



PART 2 – WHAT DETERMINES A SPECIES

CLASSIFICATION

The Binomial System of classification was developed by a Swedish botanist Carolus Linnaeus in 1735 and is still used today. It is a system that groups all living organisms, starting with the broadest group, the Kingdom, down to the smallest group, the species.

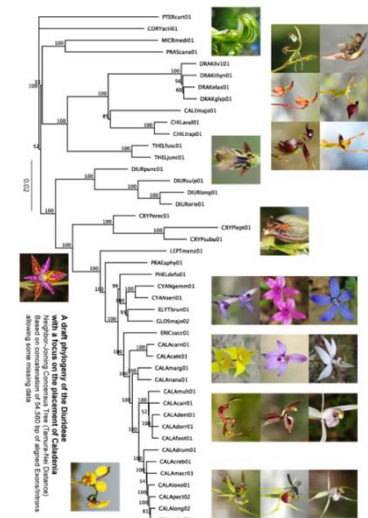
Note: The levels of classification are constantly changing as technology is playing a greater part in the study of taxonomy.

	HUMANS	COWSLIP ORCHID
KINGDOM	Animalia	Plantae
PHYLUM	Chordata	Tracheophyta
CLASS	Mammalia	Angiospermae
ORDER	Primates	Monocotylodoneae
FAMILY	Hominidae	Orchidaceae
GENUS	Homo	Caladenia
SPECIES	<i>sapiens</i>	<i>flava</i>

Modern Taxonomy

Traditionally structure and reproductive strategies were used to classification organisms but modern technology has introduced the used of molecular information including DNA and RNA. This allows taxonomists to place organisms according to their evolutionary ancestry and to show common ancestors. In the table below you can see the addition of the 'clade' classification group. A clade is a grouping that includes a common ancestor and all the descendants (living and extinct) of that ancestor.

COWSLIP ORCHID	
DOMAIN	Eukarya
KINGDOM	Plantae
CLADE	Tracheophyta
CLADE	Angiospermae
CLADE	Monocotylodoneae
ORDER	Asparagales
FAMILY	Orchidaceae
SUBFAMILY	<i>Orchidoideae</i>
TRIBE	Diurideae
GENUS	Caladenia
SPECIES	<i>flava</i>



From Australian National University
Centre of Biodiversity Analysis

Binominal nomenclature

In the 1700s Carl Linnaeus devised the binomial system of classification giving each organism 2 parts to its name – genus and species.

Members of a genus are divided into species. The word species comes from 'specific'. The language of nomenclature is derived from Latin and Greek.

eg *Homo sapiens*, *Caladenia flava*.

Nomenclature found on plaques in Kings Park are:

- **FAMILY:** members of an order are divided into families. Each family has one or more genera that share common characteristics such as containing oil glands in the leaves. Plant family names end with 'aceae' eg Myrtaceae.

- **GENUS:** (plural = genera) is defined as group of plants consisting of one or more related species that have common characteristics. A capital letter is used. eg *Eucalyptus* (eu-covered, calyptus-cap).
- **SPECIES:** plants within a species are very similar and are able to interbreed, producing fertile offspring eg *Eucalyptus macrocarpa* will interbreed with other *E macrocarpa*.
- **SUBSPECIES:** (ssp. or subsp.) and occur naturally in nature. The individuals in a subspecies may have different traits to the original species and usually occur in different areas eg *Eucalyptus preissiana* subsp *preissiana* and *E preissiana subsp lobata*.



- **VARIETY:** (var.) A variety maybe just a slight difference between plants eg colouration, and usually occur in the same area.

Some definitions you may find useful:

Hybrids- produced due to successful breeding between plants belonging to different species. This can occur naturally or in cultivation. A multiplication sign is used between the name of each species. Hybrids do not produce viable seeds.

eg *Grevillea pinnatifida* x *G banksii* – *Grevillea* ‘Robyn Gordon’

Cultivars- are developed under horticultural conditions ie cultivated. They may represent a naturally occurring plant or be bred over time under cultivation.

eg *Grevillea* ‘RSL Spirit of Anzac’.

NAMING PLANTS

Plants have a scientific name and often a common name.

Scientific names are derived from Latin and Greek terms and refer to

- a physical feature of the plant eg *Corymbia ficifolia* (fig like foliage) or
- a person eg *Eucalyptus brandiana* (Grady Brand former Senior Curator of Kings Park Botanic Garden).

