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Australian Wildflowers In Horticulture

Developing in isolation over the ages, the Australian flora includes thousands of plants with enormous horticultural potential. The first issue of our special bicentennial series of 1988 gave simple, step-by-step advice on how to grow Waratah and other Proteaceae such as *Banksia*. Our second issue described and illustrated the floral emblems of the states with special reference to the cultivation of Sturts' Desert Pea and the Kangaroo Paw.

This issue looks at the direct application of plants already developed from the Australian flora, to beautify our landscapes. The theme on the front cover sets the tone for the issue, a native garden. Not all native gardens are small and neat, or is it casual and pleasantly random. The flamboyance of the large floriferous *Grevillea* mentioned opposite can be combined to create any effect.

This series has been designed to attract the new reader and the tourist. The response from regular readers has been encouraging. Even the more experienced growers have been grateful for the basic information mixed with easily read reports on the latest scientific research. If you are not a regular reader, send \$7.00 for an annual subscription.

Australian cultivars are forms of Australian wildflowers selected by the horticultural industry as especially suitable for landscaping our gardens. They are usually selected because of large, especially attractive, or abundant flowers but may simply be good forms that have proven reliable in cultivation. The *Grevillea* plants described opposite are Australian cultivars. See Page 371 for more details on the selection and availability of cultivars based on the Australian flora. ■

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COVER PLATE

Photographed by Neil Marriott

A wildflower garden with colour and appeal. *Acacia restiacea*, the rounded yellow dwarf wattle tree in front, backed by *Commersonia pauciflora*, a *Dampiera*, yellow everlastings with the house screened by a weeping red/pink-flowered *Eucalyptus caesia* var. *magna* known in the trade as 'Silver Princess'. This issue features other dwarf floriferous yellow shrubs, *Conostylis* to grace the larger *Grevillea* described.

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Tropical *Grevillea* Hybrids

by Russell and Sharon Costin

Grevillea 'Robyn Gordon' did for Australian Native Plants what Gladioli did for Edna Everage. It lifted them into the big-time market.

No *Grevillea* before it had so much going for it. Semi-prostrate, large flowers all year round and hardy and adaptable to a wide climate range and soil types. It is a delight for our native nectar feeding honeyeaters and parrots.

With enthusiasm from some dedicated amateur plant collectors, conservationists and members of the Society for Growing Australian Plants, a whole range of seedling species were brought into gardens. These included forms of *Grevillea banksii*, *G. sessilis*, *G. pteridiifolia*, *G. longistyla* and *G. whiteana*. These species, while spectacular, are sometimes unreliable on their own roots. A good F1 hybrid confers the benefits of both the parents in a stronger more vigorous plant. Nature in most cases has done the work. Interested gardeners helped by nurturing the unusual seedlings to flowering stage. The best of the natural hybrids eventually came to the attention of nurserymen who saw their potential and were in a position to market them.

The original two that started the ball rolling were *Grevillea* 'Robyn Gordon' and *Grevillea* 'Sandra Gordon'. Both these spectacular hybrids originated in Dave Gordon's garden at his property 'Glenmorgan' near Surat in south-western Queensland.

For cultivation refer to "Growing The *Grevillea* Hybrids", page 372.

Potential for Cut Flowers

These hybrid *Grevilleas*, with their outstandingly showy flowers, have considerable potential for use in floral arrangements and bouquets. This has particular potential with the increasing demand and usage of all things Australian both domestically and overseas. The colours are vibrant, the flowers last at least as well as a lot of commonly used cut flowers, without any treatment or special care. They are 'different' and 'unusual', they flower all year long so the potential is there for large scale usage. Their consistency of flowering means they can be placed in the most receptive market on a rotational basis throughout the year.

Conservation — Birds in Your Garden

Bird lovers please take note. These plants are the most singularly important bird feeding and nectar producing plants in Australia today. No other plants have all their attributes with regard to being able to support birdlife, and as such, should be given wide support for use in public plantings. Their widespread use around parks and cities in general would result in an abundance of colour and birdlife. Place these shrubs strategically near windows and outdoor areas and you will soon become an amateur ornithologist.

Grevillea — The Flower

The brilliant flower head of a *Grevillea* comprises a large number of individual flowers each capable of being fertilized and forming seed. The parts and functions of each flower are described in detail on page 368. This detail is not included here as new readers may consider it a little "technical" at first glance. All the articles in this issue are presented so as to be easily read by new readers to Australian Plants. — Editor.



Grevillea 'Robyn Gordon' (foreground) and *Grevillea* 'Superb' △ ▽ *Grevillea* 'Pink Parfait'





***Grevillea* 'Majestic'**

Photography by Peter Olde

A third group of hardy hybrids between *Grevillea banksii* and *G. whiteana* is described on page 341. The cultivar name *Grevillea* 'Majestic' is particularly apt, the large flower head being possibly the most majestic and colourful of the Queensland tropical hybrid collection.

***Grevillea* 'Superb' – *Grevillea* 'Robyn Gordon'**

Photography by Merv Hodge

As described on page 338 there are four widely marketed *Grevillea* hybrids that are very similar, each growing into a compact bush as above with an abundance of flowers during most of the year when growing in full sun. The only difference to the casual observer is that the colour ranges from the deep red of *Grevillea* 'Robyn Gordon', foreground, to the orange-red of *Grevillea* 'Superb' in the background. These three year old plants are typical of growth habit in the open.

***Grevillea* 'Pink Parfalt'**

Photography by W. H. Payne

The next group are hybrids of *Grevillea banksii* and *G. sessilis* and have completely round cones as shown for the outstanding plant opposite. This group, as described on page 339, are selections from seedlings of this outstanding plant, *Grevillea* 'Misty Pink' illustrated in colour on page 380. They are similar, the principal variation being in flower colour as indicated by the cultivar name.

We must commence this description of the spectacular tropical *Grevillea* horticultural hybrids with the first and most widely known of them, *Grevillea* 'Robyn Gordon'. This outstanding plant is renowned, not only for its spectacular prolific flowering, but also for its hardiness to a wide range of growing and climatic conditions. They are frost hardy and will tolerate cold conditions down to Victoria and Tasmania. Three more recent introductions, although from different forms of one of the parents, are then described, each with the characteristic one-sided clothes-brush type flower head. The colour ranges in the order below from the deep red of 'Robyn Gordon' to an orange-pink.

***Grevillea* 'Robyn Gordon'**

An F1 Hybrid between *Grevillea bipinnatifida* and *Grevillea banksii*. For those unfamiliar with this *Grevillea* it grows 1-1.5 m high $\times$ 1.5-2 m wide. Flowers are continuous throughout the year, with major flushes in spring and autumn. The colour is excellent, being dark pink and red, with the flowers being held slightly pendulous. A magnificent plant for landscaping, it has proven to be relatively frost hardy with plants being grown throughout Australia. It responds well to heavy pruning. Colour photograph on page 336.

Origin: Mr Dave Gordon, 'Glenmorgan'.

A full colour photograph of *Grevillea* 'Robyn Gordon', *Grevillea* 'Mason's Hybrid', *Grevillea* 'Sandra Gordon' and *Grevillea* 'Pink Surprise' is included in the new publication "Garden Varieties of Australian Plants". (See page 371 for details and how you can obtain your copy for only \$4.00.)

***Grevillea* 'Coconut Ice'**

An F1 Hybrid between *Grevillea bipinnatifida* and *Grevillea banksii* 'Alba'. *Grevillea* 'Coconut Ice' is an outstanding medium spreading shrub with lush green fern-like foliage. Large pink and orange 20 cm brushes cover the whole dome-shaped shrub all year round. It grows to 1-1.5 m high and 1.5 m wide in most sunny garden situations. It is wind and frost hardy and a very reliable flowerer. Regular pruning is recommended.

Grevillea 'Coconut Ice'. *Origin:* Mr Barry Arthur, Brisbane. *Marketing:* Lakkari Native plant Nursery.

***Grevillea* 'Mason's Hybrid'**

An F1 Hybrid between *Grevillea banksii* and *Grevillea bipinnatifida* (orange form). This plant is marketed as *Grevillea* 'Ned Kelly'. It is an upright rounded bushy shrub growing 2 m $\times$ 1-1.5 m with dense bright green fern-like foliage. It carries masses of orange and red brushes all year round from top to bottom of the shrub. It is very hardy and reliable in most soils and reasonably frost tolerant. Regular pruning is recommended.

Origin: Mr Joe Mason. *Marketing as* 'Ned Kelly': Mr Don Burke and East Coast Nurseries.

***Grevillea* 'Superb'**

An F1 Hybrid between *Grevillea bipinnatifida* and *Grevillea banksii* 'Alba'. *Grevillea* 'Superb' is a very dense low spreading shrub growing 1-1.5 m $\times$ 1.5 m. Masses of flowers appear all year long covering the bush with gold tipped orange and pink brushes. It is very hardy and superior to *Grevillea* 'Robyn Gordon' as it holds its foliage very well. Regular pruning encourages flowering and keeps the bush shapely. Colour photograph on page 336.

Grevillea 'Superb'. *Origin:* Mr Merv Hodge. *Marketing:* Swanes Nursery.

Grevillea banksii

A parent of the plants above, this is a beautiful garden shrub in its own right with flower colour of white to red, over many forms, from large upright shrubs to ground hugging prostrate forms. One upright selection is marketed as *Grevillea* 'Kingaroy Slippers'. Selected prostrate forms are available as *Grevillea banksii* 'Prostrate Alba' (a white-flowered form), *Grevillea banksii* 'Prostrate' (red) and an exceptional smaller flowered form, brighter red and with denser, smaller foliage, *Grevillea banksii* 'Ruby Red'.

Grevillea sessilis

This is another Queensland plant similar to *Grevillea banksii* but with white to cream flowers, not with the same value as a specimen shrub. When hybridized with *Grevillea banksii* it has produced some outstanding plants. The flower heads are a full cylinder of flowers as with the two parents but this group of plants do not appear to perform as well in the colder climates.

***Grevillea* 'Misty Pink'**

An F1 Hybrid between *Grevillea banksii* and *Grevillea sessilis*. *Grevillea* 'Misty Pink' originated on lush and green Tamborine Mountain near Brisbane, where both its parent plants were growing and flowering. It differs from most other *Grevillea* hybrids of this type in that it was hand pollinated and selected for its colour and vigour. The selected breeding shows in its garden performance. It is a vigorous and hardy, free flowering shrub growing as a bushy, medium shrub with greyish lobed leaves. It reaches 2-3 m high with a spread of 1.5-2 m. Flowers are spectacular and plentiful rich pink with cream styles 15 cm brushes in terminal clusters of six or more. Flowers occur all year round with peaks in spring and autumn. *Grevillea* 'Misty Pink' should be pruned regularly both to shape the bush and to remove old seed pods to improve flowering. It is also widely grown throughout Australia. Colour photograph on page 380.

Origin: Mr Lloyd Neilsen, 'Tamborine Mountain'. *Marketing:* Lakkari Native Plant Nursery*.

***Grevillea* 'Pink Parfait'**

An F2 Hybrid from *Grevillea* 'Misty Pink', *Grevillea* 'Pink Parfait' is a very determined flowerer, growing to a medium bushy shrub, 2-3.5 m high by 1-1.5 m wide. The foliage is like *Grevillea* 'Misty Pink' but more silvery in appearance. The flowers are a brilliant watermelon pink, and are 16-18 cm long, often having double styles, with gold tips. The flowers are very shiny and stand out well against the bush, often occurring in clusters. Regular pruning is required to encourage new flowers. It is quite frost tender, and although if big enough it will recover, it should be planted on the higher warmer spots in frost prone areas.

Origin: John Donahue and Peter Gillard, Townsville. *Marketing:* Townsville Tropical Trees.

***Grevillea* 'Pink Champagne' — *Grevillea* 'White Wine' — *Grevillea* 'Cherry Brandy' — *Grevillea* 'Eileen Rose' (Rosy red-pink styles)**

This group are F2 Hybrids of *Grevillea* 'Misty Pink', the colour ranging from white to red as indicated in their names.

*Lakkari Native Plant Nursery is now operating in New South Wales as Limpwood Gardens Nursery Limpwood Valley, via Chillingham.



Grevillea 'Honey Gem' △

▽ *Grevillea* 'Star flame'



Grevillea whiteana

This is another species from southern Queensland that has proven a delightful garden plant. Its various forms have been marketed on their own (one being *Grevillea* 'Honeycomb' as below) or as hybrids with *Grevillea banksii*. This group of hybrids appear more cold tolerant and do better than others in New South Wales and Victoria.

***Grevillea* 'Pink Surprise'**

An F1 Hybrid between *Grevillea banksii* and *Grevillea whiteana*. The flower spikes of *Grevillea* 'Pink Surprise' are among the largest of this group of plants being 22 cm long, pink with cream styles occurring in terminal spikes throughout the year. It grows naturally into a large shrub if left unpruned average height being 3-6 m $\times$ 2 m in width. It is very fast growing with spectacular flowering, frost hardy but susceptible to wind damage, so prune regularly.

Origin: Mr Ralph Bailey, Indooroopilly, Qld. *Development:* Lakkari Native Plant Nursery*.

***Grevillea* 'Majestic'**

An F2 Hybrid from *Grevillea* 'Pink Surprise', *Grevillea* 'Majestic' is a tall upright bushy shrub growing 3-4 m $\times$ 2 m with a broader green foliage. Magnificent 30 cm terminal brushes of dark red with cream styles occur over the bush in flushes all year round. It is reasonably hardy requiring full sun.

Origin: Mr Graham Nosworth, Brisbane. *Marketing:* Wholesale Ornamental Nurserymen Pty Ltd.

***Grevillea* 'Sylvia'**

An F2 Hybrid from *Grevillea* 'Pink Surprise', *Grevillea* 'Sylvia' forms a bushy medium shrub with soft, silvery fern-like foliage. Flowers are spectacular 25 cm brilliant bright pink double styled gold tipped brushes throughout the year. It grows 2-3 m with a spread of 2 m and is hardy and reliable and tolerant of light frosts. Pruning to shape is recommended.

Grevillea 'Sylvia' *Origin:* Mr Bob Dawson, Brisbane. *Marketing:* Utingu Native Plant Nursery.

