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Once again, many thanks to those many members who have sent us encouraging comments after our cyclone experiences; we are now at the stage where we can appreciate all the good things that have come out of it. Marjory wrote: "We in Bundaberg have had cyclone scares over the years, but we seem to be somewhat protected by Fraser Island, and cyclones usually hit north of us or go past." Marjory feels she cannot contribute much to the Study Group as she does not have much of a collection. However, I think it is also valuable for members to record "finds" in the wild, like the *Pterostylis* sp Marjory spotted at Carnarvon Gorge and her further observation.

"At our local wallum area I have seen the flying duck orchid, probably *Caleana major*. It was some years ago. Recently I went back of the same area that is now covered by small trees and no sign of any orchids or the small wallum plants I remember. I think it probably needs a fire to open it up again and perhaps the small plants will re-emerge. In the vicinity further down the road there are many *Banksia aemula* and *B robur*, wallum teatrees and *Ricinocarpos pinifolia*, and these are often the target of bushfires, but I think where I found the duck orchids must have escaped fire for a few years now."

Making a note of flowering times also contributes to our greater knowledge of our wonderful plants. I have a long-term (very long-term) goal of indexing all of our newsletters. Just how detailed this would be depends upon becoming more computer literate.

LEAFLESS EPIPHYTIC ORCHIDS

Mary Gandini, BSc Dip Research Methods

Generally, leafless plants (except deciduous plants) are succulent xerophytes adapted to arid conditions like the euphorbia of Africa and the cacti of America. In these, the lack of leaves is a strategy to reduce water loss through transpiration from the large leaf area. Stems and spines take on the role of leaves while the roots remain in the ground to absorb available water. Some leafless plants may be parasites on other plants, or saprophytes depending on fungi for the supply of essential nutrients. In all of these the stem or shoot system is well developed.

In the leafless orchids, the stem is very reduced or almost non-existent (rudimentary). The exposed roots are the main body of the plant. They are green and provide all the photosynthesis necessary for the production of sugars from carbon dioxide. *Taeniophyllum* (5 species) and *Chiloschista* (1 species) are our leafless epiphytic orchids in North Queensland.

Dockrill, in *Australian Indigenous Orchids* Volume 2 (1992), states that *Taeniophyllum* are leafless at least in mature plants and *Chiloschista* occasionally have a few small leaves. Has anyone observed very small non-photosynthetic leaves in either? Maybe in seedlings?

I have encountered *Taeniophyllum* spp. in many places on my bushwalks. Mostly they are twig epiphytes on shrubs (in the tree tops too, but I can't see those unless they fall), but I did find some on a 30cm diameter trunk, at eye level, overlooking the coast north of Cairns. *Chiloschista* usually need bigger trunks as they are larger plants and the roots travel some distance. I have observed them in wet lowland areas beside streams or near the mangroves.

Finding some *Taeniophyllum* specimens in the cyclone debris prompted me to research the literature for them. I found a recent article in *American Journal of Botany* 2006, (93) 5, pages 770-786 by B.S. Carlswald, W.M. Whitten, N.H. Williams and B. Bytebier titled "Molecular Phylogenetics of Vandaeae (Orchidaceae) and the Evolution of Leaflessness". Molecular and structural characters were used to generate hypotheses about the Vandaeae and the evolution of monopodial leaflessness. Much of the following information is gleaned from that article and I am discussing the Australia genera only.

Taeniophyllum is the largest exclusively leafless genus with approximately 185 species that possess brown scale leaves. *Chiloschista* has about 3 species. There are other exclusively leafless genera of orchids in the world, and some leafy genera have one or more leafless species. A total of 112 monopodial Vandaeae were in the analysis that included familiar genera such as *Luisia*, *Thrixspermum*, *Trichoglottis*, *Robiquetia*, *Micropera*, *Schoenorchis*, *Pomatocalpa*, *Tuberolabium*, *Sarcochilus* and *Phalaenopsis* but none were Australian species. There were many names that I have not heard before so I conclude that they do not have spectacular flowers.

