

Australian Plants

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Australian plants means all the flora of Australia in all its forms. This vast array of plants has evolved over thousands of years mainly in isolation, making it the most unique assemblage of plants in the world. Our unique fauna has evolved with it and both flora and fauna, the birds, the bees, the animals and small creatures are all fully dependent on each other. We should never forget this. When I published an issue of Australian Plants with a butterfly associated with a plant on the front cover, a reader sent a letter of complaint claiming that we are concerned only with growing Australian plants. Our cover of this issue may upset that reader but it is to bring to notice that our fauna is dependent on our flora.

Australian Plants, the magazine, highlights this interdependence and refers us all to "the big picture". In this issue we refer to mammals, birds, bees and butterflies. What is not realised is that the largest most destructive animals, humans, are also vitally dependent upon a healthy continent. With proper guidance from the Chairman of the Centenary of Federal Council created to oversee the celebrations in 2001 of 100 years of federal government, this destructive animal can become a guiding angel in the management of our natural resources for a prosperous future for all including the fauna, and the flora.

This issue is presented for beginners who want practical advice.

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COVER PLATE, Pygmy Possum in its habitat, a wattle tree. Photography by Gary Lewis. This is the eastern form found in rainforest and eucalyptus forests along the coast and range south from Brisbane to Tasmania and east to Adelaide where the western form occurs west to Perth. The head and body length is only 70–110 mm. It has a special brush-tipped tongue for feeding on pollen and fruit. Its size allows it to access hollows through very small holes. Small nests about 6 cm in diameter have been found in tree hollows and among branches. Why not provide a nest box for this fascinating little creature, see page 177 for details.

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Creating A Native Garden

Wildflower Gardening For Beginners

My Garden No. 26

by P. J. Mills

Our house block is the average suburban size, with an acid loamy soil. It is 20 cm deep over a dry hard red and grey clay. We had to remove quite a lot that the builders had excavated for the house foundations and spread over our soil. The water table must be well down because we had no bad drainage except for the excessive rain during last winter. It took a while to drain away. A hole filled with water would drain away in about an hour.

Very little digging had to be done, initially. We had the block levelled out and the weeds taken away. It runs roughly north to south receiving full sun most of the day. The worst wind seems to be from the north and we try for an easterly aspect for the more difficult plants.

On this cleared block with all vegetation and weeds gone we wet the surface and spread blood and bone all over the area to be used as a garden. Over this was placed newspaper many sheets thick, and the area covered with a thick layer of mulch. You can see the mulch as it has weathered over the last five years although some areas have been topped up. There is a large deposit of fallen leaves under the shrubs. The original mulch consisted of mainly eucalyptus and other leaves of trees that had been lopped near power lines. We let it settle, gave a few waterings, then planted.

The plantings included those shown in the photographs, numerous *Grevillea* including the orange and pink forms of *G. dielsiana*, *G. drummondii*, *G. lanigera* the prostrate Mt Tamboritha form, *G. longistyla*, *G. superba*, *G. thelemanniana* (the grey leaf prostrate form), and the cultivars *Grevillea* 'Moonlight', *G. 'Boongala Spinebill'*, *G. 'Ned Kelly'* and *G. 'Winpara Gem'*. Many *Hakea* were planted including *H. coriacea*, *H. multilineata* and *H. orthorrhyncha* (which has not flowered yet), *Acacia* including *A. chrysocephala* which is a ground cover producing a lovely deep gold blossom, as well as *Banksia*. We had some losses of large shrubs during our very hot summer so will have to start again in some areas.

We had disappointing results in the past with *Banksia* but since using the "lime overlay method" results have been encouraging although they are only three years old. After preparing the hole by digging it 20 cm deep and the same wide, I put a good 3 cm layer of lime and cover this lightly with river sand. The whole is then filled in with the top soil mixed with a small bucket of river sand. The plant is planted in this such that the top of the soil from the pot is level with the top of a small mound to 5 cm high. We plant when they are quite small, about 8 cm high, small is best. They are watered well and mulched with decayed gum leaves. Ground lime can be used but I used just the common garden powdered lime. The plants are then only watered during a long dry spell, which of late we have had many. The plants shown in the photographs are:

Waratah, *Telopea* 'Shady Lady'. Our first attempt failed as it was the wrong aspect, it faced north, and the spot was very dry, not getting enough moisture. Our second was obtained from a nursery in a 15 cm size pot and was 20 cm tall. The plant in photograph A, next page, was planted out as above but with a lot of peat moss added. It has an easterly aspect with protection from the northerlies.



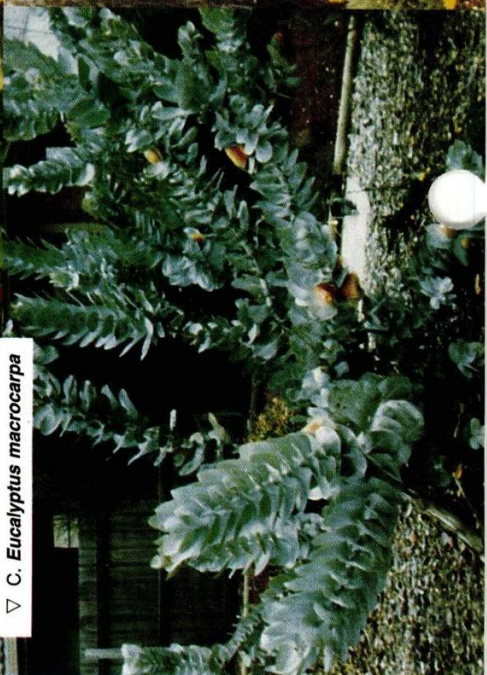
△ A. *Telopea* 'Shady Lady'

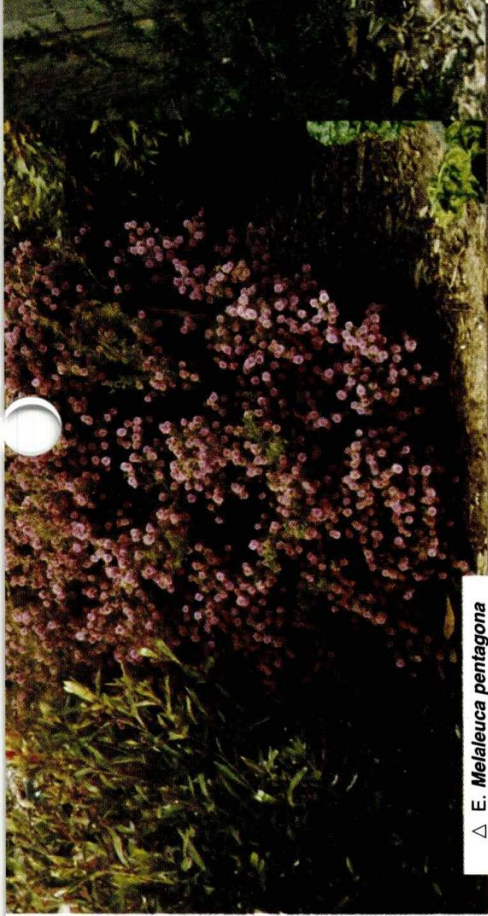
▽ C. *Eucalyptus macrocarpa*



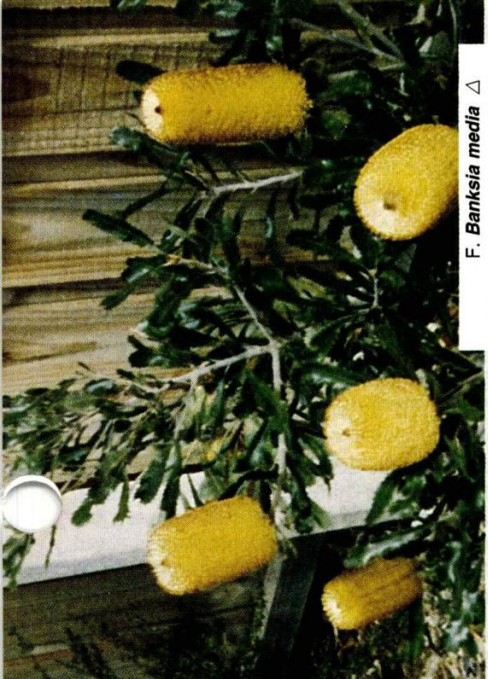
B. *Scaevola aemula* △

D. *Eucalyptus caesia* 'Silver Princess' ▽

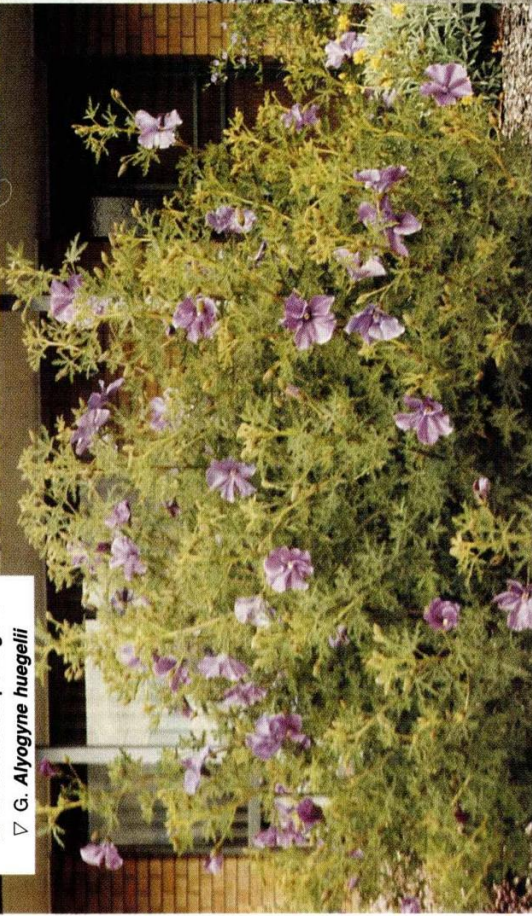




△ *E. Melaleuca pentagona*
▽ *G. Alyogyne huegelii*



△ *F. Banksia media*
▽ *H. Thysanotus patersonii*



Brown Boronia, *Boronia megastigma* has also been successful using the same method as for Waratah. The plants last 3 to 5 years and reach 30 to 100 cm high, providing a delightful fragrance to the garden. I cut it back by almost half after flowering as I feel it prolongs its life. The soil must be moist at all times. I also grew a red form of *Boronia pilosa* that lasted three years, growing to 1 m tall by 2 m wide and was a picture in flower. It succumbed to our dry summer.

Scaevola, *Scaevola aemula* (photograph B) a large flowered purple form, did well but died after the very wet winter we had last year. It will be replaced.

Showy Eucalypt, *Eucalyptus macrocarpa*, (photograph C) is 5 years old flowering in its fourth year but with less flowers the following year. The flower heads are 6 cm across. As you can see we have not had any disfiguration of the leaves that look so fresh and blue-green.

Silver Princess, *Eucalyptus caesia* is shown in the background (photograph D) behind the mauve hibiscus. Its graceful weeping habit may be recognised, slightly masking its many red flowers which are 4 cm across. It is 5 years old and flowered in its second year. I grew some from seed and planted five out when only 6–7 cm tall. I lost two of them in the dry hot summer in January of this year but the remainder are in bud and nearly ready to flower. Others shown are:

Yellow Everlasting, *Bracteantha bracteata* 'Cockatoo' (foreground photograph D). This plant is 2 years old, flowering like this each year. A very bright showy plant in the garden that flowers for a long time when the plants around it have finished. This plant has now passed on but has been replaced as it comes very readily from cuttings. It would be one for a beginner to start on.

Wattles, *Acacia fimbriata*, dwarf is shown growing in the forefront of the picture D showing Silver Princess and the Mauve Hibiscus. This is 2 years old and has just finished flowering. It is one of many small shrubby wattles that can decorate a garden without taking up a lot of room and casting shade.

Melaleuca, *Melaleuca pentagona* (photograph E) is shown growing between *Melaleuca megacephala* and *Grevillea* 'Marian' (since removed as there were very few insignificant flowers). Other *Melaleuca* species I have grown well are *M. irbyana* to 3 m tall, *M. huegelii* a dwarf form, *M. citrina* that has nice yellow flowers in spring, *M. fulgens* the purple form, and Robin Red Breast, *M. lateritia*.

Banksia, *Banksia media* (photograph F) is 4 years old and was planted using the "lime overlay method" described above. You will see that it gets protection from the fence getting the most out of an easterly aspect. Other *Banksia* growing and that are about this height are, *B. praemorsa* and *B. prionotes*. *Banksia menziesii* and *B. grandis* are less than two years old but very little yellowing has occurred.

Mauve Hibiscus, *Alyogyne huegelii* (photograph G) is a rewarding, fast growing plant. It reached this height of 1.5 m and flowered the first year. Over the last three years it has thickened up by cutting back by half after flowering. If it shows signs of yellowing give it a light dressing of garden lime.

Fringed Violet, *Thysanotus patersonii* (photograph H) flowered well but then died. It was planted in well drained loamy soil mixed with river sand. I think it was exposed to strong winds which caused its downfall. I will try again.

Others that are doing well are *Persoonia pinifolia*, *Hypocalymma angustifolium*, *Acacia cultriformis* prostrate, *Crocea saligna* and *Beaufortia squarrosa*.

Wildflowers for Beginners

by W. H. Payne

Presented for those new to the wonders of Australian wildflowers, whether for the garden, conservation or bush rambles, the issues of volume 19 will also be of wider interest. For beginner gardeners wherever you live in this vast land of ours, there are plants that you can grow with simple advice on cultivation. Look for the series "My Garden" especially, where readers with a wildflower garden describe what they grow and how they grow them.

Growing wildflowers? The last issue explodes some of the myths that have been associated with wildflower cultivation. Those that have been selected or developed for horticulture are really no different from the garden exotics, the wildflowers of other countries that have been developed for horticulture. We are just beginning this exciting period of developing the very best forms of our flora for cultivation and you can be part "of the action". Just as with exotics, you need a friable well drained soil of reasonable depth for the best results. We have active local groups in towns all around Australia, many of whom produce experienced advice on how to grow wildflowers in their area. From Cairns, and Mackay to Hobart and across to Perth and up to Broome, the gardening advice is incredibly similar, all that differs is the plants used.

