

Australian Plants

Registered by Australia Post
Publication No. PP226253/00017

September, 1994
Vol. 17, No. 140

\$3.60



Join the Surge by Readers to Save Our Australian Flora

Now is the time that we need the support of all readers. We have at last attracted the attention of the government because we are doing something ourselves. There is something everyone can do. Scientists around Australia have offered their services for vital research, essentially at a nominal cost to cover some of their expenses. In this issue you will find details of complete scientific research projects that you can support financially. Please consider this option carefully as we desperately need research to save our flora.

There are articles in this issue from groups who are active in work on the flora to the extent that professionals are so impressed they want to assist or use our results for their own studies. Enquiries to join these groups should be directed through the Society Secretary of your state listed inside the rear cover.

You can help in the field. With the flowering season in full swing will you:

1. See if you can find a good form of *Blandfordia*, Christmas Bells, that is flowering early in August/September. Mark the plant and report to the Editor. You could help research to promote early flowering to decorate our Olympic Games in 2000.
2. This search for good forms of wildflowers could be extended to all wildflowers in your area.
3. We need plants of all forms of all species of *Thysanotus*. If you can assist send enquiries or plants to Mark Bennett, RMB 3322, Hansons Road, Somersby, New South Wales 2250. This is something you can do if you have this Fringed Violet growing in your area. ■

CONTENTS OF THIS ISSUE

Our Garden No. 16	by Gwen Oxnam	335
Sturt Pea — Success at Last!	Gwen Oxnam	342
The Australian Daisy Collection	Plant Gowers Australia Pty Ltd	343
Australian Daisy Study	Australian Daisy Study Group	345
Australian Daisies that have proven reliable	Australian Daisy Study Group	346
A Garden of Birds	Graham Pizzey	355
Gardening in a Poor High-Alkaline Sand	Ron Taylor	358
Organic Mulches — some observations	Ray Holliday	359
Mulches — A contribution to their effective use	Kevin Handreck	362
Gardening Down-under	Kevin Handreck	365
Growing Wildflowers, some important observations	Kevin Handreck	366
Wildflower Research — 1995	W. H. Payne	370
Cultivars from Wildflowers	Australian Cultivar Registration Authority	372
The Names of Acacias — Let's get it straight	Lawrie Johnson	375
Amazing Achievements, Peter Olde and Alick Dockrill	W. H. Payne	376

COVER PLATE — Flame Robins (*Petroica phoenicea*) on *Pimelea ligustrina* is reproduced from a painting by South Australian artist, Ian Roberts. Information and brochures detailing limited edition prints and cards of this and other paintings by this artist can be obtained by writing to Reply Paid 64, Medika Gallery, C/o P.O. Blyth S.A. 5462. Ian Roberts considers himself primarily a painter of Australian flora, but Australian birds usually feature strongly in each work.

Studies for the cover illustration were gained on the Bogong High Plains Road approx. 12 km south-east of Falls Creek, Victoria. The Flame Robins were found in and around the snow gum woodland (with *Pimelea* understorey). They flit from branch to branch and sit quietly but watching intently, before diving to take insects from the ground flora. With back turned to the viewer, the male is difficult to see — when front on the flash of brilliant orange/red is an unforgettable sight. In winter, this species migrates out of the high country onto the warmer lowlands. Their summer range is generally south-east of a line from Warrnambool to Sydney.

AUSTRALIAN PLANTS No. 140 issue of Volume 17, comprising issues 133-140. International Series Index ISSN 0005-0008. A National publication in 10,000 copies. Published by The Society for Growing Australian Plants NSW Ltd. A.C.N. 002 680 480.

Available to members or by subscription of \$18.00 (A\$30.00 overseas), including postage to your address. Send to Australian Plants, P.O. Box 410, Padstow, NSW 2211.

Publication date of previous issue. No. 139 was 1st June, 1994.

Our Garden No. 16

Gwen Oxnam, Nedlands, W.A.

Our wildflower garden started in 1960 when we moved into our new home which is on a third of an acre of flat sand. The vegetation before we started consisted of two coastal Jarrahs, some pink myrtles, a number of large blackboys and weeds. It was the presence of the blackboys that gave us the incentive to plant a wildflower garden. In 1980 the garden was registered by the Western Australia National Trust, and in 1982 it was listed as Australian National Heritage.

We had taken a great interest in the Western Australian flora ever since arriving in Western Australia from New Zealand 15 years earlier, but at that time, when we suggested introducing them into the garden, the locals told us that they only survived in their natural habitat. However, by 1960 the Western Australia Wildflower Society, the state branch of the Society for Growing Australian Plants, had been formed, and I eagerly joined. Shortly after a Botanic Garden, which would feature a large collection of Western Australian flora, was planned for Kings Park. It proved to be an exciting time to be starting a wildflower garden, and along with other members of the Wildflower Society, I experimented with growing my own plants from seed and cuttings.

The garden lay-out was governed largely by the needs of the family at the time. The children ranged from one year to 14 years, so paths were needed for a pram, tricycles and bicycles, and there had to be an open grassed area for ball games, a barbecue and general activity. A rotary clothes hoist was a necessity, and its position is marked on the plan. It has long since been removed. And, of course, a priority was to incorporate the blackboys where they would have maximum impact in the landscape design.

Over the years plants have come and gone. Some did not adapt to the conditions, and others were lost to storms. Some had to be removed because there was not room for them in the spaces allotted. Beginners tend to make this kind of mistake. It was soon found that some of our favourite plants were not easy to grow. Hopes of a garden full of Kangaroo Paws, *Lechenaultia* and Sturt Pea were soon dashed, but with persistence a few of these are in evidence most years. *Anigozanthos manglesii* regularly succumbs to Black Ink Disease, but new plants are raised from seed annually. Now there is a choice of reliable hybrids. Nurseries now sell *Lechenaultia* and Sturt Pea and these are planted from year to year with varying degrees of success.

Tall and medium trees and shrubs were planted around the perimeter as a screen from the neighbours and as a backdrop for the rest of the garden as noted on the landscape plan. Siting of small plants in Plot A is not attempted as there are close on a hundred. In other plots a selection of plants has been added wherever requirements of space, sun or shade permit.

Looking out on to the back garden from the lounge room and kitchen windows the plants range from ground covers through 30 cm, 60 cm, 90 cm to 15 metres. Areas of lawn flow through from the back door. The front garden has tall trees and large shrubs screening the bedrooms from the street, but includes low-growing plants to lend floral interest on either side of the driveway to the carport.

Everlasting daisies are sown each year wherever there are sunny spaces.



△ *Goodenia willisiana*
Photograph by J. Simmons

Goodeniaceae, we intend to learn more
See page 379 for more details

Goodenia incana ▽
Photograph by Brian Crafter





△ A garden scene featuring *Leschenaultia biloba* (blue), *Chrysocephalum semipapposum*, *Brachyscome iberidifolia*, etc. Photograph above and below by Neil Marriott.

- ▽ *Eucalyptus nutans*, a decorative profuse flowering upright to spreading mallee shrub tree 3–5 m high.



The narrow beds along the path to the front door, plot H, have been difficult to manage because they do not get natural rain and have little light. Plants used here are *Viola hederacea* and *Rhagodia nutans* as ground covers, and *Boronia megastigma*, *Banksia blechnifolia* and *B. petiolaris*, *Orthrosanthus multiflorus*, *Chorizema cordatum*, *Dampiera diversifolia*, *Anigozanthos* 'Pink Joey' and 'Gold Foil', and three small *Macrozamia riedlei*.

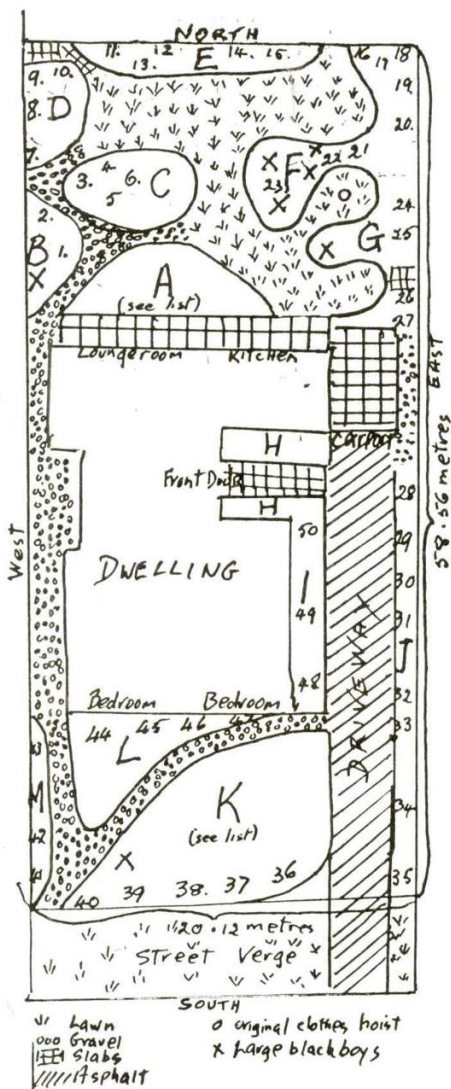
The lounge room and kitchen windows look out on to garden plot A. There is a slabbed patio area between it and the house with a pergola over part of it. It is bounded on the west by a gravel path, and on the east by a lawn. The garden is sand and level. The plants in it are from ground covers to one metre in height, but in the spring the *Anigozanthos flavidus* flower stems reach two metres and the *Xanthorrhoea* stalks (when they flower) reach three metres. *Orthrosanthus* and Kangaroo Paw flower at the same time and the contrast of colour makes a fine display. My three favourite plants, *Anigozanthos manglesii*, *Lechenaultia biloba* and *Swainsona formosa* have been difficult to establish. *Lechenaultia biloba* is short-lived on sand.

PLANT LIST — GARDEN PLOT A

<i>Agrostocrinum scabrum</i>	(8)	<i>Bracteantha</i> 'Dargan Hill'	(1)
<i>Anigozanthos bicolor</i>	(3)	<i>Rhodantha chlorocephala</i>	(6)
<i>Anigozanthos flavidus</i>	(2)	<i>Hibbertia hypericoides</i>	(1)
<i>A. flavidus/pulcherrimus</i>	(1)	<i>Hypocalymma angustifolium</i>	(1)
<i>A. flavidus</i> 'Red Cross'	(1)	<i>Hypocalymma robusta</i>	(1)
<i>A. flavidus</i> 'Gold Foil'	(1)	<i>Lechenaultia biloba</i>	(1)
<i>A. manglesii</i>	(5)	<i>L. formosa</i> 'Tango'	(2)
<i>A. viridis</i>	(3)	<i>Macropidia fuliginosa</i>	(1)
<i>Banksia blechnifolia</i>	(3)	<i>Myoporum parvifolium</i>	(1)
<i>Boronia</i> 'Heaven Scent'	(1)	<i>Myoporum parvifolium</i> 'Red'	(1)
<i>Brachyscome multifida</i>	(2)	<i>Orthrosanthus multiflorus</i>	(5)
<i>Brachyscome</i> 'Break O Day'	(1)	<i>Pimelea imbricata</i>	(1)
<i>Chorizema cordatum</i>	(3)	<i>Patersonia occidentalis</i>	(5)
<i>Swainsona formosa</i>	(1)	<i>Scaevola</i> 'Purple Fanfare'	(1)
<i>Conostylis candicans</i>	(3)	<i>Thysanotus multiflorus</i>	(3)
<i>Dampiera linearis</i>	(2)	<i>Verticordia chrysantha</i>	(4)
<i>Darwinia oldfieldii</i>	(1)	<i>V. monadelphina</i>	(2)
<i>Eremophila glabra</i>	(1)	<i>V. nitens</i>	(4)
<i>Grevillea lanigera</i>	(1)	<i>V. plumosa</i>	(1)
<i>Hardenbergia comptoniana</i>	(1)	<i>Xanthorrhoea preissii</i>	(7)
<i>Bracteantha bracteata</i>	(6)		

FRONT GARDEN PLOT K PLANT LIST

1. <i>Pittosporum phylliraeoides</i>	17. <i>Hibiscus</i> sp. (yellow with purple centre)
2. <i>Hakea orthorrhyncha</i>	18. <i>Callistemon teretifolius</i>
3. <i>Templetonia retusa</i>	19. <i>Dryandra nana</i>
4. <i>Melaleuca coccinea</i>	20. <i>Melaleuca violacea</i>
5. <i>Grevillea</i> 'Robin Gordon'	21. <i>Orthrosanthus multiflorus</i>
6. <i>Pavonia hastata</i>	22. <i>Anigozanthos</i> 'Pink Joey'
7. <i>Cassia</i> sp.	23. <i>Chorizema cordatum</i>
8. <i>Eucalyptus stoatei</i>	24. <i>Darwinia hypericifolia</i>
9. <i>Callistemon salignus</i>	25. <i>Conostylis candicans</i>
10. <i>Callistemon</i> 'Harkness'	26. <i>Brachyscome multifida</i>
11. <i>Xanthorrhoea preissii</i>	27. <i>Anigozanthos</i> 'Bush Nugget'
12. <i>Melaleuca huegelii</i>	28. <i>Anigozanthos</i> 'Yellow Gem'
13. <i>Grevillea dielsiana</i>	29. <i>Anigozanthos flavidus</i>
14. <i>Banksia blechnifolia</i>	30. <i>Anigozanthos manglesii</i>
15. <i>Banksia repens</i>	31. <i>Anigozanthos humilis</i>
16. <i>Grevillea thelemanniana</i>	32. <i>Stirlingia latifolia</i>



PLANT LIST

1. *Eucalyptus erythrocorys*
2. *Eucalyptus torquata*
3. *Acacia melanoxylon*
4. *Chamaelium uncinatum*
5. *Callistemon rigidus*
6. *Acacia iteaphylla*
7. *Acacia podalyriifolia*
8. *Eucalyptus sideroxylon*
9. *Hakea hookeriana*
10. *Acacia spectabilis*
11. *Ricinocarpus tuberculatus*
12. *Eucalyptus accedens*
13. *Eucalyptus erythrocorys*
14. *Callistemon 'Kings Park Special'*
15. *Eucalyptus marginata*
16. *Santalum acuminatum*
17. *Eucalyptus citriodora*
18. *Melaleuca linariifolia*
19. *Eucalyptus ficifolia*
20. *Brachychiton acerifolius*
21. *Eucalyptus polyanthemus*
22. *Nuytsia floribunda*
23. *Eucalyptus torquata*
24. *Acacia iteaphylla*
25. *Schefflera actinophylla*
26. *Callistemon phoeniceus*
27. *Hakea multilineata*
28. *Callistemon 'Kings Park Special'*
29. *Eucalyptus erythronema*
30. *Banksia victoriae*
31. *Hakea petiolaris*
32. *Melaleuca huegelii*
33. *Callistemon 'Kings Park Special'*
34. *Hakea elliptica*
35. *Eucalyptus erythrocorys*
36. *Pittosporum phylliraeoides*
37. *Cassia* sp. 15 feet
38. *Eucalyptus stoatei*
39. *Callistemon salignus*
40. *Callistemon 'Harkness'*
41. *Nuytsia floribunda*
42. *Allocasuarina torulosa*
43. *Banksia menziesii*
44. *Callistemon 'Kings Park Special'*
- 45, 46, 47. *Boronia alata*
48. *Grevillea banksii*
49. *Eremophila* sp.
50. *Cassia nemophila*

FRONT GARDEN PLOT K — continued

33. *Anigozanthos 'Dwarf Delight'*
34. *Anigozanthos 'Southern Aurora'*
35. *Anigozanthos 'Bush Ranger'*
36. *Anigozanthos 'Bush Gold'*
37. *Bracteantha 'Dargan Hill'*
38. *Platytheca verticillata*
39. *Rhagodia nutans*
40. *Beaufortia squarrosa*
41. *Verticordia lindleyi*
42. *Guichenotia macrantha*
43. *Eutaxia obovata*
44. *Isopogon dubius*
45. *Hakea purpurea*
46. *Melaleuca conothamnoides*
47. *Anigozanthos pulcherrimus* cross
48. *Acacia* sp.
49. *Grevillea 'Winpara Gold'*
50. *Lachnostachys eriobotrya*

This plot consists of trees and shrubs along the south and west screening the bedrooms. A cluster of small plants lines the driveway.



