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Australian Plants For The Beginner

Editor

Your Australian flora periodical is produced to show to the Australian public the beauty of our Australian wildflowers and how they may be used to beautify our living areas. The first two issues in the Series B were presented especially for the beginner. If you want to grow an Australian wildflower that is easy to grow, hardy in practically any conditions and flowers prolifically especially if you see that it is watered, then grow a Bottlebrush. It is an ideal plant to start with for a beginner. Why not grow some plants of its very close relatives, *Melaleuca*, *Calothamnus*, *Kunzea*, etc., as presented here.

The One-Sided Bottlebrush, *Calothamnus* (cal-o-THAM-nus), like the Bottlebrush, *Callistemon* (cally-STEE-mon), featured in our No. 125 issue, are hardy plants that are also easy to grow and rewarding in flower. They are often called One-Sided Bottlebrush as there is a tendency in many species for the individual flowers to grow on one side of the stem, rather than around the stem.

I hope that you will take just a few minutes to study how the flower head and the individual flowers of a Bottlebrush are composed, another wonderful beauty of nature. There are only a few botanical words used and you will find it easy to become familiar with them. In each issue we will briefly look at the structure of the flowers featured and very quickly you will be identifying plants for yourself. ■

Gardening in Southeastern Queensland

While some authors come from this area and the Bottlebrush plants described grow well there, this regional reference is made to assure readers that the emphasis is not on gardening in the southeastern corner of Australia as is the case with many publications. The plants described and the gardening practices recommended, are suitable for all temperate and sub-tropical areas of Australia. Provided water is available, they will grace many tropical gardens as well. ■

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COVER PLATE — *Melaleuca decussata*, known commonly as Totem Poles or Cross-leaved Honey-myrtle from western Victoria across to Eyre Peninsula, South Australia. This forms an erect shrub 2-3 m high if not pruned to the desired height. The delicate flowers are 2-3 cm long by 1 cm across. An article recommends its cultivation in south-east Queensland together with many other hardy easily grown plants.

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One-sided Bottlebrush

Calothamnus — The 5-merous¹ species by T. J. Hawkeswood *et al.*²

The genus *Calothamnus* of the plant family Myrtaceae is endemic to Western Australia. They are mostly tall, woody shrubs, occasionally low growing, with usually narrow, cylindrical leaves and showy red to purple-red flowers in small clusters or dense spikes. They appear on older stems, the leaves on that part of the stem having fallen, displaying the flowers. Occasionally the flowers are among the leaves but the general character is as shown in the photographs in this issue and in the sketch below.

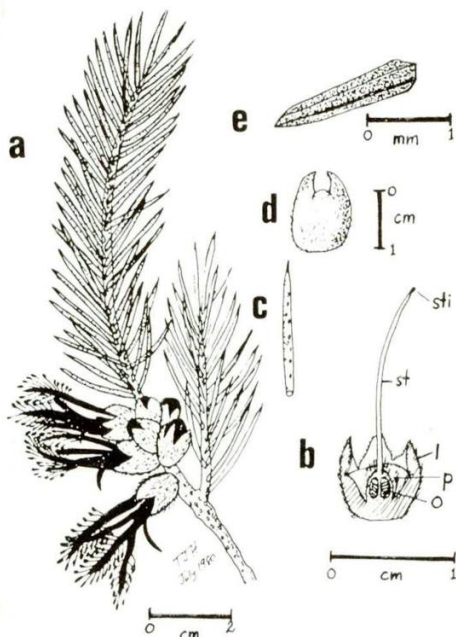
Calothamnus — The flower and the botanical terms used in this article.

The staminal claws are the prominent red part of the flower, comprising bundles of stamens with their filaments fused at the base and free at the end simulating a "claw".

As this is a 4-merous species there are four bundles of stamens or claws. Often the upper two will be joined and the lower two will be reduced in size.

The "petals" are short, densely hairy (pubescent) with short lobes. They are hairy and cup the staminal claws.

The central style (st) arises from an inferior ovary (O) which in this case is hairy (P). The fruit (d) is often characteristic of the species. It is a dry capsule joined directly to the stem (in some cases apparently sunk into the stem). In this case it is ovoid, pubescent (hairy), becoming glabrous (free of hairs) with age; there are two opposite lobes, thick and deflexed (curving inwards) with two smaller lobes, reflexed.



Calothamnus rupestris — A 4-merous species

a. Portion of branch showing cluster of flowers. — b. Half-flower diagram showing ovary (o), Calyx-lobe (petal) (l), pubescent ovary (p), style (st), and stigma (sti). (Staminal claws and petals not shown.) — c. Leaf of *C. rupestris*. — d. Side view of fruiting capsule. (c, d to same scale.) — e. Enlarged view of a fertile seed.

¹Plants of the plant family Myrtaceae, as described in our No. 125 issue for the bottlebrushes, *Callistemon*, *Melaleuca*, etc., mostly have their floral parts in fives, but *Calothamnus* have one large group with four petals. This group is known as the 4-merous group and were described in *Australian Plants* Vol. 11, pages 1-23. This article describes the remaining species, the 5-merous group.

²This article is based on a manuscript forwarded by Trevor J. Hawkeswood for publication. As he has been advised, the original manuscript has been enlarged to include the newly described species, based upon published research by Trevor Hawkeswood. I gratefully acknowledge the assistance of P. E. Bailey to achieve the valuable article above — Editor.



Calothamnus formosus △

▽ *Calothamnus blepharospermus*





Calothamnus leaves — *Calothamnus* species usually have long terete (cylindrical) leaves as shown for *Calothamnus formosus* sub species *rigidus* opposite. There are just a few that have flat leaves but in the 5-merous group there is only *Calothamnus blepharospermus* making it easy to identify. The photograph above, by Trevor Hawkeswood, is of the variety *glaber*, the usual form being opposite (photography by B. Graham). The variety *glaber* is distinct enough that it could well become a full species as defined on page 102. It has narrower leaves, smooth with prominent oil glands, whereas the true species, *C. blepharospermus*, has wider, scabrous (rough to the touch) leaves with inconspicuous oil glands.

Calothamnus formosus (opposite top)

Photograph by O. Hockings

An erect large shrub to 2.5 m high with terete (needle-like) leaves usually 4-6 cm long. This photograph shows the sub-species *rigidus* which has leaves 7-9 cm long, glabrous (without hairs) whereas shorter leaves of the type species are shortly pilose (covered with short, tiny hairs). The prominent part of the *Calothamnus* is the red staminal claw and in this species they are 22-30 cm long, crimson, with pale yellow-green near the base.

*Calothamnus*¹ may be distinguished from the rest of the "bottlebrush" group by its erect anthers at the end of stamens, grouped as a flat staminal claw, and its scattered leaves. The stamens of *Callistemon* are free, not grouped into bundles. The stamens of *Melaleuca* are grouped into five bundles. The anthers are versatile, i.e., they are supported, on the ends of the filament (stamen-stalk), in the centre and give the appearance of being able to rock back and forwards. The erect anthers of *Calothamnus* are on the ends of the stamens like a spear as shown in the sketches opposite.

KEY TO SPECIES — The botanists use a key; this one is easy to use:

- 1 Calyx-tube (at the time of flowering) immersed or half immersed in the rhachis . 2.
- 1* Calyx-tube not immersed in the rhachis (although rhachis may be slightly dilated at the base of the calyx-tube) 3.
- 2 Calyx-tube (at the time of flowering) entirely immersed in the swollen corky rhachis; fruit smooth, embedded in the rhachis 1. *C. gibbosus*
- 2* Calyx-tube (at time of flowering) half immersed in the rhachis; fruit usually ribbed, not embedded in the rhachis 2. *C. gracilis*
- 3 Leaves flat; calyx-tube and lobes densely pubescent (lobes thickened and persistent on fruit; leaves usually scabrous) 3. *C. blepharospermus*
- 3* Leaves terete 4.
- 4 Fruit with short rounded protuberances 4. *C. formosus*
- 4* Fruit without such protuberances, usually smooth 5.
- 5 Fruit $\pm$ depressed globular, smooth, usually truncate (or occasionally very shortly 5-lobed) 6.
- 5* Fruit not depressed globular, longer than wide 11.
- 6 Fruit usually with corky excrescences, sometimes smooth or warty 7.
- 6* Fruit without corky excrescences, usually smooth or with wide, smooth ribs ... 8.
- 7 Leaves mostly 4–6 cm long, terete 5. *C. oldfieldii*
- 7* Leaves mostly 1.5–2.5 cm long, terete or slightly flattened 6. *C. kalbarriensis*
- 8 Calyx-tube glabrous (leaves mostly 2–2.5 cm long, sparsely pilose; fruit large, smooth, cylindrical to almost globular, 13–17 mm long, 13–18 mm wide) 7. *C. macrocarpus*
- 8* Calyx-tube densely pubescent 9.
- 9 Leaves hirsute (mostly 2–2.5 cm long; fruit densely pubescent but becoming glabrous with age, then smooth, 5–6 mm long, 5–6 mm wide 8. *C. hirsutus*
- 9* Leaves with long spreading whitish hairs, older leaves glabrous, 10–15 mm long, fruit 5–6 mm long, 6–9 mm wide, anthers 1–5 mm long 9A. *C. accedens*
- 9** Leaves glabrous 10.
- 10 Leaves mostly 8–12 mm long, fruit initially pubescent, but becoming glabrous with age, 4–5 mm long, c. 5 mm wide 9. *C. brevifolius*
- 10* Leaves mostly 7–10 cm long, fruit glabrous or ribbed, 4–8 mm long, 5–8 mm wide 10. *C. aridus*
- 11 Calyx-tube glabrous (leaves 6–10 cm long, fruit 8–12 mm long) 11. *C. gilesii*
- 11* Calyx-tube densely pubescent 12.
- 12 Fruit truncate or very shortly 5-lobed (leaves erect, with short, appressed hairs giving them a blue-grey appearance) 12. *C. borealis*
- 12* Fruit not truncate, prominently 2 or 5 lobed 13.
- 13 Fruit widest at the middle, with 2 lobes prominently thickened at top of fruit 13. *C. villosus*
- 13* Fruit widest at the base, with 5 lobes prominently thickened at top of fruit 14. *C. chrysanthrus*

¹*Calothamnus* is a member of the Myrtaceae family and belongs in the "Beaufortia sub-alliance" of the "Leptospermum alliance". The sub-alliance is distinguished in having erect anthers (attached at the base) whereas the closely related "Melaleuca sub-alliance" has versatile anthers (centrally attached to the filament and moving freely). Genera of the "Beaufortia sub-alliance" include *Eremaea*, *Regelia* and *Phymatocarpus*. Both *Beaufortia* and *Regelia* have opposite leaves, except for *B. sparsa* which has scattered leaves, while *Calothamnus*, *Eremaea* and *Phymatocarpus* have alternate or scattered leaves. *Calothamnus* is therefore distinguished in having erect anthers and scattered leaves.

Bottlebrush Flowers

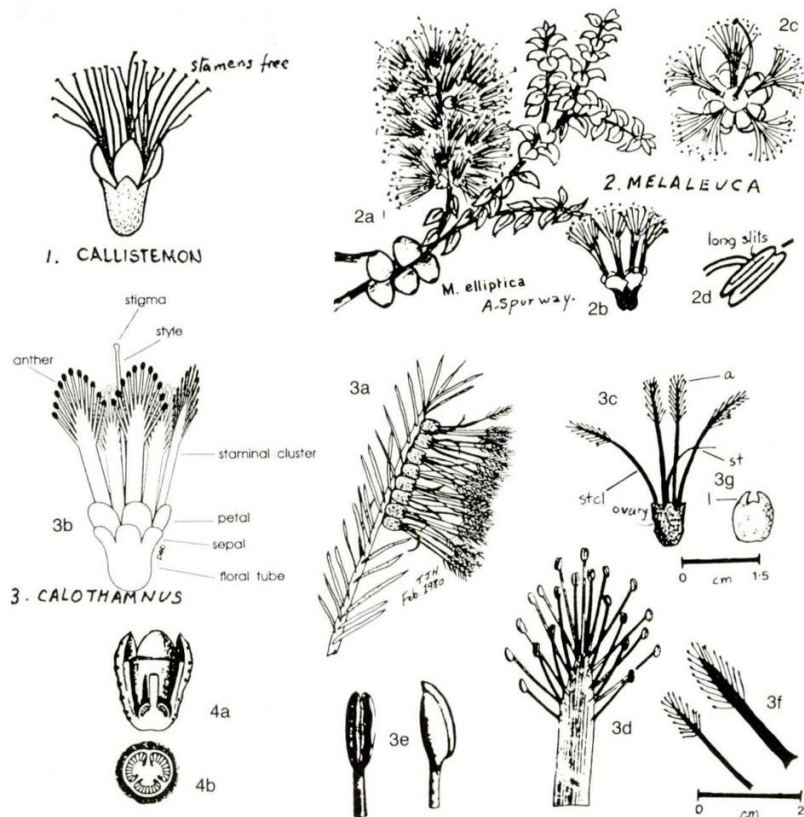


Fig. 1. A bottlebrush flower of *Callistemon*. The stamens are all free to the base

Fig. 2. A flowering branch of *Melaleuca elliptica* showing the individual flowers grouped to form a bottlebrush head of flowers. As shown in the side view 2b and the plan view 2c, the stamens are grouped into five bundles, the anthers on the end of each stamen being versatile, attached in the centre of the back and being able to "nod" 2d. These anthers open out in long slits to release the pollen.

