station. Although sheep and feral donkeys wander through the area there was no indication that mature plants were grazed. In view of the paucity of information on the distribution of the species a conservation category 'K' (Briggs and Leigh 1988) would appear to be appropriate.

Notes. There has been no revision of the genus *Philotheca* since the account given by Bentham (1863), although brief notes have been provided by Wilson (1970, 1971) who indicated its distinction from *Drummondita* and its close relationship to *Eriostemon* sect. *Nigrostipulae*. He noted that the genus *Philotheca* is morphologically similar to *Eriostemon* sect. *Nigrostipulae*, the two taxa being only separated by the presence of united stamens in the former and of free or almost free stamens in the latter. It has been pointed out by Armstrong *(ined.)* that the genus *Eriostemon* should be considered monotypic and that the species in *Eriostemon* sect. *Nigrostipulae* should be transferred to *Philotheca*. From this it follows that whether the new species is considered to belong in the narrow sense to either *Philotheca* or *Eriostemon* sect. *Nigrostipulae* it should be placed in the expanded genus *Philotheca*. In the Eastern States all species that are considered to belong to *Philotheca* and to *Eriostemon* sect. *Nigrostipulae* possess leaves with minute stipules that soon become covered by a black resinous secretion; in Western Australia half (eight) of the species of sect. *Nigrostipulae* have stipules and half do not.

Philotheca citrina is the second species of the genus to be recorded from Western Australia, the first being *P. tubiflora* A.S. George which is known from a few granite outcrops near Leonora. *Philotheca tubiflora* may be distinguished from *P. citrina* by its much shorter (c. 3 mm long) leaves, its prominent black stipules, and by its petals that are united in the lower half to form a tubular corolla.

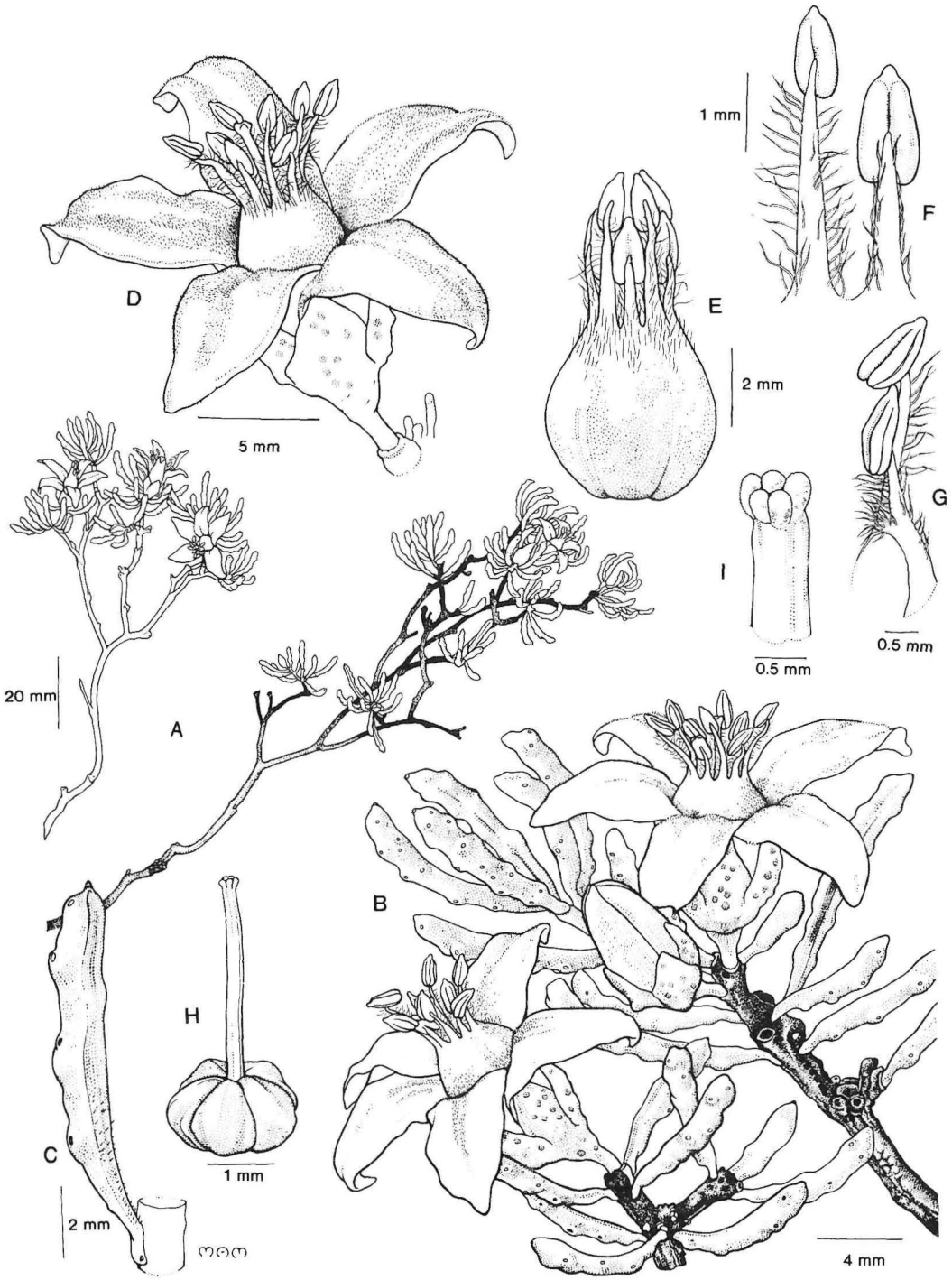

Figure 1. A - Branches. B - Flowering branchlets. C - Leaf. D - Flower with peduncle. E - Androecium. F - Antesepalous and antepetalous anthers, abaxial view. G - Stamens, side view. H - Gynoecium. I - Style apex. Drawn from the type.

Eriostemon sericeus Paul G. Wilson from Western Australia is similar in appearance to *P. citrina* and in addition has stamens that are shortly united at the base which thus approach the situation found in *Philotheca sensu stricto*.

The thick resinous peduncle that is present in *Philotheca citrina* is also found, but in a less obvious condition, in *P. tubiflora* and *Eriostemon rhomboideus* Paul G. Wilson; in these two species a pair of bracteoles is present at the articulation of the peduncle and pedicel while in *P. citrina* the bracteoles are either not formed or, as seems more likely, they are shed early in the development of the flower.

Acknowledgements

I should like to thank Sue Patrick and Ray Cranfield for providing me with their field notes on the *Philotheca* population. I also wish to thank Margaret Menadue for preparing the illustration of the plant.

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

A.R. Chapman and B.R. Maslin

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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).

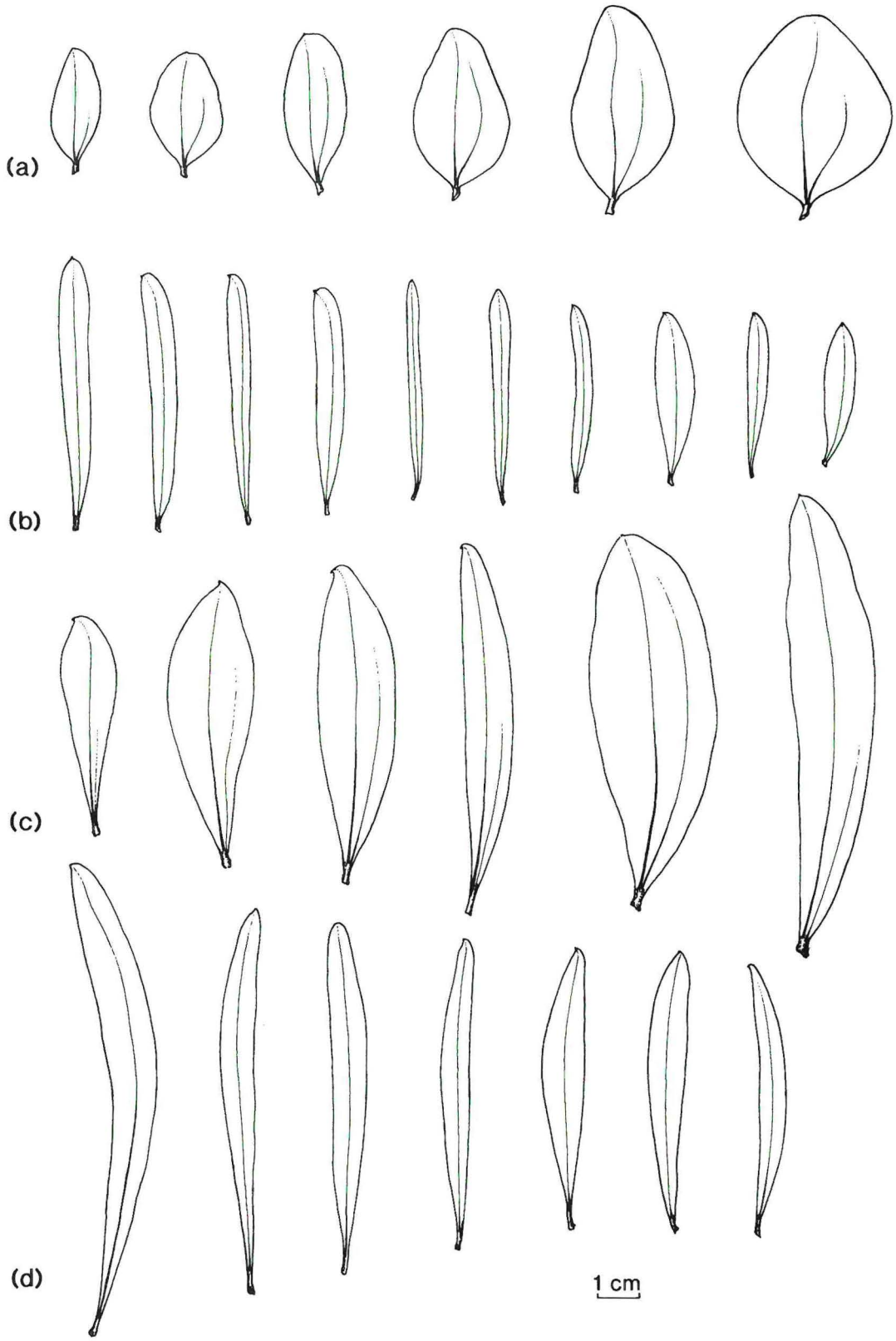

Figure 1. A range of mature phyllodes from a sample of plants in a single population of each of the following four species: (a) *A. startii* (Coral Bay, W.A.); (b) *A. ligulata* (Denham, W.A.); (c) *A. xanthina* (Coronation Beach, W.A.); (d) *A. rostellifera* (Hopetoun, W.A.).

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 species 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

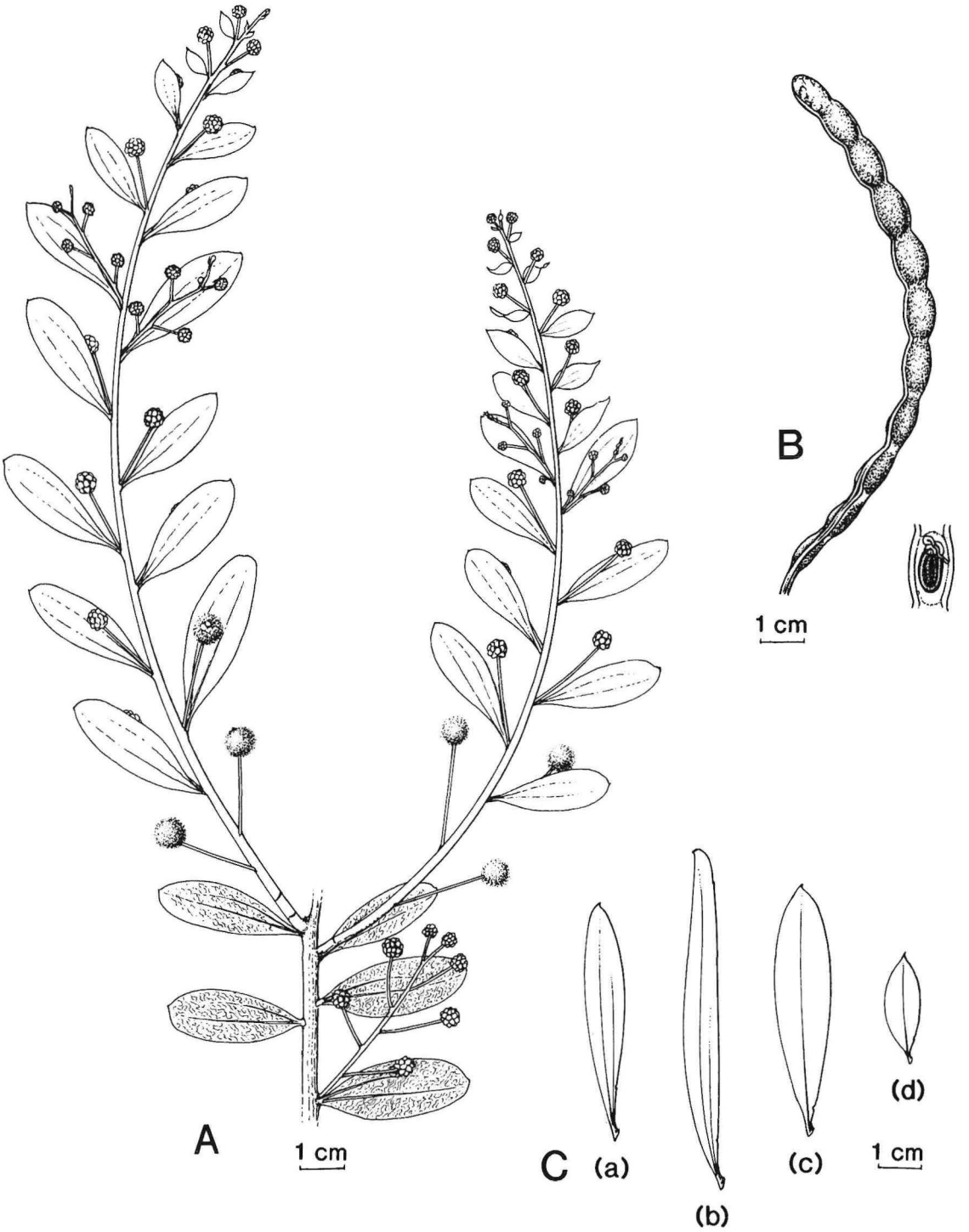

Figure 2. *Acacia bivenosa*. A - Habit (from *Maslin* 4590, PERTH). B - Legume and seed (from *Maslin* 5743, PERTH). C - Phyllode variation in *A. bivenosa*: (a) Hamersley Range (from *Ashby* 4161, PERTH); (b) Airlie Island (from *Long* 163, PERTH); (c) McDonnell Ranges, N.T. (from *Chippendale* 3370,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

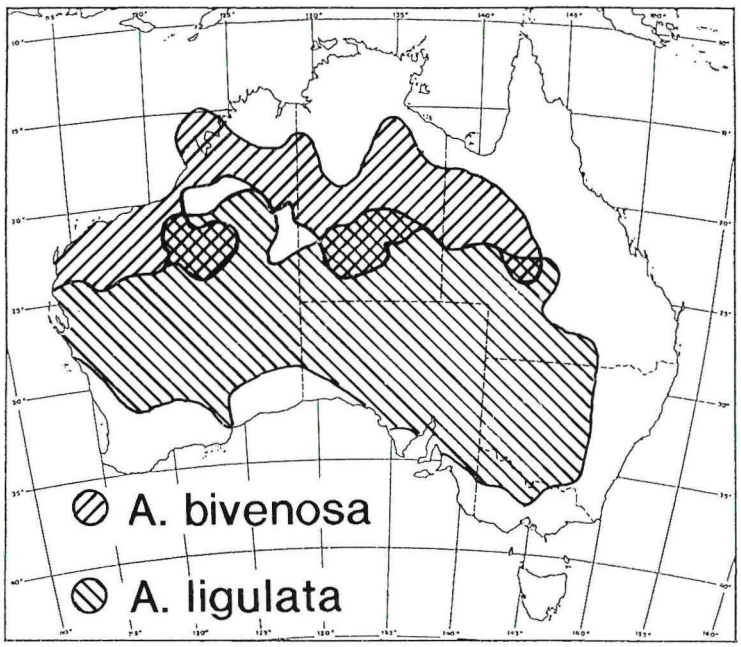

Figure 3. Distribution of *A. bivenosa* and *A. ligulata* indicating areas of geographic overlap between the two species.