△ *Banksia gardneri*

Prostrate Banksia

Banksia repens ▽



Nuytsia floribunda — In 1964 I sowed seeds *in situ* in the front garden. They germinated easily and one was retained. Couch grass was planted by it as a host. The plant grew steadily over the years to a height of three metres. It first flowered in 1987 — at 23 years of age! Seed was similarly sown in the back garden in 1967, and I have another tree of three metres, but so far it has not flowered. Maybe next year.

Santalum acuminatum — I tried many times without success to transplant a Quandong seedling into my garden. Finally I was given a root cutting which is now a two metre tree. It is eight years old and has been producing fruit for the past three years. The bright polished red fruit hang so prettily, like Christmas baubles, that I cannot ever imagine turning them into jam!

Banksia — The prostrate *Banksia blechnifolia*, *B. gardneri* and *B. repens* have been raised from seed sown *in situ*. They germinate easily and spread widely to make an excellent ground cover with most attractive fern-like foliage. They flower every year but do not set seed. I have recently sown *B. petiolaris* which also germinates easily and promises to be an equally good ground cover.

Eucalyptus — I would warn against planting tall eucalypts in a private garden. They may cause problems with neighbours, are likely to drop large limbs in storms, and at maturity throw a lot of shade over the rest of the garden. The *Eucalyptus sideroxylon* only has a place in my garden because I was given it as an un-named gum tree. Fortunately I sited it on the boundary suspecting that it might prove to be a tall one. I love its large trunk and black grooved bark, but I am hoping it never drops a branch next door. There are many small to medium Eucalypts which produce colourful flowers within eye range — *Eucalyptus torquata*, *E. erythrocorys*, *E. caesia*, *E. kruseana*, *E. stoatei*, *E. erythronema*, *E. crucis*, *E. nutans*, *E. tetragona*, *E. forrestiana*, *E. lehmannii*.

Lechenaultia — These seem to be short lived on sand, but I have three plants of *L. formosa* 'Tango' that give promise of longer life. They flower well, and the orange colour is unusual.

Acacia — *Acacia pulchella* grows in sun and shade and gives a bright splash of colour in spring. It seeds down and can be transplanted. *A. iteaphylla* is useful where you need a taller "fill-in". It seeds down freely in the garden and can either be culled or transplanted elsewhere. Its grey weeping foliage is most attractive, and the pale yellow flowers come in early winter.

Grevillea 'Robin Gordon' — It flowers all year round and attracts lots of birds. Some people seem to be allergic to it.

Anigozanthos flavidus — This takes up little space, and the tall flower stalks in a range of colours are a prominent feature in spring.

Conostylis candicans — This is a hardy small plant and is useful for its silver foliage and profuse yellow blooms in spring.

Orthrosanthus multiflorus — This is easy to propagate from seed, and will grow in both sun and shade. Its blue flowers on long stems lend contrast among other spring flowers.

Rhagodia nutans — This is a good green ground cover with attractive small leaves. One plant will cover a large area and keeps the ground cool around other plants. It can easily be pruned back to any shape you wish.

Scaevola 'Purple Fanfare' — This is an excellent ground cover spreading over a large area and flowering for most of the year. ■

Sturt Pea — Success at last!

by Gwen Oxnam

In my 34 years of experience in gardening with native plants it is Sturt Pea I would dearly love to have in my garden. It has defied all my attempts to grow it until now. I have had no difficulty in germinating the seed following an overnight soaking in cold water, and have always sown *in situ*. My soil condition is well drained sand. The plants get to about three or four inches high, then yellow and die. One year I went so far as to trial about six different pots with various mediums and fertilisers. This time I bought healthy looking plants and planted three per large pot. One by one the plants died off till one produced a flower — hardly a typical Sturt Pea display!

This year I heard by chance that a “self-watering” pot could be bought at the supermarket. It is 12” in diameter and 11” deep with the bottom 3” separated off from the top but with slits in it to allow the roots to penetrate to the moist potting mix below. There is also a wide slit in the side of the bottom compartment through which to direct the water. The existence of such a pot jogged my memory many years back to a Wildflower Society meeting when a question was put to Charles Gardiner, the then Government Botanist, “How is it that Sturt Pea flourish in desert conditions?” He replied that although they seem to be flourishing in desert conditions there is in fact plenty of underground water where they grow due to the heavy seasonal cyclonic downpours from September to March in the north. These warm moist conditions are ideal for germination and growing on.

So I decided to buy a “self-watering” pot. I filled it, both bottom and top compartments with “Super-Gro” potting mix laced with Osmocote and placed it up off the ground on bricks in full sun. I germinated four seeds in the pot and allowed all to grow on, though I believe now that it would have been better to leave only two as the best flowers came from only two plants. I was delighted to achieve about 30 flowers, the seed from which I have collected for next year. Maybe if I had cut off the dead flowers I would have got more blooms.

I should mention that at the same time and with the same treatment I planted seed in a hanging basket. The plants did not thrive and started yellowing off till I took the basket down and placed it in a tray of water. Then I got some flowers on one plant. Both the pot and tray needed the water replenished every day.

Next year I will purchase more pots and try pinching out and use the fertilisers and a fungicide such as Benlate suggested in *Australian Plants*, September 1990, by G. E. Barth. Perhaps Sturt Pea is really no trouble to grow — when you know how. ■

The Australian Native Plant Gardeners Almanac

by John Blay

An unusual little book designed to assist the “mug gardener”. Apart from an introduction in the front and a resource information section in the rear, the remaining 114 pages are each headed by a month of the year, a number of pages for each month. On each page, 4–8 species of wildflower are presented, the page month being the peak of its flowering period. Pertinent advice is given relating to aspect and soil requirements, frost tolerance, etc. The objective is to assist the beginner with advice as to what to plant where and to assure that at any time of the year there is a range of plants in flower. Relevant to the cover of this issue, a range of plants that will attract birds throughout the year is given. The retail price is \$19.95; available from booksellers or as indicated inside our rear cover.

The Australian Daisy Collection

by Plant Growers Australia Pty Ltd

In an effort to promote the diversity and beauty of Australia's native daisies for garden use, new varieties are being developed here at PGA. A comprehensive breeding project ran between 1990 and 1994. In this project we assessed a wide range of species for the genera *Helichrysum*, *Helipterum* (now known as *Rhodanthe*), and *Brachyscome*. After selecting desirable clones we then conducted a series of hybridisation trials to develop novel and improved cultivars. The project was jointly funded by PGA and the Rural Industries Research and Development Corporation. PGA is committed to the development of the Australian flora and we would like to see this work being conducted in Australia so that this country reaps the benefits. Unfortunately, this has not always been the case in the past, and that is why Natalie Peate established the breeding project originally.

In the Australian Daisy Collection we have released a range of *Bracteanthus bracteata* (previously known as *Helichrysum bracteatum*), two collections of *Brachyscome* (mostly *B. multifida* hybrids) and two varieties of *Rhodanthe anthemoides* (previously known as *Helipterum anthemoides*). Five of these varieties are protected by Plant Variety Rights in Australia and overseas in Europe, Japan and USA. We have another four new *Brachyscome* varieties we hope to release in 1995.

Brachyscome Cultivars

The wildflower *Brachyscome multifida* has been widely cultivated as a showy garden plant or as a pot/basket plant both here and in Europe where it is very highly regarded. This popular demand has led to market selection for the best forms of this variable plant see photographs on page 353. Australian bred forms available are: *Brachyscome* 'Pink Haze', *Brachyscome* 'Lemon Drops', *Brachyscome* 'Blue Haze', *Brachyscome nova-anglica* 'White', *Brachyscome* × *angustifolia* 'purple'. You may use *Brachyscome* in:

Rockeries and sleeper walls — The rambling habit of *Brachyscome* makes them ideal for these positions. In their natural environment many *Brachyscome* grow amongst rocks where their roots are kept cool and moist.

Borders — Use *Brachyscome* instead of annual displays to soften the harsh effects of path edges.

Groundcovers — *Brachyscome* have a spreading habit and serve as excellent groundcovers, suppressing weeds and conserving soil moisture. For the best effect make group plantings.

Pots, baskets and window boxes — *Brachyscome* flower for so long and respond so well to pruning they make wonderful container plants. In large tubs plant two or three together — even mix the colours. When a flush of flowers end, just shear them back. This is an ideal system for small gardens. Just be careful they do not dry out.

Some planting combinations — *Brachyscome* make an excellent contribution to many garden styles from cottage gardens to native settings. They are a great compliment to tufted plants like Iris, many bulb varieties, Kangaroo Paws and grasses like *Carex* and *Pennisetum*. In conjunction with bold foliaged plants like grevilleas (e.g., *Grevillea* 'Bronze Rambler', G. 'Robin Gordon') and *Banksia*, *Brachyscome* are particularly stunning. Try them in a cottage setting with Lavenders, Wallflowers and other perennials and herbs.

Brachyscome Growers Guide

Brachyscome are one of the easiest plants to grow. They will thrive in a variety of garden positions and do not require pampering. For best results, follow these simple steps:

- **Plant in full sun or dappled shade.** *Brachyscome* will even grow in full shade but for the best flowering results a bit of sun is ideal.
- **The soil should be well composted.** Apply a moderate amount of complete fertiliser around the base of the plant and water in well.
- **Keep well watered in summer.** *Brachyscome angustifolia* prefers more moist positions whereas the other forms will tolerate drier soils. All perform well when regular and ample supplies of water are provided in dry periods.
- **Do not be scared to prune.** *Brachyscome* benefit substantially from pruning and will grow back rapidly at any time of the year.
- **Keep the area around the plant free of weeds,** especially just after planting. Using a mulch is a great help and will also preserve soil moisture.

Rhodanthe 'Paper Cascade'

The delicate little everlasting daisy, *Rhodanthe anthemoides* is a beautiful rockery plant with displays of white daisy flowers at various times during late winter and spring. The cultivar selection *Rhodanthe* 'Paper Cascade' has a trailing habit and flowers in spring, producing a profusion of pointed crimson buds which open into pretty, star-shaped, white paper daisies. The delicate foliage is grey-green with a mildly chamomile scent. It is wonderfully versatile and performs excellently in the garden, in pots and baskets and even in the home. It is very easy to grow, preferring a sunny or semi shaded position in well drained soils and is ideally suited to rockeries and sleeper walls where the foliage and flowers can trail and cascade. The trailing habit ensures that *Rhodanthe* 'Paper Cascade' is an exceptional candidate for pots and baskets. Photographs on page 357 show this plant in a pot and in a mixed garden. In the garden photograph the purple *Erica* 'Wittinga Gem' looks good. Turn to the cover of the previous issue of *Australian Plants* and note how the red flowered *Pimelea ferruginea* 'Bon Petite' and the purple-mauve flowered *Dampiera linearis* look even better. What is more, they are as hardy and easy to grow as the *Erica* of South Africa.

Flowering plants can be brought inside for brief periods and will continue to flower, offering a novel and beautiful alternative to a bowl of cut flowers. For the best effect place the pot in an attractive terra-cotta bowl or wicker basket and it will make a stunning interior decoration.

In dried floral art Australia's everlasting daisies are without equal. The flowers of *Rhodanthe* 'Paper Cascade' are excellent for small posies and informal arrangements and once dried they retain their colour and shape indefinitely. The flowers can be dried easily by cutting the stem just as the flower is beginning to open and hanging loose bunches upside down in a dry place which is out of direct sunlight. In 3-4 weeks the flowers will be properly dried and can be arranged as you would fresh flowers.

Rhodanthe 'Paper Star'

Rhodanthe 'Paper Star' is a new cultivar. It is an extremely compact and free flowering variety which flowers very early in the season compared with the very popular *Rhodanthe* 'Paper Cascade'. It produces masses of pure white flowers and is ideal for borders, rockeries and containers. It does not trail and is not as suited to hanging baskets as the red budded *Rhodanthe* 'Paper Cascade'. Look out for 'Paper Star' in your garden centre.

Rhodanthe 'Paper Baby' is a new introduction to look out for.

Most of us grow some exotics that were developed from wildflowers from another land. We treasure our Camellias, Azaleas, etc. However, most readers have an interest to see how Australian wildflowers can be similarly developed and grown in their gardens. By Nature's chance, most of the flora of Australia has developed in isolation from the rest of the world and we have inherited a range of spectacular plants that horticulturists throughout the world are turning to with interest and avarice. We are proud of Australian horticulturists such as Plant Growers Australia who are turning to our own flora and developing its export potential to adorn homes throughout the world. —Editor

Australian Daisy Study*

Rhodanthe anthemoides 'Paper Cascade' was selected six years ago by Esma Salkin and she has since had Plant Variety Rights for this plant assigned to her. She has generously decided to use the royalty money for further research into Australian daisies. Esma and husband Alf have spent many hundreds of hours in the bush assessing plant communities, recording information and bringing rare or interesting specimens back home for cultivation or conservation. 'Paper Cascade' will be PVR protected in Britain, Germany, Holland, USA, Japan and New Zealand where it will be used mostly as a pot plant rather than a garden specimen. The attractive trailing habit and beautiful pointed crimson buds which open into large, vivid white flowers make this plant both a novel and spectacular subject for containers and baskets. I also think it will perform well under northern hemisphere conditions as it is adapted to cold weather temperatures and relatively low light intensities. — **Sandy Salmon.**

Rhodanthe anthemoides 'Paper Cascade'. I collected this *Rhodanthe* in northern New South Wales while on the lookout for *R. anthemoides* 'Paper Baby'. This latter species is well known in the horticultural industry but its origin is obscure. I must admit I thought I had found it when I spied red buds. The inflorescence is quite different from *R. anthemoides* 'Paper Baby' which has a rounded bud and cupped flower head. The ruby-red bud of 'Paper Cascade' is pointed and hangs down, and the open flower head is "star-like", displaying brilliant white acute bracts. The leaves are blue-green.