Gardening writers with little personal experience in growing natives perpetuate the myths including "try to emulate the conditions in which they grow in nature" and end up with "needs good drainage". Good gardening practice for growing exotics demands good drainage but also demands organic humus in the soil, nutrients for the plant to nourish itself, mulch on the soil surface to give a cool moist surface and watering, often copiously. Most natives developed for horticulture prefer these good garden conditions but if you prepare the garden properly before planting the need for maintenance and watering is very much reduced, but not eliminated. Pruning after flowering is usually essential.

We have articles on gardening in Queensland, New South Wales, Victoria and Western Australia in this issue. When I received the article by Phyllis Mills I thought "here is an ideal guide for beginners". Then I note that she has used lime in the bottom of the planting hole for particularly difficult plants from Western Australia, plants that have not been tamed yet, or has she done it? You can try it but only for plants from Western Australia at first, and only at the bottom of the hole. This practice was pioneered by Jim Webb many years ago but some scientists claimed that a special study proved it was wrong. They forgot to tell the plants because it works in some cases. Natives prefer acid soil and the people of Adelaide lament on how they have problems in their alkaline soil, so keep your soil acid with rotted down leaf and vegetable matter and do not use lime on top.

Wildlife conservationists? All our native creatures depend upon our flora. One cannot exist without the other. If we concentrate on conservation of our flora, the rest is then secure. Every issue deals with practical aspects of wildlife conservation. The efforts at cultivation and export expansion all are part of this desperate need to conserve our continent and our way of life. We never claim that growing in captivity is the way for conservation, only a way to gain experience on how to maintain or re-establish populations in the wild.



△ *Lambertia ilicifolia*, see page 155.

Both photographs by Bruce Fuhrer

▽ *Lambertia multiflora*, the Darling Range yellow flowered form, page 156.



Native Honeysuckle — *Lambertia*

Growing Proteaceae in Western Australia

by Bob Dixon, Extensions and Development Officer, Kings Park and Botanic Garden

Lambertias are beautiful plants, which, like other *Proteaceae* encourage nectar feeding birds into your garden. Whilst they have very attractive flowers with flowering periods sometimes lasting for several months or occasionally throughout the year, we should not forget about another of their attractive features, their foliage. This comes in many shades of green often with contrasting reddish new foliage, different shapes and sizes, some needle like and prickly whilst others have broad non prickly leaves.

In general terms *Lambertia* in the past have proved fairly difficult to propagate and grow on in Kings Park and Botanic Garden. It may also be a similar situation in the nursery industry in Western Australia as you rarely see plants for sale apart from specialist native plant nurseries. However, one nursery grows 4 species, indicating they find them fairly easy to grow from cuttings. Few home gardeners, including native plant enthusiasts, have them in cultivation.

Problems and myths for growing *Proteaceae*. Poor free draining sandy soils typical of the Perth metropolitan area. *Proteaceae* seem to require a soil with better water holding capacity. Most people think they require no summer watering as they are native plants and should be completely drought tolerant. Most people think western plants grow in bottomless gutless sand. *Banksia hookeriana* and *Macropidia fuliginosa* for example grow in soils that have a fairly high clay content, on or over lateritic soils (iron stone) with some sand and a high clay content. Failing to water these when they are established often results in their death and the same applies to *Lambertia*. It should also be borne in mind that they are also susceptible to root pathogens such as phytophthora.

The best method of growing *Proteaceae*, including *Lambertia*, seems to be either in builders sand, which has a high clay content or by using trickle irrigation as we do in Kings Park. In the newer developed gardens such as the Rare and Endangered Garden they grow fairly well. Choose a free draining slightly acid soil. They will tolerate a slow release fertiliser low or excluding phosphate, and benefit from mulching as long as they do not have it close to the main stem which can cause rotting during the wetter months of the year. Generally they do not need pruning unless they are straggly or you have to remove a dead or broken branch. Any pruning is best done straight after flowering.

***Proteaceae* from Western Australia should be in full sun** though some species will tolerate broken sunlight for the hottest part of the day. Choose a sheltered position away from strong drying easterly winds (in WA). The western *Proteaceae* can be difficult in summer rainfall areas with high humidity.*

*Growing western species of *Proteaceae* in the eastern states has proven difficult. The articles at the beginning of this issue will be a valuable guide.

Editor's Note: All 10 species of *Lambertia* are described in the Number 148 issue of Volume 18, page 335 with line drawings to illustrate the features of the plants, the leaves, flowers and fruits together with colour photographs of many.

Propagation of Native Honeysuckle by Seed

Many species have been successfully grown from seed, the problem is often obtaining the seed. Fresh seed seems to be the key to success. Many of the seedlings of rare or priority listed species have been supplied to Kings Park and Botanic Garden by The Department of Conservation and Land Management through their "Threatened Flora Seed Centre". Information has also been supplied on their germination rates and time (days) to germination as noted below. Note that the germination testing was done under sterile conditions in petri dishes, (the days to germination probably being fewer for conventional means) using a temperature of 15° centigrade and 12 hours daylight. Some clones take longer to germinate than others under the same growing conditions.

Here in Western Australia the best time for sowing is in autumn, their natural germination period. They require a free draining, preferably sandy, sowing and potting mix low in nutrients especially phosphate. Most people use a slow release fertiliser such as Macroco[®], Nutricote[®] or Osmocote[®].

Propagation by Cuttings

The best material is semi hardwood; if the material is in good condition it is much easier to strike. In Kings Park and Botanic Garden nursery where most of the information comes from, one of the unfortunate problems is that most of our records are from cuttings taken straight from plants in the bush the strike rates are variable. One commercial nursery indicates the species they grow are easy to strike from cuttings, and claims the easiest species of all is *Lambertia formosa* Mountain Devil, from New South Wales. Common commercially available hormone powders give good results. It is interesting to note from our nursery records, we have good strike rates for cuttings taken from autumn to mid summer.

The following gives some detail on the individual species. I have omitted species we are not growing. Please note several of the Declared Rare species, at the moment, are not available for cultivation as it is illegal to take material from the bushland. You can only propagate and sell from plants in cultivation.

***Lambertia echinata* Prickly Honeysuckle**

This plant is found between Albany and Esperance on coastal rocky soils exposed to strong winds. As the common name suggests this is a prickly shrub, fairly open and usually up to 1 m high, though the type form can reach a height of 2.5 m. The leaves which are up to 4 cm long, with prominent veins, are a medium green to bluish green in colour, hard, and each of the 3 to 5 lobes is terminated by a sharp prickly, a good people barrier. Flowers which are produced from Aug. to Oct., are creamy pink to red (yellow in the subspecies *citrina*), in heads of seven. They are auxiliary on the stem, yet prominent. This plant is Declared Rare Flora.

Cuttings taken in December gave strike rates of 50–90%. This species has also been grown from seed, with the first seedlings appearing in 15 days. Information from CALM indicates the following germination rates and time to first germination; *L. echinata* ssp. *echinata* 93 to 100% (23 days), *L. echinata* ssp. *citrina* 82–100% (16 days), *L. echinata* ssp. *septentrionale* (ms) 81% (18 days). The growth rate is fairly rapid when it receives trickle irrigation. However, it is new to cultivation and its cultural requirements are yet to be evaluated.

***Lambertia ericifolia* Heath-leaved Honeysuckle** (Photo. Vol. 18 page 337)

This is a magnificent plant when you see it in its natural habitat in the vicinity of the Stirling Range where it grows on gravelly soils. It is an open large shrub up to 5 m tall, being the dominant plant, where it grows, sticking out of the lower vegetation. As the name suggests its leaves are heath like, that is linear 1–1.5 mm wide and up to 2 cm long and medium to dark green in colour. The flowers are orange-red to 4 cm long, generally terminal, in sevens, and produced from Aug. to Jan. with a peak in Sept. and Oct. The growth rate of this species is very fast when given good growing conditions such as in builders sand. It normally takes 3 years to flower from seed. Seed takes 35 days to germinate.

***Lambertia fairaili* Fairall's Honeysuckle** (Photo. Vol. 19 page 1)

This is another of our Declared Rare plants. It occurs in the Stirling Range National Park on rocky slopes where it experiences strong wind but is protected, to a degree, by surrounding vegetation. It is a prickly shrub up to 1.5 m high with crowded, stiff, dark green narrowly elliptic to cuneate, rarely with irregular lobes, leaves up to 3 cm long terminating in a sharp spine. The yellow flowers, usually in sevens and crowded together, are produced in late spring, early summer and occasionally in late autumn. Cuttings taken in September gave a 14% strike rate. Seed germination varied from 33% to 100% and first seedlings appeared in 22 days. Plants are difficult to establish, young plants can become yellow and stunted.

***Lambertia ilicifolia* Holly-leaved Honeysuckle** (Photo. on page 152)

A bushy shrub up to 2 m tall and 2m across with spiny ovate to obovate medium green stiff leaves to 2.5 cm long, usually with 1 or 2 marginal lobes. Flowers are in sevens, bright yellow and mainly produced between Sept. and Oct. They have the smallest flower of the genus, to 12 mm long. Plants grow naturally in sandy soils over laterite in low scrub between Northampton and Bencubbin. Plants raised by cuttings gave a strike rate of 32%, and seed took 19 days to germinate. This species has responded poorly in cultivation in the older parts of the Botanic Garden. Trials need to be done to evaluate it as an ornamental plant.

***Lambertia inermis* Chittick** (Photo. Vol. 18 page 337)

A shrub to a small open tree to 7 m high with linear to oblong-spathulate leaves to 2.4 cm long and 7 mm wide. The attractive leaves are medium to dark green in colour and white or rusty brown underneath. Flowers are usually in sevens, terminal, to 5.5 cm long and produced throughout the year with the main flowering periods in winter and spring. The type form has orange flowers and the variety *drummondii* has yellow flowers. They grow on a variety of soils, coastal dunes, sandy loam, and sand over limestone or laterite from Esperance to Albany and north to Ongerup. It may be appropriate to select a form which would grow naturally in similar soils to those in your garden. In cultivation they have done reasonably well in the Botanic Garden and are great for attracting nectar feeding birds. They tend to be short lived in cultivation but will reseed themselves around the parent plant. Plants grown from cuttings set in Aug gave a strike rate of 56%, and seed takes 26 days to germinate.

Photographers and gardeners: We need photographs of your garden and plants in the wild. Slides or prints will do, please make a special effort right now. Hopefully Phyllis Mills who took the photographs of her garden as shown on pages 148/9 will be a good example of what can be achieved by an amateur photographer. From the above you can see we need colour photographs of *Lambertia echinata*, *L. ilicifolia* and *L. rariflora*. **Please make the effort.**

***Lambertia multiflora* Many-flowered Honeysuckle** (Photo, Vol. 18 page 357)

A bushy to upright open shrub to 2 m high, which is a fairly widespread and noticeable species within its area of distribution between Eneabba and Busselton. It is found growing on sandy, lateritic or loamy soils in low scrub or open Banksia/Eucalyptus woodland. The type form has reddish orange flowers and the var. *darlingensis* has yellow flowers. Flowers are terminal usually in sevens but up to 19, are 2.5 to 3 mm long, and produced from Aug. to Dec. The leaves are very attractive with prominent veins, dark green and up to 4 cm long with a sharp spine at the end. Their shape varies from linear, oblong to narrowly obovate and sometimes auricular. Darling Range form is in colour on page 152.

This plant is occasionally cultivated and is very rewarding. It will tolerate fairly hard pruning, if necessary, probably as it has a lignotuber. In Kings Park it is growing well under trickle irrigation. Plants raised from cuttings in May gave a 15% strike rate, whilst those of the variety *darlingensis* (photo, page 152) taken in July had a 36% strike rate, and seed took 16 days to germinate.

***Lambertia orbifolia* Round-leaf Honeysuckle** (Photo, Vol. 18 page 373)

An erect fairly open shrub to 6 m high with dark green orbicular, concave, leaves to 2 cm diameter. The new leaves are an attractive rusty brown to light green in colour. The red flowers are 4–5 cm long usually in fours and produced mainly in Dec. and Jan. This plant is another Declared Rare species and is restricted in its distribution between Busselton and Narrikup where it usually grows on sand over laterite in low areas with a high water table.

Cutting grown plants are very vigorous in cultivation and growing well in our Rare and Endangered Garden in Kings Park reaching a height of 6 m in 6 years. Seedlings grow fairly well in containers but are much slower growing reaching a height of 1m in 4 years. Plants raised from cuttings in Nov. gave a 50% strike rate. This species has also been raised by germinating seed in vitro in Kings Park Laboratory. Seed gave germination rates between 77 and 100% with most batches between 90 and 100%, and first seedlings appeared in 8 days.

***Lambertia rariflora* Green Honeysuckle**

An open large shrub or small tree to 7 m high with dark green, linear or narrow oblanceolate leaves to 9 cm long, with or without a sharp spine at the end. The flowers within the leaf whorl, mature one at a time; they are green to yellow, up to 3.5 cm long and produced in Jan. to March. Plants grow naturally in lateritic or clayey soil in *Eucalyptus megacarpa* and *Eucalyptus (Corymbia) calophylla* dominated forest between Busselton and Walpole. The type form has green flowers and the subspecies *lutea* has yellow flowers.

This is the least attractive of the species. As it is a Priority Listed species, it is being grown and evaluated in Kings Park and Botanic Garden for its horticultural attributes. It grows fairly well under trickle irrigation. Cuttings taken in May gave a 76% strike rate, those taken in Jan gave 53% strike rate.

Editor's Note: Other WA Proteaceae. In previous issues Bob Dixon has given similar descriptions of many groups of WA plants with detailed advice on propagation and cultivation. He is now covering other Proteaceae and *Isopogon* and *Petrophile* are next. We need notes from people who have grown these plants and photographs, either colour prints or slides. Please help us over this season.

Growing *Grevillea*

1 — The use of fertilisers

from The *Grevillea* Study Group*

"Osmocote +" 9 month is a reasonably safe fertiliser for *Grevillea*.

Pure **Blood and Bone** can be used mixed into the top of the soil at planting time together with a slow release fertiliser.

"Sierra Blend Nurseryman's Mix" has extra iron, low phosphorous plus a fast release component. This can cause problems, probably through the fast release component. Be careful when using any new product.