***Grevillea* 'Caloundra Gem'**

An F1 Hybrid between *Grevillea* 'Honeycomb' and *Grevillea banksii*, this bushy shrub has lobed leaves intermediate between the two parents and grows 3-5 m $\times$ 2-3 m wide holding branches, foliage and flowers down to ground level. Flowers occur all year long and are up to 20 cm long tightly clustered pink and yellow brushes. They are quite distinct from all other hybrids being not only a different colour but also a different flower formation. It likes a sunny, average position and responds well to pruning.

Grevillea 'Caloundra Gem' *Origin:* Mr Allan Brown, Caloundra. *Marketing:* Lakkari Native Nursery*.

***Grevillea* 'Honeycomb'**

A selection of the natural *Grevillea whiteana*, *Grevillea* 'Honeycomb' is a tall, but bushy shrub with deeply lobed olive green leaves. The flowers are creamy yellow in 12 cm long upright clusters during winter and spring. It reaches 3-4 m in height and 2 m in spread. It has proven to be relatively frost hardy with plants being grown extensively along the east coast.

Origin: Mr Vic Levey, Brisbane. *Marketing:* Wholesale Ornamental Nurserymen Pty Ltd.

***Grevillea* 'Moonlight'**

A seedling selection of *Grevillea whiteana*, *Grevillea* 'Moonlight' is a fast growing upright shrub with fine, fern-like olive green foliage. It is extremely floriferous, flowering all year round with 20-25 cm long creamy white brushes. Spectacular in flower it grows 3-4 m × 1.5 m in a full sun, well drained position. Pruning is recommended to keep it to a good height and to promote bushiness. It has also been marketed as *Grevillea* 'Boondooma'.

Grevillea 'Moonlight'. *Origin*: Mr Bob Dawson. *Marketing*: Utingu Native Plant Nursery.

Grevillea pteridifolia

This is an outstanding plant and may be seen growing along the roadside in northern and central Queensland. It has been hybridized with each of the other Queensland *Grevillea* above, to produce exceptional horticultural plants. The flower heads are of the one-sided clothes-brush type and this is reflected in the flower head shapes of all the following hybrids except with *Grevillea* 'Starfire'. All are frost hardy.

***Grevillea* 'Sandra Gordon'**

An F1 Hybrid between *Grevillea pteridifolia* and *Grevillea sessilis*. *Grevillea* 'Sandra Gordon' is a large shrub with silvery green lobed leaves and 15-20 cm long yellow brushes. It has a long and spectacular flowering period of 6-8 months from late summer through into spring. The flowers occur in groups over the whole plant. After flowering the plant should be pruned to a desirable height and shape. This should be done every year to avoid wind damage and promote better flowering. It is frost hardy with plants being grown throughout Australia.

Origin: Mr Dave Gordon, 'Glenmorgan'. *Marketing*: Lakkari Native Plant Nursery*.

***Grevillea* 'Honey-gem'**

An F1 Hybrid between *Grevillea banksii* and *Grevillea pteridifolia*. *Grevillea* 'Honey-gem' is one of the hardiest and most vigorous of all the larger 'shrub type' *Grevillea* hybrids produced so far. Its flowers are large 18-20 cm orange and pink brushes in terminal clusters all year long. Large, fern-like, dark green foliage creates a very dense bushy shrub growing 2.5-3.5 m high and 2 m wide. Flushes of bronze new growth are followed by multiple flowers at the end of the branches. Regular pruning is recommended both to shape the bush and to encourage flowering. *Grevillea* 'Honey-gem' is very quick growing and prolific and not prone to too many pests and diseases.

Origin: Ms Charyl Jerks, Taringa, Brisbane. *Marketing*: Wholesale Ornamental Nurseryment Pty Ltd.

***Grevillea* 'Starfire'**

An F2 Hybrid from *Grevillea* 'Honey Gem', it is a very graceful shrub growing 3-4 m × 2 m in a sunny well drained position. The fine, silvery, fern-like foliage offsets the brilliant terminal 15 cm flowers. Flower colour is magnificent dark red striped centre, with bright pink styles tipped with gold. *Grevillea* 'Starfire' flowers all year long and benefits from pruning.

Grevillea 'Starfire'. *Origin*: Mr Ralph Bailey. *Marketing*: Lakkari Native Plant Nursery*.

***Grevillea* 'Starflame'**

An F2 Hybrid from *Grevillea* 'Honey Gem', *Grevillea* 'Starflame' is an attractive shrub growing 3-4 m x 2 m with fine green foliage and forms a very bushy medium shrub. Flowers occur on and off throughout the year with a peak during winter and spring. Flower colour is a distinctive shiny Tangerine Red quite different to any of the other hybrid colours. It is extremely hardy and floriferous and is on a par with *Grevillea* 'Honey Gem' as a magnificent flowering shrub. It also benefits from pruning.

Origin: Mr Ralph Bailey, Indooroopilly, Brisbane. *Marketing:* Lakkari Native Plant Nursery*.

Propagation

For true to type and name, plants must be propagated by cuttings or tissue culture methods only. Seedlings from any of these shrubs, cannot under any circumstances be called the same name. Propagation is not easy for the beginner and our methods require professional facilities.

Our method is from cuttings. Our cuttings are produced from plants kept in a fresh young growing state all the time by regular pruning and fertilizing. Material should preferably be sprayed regularly with a good all purpose fungicide so as to be pathogen free. Cuttings are prepared, dipped in 8,000 to 16,000 ppm powder hormone, and placed in separate 6 cm tubes in a peat and perlite medium. Close attention to hygiene is necessary from beginning to end. All stages of our propagation are carried out under sterile conditions, and all pots, mediums, tools etc. are sterilized. Our propagation shed has automatic mist following light and temperature, temperature controlled ventilation and bottom heat and the needs of the *Grevillea* hybrids were taken into account in the design. *Grevilleas* will strike in 3-6 weeks during most of the year.

Limpinwood Gardens and Nursery

W. H. Payne

Nestling in the foothills of the Border Ranges, just outside Murwillumbah, New South Wales, is a picturesque floral spectacle, acres of wildflowers on a rolling hillside, and a rainforest gully. Created initially by Russell and Sharon Costin to service a large wholesale demand and their Lakkari Native Plant Nursery in Brisbane, the emphasis was upon the Queensland Proteaceae including *Grevillea*, *Oreocallis* (the Queensland Waratah), etc. Hundreds of well established, well flowered plants of a very large range, including all those mentioned in their article above, are a spectacle enjoyed by flocks of birds.

The enthusiasm of these competent horticulturists has spilled over to other interests such as exotic fruits, *Protea*, native grasses and the large range of incredible Queensland rainforest plants. They no longer have the Lakkari Nursery and depend upon a well stocked nursery at their Limpinwood Gardens. To assist in their retailing a vast range of plants are laid out in numerous garden beds. For instance, the garden bed displaying ground cover plants must be 50 metres long and eight metres wide, a splendid array of very many ground hugging plants.

For visitors to the Gold Coast-Tweed Heads area south to Ballina, take a day trip into the foothills of the Border Ranges; through the main street of Murwillumbah follow the signposts to Nerang to the turn-off to Chillingham, through Chillingham for 400 metres and then left to Limpinwood. Picnic area and barbecue facilities are provided in the midst of the wildflower gardens.

Conostylis

By P. E. Bailey
— based on the review by
Dr S. Hopper in Flora of Australia*

A genus of forty-five species endemic in the south-west of Western Australia. The flowers are distinguished in having six stamens inserted near the top of the perianth tube opposite the erect or spreading lobes. It is separated from the closely related *Blancoa* in having non pendulous flowers. Although six subgenera are recognized, two are combined in this account as they can only be distinguished after dissection of the flower.

The Subgenus *Androstemma* (Lindley) Hopper

The two similar species are distinguished from other species in the genus by the perianth (floral tube) being 30-65 mm long with lobes 14-25 mm long.

1. *Conostylis androstemma* F. Muell.

Leaves terete, 10-30 cm long, about 1 mm wide, green and glabrous. Pedicels less than 1 mm long; bracts about 5 mm long and 2 mm wide. Flowers solitary. Perianth cream to pale yellow, 30-50 mm long; tube usually straight; lobes 15-25 mm long and not reflexed. Anthers yellow and 3-5.5 mm long on filaments 8-17 mm long. Flowering from May to August. It may be distinguished from *C. argentea* in having terete, green and glabrous leaves (not flat, silvery and villous).

2. *Conostylis argentea* (J. Green) Hopper

Leaves flat, 7-25 cm long, 0.7-1.6 mm wide, silvery and villous. Pedicels 2-12 mm long; bracts 10-25 mm long and 2-4 mm wide. Flowers solitary. Perianth grey-cream and sometimes suffused with purple, 35-65 mm long; tube usually curved; lobes 14-22 mm long and often reflexed. Anthers cream and 3.5-6.5 mm long on filaments 4.5-10 mm long. Flowering in July and August. Colour photograph (labelled *C. androstemma*), Aust. Pl., Vol. 10, page 253.

Conostylis as Garden Plants

Conostylis is a group of plants with 45 species. For those familiar with botanical terms, I refer you to Volume 45 of the Flora of Australia. Here the species are described in simpler terms. It is hoped that the reader is not discouraged by the scientific names; how else would we be able to reliably refer to a particular plant in the group. Each species is a real horticultural gem. Cultivation and propagation methods are detailed in our Volume 10 from page 247 where 10 species are illustrated in colour. All you need are well drained, normal garden conditions.

From the colour plates you will see that they are all somewhat similar at first glance with yellow heads of flower from a reedy-grass-like clump to half a metre high for the taller ones. Closer inspection will reveal the differences and to help identify them Dr Steven Hopper has divided them into subgenus groups and comments:

"Flower shape is a useful guide for recognizing the subgenus groups — subg. *Greenia* with long tubes and short lobes and stamens — subg. *Androstemma* with long tubes, long lobes and stamens — subg. *Brachycaulon* without a tube and lobed to the ovary. The flower shape is variable for subg. *Conostylis* and subg. *Pendula*. The important difference between the two is that the ovules are numerous (30+) all over a globose placenta in subg. *Conostylis*, whereas in subg. *Pendula* they are visually few (less than 15) and hanging from the lower side of a peatate placenta. Subg. *Bicolorata* (i.e., *Conostylis vaginata*) is unique in its sessile inflorescences and white dimorphic anthers."

These botanical terms are strange to you? Refer to "The Flower" — Part 4 on page 368.

The Subgenus *Greenia* (Geer.) Hopper

The two similar species are distinguished from other species in the genus by the perianth being 25-45 mm long with lobes 4-7.5 mm long.

3. *Conostylis beailana* F. Muell.

Leaves 10-15 cm long, 1.5-2 mm wide, green and glabrous except for the fine appressed marginal hairs. Pedicels 5-17 mm long. Flowers solitary. Perianth deep yellow to orange-red, 25-45 mm long and straight; lobes 4.5-7.5 mm long. Anthers 2.3-3.5 mm long. Flowering from July to September. It can be distinguished from *C. albescens* in having leaves green and glabrous except for the margins and the flowers orange-yellow (not grey-green and hirsute and the flowers yellowish cream to white with suffusions of purple).

4. *Conostylis albescens* Hopper

Leaves 12-17 cm long, 0.8-1.5 mm wide, grey-green and hirsute. Pedicels 10-25 mm long. Flowers solitary. Perianth yellowish cream to white with suffusions of purple, especially on the lobes, 32-40 mm long and curved; lobes 4-7 mm long. Anthers 2.5-3.5 mm long. Flowering in August.

Subgenus *Brachycaulon* (Benth.) Hopper

This subgenus contains a solitary species that is distinguished from all other *Conostylis* in having erect lobes virtually to the ovary and incurved stamens with the anthers forming a tight ring around the style.

5. *Conostylis breviscapa* R. Br.

Leaves flat, 11-33 cm long, 1.7-5 mm wide, prominently striate, green and glabrous except for the shortly plumose margins. Scape to 65 mm long; bracts 8-15 mm long. Inflorescence a many-flowered head. Perianth creamy-white, sometimes suffused with brown outside, 8-10 mm long; lobes 7.5-9.5 mm long. Anthers 1.5-2 mm long. Fls. Aug.-Jan. Photograph page 360.

Subgenus *Bicolorata* Hopper

This subgenus contains a solitary species that is distinguished from all other *Conostylis* in having alternate anthers of unequal length with the inflorescence and individual flowers sessile.

6. *Conostylis vaginata* Endl.

Leaves terete, 4-15 cm long, 0.6-1.7 mm in diameter, green and glabrous except for villous marginal hairs 2-3 mm long at the base. Inflorescence a few flowered head, virtually sessile at the base of the leaves. Perianth golden yellow, 10-13 mm long with hairs 1 mm long at the base and much shorter above; lobes 4-6 mm long and splayed outwards. Anthers white, the larger 4.2-6 mm long and the smaller 3-4.7 mm long on filaments much shorter than the anthers. Fls. Sept. to Oct. Photograph page 349 by J. Simmons.

Subgenus *Conostylis* and Subgenus *Pendula* Hopper

The subgenera may be separated as described opposite. Together they comprise 39 species with a perianth 5-20 mm long. The stamens are erect or

splayed outwards and the anthers equal in length. A rough guide to species in these two subgenera is:

Species where the individual flowers are sessile. Species 7,10,12,14,19 (as numbered in this text) from subgenus *Conostylis* and (40-45) from subgenus *Pendula*.

Species where the individual flowers are on pedicels (stalks) usually less than 2 mm long. Species 8,9,11,13,16,20a (1-4.5 mm), 20c (1-3 mm) from subgenus *Conostylis* and (21-37) from *Pendula*.

Species where the individual flowers are on pedicels (stalks) that are usually longer than 3 mm. Species 15,17,18,20b (2-12 mm) from subgenus *Conostylis* and (38-39) from subgenus *Pendula*.

7. *Conostylis aculeata* R. Br.

