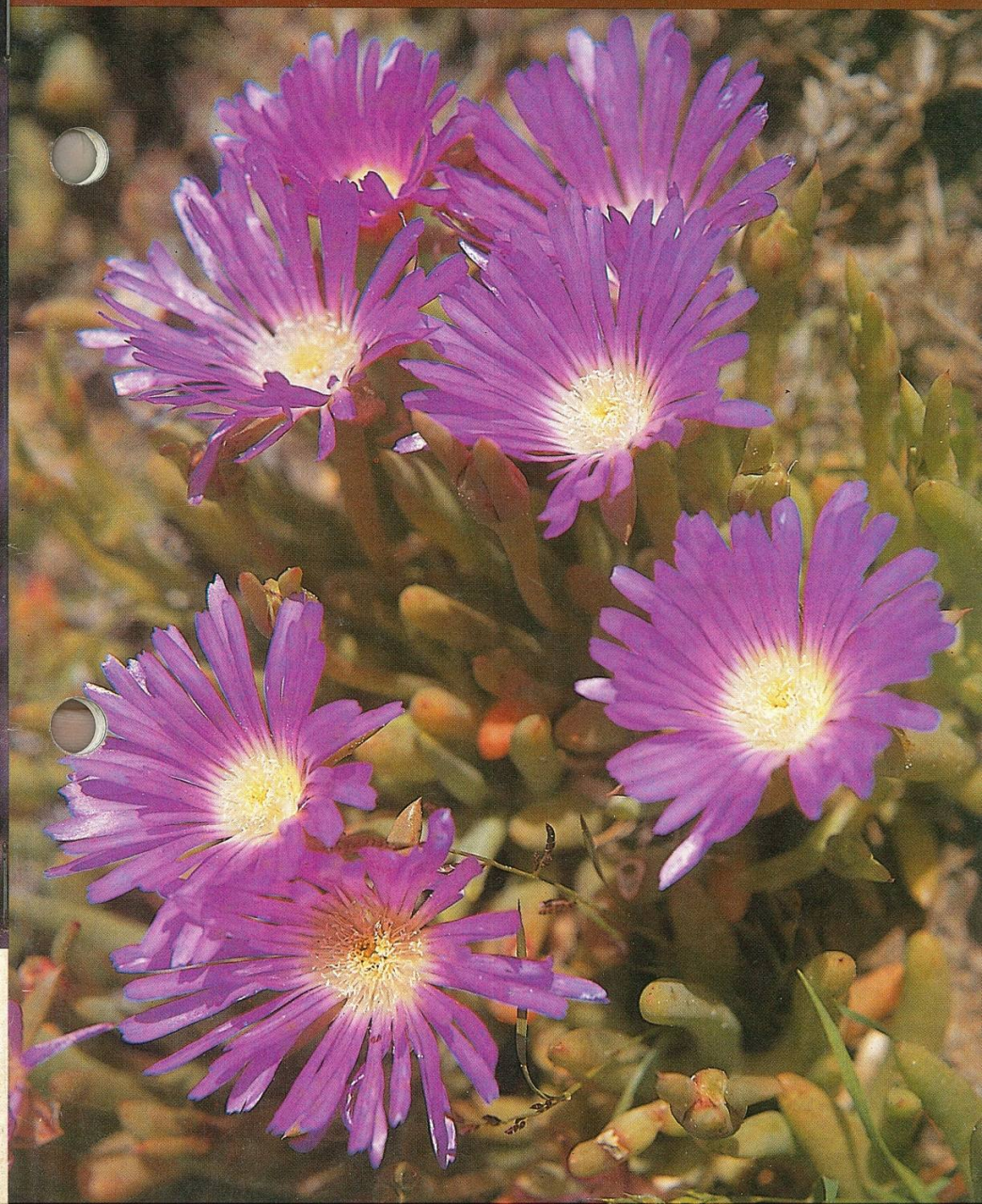


Australian Plants

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Know Your Australian Flora. The immense richness of our flora has been the subject of Australian Plants for 28 years. We have described thousands of species in simple terms and this issue presents a very difficult but important part of the flora. Inevitably, there will be comment that we are too technical for some but for those interested, this issue will be a valuable reference. The next issue presents the southern genera, *Lechenaultia*, *Pater-sonia*, *Pultenaea*, etc. Who can help with slides of *Lechenaultia*?

Grow Your Australian Flora. This is the most difficult type of article to present as the experts think everyone should know how to grow wildflowers and the battlers feel their input would be of little interest. Hopefully, readers will reflect and put pen to paper. What experience have you had with *Lechenaultia*, *Pater-sonia*, *Hoya*, *Baeckea* and related genera, in fact all Myrtaceae.

Support! I need the support of all, growers and especially photographers. What have you grown or photographed of *Cordylina*, *Pleomele*, *Dracaena*, *Chamaexeros*, *Xanthor-rhoe*, *Tacca*, *Stemona*, *Elaeocarpus* and the succulents *Hoya* and *Dischidia*.

Australian Plants and Horticulture

The use of natives in horticulture has gone backwards in Victoria. Why should this be in the "Garden State" of Australia. The nursery industry has tried to produce good plants at a reasonable price and more people than ever before, have grown natives over the past few years. Unfortunately, more people than ever before have failed or been disappointed with their new-found wild ones. Who is at fault?

Australian plants have always been in demand by the enthusiast and it is thanks to this hard core of wildflower lovers that we shall correct the problem. We are at last learning how to grow them. The nursery industry has had to stop and think and realise that the production of plants in quantity is not the sole answer to the "produce and market cheaply" problem.

Australian plants are now being regarded as general garden plants and are being critically evaluated by the consumer on this basis. It is up to the industry to more carefully select the best forms of wildflowers that will be reliable. The only way selected plants can be marketed is by giving them a cultivar name, a name the consumer will recognise and refer to. The failures will then be the cultivars and be rejected by the market next season, and the achievers will be sought after.

The Australian Cultivar Registration Authority is to shortly produce a series of booklets to guide the consumer and hopefully the horticultural industry will realise their promotional potential.

CONTENTS

Succulents, The Plant Family, Aizoaceae	J. Venning	47
Grafting — 2	Peter Olde	58
Encyclopaedia of Ferns	David Jones	61
Growing Tree ferns	Ray Best	62
East Coastal — 4, <i>Darwinia</i>	Brian Walters	63
Gardens In Miniature	Sue Forrester and Bill Molyneux	64
Grow What Small Plant	Australian Plant Study Group	65
<i>Verticordia</i>	G. Eastwood	66
<i>Callistemon</i> 'Cinderella', <i>Callistemon</i> 'Rose Opal'	ACRA	66
<i>Calectasia</i>	Peter Bailey	67
<i>Syzygium</i> and Allied Genera	D. T. Woolcock and C. E. Woolcock	70
<i>Syzygium</i>	Peter Bailey	81
Dwarf <i>Eucalyptus</i>	W. H. Payne	89
<i>Calytrix strigosa</i>	Ilma Dunn	92

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Succulents

The Plant Family, Aizoaceae

Based on the scientific article in "Flora of Australia", volume 4, pp 19-62 (1984) by J. Venning.



Plants growing in arid and saline environments have a wide range of structural and physiological adaptations to survive under harsh conditions. One such group, the plant family Aizoaceae, is widely distributed throughout Australia and contains many South African representatives which have been recorded or naturalised here.

Structural adaptations to harsh conditions may include one or more of the following:

- succulence due to an increase in water storage tissue
- an increase in the thickness of the cuticle, an impervious layer of fatty material covering the outer layer of cells of the leaf
- changes in the number, size and distribution of the stomates to control gaseous exchange at the leaf surface
- an increase in internal supportive tissue which is thought to reduce the damage normally caused by wilting
- changes in the number and size of water conducting cells
- an increase in the density of hairs and/or other structures (e.g. scales, papillae) on the leaves which in some cases are thought to insulate the photosynthetic tissue from excessive heat
- high volume to surface ratio of leaves, that is small terete leaves, or lack of leaves.

Structural changes are influenced by a number of environmental factors including light intensity, temperature, nutrient levels, salt concentrations and availability of moisture. For example, succulence can develop on exposure to increased salinity and may increase when nitrogen is lacking.

Plants in saline or arid areas are often stunted. A small habit and short life cycle may ensure production and dispersal of seed, which are essential for survival of the species. Highly specialised seed dispersal mechanisms are used.

The Aizoaceae contains two distinct groups of plants which can be separated by the presence or absence of petaloid staminodes (large sterile stamens). When present, the staminodes are numerous and form the showy part of the flower rather than petals which are absent in this family. In the cover colour plate of *Disphyma crassifolium* on page 45 the long pink 'petals' around the ring of stamens are actually petaloid staminodes. The group with staminodes are often referred to as the mesembryanthemums and many are popular as ornamentals due to the profusion and brilliant colour of flowers. The other group has relatively inconspicuous flowers with four or five small perianth parts which are lightly coloured on the inside.

Many mesembryanthemums have a complex capsule structure (Figure 1) and specialised seed dispersal mechanisms. The dispersal mechanisms optimise the chances of early seedling survival in areas subject to periods of water stress and unpredictable rainfall.

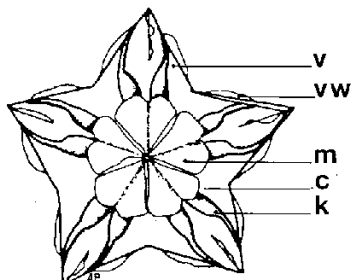


Figure 1 — Capsule structure of *Lampranthus glaucus*:

- v — valves (segments of the capsule wall which separate at maturity);
- vw — valve wing;
- m — membranous lids over the chamber;
- k — expanding keels (thickened tissue between the chambers which expands when wet to open the valves);
- c — chamber.

Australia's Showy Succulents — Identify them from these colour plates

Carpobrotus species — All shown here for easy identification.

Disphyma, only one species shown on the cover, page 45. Note the club-shaped leaves are distinct from the triangular leaves of *Carpobrotus* on page 57.

Sarcozona, the only other similar Australian succulent with showy "petal-like" staminodes, has two species found inland. The fleshy indehiscent fruits are enclosed by the two-lobed "floral" envelope.



Carpobrotus modestus (above)

Photography by Neil Marriott

This species is distinguished from other *Carpobrotus* species by its smaller size, up to 2 cm diam.

Carpobrotus edulis (opposite, top)

Photography by Lois Sourry

This species is easily distinguished by its yellow petal-like staminodes. It is a naturalised species shown here for ease of identification.

Carpobrotus aequilaterus (opposite, bottom)

Photography by Lois Sourry

This plant could be any one of four species. The petal-like staminodes of *Carpobrotus aequilaterus* are pale near the base but never white, whereas with the other Australian coastal succulents *C. glaucescens*, *C. rossii* and *C. virescens*, they are white at the base. Leaf characters do not separate the species and for those keen enough, please refer to the "key" on page 51. *Carpobrotus* species are distinguished from other succulents by their large fleshy indehiscent fruits as shown on page 52.



In a dry environment it is important not only to produce large quantities of seed, but also to disperse the seed to a suitable site at a time when conditions are favourable for germination and establishment. Most mesembryanthemums have hygroscopic capsules which open when wet and close again as they dry out. This is due to the presence of pronounced thickenings (expanding keels) on the valves, which expand on contact with moisture, opening the valves and exposing the seed. The seeds are expelled from the chambers by raindrops. This mechanism ensures that the soft-coated seeds are protected from drying out by the thick, robust capsule which resists decomposition for several years.

Upon release some seeds soon germinate and quickly become anchored in the soil. Others have a delayed germination and can remain dormant for some time. Seeds start germinating within 24 hours, but it can take up to 28 days for nearly all the viable seeds to germinate. The dormant seeds safeguard the species against the losses that would occur if the initial rains were followed by a dry spell.

Some genera have capsules with membranes over the chambers which further impede seed dispersal. However, those seeds ejected travel greater distances due to the higher velocity imparted to the seed by the dispersed rain-drop as it deflects off the membranes. Some capsules have seed pockets from which seed is only released when the capsule disintegrates. (These are not found in Australia). Such adaptations ensure that not all seeds are shed during the first rain or sporadic showers.

In Australia there are 18 genera represented in the family containing 60 species, 21 of which are introduced. The following generic descriptions and keys are based on characteristics of the Australian species and are from Prescott and Venning (1984) Aizoaceae. Fl. Australia 4.

GENERA WITH PETALOID STAMINODES

Aptenia

Perennial, succulent, low, spreading shrubs with long, prostrate stems, minutely papillose. Branches angular. Leaves opposite, ovate or heart-shaped. Flowers solitary with many, bright purple-red petaloid staminodes. Fruit a hygroscopic capsule with 4 chambers. Only one species (*Aptenia cordifolia*) in Australia, growing in coastal areas. A garden escape and possibly not naturalised. It is readily distinguished from other Australian mesembryanthemums by flowers with 4 sepals and capsules with 4 chambers.

Carpanthea

Succulent, villous, annual herbs. Leaves opposite, lanceolate, partly ensheathing stem. Flowers solitary or up to 3 together. Staminodes many, yellow. Fruit a hygroscopic capsule with 12-20 chambers.

A South African genus of two species, one of which (*C. pomeridiana*) was once collected at the junction of the Murray and Darling Rivers in 1887. It is readily distinguished from other Australian mesembryanthemums by the relatively large number of chambers (12-20) in the hygroscopic capsule.

***Carpobrotus* (Pig Faces)**

Succulent, perennials with prostrate stems up to 2 m long. Leaves opposite, 3-angled, united at base around stem. Flowers solitary. Stamínodes many, yellow, pink or purple. *Carpobrotus* are distinguished by the fleshy fruits, see page 52.

Five of the six species in Australia are generally found along or near the coast. Naturalised species *Carpobrotus edulis* (yellow flowers) and *C. aequilaterus* (purple flowers) are commonly planted on embankments for erosion control. *C. modestus* is common in mallee scrub. Coastal species *C. glaucescens*, *C. rossii* and *C. virescens* are difficult to separate.

The following key has been adapted from Blake (1969). A revision of *Carpobrotus* and *Sarcozona* in Australia, genera allied to *Mesembryanthemum* (Aizoaceae). Contr. Qld Herb. 7

1. Petal-like staminodes yellow *C. edulis**
1. Petal-like staminodes purple, pale to white near base
2. Petal-like staminodes pale at base *C. aequilaterus**
2. Petal-like staminodes white at base
3. Styles united at base, flowers up to 2.0 cm diam. *C. modestus*
3. Styles not united at base, flowers 3.5-8.5 cm diam.
4. Leaves equal-sided near middle, stamens 300-400 *C. glaucescens*
4. Leaves not equal-sided near middle, stamens 100-300
5. Stamens 250-300 *C. virescens*
5. Stamens 100-250 *C. rossii*

