THE FLORA OF MURDOCH UNIVERSITY
A Guide to the Native Plants on Campus

BERNARD DELL & IAN J. BENNETT
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Cover photograph: *Banksia menziesii* (firewood banksia)
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IAN J. BENNETT

Stylidium schoenoides
FOREWORD

Western Australia's wildflowers are recognized throughout the world for their colour, form and uniqueness. Many can be observed in the metropolitan area close to the city of Perth. Despite this, there has been very little scholarly documentation of them. This book provides an account of the flora of Murdoch University. Though the campus was disturbed first by farming and later by arboriculture, small but significant areas of the original bush remain. This scholarly account provides a valuable record of those native species that enrich the Murdoch campus after the first ten years of its operation. It should prove useful as a data base for future conservation and planning strategies, as well as providing a valuable reference source for staff and students. It should also have strong appeal to local residents who are curious about the plants which characterize the white and yellow sands of their surrounds and as a guide for visitors to the campus. The work, though written for the amateur naturalist, is scientifically sound and attempts to simplify the identification of plants using ink drawings and colour photographs in combination with keys.

The Murdoch University community is grateful to those of its members whose enthusiasm and skill have made possible this lasting contribution to the celebration of our tenth anniversary. I congratulate them.

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Chancellor, Murdoch University

March 1986
ACKNOWLEDGEMENTS

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The following Plant Recognition course students contributed to the project: Colin Beasley, Liz Franks and John Schalinger. We are also grateful to Dr Eric Hopkins for providing information on the Somerville pine plantation, Peter Voight for help with Appendix 3, Rob Manning for advice on orchids, Dr Jen McComb for reading the manuscript, Dee Cahill and Carol Hooper for word-processing, Shirley Booth and Murray Austen-Smith for design and layout. The map was prepared by Gaye Roberts.

Much of the value of a booklet dealing with identification of the flora lies in its illustrations. Credit for these is as follows:

*Line Drawings*
- Michael Bamford: Figs. 13, 63, 69, 76, Frontispiece (*Banksia attenuata*)
- Lorna Charlton: Fig. 74
- Helga Mellor: Figs. 19-24
- Joanne Robinson: Figs. 7, 16, 26, 27, 32, 33, 40, 51, 57, 58, 60, 66, 70, 72; pages 21, 95, 114, 122,
  Title Page (*Stylidium schoenoides*)
- Anitra Wendon: Figs. 6, 8-12, 14, 15, 17, 18, 31, 34-39, 41-50, 52-57, 61, 64, 65, 68, 71, 73; page 89

*Colour photographs*
- Dr S.D. Hopper: Cover (*Banksia menziesii*)
- Ruth McGrath: Plates 9, 11, 15, 18, 20, 22, 23, 25

Other figures and plates by the authors.
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INTRODUCTION TO THE VEGETATION

Background
Murdoch University lies at the interface of two dune systems on the western third of the Swan Coastal Plain. To the west lie the tall Spearwood Dunes, mainly yellow sands over limestone. The older and highly leached white sands of the Bassendean Dune system lie to the east. Separating the two systems is a chain of freshwater lakes and wetlands, the closest to Murdoch being North Lake.

Murdoch is part of the once extensive eucalypt/banksia woodland that clothed the well-drained ridges of much of the metropolitan area. Quite subtle changes in elevation, slope, drainage and soil chemistry provide a range of habitats resulting in a rich and diverse flora. As a result the Murdoch flora contains not only elements of the Kwongan sandplain vegetation (heathlands on infertile soils, e.g. Calectasia cyanea, Daviesia triflora), but units or species characteristic of the jarrah forest (e.g. Banksia grandis, Eucalyptus marginata), coastal woodlands on calcareous soils (e.g. Eucalyptus gomphocephala, Olearia axillaris) and freshwater wetlands (e.g. Astartea fascicularis, Melaleuca preissiana).

Trees form the dominant and most familiar components in the region. Of the 200 indigenous species now on campus it is perhaps surprising that only fifteen reach the stature of trees (defined as plants with a single woody trunk and over 4 metres in height). There are four species of eucalypts, two paperbarks, five banksias, and one she-oak, Christmas tree, woody pear and acacia. Clearly, therefore, most diversity is to be found in the shrub and herbaceous communities and much of this book is devoted to these groups. The number of species and their present distributions have been strongly affected by agriculture and forestry pursuits.

Recent History
Parts of the southern half of Murdoch were used to graze cattle, horses and sheep until the mid 1970s. The grazing must, however, have been light in the existing Banksia Woodland because the under-storey is quite intact and there is little weed growth. Limited cropping was also undertaken. Earlier, Chinese market gardeners established vegetable plots near the south-east corner of Melaleuca Swamp. Part of the market garden now has Melaleuca regrowth and the raised beds can still be seen in aerial photographs. Just to the west of the old gardens lies a narrow raised track lined on the eastern side by a single row of Pinus trees. This track once passed north, up the main campus ridge and onto where Riseley Street is today. These and other tracks in the area were probably once used to haul jarrah logs and billets to small local saw-pits or further afield on the limestone track (now Leach Highway) to mills in Fremantle. A few large
jarrah stumps remain on campus, e.g. below Bush Court. In addition to jarrah, tuart was also felled for timber. This species is at the eastern edge of its range, and there are a few remaining trees in Bush Court.

The northern half of Murdoch was part of the University of Western Australia Endowment Land (Cockburn Sound Location 549). In March 1926 an agreement was made between the University of Western Australia and the Conservator of Forests whereby the Forests Department undertook to establish a pine plantation. The area was to be cleared and planted at the rate of 100 acres per annum and the lease period was fifty years. The scheme was inaugurred at a time when there was a strong movement to get parliamentary permission to sell Endowment Lands, and was a challenge by members of the University of Western Australia Senate to find a way to use them profitably. The following description of the Somerville plantation is from *The West Australian* (31 May 1938) — ‘The plantation was divided into areas of about 25 acres, each of which was surrounded by a firebreak 15 feet wide. Each group of four such areas was surrounded by a firebreak one chain wide and each 300 acre lot was surrounded by a two-chain firebreak. The trees were planted about 7 feet apart’.

Wildfires in the Somerville area were small and frequent, for example there were sixty-one in the 1973-74 season. In the early 1960s a lookout tower was erected west of Kardinya to replace the treetop lookout on the edge of South Street.

Most of the Murdoch section was planted from 1937 to 1940 with *Pinus pinaster*. A small area of *P. radiata* was planted near South Street in 1955. Later, the beginning of the construction programme for Murdoch University was symbolically marked by the felling of one tree on 7 February 1973.

Vegetation Units
For practical purposes, the vegetation of Murdoch University is subdivided into five regions (A to E, see map). Except for the Upper Swamp, these are not separated by natural boundaries but reflect past and current land uses. However, each region is distinct both structurally and floristically. Two regions, the Banksia Woodland and Melaleuca Swamp, retain much of their original composition. By contrast, areas of the pine plantation contain only sporadic components of the original flora. Areas where all or nearly all of the indigenous flora has been removed (e.g. farm, irrigated campus grounds) are not considered.

Banksia Woodland (Map area A)
This small remnant of the once extensive woodland in the region lies at the southern end of campus. Here, the tree canopy is quite open allowing light
Fig. 1: Banksia Woodland (Map area A) dominated by small trees of Banksia attenuata and B. menziesii with Allocasuarina humilis, Hibbertia spp. and sedges as ground cover.

to penetrate to the floristically diverse shrub layer. A few large jarrah (Eucalyptus marginata) trees remain. Most of the small tree canopy, which is about 4 metres high, contains a mixture of Banksia attenuata, B. ilicifolia and B. menziesii with patches of Allocasuarina fraseriana (sheoak) and Banksia grandis (Fig. 1). The shrub layer provides a splash of yellow, white and blue in spring. Common species are Hibbertia hypericoides (yellow flowers), Hovea trisperma (blue), Eremaea pauciflora (orange), Hakea prostrata (white), Hypocalymma robustum (pink), Melaleuca thymoides (yellow), Petrophile linearis (pink), P. macrostachya (yellow) and Stirlingia latifolia. Sundews (Drosera) and orchids are locally common in spring.

Upper Swamp (Map area B)
This important wetland lies near the centre of campus. Though many of the trees were removed, the area was not planted to Pinus pinaster because it is waterlogged in winter. The waterbody, which is an outcrop of the water table, has been artificially deepened and now contains numerous long-necked tortoises. Main features of the area include (a) the fringing
paperbark trees (Melaleuca raphiophylla, M. preissiana) and large swamp banksias (Banksia littoralis) with an understorey of mixed sedge species (Cyperaceae, Restionaceae) (Fig. 2); (b) the dense tree-less shrub community consisting largely of Astartea fascicularis, Euchilopsis linearis, Hypocalymma angustifolium, Platytheca galioides and Acacia pulchella; and (c) on drier soil, a fringing belt of flooded gum (Eucalyptus rudis) associated with tall shrubs (Kunzea ericifolia and Melaleuca teretifolia). Smaller shrubs include two aromatic species of Boronia, Hovea pungens, Lechenaultia floribunda and Jacksonia furcellata. The common wattle, Acacia saligna, forms dense stands after fire.

**Eucalypt Woodland (Map area C)**

Though much of this area was once planted to pines considerable regrowth of Eucalyptus rudis, E. marginata and E. calophylla has occurred (Fig. 3). A small clump of Melaleuca preissiana at the eastern end once was part of the wetland opposite Murdoch Drive. Blackboys (Xanthorrhoea preissii) and zamia palms (Macrozamia reidlei) are frequent with several species of Daviesia. The groundlayer is locally

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*Fig. 2: Upper Swamp (Map area B) with reflections of Eucalyptus rudis, Banksia littoralis, Melaleuca preissiana and M. raphiophylla. The water-body is an outcrop of the water-table and supports numerous long-necked tortoises.*
Fig.3: Eucalypt Woodland (Map area C) with Macrozamia reidlei, Xanthorrhoea preissii, Jacksonia furcellata, Dianella divaricata and Conostylis in the foreground, and Eucalyptus rudis regenerating in the distance.

diverse with yellow Conostylis, blue Dampiera and a number of orchids. Perennial veldt grass is invading the more open parts.

Melaleuca Swamp (Map area D)
Melaleuca Swamp forms part of a natural drainage line that extends to North Lake. Its boundaries are Farrington Road and the University’s farm paddocks. Two species of paperbarks, Melaleuca raphiophylla and M. preissiana, together with the swamp banksia (Banksia littoralis) form a nearly closed canopy up to 6 metres high. Taller flooded gums line the flanks. Because of the dense overstorey and saturated soils in winter the understorey is dominated by a sedge growing to 2 metres high. This community provided shelter for long-nosed bandicoots in the past and is easily destroyed by trampling. Understorey shrubs include Agonis linearifolia, Aotus cordifolia, Leucopogon australis, Oxylobium lineare, Sphaerolobium vimeineum and Viminaria juncea which occur nowhere else on campus. Several weeds have become established, e.g. pampas grass (Cortaderia selloana), arum lily (Zantedeschia aethiopica) and the red-ink plant (Phytolacca octandra).

The southern edge of Melaleuca Swamp had a drainage channel cut through in 1975. A number of aquatic weeds have since invaded, chiefly
Callitriche stagnalis, Lemna minor (duckweed), Polygonum minus and Typha domingensis (bulrush).

Scattered Pine (Map area E)
Much of the campus has remnants of the Pinus pinaster Somerville plantation. The most common plants are weeds, e.g. perennial veldt grass (Ehrharta calycina), pink gladiolus (Gladiolus caryophyllaceous). Little of the indigenous flora remains except for legumes such as Daviesia, Jacksonia, Oxylobium capitatum (bacon and eggs) and Hardenbergia comptoniana (native wisteria); monocots including Conostylis and Dianella; and scattered clumps of woolly bush (Adenanthos cygnorum), Christmas trees (Nuytsia floribunda), marri and, towards North Lake, the woody pear (Xylomelum occidentale). A single specimen of Exocarpos in the Sandalwood family occurs south of the library. Several introduced natives have become established, e.g. Chamelaucium uncinatum, Leptospermum laevigatum and Pelargonium capitatum.

Future Developments
Few universities in Australia are fortunate enough to have remnants of native vegetation on campus. Not only are these an asset to the campus appearance but can also be valuable as an educational resource. For example, several courses within the School of Environmental and Life Sciences at Murdoch University use areas of campus bushland for field exercises and sources of biological material for laboratory classes. Because map areas A, B, C and D harbour the greatest diversity of species they have the greatest potential for teaching and research. Consequently, adequate provision should be given to maintaining the integrity of these areas by incorporating them permanently into the University landscape. This will require the development of strategies to minimize current disturbance as well as a commitment to long term management. The most severe threat is continued weed invasion. Weeds create an aesthetically undesirable effect and displace native species and hence reduce diversity.

Weed invasion can be reduced by keeping disturbances, such as some human activities, fire and grazing, to a minimum and selectively planting surrounding areas with species which inhibit weed invasion, thus forming a buffer zone.

Human disturbances such as vehicular movement, minor road construction and indiscriminate trampling will be of major concern as the campus population grows.

Already native vegetation has been run down after re-establishing itself on old tracks both in the Upper Swamp (B) and the Banksia Woodland (A). Future road construction should not dissect areas of high conservation
value (e.g. A, B and C). Whilst it was unfortunate that the Murdoch University ring-road was constructed through the Eucalypt Woodland (C), it was gratifying to see that care was taken to protect the area as much as possible. All too often excessive areas are cleared for road construction and wide, sandy strips result, as occurs on Murdoch Drive.

Much of the Murdoch flora is well adapted to fire but weed establishment is increased in situations where fires occur. Firebreaks should be well planned with the intention of protecting bushland as well as other property and buildings.

Rabbit control will need to be considered when formulating management plans. Rabbits not only graze on the vegetation but spread seeds in droppings and cause serious disturbance through digging burrows.

The establishment of buffer zones around the Eucalypt Woodland, Upper Swamp and Banksia Woodland would increase the viability of these areas as reserves. Fringing areas could, for example, be selectively replanted and managed to encourage the growth of desirable species. Such planting programmes should not be preceded by slashing as this only increases weed growth and dispersal and hinders the progress of native species that are re-establishing. This approach will be particularly useful in the Eucalypt Woodland.

Murdoch University has, in some areas, an opportunity to incorporate native bushland with a planned landscape. We hope that this opportunity is fully recognized and a programme is implemented to produce an effect which is aesthetically, environmentally and educationally desirable.

HOW TO USE THIS BOOK

This book has been prepared for use by the Murdoch University community to identify native plants on campus and will also be useful in Banksia woodlands of surrounding suburbs. Plants have been described using easily identifiable characters which require the minimum use of equipment or scientific knowledge. A hand lens or magnifying glass may be necessary to see the finer plant structures, and unfamiliar terminology is explained in a glossary.

The book covers vascular plants and hence excludes the mosses, liverworts, lichens and algae. Only two species of non-flowering vascular plants occur on the campus, the zamia palm and bracken fern, and these are described on page 19.

For the flowering plants, there are three ways to use this book. Firstly, if you know nothing about the particular specimen you will need to use the family key on page 14 to find out which family it belongs to. Then you would consult the more detailed family and species descriptions. Secondly,
if you know the family of the specimen you will go directly to the family (list on page ix) and species descriptions. Thirdly, it is possible to compare the specimen with the figures and plates to find its likely identity.

Introduced native horticultural species and exotic weeds are not given full descriptions but are listed in Appendices 2 and 3. A few introduced plants which may be mistaken as natives and which occur in bush areas are included in the main text.

1. The Family Key
To use this key you need to choose one of two characters which best describes the specimen in question. The appropriate description is followed by a number which directs you to another two questions.

   e.g. 1. Plants woody, stems not green ...................... 2
        Plants herbaceous, stems green ...................... 19

   In this case if the first choice is correct you go to question 2; if the second choice is correct you go to question 19.

   This procedure is followed until eventually a family name is given, followed by the page number of the family description. Other information such as the common name of the family, generic names and even species may be given at this stage depending on how many genera and species occur on campus.

   The key has been designed so that in areas where mistakes are likely to be made it is still possible to get the right family name although strictly speaking the description may be botanically incorrect. The two most difficult parts of the key are in determining whether flowers have a distinct calyx and corolla and whether the ovary is superior or inferior (Fig. 4). If these characteristics are not immediately obvious, it may be necessary to remove a single flower to obtain a closer look and cut a longitudinal section to expose the ovary.

2. The Family and Species Descriptions
Once the family is determined, or if it is already known, the process of identification is fairly straightforward using the family and species descriptions. In families where only one to three species are present it is possible to determine the species by looking at the descriptions and appropriate figures and plates. When more than three species are present, a table is provided which distinguishes them using easily identifiable characters. These tables may not necessarily give a specific answer but will at least indicate the descriptions you should read to find out which best matches your specimen.

3. The Scanning Approach
This involves comparing plates and figures throughout the book with the plant being identified. The method, although it may be tiresome, can be
effective and used to identify plants to any level, i.e. family, genus or species. It is most useful when only an incomplete specimen is available (e.g. plants not in flower) or by people who prefer looking at pictures to reading text.

An Explanation of Botanical Names
For those who are unfamiliar with botanical nomenclature an explanation of the names given in this text is appropriate. The family represents a group of morphologically similar plants which are also meant to be phylogenetically related, i.e. they have developed from the same ancestral lines. Each family is divided into smaller groups called genera and in turn these are divided into species. Species names are represented by a combination of the generic name plus a specific epithet (name), together called a binomial. For example, for *Drosera macrantha* Endl., *Drosera* is the generic name, *macrantha* is the specific epithet. The binomial is followed by the name of the author who published the original species description. For *Drosera macrantha*, S.L. Endlicher is the author and his name is abbreviated to Endl. (see Appendix 1 for author abbreviations).

Variations of this format exist when the species is re-described or given a more correct status (e.g. changing a variety to a species). Here the original author’s name is written in parenthesis. For example, *Allocasuarina fraseriana* (Miq.) L.Johnson, this plant has recently been placed in the new genus *Allocasuarina* by L.Johnson, it was formerly *Casuarina fraseriana* Miq.. Another variation occurs when the two authors’ names appear with the Latin preposition *ex* in between, e.g. *Eucalyptus marginata* Donn *ex* Sm. where J. Donn proposed the name and J.E. Smith published the description.

This system of nomenclature is very important for consistent identification and effective communication for botanists. Common or vernacular names are more convenient for many people and where these are known they are given after the binomial.

Collecting Specimens
It must be remembered that all native flora is protected by law and, hence, any collection on crown land requires a 'Flora Collecting Permit'.
GLOSSARY

achene: a dry, indehiscent fruit formed from a superior ovary of one carpel containing one seed

acuminate: tapering gradually to a long point (Fig.5)

acute: terminating in a short point (Fig.5)

adpressed: pressed against, in close contact with

alternate: leaves when borne singly at different heights on the stem

annual: a plant whose life span ends within one year of germination

aril: growth from the funicle forming a covering over the seed coat

attenuate: tapering gradually

awn: a bristle-like appendage

axillary: a flower or inflorescence in the axil of a leaf

berry: a succulent indehiscent fruit with seeds immersed in a pulp

bract: a leaf-like structure associated with an inflorescence or flower

bracteole: a small bract-like structure on the pedicel or calyx

bipinnate: a compound leaf that is twice divided (Fig.5)

calyx: the sepals of a flower collectively

capsule: a dry fruit formed from two or more united carpels and dehiscing at maturity to release the seeds

carpel: a modified leaf-like structure folded to enclose the ovule(s) in an ovary

ciliate: fringed with hairs

column: stamens and style combined as in Orchidaceae and Stylidiaceae

cordate: heart-shaped

corolla: the petals of a flower collectively

corymb: an inflorescence in which the pedicels of the lower flowers are longer than those of the flowers above, bringing all flowers to about the same level

cuneate: wedge-shaped (Fig.5)

cyme: a one-sided raceme

decumbent: spreading horizontally but then growing upwards

decurrent: the blade or petiole of a leaf extended down the stem

dehiscent: opening at maturity to release the contents

dentate: toothed

dichotomous: dividing into two

dioecious: having the male and female reproductive structures on separate plants

disc floret: a flower in the central part of a head of a daisy

divaricate: widely spreading
drupe: a succulent fruit formed from one carpel, having the seed(s) enclosed in a stony layer
elliptic: oval in outline, widest at the centre (Fig.5)
entire: having a smooth margin
epiphyte: a plant growing on another plant for support only
filiform: threadlike, slender
flexuose: bent from side to side in a zig-zag form
dehiscent: a dry, dehiscent fruit formed from one carpel and dehiscing along the line of fusion of its edges
funicle: the stalk of an ovule
glabrous: without hairs

glume: a bract in the inflorescence of a grass or sedge
haustorium: absorbing organ through which a parasite obtains materials from its host
inferior ovary: sepals, petals and stamens rising from the top of the ovary (Fig.4)
inflorescence: the arrangement of flowers on a plant
irregular flower: a flower that is bilaterally symmetrical (Fig.4)
keel: a boat-shaped structure formed by the two anterior petals of a flower in Fabaceae
labellum: the landing platform formed by a petal e.g. in the Orchidaceae
lanceolate: lance-shaped, about four times as long as it is broad, broadest in the lower half and tapering towards the tip (Fig.5)
legume: a pod-like fruit formed from one carpel characteristic of the Mimosaceae and Fabaceae
lemma: the lower of the two bracts enclosing the grass flower
ligule: an appendage from the top of a leaf e.g. from the leaf sheath of grasses
linear: long and narrow with sides parallel (Fig.5)
merous: number of parts making up a particular structure within a flower
mucron: a sharp, abrupt terminal point
mycorrhiza: symbiotic union between a fungus and a plant root
oblanceolate: similar in shape to lanceolate but attached at the narrower end (Fig.5)
oblong: having the length greater than the width, but not many times greater, and the sides parallel (Fig.5)
obovate: similar in shape to ovate but attached at the narrower end (Fig.5)
obtuse: blunt or rounded at the apex
operculum: in Eucalyptus a cap covering the bud
orbicular: circular or nearly so (Fig.5)
ovary: the basal portion of a carpel or group of fused carpels enclosing the ovule(s)
oveate: shaped like a section through the long axis of an egg, attached by the wider end (Fig.5)
ovoid: egg-shaped in three dimensions
ovule: structure which develops into the seed after fertilization
palea: the upper and innermost of the two bracts enclosing the grass flower
palmate: leaves divided into several leaflets with the leaflets arising from the same point
panicle: a compound raceme in which the flowers are pedicellate
pedicel: the stalk of a flower
peduncle: the stalk of an inflorescence
pendulous: drooping
perennial: a plant whose life span extends over more than two growing seasons
perianth: the calyx and corolla of a flower, usually where the two are similar
petiole: the stalk of a leaf
phyllode: a leaf whose blade is absent and whose petiole has assumed the functions of the whole leaf
plumose: like a feather
prostrate: lying flat on the ground
pubescent: covered with short soft erect hairs
pungent: ending in a stiff sharp point
raceme: an indeterminate inflorescence in which a main axis produces a series of flowers on lateral stalks, the oldest at the base and the youngest at the top
ray floret: the irregular, ligulate flowers in the head of a daisy
recurved: curved backwards
regular flower: a flower that is symmetrical about more than one vertical plane (Fig.4)
reniform: kidney-shaped
reticulate: forming a network
revolute: rolled downwards, of a leaf where the margins are rolled towards the midrib
rhizome: a horizontal underground stem
scape: the stem-like, flowering stalk

Fig. 4 Flower morphology
serrate: toothed, with asymmetrical teeth pointing forward
sessile: without a stalk
setaceous: bristle-like
spathulate: spoon-shaped, broadest at the outer end and gradually narrowing towards the base (Fig.5)
spike: an unbranched, indefinite inflorescence of sessile flowers
spikelet: a unit of the inflorescence in grasses and sedges
stamen: the male organ of a flower consisting of a filament and anther
staminode: sterile stamen
standard: the posterior petal in the flower of the Fabaceae
stigma: the pollen-receptive surface of a carpel
stipella: a small stipule found at the base of leaflets
stipitate: shortly stalked
stipule: one of a pair of appendages at the bases of leaves in many dicotyledons
stolon: horizontal stem rooting at the nodes forming new plants
superior ovary: petals, sepals and stamens arising at the base of the ovary (Fig.4)
tepals: perianth segments of a flower in which all perianth segments are similar
terete: cylindrical, or nearly so; circular in cross-section
triquetrous: triangular in cross-section and acutely angled
truncate: with an abrupt end
tuber: underground storage organ formed by the swelling of a stem or root
umbel: an inflorescence in which all the flower stalks arise in a cluster at the top of the peduncle and are of about equal length
unisexual: bearing only male or female reproductive organs
wing: a lateral petal of a flower in the Fabaceae

acuminate   acute   elliptic   lanceolate   linear   oblancoate   oblong
bipinnate   cuneate   obovate   ovate   orbicular   spathulate

Fig. 5 Leaf morphology
KEY TO FAMILIES OF FLOWERING PLANTS

Note: to use this key you need to choose one of two characters which best describes the specimen in question. The appropriate description is followed by a number which directs you to another two questions.

  e.g. 1 Plants woody, stems not green ........................................ 2
       Plants herbaceous, stems green .......................................... 19

In this case, if the first choice is correct you go to question 2; if the second choice is correct you go to question 19. For further information about using the key to families refer to page 7.

