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A new Hibiscus (Malvaceae) from Central Australia

Andrew S. Mitchell*

Abstract

Hibiscus arenicola sp. nov. (Section *Ketmia*) is described as new from the sand dune desert area of Central Australia. Notes on its habitat and ecology are outlined. A key is provided to the Central Australian species of the sections *Ketmia* and *Hibiscus*.

Introduction

The author is currently revising the genus *Hibiscus* (s.l.) within Australia, but because of the impending publication of the Flora of Central Australia, it is necessary to publish this new species before the completion of the revision.

Hibiscus arenicola A. S. Mitchell sp. nov. (Figures 1, 2)

Suffrutex usque 1 m altus, tomento stellato sessili; stipulae 3 mm longae; petioli 5–8 mm longi; *folia* orbicularia, interdum obscure 3-lobata, 10 (–14) mm lata x 10 (–12) mm longa, crenata, obtusa; *flores* solitarii, axillares, pedunculis petiolis aequilongis; epicalycis segmenta 12, libera, filiformia, 6–7 mm longa, pilis simplicibus parcis per tomentum stellatum interspersis; *calyx* circiter 11 mm longus, 5-lobatus, lobis tubo aequilongus, longe acuminatis; *petala* 5, 14 mm longa, 4 mm lata, basi columnae staminalis affixa, malvina vel lilacina, ut videtur maculo fusco basali carentia, convoluta, integra, obtusa, extra pilis raris simplicibus vel stellatis praedita, intus glabra; *columna staminalis* apice tantum antherifera, staminibus paucis (circiter 20), apice truncato-undulato; anthera cremea; grana pollinis spinosa, lutea; ovarium 5-loculare, loculis 1-ovulatis; *stylus* inde ab apice columnae staminalis divisus; stigmata 5, globosa, capitata, rubro-aurantiaca; *capsula* globosa, circiter 5 mm diametra, loculicida (serius etiam septicida ?), membranacea, superficie leviter papilloso, glabra, pilis paucissimis simplicibus ad apicem confertis (secus dehiscentias etiam), 5-locularis; *semina* in quoque loculo singula, reniformia, 3 mm longa, laevia, glabra.

Type: North-west of Walter James Range 24°32′ 128°33′, Western Australia, 9 Feb. 1972, *P. K. Latz* 2361. (holo: NT; iso: AD, CANB, K, MEL, PERTH).

*Subshrub** to 1 m high, covered with sessile stellate tomentum; stipules 3 mm long; petioles 5–8 mm long; *leaves* orbicular, sometimes obscurely 3-lobed, 10 (–14) mm wide x 10 (–12) mm long, crenate, obtuse; *flowers* solitary, axillary, the peduncles equalling the petioles; epicalyx segments 12, free, filiform, 6–7 mm long, with scattered simple hairs amongst the stellate tomentum, *calyx* about 11 mm long, 5-lobed, the lobes long acuminate, equalling the tube; *petals* 5, 14 mm long, 4 mm wide, attached to the base of the staminal column, mauve or lilac, apparently without a darker basal spot, convolute, entire, obtuse, outside with very occasional simple or stellate hairs, inside glabrous; *staminal column* antheriferous only at the summit with few stamens (ca 20), truncate-undulate at the summit; anthers cream; pollen spiny, yellow; *ovary* 5-locular, locules 1-ovulate; *style* divided from summit of staminal column; stigmas 5, globose, capitate, orange-red; *capsule* globose, about 5 mm diameter, splitting loculicidally (and later septicidally ?), membranous, slightly papillose on surface, glabrous except for a few simple hairs along the lines of dehiscence and a bunch at the apex, 5-locular; *seeds* one in each loculus, reniform, 3 mm long, smooth, glabrous.

Distribution: Known from only five localities, three in Western Australia and two in the Northern Territory.

Habitat: The five gatherings were all collected from deep red sand on the base, side or crests of sand dunes. Other plants were seen in the general area, sometimes in dune swales (Latz, pers. comm.).

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* Herbarium of the Northern Territory, P.O. Box 2134, Alice Springs, N.T. 5750.

* Field observations indicate this species develops a clonal habit (Latz, pers. comm.)

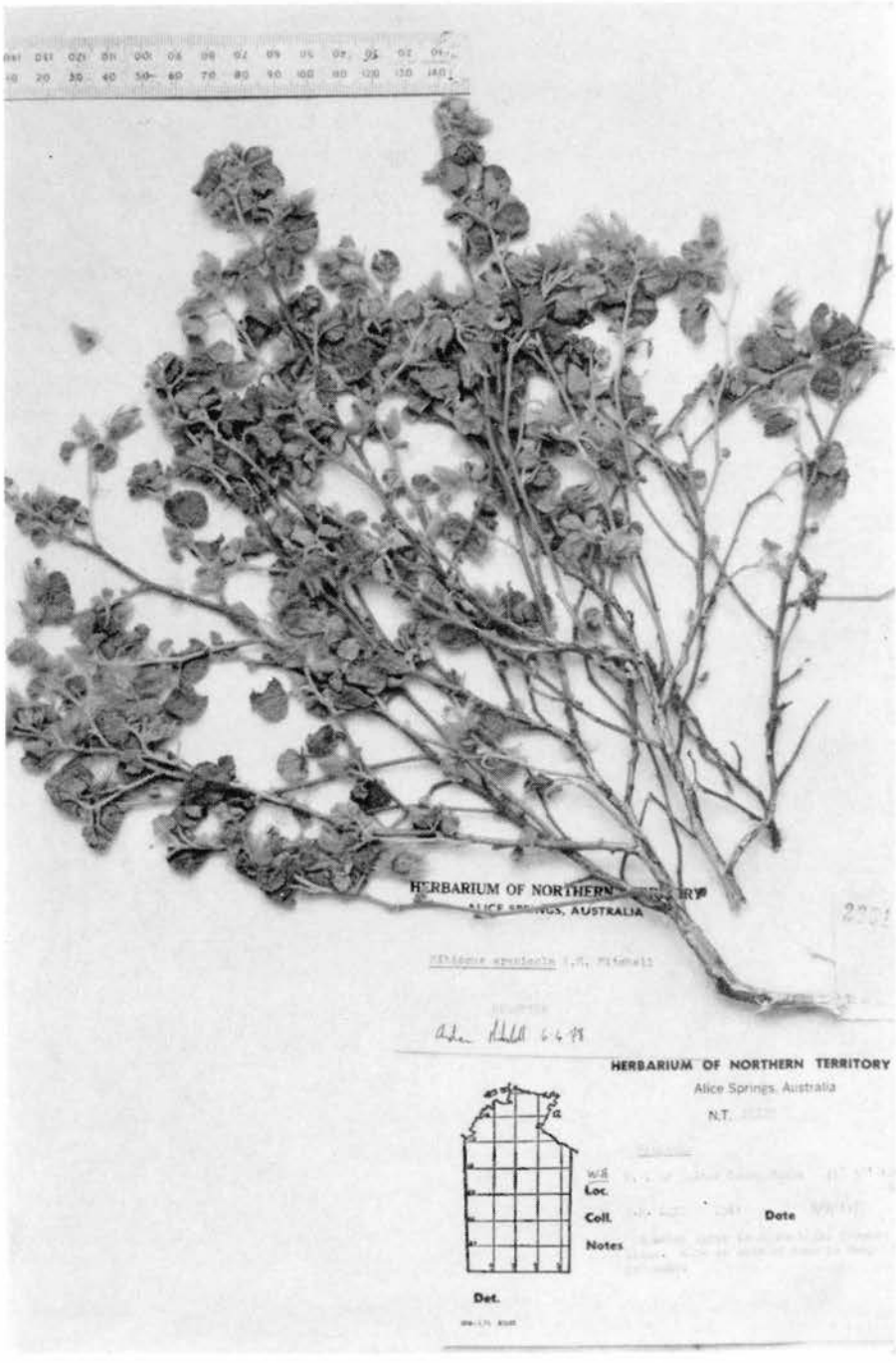

Figure 1. *Hibiscus arenicola* A. S. Mitchell.—Holotype (Latz 2361, NT).

Figure 2. *Hibiscus arenicola* A. S. Mitchell. a—portion of a branch. b—diagram of a flower in section. c—diagram of section through epicalyx, calyx and ovary.

Other collections: NORTHERN TERRITORY:—South of the Davenport Hills 23°43′ 129°17′, *P. K. Latz* 2326, 9 Feb. 1972 (NT); 35 miles north of Highland Rocks 20°50′ 130°00′, *J. R. Maconochie* 1079, 29 July 1970 (NT, PERTH).

WESTERN AUSTRALIA:—73 miles S. of New Mundiwindi, Great Northern Hwy., *A. S George* 3632, 6 March 1962 (CANB, NT, PERTH); ± 65 miles N. of Warburton on road to Giles 25°29′S, 126°35′E, *A. S. George* 8216, 2 Oct. 1966 (CANB, NT, PERTH).

Derivation of name: The specific epithet 'arenicola' refers to the restricted habitat of the taxon, viz. sand-dunes.

Relationships: The new species has been placed in the section *Ketmia* DC., as defined by Borssum Waalkes (1966). Two anomalies arise in the generic description with the inclusion of this new species. Firstly, *H. arenicola* has locules which are uni-ovulate, whereas the genus *Hibiscus* has locules with three to many ovules (Borssum Waalkes 1966, Hutchinson 1967). Examination of other species in the sections *Ketmia* and *Hibiscus* did not reveal any uni-ovulate locules except in the case of *H. geranioides* A. Cunn. ex Benth.; further material is needed to confirm the situation in this species. Secondly, the flowers of *H. arenicola* appear to lack a darker basal spot (though no living material was available for examination), a characteristic feature of most, if not all, *Hibiscus* species. A colour slide of *H. arenicola* growing in its natural state does not provide an answer to this latter problem (slide held at NT). However, as the plant appears to match *Hibiscus* in all other respects, it has been referred to that genus. It may be necessary to critically examine this decision in future.

The section *Ketmia* is very close to the section *Hibiscus* Hochr., the main distinction being the presence or absence of an aureole of long, silky, ferrugineous hairs on the median plane of the mature seed. To avoid any possible confusion the Central Australian species from both sections have been included in the key.

Key to Central Australian species of Hibiscus in Sections Ketmia and Hibiscus

1. All leaves undivided 2
— Upper or lower leaves variously divided 6
2. Epicalyx segments free 3
— Epicalyx segments united to form a cup .... **H. sturtii** Hook.
3. Calyx lobes not or only slightly exceeding capsule; capsule with a distinct dark green line along the septa; seeds with an aureole of long silky ferrugineous hairs in the median plane .... **H. burtonii** F. M. Bail.
— Calyx lobes greatly exceeding capsule (to twice as long); capsule lacking a dark green septal line; seeds tomentose or glabrous 4
4. Leaves orbicular; calyx and epicalyx silky with long (> 1·5 mm) stellate and simple hairs; seeds glabrous .... **H. arenicola** A. S. Mitchell
— Leaves ovate-lanceolate, lanceolate or oblong; calyx and epicalyx never appearing silky, hairs short (< 1·5 mm) stellate only; seeds tomentose or glabrous 5
5. Plant with a velvety white tomentum of minute (< 0·5 mm) stellate hairs; capsule with dense, appressed, sericeous hairs .... **H. krichauffianus** F. Muell.
— Plant with a tomentum of scattered or dense stellate hairs (> 0·5 mm), often appearing rusty; capsule glabrous except for a few scattered simple hairs at apex **H. leptocladus** Benth.
6. Plant ± glabrescent; capsule glabrous, often on a very long pedicel **H. brachysiphonius** F. Muell.
— Plant velutinous—tomentose or hispid; capsule hirsute, never on a very long pedicel.... 7
7. Plant velutinous-tomentose; upper leaves oblong, lower leaves palmatifid into three oblong undulate lobes; subulate epicalyx segments not reaching to sinus **H. solanifolius** F. Muell.
— Plant hispid; leaves palmatisect into three oblong-linear lobes; linear epicalyx segments surpassing sinus .... **H. drummondii** Turcz.

Synonymies of Hibiscus listed in key

Hibiscus leptocladus Benth.

H. microchlaenus F. Muell. (nom. nud.)
H. microchlaenus F. Muell. var. *leptocladus* (Benth.) Fryxell
H. krichauffianus F. Muell. var *chippendalei* Fryxell

Hibiscus solanifolius F. Muell.

H. intraterraneus J. M. Black
H. drummondii Turcz. sens. Chippendale in Check List of Northern Territory Plants (1971)

Hibiscus drummondii Turcz.

H. elliottii F. Muell.

Acknowledgments

I would like to thank John Maconochie and Peter Latz for their comments on this article; Mr. H. K. Airy Shaw for providing the Latin description; Jim Ross, Bill Barker and Helen Aston for their stimulating discussions on the genus; Dr. Hj. Eichler for his comments and advice on nomenclature; Lois Ulyatt for providing the illustrations.

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Three new species of Ptilotus (Amaranthaceae) from Western Australia

By G. Benl*

Abstract

Three new species of *Ptilotus* from Western Australia are characterised and figured, namely *P. kenneallyanus*, *P. beardii* and *P. decalvatus*. Their affinities to other taxa are considered.

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

Diagnosis. Planta fruticulosa ad 40 cm et ultra alta, partibus vegetativis leviter tomentosulis denique glabrescentibus, spicis permultis pedunculatis vel sessilibus, saturrime roseis speciosa.

Differt a *P. obovato* (Gaud.) F. Muell. praesertim habitu densiore, pubescentia inaequali, tepalis subtus carinatis, staminibus duobus tantum completis.

The more densely branched growth, a slighter, uneven, evanescent pubescence on stems and foliage as well as some differences in floral structure render this subshrub positively distinct from *P. obovatus* (Gaud.) F. Muell. in each of its varieties.

Type: Edgar Ranges (123°27'E, 18°55'S), south-east of Broome; coll. *K. F. Kenneally* 5412, 4 August 1976 (holotype: PERTH; isotypes: CANB, M, PERTH).

Description. A red-spiked spectacular bushy plant (Figure 1 A) spreading to 30 cm across, short-hairy on all surfaces of juvenile stems and leaves, the uneven vestiture (especially on shoots) composed of small irregular branched substellate hairs, of elongated (up to 2·3 mm long) denticulate or distinctly verticillate to dendroid ones, and of transitional forms indefinitely shaped, somewhat resembling *P. remotiflorus* Benl in this respect (s. Mitt. Bot. München **12**: 335, 1976).

Rhizome (root?) fusiform, at least in young specimens. *Stem* ca 6 mm diam. at base, dividing into several patent to (sub)erect branches from under 10 to over 40 cm high, dichotomously or paniculately branching repeatedly. The obtusely 4-angled branches and the flexuose angular-curved terminal branchlets (Figure 2 A), about 30 per plant, greenish, grey-puberulous when young, all floriferous, their apices becoming the peduncles and rachises of the spikes.

Leaves greyish to pale green, 3–5 cm apart in the lower branches and branchlets, less than 2 cm apart in upper portions, subrhombic-ovate to spathulate, up to 5 cm long and 2·5 cm wide but usually much smaller, coriaceous, at first densely hairy on both surfaces, at length becoming subglabrous; laminae entire with a conspicuously prominent midvein beneath, the rounded apex shortly mucronate (with a mucro ca 0·7 mm long), the base (gradually) narrowed into a petiole well-defined only in the lower leaves and up to 1·5 cm long; the uppermost leaves subsessile.

Inflorescences profuse, iridescent purplish-pink to pinky-mauve when fresh, terminal as well as pedunculate to (sub)sessile in the axils and on lower stems (Figures 1 A, 2 A); lateral peduncles right-angled at times and up to ca 2 cm long. Spikes initially depressed globose, but later obovoid and oblong-obovoid, attaining fully 2·5 cm long, 1·5 cm wide, with 15 to 20 (to 25) shortly pedicellate flowers.

Flowers crowded along thin, red, zig-zag rachis; pedicels ca 0·8 mm, densely clothed with verticillate hairs up to 1·2 mm long.

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Bracts and bracteoles membranous, entire, keeled, acuminate, the brownish midrib elongated into an arista-like point 0·8–1·1 mm long, persistent. *Bract* (narrow–)ovate, (4·5–) 5 x 1·5 (–1·8) mm, gradually tapering into the acumen, dorsally clothed (except for the basal lateral parts) with denticulate to verticillate hairs ca 2 mm long, never reaching the apex (Figure 2 B). *Bracteoles* hyaline and shiny, broadly ovate, (5–) 5·5 x 2·2 mm, hirsute only along the prominent midrib (Figure 2 C).

