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# FLORA OF AUSTRALIA

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*Volume 22*  
*Rhizophorales to Celastrales*



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# FLORA OF AUSTRALIA

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This volume of the *Flora of Australia* contains 17 families of plants which include species from all parts of Australia but especially tropical and subtropical regions. It includes mistletoes of the Loranthaceae and Viscaceae, sandalwood and related plants of the Santalaceae, and mangroves of the Rhizophoraceae. The large tropical family Celastraceae which contains many rainforest species is also well represented in Australia.

In all, 225 species in 67 genera are covered.

The text includes keys for identification, notes on distribution, and bibliographic information. Many species are illustrated by line drawings or colour photographs. Several new species are described for the first time.

**Cover:** *Amyema miraculosum* subsp. *boormanii* (Blakely) Barlow, parasitic on *Santalum lanceolatum* R.Br. Painting by Philippa Nikulinsky, reproduced by courtesy of the artist.



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# FLORA OF AUSTRALIA



*Amyema miraculosum* subsp. *boormanii* (Blakely) Barlow, parasitic on *Santalum lanceolatum* R. Br. Painting by Philippa Nikulinsky, reproduced by courtesy of the artist.



BUREAU OF FLORA AND FAUNA, CANBERRA

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*Rhizophorales to Celastrales*

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# INTRODUCTION

Volume 22 of the Flora of Australia contains the Australian representatives of five orders of the Cronquist phylogenetic system Rhizophorales, Cornales, Santalales, Rafflesiales and Celastrales. Of these the hemiparasites and related plants of the Santalales are well represented in Australia, in particular the families Loranthaceae with 12 genera and 70 species, and Santalaceae with 10 genera and 42 species. The Celastrales are represented by eight families, the largest being Celastraceae with 14 genera and 34 species. The other orders are each represented by a single family. In all, this Volume contains 17 families, 67 genera and 225 species; most species and some genera are endemic, but a number also occur outside Australia, especially in the tropical Indo-Pacific region. Only one species in the volume *Ilex aquifolium* (Holly) is naturalised, and that sparingly.

New species are described in four families, Olacaceae, Santalaceae, Celastraceae and Corynocarpaceae, and the need for further taxonomic work is suggested in some others to resolve the status of several taxa including some as yet unnamed.

## Scope and Presentation

The geographical area covered by the Flora includes the six Australian States, the Northern Territory, the Australian Capital Territory, immediate offshore islands and Macquarie Island. Other Australian and State administered territories such as Christmas Island and Lord Howe Island are excluded, but the occurrence in those territories of species included in the Flora is added to the notes on distribution. A complete Flora of those territories is in preparation.

Descriptions and discussion in the Flora are concise and are supplemented by important references, synonymy, and information on type collections, chromosome numbers, distribution, habitat, and illustrations published elsewhere. Descriptions are based on Australian material except for some taxa not confined to Australia for which the collections in Australian herbaria are inadequate. Synonymy is restricted to names based on Australian types or widely used in Australian literature. Misapplied names are given in square brackets together with an example of the misapplication. Alien taxa which are established in one or more localities, other than under cultivation, are considered naturalised and are included and marked with an asterisk(\*).

Families are arranged in the system of AJ Cronquist, *An Integrated System of Classification of Flowering Plants* (Columbia University Press, New York, 1981). Within families, the genera and species are arranged to show natural relationships as interpreted by the contributor. Although relationships cannot be shown adequately in a linear sequence, such an arrangement in a Flora usually assists comparison of related taxa. Intraspecific taxa are keyed out under relevant species. Up to five collections are cited for each species and infraspecific taxon.

Maps showing distribution in Australia are arranged in the same sequence as the descriptions and are grouped 15 on a page. Each group of maps occurs on the first right-hand page after the text reference to its last map. Thus, for any taxon, the reader will always find the map on a later page. The term 'Malesia' is often used in the notes on geographical distribution for species which occur widely in the region covered by Flora Malesiana, i.e. Malaysia, Singapore, Indonesia, Philippines, Papua New Guinea and adjacent islands.

## INTRODUCTION

New taxa, new names and other taxonomic and nomenclatural changes are included in an appendix where they are formally published in accordance with the International Code of Botanical Nomenclature (Bohn, Scheltema & Holkema, Utrecht, 1978).

A number of terms that appear in Volume 22 and were not included in the Glossary of Volume 1 are defined here in a Supplementary Glossary. Abbreviations, contractions and references to the format for author and bibliographic citations are listed after the Glossary.

## Acknowledgments

Nineteen people (including photographers) have contributed directly to Volume 22, and many others have assisted in various ways. In particular the directors and staff of the major Australian herbaria and several overseas institutions have continued to assist the Flora project with loans of specimens to writers and illustrators, with additional information and with reviews of manuscripts. The assistance of all these people is gratefully acknowledged.

The illustration on the cover and frontispiece is reproduced by permission of the artist, Philippa Nikulinsky.

All staff of the Bureau of Flora and Fauna assisted the Executive Editor in producing Volume 22. Special thanks are due to Alison McCusker, Helen Hewson, Arthur Chapman, David Berman, Wendy Riley and Cindy Warhurst. The continued co-operation of the Australian Government Publishing Service, Canberra, and Griffin Press, Adelaide, is gratefully acknowledged.



# RHIZOPHORACEAE

*Alison McCusker*

Evergreen trees or shrubs, often with conspicuous aerial roots. Leaves decussate, simple, entire, glabrous, often leathery and shiny above, petiolate; stipules interpetiolar, caducous leaving an annular scar. Inflorescence axillary, cymose, sometimes reduced to 1 or 2 flowers. Flowers bisexual, actinomorphic, usually subtended by a pair of united bracteoles. Sepals 4–16, inserted on rim of an hypanthium, free or scarcely united at base, valvate, persistent in fruit. Petals as many as sepals, free, entire or lacerate or bifid, usually caducous. Stamens twice as many as petals, occasionally more; anthers 4-locular, dehiscing longitudinally, or multi-locular (in *Rhizophora*). Ovary inferior or half-inferior, 2–8-locular, each locule with usually 2 pendulous ovules; style 1; stigma entire or lobed. Fruit pulpy or leathery, indehiscent. Seeds viviparous in all Australian genera except *Carallia*; seedling (propagule) 4–80 cm long when shed.

A family of c. 16 genera and 120 species including four genera of tropical and subtropical mangroves. Most abundant in rainforests and tidal forests from Africa to eastern Asia. Represented in Australia by three mangrove genera (11 species) and 1 species of the terrestrial genus *Carallia*.

G. Bentham, Rhizophoreae, *Fl. Austral.* 2: 492–496 (1864); J. S. Bunt *et al.*, Mangrove distributions in north-east Australia, *J. Biogeogr.* 9: 111–120 (1982); B. F. Clough (ed.), *Mangrove Ecosystems in Australia: Structure, Function and Management* (1982); Ding Hou, Rhizophoraceae, *Fl. Males.* ser. 1, 5: 429–493 (1958); V. Semeniuk *et al.*, *Mangroves of Western Australia* (1978).

## KEY TO GENERA

- |    |   |                      |
|----|---|----------------------|
| 1  | Trees or shrubs of coastlines, estuaries or tidal swamps; seeds viviparous; petals not clawed                                     |                      |
| 2  | Stilt roots present, often branching and extending several metres from trunk; sepals 4  | <b>1. RHIZOPHORA</b> |
| 2: | Stilt roots clustered around base of trunk, or absent; sepals more than 4   |                      |
| 3  | Leaves dark green above, black-dotted below; sepals usually 8 or more; bracteoles absent; ovary completely inferior               | <b>2. BRUGUIERA</b>  |
| 3: | Leaves bright green or yellow-green above, not black-dotted below; sepals 5 or 6; bracteoles paired, united; ovary half-inferior  | <b>3. CERIOPS</b>    |
| 1: | Trees of rainforests, monsoon forests or margins of freshwater streams and swamps; seeds not viviparous; petals distinctly clawed | <b>4. CARALLIA</b>   |

## 1. RHIZOPHORA

*Rhizophora* L., *Sp. Pl.* 1: 443 (1753), *Gen. Pl.* 5th edn, 202 (1754), from the Greek *rhiza* (a root), and *phoros* (bearing), in reference to the stilt roots

Type: *R. mangle* L.

Trees of tidal habitats, supported by stilt roots usually branching and extending several metres from trunk; tap root aborted. Leaves usually elliptic to obovate; midrib extended into a caducous point; stipules lanceolate, reddish. Inflorescence a di- or tri-chasial cyme; bracteoles present, forming a cup just below flower. Sepals 4, scarcely united at base,

leathery, reflexed in fruit. Petals 4, lanceolate. Stamens usually 8 or 12; filaments much shorter than anthers, or absent; anthers triangular in T.S., divided internally into many small locules, introrse. Ovary at least half-inferior, united with the leathery hypanthium, 2-locular; style sometimes very short. Fruit ovoid or pyriform, green or brownish. Fertile seeds 1 per fruit; germination viviparous; hypocotyl protruding up to 80 cm before propagule falls.

A pantropical genus of 8 or 9 species, one group of species extending westwards from western Africa to the mid Pacific, a different group from the western Pacific to eastern Africa. Four species in Australia, one of which (*R. lamarckii* Montr.) considered by Tomlinson to be of hybrid origin.

G. Bentham, *Fl. Austral.* 2: 493 (1864); Ding Hou, A review of the genus *Rhizophora* with special reference to the Pacific species, *Blumea* 10: 625–634 (1960); P. B. Tomlinson, *Rhizophora* in Australasia—some clarification of taxonomy and distribution, *J. Arnold Arbor.* 59: 156–169 (1978); N. C. Duke & J. S. Bunt, The genus *Rhizophora* (Rhizophoraceae) in north-eastern Australia, *Austral. J. Bot.* 27: 657–678 (1979).

- |    |  |                               |
|----|--|-------------------------------|
| 1  | Underside of leaves evenly dotted with brown spots   |                               |
| 2  | Style 0.5–1.5 mm long; anthers sessile   | <b>1. <i>R. mucronata</i></b> |
| 2: | Style 4–6 mm long; staminal filaments short but distinct   | <b>2. <i>R. stylosa</i></b>   |
| 1: | Underside of leaves not evenly dotted (sometimes irregularly marked with infection spots)  |                               |
| 3  | Bracteoles completely united into a bulbous cup with brown, cork-like fissures in upper half; inflorescences usually borne below oldest leaves | <b>3. <i>R. apiculata</i></b> |
| 3: | Bracteoles partly united, the margins crenulate and brown, the remainder pale green; inflorescences borne within the leafy shoot               | <b>4. <i>R. lamarckii</i></b> |

### 1. *Rhizophora mucronata* Lam., *Encycl.* 6: 189 (1804)

T: from Île de France (Mauritius); *n.v.*

*R. mucronata* f. *reducta* Hochr., *Candollea* 2: 446 (1925). T: Port Hedland, W.A., 6 Feb. 1905, *B. Hochreutiner* 2867; *n.v.*

[*R. mangle* auct. non L.: F. Mueller, *Hooker's J. Bot. Kew Gard. Misc.* 8: 51 (1856)]

Illustration: J. Lewis, *Fl. Trop. E. Africa*, Rhizophoraceae: 3, fig. 1 (1956).

Tree to 15 m (in Australia); bark brown. Leaves broadly elliptic to obovate; lamina 11–20 cm long, 5–11 cm wide, bright green, evenly brown-spotted underneath; petiole 2–4 cm long. Inflorescence usually 2–4-flowered, occasionally 1- or up to 12-flowered; bracteoles united at base, smooth; pedicels 4–8 mm long, terete. Petals 8–10 mm long, involute, villous along margins. Stamens 8, 4 at base of petals and partly enclosed by their involute margins, 4 at base of sepals; anthers 6–8 mm long, sessile. Ovary tapered upwards for 2–3 mm above disc at anthesis; style 0.5–1.5 mm long; stigma 2-lobed. Fruit usually 4–6 cm long. Hypocotyl 40–80 cm long, acute.

Widespread around Indian Ocean and in SE Asia. In Australia confined to areas with constant fresh-water influence, e.g. along banks of larger streams and towards landward margins of mangroves in areas of very high rainfall in N.T. and in Queensland N of the Hinchinbrook Channel. Map 1.

N.T.: Banja Beach, Melville Is., *G. Stocker* 295 & *R. E. Fox* (BRI). Qld: Bloomfield R., *W. T. Jones* 3994 (BRI); on road to Lucinda Point, 22 March 1962, *W. Macnae* (BRI).

### 2. *Rhizophora stylosa* Griffith, *Not. Pl. Asiat.* 4: 665 (1854), *Ic. Pl. Asiat.* 4: t. 640 (1854)

*R. mucronata* var. *stylosa* (Griffith) A. Schimp., *Bot. Mitt. TROPEN* 3: 92 (1891). T: Malacca, Malaysia; *n.v.*

Illustrations: ser. 1, 5: 451, fig. 8 (1958); P. B. Tomlinson & J. S. Womersley, *Contr. Herb. Austral.* 19: 6, fig. 3 (1976); V. Semenik *et al.*, *Mangroves W. Austral.*: 70, t. 28 (1978).

Tree to 30 m but often below 8 m; bark rough, reddish or light grey. Leaves obovate; lamina 6–14 cm long, 4–8 cm wide, the underside evenly dotted with brown spots; petiole 1.5–3.5 cm long. Inflorescence 4–16-flowered; peduncle 1–5 cm long, 2 mm diam.; bracteoles united, the margins crenulate, brown; pedicels 5–10 mm long, terete. Petals up to 12 mm long, involute, densely villous along margins. Stamens usually 8; anthers 5–6 mm long; filaments short but distinct. Upper surface of ovary very shallowly conical, less than 1.5 mm high; style 4–6 mm long; stigma 2-lobed. Fruit 2.5–4 cm long. Hypocotyl 25–65 cm long, cylindrical, acute.

On sandy and coralline shores from the Malay Peninsula to Fiji and north to Taiwan. The most common species of *Rhizophora* in Australia, extending from near Dampier, W.A., to the Richmond R., N.S.W. Map 2.

W.A.: Port Warrender, *K. F. Kenneally 5247* (CANB, PERTH). N.T.: South Bay, Bickerton Is., *R. L. Specht 589* (AD). Qld: Cairns, Oct. 1903, *W. J. Paget* (BRI); Hampton Is., *B. G. Thom 4212* (BRI). N.S.W.: Jewfish Point, Red Rock, *A. G. Floyd 1379* (BRI).

### 3. *Rhizophora apiculata* Blume, *Enum. Pl. Javae* 1: 91 (1827)

T: from Java, Indonesia; *n.v.*

Illustrations: P. B. Tomlinson & J. S. Womersley, *Contr. Herb. Austral.* 19: 4–5, figs 1, 2 (1976).

Tree to 25 m, often with several trunks; bark black, often with pale horizontal and vertical stripes, especially near base. Leaves elliptic or broadly lanceolate, dark green and shiny above, paler below, not spotted; lamina 8–19 cm long, 4–9 cm wide; petiole 1–4 cm long. Inflorescence usually 2-flowered and borne below oldest leaves; peduncle 5–15 mm long, 5 mm wide, slightly flattened; pedicels very short; bracteoles completely united into a bulbous cup with brown, cork-like, longitudinal fissures in upper half. Petals 8–11 mm long, glabrous, membranous, not involute. Stamens usually 11 or 12; anthers 6–8 mm long, sessile. Upper part of ovary shallowly conical, 1.5–2.5 mm high; style 0.5–1 mm long; stigma 2-lobed. Fruit rough, pyriform, usually 2–2.5 cm long. Hypocotyl 20–40 cm long, club-shaped.

From Sri Lanka to the islands of the western Pacific. In Australia occurs on the N coast of N.T. and E coast of Qld from Cape York to Yeppoon. Grows in deep mud below mean high water level. Map 3.

N.T.: Liverpool R., 19 Feb. 1978, *G. Wells* (DNA). Qld: Cooktown, Endeavour R., *W. T. Jones 4000* (BRI, CANB); Conway, Proserpine R., Jan. 1968, *W. T. Jones* (BRI); N bank of Mossman R. near mouth, *L. S. Smith 4007* (BRI).

### 4. *Rhizophora lamarckii* Montr., *Mém. Acad. Roy. Sci. Lyon, Sect. Sci.* 10: 201 (1860)

T: Île Art, New Caledonia; *n.v.*

Illustration: P. B. Tomlinson & J. S. Womersley, *Contr. Herb. Austral.* 19: 7, fig. 4 (1976).

Tree to c. 25 m, often with several trunks; bark light brown to grey, often horizontally fissured. Leaves elliptic; lamina 8–15 cm long, 3–8 cm wide, yellow-green, not evenly spotted below (but old leaves often liberally wound-spotted); petiole 1.2–3.5 cm long. Inflorescence 2–4-flowered, borne within the leafy shoot; peduncle 1–3 cm long; bracteoles partly united, yellow-green except a brown crenulate rim. Petals c. 10 mm long; margins slightly incurved, sparsely hairy. Stamens variable, usually 9–11; anthers sessile. Upper part of ovary shallowly conical; style c. 2 mm long; stigma minutely 2-lobed. Fruit shiny, pyriform, 2.5–3 cm long. Hypocotyl 14–28 cm long, narrowly club-shaped, rounded at apex.

Believed to be a hybrid between *R. stylosa* Griffith and *R. apiculata* Blume with relatively low seed set (P. B. Tomlinson & J. S. Womersley, *op. cit.* 8); confined to areas of NE Australia, Papua New Guinea and New Caledonia where both these species occur; also recorded from Sri Lanka and Flores, Indonesia. Forms extensive stands in N Qld from Cape York to Yeppoon in areas inundated less frequently than the preferred habitat

of either putative parent species.; a single specimen seen from N.T. (Melville Is.). Map 4.

N.T.: Cape Carslake, Melville Is., *M. I. H. Brooker 3210* (DNA). Qld: Conway, Proserpine R., Jan. 1968, *W. T. Jones* (BRI); between Cardwell & Cardwell Ranges, 24 March 1962, *W. Macnae* (BRI).

## 2. BRUGUIERA

*Bruguiera* Lam., *Tabl. Encycl.* 4: t. 397 (1797), after the French explorer J. G. Bruguères, 1750–1799

Type: *B. gymnorhiza* (L.) Savigny

Trees of tidal habitats, often buttressed at base and with knee-like pneumatophores. Leaves dark green above, black-dotted below; stipules 2–4 cm long. Flowers solitary or in 2–10-flowered cymes; bracteoles absent. Sepals 8–16, free. Petals as many as sepals, usually 2-lobed, fringed with hairs and/or bristles. Stamens twice as many as petals, in unequal pairs opposite petals, each pair enclosed by inrolled petal margins; anthers linear or lanceolate or oblong. Ovary inferior, 2–4-locular; stigma slightly lobed. Fertile seeds 1 per fruit, viviparous. Propagule falling with fruit attached; hypocotyl terete or angular, obtuse.

A genus of 6 species confined to the Indo-Pacific region; five species in Australia. Usually found in association with other mangroves in places where high rainfall or freshwater inflow reduce salinity below normal seawater concentration.

G. Bentham, *Fl. Austral.* 2: 494–495 (1864); Ding Hou, A conspectus of the genus *Bruguiera* (Rhizophoraceae), *Nova Guinea* n. ser. 8: 163–171 (1957); R. L. Mitra & L. K. Banerjee, The genus *Bruguiera* Lamk. (Rhizophoraceae) in India, *Bull. Bot. Surv. India* 21: 142–150 (1979).

### 1 Flowers solitary

2 Pedicel bright red, at least on one side; hypanthium and calyx pinkish-red or bright red; hypanthium indistinctly ribbed near top only; flowers usually more than 3 cm long

1. *B. gymnorhiza*

2: Pedicel, hypanthium and calyx green, yellow-green or rusty-brown; hypanthium distinctly ribbed throughout; flowers 2–3 cm long

3 Petals with 1–3 bristles on each lobe and a distinct bristle in sinus; hypocotyl of propagule c. 15 mm wide

2. *B. sexangula*

3: Petals with or without a small bristle in sinus, the lobes without bristles; hypocotyl 6–8 mm wide

3. *B. exaristata*

### 1: Flowers in 2–10-flowered inflorescences

4 Sepals at least half as long as hypanthium, reflexed in fruit

4. *B. cylindrica*

4: Sepals about a quarter length of hypanthium, not reflexed in fruit

5. *B. parviflora*

### 1. *Bruguiera gymnorhiza* (L.) Savigny in Lam., *Encycl.* 4: 696 (1798)

*Rhizophora gymnorhiza* L., *Sp. Pl.* 1: 443 (1753). T: from India; *n.v.*

*Bruguiera rheedei* Blume, *Enum. Pl. Javae* 1: 92 (1827). T: from Java and Moluccas, Indonesia, and Malabar, India; *n.v.*

*B. australis* Arn., *Ann. Nat. Hist.* 1: 368 (1838); *Rhizophora australis* (Arn.) Steud., *Nomencl.*, 2nd edn, 2: 449 (1841). T: Moreton Bay (Qld), *A. Cunningham s.n.*; iso: K *n.v.*

Tree to 20 m; bark dark grey; knee roots abundant. Leaves elliptic, acute; lamina 8–20 cm long, 3–9 cm wide; petiole 2–4 cm long; stipules often reddish. Flowers solitary, c. 3.5 cm long at anthesis; pedicel 1–2.5 cm long, recurved, red on at least one side. Hypanthium often reddish, not ribbed or indistinctly ribbed near top only. Sepals 10–16, linear-subulate, thick, pale pink to bright red. Petals c. 1.5 cm long, 2-lobed, white

turning brown; margins and base pubescent; soft bristles 2 or 3 terminating each lobe, 1 in sinus. Anthers c. 4 mm long, mucronate. Hypocotyl 10–25 cm long, c. 1.5 cm wide, straight, terete or slightly ribbed, rounded at apex.

Common in closed mangrove forests from Darwin and Melville Is., N.T., to Richmond R., N.S.W., and throughout the Indo-West-Pacific region; not recorded from W.A. Map 5.

N.T.: Yirrkala, Arnhem Land, *R. L. Specht 801* (AD). Qld: Lucinda Point, *W. Macnae 12.7* (BRI); near Yeppoon, *O. M. Court 39* (BRI). N.S.W.: Richmond R., *C. Fawcett 290* (MEL).

## 2. *Bruguiera sexangula* (Lour.) Poir. in Lam., *Encycl. Suppl.* 4: 262 (1816)

*Rhizophora sexangula* Lour., *Fl. Cochinch.* 1: 297 (1790). T: Cochinchina (S Vietnam), *Loureiro s.n.*; iso: BM *n.v.*

Tree to 20 m, often buttressed; bark light brown to grey. Leaves elliptic or oblong-elliptic, acute; lamina 8–16 cm long, 3–6 cm wide, flat; petiole usually reflexed, 1.5–5 cm long; stipules 3.5–4 cm long, green or yellow-green. Flowers solitary, c. 3 cm long at anthesis; pedicels 6–12 mm long. Hypanthium c. 1.5 cm long, distinctly ribbed throughout. Sepals 10–12, linear, yellow to rusty brown. Petals 1.5 cm long, 2-lobed, pubescent at base and usually along margins; tips of lobes reflexed; bristles 1 in sinus and often 1 or more on each lobe near but scarcely exceeding tip. Anthers 4–5 mm long, without mucro. Hypocotyl 6–12 cm long, 1.5–2 cm wide, somewhat angular, narrowed at both ends.

Extends from India through SE Asia to New Guinea and N Australia. Recorded near Darwin and on Arnhem Land coast, N.T., and on the E coast of Qld from Cape York to Hinchinbrook Is. Map 6.

N.T.: Darwin, *A. J. A. Bleeser 319* (MEL); Adelaide R., 17km NE of Humpty Doo Stn, *J. McKean 1031* (DNA); Channel Is., Darwin, *J. Must 928* (DNA). Qld: Watson Is., *D. R. Stoddart 4110* (BRI).

R. L. Mitra and L. K. Banerjee, *Bull. Bot. Surv. India* 21: 142–150 (1979), pointed out that this species is difficult to distinguish from *B. gymnorhiza* (L.) Savigny in India; in Australia it is difficult to distinguish from *B. exaristata* Ding Hou unless propagules are available. These three species need careful comparison across their whole geographic range.

## 3. *Bruguiera exaristata* Ding Hou, *Nova Guinea, Bot.*, ser. 2, 8: 166, figs 1–2 (1957)

T: Kapa Kapa, New Guinea, *L. J. Brass 808*; syn: BO *n.v.*, BRI.

[*B. gymnorhiza auct. non* (L.) Savigny; G. Bentham, *Fl. Austral.* 2: 495 (1864) as *B. gymnorhiza*]

Illustration: V. Semeniuk *et al.*, *Mangroves W. Austral.* t. 9 (1978).

Tree to 10 m tall, buttressed; bark fissured, grey; knee roots present. Leaves usually obovate, acute; lamina 4–10 cm long, 2–5 cm wide; margins often recurved; petiole 1.5–2.5 cm long; stipules c. 2 cm long. Flowers solitary, 2–2.5 cm long at anthesis; pedicels 7–12 mm long. Hypanthium distinctly ridged throughout, tapering to base. Sepals 8, occasionally to 10, leathery. Petals 9–11 mm long, shortly 2-lobed; base and margins densely villous; bristles absent, or a minute one in sinus only. Anthers 5 mm long, apiculate. Hypocotyl cylindrical, slightly ridged, 4–6 cm long, 6–8 mm wide. Fig. 1.

Occurs in Timor, S coast of New Guinea and in Australia from Cossack, near Roebourne, W.A., to Yeppoon, Qld., Mainly towards landward edge of mangrove forests. Map 7.

W.A.: 3 km S of Cape Bertholet, *K. F. Kenneally 5989* (CANB, PERTH). N.T.: Lee Point, Darwin, *C. R. Dunlop 1867* (NT); Melville Bay, Arnhem Land Aboriginal Reserve, *R. L. Specht 915* (MEL). Qld: Lowrie Is., *D. R. Stoddart 4993* (BRI); Cairns Inlet, *L. J. Webb & G. J. Tracey 13713* (BRI).



**Figure 1.** *Bruguiera*. **A–E**, *B. exaristata*. **A**, flowering branch  $\times 0.8$ ; **B**, flower  $\times 1.2$ ; **C**, petal with margins inrolled to enclose a pair of stamens  $\times 2$ ; **D**, ovary and hypanthium in L.S.  $\times 1.2$ ; **E**, hypocotyl emerged from fruit before shedding,  $\times 0.8$  (**A**, **E**, C. Dunlop 1867; **B–D**, reprinted by permission from V. Semeniuk *et al.*, *Mangroves of Western Australia*, 1978). **F**, *B. parviflora*, flowering branch  $\times 0.8$  (L. Craven 4612, MEL).

**4. *Bruguiera cylindrica* (L.) Blume, *Enum. Pl. Javae* 1: 92 (1827)**

*Rhizophora cylindrica* L., *Sp. Pl.* 1: 443 (1753). T: from India; *n.v.*

*B. caryophylloides* (Burm.f.) Blume, *Enum. Pl. Javae* 1: 93 (1827); *Rhizophora caryophylloides* Burman f., *Fl. Ind.* 109 (1768). T: Amboina, Moluccas; *n.v.*

Tree to 20 m with small stilt roots at base; knee roots abundant; bark grey. Leaves elliptic, acute, not leathery; lamina 5–17 cm long, 2.5–8 cm wide; petiole 1–4.5 cm long; stipules 2.5–3.5 cm long. Inflorescence 3-flowered; peduncle 5 mm long; pedicels 2 mm long; flowers cream to green. Hypanthium 4–6 mm long, 2 mm wide. Sepals usually 8, at least half as long as hypanthium, reflexed in fruit. Petals 3–4 mm long, sparsely hairy along margins; lobes c. 0.5 mm long; apical bristles much longer than lobes. Anthers 0.5 mm long, shorter than filaments, tapering upwards. Fruit 10–12 mm long. Hypocotyl 8–15 cm long, 5 mm wide, usually curved, not ribbed.

In mangroves throughout Malaysia, Indonesia and P.N.G. In Australia known from E coast of Cape York Peninsula N of 15°S lat., usually in heavy clay soils Map 8.

Qld: Olive R., *B. Hyland* 7517 (BRD); Cape Sidmouth, 1871, *F. Mueller* (MEL 603860); 6km N of Bamaga, *K. Paijmans* 3031 (BRI, CANB).

**5. *Bruguiera parviflora* (Roxb.) Wight & Arn. ex Griffith, *Trans. Med. Soc. Calcutta* 8: 10 (1836)**

*Rhizophora parviflora* Roxb., *Fl. Ind.* 2nd edn, 2: 461 (1832). T: delta of the Ganges, India; *n.v.*

Tree to 20 m; knee roots abundant; bark smooth, grey. Leaves elliptic, acute; lamina 4–13 cm long, 2.5–4 cm wide; petiole 1.5–2 cm long; stipules c. 4.5 cm long. Inflorescence 3–10-flowered; peduncle c. 2 cm long; pedicels 6–13 mm long; flowers yellow-green. Hypanthium 7–9 mm long, slightly or distinctly ribbed. Sepals usually 8, c. 2 mm long, erect in fruit. Petals 1.5–2 mm long, bearded outside near base; lobes c. 0.5 mm long; terminal bristles 3 on each lobe and 1 in sinus, about as long as lobes. Anthers oblong, distinctly shorter than filaments. Fruit 1–2 cm long. Hypocotyl 7–20 cm long, 5 mm wide, not ribbed, falling with fruit attached; fruit wall persistent as a collar on seedling, the sepals pointing downwards. Fig. 1.

Towards landward edge of mangrove forests from Bangla Desh to Vanuatu; around N coast of Australia from King Sound, W.A., to Mackay, Qld. Map 9.

N.T.: Howard River, 12°22'S, 131°02'E, *C. Dunlop* 3194 (DNA, NT); Berry Ck, 12°40'S, 130°58'E, *M. Parker* 603 (DNA, NT). Qld: Bloomfield R., *W. T. Jones* 4022 (BRI, CANB); near Jacky Jacky airstrip, *L. S. Smith* 12442 (BRI).

**3. CERIOPS**

*Ceriops* Arn., *Ann. Nat. Hist.* 1: 363 (1838), from the Greek *keras* (a horn), and *-opsis* (resembling), referring to the hypocotyl emerging from the fruit

Type: *C. roxburghiana* Arn.

Shrubs or small trees, often with stilt roots clustered around base of trunk; knee roots present or absent. Leaves crowded near tips of shoots, entire; veins obscure on both surfaces. Inflorescence usually 4- to many-flowered; bracteoles connate at base. Sepals usually 5, ovate, acuminate. Petals as many as sepals, free or cohering at base by marginal hairs, involute. Stamens usually 10, in unequal pairs opposite petals and enclosed by inrolling of petal margins; anthers 4-locular. Ovary half-inferior, 3-locular; style simple; stigma simple or obscurely lobed. Fruit elongating above rim of hypanthium. Seeds viviparous. Hypocotyl of propagule narrowly club-shaped, terete or ridged.

A genus of 2 species, distributed from the E coast of Africa through Madagascar, India, SE Asia and New Guinea to Australia and islands of the western Pacific. Both species occur in Australia.

A. G. Wells, Mangrove vegetation of northern Australia, in Clough, B. F. (ed.), *Mangrove Ecosystems in Australia: Structure, Function and Management* 57–78 (1982).

Sepals reflexed or widely spread in fruit; petals terminating in 3 club-shaped appendages; anthers much shorter than filaments; hypocotyl 12–35 cm long

1. *C. tagal*

Sepals ascending in fruit; petals terminating in 10–12 ribbon-like strands; anthers at least as long as filaments; hypocotyl 6–15 cm long

2. *C. decandra*

### 1. *Ceriops tagal* (Perr.) C. Robinson, *Philipp. J. Sci. C. Bot.* 3: 306 (1908)

*Rhizophora tagal* Perr., *Mém. Soc. Linn. Paris* 3: 138 (1824). T: Zamboanga, Philippines; *n.v.*

*C. timoriensis* (DC.) Domin, *Biblioth. Bot.* 89: 444 (1928); *Rhizophora timoriensis* DC., *Prodr.* 3: 32 (1828); *C. candolliana* Arn., *Ann. Nat. Hist.* 1: 364 (1838), *nom. superfl.* T: from Timor; *n.v.*

*C. tagal* var. *australis* C. T. White, *J. Bot.* 64: 220 (1926). T: Moreton Bay, Qld, *C. T. White s.n.*; *n.v.*

Shrub or tree 2–15 m high, often with buttresses or small stilt roots; knee roots occasionally present; bark brownish, sometimes papery. Leaves obovate to broadly spatulate, obtuse or emarginate; lamina 3–9 cm long, 1.5–6 cm wide; stipules up to 2.5 cm long. Inflorescence 4–10-flowered; peduncle 1–2 cm long; pedicels to 2 mm. Sepals 4.5 mm long, erect or slightly spreading in flower, widely spreading or reflexed in fruit. Petals oblong, thickened along mid-line, with 3 club-shaped terminal appendages; margins fringed with hairs, lightly cohering. Staminal filaments c. 3 mm long; anthers less than 1 mm long. Hypocotyl 12–35 cm long, sharply pointed.

Widespread and common in mangroves from Moçambique to the western Pacific, especially along highly saline landward margins. C. T. White distinguished *C. tagal* var. *australis* by the terete (not angular or ribbed) hypocotyl of the propagule, noting this to be the only consistent distinguishing character. Both varieties occur in Australia; var. *australis* is reputed to be by far the more abundant and is also recorded from P.N.G. The two varieties are sympatric at least in N Qld but no intermediates have been recorded. As most material available to the author lacked propagules, the distributions of the two varieties have been mapped together. Map 10.

N.T.: headland on Oyster Rd., Melville Is., *G. C. Stocker 79* (DNA) (var. *tagal*). Qld: Mowbray R., 10 May 1962, *W. T. Jones* (BRI) (var. *tagal*); 4km SE of Cape York, *L. S. Smith 12521* (BRI) (var. *tagal*); Cape York, Nov. 1966, *W. T. Jones* (BRI) (var. *australis*); Sandgate, *S. T. Blake 4779* (BRI) (var. *australis*).

This species often shows very marked ecological variation within distances of just a few metres. Under the forest canopy it occurs as small scattered trees with bright green, somewhat fleshy foliage; along highly saline landward margins of mangroves it forms a dense zone of shrubs with yellow-green leathery leaves having recurved margins.

*C. tagal* var. *tagal* forms knee roots superficially similar to those of *Bruguiera*, from which they are easily distinguished by the aerenchyma of the cortex. This is a fine, red-brown, spongy tissue in *C. tagal* and has a white, gill-like structure in *Bruguiera*.

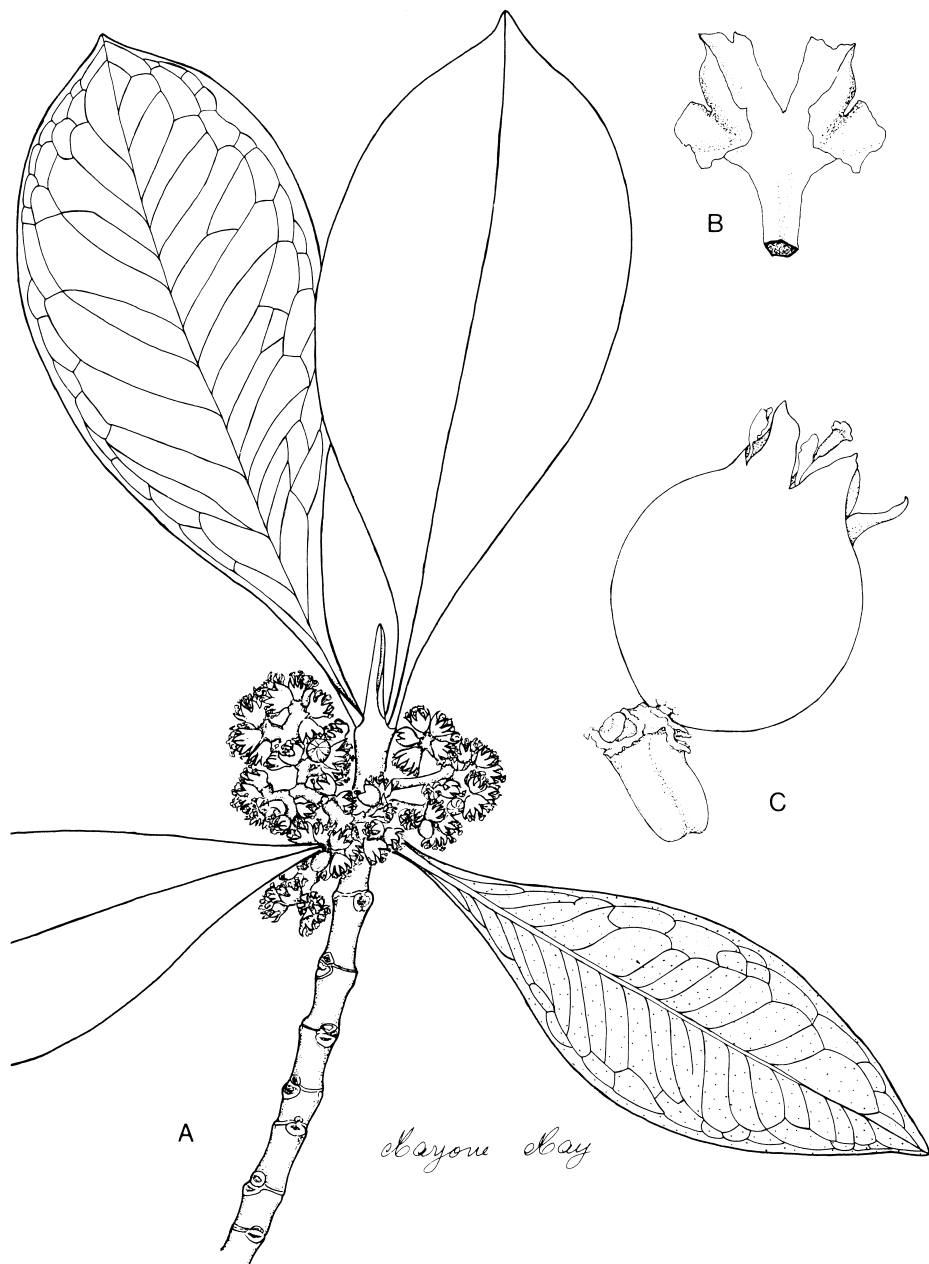
### 2. *Ceriops decandra* (Griffith) Ding Hou, *Fl. Males.* ser. 1, 5: 471 (1958)

*Bruguiera decandra* Griffith, *Trans. Med. Soc. Calcutta* 8: 10 (1836). T: from Tenasserim, S Burma; *n.v.*

Small tree usually below 5 m high, often buttressed; knee roots not known in Australia. Leaves obovate to elliptic or oblong, obtuse or emarginate; lamina 4–10 cm long, 2–6 cm wide; stipules 1.5–2 cm long. Inflorescence 3–5-flowered; peduncle less than 1 cm long, prominently ribbed; flowers sessile or almost so. Sepals 2–3 mm long, erect in flower and fruit. Petals c. 2.5 mm long, minutely fringed, not cohering, the upper third incised into 10–12 ribbon-like strands. Stamens c. 1 mm long; anthers at least as long as filaments. Hypocotyl 6–15 cm long, prominently ridged.

From India to New Guinea and Australia. Occurs on N coast of N.T. and on coast of Qld from Weipa to Hinchinbrook Is. Not abundant. Map 11.





**Figure 2.** *Carallia brachiata*. **A**, flowering branch  $\times 1.25$  (C. Dunlop 3568, DNA); **B**, petal  $\times 30$  (A. George 12825, PERTH); **C**, fruit  $\times 7$  (J. Must 1655, DNA). **B–C** drawn by Alison McCusker.

N.T.: Bank of S Alligator R., *L. A. Craven 4611* (CANB, NT); Adelaide R., 12 Sept. 1979, *G. Wells* (DNA). Qld: Cairns, *M. Gill 3* (QRS); Herbert R., *W. T. Jones 4006* (CANB); 13 km ENE of Daintree, *L. S. Smith 11617* (BRI, CANB); Fishbone Ck, 33 km SSW of Cape York, *L. S. Smith 12443* (BRI).

#### 4. CARALLIA

*Carallia* Roxb., *Pl. Coromandel* 3: 8, t. 211 (1811), *nom. cons.*, from its Indian name *caralli* (or *karallie*)

T: *C. lucida* Roxb.

*Karekandelia* Kuntze, *Revis. Gen. Pl.* 1: 234 (1891), orth. var. of *Karekandel* Wolf, *Gen. Pl.* (1776) 73. T: *Karekandelia malabarica* Raf.

Trees (Australian species), occasionally buttressed. Leaves entire or finely toothed. Inflorescence a dichasial cyme; bracteoles present. Sepals 5–8, deltoid. Petals 5–8, clawed. Stamens twice as many as petals, free, of two lengths, the shorter opposite petals. Ovary inferior, 5–8-locular; style filiform; stigma discoid or capitate or obscurely lobed. Fruit pulpy. Seeds areolate, not viviparous.

A genus of c. 10 species, in Madagascar, India, Sri Lanka, SE Asia and Solomon Is; one species in N Australia.

G. Bentham, *Fl. Austral.* 2: 495–496 (1864).

##### 1. *Carallia brachiata* (Lour.) Merr., *Philipp. J. Sci.* 15: 249 (1920)

*Diatoma brachiata* Lour., *Fl. Cochinch.* 296 (1790). T: from Cochinchina (S Vietnam); *n.v.*

*C. integerrima* DC., *Prodr.* 3: 33 (1828). T: from 'India orientalis' (India and the "East Indies"); *n.v.*

Tree to 20 m, usually 5–8 m; bark brown, cork-like. Leaves elliptic, oblong or obovate, acute, acuminate or sometimes obtuse, thin, entire; lamina 5–15 cm long, 2–10 cm wide, black-spotted beneath; base cuneate; petiole to 1 cm long; stipules to 2.5 cm long. Inflorescence 1–6 cm long, often resinous; buds spherical. Flowers c. 3 mm long, crowded, sessile or on short pedicels; bracteoles 2 or 3, partially united into a cup. Sepals 1.5 mm long. Petals c. 1.5 mm long, white; lamina suborbicular, emarginate or unevenly lobed. Stamens c. 2 mm long. Ovary bulbous, c. 2 mm long; style 1.5–2.5 mm long; stigma discoid, lobed. Fruit globose, c. 7 mm diam., glassy, pink or red. Seeds reniform. Fig. 2.

Widespread throughout the range of the genus. In Australia occurs in the Kimberley, W.A., in N.T. north of 16°S lat., and in NE Qld. Grows in coastal monsoon forest, riverine forest, vine thicket, stream beds and seasonal freshwater swamps; the only non-mangrove representative of the family in Australia. Map 12.

W.A.: Mitchell R., Kimberley, *C. A. Gardner 1489* (PERTH). N.T.: Peron Is., *T. S. Henshall 852* (NT); Keep R., *A. S. Mitchell 338* (NT). Qld: Browns Ck, Pascoe R., *L.J. Brass 19604* (BRI); Pin Pin, *A. K. Irvine 692* (BRI).

## CORNACEAE

The genus *Corokia* Cunn. was placed in Cornaceae by A. J. Cronquist, *An Integrated System of Classification of Flowering Plants* (1981), but will probably be included in Grossulariaceae in Volume 10 of the *Flora of Australia*.

# ALANGIACEAE

H. J. Hewson

Trees or shrubs. Leaves alternate, simple, exstipulate; venation pinnate or (not in Australia) palmate; tertiary veins scalariform; domatia often present. Flowers in axillary cymes, bisexual, actinomorphic, often bracteate; pedicels articulate. Perianth 4–6-merous or (not in Australia) up to 10-merous. Sepals fused into a tube, the lobes tooth-like or obsolete. Petals linear, valvate, spreading, sometimes cohering at base. Stamens in Australia as many as and opposite petals, free or epipetalous; anthers basifixed, 2-locular, dehiscent longitudinally. Disc intrastaminal. Ovary inferior, 2- or 3-carpellate, usually 1-locular; ovule 1 per locule, pendulous; style filiform; stigmas 1–4. Fruit a drupe, crowned with persistent calyx and disc. Seeds 1 or 2, with endosperm; embryo straight.

Monogeneric family of c. 20 species in tropical and subtropical regions from Africa east to Fiji including Australia; one species in Australia.

G. Bentham, *Cornaceae p.p.*, *Fl. Austral.* 3: 385–386 (1866); S. Bloembergen, *Bull. Jard. Bot. Buitenzorg* ser. 3, 16: 139–235 (1939).

## ALANGIUM

*Alangium* Lam., *Encycl.* 1: 174 (1783), *nom. cons.*, from an Indian name for *Alangium*

Type: *A. decapetalum* Lam.

*Marlea* Roxb., *Pl. Coromandel* 3: 80, fig. 283 (1820). T: *M. begonifolia* Roxb.

*Rhytidandra* A. Gray, *U.S. Expl. Exped.*, Phan. 1: 302, fig. 28 (1854); *Alangium* sect. *Rhytidandra* (A. Gray) Baill., *Adansonia* 5: 195 (1865). T: *R. vitiensis* A. Gray

*Pseudalangium* F. Muell., *Fragm.* 2: 84 (1860). T: *P. polyosmoides* F. Muell.

***Alangium villosum*** (Blume) Wangerin, *Bot. Jahrb. Syst.* 38, Beibl. 86: 61 (1906)

*Styrax villosum* Blume, *Bijdr. Fl. Ned. Ind.* 13: 671 (1826). T: from Java; *n.v.*

Tree to 9 m, sometimes taller, tomentose to glabrescent. Leaves lanceolate to ovate, rarely obovate, often asymmetric, acute to obtuse; lamina 3.5–20 cm long, 1–9 cm wide, entire, chartaceous, with 5–10 pairs of veins; base cordate to cuneate; petiole 3–20 mm long. Inflorescence 1–4-branched, 2–30-flowered, pedunculate. Calyx hairy like vegetative parts, campanulate, toothed, to 3.5 mm long. Petals 4–8, linear, dilated and cohering at base, to c. 15 mm long, hairy, creamy white to pale yellow. Stamens about as long as petals. Style to 7 mm long, hairy or glabrous; stigmas 2 or 3; ovary subcylindrical, 1-locular. Drupe ellipsoidal or globose to oblong, 1–3 cm long, 0.5–1.5 cm wide, glabrous or hairy. *Muskwood*.

*Alangium villosum* has nine subspecies found from SE Asia to Fiji. Two subspecies occur in Australia in rainforest from Cape York Peninsula, Qld, to central coast, N.S.W. Typical *A. villosum* occurs only in Java.

Internodes glabrescent

**1a. subsp. polyosmoides**

Internodes tomentose or villous-tomentose

**1b. subsp. tomentosum**

**1a. *Alangium villosum* subsp. polyosmoides** (F. Muell.) Bloemb., *Bull. Jard. Bot. Buitenzorg* ser. 3, 16: 209, figs 6j, 7t–u (1939)

*Pseudalangium polyosmoides* F. Muell., *Fragm.* 2: 84 (1860); *Rhytidandra polyosmoides* (F. Muell.) F. Muell., *Fragm.* 2: 176 (1864). T: Clarence River near Grafton, N.S.W., *Beckler s.n.*; holotype: MEL.

[*Alangium vitiense auct. non.* (A. Gray) Baill. ex Harms : K. Domin, *Biblioth. Bot.* 89: 445 (1928);



**Figure 3.** *Alangium villosum* subsp. *polyosmoides*. **A**, flowering branchlet  $\times 0.5$ ; **B**, flower  $\times 3.5$  (**A–B**, The Head, Qld, L. Bird & K. Williams, BRI); **C**, leaf base with domatia  $\times 2.5$  (Clarence R., N.S.W., J. Boorman, BRI); **D**, fruiting branchlet  $\times 0.5$  (Mt Glorious, Qld, H. Moriarty, BRI).

G. Bentham, *Fl. Austral.* 3: 386 (1866) as *Marlea vitiense* (A. Gray) Benth.; F. Mueller, *Syst. Cens. Austral. Pl.* 74 (1882) as *Stylidium vitiense* (A. Gray) F. Muell.]

Illustration: , *Bull. Jard. Bot. Buitenzorg* ser. 3, 16: 209, figs 6j, 7t–u (1939).

Young internodes lightly tomentose, later glabrescent. Leaves lanceolate to oblong, rarely ovate-oblong, 4–15 cm long, 1–5.5 cm wide, glabrous to very sparsely hairy below. Inflorescence tomentose when young, 6–10-flowered; flowers up to 18 mm long. Fig. 3.

Occurs in rainforest from Cape York Peninsula, Qld, to central coast, N.S.W. Map 13.

Qld: The Head, Mar. 1981, L. Bird & K. A. W. Williams (BRI); Upper Parrot Creek, L. J. Brass 20308 (BRI, CANB); Mt Glorious, Oct. 1980, H. Moriarty (BRI); Russell River, 1886, W. Sayer (MEL). N.S.W.: Acacia Creek, Jan. 1906, W. Dunn (NSW).

**b. *Alangium villosum* subsp. *tomentosum*** (F. Muell.) Bloemb., *Bull. Jard. Bot. Buitenzorg* ser. 3, 16: 203, figs 6b, 7g (1939)

**var. *tomentosum***

*Pseudalangium tomentosum* F. Muell., *Fragm.* 2: 85 (1860); alt. rank: *Pseudalangium polyosmoides* var. *tomentosum* F. Muell., *loc. cit.*; *Marlea vitiense* var. *tomentosa* (F. Muell.) Benth., *Fl. Austral.* 3: 386 (1867); *Alangium vitiense* var. *tomentosum* (F. Muell.) Wangerin, *Bot. Jahrb. Syst.* 38, Beibl. 86: 63 (1906); *Alangium villosum* subsp. *tomentosum* var. *australe* Bloemb., *Bull. Jard. Bot. Buitenzorg* ser. 3, 16: 204, figs 6b, 7g (1939) *nom. illeg.* T: Brisbane River, Qld, W.Hill s.n.; holotype: MEL.

Internodes villous-tomentose or tomentose. Leaves elliptic to lanceolate, ovate or obovate, 4.5–19 cm long, 2–7.5 cm wide, villous-tomentose or tomentose on abaxial surface. Inflorescence villous-tomentose or tomentose, 3–6-flowered; flowers up to 17 mm long.

Occurs in rainforest from Atherton Tableland, Qld, to north coast, N.S.W. Map 14.

Qld: Rockhampton, A. Dietrich 1787 (MEL); Port Mackay, A. Dietrich 2578 (CANB, MEL); Danbulla, Sept. 1929, R. H. Doggrell (BRI); Sarina, May 1927, W. D. Francis (BRI); Polmailly, W. J. F. McDonald & J. P. Stanton 2305 (BRI).

## OLACACEAE

### *A. S. George*

Trees or shrubs, sometimes scrambling. Leaves alternate, simple, entire, exstipulate. Flowers bisexual or unisexual, actinomorphic (except sometimes stamens), solitary or in small bracteate umbels, racemes or clusters, axillary. Hypanthium often present (in Australian species). Calyx short, reduced to a rim or lobed. Corolla of 4–6 petals, connate or (not in Australia) free; lobes valvate, usually with a  $\pm$ uncinate apical thickening inside. Disc absent or present. Stamens 3, 6 or 7, inserted in corolla tube; anthers basifixed, opening by 2 longitudinal slits; staminodes 5 or absent. Style simple; stigma globular, often shortly lobed; ovary superior or half-inferior, 1–4-locular; ovules 1 per locule, pendulous. Unisexual flowers with either stamens or pistil reduced. Fruit a 1-seeded drupe. Seeds with endosperm.

A family of 25 genera and c. 250 species in tropical and temperate regions; 3 genera and 13 species in Australia.

G. Bentham, *Olcaceae p.p.*, *Fl. Austral.* 1: 390–393 (1863); A. Engler, *Olcaceae*, *Nat. Pflanzenfam.* 3(1): 231–242 (1889); A. Engler, *Nat. Pflanzenfam.* Nachtr. 1 to 3(1): 144–149 (1897); C. F. Reed, The comparative morphology of the Olacaceae, Opiliaceae and Oktonemaceae, *Mem. Soc. Brot.* 10: 29–79, t. 1–14 (1955); H. Sleumer, *Nat. Pflanzenfam.* 2nd edn, 16b: 5–32 (1960); H. Sleumer, A taxonomic account of the Olacaceae of Asia, Malesia, and the adjacent areas, *Blumea* 26: 145–168 (1980).

## OLACACEAE

### KEY TO GENERA

- 1 Flowers solitary; corolla lobes 5; stamens 3; staminodes 5 3. OLAX
- 1: Flowers in umbels, racemes or clusters; corolla lobes 4–6; stamens 6 or 7; staminodes 0
- 2 Corolla lobes 4, bearded; stamens 7 2. XIMENIA
- 2: Corolla lobes 6, glabrous; stamens 6 1. ANACOLOSA

### Subfam. I. DYSOLACOIDEAE

**Olacaceae** subfam. **Dysolacoideae** Engl., *Nat. Pflanzenfam.* Nachtr. 1 to 3(1): 149 (1897)

Type: not designated.

Ovules with 1 or 2 integuments; raphe dorsal.

In Australia represented by the tribes Anacoloseae and Ximenieae.

### Trib. I. ANACOLOSEAE

Trib. **Anacoloseae** Engl., *Nat. Pflanzenfam.* Nachtr. 1 to 3(1): 147 (1897)

Type: *Anacolosia* Blume

Calyx not or sometimes enlarged in fruit. Stamens as many as petals, rarely twice as many. Ovary superior.

Contains eight genera, one recently recorded in Australia.

### 1. ANACOLOSA

*Anacolosia* Blume, *Mus. Bot.* 1: 250, t. 46 (1851), from the Greek *anacolos* (shortened), perhaps referring to the inflorescence

Type: *A. frutescens* (Blume) Blume

Shrubs or trees. Leaves not crowded, coriaceous; lateral nerves evident. Inflorescence of several flowers on a small, sessile rachis; flowers bisexual. Hypanthium absent. Calyx shortly toothed. Corolla 6-lobed, the tubular base globose and the lobes forming a cone in bud. Stamens 6, epipetalous; filaments flat, the anthers attached to the inner face and bearded at apex; staminodes 0. Disc hypogynous, enlarged in fruit. Ovary 1-locular or partially septate; style cone-like; stigma shortly lobed.

A genus of c. 22 species found in tropical Asia, Madagascar and Malesia; 1 species in Australia.

H. Sleumer, *Nat. Pflanzenfam.* 2nd edn, 16b: 20–21 (1960).

#### **Anacolosia** sp.

Shrub, sometimes scrambling, glabrous except flowers. Branchlets terete, slightly flexuose. Leaves elliptic to obovate, obtuse, flat; lamina 4–12 cm long, 2–5.5 cm wide, discolorous; lateral nerves 3–4 each side, openly reticulate between; petiole 7–10 mm long with 2 ridges decurrent from lamina. Inflorescence rachis c. 1 mm long; flowers developing successively; pedicels c. 1 mm long, each inserted in involucre of very small bracteoles. Calyx broadly cupular, c. 1 mm long, irregularly 5–7-lobed. Corolla 2–3 mm long, cream;

lobes very thick, shortly bearded behind anthers. Stamens c. 1 mm long; filaments very broad, cohering. Disc raised, thick. Ovary and style c. 1 mm long. Fruit not seen.

Known from one collection from the Chester River, Cape York Peninsula, Qld, where found in rainforest. Map 257 (p. 219).

Qld: Chester River, 13°40'S, 143°25'E, *B. Hyland 9472* (BRI).

Recorded as *A. papuana* Schellenb. in 1981/82 *Ann. Rep. Bot. Branch Queensland Herb.* 36 (1982) but differs from that species in the obtuse leaves and smaller flowers. Further research is needed to determine if it is a new species.

## Trib. II. XIMENIEAE

Trib. **Ximeneiae** Engl., *Nat. Pflanzenfam.* Nachtr. 1 to 3(1): 147 (1897)

Type: *Ximenia* L.

Calyx not enlarging in fruit. Stamens about twice as many as petals, in 2 rows. Ovary superior; ovules 3 or 4.

One genus in Australia.

## 2. XIMENIA

*Ximenia* L., *Sp. Pl.* 2: 1193 (1793), *Gen. Pl.* 5th edn, 500 (1754), after Francisco Ximenes, Spanish naturalist who wrote on medicinal plants c. 1615

Type: *X. americana* L.

Shrubs or trees. Lateral branchlets often divaricate. Leaves alternate, often crowded, somewhat succulent; lateral nerves evident. Flowers bisexual, in axillary umbels or racemes. Hypanthium absent. Calyx 4-lobed. Corolla tubular; lobes 4, easily parted, pale yellow to white, caducous. Stamens 7; staminodes 0. Ovary 4-locular; style slender; stigma not lobed.

A genus of 10–15 species in tropical regions; 1 species in Australia.

G. Bentham, *Fl. Austral.* 1: 391 (1863); J.-F. Villiers, *Fl. Nouv.-Caléd.* 9: 179–183 (1980); H. Sleumer, *Blumea* 26: 166–167 (1980).

### ***Ximenia americana* L., *Sp. Pl.* 2: 1193 (1753)**

T: tropical America, collector unknown; lecto: BM (*Hort. Cliff.* 483), *vide* G. L. Lucas, *Fl. Trop. E. Africa*, Olacaceae: 5 (1968).

*X. exarmata* F. Muell., *Trans. & Proc. Philos. Inst. Victoria* 3: 22 (1859). T: Suttor River, Qld, *F. Mueller s.n.*; iso: K, *vide* H. Sleumer, *op. cit.* 167.

Illustrations: H. Sleumer, *Nat. Pflanzenfam.* 2nd edn, 16b: 23 (1960); G. L. Lucas, *op. cit.* 11, fig. 2; J.-F. Villiers, *Fl. Nouv.-Caléd.* 9: 181, t. 43 (1980).

Scrambling shrub or small tree to 5 m, glabrous except corolla. Bark smooth or fissured, brown. Spines sometimes present. Leaves elliptic to obovate, succulent, obtuse or slightly emarginate, flat; lamina mostly 3–5 cm long and 1–3.5 cm wide; lateral nerves evident; petiole 5–9 mm long with 2 ridges decurrent from lamina. Peduncle and pedicels striate; peduncle 5–9 mm long; pedicels 3–5 mm long; bracts 1 mm long. Calyx 1 mm long. Corolla 7 mm long, white to pale yellow, densely bearded inside in lower  $\frac{3}{4}$ ; apical thickening papillose. Stamens 6 mm long; filaments slender, 4 mm long. Pistil 5 mm long; style 2.5 mm long. Drupe pyriform or globular, 17–25 mm long; exocarp yellow. *Yellow Plum.*

A pantropical species; in Australia occurs in N Qld from Torres Strait islands to Rockhampton, extending inland to vicinity of Blackall. Along the coast grows on sand dunes, in forest and behind mangroves; inland in loam or on quartzite hills in shrubland and mixed forest. Map 15.

Qld: Lisgool, c. 100 km NE of Blackall, *S. L. Everist 1982* (BRI); Port Douglas, *W. Jones 2071* (CANB); Lizard Beach, Hinchinbrook Is., *P. Sharpe 1771* (BRI); Clump Point, *L. S. Smith 4908* (BRI).

The fruit is edible, though sometimes purgative. Seeds are rich in oil containing ximenic acid (J.-F. Villiers, *op. cit.* 183).

### Subfam. II. OLACOIDEAE

**Olacaceae** subfam. **Olacoideae**.

Type: *Oxal* L.

Ovules without integument.

In Australia represented by the tribe Olaceae.

### Trib. III. OLACEAE

Calyx and corolla present. Stamens and staminodes together c. twice as many as petals. Ovary superior or half-inferior; ovules pendulous but turned upwards. Hypanthium enlarged about fruit.

Contains three genera, of which *Oxal* occurs in Australia.

### 3. OLAX

*Oxal* L., *Sp. Pl.* 1: 34 (1753), *Gen. Pl.* 5th edn, 20 (1754), from the late Latin *olax* (malodorous), in reference to the unpleasant scent of some species

Type: *O. zeylanica* L.

*Spermaxyrum* Labill., *Nov. Holl. Pl.* 2: 84 (1807). T: *S. phyllanthi* Labill.

*Lopadocalyx* Klotzsch, in *Lehm., Pl. Preiss.* 1: 178 (1845) (in Euphorbiaceae). T: not designated.

Shrubs or small trees, often malodorous. Branchlets slightly flexuose. Leaves distichous, usually soft when fresh, yellow-green or pale grey-green, often undulate when dried; midrib evident; lateral nerves obscure. Flowers bisexual or unisexual, solitary (in Australian species), axillary, shortly pedicellate. Hypanthium present. Calyx short, cupular, entire or slightly lobed. Petals 5, connate but usually easily parted, each with small uncinata thickening inside at apex, creamy white or pale yellow, caducous. Stamens 3, inserted in corolla tube between lobes; staminodes 5, inserted  $\pm$ opposite lobes; anthers 2-locular, introrse. Ovary partly immersed in hypanthium, 1-locular or imperfectly 3-locular, with 1 ovule per locule; style short, often caducous; stigma 3-lobed. Fruit with succulent exocarp formed by enlarged hypanthium; calyx persistent as apical collar. Seed 1.

A genus of c. 60 species in tropical Africa, Madagascar, Malesia and Australia; 11 endemic species in Australia, all in the section *Triandrae* Engl., having 3 stamens and 5 staminodes. Absent from Tas.

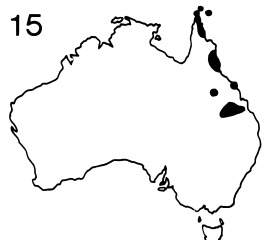
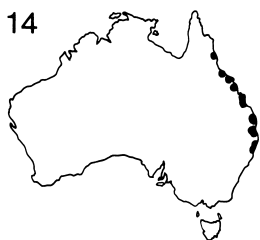
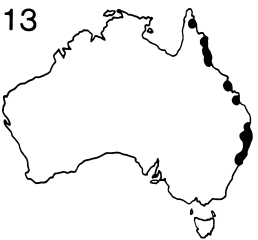
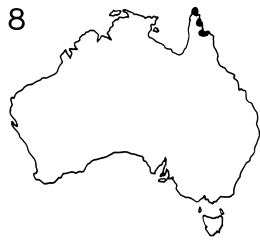
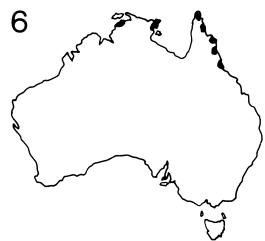
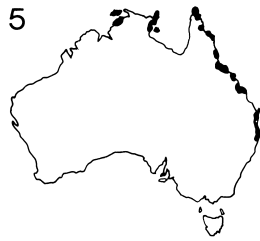
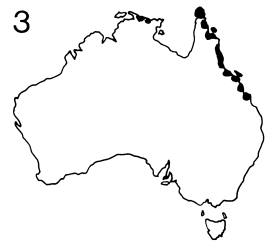
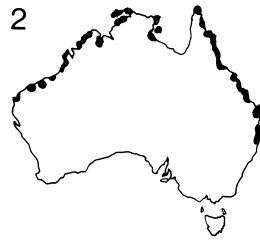
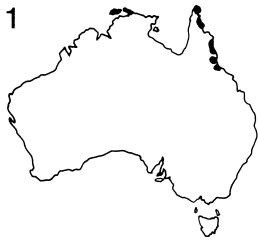
G. Bentham, *Fl. Austral.* 1: 391–393 (1863); H. Sleumer, *Nat. Pflanzenfam.* 2nd edn, 16b: 24–27 (1960); H. Sleumer, *Blumea* 26: 154–160 (1980).

1 Leaves 2.5–9 cm long

1. ***O. pendula***

1: Leaves up to 2 cm long or scale-like or absent





- 1. *Rhizophora mucronata*
- 4. *Rhizophora lamarckii*
- 7. *Bruguiera exaristata*
- 10. *Ceriops tagal*
- 13. *Alangium villosum*  
subsp. *polyosmoides*

- 2. *Rhizophora stylosa*
- 5. *Bruguiera gymnorhiza*
- 8. *Bruguiera cylindrica*
- 11. *Ceriops decandra*
- 14. *Alangium villosum*  
subsp. *tomentosum*

- 3. *Rhizophora apiculata*
- 6. *Bruguiera sexangula*
- 9. *Bruguiera parviflora*
- 12. *Carallia brachiata*
- 15. *Ximenia americana*

- 2 Leaves absent or scale-like
- 3 Branchlets usually setose; staminodes simple or emarginate 8. *O. aphylla*
- 3: Branchlets glabrous; staminodes bifid 7. *O. spartea*
- 2: Leaves well-developed, green
- 4 Staminodes glabrous 11. *O. phyllanthi*
- 4: Staminodes villous, hirsute or papillose in lower half
- 5 Staminodes simple
- 6 Branchlets  $\pm$ terete; leaves mostly 5–10 mm long, 1–2 mm wide, rarely larger, uncinata; corolla 4–5 mm long 9. *O. stricta*
- 6: Branchlets angular; leaves mostly 10–20 mm long, 4–6 mm wide, not uncinata; corolla 5–5.5 mm long 10. *O. angulata*
- 5: Staminodes bifid
- 7 Leaves deeply concave, mostly 2–6 mm long; pedicel and hypanthium together 1–2 mm long
- 8 Leaves broadly obovate to obcordate
- 9 Leaves uncinata; W.A. species 4. *O. benthamiana*
- 9: Leaves with erect, obtuse mucro; S.A. species 3. *O. obcordata*
- 8: Leaves linear, oblong or narrowly obcordate
- 10 Staminodes hirsute near base; corolla hirsute in throat; drupe 4–5 mm long; branchlets angular but not flattened 4. *O. benthamiana*
- 10: Staminodes papillose in lower half; a few hairs at base of corolla lobes; corolla papillose in throat; drupe 8–10 mm long; branchlets flattened 5. *O. scalariformis*
- 7: Leaves  $\pm$ flat, mostly 4–18 mm long; pedicel and hypanthium together 2–3 mm long
- 11 Leaves oblong to narrowly cuneate, usually retuse; corolla 3.5–4 mm long; eastern species 2. *O. retusa*
- 11: Leaves obovate-elliptic, not or slightly retuse; corolla 6–7 mm long; western species 6. *O. aurantia*

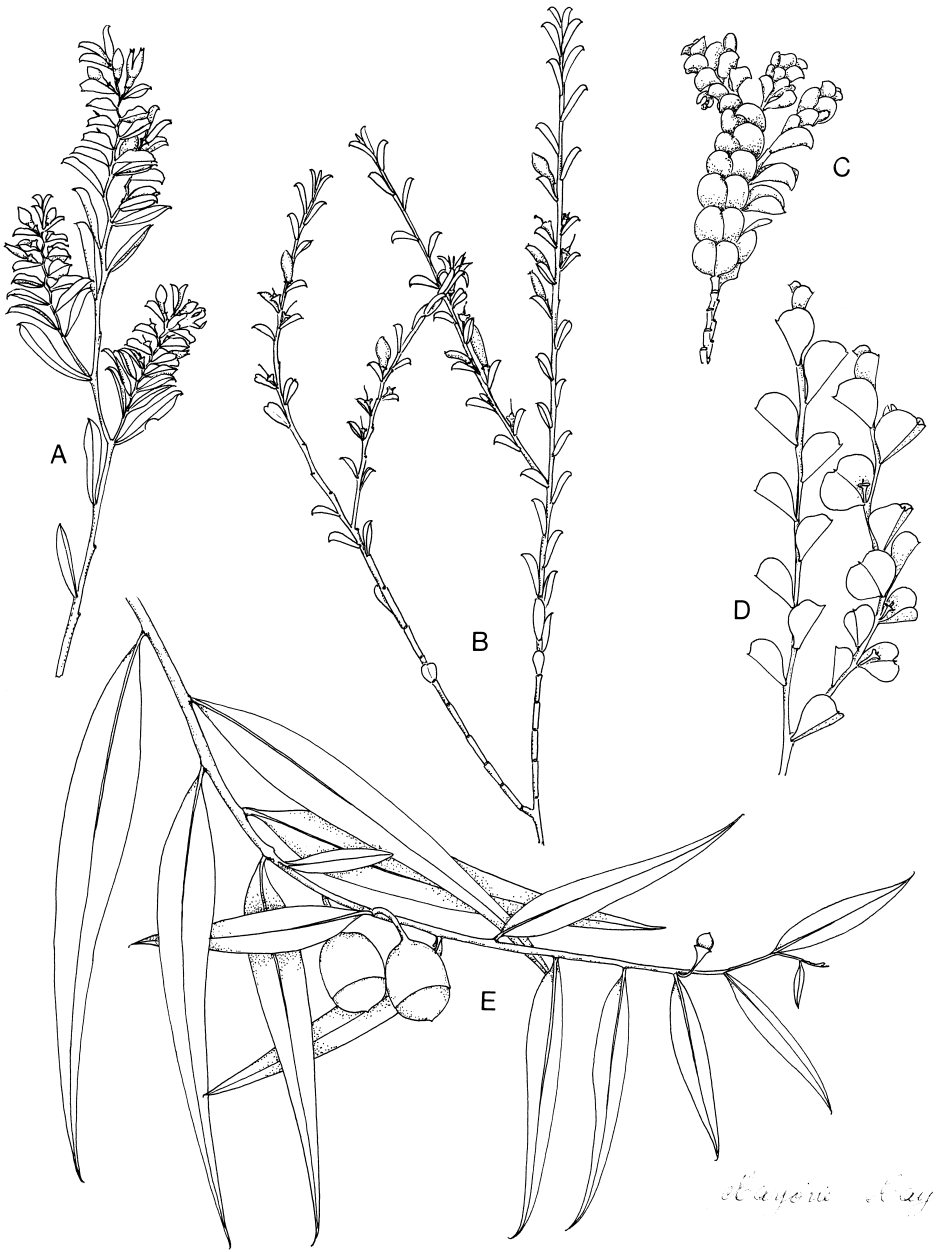
**1. *Olax pendula*** L. S. Smith, *Contr. Queensland Herb.* 6: 9 (1969)

T: Fishbone Ck near Jacky Jacky airstrip. c. 17.5 miles (28 km) SSW of Cape York, Qld, L. S. Smith 12428; holo: BRI; iso: BRI, CANB.

Shrub or small tree to 4 m, glabrous. Branchlets pendulous, angular, striate. Leaves lanceolate, sometimes narrowly ovate, acuminate or acute, not undulate, mostly 2.5–9 cm long and 5–15 mm wide, sessile or very shortly petiolate. Flowers solitary, sometimes on short, leafy branchlets; pedicel and hypanthium together 3–5 mm long, elongating in fruit. Calyx 0.2–0.3 mm long. Corolla 4–4.5 mm long, pale green. Stamens c. 2 mm long; anthers with short, bifid appendage; filaments broad; staminodes 3 mm long, broad at base, narrow and bifid above, glabrous. Style less than 1 mm long; ovary 3-locular. Drupe broadly ellipsoidal, 8–11 mm long; enlarged hypanthium cup-like, sometimes almost enclosing fruit, orange-red. Fig. 4E.

Occurs in W Arnhem Land, N.T., on Cape York Peninsula and on N Great Barrier Reef islands, Qld. Grows in sandstone in vine forest, coastal forest and shrubland, and on coral islands. Map 16.

N.T.: Little Nourlangie Rock, C. R. Dunlop 5015 (BRI, CANB, NSW, NT). Qld: Perry Island, near Cape Grenville, H. S. Curtis 12 (BRI); c. 32 km N by W of Moreton Telegraph Station, C. H. Gittins 1830 (BRI, NSW); Olive River, B. Hyland 7414 (BRI, CANB, NSW).



**Figure 4.** *Olax*. **A.** *O. benthamiana*, typical variant, flowering branchlet  $\times 1$  (Cottesloe, W.A., A. Morrison, BRI). **B.** *O. benthamiana*, common inland variant, flowering branchlet with some corollas fallen,  $\times 1$  (T. Muir 4209, MEL). **C.** *O. benthamiana*, northern broad-leaved variant, branchlet  $\times 1$  (R. Hnatiuk 800009, PERTH). **D.** *O. obcordata*, branchlet with corollas fallen,  $\times 1$  (Kangaroo Is., S.A. M. Phillips, CBG). **E.** *O. pendula*, fruiting branchlet  $\times 1$  (C. Gittins 1830, NSW).

Distinguished from other Australian species by the large habit, pendulous branchlets and large, usually acuminate leaves. Recorded for W.A. (J. W. Green, *Census Vasc. Pl. W. Austral.* 33, 1981) but the sterile specimen on which this was based is not Olacaceae.

## 2. *Olax retusa* Benth., *Fl. Austral.* 1: 392 (1863)

T: Moreton Is., Qld, Aug. 1855, *F. Mueller*; syn: MEL; same locality, *McGillivray*; syn: *n.v.*

Illustration: N. C. W. Beadle, *Stud. Fl. N.E. New South Wales* 4: 523, fig. 229B (1980)

Shrub to 60 cm, rarely taller, single-stemmed or with fire-tolerant stock and many openly-branched stems, glabrous except staminodes. Branchlets almost smooth. Leaves oblong to narrowly cuneate, truncate to retuse, shortly apiculate, mostly 4–10 mm long and 2–3 mm wide, sessile, semi-amplexicaul. Pedicel and hypanthium together 2–3 mm long. Calyx c. 0.2 mm long. Corolla 3.5–4 mm long, creamy white. Stamens 1.5 mm long; filaments narrow; staminodes 2 mm long, bifid, densely bearded in lower half. Style 1.5 mm long. Drupe ellipsoidal, 5 mm long. Fig. 6A.

Occurs in coastal districts from Bundaberg, Qld, to Coffs Harbour, N.S.W. Grows in sandy soils in sclerophyllous woodland and wallum, sometimes near swamps. Map 17.

Qld: Caloundra, *S. T. Blake 4121* (BRI); Burrum Heads, *C. H. Gittins 627* (BRI, NSW); Cooloola, 13 June 1971, *K. A. W. Williams* (BRI). N.S.W.: 1.6 km from Corindi on Red Rock road, *E. F. Constable 4822* (NSW).

## 3. *Olax obcordata* A. S. George, *Fl. Australia* 22: 220 (1984)

T: Cape Borda, Kangaroo Is., S.A., 28 Sept. 1965, *M. E. Phillips*; holotype: AD; isotype: CBG.

Shrub to 60 cm. Branchlets somewhat flexuose, angular but soon terete, finely granular. Leaves broadly obovate-obcordate, retuse, obtusely mucronate, 4–10 mm long, concave, not or slightly amplexicaul, sessile. Pedicel and hypanthium together 1–2 mm long. Calyx 0.5 mm long, irregularly lobed. Corolla 4–5 mm long. Stamens 2 mm long; anthers shortly apiculate; staminodes 3 mm long, deeply bifid, villous towards base. Style 2 mm long; stigma 3-lobed. Drupe obpyriform, 4 mm long; calyx persistent. Seed spherical, 3 mm diam. Fig. 4D.

Occurs on Kangaroo Is. and southern Eyre Peninsula, S.A. Map 18.

S.A.: Hundred of Lincoln, Eyre Peninsula, *C. R. Alcock 1686* (AD); Breakneck R., Kangaroo Is., 25 Nov. 1945, *J. B. Cleland* (AD).

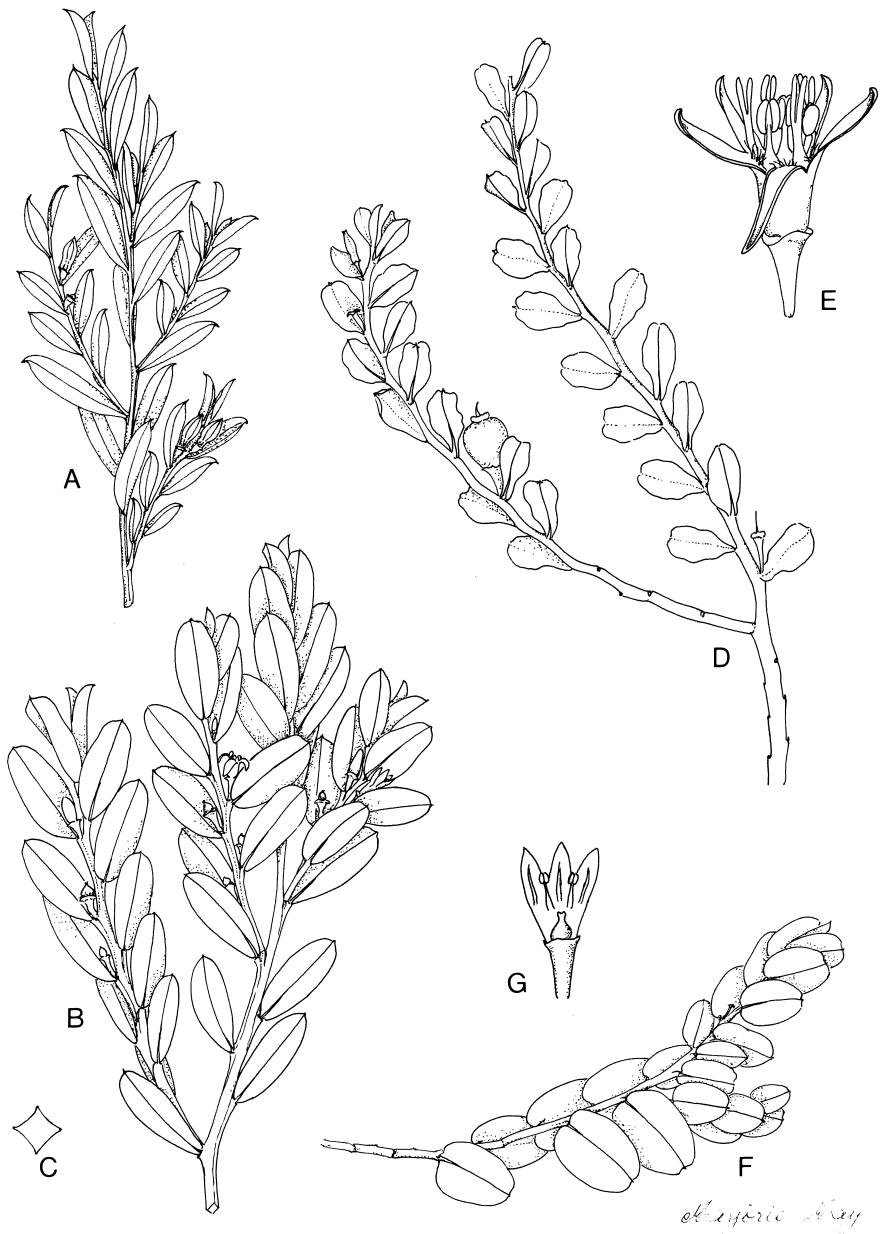
Distinguished from *O. benthamiana* Miq. especially by the consistently broad leaves (usually wider than long) with an erect, not recurved, mucro.

## 4. *Olax benthamiana* Miq. in Lehm., *Pl. Preiss.* 1: 228 (1845)

T: near Perth, W.A., 19 Jan. 1839, *L. Preiss 2095*; isotype: MEL (2 sheets); other sheets at L, P, U, *vide* H. Sleumer, *Blumea* 26: 159 (1980).

*O. uliginosa* (Klotzsch) Klotzsch, in Lehm., *Pl. Preiss.* 2: 230 (1848). *Lopadocalyx uliginosus* Klotzsch, in Lehm., *Pl. Preiss.* 1: 178 (1845); T: between Mt Melville and Mt Elphinstone, W.A., 11 Oct. 1840, *L. Preiss 1210*; *n.v.*

Shrub to 1 m, rarely taller, openly branched, glabrous except flowers. Branchlets usually erect, somewhat angular-striate. Leaves linear-oblong to obcordate, obtuse to slightly retuse, uncinuate, flat to deeply concave, often almost amplexicaul, 2–20 mm long; leaves subtending the flowers shorter and usually broader. Pedicel and hypanthium together 1–1.5 mm long. Calyx 0.5 mm long, obtusely 5-lobed. Corolla 4–6 mm long. Stamens 1.5 mm long; staminodes linear, 2.5–3 mm long, bifid, bearded in lower third. Style c. 1.5 mm long. Drupe obovoid-obpyriform, c. 4 mm long, with prominent apical scar; style persistent. Fig. 4A-C.



**Figure 5.** *Olax*. **A**, *O. stricta*, branchlet with buds  $\times 1$  (Bulli road, N.S.W., V. Atkin, BRI). **B–C**, *O. angulata*. **B**, flowering branchlet  $\times 1$ ; **C**, T.S. stem  $\times 2$  (**B–C**, D. McGillivray 2717, NSW). **D–E**, *O. aurantia*. **D**, branchlet with buds and fruit  $\times 1$ ; **E**, flower  $\times 3$  (**D–E**, P. Wilson 6583, PERTH). **F–G**, *O. phyllanthi*. **F**, branchlet  $\times 1$ ; **G**, flower with 2 corolla lobes removed,  $\times 4$  (**F–G**, T. Muir 4105, MEL).

Widespread in south-western W.A. from the lower Murchison River to Busselton and E to Esperance. Usually in sand or sandy gravel, sometimes on dunes, occasionally on laterite, in shrubland and open woodland. Map 19.

W.A.: Burns Beach, 18 Oct. 1979, *R. J. Cranfield* (PERTH); c. 4 km N of Howick Hill, *N.N. Donner* 2695 (AD, CANB, PERTH); E edge of the Wongan Hills, *K. F. Kenneally* 7413 (CANB, PERTH); Cowaramup, *R. D. Royce* 2827 (PERTH); c. 11 km E of Wannamal, *H. U. Stauffer* 5386 *et al.* (CANB, MEL, PERTH).

The most variable Australian *Olax*. Typical *O. benthamiana*, found on coastal dunes from Perth to Jurien, has large, oblong stem leaves, and flowers on short lateral branchlets. Widespread in southern districts is a variant (probably Klotzsch's *O. uliginosa*) with short, narrow leaves; on the Darling Plateau are broad-leaved variants otherwise similar to this; a population in the Stirling Range has broadly obovate floral leaves. On lateritic rises between Badgingarra and Mingenew is a variant with all leaves broadly obovate, resembling *O. obcordata* but with uncinately leaves.

### 5. *Olax scalariformis* A. S. George, *Fl. Australia* 22: 220 (1984)

T: c. 1 km S of Jurien–Coomallo road along Cervantes road, W.A., 2 Dec. 1982, *A. S. George* 16213; holotype: PERTH; isotype: AD, CANB, K, MEL, PERTH.

Much-branched but sometimes open, spreading shrub to 70 cm. Branchlets flattened, angular, slightly zig-zag, becoming terete, often orange-brown, striate when dried. Leaves linear, oblong or narrowly ovate, not or slightly retuse, obtusely uncinately, 2–6 mm long, thick, concave to canaliculate, falling after c. 1 year leaving prominent transverse scars; floral leaves scarcely wider than stem leaves. Pedicel and hypanthium together 1–2 mm long. Calyx 0.4 mm long, unevenly lobed. Corolla 4–5 mm long, papillose in throat, a few hairs behind stamens. Stamens c. 2 mm long; staminodes c. 3 mm long, deeply bifid, papillose in lower half. Style 3 mm long. Drupe obpyriform to ellipsoidal, 8–10 mm long, pale green, scarcely succulent, faintly striate when dried, the calyx persistent as an apical collar. Fig. 6D–G.

Occurs in south-western W.A. from the lower Moore River to the Arrowsmith River. Grows in sand and sandy loam, rarely in limestone, in open shrubland. Map 20.

W.A.: 3 km S of Jurien Bay road on road to Cervantes, *S. Carlquist* 5505 (NSW, PERTH); N of Arrowsmith River, *R. J. Hnatiuk* 760271 (PERTH).

Distinguished from *O. benthamiana* especially by the flattened young branchlets, markedly distichous leaves, scarcely widened floral leaves, papillose corolla throat and larger drupe.

### 6. *Olax aurantia* A. S. George, *Fl. Australia* 22: 220 (1984)

T: Indarra, W.A., May 1934, *C. A. Gardner s.n.*; holotype: PERTH; isotype: CANB, K.

Slender, openly-branched shrub to 2 m, glabrous except staminodes. Branchlets angular-striate. Leaves obovate to broadly elliptic, concave, obtuse to slightly retuse, shortly uncinately, 5–18 mm long, 3–10 mm wide, sessile or almost so, those towards shoot apices often markedly smaller. Pedicel and hypanthium together 2–3 mm long. Calyx 0.2–0.5 mm long. Corolla 6–7 mm long, with a few hairs behind stamens. Stamens 5 mm long; filaments minutely papillose; staminodes 5 mm long, bifid. Style 3 mm long. Drupe ellipsoidal, 10–14 mm long, 8–9 mm wide, orange. Seed obovoid, compressed, 6–9 mm long. Fig. 5D–E.

Occurs near the W coast of W.A. between the lower Murchison River and Eneabba, with an outlier on the Cape Range. Grows in sand, sometimes over limestone, in shrubland or low open forest. Map 21.

W.A.: Casuarinas road, E of Geraldton, *A. M. Ashby* 2287 (AD); Cape Range, SW of Learmonth, *A. S. George* 10284 (CANB, PERTH); 7 km W of Lake Indoon, *R. J. Hnatiuk* 770018 (PERTH); 10 km SE of Kalbarri, *P. G. Wilson* 6583 (PERTH).

Distinguished from *O. benthamiana* Miq. by the larger habit, leaves, flowers and fruit, the last ripening orange.

**7. *Olax spartea*** A. S. George, *Fl. Australia* 22: 221 (1984)

T: Edgar Range, SE of Broome, W.A., 13 Aug. 1976, *K. F. Kenneally 5619*; holo: PERTH; iso: CANB.

Spindly shrub with many erect branchlets, glabrous except staminodes. Branchlets slightly striate. Leaves bract-like, narrowly ovate to oblong, concave, obtuse, 1.5–2.5 mm long, almost scarious, caducous; margins slightly crenulate. Pedicel and hypanthium together less than 1 mm long. Calyx c. 0.1 mm long. Corolla 3–3.5 mm long, the lobes shortly apiculate, bearded at base of staminodes. Stamens 1 mm long; filaments very short; staminodes bifid. Style very short. Fruit not seen. Fig. 6C.

Known only from type locality on SW edge of the Kimberley, W.A. Grows on red sand dunes. Map 22.

Distinguished from *O. aphylla* R.Br. by being glabrous and by the larger leaves and corolla.

**8. *Olax aphylla*** R.Br., *Prodr.* 358 (1810)

*Spermaxyrum aphyllum* (R.Br.) DC., *Prodr.* 1: 532 (1824). T: Morgan Is., N.T., *R. Brown*; holo: BM *n.v.*, *fide* H. Sleumer, *Blumea* 26: 158 (1980); iso: BRI, CANB, MEL, NSW.

Spindly shrub to 1.5 m, usually shortly setose, sometimes almost glabrous. Branchlets striate. Leaves bract-like, ovate, acute or obtuse, 0.5–1.5 mm long, dark brown, caducous. Pedicel and hypanthium thick, together 0.5–1 mm long. Calyx 0.1–0.2 mm long, slightly undulate, setose at least on margin. Corolla 2–3 mm long, shortly setose outside, densely hirsute inside about middle. Stamens 1–1.5 mm long; staminodes linear to filiform, entire or emarginate, hirsute at base. Style c. 1 mm long, sparsely papillose. Drupe ellipsoidal, 5–7 mm long, or sometimes spherical, 3.5 mm diam., sparsely to densely pubescent. Fig. 6B.

Occurs in N Kimberley, W.A., in northern N.T., and near Laura and Cooktown, Qld. Grows among sandstone rocks and in sandy soil in woodland and shrubland. Map 23.

W.A.: Boiga Falls, Drysdale River National Park, *K. F. Kenneally 3040* (BRI, PERTH). N.T.: Mt Brockman, *C. R. Dunlop 5488* (DNA); Katherine Gorge National Park, *N. Byrnes 1183* (DNA); 6 km NW of El Sharana, *P. Martensz & R. Schodde AE 497* (CANB, DNA). Qld: near Laura River, *N. Byrnes 3098* (BRI).

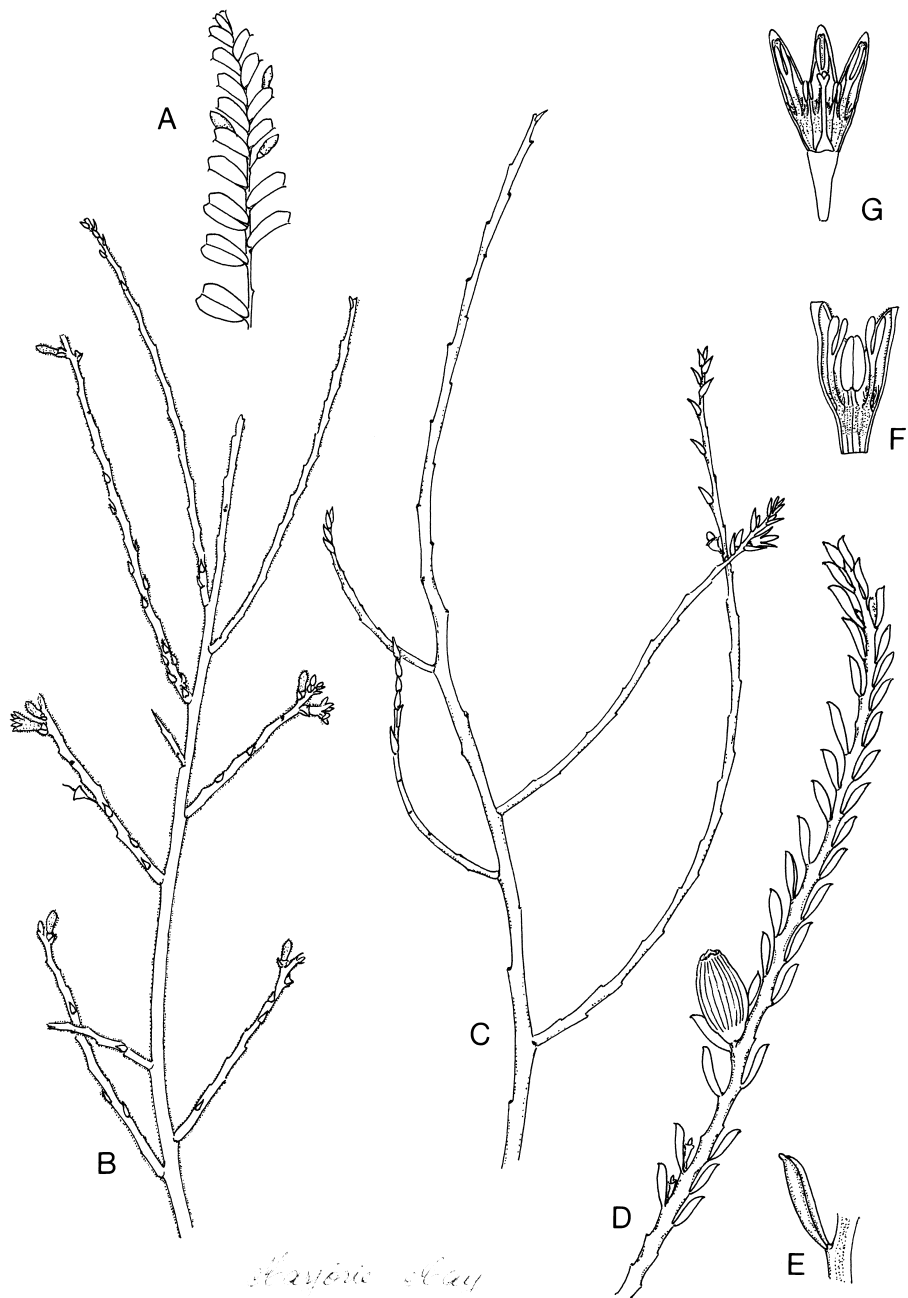
Plants with glabrous stems may be distinguished from *O. spartea* by the setose margins of the leaves and calyx.

**9. *Olax stricta*** R.Br., *Prodr.* 358 (1810)

*Spermaxyrum strictum* (R.Br.) DC., *Prodr.* 1: 532 (1824). T: Port Jackson, N.S.W., *R. Brown*; holo: BM; iso: BRI, CANB, MEL; also E, K, P, *fide* H. Sleumer, *Blumea* 26: 159 (1980).

Illustrations: E. R. Rotherham *et al.*, *Fl. Pl. New South Wales S. Queensland* 50, t. 120 (1975); N. C. W. Beadle, *Stud. Fl. N.E. New South Wales* 4: 523, fig. 229A (1980).

Shrub to 2.3 m, much-branched, glabrous except staminodes, or branchlets minutely papillose. Branchlets slender, ±striate. Leaves linear, oblong or narrowly elliptic, obtuse to truncate or acute, often mucronate and slightly uncinata, flat or concave, mostly 5–10 mm long and 1–2 mm wide, sometimes larger, sessile. Pedicel and hypanthium together 1–2.5 mm long. Calyx 0.2–0.5 mm long, slightly undulate. Corolla 4–5 mm long; lobes 0.6–0.7 mm wide at base. Stamens c. 1.5 mm long; staminodes narrow, 2 mm long, simple, densely hirsute in lower half. Style 2 mm long. Drupe obovoid-ellipsoidal, 4.5–8 mm long. Figs 5A, 11.



**Figure 6.** *Olax*. **A**, *O. retusa*, branchlet with buds  $\times 1$  (S. Everist 7687, BRI). **B**, *O. aphylla*, flowering branchlet  $\times 1$  (M. Lazarides 7929, NSW). **C**, *O. spartea*, flowering branchlet  $\times 1$  (K. Kenneally 5619, PERTH). **D–G**, *O. scalariformis*. **D**, fruiting branchlet  $\times 1$ ; **E**, leaf  $\times 1$  (**D–E**, A. George 16210, PERTH); **F**, male flower with 3 lobes removed,  $\times 3$ ; **G**, female flower with 2 lobes removed,  $\times 3$  (**F–G**, A. George 16213, PERTH).



Occurs from the Blackdown Tableland, Qld, through N.S.W. to E Gippsland, Vic.; in N.S.W. extends inland to Bunberry. Grows on sandstone and granite (rarely laterite) in open forest, woodland and shrubland, and on coastal dunes in shrubland. Map 24.

Qld: Girraween National Park, *S. T. Blake 23690* (BRI); c. 35 km SE of Blackwater, Blackdown Tableland, *R. J. Henderson et al. 974* (BRI, NSW, PERTH). N.S.W.: between St Albans and Wollombi, *R. Story 7406* (BRI, CANB, MEL); Long Beach near Pambula, 1 July 1976, *J. H. Willis* (MEL, NSW). Vic: Lower Cann River, *R. Melville 2891* (NSW).

### 10. *Olax angulata* A. S. George, *Fl. Australia* 22: 220 (1984)

T: E side of Minnie Water, N of Woolli, N.S.W., 28 Sept. 1976, *J. de S. Disney & D. J. McGillivray 2717*; holotype: NSW; isotype: BRI, CANB, MEL.

Shrub c. 1 m tall, glabrous except staminodes, possibly dioecious. Branchlets erect, prominently angular, glaucous. Leaves elliptic, rounded at apex with short, obtuse, straight mucro, 10–20 mm long, 4–6 mm wide, flat, sessile. Pedicel and hypanthium together 2–2.5 mm long. Calyx c. 0.5 mm long, not lobed. Corolla 5–5.5 mm long; lobes c. 1 mm wide at base. Stamens 2 mm long; staminodes linear, 3 mm long, simple, densely bearded in lower half. Fruit not seen. Fig. 5B–C.

Known only from the type and a nearby locality, but locally common. Grows in sandy soils in woodland and near swamps. Map 25.

N.S.W.: Diggers Camp, N of Woolli, *D. F. Blaxell 138* (NSW).

In the flowers examined, the ovary and style were undeveloped, possibly indicating dioecy.

### 11. *Olax phyllanthi* (Labill.) R.Br., *Prodr.* 358 (1810)

*Spermaxyrum phyllanthi* Labill., *Nov. Holl. Pl.* 2: 84, t. 233 (1807). T: Esperance Bay, W.A., Dec. 1792, *J. Labillardière*; isotype: BM, P, both *n.v.*, *fide* H. Sleumer, *Blumea* 26: 158 (1980).

*Lopadocalyx phyllanthoides* Klotzsch, in *Lehm., Pl. Preiss.* 1: 178 (1845). T: near Albany, W.A., 11 Oct. 1840, *L. Preiss 1211*; isotype: MEL (2 sheets); another sheet at P, *fide* H. Sleumer, *op.cit.* 158.

Illustration: *J. Labillardière, loc. cit.*

Shrub to 1.5 m, often bushy, pale green. Branchlets often curved to pendulous, somewhat angular. Leaves broadly ovate-elliptic, flat, retuse to rounded, obtusely mucronate, mostly 5–15 mm long and 4–8 mm wide, sessile or almost so, markedly distichous, soft when fresh. Pedicel and hypanthium together 2 mm long. Calyx 0.3–0.5 mm long, slightly undulate. Corolla 3–4 mm long. Stamens 1 mm long; staminodes filiform, 1 mm long, simple, glabrous. Style c. 1 mm long. Drupe ovoid to obpyriform, 3–5 mm long, the calyx persistent as an erect crown; style persistent. Seed spherical, c. 3 mm diam. Fig. 5F–G.

Common on consolidated dunes along the S coast of W.A. from Walpole to Israelite Bay; sometimes occurs a short distance inland in deep sand, rarely on quartzite or granite, in shrubland. Map 26.

W.A.: Two Peoples Bay, *N. T. Burbidge 8092* (CANB, PERTH); 14 km E of Oldfield R. mouth, *Hj. Eichler 20188* (CANB, PERTH); Yungermere, *G. J. Keighery 2305* (PERTH); Denmark, *H. U. Stauffer 5373 & R. D. Royce* (PERTH); Mt Howick, *P. G. Wilson 8166* (PERTH).



**Figure 7.** A–C, *Cansjera leptostachya*. A, flowering branchlet  $\times 1$  (A. Dietrich, B); B, pistil with scales of disc  $\times 12.5$ ; C, flower with bract  $\times 12.5$  (B–C, NGF 30718, L). D–G, *Opilia amentacea*. D, young inflorescence  $\times 4.5$  (M. Lazarides 6673, B); E, pistil with lobes of disc, anterior lobe removed,  $\times 11.5$ ; F, flower  $\times 11.5$ ; G, bract  $\times 11.5$  (E–G, Kaspiev 414, B).

# OPILIACEAE

*P. Hiepko*

Small trees, shrubs or lianes, glabrous or pubescent. Leaves distichous, simple, usually variable, entire, exstipulate, pinnately veined; dried leaves mostly finely tuberculate with cystoliths in the mesophyll. Inflorescence axillary or cauliflorous, panicle-like, racemose, umbellate or spicate; bracts narrowly ovate or scale-like, often caducous. Flowers small, 3–5-merous, bisexual or sometimes unisexual. Perianth a single whorl of valvate, free or partly united tepals, rarely absent. Stamens as many as and opposite tepals; anthers 2-locular, introrse, longitudinally dehiscent. Disc intra-staminal, annular or cupular, or with lobes alternating with the stamens. Ovary superior, unilocular; style short or none; stigma entire or shallowly lobed. Ovule 1, pendulous from apex of central placenta, anatropous, with 1 integument. Fruit drupaceous; mesocarp fleshy, thin; endocarp woody or crustaceous. Seed large, without testa. Embryo terete, embedded in copious, oily endosperm, nearly as long as seed or shorter, with 3 or 4 linear cotyledons; radicle often very short.

A pantropical family of 9 genera and c. 30 species; 7 genera between India and the Solomon Is., 2 of which occur also in tropical Africa; 1 genus restricted to Africa and 1 to Central and South America. In Australia represented by 2 genera, each with one species.

The 2 genera represented in Australia, *Cansjera* and *Opilia*, are root-parasites. The inflorescence of *Opilia* and other genera is not a true raceme: the flowers are arranged in ternate groups. *Opilia* has been described as having an inconspicuous calyx and free petals but the slightly cupuliform torus is not interpreted here as a calyx.

G. Bentham & J. D. Hooker, *Gen. Pl.* 1: 349–350 (1862); G. Bentham, *Olaceae*, *Fl. Austral.* 1: 390–396 (1863); T. Valetton, *Critisch Overzicht der Olacineae B. et H.* (1886); H. Sleumer, *Opiliaceae*, *Nat. Pflanzenfam.* 2nd edn, 16b: 33–41 (1935); P. Hiepko, *A Revision of Opiliaceae I. Genera of the Eastern Old World, excluding Opilia, Willdenowia* 9: 13–56 (1979); P. Hiepko, *Opiliaceae*, *Fl. Males.* 10 (in press).

## KEY TO GENERA

Inflorescence raceme-like; flowers mostly 3 per bract; bracts broadly ovate, caducous before anthesis; tepals free; fruit up to 3 cm long

1. OPILIA

Inflorescence a spike; each flower in axil of a small persistent bract; tepals united, the tube urceolate; fruit up to 1.5 cm long

2. CANSJERA

## 1. OPILIA

*Opilia* Roxb., *Pl. Coast Coromandel* 2: 31, t. 158 (1802), derivation not known

Type: *O. amentacea* Roxb.

Lianes or erect shrubs; young branchlets often puberulous. Leaves coriaceous. Flowers bisexual, 3 per bract in axillary racemes; rachis and pedicels tomentose with brown or yellow hairs. Bracts peltate, broadly ovate, ciliate, closely imbricate, caducous before anthesis. Tepals 5, rarely 4, free, recurved. Stamens exceeding perianth. Disc lobed, with 5, rarely 4, fleshy, irregularly dentate lobes alternating with stamens. Ovary cylindrical to ellipsoidal; stigma sessile. Drupe ellipsoidal, puberulous; endocarp thin. Embryo nearly as large as seed; radicle small; cotyledons 3.

A genus of 2 species, 1 restricted to tropical Africa, the other from tropical Africa through tropical Asia and Malesia to the Solomon Is. and northern Australia.

G. Bentham & J. D. Hooker, *Opilia* (in Olacineae), *Gen. Pl.* 1: 350 (1862); G. Bentham, *Opilia* (in Olacineae), *Fl. Austral.* 1: 394 (1863); H. Sleumer, *Nat. Pflanzenfam.* 2nd edn, 16b: 38 (1935); P. Hiepko, A Revision of Opiliaceae II. *Opilia* Roxb., *Willdenowia* 12: 161–182 (1982).

**Opilia amentacea** Roxb., *Pl. Coast Coromandel* 2: 31, t. 158 (1802)

T: Roxburgh, *Pl. Coast Coromandel* 2: t. 158 (1802); lecto, *vide* P. Hiepko, *Willdenowia* 12: 163 (1982).

Illustrations: F. M. Bailey, *Compr. Cat. Queensland Pl.* 98, fig. 74 bis (1913); P. Hiepko, *op. cit.* 166, fig. 2 (1982).

Liane up to 10 m, or erect shrub; branches glabrous or glabrescent. Leaves ovate to oblong or lanceolate, acuminate, acute or obtuse; lamina usually 5–14 cm long, 2–5 cm wide, mostly glabrous; base attenuate, sometimes rounded; midrib prominent beneath; veins mostly 7–9 each side of midrib; petiole 3–7 mm long. Racemes 1–5 per leaf axil, 1.5–3.5 cm long; bracts 2–3 mm diam.; flowers sweetly scented; pedicels 1.5–2 mm long. Tepals oblong, c. 1.5 mm long, shortly pubescent outside, yellowish-green. Stamens 1.8 mm long. Disc lobes subclavate, green, c. 0.5 mm long. Ovary c. 1 mm long. Drupe orange-yellow, 15–30 mm long, 12.5–17.5 mm wide; pedicel thickened upwards, 5–7 mm long. Fig. 8 D–G.

Occurs in N Australia, tropical Africa, India, Sri Lanka, Burma, Thailand, Indochina and Malesia to the Solomon Is.; in Australia, from the SW Kimberley, W.A., to Cape York Peninsula, Qld. Grows in sandy soil, often on coastal dunes; also on sandstone and laterite in shrubland and woodland. Map 27.

W.A.: 8 km N of Fairfield Stn, *M. Lazarides 6519* (CANB, K, MEL, US). N.T.: Oenpelli, Arnhem Land, *R. L. Specht 1088* (A, BRI, CANB, K, MEL, US). Qld: c. 32 km E of Coen, *L.S. Smith 11930* (BRI).

The fruits are eaten by Aborigines.

## 2. CANSJERA

*Cansjera* A. L. Juss., *Gen. Pl.* 448 (1789), *nom. cons.*, derived from a Malabar name, (*Tsjerou-Cansjeram*) mentioned by H. A. van Rheede tot Draakestein, *Hortus Indicus Malabaricus* 7: 3 (1688)

Type: *C. rheedii* J. Gmelin

Lianes or erect shrubs; young branchlets densely covered with mostly upcurved hairs. Leaves herbaceous to thinly fleshy or coriaceous, glabrous or hairy. Flowers bisexual, in axillary spikes, each flower in axil of small persistent bract; rachis and bracts densely hairy. Perianth urceolate or campanulate with 4 small, recurved lobes, rarely 5-lobed, pilose. Stamens not exceeding perianth-tube. Disc lobed, the ±fleshy scales alternating with the stamens. Ovary ovoid to cylindrical; style short, not or hardly exceeding perianth-tube; stigma capitate, tending to be 4-lobed. Drupe ellipsoidal to ±globular, glabrous, sessile on persistent lacerated perianth; endocarp thin, brittle. Embryo much shorter than seed, with 3 or 4 cotyledons.

A genus of 3 species, from India and Sri Lanka to S China, New Guinea and northern Australia; one species in Australia.

C. F. Meissner, *Cansjera* (in Thymelaeaceae), in A. P. de Candolle (ed.), *Prodr.* 14(2): 519 (1857); G. Bentham & J. D. Hooker, *Cansjera* (in Olacineae), *Gen. Pl.* 1: 349 (1862); G. Bentham, *Cansjera* (in Olacineae), *Fl. Austral.* 1: 393–394 (1863); H. Sleumer, *Nat. Pflanzenfam.* 2nd edn, 16b: 36 (1935); P. Hiepko, *Cansjera*, in A Revision of Opiliaceae I. Genera of the Eastern Old World, excluding *Opilia*, *Willdenowia* 9: 43–50 (1979).

**1. *Cansjera leptostachya* Benth., *London J. Bot.* 2: 231 (1843)**

T: New Ireland, 1841, *Hinds s.n.*; lecto: K *vide* P. Hiepko, *Willdenowia* 9: 49 (1979); iso: NY.

