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Editorial

John Aitken, NSW Region Council

This issue of Australian Plants is devoted entirely to Australian native orchids and was compiled by Margaret Bradhurst and Doug Rickard. The majority of the contributors are active members of The Indigenous Orchid Study Group of the Australian Native Plants Society (Australia).

World wide, there are 35,000 species of orchids in 850–1000 genera. Australia is well represented and has over 1300 named species of orchids in 193 different genera with hundreds more species yet to be named.¹

Australian native orchids have a committed following of admirers, amateurs and professionals, many of whom are members of the ANPSA Indigenous Orchid Study Group and the Australasian Native Orchid Society (ANOS), which has 20 active groups and associated societies in Australia.

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

Note: This issue is dated September 2008 to maintain sequence. It was, however, compiled in May 2009 and may mention occurrences between these dates.

CONTENTS OF THIS ISSUE

A Year of Orchids in Perth	John Ewing	291
Orchids in Queensland's World Heritage Wet Tropics	Don Lawie	301
Orchid Foes in Queensland's Wet Tropics Heritage Area	Pauline Lawie	308
The Elusive and Hard-to-Find Helmet Orchids	Margaret Bradhurst	312
Saprophytic Orchids of Southern Sydney	Margaret Bradhurst	317
Caladenia (Arachnorchis) Reintroduction	Kate Vlcek	320
Pollination Biology of Terrestrial Orchids	Kate Vlcek	324
Growing Native Epiphytic and Lithophytic Orchids	Neville Roper	330
Cultivation of Greenhood Orchids	Jean Brian	332
Captain Cook: Scurvy and the Consumption of Orchids	Don Lawie	333
ANPSA on the Web	Brian Walters	334

Front Cover: *Pterostylis barbata* (Bird Orchid) Photo: Etienne Delanoy

Back Cover: *Thelymitra rubra* (Salmon Sun Orchid) flowering in the Lower Glenelg National Park. Photo: Kate Vlcek

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A Year of Orchids in Perth

John Ewing, Western Australian Native Orchid Study and Conservation Group

The Orchadian Calendar year in Perth is nine months in length. Generally, the first month of the year, in Perth, is April. An occasional and unseasonably wet March could see an earlier start to the orchid fancier's calendar. During the nine months you may be able to find over 100 different orchid species within the Metropolitan Area.

The 'metro area', as it is known, is quite large stretching along the coast from Yanchep in the north to Rockingham in the south, a distance of more than 120 kilometres and then inland to the east of the Darling scarp, a distance of nearly 50 kilometres. The shape is roughly triangular with the apex being along the Darling Scarp. Despite the constant spread of urban development in Perth there are still a wide range of conservation areas and currently undeveloped sites. In most suburbs, apart from the inner city ones, there are pockets of pristine bush that hold little treasures just waiting to be discovered by the enthusiastic explorer.

April

The first action in Perth is with the Bunny Orchids. The common ones in April are the Common Bunny Orchid (*Eriochilus dilitatus* subsp. *multiflorus*) and the White Bunny Orchid (*Eriochilus dilitatus* subsp. *dilitatus*). Both of these small white flowers are easy to miss when first searching, but the real issue, when one is found, is trying to decide which is which. While *E. dilitatus* (the White Bunny) is said to have more widely spaced flowers and larger leaves up to 10 cm, actual plant specimens refuse to be so neatly and conveniently pigeon holed. When is 'closely packed', (the description of *E. multiflorus*), actually closely packed? Flowers are widely found over the metro area, but one site is Swan View on Throssell Road near the corner of Wallis Ct. and another is adjacent to the entrance to John Forrest National Park. Turning into Park Road just opposite Bilgoman Pool there is a small carpark on the right with a track leading north. It is a lovely walk through the bush and occasional Bunny Orchids can be spotted along the track.



Eriochilus dilitatus subsp. *multiflorus*
Common Bunny Orchid

The next 'April' Bunny Orchid is often not seen until the ground is well saturated and so may not appear until May, even late May. The flower of the Swamp Bunny (*Eriochilus helonemos*) is distinguishable from the above species due to the petals being clasped to the column of the flower. It has a smaller rounded leaf that is often 'crinkled' on one side. One site is Lacey Reserve in Lacey St, Sawyers Valley. In a good season, this small gently sloping granite covered hillside is home to hundreds of Swamp Bunnies. They can also be found on the western side of Forrestdale Lake towards the southern end of Stirling Rd.

April also has the Hare Orchid (*Leporella fimbriata*). Its flower is on a 20 cm tall stem with new flowers being greenish with prominent fringes on the labellum. Hare Orchids are quite widespread and can be found in Talbot Reserve, Talbot Road in Swan View and also in Mundaring at the southern end of Coppin Road. At the entrance to the Transfer Station, follow the track to the left and then divert to a fork on the right, walking about 200 to 300 m. Bunny Orchids are in this area as well.

May – June

With the advent of winter in May and then into June the two common Greenhoods emerge. The Banded Greenhood (*Pterostylis vittata*) is very widespread being found in Kings Park, Warwick Open Space and the previously mentioned entrance to John Forrest National Park. The closely related Dark Banded Greenhood (*Pterostylis sanguinea*) soon follows and again produces the 'which is which' dilemma. While the dark brown flowers are easy to distinguish, some are green and even quite light green that is a characteristic of *P.vittata*.

The June flowering sees the first of the blue orchids. Blue Fairy Orchids (*Pheladenia deformis*) are also widespread and easy to see as the blue flowers stand out clearly especially when waving in the breeze on their thin stems. They are common on the Darling Scarp. Lesmurdie Falls is one useful site, as is the top of the Zig Zag in Kalamunda. If the year has been wet, the top of the Zig Zag also has the Dwarf Common Spider (*Caladenia hiemalis*). If the area has been burnt they are easy to spot, but being 'dwarf' they are pretty good at hiding among other plants. Finally in June is the Robust Snail Orchid (*Pterostylis dilatatus*). Although widespread outside of Perth it has taken up residence in some of the pine plantations where sometimes carpets of little green heads are seen poking through the thick layer of pine needles. Virtually nothing else can grow in this shaded and very acidic environment. Oddly enough at the site in the Ngarara Pine plantation on Ngarara Road there appear to be no other plants in the surrounding bushland.

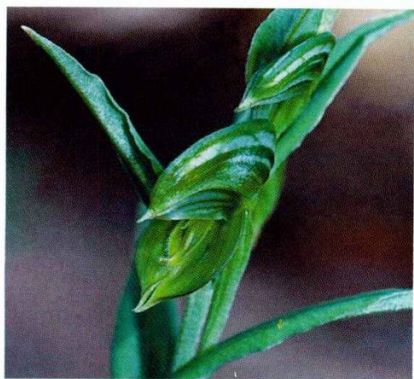
July – August

While some early winter flowers may be found in June, it is July and August that sees a greater variety. The Pink Bunny (*Eriochilus scaber* subsp. *scaber*) is another scarp resident, although it is not seen unless the bush has been burnt the previous summer. In that sense locations are variable, but when found, its pretty pink labellum makes it easy to identify.

Much easier to find is the Winter Donkey Orchid (*Diuris brumalis*). At a range of sites along 'Greenmount Hill' on Great Eastern Highway they are easy to



Leporella fimbriata
Hare Orchid



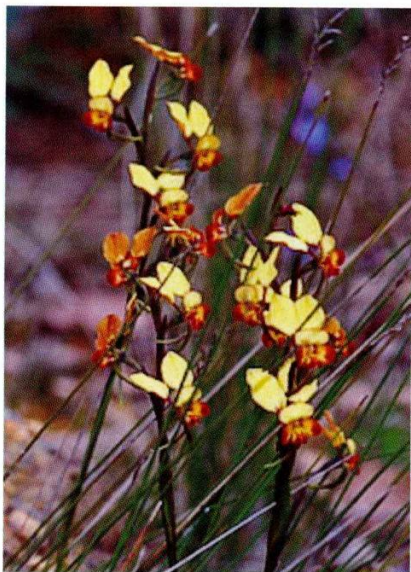
Pterostylis vittata
Banded Greenhood



Pterostylis sanguinea
Dark Banded Greenhood



Pheladenia deformis
Blue Fairy Orchid



Diuris brumalis
Winter Donkey Orchid

spot on the roadside verge as you drive along. They are also present near the entrance to John Forrest National Park. Also here is the Bird Orchid (*Pterostylis barbata*, see front cover) with its cute little beak thrust upwards to the sky. It is easy to see where the name has come from. Other sites that have colonies of Bird Orchids include the Railway Reserve walking track near Coppin Road in Mundaring and Pomeroy Road, just west of Canning Road in Carmel, just south of Kalamunda. The grove of she-oaks on the south side of the road has an abundance of flowers.

It is about this time that the first of the Leek Orchids appear. It is well into winter before the Autumn Leek Orchid (*Prasophyllum parvifolium*) is sighted, and this means that its name is a bit misleading. Its greenish white appearance, with small flowers makes it another challenge to find the first one on any outing. However, frequently many plants grow together. Places such as bush areas around Stephens Street in Sawyers Valley and Chevin Road in Roleystone provide plenty of opportunities. Near to Chevin Road, at the top of Mills Road East is the little car park at Foxley Place and here is the other early Leek Orchid, the Fringed Leek Orchid (*Prasophyllum fimbria*). Its tall stem with an array of pink and white flowers with the highly fringed labellum make it easy to find.

Finally the first of the Sun Orchids in the form of the Lemon Scented Sun Orchid (*Thelymitra antennifera*) emerges, although probably more in August. At the top of the hill on the south side of Victor Road in Darlington is one of many sites.

September – October

September/October is the peak flowering time, both in Perth and also the rest of the South West. The confusing array of fifteen varieties of white spider orchids is simplified in the metro area as there are only two varieties; the White Spider Orchid (*Caladenia longicauda* subsp. *longicauda*) and the Coastal White Spider Orchid (*Caladenia longicauda* subsp. *calcigena*). Even with these two it can be hard to separate them. Size is a guide as the *C. calcigena* is smaller (30-40 cm), but also its petals and sepals are more pendulous and the calli on the labellum tend to merge rather than being in neat rows as they are on *C. longicauda*. Two locations for the Coastal White Spider Orchid are at the northern end of Star Swamp and in the remnant reserve along the western side of the Mitchell Freeway just north of Hodges Drive. In the latter site there are also plenty of Carousel Spider Orchids (*Caladenia arenicola*) with their beautiful pink petals and sepals and also some remaining Tuart Spider Orchids (*Caladenia georgei*).

As is often the case, these orchids hybridise, especially with *C. calcigena*, and thus it may be hard to tell if you have a 'pure' specimen. Tuart Spider Orchids can also be found in a reserve in Koondoola, just off Waddingham Drive. Returning to Star Swamp, there are plenty of Carousel Spiders there as well.

In addition is the Pansy Orchid (*Diuris magnifica*). Somehow, the common name does not convey the magnificence of this species that is part of the group commonly known as Donkey Orchids. So it is best thought of as *magnifica*. One stand in Star Swamp has more than a hundred plants in two square metres and it is truly magnificent. *D. magnifica* is very widespread and is also found at Koondoola.



