

KINGS PARK

NATIVE PLANT

ANNUAL



Western Spinebill (*Acanthorhynchus superciliosus*)



Found predominantly in the forests and scrubs of south western Australia from Jurien Bay to Israelite Bay, the Western Spinebill, like many other birds, mammals and insects, thrives on nectar and pollen of native flowering plants. These plants, have in turn, evolved shapes and structures to maximize their pollination in this, one of many, partnerships in nature.

FRONT COVER

- Top right: Pink Petticoats (*Polypompholyx multifida*) a carnivorous plant from the Bladderwort family. (Photo K.W. Dixon).
- Top left: King Spider Orchid *Caladenia huegelii*) a common orchid in Kings Park bushland. (Photo K.W. Dixon).
- Centre: Bindoon Starbush (*Urocarpus niveus*) a rare and endangered plant. (Phone K.W. Dixon).
- Bottom right: Orange Stars (*Hibbertia stellaris*) one of only 3 species of Hibbertia with orange flowers. (Photo I.R. Dixon).
- Bottom left: Red Flowering Gum (*Eucalyptus ficifolia*) the best known of all our ornamental Eucalyptus. (Photo P.R. Wycherley).

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Every effort has been made to ensure that the information obtained in this publication is correct. All correspondence should be addressed to the authors, Kings Park and Botanic Garden, West Perth, W.A. 6005.

Copies of the Native Plant Notes from which data for this publication were obtained are available from Kings Park Board.

Authors: Bob Dixon — Horticultural Advisory Officer
Kingsley Dixon — Research Botanist
Eleanor Bennett — Display Botanist

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VEGETATION REGIONS of Western Australia

1. JARRAH FOREST

The true Jarrah Forest extends from the south coast near Albany to near New Norcia, forming almost pure stands on the heavier lateritic soils. However, other tree species do occur within the forest normally on deeper soils or along rivers and water courses. Jarrah (*Eucalyptus marginata*) also occurs in mixed woodland closer to the coast on sandy soils eg. Kings Park.

Within the Jarrah Forest region you also have other distinctive floral areas eg. Banksia woodland, swamps and Tuart Forest. Some of the best known plants of the Jarrah Forest include — Red and Green Kangaroo Paw (*Anigozanthos manglesii*) which is the state floral emblem and endemic to Western Australia — Blue Leschenaultia (*Lechenaultia biloba*) — Common Blackboy (*Xanthorrhoea preissii*) and Brown Boronia (*Boronia megastigma*).

The main flowering period for the Jarrah Forest is from late winter to spring, however, in the southern area near Albany many species flower in late spring and summer.

2. KARRI FOREST

Karri occurs naturally only in the wetter parts of South Western Australia where it receives an annual rainfall of over 1000mm. As well as the 3 main areas of distribution, there are also many smaller outlier populations. Karri (*Eucalyptus diversicolor*) is one of the largest hardwood trees of the world, reaching a recorded height of 90m, however, trees are usually much smaller than this. One of the best places to see the larger specimens is Valley of the Giants near Walpole and Nornalup. In this area these magnificent trees with greyish white bark are in a mixed forest with Red Tingle (*Eucalyptus jacksonii*) which is also a large tree up to 70m high with a large buttress trunk, and Yellow Tingle (*Eucalyptus guilfoylei*) reaching a height of 40m.

The floor of the forest is usually very moist due mainly to the thick cover of understorey shrubs. Some of these common shrubs include — Karri Wattle (*Acacia pentadenia*) — Tree Hovea (*Hovea elliptica*) — Crowea (*Crowea angustifolia*) and Holly Flame Pea (*Chorizema ilicifolium*).

The main flowering period in the Karri Forest is spring and early summer, although it is also worth a visit in late summer as the forest is shady and cool.

3. JAM COUNTRY

Jam occurs naturally on loamy or loamy sandy soils and is therefore more common in the wheatbelt area of West Australia. In the north it can be seen north of the Murchison River in the sand plains and heath and in the south near the Stirling Range, but not as close to the coastal areas as the map indicates.

Jam (*Acacia acuminata*) is a tree up to 5m high with yellow cylindrical flowers produced from July to September. When wood is freshly cut it smells like raspberry jam.

Within the Jam country we have many interesting floral areas eg. northern sand plains which are well known for their Smokebush (*Conospermum species*), Banksias and Feather flowers (*Verticordia species*), the flowering season in this area extends from August to November — Stirling Range with its many endemic species such as Giant Andersonia (*Andersonia axilliflora*) and of course the famous Mountain Bells (*Darwinia species*), the best flowering season here is from August to November.

4. MALLEE, YORK AND SALMON GUM

This region includes many different types of vegetation with everlastings and heathland at Shark Bay best seen from July to September, York and Salmon Gum in the eastern wheatbelt extending to Baladonia, Blue Bush Plains in the Nullabor, with Mallee heath near the south coast then a belt of Mallee further north this is where many of our best ornamental Eucalyptus occur.

One of the most interesting places to visit in spring is the Barrens Range where the Royal Hakea (*Hakea victoria*) and Qualup Bell (*Pimelea physodes*) can be seen.

5. MULGA COUNTRY

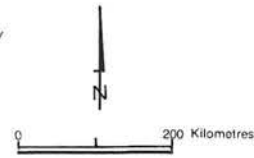
The general term Mulga refers to about 10 species of Acacia the most common being *Acacia areura*. In the coastal area there are many interesting plants eg. Coppercups (*Pileanthus species*) and Forrests Featherflower (*Verticordia forrestii*) while the Mount Magnet and Meekatharra areas are known for their carpets of Everlastings, Poverty Bushes (*Eremophila species*) and Mulla Mulla (*Ptilotus species*). The main flowering period is from July to September, however, good flowering seasons are dependant on good rainfall.

6. NORTH WESTERN AUSTRALIA

This large area has a very diverse flora most of which is scattered Eucalypts, Spinifex and Savanna, however, two very interesting areas include — the Pilbara (Hamersley Ranges) which are well known for the Cork Tree (*Hakea suberea*), Sturts Desert Pea (*Clianthus formosus*), Cockroach Bush (*Cassia nobilis*) and Millstream Fan Palm (*Livistona alfredii*), the main flowering season in this area is from June to September — the Kimberley, this area receives high summer rainfall when many roads are impassable. Although most plants, especially the ephemerals, flower during the wet season December — March, others flower during the dry season autumn to winter eg. Boab (*Adansonia gregorii*), Birdflower (*Crotalaria cunninghamii*) and Elephants Ear (*Acacia dunnii*).

LEGEND

- Summer Rainfall (millimetres) (November-April)
- Winter Rainfall (millimetres) (May-October)
- Jarrah Forest
- Karri Forest
- Jam Country
- Malley, York and Salmon Gum...
- Mulga Country
- North Western Australia.....



HORTICULTURAL SERVICES in Kings Park

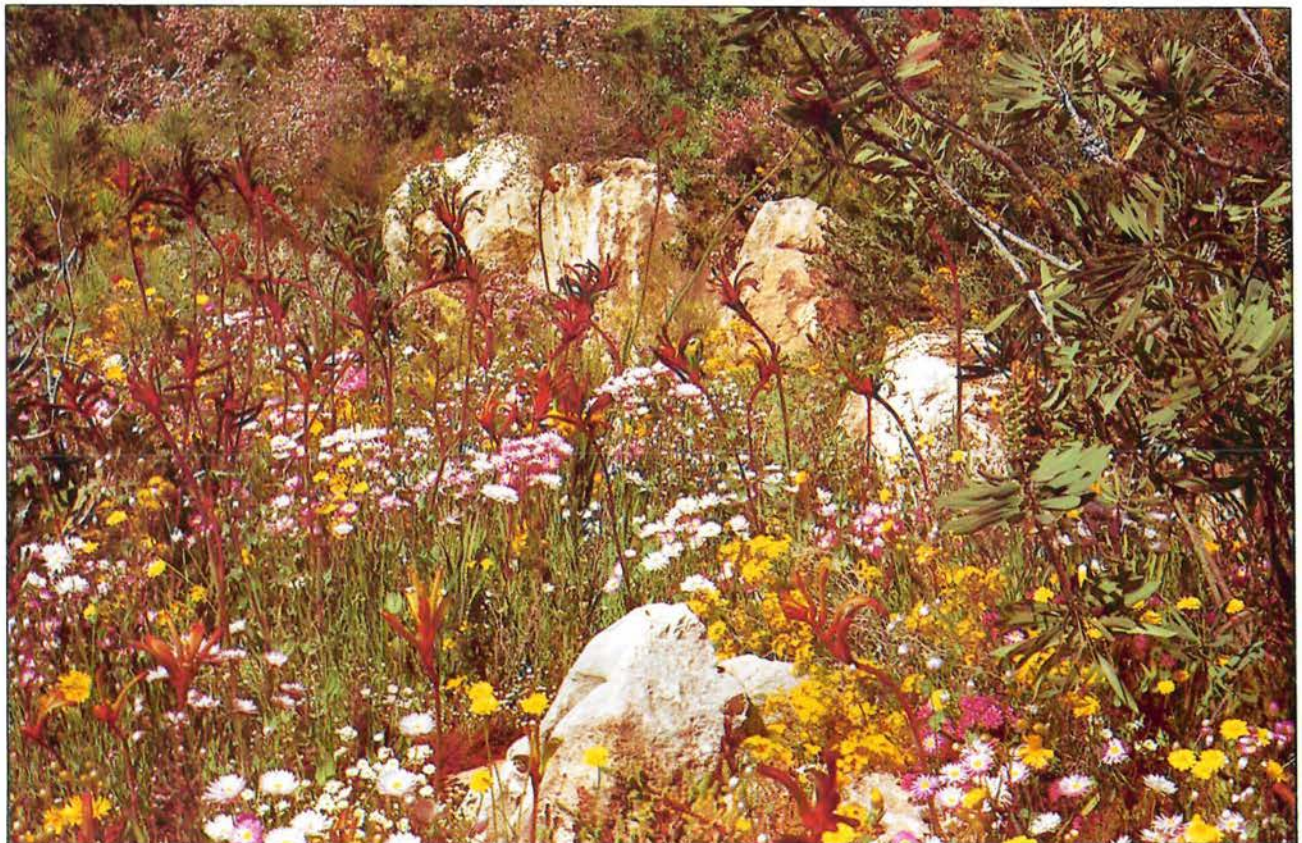
The introduction to the previous issue of the Kings Park Native Plant Annual was entitled "Horticultural Advances in Kings Park" and reviewed the history of Kings Park and Botanic Garden with special emphasis on contributions to the advancement of horticultural knowledge and practice. Rather than recapitulate those aspects again, this introduction to the second issue summarises the services provided through Kings Park and Botanic Garden to the general and professional public in horticulture and the related fields of botany and natural history.

