



Topic 22: **ORCHIDS** (Orchidaceae)

Did you know that,

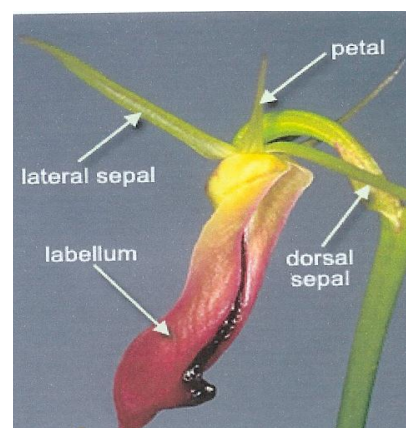
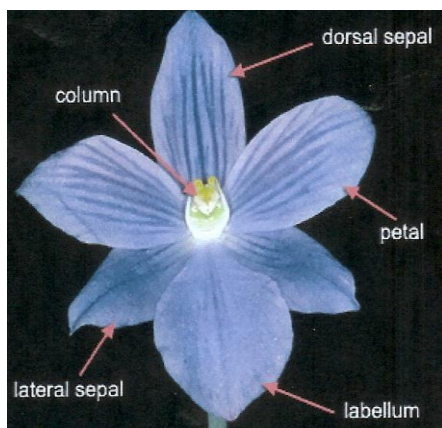
- The orchid family is the largest and most successful in the world.
- The name describing the orchid family originated about 300BC when the scholar Theophrastus used the Greek word *orchis* meaning testicle to describe a plant with underground tubers which he felt bore a resemblance to testicles. Linnaeus later used the name *Orchis* to describe the plant genus Theophrastus had observed.
- Orchids are so loved by people that unscrupulous collectors have removed extensive numbers of orchids from the wild, to the extent that in many areas orchids are no longer found.

Orchid Species

The orchid family, Orchidaceae, has about 25000 species in about 1000 genera. Australia is not as rich in orchids as other countries, but close to 200 genera with about 1300 species are found here. Three quarters are terrestrial and the others are epiphytes.

Flower Structure

Orchids are herbs with distinctive floral features. They are monocotyledons with three sepals and three petals, but one of the petals in most species is greatly modified to form the labellum or tongue. Its primary function is to attract pollinators. The labellum is usually larger than the other segments and can be entire or with 3 lobes. It can be fixed or attached by a flexible strap which snaps shut and traps an insect to achieve pollination. It commonly has a variety of structure, plates, calli, hairs and glands. The male and female sexual parts are combined to form the fleshy structure called the column, located centrally in the flower. The anther is located at the apex of the column and is formed of an anther cap containing the pollinia (the pollen masses).



The stigma (the female part of the column) is located beneath the anther. It is separated from the anther by a tissue called the rostellum. The column of many terrestrial orchids has appendages and adornments, such as column wings.

Orchid flowers have an inferior ovary.

Orchids exhibit a great range of diversity, in their inflorescences, colours and perfumes. Most Australian orchids are pollinated by insects, either by simple or highly specialized means. Beetles, moths, flies, gnats, ants, bees and wasps may be involved. Orchids may produce scents that attract the relevant insect or they may mimic flowers of another species e.g. some species of *Diuris* mimic nectar bearing pea flowers such as *Daviesias* or *Pultenaeas*. The orchid flowers may resemble the pollinator and even produce a pheromone (a scent which matches that of the pollinator). All species of *Cryptostylis* in Australia are pollinated in this way. Males of the Ichneuman wasp *Lissopimpla excelsa* back into the flower and pick up pollinia attached to its abdomen. On visiting a second flower, the pollinia may be deposited causing pollination. After pollination, a series of changes occur to the orchid flower and the rest of the plant. Seed is tiny and dispersed by wind. In early development, an orchid has the labellum on the upper side, but later when the flower opens, the labellum is on the lower side (a resupinate flower e.g. *Thelymitra* sp.). Some, which do not invert as above, are called non-resupinate (e.g. *Prasophyllum* sp.)

