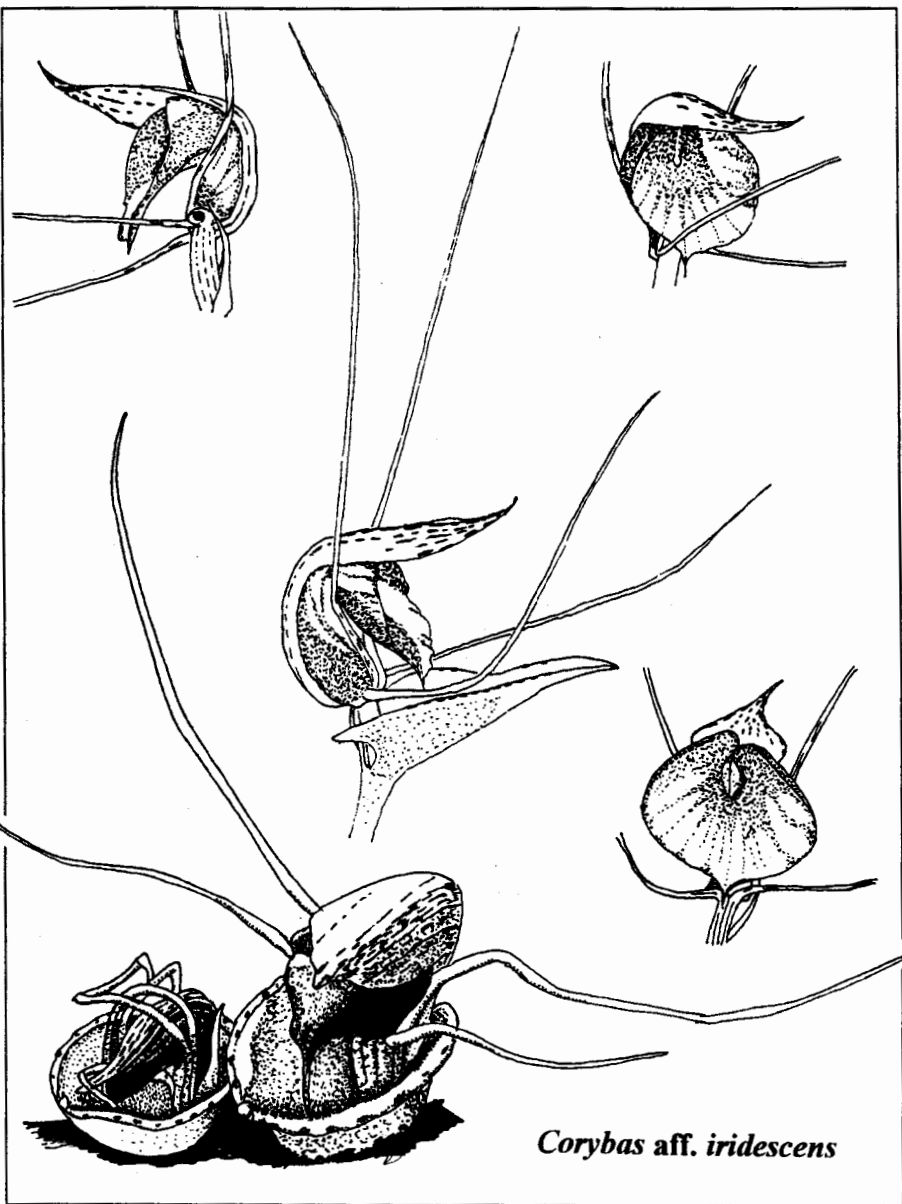




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Corybas aff. iridescens

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From the editor

Corybas on the southern islands

JD Hooker recorded *Acianthus* (*Corybas*) *rivularis* from "Lord Auckland's Group", in his *Flora Antarctica* in 1844. In 1864 he recorded *Corysanthes rotundifolia* (*Corybas oblongus*) for Campbell Island; Cheeseman confirmed it and added *C. trilobus* and *C. macranthus* in 1909. Betty Seddon found *C. trilobus* on Campbell Is. and *C. oblongus* and *acuminatus* on Auckland Is. (J54 p18).