Depending on the soil, **"Sulphate of Ammonia"** does not cause problems with *Grevillea*; *Hakea*, however, hate it.

Nitrogen draw-down can be a problem with any potting mix containing decomposed sawdust.

The symptoms of **iron, nitrogen and magnesium deficiencies** were discussed and treatments passed on as was the warning that iron can tie up phosphorous and conversely, phosphorous can also tie up iron causing deficiency symptoms.

If unsure of the deficiency, a fertiliser containing ALL the trace elements, such as **"Aquasol"** and **"Thrive"**, is a good fertiliser when used with caution. A foliar spray will show results within a few days of use. Half strength use is a good first option until the results have been tested.

"Nutricote" has a polymer coating whereas **"Osmocote"** has a soy based coating, but both work in the same way by leaching of the fertiliser through the coating by osmosis. The coating forms cracks according to the temperature, the higher the temperature the wider the crack. Both fertilisers are colour coded according to the designed temperature range, and hence designed life of the fertiliser.

All potting mixes should be covered to avoid contamination. **Weed Mat** is good, allowing moisture to penetrate. Clear plastic sheeting will cause some sterilisation by solarisation.

"Zeolite" is supposed to absorb excess fertiliser and so act as a fertiliser itself. This can be purchased as **"Kitty Litter"**.

"Tropic" can be used as a fertiliser with caution for in-ground *Grevillea*.

*The *Grevillea* Study Group is one of many study groups open to members of the Society. They usually operate by mail through a leader enabling members with a common interest from all areas of Australia to be involved in a practical way. They each produce a newsletter and to cover this and postage costs they charge a fee of \$5-9 to belong. The notes above are reproduced from the *Grevillea* Study Group newsletter, the meeting being reported being from the south-east Queensland section of the group when it met in a private home at Cooran, just south of Gympie. These notes are unedited jottings of a general discussion at a private meeting and should be regarded as such. They are personal observations by experienced growers, impromptu advice to the other members of the group. We are privileged to have access to this information.

Study Groups are an important part of this Australia wide society and are another reason why the society is so highly regarded by the professional community. Its membership is predominantly average Australian citizens concerned about the conservation of the Australian flora and the development of this vast national asset for horticulture but there are many professional qualified people contributing to the activities. The operation of the Study Groups over the years has earned the respect of the professional community and the newsletters are an eagerly sought resource by academic institutions and botanic gardens.

Grey Spider Flower *Grevillea buxifolia*

The complex by J. M. Hart and M. J. Henwood in *Telopea* 7(1) 1996*
Notes compiled by W. H. Payne with references to the *Grevillea Book***

The Grey Spider Flower, *Grevillea buxifolia*, is well known to those who tramp the Hawkesbury sandstone bush as a very variable flower head. Recent research* has confirmed the findings of Olde and Marriott in their *Grevillea Book***, that there are many variants but that these may be grouped into three distinct forms. Two of these are the type form and another known as subspecies *ecorniculata*. However, most variants of what was previously subspecies *phylicoides* of *Grevillea buxifolia* are sufficiently distinctive to be raised to species level and will now be known as *Grevillea phylicoides* as initially named by Robert Brown.

These forms and similar species are well illustrated by Olde and Marriott in their *Grevillea Book***. The distinguishing features are in the fine flower detail.

The *Grevillea* Flower, The Spider flower of *Grevillea buxifolia*

Grevillea have a head of flower, known generally as an inflorescence, that comprises a number of individual flowers on a central stalk known as the floral rachis, the whole now called a confluence. For many species these individual flowers are along an elongated central stalk, the rachis, the whole presenting a tooth-brush or bottle brush presentation. With the Spider Flower Group this rachis is short and the individual flowers are clustered to form a pom-pom presentation. As described opposite, each individual flower opens with the long style opening from a "loop" to a long curved arm that collectively look like the many legs of a spider, the Spider Flower.

Grevillea phylicoides was previously a subspecies of *Grevillea buxifolia*, and incorporates those forms from the Blue Mountains found on Kings Tableland near Wentworth Falls to south west of Camden. It is a shrub to 1.5 m high with narrow elliptic to oblong leaves (7–30 mm long) although some local clones have wider ovate leaves. They are covered with erect hairs below whereas the leaves of *Grevillea buxifolia* are usually shorter and covered with adpressed hairs. The flowers are conspicuous, as shown in photograph 58B of the *Grevillea Book*, Volume 2. The style appendages are shown as green shiny blobs on the ends of the red furry styles, and the surface will have an elliptical pollen presenter 1 mm wide. The Colo form from the Culoul Range to the Wiseman's Ferry Dural area is retained in the *Grevillea buxifolia* subspecies *buxifolia* complex.

Grevillea sphacelata is also commonly called Grey Spider Flower and is very similar. It differs by having silky branchlets but glabrous (without hairs) leaves. It does not have the style head appendage, its style head being as in Figure 6.

**Telopea* is a scientific publication by Royal Botanic Gardens Sydney.

**The *Grevillea Book* by Peter Olde and Neil Marriott is published in three volumes. This exceptional series describes all 340 species of *Grevillea* and their various wild forms, but what makes identification easy is that there is at least one coloured photograph of every species. With notes on their readily identifiable features and how they differ from similar species, identification is especially easy. The three volumes are widely available from book stores but the price has varied widely because of unsatisfactory marketing practices. The society has invested heavily to produce these incredible books to the high standard that has been achieved and apologises for this marketing problem for which it is not responsible.

***Grevillea buxifolia*:** An individual flower is shown in its maturing stages:

Figure 1. The perianth (flower) before the style opens to become a "spider leg".

Figure 2. The style has separated from the hairy nectary, this is anthesis.

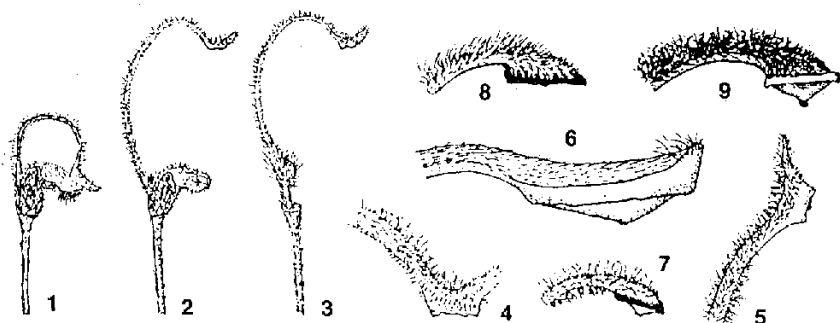
The magic of fertilisation and development of seed has started. The end of the style has inserted in it, what is known as a pollen presenter. Pollen grains were deposited on the pollen presenter just prior to anthesis. Within hours the pollen grains on the presenter are ready to be transferred by a bird or creature to the pollen presenter of another flower where the removal of one of its pollen grains has caused that vacant point to be receptive. This gives access to the stigma behind leading to fertilisation of the ovary.

Figure 3. Maturity has caused the dried floral components of the nectary to fall leaving the bulge of the ovary which, on fertilisation develops to seed.

Figure 4. The end of the style is shown in side view showing the appendage or bump on the end that is characteristic of *Grevillea buxifolia*. Its subspecies *ecorniculata* is without this appendage but the pollen presenter on the surface is rounded as with the type form.

Figure 5. *Grevillea phyllicoides* has a similar appendage but the pollen presenter is elliptical, only one millimetre wide.

Figures 6, 7 and 8 — There are a number of similar grey spider flowers as described.



Grevillea acerata is restricted to a small area near Glen Innes, NSW. Previously regarded as the northern form of *Grevillea sphacelata*, it is distinguished by the revolute margins to the crowded leaves, largely obscuring their underside. The flowers may have a bluish tinge to the grey. The style end is shown in Figure 7.

Grevillea occidentalis may be called the Western Grey Spider Flower being found in the lower south west of WA. The leaves are not crowded, rough to the touch on the upper surface and silky below, the ends sharp pointed and blackish. The style end is as shown in Figure 8.

Grevillea umbellata is also from WA but further north, Mt Lesueur to New Norcia to Wongan Hills with a variety *acerosa* widespread nearer the coast. While the flower heads are grey and woolly tending to pink in some forms, the leaves are distinctively narrow with a pungent end, the style end shown in Figure 9.

Christmas Bush of NSW

Ceratopetalum gummiferum, its forms and related species

from Yellow
Rock Nursery

There are five species of *Ceratopetalum* all of which appear to have some horticultural merit. They are restricted to Australia and New Guinea. *Ceratopetalum apetalum*, Coachwood, has been cut extensively as a valuable timber tree for many years. It has attractive fruit and some selection could see improved clones on the market.

The NSW Christmas Bush, *Ceratopetalum gummiferum*, is endemic to the east coast of NSW on the edge of rainforest or open forest. Often found on coastal dunes in areas of good rainfall, 1,150 mm (45 inches) and above. There are some excellent stands in the Port Stevens area. It regenerates well after severe fire with fresh growth from ground level from epicormic buds that also allow them to respond well to severe pruning.

Planting Christmas Bush

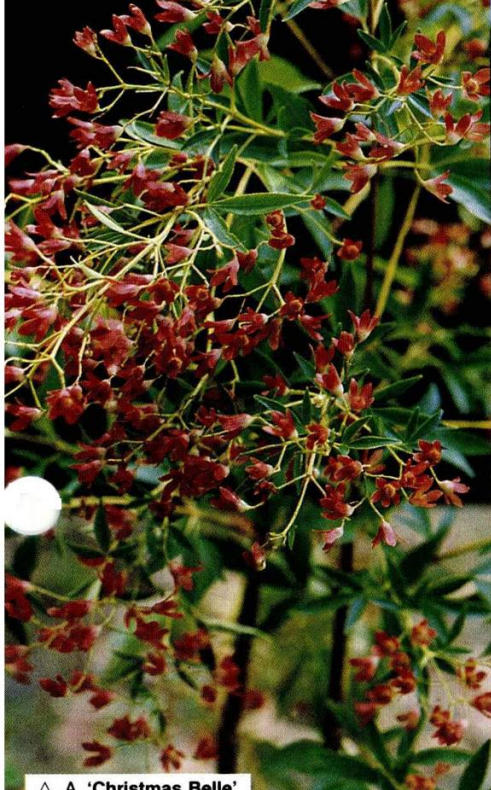
They prefer a well drained sandy soil but are not at all fussy, provided there is plenty of water and good drainage. The fine fibrous roots on young plants are tolerant of competition from weeds and grass. They also like a cool root run so a deep mulch is essential. Some organic matter incorporated into the soil at the time of planting seems to be beneficial. They can be difficult to "kick start" if severely checked when planted. Obviously then attention to detail at planting is vital. In a plantation situation I would consider irrigation essential. Ensure that drippers, micro sprays, etc. are located to water the soil ball of the freshly planted bush. They may need to be moved as the bush grows.

Care of seedling plants

Growing in containers requires constant grading especially clones such as Alberys Red. They grow best in a soil mix high in organic matter such as peat and pine bark fines and will take high levels of fertiliser up to 3–5 gm/litre. Some clones such as White Christmas are a little prone to iron deficiency and require higher levels of iron. They are not phosphorous sensitive but keep levels within the normal range. You need to watch some of the more vigorous clones as they can stretch up.

Care of a cut flower plantation

The small white flowers open mainly in October/November depending on location and the clone. After flowering the sepals swell and colour, the mostly mature fruit then becoming the harvested product. In general terms then you have the product at risk for a considerable time, right through flowering and into fruit set. During this period it is absolutely imperative that no water stress occurs. Water stress will cause small poorly coloured fruit or total loss of the crop from abortion of flowers or fruit. Exposure to hot drying winds at this time can also cause flowers or fruit to abort. We grow our large container plants on drippers but have overhead sprinklers which we use on extreme days to increase the humidity; this also helps to prevent leaf scorch.



△ A 'Christmas Belle'
▽ C. 'True Blue'



B. 'Wildfire' △
D. 'Alberys Red' ▽



The early flowering clones of Christmas Bush set flower buds very early in May/June so you need to ensure that plants have made sufficient size by then. This also means that in the plantation you need to prune and shape the bushes as soon as possible after flower picking, to get maximum growth during the summer. Plants should be fertilised at this time. As we are not plantation growers it is difficult for me to advise on the best pruning techniques to maximise growth and flower production but bush shape pruning after flower cutting appears essential. One commercial grower gives alternate rows a severe pruning every second year.

Bushes will require **regular fertilising** to keep them actively growing. As with seedling plants they are not particularly fussy and will respond well to most common fertilisers. They are not sensitive to phosphorous but avoid high levels of nitrogen in spring as this can cause shoots to grow through flowers giving too soft a product at harvest time. Avoid fertilising during very hot or dry conditions.

Planting in rows approximately 4 m apart (to allow machinery access) with plants 1.5 to 2 m apart would give good results. Very close planting could cause excessive shading which will cause poorer colour on the fruit in some areas, as well as more problems with disease control.

Pests

The flowers are very perfumed and produce a considerable quantity of nectar which attracts large numbers of insects most of which are harmless so please ensure you identify the problem before you resort to spraying. Most of these visitors are friendly pest controllers.

Leaf curling psyllid is a major pest. This is a native insect and will be more prevalent in those areas with plenty of bushland surrounding them. They will severely debilitate and disfigure the bushes if left uncontrolled. They are readily controlled with most insecticides, those with a slight systemic or at least leaf penetrating properties being more effective.

Scale is an occasional problem. Use the usual control for this pest but watch for phytotoxicity of some petroleum oils on very hot sunny days.

Thrips can cause severe damage during flowering. Either background native thrips or from exotic crops are easily controlled with most insecticides.

Borers are sometimes a problem. Their distinctive "sawdust" usually at a branch union, is easily seen. Their appearance is usually an indication of poor health and vigour of the bushes and is generally best controlled by attending to the needs of the bushes. In very severe cases I guess you could use a systemic insecticide.

Birds! In our area Crimson Rosellas, King Parrots and Sulphur Crested Cockatoos have a particular liking for the fruit. The Crimson in particular can demolish a plant in no time. Control??

Diseases

Fungal attack in flowers can cause major damage and if severe or left uncontrolled will cause total loss. The usual culprit is either *Glomerella* or *Rhizoctonia*, both opportunistic organisms and both controlled with Octave®. These pathogens can also attack both the tips and the stems often causing ugly brown lesions and die back. If left untreated they will cause severe splitting of stems and eventual death of the plant.