Perianth erect later subcampanulate, plumose on the back with stiff verticillate hairs initially deep purplish later fading to pink, tube indurated,

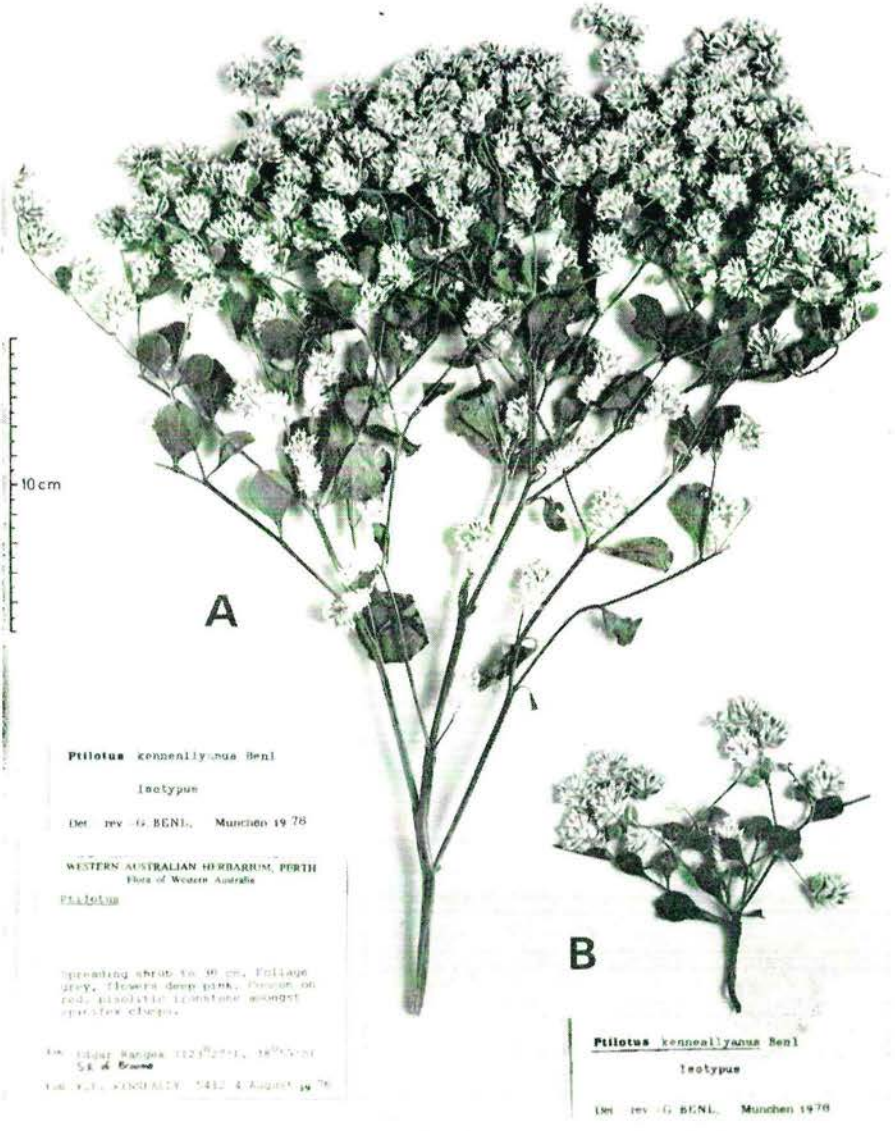

Figure 1. *Ptilotus kenneallyanus* Benl. (K. F. Kenneally 5412) (phot. K. Liedl).

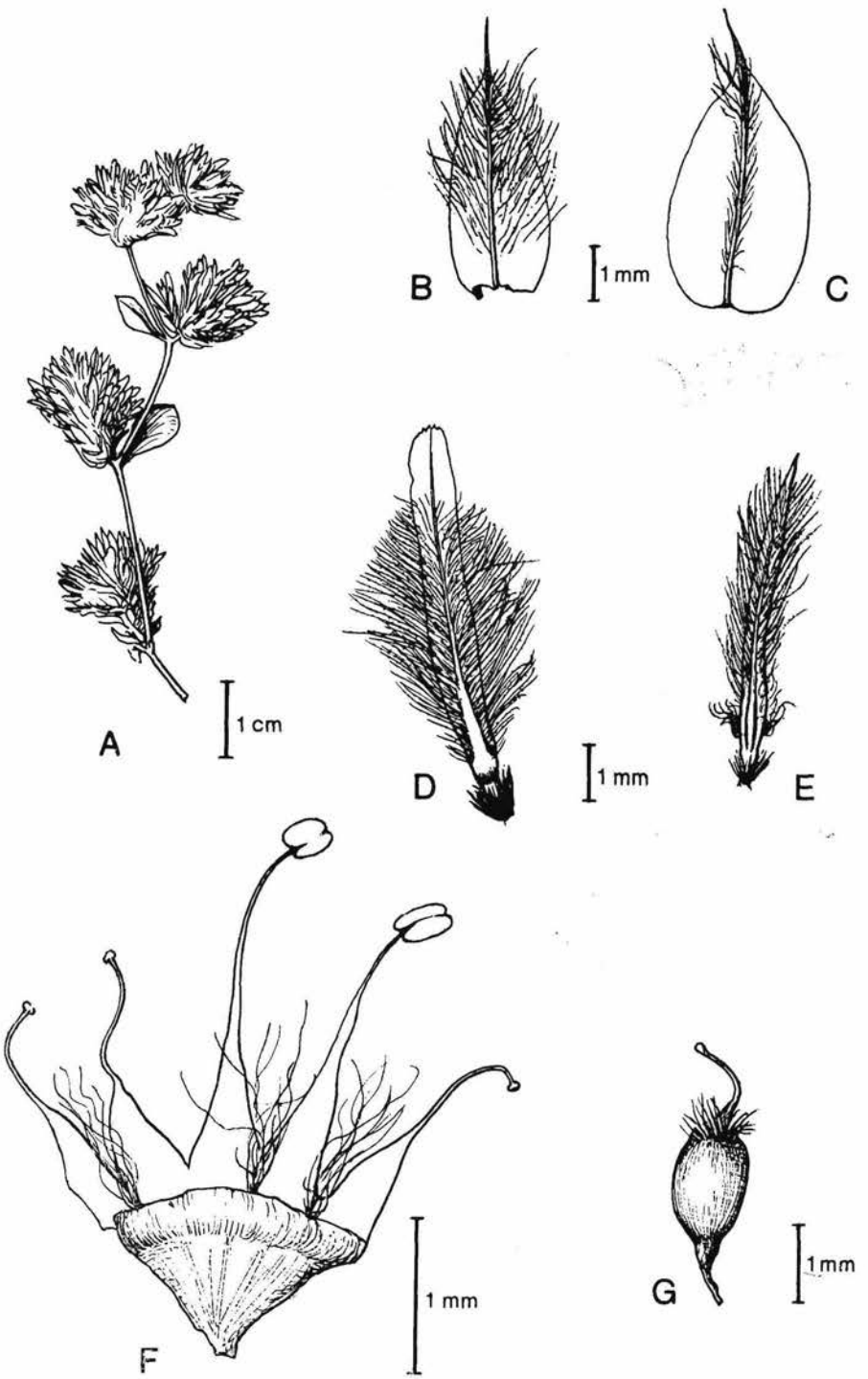

Figure 2. *Ptilotus kenneallyanus* Benl. A—Terminal branchlet. B—Bract, outer face. C—Bracteole, outer face. D—Outer tepal, outer view. E—Inner tepal, outer view. F—Androecium spread open, outer view. G—Gynoecium. (Drawn by A. Böhm.)

turbinate ca 1 mm long, up to 0·4 mm wide, surrounded at base by a dense tuft of simple bristly hairs about 0·7 mm long and more or less irregularly septate.

Tepals conspicuous with their glabrous red shining apices not exceeded by the copious external snow-white hairs, 3-nerved with a distinct median vein and two fainter marginal ones; the broad ridge above the tube glabrous in its lower part of about 1·2 mm. *Outer tepals* 7–7·5 mm long and 0·8 mm broad near the middle, the apex 2·8–3·1 mm long, glabrous in its upper 2 mm, subspathulately dilated to 1·2 mm, apex rounded to sub-truncate, minutely serrate; dorsal hairs articulate (finely denticulate to verticillate), up to 2·8 mm long and markedly decreasing in length towards the base (Figure 2 D); internally glabrous throughout. *Inner tepals* 5·8–6·5 mm long and ca 0·5 mm broad near the middle; the apex 1·2–1·8 mm long, glabrous, dilated to 0·8 (–1·0) mm, but mostly inrolled, subacute, scarcely reached by the dorsal vestiture; inside with a faint beard of thinner, crisped, nodose hairs along both (rarely one) edges above the tube; the basal ridge more sharply bordered (Figure 2 E).

Two adjacent *stamens* consistently fertile, filaments flattened, 1·6–2·2 mm long, ca 0·1 mm broad in the middle, subulate above and markedly (to 0·3–0·45 mm) dilated below; the three *staminodes* mostly shorter subequal, bearing a minute button-like rudimentary anther, filiform and curling upwards at times and often more abruptly broadened downwards to the same extent as the fertile ones (Figure 2 F). Stamens and staminodes fused into a turbinate cupula strongly adnate to the perianth tube, with a free membranous, sometimes asymmetrical ring to 0·25 mm high, with fascicles of curly nodose hairs 1·2 mm long outside at the base; sinuses acute; no pseudo-staminodial lobes. *Anthers* very broadly elliptic, ca 0·3 x 0·2 mm.

Pistil moderately stipitate. *Ovary* more or less club-shaped to subglobose, finally up to 2·4 mm long, the 0·3–0·4 mm long stipes included; pubescence of rigid articulate hairs up to 0·3 mm long, occupying the upper half of the juvenile ovary, limited toward its top in mature stage. *Style* 1·0–1·3 mm long, to 0·1 mm in diameter, eccentrical and always shortly hairy on its thickened base (Figure 2 G). *Stigma* capitellate becoming inconspicuous with the age.

Habitat. "Common on red, pisolitic ironstone amongst spinifex clumps" (K. F. Kenneally).

Specimens examined

Apart from the type material (five large specimens each consisting of a branch such as shown in Figure 1 A and two small specimens such as in Figure 1 B) there is a previous collection of J. S. Beard (4105, 13 May 1965, Dampier Downs, Edgar Ranges), comprising four specimens, two of them (on a single sheet) lodged at NSW, one at PERTH and one at K. These samples are reduced variants ("small shrub, 3 in.–6 in.") of the new taxon, evidently grown in a more barren soil, differing from Kenneally's younger specimens in having a thicker stem (NSW) and larger leaves (K, NSW, PERTH); the pubescence and floral features match those of the type material.

Discussion. The resemblance to *P. obovatus* (Gaud.) F. Muell. seems to be merely a superficial one, as already indicated in the diagnosis above. It is difficult to assess whether the plants are perennial, since the smaller isotype (7·5 cm tall, 10 cm across) has a considerable number of inflorescences (Figure 1 B), and the taxon thus displays a range of variation in size uncommon in perennials in general and unknown in *P. obovatus* in particular.

The upper floriferous branchlets may form a right angle as is often the case with *P. obovatus* which, however, produces only terminal corymbose panicles, not isolated spikes in lower parts of the branches as shown in Figure 1 A. In *P. obovatus* var. *obovatus* with its dense, persistent tomentum the hairs

on stems and especially on leaves are stellate and uniform; also in other varieties of this species vestiture is far more uniform and persistent than in *P. kenneallyanus*.

As regards floral structure, the basally dilated filaments are characteristic of *P. aristatus* Benl, *P. eichleranus* Benl, and *P. chippendalei* Benl, all of which constantly have two fertile stamens. These species, however, are completely different in habit.

This new, distinctive *Ptilotus* does not have close affinities with any other species of the genus known so far.

Name. The novelty is named after Mr. Kevin F. Kenneally, botanist of the Western Australian Herbarium, South Perth.

2. Ptilotus beardii Benl sp. nov. (Figures 3 and 4)

Diagnosis. Fruticulus ca 45 cm altus; ramuli terminales (sicut foliola subarachnoidei-pilosi, denique glabrescentes) loco pedunculorum in rhachidem brevem transeuntes et spicas solitarias hemisphaericas paucifloras gerentes. Flores spectabiles tepalis ad 1·8 cm longis apicibus glabris malvinis; filamenta staminum fertilium basim versus haud dilatata, cupula staminalis dense ciliata; ovarium glaberrimum.

A *Ptiloto polakii* F. Muell. et a *P. parvifolio* (F. Muell.) F. Muell. (var. *laeto* Benl incluso) praecipue inflorescentia ampliore et longius pedunculata, pubescentia diversa, bracteolis bractea manifeste maioribus distinctus.

Readily distinguished from *P. polakii* and *P. parvifolius* by its more spreading habit, different indumentum, larger but at most 8-flowered spikes on long peduncles (Figure 3), the bracteoles larger than the bracts (Figures 4 A, 4 B), the filaments of the fertile stamens not dilated at the base, and the straight cupule.

Type: Muggon Station (115°32′E, 26°37′S), on salt flats; coll. *J. S. Beard* 6859, 17 Oct. 1973 (holotype: PERTH; isotypes: M, NSW, PERTH). "Subshrub 18 in., flowers mauve, appears to differ from *P. polakii*."

Description. A much-branched, rigid subshrub to 45 cm or more tall, pubescent with a cobweb-like thin indumentum of irregularly denticulate, bent, slightly appressed hairs up to 0·6 mm long on younger greyish-green shoots and leaves (equally on both surfaces) becoming glabrescent with age; bark on lower stems (to 6 mm diam.) dark. Root and stem base not seen. Branchlets divaricate.

Leaves alternate, 2–6 mm apart, erect-spreading, very small (10 x 1·2 mm) to minute (4 x 0·8 mm), distinctly mucronate (with mucro ca 0·7 mm long), sessile but with a callose yellow decurrent base ca 1·5 mm long, lamina entire, firm, the midrib becoming prominent with age. Older leaf axils with a tuft of rather straight jointed hairs (0·8–1·0 mm); new leaves mostly 3–5-clustered in axils.

Spikes of 5 to 7 (8) flowers, hemispherical, 3·2–3·8 cm across, terminal. Rachis short, 2–3 mm long, densely villous, the hairs 0·5 mm long, not appressed.

Bracts and bracteoles membranous-scarious, keeled; midribs prominent, reddish-tinged, produced into rigid apices; margins indistinctly denticulate toward the end; bract ovate ca 5 x 2·2 mm with an awn 0·7–1 mm long, honey-coloured but densely hairy throughout at first (Figure 4 A); bracteoles broadly ovate, concave, 7·5 x 4 (–5) mm with an awn 1·0–1·1 mm long, colourless, translucent lustrous, the pubescence more or less limited toward the keel (Figure 4 B), of tiny but clearly dendroid-verticillate hairlets.

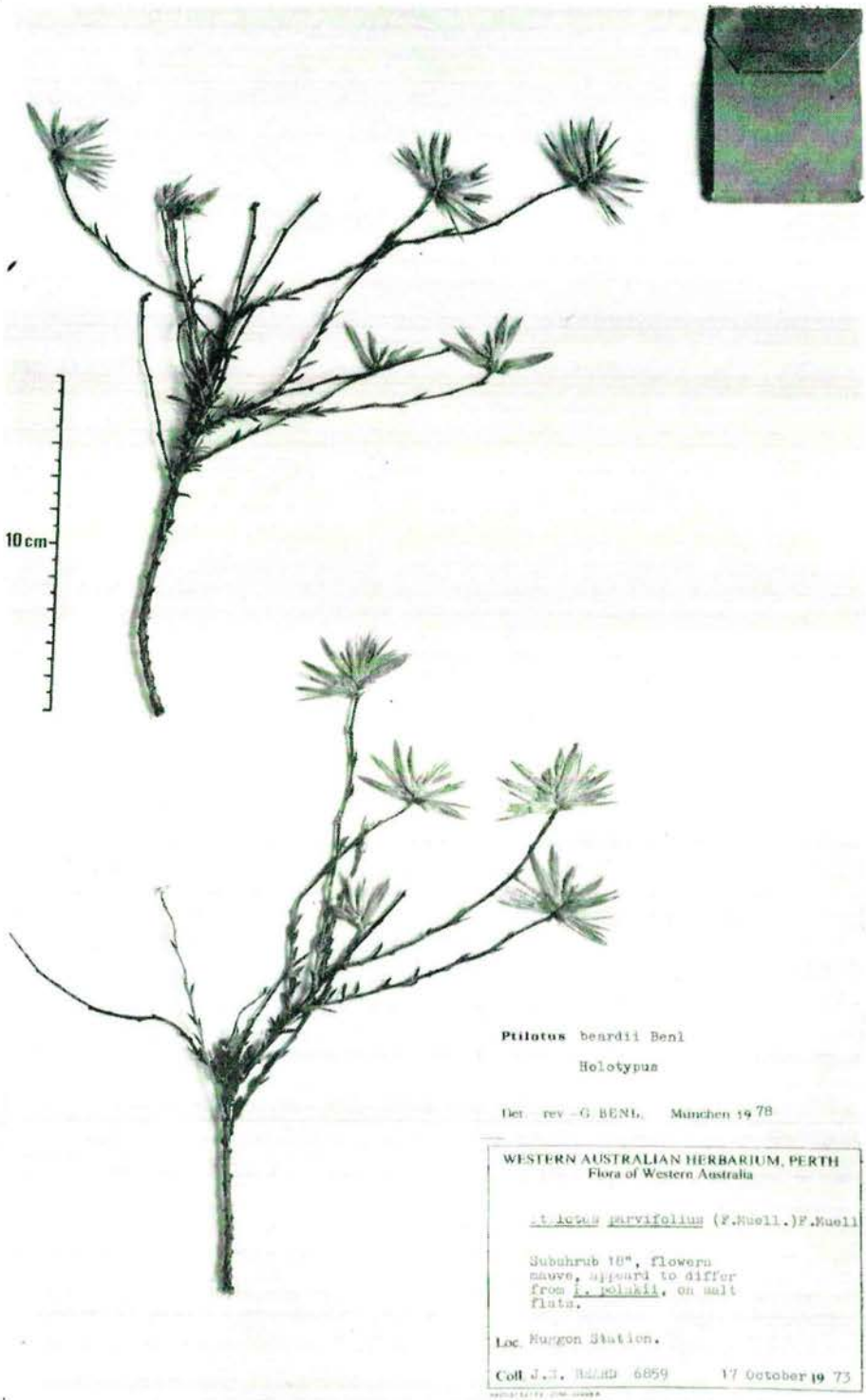

Figure 3. *Ptilotus beardii* Benl. (J. S. Beard 6859) (phot. K. Liedl).

