

# Australian Plants



Registered by Australia Post  
Publication No. PP226253/  
00017

June, 1998  
Vol. 19, No. 155

\$3.60

# Centenary celebrations for 2001

The Executive Committee responsible for the promotion of the celebrations for 100 years of federal government in the year 2001 is consulting with us. Our proposals for Prosperity For Australia Beyond 2001 based upon sustainable development and conservation of our natural resources are being seriously considered. The major problem is that there is very limited time to evaluate and adopt schemes of merit. Fortunately we have been working for years on preliminary work and pilot schemes and the limited time will not be a responsible rejection of pertinent projects. There will be urgent calls for workers as projects for funding will need to be submitted at state level. If you want a particular project funded, contact the society secretary for your state but it requires detailed steps for completion and a sound estimate of the funds required.

**Australian daisies.** This issue commences a series of articles covering this large group of plants. Take a little time studying the introduction by Jim Willis and the associated sketches. Once again a major article is on commercial cultivation but it has many valuable lessons for all who hope to grow wildflowers in the home landscape.

**Potted flowering plants,** a vast market for the right plants and superb decoration for the home. What a delightful present, a pot covered in blooms that will last for weeks. Join the race to develop startling wildflowers in a pot or simply grow some yourself, see what we have in this issue.

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**COVER PLATE,** Everlasting daisies, *Rhodanthe manglesii*. Learn more about the amazing daisy family in Australia and how to grow them to decorate your private landscape from articles in this issue. Photography by C. Green, from the ANBG collection.

AUSTRALIAN PLANTS. No. 155 issue of Volume 19, comprising issues 149-156.  
International Series Index ISSN 0005-0008. A national publication in 9,000 copies.  
Published by The Society for Growing Australian Plants NSW Ltd. A.C.N. 002 680 408.  
Publication date of previous issue No. 154 was 1st March, 1998.

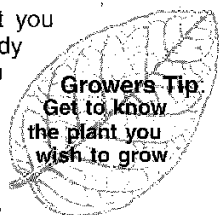
# Gardening in clay

Our Garden No. 15B

by Anne Dealtry, One Tree Hill, South Australia

We live on a gently undulating property in the hills north of Adelaide. The soil is slightly acid, pH 6, and a gravelly clay, very compacted. We are in a frost free area with cool damp winters, long dry summers and usually no humid weather. It can be quite windy at any time of the year. See *Australian Plants*, volume 17 page 287. The garden area was ripped and broken up. We dig the hole wider and deeper than the root ball, break up the ground around it and back fill with the original soil that has composted soil introduced to the whole area. Never dig a hole in clay and plant with other soil. When it rains a sump is created and the plant drowns. We are growing a wide range of plants and the editor wants me "to divulge our secrets". There are no secrets or sure-fire methods. Our practices are really quite simple. The following comments may help others.

It is very important firstly to get to know the plant you wish to find a place for. Will it do well in shade, a windy position, a wet or dry area or does it prefer protection of other shrubs? The approximate height will play the major part in positioning although a two metre plant can be pruned to a 1.5 m shrub. We are fortunate to have a large area to grow a garden and can have plants flowering all through the year. For photographs of our garden see pages 292, 293, 329 and 333.



We tend to over plant. Many people are surprised to see so many plants planted so close together. Apart from some *Eremophila* species and other desert plants, most species seem to grow better with the shelter of other plants. All garden areas are mulched with shredded pine bark, any suitable material is far better than none.

**Watering!** Most of our planting is done during autumn and early winter, as winter rains should settle them in before the hot weather returns. Plants are given a deep watering when first planted. Depending on weather, another good watering is done a few days later. If no rain falls, a weekly check is done until winter rains take over. The mature plants are only watered when summer starts using overhead impact sprinklers. One small area is on drip irrigation. The plants here resent overhead watering, *Eremophila* species, *Ptilotus* and some dryland *Grevillea*. Drippers are an aid to watering and we hand water every 3 or 4 weeks during summer in this area.

**Fertilizing!** We use cow manure (commercially packed) on all species, usually lightly sprinkled under the shrubs on top of the ground and then lightly hoed to help it get through the mulch. Autumn and early winter suits us for this task as winter rains will wash the manure into the soil ready for spring when the plant can make use of it. Mulch tends to pack down after time and almost makes a waterproof barrier. This is why we lightly hoe in autumn to re-aerate it and improve access for water and fertilizer to the root zone.



△ **Everlasting daisies**, *Rhodanthe chlorocephala* ssp. *rosea* to the right of the path opposite Black-eyed Susan, *Tetradlea thymifolia* (purple flowers), Kangaroo Paw cultivars, *Anigozanthos* 'Sunlight' (apricot-yellow), and *Anigozanthos* hybrid (red), and behind the rock, *Lechenaultia formosa* prostrate red. Photographs of the Dealtry garden by W. H. Payne.

▽ **White Waratah**, *Telopea* 'Wirrimbirra White' growing in a wooden barrel with *Brachyscome* 'Pilliga Posy' at the base. See page 294 on hints on growing in containers.





△ Long-flowering and spectacular is *Lechenaultia biloba* 'Light Blue' with *Lechenaultia formosa* cultivars 'New Morning' (red and yellow flowers), 'Pink and Cream', and 'Prostrate Red', with *Dampiera linearis* a form from North Hampton with grey foliage, and a dark blue form of *Lechenaultia biloba*, and on the other side of the path, *Grevillea sericea* X *G. confertifolia*.

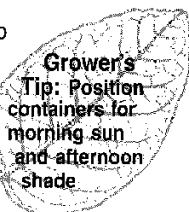
▽ Containers can decorate a garden. A dwarf form of *Banksia ericifolia* makes a charming display with *Lechenaultia* 'Prostrate Red' and *Darwinia macrostegia* hybrid at its base.



**Weeds!** On new garden beds we put a sprinkle of fertilizer on the ground, blood and bone or cow manure, then 6-8 sheets of newspaper and finally a good layer of shredded pine mulch. This kills off any weeds and stops new ones germinating. As time goes by, weed seed blows in and can germinate on top of the bark. They are only on the surface and are easily pulled out. The mulch will compost gradually into the soil and a top-up layer is needed every few years. We plant our shrubs close together and as they grow and touch each other weeds are shaded out. We have never had the need to spray weed or insect killer.

**Container growing!** Large tubs of plants provide a nice feature point in a garden. We have some plants that are "special" such as grafted *Darwinia*, *Telopea*, dwarf forms of *Banksia* etc. in wooden half wine barrels. Never use garden soil in container plants. A good potting mix is used; check for added fertilizer to see if it is suitable for native plants. Ours is a potting mix with no fertilizer and we add Nutricote with trace elements and slow release nitrogen (1 B D U). We mix plants in each tub, a slightly taller plant such as *Banksia ericifolia* dwarf, a smaller shrub such as a *Darwinia* and a cascading *Lechenaultia*.

We put a light dressing of mulch on top of the tub to help keep moisture up and water regularly, more often than if they were in the ground. Position so that they get the best aspect, morning sun and afternoon shade. Many plants that do not suit local soils can be grown quite successfully in large containers. *Crowea*, some *Boronia*, difficult forms of *Dampiera* display their form and true beauty in flower in containers.



The **annual daisies** make such a show, readers may be interested in how we have been so successful with them. For peak flowering from mid-September to mid-October, we planted the seed around mid-May. *Rhodanthe chlorocephala* ssp. *rosea* seems to be the best species. The garden bed can be in full sun or dappled shade, the colours not fading so fast when the plants are in light shade.

Our local soil is hard and stony so we add some sandy loam, mix in cow manure, and lightly hoe into our own soil. It only needs to be about 5 cm deep. Rake the bed smooth and sprinkle the seed on; do not cover the seed with soil. We then use an old axe handle with a square piece of wood nailed to the base to press the seed down lightly. Lightly water the seed. The seed will need watering daily until germination, usually 4-5 days. Water when the top soil looks dry, as needed. Liquid fertilizer is applied weekly when the seedlings reach 5-7 cm high, and continue this until the flowers start to finish.

When the flowers are fully dried and have set seed, the whole flower head, including seed and petals can be collected and stored in a dry location until the next year. There will be areas where they will self sow if seed falls to the soil. Many of our patches of spring wildflower are now self seeded. ■

**Our Garden Series.** This series is very popular but can only continue if readers will send me some notes on their garden. Take a few photographs yourself over the next flowering season and send them to me. It is so popular that I have included 8 photographs of the garden. You can see what can be achieved. Remember these were taken on one day in a garden designed for year around flowering. Editor.

# Native frangipani

## *Hymenosporum flavum*

by Ivan Holliday

Although of sub-tropical origin, Native Frangipani is one of the best small to medium sized, long-flowering trees which is grown successfully in most areas of the Adelaide region. Here, winters are cool to cold and reasonably wet (annual rainfall approx. 500–600 mm, most of which falls in winter), but usually, very dry from October to June. Summer periods can be extremely hot, in excess of 40°C.

Large areas of Adelaide soils are red-brown earth (lime-based and alkaline to neutral clays), which become very dry in summer and autumn. Yet Native Frangipani succeeds in streets where the trees receive no water other than natural rainfall, or perhaps, some additional moisture from adjacent private gardens. I have also observed this tree growing successfully on Yorke Peninsula on very limy soils, and where rainfall is only about two thirds of that in Adelaide.

Native Frangipani is the only Australian species of *Hymenosporum*, and is closely related to the *Pittosporum* genus, which it resembles in certain respects. It is native to the coastal brush forests of eastern Australia, extending from the Hunter River in New South Wales to Atherton in Queensland.

In tropical Queensland some trees grow to 25 m with a stem diameter of 30 cm or more, but further south it is much smaller. In cultivation it is usually only a small, very slender and upright tree up to 10 m high. Bark is grey and roughish, and the branches are sparse, radiating in whorls from the main stem. The deep lustrous green leaves, which resemble those of *Pittosporum*, are alternately grouped at the ends of the twiggy branchlets, oval-oblong in shape, and 7–15 cm long. This is a very fine flowering tree that begins to bloom in early spring, when the fragrant, open, tubular flowers are cream-coloured. They darken with age to a deep sulphur yellow before they drop. The effect of masses of cream and yellow flowers is very lovely. The flowering period extends to early summer. The 4 cm diameter flowers in terminal corymbs are sweetly scented, and about the size and shape of those of the Frangipani, from which the common name is derived. In other respects the tree bears no resemblance.

Fruit capsules are hard and brown, containing numerous closely packed layers of brown, papery seeds which germinate freely. ■

## Riceflower as a cutflower

A RIRDC project reported by W. H. Payne

A project also involving the Queensland Department of Primary Industries and the Institute for Horticultural Development, Knoxfield, Victoria, required the establishment of five trial sites at Helidon and Cleveland, Queensland, Robertson, NSW, and Knoxfield and Monbulk in Victoria. The trials were with four cultivars of *Ozothamnus diosmifolius*, all the fine-leaved form, and two related species, *Ozothamnus obcordatus* and *Chrysocephalum semipapposum*. *Ozothamnus diosmifolius* 'Redlands Sandra', especially developed for cut flower production, was typical of the results obtained with 100% survival after 20 months from planting at Helidon, 74% at Cleveland, 62% at Robertson, 1% at Knoxfield and 46% at Monbulk. More success is now being had in Victoria with material collected from central and southern NSW areas which is known as the mid-leaf form. Apart from the climatic limitations when using the fine-leaf form from southern Queensland, disease was a major problem, *Phytophthora* (see page 326) and root-knot nematodes, problems also encountered in the saga on page 300. ■



△ *Bracteantha macrantha*

Photo, A. McWirter, see page 300

▽ *Leucochrysum albicans* spp *alpinum*

Photo, A. McWhirter, see page 300

The everlastings here comprise a large number of tiny yellow flowers, disc florets in figure 1, surrounded by white papery bracts that look like petals but are regarded as modified leaves with very little moisture. For this reason the flower heads do not appear to age when dried, everlasting!



# The Daisy Family

by Jim. H. Willis\* et al.

No great natural group of plants is more familiar or easier to recognize anywhere than the Daisy Family. It includes such tamed and useful garden subjects as lettuce, artichoke, dahlia, chrysanthemum, marguerite, sunflower, and cornflower and troublesome weeds like dandelion, flatweed, stinkwort, fleabane, cape-weed, skeleton-weed and the innumerable prickly thistles.

The so-called "flowers" of these are actually heads containing numerous very small, one-seeded, stalkless flowers or **florets**, closely packed together for maximum fertility and often showing a remarkable division of labour; some are bisexual, others in the same head male or female, while those at the periphery may be neuter. The central florets are often regularly tubular, called **disc florets** in figure 1, contrasting with an outer ring of much enlarged, very flattened florets that appear like the radiating petals of a single flower, called **ray florets** in figure 1. Because of the "composite" nature of their individual flower-like heads, daisies are placed in the botanical family previously known as Compositae. This family is now known as **Asteraceae** after one of the larger boreal genera, *Aster*. Heads of small flowers can occur in members of many other families, notably the wattle, myrtle and pincushion groups.