Leaves flat, 20-50 cm long, 3-7.5 mm wide, in loosely flattened, narrowly fan-shaped clusters, with upwardly spreading bristles usually 2-3 mm long covering the whole margin. Inflorescence a loose cyme or raceme; scape simple or branched, usually much shorter than the leaves or rarely almost equal. Flowers 9-15 mm long; tube yellow outside and inside; lobes creamy-white inside, 3-9 mm long. Anthers 1-4 mm long on erect filaments 0.5-1.5 mm long. The type form, subspecies *aculeata* flowers, Aug. to Nov. See photograph in Vol. 10, page 248.

b. subspecies *preissii* (Endl.) J. Green

Leaves 10-25 cm long, 2-3 mm wide. Inflorescence a dense to loose raceme on a scape shorter than the leaves. Flowers 9-12 mm long. Flowering from September to November.

c. subspecies *spinuligera* (F. Muell. ex Benth.) Hopper

Leaves 24-35 cm long, 1.5-2.5 mm wide. Inflorescence a loose terminal head; scape equal to or somewhat shorter than the leaves. Flowers 11-13 mm long. Flowering in August and September.

d. subspecies *gracilis* Hopper

Leaves 10-25 cm long, 1-2 mm wide. Inflorescence a short cymose head on a scape shorter than the leaves. Flowers 9-12 mm long, Oct. to Nov.

e. subspecies *bromelioides* (Endl.) J. Green

Similar to subspecies *aculeata* but distinguished in having a prominent, yellow-brown marginal leaf nerve, the leaves stouter, shorter (15-35 cm long) and often twisted. Flowering in September and October.

f. subspecies *cygnorum* Hopper

Leaves usually 20-45 cm long, 3-10 mm wide, marginal nerve inconspicuous to distinct, green but rarely as prominent as subspecies *bromelioides*. Inflorescence a dense globular head. Flowers 10-14 mm long, Sept. to Nov.

g. subspecies *breviflora* Hopper

Leaves 10-18 mm long, usually 1.5-2.5 mm wide. Scape to 20 cm long. Inflorescence a capitate cyme. Flowers 6-10 mm long, Aug. to Oct.

h. subspecies *rhypidion* J. Green

Leaves 10-17 mm long, 2.5-4 mm wide. Inflorescence a dense head on a scape equal to or somewhat longer than the leaves. Flowers 10-13 mm long. Flowering in late August and September.

i. subspecies *septentrionora* Hopper

Leaves 6-30 cm long, 2-4 mm wide, marginal nerve inconspicuous to distinct, green but not as prominent as subspecies *bromelioides*. Inflorescence a capitate cyme on a scape 10-30 cm long, usually longer than the leaves. Flowers 6-10 mm long. Flowering in August and September.

j. subspecies *echinissima* Hopper

Leaves 6-25 cm long, usually 1 mm wide. Inflorescence a loose capitate cyme on a simple scape 10-13 cm long, usually exceeding the leaves. Flowers 8-10 mm long. Flowering in August and September.

8. *Conostylis bracteata* Lindley

This species is similar to *C. aculeata* subspecies *cygnorum*, but differs in the stems to 20 cm long, the leaf margins with dense flexible plumose hairs, sometimes abrading to glabrous with age, the leaves sometimes sparsely hirsute and arranged in flattened, broadly fan-shaped clusters. Perianth lobes golden yellow inside. Flowering in August and September.

9. *Conostylis festucacea* Endl.

Leaves subterete to almost flat, 18-40 cm long, 0.8-1.8 mm wide. Inflorescence loosely capitate; scapes about half as long as the leaves, 8-19 cm long. Perianth 8-12 mm long, yellow outside and inside of tube; lobes creamy white inside 5-7.5 mm long. Anthers 2-4 mm long on erect filaments 0.5-1.5 mm long. Flowering is in September and October.

Allied to *C. aculeata* and *C. robusta*, *C. festucacea* is distinguished in not having marginal bristles or sometimes with a few scattered toward the apex. The subspecies *filifolia* (F. Muell.) Hopper, differs from subspecies *festucacea* in having terete leaves (not subterete to almost flat) and scapes less than a third the length of the leaves (not about half the length of the leaves).

10. *Conostylis candicans* Endl.

Leaves flat, covered by a pale grey tomentum, rarely abraded to semi-glabrous, the margins often ciliate, usually 20-40 cm long and 2-6 mm wide. Inflorescence globular in bud, sometimes becoming rather loose; scape 20-45 cm long, less than twice as long as the leaves. Perianth golden yellow outside and in, 9-13 mm long; lobes 2.5-7.5 mm long. Anthers 1.4-5 mm long on erect filaments 0.5-1.5 mm long. Flowers Aug. to Nov. Photograph, page 352.

Allied to *C. aculeata* and *C. prolifera*, *C. candicans* is distinguished in having densely tomentose leaves and flowers with golden yellow lobes.

b. subspecies *calicicola* Hopper

Distinguished in having leaves 5-15 cm long, 0.8-2 mm wide and often less than 10 cm long. Scape 10-20 cm long, twice as long as the leaves. Perianth 8-13 mm long.

c. subspecies *flavifolia* Hopper

Distinguished in having leaves 10-20 cm long, 2-3 mm wide and yellowish. Scape 15-30 cm long. Perianth 5-9 mm long.

d. subspecies *procumbens* Hopper

Distinguished in having leaves markedly flattened, 10-20 cm long, 2.5-4 mm wide and grey. Scape 12-32 cm long. Perianth 8-12 mm long.

11. *Conostylis prolifera* Benth.

Leaves flat, 1-6 cm long, rarely to 10 cm, 0.5-1.5 mm wide, glabrous, sometimes minutely setose on the margins with hairs 0.5-1.5 mm long. Inflorescence loosely capitate; scape 1-15 cm long, as long as or longer than the leaves, usually with a small somewhat leafy, glabrous median bract 5-17 mm long. Perianth yellow outside and cream inside. 7-13 mm long, often the tube turning green and the lobes golden-brown with age; lobes 4.5-8 mm long. Anthers 0.4-1.1 mm long on very short erect filaments. Flowering from August to October. Distinguished in having a mat-like habit, small green leaves and small flowers with the lobes cream inside.

12. *Conostylis stylidioides* F. Muell.

Leaves flat, usually 1.5-2.5 cm long, sometimes up to 5 cm, 0.4-0.9 mm wide, grey-tomentose when young, sometimes becoming glabrous. Inflorescence a small capitate cyme; scape 3-24 cm long, usually much longer than the leaves, with a small median tomentose bract. Perianth golden yellow, 7.5-13 mm long; lobes 2.5-6 mm long. Anthers 1-2.5 mm long on erect filaments 1-2 mm long. Flowering in August and September.

Distinguished from *C. candicans* in having short leaves and *C. prolifera* in having tomentose leaves and flowers with a golden perianth.

13. *Conostylis pauciflora* Hopper

Leaves flat, 15-35 cm, 1-2.5 mm wide. Inflorescence a small capitate cyme of usually less than 10 flowers; scape 10-30 cm long, equal to or exceeding the leaves; bracts 2-4 cm long, green with tomentose margins. Perianth yellow, 7-11 mm long; lobes 4-7 mm long. Anthers 2.5-3.5 mm long on filaments 0.5-1 mm long. Flowering from August to October.

Distinguished from *C. aculeata* in having narrower sword-like leaves with soft, short, tomentose bristles and a few-flowered inflorescence. The subspecies *euryrhipis* Hopper differs from subspecies *pauciflora* in having leaves 6-18 cm long, 1-1.5 mm wide, in flattened broadly fan-shaped clusters (not 15-35 cm long, 1-2.5 mm wide in loose narrowly fan-shaped clusters).

14. *Conostylis robusta* Diels

Similar to *C. aculeata* but distinguished in having leaves 15-40 cm long, 5-15 mm wide, bluish green. Inflorescence capitate; scape 19-42 cm long, usually exceeding the leaves. Anthers 2.5-6 mm long. Flowering in August and September. See page 357 for a photograph.

15. *Conostylis lepidospermoides* Hopper

Leaves flat, 17-36 cm long, 1-1.6 mm wide, yellowish-green becoming yellow at the base; margins with short appressed dark brown bristles in two rows. Inflorescence loosely cymose with 1-6 flowers; scape 1-4 cm tall, much shorter than the leaves; bracts 5-21 mm long, glabrous, brown; pedicels 6-8 mm long. Perianth lemon yellow outside and inside lobe margins, otherwise golden yellow inside, 13-18 mm long; lobes 6-10 mm long. Anthers 4-5.5 mm long on filaments about 1 mm long. Flowering in late September and October. A distinctive species with no apparent relatives. Inconspicuous when not in flower due to the slender sedge-like leaves.

16. *Conostylis juncea* Endl.

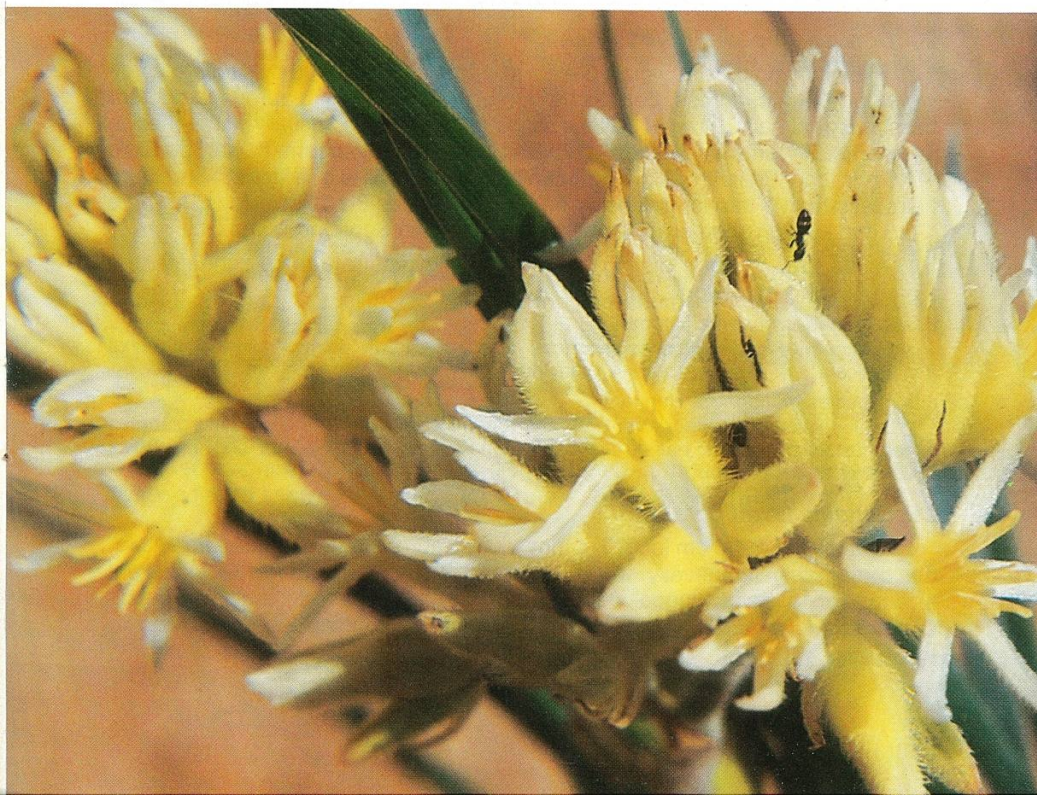
Leaves terete or flat, 10-40 cm long, 1-4 mm wide green rarely grey-white, glabrous or rarely hirsute, usually prominently nerved. Inflorescence a many flowered head; scape woolly, usually 2-7 cm long, rarely to 15 cm; bracts two or three, broadly ovate to lanceolate, woolly to glabrous and green; pedicels to 1 mm long. Perianth yellow or greenish yellow, 12-20 mm long, with rigid, simple to minutely denticulate hairs to 4 mm long on the outside, not woolly, glabrous inside; lobes 9-12.5 mm long. Anthers 3.5-6 mm long on filaments 0.5-1.5 mm long. Flowering from July to September.

Distinguished in having indumentum on the perianth consisting only of bristle-like hairs (not tomentose as in all other species).



Conostyllis vaginata △

▽ *Conostyllis neocymoso*



17. *Conostylis serrulata* R. Br.

Leaves flat, 10-40 cm long, 1.5-7 mm wide, green or blue-green, glabrous except for the minutely denticulate-serrulate margins. Inflorescence a compact or loose many-flowered cyme; scape 0.8-3.3 cm long, with one or two chaffy bracts 1-4 cm long; pedicels to 6 mm long. Perianth cream or dull yellow, with a smooth dense mat of branched hairs outside, glabrous inside, 6.5-11.5 mm long; lobes 5.5-11 mm long, divided almost to ovary. Anthers 3.5-5.5 mm long on filaments about $\frac{1}{3}$ as long as the anthers. Flowering Aug. to Oct.

Distinguished in having striate leaves with minutely serrulate margins, perianth lobes almost to the ovary and anthers reclined against the spreading lobes. Colour photograph on page 352.

18. *Conostylis laxiflora* Benth.

Closely related to *C. serrulata* but differs in the inflorescence a loose cyme, the scape to about half the length of the leaves (not much shorter than the leaves), the floral hairs shaggy (not shortly matted) and the anthers erect and less than twice as long as the filaments (not reclined against the lobes and three times as long as the filaments). Flowering in October and November.

19. *Conostylis misera* Endl.

Leaves flat, 5-18 cm long, 2-6 mm wide, green, glabrous; margins thin, entire or with a few small hairs. Flower usually solitary; scape 0.4-2 cm long with two or three brown bracts partly hidden in the sheathing leaf bases. Perianth yellow, 12-19 mm long with a smooth indumentum composed of short branched hairs mixed with longer hairs; lobes 10.5-18 mm long. Anthers 4.5-7 mm long on erect filaments 0.5-3 mm long. Flowering in October and November.

Distinguished in having short, soft leaves and large usually solitary flowers.

20. *Conostylis seorsiflora* F. Muell.

Plant forming prostrate mats 3-4 cm in diameter, connected by stems in a network up to 40 cm across. Leaves flat, green, 2-9 cm long, glabrous except for basal marginal hairs. Flowers solitary; scape 0.1-5.2 cm long usually with a median leafy bract 7-18 mm long and two linear bracts subtending the flower; pedicels 1-4.5 mm long. Perianth yellow, 12-15 mm long, tomentose outside with branched hairs less than 1 mm long, loosely hairy inside; lobes 8-10.5 mm long. Anthers 4-5.5 mm long on short erect filaments. Flowering in September and October.