Prevention is best so avoid overhead watering late afternoon or at night. Where possible use drippers or micro sprays on the root zone. Ensure adequate air movement by correct spacing. *Phytophthora cinnamomi* is generally only a problem in poorly drained areas. Some clones are more susceptible than others, Magenta Star being one.

Clonal selection

There is a vast untapped genetic pool of NSW Christmas Bush and over the next few years a number of new clones will be released. Generally these will be bush seedling selections. An active breeding programme will improve the range and quality immensely. We are currently sourcing and assessing new clones for various attributes which include:

- Vigour and disease resistance.
- Ease of propagation.
- Heavy flower and fruit set, i.e., good bunching (good sepal to leaf ratio).
- Strong distinctive colour, dark red/pink/orange/white/bi-colours.
- Bigger fruit; there is big variation on most clones at the moment.
- Distinctive fruit shape, bell shaped/stellate/cupped.
- Good vase life, there is a large variation between clones.
- Late and early flowering to take advantage of Australia Day and Valentines Day.
- Distinctive leaf. This is displayed to a degree by Magenta Star and True Blue.

Clones of *Ceratopetalum gummiiferum*

Vase life recorded here is that obtained during a trial of 18 cultivars of *Ceratopetalum gummiiferum* as reported below. Comments on this study are made at the end of this report. The study was carefully carried out and qualifications on the results reached are given. As observed, the vase life will vary under conditions that prevail at the time and the figures quoted below are to be regarded as a guide pending further studies.

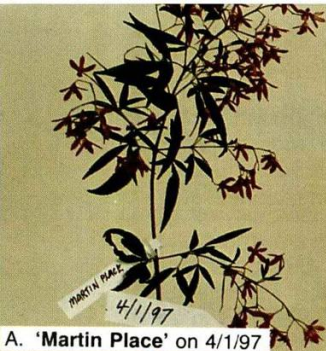
Origin of the clone. This is given as a matter of interest and to acknowledge the work of others in this field.

Alberys Red is generally considered the best clone for cut flower production. It is compact to 3–4.5 m high, the earliest to flower and colour. It stands up well to hot windy conditions during flowering and ripening and in almost any district north of Sydney can be sure of good colour well before Christmas. It is vigorous, heavy flowering, good bunching with a medium to large fruit that is an excellent dark red (RHS 45A). Photo on page 161. It exports well. Recorded vase life, 13 days*.

Origin: This was developed from the sole survivor of four seedlings bought by N. Kirby from P. Albery in 1977. It was released by Yellow Rock Native Nursery in 1984. The original plant is still at the home of N. Kirby, Winmalee, NSW.

Wildfire is a good container or garden specimen being of small stature to 2–3 m, with a classic formal shape. It is vigorous but generally poor bunching although a good flower with a medium sized fruit of a brick red. It is a mid-season crop and it exports well. Photograph on page 161(D). The recorded vase life is 14 days.

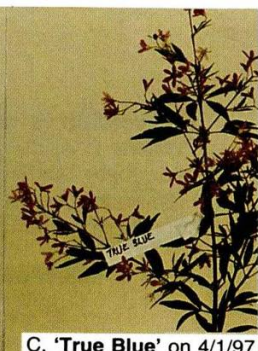
Origin: It was selected by John Emery from a batch of seedlings grown by Overland Nursery, Arcadia, in the late 1970s.



A. 'Martin Place' on 4/1/97



B. 'Bulli' on 4/1/97



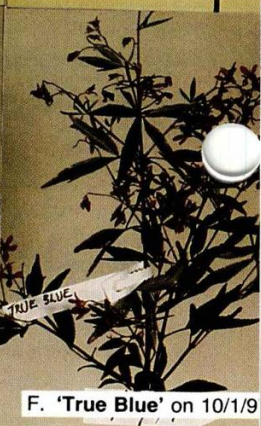
C. 'True Blue' on 4/1/97



D. 'Martin Place' on 10/1/97



E. 'Bulli' on 10/1/97



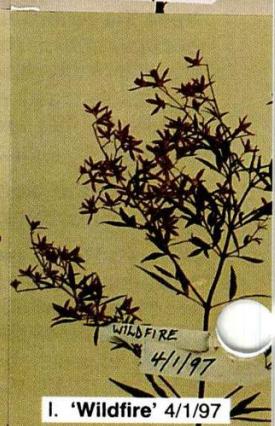
F. 'True Blue' on 10/1/97



G. 'Wentworth Falls' 4/1/97



H. 'Christmas Belle' 4/1/97



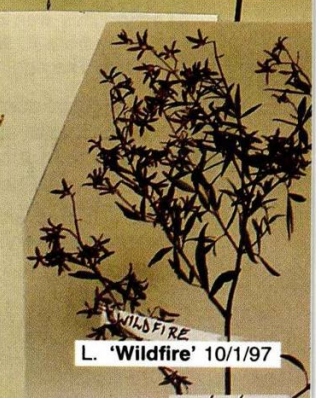
I. 'Wildfire' 4/1/97



J. 'Kariong Selection' 10/1/97



K. 'Fairleys Coral' 4/1/97



L. 'Wildfire' 10/1/97



△ *Ceratopetalum gummiferum* 'Festival'

▽ *C. gummiferum* 'Long Angle Pink'

C. gummiferum 'Kariang Selection 8' ▽



White Christmas (photo, page 168) is a large bush to 6 m high, a heavy flowerer with good bunching, but often with very long internodes. It can be slow growing and is prone to iron deficiencies. Heavy bunching of fruit can cause the bush to weep over. It is a little prone to Glomeralla in flower but has very good white fruit, (RHS 11D) large and ready for picking. The recorded vase life is 14 days.

Origin: From wild populations, Castle Hill, NSW, in 1977.

Magenta Star is a large bush to 6 m plus. The distinctive purple new growth (with long internodes) fades a little with age. A poor flowerer, the very large dark red fruit are picked in mid season. It is intolerant of poor drainage. The recorded vase life is 9 days.

Origin: Selected from wild populations by Ray Brown, Bulli, NSW.

'Bulli' is a well shaped small bush to 4 m, and is ideal for container growing or as a garden specimen. The attractive sinuate foliage has tight internodes, and it produces medium sized fruit of a brick red (RHS 42B), medium flowerer, good bunching fruit is harvested mid season. Recorded vase life is 13 days. (p. 164 B and E).

Origin: Selected from wild populations by Ray Brown, Bulli, NSW.

'Fairleys Coral Pink' (photo, page 168) is a large bush to 5–6 m, a heavy flowerer with good bunching of large stellate fruit of a strong pink (RHS 48A) in mid to late season here in Winmalee, NSW. The recorded vase life is 9 days although other reports record that it has an excellent vase life. (p. 164 K).

Origin: Selected from wild populations in the Ku-ring-gai Chase area by John and Jan Fairley.

'Christmas Belle' (photo, page 161 A) is a large bush to 5 m with attractive pale sinuate foliage. It is a heavy flowerer with good bunching of a distinctive bell shaped fruit of a strong deep red (RHS 45B) that is bi-colour before fully maturing in mid to late season. The recorded vase life is 9 days. (p. 164 H).

Origin: Florallands Native Nursery, NSW.

'Long Angle Pink' (photo, page 165) is a large bush to 6 m. A heavy flowerer with excellent bunching of very large pale pink fruit in mid season Initial impressions are that it has a poor vase life, not included in the trial of 1996.

Origin : Selected from wild populations by Tony Foster.

'Christmas Snow' is a variegated form, the blotched variations being 3–5% of leaf surface area. It is reputed to be a poor grower and weak generally. Little is known of this plant or its vase life.

Origin: Selection by Roy Whalen of Kotara, NSW.

'True Blue' PBR (photo, page 161) has colour variegation giving the bush an overall smoky blue appearance and is a good flowerer producing mid red fruit (RHS 50A) in mid to late season. It is reported to be a vigorous grower. Recorded vase life 13 days. (p. 164 C and F).

Origin: Collected by Vic Ciccolella, Oakville, NSW.

'Festival' (photo, page 161) is a cross between 'Alberys Red' and 'Christmas Belle'. It is a vigorous shrub with dark green foliage and red tip growth. The large deep red (RHS 46C) fleshy fruit ripen 2–3 weeks later than 'Alberys Red' and one week later than 'Christmas Belle'. The recorded vase life was 18 days.

Origin: Bred by Yellow Rock Native Nursery in 1992.

'Kariong Selection 8' (photo, page 165) is a cross between 'White Christmas' and 'Christmas Belle'. It is a large shrub with bi-coloured pink (RHS 51B) and white (RHS 4C) fruit ripening mid-season. It recorded the longest vase life of 28 days. (p. 164 J).

Origin: Bred by Yellow Rock Native Nursery.

'Martin Place' is a form collected in the Blue Mountains. It has deep red, (RHS 45A) stellate fruit in mid season. The recorded vase life was 17 days. (p. 164 D).

Origin: Collected at Linden, NSW. The original plant has been lost.

'Silent Night' has creamy yellow (RHS 159C) fruit. Recorded vase life, 13 days.

'Mirrabooka' has fleshy cream (RHS 158B) fruit. Both these were late flowering (after Christmas) here in the Blue Mountains, making them a possible crop for warmer areas further north.

Origin: Selected by Jerome Smith from seedlings grown by Eastwood Nursery.

'Wentworth Falls' has dark green foliage and red tip growth. It flowers and colours at the same time as 'Alberys Red' at Winmalee (300 m). The fruit is a deep rose red (RHS 46A), slightly pendulous, with good bunching. At Wentworth Falls (700 m) it is a late season (February) crop and as the fruit remains bright red on the bush for at least 8 weeks before seed set it retains colour up to Easter. The recorded vase life was only 9 days but the fruit may have been over mature when collected.

Origin: Collected from the Wentworth Falls area in 1992.

Vase life trial of 18 cultivars of NSW Christmas Bush

Researcher, Neil Kirby at Yellow Rock Native Nursery, Winmalee, NSW.

The bunches of stems of 18 cultivars of *Ceratopetalum gummiferum* were cut within 10 minutes at 1400 hours on 24 December, 1996. The temperature at the time was 40°C. The stems were immediately placed in water chilled to 3°C and the fruit subsequently sprayed with an atomiser. Four hours later the basal stem of each branch was cut with secateurs to give a stem length of 25 cm, and the lower 30 mm of basal stem crushed with a hammer.

Throughout the period of the trial the vase water was changed every day and the fruit was sprayed with an atomiser of water several times each day. All bunches were stored in one vase and kept within 1.5 metres of a window at room temperature. No air conditioning was used. The room temperature would have varied between 24°C and 32°C. Notes were kept on the condition of the fruit until 21/1/97 when the last of the cultivars had wilted.

The bunches were transported to the photographer in a bucket of water and individual varieties may have suffered some stress during the photographic sessions on 4/1/97 and 10/1/97. Some of these photographs are shown on page 164.

Vase life of NSW Christmas Bush

Research being carried out for NSW Agriculture by Dr Ross Worrall indicates that vase life depends on the following in order of importance:

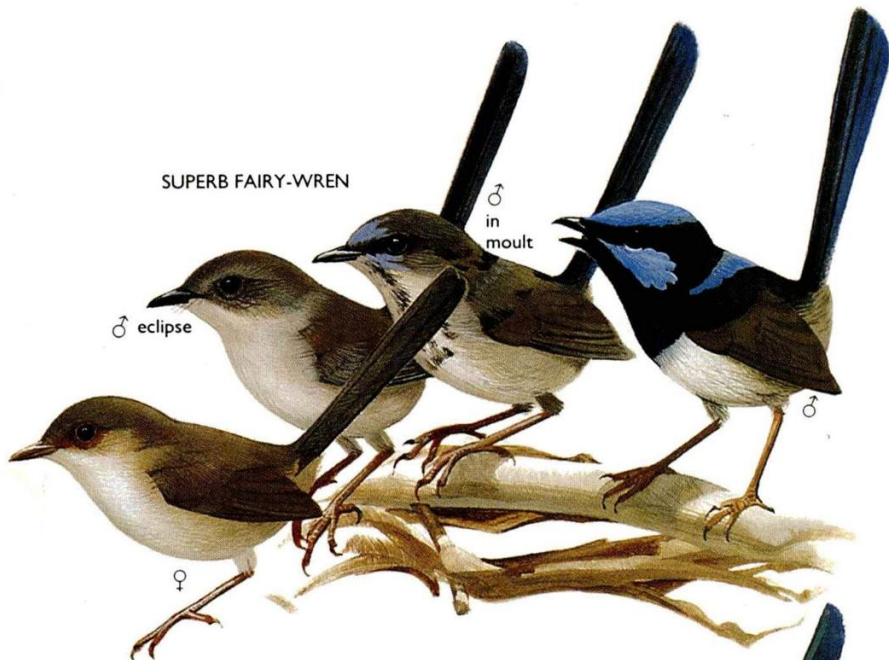
1. **Growing conditions** — The most important is protection from hot dry winds which cause flower drop and generally reduced vase life.