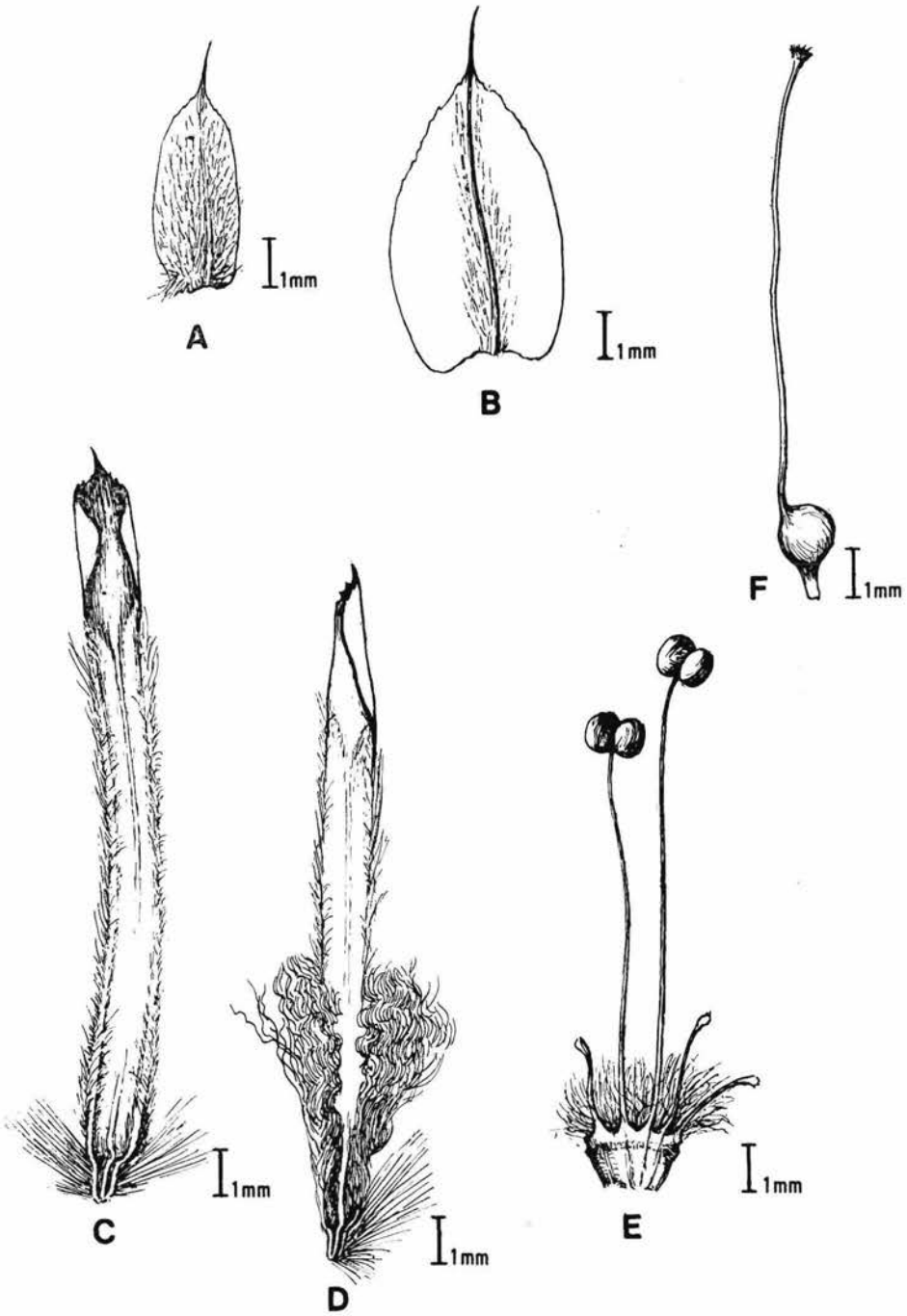

Figure 4. *Ptilotus beardii* Benl. A—Bract, outer face. B—Bracteole, outer face. C—Outer tepal, inner view. D—Inner tepal, inner view. E—Androecium spread open, inner view. F—Gynoecium. (Drawn by A. Böhm.)

Perianth elongated, rigid, erect but later divergent, the exposed glabrous tepal ends coloured, base constricted to a small turbinate tube, hardened, 0·8–1 mm long, obscured by the stiff dorsal hairs (to 2 mm long) of the basal pubescence.

Tepals linear, invested outside along the centre with firm, straight, jointed and subdenticulate hairs, up to 7·5 mm long in lower half but never reaching the apices (Figure 4 C and 4 D); strongly short-ciliate at the margins with delicate hairs ca 1–1·5 mm long (increasing somewhat in length toward the base) and sharply dendroid-verticillate; these underlying the dorsal vestiture for the most part and often turned in from the margins against inner surface of the tepals; three nerves fairly conspicuous inside especially in the thickened base.

Outer tepals (Figure 4 C) 1·5–1·7 cm long and up to 1·3 mm broad above the tube; apex glabrous, reddish, ca 2·5 mm long, often prolonged another 1–1·5 mm down the margins, subspathulately dilated to about 2 mm but mostly incurved, apically erose-serrulate with a central mucro; the lamina greenish, glabrous inside except for the marginal cilia mentioned above, the central nerve prominent inside.

Inner tepals (Figure 4 D) somewhat smaller, usually strongly inrolled towards the apices—hence appearing more acute in outline—bearing inside above the tube a flexuose indumentum of crisped weakly nodose hairs up to 7–8 mm long, twisted between the nodes and more or less intricate with each other, rising marginally on one or on either side.

Only two adjacent *stamens* fertile (Figure 4 E), their slightly flattened upright filaments 8·5 to 12 mm long and up to 0·3 mm wide in the middle, abruptly subulate below the anthers and not dilated in lower portions except for the very base; *staminodes* reduced to 1–3 mm in length and hidden in part among the copious hairlets up to 1·3 mm long and distinctly nodose, surrounding the staminal cup (ca 1·6 mm high) on its outer distal face, regularly bordering the free ring up to 0·6 mm high and not oblique. No pseudostaminodes present. *Anthers* yellow, almost globose, 0·9–1·0 mm in diameter.

Pistil shortly stalked, the stipes 0·6–0·8 mm in length. *Ovary* club-shaped entirely glabrous, 2·2–2·8 x 1·0–1·4 mm (including the stipes). *Style* lateral (Figure 4 F), straight, slender, up to 11 mm long and ca 0·12 mm diam. in the middle, scarcely thickened downwards. *Stigma* capitellate, papillose, more or less level with the anthers.

Discussion. The new taxon is based on one collection consisting of five fragments. It bears some resemblance to other low, shrubby species with woody stems—i.e. *P. parvifolius* (F. Muell.) F. Muell., *P. polakii* F. Muell., *P. remotiflorus* Benl—characterised by sparsely tomentose shoots, more or less persistent bases of the leaves, a hirsute staminal cup and an eccentric style. However, none of these plants ever develops the large long-pedunculate spikes broader than long and evidently not becoming ovoid, as shown by the new taxon; in addition, the bracteoles of the new species are considerably larger than the bracts and the tepals conspicuously narrower than in any allied species. The cobweb-like indumentum does not occur in related species.

P. remotiflorus from the Gregory North District (Queensland) is unique for its extremely heterogeneous pubescence, and its ovary being distinctly hirsute toward the summit. In *P. polakii* the staminal ring is very oblique, its ovary long-stipitate, the pubescence of the shoots is more or less restricted to leaf axils; and the leaves are larger and broader. *P. parvifolius* has glaucous branches and (sub)glabrous bracts. In the var. *parvifolius* the tepals are ciliate at the margins with shorter hairs, and the dense dorsal indumentum projects to or beyond the apices of the tepals, thus rendering the flowers very different from those of *P. beardii*. In *P. parvifolius* var. *laetus* the tepals are broadly limbate.

Both *P. polakii* and *P. parvifolius* have shorter pointed bracts and bracteoles and (finally) drooping anthers; in the structure of the staminal cup *P. beardii* seems to be closer allied to *P. parvifolius* than to *P. polakii*.

The new taxon diverges in so many respects that there is sufficient evidence to justify its specific rank.

Name. The specific epithet honours the collector, Dr. John S. Beard. Through his valuable collections especially from the North West many rare taxa of *Ptilotus* have become better known to science.

3. Ptilotus decalvatus Benl sp. nov. (Figures 5 and 6)

Diagnosis. Herba annua caulibus erectis rubescentibus ramosis, foliis mox glabris angustissime linearibus, spicis subrotundis denique cylindraceis, floribus densis. Bracteae bracteolaeque parvae glabrae; tepala praecipue apicem versus parce pilosa, pilis scaberulis minutis caducis, tandem decalvata; stamina omnia fertilia, cupula et ovarium glaberrimum.

Pubescentia unica inflorescentiae ab omnibus speciebus adhuc cognitis recedit.

Erect laxly branching annual of medium size (Figure 5), younger parts of shoots finely tomentose with curled rough hairs; leaves inconspicuous, the loosely paniculate spikes subglobose at length shortly cylindrical, up to 3·5 cm long; tepals with white fragile hairs mainly toward the apex, scarcely visible without a lens and soon breaking off, thus giving the apex of the tepals a white bald-headed aspect, as long as these are dark-coloured (Figure 6 B). This characteristic pubescence on the floral organs serves to separate the new plant principally from all other known species of the genus.

Type: Byam Martin Island, Bonaparte Archipelago (124°22′E, 15°24′S), growing in alluvium; coll. *P. G. Wilson* 11513, 11 July 1973 (holotype: PERTH; isotypes: M, PERTH).

Description. Herbaceous species up to 40 cm tall; producing from a slender tap root (to 3 mm diam.) a striate stem which may divide near ground level into several rigid main branches measuring up to 30 cm in length and 1 to 1·5 mm in diameter near the middle, becoming reddish-tinged and irregularly divided again (Figure 5). *Branches* and branchlets tomentose-pubescent when young (Figure 6 A) with whitish crisped hairs 0·1–0·25 mm long and remarkable for their very rough granulate to tuberculate surface, later glabrescent.

Leaves pale green, narrow-linear to almost filiform, 1 to 4·5 cm apart, up to 4·5 cm long, 0·5–0·8 mm wide in the lower part of stems, ca 1 cm long below the terminal spikes, distinctly mucronate-acute (mucro excurrent 2 mm long), scarcely attenuate at the base, at first pubescent, becoming glabrous; midrib not prominent beneath.

Spikes compact, rigid (Figure 6 B) at first subglobose (ca 0·8 cm in diameter), becoming ovoid to cylindric (1·5–3·5 cm long) with age, dark mauve to (brownish) red when fresh, fading at length to cream; forming congested to diffuse panicles terminating main and lateral branches, as well as sessile and axillary; spikes in general single but sometimes divided with 1–2 smaller divergent spikes at the base. Flowers varying from 30 to about 80.

Rachis with short pedicels (ca 0·5 mm long) hidden among a villous pubescence consisting of tuberculate to indistinctly verticillate hairs which are curved, intricately crisped, to 1·2 mm long. Flower-axis articulate above the bracteoles.

Bracts and bracteoles very inconspicuous, concave, entire, membranous-scarious, yellowish, shining, 1-nerved, persistent after fall of perianth, unequal: bract oblong-ovate, slightly acute, 1·5–1·7 x 0·6 (–0·8) mm, with a blunt keel

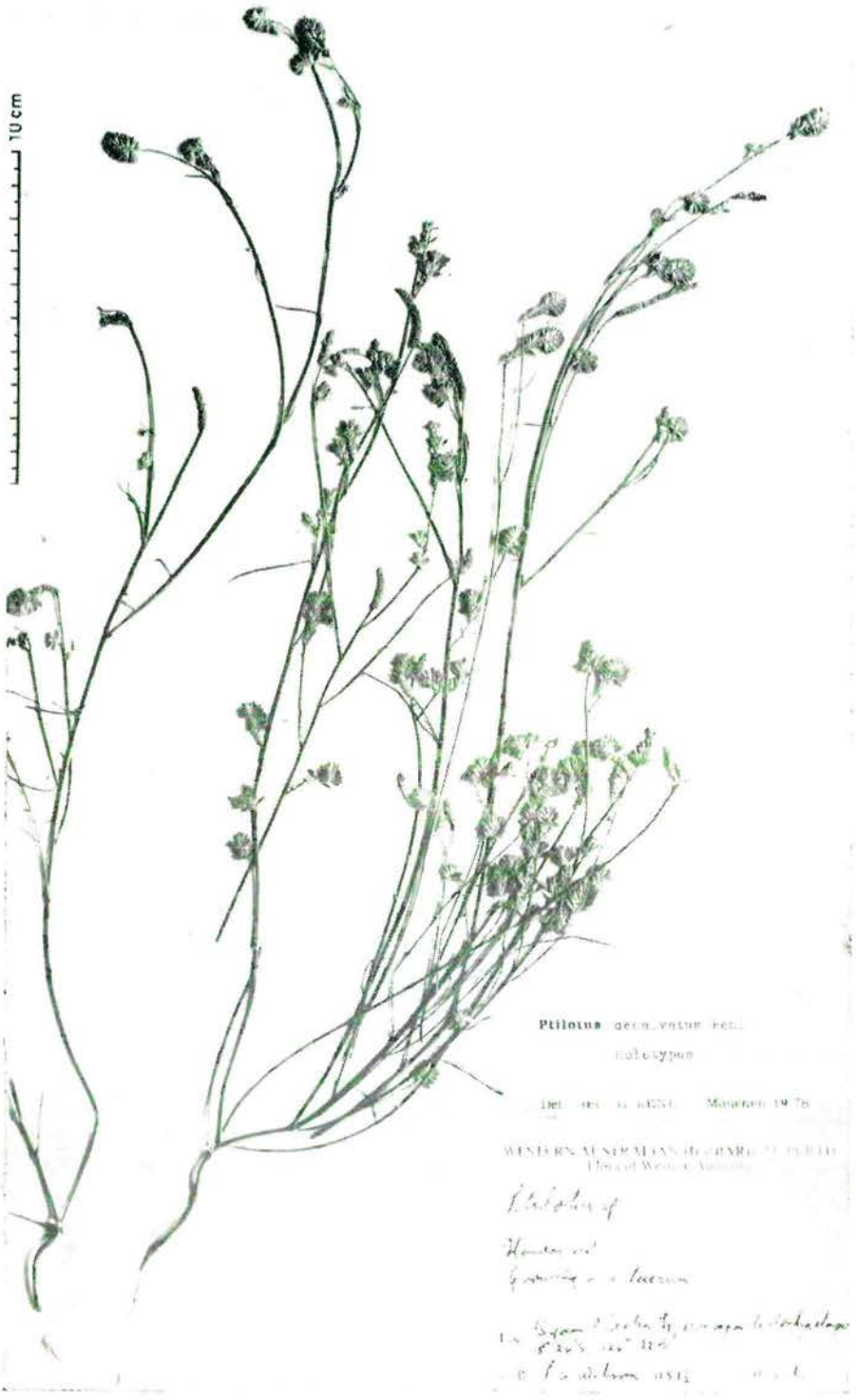

Figure 5. *Ptilotus decalvatus* Benl. (P. G. Wilson 11513) (phot. K. Liedl).

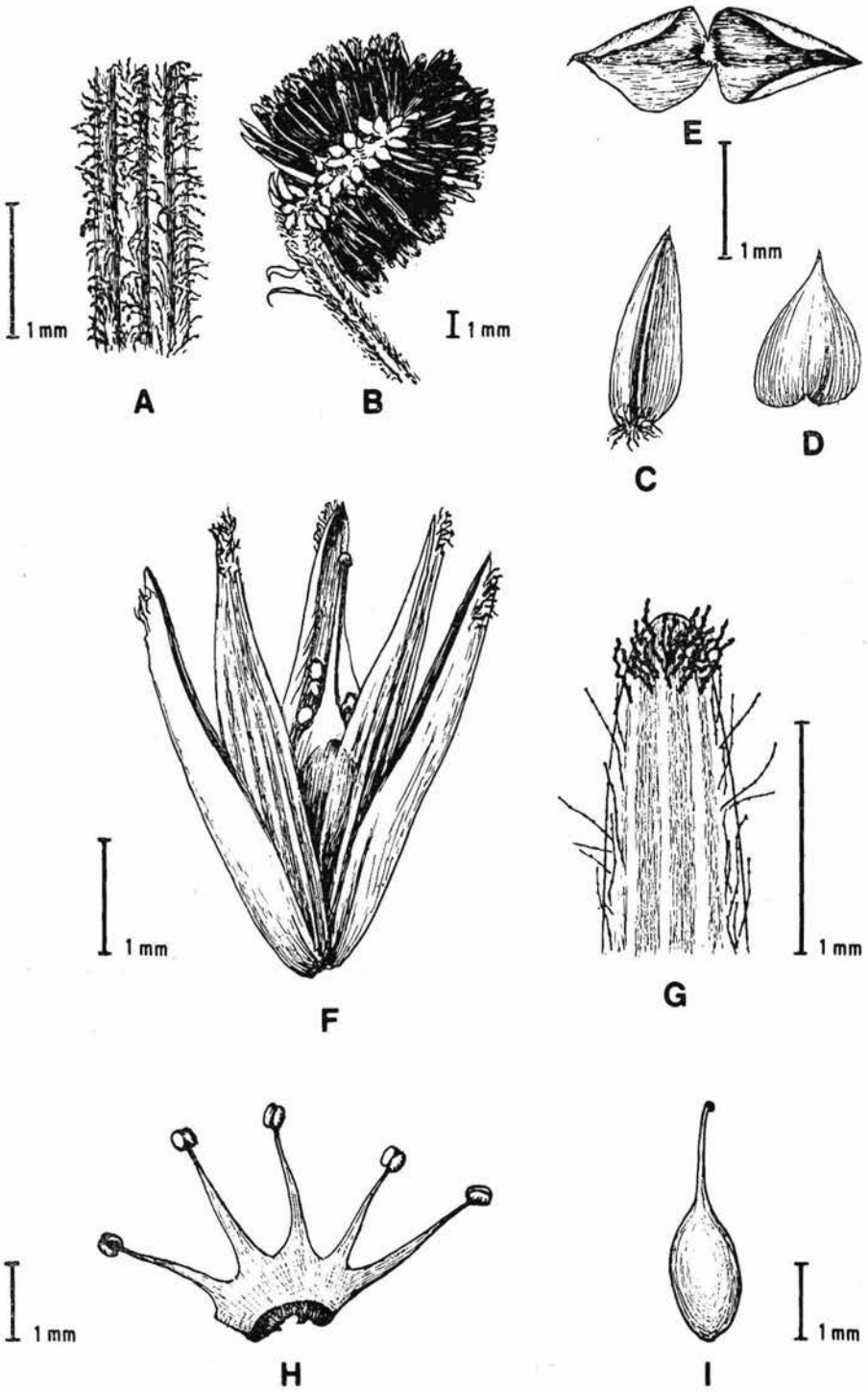

Figure 6. *Ptilotus decalvatus* Benl. A—Segment of a young branch. B—Terminal spike. C—Bract, outer face. D—Bracteole, outer face. E—Bracteoles pressed down, inner face. F—Perianth, side view. G—Top of inner tepal, outer face. H—Androecium cut open, inner view. I—Gynoecium. (Drawn by A. Böhm.)

