

Australian Plants



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Learn about wildflowers

With the start of a new volume we welcome new readers to the enchantment of our wildflowers. The Australian flora is so vast, so unique because of its development over the ages in isolation from the rest of the world's flora, it is a treasure to be nurtured and enjoyed by all. All the world's flowering plants have developed from the same basic structure. Please do not think that a knowledge of plants can become too technical.

Botany for the beginner, on page 28, is a simple introduction to the basis of botany. The professionals have developed a whole new language for the description of every tiny detail of a plant without the need to see it. We prefer to enjoy the beauty of plants by seeing them in the wild, in the garden, or as a last resort, in colour pictures, hence this periodical, *Australian Plants*.

However there are a few basic terms for parts of a flower we need to learn; the **ovary** where the seed develops; the **style** in the centre of the flower with its **stigma** on top to receive pollen; the **stamens**, that ring of fluffy colourful "hairs" that surrounds the central style and the **petals** and **sepals** that provide the floral setting. These are introduced in simple terms on page 28.

Despite all this, there are the hundreds of names of each unique group of plants. There does not seem to be a way to make this easy. Common names are rarely available and often confusing but we use them where we can. Scientific names are in two parts; the first part is a generic name referring to a group of similar plants and it is the name we hope you will learn to use. Hence *Thryptomene calycina* (referred to opposite) is one of a group of Lace Flowers known collectively as **thrip-TOM-e-nee**. The reference in brackets (17:166,168P) refers to a more detailed description in volume 17 of *Australian Plants* on page 166 and a colour photograph on page 168.

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COVER PLATE. Gardens are for all creatures, especially birds. Grow Australia's wildflowers and you provide a restaurant for birds and entertainment for humans. *Australian Plants* will help you do this. Our cover is part of a magnificent print by the artist Ian Roberts. There is a vast range of prints featuring birds on plants, each on high quality art paper printed with fade-proof inks, 293 mm x 355 mm, each \$33 plus postage, or \$110, fully framed. There is a range of post cards and stationary for that special gift or occasion. Write to Modika Gallery, C/- P.O., Blyth, South Australia 5462 for details.

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Bernawarra Gardens

Gardening for colour

My Garden No. 33*

by Norma Duff, Lower Barrington, Tasmania

In the first half of July, 1998, I can cut flowers from over 100 different wild flowers. It makes mockery of the often heard, "There's not much out in Winter!"

In 1981 we bought 4 acres (1.6 h) of land less than 20 mins south of Devonport, Tasmania. The land faces N.E., on a good slope, and is surrounded by farmland. The soil is mixed, small areas of gravel, sandy and light soil, to fairly heavy red, but no clay. It is very well drained. It is often very windy, usually from the S.W. or N.W. Most years there are 10–15 heavy frosts, and there is an annual average rainfall of 1,100 mm. Occasionally we have a light snowfall, but only once has it stayed on the ground for more than 24 hours.

The next few years we grew flowers for sale in some paddocks, and grazed a few sheep in some more. Meanwhile we put in a small orchard and a vegetable garden. In February of 1984, I joined S.G.A.P. in the N.W. and learned there were lots of lovely shrubs I wanted to grow. A few circles of garden were made around established rhododendrons, camellias, etc., in the front garden, and Aussie plants began to mix and mingle. Some did quite well, others didn't. Weeds were a big problem, as our block is an old farm paddock not worked for up to 25 years before we came, and dandelions had choked the grass. They came up in thousands when the ground was disturbed. After struggling to keep weeds at bay, we decided we had to do something about it.



Grower's Tip:
A beginner created
this wildflower
garden in six
years

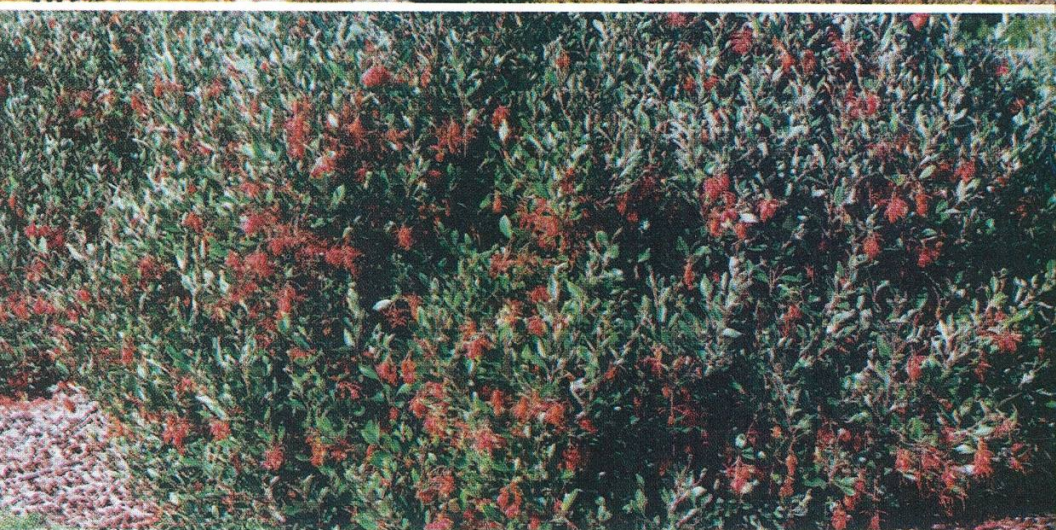
Pine bark was the final decision, after much discussion. Out came the hose and string, and large beds were marked out. Next came the "Roundup" and every bit of grass and weeds within the beds were sprayed. Our son was thrilled that 3 hours of lawn mowing was reduced to about half an hour. The next move was 11 truck loads of pine bark, spread about 16 cm deep. In August 1987, we began to plant. We scrape away the bark, dig a big hole, plant, and put the bark back.

In 1990, down came the fence on the eastern side for a new start on a purely "Aussie" garden and 9 loads of pine bark. We began to plant and for something different, we have planted in groups of flower colour.

The white bed was planted with *Thryptomene calycina*, (17:166CDX, 168P)* *Brachyscome segmentosa* (17:347,354), *Olearia phlogogapappa*, (19:362,364P) A double flowered *Epacris gunnii* is lovely; *Epacris impressa* with smaller flowers than usual, flowers later, *Leucopogon ericoides* (from the West Coast of Tassie) is showy as is *Chamelaucium ciliatum*. ■

*In November 1996 we opened Bernawarra to the public on Tuesday, Wednesday and Thursday of each week and other days by appointment. We also open every day in November. We've had visitors from 8 countries and every state and territory of Australia. The whole thing has been a lot of fun, you try it!

**An article such as this is excellent as a guide to what will grow in an area. It can be frustrating also as many people do not know what the plants, identified by these daunting scientific names, look like. I have given references to recent issues of *Australian Plants* that describe the plants and may have a colour photograph. Editor.





△ Bernawarra Gardens from the eastern corner looking towards the house
 ◁ Opposite top: *Boronia crenulata*; centre: **G.** *Dodonaea viscosa*; **H.** *Leptospermum*;
J. *Leptospermum*; **K.** *Calytrix tetragona*; **L.** *Leptospermum*; **M.** *Goodenia* (prostrate);
N. *Lomatia polymorpha*; **O.** *Melaleuca*; below: *Grevillea victoriae*
 ▽ **A.** *Anigozanthos flavidus* (selected form); **B.** *Indigofera australis* alba;
C. *Dryandra praemorsa*; **D.** *Hakea*; **E.** *Thomasia pauciflora* var. *paniculata*; **F.** *Grevillea*



Ozothamnus rosmarinifolius (19:258) with silver foliage from South-Port Biuff in Southern Tasmania (removed in 1997 as it grew too big and "untidy" and died in patches but more are coming up from seed.) We planted *Ozothamnus ledifolius* (19:362,364P) a beautiful small shrub with all year round interest. New foliage is a bright yellow, flower heads 0.5 cm in terminal clusters to 3 cm across, very conspicuous, reddish brown before opening white. When my first plant began to flower, my husband told me one night there was a new red plant flowering in the white bed! At 11 p.m. we went out with torches to see what it was!

A variety of *Correa reflexa* var. *nummulariifolia* is more green than white but slots in nicely with its slightly rusty looking, silver-green foliage. I've taken an each way bet and planted one in the mixed green/orange/brown bed and two more, labelled 'Lemon Squat,' in the yellow/cream bed. *Darwinia taxifolia* has red buds, maybe I should have planted it in the "Red" bed.

Diplarrrena latifolia (16:295) and *D. moraea* (14:192,198) are doing well and are seeding about. *Kunzea 'Badja Carpet'* (10:173) and *Leptospermum rupestre* cover a large area. Along one edge is a *Leptospermum lanigerum* with a pendulous weepy habit and lovely silver woolly foliage. It's only a tad over 1 m high in 7.5 years. *Olearia teretifolia* var. *compacta* and *Olearia erubescens* (11:191) with dark green foliage are still small plants. *Pimelea 'Snow Clouds'* lived 3 years. I think frost did it in! *Agonis marginata* flowers for months and is good to cut. *Eriostemon myoporoides* 'Mt. Giant', *E. myoporoides* 'Profusion' and *E. verrucosus* are all doing well. The large leaved one suffered from scale, as did a lovely *Correa* with a creamy white flower, alongside it and both looked "scruffy". I cut them back by half, sprayed both with white oil, and they are now looking lush and healthy and covered with flower.

Phelialium bilobum (11:304) grew well for 4 years. Luckily I had struck cuttings so I still have it. *Stackhousia monogyna* (12:155) look good in a clump, grown from cuttings from plants growing along the roadside where the council mower cuts them back every year. We also cut them back each year.

Leading into the "coloured" beds area from the original garden is an archway built from treated pine poles and reinforcing wire and I have trained a white *Bauera rubioides* to climb up. On either side of one end there is a *Clematis aristata* and a *Clematis microphylla*, and at the other ends are a mauve *Billardiera cymosa* (15:276) and a white "berried" form of *Billardiera longiflora*. *Gaultheria hispida* (19:283) is tucked in behind the walkway shade and flowers well; the fruits are lovely, but the birds love them. One year I covered them up with a net so I could admire them for a while!

The pink bed blends into the white bed so several plants are either/or and planted as transition plants. *Eriostemon angustifolius* ssp. *montanus* with its delightful pink buds and starry white flowers is beside *Boronia fraseri*. *Lasiopetalum macrophyllum* (11:304) is tucked away here. Where we took out *Ozothamnus rosmarinifolius* last year we have planted two pale pink *Crowea* 'Pink Blush' (17:55) and they are looking good. A *Haloragodendron monospermum* (6:247) with creamy white flowers and is flourishing. Cuttings had 100% strike. *Alyogyne hakeifolia* (pink form) is growing well in the new space. The *Eriostemon myoporoides* 'Profusion' (18:294) had been overgrown, but after cutting back a few bare branches they are shooting lots of new growth and are full of flower buds. A low weeping form of *Astartea* has also begun to improve the last few months after being overshaded. *Correa pulchella*, a dusky pink form was planted beside a *Boronia fraseri* and is now tucked up under it. The rabbits ate half of the new *Correa* not long after it was planted and the new growth that sprang up was phenomenal! (I've planted at least three more in other parts of the garden; I love them).

In front of this pink bed is *Melaleuca thymifolia* (16:125). *Boronia fraseri* is 8 years old and is 2 m x 2 m, at present loaded with flower buds and looking beautiful. Behind it is *Boronia heterophylla* x *crassipes* 'Lipstick' (17:357, 19:56) and is the same age but not looking so well. Some years it has had three good flushes of flowers, so I feel it wears itself out!

Eriostemon verrucosus with the double flowers is growing slowly and flowers fairly well, but it never looks really healthy. Two varieties of *Stylidium*s flower well and seed around a large patch. *Brachyscome* 'valencia' and a pink form of *Brachyscome multifida* are growing well in front of *Boronia fraseri*.

Further along in the pink bed is *Rulingia pannosa* which is seeding around the garden. Growing up amongst the *Rulingia* is a pink *Scaevola* which has seeded and sent up a blue flowered plant! At the back is an *Eucalyptus leucoxylon* ssp. *macrocarpa* with a lovely trunk (9:171, 173P). In front of the eucalypt was a pink *Prostanthera melissifolia* which died last year, and I hope a self-sown seedling will be pink. Next is a *Melaleuca gibbosa* and tucked in under the *Rulingia pannosa* is an *Epacris reclinata*. I've also put one in the "red" bed as I can never decide whether the flowers are red or pink. They look good for 6-7 months each year. On the other side of the *Rulingia* are two *Crowea exalata* doing very well. They have dark pink flowers and reddish new growth. A pink flowered form of *Olearia phlogopappa* (17:350, 19:316P) is behind the *Crowea* and its silvery foliage contrasts well with the greens around it. I did have an *Eriostemon australasius* in beside the *Olearia*, but it only survived for 5 years. I did manage to strike quite a few cuttings before it died. Two plants of a weeping form of *Melaleuca squamea*, and 2 plants of *Boronia anemonifolia* (15:97P) with fine foliage flower all year. Beside them is a *Leptospermum scoparium*, Jervis Bay form, which is more mauve than pink, and behind that beside a walkway is a *Boronia citriodora* and a *Thomasia rhynchocarpa*. Up a post supported by a piece of reinforcing wire is a *Billardiera longiflora* and at the bottom of the post is a pink flowered *Bauera rubioides*. Along the back beside the Eucalypt is a *Prostanthera rotundifolia*, pink form.

Grower's Tip:
Landscaping using colours could be very effective, who has done it?

