

ISSN 0085-4417

NUYTSIA

Bulletin
of the Western Australian
Herbarium

Edited by A. S. George

Vol. 2 No. 2

1976

Department of Agriculture of Western Australia

ISSN 0085—4417

NUYTSIA

Bulletin
of the Western Australian
Herbarium

Edited by A. S. George

Vol. 2 No. 2
1976

Department of Agriculture of Western Australia

(1)—52816

Two new species of *Acacia* from Western Australia

By Mary D. Tindale* and B. R. Maslin†

Abstract

Two new species of *Acacia* endemic to Western Australia are described: *A. citrinoviridis* sp. nov. and *A. subtessarogona* sp. nov. Both belong to Bentham's series Juliflorae.

Introduction

Due to the pending publication of a further section on the phytochemistry of Australian *Acacia* species by Prof. D. G. Roux and Dr. Tindale, it is necessary to provide names for these two new Western Australian taxa.

Specimens cited in the text are located at the Western Australian Herbarium (PERTH) unless otherwise indicated.

Acacia citrinoviridis Tindale et Maslin sp. nov. (Figures 1, 3C and D, 4).

Acaciae acuminatae Benth. affinis, a qua differt ramulis manifeste porcatis, marginibus phyllodiorum nonciliatis, phyllodiis minus striatis, sed costa prominenti et venis 2 minus prominentibus axi parallelis, floribus 5-meris, leguminibus strictis vel raro parum inter semina constrictis, multo latioribus (0.7–1.5 cm latis), marginibus prominentioribus (1.2–1.5 mm latis) et praesertim juventute pilis lucentibus citrino-viridibus dense vestitis.

Allied to *Acacia acuminata* Benth. from which it differs in the prominently ridged branchlets, the margins of the phyllodes non-ciliate, the phyllodes less striate but with a prominent midrib and 2 less prominent veins parallel to the axis, the flowers 5-merous, the legumes straight or rarely slightly constricted between the seeds, much broader (0.7–1.5 cm broad), the margins more prominent (1.2–1.5 mm broad) and especially in the young condition densely clothed with glistening, citron-green hairs.

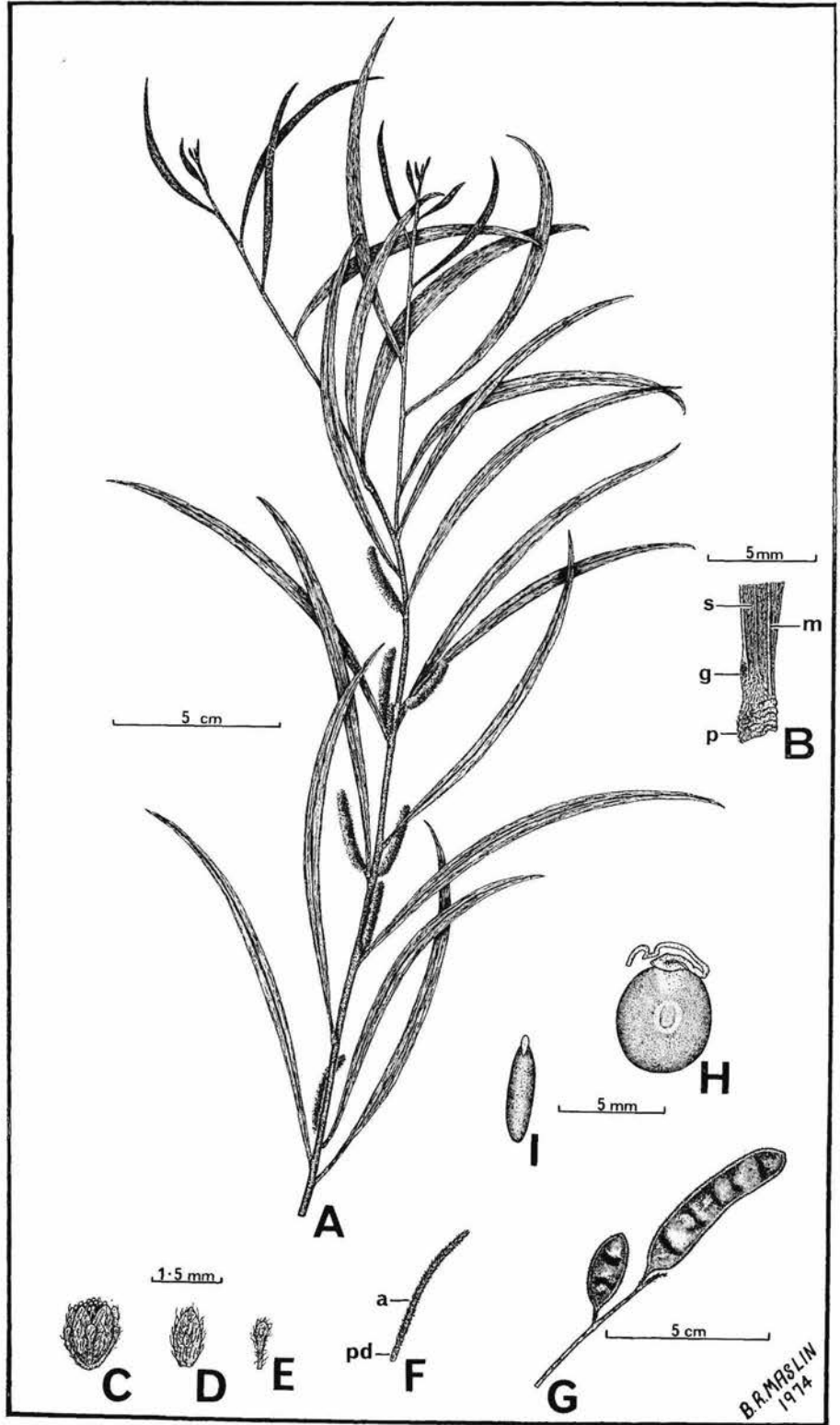
Type: Fortescue River crossing, E. of Millstream homestead, 11 June 1972, B. R. Maslin 2735 (holo: PERTH; iso: CANB, K, L, MEL, NSW, NY, PERTH).

Tree to 7–8 m high; *young plants* forming dense bushes often with somewhat drooping branches; *bark* grey, fissured on trunk and main branches; *branchlets* red-brown, glossy, with prominent, fawn, longitudinal ribs, clothed between them with fugacious, short, grey, appressed hairs; *young shoots* very densely clothed with iridescent citron-green hairs. *Mature phyllodes* very narrowly elliptical, 8–12 cm long, 0.5–1.2 cm broad, falcate, silvery greyish green, densely clothed with antrorsely appressed, short hairs, often slightly twisted at the base; *midrib* fairly prominent, with 2 less prominent veins parallel to the costa as well as numerous, parallel minor veins, all arising from the base of the phyllode; *margins* non-ciliate; *apiculum* curved, obtuse, hard, thickened and sometimes knob-like; *pulvinus* 4–6 mm long, transversely rugose, clothed with short, appressed, grey hairs. *Gland* small, round or oblong, situated on the upper margin of the phyllode 1–1.5 mm above the pulvinus or rarely halfway between the apiculum and the pulvinus. *Flower-heads* spicate, 1–2 in the axils of the phyllodes, 1.3–3.2 cm long; *axis* with a dense yellow tomentum; *peduncles* 2–4.5 mm long, densely clothed with tomentose, yellowish green hairs. *Flowers* 5-merous; *calyx* c. 0.9 mm long, divided almost to the base

Figure 1. *Acacia citrinoviridis*. A—Upper portion of branch. B—Phyllode base showing obscure gland (g), pulvinus (p), midrib (m), and fine secondary veins (s). C—Flower. D—Petal. E—Sepal. F—Flowering spike (flowers removed) showing minute peduncle (pd) and densely (golden) hairy axis (a). G—Legumes. H—Seed (side view). I—Seed (end view). A, C–F from B. R. Maslin 2764A; B and G from *A. Robinson* s.n.; H and I from G. & E. Scott s.n.

* Royal Botanic Gardens, Sydney, Australia 2000.

† Western Australian Herbarium, South Perth, Australia 6151.



into club-shaped, villous sepals; *corolla* divided to almost half its length into densely villous petals which are c. 1.2 mm long and c. 0.5 mm broad at the base; *stamens* 1.5–2 mm long; *ovary* brown, c. 0.8 mm long, c. 0.4 mm broad, clothed with villous yellow hairs; *style* yellow, c. 1 mm long. *Legumes* 3.5–8 cm long, 0.7–1.5 cm broad, straight or very rarely slightly constricted between the seeds, hard and brittle, light brown or yellowish, rugose, densely clothed especially in the young condition with fugacious, glistening, slightly matted, citron-green hairs; *margins* prominent, 1.2–1.5 mm broad. *Seeds* 3–8, black or dark brown, almost globose, compressed, c. 5 mm diam.; *pleurogram* central, continuous; *areole* oval, cream-coloured to dark green, c. 1 mm long; *funicle* filiform, cream-coloured with 2 folds, very slightly dilated into an aril.

Distribution and habitat: (Figure 4) North-west Western Australia: extending from the vicinity of Shark Bay north-east to the Fortescue River. This species occurs as far west as Nanutarra (between Roebourne and Carnarvon), while a line from Marble Bar to Wiluna represents the approximate eastern limit of its known distribution. Although *A. citrinoviridis* is normally found along creeks and rivers with sandy rocky beds, it also grows in stony soil away from the water-courses.

WESTERN AUSTRALIA: Millstream, M. I. H. Brooker 2071; Weeli Walli Creek, Wittenoom area, J. V. Blockley 203; Nanutarra Bridge, Ashburton River, B. Maloney NSW 107190 (K, NSW), wood voucher for phytochemical survey; Nanutarra Bridge, Ashburton River crossing, North West Coastal Highway, B. R. Maslin 2764A (AD, BRI, NSW, PERTH, US); Between Mundiwindi and Roy Hill, J. S. Beard 4600; Kookhabinna Gorge, A. Robinson s.n., Sept. 1959; Pingandic Station, Ashburton district, G. & E. Scott s.n., 1971; Tom Price, F. Lullfitz NSW 104414 (K, NSW); Mt. Augustus Station, J. S. Beard 6089 (NSW, PERTH); Peak Hill road, G. E. Brockway 10; Glenburgh Station, 150 mi | 240 km | E. of Carnarvon, J. S. Beard 4354.

Flowering and fruiting period: According to Mr. G. Scott (pers. comm.) this species only flowers in a good season following summer or winter rains. Flowering material examined by the authors ranged from late April to June and fruiting specimens from late April to September.

This species superficially resembles *Acacia acuminata* Benth. which is commonly known as "Jam", hence the name "River Jam" for *A. citrinoviridis*. Both taxa are members of the Juliflorae-Falcatae (Benthams, 1864). *Acacia citrinoviridis* is known as the "Milhan" tree in the Ashburton district but "Wantan" in the Murchison-Gascoyne region. The aborigines coarsely grind the dry seeds of this wattle and eat them uncooked (Scott, 1972).

The specific epithet refers to the citron-green hairs occurring on the young shoots and legumes of this wattle.

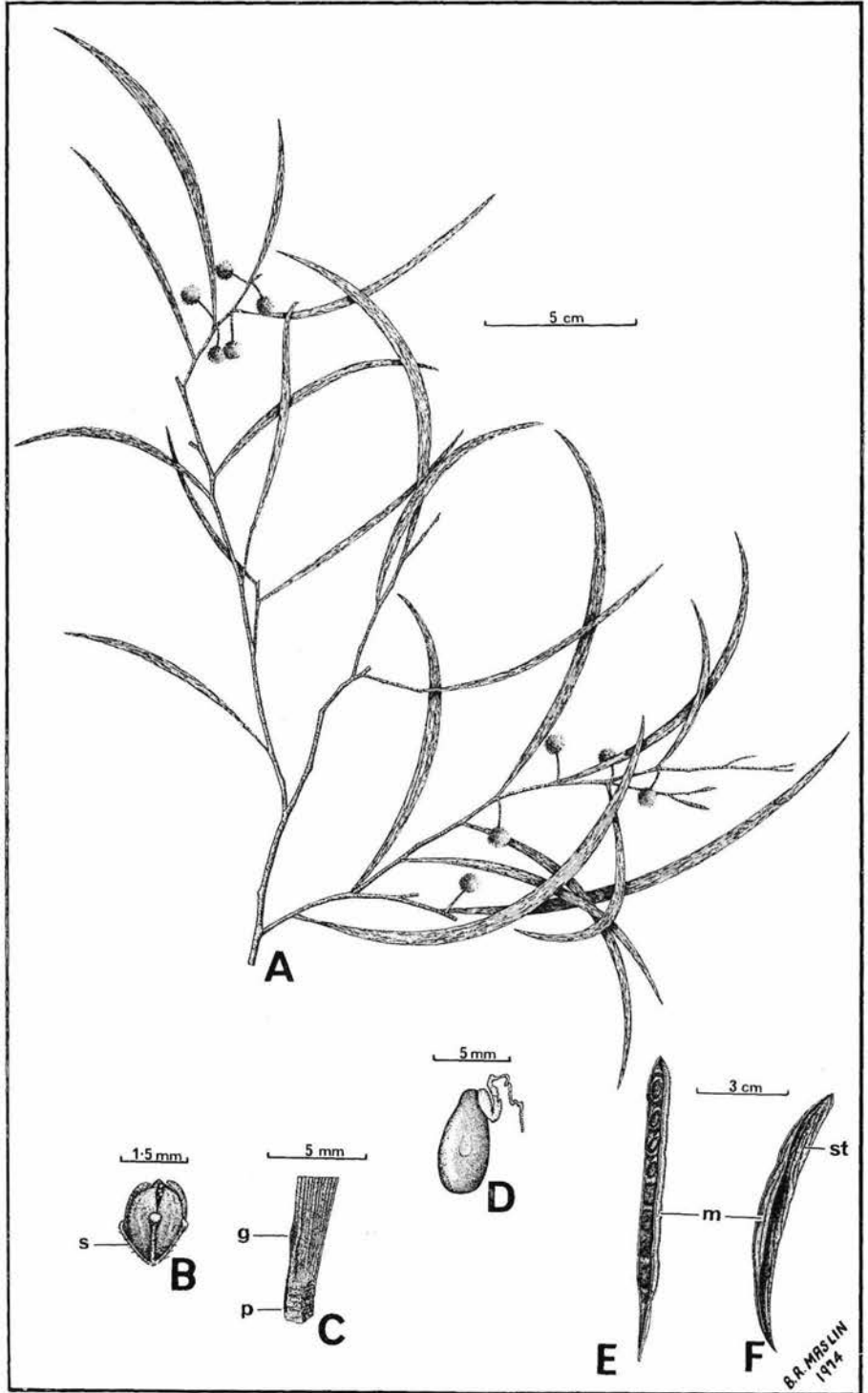
***Acacia subtessarogona* Tindale et Maslin sp. nov.** (Figures 2, 3A and B, 4).

Acaciae brachystachyae F. Muell. affinis, a qua differt phyllodiis latioribus (4–9 mm latis), inflorescentiis junioribus subsessilibus e phyllodiorum axillis 1–5 ortis, leguminibus plerumque longioribus (6–12 cm longis) plus minusve tetragonis lignosioribus, leguminum paginis laterali-bus sulcatis.

Allied to *Acacia brachystachya* F. Muell. from which it differs in the broader phyllodes (4–9 mm broad), the young inflorescences subsessile and 1–5 borne in the axils of the phyllodes, the legumes longer (6–12 cm long), more or less tetragonous, more woody, the lateral sides of the legumes sulcate.