Allied to *C. misera*, distinguished in having prostrate mats connected by stems forming a network.

b. subspecies *longissima* Hopper

Distinguished from subspecies *seorsiflora* in having leaves 8-16 cm long (not 2-9 cm long) and pedicels 2-12 mm long (not 1-4.5 mm long). Flowering in November and December.

c. subspecies *trichophylla* Hopper

Distinguished in having silver-grey and tomentose leaves (not green and glabrous except for basal marginal hairs). Leaves 2-8 cm long. Pedicels 1-3 mm long. Flowering in October and November.

21. *Conostylis setigera* R. Br.

Leaves flat, 5-36 cm long, 1-4 mm wide, glabrous or with sparse fine hairs, the marginal hairs usually white. Inflorescence composed of 5-10 flowers arranged in a head; scape 4-20 cm long, with one or two scapose bracts 0.9-4.5 cm long and leaf-like, with short bracts subtending the inflorescence.

Perianth yellow, suffused red with age, 10-15 mm long, woolly-tomentose outside and shortly woolly inside; lobes 5-9 mm long. Anthers 2-3.5 mm long on filaments 0.2-1.5 mm long arranged in two rows. Flowering Aug. to Oct.

A most variable species, distinguished from *C. drummondii* in having flat, glabrous leaves and earlier flowering. The subspecies *dasys* Hopper is distinguished from subspecies *setigera* in having leaves 15-30 cm long and 1-2 mm wide with shaggy hairs that are white on new growth and age to black (not glabrous except for the margins or with sparse fine hairs).

22. *Conostylis pusilla* Endl.

Distinguished from *C. setigera* in having leaves 3-6 cm long and 0.5-1 mm wide (not 8-36 cm long and 1-4 mm wide) and perianth 5-9.5 mm long (not 10-15 mm long). Flowering in September and October.

23. *Conostylis villosa* Benth.

Leaves flat, 8-20 cm long, 0.7-2 mm wide and loosely villous with soft hairs often silvery white and 0.9-1.5 mm long. Inflorescence a many flowered head; scape white-tomentose when young, 5-12 cm long with one or two leaf-like bracts 7-15 mm long. Perianth yellow ageing to purplish red, 12-15 mm long; lobes 5-7 mm long, tomentose on the outside and inside. Anthers 2 mm long on filaments 1.5 mm long arranged in two rows. Flowering in Sept.-Oct.

Distinguished from *C. drummondii* in having leaves usually flat with a coarser tomentum and longer scapes.

24. *Conostylis drummondii* Benth.

Leaves subterete, 10-30 cm long, 0.5-1.5 mm wide, grey-green and densely hirsute with a fine tomentum of white hairs about 1 mm long. Inflorescence somewhat head-like composed of several flowers; scape 5-8 cm long with a tomentose median bract. Perianth pale lemon-yellow outside, 6-9 mm long; lobes cream inside, golden yellow towards the base, 4-5.5 mm long. Anthers 2-4 mm long on filaments 2-4 mm long in the upper row and shorter in the lower row. Flowering in late October and November.

Distinguished in having leaves grey-green, closely tomentose and subterete, scapes short, stamens at alternate levels in the perianth.

25. *Conostylis teretifolia* J. Green

Leaves terete and grooved, 5-13 cm long and 0.5-1.1 mm in diameter with spreading white hairs 2-6 mm long. Inflorescence a few flowered head; scape 3.5-11 cm long, sometimes bearing a median bract 3-16 mm long. Perianth with yellow or reddish indumentum outside and woolly-tomentose inside, 7-11 mm long; lobes 5-9 mm long. Anthers 1.3-3.2 mm long on filaments 2 mm long. Flowering in August and September.

Distinguished in having narrow leaves with long, spreading, widely spaced hairs along the whole margin and the stamens at 1 level in the perianth. The subspecies *planescens* Hopper is distinguished from subspecies *teretifolia* in having flat to subterete leaves (not terete).

26. *Conostylis micrantha* Hopper

Leaves terete, 13-24 cm long, 0.7-1.2 mm in diameter, glabrous except for a few white lower marginal hairs 3-9 mm long. Inflorescence a many-flowered head; scape 5-13 cm long with a median bract 3-8 mm long. Perianth



Conostylis candicans △

▽ *Conostylis serrulata*





Conostylis seorsiflora ssp. *seorsiflora* △

▽ *Conostylis setigera* ssp. *setigera*



pale yellowish cream ageing to brick-red, 5-7.5 mm long; lobes cream inside and golden yellow towards the base, 2.5-4.5 mm long. Anthers 1-1.7 mm long on somewhat shorter filaments. Flowering in July and August.

Allied to *C. terefolia*, distinguished in having longer leaf hairs confined to the base, the earlier flowering and flowers that are the smallest genus.

27. *Conostylis crassinerva* J. Green

Leaves flat, 7-18 cm long, 1-3 mm wide with the margins prominent and yellow-brown, glabrous or with short appressed hairs. Inflorescence a many-flowered head; scape 4-12.5 cm long with a leaf-like bract 14-33 mm long near the base and two shorter leaf-like bracts subtending the inflorescence. Perianth yellow ageing to reddish, 7-12 mm long loosely tomentose outside and shortly woolly inside; lobes 4-8 mm long. Anthers 3-5 mm long on filaments one mm long. Flowering from June to August. Colour photograph, page 360.

Distinguished in having flat leaves with short plumose marginal hairs and stamens at one level in the perianth with anthers much longer than the filaments. The subspecies *absens* Hopper is distinguished from subspecies *crassinerva* in having leaf margins indistinguishable from the blade or scarcely fibrous, usually green and hirsute; the blade usually glabrous and green or sometimes densely hirsute and grey-green.

28. *Conostylis latens* Hopper

Leaves flat, 10-27 cm long and 2-3.5 mm wide, glabrous except for the margins hirsute or rarely glabrous, the white hairs 3-4 mm long. Inflorescence a several-flowered head; scape 9-20 cm long. Perianth pale greenish yellow outside ageing to brick-red, 10-13 mm long; lobes cream inside, yellow towards the base, 6-8 mm long. Anthers 3-5 mm long on filaments much shorter. Flowering in August and September.

Related to *C. crassinerva*, distinguished in having bigger leaves and flowers, the leaves with longer and more conspicuous marginal hairs and later flowering.

29. *Conostylis deplexa* J. Green

Leaves flat, 15-22 cm long, 1.5-3 mm wide, glabrous except for marginal bristles 0.7-1.8 mm long arranged in two ranks. Inflorescence composed of 10-20 flowers in a simple head; scape 2-5 cm long and softly tomentose with a bract 2-3 cm long which is sometimes leaf-like; the one or two inflorescence bracts are 0.7-2 mm long. Perianth yellow, 8.5-12 mm long; lobes 4-7 mm long, woolly outside and pubescent inside. Anthers 2-2.5 mm long on filaments 0.2-0.7 mm long. Flowering in September and October.

Similar to *C. latens* and *C. crassinerva*, distinguished in having leaves with strong, inflexed marginal hairs.

30. *Conostylis canterlata* Hopper

Leaves flat, 10-20 cm long 1-3 mm wide, glabrous or sometimes with white marginal hairs. Inflorescence a many-flowered globular head; scape 15-25 cm long; median bract glabrous. Perianth shortly tomentose, pale lemon outside ageing to brick red, 5.5-11 mm long; lobes golden yellow inside towards the base, white outside, 4-7.5 mm long. Anthers 1.5-4 mm longer on shorter filaments. Flowering from May to August.

Distinguished in having a stilt-rooted habit and small flowers borne on a globular head above the leaves.

31. *Conostylis caricina* Lindley

Leaves flat, 10-30 cm long, 1-5.5 mm wide, glabrous except for the prominent fibrous margins with hairs 0.4-1 mm long. Inflorescence a dense or loose head of 6-8 flowers arranged in two or three rows; scape 2.5-12.5 cm long usually with a single brown median bract 5-30 mm long. Perianth fawnish-cream, 10-15 mm long with a velvety tomentum outside; lobes claw-like, 3-9 mm long. Anthers 3-6 mm long on short filaments. Flowering, Aug.-Sept.

Distinguished from *C. dielsii* in having glabrous leaf bases except for short appressed marginal hairs (not densely tomentose at the base and glabrous above). The subspecies *elachys* Hopper is distinguished from subspecies *caricina* in having leaves 5-10 cm long (not 10-30 mm long) and perianth 4-8 mm long (not 10-15 mm long). Flowering in July and August.

32. *Conostylis teretiuscula* F. Muell.

Leaves somewhat terete to flat, 10-40 cm long, 0.5-1.6 mm wide, silvery-villous with hairs 0.5-1.5 mm long. Inflorescence 5-8 flowered; scape woolly-tomentose, 3-10 cm long with a narrow median bract 4-9 mm long. Perianth creamy-yellow, 7-11.5 mm long; lobes 5-9 mm long, tomentose outside and inside. Anthers 2.5-4.5 mm long on filaments 1 mm long. Fls., July-Sept.

Distinguished in having somewhat terete, silvery-villous leaves.

33. *Conostylis wonganensis* Hopper

Leaves terete, grooved, 8-17 cm long, 0.5-0.9 mm in diameter, glabrous except for small pubescent bristles evenly spaced along the margins. Inflorescence composed of less than 10 flowers; scape tomentose, 1-3 cm long. Perianth creamy yellow and densely tomentose on all surfaces, 4.5-8 mm long; lobes 3-6 mm long and spreading. Anthers 1.8-3.2 mm long on filaments 0.5-1.1 mm long. Flowering from July to September.

Related to *C. teretiuscula*, *C. dielsii* and *C. caricina*, distinguished in having terete leaves that are glabrous except for small pubescent marginal bristles, and small flowers.

34. *Conostylis dielsii* W. Fitzg.

Leaves flat, 7-15.5 cm long, 0.8-1.8 mm wide, glabrous except for the woolly base with white hairs. Inflorescence a many-flowered head or cyme; scape 4-10 cm long usually with a median leaf-like bract 6-15 mm long and a small bract subtending the inflorescence. Perianth creamy yellow, densely tomentose outside and glabrous or shortly hairy inside, 7.5-10 mm long; lobes 4-6 mm long. Anthers 2.5-4 mm long on short filaments. Fls., June-Sept.

Distinguished in having leaves woolly at the base and glabrous above. The subspecies *teres* Hopper is distinguished from subspecies *dielsii* in having terete (not flat) leaves 13-33 cm long (not 7-15.5 cm long). Flowers July-Aug.

35. *Conostylis petrophiloides* F. Muell. ex Benth.

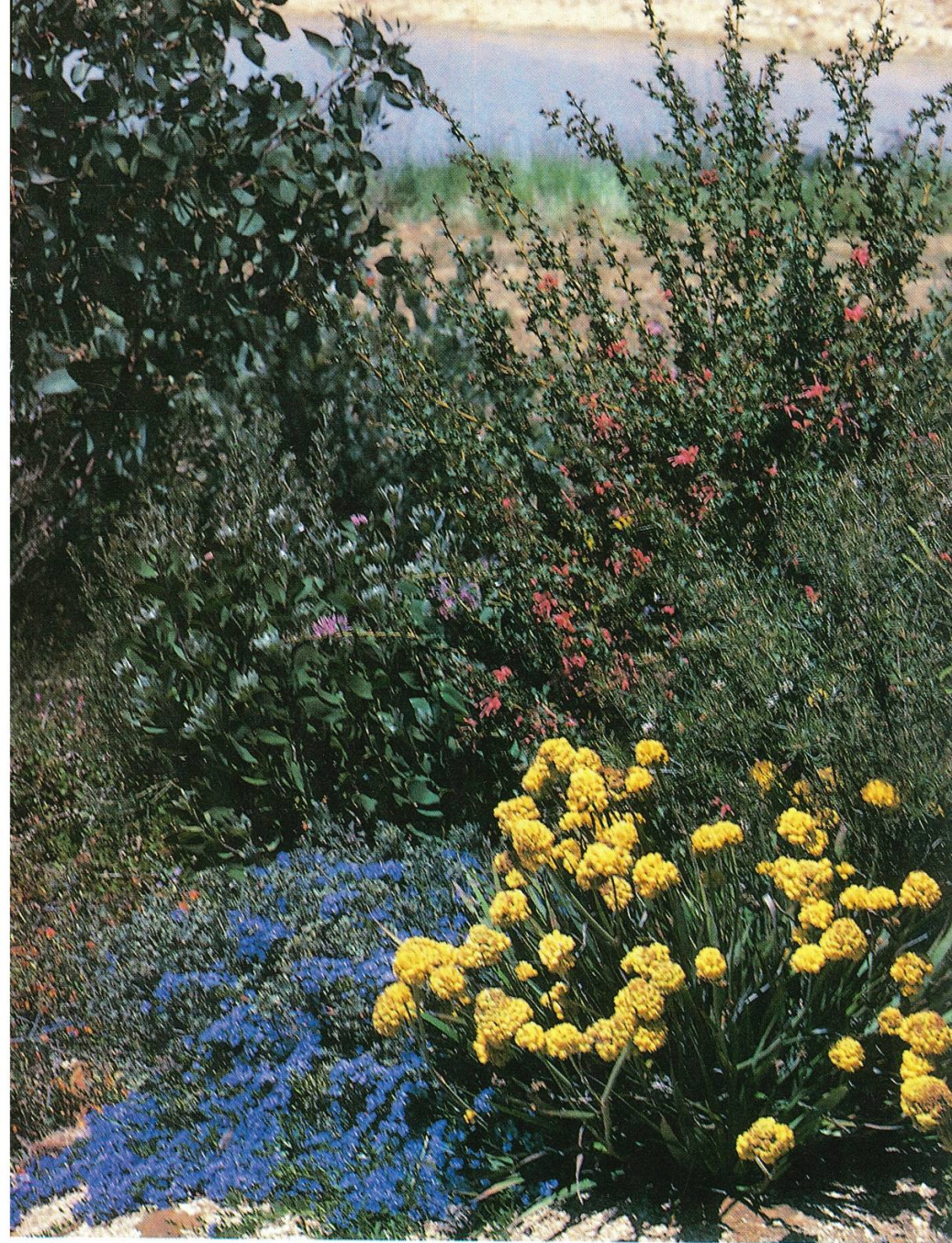
Leaves flat, 15-30 cm long, 1-4.5 mm wide, prominently nerved and glabrous except for marginal hairs 0.5-2.5 mm long. Inflorescence composed of numerous flowers in a head 2-3 cm across and subtended by two broad hyaline



Conostylis aculeata, various forms △

▽ *Conostylis petrophiloides*





Conostylis as landscaping plants, a study by Neil Marriott. *Conostylis robusta* contrasts with the mauve *Dampiera diversifolia* with a backdrop of *Grevillea* 'Merinda Gordon' (featured with description and colour photography in our No. 112 issue. Opposite, several forms of *Conostylis aculeata* blend with the red *Lechenaultia formosa*, in a garden raised using wooden sleepers.

or coloured bracts; scape 4-17 cm long, usually with a median bract 2-3 cm long. Perianth golden yellow, woolly-villous outside and sparingly hairy inside, 12-18 mm long; lobes 8-12 mm long. Anthers 4-7 mm long on filaments 0.1-1 mm long. Flowering from September to November.