[*C. scandens* auct. non Roxb. (= *C. rheedii* J. Gmelin): J. D. Hooker, *Fl. Tasman.* 43 (1859)]

[*C. rheedii* auct. non J. Gmelin: *Index Kewensis* 1: 413 (1895)]

Illustration: P. Hiepko, *Willdenowia* 9: 46, fig. 18, 6–7 (1979).

Liane up to 6 m, or erect shrub; branches pendulous, glabrescent. Leaves ovate-lanceolate, acute or acuminate, usually 4–9 cm long, 1.5–4 cm wide; base attenuate to shortly attenuate; lateral veins mostly 7–9 pairs, inconspicuous, rarely somewhat prominent beneath; petiole 4–6 mm long, hairy. Spikes 1–4 in leaf axil, 1–3 cm long; bracts lanceolate, 0.5–1 mm long. Perianth urceolate, greenish yellow or white, the tube 1.5–2 mm long. Stamens as long as perianth-tube. Disc scales slightly fleshy, oblong, 3-toothed, c. 0.5 mm long. Ovary ovoid, c. 1 mm long; style c. 0.5 mm long. Drupe ellipsoidal to nearly globular, 11–15 mm long, 9–13 mm wide, orange-red. Fig. 8A–C.

Occurs in eastern Malesia (E Java, Lesser Sunda Is., Moluccas, New Guinea, Admiralty Is., and Bismarck Archipelago) and scattered through northern Australia from the Kimberley, W.A., to Cape York Peninsula, Qld. Grows in sandy soil, often on coastal dunes, and on sandstone screes in semi-deciduous vine thicket. Map 28.

W.A.: Mt Trafalgar, Prince Regent River Reserve, A. S. George 12654 (NT, PERTH). N.T.: Bartalumba Bay, Grootte Eylandt, C. R. Dunlop 2637 (CANB, NT). Qld: Bloomfield Beach, c. 1.6 km N of Bloomfield River mouth, L. S. Smith 11044 (BRI).

**SANTALACEAE**

*H. J. Hewson, A. S. George*

Shrubs, small trees, herbs or climbers, hemiparasitic on roots or rarely on branches, bisexual or monoecious or dioecious. Leaves opposite or alternate, rarely whorled, often reduced and scale-like, simple, entire, often soft, sometimes caducous; stipules absent. Inflorescence a raceme, spike, panicle, corymb or cluster, often reduced to a single flower, axillary or terminal, usually bracteate, sometimes bracteolate. Flowers actinomorphic. Perianth 1-whorled; tepals 3, 4 or 5, rarely more, valvate, inserted on a shallow to cup-like receptacle. Stamens as many as tepals and opposite them; anthers basally attached or almost so, 2-locular but often lobed and appearing 4-locular, introrse. Ovary inferior or superior, 1–5-locular sometimes with several chambers at base, with 1–5 ovules or the ovules not differentiated; disc present, often thickened and lobed at margin, rarely absent; style usually very short; stigma 2-, 3- or 5-lobed. Fruit a drupe; mesocarp often somewhat fleshy; receptacle often enlarged, fleshy and coloured. Seed 1, without testa; endosperm copious.

About 30 genera and 400 species, in tropical and temperate regions of the world; in Australia 10 genera (4 endemic) and 46 species (42 endemic).

All Australian genera except *Dendromyza* are root-parasites. There are few data on hosts, but it is likely that most species parasitise plants of several families.

G. Bentham, Santalaceae, *Fl. Austral.* 6: 211–231 (1873); R. Pilger, Santalaceae, *Nat. Pflanzenfam.* 2nd edn, 16b: 52–91 (1935); H. U. Stauffer, Revisio Anthobolearum, *Mitt. Bot. Mus. Univ. Zürich* 213: 1–260 (1959); H. U. Stauffer, Amphorogyneae, eine neue Tribus der Santalaceae, *Mitt. Bot. Mus. Univ. Zürich* 242: 49–76 (1969).

## KEY TO TRIBES

- |    |  |                              |
|----|--|------------------------------|
| 1  | Ovary superior   | <b>Trib. I. ANTHOBOLAEAE</b> |
| 1: | Ovary inferior   |                              |
| 2  | Leaves opposite or whorled   | <b>Trib. III. SANTALEAE</b>  |
| 2: | Leaves alternate   |                              |
| 3  | Inflorescence a spike, raceme or cluster                                     | <b>Trib. II. AMPHOROGEAE</b> |
| 3: | Inflorescence reduced to a single flower, the peduncle united with leaf base | <b>Trib. IV. THESIEAE</b>    |

## KEY TO GENERA

- |    |   |                         |
|----|---|-------------------------|
| 1  | Slender perennial herb; inflorescence 1-flowered; peduncle united at base with leaf   | <b>10. THESIUM</b>      |
| 1: | Shrubs or trees, rarely climbers; inflorescence a spike, raceme, umbel, panicle or cluster, sometimes reduced to 1 flower; peduncle, when present, not united with leaf |                         |
| 2  | Ovary superior; receptacle often enlarged and fleshy below drupe  |                         |
| 3  | Flowers prominently stalked   | <b>1. ANTHOBOLUS</b>    |
| 3: | Flowers sessile or almost so  |                         |
| 4  | Plant dioecious, leafless; drupe 6–7 mm long, $\pm$ sessile; receptacle not enlarged below drupe  | <b>3. OMPHACOMERIA</b>  |
| 4: | Plant bisexual; drupe up to 5 mm long, or if larger than leaves prominent; receptacle enlarged and fleshy below drupe   | <b>2. EXOCARPOS</b>     |
| 2: | Ovary inferior; receptacle often enlarged around drupe  |                         |
| 5  | Leaves opposite or whorled, persistent  | <b>9. SANTALUM</b>      |
| 5: | Leaves alternate, often caducous  |                         |
| 6: | Leaves small or scale-like, often caducous; terrestrial shrubs  |                         |
| 7  | Climbers  | <b>7. DENDROTROPHE</b>  |
| 7: | Shrubs parasitic on branches  | <b>8. DENDROMYZA</b>    |
| 6  | Leaves broad, elliptic, obovate or ovate, persistent; climbers or shrubs parasitic on branches  |                         |
| 8  | Flowers in terminal, spiral spikes without bracts   | <b>5. SPIROGARDNERA</b> |
| 8: | Flowers in axillary or lateral racemes or clusters, or solitary, subtended by a bract or bracteoles   |                         |
| 9  | Each flower subtended by 2 or more bracteoles   | <b>4. CHORETRUM</b>     |
| 9: | Each flower subtended by 1 bract  | <b>6. LEPTOMERIA</b>    |

**Trib. I. ANTHOBOLAEAE**

Trib. **Anthoboleae** Bartling, *Ord. Nat. Plant.* 113 (1830)

Type: *Anthobolus* R.Br.

Shrubs. Leaves alternate, often scale-like and caducous. Inflorescence an axillary spike, umbel or cluster, sometimes reduced to 1 flower. Flowers unisexual or bisexual. Tepals 3–5, without hairs behind stamens. Disc present. Stigma sessile or almost so. Ovary superior. Receptacle often enlarged and fleshy below drupe.

Three genera; *Exocarpos* widespread from Malesia to Australia, New Caledonia, New Zealand and the Hawaiian Islands; *Anthobolus* and *Omphacomeria* endemic in Australia.



**Figure 8.** *Bruguiera exaristata*.  
Photograph —K. F. Kenneally



**Figure 9.** *Opilia amentacea*.  
Photograph —A. S. George



**Figure 10.** *Santalum acuminatum*.  
Photograph —A. S. George.



**Figure 11.** *Olax stricta*.  
Photograph —M. Fagg

## 1. ANTHOBOLUS

A. S. George

*Anthobolus* R.Br., *Prodr.* 357 (1810), from the Greek *anthos* (flower), and *bolos* (throw), in reference to the caducous perianth of the female flowers

Type: *A. filifolius* R.Br.

Dioecious shrubs. Leaves alternate, sessile, persistent or caducous. Male inflorescence a small axillary umbel, raceme or cluster; tepals usually 3 or 4, yellow or greenish brown, not caducous. Female inflorescence axillary, pedunculate, of 1 or 2 pedicellate flowers; pedicel usually thickened under fruit; tepals 3–5, greenish brown, caducous; ovary superior; stigma sessile. Drupe with thin, orange-red mesocarp; stigma persistent.

3 species, all endemic in Australia.

G. Bentham, *Fl. Austral.* 6: 226–227 (1873); H. U. Stauffer, *Mitt. Bot. Mus. Univ. Zürich* 213: 101–116 (1959). This account based partly on Stauffer, *loc. cit.*

- |    |  |                             |
|----|--|-----------------------------|
| 1  | Mature branchlets leafless; male flowers in clusters; female peduncle less than 2.5 mm long    | <b>3. A. leptomerioides</b> |
| 1: | Mature branchlets leafy; male flowers in small umbels or racemes; female peduncle 5–20 mm long |                             |
| 2  | Leaves usually 0.5–1 mm thick; tropical species  | <b>1. A. filifolius</b>     |
| 2: | Leaves usually 1.5–2 mm thick; species of south-western W.A.                                   | <b>2. A. foveolatus</b>     |

**1. *Anthobolus filifolius* R.Br., *Prodr.* 357 (1810)**

T: coast opposite Groote Eylandt, Gulf of Carpentaria, N.T., 4 Jan. 1803, *R. Brown* (♀); holo: BM *n.v.*; iso: K, G–DC, P, all *n.v.*, *fide* H. U. Stauffer, *op. cit.* 105.

*A. triqueter* R.Br., *Prodr.* 357 (1810). T: Endeavour R., Qld, ? *J. Banks* (♀); holo: BM *n.v.*, *fide* H. U. Stauffer, *op. cit.* 108.

Illustration: H. U. Stauffer, *op. cit.* t. 1.

Shrub to 3 m. Branchlets angular becoming terete, sometimes pendulous. Leaves narrowly linear, semi-terete, mucronate, 1–5 cm long, 0.5–1 mm thick, soft. Male flowers in umbels of up to 5; peduncle 4–10 mm long; bracts navicular, acute, to 1.5 mm long, caducous; pedicels 1–4 mm long; tepals ovate, obtuse, 2 mm long. Female flowers solitary or in 2- or 3-flowered umbels; peduncle 5–20 mm long; bracts ovate, caducous; pedicels 5–20 mm long; tepals oblong-ovate, 1.5–2 mm long; ovary broadly cylindrical, 1.5 mm long. Drupe ellipsoidal, 5–9 mm long; endocarp smooth or sometimes obscurely pitted. Fig. 12A–E.

Occurs in near-coastal areas of N.T. and N Qld. Grows in sandy soil and in sandstone and laterite, usually in open woodland, rarely in heath, fringing forest and near mangroves. Map 29.

N.T.: 1.6 km S of Dhupuna College, Gove Peninsula, *P. K. Latz* 2869 (CANB); Little Lagoon, Groote Eylandt, *R. L. Specht* 434 (♀) (AD, CANB, PERTH); Oenpelli, *R. L. Specht* 1218 (♀) (AD, CANB, PERTH). Qld: Browns Ck, Pascoe R., *L. J. Brass* 19550 (♀) (CANB); c. 72 km S of Cape York, *L. Pedley* 2734 (♂) (BRI, CANB).

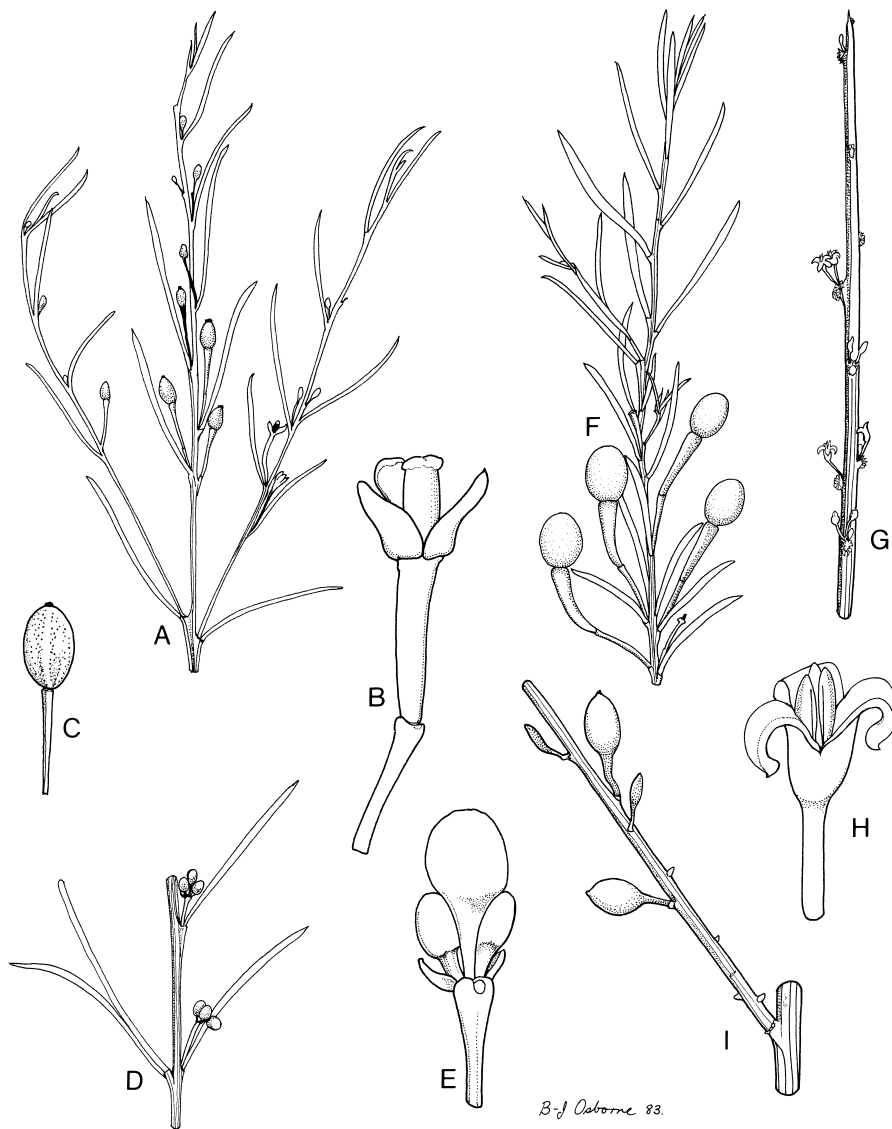
**2. *Anthobolus foveolatus* F. Muell., *Fragm.* 1: 212 (1859)**

T: between Murchison R. and Port Gregory, W.A., *A. Oldfield s.n.* (♀); lecto: K *n.v.*, *fide* H. U. Stauffer, *Mitt. Bot. Mus. Univ. Zürich* 213: 109 (1959); iso: MEL.

*A. brevifolius* Gaudich. ex Chatin, *Anat. Comp. Veg.* 376 (1862). T: ? Shark Bay, W.A., 1818, *C. Gaudichaud* (♀); iso: P, G–DC, both *n.v.*, *fide* H. U. Stauffer, *op. cit.* 112.

Illustration: H. U. Stauffer, *op. cit.* t. 2.





**Figure 12.** *Anthobolus*. **A–E**, *A. filifolius*. **A**, female branch  $\times 0.5$ ; **B**, female flower  $\times 8$ ; **C**, fruit  $\times 1.5$ ; **D**, male branchlet  $\times 1$ ; **E**, male buds  $\times 7$  (**A**, **C**, L. Brass 19550, CANB; **B**, **D–E**, L. Pedley 2734, CANB). **F**, *A. foveolatus*, fruiting branchlet  $\times 1$  (H. Stauffer 5341, CANB). **G–I**, *A. leptomerioides*. **G**, male branchlet  $\times 1$ ; **H**, male flower  $\times 10$  (**G–H**, M. Lazarides 8315, CANB); **I**, fruiting branchlet  $\times 1$  (N. Forde 1162, CANB).

Shrub to 1.5 m. Branchlets  $\pm$ terete. Leaves linear, concave above, acute, 1–4.5 cm long, 1.5–2 mm thick, soft. Male flowers in axillary umbels or contracted racemes; peduncle 7–15 mm long; bracts narrowly ovate, 0.5–2.5 mm long, caducous; pedicels 2–4 mm long; tepals ovate, obtuse, c. 2 mm long. Female flowers solitary; peduncle 8–10 mm long; bracts narrowly ovate, 1–2 mm long; pedicel 9–11 mm long; tepals narrowly ovate, c. 2 mm long; ovary ovoid, 2–3 mm long. Drupe ellipsoidal or almost spherical, 5–9 mm long; endocarp pitted. Fig. 12F.

Occurs in coastal areas of W.A. from Shark Bay to Dongara, grows on consolidated dunes in shrubland. Map 30.

W.A.: Spalding Park, Geraldton, *A. C. Burns* 39 (PERTH); N of Murchison R., *F. Lullfitz* 5953 (PERTH); c. 1 km SE of Dongara, *H. U. Stauffer* 5341 & *R. D. Royce* ( $\varnothing$ ) (AD, CANB, MEL, PERTH).

### 3. *Anthobolus leptomerioides* F. Muell., *Fragm.* 1: 21 (1858), as *leptomeroides*

T: towards the Burdekin, Suttor and Burnett Rivers, *F. Mueller*; lecto: Burdekin R. ( $\varnothing$ ), *K n.v.*, *fide* H. U. Stauffer, *op. cit.* 113; iso: *GH n.v.*, MEL.

*A. exocarpoides* F. Muell., *Fragm.* 9: 3 (1875). T: Macdonnell Range, N.T., *E. Giles s.n.* ( $\varnothing$ ); holo: MEL; iso: *K n.v.*, *fide* H. U. Stauffer, *loc. cit.* 113.

Illustration: H. U. Stauffer, *op. cit.* t. 3.

Shrub to 2.5 m, yellow-green. Branchlets divaricate or erect, rigid, striate. Leaves narrow, to 1 cm long, very early caducous. Male flowers clustered at nodes; bracts many, persistent, less than 1 mm long; pedicels 2–5 mm long; tepals narrowly ovate to ovate, connate in lower half, 1.5–2 mm long, granular on thickened apex; stamens 1 mm long. Female flowers solitary or paired; bracts caducous; peduncle 1 mm long; pedicel 4–18 mm long; tepals narrowly oblong, channelled, 2 mm long. Drupe ellipsoidal, umbonate with persistent stigma, 7–8 mm long; endocarp not pitted; pedicel not much thickened. Fig. 12 G–J.

Widespread from the Hamersley Ra., W.A., through central Australia, extending E in Qld almost to the Divide; in S.A. known only from the far NW. grows on plains in sand, loam and gravel. Map 31.

W.A.: 37 km W of Jupiter Well, *A. S. George* 9078 (PERTH); Christie Crossing, Oakover River, *P. G. Wilson* 10344 ( $\sigma$ ) (AD, CANB, PERTH). N.T.: c. 13 km W of Docker River on road to Giles, *M. Lazarides* 8315 ( $\sigma$ ) (AD, CANB, PERTH). Qld.: 6 km NNW of Glenmorgan, *H. U. Stauffer* 5536 & *S. L. Everist* (AD, BRI, MEL, PERTH).

Plants in Qld often have slender, erect branches.

## 2. EXOCARPOS

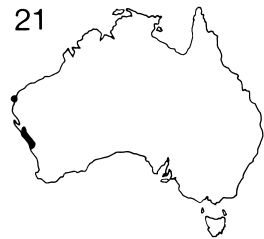
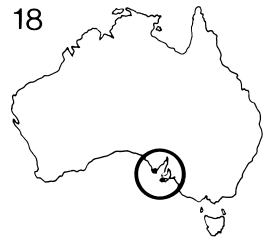
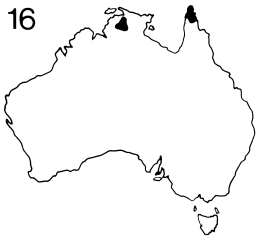
### *A. S. George*

*Exocarpos* Labill., *Voy. Rech. Pérouse* 1: 155 (1800), from the Greek *exo* (outside), and *carpos* (fruit), the fruit is borne above a swollen receptacle

*Xylophyllus* sect. *Exocarpos* (Labill.) Kuntze, in T. von Post & O. Kuntze, *Lex. Gen. Phan.* 598 (1903) as *Exocarpus*.

T: *E. cupressiformis* Labill.

Shrubs or trees, bisexual. Leaves alternate, sometimes opposite, persistent or caducous. Flowers in axillary spikes or clusters. Tepals 4 or 5, greenish yellow. Stamens often incurved over style. Ovary superior; stigma sessile or almost so, often lobed. Fruiting receptacle swollen below drupe, succulent, coloured; drupe with thin green or brown epicarp.



- 16. *Olax pendula*
- 19. *Olax benthamiana*
- 22. *Olax spartea*
- 25. *Olax angulata*
- 28. *Cansjera leptostachya*

- 17. *Olax retusa*
- 20. *Olax scalariformis*
- 23. *Olax aphylla*
- 26. *Olax phyllanthi*
- 29. *Anthobolus filifolius*

- 18. *Olax obcordata*
- 21. *Olax aurantia*
- 24. *Olax stricta*
- 27. *Opilia amentacea*
- 30. *Anthobolus foveolatus*

26 species, from Malesia to Australia, New Caledonia, New Zealand and the Hawaiian Islands; 1 non-endemic and 9 endemic species in Australia including 1 endemic on Lord Howe Is.

G. Bentham, *Fl. Austral.* 6: 227–231 (1873); H. U. Stauffer, *Mitt. Bot. Mus. Univ. Zürich* 213: 117–237 (1959).

All Australian species belong to subg. *Exocarpos*. The term fruiting receptacle is used in this treatment in preference to cupula (H. U. Stauffer, *op. cit.*).

- |    |   |                             |
|----|---|-----------------------------|
| 1  | Leaves obovate-elliptic, several-nerved, persistent   | <b>1. E. latifolius</b>     |
| 1: | Leaves scale-like or linear, $\pm$ nerveless, often caducous  |                             |
| 2  | Prostrate or low shrubs of high altitudes   |                             |
| 3  | Leaves opposite   | <b>9. E. nanus</b>          |
| 3: | Leaves alternate  | <b>8. E. humifusus</b>      |
| 2: | Erect shrubs, usually of low to medium altitudes  |                             |
| 4  | Leaves crowded, persistent, broadly linear, acute, 5–15 mm long; peduncle 3 mm long   | <b>2. E. odoratus</b>       |
| 4: | Leaves not crowded, often caducous, narrowly linear or scale-like, usually less than 5 mm long or if longer then uncinatate; peduncle 1–2 mm long or absent |                             |
| 5  | Flowers in elongated spikes   |                             |
| 6  | Leaves c. 0.5 mm long, not uncinatate   | <b>3. E. cupressiformis</b> |
| 6: | Leaves 2–10 mm long, uncinatate   | <b>4. E. sparteus</b>       |
| 5: | Flowers in short clusters or very condensed spikes  |                             |
| 7  | Branchlets prominently angular  | <b>7. E. strictus</b>       |
| 7: | Branchlets usually terete, striate  |                             |
| 8  | Branchlets usually divaricate, with small stellate hairs when young, grey-green; fruiting receptacle depressed-obovoid                                      | <b>5. E. aphyllus</b>       |
| 8: | Branchlets erect, glabrous, dark green; fruiting receptacle ellipsoidal   | <b>6. E. syrticola</b>      |

### Sect. I. *Sarcocalyx*

**Exocarpos** sect. *Sarcocalyx* Zipp. ex A.DC., *Prodr.* 14: 688 (1857)

T: not designated.

New growth closely stellate-pubescent. Branchlets terete. Leaves usually 2–14 cm long, palminerved, petiolate, not decurrent. Spikes often compound.

Includes 4 species in Malesia, Australia and W Pacific; 1 non-endemic species in Australia.

#### **1. *Exocarpos latifolius*** R.Br., *Prodr.* 356 (1810)

*Xylophyllus latifolius* (R.Br.) Kuntze, *Revis. Gen. Pl.* 589 (1891). T: Coen River, Qld, 6 Nov. 1802, R. Brown *s.n.*; lecto: BM *n.v.*, *fide* H. U. Stauffer, *Mitt. Bot. Mus. Univ. Zürich* 213: 126 (1959); iso: BRI.

*E. floribundus* Domin, *Biblioth. Bot.* 89: 49 (1921). T: near Chillagoe, Qld, Feb. 1910, K. Domin *s.n.*; holo: PR *n.v.*, *fide* H. U. Stauffer, *op. cit.* 131

Illustrations: K. A. Williams, *Native Pl. Queensland* 123 (1979); D. Levitt, *Plants and People* t. 71 (1981).

Shrub or small tree to 10 m. Bark becoming furrowed, dark. Young shoots sparsely pubescent. Branchlets terete. Leaves broadly ovate, elliptic or obovate, very obtuse; lamina to 14 cm long, palminerved; petiole 5–20 mm long. Spikes often clustered or

branched, up to 5 cm long, green. Tepals 5, ovate-triangular, 0.5–1 mm long, pubescent outside, green. Fruiting receptacle obovoid, 4–8 mm long, red; drupe ellipsoidal, 6–9 mm long, scurfy; tepals persistent. *Mistletoe Tree*. Fig. 13A–C, 29.

Widespread across N Australia from Derby, W.A., to Richmond R., N.S.W.; also in Malesia and Philippines. Grows in many habitats, especially coastal dunes, river banks and sandstone gullies, in shrubland, woodland and forest. Map 32.

W.A.: 4 km S of Cape Bertholet, *K. F. Kenneally 6033* (CANB, PERTH). N.T.: Bentinck Is., May–June 1933, *N. Tindale & P. Aitken* (AD). Qld: c. 14 km N of Coen, 25 Apr. 1972, *J. Wrigley & I. Telford* (CBG).

Infusion of bark and seeds used as contraceptive by Aborigines (D. Levitt, *op. cit.*).

## Sect. II. Exocarpos

### Exocarpos sect. Exocarpos

Usually glabrous except hairs on floral rachis of some species. Branchlets angular, striate or sulcate. Leaves less than 2 cm long, sessile, decurrent, often caducous. Spikes simple, sometimes reduced to clusters.

11 species, in Australia, New Zealand and Rapa; 9 endemic species in Australia including 1 endemic on Lord Howe Is.

### 2. *Exocarpos odoratus* (Miq.) A.DC., *Prodr.* 14: 689 (1857)

*Leptomeria odorata* Miq., in Lehm., *Pl. Preiss.* 1: 613 (1845). T: Sussex district, W.A., 19 Dec. 1839, *L. Preiss 2093*; holotype: U n.v., *fide* H. U. Stauffer, *Mitt. Bot. Mus. Univ. Zürich.* 213: 155 (1959).

Illustration: H. U. Stauffer, *op. cit.* t. 8.

Shrub to 2 m. Branchlets erect, striate. Leaves crowded, linear, acute, 5–15 mm long. Spikes axillary; peduncle 3 mm long. Tepals 5, c. 0.3 mm long. Fruiting receptacle enlarged to 3 mm long, expanded at apex; drupe ovoid, 2.5 mm long; tepals persistent.

Endemic in coastal south-western W.A. between Bunbury and Windy Harbour; grows in sandy soil in *Agonis flexuosa* woodland. Map 33.

W.A.: Windy Harbour, *A. M. Ashby 2693* (AD); Vasse R., Busselton, *R. D. Royce 7983* (PERTH).

### 3. *Exocarpos cupressiformis* Labill., *Voy. Rech. Pérouse* 1: 156, t. 14 (1800)

*Xylophyllus cupressiformis* (Labill.) Kuntze, *Revis. Gen. Pl.* 589 (1891). T: Storm Bay, Tas., 9 May 1792, *J. Labillardière s.n.*; lectotype: FI n.v., *fide* H. U. Stauffer, *Mitt. Bot. Mus. Univ. Zürich* 213: 159 (1969); iso: BRI, G.

*E. dasystachys* Schldl., *Linnaea* 20: 580 (1847). T: Murray River, ?S.A., May, *Behr; n.v.*

Illustrations: N. T. Burbidge & M. Gray, *Fl. Austral. Cap. Terr.* 151, fig. 129 (1970); L. Costermans, *Native Trees Shrubs S.E. Austral.* 168, 169 (1981).

Shrub or small tree to 8 m with rounded or pyramidal crown, green or yellowish green. Bark tessellated, grey. Branchlets numerous, fine, striate, erect to pendulous. Leaves scale-like, thick, spreading, obtuse or acute, 0.5 mm long. Spikes to 6 mm long, mostly in uppermost axils; peduncle 1–2 mm long. Tepals 5, c. 0.3 mm long. Fruiting receptacle obovoid or ellipsoidal, 4–6 mm long, red; drupe ovoid or ellipsoidal, 4–5 mm long; tepals persistent. *Cherry Ballart*. Fig. 13D.

Widespread from Eyre Peninsula, S.A., through Vic. and eastern N.S.W. to SE Qld, and in Tas; grows in various soils in Eucalypt forest and woodland. Map 34.

S.A.: Mt Remarkable, *N. N. Donner 4689* (AD). Qld: Cainbale Range, *H. U. Stauffer 5504* (AD, CANB). N.S.W.: N of Boboyan, *R. D. Hoogland 6434* (AD). Vic.: Cultivation Ck, Grampians, *H. Streimann 3301* (CBG). Tas.: Dover, 25 Nov. 1965, *M. E. Phillips* (CBG).



**Figure 13.** *Exocarpos*. **A–C**, *E. latifolius*. **A**, flowering branchlet  $\times 1$ ; **B**, flowers  $\times 10$  (**A–B**, J. Wrigley & I. Telford, CBG 043073); **C**, fruit  $\times 1.5$  (M Rankin, CBG 7905642). **D**, *E. cupressiformis*, flowering branchlet  $\times 1$  (Black Mtn, A.C.T., A. George, CANB). **E**, *E. sparteus*, flowering branchlet  $\times 1$  (A. Orchard 1381, BRI). **F**, *E. nanus*, fruiting branchlet  $\times 1$  (E. Carroll, CBG 016785). **G**, *E. aphyllus*, fruiting branchlet  $\times 1.5$  (M. Phillips, CBG 024978).

Early records for W.A., e.g. C. A. Gardner, *Enum. Pl. Austral. Occid.* 35 (1930), are incorrect.

#### 4. *Exocarpos sparteus* R.Br., *Prodr.* 356 (1810)

*Xylophyllus sparteus* (R.Br.) Kuntze, *Revis. Gen. Pl.* 589 (1891). T: King George Sound, W.A., Dec. 1801, R. Brown; lecto: BM *n.v.*; iso: K *n.v.*; both *fide* H. U. Stauffer, *Mitt. Bot. Mus. Univ. Zürich* 213: 165 (1959).

*E. glandulaceus* Miq., in Lehm., *Pl. Preiss.* 1: 619 (1845). T: south-western W.A., *L. Preiss* 2122; *n.v.*

*E. sparteus* f. *gracilis* Miq., *op. cit.* 618. T: near waterfall at head of Swan R., W.A., 25 July 1839, *L. Preiss* 2125; *n.v.*

*E. sparteus* f. *tenerior* Miq., *op. cit.* 618. T: near the coast, Perth, W.A., 19 June 1839, *L. Preiss* 2092; *n.v.*

*E. spicatus* A.DC., *Prodr.* 14: 689 (1857). T: eastern Australia, *collector unknown*; *n.v.*

*E. pendulus* F. Muell., *Trans. Roy. Victorian Inst.* 42 (1855). T: Murray (River), 1852, F. Mueller; lecto: MEL *fide* H. U. Stauffer, *op. cit.* 168.

Shrub to 4m with weeping crown, yellowish green. Branchlets slender, often pendulous, striate. Leaves narrowly linear, triquetrous, uncinata, 2–10 mm long, often persistent for some time. Spikes to 16 mm long; peduncle 1–2 mm long. Receptacle very short. Tepals 5, 0.3–0.5 mm long. Fruiting receptacle depressed-spherical, c. 2 mm long, red or pink; drupe ellipsoidal-spherical, smooth, usually shining, 3–5 mm long; tepals persistent. *Broom Ballart.* Fig. 13E.

Widespread in W.A. and N.T. S of 20°S lat.; in S.A. in the far NW, on Eyre Peninsula and the SE; in N.S.W. around Euston; in far NW Vic.; occasional in S Qld. Grows in many habitats including coastal and desert sand dunes and on plains. Map 35.

W.A.: Cape Arid National Park, R. D. Royce 10073 (PERTH). N.T.: Ormiston Gorge, D. V. McKey 342 (AD, CANB, PERTH). S.A.: 25 km NW of Gawler, E. N. S. Jackson 152 (AD). Qld: 5.5 km SE of Yarrowmure Stn, L. Adams 985 (AD, CANB). Vic.: Wyperfeld National Park, A. C. Beauglehole 28915 (AD).

Coastal plants often have thick branchlets and leaves. H. U. Stauffer, *op.cit.* 181, recorded a possible hybrid with *Exocarpos strictus* R.Br. (Lake Albacutya, Vic., Sept. 1897, C. French, MEL).

#### 5. *Exocarpos aphyllus* R.Br., *Prodr.* 357 (1810)

*Xylophyllus aphyllus* (R.Br.) Kuntze, *Revis. Gen. Pl.* 589 (1891). T: Thistle Is., S.A., 7 Feb. 1802, R. Brown; lecto: BM *n.v.*; iso: K *n.v.*; both *fide* H. U. Stauffer, *op.cit.* 169

*E. leptomerioides* F. Muell. ex Miq., *Ned. Kruidk. Arch.* 4: 103 (1856). T: towards Mt Brown, S.A., F. Mueller; lecto: U *n.v.*; iso: MEL *n.v.*; both *fide* H. U. Stauffer, *op.cit.* 172.

Shrub to 5 m, usually grey-green or olive-green. Branchlets usually divaricate, rigid, finely striate or sulcate. Leaves scale-like, appressed, c. 1 mm long, very early caducous. Flowers in axillary, sessile ovoid clusters or spikes 2–4 mm long. Tepals 5, narrowly triangular, 0.5 mm long. Fruiting receptacle depressed-obovoid, 1–2 mm long, red; drupe ovoid, 3 mm long, somewhat ribbed, scurfy-pubescent; tepals persistent. *Leafless Ballart.* Fig. 13G.

Widespread in southern mainland Australia from Shark Bay, W.A., to SE Qld, but absent from wetter regions and the desert; grows in various habitats including coastal dunes, Eucalypt woodland and shrubland in rocky loam, clay-loam and calcareous soils. Map 36.

W.A.: 3 km S of Denham, J. W. Green 1420 (PERTH); c. 27 km E of Newdegate, 30 Oct. 1962, M. E. Phillips (CBG). S.A.: Oraparinna National Park, J. Z. Weber 2423 (AD). Qld: 8 km SE of Glenmorgan, H. U. Stauffer 5538 & S. L. Everist (CANB). N.S.W.: 58 km NNW of Balranald, M. D. Crisp 1726 (AD, CBG). Vic.: c. 2km SW of Sunset Tank, M. G. Corrick 6657 (AD).

Plants from S regions of W.A. and Yorke Peninsula, S.A., often have dark green erect branches like those of *E. syrticola* and have prominent inflorescence axes persistent after flowering.

**6. *Exocarpos syrticola*** (F. Muell. ex Miq.) Stauffer, *Mitt. Bot. Mus. Univ. Zürich* 213: 173, t. 9, 23B (1959)

*E. strictus* var. *syrticola* F. Muell. ex Miq., *Ned. Kruidk. Arch.* 4: 104 (1856). T: Wilsons Promontory, Vic., Apr. 1853, *F. Mueller*; lecto: MEL; iso: K, both *vide* H. U. Stauffer, *op. cit.* 174.

Shrub to 3.5 m, usually dark green. Branchlets erect, rigid, angular to terete, striate. Leaves narrowly triangular, 1 mm long, erect or spreading, persistent, usually becoming dark. Flowers 2–9 in sessile, ovoid spikes 2–3 mm long. Tepals 5, triangular, obtuse, 0.5 mm long, greenish-yellow. Inflorescence axis persistent and prominent. Fruiting receptacle spherical-ovoid, 4–8 mm long, pink to white; drupe ellipsoidal, smooth or slightly striate, 3–4 mm long, glabrous; tepals persistent. *Coastal Ballart.*

Occurs from Port Lincoln, S.A., along the coast to Wilsons Promontory, Vic., on Bass Strait islands, and on N and W coasts of Tas; grows on dunes and cliffs in shrubland. Map 37.

S.A.: Elliston, 7 Sept. 1965, *J. B. Cleland* (AD); Pondalowie Bay, *D. Kraehenbuehl* 865 (AD); Beachport, *P. G. Wilson* 1156 (AD).

**7. *Exocarpos strictus*** R.Br., *Prodr.* 357 (1810)

*Xylophyllos strictus* (R.Br.) Kuntze, *Revis. Gen. Pl.* 589 (1891). T: Derwent R., Tas., Mar. 1804, *R. Brown*; lecto: BM; iso: K, P; all *n.v.*; *vide* H. U. Stauffer, *op. cit.* 178 (1959); near Port Jackson, N.S.W., *R. Brown*; *n.v.*

*Omphacomeria psilotoides* DC., *Prodr.* 14: 681 (1857); *O. acerba* var. *psilotoides* (DC.) C. Moore & Betche, *Handb. Fl. New South Wales* 224 (1893). T: Blue Mtns, N.S.W., 1817, *A. Cunningham* 390; lecto: G *n.v.*, *vide* H. U. Stauffer, *op. cit.* 180; same region, *C. Huegel*; *n.v.*; Tasmania, *R. Gunn* 544; *n.v.*

Illustration: H. U. Stauffer, *op. cit.* t. 10.

Shrub to 3.5 m, light green to bronze-green. Stems usually finely branched but sometimes stout; branchlets angular, striate, erect or pendulous. Leaves subulate, 1–3 mm long, caducous. Flowers in sessile or shortly pedunculate clusters of 2–6. Tepals 4 or 5, triangular-ovate, almost acute, 0.5 mm long, greenish-yellow. Fruiting receptacle broadly obovoid, 2–4 mm long, red, white or mauve; drupe ovoid or globular, 2.5–4 mm long, shining; tepals caducous. *Pale Ballart.*

Widespread in south-eastern S.A., Vic., and eastern N.S.W., rare in SE Qld and Tas; grows in various habitats including eucalypt forest and river banks. Map 38.

S.A.: Chowilla, NE of Renmark, *R. H. Kuchel* 2311 (AD). Qld: Mt Glorious–Mt Nebo, *H. U. Stauffer* 5502 (AD, CANB, MEL). N.S.W.: Aberdeen, Hunter Valley, *R. Story* 6957 (AD, CANB). Vic.: Bairnsdale, *H. U. Stauffer* 5437 (CANB, MEL). Tas.: Flinders Is., *J. S. Whinray* 1401 (AD).

Specimens with stout branchlets resemble *E. syrticola* (F. Muell. ex Miq.) Stauffer but may be distinguished from that species by the angular branchlets and caducous leaves.

**8. *Exocarpos humifusus*** R.Br., *Prodr.* 356 (1810)

*Xylophyllos humifusus* (R.Br.) Kuntze, *Revis. Gen. Pl.* 589 (1891). T: Mt Wellington, Tas., May 1804, *R. Brown*; holotype: BM *n.v.*, iso: K *n.v.*, both *vide* H. U. Stauffer, *op. cit.* 192.

Illustration: E. M. Stones, *Endemic Fl. Tasmania* 5: 336, t. 177 (1975).

Prostrate shrub to 1 m diam., or ascending in sheltered places. Branchlets rigid, sulcate-striate. Leaves alternate, scale-like, triangular, erect, c. 0.5 mm long, persistent. Flowers in sessile, clusters of 2–6. Tepals 5, ovate-triangular, 0.5 mm long, papillose on inner margins, greenish-yellow. Fruiting receptacle obovoid or cylindrical, 3–5 mm long, red; drupe ovoid, 3–4 mm long, dark red; tepals persistent.



Endemic in Tas., growing in subalpine areas, often over rocks. Map 39.

Tas.: Mt Barrow, *E. M. Canning* 2659 (AD, CBG); above Crater Lake, *E. M. Canning* 2709 & *I. R. Telford* (CBG); Mt Wellington, 16 Jan. 1962, *M. E. Phillips* (CBG).

### 9. *Exocarpos nanus* J. D. Hook., *London J. Bot.* 6: 281 (1847)

*Xylophyllus nanus* (J. D. Hook.) Kuntze, *Revis. Gen. Pl.* 589 (1891). T: 'mountain tops', Tas., 1833, *R. Gunn* 318; holo: K n.v., *fide* H. U. Stauffer *op. cit.* 195.

Illustration: H. U. Stauffer, *op. cit.* t. 13.

Prostrate shrub to 1 m diam., or ascending in sheltered places. Branchlets slender, angular-striate. Leaves opposite, scale-like, triangular, thick, erect or spreading, 0.5 mm long, persistent. Flowers in sessile clusters of 2–4. Tepals 5, triangular-ovate, obtuse, c. 0.5 mm long. Fruiting receptacle obovoid to obconical, 2–4 mm long, dark red; drupe ovoid, 2–3 mm long, red-brown; tepals persistent. *Alpine Ballart.*

Occurs in N.S.W., Vic. and Tas. in subalpine areas; grows in bogs and open heath. Map 40.

N.S.W.: Pounds Ck, Mt Twynam, *I. R. Telford* 3722 (CBG). Vic.: Mt Nelse, Bogong High Plains, *Hj. Eichler* 14840 (AD); Mt Baw Baw, *H. U. Stauffer* 5448 (AD, CANB). Tas.: Ben Lomond, Mar. 1967, *D. N. McVean* (CANB).

The only Australian species of *Exocarpos* with opposite leaves.

### Doubtful species

*Exocarpos expansus* Labill., *Voy. Rech. Pérouse* 1: 73 (1800)

T: from Tasmania, 1793, *J. Labillardière; n.v.*

Insufficiently described, but probably referable to *E. cupressiformis* Labill.

## 3. OMPHACOMERIA

### *A. S. George*

*Omphacomeria* (Endl.) A.DC., *Prodr.* 14: 680 (1857), from the Greek *omphakos* (bitter), and *meros* (a part), referring to the taste of the fruit

*Leptomeria* sect. *Omphacomeria* Endl., *Gen. Pl.* 326 (1837).

T: *O. acerba* (R.Br.) A.DC.

Dioecious shrubs. Leaves alternate, scale-like, caducous. Male flowers in short axillary spikes; tepals 4 or 5, slightly thickened at apex, opening widely; style obsolete. Female flowers solitary, axillary, sessile, with small staminodes; stigma sessile. Disc in male and female flowers almost flat. Drupe with thin mesocarp, sessile; receptacle not enlarged under drupe.

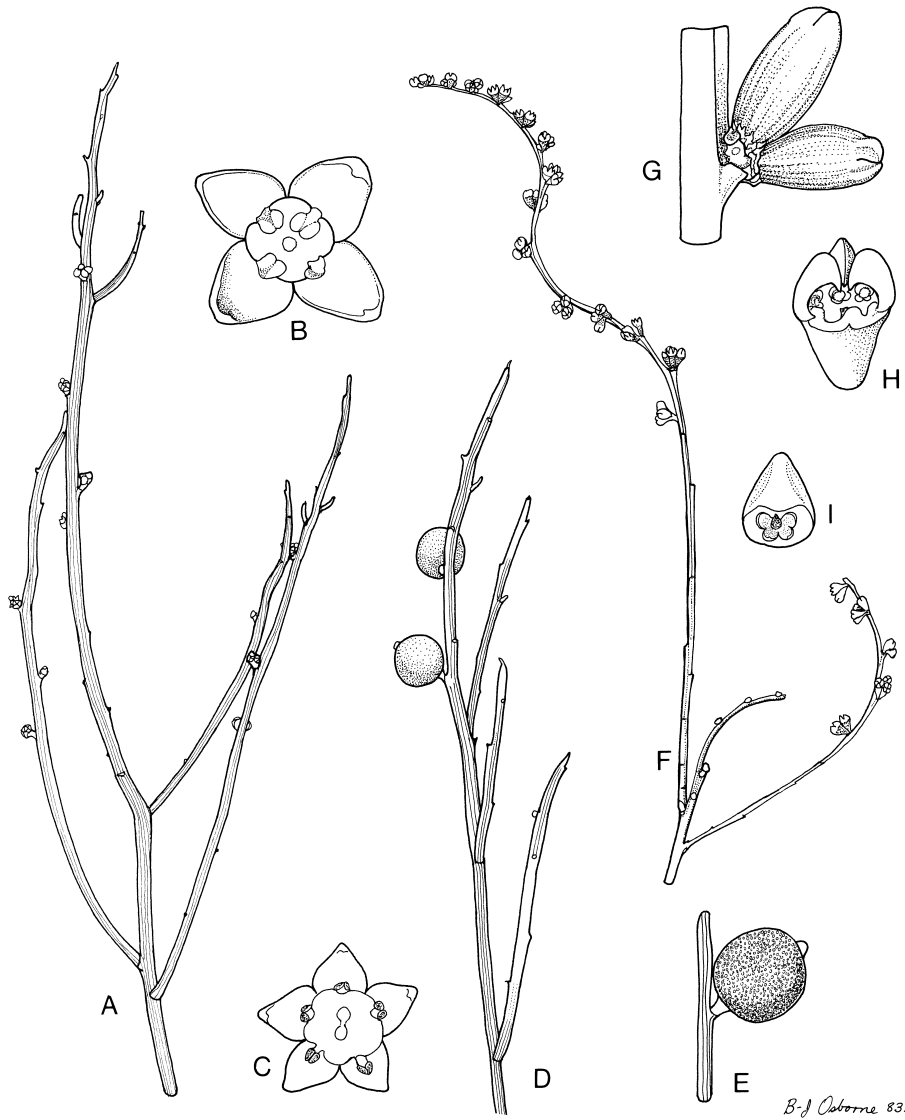
Monotypic, endemic in south-eastern Australia.

G. Bentham, *Fl. Austral.* 6: 225–226 (1873); H. U. Stauffer, *Mitt. Bot. Mus. Univ. Zürich* 213: 237–242 (1959); J. H. Willis, *Handb. Pl. Victoria* 2: 63–64 (1972).

### 1. *Omphacomeria acerba* (R.Br.) A.DC., *Prodr.* 14: 681 (1857)

*Leptomeria acerba* R.Br., *Prodr.* 354 (1810); *O. acerba* var. *typica* Domin, *Biblioth. Bot.* 89: 48 (1921), *nom. illeg.* T: Parramatta, N.S.W., 17 June 1802, *R. Brown*; holo: BM n.v., *fide* H. U. Stauffer, *op. cit.* 239; possible iso: MEL.

Illustrations: H. U. Stauffer, *op. cit.* t. 21; N. T. Burbidge & M. Gray, *Fl. Austral. Cap. Terr.* 151, t. 131 (1970).



**Figure 14.** A–E, *Omphacomeria acerba*. A, male flowering branchlet  $\times 0.5$ ; B, male flower  $\times 13$ ; C, female flower  $\times 10$ ; D, fruiting branchlet  $\times 0.5$ ; E, fruit  $\times 2$  (A–E, Black Mtn, A.C.T., A. George, CANB). F–I, *Spirogardnera rubescens*. F, flowering branchlet  $\times 1$ ; G, fruit  $\times 12$ ; H, flower with 2 tepals and stamens removed,  $\times 10$ ; I, tepal and stamen  $\times 12$  (F–I, SW of Coorow, W.A., C. Chapman, CANB).

Glabrous shrub to 1 m often forming clones. Branchlets erect, terete, finely striate. Leaves minute, scale-like, the bases persisting as scars. Male flowers up to 7 in spikes 3–4 mm long; flowers c. 3 mm diam.; tepals cordate, obtuse, 0.7 mm long, slightly thickened at apex; stamens c. 0.2 mm long; style obsolete. Female flowers: receptacle 0.7 mm long; tepals triangular, 0.7 mm long; stigma bilobed. Drupe ellipsoidal, 6–7 mm long; tepals persistent. *Leafless Sourbush*. Fig. 14A–E.

Occurs in eastern N.S.W. S of the Hunter R. and in eastern Vic. Grows in upland forests, often in rocky soil. Map 41.

N.S.W.: Blue Mts, *H. U. Stauffer 5697* (AD). A.C.T.: N side of Mt Coronet, *R. Pullen 2349* (♀), *2350* (♂) (AD, MEL). Vic.: E Wingan road, *A. C. Beaglehole 32633* (AD); Suggan Buggan, *A. E. Orchard 2480* (AD).

## Trib. II. AMPHOROGEYNEAE

Trib. **Amphorogyneae** Stauffer, *Cuad. Bot. Canar.* 16: 15 (1972)

Type: *Amphorogyne* Stauffer & Hürl.

Shrubs or climbers, sometimes parasitic on branches. Leaves alternate, often scale-like and caducous. Inflorescence a spike, raceme, corymb, umbel or cluster, or reduced to a single flower. Flowers bisexual or unisexual. Tepals 4 or 5, usually with hairs behind stamens. Anther locules often with 2 superposed lobes. Stigma sessile or almost so. Ovary inferior. Disc present. Drupe crowned with persistent tepals.

Contains 11 genera, of which 5 occur in Australia — *Choretrum*, *Dendromyza*, *Dendrotrophe*, *Leptomeria* and *Spirogardnera*.

## 4. CHORETRUM

*H. J. Hewson*

*Choretrum* R.Br., *Prodr.* 354 (1810), from the Greek *khoris* (separate), and *etron* (abdomen), in reference to the separation between the receptacle and the perianth

Type: *C. glomeratum* R.Br.

Shrubs, glabrous, often appearing leafless. Branches usually striate with decurrent ridges below leaf scars. Leaves alternate, scale-like, caducous very early. Flowers bisexual, axillary, solitary or clustered; bracteoles 2 or more per flower. Tepals 5, with uncinata, adaxial apical thickening. Staminal filaments very short, sometimes with small appendages; anther locules 2-lobed. Disc slightly lobed. Ovary inferior; style very short; stigma entire or obscurely 2–5-lobed; ovules 2. Fruit dry, crowned with persistent perianth.

An endemic genus of 6 species in southern Australia. The tepals spread widely at anthesis and later, as the flowers close, become tightly or loosely appressed in a manner consistent for each species. The diameter of the flowering branchlets also is often significant.

G. Bentham, *Fl. Austral.* 6: 217–219 (1873).

1 Flowers clustered

1. ***C. glomeratum***

1: Flowers solitary

2 Flowering branchlets more than 1.5 mm diam.

2. ***C. spicatum***

2: Flowering branchlets up to 1.5 mm diam.

3 Flowers globose in bud and closed flower, 1.5–2 mm diam.

3. ***C. pritzelii***

3: Flowers cylindrical in bud and closed flower, 1–1.5 mm diam.

- |    |   |                           |
|----|---|---------------------------|
| 4  | Shrub to 1 m tall; stems terete, not or slightly ridged; stamens with hairlike appendages | <b>4. C. pauciflorum</b>  |
| 4: | Shrub 1 m or more tall; stems angular, ridged; stamens without appendages                 |                           |
| 5  | Bracteoles 4–6; tepals closely appressed when dry   | <b>5. C. lateriflorum</b> |
| 5: | Bracteoles more than 6; tepals loosely appressed when dry                                 | <b>6. C. candollei</b>    |

### 1. *Choretrum glomeratum* R.Br., *Prodr.* 354 (1810)

T: near Port Lincoln, S.A., Mar. 1802, *R. Brown s.n.*; *n.v.*

Illustrations: R. Pilger, *Nat. Pflanzenfam.* 2nd edn, 16b; fig. 33A, B (1935).

Shrub mostly 1–2.5 m tall; branches erect. Stems striate, almost terete to angular; flowering branchlets 0.5–1.5 mm diam. Leaves subulate, c. 1 mm long, appressed to slightly spreading. Inflorescences clustered, 2–5-flowered; bracts similar to vegetative leaves; peduncle 2–3 mm long, with 1–3 bracts; pedicels less than 0.5 mm long, each with 3 involucre bracteoles. Flowers cylindrical. Tepals 1–1.75 mm long, 0.75–1 mm wide, white or yellow, closely appressed when dry. Stamens without appendages; anther lobes approximately equal. Drupe globose, 4–5 mm long. *Common Sourbush, Berry Broombush.*

Occurs in southern W.A., south-eastern S.A., the central western slopes of N.S.W. and western Vic.

Flowers white

**1a. var. glomeratum**

Flowers yellow

**1b. var. chrysanthum**

#### 1a. *Choretrum glomeratum* R.Br. var. *glomeratum*

Stems distinctly striate, angular. Tepals white, papillose outside at base.

Found over the entire range of distribution. Map 42.

W.A.: near Tunney, *H. U. Stauffer 5357* & *R. D. Royce* (AD, CANB). S.A.: Hundred of Moody, *C. R. Alcock 899* (AD); 45km SE of Streaky Bay, *Hj. Eichler 19503* (AD); Port Lincoln, *T. R. N. Lothian 4295* (AD); near Monarto South, *H. U. Stauffer 5405* & *Hj. Eichler* (AD, CANB).

#### 1b. *Choretrum glomeratum* var. *chrysanthum* (F. Muell.) Benth., *Fl. Austral.* 6: 218 (1873)

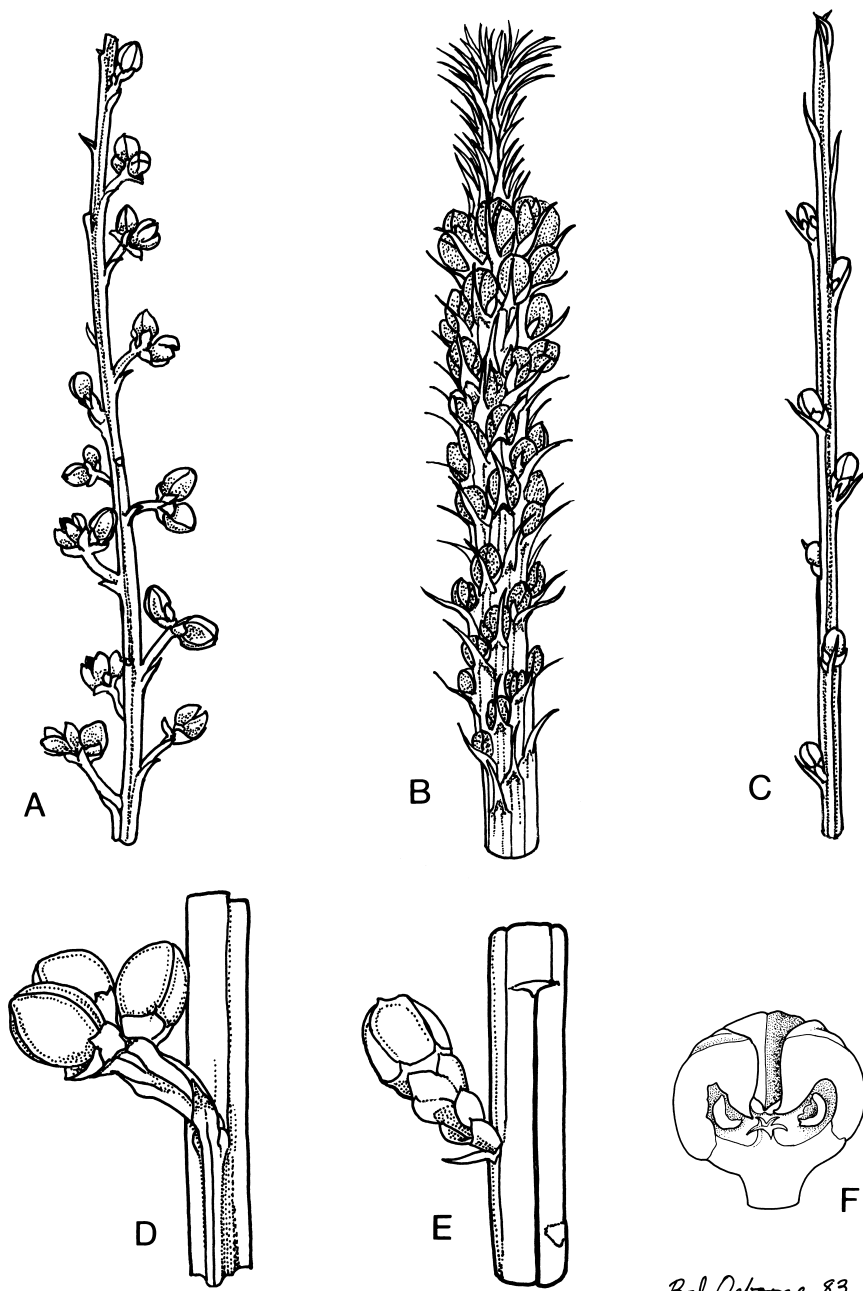
*C. chrysanthum* F. Muell., *Trans. Philos. Soc. Victoria* 1: 23 (1855). T: Avoca and Murray River, Vic., collector unknown; holotype: MEL.

Stems slightly striate, more or less terete. Tepals yellow, smooth outside at base. Fig. 15A–D.

Found in all parts of the species range except N.S.W., but usually less common. Map 43.

W.A.: near Cundelee Mission, *A. S. George 6005* (AD, PERTH). S.A.: near Melrose, *H. U. Stauffer 5421* & *P. G. Wilson* (AD, BRI, CANB, MEL); Coonalpyn, *O. Tepper 181* (MEL). Vic.: Lowan, Nov. 1899, collector unknown (MEL 2260); Rushworth Forest, Mar. 1973, *J. H. Willis* (AD).

The two varieties may ultimately be better treated as distinct species, *vide* Hj. Eichler, *Suppl. Black's Fl. S. Austral.* 98 (1965) and A. S. George, *Fl. Centr. Austral.* 25 (1981), but further study is needed to determine this.



*B-J Osborne 83.*

**Figure 15.** *Choretrum*. **A, D**, *C. glomeratum* var. *chrysanthum*. **A**, flowering branchlet  $\times 3.5$ ; **D**, inflorescence  $\times 8$  (Mt Ivor, Vic., F. Mueller, MEL). **B**, *C. spicatum*, flowering branchlet  $\times 3.5$  (Kangaroo Is., S.A., R. Rogers, NSW). **C**, *C. lateriflorum*, flowering branchlet  $\times 3.5$  (H. Stauffer 5381, PERTH). **E**, *C. pauciflorum*, inflorescence  $\times 8$  (R. Pullen 2351, MEL). **F**, *C. pritzelii*, flower with 1 tepal removed,  $\times 10$  (A. Burns 17, PERTH).

**2. *Choretrum spicatum* F. Muell., *Fragm.* 1: 21 (1858)**

T: Kangaroo Island, S.A., *Bannier s.n.*; holotype: MEL.

Illustration: J. M. Black, *Fl. S. Austral.* 2nd edn, 2: fig. 330D, E (1948).

Shrub 1–2 m tall; branches erect. Stems finely striate, terete; flowering branchlets 1.5–2.5 mm diam., the internodes short. Leaves triangular, alternate, appressed, 1.5–2.5 mm long; apex weak, dry, recurved or variously twisted or abraded. Flowers solitary, often crowded; bracts similar to vegetative leaves, spreading; pedicels c. 0.5 mm long with 8–12 bracteoles, 4 of which are involucre. Flowers cylindrical. Tepals c. 1.5 mm long, c. 1 mm wide, white, closely appressed when dry. Stamens without appendages; anther lobes approximately equal. Drupe globose, 2–3 mm long. *Spiked Sourbush*. Fig. 15B.

Occurs on Kangaroo Is., in south-eastern S.A. and in western Vic. Map 44.

S.A.: Duncan and Seddon, Kangaroo Is., *K. H. Northcote* 18 (CANB); South West River, Kangaroo Is., Sept. 1908, *R. S. Rogers* (NSW); Kelley Hill Caves, Kangaroo Is., *H. U. Stauffer 5409 & Hj. Eichler* (AD, CANB, MEL, NSW). Vic.: Little Desert, 1950, *A. Hicks* (MEL); near Miram South, *R. Melville 939 et al.* (MEL, NSW).

The species may consist of two varieties, *vide* Hj. Eichler, *Suppl. Black's Fl. S. Austral.* 98 (1965) and H. U. Stauffer, *Vierteljahrsschr. Naturf. Ges. Zürich* 114: 51 (1969), but investigation is needed to determine this. Records of the species for N.S.W. are regarded as misapplications of the name to *C. pauciflorum* A. DC.

**3. *Choretrum pritzelii* Diels, *Bot. Jahrb. Syst.* 33: 177 (1904)**

T: between Irwin and Greenough Rivers, W.A., *E. Pritzel 418*; syn: AD, MEL, NSW; same locality, *L. Diels 3300*; syn: *n.v.*

Shrub 1–2.5 m tall; branches erect. Stems striate, the ridges rounded; flowering branchlets 1–1.5 mm diam. Leaves subulate, c. 1.5 mm long, appressed. Flowers mostly solitary; bracts subulate, spreading, more or less recurved, c. 3 mm long; pedicels c. 0.5 mm long with 4 subequal involucre bracteoles. Flowers globose. Tepals 1.5–2 mm long, 1–1.5 mm wide, white, loosely appressed when dry. Stamens without appendages; anther lobes unequal, the posterior pair larger. Drupe globose, 5–6 mm long. Fig. 15F.

Occurs between Kalbarri and Eneabba and up to 100 km inland in south-western W.A. Map 45.

W.A.: near Eradu, *A. M. Ashby 1899* (AD, BRI, PERTH); near Geraldton, *A. C. Burns 17* (PERTH); Eneabba, Sept. 1969, *C. Chapman* (PERTH); W of Winchester, Apr. 1969, *C. Chapman* (PERTH); Kalbarri National Park, *P. G. Wilson 6755* (CANB).

**4. *Choretrum pauciflorum* A. DC., *Prodr.* 14: 676 (1857)**

T: Australia, *A. Cunningham, F. Sieber, J. P. Verreaux*; syn: all *n.v.*

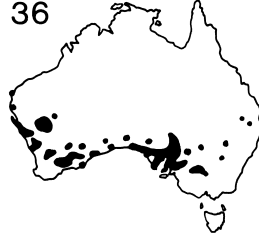
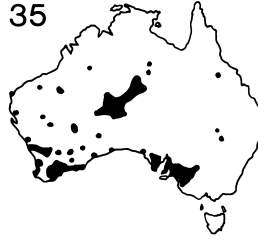
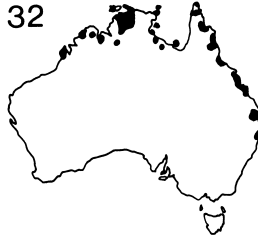
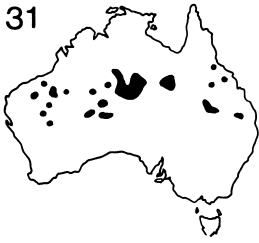
[*C. spicatum auct. non* F. Muell.: S. W. L. Jacobs & J. Pickard, *Pl. New South Wales* 195 (1981)]

Illustration: N. T. Burbidge & M. Gray, *Fl. Austral. Cap. Terr.* fig. 130 (1970).

Small decumbent to ascending shrub, mostly 30–100 cm tall. Stems not or slightly striate, terete; flowering branchlets 1–1.5 mm diam. Leaves triangular-subulate, appressed to slightly spreading, 0.5–1 (rarely to 2) mm long. Flowers solitary; bracts similar to vegetative leaves, spreading to horizontal; pedicels c. 0.5 mm long with 8–10 bracteoles, 4 of which are involucre. Flowers cylindrical. Tepals c. 1 mm long and 0.75 mm wide, white to cream, mostly tightly appressed when dry. Stamens with posterior hair-like appendages; anther lobes approximately equal. Drupe globose, 4–5 mm long. *Dwarf Sourbush*. Fig. 15E.

Occurs on the S coast and S tablelands of N.S.W. and eastern Vic. Map 46.

N.S.W.: Mt. Budawang, *L. A. Craven 578* (CANB, MEL); Tuross River, *L. A. Craven 2519* (CANB). A.C.T.: Mt. Coronet, *R. Pullen 2351* (BRI, CANB, MEL); Black Mountain, *H. U. Stauffer 5478 & M. Gray* (AD, BRI, CANB). Vic.: 53 km N of Buchan, *H. U. Stauffer 5441 et al.* (CANB).



- 31. *Anthobolus leptomerioides*
- 34. *Exocarpos cupressiformis*
- 37. *Exocarpos syrticola*
- 40. *Exocarpos nanus*
- 43. *Choretrum glomeratum*  
var. *chrysanthum*

- 32. *Exocarpos latifolius*
- 35. *Exocarpos sparteus*
- 38. *Exocarpos strictus*
- 41. *Omphacomeria acerba*
- 44. *Choretrum spicatum*

- 33. *Exocarpos odoratus*
- 36. *Exocarpos aphyllus*
- 39. *Exocarpos humifusus*
- 42. *Choretrum glomeratum*  
var. *glomeratum*
- 45. *Choretrum pritzelii*

**5. *Choretrum lateriflorum* R.Br., *Prodr.* 354 (1810)**

T: King George Sound, W.A., Dec. 1801, *R. Brown s.n.*; iso: MEL, NSW.

*C. pendulum* Tovey & P. Morris, *Proc. Roy. Soc. Victoria* ser. 2, 34(2): 209, fig. 2 (1922). T: Pemberton, W.A., Oct. 1919, *M. Koch 2409*; syn: ? AD, MEL; *loc. id.*, Jan. 1921, *M. Koch 2537*; syn: ? AD, BRI, MEL, PERTH.

Illustration: J. R. Tovey & P. F. Morris, *loc. cit.*

Shrub 1.3–4.5 m tall; branches erect to pendulous. Stems striate, angular; flowering branchlets less than 1 mm diam. Leaves subulate, 1–2 mm long, appressed to slightly spreading. Flowers solitary; bracts similar to vegetative leaves, spreading, the apex slightly recurved; pedicels less than 0.5 mm long with 6 bracteoles, 4 of which are involucrel. Flowers cylindrical. Tepals c. 1 mm long, 0.5 mm wide, white to cream, tightly appressed when dry. Stamens without appendages; anther lobes approximately equal. Drupe globose, 4–5 mm long. Fig. 15C.

Occurs along the S coast of south-western W.A. Map 47.

W.A.: Torbay Inlet, Dec. 1902, *W. V. Fitzgerald* (NSW, PERTH); Bow River, Nov. 1912, *S. W. Jackson* (NSW); Wheatley Mill, *C. E. Lane-Poole 316* (PERTH); near Denmark, *R. D. Royce 8112* (PERTH); near Nornalup, *H. U. Stauffer 5381* (CANB, PERTH).

**6. *Choretrum candollei* F. Muell. ex Benth., *Fl. Austral.* 6: 219 (1873)**

T: 12 syntypes cited; all *n.v.*

[*C. lateriflorum auct. non R.Br.*: S. W. L. Jacobs & J. Pickard, *Pl. New South Wales* 195 (1981)]

Shrub 1–5 m tall; branches erect. Stems sharply striate, especially at nodes, angular; flowering branchlets 0.5–1 mm diam. Leaves subulate, 1–2 mm long, appressed to slightly spreading. Flowers solitary; bracts similar to vegetative leaves, spreading; pedicels 0.5–2 mm long, with 4–15 bracteoles, 4 of which are involucrel. Flowers cylindrical. Tepals c. 1 mm long, c. 0.75 mm wide, white, loosely appressed when dry. Stamens without appendages; anther lobes approximately equal. Drupe globose, 4–5 mm long.

Occurs in south-eastern Qld and on the coast, tablelands and western slopes of N.S.W. Map 48.

Qld: Mt. Barney, *S. L. Everist 7127* (CANB); Bunya Mountains, *L. S. Smith 11375* (CANB). N.S.W.: Brown Mountain, *P. J. Darbyshire 1226* (BRI, MEL); near Howell, *R. W. Jessup & M. Gray 1658* (CANB); near Mt Darcy, Oct. 1969, *J. H. Willis* (MEL)

**Doubtful and excluded names**

*Choretrum chrysanthum* F. Muell. ex Miq., *Ned. Kruidk. Arch.* 4: 103 (1856)

T: Wheal-Warton, ?S.A., *F. Mueller*; *n.v.*

This is a later homonym of *C. chrysanthum* F. Muell. (1855) and is probably referable to this taxon. If so, then it is a synonym of *C. glomeratum* var. *chrysanthum* (F. Muell.) Benth.

*Choretrum oxycladum* F. Muell., *Fragm.* 1: 21 (1858)

T: Port Lincoln, S.A., *C. Wilhelmi s.n.*; *n.v.*

This is *Acacia spinescens* Benth.



**5. SPIROGARDNERA***A. S. George*

*Spirogardnera* Stauffer, *Mitt. Bot. Mus. Univ. Zürich* 240: 307 (1968), after C. A. Gardner (1896–1970), Government Botanist of Western Australia 1929–1960, and *spiro* (from *spiralis*, twisted), in reference to the inflorescence

Type: *Spirogardnera rubescens* Stauffer

Shrubs, leafless except young branchlets. Inflorescence terminal, spike-like, twisted, the flowers in small clusters, bisexual. Tepals 5, rarely 4, with a few hairs inserted at base behind stamens, very thick, the apex uncinately adaxially. Stamens 5, rarely 4, inserted at base of tepals; anthers dorsifixed, introrse. Disc prominently 5-lobed. Style short; stigma 5-lobed; ovary 5-locular; ovule 1 per locule, pendulous. Drupe 1-seeded, on a very short thick pedicel; old floral parts persistent. Seed with copious endosperm.

Monotypic, endemic in south-western W.A.

**1. *Spirogardnera rubescens* Stauffer, *Mitt. Bot. Mus. Univ. Zürich* 240: 307 (1968)**

T: 7 miles (c. 11 km) E of Wannamal, W.A., 8 Nov. 1963, *H. U. Stauffer 5385 et al.*; holo: Z n.v.; iso: AD, CANB.

Illustrations: *H. U. Stauffer, op.cit.* 306 fig. 1, 308 t. 1

Spindly, openly branched shrub to 1.6 m, glabrous. Branchlets terete. Leaves linear, triquetrous, acuminate, 3–4 mm long, very early caducous. Receptacle 1–1.5 mm long. Tepals triangular, obtuse, thick, 1 mm long, white turning red. Disc lobes slightly thickened and bilobed at apex. Drupe ellipsoidal-cylindrical, 3 mm long. Fig. 14F–I.

Occurs in few localities in south-western W.A. between Eneabba and Bindoon; grows in laterite, in sand over laterite and in loam, in heath and eucalypt woodland. Flowers Aug.–Nov. Map 49.

W.A.: 6.6 km S of Coorow–Green Head road on Tootbardi road, *J. D. Briggs 602* (AD, CBG, NSW, PERTH, US); c. 62 km SW of Coorow, Sept. 1969, *C. Chapman* (CANB, PERTH); c. 24 km N of Badgingarra, *A. S. George 6749* (PERTH).

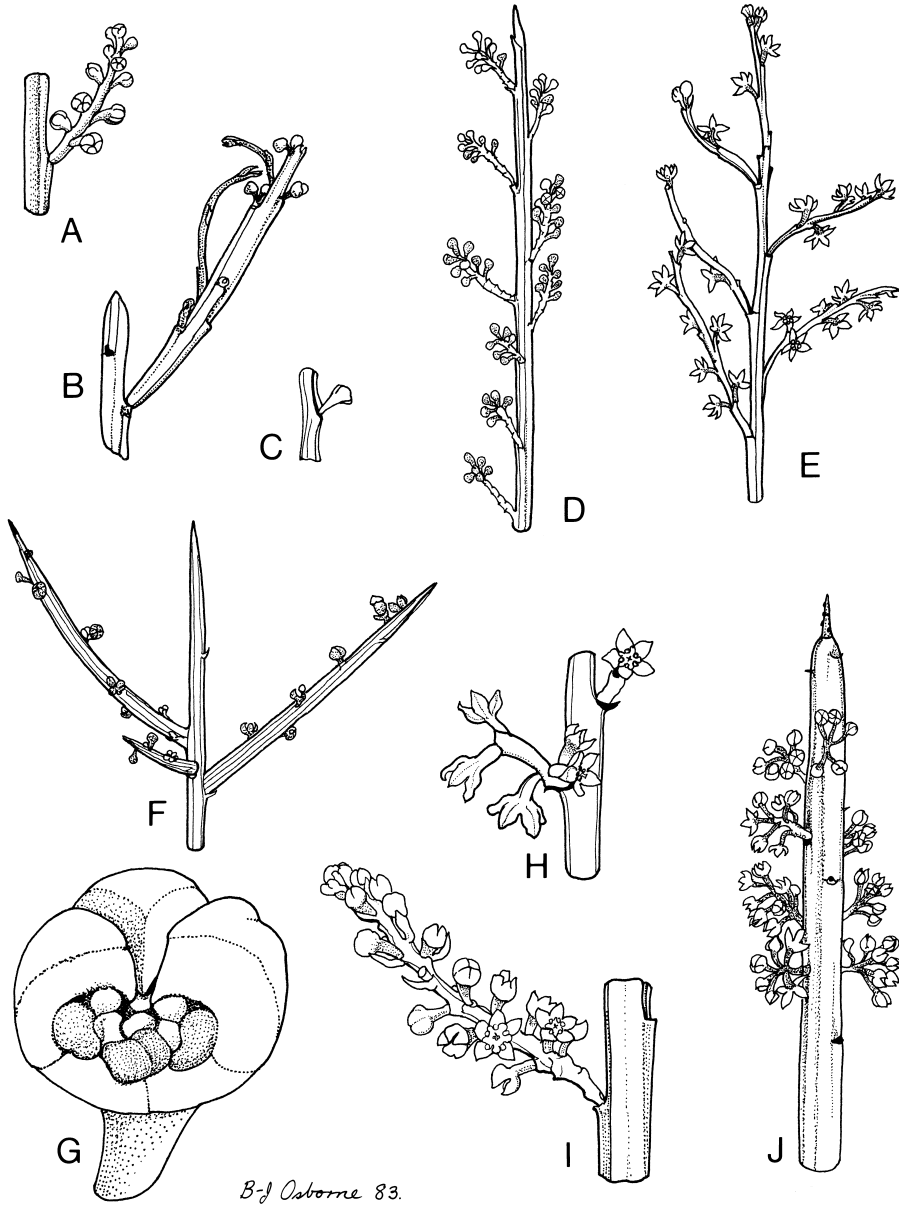
**6. LEPTOMERIA***H. J. Hewson*

*Leptomeria* R.Br., *Prodr.* 353 (1810), from the Greek *leptos* (slender), and *meros* (part), in reference to the slender branches

Type: *L. acida* R.Br.

Shrubs, mostly glabrous, some species appearing leafless; branches usually striate with decurrent ridges. Leaves scale-like or well developed, persistent or caducous. Flowers either solitary on fertile branches not markedly different from vegetative stems, or in lateral spikes, racemes or corymbs with rachis different from vegetative stem and subtended by a leaf-like bract. Flowers bisexual, each subtended by a bract. Tepals 5, rarely 4, thin or fleshy, the apex sometimes slightly incurved or thickened. Stamens inserted at base of tepals; filaments very short; locules obscurely or obviously 2-lobed; connective prominent. Disc usually prominently lobed. Ovary inferior, 1-locular, 2–5-chambered at base; style very short; stigma 5-lobed. Drupe fleshy or dry, crowned with persistent perianth.

An endemic genus of 17 species in southern Australia.



B-J Osborne 83.

**Figure 16.** *Leptomeria*. **A**, *L. acida*, inflorescence  $\times 4$  (H. Stauffer 5699, CANB). **B**, *L. glomerata*, flowering branchlet  $\times 3$  (F. Rodway 231, NSW). **C**, *L. dielsiana*, inflorescence  $\times 3$  (loc. unknown, W.A., J. Drummond, NSW). **D**, *L. aphylla*, flowering branchlet  $\times 3$  (A. Beaglehole 24920, MEL). **E**, *L. drupacea*, flowering branchlet  $\times 3$  (M. Phillips 031215, NSW). **F-G**, *L. spinosa*. **F**, flowering branchlet  $\times 4$  (P. Wilson 5485, PERTH); **G**, flower with 2 tepals removed,  $\times 35$  (C. Chapman, PERTH). **H**, *L. pauciflora*, flowering branchlet  $\times 4$  (G. Keighery 2242, PERTH). **I**, *L. preissiana*, inflorescence  $\times 4$  (E of Yuna, W.A., L. Johnson, PERTH). **J**, *L. pachyclada*, flowering branchlet  $\times 3$  (E. Wittwer 1955, PERTH).

G. Bentham, *Fl. Austral.* 6: 219–225 (1873).

- 1 Bracts and leaves persistent
- 2 Bracts articulate at base
- 3 Stems papillose 13. *L. empetriformis*
- 3: Stems glabrous
- 4 Flowering branchlets erect to spreading 12. *L. cunninghamii*
- 4: Flowering branchlets pendulous
- 5 Some or all leaves ovate or obovate 15. *L. obovata*
- 5: Leaves linear 14. *L. axillaris*
- 2: Bracts not articulate at base
- 6 Leaves articulate at base 16. *L. pendulifera*
- 6: Leaves not articulate at base 17. *L. squarrulosa*
- 1: Bracts and leaves caducous
- 7 Flowers white
- 8 Branches pungent
- 9 Inflorescence a raceme of 10–25 flowers 8. *L. preissiona*
- 9: Inflorescence a corymb or short raceme of less than 10 flowers
- 10 Flowering branchlets 1.5–2 mm thick 7. *L. pachyclada*
- 10: Flowering branchlets up to 1.5 mm thick 6. *L. spinosa*
- 8: Branches not pungent
- 11 Shrub less than 0.5 m tall; flowers up to 10 per inflorescence 4. *L. glomerata*
- 11: Shrub more than 0.5 m tall; flowers more than 10 per inflorescence 3. *L. drupacea*
- 7: Flowers green, yellow, orange or brown
- 12 Flowers solitary 9. *L. dielsiana*
- 12: Flowers in racemes, spikes or corymbs
- 13 Inflorescence a spike with rachis thickened and flowers partly sunken
- 14 Stems papillose 10. *L. scrobiculata*
- 14: Stems glabrous 11. *L. ericoides*
- 13: Inflorescence otherwise, if a spike then rachis not thickened
- 15 Stems rigid, terete, pungent 2. *L. aphylla*
- 15: Stems weak to semi-rigid, ridged, not pungent
- 16 Inflorescence a raceme of 20 or more flowers 1. *L. acida*
- 16: Inflorescence a corymb or short raceme of less than 20 flowers 5. *L. pauciflora*

### 1. *Leptomeria acida* R.Br., *Prodr.* 353 (1810)

T: Port Jackson, N.S.W., 4 June 1802, *R. Brown s.n.*; *n.v.*

Illustrations: R. Pilger, *Nat. Pflanzenfam.* 2nd edn, 16b: fig. 33C–E (1935); L. Costermans, *Native Trees Shrubs S.E. Austral.* 171 (1981).

Erect shrub 1.5–3 m tall, glabrous. Stems striate, semi-terete; flowering branchlets 0.5–1.5 mm diam. Leaves slightly spreading, subulate to triangular, c. 2 mm long, caducous. Inflorescence a lateral raceme; rachis 1–4 cm long; flowers 20 or more, almost sessile; bracts ovate to acuminate, c. 1 mm long. Tepals up to 0.5 mm long, green-brown outside, darker inside; apex hooded to uncinately with adaxial thickening. Disc not lobed. Drupe ovoid, c. 7 mm long, fleshy. *Sour Currant-bush*, *Native Currant*. Fig. 16A.

Occurs in south-eastern Qld, eastern N.S.W. and far eastern Gippsland, Vic. Map 50.

Qld: c. 38 km ENE of Gympie, *L. S. Smith 12137* (CANB, MEL); c. 40 km E of Gympie, *S. L. Everist 7701* (CANB, MEL). N.S.W.: near Mt Sassafras, *T. G. Hartley 14297* (CANB); near Nerriga, *H. U. Stauffer 5490* & *R. Pullen* (CANB). Vic.: East Wingan Road, *A. C. Beauglehole 32634* (MEL).

## 2. *Leptomeria aphylla* R.Br., *Prodr.* 354 (1810)

T: Memory Cove & Port Lincoln, S.A., 22 Feb. 1802, *R. Brown s.n.*; syn: MEL.

*L. pungens* F. Muell., *Trans. & Proc. Victorian Inst. Advancem. Sci.* 41 (1855). T: Murray River; St Vincent Gulf; Spencer Gulf; collector unknown; n.v.

Illustration: G. R. Cochrane *et al.*, *Fl. Pl. Victoria* t. 87 (1968).

Erect shrub to 2 m, glabrous. Stems rigid, pungent, slightly striate, terete; flowering branchlets 0.7–1.5 mm diam. Leaves appressed, triangular to ovate, 0.5–1 mm long, caducous. Inflorescence a lateral raceme; rachis to 1 cm long; flowers 10–30, almost sessile; bracts similar to bracts but more cupped, to 0.5 mm long. Tepals to 0.5 mm long, green to purple; apex hooded to uncinately with adaxial thickening. Disc slightly lobed. Drupe ovoid, 5–8 mm long, fleshy. *Leafless Currant-bush*. Fig. 16D.

Occurs in south-eastern S.A. including Eyre Peninsula, in western Vic. and on King Is., Tas. Map 51.

S.A.: 48 km S of Bordertown, *H. U. Stauffer 5393* & *Hj. Eichler* (MEL); Kelley Hill Caves, Kangaroo Island, *H. U. Stauffer 5408* & *Hj. Eichler* (CANB, MEL). Vic.: near Dimboola, *R. Melville 1005 et al.* (MEL); Boronia Peak, Grampians, *T. B. Muir 837* (CANB, MEL); near Eaglehawk, Sept. 1969, *J.H. Willis* (MEL).

Recorded for N.S.W. but not accepted by S. W. L. Jacobs & J. Pickard, *Pl. New South Wales* 196 (1981). However, two sterile specimens from the northern tablelands of N.S.W. (NSW 149841, 149843) are probably *L. aphylla*.

## 3. *Leptomeria drupacea* (Labill.) Druce, *Bot. Exch. Club. Soc. Brit. Isles Rep.* 1916, Suppl. 2: 632 (1917)

*Thesium drupaceum* Labill., *Nov. Holl. Pl. Spec.* 1: 68, t. 93 (1805); *Leptomeria billardieri* R.Br., *Prodr.* 354 (1810). T: Tasmania, *J. Labillardière s.n.*; iso: NSW.

Illustrations: J. J. H. de Labillardière, *loc. cit.*; W. M. Curtis, *Stud. Fl. Tasmania* 3: fig. 133 (1967).

Erect shrub to 2.5 m, glabrous. Stems slightly striate, semiterete; flowering branchlets 0.7–1.5 mm diam. Leaves appressed, subulate to triangular, c. 1 mm long, caducous. Inflorescence a lax lateral raceme; rachis 1–2 cm long; flowers 10–16, almost sessile; bracts ovate to acuminate, c. 0.75 mm long. Tepals 0.5–0.75 mm long, white; apex uncinately with adaxial thickening. Disc markedly lobed between stamens. Drupe ovoid, 3–6 mm long, slightly fleshy. Fig. 16E.

Occurs in eastern N.S.W. and in Tas. Map 52.

N.S.W.: near El Dorado, Jan. 1961, *W. E. Giles* (NSW); near Tuross Falls, Jan. 1968, *L. A. S. Johnson* (NSW). Tas.: Blythe River, Jan. 1936, *G. & C. Davis* (NSW); Oyster Cove, *R. Melville 2412 et al.* (NSW); near Gardners Bay, *M. E. Phillips 31215* (NSW).

## 4. *Leptomeria glomerata* J. D. Hook., *Fl. Tasman.* 2: 370 (1859)

T: Southport, Tas., *Stuart s.n.*; syn: n.v.; Police Point, Huon River, Tas., *Oldfield s.n.*; syn: n.v.

*L. billardieri* var. *humilis* J. D. Hook., *Fl. Tasman.* 1: 337 (1857). T: Lake St Clair, Tas., *R. C. Gunn s.n.*; iso: n.v.

Illustration: E. M. Stones, *Endemic Fl. Tasmania* 5: 336, t. 176 (1975).

Small prostrate to erect shrub to 30 cm tall, glabrous. Stems markedly articulate, rigid, striate, semiterete to obtusely angular; flowering branchlets 1–1.5 mm diam. Leaves appressed, triangular, 0.5–1.5 mm long, caducous. Inflorescence variable from an almost sessile cluster to a spike; rachis mostly to 5 (rarely 15) mm long; flowers 1–10; bracts triangular to ovate, 0.5 mm long, caducous. Tepals 4 or 5, 0.5 mm long, white; apex

uncinate with adaxial thickening. Disc lobed. Drupe globose, 2–4 mm long, slightly fleshy. Fig. 16B.

Endemic in southern, western and central Tasmania. Map 53.

Tas.: Western Mountains, *W. H. Archer* (NSW 149854); Recherche to South Cape Bay, Dec. 1901, *F. A. Rodway* (NSW); Cradle Mountain, Dec. 1915, *F. A. Rodway* (NSW); Strahan, *L. Rodway* 2709 (NSW).

### 5. *Leptomeria pauciflora* R.Br., *Prodr.* 354 (1810)

T: King George Sound, Dec. 1801, *R. Brown s.n.; n.v.*

*L. lehmannii* Miq., in *Lehm., Pl. Preiss.* 1: 614 (1845). T: Wuljenup (Mt Willyung), W.A., *L. Preiss* 2107, 2121; syn: MEL; Goderick, W.A., *L. Preiss* 2097; syn: MEL.

*L. lehmannii* f. *tenerior* Miq., in *J. G. C. Lehmann, Pl. Preiss.* 1: 615 (1845). T: Gordon River, Hay, W.A., *L. Preiss* 2123; iso: MEL.

Erect shrub to 5 m, glabrous; branches sometimes drooping. Stems slightly striate, terete; flowering branchlets 0.7–1.5 mm diam. Leaves appressed to slightly spreading, subulate, 1–1.5 mm long, caducous. Inflorescence a lateral corymb or short raceme; rachis 2–6 mm long, rarely longer; flowers 3–15, almost sessile; bracts ovate, cupped, 0.5–1.0 mm long. Tepals c. 0.5 mm long, green-yellow to orange; apex very slightly incurved. Disc lobed. Drupe ovoid to elongate-ovoid, 3–7 mm long, fleshy. Fig. 16H.

Occurs in south-western W.A. between Perth, Cape Leeuwin and Israelite Bay. Map 54.

W.A.: Denmark, Nov. 1927, *C. A. Gardner* (PERTH); Needilup, *K. Newbey* 1462 (PERTH); Fitzgerald River Reserve, *R. D. Royce* 8929 (PERTH); near Kendenup, *H. U. Stauffer* 5365 & *R. D. Royce* (BRI, CANB, MEL, NSW, PERTH); 30 km W of Mt Ragged, *P. Wilson* 2937 (PERTH).

Variable especially in robustness, inflorescence length and fruit shape, and requires further investigation.

### 6. *Leptomeria spinosa* (Miq.) A.DC., *Prodr.* 14: 678 (1857)

*Choretrum spinosum* Miq., in *Lehm., Pl. Preiss.* 1: 609 (1845). T: Hay, W.A., Nov. 1840, *L. Preiss* 2105; iso: MEL.

Erect shrub to 1 m, rarely taller, glabrous. Stems rigid, pungent, not or slightly striate, terete to slightly angular; flowering branchlets 0.7–1.5 mm diam. Leaves slightly spreading, subulate, 1.5–2 mm long, caducous. Inflorescence a lateral corymb or short raceme; rachis 1–2 mm long, rarely longer; flowers 3–6, almost sessile; bracts ovate-acuminate, cupped, 0.5–1 mm long. Tepals c. 0.5 mm long, white; apex hooded to uncinately with adaxial thickening. Disc slightly lobed. Drupe globose, 1.5–2 mm long, dry. *Spiny Currant-bush*. Fig. 16F–G.

Widespread in south-western W.A. Map 55.

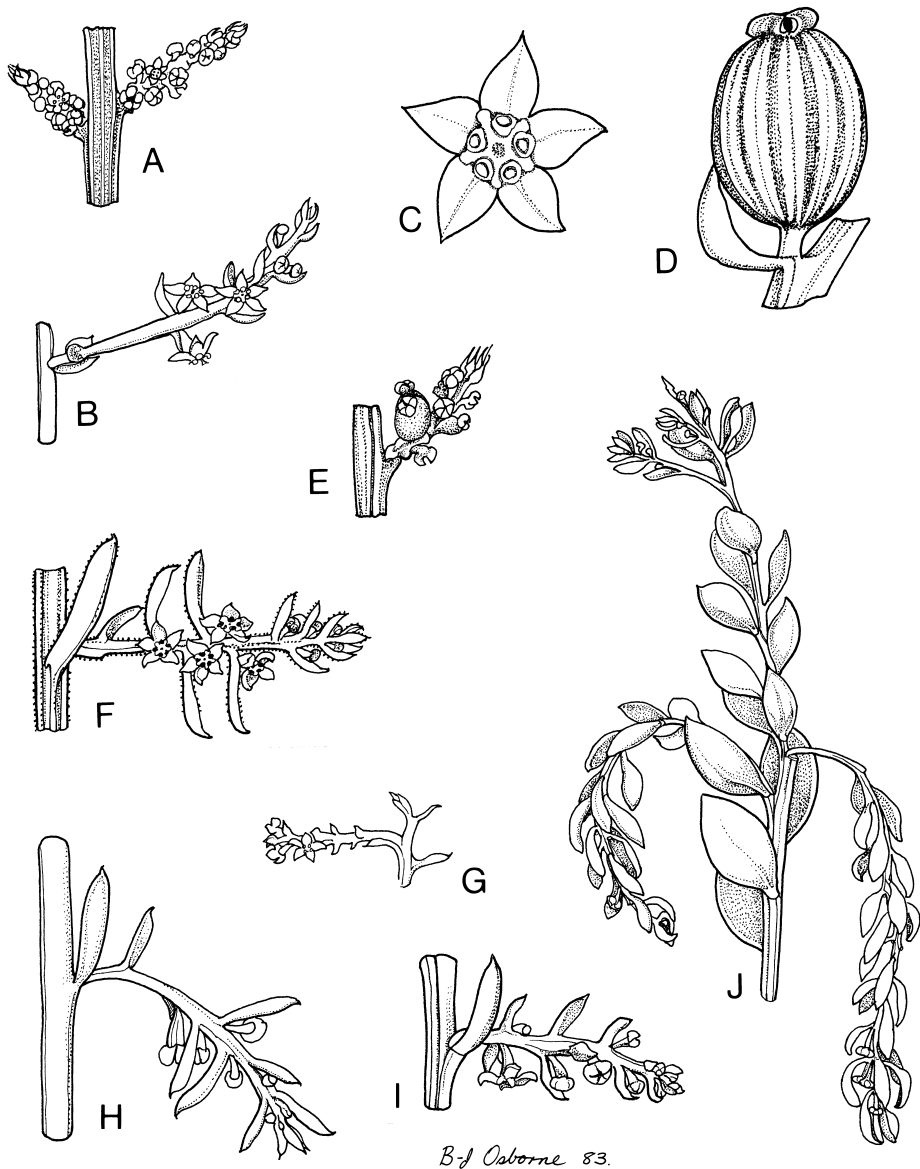
W.A.: near Winchester, Sept. 1969, *C. Chapman* (PERTH); Sorrento, *R. Melville* 4344 & *R. D. Royce* (MEL); Nambung National Park, *R. D. Royce* 10299 (PERTH); Thomson Lake, *H. U. Stauffer* 5353 *et al.* (BRI, CANB, NSW, PERTH); East Mt Barren, *P. G. Wilson* 5485 (PERTH).

### 7. *Leptomeria pachyclada* Diels, *Bot. Jahrb. Syst.* 35: 178 (1904)

T: N of Esperance Bay, W.A., *L. Diels* 5447; *n.v.*

Erect shrub to 3 m, glabrous. Stems rigid, pungent, slightly striate, terete; flowering branchlets 1.5–2 mm diam. Leaves appressed, subulate, c. 1.5 mm long, caducous. Inflorescence a lateral corymb or short raceme; rachis 0.5–3 mm long; flowers mostly 8, almost sessile; bracts ovate, cupped, 0.7–1.5 mm long. Tepals c. 1 mm long, white; apex hooded to uncinately with adaxial thickening. Disc slightly lobed. Drupe globose, 3 mm long, dry. Fig. 16J.

Occurs in south-western W.A. from Albany to Twilight Cove. Map 56.



**Figure 17.** *Leptomeria*. **A**, *L. scrobiculata*, flowering branchlet  $\times 4$  (E. Wittwer 1568, PERTH). **B–D**, *L. cunninghamii*. **B**, inflorescence  $\times 4$  (H. Stauffer 5310, PERTH); **C**, flower  $\times 20$  (S. Paust 954, PERTH); **D**, fruit  $\times 14$  (V. Mann 48, PERTH). **E**, *L. ericoides*, inflorescence  $\times 4$  (R. Royce 2835, PERTH). **F**, *L. empetriformis*, inflorescence  $\times 4$  (Cannington, W.A., A. Morrison, PERTH). **G**, *L. squarrulosa*, inflorescence  $\times 4$  (S. Paust 529, PERTH). **H**, *L. axillaris*, inflorescence  $\times 4$  (A. George 7464, PERTH). **I**, *L. penduliflora*, inflorescence  $\times 4$  (Kalgan Plains, W.A., J. Maiden, NSW). **J**, *L. obovata*, flowering branchlet  $\times 3$  (K. Newbey 2933, PERTH).

W.A.: c. 50–60 km NE of Condingup, *J. S. Beard 6359* (NSW, PERTH); Israelite Bay, 1887, *S. Brooke* (MEL); near Mt Ragged, *N. N. Donner 3091* (PERTH); Salmon Gums to Grasspatch, *C. A. Gardner & W. E. Blackall 1010* (PERTH); 80 km N of Esperance, *R. H. Kuchel 1716* (BRI).

### 8. *Leptomeria preissiana* (Miq.) A.DC., *Prodr.* 14: 678 (1857)

*Choretrum preissianum* Miq., in Lehm., *Pl. Preiss.* 1: 608 (1845). T: Garden Island, W.A., 9 Nov. 1839, *L. Preiss 2101*; n.v.

Erect shrub to 2.5 m, glabrous. Stems rigid, pungent, slightly striate, terete; flowering branchlets 1–1.5 mm diam. Leaves slightly spreading, lanceolate, 2–3 mm long, caducous. Inflorescence a lateral raceme; rachis 0.5–1.5 cm long; flowers 10–25, almost sessile; bracts ovate, cupped or lanceolate, incurved, 1–1.5 mm long. Tepals c. 0.75 mm long, white; apex hooded to uncinately with adaxial thickening. Disc lobed. Drupe globose, 2–3 mm long, dry. Fig. 16 I.

Occurs in south-western W.A. from Shark Bay to Perth and E to Comet Vale and Norseman; one collection from northern Eyre Peninsula, S.A. Map 57.

W.A.: near Eradu, *A. M. Ashby 1900* (BRI, MEL); near Dalwallinu, *J. S. Beard 7972* (PERTH); near Holt Rock, *L. Haegi 1207* (NSW, PERTH); Cowcowing, *M. Koch 1199* (PERTH); Frank Hann National Park, *R. D. Royce 10200* (PERTH).

### 9. *Leptomeria dielsiana* Pilger, *Bull. Herb. Boissier* ser. 2, 6: 103 (1906)

T: south-western W.A., *J. Drummond 2*: 228; iso: NSW.

Erect shrub to 50 cm, glabrous. Stems rigid, slightly striate, terete; flowering branchlets 0.5–1 mm diam. Leaves appressed, subulate, 0.7–1.2 mm long, caducous. Flowers solitary, sessile; bracts ovate, c. 1.5 mm long. Tepals up to 0.5 mm long, brown; apex slightly hooked, not thickened. Disc slightly lobed. Drupe globose, c. 0.4 mm diam., fleshy. Fig. 16C.

Known only from the type. Map 58.

### 10. *Leptomeria scrobiculata* R.Br., *Prodr.* 354 (1810)

T: King George Sound, Dec. 1801, *R. Brown s.n.*; n.v.

*L. chrysadena* Miq., in Lehm., *Pl. Preiss.* 1: 612 (1845). T: between Mt Melville and Mt Elphinstone, W.A., 11 Oct. 1840, *L. Preiss 2124*; iso: MEL.

Erect shrub to 1.5 m. Stems striate, angular, tuberculate; flowering branchlets 0.7–1.5 mm diam. Leaves slightly spreading, subulate, 1–2 mm long, caducous leaving decurrent leaf bases. Inflorescence a lateral spike, sometimes conelike; rachis 0.5–3.5 cm long, thickened with flowers partly sunken; flowers 5–45, sessile; bracts ovate, cupped, 0.7–1 mm long. Tepals up to 0.5 mm long, orange to brown; apex slightly incurved. Disc raised and lobed. Drupe globose, 2–3 mm long, dry. Fig. 17A.

Occurs in south-western W.A. between Pemberton and Cape Riche. Map 59.

W.A.: near Mt Toolbrunup, *T. E. H. Aplin 1102* (PERTH); Pemberton, *M. Koch 2357* (BRI, MEL, PERTH); King George Sound, Nov. 1909, *J. H. Maiden* (NSW); Mt Toolbrunup, *P. G. Wilson 4236* (PERTH); 25 km N of Walpole, *E. Wittwer 1568* (PERTH).

### 11. *Leptomeria ericoides* Miq. in Lehm., *Pl. Preiss.* 1: 611 (1845)

T: Wuljenup (Mt Willyung), W.A., Oct. 1840, *L. Preiss 2117*; iso: ?MEL.

Erect shrub to 50 cm tall, glabrous. Stems striate, angled; flowering branchlets 0.7–1.5 mm diam. Leaves appressed, subulate, 2–3 mm long, mostly persistent. Flowers in lateral and terminal spikes; rachis 3–7 mm long, thickened, with flowers partly sunken; flowers 3–10, sessile; bracts lanceolate, 1–2 mm long. Tepals up to 0.5 mm long, orange to brown; apex slightly hooded to uncinately with adaxial thickening. Disc lobed. Drupe globose, 2–3 mm long, dry. Fig. 17E.

Known only from the type and one other collection in south-western W.A. Map 60.

W.A.: Cowaramup, *R. D. Royce 2835* (PERTH).

**12. *Leptomeria cunninghamii* Miq. in Lehm., *Pl. Preiss.* 1: 611 (1845)**

T: Emu Plains, Darling Range, W.A., 12 Sept. 1839, *L. Preiss 2096; n.v.*

Erect shrub to 0.6 m, glabrous. Stems weak, slightly striate; flowering branchlets c. 0.5 mm diam. Leaves spreading, incurved, ovate to linear, flat to triquetrous, 5–10 mm long, articulate at base, persistent. Flowers solitary; fertile branches erect to spreading; bracts either ovate, incurved, flat adaxially, ridged abaxially and 1–2 mm long, or lanceolate, straight, flat, slightly ridged abaxially and 2–3 mm long; pedicel c. 0.25 mm long. Tepals c. 0.5 mm long, golden brown; apex very slightly hooded. Disc lobed. Drupe globose, c. 2 mm long, dry. Fig. 17B–D.

Occurs in south-western W.A. mainly in the Darling Range between Perth and Manjimup. Map 61.

W.A.: Armadale, *S. T. Blake 20713* (BRI); Boyanup, *C. A. Gardner 923* (PERTH); Stirling Dam, *S. Paust 954* (PERTH); Balingup, Dec. 1917, *R. H. Pulleine* (NSW); Manjimup, *R. D. Royce 2711* (PERTH).

This species varies in the length of both the flowering branchlet and the internodes between flowers, and in the length and shape of the bracts. *L. laxa* Miq. may belong here but until the type is studied the application of the name remains doubtful.

**13. *Leptomeria empetriformis* Miq. in Lehm., *Pl. Preiss.* 1: 610 (1845)**

T: near Swan River, W.A., 23 Jul. 1839, *L. Preiss 2094; n.v.*

*Leptomeria hirtella* Miq., Lehm., *Pl. Preiss.* 1: 610 (1845). T: Perth, W.A., 19 Jun. 1839, *L. Preiss 2113; n.v.*

Erect shrub to 0.6 m. Stems rough with papillae, striate, angular; flowering branchlets 0.5–1 mm diam. Leaves spreading, incurved, linear-terete, 2–10 mm long, papillate, articulate at base, persistent. Flowers solitary; fertile branchlets erect to spreading; bracts ovate to linear, 2–3 mm long; pedicel c. 0.5 mm long. Tepals up to c. 0.75 mm long, orange or brown; apex very slightly hooded. Disc lobed. Drupe globose to ovoid, 3–4 mm long, dry. Fig. 17F.

Occurs between Eneabba and Pinjarra near the W coast of south-western W.A. Map 62.

W.A.: Buckland Hill, near Fremantle, Aug. 1902, *C. Andrews* (PERTH); Cannington, Aug. 1898, *A. Morrison* (PERTH); 49 km S Perth, *R. A. Saffrey 248* (PERTH); near Mt Henry, *H. U. Stauffer 5308* & *A. S. George* (BRI, CANB, NSW, PERTH); Jandakot Marsupial Breeding Station, *A. S. Weston 8559* (PERTH).

**14. *Leptomeria axillaris* R.Br., *Prodr.* 354 (1810)**

T: south coast [probably Lucky Bay], W.A., *R. Brown s.n.*; iso: NSW.

Erect shrub to 0.7 m, glabrous. Stems weak, slightly striate, angular; flowering branchlets 0.5–0.75 mm diam., pendulous. Leaves spreading, linear, more or less terete to flattened adaxially, 4–7 mm long, articulate at base, persistent. Flowers solitary; bracts linear, terete, 2–5 mm long; pedicel c. 0.5 mm long. Tepals c. 0.5 mm long, orange or brown; apex slightly hooded. Disc lobed. Drupe globose to ovoid, 2 mm long, dry. Fig. 17H.

Occurs in south-western W.A. between the Fitzgerald R. and Israelite Bay. Map 63.

W.A.: Fitzgerald River National Park, *M. D. Crisp 5021* (BRI, CBG, NSW); Lucky Bay, *A. S. George 7674* (PERTH); 45 km W of Israelite Bay, *R. J. Hnatiuk 761248* (PERTH); Thistle Cove, *T. B. Muir 4310* (MEL); Cape Le Grand National Park, *R. D. Royce 8628* (PERTH).



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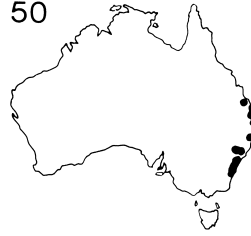
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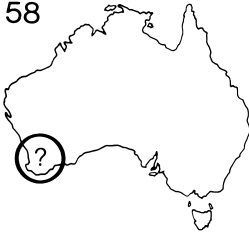
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46. *Choretrum pauciflorum*  
 49. *Spirogardnera rubescens*  
 52. *Leptomeria drupacea*  
 55. *Leptomeria spinosa*  
 58. *Leptomeria dielsiana*

47. *Choretrum lateriflorum*  
 50. *Leptomeria acida*  
 53. *Leptomeria glomerata*  
 56. *Leptomeria pachyclada*  
 59. *Leptomeria scrobiculata*

48. *Choretrum candollei*  
 51. *Leptomeria aphylla*  
 54. *Leptomeria pauciflora*  
 57. *Leptomeria preissiana*  
 60. *Leptomeria ericoides*

**15. *Leptomeria obovata* Miq. in Lehm., *Pl. Preiss.* 1: 613 (1845)**

T: Western Australia, Feb. 1841, *L. Preiss* 2108; *n.v.*

Erect shrub to 0.5 m, glabrous. Stems weak, slightly or not striate, angular; flowering branchlets 0.5–1 mm diam., pendulous. Leaves spreading to horizontal, ovate to obovate, 2–10 mm long, articulate at base, persistent; linear leaves sometimes also present. Flowers solitary; bracts linear or obovate, 3–5 mm long; pedicel c. 0.5 mm long. Tepals c. 0.5 mm long, orange or brown; apex slightly hooded. Disc lobed. Drupe globose, c. 2 mm long, dry. Fig. 17J.

Occurs in south-western W.A. between Cape Riche and Hopetoun. Map 64.

W.A.: West Mt Barren, *T. E. H. Aplin* 2768 (PERTH); Thumb Peak, *A. S. George* 7149 (PERTH); Mt Melville, *K. Newbey* 2933 (PERTH); Cape Riche, *J. W. Wrigley* WA/684975 (CBG).

This species may be a western variant of *L. axillaris* R.Br. It differs in having at least some flat ovate or obovate leaves and bracts.

**16. *Leptomeria penduliflora* Hewson, *Fl. Australia* 22: 221 (1984)**

T: Kalgan Plains, W.A., Dec. 1909, *J. H. Maiden*; holo: NSW; iso: K, PERTH.

Erect shrub c. 30 cm tall, glabrous. Stems slightly striate and angular; flowering branchlets c. 0.5 mm diam., pendulous. Leaves spreading to horizontal, incurved at apex, narrowly obovate to linear, 2–5 mm long, sometimes longer, articulate at base, persistent. Flowers solitary; bracts triangular, incurved, decurrent, not articulate, 1–2 mm long; pedicel c. 0.5 mm long. Tepals c. 0.5 mm long, orange or brown; apex hooded with slight adaxial thickening. Disc lobed. Drupe globose, 2–2.5 mm long, dry. Fig. 17 I.

Occurs in south-western W.A. between Albany and the Stirling Range. Map 65.

W.A.: Sukey Hill, Mar. 1922, *C. A. Gardner* (PERTH); South Stirling, *A. S. George* 6237 (PERTH); Mt Barker, *A. Meebold* 10814 (PERTH); 24 km W of Chester Pass, *T. B. Muir* 3910 (MEL).

**17. *Leptomeria squarrulosa* R.Br., *Prodr.* 354 (1810)**

T: south coast [probably King George Sound], W.A., *R. Brown s.n.*; iso: MEL.

*L. brownii* Miq., in Lehm., *Pl. Preiss.* 1: 612 (1845). T: Wuljenup (Mt Willyung), W.A., 14 Oct. 1840, *L. Preiss* 2109; iso: MEL.

Erect shrub to 1 m, glabrous. Stems striate, angular; flowering branchlets 0.5–1 mm diam., pendulous. Leaves spreading to horizontal, sometimes recurved at apex, triangular, 0.5–4 mm long, (juveniles to 1 cm long), without articulation, persistent; older leaves semi-terete, acute, the apices recurved. Flowers solitary; bracts triangular, decurrent, c. 0.75 mm long; pedicel c. 0.5 mm long. Tepals up to 0.5 mm long, yellow or orange; apex slightly hooded to uncinat with adaxial thickening. Disc lobed. Drupe globose, 1.5–3 mm long, dry. Fig. 17G.