Plants having leaves with reticulate (branching) veins, flower parts in multiples of 4 or 5, seeds with 2 cotyledons. Herbaceous or woody. **(Dicotyledons)** p.21

Plants having leaves with parallel veins, flower parts in multiples of 3, seeds with 1 cotyledon. Mainly herbaceous. **(Monocotyledons)** p.89

---

**Dicotyledons**

1  Plants woody, stems not green
   ('crack' when broken) .................................................... 2
   Plants herbaceous, stems green ........................................ 19

2  Leaves reduced to dry scales on needle-like green stems
   Leaves not reduced  ....................................................... 3

3  Flowers with distinct calyx and corolla
   Flowers without distinct calyx and corolla ......................... 14

4  Flowers irregular
   Flowers regular .................................................................. 5

5  Flowers pea-shaped
   Flowers not pea-shaped ...................................................... 7

6  Stamens 10, flowers yellow, purple red or orange
   Stamens less than 10, flowers pink, purple or blue, some yellow on keel
   **Fabaceae (pea family)** .................................................... p.41
   **Polygalaceae** (**Comesperma** sp.) ................................ p.71

7  Ovary superior .................................................................. 8
   Ovary inferior .................................................................. 13

8  Crushed leaves scented
   Crushed leaves not scented ................................................... 9

9  Petals obvious, stamens shorter than petals
   Petals reduced, stamens longer than petals .............................
   **Rutaceae** ........................................................................ p.72

10 (i) Flowers white, cream or red
    (ii) Flowers blue-purple
    (iii) Flowers yellow
    **Epacridaceae** ................................................................ p.34

---

14
11 Plants slender shrubs

Plants twiners

12 Flowers solitary, large petals more than 5mm long

Flowers in globular heads, petals less than 5mm long

13 Crushed leaves scented

Crushed leaves not scented

14 Flowers irregular

Flowers regular

15 Ovary superior

Ovary inferior

16 Ovary inferior, flowers white or cream, perianth forming an operculum

Ovary superior, perianth not forming an operculum

17 (i) Flowers yellow in globular heads, perianth segments less than 5mm long, small shrub

(ii) Flowers very small, greenish yellow, in depression along condensed spikes

(iii) Flowers pink, white or yellow not in globular heads, perianth fused to form a tube at base. Perianth segments less than 5mm long

18 Staminal filaments fused along the length of the perianth, anthers at end of perianth lobes, tall shrubs

Staminal filaments not fused along whole length of perianth, small shrubs

19 Plants with very fleshy leaves

Plants not fleshy

20 Flowers with distinct calyx and corolla

Flowers without distinct calyx and corolla

21 Flowers irregular

Flowers regular

22 Flowers pea-shaped

Flowers not pea-shaped

23 Stamens 10

Stamens less than 10
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Family</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>Ovary superior</td>
<td>Scrophulariaceae</td>
<td>p.77</td>
</tr>
<tr>
<td></td>
<td>Ovary inferior</td>
<td></td>
<td>p.30</td>
</tr>
<tr>
<td>25</td>
<td>(i) Flowers yellow or red</td>
<td>Euphorbiaceae</td>
<td>p.69</td>
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<tr>
<td></td>
<td>(ii) Flowers cream-white</td>
<td>Orobancheaeae</td>
<td>p.78</td>
</tr>
<tr>
<td></td>
<td>(iii) Flowers blue-purple or pink</td>
<td>(Orobanche minor)</td>
<td></td>
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<td>26</td>
<td>Plants with green leaves</td>
<td>Geraniaceae</td>
<td>p.73</td>
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<tr>
<td></td>
<td>Plants without green leaves</td>
<td>(Pelargonium capitatum)</td>
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<tr>
<td>27</td>
<td>Plants densely hairy</td>
<td>Lamiaceae</td>
<td>p.76</td>
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<tr>
<td></td>
<td>Plants not densely hairy</td>
<td>(Hemiondra pungens)</td>
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<td>28</td>
<td>Leaves pungent</td>
<td>Scrophulariaceae</td>
<td>p.77</td>
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<td></td>
<td>Leaves not pungent</td>
<td></td>
<td>p.29</td>
</tr>
<tr>
<td>29</td>
<td>Flowers sticky, red to purple</td>
<td>Scrophulariaceae</td>
<td>p.77</td>
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<td>Flowers not sticky, blue-purple</td>
<td>Violaceae</td>
<td>p.33</td>
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<tr>
<td>30</td>
<td>Stamens fused to style to form a column</td>
<td>Stylidiaceae (trigger plants)</td>
<td>p.80</td>
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<td></td>
<td>Stamens not fused to style</td>
<td></td>
<td>p.31</td>
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<tr>
<td>31</td>
<td>Petals ribbed</td>
<td>Goodeniaceae</td>
<td>p.82</td>
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<td>Petals not ribbed</td>
<td>Lobeliaceae (Lobelia alata)</td>
<td>p.79</td>
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<tr>
<td>32</td>
<td>Ovary superior</td>
<td></td>
<td>p.33</td>
</tr>
<tr>
<td></td>
<td>Ovary inferior</td>
<td></td>
<td>p.36</td>
</tr>
<tr>
<td>33</td>
<td>Leaves sticky with glandular hairs</td>
<td>Droseraceae (Drosera sp.)</td>
<td>p.30</td>
</tr>
<tr>
<td></td>
<td>Leaves not sticky, without glandular hairs</td>
<td></td>
<td>p.34</td>
</tr>
<tr>
<td>34</td>
<td>Flowers yellow in globular heads, petals less than 5mm long</td>
<td>Mimosaceae (Acacia sp.)</td>
<td>p.38</td>
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<tr>
<td></td>
<td>Flowers white or pink</td>
<td></td>
<td>p.35</td>
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<tr>
<td>35</td>
<td>Plants hairy with white to pink terminal flowers</td>
<td>Caryophyllaceae</td>
<td>p.122</td>
</tr>
<tr>
<td></td>
<td>Plants not hairy, foliage dark green or purplish green, flowers white with yellow stamens. Berries black or purplish-black when mature</td>
<td>Solanaceae (Solanum nigrum)</td>
<td>p.122</td>
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<tr>
<td>36</td>
<td>Plants with branched tendrils, flowers yellow, large melon fruits</td>
<td>Cucurbitaceae</td>
<td>p.121</td>
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<tr>
<td></td>
<td>Plants without tendrils, flowers cream-white in compound head</td>
<td>(Citrullus lanatus)</td>
<td></td>
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<tr>
<td>37</td>
<td>Leaves giving offensive odour when crushed</td>
<td>Rubiaceae</td>
<td>p.84</td>
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<tr>
<td></td>
<td>Leaves odourless when crushed</td>
<td>(Opercularia vaginata)</td>
<td></td>
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<td></td>
<td></td>
<td>Apiaceae</td>
<td>p.74</td>
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</tbody>
</table>
38  Flowers irregular  
    Flowers regular

39  Flowers in compound head  
    Flowers solitary

40  Ovary superior  
    Ovary inferior

41  Flower morphology variable throughout flower head  
    Flower morphology not variable

42  Twining plants  
    Non-twining plants

43  Flowers small (less than 5mm), bisexual and cream-white. Leaves absent or very reduced  
    Flowers large (more than 5mm), unisexual and white. Leaves large (more than 20mm), petiolate and divided into 3

44  (i) Flowers in cylindrical head, perianth greenish-yellow  
    (ii) Flowers bright yellow  
    (iii) Perianth white or cream

45  Male and female plants separate, stamens less than 10 on male plant  
    Flowers bisexual, stamens 10, mature berries, purple-black

**Monocotyledons**

1  Plants growing in freshwater habitat. Roots in soil, foliage emerging from water.  
    Flowers with distinct perianth, carpels separate and distinct  
    Land plants, may grow near freshwater

2  Plants grass-like. Petals and sepals (perianth) not obvious, stamens and ovary surrounded by glumes or membranous perianth segments

3  Perianth absent, stamens and ovary surrounded by glumes

4  Perianth present
4 Stems hollow, nodes present, leaf sheaths which surround nodes are split
Stems solid, nodes absent, leaf sheath not split

5 Leaves mostly basal
Leaves reduced to sheathing bracts

6 Ovary superior
Ovary inferior

7 Calyx and corolla similar in shape and colour, forming perianth
Calyx and corolla distinct, perianth whorls dissimilar

8 Plants small (less than 0.5m) and herbaceous, flowers blue
Plants large (more than 0.5m), with tough leaves, long flowering spike and when present, black stem

9 Stamens and style fused to form a column. Petals 3, sepals 3, may be brightly coloured or green, sometimes difficult to distinguish. Plants often only having one leaf
Stamens and style not fused

10 Stamens 6
Stamens 3

11 Perianth brightly coloured, pink, purple or lilac
Perianth not brightly coloured

Poaceae (grass family) p.104
Cyperaceae pp.95, 101
Juncaceae (Juncus pallidus) pp.95, 100
Restionaceae pp.95, 98
Liliaceae p.108
Commelinaceae (Cartonema philydroides) p.94
Xanthorrhoeaceae (Xanthorrhoea preissii) p.114
Orchidaceae p.115
Haemodoraceae (kangaroo paw family) p.105
Iridaceae p.113
Haemodoraceae (Haemodorum paniculatum) p.105
NON-FLOWERING VASCULAR PLANTS

Two species on campus, a fern (*Pteridium esculentum*) and the other, a cycad (*Macrozamia reidlei*), belong in this category. Ferns typically have leaves which unroll as they develop and reproduce by spores. The spores are produced in sacs or sporangia on the undersurface of the leaf giving it a brown appearance. Sporangia are clustered together in a structure called a soral and the shape and distribution of these are important in identifying species. The sporangia may be covered by a layer of tissue called the indusium. *Pteridium esculentum* is one of the commonest plants in Australia. It spreads rapidly by means of a horizontal underground stem or rhizome. Cycads, unlike ferns, reproduce by seed. The plants are dioecious and have large strobili (cones) on both the male and female plants. These strobili and a palm-like leaf make the Murdoch species easy to recognize. These plants are poisonous but the Aborigines had methods of preparation and cooking that made the seed edible.

*Pteridium esculentum* (G. Forster) Cockayne; bracken fern (family Polypodiaceae)

*Shrub* to 1.5m, perennial, rhizomatous. *Leaves* arising from underground rhizome; blade bipinnate glabrous on upper surface, hairy underneath, stiff; petiole with short stiff hairs. *Sori* marginal and continuous along underside of leaf; indusium opening towards midrib of leaf.  

*Macrozamia reidlei* (Fischer ex Gaudich.) C.A. Gardner; zamia palm (family Zamiaceae)

*Shrub* to 2m, perennial, subterranean stem. *Leaves* tough and almost leathery, pinnate, to 2m long; leaf bases woolly, persistent, sometimes forming an obvious bole at the base of the plant. *Cones* stalked to 0.5m long; female cones producing large seeds with bright red coating.  

*Occurrence* A B C E
Dicotyledons

Dampiera linearis
LAURACEAE

The two species from this family that occur on campus belong to the genus Cassytha which is placed by some authors in the separate family Cassythaceae. Cassytha species are parasitic climbers which are distributed throughout tropical and subtropical regions but the greatest number of species occur in southwestern Australia. Because of their very reduced vegetative and floral structures they are difficult to tell apart and are also commonly confused with the dodders (Cuscuta species; family Cuscutaceae. However, dodders have a yellow-brown appearance rather than green as in Cassytha). The most distinguishing feature of the two Murdoch campus species is the presence or absence of hairs over the surface of the plant.

Cassytha glabella R.Br.; tangled dodder laurel

Twiner, herbaceous, green, perennial, glabrous stems, elliptic haustoria. Leaves triangular to ovate, very small. Inflorescence of solitary or paired heads on peduncle 7-8mm long. Flowers very small; corolla white; calyx yellowish green with yellow or white; stamens 9 fertile in 3 whorls, 3 staminodes. Flowering period all year round Occurrence A B

Cassytha racemosa Nees; dodder laurel (Fig.6)

Twiner, herbaceous, green, perennial, hairy, elliptic haustoria. Leaves narrowly ovate, very small. Inflorescence a raceme of 4-8 flowers. Flowers very small, white to yellowish green; stamens 6 fertile in 2 whorls, 6 staminodes. Flowering period all year round Occurrence A B

Fig.6 x1.5
RANUNCULACEAE

The buttercup (Ranunculus) family with about 1,800 species is common in the northern temperate zone. Only about forty-five species are Australian. In southwestern Australia occur three bright yellow species of Ranunculus and two species of Clematis with white flowers. Diagnostic features are the divided leaves, free floral parts, numerous stamens, few to many free carpels and endospermic seeds. Like the Dilleniaceae this is a very old family. Clematis is a prominent woody climber which produces large heads of dry one-seeded fruits with long plumed tails which are dispersed in the wind.

*Clematis pubescens* Huegel ex. Endl.; white clematis (Fig. 7)

*Climber*, young stems with short hairs. *Leaves* opposite, seedling leaves entire, adult leaves divided into 3 leaflets, main petiole 40-50mm long; leaflets ovate, 50-60mm long, 20-30mm wide, twining. *Flowers* in axillary racemes, pedicels 30-40mm long, hairy; perianth one whorl of 4 segments, elliptic, c. 30mm long, 5mm wide, white; male flowers with numerous stamens; female flowers with 4 or more staminodes. *Fruit* achene with plumose awn.

*Flowering period* July-October  
*Occurrence* A C E

*Ranunculus muricatus* L.

*Herb* to 0.3m, soft, glabrous. *Leaves* near base large, alternate, petiole terete, hollow, up to 150mm long, stem-clasping at base, lamina semicircular, c. 50mm across, lobed; flowering leaves small, opposite or alternate, lanceolate, 20-25mm long, 8-10mm wide. *Flowers* axillary, c. 15mm across; pedicels to 25mm long; corolla five free petals, yellow, shining; carpels 15-20, free. *Achenes* rough. *Introduced.*

*Flowering period* September-November  
*Occurrence* Veterinary School farm

Fig. 7 x0.3
CASUARINACEAE

This family has only five genera which are distributed throughout Australia, parts of Asia and Oceania. The Australian genera are *Casuarina, Allocasuarina* (formerly included in *Casuarina*) and *Gymnostoma*.

The plants are woody trees or shrubs and their most distinctive feature is having reduced scale-like leaves on needle-like branchlets. The leaves are produced in whorls around the branchlet and the number present in each whorl is useful in identifying individual species. Sexually the plants may be monoecious or dioecious and female flowers develop into woody cones.

Several species in this group are planted extensively outside their native range for the production of firewood and charcoal. They have also been used in dune stabilization programmes in such places as Senegal.

Interesting symbiotic relationships exist in species of *Casuarina* and *Allocasuarina*. In association with soil micro-organisms (e.g. *Frankia* sp.) atmospheric nitrogen fixation can be achieved, and ectotrophic mycorrhizal fungi (e.g. *Pisolithus tinctorius*) can assist in nutrient absorption. This allows the plants to be grown on soils with poor nutrient status.

*Allocasuarina humilis* (Otto and Dietr.) L. Johnson; dwarf sheoak (Fig.8)

- Shrub 1-2m; dioecious. *Branchlets* with numerous internodes; internodes 3-4mm long. *Leaves* scale-like, whorled, 5-7 per whorl, pressed close to stem. *Inflorescence* male spike with peduncle, cylindrical, 3-20mm long; female spike ovoid. *Cone* grey, prominent tip, cylindrical.
- **Flowering period** May-November
- **Occurrence** A E

*Allocasuarina fraseriana* (Miq.) L. Johnson; sheoak

- Tree to 15m; dioecious, thick fibrous bark. *Branchlets* with numerous internodes; internodes 5-15mm long. *Leaves* scale-like, whorled, 6-8 per whorl, not pressed close to stem, reflexed. *Inflorescence* male spike with peduncle, cylindrical, to 120mm long; female spike ovoid. *Cone* reddish brown to grey, globular to ovoid.
- **Flowering period** May-October
- **Occurrence** A C
AIZOACEAE

The pigface family consists of succulent shrubs and herbs in which the leaves store considerable amounts of water. The bisexual flowers have a 4 to 5-lobed perianth; there are 4-5 or numerous stamens, the outer whorls changed into petaloid staminodes; the ovary is inferior or superior with one to many chambers containing numerous ovules; and the fruits may be dry or fleshy.

There are nearly sixty species in Australia with about twenty in Western Australia. The genus Carpobrotus, with large and showy flowers and succulent triquetrous leaves, is a common sight on the coast often growing on exposed sand. The name comes from the Greek meaning edible fruit. Both the fruit and leaves were used in Aboriginal diets. Though two species of Carpobrotus occur in the metropolitan area, only the South African C. edulis, occurs on the Murdoch campus. The fruit of this plant is called the 'Hottentot fig' in its native country.

Carpobrotus edulis (L.) Bolus; pigface (Fig.9).

Herb with stout prostrate stems. Leaves opposite, fused at the base, smooth, fleshy, triquetrous, 40-80mm long, acute. Flowers solitary, terminal, large, 70-100mm across, shades of yellow to pink. Fruit juicy, red, edible.

Flowering period September-December

Occurrence A B C E

Fig.9 x0.5
AMARANTHACEAE

The Amaranthaceae is a cosmopolitan family with about 900 species of herbs and shrubs. The family includes the cockscombs, important weeds e.g. fat-hen, and the native mulla-mullas which are common in the northern and interior regions of Western Australia. Diagnostic features are the flowers with only one whorl of 5 (rarely 4), often brightly coloured, membraneous segments and the one-chambered superior ovary. Flowers are borne in terminal or axillary spikes. Leaves are entire and stipules are absent. The family is close to the Chenopodiaceae (bluebushes, saltbushes, samphires). *Ptilotus polystachyus* is widespread throughout mainland Australia. The succulent, green-flowered plant may be mistaken as a weed.

*Ptilotus polystachyus* (Gaudich.) F. Muell.; (Fig.10)

*Herb* 0.5-1.2m, annual or perennial, sparsely hairy, stems striate. *Leaves* linear to ovate, alternate, margins undulate, 20-60mm long (larger towards the base). *Flowers* crowded in a terminal raceme, greenish-yellow; bracts translucent; sepals 10-15mm long, greenish yellow towards apex, hairy towards base; filaments yellow, fused at the base into a red staminal cup.

*Flowering period* July-November

*Occurrence* C.E.

Fig.10  x0.7

27
DILLENIACEAE

The *Hibbertia* family is a prominent understorey component of the Banksia Woodland and is conspicuous from June to November. The five species of *Hibbertia* are easily recognized by their regular flowers with 5 free, bright yellow petals and 5 persistent sepals. Numerous stamens surround the almost free carpels. Most species are pollinated by beetles. Seeds, which are few, may be dispersed by ants.

<table>
<thead>
<tr>
<th>Species</th>
<th>Leaf base clasp.</th>
<th>Carpel number</th>
<th>Pedicel</th>
<th>Stamens</th>
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<td><em>H. hypericoides</em></td>
<td>no</td>
<td>2</td>
<td>1-5cm</td>
<td>free</td>
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<tr>
<td><em>H. huegelii</em></td>
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<td>5</td>
<td>sessile</td>
<td>in bundles</td>
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<tr>
<td><em>H. racemosa</em></td>
<td>slightly</td>
<td>3</td>
<td>1.5-2cm</td>
<td>in bundles</td>
</tr>
<tr>
<td><em>H. stellaris</em></td>
<td>no</td>
<td>3</td>
<td>2-2.5cm</td>
<td>free</td>
</tr>
<tr>
<td><em>H. subvaginata</em></td>
<td>yes</td>
<td>3</td>
<td>2-3mm</td>
<td>in bundles</td>
</tr>
</tbody>
</table>

*Hibbertia hypericoides* (DC.) Benth.; (Fig. 11)

Shrub 0.3-0.7 m, spreading, branchlets minutely hairy. Leaves linear to narrow oblong, 10-15 mm long, c. 1 mm wide, margins revolute, with short stellate hairs. Flowers axillary, solitary; sepals elliptic, broad, hairy; petals yellow; stamens 10-15 grouped on one side of carpels; carpels 2, hairy.

*Flowering period* May-November

*Occurrence* A C E

*Hibbertia huegelii* (Endl.) F. Muell.; (Fig. 12)

Shrub semi-prostrate to 0.5 m. Leaves densely clustered, linear to terete, 30-50 mm long, c. 1 mm wide. Flowers 1-2 in terminal axillary shoots, almost sessile in clusters of floral leaves; sepals ovate to elliptic, outer ones narrow; petals yellow; stamens in bundles of 4-5 plus 1 free; carpels 5, glabrous.

*Flowering period* August-November

*Occurrence* A
*Hibbertia racemosa* (Endl.) Gilg.; stalked guinea flower

Shrub low, spreading to 0.3m, glabrous. Leaves narrow oblong to linear, 20-25mm long, 2-3mm wide, truncate, midrib and marginal veins often extended to form 3 small points. Flowers axillary, 8-15mm across, peduncles 10-30mm long; sepals ovate to oblong, outer ones narrow; petals yellow; stamens 10-12 in 3 bundles with additional 1 or 2 free; carpels 3, glabrous.

Flowering period July-November

Occurrence A

*Hibbertia stellaris* Endl.; star guinea flower; (Fig.13)

Shrub 0.15-0.2m with spreading filiform branchlets. Leaves linear, narrower at the base. 15-40mm long, 1-3mm wide. Flowers axillary, solitary. 5-15mm across, peduncles 12-25mm long; sepals 3-4mm long, inner sepals membranous; petals orange, twice as long as sepals; stamens 10-15 free around the 3 glabrous carpels.

Flowering period September-January

Occurrence B

*Hibbertia subvaginata* (Steudel) F. Muell.

Shrub 0.3-0.4m, spreading, much branched. Leaves linear to oblong, 25-50mm long, 3-5mm wide, flat, apex truncate, base greatly dilated and stem-clasping. Flowers axillary, solitary or clustered, 15-25mm across, shortly pedunculate; bracts small and dry; sepals as long as or longer than petals; petals yellow, stamens 8-12, fused in 3 bundles with additional 1 or 2 free, staminodes absent; carpels 3, glabrous.

Flowering period July-November

Occurrence A B C E
DROSERACEAE

A cosmopolitan family of insectivorous plants with four genera and about 100 species. The two most well-known genera are *Dionaea* or Venus' fly-trap, in which the leaf blade closes trapping insects inside the interlocking marginal hairs, and *Drosera* (sundews). Sundews have long and short glandular hairs on their leaves. The long hairs are sensitive to touch and move to enclose their prey. The short hairs secrete enzymes which digest the insect allowing small molecules such as amino acids to diffuse into the leaf. In this way sundews can supplement their nutrients taken up from soil.

The genus *Drosera* contains both annual and perennial species with rhizomes, fibrous roots or underground tubers; stems are dwarf, erect and climbing or free-standing; leaves are basal rosettes, or all cauline, or a mixture of the two. Flowers are bisexual, regular, with usually 5 (rarely 4 or 8) petals; ovary is superior and has one chamber; styles 2 to 5, often divided.