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).

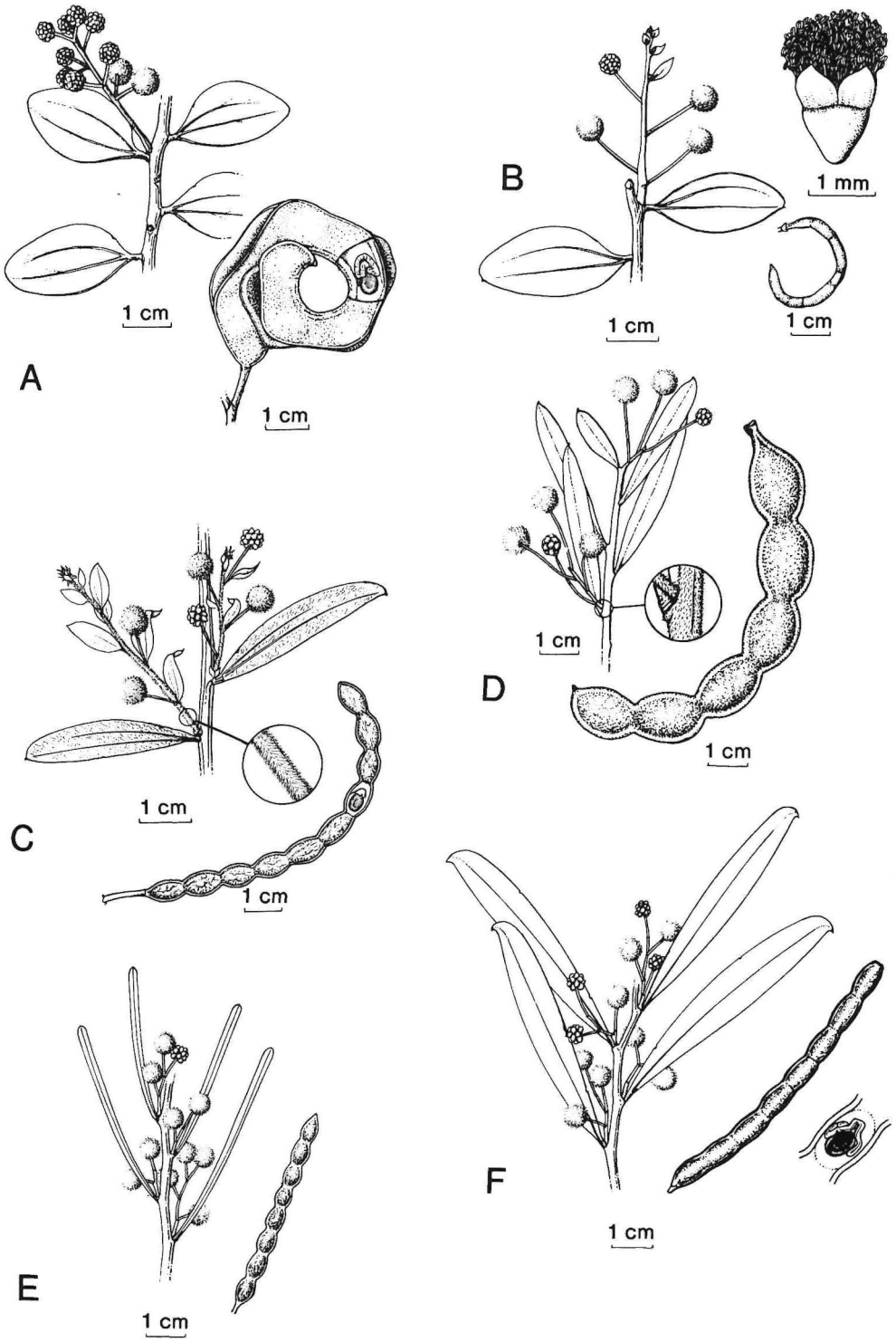

Figure 4. *Acacia didyma*. A - Habit (from *Maslin* 3699, PERTH) and legume (from *Stretch*, PERTH 00801895). *Acacia startii*. B - Habit, flower (both from *Start* 7, PERTH) and legume (from *Start* 65, PERTH). *Acacia telmica*. C - Habit and legume (both from *Chapman* 563, PERTH). *Acacia sclerosperma* 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, Austrobaileya 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	3-7.5 cm	5-11.5 cm
	- 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 Balline-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 Eneabba, *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.

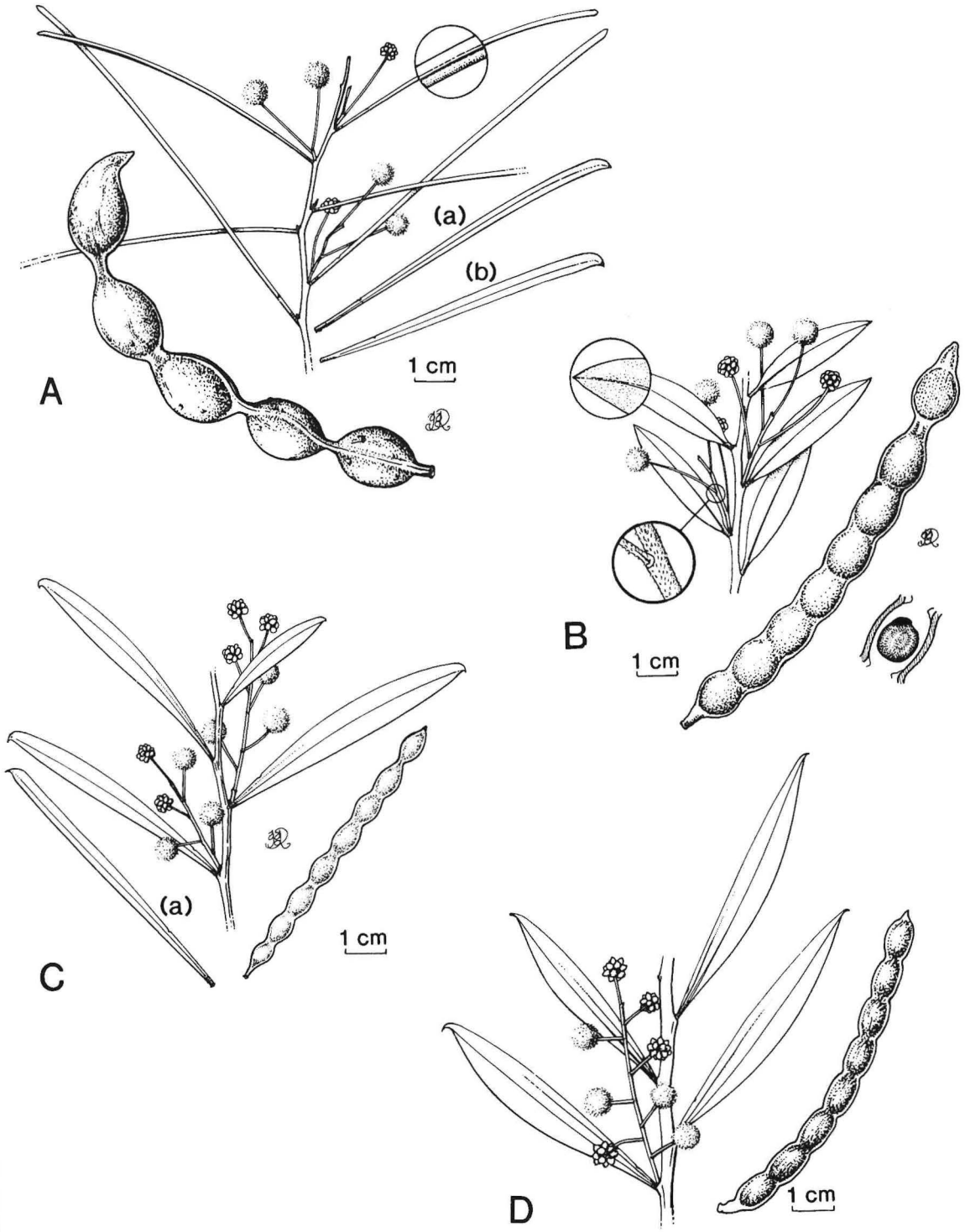

Figure 5. *Acacia sclerosperma* subsp. *sclerosperma*. A - Habit (from *Walker* 85, PERTH), legume (from *Demarz* D5795, PERTH); (a)-(b) - phyllode variation (from *Dixon* D1/84, PERTH and *Story* 8229, PERTH). *Acacia tysonii*. B - Habit (from *Gardner* 12652, PERTH), legume and seed (both from *Maslin* 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 Exped. 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 ser.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 Meekatharra, 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 puberulous. *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 legumine, 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 sub-moniliformia, 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. Asbhy* 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 Eneabba, *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); Leeman, *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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Acacia Miscellany 6. Review of *Acacia victoriae* and related species (Leguminosae: Mimosoideae: Section *Phyllodineae*)

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Abstract

Maslin, B.R. Acacia Miscellany 6. Review of *Acacia victoriae* and related species (Leguminosae: Mimosoideae: Section *Phyllodineae*). Nuytsia 8(2): 285-309 (1992). A key is presented to the 10 species comprising the informal "*Acacia victoriae* group". Five of these species, all from Western Australia, are described as new, namely, *A. alexandri*, *A. aphanoclada*, *A. chartacea*, *A. ryaniana* and *A. synchronicia*. *Acacia glaucocaesia* Domin (syn. *A. glabripes* Maiden & Blakely, non Domin) is reinstated but may ultimately prove better placed as an infraspecific taxon under *A. victoriae* Benth. Legumes are described for *A. pickardii* Tind. and a full description is given for *A. dempsteri* F. Muell. All species of the group are illustrated.

Introduction

The following account of *Acacia victoriae* Benth. and its allies is the result of studies connected with the preparation of *Acacia* subgenus *Phyllodineae* section *Phyllodineae* DC. for the Flora of Australia. Five new Western Australian species are described and these, together with five close relatives, are here referred to informally as the "*Acacia victoriae* group". The 10 species assigned to this group are: *A. alexandri* Maslin sp. nov., *A. aphanoclada* Maslin sp. nov., *A. chartacea* Maslin sp. nov., *A. cuspidifolia* Maslin, *A. dempsteri* F. Muell., *A. glaucocaesia* Domin, *A. pickardii* Tind., *A. ryaniana* Maslin sp. nov., *A. synchronicia* Maslin sp. nov. and *A. victoriae* Benth. This group is most closely related to *A. murrayana* F. Muell. ex Benth. and its allies (i.e. *A. pachyacra* Maiden & Blakely and *A. praelongata* F. Muell.) and *A. pyrifolia* DC. and its allies (i.e. *A. inaequilatera* Domin, *A. marramamba* Maslin and *A. strongylophylla* F. Muell.).

The species of the *A. victoriae* group occur mainly in the Australian Arid Zone. Except for *A. victoriae* (which occurs in all mainland States) and *A. pickardii* (which is geographically restricted in South Australia and Northern Territory) the species of the group are confined to Western Australia where most have relatively restricted geographic ranges. Distributions are discussed under each species; for previously described taxa these data replace those which are given in Maslin & Pedley (1982).

In the absence of a comprehensive review of the classification of *Acacia* it has not been possible here to identify a single morphological character which uniquely defines the "*A. victoriae* group". There are, however, a number of characters which, when taken in combination, serve to define the

group, however, not all species possess all the characters. Although none of the characters is unique to the group, two of the more important ones, namely, spinose stipules and medial peduncular bracts, are infrequent elsewhere in subgenus *Phyllodineae*.

1. Stipules.

Spinose stipules are seemingly present in all members of the group, although in *A. alexandri*, *A.aphanoclada* and *A. glaucocaesia* they are rather poorly developed. The stipules are often prominent on young plants but are commonly absent with age. On biologically mature plants often only the stipule bases remain and are represented by a pair of blunt protruberances at the base of the phyllodes; sometimes even the protruberances are lacking.

Spinose stipules occur elsewhere in section *Phyllodineae*, but at a rather low frequency, e.g. *A.congesta* Benth., *A. paradoxa* DC., *A. xerophila* W.Fitzg. They also occur in other sections of subgenus *Phyllodineae*, namely, the *Alatae* (*A. alata* R.Br.), *Plurinerves* (in *A. unguicula* Cowan & Maslin and at least three undescribed species from W.A.) and *Pulchellae* (*A. anarthros* Maslin and *A.moirii* subsp. *recurvistipula* Maslin). Spinose stipules occur in all species of subgenus *Acacia* (where they are often very well developed) but in subgenus *Aculeiferum* they are seemingly absent (although the stipules at mature nodes on *A. coulteri* Benth. ex A.Gray from Mexico are somewhat spinose).

