

Six new species of *Eucalyptus* from Western Australia

By M. I. H. Brooker*

Abstract

Six new Western Australian eucalypts are described—*E. aquilina* and *E. ligulata* from near Mt. Le Grand, *E. insularis* from North Twin Peak Island (Recherche Archipelago) and from near Mt. Le Grand, *E. calcicola* from near Boranup, *E. brevistylis* from north east of Walpole, and *E. exilis* from Boyagin Rock Reserve, the Mundaring Weir catchment and the Wickiepin Reserve. All belong to the sub-genus "*Monocalyptus*".

***Eucalyptus aquilina* M. I. H. Brooker sp. nov.** (Figures 1, 2) Pryor and Johnson code MABCC.

Frutex "mallee" 2–5 m altus. caulibus exilibus, laevibus, eburneis vel canis. *Ramuli* juvenes quadrangulares in sectione transversali. *Glandulae oleosae* in cortice. *Lignotuber* nullum visum.

Cotyledones reniformes, 0·8–1·5 x 1·2–2 cm, ad basin triplinerves, supra virides, infra purpureae. *Folia plantulae* sessilia, decussata, elliptica, 1·5–8 x 1–5 cm, discoloria, marginibus undulatis et glandiferis. *Axis* plantulae verrucosus, glandulosus. *Folia adulta* petiolata, in gemma decussata, demum ab intranodiis separata, lanceolata vel falcata, 8–13 x 1·5–2·5 cm, in acumen longum rectum angustata, viridia, concoloria, leviter nitida, dense reticulata, nervis irregulariter incrassatis. *Glandulae oleosae* parvulae, sparsae, discretiae. *Petioli* complanati, glandiferi, 1–2 (2·5) cm longi.

Inflorescentiae axillares, 3-florae. *Pedunculi* 2–3 x 0·7–1 cm, complanati, erecti alabastra immatura ferentes, recurvi flores et fructus ferentes. *Alabastra* sessilia, turbinata, 2·5–3·5 x 2–3·5 cm. *Operculum* hypanthium aequans vel quam eo brevius, late conicum, apiculatum, crassum. *Stamina* omnia fertilia. *Filamenta* in alabastro fere horizontalia, partim inflexa, valde glandifera. *Antherae* stylum cingentes, oblongae, dorsifixae, versatiles, ab rimis longitudinalibus dehiscentes, glandula antherae a tergo manifesta. *Stylus* gradatim angustatus. *Stigma* inconspicuum. *Ovarium* 5–7 loculare. *Ovula* verticaliter 2-seriata.

Fructus sessilis, obconicus, 2–2·5 x 3·5–5 cm, laevis vel parum costatus vel angulatus. *Annulus operculi* latus, concavus. *Discus* latus, rugosus, porphyreus, nitens, super valvas in lobos uncatos 5–18 mm elevatos extensus. *Valvae* 5–7, pro parte maxima ab lobis disci tectae, apicibus liberis sursum versis.

Semen pyramidale, nigrum, 2–3 x 2 mm, rotundatum, latere dorsali lacunoso, ventrali cum porcis aliquot ad hilum adscendentibus. *Ovulodia* oblonga, fulva vel porphyrea.

Type: near Mt Le Grand, Western Australia (33°59'S, 122°08'E) 22 April 1972, M. I. H. Brooker 3622 (holo: FRI; iso: PERTH, K, NSW, AD, MEL, GAUBA).

A mallee 2–5 m tall with slender, creamy-white or grey, smooth stems. *Young branchlets* flattened. *Bark* glandular. *Lignotuber* not seen.

Cotyledons reniform, 0·8–1·5 x 1·2–2 cm, triplinerved at the base, green above, purple below. *Seedling leaves* sessile, decussate, elliptical, 1·5–8 x 1–5 cm, discolorous, edges undulate and glandular. *Seedling axis* verrucose, glandular. *Adult leaves* petiolate, decussate in bud, separated on the mature axis by intranodes, lanceolate or falcate, 8–13 x 1·5–2·5 cm, narrowing to a long straight point, green, concolorous, slightly glossy. *Reticulations* dense, irregularly thickened. *Oil glands* small, sparse, discrete. *Petiole* flattened, glandular, 1–2 (2·5) cm long.

Inflorescences axillary, of 3 buds. *Peduncles* 2–3 x 0·7–1 cm, flattened, erect with immature buds, recurved with flowers and fruit. *Buds* sessile, turbinata, 2·5–3·5 x 2–3·5 cm. *Operculum* equal to or shorter than hypanthium,

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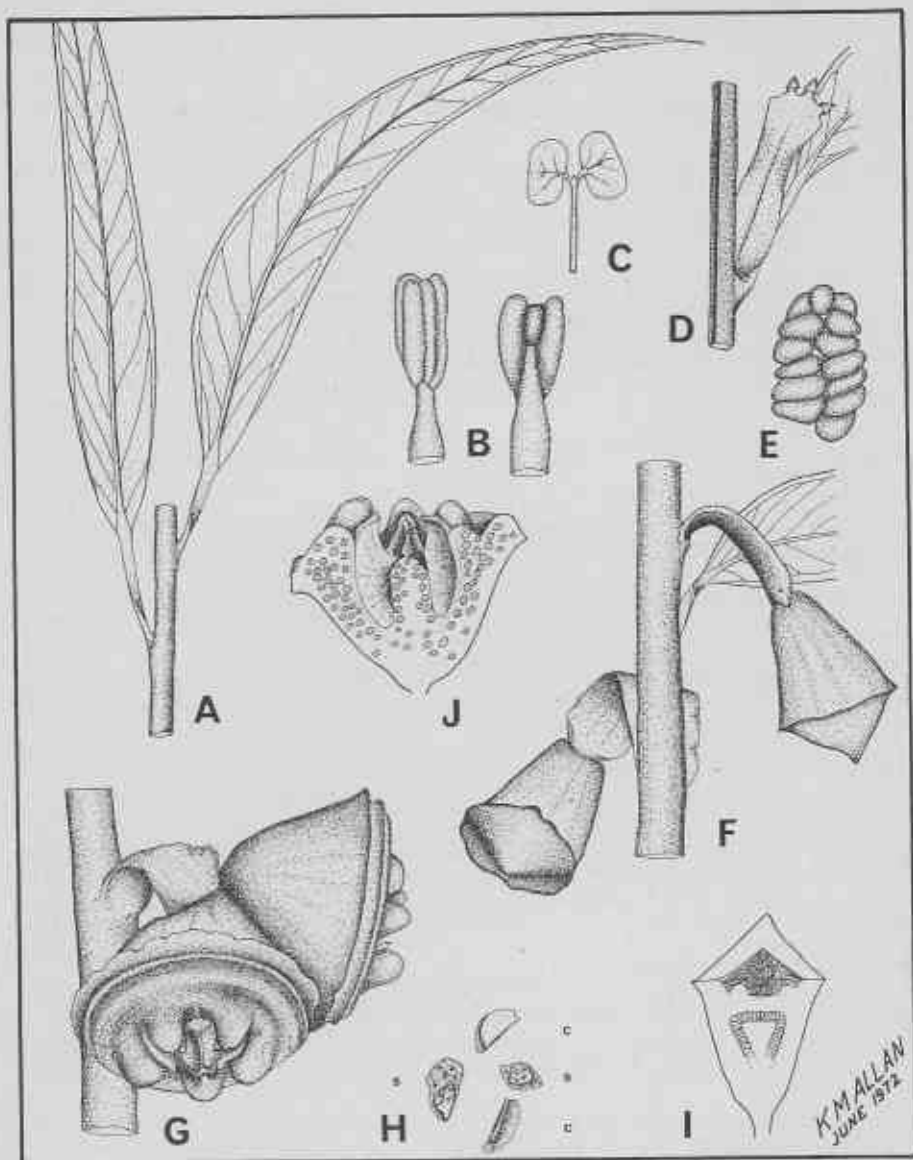


Figure 1—*Eucalyptus aquilina* sp. nov. A—Leaves, x 1. B—Anthers, x 8. C—Cotyledons, x 0.75. D—Young buds, x 1. E—Ovules, x 5. F—Buds, x 1. G—Fruit, x 1.25. H—Seed, x 5. I—Bud section, x 1. J—Fruit section, x 1.25.

broadly conical, apiculate, thick. *Stamens* all fertile. *Filaments* almost horizontal in bud, partially inflected, strongly glandular. *Anthers* surrounding the style, oblong, dorsifixed, versatile, opening by longitudinal slits; gland visible from the back. *Style* tapering. *Stigma* inconspicuous. *Locules* 5–7. *Ovules* in 2 vertical rows.

Fruit sessile, obconical 2.2–5 x 3.5–5 cm, smooth or faintly ribbed or angled. *Operculum* scar broad, concave. *Disc* broad, rugose, red-brown, shining, extending over the valves as hooked lobes raised 5–18 mm. *Valves* 5–7, mostly obscured by lobes of disc, free tips upturned.