Fig. 3. A flowering branch of *Calothamnus quadrifidus* 3a showing the individual flowers grouped on one side of the flowering stem. While this is characteristic of the genus, it often happens that the flowers will form all around the stem creating a "bottlebrush". Fig. 3b shows a typical *Calothamnus* flower in a stylised form to show the flower parts more clearly and the way the stamens are grouped and bonded in a claw. This shows five staminal claws, characteristic of the 5-merous group of species described below. *Calothamnus quadrifidus* in Fig. 3a is a 4-merous species, an individual flower being shown in Fig. 3c. One of the stamen-claws is further enlarged in Fig. 3d and the anthers on the ends of the filaments, enlarged still further in Fig. 3e, a side and front view, showing how they are attached at the base in spear-like fashion, with two vertical slits to release the pollen. Fig. 3f shows the stamen-claw of *Calothamnus quadrifidus* (lower) and a stamen-claw of *Calothamnus asper* which is larger and more closely resembles the shape in Fig. 3b.

Fig. 4. The fruit or seed capsule Fig. 3g is reproduced, enlarged in Fig. 4a showing how the petals disappear and the calyx lobes thicken to become a hard woody capsule. The plan view Fig. 4b shows how the seed is formed in three compartments. See "Find Your Seed" on page 107 and how to grow plants from seed.



Calothamnus macrocarpus △

Photography by M. Fagg

▽ *Calothamnus gracilis*



1. *Calothamnus gibbosus* Benth.

Calothamnus gibbosus is a beautiful shrub which is characterised by having rigid, terete, pungent leaves mostly 4–6 cm long and smooth, depressed globular fruit embedded in the corky stems. It is related to *C. gracilis* (see below). The name *gibbosus* comes from Latin, meaning "with hump-like swellings" and refers to the swollen corky branches and the swollen rhachis.

It is an erect, much-branched, usually compact, rounded, glabrous shrub mostly to 1 m high, with thick, woody branches and corky bark. Leaves linear, terete, erect, rigid, mostly 4–6 cm long, 1–1.5 mm wide, somewhat pungent, crowded. Flowers 2–5 together forming $\pm$ unilateral spikes. Calyx-tube 2.5–3 mm long, glabrous. Petals ovate, 4–5 mm long, orange-brown. Staminal claws $\pm$ equal, 25–30 mm long, 1–1.5 mm wide, deep red; marginal filaments 9 or 10. Style with a small stigma. Fruit sessile, depressed globular, 5–6 mm wide, glabrous, smooth, truncate, embedded in the corky stems. Fertile seeds about 1.5 mm long, oblong, truncate, testa grey-brown.

This species is restricted to an area between Mt. Short (north of Ravensthorpe) and the Fitzgerald River, where it grows in shrubby heath or mallee-heath in lateritic sandy or clay soils. Flowers mostly from July to October and sometimes into November.

2. *Calothamnus gracilis* R.Br.

Calothamnus gracilis is one of the most beautiful species of the genus and one of the first species to be described. The type specimen was collected by Robert Brown at Lucky Bay east of Esperance. It is found from the Mount Barren Range west of Hopetoun in coastal sand vegetation eastward to Cape Arid. It has been recently collected as far east as Twilight Cove about 80 miles north-east of Cape Arid. Its conservation is assured in the Fitzgerald River National Park and the Cape Arid National Park. A fairly common species it grows in heath or mallee-heath in quartzite sand with species of *Hakea*, *Banksia*, *Dryandra*, etc. Flowering is from August to October.

It is an erect, multi-stemmed, stiff, low, sometimes spreading, glabrous shrub to 1 m high. Leaves linear, terete, rigid, mostly 4–6 cm long, 1–1.4 mm wide, somewhat pungent, scattered or crowded at end of branches. Flowers 2–4 (mostly 3) together arranged in $\pm$ unilateral, interrupted clusters or spikes 2–6 cm long, slightly immersed in the rhachis. Calyx-tube c. 2 mm long. Petals 2.5 mm long, orange-brown. Staminal claws $\pm$ equal, 20–27 mm long, 1–1.5 mm wide, blood red; marginal filaments 5 or 7. Fruit depressed globular, 7–9 mm wide, usually broadly ribbed (sometimes smooth), truncate, not immersed in the rhachis. Fertile seeds 2.5–3 mm long, linear-oblong to oblong; transparent cilia borne on angles of the dark brown testa.

The closest relative of *Calothamnus gracilis*, based on the leaves, fruit and flowers, is *C. gibbosus* with which it has been occasionally confused. *C. gibbosus* is characterised by having thick, corky stems with smooth, depressed globular fruit 5–6 mm wide which are embedded in the corky tissue. The staminal claws mostly have 9 or 10 marginal filaments. The fertile seeds measure 1.2–1.5 mm long and are glabrous. *C. gracilis* has smooth stems with depressed globular fruit 7–9 mm wide usually with longitudinal, rounded ribs (or occasionally smooth) and are not embedded in the stems as is the calyx-tube at time of flowering.

3. *Calothamnus blepharospermus* F. Muell.

This species is one of the most spectacular species in respect of the showiness of its flowers. It occurs from about 25 miles north of the Kalbarri National Park to the Murchison River. Despite its somewhat limited distribution, the species is locally common and its conservation appears assured in the Kalbarri National Park. It grows in sandplain habitats with *Calothamnus chrysantherus*, and species of *Xanthorrhoea* and *Acacia* and flowers mostly from July to early September. Colour photograph on page 96.

It is an erect, rigid, straggly or diffuse, much-branched shrub to 2 m high. Leaves narrow oblanceolate, mostly 7–9 cm long, 5–9 mm wide, somewhat scabrous, often with scattered, short, white hairs, mucronate. Flowers 3–12 in small, dense clusters or in irregular, short, $\pm$ unilateral or interrupted cylindrical spikes. Calyx-tube 7–9 mm long, densely pubescent. Petals 5–9 mm long, with a short claw 3–4 mm long. Staminal claws $\pm$ equal, 40–45 mm long, 4–4.5 mm wide, blood-red becoming orange-red at base; marginal filaments 42–45. Fruit almost cylindrical but slightly wider at base than apex, 10–14 mm long, 10–12 mm wide, pubescent but often becoming glabrous with age; lobes short, thickened. Fertile seeds oblong, 2.5–3.5 mm long, transparent cilia, borne on angles of the light, buff-brown testa. Ovulodes buff to dark brown.

Calothamnus blepharospermus belongs to a group of species which have fertile seeds with a single row of short, transparent membranous cilia on the angles of the testa. Other species having this feature include *C. gracilis* and *C. chrysantherus*.

In his original description of *C. blepharospermus*, Von Mueller noted that some glabrous specimens accompanied the collections of typical *C. blepharospermus* but did not describe these as separate. However, Bentham (1867) described these specimens as a variety *glaber* of *C. blepharospermus* on the basis that specimens were totally glabrous. It appears certain that this entity deserves specific rank. Since this is the most common species growing in cultivation, the following comparison will distinguish them. Photo page 97.

- (a) The leaves of var. *glaber* are narrower and smooth with prominent oil glands whereas in var. *blepharospermus*, the leaves are wider, scabrous (rough to the touch) and the oil glands are inconspicuous.
- (b) The fruiting capsules of var. *glaber* are usually $\pm$ cylindrical and truncate, with prominent, short, rounded, bullate protuberances, whereas the fruit of var. *blepharospermus* are wider at the base than at the apex, are hirsute and have the lobes thickened and persistent.
- (c) The flowers (staminal claws) of var. *glaber* are smaller (30–35 mm long) and orange-red; they are blood-red in var. *blepharospermus*.
- (d) var. *blepharospermus* has only been collected from the Murchison River area mostly in the Kalbarri National Park, while var. *glaber* has a wider distribution from the Shark Bay area (Wannoo) to the Hill River and Eneabba. There is a record from Cockleshell Gully but a visit to the area by the author in October, 1979, failed to find it growing in the area.

The name comes from the Greek *blepharo*, relating to eye-lids with respect to the margins being fringed with hairs, i.e. "ciliate", and the Greek *spermus*, from Greek meaning "seed" or "seeded". The name *blepharospermus* refers to the transparent, membranous cilia on the angles of the fertile seeds.

4. *Calothamnus formosus* T. J. Hawkeswood

A prominent feature of this erect large shrub to 2.5 m high is the pink petals of the flowers, although these are typically hidden by the showy crimson staminal claws; the claws become pale yellow-green near the base. The terete leaves are usually 4–6 cm long. It is related to *C. blepharospermus* but *C. formosus* is distinctive in having smaller cylindrical fruits and terete leaves. It may be distinguished from *C. gilesii* in having fruit truncate or with five very short rounded lobes (not with two prominent and thickened lobes, the remaining three lobes being very short or absent). Colour photograph on page 96.

The type species occurs in the Shark Bay area of Western Australia. A sub-species *rigidus* is distinguished from the type species in having leaves usually 7–9 cm long (not 4–6 cm long) and glabrous (not normally shortly pilose). It occurs from the Overlander Roadhouse to Yuna, Western Australia.

A shrub usually to 2.5 m high, occasionally reaching 4 m high, with young branches and leaves densely pilose. Leaves sessile, terete, 3–6 cm long, 0.8–1.2 mm wide. Flower clusters composed of 3–15 flowers. Floral tube narrowly bell-shaped, occasionally pubescent, 4–5 mm long, sepals about 1 mm long. Petals oblong, pink, 3.5–6.0 mm long. Staminal claws more or less equal, crimson but pale yellow-green near base, 22–30 mm long, 1.0–1.5 mm wide, with 26–32 marginal filaments. Style slender, 15–30 mm long with a small stigma. Top of the ovary densely pubescent. Fruit sessile, cylindrical, 6.5–8.0 mm long, 5–6 mm wide. Flowering from August to December.

5. *Calothamnus oldfieldii* F. Muell.

This is a common shrub found from immediately north of the Kalbarri National Park to Mullewa. Its conservation is assured in the Kalbarri National Park although reserves should be set aside on the sandplains north and south of Kalbarri because the largest populations occur here. Plants grow in mallee-heath and low-heath communities on sandplains with species of *Eucalyptus*, *Grevillea*, *Hakea*, *Casuarina*, etc. It flowers mostly from August to November and grows sympatrically with *Calothamnus chrysanthus*, *C. homalophyllus* and *C. blepharospermus* var. *glaber*.

It is an erect, compact or spreading, mostly glabrous shrub to 1.5 m high. Leaves sessile, linear, terete, erect, rigid, mostly 4–6 cm long, 0.7–1 mm wide, glabrous, slightly pungent, crowded. Flowers mostly 4–8 together in a cluster or a short spike. Calyx-tube 2.5–3 mm long. Petals broadly obovate-elliptical to elliptical, mostly 6–7 mm long. Staminal claws $\pm$ equal, 20–25 mm long, 1.2–1.5 mm wide; marginal filaments 24–26; anthers linear, 0.8–1.2 mm long. Fruit sessile, globular to depressed globular, 6–10 mm long, 8–12 mm wide, smooth, warty or with corky excrescences, $\pm$ truncate. Fertile seeds few per capsule, oblong, c. 2 mm long, ciliate on the angles, buff-brown. Ovulodes numerous, linear, c. 1.5 mm long.

Calothamnus oldfieldii is related to another *Calothamnus* which occurs from Kalbarri to Shark Bay from which it differs by having long leaves mostly 4–6 cm long (1.5–2 cm long in the new species). However, *C. oldfieldii* can be easily distinguished from all species in the Kalbarri region (and from the rest of the genus) by usually having very corky fruit.

The species was named in honour of Augustus Oldfield, an English botanist and zoologist who collected plants in the south-west of Western Australia and in the Murchison River area during 1850 and 1865.

6. *Calothamnus kalbarriensis* T. J. Hawkeswood

The flowers and fruit of this small shrub to 1 m high, resemble those of *C. oldfieldii*. However, it can be readily distinguished by the shorter, erectly held leaves mostly 1.5–2.5 cm long (4–6 cm long and spreading in *C. oldfieldii*). Named after the township of Kalbarri, it grows on sand dunes or shallow sand over limestone in low open mallee-heath. A shrub to 1 m high with young branches glabrous or pilose. Leaves sessile, terete or slightly flattened, 0.8–3.5 cm long, 0.8–1.5 mm wide. Flower clusters composed of 1–3 flowers. Floral tube broad bell-shaped to almost cylindrical, 4–6 mm long, sepals broad triangular, 2.5–4.0 mm long. Petals obovate-elliptical to broad obovate-elliptical, orange-brown, 6–7 mm long. Staminal claws more or less equal, dark orange-red, 20–30 mm long, 1.5–2.0 mm wide, 20–30 marginal filaments with dark-brown anthers about 1.5 mm long. Style slender, 20–25 mm long with a small stigma. Fruit almost cylindrical, 8–12 mm long, 10–12 mm wide. Flowering from August to October. Photograph on page 112.

7. *Calothamnus macrocarpus* T. J. Hawkeswood

This is probably one of the most beautiful species of the genus and has been cultivated in Perth gardens for many years. The erect, much-branched shrub usually to 2 m high, is not closely allied to any other species. The large, cylindrical to almost globular smooth fruits, 13–17 mm long and 13–18 mm wide, are a distinctive feature. It is restricted to the East Mt. Barren area of Western Australia where it grows on rocky, quartzite soil in shrubby heath. A shrub to 2 m or sometimes 3 m high with pilose young branches. Leaves sessile, terete, somewhat succulent, 1.2–3.0 cm long, 1–2 mm wide. Flowers usually solitary or in pairs but occasionally with 3–8 in a cluster. Floral tube broad bell-shape, glabrous, 3–6 mm long, sepals triangular, 2.0–2.5 mm long. Petals obovate, glabrous except for ciliate margins, pink to light brown. Staminal claws more or less equal, crimson, 28–35 mm long, 2–3 mm wide, with 22–32 marginal filaments and yellow anthers about 1.5 mm long. Style slender, 15–39 mm long with a small stigma. Top of the ovary densely pubescent. Fruit sessile, cylindrical to almost globular, 13–17 mm long, 13–18 mm wide. Fl. Aug.–Dec. and sometimes April. Photograph on page 100.