2. Peduncular bracts.

A minute bract occurs near or above the middle of the peduncle in all species of the group; the base of the peduncles is ebracteate. Although this supra-basal bract is caducous (it is best observed on very young inflorescences) its scar can usually be observed on at least some mature flowering peduncles of all species except *A. aphanoclada*.

Peduncular bracts are common elsewhere in subgenus *Phyllodineae* but they are usually located at the base of the peduncle. Solitary bracts situated near or above the middle of the peduncle are uncommon but do occur in a few species of section *Phyllodineae* besides the "*A. victoriae* group", e.g. some members of the *A. deltoidea* group (*fide* Cowan & Maslin 1990), *A. dentifera* Benth., *A. nodiflora* Benth. Similar bracts occur also in subgenus *Aculeiferum* (e.g. *A. tamarindifolia* Willd. and *A. paniculata* Willd. from South America) and in a few species of subgenus *Acacia* (e.g. *A. biacicularis* S. Watson and *A. glandulifera* S. Watson from Mexico).

3. Other characters of the "*A. victoriae*" group.

Species of the "*A. victoriae* group" are assigned to section *Phyllodineae* on account of their globular flower-heads and 4-nerved phyllodes. When the phyllodes are flat, which is the usual condition, there is a nerve along each margin and one on each face; when terete (*A. pickardii*) the nerves are equally spaced around the lamina. The nerves are sometimes submerged and thus seemingly absent.

Other characters commonly encountered in species of the group are the following: tall shrubs or small trees (except for *A. ryaniana* which is ± prostrate); branchlets often pruinose, glabrous (sometimes hairy in *A. pickardii* and *A. victoriae*); phyllode apices commonly innocuous (pungent in *A. aphanoclada*, *A. cuspidifolia*, *A. pickardii* and sometimes *A. dempsteri*); peduncles commonly twinned, either within axils of phyllodes or along a raceme axis, their base ebracteate; inflorescences commonly initiated on

new shoots within the axils of young phyllodes which usually mature prior to anthesis, determinate racemes are common in *A. aphanoclada*, *A. chartacea*, *A. glaucocaesia* and *A. victoriae* but a secondary phyllode may develop at the base of some peduncles so that a proportion of the inflorescences appear simple and axillary; sepals usually free (variably united in *A. cuspidifolia*); legumes chartaceous, usually flat; seeds transverse to oblique (longitudinal in *A. aphanoclada* and sometimes in *A. alexandri*), brown or black but commonly yellow at the centre in the region of the areole or mottled; aril usually absent or poorly developed.

Methods

All measurements are from dried herbarium material unless stated otherwise. Abbreviations for herbaria are as given in Index Herbariorum ed. 7 (1981) except for the following: KARR (Pilbara Regional Herbarium, Karratha, W.A.) and KP (Kings Park and Botanic Garden, Perth, W.A.).

Key to species of the "*A. victoriae* group"

1. Phyllodes >15 cm long ..... 2. *A. aphanoclada*
1. Phyllodes <15 cm long
   2. Phyllodes pungent
      3. Phyllodes terete ..... 7. *A. pickardii*
      3. Phyllodes flat
         4. Phyllodes linear to narrowly oblong-oblanceolate, cusp 1-2 mm long; heads pale yellow ..... 4. *A. cuspidifolia*
         4. Phyllodes lanceolate to narrowly lanceolate, cusp <1 mm long; heads golden ..... 5. *A. dempsteri*
   2. Phyllodes innocuous, commonly mucronulate
      5. Phyllodes ± linear AND some or all >4 cm long; heads cream
         6. Flowers 15-30 per head; inflorescences all or predominantly racemose; legumes 9-16 mm wide (widespread) ..... 10. *A. victoriae*
         6. Flowers 60-80 per head; inflorescences not racemose; legumes 7-8 mm wide (restricted, Western Australia) ..... 1. *A. alexandri*
      5. Phyllodes not as above (if linear then <4 cm long)
         7. Heads creamy white to pale yellow; inflorescences usually all or predominantly racemose; peduncles 6-18 mm long
            8. Phyllodes 10-25(33) mm wide, retuse to sub-retuse, green; heads 60-90-flowered; peduncles robust ..... 3. *A. chartacea*
            8. Phyllode characters not combined as above; heads <60-flowered; peduncles slender
               9. Heads 20-30-flowered; phyllodes 2-10 cm long, 2-11 mm wide, 1:w = 2-20, midrib rather prominent (widespread) ..... 10. *A. victoriae*
               9. Heads 35-50-flowered; phyllodes 1.5-2.5 cm long, (5)7-13 mm wide, l:w = 1.5-3, midrib not prominent (restricted, Western Australia) ..... 6. *A. glaucocaesia*

7. Heads golden; inflorescences all or mostly not racemose; peduncles 10-30 mm long
   10. Phyllodes 3-6 cm long with l:w = 4-12, lanceolate to narrowly lanceolate; heads c. 10 mm diam. when dry; spinose stipules persistent ..... 5. *A. dempsteri*
   10. Phyllode 1-3 cm long, shape otherwise; heads 5-7 mm diam. when dry
      11. Shrubs 0.3 m tall, ± prostrate; legumes curved; phyllodes 7-15 mm wide, 1:w = 1.2-3, midrib rather prominent; spinose stipules usually persistent ..... 8. *A. ryaniana*
      11. Shrubs or trees 1-3(6) m tall; legumes straight; phyllodes 1-8(13) mm wide, 1:w = (2)3-7(14), midrib obscure or absent; stipules often absent ..... 9. *A. synchronicia*

Taxonomy

1. Acacia alexandri Maslin, sp. nov. (Figure 1)

Frutices glabri 1.5-3 m alti. Stipulae spinosae, 3-4 mm longae, graciles, plerumque nullae vel infrequentia aetate provecta. Phyllodia linearia, augustata ad basim, (4)6-13 cm longa, 2.5-6(9-11) mm lata, ratione horum (8)15-50, non rigida, viridia, uninervata, penninervia. Inflorescentiae vulgo simplices et in surculis juvenibus orientes, pedunculis vulgo 2 in quoque axilla, 8-15 mm longis, gracilibus, bractea caduca prope vel super medium orienti, florum capitulis globularibus, cremeis, dense 60-80-floribus. Flores 5-meri. Sepala discreta, anguste spathulata. Legumina anguste oblonga, ad 7 cm longa, 7-8 mm lata, chartacea, plana, super semina rotundata. Semina plerumque transversalia, globosa, circa 4 mm longa, nigricantia, circum pleurogramma luteola, funiculo brevi, arillo depresso-clavato.

Typus: Cape Range, Western Australia, 29 August 1988, *B.R. Maslin* 6284 (holo: PERTH; iso: CANB, K, MEL, NY, NSW).

Open or moderately dense *shrubs* 1.5-3 m tall, sometimes whispy, main stems rather slender. *Bark* dark grey and sometimes irregularly fissured at base of stems, smooth and greenish brown higher up, red-brown to reddish or yellow-green on branchlets. *Branchlets* slender, terete but slightly angled at extremities, finely ribbed, slightly flexuose, glabrous. *Stipules* spinescent, commonly absent or infrequent on mature plants, not prominent, slender, 3-4 mm long, straight. *Phyllodes* linear, narrowed at base, 6-13 cm long, sometimes a few shorter (c. 4 cm long), 2.5-6 mm wide, abnormally broad (9-11 mm wide) on *A.S. George* 1334, l:w = (8)15-50, slightly thick and therefore usually slightly wrinkled when dry, not rigid, ± erect, straight or variously curved, glabrous, olive-green to yellow-green, dull; midrib evident but not overly prominent, often drying yellowish, finely penninerved, marginal nerves narrow and yellowish; apices acute or obtuse-mucronate; pulvinus c. 1 mm long, transversely wrinkled. *Gland* situated on upper margin of phyllode 0-2 mm above pulvinus, not prominent, circular to oblong-elliptic, 0.3-0.8 mm long, central pore shallow. *Inflorescences* initiated synchronously with phyllodes on terminal or sometimes axillary new shoots, phyllodes usually maturing prior to anthesis so that peduncles appear axillary, shoots rarely racemose due to phyllode suppression. *Peduncles* 1-4 per axil but commonly 2, 8-15 mm long, slender, glabrous, base ebracteate; bract near or above middle of peduncle caducous (bract scar visible on mature peduncles), narrowly oblong, c. 1.5 mm long, scarious, brown. *Flower-heads* globular, 8 mm diam. (fresh), c. 5 mm diam. (dry), cream, densely 60-80-flowered.

Figure 1. *Acacia alexandri*. A - Flowering branchlet. B - New shoot showing inflorescences arising synchronously with phyllodes (inserts showing supra-basal peduncular bract and, on older peduncle, scar where bract has fallen). C - Legume. D - Seed showing funicle expanded into a narrow, depressed-clavate aril.
A from *A.S. George* 2479. B from *W.B. Edgecombe* s.n. C & D from *W.B. Edgecombe* 13.

Bracteoles similar to sepals except laminae twice as large. *Flowers* 5-merous. *Sepals* 1/2 to 3/4 length of petals, free, narrowly spathulate, brown except base often colourless; claws narrowly linear, glabrous; laminae widely ovate, 0.15 mm wide, concave, apiculate, sparsely ciliolate. *Petals* 1.8-2 mm long, joined for c. 3/4 their length, glabrous, midrib not visible. *Legumes* narrowly oblong, to 7 cm long, 7-8 mm wide, chartaceous, ± straight, flat, prominently rounded over seeds with the convexities not extending to the margins, ± straight-edged with occasional deep constrictions between seeds, glabrous, dark brown, obscurely transversely reticulate. *Seeds* longitudinal, oblique or most commonly transverse in legumes, globose, c. 4 mm long, dull, blackish, yellow around the "U"-shaped pleurogram; areole often excentric, open towards the hilum, 0.7 mm long; funicle 1-1.5 mm long, slender, expanded into a narrow, depressed-clavate aril c. 2 mm long.

Other specimens examined. WESTERN AUSTRALIA: Cape Range, *Y. Chadwick* 1353 & s.n. (both PERTH), *W.B. Edgecombe* 12 (PERTH), 13 (PERTH) & s.n. (PERTH 00153354, 00669482), *A.S. George* 2479 (PERTH), 1334 (PERTH) & 10270 (PERTH, K), *S.D. Hopper* 5085, 5086 & 5088 (all PERTH), *K.F. Kenneally* 7337 (BRI, CANB, MEL, PERTH) & 7344 (PERTH), *B.R. Maslin* 6289 (PERTH).

Distribution. North-west Western Australia in the Carnarvon Botanical District (1:250,000 maps F49-12, F50-9). Known only from a few localities in the Cape Range.

Habitat. Pinkish brown loam on rocky limestone slopes in Open Shrub Mallee over Low Scrub and Spinifex (*Triodia* spp.).

Conservation status. 2RC- according to the criteria of Briggs & Leigh (1988). Of the few collections known, about half occur within the Cape Range National Park.

Flowering period. Mostly August-September; one collection in June.

Fruiting period. Legumes with mature seeds have been collected in late October.

Affinities. Closely allied to the widespread species, *A. victoriae*, but distinguished by flowers 60-80 per head, inflorescences initiated on new shoots with 1-4 peduncles arising within the axils of the young phyllodes, legumes 7-8 mm wide, seeds not mottled, funicle slender, and phyllodes usually longer. In Western Australia the phyllodes of *A. victoriae* are generally 2.5-4 cm long and not often linear. However, in the Kimberley region (and also in Queensland) some specimens of *A. victoriae* have linear phyllodes to about 10 cm long but these can be distinguished from *A. alexandri* by the other characters given above. Another widespread member of the "*A. victoriae* group", *A. synchronicia*, grows near *A. alexandri* in the Cape Range but is readily recognised by its much shorter phyllodes (c. 2 cm long) and golden flower-heads.

Etymology. Named after Alexander S. George who discovered the species in 1960. Prior to becoming Editor of the Flora of Australia in 1981, Alex was employed for 21 years at the Western Australian Herbarium. He has made significant contributions to the botany of Western Australia through his numerous collections (e.g. almost 800 *Acacia* gatherings) and publications.

2. Acacia aphanoclada Maslin, sp. nov. (Figure 2)

Frutices glabri virgati ad 5 m alti, phyllodiis et ramis ultimis pendulis, ramulis pruinosis. Stipulae plus minusve spinosae, 2.5-4 mm longae, aliquando nullae. Phyllodia anguste linearia, 20-45 cm longa, 1.5-2(3)

Figure 1. *Acacia alexandri*. A - Flowering branchlet. B - New shoot showing inflorescences arising synchronously with phyllodes (inserts showing supra-basal peduncular bract and, on older peduncle, scar where bract has fallen). C - Legume. D - Seed showing funicle expanded into a narrow, depressed-clavate aril.
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Bracteoles similar to sepals except laminae twice as large. *Flowers* 5-merous. *Sepals* 1/2 to 3/4 length of petals, free, narrowly spathulate, brown except base often colourless; claws narrowly linear, glabrous; laminae widely ovate, 0.15 mm wide, concave, apiculate, sparsely ciliolate. *Petals* 1.8-2 mm long, joined for c. 3/4 their length, glabrous, midrib not visible. *Legumes* narrowly oblong, to 7 cm long, 7-8 mm wide, chartaceous, ± straight, flat, prominently rounded over seeds with the convexities not extending to the margins, ± straight-edged with occasional deep constrictions between seeds, glabrous, dark brown, obscurely transversely reticulate. *Seeds* longitudinal, oblique or most commonly transverse in legumes, globose, c. 4 mm long, dull, blackish, yellow around the "U"-shaped pleurogram; areole often excentric, open towards the hilum, 0.7 mm long; funicle 1-1.5 mm long, slender, expanded into a narrow, depressed-clavate aril c. 2 mm long.

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Habitat. Pinkish brown loam on rocky limestone slopes in Open Shrub Mallee over Low Scrub and Spinifex (*Triodia* spp.).

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Fruiting period. Legumes with mature seeds have been collected in late October.

Affinities. Closely allied to the widespread species, *A. victoriae*, but distinguished by flowers 60-80 per head, inflorescences initiated on new shoots with 1-4 peduncles arising within the axils of the young phyllodes, legumes 7-8 mm wide, seeds not mottled, funicle slender, and phyllodes usually longer. In Western Australia the phyllodes of *A. victoriae* are generally 2.5-4 cm long and not often linear. However, in the Kimberley region (and also in Queensland) some specimens of *A. victoriae* have linear phyllodes to about 10 cm long but these can be distinguished from *A. alexandri* by the other characters given above. Another widespread member of the "*A. victoriae* group", *A. synchronicia*, grows near *A. alexandri* in the Cape Range but is readily recognised by its much shorter phyllodes (c. 2 cm long) and golden flower-heads.