Distinguished in having woolly-villous, golden yellow flowers subtended by large bracts. Colour photograph on page 356.

36. *Conostylis setosa* Lindley

Leaves flat 15-30 cm long, 1.5-4 mm wide, glabrous except for two or more rows of long white hairs 0.8-4 mm along the margins. Inflorescence a dense head or cyme to 5 or 6 cm diameter; scapes rarely more than four, 8-35 cm long with a median leaf-like bract 3-4 cm long. Perianth white, or pinkish maroon to purple, silky-tomentose outside and somewhat woolly inside, 12-20 cm long; lobes 6-10.5 mm long spreading and white inside. Anthers 2.8-3.8 mm long on filaments 2-4 mm long. Flowering from September to October.

Distinguished in having large inflorescences of unique pink and white fls. See Aust. Pls., Vol. 10, page 257, for colour photograph.

37. *Conostylis rogeri* Hopper

Leaves flat, 2.5-5 cm long, 0.6-1.5 mm wide, glabrous except for spreading white marginal hairs 1-3.5 mm long. Flowers solitary; scape 0.5-2.5 mm long. Perianth pale yellow, tomentose, 10-12.5 mm long; lobes 5-7.5 mm long. Anthers 3-4.5 mm long on much shorter filaments. Flowering in September.

Similar to *C. pusilla* (No. 22) and some forms of *C. setigera* (No. 21), distinguished in having stamens in one series with anthers much longer than the filaments.

38. *Conostylis neocymosa* Hopper

Leaves linear, 10-25 cm long, 1-4 mm wide with numerous marginal bristles 0.5-2 mm long and rarely more than 3 mm apart. Inflorescence usually composed of less than 10 flowers; scape 5-15 cm long and once or twice divided; pedicels 3-6 mm long. Perianth yellow, shortly tomentose outside and glabrous inside, 8-15 mm long; lobes 6-10 mm long. Anthers 4-6 mm long on filaments 0.3-1 mm long. Flowering from July to September.

Distinguished in having a stilt-rooted habit, ciliolate leaf bristles, long perianth lobes and large anthers. Photograph on page 349 by J. Glass.

39. *Conostylis phathyantha* Diels

Leaves somewhat falcate, 13-30 cm long, 3-6 mm wide, black and shining at the base and glabrous except for the papillose margins. Inflorescence several-flowered subtended by a linear-lanceolate bract 1-5 cm long; scape 6-16 cm long; pedicels about 5 mm long, each subtended by a small bract. Perianth yellow, tomentose and 12-15 mm long; lobes 5 mm long and tomentose outside. Anthers about 2 mm long on filaments dilated at the base. Flowering from August to October.

Distinguished in having broad leaves and a large open inflorescence composed of pale yellow flowers with spreading slender lobes and golden stamens.

40. *Conostylis aurea* Lindley

Leaves flat, usually 15-40 cm long and 1.5-7 mm wide, glabrous except for a row of small appressed hairs 0.5-2.5 mm long on the margins, red-brown at the base and green above. Inflorescence capitate; scape 9-25 cm long. Perianth golden or pale yellow, sometimes tinged purplish red, 10-16 mm long; lobes 4.5-8 mm long. Anthers 3.5-5.5 mm long on filaments with two erect horn-like appendages above the connective. Flowering from August to October. Distinguished in having leaves somewhat glabrous, red-brown at the base and green above, scape much shorter than the leaves, and flowers that develop a red colouration with age.

41. *Conostylis seminuda* Hopper

Leaves flat, to 30 cm long, 1.5-3.5 mm wide, moderately tomentose and grey ageing to sparsely tomentose and green, with longer white marginal hairs to 3 mm long. Inflorescence capitate; scape to 25 cm long. Perianth 10.5-12.5 mm long; tube golden yellow; lobes pale yellow to cream with brown apical margins, 5-8 mm long. Anthers 4-5.5 mm long on filaments with two erect horn-like appendages above the connective. Flowering in Sept. and Oct. Distinguished from *C. aurea* and *C. resinosa* in having narrower tomentose leaves.

42. *Conostylis resinosa* Hopper

Similar to *C. aurea* but distinguished in having the leaves less than 4 mm wide and conspicuously shining with sticky resin, usually yellow brown at the base and green above, the margins always with fine spreading hairs; scape longer than the leaves; perianth 10-12 mm long; anthers 4-5 mm long. Flowering in late August and September.

43. *Conostylis hiemalis* Hopper

Leaves flat, 10-18 cm long, 1.5-4 mm wide, usually grey-tomentose at the base ageing to glabrous and green with two alternate rows of white marginal hairs 1.5-2.5 mm long. Inflorescence capitate; scape 7-30 cm long. Perianth 6.5-12 mm long; tube golden yellow; lobes pale yellow to cream with brown apical margins, 3.5-5.5 mm long. Anthers 1.5-4 mm long on filaments with two erect horn-like appendages above the connective. Flowering June to Aug. Distinguished from *C. aurea* and *C. resinosa* in being smaller in all respects and flowering earlier with a peak in July.

44. *Conostylis tomentosa* Hopper

Leaves flat, to 20 cm long, 1-4 mm wide, densely tomentose, grey-white, with longer white marginal hairs to 1.5 mm long. Inflorescence capitate; scape to 30 cm long. Perianth 10-13 mm long; tube golden yellow; lobes pale yellow to cream with brown apical margins, 5-8 mm long. Anthers 3-4 mm long on filaments with two erect horn-like appendages above the connective. Flowering in July and August. Distinguished in having grey-white densely tomentose leaves and winter flowering.

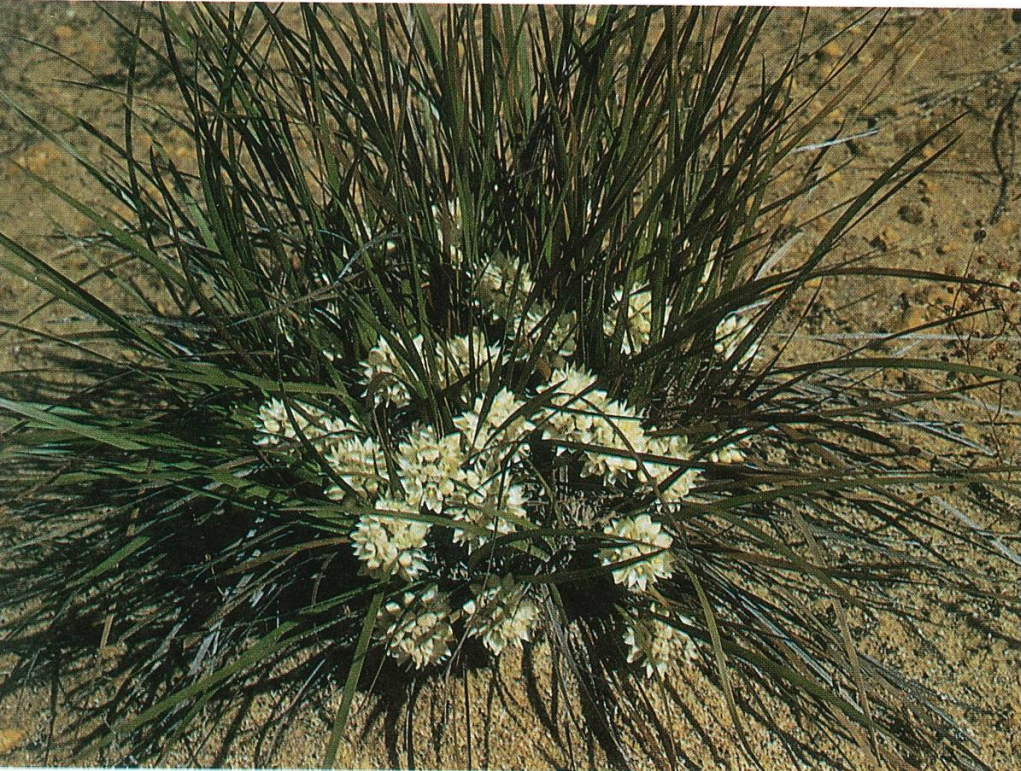
45. *Conostylis angustifolia* Hopper

Leaves flat, 12-40 cm long, 1-3.5 mm wide, dull brick red and sometimes densely tomentose near the base (often abraded glabrous), green, glabrous except for small marginal hairs. Inflorescence capitate; scape 15-40 cm long. Perianth 11-17 mm long; tube golden yellow; lobes pale yellow with white or rarely maroon apical margins, 5-9 mm long. Anthers 2-3.5 mm long on filaments without appendages. Flowering in Sept. to Oct. Distinguished in having long narrow leaves, long scapes with large flowers, and anthers lacking appendages.



Conostylis crassinerva ssp. *absens* △

▽ *Conostylis breviscapa*



***Crowea* – adaptable, rewarding plants**

by Norm McCarthy
Toowoomba, Queensland

The genus *Crowea* – family Rutaceae, is named after James Crowe, an English botanist. The plants are very similar to those of *Eriostemon* and *Boronia*, also in the same plant family. There are three species in this hardy, ornamental and very desirable, endemic genus.



Crowea saligna

Photography by R. W. Burbury

Crowea are easily grown, long lived and eminently suitable for all gardens, large or small. Normal growth does not exceed one metre in height or width, quite often less. However, dwarf forms exist and will receive further mention.

There are no known pests or diseases so they are trouble-free plants. There is a remote chance of an infestation of white scale and black smut could occur. This is easily controlled by spraying a solution of 1% white oil on the foliage. Use only at night or morning to avoid the heat of the day. One, or possibly two, applications should be sufficient. However, as the plants are so robust, there is little chance of infestation. *Crowea* are really quite tough, enduring and completely frost tolerant.

All species prefer to grow in a moist, well-drained position, with some protection from winds. A part-sun, part-shade, situation amongst other shrubs is ideal. However, plants of *C. exalata* have been growing in full sun without apparent problems. With full sun of course, plants need to be well watered. Some form of mulching to retain moisture is a great help. Amazingly enough, *Crowea* adapt to a wide range of soils. They will accept liquid fertilizer used sparingly, at monthly intervals.

Crowea, if desired, can be grown as pot plants, using large pots. They can then be placed on verandahs and patios where they do quite well. As cut flowers, they are highly recommended and last well indoors.

FLOWERS — usually in varying shades of pink, which range from very pale to dark and almost red. White forms also occur. Flowers are five petalled, waxy and star shaped. Their occurrence on all plants is axillary.

PROPAGATION — seed is not easy to obtain and the usual method of reproduction is by cuttings. This vegetative method also ensures plants coming true to type. This way is easy and quick. The optimum time to take cuttings is early December. Cuttings taken thus should produce roots in six to eight weeks. Spring and autumn cuttings should also yield good results.

PRUNING — to improve the growth habit of *Crowea*, plants should be tip pruned as they develop. This practice keeps them dense and compact and increases their flowering potential. Also, keeping the plant in good shape reduces the tendency for it to become leggy.

Crowea angustifolia

narrow leaves

Endemic to Western Australia, this species is rarely available in the eastern States. It occurs as a shrub to c. 3 metres with narrow leaves and pale pink or white flowers. There is a dwarf form of var. *angustifolia* only .25 metres tall. On the other hand, variety *dentata* can be three metres tall with white flowers.

Crowea saligna

willow like

This species grows .5 to one metre tall with a similar spread. It is inclined to be an open spreading shrub. Pruning could aid in keeping a denser habit. Leaves are bright green, alternate and not over-numerous. Leaf size is 5 cm by 2 cm. The flowers are quite large, up to 4 cm across, light to dark pink, sometimes white and again, not over-numerous. What they lose by number is made up for by the peerless beauty of individual blossoms. The main flowering period is usually midwinter, but sporadic bursts of blooms can occur at other

times, i.e. after good rains. To my knowledge, the species occurs mainly on the "Hawkesbury Sandstone", around Sydney, in an area renowned for its flora.

Crowea exalata

without wings

This species is surely the best known and most widely grown of all. It occurs mainly in north and eastern Victoria and the nearby south coast of New South Wales. Like *C. saligna* it proliferates around Sydney in Hawkesbury sandstone areas. It usually attains a height of .75 metres by .75 metres although it is sometimes found in more dwarf forms of approximately .25 metres. The foliage is crowded with leaves bright green and alternate. The leaf size is small, about 3 cm by 1.5 cm. Flowers are normally pink and profuse, occasionally white. Flowering is for long periods of the year and the plant almost always produces a few flowers. Good conditions and consistent moisture prolong the flowering period and quantity of bloom. Flowering is again axillary. The foliage is aromatic when crushed and is reminiscent of aniseed.

Hybrids and Other Forms

Some excellent hybrid and other forms are available at specialist nurseries from time to time. Perhaps some are worthy of mention in detail.

One such hybrid is simply labelled as *Crowea saligna* x *exalata*. This plant has narrow leaves like *Crowea exalata* but I have not seen it in flower. Only new to the garden, it could be a surprise packet. Let's wait and see how it develops, then we'll know.

I have two plants with white flowers in my garden. It is interesting to note that the first flowers had a distinct green tinge, which is unusual. A second flowering was at first white, but turned green as the flowers aged. Time will tell whether this green tinge is a juvenile characteristic.

