

A new series, *Rigentes*, of *Eucalyptus* (Myrtaceae) comprising three new species endemic to Western Australia

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Abstract

Brooker, M.I.H. and Hopper, S.D. A new series, *Rigentes*, of *Eucalyptus* (Myrtaceae) comprising three new species endemic to Western Australia. Nuytsia 7(1): 5-13 (1989). A new taxonomic series, *Rigentes*, endemic to Western Australia is described. It comprises *Eucalyptus rigens* from north-west, north and north-east of Esperance, *E. litorea* from near Israelite Bay, both occurring around salt lakes, and *E. famelica* from east of Hopetoun, a species of subcoastal swamps. The series belongs in the informal *Eucalyptus* sect. *Dumaria* of Pryor & Johnson and is characterised by brown, somewhat flat to pyramidal seed, with the ventral side ribbed and dorsal side shallowly pitted.

Introduction

Many new species of *Eucalyptus* have been discovered in Western Australia in the last 30 years. This has been due to the intensive study of the remaining vegetation in the newly developed agricultural lands and to the botanical exploration of uncleared country. Access to much of the latter has been made possible by the extension of roads into virgin marginal scrub for development of potential farmland.

The first of the currently treated new species to be discovered was *E. litorea*, which was found by R.D. Royce in 1960 and is only known from the shores and near vicinity of a few coastal salt lakes in the remote south-east of the State near Israelite Bay. The second species, *E. rigens*, was discovered in 1970 east of Scadden, but has since been found to be widespread around the numerous salt lakes in the area. The most recently discovered of these species is *E. famelica*, which is known from only two sites in subcoastal swamps east of Hopetoun. Because of its rarity and occurrence in potentially usable agricultural land, *E. famelica* may be threatened.

Taxonomy in the informal *Eucalyptus* sect. *Dumaria* Pryor & Johnson

The new *Eucalyptus* ser. *Rigentes*, characterized by reniform cotyledons, inflexed stamens and versatile anthers, belongs in the very large informal "*E. sect. Dumaria*" (Pryor & Johnson 1971). *E. sect. Dumaria* is based on the *E. ser. Dumosae* Blakely which was broken up by Blakely (1934), with a limited amount of material at his disposal and even more limited field experience, into four subseries based on habit and bud and fruit morphology. The deficiencies in this classification were pointed out by Carr & Carr (1969) and Brooker (1971) who both recognised four groups of species based on seed characters. These groups were not in agreement with Blakely's and were given informal recognition by Pryor & Johnson (1971) (see Key below).

Brooker (1979) later informally described a fifth series also based on seed characters. This fifth series, *E. ser. Merrickianae*, comprised *E. leptocalyx* Blakely, *E. platycorys* Maiden & Blakely, and *E. scyphocalyx* (F. Muell. ex Benth.) Maiden & Blakely (with which *E. merrickiae* Maiden & Blakely was then believed to be conspecific). Following the rediscovery in the field of typical *E. merrickiae* and a study of its seed, it is now realised that both it and a later described species, *E. deflexa* Brooker, have similar seed (see Key following) which is clearly different from the seed of the other series. These two species themselves differ in stature, bark type, inflorescence deflection and flower bud numbers. They are here recognised as two monotypic series, namely *E. ser. Merrickianae* and *E. ser. Deflexae* (see Key below). The species eliminated from the now monotypic *E. series Merrickianae*, namely *E. leptocalyx*, *E. platycorys* and *E. scyphocalyx*, make up the new informal *E. ser. Leptocalyces* (see Key below).

A sixth series, described here as *E. ser. Rigentes*, is made up of three undescribed species. They have seed different from the other series in the informal *E. sect. Dumaria*. Of these series, the *Incrassatae* are closest in bud, fruit and seed morphology to the *Rigentes* but can always be distinguished by the black rather than brown seed. The various groups in *E. sect. Dumaria* may be distinguished as follows.