↑ Brown *et al* collected what Elizabeth Edgar identified as *C. macranthus* from Macquarie Island in 1978 [1]. Their photographs show a rather immature-

looking, short-tepalled *Corybas*. The flowers appear to sit in cupped leaves.

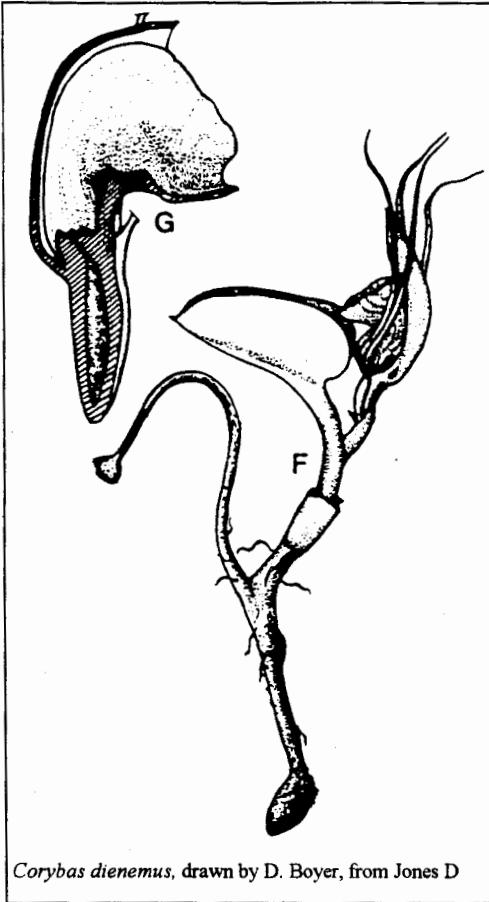
A colour habitat photograph from 1988 shows little detail, but again, the leaves are cupped, and the flowers appear sessile within them [2].

Moore reckoned all the Campbell Is. *Corybas* were *C. trilobus*" [3].

Croft collected the Macquarie *Corybas* again in 1989, and David Jones recognised that it was in fact a new species. He described it as *C. dienemus* (Gr. *dienemos* = windswept) [4] and D. Boyer drew it (see opposite): "colonies in very wet bog communities... This species can be immediately distinguished by the pale green and red, semi-erect flowers which sit in the cordate base of the leaf".

What, I wonder then, are Hooker's *Acianthus rivularis* from the Auckland Islands and Cheeseman's *C. macranthus* from Campbell Island?

[The *C. aff. iridescens* (see cover sketches) from Trotter's Gorge north of Dunedin emerges in a similarly cupped leaf - is the cup nature's windbreak? Dan Hatch agrees it probably is a "subalpine adaptation to continuous and very bitter winds", has noticed it himself in *C. "Waiouru"* growing in bogs in the Onetapu desert east of Ruapehu, and points out that it is actually a case of "arrested development" - since members of this group of *Corybas* push through the soil in winter, buds cupped in the leaves].



Corybas dienemus, drawn by D. Boyer, from Jones D

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Could the dread South African weed orchid infest New Zealand?

I asked Bob Bates, editor of the Native Orchid Society of South Australia (NOSSA) *Journal*, whether the South African weed orchid *Monadenia bracteata*, now present in three States of Australia, could reach New Zealand. He relates the story of its introduction to Australia below, and answers that the climate is not the best for it, but that seed could escape collections to establish in the wild here.

Indeed, New Zealand has proved hospitable to many species drifting in from Australia on the prevailing westerlies over the years, and the climate of Northland especially so. Some make only brief landfall; others do establish themselves, a few to become New Zealand species.

None, to our knowledge, has escaped from human collection to establish in the wild - but that is almost certainly what happened with *Monadenia* in South Australia and Victoria, and it could happen here.

Monadenia bracteata would not be a welcome migrant in New Zealand. Discourage growers. Burn your own specimens if you have it. Let's at least minimise the risk.

Malcolm and Beverley Thomas of Melbourne recently visited south Western Australia, and "found it at almost every site they visited, and it was certainly the most common orchid they saw in the south west" [Helene Wild in Victorian Group *Bulletin* June 1996].

Original papers

***Gastrodia* aff. *sesamoides* in Auckland city (2)**

by E. K. Cameron (from Auckland Botanical Society *Journal* 1996; 51 (1): 22-27).