Firstly in its gardens, especially the Botanic Garden itself, devoted mainly to the flora of the South West of Western Australia, but not entirely, there being sections representative of other regions sharing the Mediterranean type climate of Perth, there are demonstrations of what can be grown under typical open ground conditions of the Swan Coastal Plain. Secondly in Kings Park Native Plant Display and other occasional exhibitions there are

presentations of which Western Australian species can be grown in containers. Thirdly the Display Glasshouses exhibit a more extensive range of the flora of the State, especially those elements which need particular environmental regimes distinctly different from Perth ambient conditions, as well as those which need some security. Thus collectively all require protected cultivation in one or other sense of the phrase. There are further demonstrations of the native flora in various arboreta and other plantings throughout Kings Park, as well as along the Nature Trail where the plants occurring there naturally are labelled especially during the spring wildflower season. The Nature Trail is of particular interest to those who wish to grow plants indigenous on the old dune systems. Kings Park Board has constructed accessible paths along the Nature Trail and in other bushland areas.

During the past three years the Kings Park Guides have come into being. These are a

Kings Park Native Plant Display and wildflower exhibition. (Photo P.R. Wycherley).



group of volunteers who give of their services freely to conduct walks in Kings Park, especially through the Botanic Garden and along the Nature Trail. This enables visitors to be given a personal introduction to plants of note and information about them.

Advice on the cultivation of native Western Australian plants is provided mainly through the Horticultural Advisor, Bob Dixon, who is the principal author of this publication. Information may be obtained through correspondence or in an interview either by telephone or in person by appointment. Leaflets have been prepared on a number of horticultural subjects as well as guides to some of the plantings and the Native Trail. These are available on request.

Since the inception of the Botanic Garden in Kings Park the Board has engaged a Seed Collector to obtain seed and other propagation material by means non-destructive of the wild source plants. This is used to enrich the living plant collections in Kings Park. Also through the issue of an Index Seminum and exchange of seed with other botanic gardens all over the world, this service to science is extended on an international basis. Within Australia cuttings and other vegetative material of particular selections is released in nucleus quantities to trade and scientific organisations. The advent of tissue culture is facilitating this both in Australia and overseas.

Investigations continue into propagation by conventional horticultural means and by the more recent methods, which are fast becoming accepted as part of general practice. This is

sometimes to multiply rare and endangered species to relieve pressure on the wild resource and give opportunity for preservation in cultivation, even although conservation in the wild is preferred as far as possible. It is often desired to propagate particular selections such as colour variants, growth forms or plants with resistance to pests and diseases. Research on various aspects of the biology of native plants aids not only in bringing them into cultivation, but also in setting up effective management which conserves water and energy. Currently special attention is being given to herbicides which are promising for the control of introduced competitive grasses.

While research into the taxonomy of the native flora is primarily the function of the Western Australian Herbarium, Kings Park is able to assist with the identification of native plants particularly if they are the subjects of horticultural enquiry. Currently there is a vigorous program to label extensively throughout Kings Park and Botanic Garden and also in other parks and gardens surrounding Perth water and its foreshores. This will help casual visitors.

In conclusion gardeners and visitors can gain much help and interesting information from Kings Park. Frequent visits during different seasons, enjoying the labelled living collections in Botanic Garden, Arboreta, Nature Trail, Display Glasshouses and spring Wildflower Exhibitions are of recreational value as well as being informative. Contact with Kings Park and Botanic Garden will give access to the literature available and the advisory services.

P.R. Wycherley — Director
Kings Park and Botanic Garden.

Botanic Garden in full bloom. (Photo P.R. Wycherley).



RED LESCHENAULTIA



This large red flowered form, common in its natural habitat, is the most popular in cultivation. (Photo P.R. Wycherley).

Lechenaultia commemorates the French naturalist Jean-Baptiste Louis Claud Theodore Leschenault de la Tour who collected at Cape Naturaliste, the Swan River and Shark Bay in 1801 and 1803. Robert Brown, an English botanist misspelt the generic name when he described the genus in 1810. Brown also described this species in 1810, the specific epithet, *formosa* being derived from the Latin meaning beautiful.

Lechenaultia formosa is known locally as the Red Leschenaultia, because red is the common flower colour. It belongs to the family Goodeniaceae which includes the Fan Flowers, *Scaevola* species as well as *Goodenia* and *Velleia* species.

The Red Leschenaultia is most common between the Stirling Range (north of Albany) to the Barren Range (near Hopetoun), however, there are also disjunct populations near Perth.

Not far from Perth, along the Brookton Highway, it grows in open areas of the Jarrah forest amongst low open scrub in sandy soils.

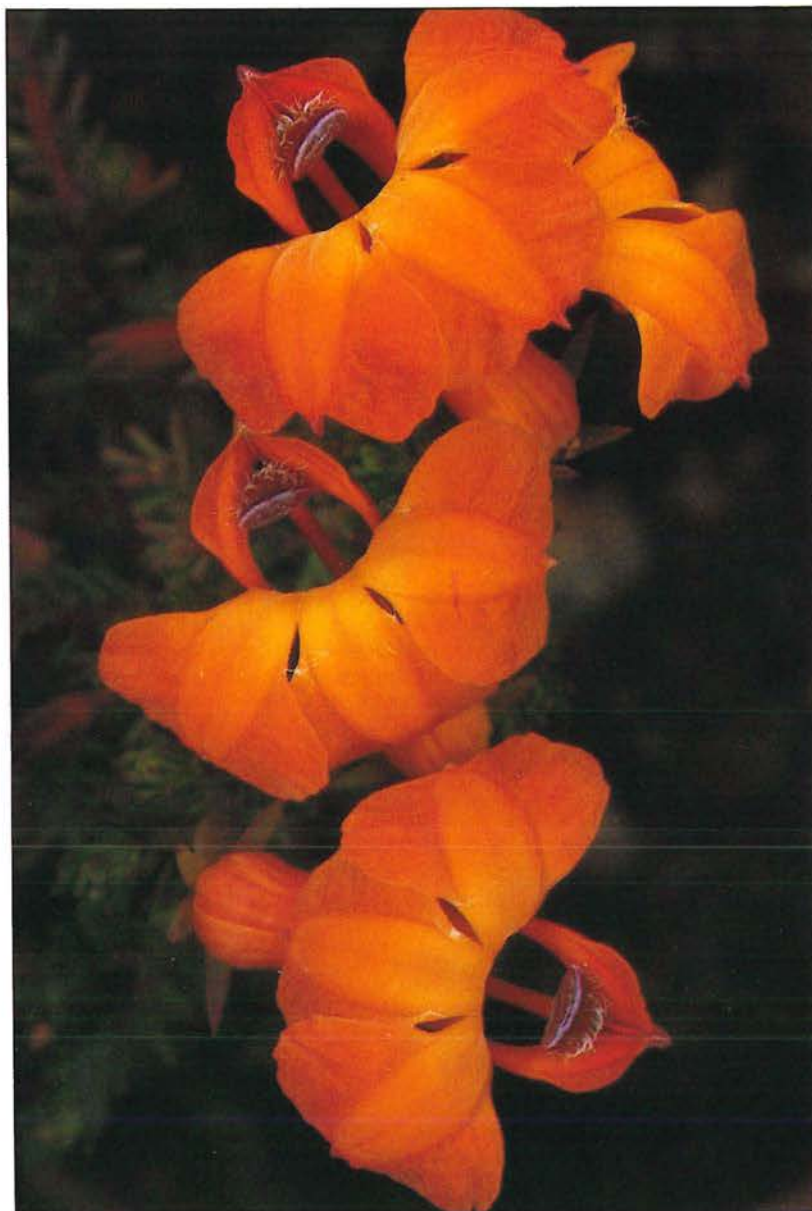
The flower colour varies considerably from shades of pink, red, orange, yellow to white and includes bicolour forms of red and yellow. The white form has a differently shaped flower and may be a hybrid. Plants vary in height from a low ground-hugging plants 2cm high, to upright forms from near the coast in the Barren Range which grow up to 20cm high.

They are normally quite soft plants but may also be fairly woody. Some forms sucker profusely from their roots whilst others produce no suckers.

PROPAGATION

Seed

Plants are very difficult to raise from fresh



Detail of the indusium (cup shaped hairy structure) enclosing the pollen receptive part of the flower . (Photo K.W. Dixon.)

seed. Seed which is at least one year old may be easier to germinate as is the case with *Lechenaultia biloba* and *Lechenaultia linearoides*. We believe the seed may take time to develop or may contain an inhibitor which needs time to break down. Seed should be sown in a free draining mix in autumn.