Type: 10 miles [16 km] SW of Winning Pool, Western Australia, 10 Oct. 1941, C. A. Gardner 6224 (holo: PERTH; iso: CANB, K).

Figure 2. *Acacia subtessarogona*. A—Upper portion of branch. B—Flower bud showing linear-spathulate sepals (s). C—Phyllode base showing pulvinus (p) and obscure gland (g). D—Seed. E—Legume valve (with few seeds—remainder dehisced) showing broad margin (m). F—Legume showing broad margin (m) and surface striations (st). A and F from C. A. Gardner 6041; B, C and E from C. A. Gardner 6224 (the type); D from B. R. Maslin 2768.



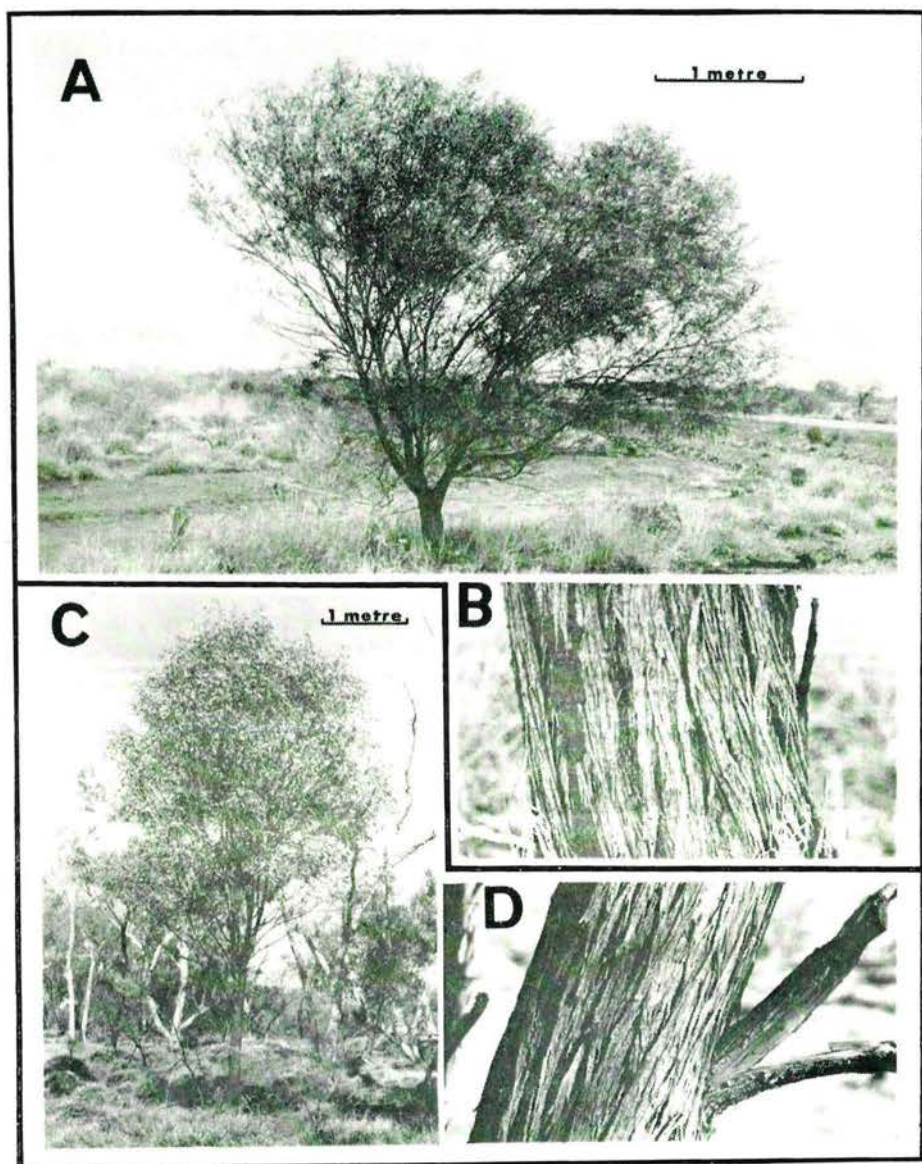


Figure 3. *Acacia subtessarogona* (A—habit, B—bark); *A. citrinoviridis* (C—habit, D—bark). A and B from *B. R. Maslin* 2768; C and D from *B. R. Maslin* 2735 (the type).

Small tree or tall spreading shrub usually 5–8 m high; bark grey, fissured near the base of the main trunk, smooth on the branches; young branchlets with light brown ridges, the surface between them dark red-brown, clothed mainly on this surface with very short, grey, appressed hairs. Phyllodes very narrowly elliptical, 7–13 cm long, 4–9 mm broad, falcate, pale green, coriaceous, clothed with short, appressed, silvery hairs mainly between the veins; midrib often not readily distinguished from the numerous parallel minor veins, all arising from the base of the phyllode; apiculum hard, rounded, often knob-like; pulvinus 2–3 mm long, transversely rugose, clothed with very short, grey, appressed hairs. Gland small, oval, situated on the upper margin of the

phyllode 1.5–5 mm above the pulvinus. *Young flower-heads* subsessile, 1–5 clustered in the axils of the phyllodes. *Flower-heads* shortly spicate to globose, 6–12 mm long, 4–8 mm broad; *peduncles* comparatively elongated in mature flower-heads, 4.5–8 mm long, clothed with short, closely appressed, grey hairs. *Bracts* at the base of peduncles very broadly ovate, brown, ciliate. *Bracteoles* with fimbriate claws; *laminae* peltate and fimbriate. *Flowers* 5-merous; *calyx* c. 1 mm long, divided to the base into very narrow, club-shaped sepals clothed with pale yellow hairs; *corolla* divided one third to one half of its length into glabrous petals which are c. 2 mm long and c. 0.8 mm broad, petals swollen at their apices which bear a tuft of papillae, the margins granulose and the median stripe inconspicuous; *stamens* c. 2.3 mm long; *ovary* subsessile, brown, c. 0.7 mm long; *stigma* slightly expanded. *Legumes* 6–12 cm long, subtetragonous, with the upper and lower surfaces sulcate and 2–3 mm broad, grey, hoary, ornamented with light brown, longitudinal veins with some reticulations. *Seeds* up to 8 and longitudinal in each legume, obloid-compressed, 5–6.5 mm long, 3–3.5 mm broad, dark brown; *pleurogram* small, central, light brown, horseshoe-shaped; *areole* dark brown, 0.3–0.6 mm long; *funicle* fawn, convoluted, filiform, expanded into an aril on top of the seed.

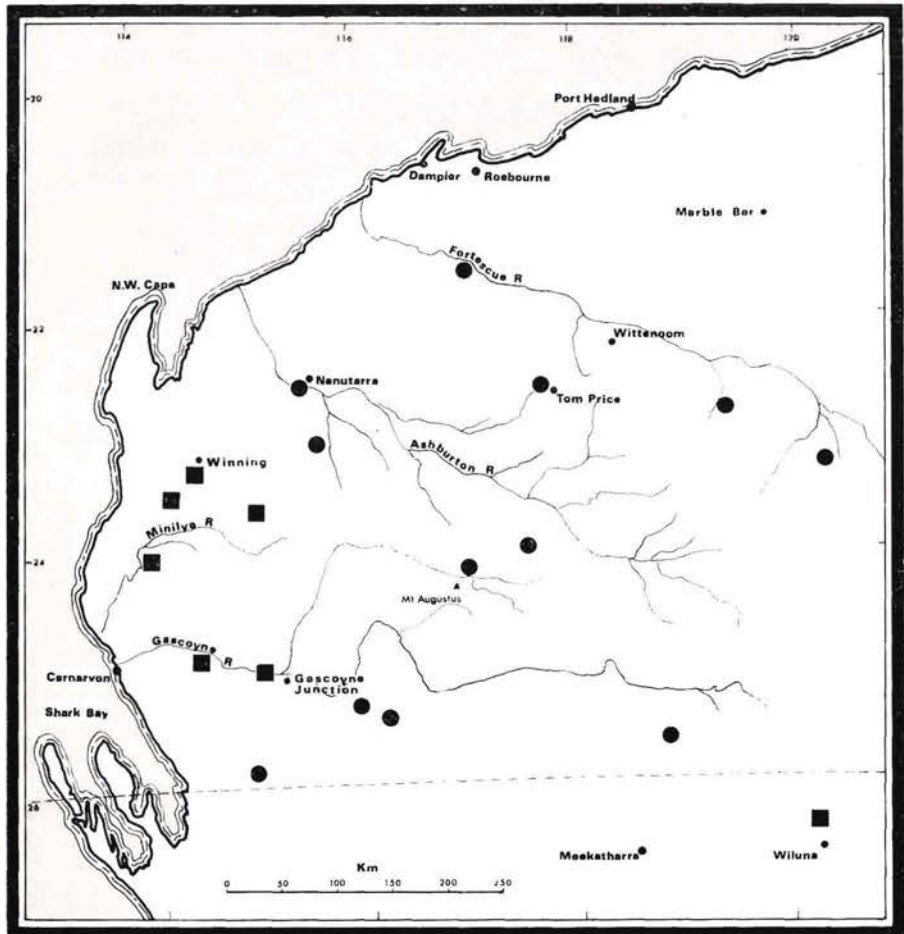


Figure 4. Distribution of *A. citrinoviridis* (●) and *A. subtessarogona* (■).

Distribution and habitat: (Figure 4) North-west Western Australia: most collections of this species have been made from between Winning Station (210 km north-east of Carnarvon) and Gascoyne Junction (160 km east of Carnarvon); there is also one record of this plant from the Wiluna district which is about 400 km south-east of the main area of distribution. This species commonly grows on red loamy soil in low-lying areas often in association with *A. sclerosperma* F. Muell. and *A. tetragonophylla* F. Muell. It has also been collected from higher rocky ground in association with *A. ancistrocarpa* Maiden and Blakely.

WESTERN AUSTRALIA: Wogoola Station, Ashburton River, *C. A. Gardner* 3188; Winning Pool Station, 53 km S of Barradale on North West Coastal Highway, *B. R. Maslin* 2768 (BRI, NSW, NY, PERTH); 75 Mile Post N of Carnarvon, *J. S. Beard* 3492; Wiluna area, *J. Morrissey* 62; Gascoyne River, 80 miles [129 km] E of Carnarvon, *C. A. Gardner* 6041.

Flowering and fruiting period: Flowers from July to September; mature legumes present from September to December.

As outlined earlier in this paper on p. 88, *A. subtessarogona* is closely allied to *A. brachystachya* Benth. The latter species together with *A. cibaria* F. Muell., *A. linophylla* W. V. Fitzg. and *A. ramulosa* W. V. Fitzg. form an interrelated taxonomic complex which has a very wide range in Australia. *Acacia subtessarogona* is most readily distinguished from the above four taxa by the subtetragonous, almost "squashed" character of its mature legumes.

The specific epithet refers to the subtetragonous fruit in this wattle.

Acknowledgments

We wish to express our appreciation to Mr. H. K. Airy Shaw for checking the Latin diagnoses, as well as to Mr. G. Scott for very helpful field observations about *A. citrinoviridis*.

References

- BENTHAM, G. (1864). *Flora Australiensis*, Vol. 2. Reeve, London.
SCOTT, MARJORIE P. (1972). Some Aboriginal food plants of the Ashburton district, Western Australia. *W.A. Nat.* 12 (4):94-96.

Ptilotus gardneri Benl sp. nov. (Amaranthaceae)

By G. Benl, F.L.S.*

Abstract

A new species of *Ptilotus*, *Pt. gardneri* Benl, is described from Western Australia. It resembles *Pt. clementii* (Farnar) Benl, but its pubescence in stems and leaves is fundamentally different.

Ptilotus gardneri Benl sp. nov. (Figures 1 and 2).

Descriptio. Perennis valida robusta lanuginosa. *Caules* singuli stricti-erecti plus quam 30 cm alti et 4 mm diametro, sulcati, basim versus lignosi, per totam longitudinem foliati, ramosi, ramulis pluribus ex axillis foliorum orientibus. Pubescencia haud hirsuti-villosa, sed sicut tomentum molle: pilis nodosis 1,5–2 mm longis crispis, inter se intricatis. *Folia* caulina alterna 0,7–1,5 cm distantia (sub)sessilia, laminis oblongi-lanceolatis ad 4,5:1,4 cm longis latisque, nervo medio subtus conspicuo in mucronem ad 0,5 mm longum producto; utrimque pilis (ut in caulibus) dense vestita.

Inflorescentiae amplae, in speciminibus exstantibus sordide (viridi-)canescentes. *Flores* permulti in spicas solitarias, ad 8,5 cm longas et 4,3 cm diametro, conici-cylindraceas, terminales, postea cernuas, denique nutantes congesti. *Rhachis* conspicue villosa, pilis niveis circiter 3 mm longis visu fasciculatis. *Bractea bracteolaeque* in lateribus scariosae et nitentes, integrae, uninerviae, distincte carinatae—carina (atro)fusca—, post lapsum perianthii superstites, subinaequales: Bractea rigidior, elongati-lanceolata ad 10:5,5 mm longa et lata, in cuspidem sensim angustata, imprimis carinam pilosiusculam versus fuscescens. Bracteolae subcordati-concavae adpressae breviores (7:5 mm), distincte apiculatae, praeter carinam hyalinae, omnino glabrae.

Perianthium elongatum rigidi-erectum, postea tepalis divergentibus subcampanulati-patens, basim constrictam, callosam, conicam versus valde indurescens. *Tepala* inferne fere libera in pseudotubum (ad 3,5 mm) intus nitidum conniventia et ima basi anulum parvum formantia, lanceolati-linearia, acuta (marginibus membranaceis superne involutis), tricostrata, extus pilosa—pilis irregulariter insertis pallide flavescentibus subtilibus rectis articulatis ad 6 mm longis, apicem nudum (ad 2·5 mm) haud vel plus minusve aequantibus—, inaequiformia: 2 extima 17–18: 2 mm longa lataque, intus glaberrima; 3 interiora paulum minora (15–16: 1·5 mm) intus inferne lana alba undulati-crispata praecipue marginibus (sive uni margini tantum) oriente obsessa.

Stamina 5 aequalia et fertilia, basi cupulam subglabram, circiter 0·8 mm altam—parte libera 0·15 mm, ceterum anulo perianthii insidentem—formantia. *Pseudostaminodia* lobuliformia (Fig. 1c) 0·6–0·9: 0·2–0·4 mm longa et lata, raro integra, plerumque valde fissa et /vel fimbriata interposita. *Filamenta* ligulata ad 1·2 cm longa, basi libera vix dilatata, superne subulata. *Antherae* flavae lineari-oblongae 1·8–2·0: 0·2 mm longae lataeque.

Ovarium (Fig. 1a, b) primo clavatum dein ovoideum sessile, in parte superiore hirsutum—pilulis rectis (0·5 mm) basim styli occultantibus—, ad 2·8 mm longum et 1·8 mm diametro. *Stylus* plus minusve centralis filiformis sigmoideus, circiter 13 mm longus, inferne modice dilatatus et pilos nonnullos patulos ad 0·5 mm longos gerens; *stigmatibus* parvo papilloso.

Holotype of species: Western Australian Boundary Survey 1936–38. Low plant in rough limestone country. Lat. 17°30'5"; L. Stokes, 10 June 1936 (PERTH).