Flower heads, (**capitula**), of Asteraceae are almost always surrounded by a protective cluster of modified leaves or **bracts**, sometimes green and sappy (or even fleshy), sometimes dry, papery (white for the everlastings shown opposite) and brightly coloured as in some genera, *Helichrysum*<sup>2</sup>, *Helipterum*<sup>3</sup> (see page 298), *Schoenia*, *Ixodia*, *Waitzia*, etc. which embrace the "everlastings" and "immortelles". The various florets are attached on a cushion-like circular swelling, (or **receptacle**), at the apex of each flowering stem. See the sketch on page 323. When examined after the ripe fruits have all fallen, this receptacle may have a smooth naked surface or one that is uniformly sculptured into shallow pits or deep honeycomb-like cells: sometimes it is also beset with chaffy scales.

The typical **bisexual flower** in Asteraceae has 5 **petals** united into a cylindrical, bell-shaped or funnel-shaped tube surmounting the ovary. Such a flower is the disc floret in figure 1. Sepals are absent, but their place is usually taken by a series of scales, awns, bristles or long silky hairs which constitute the **pappus** and aid in seed-dispersal by the wind. The five **anthers**, each on an individual filament, are fused at their vertical edges to form a short tube through which the forked style-tip protrudes when fully mature.

\*Dr. J. H. Willis, retired Government Botanist, Royal Botanic Gardens, Melbourne, will be missed, not only by those that knew him as a gentle, compassionate man who would go to extremes to assist anyone, but by scientists throughout the world among whom he held a very revered place in botanical history. He contributed this article for publication in *Australian Plants*, volume 2, June, 1964. I have updated it slightly with the help of others as acknowledged in footnote 1 on the next page, and present it here as the cornerstone on which a complete new series of articles on Australian daisies will commence. From all of us thank you very sincerely for the pleasure of knowing you. Editor.

The base of each anther cell may be prolonged into a slender tail or brush-like appendage. Pollen is shed inwards from the ripe anthers and carried up on the elongating style whence it is distributed by insects to receptive stigmas on the styles of other heads. Thus the number of seeds produced by a very large head, like a sunflower, is truly "prodigious." See note 1 below for continuation.

### The daisy flower head as shown in figure 1

Editor *et al.*<sup>1</sup>

The typical **bisexual flower** has 5 **petals** united into a cylindrical, bell-shaped or funnel-shaped tube surmounting the ovary. Such a flower is the disc floret in figure 1, the five petal tips surmounting the five united petals form a tube that is first swollen and then becoming a narrow tube surmounting the ovary (which becomes the achene when ovule is fertilized). Filiform florets, usually unisexual, are a form of disc floret in which the corolla tube is very slender. In the ray floret the five petals are shown united in what appears to be a single petal with five tightly joined segments, the petal tips being visible on the outer end. This floret is also known as a ligulate floret or a strap-shaped floret. The flower head shown opposite with ray florets is represented by the flowers of *Olearia* and *Lawrencella* shown in colour on page 320, as distinct from the everlasting. A different form of flower head is shown on page 323.

Daisy flowers are without sepals, but their place is usually taken by a series of scales, awns, bristles or long silky hairs which constitute the **pappus** and aid in seed-dispersal by the wind. The sketch opposite shows the variation in shape of the pappus as scales or bristles shown on the ray floret. These **bristles** take various forms which, if magnified, may be as shown in the adjacent four details.

The five **anthers**, each on an individual filament, are fused at their vertical edges to form a short tube through which the forked style-tip protrudes when fully mature. The disc floret in the sketch has the five fused anthers cupped by the petal tip. The base of each anther cell may be prolonged into a slender tail or brush-like appendage as shown in the associated sketch details. The anthers mature before the pistil, the female part of the flower that includes the style and the ovary. **Pollen** is shed inwards from the ripe anthers and, as the style grows up through the anther-tube, it carries the ripe pollen up for distribution by insects to receptive stigmas on the styles of other heads.

The style comprises a tube from the ovary, the upper end being forked and on maturity protruding from the ring of five anthers. The style ends may vary in shape from the simple limbs as shown on the ray floret to the furry-flat (ligulate) ends shown on the disc floret. It will be noted that the ray floret does not have anthers and that it is a female flower only relying on the arrival of pollen on its style ends from another flower. The disc floret is a bisexual flower having both male (pollen producing anthers) and female parts, the style with ovary at its base.

<sup>1</sup>As acknowledged on the previous page, the introduction above is by J. H. Willis. Others have contributed to the remainder of the article. From page 300 it is principally the work of Brother Peter Codd together with the beautiful illustrations by Colin Woolcock taken from the book, *The Plant Life of Mount Kosciuszko* as reviewed on page 332.

<sup>2</sup>*Helichrysum* has recently been revised on a world wide basis and the Australian species split up into a number of genera which include, *Argentipallium*, *Bracteantha*, *Chrysocephalum*, *Ozothamnus*, *Lawrencella* and a genus yet to be announced. This series will give details of these very different plants.

<sup>3</sup>*Helipterum* has recently been revised on a world wide basis and the Australian species split up into a number of genera which include, *Erymophyllum*, *Leucochrysum*, *Rhodanthe* and *Triptilodiscus*. This series will describe why this has been done.

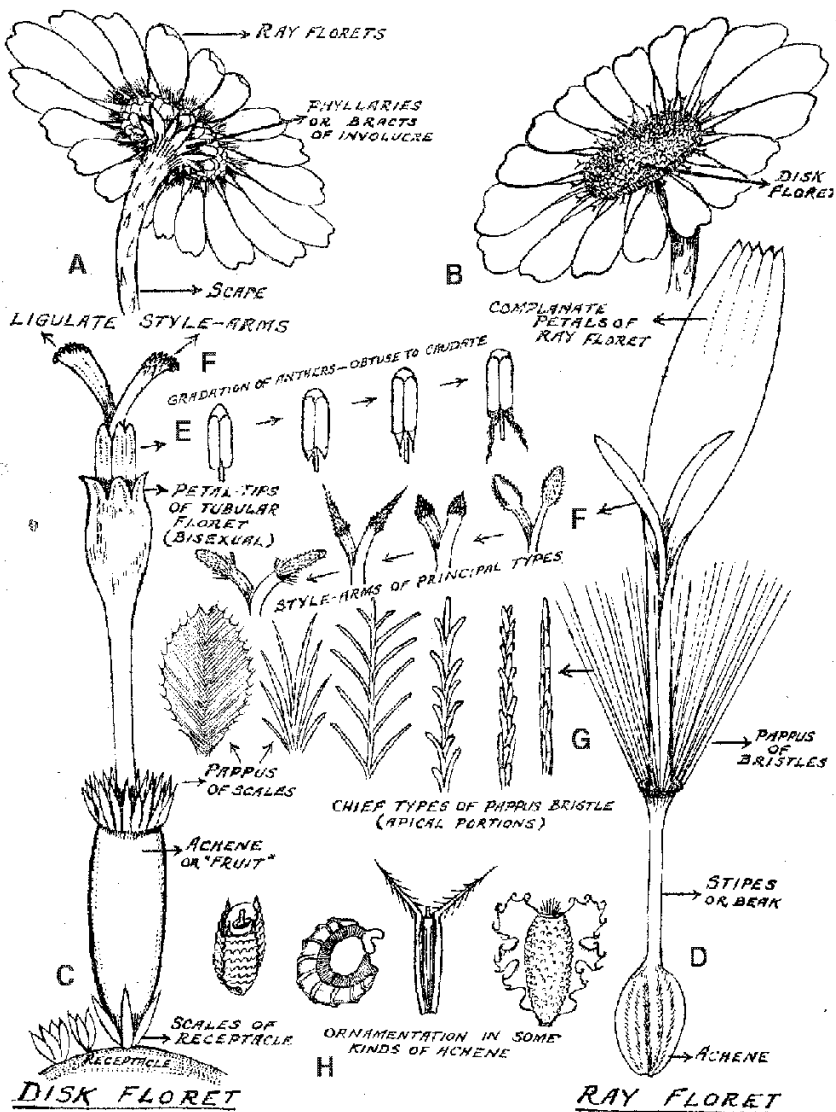


**Figure 1**

Fertilization occurs when pollen is deposited on the stigma, the surface on top of the style, when in the receptive stage. Nature weaves its magic, a pollen grain elongating down the long narrow tube to fertilize the ovule that develops a single seed. The floral parts wither and die leaving the achene containing the seed with pappus of scales on top, or bristles on a stipe or beak. These break off the receptacle and, being light, often with an apical parachute of plummy hairs or a crown of winged scales (the pappus) are admirably fitted for wide and rapid dispersal by air currents.

# The everlastings

We regard everlastings as flowers with papery-like petals that appear to hold their colour and texture for a long time even after picking and drying. These flowers, of the Asteraceae family just presented, comprise a compact centre of tubular, mostly bisexual florets but the ring of bracts cupping the flower head are greatly enlarged forming what appears to be a ring of papery, 'petals', white for those on page 296 but coloured for those on the cover. They retain their colour when picked and even after drying out. There are other groups of flowers in this family that are regarded as 'everlastings' but they do not conform to this simple rule and include *Angianthus*, *Calocephalus*, *Leucophyta* and *Pycnosorus*.

Everlastings may be divided into two groups, 'shrubby everlastings' referred to on the next page, and herbaceous plants, that is small plants without a main woody stem. Those found on Mt. Kosciuszko are shown opposite. Others are:

***Bracteantha*** (bract-ee-ANTH-a) There are probably six species the most widely known and grown being ***Bracteantha bracteata***. It is a variable plant and has adapted its size to various environmental conditions. This plant has been recognized as a valuable contribution to horticulture, see page 314. Easy to propagate from cuttings, every garden should have numerous plants.

***Bracteantha macrantha***, previously regarded as a form of the above species, is distinctive with white bracts surrounding yellow florets, photo on page 296.

***Bracteantha subundulata*** is a large-flowering species, the leaves 5–10 cm long tapering to a sharply pointed tip. The flower heads are solitary on stems 3–15 cm long and have conspicuous, papery bracts which are orange, often tinged with red or brown. The alpine form is in figure 2 opposite. Photo, page 312.

***Bracteantha viscosa*** is called 'Sticky Everlasting' because of its sticky shorter and narrower leaves. It has bright gold flowerheads and lemon and orange forms are available.

***Bracteantha papillosa*** is confined to Tasmania. An erect stout plant to 1 m with white papery bracts relieved by a few pink outer bracts.

***Bracteantha bicolor*** is also confined to Tasmania, usually in wet places near the coast. In the garden plants grow to 30–40 cm x 40–50 cm with a compact, branching habit. Orange-brown buds open to yellow heads to 3.5 cm across in summer. Bracts are yellow, tipped brown below and often above.

***Helichrysum scorpioides***, Button Everlasting, is one of very showy plants that has yet to receive a name change. In this plant the bright yellow centre is surrounded by orange papery bracts like a fringed button.

***Leucochrysum albicans***, embraces two subspecies and three varieties. Alpine Sunray, the subspecies *alpinum* is a spectacular plant in alpine areas with massed displays where the narrow, silvery, woolly leaves are a background for the large flowerheads, to 4 cm across, rows of white papery bracts surrounding the orange-yellow disc florets, photograph on page 296. A variety on Mt. Buffalo has yellow bracts. All five species are being trialed for horticulture.

***Rhodanthe*** There are 46 species confined to Australia. This genus forms part of a special study by the society's Australian Daisy Study Group, see page 319.

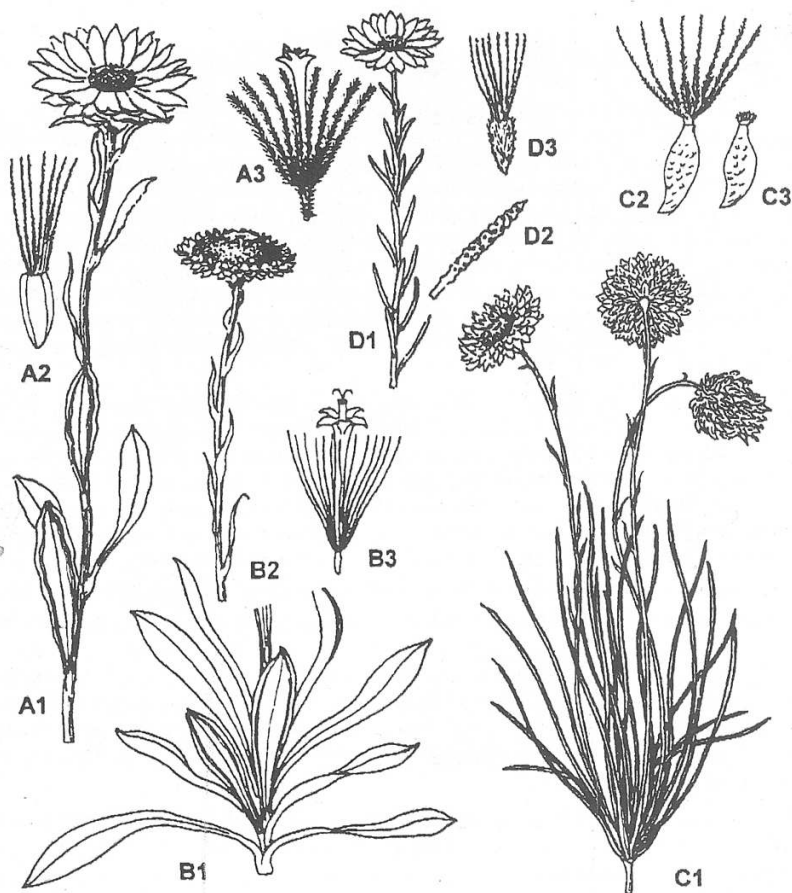


**Figure 2 — Everlastings of Mount Kosciuszko.**

**Yellow Everlasting**, *Bracteantha subundulata*, Fig. A, has a solitary flower head 3.5–5 cm across, the compact centre of yellow disc florets, A3, dwarfed by the shiny yellow to orange “petals” (really bracts) that surround it. The hairless fruit, achene A2, retains the pappus of barbed hairs on its top. See the colour photograph on page 312.