***Crowea* 'Poorinda Ecstasy'**. I'm growing this one. It appears to be a good form of *Crowea saligna* in flower, foliage and habit with pale pink flowers. It is stated to be a *saligna* x *exalata* hybrid. Flowers are not over abundant.

***Crowea exalata* 'Bindalong Compact'**. This is a low growing compact form with pink flowers. It is a good dwarf from the Victorian Alps which grows .5 metres tall and .75 metres wide.

***Crowea exalata* 'Australflora Green Cape'**. This is yet another dwarf form of *Crowea exalata*, low and spreading. It originates from Green Cape on the south coast of New South Wales. This one is only 15 cm tall by 60 cm across. The flowers are mauve, but as ageing occurs may change to white, then to green.

***Crowea exalata* 'Festival'**. This is an outstanding, select form which arose from seed. It originated in a suburban garden on Sydney's north shore which is part of the "Sydney Sandstone". The flora of this region is unique in origin but, at the same time, is abundant and well known. The flowers, foliage and period of flowering make *C. Festival* an infinitely superior form. Its almost continuous flowering enhances the delightful characteristics of this exciting cultivar. ■



Crowea angustifolia var. *angustifolia* △

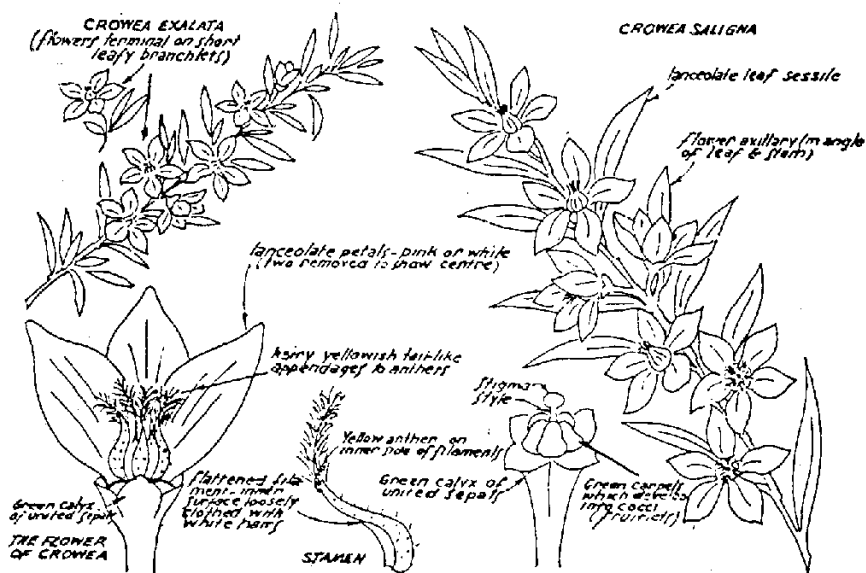
▽ *Crowea exalata*



The Genus *Crowea*

by Jean Galbraith*

The genus *Crowea* (named after English botanist J. Crowe and pronounced *Crow-e-a*) is an Australian endemic — that is, it is found in this country and in no other. It is closely related to *Eriostemon*, with which genus it was once united, but may be readily distinguished from it by the hairy appendages, or tails, on the anthers. These may be seen in the detailed drawing below. *Crowea* species are undershrubs with glabrous undivided, alternate leaves, usually rather narrow, and attached to the stem without a leaf stalk.



The flowers, as shown in the sketches, are typically five-petalled and comprise: a CALYX of five blunt sepals united for some distance to form a cup; COROLLA of five lanceolate petals, pink or white, imbricate (overlapping) in bud, spreading into a broadly starlike flower, but later closing to enfold the developing fruit; STAMENS, 10, erect, inflexed, with flattened filaments, hairy on the margins, and anthers with conspicuous hairy appendages, the principal distinguishing character for the genus; PISTIL comprising five green carpels (each of which may eventually develop into fruit) surrounding a very short style on which is a more or less globular stigma; FRUIT developing from the carpels, consisting of up to five erect blunt cocci that contain the seed.

Three species of *Crowea* are commonly in cultivation and *Crowea exalata* is probably one of the most satisfactory small shrubs grown. Cultural requirements for *Crowea exalata* are exactly the same as for *Eriostemon*. The other species, according to Mr. Bill Cane, who has had experience of them all, prefer a cool damp position. *Crowea saligna* must also be protected from frost when young. It needs a damp propagating medium and damp atmosphere for growing either cuttings or seeds. The other species are easily propagated from cuttings or seeds in almost any medium.

***Crowea exalata* F. Muell.** (Pronounced *ex-al-a-ta* meaning not winged). Small *Crowea*. Normally a shrubby small bush 0.3 to 0.6 metres high bearing an abundance of bright pink flowers, 20 mm across, throughout winter and spring, and to a less extent at other times. Under exceptional circumstances bushes may be a metre high, and flowers range from (occasionally) white, or pale pink to almost red, fading in warm weather. Both leaves and flowers, in exceptional circumstances, may be as large as those of *C. saligna*. Leaves are thin, narrow, usually narrow-spathulate, (that is, narrow, broadening a little toward the tip) dark green, paler beneath, usually 30 (up to 50) mm long, or less. The well-branched little bushes are compact, with flowers all along the branches; not axillary but on the ends of the branchlets which may be quite short, usually bearing one to three leaves.

Paul Wilson in his published review of the genus (*Nuytsia* Vol. 1 No. 1 1970) gives the difference as:

Branchlets glabrous, acutely angular or narrowly winged (a single angle decurrent from each leaf base); leaf $\pm$ elliptic *Crowea saligna*.
 Branchlets puberulous (at least in narrow lines), obtusely angular or $\pm$ terete; leaves oblong-cuneate to spatulate *Crowea exalata*.
 The eastern species may be distinguished from the western *Crowea angustifolia* in that the leaves are entire (not serrulate) and are not decurrent as two narrow-denticulate wings along the stem.

***Crowea saligna* Andr.** (pronounced *sal-ig-na* meaning willowy). Lance-leaf *Crowea*. As a rule a taller stiffer shrub than *C. exalata* up to one metre or more. It has rather erect branches and leaves pointing upward, with a large short-stalked pink flower at the base of each. Flowers vary from white or shell-pink to almost red, but in Victoria at least, are usually the same cheerful pink as *E. exalata*, deepening in colour in warm weather, when the smaller species becomes paler. They are up to 35 mm across when fully open. The leaves vary from narrowly to broadly elliptic, but are often blunt, or wider at the top. One very beautiful form has flowers white in the centre, shading to clear pink for the outer 2/3 of the petals.

***Crowea angustifolia* Sm.** (*an-gus-ti-fo-lia* meaning narrow-leaf). "Swamp *Crowea*". A very diffuse slender shrub to 0.6 metres (much higher in sheltered scrub). This is a swamp-lover of southern Western Australia. The leaves are serrulate, the base decurrent as two-denticulate wings along the stem.

The type variety *angustifolia* has linear to narrow-oblong leaves 24-50 mm long, usually with minutely serrated edges that recurve when they dry. The flowers are usually pink.

The variety *dentata*, (Bentham) P. G. Wilson (previously known and described in the original article as a separate species *C. dentata*) has elliptic to obovate, flat leaves. The flowers are usually white.

*This article was published in *Australian Plants* No. 4 dated September 1960. There have been some minor changes based on recent research and these have been made with the help of a number of people. As Volume 1 is out of print and will not be reprinted, it is proposed to update the article in new issues of *Australian Plants*. *Australian Plants* is the most complete up-to-date reference on the Australian flora and readers are advised to purchase the available copies of bound volumes of past issues as quoted on the inside of the rear cover of this issue. ■

Grevillea Park

A Dream; A Reality to Ray Brown

A dream is coming true! Let us fantasize a moment. Mature, healthy, well-flowered plants of *Grevillea*; not just a few but many of the hundreds of species native to Australia. Now let us just imagine a natural bushland setting over say ten hectares where these hundreds of *Grevillea* appear to be flourishing naturally; a wonderland. Add a feature area for easily seen and labelled potted plants, a herbarium for student study and an amenities area for the thousands who will flock there and you have a dream that is becoming a reality.

Most Australian gardeners will know of the splendour of *Grevillea* 'Robyn Gordon' and many of the other *Grevillea* featured in this issue. They have been developed from just a few species from central and southern Queensland. There are hundreds of Australian *Grevillea* and every region of the continent has some from the tropical north, down the coastal regions of eastern or western Australia, or even down the dry centre, to the southern shores and through to Tasmania. Most of Australia's wildflowers are small but with *Grevillea*, they are clustered together in showy, brilliant heads, adored by creatures such as bird and man (human person). Spectacular forms from all areas have yet to be adapted to general horticulture. An unexploited natural resource of Australia is its unique flora. It has evolved over the ages, largely in isolation from the other flora of the world. Already millions of export dollars have been earned from commercial plantations of Australian wildflowers.

The splendour and presentation of these beautiful shrubs has stirred a level of dedication into Peter Olde and his fellow members of the *Grevillea* Study Group, that has started many initiatives that have brought credit to the Society and significant gains in the conservation of our native flora. This has led to the tremendous achievement of Ray Brown in the establishment of the Illawarra *Grevillea* Park and its associated incorporated society.

The support of local business and government undertakings is a reflection of the drive and competence of Ray Brown; the lease of 10 hectares of natural escarpment and active support from Wollongong City Council; material support by the Illawarra County Council, the NSW State Government; I.C.I., Sierra Chemicals, May and Baker, Kembla Coal and Coke, B.H.P., Bulli Brick and Tile etc.

This is not a spontaneous project initiated by presently active and well-meaning people, but a well presented and detailed scheme based on many years of study and experience. Ray Brown has had first hand experience, over many years, with the highly successful *Rhododendron* park nearby. He knows what he wants, what will work in the long term, and often importantly, how to get it. While finance, organising ability and energy are vital, a critical factor is the competence needed to propagate, and successfully establish, a large range of *Grevillea* species, to the stage of reliable display and landscaping splendour. Those who have gazed in wonder at the large, flowering plants displayed by Ray Brown at various shows over the last eight years, will heartily support those of us who have the privilege of knowing him; Ray Brown also has the practical touch.

What does the constitution of the Illawarra *Grevillea* Society Inc. say about objectives, a guide for those to follow Ray for years to come.

"to establish an Australian native plant arboretum at Slacky Flat, Bulli, for the purposes of scientific and horticultural research into, primarily, the genus *Grevillea*.

"to provide a permanent site for the living plant collections of the ASGAP *Grevillea* Study Group."
 "to house suitable scientific collections of other native plant study groups."
 "to plant out gardens in accordance with recognised botanical practice."
 "to maintain an ongoing herbarium."
 "to arrange field trips as necessary to maintain the collection using cutting and seed material".
 "to retain suitable areas of significant natural flora to be used for bush walks and passive recreation".
 "to act for the general public's benefit in the dissemination of knowledge of horticulture and the preservation of native flora and fauna."

When there are enough plantings and the development works are adequate, the public will be charged admission and this will cover running costs including staff. Meanwhile you may support this brave venture by becoming a member at a cost of \$25 per annum, \$10 for students and pensioners. Other donations will be gratefully acknowledged. Send to the Illawarra *Grevillea* Park Society Inc., 29 Gwyther Avenue, Bulli 2516. ■

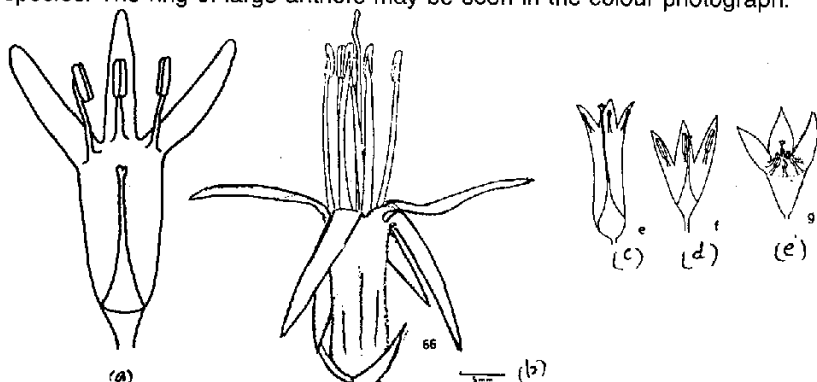
The Flower — Part 4

by P. E. Bailey and W. H. Payne

In this series we have been looking at the parts of a flower. The principal basis for the grouping (classification) of flowering plants of the world is based upon the various types of flowers. The botanists have created a whole language to describe the finest detail of each of the floral components. Hopefully the reader will be patient and possibly join us in this world of botany. We will make it as simple as possible. The flowers in each particular issue are examined and this issue presents *Grevillea*, *Conostylis* and *Crocea* (well illustrated on page 365).

Conostylis

The flowers resemble a "normal" regular flower with the various components in concentric rings around the central female part of the flower. Refer to the colour photograph of *Conostylis neocymosa* on page 349. Here we have a tubular perianth split quite deeply at the top, the long perianth lobes folding back. These is how the botanists would describe it but let us restate it in more familiar language. *Conostylis* probably developed from a flower with six petals. These became fused to form a tube at their lower end but remained free on the ends. The description of *Conostylis neocymosa* on page 358 points out that long perianth lobes and long anthers are a distinguishing feature of the species. The ring of large anthers may be seen in the colour photograph.



The cross-section of a flower (a) below shows how the anthers are attached to the perianth segments. Each anther is held up on a filament (stalk) and together they are known as a stamen. The stamens form a ring inside the

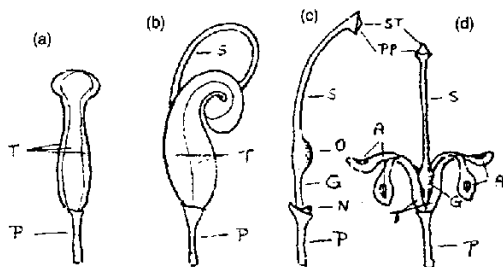
perianth, surrounding the style, the female component of the flower. Sketch (b) of a flower shows an outer ring of six short leaf-like bracts.