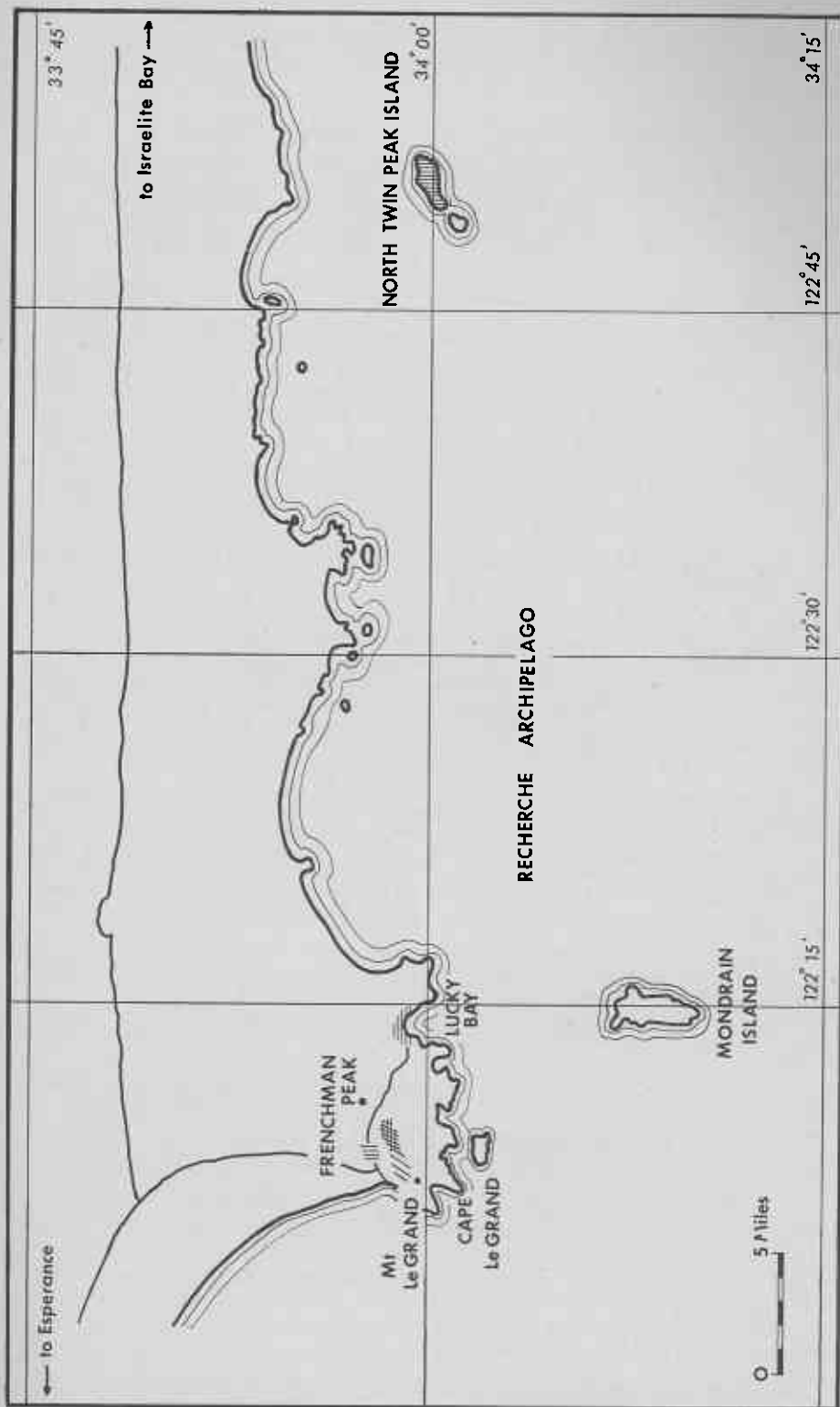


Figure 2—Distribution of *Eucalyptus aquilina* sp. nov. (oblique hatching); *E. ligulata* sp. nov. (horizontal hatching); and *E. insularis* sp. nov. (vertical hatching).

Seed pyramidal, black, 2-3 x 2 mm; rounded, lacunose on dorsal side with ribs ascending to the hilum on the ventral side. Chaff elongate, yellow brown or red brown.

Distribution: Western Australia, among hills near Mt Le Grand.

Other collections: various localities near Mt Le Grand and between Mt Le Grand and Frenchmans Peak, Western Australia: 7 Oct. 1966, P. G. Wilson 5570 (PERTH); 16 Aug. 1971, A. S. Weston 6748 (PERTH); 5 Nov. 1971, A. S. Weston 7017 (PERTH, FRI, NSW, AD, MEL); 13 Nov. 1971, A. S. Weston 7239 (PERTH); 15 Mar. 1972, K. M. Allan 821 (PERTH, FRI, NSW, AD, MEL) and 22 April 1972, M. I. H. Brooker 3611 (FRI, PERTH, GAUBA, BRI, NSW).

Flowering period: May-October.

The specific epithet alludes to the hooked lobes of the disc.

Eucalyptus aquilina is a species with affinity to *E. coronata* C. A. Gardn. but differing in the larger buds and fruit, the practically unribbed hypanthia, the unbeaked, unribbed conical opercula and the larger, more conspicuously lobed discs. It grows in shallow soil amongst gneissic rocks on creeksides. The type comes from the steep bank of a creek flowing north from a saddle on the west side of Mt Le Grand. Associated eucalypts are *E. doratoxylon* F. Muell., *E. affin. goniantha* Turcz. and *E. ligulata* M. I. H. Brooker sp. nov.

***Eucalyptus ligulata* M. I. H. Brooker sp. nov.** (Figures 2, 3) Pryor and Johnson code MABEL.

Frutex "mallee" 2-3 m altus. *Cortex* canis vel cinereus, laevis, glandifer. *Ramuli* juvenes quadrangulares vel complanati in sectione transversali. *Lignotuberum* formans.

Cotyledones reniformes, 7-10 x 10-15 mm, ad basin triplinerves, supra virides, infra purpureae. *Folia plantulae* sessilia, decussata, amplexicaulia, elliptica vel ovata, 1.5-10 x 1-4.5 cm, viridia, leviter discoloria. *Folia adulta* petiolata, in gemma decussata, demum ab intranodiis separata, lanceolata, erecta, aliquot uncinata, 5-10 x 0.8-2.5 cm, viridia, concoloria, moderate dense reticulata. *Glandulae oleosae* ambitu irregulares, in dimensione variables, aliquot per areolam. *Petioles* valde complanati, aliquot torti, 8-20 mm longi.

Inflorescentiae axillares 7-11 (14) florum, profusae, multae in axillis inferioribus aphyllis. *Pedunculi* 7-25 mm longi, complanati. *Alabastra* clavata, 9-15 x 4-6 mm, costata vel striata, in pedicellis 4-10 mm longis angustata. *Operculum* hypanthio longius et latius, interdum rostratum, stramineum vel brunneum tempore exutum. *Stamina* omnia fertilia. *Filamenta* exteriora erecta, interiora radiale inflexa. *Antherae* stylum cingentes, oblongoreniformes, dorsifixae, versatiles, ab rimis longitudinalibus vel semi-obliquis dehiscentes, glandula terminali magna. *Stylus* gradatim angustatus. *Stigma* inconspicuum. *Ovarium* 3-loculare. *Ovula* verticaliter 2-seriata.

Fructus pedicellatus, globularis vel ovoide-truncatus, 8-15 x 9-14 mm, rugosus, leviter costatus. *Cicatrix operculi* angustata. *Discus* prominens, porphyreus, variabilis, declivis vel leviter convexus. *Valvae* 3, depressae, obscurae.

Semen pyramidale, nigrum, 3 x 2 mm, rotundatum, latere dorsali striato et lacunoso, ventrali cum porcis aliquot ad hilum adscendentibus. *Ovulodia* breviora, flavi-brunnea et porphyrea.

Type: About 1½ miles east of the beach near Cape Le Grand, Western Australia (33°58'S, 122°90'E) 15 Mar. 1972, K. M. Allan 820 (holo: PERTH; iso: FRI, K, NSW).

A mallee 2-3 m tall. *Branchlets* quadrangular in cross section or flattened. *Bark* grey to light grey, smooth, glandular. Capable of forming lignotubers.

Cotyledons reniform, 7-10 x 10-15 mm, triplinerved at the base, green above, purple below. *Seedling leaves* sessile, decussate, amplexicaul, elliptical to ovate, 1.5-10 x 1-4.5 cm, green, slightly discolorous. *Adult leaves* petiolate, decussate in bud finally separated by intranodes, lanceolate, erect, some uncinata, 5-10 x 0.8-2.5 cm, green, concolorous, moderately densely reticulate. *Oil glands* irregular in outline, variable in size, several per areole. *Petioles* strongly flattened, some twisted, 8-20 mm long.

