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Australian Plants – what is it about?

Four issues are produced annually. You may obtain it by annual subscription, having it posted directly to you for $7.00 or as part of your membership of The Society for Growing Australian Plants (optional in Victoria), for a fee ranging from $15.00 to $18.00 depending on the State.

Australian Plants is directed to the beginner, the Australian who knows nothing about botany or horticulture. We will teach you the elementary details, sufficient for you to get a greater understanding and appreciation of our Australian flora. If you do not want to learn more, there is a wealth of information surrounding the beautiful colour plates and general articles.

The Australian flora is vast, literally thousands of beautiful plants. For even a casual look at such a vast number of plants, it is best to consider them in groups. The botanists have placed them into families and then into subgroups called genera, such as *Grevillea, Cassia, Banksia,* etc. In this issue we introduce you to the Proteaceae family and the genera *Telopea* (tel-O-pe-a), *Grevillea* (gre-VILL-ee-a) etc.

The Australian flora is unique. Our continent has survived in isolation from the rest of the world with only minor influences from the north. Over thousands of years, our flora has evolved into a vast array of plants, the majority of which are unique in the floral kingdom of the world. What are you doing as an Australian to preserve and enjoy this privileged inheritance? One direct way is to receive Australian Plants by subscription and even as a passive reader or admirer of our beautiful colour plates, you are giving support and encouragement to others to carry out this trust bequeathed to us.

The Australian flora in horticulture. The exotic garden plants in your garden are developed from the wildflowers of other lands. The potential for the use of Australian plants in general horticulture, landscaping and to add beauty and interest to your home is enormous. Why not purchase Australian Plants by subscription and learn how to do it?

Do not be deterred by the apparent technical content of some articles. Skip these items and enjoy the rest. Before long we will have you understanding all the articles.

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COVER PLATE

Waratah, *Telopea speciosissima* — Photography by Lois Sourry

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Grow Waratah* from Seed to Flower

by Paul Nixon

1. Early August: Start with fresh seed, usually harvested and cleaned late autumn to early winter. Do not use seed older than 12 months.
   1.1 Select a container with drain holes. I would suggest a plastic ice cream container. A container 30×30 cm will hold 250 seeds.
   1.2 Three quarters fill with well-drained clean soil. The medium is not important, only that it has been treated with a fungicide. A well washed coarse river sand is satisfactory.
   1.3 Drench with a general purpose fungicide. Benlate applied by mixing one gram (a level teaspoon) to a litre of water will be ideal.
   1.4 Sow the seed on the surface and cover with a few millimetres of soil. If kept at 25°C, the seedlings will emerge in one week. To achieve this I use a heated area inside. This facility is not available to everyone. Keep the container as warm as possible. If using an ice cream container you can keep it in an old foam fruit container that insulates it from the surrounds. It can be moved out into the sun, of a day, and brought into the warm house overnight. Inside a window on the sunny side of the house may do. A sheet of glass on top may keep it warmer.
   1.5 Keeping the surface moist is a problem. A fine spray applied daily is suitable. If kept in a plastic bag it will retain its moisture and not need watering at all.
   1.6 If the seed has not germinated within four weeks, it is not going to.
2. September: The seed will have germinated and have four leaves.
   2.1 Prepare containers for growing on the seedlings. A one litre container is recommended, a 15 cm plastic pot is ideal. The pots should be well cleaned, a 25% household bleach being suitable.
   2.2 Crocking the bottom of the pot with stones or gravel is not modern practice but it is necessary to keep pots on a well drained surface.
   2.3 The growing medium must be freely draining. A mixture of peat, sand and loam in equal volumes is suitable. It should have been treated with a fungicide or may have been bagged in small quantities and sterilized by boiling.
   2.4 Lift the seedlings out with a small trowel or fork and plant in the pots firming down well.
3. October: The seedlings will be showing active growth.
   3.1 Feed with one gram (a half teaspoon) of complete slow release (3 to 4 month release) fertilizer. See page 248 for fertilizer details.
   3.2 Ensure that the containers still drain freely. Keep in an open sunny position and water regularly.

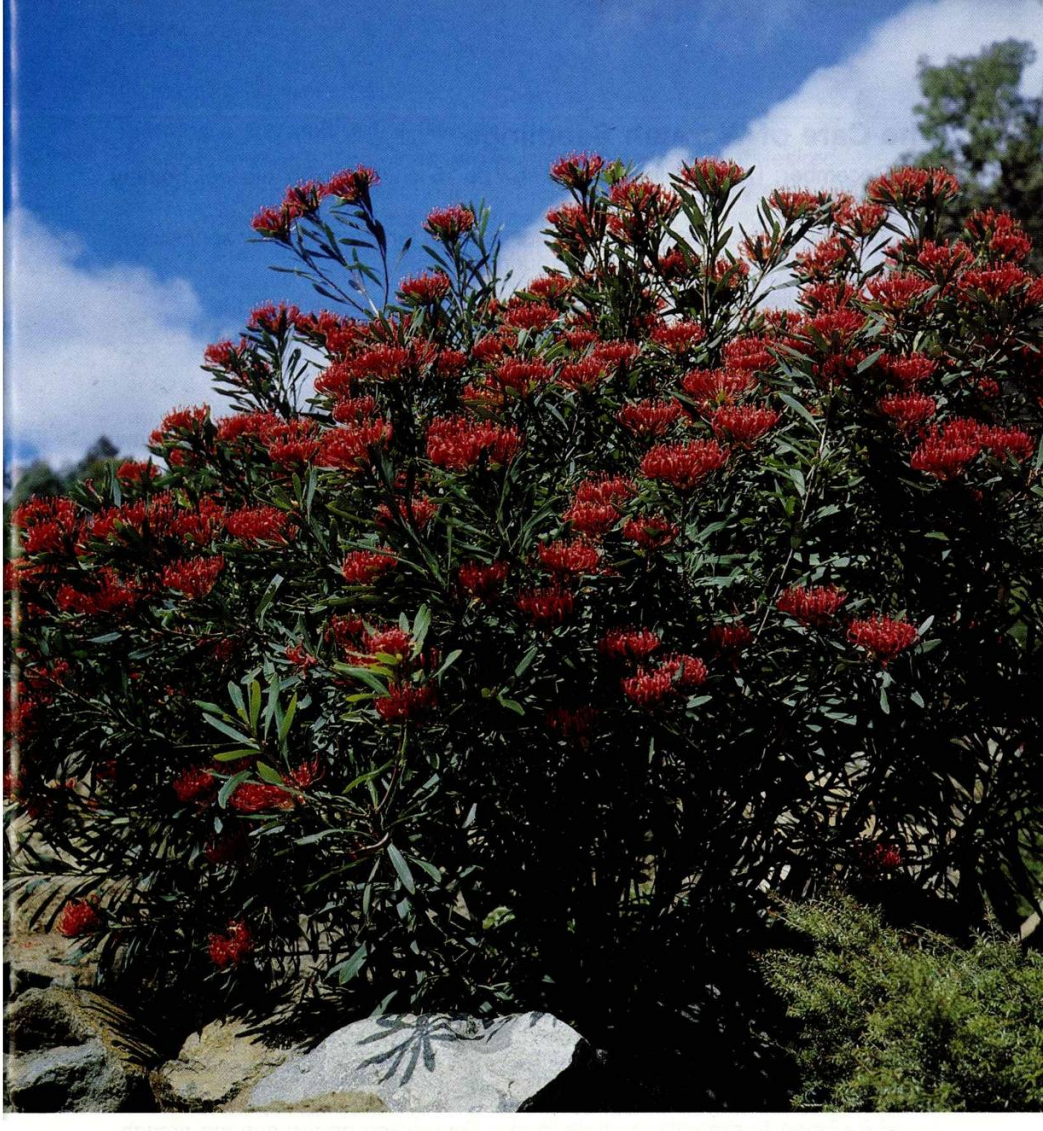
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*The Waratah: Paul Nixon. This 80-page hard-covered book is available, it tells you everything you need to know about our famous Waratahs. Available from SGAP Book Service, P.O. Box 551, Milsons Point 2061 for $19.00 post free.

Telopea speciosissima, a five-flowered head ▲

▼ ***Telopea mongaensis***





A vigorous well-flowered Waratah Photography by Lois Sourry

There are four species of *Telopea*, the plant above being a cross between *Telopea speciosissima*, the NSW Waratah, and *Telopea oreades*, the Gippsland Waratah, described on page 250.

Waratahs (opposite top) Photography by Paul Nixon

These five well developed flowers formed on one flower stem. This is unusual.

Telopea mongaensis (opposite bottom) Photography by Lois Sourry

This species of Waratah is found on the southern New South Wales ranges at the northern limits of *Telopea oreades* and is very similar to it. The principal character that separates the two species is that *Telopea mongaensis* is quite smooth between the veins of the leaves, whereas both surfaces of the dried leaf of *Telopea oreades* have a minutely granular texture.

Lois Sourry has recently passed on. How fitting it is that our final tribute to her is in an issue on her beloved Waratah. Her memory will live on with her fine photography, but many will know of her work as a dedicated conservationist of the Central Coast of New South Wales.

The Care of Waratah Seedlings

4. December: The seedlings should now be 15 to 20 cm high and look healthy and green.
   4.1 Apply three grams (about a teaspoon) of fertilizer again by sprinkling it on the surface of the soil around the plant.
   4.2 Regular watering is important.
5. March: The plants will be vigorous and green.
   5.1 Prune the stems to reduce the plant to 15 cm high.
   5.2 Pot on into five litre containers, pots 20-25 cm across the top.
   5.3 Some two weeks later, after the plants have adjusted to their new situation, sprinkle three grams of a slow release fertilizer over the surface of the media around the edge of the pot and well clear of the stem of the plant.

       Keep the pots where they will drain freely and receive full sun. Both factors are important. If the pot does not drain freely the concentration of fertilizer-chemical will build up to toxic proportions. The pot needs to stand on well drained gravel or ashes to ensure this free flow of water. In such a situation, provided there is adequate water, the plants will thrive in a very hot, sunny situation.
   5.4 Watering is critical. In a nursery situation, pots in the situation above receive daily watering in significant quantities, usually supplied by a hand held hose to ensure adequate water. While you have the plants in small containers you will need to ensure adequate, regular watering.
6. September, Year 2: The plants are now one year old and probably 20-30 cm tall. There should be a few branches including fresh growth from the base, a lumpy root structure known as a lignotuber.
   6.1 Fertilize the plants with one gram of slow release, zero phosphorus, fertilizer, applying one gram per litre of medium making 5 grams for these five litre containers.
   6.2 Inspect the plants for signs of damage. If you have a number and one is very much less vigorous than the others discard it as it may be diseased.
   6.3 Prune to promote multiple trunks. Depending on the autumn growth, some plants may be pruned now, otherwise leave until Christmas. It is desirable to have as many trunks as possible. The best time to prune is just before a flush of growth which occurs in mid spring and again in late summer. If one aims at obtaining 4 to 6 stems at about 20 cm from the ground, that will develop to a well shaped tree; it is all right to have more stems.
7. December, Year 2
   7.1 Repeat the fertilizer application of one gram per litre of medium.
8. February, Year 2. The plants are now 18 months old and should have several branches.
   8.1 Prune the tips out of the prominent leading stems.

Planting a Waratah in the Garden

9. March, Year 2. The plants are ready for planting out, if desired.

9.1 You may now plant out into the garden, preferably after rain. Follow normal planting out procedure in good, well drained soil.

9.2 Drainage is important. One sure way of achieving positive drainage is to place the plant on or above the ground surface. Do not dig a hole, but build a mound up around the plant to form a bed.

9.3 The best Waratahs are growing in rich, well drained soil as found near Robertson (south of Sydney) or in the Dandenong Range, (east of Melbourne). This soil is red/brown basalt and does not respond to fertilizer.

9.4 At planting, 20 grams of slow release fertilizer should be placed around the plant, ensuring it is away from the stem. Some soils, such as good garden loam with regular addition of compost will have adequate nutrient and no added fertilizers will be required.

9.5 The care of a mature bush.

Annual pruning is desirable and should be done as soon as possible after the flowers have lost their charm and just prior to new shoots appearing. Prune all but the 3-4 cm of the last year's new growth and this will normally mean the removal of about 30-40 cm of stem below the spent flowerhead. For plants that have not been pruned for a year or two and have become "leggy", it is best to prune severely by cutting back all or part of the plant to 30 cm from the ground, just after flowering or harvesting of seed.