*naturalized species

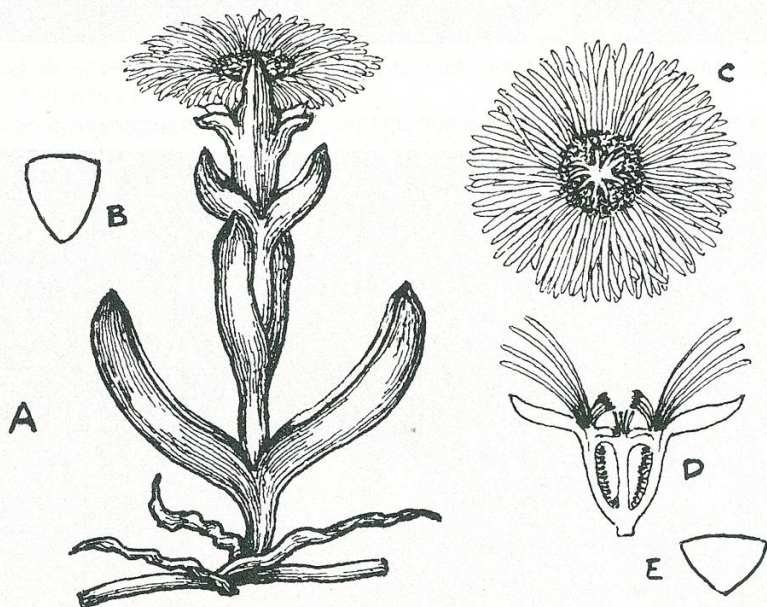
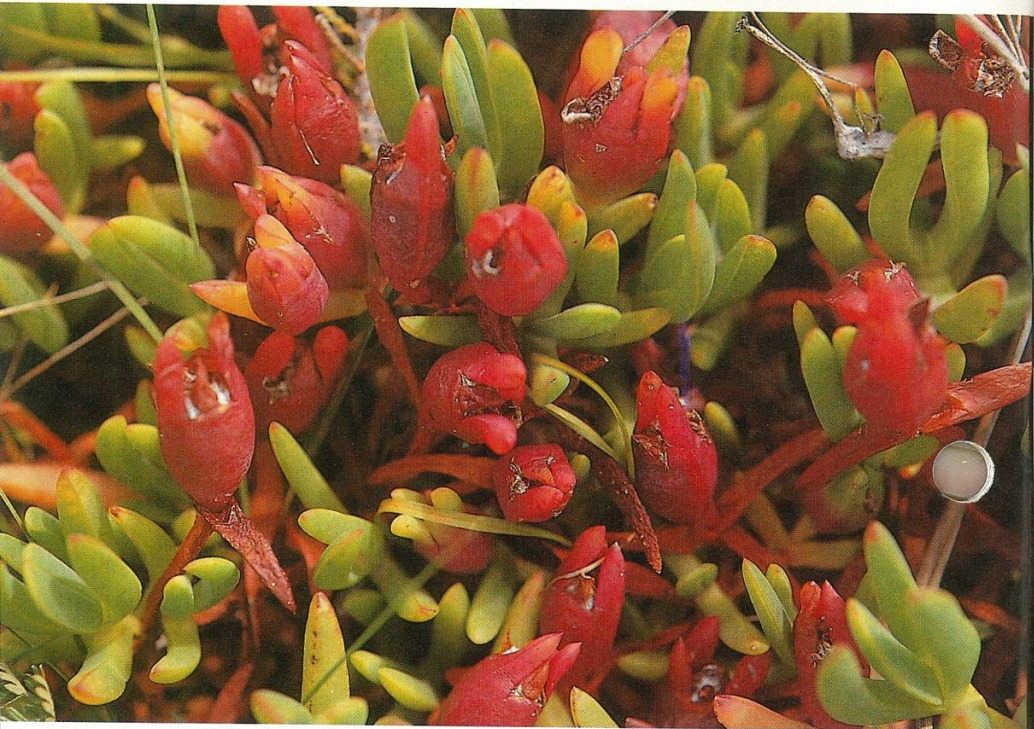


Figure 2

***Carpobrotus rossii*.** A, the plant; B, cross-section of a leaf; C, flower with many large, petal-like staminodes.

***Carpobrotus glaucescens*.** D, longitudinal section of flower showing parietal placentation; E, cross-section of equilateral leaf.

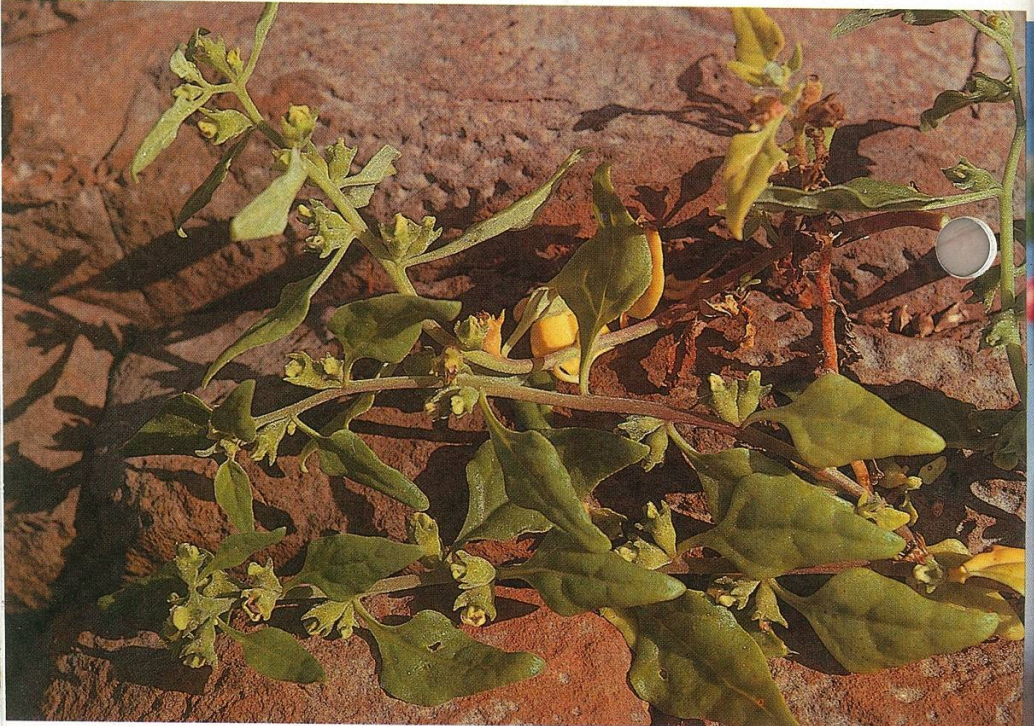


Carpobrotus fleshy indehiscent fruit, all species △

Photography by Lois Sourry

Tetragonia tetragonoides, note horned fruit ▽

Photography by Lois Sourry



Conicosia

Perennial, succulent, glabrous herbs to 30 cm high with erect or prostrate stems arising from a dense basal rosette of leaves. Leaves opposite, clustered, 3-angled to nearly terete. Flowers solitary. Stamines many, yellow. Fruit a capsule with 10-20 chambers, dehiscent when dry. The one species in Australia (*Conicosia bijlilii*) has only been collected near Drysdale in Victoria on an area of wind blow. No recent collections have been made.

Readily distinguished by cone-shaped capsules which expel seed when dry. Other Australian mesembryanthemums have either fleshy, indehiscent fruits (e.g. *Carpobrotus*, *Sarcocolla*) or capsules which expel seed when wet (all other genera).



Disphyma (Rounded Pig Face)

Prostrate, perennial, succulent shrubs with trailing branches up to 1.5 m long. Leaves opposite, 3-angled, club-shaped, clustered on short shoots, often with yellow or red tinge. Flowers solitary. Stamines many, purple, white at base. Fruit a hygroscopic capsule with 5 chambers.

A genus of one species *Disphyma crassifolium* which is common on samphire flats, dunes of coastal areas and saline areas inland.

A distinctive species due to its glabrous, club-shaped leaves and capsules borne on long pedicels. Flowers profusely forming conspicuous purple mats.

Drosanthemum

Succulent, perennial, semi-erect shrubs with trailing, hirsute stems. Leaves opposite, club-shaped, clustered, fused at base, densely papillose. Flowers solitary. Stamines many, white. Fruit a hygroscopic capsule with 5 chambers.

Only one species (*D. candens*) in Australia which is possibly naturalised. It is grown as an ornamental on rockeries and embankments. It is distinguished by small, papillose, club-shaped leaves and hirsute stems.



Lampranthus

Succulent, perennial, erect or prostrate shrubs. Branchlets compressed. Leaves opposite, 3-angled, fused at base. Flowers solitary. Stamines many, white, yellow or purple. Fruit a hygroscopic capsule with 5 chambers.

A large genus of South African plants, three of which (*Lampranthus tegens*, *L. glaucus*, *L. multiradiatus*) have been collected, and possibly naturalised, in Australia. The genus is common in cultivation due to the profusion and brilliant colour of flowers.

Mesembryanthemum (Ice Plants)

Annual or biennial, succulent, prostrate herbs with trailing stems, densely papillose. Branches angled or terete. Leaves opposite on lower branches, alternate on flowering branches, flat or semiterete. Flowers solitary. Stamines many, white. Fruit a hygroscopic capsule with 5 chambers.

All three species (*M. nodiflorum*, *M. aitonis*, *M. crystallinum*) in Australia are natives of Africa. Widely distributed on samphire flats, saline areas inland and road verges. It may be distinguished from other Australian mesembryanthemums by dense papillae on stems and leaves which make plants glisten in the sun, hence common name Ice Plants.

Micropterum

Semi-erect, succulent annual to 15 cm high, densely papillose. Leaves opposite, spatulate. Flowers solitary. Staminodes many, yellow. Fruit a hygroscopic capsule with 5 chambers. Only one naturalised species (*M. papulosum*) with isolated occurrences in hilly areas in southern Australia.

Psilocaulon

Perennial, semi-erect or prostrate shrubs, minutely papillose. Branches terete, appearing jointed due to persistent leaf bases. Leaves opposite, narrowly terete, soon falling. Flowers solitary. Staminodes many, white. Fruit a hygroscopic capsule with 5 chambers. Only one species (*P. tenue*) in Australia which has become naturalised along Murray River. It is easily distinguished by leaves which readily fall, leaving persistent leaf bases on branchlets.

Ruschia

Erect, perennial shrubs. Branchlets compressed, red. Leaves opposite, 3-angled, recurved, fused at base, partly ensheathing stem. Flowers clustered. Staminodes many, purple. Fruit a hygroscopic capsule with 5 chambers.

A genus of approximately 350 species endemic to southern Africa, one of which (*R. tumidula*) has been recorded along the southern Australian coast and is possibly naturalised. Readily distinguished from other Australian mesembryanthemums by many-flowered inflorescences. Others have solitary flowers or flowers in groups of 2 or 3.

Sarcozona

Succulent, perennial, erect shrubs to 30 cm, glabrous. Branches angled. Leaves opposite, 3-angled, fused around stem, densely covered with small warts or transparent dots. Flowers solitary or in threes, partly or entirely enclosed in a bilobed, fleshy involucre. Staminodes many, white or pale pink. Fruit fleshy, indehiscent.

A genus of two species (*S. praecox* and *S. bicarinata*) endemic to Australia. Found inland in a variety of habitats.

Although both *Carpobrotus* and *Sarcozona* have fleshy, indehiscent fruits, *Sarcozona* is readily distinguished by a bilobed involucre which partly or entirely encloses the fruit. In *S. praecox* the fruit are enclosed for at least half their length, but in *S. bicarinata* for less than half their length.

GENERA WITHOUT STAMINODES

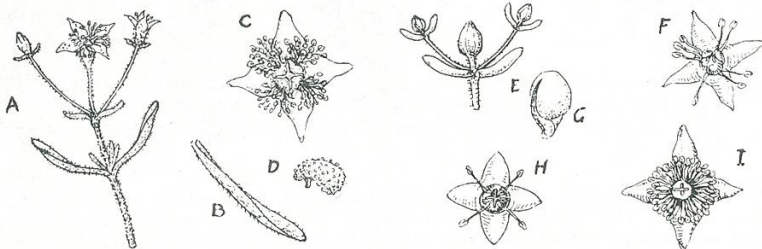
Galenia

Perennial, dense, procumbent shrubs. Leaves alternate, obovate to spatulate, papillose. Flowers solitary. Perianth segments 5, free, yellow, white or pink inside. Fruit a dry, leathery, 5-angled, truncate capsule with 5 chambers, opening at apex of angles. Two species (*G. pubescens* and *G. secunda*) are naturalised in southern Australia in settled areas, along road verges and the coast.

Gunniopsis

Succulent shrubs or ephemeral herbs up to 1 m high. Branches terete or somewhat compressed. Leaves opposite, terete or flattened. Flowers solitary or in cymes. Perianth segments 4, free or fused at base, white, yellow or pink inside. Fruit a hygroscopic capsule with 4 chambers. A genus of 14 species endemic to Australia, common in saline areas.

1. Stamens 30 or more
 2. Capsules dehiscing septically; valves simple *G. divisa*
 2. Capsules dehiscing septically and also partly loculicidally; valves bifid
 3. Leaves terete, if flat only near base
 4. Plants densely pubescent *G. quadrifida*
 4. Plants glabrous *G. tenuifolia*
 3. Leaves flat
 5. Leaves lanceolate; stems and leaves covered with peltate scales *G. calcarea*
 5. Leaves spatulate, ovate or linear; if stems and leaves pubescent, trichomes not peltate scales
 6. Flowers solitary; stems rarely branched *G. glabra*
 6. Flowers in cymes; stems much-branched
 7. Perennial, densely pubescent *G. zygophylloides*
 7. Ephemeral, glabrous
 8. Papillae sparse on leaves or absent
 9. Perianth yellow inside *G. intermedia*
 9. Perianth white inside
 10. Seeds club-shaped; W.A. species *G. rodwayi*
 10. Seeds oblong; S.A. species *G. calva*
 8. Papillae numerous on leaves
 11. Perianth yellow or white inside *G. papillata*
 11. Perianth pink inside *G. kochii*
 1. Stamens 4-12
 12. Leaves oblong; perianth green inside.
 13. Valves bifid *G. septifraga*
 13. Valves simple *G. rubra*
 12. Leaves linear; perianth white or pink inside *G. propinqua*



Gunniopsis quadrifida. A, habit; B, terete leaf; C, flower with many stamens arranged in 4 clusters alternate with perianth lobes; D, papillose seed.

Gunniopsis septifraga. E, flowers arranged in a cyme; F, flower with 4 stamens arranged alternatively with perianth lobes; G, hyaline seed.

Gunniopsis propinqua, flower with 4-12 stamens arranged in 4 clusters alternative with perianth lobes.

Gunniopsis calva, flower with many stamens evenly distributed around ovary.

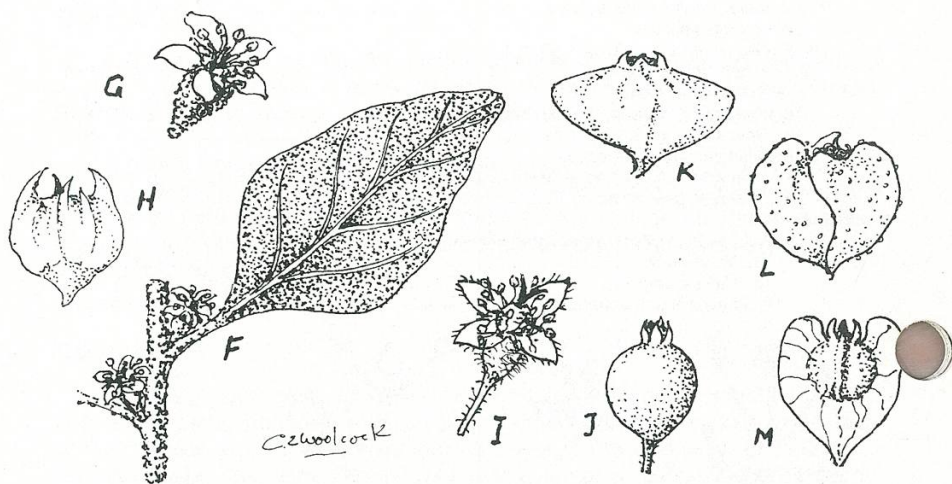
Tetragonia

Sprawling or climbing herbs or shrubs, usually papillose. Leaves alternate, somewhat succulent, lanceolate to rhomboid. Flowers clustered. Perianth segments 4 or 5, green or yellow inside. Fruit indehiscent, dry or succulent.

A genus of about 50 species found mainly in the southern hemisphere. Eight species in Australia, three introduced from South Africa, in a wide range of habitats.

1. Flowers with pedicels at least 4 mm long
2. Fruit succulent *T. implexicoma*
2. Fruit dry
3. Fruit with thick wings *T. decumbens**
3. Fruit with thin wings
4. Leaves lanceolate to oblanceolate *T. fruticosa**
4. Leaves broadly ovate to orbicular *T. nigrescens**
1. Flowers sessile or subsessile
5. Anthers equal number of perianth lobes
6. Fruit with 4 wings, 2 large and 2 small *T. eremaea*
6. Fruit with 2 wings *T. diptera*
5. Anthers at least twice number of perianth lobes
7. Fruit with horns, sparsely papillose *T. tetragonoides*
7. Fruit without horns, densely papillose *T. cristata*

*introduced species



Tetragonia tetragonoides. F, habit; G, flower; H, subglobose, horned fruit. Colour plate on page 53.

Tetragonia implexicoma. I, pedicellate flower; J, succulent, globose fruit.

Tetragonia eremaea, compressed, 4-winged fruit.

Tetragonia decumbens, L, 4-winged fruit.

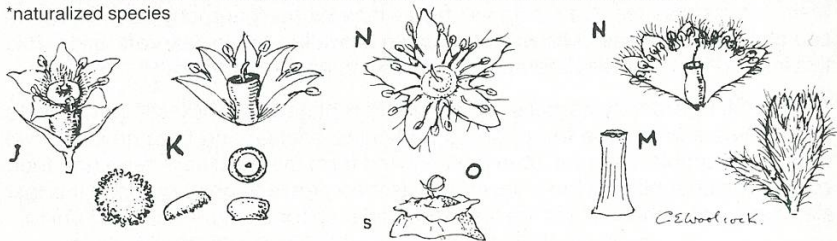
Tetragonia diptera, M, heart-shaped, 2-winged fruit.