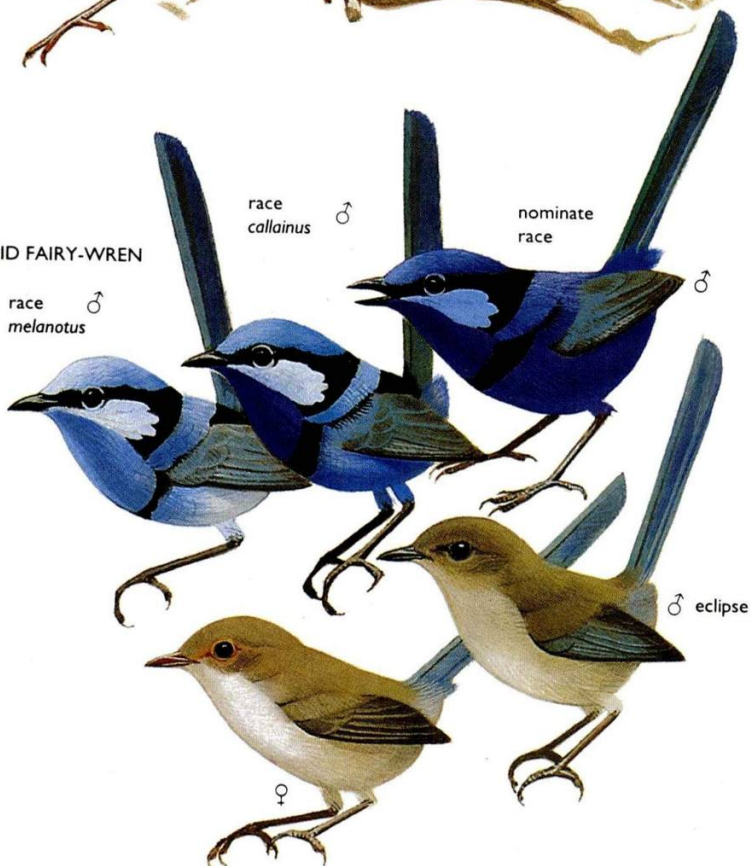
△ *Ceratopetalum gummiferum* 'White Christmas'
▽ *Ceratopetalum gummiferum* 'Fairleys Coral Pink'



SUPERB FAIRY-WREN



SPLENDID FAIRY-WREN



Birds facing extinction unless the understorey is maintained, page 174.

Top: Superb Fairy Wren, of eastern Australia. Must they die!

Bottom: Splendid Fairy Wren, various races from western NSW to WA.

Reproduced from *Field Guide to the Birds of Australia*, see page 188.

For best growing conditions for Christmas Bush, the crop should not be allowed to dry out, i.e., be watered regularly and thoroughly particularly during the flowering and ripening stages. Fertiliser rates should be adequate for good growth but not high enough to cause overgrowing of fruit by new foliage.

2. **Stage of harvest** — The optimum stage of harvest to achieve maximum vase life is when sepals have fully coloured and expanded but there are a few white flowers (less than 3%). Harvesting after this stage shortens the vase life. Storage of the ripened fruit will also reduce subsequent vase life.
3. **Cultivar selection** — It became obvious from this trial and the limited trials by NSW Agriculture, although consideration should be given to the condition of each cultivar at the time of harvest, which in this trial was arbitrary.
4. **Preservative solutions** — Provided that the Christmas Bush has been handled correctly and good quality water has been used, preservative solutions have only a minor effect on vase life.

Dr Worrall suggests that as a general rule **60% of the vase life of flowers is determined by growing conditions** and this certainly appears to be the case with Christmas Bush.

Discussion on trial study of Vase Life of Christmas Bush

Some of the early ripening varieties, e.g., 'Albertys Red' and 'Wentworth Falls' may have been at a disadvantage in this test as the fruit would have been over ripe by the date they were collected. Both these varieties are usually ripe for commercial picking by the first week of December. Also all sprays were taken from container grown plants and some of the containers would have been low in residual slow-release fertilisers by 24/12/96. This was certainly the case with 'Christmas Belle', 'Fairleys Coral' and 'Wildfire'. Post harvest treatment was recommended by staff at 'Floralands', Karing, NSW.

Summary

The vase life of Christmas Bush in florist shops is very poor and causes many complaints from florists and consumers. It could be greatly improved if all of the above cultural practices were observed. Of crucial importance appears to be the practice of dipping the bunches in chilled water as soon as they are cut. Wrapping the bunches in wet newspaper or damp hessian bags often causes wilting within 48 hours of harvest.

Finally, from our experience of selecting late ripening cultivars, it would seem that increasing altitude negates the effect of latitude in flowering and ripening of Christmas Bush. For example 'Albertys Red' usually ripens at Winmalee, NSW (300 m) in the first week of December which is the same time for this cultivar at Crows Nest, Queensland (700 m).

Acknowledgments

I would like to acknowledge and thank Dr Ross Worrall for commenting helpfully on the draft of this paper, the staff of 'Floralands', Karing, NSW, for their advice on post harvest treatment, Jelyssa Photographics Pty. Ltd., Dee Why, NSW, and Peter Abell, Plant Breeding Institute, Cobbitty, NSW, for photographing the trial plants.

"60% of the vase life of flowers is determined by growing conditions". This is something that cannot be assessed by the wholesaler or florist but is readily perceived by the customer, bad!

"vase life in florists shops is very poor", who is at fault? The only satisfactory way to secure sales, including exports, is to confine production to wildflower farms operated by professionals concerned to produce the best product.

Small Plants From South East Queensland

Gardening For Beginners — 2

by Rosalie Eustace*

We have some delightful small plants, mostly from open forest areas, that are quite showy in the garden. The March issue featured the Fan Flowers, *Scaevola*, and we have our share of these. *Scaevola calandulacea* was shown in colour on the rear cover. It is salt tolerant and forms a dense ground cover displaying its blue fan-flowers well. *Scaevola ramosissima* is not such a dense ground cover but its large blue flowers to 2.5 cm across are very attractive.

Other similar fan-flowered plants are: *Dampiera sylvestris* which is a spindly plant growing in clumps in wet areas to 30 cm high, the brilliant blue flowers being to 1 cm across; *Goodenia bellidifolia* that looks like a flat ground hugging weed when not in flower, then produces a mass of flowering stems to 30 cm high of pale orange/yellow flowers; *Goodenia rotundifolia* which can form a thick dark green mat of foliage in wet, full sun, heavy soil conditions with yellow fan flowers over most of the year; *Goodenia stelligera* which grows in swampy parts of the coastal sand heath, and *Velleia spathulata* which has a potential as a lawn alternative as it is a hardy plant that withstands regular mowing and hugs the ground, especially valuable for rockeries.

Other herbaceous plants with potential for containers and rockeries:

Anellema acuminatum is a creeping plant that grows in wet shaded areas producing white three-petalled flowers in attractive heads, try it as a basket plant.

Drosera spathulata that throws up a stem (to 25 cm high) of pale pink flowers from a flat ground hugging rosette of green, often red leaves. It attracts and digests small insects.

Hibbertia stricta and *Hibbertia vestita* are similar dense mat-forming plants to 50 cm across, producing masses of bright yellow flowers for several months. *H. vestita* is the one with hairy leaves and larger flowers.

Hybanthus enneaspermus and *Hybanthus monopetalus* are spindly in nature but will bush up in cultivation to form pleasing plants displaying the bright orange and deep blue spade-shaped flowers over several months.

Lobelia glibbosa grown en masse is an eye-catching sight in spring with brilliant blue flowers on bare stems to 30 cm high.

Continued on page 174

**Indigenous Gardening — Growing Local Native Plants* is a book by Rosalie Eustace, illustrated by Lorna Johnston. The article above was culled from it. She is keen to promote the establishment of local plants in her local area. Why do not you do the same? You may purchase a copy for \$29 including postage available from Rosalie Eustace, 18 Valentine Rd., Birkdale, Qld. 4159. The book has 40 pages describing the local plants of the Redlands Shire in south east Queensland with a large number shown in full colour photographs, some reproduced on the next two pages. If you live in or near this area then the book is necessary reading for you — Editor.

Wildflowers in colour. Wouldn't it be lovely to have a colour photograph of each of the above plants to illustrate this article? Unfortunately, I do not have the photographs. Technology has progressed to the stage that I can now use colour prints as well as colour slides. Most people now have cameras that are capable of taking quite good photographs and the only limitation is your determination to try flower photography. Give it a go, the results will be obvious to you when you get your prints back. Learn from this and try again if necessary. Send the best to me for comment. We will be able to help with the correct names.

****Gardening For Beginners — 1**, using local plants was in our last issue.

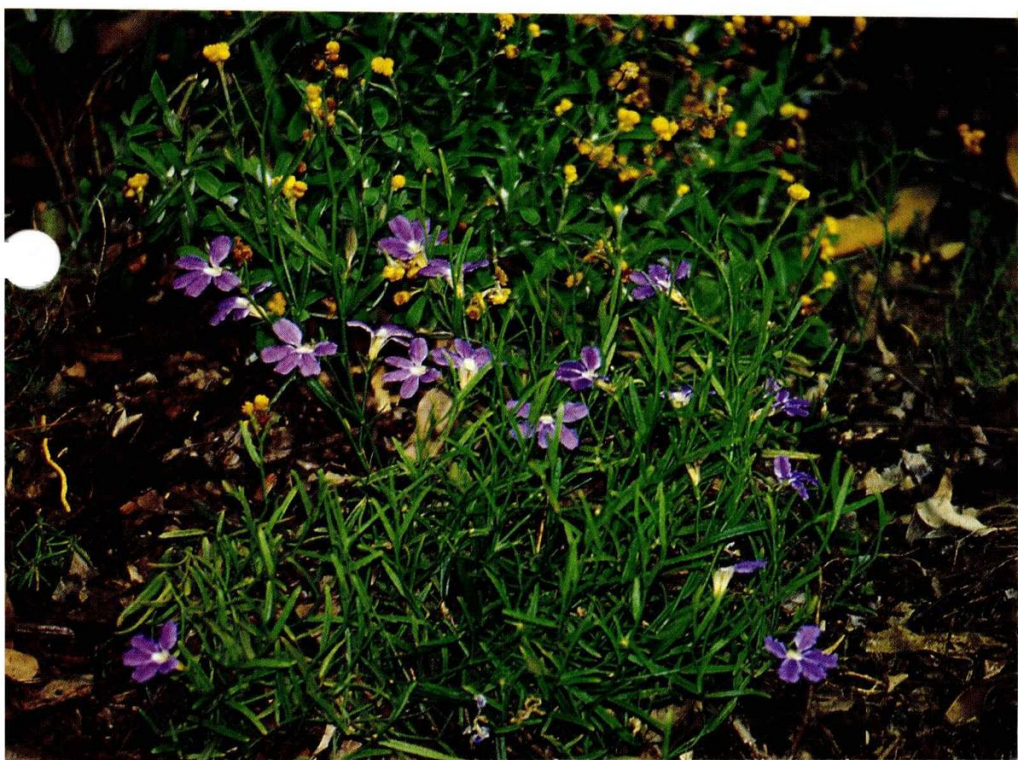


- △ **Yellow Buttons, *Chrysocephalum apiculatum***, a ground cover or rockery plant that refuses to stop flowering.
- ▽ **Native Broom, *Aotus lanigera***. Rivaling the exotic broom, this spectacular plant grows as a dense shrub to 2 metres in sandy soil.





- △ **Guinea Flower, *Hibbertia diffusa***, is a soft-leaved shrub, sometimes with a reddish tinge to one metre, flowering over long periods.
- ▽ **Fan Flower, *Scaevola ramosissima***, is a ground hugging plant on sandy soils. The mauve flowers may be to 2.5 cm across. *Scaevola* were featured in colour in our last issue.



Small Plants from South East Queensland continued from page 171

Mitrasacme paludosa is often hidden amongst grasses in the wild but in containers it produces a thick matted plant 30 cm across with a mass of tiny white flowers produced all year round.

Pimelea liliifolia, Rice Flower, is very common in the bush, usually spindly to 50 cm tall but in cultivation, regular cutting back will encourage it to bush out and produce heads of white and occasionally pink flowers almost continuously.

Plectranthus parviflorus, Native Coleus, produces spikes of mauve-blue flowers all year from a fleshy-leaved herb growing in damp shady situations.

Podolepis neglecta looks like a dandelion but its large yellow flowers on stalks to 60 cm are attractive in a group planting. Look closely at the exquisite makeup of the flower head.

Pseuderanthemum variable, Love Flower, is a small plant from shady damp places or sunny moist situations, the pink to mauve flowers appearing all year.

Thysanotus tuberosus, Fringe Lily, is a small grass-like plant but it produces beautiful fringed purple flowers after rain.

Trachymene incisa, Wild Parsnip, grows well in a container. The small rosette plant produces delicate heads of white flowers 1.5 cm across that are like a miniature Queen Anne's Lace, on long arching stems to 60 cm. The root is edible.

Tripladenia cunninghamii is a prostrate plant, hardy in semi-shaded areas. The wiry stems with broad leaves produce pale pink flowers to 1 cm across. ■

Restoration of Habitat

Revegetation — Growing the Understorey

by W. H. Payne

See page 188 for fencing subsidy.

The regeneration of any area is only as successful as its understorey plant population. This is the most difficult to establish successfully and, for large areas, it is only practicable by direct sowing. **Where do you get the seed?** This will become the major problem, the limiting factor to restoration of habitat. It will be necessary to harvest seed in commercial quantities to meet the demand. *Growing Understorey Seed** will assist you to do this by creating a seed orchard.

Growing Australian plant seed is another commercial activity with a potentially large market as the fight to save our continent is accepted as essential to maintain our increasing population at our present standard of living. "We have to face the fact that there is no longer enough seed in the patches of remnant vegetation left to us. If we tried to collect enough it would cause great damage to those patches of bushland that are left and we still would not have enough seed to do very much. Seed of native plants can be grown in a plantation in the same way as any other crop. Seed of Australian plants is quite expensive and the growing of a seed orchard should provide good remuneration."

***Growing Understorey Seed** is an excellent guide. Above, I am quoting from papers and a number of other small books all written by Joanna Seabrook and available from Greening Australia or the Western Australia Wildflower Society. Others are, "Seeds of the Future How to Establish a Native Plant Seed Orchard and Revolutionise Revegetation", "How to Grow Australian Plants from Broadcast Seed", "Collection of Seed of Australian Native Plants". Joanna has worked for many years to conserve what remains of Western Australian flora and to encourage people to revegetate alienated areas. A lovely lady and a true Australian. — Editor.

An Australian Seed Orchard

A commercial opportunity

Growing seed for harvesting requires a lot of planning, a long lead time and sustained work. The need to establish seed orchards has been recognised for some time but this is not being done nation wide.

An alternative could be mini-seed germination plots. Any group engaged on habit restoration will acknowledge that the availability of sufficient suitable seed is the major restriction to their efforts. They may be desperate enough to try this alternative method. A major advantage is that it generates seed of plants native to the area. If you can find natural areas where you will be allowed to work. During a flowering season tag those bushes that are the best in the area. Check regularly for the ripening of seed, usually early in summer. Prepare an area near the plant chosen by removing weeds and litter, opening up the soil by lightly raking it. Collect fresh seed and sow it by just sprinkling over the surface of the plot.