Cuttings

This is the preferred method of propagation as the exact colour form you require can be reproduced. Take softwood or semi-hardwood cuttings in autumn through to late spring. Use a hormone powder on the base of the cutting, which under ideal conditions will form roots in about 4 weeks.

CULTIVATION

Grow plants in a free draining soil, preferably

a sandy loam or sandy lateritic soil. Plants do not normally grow very well in Perth's sandy soils as they tend to gradually die out. However they do last longer when grown in broken sunlight or where they receive morning or late afternoon sun. They require regular summer watering and benefit from mulching, as well as a light dressing of a general slow release fertiliser.

In cultivation they respond best when grown in containers and make excellent hanging basket subjects. They are best grown in broken sunlight, requiring regular watering and fertilising. Under these conditions many forms will flower for 8 months of the year. Always try to grow suckering forms as these last longer in cultivation. However, plants should be repropagated, as they decline in vigor when more than 2 years old, and the containers become full of roots.

FRINGE LILY



Thysanotus with typical grey-green hairy leaves. This dark coloured form was photographed between Hyden and Narembeen. (Photo F.W. Humphreys).

Thysanotus triandrus is known locally as a Fringe Lily due to the fringe on the edge of the flower petals. It belongs to the family Anthericaceae (separated recently from the Liliaceae family) and is therefore closely related to *Chamaescilla*, Blue Squill and *Sowerbaea*, Vanilla Lily.

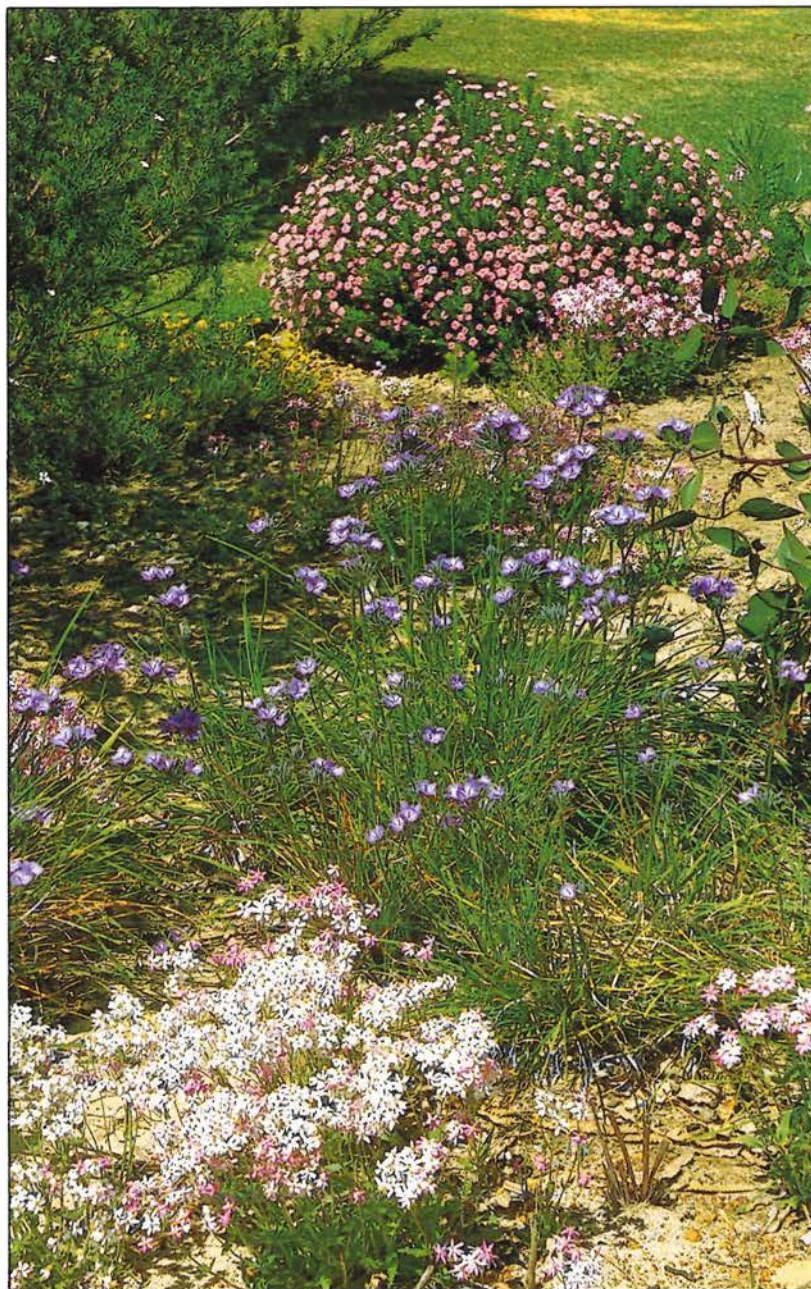
Thysanotus from the Greek *thysanos* - a fringe, was first described by Robert Brown in 1810, after his voyage to Australia aboard the Investigator under the command of Matthew Flinders. Brown's collection of the genus was not the first. In 1792 the French botanist Labillardiere visited Western Australia and collected specimens of two plants which he referred to as *OPrithogalum* L. One of these plants was *Thysanotus triandrus*, which he described in 1804 as *Ornithogalum triandrum*.

Thysanotus triandrus occurs naturally in sandy soils usually in low heath or Banksia forest from Cockleshell Gully to Israelite Bay. Plants

occur naturally in Kings Park bushland usually as scattered plants not in dense colonies. Locally they may also be seen in much wetter locations eg: Cannington Swamp.

To the horticulturalist and amateur gardener, this species closely resembles *Thysanotus multiflorus* the main difference being *Thysanotus triandrus* has hairs on its leaves especially on the leaf margins, whereas *Thysanotus multiflorus* has no hairs on its leaf excepting a few on the base of the leaf margins.

An herbaceous perennial with fibrous roots *Thysanotus triandrus* grows up to 40cm high with long, narrow, greyish green leaves slightly shorter than the flower stems. The flower heads are terminal consisting of up to 50 flower buds, with each flower lasting for one day, but normally with 3 or 4 flowers opening at the same time. Flowering occurs from early October to December.



The closely related *Thysanotus multiflorus*. In cultivation, this species usually reseeds itself around parent plants. (Photo I.R. Dixon).

PROPAGATION

Seed

Plants are normally raised from seed sown in the autumn, germination usually takes about 30 days. Seedlings should then be pricked out (transplanted) into small pots and grown on for 1 year before planting out.

Division

Plants have fibrous root systems, and can be easily divided in late autumn. They should be lifted and pulled apart, and if done in May divisions will have few live roots. Reduce the length of the leaves by two thirds to reduce transpiration (water loss) and trim off any dead or damaged roots. If the weather is mild they can be planted directly and kept moist or else pot up into an open free draining mix and keep under light shade until the plants have revived or commenced growing.

CULTIVATION

Plants require a free draining preferably sandy soil. Choose a sunny position which receives early morning and late afternoon sun; with all day sunshine the flowers will wilt by midday.

In low humus sandy soils, plants benefit from a light dressing of either general slow release fertiliser or blood and bone.

Seedlings normally take about 18 months to flower. *Thysanotus triandrus* produces little viable seed and may be difficult to obtain whereas the related species *Thysanotus multiflorus* produces abundant seed and is occasionally available in nurseries. *Thysanotus multiflorus* has similar cultural requirements and normally produces self sown seedlings around the parent plants in the home garden.

Thysanotus species are also being tissue cultured in Kings Park.

STURTS DESERT PEA



The black and red flowered form although common in its natural habitat is much sort after for cultivation.
(Photo P.R. Wycherley).

Clianthus formosus known locally as Sturts Desert Pea or Sturts Pea, belongs to the Pea Family Papilionaceae or Fabaceae and is closely related to the Coral Peas, *Kennedia* species.

Clianthus comes from the Greek meaning glory flower *formosus* from the Latin for beautiful.

William Dampier collected this during his second voyage of discovery to the west coast of Australia in 1699. These specimens were the first recorded collection of an Australian plant by a European and were lodged in the herbarium of Oxford University. Sturts Desert Pea was originally described as a species in the genus *Colutea* from which *Clianthus* was later split off.

It occurs naturally on the north west coast and adjacent islands from Port Hedland east into the desert and south to Kalgoorlie, then east across the Nullabor Plain and also in N.S.W., N.T., Qld. and S.A. It is South Australia's floral emblem.