Common names can be derived from local and familiar names of plants in a particular area but may be multiple in number and vary according to a place. They are not regulated so this can lead to confusion eg 3 plants referred to as ‘native fuschia’ - *Correa reflexa*, *Eremophila maculata*, *Epacris impressa*

Name Changes

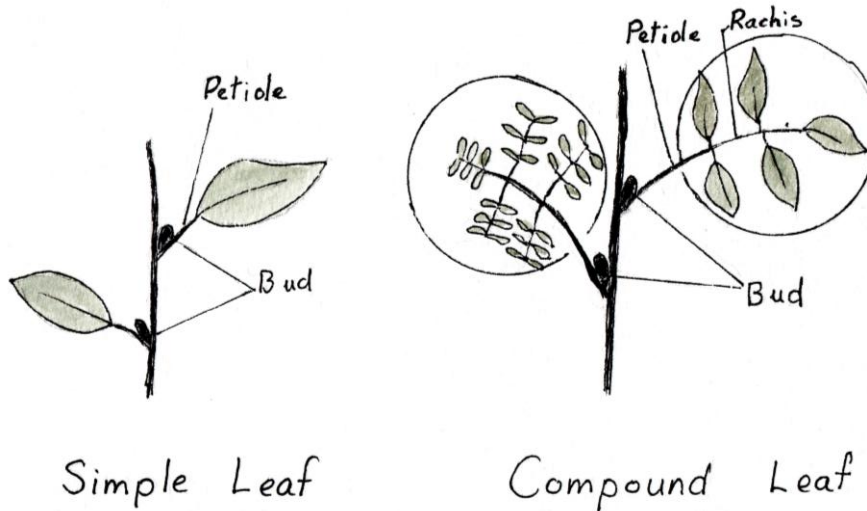
The advent of molecular biology has enabled more accurate determinations of separate species to be made, and, along with the higher levels of classification we showed above, scientists are continually re-appraising the correct scientific names for organisms. Two prominent examples are

- genera *Banksia* and *Dryandra* are now grouped together as *Banksia* so all *Dryandra* species are renamed eg *Dryandra nivea* renamed *Banksia nivea*, *Dryandra praemorsa* renamed *Banksia undata*
- genus *Eucalyptus* has been split into 3 genera, *Eucalyptus*, *Corymbia* and *Angophora* (does not occur in WA) so some renaming occurred eg the Marri, *Eucalyptus calophylla* renamed *Corymbia calophylla*.

FEATURES USED IN PLANT IDENTIFICATION

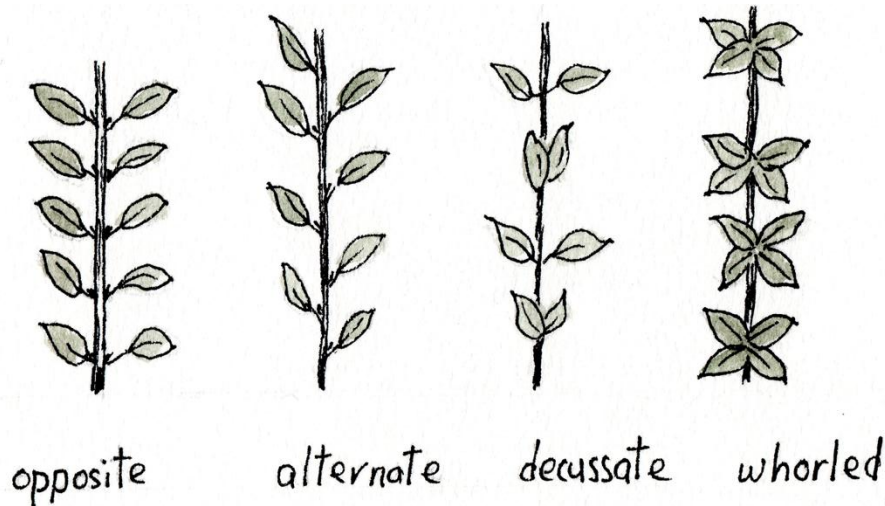
LEAVES

The blade of a simple leaf is all one structure, and the blade of a compound is divided into several leaflets. The petiole is the stalk that attaches the blade of the simple or compound leaf to the stem. In a compound leaf the axis above the lowest leaf is called the rachis. In a compound leaf the axis above the lowest leaf is called the rachis.