Trianthema

Prostrate or diffuse herbs. Leaves opposite, terete or flat. Flowers solitary or clustered, subtended by bracts. Perianth segments 5, shortly fused, white, pink, red, purple or green inside. Fruit a membranous or woody capsule with one chamber, circumciss usually near base. A genus of about 20 species, some widely distributed in tropics and subtropics; 12 species in northern and arid Australia, 10 endemic, one pantropic and one naturalized. Distinguished from other Aizoaceae genera without petal-like staminodes by circumciss capsules with one chamber. *Sesuvium* and *Zaleya* also have circumciss capsules, but with 3 and 2 chambers respectively.

1. Plants generally densely hairy
2. Flowers in groups of 3 or 4 *T. pilosa*
2. Flowers solitary or paired
3. Flowers pedicellate *T. megasperma*
3. Flowers sessile
4. Operculum of fruit subovoid tapering to a persistent style *T. rhynchocalyptra*
4. Operculum of fruit dish-shaped with a hyaline cover *T. patelliflora*
1. Plants glabrous or sparsely hairy
5. Pedicels at least 2 mm long
6. Flowers in cymes *T. cypseleoides*
6. Flowers solitary or in groups of 2 or 3
7. Stamens 5-7, seeds smooth *T. compacta*
7. Stamens 10-25, seeds patterned
8. Style flattened, tongue-like *T. glossostigma*
8. Style terete
9. Leaves terete or clavate *T. turgidifolia*
9. Leaves flat *T. oxycalyptra* var. *oxycalyptra*
5. Pedicels less than 1 mm long or absent
10. Flowers solitary or in groups of 3
11. Fruit cylindrical *T. portulacastrum**
11. Fruit ovoid *T. oxycalyptra* var. *sessiliflora*
10. Flowers generally in groups of 2 or more
12. Stamens 5 *T. triquetra*
12. Stamens 10 *T. cussackiana*

*naturalized species



Trianthema triquetra var. *triquetra*. J, flower with 5 stamens; K, disc-shaped seed in rounded, thick-walled operculum. *Trianthema pilosa*. L, flower with 15-20 stamens; M, cylindrical operculum. *Trianthema megasperma*. N, flower with 5-15 stamens; O, bell-shaped operculum.

Sesuvium

Succulent, perennial herbs. Leaves opposite, linear to oblanceolate, fused at base. Flowers solitary. Perianth segments 5, pink to purple inside. Fruit a circumciss capsule with 3 chambers. Six species in the genus, one (*S. portulacastrum*) in Australia along the northern coast often associated with mangroves.

Zaleya

Prostrate or semi-erect, succulent herbs, minutely papillose. Leaves opposite, oblong to ovate. Flowers clustered. Perianth segments 5, white, pink or purple inside. Fruit a hard, truncate, cylindrical capsule with 2 chambers and raised outer margin, circumciss near base. One species (*Z. galericulata*) in Australia scattered throughout drier areas. ■

Grafting — 2

A series introduced by Peter Olde

The grafting of a desirable plant that has proven difficult to grow, onto the roots of a plant that has proven easier to grow, is a practice within the grasp of all. Our No. 108 issue introduced this series as a means of growing our more difficult *Grevillea*. Let us go back to basics and refer to the excellent book, "Plant Propagation" by Hartman-Kesler and learn what they say of a graft union:

- (a) Freshly cut scion tissue* capable of meristematic activity is brought into secure, intimate contact with similar freshly cut stock tissue in such a manner that the cambial regions of both are in close proximity. Temperature and humidity conditions must be such as to promote growth activity in the newly exposed and surrounding cells.
- (b) The outer exposed layers of cells in the cambial region of both scion and stock produce parenchyma cells which soon intermingle and interlock; this is called *callus tissue*.
- (c) Certain cells of this newly formed callus which are in line with the cambium layer of the intact scion and stock differentiate into new cambium cells.
- (d) These new cambium cells produce new vascular tissue, xylem towards the inside and phloem toward the outside, thus establishing vascular connection between the scion and stock, a requisite of a successful graft union.



What Happens In A Graft?

When a graft is performed, the first action of cutting both stock and scion exposes fresh tissue. This tissue, because it has been damaged, will attempt to repair itself. It does this by the formation of callus tissue. However, in grafting, two pieces of plant material will be placed in close contact, especially in relation to their cambial tissues. Callusing will take place by the parenchyma cells in the cambial tissue. These cells will intermingle providing the initial graft union. It is this initial union that will determine the further success of the graft.

Certain parenchyma cells will then differentiate, i.e. they will re-organise themselves and change to perform a particular function and form new cambial cells. The cambial cells will then multiply and form the vascular tissue (the food conducting channels) in the plant known as the xylem and phloem. Once this last step has been achieved it is the last essential step for a successful graft union.



*Terms Used In This Series

Scion tissue: That part of the graft combination which becomes the upper part and becomes the ultimate plant desired.

Rootstock, Understock: The part of the graft combination used as the roots of the ultimate plant.

Meristematic activity: Capable of cell division and hence growth.

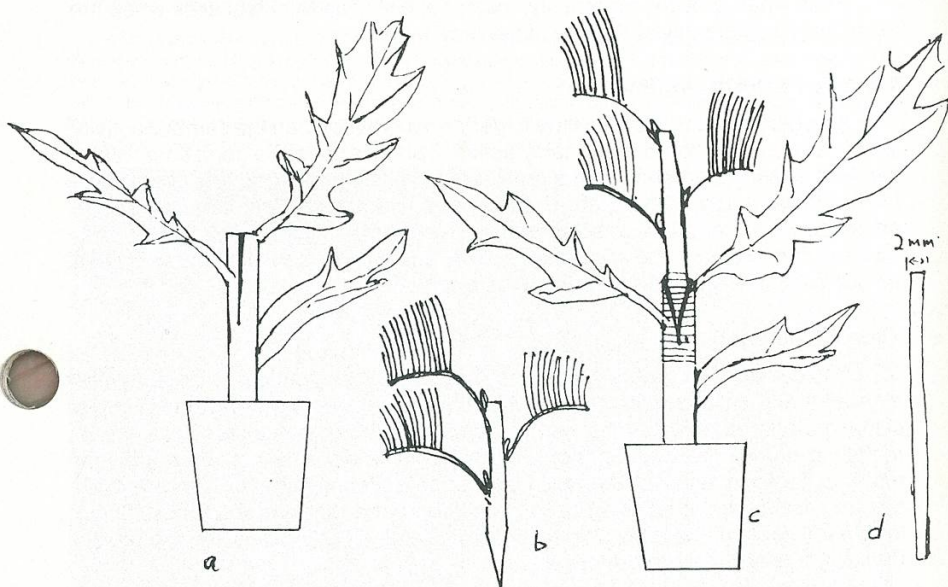
Vascular system: Part of the stem which conducts moisture and food from the roots to the flowers and leaves and returns food from the leaves to the roots.

Cambium: The part of the stem of a plant in which the vascular system is located.

Xylem: That part of the vascular system towards the middle of the stem which conducts food and nutrients one way.

Phloem: That part of the vascular system towards the outside carrying moisture the other way.

Callus: Undifferentiated (parenchyma) cells which eventually line up to become part of the cambium layer (or vascular system) of the plant. If the cambial region of grafts are not lined up properly, callus cells do not form an eventual cambial layer and the graft fails.



1. Cut the rootstock (a) above, off at the 3rd or 4th leaf just above the node. Leave the leaves on especially the top one near the cut.
2. Make an incision down the middle of the stem to a depth of about 10 mm. The stem should be a minimum of 2 mm thick otherwise it becomes difficult to work with. You will need a clean, sharp grafting knife or razor blade to make the cut.
3. Select your scion wood, (b) above. It should be semi-ripe with about two or three leaves and some unshot buds in the leaf axils. If the leaves are large and fleshy cut them back as you would a cutting. Trim the bottom 8 mm into a V-shape.
4. Place the V-shape into the cut you made in the rootstock as in (c) above. Line the scion and rootstock up at least on one side. Ensure there is intimate contact between the wounded stems.
5. Tie them together with an appropriate tape. I prefer Nescofilm prepared as in (d) above. The tie should be just firm enough to ensure good contact. Don't strangle the plant.
6. Place a clean coffee jar over the newly tied graft. You can fit two or three tubes under one jar. Rest the neck of the jar on the top rim of the tubes. Place this in your hothouse or in a warm sheltered position. Do not wet the graft union or the foliage. Water the tube as it requires.
7. Wait a few weeks till the union calluses and the tape begins to burst. At the same time the scion will begin to shoot and grow. Remove the tape and seal the graft union with grafting mastic or vaseline.
8. Leave the young plant in the hothouse or cold frame for a few more weeks.

Incompatibility

Stock and scion may be unsuited to each other because:

1. Introduced viral infection at the point of the graft or latent viruses in the rootstock.
2. Difference in lignin production between stock and scion.
3. Differences in time of growth.
4. The rootstock and scion are too far removed genetically.

Symptoms of an incompatible graft that may take 20 years to appear:

- a. Unwillingness of the scion to grow vigorously.
- b. Enlargement of the callus at the union marked by enlargement of either the scion or the rootstock.
- c. Repeated difficulty to achieve a union between the two species.
- d. Premature death of a plant.

Even when growing vigorously, incompatibility can manifest itself when the scion snaps off cleanly at the site of the graft union.

Time To Perform Grafting

As a general rule, the best time to perform a graft is when the cambial activity in both stock and scion is reasonably active. Spring is usually a good time. When cambial activity is present, callus proliferation will be good, and this is essential for the initial union of the graft. Glasshouses, coldframes etc. can be used to advantage if either stock or scion material are slower than one another. Better housing can induce a rise in cambial activity and growth, so stock and scion can be at a similar stage in preparation to be grafted.

Type Of Material

This can depend greatly on the urgency behind the grafting. Once again, as a general rule, half hardened material is the best to use. Wherever possible the scion material should be the same diameter as the rootstock. This aids in matching cambiums when performing the graft. Always select the healthiest material possible, avoid unthrifty or pest ridden material. If material is soft at the tips, the ends can be pinched out as would be done for normal cuttings. Scion length will vary but 5-8 cms long is generally satisfactory, but this will depend on the type of grafting being performed.

Housing And Care

The newly completed graft should be housed in a humid atmosphere preferably in a hot house or a cold frame. An ideal temperature is about 25°C. Reasonable air flow should be permitted around the graft to prevent fungal attack on foliage and stems. However, the air must be humid as callus tissue is soft and easily desiccated. If too much dry air circulates around the graft the callus tissue may dry out resulting in the loss of the graft. Once the graft looks as though it has taken (this may be shown by growth of the scion) the remaining leaves on the rootstock can be cut back to the stem. The graft at this stage will then be ready for unwrapping.

Removing Graft Tape

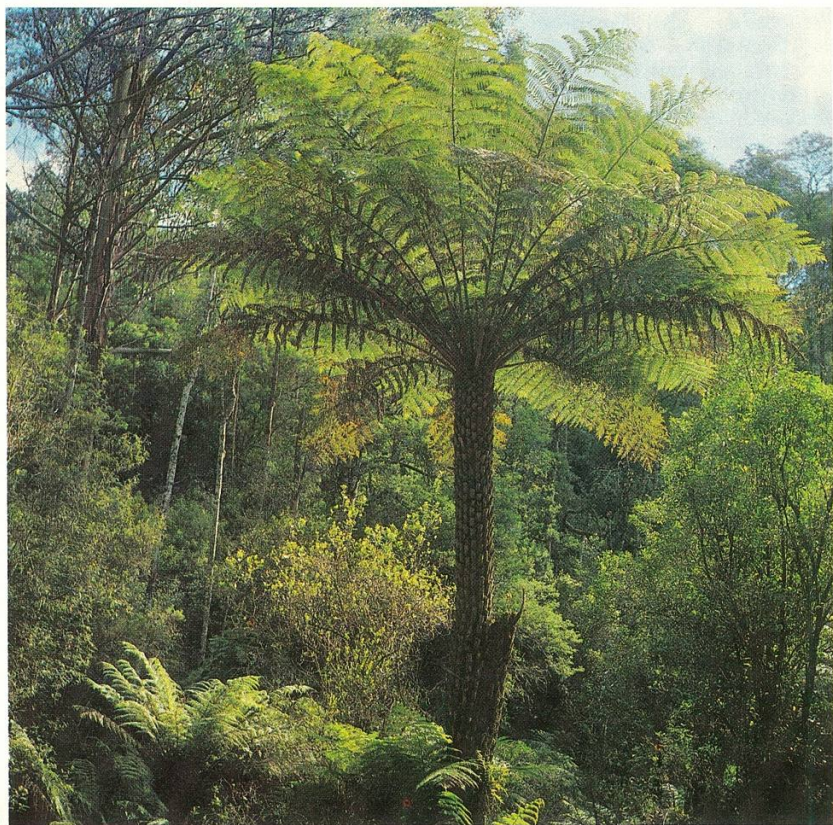
Once the graft has taken it is very important to remove the graft tape. As the graft grows its diameter also expands and if the tape is left on for too long it may constrict stem growth and result in the loss of the graft. A *general* rule is that once good growth is being made by the scion, the graft tape can be removed 2-3 weeks later. If when unwrapped the graft union looks weak or not fully healed, it can simply be rewrapped. Extreme care must be taken when unwrapping the graft that the union is not disturbed. When using NESCOFILM the tape does *not* need removing at all as it will split as the callus union expands it.

Hardening Off

Grafts should gradually be hardened off in the same fashion as normal cuttings. It should be a gradual transition from its humid housing conditions to where it is to be grown on until ready for planting. The hardening period may take up to one month, especially in cooler weather. After unwrapping it is useful to re-seal the grafted area with grafting mastic. ■

Encyclopaedia Of Ferns

A large book, 300 pages (250 × 180 mm) with 250 colour plates and many detailed sketches, an expensive book retailing at \$100, but an invaluable reference. The book is styled to enable the complete beginner to study the basic structure and botany of ferns, to achieve instant success with advice on cultivation, to immediately diagnose problems with pests, diseases and ailments and to develop a pleasing fernery. This is just a beginning to a new hobby where you can become an expert on ferns. Available from The Editor, Australian Plants, at a special introductory offer of \$80.00 post free.



Cyathea cunninghamii (above)

Photography by Lois Sourry

Growing Tree Ferns

by Ray Best

A request came from "The British Pteridological Society" for an article on tree fern types that would suit English conditions. Naturally, I could only deal with those species that I have grown myself here in Kenthurst, NSW and this is a summary of my reply. As tree ferns are generally too large for a fernhouse I grow them outdoors in a gully situation I have created over a period of some 16 years. *Eucalyptus* tree species were first planted to provide overhead cover, *Eucalyptus saligna*, *Eucalyptus robusta* as well as *Acacia elata*, etc. These are all evergreen species that provide both winter and summer cover. Those leaves that do fall tend to rot down to a somewhat acid soil. Before the trees were established I constructed a number of tree guard-like structures with a heavy clear plastic cover to protect the ferns. Once the trees were mature no other protection was necessary.

Of the four *Dicksonia* species mentioned *Dicksonia youngiae* is the most difficult to propagate and maintain, being an elevated subtropical species. Basically all the *Dicksonia* species are much slower

growing than the *Cyathea* sp. both in the spore development and ultimate growth as is indicated in the list. This also applies to all the slow growing ferns; that require longer periods for prothallus development; so patience is essential to success.