Material. The description is based on the holotype-sheet (Fig. 2) consisting of two plant fragments measuring 34 and 31 cm, respectively. Only one plant bears an inflorescence more or less complete; on the other the spike has already lost its flowers, thus showing the white, unusually long-haired and clustered indumentum of the rachis.

Discussion. While *Pt. clementii* exhibits a villous pubescence all over stems and foliage, the new taxon must be placed in a group of species characterised by a continuous and densely-tomentose coat. Further differences of diagnostic value are the less hairy bracts, the hairless bracteoles, the abruptly pilose ovary (Fig. 1a, b), and the S-shaped style with spreading hairs in its lower part. Contrasting with *Pt. clementii*—see "Australian Plants" 4 (1967): 115, Fig. 2a—the dilated intrastaminodial lobes are mostly considerably more fringed (Fig. 1c). Thus the plant is easily distinguished.

* Botanische Staatssammlung, München, Germany

S-shaped bendings of the style have already been recorded in *Ptilotus beckerianus* (F. Muell.) F. Muell., *Pt. chortophytum* (Diels) Schinz, *Pt. nobilis* (Lindley ex Mitch.) F. Muell. emend. Benl, and *Pt. polystachyus* (Gaud.) F. Muell. emend. Benl. There is no closer relationship either between these species or between one of them and our new taxon.

The plant is named in honour of the late Mr. Charles A. Gardener, formerly Government Botanist of Western Australia in Perth, who not only collected many *Ptilotus* specimens but also recognized several taxa as new.

Ptilotus gardneri can easily be included into my key to the genus, in Mitt. Bot. München 9: 135–176 (1971). Add in page 145:

- 20 Crisped hairs form a homogeneous tomentose indumentum on the leaves. Single hairs not recognizable with the naked eye.
- (a) Leaves more hairy underneath, margin narrowly reflected. Spikes (shorter than 2 cm) with few flowers, and composed in loose panicle; bracteoles relatively large, golden; tepals (shorter than 10 mm) widely surpassed by their silky hairs. The tiny staminal ring without any lobes; ovary hairless, style straight. See 8+! *Pt. erio-trichus*.
- (b) Leaves equally pilose on both sides, margin not reflected. Flowerheads (longer than 5 cm) many-flowered, mostly terminal; bracteoles inconspicuous; tepals (at least 15 mm) not exceeded by their dorsal hairs. Staminal cup with pseudo-staminodial lobes, usually fringed; ovary with an apical pubescence, style with an S-shaped bending.—W.A. *Pt. gardneri* Benl, in *Nuytsia* 2; 2(1976).

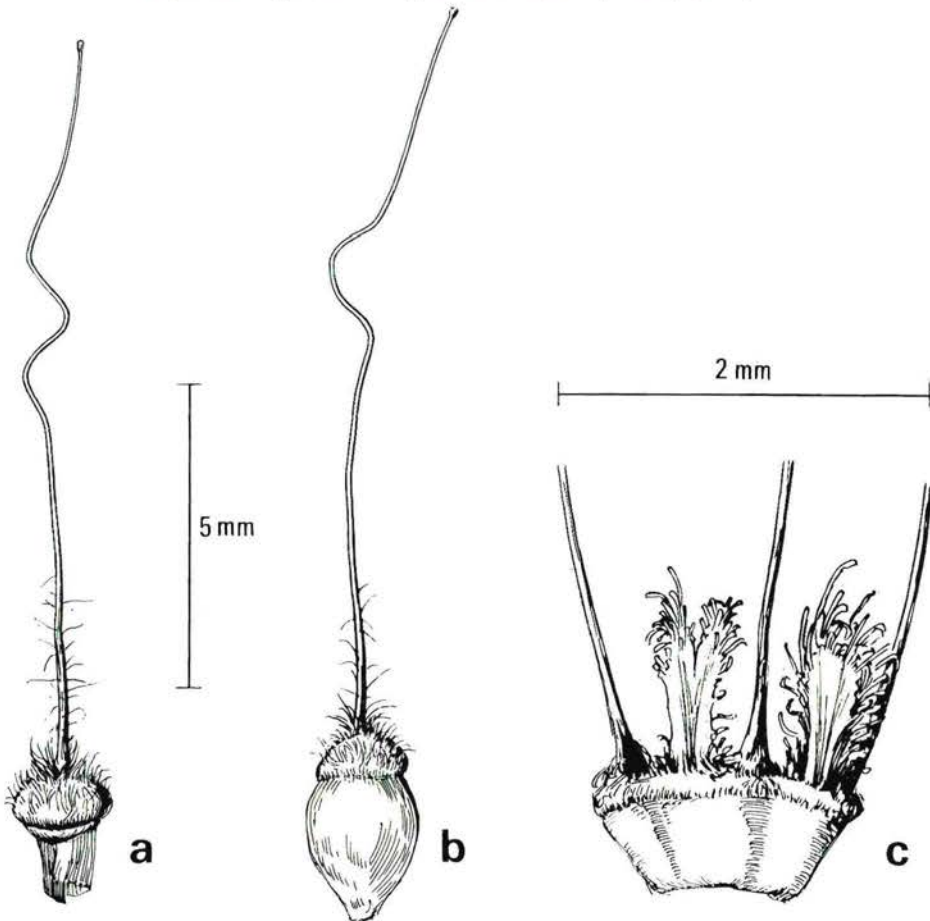


Figure 1. *Ptilotus gardneri* Benl. a and b—Pistil in a younger and in an adult stage. c—Part of staminal cup (cupula) with pseudostaminodes.



Figure 2. *Ptilotus gardneri* Benl. Holotype-sheet.

Studies in the genus *Acacia* (Mimosaceae)—5* —Miscellaneous new phyllodinous species—

By B. R. Maslin

Abstract

Four new, endemic, Western Australian *Acacia* species are described: *A. anfractuosa* sp. nov., *A. argutifolia* sp. nov., *A. jacksonioides* sp. nov. and *A. simulans* sp. nov. These species belong to Bentham's division Phyllodineae.

1. *Acacia anfractuosa* Maslin sp. nov.

Frutex vel *arbor* parva ad 4 m alta, diffusa, exilis; *rami* plerumque penduli, flexuosi, glabri vel strigosi. *Stipulae* caducae. *Phyllodia* linearia, ad 170(200) mm longa. 1–2 mm lata, inter veniis minute strigosis, in sectione transversali rhombea (ubi angusta) ad \pm plana; costa nervisque marginalibus prominentibus; inter eos 1–3 nervi tenuiores. *Glans* obscura in margine supera phyllodii ad extremitatem distale pulvini. *Pedunculis* 5–7(10) mm longis; *capitula* globulosa ad leviter obloidea. *Florae* 5-merae. *Legumen* lineare, ad 120 mm longum, 1.5–2.5 mm latum. *Semina* in legumine longitudinalia, ellipsoidalia, 4.5–5 x 1.5 mm.

Type: 26 km E of Karalee on Great Eastern Highway, Western Australia, 15 December 1971, B. R. Maslin 2402 (holo: PERTH; iso: CANB, K, NY).

Diffuse, openly branched, rather spindly *shrub* or *small tree* to 4 m tall, either single-stemmed or dividing at ground level into ca. 3 main trunks; *bark* grey, smooth but sometimes slightly roughened at base of trunk; *branches* often pendulous, flexuous, terete, obscurely ribbed on branchlets, glabrous or strigose (hairs densest around base of phyllodes and between ribs on branchlets), light brown to red-brown, soon becoming grey. *Stipules* caducous. *Young shoots* resinous, densely strigose. *Mature phyllodes* linear, to 170(200) mm long, 1–2 mm wide, simply curved or sometimes \perp sigmoid, spreading, slightly resinous, minutely strigose between veins, olive-green to grey-green, rhombic in cross section (when narrow) to \perp flat; *midrib* and marginal nerves prominent broad and yellowish, 1–3 finer nerves occur between each midrib and marginal nerve; *apex* sometimes uncinatate, not pungent, brown; *pulvinus* cylindrical, 0.5–1.5 mm long, obscurely transversely wrinkled, minutely strigose. *Gland* obscure, situated on upper margin of phyllode at distal end of pulvinus, lamina tissue insignificantly swollen around the gland. *Inflorescences* simple, often arising from base of a new shoot within axil of phyllode, 1–2(3) per node; *peduncles* 5–7(10) mm long, minutely strigose (hair density variable), basal bract caducous solitary ovate and minute (ca. 0.5 mm long); *receptacle* obloid, 1.5–3 mm long, densely puberulous to glabrescent; *flower heads* bright yellow, globular to obloid, 7–8 mm long at anthesis, with 22–32 \pm loosely arranged flowers. *Bracteoles* 0.7–0.9 mm long, puberulous abaxially, claws linear, laminae ovate and inflexed. *Flowers* 5-merous; *calyx* $\frac{1}{4}$ to ca. $\frac{1}{2}$ length of corolla, divided for $\frac{1}{4}$ its length into oblong obtuse ciliolate lobes, tube brown sparsely to densely puberulous and nerveless; *petals* ca. 2 mm long, connate for $\frac{1}{3}$ – $\frac{1}{2}$ their length, glabrous, obscurely 1-nerved. *Legumes* linear, to 120 mm long, 1.5–2.5 mm wide, firmly chartaceous, slightly raised over seeds, obscurely longitudinally nerved, minutely silvery-strigose (hairs dense on young legumes), dark brown; *margins* somewhat contracted between seeds (indentations shallowly concave), marginal nerve scarcely thickened broad glabrous and yellowish. *Seeds* longitudinal in legume, ellipsoid, 4.5–5 mm long, 1.5 mm wide, brown with cream-coloured mottlings, a dark brown line extends around periphery of seed, somewhat shiny; *pleurogram* horseshoe-shaped, open towards the hilum, obscure; *areole* 0.5 mm long; *funicle* slender and convoluted, gradually thickened into a pileiform, whitish aril.

* The previous four papers in this series were published in *Nuytsia* vol. 1, nos. 3, 4 and 5.

Distribution: (Figure 1) Western Australia: Bruce Rock to near Kellerberrin then east to Boorabbin (about halfway between Southern Cross and Coolgardie).

Habitat: Yellow sand in sandplain heath.

WESTERN AUSTRALIA: 283 mi peg on Great Eastern Highway (454 km E of Perth), *T. E. H. Aplin* 1953 (L, PERTH, RSA); Bruce Rock, *E. T. Bailey* s.n., Sept. 1933 (PERTH); 5 mi (8 km) north of Muntadgin, *E. T. Bailey* 284 (MEL, PERTH); Near Southern Cross, *W. E. Blackall* s.n., Sept. 1929 (CANB, PERTH); Near Kellerberrin, *G. E. Brockway* s.n., Dec. 1943 (PERTH); 1 mi (1.6 km) E of Boorabbin, *C. A. Gardner* 7998 (K, PERTH); About 6.5 mi (10.5 km) E of Muntadgin, *B. R. Maslin* 1822 (AD, B, BRI, MEL, NSW, PERTH).

Flowering and fruiting period: The flowering season begins in July-August and extends to at least December. Legumes are initiated from October to at least December; mature seed has been collected in December. The previous year's legumes are often present on the bushes during the next flowering season and these sometimes contain a few ripe seed.

Because the flower heads of *A. anfractuosa* vary from globular to obloid, it is difficult to fit this species into Bentham's classification (1864). The taxon is most closely allied to *A. heteroneura* Meisn. (Plurinerves-Nervosae, according

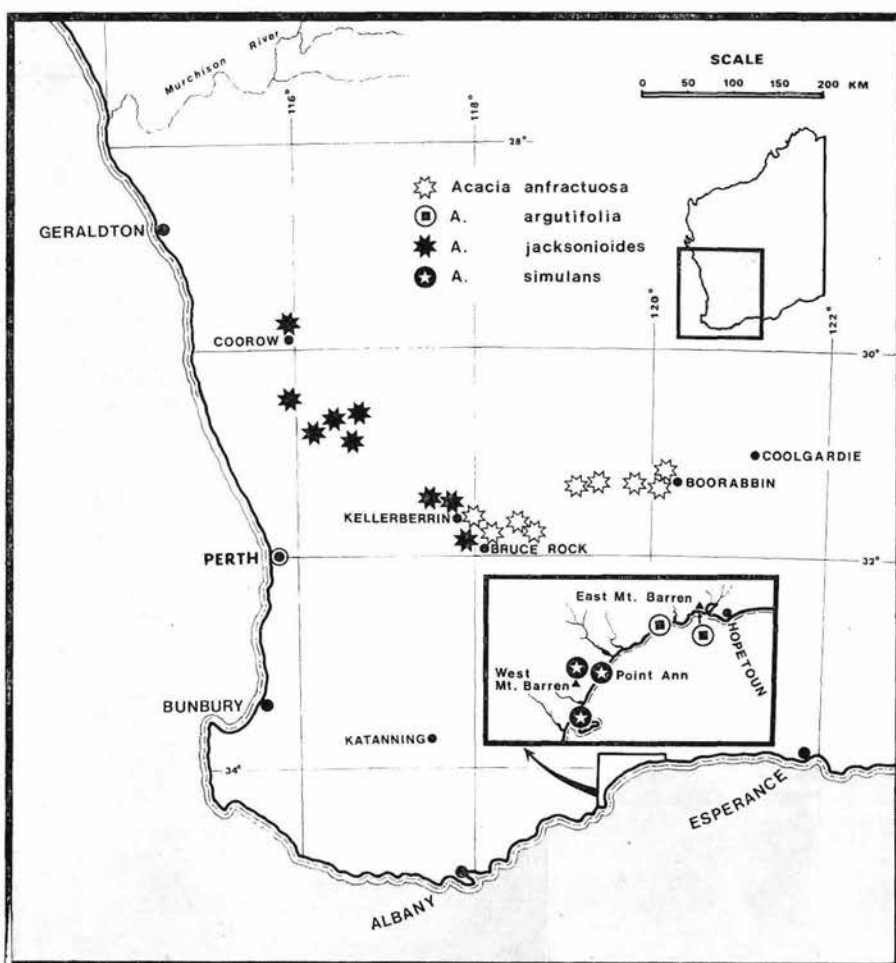


Figure 1. Distribution of *Acacia anfractuosa*, *A. argutifolia*, *A. jacksonioides* and *A. simulans*.

to Bentham, l.c.) and *A. jutsonii* Maiden (Juliflorae-Stenophyllae, according to Maiden, 1917) but it differs from both in its often pendulous, flexuose branches, and its curved phyllodes.

Mainly because of its flexuose, often pendulous branches and its long, narrow phyllodes and legumes, *A. anfractuosa* has in the past often been referred to as *A. hynesiana* W. V. Fitzg. This latter name is probably a synonym of *A. merinthophora* E. Pritzel but further work is needed to confirm this. *Acacia anfractuosa* differs significantly from the types of both *A. hynesiana* (W. V. Fitzgerald s.n.—MEL, NSW, PERTH) and *A. merinthophora* (L. Diels 2858—PERTH; E. Pritzel 316—NSW) in the following characters: phyllodes differently veined, flower heads pedunculate, and flowers 5-merous.

Between Mukinbudin and Welbungin (about 80 km north of Merredin) there occurs a variant of *A. anfractuosa* which differs from the typical form in that its phyllodes are terete and have four, equally spaced, very prominent, longitudinal grooves running the entire length of the phyllode. This variant is known from only two collections, viz. W. E. Blackall 848 and C. A. Gardner 2754, both of which are in flower. Judging from the herbarium label information, this variant has the same distinctive habit as the typical form. Further information is needed concerning this variant before its taxonomic status can be determined.