The results indicated that *Chiloschista*, *Phalaenopsis* (which has some leafless species in Asia), *Taeniophyllum* and *Trichoglottis* are monophyletic in that all members of each genus are derived from a common ancestor. This is the desirable result for molecular studies otherwise investigators will be wanting to invent new genera or transfer species to other genera. *Chiloschista* is sister to the leafy *Tuberolabium*, and *Taeniophyllum* is sister to the leafy *Sarcochilus*. In other words, they are very closely related. The results indicate that leaflessness has evolved more than once in each genus as reversals have also occurred. Climate change?

Why do plants become leafless? Ecologists talk about 'niches' and 'competition'. If the competition from others in one niche is too great for a species, it may colonise another vacant or sparsely occupied niche where it may be able to survive. Conditions in this new niche may be harsher and more difficult so the plant evolves adaptations to accommodate these changed conditions. Think of how harsh the canopy of a rainforest can be, e.g. bright sunlight and UV to burn leaves, and strong winds to remove the moisture and blow the plant from its mount. Salt water in mangrove environments can be equally desiccating. So get rid of the leaves; make the roots do all the work!

Our researchers found that 'a monopodial growth habit, a reduction to non-photosynthetic leaves, and the presence of aeration complexes in photosynthetic roots may be important structural precursors to the leafless habit'.

Dockrill (1992) classifies the Genera *Taeniophyllum* and *Chiloschista* in Family Orchidaceae, Sub family Epidendroideae, Tribe Vandaeae, Sub tribe Sarcantinae. It now looks as though we may have to get used to not using Sarcantinae for the sub tribe name. The above paper tells us that Dressler, R.L. [Phylogeny and Classification of the Orchid Family (1993)] finds Sarcantinae an illegitimate name and replaces it with Aeridinae.

Orchid nomenclature is always controversial. Relationships based on morphological similarities, particularly of the flower and its labellum, are being questioned due largely to the burgeoning "Molecular Evolution" where sections of genes in the DNA are extracted, sequenced and compared by computer programs that churn out possible relationships. Watch out for renaming of, or changes to, some of our other genera viz. *Thrixspermum*, *Robiquetia*, *Micropera*, *Schoenorchis*, *Pomatocalpa*, *Tuberolabium* and *Sarcochilus*. *Chiloschista*, *Taeniophyllum*, *Trichoglottis*, *Phalaenopsis* are shown to be monophyletic so they should be OK.

David Jones new orchid book should be interesting.

Pauline says: I have at last found something positive, by that I mean positively pleasant, to say about "The Big Splitters": Being presented with so many so-called species, it has made us look far more closely at all the orchid flowers we see. It has also strengthened my determination to take useful photographs.

DENDROBIUM SPECIOSUM

This is probably the most widely occurring and, I'd venture to say, the most cultivated orchid species in Australia, judging by the number of photographs available. Prompted by its absence by name in Jones' new book and also the article by Adams, Burke and Lawson in the latest *Orchadian* (similar to the one quoted by Mary in our last newsletter), I looked very closely at a flowering specimen which occurs near Lake Tinaroo in the "Cairns Highlands!". On day one I had an exact replica of one photograph I found – patent, white with purple markings. By day two the colour had changed to cream then darkened to gold before the flowers dropped. Also as the flowers matured, the petals projected further forward and the lateral sepals finished up crossed, so it looked exactly like a different "species", though smaller. The lower bract on the first inflorescence stood well out from the peduncle conforming with one line drawing. The lower bract on the second inflorescence on the same plant was sheathing as in a different "species". This may sound confusing but it convinced me, if I needed convincing, that splitting a species on the basis of dried material or the flower of one plant at one location at one time is flawed.

DENDROBIUM DISCOLOR

This is the most common orchid in our area and has been treated like a trash orchid. I know the two words don't go together; the epithet is more a reminder of my birdo sister than a slur on orchids. When the Atherton Scrub Wren was on her Must See List, we took Geraldine to Lake Eacham. She was greatly excited to see this bird for the first time, but by the end of the day we had seen it so often it had become "trash bird".

Dendrobium discolor is another variable species, but because of its massive size I doubt that it is cultivated much. Its size makes it susceptible to wind damage and it throws many kiekies. These often attach to other branches, and after high winds sit on the ground begging the observant passer-by to be rescued. Our original plants were purchased from the markets in Innisfail years ago, we've rescued many, and I have the celebrated "present" from an orchid fancier who was moving south, which took 25 years to declare itself. (It has made up for lost time since.)