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faintly woolly toward its base (Figure 6 C). Bracteoles shorter (0·7–0·9 mm) but broader (0·9–1·1 mm), glabrous and wholly transparent (Figures 6 D and 6 E), imbricate, completely embracing the perianth in its lowest part; midrib not prominent.

Perianth mauve to reddish with a very low and somewhat notched basal disc formed by the lowermost portions of the tepals; base callose inside; apices subobtuse, concave. All *tepals* finally subequal in length, glabrous internally, bearing a scanty outer apical pubescence; the hairs straight, 0·3–0·4 mm long, stout, tuberculate, soon breaking off. *Outer tepals* rigid, boat-shaped (Figure 6 F), up to 4·2 x 1 mm, scarcely or slightly margined, more or less sharply keeled and diverging in anthesis, the scanty pubescence restricted to the uppermost part. *Inner tepals* somewhat broader and flatter, varying in details of shape but regularly 3-ribbed in their median area, the membranous marginal zone up to 0·45 mm wide; beside the apical hairlets there are somewhat longer (up to 0·6 mm) but thinner ones (i.e. looking less tuberculate under the microscope) developed along the margin, more scattered and appressed (Figure 6 G).

All *stamens* constantly perfect; filaments slightly flattened and dilated toward their base, 1·4–2 mm long, to 0·2 mm wide near the middle and broadened to 0·4–0·6 mm, fused below into a comparatively high (ca 1 mm) and free, membranous, broadly turbinate cup (Figure 6 H), attached to the perianth disc by its lowest portion (ca 0·3 mm). *Anthers* broadly elliptical, 0·18 x 0·12 mm.

Pistil (Figure 6 I) almost sessile when fully developed, entirely glabrous. *Ovary* up to 1·3 mm long and 0·6 mm across. *Style* central, straight, ca 1·2 mm long and thickened downwards. *Stigma* subglobose.

Specimens examined

Western Australia: N. W. Coast, *De Bouley*, s.n., no date—BM. This plant was misidentified as "*Ptilotus roseo-albus* Farmar" with reference to the type at Kew Herbarium. But the type specimen of this taxon clearly shows the close alliance to *P. gomphrenoides* F. Muell. ex Benth., having a dense woolly indumentum on the perianth.

Lat. 18°10′, Long. 122°26′, *A. Forrest & T. Carey*, s.n., 1879—MEL (77349)

Heywood Islands (southern island), Bonaparte Archipelago, "growing in Acacia scrub on sandstone", *P. G. Wilson* 10904, 22 May 1972—PERTH.

Byam Martin Island, Bonaparte Archipelago, 124°22′E, 15°24′S, *P. G. Wilson* 11513 (typus), 11 July 1973—M, PERTH.

Discussion. To some extent the above described plant approaches *P. conicus* R. Br. and *P. corymbosus* R. Br. in general habit. *P. conicus*, however, is markedly separated from all other species of the genus by the peculiar structure of the androecium, while *P. corymbosus* (with its stronger corymbose aspect) belongs to a group of *Ptiloti* with bipartite inner tepals.

Hairs resembling the rough-walled ones of the new species are to be seen in the yellowish indumentum of *P. arthrolasius* F. Muell. They have a similar scabrid appearance, but are clearly septate—with sometimes smooth walls of the internodes especially toward their apices—and are more or less restricted to stems and foliage. The perianth is characterized by long silky trichomes up to 7 mm in length and widely exceeding the tepals. This species is not closely related to *P. decalvatus*. The same is the case with *P. forrestii* F. Muell. allied to *P. arthrolasius*.

With regard to the pubescence of the tepals there seems to be some resemblance to *P. lophotrichus* Benl. In the latter species the tepals have an apical tuft of relatively few hairs. But in that species the apical hairs are much longer (to 2 mm), jointed and smooth; the outer and inner tepals bear short crisped hairs at their external base, the inner ones—markedly narrowed below—are

moreover woolly inside. The unusually large bracts and bracteoles likewise have tufts of straight hairs exceeding the apex, whereas in *P. decalvatus* these organs are very small and entirely glabrous. There are other significant differences.

Nevertheless the relationship of the new plant to *P. lophotrichus* (and perhaps even to *P. lanatus* A. Cunn. ex Moq.) may be closer than to *P. conicus* and *P. corymbosus*, respectively, whilst on the other hand there are such well-defined characteristic features of the new taxon that its specific rank is justified. *Name:* The specific epithet, meaning "become glabrous", refers to the tepals, in which the sparse pubescence soon wears off.

Studies in the genus Acacia (Mimosoideae)—9
Additional notes on the Series Pulchellae Benth.

By B. R. Maslin

Abstract

Preparatory to a collaborative paper on *Acacia* Series *Pulchellae* Benth.*, some additions and corrections are made to my previous revision of the Series (Maslin, 1975). The following transfers and changes of status are proposed: *A. anarthros* Maslin (formerly *A. drewiana* subsp. *pungens* Maslin), *A. epacantha* (Maslin) Maslin (*A. lasiocarpa* var. *epacantha* Maslin), *A. fagonioides* Benth. (*A. pulchella* R. Br. var. *fagonioides* (Benth.) Macbride), *A. guinetii* Maslin (formerly *A. lasiocarpa* var. *villosa* (E. Pritzel) Maslin), *A. browniana* var. *glaucescens* Maslin (formerly a variant of *A. browniana* var. *endlicheri* (Meisn.) Maslin), *A. drummondii* subsp. *affinis* (Maslin) Maslin (*A. varia* var. *affinis* Maslin). *Acacia denudata* var. *spinosissima* Meisn. is transferred in synonymy from *A. pulchella* var. *glaberrima* Meisn. to *A. pulchella* R. Br. var. *pulchella*, while *A. pulchella* var. *grandis* (Henfr.) Chop. is added in synonymy under var. *glaberrima*. Opportunity is also taken to add or supplement legume and seed descriptions of 15 species and to choose a lectotype for *A. insolita* E. Pritzel.

Introduction

Since my revision of *Acacia* Series *Pulchellae* Benth. (Maslin, 1975) a number of name changes have become necessary. New data necessitating these alterations are derived from studies of seeds and seedlings by J. Vassal and of pollen morphology by Ph. Guinet (pers. comm.) and also from my own work on gross morphology. The new names given here are preparatory to a collaborative paper on the classification of the *Pulchellae**. At the same time, the opportunity is taken to provide new and supplementary descriptions of legumes and seeds for many of the included species.

The taxa are presented alphabetically by specific name. A list of the numbered specimens seen is given at the end of the paper.

Taxonomy

1. Acacia anarthros Maslin nom. et stat. nov., based on *Acacia drewiana* W. V. Fitzg. subsp. *pungens* Maslin.

Acacia drewiana W. V. Fitzg. subsp. *pungens* Maslin, Nuytsia 1(5): 475, Fig. 31 J–K, Map 5 (1975). Type: Boxvale, Miss *Julia Wells* s.n. (holo: MEL 49593).

Seed of *A. drewiana* subsp. *drewiana* (p. 357) provide data additional to the floral and vegetative features already noted (Maslin, l.c.) for the segregation of subsp. *pungens*. In my estimation the differences observed (see key below) justify specific rank for the latter. *Acacia anarthros* and *A. drewiana* share the unusual feature of decurrent leaf-axes, a character otherwise unknown in the *Pulchellae*. The new ephithet, *anarthros*, refers to this character.

A recent fruiting collection necessitates the following modifications to my previous description of this taxon: these modifications are based on *B. R. Maslin* 4347, 23 Nov. 1976, 21 km S of New Norcia towards Bindoon (PERTH).

Legumes to 60 mm long, 5–8 mm wide, obscurely reticulate. *Seeds* 3–4 mm long, 2·5–3 mm wide; *funicle* minute (less than 1 mm long), gradually expanded into a thickened yellowish *aril* which is folded near its middle and again close to the hilum.

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* Guinet, Ph., Vassal, J., Maslin, B. R., and Evans, C. S. "Acacia (Mimosoideae): Composition and affinities of the Series *Pulchellae* Benth" Paper presented at the Mimosoideae Group meeting, Kew, July 1978 and to be published shortly in Bot. J. Linn. Soc.

Key to decurrent-leaved taxa of Pulchellae:

1a. Pinnae consistently 1 pair; terminal seta pungent; stipules ± pungent; flowers less than 20 per head; apex of pinna rachis not laterally flattened; calyx ciliolate, without additional longer hairs; seeds longitudinal in legume, dull, minutely roughened, not mottled. (Wannamal–New Norcia area) .... **A. anarthros**

b. Pinnae more than 1 pair (a few unijugate leaves may occur among the multijugate ones); terminal seta often rigid but scarcely pungent; stipules not pungent, flowers more than 20 per head 2

2a. Apex of pinna rachis conspicuously laterally flattened; pinnules 4–6 mm long; calyx lobes ciliolate and with conspicuous, spreading hairs at their apices; seeds transverse to slightly oblique in legume, shiny, smooth, somewhat obscurely and irregularly mottled. (Near Armadale to Bindoon) .... **A. drewiana** subsp. **drewiana**

b. Apex of pinna rachis not conspicuously flattened; pinnules 2·5–4 mm long; calyx lobes ciliolate, without additional longer hairs; seeds unknown. (Wongan Hills; Kukerin to Lake King) .... **A. drewiana** subsp. **minor**

2. Acacia browniana H. Wendl.; Maslin (1975), Nuytsia 1(5): 425.

Further material of this species shows that the Mogumber-Bindoon form of var. *endlicheri* (Meisn.) Maslin represents a distinct variety described below as var. *glaucescens*, and also permits a description of the hitherto unknown fruits of var. *obscura* (DC.) Maslin. The species description should be amended as follows:

Pinnules 2–10 mm long, 1–4 mm wide. *Legumes* 10–45 mm long, 5–9 mm wide, glabrous or rarely sparsely pilose (var. *glaucescens*), rarely sparsely transversely reticulate. *Seeds* (not seen for var. *endlicheri*) 2·5–4 mm long; *areole* 1–2·7 mm long, 0·8–2 mm wide; *funicle* reflexed below and ± abruptly or gradually expanded into a thickened aril which is folded near the hilum.

The key to varieties previously given should be altered as follows (commencing at lead 4):

4a. Pinnules glaucescent and ± concolorous; dwarf shrub to 30 cm tall. (Mogumber to Bindoon) .... var. **glaucescens**

b. Pinnules dark green above, light green below; shrub normally 1–2 m tall. (Albany to Busselton) .... var. **browniana**

5a. Flowering peduncles normally very sparsely hairy at base; tall shrubs 1–2 m tall, subterranean runners absent; pinnules ciliolate, dark green above and light green below. (Karri or Karri-Jarrah forest from Nannup to near Northcliffe) var. **obscura**

b. Flowering peduncles glabrous; dwarf shrubs 0·3–0·5(0·6) m tall, spreading vegetatively by subterranean runners. (Jarrah forest) 6

6a. Pinnules glaucescent, ± concolorous, flat, normally glabrous, 6–10 x (2)3–4 mm; legumes 6–9 mm wide. (Mogumber to Bindoon) .... var. **glaucescens**

b. Pinnules dark green above and light green below, slightly to prominently recurved, normally ciliolate, (2)3–5(6) x 1–2(3) mm; legumes 4–6 mm wide. (Sporadic from Collie to Mount Barker) .... var. **endlicheri**

2a. var. **endlicheri** (Meisn.) Maslin, Nuytsia 1(5): 431 (1975).

Acacia browniana var. *endlicheri*, amended to exclude the more northerly var. *glaucescens* (see below) requires a revised description:

Small, single- or multi-stemmed *shrub* 30–50(60) cm tall, suckering from subterranean runners; *branchlets* pilose to hispidulous (hairs patent), rarely glabrous. *Rachis* 3–5 mm long; distal pinna rachis 6–18 mm long; *pinnules* oblong or sometimes obovate, (2)3–7(9) pairs on distal pinnae, (2)3–5(6) mm long, 1–2(3) mm wide, slightly or sometimes prominently recurved along margins, discolorous (dark green above, light green below), ciliolate and sometimes also hairy on lamina, rarely glabrous, midrib slightly raised on lower pinnule surface. *Gland* situated on upper surface of rachis at base of (or 0·5–2 mm below) pinnae, lip yellow and prominent (obviously raised above

level of rachis), orifice distinct. *Peduncles* 8–15 mm long, glabrous. *Flower-heads* with 18–21 flowers. *Petals* not prominently inflexed at apex, rather obviously 1-nerved when dry; *flower buds* ± attenuated. *Legumes* to 22 mm long, 4–6 mm wide, glabrous. *Seeds* n.v.

Distribution: Sporadic from Collie to Mount Barker.

WESTERN AUSTRALIA: 13 mi (20·8 km) from Denmark on road to Mount Barker, 21 Oct. 1975, *J. S. Beard* 7767 (PERTH); About 19·2 km E of Collie towards Darkan, *B. R. Maslin* 4, 11 Apr. 1970, and 3202, 30 Dec. 1972 (PERTH); 23 km from Denmark towards Mount Barker, *B. R. Maslin* 2956, 21 Sept. 1972, and 3203, 30 Dec. 1972 (PERTH); In distr. Plantagenet, Dec. 1840, *L. Preiss* 888 (NY-syntype); Without locality, *Preiss* 905 (MEL, PERTH—lectotype); Upper Hay River, 1870, Mrs. *Mary Warburton* s.n. (MEL 49668 and 49729).

2b. var. **glaucescens** Maslin var. nov. (Figure 12 D in Maslin, 1975).

Acacia browniana H. Wendl. var. *endlicheri* (Meisn.) Maslin affinis, sed pinnulis 6–10 mm longis, (2)3–4 mm latis, planis, glaucescentibus, concoloribus, plerumque glabris; glandibus inconspicuis; leguminibus usque 45 mm longis, 6–9 mm latis, plerumque sparsim pilosis, differt.

Allied to *A. browniana* var. *endlicheri* but differing in the following ways: *pinnules* 6–10 mm long, (2)3–4 mm wide, flat, glaucescent, ± concolorous, normally glabrous; *glands* inconspicuous; *legumes* to 45 mm long, 6–9 mm wide, normally sparsely pilose.

Type: About 8 km due NE of Bindoon, Western Australia, 2 Aug. 1973, *B. R. Maslin* 3232. "Dwarf shrub to 30 cm tall; branchlets often entangled among associated low shrubs; pinnules glaucous, isochromous. Dark brown loam over gravel in Jarrah." (holo: PERTH; iso: PERTH).

Attractive, dwarf, multi-stemmed *shrub* to 30 cm tall, suckering from subterranean runners; *branches* light brown but grey at extreme base; *branchlets* pilose or antrorsely puberulous, sometimes glabrous. *Leaves* rather variable in size; *rachis* 3–6 mm long; distal pinna rachis 4–18(23) mm long; *pinnules* narrowly oblong or sometimes narrowly obovate to narrowly elliptic, frequently slightly oblique, 6–10 mm long, (2)3–4 mm wide, 2–6 pairs on distal pinnae, flat, ± concolorous, glaucescent, glabrous or rarely sparsely ciliolate, midrib obscure. *Gland* obscure, obliquely terminating rib on upper surface of rachis at base of pinnae, lip not prominent (not raised above level of rachis), orifice distinct. *Peduncles* 10–15(20) mm long at anthesis, to 30 mm long when in fruit, glabrous. *Flower-heads* with (13)15–17 flowers. *Petals* obviously 1-nerved when dry. *Legumes* to 45 mm long, 6–9 mm wide, sparsely pilose or sometimes glabrous, grey-brown, glaucescent, sparsely tranversely reticulate, abruptly contracted at apex into a short mucro. *Seeds* transverse in legume, obloid, 3·5–4 mm long, 2·5 mm wide, somewhat compressed, dark brown (chestnut brown just before maturity); *areole* 2·7 mm long, 0·8 mm wide; *funicle* reflexed below and gradually expanded into a dull yellowish aril which is folded near the hilum.