**Button Everlasting**, *Helichrysum scorpioides*, Fig. B, is well named as Button Everlasting, the numerous yellow tubular flowers in the centre, each with a pappus of hairs, B3, are surrounded by short yellow to orange papery bracts like a fringed button.

**Alpine Sunray**, *Leucochrysum albicans*, see page 300, Fig. C, has heads of flower 2.5–4 cm across with showy white bracts surrounding a centre of orange-yellow flowers (disc florets). The narrow silvery woolly leaves 2.5–10 cm long are a feature of the alpine landscape. The hairless fruit with feathery bristles, C2, that eventually break off near the base, C3.

**Chamomile Sunray**, *Rhodanthe anthemoides*, Fig. D, has a solitary flower head 2–3 cm dia., yellow in the centre, surrounded by white papery bracts. The narrow leaves, D2, to 10 mm long bear spherical glands embedded in pits. The fruits, D3, are densely hairy.

**Sketches** by Colin Woolcock from the *Plant Life Of Kosciuszko*, see page 332.

# The shrubby everlastings

Readily distinguished from the previous group of everlastings, they are shrubs with a woody stem and are not herbs. Why this special concern about everlasting flowers? One can easily appreciate the interest in the previous group of herbs as they make an attractive show in the garden. "The shrubby group, are rarely attractive horticultural plants, growing large and scruffy, with small flowers in unattractive heads. When they come up by self sowing most I pull them out". The editor made this statement when this article was first prepared and others have corrected me. Exceptions appears to be *Ozothamnus ledifolius* which is a nice small shrub with pleasing foliage and delightful brick red buds; look at the photograph on page 336 of *Ozothamnus diotophyllus*, our flora is incredible.

Suddenly there is a quite lucrative market for filler plants in flower arrangements and certain species meet this demand. The next article concerns such a commercial operation. Experience has shown that the species used is quite variable in its cultivation requirements and a form developed at Redlands Research Station, Qld., will grow well on the coastal plains but is a disaster inland near Gatton. In turn the wonderfully productive Cooks Selections may not be reliable further south near Lismore where a form selected from a local plant is giving good results. The search is on for good forms, look at your local bush.

***Ozothamnus*** (Oz-o THAM-nus) The plants are shrubs with alternate, often tiny leaves. The small flower heads shown in details B2, C2, D2, and E2, consist of a central cluster of yellow or white tubular florets as in D4, surrounded by overlapping papery bracts giving them their 'everlasting' quality. These flower heads are usually presented in terminal clusters and the whole cluster of flowers with their lasting quality has made them attractive for flower arrangements. There are 44 species. The alpine species are illustrated opposite.

***Ixodia*** (ix-O-dee-a), there are two species both confined to South Australia as described on page 314, see the photograph on page 309.

***Cassinia*** (cass-IN-ee-a) is a group of 18 species that have clusters of flower heads similar to the shrubby species of *Ozothamnus*, the distinction for *Cassinia* being the presence of scales between the florets on the receptacle. Somewhat typical is Sticky Cassinia, *Cassinia uncata*, shown as figure 2A. The flower heads are cylindrical to bell-shaped, cupped by overlapping papery bracts usually pink-brown on the outer whorl. Common in the subalpine tract, it is a slender shrub with narrow, sticky leaves about 15–20 cm. Trials carried out on the *Cassinia* as a cut flower as an alternative to *Ozothamnus* have not shown promise. See photos of *Cassinia subtropica* and *C. denticulata* are on pages 309 and 312.

***Olearia*** (0-lee-AIR-ee-a) is one of a group of shrubby plants known as Daisy-bushes but none of these have the same lasting qualities. See page 320 for examples. Many species are excellent garden plants, will readers please advise of species of *Olearia* that have been successful for them.

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**Plants by common name.** The same plant in different areas often has different common names locally. For example Riceflower is applied to *Pimelea* as well as some of the everlastings in the group above. We suggest that the botanical name, first part, be used as a common name. For this reason the pronunciation for the groups of plants above are given, try them out. The pronunciation of most wildflowers, at least those mentioned in all issues of Australian Plants since 1959, are given in Australian Plant Reference, see page 335.

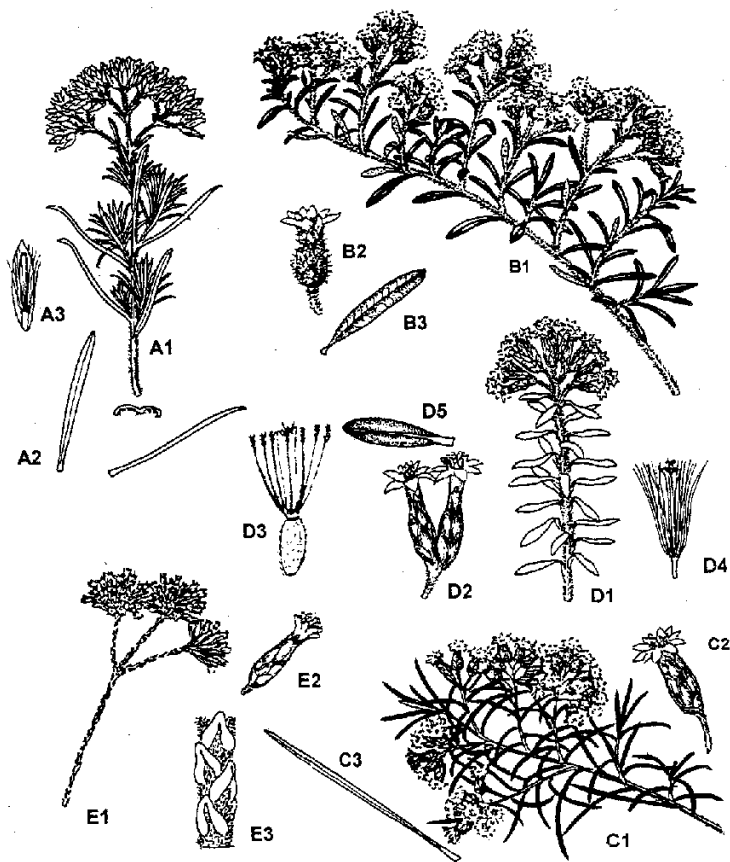


**Figure 2A — Shrubby Everlastings of Mount Kosciuszko.**

**Sticky Cassinia**, *Cassinia uncata*, figure A, is a sticky undershrub carrying its tiny white to pale yellow flowers in dense heads 3–8 cm across. The sticky leaves, 13–20 cm long, A2, have revolute margins with a recurved end; the fruit A3 has a single row of hair-like bristles. See photograph of *Cassinia subtropica*, page 309 and *C. denticulata* on page 315.

**Cascade Everlasting**, *Ozothamnus secundiflorus*, figure B, is a shrub with white to pale yellow flower heads in groups on one side of the branches as shown. Each flower head, 5–6 cm across, B2, comprises 15–20 tiny flowers (florets) cupped by red bracts. The narrow sticky leaves, B3, are 6–10 mm long, dark grey above, pale grey and woolly below.

***Ozothamnus thyrsoides***, figure C, is similar to *Ozothamnus secundiflorus*, but with longer narrow leaves, C3, 15–30 mm long, that are a dark grey-green above and pale yellow-green below, the midrib being without hairs.

**Alpine Everlasting**, *Ozothamnus alpinus*, figure D, has groups of flower heads, D2, comprising 3–6 tiny florets cupped by red bracts. The leaves, D3, are 4–10 mm long and spreading. The new growth has long needle-like glistening hairs.

**Kerosene Bush**, *Ozothamnus hookeri*, figure E, is an aromatic small shrub with distinctive scale-like leaves pressed against the stem as in E3. The tiny individual flower heads, E2, have only 2–4 florets inside the yellow-green bracts.

**Sketches** by Colin Woolcock from *The Plant Life Of Kosciuszko*, see page 332.

# Riceflower

*Ozothamnus diosmifolius*

## An everlasting daisy as Commercial Cutflowers\*

by Graham and Esther Cook

Until the late 1980s we had never dreamed of growing flowers, let alone pioneering a new species from the wild as a significant commercial crop. We were already farmers, with lucerne growing on the creek flat as our main business. We ran a few head of cattle in the higher back paddocks and occasionally had a crop of pumpkins or melons. One of the biggest restrictions to farming here is the water. In a dry spell the quantity and quality drop off sharply, especially as intensive irrigation in the Lockyer Valley, Queensland, has developed. Our supply returns to normal as soon as there is water in the creek, but during the time when it is most needed it is least dependable. Lucerne growing requires a lot of water — a lot of heavy lifting and expensive equipment. As we got older it made sense to look around for something lighter and needing less water and specialized machinery, before the machinery we already had needed replacing. But what to grow? It had to be something that would thrive on minimum quantities of hard water, and for which there was a ready market.

In 1986 Graham attended a Brookvale Park seminar on growing native flowers. We listened to the tapes over and over and were impressed with the speakers' enthusiasm, even if the figures sounded too good to be true. We started to read everything we could find on native flowers, and attended a seminar at Redlands Research Station and another one at Brookvale. Finally, in 1987, we decided to try out some of the native flowers and proteas being produced commercially at the time. Most people started off with Geraldton Wax but we planted everything that looked interesting, one or two of each. We finished up with about 50 different selections, mostly natives from West Australia.

### **Lesson 1: Do your homework, find all the information you can.**

Our first shock came in September when the *Helichrysum diosmifolium* (now *Ozothamnus diosmifolius*) we had bought came into flower. We realized that just because a certain species is labelled by a nursery as a "good cut flower", there is no guarantee that the cultivar actually in the ground will, in fact, measure up to the task. The cultivar we had bought was very disappointing, with coarse woody stems and small, off-white flower heads. Obviously, whoever wrote the label had never seen this particular cultivar in flower!

### **Lesson 2: Buying unknown cultivars should be seen as buying a ticket in a lottery — you might be lucky!**

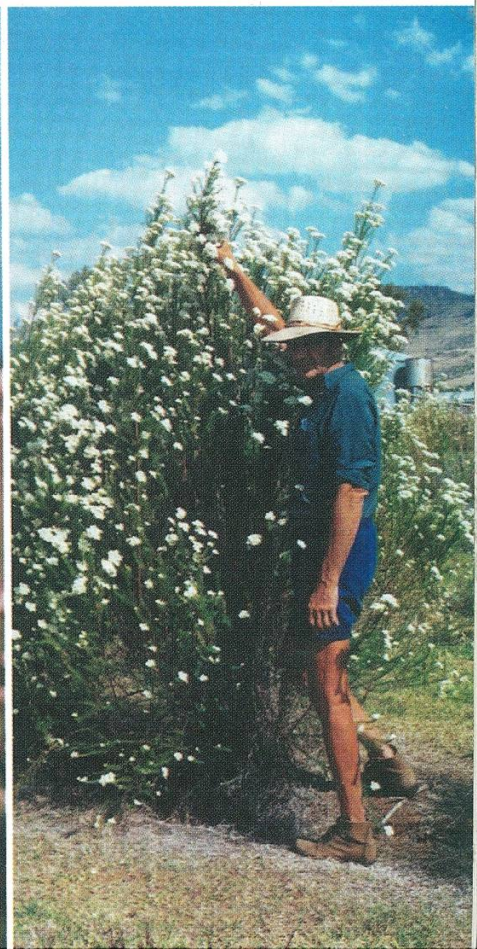
The rice flower plants we had bought did not look nearly as attractive as our local form which had cleaner white flowers, much finer leaves and stems, and a better ratio of head size to stem weight. The local form had been harvested from the wild for the Japanese market for several years.

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\*Cut flower production for inland NSW was the theme of a conference and workshop at which this paper was presented. It was hosted by NSW Agriculture and State and Regional Development with support from other bodies concerned with the promotion of cut flowers.



Above: Our Riceflower field. Below: (right) Our 'Cooks Pink' and (left) 'Cooks White' with Graham beside it, are plants we have developed. Note the profile of the flower heads of pointed buds opening out to a rounded flower. Short internodes between branches avoids lankiness.



Attempts to cultivate rice flower at the time were not successful as the types being trialed would go black as soon as they were cut. The fine leaf form did not seem to have that problem, though what it would do under irrigation was anybody's guess. It seemed worth trying.

### ***Lesson 3: Look for possibilities among your local flora.***

We set out to find a nursery that would propagate the finer-leaf form for us from cuttings selected specially for their flower quality and eventually found one at Dalby prepared to give it a go. We ordered several thousand plants and waited in naive expectation to start our new venture. We also ordered some Lady Stephanie wax flower as insurance.

