

Australian Plants



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Melaleuca conothamnoides

Photography by Ivan Holliday

Refer to next issue for comment.

Australian Wildflowers

Their Use in Our Homes — Editor

Australia is a huge island continent that has been isolated from the rest of the world's flora for thousands of years, except for the northern tropical fringe. The present garden exotic plants were developed from wild plants of other lands. The wildflowers of Australia have enormous potential for development as spectacular horticultural plants.

The interest shown in them from countries with harsh conditions and limited water such as Israel, has been increasing. European and Asian countries with a long history of horticultural development are importing cut flowers worth millions of dollars each year and are now looking through our treasure trove of floral wonders. This Society is well aware of the responsibility thrust upon it to assure the conservation of the unique flora and its practical application in our landscapes. We too, will be facing a water shortage crisis and the use of plants more suited to our climate is one way to maintain our lifestyle and beautify our living areas.

Through the Australian Flora Foundation we are promoting research, not just of the best ways to preserve our landscapes in the future, not just in developing selected wildflowers for commercial farming and export to save the current ravaging of our bush by flower pickers, but by research into how we can reliably grow our wildflowers in the circumstances we will meet in our homes.

Australian Plants, this periodical, is providing the vital link between science and horticulture, industry and government and most importantly advising you, the citizen, on how you can grow wildflowers in your home. ■

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COVER PLATE

Flower Arrangement by Elizabeth George

Refer to our flower arrangement series on page 83. This arrangement features the red and white *Banksia coccinea* at the top softened by the foliage of *Calothamnus* with *Banksia praemorsa*, *B. media*, *B. solandri*, *B. leptophylla* and *B. ashbyi* on lower left counterbalanced by the silvery foliage of *Eucalyptus rhodantha* on the right, the woolly grey centre piece being *Lachnostachys cliffonii* above the brilliant red of *Verticordia grandis*.

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Gardening in Perth

by Michael Filby

Our Garden Series No. 13

Our garden is located in the Mundaring Shire, 50 km due east of Perth, Western Australia. We are part of the Darling Ranges at an altitude of 330 metres. The block size is one-half of an acre, but being a corner site we had the opportunity to incorporate two road verges. The area was originally Jarrah, *Eucalyptus marginata* and Marri, *Eucalyptus calophylla*, woodland with an understorey of *Banksia grandis*. The road verges were seriously degraded by the provision of water and telephone services. There was significant weed invasion due to soil disturbance whilst future tree growth was limited by overhead power lines on both verges.

The soil structure is gravel (laterite) over clay and granite. Our suburban address is Stoneville, aptly named. Our climate comprises a winter wet with a summer drought. We receive 1,100 mm of rain annually, 50% falling in May–September and June and July. Summer is hot and dry with maxima reading 45°C. The lowest winter minimum recorded by us is 2°C.

We commenced clearing the centre of our land in the early 1980s, leaving a perimeter of tall jarrah trees. Although our block was at a high point of the ranges, it was basically flat with only a one metre drop east-west. We planned to angle the height of trees and shrubs back towards the house in an effort to create an amphitheatre effect, introducing light and eliminating overhanging trees. Our garden layout, using Australian plants exclusively, was based on:

- (a) need for privacy — therefore dense planting.
- (b) year-round floral display. (c) bird attraction.

The majority of our creative work was accomplished in the autumn of 1983. We decided against bringing in soil, instead using 60 cm of mulch of Jarrah woodchip. This was spread over the cleared garden beds to discourage weed invasion and conserve moisture. We introduced over 60 tons of rock (laterite) which was used to border paths, to shore up a sand-pad of coarse river sand and to create interest amongst the mulch.

A framework of mature nursery stock was then planted to provide the garden with shape. This was not easily accomplished as the "soil" was far from ideal for this purpose. A pick-axe had to be used for each planting, the resulting small hole being filled with a native planting-mix. This enabled the mature pot plants to withstand the first year without encountering rock. The only watering these received was once weekly during the first summer. From that point they were deemed self-sufficient. The following autumn a large programme of planting tube-stock commenced; this was also supplemented by large scale broadcasting of seed. In this way a more natural effect was created than was achieved by formal planting alone. The road verges were particularly successful in the seeding phase as less mulch was used. With both tube-stock and seed we restricted ourselves to low-growing legumes, e.g., *Acacia drummondii*, *Acacia pulchella*, *Hovea pungens*, *Chorizema cordatum*, *Chorizema dicksonii*, *Gastrolobium villosum*, *Hardenbergia comptoniana* and *Kennedia coccinea*. These, as with established shrubs, are pruned heavily each year to promote compactness and prolong their life-span.



△ The Michael Filby garden.

Photography by M. Filby

▽ *Verticordia plumosa*, typical of the plants grown.

Photography by M. Filby





△ The front entrance to the home.

Photography by M. Filby

△ The rear with barbecue and entertainment area.

Photography by M. Filby

▽ The street frontage — see also page 92.

Photography by M. Filby



Our attempt at year-round flowering is climaxed by our road verge display, at its height in August–September. See photograph on page 92. In the vicinity of the house we have used a theme based on hybrid *Grevillea*, there being over 50 ‘Robyn Gordon’ plants visible from the house. These plantings have encouraged over 26 species of bird on our land. Bird-baths have been provided.

Although we have no watering system as such, or fertilising regime, we have isolated one “wet” area on the southern side of the house. Here we grow *Boronia megastigma* along with *Beaufortia sparsa*. This area is watered daily during summer. All paths and driveways on our property have, at their low point, small concrete channels designed to re-direct run-off onto flower beds.

With *Beaufortia sparsa* flowering in January, we supplement this with plantings of *Beaufortia squarrosa* throughout the garden, thus extending the flowering period from February to April. Much use is made of *Hemiandra pungens* as a ground cover in association with *Beaufortia squarrosa* due to its long and similar flowering period. Following this, extended plantings of *Hakea laurina* and *Acacia iteaphylla* are used for their autumn flowering and complementary appearance. During the winter months *Kunzea baxterii* is featured in association with several eastern states wattles (*A. longifolia*, *A. dealbata*, *A. podalyriifolia*).

This garden has been a learning experience and we gained knowledge from our many errors. On another occasion we might concentrate on visible compatability of plant structure, rather than year-round flowering. ■

My Propagation Method

Continued from the opposite page

Large cuttings, e.g., *Grevillea* ‘Robin Gordon’, are best placed individually in forestry tubes, three will fit under a three litre bottle. My pots are watered frequently by the automatic sprinkler system, the bottle protects the cuttings from too much water. Otherwise cuttings are sufficiently moist if there is condensation visible in the top of the bottle.

It is important that the sand in the propagation mix is coarse enough to provide a loose enough mixture to enable the rooted cuttings to be easily separated. Look for roots coming out the bottom of the propagation pot. Also resistance with a slight tug on the cutting will give an indication as to whether roots are forming. It usually takes six weeks to three months for the roots to form, depending on the species and the season, but if the cutting looks healthy don’t give up, sometimes it takes nine to 12 months. The pot contents should be carefully knocked out occasionally, and the rooted cuttings potted on, healthy but unrooted cuttings replaced as before (with or without hormone powder), and dead ones removed. Some species form callouses and seem to come to a standstill. A slight nick on the callous will spur it on to form roots.

I give cuttings a spray of fungicide every few weeks, especially at the beginning. I like to pot on cuttings to a small plastic nursery bag with the same mixture as above. By cutting the bottom out of the nursery bag (be careful not to cut the roots) the well-rooted cutting may be transferred to a larger pot or the garden with very little disturbance. ■

Gardening at Dumbogan, NSW

by Enid Turton

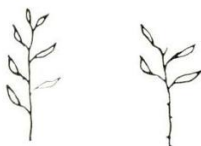
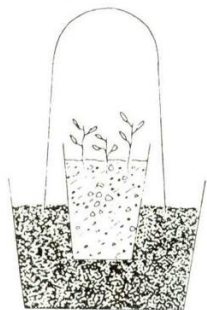
Our Garden Series No. 14

The garden is now five years old and is in sand fill on an estuary flat about 2–3 feet above high tide. About 80% of the plants I started off with I have propagated myself. The beds are built up mostly with plain local sand and those in front of the house mulched with woodchips over newspaper. I added some dolomite to the woodchips. Another two beds are mulched with Bago gravel on newspaper. There is a dripper system scattered throughout, but water is used sparingly — a good soaking every couple of weeks, with perhaps a bit extra in the dry season (usually October to December) and less in winter. Last year there was practically no rain all winter which is unusual. I put some nine-month Osmocote in the planting hole together with some potting mix and feed with some blood and bone around the plant once or twice a year.

Now that the original plants have grown larger and thicker I have been able to grow some of the smaller, more sensitive plants in their shelter. Also the *Grevillea* (large and small flowering) attract numerous honeyeaters, so grubs that were a problem in the beginning are not a problem anymore. The photographs on page 52 show the garden and my fern house on page 69.

My Propagation Method

My method of propagation by cutting relies upon the pot containing the cuttings being immersed in a larger container of gravel, the cuttings being covered by an upturned plastic soft drink bottle as shown below. These are shown in the photograph on page 69. The pots and bottle should be washed with water containing a little household bleach, and the sand should also be washed. The propagation mix is one-third peat moss and two-thirds coarse, sharp, washed river sand. I have trouble obtaining good river sand here, so I use crushed road base or paving sand, well washed.



The cutting material should be as fresh as possible. If it can't be used immediately, store it in a sealed plastic bag in the refrigerator. It should not be too soft or too woody and about two to three inches is usually long enough, except for large leaf species. The stem should be cut diagonally just below a leaf with a sharp clean razor blade or secateurs, and two-thirds of the leaves removed, also any flowers, buds or fruit. With tough stems the bark near the end should be bruised a little. The cutting is dipped in water, then hormone powder and the excess shaken off. After making suitable length holes in the propagation mix with a stick or pencil, place the cuttings gently in, about eight or 10 to a pot, carefully water, spray with fungicide and cover with bottle.

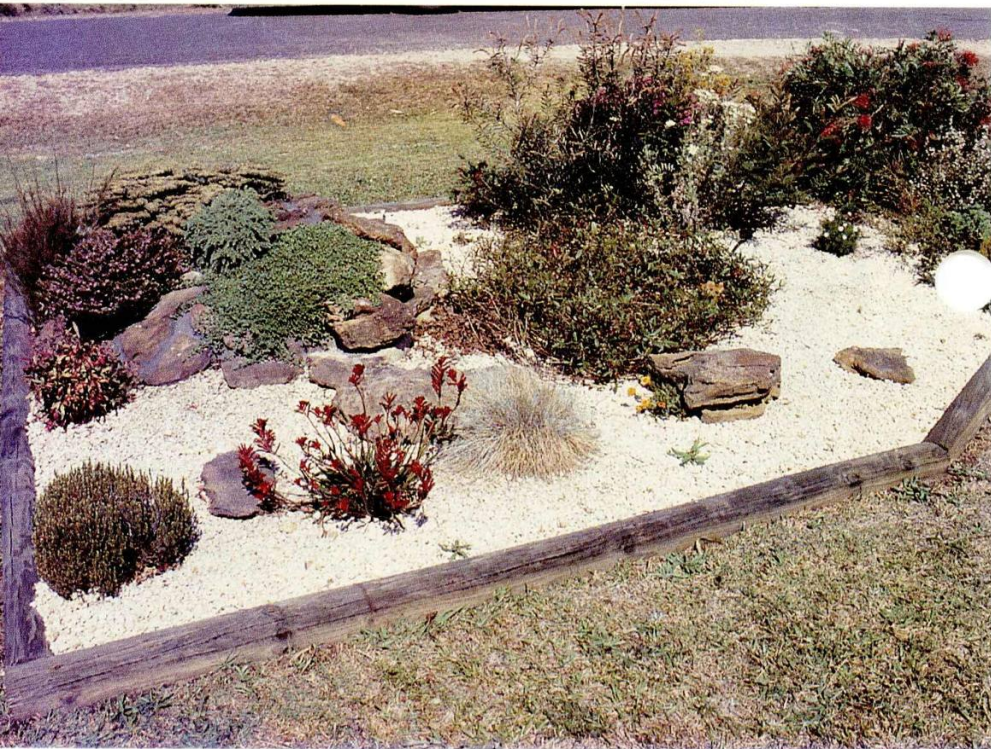
Continued on opposite page.



△ The Enid Turton garden at the front — An S.G.A.P. group is enthralled.

Photographs by W. H. Payne

▽ A garden at the side of the house — See page 69 for fernery and propagation bench.



Australian Plant Cultivars

Some Registrations by the Australian Cultivar Registration Authority*

Anigozanthos. Our No. 126 Issue described hundreds of hybrid Kangaroo Paws with advice on their cultivation. Plants registered as cultivars include:

Hybrids registered with the ACRA and already described. *Anigozanthos* 'Autumn Sunrise' 16: 75, 135; 'Big Red' 16: 51, 66; 'Bush Ranger' 16: 51, 66; Bush Emerald 17: 27; Bush Glow 17: 28; 'Dwarf Delight' 12: 322. 16: 58, 134; 'Early Spring' 16: 58, 134; 'Write Woorata' 10: 174; 'Hickman's Delight' 16: 135; 'Little Jewel' 16: 135; 'Mini prolific' 16: 177; 'Mini Red' 11: 262; 'Pink Joey' 8: 326. 16: 178; 'Red Cross' 16: 58, 178; Regal Claw 16: 178; 'Space Age' 16: 63; 'Spence's Spectacular' 16: 54; 'Velvet Harmony' 16: 58.