In its natural habitat it is an ephemeral (short lived plant completing its life cycle in one season), growing in open areas on rocky hillsides or in slight depressions where water collects. Although it is a prostrate

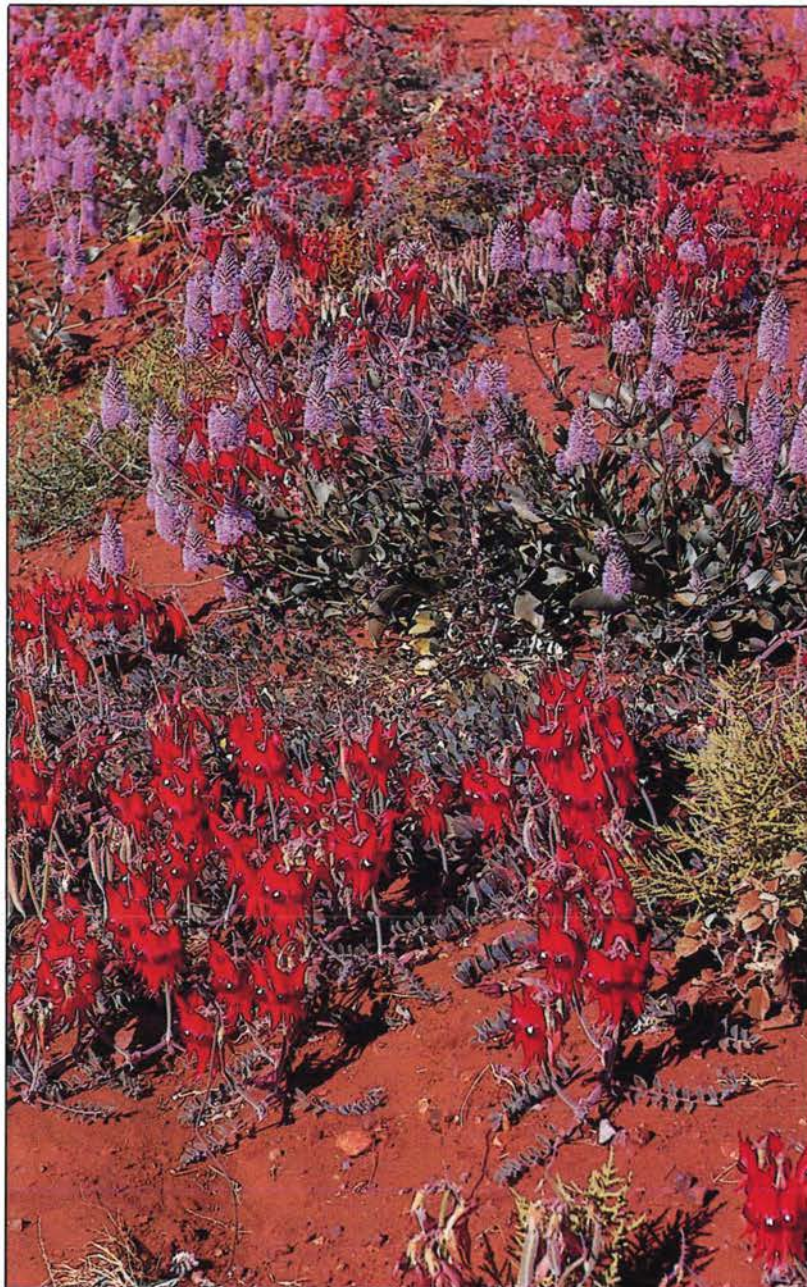
plant ascending stems are often produced. Each leaf consists of several pairs of grey-green, hairy elliptical leaflets borne on a central stalk.

In their natural habitat flowering occurs from June to September but under cultivation in Perth flowering can be from December to June. Colour variations in the flower is not unusual, normally they are red with a black or red boss (central portion of the flower), however they can also be pink, pure white, mixtures of white and red, and a pure breeding green form has been selected.

PROPAGATION

Seed

Untreated seed stored dry can remain viable for up to 20 years. In Perth seed is best sown under grass in warm conditions in early September or sow in the garden in October when the temperature rises as the seed generally rots under cold wet conditions. The seed has a hard outer covering which is best scarified (ie by removing a small portion of the seed coat before planting, taking care not to damage the seed). Alternatively the seed can be treated with hot water, by pouring near boiling water onto the seed and allowing the water and seed to cool.



Sturts Desert Pea growing in its natural habitat at Mt. Florance.
(Photo J.S. Beard).

Treated seed must be sown immediately or it will dry out and die. Sow in a free draining, slightly alkaline to slightly acid mix. A general commercial seed mix is often adequate. Seed may be sown in a large container and the seedlings pricked out (transplanted) when only a few days old or sow 2 or 3 seed in a small pot and thin out later if necessary. Seedlings are also readily available, in season, from nurseries and supermarkets usually in cell packs of 4 to 8 seedlings.

Grafting

Seedlings may be grafted when small onto *Crotalaria puniceus* the New Zealand Glory Pea or by using larger top pieces (scions) onto *Colutea arborescens* (see references). The roots (stock) of grafted plants are more resistant to wet, cold conditions, and pests especially eelworm attack, while the stock also prolongs the life span of the plant making it into a short lived perennial. Grafting will preserve the preferred colour form of the plant, however, few of these selections are available in cultivation.

Plants have also been raised by tissue culture, however, they are not yet available in nurseries.

CULTIVATION

Plants require a full sun position in slightly alkaline to slightly acid free draining soil. Regular light applications of a general fertiliser will encourage rapid growth and under ideal conditions, plants often reach 2 or more metres in diameter. Regular watering is required especially in deep sandy soils. This is best applied through trickle irrigation lines or by giving the plants an occasional heavy overhead watering. The plants are susceptible to fungal diseases if the leaves remain wet for long periods. They are also susceptible to root rot when kept wet around the roots.

Eelworm is the major pest of *Crotalaria* and damages the root system. Control is best done by treating the ground with a nematicide at planting time. By the end of the growing season eelworm has usually built up in the soil around the plant. Therefore it is recommended you plant elsewhere in your garden, the next growing season. Seedlings and mature plants should also be kept clear of slugs and snails.

Although plants normally last one season in Western Australia they may occasionally survive through the winter, but will usually require hard pruning in the spring to stimulate new growth.

GERALDTON WAX



A large flowered form with blooms almost as big as a 20¢ coin. (Photo K.W. Dixon).

Chamelaucium uncinatum belongs to the Myrtaceae family and is closely related to *Darwinia* or Mountain Bells of the Stirling Range. It is known locally as Geraldton Wax, because it was once very common around Geraldton. Plants can be easiest seen in their natural habitat south of Dongara, where it grows in small colonies, in sandy soils amongst limestone. Colonies also occur as far inland as Watheroo.

The first collection of this plant was made by the German botanist Ludwig Preiss from the pink flowering forms growing in the limestone hills around Fremantle. Only pink flowered forms have been recorded around the Swan River. The species name refers to the softly barbed end of the leaves. Flower colour is usually a shade of pink, although it varies from white to purple or two tone often darkening with age. The size of the flower ranges from 8mm to 15mm, but there is a cultivated form up to 2.5cm across. The main flowering season is from July to November.

The needle-like leaves are about 2cm long

and hooked at the end. Mature bushes vary in height from 2-4m with a spread up to 5m.

PROPAGATION

Seed

Seed should be sown in autumn or late winter, in a sandy or free draining mix. Germination normally occurs in 5 weeks with no pretreatment, but the viability is rarely over 40%.

Cuttings

New plants are normally raised by cuttings resulting in a plant exactly the same as its parent. Softwood cuttings can be taken from autumn to early summer, normally taking 2 to 3 months to form roots, but, some forms can strike in 3-4 weeks. Unfortunately they normally produce one long root which is very brittle and readily broken, therefore it is best to strike them in cell packs to avoid this damage when potting on.



Deep pink flowers clearly showing the arrangement of stamens and staminodia so typical of the genus *Chamelaucium*. (Photo K.W. Dixon).

CULTIVATION

Plant out when only a few centimetres high or grow on in pots for a few months, using a well drained potting mix.

Pot plants respond well to a general slow release fertiliser or regular weak application of liquid fertiliser. Too much fertiliser encourages soft growth which makes the plants more susceptible to a variety of chewing insects.

Choose a well drained preferably sandy soil, which can be alkaline or slightly acid, and a full sun position. As with all plants they should be hardened off before planting out, especially when planting in the summer. After the plants are established they are drought tolerant, however, they will accept regular watering.

If required, pruning should be carried out straight after flowering, regular light pruning is better than hard pruning. Geraldton Wax is an excellent cut flower lasting for up to 2 weeks in ideal conditions. Large plantings for cut flower

production have been made in Western Australia and other Australian states, as well as overseas eg. Israel.

There are many cultivars of Geraldton Wax, some are selections from wild plants, which are really forms, others are selected from seedlings appearing in gardens. The flowers may be in a dense terminal head or a fairly loose open head.

Well known cultivars include: "Munns" with pale pink flowers edged with reddish purple; "University, Red", a fairly open flowered bush with light purple flowers which age to dark purple; "Purple Pride" with dense clusters of reddish-purple flowers which have a whitish centre; "Alba" or "Album" with white flowers (these may be two different forms sold under the same name); "Dowells", with large deep pink flowers; "Mullering Brook" with dense terminal clusters of small pale pink flowers and "Lullfitz Burgundy Blush", a new introduction launched in 1986 with large pink flowers which age to burgundy.

COCKIES TONGUES



An unusual cream flowered form of Cockies Tongues growing at City Beach. (Photo E. Humphreys).

Templetonia retusa is known locally as Cockies Tongues or occasionally as Bullock Bush. It belongs to the Papilionaceae family and is closely related to *Daviesia* (Eggs and Bacon), *Crotalaria* (Bird Flowers and Rattle Pods) and *Hovea*.

The first collections of this plant were by early French expeditions to the south coast of Western Australia. Propagation material from these collections was forwarded to Botanic Gardens in Paris. *Templetonia retusa* was named from plants which were grown and flowered in Paris. The genus was named in honour of the Irish botanist John Templeton. *Templetonia retusa* occurs naturally in a coastal strip from Geraldton to the Nullabor Plain and into south eastern Australia. They can be

seen growing amongst coastal limestone, or more commonly in sand dunes especially close to Perth. A good place to see them is City Beach although they also occur naturally on the scarp in Kings Park. In the south of the State they often grow in loamy sands amongst taller vegetation. Plants vary in height from 40cm to 2m according to how much they are exposed to strong winds. When exposed the plants are more compact often forming a rounded bush whereas the taller plants have an upright, open appearance. Flowering is normally between May and September, the large pea flowers up to 6cm long are usually a shade of red or pink, however, cream forms can occasionally be found and recently a pure white flowered form was recorded from Busselton. The terminal flowers when in full bloom cover the bush, attracting nectar feeding birds which pollinate the flowers. Leaves



A cultivated plant in Kings Park nursery with open upright growth.
(Photo P.R. Wycherley).

are dull grey-green, fairly rigid, narrow and rather sparse.