Inflorescences prolific, axillary, of 7-11 (14) buds, many in lower leafless axils. *Peduncles* 7-25 mm long, flattened. *Buds* clavate, 9-15 x 4-6 mm, ribbed

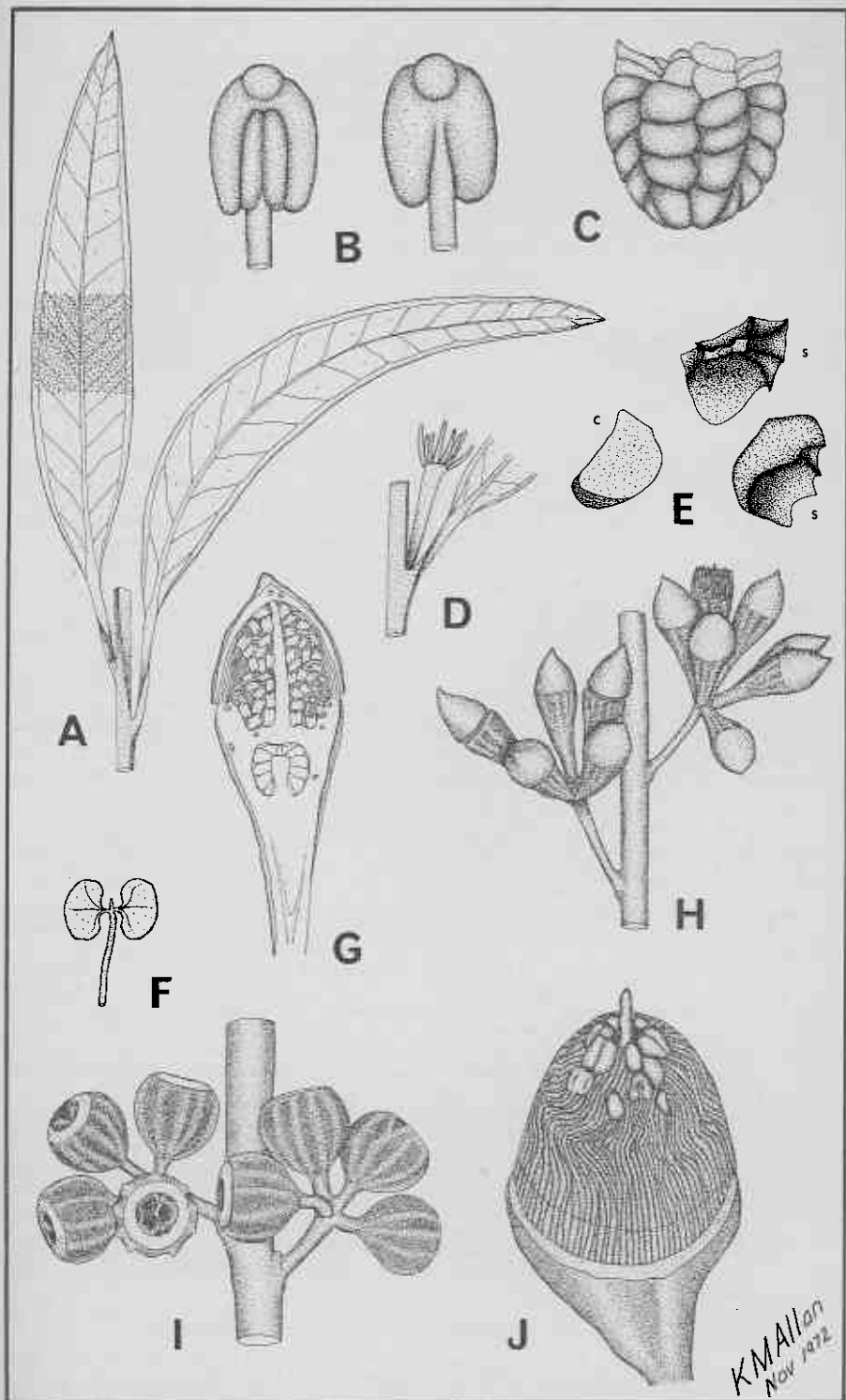


Figure 3—*Eucalyptus ligulata* sp. nov. A—Leaves, x 1. B—Anthers, x 25. C—Ovules, x 8. D—Young buds, x 1. E—Seed, x 5. F—Cotyledons, x 0.75. G—Bud section, x 2.5. H—Buds, x 1. I—Fruit, x 1. J—Bud with operculum removed, x 6.

or striate, tapering into the pedicel 4–10 mm long. *Operculum* longer and wider than hypanthium, sometimes beaked, yellow or brown when shed. *Stamens* all fertile. Outer *filaments* erect, inner ones inflected radially. *Anthers* surrounding the style, oblong-reniform, dorsifixed, versatile, opening by semi-oblique or longitudinal nonconfluent slits; gland large, terminal. *Style* simple, stigma inconspicuous. *Locules* 3. *Ovules* in 2 vertical rows.

Fruit pedicellate, globular or ovoid-truncate, 8–15 x 9–14 mm, wrinkled and shallowly ribbed. *Operculum* scar narrow. *Disc* conspicuous, red-brown, variable, inward sloping to slightly convex. *Valves* 3, sunken, obscure.

Seed pyramidal, black, 3 x 2 mm, rounded, striate and lacunose on dorsal side, with ribs ascending to the hilum on the ventral side. *Chaff* smaller, yellow-brown and red-brown.

Distribution: Western Australia, near Mt Le Grand, Lucky Bay, and Hauloff Rock.

Other collections: same locality as type: 16 Aug. 1971, A. S. Weston 6747 (PERTH); 16 Aug. 1971, A. S. Weston 6750, 6751 (PERTH); 5 Nov. 1971, A. S. Weston 7030 (PERTH, FRI, NSW); 15 Mar. 1972, K. M. Allan 822 (PERTH, FRI, AD); 22 April 1972, M. I. H. Brooker 3609, 3610, 3616 (FRI, PERTH, K, MEL, GAUBA, NSW); Lucky Bay, Western Australia (33°49'S, 122°13'E) 14 Aug. 1971, A. S. Weston 6637 (PERTH); 3 miles north-west of Hauloff Rock (ca. 50 miles north-east of Albany), 29 Jan. 1973, K. Newbey (PERTH, FRI).

Flowering period: March–June.

The specific name alludes to the marked flattening of the petioles and peduncles.

Eucalyptus ligulata grows in close association with *E. aquilina* M. I. H. Brooker sp. nov. and *E. affinis goniantha* Turcz. and has only been found in the localities cited above. It is allied to *E. calcicola* M. I. H. Brooker sp. nov. The natural affinity of these two species is not clear but they could be placed with *E. acies* M. I. H. Brooker.

Eucalyptus calcicola M. I. H. Brooker sp. nov. (Figures 4, 5). Pryor and Johnson code MABEN.

Frutex "mallee" usque ad 2.5 m altus. *Ramuli* juvenes complanati vel quadrangulares in sectione transversali. *Cortex* cinereus vel viridi-cinereus, laevis, glandifer. *Lignotuberum* formans.

Cotyledones reniformes, ca. 10 x 15 mm, triplinerves, supra virides, infra purpureae. *Folia plantulae* sessilia, decussata, ovata, 2–8 x 1–6 cm, tenuia, viridia, vivida nitentia discoloria. *Folia juvenilia* sessilia, decussata, amplexicaulia, ovata, cuspidata, 5–9 x 3–7 cm, viridia vivida nitentia, leviter discoloria. *Folia adulta* petiolata, in gemma decussata, demum ab intranodiis separata, lanceolata vel falcata, 5.5–10.5 x 1–3 cm, viridia, concoloria, moderate dense reticulata. *Glandulae oleosae* numerosae, ambitu irregularissimae, aliquot per areolam. *Petioli* complanati, aliquot torti, 1–2 cm longi.

Inflorescentiae axillares, 7-florae. *Involutrum* 6-bracteatum. *Pedunculi* complanati, 1–2 cm longi. *Alabastra* turbinata, 10–15 x 6–10 mm, costata. *Pedicelli* 3–5 mm longi. *Operculum* rostellatum vel conicum, 5–8 mm longum, crassum. *Stamina* omnia fertilia. *Filamenta* in gemma exteriora erecta, aliquantum tangentialia flexa, interiora radiale inflexa. *Antherae* stylum cingentes, oblongae, dorsifixae, versatiles, ab rimis longitudinalibus nonconfluentibus dehiscentes. *Stylus* gradatim angustatus, sculptus. *Stigma* inconspicuum. *Ovarium* 4-loculare. *Ovula* verticaliter 2-seriata.

Fructus breviter pedicellatus, globulari-truncatus, 10–15 x 12–16 mm, costis 1–2 mm altis. *Discus* prominens, annularis, primum obliquus, demum elevatus et planus, 2 mm latus. *Valvae*, 4, depressae.

Semen pyramidale, nigrum, 2–4 x 1–2 mm, latere dorsali rotundato et striato, ventrali cum costis aliquot ad hilum adscendentibus. *Ovulodia* breviora, flavi-brunnea.

Type: Near Cape Freycinet, Western Australia (34°07'S, 115°00'E) 18 June 1971, K. M. Allan 634 (holo: PERTH; iso: FRI, K, NSW, AD, GAUBA, MEL, HO, BRI).

A mallee to 2.5 m tall. Young *branchlets* flattened or quadrangular in cross section. *Bark* light-grey or greenish-grey, smooth, glandular. Capable of forming lignotubers.