Distribution and habitat: South-west Western Australia: restricted to a small area near Mogumber and Bindoon (about 100 km north of Perth). Grows in laterite or in loam over laterite in Jarrah (*Eucalyptus marginata*) or Wandoo (*E. wandoo*) open-forest.

WESTERN AUSTRALIA: Mogumber, Aug. 1929, *W. E. Blackall* s.n. (PERTH); Near 61 mi peg, Great Northern Highway, 20 Aug. 1972, *B. R. Maslin* 2794 (AD, BRI, K, MEL, PERTH); Near 62 mi peg, Great Northern Highway, 20 Aug. 1972, *B. R. Maslin* 2797 (K, PERTH); About 8 km due NE of Bindoon, 23 Nov. 1976, *B. R. Maslin* 4346 (PERTH).

Flowering and fruiting period: Flowers in August; legumes with mature seeds have been collected in late November.

The dwarf, suckering habit previously led me to treat this taxon as a form of var. *endlicheri*, i.e. the Mogumber-Bindoon form. However, examination of more material indicates that varietal rank is more appropriate. The variety is distinguished from the rest of *A. browniana* by characters given in the key above.

The varietal epithet refers to the pinnules. Glaucescent foliage is otherwise unknown in *A. browniana*.

2c. var. **obscura** (DC.) Maslin, Nuytsia 1(5): 430 (1975).

Recent gatherings now enable legumes and seeds to be described; this description is based on *B. C. Haberley* 448, 451 and 458, 7 Jan. 1977, 2·5 km W of Donnelly River bridge, between Manjimup and Nannup (PERTH).

Legumes to 30 mm long, 6–7 mm wide, very slightly undulate, dark brown, abruptly contracted at apex into an acute point. *Seeds* oblique in legume, 2·5–3·5 mm long, 1·5–2 mm wide, turgid, dark brown; *areole* 2–2·5 mm long, ca 1 mm wide.

3. Acacia drewiana W. V. Fitzg.; Maslin (1975), Nuytsia 1(5): 471.

Following the above exclusion of *A. drewiana* subsp. *pungens* Maslin as *A. anarthros* Maslin and also with the acquisition of fruits for the typical subspecies, my previous description of *A. drewiana* should be modified as follows:

Stipules scarious. *Terminal seta* often rigid but not sharply spinescent; pinnae (1)2–3(4) pairs; pinna rachis 3–8(10) mm long. *Gland*—delete reference to unijugate leaves. *Flowers* 22–35 per head. *Legumes* narrowly oblong, 30–40 mm long, 6–7 mm wide, flat or very slightly undulate, raised over seeds, puberulous to shortly pilose, greyish brown, basal stipe 3–5 mm long, abruptly narrowed at apex into a short apiculum 2 mm long; margins thickened, not contracted between seeds. *Seeds* transverse to slightly oblique in legume, ± obloid (shape somewhat irregular), 3–3·5 mm long, 2·2–2·8 mm wide, turgid (raised in centre but narrowed towards margins), dark greyish brown, somewhat obscurely and irregularly mottled, shiny, smooth; *pleurogram* open towards the hilum; *funicle* gradually expanded into a yellowish aril which is folded near its distal third and again close to the hilum.

The description of fruit is based on *B. R. Maslin* 4340, 23 Nov. 1976, 6 km N of Bullsbrook East on Great Northern Highway (PERTH).

4. Acacia drummondii Lindl.; Maslin (1975), Nuytsia 1(5): 464.

The inclusion of *A. varia* Maslin var. *affinis* Maslin within *A. drummondii* (see below) plus the acquisition of further fruiting material of subsp. *drummondii* and subsp. *candolleana* (Meisn.) Maslin necessitate some modifications to my previous description of the species:

Branches strigose, puberulous and/or pilose (hairs antrorse, retrorse or patent). Pinnules 2–4(5–6) pairs on distal pinnae, flat to recurved or sometimes (subsp. *affinis*) revolute, glabrous or sometimes (subsp. *affinis*) densely hairy. *Peduncles* strigose to puberulous or occasionally shortly pilose. *Bracteoles* 0·7–1 mm long. *Calyx* tube glabrous to puberulous. *Legumes* 15–40(50) mm long, 3–8 mm wide, light brown to dark brown or greyish brown, hairy (strigillose or puberulous) to glabrescent, slightly raised over seeds (umbo transverse to oblique), abruptly narrowed at apex into a short mucro. *Seeds* transverse to oblique in the legume, 2–3·5 mm long, 1·3–2 mm wide, slightly compressed, light brown to dark brown; *pleurogram* continuous or with a narrow opening towards the hilum, often bordered by a band of pale tissue; *areole* often darker brown than rest of seed; *funicle* reflexed below and gradually expanded into a straight, curved or once-folded aril.

The key to subspecies previously given should be modified commencing at lead 2b:

2b. Gland absent from rachis, present on petiole; hairs on peduncles (when present) normally retrorse (rarely patent in subsp. **affinis**) 3

3a. Pinnules flat, glabrous (rarely ciliolate), ± concolorous, nerveless or obscurely 1-nerved below, normally 3–6 x 1–2 mm. (Near New Norcia to Collie and Williams) subsp. **drummondii**

b. Pinnules recurved to revolute, sparsely to densely hairy (rarely glabrous), dark green above, subglaucous and ± obscurely 1-nerved below, normally 3–10 x 0·5–1·5 mm. (New Norcia to Muchea) .... subsp. **affinis**

Since my previous treatment of *A. drummondii* I have examined its types at both Cambridge (CGE) and Kew (K), and found that my former interpretation of these mixed gatherings was correct. The specimen at CGE from "West Australia" (with no other details) is labelled in Mueller's handwriting and is not a type.

4a. subsp. **drummondii**

Examination of recent fruiting specimens permits the following description to be made. This description is based on *B. R. Maslin* 4348, 23 Nov. 1976, about 17 km N of New Norcia towards Moora (PERTH) and *A. Selkirk* s.n., 6 Dec. 1976, Darling Range, ca 10 km due ENE of Mount Dale (PERTH).

Legumes 25–40 mm long, 4–8 mm wide, strigillose (hairs barely visible to unaided eye), light brown; margins yellow. *Seeds* transverse in the legume, 2–3·5 mm long, 1·3–2 mm wide; *areole* 1·5–2 mm long, 0·5 mm wide; *aril* slightly curved or occasionally once-folded, pale yellow.

4b. subsp. **affinis** (Maslin) Maslin comb. et stat. nov.—based on *A. varia* var. *affinis* Maslin.

Acacia varia var. *affinis* Maslin, Nuytsia 1(5): 461, Fig. 26, Map 9 (1975). *Type:* Near 39 mi peg, Great Northern Highway, Western Australia, 20 Aug. 1972, *B. R. Maslin* 2793 (holo: PERTH; iso: CANB, K).

Previously (Maslin, l.c.) I indicated that the position of this taxon within the *Pulchellae* was uncertain because its foliage suggested inclusion in *A. varia* but its inflorescences related it to *A. drummondii*. Recent pollen studies by Ph. Guinet (pers. comm.), showing that the central area of its central monad is divided into five parts, clearly relate the taxon to *A. drummondii*. In *A. varia* the central portion is undivided. In addition, Vassal (pers. comm.) has shown that in subsp. *affinis* the mean seed L/B is 1·7 thus rendering it closer to *A. drummondii* (L/B = 1·65–1·8) than to *A. varia* (L/B = 1·25–1·4).

Data from a recent collection permit supplementary notes on legumes and seeds to be provided; this description is based on *B. R. Maslin* 4341, 23 Nov. 1976, 7 km from Bullsbrook East towards Chittering (PERTH).

Legumes 25–35 mm long, 3·5 mm wide, ± sparsely puberulous, medium brown to greyish brown, umbo transverse. *Seeds* transverse in the legume, 2–2·5 mm long, ± 1·5 mm wide, light brown; *areole* dark brown; *aril* ± clavate, straight or slightly curved, very pale yellow.

4c. subsp. **candolleana** (Meisn.) Maslin, Nuytsia 1(5): 467 (1975).

Access to additional fruiting material permits a revised legume and seed description. This description is based on *B. R. Maslin* 4370, 13 Dec. 1976, Mount Cooke, 45 km SE of Armadale on Albany Highway (PERTH), and *A. Selkirk* s.n., 6 Dec. 1976, Darling Range, ca 10 km due ENE of Mount Dale (PERTH).

Legumes erect when young but frequently spreading or pendulous when mature, 20–40(50) mm long, 4–6 mm wide, glabrescent to moderately puberulous,

light brown to dark brown, umbo oblique. *Seeds* transverse to oblique in legume, basically obloid to slightly ellipsoid but shape sometimes irregular, 2·5–3 mm long, 1·5–2 mm wide, medium brown to dark brown; *areole* darker brown than rest of seed; *aril* straight to slightly curved or sometimes once-folded near its middle, pale yellow.

5. Acacia epacantha (Maslin) Maslin stat. nov.—based on *A. lasiocarpa* var. *epacantha* Maslin.

Acacia lasiocarpa Benth. var. *epacantha* Maslin, Nuytsia 1(5): 416, Fig. 6 I–J, Map 4 (1975)' *Type:* 15 km S of Badgingarra towards Dandaragan, Western Australia, 3 Aug. 1973 *B. R. Maslin* 3247 (holo: PERTH; iso: CANB, K, MEL, NSW, NY, PERTH).

Recent pollen studies by Ph. Guinet (pers. comm.) reveal significant differences from *A. lasiocarpa* Benth., which when combined with gross morphological features, seem to justify specific rank for this taxon. The pollen of *A. epacantha* is distinctive in that the central area of its central monad is divided into four parts whereas in *A. lasiocarpa* it is undivided. Other features distinguishing *A. epacantha* from *A. lasiocarpa* are its simple (not reduced racemose) inflorescences which are borne on the solitary axillary spines (not at their bases) and its slightly broader, curved to circinnate legumes (flat or undulate in *A. lasiocarpa*). In foliage characters *A. epacantha* is separated from *A. lasiocarpa* (excluding var. *bracteolata* Maslin) by a combination of the following attributes: pinnules consistently 2 pairs and normally 6–10 mm long, pinna rachis 1–2 mm long with an acute, normally dark brown apex which is 0·5–1·5 mm long. As noted previously (Maslin, l.c.) *A. epacantha* is related to *A. lasiocarpa* var. *bracteolata* by its foliage (a relationship supported by pollen morphology—Ph. Guinet, pers. comm.) but is distinguished, in addition to the characters noted above, by its branch indumentum, its longer, strigose peduncles, its non-mottled seeds and its hairy legumes.

Access to mature fruiting material permits the following seed description to replace the one I gave previously. This revised description is based on *B. R. Maslin* 4355, 24 Nov. 1976, 15 km S of Badgingarra towards Dandaragan (PERTH).

Seeds longitudinal in the legume, obloid to orbicular, somewhat compressed, 3–3·5 mm long, ca 2 mm wide, light brown to dark brown, glossy; *pleurogram* continuous or open towards the hilum, black; *areole* ca 2 mm long and 1 mm wide; *funicle* minute (ca 0·3 mm long) and filiform, reflexed below a clavate or sometimes once-folded, thickened, pale yellow aril.

Acacia epacantha, together with *A. megacephala* and three other species discussed below viz. *A. fagonioides*, *A. lasiocarpa* and *A. pulchella*, are the only members of the *Pulchellae* possessing axillary spines. As the present paper deals with major taxonomic changes involving most of these taxa, a key to them is provided.

Key to species of *Pulchellae* with axillary spines (N.B. spineless individuals occur in both *A. lasiocarpa* and *A. pulchella*—see key given in Maslin (1975) for these variants).

1a. Inflorescences borne *on* the solitary axillary spines 2
b. Inflorescences arising from branch at base of the axillary spines; spines 1–2 per node 3

2a. Pinnules flat, glaucescent, 2–4 pairs, less than 6 mm long. (Toodyay and Eneabba districts) .... **A. fagonioides**
b. Pinnules revolute, dark green, 2 pairs, normally 6–10 mm long. (Dandaragan to Badgingarra) .... **A. epacantha**

3a. Pinnules prominently recurved to revolute; branchlets and peduncles hairy; spines 1 per node. (Widespread in S.W. Western Australia; a variable species) **A. lasiocarpa**
b. Pinnules flat; branchlets and peduncles sometimes glabrous; spines 1–2 per node 4

4a. Flowers 80–90 per head; peduncles 15–25 mm long; pinnules 3–6 x 1·5–3 mm; branchlets densely shortly pilose. (Geraldton district) .... **A. megacephala**

b. Flowers 10–40(50) per head; peduncles normally not exceeding 10 mm long 5

5a. Hairs on branchlets and peduncles retrorse; peduncles ca 10 mm long; spines 1 per node; pinnules normally slightly recurved, 3–4 pairs, discolorous, ± prominently 1-nerved below. (Geraldton to Murchison River) **A. lasiocarpa** var. **lasiocarpa**—variant

b. Characters not combined as above. (Widespread in S.W. Western Australia; a variable species) .... **A. pulchella**

6. **Acacia fagonioides** Benth.

Acacia pulchella R. Br. var. *fagonioides* (Benth.) Macbride; Maslin (1975), Nuytsia 1(5): 405.

In the light of other rank changes given in the present paper and having now seen mature fruits of *A. fagonioides* I consider it best to treat this taxon as a distinct species rather than as a variety of *A. pulchella* as I had previously done. Access to mature fruiting material permits the following description to replace the one given previously; this description is based on *C. Chapman* s.n., Nov. 1976, Eneabba district (PERTH).

Legumes narrowly oblong, 30–80 mm long, 7–12 mm wide (size very variable), hard and brittle to ± firmly chartaceous, flat, raised over seeds, dark brown, slightly pruinose, glabrous, sparsely reticulate, abruptly contracted at both ends; *margins* thickened, yellowish to light brown, not (or rarely) prominently contracted between seeds. *Seeds* variably placed in legume (longitudinal to oblique or sometimes transverse), ellipsoid to spheroid, turgid, 3–4 mm long, 3–3·5 mm wide, dark brown, shiny; *pleurogram* open towards the hilum; *areole* ca 2 mm long and 1 mm wide; *funicle* expanded into a clavate or once-folded aril.

Acacia fagonioides occurs in a small group of species distinguished from the other members of the *Pulchellae* by their axillary spines and stipitate glands. A key to the recognition of these species is given above. Within this group, *A. fagonioides* is most closely related to *A. pulchella* from which it differs in inflorescence arrangement, strigose branchlets (glabrous or with patent hairs in *A. pulchella* except sometimes in var. *subsessilis*) and wider legumes and seeds.

An interesting example of parallel evolution exists between *A. fagonioides* and *A. epacantha* (see above). These species are closely related to *A. pulchella* and *A. lasiocarpa* respectively from which they differ (among other characters) in the same important feature viz. their inflorescences are simple (not racemose) and are borne on the axillary spines instead of at their bases. Both species have restricted ranges in the northern sandheaths while *A. pulchella* and *A. lasiocarpa* are both widespread throughout the southwest of Western Australia. Interestingly Ph. Guinet reports (pers. comm.) that the pollen of *A. epacantha* is very different from that of *A. lasiocarpa* (see p. 362) but that of *A. fagonioides* is essentially the same as that of *A. pulchella*.

7. **A. grisea** S. Moore; Maslin (1975), Nuytsia 1(5): 432.

Seeds of this species have not been described and the following account is therefore presented; this description is based on *B. R. Maslin* 4383, 14 Dec. 1976, about 13 km due SE of Broomehill, on Pallinup Road (PERTH).

Seeds transverse to slightly oblique in legume, obloid to ellipsoid, 2·5–3 mm long, 2 mm wide, dark brown, shiny; *funicle* gradually expanded into and reflexed below a thickened pale yellow *aril* which is folded near its attachment to the seed.

Since my previous treatment of *A. grisea* I have inspected the holotype, *F. Stoward* 166 (BM) and found it to accord well with my circumscription of the species.

8. Acacia guinetii Maslin sp. nov.

Acacia pulchella R. Br. var. *villosa* E. Pritzel, *synon. nov.*, Bot. Jb. 35: 310 (1904). Syntypes: Diels 2066 and 3211 (n.v.).

Acacia lasiocarpa Benth var. *villosa* (E. Pritzel) Maslin, Nuytsia 1(5): 414, Figs. 6 G—H Map 3 (1975).

Acacia lasiocarpa Benth *affinis*, sed habitu fruticoso aperto et exili 1·2–2 (2·5) m alto; spinis axillaribus nullis; stipulis 2–3·5 mm longis; rhachide pinnarum infra pinnulas infimas saepe glandulifera; pinnulis quam in *A. lasiocarpa* plerumque majoribus (3–7 (8–10) x 1–1·5 (2) mm) et magis pilosis; glandulis apice manifeste dilatatis; pedunculis 10–20 mm longis; floribus 65–75 pro capitulo; leguminibus nunquam pilosis; seminibus in legumine semper longitudinaliter dispositis, nunquam marmoratis, differt.

Type: Moresby Range, Western Australia, 30 August 1972, *A. M. Ashby* 4586 (holo: PERTH; iso: CANB, PERTH).