Anigozanthos 'Baby Roo' was developed in the USA from tetraploid forms of *Anigozanthos gabrielae* and *Anigozanthos* 'Bush Ranger'. A dwarf to 20 cm high, its red and yellow flowers appear almost continuously as a pot plant.

Anigozanthos 'Firefly' is the result of a manipulated cross between *A. bicolor* and *A. humilis*. It is the first Kangaroo Paw to secure protection under the Commonwealth Plant Variety Rights Act and as such details of the plant are very sketchy. It is less than 30 cm in height as you would expect from its parentage, the multiple yellow-green flowers set on brilliant red stems. It has been developed for indoor display to provide a living alternative to cut flowers.

Anigozanthos 'Lemon Whizz' is another Southern Aurora hybrid based upon an *Anigozanthos flavidus*, *A. humilis* cross. The other cultivars in this range, 'Surouge' (red), 'Solace' (yellow) and 'Suffuse' (pink) were featured in colour in Australian Plants No. 16: 63. All the cultivars in this range have been selected for their dwarf flowering height of 40 cm in a sunny, well-drained position or as a potted plant for patios and indoor decoration. 'Lemon Whizz' has pastel-lemon flowers.

Anigozanthos 'Roque Radiance' is a hybrid of (*A. manglesii* × *A. rufus*) × *A. flavidus*. Flower colour is very similar to *A. rufus* but there are fewer flowers with shorter and broader corolla tube on shorter branches. The flowering stems are green not red with a slight tinge of red right at the top of the stem.

Anigozanthos 'Ruby Jools' is probably a hybrid plant from *A. humilis* and *A. flavidus*. The name refers to the colour of the small flowers. The flower stems are up to 60 cm high. The branching inflorescence normally carries three main branches with most dividing again into two, with ca. 17 flowers arranged in a similar fashion to *A. humilis*. This cultivar differs from *A. humilis* by being much taller, with semi-evergreen and larger leaves, 250 mm long and 10–12 mm wide. The flowers are on a branched inflorescence. The perianth tube is not so deeply cut on the underside. The anthers are arranged in a semi-circle, not in distinct pairs and the lobes are more reflexed on the smaller flowers.

Anigozanthos 'Sue Dixon' has stems 1.3 m tall; with dense plumose wool red on the ovary and pedicel becoming more yellow immediately above. It differs from *A. manglesii* in having shorter corolla lobes on a corolla tube round at the end and from *A. rufus* in having a broader and longer corolla tube and bigger lobes.

*The Australian Cultivar Registration Authority has revised procedures for quicker registration of cultivars submitted. In future, registered cultivars will be reported in the above abbreviated form and to greater extent in issues in the future as the opportunity presents itself. A major problem is that the applications do not include a good colour slide to adequately present them to the reader and to provide a good service to the applicant.

Anigozanthos 'Unity' is the result of a manipulated cross between *A. rufus* ♀ and *A. flavidus* ♂ tetraploid. The flower stems are to 1.5 m tall. The flowers are in simple dichotomous racemes on pedicels to ca. 6 mm long, the wool dense dark red with some black tips over the ovary. This wool becomes less dense towards the perianth lobes allowing equal dominance of yellow-green hairs. The perianth tube is 40 mm long. The flowers are similar in shape to *A. rufus* but are longer with a slightly more prominent ovary. They are a much darker red and less uniform in colour with the upper half of the tube showing yellow-green hairs more the colour of those in *A. flavidus*.

Actinodium cunninghamii 'Snowflake'. Distinguished by its large well-formed creamy-white flowering heads from *Actinodium cunninghamii* it is similar to an everlasting daisy. An upright shrub to 50 cm high.

Banksia. Other *Banksia* cultivars registered with the ACRA are described in our No. 15: 200 Issue. See photo, page 65. More recent introductions are:

Banksia ericifolia 'Limelight'. An unusual form of this very showy species, the name refers to the bright lime green colour of the foliage. The new growth and the leaf margins are a golden colour and the shoot apices are reddish bronze. The flower colour is yellow orange.

Banksia integrifolia 'Austraflora Roller Coaster' is a prostrate form of *Banksia integrifolia*, the name referring to the arching prostrate branches. The flowers are lemon yellow on heads to 110 mm long.

Boronia 'Carousel'. Hybrid between *B. molloyae* and *B. heterophylla* favouring the latter, the pink flowers aging to deeper red. Vigorous plant more tolerant to root diseases.

Brachychiton 'Peter' is a hybrid between *Brachychiton discolor* and *B. bidwillii* having the smaller stature of the latter which it resembles. It has larger flowers but with fewer lobes on the densely hairy leaves.

Brachyscome multifida 'Evan' is a bushy perennial with a compact cushion-like habit with foliage and flowers being smaller than the species and its cultivar 'Breakoday.'

Bracteantha 'Pink Surprise' is similar to *Bracteantha* 'Diamond Head' (previously known as a *Helichrysum*) but with pink buds opening to cream flowers with an orange centre.

Callistemon, many hybrids were described in our No. 125 Issue, and more are listed on page 62.

Callistemon 'Kempsey'. A probable hybrid between *C. salignus* and *C. viminalis* selected as an exceptional form as the floral emblem of Kempsey Shire Council, New South Wales. To 4 m tall, bright red flowers.

Callistemon 'Pink Sensation' is a seedling from *Callistemon* 'Glasshouse Gem' differing in having light yellow-green new growth and more crowded flower spikes and deeper pink flowers.

Callistemon 'Tin-sal Glow' is an F2 hybrid of *Callistemon* 'Glasshouse Country' (*C. recurvus* × *C. salignus*) differing in the pinkish (not silvery green) new growth and deepened red flowers.

Callistemon viminalis 'Prolific' is a small tree to 6 m high being a selection from a wild population because of its prolific flowering habit, the flowering red spikes being borne in clusters at the branch ends. It has been in the trade for years.

Callistemon 'Woolomin Sparkler' with probable parentage of *Callistemon salignus*, *Callistemon* 'Harkness' and *C. citrinus*. A shrub to 3 m high, the red flowers are in spikes 80 mm long by 60 mm across, clustered near the branch ends. Brushes to 120 mm have been recorded with flowering 6–7 times/year.

Callistemon citrinus 'Western Glory' is an upright shrub 2–4 m high with lanceolate leaves 4–7 cm × 1 cm and masses of red flowers.

Chamelaucium uncinatum 'Mignonette' has been selected because of the semi-double flowers often irregularly shaped, with dissected petals and the mignonette-like appearance of the bunching petals. It is similar to *Chamelaucium* 'Mullering Brook' but shorter in stature.

Chamelaucium uncinatum 'Raggedy Anne' was selected for its flowers 0.8–1.1 cm wide, light pink fading to a pale centre, the disc in the centre of the flower distorted and corrugated; sometimes the petals are incised.

Correa. A number of cultivars, *Correa* 'Betts Red', *Correa* 'Dusky Bells', *Correa* 'Mannii' and *Correa reflexa* 'Fat Fred' (photograph, page 61) are described and illustrated in colour in Vol. 15: 227.

Correa alba 'Western Pink Star' is a selection from the wild in western Victoria because of its bright pink flowers. It is a prostrate mounding plant 15 cm high, 1 m wide with a rusty appearance, flowering over a long period. The original plants in the wild are now extinct.

Correa 'Candy Pink' is a hybrid between *Correa alba* and probably *C. pulchella*. The flower colour is similar, though lighter, to *Correa* 'Dusky Bells'. It is a dense, rounded shrub to 1 m high and wide, the leaves being similar but more elliptical than the ovate leaves of *C. alba*.

Correa glabra 'Inglewood Gold' selected for the gold colour of the flowers. Growing to 1 m high and wide it is otherwise similar to the typical species.

Correa glabra 'Coliban River' is a selection from the wild near the Coliban River, Kyneton, Victoria. It is a small, compact form of the species to 1 m high, with pale green flowers in May to August.

Correa 'Betty Fawcett' is a hybrid between *Correa reflexa* (Brisbane Range form) and *Correa reflexa* 'Marian's Marvel'. This hardy, small shrub 1 m × 2 m with dark green foliage, has pink flowers 25 mm diameter, in autumn and spring.

Crowea exalata 'White Star' is a selected form of the species with smaller white flowers and narrower, shorter leaves.

Crowea 'Pink Blush'. A hybrid between *C. exalata* and *C. saligna*, it differs from other cultivars with fresh flowers white, tinging to pink as they age.

Dianella longifolia 'Peninsula Perfection' is a selected form of the species with yellow variegation in the leaves.

Epacris impressa 'Cranbourne Bells' is a selection from the wild. It has a similar growth habit and features as *Epacris impressa*. The white flowers have multiple corollas, each with five lobes. Individual flowers are 10 mm long by 7 mm wide. The flower buds are pinkish opening to white. The flowering season is from August to October. Another multi-corolla form is *Epacris impressa* var. *grandiflora*, a form of the Grampian Mountains. This form has pink flowers and leaves that are much longer than the flowers.

Grevillea cultivars. For some years now, a complete revision of the genus *Grevillea** was expected showing all *Grevillea* species in full colour. Descriptions of *Grevillea* cultivars were delayed with the intention of comparing them to the parents shown in colour in the book, producing colour photographs of the cultivars and placing the whole plant group in perspective. I will not delay further.

Grevillea alpina 'Gold Rush' is a selection of *Grevillea alpina* from near Ararat in Victoria, the name referring to the colour of the golden flowers with a red style and the early history of the area. In other respects it is similar to a typical plant of the species to 0.8 m tall.

Grevillea 'Austraflora Jubilee' is presumed to be a hybrid between *Grevillea rosmarinifolia* and *G. alpina*. It has the appearance of a compact *Grevillea rosmarinifolia* but while the flowers are the approximate size and waxiness of this species, the colour is distinct. They are in terminal clusters, dark red and yellow-green in bud but with maturity becoming more yellow on the limb and base and a contrasting red-brown on the dorsal side. They open to release a thick red-brown style with a large tan stigma.

Grevillea 'Austraflora Lyrebird' has a dense habit and after five years has reached a height of 1.2 m by 2.0 m wide. The branches arch up giving the shrub a saucer-shaped appearance. With one parent *Grevillea tetragonoloba* it has leaves up to 15 cm long by 3.5 cm wide deeply lobed alternately along the midrib. They are silvery in appearance, new growth being a bronze colour. The toothbrush type flower heads are orange turning to pink with age.

Grevillea 'Austraflora Old Gold' is probably a hybrid between *Grevillea ilicifolia* and *G. juniperina* (prostrate yellow form). The leaves are occasionally entire but usually have 4–5 lobes similar to *G. ilicifolia* but in this case they are spiky as in the other parent. It is a medium to high density shrub to 30 cm high, the outstanding feature being the new growth which is yellow-gold contrasting with darker green of more mature leaves. The greyed yellow flowers with pink styles fade to apricot.

*"*Grevillea*" by D. J. McGillivray is the book we have been eagerly awaiting for ten years. It is the result of a life work of one of the nicest people you can meet. Unfortunately, tragedy struck and Don was afflicted with a debilitating disease before he was able to finalise the work. In many ways the work is incomplete and recommends the classification of many species in a manner which will not be widely accepted. Although this is essentially a scientific book, the publishers, Melbourne University Press, have attempted to make it of wider appeal by attractive presentation and the inclusion of over 170 photographs in full colour. This has resulted in pushing up the retail price to \$189.00, a very expensive item. Herein lies a major dilemma. If they had left it as it really is, a scientific book of very wide interest, and not tried to dress it up, the price would have been less than half this and there would be little concern over recommending it to readers. The problem is that there will be another *Grevillea* book out next year that will make the scientific report "*Grevillea*" by Don McGillivray very much out of date.

The dilemma is compounded as the new "*Grevillea* Series" (to be produced in two or three sections) by Peter Olde and Neil Marriott is being published in association with the Society and The *Grevillea* Study Group. Peter and Neil have devoted many years to this study and are now recognised as the world authorities on the genus at the scientific level as well as horticultural use, with scientific papers pending publication in *Telopea*, the scientific journal of the Royal Botanic Gardens, Sydney.

The "*Grevillea* Series" by Olde and Marriott is projected, not only as the preferred scientific reference on the genus, but as the ideal book for the public. Every species, and there are over 260 of them, will be illustrated by at least one large colour photograph, sketches and simple descriptions with advice on horticultural use. It is clear that this will not be cheap either but sooner or later, if you wish to have the only complete informative reference to *Grevillea*, you will purchase one. There is no doubt in my mind which is the best buy. All I can suggest is that you wait one year before purchasing any book on *Grevillea* including two other books already on the market, and see for yourself what suits you best. — Editor (with his neck way out).