PROPAGATION

Seed

Plants are easily raised using hot water treated or scarified seed sown in the autumn or spring in a free draining slightly alkaline mix. Sow 2 or 3 seed in a small pot and thin out later if necessary or sow in a large pot and prick out (transplant) when a few days old into small pots. Germination under ideal conditions takes 9 days.

Cuttings

New plants can be raised from semi hard-wood cuttings taken from autumn to latespring. Only plants grown from cuttings will be true to type, whereas seedlings may not be true to

colour or form, eg. when seed is taken from a white flowered bush.

CULTIVATION

This is an excellent subject for coastal gardens with limestone (alkaline) soils. Plants are very difficult to establish on acid soils even with the addition of lime to the soil. They require a full sun position and will endure an exposed position, however, they are easier to establish where more sheltered. They are drought tolerant when established, and although normally growing on very poor soils will benefit from the application of a general slow release fertiliser. As they age they may become a little straggly, especially when in a sheltered position, therefore a light regular pruning after flowering may be necessary.

BLACK KANGAROO PAW



Close up showing the black hairs covering the yellowish green flowers. (Photo I.R. Dixon).

Macropidia fuliginosa is known locally as the Black Kangaroo Paw because it resembles the other Kangaroo Paws but has black hairs covering the outside of the flowers and flowering stem. The inside of the flower is a greenish yellow, with the stamens and stigma protruding from the end of the flower tube.

Originally collected by the colonial botanist James Drummond, who referred to its common name as Kangaroo's Foot. Indeed *Macropidia* is derived from *Macropus* the Latin name for a Kangaroo. The specific name celebrates the most striking characteristic of the flower, its sombre black and green bloom called by Drummond "a mourning flower".

The genus *Macropidia* consists of only one species and is closely related to the other Kangaroo Paws of the genus *Anigozanthos*. The main difference between the two genera is the number of seed produced in each cell, *Macropidia* produces only 1 seed each making a total of 3 per flower, whereas *Anigozanthos* produce many. Both *Macropidia* and *Anigozanthos* belong to the family Haemodoraceae and are therefore closely related to *Haemodorum* (Blood Root), *Conostylis* (Cotton Heads), and *Blancoa* (Red Bugles.)

The Black Kangaroo Paw occurs naturally on sandy

or sandy lateritic soils between Mingenew and Muchea. The northern populations grow in open heathland and the southern populations around Gingin, Muchea and Chittering are in Jarrah forest. A good place to see them is on the verges of the Brand Highway between Cataby and Eneabba.

Flowering is usually between early October and December, however, plants can also flower in the autumn. Few viable seed seem to be produced, however, this varies from season to season and may be dependent on good weather conditions as well the presence of suitable bird pollinators. The flowering stems are up to 1.3m high and branch at the top. Leaves are strap-like, dark green to blueish green, and arranged in a fan shape, similar to some Iris.

Populations vary in size, ranging from scattered plants to dense populations. After a bush fire plants flower prolifically and are much easier to see. Although they may be long lived, few seedlings are seen unless the area has been disturbed.

The Black Kangaroo Paw is not rare, however, it is becoming scarce due to clearing for agriculture and commercial exploitation by removal of whole plants and picking of the flowers.



A large plant growing on a road verge near Badgingarra.
(Photo F.W. Humphreys).

PROPAGATION

Seed

Good viable seed is easy to germinate given the correct treatment. Sow the seed straight after harvest (Dec. Jan.) in a free draining preferably sandy mix. Leave the seed pots out in the elements i.e. full sun, wind and rain, do not water the seed pots until April. Normally seed will not germinate the first autumn after sowing. Leave the seed pots out in the elements again with no artificial watering until the following April. Seed will then germinate, under ideal conditions in 23 days, seedlings will keep germinating until mid June.

Seed remains viable for at least 7 years, so you can repeat the weathering process for several seasons rather than throw your seed away. Seedlings are best pricked out or transplanted when only a few days old.

Vegetative Propagation

Plants can be divided or lifted when dormant (non irrigated plants) in April or divide actively growing plants in autumn-early winter. However, as losses are usually high, it is recommended that plants be grown

from seed. New plants are also being successfully raised by tissue culture.

CULTIVATION

The Black Kangaroo Paw requires a slightly acid free draining, preferably sandy or sandy lateritic soil, and a full sun position in a frost free area. They can be planted out in the open ground when 4-5cm high or grown on in pots for a year.

They grow well in cultivation often flowering in both autumn and spring. Plants respond well to regular watering and light applications of a general slow release fertiliser. Although plants grow faster and produce more flowers under good growing conditions, the soft leaves become more susceptible to ink and rust diseases. These fungal diseases especially ink disease can kill a plant. Soft grown plants often survive for 2-4 years, whereas tougher plants, although they produce fewer flowers can survive for at least 15 years.

Plants can be grown in many parts of the state from Geraldton to Albany. The Black Kangaroo Paw is now grown commercially for cut flowers in Western Australia, South Australia and overseas. The blooms are sold fresh or dried.

QUANDONG



An old tree laden with fruit growing in the Great Victorian Desert. (Photo J.S. Beard).

Santalum acuminatum is known locally as the Quandong, it belongs to the family Santalaceae and is closely related to the Sandalwood *Santalum spicatum*.

The name of the genus *Santalum* is derived from the Sanskrit for the sweetly scented wood of the first species described which occurs in Asia. The powdered roots have long been used to make incense for religious and ceremonial purposes.

The first botanical collection of the Quandong was at King Georges Sound in 1802. Plants occur naturally on red sands, dune sands, calcareous sands and clay over gravel. The general distribution is in the southern part of Western Australia from Shark Bay in the north, east to Kalgoorlie and the coastal Nullarbor region. They are still quite common on dune sands at City Beach near Perth where there are small bushes often less than 2m tall, whilst inland they can be small trees up to 6m high.

The Quandong like all other members of the Santalaceae family is a root parasite. It is not known

exactly what the plant extracts from its host, or if a host is required throughout the whole of the plant's entire life span. The haustoria which attach themselves to the roots of the host plant's look like brown scale insects and are 3 to 5mm long.

The flowers are insignificant cream, green or brown and produced over a period of several months often from September to March. Fruiting is generally from late September to November.

This is one of the few native Australian plants valued for its fruit and nuts (kernels). The kernels are eaten fresh or roasted. The fruit may also be eaten fresh or dried. It is best made into a jam, used in pies or as stewed fruit.

The food value of the Quandong is good, because the flesh is rich in vitamin C, and the kernels have high protein and oil contents.

PROPAGATION

Seed

Fresh seed, with the shell intact but the fruit removed, can be sown in the autumn or spring. Autumn is the recommended season in Western



The fruit of the Quandong is valued for its plum-like flavour and is often used as a stewed fruit or made into jam. (Photo I.R. Dixon).

Australia when the seed is 6 or 7 months old. Sow the seed in large pots in a good open, preferably sandy mix. The seedlings which can take as little as 4 weeks to emerge should be pricked out (transplanted) as soon as possible as they have a long brittle tap root. Seed may also be sown in situ, that is in the plants final growing position. Sow 2 or 4 seeds near a marker peg within the root zone of a host, thin out the seedlings later if necessary.

Grant and Buttrose recommend the removal of the shell and part of the brown covering around the seed. The seed is then sterilised in household bleach and sown in a polythene bag filled with moist sterilised vermiculite, and placed in the dark at an optimum temperature of 1620°C. Once of sufficient size the seedling can be removed and potted out.

Vegetative Propagation

Selected plants have been grown in tissue culture and may also be grafted, however, these are difficult procedures for most amateur

gardeners, therefore propagation by seed is recommended.

CULTIVATION

Plants can be grown on in pots for over 1 year without a host as long as they are kept moist at all times. They require free draining soils, a full sun position amongst other shrubs where they receive some shelter and can attach themselves to a host. They are not specific as regards a host and seem to attach themselves to annuals, herbaceous and woody perennials. Initial growth rates are fairly slow unless the plants receive summer watering. Although flowering can occur in the third year and fruit in the fourth year, they generally flower when about 5 years old and produce very few fruit for the first 2 or 3 years of flowering. Better crops may be produced if several trees are planted together, however, single trees do produce good crops as they get older. A 10 year old tree, isolated in cultivation, which is 4m high produced 300-400 fruit last season.

GUNGURRU



Eucalyptus caesai ssp. *magna* known as Silver Princess in the nursery trade with its silvery grey branches weeping down to ground level. (Photo I.R. Dixon).

Eucalyptus caesia is known locally as Gungurru occasionally spelt Gunurru. To complicate matters Gungurru seems to have been misapplied and the name Caesia should now be used. However, old habits die hard and it will be many years before the new preferred name is commonly used. Gungurru belongs to the family Myrtaceae and is therefore related to the Bottlebrush *Callistemon* and Paperbark *Melaleuca*. *Eucalyptus caesia* was described by Bentham in *Flora Australiensis* in 1867 from a plant collected by Drummond, and sent to William Hooker in England in his 5th collection. The collection would have been made from Mt Stirling or Mt Caroline.

Gungurru although very common in cultivation in Western Australia is very rare in its natural habitat and is gazetted rare and endangered. Plants occur naturally on isolated granite outcrops inland from Perth in the central wheatbelt; at present it is only known from a few locations.