### ***Lesson 4: Propagating new species is the first major hurdle.***

The second shock came in December 1987 after a prolonged spell of typical hot, humid mid-summer weather. We came home from a few days away to find most of the plants in the original trials either dead or dying or showing signs of ink-spot or other fungal disease. Obviously the West Australian varieties and most of the proteas did not like our hot, muggy summers.

### ***Lesson 5: Trial plantings are the only way to tell what will suit your climate and particular site.***

We planted our first riceflower in January 1988, the worst possible time of the year! We know now that riceflowers don't grow much in the heat of summer, so while the weeds were rampant the little riceflower were hardly progressing at all. Nowadays we plant in autumn or early winter when the riceflowers are growing well and there are not so many weeds around. We mulched them all with either sorghum or grassy lucerne hay, but after carefully re-arranging it several times when the wind tossed it around, we had to shift it away from the stems when fungi developed. Waterlogging caused our first major disaster with floods at Easter time. By the time Graham could get machinery on to the bottom end to redesign the drains, a lot of riceflower in that section had died. We decided to hill all the rows in future.

### ***Lesson 6: Growing a new species causes a steep learning curve.***

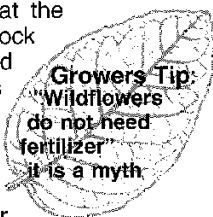
Although a lot of the bushes were thriving there were always losses. Odd bushes would go yellow and die, often for different reasons. Root-binding in the pots when they were tiny plants killed dozens of them at two to three years old when the tangled roots became too thick and strangled each other. Shortage of nitrogen during wet spells and shortage of iron and nitrogen during growing bursts caused yellowing and left plants susceptible to anything that was going around. The West Australian Lady Stephanie wax flowers suffered from *Phytophthora cinnamomi* which is endemic in Queensland. Luckily the riceflower in this region has long ago developed resistance to that particular fungus, though there can be problems with other phytophthora in other places, especially *P. cryptogea*. After we planted a second block, we added root-knot nematodes to the top of the list of pathogens. It cost us 100% of the new planting to find out about nematodes, yet many people still plant riceflower without checking the soil for nematodes. Even a small infestation is too many for a host crop as they simply multiply to killer proportions.

## **Lesson 7: Pests and pathogens can be expected to multiply with larger areas of a host species.**

We fumigated at first to control nematodes, but with the phasing out of methyl bromide and only short term benefits from other chemicals, we have changed our management plan. Fallow land is planted to jumbo sorghum during summer. This starves the nematodes and smothers any host weeds. Feeding molasses through the irrigation system appears to keep nematodes at bay though we have not had to try it yet. Other problems exist which have still not been sorted out. For example, some lines which look really stunning at their first harvest, have largely died before the third, and the survivors are spindly and tired looking. Researchers at Gatton College and Redlands Research Station have spent a lot of time trying to find a pathogen, without success. *Fusarium* and *Alternaria* spores can nearly always be found on plants in this area, but there is no proof that they attack healthy riceflower.

**Nutrition could be the problem.** When you look at the amount of stem and flower being taken out of the paddock

and realize that all those nutrients have to be replaced somehow, you see that the idea that "native flowers don't need fertilizer" is just another myth. Half-starved plants simply decrease their growth to fit the available water and nutrients. Riceflower in the wild are usually spindly, sometimes only a single stem, and have much sparser flowers than the same bushes grown under cultivation. Their "nutrients return to the soil in dead flowers, leaves and bushes. As well, riceflower grow naturally in open spaces of dry eucalypt forests, where the trees shed leaves containing nutrients brought up from well below the surface of the soil. If you want quality flowers year after year, plants have to be able to replace the nutrients taken away in harvest. Our plants here need a lot of iron and nitrogen every year and we are doing our own trials to see what else they need for vigorous growth and export quality flowers.

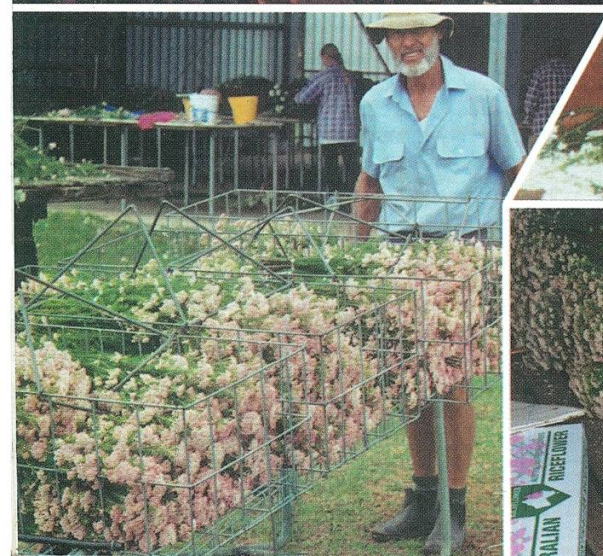


Our plants here need a lot of iron and nitrogen every year and we are doing our own trials to see what else they need for vigorous growth and export quality flowers.

**With our salty water,** iron and other nutrients get locked up in the soil as the pH rises during dry times, so even getting it right in one particular year will not give us any sort of fixed formula. We have to use our own judgement based on observation, knowing the visible signs of various deficiencies and toxicities, and learning from research and experience what to expect with different weather patterns. It would be handy if we had a blueprint, but as every farmer knows, you have to write your own. Unfortunately, with riceflower, especially in the early days, there were not even any other farmers to compare notes with. Even now, there is very little known about how the problems of different areas will affect new native plants under cultivation. What is a minor problem in one place may be a major disaster in another locality. Every native flower grower is a pioneer!

## **Lesson 8: Native flower growers are their own best researchers.**

Our first efforts at cultivating riceflower were not all disaster or worry. There were many positives as well. We were stunned the first time we saw a paddock in flower. They are beautiful! It's a shame they have to be harvested. It was clear from the first harvest that there were quite distinct types among both pinks and whites, and that some were better cut-flower types or more disease resistant than others. Some whole types were gone by the end of the second harvest; some were struggling; and some were





△ *Ixodia achillaeoides*, a similar but alternative crop? See page 314. Photo by A. McWhirter.

◁ *Ozothamnus diosmifolius*, opposite, left top to bottom, the cutflower crop ready for harvest; harvesting the flowers with a chain saw; flowers on the way to the packing shed. Opposite, right top to bottom, tying the sorted bundles with a foot operated tying machine; cutting to a length that balances stem length and flower cluster size and sorting to length; packing the flowers for market. Quality of flower by selection and rejection is paramount.

*Cassinia subtropica*, page 302, ▷ an alternative crop for areas not suitable for *Ozothamnus*.



thriving. The time had come to start some serious selecting based on the notes we had kept and a set of criteria that was falling into place.

### ***Lesson 9: Keep notes.***

**We began planting** sets of seedling from some of our best commercial lines, looking for good types that flowered earlier or later than our commercial selections. Our goal still is to have a complete series of good cultivars that flower in sequence from the beginning of September until mid-November. Each particular cultivar has only a short time (from two or three days to two weeks) when it is at its best for picking, so choosing cultivars with different flowering times is essential for developing any sort of market.

### **Producing Better Plants**

We have a list of criteria which falls into two categories: The first five criteria are essentials and a plant that fails in any of these is discarded:

1. Clean pink or snow white flowers (no off-whites, no muddy or washed out pinks);
2. All the heads on a stem are ready to pick at the same time (no over-mature, open flowers or immature drooping buds);
3. The plant re-grows vigorously after harvesting;
4. The plant can be commercially propagated;
5. The flower-heads form well shaped clusters.

Other criteria are judged on a scale from poor to excellent, including such things as iron deficiency, stem length and straightness, leaf colour and how easy the stems are to trim and pack.

### ***Lesson 10: If you know where you are going you are more likely to get there.***

**Preparation for market.** It is one thing to select and grow good quality flowers, but they must still be packed and marketed well if you are to keep a competitive edge. We helped write the riceflower standards for FECA so new growers can get some idea what is needed to get top prices from the markets. Our packers know they are part of a team that is fussy about standards at every stage of the process. Anything with obvious faults like blown flowers, insect damage or twisted stems is discarded, but sometimes it is harder to explain exactly why a stem does not look "right". It is cheaper to reject something where there is a doubt than to spend time dithering about it. ***if in doubt, throw it out.***

One of our workers' most important skills is to be able to see what length of stem balances the cluster of flower heads. Very long stems with a few small flower heads are a waste of expensive freight space as they sell on the quality of the flowers. The same heads on a shorter stem may look very good, and of course many more stems can be packed in the same box and sent for the same freight and inspection charges. ***if in doubt, cut shorter rather than longer.***

**Facilities for packing.** Every packing shed and production line is different, and a new grower needs to look at a few different layouts before deciding on a system. A cold room is, we believe, absolutely essential for top quality riceflower. We added a forced air cooling chamber in one corner of our cold room. Our shed system aims to get flowers cut to length, sorted, bunched, dipped, boxed and in the cold room within two hours of being cut in the field. While we can't be sure the boxes will be kept cold all the way to market, we can be sure that our part of the "cool chain for quality" is right.

## ***Lesson 11: Find out what is the best post-harvest treatment for your flowers.***

**Marketing itself is a bit of a minefield.** Growers are too busy with harvesting to do their own exporting as well. The first (small) crop we had should have been a complete success. The flowers carried well, the buyers were delighted, the prices were good. Unfortunately, the exporter went bankrupt and we never received a cent! Again, do your homework. Talk to other growers, look at an exporter's past performance, choose carefully, and follow market reports. Growers may use more than one agent, to spread the risk, especially when a major part of their whole income is dependent upon a once-a-year harvest.

## ***Lesson 12: Choose your exporter carefully.***

Where do we go to from where we are at? Ten years down the track our main concerns (apart from the inevitable new pathogens that flare up with monotonous regularity) revolve around selection and propagation. Our breeding program has some 3,000 plants at present. No two plants are identical, so observing, recording and analysing data is a massive job, particularly during the main harvest period. All the plants are numbered and entered in a database on the computer so they can be compared in groups which flower at the same time, or grow back particularly well. Good single plants are promoted to our "Ten Trials", where ten clones are planted side by side. This shows up all sorts of problems and characteristics which were not so noticeable on one plant. The first problem may be that it is very difficult to propagate vegetatively. Characteristics like bush shape, length of stems, colour of foliage, out of season flowering and disease resistance can all be monitored more accurately in the "Ten Trials".

We have released two cultivars (registered under Plant Breeders Rights) 'Cooks' Snow White' and 'Cooks' Tall Pink', and expect to release others when we are satisfied with their quality and dependability under our conditions. It takes at least six years from when the initial seedling is planted until a cultivar can be considered a commercial prospect. When we think that tulips have celebrated 400 years of breeding, we realize that we haven't done too badly in turning a wild plant into a part of the export native flower industry in ten years.

## **Growing our own seedlings**

One of the first problems we faced was sticky seed dormancy. The sticky\* mucilage coating on riceflower parts, particularly the stems and leaves is quite obvious under the microscope as tiny beads of 'gum'. The mucilage on the seed would be a good protection against germinating after light showers in the wild. The seed is also mixed up with a lot of trash from the bracts and other debris and when germinating naturally may have to develop a comparatively long root to wend its way to the soil before it can get established. What a wasted effort if the ground had already dried out before the first root even reached it! One way to remove the mucilage is to soak the seeds in warm soapy water for up to 24 hours, giving the container a shake or stirring the mixture occasionally. I then plant the seedlings on top of gravel and water them in fairly vigorously. As soon as seedlings appear I prick them out into jiffy pots so that I can keep using a heavier spray on the remaining seeds than I could use on seedlings. ■

\*Sticky seed separation. One reader reports that her solution to the problem of separation of sticky seeds was to sprinkle the sticky heap with talcum powder. Worked between thumb and forefinger they separate and are easy to sprinkle over the seed sowing surface. Editor.



△ *Bracteantha subundulata*, see page 300.  
Photography by I. Adler. ANBG collection.

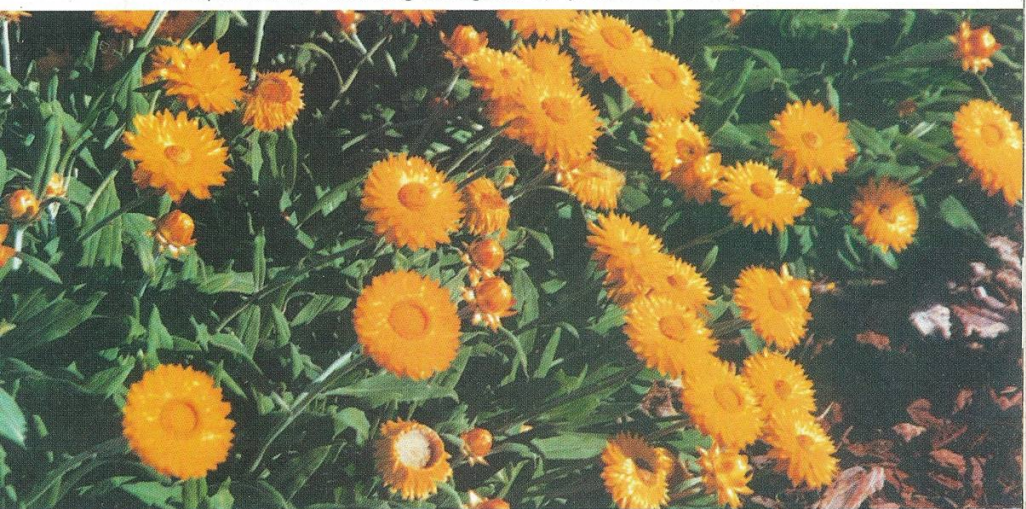
▽ *Cassinia denticulata*, see page 302.  
Photography by P. Ollerenshaw.