Grevillea 'Bairnsdale' is a seedling selection from *Grevillea* 'Poorinda Constance' and is very similar, being far more floriferous though paler and not as showy. It is a dense compact shrub growing to 2 m tall and wide.

Grevillea 'Bonnie Prince Charlie' is a hybrid between *Grevillea rosmarinifolia* and the Grampians form of *Grevillea alpina*, the same parents as *Grevillea* 'Austraflora McDonald Park' from which it differs only slightly; more open and firmer foliage with leaf margins recurved.

Grevillea 'Brookvale Letitia' is said to be a hybrid of the Jervis Bay form of *Grevillea barklyana*, the subspecies *macleayana*, and *G. acanthifolia*. The lobes of the deeply divided leaves, differing markedly from both parents, have a prominent though not pungent tip as with *G. acanthifolia*. The toothbrush red flowers closely resemble those of *G. acanthifolia*.

Grevillea 'Chatsworth Lorran' is a hybrid between *Grevillea venusta* and *G. thelemanniana* ssp. *obtusifolia*. It is a compact upright shrub to 1.5 m high. The leaves are to 50 mm long, entire or pinnate with up to five lobes, a glossy dark-green above with a prominent mid rib beneath. The pale peach spider-like flowers to 30 mm diam., axillary or terminal on short branchlets.

Grevillea 'Crimson Glory' is thought to be a hybrid between *Grevillea willisii* and *G. acanthifolia*. The name refers to the toothbrush type flower each with pale perianth segments and a crimson style. It grows to 0.3 m tall and 1.5 m wide with a very dense habit. The leaves to 80 mm long by 45 mm wide are deeply lobed, each lobe ending in a pungent tip. The upper surface is a shiny yellow green but covered with a matt of tiny hairs beneath.

Grevillea 'Crosbie Morrison' is a beautiful plant that has given pleasure in a wide range of conditions for many years. It is a hybrid between *Grevillea lanigera* and *G. lavandulacea*. It is very similar to *Grevillea* 'Poorinda Illumina' which has pink rather than red flowers.

Grevillea 'Green Glow' is a presumed hybrid between *Grevillea tetragonoloba* and *G. × gaudichaudii*. The name refers to the very bright green foliage. The deeply divided leaves are similar in shape to *G. × gaudichaudii* but smaller, 6 cm long by 4 cm wide. The pale claret flowers are in racemes 6–8 cm long, terminal on branches and branchlets. It is more upright than *G. × gaudichaudii* growing to 1 m high and up to 2.5 m across.

Grevillea 'Ivanhoe' is a hybrid between *Grevillea longifolia* and *G. caleyi* that has been widely grown for many years. A bush 3–4 m high with red toothbrush flower heads to 50 mm long. It is similar to *Grevillea* 'Poorinda Peter' which is more vigorous with darker wider leaves.

Grevillea 'Orange Marmalade'. This plant has the vigour of *G. venusta* and the bright orange flower colour of its other parent *G. glossadenia*, to 2.5 m tall.

Grevillea 'Parfait Creme' is a hybrid between *Grevillea* 'Pink Parfait' (female) and *Grevillea whiteana* (male). It is an open to medium dense bush 3.5 m tall by 3 m wide. The leaves are similar to those of *G. whiteana*, the flowers a deeper cream to caramel.

Grevillea 'Poorinda Gaye' is a tall spreading shrub to 2 m tall being very similar to one of its parents *Grevillea hookeriana*, a form with large flowers and shorter more divided leaves. The flowers are also similar.

Grevillea 'Red Hooks' has been widely grown as *Grevillea hookeriana* but is said to be a hybrid between *Grevillea longifolia* and *G. tetragonoloba*. A dense

rounded shrub to 3 m high, the bright red toothbrush-like flower heads to 70 mm long usually held out horizontally from the bush.

Grevillea 'Tyalge Glow' is suspected to be a hybrid between *Grevillea speciosa* and *Grevillea* 'Poorinda Firebird'. It is a shrub 1 m × 1 m with leaves similar to *G. speciosa*, 25 mm long by 5 mm wide with similar red spider flowers.

Grevillea 'Wakiti Gem' is a presumed cross between *Grevillea tetragonoloba* and *G. × gaudichaudii*, a prostrate, compact, very dense plant to 1.5 m across. It is similar in both foliage and red flower to *G. × gaudichaudii* but does not have the long trailing stems.

Grevillea 'Waverley Ghost' is a dense bushy shrub to 1 m tall, mainly grown for its variegated foliage. It is attractive in flower, the pink of the flowers contrasting well with the yellowish-green foliage. It is similar to *Grevillea* 'Poorinda Constance', the presumed parent to *Grevillea* 'Golden Sparkle' though more vigorous.

Grevillea 'Winpara Gem'. A hybrid between *G. thelemanniana* and *G. olivacea* with deeply divided grey-green foliage to 2 m tall. Pink-red flowers in racemes.

Grevillea 'Winpara Gold' is similar to that above but with orange-gold flowers. With foliage similar to *G. thelemanniana*, the selections appear drought tolerant and frost hardy.

Hakea *salicifolia* 'Gold Medal' is a variegated form, the older foliage having a cream to light green variegation; new growth rose pink fading to light pink.

Hypocalymma *cordifolium* 'Golden Veil' is a variegated leaf form of the natural species. It can be expected to grow to a height of about 1 m, the small variegated heart shaped sessile leaves are 8 mm long and wide, produced opposite each other on minutely winged stems. These stems are bright pink while the new growth is young.

Kennedia *nigricans* 'Minstrel' the flower colour being the only notable difference from *Kennedia nigricans*. The flowers are black with a white patch on the standard instead of a yellow patch.

Leptospermum, the tea tree will be featured in a future issue.

Leptospermum continentale 'Horizontalis' is a form collected from heathland near Portland, Victoria. The name refers to the low-growing "flat-topped" habit of the shrub. It grows from 0.9-1.2 m tall by 2-3 m wide. It has a very dense habit. The foliage is a dull green in colour, generally broader than typical *Leptospermum juniperinum*. The flowers are white and from 15-20 mm across. This form has often been confused with *Leptospermum scoparium* and has also been sold under the name *Leptospermum* 'Portlandii'.

Leptospermum nitidum 'Copper Sheen' differs from parent with bronzey-purple new growth, a spreading habit to 2 m tall and creamy-yellow flowers.

Leptospermum 'Lemon Frost' is a presumed hybrid between *Leptospermum petersonii*, which it resembles in its dense but more upright habit and fine bright green leaves, and *L. polygalifolium*. A shrub 2 m × 1.5 m, the solitary white flowers being 20 mm across. The selection was made in Cairns, where it is now well established in North Queensland horticulture.

Leptospermum 'Pink Cascade' possibly from *L. flavescens* 'Pacific Beauty' and *L. scoparium*. Ideal as a feature plant, for rockery or for cascading over walls. It has been described as 'Pacific Beauty' with pink flowers, photo p. 61.

Leptospermum flavescens 'Pacific Beauty' is a low growing, cascading form to 1.5 m tall by 2–2.5 m wide. The branches are very long and thin which adds to the cascading appearance when the branches are laden with flowers. The leaves vary between 1–1.5 cm long by 1 mm wide and are linear to narrow oblong in shape. The leaf tip is acute. The new growth, especially the branchlets, are pink in colour. The flower buds are pink and open to white and have a pale green centre. The white flowers are from 20 to 30 mm across.

Leptospermum laevigatum 'Raelene' exhibits all the characters of the normal forms of *Leptospermum laevigatum* except that the leaves are slightly smaller, being about 15 mm long by about 6 mm wide, and that they are variegated. The new growth is light green margined with yellow-cream and as the growth matures the green becomes darker and the yellow-cream margins turn bright pink. The plant appears identical to a cultivar sold as *Leptospermum laevigatum* 'Flamingo'.

Leptospermum polygalifolium 'Copper Glow' is an open shrub to 3 m high. The young stems are reddish and the narrowly oblanceolate to narrowly elliptical or oblong leaves are up to 20 mm long by 2 mm wide. They are bronze-green on the top surface and paler beneath. The five-petalled flowers are white and approximately 16 mm diameter. The fruits are 6 mm diameter with the typical high dome of the species. It differs from other forms of *Leptospermum polygalifolium* in the bronze-green colour of the top surface of the leaves and the reddish stems of the new growth.

Melaleuca have been featured in our Nos 125 and 127 Issues.

Melaleuca thymifolia 'Little Beauty'. The name refers to its small and compact habit and the large flower clusters that it bears. It resembles the species but is a compact and dense shrub growing to 0.3 metres tall by 0.6 metres wide. It flowers over most of the year except the winter months. The flowers are mauve and up to 20 mm in diameter.

Myoporum parvifolium 'Monaro Marvel' is basically prostrate but mounds to ± 30 cms tall in the centre of the shrub. It will grow to 2 m in diameter after three years. It forms a dense, low shrub, becoming prostrate around the outer edges. The flowers are white. The leaves are larger than those usually found. They are ± 6 cms long by ± 8 cms wide. All other characteristics are as for the species.

Olearia lirata 'Olwyn Barnett' was selected from the wild near Browntown Road, Weeapoinah, in the Otway Ranges of Victoria. It forms a shrub to 2 m high with moderately dense light green foliage. It was selected because of its purple/pink flowers to 20 mm across, that completely cover the plant in November, December and January.

Pandorea jasminoides 'Charisma' is a selection of the species with variegated leaves. Species of *Pandorea* descr. and illustrated in 15: 362.

Pandorea pandorana 'Golden Showers' was selected from a naturally occurring plant near Kempsey, New South Wales. The name refers to the weeping racemes of flowers and to the spent flowers which fall to the ground as the flowering season finishes. It is a vigorous woody climber with glossy pinnate leaves consisting of 5–9 leaflets. The flowers are massed on pendulous inflorescences and are a rich golden flowered selection of the species.

Pimelea ferruginea 'Bonne Petite' is a colour form of this hardy, very floriferous species. The cerise pink flower heads (almost ball shaped to 25 mm across) cover the very compact dome shaped shrub to 0.7 m tall. The bush and flowers are a little smaller than a very similar plant *Pimelea ferruginea* 'Magenta Mist' but the flower colour appears brighter and fades less quickly.

Plectranthus graveolens 'Bennelong Frosty Carpet' originated from a wild collection made near Sawtell, NSW. It is basically prostrate but with flowering stems that can rise from 10–25 cms tall. It roots very freely along the prostrate stems, forming a dense mat $\pm$ 2 m across. The leaves are suborbicular to broadly ovate $\pm$ 8 cms long by $\pm$ 4.5 cms wide. The upper surface of the leaf is a deep green and the underside pale green. Both leaf surfaces are covered in a dense coating of fine, twisted, silky hairs, though they are more prominent on the lower surface. The upper leaf surface is concave and the leaf margin is dentate. The flowers are violet blue on racemes to 14 cms long.

Prostanthera cuneata 'Alpine Gold' is a form from Mt McDonald, Victoria, differing in the variegation of its upper leaves. Colour proportions vary from $\pm$ 90% golden yellow to $\pm$ 20% where the leaves are merely edged with gold. Variegation is absent from the lower leaves of the branches, but the green of these is virtually masked by the brilliant yellow of the younger leaves.

Prostanthera lasianthos 'Kallista Pink' is a naturally occurring deep pink flowering form growing in the Dandenong Ranges in Victoria. It has deep clear pink flowers in profusion and grows 4–5 m tall by $\pm$ 3 m wide.

Spyridium parvifolium 'Australflora Nimbus' is a naturally occurring form from the Mudgee area of New South Wales. It is a dense prostrate shrub growing to a height of about 10 mm with a spread of about 2 m. The small round leaves are up to 8 mm long by 6–8 mm wide. The leaf tip is often indented. The green upper leaf surface has distinct veining while the underside is silvery and covered with long, silky hairs. New foliage is distinctly grey. The small and insignificant flowers are borne in clusters at the end of the branchlets.

Telopea oreades 'Errinundra White' is a white flowered form of the usually red flowered Victorian Waratah, *Telopea oreades*, a small tree.

Thryptomene saxicola 'Mingenew' was selected from a wild population near Mingener, Western Australia for its larger, purple flowers, up to 7 mm diameter, that are borne on longer pedicels. The flowering period is from March to October (in Melbourne) but some flowers can be found throughout the year. The shrub is of medium density, growing to ca. 0.5 m tall by 1-2 m wide.

Westringia 'Poorinda Pavane' is said to be a hybrid between *Westringia fruticosa* and *Westringia glabra*. It is a bush shrub up to 2.5 m tall by 1.5-2 m wide. The leaves are from 10 to 25 mm long by up to 8 mm wide, are in whorls of 3-4 and have recurved margins. They are glabrous above though the young growth does have a few fine white appressed hairs on the upper surface. The undersurface is coated with short, white appressed hairs. The midribs are prominent. The flowers are pale violet in colour. The calyx is hairy and the corolla has a scattering of fine hairs. Flowering, October to November.