One of the best places to see it in its natural environment is at Boyagin Rock, near Brookton.

There are two distinct forms of this plant, *Eucalyptus caesia* ssp. *caesia*, what we know as the small leaf and small flowered form, with branches that only weep at the ends. *Eucalyptus caesia* ssp. *magna* has larger flowers, young branches are a silvery grey colour and weep down to ground level, it is known as Silver Princess in the nursery trade. Flowers are produced from April or May through to September they vary in colour from light pink to deep pink and are up to 6cm across. This small tree is a mallee up to 13m high but usually much smaller with old brown bark, as the bark is shed it peels longitudinally revealing fresh green bark turning reddish brown. Juvenile leaves are heart shaped dark green with a reddish tinge, mature leaves are lance shaped, medium green to greyish green up to 23cm long. Fruit varies considerably in size from the smaller ssp. *caesia* 2.0cm to ssp. *magna* up to 3.5cm, young fruit are silvery grey ageing to reddish brown then grey.



Silver Princess with large flowers up to 6cm across. (Photo I.R. Dixon).

PROPAGATION

Seed

At present plants can only be successfully raised from seed. If you wish to collect seed from your own or friends trees, cut off mature fruit and leave them in open trays or paper bags in a dry airy position. Seed is normally released in 2 or 3 weeks, as with most Eucalypts there is a lot of chaff amongst the seed. Good seed is blackish in colour and white when cut in two.

Sow the seed in autumn, spring or early summer, seed sown in wet cold conditions normally rots. Use a free draining seed mix eg: 6 parts local grey bush sand to 1 part cladium peat (parts by bulk) or use a commercial seed mix.

Germination under ideal conditions takes about 8-10 days. Seedlings are best pricked out (transplanted) when only 1 or 2 days old. Alternatively 2 or 3 seeds can be sown in a small pot,

the seedlings can then be thinned out later if necessary.

CULTIVATION

The plants may be planted out when they are about 10cm high or grown on for a few months in a free draining mix containing slow release fertiliser. Plants require a free draining slightly acid soil and need to be grown in full sun.

When grown in an exposed position they are best grown as a mallee, that is, with several trunks. To achieve this, seedlings should have their growing tip pinched out when they are only 40-50cm high; older plants can be pruned back to within 50cm of ground level, if necessary, this will encourage new growth from the trunk and lignotuber.

Once established *Eucalyptus caesia* is drought tolerant although it will benefit from an occasional summer watering, regular heavy watering may lead to the death of the plant.

ORANGE MORRISON



Orange Morrison, with its usual dense flower head containing hundreds of individual flowers.
(Photo F.W. Humphreys).

Verticordia nitens is known locally as the Orange or Christmas Morrison. It belongs to the family Myrtaceae and is therefore closely related to gum trees and bottlebrushes. *Verticordia nitens* was originally named *Chrysorhoe nitens* by John Lindley in 1837 from a plant collected near the Swan River by Robert Mangles. Mangles sent the plant to Lindley who was the Professor of Botany at University College London. In 1838 an Austrian botanist, Sephen Endlicher decided it was a *Verticordia*.

The generic name *Verticordia* refers to the goddess Venus "the Turner of Hearts" while *nitens* means bright and gleaming. The binomial is indeed apt because of the outstanding display and vivid colouring of Orange Morrison blooms.

Plants occur usually in open Banksia woodland, the general area of distribution is from Mandurah to just north of the Moore River. There is also a yellow flowered form with stouter flowering stems which occurs near Eneabba, and flowers in early October.

Verticordia nitens is best seen just south of the Moore River, when in full flower the bushland is a

mass of bright orange blossom. The main flowering period is from November to February, however occasional plants flower into April. Each plant, depending on age, produces many hundreds of individual flowers crowded into a dense head atop of a straight flowering stem. Each season the flower head increases in size to accommodate new flowers and can reach 1m across, although they are usually 7-30cm across.

Plants are 1-1.5m tall with the terete or needle-like leaves produced on the lower portion of the plant. The plants are killed by fire and regenerate freely from seed, normally flowering in their second year.

PROPAGATION

Seed

This is one of the few *Verticordias* which regularly produces a good crop of seed. Each flower produces only one seed and is covered in a hard cone shaped fruit. The seed germinates best in the second autumn after sowing. Sow seeds in pots or trays straight after collection and leave it out in the elements, wind, rain



Young plants with long, almost leafless stems topped with dense heads of flowers. (Photo F.W. Humphreys).

etc; do not water the seed until autumn. Seed takes about 6 weeks to germinate. The seedlings are best pricked out (transplanted) when only a few days old. Remaining ungerminated seed can be left outside for a further year to promote further germination.

Seed may also be sown in the plants final growing position. It should be sown on bare ground and lightly raked in. This method should only be used in weed free areas.

Cuttings

Plants are easy to raise from semi hardwood tip cuttings taken in autumn through to spring, from the lower half of the plant. Cuttings taken from the flower head tends only to produce small plants. Under ideal conditions they take about 5 weeks to form roots.

CULTIVATION

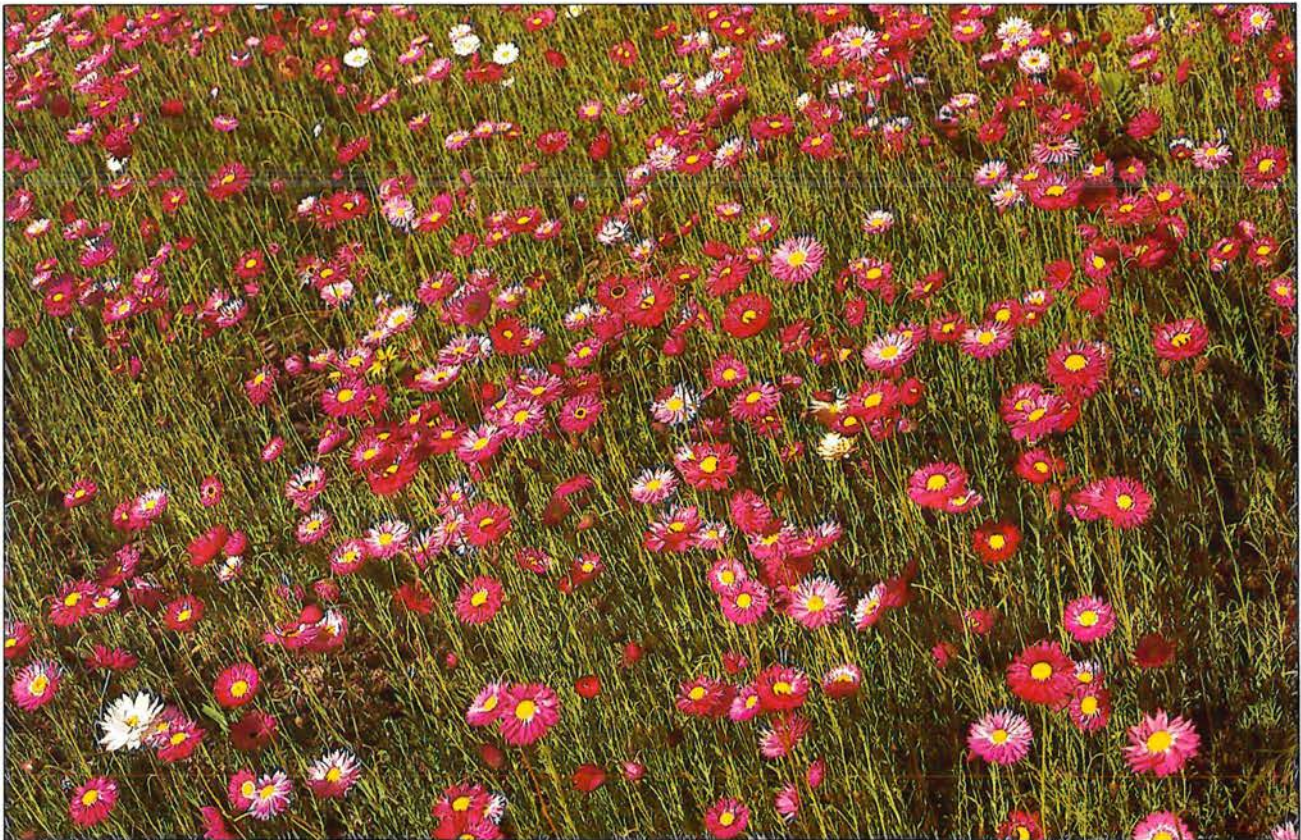
Plants grown from seed normally take 2 years to flower, whereas plants grown from cuttings can flower in a few months. The Orange Morrison requires a full sun, but not exposed position, a slightly acid, preferably sandy free draining soil.

Generally plants do not require pruning, however removal of the flowering stems for cut flowers will not harm the plant but smaller flower heads will be produced next season. Fertilisers are not really necessary, however, plants will respond well to a light application of general slow release fertiliser.

Plants seem to suffer little from pests and diseases, however, they are susceptible to a fungus disease which attacks the flower heads, this will not normally spoil the flowers on the plant, although if you pick them they will fall off during the drying process.

The Orange Morrison is widely picked as a cut flower dried and exported. Most flowers are harvested from large natural stands in the bush. Unfortunately at this stage it seems to be uneconomic to grow them as a cut flower. If you wish to dry the flowers yourself, cut the flowers when they are semi mature and hang them upside down in a dry airy position for a few weeks. The flowers retain their colour fairly well and will last 1 or 2 years. Fresh flowers treated with glycerine will last much longer and are not so brittle.