After our acres-of-orchids experience near Cooktown, and our follow-up visit, Don was keen to check out a similar colony he had been told of, and dreamed about, much closer to home. More from him about this follows. At the time of our visit to the beach-side colony of Golden's nearby, I was more interested in colour and collected a few flowers to compare with those in our garden. I was surprised to find these beach-side flowers had a big, flat, outcurved labellum. A flower from a road-side plant close to home also had the outcurved labellum. It was then that I realised the plants at our place, with column clasping labellums, were not local ones. Further study is indicated, and the pejoratively labelled "trash orchid" has now become an orchid of interest.

BULBOPHYLLUM JOHNSONII

This was the next flower to come under the microscope. I went first to Jones' 1988 book – no need for an index – and read that the flowers were 'usually a shiny yellow colour' but lasted 'only a few hours'. These flowers lasted several days, so the little voice which says "something new" also said: "Ask *Dockrill*". There I found that this is a very variable species, and no wonder. It grows on trees or rocks, in or out of rainforests, from sea level to 1200 metres. It can flower any month of the year, and several times a year. Pseudobulbs are from seven to 18 mm, and can be green, yellow, red or deep purple. Leaves, from one to seven centimetres, can be almost circular, oval or elliptic.

The first two photographs are from an altitude plant with small, almost round, recurved, tough leaves. Although the flower has no stripes and doesn't look exactly like any other photograph I can find, I

accept that it is a *Bulbophyllum johnsonii*. What do you think the common name should be? Short-sighted bulbous snout orchid? Why not? I understand that in Jones' new book he has also changed some long-standing common names.



The next two are on a similar plant. I have tried to take photographs from exactly the same angle but found this impossible as the proportions of the flowers are quite dissimilar. Of particular note is the size of the petals in the second subject. They are actually visible to the naked eye. The difference in colour and flower shape is obvious. (Digital macro x 2 The second flower is smaller, taken slightly closer)



When they pose together we can see they are more than just good friends.

ACRES OF ORCHIDS – PART TWO

Don Lawie

In our last Newsletter (No. 56, September 2006) we reported on a visit to an area near Cooktown which contained, literally, Acres of Orchids. Of the three species of orchid present - *Dendrobium discolor*, *D semifuscum* and *D rigidum* - only the *rigidii* were in flower at the time. We concluded the report with a wistful, “*What a sight this will be when all are in flower*”.

A little after that, we heard that the perennially windy Archer Point is to be utilised as a wind-powered electricity generating area, with control of the entire area devolving on Traditional Owners with their normal activities. While we fully approve of making good use of the ceaseless wind, we had to recall that on our June visit we had noticed that many hundreds of orchids had been destroyed by fire in recent years, and we now fear the fate of the entire orchid patch is in jeopardy. With this in mind, we decided to re-visit the area when the main orchids were in flower.

We contacted friends in Cooktown and after receiving the intelligence that the Golden in town were in flower, we set off on the 800 km plus round trip to view “our” wonderland. We walked in from the main road this time, being unwilling to bushbash our shiny new Subaru Forester. The date was October 8 and winter was definitely a memory here, with relentless sunshine and the wind lost behind a ridge. We had a little difficulty finding “the Patch” then it suddenly loomed in front of us – a distinct change of flora from the prevailing *Lophostemon*, *Syncarpia*, *Eucalypt* open forest. There on the blue-sand ridge, covered with scrubby *Leptospermums*, was our target. The orchids were indeed in flower, *D semifuscum* and *D discolor*, with the *D rigidum*, which had flowered so profusely in June now mostly displaying many fresh fruit, ready to cast their seed to the breezes when ripe.

We wandered the wonderland; Pauline scrutinised with her lens, measured flowers and made notes. We determined that most of the flowers were species. A couple could have been a second or third throwback cross, though none exhibited the expected traits of both parents.