Auckland City

I read with interest Peter de Lange's article about the population of the potato or pot-bellied orchid (*Gastrodia* means "pot-bellied"), *Gastrodia* aff. *sesamoides* in Symonds Street, Auckland City discovered in December 1994 [1]. Can you imagine my surprise when I discovered a similar city population in another part of built-up Auckland on 8 December 1995? This new one is on the Parnell side of Newmarket, on the corner of Parnell Road and George Street. The orchids are in a planter at the Nestlé Building entrance, again less than 1m from a busy footpath.

The site is a triangular sloping planter, 6m across with an 8m tall silver birch tree, a low *Juniper* cultivar as dense ground cover and pine bark over the ground by the orchids. There were 15 orchid stems emergent through the *Juniper* and they were less than 50cm apart; flowering stems were 24-85cm tall; flowers per stem (4)-16-28; most flowers were fully open except one stem which was entirely in bud. The flowers were weakly scented, had a long column; perianth pale brown, white at the mouth, darkened towards the base with pale calli (bumps); stem shining pale brown with pale streaks. I vouchered two stems (AK 225971).

Two days later, for comparison, I visited Peter's site in Symonds Street. I

counted 31 orchid stems over the bordered area 6m x 5m; stems 19-93cm tall, some of the taller ones were on their side with only an erect tip; flowers per stem 4-46; they ranged from in bud to fully open, some were shrivelled and appeared to have suffered from sap-sucking insects. Under the rich *Casuarina* litter there was a thin covering of pine bark. The orchids were identical to the Newmarket ones.

The Newmarket site is more "up-market", being a well cared for bed in an attractive setting with higher light. The sloping bed with a high tree canopy means the potato orchids are clearly visible above the *Juniper* ground cover. The flat Symonds Street site is unkept and more shaded with the tree canopy much lower. There were other planter beds near the Symonds Street site which were more open and most contained bark and various shrubs and trees. Apart from a single onion orchid, *Microtis unifolia*, there were no orchids to be seen in the adjacent beds.

I returned to both sites on 6 January 1996. At Newmarket there were eight dry stems bent over and lying on the *Juniper*, no ovaries had developed. At Symonds Street c. 10 stems were persisting, but only one flower appeared to be swelling, most were shrivelled up with the stem tips curving over. On 13 January the only ovary that looked like

it might swell was shrivelled up and a Christmas tree had been dumped into a corner of the bed.

Rotorua

While holidaying in Rotorua I contacted Chris Ecroyd and told him about the Auckland City potato orchids, and asked him about the ones growing in the Forest Research Institute (FRI) grounds. Chris informed me that a couple of years ago he had seen a few potato orchids growing in the bark gardens at the Pak N Save supermarket carpark in Rotorua. On 3 January 1996 I had a look around the extensive carpark but failed to locate any. Later that day Chris found 6 plants of what appeared to be *Gastrodia cunninghamii* (NZFRI 21977). They were past their best. We then spent a couple of hours in the FRI grounds where *G. aff. sesamoides* is locally common under various cultivated trees. We carefully exposed the swollen rhizomes of one clump as I was keen to see how inter-connected the swollen rhizomes ("tubers") were. One fine flowering stem measured 122cm tall! (Could this be New Zealand's tallest orchid? Or is it *Cryptostylis subulata* which has been recorded as 120cm tall [2]?) *Gastrodia cunninghamii* was also present in the FRI grounds. In some places it was virtually mixed in with the *G. aff. sesamoides*. Much of the *G. aff. sesamoides* was in flower, whereas the *G. cunninghamii* flowers were well past anthesis, had swollen ovaries and were also a much darker colouring (stems and flowers). In one place Chris showed me where *G. minor* is also

present. All three species within a few metres of each other (*G. cunninghamii* NZFRI 9913, *G. minor* NZFRI 15001, *G. aff. sesamoides* NZFRI 408)! I wonder if this occurs anywhere else in New Zealand?

Taxonomy

Currently there are four *Gastrodia* taxa recorded for New Zealand and only two of these are described [3]: *G. cunninghamii* and *G. minor*. The name *Gastrodia aff. sesamoides* is used to separate the New Zealand taxon from the Australian *G. sesamoides s.str.* which is now regarded as different [4]. The fourth New Zealand taxon is *G. "long column"* [5].