COMMON EVERLASTING



A massed display of Common Everlastings in Kings Park. (Photo P.R. Wycherley).

Helipterum roseum is known locally as the Common Everlasting as plants are frequently cultivated in public and private gardens. It is also occasionally known as the Rosy Sunray. This plant belongs to the Daisy Family Asteraceae and is therefore closely related to all the other genera we know collectively as Everlastings eg: *Helichrysum* and *Waitzia*, it is also related to the Daisy Bushes *Olearia*, as well as the Swan River Daisy *Brachycome iberidifolia*.

Helipterum roseum was originally described as *Acroclinium roseum* in 1854. James Drummond, Naturalist and a prolific botanical collector in Western Australia, sent in 1853 a pressed specimen together with seed collected from between the Moore and Murchison Rivers to William Hooker, the Director of the Royal Botanical Gardens at Kew, England. Hooker described the plant and grew the seed in the Botanical Gardens where it flowered the following summer. In 1867 George Bentham in "Flora Australensis" included this plant under *Helipterum*.

The genus *Helipterum*, from the Greek *helios* sun and *pteron* wing, occurs in South Africa and Australia. *Helipterum roseum* has been a popular garden subject since the early part of this century when selected large flowered forms were grown along with *H. manglesit*. The common name "Everlasting" derives from the persistence of blooms once cut and dried.

Helipterum roseum is distributed over a wide area of the state, Grieve and Blackall list it as occurring naturally in

the Austin, Avon, Coolgardie, Irwin and Stirling Botanical Districts and *H. roseum* variety *nigropapposum* from the Darling District. It can be found fairly close to Perth near the Hill River and also Morawa.

Plants grow normally in free draining loamy sands, generally in very open shrubland, often the whole area is blanketed with a sea of white or pink flowers. The main flowering period is from August to November, flower colour is usually a shade of pink or white, however, in cultivation this varies to a very deep pink. The centre of the flower may be white or black and size varies from 2 to 5cm across. Height of the plant varies from 12 to 40cm, this may be a genetic variation or in dry seasons the normally larger plants may be only a few centimetres high but still able to produce a few viable seed.

Helipterum roseum like most of our everlastings is an annual plant, that is, it completes its life cycle in less than one year. Normally germinating in the autumn with the first heavy rains and cool nights the seedlings quickly grow, flower, produce their seed and then die. Many of the everlastings in their natural habitat are attacked by caterpillars which eat out the centre of the flower. These flowers do not look badly damaged, however, the developing seed is eaten. The caterpillars are eaten by birds and therefore are an important link in their food chain, as so many everlastings are produced this does not threaten the survival of the species.



Before the centre lifts, is the right time to pick this everlasting for drying.
(Photo I.R. Dixon).

PROPAGATION

Seed

Sow the seed in April to mid May, later sowing usually results in shorter flower stalks. First prepare the areas, that is, remove weeds or turn over the soil, rake the soil level to prepare the seed bed. Sow the seed by broadcasting. This is best done on a calm day otherwise the seed may blow away. For more even and thinner sowing on larger areas you can mix the seed with 4 parts sawdust. Now lightly rake in the seed or scatter a thin layer of soil on top of it.

To reduce your weed problems you can use the stale seedbed technique, that is, prepare your seed bed as described, do not sow any seed, water the area thoroughly. The weeds will germinate after a few days, whilst the weeds are small lightly hoe the surface of the soil, deep hoeing will only bring more weed seeds to the surface. Leave the weeds a few days to make sure they die. Now sow your seed as described. This method reduces the number of weeds which will compete with the everlastings.

The seedlings must be kept moist, which may mean regular watering until the onset of the heavy rains. An alternative method of sowing when seed is in short supply, is to sow the seed in a pot or seed tray, then prick out (transplant) the seedlings into small pots or tubes. The seedlings should be planted out when 3 to 4cm high, do not allow them to become pot bound or spindley. It may be necessary to pinch out the growing tip of the seedlings to make them bushy.

CULTIVATION

A general fertiliser can be used at sowing time or after germination, plants respond well to fertiliser, however, do not use general fertilisers amongst other delicate native plants eg. *Banksia*. Too much fertiliser applied to everlastings will cause lush growth, which makes them more susceptible to wind and rain damage and pest attack. Thickly sown seed produces many plants with a few flowers on each plant, whereas plants with adequate room to develop will be bushy with many flowerheads.

Weeds are difficult to remove by hand without treading on the everlastings and when you remove them you often pull up the everlastings with the weeds root system. Some control of grasses can be achieved by spraying with a post emergent weedkiller containing propyzamide, this is generally sold as a wintergrass killer for lawns, large quantities are sold under the brand name kerb. Spray over the everlastings when they are about 10cm high, this kills the grass seedlings which are already growing, they turn yellow and die, it also has some residual effect in the soil killing seedlings which germinate at a later date.

The main pests are slugs and snails which eat the young seedlings and older plants. They are easily controlled by the use of snail pellets or sprays, however, most sprays only last a few days. Occasionally aphid (greenfly) attack the plants just as the flower bud is developing, usually they are not a problem as many are washed off by rain or controlled by parasitic wasp larvae.

QUEEN OF SHEBA



Close up of the distinctive 'column' found in all sun orchids. (Photo R. Peakall).

The Queen of Sheba Orchid *Thelymitra variegata* is considered by many to be one of the most striking orchids found in Western Australia. Its common name attests to the great beauty of the flowers while the specific name *variegata* refers to its particoloured blooms.

Thelymitra belongs to the family Orchidaceae and is therefore related to the better known exotic orchids eg. *Cymbidium* which are popular pot plants.

Originally named *Macdonaldia variegatae* by John Lindley in 1840 this genus name commemorates Mrs Smith nee Macdonald whose collections of orchid plants were sent to Lindley. In 1865 Ferdinand von Mueller included this plant in the widespread genus *Thelymitra*.

Unlike the other 20 species of Western Australian Sun Orchids, so named because the flowers open only on warm sunny days, *Thelymitra variegata* is variable in flower colour over its distribution range from Eneabba in the north to Israelite Bay in the south.

The most common form has outer petals, crimson with gold borders and purple-blue inner petals. All are streaked and dotted in darker tones, the intensity

and degree varying between locations. Some plants have two toned flowers, outer segments yellow contrasting with blue inner petals.

Up to 5 blooms are produced on a stout 15-25cm tall stem from June till September. The distinctive narrow leaf is usually spirally twisted around the flowering stem and is often rather difficult to see.

Queen of Sheba and indeed all *Thelymitra* possess nearly equal flower segments. The familiar and often elaborate lip or labellum found in most orchids has been modified in sun orchids to resemble just another petal. Uniform segments no doubt enable the unique feature of the sun orchids, the daily rhythm of opening and closing of the flowers, to proceed. In order to open a sun orchid bloom it needs only to be placed in a sunny window or near an electric fan heater on a low setting. Blooms open in 15-20 minutes following these treatments.

HABITAT

Plants occur singly, often in low heath or open woodland. They prefer free draining sandy soils with a low organic content and little surface litter. An early flowering variety *T. variegata* var *apiculata* is quite



Unlike the later flowering form, *Thelymitra variegata* var. *apiculata* flowers July-August in gravelly soils north of Perth. (Photo R. Peakall).

different in preferring heavy laterite soils especially around breakaways. With up to a dozen flowers open at a time this plant makes a worthy addition to the Queen of Sheba cohort.

CULTIVATION

While unfortunately at present virtually unobtainable except from wild sources, this plant adapts well to pot culture. Any free draining quartzite sandy soil will do. Pots should be kept moist during the winter and spring gradually drying out as summer approaches. Dormant plants should be kept dry and shaded throughout the summer.

Repotting is done when plants are dormant in December to March. Drainage should be used and tubers buried, eye-up, about 25mm deep. A suitable mix consists of white sand to which is added 5 parts mulch fines or compost. Approximately one quarter of old mix should be included into the new mix. This will ensure a healthy supply of fungal symbionts to the resprouting plants. Fertilizing is not necessary although a light top dressing of bush ash at the start of each season is beneficial, but should be done judiciously to prevent excess growth of moss.

PROPAGATION

Queen of Sheba rarely propagates by vegetative means. Seed sprinkled around an adult plant and lightly covered with saw dust or chopped leaf mulch may produce a few seedlings. However, seedlings are very small in their first year and readily fall prey to pests such as slugs and snails. Once dormant seedling tubers can be repotted. However, plants allowed to cluster do far better and produce a more attractive display than solitary plants.

Sterile seed culture involving nutrient agar is the best way of producing large numbers of plants. This is not a complex task but requires sterile facilities, chemicals and a temperature controlled incubation area.

Kings Park and Botanic Gardens is currently researching 'user friendly' methods of seed propagation. One method uses the beneficial fungus associated with adult plants to promote germination and seedling growth using trays of finely ground mulch. Plants produced in this way reach maturity quicker than by completely sterile methods.

BIRD POLLINATED PLANTS



The Fuchsia Grevillea, *Grevillea bipinnatifida* encourages birds into the garden providing them with a year round supply of nectar. (Photo I.R. Dixon).

Introduction

We are fortunate in Perth in having a predominantly native bird population. Free of the hordes of starlings and sparrows imported into Eastern Australia, our native birds still frequent the parks and gardens within the city centre. Over the years native birds have learnt to cope with their new environment of skyscrapers and exotic plants, many of which have provided a new nectar source especially the bird pollinated plants introduced from South Africa.

With the clearing of large tracts of bushland our mainly nomadic honeyeaters or nectar feeding birds, which follow the flowering seasons of plants, are finding it increasingly difficult to survive in their natural environment. By planting more predominantly bird pollinated native plants in our gardens, along freeways and highways we can help to improve their environment and ensure their survival.