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2. Acacia aphanoclada Maslin, sp. nov. (Figure 2)

Frutices glabri virgati ad 5 m alti, phyllodiis et ramis ultimis pendulis, ramulis pruinosis. Stipulae plus minusve spinosae, 2.5-4 mm longae, aliquando nullae. Phyllodia anguste linearia, 20-45 cm longa, 1.5-2(3)

Figure 2. *Acacia aphanoclada*. A - Branchlet showing axillary raceme (with legume) and twinned, axillary peduncles (heads at anthesis). B - Node showing axillary raceme with some peduncles subtended by a reduced phyllode (insert showing base of phyllode and gland). C - Legume. D - Seed. A from *H. Demarz* D4751. B from *N. Perry* 194. C & D from *D. O'Meara* s.n.

mm lata, non rigida, praeter ad basim plus minusve cylindrica plana, costa non prominenti. Racemi 5-9(18) cm longi. Pedunculi 1-2 cm longi, graciles, saepe binati, florum capitulis globularibus, aureis, 70-90-floribus. Flores 5-meri. Sepala discreta, anguste spathulata. Legumina anguste oblonga, 6-7 cm longa, 6-8 mm lata, inter semina modice constricta vel non constricta, super semina rotundata, plus minusve firme chartacea, pruinosa minimum juveniliter. Semina longitudinalia ad leviter obliqua, oblonga lato-ovata vel fere circularia, 4-5 mm, arillo plus minusve clavato.

Typus: Near Nullagine, Western Australia, 26 Oct. 1973, *H. Demarz* D4751 (holo: PERTH; iso: K).

Slender, wispy, glabrous, single-stemmed *shrubs* to 5 m tall, stem 2 cm d.b.h., canopy open and sparingly branched, phyllodes and ultimate branchlets pendulous. *Bark* smooth, reddish grey to pale grey-brown or mid-brown. *Branchlets* terete, obscurely nerved, pruinose. *Stipules* triangular to linear-triangular, 2.5-4 mm long, usually spinose or almost so, not prominent, erect to sub-erect, straight, thickened towards base, distal portion often brittle and breaking-off, occasionally absent at all nodes. *Phyllodes* narrowly linear, 20-45 cm long, 1.5-2 mm wide, very rarely 3 mm, to 10 mm on regrowth shoots, pendulous, not rigid, shallowly curved at least near base, flat but becoming ± terete near the pulvinus, somewhat obscurely longitudinally wrinkled when dry, midrib not prominent, lateral nerves not evident; apices attenuate, the slender, indurate, brittle point usually breaking off with age; pulvinus not prominent. *Gland* situated on upper margin of phyllode 2-6 mm above the base, circular to oblong, 0.7-1.2 mm long, 0.4-0.7 mm wide, not or scarcely raised above margin. *Racemes* usually 5-9 cm long, sometimes 18 cm, occasionally a secondary phyllode arising below the axil of the usually twinned peduncles rendering these simple and axillary; raceme axis slender, ± straight, terete, base ebracteate. *Peduncles* 1-2 cm long, slender, usually twinned (rarely solitary or in groups of three) with 1.5-2 cm between adjacent pairs, basal peduncular bracts 1 or 2 and early caducous, an additional small, early caducous bract located near apex of very young peduncles, it sheathes the developing heads and does not leave a visible scar on the peduncle upon dropping. *Flower-heads* globular, golden, densely 70-90-flowered. *Bracteoles* similar to sepals. *Flowers* 5-merous. *Sepals* c. 2/3 length of petals, free, narrowly spathulate, brown (at least at apices) when dry. *Petals* 1.8-2.5 mm long. *Legumes* narrowly oblong, straight edged to moderately constricted between seeds, rounded over seeds with convexities extending to the margins, 6-7 cm long, 6-8 mm wide, to 11 seeded, firmly chartaceous to very thinly coriaceous, straight to shallowly arcuate, obscurely transversely reticulate, brown, pruinose at least when young, marginal nerves narrow, stipe slender and 3-5 mm long. *Seeds* longitudinal to slightly oblique in the legume, oblong, widely ovate or almost circular, turgid to slightly compressed, 4-5 mm long, 3.5-4.5 mm wide, ± dull, dark brown but often yellowish near the pleurogram; pleurogram obscure, very shallowly "U"-shaped; areole 0.3-0.4 mm long, open towards the hilum, excentric, situated between centre of seed and hilum; funicle short and once-folded, expanded into a creamy white, narrow, ± clavate, terminal aril.

Other specimens examined. WESTERN AUSTRALIA: Nullagine area, *J.S. Beard* 2824 (KP, PERTH), *M.K. Deighton* 311 (PERTH), *A.S. George* 15716 (MEL, PERTH), *F. Lullfitz* L2699 and *A.R. Fairall* (KP), *B.R. Maslin* 4957 (NSW, PERTH), *K. Newbey* 10202 (PERTH), *D. O'Meara* s.n. (PERTH 00856320), *N. Perry* 194 (PERTH).

Flowering and fruiting period. August-October.

Fruiting period. Legumes with mature seeds occur in October-November and may be present with the flowers.

Distribution. North-west Western Australia in the Fortescue Botanical District (1:250,000 map F51-5). Known only from near Nullagine. Further work in this relatively under-collected area may extend the species range, especially in areas east and west of Nullagine.

Habitat. Rocky "spinifex" (*Triodia* spp.) hills with scattered eucalypts and acacias. Geologically the new species occurs on Mosquito Creek sediments and on conglomerates (D. O'Meara, pers. comm.)

Conservation status. 2[k] according to the criteria of Briggs & Leigh (1988).

Affinities. The species is readily distinguished from other members of the "*A. victoriae* group" by its very long phyllodes (which are perhaps the longest in the genus).

Etymology. The specific epithet is derived from the Greek *aphanes*, meaning unseen, invisible, obscure, and *klados*, meaning a branch. It refers to the characteristic wispy growth habit consisting of very slender stems and open crowns of very narrow, pendulous phyllodes. The plants are therefore rather difficult to detect in the field even though they may reach 5 m in height.

3. Acacia chartacea Maslin, sp. nov. (Figure 3)

Frutices vel arbores glabrae 1.5-4(6) m altae, ramulis et ramis superis pruinosis. Stipulae spinosae, 3-6 mm longae, saepe nullae aetate provecta. Phyllodia plus minusve asymmetrica, plerumque ovata ad elliptica vel anguste elliptica, rotundato-obtusa et retusa ad subretusa, (2)2.5-5.5(6.5) cm longa, (0.7)1-2.5(3.3) cm lata, ratione horum (1.5)2-4(5), coriacea, viridia, costa prominenti, obscure penninervia. Racemi (1)3-8(14) cm longi, pedunculis aliquando a phyllodium secundarium subtendentibus, infrequenter inflorescentiae simplices ut in *A. synchronicia*. Pedunculi plerumque binati, 8-15 mm longi, florum capitulis globularibus, dilute citreis ad cremeis, dense 60-90-floribus. Flores 5-meri. Sepala discreta anguste spathulata. Legumina anguste oblonga, ad 5 cm longa, 8-12 mm lata, chartacea, pallide (luteola) brunnea. Semina plus minusve transversalia, elliptica, 3 mm longa, 2-2.3 mm lata, funiculo lineari et plus minusve recto, arillo plerumque subconico.

Typus: 49.5 km S of Billabong Roadhouse, North West Coastal Highway, Western Australia, 22 Sept. 1976, *B.R. Maslin* 4331 (holo: PERTH; iso: CANB, K, MEL, NSW, NY).

Erect, straggly, glabrous *shrubs* or *trees*, 1.5-4 m tall, sometimes to 6 m, crown somewhat diffuse. *Bark* dark grey and fissured on main trunks, upper branches and branchlets smooth and pruinose, on young plants the pruinosity extends to ground level. *Branchlets* terete, obscurely ribbed, pruinose. *Stipules* spinescent, robust, rigid, 3-6 mm long, spreading, straight to very shallowly recurved, frequently deciduous or only bases remaining at many nodes. *Phyllodes* slightly to moderately asymmetric, occasionally markedly asymmetric, upper margin usually more convex than the lower, ovate to elliptic or narrowly elliptic, sometimes a few obovate or lanceolate, (2)2.5-5.5(6.5) cm long, (0.7)1-2.5(3.3) cm wide, 1:w = (1.5)2-4(5), coriaceous, smooth and slightly thickened when fresh, very finely wrinkled when dry, slightly undulate, green; midrib prominent, central or towards lower margin, obscurely penninerved with lateral nerves diverging from midrib at an acute angle; apices rounded-obtuse, retuse to sub-retuse, insignificantly mucronulate, mucro c. 0.5 mm long; pulvinus 2-4 mm long, terete. *Glands* situated on upper margin of phyllode, the basal gland circular or oblong, 0-2 mm above pulvinus and usually 0.5-1 mm long, usually a second insignificant gland present near the mucro and flanked by a pair of microscopic, caducous, stipule-like appendages. *Racemes* concentrated towards ends of branchlets, 1-2 per axil, sometimes a secondary phyllode developed within axil of the twinned peduncles so that

Figure 3. *Acacia chartacea*. A - Flowering branchlet. B - Portion of branchlet, note two peduncles with a supra-basal bract (insert showing spinose stipules). C - Legume. D - Seed.
A from *B.R. Maslin* 4331. B from *A.C. Burns* 1056. C & D from *A.M Ashby* 4495.

some (rarely all) inflorescences are simple, infrequently all inflorescences simple and initiated on new shoots as in *A. synchronicia;* raceme axis (1)3-8(14) cm long, ± straight, base ebracteate. *Peduncles* commonly twinned, 8-15 mm long, base ebracteate at anthesis, a usually caducous bract normally situated near apex of peduncle is triangular-ovate and c. 1 mm long. *Flower-heads* globular, cream to pale lemon yellow, densely 60-90-flowered. *Bracteoles* similar to sepals. *Flowers* 5-merous. *Sepals* free, 1/2 to 2/3 length of petals, narrowly spathulate, claws narrowly linear. *Petals* c. 2.5 mm long. *Legumes* narrowly oblong, to 5 cm long, 8-12 mm wide, chartaceous, straight, not or scarcely constricted between seeds although occasional moderately deep constrictions occur, rounded over seeds along midline, finely transversely reticulate, light (yellowish) brown, slightly shiny, obtuse-apiculate, stipe slender and to 5

mm long. *Seeds* transverse to slightly oblique, elliptic, 3 mm long, 2-2.3 mm wide, shiny, dark brown to black except areolar region which is usually yellowish; pleurogram very obscure, "U"-shaped; areole c. 0.5 mm long, open towards the hilum; funicle linear and ± straight, expanded into a once-folded, usually sub-conical aril.

Selected specimens examined. WESTERN AUSTRALIA: 23 miles [37 km] from Gnaraloo Station, *K.M.Allan* 394 (CANB, K, MEL, PERTH); 100 mile tank [48 km N of Murchison River] on North West Coastal Highway, 7 Jan. 1972, *A.M. Ashby* 4495 (CBG, NSW, PERTH); 390-394 mile peg on Carnarvon road [11-17 km N of Murchison River, North West Coastal Highway], *A.C. Burns* 1056 (BRI, PERTH); Peron Station, 25° 46' S, 113° 31' E, *R.J. Cranfield* 2515 (PERTH); Nanga Station, 26° 08' S, 113° 51' E, *R.J. Cranfield* 2572 and 2573 (both PERTH); Useless Loop, Tamala road, 26° 10' S, 113° 25' E, *H. Demarz* D6003 (KP); 14 miles [22.5 km] N of Quobba Station, *A.S. George* 10171 (CBG, NSW, PERTH); 31 miles [49.9 km] N of Murchison River, North West Coastal Highway, *A.S. George* 11236 (CANB, K, PERTH); Cooloomia Nature Reserve, c. 13 km W of Cooloomia homestead, *S.D. Hopper* 1396 (PERTH); 48 km N of Murchison River on North West Coastal Highway, *B.R. Maslin* 3344 (PERTH); 10.5 km W of Overlander-Denham road towards Tamala, *B.R. Maslin* 3686 (CANB, K, PERTH); Meadow Station, *A.Payne* 339 (PERTH); Gnaraloo Station homestead, Lake MacLeod district, *L. Thompson* LXT 1200 (PERTH); Old Haul road, 5 km from Cape Cuvier, 1 Oct. 1982, *J. Tyler* s.n. (PERTH 00165530).

Distribution. Western Australia in the Carnarvon and Irwin (northern extremity) Botanical Districts (1:250,000 maps G49-4, 8, 12; G50-9, 13). Near the Murchison River north to Shark Bay with an outlying population near Cape Cuvier (c. 150 km north of Shark Bay).

Habitat. Sand or sandy clay on flat or gently undulating country. In tall dense shrubland commonly with *Acacia longispinea*, *A. neurophylla*, *A. rostellifera* and species of *Banksia*, *Eucalyptus* and *Hakea*. At Cape Cuvier it grows in *Triodia*-shrub steppe on alkaline sand (pH9) with *Acacia coriacea*, *A.tetragonophylla* and *Eucalyptus fruticosa*

Affinities. Most readily distinguished from other members of the "*A. victoriae* group" by a combination of its broad phyllodes which are retuse to sub-retuse and its predominantly racemose inflorescences with cream to pale lemon yellow heads (each 60-90-flowered). Within this group it appears that only *A. chartacea* and *A. ryaniana* have a (minute) gland which is flanked by a pair of stipule-like appendages at the apices of at least some phyllodes. These two species grow in close proximity in the Cape Cuvier region but *A. chartacea* is readily recognised, in addition to the characters given above, by its tall, erect habit (prostrate and low-domed in *A. ryaniana*).

Etymology. The specific epithet refers to the papery legumes.

4. Acacia cuspidifolia Maslin, Nuytsia 4: 79, fig. 4 (1982).

The species is described and illustrated in the above publication.

Distribution. North-west Western Australia in the Ashburton and Carnarvon Botanical Districts, also on the border of the Ashburton-Austin and Ashburton-Fortescue Botanical Districts (1:250,000 maps F49-16; F50-13,15; F51-13; G49-4; G50-1,2,4,5,6,8,10). Extending from Minilya Station E to near Mundiwindi and S to near Ballythana Hill.