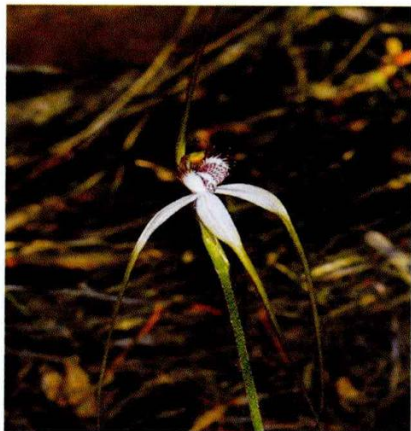
Prasophyllum fimbria
Fringed Leek Orchid



C. longicauda subsp. *longicauda*
White Spider Orchid



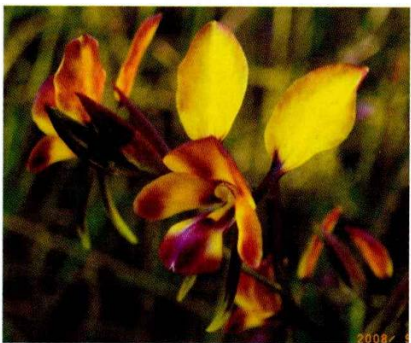
Caladenia georgei
Tuart Spider



C. longicauda subsp. *calcigena*
Coastal White Spider Orchid



Caladenia arenicola
Carousel Spider



Diuris magnifica
Pansy Orchid

Wireless Hill Park has a wide collection of spring orchids, including *magnifica*. From the car park at the top of the hill walk paths to the west have *longicauda* specimens, but to the south the walk path has the Bee Orchid (be careful with this name as there are at least three WA species called "Bee Orchids"). This one is *Caladenia discoidea*. In past years the bush at Wireless Hill has been burnt and this has resulted in prolific colonies of Red Beaks (*Pyrorchis nigricans*). Most times, all that can be found are huge numbers of succulent, oval shaped green leaves that are flat on the ground, with not a flower in sight. No fire, no flower—unless you are really lucky!

Back in the hills of the Darling Range is the Leaping Spider Orchid (*Caladenia macrostylis*). It is quite widespread, especially under she-oak trees, but can be found at the previously mentioned entrance to John Forrest National Park and along a track which leads off to the west from a small car park at the top of the rise at the southern end of Nelson Road in Darlington. Also along this track is the Slender Donkey Orchid (*Diuris* sp. '*slender*'), with some of them having green stems and some having black stems. This track also has Bird Orchids still in flower and in a truly amazing sight there are Little Pink Fairy Orchids (*Caladenia reptans* subsp. *reptans*) growing out of a cutting wall. They cling to the vertical side of the cutting and grow out of bare gravelly rock, flowering consistently every year. Rattlebeaks (*Lyperanthus serratus*) are also found both on the track and on the roadside verge in Nelson Road, just before the parking area. They can also be found in Coppin Road, Mundaring just south of Phillips Road.

At the southern end of Coppin Road, just before the entrance to the shire tip, is the previously described track leading off to the left (east). Along that track, where earlier in the year Hare Orchids are found, is the Warty Hammer Orchid (*Drakaea livida*), with its distinctive hooked labellum covered in 'warts'. In the area of this site there are also King-in-his-carriage (*Drakaea glyptodon*) and Flying Duck Orchids (*Paracaleana nigrita*). Once again these slender, earth coloured plants are quite hard to spot at first. Their redeeming feature is that they often grow on bare white sand that makes them much easier to see.

The other possibility at this area is the Reaching Spider Orchid (*Caladenia arrecta*). Unfortunately over the last couple of years the kangaroos seem to have developed a penchant for chomping off the emerging green shoots of the one or two known plants and consequently flowers haven't been seen for a while.

Staying in the hills area is a site in Kalamunda on the eastern side of Wilkins Road. The gravelly area has a range of some of the species mentioned above, but also has the very common Purple Enamel Orchid (*Elythranthera brunonis*), Jug Orchids (*Pterostylis recurva*) and the occasional Silky Blue (*Cyanicula sericea*).

Continuing south from here is the previously mentioned site in Pomeroy Road; where at this time of the year is the Common Donkey Orchid, also known as the Wallflower Orchid (*Diuris corymbosa*) and the Clubbed Spider Orchid (*Caladenia longiclavata*).



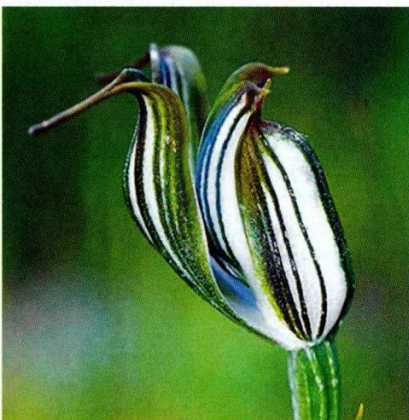
Caladenia discoidea
Bee Orchid



Caladenia macrostylis
Leaping Spider Orchid



Pyrorchis nigricans
Red Beaks



Pterostylis recurva
Jug Orchid



Paracaleana nigrata
Flying Duck Orchid



Drakaea livida
Warty Hammer Orchid

One of the most magnificent of the Perth Spider Orchids is the King Spider Orchid (*Caladenia pectinata*). To see this, a visit to Lightning Swamp in Malaga is required. On the southern side of the swamp along a walking path is an excellent stand of this flower. A wander around the rest of the swamp will allow discovery of the Common Donkey Orchid (*Diuris corymbosa*), the Pink Fairy Orchid (*Caladenia latifolia*) and the ubiquitous Cowslip (*Caladenia flava* subsp. *flava*). All these three orchids are found in many other locations, especially in little pockets of remnant bushland that remain in housing areas.

Spread widely over the metropolitan area are Snail Orchids. At Yanchep National Park, along the walk trail are colonies of the Limestone Snail Orchids (*Pterostylis* sp. 'limestone'). Slender Snail Orchids (*Pterostylis* sp. 'slender') are found in the hills area of the Darling Range and Short-Eared Snail Orchids (*Pterostylis* sp. 'short sepals') are most easily found in the gardens surrounding the Western Australian Herbarium at Kings Park.

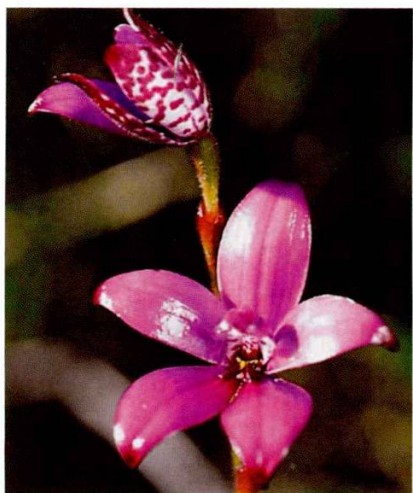
The Leek Orchids are quite variable in location, depending on whether there have been fires during the previous summer. One year, the northern part of Star Swamp had been burnt and the next spring there were hundreds of the Tall Leek Orchid (*Prasophyllum elatum*), however in the following spring, there were absolutely none. Interestingly, the Yawning Leek Orchid (*Prasophyllum hians*), which is said to flower only after fire, can be found in an unburnt remnant piece of bushland on the eastern side of Alexander Drive just north of the Reid Highway. Here it is found with Bee Orchids and Carousel Orchids.

One of the delightful Sun Orchids, the Leopard Orchid (*Thelymitra benthamiana*) is another Hills dweller, being found on the west side of Darlington Road just north of Dalry Road. Proceeding eastwards from here to the neighbouring Glen Forrest area and in Glen Forrest Drive just opposite Glenburn Road is the Darling Range Donkey Orchid (*Diuris* sp. Darling Range).

Nearby, there are many Blue Lady Orchids (*Thelymitra crinita*) and Shy Sun Orchids (*Thelymitra graminea*). Many specimens are located at the top of Rycroft Road, in the roadside verge on both sides, and just down and around the corner in Thomas Road on the northern side are both blue and pinkish-purple flowers. Often being 50-60 cm tall, they are very easy to find. In neighbouring Gooseberry Hill is the Crystal Brook Star Orchid (*Thelymitra magnifica*) and slightly further south in Roleystone is the Star Orchid (*Thelymitra stellata*).

November – December

While many other species can also be found, it is time to draw the year to a close with the November/December flowers. Perth is drying out now, but the Christmas Spider Orchid (*Caladenia serotina*) can be found, especially if the bush has been burnt in the previous summer. A favoured location at this time of the year is Forrestdale Lake where the year started with Bunny Orchids. The Plum Orchid (*Thelymitra mucida*), the Swamp Leek (*Prasophyllum drummondii*) and the Swamp Spider Orchid (*Caladenia paludosa*) can be found in the still moist surrounds of the lake. One year when the lake surrounds were burnt the quite rare Purdie's Donkey Orchid (*Diuris purdiei*) flowered.



Elythranchera brunonis
Purple Enamel Orchid



Cyanicula sericea
Silky Blue Orchid



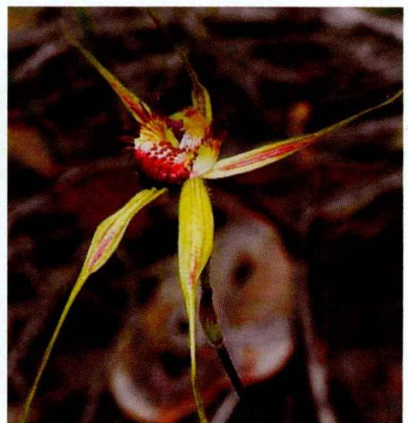
Caladenia flava subsp. *flava*
Cowslip Orchid



Caladenia latifolia
Pink Fairy Orchid



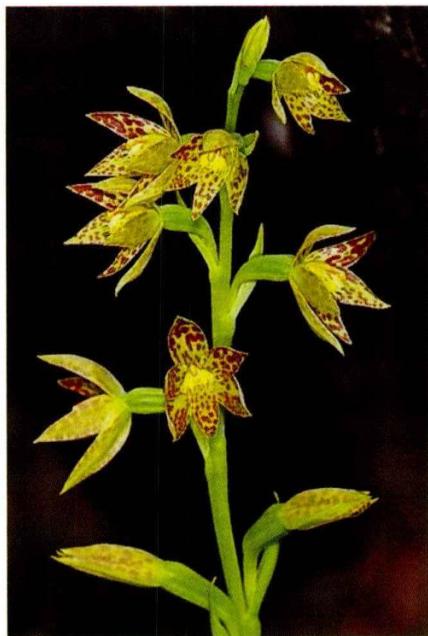
Spiculea ciliata
Elbow Orchid



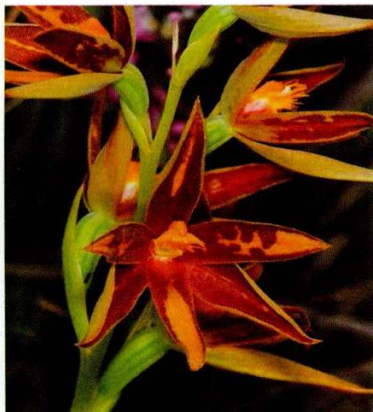
Caladenia pectinata
King Spider Orchid

The last ones to appear are the Common Mignonette (*Microtis media* subsp. *media*), which is fulfils its name and is very common, and the Elbow Orchid (*Spiculea ciliata*). This delicate little flower is found on the edges of granite rocks where it scoops up what little moisture runs off. It can be found in Darlington along the previously mentioned track at the southern end of Nelson Road.