This combination of pendent buds and white flowers against blue-green foliage attracts attention and is best seen in a hanging basket. My Italian neighbour is delighted with her basket and there was a burst of blooms on branchlets one metre long. It is thriving in a sheltered, shaded but well lit southerly aspect. My pot receives dappled shade to full sun, but is seated in a saucer of water. New growth appears in winter and I prune lightly to remove the unsightly bits, but the nursery propagating it prunes hard.

Rhodanthe anthemoides is a perennial species with a broad range extending from southern Queensland to Tasmania. There are two basic forms, branching and non-branching. The habitat is moist herb field to rocky escarpment. Moisture seems an essential prerequisite for growth. — **Esma Salkin**

***Australian Daisy Study** — These notes were taken from the newsletter of The Australian Daisy Study Group. As with all our study groups, this group comprises members from all parts of Australia who engage in correspondence to exchange seed, plants and experiences. The newsletters are a revelation, the three in 1993 yielding 54 pages of packed foolscap paper. The March 1994 newsletter reports a successful long weekend field trip. Membership enquiries should be directed through your state secretary listed inside the rear cover.

Propagation of Daisies from Seed

I use a mix of 50/50 coarse creek sand and peat moss in trays mulched with granite gravel and watered every fourth day. The granite appears to be hydrophobic and keeps water under the mulch. It does not act as a wick. The trays are placed outside and the seedlings never damp off under this regime. Freshly picked and sown seed of *Brachyscome parvula* gave almost 100% germination. I have developed a method for pricking out seedlings which provides a minimum root disturbance. Two 12 cm (5") pots are used one inside the other. The centre one has been cut into two parts vertically and holds the mix. When ready to pot on I lift out the centre pot carefully, let one side fall off and prick out the seedlings with ease. — **John Barrie** ■

Australian Daisies

by The Australian Daisy Study Group*

That have proven reliable daisies in cultivation

The following daisy species have proven reliable in cultivation. With careful naming and study of trial plantings, the group expects that Australian daisies will take their rightful place in world horticulture. Maintenance of woody perennial daisies involves cautious pruning. Plants marked with an asterisk (*) should be pruned only when new growth is well established at the base of the plant.

Perennial Daisies

Ammobium alatum — Ammobium. An erect, branching daisy 60–100 cm high with a basal rosette of large silvery leaves, 10–30 cm long and 5 cm wide. Flowerheads held in small terminal clusters are white and papery with a yellow centre. The angular silvery white stems are an attractive feature and this species dries well when picked in bud. In some districts, e.g., in alpine areas, it is an invasive weed.

Brachyscome angustifolia* var. *angustifolia — Stiff Daisy. A low, suckering species that thrives in an open sunny position. The majority of the narrow, lanceolate leaves, 3–5 cm long, have entire margins, but there may also be a few leaves with 2–3 acute teeth. Masses of bright pink-mauve or mauve flowerheads on erect stems appear from spring to autumn.

Brachyscome basaltica* var. *gracilis — Basalt Daisy. A rhizomatous perennial, 30–60 cm high, with sparse, grass-like leaves and white terminal flowerheads on long, slender stems. Ideal for water-logged or swampy soils.

*The Garden Design Study Group is compiling a list of native plants that have proved reliable in cultivation and has asked the Australian Daisy Study Group to recommend suitable daisies. Certain limitations were placed upon the choice of species:

1. Species should be readily available from nurseries or from SGAP growers.
2. Information on their cultivation should be easily obtainable from horticultural references.
3. The species chosen should be restricted to those suitable for the Eastern States.

Under the constraints of the above conditions the Study Group had to consider their recommendations carefully. A wider range could have been suggested, but many species are relatively new to cultivation and may not have been described in the literature.

Brachyscome diversifolia* var. *diversifolia — Tall Daisy, Large-headed Daisy. A widespread robust perennial, 30–60 cm high, with large white flowerheads, 3–7 cm wide, and a basal tuft of hairy, deeply-cut, lobed leaves. It likes an open sunny position and is moderately frost tolerant.

***Brachyscome formosa* 'Pilliga Posy'** — Pilliga Daisy (photo page 349). A prostrate suckering species with rounded, purplish green, lobed leaves. Another form, *B.* 'Pilliga Post', has cerise flowerheads, other naturally occurring forms have pale pink heads. *B. formosa* dies back under dry conditions, but regenerates rapidly after rain. With root protection and moisture flowering extends from spring to autumn.

***Brachyscome* 'Strawberry Mousse'**. A chance hybrid between *B. angustifolia* and *B. formosa* released by a Victorian nurseryman. It is a beautiful, low, floriferous shrub covered with large bright pink flowerheads. Lush green, lobed leaves complement the floral display.

Brachyscome* aff. *formosa. Dr P. S. Short, in his description of *B. formosa* (*Muelleria* 6(6), 1988), notes that *B. formosa* has close affinities with an unnamed taxon in eastern Victoria and southern New South Wales. Collections of this taxon have been referred to erroneously as *B. angustifolia* A. Cunn var. *heterophylla* (Benth.) Davis and *B. petrophila* Davis. Until the status of these collections is determined AD SG refers to them as *B. aff. formosa*. *B. aff. formosa* forms collected at Mount Drummer, Sydenham Inlet and other locations in east Gippsland have rounded lobed leaves, but there is a leaf variant with acute lobes from central Gippsland. They are prostrate, suckering plants with mauve flowerheads on short stems.

Brachyscome multifida. The type form, var. *multifida*, is a perennial with narrow, entire leaf segments and numerous mauve or pale pink flowerheads. There are many forms available, some shown in the photographs on pages 352–53. The forms widely available appear to have come from the variety *dilatata*. These include *B. multifida* 'Breakoday' and *B. multifida* 'Amethyst' which have deep purple-violet flowerheads. The latter tolerates hot summers and winter frosts. A form from Blackwood, Victoria, is one of the best white forms. All forms like sunny positions covering an area to 1 metre square.

Brachyscome nova-anglica — New England Daisy. Variable in habit, the best form is a small, branching bush with bright green, hairy, slightly toothed leaves. White flowerheads are numerous. Open sunny position. Seeds freely.

Brachyscome parvula* var. *parvula — Coast Daisy. A small plant with a basal tuft of green, fleshy leaves, 3.5–7 cm long, with an occasional lobe, and flowerheads on short stems from spring to autumn. The Otways (Vic.) form has pink-mauve rays, the Port Campbell (Vic.) form has bright pink rays and the Phillip Island (Vic.) form has pale pink rays. A white-flowered inland form from Huntly near Bendigo is 15–20 cm high and has a tuft of fine, mostly entire leaves. The branching stems bear a profusion of flowers over a long period.

Brachyscome radicans — Marsh Daisy. Stoloniferous, with leaves narrow, lanceolate, entire or with 1–4 linear lobes. The flowerheads are white. Plants bloom intermittently over summer. Suited to very wet spots, for example, a pot standing in a pool. It forms a thick ground cover but can be invasive.

Brachyscome segmentosa — Lord Howe Island Daisy. A robust, glabrous perennial, 0.5 × 0.5 m, with bright green, coarsely divided leaves. Large white flowerheads, 3–6.5 cm wide, are held aloft on stout stems. This species hybridises with a range of *brachyscome* species.

Brachyscome tadgellii — Syn. *B. nivalis* var. *alpina*. Stoloniferous alpine species well adapted to cultivation provided it has moisture and semi-shade. It has a small basal tuft of narrow, fleshy, entire leaves (occasionally with a few linear lobes) and white flowerheads on stout stems. Seed production is prolific.

Bracteantha bracteata (syn. *Helichrysum bracteatum*) — Golden Everlasting, Yellow Paper Daisy. There are many forms of this popular everlasting — annuals, perennials, prostrate forms and forms to over 1.5 m high. A selection of forms and cultivars is described in *Australian Plants* Vol. 15.

Bracteantha bracteata 'Dargan Hill Monarch' is a robust perennial with grey-green leaves and large golden flowerheads to 9 cm wide.

Bracteantha bracteata 'Princess of Wales' is a floriferous plant with golden flowerheads to 6 cm wide. Spent heads wither and lie hidden in the foliage. It is a presumed hybrid between *B. bracteata* 'Dargan Hill Monarch' and a coloured form.

Bracteantha papillosum (included in the *Bracteantha* complex pending revision). A Tasmanian endemic from eastern coastal cliffs and outer islands is an erect stout species to 1 m with white papery bracts relieved by a few pink outer bracts.

Bracteantha* sp. aff. *subundulata (syn. *Helichrysum* aff. *acuminatum*). A recently discovered Victorian species suited to wet situations. It is about 40 cm high, with pale green lanceolate leaves and a flowerhead with bright acute yellow bracts.

Bracteantha viscosa — 'Sticky Everlasting'. A floriferous branching daisy with leafy stems of fine lanceolate leaves and bright gold flowerheads 2–3 cm across. Pale lemon and deep orange forms are available.

Calocephalus citreus — 'Lemon Beauty Heads'. A tufted perennial has small lemon buttonheads at ends of long fine stems.

Calocephalus lacteus — 'Milky Beauty Heads'. A prostrate to low ground cover with milky-white globular heads. *Calocephalus* species dry well if picked just as the colour is developing.

Calotis cuneifolia — 'Bindieye'. An eye-catching small shrub to 30 cm covered with deep mauve flowers. See the photograph on page 349.

Calotis glandulosa. A hairy ascending herb about 20 cm high with pale green lobed leaves. Rays are mauve, pink or white.

Calotis scapigera. A stoloniferous herb to 35 cm with entire or slightly dentate linear leaves. Ray florets are white to lilac. It is suited to a hanging basket. Burrs can be a problem with *Calotis* so select an open sunny position with care.

Cassinia quinquefaria. A very attractive shrub 1–3 m high with slender leaves and a pendulous cluster of off-white flowerheads. It prefers sandy soils. Use as a cut flower. Pick in bud and preserve in glycerine or polyethylene glycol. Uptake of glycerine overnight gives a very pleasing result.

Chrysocephalum apiculatum* (syn. *Helichrysum apiculatum*) — 'Common Everlasting', 'Yellow Buttons'. This species is variable in leaf, colour, flowerhead and habit. It is summer flowering and a good ground cover for a sunny position. Consult your specialist nursery for the form best suited to your conditions. Colour photograph on page 356.

Chrysocephalum baxteri. See the photograph on page 361 and the description of the cultivar 'Midget' on page 374.



△ *Brachyscome formosa* 'Pilliga Daisy'. A selected form is sold as *Brachyscome* 'Pilliga Posy', a prostrate suckering species with rounded, purplish green, lobed leaves. Another form is sold as *Brachyscome* 'Pilliga Post' as it has cerise flowerheads. Photographs from Esma Salkin.

▽ *Calotis cuneifolia* 'Bindieye', a showy shrub to 30 cm covered in deep mauve flowers.



Chrysocephalum semipapposum* (syn. *Helichrysum semipapposum*) — 'Clustered Everlasting', 'Yellow Buttons'. This is a variable species with aromatic foliage and clustered golden flowerheads, smaller than for *Chrysocephalum apiculatum*. It is summer flowering and suckering forms can cover about 1 m × 1 m. It is excellent as a dried flower.

Helichrysum rutidolepis — 'Pale Everlasting'. A prostrate, suckering ground cover with thin silvery leaves. Heads are smaller 1.5–2 cm than the similar species *Helichrysum scorpioides*. Pale lemon flowers atop erect stems bloom in summer.

Leptorhynchus squamatus — 'Scaly Buttons'. A small button-type daisy about 20 cm high with erect flowering stems that emerge from a basal rosette of slightly hairy lanceolate leaves.

Leptorhynchus tenuifolius — 'Wiry Buttons'. A dainty button-type daisy with fine entire leaves and brown wiry stems.

Leucophyta brownii (syn. *Calocephalus brownii*) — 'Cushion Bush'. A rounded shrub 0.5–1 m with silvery, scaly leaves common on coastal dunes and headlands. A form from Esperance, WA is superior, with much longer leaf segments and more sinuous in outline.

Olearia — We have not recommended *Olearia* such as *O. phlogopappa* or *O. ramulosa*, as we find these species are prone to borer and are short-lived. *Olearia* species are easy to propagate from cuttings and gardeners should be prepared for some losses in order to keep a favourite species in cultivation. An additional advantage is that *O. phlogopappa* tends to self-sow and produce unexpected forms.

Ozothamnus alpinus (syn. *Helichrysum alpinum*) 'Alpine Everlasting'. A compact leafy shrub to 1 m with yellow tomentum. The flowerheads are a terminal cluster with white inner bracts and fawn, pink or ruby red outer bracts.

Ozothamnus costatifructum (syn. *Helichrysum costatifructum*). A Tasmanian endemic from eastern and southern coastal regions. It is a branching shrub 1–3 m high with small rounded leaves crowded along the stems. It is excellent for screen planting.

Ozothamnus ledifolius (syn. *Helichrysum ledifolium*). A Tasmanian endemic to 1 m with a white terminal cluster of flowerheads, outer bracts are red. Small leaves are dark glossy green above and tomentose and stocky with exudate beneath. It is very reliable in the Melbourne coastal sand belt and tolerates dry conditions in summer.

Podolepis jaceoides — 'Showy Podolepis'. A bright yellow daisy with fringed bracts arising from a basal tuft of long oblanceolate leaves.

Podolepis rugata — 'Pleated Podolepis'. This is a long flowering species up to 60 cm high. The basal tuft of leaves soon withers. The stem leaves are to 5 cm and the flowerhead 4 cm wide is bright yellow. The involucral bracts are wrinkled, hence the common name.

Pycnosorus chrysanthus (syn. *Craspedia chrysantha*) — 'Golden Billy Buttons', 'Yellow Drumstick'. A small branching perennial with pale green or grey-green leaves and flowerheads about 1.5 cm wide. It is excellent as a dried flower.

Pycnosorus globosus (syn. *Craspedia globosa*) — 'Drumsticks'. A perennial with a basal tuft of long linear leaves with 1–8 longitudinal veins. Flowering stems are tall to 120 cm and globular heads 8–35 mm wide. It is a good cut flower and when picked early in bud is very attractive dried.