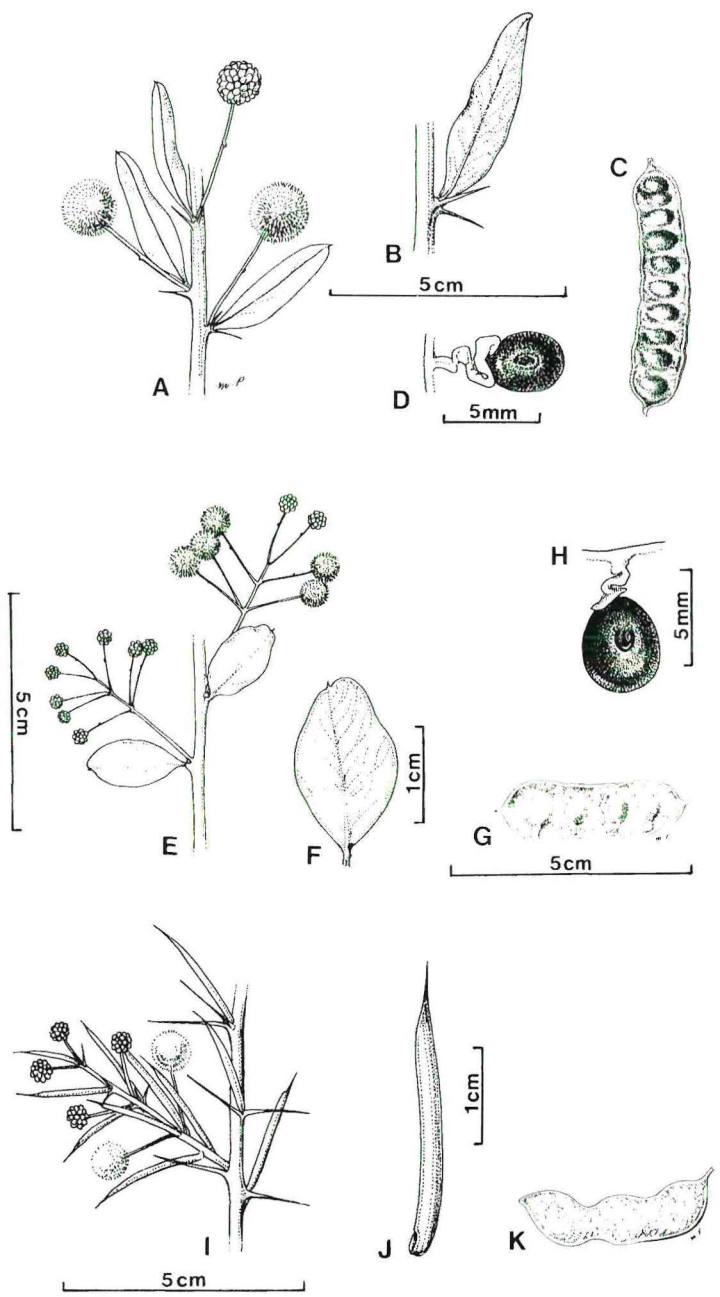

Figure 4. (A-D) *Acacia dempsteri*. A - Portion of branchlet showing peduncles with scar of supra-basal bract and large heads. B - Node showing spinose stipules. C - Legume. D - Seed. (E-H) *Acacia glaucocaesia*. E - Portion of branchlet showing racemes with slender axes and twinned peduncles with scar of supra-basal bract. F - Phyllode. G - Legume. H - Seed. (I-K) *Acacia pickardii*. I - Portion of branchlet showing prominent stipules. J - Phyllode (terete) with basal gland. K - Legume.
A & B from *R.J. Chinnock* 3023. C & D from *J. Kitcher* S907. E & F from *P. Glennon* 13. G & H from *L. Thomson* LXT 1183. I & J from *P.K. Latz* 8516 (PERTH). K from *R. Grandison* 231.

5. Acacia dempsteri F. Muell., Fragm. 11: 65 (1879). (Figure 4A-D)

Type: between Esperance Bay and Frasers Range, Western Australia, 1876, *Dempster* (holo: n.v.; iso: PERTH - fragment ex MEL).

Straggly *shrubs* or *trees* to c. 3 m tall. *Branchlets* terete, finely ribbed, glabrous, pruinose. *Stipules* spinose, (2)5-12 mm long, straight. *Phyllodes* lanceolate to narrowly lanceolate, often slightly asymmetric, excentrically mucronulate, mucro <1 mm long and sometimes pungent, 3-6 cm long, 4-10(13) mm wide, 1:w = 4-12, thinly coriaceous, straight to shallowly curved or shallowly sigmoid, glabrous, green to grey-green, midrib rather prominent, lateral nerves obscure. *Inflorescences* initiated synchronously with phyllodes on new shoots, the phyllodes normally maturing prior to anthesis so that the peduncles appear axillary, a few determinate racemes 1-8 mm long commonly occurring with some at least the result from phyllode suppression on the young shoots. *Peduncles* 1 or 2 per axil, 15-25 mm long, glabrous, base ebracteate; bract above middle of peduncle caducous (bract scar visible on mature peduncles), triangular-ovate, 0.5-1 mm long. *Flower-heads* globular, golden, densely 40-50-flowered, large, c. 1 cm diam. when dry. *Flowers* 5-merous. *Sepals* 1/3-2/5 length of petals, free, narrowly spathulate. *Petals* 2.5-3 mm long, glabrous, midrib not visible. *Legumes* narrowly oblong, raised over seeds, to 5 cm long, 8-10 mm wide, firmly chartaceous, glabrous, dark brown. *Seeds* transverse, oblong-elliptic, 3-4 mm long, 2-3 mm wide, shiny, dark brown except yellow at centre; pleurogram "U"-shaped, not prominent; areole c. 1 mm long, open towards the hilum, aril once- or twice-folded, cream.

Selected specimens examined. WESTERN AUSTRALIA: Rocky outcrop 68 km NW of Mount Ragged, *W. Archer* 22099022 (PERTH); Breeborinia Rock, *K. Bradby* KLB60 (PERTH); Dundas Rocks, ca 22 km S of Norseman, *R.J. Chinnock* 3023 (PERTH); about 22 km S of Norseman, *R.J.Chinnock* (PERTH); Gilmores, *C.A. Gardner* 2849 (K, PERTH); cultivated, Kings Park Botanic Garden, *J. Kitcher* S907 (PERTH); near Kundas Rock, *B.R. Maslin* 2473 (PERTH); 26 km W of Ponier Rock, *K. Newbey* 7620 (PERTH).

Distribution. South-west Western Australia in the Coolgardie Botanical District (1:250,000 maps H51-13,14; I51-1,2,3,7). Scattered from Depot Rock near Kambalda S to Gilmore Rocks and E to Breeborinia Rock, c. 100 km S of Balladonia.

Habitat. Confined to granite outcrops where it grows on sand or sandy loam.

Affinities. Distinguished from other members of the "*A. victoriae* group" by its large golden heads, lanceolate phyllodes and prominent, persistent stipules.

6. Acacia glaucocaesia Domin, Biblioth. Bot. 89: 252 (1926). (Figure 4E-H)

Type: Between the Ashburton and De Grey Rivers, Western Australia, *E.E. Clement* (syn: PR 527979 (sphalm. "legit. *A.A. Dorrien-Smith*") and PR 527978).

A. glabriflora Maiden & Blakely, J. Roy. Soc. W. Australia 13: 12 pl. 3 figs. 12-18 (1928), non Domin (1926), *synon. nov.* *Type*: Between the Ashburton and De Grey Rivers, Western Australia, *E.E. Clement* (holo: NSW 206821; iso: K, PERTH).

Illustration. J.H. Maiden & W.F.Blakely, *loc. cit.*

Dense, glabrous *shrubs* or *trees* 2-6 m tall. *Branchlets* terete, obscurely ribbed, conspicuously pruinose. *Stipules* presumably spinose on young plants (see *Variation* below) but only the minute, blunt bases persisting as tooth-like projections at nodes on mature plants. *Phyllodes* elliptic to narrowly elliptic or lanceolate, sometimes obovate to oblong-oblanceolate, rounded to obtuse, 1.5-2.5 cm long, (5)7-13 mm wide, 1:w = 1.5-3, thin, glaucous, rarely green except on new growth, midrib not prominent, obscurely penninerved. *Gland* situated on upper margin of phyllode at distal end of pulvinus, not overly prominent, c. 0.5 mm long. *Inflorescences* most commonly racemose with some peduncles subtended by secondary phyllodes as in *A. victoriae*, sometimes a few simple and initiated on new shoots as in *A. synchronicia*, both types may be present on a single plant. *Racemes* 1-6 cm long, axes slender, ebracteate at base. *Peduncles* mostly twinned, 7-10 mm long, slender, base ebracteate; bract above middle of peduncle caducous (bract scar visible on mature peduncles). *Flower-heads* showy and prolific, globular, small, 4 mm diam. (when dry), pale yellow, densely 35-50-flowered. *Flowers* 5-merous. *Sepals* free, narrowly spathulate. *Petals* 1-1.4 mm long, nerveless. *Legumes* narrowly oblong, to 4 cm long, 10-13 mm wide, chartaceous, flat, rounded over seeds along midline, moderately pruinose. *Seeds* transverse, oblong to ovate, 4.5-5 mm long, 3-4 mm wide, slightly shiny, brown to blackish, sometimes very obscurely mottled; pleurogram "U"-shaped, not prominent; areole c. 0.5 mm long, open towards the hilum; funicle short, thick, cream, scarcely arillate.

Other specimens examined. WESTERN AUSTRALIA: Nickol River, 1878, *A. Forest* s.n. (MEL 118332); Mardie Station, Fortescue River, *C.A. Gardner* 3079 (PERTH); Karratha-Port Hedland area, *P. Glennon* 13 (PERTH 00152897 - in flower & PERTH 00669423 - immature fruit); Dampier Salt leases, Dampier, *P. Glennon* 236 (PERTH) & 381 (CANB, PERTH); Muda-Karratha, *L.C. Snook* s.n. (PERTH 00153397); Turtle Island [North Turtle Island, off Port Hedland], Capt. *Wickham*, coll. *Bynoe* and *Stokes*, Voyage of H.M.S. "Beagle", 1839-1840 (K); 2.8 km W of Goldsworthy turn-off on North West Coastal Highway, *L. Thompson* LXT 1183 (PERTH).

Distribution. North-west Western Australia in the Fortescue and (western extremity of) Canning Botanical Districts (1:250,000 maps F50-2, 4, 6). Known only from a few scattered localities in the western part of the Pilbara region between the Fortescue and De Grey Rivers. A variant from Salt Creek (E51-13) is discussed below.

Habitat. Sandy loam on flood plains; commonly forming almost monospecific stands.

Flowering and fruiting period. Flowers late July-September. Legumes mature from late October into November.

Synonymy. In describing *A. glabriflora* Maiden and Blakely must have been unaware that Domin had already published the name *A. glaucocaesia* for the same taxon some two years previously. Not only did Maiden & Blakely base their name on the same E.E. Clement collection as was used by Domin (seemingly using different specimens) but they also adopted an epithet that Domin had used for quite a different species in 1926.

Variation. The following vegetative specimen is tentatively referred to *A. glaucocaesia*: Salt Creek, 27 km due E of Great Northern Highway between Port Hedland and Broome, 19° 44' S, 121° 28' E, *B.R. Maslin* 4874 (PERTH). It differs from the other material of this species in that it has persistent spinose stipules (2 mm long, slender, straight) and often slightly narrower phyllodes than normal (5-9 mm wide, 1:w = 2-4). This specimen was taken from a regrowth population which may account for these slight abberations. Salt Creek is located about 250 km NE of the most northerly known occurrence of "typical"

A. glaucocaesia. All other specimens seen of *A. glaucocaesia* have been biologically mature (i.e. in flower or fruit) and have only the minute, thickened stipule bases persisting at the nodes.

Affinities. The taxonomic status of this poorly collected species is uncertain. Until now specimens here attributed to *A. glaucocaesia* had been placed under *A. victoriae*. While these two taxa are certainly closely related, current evidence suggests that *A. glaucocaesia* is better treated as a distinct species rather than as a subspecies of *A. victoriae*. These two taxa share the following significant characters: inflorescences predominantly racemose, peduncles slender, flower-heads pale yellow, phyllodes with small glands, legumes chartaceous, flat, rounded over seeds along the midline and funicles thick and scarcely arillate. *Acacia glaucocaesia* is most readily distinguished from the widespread *A. victoriae* by its more numerous flowers per head and its short, broad phyllodes with a less pronounced midrib. Furthermore, in *A. victoriae* the branchlets are sometimes not pruinose, the spinose stipules are commonly persistent at some mature nodes and the legumes reach 8 cm long. Although both species occur in the Pilbara they are not sympatric, *A. glaucocaesia* occurring near the coast and *A. victoriae* occurring inland.

Acacia glaucocaesia is also related to *A. synchronicia*. The two species grow in close proximity around Karratha where *A. glaucocaesia* is recognised by its less straggly growth habit and denser crowns. Furthermore, it commences flowering earlier (late July compared with September) and the heads are smaller, more abundant, a lighter yellow and at least a proportion are arranged in racemes. Other characters useful in distinguishing *A. glaucocaesia* include its pruinose branchlets and usually narrower phyllodes. In *A. synchronicia*, however, there is considerable variation in size of phyllode whose dimensions are occasionally similar to those of *A. glaucocaesia*. These broad phyllode forms of *A. synchronicia* differ from *A. glaucocaesia* in their non-racemose inflorescences and their thicker phyllodes (thus the lateral venation is very obscure or seemingly absent) which possess a more prominent gland.

Utilization. According to the collectors note on *Thompson* LXT 1183 this species is a favoured browse of cattle. Because of its prolific flowering it does make a very attractive ornamental.

7. Acacia pickardii Tind., Telopea 1: 372 (1978). (Figure 4I-K)

As only flowering specimens were described in the protologue, a description of the fruits are given here. This is based on a specimen collected from c. 3 km S of Mt Gason on Birdsville Track (*R. Grandison* 231, AD) but unfortunately mature seeds were not present. The species is described and illustrated by Whibley (1980 and 1986) and Maslin (1981).

Legumes narrowly oblong, straight-edged or somewhat irregularly constricted between the seeds, to 4 cm long and 14 mm wide, chartaceous, ± straight, flat, light brown, glabrous, finely and openly obliquely reticulate. *Seeds* (very immature) seemingly transverse with a filiform, straight funicle.

Distribution. South Australia and Northern Territory (1:250,000 maps G53-3,7; G54-9,13). Known only along the Birdsville track S of Mt Gason Bore in north eastern South Australia and the Andado Station - O'Neill Point area in south eastern Northern Territory.

Affinities. Although the protologue contrasts this species with *A. teretifolia* (from southwest Western Australia) its affinities are clearly with the *A. victoriae* group, as evidenced by its inflorescence and legume characters. Among other things, *A. teretifolia* differs in being a sub-shrub 0.2-0.5 m tall, its phyllodes have a minute gland (c. 0.2 mm diam.) located near their middle and its peduncles possess a

caducous, brown basal bract but lack the very unusual supra-basal bract of *A. pickardii*. The legumes of *A. teretifolia* are totally different from those of *A. pickardii* in being ± terete, sub-woody and red-brown in colour while the seeds are as equally different in being longitudinal and possessing a terminal, conical aril.