Key to Series in the Informal *Eucalyptus* sect. *Dumaria*

1. Seed lustrous, ruby red *Dumosae*¹
1. Seed otherwise
 2. Seed prominently ribbed on underside
 3. Seed black *Incrassatae*¹
 3. Seed brown *Rigentes*
 2. Seed not prominently ribbed on underside
 4. Seed pitted on dorsal side, toothed around edge
 5. Pits with entire grey-brown walls *Torquatae*¹
 5. Pits with collapsed hyaline or white walls
 6. Flower buds pendulous, in 7s *Deflexae*²
 6. Flower buds erect, in 3s *Merrickianae*

4. Seed not pitted on dorsal side, not toothed around edge

7. Seed brown, compressed-ovoid, distinctly reticulate *Ovulares*³

7. Seed grey-black, flattened, scurfy, shallowly reticulate *Leptocalyces*²

¹The informal groups of Pryor & Johnson (1971). ²Informal series of L.A.S. Johnson (unpublished).
³*E. ser. Ovulares* Brooker, based on *E. subser. Ovularinae* Pryor & Johnson (informal).

The following taxonomic treatment is based on extensive field surveys, examination of herbarium specimens, bud dissections, seed morphology, and glasshouse-grown seedlings.

Series *Rigentes*

***Eucalyptus* series *Rigentes* Brooker & Hopper, ser. nov.**

Frutices "mallees" ad 6 m alti cortice laevi vel aspero; lignotuberum formantes. Medulla ramulorum glandibus pallentibus. Cotyledones reniformes. Folia plantularum petiolata decussata, remanentia opposita ad nodis paucis, tum apparenter alternantia, ovata, 5-13 x 3-5 cm. Folia adulta hebetia vel nitentia, reticulo denso, glandulis paucis. Inflorescentiae axillares, 3, 7 vel 11-floribus. Alabastra bi-operculata. Filamenta staminum inflexa; antherae versatiles, dorsifixae, dehiscentes rimis longitudinalibus. Ovula verticaliter 4-seriata. Semina brunnea aliquantum plana vel pyramidalia, hilo ventrali et testa foveata non-profunda.

Typus: Eucalyptus rigens Brooker & Hopper

Low or medium-sized *mallees* to 6 m tall with smooth or rough bark; lignotuberous. *Pith* of branchlets with pale glands. *Cotyledons* reniform. *Leaves of seedlings* petiolate, decussate, remaining opposite for few nodes, then apparently alternating, ovate, 5-13 x 3-5 cm. *Adult leaves* dull or glossy; reticulum dense; oil glands few. *Inflorescences* axillary, with 3, 7 or 11 flowers. *Flower buds* bi-operculate. *Staminal filaments* inflexed; anthers versatile, dorsifixed, opening by longitudinal slits. *Ovules* in 4 vertical rows, hemitropous. *Seed* brown, somewhat flat to pyramidal, with ventral side ribbed and dorsal side shallowly pitted.

Etymology. The name is derived from the most abundantly occurring of the three species.

Notes. The three species occur on sites associated with water, one species being near littoral salt lakes, another near inland salt lakes and the third from subcoastal swamps. The three species have potential in reclamation of salt-affected land and are likely to be suitable for windbreaks in coastal areas.

Key to the Species of the *Eucalyptus* ser. *Rigentes*

1. Inflorescences 3-flowered 1. *E. rigens*
1. Inflorescences 7-flowered
2. Bark rough over whole of stems; plants growing around salt lakes 2. *E. litorea*
2. Bark smooth or in tall specimens, rough, thin, to 0.5 m only;
plants growing in subcoastal swamps 3. *E. famelica*

1. *Eucalyptus rigens* Brooker & Hopper, sp. nov. (Figure 1)

Frutex "mallee" erectus vel fere prostratus, cortice laevi. Folia adulta rigida hebetia saepe erecta. Inflorescentiae 3-florae pedunculis parvissimis. Fructus sessiles, obconici vel cupulati.

Typus: Truslove Nature Reserve, 9 April 1983, *M.I.H. Brooker* 8070 & *S.D. Hopper* (holo: PERTH; iso: CANB, NSW).