Rhodanthe anthemoides (syn. *Helipterum anthemoides*) — 'Chamomile Sunray'. Delicately aromatic shrubs with small grey-green leaves on ascending or branching stems. A Queensland form (origin unknown) has non-branching stems to 50 cm high. The terminal white papery flowerheads are long flowering.

Rhodanthe anthemoides — 'Paper Baby' (syn. *Helipterum anthemoides* — 'Paper Baby'). This Sunray has branching stems, red buds and open cup-like flowers in winter.

Rhodanthe anthemoides — 'Paper Cascade' (syn. *Helipterum anthemoides* — 'Paper Cascade'). PVR. A selected form with deep ruby-red buds and open white starry flowerheads on cascading branching stems. It needs root protection, semi-shade and moisture.

Annual Daisies

Brachyscome bellidoides. A small white daisy 10–15 cm high with mid-green linear entire foliage.

Brachyscome iberidifolia — 'Swan River Daisy'. Similar to above but foliage is divided and rays can be white, mauve or purple. A selected form, 'Purple Splendour' grows to 40 cm high, has purple rays and yellow disc and is ideal for hanging baskets.

Bracteantha bracteata (syn. *Helichrysum bracteatum*) — 'Golden Everlasting'. This is a variable species. A Northern Tablelands form from NSW grows to about 1.5 m, has long flowering stems and is a good cut flower. Coloured hybrid forms are available and excellent for massed display.

Hyalosperma cotula (syn. *Helipterum cotula*) — 'Mayweed Sunray'. A small dainty paper daisy 10–15 cm high with linear slightly hairy leaves and white bracts and pink buds.

Hyalosperma praecox (syn. *Helipterum praecox*). Another small paper daisy with slender leaves 10–15 mm long. The papery bracts are white or yellow.

Hyalosperma simplex (syn. *Helipterum simplex*). Similar to above species but slightly larger in all characters. Papery bracts are white. There are two sub-species:

subsp. *simplex* — warty fruit, 1 mm long.

subsp. *graniticola* — smooth fruit. Habitat, loamy soil over granite rock.

Podolepis lessonli. A dainty small annual, 25–30 cm high with ovate stem-clasping leaves on brown wiry stems. The flowerheads are cup-shaped with silvery outer involucre bracts. When full open the florets spill over the 'edge'.

Rhodanthe chlorocephala subsp. *rosea* (syn. *Helipterum roseum*) — 'Rosy Sunray', 'Pink Paper-daisy'. An upright branching clump with grey-green leaves and stems. The flowerheads to 6 cm have white or pink to reddish papery bracts. A selected form has black centres. This daisy is easy to germinate from seed and grows well in a range of soils. It dries and wires well and is a good cut flower.

Rhodanthe diffusa subsp. *diffusa* (syn. *Helipterum diffusum*) — 'Ascending Sunray'. A long flowering attractive small floriferous and leafy daisy. The papery bracts are bright yellow.

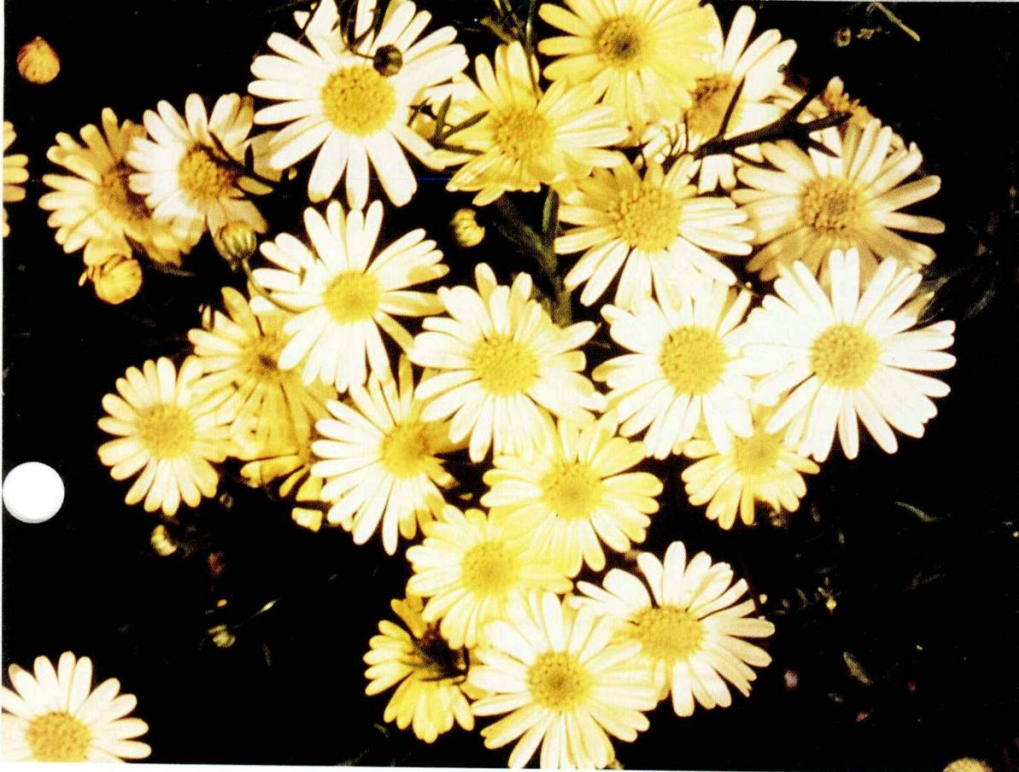


△ *Brachyscome multifida* 'Pink Haze'

▽ *Brachyscome lineariloba* naturally occurring near Pt Kenny, South Australia

Photograph by Glenn Woolcock





△ *Brachyscome multifida* 'Lemon Drops'



Rhodanthe humboldtiana (syn. *Helipterum humboldtianum*) — 'Golden Cluster Everlasting'. An erect branching annual with grey lance-shaped leaves. The terminal cluster of papery flowerheads is 2–6 cm across.

Rhodanthe manglesii (syn. *Helipterum manglesii*) 'Pink Sunray'. A slender branching annual with heart-shaped leaves and nodding silver buds opening to show pink or white papery bracts.

Schoenia cassiniana (syn. *Helichrysum cassinianum*) — 'Pink Cluster Everlasting'. A showy many stemmed daisy with a cluster of pink flowerheads (sometimes white). Foliage is aromatic.

Schoenia cassiniana 'Gabriele'. A selected form similar to the above.

Schoenia filifolia subsp. *filifolia* (syn. *Helichrysum filifolium*). A compact branching annual 20–30 cm high with fine linear leaves and citron-yellow flowerheads.

Schoenia filifolia subsp. *subulifolia* (syn. *Helichrysum subulifolium*) — 'Showy Everlasting'. This subspecies is taller, 30–50 cm high, leaves longer and wider and citron-yellow flowerheads 2–4 cm wide.

Growing well in Brisbane. Notes from Pat Shaw

Brachyscome aculeata — 'Hill Daisy'. An erect or ascending perennial to 45 cm with hairy lobed leaves. The white flowerheads are up to 4 cm wide.

Brachyscome microcarpa (Barulka Forest Reserve). This species requires further investigation. It is a branching small species to 30 cm with coarsely divided leaves and bright pink rays.

Brachyscome segmentosa 'Lord Howe Island Daisy'. A hardy *Brachyscome* 30–40 × 30–40 cm with deep green segmented leaves. Erect stems bear white flowerheads 2.5–4 cm across. Under cultivation it hybridises.

Brachyscome 'Valencia'. A cultivar registered with ACRA by Pat Shaw. It has large lobed leaves and large pink rays.

Olearia canescens. A daisy bush to 2 m high with grey felted leaves that are elliptic-ovate and entire. It has a terminal panicle of white flowers.

Spilanthes grandiflora. A mustard-yellow daisy with broad rays, reddish-purple stems and sparse long thin leaves.

Brachyscome whitei. An ascending hairy annual to 20 cm high with light green broadly lobed leaves. A distinctive feature is the pink rays fading to white at the disc.

Rhodanthe chlorocephala, *Rhodanthe manglesii* and *Schoenia filifolia* as described above. ■

A Horticultural Guide to Australian Plants

by SGAP Queensland

The latest set (9) is now available. Many years ago an enthusiastic group in Queensland decided on the perfect presentation — to produce a series of loose-leaf sheets with a large colour photograph of a wildflower on one side and the reverse side devoted to details of this plant such as a short, simple description, distribution, habitat and climatic tolerance, propagation, and a special section on horticultural features, cultivation, etc. This they have achieved with spectacular success. The full-page colour photographs are superb and the comments on the plants are invaluable. The range of plants presented is Australia-wide. The sheets have punched holes for filing in a ring binder, also available at \$6.00 plus \$1.80 postage.

The latest set (9) presents 64 species and is available for \$10.00 plus \$2.80 postage. Why not purchase this set and see the value. You will end up sending for the rest, the lot costing \$57.00 plus \$5.10 postage. Available from SGAP Queensland, P.O. Box 586, Fortitude Valley, Queensland 4006.

A Garden Of Birds

Attracting Birds to Australian Gardens

by Graham Pizzey*

"The aim of a good bird-garden should be to provide a diversity of levels and structures of vegetation, which will furnish feeding opportunities, shelter, refuge, roosting places and nest-sites. There should be at least one tall leafy tree or a high bare perch, to attract the passing trade and give a safe lookout over the garden before they risk coming down. And you will certainly want a plentiful supply of clean water in ponds or baths."

"When all these aspects have been seen to, but not before, you should think about providing artificial food and nest-boxes or hollows."

"A bird garden does not happen all at once. The important thing is to make a well-planned start. It need be no more than a dozen appropriate trees and shrubs at first. Get them planted, then as they grow, go on adding more species . . ."

To adequately plan a bird garden you need to appreciate the interaction between birds, insects and plants. This is described in such an interesting way by Graham Pizzey in his book "*A Garden Of Birds*", that the story becomes absorbing, a treasure of knowledge easily read by young and old. The green sugar factories for birds and the insects on which many live, are the plants, especially our *Eucalyptus* trees, and this transfer of energy from root to bird is a fascinating story on its own.

Blossoms and birds, honey eaters the most Australian birds of all, a parade of parrots, my own bird garden, all are entertainingly developed with details of feeding, behaviour and nesting habits.

You may choose the level of your involvement as a bird garden from a planned woodland to an assemblage of bird attracting plants. It may be that you are interested only in plants but you need birds as well to keep them well groomed, not chemical sprays.

*This is really a review of a book by Graham Pizzey of the above title, by the Editor, Graham's words being quoted. I regard the use of birds as vital to wildflower gardening and this book is the very best reference. It is a large 300-page book, normally \$30.00 but for a limited period \$20.00 if ordered by mail as directed inside our rear cover. The other book by Graham Pizzey, "*A Field Guide To The Birds Of Australia*", is available for \$30.00. ■

Bird Portraits on Postcards

by Ian Roberts

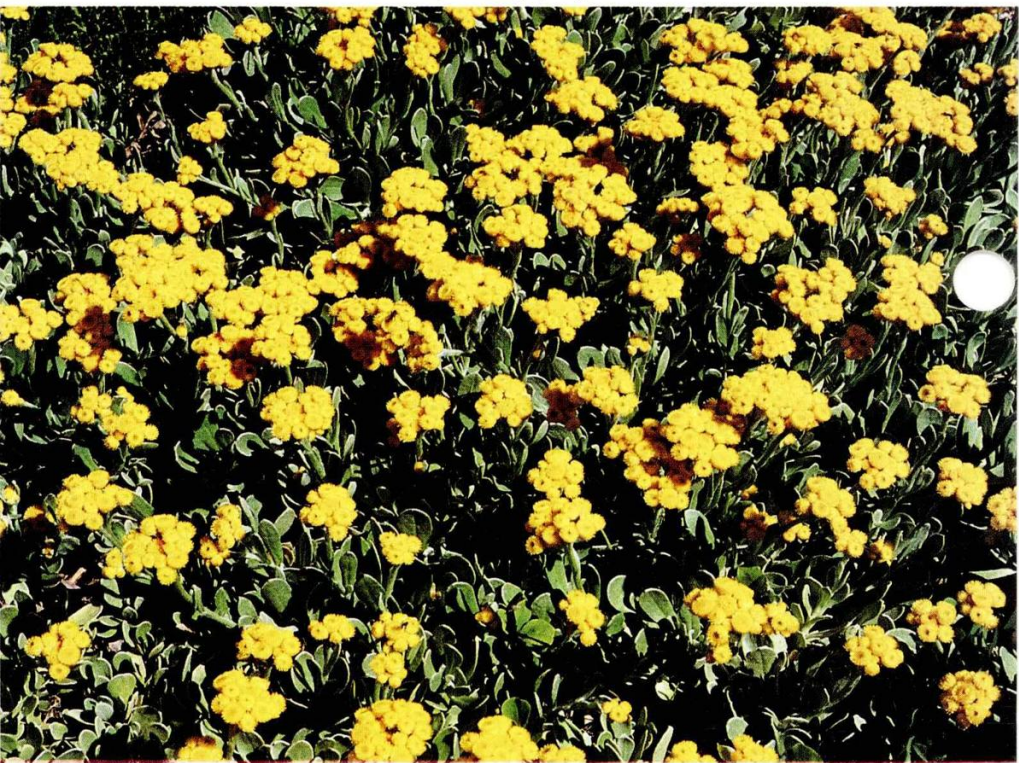
Study the painting on our front cover. Why not order some cards such as Zebra Finches on *Acacia notabilis*; Cockatiels on *Eucalyptus socialis*; Purple-backed Wrens on *Melaleuca glomerata*; Southern Emu Wrens on *Correa*; Firetail Finches on *Eucalyptus leucoxylon*; Grey Shrike Thrush on tea tree; New Holland Honeyeater on red flowering gum or Grey-fronted Honeyeater on *Cheiranthra alternifolia*. Information and brochures detailing limited edition prints and cards of these and other paintings by this artist can be obtained by writing to: Reply Paid 64, Medika Gallery, C/o P.O. Blyth, SA 5462.

The Bush — A Guide to the vegetated landscapes of Australia by Ian G. Read

The vegetation in a specific area is dependent upon the ecosystem and how this system has varied over the years due to climate and soil together with the past history of intervention by man. The author seeks to classify the many vegetation types found in Australia into 13 categories such as forest, woodland, scrub, heathland, herblands, sedge and grass types with further division into natural climatic/habitat/soil type zones. This breaks down to over 100 unique ecosystems for each of which the most prominent plants characterising the microsystem are given. ■



△ *Rhodanthe* 'Paper Cascade' growing in a pot for occasional use indoors.
▽ *Chrysocephalum apiculatum* (formerly *Helichrysum*), a prostrate suckering form ideal for garden cultivation. Photograph by Neil Marriott.