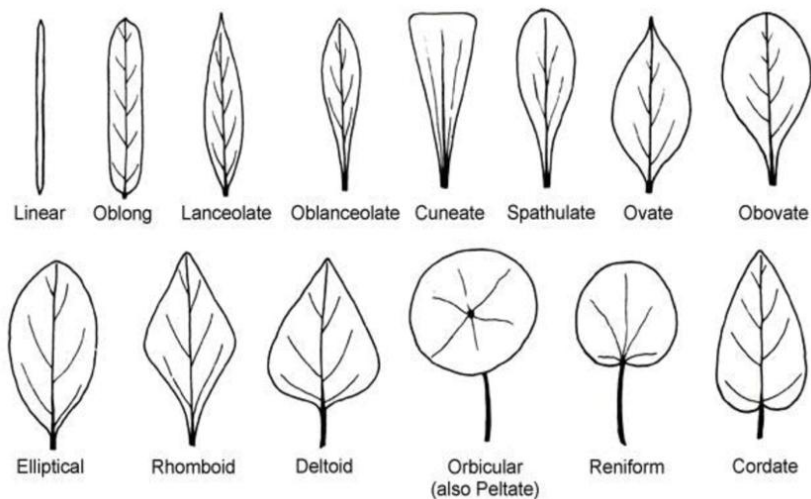
LEAF ARRANGEMENT ON THE STEM

Leaves can be arranged on the stem in different patterns around the node as shown in the diagram below.



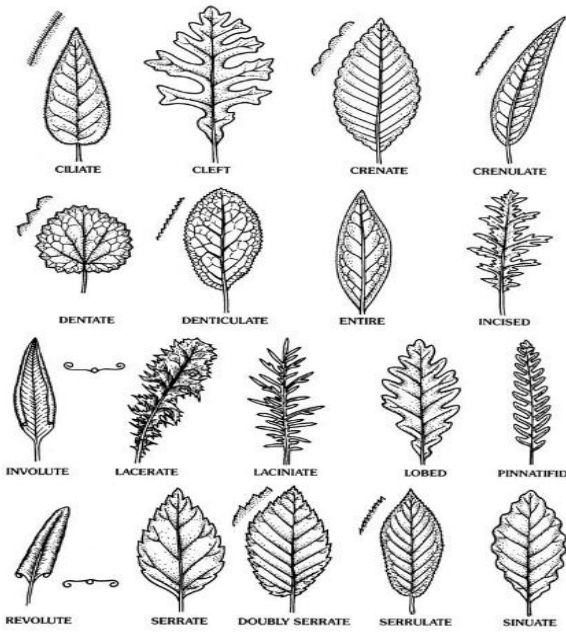
LEAF SHAPES

Leaf shape is the outline of the leaf disregarding the tip and the base.



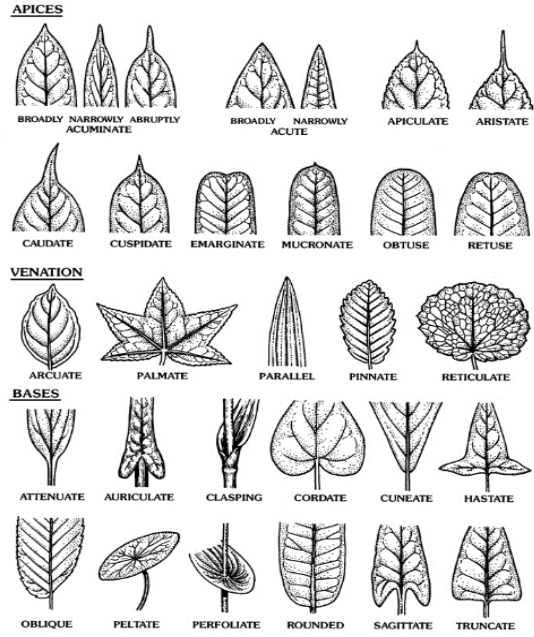
LEAF MARGINS, TIPS AND BASES

PLATE 4. LEAF MARGINS



as published in Swink, F. and G. Wilhelm, 1994. Plants of the Chicago region, 4th ed. Indianapolis: Indiana Academy of Science.

