GARDEN NATURE TRAIL

for students

Western Australian Herbarium

WELCOME

Welcome to the native plant garden of the Western Australian Herbarium. The Herbarium is a building in which is stored a collection of approximately 250,000 dried, mounted and labelled plant specimens. These specimens form the data base for botanists to study the State's 8,000 described species of wildflowers. The majority of plants in the garden are native to Western Australia, with a few species from other States. We now have well over 1,000 different native plant species, spread throughout 2.4 hectares. These plants originate from many parts of the State and show a great diversity in form, colour and growth requirements.

Man, like all animals, is dependent on green plants for his very existence. Plants are primary producers, converting the sun's energy into food through a process known as photosynthesis.

Like other green plants, flowering plants also provide oxygen (a byproduct of photosynthesis) so that all living organisms can respire. Flowering plants are thus essential in the web of life and are the most dominant plant group on earth today.

Flowering plants provide us with medicines, drugs, herbs, fruit, vegetables and other food. A knowledge of flowering plants is essential if we are going to provide enough food for all the people of the world, prevent native plants and animals from becoming extinct, develop new drugs for medical science, control air pollution and make our environment an attractive place in which to live.

HISTORY

Prior to 1978 the garden surrounding the Herbarium consisted of pine trees, lawns and flower beds. Considering this to be an inappropriate setting for a department involved in research into the State's flora, several staff members in conjunction with Mrs. Marion Blackwell, a landscape architect, drew up a plan for a native garden. The three main objectives were to:

1) exhibit living native plants for public education and enjoyment;

2) provide living specimens for taxonomic and other botanical research; and

3) form an appropriate and pleasant setting for the W.A. Herbarium where work is primarily on the native flora.

Following the removal of pine trees, sub-contractors proceeded with the initial earthworks, creating a pleasantly undulating landscape. Paths consisting of Jarrah rounds, or gravel mixed with coloured cement were then laid. The Jarrah rounds were removed in 1985 and replaced by slab paths.

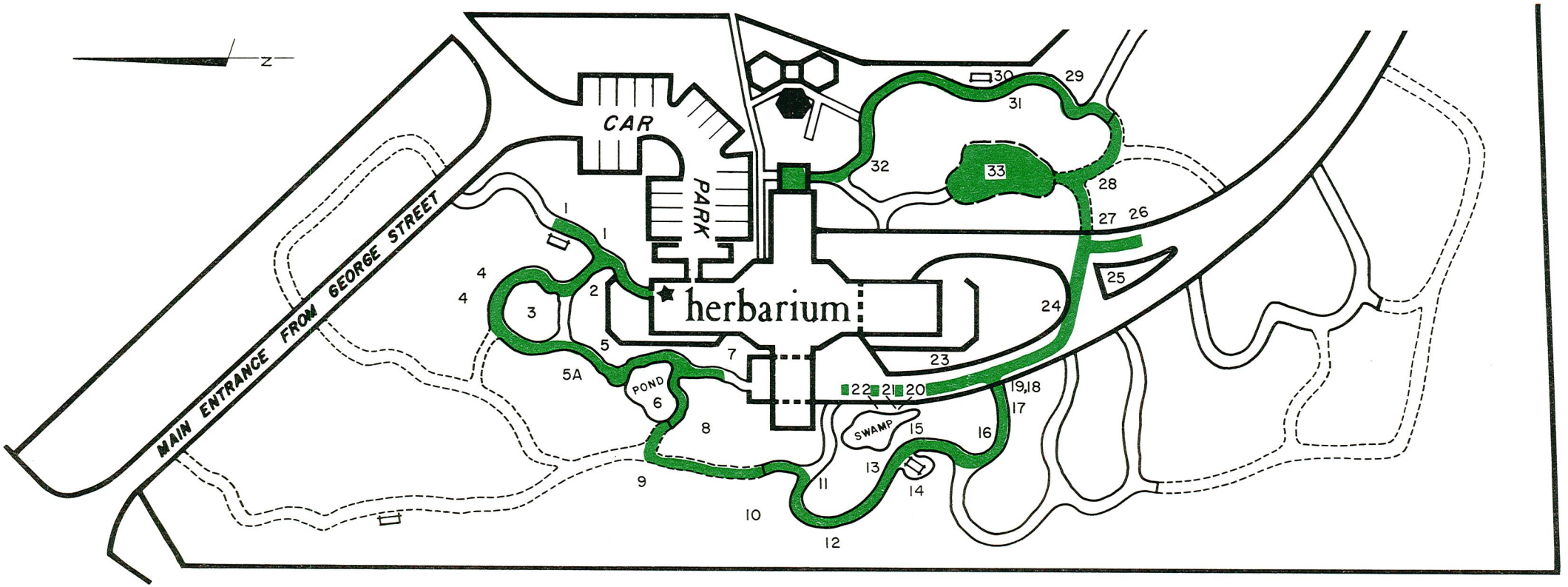
During early 1979 the first plantings were made in the Banksia bed, and since then the garden has grown dramatically.

HOW TO FOLLOW THE NATURE TRAIL

A detailed map and index can be found on the following page. Match up the points of interest on the map with those in the trail guide and in the garden. All the plants have name tags and this will lead you on a botanical exploration of our garden. Remember, not all plants in the garden are included in the trail guide but you can discover information on many of them in your library.

Please stay on the paths and do not pick or damage the plants, some of which are used for scientific research.

The native plant garden provides food and shelter for many animals. Guides to the common insects, reptiles, amphibians and birds seen in the garden can be found on pages 24-28.



HERBARIUM GARDEN

1. Banksia family:

There are 73 species of Banksia found in Australia, of which 58 occur in Western Australia. Banksia dentata is the only species found in the tropics.

Banksia species were once known as Native Honeysuckles because their flowers attracted nectar feeding birds and animals.

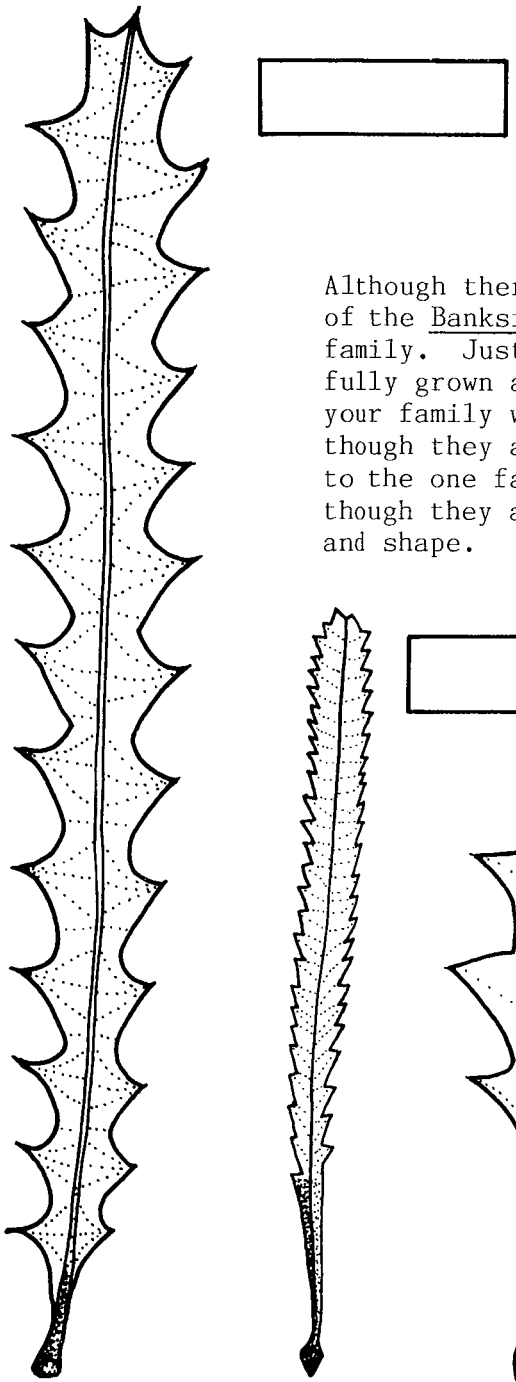
Described below are three Banksia species for you to find and examine, paying particular attention to the texture, size and colour variation of the leaves at different stages of growth, on each plant.

a) Banksia ashbyi: Ashby's Banksia

This Banksia grows up to 8 metres high and is very bushy, with bright orange flowers which can be seen in the winter months. It occurs north of Carnarvon around the Kennedy Range and Cape Range.

b) Banksia attenuata: Slender Banksia

This Banksia grows slowly and it takes up to 10 years to flower. Its size varies between 2 metres and 10 metres high according to its environment. It has bright yellow flowers which can be seen from October to February. It occurs mainly on coastal areas from Kalbarri to the Fitzgerald River, growing in heath, shrubland and woodland.



c) Banksia aculeata:

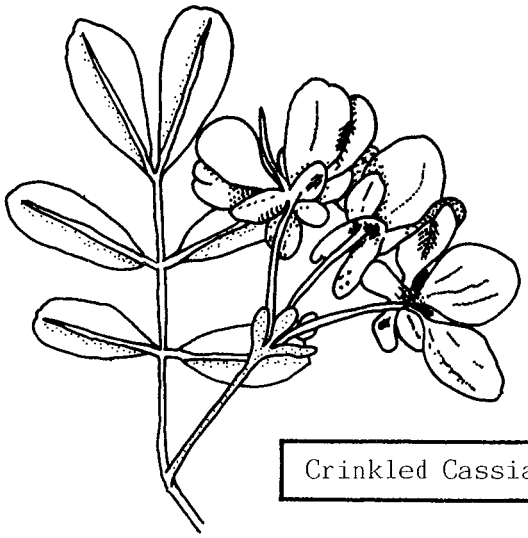
This is one of the smaller Banksia species growing up to 2 metres high, with many branches. The flowers are pink and cream and can be seen during February and March. It is only found in shrubland of the Stirling Range.

Although there is a big difference in the shape and size of the Banksia species, they all belong to the same family. Just imagine someone in your own family who is fully grown and tall, now compare them to someone in your family who is fully grown yet only small. Even though they are so different in size, they still belong to the one family. So too do the Banksia species, even though they are so different from each other in size and shape.

Exercise:

Match the leaves shown with their correct name:

a) Banksia ashbyi
b) Banksia attenuata
c) Banksia aculeata



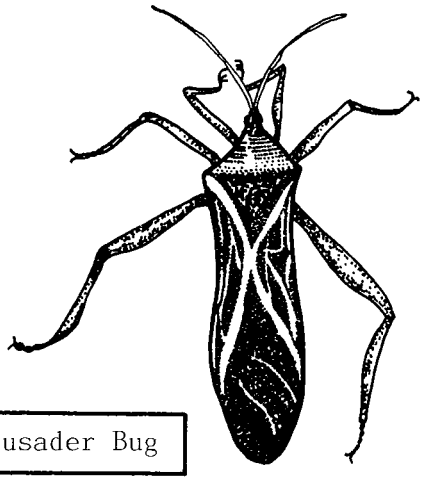
Crinkled Cassia

2. Cassia helmsii: Crinkled Cassia

This Cassia is a native of Central Australia and grows to a height of 1-2 metres. It is usually a rounded or flat topped shrub with bright yellow flowers throughout most of the year. The leaves and branches are covered in a dense layer of white to grey hairs, giving this shrub its silvery appearance.

2. Mictis profana: Crusader Bug

Spot this bug from the picture shown. They like to feed on the tips of bushes and shrubs and are partial to Cassia helmsii. Their feeding activities on Cassia result in the death of new growth. If you disturb them they let out a foul smelling fluid.



Crusader Bug

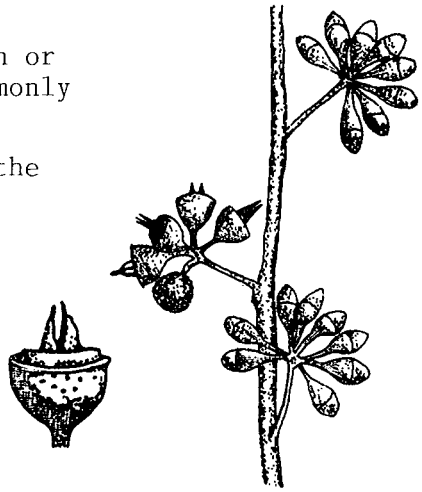
3. Eucalyptus salmonophloia: Salmon Gum

Salmon Gums are one of the largest trees of Western Australia. They grow up to great heights, some reaching 24 metres. The trunk of the tree is only about one third of its height, whilst the crown is large in an umbrella shape and the foliage is sparse. It usually flowers during the summer months and its blossoms are a great attraction for birds and bees. Hollow trunks also make suitable hives for the introduced honey bees and galahs.

The common name Salmon Gum refers to the salmon or pinkish-brown coloured bark, which is more commonly seen at the end of summer.

It occurs mainly throughout the wheatbelt and the eastern goldfields of Western Australia.

The tree found growing in the middle of the summer flowering bed is not fully grown.



fruit

Salmon Gum

4. Casuarina cunninghamii: River Sheoak

cone

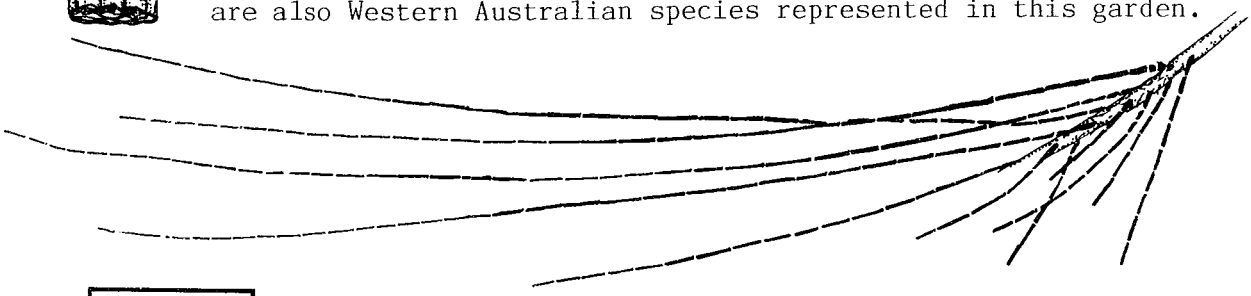
true leaves

This tree is delicate and graceful in appearance but it is a very hardy tree and it is often planted to prevent erosion. It has a massive trunk and is the largest Casuarina. The wood is valuable timber and pioneers used it for making roof shingles.