△ This garden scene features a pleasing mixture of exotics and Australian daisies. The border plants are *Rhodanthe* 'Paper Cascade' as also the large white flowered plant in the foreground. The purple flowered plant behind it is an exotic *Erica* 'Wittinga Gem', the lilies either side being dwarf drum lilies *Z. 'White Mischief'*. The pink shrub to the left is *Brachyscome* 'Pink Haze' and the red flowered plant to the extreme left-rear is *Boronia* 'Lipstick'.

◁ *Rhodanthe* 'Paper Cascade' growing in a basket almost down to the verandah rail.

Gardening in a Poor High-Alkaline Sand

by Ron Taylor, Adelaide — Reprinted from SGAP Journal of SGAP SA

Frustration with a soil of underburden sand of 9–9.5 pH overlying an ex-swamp peaty clay with underground limestone ridges has prompted these notes. The topsoil would not support any weed growth during the 12 week construction of my residence. I also noticed that when digging holes for my fence posts water was encountered in some locations at 1.4 m. More post-hole digs of 7 m plus, in random locations, gave me a rough outline of the below ground profile and the composition of the soil. The water table appeared to vary (due to the limestone ridges) from 1.4 m to 3 m. This information was later used to indicate where it was possible to grow the deeper rooting natives such as *Banksia* with reduced fear of being attacked by fungi due to wet feet.

The initial job was to ameliorate the soil's highly alkaline condition together with the low nutrient level so that I could grow a greater range of native plants. I learnt that the application of gypsum in reasonable quantities would bring the alkalinity down to 8.3 pH but no further. Much reading found one very common message — that copious quantities of compost would have the most beneficial and long-term effect in obtaining moisture retention and improvements in nutrient levels. Many earthworms were bred in one of the compost bins to assist in a more natural soil improvement.

My efforts were delayed temporarily when I checked the pH of my compost at 8–8.5. Obviously I had to change the composition of my compost heap. I had several suggestions as to methods of acidifying compost but my logic did not allow me to use them. For example, one publication advocated the addition of good quantities of pine needles. I have always believed that this material contains growth-inhibiting chemicals and I was not taking chances with that even if their composition was changed by the rotting process.

I began talking to staff of the State Herbarium, retired orchardists and nurserymen. There were many conflicting views and unusual practices suggested. By sifting through the advice and checking with further reading I came to the conclusion that all good "well-cooked" humus is slightly alkaline. Good humus is said to be right when it has a smell; sweet smells indicate alkalinity and sour smells indicate acidity. I could also expect my humus to be unusually alkaline if the ingredients I was using were grown on alkaline soils. I came to the conclusion that I should import some lawn cuttings from a known acid area so that my humus would contain a few of the deficient trace elements and a better proportion of the main minerals which my soil required. Dry cow pats from the local farmer finished the new mixture for my humus making.

However, I was still unhappy in that I was adding to my alkaline problem and not correcting it. Dusting sulphur (used as a fungicide) proved to be the answer. I found that adding the sulphur to the cooked-humus topsoil and gypsum at around 200 grams per square metre to a depth of 50 cm (before planting out) was lowering the pH by one point per application. It appeared preferable to leave the ground damp and fallow for 3–4 weeks to allow the fine sulphur powder to chemically change to its organic acid forms to give the pH correction I needed. A pH test at a depth of 10 cm after each waiting period indicated when I should stop.

I have since added sulphur but with great care and in small quantities to areas where established plants are now growing. Despite considerable investigation I have been unable to find an authority who could confirm that sulphur acting as a fungicide when freshly applied does not kill some of the mycorrhiza fungi which are of symbolic benefit to proteoid roots of the Proteaceae family.

I would also stress that I made sure that my humus was completely "cooked" before use to ensure that it would not continue to decompose within the soil and deprive the native plants of much needed nitrogen in such poor soil. The process has also been hastened by the addition of some acid sand in areas where the soil was at the highest pH level. Eighteen months later I now have good healthy specimens of *Banksia*, *Grevillea*, *Hakea*, *Isopogon* and *Crocea* growing in their chosen locations.

Before closing I would like to add that I have noticed that particular attention must be paid to the soil nutrient and mineral composition in the case of natives in the Leguminosae family. These plants fix their own nitrogen in both the soil and their own systems and I believe that too much humus and too rich soil can cause root damage due to nitrogen oversupply. In the heath areas of bushland it appears that the plants in this family provide the nourishment for the companion plants of other families such as Dilleniaceae and Epacridaceae. I am firmly of the view that there is a misconception that these heath areas consist of depauperate soils when in fact the Leguminosae family act as the fertilisers enabling the feeding plants in the other families to maintain a delicate balance. I have endeavoured to address these principles in the case of heathland plants such as *Pultenaea* and *Hibbertia* in my own garden. ■

Organic Mulches — Some Observations on their Effect

by Ray Holliday,
Adelaide

Popular garden articles and programmes constantly extol the virtues of mulching the garden. Particularly with those mulches that decompose, thereby adding organic matter to the soil and improving its structure, adding to the worm population, and protecting the soil from ravages of wind and rain. These same mulches, we are told, keep the soil cool and moist and greatly reduce the need to irrigate.

All fine useful advice, except for one problem — these mulches also prevent rain and water from sprinkler irrigation from reaching the soil. Irrigation can only be effective if placed beneath the mulch, such as drip irrigation or leaky hose. Certainly these forms of irrigation are efficient and use far less water than do sprinklers, but they have the problem of requiring high and frequent maintenance to keep them functioning well, and we are still missing out on natural rainfall thus being forced to install an irrigation system. Not a satisfactory situation in a garden we wish only to irrigate under extreme drought-stress conditions.

I have part of my garden mulched to a depth of 100 mm with a mulch consisting of partly composted lawn clippings, natural leaf fall, and chopped up prunings. Other parts have a thin mulch of approximately 10 mm of natural leaf and litter fall. The thinly mulched areas benefit from even the lightest of rains and can easily be effectively watered with sprinklers. In the heavily mulched areas the soil receives no moisture from light rains and cannot economically be watered by overhead sprinklers. I conducted a measured trial. With overhead watering in the 100 mm mulched area 30 mm of water was applied over 40 minutes. The moisture penetration into the mulch was 15 mm. The soil below remained totally dry and there was no run-off.

In nature the soils of high rainfall climates (e.g., rainforests), have a high organic content and are heavily protected by forest litter that rapidly deteriorates if the protective cover is removed. In arid regions there is very little mulch and quite different strategies are used for protecting the soils, such as an algal crust, gibber stones and, on the sand dunes, an outer later of dry sand.

Could it be that we should observe nature more closely in order to reduce garden water requirements? Our present use of organic matter and worms seems only to be effective with high water requirements. It certainly does not work in a climate such as Adelaide's where we have periods in excess of three months without useful rain. The best strategy to counter drought conditions would seem to be non-absorbent mulches such as chunky pine bark or gravel, and for the water-holding capacity of soils to be improved by digging organic matter such as compost into the soil prior to mulching. ■

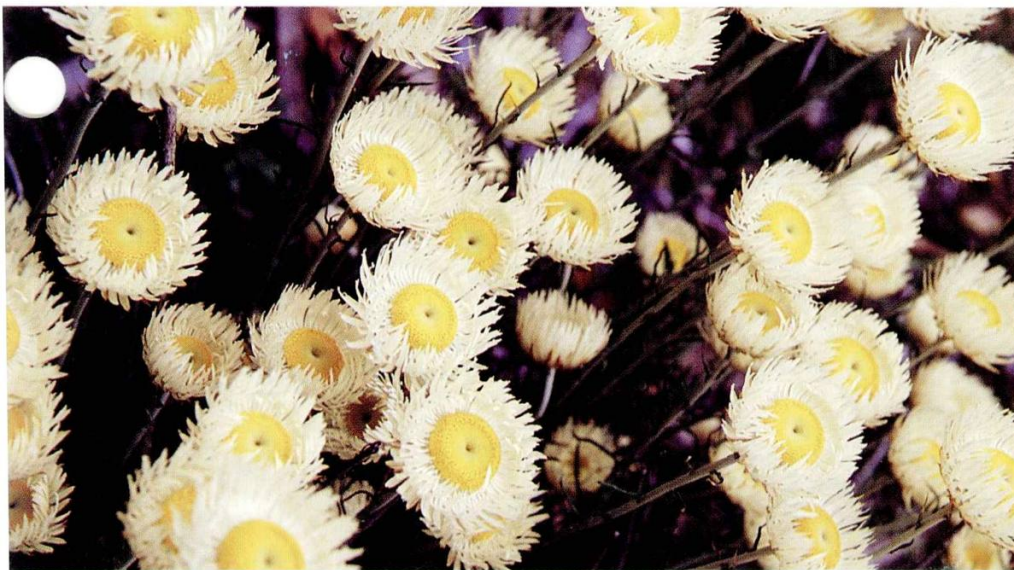


△ *Schoenia cassiniana* — Pink Cluster Everlasting. A showy plant with aromatic foliage.
▽ *Ozothamnus alpinus* — Alpine Everlasting, a compact leafy shrub to one metre.





△ *Schoenia filifolia* subsp. *subulifolia* — Showy Everlasting, a shrub 30–50 cm high.
 ▽ *Chrysocephalum baxteri*, a dwarf perennial herb with profuse flower heads 2–4 cm across, white, rarely pink and yellow. The registered cultivar 'Midget' is described on page 374. Photo by Colin Woolcock.



Mulches

A contribution to their effective use

by Kevin Handreck, South Australia

Australian Plants has contained many comments on mulches. Most comments have praised mulches, because they simulate the litter layer of forests, but there have been a few warnings about collar rot, plastics and acidity, and water repellence from raw sawdust. The author of one article found that thick organic mulches prevented all but the heaviest rains from reaching his soil, and eucalypt mulch had turned his soil into a completely non-wetting one. Another author, citing equally long experience (30 years), stated that he had not observed development of water repellence: all types of organic mulches allowed cool root runs, increased earthworm activity, easy weed pulling and increased soil organic matter. Who was right? In my opinion, both can be. Let me explain.

Litter in natural Australian ecosystems

We can learn much from a consideration of litter depth in different ecosystems. Depth depends on the relative rates of production and decomposition of organic materials. In tropical rainforests, production rates are high but decomposition rates are also high, so for much of the year there is little litter on the soil surface. This surface is nearly always moist, constantly shaded, held together by masses of roots and protected by understorey plants.

As one moves away from the tropics, the litter layer in rainforests increases in depth because of decreasing rates of decomposition, to the extent that in some Tasmanian forests, the tangle of litter and understorey shrubs forms an impenetrable barrier some metres thick.

As one goes to increasingly dry areas, total plant growth decreases so litter production also increases. It is highly seasonal, with maximum leaf fall in summer, which can be the wettest or the driest time of the year depending on where the ecosystem is. However, because the litter is wet for only limited periods, decomposition rate is also relatively low. The net result is that generally litter layers in dry areas are not as thick as in wetter cool areas, but at least in late summer they can be thicker than in tropical forests.

In non-tropical areas, it is generally found that litter layers are deepest in the wettest parts of a landscape, because of periods of anaerobic conditions in the litter due to waterlogging. This all suggests that the depth to which mulches are applied in gardens should, to some extent, match the local environment.

Dry areas — mulching

To apply a very thick mulch in a dry area to plants that will not be irrigated might well lead to the soil and hence plant roots getting little of the rain that does fall. They would get water flowing from the canopy down the stem, but not much else. I believe that in such a situation mulches should be no more than a few centimetres thick, and relatively coarse in texture. An increased mulch depth where irrigation water is applied will help conserve that which reaches the soil, but even then research suggests that there is no benefit to be obtained from a depth of more than about 6 cm.

Wet areas — mulching

A thick mulch in hot wet areas will allow plenty of water to reach the soil. It will soon rot down. But what is the point of mulching heavily if there is little need to conserve water? In cold wet areas, mulching can have detrimental effects on plant growth if the mulch prevents the soil from drying out naturally or if the mulch keeps the soil cooler than is needed by the plants being grown. Organic mulches can be particularly detrimental to plant growth in soakage areas and where frosts are severe.

In-between areas — mulching

These areas typically experience seasonal dry periods. Mulches will help conserve soil water so long as they are not so thick that they prevent all but the heaviest rains from reaching the soil. As a general rule, the finer the material of a mulch, the shallower should be its depth of application. Again, research suggests that optimum depths range from 2 to 3 cm for fine compost through 4–6 cm for chipped tree trimmings to 8 cm for bark nuggets. Thicker mulches will not significantly reduce soil temperature or evaporation of water. This was shown experimentally many years ago.

Water repellence of soils

Water repellence in soils ('non-wetting' soils) is caused by the coating of sand grains and organic particles with fungal excretions. Water repellence is therefore a result of the decomposition of organic matter in and on the soil. Clay soils tend not to be affected. In fact, water repellence is generally confined to soils with less than about 10% clay, but there are exceptions. Some highly organic soils (peats) often become water repellent on drying. Many of us have experienced the difficulty of wetting dry peat when making potting mix. Pine bark and peat-based potting mixes often show water-repellence.

Therefore, adding organic materials to sandy soils may lead to the production of water repellence. This repellence will not be noticed until you try to re-wet a soil whose surface has dried out. You will not notice any repellence if the soil under a mulch is kept constantly moist. Repellence is most likely to be noticed in situations where organic mulch has been applied to non-irrigated sandy soil. But even in such situations repellence may not be produced, while it may be produced in somewhat heavier soils.

Thus, some heavier soils can become water repellent through addition of amounts of organic materials that increase the organic matter content of their uppermost layer into the range of a peaty soil. That takes quite large additions, so water repellence is likely to develop only after some years of heavy additions. It might be worth remembering that under pre-European conditions, most bushland was probably burnt every 5–10 years, so the amount of organic matter in our soils rarely reached levels that can be attained through mulching.

Water repellence in sandy soils can be overcome by applying a dispersive (sodium-rich) clay (10–15 kg/m²), through the application each 6–12 months of specially formulated wetting agents (Aquasoil Wetter, WettaSoil, Saturaid) or through ensuring that once wet they remain wet. If application of organic materials worsens water repellence, you should either take one of the above actions or switch to a mineral mulch.



Banksia menziesii

by Philippa Nikulinsky

The painting above is on the cover of an exceptional book. The pages on the right hand side carry 22 large colour paintings (each twice the size of the one above) that trace the life of a *Banksia* flower head from emerging bud, to a head of *Banksia* buds, these developing into the *Banksia* head shown above where half the individual flower buds have opened, to the fully open head of flowers; next by pictures, the flowers mature and wither away leaving the cone where some fruit are forming, developing to the familiar cone with some fruit maturing, eventually opening to expel seed, the final painting being a germinating seed. The short discussion on the page opposite to each painting describes what is happening stage by stage, painting to painting, as the artist sees it, an artistic travel through life. Available on special offer for \$20, ordered as suggested inside the rear cover.

