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CALADENIA (ARACHNORCHIS) REINTRODUCTION

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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 these wild plants. 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*. Thirty percent of *C calcicola* plants flowered and 5% were naturally pollinated. Twenty-six percent 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.



Reintroduced *C versicolor* in flower



Reintroduced *C calcicola* in flower

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.

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 3+ 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 v non-watered, planting in clumps v planting singly). Generally at least 40 plants are required for any real statistical information. Reintroduction Plans often refer to previous successful reintroductions 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 2 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 which can affect orchid habitat. All tools to be used are cleaned and sterilised 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 which 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 1cm layer of soil/litter/moss is carefully removed from the planting site and set aside. Holes are custom-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 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 a 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.

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 please contact me. kate.vlcek@dse.vic.gov.au

ORCHIDS OF THE SOUTH FALKLAND ISLANDS

Pauline Lawie

I know this is a study group of the indigenous orchids of Australia, but who of us when travelling does not keep a look out for orchids. I have just returned from a trip via Argentina, the British South Falklands and South Georgia Islands to Antarctica in perfect weather – perfect for that part of the World that is – not quite what a Far North Queenslander is accustomed to. I mention the weather as I missed out on the massive rains we had at home during early March, though it was only through the good offices of friends that I managed to get back here across a high level flood with relative ease. In March alone this year we have had 68.99 inches of rain; it's just as well it drains away or we'd both be under water!

The four orchids which occur in the South Falklands are all terrestrials and in genera I'd never heard of. I understand that these same species occur in Patagonia and I also understand that they have received the same attention from the same splitters as have our Australian orchids but I am unaware of the effects of this attention. These orchids are:

Chloraea gaudichaudii (Gaudichaud's Orchid) has two or three dark veined pale green flowers on a tall stem. They may not flower in dry weather and are thought to be self fertilising.

Codonorchis lessonii (Dog Orchid) has a single white flower on a 10-20 cm stem. This also occurs in Southern Fuegia, Western Argentina and Chile.

Gavilea australis (Pale Yellow Orchid) has a cluster of creamy/white flowers which open sequentially from the bottom.

Gavilea littoralis (Yellow Orchid) grows to 40 cm and as its common name suggests is yellow; the labellum is distinctively marked and has an orange stripe. This orchid is also known from Southern Tierra del Fuego and Southern Chile to about 40°S.

Unfortunately for me these plants all flower between December and January so I did not see any of them. Any orchid lovers going to Antarctica would be wise to go early in the season.

I'm not suggesting that we protect our wild orchids by laying land mines but.... During the Falklands War the Argentinians laid land mines in a wide band along the foreshores around the capital city of the Falklands, Port Stanley, for many miles out to Mount Pleasant Airport. Recently Britain became a signatory to a convention to remove all land mines so they are obliged to removed the mines around Port Stanley and an amount of money has been ear marked for this purpose. The area in question is fenced and needless to say has not been used since 1982 without impinging on the life style or economy of the islands. The people of the Falklands asked that this money be given to a country where every day people are being injured or killed while they attempt to live their normal lives but this offer does not fit into the convention. This is a great pity as well because the area is being recolonised by native plants and the Dog Orchid is reappearing around the airport. It will be a very difficult and dangerous operation to clear these mines as the Argentineans removed all the metal parts of the mines so they cannot be found by the usual metal detection method. It has been suggested that to do the job properly at least two feet of soil will have to be dug up. The consequences of such a practice on the foreshores of an island with such wet and windy weather can only be imagined.

EPIPHYTIC ORCHID REINTRODUCTIONS

Pauline

Kate asks if anyone is attempting to reintroduce epiphytic orchids to the wild. We would all be interested to hear the answer to this question, especially if it is being done with anywhere near the

scientific rigor described in the reintroduction with which she is involved. Our attempt to put *Dendrobium nindii* back into our Russell River Valley, where we propagated from seed, has been well reported. It is a very slow process and not yet complete.



These pictures are of a *Peristeranthus hillii* rescued from a dead tree pushed off the highway and covered with rubble shortly before the hillside was torched by "National Sparks". In spite of the obvious insect damage the plant is flourishing far better than it did in its original location; it had been existing on a dead tree for some time. We intended to harvest the capsules and position them near the original site. Before we could, "National Sparks" was back and the host tree and orchids we thought were recovering from their previous burn off have disappeared. What can one do?