8. *Calothamnus hirsutus* T. J. Hawkeswood

This low, compact, usually erect, multi-branched, often spreading shrub to 1 m high has been confused with *C. villosus* because of its pubescent calyx-tube. However, *C. hirsutus* is clearly distinguishable in having thin spreading leaves (mostly 2–2.5 cm long, 0.5–0.8 mm wide) with long, simple white hairs (not rigid smooth leaves) and depressed globular fruits. The fruits are often initially truncate but sometimes with one lobe thickened and deflexed across the orifice. This lobe often wears or breaks away on fruits more than one year old. It is found north of Arrowsmith Lake to Perth in heath on sandplains. A shrub to 1 m high with young branches densely pilose. Leaves sessile, terete or slightly flattened, sparsely hirsute or more or less glabrous, 1.5–3.0 cm long, 0.5–0.8 mm wide. Flower cluster composed of 4–8 flowers. Floral tube broadly bell-shaped, densely pubescent, 3–4 mm long, sepals 2.5–4.0 mm long. Petals obovate-elliptical with ciliate margins, orange-brown, 5–6 mm long. Staminal claws more or less equal, deep red, 20–30 mm long, about 1 mm wide, with 20–25 marginal filaments and dark brown anthers 0.7–1.0 mm long. Style slender, 20–32 mm long with a small stigma. Top of the ovary densely pubescent. Fruit sessile, globular, 5–6 mm long, 5–6 mm wide. Fl. Oct.–Feb.

Continued on page 108.

Bottlebrushes: Which Plant Is A Bottlebrush

By C. N. Debenham

Up to the point of being asked, "Well, what is a bottlebrush?", most of us are prepared to accept quite happily that a "bottlebrush" is a shrubby plant with a very showy bloom which resembles the utensil of that name. To be more positive in our reply, there are two aspects which we must consider.

Firstly, does the name refer to a particular type of bloom (or inflorescence?). The answer can be only partly in the positive because, if in our bushland wanderings we sampled all that bloom which could qualify as typical "bottlebrush" encountered and examined the flower closely, a problem would arise. We would find, in fact, and to a degree according to the wealth of flora available, very dissimilar structure in the floral segments. The chances would be that *Callistemon*, *Melaleuca* and *Banksia* were represented and if you were in Western Australia, *Calothamnus* as well. The differences in the flowers are illustrated in the sketches on page 99.

Second, does the name refer to a particular type of plant which bears a bottlebrush-like inflorescence? The origin of the term is lost from record so we cannot say really how the word became fixed in our vocabulary, but at least this approach would narrow considerably the list of candidates for the title. It would be reasonable to say that although many *Banksia* bear "bottlebrush" bloom, we prefer to refer to them as "Honeysuckles" and for bottlebrushes be guided by the prominence and number of stamens possessed by each flower making up the "bottlebrush" or spike. The components of the flower of *Banksia* are noticeably different from the others, see Vol. 15, No. 124 for the *Banksia* flower.

Prior to the early nineteenth century, the genus *Metrosideros* of Joseph Banks provided a repository for the placing of many of the unique members of its family forwarded from 'Terra australis'. Later knowledge of this continent's flora gradually brought a sweeping change to the conception of the genus so that, after the removal of certain members to *Agonis*, *Angophora*, *Callistemon*, *Melaleuca*, *Eucalyptus* etc., a solitary Australian representative of *Metrosideros* remains. This is *M. eucalyptoides* F. Muell. of the tropical north.

Callistemon

In the Appendix III to Matthew Flinder's "A Voyage to Terra Australis" (1814), the great Robert Brown founded a genus *Callistemon*, "a genus formed by those species of *Metrosideros* that have inflorescence similar to that of *Melaleuca*, and distinct elongated filaments". The sketch on page 99 shows the difference in arrangement of these filaments. *Callistemon* are widespread in the eastern tropical and temperate regions with Western Australia having two species. Two other members are indigenous to New Caledonia. The members are remarkably stable in their floral features except for a loss in some (e.g. *C. salignus*) of the rich-red pigment of the filaments, but there is some diversity in their habit. In summing the character of his ten listed species, Bentham remarks "They might, indeed, almost be considered as varieties of one species". Characteristically, however, the members are robust, strongly-growing shrubs or trees bearing flowers closely sessile in dense spikes at first at the tips of the shoots. The fruit is woody, long-persistent and containing seed which takes about three years to mature. This fruit is found at the base of new growth. The conspicuous part of the flower, of course, is made up by the lengthy stamens, profuse in number. ■

Grow Wildflowers from Seed

The treatment of seedlings
by H. Boyd

The Treatment of *Melaleuca*, *Callistemon* and *Calothamnus* Seedlings

Letters* have been passed to the writer by the Editor from readers requesting more information regarding the "growing on" of plants propagated by the "Bog Plant Technique" This simple method was presented in *Australian Plants*, December, 1990, our No. 125 issue.

When the seedling plants are well established, say with four leaves, the glass covering the pot or tray can be removed for short periods each day or raised a little each day, until it is no longer required. The tray is then gradually moved to a position of full sunlight thus hardening the plants and strengthening the hypocotyl (stem). At this stage a dressing of magnesium sulphate (Epsom Salts) can be given, about three grains in weight on the surface to a four inch pot (as much as will cover the surface of a five cent piece). The salts are sprinkled on the surface dry. This causes a greater growth rate and produces stronger plants with thicker stems. Treat some seedlings and not others of the same species, and note the difference.

It is optional as to whether the plants are removed when small, four (4) to six (6) leaves, or grown to a height of six inches if the tray or pot is not less than three inches deep. If the plants are grown on in the seedling pots, a nutrient must be added in the form of a fertiliser, such as "Aquasol" (or nitrogen, phosphorus, potassium mixture). A strong solution is prevented from building up in the outer container by washing out this container once a week.

When many plants are grown to size in a small pot the roots will be found to have matted up between the pot and the medium in which the plants are growing. If the root growth is very great it is better to cut down one side of the root mass with a sharp razor blade. Then place the tangled mass in a tub of water to which has been added a few drops of root stimulant, such as Formula 20 (or naphthalene Acetic acid), to reduce shock and give the new plants a good start. With the plants completely submerged in the water, move them about and with digital manipulation, they can be readily separated.

Plant the seedlings in a suitable container for "growing on" such as tubes or four inch pots using soil similar to that in which they are eventually to be planted. The soil should contain, in addition, one third decayed leaf mould that has been passed through a sieve. Place the potted plants in a dark room for two or three days and then gradually increase the light on the plants until they are in full light. By placing a plant in darkness, photo synthesis is stopped and so there is not a great demand made on the unestablished root system. My method is to place the tubed plants in a box with several sheets of paper over the top for 2-3 days. With this technique, chemical fertilisers in solution can be used at any stage. ■

*This article and associated letters, were first published in *Australian Plants* in 1962. The advice applies equally as well today. The information is represented in this way as readers have been using this method successfully for thirty years. Those who have not carefully followed the advice have had problems as described by J. S. Howard of Nunawading. By following the advice carefully and caring for the seedlings as above success is assured. No special facilities or skill is required to grow as many Bottlebrush, *Eucalyptus*, *Melaleuca* or *Calothamnus* plants as you want. Your only problem will be that you produce too many plants and will have to give some away to friends.

Melaleuca from Seed

J. S. Howard, Nunawading, Victoria

I have made use of Mr. Boyd's wet septic method for propagating seedlings with good results particularly with bottle brushes and *Eucalyptus*, although not knowing the viability count of the seeds employed. *Melaleuca*, *Callistemon* and *Eucalyptus* have been propagated from seed with fair to excellent success. I have been troubled by the slow growth rate of all but the *Eucalyptus*. The *Callistemon* at two months after germination were less than two inches high with partial morning sun received. About 70% of *Eucalyptus* planted out into veneer pots and under a tree, have died (8 cm high on planting out) and survivors, though obviously healthy, are spindly.

From J. S. Howard subsequent to publication of the article opposite:

The planting-out techniques you advise are the "missing links" I have been looking for. Subsequent to my first letter I put the trough enclosed pots into full sunlight. Unfortunately on a very hot day of century temperatures most seedlings scorched and died. The pots were covered with glass and had not dried out, but the water was hot to the hand. A screen has now been erected to cut off the high afternoon sun. I employ plastic bags with the corners cut off over the pots once the seedlings demand more height than provided by the pots. After using "Aquasol" in water, no more spindly plants have developed though there is often overcrowding in the pots. Drooping of plants due to weak stems is avoided and the plants are strong and vigorous. The results by an interested neighbour show that even using "Aquasol", heavy shading from the sun gives rise to very spindly growth. ■

Seed of Bottlebrush Plants

Find Your Seed

Look along a branch of *Callistemon*, *Calothamnus* or *Melaleuca*. Provided the bush has not been pruned, behind this year's flower head will be a number of capsules containing seed formed from last year's flowers. Behind this will be the capsules from the previous year's flowers. Not all Myrtaceae retain their flowers but many have these hard dry capsules. Collect the capsules, place in a paper bag on a window sill that receives some sun and the capsules will open and expel hundreds of small seeds. Sow and grow your own plants.

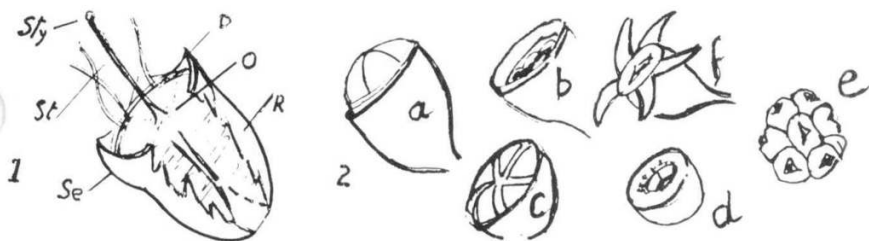


Fig. 1. A typical seed capsule — The receptacle (R) encloses the maturing ovary and seed being capped by a disc (D). The petals have dropped off, the sepals (Se) may have hardened and fused to the top of the receptacle (as in *Calothamnus* on page 99), some stamens (St) may persist a while, as with the dried style (Sty). The top of the ovary (O) may split the disc to release the seed.

Fig. 2. The seed capsule of *Eucalyptus* may have the cap exserted (a) or recessed (b). The seed capsule of *Leptospermum* (c) with the cap splitting into five to release seed. The seed capsule of *Callistemon* (d), the recessed cap rupturing to release seed. The seed capsule of *Melaleuca* is similar as shown in our No. 125 issue. The seed capsule of *Calothamnus* is similar but with the characteristic rim, page 99 (f). The seed capsules of *Agonis* are united into a lumpy ball (e). The seed capsule of *Kunzea*. These do not persist on the plant after maturity.

9. *Calothamnus brevifolius* T. J. Hawkeswood

A small, erect, spreading, much-branched glabrous shrub sometimes above half a metre high. The older stems have thick bark, often splitting. It occurs in the southern part of the wheat belt in Western Australia in sandy soil. At Marchagee, the species is a compact shrub to 30 cm tall, growing in yellow, well drained, sandy loam. It is related to *C. hirsutus* from which it differs in having smaller fruits 4–5 mm long and wide, shorter leaves mostly 8–12 mm long (not 2–2.5 cm long). It may be distinguished from *C. aridus* in having papery petals with scarious margins (not ciliate margins).

A shrub to about 50 cm high with glabrous young branches. Leaves sessile, terete, 0.7–1.5 cm long, 0.5–0.8 mm wide. Flower clusters composed of 1–5 flowers. Floral tube narrow bell-shape, 3–5 mm long, sepals narrow triangular, about 2 mm long. Petals narrow-oblong, 5–6 mm long. Staminal claws more or less equal, dark pink, 20–28 mm long, 0.8–1.0 mm wide, with 15–20 marginal filaments and anthers narrow-oblong, 0.5–0.7 mm long. Style slender, 10–27 mm long with a small stigma. Top of the ovary densely pubescent. Fruit sessile, depressed globular to almost cylindrical, 4–5 mm long, about 5 mm wide. Flowering from January to February.

9A. *Calothamnus accedens* T. J. Hawkeswood

A recently described species closely related to *C. brevifolius* sharing the following features: short, erect, terete, pilose (hairy, long and soft) leaves with oil glands clearly observable on the older, less pilose leaves; flowers in short, dense clusters; depressed globular to almost cylindrical fruits on which the styles do not persist as they do in some other species. *Calothamnus accedens* is, however, a larger shrub to 1.8 m high with thicker, more hairy leaves. It is a rare species found between Piawaning and Wongan Hills, growing in sandy soil over laterite.

10. *Calothamnus aridus* T. J. Hawkeswood

This erect, much-branched, multi-stemmed, straggly to compact shrub to 2.5 m high grows in red sand in woodland and *Triodia* sandplain from Wiluna to Paynes Find, Western Australia. It is not closely related to any other species, being the only species with petals covered in short, appressed, simple hairs. The hairy calyx-tube and petals, and the very narrow, erectly held leaves are probably adaptations to the arid environment which this species inhabits. It has been confused with *C. chrysantherus* which has larger floral parts, more densely pubescent calyx-tube, scabrous leaves, and larger fruits with prominent thickened calyx-lobes at the apex.

A shrub to 2.5 m high with young branches glabrous or occasionally finely pilose. Leaves sessile, terete, 5–12 cm long, 0.6–1.2 mm wide. Flower clusters composed of 2–4, usually three flowers or in 5–10 loose spikes among the leaves. Floral tube narrow bell-shaped to cylindrical, 2.0–2.5 mm long, sepals triangular-obtuse to semi-circular, 1.0–1.5 mm long. Petals obovate, covered with short, appressed, simple hairs, orange-brown, 3–5 mm long. Staminal claws more or less equal, orange-red and pink-red above, 20–25 mm long, about 1 mm wide, with 10–12 marginal pink-red filaments and yellow or yellow-brown anthers 1.0–1.3 mm long. Style slender, pink-red, 15–26 mm long with a small stigma. Fruit depressed globular, 4–8 mm long, 5–8 mm wide. Flowering from August to October.