This is also the time to fertilize, using 100 grams of complete slow release fertilizer per square metre of the leaf drip area. Leaf mulch and compost will help reduce weeds.

The bush should be well watered once a week in summer and once a month in winter; more often in particularly dry times.

If the Waratah borer is noticed, remove the sawdust from the hole entrance and spray with pyrethrum, or skewer the borer with a piece of wire. Unfortunately, once the pest is noticed, it is usually too late as the damage has been done but remove them just the same.

Scale is another pest that may be noticed by a small round bleach spot on the top of the leaf. The pest is on the underside of the leaf and can be controlled by spraying with Malathion and white oil or washing the leaf with methylated spirits on a cloth. Do not use Ridomil as a fungicide. Do not use Metasystox for insects.

Finally I would recommend that you read the excellent article "Growing the Waratah" by Max Hewett, on page 351 of Volume 11 of Australian Plants. I agree with all he says but in one part he says "After the plants have been established two years or so and have formed a lignotuber, I have cultivated to shovel depth (approx 200 mm) from the plant stem to one metre radius out. This has been done twice a year and the plants have never failed to respond with new vigour and new growth at or near ground level . . . Some plants which had been overgrown with foliage from adjacent shrubbery and had been dormant for ten years or more have responded with new growth when freed from leaf competition and given the above treatment."







***Telopea truncata*, The Tasmanian Waratah** (above) Photography by John Simmons

Telopea truncata is found only in Tasmania throughout the montane areas at latitudes of 600 to 1 200 metres in moist acidic soils. It differs from the New South Wales Waratah in that the stems branch freely producing many flower heads, although each flower head is smaller. The flowers at the apex of the inflorescence open first. Each flower has a sharp bend in the style just above the ovary, giving it a more open look. A flower head comprises 10-20 individual flowers.

***Telopea speciosissima*, The NSW Waratah** (top left) Photography by Paul Nixon

These Waratah from the Gosford area of New South Wales have unusually large flower heads but most notable is the size and colour of the large red leaf-like bracts that surround the brilliant flower heads. The selection of particular plants that have developed desirable features and the use of these plants to commercially produce outstanding plants for horticulture, has led to the use of cultivar names to reliably market selected forms. The discerning horticulturalist no longer purchases a plant labelled Waratah, but selects from those especially developed for horticulture that carry a cultivar name. Some of the new cultivars are described on page 255 and illustrated on other pages.

Waratah As An Industry (bottom left) Photography by Paul Nixon

An orchard of Waratah. A large export industry has grown from the pioneering work by Percy Joseph Parry (see page 254). This photograph could have been taken at his highly successful orchard at Gosford. In fact it is from Howard Gay's property at Monbulk, Victoria. It is not unusual to produce 100 saleable blooms on the one bush. Many have since followed this lead developing a sizeable export market for cut flowers.

I would not recommend this treatment. I am sure he has success as in the article is good sound advice. His plants have grown used to this severe treatment but I feel it must force the roots to go deeper. This pruning of surface roots will also cut away competing roots in the area. Perhaps this is good in his particular garden conditions or perhaps the need to produce a new set of proteoid roots regularly is stimulating.

Howard Gay, a very accomplished grower of Waratah, cultivated close and fairly deep to his plants. Sid Cadwell did not with good results. There is a very well grown Waratah at Gembrook in the Victorian Dandenongs, in a front lawn with grass growing vigorously right to the stem.

Waratah as a Container Plant

10. September, Year 2. The plants are now two years old.

10.1 Ideally plants should stay in containers until they have flowered. If the plants have not been pruned to date, 60% of them will flower this season. This is the best way to check on the quality of the plant, the flower size, shape and colour, and the vigour of the plant. If they don't flower as two year olds in a container, they will in their third year. Pruning will delay flowering a year.

10.2 The same procedure as recommended for a garden grown plant above, is followed for a container grown plant. There is a contradiction here. To flower in 2-3 years, pruning is not carried out as it delays flowering for at least one year. However, there are times when it is more important to see the flower than to have a good bush. It is often desirable to get an early indication of the qualities of the flower head following breeding or to select the best of a batch of seedlings for commercial planting. It is also done commercially to be able to sell the plant in a pot in flower. This way you can study and select the flower with the qualities you admire most. If you do purchase a plant like this or any plant that has grown leggy, prune the plant, after flowering, quite heavily to promote new growth from the base and pinch the new growth out of subsequent suckers, either in September or late December, if more stems are required.

10.3 Transfer an 18 month old plant into its final large container. One with a capacity of 150 litres, 80 cm in diameter and 30 cm high. Position the container first to ensure that it is not in direct contact with the ground by resting it on bricks or gravel. A position with full sun is satisfactory, say in Sydney, but I prefer a semi-shaded site. Avoid a windy position.

Check drainage at the bottom to see water gets out easily. Drain holes in steel containers rust up and these should be avoided. Crock the bottom of the container and fill with the same mixture recommended for pot culture, as above, for young plants. After planting, a mulch of pinebark or similar looks good and will minimize evaporation from the soil surface.

Treat the plant in the same way recommended for a plant in the garden, as above remembering that you now have a plant dependent on you for water and nourishment. Do not overdo it, but do not let the pot dry out.

TELOPEA

Australia's Waratahs
By J. L. Willis, M.Sc.*

This article appeared in Vol. 1 of Australian Plants. Dr. Jim Willis was then Director, Museum of Applied Arts and Sciences, Sydney. Some minor changes have been made following discoveries and research since 1959.

The family *Proteaceae* is a very ancient, widespread family occurring in Australia, New Zealand, South Africa, South America and Eastern Asia. It contains about 75 genera of which 44 are indigenous to Australia.

Included in the plant family *Proteaceae* is *Telopea,* a small, endemic genus which contains four species only, all of which are confined to the south-eastern regions of the continent and the island of Tasmania. The name *Telopea* is derived from the Greek "telopos", meaning "seen from afar", and refers to the conspicuous nature of the crimson heads of flowers which stand out from the dark green foliage in a striking fashion. The Aborigines called these beautiful shrubs "Waratah", and this is now the generally accepted vernacular name.

Of the four species, *Telopea speciosissima* R.Br. (meaning "very handsome") is perhaps the most familiar. This species occurs in New South Wales from Gosford, Putty and the Blue Mountains, south to Conjola, and is found usually on sandstone. There is also an isolated occurrence in the Gibraltar Range east of Glen Innes. *Telopea mongaensis* Cheel (referring to the district of origin, Monga) is also a New South Wales species and occurs from Meryla State Forest near Moss Vale, south to the Mongarlowe Valley. The third New South Wales species *T. oreades* F. Muell. (meaning "belonging to the mountains") occurs in the Bombala district and far South Coast of New South Wales, extending into East Gippsland in Victoria. There is an isolated population in the Mongarlowe Valley. The fourth species *T. truncata* R.Br. (meaning "truncate" — referring to the truncate seed-wing) is endemic to Tasmania, where it is widespread in the wet, mountainous regions.

Inflorescence

The flowers of all *Telopea* species are arranged in dense, terminal, racemose clusters. See the sketch on page 251 (technically, the inflorescence in *Telopea* and all other *Grevilleoideae* is not a raceme but a conflorescence. As in all racemes, the flowers are borne on separate stalks, but they arise in pairs so close together on the rachis that they touch one another, and give the inflorescence the appearance of a head. The size and shape of the inflorescence varies with the species. For *Telopea speciosissima* the oldest flowers are at the base of the flower head, and the youngest ones are at the apex, and as a consequence the upper flowers are often still in bud when the lowest ones are fully opened. With the other three species, the apical flowers open first. In all species the inflorescence is surrounded at the base by an involucre of large bracts which vary in size according to the species.

Floral Structure

The individual flowers of Waratahs are small and are built up in parts of four. There is no separate calyx and corolla, instead, the flower parts consist of four perianth segments which, in the bud, appear to be fused together. This fusion, however, is not a true one, as the four segments can be separated by gently twisting the bud. This apparent union of the perianth segments is related to the pollination mechanism. Each perianth segment is somewhat strap-like



Telopea speciosissima 'Pope's Weromba Cardinal' (above and opposite)
Photography by Paul Nixon

Miss Lucile Pope and her Waratah. For a description of this plant and how it is grown see page 255. "If this charming little lady can grow a Waratah like this, so can you." This is the closing comment by Paul Nixon when he gives a public address on his favourite subject, Waratah. Paul is responsible for the horticultural work involved in the Waratah Project at the Camden Research Station operated by the Sydney University, Department of Agronomy and Horticulture. He has also written a book "The Waratah", available from your bookseller for $19.95. As author of the lead article in this issue, you will see he knows what he is talking about, that he has done what he recommends, and that his book would be invaluable.

I have been with Paul when he is answering questions from people who want to grow a Waratah. His reply is always . . . "feed it, they love fertilizer".

Fertilize Your Waratah by Paul Nixon

A low phosphorus fertilizer is essential and this is indicated by the centre figure in the ratio on the packet 18:2:4. The figure 2 refers to the ratio of phosphorus, a chemical that appears to adversely affect all Proteaceae. In fact a new formulation especially for natives is on the market under the Osmocote or Nutricote brands with zero phosphorus the ratio on the packet being :0: Trace elements are important but if the mixture contains one third soil this problem should not arise. These are included in the commercial formulation.

This whole problem of balanced organic fertilizers can get quite complex and if your plants are not growing as described here, you should take some action. The need for the native grade of Osmocote with zero phosphorus is not critical, and a normal low phosphorus mix to say 3% is usually satisfactory. The normal slow release fertilizers such as Osmocote or Nutricote, do not have trace elements in the mixture. Trace elements are very low percentages of chemicals that have proven to be necessary for healthy growth of plants. Osmocote Plus has trace elements in it.

There is, commercially available, Micromax slow release trace elements. You need only small amounts. One kilogram per cubic metre of soil is the recommended application for soilless mixtures but one half of this is used for mixes containing soil. Another deficiency could be calcium as it cannot be slow release coated, so a sprinkling of Dolomite may be beneficial.

Many natives show signs of iron deficiency by a yellowing of the leaves. A slow release iron pellet is available. This problem is more often with sawdust or pinebark based mixes.



Telopea speciosissima 'Pope's Weromba Cardinal'

in appearance with a hollowed out lobe at the apex, the four lobes forming an apical swelling which is curved towards one side (see figure 1). The flowers are consequently bilaterally symmetrical. Inside the swelling are four anthers on filaments that are fused to the tepal. Each of these sessile anthers, in the bud, is in close contact with the rather conical-shaped pollen presenter, which is placed laterally towards the end of the style (see Figure 2). As the flower matures, the style grows faster than the perianth segments, and in order to make room for its increase in length, forces its way between the perianth segments, splitting them, and emerging in the shape of a hook, so typical of the Waratah flower and its allies (see Figure 3).

The ovary, which is produced on the end of an elongated stalk known as the gynophore, is superior, and consists of one carpel containing a large number of ovules, whilst the nectary, which is located at the extreme base of the gynophore, is in the shape of an incomplete ring (see Figure 2). The fruit formed from the ovary after fertilization is a follicle of leathery texture up to five inches long, containing many seeds which are quite flat and winged.

Description of Species

The following is a brief description of the four species, which can readily be separated by the leaf and inflorescence characters:—

1. *T. speciosissima* ("Waratah") (Pronounced spec-cio-siss-ima)

Stout, erect shrubs rarely above two metres in height, with alternate leaves 12-25 cm in length, sharply toothed in the upper part, from oblanceolate to obovate or almost cuneate, with prominent venation. Flowers in dense, ovoid or globular heads, 7-10 cm in diameter; involucral bracts crimson, ovate-lanceolate, the inner ones being 5-8 cm long. Fruit, a leathery follicle 8-10 cm in length.