Plant pathogens in mulch materials

There is some possibility that uncomposted organic materials (such as chipped shrub and tree trimmings) might contain a sufficiently high level of a plant pathogen that mulched plants will be affected. This has apparently happened with Dutch Elm disease in Victoria. Trees in a Melbourne garden were killed recently, allegedly by *Armillaria* (a root-rotting fungus that can build up to high populations on the stumps and roots of dead trees) introduced in mulch. Unanswered question: Is the presence of this fungus a main reason for observations of collar rot when organic mulches are placed against or close to the stems and trunks?

Such problems are probably quite rare, but we should check the origin and content of any uncomposted materials that are offered to us.

Plant nutrients in mulches

The nutrients in organic mulches will generally be beneficial to our plants. However, those who grow proteaceous species and other Australian native plants that are sensitive to phosphorus should avoid mulches containing poultry manures, mushroom composts and other materials that are relatively rich in phosphorus. Even mulches made from various exotic species may contain too much phosphorus for the more sensitive species. (Eucalypt litter may contain only 0.05% phosphorus, but that from exotic species may contain 0.3%).

Another problem with some mulches

Some materials sold as mulches and soil conditioners contain considerable amounts of limestone. Some spent mushroom composts are like this. At least one so-called seaweed mulch (actually seagrass) can contain 10% or more fine limestone sand. It harms plants that need acid soils.

Conclusion

Organic mulches are generally great for soils and plants, but their application should be tempered by consideration of natural ecosystems, local climate, soil type, irrigation practice, plant needs and experience. ■

Gardening Down-under

by Kevin Handreck, CSIRO
Review by W. H. Payne

A strange title for a book but it is about what it says, the care and attention of the soil below ground level. We cannot see down there. We plant our plants hoping that conditions down there are suitable. Really, the conditions below ground level are critical to the health of our plants, but we continue to live on hope and ignorance.

This very practical book allows us to eliminate the guesswork and transform hope to practical confidence. The soil condition below the surface is a very complex area of living organisms and food for them and the plants. This hidden world is revealed to us in such a practical, down-to-earth way that anyone can follow the simple advice and then, if they wish, read about the technical reasons for adopting this advice. Technical? This word frightens some people. The technical reasons are given but in such a clear, well illustrated way that no-one will have any trouble in following them.

Why waste so much of our valuable space in a sales pitch for a book? Because this information is presented exactly the way I would like to do it in *Australian Plants* if I had the space and colour presentation facilities used to produce the book. It is not just written for the growing of Australian wildflowers, but for the cultivation of all flowering plants and especially the home vegetable garden. The same principles apply. It is time that people realised that our native flora can and should be grown just like the plants from other parts of the world. Certainly there are some additional precautions to be taken because of the way some of our plants have evolved to survive, but this applies only to a small section of our flora; **most love good garden conditions.**

How to achieve good garden conditions is described in the book:

1. Green plants; photosynthesis, plant roots, mycorrhizal fungi, effects of temperature.
2. Soils, formation; texture, structure, earth worms, no-dig gardening, etc.
3. Chemistry for gardeners; elements and atoms, acidity, altering pH, etc.
4. Dealing with dead plants; mulch, composting, inside a compost heap, etc.
5. Organic matter; using composts, facts about humus, etc.
6. Understanding fertilisers; organic and chemical fertilisers, plant nutrition.
7. Using fertilisers; new gardens, how much?, foliar feeding, etc.
8. Water; soil as a reservoir, water-saving hints, watering systems, etc.
9. Gardening with salty water.
10. Lawns; grasses, soil preparation, planting, fertilising, etc.
11. Growing plants in pots; starting off, watering, potting mixes, etc.
12. Fertilisers for plants in pots; recipes, fertiliser useage, etc.
13. Gardening in pots; the pH, porosity, wettability and mix.

Available by mail for \$34.95 as indicated inside our rear cover. ■

Growing Wildflowers

Do you wonder about this?

Kevin Handreck, FAIH, CSIRO, Adelaide

Our editor has asked me to comment on the following:¹

1. "The use of gypsum to reduce soil alkalinity"

Alkalinity in soils is caused by the presence of calcium, magnesium and sodium bicarbonates and carbonates. When there is no sodium present, the pH is buffered (kept constant) at about 8.3 by calcium carbonate. Higher pH values than this indicate the presence of sodium carbonate/bicarbonate. Addition of gypsum (calcium sulphate) to such a soil will cause the formation of calcium carbonate and sodium sulphate, so the pH of the soil is lowered. Leaching of the sodium sulphate from the upper part of the soil will ensure that its pH will remain at 8.3.

2. "Earthworms with compost"

Compost will always improve the structure of a mineral soil. Whether earthworms in the compost will contribute to this process depends on several things. If the earthworms were initially from the garden soil, introducing them into a compost heap is a good way of rapidly producing more of them for addition to the soil. However, often the earthworms (e.g., tiger worms) that thrive in compost heaps do not thrive in garden soils. So their addition to a mineral soil will not do much to improve the soil.

¹The exceptionally fine articles in this and recent issues have given me the excuse to send a list of questions that have been concerning me and, it appears, many others. Kevin Handreck has commented very highly on the quality of the articles published in *Australian Plants*. These have been a valuable information source to professional horticulturists. He is anxious that his comments complement those recorded by others and not be taken as any criticism.

3. "The pH of compost"

Matured compost made from general garden "wastes" tends to have a pH of close to neutrality (around 7), irrespective of what it is made from. Sometimes it comes out slightly acid and sometimes slightly alkaline. However, when the water used to moisten the heap is alkaline, it is common for the pH of the compost to be 8–8.5.

4. "The effect of growth-inhibiting chemicals from materials such as pine needles"

Many living plants contain chemicals that are produced as a protection against insects, caterpillars and micro-organisms. Some of these chemicals remain in prunings and dead leaves. The roots of young plants can be harmed by these chemicals if they come into contact with one another — as when untreated wood wastes form part of a potting mix or when they are leached into a soil from mulch. These chemicals are quickly (over several weeks) destroyed during composting and more slowly as the plant materials decompose in or on the soil.

5. "The use of lawn cuttings as a source of nutrition"

All plant materials contain all trace elements. Lawn grasses may have a higher concentration of most of them (iron, manganese, copper, zinc, boron) when they are grown in acid rather than alkaline soil, but they may not if the acid soil contains little of a particular trace element. But even if humus made from the grasses from the acid area did have high concentrations of these trace elements, the high pH of an alkaline soil will soon reduce their availability to plants. The organic matter can protect them to some extent from this reduction in availability, but the only sure way of overcoming trace element deficiencies in plants that are not adapted to alkaline soils is to acidify the soil. And the only easy way of doing that is to add sulphur. Dusting sulphur, being fine, works faster than does agricultural sulphur, but weight for weight they both do the same job in the end.

6. "Will sulphur acting as a fungicide when freshly applied kill some of the mycorrhizal fungi which are of symbiotic benefit to many plants or affect the proteoid roots of the Proteaceae family"

"Authorities" have told me that they do not know what effect elemental sulphur would have on mycorrhizal fungi. One comment was that as sulphur will normally be added to alkaline soils, any effect of the sulphur or the sulphuric acid produced from it would be short-lived. It was thought that there would probably not be any effect on existing mycorrhizas.

7. "Mycorrhizal fungi and proteoid roots"

It is a fallacy that mycorrhizal fungi have anything to do with the formation of proteoid roots. In fact, those plants that form proteoid root clusters or their equivalents apparently do not form associations with mycorrhizal fungi. Proteoid root clusters and mycorrhizas are two independent mechanisms that plants have for increasing their ability to exploit the nutrient reserves in soils that are poorly endowed with phosphorus. Proteoid roots are formed mainly in response to a very low concentration of phosphorus around a particular piece of root. However, there is some evidence that the formation of proteoid roots is enhanced by the presence of soil micro-organisms, but this effect is non-specific.

8. "If compost is not completely 'cooked' before use and hence continues to decompose within the soil, would it deprive my plants of much needed nitrogen?"

The more mature (highly decomposed = "cooked") a compost, the higher will its nitrogen content be in relation to its carbon content — up to a certain point. Woody materials can have something like 500 times more carbon than nitrogen (their C/N ratio is something like 500). On the other hand, fresh green materials such as lawn clippings may have a C/N ratio of 20. With both of these materials, decomposition will reduce the C/N ratio (through production of carbon dioxide, which escapes into the atmosphere). Once the C/N ratio declines to about 15, further decomposition will release nitrogen in forms that are available to plants. Even "cooked" compost with a C/N ratio of 15 will continue to decompose in the soil, but this decomposition will aid plant growth.

On the other hand, compost made from woody materials may still have a C/N ratio of 30–80, so during its continuing decomposition after addition to a soil, soluble nitrogen will be consumed and hence removed from the reach of plant roots. Most of us cannot be bothered making hot compost heaps that need frequent turning to keep them going. We just let the materials rot away in their own good time. That is what happens in litter layers in forests and bushlands. For gardens, the only drawback with slow cool composting is that weed seeds and some plant pathogens are not all killed.

9. "The use of mulching machines — is the product too fresh for mulching?"

Fresh compost (still plenty of wood pieces and half decomposed leaves) makes an excellent mulch. If it is to be dug into the soil, it should be accompanied with some fertiliser nitrogen because of the continuing decomposition of high-carbon woody material.

10. "Legumes — how do they fix their own nitrogen?"

Legumes do not fix their own nitrogen. What happens is that *Rhizobium* bacteria in the soil invade their roots and form a symbiotic (mutual self-help) relationship with them: the plant supplies the bacterial colonies (seen as nodules on the roots) with sugars produced during photosynthesis while the bacteria fix nitrogen gas from the atmosphere into nitrogen compounds that the plant can use.

11. "There is a concern that legumes hog available nitrogen, depriving other plants"

This concern has been expressed in previous issues but is not true. In normal soil situations, legumes are net contributors of nitrogen. Sure, they do take up some soluble nitrogen from the soil, but if they have effective nodules this amount will be small compared with the amount fixed in these nodules. A small percentage of the nitrogen fixed in the nodules leaks out into the soil and becomes available to other plants in the same season. However, most of the nitrogen contributed by legumes is made available to other plants through dead roots and shed leaves. That means that it becomes available slowly over some years as these residues decompose in the soil or on its surface. Typically, in the first year of decomposition of litter from herbaceous plants, something like 20% of the nitrogen will be released, with decreasing proportions in subsequent years. First release from woody litter will be delayed for a year or two.

12. "Heath areas consist of depauperate soils and need plants of the legume family to act as the fertilisers"

Infertility in soils can have several causes. Plant growth is often poor on soils of poor physical structure, simply because roots have difficulty in growing through them because of high strength or waterlogging. These soils can be considered infertile. Plant growth is poor on soils that are poorly endowed with just one nutrient element. For example, soils that naturally had low levels of molybdenum were considered to be infertile until they were supplied with this element making highly productive soils.

So it is with heathland soils: they are all highly deficient in phosphorus. They also happen to have low concentrations of nitrogen, but this is a consequence of their usually sandy texture and low organic matter content. Certainly legumes are present in them, but the total amount of nitrogen fixed is severely limited by the low concentration of phosphorus. Add phosphorus and the plants grow faster, fix more nitrogen — and die sooner. The seedlings of those plants do not need much phosphorus; the extreme example is proteaceous plants, that may be killed by the extra phosphorus.

13. "Patons Native Plant Food"

This fertiliser contains 8.2% nitrogen, 1.9% phosphorus and 5.2% potassium. Most of the nitrogen is present in the ammonium (sulphate?) and urea forms, so this fertiliser will acidify soils. The phosphorus is all either citrate soluble or citrate insoluble (presumably from rock phosphate). This phosphorus will be only slowly available to plants, so it is unlikely to have anything other than a positive effect on the growth rate of most native plants.

14. "Is there a cheaper alternative to Osmocote and Nutricote?"

I have never condoned the application of these relatively expensive products to home garden soils. I recall having discussions with the advertising people when Osmocote for gardens was being launched. Of course they did what they wanted to do, but I had my say. For general garden use, the powdered or granular NPK fertilisers based on superphosphate, ammonium sulphate, urea and potassium chloride or sulphate are by far the cheapest source of these nutrients. These fertilisers plus compost are all that is needed. For situations where phosphorus is not needed, mixtures of urea, ammonium sulphate and potassium salts can be made, as per the recipes in *Gardening Down-under*. The need for trace elements is relatively rare.

15. "Finally, one issue records spectacular results with a desert plant, *Eremophila*, planted in almost pure fresh horse manure"

Eremophila do not appear to be particularly sensitive to phosphorus, so I am not surprised that they grow well in horse manure. Other non-P-sensitive plants would also behave similarly. I would expect the high nitrogen supply of the manure, relative to natural soil, to shorten the lives of the plants. P-sensitive seedlings might not survive.

16. "Special message for native plant gardeners?"

The first thing that comes to mind is "Do not pamper them". They might respond to a little fertiliser to get them going quickly, but any more later is likely to produce so much growth that they will get too big and either need frequent pruning, may fall over or will die early.

Pampering them with too much water can be a recipe for death. Drippers are a menace, except (perhaps) during establishment. ■

Wildflower Research — 1995

by W. H. Payne, Director
Australian Flora Foundation

1. *Thryptomene* — Cultivation/Pathogen control

The viability of the commercial *Thryptomene* industry is threatened by the root rot pathogen, *Phytophthora cinnamomi*. At present there are no economically feasible control measures. The primary aim of this project is to investigate the effect of soil amendments, in particular chicken manure, a cheap and a widely available waste product, on the incidence and severity of the disease in pot trials. It has been found that chicken manure is effective against diseases of other plants caused by this pathogen. The effect is apparently associated with an increase in the organic matter of the soil, and a corresponding increase in the biological activity. These increases create an unfavourable environment for the pathogen. These trials will lead to field experiments. Our ultimate goal is to develop an integrated disease management strategy for *Thryptomene* growers in particular and associated cultural practices. Funding required for 1995, \$4,100.

2. *Persoonia* — Propagation

Many Australian Proteaceae plants have potential as floricultural crops. Several *Persoonia* spp. are being used as a "filler" by florists in the domestic market, and have the potential to supply the export market. Problems with propagation prevent commercial cultivation. This research is investigating the propagation of *Persoonia virgata* with the long-term goal of replacing bush harvesting with commercially produced product. Vegetative propagation using cuttings is desired as it maintains genetic uniformity of selected elite types and research will investigate methods of achieving this. Funding required for 1995, \$3,839.