Calothamnus gilesii △

Photography by M. Fagg

▽ *Calothamnus gilesii*



11. *Calothamnus gilesii* F. Muell.

This is a common shrub to be found growing in a variety of habitats in sandy-loam soil over laterite or more commonly in red sand near rocky hills in *Acacia-Triodia* woodland associations. It flowers mostly from October to January. It is distributed from east of Geraldton through the arid and semi-arid areas of south-west Western Australia to Scaddan (north of Esperance) and as far east as Lake Nyanga. It often occurs sympatrically with *C. quadrifidus*, with which it has been confused. It has also been confused with *C. chrysantherus* and *C. oldfieldii*. The fruit is the most characteristic feature of *C. gilesii*. It is almost cylindrical, smooth with short white hairs at the base, often with dark spots. Two lobes are prominently thickened at the apex, while the others are merely short, rounded undulations. The flowers are very similar to those of *C. oldfieldii* and *C. chrysantherus*, but the calyx-tube is glabrous or finely pubescent in *C. oldfieldii*, densely pubescent in *C. chrysantherus*, and glabrous in *C. gilesii*, except for a dense ring of short hairs at the base.

It is an erect, straggly or compact, much-branched, glabrous shrub to 1.5 m high. Leaves sessile, linear, terete, glabrous, mostly 7–10 cm long, 1–1.5 mm wide, finely mucronate but not pungent, usually crowded at the ends of branches or scattered; oil glands usually prominent. Flowers 3–15 in clusters either unilateral or circling the stem. Calyx-tube 4–5 mm long, glabrous or usually with short hairs at the base only, somewhat verrucose. Petals 5–7 mm long. Staminal claws 25–30 mm long, 1.2–1.5 mm wide, orange-red; marginal filaments 20–25. Fruit almost cylindrical, 8–10 mm long, 7–9 mm wide, smooth, wrinkled or bumpy; two lobes persistent and prominently thickened, remaining three lobes very short or absent. Fertile seeds few per capsule, linear-oblong, truncate, 14–18 mm long, glabrous, testa chocolate brown. Ovulodes numerous, linear, similar to fertile seeds, dark red-brown. Photo. page 109.

12. *Calothamnus borealis* T. J. Hawkeswood

A short, multi-stemmed, spreading shrub to about 1 m high with corky stems, the bark often decorticating into thin layers at the base of plants. It is not closely related to other *Calothamnus* species but has been confused with *C. chrysantherus*. This is possibly because both have hairy leaves and flowers with densely pubescent calyx-tubes. *Calothamnus borealis* has dull grey-green, erectly held leaves with short appressed hairs, staminal claws 20–25 mm long (not 25–30 mm) and smaller truncate fruits 6.5–10 mm long by 7–10 mm wide with five very short lobes (not with five prominent, thickened lobes).

A shrub to about 1 m high with young branches pilose. Leaves sessile, terete to biconvex, 5–13 cm long, 1.0–1.5 mm wide. Flower clusters composed of 1–12 flowers. Floral tube almost bell-shaped, densely pubescent, 4–5 mm long, sepals triangular, 2–3 mm long. Petals obovate, pink to orange-brown, about 5 mm long. Staminal claws more or less equal, 20–25 mm long, 1–2 mm wide, with 20–25 marginal filaments with yellow anthers 0.6–0.8 mm long. Style slender, 10–25 mm long with a small stigma. Top of the ovary densely pubescent. Fruit sessile, almost cylindrical, 6.5–10.0 mm long, 7–10 mm wide. Flowering from July to September.

Calothamnus typically, have crowded, long (linear), terete (cylindrical), pointed at the end (pungent) leaves, usually glabrous (without hairs although there are a few species described with pilose hairs) and with oil glands, mostly prominent as shown by the dots in detail C. (See sketch on page 95.)

13. *Calothamnus villosus* R.Br.

This species, which is little known, is distributed from Red Gum Springs in the Stirling Range National Park to Cape Riche and then east to the Gairdner and Fitzgerald Rivers in the Fitzgerald National Park. It is also known from East Mt. Barren and Mt. Ragged. Thus its conservation seems assured. The original specimens were collected by Robert Brown from Lucky Bay near Esperance.

Calothamnus villosus grows in mallee-heath with species of *Banksia*, *Melaleuca*, *Grevillea*, etc. Flowers mostly from July to October. Only locally common. It is an erect, much-branched, compact shrub to 1.5 m high, the older stems often thick and corky. Leaves linear, terete, erect or slightly spreading, mostly 2–3.5 cm long, 0.7–1 mm wide, shortly mucronate, slightly pungent, sometimes moderately scabrous; oil glands prominent. Flowers 3–6 in short $\pm$ unilateral clusters amongst leaves or on stems from which leaves have fallen. Calyx-tube 3.5–5 mm long, densely pubescent. Petals 4–5 mm long, orange-brown. Staminal claws equal, 25–30 mm long, 1.5–2 mm wide; marginal filaments 14–16. Fruit slightly depressed globular, 7–10 mm long (including thickened lobes), 8–10 mm wide, densely pubescent becoming glabrous and smooth with age. Fertile seeds 1.2–1.5 mm long, narrow-oblong, testa dark brown, glabrous. Ovulodes similar, buff-brown.

The distinguishing features of this species are the densely-pubescent calyx-tube and leaves which vary from smooth to slightly scabrous and are held erect or slightly spreading. The fruits are almost globular and smooth with two opposite lobes thickened and slightly reflexed as in *C. quadrifidus*, *C. sanguineus*, *C. asper* and other species. The name *villosus* comes from Latin and means "shaggy-hairy". This refers to the hairy calyx-tube, and since this was the only species Robert Brown described which had this feature, it was given this name.

14. *Calothamnus chrysanthus* F. Muell.

This species is distributed from Ajana and the Murchison River in the Kalbarri National Park to the Hutt River, north-west of Northampton. It grows on sandplains in mallee-heath with species of *Eucalyptus*, *Grevillea*, *Beaufortia* and *Eremaea*, etc. It is a relatively common species in the Kalbarri National Park to north of Northampton, where it may occur sympatrically with *Calothamnus oldfieldii*, *C. homalophyllus* and *C. blepharosperrmus* var. *glaber*. Flowers mostly from August to September.

It is an erect, spreading, much-branched shrub to 1.2 m high. Leaves linear, terete, sessile, mostly 5–9 cm long, 1–1.4 mm wide, mucronate, slightly pungent, crowded at ends of branches. Flowers in small clusters or short, $\pm$ unilateral spikes on portions of the stems from which the leaves have fallen. Calyx-tube 4–7 mm long, densely pubescent. Petals 3–4 mm long with a short claw 1.5–2 mm long. Staminal claws $\pm$ equal, 25–30 mm long, c. 1.5 mm wide, scarlet becoming orange-yellow towards ovary; marginal filaments 24–28; anthers 0.6–0.8 mm long, bright yellow. Fruit almost cylindrical, slightly wider at base than at apex, sides slightly rounded towards base, 12–15 mm long (including length of lobes), 10–13 mm wide (at base), densely pubescent but becoming glabrous with age, lobes short and persistent. Fertile seeds oblong, 2–3.5 mm long, angular, usually obliquely truncate, with transparent cilia on the angles, testa pale grey-brown. Ovulodes linear, orange-brown.



Calothamnus kalbarriensis △

Photography by M. Fagg

▽ *Calothamnus villosus*



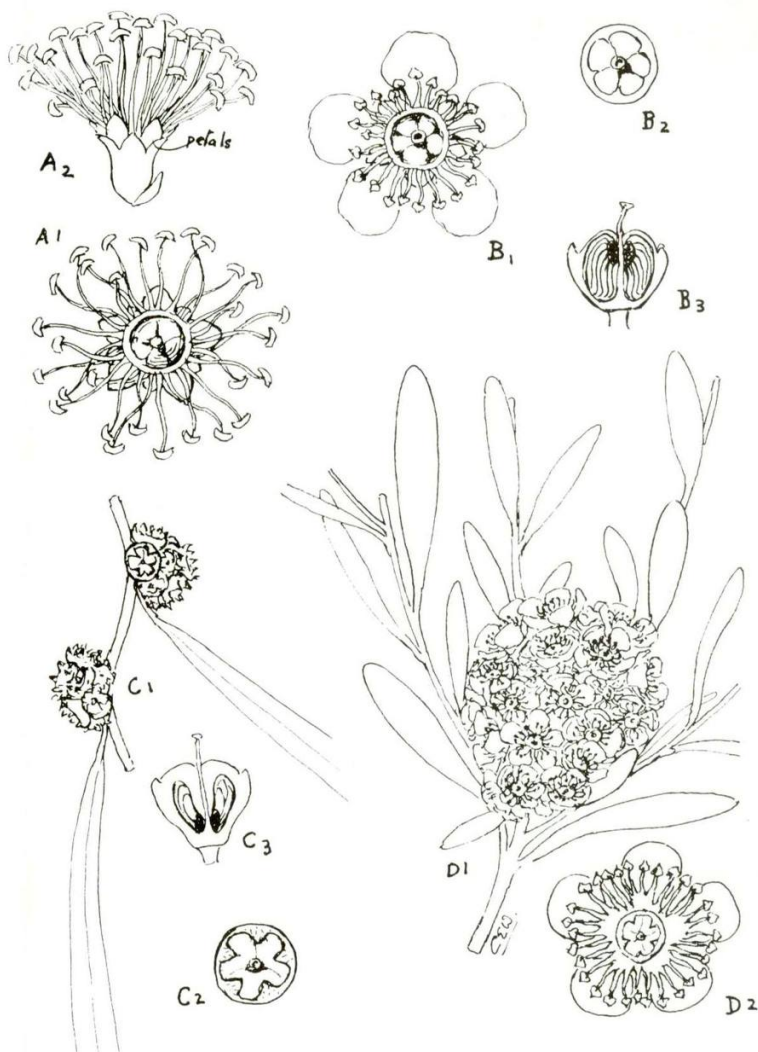


Asteromyrtus angustifolia △

Photography by D. Hockings

▽ *Agonis flexuosa*





- A. *Kunzea* flower from above showing disposition of the free stamens A1 and from the side A2, showing the tiny petals just protruding out from the cup of bracts.
- B. *Leptospermum* flower from above B1, showing disposition of the free stamens around the outer edge of the ovary just inside and shorter than the five petals, a section through the ovary B2 showing the five seed chambers or locules, and B3, longitudinal section of the ovary showing the ovules.
- C. *Agonis*, a branchlet, C1, showing the leaves and globular heads of flower and seed capsules, a transverse section of the ovary showing the locules, and C2, a section through the flower showing the attachment of the style to the ovary comprising five ovules. The ovules and seed are erect.
- D. *Asteromyrtus lysicephala* showing a head of flowers, D1, and the leaves, and a view of a flower from above showing disposition of the fused stamens, united at the base in an undulating ring, the broadest fusion in front of each petal creating five bundles.

Asteromyrtus

by P. E. Bailey

The genus *Asteromyrtus* (ass-ter-o-MERT-us) belongs to the plant family Myrtaceae. One species was previously known as *Sinoga lysicephala*. The remaining six species were previously known as species of *Melaleuca*. They are all found in northern Australia and there is very little botanical relationship with *Melaleuca*. As published in *Australian Systematic Botany*, Vol. 1 (1989), Lyn Craven has reinstated *Asteromyrtus* to accommodate this group. The genus *Asteromyrtus* is readily distinguished from *Melaleuca* by its winged seeds. Other distinguishing features include a flat ovary apex and the absence of long hairs on the ovary apex. A genus of seven species with six occurring across northern Australia and into New Guinea, and *A. tranganensis* occurring only in New Guinea.

Asteromyrtus belongs to a different section of the family Myrtaceae than *Melaleuca*, the *Leptospermum* suballiance that includes the genera *Agonis*, *Angasomyrtus*, *Homalospermum*, *Kunzea*, *Leptospermum*, *Neofabricia* and *Pericalymma*. The sketches opposite indicate characteristic differences between some of the better known genera. The remaining genera are presented in some detail in *Australian Plants*, Vol. 14: 154–157.

"Staminal bundles" in Myrtaceae is the term used for the groups of stamens resulting from fusion of the filaments into groups or bundles. Each stamen comprises a filament (stalk) with the pollen bearing anther on top. For myrtaceous plants the number of bundles is (always?) five. In *Asteromyrtus*, the number of stamens is $(60-90) \times 5$, or a total of 300–450 in undulating rings.

***Asteromyrtus angustifolia* (Gaertner) Craven**

Shrub or tree to 10 m, with leaves narrow elliptic to somewhat narrow oblong, 2–6 cm long and 0.2–0.7 cm wide, sometimes to 1.3 cm, carried on very short to obsolete petioles. Flower heads globular and terminal with a somewhat orbicular floral bract, 4.5–10.0 mm long. Bracteoles of individual flowers are somewhat oblong, 4.5–7.5 mm long, more or less enclosing the hypanthium. Hypanthium cylindrical to cup-shaped, 4–11 mm long with orbicular to somewhat oblong sepals, 2.0–3.5 mm long. Petals orbicular to elliptic, 3–6 mm long. The stamens are arranged in 5 bundles of 30–65 stamens, filaments white, cream, brownish cream or red, 6–15 mm long, the fused portion of the bundles 5–10 mm long and the free part erect or spreading. Fruit cluster globular, 10–20 mm in diameter. Photograph on page 113.

Occurs in Queensland from Cooktown to Cape York flowering from May to September, occasionally from February to October. Distinguished in having narrow elliptic to somewhat narrow oblong leaves and the free part of the filaments radiating from the bundle apex.