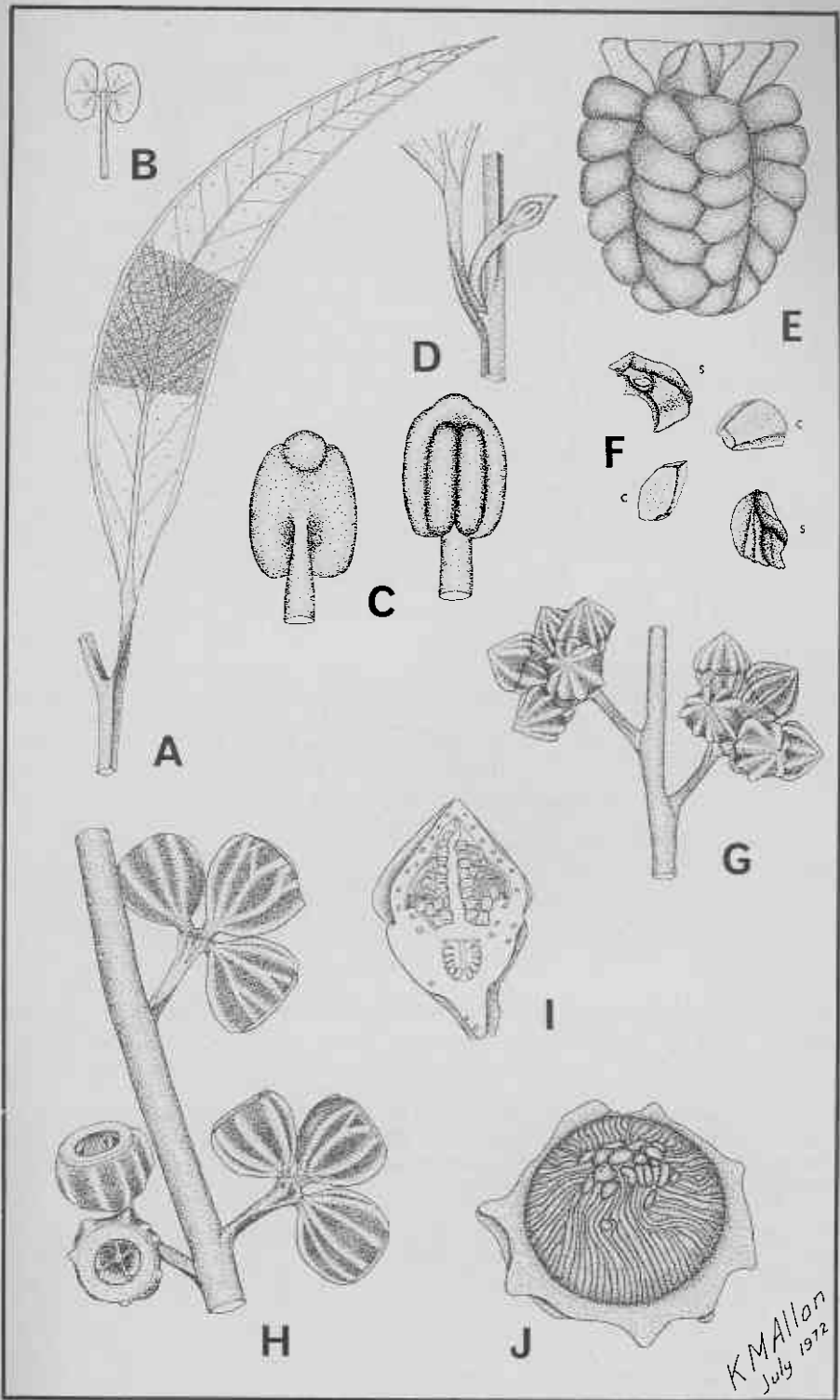


Figure 4—*Eucalyptus calcicola* sp. nov. A—Leaf, x 1. B—Cotyledons, x 1. C—Anthers x 20. D—Young buds, x 1.5. E—Ovules, x 10.5. F—Seed, x 4. G—Buds, x 1, H—Fruit, x 1. I—Bud section, x 2.5. J—Bud with operculum removed, x 4.5.

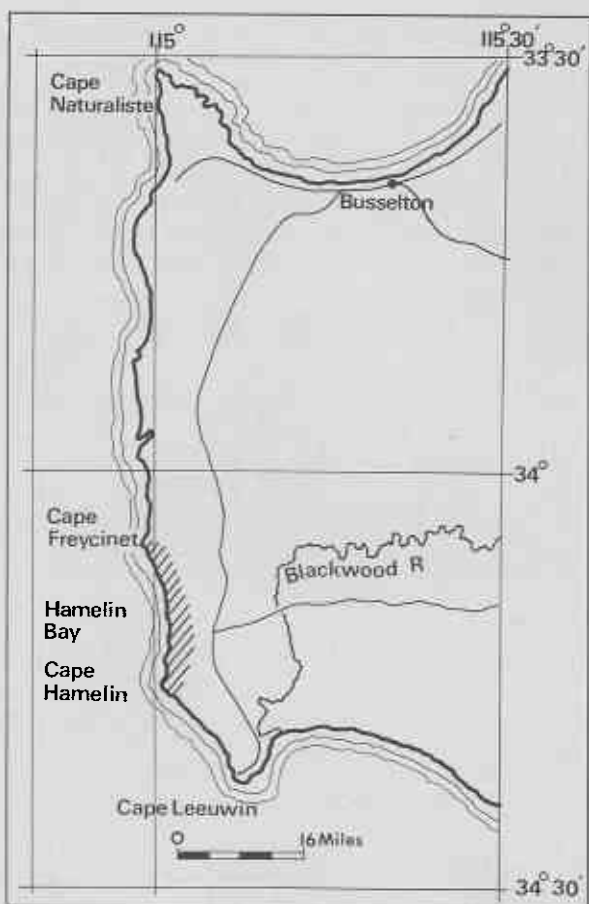


Figure 5—Distribution of *Eucalyptus calcicola* sp. nov. (shaded area).

Cotyledons reniform, ca. 10 x 15 mm, triplinerved, green above, purple below. *Seedling leaves* sessile, decussate, ovate, 2-8 x 1-6 cm, thin, bright shining green, discolorous. *Juvenile leaves* sessile, decussate, amplexicaul, ovate, cuspidate, 5-9 x 3-7 cm, bright shining green, slightly discolorous. *Adult leaves* petiolate, decussate in bud, finally separated by intranodes, lanceolate or falcate, 5.5-10.5 x 1-3 cm, moderately densely reticulate, green, concolorous. *Oil glands* numerous, very irregular in outline, several per areole. *Petioles* flattened, some twisted, 1-2 cm long.

Inflorescence axillary of 7 buds. Bracts 6. *Peduncles* 1-2 cm long, flattened. *Buds* turbinate, 10-15 x 6-10 mm, ribbed. *Pedicels* 3-5 mm long. *Operculum* beaked or conical, 5-8 mm long, thick. *Stamens* all fertile. *Outer filaments* erect, somewhat flexed tangentially, inner ones inflected radially. *Anthers* surrounding the style, oblong, dorsifixed, versatile, opening in longitudinal non-confluent slits. *Style* tapering, sculptured. *Stigma* inconspicuous. *Locules* 4. *Ovules* in 2 vertical rows.

Fruit shortly pedicellate, globular-truncate, 10-15 x 12-16 mm, with ribs raised 1-2 mm. *Disc* prominent, annular, at first oblique, finally slightly raised and level, 2 mm wide. *Valves* 4, sunken.

Seed pyramidal, black 2-4 x 1-2 mm, rounded and striate on dorsal side with ribs ascending to the hilum on the ventral side. *Chaff* smaller, yellow-brown.

Distribution: Western Australia, coastal dunes between Cape Freycinet and Cape Hamelin, between 100 and 350 feet above sea level.

Other collections: same locality as type: 18 June 1971, *K. M. Allan* 635 (juvenile leaves) (PERTH, FRI); 8 May 1972, *M. I. H. Brooker* 3697 (FRI, PERTH, NSW, GAUBA); Boranup, Western Australia (34°08'S, 115°02'E) May 1971, *B. Walsh* (PERTH, FRI); 30 Jan. 1973, *P. Christensen* (PERTH, FRI).

Flowering period: May-June.

Eucalyptus calcicola has a restricted distribution on the westerly aspect of massive calcareous dunes near the coast at Hamelin Bay to the south of Cape Freycinet. It occurs as dense clusters of mallees generally emergent above the surrounding sclerophyllous shrubs and frequently on outcropping limestone (the reason for the specific name). Nearby eucalypts are *E. calophylla* R. Br. ex Lindl. and *E. megacarpa* F. Muell. but only *E. calcicola* extends west of these towards the cliff tops. Its affinity is with *E. ligulata* M. I. H. Brooker sp. nov. from which it differs in the broader, more strongly ribbed buds and fruit, and the bright, shining green seedling leaves.

***Eucalyptus exilis* M. I. H. Brooker sp. nov.** (Figures 6, 7) Pryor and Johnson code MADAF.

Frutex "mallee" usque ad 6 m altus, caulibus exilibus erectis. *Ramuli* glauci. Canopium tenue. *Cortex* cinereo-erubescens cinereus vel eburneus, laevis. *Lignotuberum* formans.

Cotyledones reniformes, ca. 10 x 12 mm. ad basin triplinerves, supra virides, infra purpureae. *Folia plantulae* sessilia, decussata, elliptica vel oblonga, 1.5-10 x 1-6 cm, leviter discoloria. *Folia adulta* petiolata, in gemma decussata, demum ab intranodiis separata, lanceolata vel falcata, uncinata, 4-7 x 0.8-2 cm, concoloria. *Reticulum* densum, intersectionibus aliquot irregulariter crassis; glandulae oleosae sparsae; areolae aliquot cum glandula singulari. *Petioles* graciles, complanati, 6-15 mm longi.