The seven species of *Drosera* on the Murdoch campus include the pygmy, free-standing and climbing forms. *D. erythrorhiza* forms large mats and the flowers may appear before the leaves. The three climbing species may be distinguished as follows: *D. pallida* has simple styles and its leaves and flowers are smaller than *D. macrantha*. Both *D. pallida* and *D. macrantha* have white flowers, whereas *D. menziesii* usually has pink.

<table>
<thead>
<tr>
<th>Species</th>
<th>Stem habit</th>
<th>Leaves</th>
<th>Flower colour</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Drosera erythrorhiza</em></td>
<td>dwarf</td>
<td>large basal rosette</td>
<td>white</td>
</tr>
<tr>
<td><em>D. glanduligera</em></td>
<td>dwarf</td>
<td>small basal rosette</td>
<td>red or orange</td>
</tr>
<tr>
<td><em>D. macrantha</em></td>
<td>climbing</td>
<td>cauleine</td>
<td>white</td>
</tr>
<tr>
<td><em>D. menziesii</em></td>
<td>climbing</td>
<td>cauleine</td>
<td>pink</td>
</tr>
<tr>
<td><em>D. paleacea</em></td>
<td>dwarf</td>
<td>small basal rosette</td>
<td>white</td>
</tr>
<tr>
<td><em>D. pallida</em></td>
<td>climbing</td>
<td>cauleine</td>
<td>white</td>
</tr>
<tr>
<td><em>D. stolonifera</em></td>
<td>erect</td>
<td>basal rosette and cauline</td>
<td>white</td>
</tr>
</tbody>
</table>
**Drosera erythrorhiza** Lindley; red ink sundew

Herb with flat, leafy rosette connected to underground tuber; often in dense colonies 1-3m across. Leaves spatulate, green to red, sticky, 20-50mm long, 15-25mm wide. Flowers 10-30 in a single inflorescence 40-50mm high; calyx divided almost to the base; petals obovate, 6-10mm long, white; styles 3.

Flowering period March-July

Occurrence A B E

**Drosera glanduligera** Lehm.; scarlet sundew, pimpernel sundew

Herb with small, flat rosette of leaves and fibrous roots; stem 5-10mm high. Leaves 10-20, yellow-green, petiolate, lamina suborbicular, 5-8mm across, glandular. Flowers in racemes 15-30mm high, scapes glandular hairy; calyx with shaggy hairs; petals obovate, red or orange; styles 3, divided near apex.

Flowering period August-October

Occurrence B C E

**Drosera macrantha** Endl.; bridal rainbow sundew

Herb climbing to 1.2m, tuberous, stem hairy in upper part. Leaves in groups of three, petioles 10-50mm long, lamina orbicular, concave, 4-8mm across, glandular. Flowers 5-30 in loosely branched terminal clusters; sepals densely hairy; petals obovate, 6-12mm long, white; styles 3, very densely branched.

Flowering period July-October

Occurrence A

**Drosera menziesii** R.Br. ex DC.; pink rainbow sundew (Plate 1)

Herb climbing to 50cm, tuberous, stem without hairs. Leaves in groups of three, petioles 6-40mm long, lamina orbicular to slightly reniform, 2-4mm across, glandular. Flowers 2-6 in spreading terminal clusters; sepals hairy; obovate, 8-12mm long, usually red, sometimes pink or white; styles 3, divided towards base, branches not simple.

Flowering period August-October

Occurrence A

**Drosera paleacea** DC.; dwarf sundew

Herb with small, convex rosette of leaves and fibrous roots; stem 10-25mm high. Leaves 20-30, yellow-green to dark red, petiolate, lamina suborbicular, 2-3mm across, glandular; stipules 3-lobed. Flowers numerous on one side of a scape, scape 15-40mm long; calyx with or without hairs; petals obovate, 3-4mm long, white; styles 3-5, simple.

Flowering period September-November

Occurrence A
Drosera pallida Lindley; pale rainbow sundew

*Herb* climbing to 1.5m, tuberous, stem glabrous. *Leaves* in groups of three, petioles 10-50mm long, lamina orbicular to slightly reniform, concave, 3-4mm across (i.e. smaller than *D. macrantha*). *Flowers* numerous in terminal cluster, sepals glandular hairy; petals obovate, 8-10mm long, white; styles divided at base in numerous simple branches.

*Flowering period* August-October  

*Occurrence* A B E

Drosera stolonifera Endl.

*Herb* 10-20cm high with basal rosette and several stems arising from cauline rosette. Basal *leaves* spathulate, 10-20mm long, petiolate; cauline leaves whorled, obovate/reniform. *Flowers* in terminal panicle; sepals glabrous; petals 5-10mm long, white; styles of numerous simple segments.

*Flowering period* September-October  

*Occurrence* A
VIOLACEAE

The violet family has about 900 species, most of which occur outside Australia. *Hybanthus* is the only genus that occurs in Western Australia. Members of the family are herbs or shrubs with alternate leaves, 5 free sepals and 5 petals. The lower petal is often greatly expanded. The 5 stamens form a ring around the superior ovary which contains a single chamber formed by 3 fused carpels. The ovules are attached to the ovary wall. *H. calycinus* is common on coastal sands overlying limestone. The generic name refers to the pouch at the base of the large, lower petal.

*Hybanthus calycinus* (DC. ex Ging.) F. Muell.; native violet (Fig.14)

*Herb* to 0.5m, perennial. *Leaves* soft, alternate, linear, 20-25mm long, sessile. *Flowers* 3-5 in a raceme; sepals 5, blue and white; petals 5, blue with purple striations, lower petal broadly spathulate with yellow tongue and pouch at the base, other petals small and obliquely ovate; anthers purple and orange surrounding the style; nectary green.

*Flowering period* July-October  

*Occurrence* A C E

Fig.14  x0.7
EPACRIDACEAE

Members of this mainly Australian family of over 400 species are commonly known as heaths. In Western Australia they are almost restricted to the sandy and lateritic soils of the south-west. They form small woody shrubs usually with stiff pungent leaves. Flowers are usually small, mostly white and the corolla is tubular at the base with 4 or 5 lobes. Stamens may be fused to the corolla tube. The ovary is superior.

The largest genus in Western Australia is *Leucopogon* with about 100 species and ten of these are found on the Murdoch campus. These are difficult to tell apart because the flowers are small and many have similar leaves, i.e. in size, shape and colour. Four other genera, *Astroloma, Brachyloma, Conostephium, Lysinema*, each represented by a single species, are more easily separated due to their distinctive flower shapes. The drupes of some species were eaten raw by Aborigines.

<table>
<thead>
<tr>
<th>Species</th>
<th>Leaf width</th>
<th>Inflorescence</th>
<th>Flower colour/length</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Astroloma pallidum</em></td>
<td>2mm</td>
<td>flowers single</td>
<td>white to pink/15-20mm</td>
</tr>
<tr>
<td><em>Brachyloma preissii</em></td>
<td>4-5mm</td>
<td>flowers single</td>
<td>red/4-5mm</td>
</tr>
<tr>
<td><em>Conostephium pendulum</em></td>
<td>4-5mm</td>
<td>flowers single</td>
<td>white and purple/12-18mm</td>
</tr>
<tr>
<td><em>Leucopogon australis</em></td>
<td>5-8mm</td>
<td>flowers 15-20 in long spikes</td>
<td>white/3-4mm</td>
</tr>
<tr>
<td><em>L. conostephioides</em></td>
<td>2mm</td>
<td>flowers 1-3 in short racemes</td>
<td>white/3-4mm</td>
</tr>
<tr>
<td><em>L. parviflorus</em></td>
<td>4-5mm</td>
<td>flowers 10-15 in long spikes</td>
<td>white/2-3mm</td>
</tr>
<tr>
<td><em>L. propinquus</em></td>
<td>2-3mm</td>
<td>flowers 2-5 in short spikes</td>
<td>white/5-6mm</td>
</tr>
<tr>
<td><em>L. racemulosus</em></td>
<td>1mm</td>
<td>flowers 2-5 in short racemes</td>
<td>white/5-6mm</td>
</tr>
<tr>
<td><em>Lysinema ciliatum</em></td>
<td>1-2mm</td>
<td>flowers single</td>
<td>cream/15-20mm</td>
</tr>
</tbody>
</table>

*Astroloma pallidum* R. Br.

Shrub semi-prostrate, 10-20cm, dense branches erect. Leaves lanceolate, concave, striate beneath, margins denticulate, 10-20mm long, c. 2mm wide; apex pungent. Flowers solitary, axillary, vertical, pedicel c. 1mm long, corolla tube over twice length of sepals, white to pale pink, inside bearded at top of throat and five tufts of hairs towards the base; ovary 5-celled. Fruit globular.

Flowering period July-November

Occurrence A C
**Brachyloma preissii** Sonder.; globe heath (Figs. 15, 16)

Shrub to 1m, minutely hairy branches densely clothed with dark green leaves. Leaves narrowly oblong, obtuse with short mucron, 15-20mm long, 4-5mm wide. Flowers sessile, axillary, deep pink or red; corolla tube shorter than sepals, lobes as long as tube. Fruit depressed, globular, furrowed.  
Flowering period May-June  
Occurrence A B C

**Conostephium pendulum** Benth.; pearl flower (Plate 2)

Shrub to 0.5m, erect and much branched. Leaves narrowly oblong, 15-25mm long, 4-5mm wide, apex acute and pungent. Flowers pendulous on long recurved pedicels, axillary, flower base enclosed by numerous pale overlapping bracts; sepals nearly circular, white; corolla tube dilated above middle and conical towards the apex, base of tube white, apex purple.  
Flowering period June-September  
Occurrence A C E

**Leucopogon australis** R.Br.; spiked beard-heath

Shrub to 3m. Leaves linear, shortly petiolate, 30-50mm long, 5-8mm wide, prominent longitudinal veins; apex acute or obtuse. Flowers in terminal or axillary spikes, sweetly scented, 20-40mm long, dense; corolla white, lobes bearded, tube slightly shorter than sepals; ovary 5-celled. Fruit depressed, globular, yellowish.  
Flowering period July-December  
Occurrence D

**Leucopogon conostephioides** DC. (Fig. 17)

Shrub to 0.3m. Leaves erect, overlapping, shortly petiolate, lanceolate, concave, shiny green above, pale striate below, 8-10mm long, 2mm wide; apex pungent. Flowers in short axillary racemes, pendulous, peduncles 1 to 3-flowered; corolla white, tube nearly as long as sepals; ovary 2 to 3-celled.  
Flowering period April-August  
Occurrence A B C
Leucopogon parviflorus (Andrews) Lindley; coast beard-heath
Shrub to 1m. Leaves scattered, elliptic, pale green, 15-20mm long, 4-5mm wide, flat; apex acute. Flowers in axillary and terminal spikes 10-15mm long, racemes dense; corolla white, lobes bearded, corolla tube longer than calyx; ovary 5- or 4-celled. Fruit globular. Flowering period July-October Occurrence A C

Leucopogon propinquus R. Br. (Fig.18)
Shrub to 1m, rigid. Leaves broad-linear, rigid, convex, slightly twisted, 15-25mm long, 2-3mm wide; apex pungent. Flowers 2 to 5 in short axillary spikes, erect, 5-6mm long; corolla white, tube shorter than sepals, lobes woolly; ovary 5-celled. Fruit globular to shortly cylindrical. Flowering period February-June Occurrence A C

Leucopogon racemulosus DC.
Shrub to 1m, rigid, sparsely branched. Leaves linear, narrow, near horizontal, margins revolute, 15-25mm long, c. 1mm wide; apex pungent. Flowers 2-5 in short axillary raceme, pendulous; corolla white, lobes bearded, corolla tube much longer than calyx; ovary 5-celled. Fruit globular. Flowering period April-July Occurrence A

Lysinema ciliatum R.Br.; curry flower
Shrub to 0.6m, young branches hairy. Leaves alternate, ovate, 4-7mm long, 1-2mm wide, erect, stem clasping, concave; apex obtuse. Flowers single, axillary, terminal, curry scented; corolla tube c. 15mm long enclosed by brown bracts and sepals with ciliate margins; corolla lobes 5, cream, star-like, 5-6 mm long, leathery, at right angles to corolla tube. Flowering period July-December Occurrence E
**PITTOSPORACEAE**

The native frangipanni or pittosporum family is mainly Australian in origin. Seven out of the nine genera occur in Western Australia. These range in habit from small trees in arid areas of the State to low shrubs and woody climbers in the more moist southwest. Many have showy flowers, either white, yellow, red or blue, borne in compound inflorescences. The 5 petals may be united into a tube at the base. The ovary is superior and contains from 2 to 5 chambers. Fruits are either dry and dehiscent e.g. the capsules of *Pittosporum*, or succulent and indehiscent e.g. the berries of *Billardiera* and *Pronaya*. Leaves and stems have internal resin ducts.

A number of Australian species are widely cultivated including the weeping *Pittosporum*, the blue-flowered *Sollya* and the cream, blue, orange and red-flowered species of *Billardiera*. The fruits of some species are edible.

*Pronaya fraseri* (J.D. Hook.) E.M. Bennett

Twining shrub, young shoots silky hairy. *Leaves* lanceolate or linear-lanceolate, 2-4cm long, firm, margins recurved, entire; lower leaves often coarsely toothed or lobed. *Flowers* in dense terminal clusters among the last leaves; petals c. 1 cm long, pale blue, sometimes nearly white; ovary hairy. *Fruit* an oblong, cylindrical berry.

*Flowering period* January-April  
*Occurrence* A
MIMOSACEAE

Members of this family are widely distributed throughout the tropics, subtropics and warm temperate regions. There are about fifty genera and over 2,000 species but over half of these belong to the genus Acacia. In Australia these are the familiar wattles which are popular garden plants and easily recognized because of their distinctive yellow flowers. Other genera in this family include Albizia, Mimosa and Adenanthera.

The plants are perennial trees or shrubs (rarely herbs) having leaves which are bipinnate or reduced to phyllodes. Often they are stipulate and many species produce prickly spines on leaves, stems or branches. The flowers are produced in dense cylindrical spikes, racemes or globular heads. Individually the flowers are regular, usually bisexual with 4 or 5 small petals and sepals. The stamens number at least as many as the sepals but in Acacia they are very numerous and are the most conspicuous part of the open flower. A superior ovary which has numerous ovules produces a fruit called a legume which also characterizes two other families, Caesalpiniaceae and Fabaceae.

These plants are important contributors to the nitrogen cycle because symbiotic associations of Rhizobium bacteria in root nodules convert atmospheric nitrogen to organic nitrogen. This can be used for plant growth and can also indirectly increase soil nitrogen content.

Many Acacia species are considered weeds in some situations. Acacia cyclops and Acacia saligna, two Australian species introduced into South Africa to aid dune stabilization, are considered weeds in this area because they are rapidly dispersed and form dense stands which overshadow native plants. Their success is attributed to atmospheric nitrogen fixation and their ability to produce phytotoxic substances which inhibit other plants.

The abundance of acacias in particular areas is often determined by the fire history of that area. Many acacias, e.g. A. pulchella, have high germination after fires and seeds survive even hot burns because they are deep in the soil having been buried by ants.
<table>
<thead>
<tr>
<th>Species</th>
<th>Habit</th>
<th>Leaves</th>
<th>Prickly leaves or branches</th>
<th>Flower heads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acacia cyclops</td>
<td>tall shrub 3-7m</td>
<td>phyllodinous</td>
<td>no</td>
<td>short raceme</td>
</tr>
<tr>
<td>A. huegelii</td>
<td>shrub to 0.5m</td>
<td>phyllodinous</td>
<td>yes</td>
<td>solitary, axillary short raceme</td>
</tr>
<tr>
<td>A. pulchella</td>
<td>shrub to 2m</td>
<td>bipinnate</td>
<td>yes</td>
<td>axillary racemes</td>
</tr>
<tr>
<td>A. saligna</td>
<td>small tree 2-6m</td>
<td>phyllodinous</td>
<td>c.</td>
<td>axillary clusters clusters of one or two per node</td>
</tr>
<tr>
<td>A. stenoptera</td>
<td>shrub</td>
<td>phyllodinous, decurrent</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td>A. willdenowiana</td>
<td>to 0.5m</td>
<td>phyllodinous, decurrent</td>
<td>no</td>
<td></td>
</tr>
</tbody>
</table>

**Acacia cyclops** Cunn. ex Don; coastal wattle (Fig.19)

Shrub or small tree 1-7m; bark smooth, grey. Leaves phyllodinous, narrow oblong or narrow obovate, straight or slightly curved, 3 to 5 distinct veins. Flower heads 2 to 3 in short raceme, globular; c. 40 flowers per head, yellow. Pods persistent on plant, compressed narrowly oblong, not constricted between seeds, often twisted. Seeds dark brown or black surrounded by bright red or orange funicle.

**Flowering period** September-January

**Occurrence** A C E

**Acacia huegelii** Benth.; (Fig.20)

Shrub 0.3-1m, semi-prostrate, multi-stemmed. Leaves phyllodinous almost triangular, mid-rib prominent, pungent pointed. Flower heads solitary, axillary, globular; 20-35 flowers per head, white to cream. Pods compressed, linear, not constricted between seeds. Seeds black with pale aril.

**Flowering period** October-December and July-August

**Occurrence** C

**Acacia pulchella** R.Br.; prickly moses (Fig.21)

Shrub 0.5-2m, erect; axillary spines 1 or 2 per node. Leaves bipinnate. Flower heads in condensed raceme, globular; 20-40 flowers per head, yellow. Pod brown, very compressed. Seeds greyish brown, longitudinal in pod.

**Flowering period** June-October

**Occurrence** A B C E

**Acacia saligna** (Labill.) Wendl.; orange wattle (Fig.22)

Shrub or small tree 2-6m; bark smooth, dark grey. Leaves phyllodinous, very variable, linear to narrowly ovate but much larger at base of tree. Flower heads in axillary racemes, globular; 20-55 flowers per head, yellow. Pod light brown, compressed linear, slightly constricted between seeds. Seeds dark brown to black.

**Flowering period** August-September

**Occurrence** A B C E
**Acacia stenoptera** Benth.; (Fig.23) (Plate 3)

Shrub 0.3-1m, sometimes spreading. Leaves phyllodinous, decurrent with thick prominent marginal veins, c. pungent. Flower heads in axillary clusters, globular; 6-10 flowers per head, cream to yellow. Pods light brown to black, tapered at each end, not constricted between seeds. Seeds black with pale prominent aril.

*Flowering period* May-September

*Occurrence* A B C E

**Acacia willdenowiana** Wendl.; grass wattle (Fig.24)

Shrub to 0.5m, prostrate to erect. Leaves phyllodinous, decurrent forming 2 wings, apex of stem and wings rounded. Flower heads clustered 1 or 2 per node, globular, white to yellow. Pod brown, tapering towards base, not constricted between seeds. Seeds black, funicle pale.

*Flowering period* June-October

*Occurrence* A C E
FABACEAE
This cosmopolitan family of herbs, shrubs, climbers and trees has 12,000 species of which 1,100 are in Australia. About twenty-five genera are endemic to Australia, e.g. Bossiaea, Daviesia, Pultenaea, and many have their centre of diversity in southwestern Australia. The most prominent feature is the 'pea' flower composed of 5 petals: a large dorsal, often orbicular, standard; 2 lateral wings; and a ventral keel of 2 partly fused petals. Leaves may be entire, divided or reduced to minute scales e.g. Jacksonia. The 10 stamens are free or fused into a sheath. The ovary is superior and contains one chamber. The fruit is a pod or legume which becomes dry and usually dehisces to release the seeds. In many species the seeds have hard seed coats which require fire to stimulate germination. Some workers classify the peas, together with the acacias and cassias into a larger family, the Leguminosae, because they share the same fruit type. Flowers of Comesperma (Polygalaceae) superficially resemble pea flowers.

The family is important economically for food, fodder, medicines, timber, oils, gums and resins and, as in the Mimosaceae, pea-plants also fix atmospheric nitrogen. In Western Australia several genera e.g. Gastrolobium, Oxylobium, have members containing fluoroacetate (1080 rabbit poison) which are toxic to introduced grazing animals. Some forms of lamb poison, Isotropis cuneifolia, are toxic to sheep but the toxic principle is unknown. The variety on the Murdoch campus is thought to be non-toxic.

The Fabaceae occur in all habitats on campus. In areas cleared for pines several species of Daviesia, Oxylobium capitatum (bacon-and-eggs) and Hardenbergia comptoniana (native wisteria) are prominent. Other species, e.g. Aotus cordifolia and Euchilopsis linearis, are confined to sites which are moist in summer.

Viminaria juncea (swish bush) is another swamp species. This plant is unusual because it has three types of specialized roots: pneumatophores which enable gaseous exchange to occur with roots which are flooded in winter, nodules which fix nitrogen, and proteoid-roots (see Proteaceae). Further, true leaves only occur in young plants and the petioles become elongated and take over
the photosynthetic function usually performed by the leaf blade. Similar structures, phyllodes, also occur in Daviesia. Daviesia and Jacksonia flower buds are food sources for a number of small lycaenid butterflies e.g. Neolucia agricola occidentis, Lampides boeticus. The eggs are laid on young buds and the caterpillar feeds inside the bud and pupates before the flower is mature.

Twenty-five native species of peas occur on campus. In the tables that follow they are first broken into groups by flower colour and the twenty species with yellow-orange flowers are further subdivided on leaf morphology.

FLOWERS WHITE
Cytisus proliferus

FLOWERS BLUE/PURPLE

<table>
<thead>
<tr>
<th>Species</th>
<th>Habit</th>
<th>Leaf</th>
<th>Fruit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burtonia conferta</td>
<td>shrub</td>
<td>narrow, small</td>
<td>globular</td>
</tr>
<tr>
<td>Hardenbergia comptoniana</td>
<td>climber</td>
<td>divided, large</td>
<td>elongated pod</td>
</tr>
<tr>
<td>Hovea pungens</td>
<td>shrub</td>
<td>narrow, pungent</td>
<td>globular</td>
</tr>
</tbody>
</table>

FLOWERS PREDOMINANTLY RED

<table>
<thead>
<tr>
<th>Species</th>
<th>Habit</th>
<th>Leaf</th>
<th>Stamens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kennedia prostrata</td>
<td>creeper</td>
<td>tri-foil</td>
<td>9 fused, 1 free</td>
</tr>
<tr>
<td>Oxylobium lineare</td>
<td>tall shrub</td>
<td>long, linear</td>
<td>all free</td>
</tr>
</tbody>
</table>

Note: see also Aotus procumbens, Bossiaea eriocarpa, Isotropis cuneifolia, Sphaerolobium vimineum

FLOWERS PREDOMINANTLY YELLOW TO ORANGE

<table>
<thead>
<tr>
<th>Species</th>
<th>Leaf Morphology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aotus cordifolia</td>
<td>Leaves in whorls of three, ovate to cordate (Fig.25 A)</td>
</tr>
<tr>
<td>A. gracillima</td>
<td>Leaves alternate, linear (Fig.25 B)</td>
</tr>
<tr>
<td>A. procumbens</td>
<td>Leaves alternate, linear (Fig.25 C)</td>
</tr>
<tr>
<td>Bossiaea eriocarpa</td>
<td>Leaves alternate, oblong (Fig.25 D)</td>
</tr>
<tr>
<td>Daviesia decurrens</td>
<td>Leaves absent, phyllodes flattened vertically (Fig.25 E)</td>
</tr>
<tr>
<td>D. divaricata</td>
<td>Leaves and phyllodes absent, branches smooth (Fig.25 F)</td>
</tr>
<tr>
<td>D. nudiflora</td>
<td>Leaves absent, phyllodes elliptic, blue-green, pungent (Fig.25 G)</td>
</tr>
<tr>
<td>D. physodes</td>
<td>Leaves absent, phyllodes flattened vertically (Fig.25 H)</td>
</tr>
<tr>
<td>D. triflora</td>
<td>Leaves and phyllodes absent, branches smooth (Fig.25 I)</td>
</tr>
<tr>
<td>Euchilopsis linearis</td>
<td>Leaves alternate, scattered, linear (Fig.25 J)</td>
</tr>
<tr>
<td>Eutaxia virgata</td>
<td>Leaves opposite, narrowly linear (Fig.25 K)</td>
</tr>
</tbody>
</table>

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Fig. 25  Leaf morphology

R. Detail of leaf venation.
1. Drosera menziesii
2. Conostephium pendulum
3. Acacia stenoptera
4. *Aotus procumbens*
5. *Hovea pungens*
6. *Daviesia physodes*
Flowers predominantly Yellow to Orange, continued

<table>
<thead>
<tr>
<th>Species</th>
<th>Leaf Morphology</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Gompholobium tomentosum</em></td>
<td>Leaves alternate, divided into 5-9 linear leaflets (Fig.25 L)</td>
</tr>
<tr>
<td><em>Isotropis cuneifolia</em></td>
<td>Leaves alternate, linear to cuneate, apex two-lobed (Fig.25 M)</td>
</tr>
<tr>
<td><em>Jacksonia furcellata</em></td>
<td>Leaves reduced to minute scales, branchlets terete, divided (Fig.25 N)</td>
</tr>
<tr>
<td><em>J. sternbergiana</em></td>
<td>Leaves reduced to minute scales, branches angular (Fig.25 O)</td>
</tr>
<tr>
<td><em>Latrobea tenella</em></td>
<td>Leaves alternate, narrow-linear (Fig.25 P)</td>
</tr>
<tr>
<td><em>Oxylobium capitatum</em></td>
<td>Leaves opposite (or alternate), narrow, lanceolate (Fig.25 Q)</td>
</tr>
<tr>
<td><em>Pultenaea reticulata</em></td>
<td>Leaves alternate, old branches leafless, terete (Fig.25 S)</td>
</tr>
<tr>
<td><em>Sphaerolobium vimineum</em></td>
<td>Leaves alternate, lanceolate (Fig.25 R)</td>
</tr>
<tr>
<td><em>Viminaria juncea</em></td>
<td>Leaves mostly reduced to long terete phyllodes (Fig.25 T)</td>
</tr>
</tbody>
</table>

*Aotus cordifolia* Benth.; (Fig.26)

Shrub to 1.5m, sparsely hairy. *Leaves* in whorls of 3, petioles short, ovate, cordate at base, margin dentate, 5-10mm long, 4-7mm wide, apex acute. *Flowers* 2 to 5 in axillary clusters, bracts small; calyx slightly hairy, lobes acute, upper 2 lobes fused for more than half their length; corolla mostly yellow; anthers free; ovary stipitate, hairy. *Fruit* compressed, round.

