

Australian Native Orchids

Orchids are the largest and most successful plant group on earth. Estimates of their numbers range from 20 000 to more than 35 000 in 750-850 genera. These numbers mean that nearly 10% of the world's flowering plants are orchids.

TERRESTRIAL

Habitats:

Terrestrial orchids in Australia reach their optimum development in the sclerophyll forests of the south. Here the open forests and woodlands in some areas may be carpeted with an array of interesting and colorful forms, especially noticeable in the spring when the majority of species flower. Certain species favour particular niches within the forest, thus some are colonisers of the slopes and ridges whereas others are found predominately in sheltered gullies and along watercourses, often in quite shady locations.



Melaleuca Forest

Terrestrial orchids are often common in coastal districts. Coastal forests eg Melaleuca forests, stabilised coastal dunes and heathlands are suitable habitats and may support a wide diversity of types. Soils are usually sandy, although peaty bays may predominate in some areas. Coastal swamps often contain interesting species. In such habitats, water is present in winter and spring and the orchid plants can be partially submerged. Terrestrial orchids decrease in abundance with increasing distance from the coast. Suitable inland habitats include mallee communities, sandhills and sandplain vegetation (especially in Western Australia). Some grow along the snow line areas of some high ranges.

THE STRUCTURE OF TERRESTRIAL ORCHIDS

Roots:

Roots of terrestrial orchids are generally fleshy and very brittle. Perennials such as *Calanthe* and *Phaius* produce a mass of thick roots, whereas most deciduous terrestrials have a few, short roots which are often irregularly shaped.

Storage Roots:

The roots of many deciduous terrestrial orchids form fleshy organs for storage or resting purposes. Commonly known as tubers, these structures are correctly termed tuberoids, because they are formed on roots and not stems on which true tubers arise. Such structures are very common in Australian terrestrials and they allow the orchids to survive (by avoidance), the extremes of dryness and heat which occur in late spring and summer. Tuberoids contain an apical bud and new roots are produced from the base as it elongates into a new stem. Some species produce a single tuberoid each year which replaces the parent tuberoid. This is known as a replacement tuberoid and it is usually produced at the end of a short root termed a dropper or sinker. Those terrestrials which grow in colonies can produce more than one tuberoid annually, each at the end of a long, fleshy root. Thus these species increase in numbers by vegetative means and the extra tuberoids are termed daughter tuberoids. A few terrestrials such as species of *Spiranthes* and *Cryptostylis*, have swollen fleshy roots that can act as storage organs.

Leaf Shape:

Leaf shapes encountered in Australian terrestrial orchids include linear (*Diuris* sp.), cylindrical (*Thelmitra*), cordate (*Acianthus exertus*), lobed (*Acianthus arnplexi caulisdiuris*), some are hollow (*Microtis* and *Prasophyllum*). Brassavola Cucullata Leaf Thickness, Vestiture and Colouration:

Many terrestrial orchids have leaves which are very thin-textured (*Corybas*, *Peristylus*),

whereas others are fleshy (*Calochilus robertsonii*), or tough and leathery (*Cryptostylis subulata*). Most are smooth but a few are hairy or have unusual bristle like structures (*Caladenia gemmata*). In the majority the colouration of both surfaces is similar but in a few terrestrials the under surface of the leaf can be purplish (*Acianthus exsertus*) or appear as if frosted (*Corybas*). Many species which grow in very shaded habitats have thin textured, pleated leaves (*Calanthe triplicata*).



Spiranthe sinensis

Leaf Arrangements:

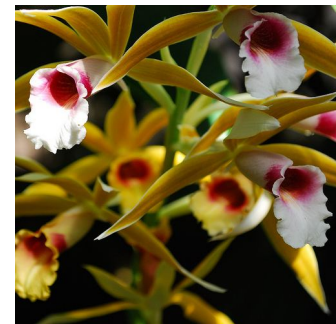
The leaves of deciduous terrestrial orchids are mainly basal and may be solitary (*Acianthus*, *Thelyrnitra*), in pairs (*Chiloglottis*), or form a spreading rosette (*Pterostylis*). Some groups have leaves scattered up the stem in a loose spiral (*Habenaria*, *Spiranthes*); others are arranged along the stems in two alternate rows. This later arrangement is termed distichous and is exemplified in *Pterostylis longifolia*.