3. Epacridaceae, *Epacris*, *Astroloma*, *Richea*, etc. — Propagation

Members of the family Epacridaceae are important components of natural ecosystems, but many are not sold widely commercially because of problems in their propagation. Because of seed dormancy, the plants are usually propagated by tip cuttings, but success is low and variable. Commercial nurseries surveyed experienced a very low strike rate and variability in survival rate at different times of the year. Some species and genera, e.g., in *Epacris*, *Astroloma*, *Brachyloma*, *Leucopogon* and *Richea* are not propagated due to lack of success. If a number of these "difficult" plants could be propagated successfully, there is great potential for expansion of the commercialisation of the epacrids and their propagation for replanting in remnant vegetation.

The study will therefore investigate the importance of the mycorrhizal relationships of selected members of the family Epacridaceae to rooting and establishment of cuttings (and seedlings, if possible), in order to increase the ease and success of their propagation and planting out. In particular, it will use cross-inoculation techniques to determine the type(s) of epacrid mycorrhizae which infect selected epacrid host plants from different environments and how important they are in establishment for horticultural and revegetation purposes. Funding required for 1995, \$1,100.

Plant Research — Wildflower propagation, cultivation and conservation

The projects above are those selected by the Australian Flora Foundation for funding in 1995. The research proposals by competent scientists have been carefully studied by the Research Committee and approved. Readers are invited to make a donation towards the cost of one of these research projects, donations to be sent to the Australian Flora Foundation Inc., GPO Box 205, Sydney 2001.

4. Nitrogen Availability for Optimum Plant Growth

Understanding of nitrogen assimilation in plant roots has important implications with respect to successful management of forest, agricultural and natural communities in nutrient-poor soils. It is also essential to the rehabilitation of degraded sites. Nitrogen acquisition, because of its accumulation in cell proteins, must be closely linked to growth and other physiological processes, particularly photosynthesis. Improvements in nitrogen acquisition are likely to enhance plant productivity in nutrient poor soils and an understanding of how mycorrhization affects assimilatory processes will provide valuable information with respect to growth of timber and crops generally. The project will undertake field determinations of the extent to which mineral and organic forms of nitrogen are significant in soils dominated by two contrasting species: *Eucalyptus grandis* and *E. maculata*. This will be used to place laboratory-based determinations of the nitrogen metabolism of both *Eucalyptus* seedlings and a range of mycorrhizal fungi in an ecological context. Funding required for 1995, \$3,100.

5. Wildflowers and Ants, an association using Euphorbs, *Adriana*

Many plants in the Euphorbiaceae are involved in associations with ants from which they appear to derive some degree of protection from herbivores. Plants in such associations range from species that simply provide ants with nectar from extra-floral nectaries to full "myrmecophytes" that provide domiciles or nest-sites within the plant body. However, another potentially widespread association between ants and euphorbs — that between ants and euphorb seeds — has so far been little studied. The seeds of many euphorb species have an appendage on the seeds known as a caruncle, the function of which remains largely uninvestigated. The study is to experimentally examine the function of the caruncle on the seeds of plants in the Australian endemic euphorb genus *Adriana*. If the common occurrence of the caruncle is an indicator of the widespread occurrence of myrmecochory (seed dispersal by ants) among euphorbs, then since ant communities are very susceptible to change following habitat disturbance, we believe that understanding the role of ants in the dispersal of *Adriana* (and of other euphorb) seeds will be very useful for the conservation of plants in this family. It may well prove that the conservation of *Adriana* and of other euphorbs will also depend upon the concurrent conservation of particular seed-dispersing ant species. Funding required for 1995, \$2,800.

6. Soft Tree Fern *Dicksonia antarctica* — Propagation and Commercial Cultivation versus Field Harvest

The largely uncontrolled commercial harvest of Soft Tree Fern *Dicksonia antarctica* in moist forests of Tasmania has prompted this research on the regeneration biology, ecophysiology and potential silviculture of this important, hitherto poorly studied species. Preliminary studies of the biology and ecophysiology of *Dicksonia* in 1992–93 will support the proposed laboratory, nursery and field trials. These will lead to conservation of the Soft Tree Fern in the wild and to sustainable cultivation for domestic and export markets. By propagation and silvicultural management of the species as an understorey component of *Eucalyptus* plantations, the University and industry hope to derive an *economic* alternative to gradually replace present savage harvest of the fern in Tasmania. This is a co-operative effort between a university, commercial marketers of Soft Tree Fern, the plant nursery industry and private forest growers, all of whom are contributing. Here is your chance to make a major impact on conservation. Funding required for 1995, \$4,200. ■

Cultivars from Wildflowers

by W. H. Payne

The following plant cultivars have been registered with the Australian Cultivar Registration Authority.

***Acacia acinacea* 'Ruby Tips'** was selected from the wild in Kingowen State Forest, Victoria. It is a small to medium shrub; branches often arching, phyllodes 0.5–2.5 cm × 0.5–1 cm, oblong or oval, smooth or hairy, dense, each with a distinctively recurved point; flower-heads globular, small and golden yellow, profuse; peduncles 1–2 per axil; pods 2–5 cm × up to 0.3 cm, curved or straight, slightly constricted between seeds. The distinguishing feature of this cultivar is the bright red colour of the new growth (59A).

It grows in dry or moist, well drained gravels and soils, but adapts to heavy clays. It is low growing suckering to provide dense ground cover with age. Likes dappled shade, partial or full sun. A widely planted ornamental that is also suitable for low windbreaks. Frost tolerant and moderately drought resistant.

***Anigozanthos* 'Patricia'** arose as a seedling of unknown parentage including *A. flavidus*. The leaves are a glossy green to 20 cm long; inflorescence to 0.6 m tall and branched between four and 10 times, lower stem green and sparsely covered with red hairs, becoming more dense closer to the flowers giving red brown colour; individual flowers to 4 cm long, overall colour effect a dull brown but a brighter red at the base of unopened perianth tube; flowering season September–November in Western Australia.

It is semi-drought hardy and is resistant to ink disease. Previously known as *Anigozanthos* 'Mister X' and *Anigozanthos* 'Mini X'.

***Diplarrena latifolia* 'Amethyst Fairy'** has been selected for the intense purple colouring on the inner perianth members and the purple shading on the outer perianth members. It is a tussock-like perennial herb 300–400 mm tall by 450 mm across with dense mid-green straplike foliage. The flowers are borne in the spring and are up to 60 mm across. The flowers are an intense purple in the centre of the flower (17B), with this colouration spreading in striations to the outer perianth parts. Although each flower only lasts one day, they are produced in quantity to give a good display.

Tested for six years at Longley in Tasmania, it has proved to be frost hardy but benefits from supplementary watering during the warmer months of the year. It grows well in semi-shade or sun in a well drained soil.

***Eucryphia lucida* 'Ballerina'** was selected from the wild in Western Tasmania. It is similar to the species, but the flower size, at 3 cm, is towards the larger end of those recorded for the species. The flowers are shaded from very pale pink inside (36B) to darker pink edges (54C) with crimson (53C) stamens. The colour of the flowers is similar to those of *E. lucida* 'Pink Cloud', but the stamens are crimson, giving the appearance of a crimson centre. Filaments are white to pale pink with base red (53C). Petals: outer margin, close to red (54C), inner margin very pale pink (36B).

The species is generally hardy and reliable in temperate climates. Plants respond well to extra water during the dryer seasons of the year. Pruning after flowering is beneficial.



△ *Diplarrena latifolia* 'Amethyst Fairy' — Selected because of the striking flower colour, this lily-like plant 300–400 mm tall is the perfect replacement for the lilies in the garden plot shown on page 357.

▽ *Eucryphia lucida* 'Ballerina' was selected for its delicate pink flowers. Known as Leatherwood in Tasmania, this small tree is grown world wide in horticulture. Photo by K. Gillanders.



Callistemon 'Tin-sal Glow' selected by Mrs E. J. Morgan this is an F2 hybrid (bee pollinated) of *Callistemon 'Glasshouse Country'* (*C. recurvus* × *C. salignus*). It has a fairly open habit, 3–5 m tall, 1.5 m wide, many-stemmed with a lignotuber-like base. Bark light grey, fissured. New growth pink. Spike moderately open, c. 3.5 cm wide; axis hairy at first. Leaves narrowly linear to oblanceolate, (30-)35–55 mm long, c. 3.2–7.7 mm wide, margins slightly recurved; reticulate venation clearly visible. Stamens c. 48–54, c. 15–21 mm long, pinkish at the tips (52A) almost white at the base. Anthers yellow.

Characterised by the “glowing” appearance of the new growth and flower spikes (produced by the pale stamen bases) it differs from the parent (*C. 'Glasshouse Country'*) in: the pinkish, not silvery green, new growth; greater red colouration in the flower and shorter flower spikes (c. 35–55 mm not 50–55 (–70) mm). It differs from *C. recurvus* with paler flower and leaf colour, mostly longer leaves and more widespreading habit.

A prolific flowerer mainly in spring and autumn. Resistant to drought; fairly resistant to frost. No synonyms.

Chamaelucium uncinatum 'Purple Pride' is a cultivar selection from a home garden in Nedlands, Western Australia. It is a moderately dense bushy shrub to 4 m high and 3 m wide, becoming more open with age, unless pruned. Leaves medium to dark green, hooked at the end to 32 mm long by 1.5 to 2 mm across. Terminal flowers in clusters are two-tone, dark and light purple, 17 mm to 20 mm across. Fresh flowers, petals deep red purple (71A), staminal collar red purple (69C), centre greyed orange (181B). Mid-aged flowers, petals purple (76A), staminal collar purple (76C), centre greyed orange (177D). Old flowers, petals purple (76C), staminal collar purple (76C), centre greyed orange (177D). Flowering period in Western Australia, June to October.

Chrysocephalum baxteri 'Midget' arose as a chance seedling in a batch of seed collected near the summit of Mt Oberon, Wilson's Promontory, Victoria. It is a leafy, compact, low shrub, 15 cm high by 30 cm wide, with very small white everlasting flowerheads with yellow discs. As the shrub matures it develops woody basal stems. Leaves 1.5–4 mm long by 0.75 mm wide, alternate, sessile, recurved, apex obtuse. Upper surfaces of leaves glabrous (141B), lower surface tomentose (190D) flowering stem 5–7 cm long, flowerhead 10–15 mm across. The rays are fringed. Flowerheads are yellow-orange (17C), solitary and terminal. Outer involucre bracts are tan in colour (172C). Flowering period is spring followed by a brief second period of blooms in January when flowerheads are smaller. It has all the characteristics of the usual forms of *C. baxteri* being distinguished by the diminutive size of all the characters of the plant — leaves, rays, flowerhead and fruit.

The naturally occurring *Chrysocephalum baxteri* is shown in the photograph on page 361.

The cultivar has been mainly tested as a pot plant in Melbourne over 4–5 years. It does not tolerate excessively open cold and wet conditions. At Shepparton, Victoria, it has been trialed in a garden. It is growing in a sheltered north-westerly aspect. This region is subject to severe frosts. Maintenance is minimal, slow release fertiliser is used twice annually and all dead branchlets are pruned off. The seed head is attacked by insects.

This report will be continued in our next issue.

The Names of Acacias

LET'S GET IT STRAIGHT

by Lawrie Johnson

Norman Hall and I wrote our little book "The Names of Acacias of New South Wales, with a Guide to Pronunciation of Botanical Names" with the hope that it would be useful to amateurs (and indeed some professionals) with an intelligent interest in plant names, and would give some rational guidance on how to pronounce them.

From my contacts, I believe we were right not to underestimate the serious interest of many people in these subjects, and their ability and willingness to work a little at them, and to understand both linguistic and scientific principles.

This belief stands, despite the confused and confusing review in *Australian Plants* for June 1993, which displays both the "tall poppy syndrome" and downright obscurantism. I cannot believe that members of SGAP, many of whom are themselves professionals in other spheres (and some, indeed, in aspects of botany), see themselves as they are implied to be by such expressions (quoted from the review) as "ignorant John Citizen", "compelled to toe the line drawn by Big Brother", or offending "the purist". These last two ominous figures are presumably the botanists, who are serious scientists in their own work, but are amateurs or "John Citizen" just like everyone else in other fields. I am myself an amateur in linguistics, but see no need to be cantankerous with experts for that reason.

Reviewers, to be respected, need to read a sufficient amount of the books they review to understand their message and not to misrepresent or misquote. The not too difficult alternative is to pass the job on to someone else who can or will do these things.

Specific points that need correction are:

- 1 "Latin" (with a capital L), not the continentalism "latin", is standard English (not "english") usage, as can be seen from any respectable dictionary or well-edited publication. The review might have given us credit for knowing what we were doing in this usage.
- 2 The mark ` is a *grave* accent, not a "diaeresis", and is used in our book, as in many others, to distinguish a long accented vowel from a short one (marked by the *acute* accent ´). This (a) is clearly explained in the book, (b) has not "fallen into misuse (sic! 'disuse' is meant)" where there is a relevant intention, and (c) its use will not be "lost to most" if they read what is given with even the slightest serious attention.
- 3 The pronunciations written out (as they are whenever doubt might enter) as, for instance, "brackeeSTAKEEea" are in no way "exceptions".
- 4 It seems quite clear to me what "market the book is aimed at", namely people who are interested in its content as indicated by the title, by Dr Barbara Briggs's intelligent and helpful foreword, and by the introduction.
- 5 The whole last paragraph of the review is a mish-mash of confusion and emotionalism. It seems to have been provoked by our comments about the already well-publicised possibility that most Australian wattles will become known as *Racosperma*. They will **certainly** be known as something other than *Acacia*, which will stay with a few Australian species and hundreds from other continents. The origin of the name *Acacia* is from the eastern Mediterranean, and its application to the main Australian group is a result of inadequate knowledge and understanding almost two centuries ago. Those who want to know more about this subject are referred to our section on it (clearly not read, or not comprehended, by the reviewer) and to the references therein to articles by Bruce Maslin and Les Pedley. Here it will suffice to say that taxonomic botany is a science, like others always imperfect but steadily improving in its understanding and application. The understanding and application necessitate changes in terms and names also. Do we still refer to "phlogiston", or call galaxies "spiral nebulae", or in a serious discourse lump molluscs and crustaceans together as "shellfish"? The case for the defence rests. ■

An Amazing Achievement

Peter Olde and Neil Marriott, *Grevillea*

When Peter Olde took on the leadership of the *Grevillea* Study Group, he never realised that his absorbing interest would lead him to be accepted in the scientific world throughout the world, as the leading authority on *Grevillea*. His professional qualifications in education were a help with the Latin descriptions of new species but it was pure determination, persistence and an insatiable urge for accuracy that provided the real impetus for such a mammoth task. He is ever ready to acknowledge the support of others which include professional botanists, the Society and its members and many others, but new exploration takes courage, dogged persistence and considerable cash.