The specific epithet refers to the characteristic prominently flexuose branches.

2. *Acacia argutifolia* Maslin sp. nov.

Frustrum ad 0.5 m altus; ramuli inconspicue nervati, modice puberuli (rami parce puberuli). *Stipulae* ± persistentes. *Phyllodia* aggregata, non verticillata, lineari-trigona, 6–13 x 1 mm, glabra, pungentia. *Glans* inconspicua, interdum nulla. *Capitula* globulosa. *Florae* 4-merae (petalae raro 5); *calycis* tubus glabratus; *petala* glabra, enervia.

Type: Northern slopes of Whoogarup Range, about 29 km due W of Hopetoun, Western Australia, 8 Oct. 1975, B. R. Maslin 3886 (holo: PERTH; iso: CANB, K, MEL, NY).

Low, spreading, intricate *shrub* 0.2–0.5 m tall and 1.2–1.7 m diam., dividing near ground level into 3–4 main branches; *bark* light grey on branches, red towards ends of branchlets; *lenticels* fairly conspicuous; *branchlets* terete, very obscurely nerved, moderately puberulous (hairs sparser on branches). *Stipules* very narrowly triangular, 1.5–2 mm long, somewhat persistent. *Phyllodes* scattered (not verticillate) and crowded, linear-trigonal (midrib prominent below but normally absent above, lateral angles conspicuous), 6–13 mm long, ca. 1 mm wide, ascending to almost patent, slightly curved, quite rigid, glabrous, bright to medium green, stomata numerous (quite apparent at x 10 mag.), pungent (mucrone 1 mm long, straight, brown or yellow); *pulvinus* ca. 0.5 mm long, somewhat dilated towards the base. *Gland* inconspicuous, sometimes absent, situated on upper surface of phyllode at, or near, distal end of pulvinus. *Inflorescences* simple, 1 per node; *peduncles* 5 mm long, glabrous, basal bract solitary and triangular; *receptacle* obloid, glabrous; *flower heads* globular, pale yellow, with 23–25 flowers. *Bracteoles* almost 1 mm long, ± glabrous, claws oblong, laminae ovate and acute. *Flowers* 4-merous (in some heads a few flowers with 5 petals occur); *calyx* ca. $\frac{1}{2}$ length of petals, divided for $\frac{1}{2}$ – $\frac{2}{3}$ its length into oblong minutely ciliolate lobes, tube glabrescent; *petals* ca. 1.2 mm long, connate for $\frac{1}{2}$ their length, glabrous, nerveless; *ovary* sessile, sparsely hairy. *Legumes* narrowly oblong, to 40 mm long, 2–4 mm wide, somewhat chartaceous, slightly raised over seeds, slightly curved, glabrous to glabrescent, tan to grey-brown, narrowed at both ends, stipe 3 mm long; *margins* slightly contracted between seeds, barely thickened, yellow. *Seeds* longitudinal in legume, obloid to ellipsoid, ca. 3 mm long and 1.8 mm wide, brown, with a darker brown line extending around periphery of seed, dull; *pleurogram* quite obvious, open towards the hilum; *areole* ca. 2.5 x 0.7 mm; funicle filiform, abruptly expanded into a conical (although often compressed at apex), white aril.

Distribution: (Figure 1) South-west Western Australia: known only from near East Mount Barren and Quoin Head (K. Newbey, pers. comm.), about 10–30 km west of Hopetoun.

Habitat: Grows in shallow sand over quartzite in low open heath.

WESTERN AUSTRALIA: East Mount Barren, south of Ravensthorpe, C. A. Gardner and W. E. Blackall 1428 (PERTH); East Mount Barren, K. Newbey 1618 (G, NSW, PERTH).

Flowering and fruiting period: Flowers intermittently from late July to January (K. Newbey, pers. comm.). Legumes containing mature seeds have been collected in early October. These were present on bushes that were just beginning their flowering period.

Using Bentham's classification (1864) *A. argutifolia* occurs in the Pungentes-Uninerves but it is not closely related to the other members of this group. This species is most closely allied to *A. simulans* Maslin from which it is readily distinguished by its scattered (not verticillate) phyllodes—see p. 101 below for a full discussion on these two species.

The specific epithet refers to the characteristic sharp-pointed phyllodes.

3. *Acacia jacksonioides* Maslin sp. nov.

Fruites 0.3–0.6 m altus, densus, intricatus, divaricate-ramosus, ramulis brevibus spinescentibus; rami nervati, glabri. *Stipulae* caducae. *Phyllodia* leviter et oblique ovata ad oblonga vel elliptica, 3.5–8(10) x 2.5–4(5) mm, glabra, marginibus \pm undulatis, costis prominentibus. *Pedunculi* 3–6 mm longi, glabri; *capitula* globosa. *Bracteolae* nullae. *Florae* 5-merae. *Legumen* anguste oblongum, plerumque 25–30 mm longum, 3 mm latum. *Semina* in legumine longitudinalia, obloidea, 2.2–2.5 x 1.2–1.7 mm.

Type: Nalyaring Well, 20 km N of Kellerberrin towards Yelbeni, Western Australia, 16 July 1970, B. R. Maslin 592 (holo: PERTH; iso: CANB, K, NY).

Dense, intricate, divaricately branched, rounded shrub 0.3–0.6 m tall, with short, spinescent branchlets; branches slightly flexuose, terete, quite prominently ribbed (ribs yellow), glabrous, glaucous (when fresh). *Stipules* caducous. *Phyllodes* slightly obliquely ovate to oblong or elliptic, 3.5–8(10) mm long, 2.5–4(5) mm wide, patent or somewhat reflexed, glabrous, margins slightly thickened and normally \pm undulate, midrib prominent, lateral veins very obscure, apiculum short somewhat sharp and dark brown; *pulvinus* ca. 0.5 mm long, obscurely wrinkled. *Gland* not prominent, situated on upper margin of phyllode 1–2 mm above the pulvinus. *Inflorescence* an extremely reduced raceme consisting of a single flower head, 1(2) per node; *raceme axis* minute (0.1 mm long); *peduncles* 3–6 mm long, glabrous, subtended by 2 basal bracts; *flower heads* globular, yellow, with 10–14 flowers. *Bracteoles* absent. *Flowers* 5-merous; *calyx* $\frac{1}{2}$ to slightly less than $\frac{1}{2}$ length of corolla, divided for $\frac{1}{4}$ it; length into obtuse glabrous or ciliolate lobes, tube nerveless and glabrous or glabrescent; *petals* 1.5–2 mm long, connate for ca. $\frac{1}{3}$ their length but readily separating, very obscurely 1-nerved, glabrous; *ovary* glabrous. *Legumes* narrowly oblong, mostly 25–30 mm long, 3 mm wide, firmly chartaceous, curved, slightly undulate, quite prominently raised over seeds (but bulged on one surface of legume only—opposite surfaces for adjacent seeds), glabrous, brown; *marginal rib* narrow, slightly contracted between seeds, pale coloured. *Seeds* longitudinal in legume, obloid, 2.2–2.5 mm long, 1.2–1.7 mm wide, brown, shiny; *pleurogram* horseshoe-shaped, open towards the hilum; *areole* 0.7 mm long; *funicle* filiform, abruptly expanded into a thickened, curved, pale yellow aril.

Distribution: (Figure 1) Western Australia: wheatbelt region from near Coorow south-east to near Bruce Rock.

Habitat: Gravelly sand or loam commonly on hilltops.

WESTERN AUSTRALIA: About 8 mi (12.9 km) N of Coorow, C. Chapman s.n., 1 July 1973 (PERTH); Yorkrakine, C. A. Gardner 8044 (BRI, MEL, PERTH, RSA); Ballidu, R. T. Lange 56 (PERTH); About 29 km due NW of Bruce Rock, B. R. Maslin 2364 (PERTH); About 37 km S of Moora towards Perth, B. R. Maslin 3275 (NSW, PERTH).

Flowering and fruiting period: Flowers in July and August; a few undehisced legumes remain on the bushes to mid-December.

According to Bentham's classification (1864) *A. jacksonioides* occurs in the Uninerves-Spinescentes. At PERTH this species has previously been known as *A. intricata* S. Moore. However, it is not closely related to this species. *Acacia jacksonioides* is distinguished from *A. intricata* by its short, divaricate, spinescent branchlets, its larger, undulate, less rigid phyllodes, and its longer peduncles.

The short, divaricate, spinescent branchlets, and relatively small phyllodes and flower heads render this new species similar to *A. erinacea* Benth. However, *A. jacksonioides* is readily recognized by its differently shaped, normally somewhat undulate, more prominently nerved phyllodes, its much narrower legumes, and its longitudinally arranged seeds. In its phyllode morphology, *A. jacksonioides* is similar to *A. semicircularis* Maiden and Blakely (Uninerves-Brevifoliae) but differs from this species in its divaricate, spinescent branchlets, and its smaller flower heads.

The specific epithet alludes to the general similarity in branching pattern between the new species and some members of the genus *Jacksonia* e.g. *J. hakeoides* Meisn. and *J. spinosa* (Labill.) R.Br.

4. *Acacia simulans* Maslin sp. nov.

Frutex diffusus ad 1 m altus; *ramuli* teretes, glabri vel sparsim antrorse strigosi. *Stipulae* ca. 1 mm longae. *Phyllodia* verticillata 6-9-na, linear-tetragona, 8-12 mm longa, patentia ad leviter reflexa, pungentia. *Glans* inconspicua. *Capitula* globulosa ad leviter obloidea. *Florae* 4-merae. *Legumen* 1 moniliforme, ad 70 mm longum, ad 4 mm latum. *Semina* in legumine longitudinalia, obloidea, ca. 4 mm longa, 2.5-3 mm lata, brunnea.

Type: About 1.6 km due NW of Mount Bland, Fitzgerald River National Park, Western Australia, 30 August 1973, B. R. Maslin 3483 (holo: PERTH; iso: BRI, CANB, K, MEL, NY, PERTH).

Diffuse, openly branched *shrub* to 1 m tall, dividing at ground level into a number of slender spreading branches; *bark* smooth, grey on branches, brown on branchlets; *lenticels* often quite prominent; *branchlets* terete, very obscurely nerved, glabrous or sparsely antrorsely strigose. *Stipules* narrowly triangular, ca. 1 mm long. *Phyllodes* regularly verticillate, 6-9 per whorl, linear-tetragonous (sometimes appearing trigonous due to reduction of midrib on upper surface of phyllode), 8-12 mm long, patent to slightly reflexed, straight or slightly curved, quite rigid, glabrous or sometimes glabrescent, stomata numerous (quite apparent at x 10 mag.), pungent (mucrone 1 mm long, straight, brown); *pulvinus* ca. 0.5 mm long, slightly dilated towards the base. *Gland* inconspicuous, situated on rib on upper surface of phyllode 2-4 mm above the pulvinus, orifice circular to oblong and 0.1-0.2 mm diam. *Inflorescences* simple, 1-2(3) per node; *peduncles* 2-4(5) mm long, glabrous, basal bract solitary; *receptacle* obloid, glabrous; *flower heads* light yellow, globular to slightly obloid, with 16-20 flowers. *Bracteoles* ca. 1 mm long, puberulous abaxially, laminae ovate. *Flowers* 4-merous; *calyx* $\frac{1}{4}$ - $\frac{1}{3}$ length of petals, divided for $\frac{1}{4}$ - $\frac{1}{3}$ its length into broadly triangular slightly keeled and inflexed lobes, tube puberulous; *petals* ca. 1.5 mm long, free to base, glabrous, nerveless; *ovary* minutely stipitate, glabrous or papillose. *Legumes* \pm moniliform, to 70 mm long, to 4 mm wide, firmly chartaceous, slightly curved, glabrous, brown, stipe ca. 6 mm long; *marginal nerve* narrow and yellow. *Seeds* longitudinal in legume, obloid to elliptic, ca. 4 mm long, 2.5-3 mm wide, dark

brown, slightly shiny; *pleurogram* quite prominent, open towards the hilum; *areole* 3 mm long, 1.5 mm wide; *funicle* slender, reflexed below a thickened, conical, white aril.

Distribution: (Figure 1) South-west Western Australia: known only from a restricted area along the south coast in the vicinity of West Mount Barren (about 70 km due WSW of Hopetoun).

Habitat: Sand among the low shrub stratum of *Eucalyptus tetragona* (R.Br.) F. Muell. tall open shrubland.

WESTERN AUSTRALIA: Below Mount Bland, near West Mount Barren, ESE of Ongerup, T. E. H. Aplin, I. Lethbridge and R. Coveny 3317 (PERTH); Near Point Ann, A. S. George 10044 (AD, PERTH); About 1.6 km due NW of Mount Bland, Fitzgerald River National Park, B. R. Maslin 3482 (B, BRI, K, L, MEL, NSW, PERTH, RSA); 1 mi (1.6 km) NW of Mount Maxwell, K. Newbey 827.

Flowering and fruiting period: Flowers from July to September; seeds mature in the first two weeks of December.

Using Bentham's classification (1864) *A. simulans* occurs in the series Brunioideae, however, it is not closely related to the other members of this group. *Acacia simulans* has its closest affinities with *A. argutifolia* Maslin (see p. 98 above) which occurs in the Pungentes-Uninerves. These two species have the same basic phyllode and legume structure and very similar inflorescences. *Acacia simulans* is distinguished from *A. argutifolia* by its verticillate phyllodes and its less hairy branchlets. Neither species shows a close relationship with previously described Western Australian acacias.

In his discussion under *A. cedroides* Benth., Pedley (1972, p. 12) referred to a possible new species collected from near Mount Maxwell (K. Newbey 827); this species is *A. simulans*. As both *A. cedroides* and *A. simulans* have pungent and verticillate phyllodes they superficially resemble one another, but they are not particularly closely related. In addition to the characters mentioned by Pedley, *A. simulans* differs from *A. cedroides* in its habit (more diffuse), its normally shorter and more spreading phyllodes, its 4-merous flowers, its \pm moniliform, firmly chartaceous, non-striate legumes, and its darker coloured seeds.

Pedley (l.c.) noted that *A. cedroides* was not closely related to the other regularly verticillate members of the Brunioideae. From my own observations it appears as though this species has its closest affinities with *A. loricata* Meisn., a member of the Pungentes-Uninerves. Both taxa share similar phyllode, inflorescence and legume characters. The main difference between them is their phyllode arrangement (verticillate in the former taxon, scattered and crowded in the latter). An interesting comparison can be made between this pair of species and the *A. simulans*-*A. argutifolia* pair. Both *A. cedroides* and *A. simulans* have regularly verticillate phyllodes and therefore, according to Bentham's classification, occur in the Brunioideae, but they are anomalous members of this group. Likewise, *A. loricata* and *A. argutifolia* (the respective closest relative of the above two species) are atypical members of Bentham's Pungentes-Uninerves; both these taxa have scattered (not verticillate) and crowded phyllodes. These two species-pairs undoubtedly constitute natural taxonomic groups. From the above it is seen that parallel evolution has occurred in these two unrelated groups of species. Thus while Bentham's classification of *Acacia* is undoubtedly useful for grouping species of this vast genus, it does not necessarily reflect the true relationships of the taxa contained therein.

The specific epithet refers to the superficial resemblance of the new species to *A. cedroides*.