TREE FERN FAMILY: CYATHEACEAE, SMITH

Name ¹ and Country of Occurrence	Age in years ²	Caudex Height
<i>Alsophila australis</i> , Robert Brown, Australia Previously:— <i>Cyathea australis</i> , (R. Br) Domin.	16	1 m 3'-3"
<i>Alsophila baileyana</i> , Domin., Australia Previously:— <i>Cyathea baileyana</i> , (Domin) Domin.	5	10 cm 4"
<i>Alsophila cunninghamii</i> (Hooker) Tyron., Aus. Previously:— <i>Cyathea cunninghamii</i> , Hooker.	16	3 m 9'-9"
<i>Alsophila marcescens</i> (N. A. Wakefield) Tyron., Aus. Previously:— <i>Cyathea marcescens</i> , N. A. Wakefield.	5	1 m 3'-3"
<i>Alsophila rebecca</i> , F. Muell., Australia. Previously:— <i>Cyathea rebecca</i> , (F. Muell) Domin.	2	No Caudex
<i>Alsophila woollsiana</i> , F. Muell., Australia. Previously:— <i>Cyathea woollsiana</i> , (F. Muell) Domin.	5	1 m 3'-3"
<i>Cyathea brownii</i> , Swartz; Hooker, Norfolk Is.	16	6 m 19'-6"
<i>Cyathea dealbata</i> , Swartz (Rox) Morton., N.Z.	15	1 m 3'-3"
<i>Cyathea dealgardi</i> , Stenb., Argentine.	5	30 cm 1'
<i>Cyathea medullaris</i> , Swartz., New Zealand.	5	30 cm 1'
<i>Cyathea muelleri</i> , Baker. New Guinea.	10	2 m 6'-6"
<i>Cyathea robusta</i> (C. Moore) Holtt., Lord Howe Is.	5	No Caudex
<i>Sphaeropteris australis</i> (Presl) Tyron., Aus. Previously:— <i>Cyathea leichhardtiana</i> , Copel.	15	3 m 9'-9"
<i>Sphaeropteris celebica</i> , (Blume) Tyron., Aus. Previously:— <i>Cyathea celebica</i> , Blume.	2	No Caudex
<i>Sphaeropteris concinna</i> , (Baker) Tyron., Aus. Previously:— <i>Cyathea felina</i> (Roxb) Morton.	5	1 m 3'-3"
<i>Sphaeropteris cooperi</i> (F. Muell) Tyron., Aus. Previously:— <i>Cyathea cooperi</i> , (F. Muell) Domin.	15	3 m 9'-9"
<i>Dicksonia antarctica</i> , Labill., Aus., N.Z., Tas.	16	2 m 6'-6"
<i>Dicksonia fibrosa</i> , Colenso, New Zealand.	10	1 m 3'-3"
<i>Dicksonia squarrosa</i> , Swartz, New Zealand.	14	2 m 6'-6"
<i>Dicksonia youngiae</i> , C. Moore, Australia.	14	1 m 3'-3"

FAMILY: OSMUNDACEAE, LINNAEUS

<i>Todea barbara</i> , (L) T. Moore, Australia.	16	No Caudex
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Other Osmundaceae are *Leptopteris fraseri*, (Hook) Et Grev Presl of Aus., *Leptopteris hymenophyllodes*, Presl of New Zealand, *Leptopteris moorei* (Baker) C. Chr. of Lord Howe Is., and *Leptopteris superba*, Hooker of New Zealand. These have been tried but all have failed here as they require specialist treatment with micro climatic conditions.

¹ The generic names used are those proposed by Prof. H. T. Clifford in "Ferns and Fern Allies and Confers of Australia" but to avoid confusion I have given the names accepted for many years by Australian botanists.

Editor's Note: All articles are checked by botanists before publishing. The names proposed by Prof. Clifford are not generally recognised in Australia, a situation that has caused extensive delays with Ray Best's article for which I apologise to him. In desperation, I contacted Prof. Clifford who advises: "I have no strong feelings as whether *Cyathea* is accepted in the broad sense as apparently is done at Kew, England, and is followed by most Australian botanists or if this genus is restricted largely to South America with *Sphaeropteris* and *Alsophila* occurring in Australia and south east Asia. I accepted the segregate genera because of the view taken by Tyrons with a large treatise of South American ferns, and by Dr Chris Page of Edinburgh Herbarium".

² As all these ferns have been grown from spores the age given will include the propagation period.

The Myrtle family includes a number of plants which form the "backbone" of many gardens. It is rare, indeed, to find a garden without the mandatory "gum tree", "bottlebrush" and "paperbark". For a plant family comprising more than 50 Australian genera and well over a thousand species, the Myrtaceae is, however, not used to anything like its true potential . . . there is far too much emphasis placed on far too few species.

I don't know about the rest of you but I'm sick of the sight of *Melaleuca armillaris* and I'm quite prepared to take an axe to the next *Eucalyptus nicholii* that I come across. Beautiful plants both . . . but give me some variety, I beg you!

Among the less common members of the Myrtle family are the genera *Darwinia* and *Homoranthus*. These are particular favourites of mine and they include many plants which are suitable to east coast gardens. Unfortunately, they don't seem to be planted anywhere near as often as they deserve, even by enthusiasts. Really, they are marvellous little plants, few reaching more than a metre or so high. *Darwinia* occurs in both the east and the west of the continent and, like most things botanic, the eastern ones are a lot easier to get along with than the western.

One of the best and most reliable of the *Darwinia* is a little groundcover . . . the prostrate form of *Darwinia taxifolia* (known botanically as subspecies *macro-laena*). This one is not particularly vigorous but will eventually cover a metre or so in diameter and produce spectacular clusters of red flowers for about three months during winter and spring. I hesitate to say "it's a must for every garden" because there's no such thing; but it really is a little beauty. It doesn't seem to be worried by frost. See the colour plate on the next page.

Darwinia grandiflora is another excellent light groundcover which is sometimes confused with the former species. The true *D. grandiflora* has smaller flower clusters and is not as flamboyant; it also tends to form roots where stems touch the ground which does not happen with *D. taxifolia*. Like many of the eastern *Darwinia*, *D. grandiflora* has a restricted natural occurrence, in this case on the plateau west of Wollongong.

Darwinia fascicularis probably needs little introduction, but there are several forms. Typically, it's a shrub to about 1.5 metres high with clusters of white flowers aging to red. The variety *oligantha* occurs on exposed clifftops in the upper Blue Mountains where it is prostrate (although it doesn't seem to retain that habit in cultivation at lower altitudes).

Another form of *Darwinia fascicularis* that I came across recently was actually sold to me as *Homoranthus papillatus* but that can't be right because the flowers are typical *Darwinia*. This form is prostrate with greyish foliage. Incidentally, the difference between *Homoranthus* and *Darwinia* is that the former has single or multiple awns (fine hairs) on the calyx lobes of the flowers; these are absent in *Darwinia* . . . simple, isn't it!! If you're still not convinced, I recommend that you obtain a copy of Trevor Blake's excellent little book "A Guide to Darwinia and Homoranthus" which has good colour photographs and superb line drawings to illustrate the subtle differences. ■

Gardens in Miniature

Editor

Many people are forced to make do with a small garden, a collection of pots on a porch or balcony, or a feature rockery. Every decorative garden should have a "miniature" section placed for quiet observation and reflection. The use of plants to adorn a small area, to provide a "mood" or a miniature "world" of tranquillity is a tradition with many races, the oriental people being famous for their art.

There are thousands of plants in the Australian flora ideally suited for use in miniature gardens, delicate, unique, striking, restful, the whole scene, and yet this has not become an art in Australia. A new book "Gardens In Miniature" by Sue Forrester and Bill Molyneux seeks to introduce you to the fundamentals.



Darwinia taxiflora

Photography by Brian Walters

A beautiful small plant (described on page 63) that is one of the many *Darwinia* recommended by Sue and Bill for miniature gardens. A most unusual flora gem.

Gardens In Miniature

Sue Forrester and Bill Molyneux

Australian plants in pots, pipes, planter boxes, hanging baskets, even small rockeries. Sue and Bill have put together a practical book with step by step procedures to follow, to success. Not everyone has a large area to garden. Not everyone is able to garden a large area. Everyone has a living area to beautify, beside the pool or barbeque, the porch or window ledge. Why not try a garden in pots, decorative pots, or hanging baskets. This book will show you how. Available from The Editor, Australian Plants, 860 Henry Lawson Drive, Picnic Point 2213, for \$28.00, post free.

Grow What Small Plant

Editor

In each issue of Australian Plants it is proposed to present, in colour, an attractive wildflower garden as an inspiration and guidance to us all. There is a lesson to be learnt from every success story and the photograph below, reproduced from "Grow What Small Plant", see below for details, has an important lesson. A paragraph quoted directly from this well presented book reveals an important message.

"A bank of very heavy clay left after the digging of house foundations, can become an asset, not a liability, as shown below. A mound or raised bed will provide the excellent drainage that many plants need to keep growing happily. In a clay soil area, a sand mound will provide the perfect drainage needed by many dry area plants. In sandy areas, a clay mound will suit plants such as *Grevillea* which often prefer heavy soils".



Grow What Small Plant

Australian Plant Study Group

Accurate and easily read, this book provides information on 1000 natives that grow no more than one metre high. The home garden needs a few specimen plants of character, large shrubs along the fence as a screen or windbreak, but dozens even hundreds of small plants that will be happy with the minimum of attention and produce an occasional blaze of colour. Those who have purchased the other books in this series will know what you get is practical advice from a group of very experienced growers, with a minimum of fancy words. This and others in the series are available from The Editor, Australian Plants, by mail, post free as follows:

Grow What Small Plant — \$28.00
Grow What Tree — \$28.00

Grow What Where — \$25.00
Grow What Basic — \$19.00.

Verticordia

by G. Eastwood, Latrobe Valley, Victoria

Bryan Sheridan's account of *Verticordia* in his garden was pleasing to read about, especially to this *Verticordia* admirer. I can never match the variety or numbers of specimens he has cultivated. Very rarely *Verticordia chrysantha* and *V. plumosa* appear for sale in Victorian nurseries but no others.

In my garden I have one each of *Verticordia densiflora*, *V. drummondii*, *V. chrysantha* and three *V. monadelpha*, all 3-5 years old plus a recently acquired *V. plumosa* nine months old. To plant, I prepare a circular hole just a bit bigger than the pot. The ground must have only received rain. I put the plant in and press the soil firmly. I like my plants sitting above the soil a couple of centimetres. Soil is then shaped up to and over the potted section of the plant leaving a little hillock. This stops water pouring into the disturbed soil. I never water my plants in.

The Latrobe Valley that I live in is one of the coolest and wettest regions on the mainland. A number of years ago when I knew very little about native plants I bought a *V. densiflora* that lasted eight years. I recently and reluctantly pulled this plant out to make way for five offspring nearby. Last winter I gave one of these seedlings to a native plant enthusiast and it is thriving. The other four seedlings are now eighteen months old, one plant being 49 × 44 cm.

Even though no rain has fallen for six weeks up to this date, the *Verticordia* are very healthy. My clay soil, particularly the top, is hard as concrete. I do not water my plants or give them fertiliser. Apart from the *V. plumosa* and *V. chrysantha* the rest of the plants are in full bloom — February.

Up to three months ago I had a second *V. drummondii* nearly four years old, that was planted against the house. In this spot it is necessary to stake because of the vicious winds that develop. Unfortunately, the stake had rotted and the wind ruined the root system. I have been lucky with *Verticordia* as for the number of plants I have had, the death rate has been small. ■

Callistemon 'Cinderella'***

The origin of this cultivar is unknown. The parent plant has been growing in the garden of Mr. and Mrs. J. Conde of Arnold Street, Killara, N.S.W., since 1966. The plant was already present in the garden when the property was purchased. It grows to 3.5 m tall by 2.5 m wide. The inflorescence is ca. 7 cm long by 5.5 cm wide and musk pink, fading rather quickly to a silver pink. The anthers are green yellow. The filaments are red group 48B; anthers, to yellow-green 147B.

Callistemon viminalis 'Rose Opal'***

This cultivar was raised from seed collected at the Wappa Falls on the South Arm of the Maroochy River by W. G. Trapnell and K. A. W. Williams in August, 1956. The population of *C. viminalis* in this area was smaller (± 4 m) than the more usual form of *C. viminalis* which grows to ± 5.5 m in height. Twenty-four seedlings were raised from the seed and planted on Mr. C. Broadley's property in Oxley, Brisbane. As the plants matured they varied in height from ± 2 m to ± 4 m in height. When flowering in spring of 1962 some colour variation became apparent. Examination by Mr. Trapnell led to the selection of one of these seedlings as *C. viminalis* 'Rose Opal'. Cuttings were taken in 1968 for propagation at the Save the Trees Nursery at Zillmere, Queensland.

Callistemon viminalis 'Rose Opal' is a dwarf and compact form of *C. viminalis* growing to 1.5-1.8 m high by 1 m wide. The inflorescence is rosy red which readily distinguishes the cultivar from the usual coloured forms of *C. viminalis*. The inflorescence is 7-8 cm long. Flowering is in spring and autumn. It is distinguished from the other forms of *C. viminalis* by its compact habit and flower colour. The stamens are within the range of Red Group 50A, 51A, 53B.

*** Australian plant cultivars registered with The Australian Cultivar Registration Authority.

Calectasia

This report, prepared by Peter Bailey, is based upon the recent publication of these species in Vol. 46 of Flora of Australia.

Calectasia are perennial herbs to about 60 cm high with short (to 17 mm) linear leaves that are pungent or sometimes almost obtuse. The flowers can be recognised by the spreading star-like blue or purple lobes to 17 mm long and the exerted yellow filaments, see colour plates on the next page.

Cultivation has proven difficult as they are slow growing, at least to get established, and they are difficult to obtain as they are difficult to propagate. For details, see page 261 of Volume 13, Australian Plants.



***Calectasia cyanea* R. Br.**

This plant suckers up from a very short rhizome in stems to 50 cm long. The leaves as shown in the photograph on page 68 are 5-15 mm long and pungent or pointed. The flowers are an iridescent blue and fading or sometimes deep blue turning reddish purple, the anthers yellow turning orange or red.

This plant is widespread in south-west Western Australia growing in sand and sometimes gravelly sand in heath and low open woodland. The flowering period is June to October. It may be distinguished in having a perianth tube 5-8 mm long (not 9-12 mm) and anthers turning orange or red (not remaining yellow or turning brown).

***Calectasia grandiflora* Preiss**

This plant arises from a very short rhizome on stems to 40 cm. The leaves are also 5-15 mm long and pungent to almost obtuse. The flowers are a deep iridescent blue or purple, the anthers remaining yellow.

This species is also widespread in south-west Western Australia growing in sand, sandy loam and gravelly sand in heath and rarely in woodland. The flowering period is June to October. It may be distinguished in having staminal filaments 3-4 mm long (not 1-3 mm) and anthers remaining yellow.



***Calectasia intermedia* Sonder**

The rhizome of this species may be up to 50 cm long producing stems to 50 cm long. The leaves are 5-17 mm long and also pungent. The flowers are a deep iridescent blue, the anthers yellow turning golden-brown.

This plant occurs in south-east South Australia and western Victoria growing in sand and sandy loam or sometimes rocky soil in open woodland and heath. The flowering period is mainly September to October. It may be distinguished in having a longer rhizome and the basal anther lobes are acute (not obtuse).

***Calectasia* Study**

This is a plant worthy of further study. Would readers report any plants that appear of exceptional value in flower size or colour and especially on any plants flowering later than others in December-January — Editor.





Calectasia grandiflora (above)

Photography by Alex George

Rising from a short rhizome, these stems of magnificent flower look equally spectacular in the garden or a container. The iridescent blue to purple "petals" may be from 13 to 17 mm long making this a flower that will be noticed.

Calectasia intermedia (opposite)

Photography by Dr B. Wallace

This plant is growing in the rockery at the Australian National Botanic Garden at Canberra. While the plant above is from Western Australia, the plant opposite is from Eastern Australia and shows great promise for horticultural development.

Syzygium and Allied genera

*Acmenosperma, Acmena
Eugenia, Waterhousea*

Notes by D. T. Woolcock, sketches by C. E. Woolcock; based on "A Revision of Syzygium and Allied Genera" by B. P. M. Hyland, Australian Journal of Botany No. 9, 17.8.83. Supplied for your guidance following a request by Editor, Australian Plants.

This group of mainly rainforest plants has been divided into five genera comprising part of the large plant family, Myrtaceae, which includes *Eucalyptus*, bottle-brushes (*Callistemon*, *Melaleuca*), tea-trees (*Leptospermum*), etc. The genera may be distinguished from each other on the basis of details of flowers or fruits as shown in the sketch opposite. For those keen to learn a little about the identification of plants, the following botanical key is offered with features shown in the sketches opposite. Too heavy for you? — then pass on to the illustrated descriptions.