A mauve and purple bed is across the back and along the top. *Prostanthera*, 10 species, *Chloanthes parviflora*, Westringias, *Brachyscomes*, *Lysiosepalum involucreatum*, *Thomasia grandiflora* and *T. foliosa* all do well. The latter 3 are probably more pink than mauve. *Boronia denticulata* (15:264P) has sent up a seedling with larger leaves, but the leaf smells the same. A seedling of *Rulingia pannosa* came up in this bed and is much more upright than the original. A dark purple form of *Olearia phlogopappa* does well. *Brachyscome angustifolia* and *B. formosa* grow together.

The Brown/Green/Orange bed is across another track, and down the Eastern boundary. Planted are *Banksia quercifolia*, *Banksia canei* (10:188P) and *B. marginata*. The New Holland honeyeaters love the *B. canei*, so I've put more in elsewhere. There is *Boronia clavata* x 3, *Melaleuca blaerifolia*, *M. dissitiflora* and *Callistemon acuminatus*. There was several brown *Boronia megastigma* (15:189P) which died this summer from being too dry (and 7 to 12 years old). Some new plants are coming along with one old *B. megastigma* 'Harlequin'. Two plants of *Dodonaea sinuolata* (17:208P, 227) do well with *Chorizema cordatum* (17:108, 109P), *Correa pulchella*, *C. 'Marian's Marvel'*, *C. glabra*, green, *C. reflexa* var. *nummulariifolia* and all need frequent pruning. *Bossiaea cordigera* (11:111) protected by a wire-netting frame, grew up inside the frame. The rabbits trimmed around the outside. Now they leave it alone it looks like a shrub instead of a scrambling twiner. There is also an orange flowered *Grevillea* about 50 cm high.



Denventia arenaria 'Cottage Blue'



Chlosochthes parviflora

*Leptospermum
nitidum*



Diplarrhena moraea



Cream and yellow bed comes next, but there is a lovely white *Calytrix* growing here and I don't know why! *Lomatia myricoides* (12:168) does well and seedlings come up like weeds. *Lomatia tinctoria* (12:168,180P) with a large leaf is beautiful. Four *Asterolasia asteriscophora* are planted. *Acacia pentadenia*, *A. drummondii* and *A. drummondii* ssp. *elegans*, *A. suaveolens* (a form from North Tasmania) and *A. terminalis* all do well. *Bracteantha bracteata* self sow; old ones are removed when they look "scruffy". They also cross with each other and this year I had some pinkish yellows.

Grower's Report: Will readers make a list of plants they recommend for various colours?

Boronia megastigma 'lutea' were planted and *Amperea xiphioclada* was allowed to climb up one of them. *Persoonia oxycoccoides* (17:84) does very well, and I recently put in a *Dodonaea viscosa* (17:228,231) with a variegated foliage. At the back is a *Banksia grandis*, *B. integrifolia*, and *Hakea epiglottis* (12:154). Until recently *Callistachys lanceolata* was quite large, but blew out in strong wind. Several are growing from seed. 3-4 varieties of 'Helichrysums' are along the edges, and the rabbits like them.

Acacia baileyana 'prostrate' wanders around the ground but *A. suaveolens* 'prostrate' doesn't do as well. *Isopogen anemonifolius* (19:65P) only grows about 50 x 50 cm but is lovely.

Blue bed is next, and there are 8-10 *Olearia ramulosa*, several *Scaevola*, a pale blue *Lechenaultia*, *Derwentia perfoliata* and *Derwentia formosa*, (previously *Parahebe* 12:1450P), *Pratia pedunculata* and 3 species of *Dampiera*. *Dianella tasmanica* has almost become a weed. At the back of the "Blues" I've sneaked a bit and recently planted some red — *Telopea* cultivars. There is also a blue *Olearia phlogopappa*. Somehow a green *Correa lawrenciana* is growing between the blue and red beds!

The Red bed has 2 clumps of short *Anigozanthos*, and several tall clumps. There is *Correa glabra*, *C. 'mannii'*, *C. reflexa* 'Fat Fred', *C. reflexa* prostrate form, *C. decumbens*, and *Correa 'Marian's Marvel'*. *Correa 'Manii'* and 'Fat Fred' grow together, by planting about 25-30 cm apart. *Grevillea 'Evelyn's Coronet'* is "sort of" red, *Grevillea 'Poorinda Peter'* is lovely, and an unknown ground cover *Grevillea* does well as well as a very dark flowered *Grevillea*. Other *Proteaceae* are two *Banksia occidentalis* and a *Telopea 'Shady Lady'* which had 160+ blooms last year. *Telopea truncata* is 3-4 years old and hasn't flowered, but is growing well. Three *Calothamnus* spp. and three *Callistemon* grown from cuttings, suffer from wind damage. *Chorilaena quercifolia* has lovely foliage, and red and green flowers.

Next comes a "fern" bed, and 3 frames for climbers. On one frame is *Billardiera cymosa*, *Hardenbergia comptoniana* with a dark blue flower, and a *Hardenbergia* with white flower. On the next frame is *Billardiera longiflora* with a pinkish-red berry and *B. scandens*. At one end is a clump of *Gleichenia dicarpa* but it hasn't climbed much yet as it nearly died last year in the dry. The next frame has 2 colour forms of *Pandorea pandorana*. Further along is another small bed of pink, with *Crowea exalata*, *Laslopetalum baueri*, *Boronia deanei*. I did have a *Bauera rubioides* pink on the side of the walkway, but it died, and *Pimelea* died also.

The coloured groupings only work if you allow them to! Many colours don't turn out how you expect them. Some flowers are different in bud from open blooms, and of course seedlings alter things again! I've got yellow *Bracteantha* flowering in the "purple", "blue" and "red" beds. The seedlings could always be potted on. Under a seat in the white area are seedlings of *Pimelea*, *Agonis*, *Olearia*, *Crowea*, and *Leptospermum*!

Two years ago we built a gazebo in an open space and planted plants under 1 m around the edges. Some are *Darwinia*, *Dillwynia retorta* prostrate, *Crowea exalata* prostrate, *Halgania preissiana* (18:156,158), *Brachyscome multifida* mauve, *Epacris* spp., *Eriostemon verrucosus* pink (a bit higher than 1 m) *Adenanthos* spp., *Baeckea* spp., and *Cryptandra amara* (19:369).

April 1992, and out came the string and "Roundup" once again. The next month we had 30 truckloads of very old sawdust delivered and spread on our new beds. It wasn't enough and as we couldn't buy enough pine bark locally, we decided on pine chips from a local mill, chipped especially for gardens. We've had 15 truck loads so far. The saw-dust hasn't been as good as we hoped, it blows away, and covers up small things. Some weeds grew through it too. We had eleven new beds. We also began to plant Australian plants between the original exotic mixed house garden and the front road.

1994 and we began planting Aussie plants on the N.W. corner. We put everything in very thickly to keep out some wind. We planted lots of *Grevillea victoriae* (orange/red form), *Acacia retinodes*, *Leptospermum* spp., *Eucalyptus gunnii*, *E. macrandra*, *E. ficifolia*, *Allocasuarina* spp. *Eriostemon* spp., *Boronia heterophylla*, *Callistemons* and *Melaleucas* spp., *Hypocalymma angustifolium* alba (lovely red foliage but few flowers), *Ixodia* (19:256,309P), *Restio tetraphyllus* (17:150,185P), *R. amblycoleus* and *R. complanatus* and a dwarf *R. tetraphyllus* do well in a drainage area, as do some *Olearia* and *Dicksonia*.

Back in April 1991 I joined the *Boronia* and Allied Genera Study Group and have gathered quite a collection of some plants in the study. There are about 50 species and forms of *Boronia* (still looking for more), 12 *Crowea*, 30 *Correa* and 14 *Eriostemon*. Some are still fairly young, but most seem to do well once established. I am also very fond of *Prostanthera*, and have 32 species. *Thomasia* and *Thryptomene* are also very firm favourites and we have a few of these.

Ron built me a small hot-house from treated pine, covered with solar weave, in August 1989 and I have spent lots of time in there. I enjoy growing plants from cuttings and usually have quite good success. I don't find seeds so easy, but really haven't sowed so many.

I bought a 1 m square propagator, with bottom heat and mist, a few years ago and have that on a bench in a tunnel house with solar weave on it. Above the propagator is 70% green shade cloth under the solar weave. Nearly two years ago we made a *Boronia* bed. There are over 100 plants of around 40 varieties, and they are beginning to look good!

They are all growing in full sun and very little wind shelter, but they are well mulched with pine chips. All are protected with a wire-netting cage until established, to prevent rabbits eating!

Birds visit, or live in our garden and we encourage them to stay by putting out a syrup of sugar for the honey eaters, and grated cheese for the wrens. Wire cages protect the food so the bigger birds can't be greedy. There is no close bushland or other garden nearby, so I put more of the plants that birds were visiting often, e.g., *Anigozanthos*, and *Grevillea*. ■

Landscaping by colour! Readers are invited to submit lists of plants they value for colour display, not just plants with flowers of a certain colour but plants that look magnificent when in full bloom and are a landscaping feature. Flowering period? this can be all important, lists for different periods of the year would be very useful. Editor.



△ *Boronia deanei* (see page 39)
 Photograph by J. F. Noble

▽ *Bossiaea cordigera* (see page 30)
 Photograph by Colin Woolcock





△ *Thomasia grandiflora*. Photography by Alan Gibb

▽ *Thomasia purpurea*

Magnificent plants for the garden border or rockery, please send reports on plants you grow, Editor.

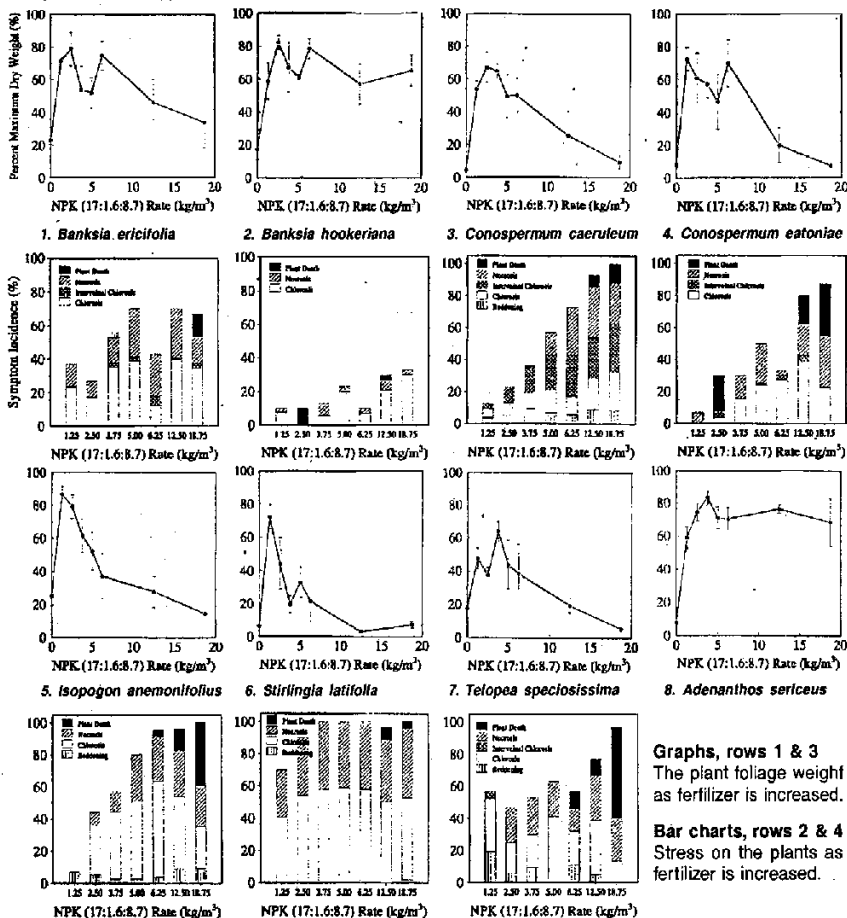


Proteaceae their nutritional needs

by S. Barlow and A. M. Haigh*

Banksia, *Adenanthos*, *Waratah*, *Isopogon*, *Conospermum* and *Stirlingia* were all subjected to a study on their nutritional needs. The results were inconclusive but a number of factors were shown.

1. All plants need nutrition. In horticulture this means fertilizer.
2. Proteaceae grow poorly and develop necrotic and chlorotic leaf symptoms when given fertilizer at rates considered normal for other cultivated plants 4–5 kg/m³. Figure 1 shows this to be between treatments of 1.25/2.25 kg/m³ of potting mix using a 5–6 month Osmocote 17N – 1.6P – 8.7K fertilizer.



Graphs, rows 1 & 3
The plant foliage weight
as fertilizer is increased.

Bar charts, rows 2 & 4
Stress on the plants as
fertilizer is increased.

*A Guide to the Nutritional Needs of Some Proteaceae, by Professor Snow Barlow and Dr Anthony M. Haigh, a Rural Industries Research and Development Corporation Research Paper Series No. 97/38, 1997. The project is part of the native plants program which aims to boost the profitability, productivity and sustainability of the Australian industry. This summary prepared by W. H. Payne with an apology for its briefness but with sincere thanks for their work.

Figures 1–8 show the growth response and symptom incidence for increasing application of fertilizer treatments for a range of species. All species receiving no fertilizer had stunted growth compared to fertilizer treatments. For most species, the lowest applications of fertilizer produced the greatest amount of growth. Increasing applications were associated with reduced growth except for *Adenanthos sericeus* and *Banksia hookeriana*.

Figure 1A is for *Banksia ericifolia*. The Percent Maximum Dry Weight is a measurement of the mass of foliage produced and this rises steeply from 20 for no fertilizer to 80 or four times the growth for a fertilizer application of 2–4 kg/m² but thereafter reduced growth for applications above 6 kg/m². The bar chart below it, figure 1B, is a reference to the plant stress shown by leaf symptoms for corresponding fertilization applications.