The foliage of the Casuarina is in fact not leaves but jointed branchlets modified to collect solar energy for food production. The true leaves are reduced to many-toothed sheaths, resembling a crown, surrounding the nodes of the branchlet.

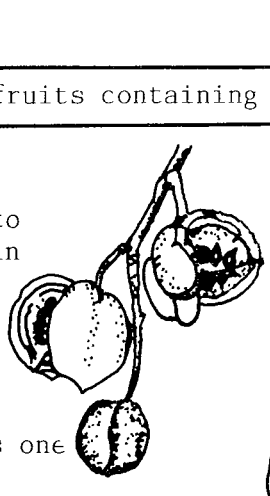
On a windy day River Sheoak has a unique crying sound.

Although this species is a native of Eastern Australia, there are also Western Australian species represented in this garden.



branchlet

5. Pittosporum phylliraeoides: Weeping Tree

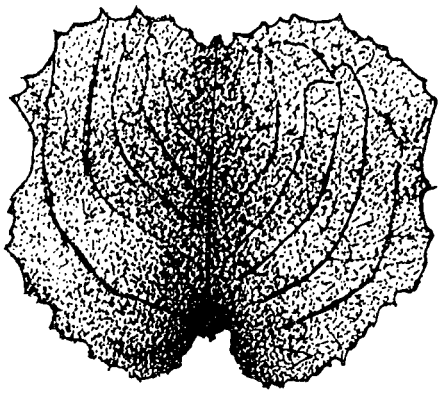


fruits containing seeds

A small bright green foliaged tree which grows to 8 metres high, with a weeping habit. It grows in most habitats though it is usually found along watercourses in various soils and is widespread throughout Australia. It bears orange coloured fruit, round in shape, which contain colourful red seeds. The seeds are extremely sticky and adhere to the birds who visit the tree. This is one of the ways that the seeds may be distributed.

The Weeping Tree is lovely to have in the home garden for it grows quickly and easily but does produce numerous root suckers.

Weeping Tree



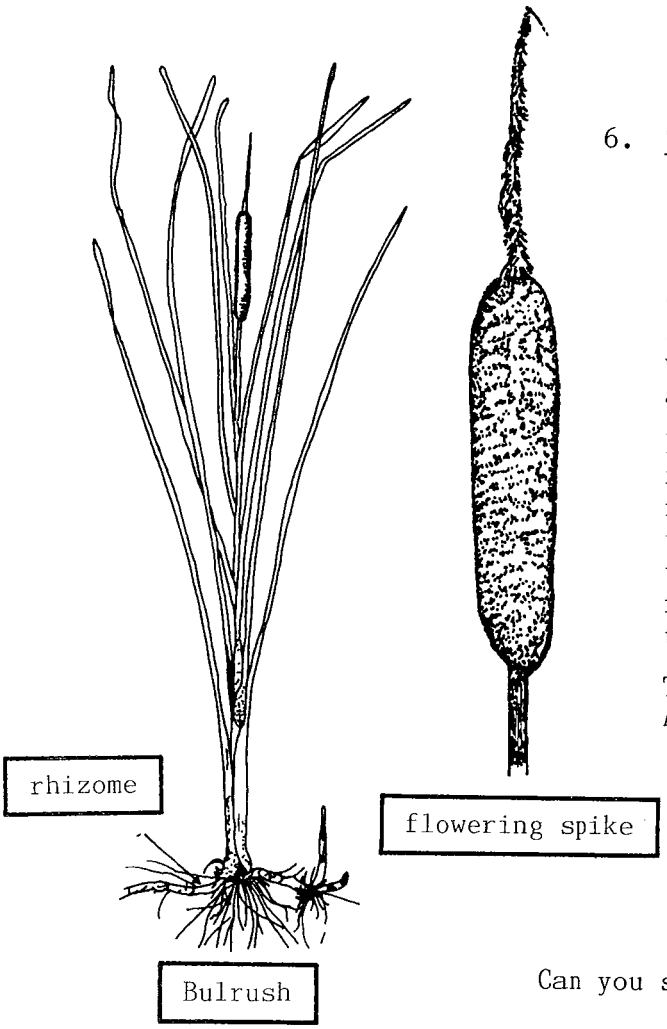
Royal Hakea leaf

5A. Hakea victoria: Royal Hakea

This plant can be found opposite the pathway to the Weeping Tree. It has especially attractive foliage which in the field, goes through a series of colour changes ranging from apple-green to rich red and purple. Its flowers are creamy-white and appear in clusters at the base of the leaves during winter.

Royal Hakea is the only native, naturally variegated plant.

It occurs in gravel sandstone along the southcoast from Bremer Bay to Israelite Bay.



THE POND

6. Typha orientalis: Yanget (Bulrush)

A robust rhizomatous or underground stemmed plant with thick spongy grass-like leaves, which usually form clumps or dense stands in areas of slow flowing fresh water (swamps). The depth of water is critical and must not exceed a depth of 1.5 metres for long periods.

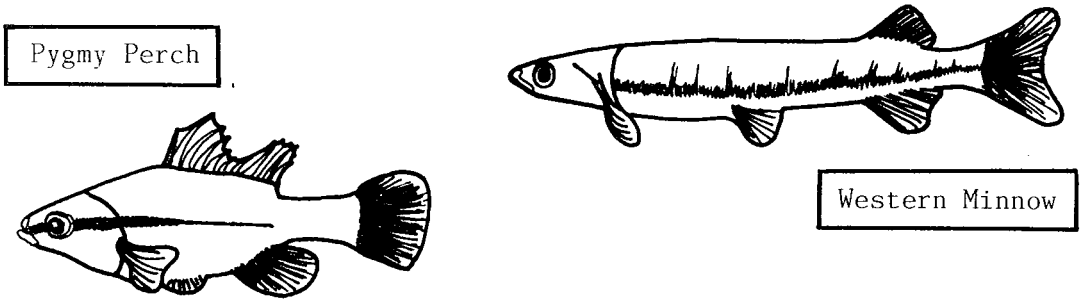
In early summer each stem produces flowering heads which may reach 2 metres in height. The flowers are divided into two parts, the upper cluster male, and the lower cluster female. Pollination is carried out with the assistance of the wind.

This species occurs throughout temperate Australia.

Bulrushes form an area where dragon fly nymphs can emerge from the water. In early summer you can see dragon flies skimming over the surface of the pond.

Can you see two different coloured dragon flies?

In the pond we have two types of native fish, Galaxiella occidentalis (Western Minnow) and Edelia vittata (Pygmy Perch). They eat the small crustaceans and insect larvae, both of which are plentiful in the pond. You would find these fish in creeks and streams or isolated pools. Aquatic plants are plentiful in creeks and streams, especially algal blooms in the summer months. Pygmy Perch and Western Minnow come from a creek environment and are therefore well adapted to living in our pond.



(actual size)

7. Eucalyptus caesia: Silver Princess or Caesia

Silver Princess is a most attractive tree that grows to a height of 8 metres with white powdery branches that hang down and bear bright red to pink flowers during later winter to early spring. It is mainly restricted to a few isolated granite outcrops in the wheatbelt.

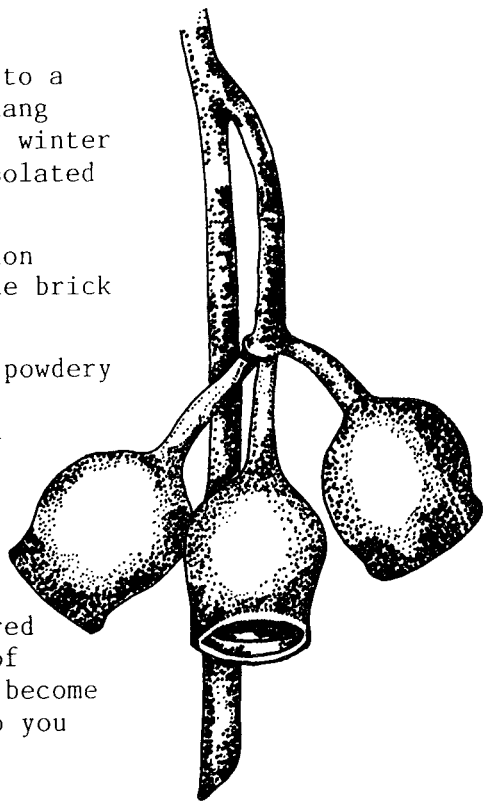
This tree has grown to its full potential in a location which is similar to that of a granite outcrop i.e. the brick wall surrounding the tree absorbs and reflects heat.

The name caesia means "bluish-grey" referring to the powdery appearance of the young branches, leaves and buds.

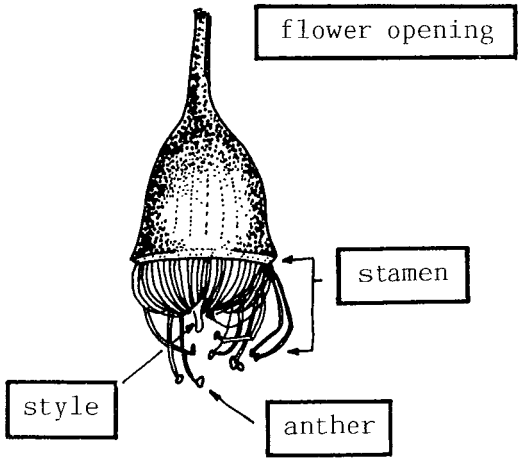
There are two forms of this spectacular tree, both of which can be found in the garden. The form you are looking at is commonly known as Silver Princess. It differs from the other form commonly known as Caesia by having larger fruits.

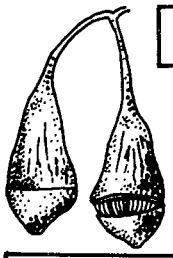
In the garden there are a number of rare and endangered plants and unfortunately this beautiful tree is one of those. It would be sad to see this species die out (become extinct). You can help stop this from happening. Do you know how?

Compare the fruits of Silver Princess with Caesia .



fruits or gumnuts



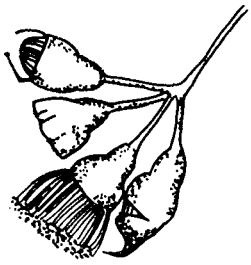


8. Eucalyptus sepulcralis: Weeping Gum

This is a most unusual tree with slender, drooping branches. Both the branches and the trunk are clothed by a smooth, white, powdery bark. It is a small tree growing up to 8 metres high. The fruits are large and urn-shaped. The flowers are yellow and occur in summer.

During the hottest part of the day the leaves of Eucalyptus trees hang vertically, exposing as little surface area to the sun as possible. Some have the ability to rotate their leaves slightly. This is a method of preventing water loss.

This rare plant occurs only in small areas southwards from Ravensthorpe in Western Australia.



flowers in different stages of opening

9. Eucalyptus macrocarpa: Mottlecah

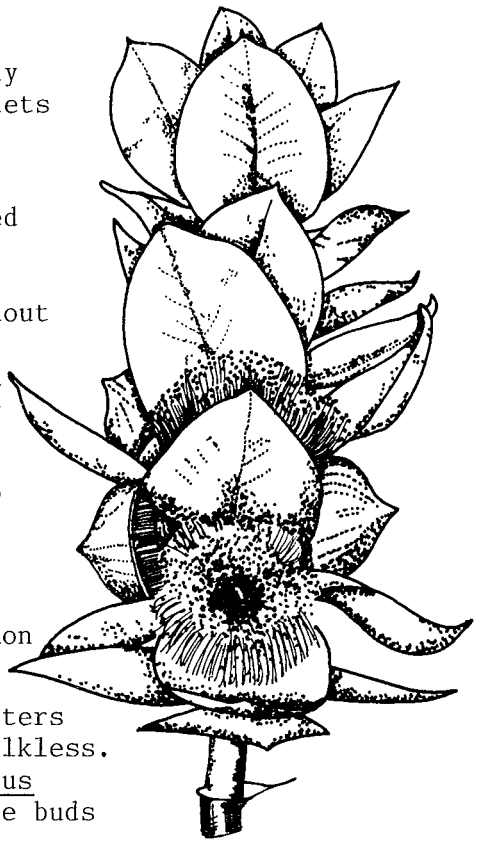
Mottlecah is a multistemmed mallee with a straggly and very sprawling appearance. Its young branchlets and foliage are covered with a silvery-grey wax which protects the plant from solar radiation.

The spectacular crimson flowers with golden-tipped anthers are amongst the largest of all the Eucalyptus trees - the name macrocarpa means "large-fruited". They flower at any time throughout the year but mainly from June to October. Unfortunately the leaves of this mallee are often attacked by insects. Can you see the damage they have done to this plant?

It occurs from Geraldton to Pingelly and can also be found growing in the heaths north and east to Perth.

Eucalyptus macrocarpa was known as 'Mottlecah' by the aborigines and today this is its adopted common name.

Many flower buds of Eucalyptus trees grow in clusters but the buds of this tree grow singly and are stalkless. Compare your diagram with those of other Eucalyptus trees illustrated. How many can you find with the buds growing singly?



branchlet showing flowers and leaves

Rottnest Island Tea-tree

10. Melaleuca lanceolata: Rottnest Island Tea-tree

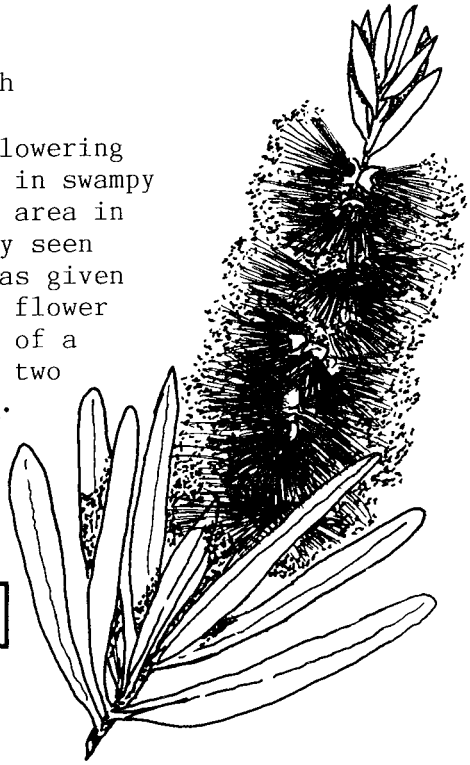
Commonly known as the Rottnest Island Tea-tree where many of these trees grow. They are found in all States of Australia except the Northern Territory and Tasmania.