***Asteromyrtus arnhemica* (Byrnes) Craven**

Shrub or tree to 5 m, with narrow elliptic leaves, 3–8 cm long and 0.7–2.0 cm wide, carried on short petioles. Flower heads somewhat oblong to globular and terminal with a depressed ovate floral bract, 3.0–4.5 mm long. Bracteoles of individual flowers are broadly to depressed obovate, 3–5 mm long, sometimes partially enclosing the hypanthium. Hypanthium cup-shaped or urn-shaped, 3–6 mm long with sepals broadly or transversely elliptical, 1.5–2.0 mm long.

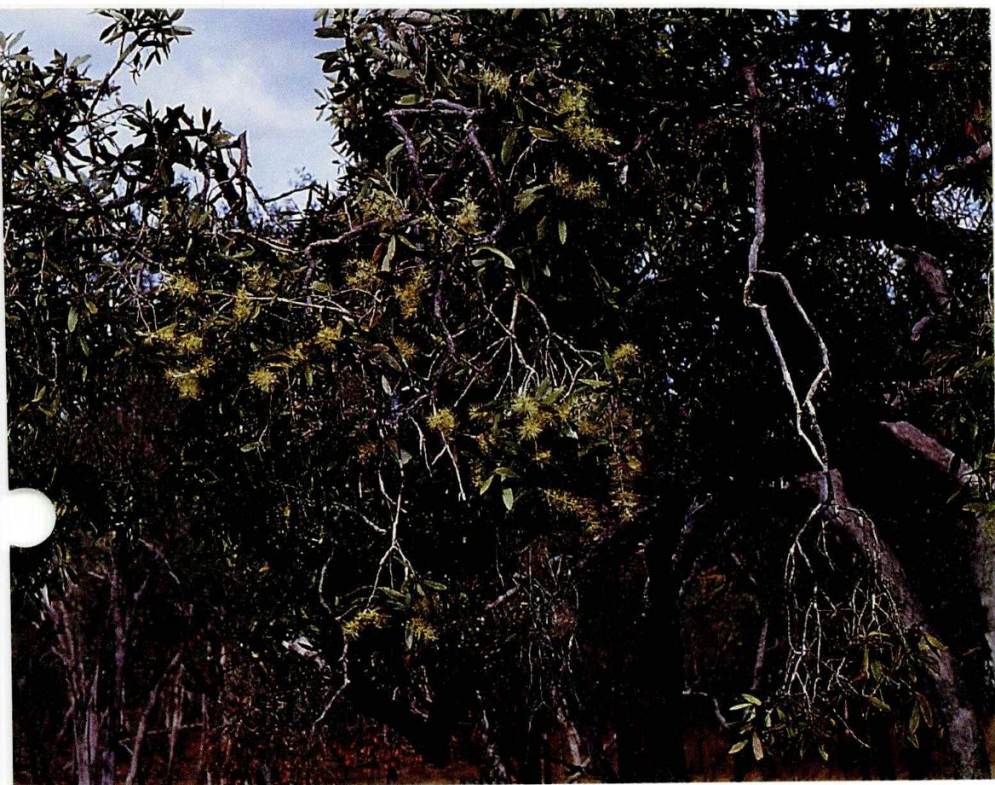


Asteromyrtus brassii △

Photography by D. Hockings

▽ *Asteromyrtus symphyocarpa*





Asteromyrtus magnifica on Groote Eylandt $\triangle \nabla$



The petals of *Asteromyrtus arnhemica* are somewhat orbicular to spatulate, 1.5–2.0 mm long. The androecium are arranged in 5 bundles of 17–32 stamens, filaments creamy white and 3–9 mm long, the fused portion of the bundles 1–4 mm long and the free part erect or spreading. Fruit cluster somewhat oblong to globular 8–14 mm in diameter. It occurs in the N.T. in the area of the South and East Alligator R. Distinguished in having narrow elliptic leaves and the free part of the stamens appearing rather brush-like.

***Asteromyrtus brassii* (Byrnes) Craven**

Shrub or tree to 25 m, with narrow elliptic to narrow obovate leaves, 4–9 cm long and 0.5–1.5 cm wide, carried on very short to obsolete petioles. Flower heads globular to depressed globular with a depressed ovate to somewhat orbicular floral bract, 5.5–6.5 mm long. Bracteoles of individual flowers are somewhat oblong to obovate, 4.5–6.0 mm long, sometimes partially enclosing the hypanthium. Hypanthium somewhat urn-shaped to cylindrical, 5–7 mm long with sepals somewhat orbicular, broadly ovate, or transversely elliptical, 1.5–2.7 mm long. Petals somewhat orbicular to obovate, 4–5 mm long. The stamens are arranged in 5 bundles of 30–50 stamens, filaments deep pink to bright red, 10–14 mm long, the fused portion of the bundles 8–10 mm long and the free part erect or spreading. Fruit cluster globular to depressed globular, 10–15 mm in diameter. Occurs in Queensland from the McIlwraith Range to Cape York and in New Guinea, flowering throughout the year, especially from May to September. Distinguished in having narrow elliptic to narrow obovate leaves and well developed staminal bundles with a tuft of free stamens at the apex. Photograph on page 116.

***Asteromyrtus lysicephala* (F. Muell. and F. M. Bail.) Craven**

Previously known as *Sinoga lysicephala*, this is a shrub to 3 m, with narrow obovate, somewhat narrow oblong, or narrow elliptic leaves, 0.8–3.0 cm long and 0.2–0.5 cm wide, carried on very short to obsolete petioles. Flower heads globular to somewhat oblong, and terminal with a broadly to transversely elliptical floral bract, 2.0–2.5 mm long. Bracteoles of individual flowers are spatulate, obovate, or somewhat oblong, 2.5–3.0 mm long, sometimes partially enclosing the hypanthium. Hypanthium funnel-shaped to somewhat urn-shaped, 2.0–2.5 mm long with sepals somewhat orbicular, 1.0–1.5 mm long. Petals somewhat orbicular, 2.2–2.5 mm long. The stamens are arranged in 9–11 groups or ungrouped and scattered around the staminal ring, filaments white to cream, 0.5–2.0 mm long, the free part erect. Fruit cluster globular to somewhat oblong, 5–10 mm in diameter. Occurs in Queensland from Cairns to Cape York and in New Guinea, flowering throughout the year, especially from February to September. Distinguished in having small leaves and stamens shorter than the petals, not bundled.

***Asteromyrtus magnifica* (Specht) Craven**

Shrub to 3.5 m, with narrow ovate to narrow elliptic leaves, 4–8 cm long and 0.4–1.0 cm wide, carried on short to very short petioles. Flower heads globular to somewhat oblong and terminal with a broad to depressed ovate floral bract, 7–11 mm long. Bracteoles of individual flowers are obovate to spatulate, 6.5–10.0 mm long, sometimes partially enclosing the hypanthium. Hypanthium funnel-shaped to somewhat urn-shaped, 7–10 mm long with sepals somewhat orbicular, broadly elliptical, or transversely elliptical, 3.0–5.5 mm long. Petals somewhat orbicular to obovate, 6.5–9.0 mm long.

The stamens of *Asteromyrtus magnifica* are arranged in 5 bundles of 60–90 stamens, filaments cream, pale yellow, or creamy white, 6–17 mm long, the fused portion of bundles 3–7 mm long and the free part erect or spreading. Fruit cluster globular to somewhat oblong, 20–30 mm in diameter. Photograph on page 117.

Occurs in the Northern Territory from the South and East Alligator Rivers to Groote Eylandt, flowering from February to July and possibly throughout the year. Distinguished in having narrow ovate to narrow elliptic leaves and very well developed brush-like staminal bundles.

***Asteromyrtus symphyocarpa* (F. Muell.) Craven**

Shrub or tree to 12 m, sometimes to 17 m, with narrow elliptic to narrow obovate leaves, 3–9 cm long and 0.5–2.0 cm wide, carried on short petioles. Flower heads globular and sometimes terminal with a transversely elliptical, broadly elliptical, or very broadly oblong floral bract, 2–3 mm long. Bracteoles of individual flowers are oblong, narrow oblong or spatulate, 3–4 mm long and not enclosing the hypanthium. Hypanthium cup-shaped to somewhat urn-shaped, 3.5–5.5 mm long with sepals orbicular to transversely elliptical, 0.7–1.8 mm long. Petals orbicular to somewhat orbicular, 2.7–3.0 mm long. The stamens are arranged in 5 bundles of 10–25 stamens, filaments yellow to orange, sometimes turning red, or red, 10–15 mm long, the fused portion of the bundles 8.0–9.5 mm long and the free part erect or spreading. Fruit cluster globular, 8–15 mm in diameter. Photograph on page 116.

Occurs in the Northern Territory from Darwin to Cape York, Queensland, and in New Guinea, flowering throughout the year, especially from February to July. Distinguished in having narrow elliptic to narrow obovate leaves and staminal bundles like *A. brassii* but with fewer stamens.

KEY TO SPECIES OF *Asteromyrtus*

1. Plant with inflorescence terminal (or rarely upper axillary)
 2. Ovary apex minutely pubescent (hairy) throughout.
 3. Filaments 3 mm or more long, leaf blade with 3–7 major veins (if 3, blade 48 cm and usually narrowly ovate with the apex narrowly acute)
 4. Bracteoles 6.5–10 mm long, stamens 60–90 per bundle *A. magnifica*
 4. Bracteoles 3–5 mm long, stamens 17–32 per bundle
 5. Leaf blade 0.7–2 cm wide *A. arnhemica*
 5. Leaf blade 0.3–0.4 cm wide **A. tranganensis*
 3. Filaments up to 2 mm long, leaf blade with 1 or 3 major veins (if 3, blade 0.8–3 cm long and usually narrowly obovate to narrowly sub oblong with apex obtuse) *A. lysicephala*
 2. Ovary apex glabrous (free of hairs) but for the minutely pubescent pit.
 6. Leaf blade 0.2–0.7 (–1.3) cm wide, stamens 30–65 per bundle, bracteole apex emarginate to obcordate *A. angustifolia*
 6. Leaf blade 0.5–2 cm wide, stamens 10–25 per bundle, bracteole apex truncate to obtuse *A. symphyocarpa*
1. Plant ramuliflorous, flowers on branchlets below the leaves.
 7. Filaments 10–15 mm long, leaf blade 0.5–2 cm wide
 8. Leaf blade apex obtuse, bracteole apex truncate to obtuse *A. symphyocarpa*
 8. Leaf blade apex narrowly acute, bracteole apex emarginate to obcordate *A. brassii*
 7. Filaments 3–6 mm long, leaf blade 0.3–1.4 cm wide **A. tranganensis*

**Asteromyrtus tranganensis* is native to Malaysia and New Guinea.

Keys to Species!

This is a device used to readily distinguish one species from another. It looks complex and "scientific" but it is really quite simple and easily read. Referring to the descriptions of the species, many readers will feel it is written in a strange language. If you have a specimen and wish to name it, using the key above is quite simple provided you know what is the ovary, a filament and a bracteole. Refer to the sketches on page 114. ■



Melaleuca diosmatifolia △

Photography by I. Holliday

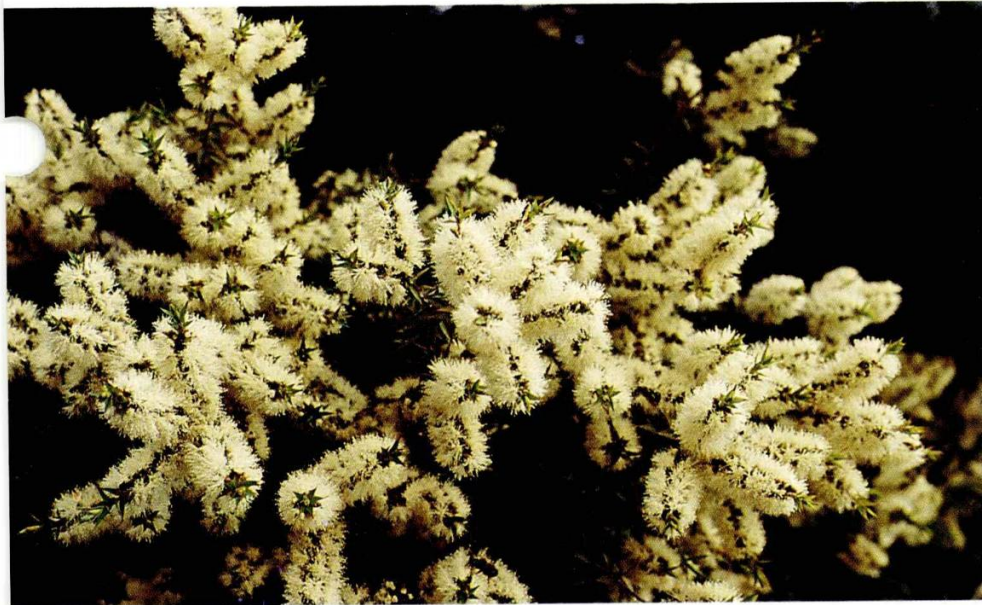
▽ *Melaleuca hypericifolia*





Melaleuca incana △
Photography by I. Holliday

▽ ***Melaleuca styphelioides***
Photography from Fairhill Nursery



Melaleuca

In S.E. Queensland

By Colin Cornford,

Melaleuca Study Group Leader

The area referred to herein extends from around Maryborough in the north to the Queensland-New South Wales border and inland to the foot of the ranges. *Melaleuca* grown in the area are, generally, the larger growing species and are used as household garden specimens, street trees and for park plantings. The local species are, predominantly, in the larger growing group although one very good smaller growing species, *Melaleuca thymifolia*, is widespread throughout the "Wallum" areas.

It is unfortunate, and I use the term unfortunate in a general sense, that many of the spectacular *Melaleuca* from southern and south-western Australia are unreliable in this part of Queensland even though there are instances where some of these have been grown with reasonable success.

Generally, *Melaleuca* are fairly attractive to nectar-feeding birds and insects, particularly the larger flowered species such as *M. quinquenervia*, *M. viridiflora* and *M. leucadendra*.