What is available in Perth's metropolitan area is only a sample of what is available in the South West Region. Stretching in a triangle from north of Geraldton to east of Esperance are more than 400 different species, not counting the myriad of hybrids. Most are notoriously difficult to grow in pots or a garden and many are endangered due to their fussy requirements of habitat that require a symbiotic relationship with a particular fungus. However, out in the bush, the treasure hunt is frequently rewarded and new surprises keep being discovered. If you live in the West or come to visit; happy hunting.



Thelymitra benthamiana
Leopard Orchid



Thelymitra magnifica
Crystal Brook Star Orchid



Thelymitra mucida
Plum Orchid

Photos by Etienne Delanoy
and John Ewing

Orchids in Queensland's World Heritage Wet Tropics

Don Lawie, Joint Leader, ANPSA Indigenous Orchid Study Group

Technical advice from Len and Kate Lawler and Pauline Lawie

The Wet Tropics of North East Queensland was declared a World Heritage Area in 1988. The defined area extends approximately 450 kilometres north-eastwards along the coastline from Townsville to Cooktown and from the offshore islands in the east, across the coastal plains and includes the adjacent mountain ranges. Altitude varies from sea level to a maximum of 1622 metres at the peak of Mount Bartle Frere, Queensland's highest mountain. Offshore, The Wet Tropics merges with the adjacent Great Barrier Reef World Heritage Area. Latitude ranges from 15.5 to 19 degrees south. This World Heritage Area has a tropical climate of rainy summers and drier winters.

Australia's highest rainfalls occur in the area with a "super-wet" belt along the coastal plain from about Tully to Babinda consistently recording annual falls of above four metres. The elevated area of the Atherton Tablelands enjoys cooler weather than the coast and supports a different spectrum of vegetation. Not all the Wet Tropics is wet: dry sclerophyll forests abound in the rain shadow of the coastal ranges and they support their own distinctive flora. Soil types range from coastal sandy loams, decomposed granite and rich volcanic basalts, each supporting appropriate plants. Orchids, both epiphytic and terrestrial, are present in all the vegetation types of The Wet Tropics. Many species are endemic to the area but a number of genera are also found further south in Australia or in the pan-tropical regions from New Guinea across Malaysia to southern India.

The lowland tropical rainforests in the areas north and south of Cairns are a match for those in any other part of the world. Permanent rivers and swift-running creeks nurture a multitude of plants, including gems such as *Schoenorchis micrantha*, a tiny orchid, which is difficult to find in a tall, closed-canopy riot of rampant greenery. Frequent rain and consistently high temperatures ensure year-round growth and emergent trees in the canopy reach above twenty metres in height. The Golden Orchid, *Dendrobium discolor*, with canes up to five metres in length dominates the riverbanks and old sand dune ridges. It flourishes in large colonies where the rainforest halts at a sharp line of demarcation within reach of the salt spray on sea-washed granite cliffs that plunge steeply into the Coral Sea. Melaleuca swamps and ephemeral wetlands host plants such as the Swamp Orchid, *Phaius tancervilleae*, which also occurs as far south as New South Wales and northwards to South-East Asia.

Coastal dunes, lowland and upland rainforest, grasslands, sclerophyll forest, cloud and mist forests on high peaks and mangrove swamps all afford comfortable sites for the ever-enterprising orchid family. In grasslands and open forests where terrestrial orchids outnumber epiphytes, genera such as

Nervilia, *Pterostylis* and *Calochilus* emerge and flower in response to the first summer storms. Other terrestrials such as *Malaxis* and *Spathoglottis paulinae* grow in conditions suited to year round growth.

Epiphytic orchids in The Wet Tropics utilise a wide range of conditions that are often inimical to growth of other plants. *Dendrobium fleckeri*, with short stems and apricot coloured flowers, occupies a niche habitat on exposed rocks atop the highest mountain peaks where light is harsh and cold winds blow constantly. Here, this little orchid harvests its nutrition from the passing mists. Such conditions can sometimes produce a micro-habitat which favours the growth of unexpected orchids: on the exposed high western slope of Mount Lewis a small patch of grass clings to the ledge and there a colony of *Thelymitra* sp. flourishes and flowers. Elsewhere, twig epiphytes such as *Plectorrhiza* and *Tuberolabium* colonise the very ends of thin branches. Here they have access to air movement, light and moisture and their supporting structure is too slight to accommodate anything other than small mosses.

In the densely plant-populated rainforests there is constant competition for nutrients. Plants close to the ground develop large leaves to enhance their light gathering. The terrestrial Christmas Orchid, *Calanthe triplicata*, has large pleated leaves for that purpose. A variation on this ploy is found in *Chiloschista phyllorhiza*. This orchid dispenses with both leaves and stem and instead has large, flattened, chlorophyll-containing roots that serve the dual purpose of plant anchorage and nutrition. Light-gathering and subsequent photosynthetic nutrient production is by-passed altogether by saprophytic orchids that glean their sustenance by processing the decaying remains of fallen forest trees and so have no need of either leaves or chlorophyll. *Eulophia zollingeri*, which occurs sporadically in areas after forest destruction, throws out its distinctive maroon flowers, sets fruit and then disappears.

Trees are the dominant plant life form in The Wet Tropics. They range from the biggest plant in the forest through all dimensions to straggly specimens on swamp edges or upland heaths. All trees provide a potentially ideal support for epiphytes. However, some undergo annual partial or complete decortication and so are unsuitable for epiphytes. The bark of some trees, while attractive, contains substances that deter the growth of attaching plants. Nevertheless, trees in general provide a stable, elevated substrate and rainfall flowing down the branches carries dissolved nutrients to the receptive roots of strategically placed orchids.

Some trees are positively favoured by orchids and on a walk through a tropical forest one soon learns to search for tree types likely to host orchids. Long-lasting rough or fissured bark is best. In wet areas, the Golden Penda, *Xanthostemon chrysanthus*, which can grow very large and favours watercourses, is almost always worth searching for a variety of orchids. In drier country species of *Callistemon* provide ideal conditions for orchid growth. Some orchids are almost tree-specific: the Red Beech Orchid, *Eria fitzalanii*, is usually to be found on the flaky, copper-coloured bark of the Red Beech, *Dillenia alata*. The Oak Orchid *Dendrobium jonesii* has an affinity for she-oaks – *Casuarina* and *Allocasuarina*



Malaxis lawleri



Peristylus banfieldii



Nervilia plicata



Dendrobium discolor
The Golden Orchid



Eria fitzalanii
Red Beech Orchid



Phaius pictus

species. She-oaks occur in large numbers on the upland forests of the Herberton Range and *Dendrobium jonesii* and *Phreatia crassiuscula* orchids occur in large colonies on selected trees, but not on many adjacent trees even though all appear to be identical, in one of those odd orchid enigmas.

Two of perhaps the most beautiful orchids of The Wet Tropics occur on trees in lowland mangrove swamps, a habitat that most humans would avoid because it also harbours crocodiles, leeches, snakes and mosquitoes. The endangered Mangrove Orchid, *Dendrobium mirbelianum*, has stems that can grow to a metre in length and has attractive spikes of up to a dozen pale golden flowers per stem. The equally rare Blue Orchid, *Dendrobium nindii*, grows on mangrove and palm swamp trees, has stems to one and a half metres and, when conditions are suitable, up to fifty lilac/pale blue flowers are produced, an incentive to any orchid enthusiast to brave the habitat and observe the beauty.

A feature of some orchids is their ability to prosper at varying altitudes: a gem such as *Bulbophyllum bowkettiae* grows in the coastal lowlands of the Tully River plain in its southernmost occurrence, but further north it is found in cloud forests above 600 metres.

The foregoing provides an overview of orchid types that occur in Queensland's World Heritage Wet Tropics. There are more than 250 species known and certainly more are there to be found by some enterprising orchidophile. Following are some thumbnail descriptions of those that we feel to be representative of all the orchids of the area.

***Malaxis lawleri*:** Named after a prominent North Queensland orchidologist, *M. lawleri* is a swamp-margin terrestrial found south west of Cooktown at moderate elevations. It flowers late in December with up to ten translucent, greenish-cream flowers on a ten centimetre long stem.

***Pteristylus banfieldii*:** This rare, endemic terrestrial was named for the renowned Dunk Island resident. It is restricted to the island and adjacent mainland with a disjunct creek-side occurrence on the Atherton Tableland. The yellow, tubular flowers appear about February on a spike up to 70 centimetres high.

***Eria fitzalanii*:** The Red Beech Orchid is widespread in the Wet Tropics in both latitude and altitude. The perfumed flowers form arching sprays of up to fifty blooms from August onwards.

***Dendrobium discolor*:** The Golden Orchid is one of the large, spectacular orchids of the region. Ranging from coastal cliffs and dunes to riverside emergent trees the chocolate-brown to light gold flowers delight the eye in the cooler weather after July.

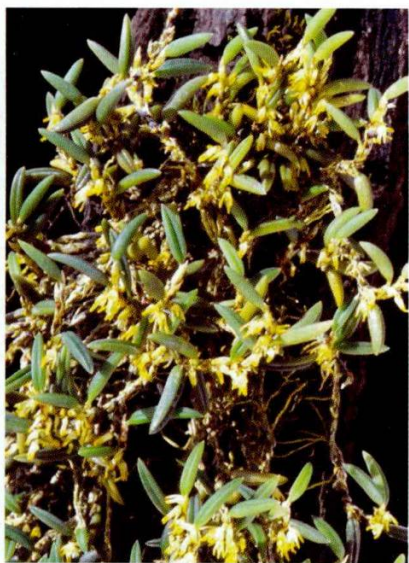
***Phaius pictus*:** An upland rainforest terrestrial, *P. pictus* has large pleated leaves to maximise light gathering on the forest floor.

***Nervilia plicata*:** An open forest terrestrial which extends to New Guinea and Asia, *N. plicata* has perfumed flowers that sometimes last for just one day.

***Dendrobium bigibbum*:** The Cooktown Orchid, Queensland's floral emblem, is an epiphyte of the drier country in the north of the Wet Tropics. Recklessly



Dendrobium bigibbum
Cooktown Orchid



Bulbophyllum gadgarrense



Phreatia crassiuscula



Bulbophyllum baileyi



Dendrobium racemosum
Pencil Orchid



Dendrobium fleckeri

collected for decades, large colonies with thousands of flowers can still be found by the informed adventurer.

***Phreatia crassiuscula*:** This little orchid loves company and colonies of hundreds of plants grow, often on just one side of the trunk, on *Casuarina* trees of the Herberton Ranges.