△ *Leptospermum flavescens* 'Pacific Beauty'
See p. 58 for description. Photo by M. Fagg

▽ *Correa reflexa* 'Fat Fred'
A registered cultivar desc. in Vol. 11: 264.
See p. 55 for more *Correa* cultivars.



Westringia 'Wynyabbie Gem' is a hybrid between *Westringia fruticosa* and a mauve flowered form of *Westringia eremicola*. It is a medium dense shrub growing to 1.5 m tall by 1.5 m wide. The leaves are narrow lanceolate to 20 mm long by 3 mm wide and greyish-green in colour. They are moderately dense along the branches and found in whorls of four. The flowers are a light lilac mauve to blue mauve with brown-orange spots and are in small axillary groups in the upper leaf axils. They are borne prolifically in the spring but some occur all year round. ■

More Callistemon cultivars

by Colin Cornford, Callistemon Study Group

Name	Height (m)	Flower colour	Probable origin	Notable features
'Aileen Black'	2.5	dark red	<i>C. linearis</i>	
'American Beauty'	2.5	pale pink		Grown at Los Angeles Arboretum
'Ayr'	2	red	<i>C. viminalis</i>	Weeping habit, flowers over a long period
'Benjamin'	3	mauve/pink	<i>C. subulatus</i>	Tolerates wet or fairly dry conditions
'Blush Pink'	2.5	pale pink	<i>C. citrinus</i>	
'Bonanza'	3	bright red	<i>C. viminalis</i> × <i>C. recurvus</i>	
'Booti Booti Queen'	1.5	dark red	<i>C. pachyphyllus</i> × <i>C. citrinus</i>	Large brushes
'Braeside'	2	pale red	<i>C. viminalis</i>	
'Bronze Wings'	5	dark red	<i>C. pachyphyllus</i>	Silky young growth
'Cameo Pink'	6	rose pink	<i>C. salignus</i>	Very small flower spikes
'Carnarvon Range'	6	red	<i>C. viminalis</i>	
'Cedar Creek'	4	red	<i>C. viminalis</i>	Pendulous branches
'Coochy Coochy Station'	8	red	<i>C. viminalis</i>	
'Demesne Bronwyn'	2.5	bright pink	<i>C. citrinus</i>	
'Ebor'	3	pink	<i>C. pityoides</i> ?	
'Enid'	5	pinkish	<i>C. pachyphyllus</i> × <i>C. polandii</i>	Red/gold anthers
'Fairy Floss'	3	pale pink	???	Fairly large brushes
'Genoa River'	2.5	purplish red	<i>C. pallidus</i>	
'Glasshouse Beauty'	4	pale pink	<i>C. recurvus</i> × <i>C. salignus</i>	
'Glasshouse Country'	4	pink	<i>C. recurvus</i> × <i>C. salignus</i>	
'Glasshouse Gem'	4	pale pink	<i>C. recurvus</i> × <i>C. salignus</i>	Pink new growth
'Howie's Fireglow'	2	red	???	
'Inverramsay'	3	pale pink	Closely related to <i>C. 'Injune'</i>	
'Jenny Wren'	2	dark red	<i>C. viminalis</i> × <i>C. polandii</i>	Gold anthers
'Little Cobber'	1	cream	<i>C. pityoides</i>	Good rockery plant
'Lolworth'	3	red	<i>C. viminalis</i>	Greyish-green foliage
'Lords Table'	3	red	<i>C. polandii</i>	
'Malawi Giant'	15	red	<i>C. viminalis</i>	Derek Arnall's garden, Malawi, Africa
'Marlborough'	3.5	red	<i>C. viminalis</i>	Smooth, slightly greyish leaves
'McIntosh'	3	dark red	<i>C. salignus</i>	Large brushes
'Mr Foster'	2	dark red	???	Very large brushes
'Mt Drummer'	3	mauve/purple	<i>C. pallidus</i>	Showy flowers in clusters
'Mt Oberon'	3.5	yellow	<i>C. pallidus</i>	Silvery new growth, large brushes
'Nabiac Red'	3.5	red	<i>C. acuminatus</i>	Large flowers, large leaves
'Phoenixus Nana'	1	red	<i>C. phoeniceus</i>	Low-growing form, grey-green foliage
'Pink Champagne'	3	pink	???	Flowers most of the year
'Prince of the West'	2.5	bright red	<i>C. phoeniceus</i>	Grey-green foliage, prolific flowering
'Red Major'	3	red	<i>C. phoeniceus</i>	Large brushes
'Snowball'	4	white	<i>C. recurvus</i> × <i>C. salignus</i>	Flowers hold colour well
'Southern Cross'	3	pink/red		Seedling of 'Candy Pink'
'Walsh's Pyramid'	5	darkred	<i>C. polandii</i>	Broad leaves
'Weir River'	4	red	<i>C. viminalis</i>	

Colour Guide to the Wildflowers of Central and Western Australia

by Denise Greig

A 170-page field guide to wildflowers for the tourist with 300 plants featured in colour. To identify a plant you open the book to the section for the colour of the flower, scan the photographs and select the one most closely resembling the plant. The major problem with such a book is that there are so many wildflowers. With 300 photographs there is a good coverage but the photographs must necessarily be small and the descriptions short. However, it will be a valuable guide to those who do not know many wildflowers. Selling at \$24.95.

Banksia spinulosa

by Alec M. Blombery and Betty Maloney

Banksia spinulosa is an attractive, bushy shrub which grows to about 2 m high, with narrow leaves, which in young plants are flat, toothed along the margins, but in older plants become entire and inrolled. In autumn and winter dense, cylindrical spikes of golden-yellow flowers with stiff, hooked, golden-yellow to purplish styles are produced. This is one of the five *Banksia* in the region where the flower spikes open from the top downwards and the stiff style remains hooked¹. When the flowers are fertilised, interesting woody fruiting cones develop; when not fertilised the flowers turn brown and persist for an indefinite period; frequently, few if any fruiting cones develop on a plant. This attractive *Banksia* is now becoming more readily available in nurseries and should become more common in cultivation, as it makes an attractive garden subject and grows well in an open sunny position in well drained soils of various types. Seeds germinate readily and growth is fairly rapid, flowering occurring in about three years from seed.

Variety *spinulosa*, the type form described above.

Variety *collina* have the same habit of growth, and the inflorescence and fruiting cones show little difference. Only in the leaves is there a difference with mature plants; in var. *spinulosa* the margins are distinctly revolute, that is, rolled under, and the margins are entire except for a few fine teeth at the apex; in var. *collina* the margins are flat or recurved, that is bent over, and there are fine teeth along the margins, each tooth terminating in a sharp point, the mid vein is recessed and lateral veins are visible.

¹NSW *Banksia* with narrow leaves. This group of plants is spectacular. The botanists have been dithering over their correct names. We shall accept the most recent publication, "Flora of NSW — Vol. 2", as being correct which names three species, each with two varieties, all with a characteristic hooked style after a thesis.

Banksia spinulosa with varieties as described above — leaves mostly longer than 3 cm long, scattered, either 1–2 mm wide or if wider than 2 mm, the lateral veins evident on the lower surface which is white; it has a lignotuber.

Banksia cunninghamii — leaves are also longer than 3 cm and scattered but are greater than 2 mm wide, the lateral veins being obscure, the lower surface brownish. The variety *cunninghamii* does not have a lignotuber and is a single-stemmed tree or shrub to 6 m.

The variety *neoanglica* has a lignotuber and is a multi-stemmed shrub to 2 m high.

Banksia ericifolia — leaves less than 2 cm long and crowded.

The variety *ericifolia* on the coast from Sydney to Jervis Bay and in the ranges from Moss Vale to Rylstone, has shorter flowers in the head 16–20 mm long.

The variety *macrantha* on coastal areas of Grafton north to Queensland and Nambucca to Forster, has longer flowers in the head 25–28 mm, with hairs at their base.

Notes prepared by Editor. ■

The Proteaceae of the Sydney Region

by Alec Blombery and Betty Maloney

The above is what you get from this well presented book; a colour photograph of each species, flower and plant, with description by Alec Blombery, and the gifted artistry of Betty Maloney presenting the fruiting heads of each species, in colour. 210 pages with a species of *Banksia*, *Conospermum*, *Grevillea*, *Hakea*, etc., on two opposite pages of colour and description. Excellent value for those interested in the flora of the Sydney region less 10% plus post. \$44.95, 1.2 kg.



Banksia spinulosa, the flower head is matured to produce seed.

Artist: B. Maloney



△ *Banksia spinulosa*

Photography by Alec Blombery

▽ *Banksia serrata* 'Australflora Pygmy Possum'

Photography by Australfiora

Typical of prostrate forms of *B. serrata* and *B. integrifolia*; see page 84.



Graptophyllum

Prepared by W. H. Payne from the revision of the genus by R. M. Barker in the Journal of the Adelaide Botanic Gardens, and A. R. Bean, *Austrobaileya* 3 (3) 1991.

The four Australian species of *Graptophyllum* are shrubs which can grow quite dense and tall and can be made a small tree. The species are very similar in many respects. For the gardener they may be distinguished from the key below using leaf shapes and spines on the branches.

The flowers are similar as shown in the colour photographs for *Graptophyllum excelsum* and *G. ilicifolium* to the extent that, except for size, they could be all one species. This is except for *G. spinigerum* which has smaller flowers which are white with red spots. The sketches opposite of *G. excelsum* show the typical flower on a branch with a detail of one flower with the petals opened out. It shows, from the centre of the flower: a superior ovary (glabrous with two ovules per cell) supporting a simple style; two stamens attached half-way up the floral tube with two tiny staminodes at their base, the filaments of the stamens being hairy at the base, the pollen-bearing anthers spear-head shaped on top; and the floral envelope (corolla) in a tube opening and splitting at the end with an upper lip shortly notched and a lower lip with three lobes curling under.

Key to species of *Graptophyllum* in Australia

1. Leaves 6–10 cm long with spinose marginal teeth >2 mm long; reticulation of leaf venation raised in dried material 2
 Leaves 1.7–6 cm long, entire or with short marginal teeth <2 mm long; leaf venation obscure on dried material 3
2. Corolla white with mauve spots, 8–11 mm long; leaves 3–4.5 cm wide *G. reticulatum*
 Corolla red >25 mm long; leaves 3.5–5.5 cm wide *G. ilicifolium*
3. Leaf pairs approx. equal in size, margins entire or slightly toothed; Corolla red >25 mm long; condensed axillary branchlets present *G. excelsum*
 Leaf pairs greatly unequal in size, margins distinctly toothed; Corolla white with mauve spots, 7–10 mm long; condensed branchlets absent *G. spinigerum*

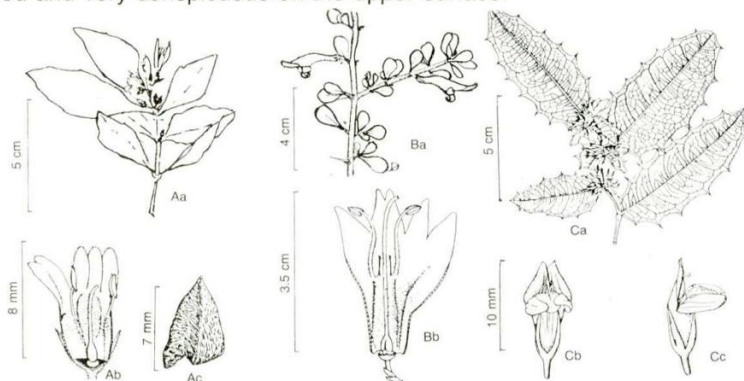
Graptophyllum spinigerum is a shrub to 2 m high with small white flowers with red spots in the throat. It is close to *G. excelsum* with axillary spines in the older parts but the leaves are usually larger and some of the larger leaved specimens are almost indistinguishable, vegetatively, from some forms of *G. ilicifolium*. It has similar flowers to *G. reticulatum* but it has hairs on its branchlets, corolla and calyx (externally), and anthers, and smaller leaves without spinose teeth and without raised leaf veins. Scattered collections from the rivers of the McIlwraith Ranges, Cape York and the Cooktown area, south to Eumundi in the Brisbane area.

Graptophyllum excelsum is the most widely grown in cultivation in Australia, being very easily propagated by cuttings. It is exceptionally hardy for me in Sydney, growing to a clumping upright bush to 3 m high. At first glance it is not unlike privet but with shiny leaves and masses of deep red flowers. As hardy as privet but without the capacity to seed everywhere, it extends itself by suckering up nearby to form clumps that are very easily contained. They also take hard pruning so are excellent as a specimen shrub, a hedge or windbreak that requires little attention. "This attractive, slender shrub to 2 m+ grows in dry vine thickets. Leaves are hardy, dark green and shiny, spatulate,

3 cm × 1 cm, opposite. The scarlet red flowers form singly or in pairs in axillary clusters, are tubular, five-lobed, with two lobes fused." (Quoted from "Rainforest Plants of Eastern Australia.") The plant is known only from the Fitzroy River and Frenchman's Creek near Rockhampton and there is some doubt as to whether the species now exists in its natural state. Its ease in propagation and cultivation and its most attractive nature will surely preserve it. *G. thoroodii* is reduced to a form of *G. excelsum*.