2. *T. oreades* ("Gippsland Waratah") (Pronounced or-e-a-des)

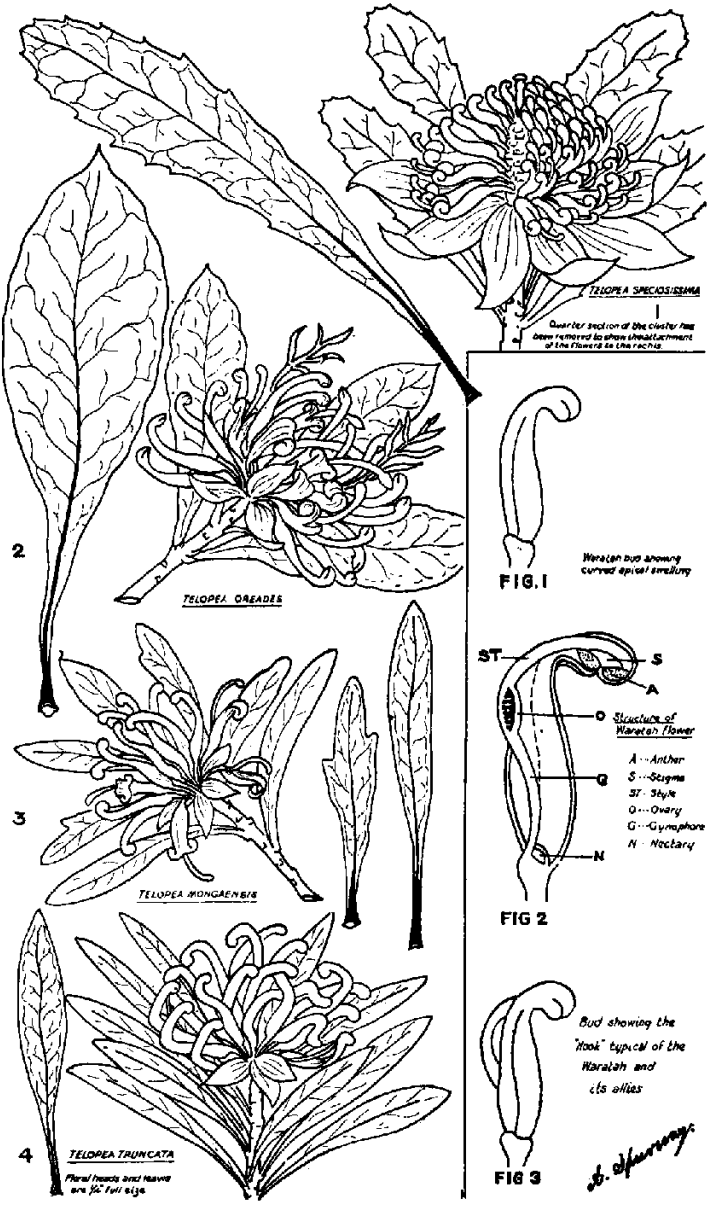
Gully and mountain shrubs, sometimes attaining tree height (up to 10 metres) with a stem diameter of 30-60 cm. Leaves alternate, 10-20 cm in length, usually entire from obovate to lanceolate, often glaucous on the under-surface, with mid-rib alone conspicuous. Flowers in ovoid or globular heads about 7 cm in diameter, with surrounding involucral bracts under 2 cm in length. Fruit, a leathery follicle 8-12 cm in length.

3. *T. mongaensis* ("monga Waratah") (Pronounced monga-en-sis)

Slender, branched shrubs to 2 metres in height, with alternate leaves 7-10 cm in length, narrowly lanceolate to oblanceolate, entire or with 2-3 sinuate lobes at the apex, slightly paler on the under-surface, conspicuously veined. Flowers in short, broad, rather flat heads about 7 cm in diameter; involucral bracts crimson, mucronate, sparsely fringed on the margins with rust-coloured hairs 1-4 cm long. Follicles 5-7 cm in length.

4. *T. truncata* ("Tasmanian Waratah") (Pronounced trun-ca-ta)

Erect or spreading shrubs to 2 metres in height, with alternate leaves 5-10 cm in length, from oblanceolate to obovate, entire, the margins often recurved, venation inconspicuous. Flowers in short, dense, flat heads about 5 cm in diameter; involucral bracts ovate, covered with appressed hairs, the inner (and longer) bracts being 2 cm long. Follicles 5-7 cm in length. ■



1. *Telopea speciosissima* showing the toothed leaf and a flower head cut open to reveal some of the 90 to 250 individual flowers from the inflorescence. The flowers open first at the base of the cone of flowers. An individual flower is shown in enlarged detail in figures 1-3, first in bud, the four petals being tightly folded to form a tube, bent at the top. Figure 2 shows a cross-section of a flower, the style emerging out the back of the flower as it matures. The stages of a maturing flower are shown in detail on page 263.
2. *Telopea oreades* with leaves not toothed and the flower head less dense, 30-60 flowers.
3. *Telopea mongaensis* is similar to *T. oreades* but does not grow as tall.
4. *Telopea truncata* with 10-20 flowers per inflorescence, each with a bent style.



Telopea speciosissima 'Light Shade of Pale' (above) Photography by Paul Nixon

This cultivar originated in the Sydney Metropolitan Water Sewerage and Drainage Board catchment area near Robertson. Several plants have been grown in containers and one is 0.6 metres tall by 0.5 metres wide. It has dark green foliage, the leaves being only slightly serrated. The cone shaped flower is medium to large, made up of 190 florets; the petals are light pink as are the styles and stigma. Usually when exposed, the stigma is covered with a mass of their own red brown pollen. About 5 per cent of the styles are fused together in pairs. The bracts are 12 in number, whitish, large and in two whorls. The flowering time at Robertson is October and the mother plant has withstood drought and frost.

Telopea Cultivars (opposite) Photography by Paul Nixon

Telopea speciosissima 'Pope's Weromba Cardinal' (top left). See description on page 255 and the large colour plate on page 249.

Telopea speciosissima 'Fire and Brimstone' (top right). This cultivar has consistently very large cone shaped flower heads comprising 240 flowers. The flower petals are a light red in colour, the style is also light red and the stigma on its end is white. The bracts are in two whorls, small to medium in size and triangular shaped. The leaves are large, dark green, with medium serrations.

Telopea speciosissima 'Brimstone Blush' (centre left). Described on page 255.

Telopea speciosissima 'Red Ned' (centre right). Described on page 255.

Telopea speciosissima 'Galaxy' (bottom left). The principal feature of this cultivar is the way the white tips of the dark red styles, the stigmas, contrast with the redness of the flowers. There are usually 190 flowers per flower head. The bracts are in three whorls.

Telopea speciosissima 'Brimstone Scarlet Starlet'. This colour plate has been reproduced from "The Waratah" by Paul Nixon, by permission. See page 248 for reference to this book.

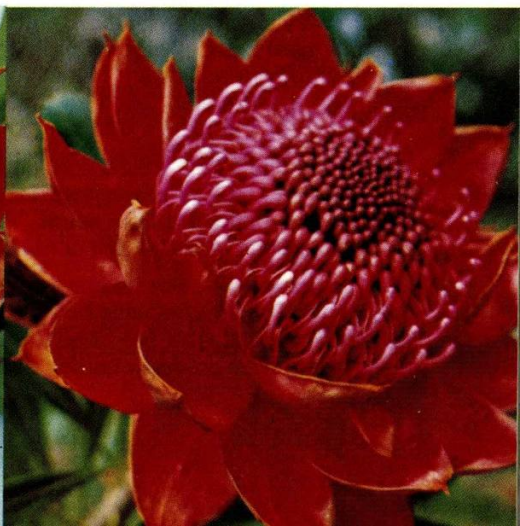












HOW TO GROW WARATAHS

By P. J. Parry,
in Volume 1 of Australian Plants

Telopea speciosissima, commonly known as the NSW Waratah, is the national flower of that State, is the best known, and is the most popular of the *Telopea.* They may be readily germinated from seed, as described later in this journal, or small plants may be obtained nursery grown.

The plants are planted out into their permanent positions at least one metre apart. The position chosen should be well drained to a depth of half a metre with reasonable sunshine available. The type of soil into which the Waratah is planted does not appear critical. They have been known to thrive in all soil conditions from a light bush sand to a heavy clay, a good loam being preferred. The important factor appears to be a good depth of soil well drained to the whole depth. At this stage watering twice a week should be sufficient. When they commence to grow and become established, watering can be restricted to windy or dry weather. Waratahs are capable of flowering in three or four years from the time of seed sowing. They respond well to occasional dressings of "blood and bone".

When plants come into bloom the flowers can be cut for indoor decorations or left on the plant until they die. If left on the plant the stems should be pruned back to about half the length of each stalk, and shoots will soon appear from above leaf nodes. It is a mistake not to prune, as plants will become scraggy and often fail to bloom during the following season. The setting of seeds will also interfere with future flowering. One Waratah bloom is capable of producing as many as two hundred and fifty seeds. Plants grown under cultivation, given proper care and feeding, should bloom each year.

On an average, Waratahs growing in the natural bushland flower in quantity once in every five years. This is quite understandable when one takes into consideration droughts, bushfires, floods and the struggle for survival with other natural shrubs and trees. It is true that the second year after a bushfire the Waratahs will bloom in profusion. This is because of the new growth to carry the bloom, but pruning promotes this new growth when carried out in the proper manner. My cultivated area is never fired and produces over 5,000 blooms every year.

Be wary about growing the Waratahs with rotted wood as they are susceptible to armillaria and phytophora root rots which thrive where rotted wood is in the ground. I am well aware that there was a friendly fungus which associated itself with the Waratah, but I am unable to decide whether this fungus was necessary for the plant's ultimate survival. This friendly fungus aids healthy growth as has been well documented elsewhere.

Waratahs can be propagated from seeds or cuttings, but the usual and most reliable method is from seeds. They should be gathered from the parent plants when ripe, usually April or May, and sown in springtime.

For sowing seeds a bed or box should be prepared with loamy soil and leaf mould. The seeds should be lightly covered and watered daily to keep the surface soil moist. The seed bed is kept covered with glass until germination takes place. Then gradually harden off the plants by lifting cover each day. ■

Telopea Cultivars*

by Paul Nixon

A cultivar is a plant selected because of exceptional qualities. The following cultivars are plants with considerable potential in horticulture.

Telopea speciosissima 'Brimstone Blush'

This shrub has grown one metre tall and 0.6 metres wide. See the colour photograph on page 253. The flower is medium sized and globe shaped with a pink crown when mature; the 160 florets are surrounded by three whorls of medium sized dark red bracts; the styles have a light red base and get whiter towards where the white stigmatic area gives the inflorescence its pink appearance. As the flower withers one or two fresh growing points will emerge from or just below the inflorescence stalk. The leaves are dark green with fine serrations. It flowers in October and remains attractive for four weeks.

The plant was found on the property of Mr B. Richards, at Oakdale, 50 km southwest of Sydney.

Telopea speciosissima 'Pope's Weromba Cardinal'

This cultivar is named from its owner Miss C. Pope, its area of origin and present location, Weromba, and Cardinal referring to the deep red colour. The plant is now about 33 years old and each year it produces in excess of 100 large blooms. It stands three metres tall and three metres wide. For a colour photograph of the mature bush and of the flower heads, see page 249. The flower is large (12 cm diameter) and dome shaped, dark red in colour; the 210 florets are surrounded by two whorls of dark red, medium sized bracts extending a further 2 cm around the flower; the style and stigma are a lighter red. The leaves are dark green, about 16 cm long and have medium and even serrations. The plant has experienced prolonged droughts (4 years) and frost to -12°C for short periods. Flowering is from mid to late September.

Outcrops of sandstone appear in the area it is growing which drains freely. Cultivation is by light clipping close to the base of the plant from time to time and no deep digging is carried out, leaf mould from eucalypt forest and cow and poultry manure and a half cup of Nitrophoska 12.5.14 is put around the leaf drop area each autumn.

Telopea speciosissima 'Red Ned'

This cultivar was grown from seed collected in the Blue Mountains area in 1978. It is growing on Sid Cadwell's property just north of Rylstone 200 km northwest of Sydney in sand four metres deep over clay. The shrub is 1.5 metres tall and one metre wide. It has dark green foliage. See the colour photograph on page 253. The flowers are large, dark red and cone shaped, having 180 florets; style and stigma are dark red as are the medium to large bracts surrounding the cluster of florets, in four whorls. The plant has proven drought tolerant and has withstood frost.

***Australian Cultivars.** This is the title of a new booklet to be produced by the Australian Cultivar Registration Authority and you are urged to purchase a copy. It is proposed to release it through your local nurseryman and if he has not got copies, suggest that he obtains some through his state Nurseryman's Association. Any plant that has exceptional qualities may be registered as a cultivar with the Authority. Application has been made to register the cultivars above and quantities should be available in 1989, from your nurseryman.