△ *Bracteantha* 'Argyle Star' ▽ *Bracteantha* 'Sunraysia Splendour'  
 ▽ ▽ *B.* 'Menindee Magic'

Compact bushes flowering throughout the year, a Sundaze promotion.



*Ixodia* (ix-O-dee-a) has been harvested from native stands for over 40 years in South Australia and an industry has developed in cultivated *Ixodia* in the southern states with an estimated value of \$330–520,000 annually. A significant market is for dried flowers as this plant is durable and remains white on drying. As a fresh flower the stems are tolerant of packing and transport conditions, followed by a good vase life. Drawbacks are the temporary closure of the flowers on contact with moisture or conditions of high humidity (they reopen as they dry), and a sticky resin in the leaves and stems leave a residue when handled. See the photograph on page 309.

*Ixodia* requires well-drained sites, preferring sandy to loam soils. It tolerates a wide range of soil pH but chlorosis problems increase with alkaline soils. It is a product for cool climates to initiate flowering, high temperatures causing foliage burn and a range of leaf diseases. Wind damage protection is necessary to assure high yield and long stem length. Selected forms are required for frost prone areas. New plants are pinched, or lightly pruned up to five times in the first year to develop a low, branching dense shrub which can support many flowering stems and resist wind damage. They are productive for three years.

An annual nitrogen application of 75–110 kg/ha is required over 3–4 applications. If soil potassium levels are less than 150 ppm, apply 50 kg/ha total K. Phosphorus is best applied as superphosphate incorporated in the soil when planting, at 50 kg/ha. It is good practice to test the soil before starting.

The most serious losses have been from the disease *Verticillium dahliae*, a fungus that can survive in infected soil from vegetables or other host crops, especially in the presence of pathogenic nematodes. The control is fumigation. *Phytophthora* is also a debilitating fungus to be guarded against by strict hygiene practices and the use of clean plant material. Treatment of infected areas requires removing plants, drenching the site and neighbouring plants with fungicide such as Fongarid, and the remaining crop treated with a spray Foli-R-Fus as a preventative treatment. Rotation planting of a non-susceptible crop in the next planting cycle is recommended.

At harvest, only green stems should be cut as darkened lignified stems will not re-shoot new buds. Pruning follows harvest to lower the height of the bush for new growth. Flower maturity at harvest is important. They need to be fully open with the central disc flowers visible in an early to middle stage of bloom. Those harvested past maturity have a raised centre and the disc flowers have changed their bloom colour of yellow or purple to grey or brown.

Flowers to be marketed as a fresh product should be rehydrated after harvest in clear water for several hours, or overnight in a cool shed or coolroom. They may be stored for up to two weeks in a coolroom and still have a vase life of two weeks. Product handling is similar to that shown for Riceflower on page 308. A financial study for a quality crop on a one hectare site and a farm gate price of \$2 per bunch, yielded a return of \$27,000 in the first year, \$2,100 to \$25,800 in the second year and \$14,500 to \$32,000 in the third year.

\*A summary of 'Development of *Ixodia achillaeoides* as a cut flower crop' presented by Gail E. Barth at a symposium on *New Floriculture Crops* in Perth, WA, was prepared by W. H. Payne.

# Daisies as potted plants

by Dr. Kerry Sharman\*

There is an expanding demand for flowering pot plants on both the domestic and international markets. Australian daisies have the potential to expand the existing range of flowering potted plants because of the range of attractive forms available. However, commercial development is dependent on manipulation to grow and flower all year-round by using photoperiod and temperature controls. The success of a commercial operation is dependent on the selection of superior forms. It was evident from the natural variation in seedling materials that selections for compact growth or flower number, would be possible.

The wholesale value of flowering potted plants in Australia alone exceeds \$10 million and continues to expand on domestic and international markets. Consumers continue to demand variety and novelty and Australian daisies have the potential to fulfil a portion of this market need because they are attractive, long lasting, come in a range of forms, and most importantly can be produced year-round enabling key markets to be targeted worldwide.

The daisy family (Asteraceae) contains more than 20,000 species worldwide, approximately 1,000 being endemic to Australia. Many exotic species have been successfully commercialized as cut flowers and flowering potted lines, the most notable of which is the chrysanthemum. A few Australian native species such as *Rhodanthe chlorocephala* subsp. *rosea* and *Bracteantha bracteata* are produced worldwide as fresh and dried flowers and have recognized potential as flowering potted plants. Forty-four species/cultivars from thirteen genera of Asteraceae (native daisy) were grown at Redlands Research Station, Queensland, and the horticultural potential of each evaluated. Species were selected on the basis that they had compact upright growth (less than 35 cm tall) and produced numerous small flowers or several distinctly showy blooms. The top nine species considered to have potential as flowering potted plants were, in order of decreasing preference, *Rhodanthe manglesii* (upright form), *Rhodanthe floribunda*, *Schoenia filifolia* subsp. *filifolia*, *Brachycome halophila*, *Lawrencella davenportii*, *Schoenia cassiniana*, *Hyalosperma cotula*, *Lawrencella rosea*, and *Hyalosperma glutinosum* subsp. *venustum*.

Controlled environment studies have shown that many daisy species are sensitive to day length and that provision of long day using supplementary lights or night break treatments could promote flowering of many species outside their normal flowering time.

Plant growth trials during the winter/spring showed that many species flower sooner and produce more flowers and flowerbuds when grown in the open outdoors, than in a heated glasshouse where minimum and maximum temperatures were approximately 5°C higher indicating that temperature also influences flowering control.

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\*This summary of a report by Dr Kerry Sharman of the Queensland Department of Primary industries and produced by the Horticultural Research Development Corporation as Report NY230 "Year round Producing of Flowering daisies," was prepared by W. H. Payne.



**Daisies that are not everlasting but provide flowers and beauty to the home.**

There are many exceptional plants such as that above, that are completely covered with flowers for long periods. Will readers who have grown these plants please send a short note on their experience and, over the next flowering season note the period they are in flower, take a photograph of the plant and pick flowers for the vase noting how long they stayed fresh. Editor.

△ ***Olearia phlogopappa***

Photography by M. Fagg. ANBG collection.

▽ ***Lawrencella davenportii***

Photography by A. McWirtter.





△ *Actinodium cunninghamii*

See page 322, a potted or bedding plant.

▽ *Gomphrena canescens*

See page 321, a bedding plant.



Plants of each of forty-four species/cultivars were grown in a glasshouse during the spring and summer of 1992–93. The growth habit, plant size, floral characteristics (flower colour, size and number), time to flowering and flowering period, were observed for each species. Dr K. V. Sharman and Ms K. Fisher then assessed the horticultural application of each species in the following categories:

**Hanging basket** — prostrate or pendulous growth with a profusion of flowers.

**Flowering pot plant** — compact upright growth (less than 35 cm tall) suited to 140 mm containers, with many small flowers or several distinctly showy blooms.

**Tub specimen** — upright plants producing a showy floral display and vigorous growth. These plants be best planted in combination for a cottage garden effect.

**Rockery or bedding plant** — prostrate or upright plants which produce numerous small flowers or several large showy blooms. Plants may be spreading and open.

**Cutflower, fresh or dried** — plants which produce blooms on long stems or blooms which may be suitable for drying.

*Rhodanthe floribunda* (photograph on page 292), and *Rhodanthe manglesii* (photograph on page 289) were dual winners in the hanging basket category. Both have pendulous growth and produce a profusion of flowers. Those of *Rhodanthe floribunda* are white with yellow centres (hundreds may be present on a single plant) and 1–2 cm in diameter while those of *R. manglesii* are pink and 2.5 cm in diameter. Both species will flower for four to six weeks under glasshouse conditions. *Rhodanthe manglesii* while naturally suited to hanging baskets since its nodding flowers are borne on willowy stems which tend to droop freely was the number one selection as potted plant subject. Its overall size, waxy leaves, variable flower colour and abundant showy long lasting flowers on upright forms are spectacular. Selection of pendulous forms of *Rhodanthe floribunda* may be necessary to be a successful hanging basket plant. Flowers continue to be produced for many months. Seed germination of both species is relatively reliable. The upright forms with neat, compact, pretty foliage provide a soft effect behind the abundant everlasting flowers. *Rhodanthe chlorocephala* would decorate an attractive cottage garden.

*Hyalosperma cotula* is a small neat nicely dense plant (5–10 cm high) which can produce 10 to 30 small white flowers (1 cm diameter) at peak flowering, from dainty compact buds. It would be well suited to miniature containers but is too small for the normal potted plant trade. Propagation by seed may be a problem as seedlings struggle along slowly; vegetative propagation is preferred. Flowering continues for several weeks.

*Hyalosperme glutinosum* subsp. *venustum* is a small annual (10–20 cm high) which produces numerous bright yellow flowers (1–1.5 cm in diameter), but they are not present upright. Plants are tufty and may look best multipanted. Flowering will continue for three to four months throughout spring and summer. Seed germination can be unreliable and vegetative propagation is preferred.

*Lawrencella davenportii* can have as many as 40 elegant pink flower heads (2–3 cm in diameter) during peak flowering, which extend above a rosette of broad leaves. The flowers fade on ageing and seed heads need

to be removed. A form with shorter flowering stems on abundant flowers had the most potential. It is a very attractive plant. Seed germination is often difficult and propagation by cuttings is not possible due to its rosette growth habit. The flowering period extends over several weeks. See the photograph on page 316.

***Lawrencella rosea*** is an untidy bush with weak soft foliage likely to damage in transport. However, it produces masses of dainty flowers and would look good in a mass display.

***Schoenia cassiniana*** is a striking annual (20–40 cm high) which produces flowering stalks with clusters of bright pink, delicate flowers (1.5–2 cm in diameter). Each plant may produce five to ten flowering stalks which are persistent and held above a mat of broad hairy leaves. There are cascading and upright forms. Seed germination can be unreliable, however plants can be vegetatively propagated with success. Plants will continue to flower for several weeks under glasshouse conditions.

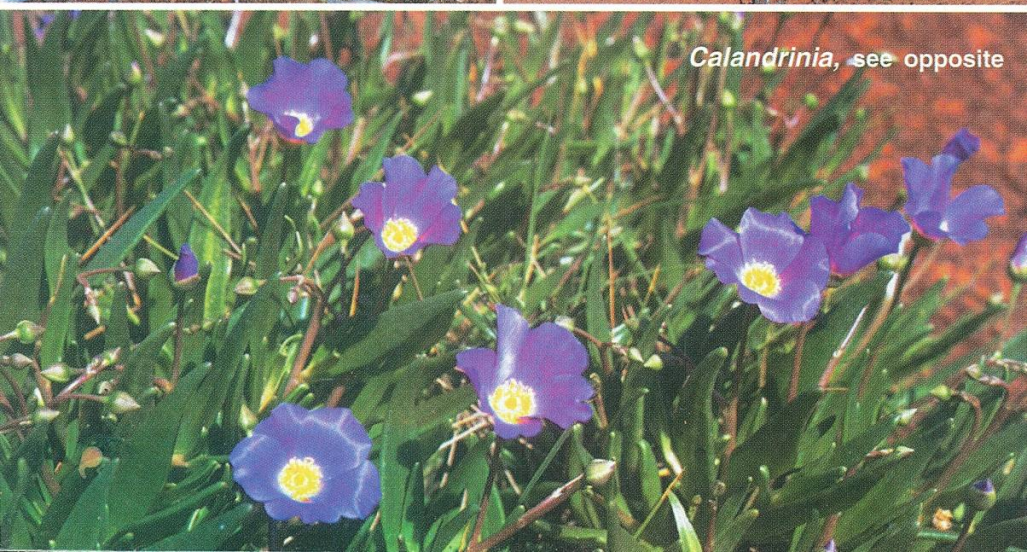
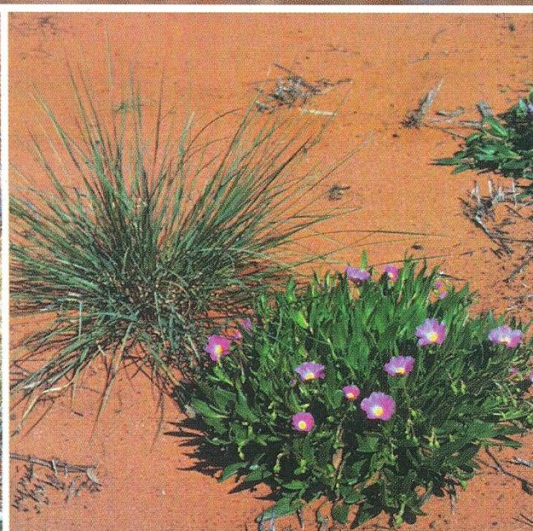
***Schoenia filifolia*** subsp. *filifolia* is a compact floriferous annual which can have up to eighty small yellow flowers (1–2 cm diameter) at peak flowering, and flowering continues for several months. The plant has thread like leaves and forms a tuft of growth to around 25 cm high. Seed germination can be unreliable but cuttings strike readily.