Leaf symptoms that appeared to be associated with reduced growth were:

- (a) Chlorosis or yellowing across the whole leaf.
- (b) Intervenal chlorosis, i.e., yellowing of leaf tips and margins and the areas between veins leaving the veinal areas green.
- (c) Necrosis or leaf death which usually commenced from leaf tips and margins leading eventually to whole leaf death.
- (d) Reddening of whole leaves, generally of new foliage.

The major objective of establishing leaf nutrient standards for management of fertilization of Proteaceae using foliar analysis has been achieved. The objective of providing information for growers of Proteaceae was also achieved. ■

Growing Banksia, Waratah and other Proteaceae in the Garden

by W. H. Payne

The above study is an excellent guide to the general cultivation of *Banksia*, Waratah, etc., they need fertilizer, significantly with some phosphorus at a low percentage, but not too much. The plant stress with increase in fertilizer is shown by leaf colour symptoms. All this is a guide to the commercial cropping of flowers for the cut-flower market. For newly prepared ground and careful nurture by feeding and watering, the conditions are approaching those of container culture, the conditions created in the above study.

But! general horticulture introduces a different dimension. As one researcher observes, "you cannot kill a Waratah or *Banksia* growing in a pot unless you deny it water or poison it (as was done in the above study) but growing it in the ground in horticulture is an entirely different matter. In pots there is no competition from roots of other plants and the below ground pests are controlled."

The world below ground level reaches a balance just as it does above where the larger birds prey on the smaller ones and there are populations of eating and sucking insects all feeding off foliage and one another. Below ground it is also survival of the fittest and the roots of Proteaceae need help. Nature's way has been to provide a friendly fungus that keeps up a trade of nutrients needed for the survival of both and a protective coating over the sensitive roots. Proteoid roots and their dependence upon a friendly mycorrhizal fungi are well documented. Studies, such as above, have shown that the formation of proteoid roots and the associated fungi are suppressed with conditions of adequate fertilizer. The plants do not need the additional nutrition. Hopefully the scientists will begin phase two of these studies, *The Cultivation of Proteaceae in the ground*.



△ *Dendrobium speciosum*, the **Rock Orchid**, growing on rock and a decaying stump with *Chorizema cordatum* nearby, all part of an exposed "rock" garden in my home. W. H. Payne.

▽ Alec Blombery's bush house, you can re-establish this in your backyard.



Orchids as garden features

by Alec Blombery*

Australian orchids have been little used as garden features. This is a pity since they lend themselves admirably to create contrasting features of spring beauty in the garden.

For best results they need a sunny position with some shade for part of the day. Plant shrubs or trees to provide the necessary shade and support. In areas of heavy frosts, some protection will be required. Orchids may be grown on most trees which do not shed their bark. However eucalypt species, apart from ironbark, contain tannins which are inhibitors to orchid growth. Native paperbark trees (*Melaleuca*) and larger bottlebrushes such as *Callistemon salignus* and *Melaleuca viminalis* as well as some exotic trees such as jacaranda are excellent hosts on which to grow orchids.

A section of a weathered hardwood hollow log makes an attractive feature in which to grow an orchid. Likewise a section of weathered hardwood log is useful as a channel in which to grow orchids. Should you be fortunate enough to have a sandstone or granite rock outcrop which may be creating a problem in a garden plan, native orchids can solve the problem. If there are not any suitable rock outcrops, create an area as follows:

Preparing a Rock Area

Clear vegetation from the area selected except for shrubs which can provide part shade. Mark out the area using a hose to form the outline which is then marked by driving small pegs into the ground. Loosen the soil where it is intended to bed a stone. Arrange the stones along the marked outline, loosening the soil and bedding the stones as you proceed.

Next place the inner stones against those already bedded down. Arrange the stones to provide spaces at intervals in the manner of a pot. Continue placing and bedding down stones, arranging spaces at convenient positions. Use the shape of the stones to provide the necessary spaces. Use larger stones on the outline to help provide a feature.

Plants of *Dendrobium speciosum* (flowers cream to yellow), *Dendrobium x gracillimum* (flowers yellow), *D. x delicatum* flowers white to pale pink, *D. speciosum* ssp. *hillii* (also known as *D. tarberi*) (tall with yellow flowers), *D. kingianum* (flowers pink and white) and the many dendrobium hybrids are all suitable for rock areas.

To attach the orchids to the rocks, drill holes using a masonry drill and a wooden or commercial plug placed in the hole. A flat-headed galvanized nail is placed in the plug. Once the plugs are in suitable positions, take the orchid from the pot and remove the potting mix from amongst the roots. The plant is then fastened tightly to the rock using galvanized tie wire, fixed to the flat-headed nails. It is important that the roots be kept tightly in contact with the stone in order they can attach themselves to the rock.

**Growing Australian Orchids* by Alec M. Blombery and Betty Maloney is the source of the above article. As with all books by Alec Blombery this is a very practical step-by-step guide on growing plants, in this case, orchids. The major part of the book contains detailed instructions on culture in a shade house either in pots or suspended from the roof on wood slabs or in receptacles such as a propagation tray. He has divided the orchids into groups based on the preferred method of culture for all areas of Australia. Terrestrial orchid cultivation is also carefully described. Available from your bookseller for \$19.95.

Securing the orchids in place. Instead of drilling the rock as described above, the plants may be weighted down with stones to hold their position. The area between the rocks where the plant is to be planted is treated in the same way as in a pot, using a potting mix of two parts of 12 mm (½ inch) treated pine bark, and one part quartz pebbles or chips of granite or marble.

Place a small quantity of the potting mix in the hole made between the rocks. Remove the plant from its pot and wash under a tap to remove any broken down potting mix. Fill around the plant with the potting mix, keeping the base of the plant level with the top of the adjoining stones. Firm the potting mix around the plant. Apply a light dressing of dried poultry manure on the plants fastened to the rocks or place in the holes then water well. Water daily and fertilize with poultry manure every two months.

In tropical areas, orchids would be *Dendrobium discolor* (very tall growing with brownish twisted flowers), *D. discolor* var. *broomfieldii* (with tall stems and yellow twisted flowers), *D. jonesii* (formerly *D. rupplanum* flowers white).

Orchids on Trees

Orchids that can be attached to the bark of trees are as follows, (they require more care with watering as they dry out readily, particularly in exposed positions).

The large-growing *Dendrobium speciosum* ssp. *hilli* (with yellow flowers), *Dendrobium x gracillimum* (yellow flowers), *Dendrobium gracilicaule* (small yellow flowers flecked with brown spots), *Dendrobium x delicatum* (with white, cream or pink flowers), *Dendrobium falcocrastrum* (with white flowers). The creeping tongue orchid, *Dockrillia linguiformis* (with white flowers), the creeping *Bulbophyllum exiguum* (with small yellow flowers) can be induced to spread over an extended area. *Dockrillia teretifolia* and *Dockrillia fairfaxii* (cream to white flowers) make interesting plants with their pendulous habit of growth. In shaded moist protected areas, the dagger orchid *Dockrillia pugioniformis* (small, pale green with white flowers) is another interesting pendulous plant. In very protected, shaded and moist positions, the orange blossom orchid *Sarcochilus falcatus* (white with yellow flowers) and *S. olivaceus* (with small greenish flowers) may be attached to trees, first placing sphagnum moss over the roots before tying to the tree. The sphagnum moss must be kept moist at all times.

Attaching Orchids to Trees

First remove the orchid from the pot in which it is growing and remove the potting mix from between the roots. Fasten the roots tightly to the bark of the tree, using strips of nylon stocking or nylon fishing line. Make a tie to the base of the plant to provide support for the plant, except in the case of small plants such as *Sarcochilus falcatus* which should only have the roots fastened. After attaching the plant, water well and spray with a weak solution of Aquasol to which has been added 10 drops of Hormone20 per litre. Water daily and fertilize with Aquasol at three weekly intervals. •

Indigenous Orchid Study Group has recently been formed, led by Don and Pauline Lawie, P.O. Box 230, Babinda, Qld., 4861, Tel. 07 4067 1577. In most issues we will now have a series of articles on Australian orchids. For this I will need good colour slides or photographs to show the plants in all their splendour. We will take *Australian Indigenous Orchids* by Alec Dockrill as the official reference for all epiphytic orchids and for tropical terrestrials, and update it as new research is published. We will publish colour photographs of species not featured in full colour so as to make this book the very best reference.

Terrestrial orchids? there are many and our first article will be on *Thelymitra*. Will readers send details of cultivation. These are exceptional plants and require special care, who knows how?

Rainforest trees for timber

My Experiences see page 32 for photographs of this plantation over the years.

by Ralph Woodford, C/- P.O. Dunoon, NSW 2480

With the locking up of the naturally occurring remaining stands of rainforest timber over the last 15 years it has become apparent that for future generations to be able to use these magnificent timbers we will have to grow them.

Historically the Queensland Forest Service planted experimental plots of Silky Oak (*Grevillea robusta*) and Red Cedar (*Toona ciliata*) in the 1920s. In the 1940s Island Maple (*Flindersia brayleyana*) was planted in moderation. Hoop Pine (*Araucaria cunninghamii*) and to a lesser degree Bunya Pine (*Araucaria bidwillii*) were the only rainforest species planted on a larger scale.

When I planted the first woodlot in 1991 it was not known that mature phase rainforest trees could be planted into a full sun plantation situation, successful. Ecological plantings had comprised species from the pioneer, secondary and mature phases. The layout for the first block planting was made up of species drawn from the pioneer, secondary and the mature phase planted alternately in rows 3 m apart and 2.5 m between trees. A second block was also planted but instead of using pioneers as the alternate species fast growing epically dominant late secondaries with good timber qualities were used. Between the fast growers a slow growing mature phase species was planted. The spacing in this block was 4 m between the rows 3 m between the trees. There were 38 species planted in the 2 blocks and they covered about 1 hectare. See the photographs on page 32. These species were known cabinet timbers. Many have not performed well having poor apical dominance, branch habit or slow growth.

It is imperative that the natural harvest cycle be dramatically reduced to encourage people to plant. A plantation that mimicked the natural rainforest like my first plantings, was not going to achieve this. In successive plantings since 1991 the amount of species planted has been reduced and format for planting changed. Instead of mixed species rows of trees that will mature at variable ages I am now planting single species rows that will mature at the same time. Ease of harvesting, growing species with similar growth and maturity rates (so that the faster species don't get their tops blown out) and priming management are the main reason for this. From the 30 species planted I have chosen the following 8 which show potential for plantation forestry on good sites in Northern New South Wales.

1. **Silky Oak** — *Grevillea robusta* — Excellent apical dominance, minimal insect damage, some fungal problems in moist, humid conditions. Average 12 cm DBH (diameter at breast height) year 6, average height of 8 metres year 6.
2. **Queensland Maple** *Flindersia brayleyana* — Reasonable apical dominance, needs some form pruning, some insect damage but not structural. Frost intolerant. DBH and height similar to Silky Oak.
3. **Silver Ash or Cudgerie** — *Flindersia schottiana* — similar to Queensland Maple but frost hardy.
4. **Kauri pine** — *Agathis robusta* — Excellent apical dominance. Self pruning new apical growth tends to snap on windy sites, similar DBH and height to Silky Oak.

5. **Hoop Pine** — *Araucaria cunninghamii* — excellent apical dominance, needs lift pruning. New hybrid of Queensland and New Guinea species shows excellent growth rates. Local species slow to establish.
6. **Bunya pine** — *Araucaria bidwillii* — similar to Hoop Pine has the added advantage of producing an edible nut. Slow to establish.
7. **Blue Fig** — *Elaeocarpus grandis* — fastest grower but needs frost free site with plenty of moisture. Poor performer on dry exposed sites. Similar structure to pines with branches emanating in whorls, needs regular lift pruning and tends to get its top blown out.
8. **White Beech** — *Gmelina leichhardtii* — slow to grow on dry exposed sites. Large variability in seedling growth habit. On moist protected sites excellent growth rates.

Our land is degraded after 100 years of extractive agriculture and much of the land that originally grew rainforest could not support rainforest today. On these sites an initial crop of Blackwood (*Acacia melanoxylon*) with a harvest cycle of 35 to 40 years in Northern New South Wales could build up soil organics and supply a short term sawlog leaving the site ready for a rainforest planting. *Acacia melanoxylon* needs a lot more management than the previous 8 species. Being an understorey species if given room and light exposure it puts on extensive lateral growth, has poor apical dominance and does not respond well to pruning. This can be overcome by increasing initial planting densities so that trees self prune until required trunk height is achieved. Then trees are thinned to encourage girth growth of the remaining trees. Another method is to plant alternate rows of emergent species with a dense crown and similar growth rates to *Acacia melanoxylon* so it is forced to grow up and maintain good apical dominance.

Although Red Cedar (*Toona ciliata*) is one of the fastest growing species the insect pest Cedar Tip Moth makes it difficult to grow in plantation situation without extra management. It must be grown in association with trees that grow as fast or faster than Cedar. At a later stage when the Cedar has reached its required height these trees can be removed giving the Cedar room to put on girth. On one of the sites I work at there are excellent stands of regenerating Red Cedar. The site was originally a dairy farm which was let go 40 years ago. Eight years ago it was dominated by Camphor Laurel (*Cinnamomum camphora*), Small leaf Privet (*Ligustrum sinense*) and Lantana.

Amongst these were remnant and regrowth Red Cedar trees many up to 80 cm DBH with an 8 to 10 metre clean bole having been forced up through competition with Camphor Laurel. The weeds were cleared away from around these regrowth trees in the years they produced seed creating a competition free seedbed. Mass germination of Red Cedar seedlings has occurred intermingled with pioneers like Bleeding Heart (*Omalanthus populifolius*), Pencil Cedar (*Polyscias murrayi*) and Corkwood (*Duboisia myoporoides*). With this competition some Cedar seedlings have died right out but others have competed well, retaining single leaders and are around 3 metres tall at 4 years old. All the seedlings have been tipped every year by the moth.