Inflorescentiae axillares, 11-florae. *Involucrum* 6-bracteatum. *Pedunculi* erecti, leviter complanati, 8-15 mm longi. *Alabastra* clavata, 6-8 x 4-5 mm. *Pedicelli* 3-5 mm longi. *Operculum* hemisphaericum, interdum apiculatum vel late conicum, hypanthio brevius. *Stamina* omnia fertilia (?). *Filamenta* primum erecta demum radiale inflexa, antheris supra ovarium sitis vel extrinsecus ad discum deflexis. *Antherae* reniformes, dorsifixae, versatiles, ab rimis obliquis dehiscentes, glandula terminali. *Stylus* glandifer, gradatim angustatus, ad basin rugosus, supra striatus, ad apicem flexus. *Ovarium* 4-loculare. *Ovula* verticaliter 2-seriata.

Fructus pedicellatus, ovoideus vel globulari-truncatus, 11-15 x 10-14 mm. *Discus* verticalis. *Valvae* depressae.

Semen pyramidale, 2-3 x 2-3 mm, nigrum, latere dorsali rotundato, ventrali cum porcis aliquot ad hilum adscendentibus. *Ovulodia* breviora, porphyrea.

Type: north-west of Boyagin Rock, Boyagin Rock Reserve, Western Australia (32°27'S, 116°52'E) 10 May 1972, *M. I. H. Brooker* 3702 (holo: FRI; iso: PERTH, K, NSW, GAUBA).

A mallee to 6 m tall with slender erect stems. *Branchlets* glaucous. Canopy thin. *Bark* pinkish-grey light-grey or creamy smooth. Capable of forming lignotubers.

Cotyledons reniform ca. 10 x 12 mm triplinerved at the base green above purple below. *Seedling leaves* decussate sessile elliptical, 1.5-10 x 1-6 cm, slightly discolorous. *Adult leaves* petiolate, decussate in bud, separated on the mature axis by intranodes, lanceolate or falcate, 4-7 x 0.8-2 cm, uncinata, concolorous. *Reticulation* dense, oil glands sparse, a few areoles with a single gland, a few irregularly thickened reticulation intersections. *Petioles* slender, flattened, 6-15 mm long.

Inflorescences axillary, of 11 buds. *Bracts* 6. *Peduncles* erect, slightly flattened, 8-15 mm long. *Buds* clavate, 6-8 x 4-5 mm. *Pedicels* 3-5 mm long.

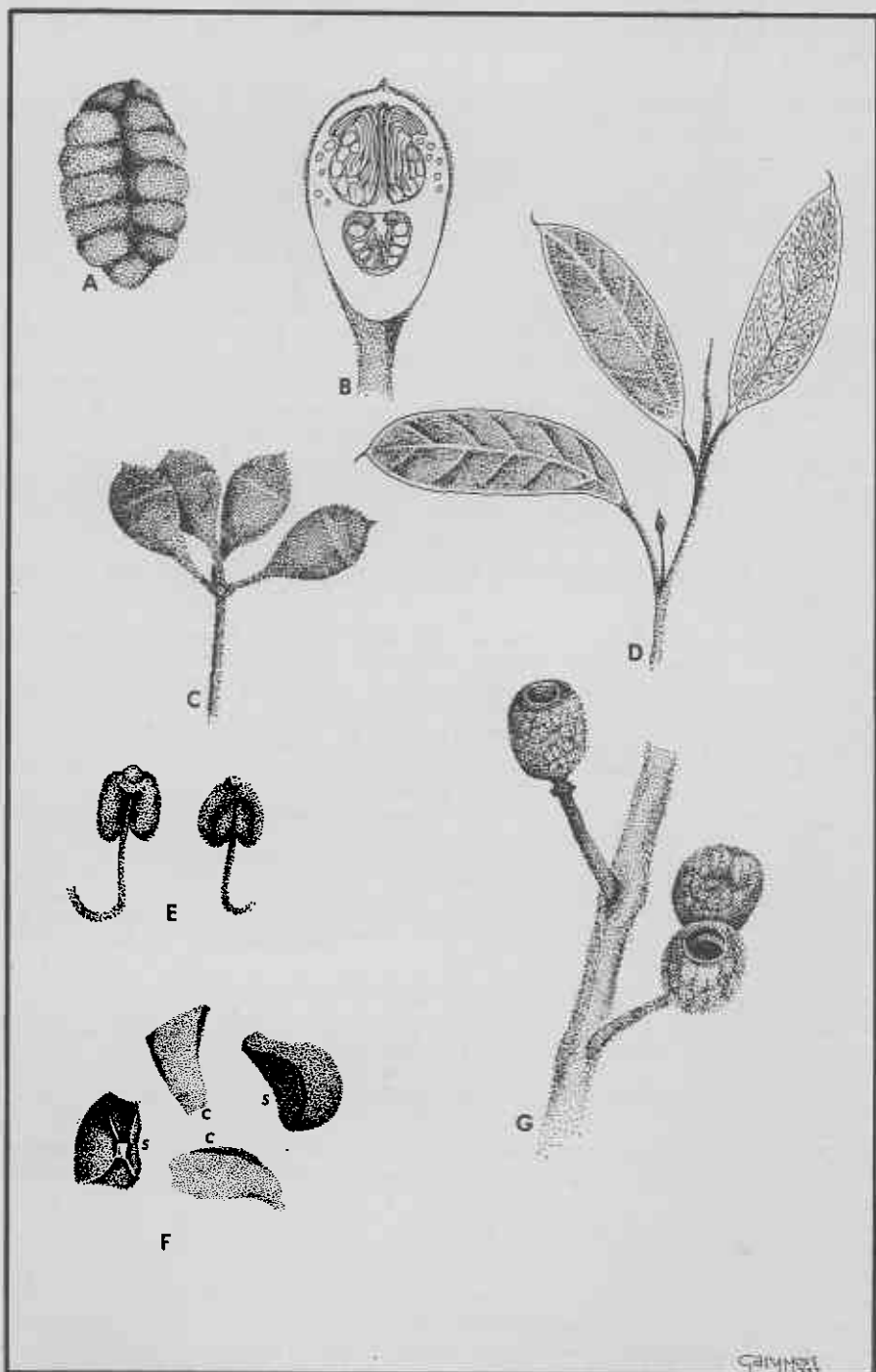


Figure 6—*Eucalyptus exilis* sp. nov. A—Ovules, x 17. B—Bud section, x 6. C—Buds, x 3
 D—Leaves, x 1. E—Anthers, x 20. F—Seed and chaff, x 6. G—Fruit, x 1.25.

Operculum hemispherical, sometimes apiculate or broadly conical, shorter than the hypanthium. *Stamens* all fertile (?). *Filaments* at first erect then inflected radially with anthers resting above the ovary or deflected outwards towards the disc. *Anthers* reniform, dorsifixed, versatile, opening by oblique slits, gland terminal. *Style* glandular, tapering, wrinkled at base, fluted above and bent at the top. *Locules* 4. *Ovules* in 2 vertical rows.

Fruit pedicellate, ovoid or globular-truncate, 11–15 x 10–14 mm. *Disc* vertical. *Valves* sunken.

Seed pyramidal, black, 2–3 x 2–3 mm, rounded and striate on the dorsal surface with a few ribs ascending to the hilum on the ventral side. *Chaff* smaller, red-brown.

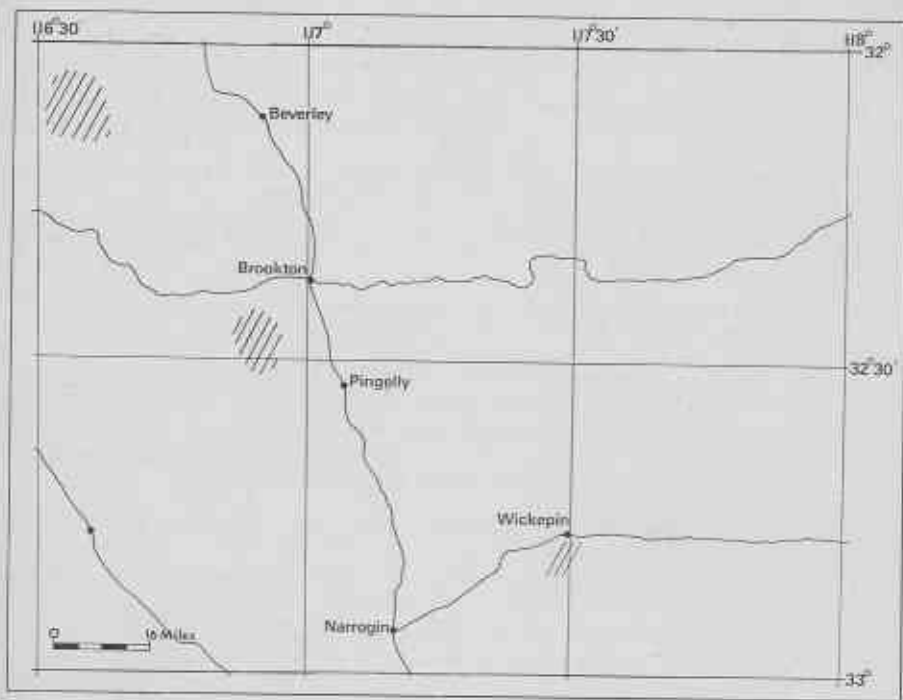


Figure 7—Distribution of *Eucalyptus exilis* sp. nov. (shaded areas).

Distribution: Western Australia, Mundaring Weir Catchment, Boyagin Rock Reserve, and Wickepin Reserve.