***Dendrobium racemosum*:** The "upside-down" Pencil Orchid is another epiphyte of the Atherton Tablelands, distinguished by its trait of having upright cylindrical leaves instead of the usual pendant habit of most Pencil Orchids.

***Bulbophyllum gadgarrense*:** Another colony orchid, *B. gadgarrense* occurs in close-packed masses on trees in the higher altitude cloud forests of the Atherton Tablelands.

***Bulbophyllum baileyi*:** In contrast to its tiny cousin, *B. baileyi* is a rainforest species that extends for several metres up the trunk and branches of its host tree. The articulated flowers are yellow with attractive maroon spotting.

***Dendrobium fleckeri*:** High on Mount Lewis, braving cold winds, enveloping cloud and then bright unfiltered sunlight, *D. fleckeri* is a delight to the eye, clinging to a small shrub and displaying its beautiful green-apricot flowers with a patterned labellum.

***Eulophia zollingeri*:** Destruction of forest, either by cyclonic winds or old age, sets the stage for *E. zollingeri* to utilise the ready food supply without needing either leaves or chlorophyll. This saprophytic orchid appears sporadically and those fortunate to see it in flower will never forget it.

***Dendrobium jonesii*:** Formerly *D. ruppianum* after another noted orchidologist of past years, is widespread in the area and displays masses of flowers in the cooler weather. Also known as the Oak Orchid, *D. jonesii* has a particular affinity for She-oak trees, but will grow on rocks if no suitable tree is available.

***Dendrobium mirbelianum*:** Formerly *D. wilkianum* after Jack Wilkie, an intrepid bushman and gold miner who first discovered it in Australia. *D. mirbelianum* is a plant of mangrove rivers and swamps and its delicate blooms making a search for it worth the effort.

***Dendrobium nindii*:** Named for a Mr. Nind, one of the first Europeans to enter the area now known as Innisfail, who found the orchid in flower in what is now Ninds Creek. The author of this article makes no apology for rhapsodising about this beautiful orchid. It, like *D. mirbelianum*, is a rare plant of the inhospitable coastal swamps south of Cairns. A century of collecting has reduced its numbers to a vulnerable state, but local people guard the remaining specimens in the wild from further predation.

Note: Orchid names used in this article conform to those used in *Australian Indigenous Orchids* by A.W. Dockrill, published by Surrey Beatty and Sons in association with Society for Growing Australian Plants – NSW, 1992 edition. .

All photographs courtesy of Mr Bruce Gray, Atherton, Queensland 4861.



Eulophia zollingeri



Dendrobium mirbelianum
Mangrove Orchid



Dendrobium jonesii
Oak Orchid



Dendrobium nindii
Blue Orchid

Orchid Foes in Queensland's World Heritage Wet Tropics

Pauline Lawie, Joint Leader, ANPSA Indigenous Orchid Study Group

Nothing could be more frustrating to an orchid grower than to find, too late, that a new shoot or an inflorescence has been "monstered". Unless, it is not knowing what has done the damage. Two creatures capable of such total devastation are both winged and, if they are not actually seen on the plant, one needs to know what to look for to attempt to circumvent the inevitable damage. As is the case with many orchids, neither of these species is confined to Queensland's Wet Tropics.

***Hypolycaena danis*—the Black and White Tit**

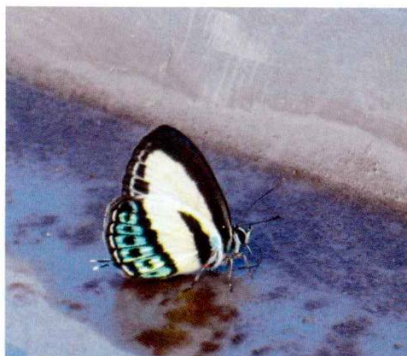
Peter Valentine in *Australian Tropical Butterflies* records that the Black and White Tit is a rainforest species of Queensland's Wet Tropics, but its range extends to the north through Cape York to Papua New Guinea. He reports that they are rarely seen in the rainforest "partly due to the dispersal of their larval food plant and its location in the canopy". When orchids are concentrated in a home garden or shade house, the butterfly is a constant visitor.

Many of the epiphytic orchids in the rainforest are quite small so it is no surprise to find this beautiful little butterfly is just 2 cm in height. Although she is predominantly black and white, it is the blue markings on the under side of her hind wings that catch the eye as she sits on an orchid and lays her tiny .5 mm pure white eggs. She may live for only a week or two but she appears to have an abundant supply of eggs. Of course it is impossible to tell how many of the creatures are present in the garden, but up to 30 eggs can be found on a pot of orchids at any one time.

It is amazing how quickly something so beautiful can transmogrify into a detested enemy. I always thought they were very nervously disposed and wondered how I could ever photograph one, till I tried. The little creature allowed me to intrude my camera to within 5 cm as she deposited her eggs, only pausing to massage her abdomen with her hind wings, presumably preparing for further egg laying. It was then that I realised her previous behaviour was to evade my frantic attempts to kill her.

The orchid's developing flower buds are obviously the most desirable site for egg laying, but no egg goes to waste. Being so small, the Black and White Tit can get in between flowers and position herself to deposit her tiny, lethal spot on the petiole either directly under the flower or where it joins the pedicel, just inside the edge of a curved petal, and even inside a bract. Then apparently satisfied with the probable safety of many of her progeny, she distributes what eggs remain onto flower stems and leaves in full view. She seems to be most active in the morning.

The only way we know to combat this destroyer is to become destroyers



Hypolycaena danis drinking from a puddle



Eggs laid by *Hypolycaena danis* on an exotic *Spathoglottis plicata* (with attendant ants)



The result of missing one egg of the Black and White Tit



Black and White Tit chrysalis on white *Dendrobium bigibbum*

ourselves and conduct search and destroy missions, to pick off every tiny white dot. A toothpick is very handy to pry the eggs out of acute places. It is imperative to inspect plants every day, as immediately the eggs hatch they take on the same hue as their food and are almost impossible to see. The pupae too are similarly coloured and to the casual observer might be just another bract.

It is known that the blue butterflies, the family *Lycaenidae*, to which our subject belongs, has a symbiotic relationship with ants. In return for sustaining liquids produced by the larvae, the ants protect them from predators. There

always appear to be drops of sticky, viscous liquid on the buds of the exotic *Spathoglottis plicata* hybrids so loved by the Black and White Tit and I wonder whether the butterfly deposits this to attract the ants before she commences to lay. Our potted orchids are a magnet for ants, so eradicating the ants may also help where some eggs escape detection.

Stethopachys formosa—Orchid Beetle

The Queensland Museum publication *Wildlife of Tropical North Queensland* gives the range for this orchid foe as "open forest and rainforest, north-eastern Australia". However, we know from members of the ANPSA Indigenous Orchid Study Group that the Dendrobium Beetle, as we call it, is not confined to the Wet Tropics Queensland World Heritage Area but is very much at home south of Sydney. Orchid Beetle is probably the better name, as they are just as happy on Vandas, Epidendrums and Arachnis plants.

This little fellow, only 11 mm in length, makes no attempt to disguise his mission to destroy orchids. He is a bright yellowy-orange with two black spots on each wing cover. He sits on flowers and chews them up with great gusto. It is easy



Stethopachys formosa, Orchid Beetle and a little of his handiwork



Larva of Orchid Beetle on Vanda hybrid



Stethopachys formosa and pupae mass



Orchid Beetle larvae on the kitchen table looking for a suitable place to pupate

to delude oneself that catching and removing the adult beetle will protect our precious blooms – it is a good start. The larvae, described as “white and slug-like, feed in groups and cover backs with own faeces”, which is probably why when they are found that they look more the colour of the food they are eating.

Not as up-front as the adult, the larvae eat their way around the plant. They are capable of skeletonising quite large leaves and often secrete themselves in the growing tips of orchid stems, turning the nascent leaves into a gooey sludge, which is not immediately obvious. Their pupation method, though, is very obvious; they somehow amass a collection of what looks like very small polystyrene packaging material.

Judy McMaugh in *What Garden Pest or Disease is That?* states that the larvae usually pupate around the base of the plant. This is something I need to look out for, as my experience was that the pupation took place inside a flower. I was able to identify what this strange mass was because it developed around the mouth of a vase in which I had several stems of *Arachnis flos-aeris*, and I confined it to a jar for further development. Obviously the larva had crawled as far down its food source as it could above the water before pupating.

The best method of control is still the removal of the beetles. We use the method suggested by an Orchid Study Group member who told us to: ‘Hold a container of water underneath the beetle then catch it between thumb and forefinger, administering the coup de grace with the thumb nail.’ The purpose of the container of water is to catch the fleeing beetle that drops to the ground to evade capture. They are unable to fly out of the water and the dispatching can be a little more personally removed by using fine secateurs or scissors.

Orchid growers in Queensland's Wet Tropics World Heritage Area also have to deal with a great many other foes, although these don't specialise in ruining orchids. They range from rats, cockroaches, grasshoppers and other leaf eaters down to mealy bugs, aphids, spider mite and scale insects, plus a new one I have recently discovered. Whatever it is builds up a great deal of what I can only describe as resembling minute oblong chocolate nonpareils. I thought it was a woodborer that would confine itself to demolishing my orchid mounts, but I have discovered that where the orchid's roots seek to grow under the bark they have been eaten and die. Further kitchen experiments are called for.

Photos: Pauline Lawie

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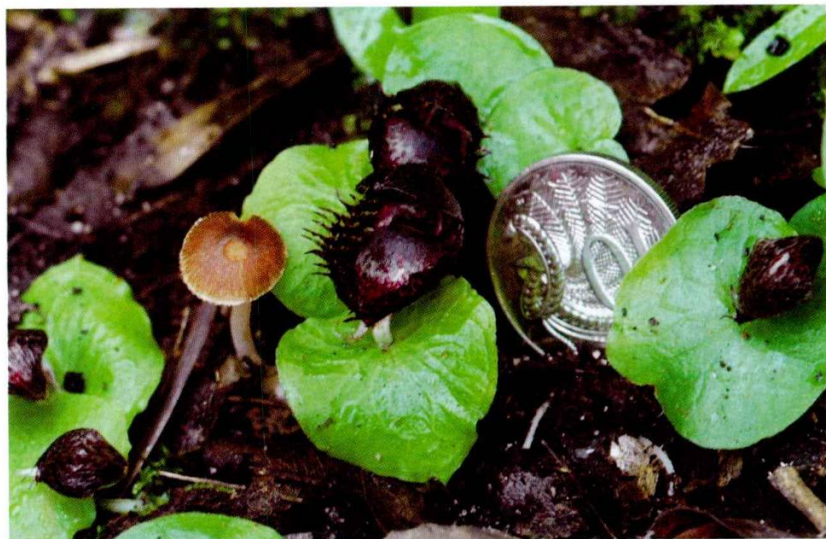
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The Elusive and Hard-to-Find Helmet Orchids

Margaret Bradhurst

Native orchid enthusiasts are well catered for in and around Sutherland Shire in southern Sydney. Close by we have the Royal National Park and the Heathcote and Botany Bay National Parks. To the south there are the Garawarra Recreation Area and the Dharawal Nature Reserve, and to the north the Georges River National Park. As well, many species of native orchids can be found in the bushland reserves dotted throughout southern Sydney. With such a wide variation in types of habitat and vegetation, it is not surprising that over 120 different species of native orchids have been recorded in the area and amongst these are seven species of *Corybas* or Helmet Orchids.