Shrub 1·2–2(2·5) m tall, somewhat spindly and straggly, normally single-stemmed, foliage crowded on branchlets which tend to arch downwards; new shoots light green; bark grey, smooth but finely fissured towards base of main stem; branches terete, very obscurely nerved, densely villous-pilose (hairs sparser with age, sometimes tubercle-based), brownish grey. Axillary spines absent. *Stipules* very narrowly triangular, 2–3·5 mm long, 0·2–0·3 mm wide, scarious, ciliolate, dark brown, 1-nerved. *Leaves* bipinnate; petiole 1–1·5 mm long; terminal seta linear to very narrowly triangular, 1·5–3 mm long, otherwise as for stipules; pinnae 1 pair; pinna rachis (2·5)4–10 mm long, often gland-bearing below the lowermost pair of pinnules, indumentum as on branches, broadly ribbed above, apex acute and rather flattened and sometimes dark brown; *pinnules* 2–4(5) pairs, normally narrowly oblong, 3–7 (8–10) mm long, 1–1·5(2) mm wide, slightly curved upwards, somewhat thickened, often very finely wrinkled when dry, prominently recurved to revolute, dark green and nerveless above, lighter green and 1-nerved below, moderately to densely puberulous (hairs patent to slightly antrorse). *Gland* arising at junction of pinnae, stipe so reduced (ca 0·1 mm long) that gland appears sessile, apex dilated (ca 0·4 mm diam.) with a yellow rim and a shallow, brown central orifice; an additional smaller gland (otherwise of the same morphology) often occurs on the pinna rachis below the lowermost pair of pinnules. *Inflorescence* a very reduced raceme with a single peduncle arising from axil of uppermost bract on the very short raceme axis (ca 1 mm long), 1–2 per node; *peduncles* 10–20 mm long (normally greatly exceeding the leaves), patent or ascending, moderately to densely puberulous; *flower-head* globular, light yellow to deep yellow, 7–9 mm diam. at anthesis (when dry), with 65–75 densely packed flowers. *Bracteoles* 2–2·5 mm long, not prominent in mature bud; claws linear; laminae narrowly ovate, sparsely to moderately puberulous, yellow to brown, ± nerveless. *Flowers* 5-merous; calyx $\frac{3}{4}$–$\frac{4}{5}$ length of corolla, divided for $\frac{1}{4}$–$\frac{1}{3}$ its length into ± oblong, sparsely hairy lobes; calyx tube narrowly turbinate, obscurely 5-nerved, glabrous or glabrescent; petals 2–2·5 mm long, 1-nerved, sparsely puberulous. *Legumes* narrowly oblong, 20–40 mm long, 3–3·5 mm wide, slightly undulate, moderately raised over seeds (umbo longitudinal), glabrous, very dark brown, apex acute; margins prominently thickened, not contracted between seeds, yellow. *Seeds* longitudinal in legume, obloid, 2·5–2·7 mm long, 1·5–1·9 mm wide, overall somewhat compressed but slightly raised in the centre and narrowed towards the margins, greyish brown, shiny; *pleurogram* continuous or with a narrow opening towards the hilum; *areole* oblong, 1·3–1·5 mm long, 0·6–0·7 mm wide; *funicle* filiform, ca 0·5 mm long, normally reflexed below and ± gradually expanded into a gently curved, clavate aril which is slightly shiny and dull yellow (except at hilum where it is brownish).

Distribution and habitat: South-west Western Australia: restricted to the Nanson-Howatharra region (about 30 km north of Geraldton) where it grows in either rocky loam or lateritic gravel.

WESTERN AUSTRALIA: Hills 10 mi (16 km) S of Northampton, 19 July 1971, *K. M. Allan* 659 (PERTH); Howatharra, 13 July 1967, *A. M. Ashby* 2148 (PERTH); Moresby Range, *A. M. Ashby* 4587, 30 Aug. 1972, and 4614 (both at PERTH); Moresby Range, *A. C. Burns* 5, 19 Sept. 1965 (K, PERTH) and 8, 19 June 1966 (PERTH); About 8·1 km W of Nanson, 27 Aug. 1970, *R. Coveny* 3062 (CANB, K, MEL, NSW, NY, PERTH); 8 km W of Nanson, *B. R. Maslin* 3164, 8 Oct. 1972 (PERTH) and 3349, 22 Aug. 1973 (MEL, PERTH); 28 km from Geraldton towards Northampton, 20 Aug. 1973, *B. R. Maslin* 3321 (PERTH); Howatharra Hill Reserve, Moresby Range, *D.* and *N. McFarland* 1005, 20 July 1974 and 14 Oct. 1974 (both at PERTH); Moresby Range, Howatharra-Nanson road, Jan. 1974, *G. Phillips* 55 (NT, PERTH); Howatharra Range, 7·5 km N of Nanson, 22 Aug. 1973, *M. D. Tindale* 2752 (PERTH) and 2753 (K, PERTH).

Flowering and fruiting period: Flowers from June to August (September); legumes with mature seeds have been collected in mid-October.

Recent pollen studies by Ph. Guinet (pers. comm.) suggest a change in rank for the taxon I previously described as *A. lasiocarpa* var. *villosa* (Maslin, 1975). Its pollen differs significantly from *A. lasiocarpa* (with var. *epacantha* excluded—see *A. epacantha* above) in that all the monads of the same polyad are faintly striate (near the pseudo-furrows on the central monads and on the polar areas on the peripheral monads) and the pseudo-furrows on the peripheral monads are interrupted. In *A. lasiocarpa* the peripheral monads are not striate on their polar areas, and in addition, their pseudo-furrows are interrupted. When these differences are combined with the gross morphological features noted in the diagnosis above it seems to justify specific rank for this taxon.

The species is named in honour of Philippe Guinet for his numerous contributions to the study of *Acacia* pollen. I am particularly indebted to Guinet for giving me access to much of his unpublished data concerning the Australian species.

9. Acacia insolita E. Pritzel, Bot. Jb. 35: 310, Fig. 36 (1904); Maslin (1975), Nuytsia 1(5): 478. *Lectotype:* In silvis subumbrosis montium Darling Range, Aug. 1901, *E. Pritzel* 1013 (K–central specimen on sheet; iso: AD, E, G–DC, K, NSW, PR, US, W), *lecto. nov.* Syntype: *Diels* 3835 (n.v.).

Because I had not examined all syntypes previously a lectotype was not selected for *A. insolita*. Having now searched in many herbaria (including Berlin) I can find no trace of the syntype, *Diels* 3835. Because *Pritzel* 1013 is well distributed and accords well with the protologue, this collection is selected as the type. The lectotype sheet at Kew is annotated by Pritzel thus: "Acacia insolita Pritzel nov. spec. Engl. Jahrb. 1905".

According to Vassal (pers. comm.) the seed and seedling characters of *A. insolita* clearly relate it to the other members of the *Pulchellae*, even though its upper leaves are reduced to phyllodes. The species none the less does possess some seed/seedling features which set it slightly apart: the cotyledons persist a little longer than normal (i.e. until the first two leaves have completely opened) and its seeds are relatively large (this species, together with *A. gilbertii*, *A. megacephala* and *A. fagonioides*, has the longest seeds in the *Pulchellae*).

10. Acacia lasiocarpa Benth.; Maslin (1975), Nuytsia 1(5): 409.

The exclusion of both var. *epacantha* Maslin and var. *villosa* (E. Pritzel) Maslin as separate species (*A. epacantha* (Maslin) Maslin and *A. guinetii* Maslin respectively—see above) and the acquisition of more fruits of var. *sedifolia* (Meisn.) Maslin necessitate a revised description for *A. lasiocarpa:*

Shrub 0·2–1·5 m tall, often dense and compact; *branchlets* often spinescent, sometimes flexuose, obscurely nerved to nerveless, indumentum various. *Spines* axillary, 1 per node, sometimes absent in var. *lasiocarpa* and var. *sedifolia*, 3–12 mm long, spreading, normally sparsely hairy towards base, brown. *Stipules* triangular to very narrowly triangular, 0·5–2 mm long, scarious but sometimes thickened towards the base, brown. *Leaves* bipinnate; petiole $\leq$ 0·5 mm long; terminal seta triangular to narrowly triangular, 0·5–2·5 mm long, scarious but often slightly thickened towards the base, often dark brown and conspicuous; pinnae 1 pair; pinna rachis 1–10(20) mm long, apex green or dark brown, sometimes prominent; *pinnules* 2–6 pairs (rarely to 12 pairs in var. *lasiocarpa*), narrowly oblong, 1–4(5) mm long, 0·5–1 mm wide, prominently recurved to revolute (rarely flat in var. *lasiocarpa*), green or occasionally glaucescent, glabrous to hairy, nerveless above, 1-nerved below; *gland* arising at junction of pinnae, stipitate but stipe often extremely reduced ($\leq$ 0·5(1) mm long), apex not dilated except often in var. *lasiocarpa*, pinna rachis eglandulose. *Inflorescence* a very reduced raceme, peduncle arising from axil of uppermost bract on the very short raceme axis, a new shoot or sometimes a second peduncle arising from axil of lowermost bract; peduncles 2–13 mm long, indumentum various; *flower-heads* globular, 4–7 mm diam. at anthesis when dry, with (13)16–50 flowers. *Bracteoles* 1–2·5(3·5) mm long; laminae green to dark brown, sometimes conspicuous in bud. *Flowers* 5-merous; calyx $(\frac{1}{2})\frac{2}{3}$–$\frac{3}{4}$ length of corolla, divided for $\frac{1}{4}$–$\frac{1}{2}$ its length into $\pm$ oblong sparsely ciliolate lobes which are slightly thickened and inflexed at their apices, tube glabrous to glabrescent and obscurely to prominently 5-nerved; petals 1·5–2·5 mm long, glabrous to glabrescent, nerveless to prominently 1-nerved. *Legumes* narrowly oblong, normally 10–40 mm long, 3–5 mm wide, flat or undulate, raised over seeds, glabrous or hairy, light brown to greyish brown or black, sometimes with a glaucescent bloom, abruptly narrowed at apex into a short acute point; margins thickened, not (or rarely slightly) contracted between seeds, yellow to brown. *Seeds* often variably placed in legume, often proximal and distal seeds longitudinal and the middle ones transverse, shape sometimes variable on the same plant, normally obloid to ellipsoid or orbicular, 1·5–2·5 mm long, 1·5–2 mm wide, distinctly turgid or somewhat compressed, pearly white, grey-brown or light brown to dark brown, frequently mottled; *pleurogram* open towards the hilum, often bordered by a narrow band of dark tissue; *funicle* $\pm$ filiform and ca 0·5 mm long, normally reflexed below and gradually or $\pm$ abruptly expanded into a fleshy, straight or slightly curved, yellowish aril.

A key to the recognition of *Pulchellae* species (including *A. lasiocarpa*) with axillary spines is given in p. 359.

10a. var. **sedifolia** (Meisn.) Maslin, Nuytsia 1(5): 411 (1975).

Examination of recent fruiting collections necessitates the following changes to my previous description of this taxon. These modifications are based on the following collections: *B. R. Maslin* 4344, 23 Nov. 1976, about 5 km due NE of Bindoon on Stephens Rd. (PERTH); *B. R. Maslin* 4351, 24 Nov. 1976, 6·5 km W of Moora towards Dandaragan (PERTH); *B. R. Maslin* 4382, 14 Dec. 1976, about 13 km due SE of Broomehill, on Pallinup Road (PERTH); *A. Selkirk* s.n., 6 Dec. 1976, east of Mundaring on Manna Flats Road, 6·5 km E of West Talbot Road (PERTH).

Legumes to 30(35) mm long, brown to greyish brown or black. *Seeds* variably placed in legume, normally proximal and distal seeds longitudinal and middle ones transverse, 1·5–2·5 mm long, light brown to dark brown, frequently mottled.

11. Acacia lateriticola Maslin, Nuytsia 1(5): 433 (1975).

A recent fruiting collection necessitates the following modifications to my previous description of this taxon; these modifications are based on *B. R. Maslin* 4366, 7 Dec. 1976, south of Serpentine, about 1 km east of South West Highway on Scriviner Road (PERTH).

Seeds shiny; funicle description should read—minute (0·2 mm long), expanded into a normally twice-folded pale yellow aril (one fold near the distal third and the other close to the hilum).

12. Acacia luteola Maslin, Nuytsia 1(5): 453 (1975).

A recent fruiting collection necessitates the following changes to my previous description of this taxon; these modifications are based on *B. R. Maslin* 4395, 15 Dec. 1976, 23 km from Denmark towards Mount Barker (PERTH).

Seeds dark brown to black; *funicle* filiform, reflexed below and gradually expanded into a curved or once-folded (near its middle) aril.

13. Acacia moirii E. Pritzel; Maslin (1975), Nuytsia 1(5): 417.

Because seeds are now described for subsp. *recurvistipula* Maslin (see below) some modifications to my previous description of *A. moirii* are necessary:

Seeds transverse to oblique in legume, obloid to ellipsoid or spheroid, 2–3 mm long, 2–2·3 mm wide, sometimes obscurely mottled (subsp. *recurvistipula*).

13a. subsp. **recurvistipula** Maslin; Maslin (1975), Nuytsia 1(5): 420.

Examination of a recent gathering enables seeds to be described. This description is based on *B. R. Maslin* 4375, 14 Dec. 1976, 7 km S of Kulin towards Kukerin (PERTH).

Seeds oblique in legume, obloid to spheroid, 2–2·5 mm long, 2–2·3 mm wide, raised in centre but narrowed towards margins; *pleurogram* often bordered by a band of yellowish tissue; *areole* 0·7 mm long, 0·7 mm wide; *funicle* very short (0·5 mm long), rather abruptly expanded into a short (0·7 mm long), pale yellow aril.

14. Acacia pentadenia Lindl.; Maslin (1975), Nuytsia 1(5): 444.

Examination of a recent collection indicates that my previous funicle description should be altered to read: *funicle* filiform or flattened, very short (ca 0·3 mm long) and abruptly expanded into a clavate or once-folded, thickened, pale yellow aril. The additional information is derived from *B. R. Maslin* 4392, 15 Dec. 1976, near Hay River, Albany–Denmark road (PERTH).

Since my previous account of the species I have examined the type sheet at Cambridge (CGE). My former interpretation of the specimens contained thereon is correct except that the right hand one is not the stunted form of *A. pentadenia* as previously thought. Instead it is a shoot apex of normal *A. pentadenia* with non-inflexed pinnules. It is therefore quite possible that all the specimens on this sheet are from the same gathering.

15. Acacia plicata Maslin, Nuytsia 1(5): 451 (1975).

Add the following data to my previous seed description of this species: *Seeds* rather compressed, broadly ellipsoid to spheroid. These additions are based on *B. R. Maslin* 4358, 24 Nov. 1976, about 20 km due E of Jurien Bay (PERTH).

16. Acacia pulchella R. Br.; Maslin (1975), Nuytsia 1(5): 397.

The exclusion of var. *fagonioides* (Benth.) MacBride as *A. fagonioides* Benth. (see above) and the acquisition of fruits for var. *reflexa* Maslin and var. *subsessilis* Maslin necessitate some changes to my previous description of *A. pulchella:*

Terminal seta 1–4 mm long. *Pinnules* 0·5–2 mm wide. *Inflorescences*—delete reference to var. *fagonioides*. *Legumes* ca 15–50 mm long, 3–5 mm wide, flat to undulate, occasionally curved; margins not constricted between seeds. *Seeds* normally longitudinal in legume (transverse to oblique in var. *subsessilis*), normally obloid to ellipsoid (rarely ± spheroid in var. *glaberrima*), 2–4·5 mm long, 1·5–3 mm wide, turgid, dark greyish to brown, mottled black in var. *subsessilis* otherwise colour uniform; *pleurogram* open towards the hilum (rarely continuous).

A key to the recognition of *Pulchellae* species (including *A. pulchella*) with axillary spines is given in p. 359.

16a. var. **pulchella**

Having examined the type of *A. denudata* var. *spinosissima* Meisn. at U.S. National Herbarium, Washington (US) in 1975, it is evident that this name should be transferred in synonymy from *A. pulchella* var. *glaberrima* to var. *pulchella*. The type sheet is labelled (probably in Meisner's hand): "Acacia denudata Lehm. γ. spinossissima Meisn. in Pl. Preiss. 1. p. 21. Cult. in Hort. Baumann, Bollwiller." The specimen is very spiny and has the minutely puberulous branchlets and peduncles of var. *pulchella* but its pinnules lack the thickened lateral veins frequently found in this taxon.

16b. var. **glaberrima** Meisn.; Maslin (1975), Nuytsia 1(5): 402.

Acacia pulchella R. Br. var. *grandis* (Henfr.) Chop., Ann. Amelior. Pl. 4: 17 (1951), *synon. nov.*

Examination of the type of *A. denudata* var. *gracilis* Meisn. (*Preiss* 904) at US confirms my previous inclusion of it as a synonym of var. *glaberrima*.

16c. var. **reflexa** Maslin, Nuytsia 1(5): 401 (1975).

Examination of a recent gathering of mature fruits now enables legumes and seeds to be properly described; this description is based on *B. R. Maslin* 4339, 23 Nov. 1976, 7 km N of Bullsbrook East on Great Northern Highway (PERTH).

Legumes to 40 mm long, 4 mm wide, puberulous, light brown; margins yellow. *Seeds* obloid, 3–4 mm long, 2 mm wide, dark brown; *pleurogram* continuous or with a very narrow opening towards the hilum; *areole* ca 2 mm long and 1 mm wide; *funicle* reflexed below a thickened yellowish aril which is normally once-folded near its middle.

16d. var. **subsessilis** Maslin, Nuytsia 1(5): 406 (1975).