Other collections: at 63 mile peg on the boundary of the Mundaring Weir Catchment area, Western Australia (32°05'S, 116°35'E) 9 July 1952, *D. H. Perry* (PERTH, FRI, K, NSW, MEL); Boyagin Rock Reserve, Western Australia (32°27'S, 116°52'E) 22 June 1961, *H. B. Shugg* (PERTH); Wickepin Reserve, Western Australia, 22 June 1961, *H. B. Shugg* (PERTH); Boyagin Rock Reserve, Western Australia (32°27'S, 116°52'E), 3 Jan. 1970, *A. S. George* 9815 (PERTH, FRI, AD, MEL, BRI) and 10 May 1972, *M. I. H. Brooker* 3703 (FRI, PERTH).

Flowering period unknown.

The specific name alludes to the slender stems.

Eucalyptus exilis is closely related to *E. pendens* M. I. H. Brooker and *E. sepulcralis* F. Muell., but differs in the erect habit and smaller leaves, buds, and fruit. The localities for *E. exilis* lie half way between those of the other two species. At Boyagin Reserve it occurs on a lateritic podsol and is associated with *E. accedens* W. V. Fitzg. and *E. drummondii* Benth.

Eucalyptus insularis M. I. H. Brooker sp. nov. (Figures 2, 8) Pryor and Johnson
code MADEM.

Frutex "mallee" 1.5–8 m altus. *Caules* exiles (plantae continentales), vel validus (plantae insulares), cortice cinereo, chlorino vel viridi-griseo, laevi, glandifero. Plantae altae cortice basali pro 20 cm porphyreo, fibroso, et ramis ad basin in latere infero conspicue corrugatis. *Ramuli* quadrangulares in sectione transversali. *Lignotuberum* formans.

Cotyledones reniformes, 4–9 x 6–12 mm, ad basin triplinerves, supra virides, infra purpureae. *Folia plantulae* sessilia, decussata, elliptica vel oblonga, denticulata, 1.5–7 x 0.5–3 cm, viridia, discoloria. *Folia intermedia* viridia (insulares) vel glauca (continentales). *Folia adulta* petiolata, in gemma decussata, demum ab intranodiis separata, brevia, erecta, lanceolata, angusti-lanceolata vel falcata, uncinata, 4.5–7.5 x 0.5–0.8 cm, viridia, concoloria. *Reticulum* sparsum. *Glandulae oleosae* numerosae, ambitu circulares, in dimensione variables, per areolam multae. *Petioles* graciles, complanati, supra sulcati, valde glandiferi, 4–8 mm longi.

Inflorescentiae axillares, multiflorae. *Pedunculi* 5–8 mm longi, vulgo recurvi. *Involucrum* 6-bracteatum. *Alabastra* clavata, 4–6 x 2–3 mm. *Pedicelli* 3–5 mm longi. *Operculum* hemisphaericum, apiculatum, hypanthio brevius et parum angustius. *Stamina* omnia fertilia. *Filamenta* primum erecta, demum radiale inflexa. *Antherae* oblongae, dorsifixae, versatiles, ab rimis nonconfluentibus longitudinalibus vel obliquis dehiscentes, glandula terminali. *Stylus* gradatim angustatus. *Stigma* inconspicuum. *Ovarium* 3-loculare. *Ovula* verticaliter 2-seriata.

Fructus pedicellatus, ovoideus, 7–8 x 5–6 mm, leviter rugosus. *Discus* supra obliquus tum verticaliter declinatus, porphyreus, nitens. *Valvae* 3, depressae.

Semen pyramidale vel elongatum, atro-brunneum vel nigrum, 1–2 x 1 mm, latere dorsali rotundato et reticulato, ventrali cum aliquot porcis ad hilum adscendentibus. *Ovulodia* breviora, flavida vel porphyrea.

Type: North Twin Peak Island, Recherche Archipelago, Western Australia (33°59'S, 122°51'E) 10 Feb. 1960, R. D. Royce 6264 (holo: PERTH; iso: FRD).

A mallee 1.5–8 m tall. *Stems* slender (mainland occurrence) or stout (island occurrence) with light-grey, yellowish-green or greenish-grey, smooth, glandular bark. Large specimens with 20 cm of basal red-brown fibrous bark and with branches conspicuously wrinkled at base on underside. Young branchlets quadrangular in cross section. Capable of forming lignotubers.

Cotyledons reniform 4–9 x 6–12 mm, triplinerved at the base, green above, purple below. *Intermediate leaves* green (island occurrence) or blue-green (mainland occurrence). *Seedling leaves* sessile, decussate, elliptical or oblong, denticulate, 1.5–7 x 0.5–3 cm, green, discolorous. *Adult leaves* small, erect, lanceolate, narrow-lanceolate or falcate, uncinata, 4.5–7.5 x 0.5–0.8 cm, green, concolorous. *Reticulations* sparse. *Oil glands* numerous, circular in outline, varying in size, many per areole. *Petioles* slender, flattened, channelled above, strongly glandular, 4–8 mm long.

Inflorescences axillary, multiflowered. *Peduncles* slender, 5–8 mm long, mostly recurved. *Bracts* 6. *Buds* clavate 4–6 x 2–3 mm. *Pedicels* 3–5 mm long. *Operculum* hemispherical, apiculate, shorter and slightly narrower than the hypanthium. *Stamens* all fertile. *Filaments* erect then radially inflected. *Anthers* oblong, dorsifixed, versatile, opening by nonconfluent slits, some of which are wholly longitudinal, others with the upper part oblique towards the gland which is terminal. *Style* tapering. *Stigma* inconspicuous. *Locules* 3. *Ovules* in 2 vertical rows.

Fruit pedicellate, ovoid, 7–8 x 5–6 mm, shallowly wrinkled. *Disc* oblique above then descending vertically, red-brown, shining. *Valves* 3 sunken.

Seed pyramidal or elongate, dark brown or black, 1–2 x 1 mm, rounded and finely pitted on the dorsal side, with ribs ascending to the hilum on the ventral side. *Chaff* smaller, yellow or red-brown.

Distribution: Western Australia, North Twin Peak Island, Mt Le Grand district.

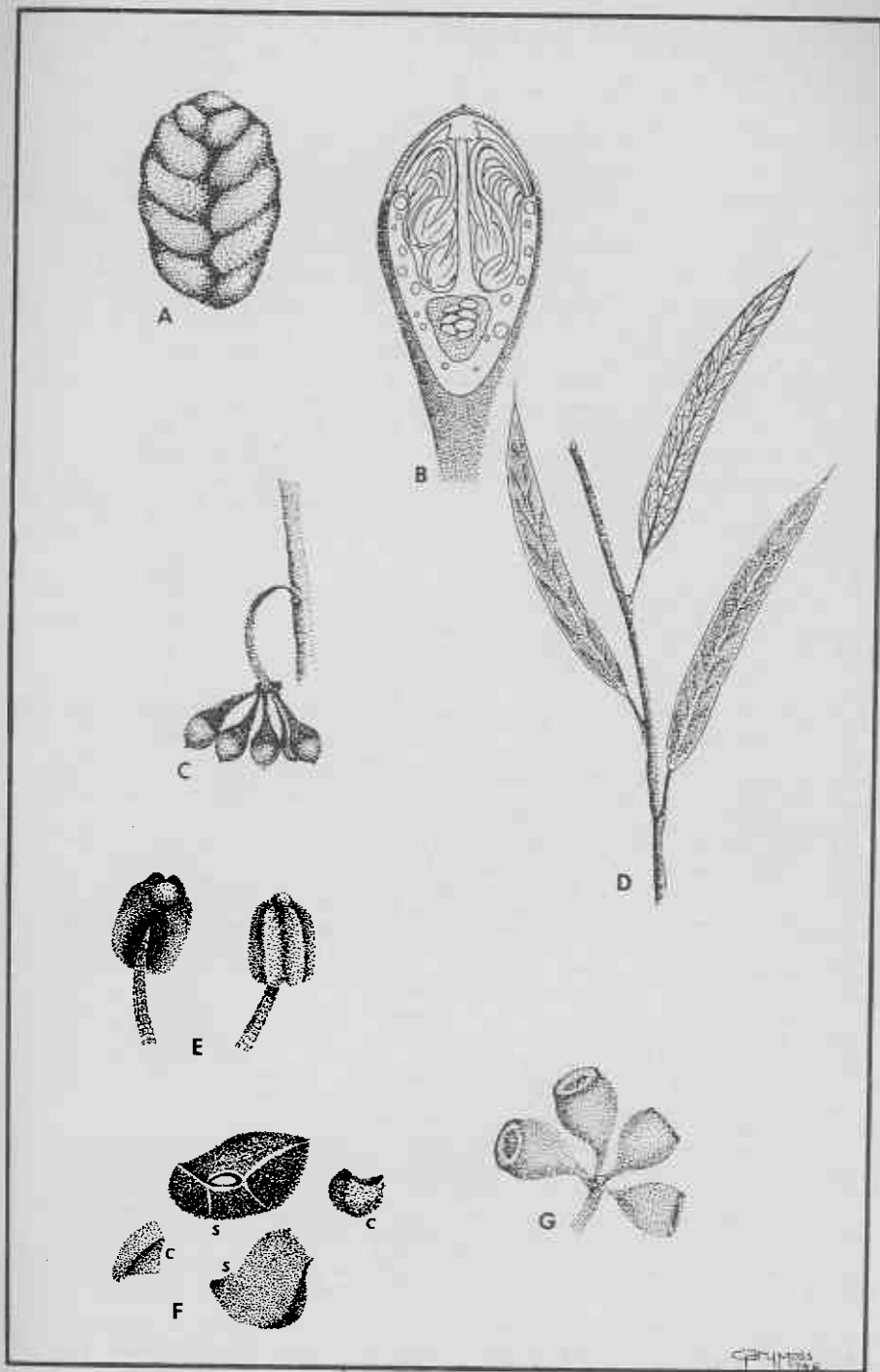


Figure 8—*Eucalyptus insularis* sp. nov. A—Ovules, x 25. B—Bud section, x 9. C—Buds, x 1.5. D—Leaves, x 1. E—Anthers, x 25. F—Seed and chaff, x 25. G—Fruit, x 1.5.