Occurs in south-western W.A. between Busselton and Cape Riche. Map 66.

W.A.: 48 km S of Busselton, *C. Andrews* 2/128 (PERTH); near Manjimup, *T. E. H. Aplin* 1367 (PERTH); Albany to Jerramungup, *S. Paust* 529 (PERTH); Stirling Range National Park, *R. D. Royce* 8077 (PERTH); near Kendenup, *H. U. Stauffer* 5364 & *R. D. Royce* (BRI, MEL, NSW, PERTH).

**Doubtful and excluded names**

*Leptomeria laxa* Miq., in Lehm., *Pl. Preiss.* 1: 612 (1845)

T: south-western W.A., Nov. 1840, *L. Preiss* 2120; *n.v.*

No material of this species was available. See note under *L. cunninghamii*.

*Leptomeria rohlena* Domin, *Vestn. Král. České Společn. Nauk, Tr. Mat.-Prír.* 1921–2 2: 21 (1923)

T: Cranbrook to Warrungup, W.A., A. A. *Dorrien-Smith*; Warrungup, Stirling Range, W.A., A. A. *Dorrien-Smith*; both *n.v.*

*Leptomeria spinosa* var. *leptoclada* Benth., *Fl. Austral.* 6: 221 (1873).

T: Dirk Hartog Island, W.A., A. *Cunningham*; *n.v.*

*Leptomeria xiphochlada* Sieber ex Spreng., *Linn. Syst. Veg.* 4: 109 (1827)

T: from Australia; locality unknown; *n.v.*

This is *Amperea xiphocladus* (Sieber ex Spreng.) Druce.

## 7. DENDROTROPHE

A. S. George

*Dendrotrophe* Miq., *Fl. Ned. Ind., Eerste bijv.* 1: 776, 779 (1856), from the Greek *dendron* (a tree), and *trophe* (nourishment), referring to the parasitic habit

T: *D. umbellata* (Blume) Miq.

*Henslowia* Blume, *Mus. Bot.* 1: 242 (1850), *nom. illeg.*, non Wall. (1832). T: *H. umbellata* (Blume) Blume.

Climbers or (not in Australia) shrubs. Leaves alternate, well-developed. Flowers unisexual or (not in Australia) sometimes bisexual, solitary or in axillary racemes or umbels, bracteate. Tepals 5. Stamens 5. Ovary inferior with several to many incomplete septa; style short or absent; stigmas 5. Fruit a drupe with succulent mesocarp. Seeds several, lobed.

30 species from the Himalayas to the Philippines and Malesia, one species reaching Australia.

***Dendrotrophe varians*** (Blume) Miq., *Fl. Ned. Ind., Eerste bijv.* 1: 780 (1856)

*Henslowia varians* Blume, *Mus. Bot.* 1: 244, t. 43 (1850). T: Borneo, *Korthals s.n.*; *n.v.*

*Henslowia queenslandiae* L. S. Smith, *Queensland Naturalist* 14: 62, with fig. (1951). T: Mt Edith, Lamb Ra., c. 15 miles (24 km) NE of Atherton, Qld, 23 Aug. 1947, L. S. Smith 3394; holo: BRI.

Illustration: L. S. Smith, *op. cit.* 64 (1951) as *Henslowia queenslandiae*.

Monoecious climber, glabrous; bark corky. Branchlets terete. Leaves elliptic-obovate, obtuse, discolorous; lamina 1.5–9 cm long with 3–5 veins, the outer ones not reaching apex; petiole to 1 cm long. Flowers greenish white. Male flowers in racemes to 1 cm long; bracts ovate, concave, less than 1 mm long, caducous; pedicels 1–2 mm long; receptacle 0.5 mm long; tepals triangular, 1 mm long, with hair tufts behind anthers; stamens c. 0.5 mm long. Female flowers solitary or clustered; bracts several on peduncle and 3 at base of pedicel, ovate, to 1 mm long, persistent; receptacle 1.5 mm long; tepals 0.5 mm long; stigmas globular, sessile. Drupe ovoid, c. 10 mm long; epicarp black; endocarp rugose. Fig. 18A.

Occurs in N Qld from Atherton Tableland to Mackay, in rainforest above 700 m. Map 67.

Qld: Danbulla, NNE of Atherton, S. T. Blake 15261 (BRI); Crediton, B. Hyland 8202 (BRI, CANB); Eungella Range, L. S. Smith 4674 (BRI).

## 8. DENDROMYZA

A. S. George

*Dendromyza* Danser, *Nova Guinea* ser. 2, 4: 133 (1940), from the Greek *dendron* (a tree), and *myzo* (to suck), in reference to the parasitic habit

Type: *D. reinwardtiana* (Blume ex Korth.) Danser

Stem-parasitic dioecious shrubs, glabrous. Branchlets dimorphic, either leafy or with haustoria and scale leaves. Leaves alternate. Flowers clustered in axils, bracteate, pedicellate. Tepals 4 or 5. Disc thick. Male flower: stamens 5; style and ovary obsolete. Female flower: ovary inferior, 1-locular; style very short; stigmas 5, erect. Fruit a drupe.

5 species, in New Guinea and Solomon Is.; one species recently recorded in Qld. This account based partly on C. A. Backer & R. C. Bakhuizen van den Brink, *Fl. Java* 2: 77 (1965).

**1. *Dendromyza reinwardtiana*** (Blume ex Korth.) Danser, *Nova Guinea* ser. 2, 4: 133 (1940)

*Tupea reinwardtiana* Blume ex Korth., *Verh. Batav. Genootsch. Kunsten* 17: 195 (1839). T: from Sumatra; *n.v.*

Illustrations: C. L. Blume, *Fl. Javae Lorantheae* t. 28 (1851); D. L. Jones & B. Gray, *Austral. Climbing Pl.* 95, t. 72 (1977).

Stem-parasitic shrub with branches to several metres long. Branchlets either with haustoria and scale leaves and twining, or leafy and non-twining, acutely angular. Scale leaves boat-shaped, acute, c. 1 mm long. Normal leaves ovate to obovate, the apex rounded; lamina 2–10 cm long, 3–5-nerved, narrowed to petiole up to 1 cm long. Flowers clustered in leaf and branch axils or along branchlets, shortly pedicellate or sessile, subtended by bracts forming an involucre. Tepals triangular, c. 1 mm long, green. Male flowers ±globose on narrowed receptacle; staminal filaments short, thick. Female flowers ±campanulate, c. 2 mm long. Drupe ovoid, 6–8 mm long, narrowed at apex and crowned by tepals, pink.

In Australia known only from the Iron and McIlwraith Ranges, Cape York Peninsula. Also from Sumatra and Luzon to Papua New Guinea. Map 68.

Qld: Chester R., *B. Hyland* 9419 (QRS) (♂); Claudie R., *B. Hyland* 9519 (QRS) (♀); Iron Range, 6 Sept. 1976, D. Jones (BRI).

## Trib. III. SANTALEAE

## Trib. Santaleae

Trib. *Osyrideae* Reichb., *Consp.* 80 (1828). T: *Osyris* L.

Shrubs or small trees. Leaves well-developed, opposite or whorled, persistent. Flowers bisexual, in terminal and axillary panicles or umbels. Tepals 4. Disc present. Drupe with succulent mesocarp and woody endocarp.

About 20 genera of tropical and temperate regions, represented in Australia only by *Santalum* L.

**9. SANTALUM**

A. S. George

*Santalum* L., *Sp. Pl.* 1: 349 (1753), *Gen. Pl.* 5th edn, 165 (1754), from *santalum*, the Greek for sandalwood

Type: *S. album* L.

*Fusanus* L., *Syst. Veg.* 13th edn, 754, 765 (1774); *Santalum* sect. *Fusanus* (L.) F. Muell., *Trans. & Proc. Victorian Inst. Advancem. Sci.* 1: 41 (1855). T: *Fusanus compressus* L.

*Eucarya* Mitchell, *Three Exped. E. Austral.* 2: 100 (1839). T: *E. murrayana* Mitchell

Root-parasitic shrubs or small trees. Leaves opposite or whorled, well-developed, pinninerved. Flowers bisexual, in terminal or axillary panicles or racemes, rarely in small umbels, with caducous bracts. Tepals 4, usually with hair tufts at base behind stamens. Stamens 4. Disc prominently or slightly lobed. Ovary inferior; ovules 2–4, without differentiated integument; style short; stigma small. Fruit a spherical drupe with succulent or firm mesocarp and woody, often rugose endocarp. Seed 1.

A genus of about 25 species from Malaysia to Australia, Polynesia, Hawaii and Juan Fernandez. Five endemic and one non-endemic species in Australia.

G. Bentham, *Santalum, Fusanus, Fl. Austral.* 6: 213–217 (1873); T. A. Sprague & V. S. Summerhayes, *Santalum, Eucarya, and Mida, Bull Misc. Inform., Kew* 1927: 193–202 (1927).

- |    |   |                                  |
|----|---|----------------------------------|
| 1  | Leaves discolorous, with recurved to revolute margins   | <b>3. <i>S. obtusifolium</i></b> |
| 1: | Leaves concolorous or slightly discolorous, flat  |                                  |
| 2  | Flowers 4–8 mm long; disc with prominent lobes; drupe 7–10 mm diam., purple or red-black  |                                  |
| 3  | Leaves ovate, rarely narrower; lateral veins evident; inflorescence up to 6-flowered; flowers 4 mm long                                       | <b>1. <i>S. album</i></b>        |
| 3: | Leaves lanceolate to narrowly elliptic, rarely wider; lateral veins obscure; inflorescence usually more than 10-flowered; flowers 6–8 mm long | <b>2. <i>S. lanceolatum</i></b>  |
| 2: | Flowers 2–3.5 mm long; disc not prominently lobed; drupe 15–25 mm diam., bright red, red-brown, greenish or rarely yellow                     |                                  |
| 4  | Endocarp smooth; leaves obtuse, grey-green  | <b>4. <i>S. spicatum</i></b>     |
| 4: | Endocarp rugose; leaves acute, usually yellow-green   |                                  |
| 5  | Leaves mostly 3–9 cm long, always opposite, not uncinat   | <b>5. <i>S. acuminatum</i></b>   |
| 5: | Leaves mostly 1.5–3.5 cm long, often in threes, uncinat   | <b>6. <i>S. murrayanum</i></b>   |

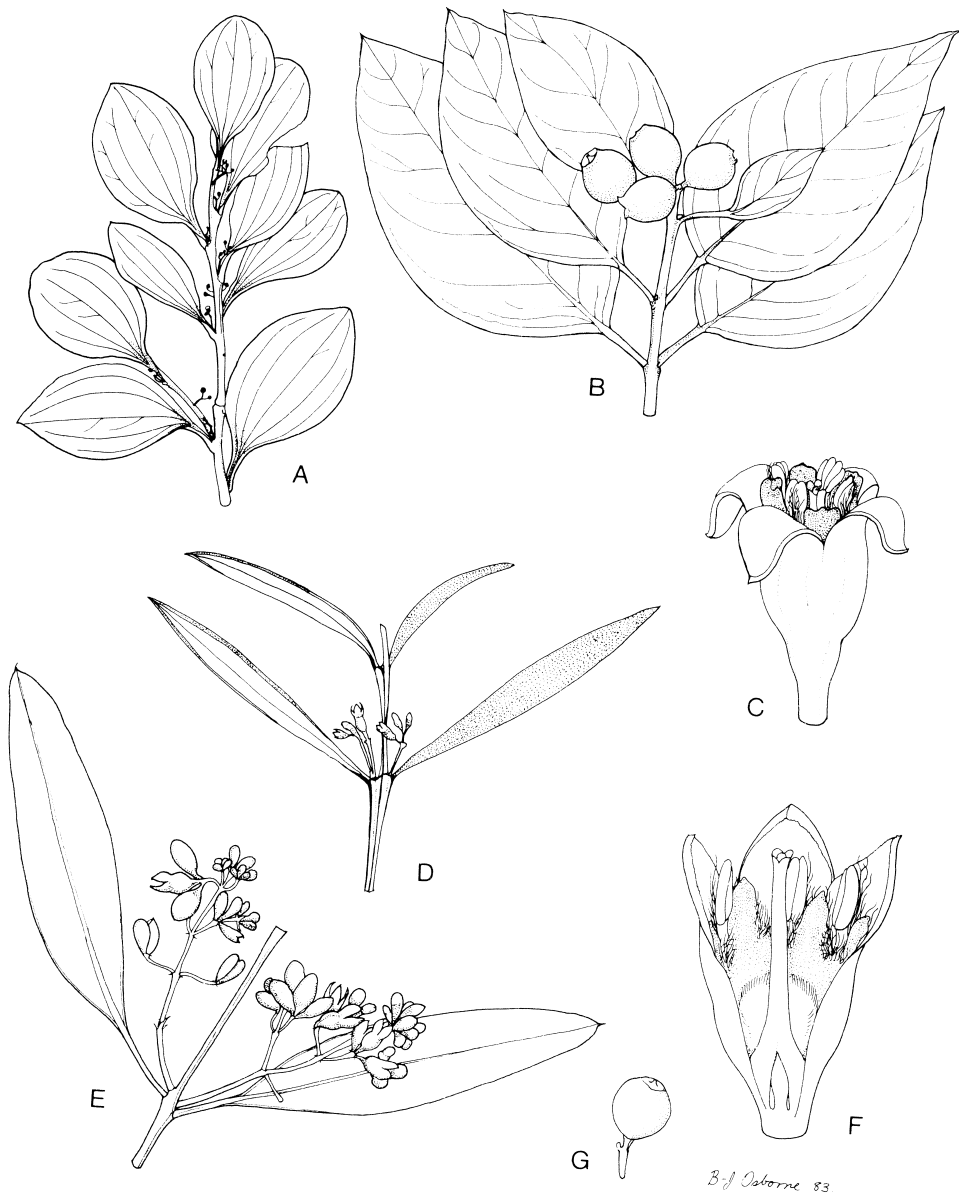
**1. *Santalum album* L., *Sp. Pl.* 1: 349 (1753)**

T: from India; *n.v.*

*S. ovatum* R.Br., *Prodr.* 355 (1810). T: Melville Bay, N.T., 13 Feb. 1803, *R. Brown s.n.*; iso: BRI, MEL, PERTH.

Illustration: R. O. Pilger, *Nat. Pflanzenfam.* 2nd edn, 16b: 82, fig. 39 (1935).

Shrub, sometimes scandent, to 3.3 m. Branchlets slightly angular-striate. Leaves ovate, sometimes broadly lanceolate-elliptic, obtuse or acute, slightly discolorous, light green; lamina mostly 2.5–7 cm long and 1.5–4 cm wide; reticulate venation evident; margins flat or slightly recurved; petiole 2-ribbed, 5–15 mm long. Flowers up to 6 in small terminal and axillary panicles or umbels; peduncle 4–11 mm long; pedicels less than 1 mm long. Receptacle 2 mm long. Tepals triangular to ovate, obtuse, c. 2 mm long, red or green; hair tufts long, coarse. Disc with prominent, ovate lobes. Style 2 mm long; stigma



**Figure 18.** **A**, *Dendrotrophe varians*, flowering branchlet  $\times 0.5$  (L. Smith 3752A, BRI). **B–G**, *Santalum*. **B–C**, *S. album*. **B**, fruiting branchlet  $\times 1$  (P. Latz 3294, BRI); **C**, flower  $\times 6$  (C. Dunlop 3985, BRI). **D**, *S. obtusifolium*, flowering branchlet  $\times 1$  (J. Maiden, BRI). **E–G**, *S. lanceolatum*. **E**, flowering branchlet  $\times 1$  (A. Mitchell 106, DNA); **F**, flower with 1 tepal removed,  $\times 6$ ; **G**, fruit  $\times 1$  (**F–G**, R. Saffrey 681, PERTH).

3-lobed. Drupe  $\pm$ sessile, ellipsoidal, 7–8 mm long, with small apical collar; epicarp dark red to black; endocarp smooth. Fig. 18B–C.

Occurs from India (where cultivated for sandalwood) to Hawaii. In Australia occurs along the coast and on adjacent islands between Melville Is. and Elcho Is., N.T. Grows in sand in shrubland behind mangroves and by billabongs. Map 69.

N.T.: Thring Ck, *N. Byrnes* 882 (AD, DNA); Point Farewell, E Alligator R. estuary, *L. Craven* 6449 (CANB); Poonali Beach, Melville Is., *C. Dunlop* 3985 (BRI, DNA); Wessel Is., *P. K. Latz* 3294 (BRI, CANB); Ganburra Creek, Elcho Is., *P. K. Latz* 6253 (BRI, CANB, NSW).

## 2. *Santalum lanceolatum* R.Br., *Prodr.* 356 (1810)

*S. lanceolatum* var. *typicum* Domin, *Biblioth. Bot.* 89: 601 (1921), *nom. illeg.* T: Sweers Is., Qld, 18 Nov. 1802, *R. Brown*; ?iso: MEL.

*S. lanceolatum* var. *angustifolium* Benth., *Fl. Austral.* 6: 214 (1873). T: 'From the Darling river to Cooper's Creek, *Dallachy and Goodwin, Neilson*; New England, *C. Stuart*'; all *n.v.*

*S. oblongatum* R.Br., *Prodr.* 355 (1810); *S. lanceolatum* var. *oblongatum* (R.Br.) Domin, *Biblioth. Bot.* 89: 47 (1921). T: locality unknown, *R. Brown*; *n.v.*

*S. venosum* R.Br., *Prodr.* 355 (1810); *S. lanceolatum* var. *venosum* (R.Br.) F. M. Bailey, *Comp. Cat. Queensland Pl.* 469 (1913), *nom. illeg.* non F. M. Bailey (1902). T: Caledon Bay, N.T., 4 Feb. 1803, *R. Brown*; *n.v.*

*S. lanceolatum* var. *venosum* F. M. Bailey, *Queensland Fl.* 5: 1385 (1902). T: Somerset, Qld, *F. L. Jardine*; *n.v.*

*S. leptocladum* Gand., *Bull. Soc. Bot. France* 66: 232 (1919). T: Mt. Lyndhurst, S.A., May 1900, *M. Koch* 17; *holo: LY n.v., fide D. J. McGillivray, Contr. New South Wales Nat. Herb.* 4: 354 (1973).

*S. megacarpum* Gand., *Bull. Soc. Bot. France* 66: 232 (1919). T: Cobar, N.S.W., July 1903, *J. L. Boorman s.n.*; *holo: LY, iso: NSW, both n.v., fide D. J. McGillivray, loc. cit.*

Illustration: D. Levitt, *Plants and People* t. 70 (1981).

Shrub to 7 m. Bark becoming fissured, grey. Branchlets spreading or pendulous. Leaves broadly lanceolate to narrowly elliptic, flat, acute, concolorous or slightly discolorous; lamina 2–9 cm long, 0.5–2.5 cm wide, rather soft, often slightly glaucous; reticulate venation obscure; petiole 2–10 mm long. Flowers in terminal and axillary panicles or racemes; peduncle 5–30 mm long; pedicels 1 mm long. Receptacle 2–3 mm long. Tepals triangular, cream to pale green, 3–5 mm long; hair tufts prominent. Disc with knob-like lobes. Style 3–4 mm long; stigma 4-lobed. Drupe 7–10 mm diam. with prominent circular apical scar; epicarp purple; endocarp smooth. Fig. 18E–G.

Widespread in tropical Australia, extending south into S.A., N.S.W. and Vic. where rare; of scattered occurrence in the central deserts. Map 70.

W.A.: Edgar Range, *K. F. Kenneally* 5727 (CANB, PERTH). N.T.: Edith Falls Reserve, *M. O. Parkēr* 105 (CANB, CBG, DNA). S.A.: Evelyn Downs, 24 Sept. 1955, *E. H. Ising* (AD). Qld: Maxvale, *S. L. Everist* 1441 (BRI). N.S.W.: Quarry View Stn, NW of White Cliffs, *P. Martensz* 4142 (CANB).

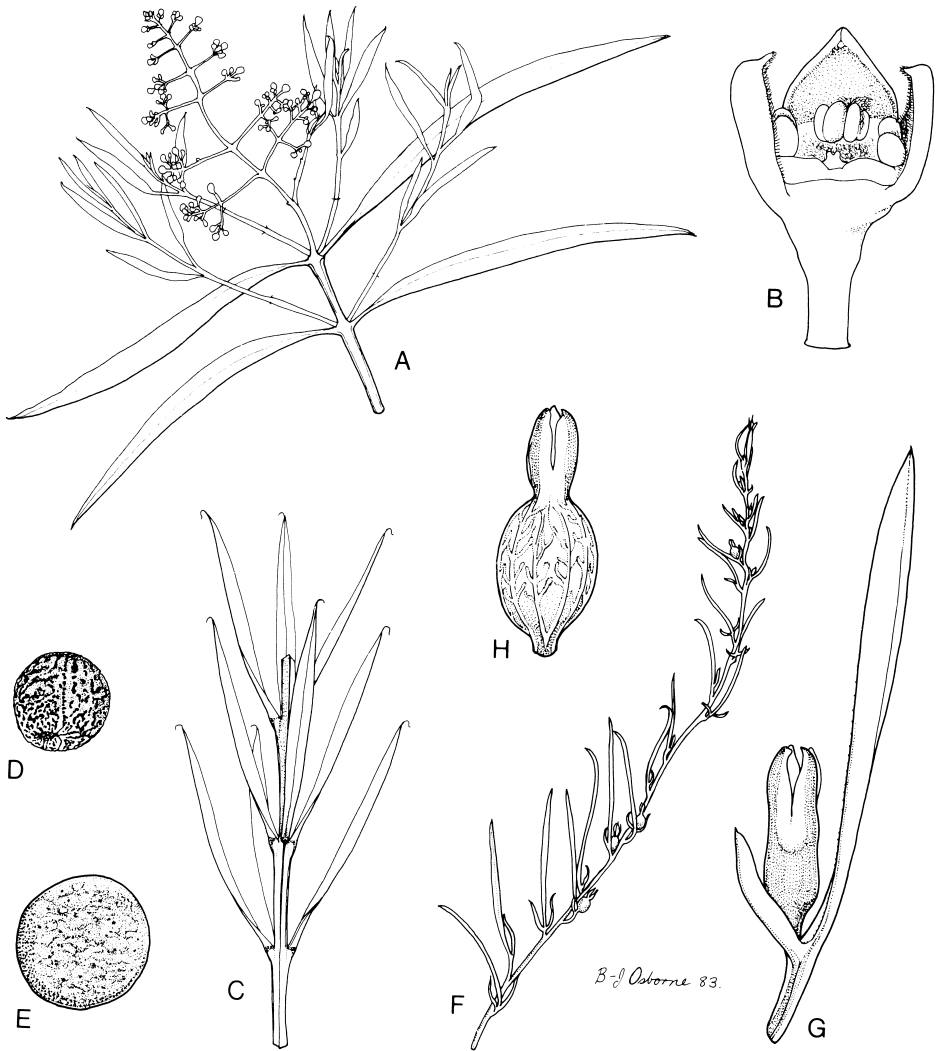
There is much variation especially in leaf form and size throughout the geographic range. Some collections from N Qld have thin,  $\pm$ discolorous leaves and small flowers. May be distinguished from *S. acuminatum* (R.Br.) A.DC. by the dull leaves and larger flowers with prominent disc lobes. Fruit sometimes galled.

## 3. *Santalum obtusifolium* R.Br., *Prodr.* 356 (1810)

T: Hawkesbury (River), N.S.W., Jan. 1805, *R. Brown*; iso: MEL.

*S. crassifolium* (R.Br.) A.DC., *Prodr.* 14: 685 (1857); *Fusanus crassifolius* R.Br., *Prodr.* 355 (1810); *Mida crassifolia* (R.Br.) Kuntze, *Revis. Gen. Pl.* 2: 589 (1891); *Eucarya crassifolia* (R.Br.) Sprague & Summerh., *Bull. Misc. Inform., Kew* 1927: 196 (1927). T: Parramatta, N.S.W., Dec. 1804, *R. Brown s.n.*; *n.v.*

Shrub to 2.6 m. Branchlets angular-striate, erect. Leaves lanceolate to linear or sometimes elliptic, obtuse or acute, discolorous; lamina 3–6.5 cm long; margins recurved to revolute; petiole 1–5 mm long. Inflorescence axillary, usually umbel-like, to 5-flowered; peduncle



**Figure 19.** A–E, *Santalum*. A–B, *S. acuminatum*. A, flowering branchlet  $\times 1$  (A. Sikkes, CBG 053817); B, flower with 1 tepal removed,  $\times 6$  (J. Wrigley, CBG 042239). C–D, *S. murrayanum*. C, leaves  $\times 1$  (A. George 2843, PERTH); D, fruit with exocarp removed,  $\times 1$  (R. Royce 8187, PERTH). E, *S. spicatum*, fruit with exocarp removed,  $\times 1$  (Batt, MEL 566395). F–H, *Thesium australe*. F, branchlet  $\times 1$ ; G, flower and leaf with 1 bracteole  $\times 10$ ; H, fruit  $\times 12$  (F–H, NW of Wombargo, Vic., J. Willis, MEL).



4–10 mm long; pedicels c. 1 mm long. Receptacle 2–3 mm long. Tepals ovate-triangular, obtuse, 1.5–2 mm long, whitish, caducous; hair tufts dense. Disc with prominent oblong lobes. Style c. 3 mm long; stigma 4-lobed. Fruit almost sessile, broadly ellipsoidal, 8–10 mm long; epicarp purple; style base persistent. Fig. 18D.

Occurs from Lamington Plateau, SE Qld, through eastern NSW to far E Vic.; grows on creek banks in forest, in sand or gravelly clay. Map 71.

Qld: Cainbale Range, Lamington National Park, *H. U. Stauffer 5505* & *S. L. Everist* (CANB, MEL, NSW, PERTH). N.S.W.: Bargo River, Dec. 1902, *J. L. Boorman* (NSW); Mt Comcrang, *E. F. Constable 4147* (NSW); 53 km SSW of Braidwood, *R. Coveny 6361 et al.* (MEL, NSW). Vic.: Wangarabell, Genoa River, *N. A. Wakefield 4494* (MEL).

In some plants, all leaves are linear. The only Australian species of *Santalum* with prominently recurved leaf margins.

#### 4. *Santalum spicatum* (R.Br.) A.DC., *Prodr.* 14: 685 (1857)

*Fusanus spicatus* R.Br., *Prodr.* 355 (1810); *Mida spicata* (R.Br.) Kuntze, *Revis. Gen. Pl.* 2: 589 (1891); *Eucarya spicata* (R.Br.) Sprague & Summerh., *Bull. Misc. Inform., Kew* 1927: 196 (1927). T: Spencer Gulf, S.A., 11 Mar. 1802, *R. Brown s.n.*; iso: MEL.

*S. cygnorum* Miq., in *Lehm., Pl. Preiss.* 1: 615 (1845); *Mida cygnorum* (Miq.) Kuntze, *Revis. Gen. Pl.* 2: 589 (1891). T: York, W.A., 11 Mar. 1839, *L. Preiss 2103*; iso: MEL.

*S. diversifolium* (Miq.) A.DC., *Prodr.* 14: 684 (1857). *Fusanus diversifolius* Miq., in *Lehm., Pl. Preiss.* 1: 617 (1845); T: near Avon R., York, W.A., 9 Sept. 1839, *L. Preiss 2111*; lecto: U, *fide* A. S. George, *Fl. Australia* 22: 221 (1984).

*Fusanus spicatus* var. *frutescens* Hochr., *Candollea* 2: 355 (1925). T: Boorabbin, W.A., 15 Feb. 1905, *B. Hochreutiner 2938*; *n.v.*

Shrub to 4 m tall. Bark rough, grey. Branchlets stiff, spreading. Leaves lanceolate to narrowly elliptic, flat, obtuse; lamina 2–7 cm long, 3–15 mm wide, concolorous, grey-green; petiole 3–5 mm long. Flowers numerous in panicles, scented; peduncle 3–5 mm long; pedicels 1 mm long. Receptacle 1–1.5 mm long. Tepals triangular-ovate, 1.5–2 mm long, scurfy inside, red-green, persistent in fruit; hair tufts small. Disc shortly lobed. Style 0.5 mm long; stigma bilobed. Drupe 1.5–2 cm diam.; epicarp green or brown; mesocarp firm, usually adhering to endocarp when ripe; endocarp smooth. *Sandalwood*. Fig. 19E.

Widespread from Shark Bay through inland regions of W.A. and in southern S.A. Grows in loam and among rocks in woodland and tall shrubland. Map 72.

W.A.: Mt Churchman, *A. M. George 41* (PERTH); Oldfield R., Ravensthorpe–Esperance road, *E. N. S. Jackson 1406* (AD, CANB); 10 km E of Mt Brockman Stn, *A. S. Mitchell 356* (PERTH). S.A.: Bibliando Stn, *M. D. Crisp 726* (CBG); Gawler Range, *J. Z. Weber 3209* (AD).

Once extensively cut and exported as sandalwood; still harvested in small quantities in W.A.

#### 5. *Santalum acuminatum* (R.Br.) A.DC., *Prodr.* 14: 684 (1857)

*Fusanus acuminatus* R.Br., *Prodr.* 355 (1810); *Mida acuminata* (R.Br.) Kuntze, *Revis. Gen. Pl.* 2: 589 (1891); *Eucarya acuminata* (R.Br.) Sprague & Summerh., *Bull. Misc. Inform., Kew* 1927: 196 (1927). *Fusanus acuminatus* var. *typicus* Hochr., *Candollea* 2: 355 (1925), *nom. illeg.*; T: Fowler Bay, S.A., 29 Jan. 1802, *R. Brown s.n.*; iso: MEL.

*S. preissianum* Miq., in *Lehm., Pl. Preiss.* 1: 615 (1845). T: near seashore, Sussex district, W.A., 25 Dec. 1839, *L. Preiss 2102*; *n.v.*

*S. cognatum* Miq., in *Lehm., Pl. Preiss.* 1: 616 (1845). T: near Perth, W.A., 31 Jan. 1839, *L. Preiss 2098*; syn: *n.v.*; Peel district (S of Perth), W.A., Feb. 1841, *L. Preiss 2102*; syn: *n.v.*

*S. densiflorum* Gand., *Bull. Soc. Bot. France* 66: 232 (1919). T: Mt Lyndhurst, S.A., Nov. 1899, *M. Koch 47*; holo: LY *n.v.*, *fide* D. J. McGillivray, *Contr. New South Wales Nat. Herb.* 4: 354 (1973).

Illustration: L. Costermans, *Native Trees Shrubs S.E. Austral.* 171 (1981).

Shrub or small tree to 6 m, sometimes forming clones by means of underground stolons. Bark rough, dark grey. Branchlets spreading to pendulous. Leaves lanceolate, often falcate, flat, acute; lamina 3–9 cm long, 3–15 mm wide, concolorous, yellowish-green; petiole 3–8 mm long. Flowers numerous in panicles; peduncle 5–10 mm long; pedicels 1–2 mm long. Receptacle 1 mm long. Tepals ovate-triangular, 1–2 mm long, scurfy inside, green or orange, persistent in fruit. Disc shortly lobed. Style c. 0.5 mm long; stigma bilobed. Drupe 15–25 mm diam.; epicarp bright shining red, rarely yellow; mesocarp firm, easily freed from endocarp when ripe; endocarp rugose. *Quandong*. Fig. 19A–B.

Widespread though often intermittent in southern Australia except wetter regions, extending into southern N.T. and Qld. Grows in many habitats including coastal dunes, gravelly plains, granitic outcrops and creek banks. Map 73.

W.A.: c. 100 km S of Menzies, *J. S. Beard 3069* (PERTH). N.T.: 21 km SW of Angas Downs Stn, *G. M. Chippendale 7391* (CBG). S.A.: 9 km W of Tallaringa Well, *P. K. Latz 8357* (AD). Qld: Honeyamah, SW of St George, *H. U. Stauffer 5535* & *S. L. Everist* (CANB, MEL). N.S.W.: 41 km NNW of Cobar, *M. D. Crisp 4194* (CBG).

Small-leaved specimens may resemble *S. murrayanum* (Mitchell) C. Gard. but are distinguished by the non-uncinate leaves. Some populations in south-western W.A. appear to set no fruit. Ripe mesocarp edible, sometimes used for jam or as a dessert.

### 6. *Santalum murrayanum* (Mitchell) C. Gard., *Enum. Pl. Austral. Occid.* 35 (1930)

*Eucarya murrayana* Mitchell, *Three Exped. E. Austral.* 2: 100 (1838); *S. mitchellii* F. Muell., *Fragm.* 2: 179 (1861), *nom. illeg.* T: below Lake Benanee, Murray R., N.S.W., 27 May 1836, *T. L. Mitchell; n.v.*

*S. angustifolium* A.D.C., *Prodr.* 14: 685 (1857); *Fusanus acuminatus* var. *angustifolius* (A.D.C.) Benth., *Fl. Austral.* 6: 216 (1873). T: south-western W.A., *J. Drummond 3: 218*; syn: MEL, NSW; *loc. id.*, *J. Drummond 4: 430*; syn: BRI, MEL.

*S. persicarium* F. Muell., *Trans. & Proc. Victorian Inst. Advancem. Sci.* 41 (1855); *Fusanus persicarius* (F. Muell.) F. Muell. ex Benth., *Fl. Austral.* 6: 216 (1873); *Mida persicaria* (F. Muell.) Kuntze, *Revis. Gen. Pl.* 2: 589 (1891). T: near Murray River, ?Vic., Dec. 1853, *F. Mueller*; iso: MEL.

Shrub or small tree to 4 m. Bark +smooth. Branchlets spreading to pendulous. Leaves opposite and in threes, narrowly lanceolate, flat, uncinat; lamina 1.5–3.5 (rarely 5) cm long, 1.5–4 mm wide, concolorous, pale or yellowish green; petiole to 4 mm long. Flowers numerous in large panicles; peduncle 1–2 cm long; pedicels 1–2 mm long. Receptacle 1 mm long. Tepals ovate to triangular, 2 mm long, scurfy inside, yellowish. Disc scarcely lobed. Style 0.5 mm long, stigma 3-lobed. Drupe 15–23 mm diam. with small apical scar; epicarp green, brownish or dull red; mesocarp firm, adhering to endocarp when ripe; endocarp rugose. *Bitter Quandong*. Fig. 19C–D.

Occurs in inland southern W.A., southern S.A., far south-western N.S.W. and NW Vic. Grows in gravelly and sandy loam and sometimes on dunes, in open woodland and tall shrubland. Map 74.

W.A.: 10 km E of Chifley, *A. S. George 5948* (BRI, PERTH); 9 km S of Mt Gibbs, *K. Newbey 5431* (PERTH). S.A.: c. 11 km S of Monarto South, *H. U. Stauffer 5404* & *Hj. Eichler* (AD, CANB, MEL). N.S.W.: between Prungle and Balranald, *P. L. Milthorpe 2490* & *G. M. Cunningham* (NSW). Vic.: Hattah Lakes National Park, *A. C. Beaglehole 43074* (MEL).

May be recognised by the uncinat leaves that are smaller than those of the other Australian species and are often whorled. Mesocarp very bitter.

**Excluded name**

*Fusanus emarginatus* Miq. in Lehm., *Pl. Preiss.* 1: 617 (1845)

T: near Mt Wuljenup (Mt Willyung), W.A., Oct. 1840, *L. Preiss 2112*; iso: LD, U.

This is a species of *Daviesia*, *fide* M. D. Crisp (CBG).

**Trib. IV. THESIEAE**

Trib. *Thesieae* Reichb., *Handb.* 167 (1837)

Type: *Thesium* L.

Small herbs or shrubs. Leaves well-developed, alternate, persistent. Flowers bisexual, solitary in axils. Tepals 4 or 5. Disc absent. Ovary inferior. Drupe with thin mesocarp.

Five genera, of which only *Thesium* occurs in Australia.

**10. THESIUM**

A. S. George

*Thesium* L., *Sp. Pl.* 1: 207 (1753), *Gen. Pl.* 5th edn, 97 (1754), after Theseus, of Greek mythology

Type: *T. alpinum* L.

Root-parasitic herbs and small shrubs. Leaves alternate. Inflorescence reduced to 1 flower, axillary; peduncle united with leaf-base. Flowers bisexual. Tepals 5, sometimes 4, united at base. Stamens 5, inserted on tepals. Ovary inferior; ovules 3; style slender; stigma capitate. Drupe small, dry, nut-like.

A genus of c. 245 species in Europe, Africa, Asia, Australia and S America; 1 species in Australia.

G. Bentham, *Fl. Austral.* 6: 212–213 (1873); R. Pilger, *Nat. Pflanzenfam.* 2nd edn, 16b: 85–89 (1960); J. H. Willis, *Handb. Pl. Victoria* 2: 65 (1972).

**1. *Thesium australe* R.Br., *Prodr.* 353 (1810)**

T: Cowpasture plains (Camden), near Port Jackson, N.S.W., 19 Oct. 1803, *R. Brown s.n.*; iso: MEL.

Illustrations: N. C. W. Beadle, *Stud. Fl. N.E. New South Wales* 4: 536, fig. 235 A1–A5 (1980).

Perennial pale green or yellow-green herb with 1–several little-branched wiry stems to 40 cm tall, glabrous; stems striate. Leaves linear, acute, mostly 1–3 cm long, sessile; midrib decurrent; lowest leaves scale-like. Flowers solitary, axillary; peduncle 1–3 mm long, united with leaf-base; bracteoles 2, opposite, linear, 2–3 mm long; pedicel very short. Receptacle cupular-globular, 1 mm long. Tepals 1.5 mm long, oblong, united at base, finely keeled, green with white margins; apices incurved; hairs few at base behind stamens. Stamens inserted at middle of tepals. Style 1 mm long; stigma globular. Fruit globose, crowned with persistent tepals, 2 mm diam., reticulate-striate. *Toadflax*. Fig. 19F–H.

Occurs from SE Qld to E Gippsland, Vic.; one early record in Tas. Grows in grasslands and woodlands. Flowers spring–summer; fruit summer. Also in E Asia. Map 75.

Qld: Warwick, Dec. 1875, *F. M. Bailey* (BRI). N.S.W.: Glen Innes, 1911, *F. H. Kenny* (BRI); Kiandra, *H. U. Stauffer 5482* & *C. W. E. Moore* (BRI, CANB, PERTH). Vic.: 8 km N of Gillingal, *H. U. Stauffer 5439 et al.* (BRI, MEL, PERTH); NW of Wombargo Range, 21 Feb. 1974, *J. H. Willis* (MEL).

An inconspicuous plant, not often collected.

# LORANTHACEAE

B. A. Barlow

Hemiparasitic shrubs on branches of woody plants, attached by woody haustoria with or without epicortical runners producing secondary haustoria; rarely terrestrial root-parasitic shrubs or trees. Leaves mostly opposite, rarely verticillate, displaced-opposite or alternate, exstipulate; lamina entire, curvined or penninerved. Inflorescence terminal or lateral; flowers bisexual, rarely unisexual, borne singly or in pairs or 3-flowered dichasia (triads) or tetrads on the inflorescence axis; bract usually 1 per flower. Calyx reduced to an entire, lobed or toothed limb. Petals free or united, usually 4–6, valvate. Stamens as many as petals, epipetalous; anthers 2- or 4-locular (sometimes with transverse partitions), usually basifixed, immobile and introrse, but sometimes dorsifixed and then usually versatile, opening longitudinally. Ovary inferior, with 1–4 obscure locules and lacking differentiated ovules; sporogenous tissue in a lobed placental column or a central mass. Style and stigma simple. Fruit usually baccate, rarely drupaceous (dry and winged in *Nuytsia*); seed 1, usually surrounded by a viscous layer developed from layer of fruit wall outside vascular bundles leading to corolla.  $x = 12, 11, 10, 9, 8$ , (184 species studied) *vide* B. A. Barlow & D. Wiens, *Taxon* 20: 291 (1971).

A family of c. 65 genera and 950 species widely distributed in tropical regions but with many representatives in south temperate regions and fewer in north temperate regions. Represented in Australia by 12 genera and 70 species, of which six genera and 60 species are endemic. Of little economic importance; some species reported to cause economic losses when infesting cultivated tree crops.

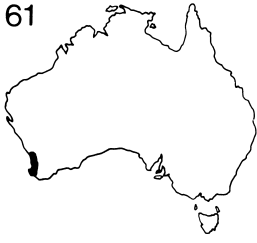
The aerial stem-parasites commonly known as mistletoes belong to several families, of which the major ones are Loranthaceae and Viscaceae. These two families differ primarily in that the former has hermaphrodite flowers with calyx and showy corolla and the latter has small, inconspicuous, unisexual flowers with only 1 perianth whorl. In Loranthaceae both terrestrial root-parasites and aerial stem-parasites occur; the former condition is thought to be ancestral to the latter.

The Loranthaceae are well represented in the Southern Hemisphere, and the family is thought to be an ancient Gondwanan one which was well established and differentiated before the rifting of the southern continents. The Australian species comprise both primitive relicts from Gondwanaland and advanced groups of tropical origin. Advanced species are generally host specific, usually being adapted to a common, widespread species or genus of hosts. The high host specificity is usually associated with a close visual resemblance between the vegetative shoots of the mistletoe and its host, and cryptic mimicry has been suggested.

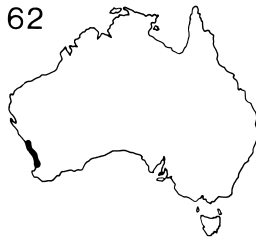
The basic inflorescence unit in many genera is a 3-flowered dichasium (triad). These units are generally aggregated into indeterminate conflorescences, and inflorescence evolution in the family has probably involved reduction from such conflorescences. Simple inflorescences such as racemes and umbels may thus have been derived independently in several genera and do not necessarily indicate common origin.

G. Bentham, Loranthaceae, *Fl. Austral.* 3: 386–397 (1867); P. van Tieghem, Sur les Loranthoidées d'Australie, *Bull. Soc. Bot. France* 42: 82 (1895); W. F. Blakely, The Loranthaceae of Australia, *Proc. Linn. Soc. New South Wales* 47: 1–25, 199–222, 391–414 (1922), *op. cit.* 48: 130–152 (1923), *op. cit.* 49: 79–96 (1924), *op. cit.* 50: 1–24 (1925); B. H. Danser, On the taxonomy and nomenclature of the Loranthaceae of Asia and Australia, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 291–373 (1929); S. G. Hamilton & B. A. Barlow, Studies in Australian Loranthaceae. II. Attachment structures and their Interrelationships, *Proc. Linn. Soc. New South Wales* 88: 74–90 (1963); B. A. Barlow, Classification of the Loranthaceae and Viscaceae, *Proc. Linn. Soc. New South Wales* 89:

61



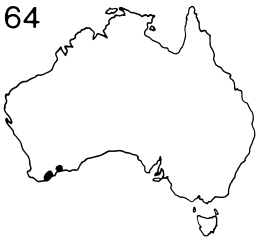
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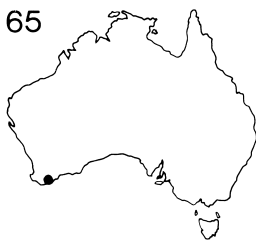
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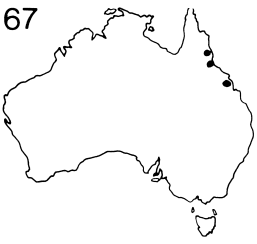
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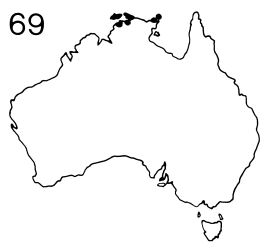
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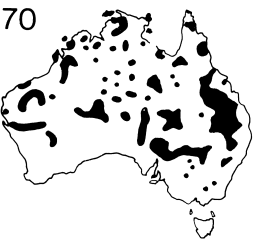
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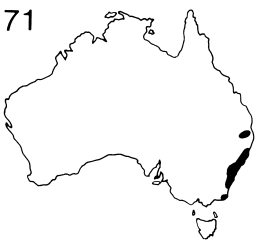
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74



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61. *Leptomeria cunninghamii*  
 64. *Leptomeria obovata*  
 67. *Dendrotrophe varians*  
 70. *Santalum lanceolatum*  
 73. *Santalum acuminatum*

62. *Leptomeria empetriformis*  
 65. *Leptomeria penduliflora*  
 68. *Dendromyza reinwardtiana*  
 71. *Santalum obtusifolium*  
 74. *Santalum murrayanum*

63. *Leptomeria axillaris*  
 66. *Leptomeria squarrulosa*  
 69. *Santalum album*  
 72. *Santalum spicatum*  
 75. *Thesium australe*

268–272 (1964); B. A. Barlow, A revision of the Loranthaceae of Australia and New Zealand, *Austral. J. Bot.* 14: 421–499 (1966); B. A. Barlow & D. Wiens, Cytogeography of the Loranthaceae, *Taxon* 20: 291 (1971); B. A. Barlow & D. Wiens, Host-parasite resemblance in Australian mistletoes: the case for cryptic mimicry, *Evolution* 31: 69 (1977); B. A. Barlow, Biogeography of Loranthaceae and Viscaceae, in D. M. Calder, *Biology of Mistletoes*, Academic Press (1983); B. A. Barlow, Supplement to a Revision of the Loranthaceae in Australia, *Brunonia* 5: 203–212 (1983).

### KEY TO GENERA

- 1 Petals united to the middle or higher
- 2 Petals 5
- 3 Corolla tube deeply split on one side with lobes and stamens reflexed to other side, not inflated in middle; inflorescence a 2-flowered umbel, the flowers of equal age **12. BENTHAMINA**
- 3: Corolla tube curved, unequally split but lobes and stamens not reflexed to one side, inflated in middle; inflorescence a simple raceme, sometimes reduced to 2 flowers (1 older than the other) or a single flower **11. DENDROPHTHOE**
- 2: Petals 6
- 4 Corolla tube straight, nearly regular; inflorescence usually a raceme of triads or a simple raceme; epicortical runners present **3. AMYLOTHECA**
- 4: Corolla tube curved, more deeply split on one side; inflorescence a 2-flowered umbel or a solitary flower; epicortical runners present **5. LYSIANA**
- 1: Petals free to base or almost so
- 5 Anthers dorsifixed, versatile
- 6 Terrestrial root-parasitic shrubs or trees
- 7 Fruit succulent, not winged; inflorescence a simple raceme; low spreading shrub **1. ATKINSONIA**
- 7: Fruit dry, winged; inflorescence a raceme of triads; tree or large shrub **2. NUYTSIA**
- 6: Aerial stem-parasitic shrubs with epicortical runners
- 8 Petals 6, not curved; stamens almost equal **7. CECARRIA**
- 8: Petals 5, curved; stamens unequal **6. MUELLERINA**
- 5: Anthers basifixed, immobile, introrse
- 9 Petals united for 0.5–3 mm from base, the corolla shed as a single unit; inflorescence a raceme of triads **4. DECAISNINA**
- 9: Petals free to base, shed separately
- 10 Inflorescence capitate, subtended by 2 enlarged foliaceous bracts connate at margins, covering buds during development **10. DIPLATIA**
- 10: Inflorescence not subtended by enlarged foliaceous bracts
- 11 Inflorescence a raceme of whorls of triads **8. DACTYLIOPHORA**
- 11: Inflorescence basically an umbel of dyads, triads or tetrads, sometimes reduced to a simple umbel or a head **9. AMYEMA**

## 1. ATKINSONIA

*Atkinsonia* F. Muell., *Fragm.* 5: 34 (1865), after Caroline Louisa Waring Atkinson (1834–1872), Australian botanist and writer

Type: *A. ligustrina* (A.Cunn. ex Lindl.) F. Muell.

Terrestrial root-parasitic shrubs. Leaves opposite, penninerved. Inflorescence axillary, a raceme with a basal involucre of a few pairs of decussate prophylls; bracts 3 under each flower. Corolla 6-merous, regular; petals free. Stamens equal; anthers dorsifixed, versatile, 4-locular. Fruit drupaceous; seed with a thin viscous coat.  $x = 12$ , *vide* B. A. Barlow & D. Wiens, *Taxon* 20: 291 (1971).

A monotypic genus endemic in N.S.W., confined to a small area in the Blue Mountains. Possibly the most primitive extant genus in the family.

B. P. Menzies & H. S. McKee, Root parasitism in *Atkinsonia ligustrina* (A. Cunn. ex F. Muell.) F. Muell., *Proc. Linn. Soc. New South Wales* 84: 118 (1959).

1. *Atkinsonia ligustrina* (Cunn. ex Lindl.) F. Muell., *Fragm.* 5: 34 (1865)

*Nuytsia ligustrina* Cunn. ex Lindl., *Sketch Veg. Swan R.* xxxix (1840); *Loranthus atkinsonae* Benth. ex Oliv., *Hook. Icon. Pl.* 14: t. 1319 (1880); *Gaiadendron ligustrinum* (Cunn. ex Lindl.) Engl., *Nat. Pflanzenfam.* 3(1): 178 (1889). T: Blue Mts, N.S.W., 1817, *A. Cunningham s.n.*; *n.v.*

Illustrations: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 47: t. 28 (1922) as *Gaiadendron ligustrinum*; B. A. Barlow, *Austral. J. Bot.* 14: 427, fig. 1 (1966).

Spreading shrub to 1 m high, glabrous. Leaves lanceolate, obtuse or rounded; lamina 30–55 mm long, 6–14 mm wide, with recurved margins, attenuate at base into petiole c. 2 mm long. Inflorescence axis usually 5–12 mm long, rarely to 40 mm, subtended by 2–4 pairs of rounded prophylls up to 1.5 mm long; pedicels 2–6, c. 1 mm long; bracts c. 2 mm long, the central one decurrent to base of pedicel. Calyx 0.5 mm long, irregularly toothed. Corolla in mature bud 6–8 mm long, acute, yellow. Anthers lanceolate, 2 mm long, about equal to free part of filament. Fruit ovoid, c. 12 mm long. Fig. 20A.

Endemic in the Blue Mountains, N.S.W. in exposed habitats in woodland or heath; single plants often root-parasitic on many neighbouring plants. Map 76.

N.S.W.: 3–5 km W of Putty Road 3 km N of Grassy Hill, *A. N. Rodd* 40 (NSW); 3 km SW of Mt Wilson at foot of Zigzag, *B. A. Barlow* 219 (BRIU).

## 2. NUYTSIA

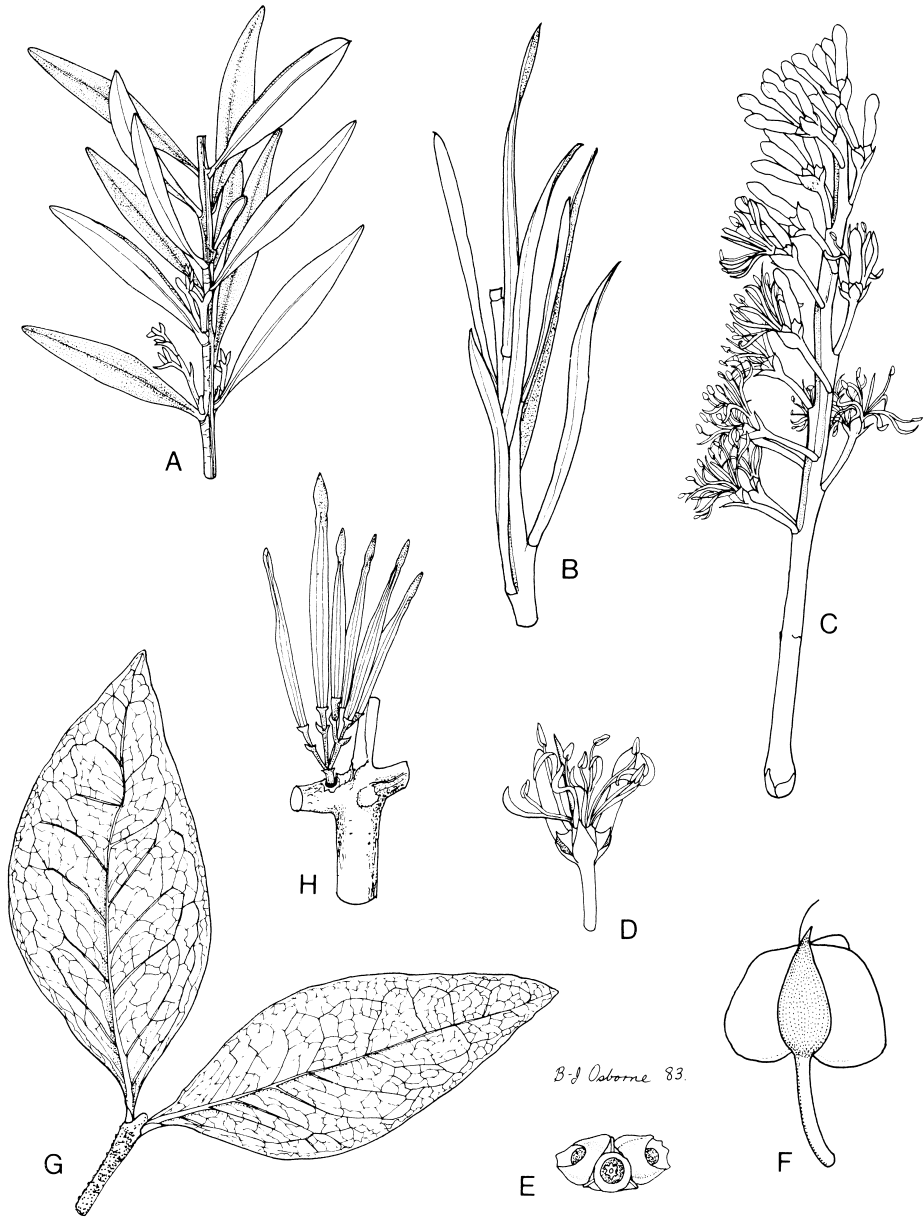
*Nuytsia* R.Br., *J. Geog. Soc.* 1: 17 (1831), after Pieter Nuyts, Dutch explorer of the south-western coast of Australia in 1626–1627

Type: *N. floribunda* (Labill.) R.Br.

Terrestrial root-parasitic small trees or shrubs. Leaves opposite, displaced-opposite or rarely verticillate, penninerved. Inflorescence terminal, a raceme of triads, the central flower bisexual, lateral flowers male; bract 1 under each flower. Corolla regular; petals 6–8, free. Stamens unequal; anthers dorsifixed, versatile, 4-locular. Fruit dry, strongly 3-winged; seed with a thin viscous coat.  $x = 12$ , *vide* B. A. Barlow & D. Wiens, *Taxon* 20: 291 (1971).

A monotypic genus endemic in south-western W.A. Primitive and relictual, sharing characters with the South American genus *Gaiadendron*.

D. A. Herbert, The Western Australian Christmas Tree, *J. Roy. Soc. W. Austral.* 5: 72 (1920).



**Figure 20.** **A**, *Atkinsonia ligustrina*, flowering branchlet, corollas fallen,  $\times 1$  (H. Stauffer 5696, CANB). **BF**, *Nuytsia floribunda*. **B**, leaves  $\times 1$ ; **C**, inflorescence  $\times 1$ ; **D**, a triad  $\times 1.5$ ; **E**, calyxes of a triad from above  $\times 5$  (**B–E**, A. George 16216, PERTH); **F**, maturing fruit with enlarged bracteole  $\times 1.5$  (M. Tindale 324, CANB). **G–H**, *Amylotheca dictyophleba*. **G**, leaves  $\times 1$ ; **H**, inflorescence  $\times 1$  (**G–H**, M. Balgooy 1593, CANB).



**1. Nuytsia floribunda** (Labill.) R.Br., *J. Geog. Soc.* 1: 17 (1831)

*Loranthus floribundus* Labill., *Nov. Holl. Pl.* 1: 87 (1805). T: 'terra Van-Leuwin' — south coast of W.A.; n.v.

Illustrations: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 47: t. 27 (1922); B. A. Barlow, *Austral. J. Bot.* 14: 436, fig. 3 (1966).

Spreading tree or shrub to 7 m high, glabrous except scattered hairs on bracts. Leaves lanceolate, acute to rounded, 25–100 mm long, 3–6 mm wide, attenuate at base, sessile. Inflorescences forming terminal fascicles; axis up to 25 cm long, angular, bearing up to 50 triads; peduncles of triads 8–16 mm long, enlarging in fruit; all flowers sessile; bracts triangular, decurrent, 4–7 mm long, 2–3 mm wide, reaching 20 mm long in fruit. Calyx 1–1.5 mm long, irregularly toothed. Corolla in mature bud c. 12 mm long, robust, clavate, bright orange to golden yellow. Anthers 2–3 mm long; filaments epipetalous near base, the free parts c. 6 mm long. Fruit c. 10 mm long, brown. *Western Australian Christmas Tree*. Fig. 20B–F.

Occurs from the Murchison River to the W end of the Great Australian Bight, W.A., in sandy or granitic soil in open forest, woodland and heath; parasitic on many species including annuals, often connected by underground runners to hosts some distance away. Flowers Nov.–Jan.; fruit Mar.–Apr. Map 77.

W.A.: Jandakot, A. S. *George 360* (PERTH); Mt Ragged, Mar. 1951, H. *Tarleton Phillips* (PERTH).

Flowers more prolifically the first season after fire.

**3. AMYLOTHECA**

*Amylothea* Tieghem, *Bull. Soc. Bot. France* 41: 261 (1894), from the Latin *amylum* (starch), and *theca* (case), in reference to the starch cells which develop in the locules of the ovary

*Loranthus* sect. *Amylothea* (Tieghem) Blakely, *Proc. Linn. Soc. New South Wales* 50: 11 (1875).

T: *A. dictyophleba* (F. Muell.) Tieghem

Aerial stem-parasitic shrubs, erect to pendulous; epicortical runners present. Leaves opposite, penninerved. Inflorescence axillary, a raceme of opposite triads with the central flower sessile and lateral flowers pedicellate, sometimes reduced to a simple raceme or umbel; bract 1 under each flower. Corolla 6-merous, regular; petals united to the middle or higher into a slightly inflated tube. Stamens equal; anthers dorsifixed, immobile, introrse, 4-locular.  $x = 12$  (2 species counted), *vide* B. A. Barlow & D. Wiens, *Taxon* 20: 291 (1971).

A genus of 5 species occurring in New Guinea, Melanesia and eastern Australia. Of the 2 Australian species, 1 is endemic.

Leaves broadly lanceolate to nearly orbicular, usually shining above and dull below

**1. A. dictyophleba**

Leaves linear to narrowly lanceolate, dull both sides

**2. A. subumbellata**

**1. Amylothea dictyophleba** (F. Muell.) Tieghem *Bull. Soc. Bot. France* 41: 262 (1894)

*Loranthus dictyophlebus* F. Muell., *Essay. Burdekin Exped.* 14 (1860); *Aciella dictyophleba* (F. Muell.) Tieghem, *Bull. Soc. Bot. France* 42: 87 (1895); *Elytranthe dictyophleba* (F. Muell.) Engl., *Nat. Pflanzenfam. Nachtr.* I to 3(1): 126 (1897). T: Hastings R., N.S.W., *Beckler*; lecto: MEL *vide* B. A. Barlow, *Austral. J. Bot.* 14: 439 (1966); iso: NSW.

*Loranthus tenuifolius* F.M. Bailey, *Queensland Dept. Agric. Stock. Bot. Bull.* 16: 1 (1903), *non* (Tieghem) Tieghem (1895). T: Mt Alexandra, Qld, Nov. 1902, *collector unknown*; n.v

*Loranthus beauverdiana* F.M. Bailey, *Queensland Agric. J.* 21: 294 (1908). T: Mt Alexandra, Qld, 1902, H.

Newport 8; holo: BRI; iso: NSW.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 50: t. 6 (1925) as *Loranthus dictyophlebus*.

Plant spreading to pendulous, glabrous. Leaves lanceolate to elliptic, acute to rounded; lamina 6–12 cm long, 2–6 cm wide, usually shining above and dull below, attenuate or contracted at base into petiole 2–8 mm long, reticulate venation distinct. Inflorescence axis slender, 5–14 mm long, rarely to 28 mm, bearing 1–6 decussate pairs of triads or single flowers on peduncles usually 4–8 mm long; pedicels of lateral flowers of triad, if present, 2–4 mm long; bracts triangular, 1 mm long. Calyx obscure, 0.3 mm long. Corolla in mature bud 28–38 mm long, inflated in middle, acute, usually red, often grading into green in upper part and yellow at apex. Anthers 3–4 mm long, slightly longer than free part of filament. Style articulate 1–3 mm above base. Fruit globose, 10–12 mm diam. red or purple. Fig. 20 G–H.

Occurs in Qld and N.S.W. from Cape York to Illawarra district in mesic forests on many species of rainforest trees. Also in southern New Guinea. Map 78.

Qld: Lockerbie, 16 km WSW of Somerset, *L. J. Brass 18545* (BRI); Pimpama Creek near Beenleigh, *B. A. Barlow 236* (BRIU). N.S.W.: Fig Tree via Wollongong, Jan. 1930, *N. J. Fishlock* (NSW).

## 2. *Amylotheca subumbellata* Barlow, *Austral. J. Bot.* 14: 439, fig. 3c–d (1966)

T: Mueller Creek, Qld, 11 Aug. 1960, *B. A. Barlow 123*; holo: BRI; iso: BRIU.

Illustration: B. A. Barlow, *loc. cit.*

Plant spreading to pendulous, glabrous. Leaves narrowly linear to lanceolate, acute or rarely obtuse; lamina 8–15 cm long, 6–18 mm wide, attenuate at base, sessile or obscurely petiolate, dull both sides; reticulate venation distinct. Inflorescence axis slender, 4–10 mm long, bearing 2–6 decussate pairs of subumbellate triads on peduncles 2.5–3.5 mm long; pedicels of the lateral flowers 1.5–2 mm long; bracts triangular, 1 mm long. Calyx obscure, 0.3 mm long. Corolla in mature bud 27–32 mm long, inflated in middle, obtuse, red. Anthers 2–3 mm long, about equal to free part of filament. Style articulate c. 1.5 mm above base. Fruit unknown.

Endemic in Qld, from Cardwell to Ingham in coastal lowland open forest on Casuarinaceae and *Grevillea*. Map 79.

Qld: foot of Cardwell Range c. 19 km N of Ingham, *B. A. Barlow 334* (BRIU, CANB, NSW, NT).

## 4. DECAISNINA

*Decaisnina* Tieghem, *Bull. Soc. Bot. France* 42: 435 (1895), after Joseph Decaisne (1807–1882), Belgian botanist, who worked especially on the flora of Timor

*Amylotheca* sect. *Decaisnina* (Tieghem) Engl. & Krause, *Nat. Pflanzenfam.* 2nd edn, 16b: 139 (1935). T: *D. glauca* Tieghem

Aerial stem-parasitic shrubs, erect to pendulous; epicortical runners present. Leaves opposite, penninerved. Inflorescence axillary, a raceme of decussate pairs of triads with all flowers sessile or nearly so; bract 1 under each flower. Corolla regular; petals 6, free or shortly united at base. Stamens equal; anthers basifixed, immobile, introrse, 4-locular, sometimes transversely septate.  $x = 12$  (4 spp. counted) *vide* B. A. Barlow & D. Wiens, *Taxon* 20: 291 (1971).

A genus of c. 30 species distributed from the Philippines to Tahiti and northern Australia. Of the 6 species in Australia, 5 are endemic.

1 Leaves linear to broadly lanceolate

2 Internodes strongly flattened

2: Internodes terete except when very young

6. *D. biangulata*

- 3 Leaves attenuate at base often falcate **5. D. brittenii**
- 3: Leaves truncate or cordate at base, sessile or nearly so, usually straight **4. D. signata**
- 1: Leaves broadly lanceolate to orbicular
- 4 Inflorescence axis usually bearing 1 or 2 pairs of triads **2. D. congesta**
- 4: Inflorescence axis usually bearing 4 or more pairs of triads
- 5 Leaves shining above, dull below; lateral flowers shortly pedicellate **1. D. hollrungii**
- 5: Leaves dull and sometimes glaucous both sides; lateral flowers sessile
- 6 Leaves attenuate or contracted at base, distinctly petiolate **3. D. petiolata**
- 6: Leaves truncate or cordate at base, sessile or nearly so **4. D. signata**

### 1. *Decaisnina hollrungii* (Schumann) Barlow, *Austral. J. Bot.* 14: 434 (1966)

*Loranthus hollrungii* Schumann., in Schumann & Hollrung, *Fl. Kaiser Wilh. Land* 105 (1889); *Amylotheca hollrungii* (Schumann.) Tieghem, *Bull. Soc. Bot. France* 41: 263 (1894); *Elytranthe hollrungii* (Schumann.) Engl., *Nat. Pflanzenfam. Nachtr.* 1 to 3(1): 126 (1897). T: Augustafloss, New Guinea, July 1887, *Hollrung 659*; holo: B; iso: K.

Plant pendulous, glabrous or undersides of leaves and rarely inflorescences with a sparse brown indumentum. Internodes angular when young, usually terete at maturity. Leaves broadly lanceolate to ovate, acute to rounded; lamina 6–15 cm long (in Australian specimens), 3.5–6 cm wide, shining above, dull below, recurved at margin, contracted at base into distinct terete petiole 6–18 mm long; midrib raised and prominent on abaxial surface and lateral veins distinct on upper surface. Inflorescence axis up to 60 mm long, elongating in fruit, with 5–10 pairs of triads on peduncles 1.5–5 mm long; pedicels of lateral flowers c. 1 mm long; bracts c. 1.5 mm long, obtuse. Calyx 0.3 mm long, minutely lobed. Corolla in mature bud 30–50 mm long, yellow to red; petals united in lower 4 mm. Anthers 3–4 mm long, about equal to free part of filament. Fruit nearly globose, 7–10 mm long. Fig. 21C.

Occurs in Qld from Cape York to Russell R. in rainforest and dense coastal scrub on a wide range of host trees. A very polymorphic species, also widespread in New Guinea, Bismarck Archipelago and Solomon Islands from sea level to 2900 m, and common on roadside and cultivated plants. Map 80.

Qld: N of Kings Park, Iron Range, *B. A. Barlow 3693* (BRI, CANB, MO, QRS); Russell R., 1886, *W. Sayer* (MEL); Mossman-Daintree Rd, 0.9 km N of Rocky Point, *I. B. Staples 2372* (BRI); Olive R. W of Temple Bay, July 1923, *E. J. Young* (BRI, NSW).

### 2. *Decaisnina congesta* Barlow, *Brunonia* 5: 204 (1983)

T: State Forest Reserve 607, Bridle Logging Area, 16°59'S 145°37'E, Qld, 1 Dec. 1978, *B. Gray 1168*; holo: QRS; iso: CANB.

*Loranthus signatus* var. *petiolatus* Blakely ex C. T. White, *Proc. Roy. Soc. Queensland* 47: 79 (1936). T: Mt Molloy, Qld, *L. J. Brass 2514*; holo: BRI; iso: NSW.

Plant erect to spreading, glabrous. Internodes slightly angular when young, terete when older. Leaves elliptic, obtuse to rounded with a small blunt mucro; lamina 5–8 cm long, 2–4.5 cm wide, finely recurved at margin, dull both sides or slightly lustrous on adaxial surface, attenuate at base into distinct petiole 6–15 mm long; venation distinct on abaxial surface. Inflorescence axis usually 8–13 (rarely to 30) mm long, with usually 1 (rarely 2 or 3) pairs of triads sessile or on peduncles to 1 mm long; all flowers sessile; bracts 1.5–2 mm long, rounded. Calyx 0.7 mm long, irregularly split. Corolla in mature bud slender, 23–30 mm long, red below, green above; petals united in lower 2 mm. Anthers 3 mm long, slightly shorter than free part of filament. Fruit ovoid, 9 mm long. Fig. 21D.

Endemic in Qld, from Daintree to the Atherton Tableland and possibly to Palm Island; mostly in rainforest, on various host species. Map 81.

Qld: Kuranda, 7 Nov. 1967, *J. Berry* (QRS); Edge Hill, Cairns, 3 May 1968, *M. L. Cassels* (QRS); 3 km S of Daintree, *H. C. Weber* U9 (CANB).

### 3. *Decaisnina petiolata* (Barlow) Barlow, *Austral. J. Bot.* 14: 434 (1966)

*Amylothea petiolata* Barlow, *Proc. Linn. Soc. New South Wales* 87: 53, fig. 1a–b (1962). T: South Bay, Bickerton Is., N.T., 11 June 1948, *R. L. Specht* 537; holo: BRI; iso: AD, NSW, PERTH.

Plant erect to pendulous, glabrous and often glaucous. Internodes terete, sometimes slightly compressed when young. Leaves narrowly to broadly elliptic, rounded; lamina 4–10 cm long, 1.5–4 cm wide, attenuate or contracted at base into a distinct but often winged petiole 3–10 mm long, often finely recurved at margin; venation distinct on both surfaces. Inflorescence axis 20–45 mm long, bearing 4–7 pairs of triads on peduncles 1–4 mm long; all flowers sessile; bracts 1–2.5 mm long, the central one often longer than the laterals, rounded. Calyx entire, 0.5–1 mm long. Corolla in mature bud 18–25 mm long, red, orange or pink below, yellow or green above; petals united in lower 0.5–2 mm. Anthers 2–3 mm long, about equal to free part of filament. Fruit ellipsoidal to globose, 8–10 mm long, sometimes longitudinally striped.

Occurs in W.A. and N.T. from the W Kimberley to Arnhem Land, in open monsoon forest and coastal scrub on various hosts. There are 2 subspecies.

Leaves broadly elliptic, attenuate or contracted at base into distinct terete petiole 4–10 mm long, usually not glaucous

**3a. subsp. *petiolata***

Leaves narrowly elliptic, attenuate at base into obscure winged petiole 3–5 mm long, usually glaucous

**3b. subsp. *angustata***

### 3a. *Decaisnina petiolata* (Barlow) Barlow subsp. *petiolata*

Leaves broadly elliptic, attenuate or contracted at base into a distinct terete petiole 4–10 mm long, usually not glaucous. Calyx limb 0.5 mm long.

Occurs in Arnhem Land and adjoining islands, N.T.; in coastal communities on *Buchanania*, *Acacia*, *Ervatamia* and *Maba*. Map 82.

N.T.: Bing Bong Station, *L. A. Craven* 4712 (CANB, NT); Wessel Is., *P. K. Latz* 3358 (CANB, NT); Yirrkala, *R. L. Specht* 790 (AD, BRI).

### 3b. *Decaisnina petiolata* subsp. *angustata* Barlow, *Brunonia* 5: 205 (1983)

T: Boiga Falls, Drysdale R. National Park, 15°08'S 127°06'E, W.A., 4 Aug. 1975, *K. F. Kenneally* 3049; holo: CANB; iso: PERTH.

[*Decaisnina signata* subsp. *signata* auct. non (F. Muell. ex Benth.) Tieghem: Barlow, *Austral. J. Bot.* 14: 435 (1966), *p.p.*]

Leaves narrowly elliptic, usually glaucous, attenuate at base into an obscure petiole; petiole 3–5 mm long, flat or channelled above and more or less winged. Calyx 1 mm long.

Occurs from the West Kimberley, W.A., to Arnhem Land, N.T.; in dry monsoon woodland on various hosts including *Buchanania*, *Ficus*, *Erythrophleum*. Map 83.

W.A.: Sunday Is., King Sound, Nov. 1906, *W. V. Fitzgerald* (NSW); The Grotto, S of Wyndham, *K. F. Kenneally* 1949 (CANB, PERTH). N.T.: 21.5 km SE of Koongarra, *M. Lazarides* 9147 (CANB).

### 4. *Decaisnina signata* (F. Muell. ex Benth.) Tieghem, *Bull. Soc. Bot. France* 42: 436 (1895)

*Loranthus signatus* F. Muell. ex Benth., *Fl. Austral.* 3: 392 (1861); *Elytranthe signata* (F. Muell. ex Benth.) Engl., *Nat. Pflanzenfam. Nachtr.* I to 3(1): 126 (1897); *Loranthus signatus* var. *typicus* Domin, *Biblioth. Bot.* 89: 54 (1921); *Amylothea signata* (F. Muell. ex Benth.) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 300 (1929). T: Northern Australia (Gregory Expedition), Sept. 1855, *F. Mueller s.n.*: lecto: MEL *vide* B. A. Barlow, *Austral. J. Bot.* 14: 435 (1966).

Plant spreading to pendulous, glabrous. Internodes terete. Leaves broadly lanceolate to nearly orbicular, acute to rounded; lamina 4–15 cm long, 25–55 mm wide, truncate or cordate at base, sessile or on petiole up to 2 mm long, dull both sides; venation distinct both sides. Inflorescence axis 3–6 cm long, bearing 4–9 pairs of triads on peduncles 1–5 mm long; all flowers sessile; bracts 1.5–2.5 mm long, the central one often longer than the laterals, rounded. Calyx entire or weakly toothed or dissected, 1 mm long. Corolla in mature bud slender, 24–32 mm long, red below, green or yellow above, often with a brown or dark red band at or just below apex; petals united in lower 0.5–1.5 mm. Anthers 3–4 mm long, 1.2–2.5 times as long as free part of filament. Fruit ovoid to nearly globose, c. 10 mm long.

Endemic in N.T. in monsoon forest and woodland on various hosts. There are 2 subspecies.

Leaves broadly lanceolate to elliptic, strongly contracted or truncate at base into petiole 0.5–2 mm long

**4a. subsp. *signata***

Leaves ovate to nearly orbicular, cordate at base, sessile

**4b. subsp. *cardiophylla***

**4a. *Decaisnina signata* (F. Muell. ex Benth.) Tieghem subsp. *signata***

Leaves broadly lanceolate to elliptic, attenuate but eventually rounded at apex; lamina 8–15 cm long, 2.5–5 cm wide, strongly contracted or truncate at base into petiole 0.5–2 mm long.

Occurs in N.T. from Daly River region to western Arnhem Land, in monsoon forest and woodland on various hosts but most commonly on *Planchonia*, *Barringtonia* and *Ficus*. Map 84.

N.T.: 8 km SW of Danger Pt, Cobourg Peninsula, 23 July 1961, *G. Chippendale* (NT); 4 km NNW of Nourlangie Ranger Stn, *L. A. Craven* 6362 (CANB); Beatrice Hill, 58 km ESE of Darwin, *M. Lazarides* & *L. G. Adams* 337 (BRI, CANB, K, L, MEL, NSW, NT).

**4b. *Decaisnina signata* subsp. *cardiophylla* (Domin) Barlow, *Austral. J. Bot.* 14: 437 (1966)**

*Loranthus signatus* var. *cardiophyllus* Domin, *Biblioth. Bot.* 89: 54 (1921); *Loranthus amplexans* Tieghem ex Blakely, *Proc. Linn. Soc. New South Wales* 47: 393 (1922) and 49: 94, t. 26 (1924); *Amylothea amplexans* (Tieghem ex Blakely) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 300 (1929). T: Quail Is., N.T., Sept. 1855, *Flood*; iso: MEL.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 49, t. 26 (1924) as *Loranthus amplexans*.

Leaves ovate to nearly orbicular, sometimes attenuate but finally rounded at apex; lamina usually 4–9 cm long, 2.5–5.5 cm wide, cordate at base, sessile, amplexicaul. Fig. 21A.

Occurs in N.T. from the Daly River region to western Arnhem Land, in monsoon forest and woodland, usually on *Syzygium* or *Buchanania*. Sympatric with subsp. *signata*, but appears to occur on different hosts. Map 85.

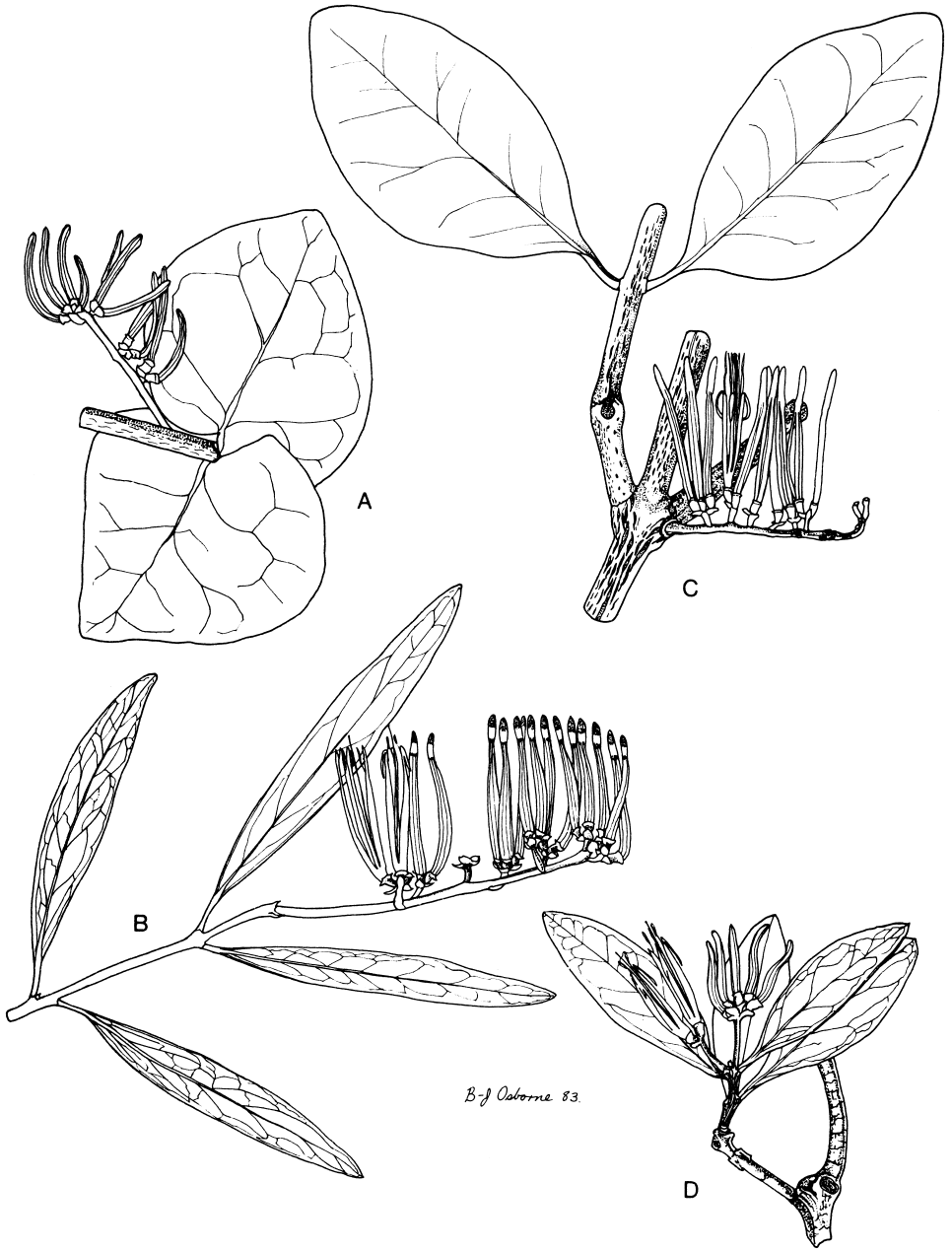
N.T.: Darwin, *N. Byrnes* 2785 (CANB, DNA, K, L, NT); Nourlangie escarpment, 1 July 1972, *E. Lovett* (CANB, DNA, NT); 11 km SW of Maranboy, *N. H. Speck* 1642 (CANB).

**5. *Decaisnina brittenii* (Blakely) Barlow, *Austral. J. Bot.* 14: 433 (1966)**

*Loranthus brittenii* Blakely, *Proc. Linn. Soc. New South Wales* 47: 393 (1922) and 49: 92, t. 24 (1924); *Amylothea brittenii* (Blakely) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 300 (1929). T: Endeavour River, Qld, 1770, *J. Banks* & *D. Solander*; iso: NSW.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 49: t. 24 (1924) as *Loranthus brittenii*.

Plant pendulous, glabrous. Internodes compressed near apex when young, soon becoming terete. Leaves linear to broadly lanceolate, attenuate but finally rounded at apex, often with a small mucro; lamina 7–17 cm long, 3–35 mm wide, dull both sides, attenuate at base into an obscure to distinct petiole up to 10 mm long; venation obscure to distinct. Inflorescence axis 3–5 cm long, bearing 3–6 pairs of triads on peduncles 2–4 mm long; all



**Figure 21.** *Decaisnina*, flowering branchlets 0.7. **A.** *D. signata* subsp. *cardiophylla* (L. Craven 4554, CANB). **B.** *D. brittenii* subsp. *speciosa* (L. Craven 2455, CANB). **C.** *D. hollrungii*, some triads removed (B. Barlow 3719, CANB). **D.** *D. congesta* (B. Gray 1168, CANB).

flowers sessile; bracts 1.5–2.5 mm long, rounded at apex. Calyx entire or weakly toothed or dissected, 0.7–1 mm long. Corolla in mature bud usually 16–24 mm long, rarely to 31 mm, red below, usually green or cream above; petals united in lower 0.5–1 mm. Anthers 2–5 mm long, equal to or longer than free part of filament. Fruit ellipsoidal, c. 12 mm long, often longitudinally striped.

Occurs from Arnhem Land, N.T., to Torres Strait islands and Burke District, Qld., in open woodland on various hosts but commonly on *Melaleuca*. There are two subspecies.

Anthers c. 3 mm long, about equal to free part of filament; leaf venation obscure

**5a. brittenii**

Anthers 3–5 mm long, about twice length of free part of filament; leaf venation distinct

**5b. speciosa**

### 5a. *Decaisnina brittenii* (Blakely) Barlow subsp. **brittenii**

*Loranthus signatus* var. *angustatus* Domin, *Biblioth. Bot.* 89: 54 (1921). T: Boonmoo, Qld, Feb. 1910, K. Domin s.n.; holotype: PR.

Leaf lamina 7–17 cm long, 3–35 mm wide, leathery; venation indistinct except midrib and some lateral veins in wider leaves. Inflorescence bracts 1.5–2 mm long, more or less equal. Corolla in mature bud usually 18–24 mm long, without red or brown bands near apex. Anthers c. 3 mm long, about equal to free part of filament.

Occurs from the N coast of Arnhem Land, N.T., to Torres Strait islands and Burke District, Qld., in open lowland forest and woodland on various hosts including *Parinari*, *Tristania*, *Melaleuca*, *Syzygium*, *Ficus* and *Alstonia*. There is a distinct cline in decreasing leaf width and thickness from Torres Strait islands to drier areas of the Gulf districts, associated with a shift to *Melaleuca* as the preferred host. Map 86.

N.T.: 10 km S of Yaimani Ck, 12°49'S, 134°37'E, D. E. Symon 7878 (CANB, MEL, NSW, NT). Qld: Lockhart R. Mission, B. A. Barlow 3724 (BRI, CANB, QRS); between Oak Creek and Petford, B. Gray 1490 (CANB, QRS); Thursday Is., G. C. Stocker 1292 (QRS).

### 5b. *Decaisnina brittenii* subsp. **speciosa** Barlow, *Brunonia* 5: 203 (1983)

T: bank of Nourlangie Ck., 12°52'S, 132°47'E, N.T., 28 Feb. 1973, L. A. Craven 2455; holotype: CANB; iso: A, BRI, L, MO, NT, PERTH, RSA.

Leaf lamina 7–16 cm long, 8–25 mm wide, thin, finely recurved at margin; venation distinct both sides. Inflorescence bracts 2–2.5 mm long, rounded at apex, conspicuous, the central one often longer than the laterals. Corolla in mature bud 20–31 mm long, red or purple below, green or cream above with 1 or 2 red or brown bands near apex. Anthers 3–5 mm long, about twice as long as free part of filament. Fig. 21B.

Endemic in the Victoria River district and Arnhem Land, N.T., from Timber Creek to Blue Mud Bay in swamps, riparian forest and woodland on *Melaleuca* and *Barringtonia*. Map 87.

N.T.: Mainoru, B. A. Barlow 597 (BRIU); 5 km S of Coolibah, B. A. Barlow 1193 (CANB); Leichhardt Lagoon, Magella Creek, N. Byrnes 2839 (CANB, DNA, NT); Rose River, McKean & C. Dunlop 2660 (CANB, NT).

### 6. *Decaisnina biangulata* (W.Fitzg.) Barlow, *Austral. J. Bot.* 14: 433 (1966)

*Loranthus biangulatus* W. Fitzg., *J. Roy. Soc. W. Austral.* 3: 136 (1918); *Amylothea biangulata* (W. Fitzg.) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 300 (1929). T: base of Mt Broome, W.A., May 1905, W. V. Fitzgerald 816; lecto: NSW *vide* B. A. Barlow, *loc.cit.*; junction of Spring & Isdell Rivers, W.A., Aug. 1905, W. V. Fitzgerald s.n.; syn: PERTH.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 49: t. 27 (1924) as *Loranthus biangulatus*.

Plant pendulous, glabrous, glaucous. Internodes strongly flattened and double-edged, dilated towards apex and up to 7 mm wide. Leaves lanceolate, acute or obtuse; lamina 6–20 cm long, 5–20 mm wide, dull both sides, attenuate at base but without distinct

petiole; venation distinct both sides. Inflorescence axis 3–4 cm long, bearing 3–6 pairs of triads on peduncles 2–3 mm long; all flowers sessile; bracts 2 mm long, rounded at apex, overlapping. Calyx entire, 1–1.5 mm long. Corolla in mature bud 20–25 mm long, red or yellow below, green above; petals united in lower 0.5 mm. Anthers 2–3 mm long, equal to free part of filament. Fruit ovoid, c. 10 mm long.

Endemic in W Kimberley, W.A., known only from the types; occurs in open forest on *Tristania* and *Syzygium*. Map 88.

## 5. LYSIANA

*Lysiana* Tieghem, *Bull. Soc. Bot. France* 41: 599 (1894), from the Greek *lyo* (I set free), alluding to separation of the genus from *Loranthus*

*Elytranthe* sect. *Lysiana* (Tieghem) Engl., *Nat. Pflanzenfam. Nachtr.* 1 to 3(1): 126 (1897); *Loranthus* sect. *Lysiana* (Tieghem) Blakely, *Proc. Linn. Soc. New South Wales* 50: 1, 2 (1925). T: *L. casuarinae* (Miq.) Tieghem

Aerial stem-parasitic shrubs, erect to pendulous, glabrous; epicortical runners absent. Leaves opposite, sometimes clustered on condensed axes, flat with pinnate venation or compressed or terete. Inflorescence axillary, a pedunculate or sessile 2-flowered umbel or a single flower; bract 1 per flower. Petals 6, united into a curved tube inflated in middle and unequally divided, more deeply so and more reflexed on concave side. Stamens equal; anthers basifixed, immobile, introrse, 4-locular, acute, sometimes transversely septate, about as long as free part of filament.  $x = 12$  (6 species studied); *vide* B. A. Barlow & D. Wiens, *Taxon* 20: 291 (1971).

A genus of 8 species endemic in Australia in open habitats, best developed in the arid zone. Probably the most advanced of the genera of Loranthaceae with 12 pairs of chromosomes.

- |    |  |                                  |
|----|--|----------------------------------|
| 1  | Flowers single or in pairs without a common peduncle; pedicels distinctly winged; fruit globose                          | <b>8. <i>L. murrayi</i></b>      |
| 1: | Flowers in pairs on a common peduncle (sometimes very short); pedicels not distinctly winged; fruit ellipsoidal to ovoid |                                  |
| 2  | Leaves flat (rarely compressed when very narrow)   |                                  |
| 3  | Leaves linear to narrowly oblong or oblanceolate, usually less than 10 mm wide   |                                  |
| 4  | Leaves linear to narrowly oblong, with obscure venation; fruit deeply coloured; calyx usually short, entire              | <b>2. <i>L. exocarpi</i></b>     |
| 4: | Leaves oblanceolate, with distinct venation; fruit more or less translucent; calyx usually lobed or toothed              | <b>3. <i>L. subfalcata</i></b>   |
| 3: | Leaves oblanceolate to spatulate, usually more than 10 mm wide   |                                  |
| 5  | Calyx forming a collar below apex of fruit; anthers septate  | <b>1. <i>L. spathulata</i></b>   |
| 5: | Calyx forming a collar at apex of fruit; anthers not septate   | <b>4. <i>L. maritima</i></b>     |
| 2: | Leaves terete  |                                  |
| 6  | Peduncle more than 5 mm long, 0.5–1 mm thick   | <b>7. <i>L. linearifolia</i></b> |
| 6: | Peduncle less than 4 mm long, c. 1.5 mm thick  |                                  |
| 7  | Leaves 4.5–9 cm long; corolla 35–50 mm long  | <b>5. <i>L. casuarinae</i></b>   |
| 7: | Leaves 10–20 cm long; corolla c. 30 mm long  | <b>6. <i>L. filifolia</i></b>    |



**1. *Lysiana spathulata*** (Blakely) Barlow, *Proc. Linn. Soc. New South Wales* 88: 139 (1963)

*Loranthus exocarpi* var. *spathulata* Blakely, *Proc. Linn. Soc. New South Wales* 50: 10, t. 5 (1925); *Lysiana exocarpi* var. *spathulata* (Blakely) Chippend., *Trans. Roy. Soc. S. Austral.* 86: 7 (1963). T: Bacon Swamp, Roper R., N.T., July-Aug. 1911, *Baldwin Spencer s.n.*; holo: NSW.

Plant erect to pendulous. Leaves flat, obovate to spathulate, rounded at apex; lamina 3–8 cm long, 12–25 mm wide, gradually attenuate at base into petiole 5–15 mm long; venation distinct, the central vein more prominent. Inflorescence a pedunculate 2-flowered umbel; peduncle usually 1–2 mm long; pedicels 3–7 mm long; bracts 2 mm long, rounded at apex, appressed to ovary. Calyx 1–1.5 mm long, distinctly 6-toothed. Corolla in mature bud 20–30 mm long, usually red, rarely yellow, sometimes tipped with green or black. Anthers transversely septate. Style articulate c. 1 mm above base. Fruit ellipsoidal, 8–12 mm long, the calyx limb forming a distinct collar below apex.

Occurs in W.A., N.T. and Qld, from Eighty Mile Beach to Mitchell District in open forest and woodland on various hosts but most commonly on *Acacia*. There are 2 subspecies.

Leaves 5–8 cm long, often somewhat falcate; stems pendulous, sparsely branched

**1a. subsp. *spathulata***

Leaves 3–5 cm long, not falcate; stems erect, much-branched

**1b. subsp. *parvifolia***

**1a. *Lysiana spathulata*** (Blakely) Barlow subsp. ***spathulata***

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 50: t. 5 (1925) as *Loranthus exocarpi* var. *spathulata*.

Plant pendulous. Stems sparsely branched. Leaves 5–8 cm long, often somewhat falcate.

Occurs in W.A., N.T. and Qld from W Kimberley to Normanton with a possibly disjunct occurrence near Jericho; Mostly on *Acacia*. Map 89.

W.A.: 7 km SW of Martins Well, N of Broome, *K. F. Kenneally 6175* (CANB, PERTH). N.T.: near Fish R. Gorge, Nicholson R. area, *A. Kanis 1758* (CANB, K, L, NT, US). Qld: 19.7 km E of Jericho, *A. D. Chapman 1284* (BRI, CANB).

**1b. *Lysiana spathulata*** subsp. ***parvifolia*** Barlow, *Proc. Linn. Soc. New South Wales* 88: 141, fig. 1d (1963)

T: Palm Valley, N.T., 15 Aug. 1961, *D. Nelson 5*; holo: NT.

Plant erect to spreading. Stems much-branched, somewhat divaricate. Leaves 3–5 cm long.

Occurs near Eighty Mile Beach, W.A. and in Central Australia, N.T., on various hosts but most commonly on *Acacia* and *Ficus*. Map 90.

W.A.: Wallal Downs, *N. T. Burbidge 1508* (PERTH).

**2. *Lysiana exocarpi*** (Behr) Tieghem, *Bull. Soc. Bot. France* 41: 603 (1894)

*Loranthus exocarpi* Behr, *Linnaea* 20: 624 (1847); *Elytranthe exocarpi* (Behr) Engl., *Nat. Pflanzenfam. Nachtr. I* to 3(1): 126 (1897). T: Barossa, S.A., 1841–1846, *H. H. Behr s.n.*; iso: K.

Plant spreading to pendulous. Leaves flat or somewhat compressed when very narrow, linear to narrowly oblong, usually rounded at apex, sessile or the wider leaves shortly petiolate; lamina 3–15 cm long, 1–10 mm wide, attenuate to contracted at base; venation obscure. Inflorescence a pedunculate usually 2-flowered umbel; peduncle usually 0.5–2 mm long; pedicels 2–5 mm long; bracts 1–1.5 mm long, rounded at apex. Calyx 0.3–0.7 mm long, entire or irregularly lobed. Corolla in mature bud 25–50 mm long, usually red, rarely yellow, sometimes tipped with green or black. Anthers not septate. Style articulate at base. Fruit ellipsoidal to ovoid, 6–10 mm long, red or black.

Occurs in arid and temperate regions of all mainland States, from Lake Carnegie, W.A., to the Hunter Valley, N.S.W., in open forest and woodland on many different hosts but frequently on other Loranthaceae. There are two subspecies.

Leaves linear to narrowly oblong or narrowly elliptic, more than 3 mm wide

**2a. subsp. exocarpi**

Leaves linear, less than 0.3 mm wide

**2b. subsp. tenuis**

**2a. *Lysiana exocarpi* (Behr) Tieghem subsp. exocarpi**

*Loranthus exocarpi* var. *coccineus* F. Muell. ex Miq., *Ned. Kruidk. Archiv.* 4: 105 (1856). T: none designated.

*Loranthus exocarpi* var. *flavescens* F. Muell. ex Miq., *Ned. Kruidk. Archiv.* 4: 105 (1856). T: none designated.

*Loranthus angustifolius* R.Br. ex Benth., *Fl. Austral.* 3: 390 (1867); *Dendrophthoe angustifolia* (R.Br. ex Benth.) Tieghem, *Bull. Soc. Bot. France* 42: 82, 87 (1895). T: Port Lincoln or Memory Cove, S.A., 1802, *R. Brown s.n.*; *n.v.*

*Loranthus diamantinensis* J. M. Black, *Trans. Roy. Soc. S. Austral.* 69: 309 (1945); *Lysiana exocarpi* subsp. *diamantinensis* (J. M. Black) Barlow, *Proc. Linn. Soc. New South Wales* 88: 145, fig. 3f–g (1963). T: Minnie Downs, S.A., 1924, *L. Reese 140*; *holo: AD.*

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 50: t. 4 (1925) as *Loranthus exocarpi*.

Plant spreading to pendulous. Leaves linear to narrowly oblong or narrowly elliptic, 3–10 mm wide, often thick or leathery when mature.

Occurs in arid and temperate Australia from Lake Carnegie, W.A., to western Qld and central Vic.; on many host species, most frequently on *Acacia*, *Amyema*, *Cassia*, *Casuarinaceae*, *Eremophila*, *Exocarpos*, *Heterodendrum* and exotic trees. A polymorphic subspecies, with a cline towards wider and thicker leaves from temperate to arid habitats. Map 91.

W.A.: Wongawol, Lake Carnegie, *F. M. Bennett 183* (PERTH). N.T.: 21 km NW of Napperby, 17 May 1956, *G. M. Chippendale* (BRI, NSW, NT, PERTH). S.A.: between Goolwa and Milang, *Hj. Eichler 17131* (AD). Vic.: You Yangs, 1 Jan. 1903, *C. Walters* (NSW).

**2b. *Lysiana exocarpi* subsp. tenuis (Blakely) Barlow, *Proc. Linn. Soc. New South Wales* 88: 145, fig. 3d–e (1963)**

*Loranthus exocarpi* var. *tenuis* Blakely, *Proc. Linn. Soc. New South Wales* 50: 8, t. 5a (1925). T: near Narrabri, N.S.W., 22 Jan. 1918, *G. Burrows s.n.*; *lecto: NSW fide B. A. Barlow, Austral. J. Bot.* 14: 443 (1966).

Plant pendulous. Leaves linear, 1–3 mm wide, sometimes compressed but not terete.

Occurs in Qld and N.S.W. from the Darling Downs to the Hunter Valley and inland to the Western Plains, in open woodland and forest, usually on *Casuarinaceae*. Map 92.

Qld: between Miles and Gurulmundi, 3 June 1946, *C. T. White & L. J. Webb* (BRI). N.S.W.: Byrock, Mar. 1889, *H. Deane* (NSW); 3 km W of Jerrys Plains, *R. Story 7116* (CANB, NSW).

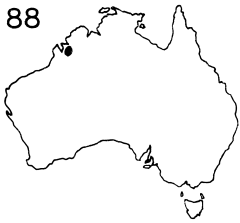
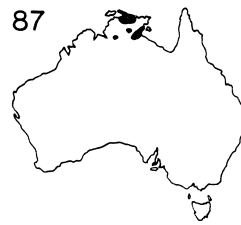
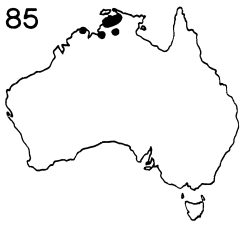
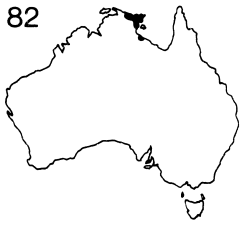
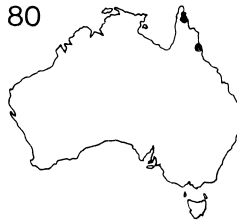
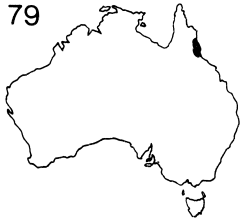
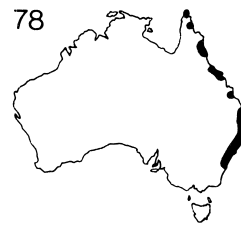
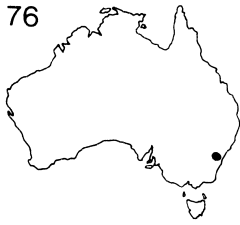
**3. *Lysiana subfalcata* (Hook.) Barlow, *Proc. Linn. Soc. New South Wales* 88: 141, fig. 1e–g (1963)**

*Loranthus subfalcatus* Hook., in T. L. Mitchell, *J. Exped. Trop. Austral.* 224 (1848); *Loranthus exocarpi* var. *subfalcatus* (Hook.) Domin, *Biblioth. Bot.* 89: 53 (1921). T: subtropical New Holland, July–Sept. 1846, *T. L. Mitchell 213*; *lecto: K, fide B. A. Barlow, Austral. J. Bot.* 14: 446 (1966); *iso: MEL.*

*Loranthus exocarpi* f. *breviflorus* Domin, *Biblioth. Bot.* 89: 53 (1921). T: E of Jericho, Qld, 1910, *K. Domin s.n.*; *n.v.*

*Loranthus exocarpi* var. *venulosa* Blakely, *Proc. Linn. Soc. New South Wales* 50: 9, t. 5c (1925). T: Cobar, N.S.W., May 1918, *J. L. Boorman s.n.*; *holo: NSW.*

Plant spreading to pendulous. Leaves flat, oblanceolate, acute to rounded; lamina 2–11 cm long, 4–20 mm wide, attenuate at base into petiole 5–10 mm long; venation distinct with 2–4 lateral veins nearly as distinct as midrib. Inflorescence a pedunculate 2-flowered



76. *Atkinsonia ligustrina*  
 79. *Amylothecha subumbellata*  
 82. *Decaisnina petiolata*  
 subsp. *petiolata*  
 85. *Decaisnina signata*  
 subsp. *cardiophylla*  
 88. *Decaisnina biangulata*

77. *Nuytsia floribunda*  
 80. *Decaisnina hollrungii*  
 83. *Decaisnina petiolata*  
 subsp. *angustata*  
 86. *Decaisnina brittenii*  
 subsp. *brittenii*  
 89. *Lysiana spathulata*  
 subsp. *spathulata*

78. *Amylothecha dictyophleba*  
 81. *Decaisnina congesta*  
 84. *Decaisnina signata*  
 subsp. *signata*  
 87. *Decaisnina brittenii*  
 subsp. *speciosa*  
 90. *Lysiana spathulata*  
 subsp. *parvifolia*

umbel; peduncle 1–3 mm long; pedicels 3–7 mm long; bracts 1–1.5 mm long, acute to rounded. Calyx variable, usually c. 1 mm long and 6-lobed. Corolla in mature bud 25–50 mm long, usually red, rarely yellow, sometimes tipped with green or black. Anthers not septate. Style articulate 0–0.5 mm above base. Fruit ellipsoidal to pear-shaped, 8–14 mm long, usually pale and somewhat translucent. Fig. 22A–B.

Occurs in all mainland States except Vic., mostly in northern regions from Shark Bay to Brisbane, in open forest and woodland on a wide range of hosts but locally common on *Lysiphyllum*, *Atalaya*, *Heterodendrum*, *Santalum*, *Acacia* and Casuarinaceae. Map 93.

W.A.: Halls Creek, C. A. Gardner 9703 (PERTH). N.T.: Muggs Mistake, McArthur R., L. A. Craven 4000 (A, CANB, L, NT). Qld: c. 5 km E of Barcaldine, J. R. Clarkson 231 (BRI, CANB). N.S.W.: c. 40 km SE of Louth, C. W. E. Moore 8028 (CANB).

#### 4. *Lysiana maritima* (Barlow) Barlow, *Brunonia* 5: 207 (1983)

*Lysiana subfalcatata* subsp. *maritima* Barlow, *Proc. Linn. Soc. New South Wales* 88: 143, fig. 1h–i (1963). T: 10 miles (16 km) S of Gladstone, Qld, 7 Apr. 1961, B. A. Barlow 248; holotype: BRI; isotype: AD.

Plant erect to spreading; branches divaricate. Leaves flat, obovate to broadly spathulate, rounded at apex; lamina 2–4 cm long, 12–22 mm wide, attenuate at base into obscure petiole 2–4 mm long; venation distinct. Inflorescence a pedunculate 2-flowered umbel; peduncle 2–5 mm long; pedicels 4–8 mm long; bracts c. 2 mm long, rounded at apex, concave. Calyx c. 1 mm long, weakly 6-toothed or 6-lobed. Corolla in mature bud 30–45 mm long, red. Anthers not septate. Style articulate 0.5–1 mm above base. Fruit ellipsoidal, 8–10 mm long, more or less translucent.

Endemic in Qld from the Gulf of Carpentaria to Wide Bay, in mangrove communities on *Ceriops* and *Rhizophora*, occasionally on adjacent Casuarinaceae and *Myoporum*. Map 94.

Qld: 19 km S of Mossman, B. A. Barlow 132 (BRIU); 32 km SE of Karumba, B. A. Barlow 321 (BRIU).

#### 5. *Lysiana casuarinae* (Miq.) Tieghem, *Bull. Soc. Bot. France* 41: 601 (1894)

*Loranthus casuarinae* Miq., in Lehm., *Pl. Preiss.* 1: 279 (1845); *Elytranthe casuarinae* (Miq.) Engl., *Nat. Pflanzenfam. Nachtr.* 1 to 3(1): 126 (1897). T: plain beyond Perth, W.A., 13 May 1839, L. Preiss 1615; isotype: MEL.

[*Loranthus linophyllus* auct. non Fenzl: G. Bentham, *Fl. Austral.* 3: 394 (1866)]

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 50: t. 3 (1925) as *Loranthus casuarinae*.

Plant pendulous. Leaves terete, shortly mucronate, 4.5–9 cm long, 0.7–1.5 mm diam., slightly enlarged at base. Inflorescence a pedunculate 2-flowered umbel; peduncle 1–3 mm long; pedicels 5–12 mm long; bracts triangular, 1–2 mm long, rounded or acute. Calyx 1 mm long, weakly toothed. Corolla in mature bud 35–50 mm long, red. Anthers not septate. Style articulate at base. Fruit ovoid, 8–10 mm long, red or black.

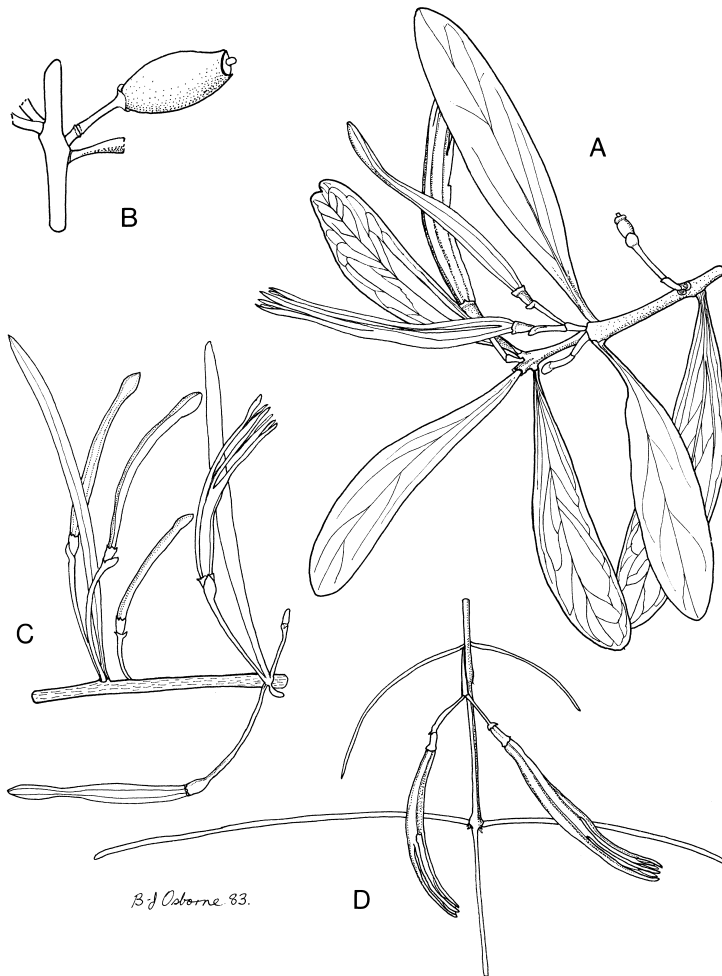
Endemic in W.A. from the Hamersley Range to Norseman, in semi-arid woodlands on various trees but frequently on Casuarinaceae, *Acacia*, *Exocarpos*. Map 95.