A stout effuse *mallee* to 4 m tall or almost prostrate shrub. Bark smooth, grey over white. *Juvenile leaves* to 13 x 5 cm. *Adult leaves* alternating, petiolate, lanceolate, to 11 x 2.5 cm, concolorous, dull or glossy, grey-green to light green, very firm and stiff, often erect. *Inflorescences* axillary, unbranched, 3-flowered; peduncles strongly flattened, to 0.5 cm long, widening at the top. *Flower buds* sessile or very shortly pedicellate, ovoid, longitudinally ribbed, to 1.4 x 0.9 cm; inner operculum conical to slightly beaked. *Flowers* not seen. *Ovary* 3 or 4-locular. *Fruit* sessile, obconical to cupular, ribbed, to 1.3 x 1.3 cm; rim thick; disc descending obliquely; valves to rim level or slightly exserted.

Other specimens examined. WESTERN AUSTRALIA: c. 20 miles E of Scadden, 8 August 1970, *M.I.H. Brooker* 2757 (CANB, PERTH); 24 km from Mt Burdett towards Mt Ney, 33° 26' S, 122° 13' E, 11 Nov. 1981, *M.I.H. Brooker* 7088 (CANB, NSW, PERTH); 1.3 km S of Browning's road, N of Gibson Soak, 33° 38' S, 121° 49' E, 7 Nov. 1986, *M.I.H. Brooker* 9519 (CANB, MEL, NSW, PERTH); "near salt lake", 33° 28' S, 122° 21' E, 9 Aug. 1980, *A.S. George* 15938 (PERTH); 17 km S of Mt Ridley on Dempster Road, 22 Jan. 1981, *G.J. Keighery* 3695 (PERTH); 9 km E of Scadden on Norwoods Road, 26 May 1982, *P. van der Moezel* 15 (PERTH); 21 km NE of Scadden on Lignite Road, 18 Aug. 1982, *P. van der Moezel* 130 (PERTH).

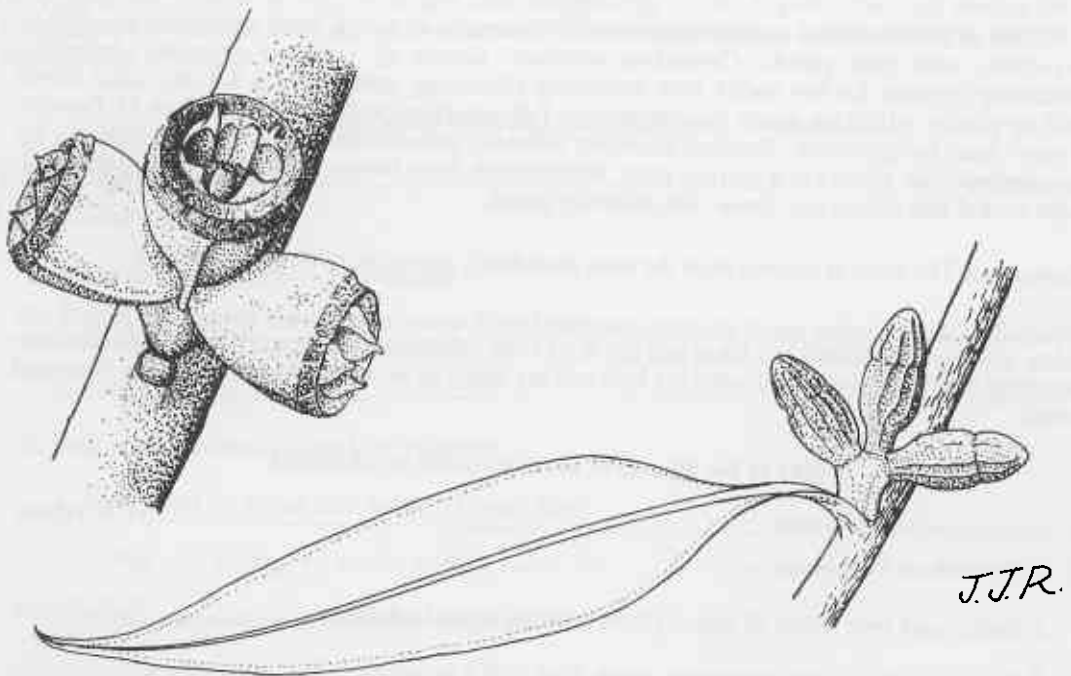


Figure 1. Leaf, flower buds and fruits of *E. rigens* (*A.S. George* 15938).