***Brachyscome lberidifolia*** (annual) is a attractive compact daisy (10–40 cm high) which has long been used in the garden or, on rare occasions, in a hanging basket. The flowers, 1–2 cm in diameter, are blue, mauve, purple and white. The compact habit and tendency to produce hundreds of flowers over several weeks makes it deserving of assessment as a flowering potted plant. Seed germinates readily and cutting propagation is also successful. Refer to *Australian Plants*, volume 18, page 317 for more *Brachyscome*'s and associated colour photographs.

***Bracteantha bracteata*** (annual and perennial) is a diverse species. The perennial cultivar 'Hastings Gold'; is the most suited as a flowering pot plant since it is compact (15–20 cm high) and bares large yellow blooms (3–4 cm in diameter) on short stems. An average of 20 flowers and 17 buds can be present on mature plants. Dwarf hybrids of annual *B. bracteata* which come in a range of colours, are commonly produced for the bedding plant trade and may also be suited as flowering pot plants. Plants propagate readily from cuttings and seed germination of hybrid forms is excellent. All the annual forms of *B. bracteata* flower for many months and the perennial forms will often produce flowers all year-round. Others such as *Bracteantha bracteata* 'Dargan Hill Monarch' are most suited to tub culture since their vigorous plant growth would not permit production in small containers. See photographs on page 313.

***Craspedia giobosa*** is considered to be suited to larger containers where a massed planting would produce a striking display. ■

**The Australian Daisy Study Group** has published *Australian Daisies for gardens and floral art*, and *Australian Brachyscomes*. Members are currently working on the collection of information to be the basis of their next book, *Australian Everlasting Daisies*. The following genera will be included: *Bracteantha*, *Cephalopterum*, *Chrysocephalum*, *Haptotrichion*, *Hyalosperma*, *Lawrencella*, *Leucochrysum*, *Rhodanthe*, *Schoenia* and *Waitzia*. They have done such a wonderful job of all their publications we await their results with high expectations. These genera will not be described in our series on Australian daisies until it is published. Please send notes on *Olearia* for *Australian Plants*.



*Calandrinia*, see opposite

# Bedding Plants for the 21st Century

Plants from Western Australia by Alison Fuss\*

Sales of bedding plants exceeded \$US1 billion in the USA in 1990, estimated at \$55 million wholesale in Australia. The plants among the best sellers bear little resemblance to their parents in the wild because of years of intensive development. Entrepreneurs from other countries are now looking at the rich Australian flora, let Australian enterprise develop this national resource.

The study has identified over 30 Western Australian native species with potential for use as bedding plants. Other research studies are being made of the many species in the large Asteraceae family so these have not been included.

***Actinotis leucocephalus*** is a small annual herb related to the NSW Flannel Flower. The flower head is of similarly arranged florets in densely packed heads, surrounded by a ring of white, densely hairy 'petals' actually involucre bracts. The plant has glossy green leaves. Native populations had between 3 and 17 blooms which varied in size from 20 mm to 36 mm across. The most floriferous populations also had the largest bracts relative to the central ring of florets and selections from the best forms were made. *Actinotis superba* was also included.

***Brunonia australis***, known as the Blue Pincushion Flower, has a compact head of cornflower blue with what appears as golden pins sticking into the blue pincushion. A local media campaign was used to assist in the location of the outstanding populations. Plants with pink, white a bicolor of blue and white were also located for development of pleasing forms. It is an annual arising from an attractive rosette of simple spatulate leaves. Variations of 5 to 27 blooms per plant on stems ranging from 10 to 35 cm long were noted, the blue pincushion heads ranging from 10 to 30 mm across. The plants ranged from large, vigorous and highly floriferous to quite petite in presentation. This was assessed by the horticultural industry as the plant with the greatest potential as a bedding plant. One reason given was the attractiveness of the particular shade of blue available. Our last issue, page 280, had a colour photograph and cultivation details.

***Calandrinia polyandra***, Parakeeylea, belongs to the succulent family Portulacaceae. The hot pink flowers with yellow centres arise from a basal rosette of succulent leaves, the flowers opening and closing in response to the sun. *Calandrinia* species occur in arid areas across Australia and the many forms offer an ideal development potential. *Calandrinia uniflora* was also included in this study. Three species are shown opposite, *Calandrinia uniflora* above, *C. remota*, (centre left) and *C. balonensis* (centre right) with *Calandrinia remota* below, all spectacular plants for pots or rockeries.

***Gomphrena canescens***, Batchelor's Buttons, is found in northern, tropical areas of Australia. The usually pink to mauve, dense, spherical flower heads 2-3 cm across are borne on simply branched stems. White and red forms have been reported. This annual usually grows erect to 30 cm high with opposite narrow leaves along the branches. See page 317 for a colour photograph.

\*A report produced by Dr. Alison Fuss and Rebecca Evans, funded by the Horticultural Research Development Corporation (HRDC).

A similar report "NSW Flora as Flowering Pot Plants", illustrated with many colour photographs, is given in *Australian Plants*, volume 18, page 297.

*Velleia rosea* has flowers ranging from white, pale mauve or violet to rosy pink all with contrasting colour variation at the centre. The flowers 18–25 mm across are terminally displayed in very open branching heads 15–23 cm across. The number of heads of flowers per plant ranged from 7 to 21 and seemed closely linked with the diameter of the basal rosette of leaves. The basal rosette of deeply serrated leaves of this semi-prostrate annual herb are an attractive platform to present these flower heads.

*Velleia trinervis* is a similar plant with more erect but smaller flower heads apricot to orange with a dark centre.

*Lobelia winfridae* is one of many Australian *Lobelia*. A form located in the Mt Magnet region is compact to only 5 cm tall displaying masses of characteristically slipper shaped flowers, each 2–3 cm long. The flower colours included mauve, yellow, khaki, blue and white with the possibility of more than one colour of flowers on a single clump. Flower colour and their abundance attracted a high assessment with purple flowers preferred over yellow, its use in hanging baskets receiving special mention. Critical comment was that there "were too many flowers in relation to the foliage" and one comment, "the flowers were too large".

\**Dampiera wellsiana* is widely known to native plant enthusiasts and visitors to the wildflower areas of western Australia for its flamboyant display of mauve to purple flowers proudly displayed about a neat clump of silver grey felted leaves. A very similar species *Dampiera eriocephala* also included in this study is featured in colour in volume 18, page 113, the only difference appearing to be that this species has non-hairy leaves. The characteristic clumping and round heads of mauve flowers is very similar to the much sought after *D. wellsiana*. The commercial horticultural industry consulted, ranked this species, together with the next two species described below, as the plant in the natural undeveloped state most suited to horticultural use for massed planting as a bedding plant, for general cottage garden use, or as a feature plant and for display in large pots. The large flower heads are displayed on single flower stems to 40 cm tall.

Other *Dampiera* species included in this study included *D. javandulacea*, *D. oligophylla*, *D. plumosa*, all with great potential.

\**Stylidium macrocarpum*, a Trigger Plant, ranked very highly as a bedding plant in cottage gardens and mass displays because of the soft pink flower colour and its plant form. There are a large number of trigger plants all with unique flowers either in heads on a single stem or produced in mass on shorter stems. Other species included in this study were *S. adnatum*, *S. crassifolium* and *S. graminifolium*. There are many more species of Trigger Plant very suitable.

\**Actinodium cunninghamii* is a perennial that has already taken off, one nursery classifying it as a "walk out the door" plant. While it was assessed as having considerable potential for massed planting and cottage gardens, its form, colour and size made it ideal as a specimen plant in rockeries or a large pot. See the colour photograph of this spectacular plant on page 317.

#### \*Annuals or perennials?

The last three species above were not included in the final list of plants suitable as bedding plants as they are perennial species. They were, however, highly ranked by the industry evaluation, together with *Stylidium adnatum* as being extremely attractive in their natural form and of considerable potential. Under basic cultural conditions where plants are selected and bred for seed production for the next years bedding plant sales, their growth and time to flowering may not be sufficiently rapid.

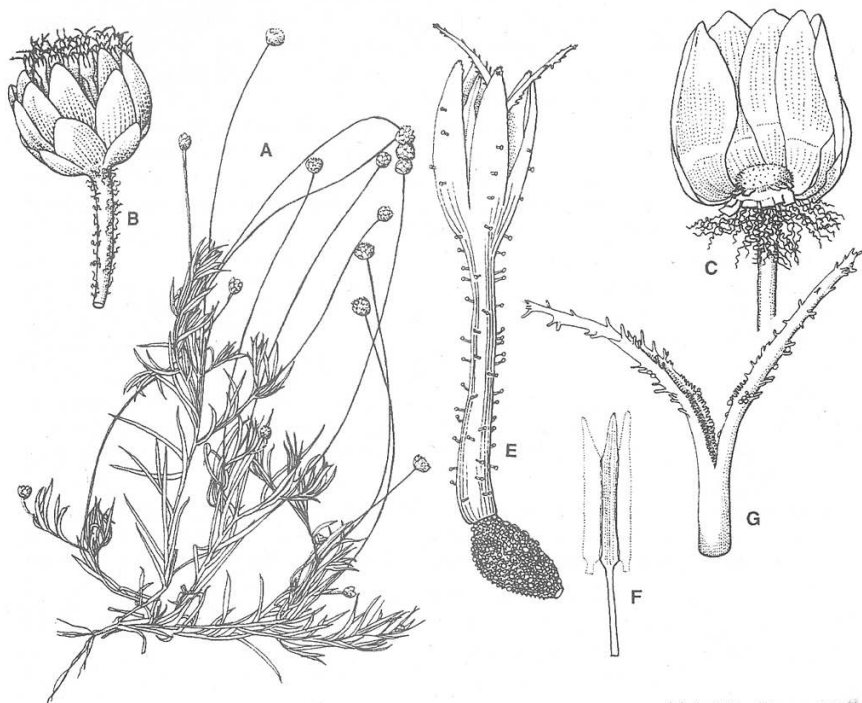
Annuals are generally considered more suitable for the production from seed. To maintain the desired standard of quality by selection, the practice of bush picking for seed must be replaced by cultivation for seed.

*Acomis* belongs to a group in the daisy family, where the flower heads remain a tightly packed ball of individual flowers or florets. The outer envelope of bracts (some long, others short) encloses a number of individual florets. The abundant yellow-brown flower heads **B** are 7–13 mm across. For *Acomis bella*, from Cape Yorke Peninsula, detail **C** shows this envelope of bracts with some removed, and all the florets in the centre removed, for clarity. It shows the dome shaped receptacle on which the florets are mounted and the white cobwebby hairs clustered below. There could be 60–80 florets (individual flowers) in one flower head each as shown in detail **E**, with the five petals surrounding the central style. The style has a pronged head, known as the stigma, as shown in detail **G**. The anthers, detail **F**, are hidden by the petals, one being just visible.

*Acomis macra* has similar bracts, a pale yellow or brown, but it has much narrower leaves and has female florets present.

*Acomis kakadu* has white opaque bracts with more open flower heads and is found in Kakadu.

*Acomis acoma* is not an annual but a perennial herb to 60 cm tall, with rounded to lanceolate, woolly-hairy leaves and yellow florets. It is found in south-east Queensland and north-east NSW.



# Tea tree oil industry

Rural Industries Research and Development Corporation Research Paper 97/53\*

by W. H. Payne

**Tea Tree oil production, an economic reality.** It has long been known in the bush as an excellent antiseptic and disinfectant. In recent years it has been used more widely, both in Australia and overseas. Originally extracted from natural stands of *Melaleuca alternifolia*, most tea tree oil is now obtained from plantations, from several thousand hectares established in Australia. The value of the total crop yield in Australia is estimated to exceed \$13 million.

*Melaleuca alternifolia* is usually a small erect tree reaching 15 m tall in good conditions, but may be reduced to a small to medium-sized shrub of 1–8 m tall in some locations (e.g., near Stanthorpe). It has grey to white papery bark. Leaves are narrow, linear and about 1–2.5 cm long, with numerous oil glands. The white flowers that are prominent in spring and summer are borne terminally or in the upper axils in a loose spike of 6–28 individual flowers. The cylindrical fruits are 3–4 mm in diameter. The species is frequently confused with *M. linariifolia*, but differs in its irregular leaf arrangement, shorter style and narrower leaves.

*Melaleuca alternifolia* has a restricted natural distribution centred on northeastern New South Wales with scattered populations between Coffs Harbour and Casino (altitudinal range 5–100 m asl) and outlying populations at Port Macquarie (15 m asl), Tabulam (550 m asl) and in the Stanthorpe-Ballandean area of Queensland's Granite Belt (800 m asl). The climate is warm subhumid with a mean annual rainfall of 1,100–1,600 mm (740 mm at Stanthorpe) falling near the coast to 51 mm annually in inland areas. The species has proven moderately frost tolerant in cultivation. In its main area of occurrence it is found in swampy areas subject to inundation for 1–3 months per year where the soils are predominantly alluvials, loams or clays of pH 4.5–5.5. Elsewhere it is restricted to the banks of drainage lines. Seasonal flowering usually occurs in late spring-early summer on trees that are more than 2–3 years old. A wet winter is associated with an increase in the number of trees flowering in a population and flowers per tree.