W.A.: NW of Wittenoom Gorge, Sept. 1957, K. Stewart (PERTH); Peak Charles, 20 May 1956, A. R. Main (PERTH).

#### 6. *Lysiana filifolia* Barlow, *Brunonia* 5: 206 (1983)

T: Dry River, Silver Valley Road, North Kennedy District, 17°27'S, 145°18'E, Qld, 16 Mar. 1980, B. Gray 1672; holotype: QRS; isotype: CANB, QRS.

Plant pendulous. Leaves terete, obtuse, 10–20 cm long, 1 mm diam., scarcely enlarged at base. Inflorescence a pedunculate 2-flowered umbel; peduncle 1–2 mm long; pedicels 6–8 mm long; bracts 1.5 mm long, forming a membranous rounded cupule at base of each flower. Calyx 0.7 mm long, weakly lobed. Corolla in mature bud c. 30 mm long, orange



**Figure 22.** *Lysiana*. **A–B**, *L. subfalcata*. **A**, flowering branchlet  $\times 1$ ; **B**, fruit  $\times 3$  (**A–B**, L. Craven 4000, CANB). **C**, *L. murrayi*, flowering branchlet  $\times 1$  (G. Carr 2418, CANB). **D**, *L. linearifolia*, flowering branchlet  $\times 1$  (B. Gray 1672, CANB).

or red. Anthers not septate. Style articulate c. 0.5 mm above base, leaving a conical nipple on fruit. Fruit not known mature.

Endemic in Qld, as possibly disjunct occurrences in the Stannary Hills and Blackdown Tableland areas. in open forest, parasitic on Casuarinaceae. Map 96.

Qld: Wolfram Camp, 20 July 1968, *M. L. Cassels* (QRS); Blackdown Tableland, *Pearson 45* (BRI).

### 7. *Lysiana linearifolia* Tieghem, *Bull. Soc. Bot. France* 41: 603 (1894)

*Loranthus linearifolius* Hook., in T. L. Mitchell, *J. Exped. Trop. Austral.* 102 (1848), non Bert. (1833); *Loranthus mitchellianus* Blakely, *Proc. Linn. Soc. New South Wales* 50: 4, t. 2 (1925). T: Narran R., subtropical New Holland, *T. L. Mitchell* 57; holo: K; iso: MEL.

Illustration: W. F. Blakely, *loc.cit.* as *Loranthus mitchellianus*; B. A. Barlow, *Proc. Linn. Soc. New South Wales* 88: 146, fig. 3i-l (1963).

Plant pendulous. Leaves terete, shortly mucronate, 3–12 cm long, 0.5–1.2 mm diam., scarcely enlarged at base. Inflorescence a pedunculate 2-flowered umbel; peduncle 6–15 mm long, slightly flattened at apex; pedicels 6–20 mm long, angular; bracts c. 1 mm long, acute. Calyx 0.5 mm long, obtusely 6-toothed. Corolla in mature bud 20–25 mm long, red below, yellow or green above. Anthers not septate. Style articulate 1–3 mm above base, leaving a conical nipple on fruit. Fruit ellipsoidal, 10–12 mm long. Fig. 22D.

Occurs in Qld and N.S.W. from the Mitchell District to Nyngan in open semi-arid woodland on various hosts but frequently on *Flindersia*, *Eremophila*, *Acacia*. Map 97.

Qld: 53 km NW of Longreach, *D. Davidson* 67 (BRI, BRIU). N.S.W.: Nyngan, June 1922, *E. C. Chisholm* (NSW).

### 8. *Lysiana murrayi* (F. Muell. & Tate) Tieghem, *Bull. Soc. Bot. France* 41: 603 (1894)

*Loranthus murrayi* F. Muell. & Tate, *Trans. Roy. Soc. S. Austral.* 6: 109 (1883); *Elytranthe murrayi* (F. Muell. & Tate) Engl., *Nat. Pflanzenfam. Nachtr.* I to 3(1): 126 (1897). T: Idyaka, near Leigh Creek, S.A., 2 Sept. 1883, *M. Murray* & *R. Tate s.n.*; holo: AD.

*Loranthus miniatus* S. Moore, *J. Bot.* 35: 170 (1897); *Loranthus murrayi* var. *parviflorus* S. Moore, *J. Linn. Soc. Bot.* 34: 225 (1899); *Lysiana miniata* (S. Moore) Danser, *Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk., Tweede Sect.* 29: 91 (1933). T: Near Goose Soak and Kilkenny Soak, W.A., June 1895, *S. Moore s.n.*; holo: BM.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 50: t. 1 (1925) as *Loranthus murrayi*.

Plant erect or spreading. Leaves flat and linear to narrowly lanceolate or oblanceolate, or semiterete and channelled above, acute, 2.5–6 cm long, 1–3.5 mm wide, without distinct petiole; venation not visible. Inflorescence a solitary flower or pair of flowers without a common peduncle; pedicels 8–20 mm long, dilated and strongly winged towards apex; bracts 2–3 mm long, spreading, membranous, rounded at apex. Calyx c. 1 mm long, entire or irregularly toothed. Corolla in mature bud usually 18–28 mm long, white, yellow or pink. Anthers not septate. Style articulate almost at base. Fruit globose, 7–12 mm long, pink or red.  $2n = 24$ , *vide* B. A. Barlow & D. Wiens, *Taxon* 20: 291 (1971). Fig. 22C.

Occurs in all mainland States except Vic., from the Ashburton R., W.A., to the Western Plains of N.S.W. and Qld, in arid and semi-arid woodland nearly always on *Acacia* (especially *A. aneura*). Map 98.

W.A.: Minnie Creek, 30 Aug. 1935, *N. B. Tindale* (PERTH). N.T.: Pine Hill, 23 Aug. 1936, *J. B. Cleland* (AD). S.A.: Woomera, 25 July 1948, *A. H. Patterson* (ADW). Qld: Near Charleville, 25 Aug. 1923, *W. MacGillivray* (ADW, BRI, NSW). N.S.W.: Rowena Tank, 8 km from Mootwingee Hills, Oct. 1921, *A. Morris* (BRI, NSW).

## 6. MUELLERINA

*Muellerina* Tieghem, *Bull. Soc. Bot. France* 42: 25 (1895), after Ferdinand Mueller (1825–1896), pioneering and prodigious Australian botanist

Type: *Muellerina celastroides* (Sieber ex Schultes & J. H. Schultes) Tieghem

Aerial stem-parasitic shrubs, erect to pendulous, glabrous or nearly so; epicortical runners present. Leaves opposite, flat, penninerved or curvinerved. Inflorescence terminal, a raceme of 1–6 decussate pairs of pedunculate triads or single flowers (i.e. sometimes a simple raceme or umbel); triads with central flower sessile and lateral flowers pedicellate; bract 1 under each flower. Corolla 5-merous, curved in bud; petals free, green shading to red or purple above. Stamens unequal; anthers dorsifixed, versatile, 4-locular.  $x = 11$  (3 species studied), *vide* B. A. Barlow & D. Wiens, *Taxon* 20: 291 (1971).

A genus of four species endemic in Australia, occurring in open and closed forest, mostly in the more mesic parts of SE Australia. A primitive and relictual genus which appears to have no close relatives.

B. A. Barlow & D. Wiens, *Muellerina*, *Brittonia* 25: 30 (1973).

1. Inflorescence a 2-flowered simple umbel

2. Leaves linear to narrowly oblanceolate

4. *M. bidwillii*

2: Leaves elliptic or ovate

3. *M. myrtifolia*

1: Inflorescence a raceme of at least 3 pairs of single flowers or of 1 or more pairs of triads

3. Stems pendulous; leaves linear to lanceolate or oblong, usually more than 8 cm long, acute, more or less curvinerved; usually on *Eucalyptus*

2. *M. eucalyptoides*

3: Stems spreading; leaves oblong to orbicular, usually less than 8 cm long, rounded, more or less penninerved; usually not on *Eucalyptus*

1. *M. celastroides*

**1. *Muellerina celastroides*** (Sieber ex Schultes & J. H. Schultes) Tieghem, *Bull. Soc. Bot. France* 42: 25 (1895)

*Loranthus celastroides* Sieber ex Schultes & J. H. Schultes, *Syst. Veg.* 7: 163 (1829); *Dendrophthoe celastroides* (Sieber ex Schultes & J. H. Schultes) Mart., *Flora* 13: 110 (1830); *Phrygilanthus celastroides* (Sieber ex Schultes & J. H. Schultes) Eichler, in C. Martius, *Fl. Brasil.* 5(2): 48 (1868), *nom. illeg.*; *Loranthus celastroides* var. *typicus* Domin, *Biblioth. Bot.* 89: 50 (1921), *nom. illeg.* T: New Holland (N.S.W.), *F. Sieber* 244; holo: G; iso: K, MEL.

*Loranthus tenuiflorus* J. D. Hook., *Fl. Nov. Zeland.* 1: 100 (1853); *Hookerella tenuiflora* (J. D. Hook.) Tieghem, *Bull. Soc. Bot. France* 42: 25 (1895); *Phrygilanthus tenuiflorus* (J. D. Hook.) Engl., *Nat. Pflanzenfam. Nachtr.* 1 to 3(1): 134 (1897), *nom. illeg.* T: ?New Zealand, without locality, ?W. Colenso *s.n.*; holo: K (possibly collected in Australia).

*Loranthus maytenifolius* A. Gray, *U.S. Expl. Exped. Bot.* 1: 739, t. 99 (1854); *Amyema maytenifolium* (A. Gray) Tieghem, *Bull. Soc. Bot. France* 41: 507 (1894) *p.p.*, except stamens which are from an undetermined genus. T: Wollongong, N.S.W., *collector unknown*; *n.v.*

*Loranthus raoulii* Tieghem, *Bull. Soc. Bot. France* 42: 25 (1895); *Muellerina raoulii* (Tieghem) Tieghem, *Bull. Soc. Bot. France* 42: 26 (1895); *Phrygilanthus raoulii* (Tieghem) Engl., *Nat. Pflanzenfam. Nachtr.* 1 to 3(1): 134 (1897), *nom. illeg.* T: ?Bay of Islands, New Zealand, 1834, *M. Raoul s.n.*; holo: P (possibly collected near Sydney, Australia).

Illustrations: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 47: t. 30 (1922) as *Phrygilanthus celastroides*; B. A. Barlow, *Austral. J. Bot.* 14: 467, fig. 7b–c (1966).

Plant erect or spreading, glabrous except the inflorescence axes minutely brown-tomentose. Leaves elliptic to oblong, rounded or obtuse; lamina 2.5–7 cm long, 15–25 mm wide, attenuate at base into obscure petiole 3–8 mm long; venation pinnate, indistinct. Inflorescence a raceme of 1–3 pairs of triads; axis 5–20 mm long; peduncles of triads 5–7 mm long; pedicels of lateral flowers 3–6 mm long; bracts narrowly triangular, 1.5–2 mm long. Calyx entire, 0.7–1 mm long. Corolla in mature bud 22–35 mm long.

Anthers c. 1.5 mm long; free part of filament 8–13 mm long. Fruit pear-shaped, 7–11 mm long, green grading to light red.

Occurs in E Australia from Noosa, Qld, to the Lakes District, Vic., in open and closed forests of the coast and ranges on various hosts but commonly on Casuarinaceae and *Banksia*. See note on hybridisation under *Muellerina eucalyptoides* (DC.) Barlow. Map 99.

Qld: Noosa, A. B. Cribb (BRIU). N.S.W.: Fingal, B. A. Barlow 194 & 196 & 668 (BRIU); Shoalhaven Head 8 km SE of Berry, H. Salasoo 3088 (NSW). Vic.: Lake King, May 1855, F. Mueller (MEL).

## 2. *Muellerina eucalyptoides* (DC.) Barlow, *Proc. Linn. Soc. New South Wales* 87: 55 (1962)

*Loranthus eucalyptoides* DC., *Prodr.* 4: 318 (1830); *Dendrophthoe eucalyptoides* (DC.) Ettingsh., *Denks. Akad. Wiss. Math.-Nat.* 32: 67 (1872); *Phrygilanthus eucalyptoides* (DC.) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 348 (1929), *nom. illeg.* T: New Holland, F. Sieber 242; holo: G; iso: K, MEL.

*Loranthus eucalyptifolius* Sieber ex Schultes & J. H. Schultes, *Syst. Veg.* 7(1): 163 (1829), *non* Kunth (1820); *Phrygilanthus eucalyptifolius* (Sieber ex Schultes & J. H. Schultes) Eichler, in C. Martius, *Fl. Brasil.* 5(2): 48 (1868), *nom. illeg.*; *Muellerina eucalyptifolia* (Sieber ex Schultes & J. H. Schultes) Tieghem, *Bull. Soc. Bot. France* 42: 25 (1895); *Loranthus celastroides* var. *eucalyptifolius* (Sieber ex Schultes & J. H. Schultes) Domin, *Biblioth. Bot.* 89: 606 (1921). T: New Holland, F. Sieber 242; holo: G; iso: K, MEL.

[*Loranthus celastroides* auct. *non* Sieber ex Schultes & J. H. Schultes: G. Bentham, *Fl. Austral.* 3: 389 (1867), *p.p.*]

Illustrations: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 47: t. 29 (1922) as *Phrygilanthus eucalyptifolius*.

Plant spreading to pendulous, glabrous. Leaves linear to lanceolate or oblong, attenuate and usually acute; lamina 8–20 cm long, 7–20 mm wide, attenuate at base into petiole 1–3 cm long, curvined, the veins indistinct. Inflorescence a raceme of usually 4 or 5 pairs of triads or single flowers; axis 12–35 mm long; peduncles of triads 5–9 mm long; lateral flowers (when present) with pedicels 4–6 mm long; bracts narrowly triangular, 1 mm long. Calyx entire, 0.7 mm long. Corolla in mature bud 30–45 mm long. Anthers 2–2.5 mm long; free part of filament 8–12 mm long. Fruit pear-shaped, 8–15 mm long, becoming yellow. Fig. 23A–B.

Occurs in S.A., Qld, N.S.W. and Vic., from Mt Gambier to Kingaroy in open forest of the coast, ranges and slopes; usually on *Eucalyptus* but also on various other hosts including exotic tree species. Map 100.

S.A.: Cape Banks, 27 Feb. 1945, J. B. Cleland (AD). Qld: Boyne R. SW of Kingaroy, B. A. Barlow 35 (BRIU). N.S.W.: Cox Gap, Kerrabee, Apr. 1953, L. A. S. Johnson (NSW). Vic.: Mentone, 8 Feb. 1915, J. R. Tovey (MEL).

Connected to *M. celastroides* by a range of intermediates which are possibly hybrids and which often occur on exotic trees.

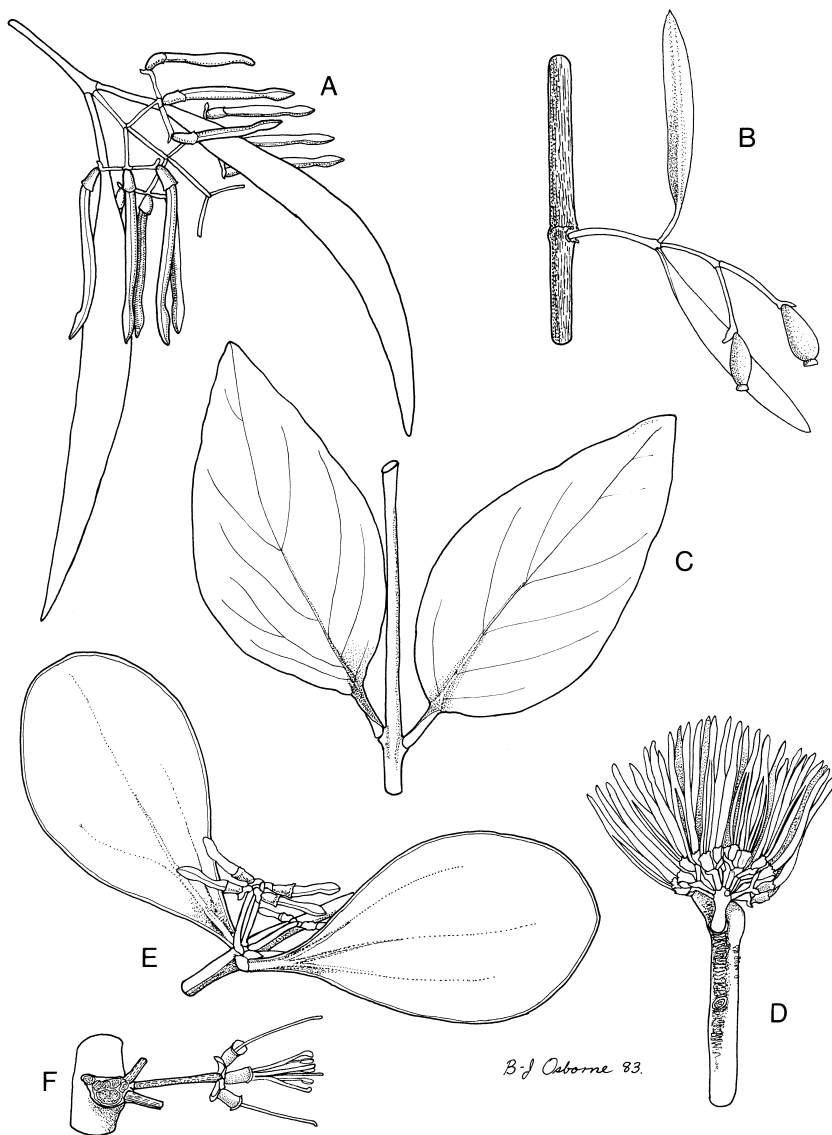
## 3. *Muellerina myrtifolia* (Cunn. ex Benth.) Barlow, *Proc. Linn. Soc. New South Wales* 87: 55 (1962)

*Loranthus myrtifolius* A. Cunn. ex Benth., *Fl. Austral.* 3: 390 (1867); *Phrygilanthus myrtifolius* (Cunn. ex Benth.) Eichler, in C. Martius, *Fl. Brasil.* 5(2): 48 (1868); *Furcilla myrtifolia* (Cunn. ex Benth.) Tieghem, *Bull. Soc. Bot. France* 42: 85, 87 (1895). T: Logan Vale, Qld, June 1827, A. Cunningham 12; holo: K.

Illustration: F. M. Bailey, *Queensland Fl.* 5: t. 63 (1902) as *Loranthus myrtifolius*; W. F. Blakely, *Proc. Linn. Soc. New South Wales* 47: t. 31 (1922) as *Phrygilanthus myrtifolius*.

Plant erect or spreading, glabrous. Leaves elliptic to ovate, obtuse; lamina 1.5–2.5 cm long, 8–12 mm wide, cordate and sessile at base; venation pinnate, the midrib and major lateral veins distinct. Inflorescence a 2-flowered simple umbel; peduncle 5–10 mm long; pedicels 6–10 mm long, angular towards apex; bracts narrowly triangular, 1 mm long. Calyx entire, 0.5 mm long. Corolla in mature bud 20–25 mm long. Anthers 1–1.5 mm long; free part of filament 8–11 mm long. Fruit unknown.





**Figure 23.** A–B, *Muellerina*. **A**, *M. eucalyptoides*, flowering branchlet  $\times 0.7$  (Grose R., N.S.W., R. Brown, CANB); **B**, *M. bidwillii*, fruiting branchlet  $\times 1.5$  (R. Story 7580, CANB). C–D, *Dactylophora novaeguineae*. **C**, leaves  $\times 0.5$ ; **D**, inflorescence  $\times 0.5$  (C–D, B. Barlow 3700, CANB). E–F, *Ceccaria obtusifolia*. **E**, leaves and inflorescence  $\times 0.7$ ; **F**, triad, 1 flower of upper pair missing, corolla of lateral flowers fallen,  $\times 1.5$  (E–F, B. Hyland 10884, CANB).

Restricted to the SE Darling Downs, Qld, and Macpherson Range, Qld/N.S.W.; in mesic forest on *Croton*, *Parsonsia* and *Pandorea*; apparently rare. Map 101.

Qld: Gladfield, 1890, *F. M. Bailey* (BRI, NSW); Killarney, near border gate, *B. A. Barlow 676 & 679* (BRIU). N.S.W.: Acacia Creek via Killarney, Jan. 1906, *W. Dunn* (NSW).

**4. *Muellerina bidwillii* (Benth.) Barlow, *Proc. Linn. Soc. New South Wales* 87: 53 (1962)**

*Loranthus bidwillii* Benth., *Fl. Austral.* 3: 390 (1867); *Phrygilanthus bidwillii* (Benth.) Eichler, in *C. Martius, Fl. Brasil.* 5(2): 48 (1868); *Furcilla bidwillii* (Benth.) Tieghem, *Bull. Soc. Bot. France* 42: 85, 87 (1895). T: Wide Bay, Qld, *J. Bidwill s.n.*; holotype: K.

Illustrations: *F. M. Bailey, Queensland Fl.* 5: t. 62 (1902) as *Loranthus bidwillii*; *W. F. Blakely, Proc. Linn. Soc. New South Wales* 47: t. 32 (1922) as *Phrygilanthus bidwillii*.

Plant erect to spreading, glabrous or with a few scattered hairs on inflorescence axes. Leaves linear to oblanceolate, rounded at apex; lamina usually 1.5–3 cm long and 1.5–3 mm wide, attenuate at base into obscure petiole c. 2 mm long; venation obscure. Inflorescence a 2-flowered simple umbel; peduncle 3–6 mm long; pedicels 5–7 mm long. Calyx entire, 0.5 mm long. Corolla in mature bud 20–27 mm long. Anthers 1–1.5 mm long; free part of filament 8–10 mm long. Fruit pear-shaped to globose, 6–8 mm long, pink or red. Fig. 23B.

Occurs from Wide Bay, Qld, to A.C.T., in open forest and woodland, exclusively on *Callitris*. Map 102.

Qld: 3 km N of Miles, *N. J. Martin 139* (AD). N.S.W.: Nepheline Mt 19 km SSE of Wollar, *R. Story 7580* (CANB, NSW). A.C.T.: ridge above Murrumbidgee R. near Cotter Junction, *H. S. McKee 9672* (NSW).

## 7. CECARRIA

*Cecarria* Barlow in Barlow & Wiens, *Brittonia* 25: 34 (1973), after Cedric Errol Carr (1892–1936), pioneering New Guinea botanist

Type: *C. obtusifolia* (Merr.) Barlow

Aerial stem-parasitic shrubs, erect or spreading; epicortical runners present. Leaves opposite, curvined. Inflorescence axillary, a 2-flowered umbel or a 4-flowered raceme or spike; bract 1 under each flower. Corolla regular; petals 6, free. Stamens nearly equal; anthers dorsifixed, versatile, 4-locular.  $x = 9$ , *vide* B. A. Barlow & D. Wiens, *Brittonia* 25: 26, 34 (1973).

A monotypic genus in the Philippines, New Guinea, Solomon Islands and in Cape York Peninsula, Qld. The genus is thought to be a relictual Gondwanan entity.

B. A. Barlow & D. Wiens, *Cecarria*, *Brittonia* 25: 26 (1973); B. A. Barlow, *Cecarria*, *Austral. J. Bot.* 22: 556 (1974); B. A. Barlow, Biogeography of Loranthaceae and Viscaceae, in D. M. Calder, *Biology of Mistletoes*, Academic Press (1983).

**1. *Cecarria obtusifolia* (Merr.) Barlow in Barlow & Wiens, *Brittonia* 25: 34 (1973)**

*Phrygilanthus obtusifolius* Merr., *Philipp. J. Sci.* 1: suppl. 189 (1906); *Muellerina obtusifolia* (Merr.) Barlow, *Proc. Linn. Soc. New South Wales* 87: 60 (1962). T: Lamao R., Mt Mariveles, Bataan, Luzon, Philippines, May 1904, *Whitford 134*; syn: NSW.

Illustration: B. A. Barlow, *Austral. J. Bot.* 22: 542, fig. 1 (1974).

Plant erect or spreading, glabrous. Leaves obovate to broadly obovate, rounded at apex; lamina 30–55 mm long, 20–45 wide, attenuate at base into obscure petiole 2–6 mm long. Peduncle 6–9 mm long, up to 20 mm when inflorescence a raceme; pedicels 0–3 mm long; bracts nearly orbicular, 1 mm long. Calyx entire, 0.5–1 mm long. Corolla in mature bud 10–14 mm long, slightly clavate, ivory-white. Anthers ovoid, 1.5 mm long, with a

short sterile tip; free part of filament c. 2 mm long. Fruit almost globose, c. 8 mm long. Fig. 23E–F.

In Australia occurs in the McIlwraith Ra. area, Qld, in rainforest; parasitic on *Syzygium* and *Xanthostemon*. Map 103.

Qld: Timber Reserve 14, Kesteven (13°44'S, 143°20'E), *B. Hyland 11149* (QRS); Timber Reserve 14, Massy, *B. Hyland 10884* (CANB, QRS).

## 8. DACTYLIOPHORA

*Dactyliophora* Tieghem, *Bull. Soc. Bot. France* 41: 549 (1894), from the Greek *dactylos* (finger), and *phoros* (bearing), in reference to the inflorescence axis with its numerous peduncles

Type: *D. verticillata* (Scheffer) Tieghem

Aerial stem-parasitic shrubs, erect or spreading; epicortical runners present. Leaves opposite or ternate; lamina entire, penninerved. Inflorescences lateral, borne on stems or runners, of 1–4 whorls of triads; bract 1 under each flower. Petals usually 6, free. Anthers basifixed, immobile, 4-locular.  $x = 9$ , *fide* B. A. Barlow & D. Wiens, *Taxon* 20: 291 (1971).

A genus of 3 species in Papuasias. One species extends to Cape York Peninsula, Qld. Closely related and perhaps ancestral to the large Papuasian/Australian genus *Amyema*.

B. A. Barlow, *Dactyliophora*, *Austral. J. Bot.* 22: 558 (1974); B. A. Barlow, *Dactyliophora*, *Brunonia* 5: 207–208 (1983).

### 1. *Dactyliophora novaeguineae* (Bailey) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 307 (1929)

*Loranthus novaeguineae* Bailey, *Contr. Fl. New Guinea* reimpr. ex *Rep. Brit. New Guinea* 3 (1902). T: Poiana, Goodenough Is., New Guinea, *Le Hunte*; holotype: BRI.

Illustrations: B.H. Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 11: 359, fig. 14 (1931); B. A. Barlow, *Austral. J. Bot.* 22: 542, fig. 1 (1974).

Plant spreading, glabrous except inflorescence shortly brown-tomentose. Leaves opposite, ovate; apex rounded or obtuse; lamina 8–12 cm long, 4–7 cm wide, attenuate or contracted at base into distinct petiole 8–20 mm long. Inflorescence axis 12–35 mm long, 2–3 mm thick, usually with 2 or 3 nodes above the first, the internodes becoming shorter upwards; triads 8–12 at first node, 8–10 at second node, 4–10 at third node; peduncles of triads 5–8 mm long; central flower sessile; pedicels of laterals 2 mm long; bracts 1 mm long, acute. Calyx entire, 0.5 mm long. Corolla in mature bud slender, 25–36 mm long, acute, red. Anthers 4–6 mm long, slightly longer than free part of filament. Fruit ellipsoidal, c. 8 mm long. Fig. 23C–D.

Recorded only near Portland Roads, Qld, in dry rainforest on *Mallotus* and several other hosts. Also in New Guinea, from Vogelkop to Milne Bay. Map 104.

Qld: Portland Roads, 14 July 1968, *T. H. Guthrie* (AD); Portland Roads, *B. A. Barlow 3703* (CANB, QRS); Granite Ridge 2 km W of Tozer Gap, *B. A. Barlow 3709* (CANB, QRS).

## 9. AMYEMA

*Amyema* Tieghem, *Bull. Soc. Bot. France* 41: 499, 506 (1894), from the Greek *a* (negative), and *myeo* (I initiate), in reference to a genus not previously recognised, note also the Greek *amyema* (neuter - those not yet initiated)

*Loranthus* sect. *Amyema* (Tieghem) Engl., *Nat. Pflanzenfam.* Nachtr. I to 3(1): 127 (1897). T: *A. congener* (Sieber ex Schultes & J. H. Schultes) Tieghem

*Pilostigma* Tieghem, *Bull. Soc. Bot. France* 41: 488 (1894); *Loranthus* sect. *Pilostigma* (Tieghem) Engl., *Nat. Pflanzenfam. Nachtr.* I to 3(1): 128 (1897). T: *P. sanguineum* (F. Muell.) Tieghem

*Xylochlamys* Domin, *Biblioth. Bot.* 89: 56 (1921). T: *X. queenslandica* Domin.

Aerial stem-parasitic shrubs, erect to pendulous; epicortical runners present or absent. Leaves usually opposite, rarely displaced-opposite or verticillate, entire, usually curvinnerved in Australian spp. Inflorescence axillary, basically a pedunculate umbel of triads but variously reduced in some species, especially to a simple umbel or a head; rays of umbel 2 to several, usually strongly divergent; bract usually 1 under each flower. Petals usually 4–6, free in Australian spp. Anthers basifixed, immobile, 2- or 4-locular.  $x = 9$  (32 taxa counted), *vide* B. A. Barlow & D. Wiens, *Taxon* 20: 291 (1971).

A genus of c. 100 species, extending from Malaya and the Philippines to Australia and the western Pacific, with the greatest numbers of species in Australia and New Guinea. Of the 36 spp. in Australia, 32 are endemic. Many Australian species show a close visual resemblance to their hosts, and mimicry has been suggested.

S. G. Hamilton & B. A. Barlow, Studies in Australian Loranthaceae. II. Attachment Structures and their Interrelationships. *Proc. Linn. Soc. New South Wales* 88: 74–90 (1963); B. A. Barlow & D. Wiens, Host-parasite resemblance in Australian mistletoes: the case for cryptic mimicry, *Evolution* 31: 69 (1977).

- 1 Leaves terete
- 2 Flowers in dyads; petals usually 4; free part of filament shorter than anther; hosts *Hakea*, *Grevillea* **22. A. gibberula**
- 2: Flowers in triads; petals usually 5; free part of filament longer than anther
- 3 Central flower of triad pedicellate; hosts *Melaleuca*, *Calytrix*, *Baeckea* **18. A. tridactyla**
- 3: Central flower of triad sessile
- 4 Inflorescence tomentose; host Casuarinaceae
- 5 Indumentum of corolla short, grey; fruit almost glabrous, pink; corolla very slender in bud **20. A. cambagei**
- 5: Indumentum of corolla long, white or pale brown; fruit tomentose, white; corolla robust in bud **21. A. linophylla**
- 4: Inflorescence glabrous
- 6 Leaves 5–8 mm long; host *Melaleuca* **17. A. microphylla**
- 6: Leaves 20–80 mm long; hosts *Acacia*, *Cassia* **19. A. preissii**
- 1: Leaves flat
- 7 Inflorescence a pedunculate simple umbel
- 8 Leaves verticillate; hosts rainforest trees **34. A. quaternifolia**
- 8: Leaves opposite (sometimes displaced-opposite and appearing alternate)
- 9 Umbel 3–6-flowered; hosts *Eucalyptus*, *Melaleuca* **33. A. sanguinea**
- 9: Umbel 2-flowered; hosts rainforest trees
- 10 Leaves penninerved, mostly rounded at apex; peduncle more than 1 mm thick; corolla in mature bud robust, obtuse, longitudinally ribbed or angled **35. A. whitei**
- 10: Leaves curvinnerved, mostly acuminate; peduncle less than 1 mm thick; corolla in mature bud thin, slender, acute, not longitudinally ribbed or angled **36. A. seemeniana**
- 7: Inflorescence an umbel of dyads, triads or tetrads, or contracted to a pedunculate head
- 11 Inflorescence a pedunculate head of 3–6 sessile flowers; host *Acacia*

- 12 Flowers in a single group of 3–5, the central flower ebracteate, lateral flowers bracteate **32. A. fitzgeraldii**
- 12: Flowers in 2 opposite triads
- 13 Lateral flowers of triad sessile **31. A. maidenii**
- 13: Lateral flowers of triad shortly pedicellate **30. A. subcapitata**
- 11: Inflorescence an umbel of 2 or more dyads, triads or tetrads
- 14 Flowers in dyads; host *Eucalyptus*
- 15 Corolla robust, rusty- or white- tomentose; fruit globular; bract enlarged under fruit **26. A. bifurcatum**
- 15: Corolla slender, glabrous and green at maturity; fruit ovoid; bract not enlarged under fruit **25. A. biniflora**
- 14: Flowers in triads or tetrads
- 16 Leaves less than 7 mm wide; host *Melaleuca*
- 17 Corolla glabrous in bud **15. A. melaleucae**
- 17: Corolla tomentose or with a sparse indumentum in bud
- 18 Corolla less than 15 mm long **16. A. gaudichaudii**
- 18: Corolla more than 15 mm long **14. A. herbertiana**
- 16: Leaves mostly more than 7 mm wide; host not *Melaleuca*
- 19 Rays of umbel 2
- 20 Corolla in mature bud tomentose
- 21 Ovary abruptly widened and then contracted just below calyx; host *Acacia* **27. A. quandang**
- 21: Ovary uniformly cylindrical or funnel-shaped
- 22 Rays 1–3 mm long, not strongly divergent; hosts *Acacia*, *Terminalia* and other spp. **9. A. villiflora**
- 22: Rays more than 5 mm long, strongly divergent; host *Acacia*
- 23 Tomentum golden; leaves more or less penninerved **29. A. nestor**
- 23: Tomentum white; leaves curvinerved **28. A. hilliana**
- 20: Corolla in mature bud glabrous or with a few scattered hairs
- 24 Ovary white- or pale brown-tomentose in lower part, glabrous above
- 25 All flowers of triad sessile; host *Flindersia* **12. A. lucasii**
- 25: Lateral flowers of triad pedicellate, sometimes very shortly so
- 26 Leaves cordate or rounded at base, sessile or minutely petiolate; host usually *Brachychiton* **10. A. benthamii**
- 26: Leaves attenuate or contracted at base, petiolate
- 27 Rays of umbel tomentose; hosts various rainforest or open forest trees **8. A. conspicua**
- 27: Rays of umbel glabrous; host *Acacia* **11. A. dolichopoda**
- 24: Ovary glabrous or with a more or less uniformly sparse indumentum
- 28 Corolla in mature bud ridged or winged longitudinally

- 29 Leaves more than 20 mm wide; pedicels winged; hosts mangroves **6. A. thalassia**
- 29: Leaves less than 20 mm wide; pedicels terete; hosts various, commonly Santalaceae, Loranthaceae **5. A. miraculosa**
- 28: Corolla in mature bud terete or angular but not ridged or winged longitudinally
- 30 Leaves sessile or nearly so, abruptly contracted to cordate at base; rays of umbel not strongly divergent; buds acute; hosts rainforest trees, rarely mangroves **7. A. glabra**
- 30: Leaves attenuate or contracted at base into a distinct petiole 3–6 mm long; rays of umbel strongly divergent; buds obtuse; hosts mangroves **4. A. mackayense**
- 19: Rays of umbel usually more than 2
- 31 All flowers of triad usually pedicellate; hosts *Eucalyptus*, *Acacia* **24. A. miquelii**
- 31: At least central flower of triad or tetrad sessile
- 32 Corolla in mature bud tomentose
- 33 Leaves cordate at base, sessile; hosts monsoon forest trees **13. A. haematodes**
- 33: Leaves attenuate to contracted at base, petiolate
- 34 Triads with all flowers sessile; rays of umbel 5–8; hosts rainforest trees **2. A. friesiana**
- 34: Triads or tetrads with lateral flowers pedicellate; rays of umbel 3–5; hosts *Eucalyptus*, *Acacia* **23. A. pendula**
- 32: Corolla in mature bud glabrous or with a few scattered hairs
- 35 Triads with all flowers sessile; ovary white-tomentose in lower part, glabrous above; host *Flindersia* **12. A. lucasii**
- 35: Triads with lateral flowers pedicellate; ovary glabrous or with uniformly sparse indumentum
- 36 Rays of umbel 5 or more; epicortical runners with secondary haustoria present; hosts rainforest trees **1. A. queenslandica**
- 36: Rays of umbel 4 or fewer; epicortical runners absent
- 37 Corolla in mature bud longitudinally ridged in upper part; hosts various, commonly Santalaceae, Loranthaceae **5. A. miraculosa**
- 37: Corolla in mature bud terete or angular but not ridged longitudinally
- 38 Calyx tomentose; hosts various but usually Casuarinaceae, *Acacia*, *Geijera*, rainforest trees **3. A. congener**
- 38: Calyx glabrous or nearly so; hosts mangroves **4. A. mackayense**

**1. Amyema queenslandica** (Blakely) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 298 (1929)

*Loranthus queenslandicus* Blakely, *Proc. Linn. Soc. New South Wales* 47: 392 (1922), and 48: 130, t. 3 (1923). T: near Herberton, Qld, *S. Dixon s.n.*; holo: NSW.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 48: t. 3 (1923) as *Loranthus queenslandicus*.

Plant erect or spreading, glabrous except a sparse scattered indumentum on inflorescence and young shoots; epicortical runners present. Leaves ovate to orbicular, rounded at apex; lamina 4–8 cm long, 3–6 cm wide, attenuate at base into petiole 5–8 mm long. Inflorescence a pedunculate umbel of triads, the central flower sessile, lateral flowers pedicellate; peduncle robust, 10–25 mm long; rays of umbel c. 6, 6–10 mm long, dilated towards apex; pedicels of lateral flowers 3–4 mm long; bracts erect, concave, thick, c. 3

mm long. Calyx 1.5–2 mm long, truncate, irregularly split. Corolla in mature bud robust, 30–35 mm long, 6-merous, yellow. Anthers 3–4 mm long, equal to free part of filament. Fruit ovoid, c. 8 mm long, contracted into a neck at apex. Fig. 24A.

Endemic in Qld, from Cape York Peninsula to the Atherton Tableland and adjacent coastal districts, in rainforest on a wide range of host trees. Map 105.

Qld: McIlwraith Range, *Sanderson 1226* (QRS); Ellis Beach 18 km N of Cairns, *B. A. Barlow 129* (BRIU); E of Malanda, *B. Hyland AFO/2563* (BRI).

**2. *Amyema friesiana*** (Schumann.) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 295 (1929)

*Loranthus friesianus* Schumann., in Schumann & Lauterbach, *Fl. Deutsch. Schutzgeb. Südsee Nachtr.* 258 (1905). T: Stephansort, New Guinea, 22 Dec. 1898, *Nyman 41*; iso: WRSL.

Plant spreading or pendulous, glabrous except the inflorescence brown- or white-tomentose; epicortical runners present. Leaves lanceolate to broadly ovate, often falcate or oblique, usually acuminate and acute; lamina 6–20 cm long, 3–10 cm wide, contracted at base into petiole 8–30 mm long. Inflorescence a pedunculate umbel of triads; all flowers sessile; peduncle 18–30 mm long, sometimes enlarged and globose at apex; rays of umbel 5–8, 5–10 mm long; bracts 3 at apex of each ray, 1.5–2 mm long, acute, shortly united. Calyx 0.7–1 mm long, entire. Corolla in mature bud slender, 28–35 mm long, 6-merous, slightly clavate, red-brown. Anthers 2.5–3 mm long, longer than free part of filament. Fruit ellipsoidal, c. 10 mm long.

Occurs near Cape York, Qld; widespread in New Guinea, in rainforest from sea level to 2670 m; parasitic on a wide range of host trees. Map 106.

Qld: Between Lockerbie and Somerset, *B. Hyland 11064* (QRS).

**3. *Amyema congener*** (Sieber ex Schultes & J. H. Schultes) Tieghem, *Bull. Soc. Bot. France* 41: 507 (1894)

*Loranthus congener* Sieber ex Schultes & J. H. Schultes, *Syst. Veg.* 7(1): 114 (1829); *Dendrophloe congener* (Sieber ex Schultes & J. H. Schultes) Mart., *Flora* 13: 110 (1830); *Loranthus pendulus* var. *congener* (Sieber ex Schultes & J. H. Schultes) Domin, *Biblioth Bot.* 89: 52 (1921). T: New South Wales, *F. Sieber 243*; iso: BM, G, K.

Plant erect or spreading, glabrous except young vegetative parts and ovary shortly brown- or white-tomentose and sometimes a sparse scattered indumentum on inflorescence axes; epicortical runners absent. Leaves lanceolate or oblanceolate to nearly orbicular, rounded at apex; lamina 3–10 cm long, 1–5.5 cm wide, attenuate or contracted at base into a petiole 3–8 mm long. Inflorescence a pedunculate umbel of triads, the central flower sessile, lateral flowers pedicellate; peduncle slender, 10–35 mm long; rays of umbel 3–5, 5–8 mm long; pedicels of lateral flowers 2–3 mm long, spreading; bracts 1 mm long, usually acute. Calyx 0.7–1 mm long, entire or irregularly split. Corolla 5-merous, in mature bud slender, clavate, acute, 16–35 mm long, green or yellow. Anthers 2–3 mm long, less than half length of free part of filament. Fruit ellipsoidal to nearly globose, c. 8 mm long.

Occurs from Torres Strait islands, Qld, to Merimbula, N.S.W., mainly in coastal districts but reaching 400 km inland in southern Qld, in rainforest and open forest on a wide range of hosts but commonly on Casuarinaceae, *Acacia* and *Geijera*. There are 3 subspecies.

**1** Leaves thin with distinct venation; rays of umbel and flowers spreading; hosts rainforest trees

**3a. subsp. *divergens***

**1:** Leaves thick with obscure venation; rays of umbel incurved, the flowers closely convergent

- 2 Leaves lanceolate to ovate or obovate; lamina usually 4–10 cm long, attenuate at base into obscure petiole; hosts various but commonly Casuarinaceae, *Acacia*, other Loranthaceae **3b. subsp. congener**
- 2: Leaves ovate to nearly orbicular; lamina 2.5–5 cm long, contracted at base into distinct petiole; host usually *Geijera* **3c. subsp. rotundifolium**

**3a. Amyema congener** subsp. **divergens** Barlow, *Brunonia* 5: 208 (1983)

T: between Massy Creek and Rocky River, 13°53'S, 143°28'E, Qld, 20 Feb. 1980, *B. Hyland 10307*; holo: QRS.

Leaves obovate; lamina 3–4.5 cm long, 10–17 mm wide, attenuate at base into obscure petiole 3–4 mm long, thin, with distinct venation. Rays and pedicels spreading, the flowers slightly divergent.

Occurs on Cape York Peninsula, Qld; Parasitic on rainforest trees. Map 107.

Qld: Big Creek, Prince of Wales Island, *E. Cameron 20225* (QRS).

**3b. Amyema congener** (Sieber ex Schultes & J. H. Schultes) Tieghem subsp. **congener**

Leaves lanceolate to ovate or obovate; lamina usually 4–10 cm long and 1–4 (rarely 5.5) cm wide, attenuate at base into petiole 4–8 mm long, leathery, the venation obscure. Rays of umbel and pedicels incurved, the flowers closely convergent. Fig. 24E.

Occurs in coastal and tableland areas from Atherton Tableland, Qld, to Merimbula, N.S.W., mostly in open forest; commonly parasitic on *Acacia* and Casuarinaceae but also frequent on other Loranthaceae and exotic trees. Map 108.

Qld: between Kuranda and Mona Mona, *L. J. Brass 33600* (QRS); Belmont, Bulimba, *S. T. Blake 4858* (BRI, CANB). N.S.W.: Merimbula, *E. D. Briggs 1968* (NSW).

**3c. Amyema congener** subsp. **rotundifolium** Barlow, *Austral. J. Bot.* 14: 462, fig. 6 (1966)

T: Gladfield, Qld, June 1892, *F. M. Bailey s.n.*; holo: NSW.

Leaves ovate to nearly orbicular, leathery; lamina 2.5–5 cm long, 14–35 mm wide, contracted at base into distinct terete petiole 2–8 mm long; venation obscure. Rays of umbel and pedicels incurved; flowers closely convergent.

Occurs in Qld from Townsville to the Darling Downs and Maranoa Districts in semi-arid woodland, almost exclusively on *Geijera parviflora*. Map 109.

Qld: 52 km S of Rockhampton, *B. A. Barlow 114* (BRIU); 49 km E of Roma, *B. A. Barlow 202* (BRIU).

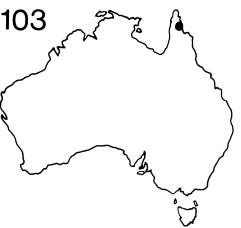
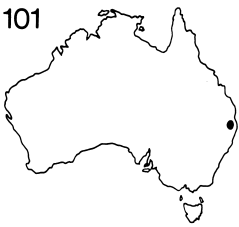
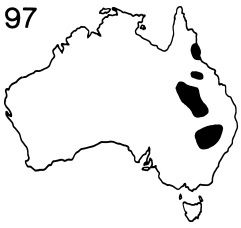
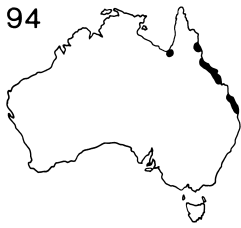
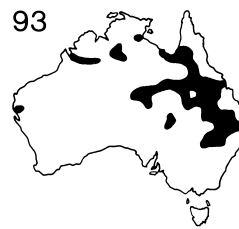
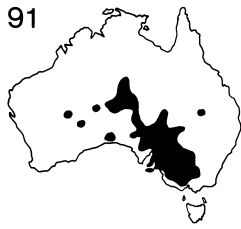
**4. Amyema mackayense** (Blakely) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 297 (1929)

*Loranthus mackayensis* Blakely, *Proc. Linn. Soc. New South Wales* 47: 392 (1922), and 48: 131, t. 4 (1923). T: Mackay, Qld, *H. Tryon s.n.*; holo: NSW.

Plant erect or spreading, glabrous except very rarely with a few scattered brown hairs on calyx; epicortical runners absent. Leaves elliptic to orbicular, rounded; lamina 25–60 mm long, 12–45 mm wide, contracted at base into terete petiole 3–6 mm long. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals pedicellate; peduncle slender, 6–22 mm long, usually deflexed; rays of umbel 3–4 (rarely 2 or 5), 4–10 mm long, spreading; pedicels 2–5 mm long; bracts 1 mm long, acute or truncate. Calyx entire, 0.5–1 mm long. Corolla in mature bud slender, 10–28 mm long, 5-merous, clavate, green or yellow. Anthers 1.5–3 mm long, c. ½–¼ length of free part of filament. Fruit ellipsoidal, c. 6 mm long.

Occurs in W.A., N.T. and Qld in maritime communities, on mangroves. Also found on the S coast of New Guinea. There are 2 subspecies.





91. *Lysiana exocarpi*  
subsp. *exocarpi*

94. *Lysiana maritima*

97. *Lysiana linearifolia*

100. *Muellerina eucalyptoides*

103. *Cecarria obtusifolia*

92. *Lysiana exocarpi*  
subsp. *tenuis*

95. *Lysiana casurinae*

98. *Lysiana murrayi*

101. *Muellerina myrtifolia*

104. *Dactyliophora novaeguineae*

93. *Lysiana subfalcata*

96. *Lysiana filifolia*

99. *Muellerina celastroides*

102. *Muellerina bidwillii*

105. *Amyema queenslandicum*

Peduncle 12–22 mm long; ovary cylindrical to slightly funnel-shaped; corolla 17–28 mm long

**4a. subsp. mackayense**

Peduncle 6–15 mm long; ovary strongly funnel-shaped, contracted just below calyx; corolla 10–20 mm long

**4b. subsp. cycnei-sinus**

**4a. Amyema mackayense** (Blakely) Danser subsp. **mackayense**

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 48: t. 4 (1923) as *Loranthus mackayensis*.

Peduncle 12–22 mm long. Ovary cylindrical to slightly funnel-shaped. Corolla 17–28 mm long.

Occurs in coastal districts from Mackay to Wide Bay, Qld. Map 110.

Qld: Mackay, *B. A. Barlow 156 & 157* (BRIU); Cooloola Sand Hills, Wide Bay, 20 May 1959, *R. F. Thorne* (BRI).

**4b. Amyema mackayense** subsp. **cycnei-sinus** (Blakely) Barlow, *Austral. J. Bot.* 14: 472, fig. 8 (1966)

*Loranthus cycnei-sinus* Blakely, *Proc. Linn. Soc. New South Wales* 47: 392 (1922), and 48: 131, t. 4 (1923); *Amyema cycnei-sinus* (Blakely) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 295 (1929). T: Cygnet Bay, W Kimberley, W.A., Nov. 1906, *W. V. Fitzgerald 1705*; holotype: NSW; isotype: PERTH.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 48: t. 4 (1923) as *Loranthus cycnei-sinus*.

Peduncle 6–15 mm long. Ovary strongly funnel-shaped, contracted just below calyx. Corolla 10–20 mm long.

Occurs in W.A., N.T. and Qld in coastal districts from W Kimberley to Torres Strait islands. Also found in S New Guinea. Map 111.

N.T.: Fanny Bay, Darwin, *B. A. Barlow 500* (AD, BRI, BRIU). Qld: Saibai, *G. C. Stocker 1412* (QRS).

**5. Amyema miraculosum** (Miq.) Tieghem, *Bull. Soc. Bot. France* 42: 83, 84 (1895)

*Loranthus miraculosum* Miq., in Lehm., *Pl. Preiss.* 1: 281 (1845). T: Wicklow, W.A., 18 Mar. 1841, *L. Preiss 1609*; *n.v.*

Plant erect, spreading or pendulous, glabrous except rarely the ovary and young shoots with a sparse indumentum; epicortical runners absent. Leaves lanceolate to elliptic or obovate, acute to rounded; lamina 2.5–10 cm long, 5–25 mm wide, attenuate or contracted at base into petiole 2–10 mm long. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals pedicellate; peduncle slender, 6–30 mm long; rays of umbel 2 or 3, 3–10 mm long; pedicels usually 1.5–7 mm long; bracts 0.7–1.5 mm long, acute or truncate. Calyx entire, 0.5 mm long. Corolla in mature bud slender, 8–25 mm long, 5-merous (sometimes 4-merous in lateral flowers), clavate, longitudinally ridged or winged, crimson. Anthers 1–2 mm long,  $\frac{1}{2}$ – $\frac{1}{4}$  length of free part of filament. Fruit narrowly ellipsoidal, constricted at apex, c. 10 mm long.

Occurs in all mainland States, usually in semi-arid woodland; parasitic on various hosts but commonly on *Santalum*, Casuarinaceae, Myoporaceae and other *Amyema* spp. There are two subspecies.

Corolla 8–12 mm long; leaves elliptic to obovate; lamina mostly less than 5 cm long

**5a. subsp. miraculosum**

Corolla 15–25 mm long; leaves lanceolate to narrowly elliptic; lamina 4–10 cm long

**5b. subsp. boormanii**

**5a. Amyema miraculosum** (Miq.) Tieghem subsp. **miraculosum**

*Loranthus pendulus* var. *parviflorus* Benth., *Fl. Austral.* 3: 394 (1867) *p.p.*, excluding lecto. T: Rottneest Is., W.A., 18 Aug. 1839, *L. Preiss 1616*; syn: MEL.

*Amyema apiculata* Tieghem ex Danser, *Candollea* 7: 242, t. IV (1937). T: Swan River, W.A.,

*J. Drummond 511*; n.v.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 48: t. 5 (1923) as *Loranthus miraculosus*.

Leaf lamina elliptic to obovate, 25–55 mm long, contracted at base into distinct petiole 4–7 mm long. Corolla in mature bud 8–12 mm long.

Occurs from the Murchison R. to York, W.A., usually on *Santalum* but also recorded on *Casuarina*. Map 112.

W.A.: Murchison R. flats, Sept. 1947, *D. L. Serventy* (PERTH); York, *L. Preiss 1610* (MEL).

**5b. *Amyema miraculosum* subsp. *boormanii*** (Blakely) Barlow, *Austral. J. Bot.* 14: 477, fig. 9 (1966)

*Loranthus miraculosus* var. *boormanii* Blakely, *Proc. Linn. Soc. New South Wales* 47: 392 (1922), and 48: 137, t. 7 (1923); *Amyema miraculosum* var. *boormanii* (Blakely) H. Eichler, *Fl. S. Austral.* 2nd edn, *Suppl.* 102 (1965). T: Cobar, N.S.W., *L. Abraham 774*; lecto: NSW, *vide* B. A. Barlow *loc. cit.*

*Loranthus bifurcatus* var. *queenslandicus* Domin, *Biblioth. Bot.* 89: 55 (1921). T: Barcaldine, Qld, Mar. 1910, *K. Domin s.n.*; holotype: PR.

*Loranthus miraculosus* var. *pubiger* Blakely, *Proc. Linn. Soc. New South Wales* 47: 392 (1922), and 48: 138, t. 7 (1923). T: 35 miles (56 km) W of Cobar, N.S.W., June 1912, *L. Abraham 801*; holotype: NSW.

Illustration: W. F. Blakely, *op. cit.* 48: t. 7 (1923) as *Loranthus miraculosus* var. *boormanii* and var. *pubiger*.

Leaves lanceolate to narrowly elliptic; lamina 4–10 cm long, attenuate at base into obscure petiole 2–10 mm long. Corolla in mature bud 8–12 mm long. Frontispiece

Occurs in all mainland States, usually in semi-arid woodland; parasitic on various hosts but commonly on *Santalum*, Casuarinaceae, *Acacia*, *Amyema* and Myoporaceae. Map 113.

W.A.: Glenorn Station, Aug. 1938, *N. T. Burbidge* (PERTH). N.T.: 35 km S of George Gill Range, 27 June 1959, *G. McC. Chippendale* (NT). S.A.: Koonamore, 31 Aug. 1923, *T. G. B. Osborne* (AD). Qld: 48 km W of Warwick, *B. A. Barlow 174* (BRIU). Vic.: Rushworth, 1902, *E. Pescott* (MEL).

**6. *Amyema thalassium*** Barlow, *Proc. Linn. Soc. New South Wales* 87: 57 (1962)

*Loranthus maritimus* C. Gardner, *For. Dep. Bull. W. Austral.* 32: 46 (1923), *nom. illeg., non* Merrill. (1914). T: Pender Bay, Broome, W.A., 26 Oct. 1919, *C. E. Lane-Poole*; holotype: PERTH; isotype: NSW.

Plant erect or spreading, glabrous or rarely with a few scattered hairs on ovary; epicortical runners absent. Leaves obovate to orbicular, rounded; lamina 25–45 mm long, 22–40 mm wide, contracted at base into distinct winged petiole 3–6 mm long. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals pedicellate; peduncle slender, 2–8 mm long; rays of umbel 2, 5–10 mm long, spreading, strongly angular or winged; pedicels 4–8 mm long, strongly angular or winged by decurrent bracts; bracts orbicular, 1.5 mm long, concave. Calyx entire, 0.7 mm long. Corolla in mature bud robust, 18–25 mm long, 4-merous, inflated at base, clavate, strongly 4-winged, red at base, green at apex. Anthers 3 mm long, equal to free part of filament. Fruit funnel-shaped, 12 mm long. Fig. 24D.

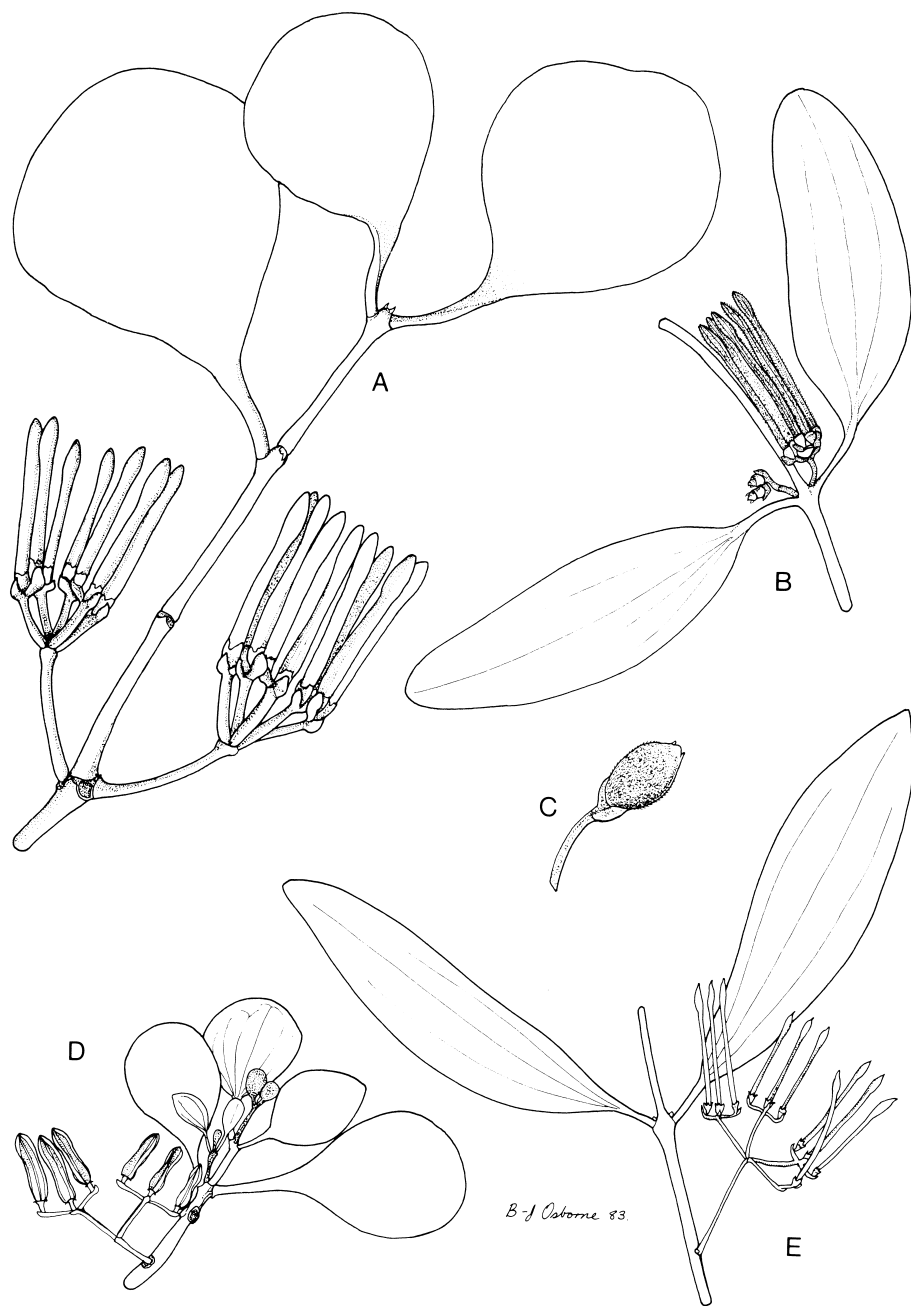
Occurs from Cape Keraudren, W.A., to western Arnhem Land, N.T., in mangrove communities, on *Avicennia*, *Excoecaria* and *Bruguiera*. Map 114.

W.A.: Cape Keraudren, *A. S. George 14825* (CANB, PERTH). N.T.: near mouth of East Alligator R., *L. A. Craven 6442* (CANB).

**7. *Amyema glabrum*** (Domin) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 295 (1929)

*Loranthus glaber* Domin, *Biblioth. Bot.* 89: 55 (1921). T: Carpet Creek near Harveys Creek, Qld, Jan. 1910, *K. Domin 3622*; holotype: PR.

*Loranthus obliquus* Blakely, *Proc. Linn. Soc. New South Wales* 47: 393 (1922), and 48: 150, t. 14 (1923);



**Figure 24.** *Amyema*. **A.** *A. queenslandicum*, branchlet in late bud  $\times 0.7$  (F. Crowe 502, CANB). **BC.** *A. villiflorum* subsp. *villiflorum*. **B.** branchlet in late bud  $\times 0.7$ ; **C.** fruit  $\times 1.5$  (**B-C.** M. Reed 48, CANB). **D.** *A. thalassium*, branchlet in late bud  $\times 0.7$  (J. McKean B701, CANB). **E.** *A. congener* subsp. *congener*, branchlet in late bud  $\times 0.7$  (S. Blake 4858, CANB).

*Amyema obliquum* (Blakely) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 297 (1929). T: Johnstone R., Qld, T. L. Bancroft; holo: NSW.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 48: t. 14 (1923) as *Loranthus obliquus*.

Plant erect or spreading, glabrous or the ovary with short, sparse brown indumentum in lower part; epicortical runners absent. Leaves elliptic to ovate, rounded or obtuse; lamina 35–65 mm long, 18–40 mm wide, rounded or cordate at base, sessile or contracted into distinct petiole up to 1.5 mm long. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals pedicellate; peduncle slender, 8–18 mm long; rays of umbel 2, 4–8 mm long, not strongly divergent; pedicels 1.5–3 mm long, not strongly divergent; bracts 1 mm long, acute. Calyx entire, 1 mm long. Corolla in mature bud very slender, 25–30 mm long, 5-merous, acute, red at base, yellow or green at apex. Anthers 3 mm long, c. ¼ length of free part of filament. Fruit ellipsoidal, c. 8 mm long.

Endemic on the Atherton Tableland and adjacent coastal districts, Qld., in rainforest and mangrove communities on a wide range of host trees. Map 115.

Qld: Bloomfield, B. Hyland 6769 (QRS); Gillies Highway and Lake Eacham Road, B. A. Barlow 3733 (CANB, QRS).

**8. *Amyema conspicuum* (Bailey) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 294 (1929)**

*Loranthus conspicuus* Bailey, *Queensland Agric. J.* 26: 198, t. 20 (1911). T: Eidsvold, Qld, Feb. 1911, T. L. Bancroft; holo: BRI.

Plant erect or spreading, glabrous except young shoots, inflorescence axes and calyx white- or pale brown-tomentose; epicortical runners absent. Leaves elliptic to ovate or obovate, rounded; lamina 3.5–8 cm long, 12–45 mm wide, attenuate or contracted at base into terete petiole 1–6 mm long. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals pedicellate; peduncle slender, 3–9 mm long; rays of umbel 2, 1–2.5 mm long, not strongly divergent, densely tomentose above, nearly glabrous below; pedicels 0.5–1 mm long, with tomentum similar to rays; bracts 1–2 mm long, acute. Calyx entire, 1 mm long. Corolla in mature bud slender, 14–25 mm long, 5-merous, acute, green. Anthers 1.5–2 mm long, c. ¼ length of free part of filament. Fruit globose, c. 7 mm long, with a distinct neck.

Occurs in N.T., Qld and N.S.W., from Arnhem Land to Ballina, in rainforest and open forest on various hosts but commonly on *Alphitonia* and *Terminalia*. Also in New Guinea. There are three subspecies, of which 2 occur in Australia.

Leaves dull both sides, not dark green; venation distinct

**8a. subsp. *conspicuum***

Leaves lustrous or shining, dark green; venation obscure

**8b. subsp. *obscurinerve***

**8a. *Amyema conspicuum* (Bailey) Danser subsp. *conspicuum***

*Loranthus betchei* Blakely, *Proc. Linn. Soc. New South Wales* 47: 393 (1922), and 48: 148, t. 13A (1923); *Amyema betchei* (Blakely) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 294 (1929). T: Ballina, N.S.W., Dec. 1892, W. Bauerlen 942; holo: NSW.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 48: t. 13A (1923) as *Loranthus betchei*.

Leaves attenuate at base into petiole 1–6 mm long, dull both sides; venation distinct. Peduncle 4–9 mm long. Corolla in mature bud 14–25 mm long.

Occurs from Torres Strait islands, Qld, to Ballina, N.S.W., in coastal districts in open forest and rainforest margins; on various hosts but common on *Alphitonia* in southern part of range. Map 116.

Qld: Horn Is., E. Cameron 2173 (QRS); 16 km E of Gatton, B. A. Barlow 199 (BRIU).

**8b. Amyema conspicuum** subsp. **obscurinerve** Barlow, *Austral. J. Bot.* 14: 463, fig. 6 (1966)

T: Mainoru, N.T., 5 Jan. 1962, *H. Dodd* 5; holo: NT; iso: AD, BRI, BRIU.

Leaves shortly attenuate at base into distinct petiole 2–3 mm long, lustrous or shining and dark green; venation obscure. Peduncle 3–5 mm long. Corolla in mature bud 16–22 mm long.

Occurs in southern Arnhem Land, N.T., in open forest; recorded only on *Terminalia*. Map 117.

N.T.: 27 km SW of Katherine, *B. A. Barlow* 619 (BRI, BRIU).

**9. Amyema villiflorum** (Domin) Barlow, *Austral. J. Bot.* 14: 485, fig. 9 (1966)

*Loranthus quandang* var. *villiflorus* Domin, *Biblioth. Bot.* 89: 55 (1921). T: Russell R., Qld, Jan. 1910, *K. Domin* s.n.; holo: PR.

Plant erect or spreading, red-brown- to white-tomentose on young shoots, inflorescence, flowers and fruits, otherwise glabrous; epicortical runners absent. Leaves elliptic to ovate, rounded; lamina 3–9 cm long, 14–45 mm wide, attenuate at base into a distinct terete petiole 5–12 mm long. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals pedicellate; peduncle slender, 5–14 mm long; rays of umbel 2, 1–3 mm long, not strongly divergent; pedicels 0.5–1 mm long; bracts usually 2 mm long, acute or rounded, but rarely the central bract foliose and up to 14 mm long and 7 mm wide. Calyx entire or 5-lobed, c. 1 mm long. Corolla in mature bud slender, 18–30 mm long, 5-merous, clavate, green or red. Anthers c. 2 mm long, c. one-fifth length of free part of filament. Fruit ellipsoidal, 6–9 mm long.

Occurs in W.A., N.T. and Qld, in open forest and rainforest on a wide range of trees. There are 2 subspecies.

Corolla acute in mature bud, red-brown to light-brown, densely tomentose; ovary and fruit uniformly tomentose

**9a. subsp. villiflorum**

Corolla obtuse in mature bud, green to dark red, sprinkled with red-brown to white hairs; ovary and fruit more densely tomentose in lower part

**9b. subsp. tomentillum**

**9a. Amyema villiflorum** (Domin) Barlow subsp. **villiflorum**

*Loranthus betchei* var. *dubius* Blakely, *Proc. Linn. Soc. New South Wales* 47: 393 (1922), and 48: 149, t. 13 (1923). T: Walsh R., Qld, Mar. 1891, *T. Barclay Millar* s.n.; holo: NSW.

Ovary uniformly red-brown- to light-brown-tomentose; calyx ciliate. Corolla in mature bud acute, tomentose, red-brown to light-brown. Fruit uniformly tomentose. Fig. 24B–C.

Occurs in W.A., N.T., and Qld, from E Kimberley to Torres Strait islands and Atherton Tableland in rainforest, open forest and coastal scrub on various trees but commonly on *Terminalia*, *Acacia* and *Lysiphyllum*. Map 118.

W.A.: Lake Argyle, *M. Parker* 473 (PERTH). N.T.: Caranbirini Waterhole, McArthur R., *L. A. Craven* 3423 (A, BRI, CANB, L, NT). Qld: Big Creek, Prince of Wales Is., *E. Cameron* 20370 (QRS); Cow Logging Area, Timber Reserve 140 (16°25'S 145°15'E), *B. Hyland* 6900 (CANB, QRS).

**9b. Amyema villiflorum** subsp. **tomentillum** (Blakely) Barlow, *Austral. J. Bot.* 14: 486, fig. 9 (1966) [as *-ellum*]

*Loranthus betchei* var. *tomentillum* Blakely, *Proc. Linn. Soc. New South Wales* 47: 393 (1922), and 48: 149, t. 13 (1923). T: Sweers Is., Gulf of Carpentaria, Qld, June 1901, *F. M. Bailey* s.n.; holo: NSW.

Ovary light-brown- or white-tomentose, the tomentum denser in lower part; calyx shortly ciliate. Corolla in mature bud obtuse, sprinkled with brown to white hairs but visibly green to dark red. Fruit more densely tomentose in lower part.

Occurs in N.T. and Qld from Arnhem Land to lowlands around Gulf of Carpentaria in monsoon forest and coastal scrub; parasitic on *Wrightia*, *Thespesia*, *Gardenia*, *Acacia*, *Ficus* and other trees. Map 119.

N.T.: Lee Point near Darwin, *M. Parker* 336 (BRI, CANB, DNA, K, NSW, NT); Sir Edward Pellew Group, *L. A. Craven* 3693 (BRI, CANB, LAE, NT, PERTH, RSA). Qld: between Croydon and Cumberland, 25 June 1938, *H. Flecker* (NSW).

**10. *Amyema benthamii*** (Blakely) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 294 (1929)

*Loranthus benthamii* Blakely, *Proc. Linn. Soc. New South Wales* 47: 393 (1922), and 49: 86, t. 20 (1924). T: Comet Vale, W.A., Dec. 1917, *J. T. Jutson s.n.*; lecto: NSW, *vide* B. A. Barlow, *Austral. J. Bot.* 14: 458 (1966).

*Loranthus pendulus* var. *amplexifolius* Benth., *Fl. Austral.* 3: 394 (1867). T: Roebuck Bay, W.A., *Martin* 48; iso: MEL.

*Loranthus quandang* var. *amplexifolius* Benth., *Fl. Austral.* 3: 395 (1867). T: Victoria R., N.T., *F. Mueller s.n.*; iso: MEL, NSW.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 49: t. 20 (1924) as *Loranthus benthamii*.

Plant erect or spreading, glabrous except lower part of ovary white-tomentose; epicortical runners absent. Leaves elliptic to almost orbicular, rounded; lamina 23–70 mm long, usually 18–27 mm wide, cordate or truncate at base, sessile or rarely minutely petiolate. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals pedicellate; peduncle slender, 10–18 mm long; rays of umbel 2, 2–4 mm long; pedicels 0.5–1.5 mm long; bracts 1.5–2.5 mm long, acute to rounded. Calyx entire or weakly toothed, 0.7 mm long. Corolla in mature bud slender, usually 15–20 mm long, 5-merous, clavate, red below, green above. Anthers 1.5–2 mm long, c. ¼ length of free part of filament. Fruit ellipsoidal, 8–14 mm long, white-tomentose except at apex.

Occurs from the Eastern Goldfields, W.A. to Arnhem Land, N.T., in semi-arid woodland, usually on *Brachychiton*. Map 120.

W.A.: Widgiemooltha, *C. A. Gardner* 1238 (NSW, PERTH); McLarty Hills, *A. S. George* 14712 (PERTH). N.T.: Mainoru, Jan. 1962, *H. Dodd* (BRIU).

**11. *Amyema dolichopodum*** Barlow, *Brunonia* 5: 209 (1983)

T: c. 7 km SSW of Paradise Pool on Ernest R., 75 km WNW of Wyndham, W.A., 20 Mar. 1978, *M. Lazarides* 8649; holotype: CANB.

Plant erect or spreading, glabrous except stem apex and lower part of ovary white-tomentose; epicortical runners absent. Leaves narrowly elliptic, rounded; lamina 45–60 mm long, 12–16 mm wide, attenuate at base into petiole 1–2 mm long. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals pedicellate; peduncle slender, 13–18 mm long at anthesis but reaching 28 mm in fruit; rays of umbel 2, 5–7 mm long at anthesis, 9 mm in fruit; pedicels 2–3 mm long at anthesis, 5 mm in fruit; bracts 1.5 mm long, rounded or truncate. Calyx entire, 0.8 mm long. Corolla in mature bud slender, c. 23 mm long, 5- or 6-merous, yellow or orange. Anthers 2 mm long, c. ½ length of free part of filament. Fruit ellipsoidal but not known in mature state. Fig. 25A.

Occurs in W.A., known only from the type collection which was parasitic on *Acacia*. Map 121.

**12. *Amyema lucasii*** (Blakely) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 296 (1929)

*Loranthus lucasii* Blakely, *Proc. Linn. Soc. New South Wales* 47: 393 (1922), and 49: 80, t. 18 (1924). T: 40–50 miles (64–80 km) NW of Collarenebri, N.S.W., Dec. 1911, *S. W. Jackson s.n.*; lecto: NSW, *vide* B. A. Barlow, *Austral. J. Bot.* 14: 471 (1966); *loc. id.*, Nov. 1911, *S. W. Jackson s.n.*; syn: NSW.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 49: t. 18 (1924) as *Loranthus lucasii*.

Plant erect or spreading, rarely pendulous, glabrous except lower part of ovary white-tomentose; epicortical runners absent. Leaves narrowly elliptic to elliptic, obtuse or rounded; lamina 35–55 mm long, 10–25 mm wide, contracted at base into a distinct petiole 4–8 mm long. Inflorescence a pedunculate umbel of triads; all flowers sessile; peduncle slender, 12–20 mm long; rays of umbel usually 4, usually 5–12 mm long; bracts 1.5–2 mm long, concave. Calyx entire, 1 mm long. Corolla in mature bud slender, c. 20 mm long, 5-merous, clavate, green or red. Anthers 1.5–2 mm long, c. ¼ length of free part of filament. Fruit ellipsoidal, c. 8 mm long.

Occurs from the Mitchell District, Qld, to the lower Darling R., N.S.W., in semi-arid woodland, almost exclusively on *Flindersia maculosa*. Map 122.

Qld: 58 km N of Aramac, 29 Aug. 1964, *I. Tommerup* (AD); Rosewood, Sept. 1911, *C. T. White* (NSW). N.S.W.: Wilcannia Road, 27 Dec. 1921, *W. MacGillivray* (ADW).

**13. *Amyema haematodes*** (O.Schwarz) Danser, *Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk., Tweede Sect.* 29(6): 29 (1933)

*Loranthus haematodes* O. Schwarz, *Repert. Spec. Nov. Regni. Veg.* 24: 82 (1928). T: abandoned rice garden c. 13 miles (21 km) SE of Darwin, N.T., 4 Jan. 1963, *B. A. Barlow* 516; neo: NT; isoneo: AD, BRI, BRIU, *vide* *B. A. Barlow, Austral. J. Bot.* 14: 466 (1966).

Plant spreading or pendulous; young shoots and inflorescences brown- and white-tomentose or the indumentum sparse; epicortical runners absent. Leaves elliptic to ovate, attenuate and finally rounded; lamina 45–70 mm long, 20–55 mm wide, cordate at base, sessile. Inflorescence a pedunculate umbel of triads, the central flowers sessile, the laterals pedicellate; peduncle slender, 10–18 mm long; rays of umbel 3, 2.5–5 mm long, densely white-tomentose on upper surface; pedicels 1.5–2 mm long; bracts 1.5–2 mm long, acute or truncate. Calyx entire or slightly lobed, 0.5 mm long. Corolla in mature bud slender, 18–22 mm long, 5-merous, clavate, densely tomentose. Anthers 3 mm long, almost equal to free part of filament. Fruit not known.

Occurs in N.T. in monsoon forest, known only from the original description and the neotype collection which was parasitic on *Barringtonia*. Map 123.

**14. *Amyema herbertianum*** Barlow, *Austral. J. Bot.* 14: 468, fig. 7h–i (1966)

T: Mainoru, N.T., Apr. 1962, *R. Martin s.n.*; holo: NT.

Plant erect or spreading, white-tomentose on young shoots and inflorescences, otherwise glabrous; epicortical runners absent. Leaves lanceolate, rounded at apex; lamina 20–40 mm long, 3–6 mm wide, attenuate at base into obscure petiole c. 1 mm long. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals pedicellate; peduncle slender, 3–5 mm long; rays of umbel 2–3, 4–5 mm long; pedicels 4–5 mm long; bracts 1 mm long, obtuse. Calyx entire, 0.5 mm long. Corolla in mature bud slender in middle, c. 25 mm long, 4- or 5-merous, distinctly clavate, white-tomentose. Anthers 2–3 mm long, c. ½ length of free part filament. Fruit almost globular, 6–9 mm long, pink beneath white tomentum.

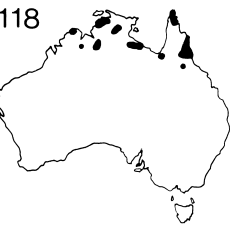
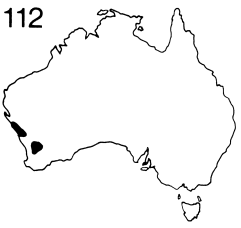
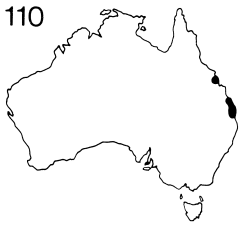
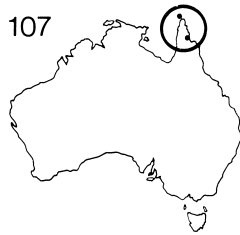
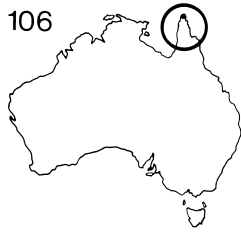
Occurs from Arnhem Land, N.T., to Cape York Peninsula, Qld, in open swamp woodland, exclusively on *Melaleuca* Map 124.

N.T.: Cox River Station, *T. S. Henshall* 1633 (CANB, NT). Qld: Normanton, *B. A. Barlow* 282 (BRI, BRIU); Endeavour River, *B. Gray* 108 (QRS).

**15. *Amyema melaleuca*** (Lehm. ex Miq.) Tieghem, *Bull. Soc. Bot. France* 42: 82, 84 (1895)

*Loranthus melaleuca* Lehm. ex Miq., in Lehm., *Pl. Preiss.* 1: 281 (1845); *Loranthus pendulus* var. *melaleuca* (Lehm. ex Miq.) Tate, *Trans. Roy. Soc. S. Austral.* 3: 68 (1880); *Loranthus miraculosus* var. *melaleuca* (Lehm. ex Miq.) Blakely, *Proc. Linn. Soc. New South Wales* 47: 392 (1922), and 48: 135, t. 6 (1923). *Loranthus pendulus* var. *parviflorus* Benth., *Fl. Austral.* 3: 394 (1867), *p.p.*, excluding lecto; T: Rottneest Is., W.A., 18 Aug. 1839, *L. Preiss* 1616; iso: MEL.





106. *Amyema friesianum*

109. *Amyema congener*  
subsp. *rotundifolium*

112. *Amyema miraculosum*  
subsp. *miraculosum*

115. *Amyema glabrum*

118. *Amyema villiflorum*  
subsp. *villiflorum*

107. *Amyema congener*  
subsp. *divergens*

110. *Amyema mackayense*  
subsp. *mackayense*

113. *Amyema miraculosum*  
subsp. *boormanii*

116. *Amyema conspicuum*  
subsp. *conspicuum*

119. *Amyema villiflorum*  
subsp. *tomentillum*

108. *Amyema congener*  
subsp. *congener*

111. *Amyema mackayense*  
subsp. *cycneisus*

114. *Amyema thalassium*

117. *Amyema conspicuum*  
subsp. *obscurinerve*

120. *Amyema benthamii*

*Amyema leschenaultii* Tieghem, *Bull. Soc. Bot. France* 42: 84 (1895). T: not designated.

Illustration: W. F. Blakely, *op.cit.* 48: t. 6 (1923) as *Loranthus miraculosus* var. *melaleucae*.

Plant erect, compact, glabrous; epicortical runners absent. Leaves lanceolate to narrowly obovate, rounded at apex; lamina usually 20–35 mm long, usually 2–4 mm wide, attenuate at base, without distinct petiole. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals pedicellate; peduncle slender, usually 6–14 mm long; rays of umbel usually 2, 5–9 mm long, not strongly divergent; pedicels angular or winged, 1.5–4.5 mm long; bracts 1–1.5 mm long, concave, acute. Calyx 0.3 mm long, minutely lobed. Corolla in mature bud slender in middle, 14–22 mm long, 4- or 5-merous, markedly clavate, red. Anthers 1–2 mm long, c. ½ length of free part of filament. Fruit nearly globular, 6–8 mm long, red.

Occurs from Perth, W.A., to Robe, S.A., in coastal scrub, exclusively on *Melaleuca* Map 125.

W.A.: Garden Is., 20 May 1957, W. McArthur (PERTH); Middle Is., Recherche Archipelago, R. D. Royce 6271 (PERTH). S.A.: Nora Creina Bay near Lake St Clair, 28 Feb. 1946, J. B. Cleland (AD).

### 16. *Amyema gaudichaudii* (DC.) Tieghem, *Bull. Soc. Bot. France* 42: 82, 84 (1895)

*Loranthus gaudichaudii* DC., *Prodr.* 4: 295 (1830); *Dendrophthoe gaudichaudii* (DC.) G. Don, *Gen. Hist.* 3: 419 (1834). T: Port Jackson, N.S.W., 1829, C. Gaudichaud s.n.; holotype: G.

*Loranthus pendulus* var. *parviflorus* Benth., *Fl. Austral.* 3: 394 (1866). T: Parramatta, W. Woolls s.n.; lectotype: MEL, fide B. A. Barlow, *Fl. Australia* 22: 222 (1983).

Plant erect, compact, shortly tomentose on young shoots and inflorescences, otherwise glabrous; epicortical runners absent. Leaves lanceolate, rounded at apex; lamina usually 20–35 mm long, 2–5 mm wide, attenuate at base into obscure petiole 2–5 mm long. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals pedicellate; peduncle very slender, 8–12 mm long; rays of umbel 2–3, 4–6 mm long; pedicels 2–4 mm long; bracts 1 mm long, acute. Calyx entire, 0.2 mm long. Corolla in mature bud slender, 7–10 mm long, 4- or 5-merous, clavate, red. Anthers 1 mm long, c. ½ length of free part of filament. Fruit globular, c. 4 mm diam., red.

Occurs in apparently disjunct areas in the western Darling Downs, Qld, and the Hunter to Illawarra districts, N.S.W., in open swamp woodland exclusively on *Melaleuca* Map 126.

Qld: Inglewood, 28 Nov. 1922, C. T. White (BRI). N.S.W.: Bulga, B. A. Barlow 3740 (CANB); Braidwood Road near Nowra, Mar. 1924, P. Monaghan (NSW).

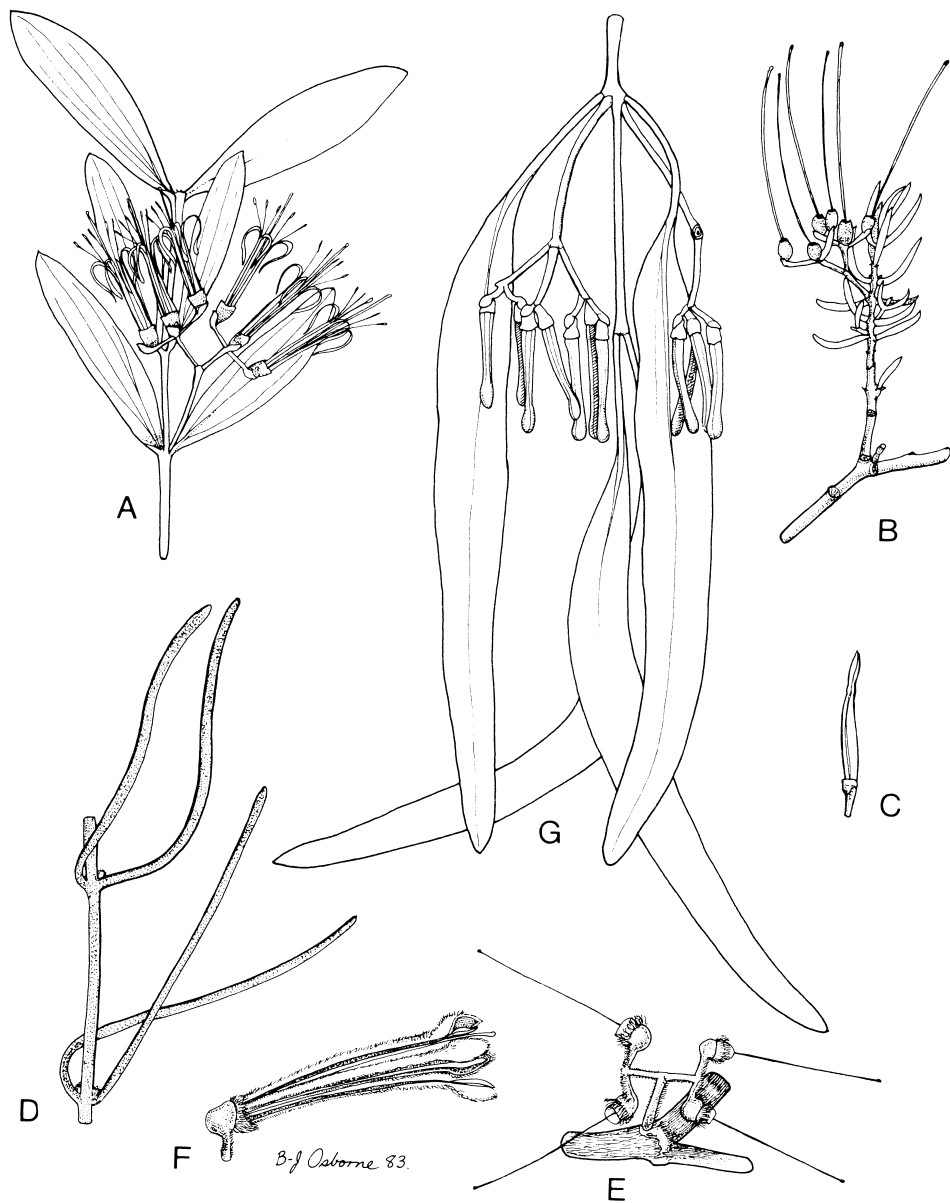
### 17. *Amyema microphyllum* Barlow, *Brunonia* 5: 210 (1983)

T: Lake Way, 26°45'S, 120°23'E, W.A., 25 Apr. 1978, L. A. Craven 5135; holotype: CANB.

Plant erect and compact, glabrous; epicortical runners absent. Leaves terete, shortly mucronate, 5–8 mm long, 1–1.5 mm diam., curved upwards. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals pedicellate; peduncle slender, 3–7 mm long; rays of umbel 2, c. 4 mm long, not strongly divergent; pedicels c. 3 mm long; central bracts 2 mm long and narrowly cuneate or sometimes up to 4 mm long and leaf-like; lateral bracts 1 mm long, truncate, keeled. Calyx shortly toothed, 0.3 mm long. Corolla in mature bud slender, 20 mm long, 4-merous, clavate, red. Anthers 2 mm long, c. ½ length of free part of filament. Mature fruit not known. Fig. 25B–C.

Endemic in the Wiluna area, W.A., on *Melaleuca* around margins of salt lakes. Map 127.

W.A.: Lake Way, L.A. Craven 5078 (A, CANB, L, NT, PERTH); Yeelirrie Station, 22 Mar. 1973, M. Blackwell (PERTH); Lake Miranda, 35 km N of Agnew on Wiluna road, L.A. Craven 7488 (CANB).



**Figure 25.** *Amyema*. **A**, *A. dolichopodum*, flowering branchlet  $\times 0.7$  (M. Lazarides 8649, CANB). **B-C**, *A. microphyllum*. **B**, flowering branchlet, corollas fallen  $\times 1$ ; **C**, bud  $\times 1$  (**B-C**, L. Craven 5145, CANB). **D-F**, *A. gibberulum* var. *gibberulum*. **D**, leaves  $\times 0.7$ ; **E**, inflorescence, corollas fallen,  $\times 0.7$ ; **F**, flower  $\times 0.7$  (**D-F**, P. Wilson 10413, CANB). **G**, *A. miquelii*, branchlet in late bud  $\times 0.7$  (D. Walker ANU206, CANB).

**18. *Amyema tridactylum*** Barlow, *Brunonia* 5: 211 (1983)

T: 2–3 miles (3–5 km) N of El Sharana, N.T., 25 Jan. 1973, *P. Martensz & R. Schodde AE 584*; holo: CANB; iso: BRI, DNA, NT.

Plant erect or spreading, glabrous; epicortical runners absent. Leaves terete, acute or obtuse, 4–6 cm long, 1 mm diam. Inflorescence a pedunculate umbel of triads; all flowers pedicellate; peduncle slender, 9–20 mm long; rays of umbel 2, usually 4–6 mm long, not strongly divergent; pedicels 3–5 mm long; bracts 1 at base of triad and 1 under each lateral flower, 1 mm long, acute. Calyx entire, 1 mm long. Corolla in mature bud slender, 18–24 mm long, 5-merous, clavate, red. Anthers 2 mm long, c. one-fifth length of free part of filament. Fruit ellipsoidal, c. 13 mm long, yellow-green.

Endemic in N.T. on the sandstone escarpments of Arnhem Land; parasitic on Myrtaceae including *Calytrix*, *Melaleuca* and *Baeckea*. Map 128.

N.T.: Mt Brookman, *L. A. Craven 6587* (CANB); Mt Gilruth, Deaf Adder Gorge, *C. Dunlop 4426* (AD, DNA).

**19. *Amyema preissii*** (Miq.) Tieghem, *Bull. Soc. Bot. France* 42: 82, 84 (1895)

*Loranthus preissii* Miq., in Lehm., *Pl. Preiss.* 1: 280 (1845); *L. linophyllus* var. *preissii* (Miq.) Ostenf., *Biol. Meddel. Kongel. Danske Vidensk. Selsk.* 3(2): 54 (1921). T: Perth, W.A., 8 Mar. 1841, *L. Preiss 1611*; n.v.

*Loranthus scoparius* Miq., in Lehm., *Pl. Preiss.* 1: 280 (1845); *Amyema scoparium* (Miq.) Tieghem, *Bull. Soc. Bot. France* 42: 84 (1895). T: Perth, W.A., 20 Apr. 1840, *L. Preiss 1613*; iso: MEL.

*Loranthus preissii* var. *didymus* Blakely, *Proc. Linn. Soc. New South Wales* 47: 392 (1922), and 48: 142, t. 9 (1923). T: Diamantina, Qld, Apr. 1892, *T. L. Bancroft s.n.*; holo: NSW.

Illustration: W. F. Blakely, *op.cit.* 48: t. 9 (1923) as *Loranthus preissii*.

Plant erect or spreading, glabrous; epicortical runners absent. Leaves terete, acute or the thicker ones rounded, 2–8 cm long, 0.5–2.3 mm diam. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals pedicellate; peduncle slender, 6–26 mm long; rays of umbel 2, rarely 3, 3–13 mm long; pedicels 4–10 mm long; bracts 1.5–2 mm long, acute or rounded. Calyx entire, 0.2 mm long. Corolla in mature bud slender in middle, 18–26 mm long, 4- or 5-merous, distinctly clavate, red. Anthers usually 3.5–5 mm long, equal to free part of filament. Fruit globose, 8–10 mm diam., white or pink. Fig. 26A–B.

Occurs in all mainland States in open forest and woodland, usually on *Acacia* but occasionally on other hosts, especially *Cassia*. Map 129.

W.A.: North West Cape, near lighthouse, *A. S. George 1388* (PERTH). N.T.: Mud Tank near Mt Riddock, June 1953, *D. E. Symon* (ADW). S.A.: 3 km W of Nairne, *B. A. Barlow 984* (AD). N.S.W.: Central Mine near Mt Hope, Mar. 1904, *W. Bauerlen* (NSW). Vic.: road to Back Beach, Sorrento, 3 Jan. 1925, *W. J. Harris* (MEL).

**20. *Amyema cambagei*** (Blakely) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 294 (1929)

*Loranthus cambagei* Blakely, *Proc. Linn. Soc. New South Wales* 47: 392 (1922), and 48: 143, t. 10 (1923). T: Grose R., N.S.W., Sept. 1906, *J. H. Maiden & R. H. Cambage*; lecto: NSW, *vide* B. A. Barlow, *Austral. J. Bot.* 14: 461 (1966); Nepean R. near junction with Grose R., N.S.W., *J. H. Maiden & R. H. Cambage*; syn: NSW.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 48: t. 10 (1923) as *Loranthus cambagei*.

Plant spreading to pendulous, shortly white- to grey-tomentose on young stems, leaves and inflorescences; epicortical runners absent. Leaves terete, shortly mucronate, usually 6–15 cm long and 1–1.3 mm diam. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals pedicellate; peduncle slender, 8–17 mm long; rays of umbel 2–4 (usually 3), 4–6 mm long; pedicels 3–6 mm long; bracts 1–2 mm long, acute. Calyx entire, 0.3 mm long. Corolla in mature bud slender, 15–21 mm long, 5-merous,

clavate, pink under the short white indumentum. Anthers 1.5–2 mm long, c. ½ length of free part of filament. Fruit globose, 5–6 mm diam., pink or red.

Occurs from Cairns, Qld, to Canberra, A.C.T., in open forest and woodland on several species of *Casuarina*. Map 130.

Qld: Heales Monument, SW of Gordonvale, *B. A. Barlow 381* (BRIU); Carnarvon Creek, *C. T. White 11371* (BRI). A.C.T.: Uraryarra, Coree district, *P. J. Darbyshire 1251* (BRI, CANB).

## 21. *Amyema linophyllum* (Fenzl) Tieghem, *Bull. Soc. Bot. France* 41: 507 (1894)

*Loranthus linophyllus* Fenzl, in Endl. *et al.*, *Enum. Pl.* 56 (1837). T: Swan R., W.A., *C. Huegel*; holo: W n.v.

Plant spreading or pendulous, white- or rarely pale brown-tomentose or the older stems and leaves glabrous; epicortical runners absent. Leaves terete, obtuse, 6–12 cm long, 1–2.5 mm thick. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals pedicellate; peduncle slender, 5–10 mm long; rays of umbel usually 3, 2–6 mm long; pedicels 1–3.5 mm long; bracts 2–3 mm long, acute. Calyx entire, 0.7–1 mm long. Corolla in mature bud slender to robust, 16–26 mm long, 4- or 5-merous, clavate, white-tomentose. Anthers 2.5–3 mm long, c. ½ length of free part of filament. Fruit globose, c. 6 mm long.

Occurs in all mainland States except N.T., mostly in semi-arid woodlands; parasitic on several species of *Casuarina*. There are 2 subspecies.

Pedicels of lateral flowers 2.5–3.5 mm long; rays of umbel usually 5–6 mm long; corolla 20–26 mm long; peduncle shortly tomentose, usually 8–10 mm long

### 21a. subsp. *linophyllum*

Pedicels of lateral flowers 1–2 mm long; rays of umbel 2–4 mm long; corolla usually 16–22 mm long; peduncle long-tomentose, 5–8 mm long

### 21b. subsp. *orientale*

## 21a. *Amyema linophyllum* (Fenzl) Tieghem subsp. *linophyllum*

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 48: t. 11 as *Loranthus linophyllus*.

Leaves 1–2 mm diam. Peduncle shortly white- or pale brown-tomentose, usually 8–10 mm long; rays of umbel usually 5–6 mm long; pedicels 2.5–3.5 mm long. Corolla in mature bud 20–26 mm long.

Occurs in W.A. from the Murchison River southwards on Casuarinaceae. Map 131.

W.A.: Murchison River flats, Sept. 1947, *D. L. Serventy* (PERTH); Livesay Siding, Lake Noonying, *T. E. H. Aplin 625* (PERTH).

## 21b. *Amyema linophyllum* subsp. *orientale* Barlow, *Austral. J. Bot.* 14: 470 (1966)

T: E of Bidion, near Gilgandra, N.S.W., Feb. 1964, *D. Walker ANU 1284*; holo: NSW; iso: CANB.

Leaves 1.3–2.5 mm diam. Peduncle with long white tomentum, 5–8 mm long; rays of umbel 2–4 mm long; pedicels 1–2 mm long. Corolla in mature bud usually 16–22 mm long.

Occurs in S.A., Qld, N.S.W. and Vic., mainly in inland districts in semi-arid woodland; parasitic on *Casuarina*, especially *C. cristata* and *C. luehmannii*. Map 132.

S.A.: near Aroona Dam, Leigh Creek, 16 Jan. 1956, *T. F. Robbins* (AD). Qld: Eidsvold, *T. L. Bancroft* (NSW). N.S.W.: near Balranald, 21 Jan. 1954, *D. E. Symon* (ADW). Vic.: between Warra and Wallup, Shire of Dimboola, 22 Jan. 1893, *F. M. Reader* (MEL).

## 22. *Amyema gibberulus* (Tate) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 295 (1929)

*Loranthus gibberulus* Tate, *Trans. Roy. Soc. S. Austral.* 8: 71 (1886). T: William Tableland, Lake Eyre west, S.A., *M. Murray*; holo: AD.

Plant erect or spreading; inflorescence axes and often whole plant densely white-tomentose; epicortical runners absent. Leaves terete, acute, 5–10 cm long, 1.5–2.5 mm diam. Inflorescence a pedunculate umbel of dyads; flowers pedicellate; peduncle 1–5 mm long; rays of umbel 2–3 (or reduced to 1, when the 'peduncle' appears jointed), 2–5 mm long; pedicels 1–3 mm long; central bracts (at apex of each ray) 1–1.5 mm long; lateral bracts orbicular, 3–4 mm long, concave. Calyx entire, 1 mm long. Corolla in mature bud robust, 25–45 mm long, 4-merous, clavate, with long white tomentum. Anthers 2–5 mm long, almost sessile. Fruit almost globose, c. 8 mm long.

Occurs in W.A., N.T. and S.A., in arid communities on several species of *Hakea* and *Grevillea*. There are 2 varieties.

Whole plant densely white-tomentose

**22a. subsp. gibberulum**

Plant glabrous except inflorescence

**22b. subsp. tatei**

**22a. *Amyema gibberulum* (Tate) Danser var. *gibberulum***

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 47: t. 39 (1922) as *Loranthus gibberulus*.

Whole plant densely white-tomentose. Fig. 25D–F.

Occurs throughout the range of the species in arid lands from the Great Sandy Desert to Southern Cross and Lake Eyre. Map 133.

W.A.: 27 km SW of Halls Creek, *B. A. Barlow 1208* (CANB); 48 km N of Meekatharra, 18 July 1931, *C. A. Gardner* (PERTH); Dragon Tree Soak, Great Sandy Desert, *A. S. George 14807* (PERTH). N.T.: Elkedra, 1954, *T. R. N. Lothian* (AD). S.A.: 128 km N of Tarcoola, 31 Oct. 1929, *J. B. Cleland* (AD).

**22b. *Amyema gibberulum* var. *tatei* (Blakely) Barlow, *Austral. J. Bot.* 14: 465 (1966)**

*Loranthus gibberulus* var. *tatei* Blakely, *Proc. Linn. Soc. New South Wales* 47: 395 (1922). T: 36 miles (58 km) NW of Southern Cross, W.A., 26 Nov. 1891, *R. Helms*; holo: NSW; iso: AD, PERTH.

Plant glabrous except the densely white-tomentose inflorescence.

Occurs sparsely in the SW part of the range of the species, from Yorkrakine to Comet Vale, W.A. Map 134.

W.A.: Yorkrakine, Sept. 1945, *E. Gardner* (PERTH); Comet Vale, Dec. 1917, *J. T. Jutson* (NSW).

**23. *Amyema pendulum* (Sieber ex Spreng.) Tieghem, *Bull. Soc. Bot. France* 41: 507 (1894)**

*Loranthus pendulus* Sieber ex Spreng., *Syst. Veg. Suppl.* 139 (1827); *Dendrophthoe pendula* (Sieber ex Spreng.) Mart., *Flora* 13: 110 (1830). T: Port Jackson, New Holland, *F. Sieber 241*; holo: K; iso: BM, G, MEL.

Plant pendulous, the young shoots and inflorescence shortly brown-tomentose, otherwise glabrous; epicortical runners absent. Leaves lanceolate, usually acute; lamina 10–40 cm long, 3–15 mm wide, attenuate at base into petiole 1–4 cm long. Inflorescence a pedunculate umbel of triads or tetrads, the central flower sessile, the laterals pedicellate; peduncle 8–40 mm long; rays of umbel 3–4, 5–18 mm long; pedicels 2–7 mm long; bracts 2–3 mm long, concave, usually acute. Calyx entire or minutely dissected, 1–1.5 mm long. Corolla in mature bud slender to robust, 22–40 mm long, usually 5- or 6-merous, rusty brown-tomentose. Fruit ellipsoidal to ovoid, 10 mm long.

Occurs from Adelaide, S.A., through Vic. and N.S.W. to Rockhampton, Qld, in open forest and woodland; parasitic on many *Eucalyptus* spp. and locally common on several *Acacia* spp. There are 2 subspecies.

Corolla in mature bud usually acute, 5-merous; peduncle usually 10–22 mm long; pedicels of lateral flowers 2–4 mm long; anthers 2–4 mm long

**23a. subsp. pendulum**

Corolla in mature bud usually obtuse, usually 6-merous; peduncle 15–40 mm long; pedicels of lateral flowers 4–7 mm long; anthers 5–9 mm long

**23b. subsp. longifolium**

**23a. Amyema pendulum** (Sieber ex Spreng.) Tieghem subsp. **pendulum**

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 47: t. 46 (1922) as *Loranthus pendulus*.

Haustorial attachment usually globose, without strands under bark. Peduncle usually 10–22 mm long; rays of umbel 5–11 mm long; pedicels 2–4 mm long. Corolla in mature bud 5-merous, usually acute. Anthers 2–4 mm long, c. ½ length of free part of filament.

Occurs in coastal and near-coastal localities of S.A., N.S.W. and Vic. from Adelaide to the New England tableland. Map 135.

S.A.: near Yankalilla, 22 Feb. 1928, *J. M. Black* (AD). N.S.W.: 10 km S of Guyra, Feb. 1928, *E. W. McKie* (NSW). Vic.: Lower Cann R., Gippsland, *R. Melville* 2877 (BRI).

**23b. Amyema pendulum** subsp. **longifolium** (Hook.) Barlow, *Austral. J. Bot.* 14: 479 (1966)

*Loranthus longifolius* Hook., *Icon. Pl.* 9: t. 880 (1851); *Amyema longifolia* (Hook.) Tieghem, *Bull. Soc. Bot. France* 42: 82, 84 (1895). T: Wide Bay, Qld, *Bidwill*; holo: K.

Haustorial attachment elongate, with longitudinal strands under host bark. Peduncle usually 15–40 mm long; rays of umbel 8–18 mm long; pedicels 4–7 mm long. Corolla in mature bud 5–8 (usually 6)-merous, usually obtuse. Anthers 5–9 mm long, about equal to free part of filament.

Occurs from Rockhampton, Qld, to Hillston, N.S.W. Map 136.

Qld: Eidsvold, 13 Apr. 1918, *T. L. Bancroft* (BRI, NSW). N.S.W.: Hillston, *L. A. S. Johnson* 547/29 (NSW).

**24. Amyema miquelii** (Lehm. ex Miq.) Tieghem, *Bull. Soc. Bot. France* 41: 507 (1894)

*Loranthus miquelii* Lehm. ex Miq., in Lehm., *Pl. Preiss.* 1: 280 (1845); *Dendrophthoe miquelii* (Lehm. ex Miq.) Ettingsh., *Denks. Akad. Wiss. Math.-Nat.* 32: 66 (1872); *Loranthus pendulus* var. *miquelii* (Lehm. ex Miq.) Domin, *Biblioth. Bot.* 89: 55 (1921). T: York, W.A., 13 Mar. 1839, *L. Preiss* 1617; n.v.

*Loranthus aurantiacus* A. Cunn. ex Hook., in T. L. Mitchell, *J. Exped. Trop. Austral.* 101 (1848); *Amyema aurantiaca* (A. Cunn. ex Hook.) Tieghem, *Bull. Soc. Bot. France* 41: 507 (1894). T: Lachlan R., N.S.W., 1817, *A. Cunningham* 134; holo: K; iso: BM.

*Loranthus miquelii* var. *micranthus* F. Muell. ex Miq., *Ned. Kruidk. Arch.* 4: 105 (1856). T: Halifax Bay, Qld, *F. Mueller*; n.v.

*Loranthus miquelii* var. *minor* Blakely, *Proc. Linn. Soc. New South Wales* 47: 406, t. 45 (1922). T: Coolgardie, W.A., 1898, *L. C. Webster*; holo: NSW.

Illustration: W. F. Blakely, *loc. cit.* as *Loranthus miquelii*.

Plant pendulous, glabrous except young shoots, ovary and sometimes other parts of inflorescence shortly brown-tomentose; epicortical runners absent. Leaves linear to elliptic, acute to rounded; lamina 3–35 cm long, 5–30 mm wide, often falcate, attenuate at base into petiole 10–50 mm long, often pigmented yellow to red. Inflorescence a pedunculate umbel of triads; all flowers pedicellate or rarely the central one sessile, or in tetrads with the central flower sessile; peduncle 10–50 mm long; rays of umbel 3–7, 3–15 mm long; pedicels usually 3–6 mm long; bracts at apex of ray and beneath each pedicellate flower, 1–1.5 mm long, acute. Calyx entire or slightly lobed or dissected, 0.1–1.5 mm long. Corolla in mature bud slender in middle, 15–28 mm long, 5–7-merous, clavate, usually red. Anthers 1.5–4 mm long, c. ½ length of free part of filament. Fruit ellipsoidal to pear-shaped, 8–12 mm long. Fig. 25G.

Occurs throughout mainland Australia except Cape York Peninsula, in open forest and woodland; parasitic on many species of *Eucalyptus* and locally common on several *Acacia* spp., rarely on other hosts. Map 137.

W.A.: Cape Range c. 14 km N of Learmonth, *A. S. George* 1315 (PERTH). N.T.: 64 km N of Lake Mackay, 17 June 1957, *G. Chippendale* (NT). S.A.: Blackwood, 8 Jan. 1953, *J. W. Banfield* (ADW). Qld: Red Cliff Point, N of Cairns, *B. A. Barlow* 141 (BRIU). Vic.: Bairnsdale, *T. S. Hart* (NSW).

A polymorphic species with many local forms, see B. A. Barlow, *Austral. J. Bot.* 14: 474 (1966).

**25. *Amyema biniflorum*** Barlow, *Austral. J. Bot.* 14: 459, fig. 6 (1966)

T: Endeavour R., Qld, 1770, *J. Banks & D. Solander*; holo: BM; iso: MEL, NSW.

[*Loranthus bifurcatus* auct. non Benth.: Blakely, *Proc. Linn. Soc. New South Wales* 47: 395, t. 40 (1922); Barlow, *Proc. Linn. New South Wales* 87: 52 (1962)]

Illustration: W. F. Blakely, *loc. cit.* as *Loranthus bifurcatus*.

Plant pendulous, glabrous except the young shoots and flower buds with sparse brown indumentum; epicortical runners absent. Leaves narrowly lanceolate, acute; lamina 8–18 cm long, 8–15 mm wide, often falcate, attenuate at base into petiole 13–30 mm long. Inflorescence a pedunculate umbel of dyads; flowers pedicellate; peduncle very slender, 30–60 mm long; rays of umbel 2, not strongly divergent, 5–10 mm long; pedicels 4–8 mm long; bracts c. 1 mm long. Calyx entire, 0.3 mm long. Corolla in mature bud slender in middle, 20–25 mm long, 5-merous, obtuse, green or sometimes red. Anthers c. 4 mm long, about equal to free part of filament. Fruit narrowly ellipsoidal, c. 9 mm long.