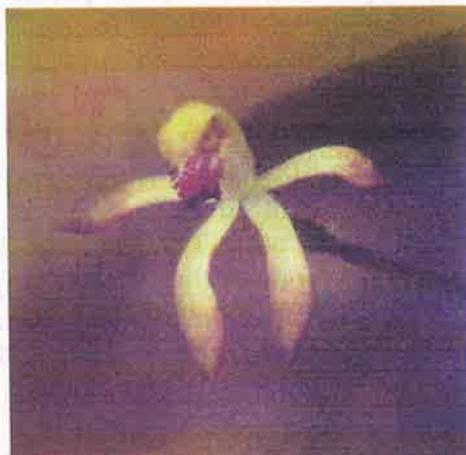
Margaret Bradhurst writes:

"The arrival of your December newsletter has reminded me that I did not reply to your September newsletter as I had intended. In the meantime, your article on the Dendrobium beetle is very timely because at present I am having to make twice-daily inspections of my orchids to see if I can catch the little critters. They particularly like my *Dendrobium kingianum* and crucifix (*Epidendrum*) orchids. The *Dendrobium* leaves are being skeletonised in some cases and the flowers of the *Epidendrums* are disappearing overnight. I think I will wear gloves in future when I remove the larvae, now that I know they cover their backs with their own faeces! ! I have also noticed skinny green caterpillars (like cabbage butterfly grubs) on my *Dendrobium nobile* leaves, and with the stink bugs on the lemon tree, I seem to be continually disposing of unwanted pests."

(P. I was taken to task for not suggesting the best method of destroying the Dendrobium beetle. We use the "Ethel Baxter method", that is, carry an ice cream container with a couple of centimetres of water in it and hold that under the beetle whilst attempting to grab it. If the attempt fails the beetle drops straight down into the water where it swims around until it is despatched.)

STEGOSTYLA TESTACEA AND STEGOSTYLA TRANSITORIA
(*Caladenia testacea* and *Caladenia* sp aff *iridescens*)

Margaret Bradhurst



Stegostyla testacea (*Caladenia testacea*)



Stegostyla transitoria (*Caladenia* sp aff *iridescens*)

On a recent outing to Maddens Plains (between Sydney and Wollongong) in October, I was lucky enough to discover a tiny terrestrial orchid which I had not seen before. It goes under the name of *Stegostyla transitoria* in David Jones new book 'A complete Guide to Native Orchids of Australia', 2006, and *Caladenia* sp. aff. *iridescens* (Coastal) in Tony Bishops book 'A Field Guide to the Orchids of New South Wales and Victoria'.

Apparently it is a poorly known species because of its short-lived flowers and the fact that it grows under spindly shrubs and in leaf litter. It was certainly difficult to see because the pale yellowy/brown colour of the flowers blended into the brown leaf litter the plant was growing in. At first I thought it was *Stegostyla gtestacea* (*Caladenia testacea*, the Honey Caladenia) which is fairly plentiful in the area, but the widely spreading petals and sepals and the purplish black labellum looked 'different'. I could hardly wait until I got home to work out what it was. I had the *Stegostyla transitoria* (*Caladeniasp* aff *iridescens*) identified by the Herbarium. It had not been found there before.

More from Pauline:

DENDROBIUM BAILEYI

As may be expected our local orchids flourish in the rain, particularly *Dendrobium baileyi*. This has a fern-like appearance and habit and anyone who does not know it finds it hard to believe it is actually an orchid. Trying to prove it is difficult too as the spidery flowers which usually come in pairs, though quite large, are ephemeral, lasting about half a day. Whenever we have heavy rain I try to remember to get out and have a look at it, so I looked pretty soon after I arrived home. I was too late for the flowers but observed the largest seed capsules it has ever had, like large dark green peas. I was keen to take a photograph but when I returned most had dehisced and within a week there was no sign whatsoever that it had ever flowered.

DENDROBIUM TERETIFOLIUM

We are cultivating Pencil Orchids from a few different areas to see whether there are any floral differences. Don reported flowers on one plant when others had none so I hot-footed it up to take a look. I had to advise him to wear his glasses in future when making observations on orchids. This particular plant had been taken advantage of by a *Hoya australis* and had lovely little umbels of star shaped flowers. To add insult to injury within a few weeks the hoyas had long pencil-shaped seed pods dangling among the *D teretifolium* leaves, giving it an appearance of prolific new growth.

Two more small observations: I bought an expensive Hozelock 2L spray bottle with the expectation that it would outlast many cheaper ones. Long before I thought it should, the bottle would not hold the pressure so I had to pump far too often. I bought a new O ring but this did not solve the problem, so I went back to the retailer. To show him what the difficulty was I took a new bottle off the shelf and when I unscrewed the lid I discovered that the O ring was greasy. The solution was simply to apply Vaseline to the O ring.

Another tip I tried and found most successful was to put a little Roundup into a container, dip in a gloved hand and with consummate care wipe a smear of herbicide into both sides of weeds it is impossible to spray. We keep getting *Pseuderanthemum variabile* in our pots. These have an extensive root system which robs plants of fertiliser. They also flower and seed prodigiously. The seedlings can be removed by hand when they are at the two to four leaf stage, but any bigger and they just break off at ground level. I can't attribute this technique to the clever person who first thought of it as I cannot remember where I read it. I suspect it was in one of the ASGAP state bulletins. Thanks anyway whoever you are.