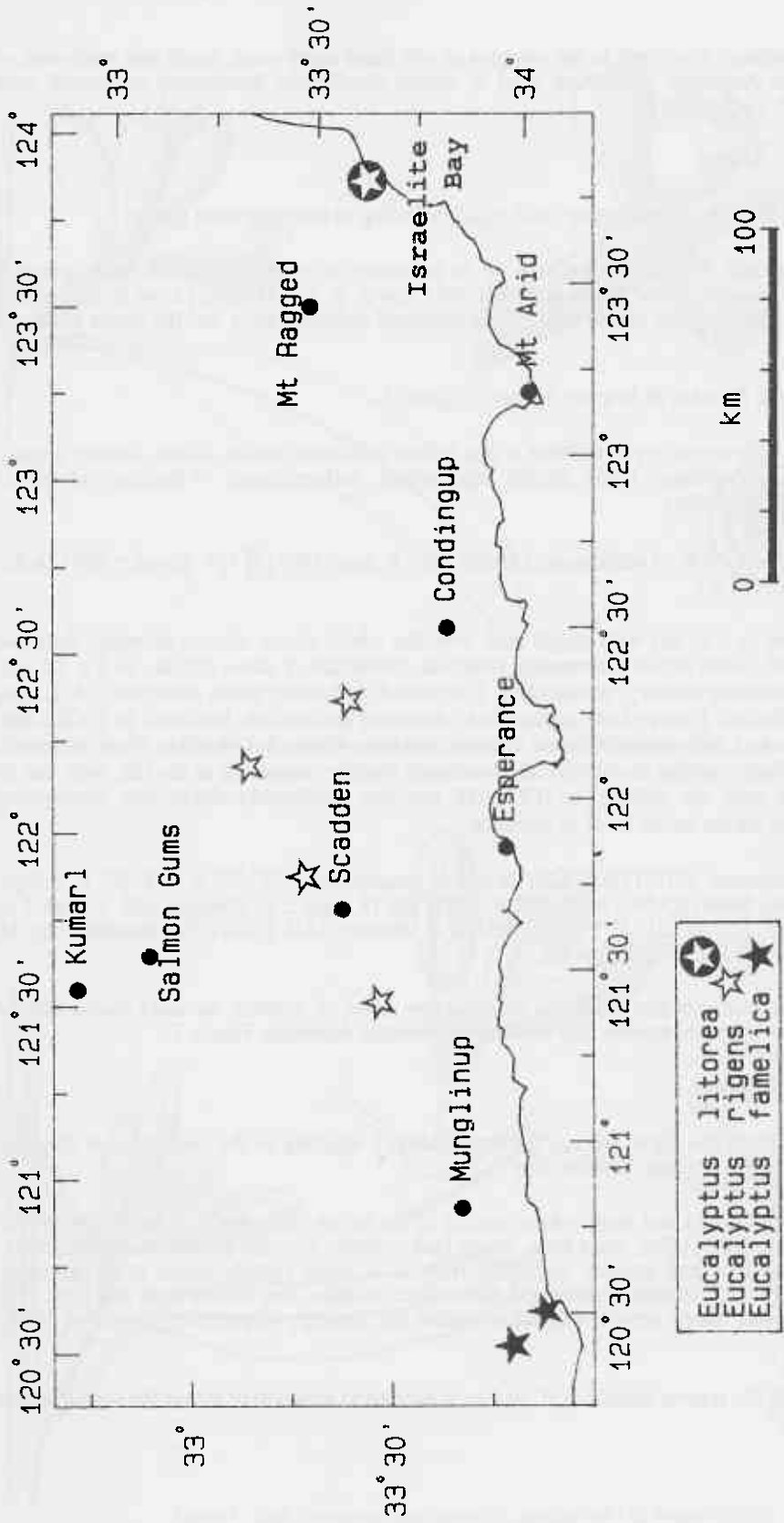


Figure 2. Distributions of *E. litorea*, *E. rigidus* and *E. famelica* in the Esperance region of south-western Australia.