Endemic in Qld from Cape York Peninsula to Eidsvold, in dry and mesic sclerophyll forest exclusively on *Eucalyptus* Map 138.

Qld: Heales Monument, SW of Gordonvale, B. A. Barlow 383 (BRIU); Eidsvold, Aug. 1911, T. L. Bancroft (BRI, NSW).

**26. *Amyema bifurcatum*** (Benth.) Tieghem, *Bull. Soc. Bot. France* 41: 507 (1894)

*Loranthus bifurcatus* Benth., *Fl. Austral.* 3: 393 (1867). T: Carpentaria, Island H (North Is., Sir Edward Pellew Group) and Groote Is., 17–25 Dec. 1802 & 15 Jan. 1803, R. Brown *s.n.*; syn: BM, CANB, MEL.

Plant pendulous; young shoots, flowers and sometimes axes of inflorescence with rusty (rarely white) tomentum or scattered hairs, otherwise glabrous; epicortical runners absent. Leaves linear to lanceolate, acute to rounded; lamina 10–35 cm long, 4–25 mm wide, often falcate, attenuate at base into petiole 10–40 mm long. Inflorescence a pedunculate umbel of dyads; flowers pedicellate; peduncle slender, 15–40 mm long; rays of umbel mostly 2, usually 6–20 mm long; pedicels usually 3–7 mm long; central bract at apex of each ray triangular, 1 mm long; lateral bracts orbicular, c. 3 mm long, concave, enlarging in fruit. Calyx entire, 0.7 mm long. Corolla in mature bud robust, 22–30 mm long, 5- or 6-merous, clavate, rusty- or white-tomentose. Anthers 4–9 mm long, about twice length of free part of filament. Style articulate above base. Fruit globose, c. 10 mm diam., with a prominent nipple formed by base of style.

Occurs in W.A., N.T., Qld and N.S.W. from the Kimberley to Gunnedah, in open forest, exclusively on *Eucalyptus*. There are 2 varieties.

Tomentum rusty brown

**26a. subsp. *bifurcatum***

Tomentum ivory white

**26b. subsp. *eburneum***

**26a. *Amyema bifurcatum*** (Benth.) Tieghem var. ***bifurcatum***

*Loranthus ferruginiflorus* W. Fitzg., *J. Roy. Soc. W. Austral.* 3: 136 (1918); *Amyema ferruginiflora* (W. Fitzg.) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 295 (1929). T: summit of Mt Haste, W.A., July 1905, W. V. Fitzgerald 1251; lecto: NSW, *vide* B. A. Barlow *Fl. Australia* 22: 221 (1983).

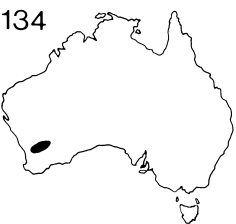
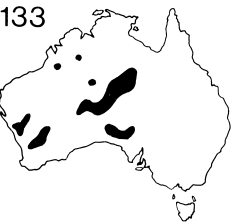
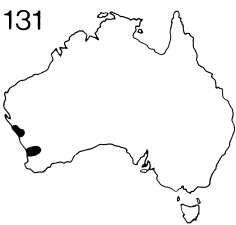
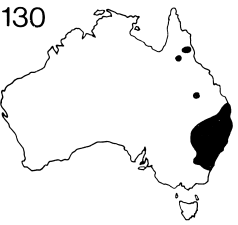
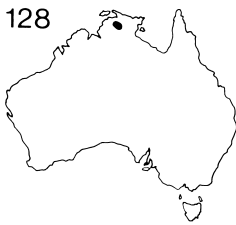
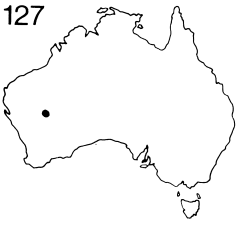
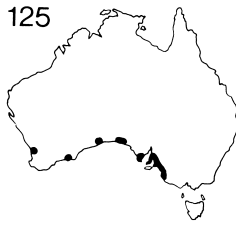
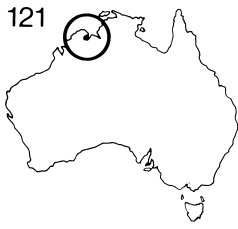
*Loranthus pendulus* var. *taenifolius* Domin, *Biblioth. Bot.* 89: 54 (1921). T: Glass House Mts, Qld, May, C. T. White *s.n.*; holo: PR; iso: BRI.

*Xylochlamys queenslandica* Domin, *Biblioth. Bot.* 89: 56 (1921); *Amyema xylochlamys* Danser, *Verh. Kon. Ned. Akad. Wetensch., Afd. Natuurk., Tweede sect.* 29(6): 35 (1933). T: Mungana, Qld, Feb. 1910, K. Domin *s.n.*; holo: PR.

*Loranthus ferruginiflorus* var. *linearifolius* Blakely, *Proc. Linn. Soc. New South Wales* 47: 398, t. 41 (1922). T: Eidsvold, Qld, Nov. 1920, T. L. Bancroft *s.n.*; holo: NSW.

Illustration: W. F. Blakely, *loc. cit.* as *Loranthus ferruginiflorus*.





121. *Amyema dolichopodum*  
 124. *Amyema herbertianum*  
 127. *Amyema microphyllum*  
 130. *Amyema cambagei*  
 133. *Amyema gibberulum*  
 var. *gibberulum*

122. *Amyema lucasii*  
 125. *Amyema melaleucae*  
 128. *Amyema tridactylum*  
 131. *Amyema linophyllum*  
 subsp. *linophyllum*  
 134. *Amyema gibberulum*  
 var. *tatei*

123. *Amyema haematodes*  
 126. *Amyema gaudichaudii*  
 129. *Amyema preissii*  
 132. *Amyema linophyllum*  
 subsp. *orientale*  
 135. *Amyema pendulum*  
 subsp. *pendulum*

Plant rusty-tomentose.

Occurs throughout the range of the species. Map 139.

W.A.: Prince Regent River Reserve, *K. F. Kenneally 2131* (CANB, PERTH). N.T.: Hidden Valley Stn, *T. S. Henshall 1911* (AD, CANB, MEL, NT). Qld: mouth of Claudie R., Lockhart River Mission, *B. A. Barlow 3725* (BRI, CANB, QRS). N.S.W.: Gunnedah, *W. MacDonald* (NSW).

**26b. *Amyema bifurcatum* var. *eburneum* Barlow, *Brunonia* 5: 208 (1983)**

T: The Bastion, Wyndham, W.A., 6 Aug. 1974, *K. F. Kenneally 1961*; holo: CANB; iso: PERTH.

Plant ivory white-tomentose. Fig. 26C.

Endemic in the Kimberley, W.A. Map 140.

W.A.: King Leopold Range, *B. A. Barlow 1226* (AD); Boiga Falls, Drysdale River National Park, *K. F. Kenneally 3078* (CANB, PERTH).

**27. *Amyema quandang* (Lindl.) Tieghem, *Bull. Soc. Bot. France* 41: 507 (1894)**

*Loranthus quandang* Lindl., in T. L. Mitchell, *Three Exped. Australia* 2: 69 (1838). T: Lachlan R., N.S.W., 34°14'S 144°25'E, 9 May 1835, *T. L. Mitchell s.n.*; holo: CGE.

Plant pendulous, shortly white-tomentose, the vegetative parts glabrescent; epicortical runners absent. Leaves opposite or displaced-opposite, lanceolate to ovate, often falcate, acute to rounded; lamina 3–12 cm long, 8–45 mm wide, attenuate or contracted at base into petiole 4–12 mm long. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals pedicellate; peduncle 3–10 mm long; rays of umbel 2, 2–8 mm long; pedicels 1–3 mm long; bracts 1 mm long, acute to rounded. Ovary abruptly expanded and then narrowed just below calyx; calyx entire, 0.5–1 mm long. Corolla in mature bud slender to robust, 16–30 mm long, 5-merous, acute or obtuse, green beneath tomentum. Anthers 2–4 mm long, slightly shorter than free part of filament. Fruit ellipsoidal, slightly pear-shaped or nearly globose, 6–10 mm long.

Occurs in all mainland States in semi-arid and arid woodland; parasitic on many *Acacia* spp., commonly on *A. aneura*, *A. cambagei*, *A. harpophylla* and *A. papyrocarpa*. There are 2 varieties.

Leaves lanceolate to elliptic, usually falcate, less than 20 mm wide, attenuate at base

**27a. subsp. *quandang***

Leaves broadly lanceolate, not falcate, more than 20 mm wide, contracted at base

**27b. subsp. *bancroftii***

**27a. *Amyema quandang* (Lindl.) Tieghem subsp. *quandang***

*Loranthus nutans* A. Cunn. ex Hook., in T. L. Mitchell, *J. Exped. Trop. Australia* 158 (1848), *nom. illeg. non Spreng.* (1825); *Loranthus cunninghamii* A. Gray, *U.S. Explor. Exped., Phan.* 1: 741 (1854); *Amyema nutans* Tieghem, *Bull. Soc. Bot. France* 42: 84 (1895). T: Fields Plains, Lachlan R., N.S.W., May 1817, *A. Cunningham 136*; holo: K; iso: BM.

*Loranthus canus* F. Muell., *Hooker's J. Bot. Kew Gard. Misc.* 8: 145 (1856); *Amyema cana* (F. Muell.) Tieghem, *Bull. Soc. Bot. France* 42: 83, 84 (1895). T: McKenzie Creek, Grampians, Vic., *F. Mueller; n.v.*

*Loranthus pruinus* A. Cunn. ex Ettingsh., *Denkschr. Kaiser. Akad. Wiss. Math.-Naturwiss. (Kl.)* 32: 65, t. II, 19–21, (1872); *Dendrophthoe pruinosa* (Cunn. ex Ettingsh.) Ettingsh., *loc.cit.*; *Amyema pruinusum* (Cunn. ex Ettingsh.) Tieghem, *Bull. Soc. Bot. France* 42: 83, 84 (1895). T: not designated.

*Loranthus pendulus* var. *canescens* F. Muell. & Tate, *Trans. Roy. Soc. S. Austral.* 16: 360 (1896). T: Arkaringa, S.A., 15 May 1891, *R. Helms*; holo: AD.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 49: t. 19 (1924) as *Loranthus quandang*.

Leaves lanceolate to elliptic, usually falcate, 8–20 mm wide, attenuate at base.

Occurs throughout the range of the species. Map 141.

W.A.: 24 km E of Zanthus, *R. D. Royce 5573a* (PERTH). N.T.: Elkedra, *T. R. N. Lothian 265/1954* (AD). S.A.: 35 km W of Whyalla, *P. G. Wilson 131* (AD). Qld: Canobie, *B. A. Barlow 301* (AD, BRIU). Vic: Whitfield, Oct. 1920, *H. B. Williamson* (CANB).

**27b. *Amyema quandang* var. *bancroftii*** (F.M.Bailey) Barlow, *Austral. J. Bot.* 14: 481 (1966)

*Loranthus quandang* var. *bancroftii* Bailey, *Queensland Agric. J.* 29: 180, t. 23 (1912). T: Eidsvold, Qld, *T. L. Bancroft*; holo: BRI.

Leaves broadly lanceolate, usually not falcate, 20–45 mm wide, contracted at base.

Occurs from Broadsound Range, Qld, to Nyngan, N.S.W. Map 142.

Qld: 19.7 km E of Jericho, *A. D. Chapman 1288* (AD, BRI, CANB, K, L). N.S.W.: Byrock district, Mar. 1899, *H. Deane* (NSW).

**28. *Amyema hillianum*** (Blakely) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 296 (1929)

*Loranthus hillianus* Blakely, *Proc. Linn. Soc. New South Wales* 47: 393 (1922), and 49: 80, t. 17 (1924). T: 20 miles (32 km) NW by W of Meyers Hill, Macdonnell Range, N.T., 1 June 1911, *G. F. Hill 220*; holo: NSW.

Illustration: W. F. Blakely, *loc. cit.* as *Loranthus hillianus*.

Plant spreading to pendulous, shortly white- tomentose, especially the inflorescence; epicortical runners absent. Leaves lanceolate to elliptic, rounded or obtuse; lamina 4–7 cm long, 10–25 mm wide, attenuate at base into petiole c. 10 mm long. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals very shortly pedicellate; peduncle slender to robust, 10–18 mm long; rays of umbel 2, 8–10 mm long; pedicels c. 1–2 mm long; central bracts 3–5 mm long, 2 mm wide, obtuse or rounded; lateral bracts orbicular, 3 mm long, 3–4 mm wide, concave. Calyx entire or toothed, 1–2 mm long. Corolla in mature bud slender to robust, 20–25 mm long, usually 6-merous, obtuse, green. Anthers 2 mm long, c. ½ length of free part of filament. Fruit ellipsoidal, c. 10 mm long, constricted at apex.

Occurs in W.A., N.T. and S.A. from the Barlee Range to the Harts Range in arid woodland on *Acacia* spp., usually *A. estrophiolata* and *A. victoriae*. Map 143.

W.A.: Bungabooka, Barlee Range, 15 Sept. 1959, *A. Robinson* (PERTH). N.T.: 18 km E of Ambrolindum, S of Harts Range, 2 June 1953, *D. E. Symon* (ADW).

**29. *Amyema nestor*** (S. Moore) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 297 (1929)

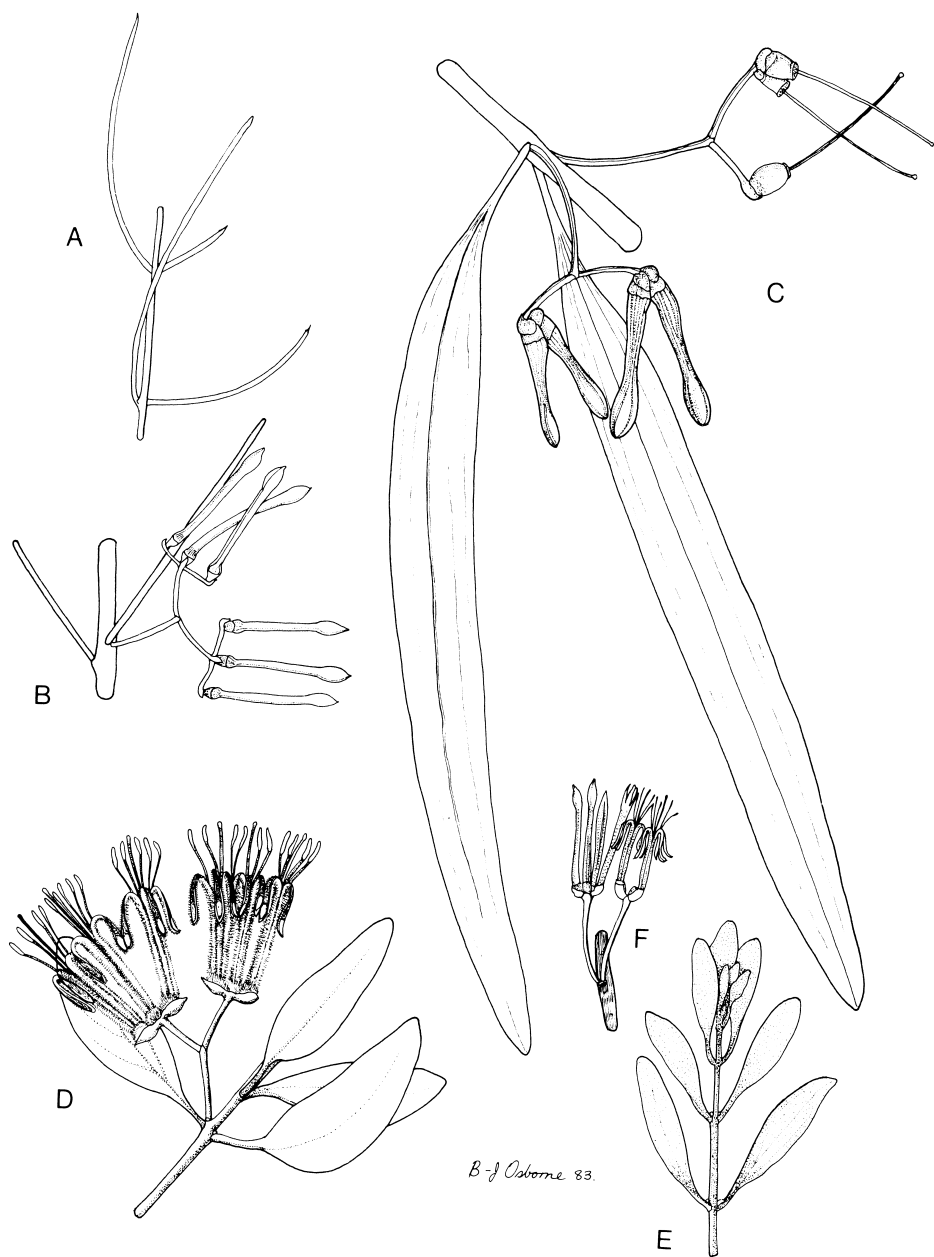
*Loranthus nestor* S. Moore, *J. Bot.* 35: 170 (1897). T: near Brickey Soak, Goldfields, W.A., June 1895, *S. Moore s.n.*; holo: BM.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 49: t. 16 (1924) as *Loranthus nestor*.

Plant spreading to pendulous, golden- or red-brown-tomentose (especially the flowers); epicortical runners absent. Leaves elliptic to ovate, rounded; lamina 4–7 cm long, 12–25 mm wide, contracted at base into distinct petiole 5–10 mm long. Inflorescence a pedunculate umbel of triads, the central flower sessile, the laterals very shortly pedicellate, apparently sessile but 3 flowers of triad standing parallel; peduncle 10–18 mm long; rays of umbel 2, 5–10 mm long; central bracts lanceolate, c. 6 mm long, obtuse or rounded; lateral bracts c. 4 mm long, concave, acute. Calyx entire, 0.5 mm long. Corolla in mature bud robust, c. 25 mm long, 5- or 6-merous, clavate, golden- or brown-tomentose. Anthers c. 4 mm long, slightly shorter than free part of filament. Fruit ovoid, 10–12 mm long. Fig. 26D.

Endemic in W.A. from the Gascoyne R. to the Eastern Goldfields in semi-arid woodland, exclusively on *Acacia*. Map 144.

W.A.: Mt Magnet, *A. Ashby 3464* (AD, CANB); Comet Vale, Aug. 1917, *J. T. Jutson* (MEL, NSW).



**Figure 26.** *Amyema*. **A–B**, *A. preissii*. **A**, leaves  $\times 0.7$ ; **B**, inflorescence  $\times 0.7$  (**A–B**, M. Blackwell 2848, CANB). **C**, *A. bifurcatum* var. *eburneum*, flowering branchlet  $\times 0.7$  (K. Kenneally 3078, CANB). **D**, *A. nestor*, flowering branchlet  $\times 0.7$  (S. Moore 3464, CANB). **E–F**, *A. fitzgeraldii*. **E**, leaves  $\times 0.7$ ; **F**, inflorescences  $\times 0.7$  (EF, N. Forde 508, CANB).

**30. Amyema subcapitatum** Barlow, *Brunonia* 5: 210 (1983)

T: Ross River near Trephina Gorge, N.T., 26 Sept. 1981, *H. C. Weber* AS9; holotype: CANB.

Plant erect or spreading, white- or rusty-tomentose on young shoots and inflorescences or the indumentum sparse, otherwise glabrous; epicortical runners absent. Leaves linear to narrowly oblanceolate, rounded at apex; lamina 35–55 mm long, 3–5 mm wide, attenuate and terete at base, without distinct petiole. Inflorescence a pedunculate head of 2 sessile triads each with the central flower sessile, the laterals pedicellate; peduncle slender, 15–25 mm long; pedicels 1.5–2 mm long; central bracts elliptic, 2 mm long, keeled; lateral bracts 2–2.5 mm long, rounded at apex, concave, enclosing ovary. Calyx entire, 0.8 mm long. Corolla in mature bud slender in middle, c. 25 mm long, 4- or 5-merous, distinctly clavate, yellow-green. Anthers 2.5–3 mm long, c. ½ length of free part of filament. Fruit not known.

Occurs in N.T., known only from the type collection which was parasitic on *Acacia* Map 145.

**31. Amyema maidenii** (Blakely) Barlow, *Proc. Linn. Soc. New South Wales* 87: 57 (1962)

*Loranthus maidenii* Blakely, *Proc. Linn. Soc. New South Wales* 47: 393 (1922), and 49: 87, t. 21 (1924); *Diplatia maidenii* (Blakely) Danser, *Bull. Jard. Bot. Buitenz.* ser. 3, 10: 312 (1929). T: Tarcoon, N.S.W., Nov. 1903, *J. L. Boorman s.n.*; lecto: NSW, *vide* B. A. Barlow, *Austral. J. Bot.* 14: 472 (1966).

Plant erect or spreading, white- or brown-tomentose especially the inflorescence, sometimes adult leaves, bracts and peduncles nearly glabrous; epicortical runners absent. Leaves oblanceolate to ovate, rounded; lamina 2–6 cm long, 5–23 mm wide, attenuate or contracted at base into petiole 1–10 mm long. Inflorescence a pedunculate head of 2 sessile triads; flowers sessile; peduncle 10–30 mm long, dilated upwards; central bracts triangular to elliptic, 2–5 mm long; lateral bracts nearly orbicular, 2–3 mm long, concave. Calyx entire, 1 mm long. Corolla in mature bud slender, 14–30 mm long, 5-merous, clavate, green. Anthers 1.5–3 mm long, c. ½ length of free part of filament. Fruit ellipsoidal, c. 8 mm long, constricted near apex.

Occurs in all mainland States except Vic. in semi-arid and arid woodland, exclusively on *Acacia*. There are 2 subspecies.

Plant entirely tomentose; leaves elliptic to ovate; lamina usually 3–4 cm long, 10–18 mm wide; petiole 5–10 mm long

**31a. subsp. maidenii**

Plant sparsely tomentose, except adult leaves, bracts and peduncles nearly glabrous; leaves oblanceolate to oblong; lamina usually 3–6 cm long, 5–10 mm wide; petiole 1–5 mm long

**31b. subsp. angustifolium**

**31a. Amyema maidenii** (Blakely) Barlow subsp. **maidenii**

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 49: t. 21 (1924) as *Loranthus maidenii*.

Plant tomentose except mature stems. Leaves elliptic to ovate; lamina usually 3–4 cm long, 10–18 mm wide, attenuate or contracted at base into petiole 5–10 mm long.

Occurs in all mainland States except Vic., from the Gibson Desert to the Western Plains of Qld and N.S.W., usually on *Acacia aneura* and *A. tetragonophylla*. Map 146.

W.A.: Miss Gibson Hill, *A. S. George* 4042 (PERTH). N.T.: Wauchope, July 1953, *H. Caulfield & R. Hill* (AD). Qld: 24 km W of Mitchell, *B. A. Barlow* 205 (BRIU). N.S.W.: Cobar, 1 July 1910, *L. Abrahams* (NSW).

**31b. Amyema maidenii** subsp. **angustifolium** Barlow, *Austral. J. Bot.* 14: 473 (1966)

T: Pilliga, N.S.W., Sept. 1932, *H. M. R. Rupp s.n.*; holo: NSW.

Plant tomentose except mature stems, leaves, peduncles and bracts glabrous or nearly so. Leaves oblanceolate to oblong; lamina usually 3–6 cm long, 5–10 mm wide, attenuate at base into obscure petiole 1–5 mm long.

Occurs in Qld and N.S.W. from the Mitchell District through the western Darling Downs to the Pilliga District; most commonly parasitic on *Acacia harpophylla* and *A. cambagei* Map 147.

Qld: 58 km N of Aramac, *I. Tommerup 35* (AD); 58 km E of Condamine, *B. A. Barlow 34* (BRIU). N.S.W.: 27 km S of Boggabilla, *B. A. Barlow 52* (BRIU); Narrabri, June 1907, *W. Bauerlen* (NSW).

**32. Amyema fitzgeraldii** (Blakely) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 295 (1929)

*Loranthus fitzgeraldii* Blakely, *Proc. Linn. Soc. New South Wales* 47: 393 (1922), and 49: 89, t. 22 (1924). T: Mingenew, W.A., Oct. 1909, *J. H. Maiden s.n.*; lecto: NSW, *fide* B. A. Barlow, *Austral. J. Bot.* 14: 464 (1966).

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 49: t. 22 (1924) as *Loranthus fitzgeraldii*.

Plant erect or spreading, shortly white-tomentose; epicortical runners absent. Leaves oblong to elliptic, rounded at apex; lamina 2–4 cm long, 6–20 mm wide, attenuate at base into petiole 4–8 mm long. Inflorescence a pedunculate head of 3–5 sessile flowers; peduncle slender, 5–15 mm long; bracts subtending each flower except central one, nearly orbicular, 2–2.5 mm long. Calyx entire, 0.5 mm long. Corolla in mature bud slender, 18–26 mm long, 5-merous, clavate, acute, green. Anthers 2 mm long, c. ½ length of free part of filament. Fruit nearly globose, c. 6 mm long. Fig. 26E–F.

Occurs in W.A. and S.A. from Geraldton to the Great Victoria Desert in semi-arid woodland, parasitic exclusively on *Acacia* Map 148.

W.A.: Barlee Range, Sept. 1959, *A. Robinson* (PERTH); 58 km E of Warburton, *A. S. George 3900* (PERTH). S.A.: 46 km W of Emu, *N. Forde 508* (AD, CANB).

**33. Amyema sanguineum** (F. Muell.) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 298 (1929)

*Loranthus sanguineus* F. Muell., *Fragm.* 1: 177 (1859); *Pilostigma sanguineum* (F. Muell.) Tieghem, *Bull. Soc. Bot. France* 41: 489 (1894). T: bank of Victoria R., N.T., Oct. 1855, *F. Mueller s.n.*; holo: MEL.

Plant pendulous, glabrous; epicortical runners present. Leaves narrowly lanceolate to broadly elliptic, obtuse to rounded; lamina 6–25 cm long, 1–6 cm wide, attenuate to contracted at base into petiole 5–20 mm long. Inflorescence a pedunculate umbel of 3–6 flowers; peduncle robust, 4–12 mm long; rays of umbel 3–7 mm long; bracts 1.5–3.5 mm long, acute. Calyx entire or irregularly split, 0.5 mm long. Corolla in mature bud robust, 3–6 cm long, 6-ribbed or 6-angular, clavate, usually red, rarely yellow. Anthers 4–7 mm long, equal to free part of filament. Fruit funnel-shaped, 8–14 mm long.

Occurs in W.A., N.T., S.A. and Qld, from North West Cape to Torres Strait islands and Townsville, in open forest and woodland; parasitic mostly on *Eucalyptus*, occasionally on *Melaleuca* and *Tristania*. There are 2 varieties.

Leaves narrowly to broadly lanceolate; lamina up to 25 cm long and 2.5 cm wide; corolla 3–5 cm long

**33a. var. sanguineum**

Leaves oblong to broadly elliptic; lamina up to 10 cm long and 6 cm wide; corolla usually 4.5–6 cm long

**33b. var. pulchrum**

**33a. Amyema sanguineum** (F. Muell.) Danser var. **sanguineum**

*Pilostigma muelleri* Tieghem, *Bull. Soc. Bot. France* 41: 540 (1894); *Loranthus muelleri* (Tieghem) Engl., *Nat. Pflanzenfam. Nachtr.* 1 to 3(1): 128 (1897); *Amyema muelleri* (Tieghem) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 297 (1929). T: Albert River, ?Qld, collector unknown; n.v.

*Pilostigma brevipes* Tieghem, *Bull. Soc. Bot. France* 41: 540 (1894); *Loranthus brevipes* (Tieghem) Engl., *Nat. Pflanzenfam. Nachtr.* 1 to 3(1): 128 (1897); *Amyema brevipes* (Tieghem) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 294 (1929). T: Rockingham Bay, Qld; n.v.

*Loranthus spathulatus* O.Schwarz, *Repert. Spec. Nov. Regni Veg.* 24: 81 (1927); *Amyema spathulatum* (O. Schwarz) Danser, *Verh. Kon. Ned. Akad. Wetensch. Afd. Natuurk., Tweede Sect.* 29: 34 (1933). T: without locality, North Expedition, F. Schultz 588, 704, 794; n.v.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 47: t. 42 (1922) as *Loranthus sanguineus*.

Leaves narrowly to broadly lanceolate; lamina 6–25 cm long, 1–2.5 cm wide, often falcate. Corolla in mature bud 3–5 cm long.  $n = 9$ , *vide* B. A. Barlow & D. Wiens, *Taxon* 20: 291 (1971). Fig. 27C.

Occurs throughout the range of the species. Map 149.

W.A.: edge of Cape Range, c. 15 km N of Learmonth, A. S. George 1305 (PERTH). N.T.: Mataranka Station, T. S. Henshall 1926 (AD, BRI, CANB, CBG, NSW, NT). S.A.: Piltadi Creekline, Mann Range, D. E. Symon 2610 (ADW). Qld: Prince of Wales Is., E. Cameron 20232 (QRS); 34 km S of Townsville, B. A. Barlow 120 (BRIU).

**33b. Amyema sanguineum** var. **pulchrum** (Ewart) Barlow, *Austral. J. Bot.* 14: 484, fig. 9 (1966)

*Loranthus sanguineus* var. *pulcher* Ewart, *Proc. Roy. Soc. Victoria* ser. 2, 24: 69 (1911). T: Napier Broome Bay, W.A., 2 Apr. 1910, G. F. Hill 156; holo: MEL; iso: NSW.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 47: t. 43 (1922) as *Loranthus sanguineus* var. *pulcher*.

Leaves oblong to broadly elliptic; lamina 6–10 cm long, 2.5–6 cm wide. Corolla in mature bud usually 4.5–6 cm long.

Occurs from Napier Broome Bay, W.A., to Katherine, N.T., as an occasional variant within the range of the typical variety. Map 150.

N.T.: Katherine, B. A. Barlow 555 (BRIU); Jim Jim Road, 29 km W of South Alligator R., J. Must 886 (BRI, CANB, DNA, K, L, NSW, NT).

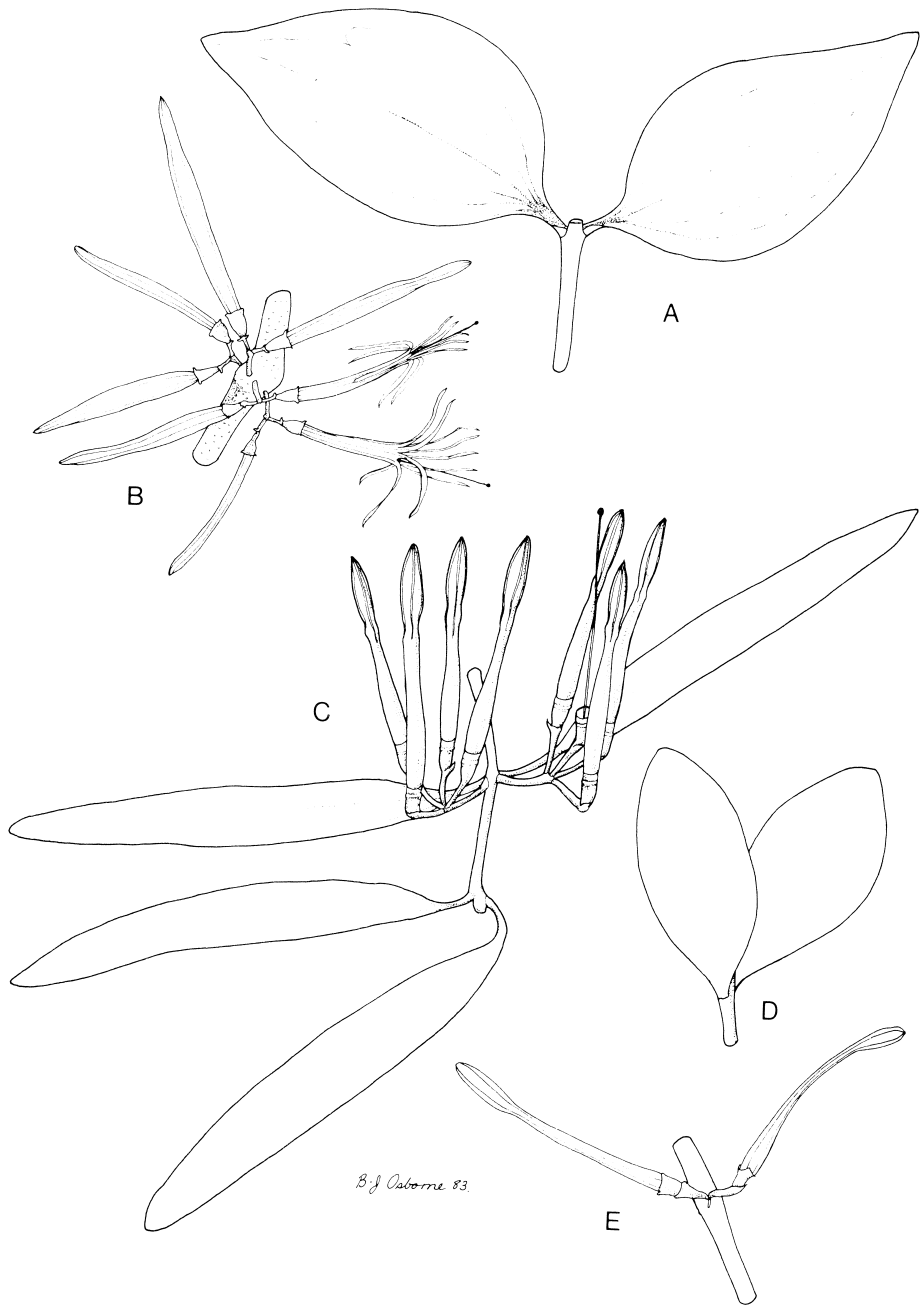
**34. Amyema quaternifolium** Barlow, *Austral. J. Bot.* 14: 482, fig. 7E–G (1966)

T: 1 mile (1.6 km) S of Daintree, Qld, 11 Oct. 1964, I. B. Staples s.n.; holo: BRI; iso: AD, ADW, BRIU, CANB, NSW, NT.

Plant spreading to pendulous, glabrous except the inflorescence and calyx sometimes hoary; epicortical runners present. Leaves in groups of 4, oblong to obovate, rounded; lamina 5–11 cm long, 2–5 cm wide, attenuate at base into petiole 1–2 cm long. Inflorescence a pedunculate umbel of 2–4 flowers; peduncle 4–9 mm long; rays of umbel 3–5 mm long; bracts 1.5 mm long, obtuse. Calyx entire, 0.3 mm long. Corolla in mature bud slender in middle, 35–40 mm long, 6-ribbed or 6-angular, clavate, red. Anthers c. 4 mm long, c. ½ length of free part of filament. Fruit not known.

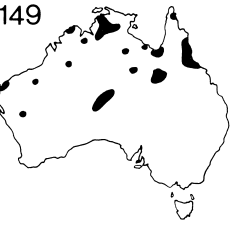
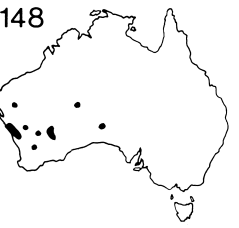
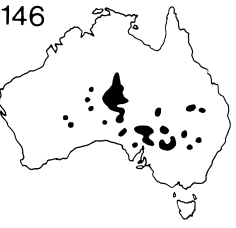
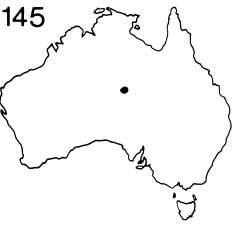
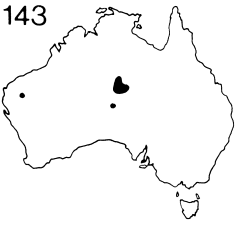
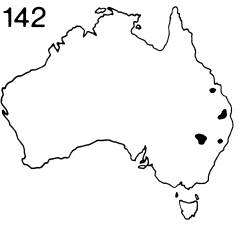
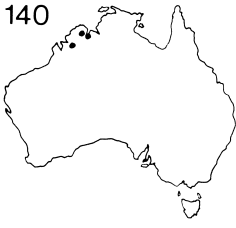
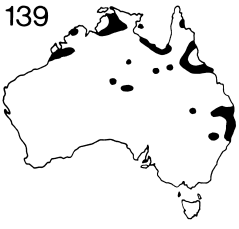
Endemic in Qld from Daintree to the Atherton Tableland in rainforest on various hosts. Map 151.

Qld: Upper Daintree, B. A. Barlow 755 (BRIU, NSW); State Forest Reserve 194 (17°19'S 145°26'E), G. L. Unwin 703 (QRS).



**Figure 27.** *Amyema*. **A–B**, *A. semenianum* subsp. *flexuosum*. **A**, leaves  $\times 0.5$ ; **B**, inflorescences  $\times 0.7$  (**A–B**, R. Pullen 3647, CANB). **C**, *A. sanguineum* var. *sanguineum*, flowering branchlet  $\times 0.7$  (R. Roos, CANB). **D–E**, *A. whitei*. **D**, leaves  $\times 0.7$ ; **E**, inflorescence  $\times 0.7$  (**D–E**, G. Stocker 1174, CANB).





136. *Amyema pendulum*  
subsp. *longifolium*

139. *Amyema bifurcatum*  
var. *bifurcatum*

142. *Amyema quandang*  
var. *bancroftii*

145. *Amyema subcapitatum*

148. *Amyema fitzgeraldii*

137. *Amyema miquelii*

140. *Amyema bifurcatum*  
var. *eburneum*

143. *Amyema hillianum*

146. *Amyema maidenii*  
subsp. *maidenii*

149. *Amyema sanguineum*  
var. *sanguineum*

138. *Amyema biniflorum*

141. *Amyema quandang*  
var. *quandang*

144. *Amyema nestor*

147. *Amyema maidenii*  
subsp. *angustifolium*

150. *Amyema sanguineum*  
var. *pulchrum*

**35. *Amyema whitei*** (Blakely) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 299 (1929)

*Loranthus whitei* Blakely, *Proc. Linn. Soc. New South Wales* 47: 400, t. 44 (1922); *Pilostigma whitei* (Blakely) Barlow, *Proc. Linn. Soc. New South Wales* 87: 56 (1962). T: Atherton scrub, Qld, Sept. 1911, R. Mitchell; holo: NSW.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 47: t. 44 (1922) as *Loranthus whitei*.

Plant erect to spreading, glabrous except ovary and axes of inflorescence shortly brown-tomentose; epicortical runners present. Leaves ovate to nearly orbicular, rounded or rarely acute; lamina 5–9 cm long, 3–5 cm wide, contracted at base into petiole 3–5 mm long. Inflorescence a pedunculate 2-flowered umbel; peduncle robust, 1–4 mm long; rays of umbel 3–4 mm long; bracts nearly orbicular, 2 mm long, concave. Calyx entire, 0.5 mm long. Corolla in mature bud robust, c. 40 mm long, more or less 6-ribbed, clavate, red or rarely yellow. Anthers 4–5 mm long, c. ½ length of free part of filament. Fruit nearly globose, 8 mm long, contracted at apex. Fig. 27D–E.

Endemic in Qld from Mossman to the Atherton Tableland in rainforest on various hosts. Map 152.

Qld: State Forest Reserve 143 (16°33'S 145°18'E), B. P. Hyland 9677 (QRS); Lake Barrine, S. F. Kajewski 1121 (BRI).

**36. *Amyema seemenianum*** (Schumann.) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 299 (1929)

*Loranthus seemenianus* Schumann., in Schumann & Hollrung, *Fl. Kaiser Wilh. Land* 106 (1889). T: near Hatzfeldhafen, New Guinea, Oct. 1886, Hollrung 345; iso: K, WRSL.

Illustration: B. H. Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 11: 343, fig. 11 (1931).

Plant erect or spreading, glabrous or the inflorescence shortly brown- or white-tomentose; epicortical runners present. Leaves broadly lanceolate to ovate, acuminate or obtuse; lamina 6–30 cm long, 3–13 cm wide, contracted at base into petiole 5–18 mm long. Inflorescence a pedunculate 2-flowered umbel; peduncle slender, 3–8 mm long; rays of umbel 2–6 mm long; bracts nearly orbicular, 1–2 mm long, spreading. Calyx entire to toothed, 0.2–2 mm long. Corolla in mature bud 30–65 mm long, 5-merous, thin, inflated, acute or obtuse, red or yellow. Anthers 5–7 mm long, nearly equal to free part of filament. Fruit pear-shaped to almost globose, 10–12 mm long, constricted at apex.

Occurs on Cape York Peninsula, Qld, in rainforest on various hosts. Also in New Guinea from Cycloop Mts to the Sogeri Plateau from sea level to 2150 m altitude. For account of the 3 subspecies, see B. A. Barlow, *Austral. J. Bot.* 22: 590 (1974). 1 subsp. occurs in Australia.

**36a. *Amyema seemenianum* subsp. *flexuosum*** Barlow, *Austral. J. Bot.* 22: 591 (1974)

T: central N coast of Yule Is., Papua New Guinea, 31 July 1962, P. Darbyshire 743; holo: CANB; iso: CANB, L.

Leaf lamina 6–12 cm long, usually acuminate. Ovary funnel-shaped; calyx weakly toothed or dissected, 0.2–0.5 mm long, usually infolded. Anthers hooked or curved at apex. Fig. 27A–B.

Occurs on Cape York Peninsula, Qld, near the McIlwraith Range in rainforest. Also in New Guinea. Map 153.

Qld: Leo Creek, Upper Nesbit R., L. J. Brass 19924 (BRI, CANB); Timber Reserve 14, Leo Creek Road (13°44'S 143°19'E), B. Hyland 11020 (QRS); Upper Massey Creek, c. 24 km ENE of Coen, L. S. Smith 11901 (BRI).

Australian specimens show features of subsp. *flexuosum* and some of subsp. *seemenianum* and are more or less intermediate.

## 10. DIPLATIA

*Diplatia* Tieghem, *Bull. Soc. Bot. France* 41: 501 (1894), from the Greek *di* (two), and *plateia* (flat object), in reference to the enlarged foliaceous bracts

*Loranthus* sect. *Diplatia* (Tieghem) Engl., *Nat. Pflanzenfam.* Nachtr. I to 3(1): 129 (1897). T: *D. grandibractea* (F. Muell.) Tieghem

Aerial stem-parasitic shrubs, erect to pendulous; epicortical runners absent. Leaves opposite, entire, curvined. Inflorescence axillary, a pedunculate head of 2 opposite sessile triads; central bracts of triads enlarged, foliaceous, connate at margins, covering buds during development; lateral bracts small, narrow, caducous. Petals 5, free. Anthers basifixed, immobile, 4-locular.  $x = 9$  (2 spp. counted), *vide* B. A. Barlow & D. Wiens, *Taxon* 20: 291 (1971).

A genus of 3 species endemic in Australia, confined to hosts in the Myrtaceae. The species show close visual resemblance to their respective hosts, and mimicry has been suggested.

B. A. Barlow, Studies in Australian Loranthaceae, *Proc. Linn. Soc. New South Wales* 87: 60 (1962).

- |    |  |                                   |
|----|--|-----------------------------------|
| 1  | Ovary white-tomentose; peduncle less than 10 mm long, terete or nearly so        | <b>1. <i>D. tomentosa</i></b>     |
| 1: | Ovary glabrous; peduncle more than 10 mm long, flattened in same plane as bracts |                                   |
| 2  | Bracts shorter than flowers; peduncle divided at apex                            | <b>2. <i>D. furcata</i></b>       |
| 2: | Bracts longer than flowers; peduncle undivided at apex                           | <b>3. <i>D. grandibractea</i></b> |

**1. *Diplatia tomentosa*** Barlow, *Austral. J. Bot.* 14: 488, fig. 7 j-l (1966)

T: near Rocky Point, c. 14 miles (22 km) N of Mossman, Qld, 22 May 1964, B. A. Barlow 753; holo: AD; iso: BRIU.

Plant erect or spreading, glabrous except ovary and inside of central bracts at base white-tomentose. Leaves broadly lanceolate to oblong, rounded at apex; lamina 6–9 cm long, 10–25 mm wide, attenuate at base into petiole 4–6 mm long. Peduncle terete or slightly compressed at right angles to plane of bracts, 5–8 mm long, undivided at apex; central bracts c. 25 mm long, 18 mm wide; lateral bracts linear, c.

**k** length of ovary. Calyx entire, 0.7 mm long. Corolla in mature bud c. 26 mm long, green. Anthers c. 3.5 mm long,  $\frac{2}{3}$  length of free part of filament. Fruit ellipsoidal, not seen mature.

Endemic in Qld from Torres Strait islands to Mossman in swamp forest on *Melaleuca*. Map 154.

Qld: Baileys Creek, 13 km ENE of Daintree, L. S. Smith 11625 (BRI, CANB).

A collection from Badu Is. (Garrett 279, BRI) has peduncle features similar to *D. furcata*, and is possibly hybrid.

**2. *Diplatia furcata*** Barlow, *Proc. Linn. Soc. New South Wales* 87: 57, fig. 1 (1962)

T: Dallarnil, Burnett District, Qld, 28 Dec. 1939, L. S. Smith 624; holo: BRI.

Illustration: F. M. Bailey, *Queensland Fl.* 5: t. 44 (1902), as *Loranthus grandibracteus*.

Plant erect or spreading, glabrous. Leaves lanceolate to oblong, rounded or obtuse; lamina 4–10 cm long, 5–25 mm wide, attenuate at base into petiole 3–5 mm long. Peduncle 10–25 mm long, terete at base, dilated and flattened in plane of bracts to 2–5 mm wide at apex, divided and fused with central bract in upper 2–4 mm; central bracts usually 14–20 mm long and 8–12 mm wide; lateral bracts linear, 1–4 mm long. Calyx entire, 0.7 mm

long. Corolla in mature bud 18–28 mm long, green. Anthers 2–3 mm long, almost  $\frac{1}{2}$  length of free part of filament. Fruit ellipsoidal, c. 8 mm long.

Occurs in N.T. and Qld from Arnhem Land to Torres Strait islands and near Brisbane, in open forest; usually on *Melaleuca* and *Callistemon*, rarely on *Eucalyptus* Map 155.

N.T.: Kapalga, L. A. Craven 4494 (A, CANB, L, NT). Qld: 9 km SSW of Portland Roads, B. A. Barlow 3701 & 3707 (BRI, CANB, QRS); Glass House Mts, 1901, T. L. Bancroft (BRI, NSW).

### 3. *Diplatia grandibractea* (F. Muell.) Tieghem, *Bull. Soc. Bot. France* 41: 501 (1894)

*Loranthus grandibracteus* F. Muell., *Essay. Burdekin Exped.* 14 (1860). T: Gulf of Carpentaria, F. Mueller; holotype: MEL.

*Diplatia tenuifolia* Tieghem, *Bull. Soc. Bot. France* 41: 502, 509 (1894). T: Suttor River & Port Denison, Qld, collector unknown; n.v.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 49: t. 23 (1924) as *Loranthus grandibracteus*.

Plant pendulous, glabrous. Leaves narrowly lanceolate to oblong, rounded at apex; lamina 6–12 cm long, 5–20 mm wide, attenuate at base into petiole 5–18 mm long. Peduncle 17–35 mm long, terete at base, dilated and flattened in plane of bracts to 6–8 mm wide at apex, undivided; central bracts 28–45 mm long, 15–22 mm wide; lateral bracts usually slightly longer than ovary. Calyx entire or dissected, 0.7 mm long. Corolla in mature bud 25–32 mm long, green. Anthers 2.5–3 mm long, almost equal to free part of filament. Fruit ellipsoidal, 8 mm long.

Occurs in all mainland States except Vic., from the Hamersley Range and the Kimberley to Townsville and the Western Plains of N.S.W. in open forest and woodland, commonly along watercourses; parasitic on *Eucalyptus* Map 156.

W.A.: Lennard R., King Leopold Range, B. A. Barlow 1229 (CANB); below summit of Mt Nameless (22°32'S, 117°44'E), R. J. Chinnock 4760 (AD). S.A.: 176 km NW of Parakylia, 10 Feb. 1937, H. G. Andrewartha (ADW). Qld: Stannary Hills, 1908, T. L. Bancroft (BRI). N.S.W.: 14 km S of Lightning Ridge, B. A. Barlow 56 (BRIU).

## 11. DENDROPTHOE

*Dendroptoe* Martius, *Flora* 13: 109 (1830), from the Greek *dendron* (a tree), and *pthienin* (to wither), in reference to the effect of the mistletoe on its host

Type: *D. farinosa* (Desr.) Mart.

Aerial stem-parasitic shrubs, spreading to pendulous; epicortical runners usually present. Leaves opposite, displaced-opposite or alternate, penninerved. Inflorescence axillary, a raceme or (not in Australia) spike, sometimes reduced to 1 or 2 flowers; bract 1 under each flower. Petals 5, united to middle or higher into a curved tube inflated in middle and unequally lobed. Stamens equal; anthers dorsifixed, immobile, introrse, 4-locular.

$x = 9$ , *vide* B. A. Barlow & D. Wiens, *Taxon* 20: 291 (1971).

A genus of c. 30 species distributed from tropical Africa to Australia, with its centre of diversity in western Malesia. Specific limits are generally difficult to distinguish because many species are polymorphic and connected by intergrades. This situation applies in part to the six Australian species, 4 of which are endemic.

B. H. Danser, *Dendroptoe*, *Bull. Jard. Bot. Buitenzorg* ser. 3, 11: 397 (1931); B. A. Barlow, *Dendroptoe*, *Austral. J. Bot.* 22: 606 (1974).

1 Leaves opposite, sessile, cordate at base

5. *D. homoplastica*

1: Leaves usually displaced-opposite or alternate, petiolate, not cordate at base

- 2 Fruit warted; inflorescence usually 2-flowered, rarely 1- or 3-flowered **6. D. acacioides**
- 2: Fruit smooth; inflorescence several-flowered
- 3 Leaves dorsiventral, usually thin; hosts usually rainforest trees **1. D. falcata**
- 3: Leaves isobilateral, usually leathery; hosts usually trees of open forest
- 4 Ovary glabrous or with sparse white indumentum **2. D. glabrescens**
- 4: Ovary white- or brown-tomentose
- 5 Calyx prominently toothed; tomentum white **4. D. odontocalyx**
- 5: Calyx entire or weakly toothed; tomentum brown **3. D. vitellina**

**1. *Dendrophthoe falcata* (L.f.) Ettingsh., *Denkschr. Kaiserl. Akad. Wiss. Math.-Naturwiss. Kl.* 32: 52 (1872)**

*Loranthus falcatus* L.f., *Suppl. Pl.* 211 (1782). T: Madras, *K. D. Koenig; n.v.*

*Loranthus odontocalyx* var. *proprius* Blakely, *Proc. Roy. Soc. Queensland* 34: 28 (1922); *Dendrophthoe discolor* Barlow, *Proc. Linn. Soc. New South Wales* 87: 55 (1962). T: Yule Is., Papua, July–Aug. 1918, *C. T. White 736*; holotype: BRI; isotype: NSW.

*Loranthus vitellinus* var. *inflatus* Blakely, *J. Arnold Arbor.* 13: 298 (1932). T: Gadgarra Reserve, Atherton Tableland, Qld, 27 July 1929, *S. F. Kajewski 1163*; holotype: NSW.

Plant spreading to pendulous, glabrous except young shoots, inflorescences sparsely to densely white- (rarely brown-) tomentose or the indumentum sparse; epicortical runners present. Leaves displaced-opposite or alternate, mostly oblong to elliptic, acute or obtuse; lamina 6–13 cm long, 1–4 cm wide, contracted at base into distinct petiole 6–12 mm long, dorsiventral with ventral surface more shining, often recurved at margin, thin; venation distinct on both surfaces with midrib prominent below. Inflorescence axis 5–30 mm long, with 3–12 flowers; pedicels 2–4 mm long; bracts 1 mm long, acute. Calyx entire or 5-toothed, c. 1 mm long. Corolla in mature bud 28–60 mm long, orange to bright red. Anthers 4–5 mm long, equal to free part of filament. Fruit ovoid, 10–14 mm long, yellow to red. Fig. 28A.

Occurs in Qld from Daintree to Cardwell in rainforest on a wide range of host trees. Also occurs from New Guinea to India. Map 157.

Qld: Tolga Creek, 3 km E of Atherton, *R. Schodde 3256* (A, AD, B, BRI, CANB, L, QRS, WELT).

**2. *Dendrophthoe glabrescens* (Blakely) Barlow, *Proc. Linn. Soc. New South Wales* 87: 55 (1962)**

*Loranthus vitellinus* var. *glabrescens* Blakely, *Proc. Linn. Soc. New South Wales* 50: 19, t. 10 (1925). T: Rockhampton, Qld, Mar. 1909, *J. H. Maiden s.n.*; holotype: NSW.

*Loranthus longiflorus* var. *savannorum* Domin, *Biblioth. Bot.* 89: 52 (1921). T: Mt Walker, Hughenden, Qld, Feb. 1910, *K. Domin s.n.*; holotype: PR.

[*Loranthus longiflorus* auct. non Desr.: G. Bentham, *Fl. Austral.* 3: 390 (1867), p.p.]

[*Dendrophthoe pelagica* auct. non Barlow: B. A. Barlow, *Austral. J. Bot.* 22: 609 (1974)]

Illustration: W. F. Blakely, *loc. cit.* as *Loranthus vitellinus* var. *glabrescens*.

Plant spreading to pendulous, glabrous or inflorescence axes and ovary with sparse white indumentum; epicortical runners usually present. Leaves displaced-opposite or alternate, lanceolate to elliptic (rarely almost orbicular), rounded at apex; lamina 3–20 cm long, 1–6 cm wide, attenuate at base into petiole 3–25 mm long, isobilateral, leathery; venation distinct or obscure except prominent midrib. Inflorescence axis 10–30 mm long, with 5–20 flowers; pedicels 3–5 mm long; bracts 1.5–2 mm long, acute. Calyx entire or weakly toothed, sometimes irregularly split, 1–2 mm long. Corolla in mature bud 2–5 cm long, yellow to light red. Anthers 3–5 mm long, about equal to free part of filament. Fruit ovoid, 10–15 mm long, yellow to red.

Occurs in W.A., N.T., Qld and N.S.W. from E Kimberley, W.A., to Torres Strait islands, Qld, and thence southwards to Tumberumba, N.S.W., mostly in open forest and

woodland in inland localities but extending into rainforest on Cape York Peninsula; parasitic on various trees but common on *Eucalyptus*, *Melaleuca*, *Tristania*, *Barringtonia*. Also in P.N.G. Map 158.

W.A.: Cave Road, near Kununurra, *W. Leutert 19* (CANB). N.T.: near Caranbirini Waterhole, McArthur R., *L. A. Craven 4056* (CANB). Qld: Iron Range, *L. J. Brass 19652* (BRI, CANB); 17 km E of Torrens Creek, *A. D. Chapman 1362* (AD, BRI, CANB). N.S.W.: 17 km S of Tumburumba, 12 Dec. 1921, *J. W. Dwyer* (NSW).

The greatest variation in leaves, indumentum and habitat occurs on Cape York Peninsula where introgression from *Dendrophthoe falcata* has probably occurred.

**3. *Dendrophthoe vitellina*** (F. Muell.) Tieghem, *Bull. Soc. Bot. France* 42: 86, 87 (1895)

*Loranthus vitellinus* F. Muell., *Rep. Burdekin Exped.* 12 (1860). T: near Ipswich, Qld, *Beckler s.n.*; lecto: MEL, *fide* B. A. Barlow, *Austral. J. Bot.* 14: 493 (1966).

[*Loranthus longiflorus* auct. non Desr.: G. Bentham, *Fl. Austral.* 3: 390 (1867), *p.p.*]

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 50: t. 9 (1925) as *Loranthus vitellinus*.

Plant spreading to pendulous, glabrous except young shoots and inflorescence brown-tomentose; epicortical runners usually present, especially on myrtaceous hosts, rarely absent. Leaves displaced-opposite or alternate, narrowly lanceolate to elliptic, rounded at apex; lamina 4–14 cm long, 6–30 mm wide, attenuate at base into petiole 3–12 mm long, isobilateral, leathery; venation distinct or obscure except prominent midrib. Inflorescence axis 5–50 mm long, with 5–20 flowers; pedicels 1.5–4 mm long; bracts 1.5 mm long, acute or obtuse. Calyx entire or weakly toothed, 1 mm long. Corolla in mature bud 25–50 mm long, yellow to red. Anthers 3–4 mm long, about equal to free part of filament. Fruit ovoid, 10–15 mm long, yellow to red.

Occurs from Atherton Tableland, Qld, to Mallacoota, Vic., in open forest on a wide range of hosts but frequently on Myrtaceae Map 159.

Qld: Black Mt Forestry Road c. 16 km N of Kuranda, *R. D. Hoogland 8256* (A, BRI, CANB, K, L, US). N.S.W.: Mebbin State Forest, c. 8 km S of Tyalgum, *R. D. Hoogland 11663* (BRI, CANB, MEL, NSW). Vic.: Mallacoota, 26 Jan. 1947, *N. A. Wakefield & J. Willis* (MEL).

**4. *Dendrophthoe odontocalyx*** (F. Muell. ex Benth.) Tieghem, *Bull. Soc. Bot. France* 42: 87 (1895)

*Loranthus odontocalyx* F. Muell. ex Benth., *Fl. Austral.* 3: 391 (1867). T: between McAdam Range and Providence Hill, northern Australia, Oct. 1855, *F. Mueller s.n.*; holo: MEL; iso: NSW.

*Elytranthe bleeseri* O. Schwarz, *Repert. Spec. Nov. Regni Veg.* 24: 82 (1927). T: Koolpinyah, N.T., *F. A. K. Bleeser 371*; iso: NSW.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 50: t. 11 (1925) as *Loranthus odontocalyx*.

Plant spreading to pendulous; young shoots, inflorescence and sometimes whole plant white-tomentose; epicortical runners present. Leaves displaced-opposite or alternate, lanceolate to broadly elliptic, obtuse or rounded; lamina usually 4–10 cm long and 10–35 mm wide, attenuate to contracted at base into petiole 5–15 mm long, isobilateral, leathery; venation distinct or obscure except prominent midrib. Inflorescence axis 5–20 mm long, with 3–8 flowers; pedicels 2–6 mm long; bracts 1 mm long, acute. Calyx 1–2 mm long, prominently toothed. Corolla in mature bud 3–4 cm long, yellow to red. Anthers usually 5–7 mm long, usually slightly longer than free part of filament. Fruit ovoid, 12–15 mm long, yellow to red.

Endemic in N.T. from Melville Is. to Borroloola, in monsoon forest and woodland on various trees but especially on *Eucalyptus*, *Grevillea* and *Syzygium* Map 160.

N.T.: 10 km NW of Katherine, *L. G. Adams 812* (BRI, CANB, K, L, NSW, NT, US); Melville Is., *N. Byrnes 2790* (BRI, CANB, DNA, K, NT); Wessel Is., *P. K. Latz 3464* (CANB, NSW, NT).

**5. *Dendrophthoe homoplastica*** (Blakely) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 309 (1929)

*Loranthus homoplasticus* Blakely, *Proc. Linn. Soc. New South Wales* 50: 19, t. 11 (1925). T: Stannary Hills, Qld, *T. L. Bancroft s.n.*; holo: NSW.

[*Loranthus longiflorus* var.? *amplexifolius* auct. non Thwaites: G. Bentham, *Fl. Austral.* 3: 390 (1867), p.p.]

Illustration: W. F. Blakely, *loc.cit.* as *Loranthus homoplasticus*.

Plant spreading, glabrous or rarely the inflorescence with sparse white indumentum; epicortical runners present or absent. Leaves opposite, ovate to orbicular, rounded at apex; lamina 3–5 cm long, 3–4 cm wide, cordate at base, sessile, isobilateral, leathery; venation usually obscure except midrib. Inflorescence axis 8–20 mm long, bearing 6–12 flowers; pedicels usually 2–5 mm long; bracts 1–1.5 mm long, acute or obtuse. Calyx entire or irregularly split, 1 mm long. Corolla in mature bud 28–40 mm long, usually yellow. Anthers 4–7 mm long, usually slightly longer than free part of filament. Fruit ovoid to ellipsoidal, 10–12 mm long, yellow to red. Fig. 28C–D.

Endemic in Qld from Chillagoe to Blair Athol, in open forest and woodland on *Eucalyptus* (especially *E. shirleyi*), *Tristania* and *Melaleuca* Map 161.

Qld: Sandy Tate R., *B. Hyland 8749* (BRI, CANB, QRS); Einasleigh R. crossing between Mt Surprise and Georgetown, *D. E. Symon 4902* (ADW, B, BRI, CANB, K, NSW).

**6. *Dendrophthoe acacioides*** (Cunn. ex Benth.) Tieghem, *Bull. Soc. Bot. France* 42: 85, 87 (1895)

*Loranthus acacioides* Cunn. ex Benth., *Fl. Austral.* 3: 392 (1867); *Amyema acacioides* (Cunn. ex Benth.) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 293 (1929). T: Bat Is., Pt Nelson, Montague Sound, north-western Australia, Oct. 1820, *A. Cunningham 211*; lecto: K; iso: BM, MEL, *vide* B. A. Barlow, *Austral. J. Bot.* 14: 490 (1966).

Plant spreading to pendulous, glabrous; epicortical runners present. Leaves mostly displaced-opposite or alternate, linear to lanceolate or narrowly obovate, rounded or obtuse or acute; lamina 3–14 cm long, 2–28 mm wide, isobilateral, thin, attenuate at base into obscure petiole 5–8 mm long, midrib and sometimes lateral veins distinct on both surfaces. Inflorescence usually 2-flowered and resembling an umbel, rarely 3-flowered with axis to 10 mm long or reduced to a solitary flower; pedicels 1–8 mm long; bracts ovate, 1.5–2 mm long, acute. Calyx 1.5–2 mm long, prominently toothed. Corolla in mature bud 23–35 mm long, yellow to red. Anthers 3–5 mm long, longer than free part of filament. Fruit ovoid, 10–13 mm long, distinctly warted, yellow to red.

Occurs from the W Kimberley, W.A., to W Arnhem Land, N.T., in open forest and woodland, mostly on *Acacia*. There are 2 subspecies.

Leaves linear to narrowly lanceolate; lamina 8–13 cm long, usually 2–4 mm wide

**6b. subsp. longifolia**

Leaves lanceolate to narrowly obovate; lamina 3–8 cm long, usually 8–18 mm wide

**6a. subsp. acacioides**

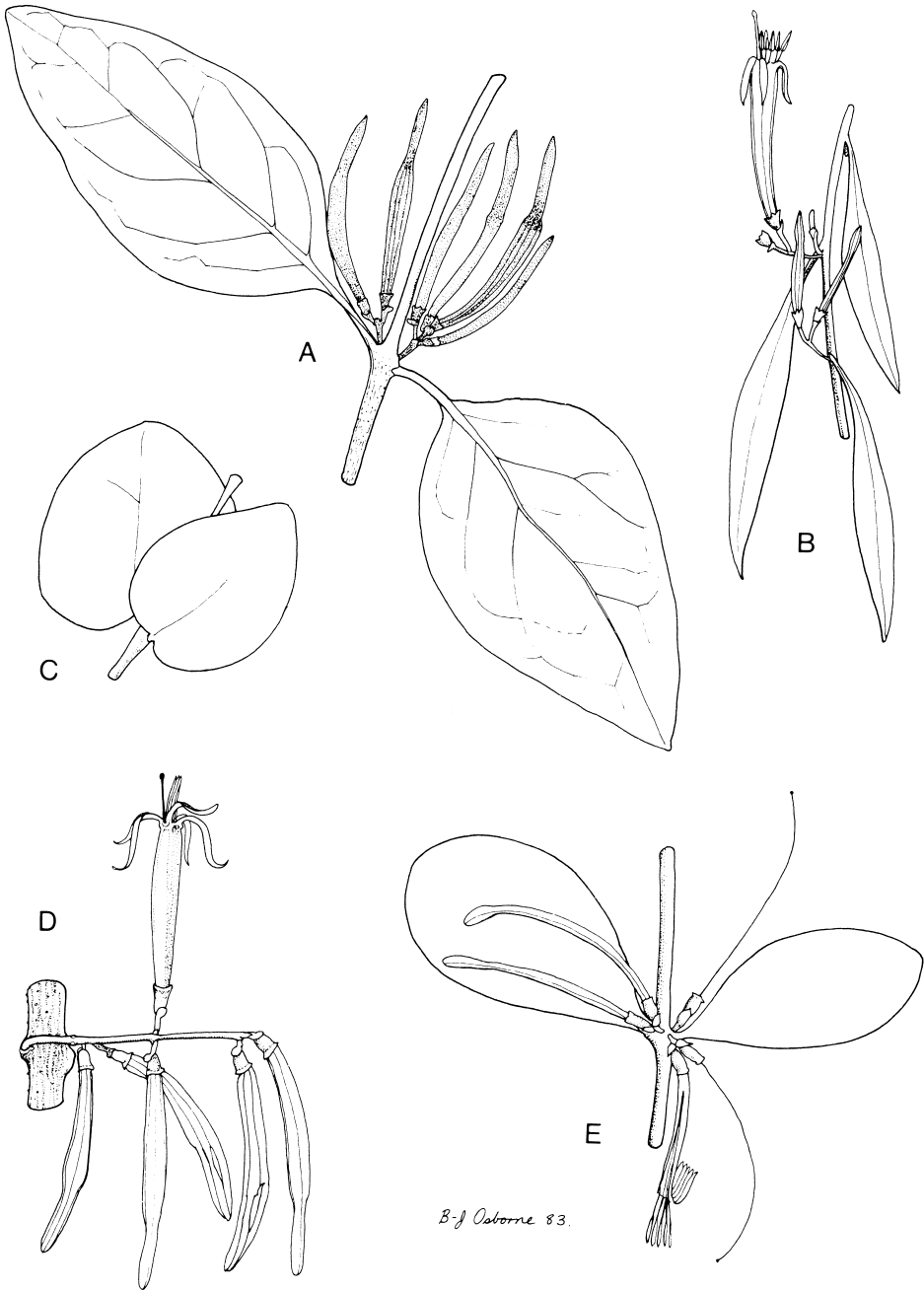
**6a. *Dendrophthoe acacioides*** (A.Cunn. ex Benth.) Tieghem subsp. **acacioides**

*Loranthus kimberleyensis* C. A. Gardner, *Bull. For. Dept. W. Austral.* 32: 46 (1923). T: Moran R., W.A., 30 May 1921, *C. A. Gardner s.n.*; holo: PERTH.

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 50: t. 7 (1925) as *Loranthus acacioides*.

Leaves lanceolate to narrowly obovate; lamina 3–8 cm long, 5–28 (usually 8–18) mm wide. Fig. 28B.

Occurs in W.A. and N.T. throughout the Kimberley and Victoria River district, usually on *Acacia* but also on *Adansonia* and *Brachychiton*. Map 162.



B. J. Osborne 83.

**Figure 28.** A–D, *Dendrophthoe*. A, *D. falcata*, flowering branchlet  $\times 0.7$  (R. Schodde 3256, CANB). B, *D. acacioides* subsp. *acacioides*, flowering branchlet  $\times 0.7$  (T. Hartley 14692, CANB). C–D, *D. homoplastica*. C, leaves  $\times 0.7$ ; D, inflorescence  $\times 0.7$  (C–D, D. Symon 4902, CANB). E, *Benthamina alyxifolia*, leaves and inflorescences  $\times 0.7$  (loc. unknown, N.S.W., R. Brown, CANB).



W.A.: 3 km S of Cape Bertholet, *K. F. Kenneally 5997* (CANB, PERTH); 16 km SE of Tableland, *M. Lazarides 5115* (CANB, MEL, NSW, NT, PERTH). N.T.: 13 km W of Timber Creek, *B. A. Barlow 1195* (CANB).

**6b. *Dendrophthoe acacioides* subsp. *longifolia*** (Specht) Barlow, *Brunonia* 5: 212 (1983)

*Amyema acacioides* var. *longifolia* Specht, *Records Amer.-Austral. Exped. Arnhem Land* 3: 222, fig. 3 (1958); *Dendrophthoe acacioides* var. *longifolia* (Specht) Barlow, *Austral. J. Bot.* 14: 491 (1966). T: Oenpelli, N.T., 1 Oct. 1948, *R. L. Specht 1111*; holo: BRI; iso: NSW.

Leaves linear to narrowly lanceolate; lamina 8–13 cm long, 2–4 (rarely to 8) mm wide.

Endemic in N.T., known only from eastern Arnhem Land, nearly always on *Acacia*. Map 163.

N.T.: 44 km S of Oenpelli, *C. R. Dunlop 4932* (CANB, DNA, K, NSW, NT); Mt Gilruth, *T. S. Henshall 1874* (AD, CANB, DNA, NT).

## 12. BENTHAMINA

*Benthamina* Tieghem, *Bull. Soc. Bot. France* 42: 85, 246 (1895), after George Bentham (1800–1884), English botanist and author of the first comprehensive Australian Flora

*Loranthus* ser. *Benthamina* (Tieghem) Blakely, *Proc. Linn. Soc. New South Wales* 50: 2, 21 (1925).

Type: *Benthamina alyxifolia* (F. Muell. ex Benth.) Tieghem

Aerial stem-parasitic shrubs, erect or spreading; epicortical runners present. Leaves opposite, curvined. Inflorescence axillary, a pedunculate 2-flowered umbel; bract 1 under each flower. Petals 5, united almost to apex into a tube deeply split on one side, the lobes and stamens reflexed to the other side. Stamens equal; anthers basifixed, immobile, introrse, 4-locular.  $x = 9$ , *fide* B. A. Barlow & D. Wiens, *Taxon* 20: 291 (1971).

A monotypic genus endemic in eastern Australia. Apparently related to the Asian genus *Taxillus*.

B. A. Barlow, Biogeography of Loranthaceae and Viscaceae, in D. M. Calder, *Biology of Mistletoes* (1983).

**1. *Benthamina alyxifolia*** (F. Muell. ex Benth.) Tieghem, *Bull. Soc. Bot. France* 42: 85, 87 (1895)

*Loranthus alyxifolius* F. Muell. ex Benth., *Fl. Austral.* 3: 391 (1867); *Amyema alyxifolium* (F. Muell. ex Benth.) Danser, *Bull. Jard. Bot. Buitenzorg* ser. 3, 10: 304 (1929). T: Hastings R., N.S.W., *F. Mueller s.n.*; lecto: MEL *fide* B. A. Barlow, *Austral. J. Bot.* 14: 494 (1966).

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 50: t. 12 (1925) as *Loranthus alyxifolius*.

Plant erect or spreading, glabrous except inflorescence axes and calyx shortly brown-tomentose. Leaves elliptic to broadly obovate, rounded at apex; lamina 25–75 mm long, 20–50 mm wide, somewhat shining above and dull below, recurved at margin, contracted at base into distinct petiole usually 2–7 mm long; venation pinnate, indistinct. Peduncle 0.5–3 mm long; pedicels 0.5–1.5 mm long; bracts 2–3 mm long, encircling ovary. Calyx entire, 1 mm long. Corolla in mature bud 32–42 mm long, curved, truncate, red. Anthers 1.5–3 mm long, about equal to free part of filament. Fruit ellipsoidal, 8–10 mm long. Fig. 28E.

Occurs from Gympie, Qld, to Newcastle, N.S.W., in rainforest and riparian forest on various hosts but frequently on Myrtaceae. Map 164.

Qld: Kin Kin, Jan. 1917, *C. T. White* (BRI). N.S.W.: Upper Allyn R., Nov. 1953, *McDonald* (NSW).



**Figure 29.** *Exocarpos latifolius*.  
Photograph —M. Fagg

**Figure 30.** *Choretum pauciflorum*.  
Photograph —M. Fagg



**Figure 31.** *Dendrophthoe glabrescens*.  
Photograph —B. A. Barlow

**Figure 32.** *Nuytsia floribunda*.  
Photograph —A. S. George

**Doubtful name**

*Loranthus celastroides* Sieber ex Schultes var. ? *longicarpeus* Domin, *Biblioth. Bot.* 89: 606 (1921)

T: near Hughenden, Qld, 1910, K. Domin s.n.; n.v.

Probably synonymous with *Amyema sanguineum* (F. Muell.) Danser.

**VISCACEAE**

B. A. Barlow

Hemiparasitic aerial stem-parasitic shrubs, glabrous or stellate-hairy; haustorial attachment single, without epicortical runners. Leaves opposite, often reduced or apparently absent, entire, curvined, exstipulate. Flowers small (mostly less than 2 mm long), monochlamydeous, unisexual, monoecious or (not in Australia) dioecious, in small cymes or developing successively in clusters. Tepals 2–4, triangular, valvate. Stamens 2–4, opposite tepals; anthers adnate to tepals or to each other or free, 1–many-locular, opening by pores; pollen spherical. Ovary inferior, without differentiated locules or ovules, surmounted by a nipple-like stigma. Fruit berry-like, with a single seed surrounded by a viscous layer; endosperm present. Primary basic chromosome number  $x = 14$  (125 species studied), *vide* D. Wiens & B. A. Barlow, *Taxon* 20: 313 (1971); D. Wiens, *Bot. J. Linn. Soc.* 17: 295 (1975).

A family of 7 genera and c. 400 species with its richest development in the tropics of both hemispheres, fewer species in temperate regions. In Australia 3 genera and 14 species; 7 species endemic, the remainder also occurring in New Guinea or more widely in the Malesian/SE Asian region. The hosts are usually dicotyledonous trees, sometimes conifers but not in Australia.

The family has little economic importance. There is extensive mythology and folk medicine based on mistletoes generally and on *Viscum album* L. in particular; species of *Viscum* and *Phoradendron* are used as Christmas symbols in Europe and North America respectively. Species of *Arceuthobium*, parasitic on conifers, cause significant reduction in timber production in North America.

Until about 1960 the Viscaceae were generally included in the Loranthaceae, often as a subfamily. The close similarities between the families arise in part from convergence associated with the aerial parasitic habit, and there are important differences between them in floral structure, embryology, fruit structure, karyology and biogeography.

G. Bentham (in Loranthaceae), *Fl. Austral.* 3: 395–396 (1867); W. F. Blakely (in Loranthaceae), *Proc. Linn. Soc. New South Wales* 53: 31–50 (1928); S. N. Dixit, *Bull. Bot. Surv. India* 4: 49–55 (1962); B. A. Barlow, *Proc. Linn. Soc. New South Wales* 89: 268–272 (1964); J. Kuijt, *Brittonia* 20: 136–147 (1968); D. Wiens & B. A. Barlow, *Taxon* 20: 313–332 (1971); B. A. Barlow, *Brunonia* 6: 25–57 (1983).

## KEY TO GENERA

- 1 Plant leafy
- 2 Plant with a dense indumentum of dendritic and stellate hairs, especially on young parts; tepals persistent on fruit **2. NOTOTHIXOS**
- 2: Plant with vegetative parts entirely glabrous; tepals not persistent on fruit **1. VISCUM**
- 1: Plant apparently leafless (with minute scale- like leaves)
- 3 Fruit up to 2 mm long, with persistent tepals; flowers in clusters at nodes, separated by hairs **3. KORTHALSELLA**
- 3: Fruit more than 3 mm long, without persistent tepals; flowers in axillary inflorescences, subtended by bracts **1. VISCUM**

## 1. VISCUM

*Viscum* L., *Sp. Pl.* 2: 1023 (1753), *Gen. Pl.* 5th edn, 448 (1754), the Latin word for mistletoe

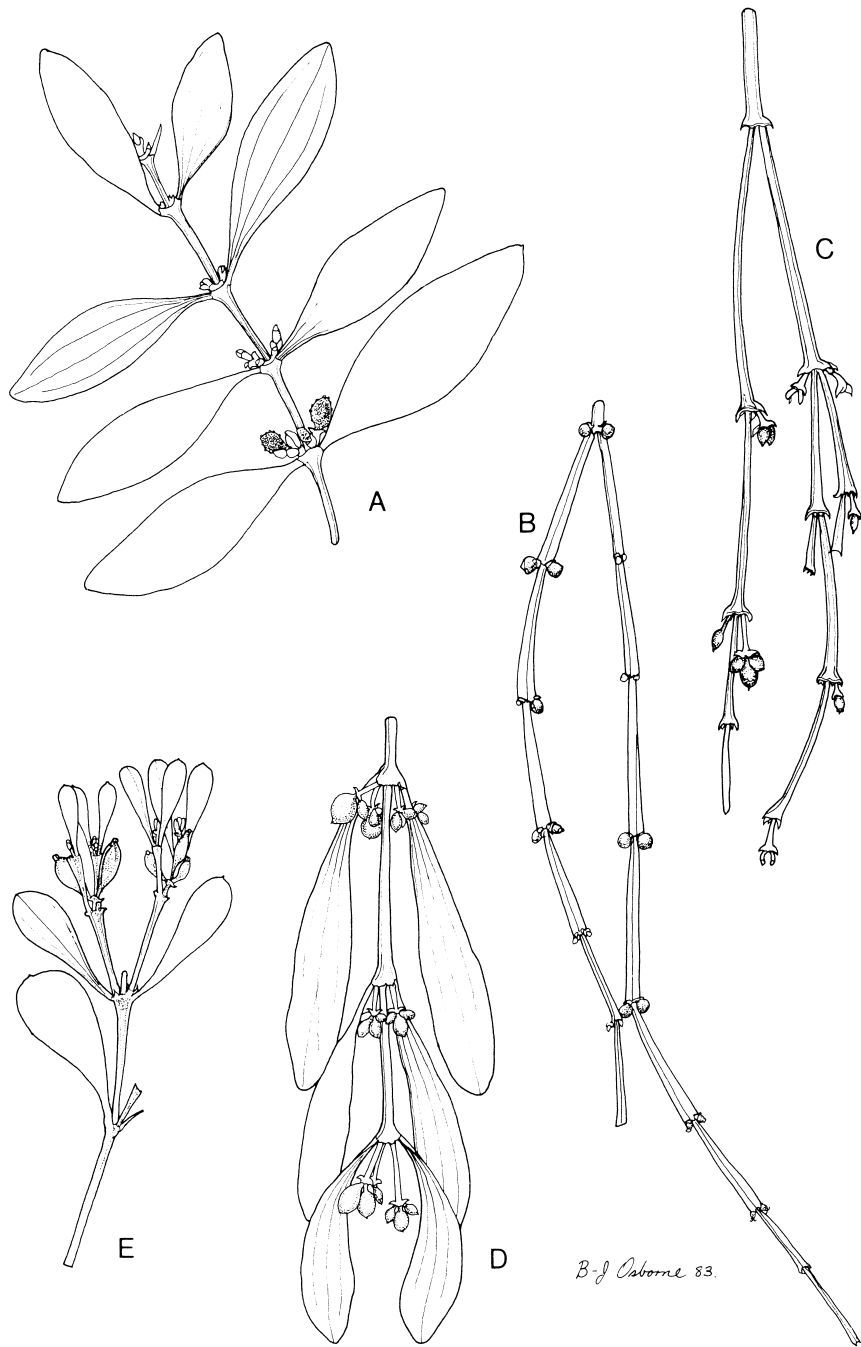
Type: *V. album* L.

Glabrous shrubs, erect or pendulous. Internodes terete or successively flattened alternately, ridged or furrowed longitudinally. Leaves present or apparently absent (reduced to small scales). Inflorescence axillary or (not in Australia) terminal, a sessile or pedunculate cyme of 3 (1–5) flowers subtended by a boat-shaped pair of bracts. Plants monoecious or (not in Australia) dioecious, when monoecious with either male or female flowers central in the cymes. Male flower 2–4-merous, with an ovoid anther sessile on each tepal; anthers many-locular. Female flower 2–4-merous; tepals caducous after anthesis. Fruit globular or ellipsoidal, smooth or warty; stigma persistent as a very small nipple at apex.  $x = 14, 13, 12, 11, 10$  (50 species studied), *vide* D. Wiens, *Bot. J. Linn. Soc.* 71: 295 (1975).

A genus of c. 100 species with its main centres of species-richness in Madagascar, Africa and southern Asia, and extending to Europe, eastern Asia, Malesia and Australia. The usual hosts are dicotyledonous trees, but several species parasitise other mistletoes, especially those of the Loranthaceae. There are 4 species in Australia, of which 2 are endemic.

G. Bentham, *Fl. Austral.* 3: 396 (1867); W. F. Blakely, *Proc. Linn. Soc. New South Wales* 53: 44 (1928); B. H. Danser, *Blumea* 4: 261 (1941); B. A. Barlow, *Brunonia* 6: 26–34 (1983).

- 1 Plant apparently leafless
- 2 Flowers and fruits sessile at nodes, with a female flower developed first; leaves reduced to a membranous limb at apex of each internode **2. V. articulatum**
- 2: Flowers and fruits in pedunculate cymes, with a male flower (when present) central; leaves reduced to a pair of opposite, acute, concave bract-like structures together forming a boat-like sheath at apex of each internode **4. V. bancroftii**
- 1 Plant leafy
- 3 Cymes with male flowers, when present, lateral; fruit warty except when fully ripe, orange to dark-coloured; leaves more than 12 mm wide **1. V. ovalifolium**
- 3: Cymes with male flowers, when present, central; fruit smooth, white, pale yellow or pink; leaves less than 12 mm wide **3. V. whitei**



**Figure 33. AD, *Viscum*.** **A,** *V. ovalifolium*, flowering and fruiting branchlet  $\times 1$  (B. Barlow 3718, CANB). **B,** *V. articulatum*, flowering and fruiting branchlet  $\times 1$  (A. Dockrill 847, CANB). **C,** *V. bancroftii*, fruiting branchlet  $\times 1$  (W. Jones 3779, CANB). **D,** *V. whitei* subsp. *flexicaule*, fruiting branchlet  $\times 1$  (L. Craven 4496, CANB). **E,** *Notothixos incanus*, fruiting branchlet  $\times 1$  (L. Craven 3368, CANB).

**1. *Viscum ovalifolium* DC., *Prodr.* 4: 278 (1830)**

T: Penang, Malaysia, *Wallich 489*; holo: K; iso: BM.

*V. pedunculatum* Barlow, *Proc. Linn. Soc. New South Wales* 87: 58, fig. 1f–h (1962). T: Ellis Beach near Cairns, Qld, 12 Aug. 1960, *B. A. Barlow 128*; holo: BRI.

Illustrations: *B. A. Barlow, Brunonia* 6: 28, figs 3–5 (1983).

Erect, divaricate plant to 70 cm diam. Internodes  $\pm$ terete. Leaf lamina elliptic, rounded or obtuse at apex, usually 3–4.5 cm long and 1.5–2 cm wide, attenuate into obscure petiole 2–5 mm long. Inflorescences arising successively in leaf axils, each a pedunculate 3-flowered cyme, the central flower female, lateral flowers male; peduncle 1–5 mm long; bracts c. 1 mm long, obtusely acute, spreading. Male flower disc-shaped, 1.5 mm diam., often formed much later than female. Female flower cylindrical; ovary 1.5 mm long; tepals c. 1 mm long. Fruit more or less globular, 6 mm diam., on a stipe 2 mm long, warty but warts disappearing at maturity and fruit becoming somewhat translucent.  $n = 11, 22$ , *vide* *B. A. Barlow, Brunonia* 6: 31 (1983). Fig. 33A.

Occurs in N Qld from Cape York Peninsula south to Cairns, in rainforest and coastal scrub; parasitic on various species of trees. Also from New Guinea through Malesia to Burma and southern China. Map 165.

Qld: Gordon Creek, Iron Range, *B. A. Barlow 3708* (BRI, CANB, QRS); Rex Lookout near Cairns, *S. T. Blake 21794* (BRI); Shiptions Flat, *L. J. Brass 20189* (BRI).

**2. *Viscum articulatum* Burm.f., *Fl. Indica* 211 (1768)**

*Aspidixia articulata* (Burm.f.) Tieghem, *Bull. Soc. Bot. France* 43: 193 (1896). T: from Java; *n.v.*

[*Viscum angulatum auct. non* B. Heyne ex DC.: Bentham, *Fl. Austral.* 3: 396 (1867); Blakely, *Proc. Linn. Soc. New South Wales* 53: 47, t. 9 (1928)]

Illustrations: *W. F. Blakely, loc. cit.*; *B. A. Barlow, Brunonia* 6: 28, figs 1–2 (1983).

Pendulous slender plant to 1 m long. Internodes compressed-quadrangular with acute marginal and median ridges, 2–4.5 cm long, usually 1.5–2.5 mm wide, the basal ones becoming terete with age. Leaves reduced to a limb c. 0.5 mm high subtending inflorescences. Inflorescence of several sessile axillary flowers developing successively; first flower usually female and solitary; male flowers usually in a pair below involucre of female, subtended by acute bracts c. 0.7 mm long; subsequent flowers mostly female, developing below earlier ones. Male flower pyramidal, 1 mm long. Female flower broadly cylindrical; ovary c. 0.5 mm long; tepals c. 0.5 mm long. Fruit globular, 4–6 mm diam., somewhat translucent, white, pale yellow or pink.  $n = 12$ , *vide* *D. Wiens & B. A. Barlow, Taxon* 20: 313 (1971). Fig. 33B.

Common in N and E Australia from the Kimberley, W.A., to Torres Strait islands, Qld, and southwards to the central coast of N.S.W. Also from New Guinea through Malesia to eastern India (Assam) and southern China. The hosts are usually species of Loranthaceae or other Viscaceae; in Australia the only other confirmed hosts are in the related family Santalaceae (*Exocarpos cupressiformis*, *E. latifolius*). Map 166.

W.A.: Packhorse Range, July 1905, *W. V. Fitzgerald* (PERTH). N.T.: Nhulumbuy, *J. Cooper 74* (NSW). Qld: Weipa Concession, Marmoss Creek, *A. Dockrill 847* (BRI, CANB, QRS); Bell, Darling Downs, *C. T. White 2498* (BRI). N.S.W.: Glenbrook, Sept. 1931, *J. Devaney* (NSW); Cudgen, *H.S.McKee 9538* (BRI, CANB, NSW).

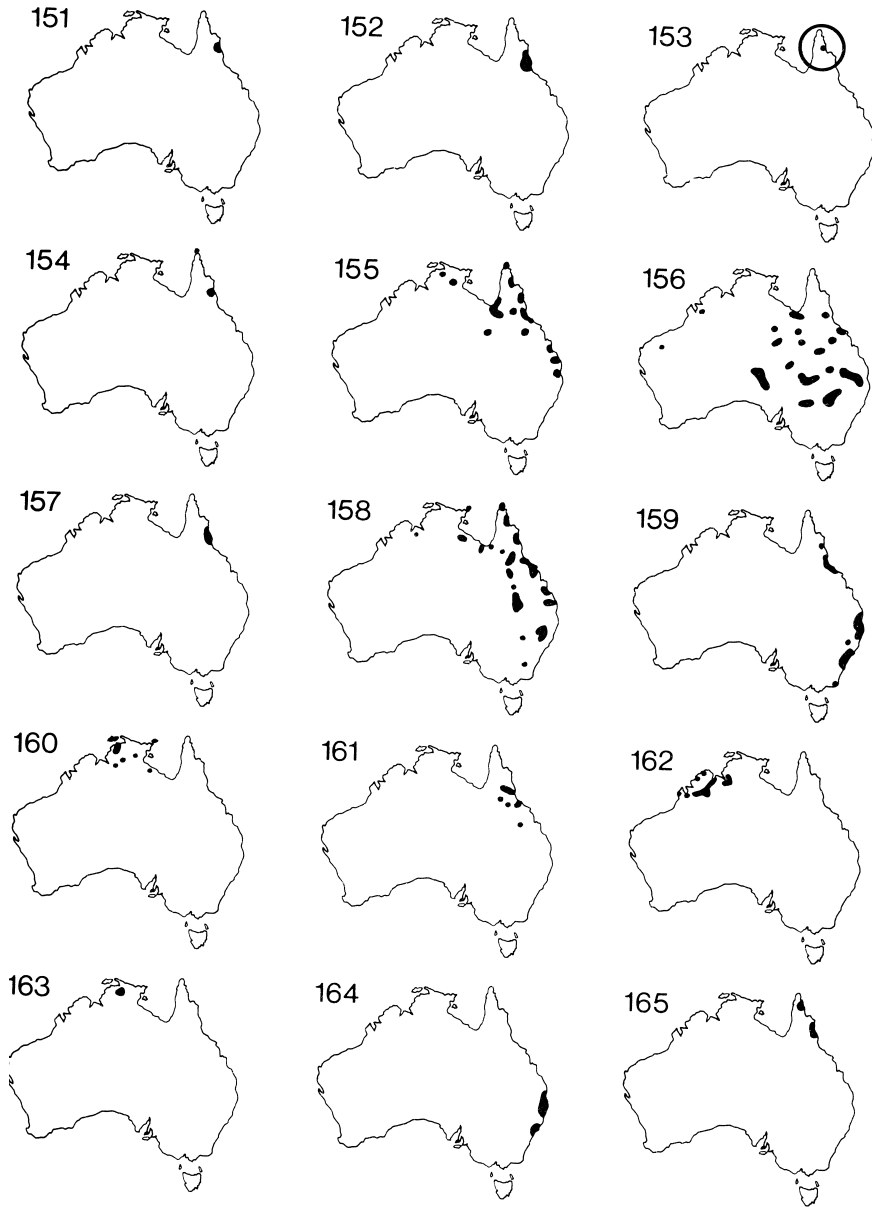
**3. *Viscum whitei* Blakely, *Proc. Linn. Soc. New South Wales* 53: 45, t. 7 (1928)**

T: Stannary Hills, Qld, 1909, *T. L. Bancroft*; holo: NSW; iso: BRI.

*V. flexicaule* Barlow, *Contr. New South Wales Natl. Herb.* 4: 95, t. 4 (1970). T: Berrimah near Darwin, N.T., 4 Jan. 1963, *B. A. Barlow 514*; holo: NT; iso: AD, BRI, BRIU, CANB, NSW.

[*Viscum orientale auct. non* Willd.: G. Bentham, *Fl. Austral.* 3: 396 (1867)]

Illustration: *W. F. Blakely, loc. cit.*



151. *Amyema quaternifolium*

152. *Amyema whitei*

153. *Amyema seemanianum*  
subsp. *flexuosum*

154. *Diplatia tomentosa*

155. *Diplatia furcata*

156. *Diplatia grandibractea*

157. *Dendrophthoe falcata*

158. *Dendrophthoe glabrescens*

159. *Dendrophthoe vitellina*

160. *Dendrophthoe odontocalyx*

161. *Dendrophthoe homoplastica*

162. *Dendrophthoe acacioides*  
subsp. *acacioides*

163. *Dendrophthoe acacioides*

164. *Benthamina alyxifolia*

165. *Viscum ovalifolium*  
subsp. *longifolia*



Pendulous plant to 1 m long. Internodes terete or  $\pm$ compressed-angular. Leaves oblanceolate to narrowly obovate, rounded but terminating in a small mucro, the lamina 1.5–5.5 cm long, 3–11 mm wide, gradually attenuate into obscure petiole 1–8 mm long. Inflorescence a pedunculate axillary cyme of 3–5 flowers, the central flower male or all flowers female; peduncle c. 2 mm long at anthesis reaching 20 mm long in fruit, dilated upwards; bracts 1.5 mm long, spreading, acute. Male flower orbicular, 1.5 mm diam., 2-merous, on stipe 1 mm long. Female flower cylindrical; ovary 1.8 mm long; tepals 2–3, 1 mm long. Fruit globular, 5 mm long, somewhat translucent. *n* = 10, 20, *fide* B. A. Barlow, *Proc. Linn. Soc. New South Wales* 88: 151 (1963).

N and E Australia, from the Kimberley, W.A., to southern Qld, in open forests. The usual hosts are species of Loranthaceae. There are 2 subspecies.

Internodes usually 3–4.5 cm long; leaf lamina usually 2–4 cm long and 4–6 mm wide; venation mostly invisible; peduncle 4–15 mm long under fruit

**3a. subsp. whitei**

Internodes usually 5–6 cm long; leaf lamina usually 4–5 cm long and 7–9 mm wide; venation visible on underside; peduncle 6–20 mm long under fruit

**3b. subsp. flexicaule**

### 3a. *Viscum whitei* Blakely subsp. *whitei*

Illustrations: B. A. Barlow, *Brunonia* 6: 32, figs 11–12 (1983).

Internodes usually 3–4.5 cm long. Leaf lamina oblanceolate, usually 2–4 cm long and 4–6 mm wide; venation mostly invisible. Peduncle 4–15 mm long under fruit. *n* = 20, *fide* B. A. Barlow, *Proc. Linn. Soc. New South Wales* 88: 151 (1963).

Endemic in Qld from Rockhampton south to Miles, with a possibly disjunct occurrence further north at Stannary Hills. Map 167.

Qld: Berserker Range, Rockhampton, *F. Mueller* (MEL); Columboola, *M. G. Lithgow* 56 (BRI).

### 3b. *Viscum whitei* subsp. *flexicaule* (Barlow) Barlow, *Brunonia* 6: 34 (1983)

*V. flexicaule* Barlow, *Contr. New South Wales Natl. Herb.* 4: 95, t. 4 (1971). T: Berrimah near Darwin, N.T., 4 Jan. 1963, *B. A. Barlow* 514; holo: NT; iso: AD, BRI, BRIU, CANB, NSW.

Illustrations: B. A. Barlow, *Brunonia* 6: 32, figs 13–15 (1983).

Internodes usually 5–6 cm long. Leaf lamina oblanceolate or narrowly obovate, usually 4–5 cm long and 7–9 mm wide; longitudinal and sometimes reticulate veins visible on underside. Peduncle 6–20 mm long under fruit. *n* = 10, *fide* B. A. Barlow, *Proc. Linn. Soc. New South Wales* 88: 151 (1963), as *V. sp.* Fig. 33D.

Occurs from the Kimberley, W.A., to Arnhem Land, N.T. Map 168.

W.A.: Pseudomys Hills, Drysdale River National Park, *K. F. Kenneally* 4108 (CANB, PERTH). N.T.: 50 km ENE of Oenpelli, *P. K. Latz* 3058 (BRI, CANB).

### 4. *Viscum bancroftii* Blakely, *Proc. Linn. Soc. New South Wales* 53: 46, t. 8 (1928)

T: Eidsvold, Qld, Nov. 1918, *T.L. Bancroft*; holo: NSW.

Illustrations: W. F. Blakely, *loc. cit.*; B. A. Barlow, *Brunonia* 6: 32, figs 9–10 (1983).

Pendulous, slender, apparently leafless plant to 0.8 m long. Internodes somewhat compressed and angular, usually 3–4 cm long, gradually widened upwards, becoming terete when older. Leaves bract-like, acute, 1–1.5 mm long, spreading, concave, forming a boat-shaped sheath. Inflorescence a pedunculate axillary cyme of 3–5 flowers, the central flower male or all flowers female; peduncle c. 2 mm long at anthesis reaching 6 mm long in fruit, dilated upwards; bracts 1.5 mm long, spreading, acute. Male flower orbicular to cordate, 1.5 mm diam., 2-merous, on a stipe 1 mm long. Female flower cylindrical; ovary 1.8 mm long; tepals 2–3, 1 mm long. Fruit globular, 5 mm long, somewhat translucent. Fig. 33C.



Endemic in Qld, from Rockhampton S to Eidsvold, in open forests; recorded only on mistletoes of the genus *Amyema* Map 169.

Qld: Eidsvold, 1911–1920, *T.L.Bancroft* (NSW, several collections); Rockhampton, *A.Dietrich 890 & 980* (MEL).

Appears to differ from *Viscum whitei* Blakely only in being leafless. For discussion on specific ranking see B. A. Barlow, *Brunonia* 6: 34 (1983).

## 2. NOTOTHIXOS

*Notothixos* Oliv., *J. Linn. Soc. Bot.* 7: 92, 103 (1863), from the Greek *notos* (southern), and *ixos* (mistletoe)

Type: *N. subaureus* Oliv.

Erect or pendulous shrubs, the whole plant or at least young parts with a dense indumentum of dendritic or stellate hairs and/or peltate scales. Stems much-branched, often dichotomous below inflorescences; branches with 1 pair of acute prophylls and 1 pair of acute cataphylls at right angles to them near base. Leaves petiolate, curvined. Inflorescence terminal, of 1 or more small fan-like cymes (cymules) each subtended by a pair of narrow acute bracts; cymules solitary or in determinate or indeterminate confluences; flowers in each cymule 3–13, developing centrifugally, the central flower(s) male, lateral flowers female. Male flower 4-merous, with an ovoid to reniform anther opposite each tepal on a short filament; anthers many-locular. Female flower 4-merous; ovary cylindrical to barrel-shaped. Fruit mostly ellipsoidal, crowned by the persistent tepals.  $x = 13, 12$  (2 species studied), *vide* B. A. Barlow, *Brunonia* 6: 35 (1983).

A genus of eight species, ranging from Sri Lanka and Lower Burma through Malesia to the Solomon Islands and eastern Australia. Found mostly in humid closed or open forest; parasitic on dicotyledonous trees, sometimes on other mistletoes. There are 4 species in Australia, of which 2 are endemic.

G. Bentham, *Fl. Austral.* 3: 396 (1867); W. F. Blakely, *Proc. Linn. Soc. New South Wales* 53: 38 (1928); B. A. Barlow, *Brunonia* 6: 1–24, 34–37 (1983).

- |    |   |                                 |
|----|---|---------------------------------|
| 1  | Inflorescence a single cymule of usually 3 flowers; leaf lamina cuneate to spatulate, 16–25 mm long, usually 5–7 mm wide; fruit fusiform, c. 13 mm long   | <b>1. <i>N. incanus</i></b>     |
| 1: | Inflorescence of 3 or more cymules on a common axis; cymules with usually 7–9 flowers; leaf lamina narrowly ovate to elliptic, mostly more than 30 mm long and 10 mm wide; fruit ellipsoidal to nearly globular, c. 7 mm long |                                 |
| 2  | Inflorescence determinate, of 1 terminal and 2 lateral cymules; leaf lamina up to 5 cm long   | <b>2. <i>N. subaureus</i></b>   |
| 2: | Inflorescence indeterminate, of 4–12 decussate pairs of cymules in racemose arrangement; leaf lamina usually 4.5–8 cm long  |                                 |
| 3  | Tomentum mostly golden, rarely cream, mainly of long hairs, persistent on abaxial leaf-surface; upper cataphylls narrow, not sheathing stem, not at a visible nodal articulation  | <b>3. <i>N. leiophyllus</i></b> |
| 3: | Tomentum white or tawny, mainly of short hairs, becoming sparse or absent on abaxial leaf-surface with age; upper cataphylls broad, together sheathing stem, often at nodal articulation                                      | <b>4. <i>N. cornifolius</i></b> |

### 1. *Notothixos incanus* (Hook.) Oliv., *J. Linn. Soc. Bot.* 7: 104 (1863)

*Viscum incanum* Hook., *Icon. Pl.* 1: t. 73 (1837). T: Brisbane R. (Qld), 1829, *Fraser*; holo: K.

Illustrations: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 53: t. 4 (1928); B. A. Barlow, *Brunonia* 6: 7, fig. 4a–b, and 8, fig. 5a (1983).

Compact erect plant to 0.5 m high; tomentum of short stellate white hairs with scattered longer dendritic ones, becoming sparse and giving a grey-green colour. Prophylls and cataphylls linear, 0.6–1 mm long; cataphylls c. 1 mm above prophylls. Leaf lamina cuneate to spatulate, rounded to truncate with a small blunt mucro, 16–25 mm long, usually 5–7 mm wide, attenuate at base, not distinctly petiolate. Inflorescence a triad or pentad; peduncle erect, c. 2 mm long; bracts narrowly triangular, c. 1 mm long, spreading. Male flower c. 1.5 mm diam.; stipe c. 1.5 mm long. Female flower c. 3 mm long. Fruit fusiform, c. 13 mm long, stipitate, the tepals cap-like at apex. *n* = 13, *vide* B. A. Barlow, *Brunonia* 6: 9 (1983). Fig. 33E.

Endemic in Australia, in eastern coastal districts and adjacent ranges from near Cooktown, Qld, to Kendall, N.S.W. The usual hosts are several species of *Melaleuca* and *Callistemon*. Map 170.

Qld: 2 km N of Jimboomba, B. A. Barlow 3726 (BRI, CANB, MO); lower Annan R., Cape York Peninsula, L. J. Brass 20362 (BRI, CANB, K, L). N.S.W.: Port Macquarie district, O. D. Evans 2141 (CANB).

## 2. *Notothixos subaureus* Oliver, *J. Linn. Soc. Bot.* 7: 103 (1863)

*N. cornifolius* var. *subaureus* (Oliver) F.M. Bailey, *Syn. Queensland Fl.* 452 (1883); *N. incanus* var. *subaureus* (Oliver) C. Moore & Betche, *Handb. Fl. New South Wales* 227 (1893). T: Brisbane River, July 1855, F. Mueller; lecto: K *vide* B. A. Barlow, *Brunonia* 6: 13 (1983); iso: MEL; Moreton Bay, July 1855, F. Mueller; syn: K, MEL; Lake Macquarie, Backhouse; syn: K.

*N. subaureus* var. *cinereus* Blakely, *Proc. Linn. Soc. New South Wales* 53: 42 (1928). T: Kuranda, N Qld, 1908, N. Michael 609; holotype: NSW; iso: BRI.

*Viscum incanum* var. *aureum* Ettingsh., *Akad. Wiss. Wien., Math.-Naturwiss. Kl., Denkschr.* 58: t. 1, fig. 9 (1871). T: not designated; iso: ?W n.v.

Illustrations: W. F. Blakely, *op. cit.*; B. A. Barlow, *Brunonia* 6: 8 fig. 5e (1983).

Erect or spreading plant to 0.6 m diam.; tomentum bright golden, sometimes greyish-white, fading and becoming sparse or absent on adaxial leaf-surface. Prophylls and cataphylls linear, c. 1 mm long; cataphylls often unequally fused 1–5 mm above prophylls. Leaf lamina trullate, rhombic or elliptic, rounded, obtuse or acuminate with a short blunt mucro, usually 3 cm long, 1–2 cm wide, darker and sometimes shining adaxially; petiole 3–5 mm long. Inflorescence of 1 terminal and 2 lateral fan-like cymules, each 5–11-flowered, usually the central 1–5 flowers male; bracts narrowly triangular, 0.5–0.8 mm long. Male flower 1 mm diam.; stipe 0.5 mm long. Female flower 2 mm long. Fruit ellipsoidal to nearly globular, 7 mm long. *n* = 12, *vide* B. A. Barlow, *Brunonia* 6: 13 (1983). Fig. 34A.

Endemic in Australia, in eastern coastal districts and adjacent ranges from Cape York Peninsula, Qld, to East Gippsland, Vic. In N Qld the hosts are commonly rainforest trees, elsewhere usually mistletoes of the family Loranthaceae. Map 171.

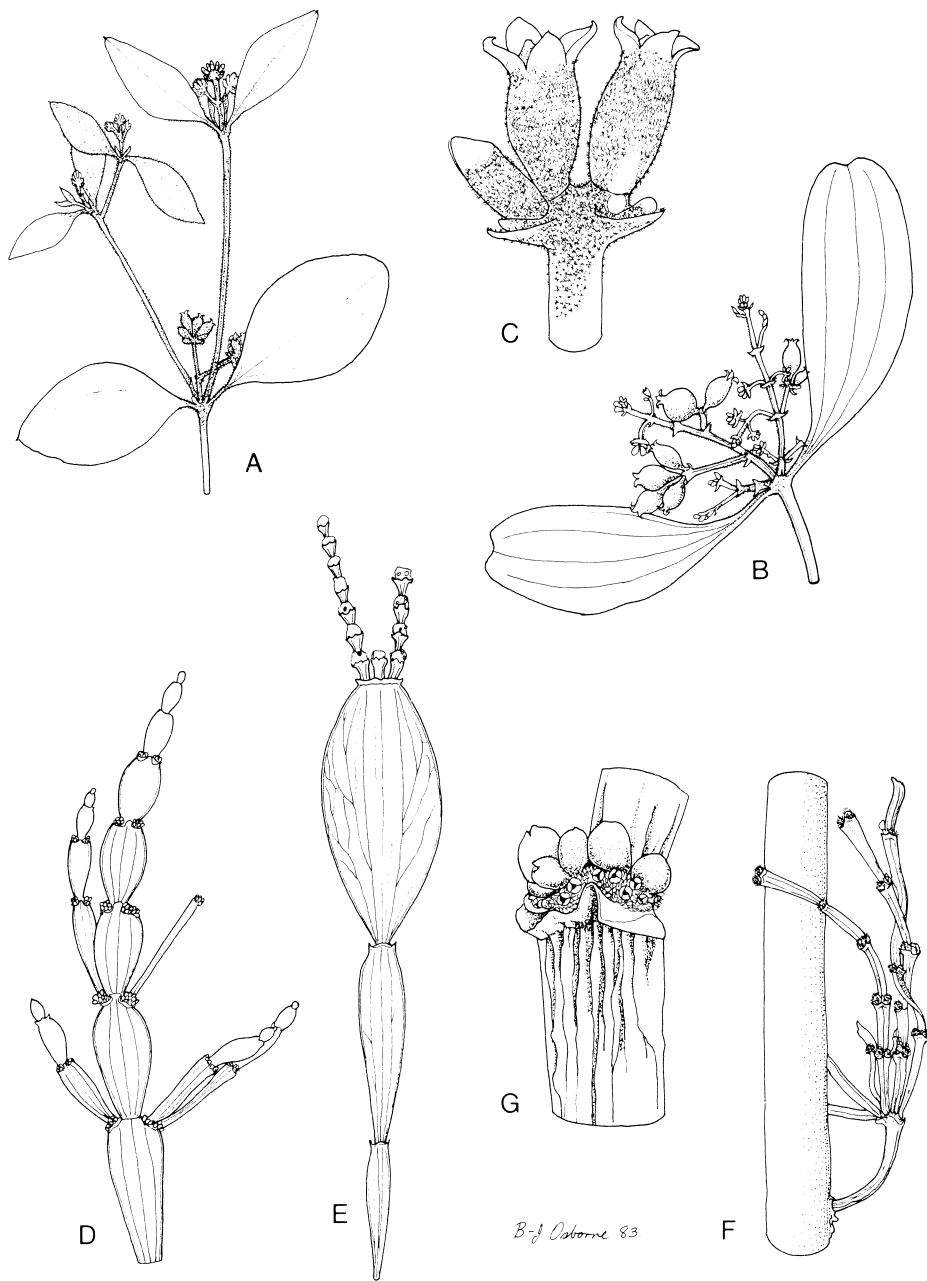
Qld: near N.S.W. border on Boonah Road via White Swamp, L. Craven 3369 (BRI, CANB); Leo Creek Road, McIlwraith Range, B. Hyland 8387 (CANB, QRS). N.S.W.: 5.8 km NNW of Martinsville School, R. Coveny 9112 & P. Hind (NSW). Vic.: Bastion Point, Mallacoota, R. Melville 2780 & N. Wakefield (K, MEL).