Telopea speciosissima 'Parry's Dream'

Selected from the many seedling plants grown about 1970 at 'Floralands', Kariong 50 km north of Sydney this cultivar was selected because of the usual attractiveness and colour of the flower head and the vigour of the bush. This cultivar was featured in colour in issue 112. The shrub stands three metres tall and remains only one metre wide with four main stems. The flower is cone shaped 10 cm diameter and 10 cm high; there are 204 florets surrounded by 18 bracts in two whorls. The bracts measuring 9 cm long and 3 cm wide, extend 4 cm outside the cluster of florets. The flower colour is dark pink, all the inflorescence parts being of the same colour. The foliage is dark green. The flowering time is mid-September. ■

The Queensland Waratah

by F. D. Hockings

Oreocallis pinnata, the Tree Waratah or the Queensland Waratah is one of three Australian species of *Oreocallis*. Other species (or closely allied genera depending on the final classification) occur in New Guinea and South America. It occurs naturally in elevated rainforest areas such as the Macpherson Ranges in Queensland and places such as Barrington Tops in New South Wales. It is often restricted near the crests of the ranges. In nature it may reach a height of 12 to 15 metres but in cultivation or in regrowth on cleared land it is usually a shrubby tree of 3 to 5 metres.

The juvenile leaves are simple as are the last few leaflets surrounding the inflorescence. The mature pinnate leaves consist of 3 to 7 leaflets and sometimes a few of the leaflets are also divided.

The red flowers are borne in distinct terminal heads similar to the New South Wales Waratah and are usually at their peak about Christmas time.

It is unfortunate that the northern Queensland species known as *Oreocallis wickhamii* which has orange/red flowers borne in corymbs in the upper leaf axils is wrongly promoted as tree Waratah. This is a beautiful tree in its own right but the open heads of flower do not resemble the traditional Waratah.

Fruit must be about 10 or 11 months old before seed is viable. Seedlings are difficult to raise because they are very susceptible to damping off fungi. Cuttings are relatively easy to strike and if taken from matured wood will flower in containers.

Oreocallis pinnata is difficult to grow in conditions far removed from its natural rainforest habitat. It needs a deep friable (well drained) soil, shelter from hot dry winds and exposure and it prefers a moist environment at an altitude. ■

Oreocallis pinnata (opposite page) Photography by O. B. Hockings

The open, more visible floral parts of *O. pinnata* are readily observed in this photo. The pinnate leaves also distinguish this species.



Oreocallis pinnata

Photography by O. B. Hockings

I Try Paul Nixon's Method of Growing Waratah — Editor

As Paul's book "The Waratah" was available to me in August 1987, I followed the procedures recommended. My results may be of interest.

(a) The seed was supplied by Paul and was fresh. My previous attempts had all ended in failure, rarely getting seed germination at all. Use fresh seed.

(b) I used a variety of mixes in the seed boxes from a coarse washed river sand on its own to sand and peat and perlite and peat. It did not make any difference. In some containers, all the seed germinated, in others none but for the different mixtures none was better than the others.

(c) I used a variety of containers but an ice cream container with holes in the bottom was as good as any.

(d) Why the failures? I had to be away for three weeks at a time and some methods allowed the containers to dry out – hence these failed. The containers and propagation mix are only a vehicle for holding the seed in a moist warm situation that will encourage germination. One batch of seed that produced good, and the earliest, results was germinated in my "egg boxes". I have described this method in previous issues of Australian Plants, notably, Vol. 8, page 30. It is simply a method for keeping seed moist and warm and allows me to go on holidays for two to three weeks. On my return, the boxes, without any attention while I am away, are bursting with germinating seed.

(e) The "kept at 25°C" in Paul's method had me intrigued. He admitted that his facilities were a little more sophisticated than those generally available to everyone else. He suggested I put my various ice cream containers in a white foam fruit box and move it out to the sun in day time and bring it inside at night. I did not get started until September and carried out this day by day procedure for four weeks. No result although my egg boxes had produced germinating seed by this time. I had a range of containers in plastic bags in a sunny position. No result. I had to go away for two weeks in early October, so I placed the failed containers in my propagation house. On my return I found the seed had germinated. My propagation house is a simple affair that I will describe to readers in a further issue.

It is sufficient to say that if you keep the seed warm and moist, it will germinate, without special facilities, probably in October.

(f) Although Paul said to pot straight into large containers, I followed my usual practice of potting up into 12 cm containers. I used a variety of mixes. As well as the one recommended I used a garden compost produced with a large percentage of stable manure and also an equal mixture of peatmoss and perlite. None appeared to be better than the other for the short period the seedlings were in the smaller pots.

(g) I potted all the small plants which were now 3-5 cm high into 15 cm pots using Paul's mix of equal parts of peat, sand and loam. I went off again for three weeks straight after this so no fertilizer was applied until mid December, when the plants were 20 cm high. On each occasion that I potted on, the pots were well watered with the benlate mixture recommended. My losses from damping off were very small, so small that possibly the few plants that failed were weak plants due to collapse anyway. ■

Proteaceae

by Peter H. Weston
(National Herbarium of New South Wales, Mrs Macquarie's Road, Sydney 2000)

Plants of the Proteaceae are among the most familiar, conspicuous and distinctive members of the Australian flora. A number of genera such as *Grevillea, Hakea, Telopea* and *Banksia* include species that are popular in ornamental horticulture, and some of these are becoming commercially important in the cut flower trade. *Macadamia integrifolia* produces the commercial "Macadamia Nut" and a number of genera include species that are useful timber-trees. The family is absent from very few regions in Australia and anyone who has spent time in the bush near any of Australia's capital cities would be familiar with some members of the family.

The Proteaceae are represented on all of the continental land masses of the Southern Hemisphere with some extensions into the Northern Hemisphere and the Pacific Islands. This distribution evidently reflects an origin for the family on the ancient "supercontinent" of Gondwanaland, at least 80 million years ago. Under this theory the ancestors of the great majority of extant proteaceous species "drifted" with the continents after fragmentation.

Like many families of flowering plants, the Proteaceae show a great deal of morphological variation based on a general, unifying, "structural plan". Thus different genera, and even different species in the same genus, may look superficially quite dissimilar. For example, *Telopea speciosissima,* the Sydney Waratah, may be found growing in the bush next to *Persoonia pinifolia,* the Pine-leaved Geebung. The unfamiliar observer would be hard-pressed to see any particular resemblance between these species at all. The Waratah has large, leathery, toothed leaves, and produces flamboyant, red, pyramidal "blossoms" and thick, dry leathery fruits that split open at maturity, releasing numerous, winged seeds. In contrast, the Geebung has much shorter, fine, cylindrical leaves resembling pine needles and produces elongated clusters of small yellow flowers and succulent fruits resembling small plums. The "blossom" of the Waratah is, of course, a whole shoot that bears numerous, small flowers, surrounded by petal-like bracts (i.e. it is an inflorescence). When the individual flowers of the *Telopea* and the *Persoonia* are examined in detail, (see page 262), their resemblance becomes more apparent.

The morphology of leaves is tremendously variable in the Proteaceae, but in most species they are net-veined and leathery. They may be compound, deeply dissected, lobed, toothed or simple and entire (without lobes or teeth). Of some interest is the degree to which leaf shape varies between different stages in development. For example, some species (e.g. *Grevillea hilliana, Buckinghamia ceisissima, Placospermum coriaceum*) produce simple leaves as seedlings, compound or lobed leaves as juveniles, and then "revert" to simple leaves as adults.

One feature that is characteristic of nearly all genera of Proteaceae (*Persoonia* is a major exception) but that mostly goes unnoticed is the production of proteoid roots. These are small, lateral roots of limited growth that form dense clusters on "ordinary" roots. They are produced in seasonal flushes and possibly enhance the rate at which the root-system acquires nutrients from the soil. Clusters of proteoid roots often form on the outside of the root-ball in potted proteaceous plants as may be observed on species of *Banksia.* ■



Dryandra nobilis ▲

▼ *Hakea bakerana*





Grevillea tetragonaloba (above) Photography by Neil Marriott

The flower heads of *Grevillea* are in many shapes, one large group having "tooth-brush" like flower heads. The individual flowers that comprise the inflorescence are very similar. One of these flowers is shown in figure 3 of the sketches on page 263 and from these you will see that while many of the flowers above have matured to the stage where the style is upright, the bristles of the tooth-brush, some still have their styles bent in a loop.

This colour plate is reprinted from "Creating An Australian Garden" by John Hunt, the book especially commissioned by the Society as the very best guide to beginners who wish to create a wildflower garden of their own. See page 283.

Dryandra nobilis (opposite top) Photography by F. W. Humphreys

Dryandra are similar to *Banksia* and both are members of the plant family Proteaceae. The flower heads comprise numerous individual flowers and in this species of *Dryandra* the flowers are grouped in a cone similar to the Waratah. Maturing first at the base of the cone, the yellow styles are bursting out from each of the white petalled flowers.

Hakea bakerana (opposite bottom) Photography by Lois Sourry

Hakea are often confused with *Grevillea* having similar flowers, at least to the non-botanist. The easiest way to tell them apart is to look for the seed "pod". *Hakea* have woody seed capsules that usually remain on the bush as shown here, whereas *Grevillea* usually have fragile capsules that release the seed when mature which then fall from the bush.

The Flower — Part 2

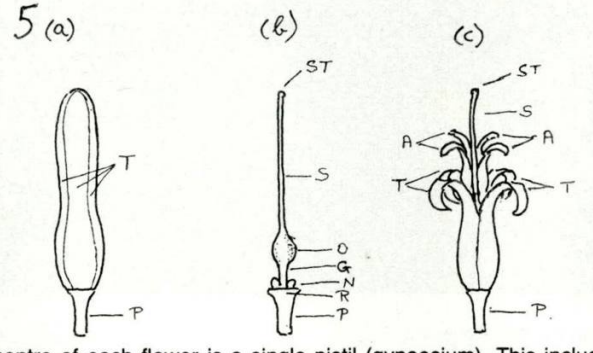
by Peter H. Weston

This article is second in a series that describes the parts of a flower for the beginner. It deals with flowers of the plant family Proteaceae, with examples mostly from one group in the family, the sub-family Grevilleoideae.

The sketch of *Telopea* on page 251 shows how the "flower head" of the Waratah is really made up of a large number of individual flowers, and one of these is shown enlarged. Opposite are detailed sketches of the individual flowers of *Telopea, Oreocallis, Grevillea, Banksia* and *Persoonia.* The colour plates on other pages of this issue show the flower heads of these genera.

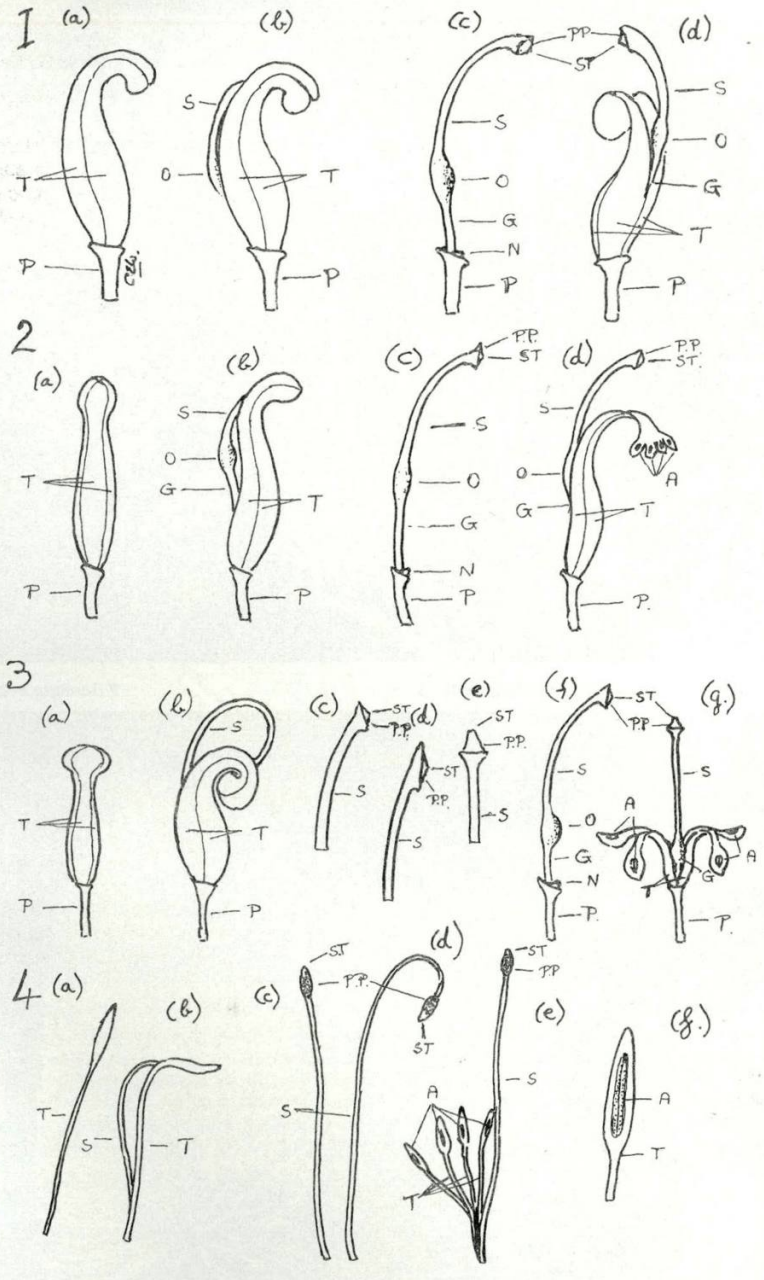
Whereas most other flowering plants have two perianth-whorls (the sepals and petals), the Proteaceae have only a single whorl of four "tepals", so named because it is unclear whether they are petals or sepals.