Inflorescence:

The point where the inflorescence arises is of interest. In deciduous terrestrials the inflorescence is terminal on the stem, whereas in many of the evergreen types such as *Calanthe triplicata* and *Phaius tankevilleae*, the inflorescence arises from a nearly basal node. Many native orchids have one-flowered inflorescences (*Chiloglottis*, *Corybas*, *Pterostylis*). Flower arrangements on an inflorescence can be spiral (*Spiranthes sinensis*), alternately in two ranks.

Effects of Fire:

Fire is a major environmental factor in Australia and the most important habitats for terrestrial orchids are burnt regularly. Members of the Australian flora, including some orchids, have developed remarkable adaptations to cope with fire. Many terrestrial orchids not only survive summer bushfires but have become so adapted to their occurrence, that they have become an integral part of their life cycle. Thus a number of species require fire to induce flowering (that is they will only flower after fires) and many other species flower much more profusely in the season following a burn.



Phais tankervilleae

About sixteen species of Australian terrestrial orchids are dependant on the stimulus provided by a summer fire before they will flower. Clearly such orchids have evolved during the long history of burning. It is interesting to note that fifteen of the sixteen fire dependent species occur naturally in south-western Western Australia, thirteen of these being endemic to this region. In eastern Australia there are only three species which can be said to be fire dependent and only one of these is endemic to the region.

Terrestrials dependent/stimulated by fire. *Caladenia*, *Diuris*, *Chiloglottis*. *Corybas*, *Lyperanthus* *Aficrotis*, *Prasophyllum*, *Glossodia*, *Thelyrnitra*.

VEGETATIVE REPRODUCTION

Terrestrial:

Many terrestrial orchids which grow in colonies increase by producing more than one new tuberoid each season. Thus the colonies increase in size and spread into new territory. The extra daughter tuberoids are produced at the end of long, stolon-like roots and are of similar shape and size to the parent tuberoid. By this technique some terrestrial orchids can increase two to four fold in numbers each year. Species which exhibit this type of vegetative

reproduction can be found in the genera Actanthus, Corybas, Pterostylis, Lyperanthus to name a few.

Corybas barbarae



Terrestrial orchids are much less commonly grown than other epiphytes, and the Australian deciduous species are more challenging than most. The fact that they may often require specialised treatment, and that some species may be below the ground for long periods limits their appeal to the general grower of orchids. Other types of terrestrial orchids, such as Calanthe triplicata and Phaius tankervilleae, are not so difficult to grow and plants can often be found in mixed collections.

Growth Cycle:

The successful cultivation of deciduous terrestrial orchids relies heavily on an understanding of their growth cycle, which is strongly seasonal. The plants survive the hot, dry summer conditions as dormant tuberoids. These sprout after the advent of good, soaking rains. Most species are dormant over summer and come into active growth after late summer and autumn rains (February-March).

When the shoots from the previously dormant tuberoids reach the surface, they develop into a leaf or rosette characteristic of the species. Some species flower directly from the tubers and the leaves emerge later, whereas in others the leaves are born along the flower stem. Some species of Pterostylis have a leafy rosette which is a separate juvenile plant, *revoluta*, *grandiflora*. or is attached to the base of the flowering scape, *parvilora*, many others form a rosette first and later an inflorescence develops from the centre, *nutans*. Most of the spring flowering orchids have a fully developed leaves before the flower emerges.

Pot culture:

The majority of terrestrial orchids are grown in pots as they need specialised treatment and protection from pests and diseases.