## 3. *Notothixos leiophyllus* Schumann. in Schumann & Lauterbach, *Fl. Schutzgeb. Südsee Nachtr.* 260 (1905)

T: New Britain, 1885, Parkinson 105; lecto: K, *vide* B. A. Barlow, *Brunonia* 6: 15 (1983); iso: NSW.

Illustrations: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 53: t. 5 (1928); B. A. Barlow, *Brunonia* 6: 5 fig. 2a, and 8 fig. 5f–g (1983).

Spreading or pendulous plant to 1 m long; tomentum cream to golden, rarely rusty, fading and disappearing from stems and adaxial leaf-surfaces. Prophylls and cataphylls narrowly triangular, c. 1 mm long; cataphylls often unequally placed 1–4 mm above prophylls. Leaf lamina narrowly to broadly ovate or elliptic, acuminate but eventually



**Figure 34.** **A–C,** *Notothixos*. **A,** *N. subaureus*, flowering and fruiting branchlet  $\times 1$  (B. Barlow 3739, CANB). **B–C,** *N. cornifolius*. **B,** flowering and fruiting branchlet  $\times 1$ ; **C,** inflorescence  $\times 6$  (**B–C,** B. Barlow 3742, CANB). **D–G,** *Korthalsella*. **D,** *K. rubra* subsp. *rubra*, flowering branchlet  $\times 1$  (B. Hyland 6460, CANB). **E,** *K. papuana*, fruiting branchlet  $\times 1$  (B. Hyland 8007, CANB). **F–G,** *K. leucothrix*. **F,** plant on host stem  $\times 1$ ; **G,** flowers and fruit  $\times 6$  (**F–G,** E of L. Monger, W.A., C. Gardner, CANB).

rounded, bluntly mucronate, usually 5–10 cm long, 2–4 cm wide, darker and sometimes lustrous adaxially; petiole 5–10 mm long. Inflorescence an indeterminate raceme of cymules in 6–12 decussate pairs; axis up to 10 cm long; peduncle of cymule 2–5 mm long; bracts narrowly triangular, c. 1 mm long; cymules 5–9-flowered, the central 0–3 flowers male. Male flowers 1 mm diam., shortly stipitate. Female flowers 1.5 mm long. Fruit ellipsoidal to nearly globular, somewhat translucent, c. 8 mm long.

From the Philippines southwards and westwards to Timor, New Guinea, the Bismarck and Solomon Islands as far as Santa Cruz, and NE Qld S to the Atherton Tableland. The hosts are rainforest trees. The hosts are rainforest trees. Map 172.

Qld: Gordon Creek, Iron Range, *B. A. Barlow 3695* (BRI, CANB, QRS); State Forest Reserve 755, North Johnstone Logging Area, *V. Moriarty 1964* (QRS).

#### 4. *Notothixos cornifolius* Oliver, *J. Linn. Soc. Bot.* 7: 103 (1863)

*N. incanus* var. *cornifolius* (Oliv.) Maiden & Betche, *Census New South Wales Pl.* 64 (1916). T: New South Wales, Liverpool Plains, *A. Cunningham 50*; lecto: K *vide* B. A. Barlow, *Brunonia* 6: 18 (1983); upper parts of Hunter River, *A. Cunningham*; syn: K, BM; Liverpool Plains, May 1825 & July 1827, *A. Cunningham 41 & 48*; syn: BM, BRI, K, MEL; Port Jackson, *collector unknown*; syn: MEL.

*N. cornifolius* var. *angustifolius* Oliv., *J. Linn. Soc. Bot.* 7: 103 (1863). T: Moreton Bay, *A. Cunningham*; lecto: K *vide* B. A. Barlow, *Brunonia* 6: 18 (1983); iso: K; Brisbane River, Aug. & Sept. 1829, *A. Cunningham 53 & 54*; syn: BM, K, MEL.

Illustrations: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 53: t. 4 (1928); B. A. Barlow, *Brunonia* 6: 5 fig. 2b, 6 fig. 3b and 8 fig. 5h (1983).

Spreading or pendulous plant to 1 m long; tomentum short, white or tawny, becoming sparse on leaves, inflorescence axes and fruits. Prophylls triangular, c. 0.3 mm long; cataphylls broadly triangular, c. 1 mm long, ±sheathing stem. Leaf lamina elliptic to narrowly ovate, rarely lanceolate, usually rounded, sometimes falcate, attenuate and acute, usually 4.5–7 cm long, 15–25 mm wide; petiole 5–10 mm long. Inflorescence an indeterminate raceme of cymules in 4–11 decussate pairs; axis usually 25–60 mm long; peduncles of cymules 2–5 mm long; bracts triangular, 1–1.5 mm long; cymules 5–11-flowered, the central 1–5 flowers male. Male flower c. 1 mm diam.; stipe c. 0.7 mm long. Female flower 2.5–3 mm long. Fruit ellipsoidal, c. 7 mm long. Fig. 34B–C.

Occurs in eastern Australia in coastal districts, adjacent ranges and slopes from Cape York Peninsula, Qld, to Yass District, N.S.W., in rainforest and open forest. The hosts are almost exclusively species of Sterculiaceae (*Argyrodendron*, *Sterculia* and *Brachychiton*). Also in New Guinea. Map 173.

Qld: 2 km W of Tozer Gap, *B. A. Barlow 3709* (BRI, CANB, MO); Sunnyvale via Bell, April 1959, *E. Buck* (BRI). N.S.W.: between Dripstone and Neurea, 24 Oct. 1978, *G. Althofer* (NSW); Wee Jasper, 23 July 1967, *N. T. Burbidge* (CANB).

### 3. KORTHALSELLA

*Korthalsella* Tieghem, *Bull. Soc. Bot. France* 43: 83, 163 (1896), in honour of the Dutch botanist Korthals (1807–1892)

Type: *K. remyana* Tieghem

*Bifaria* Tieghem, *Bull. Soc. Bot. France* 43: 163, 164 (1896). T: *B. rubra* Tieghem

*Pseudixus* Hayata, *Bot. Mag. (Tokyo)* 29: 31 (1915). T: *P. japonica* (Thunb.) Hayata

Small, glabrous, erect perennials, mostly less than 15 cm high. Stems green or yellowish, articulated at nodes, terete or compressed or most often strongly flattened in one plane forming a cladode; leaves rudimentary, opposite, usually distichous but sometimes decussate, forming a border mostly less than 1 mm high around flower clusters. Flowers developing successively in lateral monoecious clusters, surrounded and separated by multicellular sparsely branched thick-walled hairs which often form a raised mound (floral

cushion); first-formed flower axillary and usually male, subsequent flowers developing laterally and usually also in rows below the first, mostly female. Male flowers globose to obconical, c. 0.5 mm diam., attenuate into short stipe to 0.5 mm long, with 3 persistent triangular tepals; anthers 3, bilocular, introrse, united into a synandrium with an apical pore. Female flowers globular or pear-shaped, usually less than 0.5 mm diam.; tepals 3, persistent on fruit. Fruit pear-shaped or ellipsoidal, seldom reaching 2 mm long; seed disc-shaped, c. 1 mm diam.  $x = 14$  (4 species studied), *vide* D. Wiens & B. A. Barlow, *Taxon* 20: 313 (1971).

A genus of c. 30 species, from Japan and S Asia to Australia and New Zealand, extending E to several Pacific archipelagoes and W to Indian Ocean islands and Ethiopia. The species occur in rainforests and open forests on a wide range of dicotyledonous host trees and shrubs. There are 6 species in Australia, of which 3 are endemic.

W. F. Blakely, *Proc. Linn. Soc. New South Wales* 53: 31 (1928); B. H. Danser, *Bull. Jard. Bot. Buitenzorg* 14: 119 (1937); *op. cit.* 16: 329 (1940); B. A. Barlow, *Brunonia* 6: 37–55 (1983).

- |    |  |                              |
|----|--|------------------------------|
| 1  | Vegetative or all internodes strongly flattened in one plane, with 1–5 veins visible as longitudinally raised ribs   |                              |
| 2  | Flowers in terete spike-like confluences arising singly or in threes, terminal and sometimes lateral, sharply distinct from the strongly flattened vegetative internodes               | <b>6. K. papuana</b>         |
| 2: | Flowers produced at all nodes or predominantly on more slender lateral axes, but not in strongly differentiated spike-like confluences   |                              |
| 3  | Branches flattened in same plane as parent stem; internodes slightly contracted, not strongly articulated at nodes, each whole stem forming an integrated cladode tapering at each end | <b>5. K. breviarticulata</b> |
| 3: | Branches mostly flattened transversely to parent stem; internodes contracted at ends, strongly articulated so that individual internodes are the visually distinct units of all stems  |                              |
| 4  | Plant usually less than 7 cm high; largest internodes less than 10 mm long and 5 mm wide; flowers usually 8 or fewer per cluster   | <b>2. K. japonica</b>        |
| 4: | Plant usually more than 10 cm high; largest internodes more than 12 mm long and 8 mm wide; flowers usually over 12 per cluster   | <b>3. K. rubra</b>           |
| 1: | Vegetative or all internodes terete or compressed but not double-edged, without visible veins  |                              |
| 5  | Internodes terete or slightly compressed, c. 1.5 mm diam.; flowers usually 4 per cluster, not immersed in a cushion-like mound of hairs  | <b>1. K. grayi</b>           |
| 5: | Internodes compressed-flattened but rounded at edges, widest at apex, up to 3 mm wide; flowers more than 20 per cluster, immersed in a cushion-like mound of white hairs               | <b>4. K. leucothrix</b>      |

### 1. *Korthalsella grayi* Barlow, *Brunonia* 6: 46 (1983)

T: State Forest Reserve 607, Emerald Logging Area, Qld, 17 June 1980, *B. Gray 1724*; holotype: QRS.

Illustrations: B. A. Barlow, *Brunonia* 6: 45, figs 29–30 (1983).

Slender plant up to 12 cm high, often much-branched. Internodes terete or compressed in one plane but not flattened and double-edged, those of main stems 8–15 mm long, c. 1 mm wide, the distal ones and those of minor branches shorter and narrower; venation not visible. Hairs of floral cushion few, very short, white or pink, hardly visible among fruits. Flowers produced at every node, mostly in a single whorl of 8; male flowers solitary in axils.

Endemic in N Qld in rainforest from 1000 to 1300 m and sometimes at higher elevations in mountain heath. Map 174.

Qld: State Forest Reserve 144, top of the Great Divide, *B. Hyland* 5663 (QRS); Mt Bartle Frere, 1891 & 1892, *S. Johnson* (MEL).

## 2. *Korthalsella japonica* (Thunb.) Engl., *Nat. Pflanzenfam.* Nachtr. 1: 138 (1897)

subsp. **brassiana** (Blakely in C.T.White) Barlow, *Brunonia* 6: 47 (1983)

*Korthalsella brassiana* Blakely in C. T. White, *Proc. Roy. Soc. Queensland* 47: 79 (1936). T: Thornton Peak, Qld, 14 Mar. 1932, *L. J. Brass* 2298; holotype: NSW.

Illustrations: B. A. Barlow, *Brunonia* 6: 45, figs 31–33 (1983).

Plant c. 6 cm high, rarely to 9 cm; stems more or less dimorphic, some plants with all branches similar to parent stem, others with distinctly narrower lateral flowering stems. Internodes of each branch all strongly flattened in one plane, those of main stems narrowly obovate in strongly dimorphic specimens, narrowly cuneate in almost uniform specimens, 8–10 mm long, 2–4 mm wide; branches several at older nodes, usually flattened transversely to parent axis; midvein distinct, raised on all internodes except small lateral ones. Hairs of floral cushion few or absent, short, white or pale pink, not prominent between flowers and fruits. Flowers in 1 or 2 rows, seldom over 8 per cluster, the clusters meeting and encircling node; male flowers usually solitary in axils.

Endemic in N Qld in heath-like vegetation on mountain tops, mostly above 1250 m but occasionally as low as 1000 m; parasitic on shrubs and trees, recorded on *Monotoca baileyana* and *Rhodomlyrtus sericea*. Map 175.

Qld: Mt Finnigan, *L. J. Brass* 20060 (BRI); Mt. Bartle Frere, *J. Martin & B. Hyland* 1884 [QF 61/191] (BRI); Thornton Peak, *G. Stocker* 1093 & 1108 (QRS).

The typical subspecies is widely distributed in S and E Asia. Other subspecies and varieties occur in Ethiopia and islands of the Indian Ocean as well as on the Asian mainland.

## 3. *Korthalsella rubra* (Tieghem) Engl., *Nat. Pflanzenfam.* Nachtr. 1: 138 (1897)

*Bifaria rubra* Tieghem, *Bull. Soc. Bot. France* 43: 173 (1896). T: Richmond River, N.S.W., *F. Mueller*; holotype: P.

[*Viscum articulatum* auct. non Burm.f.: G. Bentham, *Fl. Austral.* 3: 396 (1867), p.p.]

[*Korthalsella opuntia* auct. non (Thunb.) Merr., nom. illeg.: Danser, *Bull. Jard. Bot. Buitenzorg.* 14: 134 (1937); Danser, *Bull. Jard. Bot. Buitenzorg.* 16: 333 (1940), p.p.]

[*Korthalsella japonica* auct. non (Thunb.) Endl.: Eichler, *Suppl. Fl. S. Austral.* 103 (1965); Barlow, *Fl. New South Wales* 58A: 2 (1971)]

Illustration: W. F. Blakely, *Proc. Linn. Soc. New South Wales* 53: t. 1 (1928).

Plant usually 10–16 cm high, branched several times at lower nodes with unbranched extremities up to 12 internodes long. Internodes of each branch all strongly flattened in one plane, narrowly cuneate to narrowly obovate, usually 10–18 mm long and 3–8 mm wide, attenuate at base, contracted at apex; branches mostly flattened transversely to parent axis; a central vein raised and distinct and usually one pair of lateral longitudinal veins more or less distinct. Flowers 10–80 per cluster, in 2–5 rows developing successively; male flowers few in all rows.

Occurs in eastern Australia, from Cape York, Qld, to eastern Vic., as far inland as the Western Plains of N.S.W. Also on Lord Howe Is. and in New Guinea. Habitats range from rainforest to semi-arid woodland, on a broad range of hosts. There are 2 subspecies.

Floral cushions not protruding, with sparse red hairs; rudimentary leaves 0.5–1 mm high, together continuous around node and almost continuously free; flowers almost completely encircling node in early stage

### 3a. subsp. *rubra*

Floral cushions protruding in older inflorescences, with a dense mass of white hairs; rudimentary leaves tapering from 0.5 to 0.2 mm high, fused as a rim on face of internode between flower clusters, which are distinct at all stages

### 3b. subsp. *geijericola*

**3a. Korthalsella rubra** (Tieghem) Engl. subsp. **rubra**

*Viscum pycnanthum* Domin, *Biblioth. Bot.* 89: 604 (1921). T: summit of Mt Bellenden Ker, Qld, 4 Jan. 1910, *K. Domin s.n.; n.v.*

*K. articulata* Blakely, *Proc. Linn. Soc. New South Wales* 53: 33, t. 1 (1928). T: Mt Kembla, Illawarra, N.S.W., June 1888, *Fletcher*; lecto: NSW, *vide* B. A. Barlow *Brunonia* 6: 51 (1983).

Illustrations: B. A. Barlow, *Brunonia* 6: 53, figs 42–44 (1983).

Rudimentary leaves 0.5–1 mm high, membranous, usually obtuse, together continuous around node and completely free except fusion to face of internode at its midpoint. Flower clusters together almost encircling node in young stages, separating as internode expands; hairs red, long, sparse, mostly in a single row between flowers, visible between flowers and fruits at all stages but not producing dense protruding cushions. *n* = 14, *vide* B. A. Barlow, *Proc. Linn. Soc. New South Wales* 88: 151 (1963), as *Korthalsella opuntia*. Fig. 34D.

Occurs in coastal districts and adjacent tablelands from Cape York Peninsula, Qld, to eastern Vic., in tropical and temperate rainforests and wet open forests; parasitic on a wide range of dicotyledonous trees. Also on Lord Howe Is. and in New Guinea. Map 176.

Qld: South Pap, *T. Risley* 71 (QRS); Lamington National Park, *L. Smith & L. Webb* 3643 (BRI). N.S.W.: Cambewarra, Sept. 1923, *P. Monaghan* (NSW). Vic.: Gippsland, Noorinbee North, Cann R., *R. Melville* 2796 *et al.* (BRI, NSW, PERTH).

**3b. Korthalsella rubra** subsp. **geijericola** Barlow, *Brunonia* 5: 54 (1983)

T: Wee Waa, N.S.W., 21 Oct. 1920, *Withers*; holo: NSW.

Illustrations: B. A. Barlow, *Brunonia* 5: 53, figs 45, 46 (1983).

Rudimentary leaves distinct only around flower clusters, acute, tapering from 0.5 mm high at outer limit of floral cushion to 0.2 mm high at inner limit, together extending across face of internode between flower clusters as a rim 0.2 mm wide and not spreading. Flower clusters separated by a distinct triangular area of internode surface; hairs dense, white, longer than flowers in young clusters and forming protruding masses at older nodes.

Endemic in Australia on the western slopes and plains of Qld and N.S.W., parasitic mostly on *Geijera parvifolia*. Map 177.

Qld: Glenruth, Chinchilla, 20 Dec. 1977, *W. Braithwaite* (BRI); Tree View, Mitchell, 2 May 1965, *R. Brumpton* (BRI). N.S.W.: Nyngan, 9 Nov. 1921, *W. W. Froggatt* (NSW).

**4. Korthalsella leucothrix** Barlow, *Brunonia* 5: 48 (1983)

T: Wanarra Rock, W.A., 12 Aug. 1960, *C. A. Gardner* 12450; holo: PERTH; iso: PERTH.

Illustrations: B. A. Barlow, *Brunonia* 5: 50, figs 34–38 (1983).

Plant to 9 cm high, much-branched with 1–4 stems arising from haustorium. Internodes slightly compressed at base, compressed to slightly flattened but not double-edged at apex, linear-cuneate, progressing from c. 20 mm long and 3–5 mm wide to c. 10 mm long and 2 mm wide, those of each stem compressed in one plane except sometimes the lower ones, lateral branches mostly flattened transversely to parent stem; venation invisible. Rudimentary leaves c. 0.7 mm high, together uniformly continuous around node. Hairs on floral cushion white, barely visible between flowers in young clusters, in distinct protruding tufts around fruits in older clusters. Flowers produced at every node, in clusters of c. 20 in 3–4 rows; male flowers solitary or few in axils. Fig. 34F–G.

Endemic in Australia, in semi-arid woodland in W.A. and S.A., Parasitic on *Acacia* spp. Map 178.

S.A.: above Wirrealpa Creek, 31 Aug. 1946, *N. T. Burbidge* (CANB); near Ooldea Soak, Aug. 1922, *J. B. Cleland* (NSW); SE shore of Lake Hart, *Conrick* 337 (AD).

**5. Korthalsella breviarticulata** (Tieghem) Danser, *Bull. Jard. Bot. Buitenzorg* 16: 339, t. 4 (1940)

*Bifaria breviarticulata* Tieghem, *Bull. Soc. Bot. France* 43: 173 (1896). T: Gowrie Mountain, Qld, F. M. Bailey; holotype: P n.v.; isotype: BRI, NSW.

*Viscum australe* F. M. Bailey, *Queensland Agric. J.* 26: 199 (1911); *Korthalsella australis* (Bailey) Blakely, *Proc. Linn. Soc. New South Wales* 53: 35 (1928). T: Crows Nest, Qld, 18 May 1886, E. W. Pechey; holotype: BRI.

[*Viscum articulatum* auct. non Burm.f.: G. Bentham, *Fl. Austral.* 3: 396 (1867)]

Illustrations: W. F. Blakely, *op. cit.*; B. A. Barlow, *Brunonia* 6: 40, figs 16–18 (1983).

Plant to 16 cm high, sometimes with 2 or 3 main stems arising from haustorium. Internodes strongly flattened in one plane, not or hardly contracted and not strongly articulated at nodes, forming an integrated cladode tapering at each end, the central ones up to 30 mm long and 20 mm wide; lateral branches flattened in same plane as parent axis; 3 longitudinal veins raised and distinct and up to 4 weaker longitudinal veins and reticulate venation visible. Rudimentary leaves encircling floral cushions and not continuous around nodes, 0.25–0.5 mm long. Hairs of floral cushion dense, short, red, not visible in young inflorescence. Flowers over 40 per cluster, in at least 4 rows; male flowers few, developing successively down midline of cluster.  $2n = c. 28$ , *vide* B. A. Barlow, *Proc. Linn. Soc. New South Wales* 88: 151 (1963).

Endemic in Australia from near Monto, Qld, to near Dungog, N.S.W., in coastal districts and adjacent ranges in open and closed forests on a wide range of hosts. Map 179.

Qld: Gladfield, B. A. Barlow 169 & 227 (BRIU); Bukali near Monto, 29 Nov. 1965, G. H. Malcolmsen (BRI). N.S.W.: Sugarloaf Road, c. 8 km from Dungog towards Gresford, 30 Oct. 1969, D. F. Blaxell (NSW).

**6. Korthalsella papuana** Danser, *Blumea* 3: 53, fig. 1f (1938)

T: crest of Main Range NW of The Gap, Papua, Carr 15120; holotype: L; isotype: LAE.

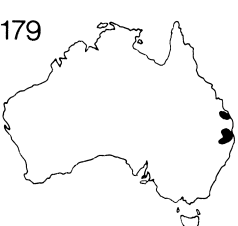
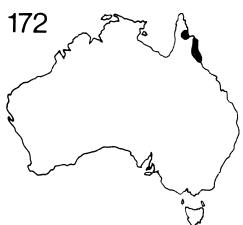
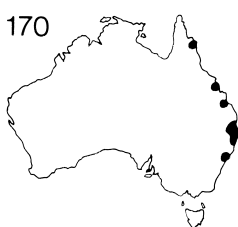
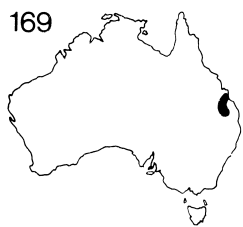
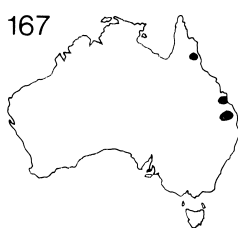
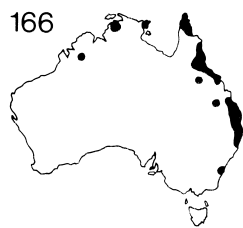
Illustrations: B. A. Barlow, *Brunonia* 5: 50, figs 39–41 (1983).

Plant 6–18 cm high, little-branched when young, later branched at most vegetative nodes; vegetative stems of usually 3–5 internodes. Vegetative internodes strongly flattened in one plane, narrowly to broadly obovate, usually 25–55 mm long and 15–22 mm wide, attenuate and sometimes almost terete at base, abruptly contracted at apex; branches flattened transversely to parent axis; 3 prominent longitudinal veins and reticulate venation distinct. Rudimentary leaves acute, c. 1 mm long, each pair encircling node. Flowering stems forming terete, spike-like confluences, usually 3 terminating each vegetative stem and sometimes solitary in lower axils; internodes compressed when young, terete or nearly so at maturity, 1.5–3 mm long; rudimentary leaves of flowering stems decussate. Hairs red, visible between young flowers but not forming dense cushions. Flowers eventually over 40 per cluster, in c. 4 rows, encircling each node in dense whorls; male flowers forming single whorl at top of each cluster. Fig. 34E.

Occurs in N Qld in rainforests of the Dividing Range from 900–1570 m altitude; commonly parasitic on *Syzygium* and *Acmena*. Also at high elevations in New Guinea. Map 180.

Qld: State Forest Reserve 143, North Mary Logging Area, B. P. Hyland 8007 (CANB, QRS); Mt Bellenden Ker, c. 1 km SW of Centre Peak, L. S. Smith 14626a (BRI); Clarke Range, Massey Creek and road junction, L. S. Smith 4818A (BRI).





166. *Viscum articulatum*

167. *Viscum whitei*  
subsp. *whitei*

168. *Viscum whitei*  
subsp. *flexicaule*

169. *Viscum bancroftii*

170. *Notothixos incanus*

171. *Notothixos subaureus*

172. *Notothixos leiophyllus*

173. *Notothixos cornifolius*

174. *Korthalsella grayi*

175. *Korthalsella japonica*

176. *Korthalsella rubra*  
subsp. *rubra*

177. *Korthalsella rubra*  
subsp. *geigericola*

178. *Korthalsella leucothrix*

179. *Korthalsella breviarticulata*

180. *Korthalsella papuana*

# BALANOPHORACEAE

H. J. Hewson

Herbaceous, fleshy root-parasites, without chlorophyll or roots, dioecious or monoecious; stem arising endogenously or exogenously from tuber, leafless or with scale leaves. Inflorescence spadix-like, often appearing cone-like or fungus-like; flowers unisexual; male flowers conspicuous, giving the cone-like appearance; female flowers minute and very numerous, giving the fungus-like appearance. Male flowers sessile or pedicellate, usually bracteate, 2–6-merous, rarely more; tepals in 1 whorl, free; stamens opposite tepals, fused into a synandrium. Female flowers (in *Balanophora*) subtended by club-shaped bracts (spadicles); perianth bilobed and fused to ovary, or absent; styles 1 or 2; ovary with 1 or 2, rarely 3, carpels, inferior or superior. Fruit minute, nut-like or drupe-like. Seeds with endosperm; embryo minute.

18 genera in tropical and subtropical regions. One genus native in Australia.

G. Bentham, *Fl. Austral.* 6: 231–232 (1875); B. Hansen, *Fl. Males.* ser. 1, 7: 783–805, figs 1–26 (1976).

## BALANOPHORA

*Balanophora* Forster & G. Forster, *Char. Gen. Pl.* 99, t. 50 (1776), from the Greek *balanos* (acorn), and *phoros* (bearing), in reference to the 'acorn-like' inflorescence

Type: *B. fungosa* Forster & G. Forster

Tubers containing wax, simple or branched; surface finely granular to coarsely tessellate, with or without stellate warts. Stem arising from pit at apex of tuber. Leaves 2–40, whorled, opposite, distichous or alternate; base broad. Inflorescence axis globular or elongate. Male flowers bracteate; perianth of 3–6, rarely to 14, tepals. Female flowers about 1 million, subtended by club-shaped spadicles, 0.5–2.5 mm long; perianth absent; style 1; ovary 1-locular; ovule 1.

15 species from temperate and tropical Africa to the Pacific islands. One species native in northern Queensland.

B. Hansen, *Dansk. Bot. Ark.* 28: 1–188 (1972).

***Balanophora fungosa*** Forster & G. Forster, *Char. Gen. Pl.* 99, t. 50 (1776)

T: not designated; *n.v.*

Plant monoecious or dioecious, yellow, orange-yellow, yellow-brown or pink, to c. 20 cm long. Leaves 10–35, alternate, imbricate, irregularly shaped, mostly ovate or obovate, obtuse, slightly cucullate, 1–3 cm long, 1–2 cm wide. Inflorescence unisexual or bisexual, monoecious plants with female flowers above males. Male flowers pedicellate, actinomorphic, 3–6-merous; tepals to 7 mm long; anthers horseshoe-shaped. Female flowers with spadicles obconical or stalked obconical to obovoid; carpels to 0.5 mm long; styles to 1.5 mm long.

Two subspecies occur in tropical and subtropical regions from India to Fiji. Both are found in rainforest in Qld N from Gympie.

Plant monoecious

**1a. subsp. *fungosa***

Plant dioecious

**1b. subsp. *indica***

**a. *Balanophora fungosa* Forster & G. Forster subsp. *fungosa***

*Balanophora fungosa* f. *extratropica* F. M. Bailey, *Compr. Cat. Queensland Pl.* 470, fig. 458 (1911).

T: Mt Eerwah, Qld, *H. Anderson s.n.*; holotype: BRI.

Illustrations: F. M. Bailey, *Queensland Fl.* 5: t. 65 (1902); B. Hansen, *Dansk. Bot. Ark.* 28: fig. 19 (1972); K. A. W. Williams, *Native Pl. Queensland* 27 (1979).

Monoecious. Tubers single or in mass, granular with stellate warts. Stem 2.5–11 cm long. Leaves 15–30, 2–3 cm long, 1.5–2 cm wide. Inflorescence bisexual. Male flowers 2–20 in a region 0.5–1 cm long, 4- or 5-merous; pedicels 3–7 mm long; tepals ovate-elliptic; synandrium ovoid-ellipsoidal. Female flowers in terminal region 1–3.5 cm long, 1–3.5 cm wide; spadicles c. 1 mm long; style to c. 1 mm long; ovary to c. 0.5 mm long.

Occurs from Burma through to Fiji. In Australia it occurs in the entire range of the species in NE Qld, in rainforest. Map 181.

Qld: Iron Range, *L. J. Brass 19323* (CANB); Mossman Gorge, *B. G. Briggs 2040* (NSW); West Claudie River, *C. H. Gittens 107* (BRD); Mossman, July 1971, *H. A. Morrison* (MEL); Freshwater Creek, *C. L. Wilson 737* (BRI).

**b. *Balanophora fungosa* subsp. *indica* (Arn.) B.Hansen, *Dansk. Bot. Ark.* 28: 100; figs 20, 21 (1972)**

*Langsdorffia indica* Arn., *Ann. Nat. Hist.* 2: 37 (1838).

T: not from Australia; *n.v.*

**var. *indica***

Illustration: B.Hansen, *loc. cit.*

Diocious. Tubers single or in mass, finely granular to coarsely tessellate with stellate warts. Leaves 10–20, to 3 cm long and 2 cm wide. Inflorescence unisexual. Male inflorescence 1–12 cm long, 1–7 cm wide; flowers 3–6-merous; pedicels 7–10 mm long; tepals elliptic-lanceolate; synandrium compressed, often obconical. Female inflorescence 0.5–7.5 cm long, 0.5–8.5 cm wide; spadicles c. 1.2–2 mm long; style to 1.5 mm long; ovary to 0.5 mm long.

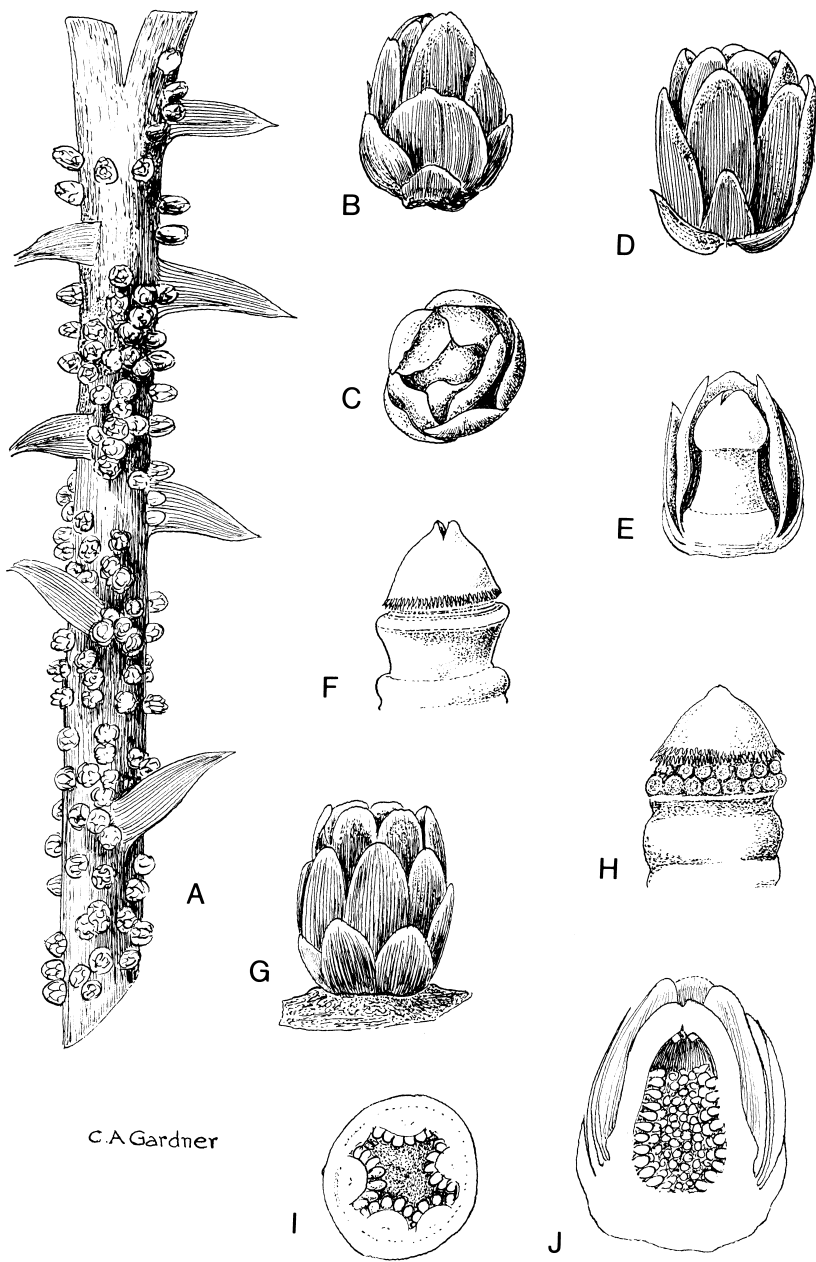
Occurs from India and South East Asia to Micronesia. In Australia it is rare on Cape York Peninsula, Qld. Map 182.

Qld: Bloomfield R., *E. Bayer 1206* (MEL); Dirty Water Creek, *L. J. Brass 19285* (♀) & *19286* (♂) (BRI, CANB); Bloomfield district, Aug. 1975, *V. Scarth-Johnson* (BRI).

This subspecies has three varieties, only one of which occurs in Australia.

**RAFFLESACEAE***B. Dell*

Fleshy, rootless, mostly acaulous herbs, parasitic in stems and roots of shrubs and trees, the flowers and fruits visible on the surface. Vegetative plant endophytic, achlorophyllous, filamentous or thalloid. Leaves absent or reduced to inconspicuous bracts subtending flowers. Flowers solitary or (not in Australia) rarely racemose, sessile, rarely pedicellate or pedunculate, actinomorphic, unisexual by abortion, bracteate. Bracts several to many, imbricate, spirally arranged or verticillate. Perianth monochlamydeous; tepals 4–6, rarely many, free and imbricate (rarely valvate) or (not in Australia) campanulate with 4–6 free or coherent lobes. Stamens and style fused in a central fleshy gynandroecial column, the apex globose or expanded into a disc. Anthers sessile, in 1–4 series below column apex, unilocular or bilocular, dehiscing by longitudinal slits or terminal pores. Ovary inferior or



**Figure 35.** *Pilostyles hamiltonii*. **A**, female flowers emergent from *Daviesia decurrens*  $\times 1.5$ . **B–G**, male flowers; **B–C**, buds just before anthesis  $\times 10$ ; **D**, open flower  $\times 10$ ; **E**, lateral view of column with some bracts and tepals removed; **F**, immature column; **G**, mature column showing biseriate anthers. **H–J**, female flowers; **H**, open flower  $\times 10$ ; **I**, L.S. flower 12; **J**, T.S. ovary showing parietal placentae. Drawn by the late C. A. Gardner from the type. Reproduced by permission from *J. Roy. Soc. W. Austral.* 32: 81 (1948); original made available by courtesy of the Director, Department of Agriculture, Western Australia.

partly inferior, unilocular or (not in Australia) with labyrinth-like chambers; stigmatic zone papillose, globular and terminal or ring-shaped around margin of apical disc. Ovules many, on 4–20 parietal placentas or in upper part of labyrinth. Fruit a berry or capsule. Seeds minute, endospermic.

A family of 9 genera and c. 50 species, widely distributed in tropical, subtropical and some warm temperate regions but with greatest diversity in tropical Africa, tropical America and SE Asia. Represented in Australia by 1 genus and 2 species.

The Rafflesiaceae are holoparasites and can be identified once the flower buds have pushed through to the surface of the host's bark. The flowers of *Rafflesia* are the largest known, some being 1 m across. The closest relatives of the Rafflesiaceae are the Mitrastemonaceae and Hydnoraceae, neither of which is represented in Australia.

G. Bentham & J. D. Hooker, Cytinaceae, *Gen. Pl.* 3(1): 116–121 (1880); R. Brown, An account of a new genus of plants named *Rafflesia*, *Trans. Linn. Soc. London* 13: 201 (1821); R. Brown, Rafflesiaceae, *Trans. Linn. Soc. London* 19: 242–246 (1844); J. D. Hooker, Cytinaceae, in DC., *Prodr.* 17: 106 (1873); H. Harms, Rafflesiaceae, *Nat. Pflanzenfam.* 2nd edn, 16b: 243–281 (1935); J. Kuijt, *The Biology of Parasitic Flowering Plants* (1969).

## PILOSTYLES

*Pilostyles* Guillemain, *Ann. Sci. Nat. Bot.* ser 2, 2: 21 (1834), from the Greek *pileus* (cap), and *stylos* (style), alluding to the central column and disc

Type: *P. berterii* Guillemain

Flowers solitary, minute, globose, unisexual. Bracts imbricate, crowded, adnate at base to ovary and similar to perianth segments. Tepals 4–6, distinct, imbricate, persistent. Anthers unilocular, dehiscing by a terminal pore. Ovary unilocular; placentas parietal. Fruit a berry. Seeds with reticulate testa.

A genus of c. 21 species; two species endemic in south-western W.A. *Pilostyles* is the most widely distributed genus of the family, recorded also in Iran and Central and South America, and is closely related to the genus *Berlinianche* (Harms) Vatt. with two species in tropical Africa. The present disjunct distribution of this group probably resulted from continental drift and subsequent migration. Each species has a limited host range within one or more of the families Mimosaceae, Caesalpinaceae and Fabaceae.

I. de Vattimo, Notice sur la Tribu Apodanthae R.Br. (Rafflesiaceae), *Taxon* 4: 211–212 (1955); R. J. Rutherford, The anatomy and cytology of *Pilostyles thurberi* Gray (Rafflesiaceae), *Aliso* 7: 263–288 (1970); B. Dell & A. H. Burbidge, Notes on the biology of *Pilostyles* (Rafflesiaceae) in Western Australia, *W. Austral. Herb. Res. Notes* 5: 71–79 (1981); B. Dell *et al.*, Anatomy of *Pilostyles hamiltonii* C. A. Gardner (Rafflesiaceae) in stems of *Daviesia*, *Austral. J. Bot.* 30: 1–9 (1982).

Bracts 12–15, triseriate, reddish-orange with brownish-orange tips; berry 2–3 mm diam.

**1. *P. collina***

Bracts 8–12, biseriata, reddish-purple; berry 3–4 mm diam.

**2. *P. hamiltonii***

### **1. *Pilostyles collina* Dell, *Nuytsia* 2: 293 (1983)**

T: Peak Charles, W.A., 10 Jan. 1982, *B.Dell 8216*; holo: PERTH; iso: CANB, G, K, MO, PERTH.

Flowers 1.5–2 mm diam., fleshy. Bracts 12–15, triseriate, suborbicular to ovate, concave, reddish-orange, broad and fleshy at base, gradually thinning towards brownish-orange apex. Tepals 4 or 5, oblong to narrowly obovate, truncate or praemorse, shortly attenuate at base, pale pink; apex brownish-orange. Gynandroecial column cylindrical, pink. Anthers biseriata, contiguous under margin of apical disc. Ovary half-inferior, globose, lemon-yellow; stigma ring-shaped on margin of apical disc. Berry globose, 2–3 mm diam.

A rare species, endemic in the Stirling Range and Fitzgerald Peaks, W.A. Parasitic on *Oxylobium linearifolium* (G. Don) Domin, *O. atropurpureum* Turcz. and *Gastrolobium velutinum* Lindl. & Paxton. Map 183.

W.A.: Bluff Knoll, Stirling Range, 27 Feb. 1982, *B. Dell* (PERTH); foot of Bluff Knoll, Stirling Range, *K. F. Kenneally* 6528 (PERTH); Peak Eleanor, 10 Jan. 1980, *J. S. Pate* (PERTH).

## 2. *Pilotyles hamiltonii* C. Gardner, *J. Roy. Soc. W. Austral.* 32: 77 (1948)

T: near the Helena R., Mundaring, W.A., Mar. 1946, *C. D. Hamilton s.n.*; holo: PERTH

Illustrations: B. Dell & A. H. Burbidge, *W. Austral. Herb. Res. Notes* 5: 75–76 (1981); C. A. Gardner, *op. cit.*, t. I.

Flowers 2–3 mm diam., fleshy. Bracts 8–12, biseriate, ovate-orbicular to oblong, concave, entire or erose, reddish-purple; apex obtuse, pale yellow. Tepals 4–6, imbricate, attenuate or constricted near base, blood-red; apex obtuse, cream. Gynandroecial column cylindrical, pink; disc fleshy. Anthers biseriate under margin of apical disc. Ovary half-inferior or nearly superior, ovoid, pale pink; stigma ring-shaped on margin of apical disc. Berry globose, 3–4 mm diam. Figs 35, 37.

Endemic in W.A., from Eneabba to Busselton. Parasitic on 10 species of *Daviesia* and 2 of *Jacksonia*, *vide* B. Dell & A. H. Burbidge, *W. Austral. Herb. Res. Notes* 5: 71–79 (1981). Map 184.

W.A.: Eneabba, *B. Dell* 76872a (PERTH); 20 km N of Cataby, 23 Apr. 1976, *B. Dell* (PERTH); 1.7 km E of Regans Ford, 23 Apr. 1977, *B. Dell* (PERTH); c. 22 km E of York on Malabelling Rd, *A. S. George* 14961 (PERTH); Boyagin Reserve NW of Pingelly, *A. S. George* 14323 (PERTH).

## CELASTRACEAE

*L. W. Jessup*

Trees or shrubs, sometimes scandent, bisexual, dioecious or monoecious, sometimes deciduous. Leaves alternate or opposite, simple, rarely scale-like or absent; stipules minute or absent. Inflorescence axillary or terminal, cymose, thyrsoïd, paniculate or racemose, usually bracteate; flowers sometimes solitary. Flowers actinomorphic, bisexual or unisexual. Sepals 3–5, imbricate or valvate. Petals 3–5, imbricate, contorted, rarely valvate. Stamens 2–5, sometimes (not in Australia) up to 10, opposite sepals, rarely alternating with staminodes; filaments inserted on or beneath disc; anthers 2-locular, rarely (not in Australia) 1-locular, dehiscing by longitudinal slits. Disc various, usually conspicuous. Ovary partly, completely or not at all immersed in disc, 1–10-locular with 1 to many anatropous erect or rarely pendulous ovules per locule; style prominent, short or obsolete. Fruit a loculicidal capsule or indehiscent. Seeds often arillate, sometimes winged. Endosperm copious, rarely absent; cotyledons mostly flat, foliaceous.

About 50 genera and 800 species in tropical, subtropical and temperate regions; 14 genera (6 endemic) and 34 described species in Australia.

L. E. T. Loesener, *Celastraceae*, *Nat. Pflanzenfam.* 2nd edn, 20b: 87–197 (1942); Ding Hou, *Celastraceae*, *Fl. Males.* ser. 1, 6: 227–291 (1962), *op. cit.* 389–397 (1964); N. K. B. Robson, New and little-known species from the Flora Zambesiaca area 16. Taxonomic and nomenclatural notes on Celastraceae, *Bol. Soc. Broteriana* 39: 36–38 (1965).



**Figure 36.** *Amyema preissii*.  
Photograph —A. S. George

**Figure 37.** *Balanophora fungosa*.  
Photograph —M. Fagg



**Figure 38.** *Pylostyles hamiltonii*.  
Photograph —A. S. George

**Figure 39.** *Notothixos subaureus*.  
Photograph —M. Calder

## KEY TO GENERA

- 1 Leaves and branchlets with conspicuous indumentum **7. HEXASPORA**
- 1: Leaves and branchlets glabrous or nearly so
- 2 Fruit a capsule
- 3 Leaves alternate
- 4 Ovary 4- or 5-locular
- 5 Stamens inserted beneath margin of a fleshy disc in sinuses; aril attached lengthwise to one side of seed **6. HEDRAIANTHERA**
- 5: Stamens inserted on margin of a cupular disc; aril attached to base of seed **1. DENHAMIA**
- 4: Ovary 1–3-locular
- 6 Leaves distichous on lateral branches **8. HYP SOPHILA**
- 6: Leaves not distichous
- 7 Dioecious scandent shrubs; staminodes of female flowers similar to stamens of males but smaller **2. CELASTRUS**
- 7: Trees or erect shrubs with mostly bisexual flowers
- 8 Ovary imperfectly, rarely perfectly, 2- or 3-locular with 3–10, rarely 2, ovules per locule; septa mostly not touching axially in fruit; valves of capsule usually woody **1. DENHAMIA**
- 8: Ovary perfectly 2- or 3-locular with 2 ovules per locule; septa connate or touching axially in fruit; valves of capsule crustaceous
- 9 Flowers solitary **4. APATOPHYLLUM**
- 9: Inflorescence usually few- to many-flowered **3. MAYTENUS**
- 3: Leaves opposite, subopposite or absent
- 10 Apparently leafless shrubs **5. PSAMMOMOYA**
- 10: Trees or shrubs with leaves
- 11 Seeds winged, flat; aril absent; petals often with small appendages inside **10. LOPHOPETALUM**
- 11: Seeds not winged or flat; aril present; petals not appendaged **11. EUONYMUS**
- 2: Fruit indehiscent
- 12 Leaves opposite or subopposite
- 13 Style terminal on fruit; anther connective obscure **12. CASSINE**
- 13: Style lateral on fruit; anther connective distinct and broad **13. PLEUROSTYLIA**
- 12: Leaves alternate
- 14 Pistil hollow at apex; fruit drupaceous containing several to many 1-seeded pyrenes embedded in a hard or fleshy pulp; petals nearly circular **14. SIPHONODON**
- 14: Pistil not hollow at apex; fruit a 1- or 2-seeded berry; petals narrowly triangular **9. PERROTETIA**



## 1. DENHAMIA

*Denhamia* Meissner, *Pl. Vasc. Gen.* 1: 18, 2: 16 (1837), *nom. cons.*, *non* Schott (1832) *nom. rej.* after Capt. D. Denham (1786–1828), English explorer in Africa

Type: *D. obscura* (A. Rich.) Meissner ex Walp.

*Leucocarpum* A. Rich., in J.S.C. Dumont d'Urville, *Voy. Astrolabe* 2: 46, t. 18 (1834) *nom. rej.* T: *L. obscurum* A. Rich.

Shrubs or trees, glabrous or nearly so. Leaves alternate, often clustered, entire or serrate; stipules minute. Flowers bisexual, usually in cymes in axils of leaves or cataphylls; peduncle subtended by bract; pedicels articulate. Sepals 5, nearly equal, imbricate in bud. Petals 5, imbricate in bud, spreading, sometimes reflexed, white to pale green. Stamens inserted on margin of disc; anthers introrse or latrorse. Ovary partly immersed in disc, perfectly or imperfectly 2–5-locular; septa touching near apex, connate near base; ovules 2–10 per locule, attached to inner angle of septum, biserially arranged from base or near centre of axis; stigmas 3–5 or single and ±lobed. Fruit a capsule containing 1 to several seeds with fleshy ±irregularly lobed red arils.

An endemic genus of 7 described species and 2 or 3 insufficiently known and undescribed taxa.

- 1 Adult leaves serrate or serrulate, sometimes obscurely so
- 2 Ovary perfectly or imperfectly 3-locular; capsule ovoid; septa not connate axially in fruit
  - 3 Style to 0.3 mm long; lamina 0.5–3 cm long; petiole 0.6–1 mm long **1. *D. parvifolia***
  - 3: Style 2–2.5 mm long; lamina 4–12 cm long; petiole 2–5 mm long **2. *D. celastroides***
- 2: Ovary perfectly 3–5-locular; capsule depressed-globular or slightly obovoid; septa connate axially in fruit **3. *D. pittosporoides***
- 1: Adult leaves entire
  - 4 Valves of capsule woody; septa not touching axially
  - 5 Capsule valves 0.9–3.5 mm thick; petiole 4–10 mm long
  - 6 Filaments 1.3 mm or more long; style 0.4–1 mm long; ovary with 8–10, rarely 6, ovules per carpel; capsule valves 0.9–3 mm thick
  - 7 Petals 3–3.5 mm long; capsule ovoid, rarely obovoid, 15–28 mm long; inflorescence many-flowered **6. *D. oleaster***
  - 7: Petals 3.5–4.5 mm long; capsule fusiform or obovoid, 25–45 mm long; inflorescence mostly 1–3-flowered **4. *D. viridissima***
  - 6: Filaments 0.5–1 mm long; style very short or obsolete; ovary with 6 ovules per carpel; capsule valves 3–3.5 mm thick **7. *D. obscura***
  - 5: Capsule valves 0.3–0.5 mm thick; petiole 0.6–1 mm long **1. *D. parvifolia***
  - 4: Valves of capsule coriaceous; septa at least partially connate or touching axially **5. *D. moorei***

**1. *Denhamia parvifolia*** L. S. Smith, *Proc. Roy. Soc. Queensland* 67: 30 (1956)

T: Edenvale Hill, near Kingaroy, Qld, *N. Michael* 3041; holo: BRI.

Shrub 2–3 m; branchlets striate. Leaves elliptic, oblong-elliptic or obovate, gently recurved, acute to rounded, mucronate or emarginate, remotely serrate or entire, subcoriaceous; lamina 0.5–3 cm long, 3–9 mm wide; base shortly attenuate; secondary veins 4–8 pairs; petiole 0.6–1 mm long. Inflorescence raceme-like or flowers solitary; pedicels 2.5–3.5 mm long. Sepals broadly ovate, denticulate, 0.6 mm long. Petals oblong or oblong-obovate, 3–3.5 mm long. Staminal filaments c. 1.5 mm long. Ovary conical, slightly immersed in disc, imperfectly 3-locular with 2, sometimes 4, centrally attached ovules per locule; style to 0.3 mm long; stigma minutely 3-lobed. Capsule ±woody, ovoid,

1-locular, 3-valved, 6–8 mm long, 5–6 mm wide. Seed almost enclosed in aril. Fig. 40A.

Occurs in microphyll vine thickets from Eidsvold to Chinchilla and E to Kingaroy, Qld. Map 185.

Qld: Portion 129v, Parish of Wooroolin, Shire of Kingaroy, 26 Mar. 1982, *S. McF. James* (BRI); Chinchilla, Oct. 1978, *G. Lithgow* (BRI).

**2. Denhamia celastroides** (F. Muell.) Jessup, *Fl. Australia* 22: 222 (1984)

*Leucocarpum celastroides* F. Muell., *Fragm.* 6: 203 (1868). T: Head of the Macleay River, New England, N.S.W., *C. Moore* 103; lecto: MEL *vide* L. Jessup, *Fl. Australia* 22: 222 (1984).

[*D. pittosporoides* auct. non F. Muell.: N. C. W. Beadle, *Stud. Fl. N.E. New South Wales* 4: 510, fig. 221C (1980)]

Shrub or small tree to 7 m; branchlets striate. Leaves elliptic, oblanceolate, rarely lanceolate, acute, sometimes acuminate or rounded, serrulate or serrate, subcoriaceous; lamina mostly 4–12 cm long and 1–4.5 cm wide; base attenuate or narrowly cuneate; secondary veins 6–10 pairs; petiole 2–5 mm long. Inflorescence many-flowered; pedicels c. 1 mm long. Sepals ovate, concave, minutely erose, c. 1 mm long. Petals oblong-obovate, concave, reflexed, c. 2.5 mm long, caducous. Staminal filaments c. 1.5 mm long. Ovary partly immersed in disc, 3-locular with 2 or 3, rarely 4, ovules per locule; style 2–2.5 mm long; stigma 3-lobed. Capsule ovoid, 3-locular, 3-valved, 10–17 mm long. Seed more than half surrounded by aril. Fig. 40B–D.

Occurs in the wetter coastal and upland notophyll vine forests and ecotones with sclerophyll forest in E Qld and N.S.W. Map 186.

Qld: Springbrook, Macpherson Range, *C. E. Hubbard* 4210 (BRI); Fraser Is., *C. E. Hubbard* 4539 (BRI); O'Reillys, Lamington National Park, *L. S. Smith & L. J. Webb* 3605 (BRI). N.S.W.: Comboyne (Plateau), Feb. 1924, *Chisholm* (NSW); White Swamp Road, 1km S of Qld border, *K. A. W. Williams* 78019 (BRI).

**3. Denhamia pittosporoides** F. Muell., *Trans. & Proc. Philos. Inst. Victoria* 3: 30 (1859)

*Leucocarpum pittosporoides* (F. Muell.) F. Muell., *Fragm.* 6: 203 (1868). T: Scott's station near source of the Burnett R., Qld, *C. Moore s.n.*; syn: MEL.

Shrub or tree to 7 m, sometimes multistemmed. Leaves oblong-lanceolate to elliptic, rarely oblong-obovate or oblanceolate, acute or obtuse, serrate to almost entire, subcoriaceous, discolorous; lamina mostly 2.5–11 cm long and 0.4–2.5 cm wide; base cuneate or attenuate; secondary veins 6–10 pairs; petiole 3–11 mm long. Inflorescence many-flowered, 1–4 cm long; pedicels c. 1 mm long. Sepals ±semicircular, concave, slightly erose, c. 1.5 mm long. Petals ovate, c. 2.5 mm long. Staminal filaments c. 1.5 mm long. Ovary partly immersed in disc, 3–5-locular, with 2, rarely 4, ovules per locule; style 1–1.3 mm long; stigmas 3–5. Capsule depressed-globular or slightly obovoid, often obtusely 3–5-angular, 12–15 mm long, 20–24 mm wide. Seed almost completely enveloped in aril.

Occurs in the drier notophyll and microphyll vine forests and thickets of E Qld and NE N.S.W. There are 2 subspecies.

Leaf length 3–9 times width; petiole 3–6 mm long, 0.9–1.5 mm wide

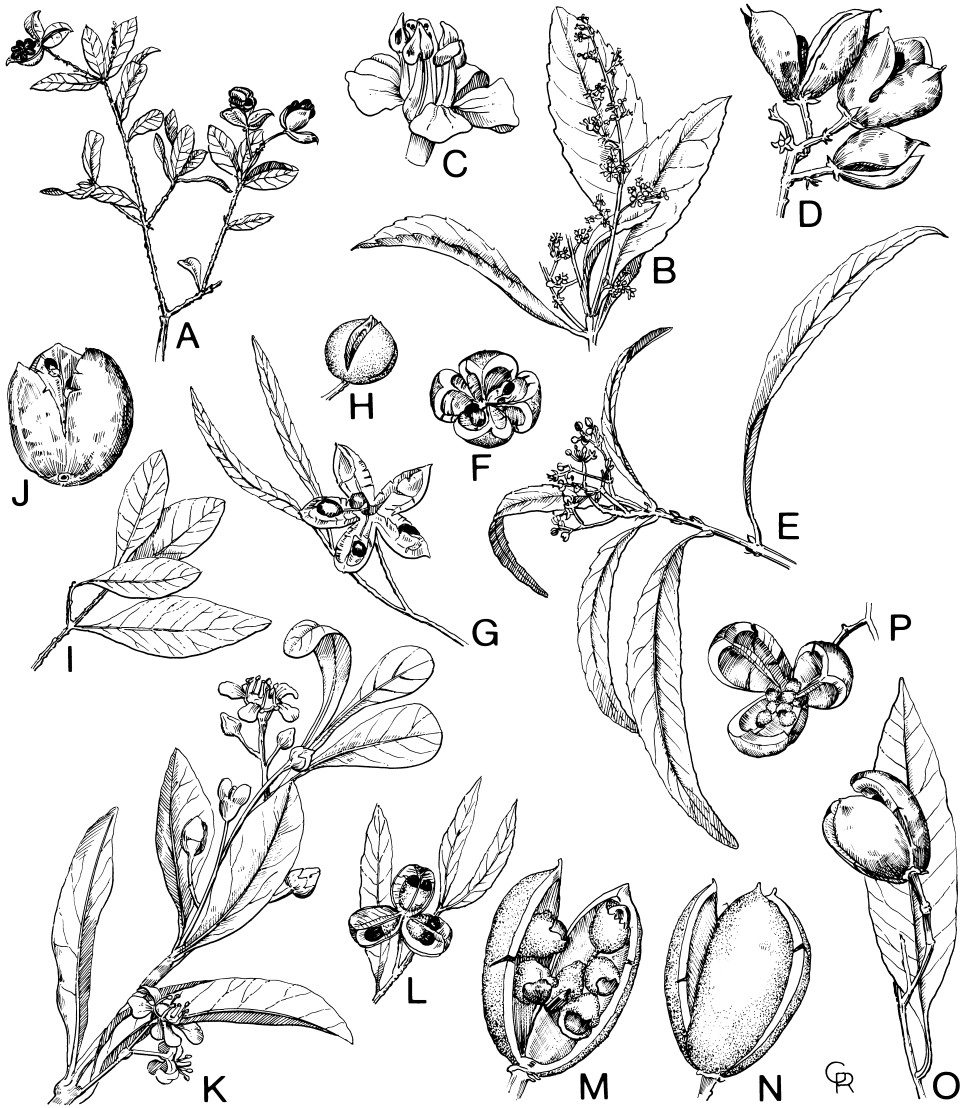
**3a. subsp. pittosporoides**

Leaf length 8–14 times width; petiole 6–11 mm long, 0.5–0.6 mm wide

**3b. subsp. angustifolia**

**3a. Denhamia pittosporoides** F. Muell. subsp. **pittosporoides**

Shrub or tree to 7 m. Leaves oblong, lanceolate or elliptic, rarely oblong-obovate, rounded-obtuse, sometimes acute, serrate or serrulate, subcoriaceous; lamina usually 3–11 cm long and 7–25 mm wide, cuneate or attenuate at base; petiole 3–6 mm long. Fig. 40E–F.



**Figure 40.** *Denhamia*. **A**, *D. parvifolia*, fruiting branchlet  $\times 0.5$  (S. James, BRI). **B–D**, *D. celastroides*. **B**, flowering branchlet  $\times 0.5$ ; **C**, flower  $\times 6$  (**B–C**, S. Jensen, BRI 254644); **D**, fruit  $\times 1$  (K. Williams 78019, BRI). **E–F**, *D. pittosporoides* subsp. *pittosporoides*. **E**, flowering branchlet (L. Jessup 468, BRI); **F**, fruit  $\times 0.5$  (L. Jessup 485, BRI). **G–H**, *D. pittosporoides* subsp. *angustifolia*. **G**, fruiting branchlet  $\times 0.5$ ; **H**, fruit  $\times 0.5$  (**G–H**, B. Gray 1424, BRI). **I–J**, *D. viridissima*. **I**, branchlet  $\times 0.5$ ; **J**, fruit  $\times 0.5$  (**I–J**, B. Hyland 3681 R.F.K., BRI). **K–L**, *D. moorei*. **K**, flowering branchlet  $\times 1$  (G. Guymer 1673, BRI); **L**, fruit  $\times 0.5$  (J. Vickery, NSW 147706). **M–N**, *D. oleaster*. **M**, fruit, 1 segment removed  $\times 1$ ; **N**, fruit  $\times 1$  (**M–N**, B. Hyland 11635, BRI). **O–P**, *D. obscura*. **O**, fruiting branchlet  $\times 0.5$  (J. Must 833, DNA); **P**, fruit  $\times 0.5$  (R. Story 8382, DNA).

Occurs from Mt Garnet, Qld, to Acacia Creek, N.S.W. Map 187.

Qld: Wonga Hills, parish of Kragra, Chinchilla Shire, *S. McF. James 83* (BRI); Possum Ck, tributary of Woogaroo Ck, Goodna, *L. W. Jessup 485 & L. H. Bird* (BRI, CANB, NSW, PERTH, QRS); near Biloela, *L. S. Smith 3561* (BRI); White Swamp road, 4 km N of Qld–N.S.W. border, *K. A. W. Williams 78027* (BRI). N.S.W.: Acacia Ck, via Killarney, Feb. 1905, *J. L. Boorman* (NSW).

**3b. *Denhamia pittosporoides* subsp. *angustifolia* Jessup, *Fl. Australia* 22: 222 (1984)**

T: No Name Hill, Valley of Lagoons, *B. Gray 1424*; holo: BRI; iso: QRS.

Shrub or tree to 6 m. Leaves often pendulous, narrowly lanceolate or oblanceolate, acute, remotely serrulate or subentire, thinly subcoriaceous; lamina mostly 2.5–9 cm long, 4–11 mm wide; base attenuate-decurrent; petiole 6–11 mm long. Fig. 40G–H.

Occurs in vine thicket and savannah woodland, sometimes on rock outcrops from Mt Garnet to Nebo, Qld. Map 188.

Qld: near Reedybrook Stn turnoff on Northern Inland Highway, c. 100 km from Mt Garnet, *M. Lockyer 176* (BRI); 88 km W of Ingham, road to Valley of Lagoons Stn, *S. A. Morain 318* (BRI); St. Ronans Stn, Mt Garnet, 23 Dec, 1960, *R. J. Myers* (BRI); 75 km W of Nebo, *R. Story & G. Yapp 104* (BRI); Water reserve, anabranche off Big Sandy (Hann) Creek (near Burdekin River), *K. A. W. Williams 77070* (BRI).

**4. *Denhamia viridissima* Bailey & F. Muell. ex Bailey, *Bot. Bellenden-Ker Exped.* (in *Meston, Rep. Govt Sci. Exped. Bellenden-Ker Ra.*) 35 (1889)**

T: Mt Bellenden Ker, Qld, 2 Nov. 1889, *F. M. Bailey s.n.*; holo: BRI; iso: MEL.

Tree to 20 m. Leaves often clustered, lanceolate, oblanceolate or obovate, acuminate or acute, entire or rarely with 1 or 2 teeth near apex, subcoriaceous; lamina 4.5–11 cm long, 1.5–3.5 cm wide; base attenuate; secondary veins 5–8 pairs; petiole 4–10 mm long. Inflorescence mostly 1–3-flowered, 10–20 mm long; pedicels 2–3 mm long. Sepals broadly ovate, c. 1 mm long. Petals oblong-obovate, convex, recurved, 3.5–4.5 mm long. Staminal filaments c. 1.7 mm long; anthers latrorse to slightly introrse. Ovary narrowly conical, half-immersed in disc, 3-locular with 8–10 ovules per locule; style c. 1 mm long; stigma obscurely 3-lobed. Capsule obovoid or ±fusiform, 3-angular, 2.5–4.5 cm long; valves 2–3 mm thick. Seeds half-enclosed in aril. Fig. 40 I–J.

Occurs in montane rainforest on the Bellenden Ker Range and on mountains W of Mossman, Qld. Map 189.

Qld: State Forest Reserve 143, North Mary Logging Area, WSW of Mossman, *B. Gray 1846* (QRS); *loc. id.*, *B. Hyland 3681 R.F.K.* (BRI, QRS).

**5. *Denhamia moorei* Jessup, *Fl. Australia* 22: 222 (1984)**

T: 0.1 km along W arm of Deervale road, off Dorrigo-Armidale road, N.S.W., *G.P. Guymner 1673*; holo: BRI; iso: BRI, CANB, K, L, NE, NSW.

Shrub or small tree to 6 m, glabrous; branchlets striate. Leaves oblanceolate or narrowly elliptic, sometimes falcate, acute or rounded-obtuse, entire, rigidly chartaceous, recurved; lamina 2–6 cm long, 4–17 mm wide; base attenuate; secondary veins 5–8 pairs; petiole 0.6–1 mm long. Inflorescence 1–3 (rarely to 15)-flowered; pedicels 2–3 mm long. Sepals broadly ovate, c. 1 mm long. Petals oblong-obovate, 3.3 mm long. Staminal filaments to 1.5 mm long. Ovary partly immersed in disc, 3-locular with 4–6 ovules per locule. Style 0.8 mm long; stigma 3-lobed. Capsule obovoid or ovoid, 10–18 mm long, 3-valved; valves coriaceous, c. 0.5 mm thick. Seed ±half-surrounded by aril. Fig. 40K–L.

Occurs on margins of montane rainforest often dominated by *Nothofagus moorei* from Mt Hyland NW of Dorrigo to the headwaters of the Macleay River, N.S.W. Map 190.

N.S.W.: head of Little Murray River, Lanton Peak, SW of Dorrigo, *E. Darley H173* (NSW); Mt Hyland, *A. G. Floyd 1663* (BRI); c. 50 m along road to Deervale off Ebor-Dorrigo road, *N. S. Lander 516* (NSW); Coghlan Stn, head of Bellinger River, *C. Moore 96* (MEL); Deervale, near Dorrigo, 15 April 1953, *J. Vickery* (NSW).

**6. Denhamia oleaster** (Lindley) F. Muell., *Trans. & Proc. Philos. Inst. Victoria* 3: 29 (1859)

*Melicytus oleaster* Lindley, in T. L. Mitchell, *J. Exped. Trop. Austral.* 383 (1848); *Leucocarpum oleaster* (Lindley) F. Muell., *Fragm.* 6: 203 (1868). T: St Georges Bridge, Balonne River, Qld, T. L. Mitchell s.n.; syn: MEL.

*D. heterophylla* F. Muell., *Trans. & Proc. Philos. Inst. Victoria* 3: 29 (1859). T: On scrubby ridges from Gilbert River to Burdekin River, Qld, F. Mueller s.n.; syn: MEL.

Shrub or small tree to 6 m, glabrous. Leaves narrowly to broadly elliptic, rarely obovate, acuminate or rarely obtuse, entire, dentate in juveniles, subcoriaceous, often discolorous; lamina mostly 4–8 cm long and 1–3.5 cm wide; base attenuate; secondary veins 7–9 pairs; petiole 0.5–1 cm long. Inflorescence cymose; pedicels 3–4 mm long. Sepals rounded, fringed, c. 1.3 mm long. Petals oblong, 3–3.5 mm long. Staminal filaments 1.3–3 mm long; anthers  $\pm$ introrse. Ovary scarcely immersed in disc, imperfectly 3 (rarely 2 or 4)-locular with 8 (sometimes 6) ovules per locule; style to 1 mm long; stigma undivided or shortly 3-lobed. Capsule ovoid, rarely obovoid, 1.5–2.8 cm long, yellow; valves woody, 0.9–2 mm thick. Seed 5–6 mm long, enveloped in aril. Fig. 40M–N.

Widespread in inland districts of Qld and near-coastal central Qld, usually in vine thickets and often with brigalow (*Acacia harpophylla*) Map 191.

Qld: Cumberland, Gilbert River, L. J. Brass 8853 (BRI); 40 Mile Scrub to Mt Garnet, B. Hyland 4985 (BRI, QRS); 20 km NE of Richmond, R. A. Perry 4084 (BRI); c. 1.6 km N of Planet Downs Homestead, R. Story & G. Yapp 220 (BRI); Marmor, C. T. White 12477 (BRI).

**7. Denhamia obscura** (A.Rich.) Meissner ex Walp., *Repert. Bot. Syst.* 1: 203 (1842)

*Leucocarpum obscurum* A. Rich., in J. S. C. Dumont d'Urville, *Voy. Astrolabe* 2: 46, t. 18 (1834); *Denhamia leucocarpum* Steud., *Nom. Bot.* 2nd edn, 1: 491 (1841), *nom. illeg.* T: Melville Island, N.T., (not 'Moreton Bay'), Fraser; n.v.

*D. xanthosperma* F. Muell., *Trans. & Proc. Philos. Inst. Victoria* 3: 28 (1859). T: Arnhem Land, N.T., F. Mueller s.n.; syn: MEL.

Shrub or tree to 9 m, glabrous. Leaves elliptic, oblong-elliptic or rarely obovate, acuminate, acute, rarely obtuse, entire, dentate in juveniles, subcoriaceous; lamina mostly 5–12 cm long and 1.5–3.5 cm wide; base attenuate; secondary veins 8–12 pairs; petiole 5–10 mm long. Inflorescence cymose; pedicels 1.5–2 mm long. Sepals rounded, entire or erose, c. 1.3 mm long. Petals oblong to nearly semicircular, 2–3.5 mm long. Staminal filaments 0.5–1 mm long; anthers  $\pm$ latrorse. Ovary slightly immersed in disc, imperfectly 3–(rarely 2)-locular with 6 (rarely 7) ovules per locule; style obsolete; stigmas 3. Capsule ovoid or globular; 2.5–4 cm long, greenish-yellow; valves woody, 3–3.5 mm thick. Seed c. 8 mm long, enveloped in aril. Fig. 40 O–P.

Occurs in the Kimberley, W.A., and in Arnhem Land and adjacent islands E to Groote Eylandt, N.T., in tall shrubland, eucalypt forest and vine thicket, mostly in well-drained soil Map 192.

W.A.: near Mt Shadforth, Edkins Range, C. A. Gardner 1577. (PERTH); near Manning Gorge, Mt Barnett Stn, A. S. George 15188 (PERTH). N.T.: c. 8 km ENE of Adelaide River bridge, P. K. Latz 3095 (BRI, NT); on Mudginberry road, c. 3.3 km from Cannon Hill, M. Lazarides 7596 (BRI, MEL, NT); Yirrkala, R. L. Specht 792 (BRI, MEL).

Specimens from Qld cited by Bentham are *Denhamia oleaster* (Lindley) F. Muell.

## 2. CELASTRUS

*Celastrus* L., *Sp. Pl.* 1: 196 (1753), *Gen. Pl.* 5th edn, 91 (1754), from the Greek *kelastrós*, an evergreen tree

Type: *C. scandens* L.

Scandent shrubs, usually dioecious. Leaves alternate, mostly serrate; stipules caducous. Flowers in terminal or axillary racemes or panicles. Perianth 5-merous. Stamens 5; anthers dorsifixed, versatile, dehiscing laterally or extrorsely; female flowers with staminodes. Ovary 3-locular; ovules 2 per locule, basally attached; stigma  $\pm$ 3-lobed. Fruit a 3-valved, 3-locular capsule crowned by persistent remnants of style. Seeds 1–6, enveloped in a coloured, fleshy aril. Endosperm copious; embryo erect; cotyledons thin, broadly spatulate.

About 32 species, mostly in eastern Asia, Malesia, tropical and subtropical America, New Caledonia, Madagascar and Australia. 2 species in Australia.

Scales near base of youngest branchlets narrowly deltoid to subulate,  $\pm$ entire; mature fruit 5–9.5 mm long, the inside surface of valves with very few or no red spots; tertiary leaf veins often directly linking successive secondary veins,  $\pm$ conspicuous

1. *C. subspicata*

Scales near base of youngest branchlets broadly ovate, oblong-ovate or deltoid, erose; mature fruit 3–6.5 mm long, the inside surface of valves with scattered red spots; tertiary leaf veins not directly linking successive secondary veins, indistinct on undersurface

2. *C. australis*1. *Celastrus subspicata* Hook., *Icon. Pl.* 5: t.482 (1842)

T: cultivated at Kew; holotype: *K n.v.*, *fide* N.S.Lander & L. A. S. Johnson, *Telopea* 1: 35, 37 (1975).

Scandent shrub; young branchlets puberulous, with entire, narrow scales near base. Leaves elliptic or lanceolate to ovate, acute or acuminate, serrate, subcoriaceous; lamina mostly 5–14 cm long and 2–7 cm wide; base obtuse or acute; secondary veins 6–11 pairs; petiole 3–13 mm long. Panicles terminal, puberulous; pedicels articulate, 1.5–5 mm long. Sepals broadly ovate, erose, c. 0.7 mm long. Petals broadly ovate to elliptic, 2.2–2.8 mm long. Staminal filaments c. 0.6 mm long; staminodes of female flowers similar but smaller. Style c. 1 mm long. Capsule broadly ellipsoidal or ovoid, 5–9.5 mm long, 5–9 mm diam. Seeds 1–6,  $\pm$ angular, 4.5–6 mm long, enveloped in an orange or yellow-green aril. Fig. 42A.

Usually associated with the warmer and drier forms of notophyll vine forest in E Qld and N.S.W. Map 193.

Qld: Yarraman, Aug. 1944, *M. S. Clemens* ( $\varnothing$ ) (BRI); State Forest Reserve 607, Tin Logging Area, *B. Hyland* 5033 ( $\varnothing$ ) (BRI, NSW, QRS); O'Reillys Guest House, Lamington Plateau, *K. A. W. Williams* 77264 ( $\varnothing$ ) (BRI); The Head, source of Teviot Creek, *K. A. W. Williams* 78040 ( $\varnothing$ ) (BRI). N.S.W.: Sandiland Ranges, Nov. 1904, *J. L. Boorman* (NSW).

2. *Celastrus australis* Harvey & F. Muell. ex F. Muell., *Trans. Philos. Soc. Victoria* 1: 41 (1855)

T: Snowy River, *F. Mueller s.n.*; lectotype: MEL 49330, *fide* N. S. Lander & L. A. S. Johnson, *Telopea* 1: 38 (1975).

Scandent shrub; young branchlets glabrous or puberulous, with erose broad scales near base. Leaves lanceolate to elliptic, often falcate, acute or acuminate, serrate, glabrous, membranous to chartaceous; lamina mostly 3–9 cm long and 1–4 cm wide; base cuneate; secondary veins 6–11 pairs; petiole 3–15 mm long. Panicles terminal, glabrous or puberulous; pedicels articulate, 0.8–2.3 mm long. Sepals rounded-deltoid, c. 0.4 mm long. Petals oblong-ovate, 1.8–2.8 mm long; margins recurved. Staminal filaments 0.6–1 mm long; staminodes of female flowers similar but smaller. Style c. 1 mm long. Capsule

ellipsoidal to subglobose, 3–6.5 mm long, 3.3–6 mm diam. Seeds 1–6,  $\pm$ angular, 3–4.2 mm long, enveloped in an orange aril. Fig. 42B.

Usually associated with the cooler and moister forms of notophyll vine forest in SE Qld, eastern N.S.W. and Vic. Map 194.

Qld: Bunya Mts, Mar. 1944, *M. S. Clemens* (♀) (BRI); The Head, source of Condamine River, *K. A. W. Williams* 78039 (♀) (BRI). N.S.W.: Cambewarra Mtn, Nowra, *J. L. Boorman*, (NSW 122073); Cattai Creek, Cattai, *R. Coveny* 8646 & *S. K. Ray* (NSW); Mt Wilson, *J. Gregson* (NSW 24207).

### 3. MAYTENUS

*Maytenus* Molina, *Saggio Chile* 177, 349 (1781), from *Mayten*, the Chilean name for the type species

Type: *M. boaria* Molina

*Celastrus* sect. *Gymnosporia* Wight & Arn., *Prodr. Fl. Penins. Ind. Orient.* 1: 159 (1834). *Gymnosporia* (Wight & Arn.) J. D. Hook., in Benth. & J. D. Hook., *Gen. Pl.* 1: 365 (1862), *nom. cons.* T: *G. montana* (Roth ex Roemer & Schultes) Benth.

Shrubs or small trees. Leaves alternate or in fascicles, rarely (not in Australia) opposite; margins serrate or entire; stipules minute or absent. Flowers bisexual, or unisexual with  $\pm$ well-developed staminodes and pistillode, in lateral cymes or racemes with the axis sometimes growing out into a leafy branch; peduncle subtended by a bract; pedicels articulate. Sepals 4 or 5, imbricate in bud. Petals 4 or 5, imbricate in bud, spreading. Stamens inserted on or beneath margin of disc; anthers  $\pm$ introrse. Ovary partly or rarely completely immersed in disc, 2- or 3-locular with 2 erect collateral ovules per locule attached to septum near base; stigmas 2 or 3. Fruit a capsule, 2–6-seeded. Seeds arillate.

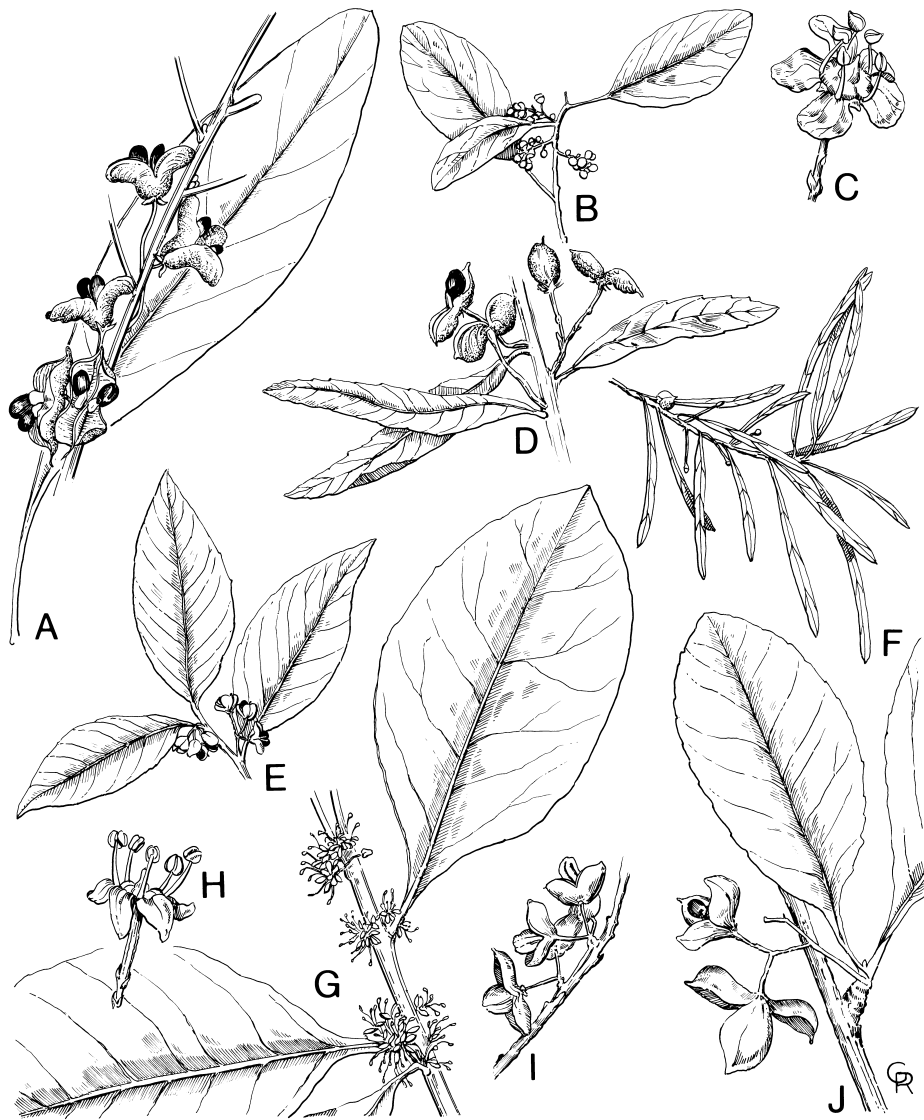
About 200 species, pantropical and subtropical; 7 described species in Australia and 1 or 2 undescribed in northern Qld.

- |    |   |                             |
|----|---|-----------------------------|
| 1  | Flowers in axillary or lateral racemes with the axis sometimes growing out into leafy branches, or in fascicles, sometimes solitary |                             |
| 2  | Aril thick, at base of seed   |                             |
| 3  | Flowers 4-merous; disc 1 mm diam.   | 1. <i>M. disperma</i>       |
| 3: | Flowers 5-merous; disc 2.3 mm diam.   | 2. <i>M. ferdinandi</i>     |
| 2: | Aril thin, surrounding at least half seed   |                             |
| 4  | Flowers in racemes  |                             |
| 5  | Leaves grey-green below, mostly darker above; margins usually serrate, slightly recurved  |                             |
| 6  | Leaves usually curved toward tip, narrowly lanceolate, ovate or obovate   | 3. <i>M. silvestris</i>     |
| 6: | Leaves straight, broadly lanceolate   | 4. <i>M. bilocularis</i>    |
| 5: | Leaves bright green, rarely darker above; margins always entire, not recurved   | 5. <i>M. cunninghamii</i>   |
| 4: | Flowers in fascicles of 3–12, sometimes solitary  | 6. <i>M. fasciculiflora</i> |
| 1: | Flowers in single or fascicled axillary cymes, or crowded near end of short spinescent shoots                                       | 7. <i>M. emarginata</i>     |

**1. *Maytenus disperma*** (F. Muell.) Loes., *Nat. Pflanzenfam.* 2nd edn, 20b: 135 (1942)

*Celastrus disperma* F. Muell., *Trans. & Proc. Philos. Inst. Victoria* 3: 31 (1859). T: Moreton Bay, Qld, *F. Mueller*; holo: MEL.

Tree to 8 m; branchlets glabrous. Leaves obovate, oblong-obovate or elliptic, obtuse or acute, subcoriaceous, entire; lamina mostly 3–8 cm long and 1–4 cm wide, glabrous; base attenuate; secondary veins 3–5 pairs; petiole 3–7 mm long. Racemes axillary or lateral,



**Figure 41.** *Maytenus*. **A**, *M. disperma*, fruiting branchlet  $\times 1$  (L. Webb & J. Tracey 5502A, BRI). **B–C**, *M. ferdinandi*. **B**, habit  $\times 0.5$  (P. Martensz & R. Schodde A-È71, BRI); **C**, flower  $\times 3$  (R. Fox 721, DNA). **D**, *M. silvestris*, fruiting branchlet  $\times 1$  (W. Trapnell, BRI). **E**, *M. bilocularis*, fruiting branchlet  $\times 0.5$  (C. White 12520, BRI). **F**, *M. cunninghamii*, fruiting branchlet  $\times 0.5$  (S. Morain 105, BRI). **G–I**, *M. fasciculiflora*. **G**, flowering branchlet  $\times 1$ ; **H**, flower  $\times 3$  (**G–H**, B. Hyland 6793, BRI); **I**, fruit  $\times 1$  (J. Tracey 14363, BRI). **J**, *M. emarginata*, fruiting branchlet  $\times 1$  (V. Scarth/Johnson 281A, BRI).



0.5–5 cm long; pedicels 0.5–4 mm long. Sepals 4, broadly ovate. c. 1 mm long. Petals 4, oblong, 1.8–2.5 mm long. Stamens 4; filaments 0.9–1.2 mm long. Disc 4-angled, c. 1 mm wide. Ovary glabrous, 2-locular; style 0.2–0.4 mm long; stigma 2-lobed. Capsule ±obovoid, compressed, 7–9 mm long, 5–6 mm wide, 2-valved. Seeds 1 or 2, black, with a thick, fleshy, yellow aril at base. Fig. 41A.

Occurs mostly in seasonally dry coastal and near-coastal vine forest and thickets from Mt Spurgeon, Qld, to Hastings R., N.S.W. Map 195.

Qld.: Pine Mtn, near Ipswich, 8 Jan. 1981, *L. Bird* (BRI); Inveragh Creek, *I. Cowie 48* (BRI); 40 Mile Scrub, *A. Irvine 169* (BRI, QRS); Gorge Creek on Mareeba to Dimbulah road, *L. J. Webb & J. G. Tracey 5502A* (BRI); road between Valley of Lagoons and Ingham, *K. A. W. Williams 80054* (BRI).

## 2. *Maytenus ferdinandi* Jessup, *Fl. Australia* 22: 223 (1984)

*Celastrus muelleri* Benth., *Fl. Austral.* 1: 399 (1863), non *Maytenus muelleri* Schwacke, *Addit. Fl. Brasil.* 1 (1886). T: near Macadam Range, N.T., *F. Mueller s.n.; n.v.*

Tree to 8 m; branchlets glabrous. Leaves elliptic to obovate or ovate, obtuse or acute, entire, or serrulate towards apex, chartaceous, glabrous; lamina mostly 4–10 cm long and 2–5 cm wide; base attenuate; secondary veins 4–7 pairs; petiole 9–13 mm long. Racemes axillary or lateral; pedicels 3.5–6 mm long. Sepals 5, broadly deltoid or rounded, erose. Petals 5, oblong, irregularly dentate, 6–7 mm long. Stamens 5; filaments 1.5–1.7 mm long. Disc flat, notched, c. 2.3 mm diam. Ovary 2- or 3-locular; style c. 0.3 mm long; stigma 2- or 3-lobed. Capsule ±depressed-globular, 4–5 mm long, 4–6 mm diam., 2- or 3-valved. Seeds 1–3, dark brown, with a fleshy aril at base. Fig. 41B–C.

Occurs from Edkins Range, W.A., to Mt Brockman, N.T., in open forest in sandy soil. Map 196.

W.A.: near Mt Agnes, *C. A. Gardner 1413* (PERTH); SW of Camp Creek, Mitchell Plateau, *K. F. Kenneally 7129* (PERTH). N.T.: El Sharana road, near Oepelli turnoff, *C. R. Dunlop 5213* (DNA); E of Mt Brockman, *R. E. Fox 721* (DNA); c. 26 km W of El Sharana on Pine Creek road, *P. Martensz & R. Schodde AË70* (BRI).

## 3. *Maytenus silvestris* Lander & L.A.S. Johnson, *Contr. New South Wales Natl Herb.* 4: 373 (1973)

T: Nepean River, Douglas Park, 6 miles (9.6 km) E of Picton, N.S.W., 13 Oct. 1965, *E. F. Constable 6222*; holotype: NSW *n.v.*; iso: A *n.v.*, BRI, MEL.

Shrub to 4.5 m; branchlets glabrous. Leaves narrowly elliptic, ovate or obovate, acuminate, mucronate or acute, serrulate or entire, subcoriaceous; lamina mostly 1–8 cm long and 1.5–15 mm wide; base acute or attenuate; secondary veins mostly 5–8 pairs; petiole 1–2 mm long. Flowers axillary or lateral, solitary, or in fascicles of 2 or 3, or in racemes; pedicels 5–10 mm long. Sepals 5, deltoid, dentate or fringed. Petals 5, broadly ovate, 1.5–2 mm long. Stamens 5; filaments tapered, 1.3–2 mm long. Disc 1–1.8 mm diam. Ovary glabrous, 2-locular; style c. 0.5 mm long; stigma 2-lobed. Capsule obovoid to globular, 3.5–8 mm long, 3.5–8 mm wide, 2-valved. Seeds 1–4, surrounded by an aril. Fig. 41D.

Occurs in moister eucalypt forest and rainforest in a variety of soils from Conondale, Qld, to the Shoalhaven River, N.S.W. Map 197.

Qld: near Swanfels, ENE of Warwick, *S. T. Blake 23746* (BRI); Dalrymple Creek, Mistake Range, *R. J. Henderson H2472* (BRI). N.S.W.: Wyong, Dec. 1898, *J. L. Boorman* (BRI); Unumgar State Forest, c. 32 km NW of Kyogle, *S. Clark, J. Pickard & R. Coveny 1665* (BRI); Torrington, *W. T. Jones 4118* (BRI).

Putative hybrids between this species and *M. bilocularis* (F. Muell.). Loes., with broader leaves, occur in the N end of the range of the species.

**4. Maytenus bilocularis** (F. Muell.) Loes., *Nat. Pflanzenfam.* 2nd edn, 20b: 135 (1942)

*Celastrus bilocularis* F. Muell., *Trans. & Proc. Philos. Inst. Victoria* 3: 31 (1859). T: Dawson River, *F. Mueller s.n.*; syn: MEL; Burnett River, *F. Mueller s.n.*; syn: MEL.

Tree to 10 m; branchlets glabrous. Leaves elliptic, ovate, oblong-ovate or obovate, obtuse to slightly acuminate, ±pungently serrate or subentire, slightly recurved, coriaceous; lamina 3–9 cm long, 1.3–3 cm wide, glabrous; base acutely cuneate or attenuate; secondary veins 5–8 pairs; petiole 2–5 mm long. Racemes axillary or lateral; pedicels 1.8–2.5 mm long. Sepals 5, rarely 4, broadly ovate, ±dentate, c. 0.8 mm long. Petals 5, rarely 4, oblong-ovate, 1.6–2 mm long. Stamens 5, rarely 4; filaments 0.5–0.7 mm long. Disc c. 1.2 mm diam. Ovary glabrous, 2-locular; style 0.7–0.8 mm long; stigma 2-lobed. Capsule globular or obovoid, 5–8 mm long, 4–5 mm diam., 2-valved. Seeds 1 or 2, surrounded by aril. Fig. 41E.

Occurs in near-coastal rainforest and open forest near Atherton, Qld, and from Biloela, Qld, to Dorrigo, N.S.W. Map 198.

Qld: 6.5 km NW of Cooyar, *L. Durrington 631* (BRI); Edenvale Hill, near Kingaroy, *N. Michael 3047* (BRI); near Biloela, *L. S. Smith 3557* (BRI); Crows Nest, *K. A. W. Williams 75122* (BRI). N.S.W.: Unumgar, near Mt Lindsay, *C. T. White 12520* (BRI).

**5. Maytenus cunninghamii** (Hook.) Loes., *Nat. Pflanzenfam.* 2nd edn, 20b: 136 (1942)

*Catha cunninghamii* Hook., in T. L. Mitchell, *J. Exped. Trop. Austral.* 387 (1848); *Celastrus cunninghamii* (Hook.) F. Muell., *Trans. & Proc. Philos. Inst. Victoria* 3: 30 (1859). T: 'On the Mooni in latitude 28° 17'51"S, Qld, 622 feet above sea level, *T. L. Mitchell 17 Nov 1846*'; holotype: K n.v.

*Celastrus cunninghamii* var. *parvifolia* F. M. Bailey, *Queensland Agric. J.* 29: 178, t.22 (1912); *C. baileyana* Domin, *Biblioth. Bot.* 89: 340 (1927). T: Chinchilla, Qld, *R. C. Beasley 2*; holotype: BRI.

Shrub to 4.5 m; branchlets glabrous or puberulous. Leaves linear, narrowly elliptic or oblong-obovate, acute or obtuse, often mucronate, entire, coriaceous; lamina mostly 2–7 cm long and 0.2–0.8 cm wide; base attenuate or cuneate; secondary veins at very acute angle, variable in number; petiole to 2 mm long. Inflorescence axillary, racemose, 1 to many-flowered; pedicels 5–10 mm long. Sepals 5, obtuse, c. 0.7 mm long. Petals 5, oblong-ovate, 1.5–1.8 mm long. Staminal filaments 0.5–1 mm long. Disc c. 1 mm diam. Ovary 2-locular; style c. 0.5 mm long; stigma 2-lobed. Capsule globular or obovoid, 4–5 mm diam., 2-valved. Seed 1, rarely 2, more than half enclosed in aril. Fig. 41F.

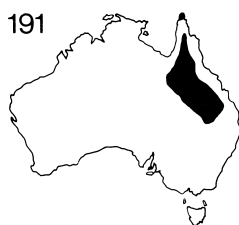
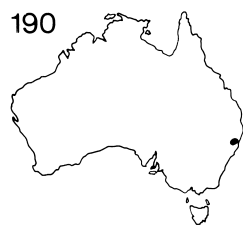
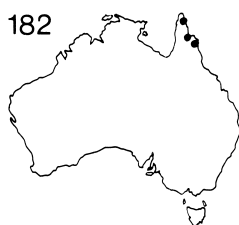
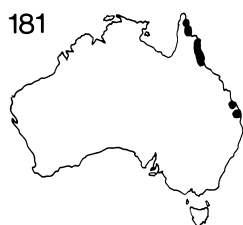
Widespread in near-coastal and inland districts from the Kimberley, W.A., to Cape York, Qld, and S to N.S.W. Map 199.

W.A.: 9.6 km SSW of Beagle Bay, *M. Lazarides 6572* (BRI, MEL, NSW, PERTH). N.T.: 35 km N of Larrimah, *M. O. Rankin 1924* (BRI, MEL). Qld: c. 88 km W of Ingham, on road to Valley of Lagoons Stn, *S. A. Morain 105* (BRI); Newcastle Range, *G. C. Stocker 852* (BRI, QRS). N.S.W.: c. 13 km NE of Dubbo towards Mendooran, *R. Coveny 2484* (NSW).

**6. Maytenus fasciculiflora** Jessup, *Fl. Australia* 22: 223 (1984)

T: Annan R. crossing–Cooktown road, Qld, 27 July 1973, *B. P. Hyland 6793*; holotype: BRI, iso: QRS.

Tree to 8 m; branchlets glabrous. Leaves obovate or broadly elliptic, obtuse or acute, obtusely serrate or subentire, subcoriaceous; lamina 3–10 cm long, 1.7–5 cm wide, glabrous; base attenuate; secondary veins 5–8 pairs; petiole 3–6 mm long. Flowers in lateral or axillary bracteate fascicles of 3–12, sometimes solitary; pedicels 2.5–3 mm long, glabrous. Sepals 4 or 5, broadly ovate, 0.4–0.6 mm long. Petals 4 or 5, oblong-ovate, 1.7–2 mm long. Stamens 4 or 5; filaments 1.8–2.2 mm long. Disc thick, notched, 1.5–1.7 mm diam. Ovary glabrous, 2-locular; style 0.5–0.6 mm long; stigma 2-lobed. Capsule globular or obovoid 5–7 mm long, 4–7 mm diam., 2-valved. Seeds 1 or 2, ±surrounded by aril. Fig. 41G–I.



181. *Balanophora fungosa*  
subsp. *fungosa*

184. *Pilostyles hamiltonii*

187. *Denhamia pittosporoides*  
subsp. *pittosporoides*

190. *Denhamia moorei*

193. *Celastrus subspicatus*

182. *Balanophora fungosa*  
subsp. *indica*

185. *Denhamia parvifolia*

188. *Denhamia pittosporoides*  
subsp. *angustifolia*

191. *Denhamia oleaster*

194. *Celastrus australis*

183. *Pilostyles collina*

186. *Denhamia celastroides*

189. *Denhamia viridissima*

192. *Denhamia obscura*

195. *Maytenus disperma*

Occurs in evergreen and deciduous vine forest and thickets in mostly oligotrophic soils from Cape York to Atherton Tableland, Qld. Map 200.

Qld: Bridle Creek, c. 20 km SE of Mareeba, *T. Hartley 14122* & *B. Hyland* (BRI); between Iron Range and Portland Roads, *B. Hyland 6413* (BRI, QRS); Chester River, *B. Hyland 9457* (BRI, QRS); Quintil Beach, N of road from Lockhart River Settlement, *J. G. Tracey 14363* (BRI, QRS); Starke to Cape Flattery road, *J. G. Tracey 14453* (BRI, CANB, MEL, NSW, QRS).

### 7. *Maytenus emarginata* (Willd.) Ding Hou, *Fl. Males.* ser. 1, 6: 241 (1962)

*Celastrus emarginata* Willd., *Sp. Pl.* 1(2): 1128 (1792). T: eastern India; *n.v.*

*Celastrus montana* Roth ex Roem. & Schultes, *Syst. Veg.* 5: 427 (1819); *Gymnosporia montana* (Roth ex Roem. & Schultes) Benth., *Fl. Austral.* 1: 400 (1863). T: eastern India, *B. Heyne s.n.*; holotype: B *n.v.*

Scandent shrub or small tree to 5 m, unarmed or with spines in axils or terminating short shoots. Leaves obovate to subspathulate or elliptic, obtuse or rounded, ±crenate, chartaceous to coriaceous; lamina mostly 3–8 cm long and 1.5–4.5 cm wide, glabrous; base attenuate; secondary veins 5–7 pairs; petiole 2–10 mm long. Flowers in single or fascicled axillary cymes 10–25 mm long; pedicels 3.5–10 mm long. Sepals 5, broadly ovate to deltoid, 0.4–0.6 mm long. Petals 5, ±oblong-obovate, 2–3.5 mm long, 1–1.5 mm wide. Stamens 5; filaments 1–1.2 mm long. Disc c. 1.2 mm diam. Ovary imperfectly 3-locular; style 0.3 mm long; stigma 3-lobed. Capsule obovoid or subglobose, 10–12 mm long, 8–9 mm diam. Seeds 1–3, nearly half surrounded by aril. Fig. 41J.

Occurs behind mangroves from Cairns to Torres Strait, Qld, extending throughout Malesia to SE Asia as far as Sri Lanka. Map 201.

Qld.: Portland Roads, *A. W. Dockrill 468* (BRI, QRS); Marrett River, Princess Charlotte Bay, *J. Elsol 630* & *T. D. Stanley* (BRI); Saibai Island, *G. C. Stocker 1350* (BRI, QRS); Stoney Point, N of Pascoe River, *J. G. Tracey 14152* (BRI, QRS); Cairns inlet, *L. J. Webb* & *J. G. Tracey 8193* (BRI).

## 4. APATOPHYLLUM

*Apatophyllum* McGill., *Kew Bull.* 25: 401 (1971), from the Greek *apate* (deceit, fraud), and *phyllon* (a leaf), referring to the deceitful resemblance to members of the Epacridaceae

Type: *A. constablei* McGill.

Shrubs. Leaves alternate, rarely subopposite or nearly whorled; stipules present. Flowers solitary, axillary, bisexual; peduncle with 2 apical, subopposite bracteoles. Sepals 5, imbricate. Petals 5, imbricate. Stamens 5, inserted on margin of disc; filaments incurved; anthers introrse, with a broad connective. Ovary ±immersed in disc, 2- or rarely 3-locular with 2 basal to subaxile ovules per locule. Fruit a 1- or rarely 2-seeded capsule. Seeds arillate; testa crustaceous; endosperm copious.

A genus of 2 species endemic in E Australia.

Stipules 1.5–3 mm long with slender lobes near base

**1. *A. constablei***

Stipules entire, 0.2–0.3 mm long

**2. *A. olsenii***

### 1. *Apatophyllum constablei* McGillivray, *Kew Bull.* 25: 403 (1971)

T: Green Gully, Glen Davis, c. 25 miles (40 km) N of Lithgow, N.S.W., *E. F. Constable 7200*; holotype: NSW *n.v.*; isotype: K *n.v.*

Illustrations: D. J. McGillivray, *Kew Bull.* 25: figs 1B, 2.1 (1971).

Shrub to 40 cm; branchlets glabrous. Leaves sessile, acicular, 10–15 mm long, 0.5 mm wide; adaxial surface sulcate; stipules subulate, 1.5–3 mm long, with slender lobes near base. Pedicels 2–2.5 mm long; bracteoles 0.5–1 mm long. Sepals ovate, acuminate, 0.7–1 mm long. Petals deltoid, 1.2–1.5 mm long. Staminal filaments subulate, 0.4 mm long; anthers 0.3 mm long. Disc shallowly cupular. Ovary ovoid, partly immersed in disc; style

0.3 mm long. Capsule compressed-pyriform, 4–5 mm long, 2–3 mm wide. Seeds oblong-ovoid 2.5–3 mm long, 2 mm wide; testa rugulose, dark brown. Fig. 42E–F.

Known from one small area on a rocky hillside at the base of high sandstone cliffs near Glen Davis, N.S.W. Map 202.

N.S.W.: Green Gully 2 km SSW of Glen Davis, 40 km N of Lithgow, *M. D. Crisp 2206 & I. R. Telford* (BRI); near Glen Davis, *E. F. Constable & D. McGillivray 3061* (BRI, MEL).

## 2. *Apatophyllum olsenii* McGillivray, *Kew Bull.* 25: 405 (1971)

T: Many Peaks Range, approx. south of Gladstone, Qld, *I. S. Olsen 347*; holotype: NSW *n.v.*; iso: BRI, K *n.v.*

Illustrations: D. J. McGillivray, *Kew Bull.* 25: figs 1A, 2.2 (1971).

Shrub to 1 m; branchlets glabrous. Leaves scarcely petiolate, linear,  $\pm$ concave, 8–22 mm long, 0.7–1.2 mm wide; stipules subulate, entire, 0.2–0.3 mm long. Pedicels 0.8–1.5 mm long; bracteoles 0.5–0.6 mm long. Sepals ovate, acuminate, 0.6–0.7 mm long. Petals deltoid, 0.9–1 mm long. Staminal filaments linear, 0.3 mm long; anthers 0.2 mm long. Disc nearly flat. Ovary obconical, immersed in disc; style 0.2 mm long. Capsule obovoid, slightly compressed, 7–7.5 mm long, 2.5–4.5 mm wide. Seeds sub-cylindrical, umbonate, 4.5 mm long, 2 mm wide; testa finely ribbed, dark purplish-brown. Fig. 42C–D.

Known from one locality on a granitic ridge in open forest at Many Peaks Range, Qld. Map 203.

Qld.: Many Peaks Range, 16 Jan. 1968, *I. Waddell*, (BRI); c. 1 km W of Castletower Mt., Many Peaks Range, *A. N. Rodd 1132* (BRI, MEL).

## 5. PSAMMOMOYA

*Psammomoya* Diels & Loes., in L. Diels & E. Pritzel, *Bot. Jahrb. Syst.* 35: 339 (1904), derived from Greek *psammos* (sand), and *Moya*, a S American genus in Celastraceae

Type: *P. choretroides* (F. Muell.) Diels & Loes.

Bisexual glabrous shrubs. Leaves reduced to opposite or subopposite decussate cataphylls; stipules absent. Inflorescence of 1- or few-flowered glomerules in axils of cataphylls; flowers on short pedicels with bracteoles at base. Sepals 5, imbricate, red-brown or black towards apex. Petals 5, imbricate. Stamens 5; anthers longitudinally dehiscent, introrse. Disc  $\pm$ flat, pentagonal. Ovary scarcely or partially immersed in disc, 2- or 3-locular with 2  $\pm$ erect, basally attached ovules per locule; stigma obscurely 2- or 3-lobed. Fruit a capsule, 2- or 3-locular. Seeds 1 or 2, erect, with a fleshy aril at base; testa longitudinally striate, dark red-brown. Endosperm sparse.

A genus of 2 species endemic in W.A.

Petals 2–2.4 mm long; filaments 0.4–0.5 mm long; capsule 2-valved

**1. *P. choretroides***

Petals 4.2–7 mm long; filaments 1.7–2.8 mm long; capsule 3-valved

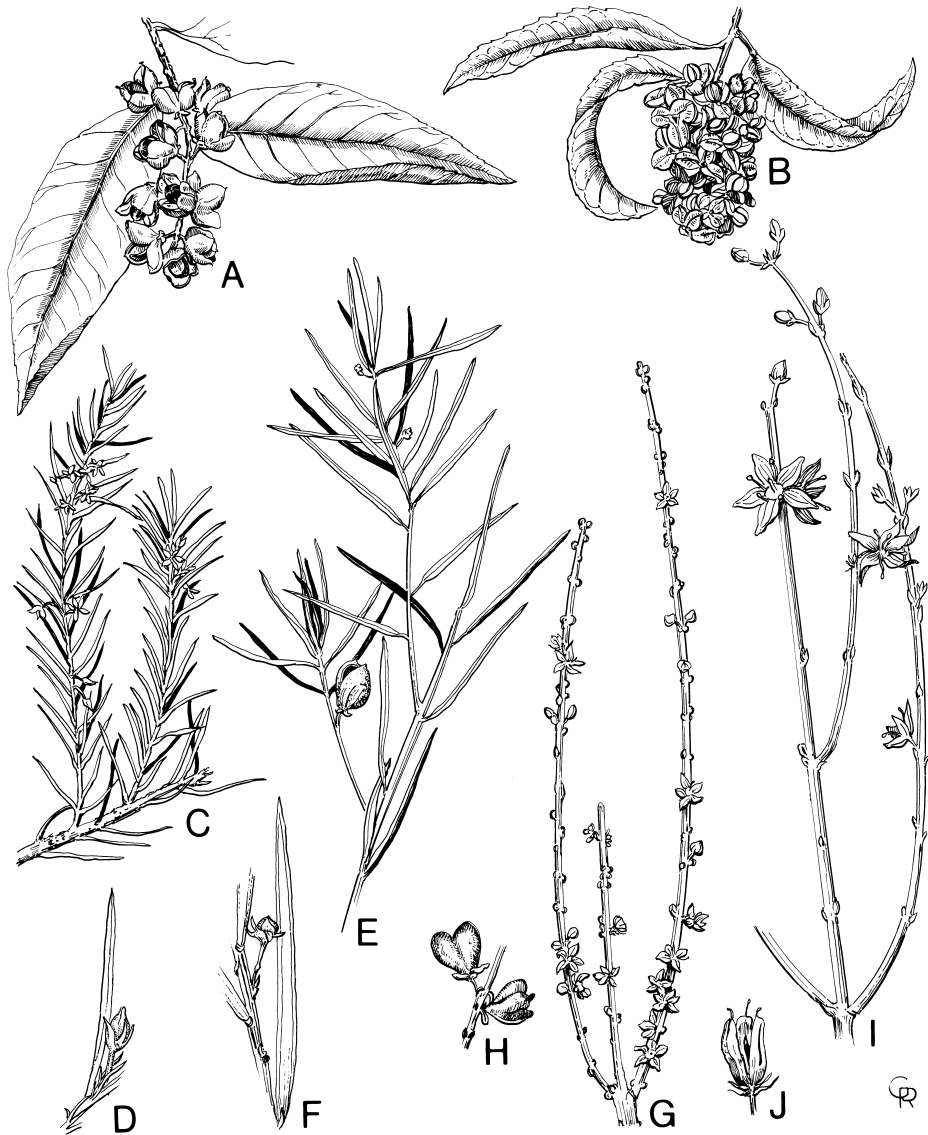
**2. *P. ephedroides***

### 1. *Psammomoya choretroides* (F. Muell.) Diels & Loes., *Bot. Jahrb. Syst.* 35: 340 (1904)

*Logania choretroides* F. Muell., *Victorian Naturalist* 6: 118 (1889). T: eastern sources of Swan River, W.A., *Mrs Heal*; holotype: MEL.

Illustration: L. Diels & L. Loesener, *Bot. Jahrb. Syst.* 35: fig. 41A–H (1904).