Immediately inside each tepal is a stamen, composed of an anther on the end of a filament which is fused to the tepals below the anthers in most Proteaceae (figs 2d, 3g, 4e-f, 5c). Inside the whorls of tepals and stamens are small nectary-glands. Most Proteaceae (including *Persoonia* and *Banksia*) have a whorl of four of these, alternating with the tepals (figs 4c-d, 5b). However, many species of other genera such as *Telopea, Grevillea, Hakea* and *Stenocarpus,* have a single, U-shaped nectary (figs 1c, 2c, 3c-e). A few genera, such as *Symphionema* have no nectary-glands at all.



In the centre of each flower is a single pistil (gynoecium). This includes an ovary with a single chamber (i.e. it is unilocular), containing one to many ovules. The ovary is often borne on a basal stalk (gynophore) that may be quite short as in *Persoonia* (fig 5b and some species of *Grevillea,* fig 3e), or elongated as in *Telopea* (fig 1e) and *Oreocallis,* (fig 2c). In *Banksia* there is no gynophore at all; the ovary is sessile on the receptacle (fig 4c). At its tip, the ovary bears a single style (figs 1c, 2c, 3c-e, 4c-d, 5b). In most Proteaceae, including *Telopea, Oreocallis, Grevillea* and *Banksia* (figs 1c-d, 2c-d, 3c-g, 4c-e) the tip of the style is modified as a "pollen-presenter". A pollen-presenter, as its name suggests, "presents" the pollen to pollinators (insects or birds for most species). In the flower-bud, this structure is adjacent to the anthers, which shed their pollen onto it before the flowers open. The pollen-presenter surrounds the minute stigma and varies considerably in morphology between different groups. For example it may be more or less radially symmetrical and elongated (e.g. *Banksia,* fig 4c-d), radially symmetrical and shortly conical (e.g. some species of *Grevillea,* fig 3e-g) or oblique to lateral and flattened (e.g. *Telopea, Oreocallis* and some species of *Grevillea,* figs 1c-d, 2c-d, 3c-d,f). *Persoonia* resembles most other flowering plants in lacking a pollen-presenter, presenting the pollen in the anthers (fig 5c).

The stigma is the receptive part of the pistil, on which the pollen grains germinate. It may be at the tip of the style (figs 3e-g, 4c-e, 5b-c) or lateral (figs 1c-d, 2c-d, 3c-d,f). *Persoonia pinifolia* has radially symmetrical (actinomorphic) flowers but many Proteaceae (e.g. *Telopea, Oreocallis,* most species of *Grevillea*) have bilaterally symmetrical (zygomorphic) flowers. The tepals and pistil may be slightly or strongly curved (e.g. figure a-c) and in many species the pistil pokes out of the flower bud between the tepals (e.g. fig c). ■

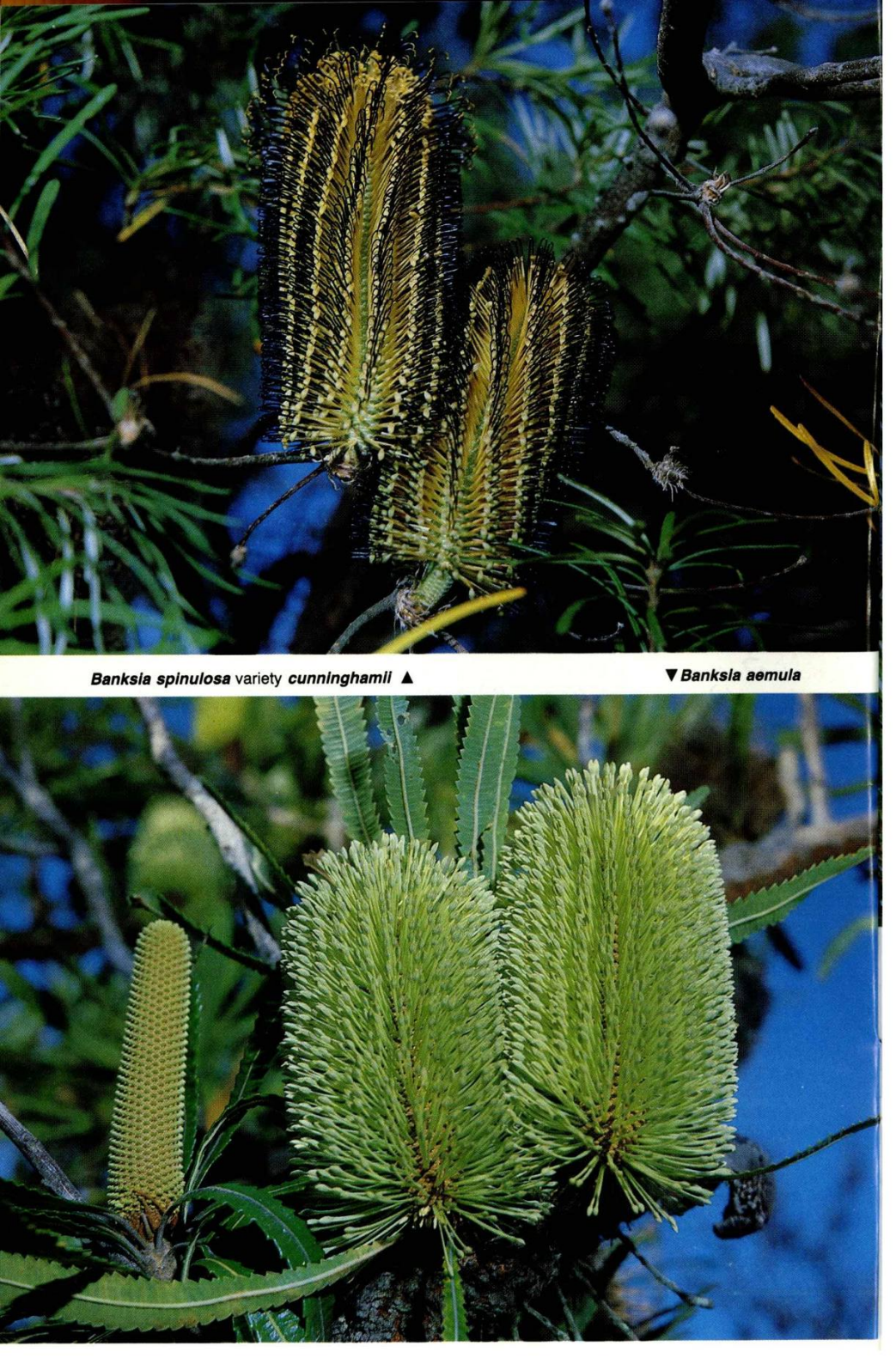


The individual flowers of some plant genera in the family Proteaceae.

1. *Telopea*. 2. *Oreocallis*. 3. *Grevillea*. 4. *Banksia*. 5. *Persoonia*.
Tepals (T), Pedicel (P), Style (ST), Pollen-presenter (PP), Stigma (S), Anthers (A), Ovary (O), Gynophore (G).

Banksia spinulosa variety ***cunninghamii*** ▲

▼ ***Banksia aemula***



Banksia of Eastern Australia



Banksia spinulosa variety ***collina*** (above) Photography by Lois Sourry

The type variety *Banksia spinulosa* variety *spinulosa* may be found in North Queensland between Mossman and Ravenshoe, again in isolated occurrences in coastal southern Queensland and again from the Hawkesbury River to the Victorian border. The variety *collina* above is confined to Nambour in Queensland south to the Hawkesbury River of New South Wales. It differs in generally having wider flat leaves although the margins are serrate and turned under. The greyish hairy underside of the leaves are evident above and the seed capsule is shown on the right.

Banksia spinulosa variety ***cunninghamii*** (opposite top) Photography by Lois Sourry

This variety is taller than the others in the wild with flat, sometimes slightly serrate, margins. A feature of this species is the black styles that are shown opening from the top down. See page 266.

Banksia aemula (opposite bottom) Photography by Lois Sourry

A record of eastern *Banksia* must include the "old man" *Banksia* with, some would say, less colourful flowers but demanding presence. It is usual to show *Banksia serrata* but the *Banksia* above is very similar though the leaves are a little narrower. The flower of *Banksia aemula* may also be more colourful, some forms being a lemon-yellow.

BANKSIA

No 7 in a Series, East Coastal by
Brian Walters

Those who are obsessed with Australian plants may often have difficulty choosing their favourite genus. It changes throughout the year, doesn't it, as different groups come in and go out of flower.

I don't have that trouble.

I like *Banksia*!

Tall ones, short ones, broad ones, thin ones. It doesn't matter . . . I like them all!

There's always something interesting about a *Banksia.* When they aren't flowering there's the magnificent gnarled old fruiting cones to appreciate, or the intricately shaped leaves. Honestly, I can't imagine a garden, any garden, without a *Banksia* or two . . . or three or more.

Of course, there are problems in growing some of them. The western species, with some exceptions, are beautiful but heartbreaking in humid coastal areas.

So . . . at the risk of being accused of indulging myself, here are a few of my favourites, none of which cause major cultivation problems.

Banksia conferta var. *penicillata*

This is one of the recently named species and is, I believe, destined for widespread cultivation once we select the best colour forms. It is mainly restricted to the Newnes Plateau west of Sydney, although a single old specimen has also been found at Leura. The yellow flower spikes occur in autumn and winter on a large, dense, non-lignotuberous shrub which reaches about 3 m high and wide. But, the most attractive features of this species are the beautiful colours developed by the flowers at the bud stage. I have seen colours ranging from deep chocolate brown through to mauve. Truly, a magnificent Banksia.

Banksia spinulosa

This species needs little introduction. Generally, a small to medium shrub, the variety *cunninghamii* is a much larger plant. It, too, occurs on the Newnes Plateau but it ranges north to the Queensland border and south to near Melbourne.

Many forms of *Banksia spinulosa* produce orange flowers with black, hooked styles (hence the name "Hairpin Banksia"). In my experience, the variety *cunninghamii* (at least in the Blue Mountains forms) produces the most intensely black styles of all. It is a beautiful small tree which unfortunately is a little hard to obtain as most nurseries don't distinguish this variety from the others, so you can't be sure that you are getting the tree form.

The smaller forms of *B. spinulosa* are just as attractive. These have a lignotuber, which means they can be cut back severely to ground level with "no problems" if they become a little too large. There are three varieties of the smaller form of *Banksia spinulosa,* differing mainly in the shape of the leaves. The newest (named late in 1987) is the variety *neoanglica* from the New England area of New South Wales. It has reasonably broad leaves with few, or no, serrations.

There is unlimited scope for selecting a range of forms and colours of *Banksia spinulosa* particularly some of the semi-prostrate forms from coastal areas. There are excellent low-growing forms of var. *collina* from the New South Wales Central Coast and of the type variety *spinulosa* on the South Coast near Ulladulla.

If this plant is to achieve its full potential it needs SGAP propagators to select good forms, name them and distribute them . . . no one else will do it!

Banksia ericifolia

"Everyone knows this! Why is he writing about it," I hear you cry!

True, but again, there are forms and forms some of which can reach 5 m high and wide with flowers held inside the bush – great for the birds but I like to see the flowers too! There are two forms that deserve special mention.

There is a form that is a compact plant that holds many of its flowers above the foliage. The orange spikes are not as large as with some other forms but they are more visible. The plant is also of modest proportions and won't kick the car out of the driveway.