Distribution and habitat. Confined to the margins of salt lakes north-west, north and north-east of Esperance, Western Australia, usually on sand in mallee shrublands. Sometimes associated with *E. halophila* Carr & Carr. Figure 2.

Flowering period. ? August.

Etymology. Named from the Latin *rigens* (stiff, rigid), alluding to the rigid erect leaves.

Notes. Easily recognised in the Scadden area by its proximity to many of the salt lakes where it occurs as a dense-canopied, effuse shrub with stiff erect leaves. *E. rigens* differs from *E. litorea* and *E. famelica* in its predominantly effuse habit, three-flowered inflorescences and the larger buds and fruits.

2. *Eucalyptus litorea* Brooker & Hopper, sp. nov. (Figure 3)

Frutex "mallee" *Eucalypto rigenti* affinis a qua habitu diffusiore erecto altiore, cortice aspero, foliis plantularum parvioribus, foliis adultis tenuioribus, inflorescentiis 7-floribus, alabastris fructibusque parvioribus differt.

Typus: N side of salt lake SW of settlement, Israelite Bay, 6 Sept. 1984, M.I.H. Brooker 8667 (holo: PERTH; iso: CANB, NSW).

An erect mallee to 6 m tall with rough bark over the whole stems. Crown terminal. Juvenile leaves to 9 x 4.5 cm. Adult leaves alternating, petiolate, lanceolate or some falcate, to 9 x 1.5 cm, light green. Inflorescences axillary, unbranched, 7-flowered; peduncles stout, flattened, 0.8-1.5 cm long, widening at the top. Flower buds sessile to distinctly pedicellate, fusiform, to 1 x 0.6 cm; inner operculum beaked, very slightly ribbed. Flowers not seen. Ovary 3(4)-locular. Fruit sessile to distinctly pedicellate, cupular to cylindrical, sometimes slightly contracted at the rim, with one to few ribs extending onto the pedicel, to 0.9 x 0.8 cm; rim moderately thick; disc descending obliquely or steeply; valves to rim level or included.

Other specimens examined. WESTERN AUSTRALIA: Israelite Bay, 33° 37' S, 123° 52' E, 6 Sept. 1984, M.I.H. Brooker 8666 (CANB, MEL, NSW, PERTH); 18.5 km E of Sheoaks Hill, 2.5 km S of Israelite Hill, 33° 37' S, 123° 51' E, 9 Sept. 1982, S.D. Hopper 2538 (PERTH); Israelite Bay, 16 Feb. 1960, R.D. Royce 6312 (PERTH).

Distribution and habitat. Locally common as a narrow band of mallees on sand dunes on the margins of salt lakes near the Israelite Bay settlement, Western Australia. Figure 2.

Flowering period. Unknown.

Etymology. Named from the Latin *litoreus* (of the seashore), alluding to the proximity of the only known populations to the sea near Israelite Bay.

Notes. *E. litorea* is the tallest and most robust species in the series, maturing to 6 m. While clearly distinct from *E. rigens* by its taller, erect form, rough bark, smaller juvenile and thinner adult leaves, 7-flowered inflorescences and smaller buds and fruit, it is more closely allied to *E. famelica*, differing in the rough bark, terminal crown and pedicellate, smaller, less ribbed buds and fruit. It is known only from sand dunes around salt lakes unlike the swampy depressions favoured by *E. famelica*.

Further survey of the remote habitat of *E. litorea* is needed to adequately assess the conservation status of the species.