The elusive and hard-to-find Helmet Orchids are tiny deciduous terrestrial plants that never grow more than 3 cm tall. They have a solitary basal leaf, small dull-coloured flowers and grow mainly in moist shady locations in sheltered forest and heathland. Even though they can grow in large colonies, they are often hidden in the undergrowth or leaf litter. This can make finding them quite difficult. After flowering, the leaves and stems die away and then following a dormant period underground, new shoots appear in autumn ready for the next flowering season. Many people walking through the bush will pass them by quite unaware that these fascinating little plants are there at their feet. So how do you go about finding them?



Corybas fimbriatus (Fringed Helmet Orchid) next to a small fungus and a 10c piece

First I find that it is best to look for small, solitary, rounded or heart-shaped leaves that are lying flat or close to the ground. These are usually about 2 to 3 cm across. The leaf is fleshy, often prominently veined and held at or just above ground level. It is green above and can be green, reddish or silvery below. It is easy to confuse them with the leaves of *Acianthus* and *Cyrtostylis* orchids as they too have similar heart-shaped leaves that are also close to the ground. However, both *Acianthus* and *Cyrtostylis* orchids produce a slender flowering stem, whereas Helmet Orchids have short squat little buds that sit on the leaf.

Having located the leaves I then search to see if any plants are flowering. Flowering can be quite sparse and there are usually many more non-flowering plants than flowering ones. Depending on the species, they can be found in flower during the autumn and winter months.

Corybas orchids are known by their common name 'Helmet Orchid' because the dorsal sepal forms a hood or 'helmet' over the labellum or lip. They produce a single dull-coloured reddish-purple or greyish flower that often sits on the base of the leaf. However, some species are shortly stalked. The lateral sepals and petals are usually very small and insignificant and not always visible. The labellum varies between species. Some have a rounded mound in the centre of the labellum that is known as the 'boss'.

Helmet Orchid flowers are said to mimic small fungi. They are pollinated by fungus gnats that are deceived into entering the flowers because the musty odour and dull coloration of the flowers is similar to that of many fungi. Like fungi, the small flowers can collapse into a squashy mass after rain and in dry seasons they often shrivel up.

Although Helmet Orchids never grow more than 3 cm tall, after pollination and as an aid to seed dispersal, their flowering stems elongate considerably and can reach to 15–20 cm in height. Until recently, Helmet Orchids were well known under the name *Corybas*. However, the genus has been revised and it is proposed to split the Australian *Corybas* into three genera—*Anzybas*, *Corybas* and *Corysanthes*. As yet the proposed new names have not been accepted by all state herbaria. Details of this proposal can be found in *The Orchadian* Vol. 13, No.10 pp 437–468.

Elongated stem of a *Corybas*
Orchid after pollination



***Corybas aconitiflorus* – Spurred Helmet Orchid**

Corybas aconitiflorus is the most common of the Helmet Orchids in the area forming quite large colonies amongst the leaf litter in moist sheltered forest. Its leaf is dark green above and purplish underneath. The dorsal sepal dominates the flower and forms the 'helmet' which almost conceals the labellum. The flower colour can vary from greenish-grey to reddish-purple. A pair of spurs can be seen at the base of the flower. It flowers from April to July and is found in NSW, Vic, Qld and Tas.

***Corybas undulatus* – Tailed Helmet Orchid**

Corybas undulatus is uncommon and is the smallest of the local Helmet Orchids, its tiny flower being only 10-12 mm across. It grows in small colonies in grassy heathland and forest and has a small rounded greyish-green leaf. Flowers are dark maroon mottled with grey and the rounded dorsal sepal is hooded over the labellum. The flared labellum which tapers to a short pointed tail, is covered with small calli and short bristles and has a fringe of tiny marginal teeth. The central boss is shallowly domed. It flowers from May to July and is found in NSW and Qld.

***Corybas fordhamii* – Banded Helmet Orchid**

Proposed new name – *Anzybas fordhamii*

Corybas fordhamii is not often seen in the Sydney area as it requires a summer bushfire to clear away the surrounding vegetation before it is found the next flowering season. It grows in swampy habitats in dense heathland often amongst grassy tussocks, sedges and ferns. Its single heart-shaped leaf is veined and green on both sides. It has a translucent nodding reddish-purple flower on a short backward curving stem and a narrow dorsal sepal hooded over a tubular maroon and white striped labellum. It flowers from May to August and is found in Qld, NSW, Vic, Tas (Flinders Island) and SA.

***Corybas unguiculatus* – Pelicans**

Proposed new name *Anzybas unguiculatus*

Corybas unguiculatus forms small colonies in moist heath or open forest. The leaf is heart-shaped, greyish-green above and green or purplish below. Its nodding dark purplish-red flower is on a short backwards curving stem and the humped dorsal sepal is hooded over a tubular labellum. It flowers in June and July and is found in NSW, Vic, Tas and SA.

***Corybas fimbriatus* – Fringed Helmet Orchid**

Proposed new name *Corysanthes fimbriata*

Corybas fimbriatus is found in moist heathland and forest. Its veined rounded leaf is grey-green above and silvery below. The translucent dark reddish-purple flower has grey and maroon markings and sits at the base of the leaf. It has a flared rounded labellum with narrowly toothed margins and a domed reddish central boss. It flowers from May to August and is found in NSW, Qld, ACT, Vic, and Tas.



Corybas aconitiflorus
Spurred Helmet Orchid



Corybas undulatus
Tailed Helmet Orchid



A group of *Corybas fordhamii*
Banded Helmet Orchid



Corybas unguiculatus
Pelicans



Corybas fimbriatus
Fringed Helmet Orchid



Corybas pruinus
Toothed Helmet Orchid



Corybas hispidus
Bristly Helmet Orchid

***Corybas pruinus* – Toothed Helmet Orchid**

Proposed new name *Corysanthes pruinosa*

Corybas pruinus grows in moist forest often under low shrubs or bracken. Its rounded leaf is green above and silvery below. The flower is erect with a light greenish-grey dorsal sepal hooded over the labellum. Its lateral sepals and petals are an almost transparent white and are visible at the base of the flower. It has a rounded deep purplish-red labellum which is covered with short bristles and fringed with narrow white-tipped teeth. In the centre is a greyish-white boss with a reddish central patch in the centre. It flowers from May to July and is found in NSW.

***Corybas hispidus* – Bristly Helmet Orchid**

Proposed new name *Corysanthes hispida*

Corybas hispidus is normally found growing on sheltered slopes near streams on the ranges and tablelands, so I was surprised to find it growing in the southern Sydney area. Its rounded veined leaf is green above and silvery below. The dark purplish-red flower has a short stalk and a rounded flared labellum which is fringed with narrow teeth and covered with bristly hairs. The white central boss is also bristly and has a conspicuous notch at the back. It flowers from April to May and is found in NSW, Qld, ACT and Tas.

Photos: Margaret Bradhurst

Further Reading:

A Complete Guide to the Native Orchids of Australia by David Jones. Reed New Holland 2006

Field guide to the Orchids of NSW & Victoria. by Tony Bishop. University of NSW Press 2000

Saprophytic Orchids of Southern Sydney

Margaret Bradhurst

Of the over 120 different species of native orchids that have been recorded in southern Sydney, nine can be regarded as being saprophytic. Most of these are completely leafless, but a few are semi-saprophytic and have their leaves reduced to small leaf-like bracts. To survive, they rely on a special symbiotic relationship with a mycorrhizal fungus on their roots and on decaying organic matter and micro-organisms in the soil. Being leafless these orchids lack chlorophyll and thus their stems are often brown or reddish in colour. All saprophytes have a thick irregularly shaped fleshy root system unlike most other terrestrial orchids that have smaller tuber-like roots. Generally saprophytes are not parasitic and do not live off other plants.

***Erythrorchis cassythoides*—Climbing or Bootlace Orchid**

The Royal National Park and the Illawarra appear to be the southern limit for this climbing terrestrial saprophytic orchid, once known as *Galeola cassythoides*.

Erythrorchis cassythoides is usually found in open forest and grows near the base of trees such as Angophora, Allocasuarina or Eucalypt where there is a good supply of rotting timber. The dark brown branching stems are wiry and can grow to 3-4 m in length, but are usually much shorter. Short fleshy roots on the stems enable the plant to climb on trunks of trees or rocks. The plant dies back each year and will only reappear in ensuing years if there is enough rotting timber to meet its needs. Masses of scented usually pale yellowish/fawn flowers are produced in drooping clusters.

***Gastrodia sesamoides*—Cinnamon Bells or Potato Orchid**

This is another leafless terrestrial saprophytic orchid that is found in open eucalypt forests. Its brown fleshy stem can be up to 50 cm tall. There are between 4 and 20 pendulous, tubular, well-spaced flowers about 20 mm long. They are pale cinnamon brown on the outside and crystalline white inside and lightly scented. The labellum has a central yellow ridge and yellow tip.

***Cryptostylis hunteriana*—Leafless Tongue Orchid**

This uncommon orchid is found in coastal forest on sandy soil and is another leafless saprophytic terrestrial orchid. The flowering stem is up to 30 cm tall and carries 2 to 5 yellowish flowers that have erect, prominent, dark red, densely hairy labellums.

***Dipodium* Orchids**

Three species of *Dipodium* occur in southern Sydney. They are summer flowering and their bright pink flowers are easily seen along the bush tracks and along the sides of roads when not much else is in flower.

Dipodium orchids are leafless terrestrials that are part saprophytic and part parasitic, having a relationship with a mycorrhizal fungus as well as an association with a host plant, usually a Eucalypt. They can grow in groups or

as individuals in open forest. Stems and flowers are fleshy and resemble the cultivated hyacinth plants after which they get their common name.

The main identifying points are: the flower colour, the size of the spots on the flowers, whether there are spots on the pedicel and ovary and whether the petals and sepals are curled back or flat.

***Dipodium roseum*—Rosy Hyacinth Orchid**

Dipodium roseum has a thick dark purplish stem and grows to 80 cm tall. Its flowers are pale pink with small dark pink spots. There are no spots on the pedicel or the ovary. Its petals and sepals are noticeably curled back.

***Dipodium variegatum*—Blotched Hyacinth Orchid**

The stems of *Dipodium variegatum* are greenish to brown and up to 80 cm tall. Its flowers are cream and heavily marked with pink to maroon blotches. Spots also appear on the ovary and pedicel. In this species the petals and sepals are only slightly curled back. I find this species to be more common in areas nearer the coast.

***Dipodium punctatum*—Hyacinth Orchid**

Dipodium punctatum does not appear to be as common as the above two species. Its thick dark purplish-red stem can grow to about 80 cm in height. It has a slender spike of up to 50 pink flowers with dark pink spots and blotches. Petals and sepals are flat and there are no spots on the pedicel or the ovary.