Guide to genera based on Floral Structure

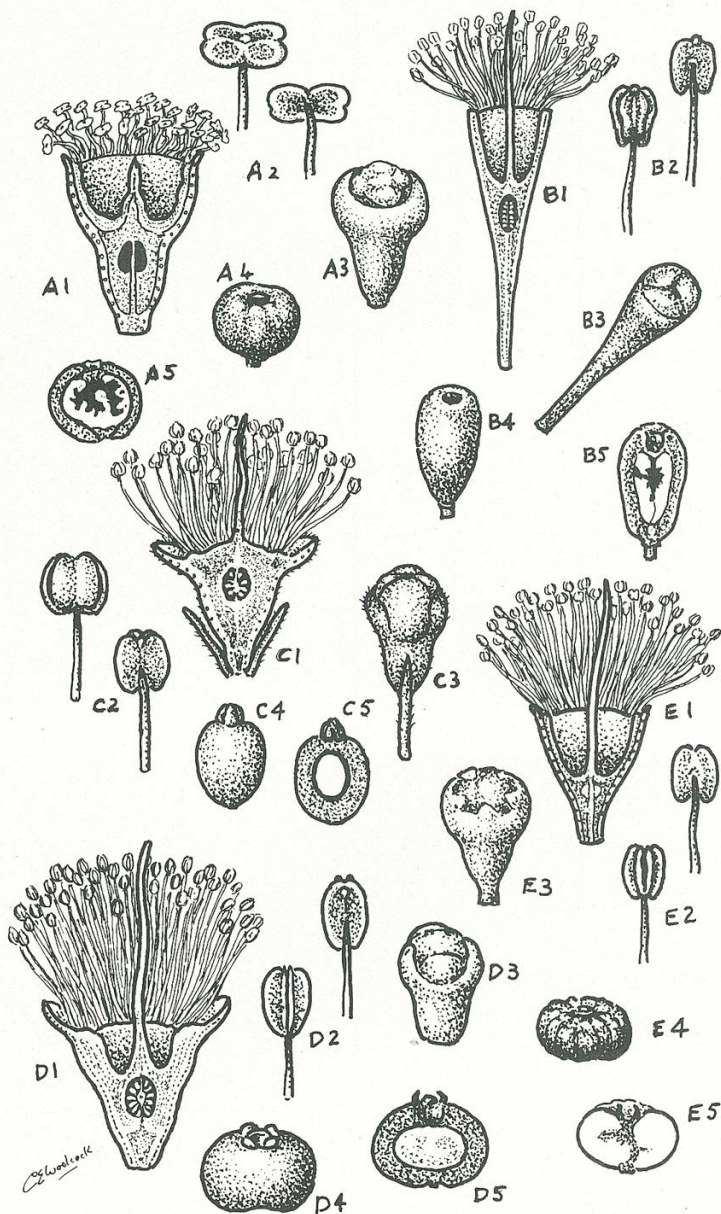
(Terms used for bud-shape are clavate = club-shaped; turbinate = dome-shaped; pyriform = pear-shaped; tubiform = tube-shaped; ovate = egg shaped).

- 1a. Flower buds and vegetative buds pubescent (hairy); persistent bracts (modified leaves) cupping the flower as in detail **C1** and remaining when the flower is mature; flower stalk absent *Eugenia*
- 1b. In the other genera the flower buds are glabrous (not hairy), though in rare cases some hairs are present; there are usually no bracts cupping the flower at maturity; and usually flower stalks (pedicels) are present.
- 2a. Anther sacs on stamens (see **A2** opposite) are globose or almost so; calyx lobes are small but free from one another *Acmena*
- 2b. Anther sacs on stamens elongated as shown in **A2** and **B2**, calyx lobes large or small, free but sometimes fused to form a cap.
- 3a. Petals usually 6-8; flower buds clavate (club-shaped) *Acmenosperma*
- 3b. Petals usually 4-5, occasionally 3; flower buds variable, sometimes clavate.
 Petals joined in rim *Syzygium*
 and *Waterhousea*

Guide to genera based on Fruiting Material

- 1a. Fruit globular, or depressed globular, **A4** opposite *Acmena*
- 1b. In the other genera, fruit cylindrical, pyriform (pear-shaped), turbinate (dome-shaped).
- 2a. Persistent calyx tube projecting from top of fruit, **C4** *Eugenia*
 And if the pericarp (fruit wall) is thin and membranous *Waterhousea*
- 2b. Apex of fruit without persistent calyx tube, pericarp fleshy *Acmena*
3. Ovule attachment to placenta (part of the ovary to which ovules are attached by stalk):
 - a. confined to the apex of each locule (fruit cell) *Waterhousea*
 - b. placenta extending from base to apex or confined to middle of each locule *Syzygium*
 in 2 vertical rows in each locule *Acmenosperma*
 near the top of ovary *Acmena*
4. Cotyledons (seed-leaves) almost or completely separate *Syzygium*
 Cotyledons partly fused or closely interlocked *Acmena*





Acmena: A1, flower (cross-section) — A2, stamen — A3, bud — A4, fruit — A5, fruit in cross-section.

Acmenosperma: B1, flower (cross-section) — B2, stamen — B3, bud — B4, fruit — B5, fruit in cross-section.

Eugenia: C1, flower (cross-section) — C2, stamen — C3, bud — C4, fruit — C5, fruit in cross-section.

Syzygium: D1, flower (cross-section) — D2, stamen — D3, bud — D4, fruit — D5, fruit in cross-section.

Waterhousea: E1, flower (cross-section) — E2, stamen — E3, bud — E4, fruit — E5, fruit in cross-section.



Syzygium hodgkinsoniae, flower $\triangle$ and fruit ∇

Photography by David Hockings





Syzygium oleosum $\triangle$, described on page 87

Photography by A. Rodd

Syzygium paniculatum ∇ , described on page 87

Photography by A. Rodd



THE GENUS *ACMENOSPERMA*

This genus (related to the SE Asian species *Eugenia claviflora*) has 2 species in Australia. *Acmenosperma* species are distinguished from *Syzygium* species in usually having 6-8 petals, not 3-5.

Acmenosperma claviflorum

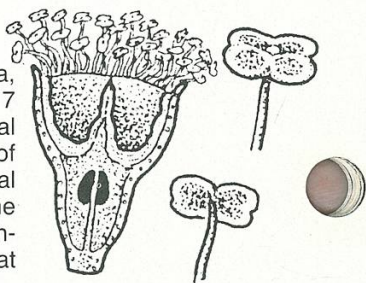
Found in rainforests from Carmila to Torres Strait and on Melville Island, NT, at altitudes from sea level to 800 m — also widely distributed outside Australia in India, Burma, Malaya, Indonesia, China, Philippines, Papua New Guinea. *A. claviflorum* has leaves **A1**, **B1** that are opposite, with stalk, oil-dotted, marginal vein visible, about 7-13 cm long, 3-6 cm wide. The flowers are in compound sprays or clusters **A1** at branch ends or in axils, and flower bracts fall off early. Buds are club-shaped (clavate), shown in flower cluster in **A1**; calyx tube is 2-4 mm diam, calyx lobes rounded, small, inconspicuous (as in **B4**); petals 6-8, round, oil-dotted; stamens have outer filaments of moderate length and a staminal gland conspicuous on the apex **A2**. The ovary is 2-3-celled, ovules hanging in 2 vertical rows in each cell **A3**; fruits are berry-like **A4**, cylindrical, succulent, seed solitary.

Acmenosperma pringlei

Occurring in rainforest or fringing forest along creeks at Bathurst Bay, Cape York Peninsula, at altitudes 5-30 m on granite, *A. pringlei* appears endemic in Australia and has been named recently by B. Hyland as sp. nov. Leaves are generally shorter and narrower than in *A. claviflorum*, 7-8 cm long, 2.5 cm wide, and have mostly fewer lateral veins — features seen in Plate III **A1**, **B1**. Flowers are in compound clusters as in previous species **A1**, **B1**. The gland on the stamen apex is absent or inconspicuous **B2**. Ovules are in 2 vertical rows (**B3** — cross section of flower) and the fruit is succulent, cylindrical to pear-shaped **B5**, ovules 8-10 per locule (ovary fruit cell), but usually mature seed is solitary.

THE GENUS *ACMENA*

This genus of 15 species ranges from Asia, Malasia, Solomon Islands to Australia and 6 of the 7 Australian species appear to be endemic. A typical flower in cross-section shows how the cluster of stamens, usually short, hides the style (the central female part of the flower leading to the ovules in the lower compartment (ovary)). *Acmena* is distinguished from the other genera in having anthers that are globular, not elongated and parallel.

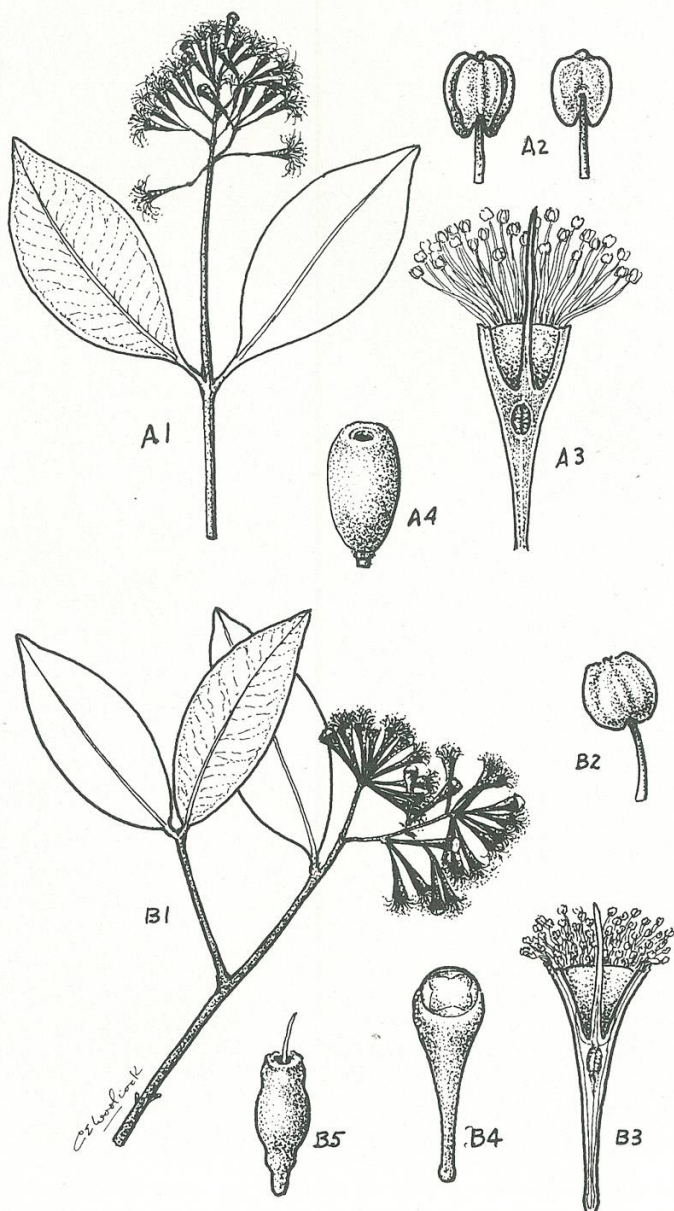


1. Species with large fruit and few ovules per cell (locule)

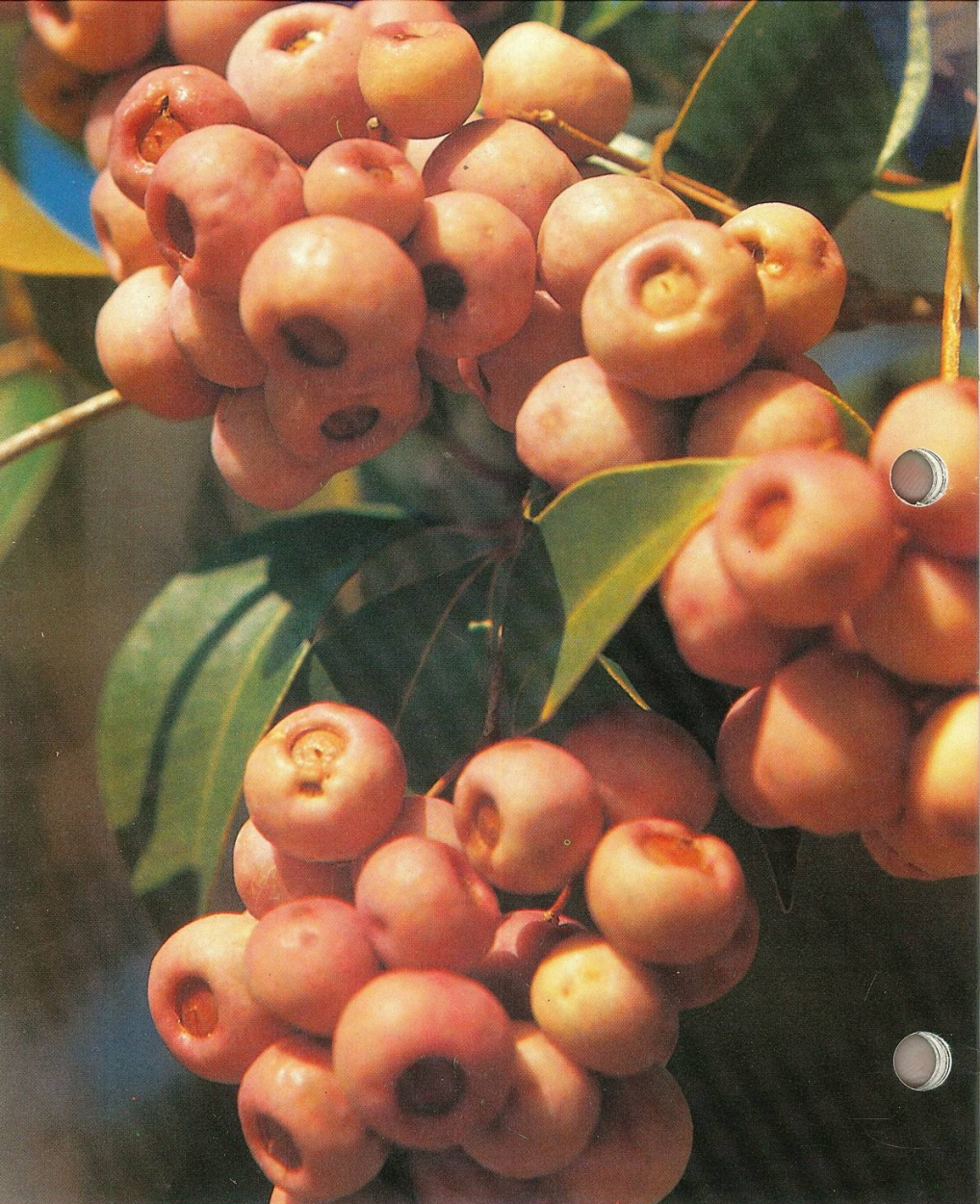
- A. mackinnoniana*: the leaves have the midrib slightly raised or flush with the upper surface of the leaf, but in accompanying 3 species the midrib is depressed at least towards the base.
- A. divaricata*: leaf margin flat or slightly recurved but not thickened or incurved at base.
- A. graveolens*: leaf margin recurved but incurved and thickened at base.
- A. brachyandra*: calyx tube plus pedicel 1.5-3 mm long, shorter than the preceding 2 species with length to 5 mm.

2. Species with a small fruit and numerous ovules per locule — species in this group are closely related and appear to grade into one another where ranges overlap.

- A. hemilampra*; *A. resa*; *A. smithii*.



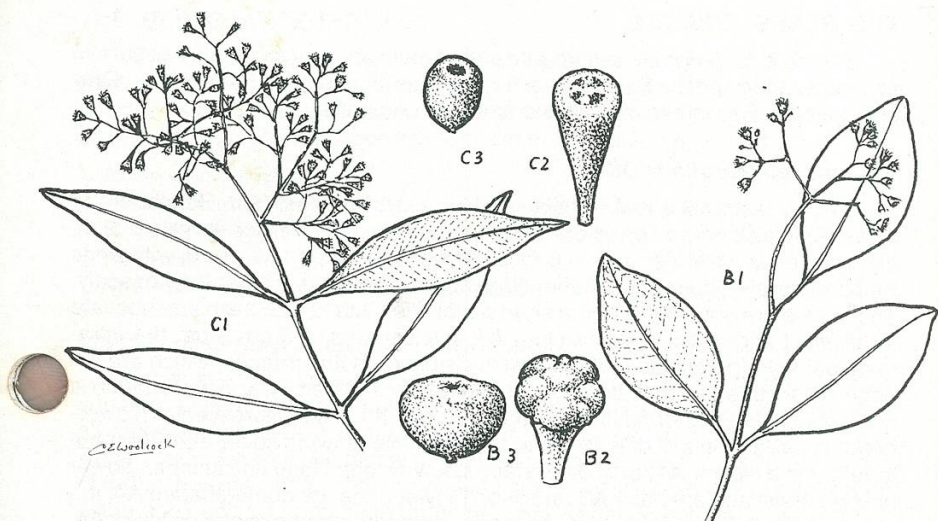
Acmenosperma claviflorum: A1, habit — A2, stamen — A3, flower (cross-section) — A4, fruit.
Acmenosperma pringlei: B1, habit — B2, stamen — B3, flower — B4, bud — B5, fruit.