Legume valves but no seeds were described previously (Maslin, 1975). A recent collection enables the following description to be presented; this description is based on *K. Newbey* 5031, 20 Dec. 1976, 5 km NW of Ongerup (PERTH).

Legumes to 15 mm long, 4 mm wide, undulate, prominently raised over seeds, glabrous, light brown, faintly pruinose. *Seeds* transverse to oblique in legume (otherwise longitudinal in *A. pulchella*), broadly ellipsoid, 2 mm long, 1.7 mm wide, 1·4 mm thick, dark brown with black mottlings; *areole* ca 1 mm long and 0·5 mm wide; *funicle* filiform, 0·4 mm long, abruptly expanded into a straight or curved (not folded) pale yellow aril.

17. Acacia varia Maslin, Nuytsia 1(5): 456 (1975)

Following the transference of var. *affinis* Maslin to *A. drummondii* (see above) and the acquisition of seed of var. *crassinervis* Maslin, the description of *A. varia* should be modified as follows:

Pinnules 2–6(7) mm long, 1–2·5 mm wide, thickened (except in var. *varia*), prominently 1-nerved below. *Peduncles* 7–15 mm long, densely hairy (rarely glabrous in var. *parviflora*); *flower-heads* 7–20 mm long and 4–7 mm wide at anthesis, with (20)25–55 flowers. *Calyx* and *corolla* sparsely to densely hairy, obscurely to prominently 5-nerved. *Legumes* moderately to densely hairy. *Seeds* obloid to ellipsoid or sometimes spheroid, dark brown to black.

17a. var. **crassinervis** Maslin, Nuytsia 1(5): 459 (1975).

Legumes and seeds of this variety have not been described and the following account is therefore presented; this description is based on *B. R. Maslin* 4381, 14 Dec. 1976, 4 km E of Katanning towards Nyabing (PERTH).

Legumes to 35 mm long, 4 mm wide, abruptly contracted at apex into a short mucro. *Seeds* variable in shape, obloid, ellipsoid, sometimes spheroid, 2–2·5 mm long, 1·7–2 mm wide, raised in centre and somewhat narrowed towards margins; *pleurogram* open towards the hilum, bordered by a band of yellow tissue; *funicle* and *aril* generally not remaining attached to dehisced seed, funicle filiform, ca 0·5 mm long, reflexed below an abruptly thickened ± straight pale yellow aril.

Acknowledgments

I wish to thank Dr. Ph. Guinet and Dr. J. Vassal for allowing me access to much of their unpublished data on pollen and seed/seedlings respectively. I am indebted to both Ms. B. S. Field and Dr. R. M. Polhill for helpful comments on the manuscript. The Australian Biological Resources Study Interim Council is acknowledged for funds provided enabling me to visit various European and American herbaria in 1975 where many types relevant to the present study were consulted.

Reference

MASLIN, B. R. (1975). Studies in the genus Acacia (Mimosaceae)-4. A revision of the Series *Pulchellae*. Nuytsia 1(5):388-494.

Index to numbered specimens

This index contains a reference to all numbered specimens seen for the present study. It is arranged aphabetically according to the name of the collector. Numbers in parentheses refer to the corresponding taxon in the text. All specimens are housed at the Western Australian Herbarium (PERTH) unless otherwise stated.

Allan, K. M. 659(8).

Ashby, A. M. 2148(8), 4586(8–Type: CANB, PERTH), 4587(8); 4614(8).

Beard, J. S. 7767(2a).

Burns, A. C. 5, 19 Sept. 1965 (8–K, PERTH), 8, 19 June 1966(8).

Coveny, R. 3062(8–CANB, K, MEL, NSW, NY, PERTH).

Haberley, B.C. 448(2c), 451(2c), 458(2c).

Maslin, B. R. 4(2a), 2793(4b–Type: CANB, K, PERTH), 2794(2b–AD, BRI, K, MEL, PERTH), 2797(2b–K, PERTH), 2956(2a), 3164(8), 3202(2a), 3203(2a), 3232(2b–Type), 3247(5–Type: CANB, K, MEL, NSW, NY, PERTH), 3321(8), 3349(8–MEL, PERTH), 4339(16c), 4340(3), 4341(4b), 4344(10a), 4346(2b), 4347(1), 4348(4a), 4351(10a), 4355(5), 4358(15), 4366(11), 4370(4c), 4375(13a), 4381(17a), 4382(10a), 4383(7), 4392(14), 4395(12).

McFarland, D. and N. 1005, 20 July 1974 and 14 Oct. 1974(8).

Newbey, K. 5031(16d).
Phillips, G. 55(8–NT, PERTH).
Preiss, L. 888(2a–Syntype: NY), 904(16b–Type: US), 905(2a–Lectotype: MEL, PERTH).
Pritzel, E. 1013(9–Lectotype: AD, E, G–DC, K, NSW, PR, US, W).
Stoward, F. 166(7–Holotype: BM).
Tindale, M. D. 2752(8), 2753(8–K, PERTH).

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Corynanthera, a new genus of Myrtaceae (Subfamily Leptospermoideae, Tribe Chamelaucieae)

By J. W. Green
(Western Australian Herbarium)

Abstract

Corynanthera flava J. W. Green gen. et sp. nov. is described and discussed. Its trisporangiate, unilocular anthers are distinctive and possibly unique. It is further characterised by the filaments produced into stipitate, terminal appendages, the stamens alternately dimorphic, the flowers zygomorphic and the inflorescence a ± terminal, spike-like raceme of yellow flowers. It is most closely related to *Micromyrtus* Benth. and is endemic in a small area 200 km north of Perth, Western Australia.

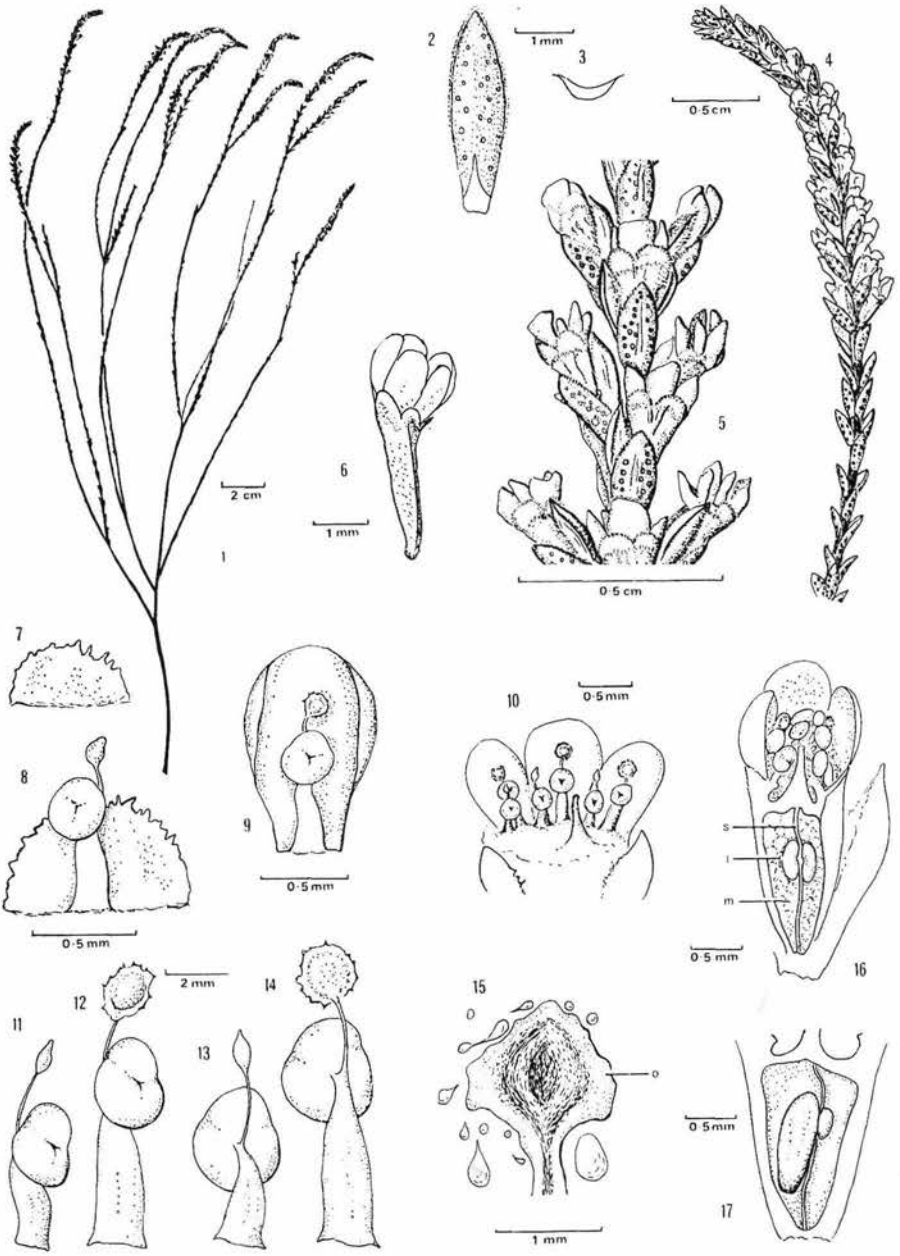
Corynanthera J. W. Green gen. nov.

Frutex racemis terminalibus spiciformibus. *Folia* opposita decussata. *Flores* solitarii, axillares, zygomorphi, tubo dorsiventraliter compresso. *Stamina* 10; filamento in stipite filiformi producto glandem terminalem ferente. *Antherae* uniloculares poro uno dehiscentes, microsporangiis 3 in uno plano dispositis. *Ovarium* uniloculare. *Ovuli* 2, ad venam stylarem posticam in parte ovarii tertia collateraliter affixi.

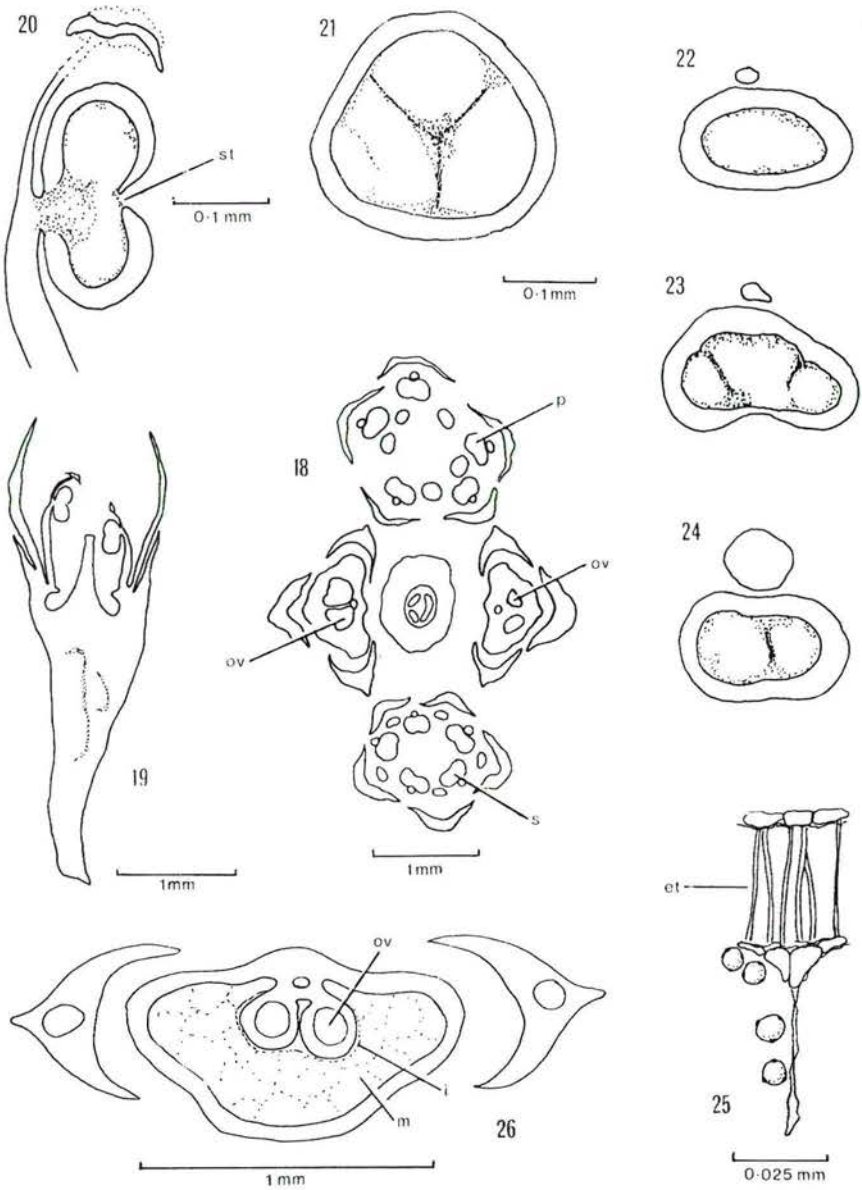
Type species: C. flava J. W. Green, the only known species. The generic name refers to the club-like appendages associated with the anthers.

Shrub with small, estipulate, decussate leaves. *Inflorescence* a terminal or sub-terminal spike-like raceme. *Flowers* solitary, in the axils of the upper leaves, subtended by two persistent bracteoles, zygomorphic; *floral tube* dorsiventrally compressed, the free part inclined towards the axis; *sepals* 5, the anterior 2 larger and the posterior smaller than the other 2; *petals* 5, exceeding the sepals. *Stamens* 5 + 5, in two scarcely distinguishable whorls, the outer, antepetalous stamens with the filament produced into a filiform stipe bearing a large, irregularly-shaped or ± globular appendage above the anther; the inner, antesepalous stamens with a shorter filament and a smaller, ellipsoidal, appendage level with the outer anthers. *Anthers* versatile, subglobular (somewhat dorsiventally compressed), uniplanar, trisporangiate, unilocular, with one microsporangium above and two below, introrse, dehiscing by a central pore. *Ovary* inferior, the wall consisting of a thin, fibrous, glandular, outer layer, a broad ± aerenchymatous middle zone and a fragile, membranous inner layer; locule 1, small, in the upper half or third. *Placenta* lateral within the ovary, attached to the stylar vein which passes just inside the outer layer on the posterior side. *Ovules* 2, ellipsoidal, collaterally attached above the middle. Aerenchyma and membrane breaking down, presumably after fertilization, their place apparently eventually becoming occupied by the single seed. *Seed* not seen mature.

Within the Chamelaucieae, which are distinguished by a unilocular ovary with a single placenta and indehiscent, dry fruit with 1–2 seeds (Bentham 1867), *Corynanthera* falls into a small group of genera containing *Thryptomene* and *Micromyrtus*, most species of which have 5 or 10 free stamens, regularly opposite sepals or petals, without staminodia. *Corynanthera*, while sharing these characteristics with *Thryptomene* and *Micromyrtus*, is distinguished from both genera by its trisporangiate, unilocular anthers, the associated, dimorphic appendages and the spike-like inflorescence of closely-appressed, yellow flowers.



Figures 1–17. *Corynanthera flava*. 1, Habit, upper half of one branch; 2–3 Leaf, lower view and T.S.; 4–5, Inflorescence; 6, Flower, lateral view showing compressed floral tube; 7–8, sepals; 9, Petal; 10, Androecium, showing dimorphic stamens *in situ*; 11–14, Stamens, 11 & 13 antesepalous, 12 & 14 antepetalous; 15, Gland showing irregular fringe with outer layer of oil-secreting cells (o); 16, Ovary showing stylar vein (s), inner wall layer (i) and middle layer (m); 17, Developing seed (1–10, 16–17 from *A. Chapman*, 18 miles W of Winchester; 11–15 fresh material from the same area).



Figures 18–26. *Corynanthera flava.* 18, T.S. Inflorescence, showing central axis, antepetalous anthers (p) (upper), antesepalous anthers (s) (lower), floral tube at two levels of ovules (ov) (left and right); 19, Flower, L.S. showing antepetalous stamen (left), antesepalous stamen (right) and developing seed; 20, Antepetalous anther and gland, L.S. showing stomium (st) after dehiscence; 21–25, Anther—21, tangential L.S. showing three microsporangia—22, T.S. upper sporangium—23, T.S. above stomium showing three sporangia—24, T.S. below stomium showing two sporangia—25, T.S. showing fibrous-banded endothecium (et), junction of two sporangia and pollen grains; 26, Floral tube and bracteoles, T.S. showing ovary, including ovules (ov), inner wall layer (i) and middle layer (m) (all from *Green* 4917).

Corynanthera flava J. W. Green sp. nov.—Figures 1–27.

Frutex gracilis, erectus, 30–175 cm altus. *Folia* angustoelliptica, 1·5–4 mm longa. *Inflorescentia* 2–7 cm longa. *Bracteolae* persistentes. *Flores* sessiles, 2·5–3 mm longi. *Tubum florale* leviter costatum. *Sepala* semicircularia inaequalia, 0·25–0·5 mm longa, 1 mm lata. *Petala* late-elliptica, 1·5 mm longa, flava. *Stamina* exteriora ± 1 mm longa, stipite 0·3 mm longo in glande irregulariter globulosa terminanti; interiora breviora glande parviore ellipsoidea. *Stylus* 0·5 mm longus.

Type: 34.6 km W of Winchester, Western Australia, *J. W. Green* 4918, 6 Dec. 1978 (holo: PERTH; iso: CANB, K, PERTH).