***Burnettia cuneata*—Lizard Orchid**

This orchid is regarded as leafless, but in fact it has a small leaf-like bract at the base of its stem. It grows only in swampy habitats in peaty soil where you can also find *Melaleuca*, *Leptospermum* sp. and ferns such as *Gleichenia*. It needs a hot summer fire to burn away the surrounding vegetation before making an appearance the following spring, after which it will not be seen again until fire again passes through the area. The flowers are short-lived and remain fully open for only part of the day and remain semi-closed at other times. The flowers are fleshy, white or pale pink inside and reddish-brown on the outside. The labellum has red stripes on the outside.

***Genoplesium baueri*—Brittle Midge Orchid**

Genoplesium baueri is semi-saprophytic and while appearing leafless, it has a leaf that tightly sheaths the flowering stem then appears as a small free blade just below the flowers. It is an uncommon orchid that grows in drier Eucalypt forest or in moss gardens over sandstone. It is more likely to be seen after fire has burnt away the surrounding vegetation. A slender spike to 15 cm tall bears 1 to 6 yellowish-green and pink well-spaced flowers that have long divergent lateral sepals.

***Prasophyllum flavum*—Yellow Leek Orchid**

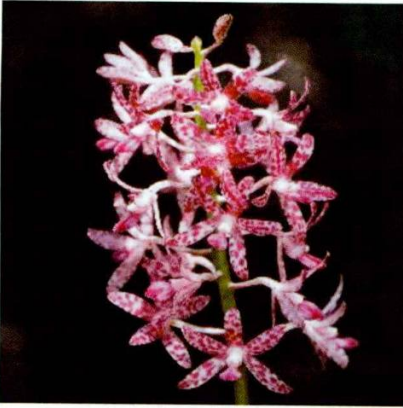
Prasophyllum flavum is another uncommon orchid. It is found in moist forest and coastal scrub and is considered to be semi-saprophytic. Its leaf tightly encloses the flowering stem leaving a very short free blade. A spike up to 60cm tall carries up to 50 dull greenish-yellow scented flowers.



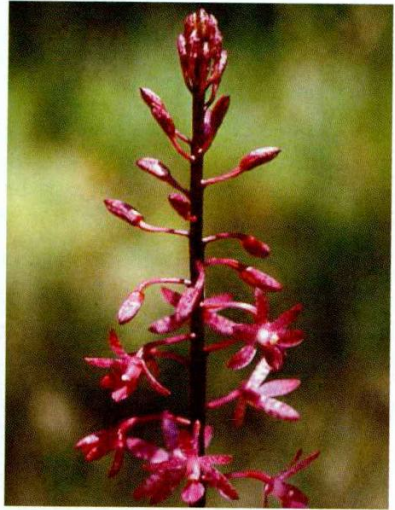
Erythrorchis cassythoides
Climbing Orchid



Gastrodia sesamoides
Cinnamon Bells



Dipodium variegatum
Blotched Hyacinth Orchid



Dipodium punctatum
Hyacinth Orchid



Prasophyllum flavum
Yellow Leek Orchid



Burnettia cuneata
Lizard Orchid

Caladenia (Arachnorchis) Reintroduction

Kate Vleck

Kate is a Threatened Species Project Officer with the Department of Sustainability and Environment (DSE) South-West Region, Victoria.

The reintroduction process really begins in the soil—the specific mycorrhizal fungi must be located, identified and isolated in the laboratory for seed germination to successfully take place. The fungi may be found using a technique where a small slice of the collar from a mature plant is removed, cleaned and taken back to the lab, from soil samples or using slides inserted into the soil around existing plants. The slides have cloth where the negative film would be and the fungi then colonise it.

Once the fungus is successfully isolated it is used to assist in seed germination. Seed collection obviously occurs prior to this step and the entire process must be carefully coordinated with lab and field personnel to ensure the timing is synchronised.

The seedlings are grown in an agar plate or on foam in sterile flasks until large and robust enough to be transplanted into soil and the nursery/hothouse. This entire process is undertaken by experienced staff, post-graduate students and ANOS volunteers at the Royal Botanic Gardens (RBG) Melbourne.

The plants generally thrive in the growing conditions provided, often producing an inflorescence within 18 months of germination (normally three+ years).

Whilst the plants are growing a reintroduction plan must be researched, written and reviewed.

Reintroduction Plans describe the following; species' biological requirements, current conservation status, known populations and habitats, reason for reintroduction, site selection, step-by-step methodology (including any follow-up care) and an evaluation component with a measurable target. The target success rate is generally 70%, as recommended by the Australian Network for Plant Conservation (ANPC) Guidelines. A watering plan may occasionally be included. Experimental design may be incorporated into the planting design so that different variables can be tested for success rates (e.g. watered vs. non-watered, planting in clumps vs. planting singly). Generally at least 40 plants are required for any real statistical information. Reintroduction Plans often refer to previous successful reintroductions



Caladenia versicolor
Candy Spider Orchid

and are peer-reviewed and refined. The creation of a Reintroduction Team is also an important aspect of both the planning and the on-ground works. This consists of people with reintroduction experience and/or knowledge of the species concerned. More recently entomologists have had input into the process advising on pollinator components to be taken into consideration. Site selection now incorporates a process known as pollinator baiting, where fresh flowers are put out at target sites in an attempt to attract, capture and identify the pollinators. The results are then used to assist site selection.

Site preparation is undertaken prior to reintroduction on both a broad and fine scale. This usually includes fencing of areas, weed control and construction of protective cages. The cages are often made with assistance from volunteers. Cages are effective against macropods and rabbits. Emus and choughs are also known to browse on Spider Orchids and echidnas sometimes disturb sites. Microhabitat preparation may involve marking out the planting sites, soil disturbance (to a depth of 10cm or so) and preparing mulch (pasteurised onsite *Allocasuarina* litter is preferred in most cases). The mulch layer assists in mycorrhiza re-colonisation as well as reducing moisture loss. Local rainwater is sourced prior to reintroduction and the plants are moved from the RBG hothouse to a nearby local grower where they are hardened off for a minimum of two weeks prior to planting out. This allows them to adjust to their new local climate. Previous *Caladenia* reintroductions have shown that the active growth period (July-August) is the most successful time to plant out, so there is some chance of frost damage if inland.

Reintroductions must be well organised and only occur over a single day. On the day, all participants are required to clean their footwear using a Phyto-Clean kit, to prevent the spread of Cinnamon Fungus that can affect orchid habitat. All tools to be used are sterilised and cleaned beforehand. Tasks are then divided up and a smooth working process is established. Plants need to be very carefully removed from containers and separated, retaining as much soil as possible. The mycorrhiza is thus reintroduced with the plants. This is usually performed sitting down at a portable table. Surplus soil is bagged and removed from the site. Each plant is then allocated an individual number on an engraved metal disc that assists with tracking the individual for monitoring purposes in the future. The plant's leaf length and width are measured and recorded and the tuber width and depth may also be recorded. Plants with a leaf length of less than 40 mm are considered too small to reintroduce and are repotted and sent back to the RBG. It is important during this time that the plants are not left to dry out before they are planted. They may be put into ziplock bags or misted with water, but the emphasis is always on minimising time spent out of soil, hence good coordination of the timing of tasks is essential. We often lay out four or five plants and their corresponding tags on a seed-raising tray filled with soil and transport them in this way over to the planting area.

The top 1 cm layer of soil/litter/moss is carefully removed from the planting site and set aside. Custom-made holes are made for each individual plant, to match their previous planting depth exactly. In sandy soil, holes are made by simply

inserting a finger. Rocky sites are much more difficult and time-consuming; this needs to be taken into consideration. The orchid is carefully planted to the required depth and the top 1cm set aside is replaced. This is thought to be the most active area for the mycorrhiza, assisting in their re-establishment. The numbered tag is then placed on a tent peg-like pin and inserted into the soil in a strictly specified distance and direction (usually 10 cm or a pin's length



Each plant is first measured and given an identification tag



Caladenia versicolor planting



The plants are carefully watered in after planting



Two members of a reintro team hard at work



A reintroduced *Caladenia calcicola*
Limestone Spider Orchid
Photos: Kate Vlcek

away). It is common for plants to be placed in small groups of three or five per cage. At this stage the plants may be mulched. They are then watered in and caged. The steel pins are also used to pin down the cages, which have flanged bases. Again, any rocky sites make the use of these pins more difficult and time consuming. The plants are then monitored and measured fairly closely for the remainder of the growing period. Any yellowing of the leaves is noted, as this is thought to indicate a decrease in mycorrhizal activity. Flower buds are often removed in the first season to redirect energy back into the leaf and tuber, growth and establishment. Sometimes they may receive supplementary watering over their first summer dormancy if the average rainfall is not met. The use of jute matting placed over the orchids during dormancy to help reduce moisture loss is also being trialled.

Success rates are usually between 65% and 85%, sometimes as high as 90% for these reintroductions. To further the success of these programs, using data from baiting research, natural pollination has been achieved at several sites where the species has previously been dependant on hand pollination. These results are particularly exciting, as they offer the potential to create self-sustaining populations for a species that previously had none.

In July of 2007 I was involved in two species of ex-situ grown Nationally Threatened Spider Orchids being reintroduced to the wild. The species were Limestone Spider Orchid *Caladenia calcicola* and Candy Spider Orchid *Caladenia versicolor*. Previous to the reintroductions, there were only approximately 300 *C. calcicola* remaining at three sites and 350 *C. versicolor* remaining at a single site in the wild.

We reintroduced 80 Candy Spider Orchids and 66 Limestone Spider Orchids, all ex-situ grown from seed collected from the wild. It is too early for any real results, as they are yet to re-emerge from their summer dormancy but initial survival rates were 95% for *C. calcicola* and 98% for *C. versicolor*. 30% of *C. calcicola*s flowered and 5% were naturally pollinated. 26% of the Candy Spider Orchids flowered and 2% were naturally pollinated. Both reintroductions involved two separate sites. The *C. calcicola* sites were previous successful pollinator baiting locations. Both these species were previously dependant on hand pollination and to make things even trickier, the pollinator of *C. versicolor* remains a mystery despite intense baiting research. It is thought to be a native bee, with the flowers being food-deceptive, mimicking other pinkish flowers such as chocolate lilies. We selected sites containing such wildflowers. In 2007 natural pollination events occurred at all four reintroduction sites, an early sign of success, especially in the site selection aspect. Seed was collected from the resulting pods and fed back into the RBG growing program, starting the cycle anew.

I would very much like to be involved in the reintroduction of an epiphytic or lithophytic species in the future and would be interested to know if any are happening.

If anyone would like any further information you can contact me at:
kate.vlcek@dse.vic.gov.au

Pollination Biology of Terrestrial Orchids

Kate Vicek

Kate is a Threatened Species Project Officer with the Department of Sustainability and Environment (DSE) South-West Region, Victoria.