Acmena smithii (above)

Photography by Lois Sourry

Usually a medium sized to tall tree, to 20 m high, sometimes a shrub in exposed coastal conditions, *A. smithii* is distributed along the east coast of Australia from eastern Victoria to northern Queensland, in altitude from sea-level to 1200 m, preferring sites along streams and rivers. The foliage is usually very dense and glossy, forming a compact crown and extending towards the ground making it a useful ornamental species for gardens and parks. Its preference is for rainforest situations, especially along the edges of the sub-tropical rainforests. However, it can grow well in southern temperate rainforests — and is well established in wet coastal conditions on the south coast of Victoria at Portland. *A. smithii* differs from the other species mainly in fruit colour and leaf shape.



Acmena mackinnoniana: B1, habit — B2, pear-shaped bud — B3, fruit about 40 mm in diameter.
Acmena resa: C1, habit — C2, club-shaped to tubiform bud — C3, fruit, 12-16 mm in diameter.

***Acmena mackinnoniana* B. Hyland sp. nov.**

Growing in the rainforests of Cape York Peninsula to the Iron Range and McIlwraith Range areas, from sea level to 500 m levels, *A. mackinnoniana* is a tree to 30 m tall with rounded twigs, bark smooth and pale. Mature leaves as on the branch B1 above, are opposite, sometimes in whorls of 3, with short stalk (petiole), blade elliptical, apex acuminate to obtuse, base tapering, intramarginal veins, usually 2, somewhat obscure but visible both surfaces, oil-dotted, midrib slightly raised but sometimes grooved on upper surface. Flowers are in many clusters, each of 4-5 flowers, terminal and in upper axils; bracts deciduous. Buds, B2, are pear-shaped (pyriform) to dome-shaped (turbinate); calyx lobes small, rounded, concave; petals round (1.5 mm diam.) oil dots large and conspicuous. Fruit, B3, is dull pink to reddish, hemispherical to depressed globular, about 40 mm diam., apex with scar 20-30 mm across; pericarp leathery but brittle, granular in texture.

***Acmena resa* B. Hyland sp. nov.**

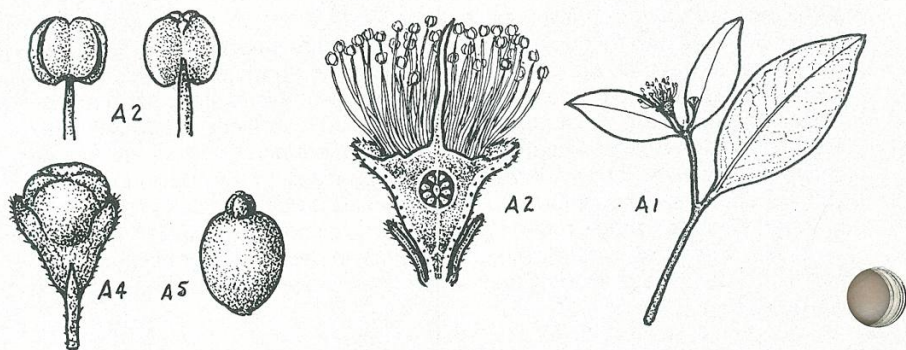
Acmena resa is a tree to 40 m tall, with twigs rounded but slightly 4-angled and flattened at nodes when young. Leaves as on the branch C1 above, are opposite petiole (stalk) 4-13 mm long, blade lanceolate to elliptical, margin wavy, apex acuminate, base tapering; intramarginal vein visible on both surfaces; oil-dotted with conspicuous oil dots; midrib grooved or depressed on upper surface towards base. Flowers are in many sprays and clusters, usually 4-5 per cluster, at ends of branches and in upper axils; bracts deciduous, buds C2 are club-shaped to tubiform; calyx tube tapers into the pedicel, calyx lobes rounded, small, inconspicuous; petals cohering by inflexed tips, irregular in shape, oil dots large but few. Fruits, C3, are globular, white or cream sometimes with green or mauve tinge, flattened or shallowly excavated at apex, 12-16 mm diam.

THE GENUS *EUGENIA*

Eugenia is generally regarded as an American genus but also occurs in southern Africa and the Pacific area. It is a genus of more than 500 species. Only one species, *Eugenia reinwardtiana*, occurs in Australia.

Eugenia reinwardtiana DC.

Widely distributed in Australia — along the east coast from Bundaberg to Cape York, also some Torres Strait islands, at altitudes from sea-level to 500 m, this species is a slender tree to 6 m tall, but sometimes a low shrub, with twigs rounded (terete), downy and flattened at nodes when young, later flaky or scaly. The leaves are opposite **A1** on a short petiole (leaf stalk) with the blade obovate to elliptical and apex round or blunt **A1**, 2-9 cm long, 1-5 cm wide; the intra-marginal vein (parallel to leaf margin) is visible on both surfaces, which are oil-dotted (punctate), oil dots being sparse to dense and generally visible; midrib is grooved, depressed or flush with upper surface **A1**. The inflorescence (flower-head) is axillary (in axil of leaf) never truly terminal; flowers solitary or 3 or more together in a cluster **A1**; the flower stalk is downy, often long and slender; flower bracts persist and are hairy **A3** (at base). Flower buds are dome-shaped **A4**, the calyx is hairy **A4** and inner lobes are larger, rounded towards centre of flower **A4**. Anther sacs are elongated and dehiscence slits parallel. Fruits **A5** are red, globular or egg-shaped, calyx persistent at apex; pericarp (wall of seed-box) succulent.



Cultivation of *Eugenia*, *Syzygium*, etc.

A number of our previous issues have featured this group of plants, described those considered to be the best for horticulture, and given details of application. For instance, our No. 97* issue of Volume 12 described those species recommended for windbreaks, for shade, for attractive flowering, for attractive fruits, for colourful leaves, etc. In this issue we attempt to provide a complete reference to all the species concerned. A complete set of Australian Plants provides the most complete reference available to all our flora.

* Unfortunately, the No. 97 issue will not be available again until volume 12 is bound later this year. A valuable reference is "Australian Rainforest Plants — In the Forest and In The Garden", available for \$9.95 plus \$2.00 postage from Terania Rainforest Nursery, Terania Creek Road, The Channon via Lismore 2480. They can also supply a wide range of plants.

THE GENUS WATERHOUSEA

This new genus is closely allied to *Acmenosperma* but differs in having seed-placentas — the part of the fruit to which seeds are attached by stalk (the funicle) — at the apex of each seed chamber (locule) and not attached at the base or middle. The four species, endemic in Australia, may be grouped:

1. Fruit longitudinally ribbed

W. mulgraveana — with white, cream or brown fruit; short leaf stalks, 2-5 mm.

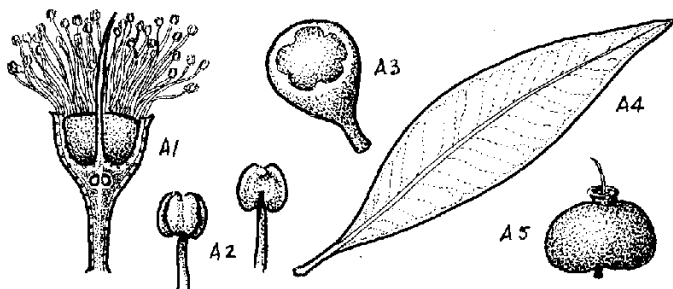
W. unipunctata — with fruit purplish-blue, bluish-black, purple or pink to mauve; leaf stalks 4-10 mm.

2. Fruit surface smooth — at least not ribbed.

W. floribunda — fruit 15-20 mm diam. *W. hedraiophylla* — fruit 8-9 mm diam.

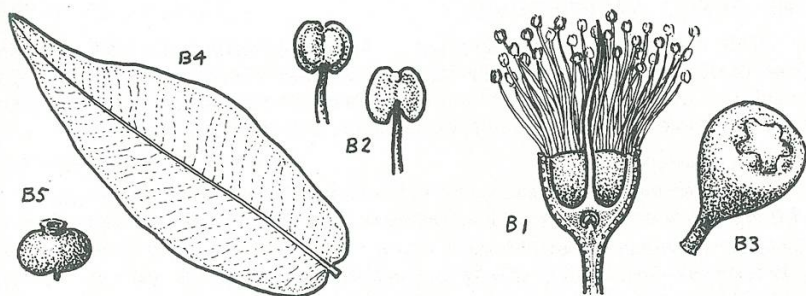
Waterhousea floribunda (previously *Syzygium floribundum*)

Growing at sea-level to 600 m and occurring in the forests of central and southern Queensland and northern New South Wales (Mackay to Newcastle), always along creeks and rivers, this tree to 30 m tall, has rounded twigs, 4-angled when young. Leaves, **A4** below, at first are alternate, later opposite or in whorls of three; they have short stalks, the blade of the leaf is lanceolate to elliptical with acute apex and tapering base, marginal vein visible on both surfaces, not conspicuously oil-dotted but dots numerous. Flowers, **A1**, are many, in small tight clusters, 4-5 flowers per cluster, and flower bracts fall off early. Buds, **A3**, are turbinate (dome-shaped), calyx lobes tiny, triangular in shape, petals are joined and rounded, oil-dotted and stamen as **A2** below. The fruit, **A5**, is usually green, becoming pink or reddish when mature, globe-shaped, crowned by remains of calyx. The pericarp (fruit wall) is thin forming an envelope around seed, usually solitary. Flowering mainly Nov.-Dec., fruits Jan.-April.



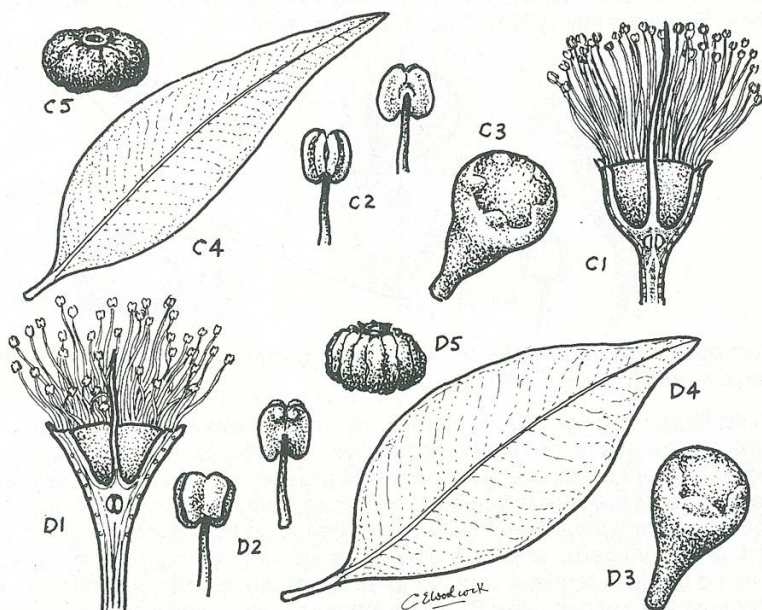
Waterhousea hedraiophylla (F. Muell.) B. Hyland comb. nov. (previously *Eugenia hedraiophylla*) F. Muell)

Distributed through the rainforests of north Queensland — Innisfail to Mosman — frequently on creeks and gullies, this tree, to 30 m tall, has twigs 4-angled or shortly 4-winged. The leaves **B4** are opposite, on a short stalk, and the leaf blade **B4** is elliptic to lance-shaped, apex acuminate (coming to an acute tip) base rounded; the intramarginal vein is visible on both surfaces, which are dotted with numerous small oil dots. Flowers are arranged in groups of 5-flowered clusters, terminal or in the axils, flower bracts often persisting. Buds are dome-shaped or globe-like **B3**; calyx lobes are small and inconspicuous and petals are joined, shed as a cap. The fruit, when ripe, is cream, green to reddish-purple, globular but sometimes 2-lobed. The fruit wall (pericarp) is very thin and covering the solitary seed like a skin. Flowering, October; fruit, Jan. to March.



Waterhousea unipunctata B. Hyland sp. nov. (closely related to *Waterhousea mulgraveana* B. Hyland)

Growing from sea-level to 1200 m altitude, this species occurs in the rain-forests of northern Queensland — Townsville to Cooktown. The tree, to 20 m tall, has leaves **D4** with leaf stalks, blade lanceolate to ovate (egg-shaped) otherwise similar to those of *W. floribunda*. The flowers are in many clusters, 4 flowers per cluster, and flower bracts fall early. The buds **D3** are pear-shaped to dome-shaped and the calyx lobes are small, triangular to slightly rounded. The fruit colour is variable — purplish-blue, bluish-black, purple, pink to mauve. The fruit **D5** is depressed, disc-like, apex hollowed out and surface of fruit ribbed or grooved. The fruit has thin walls forming a thick skin around the solitary seed.



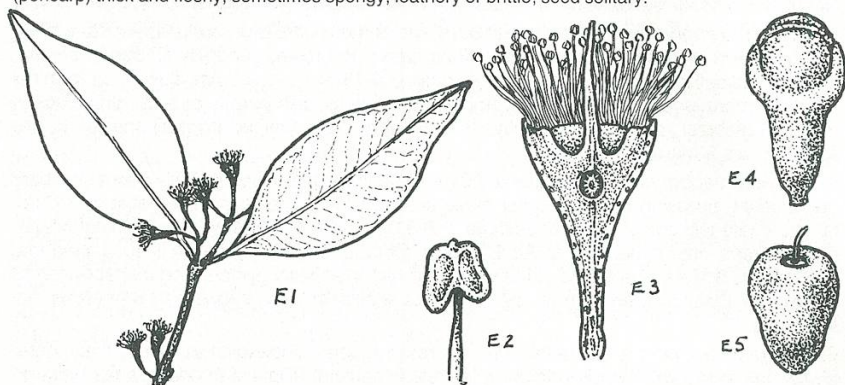
Waterhousea mulgraveana: C1, a flower — C2, stamen — C3, bud — C4, leaf — C5, fruit.

Waterhousea unipunctata: D1, cross-section of a flower — D2, stamen — D3, pear-shaped bud — D4, lanceolate to egg-shaped leaf — D5, depressed, disc-like fruit.

THE GENUS *SYZYGIUM*

This genus has a wide distribution, occurring in Africa, mainland Asia, Malaysia, Australia, New Zealand and western Pacific. Of the 52 species recorded in Australia, 41 appear to be endemic (found only in Australia). The range covered by members of this genus in Australia is the Kimberleys in WA, the Northern Territory from Daly River to Gove and Groote Eylandt; Cape York Peninsula, both the east and the west coasts; northern, central and southern Queensland; and northern New South Wales. A simplified reference to species is difficult but is attempted below.

Characters common to *Syzygium* species are similar to those for *Syzygium corynanthum* in the sketches below. The leaves, **E1**, are stalked (petiolate), rarely almost sessile, oil-dotted and with the intramarginal vein usually visible but sometimes lacking. Flowers are in compound sprays, occasionally in a spray or cluster of a few flowers, that are terminal (on tips of branches), axillary or on the stem. A typical flower is shown in cross-section **E3**. The buds, **E4**, are club-shaped (clavate) to egg-shaped (ovate); calyx lobes are generally present, though absent on species with a bud cap, variable in size and shape, mostly oil-dotted; petals are free or forming a cap, oil-dotted; stamens, **E2**, have variable outer filaments, short to very long, and anthers variable. The ovary is 2-celled (rarely 3), ovules radiating from a central axile placenta at apex of cell. Fruits, **E5**, are berry-like, calyx-lobes usually persisting; fruit wall (pericarp) thick and fleshy, sometimes spongy, leathery or brittle; seed solitary.



Syzygium species may be grouped (species number as in following descriptions):

Group I Outer staminal filaments less than or somewhat equalling the calyx tube and pedicel length.

Part A — Calyx lobes 4 mm or less (*S. eucalyptoides* ssp. *eucalyptoides* may reach 5 mm).

Species No. 7.8.11.14.15.18.19.20.21.24a.27.32.33.35.40.49.50.51b.