This tree grows on a wide range of soil types and can be a shrub, or a small tree reaching a height of 3 metres. Flowering is from April to September with a brilliant show of white flowers at the ends of the branchlets.

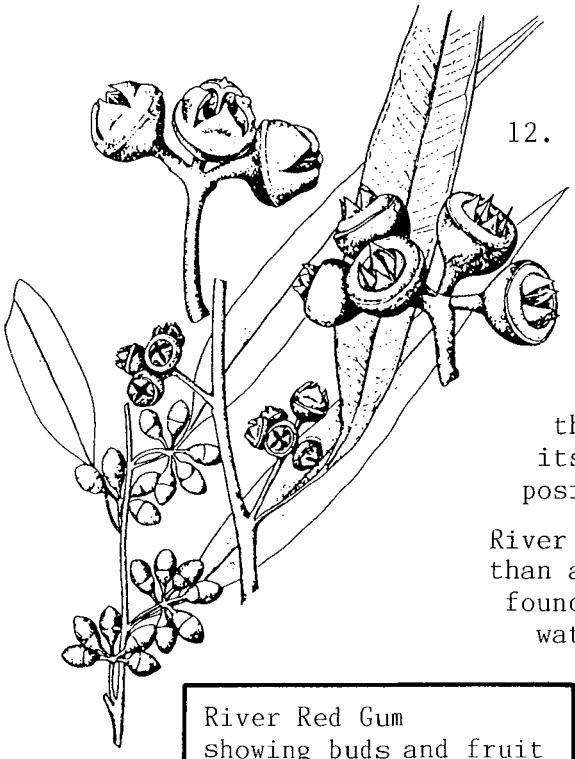
The botanical name Melaleuca comes from the Greek "melas" meaning black and "leukos" meaning white. It has been suggested that the first Melaleuca discovered had white branches and a black trunk, perhaps the after effects of a fire.

11. Callistemon speciosus: Albany Bottlebrush

This bottlebrush is one of the many red-flowering Callistemon species. It is found growing in swampy areas from Albany to the Collie-Busselton area in Western Australia. The flowers are mainly seen during October and November. The plant was given the common name 'Bottlebrush' because the flower arrangement looks similar to the bristles of a bottle-cleaning brush. It is one of only two Western Australian species of Callistemon.



bottlebrush flowerhead



River Red Gum
showing buds and fruit

12. Eucalyptus camaldulensis: River Red Gum

Do you know why this Eucalyptus tree is growing in such an unusual way?

The Peppermint Tree was planted and established before the Eucalyptus tree and because most plants rely on the sun as a vital part of their life-source, the Eucalyptus tree has had to fight for its survival by growing away from the shady position to reach the rays of the sun.

River Red Gum has a wider natural distribution than any other eucalypt in Australia as it is found in all mainland States growing along watercourses.

13. Banksia littoralis var. littoralis: Swamp Banksia

Banksia littoralis grows best in swampy areas. The trunk can twist in all directions when growing, giving the tree its very own character. They grow to 12 metres high and are found on coastal areas north of Perth down to Albany.

Most of the Banksia family are fire tolerant trees and remain growing after a bushfire. Have you been in the bush after a fire? What tree is one of the first to produce new leaves?

fruiting cone

14. Agonis flexuosa: Peppermint Tree

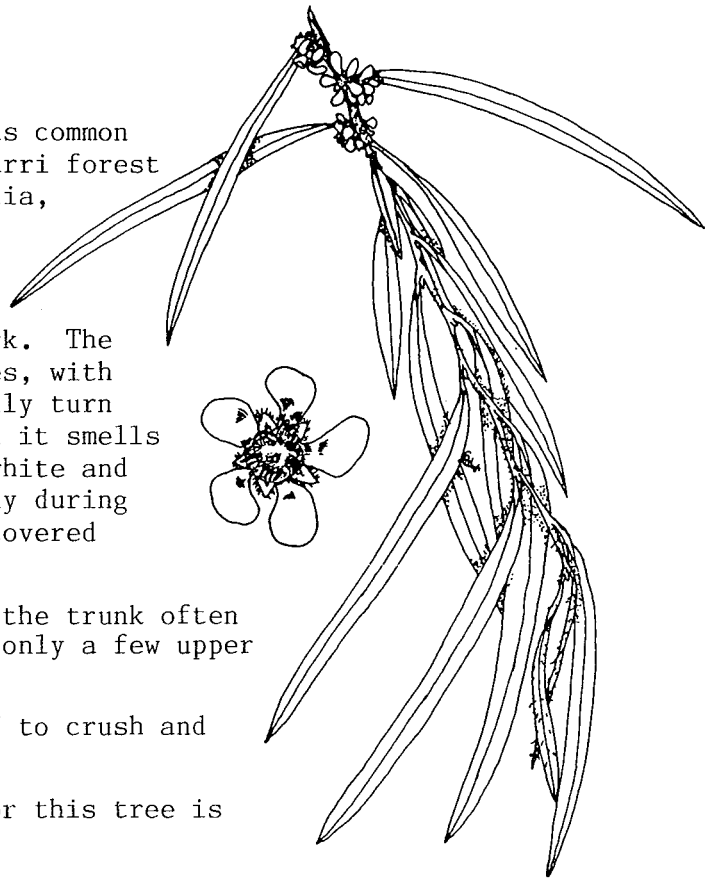
This is the Peppermint Tree which is common throughout the wetter Jarrah and Karri forest country of southern Western Australia, as well as the Swan Coastal Plain where Perth is situated.

The trunk and branches are grey or dark brown with rough, furrowed bark. The leaves are shiny in the early stages, with bronzy red new growth, but eventually turn dark green. When a leaf is crushed it smells like peppermint. The flowers are white and small, but because there are so many during spring, the branches appear to be covered with tiny white stars.

This tree lives to a great age but the trunk often becomes very thick and gnarled and only a few upper branches remain on the tree.

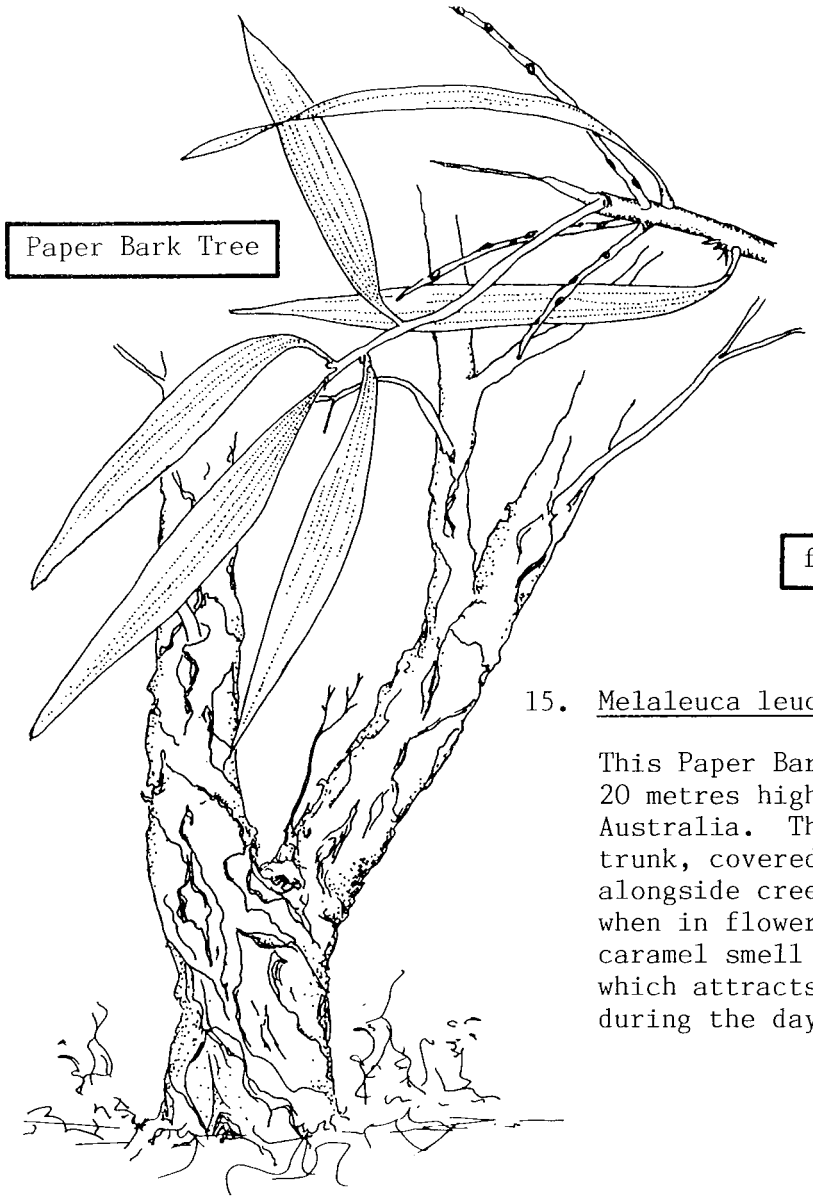
Ask your teacher to pick you a leaf to crush and smell.

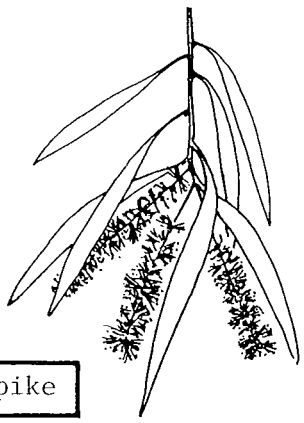
Why do you think the common name for this tree is Peppermint?



Peppermint Tree branchlet showing enlarged flower

Paper Bark Tree





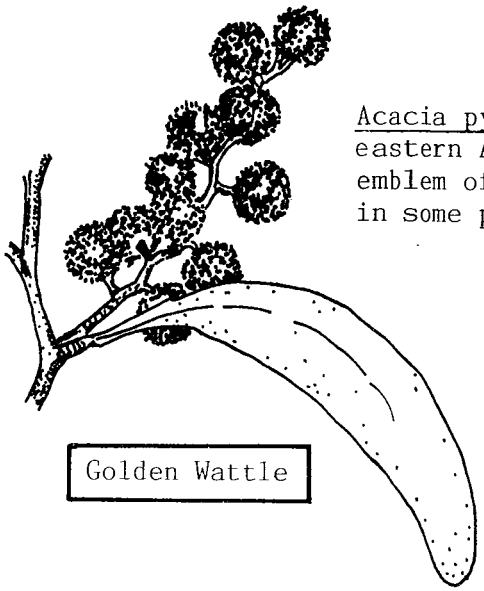
flowering spike

15. Melaleuca leucadendra: Paper Bark or Cadjeput

This Paper Bark is a large tree which grows to 20 metres high and is common in tropical Australia. The tree has a large and bulky trunk, covered in paper bark. They grow alongside creek banks and are beautiful when in flower. The flowers have a strong caramel smell and are very rich in nectar which attracts many birds and insects during the day and flying foxes at night.

WATTLES - ACACIA FAMILY

When driving in the country it soon becomes apparent that the Australian bush contains many Acacia species. In fact much of the bush is dominated by Acacia and Eucalyptus species. It has been estimated that there are 1,200 species of Acacia in the world, with 700 of them occurring in Australia. Even today undescribed wattles are being found.

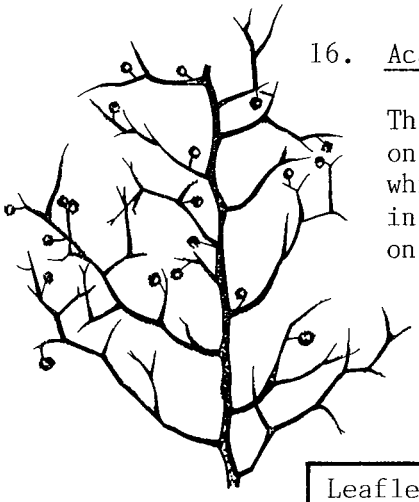


Golden Wattle

Acacia pycnantha, a widespread native wattle of eastern Australia, is the unofficial floral emblem of Australia. This species is naturalised in some parts of south-west Western Australia.

Acacia truncata

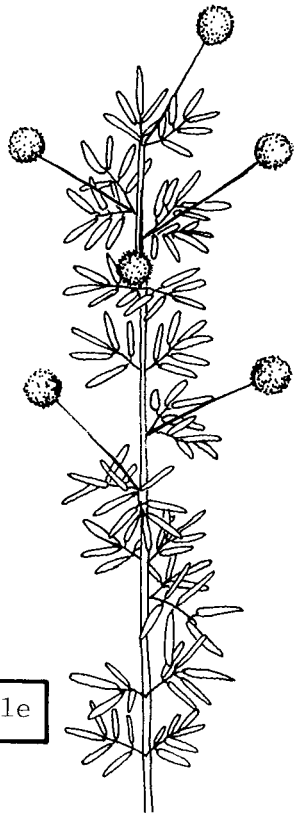
One of the first Australian plants collected was Acacia truncata from the south-west of Western Australia. This is believed to have been collected on Willem de Vlamingh's expedition of 1697.



Leafless Wattle

16. Acacia aphylla: Leafless Wattle

This unusual looking plant has no leaves, only spiny branches. It has yellow flowers which appear in spring. It is very limited in nature, occurring just east of Perth. on hills amongst granite outcrops.

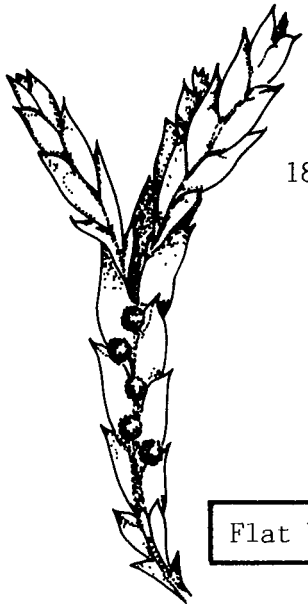


Guinet's Wattle

17. Acacia guinetii: Guinet's Wattle

This Acacia has very fine hairs covering the branches and small soft leaves. It grows into a small to medium shrub, with branchlets that can have a hanging or drooping appearance. The flowers are yellow and appear from June to October.

It is a rare plant and is restricted to a range of hills to the north of Geraldton.