*Flowering period* August-January

*Occurrence* D

*Aotus gracillima* Meissner

Shrub to 1m. *Leaves* alternate, scattered towards the base, petiole short, linear, 5-10mm long, c. 0.5mm wide, margins revolute; apex recurved. *Flowers* in terminal axillary clusters, bracteate; calyx with few hairs, shortly tubular at base, 2-lipped, upper lip of 2 lobes fused for more than half their length; corolla yellow with some red; anthers free; ovary sessile, densely hairy. *Fruit* obovoid, hairy.

*Flowering period* October-November

*Occurrence* B

*Aotus procumbens* Meissner; (Plate 4)

Shrub to 0.5m, branches hairy. *Leaves* alternate, scattered towards the base, shortly petiolate, linear, margins revolute, 10-15mm long, 1-1.5mm wide; apex blunt. *Flowers* 1-3 in axillary clusters, bracts and bracteoles hairy; calyx densely hairy, grey, tubular at the base, 2-lipped, upper lip of 2 lobes fused for more than half their length; corolla yellow and red; anthers free; ovary stipitate, densely hairy.

*Flowering period* August-September

*Occurrence* B C E
**Bossiaea eriocarpa** Benth.; (Fig.27)

Shrub to 0.5m, sparsely hairy. *Stipules* prominent, narrow, 4-5mm long. *Leaves* alternate, shortly petiolate, oblong, margins recurved and sometimes undulate, 10-20mm long, 1.5-5mm wide; apex obtuse, mucronate. *Flowers* solitary, axillary, pedicel 8-10mm, bracts and bracteoles present; calyx tubular at base, 2-lipped, upper lip of 2 broad lobes fused to above the middle; corolla brown and yellow; filaments fused into sheath open on one side; ovary stipitate, hairy. *Fruit* flat, oblong.

*Flowering period*: July-October  
*Occurrence*: A B C E

---

**Burtonia conferta** DC.

Shrub to 1m. *Leaves* crowded, petiolate, linear, 10-20mm long, c. 0.5mm wide, margins revolute. *Flowers* in short axillary racemes, pedicels c. 20mm long, bracts and bracteoles small; calyx 5-lobed, glabrous; corolla blue to purple; stamens free; ovary stipitate, glabrous. *Fruit* globular, with 2 seeds.

*Flowering period*: September-December  
*Occurrence*: A B

---

**Cytisus proliferus** L.; tree lucerne, tagasaste

Shrub or small tree to 4m with pendulous hairy branches. *Leaves* alternate, petiolate, trifoliate; leaflets elliptical, 15-30mm long, 5-10mm wide, hairy below. *Flowers* in terminal umbels, pedicellate, bracteate, bracteolate; calyx 2-lipped, 2 upper lobes fused over half their length, lower lip 3-lobed; corolla cream to white; filaments fused into a closed tube; ovary sessile, hairy. *Fruit* flat, oblong. *Introduced* native of the Canary Islands.

*Flowering period*: June-September  
*Occurrence*: E

---

**Daviesia decurrens** Meissner

Shrub to 0.5m, much branched, branchlets 3-angled with decurrent phyllode (leaf) bases. *Phyllodes* vertically flattened, awl-shaped, 20-30mm long, 4-6mm wide; apex recurved, pungent. *Flowers* in short axillary racemes, bracteate, pedicels short; corolla orange and red; stamens free, ovary glabrous. *Fruit* a triangular compressed pod with 2 seeds.

*Flowering period*: June-August  
*Occurrence*: A E

---

**Daviesia divaricata** Benth.

Shrub to 1.5m, branches terete, divaricate, spiny, ribbed. *Phyllodes* absent. *Flowers* in short axillary racemes, pedicels 3-5mm long; corolla orange and red; stamens free; ovary glabrous. *Fruit* a triangular compressed pod with 2 seeds.

*Flowering period*: July-November  
*Occurrence*: A C E
7. Banksia ilicifolia
8. Synaphaea spinulosa
9. Petrophile linearis
10. Petrophile macrostachya
11. Persoonia saccata
12. *Pimelea sulphurea*
13. *Nuytsia floribunda*
14. *Stylidium schoenoides*
Daviesia nudiflora Meissner

Shrub to 1 m with angular, ribbed branches. Phyllodes ascending, elliptic, blue-green, leathery, veins prominent, 30-40mm long, 6-15mm wide; apex tapered, pungent. Flowers axillary, sticky at the base, flowering nodes often leafless; pedicels 4-5mm long; corolla yellowish, orange and red; stamens free; ovary glabrous. Fruit a triangular compressed pod with 2 seeds.

Flowering period July-August

Occurrence A C E

Daviesia physodes Cunn. ex Don; (Plate 6)

Shrub to 1.5m with terete branches. Phyllodes dimorphic, vertically flattened, pungent, 15-30mm long; lower phyllodes with 2-lobed apex; upper phyllodes entire. Flowers in short axillary racemes, pedicels short; corolla yellow and red; stamens free; ovary glabrous. Fruit triangular, swollen, with 2 seeds.

Flowering period July-October

Occurrence A B C E

Daviesia triflora Crisp; (Fig.28)

Shrub to 0.5m with smooth, terete branches. Phyllodes absent. Flowers in short axillary racemes, bracts prominent, pedicels longer than the calyx; corolla yellow and red; stamens free; ovary glabrous. Fruit triangular, slightly swollen, with 2 seeds.

Flowering period June-August

Occurrence C E

Euchilopsis linearis (Benth.) F. Muell.; (Fig.29)

Shrub semi-prostrate to 0.5m, multi-stemmed. Leaves linear, scattered, 8-30mm long, 0.5-2mm wide, margins revolute; apex shortly pointed. Flowers axillary, pedicels 10-20mm long with minute bracts and bracteoles; calyx shortly tubular, 2-lipped, upper 2 lobes large, orbicular, 4mm long, lower lobes small; corolla orange to red; stamens free; ovary stipitate, hairy. Fruit ovoid, with 2 seeds.

Flowering period June-January

Occurrence B C

Eutaxia virgata Benth.; (Fig.30)

Shrub to 1m, slender. Leaves opposite, narrow, 5-10mm long, c. 1mm wide. Flowers axillary, solitary, pedicels 4-5mm long with 2 prominent bracteoles; calyx tubular at base, 2-lipped, 2 upper lobes fused more than half their length; corolla yellow to orange; stamens free; ovary slightly hairy, nearly sessile. Fruit flattened, with 2 seeds.

Flowering period August-November

Occurrence B
Gompholobium tomentosum Labill.

Shrub to 0.8m, branches hairy. Stipules bristle-like, 2.3mm long. Leaves alternate, divided into 5-9 leaflets, leaflets linear to terete, c. 10mm long, margins revolute. Flowers terminal, pedicels short with bristle-like bracts and bracteoles; calyx deeply divided, hairy; corolla yellow; stamens free; ovary shortly stipitate, glabrous. Fruit globular, with 4 or more seeds.

Flowering period August-December

Occurrence A B C E

Hardenbergia comptoniana (Andrews) Benth.; native wisteria (Fig.31)

Climber. Stipules ovate, 4-5mm long. Leaves divided into 3 to 5 leaflets with small stipellae at the base; leaflets ovate 40-80mm long, 10-30mm wide. Flowers in large pendulous racemes, pedicellate; corolla blue to purple; 9 filaments fused, 1 free; ovary sessile, glabrous. Fruit a swollen, elongated pod with 4 or more seeds.

Flowering period June-September

Occurrence A B C E

Hovea pungens Benth.; devils pins (Plate 5)

Shrub to 1m, pungent, stems hairy. Stipules spiny. Leaves alternate, sessile, linear, reticulate, margins revolute, 10-25mm long, c. 2mm wide; apex pungent. Flowers in axillary clusters, bracteolate; grey, hairy; calyx 2-lipped, upper lip with 2 fused lobes; corolla blue to purple; filaments all fused, sheath open on upper side; ovary glabrous; Fruit ellipsoidal, with 2 seeds.

Flowering period August-November

Occurrence A B C

Hovea trisperma Benth.; common hovea

Shrub to 0.4m, stipulate. Leaves linear or lanceolate, 30-70mm long, 5-15mm wide. Flowers axillary; calyx hairy; corolla blue.

Flowering period May-July

Occurrence A B C

Fig.31 x1
**Isotropis cuneifolia** (Smith) Benth. ex B.D. Jackson; granny bonnets, lamb poison (Fig.32)

*Shrub* or perennial herb to 0.3m, with long hairs. *Stipules* herbaceous, 8-10mm long. *Leaves* alternate, variable in shape from linear to cuneate, 10-40mm long, 5-15mm wide; apex 2-lobed. *Flowers* solitary in terminal axils, pedicels 40-60mm long, bracteolate; calyx hairy, 2-lipped, the tube shorter than the lobes; corolla yellow and red, standard reverse with red striations; stamens free; ovary sessile, hairy. *Fruit* a flattened pod.

Flowering period August-December

Occurrence A C

**Jacksonia furcellata** (Bonpl.) DC.

*Shrub* to 3m, branches grey-green, terete, striate, hairy, pungent. *Leaves* reduced to minute scales. *Flowers* in terminal racemes, shortly pedicellate; calyx deeply divided, lobes reflexed, hairy; corolla yellow and orange; stamens free; ovary stipitate, hairy. *Fruit* ovoid, dehiscent at apex.

Flowering period August-March

Occurrence A B C D E

**Jacksonia sternbergiana** Huegel; (Fig.33)

*Shrub* to 4m with pendulous, angular branches. *Leaves* absent. *Flowers* scattered or in a loose raceme, pedicellate, glabrous; calyx deeply divided, lobes much longer than the tube, lobes reflexed; corolla yellow to orange; stamens free; ovary stipitate, slightly hairy. *Fruit* oblong, dehiscent at apex.

Flowering period throughout the year

Occurrence A C E

**Kennedia prostrata** R.Br.; running postman, scarlet runner

*Prostrate* twining shrub. *Stipules* leaf-like, cordate. *Leaves* trifoliolate, stipellate, leaflets nearly circular, 15-40mm across, hairy below, margins undulate. *Flowers* in axillary pairs, pedunculate, bracteate; calyx 2-lipped, upper lip shortly 2-lobed, lower lip deeply 3-lobed, lobes acute; corolla red with 2 yellow eyes; 9 filaments fused, 1 free; ovary glabrous. *Fruit* cylindrical, with 2 seeds.

Flowering period July-November

Occurrence A B C E

**Latrobea tenella** (Meissner) Benth.

*Shrub* to 0.5m, diffuse. *Leaves* alternate, narrow, linear, 3-8mm long, c. 0.5mm wide, apex acute. *Flowers* in terminal inflorescence, pedicels 3-4mm long, bracteate, bracteolate; calyx glabrous, of 5 equal lobes; corolla yellow; stamens free; ovary stipitate, hairy. *Fruit* compressed, ovate, with 2 seeds.

Flowering period November-February

Occurrence B
Oxylobium capitatum Benth.; bacon and eggs
Shrub to 0.5m, semi-prostrate to erect. Leaves opposite or alternate, linear to lanceolate, flat or concave, 20-40mm long, 3-6mm wide; apex with recurved mucron. Flowers in short axillary and terminal clusters, pedicellate, bracteate; calyx grey, hairy, 2-lipped and 5-lobed, lobes of upper lip fused to above the middle; corolla yellow with red and orange; stamens free; ovary shortly stipitate. Fruit ovoid.
Flowering period June-September
Occurrence A B C E

Oxylobium lineare (Benth.) Benth.; narrow-leaved oxylobium
Shrub to 3m with slender branches. Leaves scattered, linear to linear-lanceolate, 50-100mm long, 4-6mm wide, reticulate above; apex with short mucron. Flowers in loose terminal racemes, pedicellate, bracteate; calyx hairy, 2-lipped and 5-lobed, lobes of upper lip fused to above the middle; corolla red; stamens free; ovary stipitate. Fruit ovoid.
Flowering period September-January
Occurrence B D

Pultenaea reticulata (Smith) Benth.
Shrub to 2m. Stipules minute, dry. Leaves alternate, shortly petiolate, narrowly lanceolate, 5-15mm long, 3-5mm wide, reticulate, pungent. Flowers axillary, solitary, terminal, shortly pedicillate, bracts and bracteoles dry and brown; calyx hairy, 2-lipped, upper lip of 2 lobes fused to the middle, lobes pungent; corolla yellowish orange; stamens free; ovary sessile, densely hairy. Fruit ellipsoid, with 2 seeds.
Flowering period August-November
Occurrence A D E

Sphaerolobium vimineum Smith; leafless globe pea
Shrub to 0.6m, with slender rush-like, apparently leafless, terete, glabrous stems. Leaves mostly alternate, on juvenile branches, linear, 2-5mm long, c. 0.5mm wide. Flowers in pairs in loose terminal racemes, shortly pedicillate, bracteate, bracteolate; calyx glabrous, 2-lipped, upper lip truncate and of 2 fused lobes; corolla orange to red; stamens free; style with membranous wing towards apex. Fruit ellipsoid, with 1 or 2 seeds.
Flowering period October-November
Occurrence B D

Viminaria juncea (Schrader & Wendl.) Hoffogg.; swish bush
Shrub to 4m with pendulous, glabrous, rush-like branches. Leaves nearly all reduced to phyllodes, phyllodes terete, 150-300mm long. Flowers in terminal inflorescences, pedicellate, bracteate; calyx of 5 equal lobes; corolla predominantly yellow; stamens free; ovary sessile, glabrous. Fruit ovoid, with 2 seeds.
Flowering period October-December
Occurrence B D
PROTEACEAE

The Proteaceae is a moderately sized family of about 1,500 species which are mainly confined to the southern hemisphere. The major areas of diversification are southwestern Australia, eastern Australia and southern Africa. It contains many familiar garden plants such as *Grevillea* and *Hakea* and includes the Murdoch University emblem *Banksia grandis*.

The plants are perennial trees or shrubs and often have leathery or hard foliage (xeromorphic) which can, particularly in the Australian species, be very prickly. The flowers have a perianth which is sepaloid (some authors believe they are petaloid) and often have 2 to 4 bracts at the base. There are 4 stamens in each flower, the filaments are fused to the perianth and the anthers are often cupped by the perianth lobes (e.g. *Grevillea*, *Hakea* and *Banksia*). The ovary is superior (sometimes stalked) and the style is long with a small stigma.

Many of these plants are pollinated by birds. While birds feed on the nectar at the base of the flower, pollen which has been shed onto the end of the style (pollen presenter) is transferred to the bird's crown. The bird then visits a flower with a receptive style and cross-fertilization occurs. The anthers are protandrous (i.e. they develop and shed pollen before the stigma is receptive) and so self-fertilization is prevented.

Another interesting feature of these plants is the presence of proteoid roots which form nutrient trapping mats beneath the soil organic layer. These occur in most members of the Proteaceae except for native plums (*Persoonia*).

Proteaceous plants are very important in the cut-flower industry in Western Australia. Most flowers are collected from wild populations (over three million stems from seven genera in 1980/81) but progressively more are being produced in commercial plantations for both local and export markets.

The trees that were most prominent on campus before it was cleared for pine production belong to this family, in particular *Banksia attenuata* and *B. menziesii*. Remnants of the type of woodland which forms with these trees still remain at the southern boundary of the Murdoch campus, now interrupted by Farrington Road.
<table>
<thead>
<tr>
<th>Species</th>
<th>Habit</th>
<th>Leaves prickly</th>
<th>Flower colour</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Adenanthos cygnorum</em></td>
<td>shrub to 4m</td>
<td>no</td>
<td>green to white</td>
</tr>
<tr>
<td><em>Banksia attenuata</em></td>
<td>tree to 10m</td>
<td>c.</td>
<td>bright yellow</td>
</tr>
<tr>
<td><em>B. grandis</em></td>
<td>tree to 10m</td>
<td>c.</td>
<td>pale yellow</td>
</tr>
<tr>
<td><em>B. ilicifolia</em></td>
<td>tree to 10m</td>
<td>yes</td>
<td>cream to deep pink-red</td>
</tr>
<tr>
<td><em>B. littoralis</em></td>
<td>tree to 12m</td>
<td>c.</td>
<td>yellow</td>
</tr>
<tr>
<td><em>B. menziesii</em></td>
<td>tree to 10m</td>
<td>c.</td>
<td>pink-red and orange-yellow</td>
</tr>
<tr>
<td><em>Dryandra sessilis</em></td>
<td>shrub to 4m</td>
<td>yes</td>
<td>pale yellow</td>
</tr>
<tr>
<td><em>Hakea prostrata</em></td>
<td>shrub to 6m</td>
<td>yes</td>
<td>white to pale yellow</td>
</tr>
<tr>
<td><em>Persoonia saccata</em></td>
<td>shrub to 1.5m</td>
<td>no</td>
<td>yellow</td>
</tr>
<tr>
<td><em>Petrophile linearis</em></td>
<td>shrub to 0.7m</td>
<td>no</td>
<td>pink or mauve</td>
</tr>
<tr>
<td><em>P. macrostachya</em></td>
<td>shrub to 1m</td>
<td>yes</td>
<td>yellow</td>
</tr>
<tr>
<td><em>Stirlingia latifolia</em></td>
<td>shrub to 1.5m</td>
<td>no</td>
<td>red-brown or yellowish</td>
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<tr>
<td><em>Synaphaea spinulosa</em></td>
<td>shrub to 0.6m</td>
<td>yes</td>
<td>yellow</td>
</tr>
<tr>
<td><em>Xylomelum occidentale</em></td>
<td>tree to 8m</td>
<td>yes</td>
<td>creamy white</td>
</tr>
</tbody>
</table>

*Adenanthos cygnorum* Diels; woolly bush (Fig.34)

Shrub to 4m, hairy, grey-green. Leaves petiolate; blade 3-branched, each branch terete, hairy. Flowers solitary on end of branchlets; calyx greenish to white, hairy inside, bearded behind each anther.
Flowering period September-February

*Occurrence A B C E*

*Banksia attenuata* R.Br.; slender banksia (Fig.35) (Frontispiece)

Tree to 10m; bark thick, rough, red-brown underneath. Leaves broadly linear 40-270 x 5-16mm, truncate, serrate except at base, prickly toothed. Flowers in cylindric cone; calyx bright yellow when mature, green when young; style bright yellow. Fruiting cone quite persistent.
Flowering period September-February

*Occurrence A B C E*

*Banksia grandis* Willd.; bull banksia (Fig.36)

Tree to 10m; bark thick, rough. Leaves broadly linear 100-450 x 30-110mm, divided to mid-rib forming triangular lobes, prickly toothed. Flowers in cylindric cone 100-400mm long; calyx pale yellow; style cream. Fruiting cone with numerous follicles, early deciduous.
Flowering period September-December

*Occurrence A*

*Banksia ilicifolia* R.Br.; (Fig.37) (Plate 7)

Tree to 10m; bark grey, thick fibrous. Leaves 30-90mm long; blade obovate to elliptic, teeth distinct almost triangular, pungent; petiole short. Flowers in ovoid-globular heads; calyx initially pink near base and cream above, becoming completely pink or dull red. Fruiting cone small with only 1-3 follicles.
Flowering period all year round, peak in summer

*Occurrence A*
**Banksia littoralis** R.Br.; swamp banksia

*Tree* to 12m; bark warty, rather friable. *Leaves* broadly linear 100-230 x 4-10mm, serrate mainly towards apex, prickly toothed. *Flowers* in cylindrical cone 70-200mm long; calyx yellow; style cream and yellow.

*Flowering period* March-July

**Banksia menziesii** R.Br.; firewood banksia (Fig.38)

*Tree* to 10m; bark greyish pink or brown, rough. *Leaves* broadly linear 80-250 x 10-40mm, serrate throughout, prickly toothed. *Flowers* in ovoid cylindrical cone, 40-120mm long; calyx variable, usually pink or red often with silvery appearance; styles yellow-orange; flower cones with two tone appearance. *Fruiting cone* with prominent spiral pattern; follicles numerous.

*Flowering period* February-August

**Dryandra sessilis** (R.Br.) Druce; parrot bush

*Tree* to 4m, may have several stems. *Leaves* c. sessile, not divided to midrib, prickly toothed, 3-4cm long. *Flowers* densely clustered into heads, not much longer than leaves; calyx pale yellow; styles prominent.

*Flowering period* July-October

**Hakea prostrata** R.Br.; (Fig.39)

*Shrub* to small tree to 6m, sometimes quite prostrate; young stems ribbed. *Leaves* sessile, bases wrapping stem, prickly toothed. *Flowers* in axillary clusters; calyx white to pale yellow, prominent pink gland in centre of flower.

*Flowering period* August-November

**Persoonia saccata** R.Br.; pouched persoonia (Plate 11)

*Shrub* to 0.2-1.5m, sometimes spreading. *Leaves* linear, terete to slightly flattened. *Flowers* in variable inflorescence of 1-90; calyx yellow, hairy outside. *Fruit* drupe.

*Flowering period* July-January

**Petrophile linearis** R.Br.; pixie mops (Plate 9)

*Shrub* to 0.7m, grey-green. *Leaves* linear to narrowly obovate, thick, curved. *Flowers* in terminal or axillary spheric heads, surrounded by numerous bracts; calyx pink or mauve sometimes light grey, hairy; stigma colour varying with age, yellow to red. *Fruiting cone* ovoid.

*Flowering period* September-November

**Petrophile macrostachya** R.Br.; (Plate 10)

*Shrub* to 1m, spreading. *Leaves* divided, primarily 3-branched each branch subdivided into 3 or more lobes, pungent. *Flowers* numerous in 60mm long cylindrical cone; calyx pale yellow, glabrous; stigma colour varying with age, yellow to red. *Fruiting cone* persistent after flowering, 60mm long.

*Flowering period* August-November

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Stirlingia latifolia (R.Br.) Steudel; blue boy

Shrub to 1.5m, branching, leafy at base. Leaves with broad flat petioles; blade erect, flat with small apical point. Flowers in heads arranged in a panicle; peduncle much longer than leaves; calyx red-brown or yellowish.