Acknowledgments

The author wishes to express his appreciation of the assistance given by Mr. Ken Newbey for his valuable comments on *A. argutifolia* and *A. simulans*. Mr. Alex George is also gratefully acknowledged for checking the latin descriptions.

References

- BENTHAM, G. (1864). Flora Australiensis, vol. 2. Reeve, London.
MAIDEN, J. H. (1917). Notes on *Acacia* No. 3.—Extra-tropical Western Australia. J. Roy. Soc. N.S.W. **51**:238-274.
PEDLEY, L. (1972). A Revision of *Acacia lycopodiifolia* A. Cunn. ex Hook. and its Allies. Contr. Qd. Herb. No. 11, pp. 1-23.

Six new taxa of *Eucalyptus* from Western Australia

By M. I. H. Brooker*

Abstract

Six new eucalypts are described—*Eucalyptus balladoniensis* from near Balladonia, *E. deflexa* from east of Lake King, *E. effusa* from east of the Fraser Range, *E. goniantha* subsp. *semiglobosa* from near Mt Le Grand, *E. leucophloia* from the Pilbara district and eastwards to western Queensland, and *E. prominens* from near Exmouth Gulf.

***Eucalyptus balladoniensis* Brooker sp.nov.** (Figures 1, 2). Pryor and Johnson code SIT:Z.

Frutex "mallee" ad 4 m altus, caulibus inferis fibrosis, superis laevibus. *Lignotuberum* formans. *Medulla* glandulifera.

Folia plantulae sessilia, plerumque decussata, linearia, 1.5–6 x 0.1–0.8 cm, glauca, supra concava. *Folia adulta* 7–13 x 1–2.5 cm, glandulis oleosis numerosissimis.

Inflorescentiae axillares, 7-florae. *Pedunculi* 1–2 cm longi, aliquot recurvi, complanati vel teretes et crassi. *Alabastra* ad 25 x 8 mm. *Hypanthia* hemisphaerica vel obconica, aliquot costata. *Opercula* valde rostrata, crassa. *Pedicelli* 4–8 mm longi. *Loculi* 4. *Ovula* verticaliter 4-seriata.

Fructus pedicellata, hemisphaerica, 10–12 x 9–12 mm. *Cicatrix* operculi lata, ascendens. *Discus* incurvus. *Valvae* exsertae, dorsaliter excavatae. *Semina* ovalia, ca. 2 x 1 mm, cinerea, laevia.

Type: 80 km by road south of Zanthus towards Balladonia, Western Australia (31°37'S, 123°53'E) 13 Feb. 1970, M. I. H. Brooker 2471 (holo: PERTH; iso: FRI, NSW).

A mallee to 4 m tall with grey to dark grey fibrous bark on the lower trunk, smooth grey-brown or pinkish grey above. Capable of forming lignotubers. *Pith* glandular.

Cotyledons bisected, petiole 4–6 mm, arms 5–7 mm. *Seedling leaves* sessile, decussate, rarely spirally arranged, linear, 1.5–6 x 0.1–0.8 cm, bluish green, concave above. *Juvenile leaves* shortly petiolate, lanceolate, up to 15 x 1.7 cm. *Adult leaves* petiolate (to 2 cm long) not opposite, lanceolate, 7–13 x 1–2.5 cm. *Reticulation* dense. *Glands* extremely numerous, seen mostly at veinlet intersections, variable in outline, equal to or larger than the areoles.

Inflorescences axillary of 7 flowers. *Peduncles* 1–2 cm long, some recurved, flattened or terete and stout. *Buds* to 25 x 8 mm, hypanthium hemispherical to obconical, sometimes ribbed, operculum beaked, thick. *Pedicels* 4–8 mm long. *Stamens* all fertile, flexed both tangentially and radially in bud. *Anthers* subglobular, basifixed, versatile, opening by lateral, oval pores. *Style* inserted deeply into beak of operculum. *Locules* 4. *Ovules* in 4 vertical rows.

Fruit pedicellate, hemispherical, 10–12 x 9–12 mm. *Operculum* scar broad, ascending. *Disc* incurved. *Valves* 4, exserted, hollowed at the back.

Seed oval-shaped, ca. 2 x 1 mm, grey, smooth. *Chaff* reddish brown, cubic or subulate.

Distribution: Western Australia: north and north-west of Balladonia.

Other collections: 160 km east of Norseman by road towards Balladonia (32°12'S, 123°18'E) 5 Sept. 1968, P. G. Wilson 7733, 7734 (PERTH) and 23 Aug. 1969, N. T. Rossiter (FRI); 21 km west of Balladonia by road towards Norseman (32°16'S, 123°26'E) 26 April 1972, M. I. H. Brooker 3653 (FRI, PERTH, NSW, AD, MEL) and 10 April 1974, M. I. H. Brooker 4535 (FRI), 4536 (FRI, PERTH, K, GAUBA).

Flowering period: August-January.

* CSIRO, Division of Forest Research, Banks St., Yarralumla, A.C.T. 2600

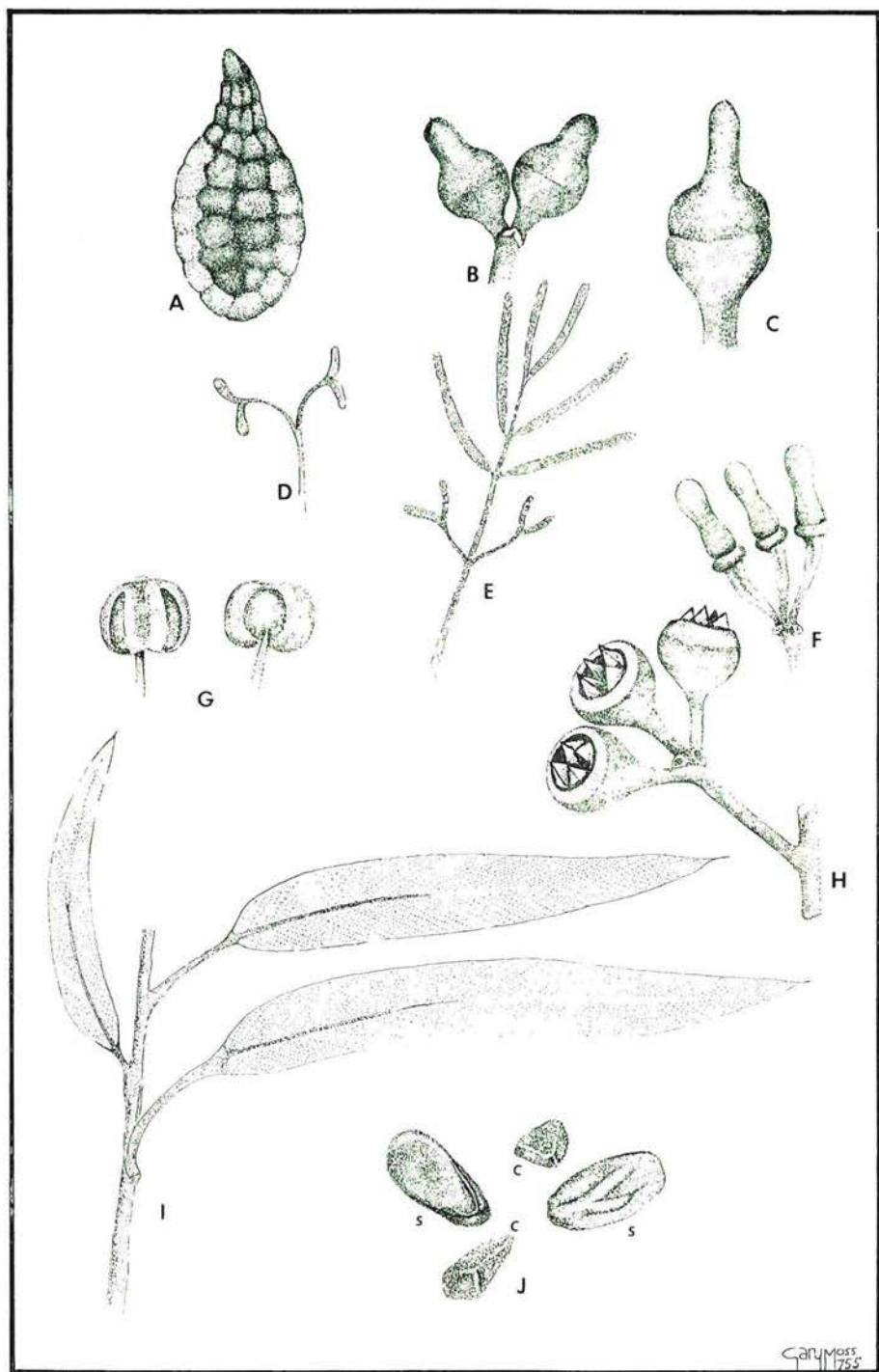


Figure 1. *Eucalyptus balladoniensis* sp. nov. A—Ovules, x 11. B, C—Buds, x 1·5. D—Cotyledons, x 1. E—Seedling, x 1. F—Young buds, x 1·5. G—Anthers, x 20. H—Fruit, x 1. I—Leaves, x 1. J—Seed(s) and chaff (c), x 15.

Few collections of *Eucalyptus balladoniensis* appear to have been made away from the Eyre Highway between Norseman and Balladonia so its distribution is poorly documented at present. The soil surface of the area of occurrence is sandy with some limestone rubble. Associated species are *Eucalyptus platycorys* Maiden & Blakely, *E. transcontinentalis* Maiden and *E. conglobata* subsp. *fraseri* M. I. H. Brooker. The two latter taxa provide a remarkable case of convergence as the trees of both are close in bark and habit. The ground cover is sparse *Triodia* sp. and *Kochia* sp.

The natural affinities of *E. balladoniensis* are not clear. It belongs in *Symphyomyrtus* and from anther and seed characters it would best be placed in the series *Oleosae** perhaps nearest to *E. transcontinentalis* from which it differs vastly, however, in habit and fruit and seedling morphology. *E. transcontinentalis* is a smooth, white-barked tree and seedlings of the Balladonia population are remarkable for their coarse, decurrent, ovate-lanceolate leaves. *E. balladoniensis* is a rough-barked mallee whose seedlings have long, linear, non-decurrent leaves.

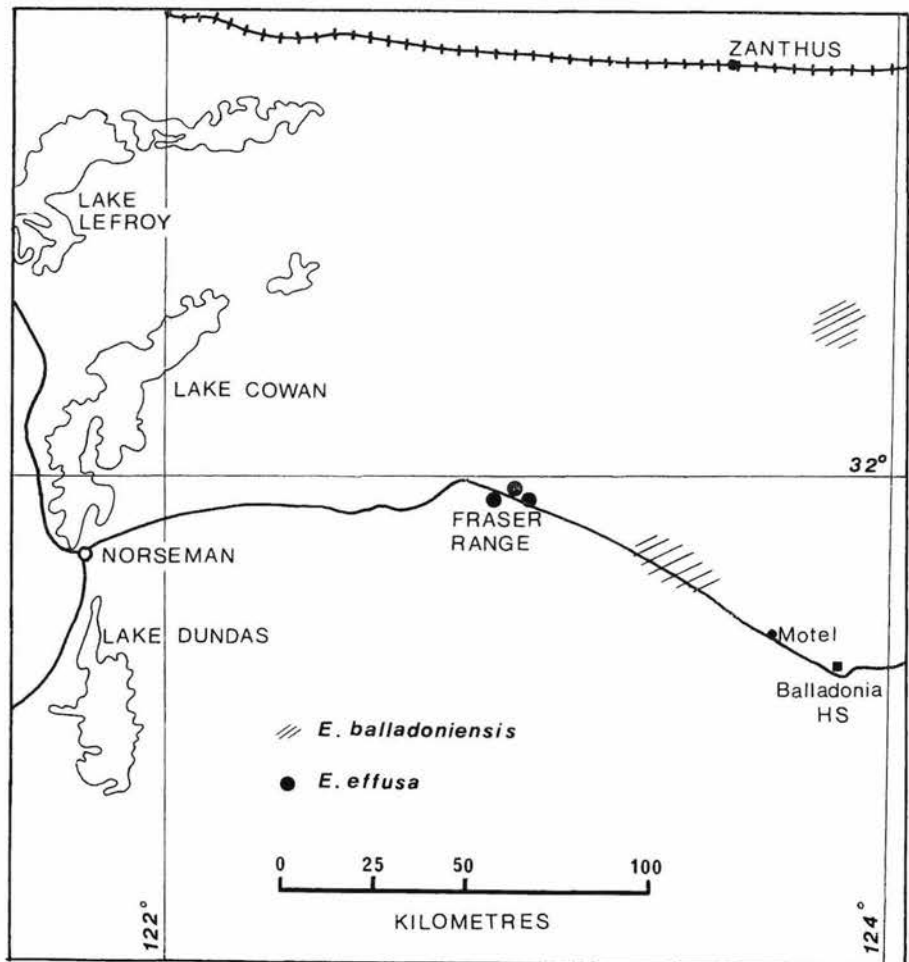


Figure 2. Distribution of *E. balladoniensis* sp. nov. and *E. effusa* sp. nov.

* Infrageneric taxa after Pryor and Johnson (1971).

Eucalyptus deflexa Brooker sp.nov. (Figures 3, 4). Pryor and Johnson code SLI:H.

Frutex "mallee" ad 3 m altus, caulibus laevibus, cinereis, exilibus. *Lignotuberum* formans

Folia adulta angusto-lanceolata, 5-7 x 0.5-0.8 cm, uncinata, flavo-virentia, nitida.

Glandulae sparsae.

Inflorescentiae axillares, (3) 7-florae. *Pedunculi* deflexi vel penduli, 1-3 cm longi, teretes. *Alabastra* cylindrica, 7-12 x 3-5 mm. *Pedicelli* ad 2 cm longi. *Opercula* depresso-hemisphaerica vel rostrata, brevia. *Filamenta* glandulifera, flava vel rosea. *Loculi* 3-5.

Fructus doliiformes, 9-12 x 6-9 mm, affixi pedicellis ad 3 cm longis.

Semina elliptica vel lachrimiformia, atrocinereo-brunnea, penitus foveata.

Type: 35 km east of Lake King towards Daniell, Western Australia (33°05'S, 120°02'E) 11 Nov. 1966, P. G. Wilson 5745 (holo: PERTH; iso: FRI).

A small mallee to 3 m tall with smooth, grey, slender stems to 3 cm diameter. *Pith* glandular. Capable of forming lignotubers.

Cotyledons reniform ca. 4 x 5 mm. *Seedling leaves* petiolate, decussate, lanceolate, 0.8-5 x 0.3-1.5 cm. *Adult leaves* petiolate (5-10 mm long), not opposite, narrow-lanceolate, 5-10 x 0.5-1 cm, uncinata, yellowish green, glossy. *Reticulation* dense. *Glands* sparse, irregular, at veinlet intersections.

Inflorescences axillary of (3) 7 buds. *Peduncles* deflexed or pendulous, 1-3 cm long, terete. *Buds* cylindrical, 7-12 x 3-5 mm, yellow, on pedicels to 2 cm long. *Operculum* depressed hemispherical, or rostrate, usually much shorter than the hypanthium. *Stamens* all fertile. *Filaments* glandular, inflected radially in bud, yellow or pink. *Anthers* oblong, truncate, sub-basifixed, versatile, opening by longitudinal slits. *Locules* 3-5. *Ovules* in 4 vertical rows.