Flat Wattle

18. Acacia glaucoptera: Flat Wattle

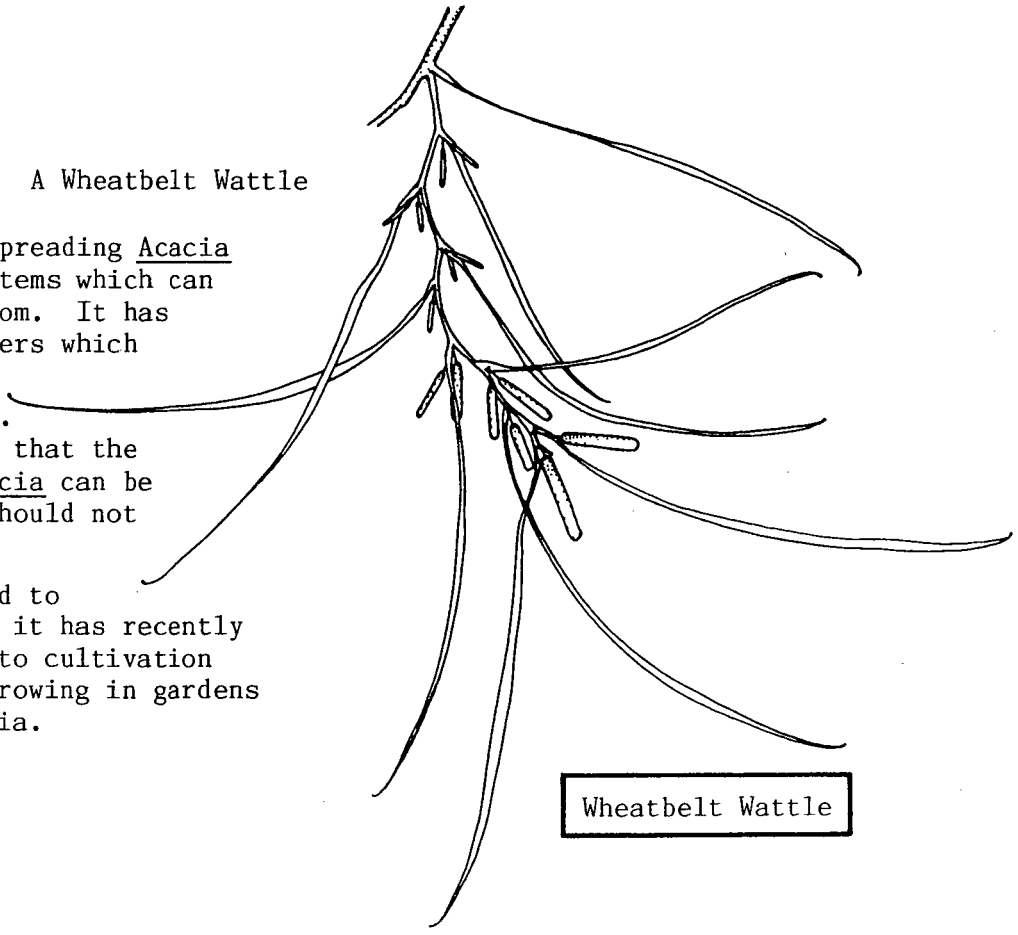
This is a small shrub with blue-green, wing-like stems. The new growth is very brightly coloured red or bronze. Its flowers are deep yellow and can be seen from August to November.

This plant occurs throughout southern Western Australia.

19. Acacia lasiocalyx: A Wheatbelt Wattle

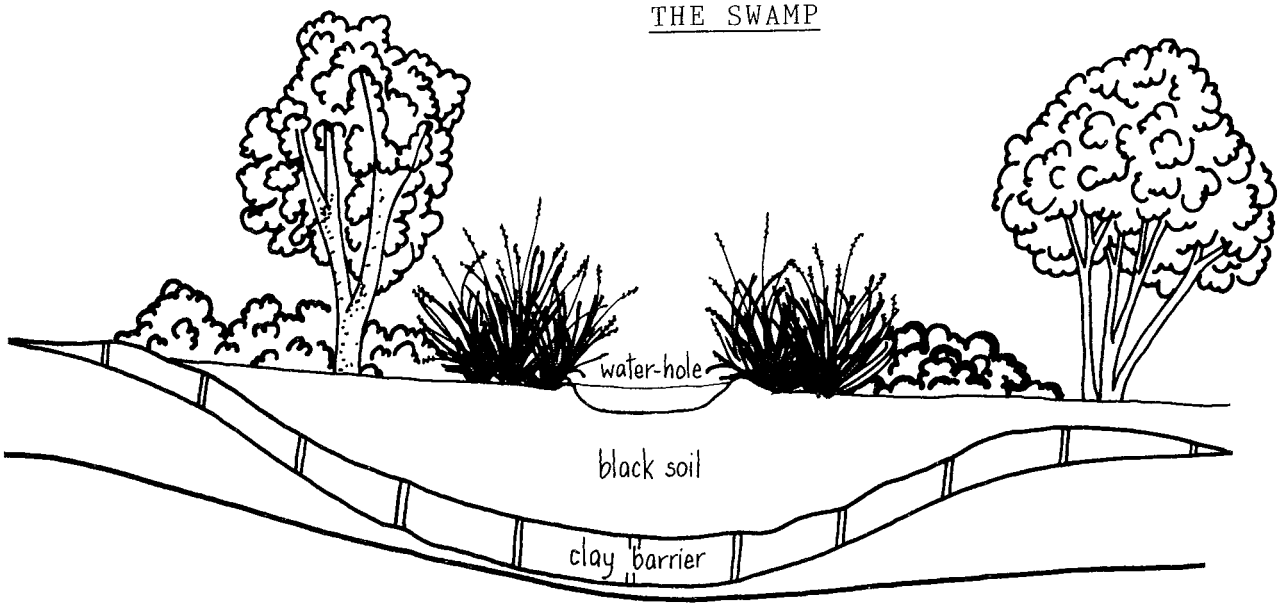
This larger more spreading Acacia has branches and stems which can have a silvery bloom. It has bright yellow flowers which appear from August to November. It should be noted that the leaves of this Acacia can be highly toxic and should not be eaten.

Although restricted to Western Australia, it has recently been introduced into cultivation and may be found growing in gardens throughout Australia.



Wheatbelt Wattle

THE SWAMP



There are basically two types of swamps occurring in Western Australia. These are:-

1) Seasonal wet/dry swamps - containing no water for large portions of the year;
2) Permanent wet swamps - often associated with drying lake edges.

The Herbarium's swamp is of the seasonal wet/dry type.

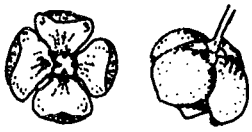
All swamps are important areas because of their ability to support many plant and animal communities. In seasonal swamps paper barks (Melaleuca species), orchids, Boronia species and many small trigger plants (Stylidium species) can be found, along with a wide variety of other plants.

The flowering season usually corresponds to the wet period, resulting in large insect populations which encourage frogs, birds and many reptiles to these areas.

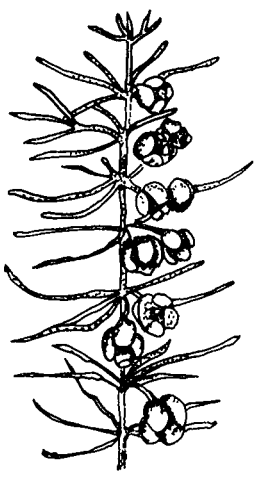
20. & 21. Boronia species:

Members of this family can usually be recognised because they often have small oil dots in their foliage as they are rich in oil; in Australia they are usually shrubs or trees. Some Boronia plants are highly perfumed and two of the species can be found growing in the swamp of the Herbarium's garden. The flowers are either white, yellow, pink, brown, red or blue.

flower heads

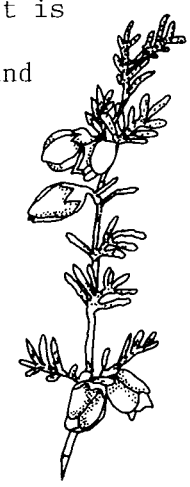


The most popular Boronia is Brown Boronia (Boronia megastigma). Its flowers are a rich chocolate brown outside and greenish-yellow inside. It has a very strong scent and it is sometimes used in perfume blends. It is found growing in winter swamp land of the south west and flowers in July and August.



Another highly perfumed Boronia is Pink Boronia (Boronia heterophylla). It is a spreading shrub up to 4 metres tall, with bell-like flowers. It grows along creek banks and in swamps, being common near Albany and Margaret River. Flowering time is late winter to spring.

Boronia species are among the few Australian plants used for making perfumes.



Brown Boronia

Pink Boronia

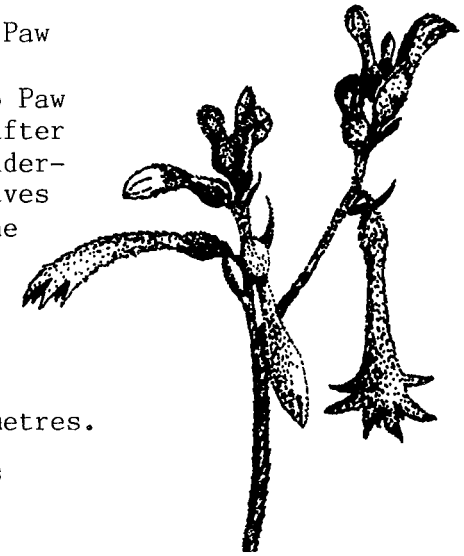
KANGAROO PAWS

Western Australian wildflowers are famous for their unique beauty which has been recognised since the early days of European exploration and settlement. Kangaroo Paws are amongst the strangest and most beautiful of all Western Australian wildflowers. Their common name comes from the shape and furry texture of the flowers.

22. Anigozanthos flavidus: Evergreen Kangaroo Paw

This plant is called the Evergreen Kangaroo Paw because unlike other Kangaroo Paws which, after flowering die down to rhizomatous stems (underground stems), the grass-like clumps of leaves remain green throughout the whole year. The flowers, although small, come in a variety of colours, ranging from pale greenish-yellow to pink, red and orange. This colour range has made it a favourite with many Perth gardeners. A lush mature flowering plant can reach a height of two metres.

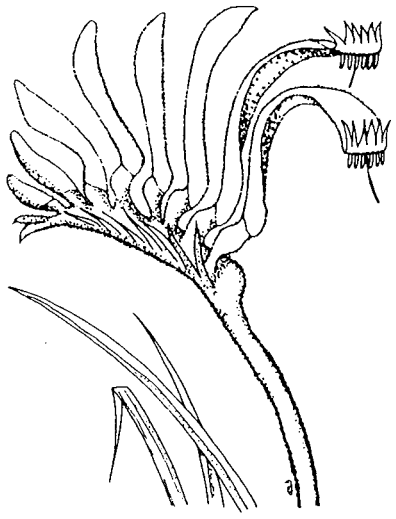
Normally found growing in damp swampy areas between Bunbury and Margaret River.



Evergreen Kangaroo Paw

Anigozanthos manglesii: Mangles' Kangaroo Paw

Mangles' Kangaroo Paw was introduced to England in 1833 and described botanically from a specimen grown to flowering stage in an English garden.



It has leathery sword-shaped leaves arranged in a tussock. The flower stems grow up to 1 metre in height and may be undivided or forked. Mangles' Kangaroo Paw is best known in its deep red and brilliant green form in which the flowers are red at the base and green for most of their length. The smooth, pale green interior is revealed when the flower opens. Other less common forms include orange, green and orange, yellow and red, and even all white. The flowers produce nectar. This attracts nectar-feeding birds which act as pollinators.

Mangles' Kangaroo Paw occurs only in Western Australia in heathland on sandy or gravelly soil.

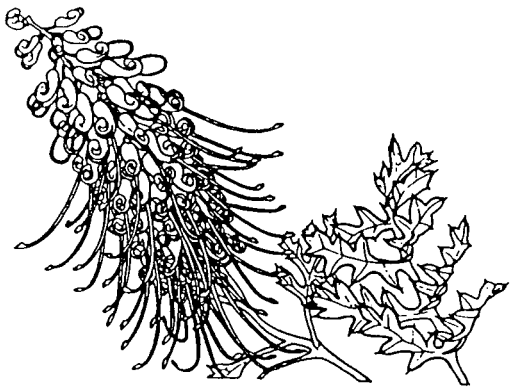
The State coat of arms includes two upright clusters of this species which is the State floral emblem.

23. Grevillea bipinnatifida: Fuchsia Grevillea

A spreading shrub with rich, light green, slightly prickly leaves. It has velvety, dark red flowers which occur throughout the year. This plant is a favourite of nectar-seeking birds.

It grows in hard gravel and granite soils of the Darling Range and Warren District.

Grevillea bipinnatifida can also be seen on the Herbarium's granite outcrop.



Fuchsia Grevillea

GRANITE OUTCROP

These are very special areas which occur widely in Western Australia and create specialised places for many plants and animals.

Many of Western Australia's rare plants can be found only on granite outcrops, indicating the specialised growth requirements of these plants. The outcrops are usually domed or massive sheets of exposed rock, occasionally with a thin layer of soil, forming deeper pockets in depressions of the rock surface. Granite outcrops can vary in size and height and act as water collectors and solar heaters, soaking up the sun's radiation.

During summer months this solar radiation is very high and for several hours after sunset the heat is radiated from the rock. Although this is a very harsh environment, many plants exist and flourish in this situation. The plants have developed various ways of protecting themselves against such hot, dry conditions.

Such plants as Eucalyptus caesia, Acacia denticulosa and several Kunzea species grow on the edges of this type of outcrop. Many smaller plants, such as mosses, grow either on the exposed areas or in crevices on these outcrops.