Flowering period August-October

Occurrence A C E

Synaphaea spinulosa (Burm) Merr.; (Plate 8)

Shrub to 0.6m; stem erect, leafy. Leaves petiole longer in basal leaves; blades divided into 3 lobes which can be further divided, pungent. Flowers in axillary spike 10-50mm long, several from one node; calyx yellow.

Flowering period July-November

Occurrence A

Xylomelum occidentale R.Br.; woody pear (Fig.40)

Shrub or small tree to 8m; bark fibrous. Leaves petiolate; blade elliptic to obovate, undulate margins, usually prickly toothed. Flowers in multiple axillary spikes to 120mm long; calyx creamy white. Fruit follicle 80 x 40mm, pear shaped, woody, persistent.

Flowering period December-February

Occurrence E
THYMELAEACEAE

A small family of 500 species worldwide and nearly 100 in Australia; includes *Daphne* and *Pimelea* which are widely cultivated. *Pimelea* is the more common genus in Western Australia. It is readily recognised because the flowers, which have a tubular 4-lobed perianth, are in heads surrounded by petal-like bracts. In a few species the bracts enclose the flowers and the heads are bell-like e.g. *P. physodes*, the Qualup bell. Either the corolla or calyx is absent and stamens are reduced to 2 in *Pimelea*.

Three species of *Pimelea* occur on the Murdoch campus including *P. rosea* which is cultivated. They may be distinguished by flower colour: *P. angustifolia* white; *P. rosea* pink; *P. sulphurea* yellow.

*Pimelea angustifolia* R.Br.; narrow-leaved pimelea

*Shrub* to 0.75m, single-stemmed at base. *Leaves* opposite, linear, concave, 15-20mm long, 1.5-3mm wide. *Flowers* in terminal head, erect; 4 bracts surrounding head, ovate, green, much broader than stem leaves, glabrous outside, with scattered hairs inside; perianth tubular with 4 short lobes, with long hairs at base and short hairs higher up, white.

*Flowering period* October-November  
*Occurrence* A

*Pimelea rosea* R.Br.; rose banjine

*Shrub* to 1m, single-stemmed at base. *Leaves* opposite, linear, 20-25mm long, 3-4 mm wide; apex acute, recurved. *Flowers* in terminal head, 30-35mm across, erect; 4 bracts surrounding head ovate, green except for white area near base, 15-18mm long, 8-10mm wide, ciliate on margins; perianth tubular with 4 short lobes with rigid spreading hairs in lower part and adpressed hairs in upper part, pink.

*Flowering period* August-November  
*Occurrence* A B C E

*Pimelea sulphurea* Meissner; yellow-flowered pimelea  
(Plate 12)

*Shrub* to 0.5m, multi-stemmed at base. *Leaves* opposite, elliptic, 7-9mm long, 4-5mm wide, flat. *Flowers* in terminal head, c. 15mm across, pendulous; bracts 6, surrounding head, longer and narrower than leaves, glabrous; perianth tubular with 4 short lobes, shortly hairy, yellow.

*Flowering period* September-October  
*Occurrence* A
MYRTACEAE

This is mainly a southern hemisphere family consisting of about 3,000 species in 147 genera. In Australia there are about 1,280 species in seventy-five genera and its members are important components of a wide range of vegetation types. In many, the dominant tree species are myrtaceous (e.g. the eucalypt forests and woodlands). Fifty-five genera are endemic to Australia and many of these (eighteen to twenty) are only found in Western Australia.

Morphologically the family is quite variable. All are woody plants but may range from small shrubs to the tallest flowering plants in the world, *Eucalyptus regnans*. The leaves and other structures usually have glands which contain aromatic oils. Leaves may be opposite or alternate and this may vary not only between species but with the age of an individual. In many cases juvenile foliage is very different from mature foliage, and this is particularly pronounced in the eucalypts. Flowers are mainly regular, but some (e.g. *Calothamnus*) are irregular, and the ovary is inferior. The fruits are dry and woody and often persistent on the plants as in *Melaleuca*, *Eremaea* and *Eucalyptus*.

Members of this group are the most economically important of the Australian native flora. Eucalypts are the most valuable as they provide timber and pulpwood in Australia, and overseas they are grown in large plantations for timber, oil, pulpwood and firewood production. Other uses of myrtaceous plants include cut-flower production, ornamental plants, oil and food. In Western Australia alone, over 3.5 million stems were cut from just seven species in 1980/81, making a considerable contribution to an expanding industry. Many plants grown in local gardens belong to this group; these include *Callistemon* (bottlebrushes), *Melaleuca* (paper barks), *Chamelau­cium* (Geraldton wax), *Verticordia* (feather flowers) and many more.

There are sixteen genera represented on the Murdoch campus, many of which are endemic to the southwest of Western Australia (*Scholtzia*, *Astartea*, *Hypocalymma*, *Agonis*, *Beaumontia*, *Regelia*, *Eremaea*, *Chamelau­cium*). Two species, *Chamelau­cium uncinatum* and *Leptospermum laevigatum*, have been introduced and are now well established in parts of the old pine plantation.
### SHRUBS UP TO 2 METRES

<table>
<thead>
<tr>
<th>Species</th>
<th>Flower colour</th>
<th>Stamens longer than petals</th>
<th>Leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beaufortia elegans</td>
<td>mauve to reddish-purple</td>
<td>yes</td>
<td>opposite</td>
</tr>
<tr>
<td>Calytrix fraseri</td>
<td>pink to pink-purple</td>
<td>no</td>
<td>alternate</td>
</tr>
<tr>
<td>C. flavescens</td>
<td>yellow</td>
<td>no</td>
<td>alternate</td>
</tr>
<tr>
<td>Eremaea pauciflora</td>
<td>orange</td>
<td>yes</td>
<td>alternate</td>
</tr>
<tr>
<td>Hypocalymma angustifolium</td>
<td>white, pink-red centre</td>
<td>no</td>
<td>alternate</td>
</tr>
<tr>
<td>H. robustum</td>
<td>deep pink</td>
<td>no</td>
<td>opposite</td>
</tr>
<tr>
<td>Kunzea ericifolia</td>
<td>greenish yellow</td>
<td>yes</td>
<td>alternate</td>
</tr>
<tr>
<td>Melaleuca lateritia</td>
<td>scarlet to crimson</td>
<td>yes</td>
<td>alternate</td>
</tr>
<tr>
<td>M. seriata</td>
<td>pink-purple</td>
<td>yes</td>
<td>alternate</td>
</tr>
<tr>
<td>M. thymoides</td>
<td>yellow</td>
<td>yes</td>
<td>alternate</td>
</tr>
<tr>
<td>Pericalymma ellipticum</td>
<td>white to pink, pink or red centre</td>
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<td>alternate</td>
</tr>
<tr>
<td>Regelia inops</td>
<td>pink-mauve</td>
<td>yes</td>
<td>opposite</td>
</tr>
<tr>
<td>Scholtzia involucrata</td>
<td>white to pale pink</td>
<td>no</td>
<td>opposite</td>
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</tbody>
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### SHRUBS 2 TO 5 METRES

<table>
<thead>
<tr>
<th>Species</th>
<th>Flower colour</th>
<th>Stamens longer than petals</th>
<th>Leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agonis linearifolia</td>
<td>white</td>
<td>no</td>
<td>alternate</td>
</tr>
<tr>
<td>Astartea fascicularis</td>
<td>white to pink</td>
<td>no</td>
<td>opposite</td>
</tr>
<tr>
<td>Chamelaucium uncinatum</td>
<td>white to pink</td>
<td>no</td>
<td>opposite</td>
</tr>
<tr>
<td>Kunzea ericifolia</td>
<td>greenish yellow</td>
<td>yes</td>
<td>alternate</td>
</tr>
<tr>
<td>Leptospermum laevigatum</td>
<td>white</td>
<td>no</td>
<td>alternate</td>
</tr>
<tr>
<td>Melaleuca teretifolia</td>
<td>white, pale yellow or pink</td>
<td>yes</td>
<td>alternate</td>
</tr>
<tr>
<td>Regelia inops</td>
<td>pink-mauve</td>
<td>yes</td>
<td>opposite</td>
</tr>
</tbody>
</table>

### TREES OVER 5 METRES

<table>
<thead>
<tr>
<th>Species</th>
<th>Flower colour</th>
<th>Stamens longer than petals</th>
<th>Leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eucalyptus calophylla</td>
<td>white to cream</td>
<td>petals absent in eucalypts</td>
<td>alternate</td>
</tr>
<tr>
<td>E. gomphoecephala</td>
<td>white to yellow</td>
<td>petals absent in eucalypts</td>
<td>alternate</td>
</tr>
<tr>
<td>E. marginata</td>
<td>white to cream</td>
<td>petals absent in eucalypts</td>
<td>alternate</td>
</tr>
<tr>
<td>E. rudis</td>
<td>cream to pale yellow</td>
<td>petals absent in eucalypts</td>
<td>alternate</td>
</tr>
<tr>
<td>Melaleuca preissiana</td>
<td>white to yellow</td>
<td>yes</td>
<td>alternate</td>
</tr>
<tr>
<td>M. rhaphiophylla</td>
<td>white to cream</td>
<td>yes</td>
<td>alternate</td>
</tr>
</tbody>
</table>
**Agonis linearifolia** (DC.) Schauer

*Shrub* to 4m, young shoots softly hairy. *Leaves* alternate, entire, narrowly ovate to narrowly obovate. *Flowers* in globular heads on short branchlets; petals white.

*Flowering period* most of the year

*Occurrence* B D

**Astartea fassiculata** (Labill.) DC.

*Shrub* 1-2m. *Leaves* opposite, clustered on lateral branchlets, blades linear. *Flowers* solitary, axillary; petals white; sepals green.

*Flowering period* October-February

*Occurrence* B C

**Beaufortia elegans** Schauer; (Fig.41, Plate 18)

*Shrub* to 1m. *Leaves* opposite, ends curved. *Flowers* in terminal heads; stamens conspicuous, mauve to reddish purple; petals with hairy margins.

*Flowering period* October-January

*Occurrence* C

**Calytrix flavescens** Cunn.; summer starflower

*Shrub* to 0.3m; regenerates from underground stock. *Leaves* alternate, petiolate, entire. *Flowers* solitary, denser on branch ends; petals yellow; sepals yellow, narrow elongate lobes, often persistent after flowering.

*Flowering period* November-January

*Occurrence* A

**Calytrix fraseri** Cunn.; pink summer calytrix (Fig.42)

*Shrub* to 1.5m. *Leaves* alternate, short petioles, curved ends, 3-angled. *Flowers* solitary, diffuse; petals pink to pink-purple; sepals pink, narrow elongate lobes, often persistent after flowering.

*Flowering period* year round, mainly November-May

*Occurrence* A C

**Chamelaucium uncinatum** Schauer; Geraldton wax

*Shrub* to 3m. *Leaves* opposite, shortly petiolate, 3-angled. *Flowers* in a corymb; petals white to pink; sepals green, fused; pink nectary at centre. *Introduced.*

*Flowering period* August-November

*Occurrence* C E

**Eremaea pauciflora** (Endl.) Druce; (Fig.43, Plate 17)

*Shrub* to 1.5m, sometimes spreading; young shoots hairy. *Leaves* alternate, linear. *Flowers* solitary, terminal; stamens conspicuous, orange; petals orange.

*Flowering period* September-December

*Occurrence* A C

**Eucalyptus calophylla** Lindley; marri (Fig.44A)

*Tree* 15-40m; bark grey, flaky. *Leaves* juvenile, opposite, stiff hairs; mature, alternate, glabrous. *Flowers* 3-7 in terminal inflorescence; stamens conspicuous, white-cream; operculum rounded. *Fruit* large, 30-40mm in diameter, valves not exerted. Fruits are commonly called 'honkey nuts' and are used by Scouts as waggles.

*Flowering period* January-May

*Occurrence* A B C E
Fig. 44 Eucalypts
*Eucalyptus gomphocephala* DC.; tuart (Fig.44B)

*Tree* to 40m, bark pale grey, rough, partly fibrous. *Leaves* petiolate, alternate, grey-green. *Flowers* 3-7 in umbels; operculum rounded, broader than top of calyx tube; peduncle flattened. *Fruit* 20mm long.  
*Flowering period* December-February  
*Occurrence* Bush Court

*Eucalyptus marginata* Donn ex Sm.; jarrah (Fig.44C)

*Tree* 15-50m, bark grey-brown, fibrous. *Leaves* juvenile, sessile, opposite; mature, petiolate, alternate. *Flowers* 5-10 in axillary umbels; stamens conspicuous, white to cream, operculum elongate. *Fruit* 10-20mm diameter, valves not exerted.  
*Flowering period* October-November  
*Occurrence* A B C E

*Eucalyptus rudis* Endl.; flooded gum (Fig.44D)

*Tree* 9-15m, spreading trunk; bark grey and rough on lower trunk, smooth and grey-white on upper branches. *Leaves* alternate, grey-green. *Flowers* axillary 4-10 in umbels; stamens conspicuous, cream to pale yellow; conical operculum. *Fruit* 8-10mm diameter, exerted valves.  
*Flowering period* April-November  
*Occurrence* B C D

*Hypocalymma angustifolium* Endl.; white myrtle

*Shrub* to 1.5m; multi-stemmed. *Leaves* opposite, linear, 3-angled, often curved, mucronate, 10-30cm. *Flowers* 2-3, axillary, sessile, pink to red in centre; petals white.  
*Flowering period* July-October  
*Occurrence* B D

*Hypocalymma robustum* Endl.; Swan River myrtle (Plate 16)

*Shrub* to 1m. *Leaves* opposite, linear to narrowly ovate, 10-25mm. *Flowers* 2-3, axillary, sessile; petals pale to deep pink, scented.  
*Flowering period* July-October  
*Occurrence* A B C E

*Kunzea ericifolia* (Sm.) Heyn.; (Fig.45)

*Shrub* to 3m, young shoots hairy. *Leaves* alternate, linear. *Flowers* in terminal globular heads; stamens conspicuous, yellow; petals yellow; sepals green.  
*Flowering period* September-November  
*Occurrence* A B C E

*Leptospermum laevigatum* (Gaertner) F. Muell.; coastal teatree (Fig.46)

*Shrub* to 3m. *Leaves* alternate. *Flowers* axillary, solitary; petals white; sepals green, hairy inside, glabrous outside.  
*Flowering period* September-October  
*Occurrence* B C E

*Melaleuca lateritia* Dietr.; robin redbreast bush (Fig.47)

*Shrub* to 2m. *Leaves* alternate, flat or slightly concave. *Flowers* 10-20 in cylindrical spikes on lateral branches; stamens conspicuous, scarlet to crimson, in bundles of 5.  
*Flowering period* September-April  
*Occurrence* D
Melaleuca preissiana Schauer; (Fig.48A)
Tree to 10m, paper-like bark. Leaves alternate, shortly petiolate, flat. Flowers 1-3 axillary, clustered along stem; stamens conspicuous, white to pale yellow.
Flowering period November-January Occurrence B C D E

Melaleuca rhaphiophylla Schauer; swamp paperbark (Fig.48B)
Tree to 10m, paper-like bark. Leaves alternate, terete, pointed and curved ends. Flowers 15-30 in dense spikes; stamens conspicuous, white to cream.
Flowering period September-January Occurrence B D

Melaleuca seriata Lindley
Shrub to 1m. Leaves alternate, flat. Flowers in globular terminal heads; stamens conspicuous, pink to purple; petals pink-mauve; floral tube hairy at base.
Flowering period October-December Occurrence C

Melaleuca teretifolia Endl.; (Fig.48C)
Shrub or small tree to 5m. Leaves alternate, terete. Flowers 5-30 in sessile axillary clusters; stamens conspicuous, white to pale yellow.
Flowering period October-January Occurrence B

Melaleuca thymoides Labill.; (Fig.48D)
Shrub to 1m, branches spinescent. Leaves alternate, flat. Flowers 20-30 in terminal heads; stamens conspicuous, yellow; petals light brown.
Flowering period October-January Occurrence A C

Pericalymma ellipticum (Endl.) Schauer; swamp teatree
Shrub to 2m. Leaves alternate, flat and tough. Flowers solitary, terminal; petals white to pink; sepals green, hairy.
Flowering period September-December Occurrence C

Regelia inops (Schauer) Schauer
Shrub to 2.5m, young stems with white hairs. Leaves opposite, almost triangular, wrapping the stem. Flowers in terminal dense heads; stamens conspicuous, pink mauve.
Flowering period October-January Occurrence C E

Scholtzia involucrata (Endl.) Druce; spiked scholtzia (Plate 15)
Shrub to 1m, spreading. Leaves opposite, almost round. Flowers 3-5 axillary along stem; petals white to pale pink.
Flowering period December-March Occurrence A B C E
Fig. 48 Melaleuca

A. x0.5

leaves

B. x0.5

fruit

flower bud

C. x0.5

D. x0.5

Fig. 48 Melaleuca
SANTALACEAE

Woody shrubs and small trees characterize this group. Plants are mainly root hemiparasites and are distributed throughout the tropical and temperate zones (c. 400 species worldwide). The genus *Santalum* is well known in Western Australia where Sandalwood has been pulled for over 100 years and exported for use in the production of incense, carvings and perfumes. Like the Western Australian Christmas tree (*Nuytsia*), the parasite derives some of its nourishment from the roots of other plants. This is achieved through root to root contact via suckers or haustoria which are produced by the parasite. The small and inconspicuous flowers consist of a single whorl of 3 to 5-fused perianth segments with attached stamens. The fruit may be a nut (e.g. *Santalum*) or drupe (e.g. *Exocarpos*) and contains food storage as endosperm (the testa is absent). The leafless, green, striated stems readily identify *Exocarpos sparteus* in the field. The generic name (*exo* = outside, *karpos* = fruit) refers to the fruit being borne at the end of a berry-like receptacle.

*Exocarpos sparteus* R.Br.; broom ballart (Fig.49)

*Shrub* to 4m with ends of branches weeping, yellowish green, striate. *Leaves* narrow linear, triquetrous, hooked, less than 1cm long, deciduous. *Flowers* in depressions along condensed spikes c. 1.5cm long; perianth a single whorl of 5 triangular segments, greenish yellow. *Fruit* a red to brown drupe, 3-5mm long.

*Flowering period* most of the year  

*Occurrence* E
LORANTHACEAE

The Loranthaceae (c. 900 species worldwide) include the stem-parasites known as mistletoes as well as a few root-parasites, e.g. *Nuytsia floribunda*, the Western Australian Christmas tree. The woody stems are brittle, leaves are simple and slightly succulent, flowers are clustered into showy inflorescences, and the ovary is inferior. In *Nuytsia* the fruit is dry and winged. *Nuytsia* seedling roots develop haustorial contacts with roots of a wide range of native and introduced plants. There are also reports of telephone cables being crushed by encircling haustoria. Little is known about the chemicals which are exchanged between host and parasite. The name *Nuytsia* is in memory of Pieter Nuyts from the Dutch vessel *'t Gulden Zeepaerd* which visited the Great Australian Bight in 1626. Though mistletoes (mainly *Amyema* spp.) occur in Western Australia they are rare on the Swan Coastal Plain. In *Amyema* the fruit is a berry containing a sticky seed. The latter is dispersed by mistletoe birds and the sticky layer adheres the seed to host branches so germination can take place.

*Nuytsia floribunda* (Labill.) R.Br.; Christmas tree (Plate 13)

Tree to 6m, glabrous. Leaves lanceolate, 30-80mm long, attenuate at base, sessile. Flowers in large terminal fascicles of up to 150 flowers, sessile, central flowers bisexual, lateral flowers male; bracts one under each flower, triangular, expanding to 20mm long; calyx minute; corolla 10-15 mm long, cadmium orange. Fruit dry, 3-winged. Flowering is more prolific after fire.

Flowering period November-January

Occurrence A B C E
EUPHORBIACEAE

The spurge or euphorbia family has most of its species in the tropics. There are about 5,000 species overall with over 200 in Australia. It includes the castor-oil plant *Ricinus communis*; *Ricinocarpus*, cultivated for its flowers; and *Euphorbia*, a diverse genus containing some toxic and leafless plants with cactus-like stems. Most species have small, inconspicuous flowers. The stems in some species have lacticifers which produce a white latex. Flowers are mostly unisexual and may be borne on separate plants. The ovary is superior, usually with 1 to 3 chambers. Twelve genera occur in southwestern Australia. The two species on the Murdoch campus can be separated on flower and leaf size.

*Monotaxis grandiflora* Endl.

*Shrub* to 0.2m, low spreading. *Stipules* narrow, setaceous, c. 2mm long. *Leaves* crowded near ends of branches, linear, 7-12mm long, c. 1mm wide, margins revolute; apex with short mucron. *Flowers* unisexual, clustered at ends of short branches, cream, c. 2mm across, pedicels c. 2mm long; male flowers with 5 oblong petals; petals of female flowers spathulate. *Fruit* capsule c. 3mm across.

*Flowering period* August-December

*Phyllanthus calycinus* Labill.; false boronia (Fig.50)

*Shrub* to 0.6m, glabrous. *Leaves* alternate, narrowly obovate, 8-18mm long, 3-4mm wide, nearly flat; deciduous in summer. *Flowers* axillary, pedicels c. 10mm long, cream with green or rarely pink; male flowers 2 or 3 together, c. 2mm across; female flowers solitary, c. 5mm across. *Fruit* capsule c. 5mm across.

*Flowering period* June-November

Fig.50
TREMANDRACEAE

This is a family of three genera which are endemic to Australia. Two genera, *Tremandra* and *Platytheca*, occur only in the southwest of Western Australia and the third genus, *Tetratheca*, occurs in all southern states.

The plants are characteristically small shrubs with simple leaves which may be alternate, opposite or whorled (as in the species on campus) and have pink, purple or white flowers. The anthers number twice as many as the petals and open by an apical pore which may be produced at the end of an elongated tube.

Only one species occurs on campus, *Platytheca galioides* which grows in wetter areas amongst Eucalyptus rudis, Astartea fascicularis and Melaleuca species.

*Platytheca galioides* Steetz; (Fig.51)

*Shrub* to 50cm, slender branches, hairy nodes. *Leaves* in whorls of 8, sessile, linear to almost terete. *Flowers* blue; anthers purple, opening in terminal pores, surround green ovary.

*Flowering period* July-November

*Occurrence* B C
POLYGALACEAE

This family receives its name from the type genus *Polygala*. There are four Australian genera and these are shrubs, herbs or climbers but species from other countries are more usually trees. The flowers are similar in appearance to pea flowers but lack the large obvious standard, have fewer stamens (5-8) and have 2 carpels in their ovary. Some of the foreign species are used as ornamentals but the Australian species generally have small flowers and are not cultivated. The two species on campus occur in the Banksia Woodland at the University's southern boundary. They may be distinguished by flower colour, leaf shape and habit.

*Comesperma calymega* Labill.; blue-spike milkwort

*Herb* to 0.3m, perennial, erect, almost glabrous. *Leaves* sessile, narrowly ovate. *Flowers* in slender racemes, small, blue; keel petal blue and yellow, posterior petal blue and white; sepals pale blue; wings not much longer than outer sepals.

*Flowering period* September-December

*Occurrence* A C

*Comesperma virgatum* Labill.

*Shrub* to 1.6m, perennial, erect, glabrous, slender. *Leaves* sessile, almost linear. *Flowers* in elongated racemes, pink or purple; keel petal partly yellow; wings 3-4 times longer than outer sepals.

*Flowering period* September-March

*Occurrence* A
RUTACEAE

The Rutaceae is a large family of woody shrubs and trees (c. 1,800 species). The leaves and stems contain essential oil cavities and, like the Myrtaceae, are strongly aromatic when crushed. Diagnostic features include the superior ovary composed of free or fused carpels, the arrangement of stamens on a raised nectar-producing disc, and the 4 or 5 free (sometimes fused) petals. The family has many species of commercial importance including Citrus (oranges, lemons) and the strongly perfumed Boronia megastigma (brown boronia) which is sold for cut-flowers and perfume manufacture. Two genera occur on campus and these can readily be identified by the regular small flowers with 4 or 5 blue or pink petals and aromatic leaves.