The scientific revision of his large genus of plants, now 340 species, has been the work of many years by Don McGillivray of Sydney Botanic Gardens. A tragic illness cut short this work just as it was nearing completion and Bob Makinson continued the work. Their conclusions were published in 1992 in the book *Grevillea* launched at a price of \$189. At the time of release of this book I warned that, though it is a good book, it would carry forward the deficiencies of other recent books on Australian Proteaceae, they are now very much out of date describing only 250 species.

The work by Don McGillivray has been carried on with extensive field studies by Peter Olde and Neil Marriott. Many new species have been included and the characters defining a species reassessed such that there are now over 340 species. This study is now generally accepted by the scientific world. Each species is described, many with sketches, and each with an average of three large colour photographs. Neil Marriott is a horticulturalist with special skills in the propagation and cultivation of *Grevillea* as well as a competent field observer. He is an excellent photographer and the 1,115 colour plates in the books are a testimony to this art.

The series will be available in three volumes, Volume 1 being an introduction to the genus and its history, its use by the Aborigines, its classification, and of exceptional interest, its propagation and cultivation. Volumes 2 and 3 will not be available until March 1995. Each volume is \$65.00 with an introductory offer of 10 per cent discount and free postage within Australia to readers who order, within three months of publication, from Kangaroo Press, P.O. Box 6125, Dural, New South Wales 2158. ■

An Amazing Achievement

Alick Dockrill, author of *Australian Indigenous Orchids*

Alick Dockrill is recognised as the leading world authority on Australia's epiphytic orchids. Without any professional training, but after years of study of orchids in the wild, he started to record his observations. His determination for strict scientific accuracy and his exceptional proficiency with line drawing attracted the support of leaders in the orchid world both here and overseas. This led to *Australian Indigenous Orchids* in 1969 describing, with detailed sketches, all Australia's epiphytic orchids and the tropical terrestrials. For 20 years it achieved the status of being the accepted scientific reference.

Australian Indigenous Orchids has now been revised and reprinted in two volumes. For many years there has been much controversy over the correct naming of species. Thanks to the exceptional scientific research by Mark Clements at the Australian National Botanic Garden in Canberra, which was published in his book *Orchid Research*, and other publications by David Jones and Mark Clements, the problems were largely resolved. This basic scientific research has been supplemented by intensive personal field studies of the forms in the wild by Alick Dockrill to competently revise *Australian Indigenous Orchids*. This revised version, so well illustrated by 115 colour photographs, has resulted in this book once again being accepted as the only satisfactory reference to Australia's epiphytic orchids. It is proposed to maintain it in this state by the issue of supplements. The colour photographs opposite are from volume 2. Unfortunately, a number were printed upside-down but this is certainly not the fault of Alick Dockrill.

If you are interested in orchids you will need the only complete reference available in two large volumes each for \$88.00 post free from The Editor, *Australian Plants*. ■



▽ Plant
Photo by G. J. Wells

Dendrobium lichenastrum

△ variety 'Prenticei'
Photo by G. McCraith



Our Wattles — *Acacia* to what? *Racosperma*!

We would prefer our wattles to remain in the genus *Acacia*. Let us be quite clear about this. We do respect and support our professional botanists. We may grumble a bit when the scientific name of a plant is changed but this is accepted because we have absolute confidence in the professional competence of our botanists. This is not a condescending statement but an unreserved declaration of faith and support. In our June 1993 issue, I made an impassioned plea that if the well known *Acacia* must be replaced, a comparable simple, short, easily spoken and remembered name hopefully similar to *Acacia* or *Wattle* be used. There is an international code to be followed which could mean the adoption of *Racosperma*. This was attempted some years ago but certain conditions indicated that this was not acceptable. Given that there is a small problem over the name, there is sufficient excuse to adopt a more generally acceptable name. Botanists, please reconsider. —Editor.

Wildflower Nurseries in Queensland

Fairhill Plants and Botanic Gardens — Fairhill Rd., Yandina, 4561. Tel. (074) 46-7088. Large range of trees, shrubs, ground covers, climbers, ferns, palms and orchids for the sub-tropical and tropical east coast. Extensive display gardens open 8.30 a.m. to 5 p.m. any day. New comprehensive catalogue \$14.00 posted.

Wildflower Nurseries in New South Wales

Annangrove Grevilleas — 98 Annangrove Road, Kenthurst 2156. Tel. (02) 654-1380. Wide range of natives including hundreds of different species in tubes — many hard to get. Ten per cent discount to SGAP members.

Bryants Native Plant Nursery — Cosy Camp Road, Bex Hill, N.S.W. 2480. Tel. (066) 28-4323. 15 kms north of Lismore. Open 7 days (from 11 a.m. on Sundays). Extensive range of trees, shrubs, groundcovers, rockery, grafted Grevilleas, rainforest plants. Excellent quality and service.

Camden Haven Wildflower Garden — At Kendall Country Living, 105 Kendall Rd, Kendall, N.S.W. 2439. Tel. (065) 59-4102. 1 km from Pacific H/way at Kew. Specialising in grafted natives and rare and unusual plants. Closed Tuesdays.

Dealbata (cold climate) Aust. Plant Nursery — off Bloomfield St., Dalgety, 2630. Tel. (064) 56-5043. Specializing in alpine and dry Monaro plants — grown from locally collected material. Phone to arrange visit.

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

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

Newcastle Wildflower Nursery — 45 Pacific Hwy, Bennetts Green 2290. Tel. (049) 48-8576. Extensive range of native plants including rare and endangered species.

Sydney Wildflower Nurseries — South at Heathcote (02) 548-2818; West at Marsden Park (02) 628-4448; North at Terry Hills (02) 450-1555. Excellent range of native plants, open 7 days.

Wariapendi Farm Nursery — Church Ave., Colo Vale (7 km north of Mittagong off F5, take Colo Vale exit). Tel. (048) 89-4327, Fax (048) 89-4092. Growers of frost hardy natives from tubestock to advanced. Open 7 days.

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

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

Wildflower Nurseries in South Australia

Anne and Colin Dealtry — Lot 2, Trevilla Rd, One Tree Hill, SA 5114. Large range of tube-stock plants. Display Gardens. Open most of the time but phone to check. (08) 280-7079.

Nesbitt's Orchids — P.O. Box 72, Walkerville, S.A. 5081. Tel. (08) 261-1550, Fax (08) 266-0372. Specialists in the propagation of Australian terrestrial orchids. Send S.A.E. for list and culture notes.

Wildflower Nurseries in Tasmania

Plants of Tasmania Nursery — 65 Hall St., Ridgeway 7054 (10 mins from Hobart). Tel. (002) 39 1583. Exclusively Tasmanian plants. Phone for opening hours or send business sized SAE for catalogue.

Pulchella Nursery — Tasman Highway, Buckland. Tel. (002) 57 5189. Open Friday to Monday 10 a.m.—5 p.m. Grower of frost hardy forest-tubes to advanced natives.

Wildflower Nurseries in Victoria

Bushland Flora — Indigenous plants of Melbourne. Ph. (03) 736 4364 for stocklist.

Kuranga Native Nursery has the largest range of Australian plants in Melbourne. Decorative flowering plants, hardy varieties, indigenous plants, grasses, etc., advanced grass trees, rainforest plants and more. Kuranga Native Nursery, 393 Maroondah Highway, Ringwood 3134. Mel. Ref. 50 B5. Tel. (03) 879 4076 — open 7 days.

Australian Wildflower Seed Suppliers

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

R. Horner — 1 Grundy St., Alice Springs, N.T. 0870. Seed of trees and shrubs of Central Australia. Please send 45¢ stamp for a list.

Wildflower Society of Western Australia — P.O. Box 64, Nedlands 6009. A wide selection of Western Australian seeds is available at \$1.50 per packet, plus postage and handling of 45¢ for a number of packets. Send for a catalogue for \$2.00 plus 80¢ postage. A huge range of seeds at a price you can afford expertly collected, labelled and packed. A book "Hints on Growing ..." 40 pages, \$3.80 posted.

Goodeniaceae, *Goodenia* (see photographs on page 336), *Leschenaultia*, *Scaevola*, *Dampiera* etc., all beautiful, usually ground hugging plants ideal for showy gardens or potted plants in the home. We intend to produce an issue on these plants but we need advice from readers on their experiences, hopefully with photographs. Please help. These plants have all been described in the recent Volume 35 of *Flora of Australia* series, send for a copy for \$35.

Flora of Australia is a series of books describing all Australian wildflowers. The descriptions will be a little technical for some but with a little perseverance you can identify species, especially with the help of the many line sketches. The point is that apart from *Australian Plants*, this is the only reference to all species in a genus with adequate keys to indicate the differences between similar species. What makes our periodical, *Australian Plants*, so unique is that we provide the only alternative service except that our treatments of genera are presented in simple easily understood terms and more adequately illustrated with sketches and many colour photographs. We however, can never hope to produce an adequate cover for the entire flora quick enough so keen readers need to purchase the *Flora of Australia* series as follows: Vol. 3 — Hamamelidales to Casuarinales \$26.95, 1 kg; Vol. 18 — Podostemaceae to Combretaceae \$40.45, 1.3 kg; Vol. 19 — Myrtaceae \$40.50, 1.5 kg; Vol. 22 — Rhizophorales to Celastrales \$21.95, 1.5 kg; Vol. 25 — Melianthaceae to Simaroubaceae \$21.95; Vol. 46 — Iridaceae to Droscoreaceae \$21.95, 1.5 kg; Vol. 35 — Brunoniaceae to Goodeniaceae \$35.00. ■

"Australian Plants", The Australian Flora Periodical

Past issues are available for all volumes (4-10), each volume is bound and cased, beautifully presented with green vinyl covering and gold lettering for \$21.00, plus \$5.00 post.

Volumes 12, 13, 14 and 15 of Series A, the volumes published in the 1980s are available only from The Editor, *Australian Plants*, 860 Henry Lawson Drive, Picnic Point 2213, for \$40 each plus \$6 postage. If 4 or more volumes ordered the order is post free. Each is superbly bound and carries a complete index. If you are a new reader it is suggested that the set of volumes of Series A will represent the most complete reference book available.

There has been a delay with Volume 16. Do not order until advised.

Binders to hold the eight separate issues of *Australian Plants* in a volume are \$5.50, plus \$3 post.

Other Books Published by the Society:

"**Australian Indigenous Orchids**", Revised Edition, by A. W. Dockrill. 2 vols. \$84 each including post.

"**Australian Plant Genera**" by J. A. Baines. \$9, \$5 post.

"**Cradle of Incense**" by G. W. Althofer. A delightful book on Mint Bushes. The Genus *Prostanthera*. \$8, \$3 post.

"**Friends and Foes in your Garden**" by D. Hockings. The best guide on pest and disease control. \$20, \$6 post.

"**Language of Botany**" by C. N. Debenham. An outstanding reference to botanical language. \$16.50, \$3 post.

Book Supply Mail Service. For back issues of *Australian Plants*, bound volumes and binders, send orders to P.O. Box 410, Padstow, NSW 2211. Send orders to Florilegium, P.O. Box 644, Rozelle, NSW 2039, phone (02) 555 8589, or by fax (02) 818 4409 for the books listed above and most other books on the Australian flora available, especially those reviewed in this issue, on a recommended retail price but post free. For orders in excess of \$50 a discount of 10% is provided.

The Australian Flora Foundation

President: Dr M. L. Reed — correspondence to GPO Box 205, Sydney 2001. Research into the biology and cultivation of the Australian flora. Donations and bequests welcome. Send \$5.00 for receipt of reports for the year.

The Societies for Growing Australian Plants

THE SOCIETY FOR GROWING AUSTRALIAN PLANTS—NSW LIMITED:

President: Mr Jim Boswell, 12 Madison Place, Bonnet Bay, NSW 2226.

Secretary: Mr Alan Woollett, 3 Currawang Place, Como West, NSW 2226

SOCIETY FOR GROWING AUSTRALIAN PLANTS—CANBERRA REGION Inc.:

President: Ms Edwina Barton, 1/10 Templeton Street, Cook, ACT 2614.

Secretary: Ms Keryn Kahl, 61 McWhae Circuit, Wanniasa, ACT 2903.

SOCIETY FOR GROWING AUSTRALIAN PLANTS—QUEENSLAND REGION Inc.:

President: Mrs Lorna Murray, P.O. Box 571, Mt Ommaney, Qld 4074.

Secretary: Ms Jan McNicol, P.O. Box 586, Fortitude Valley, Qld 4006.

SOCIETY FOR GROWING AUSTRALIAN PLANTS—SOUTH AUSTRALIAN REGION:

President: Mr Malcolm Vandepuer, 17 Grandview Drive, Tea Tree Gully, SA 5091.

Assistant Secretary: Ms Jacque Hibbert, 20 Murray Street, Clapham, SA 5062.

SOCIETY FOR GROWING AUSTRALIAN PLANTS—TASMANIAN REGION:

President: Mr Graham Roberts, GPO Box 1353P, Hobart, Tasmania 7001.

Secretary: Mrs Els Hayward, GPO Box 1353P, Hobart, Tasmania 7001.

SOCIETY FOR GROWING AUSTRALIAN PLANTS—VICTORIA INCORPORATED:

President: Mrs Cherree Densley, Princes Highway, Killarney, Vic. 3282.

Secretary: Mr Paul Kennedy, 17 Craig Court, Heathmont, Vic. 3135.

WILDFLOWER SOCIETY OF WESTERN AUSTRALIA INCORPORATED:

President: Mr Tom Alford, P.O. Box 64, Nedlands, WA 6009.

Secretary: Mrs Lorraine Boyce, P.O. Box 64, Nedlands, WA 6009.

Office open Tuesday/Thursday — Tel. (09) 383 1254 (24 hr answering service).

PUBLISHED BY THE SOCIETY FOR GROWING AUSTRALIAN PLANTS — NSW LIMITED.

Under the direction of the PUBLISHING COMMITTEE — Editor: W. H. Payne.

Assisted by: P. D. Leak, B. Kennedy, B. Maloney and P. Bailey.

Editorial Material: Editor, *Australian Plants*, 860 Henry Lawson Drive, Picnic Point 2213. Enquiries by mail only.

PUBLISHING COMMITTEE: D. G. Brooks (Chairman), I. Cox, P. Lane, P. Olde, R. Page, W. H. Payne, H. Stacy.

Address all **non-editorial correspondence** to: SGAP Publishing Committee, P.O. Box 410, Padstow, NSW 2211.

ALL PUBLISHED MATERIAL IS COPYRIGHT AS DIRECTED BY AUTHORS.

Flower arrangement by Claire Shackel

Photography by Graham Forster.