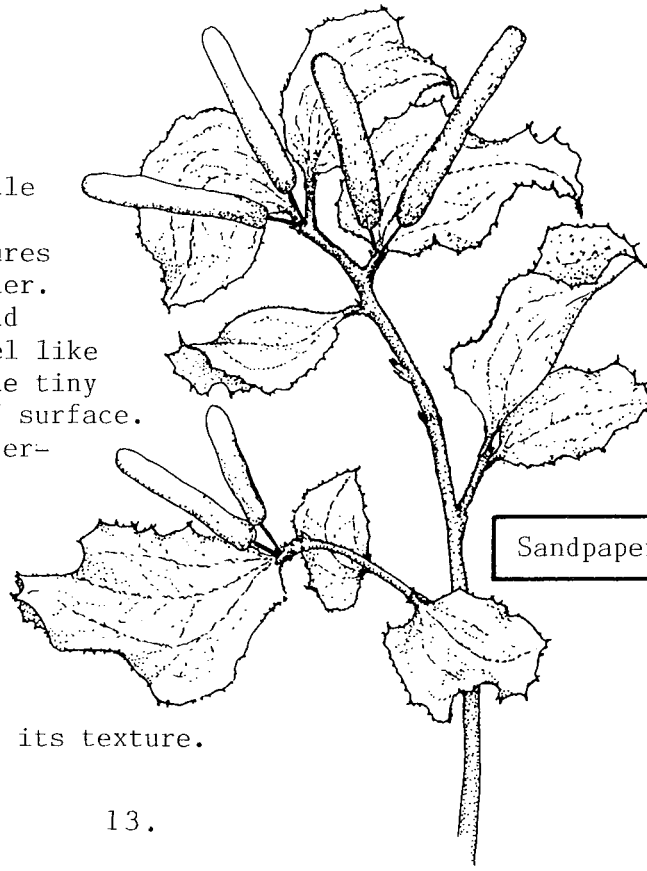
Can you suggest a way in which plants protect themselves against the severe summer heat of the granite outcrop?

24. Acacia denticulosa: Sandpaper Wattle

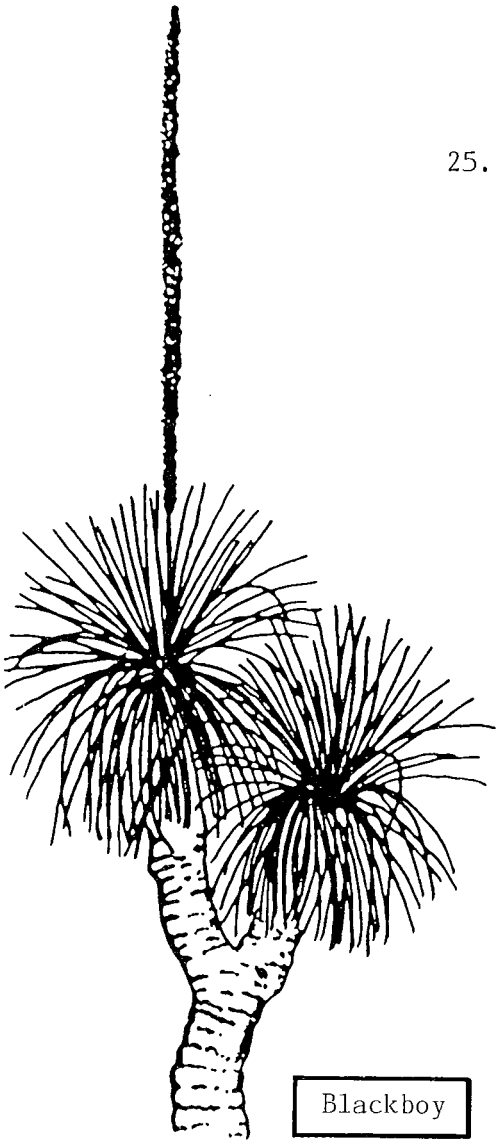
This tree has two outstanding features that make it different from any other. Firstly, the leaves, though soft and sticky to the touch when young, feel like sandpaper when mature because of the tiny prickles that cover the entire leaf surface. Secondly, the flowers look like caterpillars and are amongst the largest of any wattle flowers in Australia.

Although confined to granite rocks in the central wheatbelt, in recent years it has been introduced into cultivation very successfully.

Ask your teacher for a leaf to feel its texture.



Sandpaper Wattle



Blackboy

25. Xanthorrhoea preissii: Blackboy

Blackboy is a grass tree of Western Australia. The name Blackboy is believed to derive from the tall erect spikes standing centrally from the tops of the plants; somewhat resembling the spears of natives advancing through the bush. The grass-like skirts and blackened trunks add vividly to the impression. The spikes are single and grow up to more than 2 metres high.

Have you seen globules of reddish black gum around the base of Blackboys? This resin was used as a base for aboriginal glues.

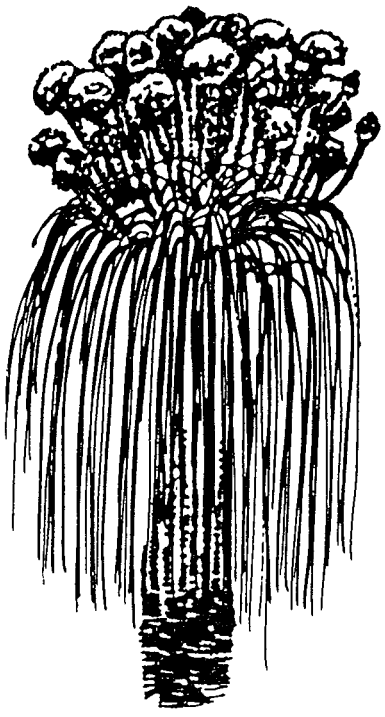
This species is unique to Western Australia and many of these plants can be found growing from the Murchison River in the north to the south coast of Western Australia.

A close relative of the Blackboy is Kingia australis which, instead of one single spike, bears up to 20 shortish stalks from its crown of leaves. On the top of each stalk is a pom-pom-like flower-head, the entire structure resembling a drumstick.

There is only one species of Kingia in the world and it is confined to the southwest corner of Western Australia.

When a Blackboy is broken or knocked over, it usually dies, but Kingia australis will grow new roots from its fallen trunk to begin afresh. Both of these plants are extremely long lived.

Kingia australis

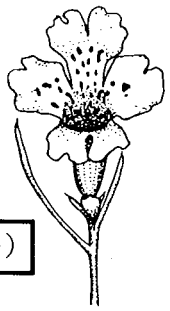


26. Hemiandra pungens: Snake Bush

The leaves on this ground cover are spiky to the touch and give the impression of a small bite. It occurs in the southwest through to coastal areas north of Perth. The flowers are pink, white or mauve and appear in the summer.

Snakebush does not grow tall, instead it spreads over the ground and forms a cover similar to that of grass.

Snake Bush



flower (actual size)

enlarged flower

27. Adenanthos cygnorum subsp. chamaephyton: Mat Plant

This soft silky ground hugging shrub acts as an excellent fill-in plant in the garden. The new growing tips are bright red during early summer, with greenish-yellow, shy solitary flowers appearing during mid-summer.

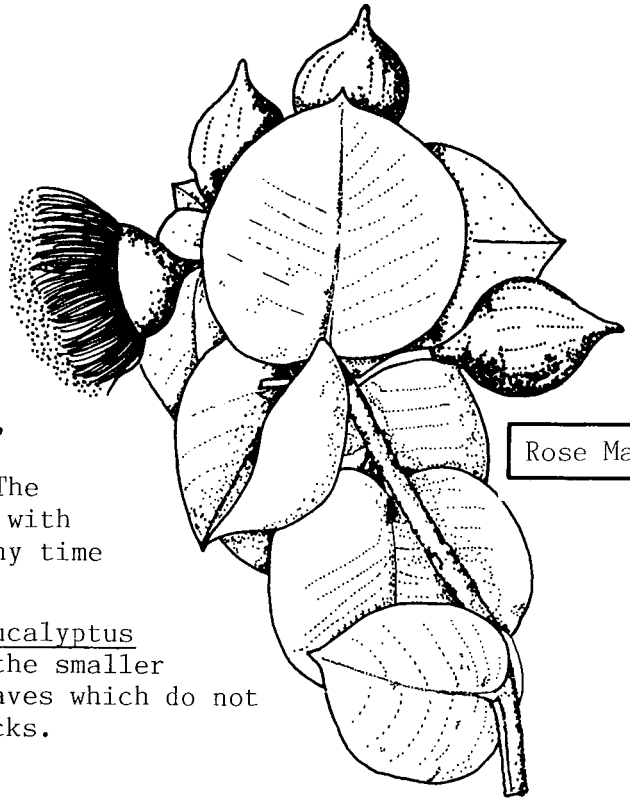
Although the Mat Plant is prostrate, Adenanthos cygnorum subsp. cygnorum (Woolly Bush) is upright and has soft silvery leaves. It can also be seen in the garden.

Compare the texture of these plants with the snake bush.

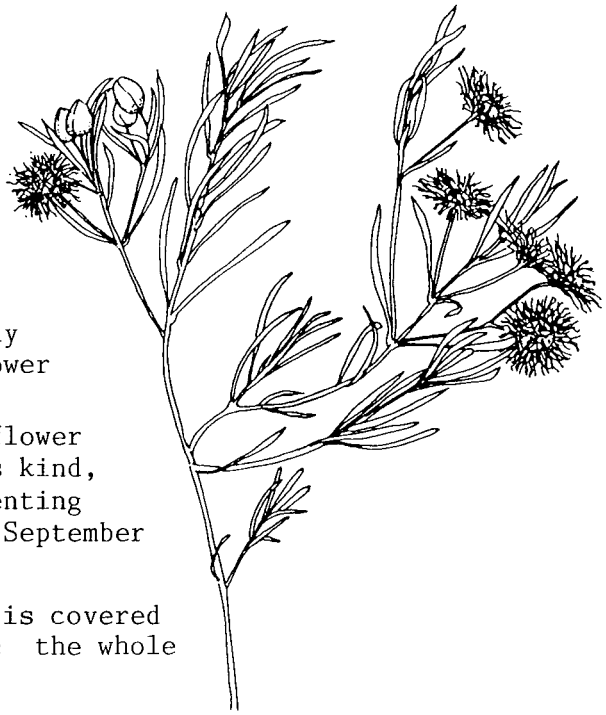
28. Eucalyptus rhodantha: Rose Mallee

This is a low straggly mallee with a spreading appearance. It has smooth, grey-brown bark and large rounded or heart-shaped, silvery-grey leaves. The large flowers are usually bright red with yellow anthers and these appear at any time throughout the year.

This species is closely related to Eucalyptus macrocarpa but can be identified by the smaller flowers which have stalks and the leaves which do not appear to be affected by insect attacks.



Rose Mallee



29. Verticordia monadelpha: Pink Woolly Featherflower

This very delicate looking featherflower is one of the most beautiful of its kind, with the grey-green leaves complementing the pink flowers which appear from September to December.

When the plant is in full bloom it is covered with fluffy pink flowers which make the whole plant resemble fairy floss.

Pink Woolly Featherflower

Raspberry Jam Tree

30. Acacia acuminata: Raspberry Jam Tree

When the wood of this tree is freshly cut or burnt, the fragrance is similar to the smell of raspberry jam. The wood is very durable or long lasting and the aborigines used it to make various weapons, but today it is extensively used for fence posts.

When in flower, the tree is covered with a mass of bright yellow blossoms. The new growth is covered with golden hairs. Flowers occur from July to October.

Raspberry Jam Tree is widespread throughout the south west of Western Australia, ranging from Shark Bay to east of Esperance.

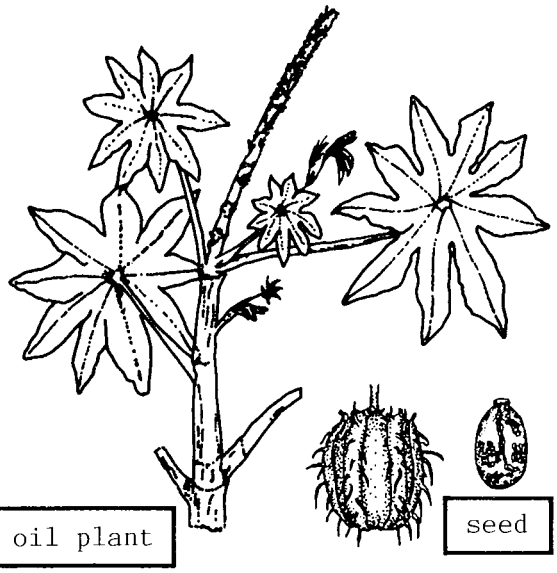
PLANTS POISONOUS TO HUMANS AND ANIMALS

There are many poisonous plants in home gardens and it is advisable not to eat any plant until you know what it is.

31. Ricinus communis: Castor Oil Plant

The Castor Oil Plant grows to a height of 4 metres and is common in the metropolitan area even though it is a highly poisonous plant. People have been poisoned from eating the seeds, while grazing animals have been killed from eating the toxic leaves, although not frequently.

This plant has a worldwide distribution and its place of origin is presumed to be Africa. It has been cultivated for castor oil, which was used for many medicinal purposes.



Castor oil plant

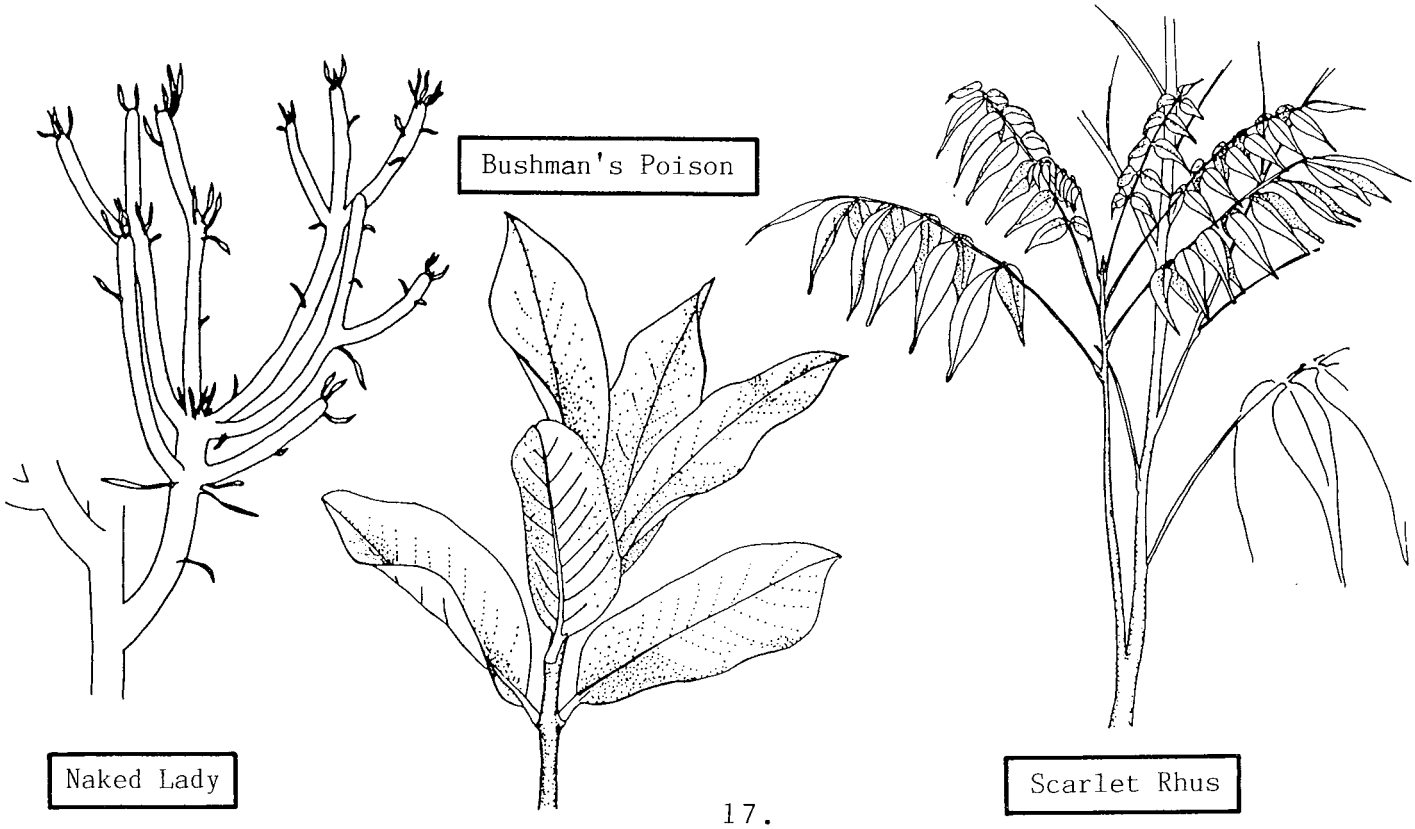
seed

Other introduced poisonous plants shown here in the garden are:-

(1) Euphorbia tirucalli: Naked Lady - contains sap that can cause blindness.