Part B — Calyx lobes 5 mm or more. 3. *S. amplum*.

Part C — Calyx calyptrate. 5. *S. apodophyllum*, 18. *S. corynanthum*, 28. *S. gustavioides*.

Group II Outer staminal filaments longer than but not exceeding twice the calyx tube and pedicel length.

Part A — Calyx lobes 4 mm or less (*S. rubrimolle* and *S. sayeri* may reach 5 mm while *S. kurandra* may be calyptrate). 1.4.9.13.26a.26b.30.31.34.36.41.42.43.44.47.48.51a.52.

Part B — Calyx lobes 5 mm or more. Species 2, 22, 24b and 48. below.

Part C — Calyx calyptrate. 37. *S. oleosum*.

Group III Outer staminal filaments at least twice the calyx tube and pedicel length.

Part A — Calyx lobes 4 mm or less (*S. aqueum* may reach 4.5 mm while *S. bamangense* and *S. fibrosum* may reach 5 mm). Species 6, 10, 25, 37, and 39.

Part B — Calyx lobes 5 mm or more (*S. boonjee* may have lobes down to 4 mm).

12. *S. boonjee*, 17. *S. cormiflorum*, 23. *S. erythroxum*, 29. *S. hodgkinsoniae*, 45. *S. sharonae*.

* We are indebted to Peter Bailey for this attempt to present such a large, difficult genus in such a manner that a reader may be able to identify a species should the major scientific work of Bernard Hyland not be on hand or be too difficult to follow. If a flower is available, see which Group and Part it fits, then refer to the short description that follows. Not a scientifically accurate way, but a good guide for the non-botanist — Editor.

The Genus *Syzygium*

A simplified guide by P. E. Bailey*

1. *Syzygium alatoramulum* is a tree to 20 m, often buttressed, bark flaky, occasionally papery, outer blaze brown and fibrous, leaves lanceolate to oblong, apex acuminate, 7-14 × 2.5-4.5 cm, flowers in terminal heads, 4-merous, whitish, September to January. Fruit pale white with pale violet tinge, globular to depressed globular, variable in size, 12-15 mm diameter. Distinguished from all species of *Syzygium* by its prominently winged twigs and small flowers.

2. *Syzygium alliligneum* is a tree to 30 m, often buttressed on larger specimens, bark papery, somewhat reddish, outer blaze somewhat granular in texture, cream to brown except for a narrow black or dark layer, leaves ovate, elliptic, apex acuminate, 7.5-11.5 × 4.0-5.5 cm, flowers in terminal heads, 4-merous, cream, February to March. Fruit red, globular to slightly cylindric, 40 × 35 mm. Fruit is edible and frequently forms a conspicuous part of the diet of the cassowary. Distinguished from other species in this section by the style which often exceeds the filaments, not equal or enclosed.

3. *Syzygium amplum* is a tree to 15 m, bark unknown, leaves elliptical, obovate, apex obtuse, 17-29 × 10-17 cm, flowers in heads on branches or twigs below the leaves, 4-merous, cream, flowering period in Australia unknown. Fruit possibly whitish green but probably red when ripe. New Guinea species extending into Australia. Fruit reported to be edible.

4. *Syzygium angophoroides* is a tree to 30 m, sometimes buttressed, bark papery, flaky, often orange-brown or reddish brown, outer blaze cream to brown, generally fibrous in texture, leaves elliptical to lanceolate, apex acuminate, 3.0-13.0 × 1.5-4.5 cm, flowers in terminal heads, 5-merous, cream, July to November. Fruit red, reddish purple, often turning black at maturity, globular, depressed globular, 9 × 13 mm. Distinguished from all species in this section by its 5-merous flowers.

5. *Syzygium apodophyllum* is a tree to 20 m, sometimes buttressed, usually about 8 m, bark nondescript, occasionally flaky, outer blaze cream, brown, grey-brown, variable in texture, leaves ovate-lanceolate, apex acuminate, 3.6-8.0 × 1.4-3.0 cm, flowers in terminal heads, (3-6)-merous, cream, January to April, August, October and November. It is suspected that this species flowers at any time of the year. Fruit red, irregularly pyriform (pear shape), 12-13 × 8-9 mm. Distinguished from all species in this section in having flowers (3-6)-merous, not 4-merous.

6. *Syzygium aqueum* is a tree to 20 m, buttressed, bark nondescript to slightly flaky, outer blaze pink to brown, fibrous in texture, leaves lanceolate, elliptical to ovate, apex acute to acuminate, 8.5-16.0 × 2.5-6.2 cm, flowers in axillary or terminal heads, 4-merous. Fruit red, campanulate (bell shape) to broadly campanulate, 25 mm long and 25 mm diameter. Found in New Guinea and cultivated in South-East Asia, so its discovery in Australia was not entirely unexpected. The fruit is edible but very acidic and oily.

7. *Syzygium argyropedicum* is a tree to 20 m, usually without buttresses, bark flaky, outer blaze pink and fibrous, leaves obovate, apex obtuse, rounded, sometimes emarginate (notched), 4.8-5.9 × 2.1-2.4 cm, flowers in terminal heads, (4-5)-merous, cream, December. Fruit possibly red, purple or almost black, depressed globular, 15-20 mm long × 20-28 mm diameter.

8. *Syzygium armstrongii* is a tree to 20 m, bark generally flaky, usually nondescript on smaller specimens, outer blaze pink-red, granular in texture, sometimes fibrous, leaves lanceolate, apex attenuate, 5.5-14.5 × 1.7-4.0 cm, flowers in terminal heads, 4-merous, cream, September to December. Fruit white (-yellow), depressed globular, 15 mm long and 22 mm diameter. The fruit is said to have an aromatic taste.

9. *Syzygium australe* is a tree to 24 m, sometimes buttressed, bark flaky, outer blaze cream, pink, rarely red, fibrous in texture, leaves lanceolate, obovate, apex very abruptly acuminate, 3.3-9.5 × 1.2-3.2 cm, flowers in terminal heads, 4-merous, every month, mostly in summer. Fruit frequently pink to red, sometimes purple, purplish red, bluish, carmine, purplish pink, globular, oval, ellipsoid, 14-23 × 8-17 mm. The fruit is edible. Rarely milled, known as Creek Satinash.

10. *Syzygium bamagense* is a tree to 35 m, buttressed on larger specimens, bark flaky, outer blaze generally pink-red and fibrous, leaves ovate, apex shortly acuminate, 8.5-15.5 × 4.5-8.0 cm, flowers in terminal heads, 4-merous, cream, November and December. Fruit white, cream to pale brown, globular to ovoid, 35-60. × 35-46 mm. Distinguished from all species in this section by having leaf petioles exceeding 10 mm (10-30 mm).

11. *Syzygium banksii* is a tree to 20 m but generally a small, poorly formed tree, bark flaky, occasionally nondescript, outer blaze red and fibrous, leaves narrowly elliptical, lanceolate, narrowly obovate, apex slightly acuminate, 8.0-12.0 × 1.9-3.8 cm, flowers in terminal heads, 5-merous, July to September. Fruit dark, plum-coloured to black, ellipsoid, 12-15 × 8-11 mm.

12. *Syzygium boonjee* is a shrub or small tree to 7 m, bark nondescript, outer blaze brownish, fibrous or granular in texture, leaves lanceolate, apex acuminate, 5.1-12.0 × 1.7-3.5 cm, flowers in terminal heads, 4-merous, February to July. Fruit variable in colour, green, pink, red or maroon, depressed globular, globular to ovoid, 30-40 mm diameter.

13. *Syzygium branderhorstii* is a tree to 25 m but generally much smaller, bark nondescript to flaky, blaze reddish brown and fibrous, leaves oblong, apex obtuse to shortly acuminate, 7.0-14.0 × 3.0-6.5 cm, flowers in heads on stems and branches, 4-merous, cream, rarely crimson, September to November. Fruit black, purple to white, 30-50 × 20-40 mm. The fruit is edible.

14. *Syzygium buettnerianum* is a tree to 25 m, generally buttressed, bark papery, outer blaze red-brown (except for the outermost green layer), granular to fibrous in texture, leaves elliptical, apex acuminate, 7.1-14.0 × 3.0-6.5 cm, flowers in terminal heads, 5-merous, cerise, November. Fruit deep red, maroon to almost black when ripe, somewhat globose, 15-20 × 16-20 mm.

15. *Syzygium bungadinnia* is a tree to 25 m, generally buttressed, bark papery, reddish, reddish brown, or orange-brown, outer blaze pink-red, fibrous in texture, leaves lanceolate, apex acuminate, 7.1-10.1 × 2.2-4.1 cm, flowers in terminal heads, 4-merous, possibly July and August. Fruit cream, depressed transversely ovoid, 35-50 mm high and 50-70 × 40-60 mm on the longer and shorter diameters. The fruit formed an important food of the Aborigines as it matures at a time of scarcity.

16. *Syzygium canicortex* is a tree to 35 m, generally buttressed, bark flaky on larger trees, nondescript on smaller specimens, outer blaze cream, brown, or greyish, generally granular in texture, occasionally fibrous, leaves elliptical, ovate, apex acuminate (generally markedly so), 1.1-6.4 × 0.8-2.2 cm, flower heads axillary, rarely terminal, 4-merous, December to May. Fruit red, frequently pyriform (pear shape) sometimes depressed globular, 6-9 mm diameter. Milled as Yellow Satinash.

17. *Syzygium cormiflorum* is a tree to 30 m, generally buttressed on larger specimens, bark generally flaky but nondescript on smaller specimens, outer blaze pink-red-brown, generally fibrous in texture, leaves oblong, elliptical to almost lanceolate, apex obtuse, acute or acuminate, 6.0-21.0 × 2.5-11.5 cm, flowers in heads on stems or branches (never terminal on leafy twigs), 4-merous, all months except December and January, but mainly July to September. Fruit white to cream/pink to reddish on smaller forms, globular to ovoid, 30-60 mm diameter. The fruit is sometimes eaten but is not particularly palatable. Milled as Bumpy Satinash. Distinguished from all species in this section by having flower heads on stems or branches (never terminal). Colour plate on page 183 of our No. 97 issue.

18. *Syzygium coryanthum* is a tree to 30 m, buttressed in most sizes, bark flaky or nondescript, outer blaze cream to brown, fibrous or glandular in texture, leaves elliptical, lanceolate, apex acuminate, acute or obtuse, 3.7-11.7 × 2.4-5.4 cm, flowers in terminal heads, 4-merous (occasionally 3 calyx lobes), April to July — northern form January. Fruit pink, red, pyriform (pear shape), 11-18 mm diameter. The fruit is edible but rather sour, suitable for jams and jellies. Milled as Killarney Satinash.

19. *Syzygium crebrinerve* is a tree to 35 m, buttressed on larger specimens, bark flaky, outer blaze pink to red, fibrous in texture, leaves lanceolate, apex acuminate (often very gradually so), 6.2-13.0 × 2.0-3.9 cm, flowers in terminal heads 4(rarely 5)-merous, November and December. Fruit pink, red, bluish purple, purplish red, violet or magenta, depressed globular, 17-25 mm diameter. Milled as Rose Satinash.

20. *Syzygium dansiei* is a tree to 30 m, buttressed on larger specimens, bark flaky, outer blaze pink, red, fibrous in texture, leaves lanceolate, elliptical, apex acuminate, 4.7-5.8 × 1.5-2.6 cm, flowers in terminal heads, 4-merous, November and December. Fruit pink with a lavender or purplish tinge, depressed globular, 25-30 mm diameter.

21. *Syzygium endophloium* is a tree to 40 m, generally buttressed, bark flaky or nondescript, outer blaze pinkish, reddish, granular in texture, occasionally fibrous, leaves lanceolate, elliptical, obovate, apex acuminate, 3.8-8.5 × 1.3-3.8 cm, flowers in terminal heads, 4-merous, cream, October to December. Fruit dark red, maroon, almost black, globular, 10-12 × 10-16 mm.

22. *Syzygium erythrocalyx* is a tree to 17 m, buttressed only on larger specimens, bark nondescript, occasionally flaky, outer blaze pink, occasionally red or brownish, granular or fibrous in texture, leaves elliptical, oblong to obovate, apex obtuse to acuminate, 11.7-31.0 × 5.4-11.0 cm, flowers in heads on stems or branches or terminal, 4-merous, July to August. Fruit white or red, globular, 50-70 mm diameter — generally somewhat smaller. The fruit is edible and reasonably palatable. Distinguished from other species in this section by having flower heads on stems or branches as well as terminal.

23. *Syzygium erythroxum* is a tree to 12 m, bark nondescript, outer blaze brown and fibrous on trees but paler on smaller individuals, leaves lanceolate, elliptical, ovate or obovate, apex acuminate often abruptly so, 5.2-10.8 × 1.3-4.4 cm, flowers in terminal heads, 4-merous, February to August. Fruit red or reddish white when ripe, depressed globular or depressed transversely ovoid, 20-30 mm long and 25-45 mm diameter on the longer axis. The flowers are sometimes fragrant and the scent has been compared with that of *Gardenia*.

24a. *Syzygium eucalyptoides* is a tree to 18 m, bark flaky or nondescript, outer blaze brown, fibrous or granular in texture, leaves linear to lanceolate, apex obtuse, acute or very gradually tapering to a fine point, 7.0-15.0 × 0.4-2.3 cm, flowers in terminal heads, 4-merous, August to November. Fruit variable in colour, red, pink, green flushed with pink, cream flushed with pink, cream, globular, 30 mm diameter. The fruit is edible.

24b. *Syzygium eucalyptoides* is a tree to 10 m, bark pale, flaky or nondescript, outer blaze cream to dark brown, granular in texture, leaves variable, orbicular to lanceolate, generally quite thick, apex obtuse, rounded to shortly acuminate, 4.0-13.6 × 1.8-11.9 cm, flowers in terminal heads, 4-merous, cream, August to November. Fruit white, cream, pink, globular, 40 mm diameter. The fruits can be eaten but have limited appeal.

25. *Syzygium fibrosum* is a tree to 15 m, usually without buttresses, bark nondescript, occasionally flaky, outer blaze brown and fibrous, leaves lanceolate, elliptical, apex acuminate (often abruptly), 6.3-10.8 × 2.9-5.2 cm, flowers in terminal heads, 4-merous, April to December. Fruit pink, red or scarlet, globular or depressed globular, 10-16 mm high and 18-21 mm diameter. The fruits are edible and have been used to make jam and tarts. There is a colour plate on page 200 of our No. 97 issue.

26a. *Syzygium forte* is a tree to 30 m, sometimes buttressed, bark papery or flaky, frequently reddish, outer blaze red and fibrous, leaves narrowly ovate, elliptical, lanceolate, apex obtuse, rounded sometimes emarginate (notched) or tapering to a blunt point, 7.7-12.8 × 2.5-6.0 cm, flowers in terminal heads below the leaves or inside the crown of the tree, 4-merous, September to January. Fruit white, cream, depressed globular, 25 mm high and 30 mm diameter.

26b. *Syzygium forte* is a tree to 25 m, occasionally buttressed on larger specimens, bark papery, flaky, outer blaze pink, red, fibrous in texture, leaves orbicular, obovate, apex obtuse, rounded, sometimes emarginate (notched), 7.1-14.7 × 3.6-8.8 cm, flowers in terminal heads, 4-merous, September to December. Fruit white, cream, depressed globular, globular, ovoid or doliform (barrel shape), 30-40 mm high and 30-40 mm diameter. Occasionally milled as Flaky-barked Satinash.