Fruit barrel-shaped, 9-12 x 6-9 mm, on pedicels to 3 cm long, smooth or slightly ribbed towards the top. *Disc* broad, descending, vertical. *Valves* 3-5, deeply sunk.

Seed elliptical or tear-shaped, dark grey-brown, deeply pitted, ca. 1.5 x 1 mm. *Chaff* red-brown.

Distribution: Western Australia: east and north-east of Lake King.

Other collections: east of Lake King, Oct. 1961, A. Popplewell (PERTH, FRI); Rabbit Proof Fence 16 km north of Lake King-Norseman Road (32°56'S, 119°53'E) 17 June 1966, J. S. Beard (PERTH); Rabbit Proof Fence east of Lake King (33°05'S, 120°02'E), Oct. 1966, F. W. Rowe (PERTH, FRI); 291 mile peg on the Hyden-Norseman track, 26 Oct. 1966, A. Kessell 510 (PERTH); Mt Madden (33°14'S, 119°50'E) Mar. 1967, Officer-in-Charge, Department of Agriculture, Lake Grace (PERTH); ca. 16 km ESE of Lake King (33°08'S, 119°49'E) 30 Mar. 1967, W. Boden (PERTH); 77 km south of the Norseman-Lake King Road, 23 May 1968, H. Demarz 130 (PERTH); 27 km east of Lake King (33°05'S, 119°57'E) 9 Aug. 1968, P. G. Wilson 6965 (PERTH, FRI); ± 5 km south of Mt Gibbs, east of Lake King (32° 57'S, 119°58'E) 31 Aug. 1969, A. S. George 9455 (PERTH, FRI), 9456 (PERTH); 30 km east of Lake King (33°05'S, 119°58'E) 21 April 1972, M. I. H. Brooker 3595 (FRI, PERTH, K, NSW, GAUBA, AD, MEL), 3596 (FRI, PERTH, AD, NSW, MEL); 121 km east of Hyden on the Norseman track (32° 21' S, 120° 07' E) 30 Oct. 1975, M.I.H. Brooker 4985 (FRI, PERTH, NSW, AD, MEL).

Flowering period: April-October.

Eucalyptus deflexa is a small mallee of the scrub east and north-east of Lake King. Soil surface is sandy, often with lateritic gravel. Associated species are *E. eremophila* (Diels) Maiden, *E. flocktoniae* Maiden, *E. foecunda* Schau. *E. incrassata* Labill., *E. redunca* Schau. and *E. pileata* Blakely. Its natural affinities within *Symphyomyrtus* are indicated by the cotyledons (reniform), the filament arrangement (radially inflected), the ovule row number (4) and the seed coat (dark, deeply pitted with irregular transparent margins). These characters place it in the series *Torquatae*. The peduncles are always deflexed (the reason for the specific name).

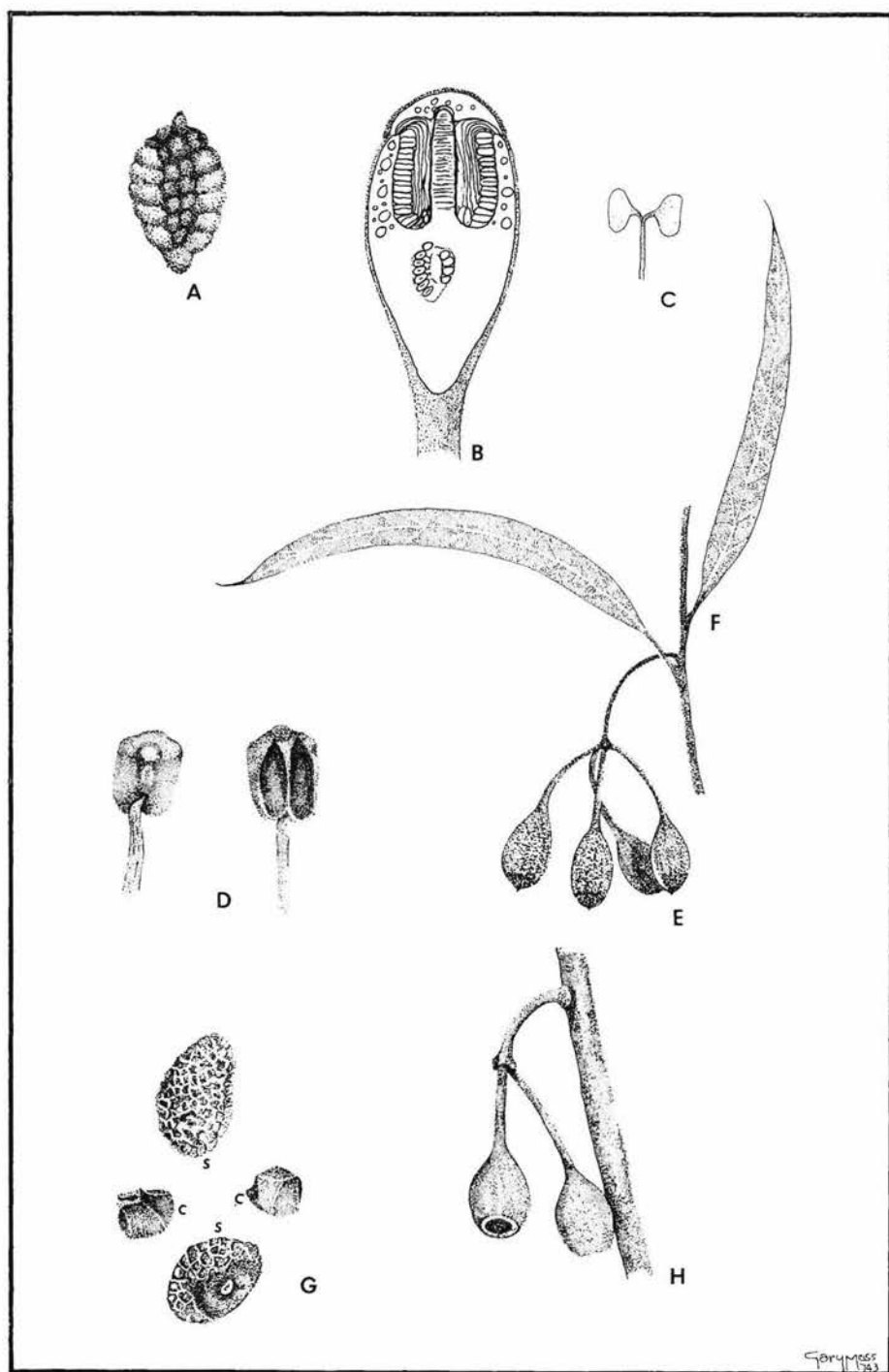


Figure 3. *Eucalyptus deflexa* sp. nov. A—Ovules, x 12. B—Bud section, x 5. C—Cotyledons, x 1.5. D—Anthers, x 30. E—Buds, x 1. F—Leaves, x 1. G—Seed(s) and chaff (c), x 10. H—Fruit, x 1.

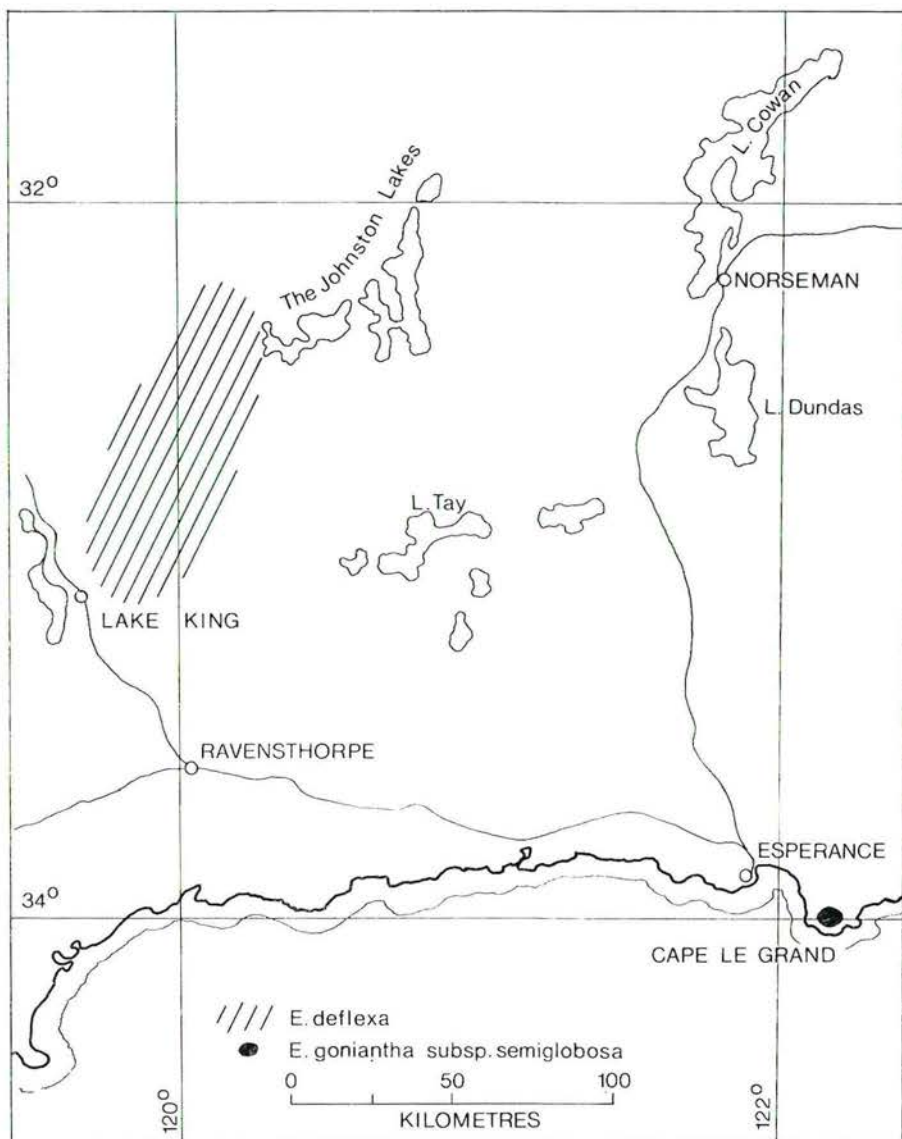


Figure 4. Distribution of *Eucalyptus deflexa* sp. nov. and *E. goniantha* subsp. *semiglobosa* subsp. nov.

***Eucalyptus effusa* Brooker sp. nov.** (Figures 2, 5). Pryor and Johnson code SIK:l.

Eucalypto salubri F. Muell. affinis a qua habitu inferiore et effusiore, cortice nondecorticante, caulibus non-caniculatis, et alabastris et fructibus brevioribus, differt.

Type: 112 km east of Norseman by road towards Balladonia, Western Australia (32°02'S, 122°57'E) 12 Mar. 1967, G. M. Chippendale 157 (holo: FRI; iso: PERTH, NSW, MEL).

A mallee to 4 m tall with flaking, non-decortivating bark on the stems, smooth grey or pinkish grey above; stems apparently non-fluted. Capable of forming lignotubers. *Pith* glandular.

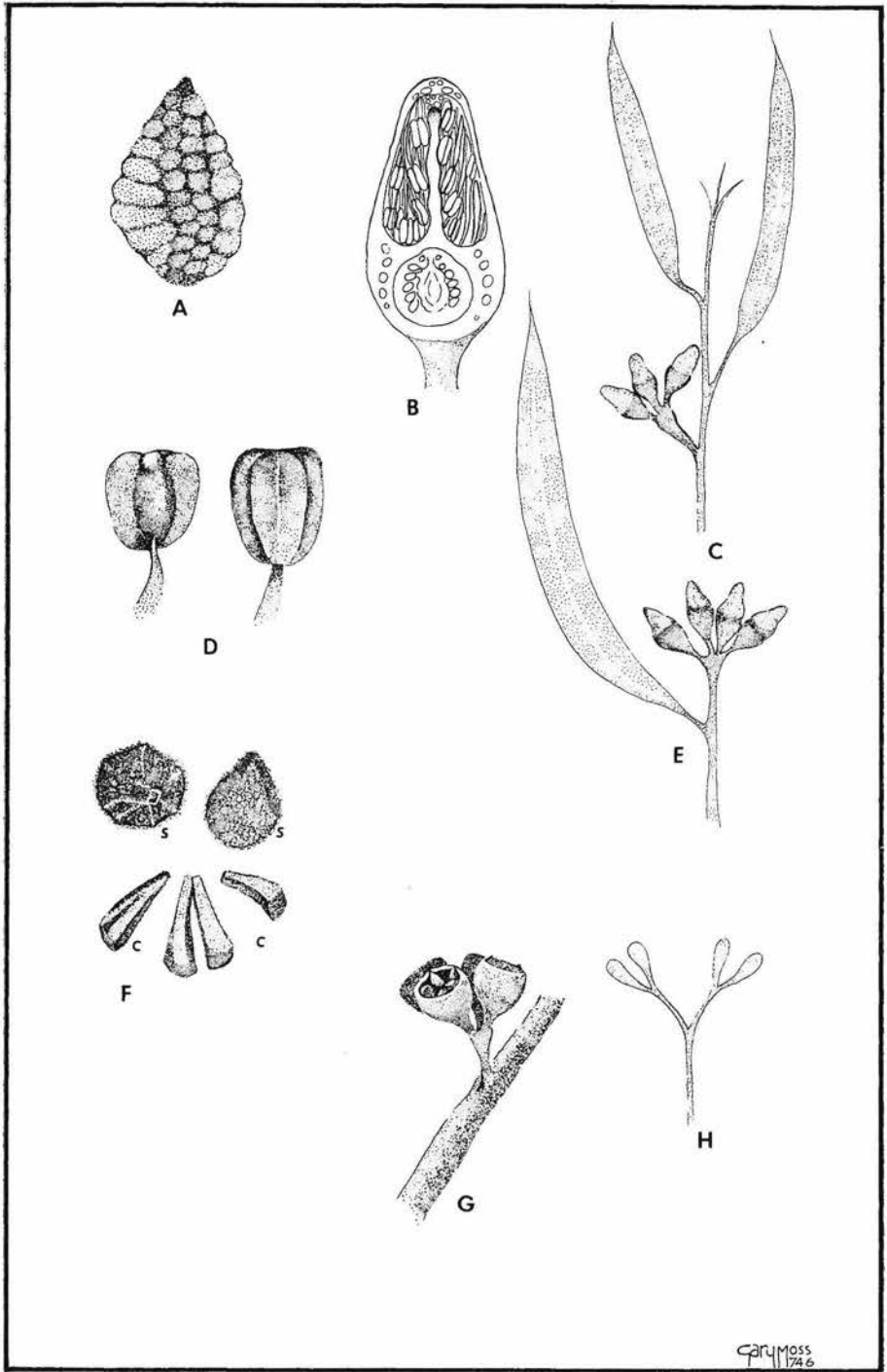


Figure 5. *Eucalyptus effusa* sp. nov. A—Ovules, x 18. B—Bud section, x 7. C, E—Buds and leaves, x 1. D—Anthers, x 20. F—Seed(s) and chaff (c), x 15. G—Fruit, x 1.7. H—Cotyledons, x 2.

Cotyledons bisected, petiole 3–4 mm, arms 5–10 mm. *Seedling leaves* petiolate, decussate, lanceolate to ovate-lanceolate, 1.5 x 0.3–2 cm, green. *Adult leaves* petiolate, not opposite, lanceolate, 5–10 x 0.6–1.5 cm. *Reticulation* moderately dense and finally obscure. *Glands* numerous, very irregular in outline, discrete.