You may like to pre-treat some of it to see if this makes a difference. If it is wattle seed or seed that appears to have a hard cover such as any from pea flowered plants, put it in a cup and pour boiling water over it. Allow it to soak for up to a week before sowing. Another method to try is to cover the freshly sown seed on the raked surface with a 4 cm layer of dry grass and set it alight. You will need to water the plot well from a can of water once a week. The only real problem may be from ants seeking to carry the seed away. Perhaps some reader will advise the editor of an effective way to discourage ants.

Pot up some of the seedlings when quite small or move some in clumps of wet soil with a minimum disturbance to the area to be revegetated or the area to serve as a seed orchard. Remember the objective is not to just get a few plants but to grow a lot of plants from which seed may be harvested for a direct seeding operation. Hence leave some of the newly germinated seedlings to grow in this natural area and produce more seed. this way you have established a number of mini-seed orchards throughout a natural area with a minimum of work and ongoing care. This is provided you have an area in which you can to work.

A major problem with seed orchards especially set aside is that there is a tendency to grow only plants that germinate readily and that grow easily. A large number of small plots scattered through the bush may germinate a wider range of seed with less trouble as well as helping that area to regenerate itself. Special treatment with smoke stimulus is also possible and this has been done in natural areas to produce plants that are difficult to germinate from seed. A keen individual may enjoy the task working on their own with the thrill of producing seed for others from their secret seed "orchard".

Our habitat, the place in which we live. It is now widely acknowledged that the natural system of life comprising plants, flowers, trees, birds, animals and all other dependent creatures so necessary to sustain the chain of life (including humans) must be an essential part of management of our land in the future. Provided it does not effect personal comfort and standard of living, people are now conscious that something must be done to conserve nature for when they will need it, even if it is only as a background for holidays or a day out. **We need a leader!**

In our last issue we saw how the population of the New England area of NSW rallied to a crisis when they saw dead trees all around them, their very existence was threatened by a collapse of the world around them. With the characteristic shrug "she'll be right mate" they have now relaxed to tolerant indifference when the disaster was averted. Fortunately, the need for revegetation and wildlife corridors was accepted as a necessary part of life as long as someone else continued to work on an honorary basis to show them how. **We need a leader!** — Editor.



△ Red-rumped parrot

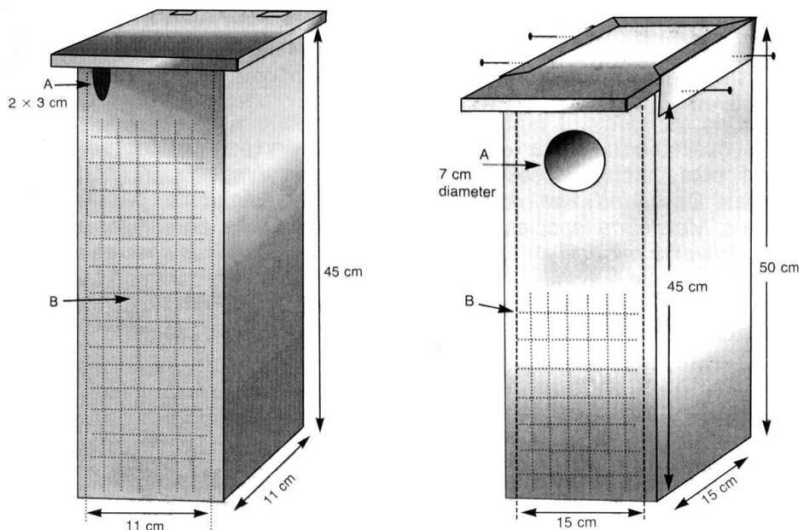
Common Jezabel Butterfly ▽



The Nestbox Book

Published by the Gould League of Victoria

This beautifully presented small book gives precise details of how to make nest boxes for a wide range of birds and mammals. They may be obtained from the Gould League, Genoa Street, Moorabbin, Victoria, 3189, for \$9.95 plus \$3 postage. Just two examples (with alternative methods for lid opening) have been reproduced as an example of how well this has been done. We would all love to have a few nesting boxes placed where we can watch birds and mammals breed and go about their daily business. Nesting boxes cannot replace the millions of tree hollows that have been lost because of the race for a comfortable life by humans but we can provide an alternative that will provide entertainment for our comfortable lifestyle. Do you appreciate how dependent humans are on the survival of all creatures and their habitats for their future? There is always a price, these boxes must be located safe from predators and must be serviced regularly as described in the book.



The box on the left is for the **Pygmy Possum** shown on our front cover.

The box on the right is for the **Red-rumped Parrot**. A is entry hole, B is a ladder of mesh on the inside wall to allow the young to climb out.

Red-rumped parrot. (opposite) These beautiful little parrots are common on farms and in suburban areas (in southeastern Australia) where there are large grassy parks and gardens. They feed on grass seeds. They spend most of their day on the ground, and when disturbed fly steeply up to a tree, the red rump of the male being obvious in flight.

Common Jezabel Butterfly (opposite) *Delias nigrina*, resting on a Westringia 'Zena'.

Mistletoe Their Natural Biological Control Agents

The Friendly Butterfly (opposite)

by Brian Faulkner

Most gardeners probably consider mistletoes to be interesting but unwelcome components of the Australian flora, as these parasitic plants of the families Loranthaceae and Viscaceae are notorious for causing severe damage to many tree species. A natural control is the friendly butterfly opposite. Let me tell you how.

Mistletoe! Despite their ugly reputations, mistletoes do have some redeeming features. Many have very attractive flowers and decorative berries, which are red or orange in most Australian species. The berries contain a single seed surrounded by a sticky, sweet-tasting pulp which is edible, though even the most ardent of bush-tucker enthusiasts would have to admit that it would be hard work getting a decent feed out of it!

Our nation has a remarkably large number of mistletoe species compared with many other parts of the globe. For example, over much of Northern Europe there is only one native species: *Viscum album*, an ancient symbol of fertility and a familiar decorative theme on Christmas cards. By contrast, Australia is home to 84 species, of which 15 are found in the Sydney region alone.

Mistletoes undoubtedly owe a large part of their success to the partnership they have evolved with the Mistletoe Bird, *Dicaeum hirundinaceum*. These little birds are found throughout Australia and feed primarily on mistletoe berries. In the process they disperse the sticky seeds by depositing them on tree branches and twigs in exactly the right places for them to germinate and commence their parasitic lives.

Most mistletoe species are highly host-specific and only parasitise a limited range of host plants. For example in the genus *Amyema*, *A. cambagei* parasitises *Casuarina* and *Allocasuarina* species, *Amyema gaudichaudii* parasitises *Melaleuca* species and *Amyema quandang* parasitises *Acacia* species. *Amyema miquelii* and *A. pendulum* prefer *Eucalyptus* species as their hosts. A notable exception is *Dendrophthoe vitellina*, a very common Mistletoe around Sydney. This remarkable plant attacks many different hosts including several exotic trees, even flourishing on Oleander (*Nerium*) plants.

Mistletoes themselves are attacked by the larvae of a number of butterfly species, in particular by a group commonly known as "Jezabel" butterflies (*Delias* species). The wings of *Delias* butterflies are usually predominantly white, cream or grey with black borders, but the undersides are often very colourfully marked with bright red, orange and yellow patches of colour.

In April last year (1996) I noticed a female Common Jezabel, *Delias nigrina*, laying her eggs on a large *Dendrophthoe vitellina* plant, that was growing on a mature *Callistemon viminalis* tree in a Sydney garden. The butterfly laid approximately forty eggs altogether and within the space of about a month the resulting brood of caterpillars had completely defoliated the mistletoe.

Not only has this mistletoe plant been unable to flower and fruit since then, it has still not fully recovered over a year after the pounding it took. It is still alive and slowly regrowing, but it probably will not be long before another *Delias* butterfly comes along and lays another batch of eggs.

This suggests that *Delias* butterflies and other butterfly species that feed on mistletoes in the larval stage are major controllers of mistletoes under natural conditions. This is almost certainly true for *Dendrophthoe vitellina*. Apart from the Common Jezabel, a further eleven different butterfly species are known to utilise this mistletoe as a larval food-plant.

Editor's note: Who has grown species of Australian mistletoe? The Mistletoe Bird is a beautiful creature, who has encouraged their presence, and how did you do it?

So why are mistletoe outbreaks a problem in some areas? The answer may possibly be linked to land clearance. Property owners clear natural vegetation for many reasons such as reducing the risk of bush fires, discouraging snakes and providing pasture for grazing animals. Unfortunately, butterflies (and other wildlife) suffer severely from such land clearance.

Adult butterflies require plenty of nectar rich flowers to provide them with energy during their relatively short but active lives and some of the best Australian native butterfly flowers include plants in the following genera: *Angophora*, *Bracteantha*, *Bursaria*, *Callistemon*, *Corymbia*, *Epacris*, *Eucalyptus*, *Grevillea*, *Kunzea*, *Leucopogon*, *Leptospermum*, *Melaleuca* and *Pimelea*. Such plants comprise a significant component of the natural flora of most rural areas and their loss when "bush" is replaced with pasture inevitably has disastrous consequences for local butterfly populations.

The decline and extinction of local populations of mistletoe-utilising butterflies frees any mistletoes on the remaining trees from their natural control agents and may lead to major outbreaks of these parasitic plants.

Unlike many other butterfly species, Common Jezabels are on the wing throughout the year and there are usually a few to be found fluttering around even in the middle of winter. The key to attracting and maintaining local populations of this and other *Delias* species is to provide a continuous succession of suitable blossoms throughout the year.

Correa alba and *Westringia fruticosa* and their hybrids are particularly useful shrubs for providing butterfly forage because these plants flower almost continuously throughout the year, a useful standby during otherwise lean times.

Common Jezabels are restricted to the East Coast of Australia, ranging from far North Queensland to Victoria. However, there are "mistletoe butterflies" of one sort or another to be found throughout Australia so wherever you live, conserving your local native flora and planting plenty of flowery, butterfly-attracting shrubs may help to protect your local trees from devastation by rampaging mistletoes. ■

Growing Proteaceae

In south eastern NSW — Our Garden No. 27

by Garry Daly

My east facing, frost free (nearly) 100 acre property situated on the south coast of NSW, at Cambewarra, has rich black soil. The soil is about 30 cm deep and has small pebbles of volcanic material and pieces of charcoal in it. The annual rainfall is 1,200 mm and the endemic tall open forest consists of Turpentine, *Syncarpia glomulifera* and Illawarra Blue Gum, *Eucalyptus saligna* *botryoides* cross. On the higher plateaus at approximately 200 m are Red Cedar, *Toona ciliata* and Brown Barrel *Eucalyptus fastigata*. Rainforest occurs in the midcanopy along Tapitallee Creek and along the upper portion of Bangalee Creek which forms a boundary of the land.

Approximately 20 acres were pasture a decade ago. Since that time cattle have been excluded and extensive planting of native species has occurred. The concept is to establish an arboretum with rainforest along the gullies and high nutrient eucalypt species along the drier ridges.

The aim is to produce an area of high floristic diversity that will provide habitat for native fauna. Currently over 150 rainforest species augment the existing flora. As indicated by the selection of Proteaceae grown, I utilise species from various parts of the continent. The eucalypts grown do not occur naturally but were grown from seed collected within a few kilometres of the site. The gums planted out include Grey Gum, *Eucalyptus punctata* (grown from trees that were incised by Yellow-bellied Gliders), Forest Red Gum, *E. tereticornis*, Swamp Mahogany, *E. robusta* and Spotted Gum, *E. maculata*. I acknowledge that such a manipulation of the environment may be philosophically unacceptable to some but should be put in context with the extensive habitat removal that is currently occurring for rural residential development.

Proteaceae that I have grown in the last decade along with comments on their success are below. I hope the information is of value to others and that it aids the cultivation of our flora. Other species will be planted out as they become available and sufficiently large to avoid being eaten by the Swamp Wallaby.

Species	Aust. Plants reference	No.	Date plant.	Comments
<i>Alloxylon pinnatum</i>		1	1997	1 m tall and doing well
<i>Alloxylon flammeum</i>		2	1994	1.5 m tall in moist protected spot
<i>Athertonia diversifolia</i> †	12:147	6	1992	Grows well in moist protected spot
<i>Banksia ericifolia</i>	16:278	1	1992	2 m and flowering
<i>Banksia integrifolia</i>	17:48	1	1985	Strong grower, flowers/fruits well
<i>B. integrifolia</i> var. <i>aquilonia</i>		2	1996	2 m tall
<i>B. integrifolia</i> var. <i>campar</i>		2	1996	1 m tall, natural grows on r.f. edge
<i>Banksia robur</i>	16:278	3	1985	2 m and fruiting
<i>Banksia serrata</i>	17:84	3	1992	4 m high and fruiting
<i>Banksia speciosa</i>		1	1990	4 m tall, fruiting, free draining area
<i>Buckinghamia celsissima</i>	16:173	1	1986	Slow grower
<i>Cardwellia sublimis</i> †	12:208	1	1985	5 m high and should flower soon
<i>Carnarvonia araliifolia</i> †	12:209	1	1995	1 m high, needs ample water
<i>Darlingia darlingiana</i> †	13:69	1	1992	Slow growing
<i>Darlingia ferruginea</i> †	12:208,229	1	1992	3 m high and doing well
<i>Floydia praealta</i> †	9:373	2	1987	Slow grower
<i>Grevillea caleyi</i>	4:339,371	3	1987	4 m high flowering and fruiting
<i>Grevillea robusta</i> †	13:69	4	1985	6 m high flowering and fruiting
<i>Grevillea sericea</i> †	11:356			Endemic
<i>Hakea sericea</i> †				Endemic
<i>Helicia glabriflora</i> †	9:374	1		Still in pot, 2 m high
<i>Lomatia fraxinifolia</i> †	14:14	2	1990	4 m high and doing well
<i>Macadamia tetraphylla</i> †	9:37	3	1985	One set fruit this year
<i>Musgravea heterophylla</i>	12:210	2	1990	One alive but not thriving
<i>Neorites kevediana</i> †	12:210	1	1993	3 m high and OK in moist gully
<i>Opisthiolepis heterophylla</i>		3	1994	2 m high and all doing well
<i>Orites excelsa</i> †		2	1987	3 m high and flowering
<i>Persoonia arborea</i> †		2	1990	3 m high, flowering and fruiting
<i>Persoonia linearis</i> *	7:146	3		Endemic
<i>Placospermum coriaceum</i> †	12:204	2	1995	1.5 m high, tip eaten by cows
<i>Stenocarpus salignus</i> *†	9:376	n		Regenerating in grassy areas
<i>Stenocarpus sinuatus</i>		3	1988	4 m tall, flowering from 1995
<i>Telopea speciosissima</i>	18:17	4	1988	3 m, flowers annually, free drainage

Key: species marked * are endemic; † indicates rainforest species.