<table>
<thead>
<tr>
<th>Species</th>
<th>Leaves</th>
<th>Petals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boronia crenulata</td>
<td>opposite, entire</td>
<td>4, pink</td>
</tr>
<tr>
<td>B. ramosa</td>
<td>opposite, divided</td>
<td>4, blue</td>
</tr>
<tr>
<td>Eriostemon spicatus</td>
<td>alternate, entire</td>
<td>5, mauve</td>
</tr>
</tbody>
</table>

Boronia crenulata Sm.; aniseed boronia (Fig.52)

Shrub 60-90cm. Leaves sessile, obovate; margins with small teeth. Flowers in axillary and terminal clusters; corolla pink. Crushed leaves have odour of aniseed.

Flowering period August-October

Occurrence B

Boronia ramosa (Lindley) Benth.; (Fig.53)

Herb 20-30cm. Leaves divided into 3-5 leaflets, nearly terete. Flowers axillary; corolla pale blue.

Flowering period July-October

Occurrence B C

Eriostemon spicatus A. Rich; pepper and salt (Fig.54)

Shrub 50-70cm with erect slender stems. Leaves sessile, linear. Flowers in elongated terminal racemes; corolla mauve, rarely white or pink.

Flowering period June-October

Occurrence A B C E
GERANIACEAE

The Geraniaceae is a cosmopolitan family easily recognized by the fruit bearing the enlarged style, hence the common names storksbills, cranesbills. At maturity the fruit separates into 5 segments. The leaves are opposite and usually aromatic. The 5 sepals, 5 petals and usually 10 stamens are inserted beneath a 5-chambered ovary. Both introduced and indigenous species of Geranium, Pelargonium and Erodium occur in Western Australia. Pelargonium capitatum is an aggressive species in disturbed habitats on the Swan Coastal Plain. It is similar in appearance to an indigenous species which occurs on coastal limestone.

Pelargonium capitatum (L.) L'Hérl.; rose geranium (Fig.55)
Shrub low, spreading to 1m high, densely hairy. Stipules brown, ovate, acuminate. Leaves nearly circular, 20-50mm across, 3-7 lobed. Flowers 8-10 in compact heads 25-40mm across; bracts densely hairy; spur 2-5mm long; petals pink or white, clawed at the base. Introduced from South Africa.
Flowering period July-October
Occurrence C E

Fig.55 x1
APIACEAE

The Apiaceae, after the genus *Apium* e.g. sea celery, can be easily recognized because of the parsley-like inflorescence in which the flowers are arranged in regular umbrella-like umbels (the family was once known as the Umbelliferae). It has a worldwide distribution and contains many culinary herbs, e.g. celery, parsley, dill. Well known native species include the flannel flower (*Actinotus leucocephalus*) and the Rottnest Island daisy (*Trachymene caerulea*). Individual flowers are small and contain 5 inconspicuous petals and sepals. The inferior ovary forms a 2-chambered dry fruit. The five species which occur on campus are very distinct: *Platysace* has flat photosynthetic stems and reduced leaves; *Xanthosia* has prominent hairy leaves; *Centella* is a swamp plant with roundish leaves; *Eryngium* resembles a thistle; *Trachymene* has green, flattened fruits.

<table>
<thead>
<tr>
<th>Species</th>
<th>Leaf</th>
<th>Habit</th>
<th>Flower colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centella cordifolia</td>
<td>reniform to</td>
<td>stoloniferous herb</td>
<td>pink or white</td>
</tr>
<tr>
<td></td>
<td>circular</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eryngium rostratum</td>
<td>divided,</td>
<td>erect herb</td>
<td>blue or purple</td>
</tr>
<tr>
<td></td>
<td>pungent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platysace compressa</td>
<td>divided,</td>
<td>erect herb with winged</td>
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<tr>
<td></td>
<td>basal</td>
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<td>Trachymene pilosa</td>
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<td>hairy herb</td>
<td>white</td>
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<td></td>
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<td>Xanthosia huegelli</td>
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<td></td>
<td>hairy</td>
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</tbody>
</table>

**Centella cordifolia** (J.D. Hook.) Nannf.

*Herb* with horizontal stems rooting at the nodes, glabrous. *Stipules* membranous, fused to the petiole. *Leaves* with long petioles, lamina reniform to near circular, 20-50mm across. *Flowers* in 3 to 4-flowered umbels; bracts obovate, c. 2mm long; petals pink or white, c. 1mm long. *Fruit* 3-4mm across. *Flowering period* throughout year (infrequent) *Occurrence* D

**Eryngium rostratum** Cav.

*Herb* to 40cm, erect perennial. *Leaves* divided, sometimes to midrib, lobes pungent; basal leaves longer than main stem leaves, stem leaves 30-150mm long. *Flowers* in compact, thistle-like, pedunculate heads; involucral bracts 6-10, blue to purple; calyx lobes blue to purple, 3-4mm long. *Fruit* clothed in vesicles. *Note* white flowers may occur. *Flowering period* September-November *Occurrence* A
Platysace compressa (Labill.) Norman; tapeworm plant

Herb to 70 cm, perennial, erect or spreading, stems flattened, winged. Leaves at base of plant divided, short lived; stem leaves small, 1.3 mm long. Flowers in terminal umbels, small; calyx lobes minute; petals 1 mm long, cream.

Flowering period January-May

Occurrence A

Trachymene pilosa Sm. in Rees; native parsnip

Herb to 12 cm, annual, hairy. Leaves palmately divided into 3-lobed segments; petioles c. 20 mm long. Flowers in simple umbels, perianth of 1 whorl of 5 parts, white. Fruits bi-carpellate, flattened vertically, inner carpel smooth, outer carpel with bristles.

Flowering period August-December

Occurrence A B C

Xanthosia hugetii (Benth.) Steudel

Herb 10-30 cm, hairy perennial. Leaves with enlarged petioles, blades divided into 3 segments, segments 10-25 mm long. Flowers in umbels, greenish yellow; calyx lobes 1.3 mm long.

Flowering period August-November

Occurrence A
LAMIACEAE

The mint family is cosmopolitan and easily recognized by the mint-like flowers. The corolla is 2-lipped and the 5 petals are fused at the base into a tube. The elongated lower lip is used as a landing platform by insects and rows of spots act as guides to the nectar at the base of the tube. The style arises near the base of the 2 carpels that make up the superior ovary. The 2 or 4 stamens are inserted on the inside of the corolla tube. In some species the stamens are modified: one anther lobe may be sterile in each stamen and the filament may end in an appendage. The sepals may enlarge during fruit formation. Leaves are usually simple, opposite on the stem and may produce essential oils, e.g. lavender, thyme, peppermint. Superficially the Lamiaceae (= Labiatae) resemble the Scrophulariaceae (foxgloves), Myoporaceae (emu bushes, poverty bushes) and Chloanthaceae (lambs' tails, woolly foxgloves).

Only one species (Hemiandra pungens) occurs naturally on campus. A more compact, prostrate cultivar may be seen on garden embankments at the University.

Hemiandra pungens R.Br.; snake bush (Fig.56)

Shrub 20-60cm, prostrate to erect. Leaves sessile, linear to triangular, apex tapered into a pungent point. Flowers axillary, clustered towards the shoot tip; corolla white, pink or lilac, tubular towards the base, upper lobe recurved and bifid, lower lobe flat and tripartite.

Flowering period throughout the year

Occurrence A B C E
SCROPHULARIACEAE

The cosmopolitan foxglove or snapdragon family is represented on the Murdoch campus by two small herbaceous species. Though introduced, they are included here because they are often mistaken as native plants. The family exhibits a wide range of floral diversity. In the basic type seen here, the corolla has 2 lips with 2 lobes in the upper and 3 in the lower. The ovary is superior and there are 2 pairs of stamens. A nectary is located at the bottom of the corolla tube. Coloured patches and lines lead pollinating insects such as bees into the throat of the flower. The two species can be distinguished most easily by flower colour.

*Parentucellia latifolia* (L.) Cardel; common bartsia

*HERB* 10-30cm, annual with erect hairy stems. *Leaves* sessile, opposite, ovate, deeply toothed, 10-13mm long. *Flowers* axillary near apex of stem, sticky; calyx with 4 short lobes; corolla red to purple, 2-lipped, lower lip with 3 small lobes, united into a tube at the base. *Introduced*, common on moist sites in spring.

*FLOWERING PERIOD* September-October

*OCURRENCE* CE

*Verbascum virgatum* Stokes; twiggy mullein

*HERB* 1-3m, hairy, biennial, one main stem, sometimes branched at the base. *Leaves* shortly petiolate, oblanceolate, toothed, 50-100mm long, alternate. *Flowers* in long terminal raceme; calyx with 5 lobes; corolla pale yellow, large (30mm across), tubular at the base expanding into 5 lobes. *Introduced*, prefers moist, peaty sites.

*FLOWERING PERIOD* June-November

*OCURRENCE* C
Orobanchaceae

Broomrapes occur mainly in the northern hemisphere. Only two species of *Orobanche* occur in Australia and one of these is introduced. These small herbs are root parasites which appear pink because they lack chlorophyll and are thus unable to manufacture their own food. The introduced *O. minor* parasitizes capeweed and clover. The erect stems join a large underground food storage tuber whose sucker-like organ, the haustorium, invades the host root. Each capsule produces nearly 100,000 minute seeds to be dispersed in currents of air. The only species on the Swan Coastal Plain is *O. minor*.

*Orobanche minor* Sm.; lesser broomrape (Fig.57)

*Herb* 0.1-0.3m, stems erect and swollen at the base, yellowish brown, glandular hairy; parasitic. *Leaves* scale-like, brown, ovate to triangular, 15-20 mm long. *Flowers* in a bracteate spike; calyx of 2 divided sepals; corolla yellowish purple, 10-20 mm long, tubular at the base, upper lip with 2 small lobes, lower lip 3-lobed. *Introduced.*

*Flowering period* August-November

*Occurrence* C E
LOBELIACEAE

This family consists of herbs with milky sap. It has a world-wide distribution (c. 1,100 species) and many species are known as cultivated plants. These include the genus *Lobelia* which commonly has blue flowers. The flowers are irregular with 5 petals joined at the base into a tube. The stamens are also fused together and join the petals at their base. The inferior ovary contains large numbers of minute seeds. In *Lobelia* the flower is like a fleur-de-lis. Plants flower from the base upwards and many species continue to flower for long periods under dry conditions. Three species of *Lobelia* are common on the Swan Coastal Plain but only the smaller flowered *L. alata* is recorded at Murdoch University.

*Lobelia alata* Labill.

*Herb* 30-50cm, perennial, prostrate to ascending; stems triangular at the base. *Leaves* obovate, becoming linear higher up, denticulate. *Flowers* blue, arranged in a loose terminal raceme. *Flowering period* November-April

*Occurrence* B
STYLDIACEAE

Members of this family are known as trigger plants because the style and anthers are combined into a column which is sensitive to touch and is called the trigger. When an insect of the right size alights on the labellum, the set trigger moves through an arc, in a fraction of a second, mechanically shedding pollen like a hammer on to the insect’s back or picking up pollen from a previous flower visit. After firing, the trigger slowly resets. There are c. 180 species that occur in Australia and over 100 are endemic to southwestern Australia. Each flower is divided into 5 lobes, 4 are prominent and the fifth is small and modified as the insect’s landing platform (labellum). The labellum thus serves the same function as in the Orchidaceae. In Levenhookia the flowers are very small, the column is short and stout, the labellum is hood-shaped and, unlike many species of Stylidium, Levenhookia species are annuals.

<table>
<thead>
<tr>
<th>Species</th>
<th>Habit</th>
<th>Leaves</th>
<th>Flower colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levenhookia stipitata</td>
<td>erect</td>
<td>few, scattered basal rosette</td>
<td>pink</td>
</tr>
<tr>
<td>Stylidium brunonianum</td>
<td>erect</td>
<td>3 whors on scape small basal rosette</td>
<td>pink to purple</td>
</tr>
<tr>
<td>S. calcaratum</td>
<td>erect</td>
<td>small basal rosette</td>
<td>white to pink</td>
</tr>
<tr>
<td>S. pilifera</td>
<td>erect</td>
<td>basal rosette only</td>
<td>pale yellow</td>
</tr>
<tr>
<td>S. repens</td>
<td>creeping</td>
<td>clusters along stem</td>
<td>white to pink</td>
</tr>
<tr>
<td>S. schoenoides</td>
<td>erect</td>
<td>basal rosette only</td>
<td>cream</td>
</tr>
</tbody>
</table>

Levenhookia stipitata (Sonder) F. Muell.; common stylewort

_Herb_ 3-8cm, slender annual, glandular hairy. _Leaves_ few scattered along stem, oblong to linear, 5-10mm long. _Flowers_ in umbels or short racemes, pedicels long, slender, glandular hairy; calyx tube and lobes glandular hairy; corolla pink, labellum hood-shaped covering column and anthers.

_Flowering period_ October-December

Occurrence B C

Stylidium brunonianum Benth.; pink fountain trigger plant (Fig.58A)

_Herb_ 20-50cm, erect perennial. _Leaves_ in basal rosette, linear or slightly broadened at the apex, greyish green, 20-50mm long; c. 3 whors of narrow leaf-like bracts along the scape. _Flowers_ in a loose raceme; calyx glabrous; petals paired vertically, pink or purple.

_Flowering period_ September-November

Occurrence A B C E
Stylidium calcaratum R.Br.; book trigger plant

*Herb* 7–10cm, slender annual. *Leaves* in small basal rosette, 5–8mm long. *Flowers* 1–3 (rarely more), terminal, petals paired vertically, 2 petals apically notched, white or pale pink with red markings near centre; nectary spur prominent.

*Flowering period* September–December

*Occurrence* A

---

Stylidium piliferum R. Br.; common butterfly trigger plant (Fig. 58B)

*Herb* 20–50cm, erect perennial. *Leaves* compact, basal rosette, linear or broad towards the apex, up to 3cm long; apex with hair-like point. *Flowers* in a loose raceme or panicle at the end of 30–40 mm scape; calyx glandular hairy; petals paired vertically, pale yellow, sometimes white to pink.

*Flowering period* September–October

*Occurrence* A C E

---

Stylidium repens R.Br.; matted trigger plant

*Herb* 8–10cm, creeping perennial, stoloniferous with aerial roots at nodes. *Leaves* apical, in terminal rosettes, triangulate, fleshy; apex acute. *Flowers* solitary among apical leaves; pedicels glandular, hairy, red; petals white to pink with red spots at base.

*Flowering period* October–February

*Occurrence* A B

---

Stylidium schoenoides DC.; cow kicks (Plate 14)

*Herb* 20–40cm, erect perennial. *Leaves* grass-like, in basal tufts, linear, glabrous, 200–300mm long; pink scale leaves located between bases of green leaves. *Flowers* 2–6 in a loose corymb, 60–80mm across; petals white to cream.

*Flowering period* August–October

*Occurrence* A
GOODENIACEAE

The intense blue of *Lechenaultia biloba* is a distinctive feature of the bush in late winter and spring. Like other members of the family (c. 410 species, mostly in Australia) this species has irregular flowers and the 5 petals are joined at the base. The petals are thickened longitudinally in the middle and are usually winged. The style is modified at the tip into an indusium or pollen cup. Leaves are spirally arranged. This is mainly an Australian family of herbaceous plants or small woody shrubs. Four genera occur on the Murdoch campus where they are mainly restricted to undisturbed sites. The names commemorate four people: Jean-Baptiste Leschenault de la Tour, a French botanist who came on an expedition to Australia from 1800 to 1804; William Dampier who visited Western Australia in 1688; the Reverend Samuel Goodenough, a Bishop who studied sedges; and Scaevola, a hero of ancient Rome.

<table>
<thead>
<tr>
<th>Species</th>
<th>Leaf LxW(mm)</th>
<th>Leaves hairy</th>
<th>Flower colour</th>
<th>Anthers fused</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Dampiera linearis</em></td>
<td>20-40x5-10</td>
<td>no</td>
<td>blue with grey hairs</td>
<td>yes</td>
</tr>
<tr>
<td><em>D. triloba</em></td>
<td>20-25x10-20</td>
<td>slightly</td>
<td>blue with brown hairs</td>
<td>yes</td>
</tr>
<tr>
<td><em>Goodenia filiformis</em></td>
<td>40-80x2-5</td>
<td>no</td>
<td>yellow</td>
<td>no</td>
</tr>
<tr>
<td><em>Lechenaultia biloba</em></td>
<td>5-12x1</td>
<td>no</td>
<td>dark blue</td>
<td>yes</td>
</tr>
<tr>
<td><em>L.floribunda</em></td>
<td>8x1</td>
<td>no</td>
<td>pale blue</td>
<td>yes</td>
</tr>
<tr>
<td><em>Scaevola canescens</em></td>
<td>30-40x5-8</td>
<td>densely</td>
<td>dirty white with grey hairs</td>
<td>no</td>
</tr>
<tr>
<td><em>S.globulifera</em></td>
<td>30-40x5-8</td>
<td>no</td>
<td>blue</td>
<td>no</td>
</tr>
<tr>
<td><em>S. paludosa</em></td>
<td>20-30x5-8</td>
<td>slightly</td>
<td>white with white hairs</td>
<td>no</td>
</tr>
</tbody>
</table>

*Dampiera linearis* R.Br.; common dampiera (page 21)

*Herb* 0.2-0.3m, perennial with spreading or erect stems. *Leaves* linear to linear spathulate, tapered at the base, entire or toothed. *Flowers* pedunculate in leafy cymes; calyx covered in dense grey hairs; corolla blue. A polymorphic species with very variable leaf shapes. *Flowering period* July-November
**Dampiera triloba** Lindley

*Herb* 0.2-0.3m, perennial with numerous erect triangular stems. *Leaves* nearly sessile, leathery, 3-lobed at the apex. *Flowers* pendunculate in cymes; peduncles and flowers covered in rust-coloured hairs; corolla blue.

*Flowering period* August-December  
*Occurrence* A

**Goodenia filiformis** R. Br.; narrow-leafed goodenia (Fig.59)

*Herb* 0.1-0.2m, perennial with several slender stems arising from a common tap-root. *Leaves* at base of stem linear, petiolate; on stem scattered, filiform. *Flowers* pedunculate in loose racemes or umbels; corolla yellow. This species prefers moist sites.

*Flowering period* September-January  
*Occurrence* B

**Lechenaultia biloba** Lindley; blue leschenaultia (Plate 19)

*Shrub* 0.3-0.5m with open stems. *Leaves* slender, triangular in section, fleshy. *Flower* pedicellate in terminal axillary clusters; corolla intense clear blue, 25mm across, woolly inside throat; petals with broad wings.

*Flowering period* August-October  
*Occurrence* B C E

**Lechenaultia floribunda** Benth. (Fig.60)

*Shrub* 0.2-0.3m, dense, branched near the base. *Leaves* small, fleshy, crowded. *Flowers* sessile, axillary in small terminal clusters; corolla bluish-white, 10-15 mm across; petals with narrow wings. This species flowers after *L. biloba* and forms small dense stands. Day-flying moths forage extensively and may act as pollinators.

*Flowering period* October-May  
*Occurrence* B C

**Scaevola canescens** Benth.; grey scaevola (Fig.61)

*Shrub* prostrate or decumbent, densely covered in woolly hairs, grey. *Leaves* linear to oblanceolate, fleshy, margins recurved. *Flowers* in short spikes or axillary clusters, hairy; corolla white or purplish-white, sometimes streaked with brown, divided in 5 lobes on one side.

*Flowering period* June-November  
*Occurrence* B C E

**Scaevola globulifera** Labill. (Fig.62)

*Herb* 0.2-0.4m with weak erect triangular stems. *Leaves* linear to narrow elliptic, toothed. *Flowers* sessile in terminal spike; corolla blue, divided into 5 lobes on one side. Favours swamps.

*Flowering period* September-March  
*Occurrence* B

**Scaevola paludosa** R. Br.

*Shrub* 0.2-0.4m, decumbent or erect, sparsely hairy. *Leaves* narrowly obovate to narrowly elliptic, fleshy. *Flowers* sessile in short axillary spikes; corolla white, throat white to brownish purple, hairy on the back, divided into 5 lobes on one side.

*Flowering period* September-January  
*Occurrence* C E
RUBIACEAE

The Rubiaceae is a large family with about 7,000 species including coffee (Coffea arabica), Gardenia and quinine (Cinchona). Leaves are opposite or in whorls, stipules may be prominent, and the regular flowers with 4 or 5 petals occur in terminal heads or axillary clusters. The ovary is located below a disc bearing the corolla tube and attached stamens. Fruits are very variable ranging from dry capsules to fleshy berries. In northern Australia the family was extensively used by Aborigines, e.g. fruit for eating, extracts for poisoning fish, trunks for making canoes. The single species on the Murdoch campus is an inconspicuous plant with an unpleasant odour when crushed.

Opercularia vaginata Labill.; dog weed

Shrub 0.25-0.3m, sparsely hairy. Stipules 2-4mm long, hairy. Leaves opposite, sessile, linear to obovate, 10-60mm long, unpleasantly aromatic when crushed. Flowers in a globular head 10-15mm across; corolla funnel shaped, 3-4mm long with 4 or 5 lobes, c. 1mm long; style divided into 2 branches.

Flowering period August-October  Occurrence A B
ASTERACEAE

The family Asteraceae (previously Compositae) or daisy family is easily recognized because the flowers are grouped into a compact head on a common receptacle. Each head may also be surrounded by involucral bracts which are especially prominent in the everlastingings. In Australia this is the family with the most species. Worldwide there are over 20,000 species, and over 200 occur in Western Australia. Members range from short-lived annuals to woody trees. Considerable variation exists in the appearance of the inflorescence. There may be two types of flowers in the one head, e.g. disc florets, and ray florets. Florets may be bisexual, unisexual or sterile. In ray (ligulate) florets the corolla is fused and strap-like. The corolla of disc florets is 5-merous, the anthers are fused around the style, and the calyx is reduced to a pappus of bristles or plumed hairs. These aid in fruit dispersal, acting as a parasol in some species, e.g. thistles. The inferior ovary is unicelled and contains a single basal ovule. These form at maturity the one-seeded dry achene which in some groups has barbs to aid dispersal in animal fur. Daisy flowers are mostly cross-pollinated by insects including bees, wasps and butterflies.

There are seven native composites on campus. The introduced species include *Dittrichia graveolens* (stinkweed), *Osteospermum clandestinum* (stinking roger), *Arctotheca calendula* (capeweed), *Conyza bonariensis* (tall fleabane), *Vellereophyton dealbatum* (white cudweed), *Taraxicum officinale* (dandelion), *Ursinia anthemoides* (ursinia) and *Sonchus* spp. (thistles). These are listed in Appendix 2.

<table>
<thead>
<tr>
<th>Species</th>
<th>Habit/height</th>
<th>Leaves</th>
<th>Flower colour</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Brachycome iberidifolia</em></td>
<td>herb/to 0.4m</td>
<td>divided</td>
<td>white or violet</td>
</tr>
<tr>
<td><em>Helichrysum cordatum</em></td>
<td>herb/to 1m</td>
<td>entire, woolly</td>
<td>white</td>
</tr>
<tr>
<td><em>Olearia axillaris</em></td>
<td>woody shrub/to 2m</td>
<td>entire, woolly</td>
<td>white</td>
</tr>
<tr>
<td><em>Podolepis gracilis</em></td>
<td>herb/to 0.1m</td>
<td>entire, hairy, stem clamping</td>
<td>white or pale pink</td>
</tr>
<tr>
<td><em>Podotheca chrysanthanca</em></td>
<td>herb/to 0.5m</td>
<td>entire, glandular divided or lobed</td>
<td>yellow</td>
</tr>
<tr>
<td><em>Senecio lautus</em></td>
<td>herb/to 0.5m</td>
<td>entire, not hairy</td>
<td>yellow</td>
</tr>
<tr>
<td><em>Siloxerus humifusus</em></td>
<td>herb/to 0.1m</td>
<td>not hairy</td>
<td>white or pink</td>
</tr>
</tbody>
</table>
**Brachycome iberidifolia** Benth.; Swan River daisy (Plate 20)

*Herb* to 0.45m, annual, glandular hairy. *Leaves* mostly divided to the midrib, rarely entire, 5-80mm long. *Flowers* in heads, involucre 5-7mm in diameter; bracts 2-4mm long; ray florets 10-20, ligule 6-16mm long, white or violet.