Slender, erect *shrub*, few-stemmed near the base, spreading above, 30–175 cm high, leaves usually confined to the upper branches, the branch endings sometimes decurved. *Leaves* sessile, narrow-elliptic, concave above, convex

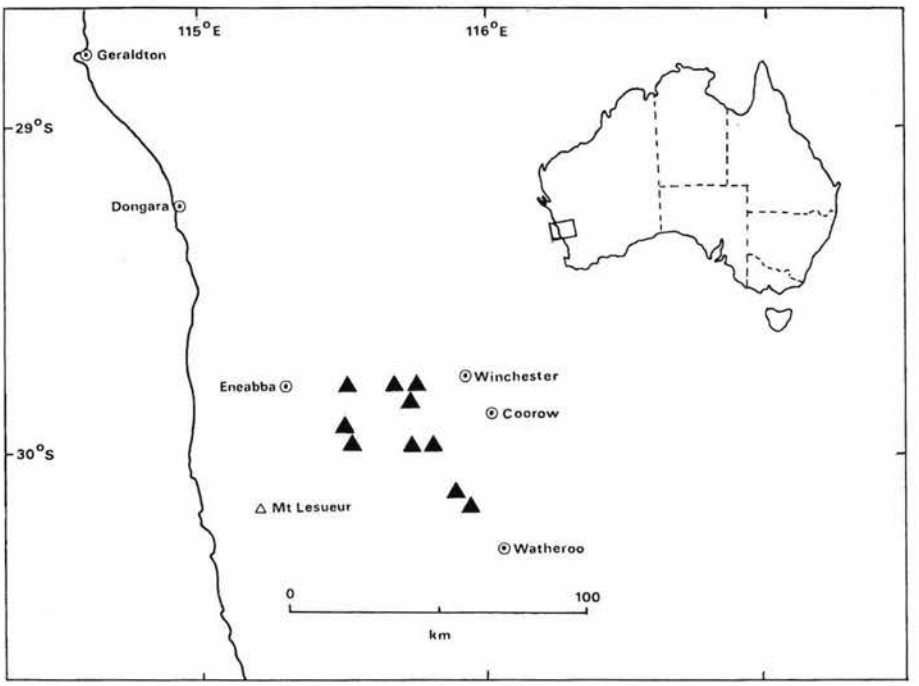


Figure 27. Distribution of *Corynanthera flava*.

or ± keeled below, 1.5–4 mm long, usually appressed, imbricate on the younger branches, margins minutely ciliolate or sometimes entire, oil-glands several to many, large and prominent. *Inflorescence* 2–7 cm long. *Bracteoles* conduplicate, keeled, as long as the floral tube at maturity, yellowish and petaloid except for the broad, scarious, ciliate margins. *Flowers* sessile, 2.5–3 mm long. *Floral tube* narrowly triangular in anterior view, with five faint, longitudinal ribs opposite the sepals, the surface somewhat rough from the presence of numerous small, pale yellow oil glands. Anterior *sepals* erect, semicircular, 0.5 mm long and 1 mm broad, yellowish-petaloid to scarious near the ciliolate to faintly denticulate margins; posterior sepal somewhat spreading, about half as long as the anterior; lateral sepals erect, intermediate in length. *Petals* broadly elliptic, 1.5 mm long, lamina yellow, slightly hooded, claw brown. Outer (antepetalous) *stamens* 0.8–1 mm long; inner (antesepalous) stamens about 2/3 as long. *Filaments* broadly compressed-terete,

yellow. *Anthers* reddish-purple, 0.3 mm diameter. Filamentous continuation of the filament 0.3 mm long, curved over the anther, yellow. *Style* 0.5 mm long, the stigma at maturity level with the inner anthers.

Selected specimens (all PERTH): 35 miles (56 km) W of Winchester, *C. Chapman*, 14 Nov. 1975; 25 km W of Winchester, *J. W. Green* 4917, 6 Dec. 1978; 30 km WSW of Winchester, *J. W. Green* 4920, 6 Dec. 1978; 43 km SW of Winchester, *J. W. Green* 4919, 6 Dec. 1978; 39 miles (62 km) W of Coorow, *C. Chapman*, 15 Jan. 1967; Within 24 miles (38 km) W of Coorow, *C. Chapman*, 4 Jan. 1976; N end of Watheroo National Park, *J. S. Beard* 7880, 18 Sept. 1976; E boundary of Watheroo National Park, *R. D. Royce* 9721, 7 Oct. 1971.

Conservation Status: Density ranges from sparse to locally abundant. Populations occur in three National Parks. Because of the very small area of occurrence, however, and because the species has already proved attractive to the cut flower trade, it should be protected from commercial exploitation in the wild. Efforts are being made to bring it into cultivation.

Distribution: an elliptical area some 70 km long, extending from Tathra National Park to Watheroo National Park, about 200 km north of Perth, Western Australia (Figure 27).

Habitat: heaths and shrublands where it is frequently associated with *Xylomelum angustifolium*, *Eucalyptus todtiana* and *Eucalyptus eudesmoides* on pale, grey-brown, somewhat loamy sands over laterite. Annotated voucher specimens of the associated species are deposited in the Western Australian Herbarium (PERTH).

Flowering period: September to February.

Discussion

The anther of *Corynanthera* may be described, using the terminology of Green (1980), as trisporangiate and unilocular (Figures 20–25). This is in sharp contrast with the remainder of the Myrtaceae which are only known to have tetrasporangiate anthers (Davis 1966), apparently always bilocular. The sporangia are uniplanar, as described by Prakash (1969) in *Darwinia micropetala*.

Two of the above characteristics of *Corynanthera* appear to be unique in the angiosperms. No record has been found in the literature of a trisporangiate anther. Eames (1961, p.114) noted that anthers with more than four sporangia were uncommon or rare, except in forked or branched stamens, and that the larger number was nearly always eight, even this sometimes resulting from connation. He regarded a smaller number, "nearly always two", as representing a reduction from the basic four, giving several examples of bisporangiate families and genera. The only example given of any other reduced number was *Arceuthobium* (Viscaceae) which has a single sporangium "with some trace of a second". It seems reasonable to speculate that the apparently trisporangiate anther of *Corynanthera* may be tetrasporangiate in origin, the appendage having arisen from a fourth, sterile sporangium.

Another apparently unique feature of *Corynanthera* is the single, porate, posterior stomium (Figures 8–9, 11–12, 20), through which pass the contents of the three microsporangia (Figure 21) at anthesis. Thus the remaining vestiges of three microsporangial compartments are here interpreted as comprising a single loculus (Green 1980). Further embryological study may reveal the pore to be morphologically terminal, which would be unusual in the angiosperms but not unique.

Also of considerable interest is the stipitate appendage which arises as a continuation of the filament beyond the point of attachment of the anther (Figures 11–15, 19–20). Appendages of the connective (a term somewhat difficult to apply to the unusual structure of *Corynanthera*) occur sporadically through the angiosperms (Kerner & Oliver 1902), a fringed structure having been found, for example, in a single species of *Conostylis* (Haemodoraceae), *C. aurea* (Green 1961). In many cases such appendages have been interpreted as staminal nectaries (Fahn 1952, 1974) but the structure in *Corynanthera*, at least in the antepetalous stamens, appears to be an oil gland, judging by immiscible droplets which were extruded by gently squashing an aqueous, microscopic whole mount (Figure 15). While many members of the Myrtaceae possess an enlarged gland on the connective, only in *Verticordia* is this greatly enlarged into what might be termed an appendage; according to Bentham (1867), seven species have variously thickened, often concave appendages. The most extreme is probably *V. grandiflora*, in which the "two long horn-like points" project well above the anther in a manner somewhat reminiscent of *Corynanthera*.

The dimorphic nature of the stipitate appendage of *Corynanthera* is also noteworthy, the appendage of the antepetalous, larger stamens being irregularly globular and that of the antesepalous, smaller stamens much smaller, ellipsoidal and discrete in shape, lacking the ragged irregular fringe of the others (Figures 11–14). This characteristic appears to have no parallel, especially as the antesepalous stamens appear equally fertile and are in no sense like staminodia.

The ovary of *Corynanthera* closely resembles that of a group of species of *Micromyrtus* having 10 stamens and two ovules, suggesting a very close relationship. Upon dissection, the ovules may sometimes be found enclosed within a fragile membrane which is here interpreted as the innermost layer of the ovary wall (Figures 16, 26). Outside this membrane (when present) occurs a broad layer of aerenchyma consisting of a convoluted network of narrow, thin-walled, parenchymatous cells with large intercellular spaces (Figures 16, 26). This middle zone has scarcely been mentioned in taxonomic descriptions, possibly because of its fragile nature and eventual disappearance in many specimens. An apparently identical structure has been described and illustrated in *Thryptomene elliottii* by Black (1952, Figure 859–16). Alternatively, this layer may be what Esau (1965) calls *stigmatoid tissue* (also known as conducting tissue) which facilitates the progress of the pollen tube through the ovary. This explanation, however, would negate the present interpretation of the aerenchyma as being outside the ovary loculus.

The hard, outer wall of the floral tube doubtless consists of the outer carpellary layer and the tube formed from either the fused calyx and corolla or an upgrowth of the receptacle but developmental studies in other genera have not provided the means of identifying the separate contributions made by each of these tissues. Pending an elucidation of this matter it is probably best to use a neutral term when describing the combined structure.

At odds with the above interpretation of the ovary is the concept of a "filiform placenta extending from the base to the top of the cavity" in *Micromyrtus* (Bentham 1867), which appears to have arisen from his examination of flowers in which the aerenchymatous layer has broken down. This "filiform placenta" is probably the fused ventral bundles of a single carpel, contributing to the vasculature of both the ovary and the style (Figures 16–17), the placenta being very short, within the innermost ovary wall layer. In describing *Thryptomene*, Bentham (1967) referred to "the cavity usually small near the top of the calyx-tube" (consistent with my interpretation of *Corynanthera* and related species of *Micromyrtus*) but then went on to say "or rarely the cavity occupies the greater part of the tube", a situation which can

certainly be found in some flowers, including those of *Corynanthera*, (Figure 17), but seems more plausibly explained as a post-fertilization stage of floral development resulting from partial breakdown of the ovary wall.

Evidence that the spongy aerenchyma may sometimes persist in older flowers or fruits is contained in the original description of *Micromyrtus sulphurea*, in which Fitzgerald (1904) noted "fruiting calyx somewhat spongy within."

Acknowledgments

I am indebted to my colleagues for helpful discussion and to Mr. C. Chapman of Winchester, W.A. for collecting specimens and assisting me to locate occurrences in the field. Mr. P. G. Wilson read the manuscript and Mr. A. S. George provided the Latin diagnoses. Mrs. J. W. Lee-Frampton is thanked for technical assistance.

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Hakea aculeata (Proteaceae), a rare and endangered new species from Western Australia

By A. S. George

Abstract

Hakea aculeata sp. nov. is known from one small population on a road verge in the central agricultural region of South-Western Australia. The species is considered in danger of extinction (IUCN category E). It is closely related to *H. ruscifolia* Labill. but the affinities of the two species to the remainder of the genus are not clear.

On 5 October, 1977 I accompanied Dr. G. Benl (Botanishes Staatssammlung, München), Dr. J. H. Willis (formerly of the National Herbarium of Victoria) and Mr. P. G. Wilson (Western Australian Herbarium), to the Cunderdin area about 160 km east of Perth. Our objective was to rediscover if possible *Ptilotus pyramidatus* (Moq.) F. Muell., last collected by W. V. Fitzgerald 70 years ago. The search was unsuccessful, but on the return journey we collected a new species of *Hakea* growing on a narrow road verge south west of Cunderdin (Figure 1). Examination of specimens in the Western Australian Herbarium of *Hakea ruscifolia* Labill. (its closest relative) revealed an earlier collection made near Hines Hill in 1929 by W. E. Blackall. This locality is 80 km east of Cunderdin, and is similarly mostly cleared for agriculture, natural vegetation surviving only on road verges, small portions of farms and a few reserves whose purposes include cemetery, water, and conservation of flora and fauna. The new *Hakea* has not been seen in the Hines Hill area in recent years, though no exhaustive search has been made.

The new population of *Hakea* contains about six plants, which appear to be lignotuberous and therefore probably able to survive fire. However they are surrounded by a dense assemblage of exotic weeds which might prevent the establishment of seedlings. Seed set was found to be low, many follicles having been attacked by insects and their seed destroyed. If the existing plants were to die the species might then become extinct in the wild. Thus its status according to "The IUCN Plant Red Data Book" (Lucas and Synge 1978) is *Endangered.*

The new find illustrates how opportunistic discoveries may be made in a region where the flora is incompletely known. It highlights the localised occurrence typical of many Western Australian species and their vulnerability. As the new species is floriferous and colourful (although discouragingly prickly) it would undoubtedly have been collected more often had it been common. It appears likely that this is the sole surviving population of a rare species. Examples of other species known only from road verges are *Acacia depressa* Maslin (1 locality) and *Grevillea scapigera* George (4 localities).

Hakea aculeata A. S. George sp. nov.

Hakea ruscifolia Labill. affinis, a qua foliis majoribus 2–4 cm longis; floribus aureis rubrisque; stylis longioribus 7–8 mm longis; pollinophoro laterale orbiculare; folliculis majoribus 15–18 mm longis, 14–15 mm latis, differt.

Type: SSW of Cunderdin, in 31°45′S, 117°10′E, 5 October, 1977, *A. S. George* 14960. Holo: PERTH; iso: CANB, NSW, PERTH.

A *shrub* to 3 m with lignotuber and with several erect or ascending stems. *Branchlets* numerous, spreading, mostly 1–5 cm long, often themselves branched, giving stems and main branches a dense columnar aspect, densely pubescent with short erect hairs and loosely hirsute with long hairs, the indumentum at length wearing off. *Leaves* scattered but more crowded towards apices of branchlets, lanceolate, oblanceolate or narrowly elliptic, 2–4 cm long, 3–8 mm

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Figure 1. *Hakea aculeata* sp. nov. at the type locality near Cunderdin.

wide; apex narrowed into a subulate, pungent, brown mucro; base narrowed into a petiole up to 4 mm long, or the leaves of main branches often sessile; lamina flat to slightly concave, thick, 1-nerved, on both sides pubescent and hirsute becoming scabrous; margins thickened. *Flowers* in short racemes terminal and sessile on branchlets, often several together; in bud enclosed with imbricate, elliptic-ovate, concave scarious bracts 3–5 mm long, densely pubescent outside, glabrous inside, deciduous by anthesis. *Rachis* 1–3 mm long, densely pubescent, bearing 15–22 flowers. *Pedicels* slender, glabrous, 7–13 mm long; torus oblique. *Perianth* yellow, slender, sharply curved adaxially under limb; upper (adaxial) segments ± 3·5 mm long from base to bend, lower ± 4·5 mm long; glabrous outside, finely scurfy inside; margins thickened and flange-like inside; limb ovate, obtuse, 0·7–0·8 mm long, glabrous. *Anthers* sessile, 0·5 mm long. *Style* slender, recurved below apex, 7–8 mm long to bend with 3 mm recurved, glabrous, yellow in lower half, red above; pollen presenter lateral, orbicular with a central obtuse umbo, yellow; hypogynous gland 0·4 mm high, extending 3/4 way around stipe; ovary shortly stipitate, glabrous, red. Follicle ± ovoid, obtuse, 15–18 mm long, 14–15 mm wide, on a short thick stipe, smooth, pale brown; lips less than 1 mm wide. *Seed* elliptic-orbicular, black, wing continuous, seed body slightly offset, convex and rugose on outer face.

Other collection Near Hines Hill, Sept. 1929, *W. E. Blackall* s.n. (PERTH).

Distribution The species has been collected from only two localities in the central wheatbelt, between 31°32′S and 31°45′S, 117°10′E and 118°01′E.

Habitat At the type locality the plants are growing in sandy loam. Vegetation on the opposite road verge is tall shrubland.

Derivation of the name From the Latin *aculeatus*, aculeate or sharp, in reference to the pungent leaf apices.

Hakea aculeata is closely related to *H. ruscifolia* Labill., having a similar habit, branching system, leaf form, inflorescence, perianth, fruit and indumentum. The dense branching system is characteristic of both species and is similar to that found in many species of *Dryandra*. The terminal inflorescence and the indumentum of spreading hairs are unusual in *Hakea*. *H. aculeata* can be distinguished from *H. ruscifolia* by the generally larger leaves (mostly 1–2·5 cm long in *ruscifolia*); the longer style (6–7 mm long in *ruscifolia*); the lateral pollen presenter (erect or almost so in *ruscifolia*); the larger fruit (7–9 mm wide in *ruscifolia*); and the elliptic seeds (narrow-elliptic with asymmetric wing in *ruscifolia*). Furthermore the new species flowers in September-October whereas *H. ruscifolia* flowers in summer (December to March). In both species the flowers produce a strong, honey-like scent.

In *Hakea*, as in *Grevillea*, the form of the pollen presenter is used together with features of the inflorescence, perianth, leaves and fruit to distinguish sections within the genus. Yet here we have two closely related species, one with the pollen presenter erect, the other lateral. Their affinities in the genus are not clear. Bentham (1870) and Gardner (1930) placed *H. ruscifolia* in Section Hakea (as Euhakea), though with its almost erect pollen presenter it is probably better placed in Conogynoides. On the basis of its lateral pollen presenter, *H. aculeata* belongs to Section Hakea. In neither Section, however, are there any species which appear close relatives of these two. It is likely that in a revision of the genus they will be placed in a Section of their own.

References

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Note Added in proof

A further population of *Hakea aculeata* was discovered in August 1979 by B. and M. Smith. The locality is south-east of Cunderdin, within the known range of the species as cited above. It, too, is on a road verge, although better vegetated than the type locality. The population contains 40–50 plants, but the species must still be considered rare and endangered.

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