Finally I need to say that the more you learn the more you have to learn. We need to do selection trials within the species to come up with trees with better form, insect resistance and growth rates. We also need to do more work on compatibility between species to enhance growth. It is early days and it takes some time to achieve answers but with the natural resource declining this can be the only way for future timber needs.

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It is not possible to provide an index of common names as the Australian flora is so vast, many are known by a different common name in different areas. Index A is a reference to articles of special interest and, with Index B and C provides a means by which those without botanical knowledge may use the book.

Index B — Plants for a particular application

Index C — Plants for specific areas of Australia

Index D — Creating and Maintaining the wildflower garden.

Index E — The propagation of plants

Index F — Index to thousands of plants based upon the botanical name.

The letter D following the page number indicates that this reference relates to a description of the plant or its natural occurrence.

" " C refers to cultivation details.

" " P indicates a colour photograph.

" " L indicates a line drawing.

" " X gives propagation advice.

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As there are many thousands of spectacular plants in the Australian flora (many
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 clue to the botanical name of a plant, we suggest that you refer to the general
 articles indexed above for the area or application of your interest.

The index to plants gives references page number followed by the letters:

- D** — the plant is described, the best reference being in bold type
- C** — cultivation notes on this plant, the best reference in bold.
- L** — a line drawing is provided to illustrate botanical details.
- P** — a colour photograph for you to see what the plant looks like.
- X** — propagation details specifically for this plant.

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<i>pulchella</i>	19:248CP	<i>saxatilis</i>	19:327CDL	Glycine	Fabaceae
'Redex'	19:202D	Enchylaena	Cheopodiaceae	<i>latrobeana</i>	19:376D
Craspedia	Asteraceae	<i>tomentosa</i>	19:279CD	Gomphrena	Amaranthaceae
<i>globosa</i> (now <i>Pycnosorus</i>)		Epacris	Epacridaceae	<i>canescens</i>	19:317P321CD
19:319CD, 207C, 228CD		<i>paludosa</i>	19:363C	Goodia	Fabaceae
Crowea	Rutaceae	Eremaea	Myrtaceae	<i>lotifolia</i>	19:285CD
<i>exaltata</i>	19:357CP	<i>beaufortoides</i>	19:220P	Grevillea	Proteaceae
'Ryans Super Duper Star Producer'	19:202CD	Eremocitris	Rutaceae	'Allyn Charm', 'A. Glory', 'Burgundy Beauty'	19:79D
Cryptandra	Rhamnaceae	<i>glauca</i>	19:133CD, 278CD	<i>calayi</i>	19:180C
<i>alpina, amara</i>	19:369CD	Eremophila	Myoporaceae	'Firesprite'	19:202D
Cucumis	Cucurbitaceae	<i>alternifolia, bignoniiflora, biserrata, clarkii, compacta denticulata, drummondii</i>	245P, 260P, 263D, 266P, 275C	<i>phyllicoides</i>	19:158D
<i>melo</i>	19:219CD	<i>duttonii, fraseri, gilesii, glabra, hillii, hygraphana, latrobei, laanii, longifolia, macdonnellii, macgillivrayi, maculata</i>	'Winter Glory' 19:263C, 274C, 275CD	<i>pilulifera</i>	19:53P
Cyathodes	Epacridaceae	<i>mastrandii, mitchellii, neglecta, nivea, paisleyi, psilocalyx, pterocarpa, racemosa, saligna, santalina, serpens, youngii</i>	19:263C, 275C	<i>repicola</i>	19:356CP
<i>glauca</i>	19:82D	Eucalyptus	Myrtaceae	<i>robusta, sericea</i>	19:180C
<i>juniperina</i>	19:82D	<i>amygdalina, archeri, barberi</i>	19:359D, 371D	<i>sphacelata</i>	19:159D
<i>parvifolia</i>	19:141P, 283CD	<i>caesia</i>	'Silver Princess' 19:148P, 150C	Gunnera	Gunneraceae
<i>platystoma</i>	19:82D	<i>coccifera, cordata, dalrympleana, delegatensis</i>	19:370CD, 371D, 357P	<i>cordifolia</i>	19:359C
Cyperus	Cyperaceae	<i>erythrocorys</i>	19:288P	Hakea	Proteaceae
<i>bulbosus</i>	19:279CD	<i>globulus, gunnii</i>	19:372D	<i>dactyloides</i>	19:357CP
Dampiera	Goodeniaceae	<i>intermedia, kingsmillii</i>	3D	<i>epiglottis</i>	19:363C
<i>wellsiana</i>	19:323CD	<i>johnstonii</i>	19:371D	<i>laurina</i>	19:356CP
Diplarrena	Iridaceae	<i>kochii, mannensis</i>	19:102C	Hardenbergia	Fabaceae
<i>latifolia, moraea</i>	19:355C, 362C, 363C	<i>macrocarpa</i>	19:148P, 150C	<i>violacea</i>	'Purple Falls', 'Winter White' 19:202D
Diplazium	Athyriaceae	<i>obliqua, ovata, pauciflora, perriniana, radiata, regnans, risdonii</i>	19:356CP, 370-1CD, 380P	Helichrysum	Asteraceae
<i>australe</i>	19:339CD	Eucryphia	Eucryphiaceae	<i>scorpioides</i>	19:300DL
Diselma	Cupressaceae	<i>lucida</i>	343D, 359C, 363C	Herpophilion	Liliaceae
<i>archeri</i>	19:352CD, 353P	<i>milliganii</i>	19:363C	<i>novae-zelandiae</i>	19:363CD
Dodonaea	Sapindaceae	Exocarpos	Santalaceae	Hibbertia	Dilleniaceae
<i>inaequifolia</i>	19:359C	<i>cupressiformis</i>	355-7CDP	<i>diffusa</i>	19:173DP
<i>lobulata</i>	19:256CD	Gaultheria	Ericaceae	<i>stricta</i>	19:171CD
<i>subglandulifera</i>	19:198D, 222DL, 256CD	<i>appressa, depressa, hispida, lanceolata, tasmanica</i>	283CD, 363CD	Histiopteris	Dennstaedt.
Donatia	Donatiaceae			<i>incisa</i>	19:339CD
<i>novae-zelandiae</i>	19:363CD, 364P			Hymenosporum	Pittospor.
Doodia	Blechnaceae			<i>flavum</i>	19:295CD
<i>caudata</i>	19:339CD			Hypolepis	Dennstaedtiaceae
<i>media</i>	19:339CD, 340P			<i>distans, glandulifera, muelleri</i>	19:339CD
Drosera	Droseraceae			Ipomoea	Convolvulaceae
<i>caduca, darwinensis, derbyensis, faconeri, kenneallyi, lanata, ordensis, peltata, petiolaris</i>	19:82D			<i>costata</i>	19:279CD
Dryandra	Proteaceae			Isopogon	Proteaceae
<i>arctotidis</i>	19:356CP			<i>flower colour change</i>	19:55
Drypetes	Euphorbiaceae			<i>adenanthoides, alcornis, anemonifolius, anethifolius, asper, attenuatus, axillaris, baxteri, buxifolius, ceratophyllus, crithmifolius, cuneatus, dawsonii, divergens,</i>	
<i>acuminata, deplanchei, iodoformis</i>	19:330CDL				
<i>verniciosa</i>	19:390CDL				
Dubolsia	Solanaceae				
<i>hopwoodii, leichhardtii, myoporoides</i>	19:325CDL				

Isopogon — continued			
<i>drummondii</i> , <i>dubius</i>			
(syn. <i>I. roseus</i>), <i>fletcheri</i> , <i>formosus</i> , <i>gardneri</i> , <i>heterophyllus</i> , <i>inconspicuus</i> , <i>latifolius</i> , <i>linearis</i> , <i>longifolius</i> , <i>mnoraifolius</i> , <i>petiolaris</i> , <i>polycephalus</i> , <i>prostratus</i> , <i>roseus</i> (now <i>I. dubius</i>), <i>scabriusculus</i> , <i>sphaerocephalus</i> , <i>teretifolius</i> , <i>tridens</i> , <i>trilobus</i> , <i>uncinatus</i> , <i>villosus</i>	19:62-77CDL		
Ixodia	Asteraceae		
<i>achillaeoides</i> , <i>flindersia</i>	19:3D,256CD,309P,314CD		
Kenedia	Fabaceae		
<i>prostrata</i>	19:359C		
Kunzea	Myrtaceae		
<i>baxteri</i>	19:210D,240P		
<i>pomifera</i>	19:132CD		
Lagarostrobos	Podocarpaceae		
<i>franklinii</i>	19:344P,346CD,355C,367C		
Lambertia	Proteaceae		
<i>echinata</i> , <i>ericifolia</i> , <i>fairallii</i> , <i>ilicifolia</i> , <i>inermis</i> , <i>multiflora</i> , <i>orbifolia</i>	19:154-156CD		
<i>rariflora</i>	19:156CD		
Lasiopetalum	Sterculiaceae		
<i>macrophyllum</i>	19:356CD		
Lastreopsis	Dryopteridaceae		
<i>acuminata</i>	19:339CD		
Lawrencella	Asteraceae		
<i>davenportii</i> , <i>rosea</i>	19:315D,316P,318CD		
Lechenaultia	Goodeniaceae		
<i>biloba</i>	19:120P		
Leptospermum	Myrtaceae		
<i>grandiflorum</i>	19:363C		
<i>laevigatum</i>	19:45C		
<i>lanigerum</i>	19:365P		
<i>morrisonii</i> 'White Opal'	19:207D		
<i>rotundifolium</i> x <i>spectabile</i>	19:79D		
<i>riparium</i>	19:363CD		
Leucochrysum	Asteraceae		
<i>albicans</i> syn. <i>Helichrysum</i>	19:296P,300-301DL,377P		
Leucophyta	Asteraceae		
was <i>Calocephalus brownii</i>	19:256CD,280P		
Leucopogon	Epacridaceae		
<i>lanceolatus</i> , <i>leptospermoides</i> , <i>parviflorus</i>	19:283CD		
Libertia	Iridaceae		
<i>paniculata</i>	19:355C		
Lissanthe	Epacridaceae		
<i>strigosa</i>	19:283CD		
Lobelia	Campanulaceae		
<i>winifridae</i>	19:322CD		
Lomatia	Proteaceae		
<i>tasmanica</i>	19:342CD		
<i>tinctoria</i>	19:363C		
Lophostemon	Myrtaceae		
<i>confertus</i> 'Billy Bunter'	19:202D		
Macadamia	Proteaceae		
<i>claudiensis</i> , <i>grandis</i> , <i>integrifolia</i> , <i>jansenii</i> , <i>ternifolia</i> , <i>tetraphylla</i> , <i>whelanii</i>	19:106CD,107D		
Macarthuria	Molluginaceae		
<i>apetala</i> , <i>australis</i> , <i>georgeana</i> , <i>intricata</i> , <i>keigheryi</i>	19:85D		
Maclura	Moraceae		
<i>cochinchinensis</i>	19:283CD		
Maireana	Chenopodiaceae		
<i>eriolada</i> , <i>sedifolia</i>	19:248CP,258CD,288P		
Marsdenia	Asclepiadaceae		
<i>australis</i>	19:181CD,277CD		
Marsilea	Marsiliaceae		
<i>mutica</i>	19:359CD		
Mazus	Scrophulariaceae		
<i>pumilio</i>	19:359CD,361P		
Melaleuca	Myrtaceae		
<i>alternifolia</i>	19:103CD		
<i>citrinia</i>	19:150C		
<i>cordata</i> , <i>exima</i>	19:212P		
<i>fulgens</i>	19:150C		
<i>hypericifolia</i>	19:357C		
<i>pentagona</i>	19:149P,159C		
<i>quinquenervia</i>	19:3D		
<i>squamea</i>	19:363C		
Microcachrys	Podocarpaceae		
<i>tetragona</i>	19:352CD,353P		
Microcitrus	Rutaceae		
<i>australasica</i>	19:181CD		
Micromyrtus	Myrtaceae		
<i>oilata</i>	19:258CD		
Microstrobos	Podocarpaceae		
<i>niphophilus</i>	19:352CD		
Microtis	Orchidaceae		
<i>graniticoia</i>	19:85D		
Mirbelia	Fabaceae		
<i>oxlobioides</i>	19:356CP		
Mitrasacme	Loganiaceae		
<i>paiudosa</i>	19:174CD		
Myriophyllum	Haloragaceae		
<i>papillosum</i>	19:359C		
Nelumbo	Nelumbonaceae		
<i>nucifera</i>	19:373C		
Neorites	Proteaceae		
<i>kevediana</i>	19:180C		
Nothofagus	Fagaceae		
<i>cunninghamii</i>	337P,343CD		
Ocimum	Lamiaceae		
<i>tenuiflorum</i>	19:279CD		
Olearia	Asteraceae		
<i>erubescens</i> , <i>glandulosa</i> , <i>obcordata</i>	19:363C		
<i>phlogopappa</i>	19:316P		
Orites	Proteaceae		
<i>acicularis</i> , <i>diversifolia</i> , <i>exelsa</i> , <i>lancifolia</i> , <i>megacerpa</i> , <i>milliganii</i> , <i>revoluta</i>	180C,378-9CDL		
Ozothamnus	Asteraceae		
<i>alpinus</i>	19:303DL		
<i>antennarium</i>	19:363C		
<i>diosmifolius</i>	19:259CD,304CDP,307P		
'Redlands Sandra'	19:79D		
<i>diotophyllus</i>	19:336P		
<i>hookeri</i>	19:303DL,363C		
<i>ledifolius</i>	19:362CD,364P		
<i>secundiflorus</i>	19:303DL		
<i>turbinatus</i>	19:258CD		
Pellaea	Adiantaceae		
<i>falcata</i>	19:339CD,340P		
Persoonia	Proteaceae		
<i>gunnii</i>	19:363CD		
Petrophile	Proteaceae		
<i>acicularis</i> , <i>aculeata</i> , <i>anceps</i> , <i>arcuata</i> , <i>aspera</i> , <i>biloba</i> , <i>bitemata</i> , <i>brevifolia</i> , <i>canescens</i> , <i>carduacea</i> , <i>chrysanthia</i> , <i>circinata</i> , <i>conifera</i> , <i>crispata</i> , <i>cyathiforma</i> , <i>divaricata</i> , <i>diversifolia</i> , <i>drummondii</i> , <i>ericifolia</i> , <i>fastigiata</i> , <i>glauca</i> , <i>helicophylla</i> , <i>heterophylla</i> , <i>imbricata</i> , <i>incurvata</i> , <i>linearis</i> , <i>longifolia</i> , <i>macrostachya</i> , <i>media</i> , <i>megalostegia</i> , <i>merrallii</i> , <i>misturata</i> , <i>multisecta</i> , <i>pauciflora</i> , <i>pedunculata</i> , <i>phylicoides</i> , <i>plumosa</i> , <i>pulchella</i> , <i>recurva</i> , <i>rigida</i> , <i>seminuda</i> , <i>scabriuscula</i> , <i>semifurcata</i> , <i>serruriae</i> , <i>sessilis</i> , <i>shirleyae</i> , <i>shuttleworthiana</i> , <i>squamata</i> , <i>striata</i> , <i>stricta</i> , <i>teretifolia</i> , <i>trifurcata</i> , <i>wonganensis</i>	19:7CDL,27D		
Phellallum	Rutaceae		
<i>squameum</i>	19:356CP		