The colour photograph on page 353 shows the flower of *Conostylis seorsiflora*, the yellow upper segments of the perianth folding back, the ring of six stamens, each opposite a perianth segment, with the style in the centre.

The flower shape does differ with the species, and as described in the footnote to page 344, the species described on page 344 have been grouped into sub-genera. The sub-genus *Androstemma* has flowers with long tubes, long lobes and stamens, and sub-genus *Greenia* has flowers with long tubes, short lobes and stamens as in sketch (c) above. Species in the sub-genus *Brachycaulon* has flowers without a tube, the lobes deep to the ovary as in sketch (e). The majority of species have flowers shaped as in sketch (d).

Grevillea

The "flower head" or inflorescence of *Grevillea* comprises a large number of individual flowers. Each flower in the head appears to have evolved quite differently from the usual regular flower, say *Conostylis* above. Its parts are not easy for a beginner to recognize but the tubular flower of *Conostylis*, if the anthers were "stalkless" and attached nearer the ends of the perianth lobes, would be a good start. Imagine the tubular flower in bud, bent at the end, before the lobes open. The style (the central female component) of the flower is snug in the bud adjacent to the anthers. The tip of the style is different, however, and the usual stigma is minute and surrounded by a structure known as a pollen presenter. The anthers shed their pollen, while the flower is still in bud, onto the pollen presenter.



As the flower matures, the perianth of four tepals (petals) comprising the floral tube, splits at the back and the rapidly growing style, held at its end, emerges as a loop as in sketch (b). Look at a maturing head of a *Grevillea* flower and you will see, at one end, the small immature flower buds, usually hooked or bent, and in the centre, larger unopened buds with the style in a loop, forcing its way out the back, and at the other end, the style is fully extended. Actually, the relative size of the components, say in the cone or brush-shaped heads of flowers featured in this issue, is such that the tepals with their anthers, as in (d), are so small as to be seen only on very close examination. The flower head appears to be a bristly brush of showy styles. On the end of each style is a pollen presenter that presents its cargo of pollen to pollinators such as birds and insects. The transfer of pollen leads to fertilization of the ovary leading to the formation of seed. The sketch (c) shows a style only with a different shape of stigma (ST) and pollen-presenter (PP) to that in sketch (d).

Orthrosanthos

Their Cultivation and Propagation in Western Australia.

By Bob Dixon,
Horticultural Advisor,
Kings Park and Botanical Garden,
Perth, Australia

This genus contains about seven species four of which occur naturally in Western Australia with *Orthrosanthos multiflorus* extending into eastern Australia (S.A. and Vic.), the other three are native to America.

Orthrosanthos are tufted evergreen perennial herbs with basal, linear erect (grass-like) leaves and a rhizomatous rootstock. The flowering stems are erect with loose panicles of flowers in short spikes, with individual flowers lasting for only one day. They are good ornamental plants with light to medium blue flowers and tend to be more widely grown than *Patersonia*. Like *Patersonia* they are used as filler plants and prefer a sheltered position and/or broken sunlight during the hottest part of the day. At least one species (*O. multiflorus*) is readily available from local native plant nurseries and occasionally *O. laxus* is for sale.

In Kings Park and Botanic Garden the only species grown in larger numbers is *Orthrosanthos laxus* which grows exceptionally well, whilst only *O. multiflorus* is grown in the State Herbarium Garden. Reference will only be made to the two species which have been grown in Kings Park.

Orthrosanthos laxus

Morning Iris

A plant 10-60 cm high with the flowering stem exceeding the length of the leaves. As the name *laxus* suggests, this species has an open-wide inflorescence. This species has now been split into two varieties, var. *laxus* 40-60 cm tall with leaves 3-6 mm wide and 12-35 cm long and var. *gramineus* (used to be *O. gramineus*) 10-40 cm tall with leaves 12-35 cm long and 1-2 mm wide. Plants occur naturally on a variety of soils e.g., granitic, lateritic, beach sand, loamy sand, sandy clay, often in low lying areas where they get extra moisture from run-off. They can be seen growing in full sun or broken sunlight and are widespread in an area from Northampton to Bremer Bay, including the bushland in Kings Park on the lower end of the park where they receive some extra water from run-off.

This is a very easy plant to grow lasting for many years in cultivation requiring free draining preferably sandy soil. In Western Australia it is drought tolerant on heavier soils and in poorer sandy soils as long as it has some light broken shade during the hotter part of the day and/or a high water table, otherwise an occasional summer watering may be necessary. Under the tougher conditions it is best to select forms which normally grow in poorer sandy soils. Plants respond well to an occasional light dressing of general slow release fertilizer.

Propagation is best by seed which is easy to germinate, sowing in autumn is recommended for this and all other species in Western Australia, in cooler districts sow in spring. Seed normally takes 20-44 days to germinate, however, some later germinants can come up after 129 days.

Plants may also be divided in autumn/early winter, remove two-thirds off the top of the leaves and any dead leaves or rhizomes, always use the outer

portions of the plant as these are the most vigorous. Although this plant normally varies little in flower colour, colour variants such as pure white forms should be propagated vegetatively, seed grown plants would not be true to type. Tissue culture has been tried in Kings Park Tissue Culture Lab., however, this programme has been discontinued due to more important work with rarer plants.

Orthrosanthos multiflorus

This plant occurs naturally on the South coast of Western Australia from the Stirling Range to Israelite Bay (also on Kangaroo Island, S.A. and Vic.) on a variety of soils e.g., sandy loams, clay, gravel. Plants vary in height from 30-60 cm with the flowering stems usually above the foliage. Leaves are 16-50 cm long and 2-6 mm wide. Flowers are produced from September to December with the flower heads being more compact or not as open as *O. laxus* making it a tidier looking plant.

This species is by far the most widely grown in home gardens, where the plants grow well in a full sun but sheltered position or in broken sunlight. They respond well to general slow release fertilizer and benefit from an occasional summer watering.

Propagation is best by seed which takes 30-40 days to germinate giving a high germination rate. Seedlings are easy to grow on flowering about 18 months after sowing. If seed is in short supply and you have a particularly good form plants can be divided in the autumn/early winter. ■

Australian Iris

The Australian *Iris*, species in the plant family Iridaceae, are described and featured in many colour photographs, in our No. 113 issue. The large colour plate of *Orthrosanthos multiflorus* is a feature of this issue. This article from Bob Dixon did not arrive in time for the issue but its publication now may encourage you to grow these delightful plants along a garden border, as I do. Written for home gardeners in Western Australia, the advice given applies equally well to the rest of temperate Australia — Editor.

Garden Varieties of Australian Plants

This 32-page glossy, colour booklet, published by the Australian Cultivar Registration Authority is a must for all home gardeners. It is exceptional value at the incredibly low price of \$3.95 plus \$1.00 postage. It should be available at your local nursery, especially those specialising in natives, or you can buy it from S.G.A.P. Booksales, P.O. Box 167, North Ryde 2113. This is the first in a series and its continuation depends on your support, more precisely, whether you buy a copy and not leave it to someone else to do what is vital.

When a nurseryman develops a very special plant he registers it with the Australian Cultivar Registration Authority and it is then known as a cultivar. This has nothing to do with limiting free trade or with Plant Variety Rights. It simply ensures that when you go to buy his plant such as *Grevillea* 'Robyn Gordon', you get exactly that, a tried and proven plant and not just an untried imitation. It costs you no more to buy the correct, evaluated plant, than to buy the imitation and you get a level of consumer protection and service from reliable competent nurserymen.

This issue features cultivars developed from species allied to the Queensland parent of the famous *Grevillea* 'Robyn Gordon'. All are spectacular cultivars. Four of these (*Grevillea* 'Robyn Gordon'; *Grevillea* 'Mason's Hybrid'; *Grevillea* 'Sandra Gordon' and *Grevillea* 'Pink Surprise') are featured in colour in "Garden Varieties of Australian Plants". You must buy a copy. There are 31 cultivars featured in colour in the first issue and you will be delighted with the other 27 cultivars of *Banksia*, *Grevillea*, *Callistemon*, *Pimelea*, *Anigozanthos* (Kangaroo Paw), *Boronia* and *Westringia*.

This delightful little colourful book is available at nearly cost price and is a brave venture by The Australian Cultivar Registration Authority. With your support (by simply buying a copy, such a small outlay, four dollars), they hope to produce a separate volume annually. Eventually, you can have a valuable reference library of the specially developed plants for horticulture. ■

Growing the *Grevillea* Hybrids

by Russell and Sharon Costin

The tropical *Grevillea*-based hybrids and forms will give outstanding growth if planted to receive full sun, in most areas from Cairns to the south of our continent. They require a moist but reasonably drained position and for heavy soils, mounding is beneficial. They will perform exceptionally well in a prepared, mulched, garden bed. Use a low-phosphorous, slow-release fertilizer in the soil when planting.

If planting as a specimen in a lawn area leave at least a metre in diameter around the base of the plant and apply a mulch such as grass clippings, pine bark, etc. This inhibits the return of the grass and assists in retaining the moisture in the soil.

It is important not to cultivate around the base of *Grevillea* after planting, as they will not tolerate any root disturbance.

For absolute top quality growth and flowering we maintain the following procedures. Having established the shrub for one year, it is pruned either after flowering or at the end of winter. This should be done using a clean pair of secateurs (wipe blades using methylated spirits and steel wool). After this, dress around the base of the plant with sulphate of ammonia, a small handful. A longer acting, low phosphorous, fertilizer can also be used. The plant should then be adequately watered to ensure new growth.

Mites attacking the new tips, deforming them and stopping growth can occur, particularly during cooler weather. This is not so much a garden problem, but can be a setback when one is trying to get perfect cuttings or flowers from the bushes. General purpose miticides are effective against this. Occasional attacks of leaf or flower chewing grubs or insects can be easily controlled by Carbaryl or Pyrethrum sprays, or by hand.

We keep leaf spotting, stem blackening and similar fungal problems under control with sprays of a general purpose fungicide.

This is particularly necessary for propagation purposes.

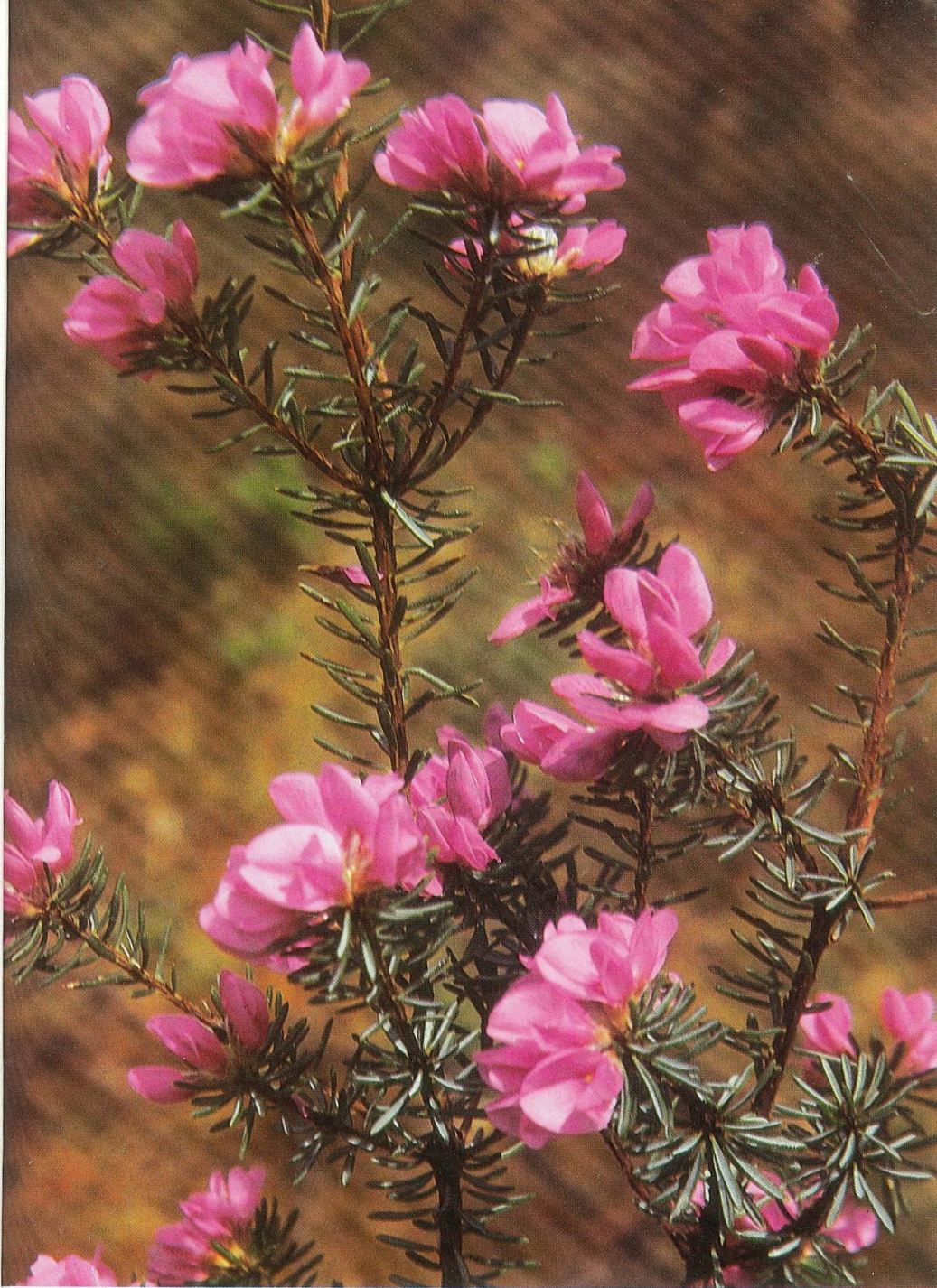
Leaf yellowing and lack of vigour in poor soils requires doses of iron chelates and a soluble nitrogen source such as sulphate of ammonia to correct this problem.