Inflorescences of 7 flowers, axillary or sometimes apparently clustered towards the ends of branchlets. *Peduncles* 3–10 mm long, becoming broader at the top. *Buds* cylindroid or double-conical, 6–9 x 3–4 mm. *Pedicels* 1–3 mm long. *Operculum* acutely or obtusely conical, as long as or longer than the hypanthium. *Stamens* all fertile, at first erect then variously inflected with the anthers surrounding the style. *Anthers* oblong, sub-basifixed, versatile, opening by longitudinal slits. *Locules* 3 or 4. *Ovules* in 4 or 6 vertical rows.

Fruit shortly pedicellate, cupular or obconical, 5–7 x 5–6 mm. *Disc* not conspicuous. *Valves* 3 or 4 to rim level or slightly exserted.

Seed irregular, ca. 1 x 1 mm, yellow or brown, deeply and finely pitted on the dorsal side. *Chaff* cubic and subulate, reddish brown.

Distribution: Western Australia: between the Fraser Range and Balladonia.

Other collections: Eyre Highway, 85 km WNW of Balladonia Station, Western Australia (32°04'S, 123°03'E) 2 Oct. 1961, J. H. Willis (MEL, FRI); 115–116 km east of Norseman by road toward Balladonia, Western Australia (32°02'S, 122°58'E) 14 Feb. 1970, M. I. H. Brooker 2483 (PERTH) and 26 April 1972, M. I. H. Brooker 3646 (FRI, PERTH, K, NSW, AD).

Flowering period: uncertain (GMC 157 flowered in March).

The natural affinities of *Eucalyptus effusa* are clear. The cotyledons are bisected (section Bisectaria), the pith is strongly glandular, the filaments are firstly erect then variously inflected with long anthers, and the seed coat is honey-combed in a characteristic fashion (series Salubres). It is therefore a "gimlet" but appears to retain the dead bark and to lack the fluted stems.

Eucalyptus effusa is a low mallee of unimpressive straggly appearance (the reason for the specific name). It often occurs in pure stands in low hilly or flat stony country sometimes with dense *Triodia* understorey. Its distribution is not known to overlap with that of other gimlets which occur to the south and west. Hence it may retain its fairly high degree of specific integrity compared with *E. salubris* F. Muell., *E. campaspe* S. Moore and *E. diptera* Andrews which have overlapping distributions resulting in intergradation.

***Eucalyptus goniantha* Turcz. subsp. *semiglobosa* Brooker subsp. nov.** (Figures 4, 6). Pryor and Johnson code SIP:DB.

A subspecies typica praesertim operculis globosis et generaliter pedicellis longioribus, gracilioribus et fructibus semiglobosis, differt.

Type: Between Mt Le Grand and Frenchmans Peak, Western Australia (33°59'S, 122°08'E) 22 April 1972, M. I. H. Brooker 3613 (holo: FRI; iso: PERTH, NSW, K, AD, MEL, BRI).

An erect mallee to 3 m tall with smooth, grey bark. *Branchlets* quadrangular in section. Capable of forming lignotubers.

Cotyledons bisected, slender, petiole 7–10 mm, arms 8–11 mm. *Seedling leaves* sessile, decussate, linear, 1.5–4 x 0.1–1 cm. *Juvenile leaves* petiolate, decussate, ovate, 2–4 x 1–2 cm. *Adult leaves* petiolate (1.5–2.5 cm long), not opposite, lanceolate to broad-lanceolate, 8–12 x 2–4 cm, dark green, glossy. *Reticulation* dense. *Glands* numerous, irregular, seen mainly at veinlet intersections, large, ± equal to areoles.

Inflorescences axillary of 7 or 9 buds. *Peduncles* erect or deflexed, 15–25 mm long, stout, flattened. *Buds* 8–11 x 6–8 mm, hypanthium cup-shaped, operculum hemispherical, thick, narrower than hypanthium. *Pedicels* 3–6 mm

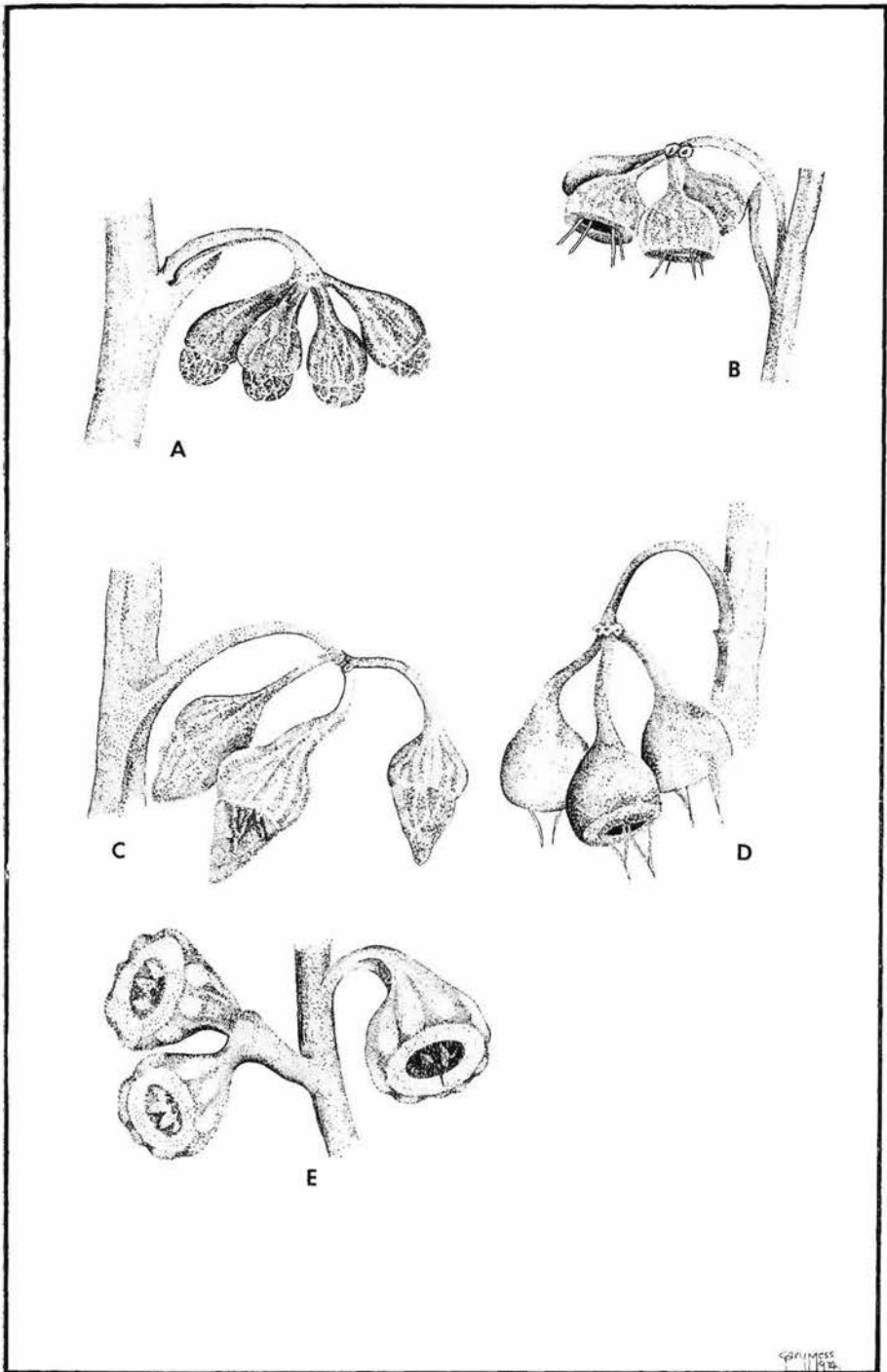


Figure 6. *Eucalyptus goniantha* subsp. *semiglobosa* subsp. nov. A—Buds, x 1.2. B—Fruit, x 1.2. *Eucalyptus goniantha* subsp. *goniantha*. C—Buds, x 1.3. D, E—Fruit, x 1.3.

long. *Stamens* all fertile. *Filaments* glandular, inflected radially in bud. *Anthems* oblong, dorsifixed, versatile, opening by longitudinal slits. *Locules* 4 or 5. *Ovules* in 4 vertical rows.

Fruit pedicellate, hemispherical to subglobular, 7–12 x 11–15 mm, ribbed or wrinkled. *Operculum* scar broad. *Disc* descending, vertical. *Valves* 4 or 5, coherent with the unshed style in young fruit, finally at rim level.

Seed elliptical, ca 2 x 1 mm, grey, with shallow reticulation. *Chaff* yellowish brown, cubic or subulate.

Distribution: Western Australia: between Mt Le Grand and Frenchmans Peak, south-east of Esperance.

Other collections: same locality as type, 22 April 1972, M. I. H. Brooker 3614 (FRI), 3615 (FRI, PERTH, NSW, AD, MEL).

Flowering period: April.

Eucalyptus goniantha subsp. *semiglobosa* is a mallee shrub known only from the sides of a creek in granitic hills between Mt Le Grand and Frenchmans Peak. Its erect habit may be brought about by the extremely dense shrubbery among which it grows. Associated species are *E. aquilina* Brooker and *E. ligulata* Brooker. It is obviously close to *E. goniantha* from which it differs consistently in the rounded opercula (the reason for the subspecific name) and consequently less deeply buried style tip, and more generally in the longer, more slender pedicels, and subglobular fruit. The form is imperfectly known and sampled and it is not to be unexpected that more intergradation with subsp. *goniantha* than has been seen to date will be found.

Eucalyptus leucophloia Brooker sp. nov. (Figures 7, 8). Pryor and Johnson code SNACIB.

Arbor parva vel frutex "mallee" pagina corticis alba, pulverulenta. *Lignotuberum* formans. *Medulla* glandulifera.

Cotyledones reniformes, 3 x 5 mm. *Folia plantulae* decussata, glauca, primum subsessilia, angusto-lanceolata vel ovata, demum petiolata, ovata vel orbicularia ad 7 x 6 cm. *Folia adulta* petiolata, non-opposita, lanceolata vel angusto-lanceolata, 5–10 x 1–2 cm, glauca vel flavo-viridia.

Inflorescentiae plerumque axillares, 7-vel 11-florae, glaucae. *Alabastra* breviter pedicellata, ovoidea vel duplicato-conica. *Stamina* omnia fertilia. *Antherae* oblongae, dorsifixae, versatiles ab rimis longitudinalibus non-confluentibus dehiscentes. *Ovarium* inferum vel semi-inferum. *Loculi* 3. *Ovula* verticaliter 4, 5, vel 6 seriata.

Fructus breviter pedicellati, hemisphaerici vel cupulati. *Discus* angustus. *Valvae* plerumque valde exsertae.

Semina ca. 1.5 x 1 mm, flavo-brunnea, reticulo nonprofundo.

Type: Western Australia, near Rudall River (22°37'S, 122°12'E) 22 May 1971, A. S. George 10782 (holo: PERTH; iso: FRI, K, NSW).

A small tree or mallee with white powder bark over the trunk and limbs. *Bark* often characteristically black-spotted. Capable of forming lignotubers. *Pith* glandular.

Cotyledons reniform, 3 x 5 mm. *Seedling leaves* decussate, glaucous, at first subsessile, lanceolate to ovate; later, petiolate, ovate to orbicular, to 7 x 6 cm. *Adult leaves* petiolate, not opposite, lanceolate to narrow-lanceolate, 5–10 x 1–2 cm, glaucous or yellowish green. *Reticulation* dense. *Glands* few at veinlet intersections.

Inflorescences 7 or 11 flowered, axillary, sometimes clustered towards the ends of branchlets; more or less glaucous. *Peduncles* 4–10 mm long. *Buds* shortly pedicellate, ovoid to double conical 5–9 x 3–5 mm. *Operculum* hemispherical, conical to slightly rostrate, shorter than or equal to the hypanthium.

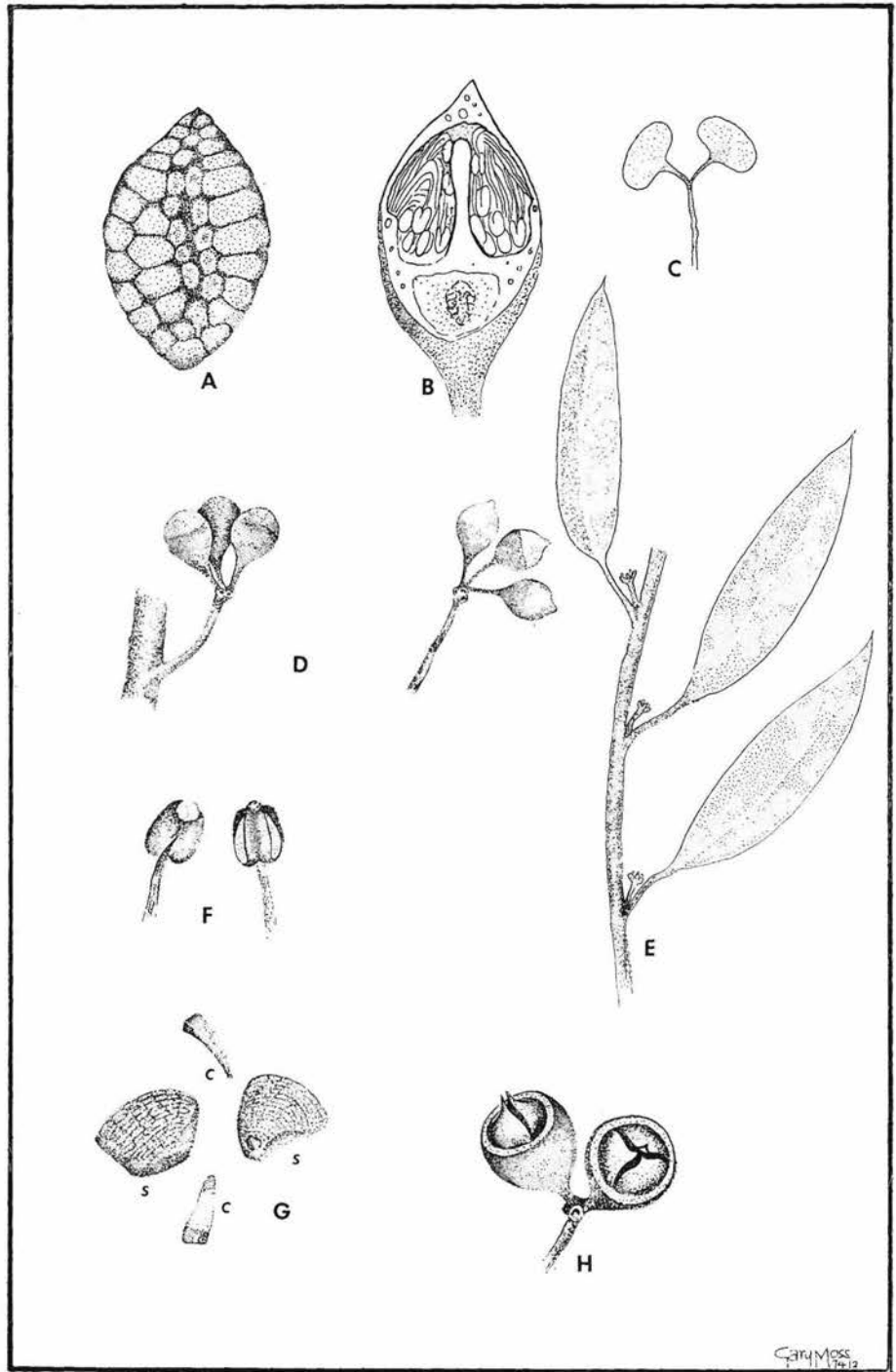


Figure 7. *Eucalyptus leucophloia* sp. nov. A—Ovules, x 30. B—Bud section, x 5. C—Cotyledons, x 3. D—Buds, x 1. E—Leaves, x 1. F—Anthers, x 20. G—Seed(s) and chaff (c), x 25. H—Fruit, x 2.