- Phyllocladus** Phyllocladaceae
asplenifolius 19:348CD
- Pilidostigma** Myrtaceae
glabrum 'Dwarf Plum Myrtle'
19:81D,206D
- Pimelea** Thymelaeaceae
linitolia 'Snowfall/Snowball'
19:81D,174C,202D
- Pittosporum** Pittosporaceae
bicolor 19:363C
- Plectranthus** Lamiaceae
parviflorus 19:174C
- Poa** 'Tussock Grass' Poaceae
labillardieri, *rodwayi* 19:376D
- Podocarpus** Podocarpaceae
lawrencei 19:351CD,353P
- Polystichum** Dryopteridaceae
proliferum 19:339CD
- Pomaderris** Rhamnaceae
andromedifolia, *apetala*
angustifolia, *argyrophylla*,
belulina, *brogoensis*,
cinerea, *cocoparrana*,
discolor, *elachophylla*,
elliptica, *eriocephala*,
ferruginea, *humilis*
heilianthemifolia, *intermedia*,
lanigera, *ligustrina*,
obcordata, *oraria*, *orans*,
phylicifolia, *paniculosa*,
pilifera, *prunifolia*,
racemosa
19:194–198CDL,367CD
- Prostanthera** Lamiaceae
ovalifolia 19:359C
- Pseuderanthemum** Acanth.
variabile 19:174CD
- Pterostylis** Orchidaceae
pedunculata 19:359C
- Regelia** Myrtaceae
velutina 19:250CD
- Rhodanthe** Asteraceae
anthemoides, *cremea*,
chlorocephala, *floribunda*,
manglesii, *sphaerocephala*,
sterilescens
19:129–301,315D,318CDLP
- Richea** Epacridaceae
dracophylla, *gunnii*,
milliganii, *pandanifolia*,
sprengelioides
19:355D,359C,362C,363C
- Sambucus** Caprifoliaceae
australasica 19:283CD
gaudichaudiana 19:283CD
- Santalum** Santalaceae
spicatum 19:103CD,182CD
- Scaevola** Goodeniaceae
aemula 'Diamond Head',
'Fairy Fanflower',
'Fan Dancer', 'Fanfare',
'Purple Fanfare',
'Summertime Blue'
19:81D,112D,117P,123C
'Sunfan' 19:202D
albida 19:356CP
argentea 19:123C,126CD
auriculata 19:123C
calendulacea 19:144P
calliptera 19:126CD,132P
crassifolia 19:101P,112CD
'Curtlin Fare' 19:119D,124P
densifolia 19:123C,126CD
hookeri, *humilis*
19:101P,112C,123C,126CD
kallophylla 19:85D
microphylla 19:123C,127CD
nitida 19:112CDP,116P
'Pink Perfection'
19:119D,127CD,175P
phlebopetala 19:112C,123D
'Purple Robe' 119D,127CD
pilosa 19:123D,126CD
platyphylla 19:127CD
pulvinaris 19:144P
ramosissima 19:127CD
spinescens 19:119D,125P
striata 'Misty Blue',
'Royal Robe'
19:105P,119C,124P,127CD
tenuifolia 19:127CD
- Schoenia** Asteraceae
cassiniana 19:315D,319CD
- Siloxerus** Asteraceae
pygmaeus 19:129CDP
- Spyridium** Rhamnaceae
gunnii, *microphyllum*,
obcordatum, *obovatum*,
parvifolium, *vexilliferum*
19:367CD,368P,369CD
- Stenanthemum** Rhamnaceae
pimelaoides 19:369CD,380P
Scortechinii 'Corrobee',
'White Mischief'
19:40C,44CDP,259CD
- Stenocarpus** Proteaceae
davallioides 19:99D
salignus, *sinuatus* 19:180C
- Stylidium** Stylidiaceae
macrocarpum 19:342CD
- Swainsona** Fabaceae
formosa (syn. *Clinanthus*)
19:208CDP,259CD,261P
- Syzygium** Myrtaceae
australe 'Tiny Trev',
'Hunchy' 19:206D
paniculatum 'Beachball',
'Undercover' 19:202D,206D
- Teloepa** Proteaceae
speciosissima 180C,284X
'Cardinal', 'Fire'n Brimstone',
'Fire'n Ice', 'Shade of Pale',
'Sunflare', 'Wirimbirra White'
19:237P
'Shady Lady' 19:147C,148P
truncata 19:100P
- Tetrastigma** Vitaceae
nitens 19:283CD
- Thelymitra** Orchidaceae
aristata, *azurea*,
chasmogama, *circumsepta*,
decora, *epipactoides*,
erecta, *ixioides*, *luteociliium*,
media, *malvina*,
merraniae, *mucida*,
purpurata 19:92P
- Themeda** Poaceae
triandra 19:376D
- Thysanotus** Liliaceae
multiflorus 19:355C
tuberosus 19:174CD
- Tricoryne** Liliaceae
olator 19:376D
- Tripladenia** Uvulariaceae
cunninghamii 19:114CD
- Triplarina** Myrtaceae
imbricata (syn. *Baeckea*
camphorata) 19:254CD
- Triumfetta** Tiliaceae
appendiculata 19:218D
arnhemica, *chaetocarpa*,
marsupata, *micrantha*,
procumbens, *prostrata*,
plumigera, *repens*
19:218D,220P
- Trochocarpa** Epacridaceae
thymifolia 19:363CD
- Vallisneria** Hydrocharitaceae
americana 19:359C
- Velleia** Goodeniaceae
rosea 19:322CD
trinervis 19:322CD
- Veronica** Scrophulariaceae
perfoliata (now *Derwentia*)
19:357CP
- Vigna** Fabaceae
lanceolata 19:279CD
- Westringia** Lamiaceae
'Starry Night' 19:81D
'Milky Way' 19:202D

Flora of Australia, Volume 12 Mimosaceae Part 1, is in a series of scientific publications describing the flowering plants of Australia. This volume refers to plants allied to our wattles, *Acacia*, (the *Acacia* are not in this volume) and to *Cassia* many of which are now known as *Senna*. Scientific publication? yes, but not really. In many issues of Australian Plants we bring you descriptions of a group of plants described in this case on page 27. You can readily obtain information in this form so it is not a book solely for scientists. Shown also are sketches reproduced from the volume and it is immediately apparent that you do not have to plow through the scientific descriptions but can identify the plants easily from the excellent sketches. A very valuable reference for \$54.95 from CSIRO Publishing, P.O. Box 1139, Collingwood, 3066.

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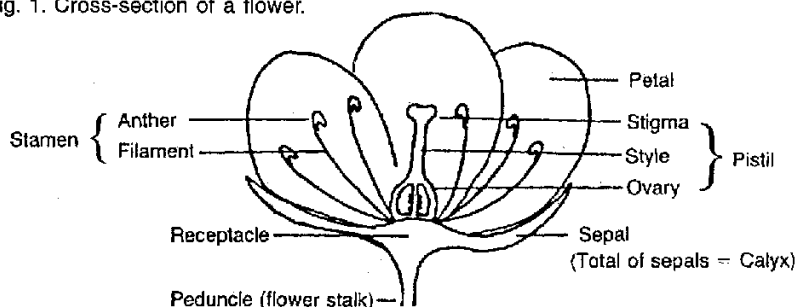
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Botany for the beginner

by W. H. Payne

The international system of classification of flowering plants, and hence for identification of plants throughout the world, is based upon the flower structure. The basic flower structure is quite simple involving very few botanical terms. All flowers appear to have developed along the pattern shown in the sketch below. Their purpose is to produce seed to maintain the species and this is achieved by fertilizing the ovules in an **ovary** which then mature to become seed. The various shapes and structures of flowers have developed over the ages to attract a pollinating agent, say a bird, bee or creatures from furry animals to tiny beetles.

Fig. 1. Cross-section of a flower.



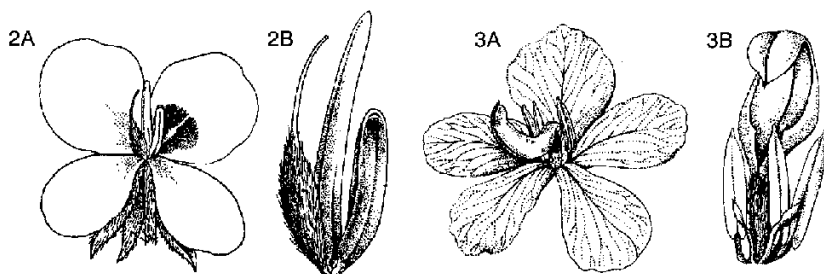
The various parts of a flower usually surround the ovary with its style on top of it. The **style** receives pollen on its upper surface (the **stigma**) the whole female structure being known as the gynoecium or pistil. Pollen is produced at the ends of the male structure, the **stamen**, which comprises the stalk (filament) with **anthers** on top. Numerous stamens form a ring around the central style though some do not always fully develop and these are called staminodes. The pollen usually matures before the stigma on top of style is ready to receive it so that pollen from one flower is delivered to an older flower with a receptive stigma.

The rest of the flower exists to attract pollinators and position them such that pollen grains will adhere to their bodies and be deposited on a receptive stigma while they move from flower to flower in search of nectar provided by the flower. The floral envelope could comprise a ring or whorl of **petals** (known as the corolla when fused in a tube), inside a whorl of **sepals** (known as the calyx), which may in turn be inside a whorl of **bracts**. The sepals may be coloured as well and the petals may not develop at all, the sepals being the showy part; the botanists have solved their dilemma by calling either or both the petals and calyx lobes, the **perianth**. The bracts cupping the flower are usually leaf-like and dull but can be the showy part of the flower. In some flowers they are deciduous.

The basic parts of the flower become specialized for each group of plants:

Petalostylis flower, figure 3A, has 5 petals. With the petals removed in figure 3B, we see the style on top of the hairy ovary is very enlarged to be boat-shaped or even petal like; it is three-lobed with the middle lobe terminated by a small stigma; there are three stamens with elongated anthers on tiny filaments and two staminodes. See the photograph on page 28.

Labichea flower, figure 2A is similar but with 4 petals, the upper one usually with a red basal flare; the sepals behind the petals are not shown but the outer two are larger, the others; the outer floral envelope enclosing the flower in bud, the calyx, comprises five bracts. As in 2B (petals removed) there are two stamens but the filaments (stalks) are short and the anthers on the end are enlarged, and for this species (see opposite) one is much larger than the other.



Now look at the sketches opposite with new understanding. We know the parts of the flower and that flowers are often in groups, (an inflorescence or raceme) of flowers. The botanists have a language to describe other parts of the plant, such as the leaves, which can be quite daunting. We do not have to learn them, we need only to look at the sketches opposite to differentiate one species from another. What a clever way to produce a book*. What at first glance looks technical are simple artists sketches of distinguishing features of the plant.

These distinguishing features are used in plant identification keys as follows:

- A. all species 1 to 5 have one anther much longer than the others.
A: species 6 and 7 have all the anthers roughly equal.
- B. leaves of species 1 are pinnate or divided while 2,3,4 and 5 have simple leaves
- C. digitate (3 or more attached at one point) rolled almost to a tube (terete) as in species 2 or V-shaped as in species 3, or
C: the central leaflet is longer than the outer ones as in 5.

Take a little effort and find a whole new world of botany that is very simple.

*How to Know Western Australian Wildflowers, Part 2

by B. J. Grieve

This book is a reference to most flowering plants of Western Australia presented in such a way that anyone can readily identify the species. We now commence a series on the many floriferous, readily grown species in the 'cassia' family Caesalpinaceae. I have reprinted three pages from this book that illustrate the western species, except for the *Cassia/Senna* group. Botanists descriptions tend to confuse me. Now I do not need to struggle with all that strange language, I can easily identify them from the sketches. You too can now identify all the western wildflowers in your garden. If you go to WA, this book will be your guide to a whole new world of botany without pain. There are many books on wildflowers most very general and at great cost. I get frustrated with them, pages of descriptions, some in simple terms but how do you tell one plant from the other when you see them. With this book the differences are obvious. Who cares how they are described, digitate, elliptic to obovate! you can see by referring to sketches.