Graptophyllum ilicifolium is a shrub 3–4.5 m high with large prickly leaves when young. It is very similar to *G. excelsum* in many respects. Steve Pearson accompanies an excellent photograph (reproduced on page 69) in his book "Rainforest Plants of Eastern Australia" with, "This slender shrub to 2 m occurs in dry rainforest in volcanic areas (of the central Queensland coast in the Mackay-Rockhampton district) where it grows quite happily in rocky crevices or along creek banks. Leaves are elliptical to ovate, 5 cm × 3 cm, with toothed margins, alternating. The larger leaves form on one side of the woody stems. Small axillary leaf bracts to 1 cm are present with the flower. The large, attractive flowers are scarlet red, tubular, five-lobed with two lobes fused, in axillary pairs."

Graptophyllum reticulatum is a shrub 1–2.5 m high, vegetatively similar to *G. ilicifolium* but with narrower leaves, longer marginal teeth and less conspicuous reticulate venation. The flowers are similar to *G. spinigerum*, smaller, white with mauve spots, leaves without teeth and hairs on its branchlets. The leaves are up to 10 × 4 cm dark green above, paler below, glabrous, leathery, with 5–8 pairs of pungent marginal teeth and acute apex. The reticulation is raised and very conspicuous on the upper surface.



A. *Graptophyllum spinigerum*, Aa, habit; Ab, opened flower; Ac, seed.

B. *Graptophyllum excelsum*, Ba, habit; Bb, opened flower.

C. *Graptophyllum reticulatum*, Ca, flowering twig; Cb and Cc, flower from front and size.

Rainforest Plants of Eastern Australia

by Steve and Alison Pearson

Continuing the style of their book "Central Queensland Plants", this book features a colour plate of all species found at Eungella National Park in the Clarke Ranges west of Mackay, Queensland. These are representative of the rainforest plants of Central Queensland but are not all the rainforest plants of eastern Australia. Against this, Steve Pearson has not picked all the most photogenic rainforest plants to present, but all the plants of a specific area. This means that many lesser known plants are photographed, the whole presenting a balanced rainforest ecology. The keen rainforest growers/students are well aware that Australia's rainforests are not a floral wonderland but a collection of fascinating plants. This book presents the plants as they are, the features used in identification by the amateur being given. 223 pages. \$59.95 RRP. Available for \$53.95, 1.8 kg — see page 91.



Graptophyllum excelsum, the plant $\triangle$ and the flowers ∇ Photography by W. H. Payne
 My plant is 3 m high and 20 years old. Prune height to suit.





Graptophyllum ilicifolium △

Photography by S. Pearson

Reproduced from "Rainforest Plants of Eastern Australia" — see page 67 for details.

▽ **The Enid Turton garden** — see page 51. Under the balcony for growing ferns.
In the foreground are her propagation bottles as described and illustrated on page 51.



Eremophila

Germination Studies¹

by Guy Richmond and Joan Osborne
Curtin University of Technology,
Perth, W.A.

This report follows germination trials and a field establishment study of *Eremophila* species. The Goldfields of Western Australia is the richest region in Australia in terms of numbers of species of *Eremophila*. Both nickel and gold mine site operators seek effective rehabilitation techniques of the native vegetation.

In an *Eremophila* germination study at Kings Park Botanic Garden, Perth, Western Australia in 1965, 21 species were selected and sown, after half the fruit samples were treated with 50% sulphuric acid (soaked for two hours, then thoroughly washed). Germination occurred in 12 fruit lots, but in 10 of these there was no difference in germination between treated and untreated fruit. Beard (1968) concluded that there was no fruit coat dormancy, at least among those lots with identical results for both treatments. Low viability and use of immature fruit were considered factors giving rise to poor germination rates. The time of germination was 20–58 days. According to Kullman (1981) the average time taken for *Eremophila* seeds to germinate is 32.5 days. Beard noted the ideal time of sowing as being at the end of August, shortly before soil temperature rises.

One of the first detailed studies of germination focused on the weed species *E. gilesii* in semi-arid Queensland in the late 1960s and early 1970s. A series of laboratory and field experiments was undertaken to establish the optimum conditions for seed. Using *Eremophila gilesii*, fruits were exposed to a series of constant temperatures in darkness at 10°C, 15°C, 25°C, 35°C and 40°C (Burrows 1974). Optimum germination occurred between 25° and 35°C, with 45% germination occurring after seven days at a constant temperature of 25°C. Germination was recorded over a 14-day period only. Whilst the germination percentage appears high, no indication as to the number of seedlings produced per fruit was recorded as *E. gilesii* fruits could produce up to 12 seeds per fruit. Burrows suggests that for *E. gilesii*, the effect of fruit weathering (followed for 14 months), enables germination to increase exponentially with time from collection of fruit, such that germination of 40–50% could be attained about three years after the fruit matures. Low germination rate was attributed to an impervious, woody pericarp, with no evidence of chemical inhibitors controlling fruit germination.

Research by Harrington, CSIRO (1977) was associated with the weed species *E. mitchellii*, along with *E. bowmanii*, *E. sturtii* and *E. longifolia*. A set of complicated treatment controls was used giving the optimum temperature regime as a day/night cycle of 25°/15°C. *E. mitchellii* had the highest germination of 15% after nine months. An unlikely upper temperature regime of 70°C was used but fruit germination was minimal.

¹This work has been funded over the last two years by the Minerals and Energy Research Institute of Western Australia and through donations from seven mining companies in the goldfields of Western Australia (i.e., Western Mining Corporation (Nickel), Placer Pacific Ltd, Goldfan Mining, Coolgardie Gold Mining Operation, Bulla Bulling Gold Project, Central Kalgoorlie Gold Mines and Kaltails Mining Services. The support of these companies is gratefully acknowledged. The research will continue for a further two years.

20 years *Eremophila* research conducted by Eremophila Study Group¹

A review by Warnes (1983) stated that . . . "while we still have no answer to seed germination, a number of plants have been established from seed and perhaps it is opportune to put down a few thoughts — all conflicting". One of the main contentious issues is the age of fruits for germination. It has often been considered that seed viability is reduced over time, as illustrated by Harrington's findings associated with the germination of fresh *E. mitchellii* and *E. sturtii* fruit, with the loss of viability after one year. In contrast, members of the Eremophila Study Group reported that they had germinated high numbers of fruits of *E. scoparia* in Tarcowie, South Australia in 1968 after they had been stored in a plastic bag in a dark cupboard from 1964. Initial sowing of this species in 1964 resulted in zero germination (Warnes 1973). In 1978 other members successfully germinated *E. gilesii* in Owen, South Australia which had been sown six years previously with no germination. Seedling emergence occurred from totally decomposed fruit, with an instance of six seedlings emerging from one fruit. This illustrates that seed viability may be extremely high over prolonged periods of time, and since *E. gilesii* has up to 12 seeds per fruit, may produce a considerable number of seedlings several years after initial fruit maturity. Warnes (1983) has postulated that an inhibitor is involved. He noted "It is natural that conditions for germination and survival must be optimum for a desert plant. I suggest that a young fruit if detached could germinate immediately if suitable conditions prevail, but if maturing on the bush because suitable conditions do not exist, the inhibitor would have developed and would be effective until broken down by time or leached out by water."

Current *Eremophila* Research at Curtin University Seed Histology

Fruit samples of *Eremophila maculata* species were selected for a study of seed structure and structural analysis. *E. maculata* was chosen because it has one of the largest *Eremophila* seeds. The larger seed size facilitates dissection and histological processing. Within an *Eremophila* fruit, between 2–12 seeds are found in the loculi (seed chambers). To obtain an indication of fruit fertility, groups of 100 fruits were dissected under a microscope and the number of seeds per fruits counted. In the case of *E. maculata*, the fruit has four locules, with two seeds in each locule (i.e., eight seeds in total). As a result, a maximum of 800 seeds per sample could be extracted from a sample of 100 fruits. However, fruit dissection of 100 fruits yielded a total of 467 seeds, a 58.3% seed set for this sample. Whilst fruit dissection gives instant information on average seed number per fruit, the technique is extremely time-consuming (e.g., dissecting 100 fruit may take up to 4/5 days). X-ray procedures were also used to ascertain fruit morphology and confirmed that in each locule there may be up to two or three superimposed ovules.

Seeds of *E. maculata* are characteristically small and range between 1–4 mm in length, and resemble a cashew in shape. Though soft and naked when excised from the fruit, they are protected by a brittle outer testa which encloses each seed within the locule. Examination of sectioned seeds illustrated a simple seed structure.

¹Study Groups: These are groups of members, usually remote from each other and functioning by mail, who have a special interest in a group of plants. The Eremophila Study Group is active in the study of *Eremophila* and their cultivation in the home garden. Being a plant from the Australian desert, their water requirements are not demanding and ideal for Australian conditions in hot, hot, hot, positions. Other study groups exist for people interested.



△ *Eremophila latrobei*, grey leaf form

▽ *Eremophila sturtii*

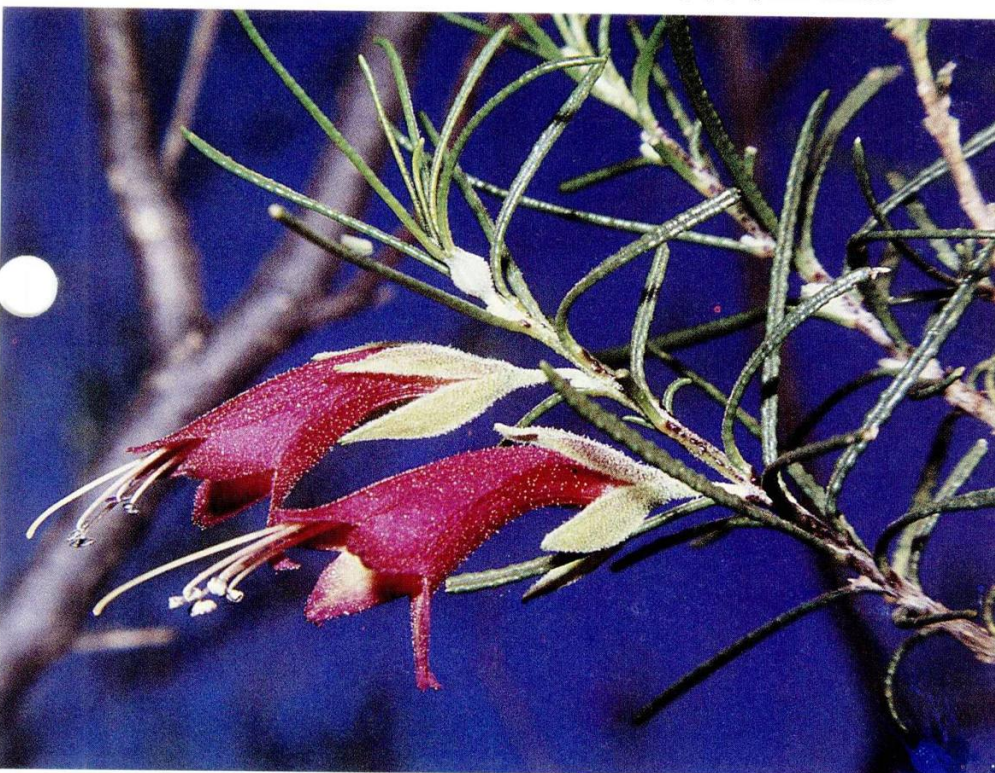
Photography by N. Marriott
Photography by Bob Chinnock





△ *Eremophila miniata*
 ▽ *Eremophila ericalyx*

Photography by Bob Chinnock
 Photography by John Simmons



Seed Viability Testing

Viability of different aged *Eremophila* species is currently being studied. The procedure involves first imbibing the seeds for 24 hours in water. Seed halves are then soaked in a colourless 2, 3, 5-triphenyl tetrazolium chloride (TTC) solution. Upon penetration of living tissue (seeds) the salt is reduced to a reddish, water insoluble compound that cannot diffuse from the cells. The areas of the seed cells which stain red indicate the functional and non-functional regions of the seed. If the plumule (for shoot emergence), radicle (for root development) and cotyledons (primary set of leaves) stain a deep red then it is evident that the seed is healthy and potentially viable. A paler pink colouration indicates a poor respiratory system and a seed of low vigour (that may be discounted as non viable).

Eremophila fruits of interest for mine site rehabilitation (e.g., *E. scoparia*, *E. longifolia*, *E. oldfieldii*) will be obtained of different ages to test if the seeds they contain differ in viability. A reference table will be constructed relating the viability changes with fruit age. The obvious disadvantage of this technique is that it involves destructive sampling. Secondly, seed viability may be influenced by climatic conditions at the time of seed set and the different storage conditions. However, the information will give the propagator an idea of the likely rate of germination for a species at differing ages.

Seed Germination

Germination of *Eremophila maculata* seeds and fruit over 100 days.