ATTRACTING BIRDS INTO OUR GARDEN

To attract birds into your garden, as well as providing a continuous supply of food, you will require a dense cover of plants to protect the birds from such predators as birds of prey and cats, and to provide shelter and a quiet atmosphere. Dense cover as well as old trees with holes in their trunks or limbs will help to provide nesting sites. A mixture of tall trees, large and small shrubs as well as ground covers will provide different levels at which the birds can feed, it will also make your garden look more attractive and encouraging a wider variety of insects.

Although certain species of birds can be encouraged into the garden by regular feeding eg. Magpies and Kookaburras, this is not a good idea as these birds generally deter small birds from coming into your garden or may drive them out.



Grevillea eriostachya the Flame Grevillea with nectar glistening in the sunlight.
(Photo K.W. Dixon).

Many of our native birds especially the honeyeaters are nomadic and follow the flowering seasons of plants, therefore, it may be difficult to keep these birds in your garden all year. In areas such as Kings Park botanic garden it has been found that many honey-eaters will stay throughout the year. Several forest birds which do not occur in home gardens or Kings Park bushland can be found in the botanic garden and this may be due to the wide variety of plant species providing a year round food source for the birds.

LANDSCAPING

Landscaping with the intention of introducing native birds into the garden, primarily honeyeaters or nectar feeding birds, is a fairly easy task as our native flora in temperate Western Australia contains over 600 species of predom-

antly bird pollinated plants. It is therefore possible to choose a selection of plants which give a continuous supply of nectar throughout the year. These plants will in turn encourage many types of insects into your garden which will supplement the birds' diet.

There are basic principles to adhere to in landscape design eg. you do not plant large trees close to buildings, under power lines or use trees with strong root systems over drains. Once you have applied these basic principles it is important to remember that, beauty is in the eyes of the beholder. If your design suits your means then all well and good, however, two books worth consulting are, *Landscaping with Australian Plants* and *Australian Native Gardens and Birds*. There is always a suitable plant for any position in the garden. Whilst it may be difficult to obtain some of this information from publications there are always the



Billardiera erubescens the Red Billardiera a climbing plant with tubular flowers. (Photo F.W. Humphreys).

living examples in the Kings Park Botanic Garden and in the garden surrounding the State Herbarium, George Street, South Perth.

WHAT THE BIRDS EAT

Many of the birds in our gardens have a wide ranging diet and to conserve energy will eat the most readily available source of food. This is demonstrated particularly by the Silver-eye which adjusts its foraging behaviour to take advantage of the most abundant food item. Honeyeaters feed mainly on nectar but will supplement their diet with manna, a sugary fluid exuded from damaged plant material which later crystalizes and honeydew, the sugary secretions of nymphal stages of aphids (greenfly), coccids (scale insects, mealy bugs) and psyllids (lerps). They also consume a fairly large range of insects which include ants, flies, bees, beetles, bugs, wasps, weevils, spiders, scale insects, caterpillars and moths.

Although the honeyeaters forage for insects as a source of protein, they fulfill their demands for energy from nectar alone.

WHAT PLANTS TO USE

Use drought tolerant species as drier gardens require less maintenance in the summer than those which are blanket watered. However, many homes are now equipped with their own bores and regularly water native plants. Generally these gardens have a lush appearance and a more cooling effect during the summer period.

The choice of plants readily available in nurseries is wide, although you may have to shop around to get what you require. Of course raising your own from seed is economical and easy.

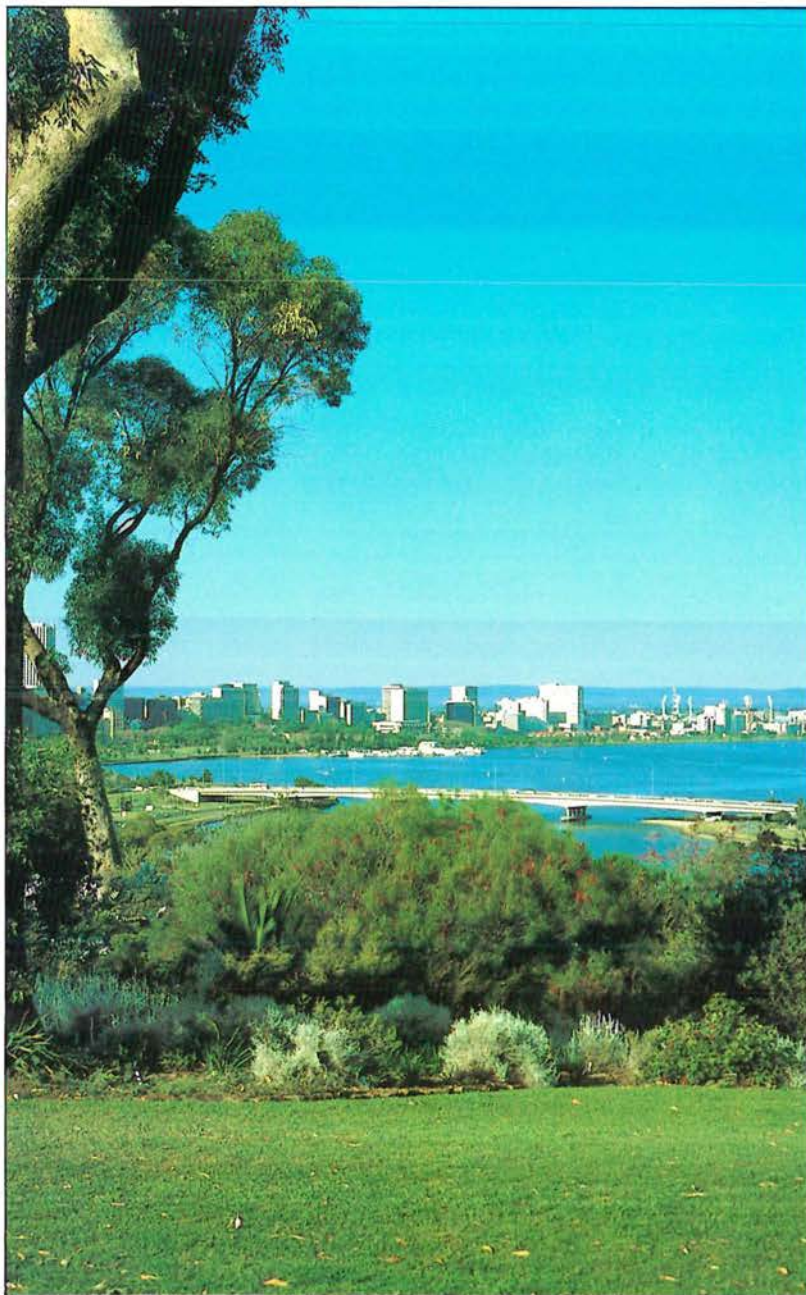


Darwinia meeboldii the Cranbrook Bell with spectacular pendulous flowers.
(Photo F.W. Humphreys).

It is generally recognised that red coloured flowers are most favoured by birds, however, many other colours are commonly visited including some dull coloured and concealed flowers. The three main flower colour groups attracting bird pollinators in Western Australia are red (274 species) white (148 species) and yellow (132 species). The most significant plant groups pollinated by birds include Myrtaceae eg. *Eucalyptus*, *Melaleuca* and *Calothamnus*; Proteaceae eg. *Adenanthos*, *Banksia* and *Dryandra*; Myoporaceae eg. *Eremophila*; Epacridaceae eg. *Astroloma*; Fabaceae eg. *Brachysema* and *Kennedia*; Loranthaceae eg. *Amyema* and *Nuytsia*; Rutaceae eg. *Diplolaena* and Haemodraceae eg. *Anigozanthos*.

A few bird pollinated species readily available in nurseries include Kangaroo Paws which are totally adapted to bird pollination eg. *Anigo-*

zanthos flavidus, *A. manglesii*, and *Macropidia fuliginosa*. One Sided Bottlebrush — they produce copious amounts of nectar and most flower over a long period, eg. *Calothamnus quadrididus*, *C. sanguinius*. A few of the Running Postman or Coral Peas eg. *Kennedia beckxiana*, *K. nigricans*. Poverty Bushes eg. *Eremophila maculata*, *E. laanii* and *E. denticulata*. Many Banksia eg. *B. baxteri*, *B. menziesii*, and Parrot Bush eg. *Dryandra formosa* and *D. praemorsa*. Most Eucalypts eg. *Eucalyptus calophylla*, *E. erythrocorys* and *E. macrocarpa*. Several of the Grevillea eg. Spider Net Grevillea, *G. thelemanniana*, Fuchsia Grevillea, *G. bipinnatifida* and *Hakea* eg. Red Pokers, *Hakea bucculenta*, Black Beak Hakea, *Hakea orthorrhunca* and the Pincushion Hakea, *H. laurina*. Another large group with many predominantly bird pollinated plants is *Melaleuca* eg. Scarlet Honeymyrtle, *M. fulgens*, Granite Rock Honeymyrtle, *M. elliptica* and *Melaleuca coccinea*.



City of Perth viewed from Kings Park Botanic Garden. (Photo E. Bennett).

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Illyarrie
(*Eucalyptus erythrocorys*)

(*Eucalyptus erythrocorys*) main area of distribution is from south of Greenhead to north of Dongara where the plants grow on limestone soils. It is a many stemmed (trunked) tree up to 10m high with whitish bark.

The bright red bud caps of the flowers contrast well with the outstanding 5 to 6cm flowers. Flowering is generally from February to April, however, in cultivation trees often flower until May.