Natural hybrids occur and a number of Australian species have evolved techniques by which they reproduce asexually. In some circumstances, epiphytic orchids produce aerial growths (keikis) and some terrestrials grow in colonies where they produce new daughter tuberoids each season. The tubers produced were a source of food for Aborigines and in the 1800s for some European children as well.

Orchids, like many other plants have a mycorrhizal fungal association (a symbiotic relationship with the fungus and the orchid). Some orchids (saprophytes) rely entirely on this fungal relationship to digest and transport substances into their roots. These plants are leafless and lack chlorophyll.

Fire is a major environmental factor in Australia. Some terrestrial orchid habitats are burnt regularly and these orchids have adapted to the occurrence of fire. Some virtually need fire to induce flowering and others are inhibited by fire. Some species of orchids at Ku-ring-gai Wildflower Garden have only been observed once in many years, possibly shortly after fire.

Epiphytic orchids have been cultivated for many years. Growers have hybridized a great number and much time and effort is put into growing species and hybrids. In recent years, many terrestrials also have been successfully grown.

David Jones and others have renamed many Australian species of orchids. He states "Recently, detailed molecular studies have become a powerful method for revealing hidden aspects of the genetic make-up of orchids and casting light on ancestral relationships that are not easily determined by morphological techniques". He suggests this provides "an extra set of powerful data which often provides compelling support for reclassification and name changes". His name changes of Australian Orchidaceae are included in his new book and are added in parenthesis in descriptions here. Many of these names are accepted by people like growers of orchids, e.g. *Dockrillia* for many epiphytic *Dendrobiums*. However, these names have not been accepted by all Botanists! Names of Orchids in this report are those in PlantNET, New South Wales Flora Online, the National Herbarium of New South Wales.

Species found at Ku-ring-gai Wildflower Garden.

Terrestrials

Acianthus* spp.** *Acianthus* species have distinctive heart-shaped leaves with the undersurface coloured purple. They are found close to, and horizontally just above the ground. ***A. exsertus (Jun-Aug) and ***A. fornicatus*** (Pixie Orchid, May-Aug) are very similar with flowering stems up to 30cm tall, but the dorsal sepal obscures the column in ***A. fornicatus***. ***A. caudatus*** (*Nemacianthus caudatus*), (Mayfly Orchid, Jun-Sep) has a flower stem up to 250 mm with 1-9 reddish-purple flowers. The dorsal sepal and petals are much longer than the other *Acianthus* species (25-40 mm long) and thread like.



Acianthus fornicatus



Acianthus exsertus



Acianthus caudatus

Caladenia catenata (*Petalochilus catenatus*) (Lady's Fingers, Jun-Oct) has a narrow dark green basal leaf and 1 or 2 white or pink flowers. It has an erect dorsal sepal above a column and curved orange tipped labellum. The lateral sepals and petals lie in a roughly horizontal line.



Caladenia catenata



Caleana major



Calochilus paludosus

Caleana major (Flying Duck Orchid, Sep-Jan) has an upright leaf to 10 cm and 2 to 4 flowers, on a stem to 40 cm, reddish-brown with a red labellum shaped like a duck.

Calochilus* spp.** (Beardie Orchids). The unique bearded labellum makes this genus "singularly beautiful". They have one tall vertical leaf. The leaf of ***C. campestris (Oct) is three-sided to 10 mm wide. Flowers are pale green with purple markings and about 20 mm

long with 2 dark glands on either side of the column base. ***C. paludosus*** (Sep-Nov) is a light green with purple veins. The labellum is covered with red hairs and a strap-like tail. ***Chiloglottis spp. C. reflexa*** (Autumn Ant Orchid, Feb-May) has paired leaves at the base of the plant with a solitary greenish brown to purple flower. The labellum is held horizontally and is covered with shiny black and red calli. ***C. formicifera (Myrmecchila formicifera)*** (Ant Orchid, Aug-Oct) has paired basal leaves and flowers with a trapezium-shaped upright greenish labellum with a band of pink to black glands extending from the base to the tip. ***Corybas aconitiflorus*** (Spurred Helmet Orchid, Apr-Jun) has a leaf similar to *Acianthus* species but with a flower 30 mm long and a purple dorsal hood covering the floral parts, just above the leaf.