8. Acacia ryaniana Maslin, sp. nov. (Figure 5)

Frutices prostrati vel demisso-tholiformes ad 0.3 m alti. Stipulae persistentes, 2-6 mm longae. Phyllodia ovata vel elliptica ad anguste elliptica, 12-25(30) mm longa, (5)7-15 mm lata, ratione horum 1.2-3, coriacea, glabra, viridia, uninervata, subtiliter penninervia. Inflorescentiae simplices et in surculis juvenibus orientes, pedunculis 1 in quoque axilla, 15-30 mm longis, glabris, florum capitulis globularibus, aureis, dense 60-70-floribus. Flores 5-meri. Sepala discreta, anguste spathulata. Legumina arcuata, ad 8 cm longa, 10-18 mm lata, chartacea, plana, super semina rotundata, globosa ad lato-elliptica, 5-6 mm longa.

Typus: Miaboolia Beach, c. 7 km N of Carnarvon, 31 Aug. 1988, *B.R. Maslin* 6295 (holo: PERTH; iso: CANB, K, MEL, NY).

Prostrate or low-domed *shrubs* to 0.3 m tall. *Branchlets* terete, finely ribbed, glabrous, rarely puberulous (hairs short, straight, patent and a little coarse), usually pruinose. *Stipules* persistent, spinescent, 2-6 mm long, slender or stout, sometimes breaking so that on old branches only the bases remain, spreading, straight to shallowly recurved, light brown but often yellowish at base. *Phyllodes* ovate or elliptic to narrowly elliptic, some tending obovate in cultivation, 12-25(30) mm long, (5)7-15 mm wide, l:w = 1.2-3, coriaceous, slightly undulate, glabrous, green, slightly shiny; midrib rather prominent, central, sometimes drying yellowish, lateral nerves fine but evident and anastomosing; marginal nerves narrow, yellow; apices obtuse to sub-acute, excentrically mucronulate; pulvinus c. 1 mm long. *Glands* situated on upper margin of phyllode, basal gland not prominent, 0-1 mm above pulvinus, 0.2-0.5 mm long, lip not raised, sometimes a second, insignificant gland adjacent to the mucro and flanked by a pair of microscopic, caducous, stipule-like appendages. *Inflorescences* initiated within axil of juvenile phyllodes on some new shoots, subtending phyllodes usually reaching maturity before anthesis. *Peduncles* 1 per axil, 15-30 mm long, glabrous, base ebracteate, a caducous bract situated near or above middle of peduncle narrowly triangular, c. 1.5 mm long, scarious and yellowish, the bract scar visible on mature peduncles. *Flower-heads* globular, 10 mm diam. (fresh), golden, densely 60-70-flowered. spathulate, claws narrowly linear. *Petals* 2-2.5 mm long, united for c. 1/2 their length, glabrous, nerveless or obscurely 1-nerved. *Legumes* curved, to 8 cm long, 10-18 mm wide, chartaceous, flat, rounded over seeds and not or variably constricted between them, glabrous, light brown or yellow-brown, finely transversely reticulate. *Seeds* transverse to oblique in the legume, globose to widely elliptic and slightly compressed, 5-6 mm long, slightly shiny, dark brown but frequently light brown or yellowish brown in vicinity of the "U"-shaped pleurogram; areole 1.5-2 mm long, open towards the hilum; funicle expanded into a once- or twice-folded narrow aril which is sometimes curved over end of seed.

Selected specimens examined. WESTERN AUSTRALIA: 7 miles [11.2 km] N of Quobba Station, *K.M.Allan* 387 (CANB, K, PERTH); 6 miles [9.6 km] N of Quobba H.S., *A.S. George* 10157 (CANB, PERTH, TLF); Miaboolia Beach, c. 5-6 km due N of Carnarvon, 22 July 1986, *P. Loeper* s.n. (PERTH 00649910); Sandy Bay Camp, Exmouth, Aug. 1987, *H. Pringle* s.n. (PERTH 00805769); Cultivated at 10 Dodd Court, Karratha, *B.R. Maslin* 5739 (PERTH); 1.2 km W of the Exmouth-Minilya road on road to Coral Bay, *B.R. Maslin* 6280 (K, PERTH); Cultivated at 10 Dodd Court, Karratha (from seed collected on roadside between Exmouth road and Coral Bay), 15 Sept. 1983 and 7 Oct. 1983, *P. Ryan* s.n. (PERTH 00165573 and 00165581); Near Cape Cuvier, 10 Nov. 1982, *J. Tyler* s.n. (PERTH 00165603).

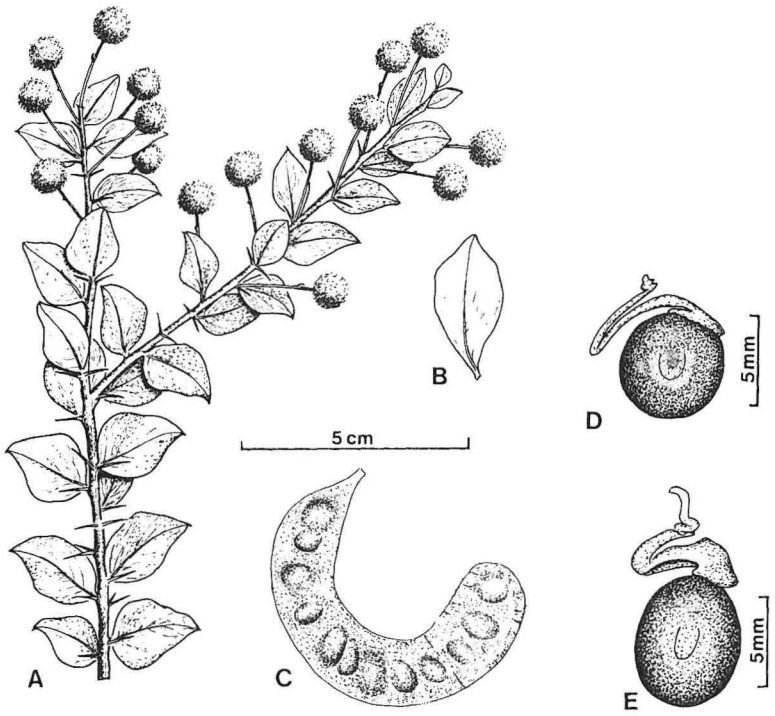

Figure 5. *Acacia ryaniana*. A - Flowering branchlet. B - Phyllode (oblanceolate) from cultivated plant. C - Legume. D & E - Seeds showing shape and funicle-aril variation.
A from *B.R. Maslin* 6295. B from *B.R. Maslin* 5739. C to E from *A.S. George* 10157.

Distribution. Western Australia in the Carnarvon Botanical District (1:250,000 maps F49-12, 16, G49-4). Known only from coastal and near-coastal areas between Carnarvon and Exmouth. The species is not very common at the few localities where it occurs.

Habitat. Grows in sand (either over clay or limestone - P. Ryan pers. comm., 31/3/88) on dunes and associated flats in scrub or heath, often with *Triodia* spp.

Flowering period. Paucity of collections makes it difficult to accurately ascertain the flowering period. In cultivation the species flowers between May and September/October. Under natural conditions it is known to flower from late June - August and in November. One collection made in September had both buds and mature fruits present on the same plant. These data suggest that the species may flower throughout the entire year, perhaps in response to rainfall (P. Ryan, pers. comm. 31/3/88).

Fruiting period. Legumes with mature seeds have been collected in September and October.

Affinities. The new species is readily distinguished from the other members of "*A. victoriae* group" by its broad, curved legumes and ± prostrate habit. Other characteristic features are its persistent spinose stipules, short, broad phyllodes, golden head of 60-70 flowers, simple inflorescences which are initiated on new shoots, and large seeds. Grows in close proximity to *A. chartacea* and *A. victoriae* at Cape Cuvier.

Cultivation. Successfully cultivated as a ground-cover shrub in Karratha by Pat Ryan from seed collected near Coral Bay. Compared with plants in the wild, those in cultivation may have phyllodes which are slightly larger (to 3 cm long) and tending obovate.

Etymology. Named after Pat Ryan who, although not the first collector of this species, was the first to bring it to my attention. He first cultivated it while Nursery Manager for the Department of Conservation and Land Management in Karratha. Pat is currently a Rural Advisor for CALM in Geraldton.

9. Acacia synchronicia Maslin, sp. nov. (Figure 6)

Frutices vel arbores expansae glabrae 1.5-3(6) m altae. Stipulae spinosae, 3-10 mm longae, plerumque nullae vel infrequentia aetate provecta. Phyllodia variabilia, anguste oblonga ad anguste elliptica vel anguste oblongo-oblanceolata, aliquando linearia vel elliptica, 1.5-3 cm longa, (1-2)3-8(13) mm lata, ratione horum (2)3-7(14), subcarnosa, in sicco subtiliter corrugata viridia ad glauca, costa et nervis lateralibus obscuris, glande paulo prominenti. Inflorescentiae simplices et in surculis juvenibus orientes, racemis determinatis raris. Pedunculis 10-20 mm longis, florum capitulis globularibus, aureis (35)40-70-floribus. Flores 5-meri. Sepala discreta, anguste spathulata. Legumina anguste oblonga, ad 4-5(7) cm longa, (7)8-12(14) mm lata, chartacea, plana, super semina rotundata. Semina transversalia, ovata ad elliptica, (3)4-5 mm longa, nigra vel maculata, funiculo brevi, crasso, anguste arillata.

Typus: Karratha, opposite Clarkson Road, Western Australia, Sept. 1988, *P. Glennon* s.n. (holo: PERTH; iso: CANB, G, K, MEL, NY).

Spreading, somewhat diffuse, open or mid-dense *shrubs* or small *trees* commonly 1.5-3 m tall, sometimes 6 m, single-stemmed or sparingly divided at or near ground level. *Bark* greenish or grey and finely fissured on main trunks, upper branches green to bronze. *Branchlets* terete, very finely ribbed, glabrous, sometimes pruinose. *Stipules* spinescent, rigid, 3-10 mm long, spreading, straight, present on young plants but commonly absent or infrequent with age, herbarium specimens usually show only the short basal portions persisting as blunt protruberances flanking the phyllodes. *Phyllodes* variable in shape and size, narrowly oblong to narrowly elliptic or narrowly oblong-oblanceolate, sometimes linear or elliptic, 1.5-3 cm long, (1-2)3-8(13) mm wide, l:w = (2)3-7(14), smooth and sub-fleshy when fresh, very finely wrinkled when dry, ± straight, glabrous, pale green to grey-green to glaucous; midrib and lateral nerves not prominent, sometimes submerged and thus seemingly absent; apices obtuse to sub-acute, rarely acute, mucro central or excentric; pulvinus c. 1 mm long. *Gland* situated on upper margin of phyllode 0-2 mm above pulvinus, circular to widely elliptic, prominent, (0.3)0.5-1.2 mm long, (0.3)0.5-1 mm wide, usually wider than margin. *Inflorescences* mostly initiated on new shoots with 1 or 2 peduncles arising from within axils of developing phyllodes, subtending phyllodes reaching maturity before anthesis, rarely a few determinate racemes present. *Peduncles* 10-20 mm long, glabrous, base ebracteate, a caducous bract situated near or above middle of peduncle narrowly triangular, 1-1.5 mm long, scarious and brown, the bract scar visible on mature peduncles. *Flower-heads* globular, golden, densely (35)40-70-flowered. *Bracteoles* similar to sepals except the lamina is about twice as large. *Flowers* 5-merous. *Sepals* 1/2-3/4 length of petals, free, narrowly spathulate; claws narrowly linear, colourless, glabrous; laminae 0.1-0.2 mm wide, acute, light brown, glabrous, rarely hirsutellous. *Petals* 1.5-2 mm long, joined for c. 1/2 their length, glabrous, rarely sparsely hirsutellous, midrib not visible. *Legumes* narrowly oblong, to 4-5(7) cm long, (7)8-12(14) mm wide, chartaceous, flat, rounded over seeds along the midline, scarcely constricted between seeds, glabrous, light brown or purplish brown, sometimes slightly pruinose, obscurely transversely reticulate. *Seeds* remaining attached to valve for some time following dehiscence, transverse in the legume, ovate to widely elliptic, (3)4-5 mm long, 3-4 mm wide, compressed (2-2.5 mm thick), ± dull but areole sometimes shiny, mottled black over

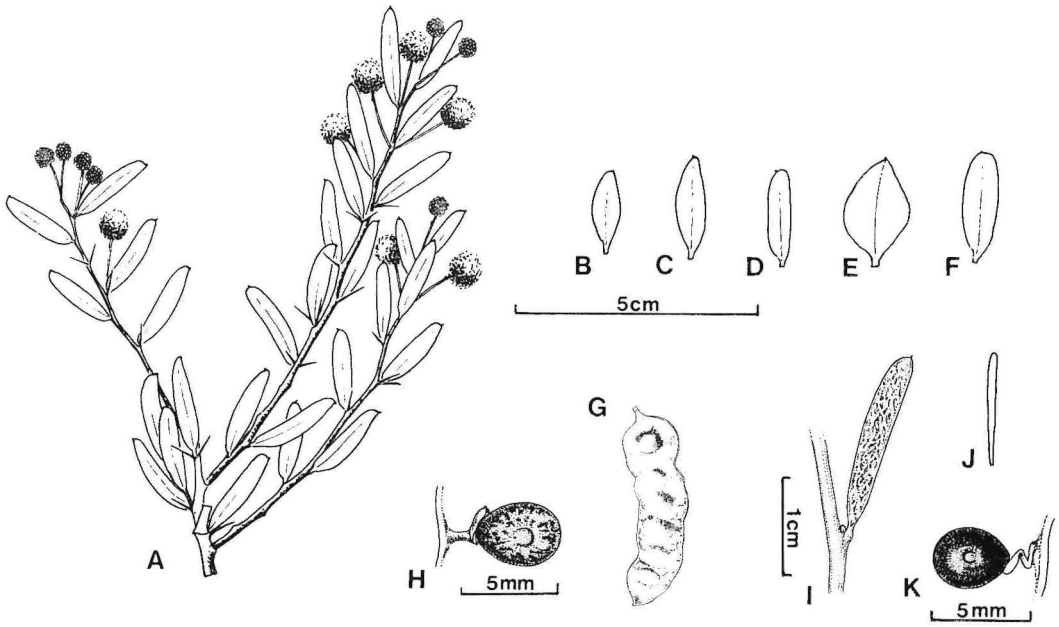

Figure 6. *Acacia synchronicia*. A - Flowering branchlet showing axillary peduncles. B-F - Phyllode variation (note obscure midrib). G - Legume. H - Seed. (I-J) Narrow phyllode variant. I - Node showing narrow, wrinkled phyllode. J - Phyllode (at same scale as typical variant). K - Seed.
A & D from *J.R. Maconochie* 1716. B from *J.V. Blockley* 440. C from *B.R. Maslin* 5290. E from *B.R. Maslin* 5267. F from *C.A. Gardner* 6234. G & H from *A.M. Ashby* 4490. I from *A.S. Mitchell* 724. J from *P.G. Wilson* 10293. K from *M. McInnes* s.n.

either yellow or light brown, entirely black or very obscurely mottled on the narrow phyllode variant; areole "U"-shaped, open towards the hilar end, 0.5-1.5 mm long, 0.4-1 mm wide; funicle narrowly oblong to linear, short and thick, 1-2 mm long, 0.5-0.6 mm wide, slightly expanded into a small sub-terminal aril.