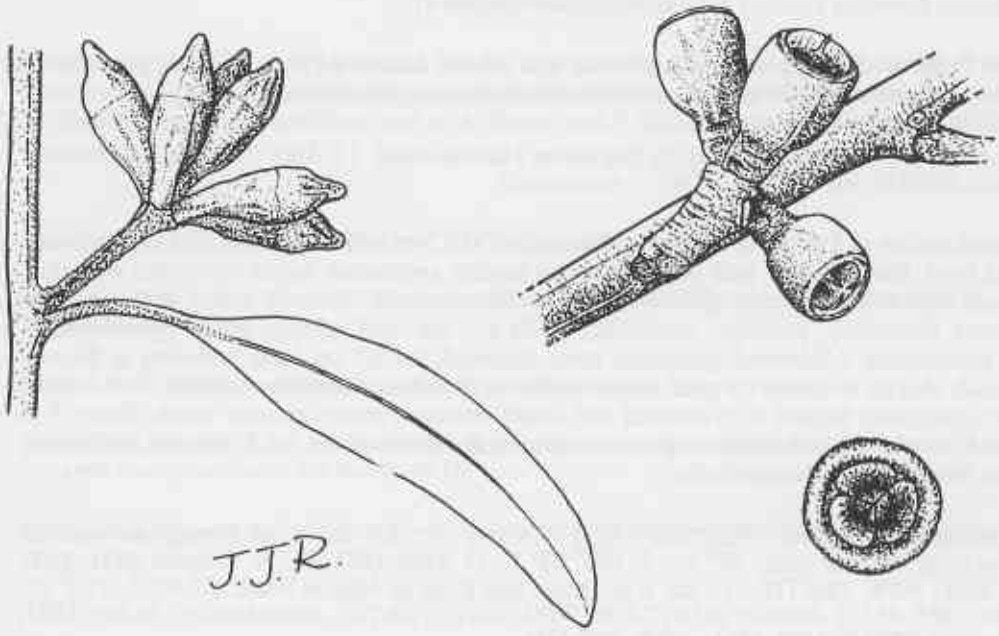


Figure 3. Leaf, flower buds and fruits of *E. litorea* (R.D. Royce 6312).

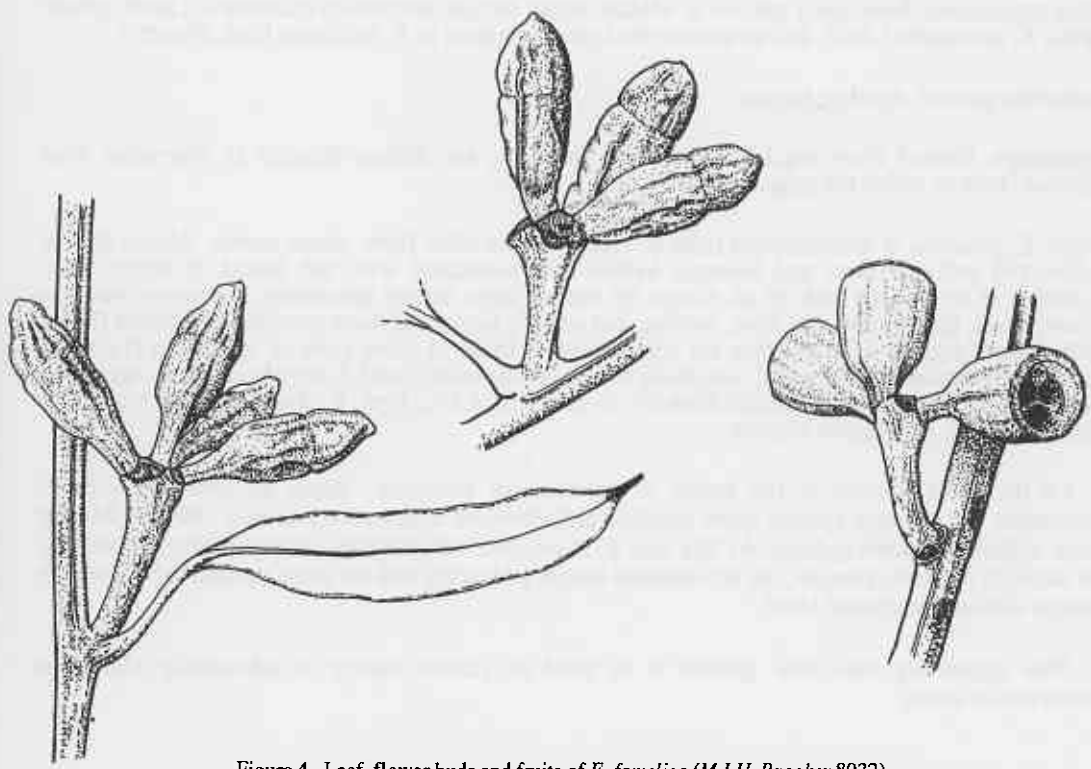


Figure 4. Leaf, flower buds and fruits of *E. famelica* (M.I.H. Brooker 8932).