Other collections: about 1 mile northeast of beach just N of Mt Le Grand, Western Australia (33°58'S, 122°08'E) 9 Aug. 1971, A. S. Weston 6470 (PERTH); 5 Nov. 1971, A. S. Weston 7044 (PERTH, FRI); 15 Mar. 1972, K. M. Allan 827 (PERTH, FRI, NSW) and 22 April 1972, M. I. H. Brooker 3619 (FRI, PERTH, AD, K, HO); North Twin Peak Island, Recherche Archipelago, Western Australia (33°59'S, 122°51'E) 24 April 1972, M. I. H. Brooker 3637 (FRI, PERTH, K, NSW, GAUBA, AD, MEL, BRI).

Flowering period: unknown.

Until recently *E. insularis* was known only from North Twin Peak Island (the reason for the specific name) where it was found growing in gullies on the western side (R. D. Royce 6264). It has since been found at the base of a gneissic cliff about $\frac{3}{4}$ of the way up on the northern side of the island (M. I. H. Brooker 3637). There it is a stout mallee about 8 m tall growing obliquely in a dense thicket with and emergent above *Acacia heteroclita* Meisn. Nearby but non-associated species are *E. lehmannii* (Preiss ex Schau.) Benth. and *E. cornuta* Labill. It is likely to occur on other islands of the Recherche Archipelago which are large enough to support trees. No mainland occurrence was known until 1971 when it was found as a very small, isolated population near Cape Le Grand (A. S. Weston 6470, 7044, K. M. Allan 827, M. I. H. Brooker 3619) again at the base of a gneissic outcrop where it must be favourably situated for water. At this locality it is a mallee shrub to 2 m tall with narrower leaves than those of the island population. At Cape Le Grand it is associated with *E. lehmannii*. It is likely to be found in similar locations near the coast and east of Cape Le Grand.

Its natural affinities are obscure as it resembles closely no other eucalypt species. It could tentatively be placed alone in a sub-series of the series *Buprestinae*.*

***Eucalyptus brevistylis* M. I. H. Brooker sp. nov.** (Figures 9, 10) Pryor and Johnson code MAE:A.

Arbor usque 40 m alta. *Ramuli* tenues, quadrangulares in sectione transversali, interdum glauci. *Planta* omnino glabra. *Cortex* hepaticus fibrosus, longitudinaliter fissuratus. *Glandulae oleosae* in cortice. *Lignotuber* nullum visum.

Cotyledones reniformes, 6-9 x 10-12 mm, ad basin triplinerves, supra virides, infra purpureae. *Folia plantulae* petiolata, decussata, cordiformes, 2-6 x 1.5-4 cm, discoloria, supra viridia, infra pallidiora, per 3-4 nodos opposita, deinde ab intranodiis separata. *Petoli* 0.8-1.5 cm longi. *Surculi* caulibus glaucis et foliis petiolatis, ovatis, cordatis. *Folia adulta*, petiolata, in gemma decussata, demum ab intranodiis separata, lanceolata vel falcata, obliqua, tenuia, 7-10 x 1.5-3 cm, aliquot uncinata, discoloria, supra viridia, infra pallidiora, moderate dense reticulata, glandulis oleosis numerosis, circularibus, aliquot per areolam. *Petoli* graciles, 1-2 cm longi. *Vena* intramarginalis remota.

Inflorescentiae axillares, 11(13) florum. *Pedunculi* 8-15 mm longi. *Alabastro* clavata vel ovoidea, 2-3 x 2-3 mm, pedicellis breviora (4-8 mm). *Operculum* hemisphaericum, laeve, hypanthium circa aequans. *Filamenta* longitudine variabilia, in alabastro radiale inflexa, aliquot sine antheris. *Antherae* reniformes, dorsifixae, versatiles, ab rimis obliquis confluentibus dehiscentes, glandula terminali. *Stylus* operculo multo brevior. *Stigma* inconspicuum. *Ovarium* 3-loculare. *Ovula* verticaliter 2-seriata.

Fructus pedicellatus, ovoideo-truncatus, 5-10 x 6-9 mm, vertice contractus, rugosus vel aliquantum costatus, ad marginem tenuis. *Discus* verticalis vel obliquus, porphyreus, nitens. *Valvae* 3, depressae, obscurae.

Semen pyramidale, 2 x 1 mm, brunneum, latere dorsali rotundato et foveato, ventrali cum porcis aliquot ad hilum adscendentibus. *Ovulodia* breviora, flavida.

Type: About 14 miles northeast of Walpole, Western Australia (34°49'S, 116°53'E) 15 Feb. 1971, B. R. Maslin 1694 (holo: PERTH; iso: FRI, NSW, K, AD, MEL, BRI, HO).

A large tree to 40 m tall. *Branchlets* slender, quadrangular in cross-section, sometimes glaucous. Plant wholly glabrous. *Bark* yellow-brown fibrous, longitudinally fissured. *Oil glands* present in bark. *Lignotuber* not seen.

* Unless otherwise indicated, subgenera, series and subseries refer to Pryor and Johnson (1971).

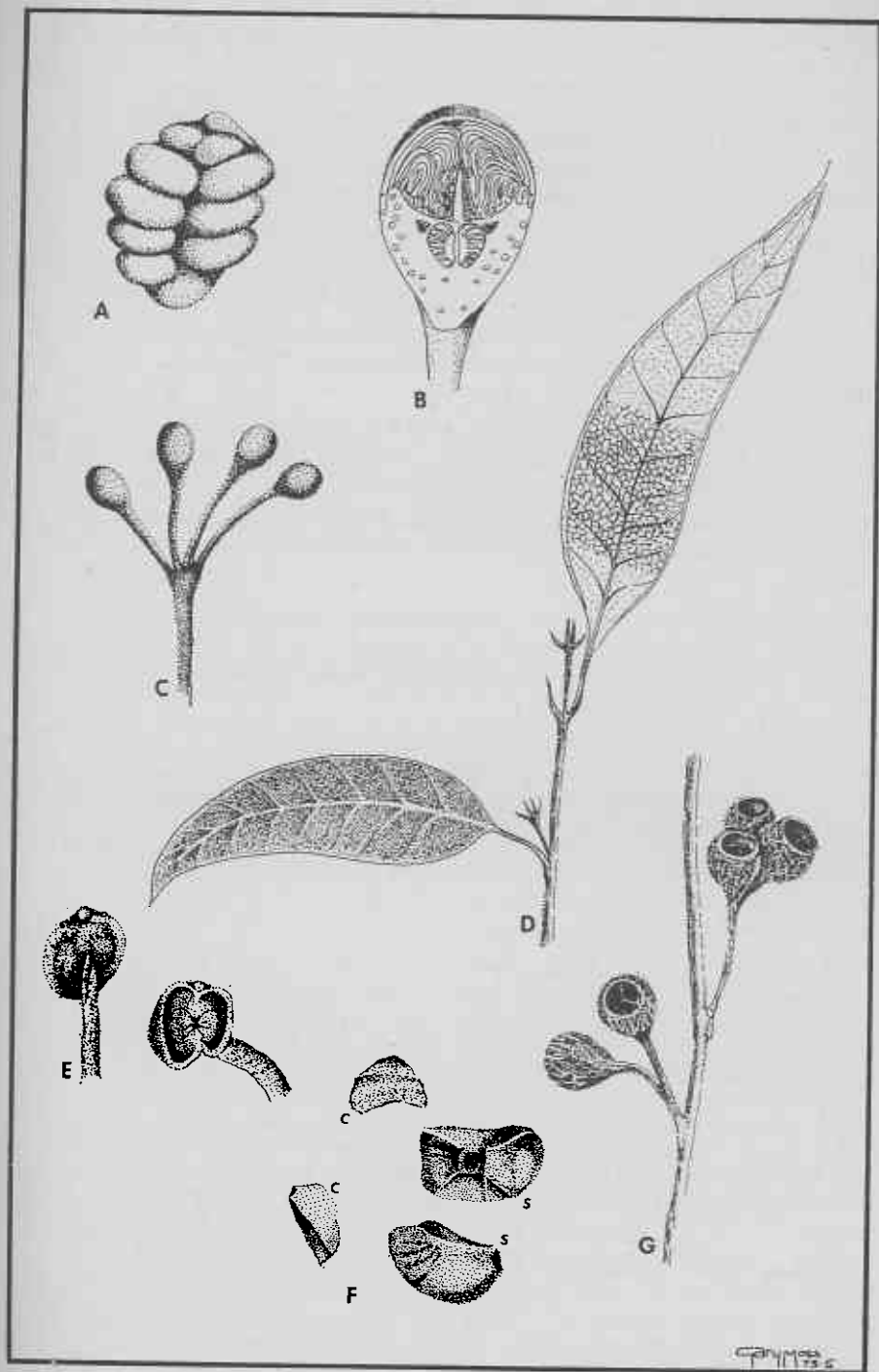


Figure 9—*Eucalyptus brevistylis* sp. nov. A—Ovules, x 30. B—Bud section, x 9. C—Buds, x 2. D—Leaves, x 1. E—Anthers, x 45. F—Seed and chaff, x 10. G—Fruit, x 1.5.