Selected specimens examined. WESTERN AUSTRALIA: 58 miles [93.3 km] from Halls Creek on road to Fitzroy Crossing, *I.B. Armitage* 166 (PERTH); S of 506 mile peg, North West Coastal Highway, *A.M. Ashby*, 4490 (CANB, K, MEL, PERTH); Duck Creek, 5 miles (8 km) from Station, *J.V. Blockley* 440 (PERTH); Barrow Island, *R. Buckley* 6952 (PERTH); Near Mindi Springs, Hamersley Range National Park, *C. Done* 093 (BRI, K, PERTH); Fitzroy River on Cherrabun Station, *D. Fell* 285 (DNA, PERTH); 10 km NE of Nita Downs Station, *P.R. Foulkes* 23 (PERTH); Hamersley Pass, Hamersley Range, *C.A. Gardner* 3131 (PERTH); near Winning Pool, *C.A. Gardner* 6234 (PERTH); E of No.2 Well, Charles Knife Road, Cape Range, *A.S. George* 10334 (PERTH, TLF); Maitland River, S of Karratha, *P. Glennon* 14 (PERTH); c. 27 miles [43.4 km] W of Fitzroy Crossing, *J.R. Maconochie* 1299 (DNA, PERTH); Alice Bore, Gordon Downs, *J. Maconochie* 1761 (PERTH); Upper Rudall River area, c. 22°30'S, 122°15'E, *B.R. Maslin* 2046, (BM, G, MO, NY, PERTH), 2053 (K, NSW, PERTH, US), 2053a (CANB, K, PERTH) and 2076 (BRI, CANB, K, MEL, PERTH); About 24 km S of Carnarvon, near Callagiddy turn-off on North West Coastal Highway, *B.R. Maslin* 2770 (PERTH); 14.5 km from Cue towards Mileura Station, *B.R. Maslin* 3597 (PERTH); Hamelin Pool Station, *B.R. Maslin* 3653 (PERTH); 57.5 km SE of Yalgoo towards Paynes Find, *B.R. Maslin* 4253 (PERTH); 51.5 km W of Gascoyne Junction on the road to Carnarvon, *B.R. Maslin* 5000 (PERTH); Mount James Station, 47 km N of Landor Station Homestead on track to Mount Augustus Station, *B.R. Maslin* 5185 (PERTH); 6 km S of Nullagine on Great Northern Highway, *B.R. Maslin* 5267 (PERTH); Tangadee Station, about 10 km NE of Homestead, *B.R. Maslin* 5290 (PERTH); Upper Rudall River area, *M. McInnes* s.n. (PERTH 00156698); Little Sandy

Desert, 22°53'S, 122°37'E, *A.S. Mitchell* 724 (PERTH); Gorge top, Elong, Barlee Range, Sept. 1959, *A.Robinson* s.n. (PERTH 00155764); Gogo Station, *R.D. Royce* 3279 (PERTH); Pingandy Station, Jan.1972, *E. Scott* per *G. Kendrick* s.n. (PERTH 00153877); 5 km NW of Shay Gap settlement, *L.Thompson* LXT 1180 (PERTH); Hamersley Range National Park, at base of north side of Marandoo Ridge, *M. Trudgen* 1865 (PERTH); 26 miles [41.8 km] S of Onslow on Ashburton River, *D.E. White* 630805 (PERTH); Logue River on road to Derby, *P.J.White* 32 (PERTH); Rudall River district, 22°35'S, 122°10'E, *P.G. Wilson* 10293 (AD, PERTH).

Distribution. Western Australia in the Dampier, Hall, Fitzgerald, Mueller, Fortescue, Keartland, Carnarvon, Ashburton and Austin Botanical Districts (1:250,000 maps E51-3,7,8,12,14; E52-9,10,14; F50-1,2,3,4,5,6,7,9,10,11,13,14,15,16; F51-1,5,6,9,10; G49-4; G5O-1,2,4,5,6,7,9,11,15; H50-2). Common in north-western W.A. from Shark Bay north to Port Hedland and east to the Rudall River. Also common in the southern Kimberley region from near Fitzroy Crossing east to the W.A./N.T. border. (It is probable that future collections will extend the range of the species to at least the western part of the Northern Territory.) Isolated occurrences are recorded from the Robinson and Logue Rivers (western Kimberley), Nita Downs Station (between the Pilbara and Kimberley regions) and the Cue-Yalgoo area, c. 350 km south-west of Shark Bay.

Habitat. Watercourses and alluvial flats in often rocky (limestone, quartz) sand, clay or loam. Sometimes on rocky hills but then usually along drainage channels or in clay/loam depressions. Commonly very abundant in places where it occurs.

Flowering period. August-December.

Fruiting period. Legumes with mature seeds have been collected in January, April, May, November and December.

Variation. The phyllodes of *A. synchronicia* vary considerably in shape and size (particularly in width) with the variation appearing to be continuous. Usually they are narrowly oblong to narrowly elliptic or narrowly oblong-oblanceolate, 3-8 mm wide, l:w = 3-7 and the seed is mottled and 4-5 mm long. Specimens with ± linear, especially narrow phyllodes (1-3 mm wide, l:w = 10-14) and ± non-mottled, black seeds 3-4 mm long are common in the Rudall River area (e.g. *B.R. Maslin* 2046, & 2076, *M.McInnes* s.n., *A.S. Mitchell* 724 and *P.G. Wilson* 10293) and at a few scattered localities in the Pilbara region, e.g. Barrow Island (*R. Buckley* 6952), near Shay Gap (*L. Thompson* LXT 1180). This narrow phyllode variant which was called *A.* aff. *victoriae* in Maslin (1981: 131) may ultimately be shown to warrant formal rank. Plants of "typical" *A. synchronicia* also occur at the Rudall River (e.g. *B.R. Maslin* 2053 and 2053a) and these have phyllodes which are elliptic to narrowly elliptic and 5-8 mm wide.

Two sterile specimens (*B.R. Maslin* 5000 and 5267) with unusually broad, elliptic phyllodes (8-13 mm wide, 1:w = 2-3) and pruinose branchlets resemble *A. glaucocaesia* but are included in *A. synchronicia* because the phyllodes are fleshy (finely wrinkled when dry) and have a prominent basal gland.

Three specimens from the west Kimberley region which appear to represent the same entity are unusual. They have thinner than normal phyllodes and, according to the label on one of them, have pale yellow flowers (a character of *A. victoriae*). They are tentatively referred to *A. synchronicia* because of their inflorescence structure and because the heads bear 35-70 flowers (legumes unknown). The entity is represented by the following gatherings. Meda-Oobagooma road, 97.5 km by road N of the Derby-Gibb River road, *A.C. Beauglehole* 52774 (PERTH); Fraser River Bore No. 1, 24 km due

N of Great Northern Highway, 111 km E of Broome on Derby road, *K.F. Kenneally* 7665 (BRI, CANB, K, PERTH); At gate, 1.7 km S of Oobagooma Station homestead, *T. Willing* 46 (PERTH).

Affinities. Until now *A. synchronicia* has been confused with *A. victoriae*. The two species are most reliably distinguished by their inflorescences but there are also differences in indumentum, phyllodes, glands and seeds. In *A. synchronicia* the inflorescences are initiated on the new shoots where 1 or 2 peduncles arise from within the axils of juvenile phyllodes. These phyllodes usually mature by the time the heads reach anthesis but occasionally they are suppressed so that a few determinate racemes (or more correctly, racemes of heads) are developed. The heads are (35)40-70-flowered and judging from the (somewhat scant) specimen label records are golden in colour (except for the Kimberley variant noted under *Variation* above). By contrast *A. victoriae* has cream to pale lemon yellow heads with fewer flowers (20-30). Furthermore, as discussed under *A. victoriae* below, the inflorescences on this species are usually all or mostly racemes (these occur in great profusion so that at anthesis *A. victoriae* is a more floriferous plant than *A. synchronicia*). Elsewhere in section *Phyllodineae* closely related species are discriminated using the same sort of inflorescence difference, e.g. *A. pyrifolia* DC. - *A. strongylophylla* (*fide* Maslin 1981), *A. ligulata* A.Cunn. ex Benth - *A. bivenosa* DC., *A. calamifolia* Sweet ex Lindley - *A. nematophylla* (*fide* Maslin & Whibley 1987). Also, elsewhere in the "*A. victoriae* group", closely related species-pairs show the same inflorescence differences, e.g. *A. chartacea* - *A. ryaniana*, *A. victoriae* - *A. alexandri*. Other characters distinguishing *A. synchronicia* from *A. victoriae* include the following. Branchlets always glabrous; phyllodes often shorter (in W.A. the phyllodes of *A. victoriae* are usually 2.5-4 cm long, however, elsewhere they can be much longer), thicker (thus more obviously wrinkled when dry) and with a less pronounced midrib; glands often larger, more pronounced and rarely removed from the pulvinus; seeds not globose. Although the geographic ranges of the two species overlap, *A. synchronicia* has a more restricted distribution and is more common in north-west W.A. and southern Kimberley than is *A. victoriae*. The plant illustrated as *A. victoriae* in Petheram and Kok (1983) is probably *A. synchronicia*.

Etymology. The specific epithet refers to the synchronous initiation of phyllodes and inflorescences on new shoots.

10. Acacia victoriae Benth. in T.Mitch., J.Exped. Trop. Australia 333 (1848). (Figure 7)

A. sentis F. Muell. ex. Benth., Fl. Austral. 2: 360 (1864), *nom. illeg.* (includes type of *A. victoriae*); *A. sentis* var. *victoriae* (Benth.) Domin, Biblioth. Bot. 89: 254 (1926); *Racosperma victoriae* (Benth.) Pedley, Austrobaileya 2: 347 (1987). *Type*: "Victoria River" [=Barcoo River, 24° 40' S, 146° 01' E], Qld, 1 Oct. 1846, *T.L. Mitchell* "620" (holo: K; iso: CGE).

A. sentis F.Muell, Second Gen. Rep. 12 (1854), *nom. nud.*; Pl. Indig. 2: 18 (1863), *nom. invalid.* (not effectively published).

A.decora var. *spinescens* Benth. (sphalm. "*pinescens*"), Linnaea 26: 620 (1855), *synon. nov. Type*: Between Flinders Range and Spencers Gulf, S.A., *F. Mueller* s.n. (syn: K). Darling River, N.S.W., *F.Mueller* s.n. (syn: n.v.).

A. hanniana Domin, Biblioth. Bot. 89: 253 (1926). *Type*: Cape York Peninsula [Palmer River, *fide* L.Pedley, Austrobaileya 1: 271 (1980)], Qld., *W. Hann* 59 (holo: K, the seeds mounted on the type sheet are possibly those of *Distichostemon malvaceus*, *fide* L. Pedley, *loc. cit.*).

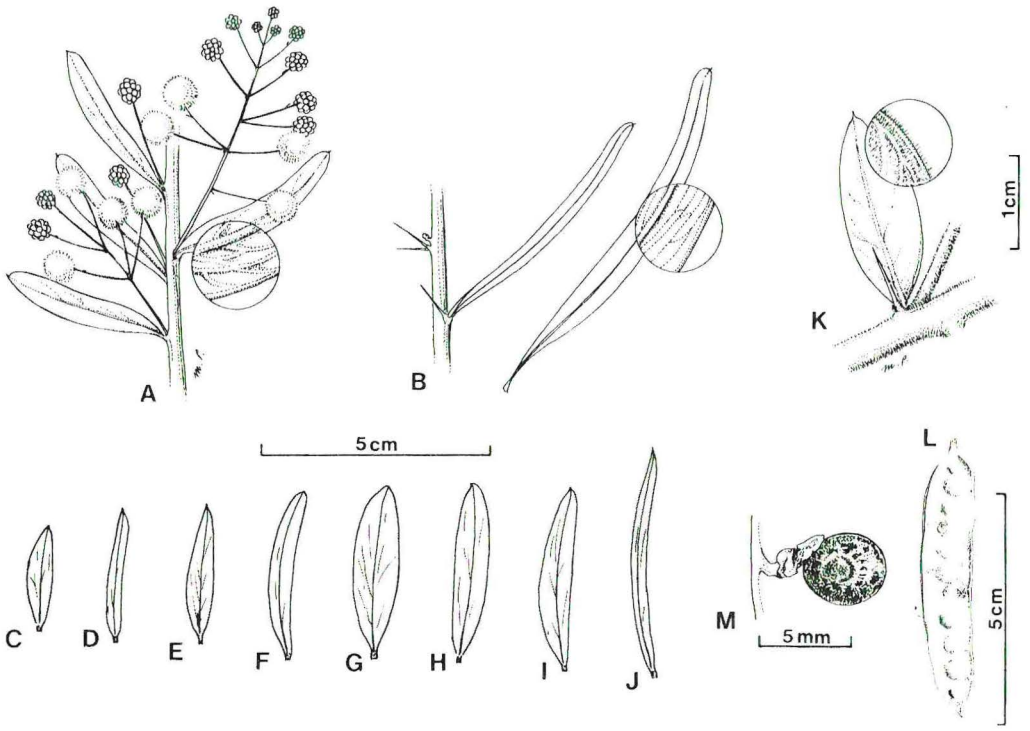

Figure 7. *Acacia victoriae*. A - Flowering branchlet showing predominantly racemose inflorescences, most peduncles with a minute supra-basal bract or, where bracts have fallen, a scar. B - Node showing spinose stipules. C-J - Phyllode variation (note pronounced midribs). K - Node showing spinose stipule and hairy phyllode (subsp. *arida*). M - Seed. L - Legume.
A from *T. & J. Whaite* 4241a. B from *N. Hall* H82/11. C from *N.H. Speck* 685. D from *G J. Keighery* 7006. E from *T. & J. Whaite* 4215. F from *C A. Gardner* 7894. G from *S J. Forbes* 1531. H from *C A. Gardner* 3126. I from *A.S. George* 2918. J from *P.E. Conrick* 1599. K from *B. Maloney* 12/83. L & M from *I. Tyson* s.n.