The scrub is generally low, but an occasional *Leptospermum* breaks the skyline and becomes an emergent. One of these, at the highest point of the ridge, was a treasure trove of epiphytes. The tree was old for the area, with a trunk diameter of about 45 cm. Branches were laced with both *Sarcostemma* and *Hoya* vines, and it was interesting to see that orchids which had somehow fallen from the tree had been caught by the vines and then attached themselves to a new branch. Ant plants were also present – a sure sign that the ocean was not far away. *D rigidum* were on every branch, some in large masses. High up in the tree were several larger orchids – a *D discolor* and a *D semifuscum* on opposite sides, and in the middle what would have to be a well developed hybrid between the pair. All three plants were in flower, and it was interesting to be able to observe *in situ* the points of convergence and difference between the three lots of flower.

This was what we had travelled so far to find, and we revelled in our discovery. We enjoyed our lunch under the *Leptospermum* then continued to search the area, but found that flowering was only sporadic – this has been an unusual year on the Cape. We decided to return to the van park and come back the next day. I had foolishly left all my navigation gear at home, thinking that I knew exactly where I was going. We had excitedly behaved like Little Red Riding Hood for so long and the sun had moved so far that we had difficulty in finding the road. Pauline insisted she knew the way and brought us out within metres of the vehicle.

The following day was almost a repeat of the first; we found more orchids in flower, but few that we could regard as hybrids. A number of orchids of both species were in early fruit, indicating that we had missed the best flowering period, even though the Golden in Cooktown were in full bloom. Rain came on, we became totally soaked, but not lost with the help of a \$2 compass from a novelty shop and a

bit more attention to what we were doing. We explored the area more widely and suspect that there may be a number of these sand ridges filled with orchids.

We also found a pretty little billabong/swamp with numerous *Dendrobium canaliculatum*, Teatree orchids, in bloom on the Melaleuca trees fringing the water's edge. A very large colony of *Drosera* species existed in the damp ground, and somewhere Pauline lost her new \$50 sunglasses whilst slugging through thick undergrowth.

The Cooktown expedition was so successful that we decided to look more closely at Golden orchid flowers growing closer to home. Pauline had detected numerous variations in the flowers we had looked at Up North, and also in those we have growing at home, which constitute quite an eclectic collection of mostly forgotten provenance.

I had been told by a workmate some years ago that a place on the coast called Tom's Rock had cliffs "covered with Golden orchids". This place is only about two kilometres from our home in a straight line, but there is a 660 metre mountain in between, very difficult to climb. Earlier this year I went past Tom's Rock in the Police Boat while on a search mission with SES, and I observed all I could see with particular care (we didn't find the lost bloke – yet another mystery). I considered it feasible to walk the three or four kilometres from the end of the road along the beach on a good low tide.

The Goldens at home were almost finished flowering by late October. There were no good tides, but we decided to give it a go anyway. After an early morning start, we left the car and crossed the creek mouth where we had seen a large crocodile slide on the last visit. The coastline here consists of a narrow golden beach fringed by sharp eroded rocks which become cliffs in places. The mountain rises very steeply behind the beach. We made good progress for a couple of kilometres, having to climb numerous rocks to make our way, and occasionally detouring through the adjacent rainforest. This area was very badly damaged by a cyclone last March, and passage through smashed rainforest requires more resources than those we had for a beach walk. We eventually found ourselves atop a high, steep series of rocks with no access to the beach and the forest impassable to us. We could see Tom's Rock about a kilometre away along a beautiful straight beach unmarred by further rocks or cliffs, but we decided to admit defeat and return when the tide was better next August/September.

We did find quite a lot of Golden orchids for the day, with a wide variation in colour, particularly some quite pale yellow specimens. (These were not pale enough to be classified as var. *broomfieldii*). Some plants were very large and carried numerous fruits, indicating that we were indeed very late in the flowering season. Some orchids grew epiphytically, on very large old Beach *Calophyllum* trees, but most were terrestrial/lithophytic, having found a niche in the junction between granite cliffs and adjoining forest land. Pauline found variations in flower structure here too, where it could be expected that all plants would belong to the same sub-group, if one such exists. The area is exposed to the Coral Sea to the east, and the rainforested mountain of the Graham Range behind it would make contamination by seed from elsewhere unlikely. To the south, a drier area of coast has open savannah forest.

It was a bright, hot sunny day – we don't get a lot of these in our wet area – and we lunched in the shade of an old *Calophyllum* just back from the beach in a dry, sandy creek bed. We saw no sign of any other people for the day – not even footprints. We'll check the tide tables for next year when the Goldens at home are flowering, and try it again.