A second form is, perhaps, more interesting than spectacular. It has cream flowers with red styles. Sound interesting? It is! It is probably a form of the variety *macrantha* which occurs along the north coast of New South Wales.

Banksia serrata

OK . . . Everyone knows the "Old Man Banksia" but how many of you are growing the prostrate form? It's not widely available but it IS available and appears to be an excellent groundcover, although it doesn't seem to be particularly quick growing. I have yet to see it flower in my garden but I have seen prostrate forms flowering at Greencape in southern New South Wales and they look magnificent.

Banksia integrifolia

Again, I am talking prostrate plants here. Unlike the prostrate form of *Banksia serrata*, this is a reasonably vigorous plant which apparently arose as a chance seedling at Australflora Nursery in Melbourne. I have it trailing down a steep slope and it looks great. I like it (although, again, I have yet to see it flower) but perhaps I am in the minority. They were certainly difficult to move at the last couple of Wildflower Exhibitions in Sydney.

Finally, I'm quite serious about the need to develop the good forms of various Banksia species. If you know of a good form, but you are not a propagator, you can let me know through the Editor and I'll arrange for someone to take up the project. ■

Growing Eastern *Banksia*

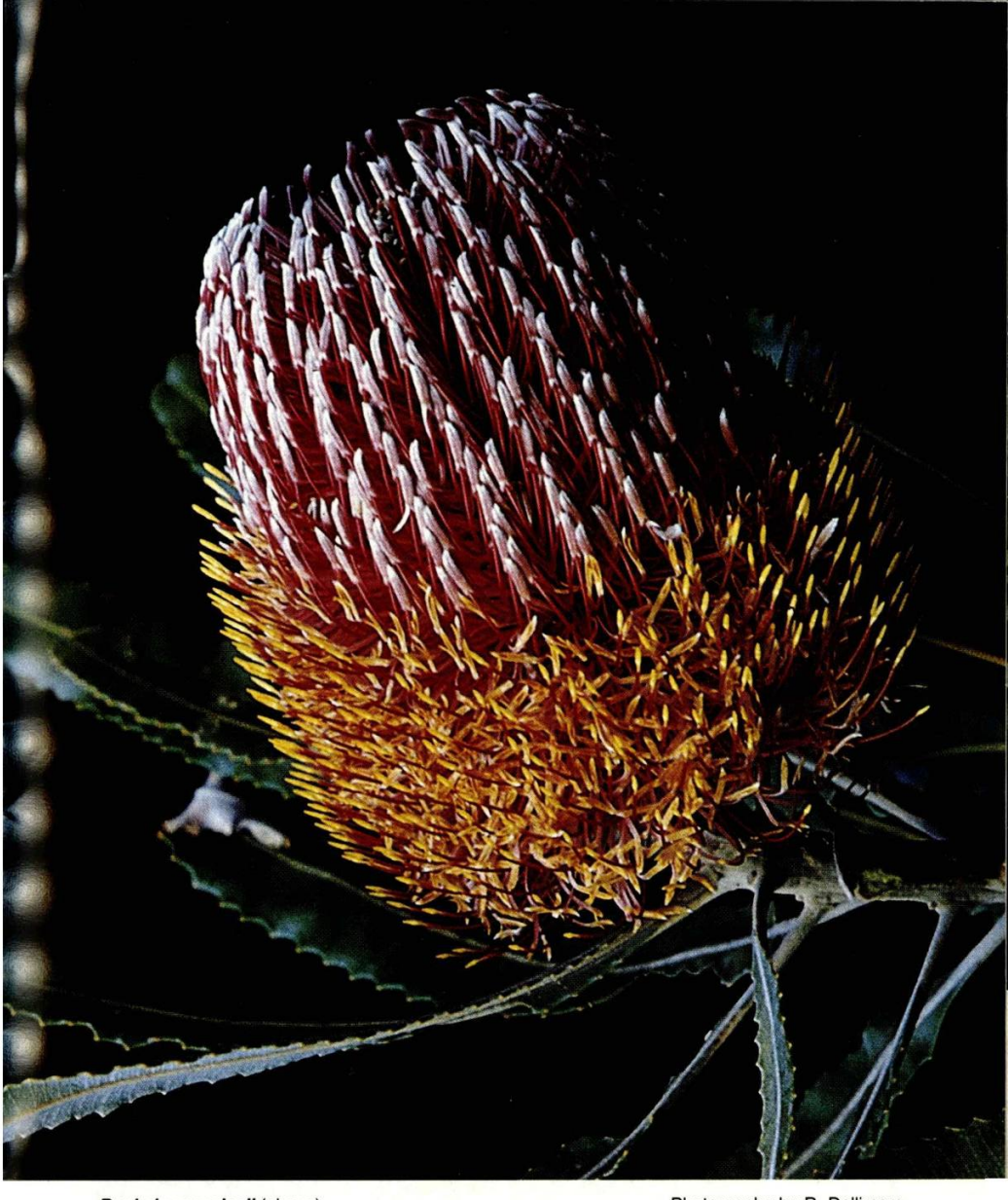
Banksia Study Group

The most recent, Report No. 7 (available from the leader of the group, Trevor Blake, 22 Vista Avenue, Ringwood East 3135, for $5 including postage) contains results of field trials and studies of the group. It is evident that the Eastern Banksia are easy to grow either in sandy soil or well drained clay/loam. After a five-year trial from seed the following summarises the results.

Species	In sand, height x width	In clay h x w	Comment
B. spinulosa var. *spinulosa*	0.7 m x 1.0 m	1.3 m x 1.5 m	poor flowering on clay/loam
B. spinulosa var. *collina*	0.7 m x 1.1 m	1.8 m x 2.0 m	better growth but less flowers on loam
B. spinulosa var. *cunninghamii*	1.5 m x 1.2 m	2.7 m x 2.1 m	growth rate was variable

Banksia of Western Australia





Banksia menziesii (above) Photography by R. Dallimore

The contrast between the flower in bud with the red petals (tepals) tightly enrolled in a tube, with enlarged white ends (limbs) and the yellow topped styles makes this a striking flower head. See the sketches of the individual flower parts on page 263. A magnificent tree or tall shrub.

Banksia burdettii (opposite) Photography by Charles Gardner

A large dense shrub produces large numbers of these flower heads prominently displayed on the outside of the foliage.

Banksia ashbyi (rear cover) Photography by B. Ballingall

A large shrub to small tree prominently displays these beautiful flower heads.

Growing Western *Banksia*

Based on the Banksia Study Group Report No 7

Banksia favour open conditions in light well drained soils but a great deal of success has been had with built up beds. Most species respond to slow release fertilizers with little or no phosphate. Many favour some lime in the soil but the role of calcium has yet to be determined. Western *Banksia* have proven difficult in Eastern gardens but much is being learnt from recent studies. The factors appear to be: a good healthy plant to start with, a hot open position, a good depth of freely drained light soil and adequate water deep down.

A parasitic fungus in the soil is the major problem to more extensive cultivation and numerous successful attempts at grafting western *Banksia* and the rootstock of eastern *Banksia* would appear to offer the best chances of success. ■

Mayi

Some Bush Fruits of Dampier land.

By Jack Edgar and Matthew Gilbert of the Yawuru tribe.
Doris and Tommy Edgar of the Karajarri tribe.
May Howard and George Dunn of the Nyul Nyul tribe.
Susan Gilbert of the Nyangumarta tribe.
Bridgette Boxer and Paul Sampi of the Bardi tribe.

Magabala (in Yawuru) – *Marsdenia viridiflora*, a vine which hangs dry and limp from its host tree for most of the year. It bursts into thick new growth in the wet. The flowers are small, greenish yellow in colour and borne in clusters. The fruit is green and up to 8 cm in length. Often referred to as the Bush Banana, when young, moist and sweet, every part can be eaten, the skin, the green seeds and the pulp. When the fruit hardens and dries prior to dispersal of seed, a light roasting in hot ashes makes the mayi once again moist and sweet.

Guwal (in Yawuru) – *Flueggea virosa*, is a bush growing in hollowed areas behind coastal sand dunes. The white, sweet smelling flowers appear in December, the fruit in January. The Mayi is a tiny berry that turns white when, as the people say, it is "cook". Bardi people use the bark for healing purposes. It is boiled to procure a fluid that can be used to bathe and clean sores. The wood is used in fire making by rubbing two sticks in an effective manner.

Gabiny (in Yawuru) – *Terminalia ferdinandiana*, is a big tree found behind coastal sand dunes. The fruit is light green and lobed, turning pale to white and soft when it is "cook". Gabiny has the highest known natural level of Vitamin C occurring in a plant food anywhere in the world. A drink can be made by pounding the mayi and soaking it in water. The gum of the tree is also edible. ■

Mayi – Some Bush Fruits of Dampier land by authors as acknowledged above

A well presented 60-page book published by Magabala Books, Kimberley Aboriginal Law and Culture Centre, Broome, W.A. It may be purchased by mail from the above for $9.95 plus $5.00 postage. The above notes were taken from the book being only portion of the information given in the book, each species having a full size sketch and a colour plate. The name shown for the plant by five of the distinct tribes of the area is given, that shown above being used by the Yawuru tribe. The article and artwork opposite have been reprinted with permission.

Opposite page — Old time, we bin live from this lot mayi. We look after 'em bush right way to get 'em mayi. That time we bin happy.

My Childhood in the Bush

Karrmaka-Elsie White. (Translated from Karajarri into English by Margaret Toby)

When I bin only little one girl, I live with my father and mother and my two brothers in the bush. Every day my father and mother bin take us looking for kuwi (meat) and mayi (plant food).

My mother bin get the dried one seeds from the lirrirnkirn tree and sift them in a dish. She bin then grind them and mixed them up with ngapa (water). We bin then eat this mayi.

My father bin get kuwi and cook it for us. He bin then cut it up and give us one piece each. My two brothers bin sit by themselves and have their mayi but I sit with my father and mother.

My father bin get walaja (honey) too. He bin put it in skin (bark) from tree and give us one each to eat. We bin get our water from a soak. We always give our father and mother a drink first and then we bin have our drink. My brothers and I bin also get the wood for our fire.

My father bin then go look for more kuwi. When he come back, he bin cook the kuwi and we bin have half of it for supper. The other half, he bin put on top in tree for next morning.

The next day we bin shift our camp to another watersoak. We move all the time and my mother and father bin always take us looking for mayi and kuwi. ■





Acacia crassa ▲



▼ *Acacia celastrifolia*

Acacia – The Australian Wattle

by Marion Simmons*



Acacia leioderma (above) Photography by John Simmons

A shrub 1-2 m from Western Australia that grows well in an open or semi-shaded position. The branches on this open small shrub are arching, ribbed, smooth and red to brown and display the large ball flowers well.

Acacia crassa (opposite, top) Photography by John Simmons

A tall shrub or small tree from northern New South Wales to the tropics. A hardy ornamental wattle for hot sunny positions in inland or sub-tropical areas.

Acacia celastrifolia (opposite, bottom) Photography by John Simmons

A medium, well branched, spreading shrub from Western Australia. Closely related to *Acacia myrtifolia* but with broader phyllodes with a prominent central vein. The dense racemes of bright yellow flowers are shown off well by new growth that can be red. It appears to be salt tolerant but needs wind protection.

Acacias (wattles) are members of the family Mimosoideae, in which all members produce legumes or seed pods.

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*Marion Simmons, leader of the Acacia Study Group see page 274.

There are about 1 200 *Acacia* species world-wide found mainly in tropical, sub-tropical and arid regions of South America, Africa, Asia and, of course, in Australia and on some of the nearby islands. In Australia acacias are widespread and, with eucalypts, form the dominant plant cover of the continent.

There are believed to be about 800-900 *Acacia* species in Australia, with many still to be described and others to be re-assigned. Botanical research and writing up of the results will accelerate as the time nears for publishing the Acacia section of the 'Flora of Australia'. This is believed to be scheduled for about three or four years' time.

Acacias in Australia occur as evergreen trees, shrubs or rarely climbers. They occur in most climatic zones and in many sizes from tall forest trees, e.g. *Acacia bakeri* (Marblewood) or *A. melanoxylon* (Blackwood), to smaller trees of the dry inland, e.g. *A. aneura* (Mulga) and *A. papyrocarpa* (Western Myall), as well as medium and small shrubs and tiny prostrate plants.

Acacias have the ability to increase nitrogen levels of the soil in which they grow, through the activity of a soil bacterium (Rhizobium sp.) which inhabits and forms nodules on their roots and which is able to take nitrogen from the air converting it into a form which the plants are able to use.