Shrub to 0.4 m. Branchlets many, erect, 4-angled and 4-sulcate, sometimes viscid. Cataphylls dark brown or black. Flowers single or in fascicles of up to 4; pedicels 0.8–1 mm long. Sepals broadly deltoid, 0.8–1 mm long. Petals broadly ovate or angular-ovate, 2–2.4 mm long, white. Stamens inserted below margin of disc; filaments 0.4–0.5 mm long; anthers 0.5 mm long. Disc slightly fleshy, 1.5–2 mm diam., crenate opposite each filament. Ovary more than half immersed in disc, 2-locular; style c. 0.2 mm long; stigma



**Figure 42.** A–B, *Celastrus*. A, *C. subspicata*, fruiting branchlet  $\times 0.5$  (K. Williams 78040, BRI). B, *C. australis*, fruiting branchlet  $\times 0.5$  (K. Williams 78039, BRI). C–F, *Apatophyllum*. C–D, *A. olsenii*. C, fruiting branchlet  $\times 0.5$ ; D, leaf, stipules and flower  $\times 3$  (C–D, A. Rodd 1132, BRI). E–F, *A. constablei*. E, fruiting branchlet  $\times 0.5$ ; F, leaf, stipules and flower  $\times 3$  (E–F, E. Constable 5046, BRI). G–J, *Psammomoya*. G–H, *P. choretroides*. G, flowering branchlet  $\times 1$  (A. George 329, PERTH); H, fruits  $\times 1$  (J. Beard 7184, PERTH). I–J, *P. ephedroides*. I, flowering branchlet  $\times 1$  (A. Burns 1, PERTH); J, fruit  $\times 1$  (A. Burbidge 33, PERTH).

obscurely 2-lobed. Capsule 2-lobed, broadest above middle, 2-valved, 8–9 mm long, 7–8 mm wide, 1- or 2-seeded. Seeds narrowly ellipsoidal, 4–4.2 mm long, 1.8–2 mm wide,  $\frac{1}{3}$  immersed in aril; aril nearly as long as seed. Fig. 42G–H.

Occurs from Shark Bay to Lake King, W.A., usually found in sand in heath. Map 204.

W.A.: near Boorabbin, Great Eastern Highway, *T. E. H. Alpin 1936* (PERTH); between Dalgarna & Mt Farmer, *J. S. Beard 7184* (PERTH); Booraan, 20 Sept. 1978, *R. J. Cranfield* (PERTH); 16 km E of Merredin on Great Eastern Highway, *M. D. Crisp 6580* (BRI); Lake King crossroads, *A. S. George 329* (PERTH).

## 2. *Psammomoya ephedroides* Diels & Loes., *Bot. Jahrb. Syst.* 35: 340 (1904)

T: toward King George Sound, W.A., 1892, *collector unknown*; holo: B (destroyed); iso: MEL 100678.

Illustration: L. Diels & L. Loesener, *op. cit.*; L. Loesener, *Bot. Jahrb. Syst.* 35: 341 (1904).

Much-branched shrub to 1.5 m. Branchlets spreading to erect, 4-angled and 4-sulcate. Cataphylls dark brown or black. Flowers mostly solitary; pedicels 3–4 mm long. Sepals broadly ovate-deltoid, 1.6–1.8 mm long. Petals ovate, oblong-ovate or narrowly deltoid, 4.2–7 mm long, white. Stamens inserted on margin of disc; filaments 1.7–2.8 mm long; anthers 0.7 mm long. Disc thin, 2.5–2.8 mm diam. Ovary scarcely or not immersed in disc, 3-locular; style 1–2 mm long; stigma entire or obscurely 3-lobed. Capsule ellipsoidal, 3-valved, 7 mm long, 4 mm wide, 1(–2 or more)-seeded. Seed (immature) narrowly ellipsoidal, 4 mm long, 1 mm wide, nearly half immersed in aril. Fig. 42I–J.

Occurs between Shark Bay and Mt Gibson, W.A. Map 205.

W.A.: Murgoo Station on Boolardy & Wooleen Road, *A. M. Ashby 3298B* (PERTH); proposed Toolonga Nature Reserve, *A. Burbidge 33* (PERTH); East Yuna Reserve, *A. C. Burns 1* (PERTH); Mt Gibson, Nov. 1968, *C. A. Gardner* (PERTH); near Murchison River, between Carnarvon & Geraldton, Aug. 1931, *C. A. Gardner & W. E. Blackall* (PERTH).

## 6. HEDRAIANTHERA

*Hedraianthera* F. Muell., *Fragm.* 5: 58 (1865), from the Greek *hedraios* (sessile), and *anthos* (anther), referring to the sessile anthers

Type: *H. porphyropetala* F. Muell.

Bisexual shrubs or trees. Leaves alternate, often distichous on lateral branches; stipules present. Flowers in axillary racemes or few-flowered fascicles, or solitary. Sepals 5, imbricate. Petals 5, imbricate in bud. Stamens 5, alternate with petals, inserted beneath margin of disc in each sinus; anthers basifixed, latrorse. Disc 5-lobed. Ovary partially immersed in disc, conical, truncate, 5-locular with 4 ovules per locule in 2 pairs one above the other, attached near base of ovary; stigma sessile, with a central depression. Fruit a capsule with a columella. Seeds 1–4 per locule, arillate. Embryo straight.

Monotypic, endemic in E Australia.

### *Hedraianthera porphyropetala* F. Muell., *Fragm.* 5: 59 (1865)

T: Rockingham Bay, Qld, *J. Dallachy s.n.*; syn: MEL.

Shrub or small tree to 6 m; branchlets glabrous. Leaves elliptic, lanceolate or ovate, acute, entire, glabrous, firmly chartaceous; lamina mostly 5–17 cm long and 1.5–6 cm wide; base acutely cuneate; secondary veins 6–9 pairs; petiole 2–6 mm long. Raceme axis very short or to 2 cm long; pedicels filiform, to 2 cm long. Sepals broadly ovate, 0.8–1.3 mm long. Petals oblong or elliptic to oblong-obovate, 3.2–6 mm long. Staminal filaments 0.2–0.5 mm long; anthers 0.8 mm long. Disc thick, fleshy, c. 2 mm diam. Capsule bony, ovoid, subglobose or depressed-globular, 1.5–2.5 cm long, 1.5–2 cm diam. Seeds ellipsoidal or

ovoid, 3-angled, c. 8 mm long, 3 mm wide; aril at base and on one side, fleshy. Fig. 43A–B.

Occurs in coastal and near-coastal rainforest from the Annan River, Qld, to the Richmond River, N.S.W. Map 206.

Qld: Shiptons Flat, Cape York Peninsula, *L. J. Brass 20018* (BRI); Nerang River, on Pocket Road, *N. Byrnes 3517* (BRI); Oliver Creek, near Cape Tribulation, *B. Hyland 8281* (BRI, QRS); Timber Reserve 1230, Boonjie, *L. W. Jessup 298 et al.* (BRI, L, NSW, QRS). N.S.W.: Coopers Creek via Mullumbimby, *C. T. White 10462* (BRI).

Some specimens from N Qld are atypical with staminal filaments 1–1.2 mm long and the raceme axis to 3 cm long.

## 7. HEXASPORA

*Hexaspora* C. T. White, *Contr. Arnold Arbor.* 4: 58 (1933), from the Greek *hexas* (six), and *spora* (seed), referring to the number of ovules in the flowers of the type

Type: *H. pubescens* C. T. White

Trees. Leaves alternate, often distichous on lateral branches; stipules present. Flowers in axillary cymes. Sepals 5, imbricate. Petals 5, imbricate. Stamens 5, inserted on margin of disc; anthers basifixed, opening  $\pm$ apically by longitudinal slits. Disc fleshy, obtusely pentagonal. Ovary partly immersed in disc, conical, truncate, 3-locular with 2–4 ovules per locule inserted at base; stigma sessile, obscurely 3-lobed. Fruit unknown.

Monotypic, endemic in NE Qld.

***Hexaspora pubescens*** C.T.White, *Contr. Arnold Arbor.* 4: 58, t.6 (1933)

T: foothills of Mt Bartle Frere, Qld, 1 Oct. 1929, *S. F. Kajewski 1352*; holo: BRI, iso: NSW.

Tree to 15 m, densely pilose with scattered and sometimes fasciculate hairs. Leaves lanceolate or oblong-elliptic, acuminate, minutely serrate, membranous; lamina 6–14.5 cm long, 2–4.5 cm wide; base obtuse or rounded; secondary veins 5–8 pairs; petiole 3–6 mm long. Cymes much-branched, many-flowered; bracts 1–1.5 mm long. Sepals rounded, pubescent outside, glabrous inside, c. 0.5 mm long. Petals rounded or obovate, pubescent outside, glabrous inside, fringed, c. 1.5 mm long, light green. Staminal filaments glabrous, c. 0.3 mm long. Disc glabrous, c. 1 mm diam. Ovary conical, truncate, glabrous. Fig. 43C–D.

Known only from the foothills of Mt Bartle Frere, Qld, in rainforest. Map 207.

Qld: Gosschalk Logging Area, State Forest Reserve 755, Bartle Frere, *G. C. Stocker 1542* (BRI, QRS).

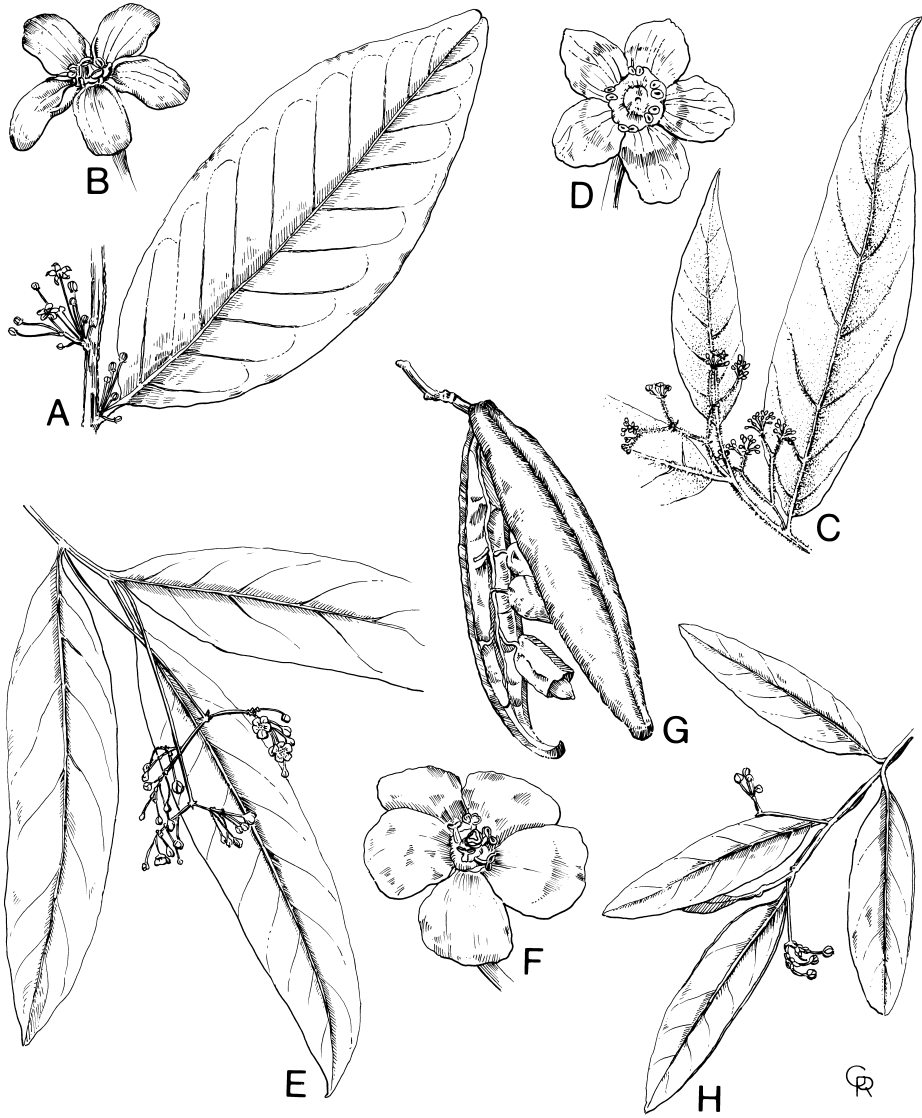
## 8. HYP SOPHILA

*Hypsophila* F. Muell., *Victorian Naturalist* 3: 168 (1887), from the Greek *hypsos* (height), and *philia* (love), referring to a preference for high altitude habitats

Type: *H. halleyana* F. Muell.

Shrubs or trees, glabrous. Branchlets usually with 2 or 4 longitudinal ridges. Leaves distichous, entire; margins recurved. Flowers in axillary cymes or solitary. Sepals 5, imbricate, outer smaller than inner. Petals 5, imbricate. Stamens 5, inserted at inner side of narrow grooves in disc; anthers basifixed, opening  $\pm$ apically by longitudinal slits. Ovary partly immersed in disc, obtusely conical, truncate, 3-locular with 6–10 ovules per locule arranged in 2 rows; stigma sessile, broad with a central triradiate slit. Fruit a fusiform 3-valved capsule. Seeds in rows, on elongated funicles from 3 placentas, embedded in a fleshy aril much larger than seed. Embryo straight; cotyledons oblong.





**Figure 43.** A–B, *Hedraianthera porphyropetala*. A, leaf and inflorescences  $\times 0.5$ ; B, flower  $\times 3$  (A–B, L. Jessup 298, BRI). C–D, *Hexaspora pubescens*. C, flowering branchlet  $\times 0.5$ ; D, flower  $\times 6$  (C–D, G. Stocker 1542, BRI). E–H, *Hypsophila*. E–G, *H. dielsiana*. E, flowering branchlet  $\times 0.5$  (L. Webb & J. Tracey 5601, BRI); F, flower  $\times 3$  (L. Smith 14665, BRI); G, fruit  $\times 0.5$  (B. Hyland 8614, BRI). H, *H. halleyana*, flowering branchlet  $\times 0.5$  (S. Blake 9842, BRI).

2 species endemic in NE Qld.

Cymes 1- or 2-branched; ovary with 6 ovules per locule; capsule c. 5 cm long

1. *H. halleyana*

Cymes usually 4–6-branched; ovary with 10 ovules per locule; capsule c. 10 cm long

2. *H. dielsiana*

### 1. *Hypsophila halleyana* F. Muell., *Victorian Naturalist* 3: 168 (1887)

T: Mt Bellenden Ker, Qld, 1887, *W. A. Sayer s.n.*; syn: MEL.

*Drimys oblonga* S. Moore, *J. Bot.* 55: 302 (1917); J.E. Dandy, *J. Bot.* 71: 45 (1933). T: Mt Bellenden Ker, Qld, *Gibbs 6319*; holo: BM *n.v.*

Stunted shrub or tree to 12 m. Leaves elliptic to oblong, acute to rounded, coriaceous; lamina mostly 4–9 cm long and 1.5–3 cm wide; base obtuse or acute; secondary veins 5–7 pairs, obscure; petiole 3–5 mm long; stipules deltoid, c. 1 mm long. Cymes once or twice branched, to 4 cm long, usually of 1–5 flowers; pedicels 4–10 mm long. Sepals ±semicircular, 1.5–2.5 mm long. Petals suborbicular, recurved, 4–4.5 mm long, red. Staminal filaments recurved, c. 0.7 mm long. Ovary with 6 ovules per locule. Capsule c. 5 cm long, 1.5–2 cm wide. Seeds c. 8 mm long. Fig. 43H.

Known only from upper slopes and summits of Mt Bellenden Ker and Mt Bartle Frere, Qld, in noto-microphyll vine-fern forest and thickets. Map 208.

Qld: Mt Bartle Frere, *S. T. Blake 9842* (BRI); summit of S peak, Mt Bellenden Ker, *L. J. Brass 18310* (BRI); c. 0.8 km SW of centre peak, Mt Bellenden Ker, *L. S. Smith 14624* (BRI).

### 2. *Hypsophila dielsiana* Loes., *Notizbl. Bot. Gart. Berlin-Dahlem* 31: 62 (1903)

T: Barron River near Kuranda, Qld, *L. Diels 8466*; holo: B *n.v.*

Tree to 10 m. Leaves oblong, elliptic, lanceolate or slightly oblanceolate, acuminate or acute, rarely obtuse, coriaceous; lamina mostly 7–17 cm long and 2.5–5 cm wide; base obtuse or acute; secondary veins 6–8 pairs; petiole 3–8 mm long; stipules deltoid, c. 1.2 mm long. Cymes usually 4–6-branched, to 15 cm long, many-flowered; pedicels 4–10 mm long. Sepals ±semicircular, 1.5–2.5 mm long. Petals suborbicular, recurved, 4–4.5 mm long, red. Staminal filaments recurved, c. 1 mm long. Ovary with 10 ovules per locule. Capsule c. 10 cm long, 2–2.5 cm wide. Seeds c. 10 mm long. Fig. 43E–G.

Occurs from E edge of Atherton Tableland to near Rossville, Qld, in mesophyll vine forest mostly at medium altitude. Map 209.

Qld: W slopes of Mt Finnegan, *L. J. Brass 20323* (BRI); Timber Reserve 146, Tableland Logging Area, near Rossville, *B. Hyland 8315* (BRI, QRS); State Forest Reserve 143, North Mary Logging Area, N of Mt Lewis, *B. Hyland 8614* (BRI, QRS); end of Davies Creek Road, *L. J. Webb & J. G. Tracey 5601* (BRI); Mt Spurgeon, *C. T. White 10539* (BRI).

## Excluded species

*H. oppositifolia* F. Muell., *Victorian Naturalist* 9: 11 (1892)

This is *Flindersia oppositifolia* (F. Muell.) T. Hartley & Jessup.

## 9. PERROTTETIA

*Perrottetia* Kunth in Humb., Bonpl. & Kunth, *Nov. Gen. Sp. folio* edn, 7: 57; quarto edn, 7: 73 (1824), after George Samuel Perrottet (1793–1870), botanical explorer

Type: *P. quinduensis* Kunth

*Caryospermum* Blume, *Mus. Bot.* 1: 175 (1850). T: *Caryospermum moluccanum* Blume

Shrubs or small trees. Leaves alternate, serrate or entire; stipules present. Flowers bisexual, rarely unisexual, in cymes in axillary thyrses. Sepals 4 or 5, rarely 6–8, valvate or slightly imbricate. Petals 5, rarely 4, valvate or slightly imbricate. Stamens 5, rarely 4 or up to 8, inserted on margin of disc; anthers  $\pm$ introrse. Ovary partly immersed in disc, mostly 2-locular, with 2 ovules per locule, basally attached, erect. Fruit a berry, 1–4 seeded. Seeds with a thin aril.

About 25–30 species from central China, Malesia, Hawaiian Islands, Solomon Islands and Central America. 1 species in Australia.

**Perrottetia arborescens** (F. Muell.) Loes., *Nat. Pflanzenfam.* 3(4): 220 (1892)

*Caryospermum arborescens* F. Muell., *Fragm.* 6: 202 (1868). T: Rockingham Bay, Qld, *J. Dallachy s.n.*; syn: MEL.

[*P. alpestris auct. non* (Blume) Loes.; Ding Hou, *Fl. Males.* ser., 6: 291 (1962) as to NE Qld distribution]

Shrub or small tree to 5 m; branchlets glabrous. Leaves distichous, oblong-obovate or elliptic, acuminate, serrulate, glabrescent, chartaceous; lamina mostly 4–12 cm long and 2.5–5 cm wide; base narrowly cuneate or slightly decurrent; secondary veins 5–7 pairs; pit domatia present; petiole 6–15 mm long; stipules c. 1.4 mm long. Inflorescence 10–30 mm long; pedicels 1–1.5 mm long. Sepals deltoid, 1–1.2 mm long, puberulous. Petals deltoid, 0.7–0.9 mm long, puberulous. Disc cupular, c. 1.5 mm diam. Staminal filaments 0.1–0.2 mm long. Ovary glabrous; style c. 0.5 mm long; stigma obscurely 2-lobed. Berry globose or subglobose, 6–8 mm diam. (10 mm when fresh), red. Seeds 1, rarely 2,  $\pm$ globose, 5.5–6 mm diam.; testa crustaceous, shallowly striate. Fig. 44A–B.

Occurs in moist montane and tableland rainforest from Mt Spec to Atherton Tableland, Qld. Map 210.

Qld: State Forest Reserve 185, Robson Logging Area, NE of Tinaroo Falls Dam, *B. Gray 983* (BRI, QRS); E slope of Mt Bellenden Ker, *B. Hyland 5352* (BRI, QRS); State Forest Reserve 700, NE of Lake Barrine, *B. Hyland 9676* (BRI, QRS); Robson Ramp, Danbulla, *L. S. Smith 4180* (BRI); Tinaroo Range, road from Downfall Creek, *L. J. Webb & J. G. Tracey 5766* (BRI).

## 10. LOPHOPETALUM

*Lophopetalum* Wight ex Arn., *Ann. Nat. Hist.* 3: 150 (1839), from Greek *lophos* (mane, crest or tuft), and *petalum* (petal), referring to appendages on the petals of some species

Type: *L. wightianum* Arn.

Bisexual trees. Leaves opposite or subopposite, decussate, entire; stipules a tuft of hair-like processes, caducous. Flowers in axillary thyrses. Perianth 5-merous. Petals imbricate, usually appendaged inside. Disc usually fleshy, nearly flat. Stamens inserted on disc; anthers dorsifixed, versatile,  $\pm$ introrse. Ovary partly immersed in disc, 3-locular with 4–18 ovules per locule; style short; stigma inconspicuous. Fruit a capsule,  $\pm$ fusiform, with 3 lobes, wings or angles. Seeds oblong, flat, winged, attached in middle. Endosperm scanty or absent.

About 20 species from India to Indo-China, Malesia and Australia; 1 endemic species in Australia.

**Lophopetalum arnhemicum** Byrnes, *Proc. Linn. Soc. New South Wales* 96: 85 (1971)

T: Katherine Gorge National Park, N.T., 7 Sept. 1968, *N. Byrnes 921*; holotype: DNA *n.v.*; iso: BRI.

Tree to 8 m, glabrous. Leaves oblong-ovate, shortly obtuse, entire, chartaceous; lamina 6–17 cm long, 1.5–3.5 cm wide; base cuneate or shortly decurrent; secondary veins 9–12 pairs; petiole 0.5–1.2 cm long. Thyrses to 10 cm long; pedicels 3–5 mm long. Sepals broadly deltoid, c. 0.8 mm long. Petals broadly ovate, c. 3 mm long, with a row of minute papillae inside near base. Disc obscurely 5-angled, 3–3.5 mm diam. Staminal filaments

1.3 mm long. Ovary immersed in disc, pyramidal, 3-locular with 6–8 ovules per locule; style c. 1.5 mm long. Capsule angular-fusiform or angular-ovoid, 6–8 cm long. Seeds 3.5 cm long, 1 cm wide including wing. Fig. 44C–E.

Occurs along the Katherine, South Alligator and East Alligator River systems, N.T., on stream banks in hilly sandstone areas. Map 211.

N.T.: Katherine Gorge National Park, *N. Byrnes* 73 (DNA); 6.6 km S of East Alligator Crossing, *N. Byrnes* 1998 (DNA); Waterfall Creek, South Alligator River, *N. Byrnes* 2451 (DNA, NT, QRS); vicinity of Cannon Hill, *P. Martensz* AÉ87 & *R. Schodde* (DNA); 15 km N of Mudginberri Homestead, *J. Must* 796 (DNA).

## 11. EUONYMUS

*Euonymus* L., *Sp. Pl.* 197 (1753), as 'Evonymus', *Gen. Pl.* 5th edn, 91 (1754), derived from the Greek *eu* (well), and *onoma* (a name), well-named

Type: *E. europaeus* L.

Small trees or shrubs, bisexual. Leaves opposite, rarely (not in Australia) otherwise; stipules present, caducous. Flowers in axillary cymes, rarely (not in Australia) in fascicles; pedicels articulate. Sepals 4 or 5, imbricate. Petals 4 or 5, imbricate. Disc present, angular, lobed or rounded. Stamens as many as petals and alternate with them, inserted on disc margin or inside; anthers latrorse or introrse. Ovary partly or wholly immersed in disc, 3–5-locular with 2–8 ovules per locule in two rows, attached to inner angle near base or pendulous; style 1; stigma 1. Fruit a capsule; columella present or absent. Seeds 1–several per locule, arillate.

About 180 species throughout tropics and subtropics but mostly in Asia. 2 endemic species in Australia.

Ovary with 2 ovules per locule; inflorescence of long-pedunculate, loosely branched cymes; leaves entire, or remotely serrate towards apex; tertiary venation inconspicuous; petals deeply fringed; fruit angular

### 1. *E. australiana*

Ovary with 8 ovules per locule; inflorescence short, few-flowered, rarely branched; leaves serrate from apex to near base; tertiary venation conspicuous; petals not fringed; fruit subglobose

### 2. *E. globularis*

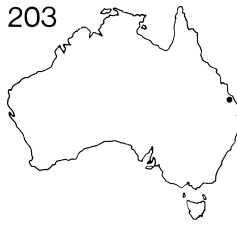
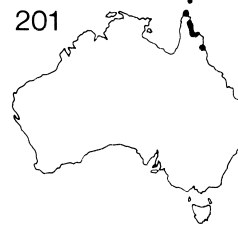
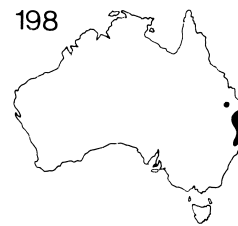
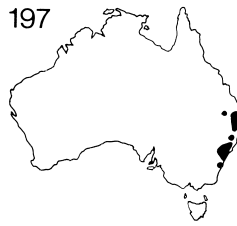
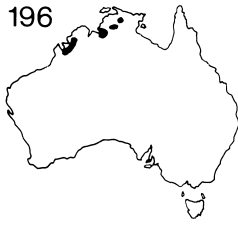
### 1. *Euonymus australiana* F. Muell., *Fragm.* 4: 118 (1864)

T: Rockingham Bay, Qld, *J. Dallachy* s.n.; syn: MEL.

Shrub or small tree to 8 m; branchlets glabrous. Leaves broadly elliptic, ovate, obovate or suborbicular, obtuse, shallowly serrulate, glabrous, chartaceous; lamina mostly 4–10 cm long and 2–6 cm wide; base obtuse; secondary veins 5–7 pairs; petiole 3–6 mm long. Cymes glabrous, 1–7 cm long; pedicels 3–4 mm long. Sepals semicircular to suborbicular, unequal, 1.5–2 mm long, fringed. Petals suborbicular, 4.5–5 mm long, deeply fringed. Disc fleshy, c. 3.5 mm diam. Staminal filaments 1.2–1.5 mm long. Ovary angular-conical, 4- or 5-locular with 2 ovules per locule; style to 0.8 mm long; stigma obscure. Capsule inverted pyramidal, 3–5-lobed, 9–13 mm long; columella absent. Seeds mostly 3–6, c. 4 mm long; aril cupular. Fig. 44F–G.

Occurs in rainforest from Hinchinbrook Island to Cape York, Qld. Map 212.

Qld: Mossman River gorge, *L. J. Brass* 2141 (BRI); 13.3 km NE of Iron Range, *H. Flecker* 8532 (BRI, QRS); State Forest Reserve 144, Mt Windsor Tableland, *B. Hyland* 3493 R.F.K. (BRI, QRS); State Forest Reserve 607, Bridle Logging Area, E of Mareeba, *B. Hyland* 5953 (BRI, QRS); State Forest Reserve 758, Japoon, *B. Hyland* 11260 (BRI, QRS).



196. *Maytenus ferdinandi*

199. *Maytenus cunninghamii*

202. *Apatophyllum constablei*

205. *Psammomoya ephedroides*

208. *Hypsophila halleyana*

197. *Maytenus silvestris*

200. *Maytenus* sp.

203. *Apatophyllum olsenii*

206. *Hedraianthera porphyropetala*

209. *Hypsophila dielsiana*

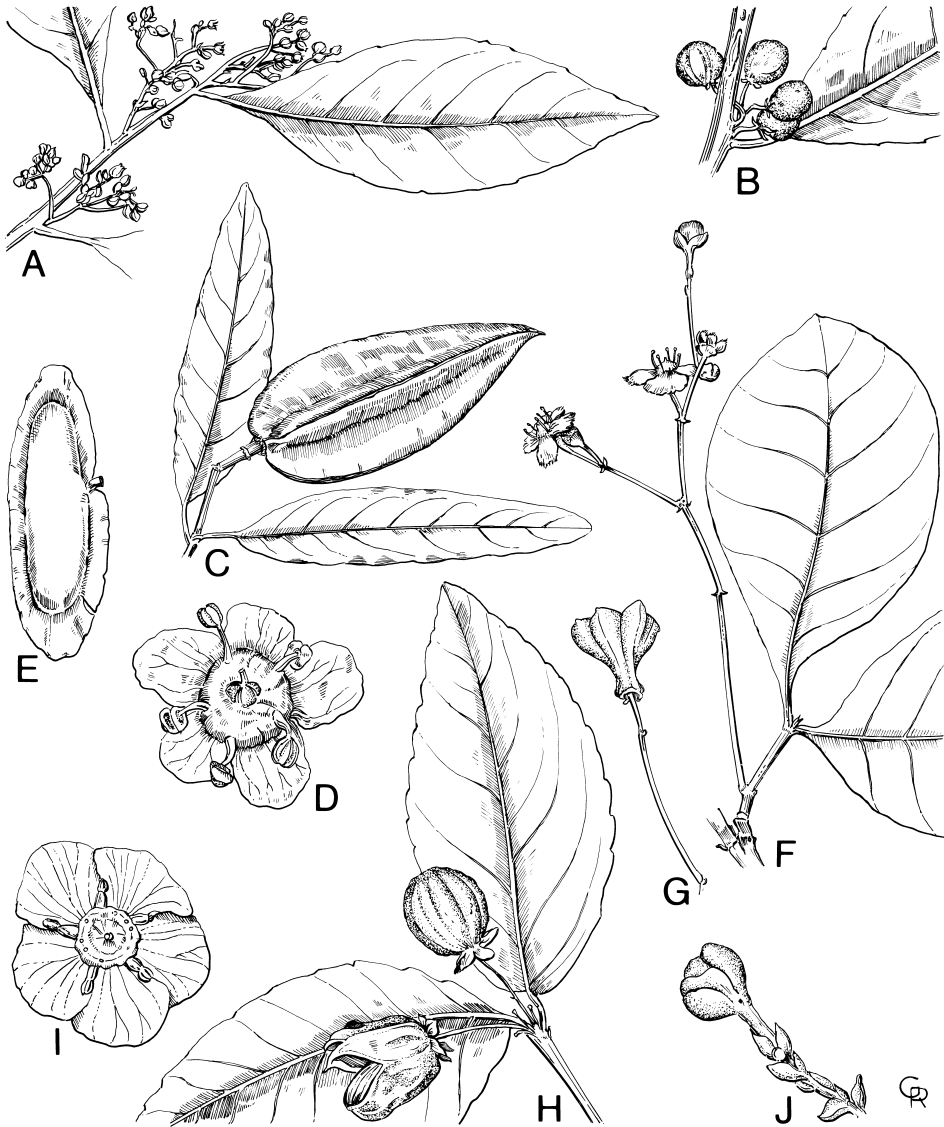
198. *Maytenus bilocularis*

201. *Maytenus emarginata*

204. *Psammomoya choretroides*

207. *Hexaspora pubescens*

210. *Perrottetia arborescens*



**Figure 44.** A–B, *Perrottetia arborescens*. A, flowering branchlet  $\times 1$  (L. Webb & J. Tracey 5766, BRI); B, fruit  $\times 1$  (L. Smith 04180, BRI). C–E, *Lophopetalum arnhemicum*. C, fruiting branchlet  $\times 0.5$ ; D, flower  $\times 3$  (C–D, N. Byrnes 2451, DNA); E, seed  $\times 1$  (N. Byrnes 73, DNA). F–J, *Euonymus*. F–G, *E. australiana*. F, flowering branchlet  $\times 1$  (B. Hyland 3493 R.F.K, BRI); G, fruit  $\times 1$  (L. Brass 2141, BRI). H–J, *E. globularis*. H, fruiting branchlet  $\times 1$  (L. Smith 10746, BRI); I, flower  $\times 3$  (B. Hyland 6788, BRI); J, bud  $\times 6$  (L. Smith 10746, BRI).

**2. *Euonymus globularis* Ding Hou, *Blumea* 22: 271 (1975)**

T: Shiptons Flat, Cape York Peninsula, Qld, *L. J. Brass 20224*; holo: L *n.v.*; iso: BRI, K *n.v.*

Illustration: Ding Hou, *op.cit.* fig. 1.

Shrub or tree to 5 m; branchlets glabrous. Leaves ovate to elliptic, acute or acuminate, serrate, chartaceous; lamina mostly 5–10 cm long and 2–4.5 cm wide; base obtuse; secondary veins 4–7 pairs; petiole 1.5–3 mm long. Inflorescence rarely branched, to 10 mm long, few-flowered; pedicels glabrous, 3–8 mm long. Sepals 5, deltoid to ovate, ciliate, 1.2–1.4 mm long. Petals 5, suborbicular, 1.8–3 mm long. Disc  $\pm$ flat, 5-notched, 1.2–1.5 mm diam. Staminal filaments c. 0.3 mm long. Ovary 5-locular with 8 ovules per locule; style c. 0.3 mm long. Capsule firmly coriaceous, globose, 5-locular, c. 1.5 cm diam.; columella short. Seeds 6–8 per locule, ellipsoidal, c. 7 mm long with an oblique narrow, fleshy, puberulous aril c. 4.5 mm long attached to base and side. Fig. 44H–J.

Occurs in medium altitude rainforest from upper reaches of Annan River to Mt Lewis, Qld. Map 213.

Qld: Shiptons Flat, *L. J. Brass 20162* (BRI); Wallaby Creek, Rossville, 22 July 1952, *H. Flecker* (BRI); Timber Reserve 146, Home Rule Logging Area, E of Rossville, *B. Hyland 6788* (BRI, QRS); Gap Creek, c. 38 km SE of Cooktown, *L. S. Smith 10746* (BRI); Mt Lewis, Bushy Logging Area, *K. J. White 1364* (BRI).

**12. CASSINE**

*Cassine* L., *Sp. Pl.* 1: 268 (1753), *Gen. Pl.* 5th edn, 129 (1754), from *Cassena*, a vernacular name of American Indian origin for a plant with similar fruit (*Ilex vomitoria* Aiton)

Type: *C. peragua* L.

*Elaeodendron* Jacq., *Icon. Pl. Rar.* t. 48 (1782); J. F. Jacquin, *Nov. Act. Helv. Phys.-Math.* 1: 36 (1787); *Cassine* sect. *Elaeodendron* (Jacq.) T. Post & Kuntze, *Lex. Gen. Pl.* 104 (1903). T: *E. orientale* J. F. Jacq.

*Portenschlagia* Tratt., *Arch. Gewachskunde* 5: 16, t. 250 (1818); *Elaeodendron* sect. *Portenschlagia* (Tratt.) F. Muell., *Fragm.* 3: 61 (1862). T: *P. australis* (Vent.) Tratt.

Trees or shrubs, dioecious, monoecious or hermaphrodite. Leaves opposite, sub-opposite or (not in Australia) alternate, often serrate; stipules minute, caducous. Flowers in simple or compound dichasial cymes. Perianth 3–5-merous. Sepals and petals imbricate in bud. Stamens as many as petals; anthers versatile. Disc fleshy. Ovary partially or not immersed in disc, 2- or 3-locular with 1 or 2 erect ovules per locule; stigma entire or 2- or 3-lobed. Fruit drupaceous; exocarp thin or fleshy; endocarp mostly stone-like. Seeds 1–3, exarillate.

About 80 species, pantropical and subtropical, mostly in Africa. 2 species endemic in Australia.

Perianth 4-merous; ovary 2-locular; fruit ovoid or broadly ellipsoidal; exocarp orange-red

**1. *C. australis***

Perianth 3 (rarely 4)-merous; ovary 3-locular; fruit globular; exocarp black

**2. *C. melanocarpa***

**1. *Cassine australis* (Vent.) Kuntze, *Revis. Gen. Pl.* 1: 114 (1891)**

*Elaeodendron australe* Vent., *Jard. Malm.* 2: 117, t. 117 (1805); *Portenschlagia australis* (Vent.) Tratt., *Arch. Gewachskunde* 5: 16, t. 250 (1818). T: not designated.

Dioecious shrub or small tree to 8 m, glabrous. Leaves acute to rounded, crenate, coriaceous; lamina mostly 2.7–10 cm long and 0.4–5 cm wide; base cuneate; secondary veins 4–9 pairs; petiole 4–10 mm long. Cymes axillary to leaves or cataphylls; peduncles longer in male than female; pedicels 2.5–5 mm long. Calyx unequally 4-lobed. Petals 4, broadly ovate, 2.3–2.7 mm long. Male flowers: disc 4-angled, centrally depressed, 1.6–1.8

mm wide; stamens 4, inserted on disc margin; filaments 0.7 mm long. Female flowers: disc slightly indented, 1.5–1.7 mm wide with 4 staminodes inserted on margin; ovary ovoid-conical, 2-locular; stigma entire. Exocarp thin, orange-red; mesocarp fleshy; endocarp stone-like. Seed 1.

Distributed from central Qld to southern N.S.W. There are 2 varieties.

Leaf length less than 4 times width; fruit up to 24 mm long

**1a. var. australis**

Leaf length 4–8, occasionally to 15, times width; fruit up to 15 mm long

**1b. var. angustifolia**

### 1a. *Cassine australis* (Vent.) Kuntze var. **australis**

Shrub or small tree to 8 m. Leaves elliptic, ovate or obovate; lamina mostly 4–10 cm long and 1.5–5 cm wide. Fruit ovoid or broadly ellipsoidal, 14–24 mm long, 9–15 mm wide. Fig. 45A–C.

Occurs from central Qld to Batemans Bay, N.S.W., in rainforest. Map 214.

Qld: Booloumba Creek, Little Yabba State Forest Reserve, *D. A. Goy & L. S. Smith 655* (♀) (BRI); Upper Brookfield, Brisbane, *L. W. Jessup 435 & G. P. Guymer* (♂) (BRI); near O'Reillys Guest House, Lamington Plateau, *K. A. W. Williams 77267* (♀) (BRI). N.S.W.: along Plantation Road, 8 km S of Tyalgum, *R. D. Hoogland 11662* (♀) (BRI); Yellow Rock Creek near Albion Park, south coast, *R. Pullen 4241* (BRI).

### 1b. *Cassine australis* var. **angustifolia** (Benth.) Jessup, *Fl. Australia* 22: 222 (1984)

*Elaeodendron australe* var. *angustifolium* Benth., *Fl. Austral.* 1: 403 (1863). T: Burnett, Dawson and Pine Rivers, Qld, *F. Mueller s.n.*; *n.v.*; Warwick, *H. Beckler*; *n.v.*

*C. australis* var. *pedunculosa* Domin, *Biblioth. Bot.* 89: 341 (1927). T: Rockhampton, Qld, *A. Dietrich 450*; lecto: NSW, *vide* L. Jessup, *loc.cit.*

*Portenschlagia integrifolia* Tratt., *Arch. Gewachskunde* 3: t. 219 (1814); *Elaeodendron australe* var. *integrifolium* (Tratt.) DC., *Prodr.* 2: 10 (1825); *Elaeodendron integrifolium* (Tratt.) Sweet, *Hort. Brit.* 2nd edn, 110 (1830); *Cassine integrifolia* (Tratt.) Domin, *Biblioth. Bot.* 89: 341 (1927). T: cultivated at Schönbrunn from Australian material; *n.v.*

Shrub to 3 m. Leaves oblong or oblong-elliptic to oblong-obovate; lamina mostly 2.7–10 cm long and 0.4–2 cm wide. Fruit ellipsoidal, rarely subglobular, 9–15 mm long, 4–9 mm wide.

Occurs mostly in semi-evergreen vine forest and thickets, often with brigalow (*Acacia harpophylla*) in near-coastal and inland districts from near Nebo, Qld, to Narrabri, N.S.W. Map 215.

Qld: Wandoan, *C. E. Hubbard 5037* (♂) (BRI); Taroom to Theodore road, c. 12 km from Taroom, *V. K. Moriarty 1278* (♀) (BRI, CANB *n.v.*); c. 4 km S of Callide open cut, *N. H. Speck 2018* (♀) (BRI, CANB *n.v.*); Roma, *C. T. White 9502* (♀) (BRI). N.S.W.: Narrabri, Nov. 1899, *J. H. Maiden* (♂) (NSW).

Several collections from N Qld with 4-ridged branchlets may represent a new taxon.

### 2. *Cassine melanocarpa* (F. Muell.) Kuntze, *Revis. Gen. Pl.* 1: 114 (1891)

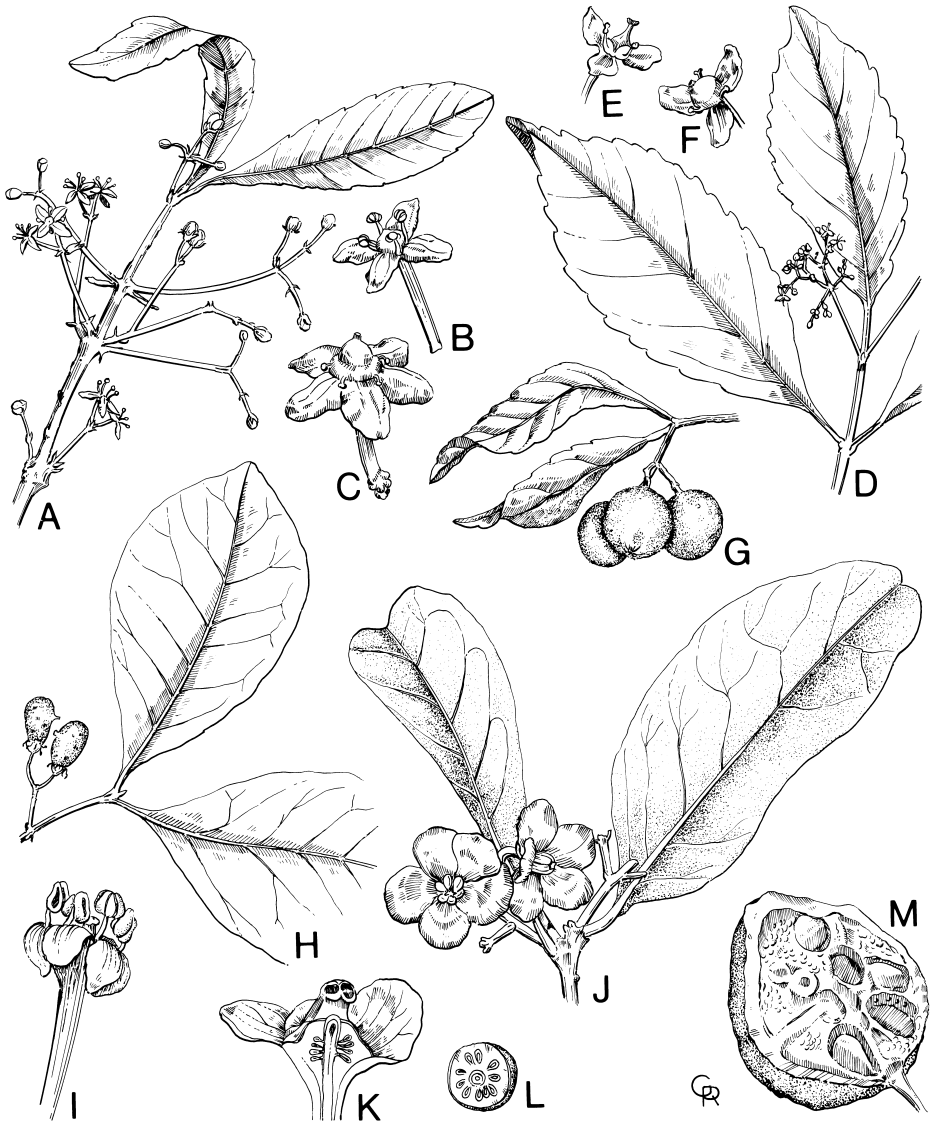
*Elaeodendron melanocarpum* F. Muell., *Fragm.* 3: 62 (1862). T: Port Denison, Qld., *E. Fitzalan*; holo(?): MEL.

*Barringtonia sphaerocarpa* C. A. Gardner, *For. Dept. Bull. W. Austral.* 32: 28, 69 (1923). T: Lawley River, W.A., 27 July. 1921, *C. A. Gardner 1491*; holo: PERTH.

[*Cassine glauca* auct. non (Rottb.) Kuntze: J.P. D. W. Payens, *Blumea* 15: 259 (1967)]

Diocious shrub or tree to 13 m, glabrous. Leaves obovate or elliptic, obtuse to bluntly acuminate, coriaceous, crenate; lamina mostly 6–13 cm long and 3–7 cm wide; base cuneate; secondary veins 5–7 pairs; petiole 7–11 mm long. Cymes axillary to leaves or cataphylls; pedicels 1.5–4 mm long. Calyx irregularly multilobed. Petals 3, rarely 4, ovate or subrotund, entire or lobed, 1.5–2 mm long. Disc 3- or 4-angled, 1.5–1.8 mm wide.





**Figure 45.** A–G, *Cassine*. A–C, *C. australis* var. *australis*. A, flowering branchlet  $\times 1$ ; B, male flower  $\times 3$  (A–B, L. Jessup 435, BRI); C, female flower  $\times 3$  (L. Jessup 438, BRI). DG, *C. melanocarpa*. D, flowering branchlet  $\times 0.5$ ; E, male flower  $\times 3$  (D–E, L. Jessup 496, BRI); F, female flower  $\times 3$ ; G, fruit  $\times 0.5$  (F–G, L. Jessup 497, BRI). H–I, *Pleurostyliia opposita*. H, fruiting branchlet  $\times 1$ ; I, flower  $\times 6$  (H–I, P. Young & J. Randall 341, BRI). J–M, *Siphonodon australis*. J, flowering branchlet  $\times 1$ ; K, flower with petals removed,  $\times 3$ ; L, T.S. ovary  $\times 3$ ; M, L.S. fruit  $\times 1$  (J–M, L. Jessup 445, BRI).

Male flowers: stamens 3, inserted on disc margin; filaments 0.2–0.5 mm long. Female flowers: staminodes 3, rarely 4, inserted inside disc margin; ovary ovoid-conical, 3-locular; stigma entire. Fruit globular, 15–20 mm diam.; exocarp thin, black; mesocarp ±fleshy; endocarp stone-like. Seeds 1–3. Fig. 45D–G.

Occurs in woodland, open forest, low and medium altitude vine forest and thickets, mostly near the coast, sometimes on islands or coral cays, in the Kimberley, W.A., from the Daly River to the Roper River, N.T., and from Torres Strait to Biggenden, Qld. Map 216.

W.A.: Lone Dingo, Mitchell Plateau, *J. S. Beard 8479* (♀) (PERTH); Mt Trafalgar, Prince Regent River Reserve, *A. S. George 12644* (♀) (PERTH). N.T.: Warangaiu Lagoon, Elcho Is., *C. Dunlop 3821* (♀) (BRI, DNA, NT). Qld: Stony Hill, Yeppoon, 1 km NW of Spring Head, *G. N. Batianoff 587* & *T. J. McDonald* (♀) (BRI); Lizard Is., *N. Byrnes 3234* (♂) (BRI).

### 13. PLEUROSTYLIA

*Pleurostyli* Wight & Arn., *Prodr. Fl. Penins. Ind. Orient.* 1: 157 (1834), from the Greek *pleura* (side), and *stylos* (style), referring to the persistent style on the side of the fruit

Type: *P. wightii* Wight & Arn.

Bisexual trees or shrubs. Leaves opposite, decussate; stipules minute, caducous. Flowers in cymes in axils of leaves or cataphylls. Sepals and petals 5, rarely 4, imbricate. Stamens 5, inserted outside disc; anthers sub-basifixed, introrse. Ovary free or slightly immersed in disc, 1-locular by abortion, rarely 2-locular, with (in Australia) 2 collateral ovules per locule. Fruit a 1-locular nut, with a prominent, persistent, hardened, lateral style; exocarp and mesocarp thin, coriaceous; endocarp crustaceous. Seeds 1, rarely 2, exarillate.

About 6 species in Africa, Madagascar, Mascarene Islands, Sri Lanka, SE Asia, Malesia and New Caledonia. 1 species in Australia.

***Pleurostyli* *opposita*** (Wallich) Alston in Trimen, *Fl. Ceylon* 6 (Suppl.): 48 (1931)

*Celastrus opposita* Wallich, in W. Roxburgh, *Fl. Indica* 2: 398 (1824). T: not designated.

*P. wightii* var. *neocaledonica* Loes., *Bot. Jahrb. Syst.* 39: 171 (1907). T: New Caledonia, *Pancher*; *n.v.*; New Caledonia, *Balansa 570, 960, 960a*; *n.v.*

*Elaeodendron microcarpum* C. White & Francis, *Proc. Roy. Soc. Queensland* 37: 154 (1926). T: Mt Perry, Qld, *J. Keys 603*; *holo*: BRI.

Illustration: Ding Hou, *Fl. Males.* ser. 1, 6: 287, fig. 20 (1962).

Shrub or tree to 15 m; branchlets glabrous. Leaves ovate, elliptic or obovate, obtuse to acuminate, rarely retuse, entire, chartaceous, glabrous; lamina mostly 2.5–6 cm long and 1–4 cm wide; base cuneate or decurrent; secondary veins 4–7 pairs; petiole 2–5 mm long. Cymes of 1–several flowers; pedicels 2–3.5 mm long. Sepals rounded, 0.2–0.4 mm long. Petals elliptic or broadly ovate, 1.2–1.5 mm long, reflexed at anthesis. Staminal filaments 0.7–0.9 mm long. Disc fleshy, cupular, crenate, c. 1.8 mm diam. Pistil urceolate; style very short; stigma cushion-shaped. Fruit ellipsoidal or obovoid, 5–7 mm long, pale yellow. Fig. 45H–I.

Occurs mostly in seasonally dry vine forest and thickets in E Qld from Imbil to Rundle Range and from Edward R. to Torres Strait; also in New Caledonia, Malesia, Sri Lanka, S India and Moçambique. Map 217.

Qld.: Big Creek, Prince of Wales Is., *E. Cameron 20261* (QRS); upper reaches of Escape River, *J. R. Clarkson 2079* (BRI); Mt Bauple, *S. F. Kajewski 113* (BRI); Deep Creek, N of Coalstoun Lakes, *P. Young 313* & *J. Randall* (BRI); c. 16 km E of Biggenden & c. 8 km N of Broowena, *P. Young 341* & *J. Randall* (BRI).

**14. SIPHONODON**

*Siphonodon* Griffith, *Calcutta J. Nat. Hist.* 4: 246, t. 14 (1844), from the Greek *siphon* (a hollow body), and *odontos* (a tooth), referring to the inner structure of the flower resembling a hollow tooth

Type: *S. celastrinus* Griffith

Trees. Leaves distichous or spirally arranged. Flowers in axillary cymes, sometimes reduced to 1 flower. Sepals 5, imbricate, outer ones smaller than inner. Petals 5, imbricate. Stamens 5,  $\pm$ connivent around ovary, incurved and appressed to disc, often alternating with 5 staminodes; anthers latrorse; connective broad, separating locules. Ovary immersed in and adnate to a large hemispherical disc, 10-locular with each locule divided horizontally into 2–4 superposed 1-ovulate locelli; upper ovules ascending, the lower pendulous; apex of ovary hollow, lined with 5 stigmatic lines ending in 5 apical stigmatic tufts and filled by a style-like column. Fruit drupaceous, hard or fleshy with few to many bony 1-seeded pyrenes. Seeds with a membranous testa.

About 7 species distributed through SE Asia, Malesia and Australia. 3 species in Australia, all endemic.

In the following descriptions the pistil and disc are referred to as the pistillar body, cf. Ding Hou, *Fl. Males.* ser. 1, 6: 395 (1964).

- |    |   |                                  |
|----|---|----------------------------------|
| 1  | Staminodes present; style-like column level with or projecting less than 0.2 mm beyond hollow apex of ovary |                                  |
| 2  | Petals 4–4.5 mm long; branchlets pendulous; leaves often falcate  | <b>1. <i>S. pendulus</i></b>     |
| 2: | Petals 6.5–8 mm long; branchlets not pendulous; leaves not falcate  | <b>2. <i>S. australis</i></b>    |
| 1: | Staminodes absent; style-like column projecting 0.5 mm beyond hollow apex of ovary                          | <b>3. <i>S. membranaceus</i></b> |

**1. *Siphonodon pendulus*** Bailey, *Queensland Bot. Bull.* 4: 8 (1891)

T: Musgrave Electric Telegraph Station, Qld, June 1891, *G. Jacobson*; holo: BRI.

Shrub or tree to 15 m, glabrous. Branchlets pendulous. Leaves oblanceolate or oblong-obovate, often falcate, acute, obtuse or minutely apiculate, entire or remotely serrate-crenate, chartaceous to subcoriaceous; lamina 4.5–20 cm long, 1–4.5 cm wide; base acutely cuneate or attenuate; secondary veins 7–11 pairs; petiole 5–17 mm long; stipules 0.7 mm long. Cymes 3–4 cm long, of 1 to few flowers; pedicels 10 mm long. Sepals  $\pm$ semicircular, 1–2.2 mm long. Petals obovate or nearly circular, 4–4.5 mm long, white. Stamens 1.8 mm long, 1–1.4 mm wide; staminodes 0.5 mm long. Pistillar body obscurely 5-angled, the flat faces opposite filaments; ovules c. 30. Fruit sub-globular, sometimes pointed at apex and base, 5 cm long, 4 cm diam., yellow-green.

Occurs from Cape York to near Mareeba, Qld, in eucalypt woodland and open forest. Map 218.

Qld.: Lockerbie, 16.6 km WSW of Somerset, Cape York Peninsula, *L. J. Brass 18365* (BRI); 6 km N of Fairview turnoff on Peninsula Development Road, *J. R. Clarkson 3445* (BRI); Chillagoe, Jan. 1918, *N. Michael* (BRI); Bamaga Mission, 11.2 km SW of Cape York, *L. S. Smith 12389* (BRI); new Cannibal Creek track, 4.7 km off Molloy–Cooktown road, *I. B. Staples 2224* (BRI).

**2. *Siphonodon australis*** Benth., *Fl. Austral.* 1: 403 (1863)

T: Brisbane River, Qld, *A. Cunningham s.n.*; syn: *n.v.*; ?Clarence River, *H. Beckler s.n.*; syn: MEL.

*S. australis* var. *keysii* F. M. Bailey, *Queensland Fl.* 1: 261 (1899). T: Mt Perry, Qld, *J. Keys*; holo: BRI.

Tree to 30 m, often smaller, mostly glabrous. Branchlets not pendulous. Leaves obovate, oblong-obovate or elliptic, obtuse or rounded, entire, subcoriaceous, slightly recurved; lamina 4.5–12 cm long, 2.5–6 cm wide; base acutely cuneate or shortly decurrent; secondary veins 5–7 pairs; petiole 4–8 mm long; stipules 0.7 mm long. Cymes 1–2 cm

long, 1–3-flowered; pedicels puberulent, 8–10 mm long. Sepals  $\pm$ semicircular, 1.5–3 mm long. Petals nearly circular, 6.5–8 mm long, pale yellow. Stamens 2.8 mm long, 1.5–2 mm wide; staminodes 0.3 mm long. Pistillar body obscurely 5-angled, the flat faces opposite filaments; ovules c. 40. Fruit globose, obovoid or depressed-globose, usually 3–4 cm long, pale yellow-brown. Fig. 45J–M.

Occurs from Iron Range to Mt Garnet, N Qld, and from Burnett R., SE Qld, to Richmond River, N.S.W., mostly in near-coastal and seasonally-dry vine forest and thickets. Map 219.

Qld: Worlds End Pocket, c. 15 km NW of Ipswich, 30 Dec. 1979, *L. H. Bird* (BRI); 76.7 km N of Injune, *G. P. Guymier 1413* (BRI); 40 Mile Scrub, S of Mt Garnet, *B. Hyland 2288 RFK* (BRI, QRS); Indooroopilly, beside Brisbane River, *L. W. Jessup 445* (BRI); Iron Range, July 1963, *E. Volck* (BRI).

### 3. *Siphonodon membranaceus* Bailey, *Queensland Agric. J.* 5: 388 (1899)

T: Evelyn, Herberton District, Qld, 8 July 1899, *J. F. Bailey s.n.*; holo: BRI.

Tree to 25 m, glabrous. Branchlets not pendulous. Leaves lanceolate, oblanceolate or elliptic, acuminate, rarely acute or obtuse, entire or remotely crenulate, chartaceous; lamina mostly 6–15 cm long and 2–5 cm wide; base shortly decurrent or rarely obtuse; secondary veins 6–9 pairs; petiole 3–6 mm long; stipules 0.8–2 mm long. Cymes c. 2 cm long, of 1 to several flowers; pedicels 3–4 mm long. Sepals  $\pm$ semicircular, 1.2–2 mm long. Petals obovate or nearly circular, c. 4 mm long, greenish yellow. Stamens 2 mm long, 1–1.2 mm wide; staminodes 0. Pistillar body 5-angled and 5-lobed; lobes opposite filaments; ovules 30 or more; style-like column projecting 0.5 mm beyond hollow apex of ovary. Fruit globular or depressed-globular, 4–5.5 cm diam., yellow or orange.

Occurs from the Annan River to Tully River, Qld, in mesophyll vine forest. Map 220.

Qld: Upper Parrot Creek, Annan River, *L. J. Brass 20242* (BRI); State Forest Reserve 755, Boonjee, *B. Gray 239* (BRI, QRS); Boonjee, Atherton Tableland, *S. F. Kajewski 1271* (BRI); Reserve 310, Gadgarra, 12 Mar. 1954, *K. J. White* (BRI).

## HIPPOCRATEACEAE

*L. W. Jessup*

Lianes, scrambling or erect shrubs, rarely trees. Leaves simple, opposite or subopposite, rarely alternate; stipules usually present. Inflorescence axillary, cymose, sometimes fasciculate, bracteate. Calyx 5-lobed, rarely 2- or 3-lobed or calyptriform and variously splitting. Petals 4–7, mostly 5, rarely (not in Australia) 2, imbricate or valvate. Disc well developed or absent, extrastaminal or sometimes (not in Australia) forming a stout androgynophore. Stamens 3, sometimes 2, rarely (not in Australia) 4 or 5; filaments often expanded and shortly connate at base; anthers 2-locular, mostly extrorse by transverse or oblique slits. Gynoecium of 2 or 3, rarely (not in Australia) 5, carpels, 2- or 3-locular, with 2–15 anatropous ovules per locule on axile placentas. Style terminal; stigmas as many as carpels, often obscure. Fruit a 1–3-locular drupe or berry with seeds embedded in pulp, or a strongly 3-lobed capsule with usually winged seeds. Endosperm absent; cotyledons thickened, often connate.

About 300 species, tropical and subtropical. Number of genera in dispute, either 2 or up to c. 14. Two genera and 4 species, 2 endemic, occur in Australia.

Hippocrateaceae is recognised here in accordance with the Cronquist classification used in this *Flora*. The family has been considered distinct from Celastraceae by several authors, *vide* Ding Hou, *Celastraceae p.p.*, *Fl. Males.* ser. 1, 6: 309 (1963). The characters used to distinguish the family from Celastraceae include the position of the

stamens relative to the disc, the number of stamens relative to the perianth whorls, the absence of endosperm and the presence of latex. Most characters typical of Hippocrateaceae can, however, be found in species of Celastraceae genera.

G. Bentham, Celastraceae *p.p.*, *Fl. Austral.* 1: 404 (1863); A. C. Smith, Notes on old world Hippocrateaceae, *Amer. J. Bot.* 28: 438 (1941); T. Loesener, Hippocrateaceae, *Nat. Pflanzenfam.* 2nd edn, 20b: 198–231 (1942); Ding Hou, Celastraceae *p.p.*, *Fl. Males.* ser. 1, 6: 397–421 (1964); N. K. B. Robson, New and little known species from the Flora Zambesiaca area 16. Taxonomic and nomenclatural notes on Celastraceae, *Bol. Soc. Brot.* 39: 42–48 (1965).

## KEY TO GENERA

- |  |                       |
|--|-----------------------|
| Fruit drupaceous; seeds not winged; petals membranous, strongly imbricate                | <b>1. SALACIA</b>     |
| Fruit a strongly 3-lobed capsule; seeds winged; petals subcoriaceous, slightly imbricate | <b>2. HIPPOCRATEA</b> |

## 1. SALACIA

*Salacia* L., *Mant.* 159 (1771), after the wife of Neptune, goddess of the sea

Type: *S. chinensis* L.

*Salacicatea* Loes., *Nova Guinea Bot.* 8: 281 (1910). T: *S. papuana* Loes.

Lianes, scandent (rarely erect) shrubs, or trees. Leaves opposite or subopposite, decussate; stipules very small, deltoid in Australian species. Flowers in axillary cymes or fascicles. Calyx 5-lobed, irregularly 3–5-lobed or calyptiform and circumscissile or splitting lengthwise. Petals 4–7, usually 5. Disc extrastaminal, often thick and fleshy, annular, truncate-conical, sometimes flattened or (not in Australia) cupular. Stamens 2 or 3, reflexed at anthesis. Ovary partly or (not in Australia) completely immersed in disc, 2- or 3-locular, with 2 (up to 8, outside Australia) ovules per locule; style not distinct from conical apex of ovary; stigma obscure. Fruit drupaceous, coriaceous when dry. Seeds (pyrenes) 1 to several inside a hard endocarp, embedded in mucilaginous, pulpy mesocarp; cotyledons large, free or united.

Pantropical, approximately 150 species. 3 species in Australia, 1 endemic.

- |   |                                  |
|---|----------------------------------|
| 1 Flowers in fascicles on a bracteate tubercle; calyx 5-lobed   |                                  |
| 2 Stamens 2; ovary 2-locular  | <b>1. <i>S. erythrocarpa</i></b> |
| 2: Stamens 3; ovary 3-locular   | <b>2. <i>S. chinensis</i></b>    |
| 1: Flowers in distinctly pedunculate cymes; calyx calyptiform, splitting longitudinally into 2 equal, orbicular, persistent lobes | <b>3. <i>S. disepala</i></b>     |

**1. *Salacia erythrocarpa*** Schumann. in Schumann & Hollrung, *Fl. Kaiser Wilhelms Land* 70 (1889)

T: Lagerberg, 2nd station on Augusta River, *Hollrung* 752; holo: B *n.v.*

Liane or (not in Australia) rarely an erect shrub. Leaves elliptic, oblanceolate or oblong-obovate, acuminate, serrulate-crenulate or subentire, chartaceous, glabrous; lamina mostly 5–10 cm long and 2–4 cm wide; base acutely cuneate or attenuate; secondary veins mostly 6–8 pairs; petiole 6–8 mm long. Flowers (not seen in Australian specimens) in fascicles on short bracteate tubercles; pedicels 2–6 mm long. Calyx lobes 5, rounded-deltoid, c. 0.5 mm long. Petals obovate, 1.7–2 mm long. Disc 1–1.3 mm diam., 0.5–1 mm high. Stamens 2. Ovary 2-locular with 2 pendulous ovules per locule. Fruit globose, 13–17 mm diam., orange to pink-red, 1- or rarely 2-seeded. Seeds globose, 7–15 mm diam.



**Figure 46.** A–F, *Salacia*. A–C, *S. chinensis*. A, part of flowering branchlet  $\times 1$ ; B, bud  $\times 3$ ; C, flower  $\times 3$  (A–C, L. Webb & J. Tracey 11428, BRI). D–G, *S. disepala*. D, flowering branchlet  $\times 1$ ; E, bud  $\times 3$ ; F, flower  $\times 3$ ; G, flower from below  $\times 3$  (D–G, B. Hyland 6437, BRI). H–J, *Hippocratea barbata*. H, fruiting branchlet  $\times 1$  (J. Simmonds, BRI 111826); I, flower from side  $\times 3$ ; J, flower from above  $\times 3$  (I–J, E. Volck 1941, BRI).

Occurs in Solomon Islands, New Guinea, and Sulawesi (Celebes) and in Australia, where found in mesophyll vine forest near Innisfail, Qld. Map 221.

Qld.: Pin Gin Hill, SW of Innisfail, *B. Gray* 993 (QRS); Russell, SE of Babinda, *B. Hyland* 11102 (BRI, QRS).

## 2. *Salacia chinensis* L., *Mant.* 293 (1771)

T: China; *n.v.*

*S. prinoides* (Willd.) DC., *Prodr.* 1: 571 (1824); *Tonsella prinoides* Willd., *Ges. Naturf. Freunde Berlin Neue Schriften* 4: 184 (1803). T: E India; *n.v.*

Illustration: R. Wight, *Icon. Pl. Ind. Orient* 2: t. 321 (1840–1843).

Liane or scandent shrub. Leaves broadly ovate, elliptic or lanceolate, obtuse, acute or acuminate, entire or serrulate-crenulate, subcoriaceous, glabrous, often discoloured; lamina 4–15 cm long, 2–8 cm wide; base obtusely cuneate or shortly attenuate; secondary veins 4–8 pairs; petiole 7–13 mm long. Flowers in fascicles; pedicels 5–12 mm long; buds obtuse. Calyx lobes broadly deltoid to semiorbicular, erose or entire, 0.5–0.7 mm long. Petals oblong-obovate with lateral margins recurved or revolute, or nearly orbicular and then shortly clawed, 3.5–4.5 mm long. Disc c. 3 mm diam., 1 mm high. Stamens 3; filaments c. 1 mm long. Ovary 3-locular with 2 ovules per locule centrally attached. Fruit subglobose or ellipsoidal, 13–23 mm diam., orange to red, with 1 globose seed 10–15 mm diam. Fig. 46A–C.

Extends from India to the Solomon Islands; in Australia occurs in vine forests and thickets mostly along the seashore, river banks and behind mangroves around Coburg Peninsula, N.T., and in NE Qld S to Bingil Bay. Map 222.

N.T.: Black Point, Coburg Peninsula, *J. R. Maconochie & N. Byrnes* 1003 (BRI, DNA); 250 km ENE of Darwin, *R. Story* 8399 (BRI, DNA). Qld.: Daintree River, *A. W. Dockrill* 274 (BRI, QRS); Clump Point, Bingil Bay, *L. S. Smith* 10197 (BRI); Cape Tribulation, *L. J. Webb & J. G. Tracey* 11428 (BRI).

## 3. *Salacia disepala* (C. White) Ding Hou, *Blumea* 12: 36 (1963)

*Salacicatea disepala* C. White, *Proc. Roy. Soc. Queensland* 55: 61 (1944). T: Boonjee, near Malanda, Qld, Aug. 1943, *S. T. Blake* 15188; holo: BRI.

Scandent shrub, glabrous. Leaves elliptic, obovate or sometimes oblong-lanceolate, obtuse or rarely acuminate, remotely serrulate-crenulate or entire, subcoriaceous, often discoloured; lamina mostly 6–15 cm long, 2.5–6 cm wide; base attenuate; secondary veins 5–9 pairs; petiole 5–8 mm long. Flowers in 1- or 2-branched cymes; peduncle 7–12 mm long; pedicels 4–6 mm long; buds apiculate. Calyx calyptriform, 2 mm long, splitting longitudinally into 2 equal, orbicular, persistent lobes. Petals obovate, incurved at apex, 3.8–4.2 mm long. Disc c. 2 mm diam., 1 mm high. Stamens 2 or 3; filaments c. 1.5 mm long. Ovary 2- or 3-locular; ovules 2 per locule, attached from central to upper part of axis. Immature fruit globose, 12 mm diam. Mature fruit not seen. Fig. 46D–G.

Occurs in coastal and tableland mesophyll vine forest from Bamaga to the Murray River, S of Tully, Qld. Map 223.

Qld.: Alligator Creek Catchment, Pascoe River road, *B. Hyland* 6437 (BRI, QRS); State Forest Reserve 607, Bridle Logging Area, (E of Mareeba), *B. Hyland* 6484 (BRI, QRS); State Forest Reserve 310, Windin Logging Area, (NE of Butchers Creek), *B. Hyland* 7154 (BRI, QRS); road to Lake Placid, 10 km NW of Cairns, *V. K. Moriarty* 5 (BRI); S of Hartleys Creek, *L. S. Smith* 4635 (BRI).

## 2. HIPPOCRATEA

*Hippocratea* L., *Sp. Pl.* 2: 1191 (1753), *Gen. Pl.* 5th edn, 498 (1754), after Hippocrates (c. 460–370 BC.), Greek physician

Type: *H. volubilis* L.

*Loeseneriella* A. C. Smith, *Amer. J. Bot.* 28: 438 (1941). T: *L. macrantha* (Korth.) A. C. Smith

Lianes or scandent, rarely (not in Australia) erect, shrubs. Leaves opposite, decussate. Stipules present. Inflorescence axillary, cymose, dichasial or submonochasial, simple or compound, with or without accessory branchlets. Calyx 5 (rarely 4)-lobed. Petals 5, rarely 4 or 6, imbricate or valvate. Disc single or double, annular, extrastaminal, fleshy. Stamens 3, rarely 2 or 4, inserted at base of free part of pistil; anthers transversely dehiscent, extrorse or apical; filaments reflexed at anthesis. Ovary partly or not immersed in disc, 3-locular with 2–20 ovules per locule; style distinct; stigmas obscure. Fruit a strongly 3-lobed capsule, the divergent dorsiventrally flattened lobes much longer than the axile placenta, each dehiscent along a median suture into 2 valves. Seeds mostly with a basal, membranous wing, with the raphe forming a submedian vein and thickened integuments forming a marginal vein. Cotyledons  $\pm$ united.

About 100 species, pantropical and subtropical; 1 endemic species in Australia.

***Hippocratea barbata*** F. Muell., *Trans. & Proc. Philos. Inst. Victoria* 3: 23 (1859)

*H. obtusifolia* var. *barbata* (F. Muell.) Benth., *Fl. Austral.* 1: 404 (1863); *Loeseneriella barbata* (F. Muell.) C. T. White, *Proc. Roy. Soc. Queensland* 55: 61 (1944). T: On the banks of rivers near Moreton Bay, Qld, W. Hill & F. Mueller; n.v.

Woody liane. Leaves elliptic, ovate, lanceolate or rarely obovate, obtuse or obtusely acuminate, crenulate or entire, firmly chartaceous, glabrous; lamina 4–9 cm long, 1.5–3.5 cm wide; base acutely cuneate or attenuate; secondary veins 5–8 pairs; petiole 5–8 mm long; stipules narrowly deltoid, 0.7–1 mm long. Cymes 2–4-branched, puberulent; pedicels 3.5–5 mm long. Calyx lobes broadly deltoid, obtuse, c. 0.3 mm long. Petals subcoriaceous, deltoid, 3.5–4.5 mm long, pilose on upper part inside. Disc c. 1.8 mm diam., pilose near apex. Staminal filaments 1.2–1.5 mm long. Ovary with 8–10 ovules per locule. Capsular lobes coriaceous, c. 36 mm long, 20 mm wide, glabrous; sutural margins recurved. Seeds, including wing, c. 30 mm long, 13 mm wide; submedian and marginal veins conspicuous. Fig. 46H–J.

Occurs in several types of rainforest from Cape York, Qld, to the Clarence River, N.S.W. Map 224.

Qld.: Portion 62, Alexandra, near Noah Creek, A. W. Dockrill 638 (BRI, QRS); State Forest Reserve 310, Goldsborough Logging Area, (upper Mulgrave River), B. Hyland 9631 (BRI, QRS); Weipa to Lake Patricia, B. Hyland 10676 (BRI, QRS); Simpsons Gap, near Brisbane, Nov. 1887, J. H. Simmonds (BRI); Kolan River Crossing on Bundaberg to Rosedale road, T. Stanley 78136 & E. Ross (BRI).





**Figure 47.** *Psammomoya choretroides*.  
Photograph —M. D. Crisp

**Figure 48.** *Macgregoria racemigera*.  
Photograph —A. S. George



**Figure 49.** *Denhamia parvifolia*.  
Photograph —L. W. Jessup

**Figure 50.** *Stackhousia monogyna*.  
Photograph —M. Fagg

# STACKHOUSIACEAE

*W. R. Barker*

Herbs with ribbed branches. Leaves alternate, simple, entire; stipules tiny, terete, sometimes caducous. Inflorescence terminal, usually racemose or spike-like, rarely paniculate or umbelliform, or flowers solitary. Flowers actinomorphic or zygomorphic, bisexual, often subtended by small bracts. Hypanthium short or cup-shaped. Sepals 5, free. Petals 5, free or fused in middle into tube. Stamens 5, free; anthers 2-locular, dehiscing by longitudinal slits. Ovary superior; carpels 3–5, 1-ovulate, united along a central axis; style 1, sometimes surrounded at base by a cup, terminated by 3–5 terete stigmas. Fruit a schizocarp with up to 5 nutlets (cocci); hypanthium and ovary axis persistent; seeds erect; endosperm fleshy; embryo straight.

A small, predominantly Australian family of three genera and at least 16 species, 1 species extending to Malesia and Micronesia and another endemic in New Zealand.

T. Schuchardt, Synopsis Stackhousiacearum, *Linnaea* 26: 1–42 (1854); G. Bentham, Stackhousiaeae, *Fl. Austral.* 1: 404–409 (1863); G. Bentham, Stackhousiaceae, in A. P. de Candolle (ed.), *Prodr.* 15: 499–502 (1864); F. Pax, Stackhousiaceae, *Nat. Pflanzenfam.* 3(5): 231–233 (1893); R. Pampanini & G. Bargagli-Petrucci, Monographia della famiglia Stackhousiaceae, *Bull. Herb. Boissier* ser. 2, 5: 901–916, 1045–1060, 1145–1160 (1905); *op. cit.* 6: 39–44 (1906); J. Mattfeld, Stackhousiaceae, *Nat. Pflanzenfam.* 2nd edn 20b: 240–254 (1942); B. L. Turner, Chromosome numbers in *Stackhousia* (Stackhousiaceae), *Austral. J. Bot.* 14: 165–166 (1966).

## KEY TO GENERA

- |    |   |                   |
|----|---|-------------------|
| 1  | Petals fused in middle into tube; stamens 3 long, 2 short; anthers not gland-tipped; style not surrounded by membranous cup |                   |
| 2  | Style inserted between cocci in fruit; coccus attachment short, triangular  | 1. STACKHOUSIA    |
| 2: | Style terminal in fruit; cocci attached to column by long narrow inner edge   | 2. TRIPTEROCOCCUS |
| 1: | Petals free; stamens 5, equal; anthers gland-tipped; style surrounded above ovary by membranous cup                         | 3. MACGREGORIA    |

## 1. STACKHOUSIA

*Stackhousia* Smith, *Trans. Linn. Soc. London* 4: 218 (1798), after John Stackhouse, author of works on the algal genus *Fucus* in the British Isles and on some botanical illustrations of Theophrastus

Type: *S. viminea* Sm.

*Plokiostigma* Schuch., *Linnaea* 26: 39 (1854). T: *P. lehmannii* Schuch.

Hypanthium cup-shaped. Petals free at base, fused in middle, distally free. Stamens 3 long, 2 short, enclosed in corolla tube; filaments as long as or longer than glandless anthers; pollen reticulate. Ovary of 3–5 carpels; style without membranous cup; stigmatic lobes 3–5, spreading. Cocci 1–5, wingless or 3-winged, connected at base to gynoeceal column by short triangular point of attachment, leaving a triangular scar after shedding; wings lacking prominent transverse veins; style inserted between and shorter than mature cocci.

A genus of 14 currently accepted species; 13 recognised here for Australia, of which 1 extends to Malesia and Micronesia; 1 species endemic in the mountains of New Zealand.

Within *Stackhousia* there are clearly natural groups of species, but no infrageneric classification is used here. One group comprising *Stackhousia viminea* Sm. and its allies has flowers arranged in spaced multibracteate clusters in the inflorescence. The terminal umbelliform inflorescence of *S. umbellata* C. A. Gardner & A. S. George seems an offshoot of this group. A group containing *S. monogyna* Labill. has tri-bracteate flowers arranged singly along the inflorescence axis; *S. pulvinaris* F. Muell. with solitary flowers is apparently a derivative from this group. Scale leaves seem to have arisen more than once in the genus. One scale-leaved group in W.A. comprising *S. scoparia* Benth. and *S. umbellata* has cocci with prominent bony endocarpic protrusions at the base. The winged cocci of *S. megaloptera* F. Muell. and *S. spathulata* Sieber ex Spreng. are apparently independent developments within the *S. viminea* and *S. monogyna* groups respectively; neither has close links with the winged cocci of *Tripterococcus*.

W. R. Barker, Taxonomic studies in *Stackhousia* Sm. (Stackhousiaceae) in South Australia, *J. Adelaide Bot. Gard.* 1: 69–82 (1977); *J. Adelaide Bot. Gard.* 1: 200 (1978).

- |     |  |                                  |
|-----|--|----------------------------------|
| 1   | Flowers solitary, in uppermost leaf axil; small mat-forming herb   | <b>13. <i>S. pulvinaris</i></b>  |
| 1:  | Flowers in several- to many-flowered terminal inflorescences; erect to ascending herb  |                                  |
| 2   | Inflorescence umbelliform  | <b>6. <i>S. umbellata</i></b>    |
| 2:  | Inflorescence elongated, spike-like  |                                  |
| 3   | Flowers arranged singly along inflorescence axis; bracts at each main inflorescence node 1–3                                       |                                  |
| 4   | Leaves foliose, not reduced to scales  |                                  |
| 5   | Leaves spatulate, rounded at apex; cocci prominently winged  | <b>4. <i>S. spathulata</i></b>   |
| 5:  | Leaves obovate to linear or lanceolate, acute; cocci not winged  |                                  |
| 6   | Perennial; ovary with 3 (rarely 5) carpels; corolla tube 5–8 (rarely 3) mm long  | <b>1. <i>S. monogyna</i></b>     |
| 6:  | Annual; ovary with 3–5 carpels; corolla tube 3.5–5.2 mm long   | <b>2. <i>S. annua</i></b>        |
| 4:  | Leaves reduced to scales   |                                  |
| 7   | Corolla tube 5–6 mm long; sepals 2–3 mm long; cocci apparently with no thick bony endocarpic connection                            | <b>3. <i>S. dielsii</i></b>      |
| 7:  | Corolla tube 1.8–4.2 mm long; sepals 1–2 mm long; cocci with thick, bony endocarpic connection                                     | <b>5. <i>S. scoparia</i></b>     |
| 3:  | Flowers in clusters of 1–6 spaced along inflorescence axis; bracts at each main inflorescence node 3–12 or more                    |                                  |
| 8   | Corolla tube stout; cocci prominently winged   | <b>12. <i>S. megaloptera</i></b> |
| 8:  | Corolla tube slender; cocci without wings  |                                  |
| 9   | Cocci pyriform to dumb-bell shaped, muricate at apex, with a prominent round basal cavity  | <b>9. <i>S. muricata</i></b>     |
| 9:  | Cocci obovoid, rugose to reticulate, rarely muricate at apex, the basal cavity lacking or shallow and ovate to narrowly triangular |                                  |
| 10  | Annual   | <b>11. <i>S. intermedia</i></b>  |
| 10: | Perennial  |                                  |
| 11  | Leaves foliose, the broadest 1.6–7.5 mm wide, the basal ones sometimes reduced to scales   | <b>8. <i>S. viminea</i></b>      |
| 11: | Leaves reduced to scales, rarely ( <i>S. clementii</i> ) foliose, up to 1.5 mm wide  |                                  |

12 Cocci 1–3, obloid-ellipsoidal, rugose to tuberculate; inflorescence 1-sided

7. *S. nuda*

12: Cocci usually 1, curved-obovoid, rugose-reticulate, sometimes muricate in apical part; inflorescence cylindrical

10. *S. clementii*

### 1. *Stackhousia monogyna* Labill., *Nov. Holl. Pl.* 1: 77, t. 104 (1804)

T: Tasmania, *J. de Labillardière p.p.*, as to flowering specimens; *n.v.*

*S. linariifolia* Cunn., in B.Field, *Geog. Mem. New South Wales* 356 (1825); *S. monogyna* (?var.) *linariifolia* (Cunn.) Benth., in DC., *Prodr.* 15(1): 500 (1864). T: Bathurst, N.S.W., A. Cunningham; syn: K (2 sheets).

*S. pubescens* A.Rich., *Sert. Astrolabe* 89, t. 33 (1834); *S. pubescens* f. *genuina* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1052 (1905), *nom. illeg.* T: King George Sound, W.A., collector unknown; syn: P.

*S. obtusa* Lindl., *Bot. Reg.* 22: sub t. 1917 (t. labelled 1916 in error) (1836); *S. monogyna* var. *obtusa* (Lindl.) Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1047 (1905). T: Tasmania, R. C. Gunn 462; holotype: CGE.

*S. huegelii* Endl., *Enum. Pl.* 17 (1837). T: Swan River, W.A., C. Huegel; holotype: W.

*S. gunnii* Schldtl., *Linnaea* 20: 642 (1847); Schldtl. in Schuch., *Linnaea* 26: 18 (1854) (as *S. gunniana*). T: J. Lindley, *Bot. Reg.* 22, t. 1917 (t. labelled 1916 in error) (1836). At CGE there is a collection from Tasmania, R. Gunn 69, on which the figure is apparently based.

*S. aspericocca* Schuch., *Linnaea* 26: 12 (1854); *S. aspericocca* f. *genuina* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1048 (1905), *nom. illeg.* T: Mount Gambier, S.A., collector unknown; lectotype: MEL *fide* W. R. Barker, *J. Adelaide Bot. Gard.* 1: 71 (1977); Barossa Range, S.A., ?H.Behr and others; syn: MEL; Tasmania, C. Stuart (locality probably incorrect); *n.v.*

*S. muelleri* Schuch., *Linnaea* 26: 16 (1854); *S. monogyna* var. *muelleri* (Schuch.) Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1045 (1905), 6: t. 13, figs 5–6 (1906). T: South Australia, F. Mueller; syn: MEL; Tasmania, C. Stuart (locality incorrect); syn: MEL.

*S. pubescens* f. *leiococca* Schuch., *Linnaea* 26: 12 (1854). T: Vasse R., W.A., G. Molloy; syn: B *n.v.*; Swan River, J. Drummond *s.n.*; syn: B *n.v.*

*Plokiostigma lehmannii* Schuch., *Linnaea* 26: 40 (1854). T: Rottneest Is., W.A., 21 Aug. 1839, L. Preiss 1364; syn: B *n.v.*, MEL.

*S. gunnii* J. D. Hook., *Fl. Tasman.* 1: 79 (1855), *non* Schldtl. (1847). T: Formosa, Tas., R. C. Gunn 1048; syn: ?BM, K, ?M, ?NSW, ?S, ?WU.

*S. georgei* Diels, *Bot. Jahrb. Syst.* 35: 342 (1904). T: near Murrinmurrin, W.A., 1902, W. J. George; holotype: B *n.v.*; iso: PERTH.

*S. giuratiifolia* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1055 (1905), 6: t. 10, t. 13 fig. 17 (1906). T: Lake K(erang), Vic., 1884, *comm. Dr Beckler*; holotype: M.

*S. maidenii* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1049 (1905), 6: t. 13 figs 11–12 (1906); *S. maidenii* var. *typica* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1050 (1905), *nom. illeg.* T: Burragorang to Wentworth Falls, N.S.W., Oct. 1898, J. H. Maiden; holotype: W; iso: NSW.

*S. maidenii* var. *flexuosa* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1050 (1905). T: Tia Falls, N.S.W., Oct. 1900, W. Forsyth; holotype: M; iso: MEL, NSW.

*S. aspericocca* f. *incrassata* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1048 (1905). T: Mallee, Vic., 1892, C. Walter; syn: M; Wimmera District, Vic., F. Mueller; syn: WU; Dimboola, Vic., F. Mueller; syn: B *n.v.*, FI (photos AD), G, M, P, W; Wimmera, Vic., C. Walter; syn: B *n.v.*, W.

*S. pubescens* f. *elatior* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1052 (1905). T: Western Australia, J. S. Roe; syn: W; south-western W.A., J. Drummond 659; syn: W.

*S. tryonii* F. M. Bailey, *Queensland Agric. J.* 17: 103 (1906). T: South Percy Is., Qld, Dec. 1905, Tryon & Young Expedition; syn: BRI (2 sheets).

*S. dietrichiae* Domin, *Biblioth. Bot.* 89: 342 (1927). T: Brisbane R. (more probably Rockhampton), Qld, A. Dietrich 919; holotype: PR; iso: NSW, ?MEL.

Illustrations: J. Lindley, *Bot. Reg.* 22: t. 1917 (1916 in error) (1836); W. R. Barker, *J. Adelaide Bot. Gard.* 1: 70, fig. 1; and 72, fig. 2 (as *S. aspericocca*).

Glabrous or pubescent perennial to 70 cm. Stems erect or ascending, simple or branched. Leaves narrowly linear to lanceolate, rarely broadly elliptic, to 35 mm long. Inflorescence a dense cylindrical or sparse to dense one-sided spike, the flowers arranged singly; bracts

3, sometimes the lateral 2 reduced, acute to acuminate, erose-serrulate. Hypanthium 0.5–1.5 mm long. Sepals 1–2.5 mm long, obtuse to acuminate, erose-serrate. Corolla white to deep yellow, rarely (some Qld plants) blue; tube 5–8 mm long, rarely 3–4 mm; lobes 2.5–5.5 mm long, rarely 2 mm, obtuse to acuminate. Gynoecium 3(rarely 5)-partite. Cocci usually 3, broadly obovoid to broadly ellipsoidal, 1.5–2.8 mm long, rugose to reticulate, glabrous or asperulate, rarely (some W.A. plants) pubescent; basal cavity shallow. Fig. 50, 51A–E.

Common throughout southern semi-arid and temperate regions, from south-western W.A. to the central east coast of Qld. Occurs from coastal to montane situations, in sandy to heavy soils, in heath, sclerophyllous woodland and forest, rarely in swamps. Map 225.

W.A.: Munglinup River, Ravensthorpe–Esperance road, *W. R. Barker* 2562 (AD, BM, BRI, CANB, HO, MEL, NSW, NT, PERTH). S.A.: c. 5.5 km S of Monarto South, *W. R. Barker* 697 (AD, BRI, CANB, HO, MEL, NSW, NT, PERTH). Qld: 30 km N of Murgon, *L. Pedley* 4005 (BRI, CANB, NSW). N.S.W.: 23 km ENE of Goolgowie on Mid Western Highway, *L. Haegi* 1335 (AD, NSW). Tas.: N side of Ben Lomond massif, *W. R. Barker* 1115 (AD, BRI, CANB, HO, MEL, NSW, NT, PERTH).

A polymorphic species which as treated here includes *S. aspericocca* Schuch., *S. huegelii* Endl. and *S. pubescens* A.Rich.

## 2. *Stackhousia annua* W.R.Barker, *J. Adelaide Bot. Gard.* 1: 75, figs 3 & 4 (1977)

T: c. 6 km SSW of Corny Point lighthouse, Yorke Peninsula, S.A., *W. R. Barker* 633; holotype: AD; isotype: CANB, K, PERTH, AD (*W. R. Barker* 634).

Illustration: *W. R. Barker, op. cit.*, 76, fig. 3; 78, fig. 4.

Slender erect glabrous annual to 19 cm. Stem usually simple. Leaves 7–25 mm long, the basal ones narrowly spatulate, the upper narrowly obovate to linear. Inflorescence a dense cylindrical spike; flowers arranged singly, tribracteate, subsessile. Hypanthium 0.7–0.9 mm long. Sepals 1.1–1.9 mm long, shallowly erose. Corolla cream; tube 3.5–5.2 mm long; lobes 3–4.5 mm long, obtuse. Gynoecium 3–5-partite. Immature cocci obovoid, rugulose.

A rare species restricted to the southern tips of Yorke and Eyre Peninsulas, S.A.; grows in sandy soil in open grassy areas in near-coastal woodland. Map 226.

S.A.: Daly Head, c. 0.8 km E of trig point, *W. R. Barker* 639 (AD); Warrenben Conservation Reserve, *B. Copley* 4554 (AD); c. 17.5 km S of Corny Point, *Hj. Eichler* 13974, (AD, CANB, FI, HO, K, MEL, NSW); Stamford Hill, 8 km SE of Port Lincoln, *P. G. Wilson* 324 (AD, G, K).

## 3. *Stackhousia dielsii* Pamp., *Bull. Herb. Boissier*, ser. 2, 5: 1052 (1905), 6: t. 11 (1906)

T: Western Australia, *L. Diels* 3291; syn: B (photo in Pampanini, *op. cit.*, t. 11), FI (photo AD).

Illustrations: R. Pampanini, *loc. Cit.*; R. Erickson *et al.*, *Fl. Pl. W. Austral.* fig. 307 (1973).

Sedge-like glabrous perennial to 55 cm. Stems several to many, erect, branched above. Leaves reduced to scales up to 6 mm long, rarely in upper part a few foliose, narrowly linear. Inflorescence a dense cylindrical spike; flowers arranged singly, tribracteate, subsessile; bracts herbaceous, narrowly linear, caudate, entire. Hypanthium 1–1.7 mm long. Sepals 2–3 mm long, linear, caudate, green-yellow to yellow. Corolla yellow, the tube darker; tube 5–6 mm long; lobes 2.5–3.5 mm long, acute. Gynoecium 3-partite. Immature cocci ellipsoidal, rugose.

Endemic in south-western W.A. between the lower Murchison River and the Hill River; Grows in white to yellow sand in dense low heath, sometimes in woodland. Map 227.

W.A.: North West Coastal Highway, c. 42 km N of Murchison River, *W. R. Barker* 2181 (AD, BRI, CANB, HO, K, MEL, NSW, NT, PERTH). c. 1.2 km E of Yuna on Tenindewa road, *W. R. Barker* 2233 (AD, HAL, PERTH, W); Burma Road, NW of Strawberry Siding, *W. R. Barker* 2241 (AD, CANB, MEL); Loop road, 9.6 km E of Kalbarri, Kalbarri National Park, *R. J. Chinnock* 3173 (AD, NSW, WELT).

**4. *Stackhousia spathulata* Sieber ex Spreng., *Syst. Veg.* 4(2): 124 (1827)**

*S. spathulata* f. *genuina* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1054 (1905), *nom. illeg.* T: New South Wales, *F. Sieber* 246; syn: BR, G, HAL, K, M, MEL, NY, P, W; *loc. id.*, *F. Sieber* 628; syn: MEL, P, W; *loc. id.*, *F. Sieber* 477; syn: W.

*Tripterococcus spathulatus* F. Muell., *Trans. Philos. Soc. Victoria* 1: 36 (1855). T: Wilsons Promontory, Vic., *F. Mueller*; syn: MEL; Rivoli Bay, S.A., *F. Mueller*; syn: MEL; Lake Alexandrina, S.A., *F. Mueller*; syn: MEL.

*S. maculata* J. D. Hook., *J. Bot.* 2: 421 (1840); *S. spathulata* f. *maculata* (J. D. Hook.) Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1055 (1905). T: New South Wales, *F. Sieber* 246; syn: K (isosyntypes cited under *S. spathulata*); Barren Island, Tas., *R. C. Gunn* 895; syn: K; Port Jackson, N.S.W., *Cunningham*; syn: K; Port Jackson, N.S.W., *Fraser*; syn: K, ?BM.

*S. spathulata* f. *obcordata* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1054 (1905). T: Port Stephens, *King*; syn: FI (photo AD); Port Jackson, N.S.W., *M. Anderson*; syn: G, isosyn: K, ?LE (photo AD); without locality or collector; syn: W; New Holland, *F. Bauer*; syn: W; New South Wales, *F. Sieber* 246; syn: P, W (isosyntypes cited under *S. spathulata*); (?Bondi), Sydney, N.S.W., *C. Huegel* 92; syn: W; New Holland, 1836, (?Gunn); syn: LE (photo AD).

[*S. monogyna* auct. non Labill.: Labill., *Nov. Holl. Pl.* 1: 77, t. 104 (1804) *p.p.* (as to winged cocci)]

Illustrations: E. R. Rotherham *et al.*, *Fl. Pl. New South Wales S Queensland* t. 16 (1975); W. R. Barker, *J. Adelaide Bot. Gard.* 1: 79, fig. 6 (1977); N. C. W. Beadle, *Stud. Fl. N.E. New South Wales* 4: 513, fig. 224 A (1980).

Glabrous perennial to over 45 cm high. Stems procumbent to ascending. Leaves obovate to spatulate, thick, to 30 mm long, sometimes longer, obtuse to rounded at apex. Inflorescence a dense cylindrical spike; flowers arranged singly, subsessile, tribracteate; bracts herbaceous, triangular, shallowly erose. Hypanthium 1–1.5 mm long. Sepals 1.5–2 mm long, shallowly erose. Corolla white or cream; tube 6–7 mm long; lobes 4–5 mm long, obtuse. Gynoecium 3-partite. Cocci 4–6 mm long, with 3 prominent wings. Fig. 51F.

A coastal species of the south-eastern and eastern mainland and western Tas.; Grows in deep sand on dunes or in swales, on beaches, and beside lagoons, sometimes in shallow calcareous sand. Map 228.

S.A.: near Beachport, between Lake George and the sea, *E. N. S. Jackson* 194 (AD, FI, PERTH). Qld: 5 km N of Perigian Beach, *P. Baxter & B. Lebler* 1144 (CANB, MEL, NSW). N.S.W.: Narawallee Beach, near Milton, *M. Gray* 6669 & *R. Groves* (BRI, CANB, NSW). Vic.: Childers Cave, c. 15 km SE of Warrnambool, *B. G. Briggs* 2950 (MEL, NSW). Tas.: Rupert Point, *W. D. Jackson* 20 (HO).

**5. *Stackhousia scoparia* Benth., *Fl. Austral.* 1: 409 (1863)**

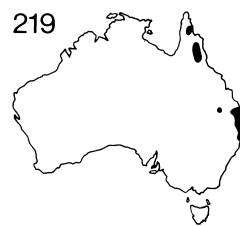
T: between Swan River and King George Sound, W.A., *J. Drummond s.n.*; holotype: K, isotype: MEL.

Glabrous broom-like perennial to 60 cm. Stems ascending, branched above. Leaves reduced to scales. Inflorescence a lax one-sided spike; flowers arranged singly or in pairs, rarely 4 together, subsessile to shortly pedicellate; bracts 3–6 at each node, ovate, entire or serrulate. Hypanthium 0.8–1.2 mm long. Sepals 1–2 mm long, light green to dark brown, entire or serrulate. Corolla greenish-yellow to mid or dark yellow or brown; tube 1.8–4.2 mm long; lobes 1.5–3.8 mm long. Gynoecium 3-partite. Cocci 1–3, obloid-ellipsoidal, 2.5–4 mm long, deeply rugose to densely tuberculate, with two lips of bony endocarp at base.

In the S wheatbelt and S coastal regions of south-western W.A.; Grows in sand, gravelly loam or sandy clay, in mallee heath. Map 229.

W.A.: Chandlers Road, c. 3.5 km WNW of Lort River bridge, c. 21 km N of Lort River crossing by main Ravensthorpe–Esperance road, *W. R. Barker* 2572 (AD, BRI, CANB, HO, MEL, NSW, NT, PERTH); 19 km E of Narembeen on Mt Walker road, *R. J. Chinnock* 4331 (AD, CANB, FI); c. 40 km ENE of Lake King on track to Norseman via Daniell Siding, *L. Haegi* 978 (AD); Merredin, *M. Koch* 2962 (MEL, NSW); East Mt Barren, 14 Oct. 1961, *J. H. Willis* (AD, K, MEL, NSW, PERTH).

This species, treated here in its traditional broad sense, encompasses three taxa. Typical *S. scoparia* has tribracteate flowers arranged singly, hyalescent serrulate bracts and deeply



211. *Lophopetalum arnhemicum*  
 214. *Cassine australis*  
 var. *australis*  
 217. *Pleurostyliya opposita*  
 220. *Siphonodon membranaceus*  
 223. *Salacia disepala*

212. *Euonymus australiana*  
 215. *Cassine australis*  
 var. *angustifolius*  
 218. *Siphonodon pendulus*  
 221. *Salacia erythrocarpa*  
 224. *Hippocratea barbata*

213. *Euonymus globularis*  
 216. *Cassine melanocarpa*  
 219. *Siphonodon australis*  
 222. *Salacia chinensis*  
 225. *Stackhousia monogyna*

rugose-tuberculate cocci; it occurs throughout the drier wheatbelt. An unnamed taxon with clustered flowers, entire opaque bracts and densely tuberculate cocci occurs E of Ravensthorpe. Another unnamed taxon near the Stirling Range has flowers arranged singly and entire caudate bracts, sepals and corolla lobes; its cocci are unknown.

**6. *Stackhousia umbellata*** C. Gardner & A.S. George, *J. Roy. Soc. W. Austral.* 46: 132, fig. 2 (1963)

T: near No. 2 (Oil) Well, Cape Range, W.A., 4 June 1961, A. S. George 2585; holotype: PERTH; isotype: MEL, K n.v.

Illustration: C. A. Gardner & A. S. George, *loc. cit.*

Scandent to procumbent, much-branched glabrous perennial to 1 m high. Leaves reduced to scales. Inflorescence a terminal umbelliform cluster; flowers subsessile to shortly pedicellate; bracts with hyaline erose margins, mucronate. Hypanthium 0.7–3 mm long. Sepals ovate, 2.5–3.2 mm long, shallowly erose, mucronate. Corolla yellow; tube 4–6.5 mm long; lobes 2.3–4 mm long, acuminate. Gynoecium 3-partite. Cocci 1–3, ellipsoidal, 3–3.5 mm long, shallowly reticulate, puberulent, with prominent projection of bony endocarp at base; basal cavity absent.

Endemic in and just S of the Cape Range peninsula, north-western W.A.; grows in shallow sandy soil on limestone within or between spinifex clumps in low hummock grassland and, in the Range, along creek-lines. Map 230.

W.A.: Oil Well No. 2, W end of Charles Knife Road, Cape Range, *W. R. Barker 2143* (AD, BRI, HO, K, L, MEL, NSW, PERTH); North West Cape, lighthouse hill, *A. S. George 1380* (PERTH); c. 6.5 km NE of Ningaloo homestead, *A. S. George 10223* (AD, CANB, MEL, PERTH).

**7. *Stackhousia nuda*** Lindley, *Bot. Reg.* 22, sub t. 1917, (t. labelled 1916, in error)

T: New Holland, *collector unknown*; holotype: CGE.

[*S. intermedia* auct. non F. M. Bailey: J. H. Willis, *Handb. Pl. Victoria* 2: 355 (1973)]

[*S. scoparia* auct. non Benth.: N. C. W. Beadle *et al.*, *Fl. Sydney Reg.* 362 (1972)]

[*S. viminea* auct. non Sm.: E. Rotherham *et al.*, *Fl. Pl. New South Wales S Queensland* 33 (1975)]

Illustration: E. R. Rotherham *et al.*, *Fl. Pl. New South Wales S Queensland* fig. 60 (1975), as *S. viminea*.

Glabrous broom-like perennial to 95 cm. Stems erect or ascending, branched above. Leaves reduced to scales. Inflorescence a lax one-sided spike; flowers in many-bracted clusters of 1–4, sessile or shortly pedicellate; bracts ovate, erose-serrulate. Hypanthium 0.5–0.9 mm long. Sepals narrowly triangular, 0.7–0.9 mm long, with whitish erose-serrulate margin. Corolla yellow to yellow-green; tube 2–3.3 mm long; lobes 1.3–2.1 mm long, narrowly acute to subacuminate. Gynoecium 3-partite. Cocci 1–3, obovoid-ellipsoidal to ellipsoidal, 1.8–3.4 mm long, rugose to verrucose, the base with small shallow cavity but no protruding bony endocarp.

Occurs along the E coast from south-eastern Qld to eastern Vic.; grows in moist sand, often peaty, and on sandstone, in low heath on swamp margins and on coastal flats, rarely on hillsides. Map 231.

Qld: 2 km N of Coolum Beach, *P. R. Sharpe 1846* (BRI). N.S.W.: top of Table Mountain, W of Milton, *R. H. Cabbage 798* (NSW, SYD); Cronulla, *R. H. Cabbage 2537* (AD, NSW, SYD); Nerriga to Tianjarra Falls, *M. Gray 5692* (CANB). Vic.: c. 4 km W of Genoa, *A. C. Beaglehole 32210* (AD, HO).

**8. *Stackhousia viminea*** Smith, *Rees Cycl.* vol. 33 (1816)

*S. viminea* f. *genuina* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1056 (1905), *nom. illeg.* T: Port Jackson, N.S.W., *J. White*; holotype: LINN (Herb. Smith 534.1, microfiche AD); isotype: LIV.

*S. flava* J. D. Hook., *Icon. Pl.* 3, t. 269 (1840); *S. viminea* f. *flava* (J. D. Hook.) Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1058 (1905). T: Woolnorth, Tas., 24 Nov. 1836, *R. C. Gunn 793*; syn: K, isosyn: ?BR, MEL, ?NSW, NY.



*S. dorypetala* Schuch., *Linnaea* 26: 24 (1854). T: New South Wales, *F. Sieber* 245; holo: B n.v.; iso: BR, HAL, K, M.

Illustrations: J. D. Hooker, *loc. cit.* (as *S. flava*); J. Galbraith, *Field Guide Wildfl. S.E. Austral.* t. 43 (1977).

Glabrous perennial to 70 cm high. Stems erect or ascending, rarely branched above. Leaves narrowly obovate to obovate or narrowly elliptic, the largest 1.6–7.5 mm wide, those at base sometimes reduced to scales. Inflorescence cylindrical, spike-like; flowers 1–5 in several-bracted clusters, subsessile; bracts ovate, shallowly erose to entire. Hypanthium 0.4–0.7 mm long. Sepals 0.5–0.8 mm long, entire to undulate. Corolla pale green to deep yellow, rarely tinged red-brown outside; tube 2.2–3.5 mm long; lobes 1.5–3 mm long, obtuse to acuminate. Gynoecium 3-partite. Cocci 1–3, broadly ovoid to broadly ellipsoidal, 1.5–3 mm long, rugose to rugose-reticulate, sometimes obtusely tuberculate at apex; basal cavity very shallow.

Occurs in montane and coastal parts of E Australia from south-eastern Qld to northern Tas.; Grows in shallow soil among rocks, rarely in clay, in sclerophyllous forest and woodland, on open rocky hillsides and in open sandy country, less commonly in swamps. Map 232.

Qld: Mt Ngungun, *S. T. Blake* 22773 (K). N.S.W.: Bungonia Lookdown, *M. Evans* 2534 (CANB, MEL, NSW). Vic.: Wireless Tower Hill, c. 1 km W of Bogong, *W. R. Barker* 1584 (AD, CANB, MEL, PERTH). Tas.: near Corinna Heads, Jan. 1954, *W. D. Jackson* (HO).

### 9. *Stackhousia muricata* Lindley, *Bot. Reg.* 22 sub t. 1917, (t. labelled 1916, in error)

*S. muricata* var. *typica* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1146 (1905), *nom. illeg.* T: Port Jackson, N.S.W., *collector unknown*; holo: CGE.

*S. elata* F. Muell., *Fragm.* 3: 86 (1862); *S. viminea* var. *elata* (F. Muell.) Benth., *Fl. Austral.* 1: 408 (1863); *S. viminea* f. *elata* (F. Muell.) Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1058 (1905). T: Phillips River, W.A., *G. Maxwell* 125; holo: MEL.

*S. viminea* (?var.) *occidentalis* Benth., in DC., *Prodr.* 15(1): 501 (1864); *S. viminea* f. *occidentalis* (Benth.) Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1057 (1905). T: south-western W.A., *J. Drummond* 92; syn: K, MEL, NSW.

*S. muricata* var. *linarioides* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1146 (1905); 6: t. 13, figs 22–23 (1906). T: Parramatta road, Sydney, N.S.W., *C. Huegel* 304 (?804); holo: W.

*S. occidentalis* Domin, *Vestn. Král. Česk. Společn. Nauk, Tr. Mat.-Prír.* 1921–22(2): 61 (1923). T: Western Australia, *W. H. Ince s.n.*; holo: K.

*S. viminea* var. *micrantha* Benth., *Fl. Austral.* 1: 408 (1863) *p.p.*, as to Drummond collection; *S. micrantha* (Benth.) Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1150 (1905). T: south-western W.A., *J. Drummond* 81; syn: G, K, isosyn: MEL, NY; syntype collections of R. Brown and A. Cunningham from the north coast of Australia are *S. intermedia* Bailey.

[*S. viminea auct. non* Sm.: J. M. Black, *Fl. S. Austral.* 2nd edn. 2: 538 (1952)]

Illustration: W. R. Barker, *J. Adelaide Bot. Gard.* 1: 80, fig. 6 (1977), as *Stackhousia* sp.

Glabrous perennial or annual, to 55 cm. Stems erect to ascending, often branched above. Leaves usually linear, the largest 0.5–2.5 mm wide. Inflorescence cylindrical, spike-like; flowers in several-bracted clusters of 1–5, subsessile to shortly pedicellate; bracts imbricate, ovate, erose to lacerate. Hypanthium 0.4–0.9 mm long. Sepals 0.5–1.5 mm long, shallowly erose to serrulate. Corolla yellow-green, pale to deep yellow, sometimes brown on tube; tube 2–5.5 mm long; lobes 0.9–3.5 mm long, obtuse to acuminate. Gynoecium 3-partite. Cocci 1–3, pyriform to unequally dumb-bell shaped, slightly curved, 1.7–4 mm long, laterally rugose, apically sharply tuberculate (rarely in depauperate plants rugose), glabrous to puberulent; basal cavity deep, circular. Fig. 51G–J.

Widespread from the NW coast of W.A. through southern W.A. into S.A., in SE Qld and the E half of N.S.W.; grows in sandy and loamy soils, often with rocks or gravel, or in crevices, in sclerophyllous woodland and open grassy areas; in arid areas associated with spinifex; in the south and west of its range associated with granite outcrops. Map 233.

W.A.: North West Coastal Highway, c. 39 km NNW of Overlander Roadhouse, *W. R. Barker 2172* (AD, BRI, CANB, HO, MEL, NSW, NT, PERTH); Mt Walker, *R. J. Chinnock 4336* (AD, CBG, PERTH). S.A.: Pine Hill, 58.5 km WSW of Whyalla, *W. R. Barker 3641* (AD, BRI, CANB, HO, MEL, NSW, NT, PERTH). Qld: c. 13 km W of Biloela, *R. W. Johnson 2828* (BRI, MEL, NSW). N.S.W.: Boggabri, *R. H. Cambage 2447* (NSW, SYD).