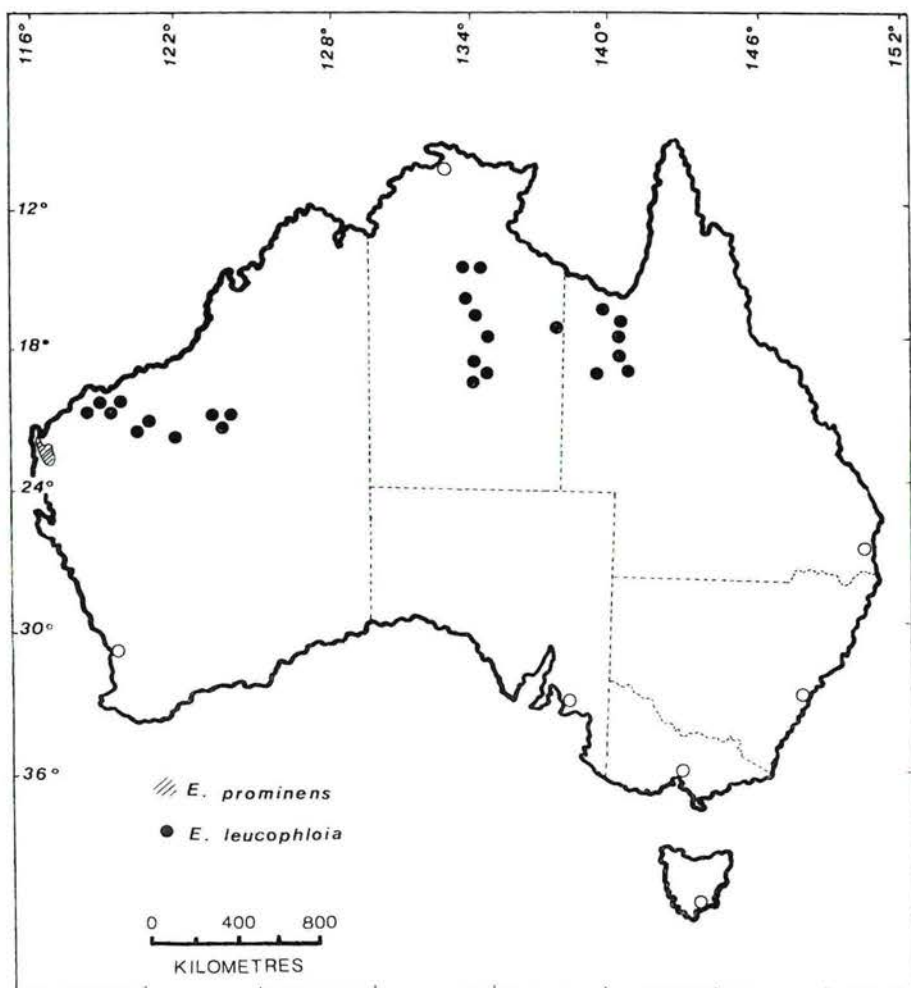


Figure 8. Distribution of *Eucalyptus leucophloia* sp. nov. and *E. prominens* sp. nov.

Stamens all fertile. *Filaments* variously inflected. *Anthers* oblong, dorsifixed, versatile, opening by longitudinal slits. *Ovary* inferior or semi-inferior. *Locules* 3. *Ovules* in 4, 5 or 6 vertical rows.

Fruit shortly pedicellate, hemispherical or cupular, 5–8 x 4–6 mm. *Disc* narrow. *Valves* 3, usually strongly exerted and deltoid.

Seed irregular in outline, flattish, ca. 1.5 x 1 mm, yellowish brown with a shallow reticulum on the dorsal side.

Distribution: From the Pilbara district of Western Australia eastwards across the continent to western Queensland.

Other collections: numerous collections in Western Australia between latitudes 20° and 23°; and in the Northern Territory and western Queensland between latitudes 16° and 21°.

Flowering period: June–November.

Eucalyptus leucophloia has been confused with *E. brevifolia* F. Muell. for many years. *E. brevifolia* has a much more restricted distribution than *E.*

leucophloia (Hall and Brooker 1974) and is confined to the Kimberley district of Western Australia and the north-west of the Northern Territory. Blake (1953) included both taxa in *E. brevifolia* and commented that specimens from the neighbourhood of the Victoria River, the type locality, had fruit with "a relatively broad disc and short valves", and that the fruit of "Blake 17360 (near Powell Creek) at the other extreme—with a relatively much thinner, more or less descending disc and larger valves". These specimens are *E. brevifolia* and *E. leucophloia* respectively.

Blake (loc. cit.) commented on the confusion between *E. brevifolia* and *E. microtheca* on fruit characters. This would apply particularly to *E. leucophloia*, as both it and *E. microtheca* have obscure discs and partly superior ovaries resulting in strongly exerted deltoid valves, but the two are readily separable on anther characters—*E. microtheca* being distinctly a box and *E. leucophloia* (and *E. brevifolia*) belonging to the series *Albae*.

The specific name is given for the strikingly white bark which is often characteristically black spotted. *E. leucophloia* is known as "Migum" in the Pilbara district of Western Australia where it is very common and associated with *E. terminalis* F. Muell., *E. gamophylla* F. Muell. and *E. trivalvis* Blakely. The seedling leaves of the Pilbara forms tend to be orbicular, often broader than long while those to the east tend to have ovate seedling leaves.

***Eucalyptus prominens* Brooker sp. nov.** (Figures 8, 9). Pryor and Johnson code SII:G.

Frutex "mallee" vel arbor parva ad 3 m alta. *Cortex* interdum fibrosa basin versus vel omnino laevis. *Lignotuberum* formans.

Folia plantulae sessilia, decussata, lanceolata, 1–6 x 0.5–1.5 cm. *Folia adulta* angustolanceolata vel lanceolata, 6–13 x 0.7–2 cm, nitida.

Inflorescentiae axillares, 7-florae. *Pedunculi* 4–15 mm longi, plerumque crassi. *Alabastra* clavata, 8–13 x 5–10 mm, fere sessilia vel pedicellis ad 4 mm longis. *Hypanthium* obconicum. *Operculum* hemisphaericum plerumque quam hypanthium brevius. *Loculi* 4 vel 5.

Fructus obconici, 6–12 x 8–13 mm. *Valvae* leviter exertae.

Semina elliptica, atrocineria, ca. 1.5 x 1 mm.

Type: Shothole Canyon, Cape Range, Western Australia (22°04'S, 114°01'E) 6 Sept. 1970, K. M. Allan 462 (holo: PERTH; iso: FRI, NSW, AS, K, AD).

A mallee or small tree to 3 m tall. *Bark* sometimes fibrous and grey at base to 0.5 m, or wholly smooth and grey to greenish brown. *Pith* glandular. Capable of forming lignotubers.

Cotyledons bisected, petiole ca. 6 mm, arms ca. 8 mm long. *Seedling leaves* sessile, decussate, lanceolate, 1–6 x 0.5–1.5 cm. *Adult leaves* petiolate (5–20 mm long, flattened), not opposite, narrow-lanceolate to lanceolate, 6–13 x 0.7–2 cm, shining. *Reticulation* moderately dense though finally obscure. *Glands* numerous, large, very irregular, green or clear.

Inflorescences axillary of 7 buds. *Peduncles* 4–15 mm long, usually stout and flattened or terete and angular. *Buds* clavate, 8–13 x 5–10 mm, almost sessile or pedicels to 4 mm long. *Hypanthium* obconical. *Operculum* hemispherical usually shorter than the hypanthium. *Stamens* all fertile. *Filaments* irregularly inflected. *Anthers* surrounding the style and domed roof of ovary, oblong, sub-basifixed, versatile, opening by longitudinal slits. *Locules* 4 or 5. *Ovules* in 4 or 6 vertical rows.

Fruit obconical, 6–12 x 8–13 mm. *Disc* incurved. *Valves* 4 or 5 slightly exerted.

Seed elliptical, ca. 1.5 x 1 mm, dark grey, shallowly pitted.

Distribution: Western Australia: Cape Range and west of Scrubby Range.

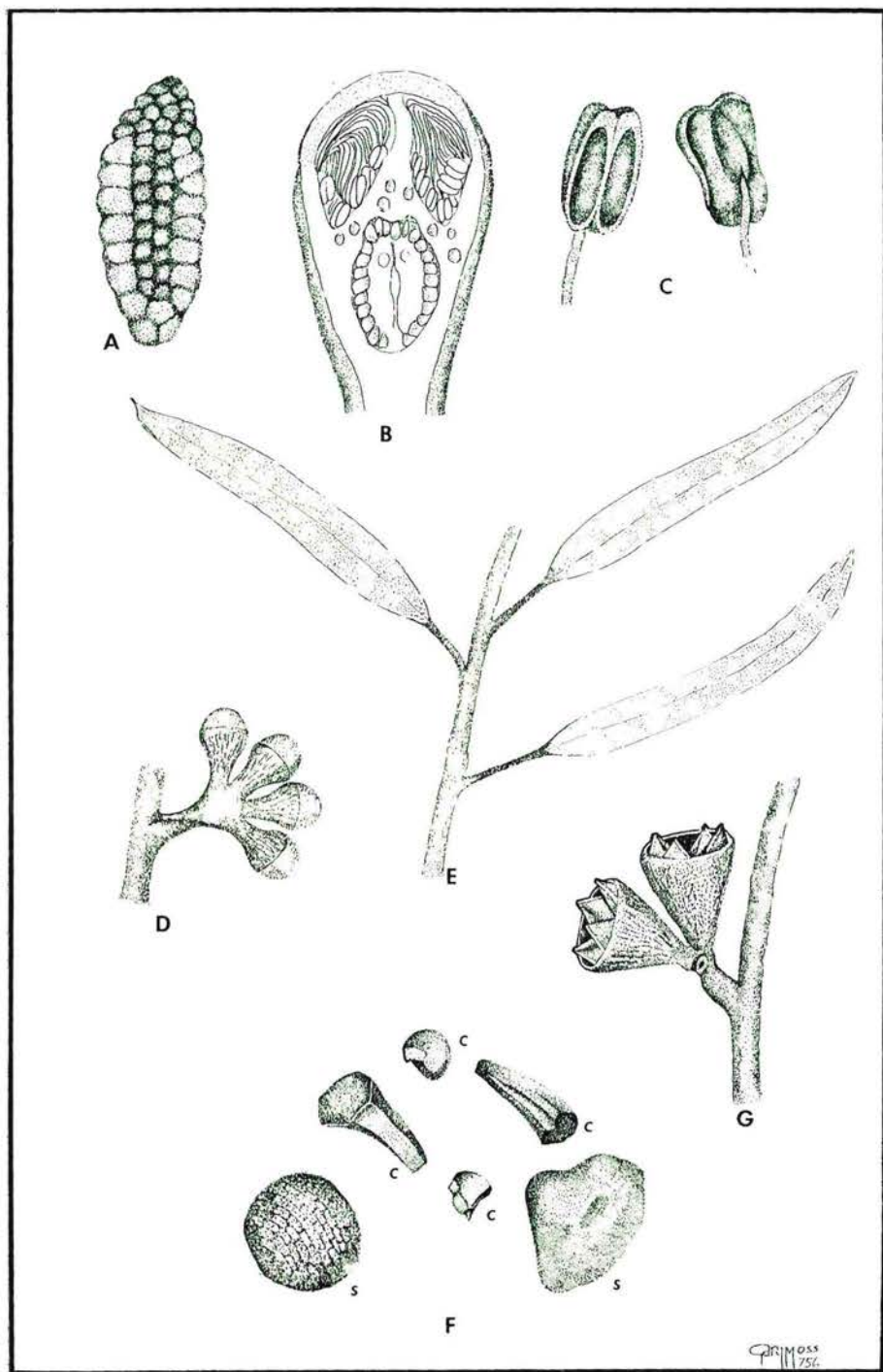


Figure 9. *Eucalyptus prominens* sp. nov. A—Ovules, x 13. B—Bud section, x 5. C—Anthers, x 20. D—Buds, x 1. E—Leaves, x $\frac{1}{2}$. F—Seed(s) and chaff (c), x 13. G—Fruit, x 1.5.

Other collections: 16 km west of Learmonth, south of Exmouth (22°14'S, 113°56'E) 5 Sept. 1970, K. M. Allan 439 (PERTH, FRI, NSW, MEL, BRI); Shothole Canyon, Cape Range, south of Exmouth (22°04'S, 113°56'E) 7 Sept. 1970, K. M. Allan 465 (PERTH, FRI, NSW, GAUBA, DAR); Shothole Canyon, Cape Range (22°04'S, 114°01'E) 7 Sept. 1970, A. S. George 10321 (PERTH, FRI, AD, MEL), 25 April 1974, M. I. H. Brooker 4577, 4578, 4579 (FRI, PERTH, NSW, AS, GAUBA); Exmouth road, 22 km north of Waroora turnoff (23°18'S, 113°51'E) 8 Sept. 1970, A. S. George 10352 (PERTH, FRI, NSW, AD, GAUBA, AS, DAR); near Mt Hollister, Cape Range (22°08'S, 114°01'E) 24 April 1974, M. I. H. Brooker 4575 (FRI, PERTH, NSW, AS, AD); ca. 5 km west of Giralia homestead (22°01'S, 114°21'E) 24 April 1974, M. I. H. Brooker 4569 (FRI, PERTH, NSW, AD, AS).

Flowering period: September-October.

Eucalyptus prominens occurs mainly in the Cape Range, west of Exmouth Gulf where it grows on limestone hills and in valleys. Associated species are *E. oleosa* F. Muell. ex Miq. and *E. terminalis* F. Muell. South of the Gulf it grows on sandy plains and low sandhills where *Triodia* sp. forms a dense ground cover.

E. prominens is related to *E. trivalvis* and differs in the 4-5 locular ovary, the obconical fruit with much more prominent valves (the reason for the specific name) and seedlings whose leaves are almost sessile. The buds are usually bigger than those of *E. trivalvis* with opercula more rounded and much shorter than the hypanthium.

Acknowledgments

I wish to thank Mr. A. S. George, Dr. A. S. Weston and Mr. K. M. Allan for bringing to my attention *E. prominens*, *E. deflexa* and *E. goniantha* subsp. *semiglobosa*; to Mr. A. S. George, Mr. C. Bell and Mrs. M. J. Brennan for checking the final drafts; Mr. G. Moss for the illustrations and Mrs. M. May for the maps.

References

- BLAKE, S. T. (1953). Studies on northern Australian species of *Eucalyptus*. *Aust.J.Bot.* 1, 185-352.
HALL, N. and BROOKER, M. I. H. (1974). Forestry and Timber Bureau, Forest Tree Series Leaflet No. 164. (AGPS, Canberra).
PRYOR, L. D. and JOHNSON, L. A. S. (1971). "A Classification of the Eucalypts" (Aust. Nat. Univ., Canberra).