(2) Carissa acokanthera: Bushman's Poison - poisonous berries.

(3) Toxicodendron succedaneum: Scarlet Rhus - whole plant causes skin irritations and allergies.



Bushman's Poison

Naked Lady

Scarlet Rhus

32. Gastrolobium bilobum: Heart-leaved Poison

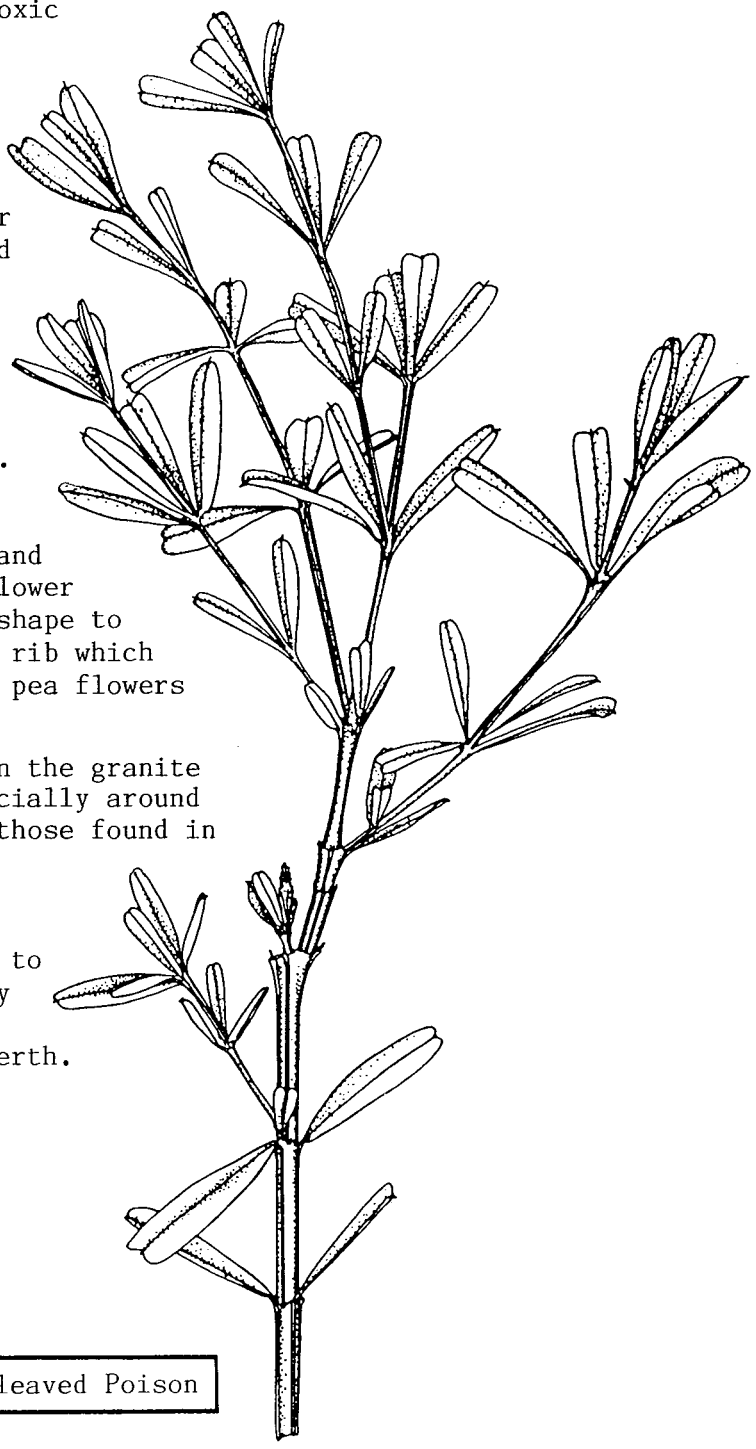
Western Australia is remarkable for its many toxic native plants, over 30 of which belong to Gastrolobium and the related genus Oxylobium.

Heart-leaved Poison is regarded as being one of the most highly toxic species of the genus to man and animals, and no part of it, including the flowers, should be eaten.

It is a poisonous native plant as compared to the Castor Oil Plant which is a cultivated introduced plant.

Heart-leaved Poison is a shrub ranging from 1 metre to 4 metres in height. The branches and branchlets are angular in shape or box-shaped. The leaves grow in fours or rarely threes. They are dark green above, paler underneath and they are usually hairy on the lower surface. They are similar in shape to that of a heart with a central rib which begins at the leaf stalk. The pea flowers are yellow tinged with red.

The smaller forms are common on the granite hills of the south coast, especially around Albany; the largest forms are those found in the Karri forest. It occurs, typically, in association with granite rocks, or may be found along the banks of streams due to the seeds being carried down by flood water. It is also found in the Darling Ranges around Perth.



Heart-leaved Poison

ACTIVITIES

Activity 1.

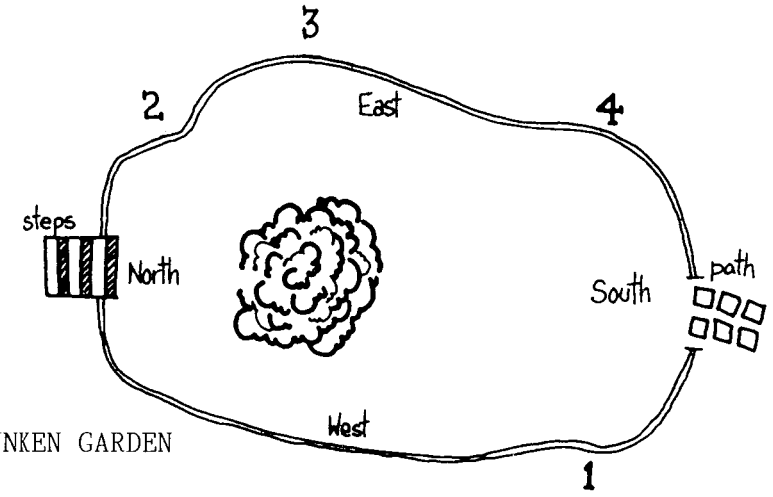
Touch and Smell

Look around the garden for a tree called (1) Eucalyptus melliodora (use your map for clues). When you have found the tree ask your teacher to pick some leaves for you to crush and smell. Do the same for the following:-

(2) Darwinia citriodora

(3) Hypocalymma angustifolia

(4) Pimelea ferruginea



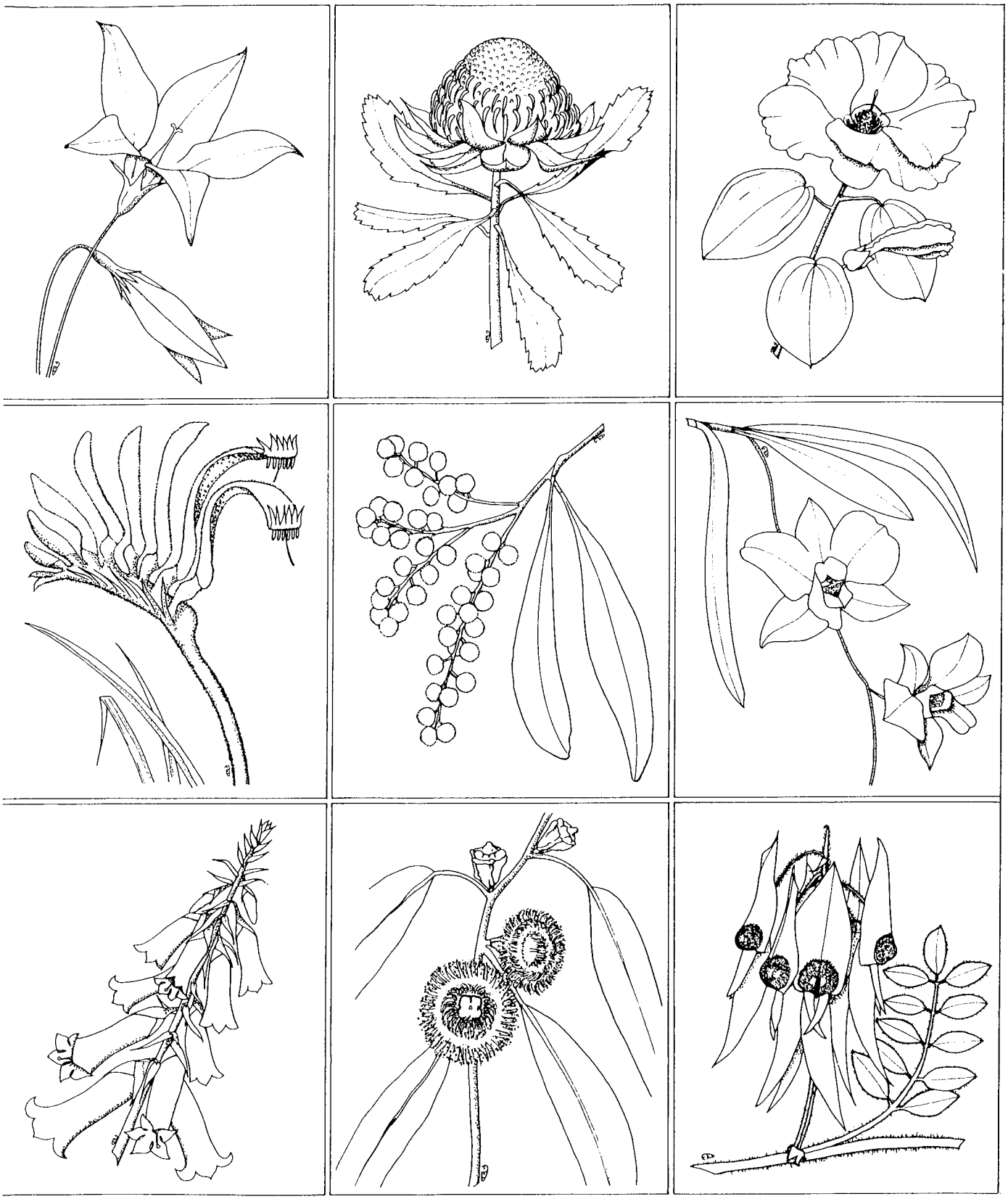
MAP OF SUNKEN GARDEN

Did you notice anything different about the last plant?
If so, what?

Activity 2.

Floral Emblems of Australia

Match the floral emblems shown below with the State to which they belong.



Australia

Acacia pycnantha, golden wattle

Australians accept golden wattle as their national flower. It is an unofficial floral emblem because, so far, Commonwealth Governments have not proclaimed it as the national flower.

Golden wattle is a shrub or small tree about 4 to 8 metres tall. Each golden ball contains up to eighty, tiny scented flowers.

Young seedlings of golden wattle have true leaves but the 'leaves' of older plants are really flattened leaf stalks called phyllodes.

Golden wattle occurs naturally in South Australia, Victoria, New South Wales and the Australian Capital Territory. It grows among taller trees in open forest and woodland. As a shrub it also occurs in open scrub where there are no trees.

Although golden wattle may not live as long as some other shrubs or small trees, it is an attractive garden plant. Native plant nurseries often stock potted specimens. Choose a sunny or lightly shaded position and make sure that water is able to drain freely from the soil.

Instead of buying a plant you may prefer to buy seeds and raise your own seedlings. Soak the seeds in hot water to break the seed coat. Then plant the seeds in moistened seed mix in a punnet. When the seedlings are large enough to handle, transplant them into individual pots of potting mix. When well established, plant out in the chosen garden site.

Wattle is widely recognised as a symbol of Australia. It is featured on Australian postage stamps, on the Commonwealth coat of arms and the insignia of the Order of Australia.

Our national colours of green and gold are the colours of our national floral emblem.

The spring has come, and suddenly
The bush is all aglow.
Its Wattles bow down gracefully,
As if with golden snow.
The air is filled with fragrance,
And - yellow, cream or white -
Those Wattles all are singing
Their magic song of light.

Nuri Mass

Australian Capital Territory

Wahlenbergia gloriosa, royal bluebell

The Australian Capital Territory was the last of Australia's six states and two mainland territories to choose a floral emblem. A committee of residents looked at local native plants to find one suitable for designs on badges and decorative goods. They also wanted a plant which would appeal to gardeners in the garden city of Canberra. Their choice was the colourful and dainty royal bluebell.

Royal bluebell is a herbaceous perennial which may reach 40cm tall in flower. It is called a herb because its stems are soft and non-woody. It is called a perennial because it lives for several years. The violet-blue flowers are up to 2 or 3cm in diameter. Some flowers are upright on slender, straight stalks and others nod like bells on curved stalks. The oblong leaves often have waved edges.