PLATE 5. LEAF APICES, VENATION, AND BASES



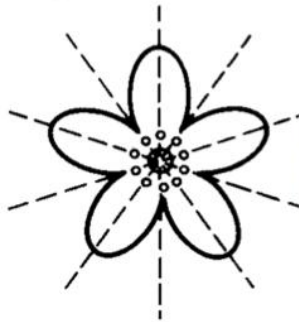
as published in Swink, F. and G. Wilhelm, 1994. Plants of the Chicago region, 4th ed. Indianapolis: Indiana Academy of Science.

VARIATION IN FLOWER ARRANGEMENT AND STRUCTURE

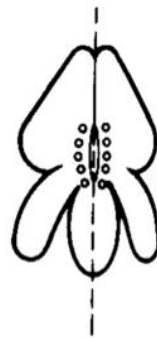
Flower symmetry, ovary position, arrangement and shape are often used in identification.

FLOWER SYMMETRY

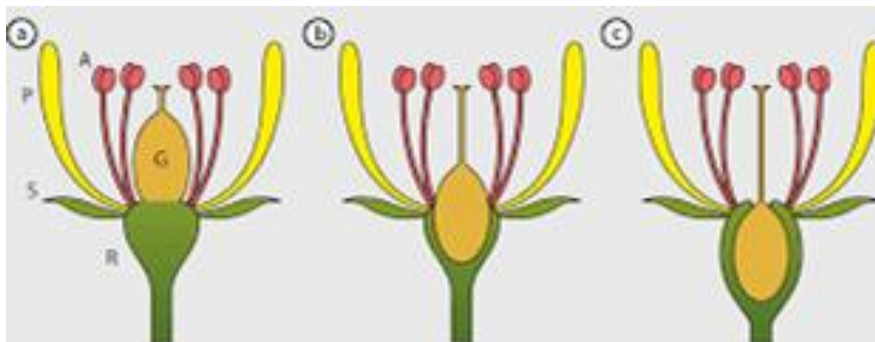
A Actinomorphic flower (radially symmetrical)



B Zygomorphic flower (bilaterally symmetrical)



OVARY POSITION

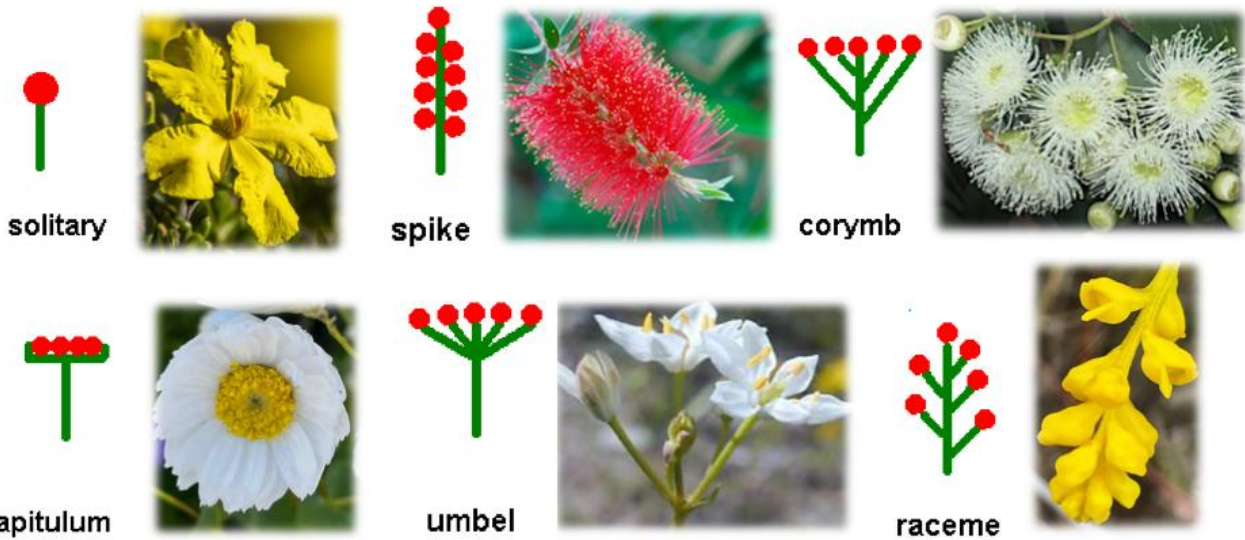


Superior

Half inferior

Inferior

FLOWER ARRANGEMENT



FLOWER SHAPE

Different families have characteristic flower structure and shape. This will be discussed in Part 3.

FLOWER SHAPE



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