The list hereunder will give some insight into the habits of *Melaleuca* grown in this part of Queensland.

Melaleuca argentea — A spreading large tree to a height of 20 m with pendulous branches and, generally, greyish foliage. It likes ample moisture and will tolerate wet conditions. Creamy-white flowers in terminal clusters are produced in spring. It is suitable for large gardens and parks.

Melaleuca armillaris — A large, rounded shrub to approximately 4 m which is attractive when young. It tends to become straggly with age unless pruned regularly. White flowers are produced in late spring and early summer. A mauve-flowered form is also available. Good drainage is required but a number of plants tend to be short-lived — 10–12 years — even under good drainage conditions. Plants grown in exposed situations may be susceptible to damage by strong winds.

Melaleuca bracteata — A hardy small tree to 7–8 m. It provides good shade and will withstand strong winds. This plant will grow in a wide range of conditions but thrives on adequate moisture. It will withstand heavy pruning if required to maintain size and shape. White flowers, which are attractive to nectar-feeding birds and insects, are produced prolifically in late spring.

Melaleuca bracteata 'Revolution Green' is similar in habit and requirements to *M. bracteata* being perhaps a little less spreading and the flower display is generally inferior. This plant was originally introduced as a medium shrub but experience has shown that it grows quite large — up to 7 m.

Melaleuca bracteata 'Revolution Gold' is a small tree to 6–7 m with similar habit and requirements to 'Revolution Green' but having yellow/gold foliage which provides good colour contrast within the garden. The display of white flowers is generally poor. It will withstand quite severe pruning if required to maintain size and shape.

Melaleuca bracteata 'Golden Gem' is a compact shrub to 2 m which is hardy in most situations and which will withstand pruning to maintain size and shape. Foliage colour is yellow/gold, similar to 'Revolution Gold'. Flowers are white but, generally, sparse. 'Golden Gem' is a good screen plant and can be pruned to form a dense hedge.

Melaleuca cheelii — This plant is native to the Burrum River area north of Maryborough, Queensland. It is not widely grown. Developing into a medium shrub to 3–4 m with a fairly open habit, it appears to prefer a fairly shaded position, e.g., under tall eucalypts. Creamy-white flowers are produced in spring.

Melaleuca decora — This species grows locally in south-east Queensland often in poorly drained soils. It develops into a medium shrub to 4 m. It is not widely grown as a garden plant as it tends to become straggly with age unless pruned regularly. White flowers are produced in late spring to summer. It is reported to be a good honey tree.

Melaleuca decussata — A rounded many-stemmed shrub to 2–2.5 m with spread up to 3.5 m. Small mauve flowers, fading to off-white, are produced in spring and summer. This plant is worth a place in large gardens but it is not readily available at nurseries. Photograph on page 93, the cover.

Melaleuca diosmatifolia (previously *M. erubescens*) — An erect open shrub to 2.5 m which appears to be hardy in most situations but prefers good light. Mauve flowers are produced prolifically in summer, flower colour does not fade as readily as that of *M. decussata*. Photograph on page 120.

Melaleuca fulgens — This plant is fairly reliable in areas of very good drainage and will not tolerate poor drainage. Under good conditions this plant will develop into an open shrub to 1.5 m with similar spread. Flowers are produced in spring with colours including red, pink and salmon.

Melaleuca hypericifolia — A rounded to semi-rounded shrub to 4.5 m. Rusty-red flowers, which are often hidden amongst the foliage, are produced in spring and summer. This plant is fairly reliable where drainage is good, growing best in full sun. It will withstand fairly severe pruning if grown in a favourable location. I understand that it grows in very exposed positions on the south coast of New South Wales where the fierce salt laden south winds maintain it as a low dense cover that is an ideal refuge for bird life. Photograph on page 120.

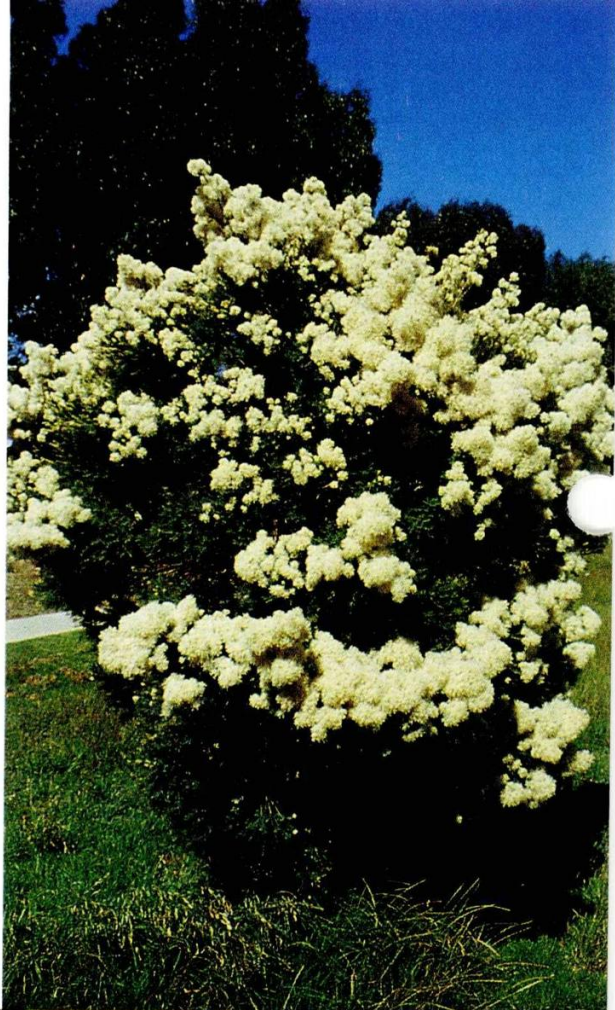
Melaleuca incana — An attractive grey-foliaged, dense, rounded shrub to 1.5 m. It is generally unreliable in this area although occasional plants have persisted for a few years in well-drained, dryish situations. Small yellow flowers are produced in late spring and summer. Photograph on page 121.

Melaleuca lateritia — An erect fairly compact shrub to 1.5 m. Red flowers are produced in spring and summer but many plants flower poorly. Flowers are usually produced on old wood. Full sun and good drainage are required for best results. Although popular some years ago this plant is becoming difficult to obtain from nurseries.

Melaleuca leucadendra — A large tree to around 20 m. It is hardy and will tolerate wet conditions. Useful as a street tree and in large gardens. It is a good shade tree. Creamy-white flowers, which produce substantial quantities of nectar, are abundant in spring and early summer. It is attractive to nectar-feeding birds, various insects and to flying foxes.

***Melaleuca linariifolia* 'Snowstorm'** ▷
Photography by I. Holliday

Melaleuca quinquenervia ▽
Photography from Fairhill Nursery



Melaleuca linariifolia — A small tree which grows locally and which reaches a height of some 5 m. While it grows naturally in moist situations it is hardy under most conditions and is fairly widely used as a street tree. It is very floriferous and produces masses of white flowers in spring and early summer. It generally maintains good shape without regular pruning, worthy of a place in any garden.

Melaleuca linariifolia var. *trichostachya* is a semi-erect shrub which can reach a height of 5 m. Size and shape can be controlled by pruning. Foliage is generally less dense than that of *M. linariifolia* and flowering is less spectacular. Fairly hardy under most conditions it likes ample moisture and will tolerate some wetness.

Melaleuca linariifolia 'Snowstorm' and *M. linariifolia* var. *compacta* are two smaller forms that grow to 1.5 m and 1 m respectively. The photograph on page 124 shows how well these compact forms flower.

Melaleuca nodosa — An erect shrub which grows locally and which can reach a height of 4 m. Foliage is stiff and quite prickly. It generally grows naturally in moist conditions but is hardy under a wide range of soil and climatic conditions. Yellow flowers are produced prolifically in spring. Photograph on page 137.

Melaleuca quinquenervia — Large tracts of *M. quinquenervia* forest occur throughout the area in often moist to wet conditions, even waterlogged for various periods. In their natural state these plants develop into medium to large trees to 20 m although garden specimens do not seem to grow so large. Creamy-white flowers, attractive to nectar-feeding birds and insects are produced in late winter and early spring. Photograph opposite.

Melaleuca fulgens ssp. *steedmanii* — An open shrub to 1.5 m. Limited success has been achieved by growing this plant in very well-drained, well-lit situations. Flowers are red and produced in late winter and spring.

Melaleuca styphelioides — A large shrub generally growing to around 4–5 m and having dense foliage from ground level if not trimmed. Foliage is prickly and this combined with foliage density provides a safe nesting haven for small birds. White flowers are profuse, late spring to early summer. It is hardy under most conditions and is a useful street tree. Photograph on page 121.

Melaleuca tamariscina ssp. *pallascens* — A dense, rounded shrub to 2 m with a spread of up to 3–4 m. Mauve flowers are produced fairly profusely in late spring and early summer. This is a good screen plant as foliage generally persists to ground level. It is used to some extent for highway median strip planting. It requires average to good drainage. Previously *Melaleuca* 'Miles'.

Melaleuca thymifolia — A small shrub to 1–1.5 m which grows locally in the Wallum areas. For best results adequate moisture and good drainage is required. Forms vary from open and spreading to fairly erect. Flowers are produced in spring and summer. Colour forms include mauve, dark pink, pale pink and white. It will tolerate some shade and is a good understorey plant.

Melaleuca viridiflora — This is generally a small erect tree to 6 m with attractive papery bark. Its erect, columnar growth habit makes it useful for group plantings or for locations where a broad spread is not acceptable. It is hardy under most conditions and will tolerate some wetness for short periods. Some specimens exhibit a weeping habit while maintaining a general columnar habit. Flowers are produced in spring in various colours which include green, cream, red, pink or burgundy and which are attractive to nectar-feeding birds and insects. ■

Sub-tropical Gardening —

Beginners' Planting

by W. H. Payne et al*

People living north of Sydney/Newcastle may well wonder if the horticultural industry has forgotten them. The horticultural centre of Australia is Melbourne, the Victorian people being industrious and keen gardeners. Gardeners north, south and west of Melbourne enjoy the horticultural production from Victoria with varying success that diminishes with distance.

Surprisingly, people in sub-tropical areas can grow many of the same sort of plants. Gardeners in the north are well served by extremely competent specialist wildflower nurserymen. Pay them a visit, listen to their advice and grow the plants recommended. You will find that most of the plants recommended for beginners in the last four issues of *Australian Plants* are available and recommended. I have just received the new "Descriptive Catalogue and Planting Guide" produced by Fairhill Native Plants from north of Brisbane. They list 27 forms of Bottlebrush, *Callistemon*, most of which are mentioned in our No. 125 issue. They list and highly recommend 11 forms of Kangaroo Paw. They list 30 forms of *Melaleuca*.

This issue contains an excellent article on *Melaleuca* for south-east Queensland and all of these plants do equally well in all temperate areas of Australia. Those not mentioned but listed in the Fairhill Native Nursery catalogue are described opposite.

Pest Control — Chemical pesticides should not be used under any circumstances. When insect damage to a plant is discovered the culprit will usually have flown away. If not then use the finger and thumb method. Native plants will encourage birds and other predators into the garden and these will contribute to pest control in a more effective way than chemicals.

Soil Preparation — Garden Beds

The most important exercise before establishing any garden is the site preparation. That is where time and effort is well spent. Clay soils have most of the nutrients necessary for plant growth but cannot release them because of their dense structure. By incorporating gypsum in liberal amounts and ripping or rotary hoeing the site thoroughly, you can achieve a gradual breaking down of the clay allowing oxygen to penetrate. It is recommended that the site be left fallow for as long as possible before planting (say six months) to give the most benefit to the plants. To keep out the surrounding grass, dig a perimeter trench around the site. It will minimise weed inundation and help with drainage.

The importation of humus rich, weed free soil is an alternative. Make sure the site is slightly sloping otherwise a bog will be created. For people with sandy soil, the introduction of humus such as compost will achieve the same ideal conditions. Use well rotted compost.

*This information is taken largely from "Australian Native Plants for Tropical and Sub-tropical East Coast Gardens" compiled by Fairhill Native Plant Nursery. This Descriptive Catalogue and Planting Guide" is available from Fairhill Native Plant and Botanic Gardens, Fairhill Road, Yandina, Queensland 4561, for \$12.00 including postage. The objective is to provide authoritative advice for beginner gardeners in the relative area, not just to promote a new publication. Alex and Barbara Hansa will be quite happy for you to use their reference book of tried and proven plants when you go to any other specialist native plant nursery in Queensland. Please them by growing natives, contribute to the ecology of your area and nurture the native birds and wildlife.

Maintaining Your Wildflower Garden after Planting

Mulching your garden bed is very important. It will reduce weeds, retain moisture and help to keep the roots cool. We found the best mulch to be "Pine Flakes", the outer shavings of round pine logs. Pine bark or similar products are equally acceptable as long as they are not too fresh. Be sure to keep the mulch away from the trunk of the plants as it may encourage disease of the plant stem.

Pruning — Some native plants have the reputation of being untidy looking specimens. You will be surprised what a pair of sharp secateurs can do to alter the shape of those plants. All shrubs will benefit from pruning and will enjoy longer life and additional flowering. You will also be rewarded with fresh new leaves of many colours. It is best to shape your plants during the warmer months. Tip pruning is best but some natives will tolerate some more severe surgery like amputation of major limbs. Cutting back to ground level is only tolerated by the sturdiest of natives such as *Callistemon*, *Melaleuca* and *Leptospermum*. They will regrow into a very bushy specimen again. ■

Melaleuca for Sub-tropical Gardening

Fairhill Native Plant Nursery

In addition to the "*Melaleuca* in South-east Queensland" on page 122, the following species are recommended as reliable garden subjects:

Melaleuca calothamnoides — A shrub to 1.5 m tall for a well drained position in full sun.