As well as occurring in the Australian Capital Territory, royal bluebell also occurs in New South Wales and Victoria. It grows in woodland in the Australian Alps and nearby mountain ranges where snowfalls are common in winter.

In areas with cool to cold winters royal bluebell is suitable for growing in a rockery. It may also be grown in shallow pots or tubs in sunny or lightly shaded positions. General nurseries in the Australian Capital Territory and native plant nurseries elsewhere often stock potted royal bluebells. They may be propagated from cuttings or root divisions.

Although the region has had a floral emblem only since 1982, royal bluebell is included on the badges and logos of many local groups. It is also popular on souvenirs such as cards, tea-towels and T-shirts. In 1985 the prize-winning entry in a school competition for a Territorial flag featured the floral emblem. People now recognise royal bluebell as a symbol of the Australian Capital Territory.

New South Wales

Telopea speciosissima, waratah

Telopea, the botanical name of waratah, comes from a Greek word meaning 'seen from afar' because the large rounded crimson flowerheads are so conspicuous. They are up to 15cm in diameter.

Early European settlers at Port Jackson were so impressed by the gaudy flowers of the waratah, they sent seeds to England in 1789 hoping that English gardeners could grow such an unusual plant. The results were disappointing because English winters are too cold for waratahs to survive outdoors and they do not readily flower in glasshouses. However market gardeners in Australia, California and Israel now grow waratahs for cut flowers. Australian florists sell the flowerheads for about six dollars each.

People in the First Settlement noticed Aborigines sipping nectar from the large red flowerheads of a shrub they called waratah, a name used throughout the world.

It is an upright shrub to 4 metres and inclined to be straggly in the wild. Each flower is small but they are grouped into large heads surrounded by red bracts resembling leathery petals. The flowers attract nectar-feeding birds which act as pollinators. Later large brown pods develop. These split open when ripe and shed winged seeds.

Waratah grows naturally in open forest from near sea level to the high parts of the coastal range. It occurs only in New South Wales.

Although bushfires burn the leafy branches, the plants are not killed but sprout again after rain. A thick rootstock protects leaf buds from the heat of the fire and so the plant survives.

Waratah is a beautiful garden plant. Where the climate and soil are suitable it is long-lived and flowers well. Commercial packets of seeds with instructions are available. Some nurseries stock potted plants which should be planted out in well drained soil in a lightly shaded or sunny position.

Australia is its homeland,
And Waratah its name.
Its flower is like a goblet
Abrim with reddest flame.
Its seeds are small and playful -
They fly with dainty wings,
Then flutter softly earthward
Like tiny fairy things.
Yet, in the bush in springtime,
Of all the flowers there are,
There's none so proud and stately
And grand as Waratah!

Nuri Mass

Northern Territory

Gossypium sturtianum, Sturt's desert rose

The plan to grant self-government to the Northern Territory in 1978 encouraged people to develop a range of symbols of their region. Sturt's desert rose, proclaimed as the floral emblem in 1961, is featured in a stylised form on the Territorial flag first raised to mark the granting of self-government. The flag is black, white and ochre, the Northern Territory's colours. The natural flower has five or six petals whilst the stylised flower on the flag has seven white petals and a black star-shaped centre with seven points, representing the six Australian states and the Northern Territory. The Territorial coat of arms includes Sturt's desert rose as well as the faunal emblems, the red kangaroo and wedge-tailed eagle.

Sturt's desert rose is a small shrub related to cotton and hibiscus. Its mauve flowers have red centres and are about 8cm in diameter.

The common name commemorates Captain Charles Sturt's collecting this plant during his journey to central Australia in 1844-45.

It occurs in central Australia where rainfall is low, the days are mostly warm to hot, and the nights are often cool to cold. Sturt's desert rose tolerates droughts and light frosts.

It is an attractive garden plant well suited to districts with low rainfall and less severe frosts. However it responds well to extra water and pruning. Plants may be propagated from cuttings or seed.

Queensland

Dendrobium bigibbum, Cooktown orchid

Queenslanders helped in the choice of Cooktown orchid as their State's floral emblem. The need for a floral emblem was suggested during preparations for the State Centenary in 1959. The Government wanted a native species with flowers of maroon, the State colour. They also wanted a plant which people could recognise easily and grow in their gardens. To arouse interest and obtain suggestions, the Brisbane newspaper the *Courier-Mail* ran a poll, asking its readers to elect a floral emblem. The convincing winner was Cooktown orchid which the Government later proclaimed as the State floral emblem.

Cooktown orchid is a variable species. The flowers range in colour from white to shades of mauve including purplish-lilac edged with white. They are 3 to 7cm in width with up to twenty flowers arranged along each arching flowering stem.

It extends from the northern Queensland mainland to the Torres Strait Islands. Although it occurs in tropical districts with very high summer rainfall, Cooktown orchid grows in exposed situations rather than in rainforest.

It is suitable for outdoor cultivation in sub-tropical areas and may be grown in pots or hanging baskets, or attached to the sunny side of a tree trunk. In cooler climates protection under glasshouse conditions is needed. Plants in flower are ideal as indoor plants in well lit rooms since the flowers last for periods of up to three months. Division of established clumps is the simplest method of propagation.

South Australia

Clianthus formosus, Sturt's desert pea

Soon after winter rain falls in arid parts of Australia, the desert seems to come alive with carpets of wildflowers. Among the most colourful are the red flowers of Sturt's desert pea which occurs in all mainland states except Victoria.

The common name, Sturt's desert pea, honours Captain Charles Sturt who noted it in 1844 while exploring between Adelaide and central Australia. He described it in his journal as 'beautiful' and 'splendid.'

The explorer William Dampier collected Sturt's desert pea in 1699 on Rosemary Island in the Dampier Archipelago. This group of islands is off the north-west coast of Western Australia, about 12km from the modern mining port of Dampier. Almost three centuries later the flowers of Dampier's dried specimen, now housed at Oxford, are still a rich red in colour.

Sturt's desert pea is a spreading plant with stems lying on the ground. The flowers are clustered in groups of six to eight on short upright stems. Crimson flowers are the most common either with or without a raised glossy black centre. There are also pink and white flowered forms. The grey-green foliage and stems are covered in downy hairs.

Being a desert plant Sturt's desert pea is suited to harsh conditions. It withstands drought and a wide temperature span. These extreme conditions range from light frost to the great heat of exposed sites with much bare soil.

It is a spectacular garden plant when grown in full sun in freely draining soil. Some gardeners obtain good results using terra cotta drainpipes as tall pots. Garden shops stock packets of Sturt's desert pea seed, sometimes under the incorrect name Clianthus Dampieri. The packets carry instructions on treating the seeds to increase germination.

Many South Australian departments and clubs use Sturt's desert pea on logos and badges.

Tasmania

Eucalyptus globulus, Tasmanian blue gum

Although Tasmanian blue gum is a flowering plant, it grows so tall that many people may not have noticed its attractive creamy white flowers. Under cool moist conditions it may reach 70 metres in height with the trunk 2 metres in diameter near ground level. It occurs in Tasmania and Victoria usually in tall open forest.

The common name blue gum comes from the blue-grey bloom, a powdery layer which covers the young leaves, stems and buds. When the waxy deposit is rubbed, it brushes off, and a strong smell of *Eucalyptus* oil is released.

Tasmanian blue gum has two kinds of leaves. The greyish, round juvenile ones are arranged in pairs on square stems on young plants. By contrast the dark green, sickle-shaped adult leaves are arranged singly on round stems on mature trees. Both kinds of leaves may be seen on the same tree as it matures.

The buds are warty in appearance and shaped like spinning tops. Each bud is covered by a flattened cap with a central knob. The cap is pushed off as the flower opens. The flowers produce abundant scented nectar which yields strongly flavoured honey.

Tasmanian blue gum is too large for home gardens but is recommended for parks and large grounds in areas where severe frosts are unlikely. Although the seeds are small, they germinate readily, and propagation from seed is simple.

Both fresh and dried juvenile foliage retains its grey colour and eucalypt scent when picked. Florists use the leaves as backing in flower arrangements. For this purpose trees are pruned to encourage the growth of juvenile foliage which is easily reached for harvesting.

Tasmanian blue gum produces hard, long lasting timber which is used for poles, wharf piles and railway sleepers. It is widely grown in plantations in many overseas countries where it is a source of building timber and pulpwood for papermaking.

Victoria

Epacris impressa, common heath

Victoria, the 'Garden State' was the first Australian state to proclaim a floral emblem. Although the chosen species, common heath, also occurs in white, rose, crimson, scarlet and double-flowered forms, the pink form is Victoria's official flower. Two plants in flower are included in the State coat of arms between the central shield and the female figures representing Peace and Plenty.

Common heath is a slender, upright shrub with small sharply pointed leaves. Each flower arises just above a leaf, but the flowers are often so densely packed that the cluster of flowers looks like a brush. It resembles some of the heathers and related plants of the Northern Hemisphere.

Common heath occurs in heathland from near sea level to mountainous areas. These heathlands contain many different kinds of stiff-leaved low shrubs closely spaced. The widest occurence of common heath is in Victoria but it also occurs in New South Wales, Tasmania and South Australia.

Common heath is a beautiful garden plant suited to cool moist areas. However it tends to be short-lived in cultivation. To lessen this difficulty, some gardeners plant a new specimen at intervals to ensure a continuity of this attractive plant. Pruning improves the plants by making them more compact and bushy. It also encourages more prolific flowering.

Victoria's celebration of 150 years of statehood in 1985 has drawn special attention to the State's colourful and dainty floral emblem and made it more familiar to residents.

Western Australia

Anigozanthos manglesii, Mangles' kangaroo paw

Western Australian wildflowers are famous for their unique beauty which has been recognised since the early days of European exploration and settlement. Kangaroo paws are amongst the strangest and most beautiful of all Western Australian wildflowers. Their common name comes from the shape and furry texture of the flowers.

Mangles' kangaroo paw was introduced to England in 1833 and described botanically from a specimen grown to flowering stage in an English garden. It has leathery sword-shaped leaves arranged in a tussock. The flower stems grow up to 1 metre in height and may be undivided or forked. Mangles' kangaroo paw is best known in its deep red and brilliant green form in which the flowers are red at the base and green for most of their length. The smooth pale green interior is revealed when the flower opens. Other less common forms include orange, green and orange, yellow and red, blue and red, and even all white. The flowers produce nectar. This attracts nectar-feeding birds which act as pollinators.

Mangles' kangaroo paw occurs only in Western Australia in heathland on sandy or gravelly soil.

As a garden plant it grows best in well drained soil in a sunny position. It tends to develop fungal diseases of the leaves in moist climates or where the plants are watered excessively.

It is propagated fairly readily from seed stocked by garden shops. Some nurseries sell plantlets growing in nutritive agar medium in glass tubes, as well as potted plants growing in soil.

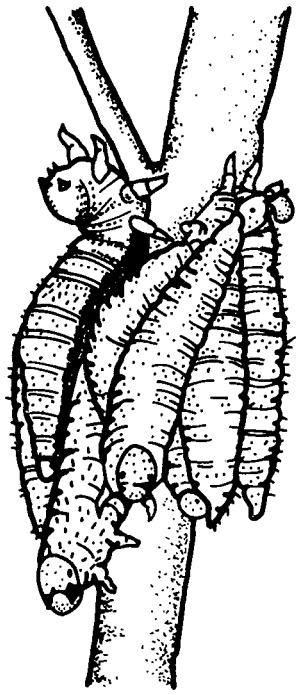
Both fresh and dried flowers of kangaroo paw are popular for indoor decoration.

The State coat of arms includes two upright clusters of the State floral emblem.

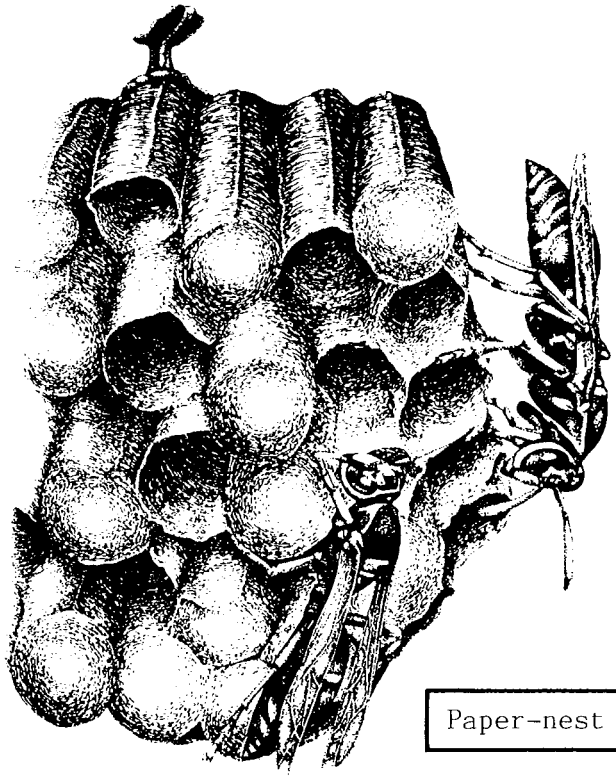
Perga species: Spitfires

Spitfires are the caterpillar-like young of sawflies, (winged insects that look similar to wasps). The grubs form clusters on the stems of Eucalyptus trees. When disturbed they flick their tails and dribble a thick, strong smelling fluid from their mouths. This serves as a protection from being eaten by predatory birds.

The grubs feed at night upon the leaves of the gum trees. If they become too numerous they may form large clusters which may eat all the leaves of the tree and then move on to another tree. There are several types of sawflies and it is possible to find their grubs as you wander through the garden. They appear more frequently during the spring and early summer months. The adult flies are like many insects, in that they do not feed during their short active lives.