## Breeding Strategy

Australia no longer holds a monopoly on tea tree oil production because of plantations in other countries. Improvements in oil yield would help our emerging tea tree oil industry maintain its competitiveness in this global marketplace. *Melaleuca alternifolia* plantations total some 2,500 ha. Individual plantations are usually established using seed from a limited number of trees from natural populations with only rudimentary selection for chemotype. Often a grower will not know the pedigree of seed used, produced from wild stock.

A research programme based on breeding from higher yielding plants hopes to increase oil yields in new seedling plantations by 30% in five years with a 60% increase at conclusion of the first generation of breeding, about year 2000; to ensure that oil produced is of consistent, desirable quality and to establish a breeding population to enable flexibility and on-going improvements.

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\*Report prepared by W. H. Payne based on information supplied.

**Tea tree oil industry**, likely gains in production from using improved seed:

- A high yielding plantation had a base yield of 200 kg/ha. The current average is estimated at 140 kg/ha
- A plantation lasting 15 years will give 14 harvests; the oil valued at \$34/kg.
- The establishment cost is estimated at \$4,930/ha plus the cost of improved seed where applicable.
- The study produced seed from three special plantings. One (SS) gave a 17% increase in yield. Another (SS01) gave a 30% increase in yield.
- Operating costs in year 1 were \$2,750/ha.
- Operating costs in subsequent years, when the crop was harvested, were \$3,235/ha for a basic crop. ■

## *Corkwood ... as a source of medicine*

A survey of published information by W. H. Payne

Corkwood is the common name applied to two similar small trees, *Duboisia myoporoides* and *D. leichhardtii*. The pharmacological effects of administering aqueous extracts to animals and to the eyes of humans was reported as early as 1877 but it was not until the onset of World War II that Australian Defence authorities called for a review of Australian plants to replace drugs previously supplied by Europe. Intensive work on *Duboisia* resulted in the supply of the motion sickness drug used by the D-Day troops crossing the channel in 1944.

The subsequent years resulted in commercial production of the first fine chemical based on Australian flora produced in plantations. The industry founded on government restrictions and overseas competition on numerous occasions until European interests developed plantations to produce leaf for export to Europe for processing. Almost completely overseas controlled, annual exports of dried *Duboisia* leaves for 1988–89 were 500 tonnes which would result in an income of \$A10 m when processed.

A high-yield hybrid of the two species is now grown in plantations in the South Burnett area of Queensland. The leaf is harvested from plants kept as shrubs rather than trees, that can be trimmed regularly. The branches are shade-dried as rapidly as possible and the leaves stripped from stems and baled for sale. The industry earns nearly \$1million, mainly from small form trees.

*Duboisia myoporoides* is a small unimpressive tree to a height of 12 m. They have thick, corky, pale bark broken into fairly regular blocks. The foliage is relatively fleshy but dries paper-thin. The flowers are small, bell shaped and whitish, produced in large loose branched clusters, followed by small black berries. It has a wide distribution in rainforests and along their margins from northern NSW to far north Qld extending to New Guinea and New Caledonia.

*Duboisia leichhardtii* is a similar tree but restricted to Queensland mainly in the softwood scrubs of the district around Kingaroy. It is distinguished by its longer, pointed petals, a more tapered leaf, and oval fruits.

*Duboisia hopwoodii* is the other Australian species in the genus but is of little interest for drug harvesting. ■

# Phytophthora

## Tree killer

by W. H. Payne based upon Research Paper No 93/4\*

*Phytophthora* fungal disease is responsible for significant economic losses across horticulture, ornamental and pasture crops in Australia, at least of \$223 million. Losses to the forestry industry are huge and impose severe limitations on its profitable expansion. The impact of *Phytophthora* disease on native vegetation especially in south-west of Western Australia and in Victoria has caused, and continues to cause, devastation on a scale which threatens whole ecosystems and has brought species to the brink of extinction. This huge national disaster is killing off trees faster than we are planting and getting new trees to maturity. This creeping paralysis of our nation's natural resources is almost unnoticed.

Following a Workshop on the Bio-control of *Phytophthora cinnamomi* held at CSIRO, WA, in 1993, the Rural Industries Research and Development Corporation has produced Research Paper No 93/4 reviewing the crisis and formulating recommendations for action. The report is an excellent start. However, the scientists concerned are used to having their recommendations ignored by governments and these have been tempered by what they regard as a realistic possibility. They call for the obvious short term objectives of early detection and possible isolation of protected areas and the dream of the development of disease resistant species, abandoning our susceptible native flora. Meanwhile the inevitable expansion of this silent disease continues.

Is the nation to be drenched with chemicals? Phosphorous acid, used correctly, can reduce vigour of the disease and its extensive use is recommended. I refer the reader to our article "Phytophthora diseases," Vol. 18 page 366 that reviews this method. The main lesson to be learnt is that there is such a bonanza for the chemical companies that they are engaged in vastly expensive litigation to see who gets the millions of dollars of profit involved.

### **Fight the *Phytophthora* fungal disease nature's way**

Biological control\*\*, the use of naturally occurring organisms to combat and control this naturally occurring fungal disease. This disease has become rampant because of the actions of mankind to maximize production by development, and monoculture to feed the ever expanding masses of people seeking a higher standard of comfort. The approach taken in the Society's recommendations for adoption as an objective for the Year 2001 celebrations is not to be negative because of the emotive terms used here, but offers alternatives that conserve and enrich our natural resources. We can increase our nation's wealth and standard of living for all Australians as well as carefully conserving native flora and fauna.

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\*The Rural Industries Research and Development Corporation has produced Research Paper No 93/4, reviewing the crisis created by *Phytophthora* and formulating recommendations for action. It follows a Workshop on the Bio-control of *Phytophthora cinnamomi* at CSIRO, WA, in 1993.

\*\*One of our proposals for adoption by the Centenary of Federation celebrations in the year 2001, is for a national campaign of action. If this devastation were being caused to people or even to pigs there would be a national outcry and appropriate government action. As with all our proposals some action is being taken. Responsible scientists/managers are evaluating the problem to formulate a plan of action.

# Dubouzetia

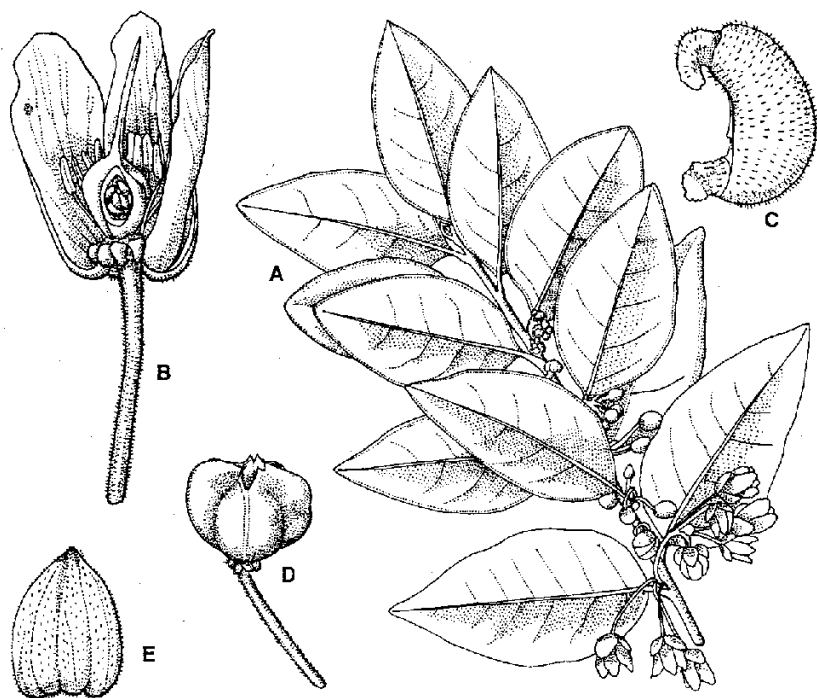
## Tropical rainforest plants\*

by A. R. Bean and L. W. Jessup in *Austrobaileya* 4(4)1997.

The Australian species of *Dubouzetia* are unusual plants that grow horizontally from vertical cliff-faces. The newly described species *Dubouzetia saxatilis* being confined to cliff faces on two peaks, one 25 km south east of Townsville, the other occurring in the Northern Territory.

*Dubouzetia saxatilis*, figure 1, is a shrub to 50 cm diameter with small white flowers as shown in detail B, its sepal C, developing to the fruit D and seed E.

*Dubouzetia australiensis* is similar but with larger leaves.

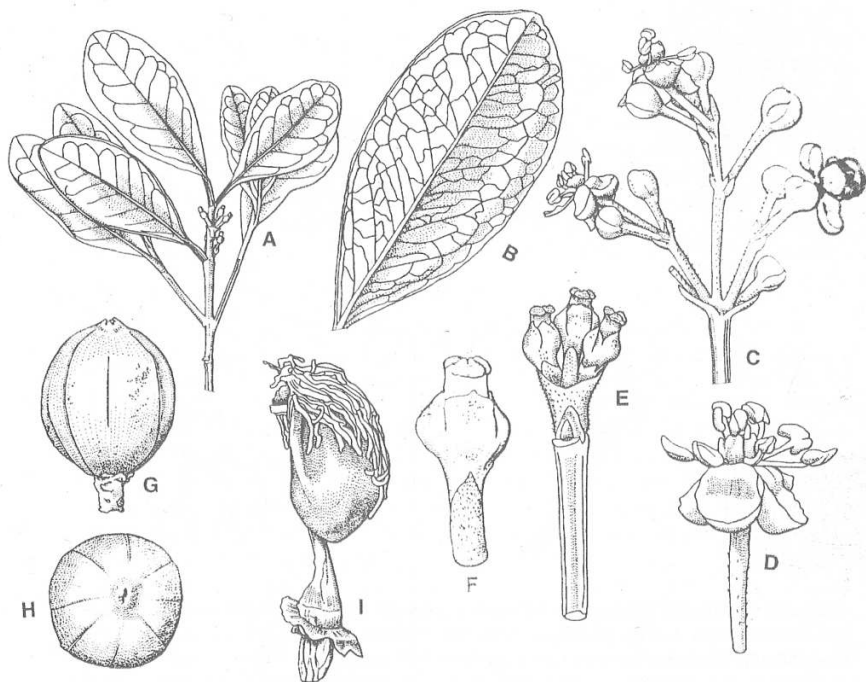


\*Tropical rainforest plants are difficult to present. Photography is usually of little value, the plants often being so large and the flowers way up in the canopy are often insignificant. Descriptions need be very technical and mean little to most of us. However, a detailed line drawing, particularly if the various species are shown together for comparison, can be of great value. These sketches by Del. W. Smith were taken from *Austrobaileya* 4(4) 1997, a botanical publication by the Queensland Herbarium, a publication not readily accessible to most of us. It records valuable research by botanical scientists whose work is not widely known. We take this opportunity to acknowledge the work of the scientists concerned and in particular, A. R. Bean, L. W. Jessop, Ailsa E. Holland and Paul I. Foster.

The two Australian species are trees to 30m high but often smaller.

*Austrobuxus megacarpus* is found only in the wet tropics in the Mt. Lewis area of Queensland. **A** is a twig with a female inflorescence, — **B** is the underside of a leaf, full size — **C** is a male inflorescence and **D** is a male flower  $\times 20$  — **E** is a female inflorescence and **F** a female flower  $\times 20$  — **G** and **H** is a three compartmented fruit  $\times 4$  and **I** a single seed with a red aril, attached to the central column of the fruit.

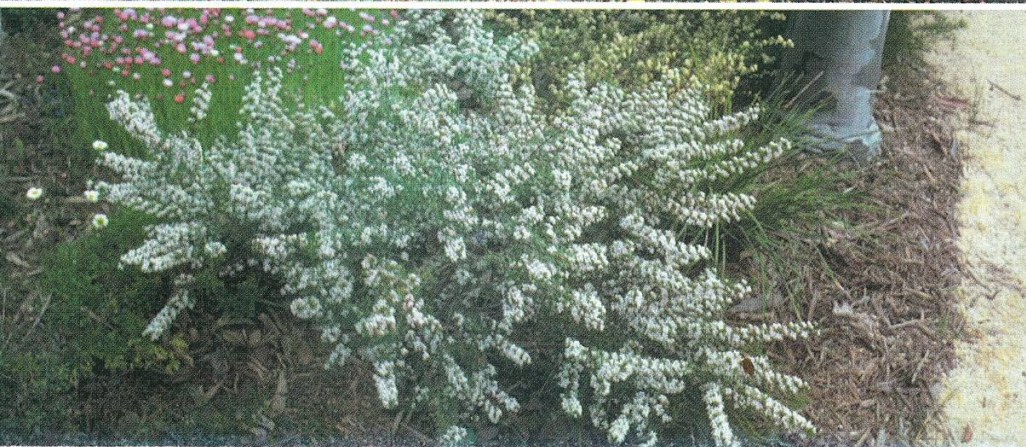
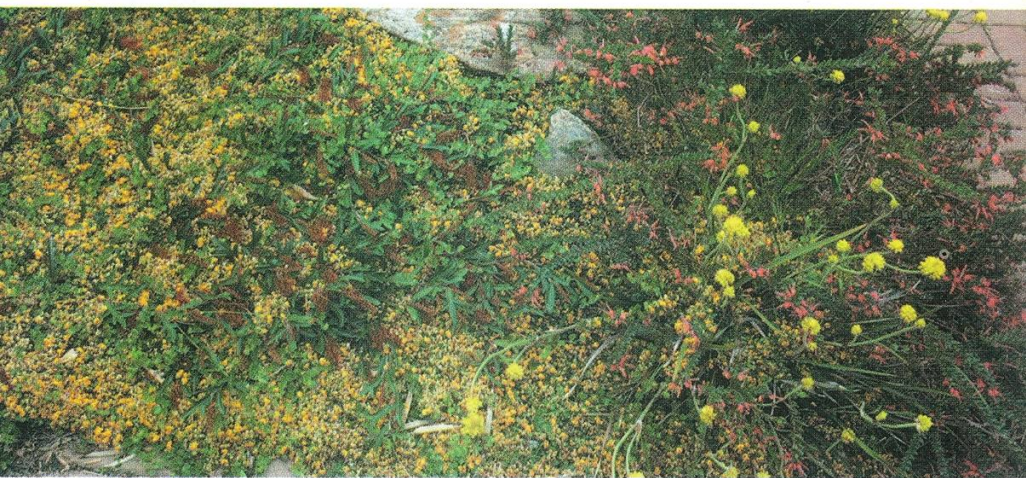
*Austrobuxus swainii* is similar but the narrower leaves have crenate, wavy leaf margins and the two compartmented fruit produces seed with a yellow aril.