Phyllodes

The majority of Australian acacias produce 'leaves' or phyllodes of great variety. These phyllodes are not really leaves but are flattened leaf stalks which have adapted to look like and function as leaves. Size is extremely variable, some of the phyllodes are huge up to 30 cm long. Some are so small they appear to be absent as they are often reduced to small scales or spines. Occasionally the stems have distinctive wide wings (as in *A. glaucoptera* and *A. alata*) with tiny phyllodes present.

A number of the acacias have bipinnate (fern-like) leaves, made up of a large number of small leaflets (pinnules) along a central stalk. The tree species with this leaf type usually are found in the eastern states and another group about 1 m tall with similar leaves occurs in Western Australia, with the exception of *A. mitchellii,* which occurs in South Australia, Victoria and New South Wales.

Phyllodese details are important as they are used as 'key' characters in identification. Some important things to note are size and shape of the phyllodes, the type and number of veins, whether penni- or net-veins; length of leaf stalk and gland position.

The gland is an indented or raised part usually occurring at the base of or on the top margin of the phyllode or on the leaf stalk of the feather-like leaves. These are extra-floral nectaries which produce very small, varying quantities of nectar to which insects and occasionally birds are attracted.

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*Marion Simmons, leader of the Acacia Study Group and author of:

"Growing Acacias": A small 72-page book (with 103 colour plates) which is ideal for those who do not know anything about our wattles but who want to know more. Marion has made an excellent job of presenting this vast group of plants, in a simple and interesting manner. It is available from SGAP NSW Book Service for $11 including postage.

"Acacia of Australia": There are some 600 species of *Acacia*. To present this large group of plants in simple terms, amply illustrated by sketches and colour plates, is a gift Marion has cultivated for the benefit of us all. This is the first of a series on *Acacia* but each volume appears to be a complete coverage of the genus on its own. It is available from SGAP NSW Book Service for $24 incl. postage.

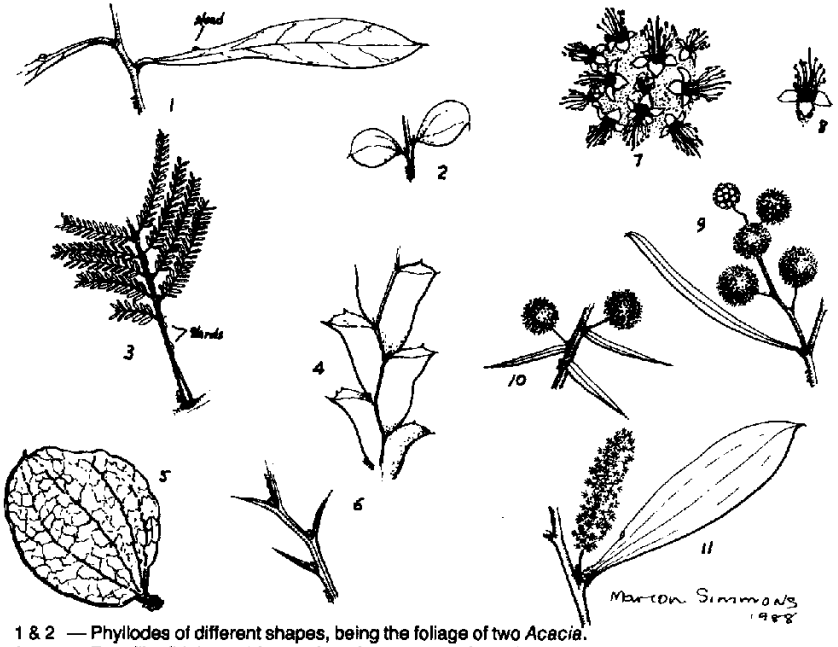
Flowers

Some acacias flower in their first year, others take longer. Flower buds may be produced at any time of the year, depending on the species; plants usually flower in great profusion once a year. Flowering time may vary in length from a few weeks to many months, once again depending on the species and often the season. The availability of soil moisture, especially in the arid zones, determines whether some of these species flower at all in any one year.

Acacia flowers vary considerably in size and occur in the form of balls or spikes. The flowers are usually bi-sexual (having male and female parts on the same flower) with 4-5 or occasionally more sepals and petals. The flower-heads are made up of a few or many tiny individual flowers with numerous free stamens, as illustrated below.

Flowers are attached to the stem in different ways, many ball and spike flowers occur on simple stalks, many on racemes (branched stalks) which sometimes extend into panicles (branched racemes).

Flowers vary in colour from almost white through shades of cream and yellow to orange. At least one species, *A. purpureapetala*, differs from the usual colour range, and produces mauve or purple flower heads.



1 & 2 — Phyllodes of different shapes, being the foliage of two *Acacia*.
3 — Fern-like (bipinnate) leaves found on a group of species.
4 — Winged stems being the only foliage of this group of *Acacia*.
5 — A phyllode showing the net-veins.
6 — The phyllodes are reduced to spines in many species.
7 — A ball flower head enlarged to show the individual flowers.
8 — One single flower enlarged 15 times.
9 — Ball flower heads in racemes (spikes of flower).
10 — Ball flower heads, solitary, from a phyllode axil.
11 — Rod flower head and a phyllode with 3 veins or nerves.

Pods and Seeds

After flowering and pollination, pods and seeds develop, sometimes within a few months, occasionally up to twelve months later.

A number of seeds develop in each pod, varying with the species. Each seed is attached to the marginal area of the pod by a seed stalk (funicle) which usually swells into a cap or aril where it terminates on the seed. The seed stalks vary in colour from white, cream, brown or red. These details are often used as an aid to identification.

When mature, the pod splits along the margin or margins, usually releasing the seeds which may be flung for some distance from the parent plant. However, there are some species which retain their seed in open pods for some time. It is thought that birds may play a part in the distribution of these seeds.

After the seeds have fallen to the ground and germinated, the first seed leaves are followed by feather-like leaves. Some species maintain these feather-like (bipinnate) leaves all their lives (e.g. *A. dealbata* (Silver wattle) and *A. mearnsii* (Black wattle), but the majority of Australian species change at an early stage and develop phyllodes. However, there are some species (e.g. *A. ruppii* and *A. rubida*) which retain their bipinnate foliage for some considerable time before developing their phyllodes. In the case of *A. latisepala* from New South Wales and Queensland only a very small percentage of plants develop phyllodes, the remainder maintain their bipinnate foliage at all times. The Blackwood *(A. melanoxylon)* may produce bipinnate leaves at any time and often may be seen with feather-like leaves sprouting from the tips of its phyllodes.

Values – Aesthetic and Commercial

Acacias in flower have a beauty all their own and, if chosen for their successive flowering times, can lend a golden glow to the garden acting as an effective foil to other flowering plants.

Some species have particularly striking foliage, varying widely in shape and colour, which makes them an interesting and attractive addition to the shrubbery.

The bark of other species, especially some northern ones, is the eye-catching, decorative 'minni ritchi' type, which curls off in many tiny strips or pieces, often revealing new reddish bark underneath.

The commercial value of growing acacias in Australia seems to have been under-rated to some degree, although overseas they are widely grown for timber for buildings, fuelwood, stock fodder, paper pulp, tanning, oil for the perfume industry and blossom for the cut flower trade.

In Australia, some *Acacia* tree species have been harvested for many years for their timber to make fine furniture, panelling and for use in the paper pulp industry. Some are now being planted for future timber production.

In recent times an increasing number of our Acacia species have been selected for trial plantings in India, Africa and Asia with a view to using them extensively to replace tree cover on land which has been over-cleared. ■

The Australian *Eucalyptus*

by W. H. Payne



Eucalyptus rhodantha Photography by John Simmons

A magnificent small tree with a mature height below three metres and flowers to 8 cm across. Why choose a photograph with such "chewed" leaves. I did this purposely. *Eucalyptus* trees are not without their problems from pests. David Hockings is well known for his keenness to get us all to hold back on chemical sprays and stop killing off our friends as well as our foes, and I requested him to write the following article.

A dominant feature of the Australian landscape is the *Eucalyptus* tree. The charm of most is their characteristic trunks and random patches of leaves. They come in all sizes, when mature. For horticulture, especially around the home, trees of small stature and pleasing appearance are in great demand. When we find a species such as *Eucalyptus rhodantha,* that grows only a few metres high with large silvery grey foliage and magnificent red flower heads to 8 cm across, we have a gem to treasure and develop.

One project we have in hand is to develop such dwarf *Eucalyptus* to be "user friendly."

Previous issues have reported on how we propose to select and develop the very best forms of a large number of selected species. We are concerned here to develop practical housekeeping methods and a major problem is pest control. Will all readers growing a dwarf *Eucalyptus* read the following article and adopt just two methods of control, a regular close inspection to remove pests manually and the regular frequent wiping of the foliage with a 50:50 solution of methylated spirits and water.

The objective is to frustrate the first cycle of infestation that, it is felt, encourages further damage as nature's creatures pursue cycle after cycle of predation.

Please join in what could be a crucial breakthrough for our project. ■

Eucalyptus

Their Care by David Hockings*

The genus Eucalyptus must surely be amongst the most pest prone of all plant genera. There is a very large number of species and eucalypts of one species or other abound in almost every part of this continent. They therefore are the main source of food for an immense number of insects and numerous other animals, small and large, that have evolved with the eucalypts.

Damage may be done within the trunk and branches of trees by chewing pests such as termites, borers such as the larvae of the Giant Wood Moth and beetle larvae.

Bark may be damaged by moth larvae which chew bark and sometimes sap wood, under shelter of frass-covered webbing. Other types of bark damage includes the insignificant and interesting scribbly marks on Scribbly Gums done by the mining larvae of a small moth.

Branches are frequently scarred by cicadas which cut zig zag grooves in the bark during egglaying. No doubt the nymphs of cicadas gain sustenance from the roots of the same eucalypts.

Twigs, leaves, buds, flowers and fruit may be galled by a whole range of gall-forming insects. Some of the galls are quite fascinating in form and beautiful in their own way. Gall-forming insects include wasps, flies, bugs, beeties and thrips.

Leaves may be disfigured or mutilated by chewing insects according to species and/or population of the pests. These include many species of caterpillars (the larvae of moths and butterflies), sawfly larvae and many species of beetles (both the larvae and the adults). Some species of phasmids or Stick Insects can severely chew leaves.

Probably, even more disfiguring, is the damage done by the sucking insects and mites that attack young shoots, leaves and buds. Some inject a toxin into the plant while feeding that can cause death of tissues or buds or deformity of new growth and leaves. Some excrete a sticky, sugary exudate on which grow several species of black coloured fungi, the well known, unsightly sooty mould.

Sucking pests include an immense range of species of the bug family such as jassids or plant hoppers of many kinds, psyllids and lerps of many kinds, scale insects and mealy bugs of many kinds. In addition a range of plant bugs cause damage that varies from necrotic spotting of new leaves to wilting of young shoots.

There are microscopic Arachnids or mites which cause deformed shoots and leaves because of the toxic substance they inject while feeding. These mites are usually present on only the very young beginnings of shoots and

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*"**Friends and Foes in Your Garden**", a book by David Hockings. An outstanding book on the subject of pest control in your garden. Lavishly illustrated with hundreds of large colour plates, the accent is to first identify your problem and your pest. This you can do from excellent colour plates that show the creature and the damage caused. It could be that the damage is not really great and you and plant can live with it. It could be that the creature you see is actually a friend who is attacking or controlling your foe. David will advise you how to deal with what is not really a problem but a fascinating journey into the world of small creatures. We can send you a copy of this wonderful book for $20.00 plus postage. See page 283.

leaves and not on the older growth where the deformity becomes increasingly obvious.

So what to do about it?

Daily examination is essential, especially while new growth is occurring. The possession and use of a 20 power hand lense is also important. Learn how to use it and develop familiarity with the pests and their symptoms on plants.

Termites are not likely to be located until removal of dead trees or sometimes dead branches. Your State Departments of Agriculture or Forestry should be consulted for recommendations.

The Giant Wood Moth only reveals its presence when the adult moths emerge from the trunk. Healthy eucalypts seem to tolerate these large borers that chew a hollow down the centre of the trunk.

Beetle larvae boring in trunk or branches can be killed by inserting a small ball of cotton wool soaked in methylated spirits into the tunnel and closing the hole.

Bark-chewing caterpillars can be removed with a screwdriver or piece of wire because usually only a small number of caterpillars is involved. If necessary a small pinch of carbaryl (Bugmaster) powder can be rubbed into the shelter hole to kill the caterpillars when next they emerge.