Cotyledons reniform, 6–9 x 10–12 mm, triplinerved at the base, green above, purple below. *Seedling leaves* petiolate, decussate, cordiform, 2–6 x 1.5–4 cm, discolorous, green above, paler below, becoming separated by intranodes after 3–4 nodes. *Petioles* 0.8–1.5 cm long. *Epicormic shoots* with axis glaucous and leaves petiolate, ovate, cordate. *Adult leaves* petiolate, decussate in bud, separated by intranodes on the mature axis, lanceolate or falcate, oblique, thin 7–10 x 1.5–3 cm, sometimes uncinata, discolorous, green above, paler below, moderately densely reticulate, oil glands numerous, circular, several per areole. *Petioles* slender, 1–2 cm long. Intramarginal vein remote.

Inflorescences axillary, of 11 (13) buds. *Peduncles* 8–15 mm long. *Buds* clavate or ovoid, 2–3 x 2–3 mm, shorter than the pedicels (4–8 mm). *Operculum* hemispherical, smooth, about equal to the hypanthium. *Filaments* variable in length, inflected radially in bud, some without anthers. *Anthers* reniform, dorsifixed, versatile, opening in oblique confluent slits, gland terminal. *Style* much shorter than operculum, stigma inconspicuous. *Locules* 3. *Ovules* in 2 vertical rows.

Fruit pedicellate, ovoid-truncate, 5–10 x 6–9 mm, contracted at the top, wrinkled or sometimes shallowly ribbed. Rim thin. *Disc* vertical or oblique, red-brown, shining. *Valves* 3, sunken, obscure.

Seed pyramidal, 2 x 1 mm, brown, rounded and finely pitted on the dorsal side with several ribs ascending to the hilum on the ventral side. *Chaff* smaller yellow.

Distribution: Western Australia, Walpole Forest Division.

Other collections: Soho Block, Ref. JO 113 79, Western Australia, May 1970, B. J. White (PERTH, FRI); about 14 miles northeast of Walpole, Western Australia (34°49'S, 116°53'E)

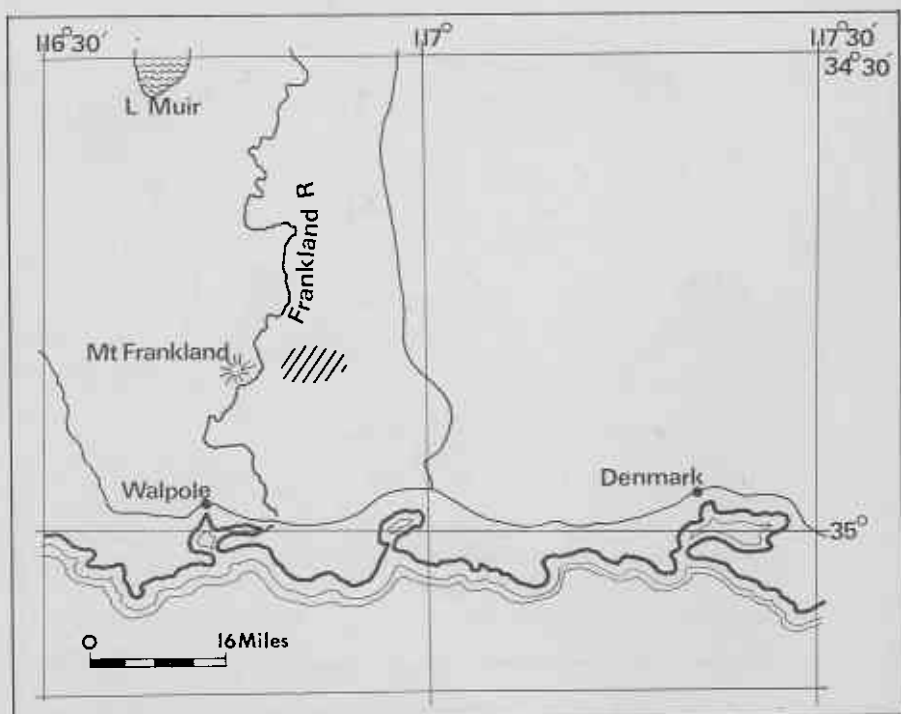


Figure 10—Distribution of *Eucalyptus brevistylis* sp. nov. (shaded area).

15 Feb. 1971, B. R. Maslin 1693 (PERTH, FRI, NSW, GAUBA, AD, MEL) and 19 April 1972, M. I. H. Brooker 3576 (FRI, PERTH, NSW, AD, MEL, BRI, GAUBA).

Flowering period: February–May.

A tribute must be made to the late Forester J. Rate through whose collections and persistent efforts from the early 1950's these trees have been recognised as a distinct species.

Eucalyptus brevistylis occurs in a small area of the Soho and London Blocks of the forest northeast of Walpole. The habitat is the banks and adjacent area of a creek deeply dissected for the locality (B. J. White pers. comm.). The soil is a yellow podsol. Nearby species are *E. marginata* Donn ex Sm. *E. calophylla* R. Br. ex Lindl. and *E. megacarpa* F. Muell.

White (1971) reports that the external appearance of the trees is that of *E. jacksonii* Maiden (red tingle) although the wood is similar to *E. guilfoylei* Maiden (yellow tingle). However, the natural affinity of *E. brevistylis* is with subgenus *Monocalyptus*. It shares relatively flexible characters like habit, bark, and fruit shape with *E. jacksonii* but these resemblances must be regarded as superficial as the differences are numerous and sometimes critical. They include the discoloured adult leaves, the short operculum, the regular inflection of the filaments some of which are anantherous, the small style (the reason for the specific name), the rugose fruit, the yellow wood, and the petiolate, cordiform seedling leaves.

Eucalyptus brevistylis appears then to be somewhat taxonomically isolated and a possible relict species. Some of the critical features it shares with other groups in *Monocalyptus*. Regularly inflected filaments occur as well in the subseries Buprestinae (including *E. insularis* M. I. H. Brooker sp. nov.), Considenianinae and Haemastominae and in *E. andrewsii* Maiden and *E. campanulata* R. T. Bak. et H. C. Sm.; anantherous filaments in the Considenianinae and Haemastominae; small styles in the Considenianinae, Haemastominae (clearly shown for *E. haemastoma* Sm. by Mueller (1879)), *E. andrewsii* and *E. campanulata* and to a lesser extent in the Amygdalininae. Inflected filaments occur as well in the two anomalous species *E. cloeziana* F. Muell. (Section Macrantherae, Blakely 1934; subgenus *Idiogenes*, Pryor and Johnson 1971) and in *E. microcorys* F. Muell. (Section Renantherae, Blakely 1934; subgenus *Symphyomyrtus*, Pryor and Johnson 1971). *E. microcorys* also has some anantherous filaments.

A further character common to these groups (except the Amygdalininae) is the presence in many buds of tubular tissue descending from the underside of the operculum and which in some buds completely ensheathes the style. Carr and Carr (1968) identified this tissue in some species of *Eudesmia* and *Monocalyptus* as petaline downgrowths. It occurs also in *E. cloeziana* and *E. microcorys*. From an incomplete survey the character appears to be common in mature buds of *Monocalyptus* species whose opercula are hemispherical or depressed-hemispherical and whose filaments are inflected. Carr and Carr (loc. cit.) cite species in *Monocalyptus* other than those discussed above in which the condition, although present in early stages, is obliterated during the expansion of growth undergone during the maturation of the bud.

Evidence of fairly inflexible characters is therefore provided to suggest links in affinity between some *Monocalyptus* in both eastern and western Australia. The unique feature of *E. brevistylis* is the juvenile leaves. Markedly petiolate, cordiform seedling leaves do not occur elsewhere in *Monocalyptus* and they resemble the seedling leaves of some species in the quite unrelated subgenus *Corymbia*, and to some extent the intermediate or coppice leaves of *E. obliqua* L'Hérit. and *E. camfieldii* Maiden, but again these are only superficial likenesses.

Acknowledgements

I would like to thank Mr K. Allan for the illustrations of *E. aquilina*, *E. calcicola* and *E. ligulata*; Mr G. Moss for the illustrations of *E. insularis*, *E. brevistylis* and *E. exilis*; Mr G. Moss and Mr R. Aronsen for the maps; Mr A. S. George for his critical examination and checking of the manuscript; Mr D. Kleinig for his assistance in checking the manuscript; Mr B. J. White, Mr A. S. George, Mr B. Rockel and Mr K. Allan for their assistance in the field; Mr Harry Butler for bringing *E. calcicola* to my attention; and Mr D. McKenzie for his patient navigation from Esperance to North Twin Peak Island.

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