Chiloglottis formicifera



Corybas aconitiflorus

Cryptostylis spp. C. erecta (Hooded Orchid, Nov-Jan) and ***C. subulata*** (Large tongue or Cow Orchid, Oct-Jan) have similar erect lanceolate leaves, but *C. erecta* is purplish below whereas *C. subulata* is a similar colour on both sides. *C. erecta* has an erect flower and its pale labellum with conspicuous red veins, forms a hood. *C. subulata*'s flower has a labellum about 25mm long, not upright, yellowish green, red at the tip and a dark red swelling below the tip.



Cryptostylis erecta



Cryptostylis subulata

Dipodium spp. (Hyacinth orchids). ***D. punctatum*** (Dec-Mar) is a leafless saprophytic orchid with 10-50 flowers. It has a purplish-red stem and its flower is a rosy pink colour with darker spots on the flowers. Its sepals and petals do not have recurved tips. It lacks spots on the flower stalk and ovary. ***D. variegatum*** (Oct-Feb) has a greenish or purplish flower stem with spots on the flower stalk and ovary. ***D. roseum*** (Nov-Mar) has a green to

blackish stem and pink flowers with small dark red spots. Its sepals and petals have recurved tips.



Dipodium punctatum



Dipodium roseum



Dipodium variegatum

Diuris aurea (Golden Donkey Orchid, Aug-Sep) has 1-2 leaves and 2-5 flowers coloured gold with some brown markings. The dorsal sepal is free, the lateral sepals linear and tail-like. The petals have a distinct claw and are ear-like.



Diuris aurea



Genoplesium baueri



Genoplesium fimbriata

Genoplesium* spp. *G. baueri (Brittle Midge Orchid, Feb-May). Stem to 15 cm tall with up to 12 green to purplish brown, non-resupinate yellowish flowers and a deep pink lanceolate recurved labellum. ***G. fimbriatum* (*Corunastylis fimbriata*)** the Fringed Midge Orchid (Jan-May), has a stem up to 40 cm high with 5-30 flowers, greenish brown with red stripes. Its thin, narrow pointed labellum has long red hairs. ***G. ruppii* (*Corunastylis ruppii*,** Rupp's Midge Orchid, Jan - Apr) has crowded nodding greenish flowers with dark purple labellum. It has a stem up to 20 cm tall. The dorsal sepal, petals and the labellum have short glandular hairs.



Genoplesium ruppii



Glossodia minor



Microtis unifolia

Glossodia spp. (Wax-lip Orchids Jul-Sep). **G. major** and **G. minor** are similar with rose-purple petals and sepals. **G. major** is 40-60mm wide with a labellum divided into a white base and a purple tip, **G. minor** is about 20 mm wide.

Microtis unifolia (Common Onion Orchid, Sep-Oct) has a slender cylindrical leaf up to 80 cm with up to 100 tiny green flowers, in a dense spike.



Prasophyllum elatum



Prasophyllum brevilabre



Pterostylis acuminata

Prasophyllum spp. bear numerous non-resupinate flowers in a dense spike. **P. brevilabre** (Short-lip Leek Orchid, Aug-Jan) has a flower stem to 48 cm high. The 8-20 flowers are about 10mm across, green with red markings and a white labellum. **P. elatum** (Tall Leek Orchid, Aug) has up to 60 flowers with a stem up to 150cm and a leaf to 120 cm high. Flowers are about 19mm across, coloured pale yellowish green, purplish or brownish. Flowering time is unpredictable but occurs more often after fire.