Australia's terrestrial orchids have evolved a wide variety of strategies to achieve pollination. Often the diverse and sometimes bizarre shapes, forms, colours and textures that make orchids so fascinating to look at are actually aimed at eyes other than our own. Strategies utilised by orchids include self-pollination (autogamy), insect pollination, floral mimicry and sexual deception. Some orchids are pollinated by a wide variety of insects while others have formed a one-on-one relationship with a single species of insect.

Self-pollinating orchids often display swollen ovaries even in the early stages of flowering, for example, the genus *Microtis* (Onion Orchids) and *Orthocerus* (Horned Orchids). Some of the Sun Orchids (*Thelymitra*) have flowers that will not open if the weather conditions are not warm and sunny enough. These are also capable of self-pollinating, with the pollen simply crumbling and falling onto the stigma, achieving fertilisation.

Species of *Pterostylis* (Greenhoods) and *Corybas* (Helmet Orchids) are pollinated by fungus gnats that resemble small mosquitoes. In some species of *Pterostylis*, the labellum (the modified petal that becomes the lip) provides not only a landing platform for the insect, but also entices them with bristle-like hairs called setae. *Pterostylis* flowers have highly irritable labellums which snap shut with the slightest touch. This mechanism effectively traps visiting insects inside the flower. The trapped insect moves towards the light created by the opening at the tip of the 'hood' (galea) and also the light created by the transparency of the flower and is guided across the stigma by the wings on either side of the column. It is forced upwards by the internal structure of the flower, emerging at the anther where it collects pollen. The flower will later lower the labellum and reset itself in approximately half an hour. *Corybas* flowers emit an odour that mimics fungus in order to attract pollinators.

Some species of *Diuris* (Donkey Orchids) and *Thelymitra* mimic other flowers to attract their pollinators that are native bees. Blue sun-orchids mimic various species of native lily such as *Orthrosanthus* (Jones, 2006). *Diuris* flowers are either yellow with brownish markings (like the typical "egg-and-bacon" native pea flowers) or various shades of purple. This type of mimicry involves twofold deception, as the insect visitors are expecting rewards of nectar based on the appearance of the flowers and the orchids offer none.

Then there are the generalists of which *Prasophyllums* (Leek Orchids) are probably the best example. They attract a wide variety of insects to their flowers by offering a reward—a small drop of nectar on their labellum. They typically attract and can be pollinated by beetles, hoverflies, bees and wasps.



A Blue Sun Orchid mimicking a Lily



Orthrosanthus multiflorus, model for the Thelymitra



A *Diuris* being pollinated by native bees



A *Prasophyllum elatum* insect visitor
Photos: Kate Vlcek

The most complex form of insect pollination employed by orchids is sexual deception and is used by many genera of terrestrial orchids; *Caladenia*, (Spider Orchids), *Chiloglottis* (Wasp/Ant/Bird Orchids), Duck Orchids (*Caleana*, *Paracaleana*), Elbow Orchids (*Arthrochilus*, *Thynninorchis*), Hammer Orchids (*Drakaea*), Tongue Orchids (*Cryptostylis*) and the Rustyhoods (*Oligochaetochilus* syn. *Pterostylis*). These types of flowers use two methods to attract insect pollinators—visual mimicry and scent. Sexually deceptive orchids typically have dull-coloured flowers, usually green, brown or maroon with highly mobile and sensitive labellums and reflexed petals and sepals that display and expose the labellum. The labellum is often highly ornate, decorated by either

calli, glands or hairs that mimic the appearance of a female insect in order to attract a male. To add to the attraction, the orchid emits a scent that mimics the sex pheromone used by the female insect.

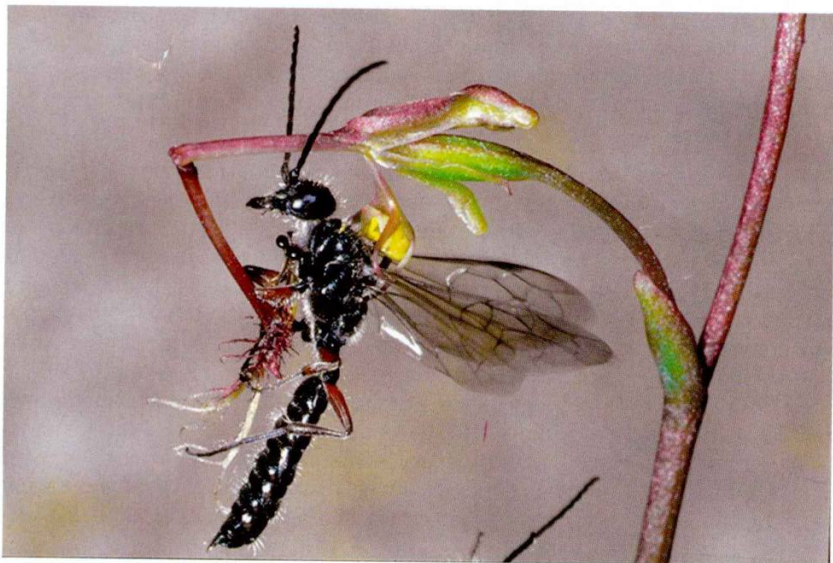
Sexual deception generally works in the following way; a male insect is initially attracted to the orchid flower by the scent which he mistakes for a receptive female. Once lured in, he is visually stimulated by the appearance of the labellum (which is usually insectiform, especially in *Chiloglottis*). He then attempts to either mate with the labellum, which is known as pseudocopulation, or tries to grasp and fly away with it. This more vigorous activity triggers the irritable labellum that is usually hinged and the male insect is flung against the column, coming in contact with both the stigma and anther. Sometimes this results in the pollinia attaching to the back of the insect.

Different genera display different adaptations. *Thynninorchis* and *Arthrochilus* have developed claw-like appendages on either side of the column that help hold the pollinating wasp in place. *Chiloglottis* have a complex arrangement of shiny black calli that mimic very closely the female insect species that pollinate them. Hammer orchids use their decorated labellums like lures. Duck orchids' warty labellums are attached with an elastic strap that snaps the flower shut. *Caladenia* (*Arachnorchis*) have collections of pheromone emitting glands that form clubs on the tips of the petals and sepals as well as dark shiny calli decorating the hinged labellum. All of these adaptations are the species' individual response to the problem of pollination.

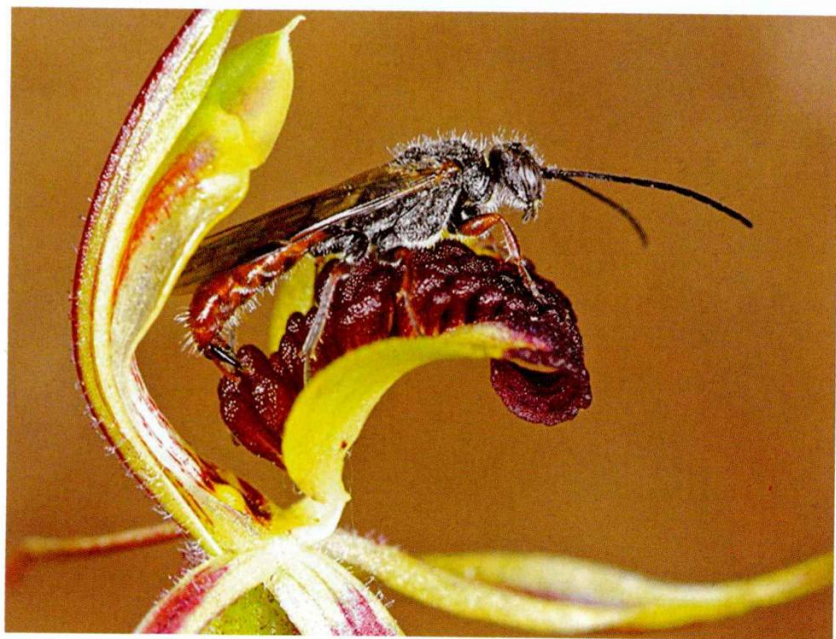
By far the most common pollinator of sexually deceptive orchids is the thynnine wasp (Schiestl & Peakall, 2005), also known as flower wasps. The males are generally quite shiny and often black with yellow markings, somewhat hairy with iridescent wings and can be seen feeding on nectar-rich flowers such as *Leptospermum*. Males are strong fliers. The flightless females are smaller and stockier than the males with strong legs adapted to their burrowing lifestyle. Thynnine adults usually emerge from the ground in September or October. Males begin patrolling their territory every morning in search of females. When a female is ready to mate she will emerge from her home in the soil and walk towards the nearest appropriate vegetation, often a grass stem, which she then climbs. She vibrates her antennae, calling to nearby males and emitting the pheromone that is carried by the wind.

Males follow these scent trails much like a shark follows blood odours in the ocean and this is reflected in the zigzagging fashion in which they fly. The height of the male flight and the female's choice of perch is reflected and mimicked in the height of the respective orchid bloom (usually 10-25 cms). When a male is within several centimetres of the female, he starts to search for her visually. The pair couple and the male then carries the female to a feeding area *in copula*, where she will feed on nectar. In some species, the male feeds the female. Male wasps are very competitive and this behaviour can be observed as one watches them fighting over an orchid flower!

When they have finished mating and feeding, the male drops off the female near where he found her. She immediately burrows into the ground and searches for



Arthrothynnus hunteriana (wasp) pollinating *Thynniorchis hunteriana* (Elbow Orchid)

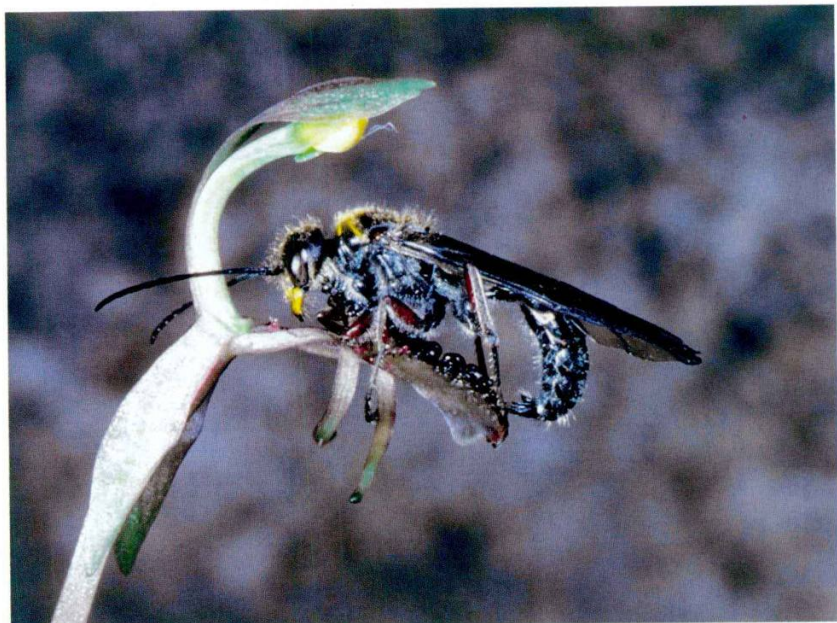


Caladenia sp. aff. *concinna* and thynnine wasp pollinator
Photos: Colin Bower

a host beetle larvae onto which to deposit her eggs. She first stings the host and then attaches her sticky eggs. The eggs hatch in 2-3 days and the wasp larvae then use their strong mandibles to feed on their larval host for 1-2 weeks before spinning a cocoon in which they may continue developing in underground for up to two years.