Australian Native Food Industry

2 — Edible Fruits, their commercial production.

from Australian Native Produce Industries Pty Ltd (ANPI)**

Leichhardtia australis (Native Pear) is an evergreen, twining, non-vigorous woody climber (1 to 3 m high by 1 to 3 m wide), with narrow olive-green leaves (40 to 100 mm long). Clusters of sweet, edible cream coloured flowers, spring to summer, produce large (40 to 100 mm), oval-shaped fruits. It exudes a milky sap when the stem is broken. It occurs in the drier (150 to 400 mm rainfall), temperate areas of all mainland States except Queensland, on a range of soils.

Culinary Uses. Flower clusters may be eaten whole and are brimming with sweet, tasty nectar. Immature fruits are eaten from late Spring through Autumn. They have a sweet, pea flavour, and may be eaten fresh, lightly steamed and used as a hot or cold salad vegetable, or pickled. Although this crop has significant potential, current use is largely experimental.

Cultivation Comments. Supported on a trellis or fence or an unsupported shrub. Frost, drought and lime tolerant. Fruits are only edible when immature.

Microcitrus australasica (Native Finger Lime) is an evergreen, spiny open shrub to medium slender tree (3 to 10 m). Dark green, oval-shaped leaves to 30 mm long. White to pink through purple, fragrant flowers (20 mm) in Spring. Long narrow fruits to 25 mm by 100 mm, which turn from green to yellow or purple when ripe. It occurs naturally in sub-tropical and tropical rainforest areas of north-eastern NSW and southeastern Qld receiving greater than 1,000 mm of rainfall, on a broad range of soil types.

Culinary Uses. Fruit ripens late Summer to Autumn. Used in chutneys, jams, marmalades, savoury sauces and refreshing drinks. In great demand for culinary use. Juice vesicles are compressed and burst out (staying in one piece) when the skin of the fruit is cut, enabling them to be used in creative ways.

Cultivation Comments. An attractive, but prickly species which tends towards the smaller end of the size range under cultivation. Closely related to commercial *Citrus*. Although a tropical to sub-tropical species, it grows well in temperate areas with adequate rainfall/irrigation and tolerates moderate frosts. Can be grafted onto a range of exotic *Citrus* rootstocks. Very slow growth on its own roots, but moderate growth on vigorous *Citrus* rootstocks. Grow in full sun or partial shade. Responds well to pruning and shaping. An attractive tub plant.

Estimated Yield and Gross Return. For estimating purposes, under irrigation, at a spacing of 4 x 4 m (625 per ha), an average yield of 2 kg per tree can be expected in the fifth season after planting. At a farm gate value of \$8 per kg, a gross return of \$10,000 per ha could be achieved. Wider spacings should be used under dryland conditions, and a lower yield (quality and quantity) should be expected. Budded hybrids promise earlier fruiting and higher yields.

*Prosperity From Australia's Resources is a series from a range of authors on this subject, previous articles being in *Australian Plants*, Volume 19, pages 90 and 131.

**Australian Native Produce Industries Pty Ltd (ANPI), is an Australian-owned and operated company formed in 1992, to supply native food restaurants and to foster the commercial cropping of Australia's native flora. The first part of this report was in our last issue.

Santalum acuminatum (Sweet Quandong) is an evergreen, rounded shrub to small tree (3 to 6 m), with grey green foliage (50 to 190 mm). Small cream coloured flowers occur in Spring during and after fruit ripening. Spherical fruits (15 to 40 mm) turn from green to red, pink, yellow or white when ripe, depending upon on genotype, and contains a large fissured stone. It occurs in 150 to 600 mm rainfall areas WA, SA, Vic., NSW and Qld, generally on light textured soils.

Culinary Uses. Ripe fruit may be eaten fresh but is generally reconstituted from a halved or dried product. It enjoys a high degree of consumer acceptance as a savoury or dessert fruit with tremendous versatility. Sugar is generally added to "cut" the acid and enhance the flavour. The kernel (similar to small *Macadamia*) is edible and highly nutritious, but may taste slightly of "bitter almonds".

Cultivation Comments. Attractive, (but often difficult to cultivate) species for hot, low rainfall areas on light textured (sandy) soils. A partial root parasite which benefits from a host plant (supplied with host plant established in pot). With the exception of the *Macadamia* Nut, probably the most researched native food plant, a very promising commercial fruit. It is tolerant of highly saline soil (dry), limestone and drought but very intolerant of root disturbance (minimise at planting out), heavy textured soils which become waterlogged (even short periods), and chemical fertilisers with greater than 3% phosphate. Under cultivation, there may be difficulties with establishment after planting out.

Responds well to pruning to contain size. An attractive amenity plant, particularly when in fruit. Due to the inherent genetic variability of seedlings, grafted plants of superior selections should be used. Frahn's 'Paringa Gem' PBR is the best genotype known to ANPI for the premium restaurant and gourmet markets (detailed information is available on request). Important criteria for selecting genotypes include, fruit size (20 to 30 mm), flavour (no meaty after taste), deep cherry-red (not too dark or too light) colour, freestone, firm texture (retained after stewing), non-skin splitting, high yield, high flesh to stone ratio, cropping at young age, compressed ripening time, resistance to quandong moth, non-root suckering, and non-biennial bearing (i.e., not heavy crop one year and light the next). Biennial bearing is a serious problem in inferior selections. The Santalbic Acid contained in the kernel is reputed to be a strong natural antibiotic.

Estimated Yield and Gross Return. For estimating purposes, under irrigation, at a spacing of 3 x 4 m (833 per ha), an average yield of 1 kg of dried fruit per tree can be expected in the fifth season after planting. At a farm gate value of \$30 per kg, a gross return of \$25,000 per ha could be achieved. Wider spacings should be used under dryland conditions, and a lower yield (quality and quantity) expected. ■

A crop for marginal area cultivation

Sandalwood Nuts — *Santalum spicatum* is the subject of current research to develop the kernels of the fruit as a commercial food nut. Selective breeding of high yield strains could see the cultivation of Sandalwood Nuts in winter rainfall, semi-arid areas of Australia where agriculture and grazing has resulted in devastation of the land and its return to desert.

Quandong, *Santalum acuminatum*, has proved itself as a suitable tree crop for arid, degenerated land where the available water is salty. With many of the world's food shortages being experienced by people living in such environments, the Quandong has the potential to be cultivated in these regions and to provide another source of food.

Quandong's Wild Peach

Shoalmarra Quandong Farm

Promotion as interpreted by W. H. Payne

The Quandong, *Santalum acuminatum*, is a round glossy red fruit with a leathery skin, the flesh dry but sweet. Because of their dry texture and low sugar content, they lack appeal as a fresh fruit. They are best stewed or made into pies, jams, jellies or sauces with sugar added to taste. Shoalmarra Quandong Farm, PO Box 21, Tumby Bay, S.A. 5605 can supply Quandong Jam, Chutney, Sauce, Chocolate Liqueurs, Dehydrated Fruit, Aussie Quandong Chews and Wild Peach Bars attractively packaged for counter or restaurant sales.

Aboriginals treasured the Quandong, it provided them with a very important source of vitamin C where none was available. They ate the fruit raw as well as the kernel and would dry the flesh and store it for later consumption. For medicinal use they crush the kernel and mix it with saliva and water and use it as an ointment to treat sores. A tea was made from the Quandong leaves and drunk as a purgative and an infusion made from the roots was believed to help rheumatism sufferers. The bark of the tree was used for tanning leather.

Quandong seedlings are supplied (there is always a good demand for them at the Royal Sydney Easter Show) hosted onto strawberry clover. They make an attractive, well shaped shrub especially when in fruit. The Quandong is a semi-parasitic plant, meaning it relies on another plant whether it is a shrub, tree, ground plant or weed, to assist in its growing. Before planting out seedlings, harden them off until they are strong (the fresh top growth ceases to droop when exposed to the sun) and until the host is vigorous and plentiful.

Plant them with a northern aspect in a well drained soil that has abundant root systems already in it such as in a lawn (where it will need fertilising) or a well established garden. Wind is the biggest killer of seedlings so give protection in the early stages. Do not weed around the planted seedlings, simply trim the weeds back. Fertilise with 8–9 month Osmocote, or similar, which contains 1.6 phosphorous, at the rate of 50 grams per 2.5 litre container or 3 grams per small tube while holding before planting and provide regular dosage after planting.

Development of the best commercial forms. The first known research orchard was established at Quorn by a retired station manager who had a love for the fruit from his early childhood. The CSIRO assisted in the development of methods for germinating seed which was an early problem. From the 300 trees planted to investigate the commercial viability of the Quandong, five trees were selected, resulting in a quality fruit. Shoalmarra Quandong Farm has 5,000 trees planted for continuing research and development of a superior product. For those wishing to establish an orchard contact the Farm and full advice and plants will be available.

The great strength of the quandong is its unique taste. There are plenty of bad tasting quandongs so do not make a judgement until you have tasted AQIA* approved products. Australian Quandong Industry Association, AQIA, is an association of growers with aims to, establish quality standards, co-ordinate research and development, provide services for members and co-ordinate marketing. AQIA, PO Box 236, Upper Sturt, SA, 5156.

Quandong is also the title of the quarterly magazine of the *Western Australian Nut and Tree Crop Association*, PO Box 27, Subiaco, WA 6008. This may be of interest to our Western readers. I have invited the association to contribute an article on their production.

Sassafras: The Rainforest "Cinderella"?

by Brian Faulkner

Sassafras (*Doryphora sassafras*), also known as Yellow or NSW Sassafras, is a common evergreen tree of New South Wales and Queensland rainforests, often growing in association with Lilly-pilly (*Acmena smithii*). Like Lilly-pillies, Sassafras trees prefer a mild climate and a fairly rich soil with ample moisture, but will tolerate light frosts and are reasonably drought hardy once established.

Under good conditions, Sassafras can grow to 30 m in height, but is usually a medium sized tree between 10 and 20 m tall. In cultivation this species makes a superb specimen tree, some fine young examples of which can be seen in the Terrace Garden at Mount Annan Botanic Gardens, Sydney. Since this tree can grow large if unpruned, some care should be taken when selecting a planting site and it is probably not a good choice for a small garden.

All parts of the plant are highly aromatic and early settlers used an infusion of the flaky, light brown bark as a fragrant, tonic tea. There are also records of the Aborigines of Queensland using a decoction of the closely related Grey Sassafras (*Doryphora aromatica*) for a similar purpose. However, the use of Sassafras bark as a tonic is not recommended since it is now known to contain poisonous substances, in particular the toxic alkaloid Doryphorine (Cribb and Cribb 1981).

In common with many other rainforest species, Sassafras trees produce a lovely flush of pink new growth in early summer and are very decorative at this time of year. Mature leaves are dark, glossy green and opposite. They are usually elliptical in shape, between six and 12 cm long and have distinctly serrated margins with forward pointing teeth.

A bushwalk in late winter or early spring in the coastal rainforests of NSW can be a horticultural revelation, for it is at this time of the year that you may encounter Sassafras trees in bloom. They festoon themselves with a dazzling display of star-shaped, pure white, six-petalled blossoms 2.5 cm in diameter. The flowers are borne in clusters of three, in the leaf axils. An aromatic, spicy perfume pervades the air and myriads of frantic insects tumble amongst the snowy blossoms. It is a spectacular sight that is guaranteed to vanquish any remaining "winter blues"!

After pollination has occurred the lower perianth segments of the flowers enlarge to form a pear-shaped seed capsule. These seed capsules mature and split in late summer, releasing small wind dispersed seeds that should be sown fresh if used for propagation.

Sassafras can also easily be propagated from outtings. I have found that semi-hardwood tip cuttings treated with rooting hormones give a good strike rate (>85%) under mist.

East coast gardens with a Sassafras tree or two may be doubly blessed, for apart from their intrinsic ornamental qualities these trees also provide a larval food plant for one of the region's most elegant butterfly species: "Macleay's Swallowtail" *Graphium macleayanum*. The potential loss of a few leaves to their hungry caterpillars is a small price to pay for the pleasure provided by these brilliant living jewels of summer.



Sassafras, *Doryphora sassafras*, △ plant and ▽ flower.

Photography by Brian Faulkner

▽ Fruits of Mistletoe, see page 177



Eucalyptus, Our Heritage

by Marion Blackwell

The typical Australian scene, be it of native bush, rural or even many urban areas, is one in which *Eucalypts* appear. They are the most conspicuous element of the Australian vegetation constituting 95% of our dominant trees. They are found from the east to the west and from the north to the south of this continent.

Since their original discovery, people from all walks of life have been amazed at the versatility of this genus of beautiful trees and shrubs; their variety, adaptability and usefulness. This has resulted in them being planted for amenity as well as in problem places, and for a wide variety of other reasons, throughout the world. Internationally as well as nationally they have become an icon of the Australian continent and the Australian way of life.

Eucalyptus trees are probably Australia's most significant export commodity. Because of their hardiness and adaptability, within the 45° parallels of latitude they provide a solution to almost every warm arid area planting problem; benefiting the concerned populace enormously and in a variety of different ways. Indeed they have been quoted as "Australia's gift to the arid areas of the World". They are used for stabilisation, rehabilitation, shade, shelter, firewood and the like. Introduced into more than 70 countries, vast economic importance as well as aesthetic value to countless millions of the human race.

With regard to their nomenclature, there is no use relying on the term '*Eucalypt*', as has been suggested, to cover what was *Eucalyptus* as the word has no taxonomic status and it also has a variety of meanings and usages. Changes are occurring all the time in the field of taxonomy as research is carried out. Classification is our means of coming to understand relationships. Changes are necessary when new facts come to light, such that the previous basis upon which classification is based, is found to be wrong. But there may still be different ways of achieving the incorporation of new knowledge, for example in this case by retaining *Eucalyptus* as the genus with all its image implications; and dividing it into sub-genera and sections; rather than splitting the genus with all the repercussions that would be involved in the execution of this move. What is important is that a move made in good faith by a reputable scientist, does not have detrimental effects in other areas of a country's image and its projection.