Cicada damage will have to be ignored, its rarely very serious.

Galls should be removed and burnt to prevent hatching of adults and continuation of the infestation. If there is bushland near by persistent reinfestation may occur.

The damage by chewing insects is usually quite obvious although some of the caterpillars can be very well camouflaged. Daily examination for signs of chewing and removal by hand is only practicable with a small number of small plants. If chemicals are considered necessary consult your State Department of Agriculture or Forestry to ensure which chemical is currently registered for that purpose and therefore legal to use.

Leaf-eating beetles and their larvae can be treated in the same way by hand removal or sprays. However, adult beetles are much more mobile and alert. Christmas beetles, which can quickly defoliate eucalypts may be picked off or shaken to the ground. They should be picked up immediately into a bucket and killed by running hot water into the bucket.

Phasmids or Stick Insects also can be controlled on a small number of small plants by hand removal.

Daily surveillance and alertness for signs of abnormality on tiny shoots and leaves are essential for avoiding damage from sucking insects and mites. Sometimes the presence of ants which collect sugary excretions, can be an indication that sap suckers are present.

It may be practicable to rub off the tiny early stages of these pests with your fingers once their presence is recognized. Otherwise the affected shoots or leaves can be painted with methylated spirits diluted 50/50 with water and applied with a small art brush or cotton bud.

The mites sometimes involved in plant damage are usually microscopic. It is only after a great deal of experience that they can sometimes be seen

through a 20 power hand lense. Their early symptoms which will be on very young shoots, may be the shedding of some rudimentary leaves, failure of some rudimentary leaves to continue to expand normally, a change in colour of affected tissues and cessation of growth or slight twisting or curling compared with the normal formation of tiny shoots and leaves.

Mite-affected shoots can be pruned off but there is no guarantee that subsequent shoots will not be similarly affected. The methylated spirits and water treatment detailed above is also effective on mites. ■

The Treatment of Seed — Waratah

By H. Boyd, in Vol. 1 of Australian Plants

Storage of Seed

The proper and careful storage of seed ensures greater viability and longer life of the seed. Seed may be stored in sealed paper packets, but if kept for a period, it is preferable that it be stored in screw-topped jars in a darkened place. It is important that insects and moisture are entirely eliminated from seed in storage. The reason for the elimination of moisture is that bacteria and fungi can only grow in the presence of high humidity. As a safeguard against insects and fungi it is wise, where the seed is to be stored for a lengthy period, to include a little insecticide and fungicide powder with it. If seed is infected by insects or small animals, it is also infected with cellulose digesting organisms. This is because most of these beasts depend upon cellulose digesting organisms living symbiotically in their gut to break down cellulose for their own metabolism, and so, if infected seed is sown in sterile or sanitized soil, the germ count would soon be very high. Perhaps a very strong culture will develop and all viable seed and small plants will be destroyed.

Preparation of Soil

The soil should be sterilized or rather, sanitized, this being a better term. The complete sterilization of soil would be very difficult to achieve. What is achieved by the technique recommended is the great reduction in the number of pathogens in the soil and so the term sanitization. The small plants can then grow to a good size before the wogs again build up to a significant proportion.

A method for the sanitization of soil is as follows:— Place wetted soil on a sheet of iron under which a fire is lighted. Cover the soil with a bag. The soil temperature will not by any great amount exceed 100°C if well wetted. It might take a while for the mass to reach this temperature depending upon the mass of soil and the heat from the fire. The writer urges the use of a thermometer. The soil should be held at 100°C for about 15 minutes. Considerable harm can be done to the soil if this temperature is exceeded. It should then be cooled as soon as possible.

Germination of Waratah Seed

Germination of seed of *Telopea*. In the propagation of Waratah *(Telopea speciosissima)* from seed a simple technique is used. Very coarse bush sand, small stones and dried Banksia leaves are mixed to form an open media and then placed in a seed box. The seed is then placed on top and covered to a depth of one quarter of an inch with finer sand. Paper is then laid flat on the

surface until germination takes place. The best conditions are for the surface to be moist but not very wet, and the paper helps to achieve this condition. The whole must not be allowed to dry out, and for this reason the use of a seed box and not terracotta pots is recommended. Do not cover with glass. The whole experiment must take place out of doors in full sunlight. The paper may be removed after the seed germinates.

Plants grown in full light using this technique do not tend to damp off as readily as those grown under glass or in a glasshouse. After the second leaves form, give a light dressing of blood and bone. The plants may be transferred from the seed box to a pot or tube containing the same media as used for germination above, when about three to four inches high, being careful not to injure the roots. In the propagation of Waratahs, full light and perfect drainage is essential.

The reason for mixing Banksia leaves through the media is that the writer has seen the partly decayed leaves attached to the roots of the Waratah by mycorrhiza or fungal threads, and is of the opinion that this plant lives symbiotically with a fungus. For this reason do not remove any leaf material adhering to the roots of the seedlings when they are being potted from the seed box.

Method 2

Alternative method for the germination of Waratah seed. Another method for the germination of Waratah seed is to place a quantity in the bottom of a plastic ice cream carton.

Mix the seed with Vermiculite to the proportions of approximately four parts of Vermiculite and one part of seed. Wet the mixture with a nutrient solution, say "Foli 8" or "Aquasol". Drainage holes in the ice cream tray are not necessary, the amount of nutrient solution being sufficient only to wet the mixture to form a pug or stiff dough-like mass. A nutrient solution is a solution of a liquid fertilizer and water mixed in the proportions recommended by the manufacture of the fertilizer. The covering of the tray with glass is not necessary although the use of glass may help to retain the moisture. The tray is kept in a sunny position, such as inside on a window sill, care being taken that the mixture is retained in its moist cohesive state. The seed must be constantly observed. When the radicle (the first root) begins to emerge and the cotyledons begin to open, the seed can then be taken and placed in plastic tubes containing three parts boiler ash that has been passed through a quarter inch sieve, and one part unsterilized bush sand that contains a fair amount of decaying leaves. The germinating seed is planted to a depth of three quarters of an inch in top of the tubes. Good growth and very little damping off is had if the plants and tubes are given adequate ventilation and light.

In common with the other plants of the family Proteaceae and in fact most native plants, adequate ventilation and light is essential, but the use of a glass house is not recommended. When they are first planted out in pots from the seed box they should be placed in a shady position with filtered sunlight for about ten days. They may then be moved to receive increasing exposure to sun until they get full sun. However, if in full sun the problem is to prevent them drying out. Nurserymen dealing with large quantities may find it necessary to keep them in a less sunny position with frequent watering, although the burying of the pots or tubes in boiler ash is an excellent method. ■

The Society for Growing Australian Plants

Membership is open to all people interested in the Australian flora, bushwalkers, naturalists, horticulturalists, or just John or Jane Citizen who want to learn more of our flora or mix with pleasant people. Each State has its own autonomous Society and the backbone of these State Societies is the local groups. There may be one close to you. Contact your Society at the address shown opposite.

Wildflower Nurseries in Queensland

Fairhill Plants and Botanic Gardens — Fairhill Rd., Yandina, 4561. Tel. (071) 46-7193. Large range of trees, shrubs, ground covers, climbers, ferns, palms and orchids for the sub-tropical and tropical east coast. Extensive display gardens open 8.30 a.m. to 5 p.m. any day. New comprehensive catalogue $3.50 posted.

Wildflower Nurseries in New South Wales

Bundara Native Nursery — 37 Carters Road, Dural, Sydney, 2158. Tel. 651-1962. Specialising in *Grevillea*. Open weekends. Weekdays please ring first.

Cranebrook Native Nursery — R23 Cranebrook Road, Cranebrook, N.S.W. 2750. Tel. (047) 77-4256. Five km north of Penrith, between Tadmore and Taylor Roads. Open 8.00 a.m.-6 p.m. Sunday 1 p.m.-5 p.m. Also at Great Western Highway Warrimoo, N.S.W.

Sydney Wildflower Nursery — Branches at Duffys Forest 450-1785, Heathcote 520-3335, Marsden Park 637-4585.

Floralands — Farry's Nurseries Pty. Ltd. Kariong via Gosford, 2250. Tel. (043) 40-1142. Preservation by cultivation. Send $1.50 for descriptive catalogue.

Kentlyn Native Plants — 206 George's River Rd., Campbelltown, 2560. Tel. (046) 25-1583., Open 7 days.

Wirrimbirra Native Nursery — Hume Hwy, between Bargo and Tahmoor E. side 2574 (3 km from Freeway entry). Wide range including unusual plants. Tel. (046) 84-1112.

Wirreanda Nursery — End of Wirreanda Rd., Ingleside, 2101. Tel. (02) 450-1400. Growers of advanced and semi-advanced native trees and shrubs. Open 7 days.

Wildflower Nurseries in South Australia

Les and Kay Nesbitt — 18 Cambridge St., Vale Park, S.A. 5081. Tel. (08) 261-1550. Specialists in the propagation of Australian terrestrial orchids. S.A.E. for list and culture notes.

Nellie Nursery — 46 Randell St., Mannum, S.A. 5238. Tel. (085) 691-762. 129 Adelaide Rd, Murray Bridge, S.A. 5253. Tel. (085) 325-188. Rare plants — over 1000 species grown including 120 eremophilas. Stock changes weekly, so enquiries should be by phone. Hours of business — Tuesday to Friday 9-5, Saturday 9-12.30, Sunday 10-2. Other times by appointment.

Wildflower Nurseries in Tasmania

Banksia Nurseries Pty. Ltd. — Waratah Hwy., Elliot 7325. Tel. (004) 36-3128. Open 7 days, 9-5. Grower of rare and common Australian native plants. Available in most sizes at certain times of the year. Advanced lines a speciality. Send S.A.E. for list.

Wildflower Nurseries in Victoria

Australflora — The nursery with the "Native Know How" — Belfast Rd., Montrose 3765. Tel. 728-1222. Mon-Sat. 9-5.00 p.m. Sun. 10-5.00 p.m.

Neil Marriott's White Gums Nursery — Specialising in Grevilleas, small shrubs and rarer species. Situated 3 km along Warracknabeal Road from Western Highway, Deep Lead intersection (13 km from Stawell). Hours — Fridays, Saturdays 9.00 to 5.00 or by appointment. Phone: (053) 58-2885 (orders to Box 107, Stawell, Victoria 3380).

Pomonal Wildflower Nursery — Grampians. Sign opposite Grampians Store Pomonal. Garden and Nursery open most of the time but phone (053) 56-6250 to check. Browse round our gardens.

Westernport Nursery — Specialist growers of Australian plants, 88 Flinders Road, Bittern, 3918. Hours — Monday to Saturday – 9.00 a.m. to 5.00 p.m., Sunday – 10.00 a.m. to 5.00 p.m. Phone: (059) 839 9328 Melway Ref. 164 F.7.

Australian Wildflower Seed Suppliers

Nindethana Seed Service — Largest selection of native seed in Australia. RMB 939 Woogenilup, W.A. 6324. Available in 50¢ pks, gram lots or kgs. Please forward a stamp-addressed envelope for free catalogue. Tel. (098) 54-1066 in busines hours. Telex: AA 91938.

R. Horner — 1 Grundy St., Alice Springs, N.T. 5750. Seed of trees and shrubs of Central Australia. Send 37¢ stamp for a list.

Western Australian Wildflower Society — P.O. Box 64, Nedlands 6009. A wide selection of Western Australian seeds is available at 70¢ per packet, plus postage of 37¢ for a number of packets. Send for a catalogue for 50¢ plus 37¢ postage. A huge range of seeds at a price you can afford expertly collected, labelled and packed. A book "Hints on Growing . . ." 40 pages, $3.80 posted.

"Australian Plants", The Australian Flora Periodical

Past issues are available bound and cased, beautifully presented with green vinyl covering and gold lettering for $21.00 plus postage $1.60 NSW, $2.05 interstate. Vols. 3-10 are bound with another Society book as follows:

VOLUME No. 3. Issues 21- 28, bound with "Catalogue of Cultivated Australian Plants".
VOLUME No. 4. Issues 29- 36, bound with "W.A. Plants For Horticulture—Part 1"
VOLUME No. 5. Issues 37- 44, bound with "The Language of Botany".
VOLUME No. 6. Issues 45- 52, bound with "West. Aust. Plants for Horticulture—Part II".
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Banksia ashbyi Photography by B. Ballingall

An Australian *Banksia*. Refer to page 269 for details of this and many others.