Spitfires



Paper-nest Wasp

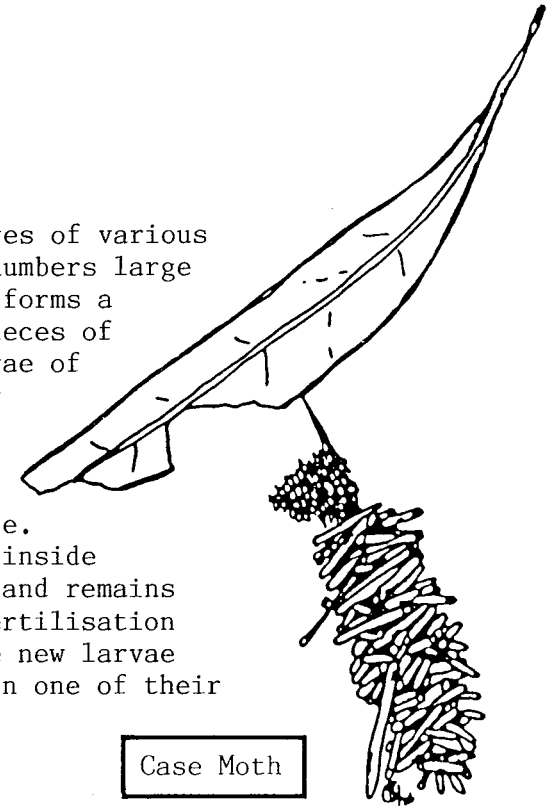
Polistes humilis: Paper-nest Wasp

This insect is easily recognised by its nests which look like upside down toadstools. They can be found in trees hidden amongst thick foliage or under the eaves of the roof of your house. If you disturb the nest, this wasp can become very aggressive and will repeatedly sting you. The sting is painful and causes swelling. Adult Paper-nest Wasps are 15 mm long, generally black to orange-brown with numerous yellow marks and bands. When flying their long back legs hang down.

This wasp is a nectar feeder and can be seen visiting many different flowers in its search for food.

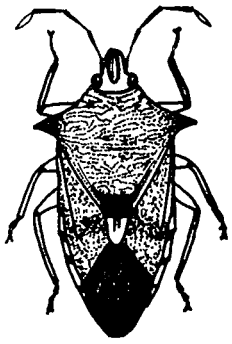
Psychidae family: Case Moth

The larvae of these moths chew the leaves of various plants but are usually not present in numbers large enough to warrant control. Each larva forms a 'case' from webbing and usually adds pieces of leaf or stick to the outside. The larvae of different species thus camouflage their cases in different ways. They never leave the cases completely, but drag them around while they feed, only allowing the top of the body to protrude. When the larva is fully fed it pupates inside the case. The female moth is wingless and remains in the case, there laying eggs after fertilisation by the male, which is winged. When the new larvae hatch out they leave this case and begin one of their own.



Case Moth

Shield Bug



Eumecopus apicalis: Shield Bug

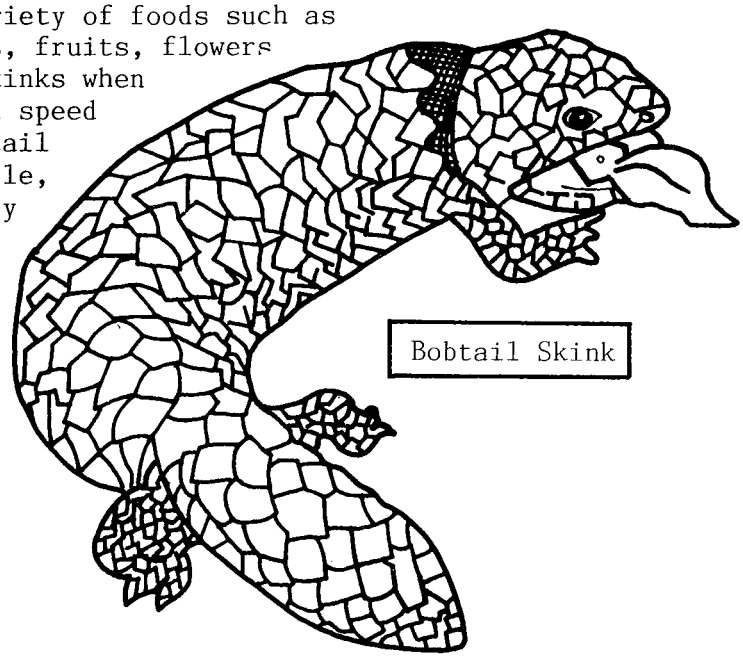
The Shield Bug is very similar to the Crusader Bug in its habitats. The main difference being that the Shield Bug prefers the sap of eucalypts whereas the Crusader Bug prefers Cassia species.

Can you see the similarities in their shape? What difference can you detect.

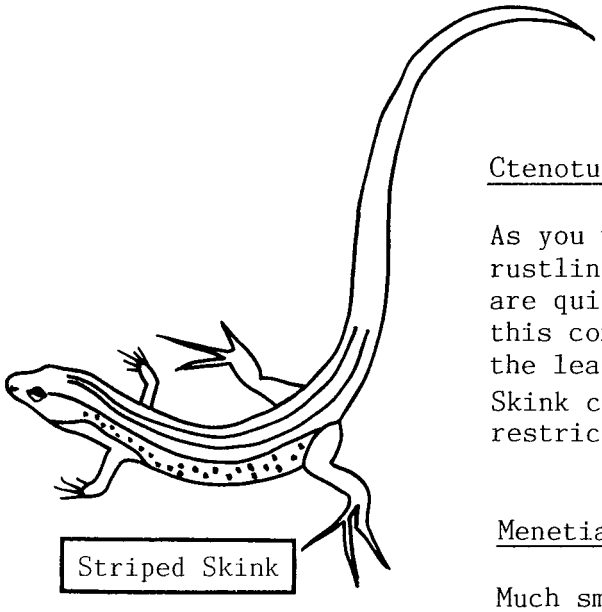
Tiliqua rugosa: Bobtail Skink

The Bobtail Skink is unique in the way that it appears to have two heads, one at each end. The scales on its body are large, thick and overlapping (similar to the tiles on a roof).

Bobtails are known to eat a variety of foods such as snails, beetles, raw meat, eggs, fruits, flowers and even strawberries. Most skinks when in trouble have the agility and speed to flee to safety, but the Bobtail being a larger and slower reptile, bluffs its way out of trouble by pretending to look fierce, suddenly opening its mouth to reveal a startling blue tongue.



Bobtail Skink



Striped Skink

Ctenotus lesueurii: Striped Skink

As you walk along the trail you may hear the rustling of leaves on the ground and if you are quick enough you may catch a glimpse of this common garden skink as it moves among the leaves searching for food. The Striped Skink can grow up to 30 cm long and is restricted to coastal sands.

Menetia greyii: Grey's Skink

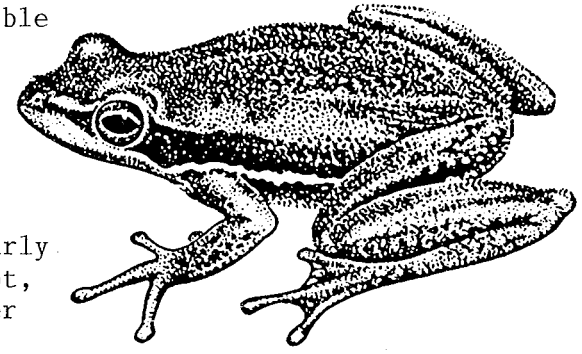
Much smaller than the Striped Skink, (usually not exceeding 8 cm), this dark coloured skink is common throughout the State.

COMMON AMPHIBIANS IN THE GARDEN

Litoria adelaidensis: Slender Tree Frog

The slender Tree Frog is a small frog with a long slender body and narrow, tapering head. As with most adult frogs the males are smaller than the females.

The colour on its back ranges from a pale fawn to brown or green to brown with large green patches. Usually there is a wide brown stripe running down either side from its head to its thigh. This dark stripe is bordered below by a thin white stripe. Both the colour on its back and the two-tone stripe help to camouflage it amongst the reeds and bushes. On the back of the thighs there are small bright orange/red patches on a blackened area. This brilliant flash of colour is visible when it jumps and possibly serves as a scare tactic to would-be attackers.



It eats a wide variety of flying and crawling insects that frequent the area where it lives.

The mating call of the male, during early spring, has been described as an abrupt, grating call. They call from the water or soil level or up on the reeds.

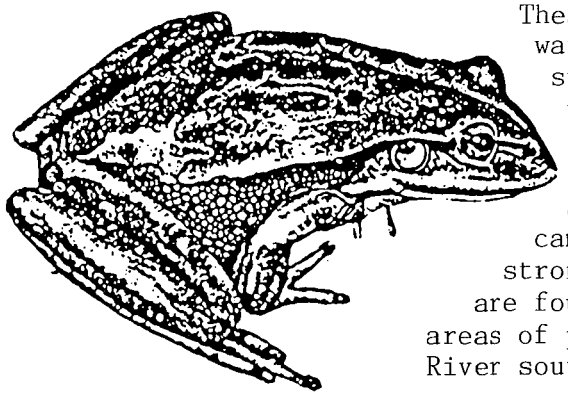
The Slender Tree Frog lives in reeds and bulrushes and other dense vegetation at the edge of streams, swamps and lakes. It spends much of its time clinging to reeds and swamp vegetation and leaps accurately to catch flying prey. It may be found in the wetter parts of the south west of Western Australia, especially coastal regions near swamps, lakes and streams.

Litoria moorei: Western Green and Gold Bell Frog

Sometimes called the Bullfrog, it is a stocky, muscular frog with a triangular-shaped head and powerful hindlegs. Its colour is usually of a mottled green, brown and whitish pattern but it is able to change its colour. Often it is green and gold in the sun, whereas in little or no light or when it is cold it will assume more of a dull brown colour. There is usually a fawn-coloured stripe running down the centre of its back. It is known to be easy to approach and is said to be placid.

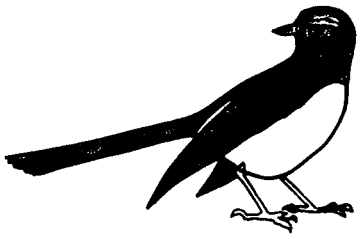
It is quite voracious and eats a variety of aquatic, flying and crawling insects and animals that live in the same environment.

During the warmer evenings of spring you can hear the mating call of the Western Green and Gold Bell Frog as he floats or sits on floating vegetation in the water. His call has been described as a long, low growl, very similar to the sound of a motorbike. Hence another of his common names is the Motorbike Frog.



These frogs live near areas of permanent water - at the edge of swamps, lakes and streams. They like to live amongst the vegetation. They climb to hide beneath the bark of such trees as the Paperbark (Melaleuca) and crawl beneath logs and stones. Their skin colour allows them to camouflage amongst the vegetation, and their strong hindlegs offer a quick getaway. They are found only in the south west of Australia, in areas of permanent water from the lower Murchison River south and east to Pallingup River.

COMMON BIRDS IN THE GARDEN



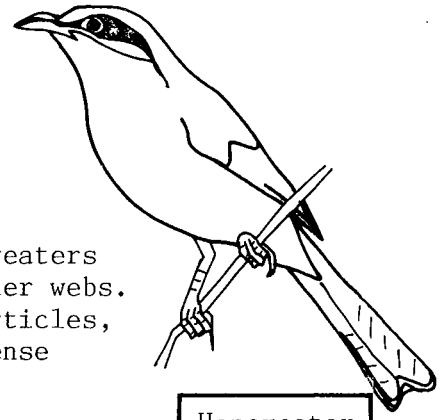
Willie Wagtail

Rhipidura leucophrys: Willie Wagtail

Willie Wagtails are insect feeders, feeding either whilst in flight or upon the ground. The large fan-like tail is used to carry out showy aerobatics during insect collecting.

They are found mainly in pairs which are formed for life, protecting their nest be aggressive attacks, irrespective of the size of the danger. Nests are shallow and cup-shaped, made of fine grass, finished off with fine bark and spider webs and lined with wool, hair, feathers and plant down. You will find them bound to small branches and in a variety of suitable locations.

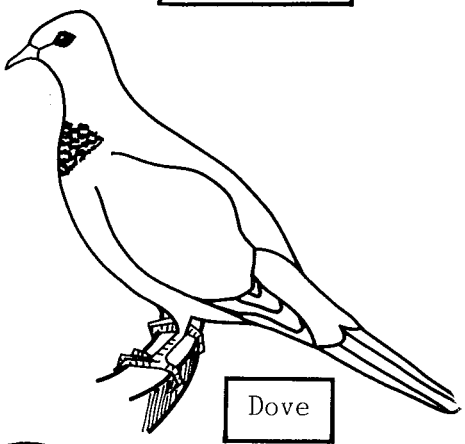
Meliphaga virescens: Singing Honeyeater



Honeyeater

Honeyeaters are insect, nectar, fruit and berry eaters, usually seen licking the nectar from Grevillea and Banksia species. The feeding habit acts as a source of pollen exchange for many species of plants. They tend to be solitary, only forming breeding pairs during nesting seasons. Nests of Honeyeaters are cup-shaped, made from grass leaves bound with spider webs. These are then lined with down and fine soft plant particles, which can be found hanging from slender branches in dense shrub.

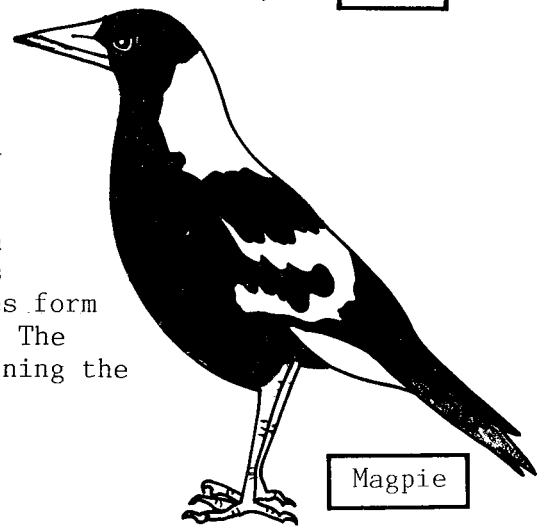
Streptopelia senegalensis: Laughing Dove
Streptopelia chinensis: Spotted Turtle Dove



Dove

These doves are not native and were introduced to Perth in 1898. The Spotted Turtle Dove (see opposite) is larger than the Laughing Dove and has a conspicious spotted patch below the throat. Doves are mainly seed eaters and form small flocks. They are easily startled and take flight with noisy wing beats. Their nests tend to be a loose, unstable platform of twigs which are often unlined. The nests can be found in a wide range of positions and heights.

Cracticus tibicen dorsalis: Magpie



Magpie

Magpies are mainly insect feeders, although they will also eat small animals.

They are very possessive of their area, and when nesting tend to become very aggressive. This is usually when swooping and pecking occur. Magpies form large family groups within their own territory. The Magpies have nested in the tall pine trees adjoining the garden.

This Is A Community Employment Program Project

A Federal Job Creation Initiative

Jointly Administered By The Commonwealth And State Governments

W.A. Herbarium Garden Committee

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