Conclusions

In the light of all of this, without throwing any aspersions upon the undoubted scientific abilities, the work carried out, the processes undertaken or the modern technologies used by the authors of the reclassification of *Corymbia*, I consider that there are some occasions when there is a need for a broader look at the implications of such proposed changes. Indeed a need for an authoritative or consensus/acceptance of higher level taxonomic changes such as this, which have implications regarding, and repercussions upon, the image of Australia. In the light of this, would it not be better to achieve the same taxonomic purpose by incorporating this updating information at a sub-genus level and in doing so, maintain the quite precious international image belonging to our country. It must be noted that, if this were to be the case, *Angophora* would also need to be located as a sub-genus, which would not be a problem to the man (or woman) in the street, as it looks like a Gum Tree anyway! It appears that the Key Reason for Johnson and Hill's recognition of *Corymbia* is the compelling evidence that *Corymbia* is more closely related to *Angophora* than it is to *Eucalyptus*.

Editor's Note: The above report was extracted from a detailed presentation by Marion Blackwell wherein she stresses her deep concern regarding the proposal to split off a large section of species previously belonging to *Eucalyptus*, to form a new genus called *Corymbia*, include the Bloodwoods and Ghost Gums. Those seeking a copy of the whole address should contact the Wildflower Society of Western Australia as listed inside our rear cover.

Proposal by the Wildflower Society of Western Australia

The Wildflower Society of Western Australia considers that species of the plant genera previously known as *Angophora* and *Eucalyptus* as well as the newly proposed genus *Corymbia*, should belong to one genus only, namely *Eucalyptus*, with three sub-genus levels of *Eucalyptus*, *Corymbia* and *Angophora*.

We invite the rest of Australia to join us toward effecting this action.

We take this step for the reasons outlined by Marion Blackwell and because:

1. *Eucalyptus* has been nationally and internationally accepted as an Australian icon, signifying a national image of which we as a nation are proud. The splitting off, of which would then become look-alikes such as *Corymbia* and *Angophora* would seriously detract from this image and only cause confusion.
2. The proposal to split off at least 113 species to form another genus deletes the major part of the *Eucalyptus* flora from northern Australia. This involves many well known species including the most telling Australian iconic visual image, the **Ghost Gum**, *Eucalyptus papuana* (painted and made famous world wide by the aboriginal artist, Albert Namatjira), the proposed name, *Corymbia aparrarija*.
3. Members of the general public recognise and have attachments to trees which belong to the genus *Eucalyptus*. This is because the genus forms a cohesive group that look like and can readily be recognised as 'Gum Trees'. It will be quite confusing and much more difficult for Australians as well as people from overseas to separate the new genera; added to which Australia will no longer have its iconic image. This proposed move would reduce the verbal, visual and cultural impact of what the members of the genus *Eucalyptus* are and do.
4. This change would affect the horticultural industry both nationally and internationally by removing vital *Eucalyptus* elements from the rest of similar species which are already widely recognised as having exceptional horticultural potential such as the Red Flowering Gum, *Eucalyptus ficifolia* which has achieved international horticultural fame as one of the top flowering trees of the world, planted and enjoyed worldwide.
5. The image that has become widely entrenched in our culture will be seriously damaged. Folk law, especially at the level of childhood fantasy, epitomised by the magical Marri with its mythical "Gum Nut Babies", Bib, Bub and Little Ragged Blossom, which is often the first introduction for both our and overseas children to the image of Australia with its unique animals and plants.
6. The alternative use of the term 'Eucalypt', as suggested, is not acceptable. It has no taxonomic status. The word also has a variety of meanings and usages.
7. The crux of the matter is; that the acceptance of proposals resulting from new botanical research is the prerogative of the user. In this case we readily accept the competence of the research work carried out and only seek to prevent the proposed change of the higher order of classification in a minor way, in order to retain other values. It is to be hoped that it does not become necessary for us to resort to publishing in accordance with the practices defined in the International Code of Nomenclature, an alternative that would legitimise our understanding of the correct and desirable position to be taken in this particular context.

Note: With regard to this situation it may become necessary to approach the International Nomenclature Committee "for the conservation of the genus name *Eucalyptus*", on the grounds of its National importance.

Native plant regeneration

Fencing off farm areas

Greening Australia is providing up to \$1,200 per kilometre to landholders as an incentive to fence off areas of native vegetation to protect them from grazing by stock. Some sites include suckers or seedlings but many contain mature trees, with no understorey, which do not regenerate successfully unless stock are removed and weed growth controlled. Some 150 km are being fenced in the Murray Catchment area. This is a pilot programme but it is a guide as to what you could apply for. See page 174 for concerns about understorey plants.

Endangered Species — You can nominate an endangered population/area for conservation. We can all help. If you identify an area housing endangered species, you can nominate this area or ecological community for its conservation funding. Contact the Australian Nature Conservation Agency in Canberra (06) 250 0200.

I have been asked why I do not feature endangered plants more often in *Australian Plants*. There is already a lot of money and effort being spent on this. My concern is for the thousands of plants that will shortly become endangered if we do not take more positive action to conserve our beautiful island continent.

An artificial wetland created to stem the flow of nutrients into Lake Forbes, NSW, is being sponsored by Australian Gaslight Company. The work is being undertaken by Greening Australia, the Forbes Urban Landcare Group, school volunteers and Forbes Shire Council. This is the type of project for which money is available under Landcare. Do you have a plan?

A Field Guide to Australian Birdsong

Bird Observers Club of Australia

Produced as a series of cassettes, each running for 60 minutes, is a record of the birdsongs of Australia. There are now 11 cassettes available from BOC. PO Box 185, Nunawading, 3131, each for \$11 plus \$3 postage, any three for \$30 or the lot for \$108 including postage. The No. 11 tape is of Little Friarbird to the Scarlet Honeyeater, and includes 59 species of Australian honeyeaters. Why not try the last three cassettes for \$30 including postage. You will end up buying all 11 cassettes on which 571 species of birds are recorded in song.

Field Guide to the Birds of Australia

by Graham Pizzey and Frank Knight

This spectacular book has just been released. Orders placed before the end of the year will be signed by the author and artist. There are 250 colour plates with more than 2,600 individual portraits describing and illustrating the birds as above. One page is reproduced on page 169 as a guide to its value. Available for \$35 plus \$4.50 postage from bookshops or as directed inside our rear cover.

Aussie Bee

A periodical about our native bees

This is the bulletin of the Australian Native Bee Research Centre, a privately funded organisation which specialises in research on the Australian species of stingless social bees. There are 2,000 known species and probably 1,000 more yet to be described. Only about ten of these live in social nests similar to commercial honey bees with a queen, workers and drones. Most of the others live in solitary nests built by only a single female. Australia's flora has evolved with these native bees and probably much of it is dependent upon them for their continued existence. If you want to know more about our native bees and follow the saga associated with them, or if you want to support this ambitious, competent research effort, then take out a year's subscription covering four issues of *Aussie Bee* for \$26.50. Sent to Aussie Bee, PO Box 74, North Richmond, NSW, 2754.



Native Bees: △ **Megachilid Bee** with special bristles under its orange abdomen for carrying pollen

▽ A brown furry **Teddy Bear Bee** (*Amegilla*)
with two bright eyes

▽ A **stingless social bee** (*Trigona carbonaria*)
emerging from a flower



Plants For Beginners

A Field Guide To *Melaleuca*, Volume 2

by Ivan Holliday

Melaleuca (mel-a-LOO-ca) are, without a doubt, the easiest Australian wildflower to grow over the widest range of conditions of soil or climate. Neglect them or leave them to rely on natural rainfall and they will survive; comes a good bout of rainfall, they freshen up and, if in late winter to autumn, they will flower beautifully. Be sure to prune hard after flowering.

The only thing that appears to hold them back is that there is so many of them, about 200. This can become a plus thanks to Ivan Holliday. His first book devoted a page to every 150 species with simple descriptions opposite a full page colour plate of each. Apart from this it is possible to identify every plant simply by flicking through the colour pages. In volume two he has presented a further 50 recently researched species. You will need this book, send \$10 to Ivan Holliday, 29 Tennyson Avenue, Tranmere, SA 5073.

Wildflower Nurseries in Queensland

Fairhill Plants and Botanic Gardens — Huge range; rainforest plants, grafted grevilleas, rare plants, wildflowers, ferns, orchids, revegetation trees. Extensive display gardens. Open every day 8.30 a.m.–5.00 p.m. Fairhill Native Plants, Fairhill Rd., Yandina, Qld 4561. Tel. (07) 5446-7088.

Wildflower Nurseries in New South Wales

Annangrove Grevilleas — 98 Annangrove Road, Kenthurst 2156. Tel. (02) 9654-1380. Wide range of natives including hundreds of different species in tubes — many hard to get. Ten per cent discount to SGAP members.

Bryants Native Plant Nursery — Cosy Camp Road, Bex Hill, N.S.W. 2480. Tel. (02) 6628-4323. 15 kms north of Lismore. Open 7 days (from 11 a.m. on Sundays). Extensive range of trees, shrubs, groundcovers, rockery, grafted Grevilleas, rainforest plants. Excellent quality and service.

Dealbata (cold climate) Aust. Plant Nursery — off Bloomfield St., Dalgety, 2630. Tel. (02) 6456-5043. Specializing in alpine and dry Monaro plants — grown from locally collected material. Phone to arrange visit.

Floralands — Parry's Nurseries Pty. Ltd. Kariong via Gosford, 2250. Tel. (02) 4340-1142. Preservation by cultivation. Send \$1.50 for descriptive catalogue.

Kentlyn Native Plants — 206 George's River Rd., Campbelltown, 2560. Tel. (02) 4625-1583. Open 7 days.

Mudgee Native Tree Nursery — 548 Henry Lawson Drive, Mudgee, 2850. Growers of frost and drought tubestock and bagstock suitable for inland NSW. Open 7 days. Tel. (02) 6373-3755, Fax (02) 6373-3754.

Newcastle Wildflower Nursery — 260 Lake Rd., Glendale 2285. Tel. (02) 4954-5584. Extensive range of native plants including rare and endangered species.

Sydney Wildflower Nurseries — South at Heathcote (02) 9548-2818; West at Marsden Park (02) 9628-4448; North at Terrey Hills (02) 9450-1555. Excellent range of native plants, open 7 days.

Wariapendi Farm Nursery — Church Ave., Colo Vale (7 km north of Mittagong off F5, take Colo Vale exit). Tel. (02) 4889-4327, Fax (02) 4889-4092. Growers of frost hardy natives from tubestock to advanced. Open 7 days.

Wirrimbirra Native Nursery — Hume Hwy, between Bargo and Tahmoor E. side 2574 (3 km from Freeway entry). Wide range including unusual plants. Tel. (02) 4684-1112.

Wirreanda Nursery — End of Wirreanda Rd., Ingleside, 2101. Tel. (02) 9450-1400. Growers of advanced and semi-advanced native trees and shrubs. Open 7 days.

Wildflower Nurseries in South Australia

Anne and Colin Dealtry — Lot 2, Trevilla Rd, One Tree Hill, SA 5114. Open on the first two weekends each month, 10 a.m.–4 p.m., or by appointment. Tel. (08) 8280-7079.

Brenton Tucker Native Plants and Carawatha Garden — Placid Estates Rd, Wellington East via Tailern Bend. Tel. (08) 8572-7104. Wide range of tubestock and advanced plants. Extensive display gardens and picnic areas. Open w/e and public holidays March to November and by appointment — 10.00 a.m.–4.00 p.m.

Wildflower Nurseries in Tasmania

Plants of Tasmania Nursery — 65 Hall St., Ridgeway 7054. SAE catalogue. Tel. (03) 6239-1583. Open 7 days.

Wildflower Nurseries in Victoria

Bushland Flora — Indigenous plants of Melbourne. Ph. (03) 9736-4364 for stocklist.

Kuranga Native Nursery — Australia's largest range of Australian plants. Delivery Australia-wide. Free stocklist on request. The Kuranga Handbook of Australian Plants now available RRP \$19.95. A comprehensive guide on plants stocked at Kuranga, 393 Maroonah Highway, Ringwood, 3134. Ph. (03) 9879-4076. Open 7 days.

Australian Wildflower Seed Suppliers

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

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

Calytrix

Not for beginners

This group of plants offers enormous potential for commercial development as a decorative pot plant, cut flower or garden shrub. The major problem is propagation on which to base development and production. A start on this problem is being made by the new leaders of our Calytrix Study Group, Cynthia and Ted Beasley, 39 Simpson St, Watson, ACT 2002. What is needed is a supply of seed and cuttings from plants from all over Australia. If you can help please contact them. The last time I promoted a similar call to assist research I received a cautioning letter from a government agency expressing concern that such collections may be not only illegal but damaging to conservation. Play due regard to the restrictions imposed on various areas.

"Australian Plants", The Australian Flora Periodical

Past issues are available in volumes 4-10/11 (except 8), each volume is bound and cased, beautifully presented for \$21.00, plus \$5.00 post. Volumes 16 and 17 will not be available bound. Volumes 12, 13, 14 and 15 are available only from The Editor, Australian Plants, 860 Henry Lawson Drive, Picnic Point 2213, for \$40 each plus \$6 postage. **Binders** to hold the eight separate issues of Australian Plants in a volume are \$5.50, plus \$3 post.

Other Books Published by the Society:

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

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

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Book Supply Mail Service. For back issues of *Australian Plants*, bound volumes and binders, send orders to P.O. Box 410, Padstow, NSW 2211. Other book orders to Florilegium, P.O. Box 644, Rozelle, NSW 2039, phone (02) 9555 8589 or fax (02) 9818 4409, at prices quoted; a discount of 10% for orders in excess of \$50.00.

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Melaleuca hugelii showing the quality of the photographs used by Ivan Holliday in his books, Field Guide to Melaleuca, see page 190. This is a pink flowered form, another candidate for commercial flower production. See the photograph of a complete bush of the usual white flowered form on page 240 of volume 12, it will "knock you out", a magnificent flowering shrub.