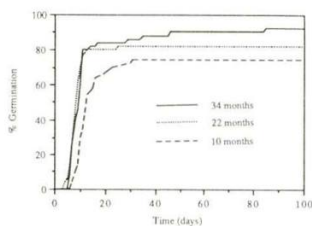


Fig. 1. Seed without testa.

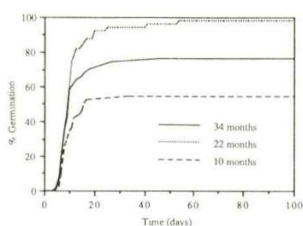


Fig. 2. Seed with testa.

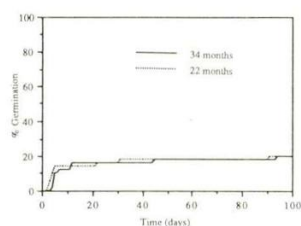


Fig. 3. Fruit.

A germination experiment was carried out to evaluate the influence of the woody fruit wall on germination. Seeds with and without testa, and fruit of three different ages (10, 22 and 34 months old) of *E. maculata* were placed in a growth cabinet (25°/7°C day/night cycle), simulating a late autumn/early spring germination regime. Figs 1–3 show the germination rate for seed with and without testa and fruits over 100 days. No seeds from 10 month old fruits germinated. The main factor which appears to restrict seed germination in *E. maculata* fruits is a physical constraint imposed by the thick fruit wall. Isolated seeds enclosed by the testa (seed coat skin) will readily germinate although presence of the testa will delay germination by two or three days, compared with seeds lacking testa. There is a possibility that a chemical inhibitor may exist within the seed testa of the 10 months old sample (as illustrated by only 54% germination). However, the main controlling mechanism for germination appears to be the physical woody structure of the fruit.

It appears that seeds in older fruits (e.g., greater than 22 months old), will also readily germinate though this percentage is markedly reduced if the seed is located in the lower section of the fruit. Seed located in the upper section (near the fruit apex where air and moisture are more readily available) germinate more readily.

Studies of *Eremophila* Species at Mt Keith and Mt Weld Stations

Study plots of the dominant *Eremophila* species have been set up at Mt Keith Station (90,000 ha) near Wiluna, Western Australia (Australian Consolidated Minerals Nickel mine) and Mt Weld Station (250,000 ha) near Laverton, Western Australia (Placer Pacific Ltd, Granny Smith Gold mine). Survey of the respective mine sites (30 km radius) were carried out between September–December 1990. A total of 25 *Eremophila* species have been identified at Mt Keith (a total of 30 species have been identified around Wiluna) and 10 species at Mt Weld. Mt Keith is characterised by hardy drought tolerant *Eremophila* species such as *E. fraseri* subsp. '*galeata*' (Turpentine bush) and *E. spectabilis* (Showy *Eremophila*). These species are located in rugged lateritic "breakaway" country on stony ground and on red earths. Average annual rainfall is 220 mm. The country has been overgrazed since the 1920s. As a result many of the desirable *Eremophila* species (for native and domestic stock) such as *E. longifolia* and *E. latrobei* have been heavily grazed throughout the area. Mt Weld comprises 60% "lake country" dominated by samphires and *Frankenia* species, with an average annual rainfall of 224 mm. As a consequence salt tolerant species such as *E. scoparia* and *E. miniata* are located in the more saline areas. *E. margarethae* and *E. forrestii* are co-dominant species throughout the Station and are located within populations of saltbush (*Atriplex*) and bluebush (*Maireana*) species.

Plant measurements comprise height, crown width, time of flowering, fruit production, seed germination and insect damage. Measurements are currently being taken three-monthly at Mt Keith and six-monthly at Mt Weld.

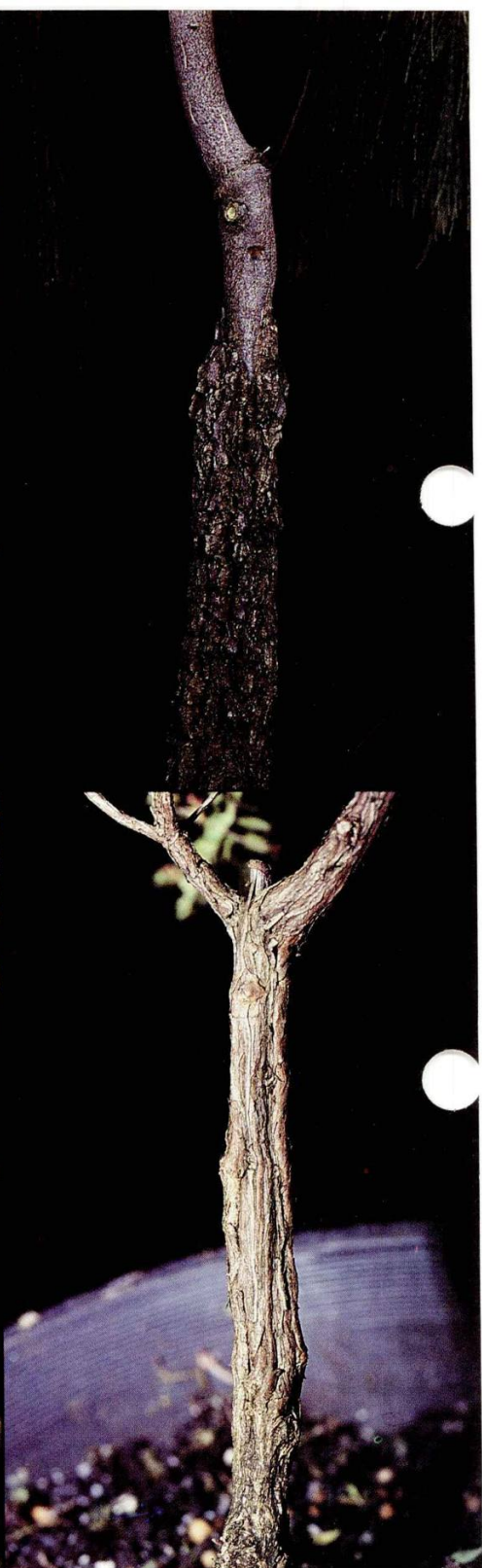
Insect predation

The study of animal life associated with *Eremophila* is a complementary facet to germination research. An understanding of species richness will enhance future ecology studies.

Pulvinaria dodonaeae have been identified as a scale insect which may affect the vitality of *Eremophila* species in the Goldfields. This insect has been recorded on *E. spectabilis*, *E. fraseri* subsp. '*galeata*' and *E. forrestii* at Mt Keith and *E. margarethae* and *E. forrestii* at Mt Weld. *Eremophila* species appear to suffer from these insects, especially in times of drought. *E. margarethae* seemed particularly susceptible to attack from this species. Though this insect species has been taxonomically described, there is no information on its life cycle. The only available information is for a related insect species *Pulvinaria maskelli*, whose life cycle was described by Olliff in 1891.

Many *E. spectabilis* plants (Mt Keith) have also been infected by gall forming moth larvae of the family Gracillariidae. The life cycle of this moth, which is considered undescribed and cannot be placed in a known genus (Nielson, pers. comm.) is unknown. Nevertheless, it appears that there are two species of moth larvae in the galls. The larger species packs its faeces in the base of the chamber and lives one to a gall, and the smaller species sometimes 2–3 to a chamber, webbing its faeces loosely with silk throughout the chamber. The moth larva bores a hole near the top of the chamber and seals it with septum of silk prior to pupation (Houston, pers. comm.). This allows the adult moth to escape as well as permitting later entry of other insects. Wasp parasites, a *Gryllacridid* grasshopper juvenile and spiders have also been identified as secondary gall inhabitants. ■

Cultivation of *Eremophila* — A number of previous issues have described the cultivation of these plants ideally suited for the hot dry position, the most recent being Vols 12: 1–39, 13: 112, 15: 162 and 16: 149.



Grafting of

Allocasuarina torulosa

by David Meyers
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Allocasuarina torulosa, the Forest Oak, occurs naturally in Queensland and New South Wales and is widely planted in other areas as a feature tree or street tree. It is a dioecious plant having separate male and female trees. Female plants produce an attractive cone-type of fruit and male plants produce spikes of flowers near the tips of branchlets. Some individuals of this species produce a deep, burgundy-coloured foliage which is regarded as having superior ornamental merit to the more common greener foliage.

Propagation from seed, which is the common propagation method for this plant, results in considerable variation in foliage colour, and allows no control over whether male or female plants are produced. Thus a method of vegetative propagation is needed to produce elite cultivars of this plant.

Previous attempts to propagate *Allocasuarina torulosa* forms by cuttings have proven difficult with uneconomically low success rates. It has been reported, however, that *Casuarina cunninghamiana* can be successfully grafted onto *C. equisetifolia*. It was therefore decided to investigate the possibility of grafting selected forms of *A. torulosa* on to seedlings of the same species and initial results indicate that this can be done successfully.

Seedling rootstocks were twelve-month-old vigorously growing containerised plants. The plants were grown in a greenhouse and were approximately 140 cm high at the time of grafting. Grafting was done in February under greenhouse conditions and compared wedge and whip grafts.

Scions of two superior selections (one male, one female) were collected from plants grown in the field. Preparation of scions included removing the softer terminal growth, leaving several short lateral shoots at the tip end of the scion and complete removal of all shoots on the basal two-thirds of the scion. Prepared scions were approximately 6 to 8 cm long and 3 mm thick.

At the time of grafting, the foliage of the tip end of the rootstock was removed for about 4 to 6 cm leaving the basal foliage intact to provide nutrition for the rootstock and to assist the formation of a successful graft union. The graft union was wrapped firmly with plastic grafting tape and each scion was covered with a clear plastic bag for about four weeks after grafting.

The grafted plants were grown on in a glasshouse and the plastic tapes were cut four weeks after grafting. Grafts were assessed six weeks after commencement of the trial and were regarded as successful if callus had formed over the graft union and if the scion was actively growing.

The success rate for this trial was about 50% with 24 out of a total of 49 grafts forming unions. The wedge type of graft was the most efficient with a 68% success rate while only 41% of whip grafts were successful. The success rate of male and female scions was similar with 44% and 51% success rates respectively.

The successfully grafted plants have been grown on for twenty months and all have made vigorous growth with at least 150 cm of growth in this time. These will be evaluated over the long term in a field plantation at the Institute. ■

Opposite top — *An Allocasuarina torulosa* graft with the matured graft (on the right) some time later.
Opposite bottom — *A Thryptomene calycina* graft with the matured graft some time later.

Thryptomene

By David Meyers,¹
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The Grafting of Grampians *Thryptomene*

Thryptomene calycina, the Grampians *Thryptomene*, occurs in the Grampian and Black Ranges in Western Victoria. Small white flowers are produced prolifically as terminal racemes in winter and early spring making this species an ideal feature plant for the garden. The flowers also have a vase life of 9–15 days and are grown commercially for cut flowers. It is, however, an unreliable plant in cultivation and susceptible to attack by fungal pathogens.

Thryptomene saxicola is a related plant which occurs naturally in Western Australia and is very commonly grown as a reliable, long-flowering garden shrub in the eastern states. It is much more hardy than *T. calycina*, especially in heavy soils. It was decided to test *Thryptomene saxicola* as a rootstock for *T. calycina* in the hope of overcoming the problems of *T. calycina* in cultivation. Both wedge and whip grafts 20 mm long were used to graft the cultivars *Thryptomene calycina* 'Snow in Winter' and *Thryptomene calycina* 'Black Range Pink' scion wood, on to *Thryptomene saxicola* rootstocks.

Clonal rootstocks of *T. saxicola* were placed as cuttings² in February and potted on as rooted cuttings in April. They were then grown on in a glasshouse until grafting in November, nine months after the cuttings were first taken. At the time of grafting the leaves of the tip of the selected branchlet of the rootstock were removed for about 3 to 4 cm leaving leaves at the basal end intact to provide nutrition for rootstock and to assist formation of a successful graft.

Scion wood was taken from containerised plants which were actively growing in a glasshouse at the time of grafting. The scion was prepared in a similar manner to a cutting with the terminal shoot removed leaving several short lateral shoots at the tip of the scion while the basal two-thirds was stripped of all leaves. Scions were on average 50 mm long and 2 mm thick. For whip grafting a sloping cut was made which matched the cut made in the rootstock. For wedge grafting the basal end was then cut to a 'V' shape which was inserted into the split tip of the selected rootstock branchlet.

The graft unions were wrapped firmly with plastic grafting tape and each scion was covered with a clear plastic bag for four weeks after grafting. The grafted plants were grown on in a glasshouse and the plastic tapes were cut three months after commencement of the trial. Graft unions were assessed four months after grafting and were regarded as successful if callus had formed and the scion was actively growing at this stage. Both cultivars were successfully grafted, with 68% of cv. 'Snow in Winter' and 77% of cv. 'Black Range Pink' forming graft unions. Overall the wedge type graft proved to be the most efficient with a success rate of 86% compared with only 60% of whip grafts forming unions. After a number of years growth of both scion cultivars has been normal, growing 40 to 80 cm in their first year.