Potting Mix:

Deciduous terrestrial orchids require a soil-based mixture for their growth. A suitable soil mix must be very freely draining and should include sand and an organic component. Organic material is an important addition to the potting mix because it provides a substrate for the mycorrhizal fungi. It also increases the water-holding capacity and nutrition of the mix. Two different types of organic material are used together in a potting mix for terrestrial orchids. They are leaf mould and wood shavings, peat moss may also be used as a complete mix.

Suitable Potting Mix:

A suitable potting mix for deciduous terrestrial can be made by combining the components in the following proportions:

	Mix 1	Mix 2
soil	1 part	1 part
coarse sand	2 parts	3 parts
leaf mould	1 part	1 part
shavings	1 part	2 parts

These are good basic mixes and both are suitable for most terrestrial species. Variations can be made by increasing or decreasing the proportions of the materials or by changing the type of components. For example, some orchids prefer heavier soils whereas others grow best in light sandy loams. Mixes can be opened up by using coarse sand, or by increasing the proportion shavings or leaf mould. Fresh leaf mould as obtained from the ground surface under suitable trees is coarse; however, the lower layers have broken down humus. This decomposed leaf mould is excellent for growth in the short term; however, for lasting effects a proportion of coarse litter should be included.

Fertilizers:

We have seen that most terrestrial orchids rely heavily on a mycorrhizal fungus for their survival. This relationship can be readily upset by the excessive use of fertilizers and hence fertilizing of terrestrial orchids must be carried out with care. A small quantity of blood and bone (one dessert spoon per bucket or 10 grams per 9 litres of mix) added to the mix can be beneficial. One or two annual applications of half strength liquid fertilizers can also be of benefit to some species.

PESTS AND DISEASES

Pests:

Terrestrial are particularly vulnerable to attack and a large snail can do a lot of damage overnight. Damaged areas become slimy from the exudation of sap and can provide an entry point for diseases. Where the surface tissue is grazed, the damaged areas are at first pale green and then become papery and die.

Caterpillar and Grubs:

The most persistent caterpillar to feed on orchids is undoubtedly that of the Light Brown Apple Moth or Leaf Roller. These fleshy, green or pinkish grubs grow to about 10 millimetres long and form crude shelters by joining leaves together. Cut worms and loopers are can also get very active. (I use Grubkill, and I spray the total area at first sign).

Spider Mites:

These tiny eight-legged animals are a common and serious pest to orchids, especially terrestrials. Spider mites feed by sucking the sap and usually congregate in colonies on the underside of leaves. (I use Hortico Red Spider miticide and to help prevent further attack Divstien).

DISEASES

Mediocalcar Root Rot:

Terrestrial orchids can suffer from a fungi, which can become active if the potting mix is incorrect (especially if drainage is inadequate) or if over watered or grown in too much shade. Afflicted plants develop a watery brown rot which spreads quickly and causes death. Control is to identify and correct the problem; that is improving factors such as drainage and air movement, reducing watering and protecting plants from heavy rain and drips.

Grey Mould:

This common fungus attacks damaged leaf tissue in still, humid conditions. Grey mould can attack terrestrial, usually entering tissue damaged by heavy watering, rain splash or drips.



Leaf Spots and Rots:

Various fungi attack the leaves of orchids causing spots, blotches and sometimes rots. Leaf rot can be a major problem of terrestrial orchids especially in tropical and subtropical regions. It is worse on plants grown in the open and often follows damage caused by heavy rain.

Rusts:

Certain terrestrial orchids are susceptible to leaf rusts. These develop on the leaves as orange, powdery pustules and frequently cause distortion and curling. The disease is spread by rust-coloured spores and usually persists through successive generations of orchids. Although a fairly minor disease, rust has been noted in species of *Chiloglottis*, *Diuris*, *Microtis*. Control can be difficult and most growers destroy affected plants.

These notes have been used at our Cultural and New Grower's Meetings. They are from various sources and we thank the authors. All articles are supplied in good faith and the Bribie Island Orchid Society and its members will not be held responsible for any loss or damage.