Melaleuca incana 'Velvet Cushion' — A compact small shrub (0.8 m high × 1 m) ideal for rockeries. It needs a well drained sunny spot. Yellow bottlebrush flowers in spring.

Melaleuca leucadendra, Weeping Paper Bark — two forms, one with fine leaves. Weeping tree to 7 m tall for moist soils in full sun. Masses of white scented flower spikes in summer/autumn.

Melaleuca sieberi — A dense, small shrub with an abundance of white flowers in spring. Suitable for seaside gardens. Height 3 m × 2 m wide.

Melaleuca squamea — A shrub to 1.5 m tall × 1 m wide with mauve bottlebrush flowers most of the year. For an average sunny position — wind break.

Melaleuca squarrosa — A dense shrub to 2.5 m tall for average to moist soils in full sun. Many cream, sweetly scented brush flowers in spring and summer. Attracts honey eating birds.

Melaleuca tamariscina, Bonsai Tea Tree — A bushy shrub to 4 m tall × 2 m wide for average soils. Masses of fluffy pink/mauve flowers in spring.

Melaleuca tamariscina sub. sp. *irbyana* — A bushy shrub to 4 m tall × 2 m wide for average to wet soil — masses of fluffy white bottlebrush flowers in spring. Photo page 140.

Melaleuca thymifolia 'Cotton Candy' — A hardy, compact shrub to 1 m tall × 1 m wide for sunny position, with pink/mauve flowers most of the year.

Melaleuca thymifolia 'Pink Lace' — A rockery shrub to 50 cm × 50 cm for average situation. Masses of pink lacy flowers most of the year. 'White Lace' has white flowers. ■

Australian Plant Cultivars

The Australian Cultivar Registration Authority*

The vast Australian flora is a unique world treasure. The potential for horticulture is enormous and recent introductions have made an impact on world markets. To distinguish a form that has exceptional horticultural qualities, from the variable species in the wild, it is given a cultivar name after the species scientific name.

Eucalyptus caesia 'Silver Princess'

yoo-ca-LIP-tus

This cultivar is a large shrub or tree 6-8 m, which is probably a tetraploid, an exceptional form of the naturally occurring subspecies *magna* of *Eucalyptus caesia* being larger and more vigorous in all respects than the normal subspecies. The fruit diameter is 30 mm compared to 15 mm for the fruit of the type species with leaves longer than normal. The subspecies occurs naturally on Mt. Caroline (Yellerberrin), Western Australia.

Eucalyptus camaldulensis 'Dale Chapman'

yoo-ca-LIP-tus

This cultivar originated as a seedling from a batch of seed obtained by Mr Dale Chapman of the Southeastern Experiment Station, Forest Service, United States Department of Agriculture at Fort Meyers in Florida. Mr Chapman planted the seedling in 1978 and cuttings from the tree have been planted since 1982 in central and southern California. The cultivar is within the known variations of *Eucalyptus camaldulensis*. It was selected for its rapid growth in dense plantations. The tree has a strong central leader with a minimum of lateral branching. It coppices readily and can be reproduced by vegetative propagation. High percentage strikes are possible under standard mist propagation conditions. It has been estimated to produce 50 dry tons per acre per year in 2500 tree/acre plantations. This cultivar has tolerated temperatures to 20°F and could possibly survive lower temperatures.

Eucalyptus citriodora 'Marion'

yoo-ca-LIP-tus

This cultivar was a seedling variation from the normal form of *Eucalyptus citriodora* selected by Mr D. Ross of Bedford Park, South Australia in 1966. At 12 years of age, the original tree is 10 m high with a spread of more than 10 m. The cultivar branches more frequently, from ground level through to the leaf stems. It therefore forms a very dense canopy which is vastly different from the tall, straight growing, sparsely foliated normal form. The leaves are up to 210 mm long by about 30 mm wide. This compares with a length of up to 180 mm and a width of up to 25 mm for leaves of the normal form. The nodes are on average about 10 mm apart which compares with an average of 22 mm apart for the normal form. This cultivar is different from normal forms of its parent in its closely branching habit and dense crown. Its leaves are wider and occur at a closer spacing. Its mature height is also expected to be considerably less than that for the normal forms which can reach a height of over 33 m. Seed collected and sown has resulted in three-year-old plants exhibiting the same characteristics as the parent plant.

*The Australian Cultivar Registration Authority, based at the Australian National Botanic Garden, Canberra, registers plant cultivars originating from the Australian flora in accordance with the International Code of Nomenclature. If you have an exceptional form you may apply for registration, addressed simply as above. There is no other satisfactory way to clearly define a particular plant and its progeny in the market place.

***Eucalyptus scoparia* 'Golden Crown'**

yoo-ca-LIP-tus

This cultivar arose as a seedling from a batch of seed grown at the Goldup Nursery at Mt Evelyn, Victoria in 1981. The seed was collected from a tree growing at Mt Evelyn. The new foliage of this plant is a bronze colour, gradually turning gold. As the foliage matures, the gold changes to a lime-green colour (7A/B). The foliage contrasts well with the red (46A) branchlets. It can easily be distinguished from the typical *Eucalyptus scoparia* by the pale coloured mature foliage. Because this cultivar is still young, all cultivation details have not been fully tested. It is likely that the tree will not be as vigorous nor reach the ultimate size of *Eucalyptus scoparia*. The plant is being tissue cultured.

***Eucryphia lucida* 'Pink Cloud'**

yoo-CRIF-ee-a

This cultivar was selected from a wild population near Smithton in north-west Tasmania in 1984. The collection was made in a forestry working area. Although the plant from which the material was selected was about 16 m tall, as with other forms of *Eucryphia lucida* when grown in cultivation, it will most likely only attain a height of 5-7 m. The flowers, which occur in the summer months, are a soft pink (54B) deepening to rose (55C) in the centre of the flower. They are 4 cm in diameter. The usual flower colour for *Eucryphia lucida* is white. The new leaves are yellow-green (146C) maturing a little darker (147A). Extra moisture will be required in drier parts of Australia during the summer months. The cultivar is frost hardy.

***Eucryphia lucida* 'Leatherwood Cream'**

yoo-CRIF-ee-a

This cultivar differs from *Eucryphia lucida* in the consistently retuse apex of its leaves and in its greenish-yellow and marginal or edged leaf variation. The margin, 25% of the leaf is yellow (4D), the inner portion of variegation being green (137C). It differs from *Eucryphia milliganii* in its slightly longer (about 2.5 cm) and oblong elliptical leaves and the marginal leaf variegation although both have the indentation of the leaf apex. The cultivar resembles *Eucryphia lucida* as far as the uppermost stems and leaves are concerned, excepting for the characteristics given above. A shrub of some horticultural merit, the cream edging of its leaves giving added beauty to this plant which is a member of an inherently attractive group.

***Eremophila maculata* 'Aurea'**

er-e-MOFF-il-a

This cultivar has been known in cultivation for many years and its origin is obscure. Collections were made during the early 1950s of a plant which came to be known as *Eremophila maculata* forma *aurea* along the Surat-Glenmorgan Road, Qld. but the clone described herein cannot be positively linked to these early collections. It grows into a compact, low shrub from 0.6-0.9 m in height by up to 1 m wide. The flowers are found in spring and are yellow (154C), tubular, with conspicuous red spots (53A) in the throat of the flowers. The flowers are $\pm$ 30 mm in length. The buds before they open are also quite conspicuous. While young they are green-yellow (1A) turning to yellow (12A) just before they open. The buds contrast well against the bright green glossy foliage. The flowers are axillary and are borne prolifically. The cultivar differs from the more usual form of *Eremophila maculata* in its lower and more compact form and its yellow flowers. It has proved extremely hardy in cultivation and is both drought and frost hardy. Tip pruning helps to keep the plant rejuvenated.

***Eremophila maculata* 'Carmine Star'**

er-e-MOFF-il-a

This cultivar originated in southern Queensland in the vicinity of Goondiwindi. It has been known in cultivation for 20 years. It is a prostrate to decumbent shrub 0.5 m tall by 1-2 m wide. The non-interlacing branches are purplish in colour, turning yellow-brown as they age. The branches are warty in appearance and otherwise glabrous. The leaves are narrow elliptic in shape. The flowers are solitary and carmine in colour (184C) while inside they are rose coloured but marked with prominent carmine spots (185C) except at the tips of the lobes. The lobes have long white wispy hairs up to 9 mm long. The flowering season in Adelaide is from October to November. It is distinguished from *E. maculata* by its decumbent sprawling habit.

***Lophostemon confertus* 'Perth Gold'**

lo-FOS-te-mon

This cultivar differs from other known forms of *Lophostemon confertus*, previously known as *Tristania conferta*, in the irregular border variegation. The golden variegation covers from about 20-95% of the leaves. The green central portion of some leaves extends to the margin, whilst areas of variegation sometimes extend to the midrib. Isolated areas of variegation occasionally occur.

***Lophostemon confertus* 'Variegata'**

lo-FOS-te-mon

The origin of this cultivar is not known. The specimen submitted for registration came from Burnley Horticultural College, Burnley, Victoria. It differs from other known forms of *Lophostemon confertus*, previously known as *Tristania conferta*, in the irregularly bordered variegation (147A) of its leaves. The inner portion of the leaves is yellow (1D) and covers irregularly, 25-75% of the leaf surface.

***Melaleuca bracteata* 'Golden Gem'**

mel-a-LOO-ca

This cultivar varies from other forms of *Melaleuca bracteata* in that it exhibits an attractive golden colour (151A) to the tips of the branchlets. This golden colour is particularly evident during the spring months. The name 'Golden Gem' has been trade marked.

***Melaleuca hypericifolia* 'Ulladulla Beacon'**

mel-a-LOO-ca

This cultivar is a low-growing form of the species that was selected from coastal headlands near Ulladulla, New South Wales. It retains the low habit in cultivation growing from 0.3-0.6 m tall with a spread of 1-2 m. The flowers are found in the spring and summer months and are a bright orange-red in colour with red filaments (47A). The appearance of the massed individual flowers in the inflorescence tends to give a darker flower colour. The dark grey anthers also contribute to this. Other features of the cultivar are as for *Melaleuca hypericifolia*. See the photograph on page 120.

***Melaleuca linariifolia* 'Snowstorm'**

Photograph on page 124

This cultivar is a dwarf form of unknown origin. After six years the original cutting grown plant was very dense and symmetrical in shape, being about 1.5 m high and 1.5 m wide. Flowering can be sporadic throughout the year but the main flowering season is in late winter and spring when it is claimed the whole plant is covered in flowers. The leaves are green excepting the young new growth which is pink. Individual leaves are very narrow being 1 mm wide and 18-25 mm long. The midrib is clearly visible on close inspection. Flowers are white (155A) and produced in "brushes" up to approximately 40 mm in length.

Grevillea banksii 'Gypsy'

This cultivar is a low growing form of *Grevillea banksii* to 0.5 m tall by up to 3 m wide. The leaves are about 170-180 mm long by 130-140 mm wide. They are deeply divided (almost to the midrib) but individual leaf segments are quite wide, usually from 10 mm to 12 mm. They are silvery-green above and have a slightly yellowish appearance under. The young foliage and stems are coated with rusty brown hairs. All other features of the cultivar are as for *Grevillea banksii*.

Low growing forms of *Grevillea banksii* are known from the wild situation. A low, sprawling form up to 1 m tall by 3 m wide is known from populations of this species along the central coast area of Queensland and on nearby islands. A low growing almost prostrate form is also recorded from near Byfield but *Grevillea banksii* 'Gypsy' has larger leaves than this form (180 mm compared to 120 mm). A similar prostrate cultivar, *Grevillea* 'Ruby Red', has greyish finely divided leaves.

Cultivation conditions are the same as required for *G. banksii*, basically sunny, frost free, well drained conditions in many soil types, with average temperatures ranging between 10 and 12°C through to 30°C. Similar forms have been marketed as *G. banksii* (red prostrate form) but this particular one has been selected and trialled by Merv Hodge and Ray Brown of the *Grevillea* Study Group. ■

The *Grevillea banksii* Type Hybrids

Beginners' *Grevillea*

There is a group of *Grevillea* hybrids that have become well established in horticulture. They are known in the trade as the northern hybrids as some of the parents derive from naturally occurring northern species such as *Grevillea banksii*. While they are especially suited to northern temperate/sub-tropical gardens, they have flowered magnificently in areas south and north of their preferred situation. This applies particularly to *Grevillea* 'Robyn Gordon' and its close allies.

Most of these have been described and illustrated in colour in our Vol. 14, No. 116 Issue. *Grevillea* 'Robyn Gordon', *Grevillea* 'Coconut Ice', *Grevillea* 'Mason's Hybrid'/'Ned Kelly', *Grevillea* 'Superb', *Grevillea* 'Misty Pink', *Grevillea* 'Pink Parfait', *Grevillea* 'Pink Champagne', *Grevillea* 'White Wine', *Grevillea* 'Cherry Brandy', *Grevillea* 'Eileen Rose', *Grevillea* 'Pink Surprise', *Grevillea* 'Majestic', *Grevillea* 'Sylvia', *Grevillea* 'Caloundra Gem', *Grevillea* 'Honeycomb', *Grevillea* 'Moonlight', *Grevillea* 'Sandra Gordon', *Grevillea* 'Honey Gem' and *Grevillea* 'Starfire'. No series directed to beginners would be complete without a special mention of these easily grown, very widely grown *Grevillea*. I would recommend you purchase a copy of Volume 14, No. 116.

Grevillea and their hybrids. With as many as 300 species, most of which are quite spectacular, one may ask, what about the rest. Shortly, there will be books produced describing all of these, many with new names. It is the intention to await the publication of these books and then build on the vast store of information provided. — Editor. ■

Australian Proteaceae*

Waratah

The range of Proteaceae in Australia is exceptional with hundreds of species over our entire range of climatic conditions. One of the most famous is the New South Wales state floral emblem, the Waratah, *Telopea speciosissima*. The recommended methods for cultivation and propagation from seed are described at some length in our Vol. 14, No. 114. Many excellent cultivars are described and illustrated in colour. Follow the same procedures for any other species of Proteaceae in Australia.