3. *Eucalyptus famelica* Brooker & Hopper, sp. nov. (Figure 4)

Frutex "mallee" *Eucalypto rigenti* affinis a qua arbore summa ad terram, foliis plantularum parvioribus, inflorescentiis 7-floribus, et alabastris fructibusque parvioribus differt.

Typus: 3.6 km S of Springvale road on Starvation Harbour road, 11 April 1985, *M.I.H. Brooker* 8932 (holo: PERTH; iso: CANB, NSW).

An erect *mallee* to 4 m tall or smaller, effuse *mallee* to 1.5 m tall, both forms with crown dense, to ground level. *Bark* smooth, pale pink or grey on smaller specimens, larger specimens with thin, grey, rough bark to 0.5 m, grey, pinkish or brown smooth above. *Juvenile leaves* to 9 x 4.5 cm. *Adult leaves* alternating, petiolate, lanceolate, to 10 x 2 cm, stiff, glossy, green. *Inflorescences* axillary, unbranched, 7-flowered; peduncles stout, flattened, 0.4-1.3 cm long, widening at the top. *Flower buds* shortly to distinctly pedicellate, fusiform, ribbed or sometimes winged, to 1.4 x 0.6 cm; inner operculum beaked to cylindrical and finally obtuse. *Flowers* creamy white. *Ovary* 3 or 4-locular. *Fruit* shortly pedicellate, cupular to cylindrical, ribbed, to 1.1 x 0.8 cm; rim moderately thick; disc descending; valves included.

Other specimens examined. WESTERN AUSTRALIA: c. 3.6 km S of Springvale road on Starvation Boat Harbour road, 33° 55' S, 120° 32' E, 11 April 1985, *M.I.H. Brooker* 8931, 8935 (CANB, MEL, NSW, PERTH); 3.9 km E of Mason Bay Road on Middle Road, 33° 47' S, 120° 25' E, 26 Nov. 1985, *M.I.H. Brooker* 9116 (CANB, MEL, NSW, PERTH); same locality, 16 July 1987, *M.I.H. Brooker* 9720 (CANB, MEL, NSW, PERTH).

Distribution and habitat. Known from only two sites on road verges and/or adjacent farmland near Starvation Boat Harbour. Favours winter-wet depressions in undulating sandplain. Before clearing, 25-30 years ago, the area enjoyed fresh-water runoff while the groundwater was probably saline (A. Popplewell pers. comm.). Nowadays the water table is higher and the surface water mostly saline. The Middle Road population is large (200+), and the plants themselves are taller (to 4 m) than the other population. Associated species at Middle Road include *Melaleuca cuticularis* Labill. (dwarf form), *E. incrassata* Labill. and an undescribed species related to *E. decipiens* Endl. Figure 2.

Flowering period. April to August.

Etymology. Named from the Latin *famelicus* (hungry), an oblique allusion to Starvation Boat Harbour, near to which the species grows.

Notes. *E. famelica* is distinguished from *E. rigens* by the taller form, dense crown, thinner leaves, 7-flowered inflorescences and swampy habitat (not associated with salt lakes). It differs from *E. litorea* in its smooth bark on all except the butt of large mature specimens, the dense crown to ground level, its swampy, not dune, habitat, and usually larger and more prominently ribbed flower buds. These degrees of distinction are comparable to those of other pairs of species in *Dumaria*, viz., *E. incrassata* Labill., and *E. angulosa* Schau., *E. leptocalyx* and *E. scyphocalyx*, *E. rugosa* R. Br. ex Blakely and *E. brachycalyx* Blakely, *E. obtusiflora* DC. (syn. *E. dongarraensis* Maiden & Blakely) and *E. sheathiana* Maiden.

Of the three species in the series, *E. famelica* in particular, might be confused with *E. incrassata*, but the two species grow together and flowered concurrently in July 1987 on Middle Road without apparent hybrids. At this site, *E. incrassata* was morphologically distinguishable by the strongly rostrate opercula, the downturned longer peduncles and the more upright habit with the canopy well above ground level.

This apparently rare new species is in need of further survey to adequately assess its conservation status.

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