*Flowering period* August-May

**Helichrysum cordatum** DC.; tangle daisy (Fig.63)

*Herb* to 1m, weakly erect or spreading woolly perennial. *Leaves* alternate, cordate, 20-70mm long, 15-20mm wide, upper surface green, lower surface densely cottony-woolly. *Flowers* 15-20 florets in heads in large, open, terminal panicles; outer disc florets female, remainder bisexual, white.

*Flowering period* October-April

**Olearia axillaris** (DC.) F. Muell. ex Benth.; coast daisy-bush

*Shrub* to 2m, much branched, branches ashen grey with close, woolly hairs. *Leaves* alternate, ovate or obovate, 10-18mm long, 2-3mm wide, white or grey hairs on both surfaces. *Flowers* 8-15 florets in sessile heads at ends of short shoots or axillary; ray florets 2-6, ligule short, white; disc florets 6-10, exceeding the involucre.

*Flowering period* March-August

**Podolepis gracilis** (Lehm.) Grah.; slender podolepis (Plate 21)

*Herb* to 0.3m, hairy annual. *Leaves* alternate, entire, narrowly ovate, stem-clasping at the base, cottony hairy, 30-45mm long. *Flowers* in heads on long peduncles, involucre 20-25mm across; ray florets 20-25, bilobed at the apex, pale pink to white; disc florets numerous.

*Flowering period* September-December

**Podotheca chrysantha** (Steetz) Benth.; yellow podotheca

*Herb* to 0.5m, annual. *Leaves* linear or narrowly elliptic, 10-100mm long, 1-5 mm wide, glandular pubescent. *Flowers* in terminal heads, involucre 10-20mm long, 10-40mm in diameter; disc florets numerous, exceeding the involucre, yellow.

*Flowering period* August-November

**Senecio lautus** G. Forster ex. Willd.

*Herb* to 0.6m, erect annual, stems pink near base. *Leaves* alternate, very variable, to 100mm long, margins dissected. *Flowers* in loosely branched terminal inflorescence, 23-35mm across, yellow; ray florets 7-9, separated at the base, 5-10mm long; disc florets numerous, bisexual. *Fruit* achene with pappus of long hairs. *Note* material from the Perth region comprises two subspecies, *S.l. maritimus* described here and *S.l. dissectifolius* with finely dissected leaves.

*Flowering period* August-January
*Siloxerus humifusus* Labill.

*Herb* to 0.1m, diffuse branching annual. *Leaves* opposite at base, alternate higher up, linear to narrowly obovate, 10·30mm long, 1·2mm wide. *Flowers* 4·5 florets in partial heads surrounded by 10·13 white or pale pink bracts; compound heads, ovoid 6·29mm long, 5·13mm in diameter, surrounded by floral leaves; tube of disc florets swollen in lower half.

*Flowering period* October-January  

*Occurrence* A B
Monocotyledons

Chamaescilla corymbosa
JUNCAGINACEAE
This is a small family, commonly called water ribbons, with three genera that occupy marshy and coastal habitats. Two genera occur in Australia — *Triglochin*, which is represented on campus and *Maudinia*, which is native to Queensland and New South Wales.

The plants produce a rhizome which gives rise to either fibrous or tuberous roots. The leaves also arise from this rhizome, sheath each other at the base and may be erect or floating. The flowers have 4 or 6 perianth segments which form 2 whorls. The ovaries are superior, may be composed of 2 or 6 unfused or partly fused carpels and the styles are short frequently with a feathery stigma.

*Triglochin procera* is the only species found on campus. It produces tuberous roots which the Aborigines used as a source of food.

*Triglochin procera* R.Br.; arrowgrass

*Herb* to 2m, perennial, thick rhizome with roots terminating in a tuber. *Leaves* emergent from still water, to 2m long. *Inflorescence* raceme with numerous flowers; perianth segments 6 in two whorls, green, reddish at the tip. *Flowering period* June-November  

*Occurrence* D
15. *Scholtzia involucrata*
16. *Hypocalymma robustum*
17. *Eremaea pauciflora*
18. *Beaufortia elegans*
19. *Lechenaultia biloba*
20. *Brachycome iberidifolia*
21. *Podolepis gracilis*
COMMELINACEAE

This is a fairly small family with 700 species worldwide and twenty-nine in Australia. As in the Liliaceae, these plants have flowers with a superior ovary and 6 stamens but differ in that the perianth segments are clearly divided into a calyx (3 sepals) and corolla (3 petals). Only one species occurs on campus (Cartonema philydroides) which is in a genus that is placed in a separate family (Cartonemaceae) by some authors. Aborigines are known to have eaten fleshy tubers in this genus.

*Cartonema philydroides F.Muell.*

*Herb* to 0.3m, perennial, glandular hairs on stems, leaves, and sepals. *Leaves* wrapping at base. *Flowers* in a dense raceme, may have short branches at base; sepals green; petals obovate, yellow. *Flowering period* October-November

*Occurrence* A
RUSHES, REEDS AND SEDGES

Rushes, reeds and sedges are often difficult to distinguish at the family, genus and species level. Listed below are characteristics of these families which should enable you to determine your specimen's family. The features which distinguish species in these groups are often difficult to see and simple descriptions are not possible. For these reasons identification tables are not included. Instead, compare your specimen with the figures provided. The overall inflorescence shape and stem cross-section are the most obvious distinguishing features.

Restionaceae (p.98)
- perianth present, 6 tepals (sometimes fewer or absent)
- plants dioecious
- stamens 3 or 6 per flower
- ovary 1, 2 or 3-chambered
- leaves reduced to sheathing bracts, sheaths split

Juncaceae (p.100)
- perianth present, 6 tepals
- plants monoecious
- stamens 3-6 per flower
- ovary 1 or 3-chambered
- leaves basal

Cyperaceae (p.101)
- perianth absent
- plants monoecious
- stems generally pith-filled, occasionally septate
- stamens 1-3 per flower
- ovary 1-chambered
- leaves mainly basal, sheaths not split
22. Conostylis juncea
23. Conostylis aculeata
24. Burchardia umbellata
25. Thysanotus multiflorus
26. *Patersonia occidentalis*
27. *Lyperanthus serratus*
28. *Elythranthera brunonis*
29. *Caladenia patersonii*
RESTIONACEAE

This is a southern hemisphere family of sedge-like plants which has its greatest diversity in southwestern Australia. Thirteen genera are endemic to Western Australia but only one of these is represented among the five species on campus.

The plants are typically herbs with creeping rhizomes which produce compact clumps. The stems are erect, may be branched or unbranched and the leaves are usually reduced with sheaths which are split. Many genera are dioecious and the male and female plants may look very different. The flowers are borne in compact spikelets which may be solitary or on a branched inflorescence. Six or fewer tepals are present in each flower, the males having 3 or sometimes 6 stamens while the females have ovaries with 1, 2, or 3 style branches. Vestigial stamens or ovaries may be present in the female and male flowers.

*Empodisma gracillimum* (F. Muell.) L.A.S. Johnson and Cutler (Fig.64A)

*Herb* to 0.7m, perennial, rhizomatous; stems branched, flexuose, 0.5-1mm wide. *Leaves,* lower leaves to 15mm long; upper leaves and bracts shorter with upper half widely spreading with reflexed points; bracts awned. *Inflorescence* dioecious; male of 2-12 spikelets, 3-4mm long, contained within bracts; female of 1 or 2 spikelets on long peduncle, protruding from bracts; perianth segments 6; male 2.5mm long, stamens 3; female 1mm long.

*Flowering period* September-February

*Occurrence* B D

![Fig.64](Reeds and Rushes)

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Hypolaena exsulca R.Br.; (Fig.64B)

Herb to 0.75m, perennial, erect; stems branched, scaly white lines alternating with green bands. Leaves pressed close to stem except when basal. Inflorescence dioecious; male of 10-40 spikelets in most bracts; female 1 or 2 flowers together, many empty bracts.

Flowering period September-December

Occurrence A B C

Leptocarpus aristatus R.Br.; bearded twine rush (Fig.64C)

Herb to 0.8m, perennial, densely tufted. Leaves somewhat translucent, marked with several lines. Inflorescence dioecious; male spikelets clustered in each node, many flowers without bracteoles; female spikelets sessile, solitary or in terminal clusters of 2 or 3, more erect and compact than male inflorescence.

Flowering period July-September

Occurrence B C E

Loxocarya flexuosa (R.Br.) Benth.; (Fig.64D)

Herb to 0.3m, perennial, tufted, forms a mat, usually hairy on branches; stem branched, prostrate. Two growth forms. Leaves and bracts longitudinally ribbed often with fringe of long hairs at the top of the sheath. Inflorescence dioecious; sessile spikelet at end of each branch.

Flowering period September-October

Occurrence A B C

Lyginea barbata R.Br. (Fig.64E)

Herb to 0.7m, perennial, rhizomatous, stem erect. Leaves tapering to a long fine point. Inflorescence dioecious; male 3-14 clustered spikelets towards end of branches, each cluster surrounded by a broad bract; female 1-3 spikelets towards end of branches, surrounded by a broad bract.

Flowering period August-February

Occurrence A B C
JUNCAEAE

The rushes form a small but widespread family closely related to the Restionaceae. There are only eight genera worldwide, two of which occur in Australia, *Juncus* and *Luzula*.

These plants are generally herbaceous perennials (sometimes annuals) which are tufted or rhizomatous. The leaves are usually basal and flat, channelled, terete or reduced to sheaths. Some stems and leaves may have diaphragms of partitioning tissue (i.e. septate). The flowers are bisexual, have 6 tepals, 3 to 6 stamens and a superior ovary with a single style but 3 stigmas.

There are few economic uses of these plants and they can cause weed problems in irrigation areas and pasture where there is a high water table.

*Juncus pallidus* R.Br.; pale rush (Fig.64F)

*Herb* to 2m, perennial; stems terete, finely lined, arising from a creeping rhizome. *Leaves* basal, usually reduced to a scale-like sheath, many have a pointed blade, dark brown at base paler above. *Inflorescence* erect panicle; flowers numerous; perianth segments acute, straw coloured.

*Flowering period* October-November  

*Occurrence* B
CYPERACEAE

The sedge family consists of large grass-like herbs which occupy most habitats containing flowering plants. There are approximately 4,000 species worldwide, 650 of these occurring in Australia.

The plants are characteristically perennial or annual herbs which are tufted, rhizomatous or produce stolons. The stems are usually terete or variously angled, pith-filled and have transverse septa. The leaves are mainly basal and the sheath around the stem is not split (one feature which distinguishes these plants from the Restionaceae), and the blades may be grass-like, terete or reduced. The flowers are similar to grass florets with superior ovaries, no perianth and associated with dry bracts (glumes). They contain 1 to 3 stamens with basifixed anthers. Styles may be undivided but more usually 2 to 4-branched. There may be leaf-like bracts at the base of each inflorescence and these are often longer than the inflorescence.

Members of this group have a long history in human affairs. The plants have been used for such purposes as food, weaving, thatching, medicine, perfume and paper making (Cyperus papyrus).

Baumea articulata (R.Br.) S.T. Blake; (Fig.65A)

Herb to 2.5m, perennial; stem terete, c. 13mm diameter, hollow, articulate. Leaves basal, erect, more articulate than stems. Inflorescence 20-40cm long, basal bracts leaf-like but with shorter blade; spikelets numerous, 3-4.5mm long; glumes denticulate; anthers c. 2.5mm long; style prominent. Nut whitish. Flowering period September-December Occurrence B

Cyperus tenuiflorus Rottb.; scaly sedge (Fig.65B)

Herb to 0.9m, perennial, tufted; stem flat or 3-angled, 1.5-3mm wide, ribbed. Leaves shorter than stem, 3-4mm wide. Inflorescence with clustered, many flowered spikelets; spikelets 7-20mm long; glumes 2-2.5mm long, 2-veined; stamens 3, anthers 1-1.5mm long; style 3-branched. Nut 3-angled. Flowering period October-April Occurrence B

Fimbristylis velata R.Br.; (Fig.65C)

Herb to 0.15m, annual, tufted; stems ribbed. Leaves shorter than stem, tapering to a point. Inflorescence umbel of spikelets; spikelets 5-7mm long, hairy; stamens 1; style hairy, stigma 2-branched; ovary hairy. Flowering period December-March Occurrence B
Lepidosperma angustatum R.Br.; (Fig.65D)

Herb to 0.8m, perennial; stem compressed, 1-3mm wide, smooth. Leaves shorter than stem, blades stem-like but more compressed. Inflorescence dense, cylindric or conical, 20-60mm long; spikelets 5-7mm long, narrowly ovoid; anthers 2.5-3mm long. Nut shortly cylindric or ellipsoid, 2.5-3 mm long.
Flowering period March-July, October-November

Occurrence A B

Lepidosperma drummondii Benth.; (Fig.65E)

Herb to 0.8m, perennial, in clumps up to 1m in diameter; stems 4-9mm wide, almost flat, edges acute. Leaves shorter, more compressed and wider than stem, dark apices. Inflorescence erect, to 170mm long, narrow, 3-angled axis; spikelets 6-8mm long, 2-flowered; anthers 3-3.5mm long. Nut ovoid, 3-4mm long.
Flowering period May-July

Occurrence C E

Lepidosperma longitudinale Labill.; pithy sword-sedge (Fig.65F)

Herb to 2m, perennial; stems 4-7mm wide, convex, edges often compressed, smooth. Leaves shorter and more compressed than stem but wider, yellowish at base, dark at apex. Inflorescence 90-300mm long, narrow, 3-angled axis; panicles 5-7mm long, 2 or 3-flowered, anthers 3-3.5mm long. Nut ovoid, 3-4mm long.
Flowering period May-June and October

Occurrence B E

Lepidosperma tenue Benth.; (Fig.65G)

Herb to 0.5m, perennial; stems slender, smooth, terete with furrow on one side. Leaves shorter than stems, slender. Inflorescence compound, 2.5-8cm long; spikelets clustered or single, sessile along stem; outside glumes obtuse, inner glumes acute.
Flowering period March-July

Occurrence B
Mesomelaena stygia (R.Br.) Nees; (Fig.65H)
*Herb* to 0.35m, perennial, erect; stems terete, 0.7-1.5mm diameter, finely ridged. *Leaves* sheath yellow-brown, blades membranous to 30mm long. *Inflorescence* 5-12mm diameter, sometimes with only one spikelet; spikelets 5.5-7mm long; glumes 5-10 with awn; anthers 3mm long with apical appendage 1-1.5mm long. *Nut* 3-3.5mm long. *Flowering period* March-July
*Occurrence* A B C E

Schoenus curvifolius (R.Br.) Benth.; (Fig.65 I)
*Herb* to 0.4m, perennial; stems terete or slightly compressed, 0.5-1.5mm wide, arising from underground cluster of bases. *Leaves* basal, much shorter than stems, curved, ends tapering to a point. *Inflorescence* compact head 8-15mm long; spikelets 5-7mm long, 1 or 2-flowered; stamens 3, anthers c. 3mm long. *Nut* 1-1.75mm long, ends hairy.
*Flowering period* July-September
*Occurrence* A E

Tetraria octandra (Nees) Kuek.; (Fig.65 J)
*Herb* to 1.2m, perennial; stem terete, 3-angled below inflorescence, 1-3mm diameter, leaf-like bracts present. *Leaves* mainly basal, blade 2-4mm wide, often twisted or curved. *Inflorescence* to 25mm long; spikelets clustered in stem bracts, 10-15mm long; stamens 6-8 rarely 4, anthers c. 6 mm long; style 4 or 5-branched. *Nut* c. 5mm long, 4-ribbed.
*Flowering period* June-November
*Occurrence* A C E
The grasses are probably the most cosmopolitan family of flowering plants. There are about 9,000 species worldwide and they occur in habitats ranging from sub-polar to tropical, and from saline, wind-blown coastlines to alpine regions. The group is very important economically as it includes the world's major food crops — wheat, rice, maize and sugarcane.

Individual flowers of a grass are called florets. These are unusual because there is no perianth (the flowers are wind pollinated) and the sexual structures are surrounded by two dry bracts called the palea and the lemma. The palea partially envelopes the stamens and ovary while the lemma is opposite the palea and is usually larger. There may be a long bristle or awn on the lemma and sometimes the palea. One or more florets are contained in spikelets at the base of which are two bracts called glumes. Spikelets may be arranged in spikes, heads, tassels or panicles on the flowering branch. The growing point (meristem) in grasses is in a very low position on the plant. This has enabled these plants to occupy such a wide range of habitats as the meristem is protected from adverse climatic conditions such as grazing and fire.

There are over ten species on campus but only two of these are native. The introduced species are most obvious in the disturbed areas where perennial veldt grass (*Ehrharta calycina*) forms a dominant component of the vegetation. This weed is very difficult to control, except by grazing, and the yellow-brown appearance of the dead foliage is a common sight in many metropolitan reserves.

*Amphipogon laguroides* R. Br.

*Herb* to 0.3m, perennial, erect, tufted, rhizomatous. *Leaves* 0.5-2mm wide, 30-200mm long, apex pungent. *Spikelets* clustered into dense panicle 10-15mm long, yellow when dry; glumes 5-6mm long; lemma 7-11mm long, hairy.

*Flowering period* November-February

*Occurrence* A

*Amphipogon turbinatus* R. Br. (Fig.66)

*Herb* to 0.35m, perennial, tufted, rhizomatous. *Leaves* 0.5-1mm wide, 30-130mm long, curled, surface may have hairs up to 1mm long. *Spikelets* clustered into dense panicle 15-30mm long, blue-grey; glumes 12-13mm long, hairy; lemma 14-17mm long, hairy.

*Flowering period* September-November

*Occurrence* A
The Kangaroo paw family, with its family name taken from *Haemodorum*, consists of thirteen genera, seven of which occur in Australia. The Australian genera are characterized by having an inferior ovary and 3 or 6 stamens which are often fused to the perianth. Six genera are endemic to the southwest of Western Australia. These are *Anigozanthos*, *Blancoa*, *Conostylis*, *Macropidia*, *Phlebocarya* and *Tribonanthes*. *Anigozanthos* species and their hybrids are grown in Australia and overseas as ornamentals (many are grown in Murdoch University gardens) and for cut-flower production. Four genera are native to the Murdoch campus, *Anigozanthos*, *Conostylis*, *Haemodorum* and *Phlebocarya*. The tufted clumps of *Conostylis* and *Phlebocarya* can readily be distinguished when not in flower by the dead, glabrous, stick-like inflorescence structure in *Phlebocarya* compared with the clusters of old hairy flowers in *Conostylis*. *Anigozanthos* species are generally bird pollinated while *Conostylis*, *Haemodorum* and *Phlebocarya* are insect pollinated.

<table>
<thead>
<tr>
<th>Species</th>
<th>Flower colour</th>
<th>Flowers hairy or glabrous</th>
<th>Number of stamens</th>
<th>Leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Anigozanthos humilis</em></td>
<td>yellow red</td>
<td>hairy</td>
<td>6</td>
<td>flat, margins hairy</td>
</tr>
<tr>
<td><em>A.manglesii</em></td>
<td>green red</td>
<td>hairy</td>
<td>6</td>
<td>flat, hairy</td>
</tr>
<tr>
<td><em>Conostylis aculeata</em></td>
<td>yellow</td>
<td>hairy</td>
<td>6</td>
<td>flat, glabrous</td>
</tr>
<tr>
<td><em>C. candidans</em></td>
<td>yellow</td>
<td>hairy</td>
<td>6</td>
<td>flat, pale grey hairs</td>
</tr>
<tr>
<td><em>C.juncea</em></td>
<td>yellow</td>
<td>hairy</td>
<td>6</td>
<td>terete, hairy</td>
</tr>
<tr>
<td><em>C.setigera</em></td>
<td>yellow</td>
<td>hairy</td>
<td>6</td>
<td>flat, soft white spines on margins</td>
</tr>
<tr>
<td><em>Haemodorum paniculatum</em></td>
<td>brown</td>
<td>glabrous</td>
<td>3</td>
<td>c. wrapping stem, glabrous</td>
</tr>
<tr>
<td><em>Phlebocarya ciliata</em></td>
<td>white or cream</td>
<td>glabrous</td>
<td>6</td>
<td>flat c. hairy on margins</td>
</tr>
</tbody>
</table>

*Anigozanthos manglesii* D. Don; kangaroo paw

Herb to 1.25m, perennial. Leaves flattened, glabrous. Flowers on one side of a raceme or spike on unbranched scape; perianth green with red base, lobes reflexed, densely hairy outside; stamens protruding. Flowering period September-November. Occurrence A B C E
Anigozanthos humilis Lindley; cat’s paw (Fig.67)

Herb to 0.5m, perennial. Leaves flattened, usually hairy on margins. Flowers on one side of raceme or spike on an unbranched scape; perianth yellow-red, lobes straight, densely hairy outside; stamens not protruding.

Flowering period August-October

Occurrence A B C E
Conostylis aculeata R.Br.; (Plate 23)

*Herb* to 0.4m, perennial, forms distinct tufts. *Leaves* flat, glabrous or striate, stiff spines may be present on margins. *Flowers* in a loose cyme or panicle or compacted into a head, scape may be shorter or longer than leaves; perianth yellow outside, creamy-yellow inside, densely hairy outside.

*Flowering period* September-October  
*Occurrence* A B C E

Conostylis candidans Endl.

*Herb* to 0.5m, perennial, distinct tufts or elongated stems. *Leaves* flat, covered by pale green hairs. *Flowers* on scape which may branch; perianth yellow outside, golden yellow inside, hairy.

*Flowering period* August-September  
*Occurrence* B C E

Conostylis juncea Endl.; (Plate 22)

*Herb* to 0.4m, perennial, distinct clumps. *Leaves* terete or flattened but thick, hairy. *Flowers* in dense head-like clusters, scape hairy, much shorter than leaves; perianth bright yellow or greenish-yellow, outside covered with long rigid hairs.

*Flowering period* September-October  
*Occurrence* A B C E

Conostylis setigera R. Br.

*Herb* to 0.25m, perennial, distinct tufts, stem short. *Leaves* flat, variable, margins with soft white spines. *Flowers* in a loose head, scape shorter than or same length as leaves; perianth yellow or yellow with red, hairy outside.

*Flowering period* September-October  
*Occurrence* A C E

Haemodorum paniculatum Lindley

*Herb* to 0.8m, perennial. *Leaves* bases wrapping stem, glabrous. *Flowers* in loose panicle; scape longer than leaves, persistent after flowering; perianth brown to black, bracts at base c. length of perianth tube; anthers large, yellow.

*Flowering period* October  
*Occurrence* A B C E

Phlebocarya ciliata R.Br.

*Herb* to 0.4m, perennial, tufted. *Leaves* basal, sheath margins and/or mid-line of back hairy, blades flat, hairy on margins. *Flowers* in a much branched inflorescence, small, scape usually glabrous; perianth with 6 equal length, free segments in 2 whorls, white or cream.

*Flowering period* September-November  
*Occurrence* A B C E
LILIACEAE

The lily family has a large number of species (3,500 worldwide) and contains well known garden plants such as tulips, liliums and hyacinths. The flowers are characterized by having 6 stamens, a superior ovary and 6 perianth segments which are often brightly coloured. There are forty-one genera of Australian lilies.

The attractive fringe lilies of the genus Thysanotus are the most familiar native species and are most diverse in southwestern Australia. Other genera such as Stawellia, Hensmannia, Johnsonia and Annocrinum are endemic to this region.

Eighteen species in twelve genera are present on campus. Flower colours range from white to yellow, blue and purple and are impressive when in full bloom during the spring. A number of the species on campus have underground tuberous roots or stems, including Caesia parviflora, Chamaescilla corymbosa, Sowerbea laxiflora, Thysanotus patersonii, Tricoryne elatior and Burchardia umbellata. Thysanotus patersonii roots were eaten by Aborigines.

The family has recently been divided into a number of smaller units. The new family names are given below with the species descriptions.