How to Know WA Wildflowers by Blackall and Grieve was first published in 1954 and since then has gone through many revisions. Part 1 has an introduction, a few little known families and the *Casuarina*, but mostly Proteaceae, the *Banksia/Grevillea* family, now badly out of date. Parts 3 and 4 make up the rest of WA flora but are out of print. If the response to Part 2 is good and you all buy copies, reprints of the others are assured. Part II has 730 pages with many colour photographs and is available from the Western Australian Society (who were largely responsible for the work) for \$75 plus \$10 postage, P.O. Box 64, Nedlands, WA, 6909.

Labichea

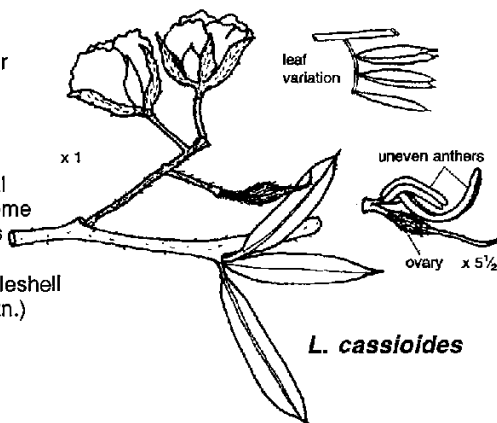
A. One anther very much longer than the other.

B. Leaves pinnate.

Habit: Shrub to 2 m high; leaves leaflets which vary from elliptical to obovate; inflorescence a raceme with 2–10 yellow flowers, sepals 5, petals 4; pod beaked.

Distribution: Da [Dr] (Hill R., Cockleshell Gully), Ir (Mt. Lesuer, Tamala Stn.)

Flowering: Jul.–Dec.



L. cassioides

B. Leaves digitate or simple.

C. Leaves digitate, leaflets $\pm$ terete or V-shaped in section.

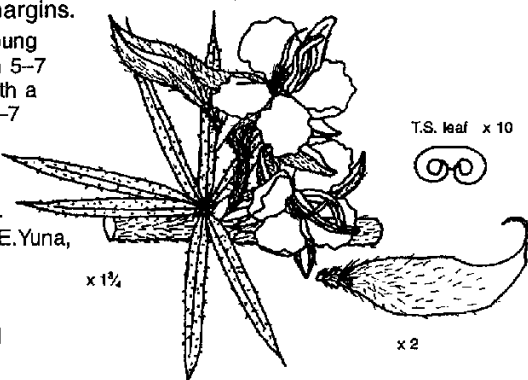
D. Racemes 3–7 flowered; leaflets $\pm$ terete or with tightly recurved margins.

Habit: Shrub to 1.5 m high, young branchlets hairy; leaves with 5–7 (–9) sessile, rigid leaflets with a pungent tip; racemes with 3–7 flowers, densely hairy, sepals 5 (rarely 4), petals 4 (rarely 5) ovary hairy; pod 1.4–2.7 cm $\times$ 5–8 mm, hairy.

Distribution: Av (Mullewa), Ir (E. Yuna, Ajana, Murchison R.)

Flowering: Jul.–Oct.

Stipules 1.5–2.5 mm long up to 2 mm wide; 2 outer sepals with golden-brown appressed hairs.



2. *L. teretifolia* subsp. *teretifolia*

Stipules 3–5.5 mm long, 2–4.5 mm wide; 2 outer sepals with silvery-white spreading hairs.

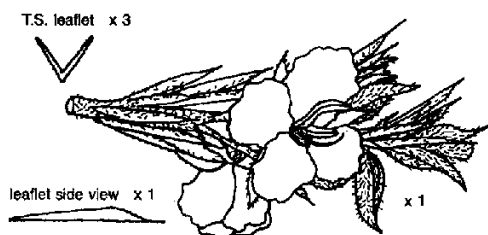
2a. *L. teretifolia* subsp. *grandistipulata*

D: Flowers usually in pairs; leaflets folded lengthwise, V-shaped in section.

Habit: Stiff, compact shrub to 80 cm high, often wider than 80 cm; leaves with 5–7 leaflets, narrow-elliptic to oblong, with a pungent tip; flowers usually in pairs, shorter than the leaves; sepals 5, petals 4, ovary densely hairy; pod up to 1.8 $\times$ 1 cm, densely hairy.

Distribution: An (Sandstone).

Flowering: Aug.



3. *L. eremaea*

C: Leaves simple or, if digitate, the central leaflets much longer than the lateral leaflets, leaflets not folded.

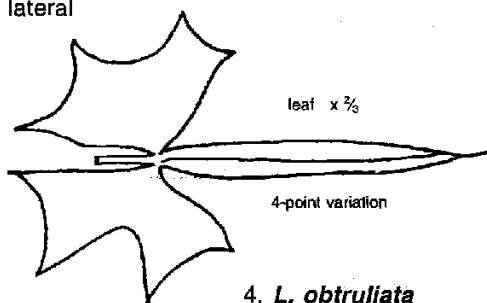
D: Lateral leaflets lobed with pungent points.

Habit: Probably a shrub; leaves 3-foliate, lateral leaflets with 3(2,4) pungent points; inflo. a raceme with 3–7 flowers, sepals 4 or 5, petals 4, ovary 3 mm long, densely hairy.

Distribution: An (W. of Yalgoo)

Flowering: Oct.

Note: Known from only 2 specimens.



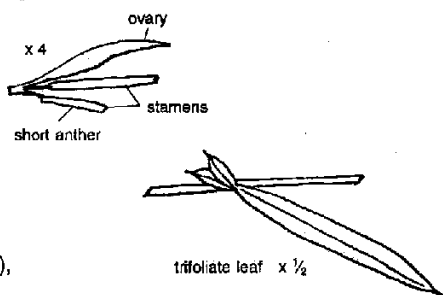
4. *L. obtrullata*

D: Lateral leaflets, if present, $\pm$ elliptic.

Habit: Shrub up to 4 m high; leaves simple or 3-foliate, leaflets elliptic-oblong, with pungent tip, central leaflet up to 120 mm long, lateral leaflets up to 17 mm long, margins thickened; inflorescence with 2–12 flowers; sepals 4 (5), petals 4, ovary 4–5 mm long, densely hairy; pod beaked, up to 40 mm long, hairy.

Distribution: Av (New Norcia, Beverley), Da [Dale] (Chidlow), [Dr] (Moore R., Serpentine R.) Ey (Ravensthorpe, C. Arid), Ir (Eneabba, Ajana), Roe (Mt. Ragged, Peak Charles)

Flowering: Jun.–Jan.



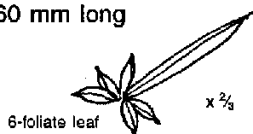
5. *L. lanceolata* subsp. *lanceolata*

Leaves (3–) 4–6 foliate, central leaflet up to 60 mm long

Distribution: Av (Pringelly), Ey (Bremer B)

Ir (E. Yuna), Roe (Mt. Ridley).

Note: Specimens formerly considered as *L. lanceolata* var. *teretifolia* are included in subsp. *brevifolia*.



5a. *L. lanceolata* subsp. *brevifolia*

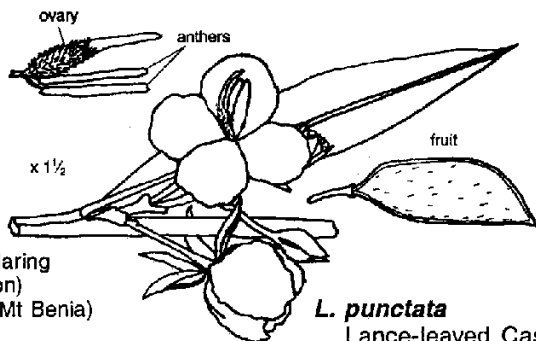
A: Anthers $\pm$ equal in size.

B. Leaves simple

Habit: Small shrub to 1 m high, $\pm$ erect; leaves linear to ovate, pungent-pointed; racemes with 3–many flowers, sepals (4)5, petals 4, ovary densely hairy, 2.5–3.5 mm long; pod beaked.

Distribution: Da [Dale] (Mundaring Weir) [Dr] (Jurien, Busselton) [Menz] (Greenbushes), Ir (Mt Benia)

Flowering: Aug.–Oct.6.



L. punctata

Lance-leaved Cassia



△ *Labichea punctata*

▽ *Labichea lanceolata*

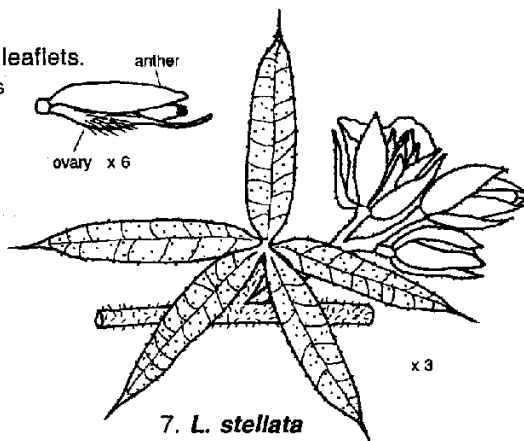


B: Leaves digitate, with 5 (7) leaflets.

Habit: Shrub to 1 m high; leaves on short petioles, leaflets pungent, narrow-elliptic, with revolute margins; racemes with 3-9 fls. sepals 5, petals 4, ovary up to 2.5 mm long, densely hairy, pod beaked, hairy.

Distribution: Roe (L. Grace, N. Ironcap)

Flowering: Aug.-Oct.



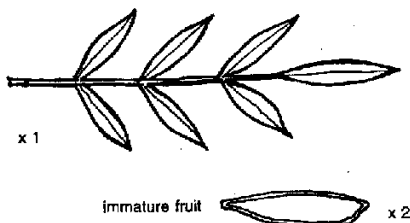
Petalostylis

A. Leaf rachis 10-50 mm, leaflets 5-15 lanceolate-elliptic, mucronate.

Habit: Erect shrub to 2 m high; sparsely tomentose; leaflets 10-20 mm long; racemes with 1-5 flowers, each with a pair of bracts 2-3 mm long; sepals 5, petals 5, style yellow; pod 2.5 cm long.

Distribution: Ir (Kalbarri Nat. Pk.)

Flowering: Oct.



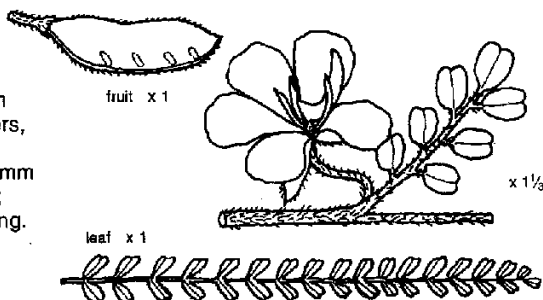
1. *P. labicheoides*
Slender *Petalostylis*

A: Lead rachis 45-90 mm, leaflets 23-55, obovate-cuneate, usually emarginate.

Habit: Spreading shrub to 1.5 m high; leaflets 3-8 mm long; racemes of 1-3 flowers, each with a pair of bracts 5 mm long; sepals 5, $\pm$ 15 mm long, petals 5, 20 mm long; style yellow; pod 25 mm long.

Distribution: An (Sandstone, Wiluna) Av (Mt. Gibson), Co (Coolgardie)

Flowering: Sept.-Dec.



2. *P. cassioides*

Labichea of Northern Australia

by J. H. Ross*

We can now extend our knowledge to the other six species using the same key.

A. Anthers unequal, one very much longer than the other.

Labichea buettneriana, figure 3A, is a shrub to 2 m tall; the leaves densely clothed with hairs on the underside. It is found north from Cooktown to Cape Flattery, North Queensland, often among coastal sanddunes.

Labichea brassii is somewhat similar but growing larger to 3 m tall but with smaller less rounded leaves. It is confined to the Mt Mulligan area of north Qld.

Labichea saxicola, figure 5B, from the Twin Falls area of Kakadu National Park is similar to *L. lanceolata* on page 24, but with broader, lance-shaped leaves that are clothed with white hairs on the lower surface.



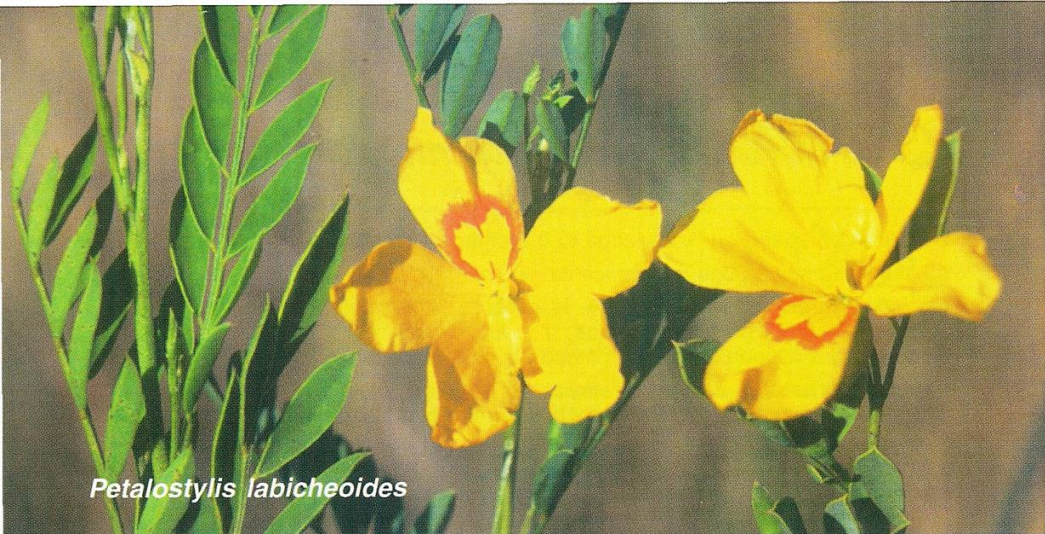
Labichea nitida from the coastal areas of Bowen northwards, is a shrub to 2 m tall with 3–7 leaflets attached to one point, digitatively, as shown for *L. teretifolia* opposite, but the central leaflet is largest, to 4 cm long, and distinctively rounded, oblong-obovate.