¹Michelle Bankier looked after the plants in these trials and David Beardsell provided plant material and supervision. This programme was partly funded by Daratech Pty Ltd.

²*Thryptomene saxicola* is quicker and easier to produce as a rooted cutting than *T. calycina* and significantly reduces the time involved in the propagation stage for cut flower plantations.

Propagation By Cuttings

Improving the Strike Rate Using Hormones

by G. C. Garrett

Over the years, I have steadily refined my methods for producing plants from cuttings to the point where I now have a method which works well. In earlier years, I used powder based rooting hormones which typically use Indole Butyric Acid at a concentration of 1000 parts per million. I now use a combination of three rooting hormones, Indole Acetic Acid, Indole Butyric Acid and Naphthalenic Acetic Acid in liquid form. Comparison testing with powder treated batches of plants, which have been prepared and grown on under the same conditions as liquid treated plants, shows a much higher success rate for those plants which have been liquid dipped.

The three hormones are readily available from garden shops by buying two different products and then combining them. The hormones are sold as *Rootex-L*, which contains Indole Butyric Acid and *Chemspray Plant Hormone*, which contains Indole Acetic Acid and Naphthalenic Acetic Acid.

I select cuttings from young growth and use pieces which are 5–8 cm in length. After being cut from the parent plant, they are stored over-night in the refrigerator standing in a dilute solution of the two hormone solutions, made up at a concentration of four drops of each to a litre of water. The cuttings are covered with a plastic bag to reduce the drying effect of the refrigerator on them.

After stripping off the lower 50% of the leaves on the cutting, they are dipped for three seconds in a concentrated solution of hormones, which is made with five millilitres of *Rootex-L*, five millilitres of rainwater, and five millilitres of *Chemspray Plant Growth Hormone*. The cuttings are allowed to dry for 30 seconds and are then potted up.

My cutting mixture is one part peat moss to five parts Perlite. I use discarded seedling trays from a local nursery as I can put cuttings in the individual cells. These trays are easy to handle and it is also easy to check for roots. The cuttings are kept under mist for between two and three weeks before being potted on.

If you do not have a misting system, I have found that a tunnel-tent of polythene fabric can also work well. These can be easily made from a short length of steel re-inforcing mesh bent over to form the frame of the tunnel and then covered with reinforced polythene cloth. Set this arrangement upon a bed of sand in a position where it gets the morning sun. Each morning and evening put the garden sprinkler inside the tent and saturate the plants for five minutes. The evaporation of the moisture from the sand during the day keeps the humidity high enough to prevent drying out of the cuttings.

Once roots are visible from the bottom of the container, the plants are soaked in a tray of water to loosen them before potting on. The plants are then housed in a sheltered and shaded area for approximately one week before being placed in a sunny position for six to eight weeks prior to planting out. This year, I have raised approximately 600 cuttings using this method. ■

Growth Retardants on Natives

by Wayne Stewart

Decorative native species are being developed as flowering pot plants by selection and hybridisation to achieve a compact long flowering attractive plant. An alternative to selective breeding is the use of plant growth retardants such as paclobutrazol (ICI — Bonzi) which has been shown to effectively reduce internode length.

Rooted cuttings of *Chamelaucium uncinatum*, *Correa alba*, *Crowea exalata* and *Dampiera trigona*, were planted individually in 1.25 litre black planter bags in a sterile (one hour at 60°C) mixture of composted sawdust:pine bark chips:coarse sand (1:1:1, V:V:V). The mix had a pH of 6.0 and nutrients were added and mixed at a rate of six kg/m³ using a controlled release fertiliser (Osmocote Plus). Fifty plants of each species were selected and allowed ten days to acclimate prior to treatment. *C. uncinatum* and *D. trigona* were pruned to a mean height of 150 centimetres. The trial was run from 24 April 1988 to 27 July 1988 in temperature controlled glasshouses at the Charles Sturt University in Wagga. All plants were watered daily with 100 millilitres of water. Diurnal temperature fluctuations ranged from 28°C to 15°C.

Treatments were applied in a completely randomised block design. There were five treatments and ten plants per treatment with individual plants being the experimental unit. The treatment consisted of a 50 ml soil drench application of paclobutrazol at 0, 0.125, 1.0, 5.0 and 10.0 milligrams of active ingredient per plant. Soil application was chosen as the method of application as paclobutrazol is readily absorbed by roots and is xylem translocated.

Plant height was noticeably affected, Table 1. Most exhibited a saturation response at the 1.0 mg a.i. rate while *Dampiera trigona* was markedly affected at the 10.0 mg a.i. rate. Plant vigour in general was good although the aesthetic appearance of the plants diminished above the 5.0 mg a.i. rate. Retardation of plant height was largely a result of a reduction in plant growth as indicated in Table 2. *C. alba* did in fact increase in total dry weight for the 1.0 mg a.i. application rate. All other species exhibited a decline in total accumulated dry weight as a function of increasing paclobutrazol concentration.

No apparent influence on flowering was noted. Newly developed leaves of treated plants appeared darker green than the control. Chlorophyll content of the control plants and the 5.0 mg a.i. treatment were measured and the results appear in Table 3. In all species there was a proportionately higher level of chlorophyll in the treated plants than the control with *Dampiera trigona* having a ratio of 2:1 (5.0 mg:0 mg). Other researchers have only shown a subjective increase in green colouration of treated leaves and none have reported any actual increase in chlorophyll levels. Chlorophyll/a to chlorophyll/b ratios did not alter between treatments.

An interesting observation was recorded with *D. trigona* where the number of lateral shoots that developed were counted at a two monthly interval (Table 4). Lateral shoot development was markedly reduced in response to increasing paclobutrazol concentration. No evidence exists to show that paclobutrazol influences lateral shoot development.

Paclobutrazol was found to be an effective growth retardant of the selected native plant species. For *Grevillea*, ICI recommends a broad spectrum dose rate of 5.0 mg a.i. per plant. Our research has shown that a saturation response may occur for certain species as low as 1.0 mg a.i. per plant. (personal communication). ■

Table 1. Effect on the mean height.		Paclobutrazol concentration ^a				
Species		0	0.125	1.0	5.0	10.0
<i>C. uncinatum</i>	A ^b	15 (1.6)	13.4 (1.5)	13.3 (2.3)	13.6 (1.1)	14.6 (2)
	B ^c	34.2 (3.9)	29.9 (6.6)	23.8 (5.9)	24.1 (2.9)	24.3 (5)
<i>C. alba</i>	A	12.7 (3.3)	11 (2.7)	12.5 (2.6)	10.3 (1.1)	11 (1.9)
	B	25.4 (4.6)	21.4 (4)	23.7 (5.6)	16.4 (3)	13 (2.2)
<i>C. exalata</i>	A	9.7 (1.3)	8.7 (2.7)	10 (1.7)	9.5 (1.6)	10.5 (2)
	B	20.2 (7)	17.6 (7.3)	12.2 (2)	12.1 (2)	12.8 (3)
<i>D. trigona</i>	A	16.8 (3.2)	15.2 (2.7)	16.8 (3.2)	14.8 (2.4)	15.9 (4)
	B	76.4 (10)	80.4 (9.1)	86 (15)	42.5 (33)	21.6 (6)

^aChemical rates expressed as mg a.i. per plant — ^bInitial height (24/4/88) — ^cFinal height (27/7/88). Each data point is the mean height of 10 plants per treatment. Standard deviations are shown in parentheses.

Table 2. Effect on the dry weight.		Paclobutrazol concentration ^a				
Species		0	0.125	1.0	5.0	10.0
<i>C. uncinatum</i>	R ^b	1.12 (.4)	1.05 (.3)	0.82 (.3)	0.67 (.3)	0.84 (.3)
	L ^c	3.71 (1)	3.1 (1.5)	2.52 (.9)	1.61 (1)	2.33 (.8)
	S ^d	2.2 (.6)	2.02 (.4)	1.4 (.49)	1.2 (.7)	1.67 (.7)
	T ^e	7 (2)	6.2 (2.4)	4.6 (1.9)	3.5 (2.1)	4.9 (1.4)
<i>C. alba</i>	R	0.62 (.2)	0.68 (.2)	0.69 (.3)	0.55 (.2)	0.62 (.2)
	L	1.49 (.5)	1.51 (.7)	1.58 (.6)	0.98 (.3)	1.22 (.4)
	S	0.50 (.2)	0.51 (.3)	0.55 (.3)	0.23 (.1)	0.24 (.1)
	T	2.6 (.8)	2.6 (1.0)	2.8 (1.3)	1.8 (.7)	2.0 (.62)
<i>C. exalata</i>	R	0.43 (.3)	1.29 (.8)	0.23 (.08)	0.21 (.1)	0.27 (.04)
	L	0.93 (7)	0.70 (.5)	0.26 (.1)	0.12 (.1)	0.12 (.03)
	S	0.38 (.3)	0.2 (.14)	0.06 (.02)	0.08 (.04)	0.06 (.02)
	T	1.7 (1.2)	1.2 (.8)	0.6 (.3)	0.41 (.2)	0.45 (.07)
<i>D. trigona</i>	R	2.34 (.6)	1.33 (.6)	1.26 (.5)	0.84 (.5)	0.63 (.23)
	L	2.36 (.5)	1.45 (.5)	1.46 (.5)	1.49 (.5)	1.33 (.5)
	S	6.5 (1.1)	4.57 (1.2)	4.7 (1.3)	0.9 (.4)	0.3 (.17)
	T	11.2 (2.1)	7.4 (2.3)	7.3 (2.3)	3.2 (1.0)	3.4 (.8)

^aChemical rates expressed as mg a.i. per plant — ^bDry weight of roots — ^cDry weight of leaves — ^dDry weight of stems — ^eTotal dry weight of plant. Each data point is the mean height of 10 plants per treatment. Standard deviations are shown in parentheses.

Table 3. Effect on the chlorophyll content.		Chlorophyll A mgm ⁻²	Chlorophyll B mgm ⁻²	Total A+B mgm ⁻²	A:B
<i>C. uncinatum</i>	O ^a	405	95	500	4.2:1
	5.0	460	110	570	4.2:1
<i>C. alba</i>	O	308	82	390	3.8:1
	5.0	429	110	539	3.9:1
<i>C. exalata</i>	O	455	105	560	4.3:1
	5.0	604	138	742	4.4:1
<i>D. trigona</i>	O	368	104	472	3.5:1
	5.0	726	219	945	3.3:1

^aChemical rates expressed as mg a.i. per plant.

Table 4. Effect on lateral shoot development in *Dampiera trigona*.

Paclobutrazol concentration ^a	Number of laterals ^b	Number of laterals ^c
0	9.8 (2.9)	22.3 (6.2)
0.125	6.7 (2.7)	16.3 (4.5)
1.0	4.1 (1.8)	13.7 (3.4)
5.0	1.2 (0.6)	8.9 (2.2)
10.0	1.2 (0.6)	5.6 (1.9)

^aChemical rates expressed as mg a.i. per plant — ^bNumber of developed laterals as at 16/5/88 — ^cNumber of developed laterals as at 22/7/88. Each data point is the mean value of 10 plants per treatment. Standard deviations are shown in parentheses.

The Testing of Soil for pH

by W. H. Payne

For thirty years competent growers have been warning me to test my soil for pH levels. I knew full well that the pH was important and that any fertilizer I applied could either be unnecessary or useless as the condition of the soil could withhold it from the plant. Old time gardeners talk of "sweet" or "sour" soil and after all, how would I like being condemned in a situation that was uncomfortable and withheld my food. The necessary equipment seemed too costly, too inconvenient to obtain or too much bother — why get technical?

I was wrong, wrong, wrong. A testing set designed by the CSIRO of Australia is readily available by post — send \$15.00 to Inoculo Laboratories, 13 Arcade Road, Box Hill North, Victoria 3129. The testing set was child's play to use. Just select half a teaspoon full of soil from 5 cm below the surface, place it on a plastic card supplied with the kit (or any clean surface such as a saucer) in a small mound, sprinkle it with a liquid from a small bottle they supply (they have labelled the bottle pH Dye Indicator), mix up the soil with this liquid until it becomes a paste or a damp mound (they supply a wooden stirrer for the job), sprinkle onto the damp soil mound a white powder (they supply in a bottle labelled pH Testing Reagent), and wait a few minutes. The powder will take on a distinctive colour which is compared with a handy colour chart supplied.

It is all so incredibly easy. You can go from place to place in the garden, and take a soil sample and test it on the spot. In 15 minutes you could test 20 places in the garden. The material supplied in the kit will last me five years.

My natural soil is bush sand that is incredibly thirsty and apparently of very low nutritional value — or is it, could it be soil pH as the experts warned. Applying fertilizer seemed an expensive waste of time — was this due to soil pH preventing the nutrients reaching the plant? I have been using stable horse manure and one does wonder what is happening to the soil. Overcoming thirty years of laziness, I purchased a test kit.

My first test was on soil taken directly from my compost bin and heaped in a new garden bed. Disaster! The reading was 8.5, incredibly alkaline and good only for Azalea. Was it the horse manure used in the compost bin?