A. coronalis. J. Black, Trans. Roy. Soc. S. Australia 71: 20 (1947). *Type*: Crown Point, Finke River, N.T., n.v., *fide* B.R.Maslin, J. Adelaide Bot. Gard. 2: 319 (1980).

[*A. decora* auct. non Reichb.: G. Bentham, Linnaea 26: 620 (1855) and F. Mueller, J. Proc. Linn. Soc. Bot. 3: 128 (1859)].

Illustrations. F. Mueller, Iconogr. Austral. *Acacia* dec. 4 (1887) - as *A. sentis*; J.H. Maiden, Forest Fl. New South Wales 8(7):pl. 254 A-I (1921); C.D. Boomsma, Native Trees S. Australia 51 (1972); K. Askew and A.S. Mitchell, Fodder Trees Shrubs N. Terr. 23 (1978); G.M. Cunningham *et al.*, Pl. W. New South Wales 375 (1981); L. Costermans, Native Trees Shrubs S.E. Australia 316 (1981); B.R. Maslin, Fl. Cent. Australia 120(1981); M. Simmons, Acacias of Australa 1: 181 (1981); D.J.E. Whibley, Fl. S. Australia 4th edn 2: 567 (1986).

Shrubs or *trees* 2-5 m tall, sometimes to 8 m, can readily regenerate from suckers, sometimes forming thickets. *Branchlets* often pruinose, glabrous or sometimes hairy, hairs spreading or appressed. *Stipules* spinose, 2-12 mm long, commonly only the short blunt bases persisting at mature nodes.

Phyllodes variable, linear to narrowly oblong, lanceolate or narrowly elliptic, commonly 2-5 cm long and 2-8 mm wide with l:w = 2-13, sometimes to 11 mm wide or (especially Qld plants) to 10 cm long with 1:w to 25 or more, straight or incurved, glabrous, sometimes hairy, green, grey-green or glaucous, midrib prominent, lateral nerves normally obscure. *Gland* 0-5 mm above pulvinus, obscure or prominent. *Inflorescences* usually all or mostly long slender racemes with some peduncles sometimes subtended by a secondary phyllode, rarely all simple as in *A. synchronicia*; peduncles 6-18 mm long, mostly twinned, slender, glabrous, sometimes hairy; heads globular, creamy white to pale lemon-yellow, 15-30-flowered. *Flowers* 5-merous; sepals free, narrowly spathulate. *Legumes* narrowly oblong, to 8 cm long, 9-16 mm wide, chartaceous, flat, rounded over seeds along midline. *Seeds* transverse, ± globose, 4-6 mm long, mottled blackish on brown, funicle short, thick and scarcely arillate. Elegant Wattle, Bramble Wattle, Prickly Wattle, Gundabluey, and others, *fide* G.M.Cunningham *et al.*, *loc.cit.*

Selected specimens examined. WESTERN AUSTRALIA: 8 km S of Mt Anderson, near Fitzroy River, *T.E.H. Aplin* 5168 (BRI, PERTH); near Munjina Gorge, *J.V. Blockley* 420 (PERTH); 100 km S of Nullagine, *P.E. Conrick* 1599 (MO, PERTH); 40 km SW of Laverton on Leonora road, *S.J. Forbes* 1531 (BRI, MEL, PERTH); Hamersley Range, West of and near Mount Bruce, *C.A. Gardner* 3126 (PERTH); 103 miles [166 km] E of Mullewa, *C.A. Gardner* 7894 (PERTH); ca 6 mi [9.6 km] S of Warburton Mission, *A.S. George* 2918 (PERTH); Haig, *G.J. Keighery* 7006 (PERTH); 66 km from Wittenoom towards Roebourne, *B.R. Maslin* 2729 (AD, NT, PERTH); Afghan Rock, 35 km due NW of Cue, *B.R. Maslin* 5384 (PERTH); Barlee Range, Henry River, *R.D.Royce* 6524 (PERTH); 15 miles [24.1 km] SE of Berringarra, *N.H. Speck* 685 (PERTH); Mt Narryer, Murchison River, *I. Tyson* s.n. (PERTH 00155799); Newman area, *K.Walker* 191 (PERTH); on Murchison River, 83 miles [133.5 km] N of Mullewa on road to Carnarvon, *T. & J. Whaite* 4214a and 4215 (both PERTH).

NORTHERN TERRITORY: 12 miles [19.2 km] NW of Lucy Creek Homestead, *G. Chippendale* 3522 (PERTH); 4.2 miles [6.7 km] E of Allua Well, Ross River, *G. Chippendale* 4963 (PERTH); Lake Amadeus, *P.K. Latz* 5705 (PERTH); 10 miles [16.1 km] SW of Soudan Station, *R.A. Perry* 691 (PERTH); 46 miles [74 km] SSW of Limbunya Station, *R.A.Perry* 2349 and *M. Lazarides* (PERTH); Palm Valley, c. 12 km SSW of Hermannsberg, 16 Sept.1965, *J.H. Willis* s.n. (PERTH 00155683).

SOUTH AUSTRALIA: ca 130 km along Big Road, E of Purnie Bore, Simpson Desert, *B. Maloney* 12/83 (PERTH); Indulkana Creek at Stuart Highway, *L. Thomson* 44 (PERTH); Black Oak Creek, 62 km SE of Pimba on Stuart Highway, *L. Thomson* 48 (PERTH); between Point Paterson and Red Cliff Point, W of Winninowie, *D.J.E. Whibley* 5465 (PERTH).

QUEENSLAND: 11 miles [17.6 km] W of Townsville on Hervey Range road, *R. Cumming* 3276 (PERTH); 35 miles [56.3 km] S of Boulia on road to Birdsville, *B. Maloney* 20/70 (PERTH); 20 miles [32.2 km] E of Thargominah, *B. Maloney* 30/70 (PERTH); 20 miles [32km] NNE of Punjaub Station, *R.A. Perry* 1390 (PERTH).

NEW SOUTH WALES: 30 miles [48.3 km] by road NW of Wilcannia, *E.F. Constable* 4627 (PERTH); 62 km N of Bourke on Mitchell Highway, *L. Thomson* 9 (PERTH).

VICTORIA: Red Cliffs, S of Mildura, *A.C. Beauglehole* 18959 (MEL); between Rainbow and Yaapeet, *D.C. Cheal* s.n. (MEL 619570); Sunset Desert N of Birthday Tank, *J. Luly*, ANU no. 30086 (MEL).

Distribution. Widespread in all mainland States of Australia except Victoria where it occurs only near Mildura. In view of the reassessment of *A. victoriae*, the distribution of the species in W.A., as given in Maslin and Pedley (1982), has been altered considerably. Within W.A. *A. victoriae* is now recorded from the following 1:250,000 maps: E51-4,10,11; F50-7,11,12,14,16; G50-6,8,10,11,14,15,16; G51-8,9,10,14; G52-9; H50-2,3,4,7; H51-1,2; H52-13. For all other states the distribution is as given in Maslin and Pedley (1982) except for the following modifications. N.T.: add D53-13; F53-16; G53-8. S.A.: add G53-9; G54-9; I53-3; delete G53-16; H53-3,6; H54-10,14. Qld: add D54-15; E55-5; F54-8; G54-6; G55-6; delete G56-14. N.S.W.: add H54-11; delete I55-9.

Habitat. Arid and subtropical areas in a variety of habitats but commonly in clay or loam on alluvial flats, also (especially subsp. *arida*) in sand.

Variation. *Acacia victoriae* is quite a variable species. Its inflorescences are usually long, slender, determinate racemes with a profusion of heads so that at anthesis the plants are very floriferous. Sometimes a few racemes may become "leafy" through the development of a secondary phyllode at the base of some of the (usually twinned) peduncles. In these cases the specimens show a mixture of racemes and simple inflorescences with the former usually occurring in greater abundance. Only very rarely have I observed the inflorescences on *A. victoriae* to be all simple, being initiated on new shoots with 1 or 2 peduncles arising from within axils of developing phyllodes as in *A. synchronicia*.

The phyllodes are quite variable as noted in the description above. According to Pedley (1980) the phyllode penninervation is prominent on specimens from north-west Qld. Elsewhere the lateral nervation is not prominent or even seemingly absent.

The taxonomic status of *A. victoriae* subsp. *arida* requires further investigation. Specimens ascribed to this taxon have densely tomentose branchlets and phyllodes and occur on sandy soil in southern N.T., northern S.A., western N.S.W. and south-western Qld. Hairy branchlets and phyllodes occur in typical *A. victoriae* but the indumentum, especially on the phyllodes, is usually sparse. Intermediates occur between the two subspecies.

A. victoriae subsp. **arida** Pedley, Austrobaileya 1: 271 (1980). *Type*: Poeppel Corner, Sept. 1966, *D. Boyland* 254 (holo: BRI, n.v.; iso: K, n.v.). (Figure 7K)

[*A. brachybotrya* auct. non Benth.: L. Pedley, Contr. Queensland Herb. No. 4: 6 (1969)].

Affinities. In the absence of flowers the species may be confused with *A. synchronicia*. Long phyllode forms from Qld superficially resemble *A. alexandri* (W.A.). *Acacia glaucocaesia* (W.A.) may ultimately be shown to be conspecific with *A. victoriae*. Refer to the above-mentioned species for discussion.

Utilization. Moderate nutritive value and a useful stock food supplement during droughts. Useful as a low windbreak and for soil stabilization in dry country. Numbers may increase markedly during a succession of wet seasons and can become a nuisance, especially around watering points. Fodder potential and other uses are discussed in Everest (1969), Askew and Mitchell (1978), Rachie *et al.* (1979), Hall *et al.* (1981) and Turnbull (1986).

Acknowledgements

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Correction: Nuytsia 7 (3) was published on **19 June 1991** as it appears in the Contents Index to Volume 7 and not on 30 June 1991 as printed in Nuytsia 8 (1) p.189.

Notes for Authors

Nuytsia publishes papers relating to the flora of Western Australia. All papers are refereed outside the Western Australian Herbarium. The Herbarium reserves the right to reject papers.

Manuscripts must be submitted in duplicate, typewritten and double spaced. Printing is now done using a desktop publishing system. After final acceptance of papers authors are requested to provide floppy discs readable directly by IBM computer. Wherever possible, the MS-WORD software should be used in conjunction with a customized style sheet, available from the editor with comprehensive instructions for its use. Alternatives should be discussed with the editor before preparing manuscripts.

Great care with layout, spacing and typography must be exercised in the preparation of electronic manuscripts. In particular, note the following. Text is not to be right-justified. Where manuscripts are compiled with software other than MS-WORD all headings and paragraphs are to be left-justified. Within a paragraph two spaces are required between sentences; after colons, semicolons, commas and dashes a single space is required. Where MS-WORD is used, text should be italicized or emboldened where appropriate.

Original figures should not be lettered but instead accompanied by copies indicating lettering. Galley proofs will be forwarded to authors for checking. Twenty reprints of each paper will be provided free of charge; no additional, copies may be ordered.

Style and layout should follow recent numbers of *Nuytsia*. Note particularly the following.

Title. Should include the family name of genera or species treated. New taxa should be named if not numerous. The geographic area of study should be given.

Abstract. The paragraph (or paragraphs) should be indented and commence with bibliographic information. New taxa, combinations and names should be listed. The major contents of the paper should be summarised but no additional material given. Key words indicating all ideas and topics covered by the paper must be included to facilitate computerised abstract searching.

Headings. All headings should be in capitals and lower case, major headings being centred and minor ones left justified.

Keys. May be either indented (e.g. Nuytsia 5: 277) or bracketed (e.g. Nuytsia 5: 84). Indented keys involving more than nine levels of indentation should be avoided. Note that use of the MS-WORD style sheet (see above) considerably facilitates the layout of both indented and bracketed keys.

Species treatments. Use of certain named paragraphs, or sets of paragraphs, for matter following the descriptions is encouraged. The desired sequence and examples of commonly used headings are shown below. Recommended headings which are italicised below, should be left justified, followed by text on the same line.

(1) Taxon name, synonymy (if any) and type details (for previously published taxa).
(2) Latin (for new taxa - indented).
(3) *Typus:* (for new taxa - not indented).
(4) English description (indented).
(5) *Other specimens examined* or *Selected specimens examined* as appropriate, preferably including number of collections examined.
(6) *Distribution.*
(7) *Habitat*
(8) *Flowering period.*
(9) *Fruiting period.*
(10) *Typification* (discussion).
(11) *Affinities* or *Relationships.*
(12) *Discussion* or *Comments* or *Notes.*
(13) *Conservation status.*
(14) *Etymology.*

Threatened species. It is the policy of the Western Australian Department of Conservation and Land Management not to publish precise locality data for threatened species. Authors are therefore requested not to cite precise locality data when describing threatened species. Generalised localities should be given accompanied by the statement "precise locality withheld".

Synonymy. The desired format is that used by P.G. Wilson, Nuytsia 4: 135-262.

Standard abbreviations. It is suggested that where possible the following standards be followed.

(1) Author abbreviations — Anon. (1980). Draft index of Author Abbreviations Compiled at the Herbarium, Royal Botanic Garrdens, Kew. (HMSO: London.)

(2) Book titles in literature citations — Stafleu, F.A. & Cowan, R.S. (1976-83). Taxonomic Literature. Edn 2. (I.A.P.T.: Utrecht) (but with Capital initial letters.) — Green, J.W. (1985). Census of the Vascular Plants of Western Australia. Edn 2. Pp. 20-24. (Department of Agriculture: Perth.)

(3) Journal titles in literature citations and reference lists — Lawrence, G.H.M. *et al.* (1968). B-P-H (Botanico-Periodicum-Huntianum). — Green *loc. cit.*

Figures. Numbers should follow a single sequence including maps.

Structure of papers. Authors are encouraged to use the conventional structure of scientific papers when a complete study is being reported (e.g. a revision). A *methods* section should include the method of drawing up the descriptions from specimens, extent of search for types, and discussion of concepts for choice of taxonomic categories. A *discussion* section should be considered, which would include some or all of the following: a summary of the findings, emphasising the most significant; interpretation of the results in the light of other relevant work; statement of new problems which have arisen; advising of aspects which are to be followed up; suggestion of topics which others might usefully pursue; prediction and speculation.