A: Anthers $\pm$ equal in size.

Labichea rupestris from central Queensland, Hughenden to Charters Towers and from Blackall to Rolleston. It is a shrub to 1.5 m tall with 3–5 leaflets arranged digitatively, the central leaflet (2.5–9 cm) being much longer than the others.

Labichea digitata, though from southern Queensland, is similar to *L. stellata* of Western Australia except that it has 4 not 5 sepals.

*The sketch by Anita Barley and the above notes were prepared by W. H. Payne from *Flora of Australia*, Volume 16 with appreciation for this excellent reference, see opposite page 21.



Petalostylis labicheoides



Labichea cassioides, the plant



Labichea cassioides, the flower



△ *Pultenaea gunnii*
 Photograph by J. B. Fanning

see page 30

▽ *Pultenaea stricta*
 Photograph by Collin Woolcock

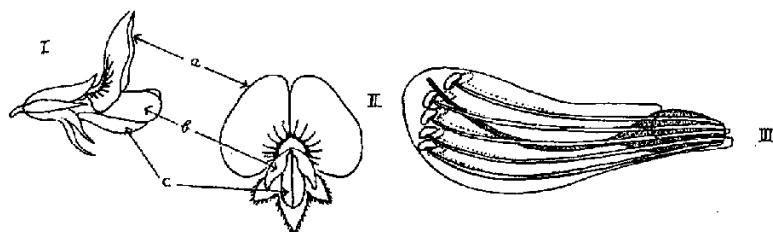


Pea-flowered plants

Pultenaea

by W. H. Payne and P. J. Lang

The publication of a new species of *Pultenaea* by P. J. Lang in the Journal of the Adelaide Botanic Gardens, volume 18/1, has presented an opportunity to bring to the attention of wildflower enthusiasts the horticultural value of the very many pea flowers that colour our bush and could adorn your garden. They are easy to grow from seed and usually easy to grow in any well drained situation. A pea-flower, developed from the same basic flower structure described on page 20, has five petals but are arranged as shown below to attract the pollinator.



a, the large standard petal; b, 2 wing petals and c, two keel petals (like a boat). This is a *Pultenaea* flower as the stamens inside are free, that is, not joined and the calyx has a bracteole.

Want to know more about pea-flowered plants, see volume 12, issue 95. The differences between the groups is graphically illustrated by sketches and many colour photographs. The 120 species of *Pultenaea* are all described and illustrated by sketches similar to those below.

Pultenaea stricta

Rigid Bush-pea

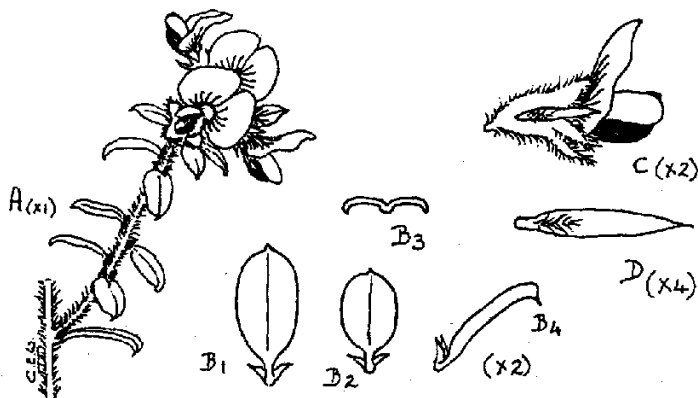
Habit Slender upright shrub to 1 m high, detail A.

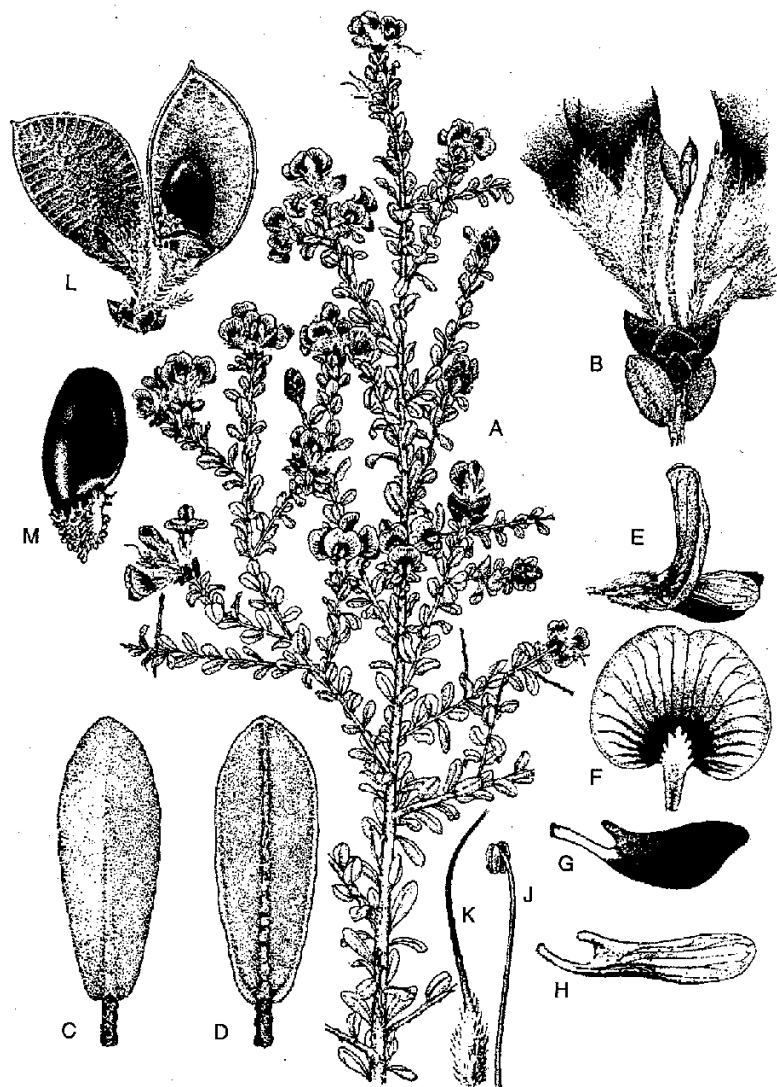
Leaves Ovate to oblong (B1 and B2) mostly 6–10 mm × 2.5–5 mm with recurved margins (B3) and a definite recurved callus point (B4); both surfaces glabrous (without hairs). Stipules small and inconspicuous.

Flowers Subsessile in terminal heads; calyx silky hairy; keel red (C)

Bracteole Oblong-linear, attached in middle of calyx tube and often exceeding the lobes in length; brown membranous and usually hairless (D).

Distribution Damp, cool locations in south-east heathland and forest.



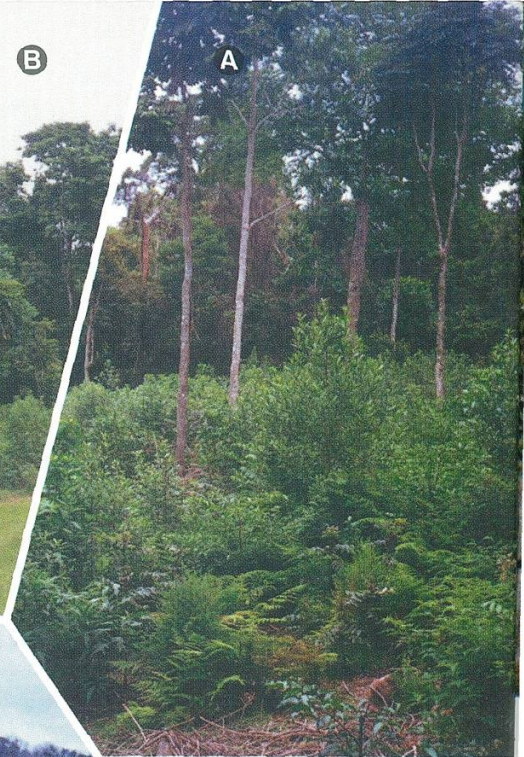


Pultenaea kraehenbuehlii A flowering branch with some buds still enclosed by floral bracts x10; B part of inflorescence showing persistent lower bracts; C leaf from above x12; D leaf from below x12; E flower in side view; F standard petal; G wing petal; H Keel petal; J stamen; K gynoeceium; L pods; M seed.

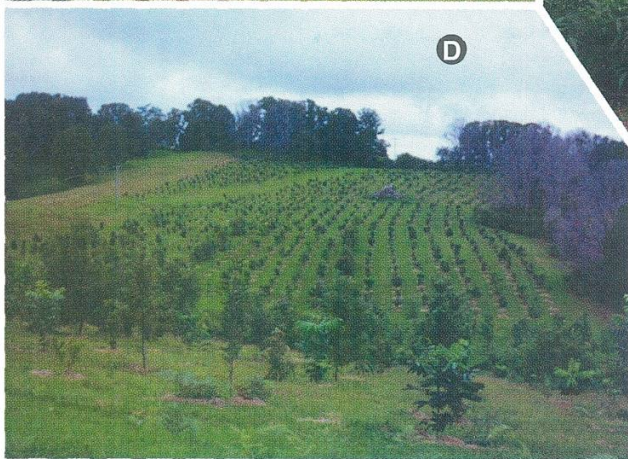
Pultenaea kraehenbuehlii differs from most species by its hairless branches and leaves. It belongs to a group of species characterized by more or less flat leaves, the upper surface darker than the lower, with terminal heads of flowers, floral bracts entire and deciduous and pubescent (hairy) ovaries. These include *Pultenaea stricta* (shown opposite) which has weak arching branches as distinct from the stiff woody branches of the new species. Others are *Pultenaea gunnii* (photo, page 29) and *P. platyphylla*. *P. largiflorens* is similar but leaves not grouped.



B



A



D

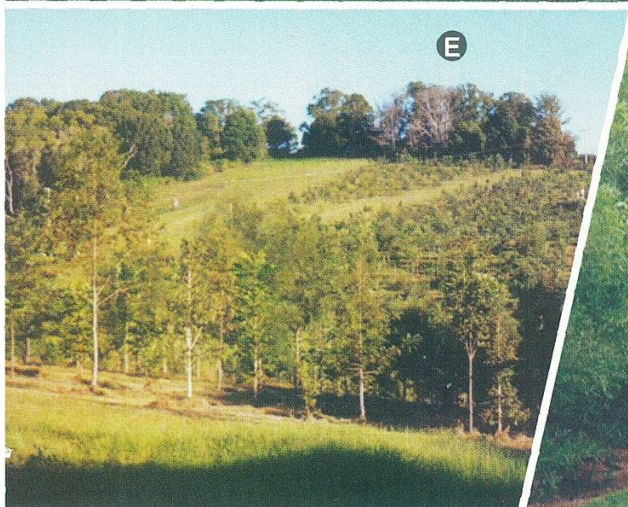
A. Assisted restoration 9 months from lantana, May 1996.

B. Assisted restoration of new planting in May 1996.

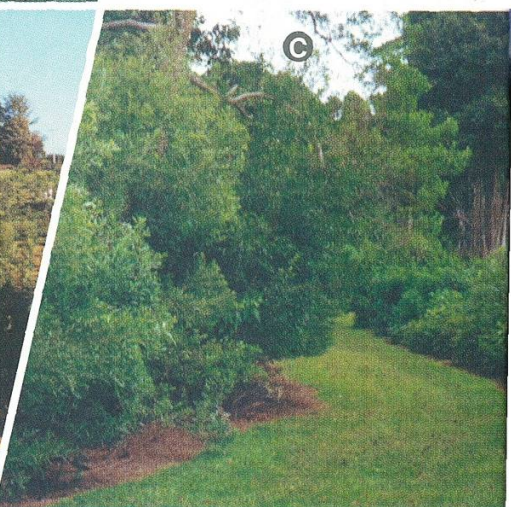
C. The plantings 3 years old, May 1996.

D. New planting of 5 hectares 2 years old, May 1996.

E. The 5 hectares 3 years old.



E



C



Rainforest trees for timber, see article on page 19.

The layout for the first block planting was made up of species drawn from the pioneer, secondary and the mature phase planted alternately in rows 3 metres apart and 2.5 metres between trees. In the second block, instead of pioneers as the alternate species fast growing epically dominant late secondaries with good timber qualities were used. The spacing was 4 metres between the rows 3 metres between the trees. Thirty-eight cabinet timbers species were planted.

Below is my first planting six years old in May 1996.

Above, some *Acacia* and other pioneers were removed, the trees are to 10 m high.



Xyris in Tasmania

by John Simmons

There are four species of *Xyris* in Tasmania three of which are endemic, *Xyris marginata*, *X. muelleri*, *X. gracilis* (subspecies *tasmanica*) and *Xyris operculata* which also occurs along eastern Australia, south from Queensland. They are widespread and frequent. They are plants of wet heaths and this of course indicates the type of conditions they prefer in cultivation.

Generally they are a small tussock with long narrow leaves from 0.8 to 3 mm wide and from 4 to 40 cm long. The short lived flowers have three pale to golden yellow petals clawed together to form a tube. They open from the axil of a bract one or two at a time and as the flowering head contains many bracts, the flowering may be spread over a period of several weeks.

The flower heads of the four species are distinctly different which makes identification relatively easy as shown in the sketches opposite.