**Photographers, please help.** It is possible to get good photographs of flowers, fruit and leaves of rainforest plants as has been done so capably by Hugh Nicholson. Unfortunately his exceptional photography is no longer available to us. Will others come to our assistance? Editor.



**The Dealtry garden**, see page 291. Above is *Leucochrysum albicans* (yellow) with the white *Cephalopterum drummondii* and *Lechenaultia* 'Scarlet O'Hara' (red) and *Lechenaultia biloba* (blue). Below is *Grevillea* 'Aussie Crawl' and *Conostylis candicans* (yellow pom-pom flowers) and *Grevillea baueri* to the right with a border carpet of yellow pea flowers. The bottom photograph shows a well flowered *Boronia anemonifolia*. This could be your garden.

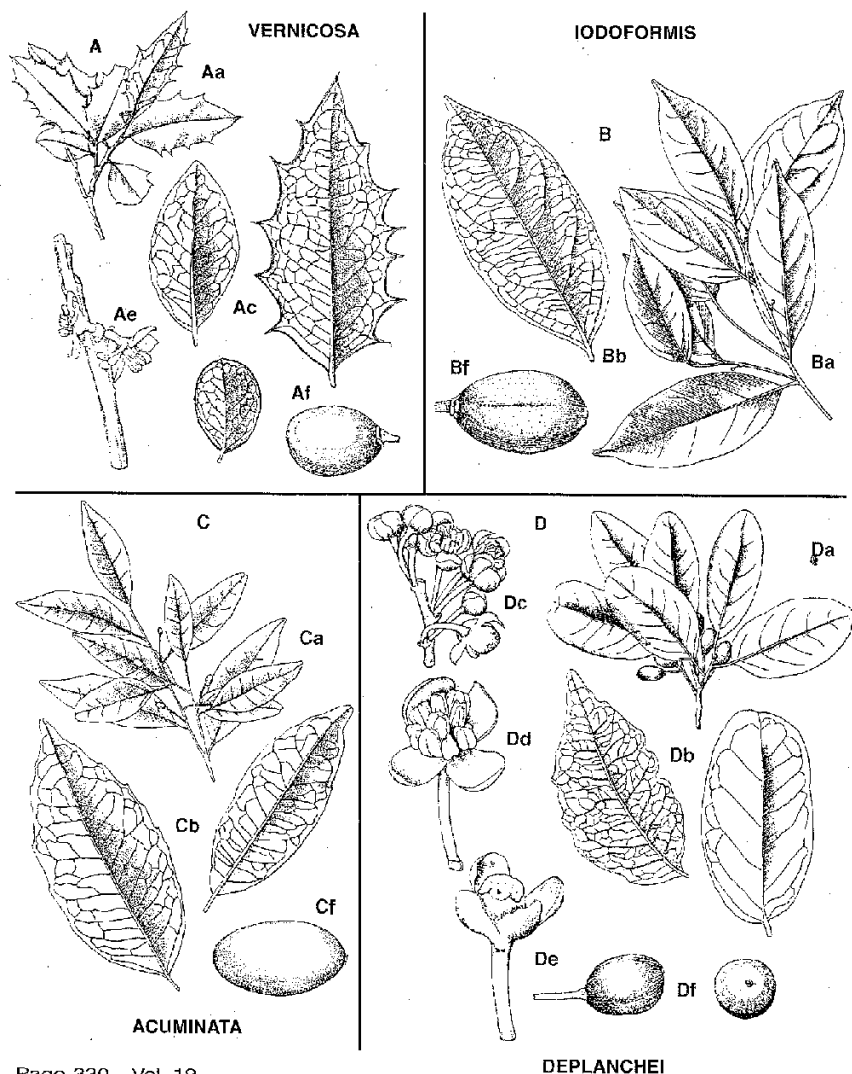


# *Drypetes* in Australia

## Tropical rainforest plants\*

by Paul I. Forster in *Austrobaileya* 4(4)1997

Attractive, relatively common trees in some northern rainforests, very little is known of their performance in cultivation as a specimen tree. The features are shown in the sketches below, alternate, entire leathery leaves, the small cream (male) flowers and female flowers developing to a small red or orange fleshy fruit.



The fruit of *Drypetes* are favoured by fruit eating pigeons. The difference between species is illustrated in the sketches. In all species the upper surface of the leaves is dark glossy green with distinct but not prominent venation, the lower surface pale mat green with prominent venation. The features shown for each species are: **a**: a fruiting twig; **b**: adult and juvenile leaves; **c**: the male inflorescence; **d**: a male flower; **e**: a female flower; **f**: a fruit.

*Drypetes deplanchei* syn *D. australasica* syn *D. lasiogyna*, Grey Bark or Yellow Tulip Tree, figure **D** is a small tree to 12 m high. The grey and white bark is scaly shedding in flakes, giving a mottled appearance. The blaze is distinctly layered, pale amber and yellowish. The trunk is sometimes weakly fluted. It occurs across northern Australia and south to Lord Howe Island and NSW. Cut as a timber tree the wood is valued for turning, carving, joinery and flooring. It makes an attractive small tree in temperate and tropical areas either as a specimen or in a cultivated rainforest. The dark green dense canopy provides useful shade and the female tree is decorative in fruit provided there is a male tree nearby.

*Drypetes acuminata*, figure **C**, is a tree to 12 m high, confined to wet tropical rainforest of north-eastern Queensland. The bark is light brown with irregular, shallow, rounded flakes, the blaze distinctly layered cream and yellow-brown, trunk fluted.

*Drypetes iodoformis*, figure **B**, is a tree to 20 m high from the wet tropical region of north-east Queensland. A cut stem produces an iodoform scent. The bark is grey, corky with whitish lenticels, the blaze distinctly layered, greenish and yellowish with a distinct 'iodoform' scent. The trunk is straight.

*Drypetes vernicosa*, figure **A**, is a shrub to 4 m high and is confined to the east coast of Cape York Peninsula. The bark is a nondescript white, the blaze distinctly layered and pale pink and yellowish. The trunk is often rather crooked.

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## Bush Food Beware

### Chemical constituents and potential toxicities of bush foods in current use.

Prepared for the Australian Native Bush Food Industry Committee  
by Plantchem Pty. Ltd., Dr. M. P. and E. E. Hegarty.

Bush foods in current use have been selected and cultivated, mostly in recent times. The selection and culling of strains to minimize the incidence of known toxic substances has been hasty in some cases. The industry needs to be wary of some products that have not been adequately tasted and researched. Most commercially available foods originate from wild strains that have potentially toxic substances and these toxins have been bred out or reduced to harmless levels in established crops such as lima beans, potatoes and melons.

For instance organic acids such as oxalic acid are common constituents of many green vegetables such as spinach, rhubarb, tea and Warrigal Greens. Warrigal Greens have been reported to contain up to 11% of soluble oxalate which can be removed by blanching. It is important that the water used in boiling or blanching is not used again for a base for sauces or to flavour other parts of the meal. For people on a low oxalate diet, such foods should be avoided. Oxalates are usually accumulative, especially in the kidney. Caution is urged when promoting new bush foods on the market.

# Environmental weeds

Joanna Seabrook OAM\*

Many introduced plants, some currently on sale in general plant nurseries, are having an unwelcome impact on the biodiversity of Western Australia. This disaster has had such an impact that the Environmental Weeds Action Network Inc. (EWAN) was formed to plan action. A working relationship has been set up with the Nursery Industry Association (NIA) to limit the weed plants used commercially. The matter is quite complex as the nursery industry needs to produce new plants each year, most of which have not been tested for weed potential. The NIA is seeking advice from anyone who has noticed a tendency of a plant, available commercially, to proliferate widely. Action will be taken.

What can we do? Develop alternative plants from the Australian flora. I see a need for smaller plants which can be massed, pot plants, standard plants and border plants. I believe there is unlimited opportunity to get more Australian plants into cultivation. Our home environment is getting more crowded, we have less space and a trend to smaller showy plants is certainly on.

I welcome the thrust of this issue of Australian Plants designed to encourage the development of small showy plants, not just because there is a ready profit for those taking advantage of this developing demand, but because it will help our Australian environment in ways you cannot imagine.

\*Joanna Seabrook has been a leader of revegetation programmes for many years. This has resulted in the award of Order of Australia to her recently. It could not have been awarded to a more worthy Australian pioneer. Contact her, 15 Rabone Way Boya, WA, 6056.

## The Plant Life Of Kosciuszko by Peter Codd, Bill Payne and Colin Woolcock

**Visiting Mount Kosciuszko?** You will need a copy of this book available for \$34.95. You will be able to identify the plants you see from the colour photographs. Like more detail, then refer to the line drawing of each plant, you will be amazed how easy it is to identify the plant; like to know more, then read the simple text. You will appreciate the wonderful alpine world much more if you spend only a few minutes on the book. Have you been to Australia's alpine areas!

**Botany for beginners!** Yes, the whole presentation is so simple and the sketches so clear you need not go to Mt. Kosciuszko to learn a lot about plants and how to identify them.

**Alpine gardening** Is gardening anywhere in cool climates. The plants presented here are ideal for that rockery or small garden, read about them and give them a try. Where do you get the plants to start with? We need to look to Tasmania and our next issue.

## Attracting Wildlife To Your Garden

by Rodger Elliot

There is nothing quite like being able to sit in a garden and watch the acrobatics of honey eaters as they gather nectar from flowers. Australia is blessed with 55 different species of parrots, lorikeets and cockatoos in a range of pastel shades to vivid contrasting colours and a few simple steps will assure a regular visit of at least one. Seed eating birds such as finches, wrens and robins can be encouraged to feel quite at home if suitable conditions are established in the garden. And what of butterflies, moths, native bees, frogs and colourful insects all in nature's garden, your garden if you want it. Every wildlife gardener is an ecologist!

Plants are essential for all creatures, even ourselves, and Rodger has presented the whole delicate scene in a way I have not seen it done so well before. Like all things of beauty, it takes some effort to create and maintain it and Rodger has done this in a very practical way. Follow the advice and sit back to enjoy. Reviews by W. H. Payne.

**Lothian Garden Series.** Each of these excellent books of about 60 large pages is produced as a series by Lothian Books, 11 Munro St., Port Melbourne. They are available at most book sellers each for \$16.95 or as indicated inside our rear cover, by post for an additional \$5. Others recommended in this series are Shady Gardens, Backyard Organic Garden, Bonsai, Creating an Australian Rainforest Garden, Hydroponic Gardening and Simple Pest and Disease Control.



**The Dealtry Garden**, see page 291. Informal landscaping above with assorted Kangaroo Paw Hybrids, *Grevillea lanigera* 'Mt.Tamboritha' in the foreground, *Doryanthes excelsa*, with the large strap-like leaves in the rear and yellow everlastings, the blue flowers being *Dampiera linearis* 'Early Blue'. Below is a fine plant of *Keraudrenia integrifolia* (purple flowers) with *Banksia petiolaris* and *Dampiera* at the base. The bottom photograph shows a reliably showy plant of *Alyogyne huegelii* with its delicate pink/mauve hibiscus type flowers.



# Australian Landcare

This quarterly periodical on practical conservation is part of the Australian Farm Journal group of publications package with an annual subscription of \$72. It is available separately for \$27 from PO Box 160, Port Melbourne, 3207. Previously there was a number of publications on the environment and now they are all together with support by the National Heritage Trust and landcare organizations. The first issue, April, 1998, gives details of last years Landcare winners, revegetation and land rehabilitation, soil management and water related schemes, as well as farm forestry.

## Wildflower Nurseries in Queensland

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#### 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. Money, N. Scarborough, R. Smythe Kirk and P. Bailey.

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

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

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*Ozothamnus diotophyllus*

Photograph by M. Fagg.