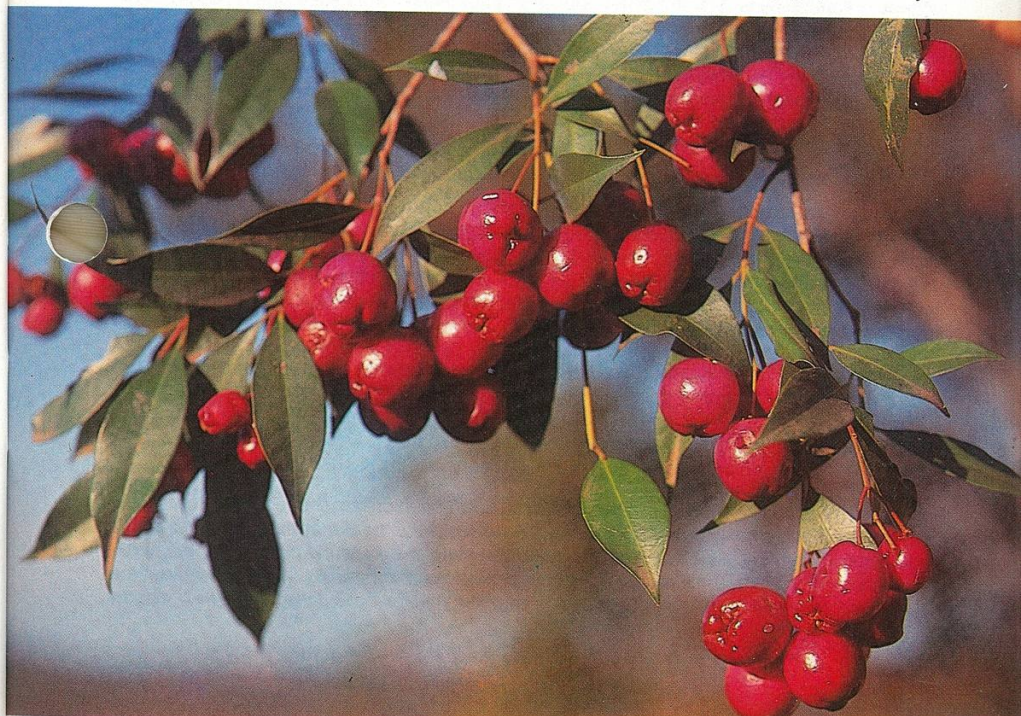


Syzygium cormiflorum Δ , described on page 83

Photography by David Hockings

Syzygium australe ∇ , described on page 82

Photography by Lois Sourry



27. *Syzygium francisii* is a tree to 30 m, buttressed on larger specimens, bark generally flaky, occasionally nondescript, outer blaze cream, pink or brown, fibrous in texture, leaves ovate, elliptical, apex acuminate to acute, 8.9-6.9 × 1.5-3.4 cm, flowers in terminal heads, 4-merous, August to December. Fruit mauve, purple or purplish blue, depressed globular, 7-13 mm high and 10-19 mm diameter. Milled as Rose Satinash.

28. *Syzygium gustavioides* is a tree to 40 m, generally buttressed, bark flaky (rarely nondescript), often orange-brown or pinkish brown, outer blaze brown, rarely cream, fibrous in texture, leaves elliptical, apex acuminate, 6.0-14.6 × 2.6-7.0 cm, flowers in terminal heads, 4-merous, most months. Fruit variable, greenish but ripening to greenish brown, reddish brown, pinkish grey, globular, to 60 mm diameter. Does not appear to be closely related to any other Australian species. Milled as Grey Satinash. Distinguished from all species in this section in having leaf petioles longer than 5 mm (5-18 mm).

29. *Syzygium hodgkinsoniae* is a tree to 15 m, buttressed on larger specimens, bark nondescript (occasionally flaky), outer blaze cream to brown (rarely pink), fibrous or granular in texture, leaves lanceolate, elliptical, apex acuminate, 5.9-17.0 × 2.2-6.0 cm, flowers in terminal heads, 4-merous, most months. Fruit red when ripe, globular, ovoid, 15-45 mm diameter. See the colour photograph of flower and fruit on page 72.

30. *Syzygium johnsonii* is a tree to 25 m, buttressed on larger specimens, bark flaky or nondescript, generally of a reddish or reddish brown hue, outer blaze pink to red, fibrous in texture (rarely granular), leaves obovate, apex shortly acuminate, 5.7-11.7 × 2-7 cm, flowers in terminal heads, 4-merous, April to October. Fruit blue, blue-purple or purplish mauve, oblong, 20 × 15 mm. Occasionally milled as Rose Satinash.

31. *Syzygium kuranda* is a tree to 30 m, generally buttressed, bark flaky occasionally nondescript, pale brown in colour, outer blaze pink-red, fibrous in texture, leaves obovate, elliptical, apex often rounded, sometimes abruptly acuminate, 6.3-11.6 × 2.4-4.8 cm, flowers in heads on branches and rarely stems, 4-merous, most months. Fruit cream to pale brown, globular, depressed transversely ovoid, 35-40 mm high and 40-45 × 40 mm on the longer and shorter diameters. The fruit is edible but not particularly palatable. It is readily eaten by the Cassowary (*Casuarus casuaris*) but may perhaps cause digestive troubles. Milled as Kuranda Satinash.

32. *Syzygium luehmannii* is a tree to 35 m, normally buttressed, bark flaky or nondescript, outer blaze pink, red, occasionally cream on small specimens, leaves ovate, lanceolate, apex conspicuously acuminate, 3.0-6.8 × 1.0-4.0 cm, flowers in terminal heads, mostly 5-merous, October to February. Fruit pink, red, purplish red, globular, pyriform (pear shape), turbinate, 7-11 mm diameter. Milled as Cherry Satinash. An excellent colour plate on page 305 of our No. 107 issue.

33. *Syzygium macilwraithianum* is a tree to 30 m, buttressed on larger specimens, bark flaky or nondescript, outer blaze pink to red, sometimes brownish, generally granular but sometimes fibrous in texture, leaves obovate, apex rounded to very shortly acuminate, 3.9-7.0 × 2.1-3.9 cm, flowers in terminal heads, 4-merous, July to September. Fruit white, cream, depressed globular, 20-30 mm high and 30-40 mm diameter. Distinguished from all species in this section by the calyx tube contracted in the middle.

34. *Syzygium malaccense* is a tree to 25 m, generally buttressed, bark flaky, pale brown, outer blaze pink-red, sometimes brownish red, generally fibrous, sometimes granular in texture, leaves elliptical, apex recurved and shortly acuminate, 11.2-14.6 × 4.4-7.2 cm, flowers in heads on branches behind the leaves, 4-merous, October to November. Fruit pink to red, turning maroon or almost black, globular, 18-20 × 18-26 mm.

35. *Syzygium minutiflorum* is a tree 20-25 m, buttressed on larger specimens, bark flaky, outer blaze pink, cream, brown, fibrous in texture, leaves obovate, apex rounded or shortly acuminate, 7.4-12.7 × 2.7-5.4 cm, flowers in terminal heads, 4-merous, October and November. Fruit white, depressed globular, depressed obovoid, 10-21 mm long and 10-15 mm diameter.

36. *Syzygium moorei* is a tree to 43 m, sometimes buttressed, bark flaky (sometimes slightly papery), outer blaze pink, red, fibrous in texture, sometimes granular, leaves elliptical, obovate, oblong, apex rounded, acuminate, 8.4-14.7 × 3.5-7.0 cm, flowers in heads on branches, 4-merous, pink, red, November to March. Fruit white, cream, depressed globular, 40 mm high and 35-65 mm diameter. Fruit is edible. An excellent colour plate on page 305 of our No. 107 issue.

37. *Syzygium oleosum* is a tree to 12 m, usually without buttresses, bark generally flaky, nondescript on smaller specimens, outer blaze pink, red, brown (cream on small vigorous stems), fibrous in texture, leaves lanceolate, elliptical, ovate, apex acuminate, 3.1-11.0 × 1.1-3.6 cm, flowers in heads in upper axils but never truly terminal, 4-merous, September and October. Fruit colour variable, blue, bluish purple or purple, globular to ovoid, 9-20 mm long and 10-16 mm diameter. See colour photograph on page 73.

38. *Syzygium operculatum* is a tree to 25 m, buttressed on larger specimens, bark nondescript or flaky on larger specimens, outer blaze cream, sometimes pinkish or brownish, fibrous in texture, leaves elliptical to ovate, apex acuminate, 9.6-17.5 × 3.4-6.6 cm, flowers in heads on twigs less than 5 mm diameter, 4-merous, September to November. Fruit black to dark blue, globular to depressed globular, to 10 mm long and 10-12 mm diameter.

39. *Syzygium paniculatum* is a tree to 15 m, without conspicuous buttresses, bark flaky, outer blaze cream, pale brown or pink, fibrous in texture, leaves lanceolate to slightly obovate, apex acuminate, 4.7-8.9 × 1.5-2.8 cm, flowers in terminal heads, 4-merous, December to March. Fruit usually magenta (white to dark purple have been observed), globular to ovoid, 16-25 mm diameter. The fruits are edible. Colour photograph on page 73.

40. *Syzygium papyraceum* is a tree to 35 m, buttressed, bark papery, reddish, outer blaze cream to brown, generally fibrous in texture, occasionally granular, leaves obovate, elliptical, lanceolate, apex acuminate, 6.4-10.5 × 2.3-4.8 cm, flowers in terminal heads, 4-merous, September and October. Fruit purple, globular, obovoid, turbinate, 25-30 mm long and 25 mm diameter. Milled as Paperbark Satinash. Distinguished from all species in this section by having leaf petioles longer than 10 mm (10-19 mm) except for *S. velae* which are 12-25 mm.

41. *Syzygium pseudofastigiatum* is a tree to 35 m, normally buttressed, bark flaky, rarely nondescript, outer blaze pink, red, fibrous in texture, leaves lanceolate, elliptical, obovate, apex acuminate, 7.0-14.8 × 3.1-4.9 cm, flowers in terminal heads, 4-merous, July to October. Fruit white or almost white, depressed globular, depressed obovoid, 20 mm high and 25-35 mm diameter.

42. *Syzygium puberulum* is a small tree to 12 m, bark flaky, nondescript, outer blaze generally cream, sometimes pink or brown, fibrous or granular in texture, leaves lanceolate, ovate, apex acuminate, 13.6-19.5 × 4.1-5.6 cm, flower heads on branches or terminal, 4-merous, cream, pink, April to October. Fruit pink, red, globular, depressed globular, ovoid, 30-50 mm high and 30-45 mm diameter. The fruit is reported to be edible.

43. *Syzygium rubrimolle* is a tree to 10 m, bark flaky, greyish but tending to be orange-coloured on fresh surfaces under the flakes, outer blaze brown and fibrous, leaves lanceolate, apex acute to obtuse, 5.8-7.2 × 1.2-2.1 cm, flowers in terminal heads, 4-merous, March. Fruit red, changing to blue-purple when ripe, globular, depressed globular, to 40 mm high and 50 mm diameter. The fruits are quite palatable and sweet when fully ripe, and lack the usual acidulous and slightly oily flavour found in the fruits of most Australian species. Its common name is Red Lady Apple.

44. *Syzygium sayeri* is a tree to 35 m, buttressed, bark flaky, occasionally nondescript, outer blaze red and fibrous on larger specimens but at times pink, cream or brown and granular in texture, leaves lanceolate, elliptical, obovate, apex acuminate, 7.3-16.2 × 2.5-7.4 cm, flowers in terminal heads on special branches, 4-merous, August to November. Fruit white when ripe, globular, depressed globular, 30-40 mm. Milled as Pink Satinash.

45. *Syzygium sharonae* is a tree to 10 m, buttressed on large specimens, bark nondescript (rarely flaky), outer blaze brown, generally fibrous in texture (rarely granular), leaves lanceolate, elliptical, ovate, apex acuminate, 10.4-15.1 × 5.2-7.1 cm, flowers in terminal heads, 4-merous, April. Fruit white when ripe, depressed globular, 60-70 mm diameter.

46. *Syzygium suborbiculare* is a tree to 12 m, bark flaky or nondescript, outer blaze red, brown, granular in texture, leaves orbicular, oblong, ovate, elliptical, lanceolate, apex normally acuminate, sometimes shortly so, rarely smoothly rounded, $7.2-19.1 \times 4.0-13.1$ cm, flowers in terminal heads, 4-merous, cream, June to November. Fruit red or reddish, depressed globular, globular to ovoid, 30-70 mm long and 35-90 mm diameter. The fruits are edible.

47. *Syzygium tierneyanum* is a tree to 25 m, buttressed on larger specimens, bark flaky, outer blaze brown, occasionally slightly pinkish, fibrous in texture, rarely granular, leaves lanceolate, elliptical, apex acuminate, $8.9-18.6 \times 3.0-6.9$ cm, flowers in heads on twigs below the leaves, 4-merous, October to February. Fruit pink to red, occasionally white when ripe, globular, to 20 mm diameter. The fruit is edible. Milled as Bamaga Satinash.

48. *Syzygium trachyphloium* is a tree to 35 m, generally buttressed, bark flaky, occasionally papery or nondescript, generally pale brown in colour, outer blaze cream or brown (rarely pink), fibrous in texture, leaves elliptical, oblong, apex generally acuminate, sometimes shortly so, $3.7-9.6 \times 1.8-4.5$ cm, flowers in terminal heads, 4-merous, September to December. Fruit red when ripe, sometimes orange-red, globular, 10-14 mm long and 10-11 mm diameter. Milled as Rough-barked Satinash.



49. *Syzygium velae* is a tree to 25 m, usually buttressed, bark flaky and somewhat papery, outer blaze pink, red or brownish, rather granular in texture, leaves lanceolate, ovate, apex acuminate, $7.5-9.0 \times 3-4$ cm, flowers in terminal heads, 4-merous, cream, December. Fruit red, obovate, ovoid, 25-40 mm long and 20-30 mm diameter. The fruit may be classed as edible but not particularly palatable.

50. *Syzygium wesa* is a tree to 35 m, sometimes buttressed, bark flaky, blaze cream to brown, fibrous, leaves lanceolate, ovate, apex bluntly acuminate, $4-10 \times 1-5$ cm, flowers in terminal heads, 4-merous, cream, April to December. Fruit red, globular, 12-15 mm diameter. Fruit is edible. Milled as White Eungella Satinash and the species name is derived from these initials.

51a. *Syzygium wilsonii* is a tree to 30 m, buttressed on larger specimens, bark flaky or nondescript, outer blaze pink (occasionally red), fibrous or granular in texture, leaves lanceolate, narrowly ovate, or almost linear, apex acuminate, often very gradually, $5.5-16.8 \times 1.3-5.0$ cm, flowers in terminal heads. (4-5)-merous, cream (occasionally pink or mauve), March to November. Fruit purplish (also pinkish white, mauve, green with mauve tinge) broadly obovoid, globular 8-12 mm diameter. Occasionally milled as Plum Satinash.

51b. *Syzygium wilsonii* is a small tree to 6 m, too small to produce buttresses, bark brownish, not properly developed because of the stem size, but generally slightly flaky to almost papery, outer blaze cream, pink, fibrous in texture, leaves narrowly ovate, apex acuminate (often very gradually), $8.6-18.5 \times 2.2-5.4$ cm, flowers in terminal heads, 4-merous, red to pink, June to December. Fruit cream or white when ripe, oval, obovoid, globular, 10-16 mm diameter.



52. *Syzygium xerampelinum* is a tree to 10 m, sometimes buttressed, bark flaky or nondescript, outer blaze pink, red, brown, fibrous or granular in texture, leaves lanceolate, ovate, apex acuminate, $8.2-10.8 \times 3.1-4.2$ cm, flowers in terminal heads, 4-merous, February to October. Fruit red, brownish red, globular to ovoid, 11-18 mm diameter. ■

Dwarf Eucalyptus

The Study Project

Our recent issues have featured dwarf ornamental *Eucalyptus*, and a major project to develop special horticultural forms. From the response and enquiries made in the horticultural industry, there is little doubt that if well flowered forms, small and decorative in stature, can be developed that are also reliable over a wide range of conditions, the demand both in Australia and overseas, will greatly exceed any other group of plants produced in Australia.

It is vital, however, that we commence the project with the very best forms of plant available. Over the next flowering season, will readers inspect the trees in their area and report on any with an unusual or especially pleasing feature. The most pleasing feature you can offer would be a report on a special tree that has prospered where others have failed.

Study Project Members. As you have been advised, this is going to be a long project. We have engaged a commercial research laboratory experienced in microculture, to produce large numbers of plants from those selected. It will be two years before these first generation plants are available for you to grow. Meanwhile please proceed to grow plants from whatever source is available to you.



Eucalyptus lansdowneana

Photography by Ivan Holliday

This species is only found in the Gawler Ranges of South Australia. The above tree is growing on the Main North Road, Pooraka, a northern Adelaide suburb. It is only 4-5 years but at maturity it will only be 5-6 metres tall, usually straggly. It needs judicious periodic lopping to form a mallee type growth. Flowering is over a long period from late spring to winter. We need to search the Gawler Ranges for the best form that has the largest brightest flowers and tends to a symmetrical ball-like canopy.

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Calytrix strigosa

Photography by Ilma Dunn

A spectacular plant! See page 69 for equally spectacular, similar plants. One problem, they are difficult to grow. Will any reader who has successfully grown *Calytrix* please contact the Editor — Australian Plants.

Page 92—Vol. 14

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