<table>
<thead>
<tr>
<th>Species</th>
<th>Flower colour</th>
<th>Inflorescence</th>
<th>Perianth segments</th>
<th>Leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Asphodelus fistulosus</em></td>
<td>white with brown or purple stripes</td>
<td>loose</td>
<td>soft, entire</td>
<td>basal</td>
</tr>
<tr>
<td><em>Burchardia umbellata</em></td>
<td>white</td>
<td>compact</td>
<td>soft, entire</td>
<td>basal and on stem basal</td>
</tr>
<tr>
<td><em>Caesia parviflora</em></td>
<td>white outside, purple or blue inside</td>
<td>loose</td>
<td>soft, entire</td>
<td>basal</td>
</tr>
<tr>
<td><em>Calectasia cyanea</em></td>
<td>blue to purple purple black</td>
<td>terminal, solitary, loose</td>
<td>stiff, entire</td>
<td>on stem</td>
</tr>
<tr>
<td><em>Chamaescilla corymbosa</em></td>
<td>white</td>
<td>loose</td>
<td>soft, entire</td>
<td>basal</td>
</tr>
<tr>
<td><em>Corynotheca micrantha</em></td>
<td>white to purplish-white yellow-brown</td>
<td>compact</td>
<td>stiff, entire</td>
<td>basal</td>
</tr>
<tr>
<td><em>Dasypogon bromeliifolius</em></td>
<td>white</td>
<td>loose, solitary or paired compact</td>
<td>stiff, entire</td>
<td>basal and on stem</td>
</tr>
</tbody>
</table>

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### Plants Described

<table>
<thead>
<tr>
<th>Species</th>
<th>Leaves Description</th>
<th>Flower Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dianella divaricata</strong></td>
<td>blue, loose, soft, entire</td>
<td>mainy basal, some on stem, lavender</td>
</tr>
<tr>
<td><strong>Laxmannia grandiflora</strong></td>
<td>white, compact, soft, entire</td>
<td>basal</td>
</tr>
<tr>
<td><strong>Lomandra integra</strong></td>
<td>white with purple markings, compact</td>
<td>basal</td>
</tr>
<tr>
<td><strong>L. suaveolens</strong></td>
<td>purple, compact, soft, entire</td>
<td>basal</td>
</tr>
<tr>
<td><strong>Sowerbaea laxiflora</strong></td>
<td>purple, compact, soft, entire</td>
<td>basal</td>
</tr>
<tr>
<td><strong>Thysanotus asper</strong></td>
<td>purple, c. solitary, soft, fringed</td>
<td>basal</td>
</tr>
<tr>
<td><strong>T. multiflorus</strong></td>
<td>purple, compact, soft, fringed</td>
<td>basal</td>
</tr>
<tr>
<td><strong>T. patersonii</strong></td>
<td>purple, solitary, soft, fringed</td>
<td>usually absent</td>
</tr>
<tr>
<td><strong>T. triandrus</strong></td>
<td>purple, compact, soft, fringed</td>
<td>basal</td>
</tr>
<tr>
<td><strong>Tricoryne elatior</strong></td>
<td>yellow, loose to compact, soft, entire</td>
<td>on stem</td>
</tr>
</tbody>
</table>

---

**Asphodelus fistulosus** L.; *onion weed* (Asphodeleaceae)

*Herb* to 0.8m, annual or short lived perennial. *Leaves* basal, terete or nearly terete, 1-3mm wide. *Flowers* loose on branched scape; *perianth* segments white with brown or purple central stripe, soft, entire. *Introduced.*

*Flowering period* June-October  
*Occurrence* C E

**Burchardia umbellata** R.Br.; *milk maid* (Plate 24) (Colchicaceae)

*Herb* to 0.6m, perennial, roots tuberous. *Leaves* basal and on stem, 5mm wide. *Flowers* 2-7 in compact head, *perianth* segments white, soft, entire; anthers conspicuous, yellow to red.  
*Flowering period* August-September  
*Occurrence* A B C E

**Caesia parviflora** R. Br.; *pale grass lily* (Antheriaceae)

*Herb* to 0.45m, perennial, roots tuberous. *Leaves* basal, linear, may be flat or folded, crowded near base, fine nervet, 5mm wide. *Flowers* on loose panicle of racemes, scapes as long or longer than leaves; *perianth* segments white inside, blue or purple outside, soft, entire.  
*Flowering period* September-November  
*Occurrence* C
**Calactasia cyanea** R. Br.; blue tinsel lily (Dasypogonaceae)

*Shrub* to 1m, perennial. *Leaves* on stem, covered with fine hairs, 1-3mm wide. *Flowers* terminal, solitary; perianth segments blue, stiff, entire; anthers conspicuous, yellow or orange.

*Flowering period* June-September  
*Occurrence* A C

**Chamaescilla corymbosa** (R.Br.) F.Meull. ex Benth.; blue squill (Antheriaceae) (page 89)

*Herb* to 0.3m, perennial, roots tuberous. *Leaves* basal, flat, broad (5mm wide), round ended. *Flowers* loose on hairy scape as long as or longer than leaves; perianth segments bright blue, soft, entire.

*Flowering period* August-October  
*Occurrence* A B C E

**Corynotheca micrantha** (Lindley) J.F. MacBride (Antheriaceae)

*Shrub* to 0.4m, perennial, branches dichotomous. *Leaves* absent in mature plants, leaf-like bracts on lower branches. *Flowers* loose, single or paired, pedicellate; perianth segments white or purplish white, soft, entire.

*Flowering period* November-January  
*Occurrence* A

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Fig. 69: Habit, inflorescence, fruit.
Dasypogon bromeliifolius R. Br.; pineapple bush (Fig. 68) (Dasypogonaceae)

Herb to 0.8m, perennial. Leaves basal and on stem, coarse spines on margins, 10-15mm wide. Flowers compact in spherical head, on hairy scapes which are longer than leaves, often persistent after flowering; perianth segments yellow brown, stiff, entire; anthers conspicuous, yellow-cream.

Flowering period September-January

Occurrence A B C E

Dianella divaricata R.Br.; (Fig. 69) (Phormiaceae)

Herb to 1m, perennial. Leaves mainly basal, 20-35mm wide, some on stem. Flowers in loose panicle, branching almost dichotomously, branches persistent after flowering; perianth segments blue, soft, entire. Fruit blue, fleshy.

Flowering period October-December

Occurrence A B C E

Laxmania grandiflora Lindley (Antheriaceae)

Herb to 0.3m, perennial. Leaves in basal tufts, ending in short point, 1 mm wide. Flowers in compact head on scape which is much longer than leaves; perianth segments white, inner whorl shorter than outer whorl, soft, entire.

Flowering period July-October

Occurrence A C E

Lomandra integra T.D. MacFarlane; (Fig. 70) (Dasypogonaceae)

Herb to 0.8m, perennial, dioecious. Leaves basal, coarse. Flowers in compact raceme on end of scape; perianth segments white with some purple, soft, entire; scented.

Flowering period August-November

Occurrence A

Lomandra suaveolens (Endl.) Ewart (Dasypogonaceae)

Herb to 0.4m, perennial, dioecious. Leaves basal, soft to stiff, splitting into fibres. Flowers in compact raceme on end of scape; perianth segments purple or yellow, soft, entire.

Flowering period April-July

Occurrence A

Sowerbaea laxiflora Lindley; purple tassels (Fig. 71) (Antheriaceae)

Herb to 0.45m, perennial, roots tuberous. Leaves basal, linear, 2mm wide. Flowers compact on end of scapes which are much longer than leaves; perianth segments purple, soft, entire; stamens conspicuous, yellow.

Flowering period August-October

Occurrence A B C E
*Thysanotus asper* Lindley; hairy fringe lily
(Antheriaceae)

*Herb* to 0.35m, perennial, often more than one stem. *Leaves* basal, densely hairy, 2-3mm wide. *Flowers* several on end of unbranched scape which is much longer than leaves; perianth segments purple or blue, soft, inner whorl fringed; 3 anthers purple, 3 anthers yellow.

*Flowering period* October-January

*Occurrence* A

*Thysanotus multiflorus* R.Br.; many-flowered fringe lily
(Antheriaceae) (Plate 25)

*Herb* to 0.5m, perennial, can regenerate from rootstock. *Leaves* basal, flat or channelled, 2mm wide. *Flowers* compact on scape which is same length as leaves; perianth segments purple or blue, soft, inner whorl fringed.

*Flowering period* September-January

*Occurrence* A B E

*Thysanotus patersonii* R. Br.; twining fringe lily
(Antheriaceae)

*Herb* twining perennial, tuberous roots. *Leaves* usually absent. *Flowers* solitary; perianth segments white to purple or blue, soft, inner whorl fringed.

*Flowering period* August-November

*Occurrence* A B C E

*Thysanotus triandrus* (Labill.) R. Br. (Antheriaceae)

*Herb* to 0.4m, perennial, can regenerate from rootstock. *Leaves* basal, covered with short stiff hairs, 2-3mm wide. *Flowers* compact on end of a scape which is the same length as leaves; perianth segments purple or blue, soft, inner whorl fringed.

*Flowering period* September-November

*Occurrence* A C

*Tricoryne elatior* R. Br.; yellow autumn lily.
(Antheriaceae)

*Herb* to 0.6m, perennial, swollen underground stem. *Leaves* on stem, brown and dry at flowering time, 3mm wide at base. *Flowers* 8-11 in compact to loose heads, perianth segments yellow, soft, entire.

*Flowering period* September-February

*Occurrence* A B C
IRIDACEAE

Members of this family are similar to the Liliaceae but differ by having an inferior ovary and only 3 stamens in each flower. Asexual reproduction is common in this group, new individuals developing from corms or rhizomes. The most familiar native genus is Patersonia but several other genera have become naturalized in Australia. These include Homeria, Watsonia and Gladiolus. Of the three species which occur on campus, two are introduced and one of these is very obvious from August to October when its pink flowers are in full bloom.

*Patersonia occidentalis* R.Br.; purple flag (Plate 26)

*Herb* forms clumps, perennial. *Leaves* several to many, crowded near base of stem and overlapping, sessile; flat, slightly ribbed, glabrous with short stiff hairs on margins. *Flowers* terminal, several enclosed in 2 rigid bracts; bracts green to dull brown; perianth three outer segments large, purple, lasting one day only.

*Flowering period* September-December  
*Occurrence* A B C E

*Gladiolus caryophyllaceous* (Burm.) Poiret

*Herb* to 0.8m. *Leaves* basal 4-6, blades sword-shaped sometimes spirally twisted, sparsely hairy; sheath hairy. *Flowers* 2-11 in a loose spike; floral bracts green; perianth bilaterally symmetrical, pink, strongly scented. *Introduced* from South Africa.  
*Flowering period* August-October  
*Occurrence* A B C E

*Romulea rosea* var. *australis* (L.) Ecklon; Guildford grass

*Herb* to 0.5m, perennial, short stem covered by leaf bases. *Leaves* several, basal, compressed, cylindric. *Flowers* short lived; perianth funnel-shaped, lilac to pink, outer lobes yellowish green with 3 dark longitudinal stripes. *Introduced.*  
*Flowering period* August-October  
*Occurrence* C E
XANTHORRHOEACEAE

These plants were formerly in the Liliaceae and considered to be closely related to the genera Dasypogon, Calectasia, Lomandra and Kingia. However, Xanthorrhoeaceae has now been designated as a family with one genus, Xanthorrhoea, the familiar grass trees.

Although several species are found in Western Australia only one is found on campus, *Xanthorrhoea preissii*, which is readily recognized by its hard, long leaves, long flowering spikes and, when present, its black trunk.

*Xanthorrhoea preissii* Endl.; blackboy

*Shrub* to small tree 0.3-3m, one to many crowns. *Leaves* in hemispherical crown, 4-angled in transverse section, sometimes almost 3-angled. *Scape* emerging from centre of crown, shorter than flowering spike, 0.3-1.4m long, 9-42mm diameter. *Flowering spike* green, 1-3.2m long, 20-70mm diameter. *Perianth* segments in 2 whorls; outer segments shorter than inner segments; inner segments recurved at maturity; stamens and style conspicuous in mature flower, white.

*Flowering period* November-January

*Occurrence* A B C D E
ORCHIDACEAE

Orchids make up the largest flowering plant family with over 30,000 species worldwide and approximately 575 native to Australia. The plants may be terrestrial or epiphytic and most, if not all, have some mycorrhizal association in their roots. Two important structures used in identifying orchids are the column and the labellum of the flowers. The column is formed by the fusion of the stamens and the style while the labellum is the petal opposite this structure and is often highly modified. The flowers are usually insect pollinated and various floral characters, both structural and chemical (pheromone production), have evolved to attract potential pollinators. For example, *Cryptostylis* species attract male *Lissopimpla semipunctata* wasps by having a labellum which resembles a female wasp as well as producing female pheromones.

The family is very important to the horticultural and cut-flower industries. Unfortunately it is very difficult to propagate the terrestrial orchids which predominate in the southwest of Western Australia, probably because little is known about the orchid/mycorrhizal associations.

![Fig.72 x0.3](image)

![Fig.73 x0.5](image)
<table>
<thead>
<tr>
<th>Species</th>
<th>Number of leaves</th>
<th>Leaves and stems hairy</th>
<th>Flower colour</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Caladenia flava</em></td>
<td>1</td>
<td>yes</td>
<td>yellow</td>
</tr>
<tr>
<td><em>C. huegelii</em></td>
<td>1</td>
<td>yes</td>
<td>white to dark red</td>
</tr>
<tr>
<td><em>C. patersonii</em></td>
<td>1</td>
<td>yes</td>
<td>white, red apex on labellum</td>
</tr>
<tr>
<td><em>Diuris longifolia</em></td>
<td>2-3</td>
<td>no</td>
<td>yellow, red-brown and some purple</td>
</tr>
<tr>
<td><em>Elythranthera brunonis</em></td>
<td>1</td>
<td>yes</td>
<td>purple</td>
</tr>
<tr>
<td><em>E. marginata</em></td>
<td>1</td>
<td>yes (glandular)</td>
<td>pink</td>
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<td><em>Leporella fimbriata</em></td>
<td>1</td>
<td>no</td>
<td>brown-green</td>
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<td><em>Lyperanthus nigricans</em></td>
<td>1</td>
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<td>crimson and white</td>
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<tr>
<td><em>L. serratus</em></td>
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<td><em>Microtus unifolia</em></td>
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<tr>
<td><em>Pterostylis nana</em></td>
<td>many</td>
<td>no</td>
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<tr>
<td><em>P. scabra</em></td>
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<td>green-brown and white</td>
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<tr>
<td><em>P. vittata</em></td>
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<td>green and white, some red-brown</td>
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<tr>
<td><em>Thelymitra campanulata</em></td>
<td>1</td>
<td>no</td>
<td>blue-purple (striped)</td>
</tr>
<tr>
<td><em>T. crinita</em></td>
<td>1</td>
<td>no</td>
<td>blue</td>
</tr>
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</table>

*Caladenia flava* R. Br.; cowslip orchid (Fig. 72)

*Herb* to 0.3m; perennial, hairy. *Leaves* one, hairy. *Flowers* in clusters of 1-5 on curving stem; labellum with short claws, 3-lobed, middle lobe twice as long as others; sepals and lateral petals yellow with red markings.

*Flowering period* August-October

*Occurrence* A B C E

*Caladenia huegelii* (R.Br.) Reichb.; rusty spider orchid (Fig. 73)

*Herb* to 0.45m, perennial, hairy. *Leaves* one, hairy. *Flowers* 1-4; labellum lobes fringed, middle lobe blotched with maroon; elongated sepals and lateral petals, white to red with some yellow.

*Flowering period* September-October

*Occurrence* A B C

*Caladenia patersonii* R.Br. var. *longicauda* R.S. Rogers; white spider orchid (Plate 29)

*Herb* to 0.4m, perennial, hairy. *Leaves* one, hairy. *Flowers* 1-3; lateral lobes of labellum deeply fringed; sepals and lateral petals very elongate, white.

*Flowering period* August-October

*Occurrence* A B C
Diuris longifolia R.Br.; common donkey orchid (Fig.74)
Herb to 0.5m, perennial, glabrous. Leaves 2 or 3, equal length and channelled. Bracts 2 or 3 on stem. Flowers in loose raceme of 2-8; labellum lobes of equal length; sepals and lateral petals yellow and brown with some purple.
Flowering period July-October
Occurrence A B C E

Elythranthera brunonis (Endl.) A.S. George; purple enamel orchid (Plate 28)
Herb to 0.4m, perennial, stem with glandular hairs. Leaves one, glandular hairy; undersurface reddish purple. Flowers in loose raceme of 1-4 somewhat cup-shaped; upper surface purple, underneath white with prominent purple spots; labellum white or white with purple markings.
Flowering period August-December
Occurrence A

Elythranthera marginata (Lindley) A.S. George; pink enamel orchid
Herb to 0.25m, perennial, stem with glandular hairs. Leaves one, glandular hairy. Flowers sepals and lateral petals pink, sometimes white with pink spots; labellum purple.
Flowering period October-November
Occurrence A

Leporella fimbriata (Lindley) A.S. George; fringed hare orchid (Fig.75)
Herb to 0.36m, perennial, glabrous. Leaves one or possibly two, 3 red stripes on upper surface. Bracts present on stem. Flowers 3-4; labellum unlobed, fringed; petals erect, brown-green; sepals hanging, brown-green.
Flowering period June-September
Occurrence A

Lyperanthus nigricans R.Br.; red beaks
Herb to 0.3m, perennial, glabrous. Leaves one, up to 80mm. in diameter. Bracts present on stem. Flowers 2-8, crimson and white; labellum 3-lobed, middle lobe deeply fringed.
Flowering period August-October
Occurrence A

Lyperanthus serratus Lindley; rattle beak orchid (Plate 27)
Herb to 0.5m, perennial, glabrous. Leaves 10-35cm long. Flowers 3-6, pale green to yellow with crimson or brown; labellum 3-lobed, middle lobe recurved; lateral petals vertical; lateral sepals c. hanging.
Flowering period September-October
Occurrence C
**Microtis unifolia** (G. Forster) Reichb.; common mignonette orchid

*Herb* to 0.55m, perennial, glabrous. *Leaves* one, terete, rolled inwards. *Flowers* up to 100 in long raceme, green, labelium with irregular margin, obtuse or slightly 2-lobed at apex.

*Flowering period* October-December  
*Occurrence* C

**Pterostylis nana** R.Br.; snail orchid

*Herb* to 0.2m, perennial, glabrous. *Leaves* in basal rosette and on stem. *Flowers* one, pale green with some white; dorsal sepal and lateral petals fused to form a hood; lateral sepals erect.

*Flowering period* July-September  
*Occurrence* A

**Pterostylis scabra** Lindley var. robusta (R.S. Rogers) A.S. George; shell orchid

*Herb* to 0.27m, perennial, glabrous. *Leaves* several on stem. *Flowers* one, green-brown and white; dorsal sepal and lateral petals fused to form a hood; lateral sepals fused at base, erect.

*Flowering period* June-July  
*Occurrence* A

**Pterostylis vittata** Lindley var. vittata; banded greenhood

(Fig.76)

*Herb* to 0.3m, perennial, glabrous. *Leaves* several on stem, basal leaves usually absent on flowering plant. *Flowers* in loose raceme of 1-9, green or sometimes red-brown with green or white stripes; dorsal sepal and lateral petals form a hood; lateral sepals hanging.

*Flowering period* May to October  
*Occurrence* A C

**Thelymitra campanulata** Lindley; bell sun orchid

*Herb* to 0.4m, perennial, glabrous. *Leaves* one. *Bracts* present on stem. *Flowers* 1-4, striped reddish-purple to blue-purple; labellum petal-like; column deep purple.

*Flowering period* September-October  
*Occurrence* A

**Thelymitra crinita** Lindley; queen orchid.

*Herb* to 0.6m, perennial, glabrous. *Leaves* one. *Bracts* present on stem. *Flowers* 1-12, bright blue; labellum petal-like.

*Flowering period* September-December  
*Occurrence* A
APPENDIX 1
Abbreviations to Authors

<table>
<thead>
<tr>
<th>Author</th>
<th>Abbreviation</th>
<th>Author</th>
<th>Abbreviation</th>
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<td>F. Muell.</td>
<td>Ferdinand H.J. von Mueller</td>
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<td>Hehynh.</td>
<td>G. Heynhold</td>
<td>Wild.</td>
<td>C.L. von Wildenon</td>
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## APPENDIX 2
### Common Weeds

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<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
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<tr>
<td>Silvery hair grass</td>
<td><em>Airea caryophyllea</em></td>
</tr>
<tr>
<td>Scarlet/blue pimpernel</td>
<td><em>Anagallis arvensis</em></td>
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<tr>
<td>Pimpernel</td>
<td><em>A. pumilla</em></td>
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<tr>
<td>Capeweed</td>
<td><em>Arctotheca calendula</em></td>
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<td>Onion weed</td>
<td><em>Asphodelus fistulosus</em></td>
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<td>Wild oat</td>
<td><em>Avena fatua</em></td>
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<td>Red azolla</td>
<td><em>Azolla filiculoides</em></td>
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<td>Wild turnip</td>
<td><em>Brassica rapa</em></td>
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<td>Quaking grass, blowfly grass</td>
<td><em>Briza maxima</em></td>
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<td>Lesser quaking grass</td>
<td><em>B. minima</em></td>
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<td>Brome grass</td>
<td><em>Bromus diandrus</em></td>
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<td>Common starwort</td>
<td><em>Callitriche stagnalis</em></td>
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<tr>
<td>Pigface</td>
<td><em>Carpobrotus edulis</em></td>
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<tr>
<td>Geraldton wax</td>
<td><em>Chamelaucium uncinatum</em></td>
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<tr>
<td>Wild melon, pie melon</td>
<td><em>Citrullus lanatus</em></td>
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<td>Tall fleabane</td>
<td><em>Conyza bonariensis</em></td>
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<td>Pampas grass</td>
<td><em>Cortaderia selloana</em></td>
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<td>Prickly paddy melon</td>
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<td>Couch</td>
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<td>Scaly sedge</td>
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<td><em>Cytisus proliferus</em></td>
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<td>Stinkwort, stinkweed</td>
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<td>Perennial veldt grass</td>
<td><em>Ehrharta calycina</em></td>
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<td>Annual veldt grass</td>
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<td>Double gee</td>
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<tr>
<td>Squirrel-tail fescue</td>
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<td>On one-leaf cape tulip</td>
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<td>Italian rye grass</td>
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<td>Sand plain lupin/Western Australian blue lupin</td>
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<td>Sand plain lupin</td>
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<td>Western Australian blue lupin</td>
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**APPENDIX 3**
**Australian Plants in Murdoch University Gardens**

| Anigozanthos flavidus hybrids | Grevillea bipinnatifida |
| Banksia ashbyi | G. biternata |
| B. grandis | G. crithmifolia |
| B. media | G. hookeriana |
| B. prionotes | G. obtusifolia |
| B. repens | G. 'Robyn Gordon' |
| B. speciosa | G. thelemanniana |
| Beaufortia sparsa | Guichenotia macrantha |
| B. squarrosa | Hakea francisiana |
| Brachychiton gregorii | H. laurina |
| B. populneus | H. petiolaris |
| Calothamnus quadrifidus | Hemiandra pungens |
| Casuarina cunninghamiana | Hibbertia cuneiformis |
| C. equisetifolia | H. scandens |
| C. stricta | Hypocalymma robustum |
| C. turtulosa | Isopogon cuneatus |
| Chamelaucium uncinatum hybrids | I. formosus |
| Darwinia citriodora | I. dubius |
| Dodonaea ceratocarpa | I. latifolius |
| Eucalyptus caesia | Kunzea baxteri |
| E. calophylla | K. pulchella |
| E. calophylla var. rosea | Melaleuca citriodora |
| E. camaldulensis | M. diosmifolia |
| E. cinerea | M. elliptica |
| E. citriodora | M. fulgens |
| E. erythrocorys | M. 'Georgina Molloy' (M. teretifolia x M. lateritia) |
| E. ficifolia | M. hypericifolia |
| E. forestiana | M. incana |
| E. gomphocephala | M. leucadendron |
| E. grandis | M. nesophila |
| E. landsowneana | M. scabra |
| E. lehmannii | M. violacea |
| E. leucoxylon | Myoporum parvifolium |
| E. nicholii | Pimelea ferruginea |
| E. platypus | Regelia velutina |
| E. ptychocarpa | Ricinocarpos tuberculatus |
| E. sideroxylon | Verticordia chrysantha |
| E. spathulata | V. mitchelliana |
| E. stoatei | V. plumosa |
| E. todtiana | Xanthorrhoea preissii |
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