Propagation is by division of the fibrous roots. They may be grown in a damp spot in the garden or in a pot in a well watered shade house. It is possible to grow potted plants fully immersed in a pond provided the growing medium is changed at regular intervals.

We have been successfully growing *Xyris operculata* in a pot both inside and outside the automatically watered shade house for many years. We are very fond of them so why not give them a try? Some specialist nurseries stock them.

Xyris in Australia

by Barry Conn

The 16 Australian species of *Xyris* may be identified readily by:

Those species with staminodes, appearing as fluffy hairs between the three stamens as shown in figure 1, detail J. Of these four have **flat leaves**, *Xyris gracilis*, *X. muelleri*, *X. tasmanica* and *X. bracteata*, shown together in figure 1 where other features that distinguish one from the other are obvious.

Those species with staminodes but the **leaves are spike-like** (subterete), *Xyris lanata*, *X. operculata*, *X. laxiflora*, *X. ustulata* and *X. marginata*, all shown together in figure 2 illustrating how they differ from each other.

Species without staminodes and with a **style** that is **shortly three branched** as shown in figure 3, *Xyris atrovirida*, *X. exilis*, *X. inaequalis*, *X. flexifolia* and *X. iacera*.

Species without staminodes and with a style unbranched *Xyris maxima* and *X. indivisa*, or a style with three branches longer than the above group, *Xyris roylei* and *X. gracillima*, as in figure 3.

Photographers, I need good colour photograph, prints or slides to use in *Australian Plants*. Will you please send me samples of your work on any subject. Editor.

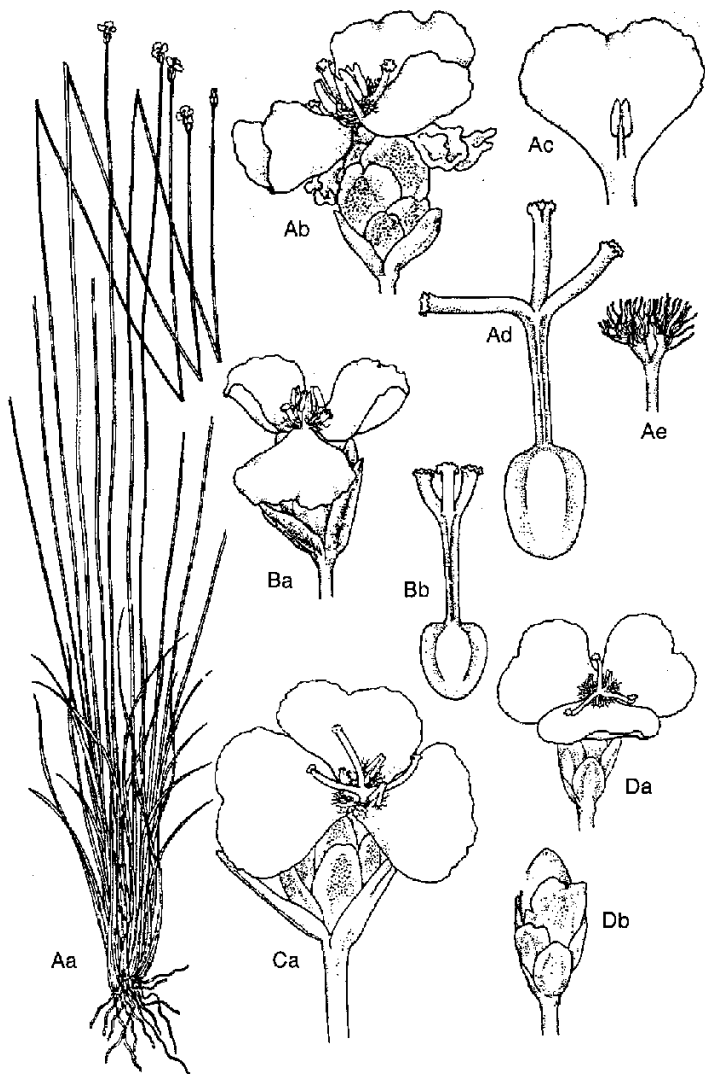


Figure 1 — *Xyris* species with flat leaves and hairy staminodes.

Xyris tasmanica, figure 1A; Aa the plant; Ab the flower spike with one flower open comprising three petals each as in Ac showing the attachment of a stamen to each, the style in the centre, as in Ad with three limbs and its ovary below; Ae are the fluffy hairs (called staminodes) between the stamens.

Xyris muelleri, figure 1B; Ba the flower spike with one flower open and; Bb its style with three shorter limbs.

Xyris bracteata, figure 1C; Ca the flower spike with one open flower, the style with three long limbs.

Xyris gracilis, figure 1D; before flowering the flower spike is as in Db comprising an overlapping cone of large bracts; in Da one flower has opened.

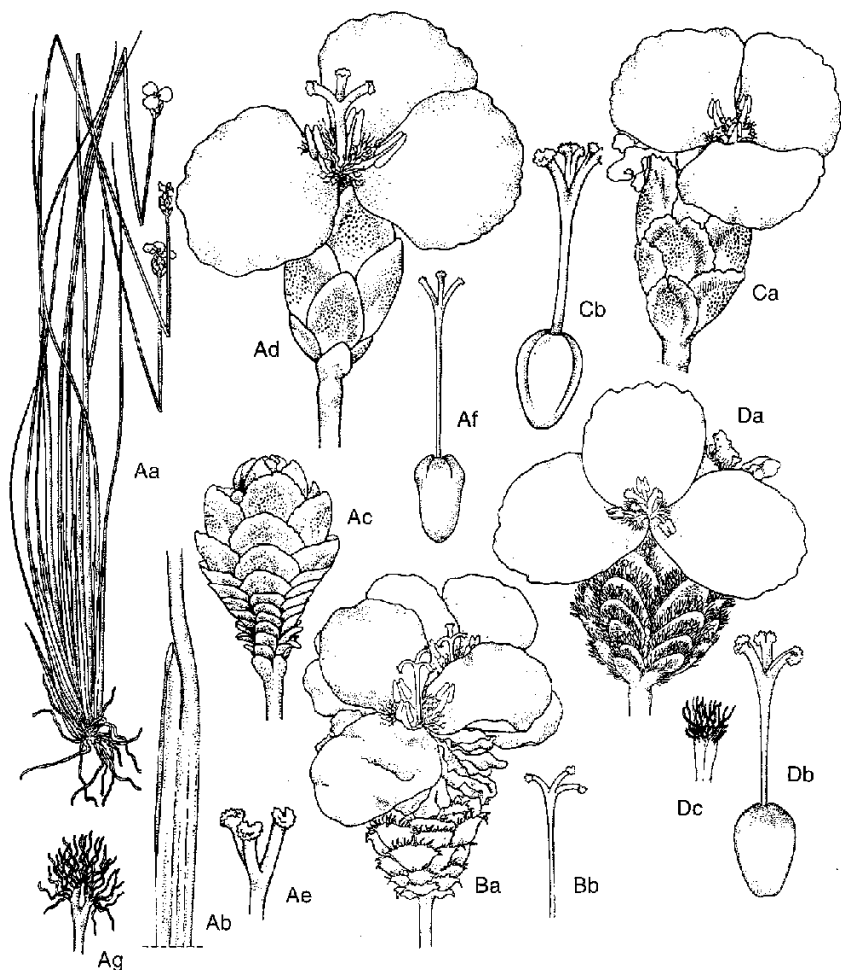


Figure 2 — *Xyris* species with spike-like (subterete) leaves and hairy staminodes.

Xyris operculata, figure 2A; Aa the plant; Ab the leaves and sheathing base; Ac the spike comprising large bracts from behind which flowers will emerge; Ad one flower with three petals, the style in the centre shown in detail Ae and on top of the ovary Af, and three stamens surrounded by fluffy hairs as shown in Ag.

Xyris ustulata, figure 2B; Ba the flower spike with two flowers showing above a number of spent flowers, Bb the style.

Xyris marginata, figure 2C; Ca the flower spike showing one flower open, its style as in Cb.

Xyris lanata, figure 2D; Da the flower spike featuring one flower open, its style Db, and staminodes Dc.

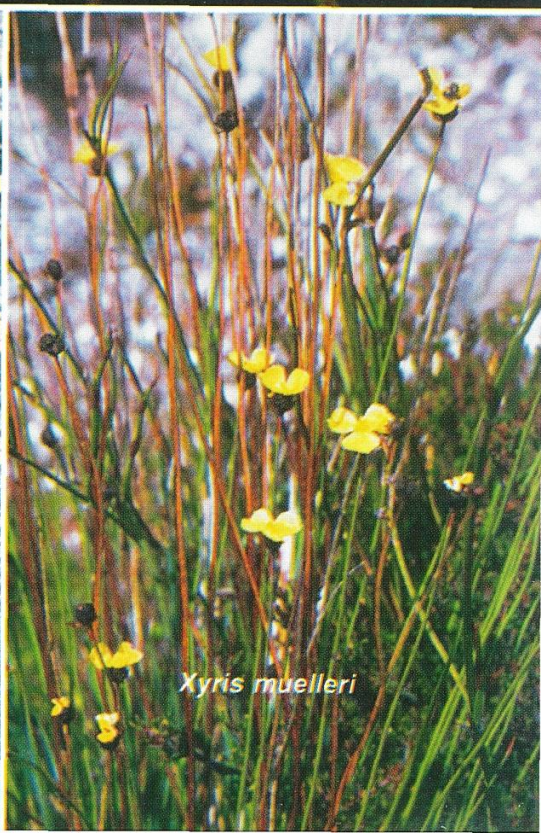
Xyris operculata



Xyris gracilis



Xyris muelleri



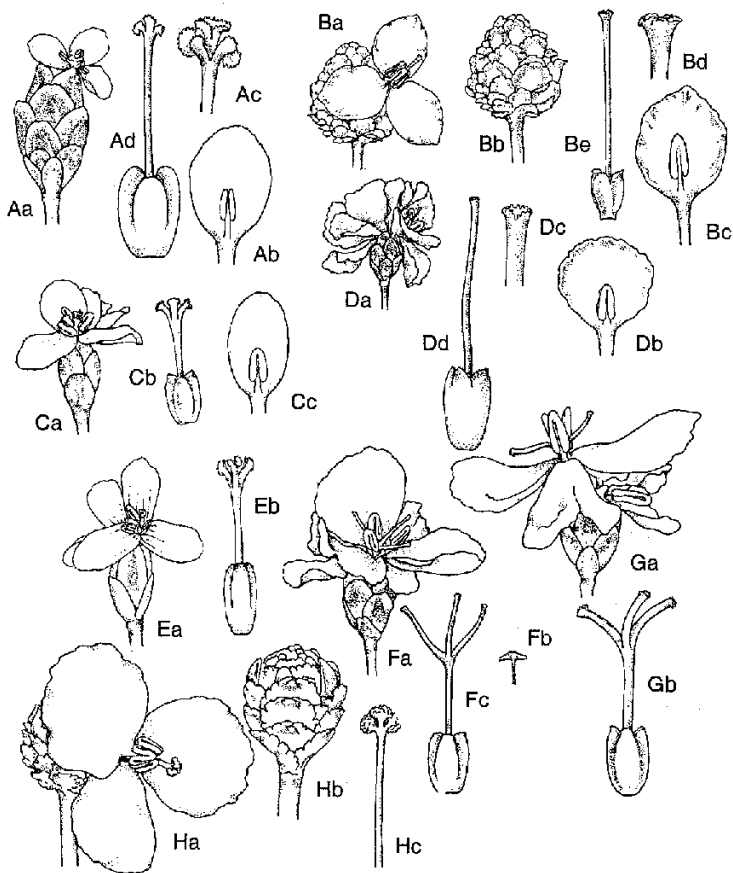


Figure 3 — *Xyris* species without fluffy hairy staminodes in the flower.

Xyris atrovirida, figure 3A; Aa the flower spike with one flower open and comprising three petals each as in Ab, showing the stamen attached, and the style in the centre, as in Ac and attached to its ovary in Ad.

Xyris maxima, figure 3B; Bb the flower head before the flowers emerge; Ba the flower spike with an opened flower showing three petals, each as in Bc with its stamen, the central style Bd which is unbranched, and on its ovary, Be.

Xyris inaequalis, figure 3C; Ca the flower spike showing one flower which has three petals as in Cb, and a shortly branched style as in Cc.

Xyris indivisa, figure 3D; Da the flower spike with numerous spent flowers each with three petals as in Db and an unbranched style Dc on the ovary Dd.

Xyris flexifolia, figure 3E; Ea the flower spike, the style being shortly branched.

Xyris gracillima, figure 3F; Fa the flower spike showing the branched style Fc; there will be three tiny staminodes Fb alternating with the petals.

Xyris roycei, figure 3G; Ga flower spike, each flower with a branched style, Gb.

Xyris lacera, figure 3H; Ha the flower spike with a flower open and with a shortly branched style Hc; the flower spike before flowering is as in Hb.

Australian plants, we need research to define assured ways of cultivation and to develop the best forms for cultivation. This Society was successful in creating the Australian Flora Foundation, AFF, for this purpose. The AFF, with the support of the scientific community, has had notable success and this has been rewarded by significant bequests including those from Michael Bowden and Toni Carver. You can fund scientific research, the donation need not be large. The money will be frugally used to get the best value in conserving our magnificent flora; it is in desperate need of scientific research and management. **Donations or bequests to The Australian Flora Foundation, G.P.O. Box 205, Sydney 2001.**

Research on Boronia is the request by the late Joyce Ward well known and loved by many members. Readers are requested to nominate studies they would like funded by the Joyce Ward bequest, by themselves or by a scientific team.

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Banksia prionotes (sulphur dried)
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Dryandra quercifolia (centre)
Eucalyptus youngiana (fruit)
Eucalyptus caesia (juvenile leaves)
 Geraldton Wax and *Calytrix* flowers