Telopea speciosissima 'Corroboree'

tel-O-pe-a

The name of this cultivar reflects the extended styles which resemble a circle of dancing figures. Probably the mature height is about two metres. This is unknown as it is pruned regularly for cut flowers. The shrubs are maintained at a width of 1.5 metres. The flower head is compact, 120 mm high by 120 mm wide, the selection being made because of the marketable qualities of its flowers. One hundred and sixteen plants at two years old produced 2,000 flowers for the market in Victoria and Japan. This cultivar is a vigorous grower, responding to applications of Nutricote slow-release fertiliser and pruning.

Telopea speciosissima 'Wirrimbirra White'

tel-O-pe-a

This cultivar is a colour form of the species originally discovered in the water catchment area at Kangaloon near Robertson, New South Wales. The original plant was found in 1970 and cutting material was selected in 1972. The cutting material was brought into cultivation by Wirrimbirra Sanctuary of Bargo, New South Wales. It is a creamy-white colour form of the species. The growth form is similar to the species though not as vigorous. The buds are an apple-green and the inflorescences open to creamy-white perianth (petals 155D, with yellow-white styles 158C). White waratahs have been recorded in the past, one of the most notable being a plant which grew in a private garden in the Colo area in the 1950s. Cutting material of this plant was not made available and the plant subsequently died without being propagated. An interesting Aboriginal account is given in "Gulpilil's Stories of the Dreamtime" compiled by Hugh Rule and Stuart Goodman, pages 108-115. The cultivar is drought and frost hardy though it seems somewhat more prone to bud-boring insects than most Waratah in Canberra. The method of using leaf buds for propagation by Ellyard and Butler as outlined in the "Australian Horticulture" 83(3), p.27-31 works well with this cultivar.

*Australian Proteaceae — a grand heading, and all we present are Waratah cultivars! The previous page refers to *Grevillea*, the northern forms, and these are also Proteaceae. There are Proteaceae in most parts of Australia from Cape York and Arnhem Land and the Kimberleys, south along the temperate coast or through the harsh inland, to Perth and Tasmania. The many flamboyant genera include the more widely known *Banksia*. It is not proposed, yet, to present these plants in detail as many years of research on Australian Proteaceae by scientists are shortly to be published. It is desirable that we await this.

Australian Proteaceae are decorative in the garden, spectacular as cut flowers, a unique treasure of the world's flora. Many are readily grown, such as the *Grevillea* hybrids of the previous page. Others are touchy. Consult your local wildflower nurseryman for advice what will grow in your area.



Telopea speciosissima 'Corroboree' △
 Photography by N. Cumming
 Courtesy of Australian National Botanic Garden

▽ *Lambertia formosa*
 Photography by Lois Sourry



Some Kangaroo Paw Cultivars

Continued from
Issue No. 126

Anigozanthos 'Autumn Mystery' is thought to be a hybrid of *A. manglesii* and *A. flavidus*. The yellow-green (144A) flowering stems are up to 1 m tall with sparse stellate hairs towards the base, becoming woolly and plumose towards the flowers. The flowers are in simple terminal racemes, on pedicels to 5 mm long. The hairs are plumose and woolly, having red tips with yellow bases over the ovary changing to yellow tips with red bases toward the perianth lobes. The perianth tube is to around 50 mm long and the lobes 15 mm long. The anthers are linear and more or less the same length as the filaments, the connective tipped with a gland-like appendage. The ovules are numerous. The flowering season is the spring months. The flowers attain a similar shape and width to *A. manglesii* although shorter. *Anigozanthos* 'Space Age' is a cultivar resulting from the same hybrid cross and has somewhat taller stature and distinctly larger (wholly deep red) flowers than *Anigozanthos* 'Autumn Mystery' where the flowers appear yellow to brown with touches of red.

Anigozanthos 'Autumn Sunrise' is a hybrid of *A. pulcherrimus* and *A. flavidus*. The red (53A) flower stems are $\pm$ 1.7 m tall, panicle plumose, slightly villose. Flowers on pedicels to ca. 6 mm long; the wool plumose, dense with red tinge (33A) on the ovary, becoming more yellow-green (154A) and less dense towards the lobes. Perianth tube to 4 cm long, scabrous inside, hairs (194) more linear towards the base, some with stellate tips immediately above the ovary; lobes to 1 cm long, silvery plumose inside. Anthers oblong-linear, $\pm$ same length as filaments, the connective tipped with a gland-like appendage. Ovules 2–6 per locule. *Anigozanthos* 'Autumn Sunrise' differs from *Anigozanthos pulcherrimus* in having, generally, broader leaves which are lighter green (137A) and more upright, the corolla tubes are longer and broader, and there are less flowers per branch.

Anigozanthos 'Big Red' is the result of a manipulated hybrid between (*A. manglesii* $\times$ *A. flavidus* tetraploid) $\times$ (*A. rufus* $\times$ *A. flavidus* tetraploid). The flowers have the colouring of *Anigozanthos rufus* but are a darker, richer red. They have a prominent ovary and are similar in length to *A. flavidus* and shaped more like *A. rufus* although less branched. The stems are not as hairy as *A. rufus* but more hair and a closer habit to *A. flavidus*. The flowering stems are from 1.5 to 2 metres tall, glabrous or nearly so below the middle, with scattered plumose hairs becoming more dense under the inflorescence. Flowers on pedicels to 12 mm long. The wool is plumose and very dense, red (53A) on the outside of the perianth tube, tinged with black on the lobes. The perianth tube is ca. 4.5 cm long, glabrous and shining but minutely scabrous inside. Lobes are to 13 mm long with dense stellate hairs inside. Anthers are oblong-linear, more or less as long as the filaments.

Anigozanthos 'Bush Ranger' is the result of a cross between *A. humilis* and *A. flavidus*. It grows to 55 cm tall by 25 cm wide. The leaves are a bright green and up to 20 cm long, tending towards being sickle shaped and the leaf margins have scattered hairs. The flower colours change as the flowers age. The younger flowers are a green-yellow (1D), but the perianth is covered in plumose red (59A) and occasional greeny-black hairs which make it appear orange. The older flowers are a dull red, some with a purplish tinge. The perianth is tubular and up to 4 cm long. The flowers are in simple terminal racemes, and the flowering stems (to 55 cm) are occasionally branched. The flowering season is during the spring and summer months.

Anigozanthos 'Dwarf Delight' is the result of a manipulated cross between *Anigozanthos onycis* ♀ (usually 0.3 m tall) with *A. flavidus* ♂ (often 2 m tall). A compact plant with much branched flower stems to 0.8 m tall covered with reddish hairs. The perianth segments of the flowers are green-yellow but appear apricot when seen through the reddish hairs. The flowers are intermediate in size between those of the two parents and produced in abundance.

Anigozanthos 'Early Spring' is the result of a manipulated cross between *A. viridis* × *A. flavidus* (tetraploid) ♀ and *A. rufus* × *A. flavidus* (tetraploid) ♂. The flowering stems to 1.1 m tall are mostly glabrous with a covering of dark purple (187A) tomentose hairs. The flowers are on terminal branchlets which are divaricately branched. The flowers have pedicels to about 4 mm long. The wool on the flowers is dark red (53A), plumose over the whole surface with occasional yellow-green hair giving them a slightly dusty appearance. The perianth tube is around 45 mm long, glabrous inside and minutely scabrous dotted below the middle with lobes 10 mm long with dense woolly yellow-green and sometimes orange plumose hairs inside. The anthers are shorter than the filaments, the connective tipped with a reduced gland-like appendage. The flowers of *Anigozanthos* 'Early Spring' have the colouring of *A. rufus* on stems less hairy and not as red. It appears unpalatable to snails and is ink disease resistant, semi-hardy to drought, with long flowering season (July to November) and is reported to be very tolerant of the humid conditions that often occur in Brisbane as compared to many other hybrid *Anigozanthos*.

Anigozanthos 'Hickman's Delight' resulted from doubling chromosomes of *A. manglesii* × *A. rufus*, then using the pollen from *A. flavidus* to obtain this hybrid. The stems are to 1.5 m with a covering of pale orange plumose hairs becoming more dense and dark red (59B) in colour at the final division of the raceme, some pale hairs persisting. Flowers on pedicels to 8 mm long, the wool dark red with scattered pale hairs lending a dusty appearance. Perianth tube to 4 cm long, minutely scabrous inside, the hairs becoming more linear finally with stellate tips; lobes 1 cm long, with grey-green, sometimes pale orange woolly plumose hairs inside. Anthers shorter than dark purple filaments, the connective with a gland-like appendage. Ovules more than 10 per locule. It differs from *Anigozanthos manglesii* in having a shorter corolla tube which is rounded at the end (not flat) and the anthers are arranged in a part circle. The colour of the larger flowers is closer to *A. rufus* than any of the other species but the leaves are a deeper green.

Anigozanthos 'Little Jewel' is the result of a manipulated cross between *A. onycis* ♀ and *A. flavidus* ♂. It has stems to 0.4 m tall with scattered red plumose hairs increasing on the upper half. The flowers are in a simple terminal raceme with pedicels to about 7 mm long. They are covered with plumose hairs which are red (46B) and dense on the ovary and upper side and a green-yellow on the lower side. The perianth tube is about 45 mm long subtended by a swollen ovary, glabrous on the inside above the middle with scattered orange plumose hairs below. The perianth lobes are about 10 mm long with the lower ones dividing more deeply. The lobes are covered with green-yellow plumose hairs on the inside. The anthers are bright yellow on green-yellow slightly shorter filaments, the connective tipped with a gland-like appendage. The ovules are more than 12 per locule. The flowers are similar in shape to *A. manglesii*, also with dense red hair towards the base though they are much shorter. The perianth tube is light green but with a comparatively light covering of red hairs rather than the more dense green covering of *A. manglesii*. It is similar to *Anigozanthos* 'Dwarf Delight' but shorter in stature, slightly redder in flower colour and more resistant to ink disease.

Melaleuca fulgens

by Phil Richardson*, Tasmania

A rounded, open shrub growing to a height of 1.5 metres and a width of 1.5 metres. The flowers are showy, short bottle-brush like, to 5 cm long and appearing in spring and early summer. They can be either red, salmon apricot, deep mauve or purple, sometimes tipped with gold. They attract both honey-eaters and insect-eating birds. The plant prefers light soils, but will grow in clay soils provided there is very good drainage. It prefers full sun and tolerates dryness, but benefits from summer watering. It is usually frost-resistant and will grow in partly protected coastal gardens. Pruning after flowering helps keep the plant dense.

*Reprinted from the Newsletter (Vol. 9-6, 1991) of the Tasmanian Region of SGAP as an indication of how well most *Melaleuca* species will adapt to a wide range of climatic conditions, coast to inland, Tasmania to Queensland. The plant occurs naturally in Western Australia.

Plants of Central Queensland

By Steve Pearson

The Great Dividing Range runs the entire length of Queensland, not far inland from the eastern coast of Australia. These sandstone mountains offer a respite from the hot dry inland to the west and the humid, seasonal wet conditions of the coastal fringe. It is not really surprising that the elevated positions on the mountain ranges offer conditions not very dissimilar from the climate of temperate and subtropical areas many miles to the south, at least halfway down New South Wales. Being largely sandstone mountains, the natural flora resembles that found right down to the Sydney Hawkesbury sandstone area. Many species of plants, or their close relatives, are common.

The Blackdown Tableland National Park, east of Gladstone/Rockhampton, offers magnificent scenery, a pleasant climate and a spectacular flora. My book has colour photographs of 450 flowering plants of the area, two of the least spectacular being reproduced opposite. These plants make good garden plants and are ideal for planting in gardens from Rockhampton to Sydney.

Plants of Central Queensland

Book Review

By Steve and Alison Pearson. Society for Growing Australian Plants. \$40.00 (plus \$8 handling) 416 pages. ISBN 0 909830 36 3.

The beauty of Australian wild flowers is attested to yet again by the superb photographs reproduced in "Plants of Central Queensland". Most of the 450 or so flowering plants described are illustrated with one or more colour plates of flowering or fruiting shoots each accompanied by a scale to judge their real size. Brief notes on habit, flowering season, habitat and Aboriginal uses are given for most species. About 50 ferns, fern allies, fungi and cycads are also illustrated.

To speed up identifications, genera are listed according to flower colour and petal number in the introductory text. The lists for each flower colour are printed on pages of the same colour for ease of location. All technical terms employed are defined in an illustrated glossary and there is an index of vernacular and technical names. Apart from a few misplaced legends to figures the text is remarkably free of errors.

The book would make an excellent gift no matter whether the recipient is a naturalist or otherwise. Indeed, the delightful photo of the "Flying Duck" orchid (p. 91) would serve to encourage even the most disinterested to become interested in Natural History.

At \$40 (plus \$8 handling) the book is a bargain. It is obtainable from the authors at Dalrymple Heights, Queensland 4757, and cheques should be made out to Sailcay P/L.

Review by H. T. Clifford, Professor of Botany, University of Queensland.



Melaleuca nervosa △

Photography by Steve Pearson

▽ *Melaleuca nodosa*



Australian Plants — Series A — Series B

Series A comprises the issues of Australian Plants of the 1980's, volumes 12, 13, 14 and 15. They will shortly be available as beautifully bound volumes, limited editions. The work involved in a comprehensive index has been enormous — after all, Australian Plant is really a difficult to read pretty picture book without a reference to a complete series compiled in this manner. I hope to advise full details in the next issue in time for ordering as that special Christmas present. —Editor.

Lambertia formosa (opposite). I need reports of a particularly good free flowering bush for development for the cut flower trade. Please look out this season —Editor.

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Melaleuca irbeyana