Pterostylis spp. (Greenhoods). These orchids have a hood formed by the dorsal sepal and petals. **P. acuminata** (Apr-May) has a solitary flower and 3-5 leaves in a basal rosette. Flowers are green and white with a brownish tip. **P. curta** (Jul-Sep) has solitary flowers with 2-6 leaves in a basal rosette and a twisted labellum tip. **P. daintreana (Pharochilum daintreanum)** (Feb-Jul) has both rosette and stem leaves. Its flowering stem is up to 30cm high. The translucent flowers are white with dark green markings. They have a green and brown labellum and a galea that curves forward and then abruptly down with a filiform point. **P. nutans** (May-Sep) has a basal rosette, a solitary flower with the hood curving forward in an arc giving it the common name, the Nodding Greenhood. **P. pedunculata** (Aug-Oct) is up to 25 cm tall with solitary flowers, 15-25 mm long. They are green and white with reddish brown or purple-brown stripes. **P. longifolia (Bunochilus longifolius)** (Apr-Sep), 15-40cm high, has a basal rosette, 5-8 sheathing stem leaves and up to 7 green and white flowers with deflexed, fused lateral sepals and a hair-covered labellum protruding from the flower.



Pterostylis curta



Pterostylis nutans



Pterostylis daintreana



Pterostylis pedunculata



Pterostylis longifolia



Spiranthes australis

***Spiranthes australis* (*Spiranthes sinensis*).** (Pink Spiral Orchid, Oct-Mar) has an erect green stem to 50cm with a spiral of up to 60 small pink and white flowers.

Thelymitra spp. have a labellum similar to the other floral segments. ***T. carnea*** (Pink or Tiny Sun Orchid, Sep-Nov) has 1-4 pink flowers, 8-15 mm across on a zigzag stem up to 35 cm high. ***T. ixioides*** (Spotted Sun Orchid, Aug-Sep) has 3-9 blue or purple flowers, 30-40 mm across. The flower segments commonly have dark spots. ***T. pauciflora*** (Slender Sun Orchid, Aug-Oct) has a short and slender stem to 50 cm, with about 4 flowers that are pale blue, white or pink, 10-20 mm across.

Epiphytes

Cymbidium suave (Sep-Oct) is an epiphytic orchid growing in trees, often in hollows. Its leaves are to 35 cm long in clumps and its flowers, in a hanging raceme are green, with a yellowish red marked labellum.



Thelymitra ixioides



Thelymitra carnea



Thelymitra pauciflora

Dendrobium speciosum (Thelychiton speciosus) (Rock Lily, Sep-Oct) is an epiphyte with large pseudobulbs found on rocks. It has 2-4 leaves on each stem and many white to yellow flowers.



Cymbidium suave



Dendrobium speciosum



Dendrobium kingianum

SPECIES PLANTED AT KU-RING-GAI WILDFLOWER GARDEN

These are found mostly in the Fern House.

***Dendrobium gracilicaule (Thelychiton gracilicaulis)*, *D. kingianum*, *D. x delicatum*, *Dendrobium (Dockrillia) linguiformis*, *D. pugioniformis*, *D. schoeninum*, *D. teretifolium*, *Bulbophyllum schillerianum (Oxysepala schilleriana)*, *Calanthe triplicata (C. australasica)*.**

FURTHER READING

Jones, D.L. A Complete Guide to Native Orchids of Australia, Reed New Holland 2006.

Jones, D.L., Hopley, T., Duffy S.M., Clements M.A. and Zhang X. Australian Orchid Genera an information and identification system. CD-ROM. CSIRO Publishing 2006.

Robinson, L. Field Guide to the Native Plants of Sydney. 3rd Ed Kangaroo Press 2003.

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