General pruning and fertilizing will maintain good vigour for garden plants, and in most cases, is all that is needed. ■

Banksia Study Group Report No. 8

This active study group periodically produces a published report which is of outstanding value. The latest, No. 8, is available from the Study Group Leader, Trevor Blake, 22 Vista Avenue, East Ringwood 3135 for \$5.50 plus \$1.00 postage. (The only previous report still available is No. 7 for \$4.00 plus \$1.00 postage). The latest report is over 70 pages and filled with many interesting articles covering discussions on pollination, grafting, Cranbourne Botanic Gardens plantings, container growing, rare species and unusual forms, plantation growing, seed sources, all based on personal experiences and the latest research. This report is almost twice the size of any previous report and has a rather fitting bicentennial flavour with an article on Bank's Florilegium.

This group deserves the support of all of us and in turn we are privileged to receive such practical proven advice for such a modest outlay — Editor. ■



Pultenaea subalpina

Photography by Colin Woolcock

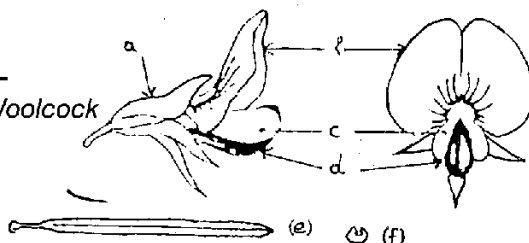
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Bush Peas

The Genus *Pultenaea* —

Part 9 by C. E. & D. T. Woolcock

a — the calyx cupping the flower
b — large petal — the standard
c — two petals — covering keels
d — two petals — boat shaped keel
e — the leaves in the group are terete with
f — edges turned upwards, e i tuberculate (lumpy)



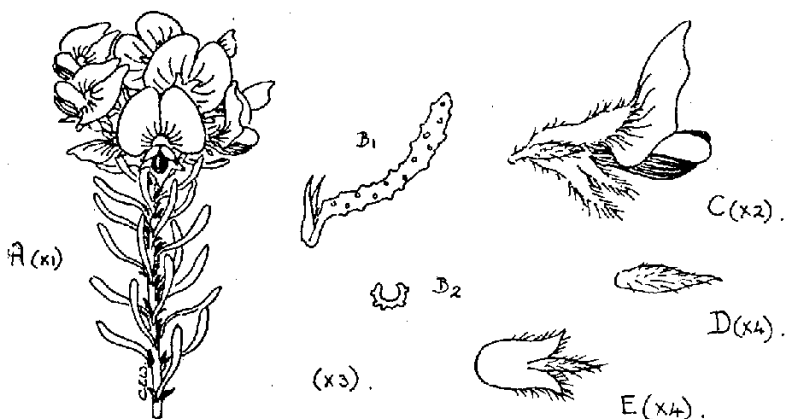
This group of *Pultenaea* species has terete leaves that are tuberculate. As shown in the sketches for each species, the leaves are covered with small tubercles, little lumps or pimples. All the leaves are soft and without sharp points. An observant person should readily identify these plants. Check that it is a *Pultenaea* first, that is, it has flowers similar to the sketch above, the component petals being in the proportions as above.

Pultenaea subalpina is featured in colour on the previous page. It is unique in the genus as it is the only pink-flowered species. The flowers of the four species in this group are all in terminal heads except for *P. laxiflora* where they are axillary but clustered towards the end of the branchlets giving the appearance of loose terminal heads. *P. brunioides* is a transition species between *Pultenaea* and *Dillwynia* and may well be transferred to that genus by some botanists.

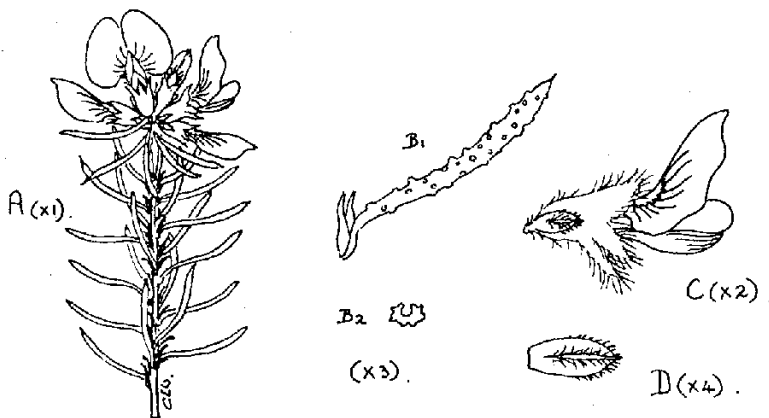
Pultenaea subalpina Druce

Rosy Bush-pea

- Habit:** Erect, somewhat bushy shrub to about 1 m high. Stems glabrous. (A).
Leaves: Terete, channelled above, crowded, blunt, glabrous but tuberculate, 6-10 mm long. Petioles c. 1 mm long. Stipules 1-1.5 mm long. (B, B₂).
Flowers: Dense terminal heads, sessile, distinctive purplish colour. Calyx lobes villous, tube less so. (C). Trifid floral bracts. (E).
Bracteoles: Linear, hairy, about length of calyx tube and attached at its base. (D).
Flowering: November-December.
Distribution: Endemic on the highest peaks (Mt. William) of the Grampians, Vic.



- Habit:** Erect, graceful shrub to 1 m high. Stems glabrous. (A).
Leaves: Terete, dense, slender, spreading, 1-furrowed above, 8-15 mm long, glabrous and tuberculate with a small mucro. Dark stipules 2-3 mm long, prominent. (B₁, B₂).
Flowers: Dense terminal yellow heads, surrounded by leaves, sessile. Calyx villous on lobes, becoming glabrous on tube. Lobes shorter than tube. (C).
Bracteoles: Oblong, shorter than calyx tube and hairy on midrib, light ciliate margins. (D).
Flowering: October-December.
Distribution: NSW – Wet tracts in Blue Mountains and adjacent areas.



Australian Wetlands — Conservation

Wetlands, where land and water meet, have been important geographic foci in the history of mankind. With the dramatic increase in the world's population and with the spectacular technological mastery that man can have over the natural environment, wetlands have been steadily shrinking and many of those that remain have been degraded. Australia has a rich array of wetlands. Many of them are permanent, many (such as the freshwater swamps of northern Australia) are seasonal, and many are temporary, if not ephemeral.

In terms of their human values wetlands occupy a most ambiguous state. Indeed, out of all those features of the natural environment that man uses, it is probably wetlands that attract the greatest collection of mixed motives and expectations. They are drained and reclaimed to produce cropland and yet from the same wetlands fish and wildlife may be harvested. They are the receptacles of a myriad of pollutants, but are also valuable recreational foci. Wetlands attract human settlement, and yet they may produce pests. Not surprisingly, therefore, the sound use, management, and conservation of our remaining wetlands is a critical national problem.

The Conservation of Australian Wetlands contains the proceedings of a World Wildlife Fund Australia sponsored workshop on the conservation of Australia's wetlands held in February, 1986. This workshop provided the first national overview of the status of wetlands in Australia and their conservation requirements. The book contains state by state overviews of the wetlands resources of each of the states and territories of Australia, each prepared by a team of experts from the particular state or territory under review. In addition to these overviews, the book will contain the synthesized discussions of the workshop on a range of topics concerned with evaluating the status of wetlands in Australia and their conservation requirements.

This 200-page book is available from Surrey Beatty & Sons, 43 Rickard Road, Chipping Norton 2170, New South Wales, for \$50 plus \$5.00 postage.



***Pultenaea bruniioides* Joy Thompson**

Bush-pea

- Habit:** Small erect shrub to 30 cm high. Stems pubescent. (A).
Leaves: Terete, spreading, triangular cross section, usually 5-10 mm long, scabrous or tuberculate, recurved from stem, occasionally some hairs. Stipules absent. (B_1 B_2 B_3).
Flowers: Small dense terminal heads, flowers on short pedicels 1-2 mm long. Densely villous calyx, lower lobes acuminate, shorter than the tube. (C).
Bracteoles: Lanceolate, villous, about as long as tube, attached below the base of calyx tube and somewhat deciduous. (D).
Flowering: September-November.
Distribution: NSW – Central and Southern Tablelands and northern part of the south coast.

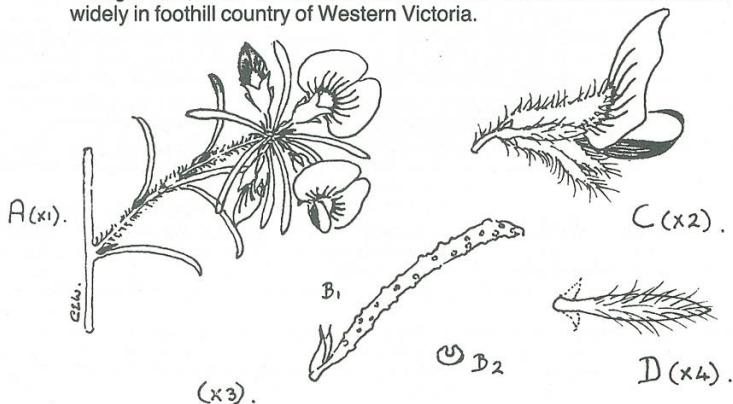




***Pultenaea laxiflora* Benth.**

Loose-flower Bush-pea

- Habit:** Low spreading shrub usually about 50 cm high. Stems glabrous, young branchlets with sparse appressed hairs. (A).
- Leaves:** Usually terete, channelled above, broader at the tip which is slightly recurved, 5-15 mm long, often glabrous or scabrid, young leaves sometimes hairy. Stipules 1.5-2 mm long. (B₁ B₂).
- Flowers:** Axillary but clustered towards end of branchlets, giving the appearance of loose terminal heads. Calyx hairy, sessile, on pedicels up to 5 mm long. Flowers usually orange with deep red keels. Large imbricate floral bracts, deciduous. Lower calyx lobes larger than tube.
- Bracteoles:** Green, leaf-like, attached to base of calyx and exceeding the length of the tube, a few sparse hairs, usually with small stipules. (D).
- Flowering:** September-November.
- Distribution:** Sth Aust., Vic., A.C.T., NSW. Drier areas. Several varieties listed. var. *pilosa* — larger size, more erect habit and subsessile crowded flowers, occurs widely in foothill country of Western Victoria.



Australian Plants Needs YOUR Help

Without your help Australian Plants will not survive. How strongly do you feel that it should? I need comments from readers and good colour slides of the following plants that will be featured in issues in preparation. Plants in the family Liliaceae and related genera; this includes *Blandfordia* (Christmas Bells), *Amorcrinum*, *Johnsonia*, *Chamaescilla*, *Dianella*, *Stypandra*, *Bulbine*, *Hypoxis*. Most Myrtaceae but especially *Calytix* and *Leptospermum*. Plants in the plant family Pittosporaceae. Plants in the plant family Sapindaceae, especially *Dodonaea*, *Euphorbia*, etc. Plants in the plant family Rutaceae, especially *Eriostemon*.

Most importantly, I need colour slides of native gardens — Editor.

Wildflower Nurseries in Queensland

Fairhill Plants and Botanic Gardens — Fairhill Rd., Yandina, 4561. Tel. (071) 46-7193. Large range of trees, shrubs, ground covers, climbers, ferns, palms and orchids for the sub-tropical and tropical east coast. Extensive display gardens open 8.30 a.m. to 5 p.m. any day. New comprehensive catalogue \$3.50 posted.

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Bundara Native Nursery — 37 Carters Road, Dural, Sydney, 2158. Tel. 651-1962. Specialising in *Grevillea*. Open weekends. Weekdays please ring first.

Cranebrook Native Nursery — R23 Cranebrook Road, Cranebrook, N.S.W. 2750. Tel. (047) 77-4256. Five km north of Penrith, between Tadmore and Taylor Roads. Open 8.00 a.m.-6 p.m. Sunday 1 p.m.-5 p.m. Also at Great Western Highway Warrimoo, N.S.W.

Sydney Wildflower Nursery — Branches at Duffys Forest 450-1785, Heathcote 520-3335, Marsden Park 637-4585.

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

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

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

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Les and Kay Nesbitt — 18 Cambridge St., Vale Park, S.A. 5081. Tel. (08) 261-1550. Specialists in the propagation of Australian terrestrial orchids. S.A.E. for list and culture notes.

Nellie Nursery — 46 Randall St., Mannum, S.A. 5238. Tel. (085) 691-762. 129 Adelaide Rd, Murray Bridge, S.A. 5253. Tel. (085) 325-188. Rare plants — over 1000 species grown including 120 eremophilas. Stock changes weekly, so enquiries should be by phone. Hours of business — Tuesday to Friday 9-5, Saturday 9-12.30, Sunday 10-2. Other times by appointment.

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Austraflo — The nursery with the "Native Know How" — Belfast Rd., Montrose 3765. Tel. 728-1222. Mon-Sat. 9-5.00 p.m. Sun. 10-5.00 p.m.

Nell Marriott's White Gums Nursery — Specialising in *Grevilleas* and unusual and small shrubs. Situated on left 3 km along Glenorchy/Warracknabeal Rd, from Western Highway, (13 km Stawell). Open Fri., Sat., Sun. or by appointment. Phone: (053) 58-2885 (orders to Box 107, Stawell, Victoria 3380).

Pomonal Wildflower Nursery — Gramplans. Sign opposite Gramplans Store Pomonal. Garden and Nursery open most of the time but phone (053) 56-6250 to check. Browse round our gardens.

Westernport Nursery — Specialist growers of Australian plants, 68 Flinders Road, Bittern, 3918. Hours — Monday to Saturday — 9.00 a.m. to 5.00 p.m., Sunday — 10.00 a.m. to 5.00 p.m. Phone: (059) 839 9328 Melway Ref. 164 F.7.

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R. Horner — 1 Grundy St., Alice Springs, N.T. 0870. Seed of trees and shrubs of Central Australia. Please send 37¢ stamp for a list.

Western Australian Wildflower Society — P.O. Box 64, Nedlands 6009. A wide selection of Western Australian seeds is available at 70¢ per packet, plus postage of 37¢ for a number of packets. Send for a catalogue for 50¢ plus 37¢ 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.

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***Grevillea* 'Misty Pink'**

Photography by Russell Costin

A feature of this issue is the descriptions and colour photographs of the magnificent range of *Grevillea* hybrids based on the tropical *Grevillea* of Queensland. They have proven the most adaptable and widely grown horticultural selections from Australia's wildflowers. Study the simple descriptions and select a number for your garden. The plant above is described on page 339.