I hastened to the home of Noel Gane, a friend? He uses practically pure horse manure to produce his really spectacular wildflower garden. It happened to be January, full summer, and he had ripped all his plants out of a number of large beds and heaped them with over forty bags of fresh manure — fresh from the stable. I plunge in my hand for a sample with some misgiving — strange it is not squelchy or smelly at all. The manure to 30 cm deep had only been dug in about two weeks before and seemed to have disappeared. The soil was a coarse granular structure. A latter comment from another competent gardener was "Noel must have an army of little creatures at the bottom of his garden and whenever he covers the garden with neat fresh manure, the call goes out 'Come on fellas, a special feast again.'" The pH test, a perfect 6.5. There is an important message here — see Vol. 15: 162.

Back home at the "ranch" I tested various areas of my garden. The results were good with a reading of about 6.5 pH. What of my new garden with its pH of 8.5. It was not suitable for planting for a few weeks but application of a mixture of Magnesium Sulphate (Epsom Salts), Iron Sulphate and Potassium Sulphate, all available quite cheaply in bulk by the kilogram from the local hardware, did the trick. ■

Floral Displays of Wildflowers

Preparation of Flowers

by Irene Cullen

Care taken when preparing flowers for display will result in a fresher looking and longer lasting arrangement. The rules are simple. Pick blooms early in the morning. If that is not possible, then in late afternoon. Try to have the flowers picked at least three hours before they are to be arranged, to allow the blooms to be immersed deep in tepid water for that time.

When picking the flowers, use sharp secateurs and carry a container with water in it. As each bloom is cut place it in the water, recutting the stem under the water. This is essential for most natives. A slant-wise cut will ensure that no air bubble will form over the slice.

When sufficient flowers are gathered, they must be prepared. Fill another container with clean tepid water, deep enough for the blooms to be just out of the water. Trim away all unnecessary foliage, etc. Then once again cut the stems under water as they are put in the container. Stand in a cool draught-free place until needed. The importance of cutting the stems under water cannot be emphasised too strongly. Hammering woody stems and scorching soft ones is not nearly as effective.

When arranging the flowers, work quickly and use clean utensils. A flower keeping agent may be added to the water in the receptacle at this stage. This is desirable, especially when arranging the flowers in an oasis block, where the water cannot be completely emptied every couple of days and replaced with clean water. Flowers to be transported should also be treated in this way. If they have been transported without water the process of cutting the stems under water should be carried out again.

Flower keeping preparations — There are many of these on the market. There are also many home recipes. An aspirin in the water or lemonade come to mind. Nowadays adding a drop or two of household bleach to the water to combat bacterial growth is popular. A little sugar also provides some glucose, while a couple of grains of citric acid is said to keep the stem capillaries open. However, caution is needed. Too much bleach will burn soft stems and an overdose of sugar can also have an adverse effect.

David Hockings, well known in horticulture, has a simple recipe for his own use. He adds two rounded tablespoons of sugar and no more than two or three drops of bleach to a bucket (approximately 7 litres) of water and finds it effective. A formula I have used for many years is 1 kg sugar, 4 gms slow release Pool Chlor and 4 gms citric acid. Mix thoroughly and store in an airtight container. Use as required — 1 tablespoon of formula to 1 litre of water or 1 cupful to 10 litres. ■

The Floral Arrangement Series

We hope to feature a floral arrangement, usually on the rear cover of each issue. This time it is on the front cover. Readers are invited to forward photographs of arrangements they have done. Colour slides are preferred but a good colour print will do if only this is possible. The scheme is for competent judges to assess the artistic achievement and send a confidential report to the participant. You will see that the cover of this issue and the rear cover of the last one are of large formal arrangements used in display/decoration. More usually the arrangements will be of a type suitable to decorate the home. Please join in this fun activity. — Editor.

Ground Covers

East Coastal 8 — A Series by
Brian Walters

Useful things, ground covers, don't you think?

They help fill up bare areas in newly planted areas and add interest to more established gardens. There's a ground cover for every purpose. Here are a few that have been successful for me:

Banksia serrata × *Banksia integrifolia* (prostrate forms) — I've mentioned both of these previously and my enthusiasm hasn't diminished. Reasonably vigorous and dense, they look magnificent spilling down a sunny bank. Photo, page 65.

Grevillea obtusifolia — another vigorous and dense cover which will quickly spread to two metres across. Unfortunately it only flowers spasmodically in my garden but this is a mere detail.

Grevillea 'Bronze Rambler' — one of the more successful of recent releases, this has much divided foliage, bronze new growth and deep red 'toothbrush' flowers. It spreads to about 2.5 metres.

Grevillea 'Austraflora Old Gold' — this is a bit taller than the others, reaching about half a metre and spreading to 1.5 m across. It, too, has much divided foliage and yellow/gold 'toothbrush' flowers.

Grevillea patentiloba (prostrate form) — again, a bit shy to flower, it forms a very attractive mat about 1.5 metres across. Leaves are much divided, the leaflets being very narrow. Red flowers occur either singly or in pairs.

Scaevola humilis — this is best in a moist, sunny position where it forms a lightly suckering mat a metre across. Mauve flowers appear in spring and summer.

Lobelia trigonocaulis — this does such a good job that some may regard it as invasive. So far, I haven't found it to be uncontrollable. I have it in a dry, shady position where it forms a dense mat under other shrubs. The deep blue flowers appear over a long period. It spreads by forming roots at leaf nodes so you can easily propagate it by ripping up bits with roots attached.

Hibbertia pedunculata — a nice compact clump! Although this one also forms roots along the branches, it could never be called invasive. Bright yellow flowers appear in spring.

Persoonia chamaepitys — this is the most magnificent thing but it is not easy to obtain (the propagation difficulties of *Persoonia* species are legendary!) The plant forms a brilliant green, dense mat about 1.5 m wide and yellow flowers appear in spring.

Persoonia oxycoccoides — another good *Persoonia* of similar size to the former and a bit easier to obtain. Both species appreciate a sunny, well-drained position. ■

Common and Aboriginal Names of Western Australian Plants

by Eleanor M. Bennett

This extremely useful reference book in two sections, an index of plants using scientific names with their common name given and an index of common names with the appropriate scientific name. It is available from the Western Australian Wildflower Society, Eastern Hills Branch, Box 111, Glen Forrest, Western Australia 6071, for \$20 including postage to the eastern states and \$16.00 in Western Australia. ■



△ *Hibbertia pedunculata*

Photography by B. Walters

▽ *Persoonia chamaepitys*



Top End Wattles for the Garden

By Peter Ball

Acacia alleniana

Almost a shrub this small tree seldom exceeds three metres. Often mistaken for a small pine tree because of its needle-like leaves, *Acacia alleniana* dispels this illusion when it flowers. In some situations the plant is loaded with bloom and in others the more widely spread flowers seem to float like yellow snow flakes in a storm. Flowering is in the early dry and is followed by slim flattish pods containing small black seeds. It is best planted in a sunny, dry spot. Wind has little effect so the best use seems to be in hard open situations or as a forest tree in bare new ground. Lightly mulch and water for best results. *Acacia alleniana* is found in the open forests of the top end, particularly north of Katherine. The only small tree likely to be confused with it because of its needle-like leaves, would be *Dolichandrone filiforme*, but it has white trumpet flowers.

Acacia aulacocarpa

Used as a most impressive street tree in Darwin suburbs, this wattle has proved useful in hard dry areas. Although most unimpressive when young, particularly in the dry season, it grows into a nice weeping foliaged tree after four years. A further bonus is when the pale yellow flowers in abundance signal the start of the dry season. The yellow flowers age to orange then to brown and are followed by the short fat seed pods, green in colour turning to grey and brown, finally splitting open to scatter the dark seed.

Most of the Darwin trees are pruned on the end of the lower weeping leaves to allow lawn mowers under them. This makes them look trimmed and neat. If let grow in its natural habitat the tree forms an elongated ball shape to the ground, the weeping foliage sweeping the ground under the tree. Plant in a sunny position, water lightly and mulch for best results.

Acacia aulacocarpa is found in the top end north of Katherine. The long scythe-shaped leaves, to 80 mm by 10 mm are somewhat similar to *Acacia auriculiformis*, the Black Wattle, but it may be distinguished by the reddish flakey bark.

Acacia auriculiformis

A large rainforest-adapted wattle, its regular flowering habit and welcome shade have made it a favourite with top end gardeners. Fast growing, it has some faults, such as splitting branches and white-ant susceptibility, but remains a favourite none-the-less. Multitrunking is a sign of insect attack when young. This wattle has scythe-like leaves 80 mm long by 15 mm wide.

Acacia auriculiformis occurs within rainforest patches of the top end and in the open forest areas adjacent to the rainforests.

Plant on the western side for quick shade and prune for single trunking. While it has adapted to rainforest conditions in the wild, it retains its tough dry-land characteristics and does well in sunny Darwin. Without pruning it would be bushy right to the ground. It provides plenty of leaf for mulch, which it needs. The cool shady area formed by the tree may be supplemented by growing a vine such as *Tinospora* up the tree and ferns and palms under it. *Tinospora* will prevent splitting branches when established.

The bright yellow flowers of *Acacia auriculiformis* appear several times a year, even in the wet, when heavy rain damages the blooms. The best flowering burst is in the mid-dry, i.e., mid-winter. A faint perfume is noticeable in still conditions. Flower spikes carpet the ground prior to setting of seed. The curled seed pods are borne in great profusion, the black seeds with their bright orange aril hanging out of the pods at maturity.

Acacia difficilis

The weeping, very thick foliage and bright yellow flowers in thick spikes, are making this a popular tree for top end gardens. Full sun and moderate water gives best results. *Acacia difficilis* is one of the few *Acacia* that will grow under heavy cover and enjoy the conditions, looking thick and green all its life.

Wind is no problem, the weeping foliage flows with the breeze.

Acacia difficilis is easily identified by its extremely yellow long fingers of flowers; no other *Acacia* in the top end has the rich colour of this one. Thick flower spikes cluster on the branch ends and among the thick green leaves. Flowers pass through a dark brown phase before converting to seed.

The long thin brown seed pods are often accompanied by an "odd" seed that is actually a wasp's nest. The long thin reddish-brown bean-like pod is the seed, the other cluster being the nest of the adapted wasp.

Acacia difficilis has large dark green leaves 100 mm long by 20 mm wide and may be distinguished from other *Acacia* by the weeping foliage.

This *Acacia* occurs naturally in open forests north of Katherine.

Acacia gonocarpa

A heavy-flowering, low growing shrub native to the Darwin area. The long "finger" spikes of white flowers appear throughout the year. The leaves are 75 mm long, and narrow; the slim straight seed pods are held out at an angle from the branches and resemble the leaves. Hot sunny positions give the best flowering. Planted in rows two metres apart it would make a light, colourful hedge.

Acacia producta

A thick green spreading shrub to 2.5 metres high, almost always in flower, it is popular in top end gardens. The leaves are 25 mm long, and 10 mm wide. The flower heads are a bright yellow ball growing from each new leaf axil. A hot sunny position is preferred, with light mulch and medium watering. It will grow in very poor soils and still put up a brilliant display. Prune to shape.



Acacia nuperrima (above)

Photography by Peter Ball

A small heavy-flowering shrub much liked by top end gardeners. The brilliant yellow flower balls and fresh green colour of the unusual short, wide leaves make this plant useful as a display shrub in the front garden. It is suitable for lawn areas. The seed is in straight pods held erect over the branches. A hot sunny spot with light mulch and water is best.

Acacia mountfordae (opposite)

This is a wattle very popular in the top end gardens because of its "weeping willow" appearance, its attractive blue-green leaves and its bright yellow flowers. It may spread out to about five metres or it can be pruned into a small tree of attractive shape. Unique in its leaf shape for the top end it cannot be confused with any other species. It occurs naturally in Arnhem Land usually in the open forest.

Acacia mountfordae will grow on the poorest of soils in full sun but preferable with a light mulch, a little water, but no fertiliser. Sweet perfumed flowers in dense cylindrical spikes are carried for most of the year. The seed pods are 3.5–4.5 cm long, bluish, curved or twisted and contain several oval seeds. Propagation is by seed.

Acacia sublanata (opposite)

A medium shrub to small tree with beautiful, almost holly-like miniature leaves arranged geometrically on the branches. Growing erect and pyramid-shaped in full sun, it becomes thin and weeping in shady positions. The bright yellow flower balls appear at odd times of the year. Plant in a dry sunny position that gets at least 75% sun, lightly mulch and water. ■



△ *Acacia mountfordae*

Photography by Peter Ball

▽ *Acacia sublanata*



Flora of New South Wales — Vol. 3

by Gwen Harden

This series has set new high standards in the presentation of books on wildflowers. It is essentially a scientific series describing over four volumes all the wild plants found in New South Wales. What is amazing is the way Gwen Harden has presented the many thousands of plants with botanical descriptions such that anyone should be able to recognise a plant in the field using sketches and colour photographs. This is the third volume of the series, all very weighty books of excellent value. All three volumes are now available at 10% discount \$71.95, 2.4 kg, see page 91 for ordering by mail.

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