Male thynnines can mate several times a day and it is this constant search for new females that orchids have learnt to exploit. Scientists undertaking pollinator research are also able to use this behaviour to their advantage in a technique known as 'baiting'. Fresh orchid flowers are picked and moved to another location where they are displayed in mounting blocks. The blocks are placed on the ground (usually on a track) perpendicular to the wind direction. Response from male thynnines can be almost immediate; in fact I have even seen wasps flying in before the block has even made it to the ground. Usually they will respond within three minutes, although recent research has shown that for some species of Spider Orchid, response time is at least ten minutes. A large net is then placed carefully over the wasp and the behaviour observed and noted before capture and eventual identification. As male wasps are able to learn locations of encounters, the block needs to be moved after each display.

This method has been used extensively by both Colin Bower and Rod Peakall to identify cryptic species of orchid, particularly in the genus *Chiloglottis* by the use of choice tests. The technique can also be used to identify cryptic species of



A *Neozeleboria* wasp on a *Chiloglottis* sp. aff. *formicifera*

Photo: Colin Bower

wasp. In his research into the *Caladenia reticulata* complex in 2008, Dr. Bower was even able to show that all members of this group actually attracted the same pollinator and from a biological point of view are a single species. It is also possible for two different orchid species to use the same floral odour to attract different pollinators as Schiestl and Peakall's (2005) research has shown in the case of *Chiloglottis trapeziformis* and *Chiloglottis valida*. Both these orchids use the same odour known as Chiloglottone to attract two different species of *Neozeleboria* wasp pollinators. What distinguishes between the two orchids in this case is floral height; *C. trapeziformis* is twice as tall as *C. valida*. It has been found by Bower and Brown (2009) that all *Chiloglottis* have different specific pollinators. *Cryptostylis* (Tongue Orchid) species are pollinated by a single species of ichneumon wasp *Lissopimpla excelsa*, yet no hybrids are known to occur.

Pollinator baiting is also applied to orchid conservation, particularly in the planning stages of reintroducing plants into the wild. The method is used to discover the identity, distribution and abundance of a pollinator within suitable habitat and this information then assists in site selection for successful reintroduction or in understanding problems with low pollination levels.

Having a good understanding of pollination biology is an important part of any successful orchid conservation program, to ensure that we can all go on finding, photographing and enjoying our wild orchids.

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Growing Native Epiphytic and Lithophytic Orchids

Neville Roper

Growing Situation

Most natives grow best in dappled shade such as under a tree attached to a branch, hanging from a limb or in a shade house with 50% to 70% shade. They should never be grown in or on the ground. They are not indoor plants and must be grown outdoors, although they can be brought inside during the flowering period.

Pots, Mounts and Live Trees

The majority may be grown in pots – either plastic or terracotta. The only rules are that pots should have as many drainage holes as possible and that the pots should be a little on the small side. If you prefer it, some of the more difficult subjects can be grown on mounts such as a piece of cork, paperbark branch, weathered fence paling or some similar material. Plants should be tied to their mount using strips of stocking around their roots and then the mount with its plant intact can be hung up in a suitable place.

Virtually all natives will grow fantastically well on living trees. Try tying them (again using stocking strips) tightly to the main branches or trunk of any lemon tree (the best), jacaranda, paperbark, bottlebrush, frangipani – almost any tree except for gum trees and trees that shed their bark. If in doubt tie one or two on as a test run.



Display of cultivated *Sarcocylus* Orchids
Photo: Neville Roper

Mixes (for Pot Culture)

Every grower has a different mix so there are many possibilities. Chopped coconut husk is the current 'favourite'. If you hunt around the nurseries there is a brand that has been processed specifically for orchids (Orchid Mate), but if you can't find this then any of the other brands are suitable if you get the chunky (often labelled as 'coco mulch') version. I prefer chunks around 10 – 15 mm and unless you get the Orchid Mate it will need some basic treatment. The block of compressed coco mulch needs to be soaked in a LARGE container (Wheelbarrow or garbage bin) as it expands by a surprising degree, the water needs to be drained and replaced at least twice to remove excess potassium that is naturally in coconut husk. This water is safe for the garden so don't waste it. Some other ingredients may be incorporated including smaller amounts of Styrofoam, charcoal, shell grit, river pebbles and perlite. Try to get all ingredients about the same size and sieve out the fines and dust.

Under no circumstances should the coconut chunks be packed or forced into the pot as this will impede the drainage to the point where it is lethal to the orchid. Some gentle shaking and tapping will settle the material down adequately.

Fertilisers

You may use any of the common soluble fertilisers. The two golden rules here are to use the fertiliser at half the strength recommended on the pack and always water thoroughly between applications. Coconut husk is devoid of calcium so dolomite or gypsum is a useful addition. I mix equal parts of dolomite with blood and bone in a large salt shaker and sprinkle this on top of the plants (leaves, bulbs and all!) and then let nature take its course.

Watering

This is the tough bit! Most orchid casualties are the result of over-watering. Try to allow the mix to dry out before watering again – if in doubt don't water. This could mean watering three times a week in the worst of summer heat and hardly at all in cool wet winters. In summer, watering is best done in the evenings while in winter, morning watering is best. The idea is to have your plant dry before the cold part of night. The nervous growers may wish to keep a 'dummy pot' with potting material and no plant in it and empty it out to check for dryness and watering efficiency – you may be surprised.

General Management

Orchids are surprisingly tough if you don't kill them with kindness. Their day-to-day management is quite simple as they are not particularly prone to pest attack. The usual pests such as snails, grasshoppers, grubs and aphids may drop in for a snack, but they can be controlled with a keen eye and a heavy foot or you can use a recommended pesticide. Repotting and changing mounts are relatively simple measures and are generally best done in early spring. This is also a good time to divide large plants, but if you are a real beginner you may be well advised to seek some help from an experienced grower.

REMEMBER, having a go is the best way to learn and your local Orchid Club can always help.

Cultivation of Greenhood Orchids

Jackie Miles

Although much of this short article can be applied to growing most Greenhood Orchids, it refers particularly to the cultivation of *Pterostylis curta*, the Blunt Greenhood Orchid. Jean's original instructions were given to her by Nesbitt's Orchids of South Australia.

I have had more success in pots than in the open ground and I replot each year. The tubers multiply rapidly and grow well when crowded in pots.

After flowering the leaves will dry off and wither. When quite dry, in about late spring, turn out the pots and using a coarse sieve, separate the tubers from the potting mix. The tubers can be kept a month in a cool dry place, but do not allow them to dehydrate.

Plant the tubers in pots in early summer, but keep fairly dry until late February or March to prevent rotting off. Plant in fairly shallow pots 150 – 300 mm diameter. A filter of ash or chopped dried tree fern in the bottom of the pot is beneficial.

I use a potting mix with the following composition:

- 40% loam

- 55% coarse sand (wash out any fine silt)

- 5% 'copra peat'

- 1 heaped dessertspoon of blood and bone to 10 litres of potting mix.

Add moist potting mix to a depth of about 50 mm. Place the tubers on the surface and cover with more potting mix to within 20 mm of the top of the pot. Add a layer of cut up *Casuarina* needles to prevent the surface drying out, then water.

From early March water weekly until leaves appear, then twice weekly. If allowed to dry out, they will be subject to red spider mite. Don't forget to protect your plants from snails.



Potted *Pterostylis curta* plants
Photo: Margaret Bradhurst



The root system of
Pterostylis curta
Photo: Doug Rickard

Captain Cook: Scurvy and the Consumption of Orchids

Don Lawie, Joint Leader, ANPSA Indigenous Orchid Study Group

Cook's voyage which commenced in 1768 was notable for many things, one of the most newsworthy at the time was that none of his crew suffered from scurvy, the seemingly inevitable accompaniment of long distance sailing. This was no coincidence since Cook was keenly interested in preserving the health of his crew. With the assistance of the Admiralty's Victualling Board, he loaded a variety of anti-scorbutic provisions that were carefully served to the crew. One item was sauerkraut, which was detested by the seamen until the officers ate it up and declared it to be "capital stuff".

Of interest to us though was an item called "Saloup". Forty pounds of Saloup were loaded, to be used in the anti-scurvy endeavours. Saloup was at the time "a powdered root of an orchis (a genus of orchids) from Turkey, which, made into broth, was a favourite dish of the working class of the eighteenth century. It is apparently still sold in Eastern Bazaars. Modern opinion is that it has no medicinal value".

DJ Mabberley's *The Plant Book* (Cambridge University Press 1997): "salep: Dried starchy tubers of various orchids formerly used in cooking and medicine, esp. from ssp. of *Eulophia*, *Dactylorhiza* and *Orchis*".

Collins English Dictionary. 1994: "salep: the dried ground starchy tubers of various orchids, used for food and formerly as drugs.... from Arabic *Sahlab*, shortened from *khusy ath-tha'lab* literally, fox's testicles".

The three orchid genera used to produce saloup/salep are related terrestrials with species occurring in a wide belt from Korea to Central Europe. Flowering time is generally spring to early summer and all produce tubers of various shapes that have given rise to the plants' fanciful names. *Orchis* with its rounded, paired tubers gave rise to the name of the entire family Orchidaceae, while *Dactylorhiza* literally means "finger-shaped root". One species of *Eulophia* occurs in Australia and we were privileged to view it in flower on the Atherton Tablelands, some years ago, little knowing that there was a tenuous connection between this rare and elusive plant and Captain Cook.

The Indigenous Orchid Study Group

The Indigenous Orchid Study Group was one of the first Australian Native Plants Society study groups to be formed. Don and Pauline Lawie took over as study group leaders in September 1995 from Len Butt. They started with Newsletter No.13 and now 14 years later Newsletter No. 67 is in production. If you are interested in joining the study group you may do so by sending \$5 to Don and Pauline at P.O. Box 230, Babinda, Queensland, 4861. You can phone them on 07 4067 1577.

ANPSA on the Web

Brian Walters, ANPSA Webmaster

The ANPSA website was set up in 1995, initially for SGAP (NSW), but it was recognised early on that the scope of the material being provided on the site covered more than NSW issues. As a result, the site became the national site a year or so later. It remains one of the most frequented sites on Australian native plants, only the National Botanic Gardens' site receives more visitors. By May 2009, over 800,000 'hits' had been recorded.

You can find the website at: <http://asgap.org.au> (note that there is no "www")

What's available? Lots!

The site comprises over 150 megabytes of material. This includes about 720 photographs in the "Photo Gallery" all with concise notes on distribution, characteristics, cultivation and propagation. Here's a summary of site content:

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- **Regions and Groups** - Information on regional and district groups all over Australia
- **Publications** - Books, journals and newsletters published by the Society
- **Study Groups** - including links to relevant pages
- **Guide to Australian Plants**
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- **What's On?** - Events big and small
- **Magazine: *Australian Plants online*** - Feature articles, short items, book reviews (<http://asgap.org.au/apol.html>)
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