The species has two races, one perennial (including the type of *S. muricata*) and spread across southern semi-arid Australia and in eastern N.S.W., the other annual (equivalent to *S. occidentalis* Domin) confined to arid S.A. and W.A.

### 10. *Stackhousia clementii* Domin, *Biblioth. Bot.* 89: 343 (1927)

T: between Ashburton and De Grey Rivers, W.A., *E. Clement s.n.*; syn: PR (2 sheets).

[*S. muricata* auct. non Lindl.: J. M. Black, *Fl. S. Austral.* 2nd edn, 2: 538 (1952)]

Dense, broom-like perennial to 45 cm, glabrous or puberulent at base. Stems slender, much-branched in upper part. Leaves, at least the upper ones, usually scale-like, sometimes linear to narrowly elliptic, up to 15 (rarely 30) mm long. Inflorescence a lax cylindrical spike; flowers in clusters of 1–3; bracts ovate, with shallowly erose to denticulate white margins. Hypanthium 0.5–1.5 mm long. Sepals 0.6–0.9 mm long, yellow to greenish-yellow, shallowly erose. Corolla pale green, yellow or dark brown; tube 2.4–3.2 mm long; lobes 1–1.6 mm long, acute. Gynoecium 3-partite. Cocci usually 1, broadly obovoid to obpyriform-obovoid, curved towards axis, 2–3.3 mm long, rugose, sometimes obtusely tuberculate over distal two-thirds; basal cavity shallow to deep with thin rim extending distally exposing tongue of bony endocarp.

A species of disjunct range across arid Australia; Often found in shallow sandy soil and limestone, sometimes in sand or clay or saline soil; grows in open woodland and hummock grassland on ephemeral swamp margins, plains and ridges. Map 234.

W.A.: c. 165 km E of Meekatharra, *C. A. Gardner 7895* (PERTH). N.T.: c. 25 km NW of The Granites, Tanami Desert, *W. R. Barker 2829* (AD, BRI, CANB, DNA, HO, MEL, NSW, NT, PERTH). S.A.: c. 8 km ENE of Mt Moulden on track to Kuntjana, *W. R. Barker 3180* (AD, CANB, NT, PERTH). Qld: 6 km ENE of Verdun Valley, *R. W. Purdie 1015* (BRI). N.S.W.: Sturt National Park, adjacent to Frome Swamp, *W. E. Mulham W936* (AD, NSW).

### 11. *Stackhousia intermedia* F.M.Bailey, *Queensland Agric. J.* 3: 281 (1898)

*S. intermedia* f. *genuina* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1150 (1905), *nom. illeg.* T: Lizard Island, Qld, collector unknown; holotype: BRI.

*S. aphylla* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1147 (1905), 6: t. 12 fig. 2, t. 13 fig. 30 (1906). T: Australia, *R. Schomburgk*; holotype: FI (photo AD).

*S. tenuissima* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1147 (1905), 6: t. 12 fig. 1 (1906). T: Port Darwin, N.T., *Schultz 303*; holotype: LE (photo AD).

*S. virgata* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1148 (1905), 6: t. 13 figs 24–25 (1906); *S. virgata* var. *typica* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1148 (1905), *nom. illeg.* T: Port Darwin (Palmerston), N.T., *M. Holtze 169*; holotype: G; isotype: LE (photo AD), WU.

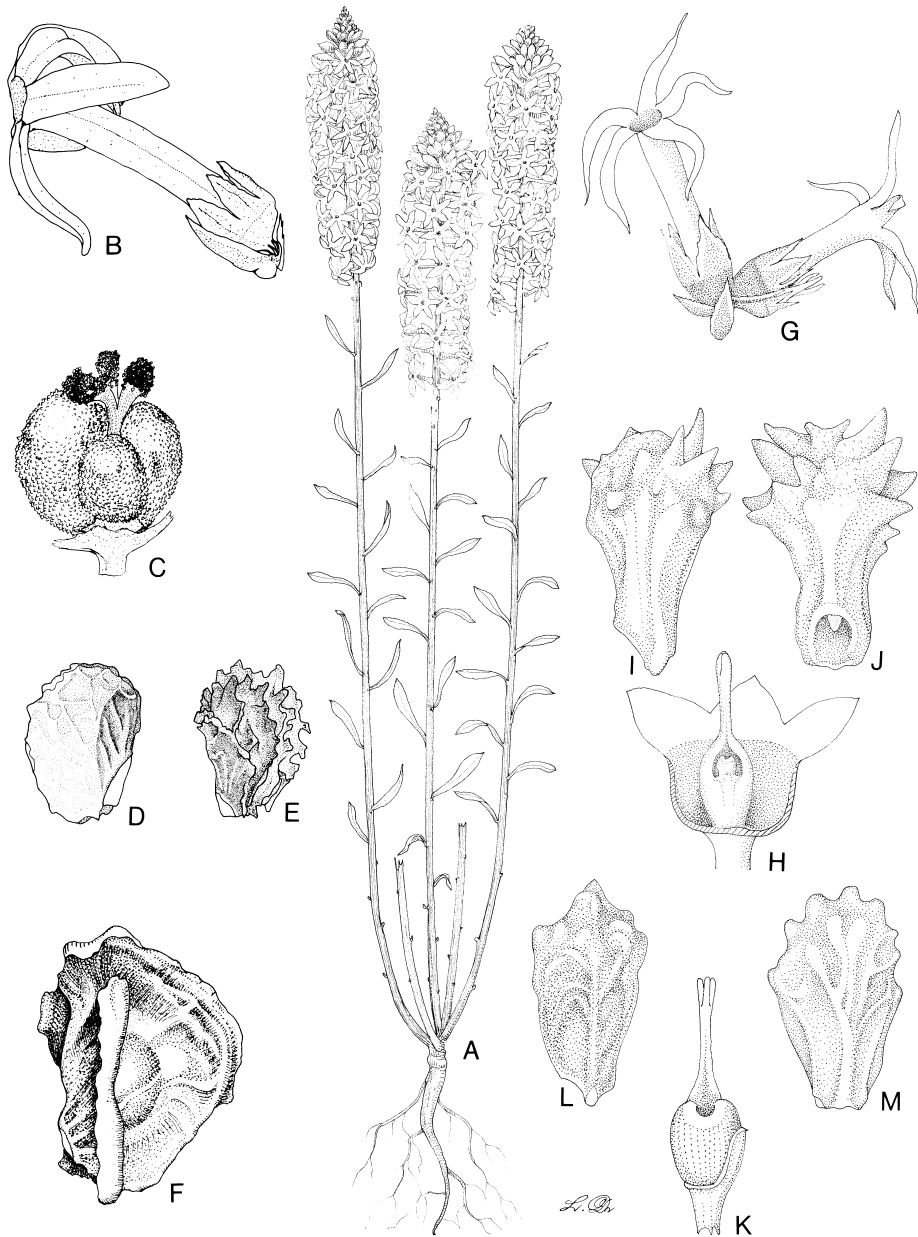
*S. virgata* var. *elegans* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1149 (1905), 6: t. 13 figs 26–27 (1906). T: Pole Is., Torres Strait, Qld, ?May 1877, *D'Albertis*; holotype: FI (photo AD)

*S. viminea* var. *micrantha* Benth., *Fl. Austral.* 1: 408 (1863), *p.p.* (Brown and Cunningham specimens). T: North coast, Australia, *R. Brown*; syn: K, LE (photo AD), MEL, NSW; *loc. id.*, *A. Cunningham s.n.*; syn: K, AD, MEL; the syntype *J. Drummond 81* is *S. muricata* Lindl.

[*S. viminea* auct. non Smith.: R. L. Specht, *Rec. Amer.-Austral. Sci. Exped. Arnhem Land* 3: 255 (1958)]

Illustration: W. R. Barker, *Fl. Centr. Austral.* fig. 234 E–F (1981), as *Stackhousia* sp.

Erect annual to 80 cm high, glabrous, rarely sparsely puberulent. Stems slender to robust. Leaves narrowly linear to linear-lanceolate, rarely scale-like, to 50 mm long. Inflorescence a lax cylindrical spike; flowers in many-bracted clusters of 1–5, subsessile to shortly pedicellate; bracts acuminate, fimbriate-dentate. Hypanthium 0.3–0.8 mm long. Sepals 0.6–0.8 mm long. Corolla pale green to pale yellow; tube 2–3.5 mm long; lobes 0.7–1.7 mm long, acuminate. Gynoecium 3-partite. Cocci ellipsoidal to obovoid or globular,



**Figure 51.** *Stackhousia*. **A–E**, *S. monogyna*. **A**, flowering plant  $\times 0.5$  (W. Barker 891, AD); **B**, flower  $\times 5$  (W. Barker 648, AD); **C**, gynoecium  $\times 12$  (W. Barker 676, AD); **D**, coccus  $\times 22$  (B. Copley 2299, AD); **E**, coccus  $\times 20$  (Hundred of Mortlock, S.A., C. Alcock, AD). **F**, *S. spathulata*, coccus  $\times 5$  (B. Copley 3334, AD). **G–J**, *S. muricata*. **G**, flowers  $\times 4$  (R. Chinnock 1024, AD); **H**, gynoecial column after shedding cocci, hypanthium part removed,  $\times 15$ ; **I–J**, cocci, lateral and adaxial views,  $\times 12$  (**H–J**, W. Barker 2172, AD). **K–M**, *S. intermedia*. **K**, gynoecial column after shedding cocci,  $\times 14$ ; **L–M**, cocci, adaxial and lateral views, 10 (**K–M**, W. Barker 2041, AD). Figures **B–F** drawn by W. R. Barker.

0.8–3.2 mm long, rugose to tuberculate, glabrous to pubescent; basal cavity absent. Fig. 51K–M.

Widespread across subtropical and tropical Australia, extending into the northern arid zone; also occurs in Malaysia and Micronesia (Caroline Islands). Grows in wooded grasslands. Map 235.

W.A.: edge of Great Sandy Desert, c. 9 km ESE of Gregory Range, *W. R. Barker 2041, 2042* (AD, BRI, CANB, DNA, HO, K, MEL, NSW, NT, PERTH.); Dog Leg Swamp, 35 km SE of Amax Campsite on Theda Station road, *K. F. Kenneally 6728* (AD, CANB, K, PERTH). N.T.: c. 25 km SE of Nourlangie Safari Camp, *M. Lazarides 7889* (AD, BRI, MEL, NSW). Qld: Portland Roads, Cape York Peninsula, *L. J. Brass 19003* (BRI, CANB, K).

A polymorphic species. Typical specimens are slender. In the arid zone there is a robust variant distinguished by sometimes pubescent cocci and relatively short sepals. Two other variants occur in the tropics, one distinguished by reduced leaves, another by small globular cocci.

### 12. *Stackhousia megaloptera* F. Muell., *Fragm.* 8: 35 (1873)

T: MacDonnell Range, N.T., *E. Giles*; holo: MEL.

Illustrations: J. Mattfeld, *Nat. Pflanzenfam.* 2nd edn, 20b: fig. 77G–J (1942); W. R. Barker, *Fl. Centr. Austral.* fig. 234G (1981).

Spreading, glabrous to puberulent perennial to 50 cm high, sometimes higher. Stems many, intertwined, much-branched above. Leaves linear to narrowly obovate, to 45 mm long. Inflorescence lax, cylindrical; flowers in many-bracted clusters of 3–6, subsessile; bracts serrulate. Hypanthium 0.6–1.1 mm long. Sepals 1.2–2.1 mm long, erose-serrulate. Corolla yellow-green to yellow, often flushed with dark brown; tube 2.5–5.5 mm long; lobes 1.8–2.2 mm long, acute to obtuse. Gynoecium 3-partite. Cocci 5–10 mm long, glabrous, with 3 prominent semi-elliptic wings; basal cavity deep, circular.

A species with a disjunct range across arid regions of W.A., south-western N.T. and far western and south-eastern S.A.; frequently grows on sand dunes, less commonly in swales and on plains, rarely in fine sand on stony ground; occurs in woodland and shrubland, often among spinifex. Map 236.

W.A.: near Ponton Ck, W of Cundelee Mission, *A. S. George 5993* (AD, CANB, K, PERTH). N.T.: c. 7 km ESE of Ayers Rock on road to Curtin Springs, *W. R. Barker 2837* (AD, BRI, CANB, HO, MEL, NSW, NT, PERTH); Bloods Range, *P. K. Latz 4199* (CANB, NT). S.A.: N of Queensland Coach Road, between Overland Corner and Renmark, c. 15 km from Overland Corner, *B. Staker 14* (AD, CBG).

### 13. *Stackhousia pulvinaris* F. Muell., *Trans. Philos. Soc. Victoria* 1: 101 (1855)

*S. pulvinaris* var. *typica* Pamp. f. *genuina* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 914, 915 (1905), *nom. illeg.* T: On the highest summits of the Australian Alps, *F. Mueller*; holo: MEL.

*S. pulvinaris* var. *typica* f. *intermedia* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 915 (1905). T: SE Australia; no specific locality; *n.v.*

Illustrations: G. R. Cochrane *et al.*, *Fl. Pl. Victoria* fig. 511 (1968); A. B. Costin *et al.*, *Kosciusko Alpine Fl.* fig. 204 (1979).

Glabrous, mat-like perennial to 3 cm high and 20 cm diam., sometimes in groups to 3 m diam., with many short intricate branches. Leaves linear-obovate, obtuse, to 10 mm long. Flowers solitary, subsessile in uppermost leaf axil. Hypanthium 0.5–0.9 mm long. Sepals 0.7–1.2 mm long, entire, obtuse. Corolla white to yellow; tube 3.3–5.6 mm long; lobes 2.5–3.8 mm long, obtuse to broadly acute. Gynoecium 3-partite. Cocci 3, broadly obovoid, c. 2.5 mm long, rugose, glabrous; basal cavity small, shallow.

Occurs in the Australian Alps in N.S.W. and Vic., and in Tasmania; in alpine herbfields and subalpine grasslands, often in small depressions or associated with margins of bogs and swamps. Map 237.

N.S.W.: track from Charlottes Pass to Blue Lake, Kosciuszko National Park, *M. Evans 2802* (CANB, NSW); Lake Albina, Kosciuszko National Park, *J. Pickard & R. Coveny 2783* (MEL, NSW). Vic.: Howitt Plains, c. 50 m S of Howitt Hut, *W. R. Barker 1516* (AD, NT, PERTH); c. 300 m N of turnoff to Kellys Hut along track to Mt Nelse, Bogong High Plains, *W. R. Barker 1598* (AD, BRI). Tas.: Middlesex Plains, Dec. 1915, *L. Rodway* (HO, NSW).

## 2. TRIPTEROCOCCUS

*Tripterococcus* Endl., *Enum. Pl.* 17 (1837), from the Greek *tri-* (three-), *pteron* (wing), and *coccus* (seed), alluding to the cocci in this genus

Type: *T. brunonis* Endl.

Hypanthium cup-shaped. Petals free at base, fused in middle into tube, distally free and spreading. Stamens 3 long, 2 short, enclosed in corolla tube; filaments longer than glandless anthers; pollen reticulate. Ovary of 3 carpels; style terminal, lacking membranous cup; stigmatic lobes 3, spreading. Cocci 3, each with 3 wings with several prominent transverse veins, connected to central axis along inner margin by strips which split from the axis from the base upwards, the cocci then falling from the strips and left with a linear scar.

A genus of 2 species (1 undescribed) endemic in south-western W.A.

### 1. *Tripterococcus brunonis* Endl., *Enum. Pl.* 18 (1837)

*Stackhousia brunonis* (Endl.) Benth., *Fl. Austral.* 1: 409 (1863); *S. brunonis* var. *typica* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1152 (1905), *nom. illeg.*; *S. brunonis* f. *genuina* Pampan., loc. cit. (1905), *nom. illeg.*. T: Swan River, W.A., *C. Huegel s.n.*; syn: W (several sheets).

*T. junceus* Bunge, in J. G. C. Lehmann, *Pl. Preiss.* 1: 181 (1845). T: near Woodman Point, Fremantle, W.A., 18 Dec. 1838, *L. Preiss 1973*; syn: LE (photo AD), MEL, P, S, ?W.

*T. simplex* Bunge, in Lehmann, *Pl. Preiss.* 1: 181 (1845); *Stackhousia brunonis* f. *simplex* (Bunge) Pampan., *Bull. Herb. Boissier* ser. 2, 5: 1153 (1905). T: Darling Range, Perth, W.A., 8 Aug. 1839, *L. Preiss 1971*; syn: LE (photo AD), M, MEL, P, S, W.

*T. brachystigma* Schuch., *Linnaea* 26: 33 (1854). T: Swan River, W.A., *J. Drummond s.n.*; syn: B *n.v.*, isosyn: ?K, ?P, ?W; Vasse River, W.A., *G. Molloy s.n.*; syn: B *n.v.*, isosyn: ?P.

*Stackhousia brunonis* var. *annua* Pamp., *Bull. Herb. Boissier* ser. 2, 5: 1153 (1905). T: Abrolhos Is., W.A., *J. Gilbert 321*; holotype: FI (photo AD).

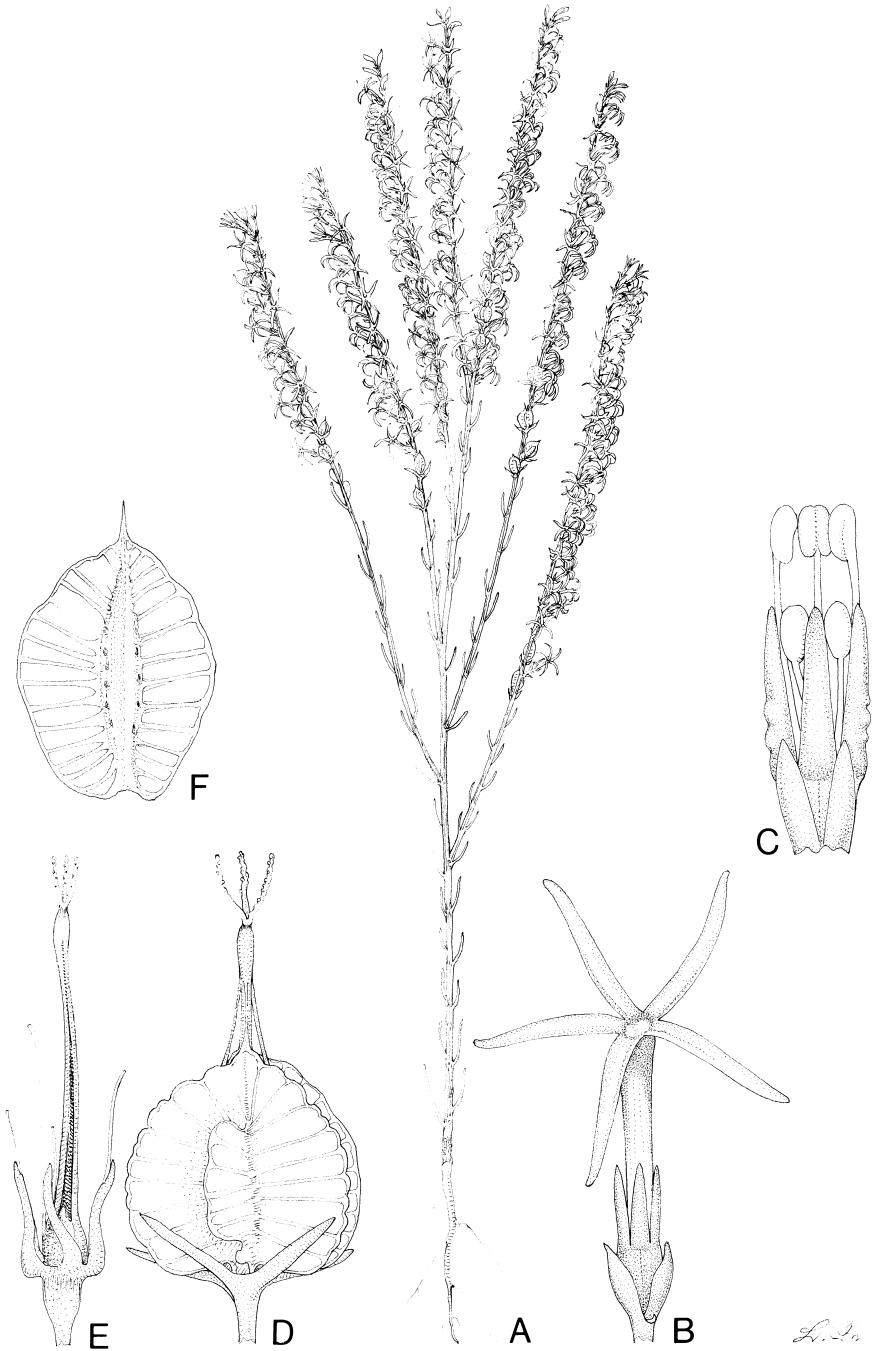
Illustrations: R. Erickson *et al.*, *Fl. Pl. W. Austral.* fig. 72 (1973); J. Mattfeld, *Nat. Pflanzenfam.* 2nd edn, 20b: figs 77 K–N, 78 K–L (1942); R. Pampanini, op. cit. 6: t. 13, fig. 4 (1906), as *Stackhousia brunonis*.

Glabrous perennial to 80 cm. Stems erect or ascending, branched above. Leaves narrowly linear to broadly ovate, sometimes scale-like, to 20 mm long. Inflorescence a one-sided spike; flowers arranged singly, tri-bracteate, subsessile to shortly pedicellate; bracts entire. Hypanthium 0.7–1.6 mm long. Sepals narrowly linear, 1.5–3 mm long, entire, acuminate, yellow-green or green to brown-black. Corolla yellow, green-yellow or brown-black; tube often broadly striped, curved, 5–8 mm long; lobes narrowly triangular, 2.5–7.5 mm long, acuminate. Gynoecium 3-partite. Cocci circular to broadly elliptic in outline, 4.3–7.5 mm long, with 2 broad lateral wings and a narrower shorter median wing. Fig. 52.

Widespread in south-western W.A., usually in sand, sometimes in loam, clay or stony soil, in heath and sclerophyllous forest and woodland; abundant after fire and in semi-disturbed sites. Map 238.

W.A.: c. 23 km NNW of Eneabba, *W. R. Barker 2256* (AD, CANB, FI, PERTH, W); c. 7.5 km N of Gibson, *W. R. Barker 2577* (AD, CBG, HO, K, MEL, NSW, NT, PERTH, SYD); c. 40 km ENE of Lake King on road to Norseman via Daniell Siding, *L. Haegi 977* (AD, NSW); 5 km E of Kendenup, *H. U. Stauffer 5363* & *R. D. Royce* (AD, BRI, CANB, MEL, NSW, PERTH, UC).

A rare unnamed species occurs near Walpole, Margaret River and Perth. It differs from *T. brunonis* in its paniculate inflorescence, long pedicels, flowers often subtended by single bracts, and often short broad obtuse corolla-lobes.



**Figure 52.** *Tripterococcus brunonis*. **A**, plant  $\times 0.4$ ; **B**, flower  $\times 5$ ; **C**, flower with corolla removed  $\times 7$ ; **D**, fruit  $\times 5$  (**A–D**, W. Barker 2577, AD); **E**, gynoecial column after shedding cocci  $\times 7$ ; **F**, coccus, adaxial view  $\times 8$  (**E–F**, W. Barker 2182, AD).

**3. MACGREGORIA**

*Macgregoria* F. Muell., *Fragm.* 8: 160 (1874), after J. Macgregor, a Victorian politician of Mueller's day in recognition of his support of the sciences

Type: *M. racemigera* F. Muell.

Hypanthium shallow. Petals free, clawed. Stamens equal; anthers tipped by a white gland; filaments much shorter than anthers; pollen minutely scabrous. Ovary of 5 carpels; style surrounded by membranous cup at base; stigmatic lobes 5, spreading. Cocci 5, without wings, connected to central axis by a small attachment leaving a scar on coccus after shedding; style inserted between mature cocci.

A monotypic genus restricted to arid Australia. Has been proposed as a subfamily but not validly published, *vide* J. Mattfeld, *Nat. Pflanzenfam.* 2nd edn 20b: 249 (1942).

***Macgregoria racemigera*** F. Muell., *Fragm.* 8: 161 (1874)

T: MacDonnell Range, N.T., *E. Giles*; holo: MEL.

Erect to procumbent, glabrous annual to 15 cm high. Leaves narrowly linear, 5–15 mm long. Inflorescence a raceme; flowers white with pink throat, arranged singly, subtended by bract at base of slender pedicel 3–8 mm long. Hypanthium much shorter than narrowly triangular sepals, together 1.5–2.5 mm long. Petals narrowly spatulate, 5–10 mm long. Cocci obovoid, 0.7–0.8 mm long, densely papillose, covered by hooked hairs. Figs 48, 53.

Occurs widely across arid Australia but not recorded from northern S.A., grows in sand or clay or sometimes gravelly soil, on ridges and plains, sometimes in depressions, in hummock grassland and woodland. Map 239.

W.A.: 2 km E of Gahnda Rockhole, 102 km WSW of Warburton, *R. J. Chinnock* 639 (AD, HO, PERTH). N.T.: 9.3 km N of Georgina Downs homestead, *G. Chippendale & L. Johnson* 3802 (BRI, CANB, NT, PERTH); 21 km N of Mt Wedge Stn, *M. Lazarides* 6092 (AD, CANB, MEL, PERTH). Qld: Currawilla, 160 km W of Windorah, *S. L. Everist* 3959 (BRI, CANB). N.S.W.: Clifton Downs, Yantabulla, Cuttaburra Creek channels, *R. D. B. Whalley* (NSW).

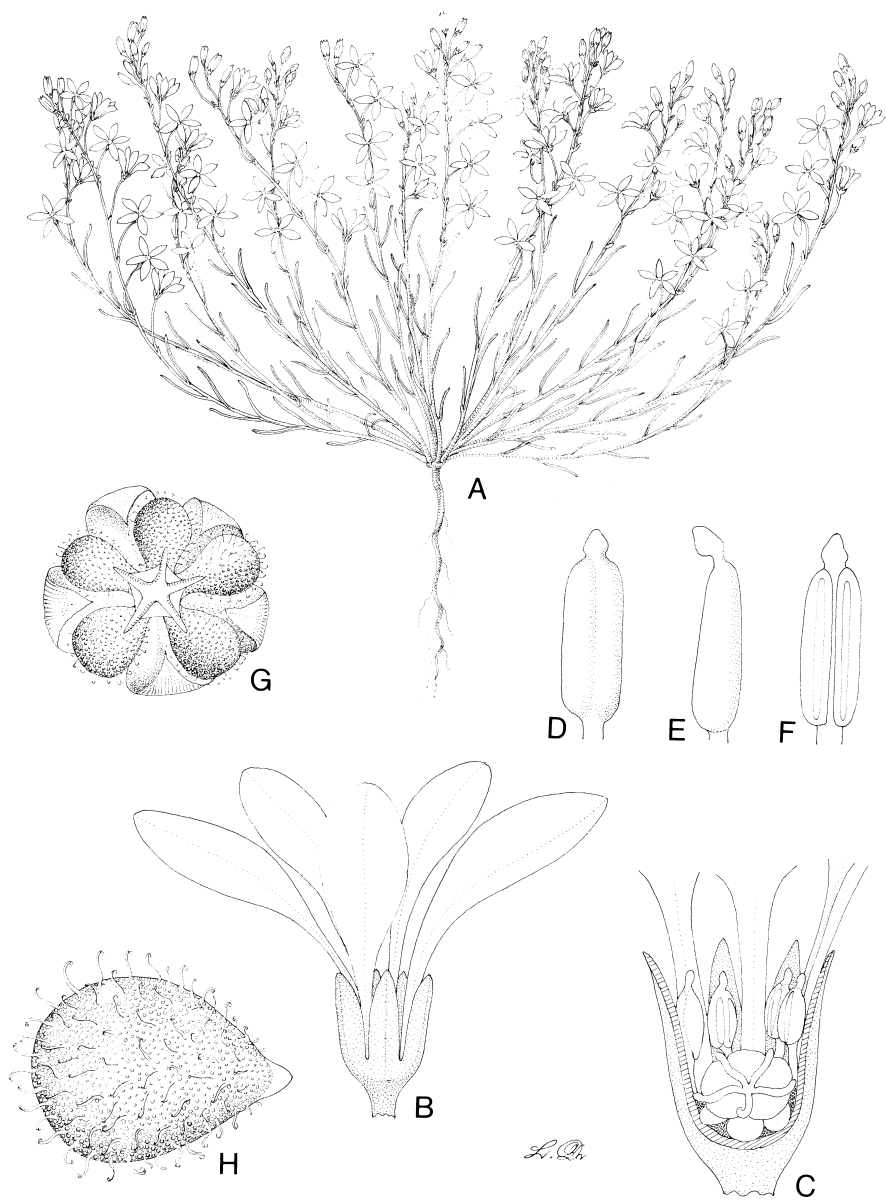
**AQUIFOLIACEAE**

*L. Pedley*

Shrubs or trees, usually dioecious. Leaves alternate, opposite or in pseudowhorls, simple; stipules small or absent. Flowers in axillary racemes or panicles of cymes, or in terminal and subterminal racemes, or rarely solitary. Flowers small, actinomorphic, hypogynous, generally unisexual, 4–6 (occasionally 7–8)-merous. Sepals free or cohering at base, imbricate. Petals free or united, imbricate or valvate or absent. Stamens usually as many as and alternate with petals, sometimes epipetalous, or up to 12, reduced to staminodes in female flower; anthers opening by longitudinal slits, introrse. Disc absent. Ovary 2- or 4–8 (rarely to 24)-locular, with 1, rarely 2, pendulous anatropous ovules per locule; style terminal, short; stigma lobed or capitate; ovary rudimentary in male flower. Fruit a drupe with as many pyrenes as carpels, or fewer. Seeds with a small straight embryo; endosperm copious, oily.

A family of 4 genera with c. 400 species throughout the tropics and subtropics, best represented in South America and eastern Asia; 2 genera and 4 species in Australia.

G. Bentham, Illicineae, *Fl. Austral.* 1: 396–397 (1863); L. E. T. Loesener, *Monographia Aquifoliacearum*, Part 1 (1901), Part 2 (1908); L. E. T. Loesener, Aquifoliaceae, *Nat.*



**Figure 53.** *Macgregoria racemigera*. **A**, flowering plant  $\times 0.5$  (R. Chinnock 890, AD); **B**, flower  $\times 7$  (R. Chinnock 639, AD); **C**, lower part of flower with one side removed,  $\times 10$ ; **D–F**, anthers  $\times 11$  (**C–F**, R. Kuchel 165, AD); **G**, fruit from above  $\times 10$ ; **H**, coccus  $\times 30$  (**G–H**, P. Latz 5788, AD).



*Pflanzenfam.* 2nd edn, 20b: 36–86 (1942); P. Baas, Vegetative anatomy and the affinities of Aquifoliaceae, *Sphenostemon*, *Phelline* and *Oncotheca*, *Blumea* 22: 311–407 (1975).

### KEY TO GENERA

Flowers in axillary cymose inflorescences, rarely solitary; sepals connate at base; staminal filaments subulate

**1. ILEX**

Flowers in terminal and subterminal racemes; sepals free at base; stamens subsessile or filaments short, thick

**2. SPHENOSTEMON**

### 1. ILEX

*Ilex* L., *Sp. Pl.* 1: 125 (1753), *Gen. Pl.* 5th edn, 60 (1754), from the Latin *ilex*, old name for the oak tree *Quercus ilex* L

Type: *I. aquifolium* L.

*Byronia* Endl., *Gen. Pl.* 1093 (1840). T: *Byronia anomala* (Hook. & Arn.) A. Heller

Leaves alternate, rarely opposite or in pseudowhorls, entire or dentate, petiolate, stipulate. Flowers usually pedicellate, in cymes or cymose fascicles or rarely solitary in axils. Sepals small, connate at base. Petals elliptic or oblong, free or united at base. Stamens epipetalous; filaments subulate; stamens reduced to staminodes in female flower, but not seen in Australian material. Ovary sessile, rudimentary in male flower; style usually absent. Pyrenes 1-seeded, smooth, ribbed or striate.

A genus of c. 400 species mostly in tropics and subtropics, especially South America and eastern Asia; 2 native and 1 naturalised species in Australia.

G. Bentham, *Fl. Austral.* 1: 396–397 (1863); S. Y. Hu, The genus *Ilex* in China, *J. Arnold Arbor.* 30: 233–344, 348–387 (1949); *op. cit.* 31: 39–80, 214–240, 241–263 (1950).

**1** Leaves glossy above, often boldly spinose-dentate; fruit red

**1. I. aquifolium**

**1:** Leaves not glossy above, entire; fruit green-white

**2** Fruit spherical or depressed-globular, of 12–14 pyrenes

**2. I. arnhemensis**

**2:** Fruit ellipsoidal, of 6 pyrenes

**3. I. sp.**

#### **1. \*Ilex aquifolium** L., *Sp. Pl.* 1: 125 (1753)

T: Herb. Linnaeus no. 173.1; holo: LINN *n.v.*, BRI microfiche.

Illustrations: A. B. Graf, *Exotica* 3: 113 (1963); S. Ross-Craig, *Drawings Brit. Pl.* 6: t. 51 (1952).

Shrub or tree to 10 m, glabrous except short hairs on calyx and occasionally pedicel. Bark grey. Leaves ovate, elliptic or oblong, undulate and spinose-dentate, usually with 5–9 teeth, occasionally entire on old trees, coriaceous, dark green and glossy above, paler and dull beneath; lamina 3–10 cm long, 2.5–5 cm wide. Flowers in 3-flowered cymes forming many-flowered axillary fascicles, rarely female flowers solitary. Flowers 4- or rarely 5-merous. Sepals 1.5 mm long, free in upper half. Petals 2–5 mm long. Stamens half to as long as corolla; anthers 1 mm long. Drupe globose or ovoid, 7–10 mm long, 6–10 mm diam., of 4–5 pyrenes coarsely ribbed on back, red. *Holly*.

Native of Europe; cultivated in cooler parts of Australia; naturalised in the Adelaide Hills, S.A., and in the Blue Mountains, N.S.W. Map 240.

N.S.W.: Mt Wilson, *J. Thompson* 1929 (NSW).

**2. *Ilex arnhemensis*** (F. Muell.) Loes., *Monogr. Aquifol.* 1: 68 (1901)

*Byronia arnhemensis* F. Muell., *Fragm.* 2: 119 (1861). T: valleys near Providence Hill, N.T., F. Mueller; MEL n.v.

Tree to 25 m, glabrous except sometimes short hairs on pedicels. Bark grey. Leaves oblong, elliptic or obovate, obtuse or obtusely acuminate, entire, discolorous, dull above, attenuate or rounded at base; lamina 7.5–13.5 cm long, 2.5–5.5 cm wide; petiole 10–15 mm long. Cymes umbelliform, 3–9-flowered; male cymes several on an axillary rachis to 30 mm long; female cymes single on axillary peduncles 8–12 mm long. Flowers 6–8-merous. Sepals 1.5 mm long, free in upper half. Petals 3–4 mm long. Stamens as long as petals; anthers less than 1 mm long. Drupe depressed-globular or spherical, 4–5 mm diam., of 12–16 smooth lenticular pyrenes, green-white.

Occurs in coastal districts from NW Kimberley, W.A., to NE Qld, and in S New Guinea. There are 2 subspecies.

Fruit depressed-globular with a small apical umbo

**2a. subsp. arnhemensis**

Fruit spherical with a prominent apical umbo

**2b. subsp. ferdinandi**

**2a. *Ilex arnhemensis*** (F. Muell.) Loes. subsp. **arnhemensis**

Flowers 6–8-merous. Fruit depressed-globular with a rather small umbo at stylar end, the remnant of the stigma; petals tending to persist beneath fruit.

Along streams in sandstone from NW Kimberley, W.A., to western Arnhem Land, N.T. Map 241.

W.A.: Thompsons Spring, near Kununurra, R. A. Perry 2951 (BRI). N.T.: near Mt Finnis, S. T. Blake 16740 (BRI); Edith Falls, J. Must 1656 (BRI).

**2b. *Ilex arnhemensis*** subsp. **ferdinandi** (Harms) Pedley, *Fl. Australia* 22: 223 (1984)

*I. peduncularis* F. Muell., *Fragm.* 7: 105 (1870), *nom. illeg.*, non Reissek (1861); *Ilex ferdinandi* Harms, *Nat. Pflanzenfam.* 2nd edn, 20b: 404 (1942). T: Rockingham Bay, Qld, J. Dallachy; iso: BRI.

*I. brassii* Merr. & L. M. Perry, *J. Arnold Arbor.* 20: 334 (1939). T: Gaima, Lower Fly River, Papua New Guinea, Nov. 1936, L. J. Brass 8291; holo: A n.v., *fide* E. D. Merrill & L. M. Perry, *J. Arnold Arbor.* 20: 334 (1939); iso: BRI.

Flowers 6-merous. Fruit spherical, prominently umbonate with remnant of stigma; petals not persistent beneath fruit.

Grows in rainforest understorey in NE Qld and S New Guinea. Map 242.

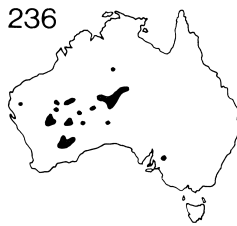
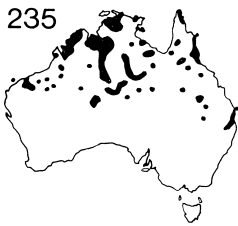
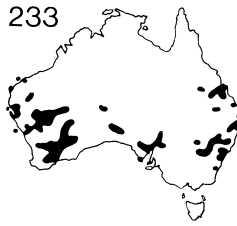
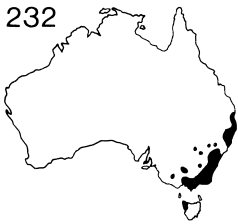
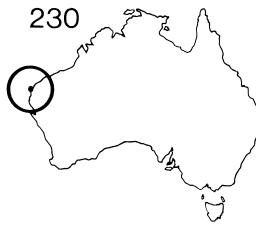
Qld: Upper Parrot Creek, Annan River, L. J. Brass 20237 (BRI); Range Road, Atherton Tableland, S. F. Kajewski 1301 (BRI); Cucania, near Babinda, L. S. Smith 5344 (BRI).

**3. *Ilex* sp.**

Small tree, glabrous except sparse short curved hairs on branchlets, peduncles and pedicels, otherwise vegetatively similar to *Ilex arnhemensis*. Flowers not seen. Fruits in subsessile fascicles of 6, ellipsoidal, 6 mm long, 3 mm diam., not prominently umbonate; pyrenes 6, grooved on back.

Occurs in rainforest understorey in NE Qld. Map 243.

Qld: Mission Beach, near Tully, B. P. M. Hyland 767 & 1150 (BRI); Gadgarra, near Atherton, B. P. M. Hyland 2011 (BRI).



226. *Stackhousia annua*  
 229. *Stackhousia scoparia*  
 232. *Stackhousia viminea*  
 235. *Stackhousia intermedia*  
 238. *Tripterococcus brunonis*

227. *Stackhousia dielsii*  
 230. *Stackhousia umbellata*  
 233. *Stackhousia muricata*  
 236. *Stackhousia megaloptera*  
 239. *Macgregoria racemigera*

228. *Stackhousia spathulata*  
 231. *Stackhousia nuda*  
 234. *Stackhousia clementii*  
 237. *Stackhousia pulvinaris*  
 240. *Ilex aquifolium*

**2. SPHENOSTEMON**

*Sphenostemon* Baill., *Bull. Mens. Soc. Linn. Paris* 7: 53 (1875), from the Greek *sphen* (a wedge), and *stemon* (a stamen), referring to the shape of the stamens

T: not designated.

Leaves in pseudowhorls, opposite or (not in Australia) alternate, glandular-dentate, pinnately veined, exstipulate. Flowers in few-flowered terminal and subterminal racemes. Sepals 4–8, free. Petals absent or (not in Australia) sometimes 4–8. Stamens 6–10; filaments free, short or almost absent, thick, flattened; anthers with broad petaloid connective sometimes produced beyond locules. Ovary sessile, grooved, 2-locular; stigma large, sessile. Drupe with thick endocarp, usually 1-seeded.

A genus of c. 7 species in New Caledonia and New Guinea with 1 species in Australia. Sometimes included in the Trimeniaceae or the monogeneric Sphenostemonaceae.

C. G. G. J. van Steenis, Some notes on the flora of New Caledonia and the reduction of *Nouhuysia* to *Sphenostemon*, *Svensk Bot. Tidskr.* 49: 19–23 (1955); L. S. Smith, New species of and notes on Queensland plants — II, *Proc. Roy. Soc. Queensland* 68: 43–50 (1957); L. Benardi, La position systématique du genre *Sphenostemon* Baill. sensu van Steenis, *Candollea* 19: 199–205 (1964); J. Hutchinson, *Gen. Fl. Pl.* 1: 124 (1964).

**1. *Sphenostemon lobosporus*** (F. Muell.) L. S. Smith, *Proc. Roy. Soc. Queensland* 68: 43 (1957)

*Phlebocalymna lobospora* F. Muell., *Fragm.* 9: 151 (1875). T: Rockingham Bay, Qld, *J. Dallachy*; ?MEL *n.v.*

Tree to 25 m. Leaves opposite or in pseudowhorls, oblong or obovate, obtuse or obtusely acuminate; lamina 8–16 cm long, 2.5–4 cm wide, discolorous; petiole 8–20 mm long. Racemes c. 3 cm long. Sepals 4, oblong, obtuse, 4–5 mm long. Petals absent. Stamens 6 in male flowers, slightly longer than sepals, subsessile. Fruit ellipsoidal, sometimes apiculate, 15 mm long, 8–10 mm diam., black; mesocarp thin; endocarp thick and woody. *Feather Beech*.

Occurs in NE Qld in rainforest at altitudes of 600–1200 m. Map 244.

Qld: Gadgarra, near Atherton, *S. F. Kajewski 1081* (BRI); Tinaroo Creek road near Mareeba, *A. N. Rodd 269* (BRI); Dalrymple Heights, W of Mackay, *L. S. Smith & L. J. Webb 4721* (BRI).

**ICACINACEAE**

*G. P. Guymer*

Trees, shrubs or rarely (not in Australia) woody vines, bisexual, polygamous or dioecious. Leaves alternate, occasionally distichous on lateral branches, rarely (not in Australia) opposite, simple, entire, lobed or serrate, exstipulate; domatia present or absent. Inflorescence terminal, axillary, leaf-opposed or supra-axillary; cymose, paniculate or thyrsoid, rarely (not in Australia) in fascicles or flowers solitary, bracteate. Flowers actinomorphic, 5-merous, sometimes 3-, 4-, or 6-merous. Sepals mostly connate into a tube with imbricate or rarely valvate lobes, rarely (not in Australia) free, generally persistent. Petals free or connate, valvate or subimbricate, inflexed at apex. Stamens as many as petals and alternate with them, hypogynous, free or epipetalous; anthers bilocular, latrorse or introrse by longitudinal slits, rarely (not in Australia) apically dehiscent, dorsifixed or subbasifixed. Disc absent or (not in Australia) present, annular or cupular. Ovary superior, 1-locular, rarely (not in Australia) 2- or 3-locular, occasionally

with a fleshy lateral appendage; ovules 2 (rarely 3) per locule on apical placentas, anatropous or apotropous; style 1 or 2, or absent; stigma capitate or discoid, entire or 2–5-lobed. Fruit a 1-seeded drupe or drupaceous, rarely (not in Australia) samaroid. Seeds exarillate, generally with abundant endosperm; embryo straight or curved.

A family of about 56 genera and over 400 species, widely distributed in the tropics. Represented in Australia by 6 genera and 7 species of which 1 genus and 4 species are endemic.

J. Miers, Observations on the affinities of the Icacinaceae, *Ann. Mag. Nat. Hist.*, ser. 2, 9: 218–226 (1852) and *Contrib. Bot.* 1: 48–56 (1862); G. Bentham, Icachineae, *Gen. Pl.* 1: 350–355 (1862); G. Bentham, Olacineae Trib. Icachineae, *Fl. Austral.* 1: 395–396 (1863); R. A. Howard, Studies of the Icacinaceae 1, *J. Arnold Arbor.* 21: 461–489 (1940); H. Sleumer, Icacinaceae, *Nat. Pflanzenfam.*, 2nd edn, 20b: 322–396 (1942); H. Sleumer, Materials towards the knowledge of the Icacinaceae of Asia, Malesia, and adjacent areas, *Blumea* 17: 181–264 (1969); H. Sleumer, Icacinaceae, *Fl. Males.* ser. 1, 7: 1–87 (1972).

### KEY TO GENERA

- 1 Ovary and fruit without a fleshy lateral appendage
  - 2 Petals free; style present; domatia present
    - 3 Inflorescence a corymbose panicle; filaments reflexed at middle; anthers versatile; ovule 1 per locule; domatia pit-like **1. PENNANTIA**
    - 3: Inflorescence thyrsoid; filaments not reflexed; anthers not versatile; ovules 2 per locule; domatia pocket-like **2. CITRONELLA**
  - 2: Petals united; style obsolete; domatia absent
    - 4 Flowers in spikes; ovary strigose; drupe laterally compressed; endocarp coarsely reticulate **4. RYTICARYUM**
    - 4: Flowers in cymes; ovary glabrous; drupe ellipsoidal; endocarp longitudinally ridged **3. GOMPHANDRA**
- 1: Ovary and fruit with a fleshy lateral appendage; domatia absent
  - 5 Filaments villous above middle, flattened; style obsolete; drupe ovate or elliptic, 21–25 mm long; appendage ovoid, 28–35 mm long **6. IRVINGBAILEYA**
  - 5: Filaments glabrous, subulate; style slender, persistent; drupe obovate, 12–15 mm long; appendage globular, c. 5 mm long **5. APODYTES**

### 1. PENNANTIA

*Pennantia* Forster. & G. Forster, *Char. Gen. Pl.* 133 (1776), after Thomas Pennant (1726–1798), British zoologist and antiquary

Type: *P. corymbosa* Forster & G. Forster

Trees, dioecious, androdioecious or bisexual. Leaves alternate, entire or toothed; domatia present. Flowers bisexual or functionally unisexual, in terminal or axillary corymbose panicles, glabrous; pedicels articulate at apex. Calyx rudimentary, annular or shallowly 5-lobed or toothed. Corolla of 5 free petals, valvate in bud. Stamens 5; filaments free, slender; anthers versatile. Ovary 1-locular, with 1 pendulous ovule; style short or obsolete; stigma 3-lobed. Fruit a 1-seeded drupe.

A genus of 3 species in E Australia, Norfolk Is. and New Zealand; 1 species endemic in E Australia.

S. Reissek, Monographische Erläuterung der Gattung Pennantia, *Linnaea* 16: 339–346, t. 12 & 13 (1842); J. Miers, On some genera of the Icacinaceae, *Ann. Mag. Nat. Hist. ser.* 2, 9: 485–492 (1852).

### 1. *Pennantia cunninghamii* Miers, *Ann. Mag. Nat. Hist. ser.* 2, 9: 491 (1852)

T: County of Camden, Illawarra, N.S.W., *McArthur*; syn: *n.v.*; Five Island District, N.S.W., *A. Cunningham*; syn: *n.v.*

Illustration: J. Miers, *Contrib. Bot.* 1, t. 12 (1862).

Androdioecious tree to 30 m; branchlets glabrous. Leaves elliptic or oblong-ovate, shortly acuminate, acute or rarely obtuse, entire, remotely denticulate in juveniles, coriaceous, glabrous; lamina 10–16 cm long, 5–8 cm wide; base cuneate or decurrent; secondary veins 5–8 pairs; domatia prominent, mostly in forks of secondary veins; petiole 1–2 cm long. Inflorescence 5–12 cm long; rachis sparsely puberulent; pedicels 0.5–1.5 mm long. Petals elliptic, 3–4 mm long, 3-veined, white. Staminal filaments reflexed about middle, c. 4 mm long. Male flowers: ovary rudimentary with sometimes an imperfect ovule. Bisexual flowers: ovary 2–2.5 mm long, glabrous; style c. 0.5 mm long; stigma deeply 3-lobed. Drupe ellipsoidal, 10–16 mm long, 7–9 mm diam., black. *Brown Beech*. Fig. 54A.

Found in notophyll vine forest from the Atherton Tableland, Qld, to Milton, N.S.W. Map 245.

Qld: Forestry Reserve 99, SW of Atherton, *S. J. Dansie 2003* (♂) (BRI); Mt Cordeaux, Cunninghams Gap National Park, *G. P. Guymer 1657* (♂) (AK, BRI, CANB, MEL, NE, NSW). N.S.W.: S Brother, Johns R., Nov. 1915, *J. L. Boorman* (♂) (BRI, NSW); Whispering Gallery, 5 km SE of Albion Park, *R. Coveny 9742* (♀) (NSW); Kiernans Ck, c. 32.5 km SW of Murrurundi, *J. Pickard & R. Coveny 1236* (♀) (BRI, NSW).

## 2. CITRONELLA

*Citronella* D. Don, *Edinburgh New Philos. J.* 13: 243 (1832), derived from a Chilean vernacular name for a species of the genus

Type: *C. mucronata* (Ruiz Lopez & Pavon.) D. Don

*Villaresia* Ruiz Lopez & Pavon, *Fl. Peruv. Chil.* 3: 9, t. 231 (1802), *non* Ruiz Lopez & Pavon (1794). T: *V. mucronata* Ruiz Lopez & Pavon

*Pleuropetalon* Blume, *Mus. Bot. Lugd.-Bat.* 1: 248 (1850), *non* J. D. Hook. (1846). T: *P. suaveolens* Blume.

*Chariessa* Miq., *Fl. Ind. Bat.* 1(1): 794 (1856). T: *C. suaveolens* (Blume) Miq.

Trees or (not in Australia) shrubs, bisexual, polygamous or dioecious. Leaves alternate, entire or (not in Australia) spinose-dentate. Inflorescence leaf-opposed, supra-axillary, axillary or (not in Australia) terminal, thyrroid; secondary branches cymose with 2–12 sessile flowers clustered on common peduncles. Calyx cupular, 5-lobed; lobes imbricate. Petals 5, free, valvate or slightly imbricate in bud; mid-vein keeled inside. Stamens 5, free; filaments subulate; anthers latrorse to introrse, dorsifixed, glabrous. Ovary ovoid, 1-locular, rarely 2-locular; ovules 2 or 3 per locule. Style 1, rarely 2, slender; stigma capitate, bilobed. Fruit a 1-seeded drupe; endocarp woody. Seed with a longitudinal groove formed by an intrusion of the endocarp wall.

A genus of 20 species, 10 in tropical Central and South America, and 10 throughout Malesia, Solomon Is., New Caledonia, Australia, Loyalty Is., Vanuatu, Fiji, Samoa and Tonga Is. 2 endemic species in Australia.

R. A. Howard, A revision of the genus *Citronella* D. Don, *Contr. Gray Herb.* 142: 60–89 (1942).

Leaves glabrous; young growth and buds appressed-puberulent; ovary strigose; drupe globose, 18–24 mm long

1. *C. moorei*

Leaves pubescent below; branchlets pubescent with erect hairs; ovary glabrous or with a few hairs; drupe ellipsoidal, 12–16 mm long

2. *C. smythii*

**1. *Citronella moorei*** (F. Muell. ex Benth.) R. Howard, *J. Arnold Arbor.* 21: 472 (1940)

*Villaresia moorei* F. Muell. ex Benth., *Fl. Austral.* 1: 396 (1863); *Chariessa moorei* (F. Muell. ex Benth.) Engl., *Nat. Pflanzenfam.* 3(5): 245 (1893) T: Clarence R., N.S.W., *C. Moore*; holo: MEL.

Diocious tree to 40 m; trunk fluted; bark fissured, corky, cream. Branchlets appressed-puberulent with pale brown hairs, glabrescent. Leaves ovate, ovate-lanceolate or rarely lanceolate, acuminate; lamina mostly 7–13 cm long and 3.5–6.5 cm wide, glabrous; base attenuate; secondary veins 5–7 pairs; pocket domatia present; petiole 5–15 mm long. Inflorescence 6–16 cm long; rachis appressed-puberulent. Calyx sparsely puberulent, 1.4–2 mm long; lobes shallowly triangular, c. 0.4 mm long. Petals ovate-lanceolate, 4.5–5 mm long, glabrous. Male flowers: filaments 4–4.5 mm long; rudimentary ovary strigose; style and stigma absent. Female flowers: filaments 3–3.5 mm long, the anthers indehiscent; ovary strigose; style 1.5–2 mm long, glabrous. Drupe globose, 18–24 mm long, c. 20 mm diam.; exocarp thin, black; mesocarp 1.5 mm thick. Fig. 54B–C.

Occurs in notophyll or mesophyll vine forest from Windsor Tableland, N Qld, to the Clyde R., N.S.W., usually below 900 m. Map 246.

Qld: Bunya Mtns, *F. M. Bailey 74E* (♀) (BRI); State Forest Reserve 756, Maple Logging Area, between Tully R. and South Johnston R., *A. W. Dockrill 32* (♂) (BRI, QRS); Bryces Rd, Mt Glorious, c. 45 km NW of Brisbane, *G. P. Guymer 1766* (♂) (BRI, CANB, K, L, NOU, NSW, QRS); Gadgarra Reserve, Atherton Tableland, *S. F. Kajewski 1125* (♀) (BRI). N.S.W.: Whian Whian State Forest, *V. K. Moriarty 705* (♂) (BRI).

**2. *Citronella smythii*** (F. Muell.) R. Howard, *J. Arnold Arbor.* 21: 475 (1940)

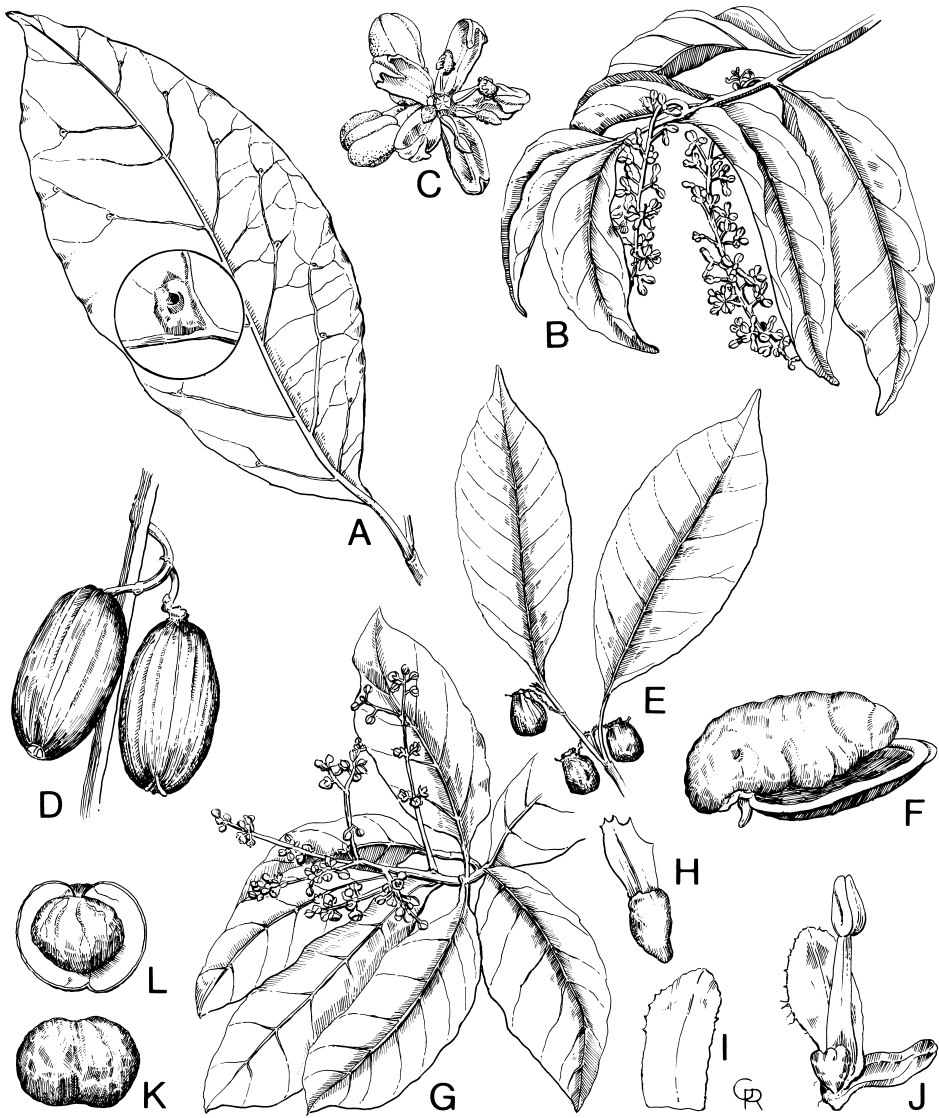
*Villaresia smythii* F. Muell., *Fragm.* 5: 156 (1866); *Chariessa smythii* (F. Muell.) Becc., *Malesia* 1: 118 (1877). T: Dalrymple Gap, Qld, Oct. 1846, *J. Dallachy s.n.*; holo: MEL, iso: BRI.

*Villaresia adenophylla* Domin, *Biblioth. Bot.* 89: 50 (1921). T: Harveys Creek, Qld, Jan. 1910, *K. Domin*; holo: PR.

Tree 8–25 m tall; trunk fluted; bark fissured, corky. Branchlets pubescent with rusty brown simple hairs. Leaves elliptic, ovate or ovate-lanceolate, acuminate, softly pubescent below, glabrescent above; lamina mostly 11–17 cm long and 4–8.5 cm wide; base cuneate; secondary veins 4–6 pairs; pocket domatia present; petiole 7–15 mm long, pubescent. Inflorescence 3.5–10 cm long; rachis pubescent. Flowers bisexual. Calyx sparsely pubescent, 1.2–1.8 mm long; lobes shallowly triangular, c. 0.5 mm long. Petals lanceolate, 2.8–4.5 mm long. Ovary glabrous or with a few hairs. Drupe ellipsoidal, 12–16 mm long, 9–12 mm diam.; exocarp thin, black; mesocarp c. 1 mm thick.

Occurs in mesophyll or notophyll vine forests from Mt Carter to Mt Spec, Qld, usually below 800 m. Map 247.

Qld: State Forest Reserve 185, NE of Tinaroo Falls, *B. Gray 289* (BRI, QRS); Timber Reserve 1230, NE of Topaz, *B. P. M. Hyland 9166* (BRI, QRS); Daintree R., *S. F. Kajewski 1408* (BRI); Windin Logging Area, NE of Butchers Ck, *L. S. Smith 10420* (BRI); Davies Ck, *L. J. Webb & J. G. Tracey 5576* (BRI).



**Figure 54.** A, *Pennantia cunninghamii*, leaf  $\times 0.5$ , domatia (inset)  $\times 3$  (G. Guymer 1657, BRI). B–C, *Citronella moorei*. B, male flowering branchlet  $\times 0.5$ ; C, male flower  $\times 3$  (B–C, G. Guymer 1766, BRI). D, *Gomphandra australiana*, fruit  $\times 1$  (B. Hyland 2510, BRI). E, *Apodytes brachystylis*, fruiting branchlet  $\times 0.5$  (L. Smith 4954, BRI). F, *Irvingbaileya australis*, fruit  $\times 1$  (B. Hyland 11106, BRI). G, *Corynocarpus rupestris* subsp. *rupestris*, flowering branchlet  $\times 0.5$  (G. Guymer 1324, BRI). H–J, *Corynocarpus rupestris* subsp. *arborescens*. H, staminode and nectary  $\times 6$ ; I, petal  $\times 6$ ; J, stamen, petal and sepal  $\times 6$  (H–J, G. Guymer 1788, BRI). K–L, *Corynocarpus cribbianus*. K, fruit  $\times 0.25$ ; L, fruit with half mesocarp removed  $\times 0.25$  (K–L, B. Gray 1877, BRI).



**3. GOMPHANDRA**

*Gomphandra* Wallich ex Lindley, *Nat. Syst.* 2nd edn, 439 (1836), from the Greek *gomphos* (nail or peg), and *andros* (man or male), referring to the shape of the anthers

Type: *G. tetrandra* (Wallich) Sleumer

Diocious trees, rarely shrubs. Leaves alternate, occasionally distichous on lateral branches. Flowers functionally unisexual, in axillary, rarely leaf-opposed, cymes. Calyx cupular, shallowly 4- or 5-toothed. Petals 4 or 5, rarely to 7, valvate in bud, connate at base or united in a tube. Disc absent or obscure. Male flowers: stamens 4 or 5, rarely to 7, free; filaments flattened, hairy or papillose above, or glabrous; anthers latrorse to introrse, dorsifixed. Rudimentary ovary present. Female flowers: staminodes present or absent; filaments linear; anthers rudimentary. Ovary cylindrical; style obsolete; stigma discoid, 4- or 5-lobed. Fruit a 1-seeded drupe,  $\pm$ ellipsoidal, crowned by persistent stigma; endocarp crustaceous or woody, smooth or with 8–15 longitudinal ridges.

A genus of c. 33 species, in Australia, SE Asia, Malesia, Solomon and Santa Cruz Is.; 1 species in Australia.

***Gomphandra australiana* F. Muell., *Fragm.* 6: 3 (1867)**

*Stemonurus australianus* (F. Muell.) Kuntze, *Revis. Gen. Pl.* 1: 112 (1891). T: Gold Island, Qld, 1 Aug. 1865, *J. Dallachy s.n.*; syn: MEL; Dalrymple Gap, Qld, 26 June 1866, *J. Dallachy s.n.*; syn: MEL; Rockingham Bay, Qld, *J. Dallachy s.n.*; syn: MEL.

[*Gomphandra polymorpha auct. non* Wight; F. M. Bailey, *Queensland Dept. Agric. Bot. Bull.* 8: 71 (1893) & *Queensland Fl.* 1: 247 (1899)]

Tree 5–20 m tall. Branchlets appressed-puberulent with grey hairs, glabrescent. Leaves distichous on lateral branchlets, elliptic, ovate or ovate-lanceolate, shortly acuminate, rounded; lamina mostly 13–24 cm long and 5.5–9.5 cm wide; base cuneate or slightly decurrent; secondary veins 5–8 pairs; petiole 10–13 mm long, glabrescent. Cymes 2–3.5 cm long, appressed-puberulent with brown hairs. Calyx 1–1.5 mm long,  $\pm$ glabrous. Petals united into tube 2.5–3 mm long, glabrous; lobes deltoid, c. 1 mm long. Male flowers: stamens slightly exerted, glabrous; filaments 3–4.5 mm long; anthers c. 1 mm long; staminodes present; rudimentary ovary conical, c. 1 mm long, glabrous. Female flowers: ovary 1-locular with 2 ovules, c. 3 mm long, glabrous; stigma c. 2.5 mm diam. Drupe ellipsoidal, 2–2.5 cm long, 1.2–1.5 cm diam., salmon pink; exocarp thin; mesocarp 1–2 mm thick; endocarp thinly woody, with 12–15 longitudinal ridges, c. 0.4 mm thick. Fig. 54D.

Found in lowland mesophyll vine forests N from Herbert River, Qld; also in Papua New Guinea. Map 248.

Qld: Wasp Ck area, near Lockerbie, *B. P. M. Hyland 2510* (♀) (BRI); near Noah Head, Cape Tribulation, *B. P. M. Hyland 5967* (♂) (BRI, QRS); Cairns, 1897, *L. J. Nugent* (♀) (BRI); between Mossman and Daintree, *L. S. Smith 4653* (♀) (BRI); Timber Reserve 14, Rocky R. area, *G. C. Stocker 1044* (♀) (BRI, QRS).

**4. RYTICARYUM**

*Ryticaryum* Becc., *Malesia* 1: 120 (1877), from the Greek *rhytis* (wrinkle), and *karya* (walnut tree), alluding to the fruit

Type: *R. oleraceum* Becc.

Diocious shrubs, rarely small trees. Leaves alternate, entire. Flowers in axillary spikes, rarely in panicles or fascicles. Calyx cupular, shortly 4- or 5-lobed. Corolla 4- or 5-lobed to c. middle; lobes valvate. Male flowers: stamens 4 or 5, adnate to corolla-tube at base, glabrous; anthers introrse, dorsifixed. Female flowers: staminodes absent or rudimentary,

without anthers; ovary 1-locular with 2 ovules, strigose; style obsolete; stigma flattened. Drupe compressed laterally and almond-like when dried; exocarp red to orange; endocarp thinly woody, coarsely reticulate. Seed 1, with broad flat cotyledons.

A genus of 12 species, in Australia, Melanesia, Papua New Guinea and the Moluccas; 1 species in NE Australia.

**Ryticaryum longifolium** Schumann. & Lauterb., *Fl. Schutzgeb.* 415 (1900)

T: Ibeckippo, near Bonga, Papua New Guinea, *C. A. G. Lauterbach* 773; holo: B *n.v.*, iso: WRSL *n.v.*

Illustration: H. Sleumer, *Icacinaceae, Fl. Males.* 7: 40 (1971).

Sprawling shrub to 5 m; young growth and buds strigose with brown hairs. Leaves glabrous except scattered appressed simple hairs on midrib below; lamina oblanceolate or oblong-lanceolate, rarely obovate, shortly caudate, 8–18 cm long, 3–6 cm wide; base cuneate; secondary veins 7–10 pairs; petiole 5–10 mm long. Spikes compact, ♂ mostly 3–5 cm long, 1.5–2.5 cm long, rarely up to 11 cm; rachis densely strigose with brown hairs. Calyx cupular, shallowly 5-lobed, strigose, 0.5–0.8 mm long. Corolla sparsely to densely strigose outside, glabrous inside, 1.5–2 mm long. Male flowers: stamens 4 or 5; filaments c. 0.5 mm long; anthers 0.8–1.2 mm long; rudimentary ovary strigose. Female flowers: ovary ovoid-conical, densely strigose. Drupe ovoid-ellipsoidal, 2–2.5 cm long, c. 1.5 cm wide, 0.8–1.2 cm thick; mesocarp 2–3 mm thick; endocarp woody, c. 1 mm thick.

Occurs in semi-evergreen vine forest N from the McIlwraith Ra., Qld; also in Papua New Guinea and the Solomon Is. Map 249.

Qld: Middle Claudie R., *J. G. Tracey* 14906 (♀) (BRI, CANB, NSW, QRS); McIlwraith Ra., NE of Coen, *L. J. Webb & J. G. Tracey* 7970 (sterile) (BRI); Claudie R., Cape York Peninsula, *L. J. Webb & J. G. Tracey* 8316 (♂) (BRI); Iron Ra., *L. J. Webb & J. G. Tracey* 8339 (♀) (BRI); between Portland Roads & Iron Ra., *L. J. Webb & J. G. Tracey* 11497 (♀) (BRI).

## 5. APODYTES

*Apodytes* E.Meyer ex Arn., *Hook. J. Bot.* 3: 155 (1840), derived from the Greek *apodyein* (to strip, undress or divest), application uncertain

Type: *A. dimidiata* E.Mey. ex Arn.

Trees, bisexual. Leaves alternate, entire. Flowers in axillary or terminal panicles or corymbs. Calyx cupular, 5-lobed, rarely 4-lobed. Petals 5, rarely 4, free or slightly coherent at base, valvate. Stamens 5, free, c. as long as petals; filaments subulate, glabrous; anthers introrse, dorsifixed. Ovary oblique, with a fleshy lateral swelling; style ±eccentric, slender; stigma subcapitate, bilobed. Fruit drupaceous with a fleshy lateral appendage, obliquely obovate; style persistent, finally lateral to almost basal; endocarp crustaceous. Seed 1, compressed, ovate-reniform.

A genus of 3 species in Africa, SE Asia, New Caledonia and Australia; 1 species endemic in NE Australia.

**Apodytes brachystylis** F. Muell., *Fragm.* 9: 149 (1875)

T: Rockingham Bay, 1870, *J. Dallachy s.n.*; holo: MEL, iso: BRI.

Tree to 20 m tall. Branchlets with reddish-brown puberulent tips. Leaves ovate, elliptic or ovate-lanceolate, acuminate or caudate, glabrous, chartaceous; lamina mostly 8–15 cm long and 3–5 cm wide; base cuneate or slightly decurrent; secondary veins 5–8 pairs; petiole 8–10 mm long. Inflorescence axillary, paniculate, 8–20 mm long; rachis sparsely puberulent; pedicels articulate in middle, 1.5–3 mm long. Calyx glabrous, c. 1 mm long; lobes deltoid, c. 0.5 mm long. Petals oblong, 3–4.5 mm long, villous inside, glabrous outside. Filaments 2–3 mm long. Ovary 1-locular, ovoid, glabrous; ovules 2; style

recurved. Drupe veined when dried, 12–15 mm long, 4.5–6 mm thick, with a lateral globular fleshy appendage. Fig. 54E.

Occurs in mesophyll and notophyll vine forest from Cooktown to Mt Spec, Qld, usually below 800 m. Map 250.

Qld: Mt Fox, Oct.–Nov. 1949, *M. S. Clemens* (BRI); Bridle Ck, c. 20 km SE of Mareeba, *T. Hartley & B. P. M. Hyland 14150* (BRI); State Forest Reserve 194, SW of Atherton, *A. K. Irvine 1083* (BRI, NSW, QRS); Boonjje, Atherton Tableland, *S. F. Kajewski 1272* (BRI); Lacey's Ck, NE of Tully, *L. S. Smith 4954* (BRI).

## 6. IRVINGBAILEYA

*Irvingbaileya* R. Howard, *Brittonia* 5: 50 (1943), in honour of Irving W. Bailey (1884–1967), American botanist and anatomist at the Bussey Institution of Harvard University

Type: *I. australis* (C. White) R. Howard

Trees, dioecious. Leaves alternate, distichous on lateral branches, entire, glabrous. Inflorescence cymose, axillary or terminal. Calyx cupular, shallowly 5-lobed, glabrous. Petals 5, free, valvate in bud, glabrous. Male flowers: stamens 5, free; filaments flattened, villous above middle; anthers introrse, dorsifixed; gynoecium rudimentary. Female flowers: ovary with a fleshy lateral appendage at base, asymmetrical, glabrous; ovules 2; style obsolete; stigma capitate, shallowly 4- or 5-lobed. Fruit drupaceous with a thick fleshy lateral adnate appendage, flattened, elliptic or ovate, keeled; keel attached for most of its length to appendage. Seed 1.

Monotypic, endemic in NE Australia.

### *Irvingbaileya australis* (C. White) R. Howard, *Brittonia* 5: 52 (1943)

*Tylecarpus australis* C. White, *Queensland Dept. Agric. Bot. Bull.* 20: 12 (1918); *Medusanthera australis* (C. White) R. Howard, *J. Arnold Arbor.* 21: 469 (1940). T: Johnstone River, *T. L. Bancroft s.n.*; lecto: A n.v., fide R. Howard, *Brittonia* 5: 52 (1943); iso: BRI.

[*Apodytes brachystylis* auct. non F. Muell.: F. M. Bailey, *Queensland Fl.* 1: 248 (1899)]

Illustration: R. A. Howard, *Brittonia* 5: 48, fig. 1 (1943).

Tree to 20 m; young shoots puberulent with pale brown hairs. Leaves elliptic, narrowly elliptic, ovate or ovate-lanceolate, obtuse, thinly coriaceous; lamina mostly 9–15 cm long and 3–5 cm wide; base acutely cuneate or decurrent; secondary veins 5–8 pairs; petiole 10–16 mm long. Inflorescence 3–20-flowered, 1–3 cm long. Calyx c. 1 mm long. Sepals ovate, 1-veined, 4–5 mm long. Male flowers: staminal filaments 3.2–4.2 mm long; anthers 0.9–1 mm long. Female flowers: ovary flattened, curved; lateral appendage 2-lobed, 1–2 mm long. Fruit 21–25 mm long, c. 20 mm wide, smooth; appendage ovoid when fresh, 28–35 mm long, c. 15 mm diam., white. Fig. 54F.

Occurs in mesophyll and notophyll vine forest from Mt Finnegan (S of Cooktown) to the Johnstone River, Qld, usually below 800 m. Map 251.

Qld: Mt Bartle Frere, *S. T. Blake 9790* (♂) (BRI); Timber Reserve 1230, NE of Topaz, *B. P. M. Hyland 8918* (♂) (BRI, QRS); State Forest Reserve 700, SW of Gordonvale, *A. K. Irvine 1607* (♀) (BRI, NSW, QRS); Boonjje, Atherton Tableland, *Kajewski 1232* (♀) (BRI); State Forest Reserve 755, headwaters of Russell R., *G. C. Stocker 1537* (♀) (BRI, QRS).



**Figure 55.** *Cardiopteris moluccana*, fruiting branchlet  $\times 0.7$  (B. Gray 205, BRI).

## CARDIOPTERIDACEAE

*H. J. Hewson*

Twining climbers with latex. Leaves alternate, simple, entire or lobed, palmati-nerved, exstipulate. Inflorescence an axillary panicle of scorpioid cincinni; flowers small, bisexual, or bisexual and unisexual, ebracteate, subsessile. Sepals 5, rarely 4, united at base, persistent. Corolla funnel-shaped, caducous; lobes 5, rarely 4, imbricate in bud. Stamens 4 or 5, epipetalous on upper corolla tube, alternate with corolla lobes; anthers medifixed. Disc absent. Ovary superior, of 2 carpels, 1-locular, rudimentary in male flowers; styles 2, dissimilar; ovules 2, pendulous, often 1 aborted. Fruit dry, indehiscent, flat, 2-winged. Seed usually 1, with endosperm; embryo minute, conical.

Monogeneric family of south-eastern Asia through Malesia to Australia. There are two species, one of which is native in N Queensland.

H. Sleumer, *Nat. Pflanzenfam.* 2nd edn, 20b: 397–400 (1942) as Peripterygiaceae;  
H. Sleumer, *Fl. Males.* ser. I, 7: 93–96 (1976).

### CARDIOPTERIS

*Cardiopteris* Royle, *Ill. Bot. Himal. Mts* 136 (1834), from the Greek *kardia* (heart), and *pteron* (wing), in reference to the fruit

Type: not designated.

*Peripterygium* Hassk., *Tijdschr. Natuurl. Gesch. Physiol.* 10: 142 (1843). T: *P. quinquelobum* Hassk.

***Cardiopteris moluccana*** Blume, *Rumphia* 3: 207 (1847), 4: t. 177, figs 1B, 2A–B (1849)

*Cardiopteris lobata* var. *moluccana* (Blume) Masters., in J. D. Hooker, *Fl. Brit. India* 1: 597 (1875);  
*Peripterygium moluccanum* (Blume) Sleumer, *Notizbl. Bot. Gart. Berlin-Dahlem* 15: 257 (1940). T: not Australian; n.v.

[*Cardiopteris lobata* auct. non Benn. & R.Br.: F. M. Bailey, *Queensland Fl.* 1: 251 (1899)]

Illustration: H. Sleumer, *Fl. Males.* 7: 94, fig. 1 (1976).

Climber; stems twining, to 9 m long. Leaves ovate to cordate, sometimes hastate, acuminate; lamina to 24 cm long and 22 cm wide, entire, chartaceous; petiole 3–12 cm long. Inflorescence 3- or more-branched, many-flowered, glandular-puberulous to glabrous. Flowers small; calyx c. 2 mm long; corolla 2.5–3.5 mm long, white. Fruit cordate to obovate-elliptic, c. 3 cm long including persistent style; wings glossy, straw-coloured or yellow. Fig. 55.

Occurs in Malesia and, in Australia, in north Qld. Map 252.

Qld: Kuranda Ra., *B. Gray 205* (BRI); East Mulgrave, *B. Hyland 8904* (BRI); Johnson R., June 1917, *N. Michael* (BRI); Gap Ck, *L. S. Smith 11127* (BRI).

Description based partly on H. Sleumer, *Fl. Males.* ser. I, 7: 93–96 (1976).

# CORYNOCARPACEAE

G. P. Guymer

Trees or shrubs, bisexual. Leaves alternate, sometimes in pseudowhorls, simple, entire or occasionally spinose in juveniles, glabrous, coriaceous, petiolate, exstipulate; terminal shoots with caducous cataphylls leaving crescent-shaped scar just above leaf scar. Inflorescence terminal, paniculate, the ultimate branches simple cymes. Flowers actinomorphic, hypogynous, pedicellate, bracteate. Sepals and petals 5, free, imbricate. Stamens 5, opposite petals and adnate to them at base; anthers dorsifixed, bilocular, introrse by longitudinal slits; staminodes 5, alternate with stamens, petaloid, each with a basal depressed-globular nectary. Ovary superior, 1-locular; ovule 1 on apical placenta, anatropous; styles 1 or 2; stigma capitate. Fruit a drupe; seeds without endosperm; embryo straight.

A single genus *Corynocarpus* with c. 6 species, native to E Australia, New Guinea, New Caledonia, New Zealand and Vanuatu; 2 species in Australia, 1 endemic.

W. B. Hemsley, On the genus *Corynocarpus* Forst., with descriptions of two new species, *Ann. Bot.* 17: 743–760, t. 36 (1903); C. G. G. J. van Steenis, *Corynocarpaceae*, *Fl. Males.*, ser. 1, 4: 262–264 (1951); K. Krause, *Corynocarpaceae*, *Nat. Pflanzenfam.* 2nd edn, 20b: 22–35 (1960); D. B. Foreman, *Corynocarpaceae*, *Handb. Fl. Papua New Guinea* 1: 111–113 (1978).

## CORYNOCARPUS

*Corynocarpus* Forster & G. Forster, *Char. Gen. Pl.* 31, t. 16 (1776), from the Greek *koryne* (club), and *karpos* (fruit), referring to the shape of the fruit

Type: *C. laevigatus* Forster & G. Forster

Leaves not aristate, the juveniles with entire margins; petals shortly spatulate, entire; staminodes irregularly lobed

1. *C. cribbianus*

Leaves aristate, juveniles with spinose margins; petals oblong-spatulate, minutely fimbriate at apex; staminodes denticulate

2. *C. rupestris*

1. *Corynocarpus cribbianus* (Bailey) L. S. Smith, *Proc. Roy. Soc. Queensland* 67: 31 (1956)

*Cyanocarpus cribbianus* Bailey, *Queensland Agric. J.* 1: 370 (1897); *Helicia cribbiana* (Bailey) Bailey, *Queensland Fl.* 4: 1327 (1901). T: Mourilyan district, Qld, Sept. 1897, E. Cowley 3; holo: BRI.

*Corynocarpus australasicus* C. White, *Contr. Arnold Arbor.* 4: 57, t. 5 (1933). T: Gadgarra Reserve, Peeramon, Qld, May 1929, S. F. Kajewski 1024; holo: BRI.

Illustration: C. White, *Contr. Arnold Arbor.* 4: 57, t. 5 (1933).

Tree to 25 m. Leaves obovate or elliptic, entire, shortly acuminate, the apex obtuse or acute; lamina mostly 8–15 cm long and 4–7 cm wide; base cuneate or slightly decurrent; lateral veins 6–9 pairs. Cataphylls broadly ovate, acuminate, 1.5–2.2 mm long. Inflorescence 4–10 cm long; pedicels 2–4 mm long. Sepals ovate, c. 2.5 mm long. Petals shortly spatulate, entire, 2.4–2.7 mm long, 1.4–1.8 mm wide. Staminodes oblong-spatulate, irregularly lobed, 1.5–2 mm long, 0.6–0.8 mm wide. Drupe globose or depressed-globose, 3.5–4.5 cm long, 4–5 cm diam.; exocarp thin, red or pink-red; mesocarp 5–10 mm thick; endocarp woody, c. 2 mm thick.

Occurs in mesophyll and notophyll vine forest from Johnstone R., Qld, to Papua New Guinea, usually below 800 m. Map 253.

Qld: Upper Parrot Ck, Annan R., *L. J. Brass 20204* (BRI); Boonjee Logging Area, NE of Topaz, *B. Gray 1877* (BRI); Mt Lewis road, 28 km from Mt Molloy–Mossman road, *L. W. Jessup 276 & J. R. Clarkson* (BRI); Koolman Ck, c. 17 km SSE of Ravenshoe, *L. S. Smith & L. J. Webb 4600* (BRI); Gregory Falls, Lower Palmerston, S of Innisfail, *L. J. Webb & J. G. Tracey 6600* (BRI).

The description and illustrations of this species by C. G. G. J. van Steenis, *Fl. Males.* ser. 1, 4: 263 (1951) and D. B. Foreman, *Handb. Fl. Papua New Guinea* 1: 111–113, fig. 15B–C (1978), refer in part to *C. similis* Hemsley. Several specimens from the McIlwraith Ra. have narrower leaves with coarser venation and may represent an undescribed taxon.

## 2. *Corynocarpus rupestris* Guymer, *Fl. Australia* 22: 223 (1984)

T: Glenugie Peak, 51.6 km by road NNW of Woolgoolga, N.S.W., Sept. 1978, *G. P. Guymer 1324*; holo: BRI; iso: AK, BRI, CANB, K, L, LAE, MEL, NE, NOU, NSW, QRS.

Tall shrub or small tree to 12 m. Leaves ovate, elliptic, obovate or oblanceolate, entire, spinose in juveniles, the apex aristate and recurved, margins slightly recurved, undulate; lamina mostly 9–14 cm long and 4–6 cm wide; base decurrent; lateral veins 8–11 pairs. Cataphylls semicircular to broadly ovate, 2–3 mm long. Inflorescence 4–21 cm long; pedicels 3–5 mm long. Sepals ovate, 2–4 mm long, 1.3–2 mm wide. Petals oblong-spathulate, minutely fimbriate at apex, 2.4–3.5 mm long, 1–1.5 mm wide. Stamines oblong, denticulate at apex, 2–2.5 mm long, c. 1 mm wide. Drupe not seen.

Known from a few localities in SE Qld and NE N.S.W. There are two subspecies.

Inflorescence 10–21 cm long; sepals 2–2.2 mm long; petals 2.4–2.8 mm long

**2a. subsp. rupestris**

Inflorescence 4–5 cm long; sepals 3–4 mm long; petals 3–3.5 mm long

**2b. subsp. arborescens**

### 2a. *Corynocarpus rupestris* Guymer subsp. **rupestris**

Tall shrub to 5 m. Inflorescence 10–21 cm long. Sepals 2–2.2 mm long. Petals 2.4–2.8 mm long. Fig. 54G.

Known from Glenugie Peak, north-eastern N.S.W. Grows in notophyll vine thickets on volcanic screes. Map 254.

N.S.W.: Glenugie Peak, Feb. 1956, *H. C. Hayes* (BRI).

### 2b. *Corynocarpus rupestris* subsp. **arborescens** Guymer, *Fl. Australia* 22: 223 (1984)

T: NW slopes of Mt French, 7.8 km WNW of Boonah, Qld, 16 Oct 1982, *G. P. Guymer 1788*; holo: BRI; iso: BRI, CANB, K, MEL, NE, NSW, QRS.

Tree to 12 m. Inflorescence 4–5 cm long. Sepals 3–4 mm long. Petals 3–3.5 mm long. Fig. 54H–J.

Known from Ban Ban Ra. (W of Maryborough) and Mt French (SW of Brisbane), Qld, growing in semi-deciduous microphyll vine thickets on volcanic screes. Map 255.

Qld: Deep Ck, c. 15 km N of Coalstoun Lakes, *G. P. Guymer 1549 & L. W. Jessup* (BRI, NSW); Mt Walsh, S of Biggenden, *P. Young 13* (BRI).



**Figure 56.** *Dichapetalum papuanum*. **A**, flowering branchlet  $\times 1.5$ ; **B**, fruiting branchlet  $\times 1.5$ ; **C**, flower with 2 sepals and petals removed  $\times 12.5$  (**A,C**, L. Webb & L. Smith 5045, BRI; **B**, G. Unwin 170, BRI).





241. *Ilex arnhemensis*  
subsp. *arnhemensis*

244. *Sphenostemon lobosporus*

247. *Citronella smythii*

250. *Apodytes brachystylis*

253. *Corynocarpus cribbianus*

242. *Ilex arnhemensis*  
subsp. *ferdinandi*

245. *Pennantia cunninghamii*

248. *Gomphandra australiana*

251. *Irvingbaileya australis*

254. *Corynocarpus rupestris*  
subsp. *rupestris*

243. *Ilex* sp.

246. *Citronella moorei*

249. *Ryticaryum longifolium*

252. *Cardiopteris moluccana*

255. *Corynocarpus rupestris*  
subsp. *arborescens*

## DICHAPETALACEAE

*H. J. Hewson*

Trees, shrubs (often scrambling) or lianes, monoecious or dioecious. Leaves alternate, simple, stipulate. Flowers small, actinomorphic or slightly zygomorphic, bisexual. Sepals 5, free or basally connate, imbricate. Petals 5, mostly bilobed, free or fused into tube. Stamens 5, alternate with petals, free or episealous; anthers 2-locular, dehiscing by longitudinal slits. Disc of 5 epipetalous lobes. Ovary superior or inferior, of 2 or 3, rarely 4, connate carpels; style mostly connate at base, 2–3-fid at apex; ovules 2 per locule, pendulous. Fruit a drupe, dry or fleshy. Seeds without endosperm; embryo straight.

The family has 4 genera in the tropics. One genus is native in rainforest in north Queensland.

A. Engler & K. Krause, *Nat. Pflanzenfam.* 2nd edn, 19c: 1–11 (1931); P. W. Leenhouts, *Reinwardtia* 4: 75–87 (1956); P. W. Leenhouts, *Fl. Males.* ser. 1, 5: 305–316 (1957).

### DICHAPETALUM

*Dichapetalum* Thouars, *Gen. Nov. Madag.* 23 (1806), from the Greek *dicha* (in two) and *petalon* (petal), in reference to the bifid petals

Type: *D. madagascariense* Poir.

Trees, shrubs (often scrambling) or lianes. Leaves alternate, pseudo-distichous, pinnately-nerved, usually glandular; glands flat, orbicular, mostly abaxial at base; margins entire, thickened by a nerve; stipules triangular to subulate. Inflorescence axillary, usually dichotomously branched; pedicels articulate near apex. Petals free, bifid to emarginate. Stamens episealous. Glands intrastaminal epipetalous lobes. Ovary superior. Fruit a drupe, lobed, with or without suture; pericarp fleshy; endocarp crustaceous; stones 1–3, 1-seeded.

About 200 species throughout the tropics except Micronesia and Polynesia; 1, possibly 2, species occur in north Qld.

***Dichapetalum papuanum*** (Becc.) Boerl., *Handl. Fl. Ned. Ind.* 1: 199 (1890)

*Chailletia papuana* Becc., *Malesia* 1: 176 (1877). T: not Australian; *n.v.*

*Dichapetalum australianum* C. White, *Proc. Roy. Soc. Queensland* 53: 211 (1942).

T: Mt. Fraser, Qld, *L. J. Brass* 2510; *n.v.*

Dioecious, climbing shrub or small tree to 10 m, pilose to glabrescent. Leaves mostly elliptic, sometimes obovate, narrowed at apex but obtuse, 5–18 cm long, 2–7 cm wide, glabrous above, pilose to glabrescent below; nerves 4–8 pairs; glands inconspicuous or absent; stipules caducous; petiole 2–7 mm long. Inflorescence lax, 0.7–2.5 cm long. Male flowers 1 mm long; female flowers 2 mm long. Sepals pilose outside, densely so on margins. Petals ovate or obovate, equal to or slightly longer than sepals, truncate to slightly bifid, white or yellow. Glands small, 2-lobed. Ovary densely tomentose; carpels 3; styles 3, or stigma sessile and 3-lobed. Fruit 1–3 (rarely 4)-lobed, 7–17 mm long, 10–17 mm wide, glabrous or sparsely pilose, yellow or orange; suture narrow. Fig. 56.

Occurs in vine thickets in rainforest in north Qld, and in Malaysia and the Solomon Islands. Map 256.

Qld: Herberton, *T. Hartley & B. Hyland 14098* (BRI, CANB); Boonjee, *B. Hyland 9164* (BRI, CANB, QRS); Wongabel, *A. Irvine 202* (BRI, QRS); Wongabel, *G. L. Unwin 170* (BRI, QRS); Wongabel, *L. J. Webb & L. S. Smith 5054* (BRI).

*Dichapetalum papuanum* was treated by P. W. Leenhouts, *Fl. Males.* ser. 1, 5: 309 (1957) as having two subspecies. In *Fl. Males.* ser. 1, 6: 942 (1972), however, he raised *D. papuanum* subsp. *borneense* Leenh. to specific rank.

Irvine (in sched.) described the fruit of *Irvine 200* as having the 'three outer lobes opened and still attached to plant after seed dispersed. The lobes flatten right back and appear as a bright yellow flower at first glance.' The genus was described by Leenhouts (1957) as having 'apparently indehiscent' fruit.

Collections from the Claudie River area of Cape York Peninsula may represent another taxon, but only sterile specimens are available. They have retrorse branches and climb with hooks.



256. *Dichapetalum papuanum*



257. *Anacolosa* sp.

# APPENDIX

## New taxa, combinations and lectotypifications

New taxa, combinations and lectotypifications occurring in this Volume of the *Flora of Australia* are formally published here. The families are arranged in the same order as in the text; taxa are alphabetical within families. For economy the entries are brief; the treatment in the main text is more comprehensive. The date of publication of this Volume will be given in Volume 4.

### OLACACEAE

*A. S. George*

***Olox angulata*** A. S. George, sp. nov.

*Olaci strictae* R. Br. affinis, a qua ramulis prominente angulatis, foliis majoribus (plerumque 10–20 mm longis) et floribus parum majoribus (corolla 5–5.5 mm longa, staminibus 2 mm longis), differt.

T: E side of Minnie Water, N of Wooli, N.S.W., 28 Sept. 1976, *J. de S. Disney & D. J. McGillivray 2717*; holo: NSW; iso: BRI, CANB, MEL.

Known only from the type and a nearby locality.

Named from the Latin *angulatus* (angular), in reference to the branchlets.

***Olox aurantia*** A. S. George, sp. nov.

*Olaci benthamiana* Miq. affinis, a qua habitu elatiori (ad 2 m alto), foliis plerumque majoribus (ad 18 mm longis), corolla majori (6–7 mm longa), et drupa majori aurantia (10–14 mm longa), differt.

T: Indarra, W.A., May 1934, *C. A. Gardner s.n.*; holo: PERTH; iso: CANB, K.

Occurs in W.A. between the lower Murchison R. and Eneabba, and on the Cape Range.

Named from the latin *aurantius* (orange), in reference to the mature drupe.

***Olox obcordata*** A. S. George, sp. nov.

*Olaci benthamiana* Miq. affinis, a qua foliis semper late obovatis ad obcordatis mucrone obtuso erecto differt.

T: Cape Borda, Kangaroo Is., S.A., 28 Sept. 1965, *M. E. Phillips s.n.*; holo: AD; iso: CBG.

Occurs on Kangaroo Island and southern Eyre Peninsula, S.A.

Named from the Latin *cordatus* (cordate) with the prefix *ob-* (reversed), in reference to the leaf shape.

***Olox scalariformis*** A. S. George, sp. nov.

*Olaci benthamiana* Miq. affinis, a qua ramulis applanatis, foliis manifeste distichus, foliis floralibus non dilatatis, fauce corollae papillosa, et drupa majori (8–10 mm longa), differt.

T: c. 1 km S of Jurien-Coomallo road along Cervantes road, W.A., 2 Dec. 1982, *A. S. George 16213*; holo: PERTH; iso: AD, CANB, K, MEL, PERTH.

Occurs in W.A. between the Arrowsmith and lower Moore Rivers.

The Latin epithet *scalarformis* refers to the ladder-like appearance of the leaf scars on the branchlets.

**Olax spartea** A. S. George, sp. nov.

*Olaci aphyllae* R. Br. affinis, a qua planta glabra (praeter staminodia), foliis majoribus scariosis (1.5–2.5 mm longis), et floribus majoribus (corolla 3–3.5 mm longa), differt.

T: Edgar Ra., SE of Broome, W.A., 13 Aug. 1976, K. F. Keneally 5619; holotype: PERTH; isotype: CANB.

Known only from type.

The epithet, from the Latin *sparteus* (after *Spartium* L., the Spanish Broom), refers to the spindly, broom-bush habit.

## SANTALACEAE

*H. J. Hewson*

**Leptomeria penduliflora** Hewson, sp. nov.

Frutex c. 30 cm altus, glaber. Folia patentia ad horizontalia, anguste obovata ad linearia, ad apicem incurva, ad basin articulata, persistentia. Ramuli fertiles penduli. Flores sloitarii, aurantiaci vel brunnei; bractae triangulares, decurrentes, incurvatae, ad basin non articolatae.

T: Kalgan Plains, W.A., Dec. 1909, J. H. Maiden s.n.; holotype: NSW 67990; isotype: K, PERTH.

Named from the Latin *pendulus* (pendulous) and *flos* (flower), in reference to the inflorescence.

*A. S. George*

*Santalum diversifolium* (Miq.) A. DC., *Prodr.* 14: 684 (1857)

*Fusanus diversifolius* Miq., in Lehm., *Pl. Preiss.* 1: 617 (1845). T: near Avon R., York, W.A., 9 Sept. 1839, L. Preiss 2111; lectotype (here chosen): U.

The type material at U of this name, which is a synonym of *Santalum spicatum* (R. Br.) A. DC., is mixed – a single fruit of *Santalum* and somewhat fragmentary material of *Acacia ? microbotrya* Benth. There is also an immature pod of *Acacia*. A further sheet at LD bears a leafy specimen of *Acacia ? microbotrya*. Miquel's description is based on all the material. Since the name was applied in Santalaceae it is here lectotypified by the fruit of *Santalum* in order to fix its application. This does not affect current nomenclature in *Santalum*, nor would lectotypification by the *Acacia* material have affected the status of *A. microbotrya*. According to the label the date of collection was 9 September 1839, not 2 September as published.

## LORANTHACEAE

*B. A. Barlow*

*Loranthus ferruginiflorus* W. Fitzg., *J. Roy. Soc. W. Austral.* 3: 136 (1918)

*Amyema ferruginiflorum* (W. Fitzg.) Danser., *Bull. Jard. Bot. Buitenz.* ser. 3, 10: 295 (1929). T: summit of Mt Haste, W.A., July 1905, W. V. Fitzgerald 1251; lectotype (here chosen): NSW.

Fitzgerald cited three collections for this species. This collection is chosen as lectotype since it agrees closely with his description. The name is synonymous with *Amyema bifurcatum* (Benth.) Tieghem var. *bifurcatum*.

*Loranthus pendulus* var. *parviflorus* Benth., *Fl. Austral.* 3: 394 (1866)

T: Parramatta, N.S.W., *W. Woolls s.n.*; lecto (here chosen): MEL.

The collections cited by Bentham are heterogeneous, embracing *Amyema melaleuca* (Lehm. ex Miq.) Tieghem, *A. miraculosum* (Miq.) Tieghem and *A. gaudichaudii* (DC) Tieghem. The Woolls collection, which belongs in *A. gaudichaudii*, agrees closely with Bentham's description of *Loranthus pendulus* var. *parviflorus* and is chosen as lectotype.

## CELASTRACEAE

*L.W. Jessup*

**Cassine australis** var. **angustifolia** (Benth.) Jessup, comb. nov.

*Elaeodendron australe* var. *angustifolium* Benth., *Fl. Uastral.* 1: 403 (1863).

T: Burnett, Dawson and

Pine Rivers, Qld, *F. Mueller s.n.*; syn: n.v.; Warwick, Qld, *H. Beckler*; syn: n.v.

*Cassine australis* var. *pedunculosa* Domin, *Biblioth. Bot.* 89: 341 (1927).

T: Rockhampton, Qld, *A. Dietrich 450*; lecto (here chosen): NSW.

Most of the 11 syntypes cited by Domin are probably *C. australis* var. *angustifolia* but Domin's Tamborine Mt collection is almost certainly *C. australis* var. *australis*.

**Denhamia celastroides** (F. Muell.) Jessup, comb. nov.

*Leucocarpum celastroides* F. Muell., *Fragm.* 6: 203 (1868).

T: head of the Macleay R., New England,

N.S.W., *C. Moore 103*; lecto (here chosen): MEL.

Among the syntypes cited by Mueller is *C. Moore's* collection from Bellinger River. This is *Denhamia moorei* Jessup.

**Denhamia moorei** Jessup sp. nov.

*A. D. celastroide* (F. Muell.) Jessup foliis minoribus integris, petiolis brevioribus, inflorescentia floribus paucis, stylo brevioris, et capsula valvis coriaceis, differt.

T: 0.1 km along W arm of Deervale road, off Dorrigo – Armidale road, N.S.W., *G. P. Guymer 1673*; holo: BRI; iso: BRI, CANB, K, L, NE. NSW.

Occurs between Mt Hyland and the headwaters of the Macleay R., N.S.W.

The name commemorates Charles Moore (1820–1905), director of the Botanical Garden at Sydney 1848–1896 and the first collector of this species.

**Denhamia pittosporoides** subsp. **angustifolia** Jessup subsp. nov.

*A. D. pittosporoide* F. Muell. subsp. *pittosporoide* foliis angustis pendulis et petiolis longioribus differt.

T: No Name Hill, Valley of Lagoons, Qld, *B. Gray 1424*; holo: BRI; iso: QRS.

Occurs between Mt Garnet and Nebo, Qld..

Named from the Latin *angustus* (narrow) and *folium* (leaf) in reference to the narrow leaves.

**Maytenus fasciculiflora** Jessup sp. nov.

A *M. biloculari* (F. Muell.) Loes, floribus fasciculatus, pedicellis longioribus, filamentis longioribus et disco majore, differt.

T: Annan R. crossing –Cooktown road, Qld, 27 July 1973, *B. P. Hyland 6793*; holo: BRI; iso: QRS.

Occurs from Cape York to the Atherton Tableland, N Qld..

Named from the Latin *fasciculus* (fascicle or cluster) and *flos* (flower) in reference to the inflorescence.

**Maytenus ferdinandi** Jessup nom. nov.

*Cellastrus muelleri* Benth., *Fl. Austral* 1: 399 (1863). T: near Macadam Ra., N.T., *F. Mueller s.n.*; n.v.

A new name is needed for this species when placed in *Maytenus* since the epithet *muelleri* is already occupied in the genus (*M. muelleri* Schwacke, *Addit. Fl. Brasil* 1, 1886). The new name still commemorates Ferdinand Mueller.

## AQUIFOLIACEAE

*L. Pedley*

**Ilex arnhemensis** subsp. **ferdinandi** (Harms) Pedley, comb. et stat. nov.

*Ilex ferdinandi* Harms, *Nat. Pflanzfam.* 2nd edn, 20b: 404 (1942). T: Rockingham Bay, Qld. *J. Dallachy s.n.*; iso: BRI.

## CORYNOCARPACEAE

*G. P. Guymer*

**Corynocarpus rupestris** Guymer, sp. nov.

*Corynocarpo cribbiano* (Bailey) L. S. Smith affinis, a qua petalis spathulatis apicibus fimbriatis, staminodiis oblongis denticulatis, et foliis juvenilibus spinosis, differt.

T: Glenugie Peak, 51.6 km NNW of Woolgoolga, N.S.W., *G. P. Guymer 1324*; holo: BRI; iso: AK, BRI, CANB, K, L, LAE, MEL, NE, NOU, NSW, QRS.

The epithet *rupestris*, (rock-dwelling) refers to the habitat of the species. Two subspecies are recognised, subsp. *rupestris* and the following new subspecies.

**Corynocarpus rupestris** subsp. **arborescens** Guymer, subsp. nov.

A *C. rupestri* subsp. *rupestri* habitu arborescenti, inflorescentiis brevioribus (4–5 cm longis), sepalis longioribus (3–4 mm longis), et petalis longioribus (3–3.5 mm longis), differt.

T: NW slopes of Mt French, 7.8 km WNW of Boonah, Qld, 16 Oct. 1982, *G. P. Guymer 1788*; holo: BRI; iso: AK, BRI, CANB, K, L, MEL, NE, NOU, NSW, QRS.

Named from the Latin *arbor* (tree) and the suffix *-escens* (becoming), in reference to the habit.

## SUPPLEMENTARY GLOSSARY

**asperulate:** slightly rough to the touch.

**broom-like:** with many branches parallel or almost so and usually erect, as in *Spartium* (Spanish broom).

**canaliculate:** with a longitudinal groove or channel.

**coccus:** a one-carpel unit of a schizocarp or lobed fruit.

**concolorous:** coloured uniformly; the same colour on both sides. cf. **discolorous**.

**conflorescence:** a compound inflorescence consisting of two or more unit inflorescences.

**curvinerved:** with curved parallel veins.

**cushion, floral:** a swollen floral axis on which several small flowers are borne.

**cymule:** a diminutive cyme, usually few flowered.

**dichlamydeous:** of a flower, having two whorls of perianth parts.

**discolorous:** variegated; coloured differently on different sides. cf. **concolorous**.

**epicortical:** on top of the bark, i.e. outside the bark.

**erose:** of a margin, finely and irregularly eroded or toothed.

**exocarp:** the outer layer or "skin" of a pericarp.

**hemiparasite:** an organism which lives on and derives part of its nourishment from a different organism, and is partially self-supporting.

**hyalescent:** becoming translucent.

**obsolete:** vestigial (or rudimentary).

**penninerved:** having conspicuous lateral veins divergent from the midrib and lying approximately parallel to each other. =**penniveined**.

**pneumatophore:** an air-vessel; an organ containing aerenchyma; *in particular*, a root of a mangrove plant, growing above the substratum.

**praemorse:** appearing bitten off at the end.

**ray:** of a compound umbel, one of the first (lower) series of branches of the inflorescence axis.



## Abbreviations and Contractions

Author abbreviations follow the *Draft Index of Author Abbreviations compiled at the Herbarium, Royal Botanic Gardens Herbarium, Kew* (HMSO, London, 1980).

Journal titles are abbreviated in accordance with G.H.M. Lawrence *et al.*, *Botanico-Periodicum-Huntianum* (Hunt Botanical Library, Pittsburgh, 1968).

Other literature is abbreviated in accordance with F.A. Stafleu & R.S. Cowan, *Taxonomic Literature*, 2nd edn (Bohn, Scheltema & Holkema, Utrecht, 1976–), except that upper case initial letters are used for proper names and significant words. The *Flora of Australia* is abbreviated to *Fl. Australia*.

Abbreviations of herbaria are in accordance with P.K. Holmgren, W. Keuken & E. K. Schofield, *Index Herbariorum* Part I, 7th edn (Bohn, Scheltema & Holkema, Utrecht, 1981). Those most commonly cited in the *Flora* are:

AD	State Herbarium of South Australia, Adelaide
ADW	Waite Agricultural Research Institute, Adelaide
BM	British Museum (Natural History), London
BRI	Queensland Herbarium, Brisbane
CANB	Australian National Herbarium, Canberra
CBG	Australian National Botanic Gardens Herbarium, Canberra
DNA	Northern Territory Herbarium, Darwin
HO	Tasmanian Herbarium, Hobart
JCT	James Cook University of North Queensland, Townsville
K	Royal Botanic Gardens, Kew
MEL	National Herbarium of Victoria, Melbourne
NSW	National Herbarium of New South Wales, Sydney
NT	Northern Territory Herbarium, Alice Springs
PERTH	Western Australian Herbarium, Perth
QRS	Australian National Herbarium, Atherton
US	Smithsonian Institution, Washington, D.C.

Abbreviations of Australian States and Territories and nearby countries as used in statements of distribution and citation of collections.

A.C.T.	Australian Capital Territory
N.Caled.	New Caledonia
N.S.W.	New South Wales
N.T.	Northern Territory
N.Z.	New Zealand
P.N.G.	Papua New Guinea
Qld	Queensland
S.A.	South Australia
Tas.	Tasmania
Vic.	Victoria
W.A.	Western Australia

### General abbreviations

alt.	altitude
app.	appendix
auct.	<i>auctoris/auctorum</i> (of an author or authors)
c.	<i>circa</i> (about)
cm	centimetre
col.	colour
coll.	collector
cult.	cultivated

## ABBREVIATIONS AND CONTRACTIONS

diam.	diameter
E	east
ed.	editor
edn	edition
eds	editors
<i>et al.</i>	<i>et alii</i> /and others
fam.	<i>familia</i> /family
fig./figs	figure/figures (in other works)
Fig.	Figure (referring to a Figure in this Volume of the <i>Flora</i> )
holo	holotype
iso	isotype
isosyn	isosyntype
km	kilometre
lat.	latitude
lecto	lectotype
<i>loc. cit.</i>	<i>loco citato</i> (in the same work and page as just cited)
<i>loc. id.</i>	<i>loco idem</i> (in the same place as just cited)
long.	longitude
L.S.	longitudinal section
m	metre
mm	millimetre
N	north
<i>n</i>	haploid chromosome number
<i>2n</i>	diploid chromosome number
<i>nom. cons.</i>	<i>nomen conservandum</i> (conserved name)
<i>nom. illeg.</i>	<i>nomen illegitimum</i> (illegitimate name)
<i>nom. inval.</i>	<i>nomen invalidum</i> (name not validly published)
<i>nom. nud.</i>	<i>nomen nudum</i> (name published without valid description)
<i>nom. rej.</i>	<i>nomen rejiciendum</i> (rejected name)
n. ser.	new series
<i>n.v.</i>	<i>non vidi</i> (not seen)
<i>op. cit.</i>	<i>opere citato</i> (in the work cited above)
orth. var.	orthographic variant
p./pp.	page/pages
<i>p.p.</i>	<i>pro parte</i> (in part)
R.	River
S	south
sect.	<i>sectio</i> /section
ser.	<i>series</i> /series
<i>s. lat.</i>	<i>sensu lato</i> (in a wide sense)
<i>s.n.</i>	<i>sine numero</i> (without number)
sp./spp.	species (singular/plural)
<i>s. str.</i>	<i>sensu stricto</i> (in a narrow sense)
Stn	(pastoral) Station
subg.	subgenus
subsp.	subspecies
suppl.	supplement
syn	syntype
synon.	synonym
T	Type (collection)
t.	<i>tabula</i> (plate)
trib.	<i>tribus</i> /tribe
T.S.	transverse section
W	west
<i>x</i>	basic chromosome number

## ABBREVIATIONS AND CONTRACTIONS

### **Symbols**

†	taxon included in key but not treated further in text
*	naturalised taxon
[ ]	misapplied name

### **Publication date of previous volumes**

Volume 1	22 August 1981
Volume 8	9 December 1982
Volume 29	27 July 1982

For the publication date of Volume 2, see Volume 4.

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