Below the ground

Below the ground the flowering stem is attached to an enlarged rhizome up to 8cm long x 3cm broad and 2cm deep [6], occurring singly or occasionally 2-4 joined together. The plants that Chris Ecroyd and I unearthed from under a large *Thuja plicata* in the FRI grounds had rhizomes up to 7.6 x 2.6 x 2cm and it appeared that more than four tubers were joined together (AK 224770, 224772). Roots were evident coming from the fleshy rhizomes, some were coraloid-like.

Campbell (1964) interpreted that *Gastrodia aff. sesamoides* from Silverdale behaves as an epiparasite on the roots of Tasmanian blackwood (*Acacia melanoxylon*). A fungus, thought to be the widespread *Fomes mastoporius*, occurs both as a root-inhabiting parasite in the *Acacia* roots and also as an endophyte in the roots

and rhizomes of the *Gastrodia* [6]. Campbell also recorded the tubers as usually lasting for one season only; and that the orchid has only a limited rhizome system compared with *G. cunninghamii*, but that the possession of roots up to 13cm long adds to its possibilities for making contact with its "host". The FRI orchids were certainly intimately associated with the roots of the *Thuja* with the orchid tubers lying horizontally just under the feeding roots of the conifer in thick humus. Fine rhizomes/roots were evident from the fleshy orchid rhizomes.

Campbell [7] in a summary of New Zealand orchids records the work of Burgeff (1936, [8]), that showed

saprophytic orchids (which include *Gastrodia* spp.) can utilise a wide range of complex organic substances including bark and lignin by secreting enzymes which oxidise the tannins in bark and so make available the other substances in the cell walls.

Auckland localities

As Peter de Lange recorded, no species of *Gastrodia* appear to have ever been common in the mainland Auckland region [1]. Within the Auckland region the following *Gastrodia* have been recorded (based on AK, AKU, CHR, WELT herbarium specimens, published records and E.D. Hatch *pers. comm.*):

Locality and flower stems	Date	Reference
1. <i>Gastrodia</i> aff. <i>sesamoides</i>		
<u>Kaipara Ecological District (ED)</u>		
Woodhill Forest, Kawau Crk	Nov. 1962	Bruce Roy*
Woodhill Forest, Coal Seam Hill (c. 5 fl stems)	Jan. 1986	Cameron 3836 & Bellingham, AKU 19090
Woodhill Forest, upp. Wainui Inlet (4 fl stems)	Nov. 1987	Wright 7891, AK 179251; Cameron 4614, AKU 20458
<u>Rodney ED</u>		
Silverdale, Bankside	Dec. 1945	Bartlett, AK 108992
≡	Nov. 1946	Bartlett, AK 24593
≡	Dec. 1947	Bartlett, AK 24592
≡	Dec. 1953	Olsen, AK 155155
≡ (c. 10 fl stems)	Dec. 1959	F.W. Bartlett*
≡ (c. 12 fl stems)	Nov. 1962	Campbell 1964: 238 [6]
Glorit, Mt Auckland (3 fl stems)*	Jan. 1964	Hatch 1964 [9]; & Beever, CHR 195662
≡	Dec. 1966	Horsman 1967 [10]
<u>Tamaki ED</u>		
Henderson, cnr Swanson & Rathgar Rds (1 fl stem - never reappeared)	1959	Brook, AK 69193, and P.J. Brook <i>pers. comm.</i>
Swanson, Scenic Dr. just below rail bridge (few isolated fl stems)	Oct. 1966	Horsman 1967 [10] and J. Cole <i>pers. comm.</i>
Greenhithe, Isobel Rd (25 fl stems)	Dec. 1966	E.D. Hatch 1968 [11]; & Hatch CHR 181615
≡	Dec. 1967	Hatch, CHR 191668
Coatesville, Mahoenui (1 fl stem)	Jan. 1969	E.D. Hatch 1969 [12]
≡	Feb. 1969	Smith, CHR 189030
Symonds St (8 fl stems)	Dec. 1994	de Lange, AK 221396-397

≡ (31 fl stems)	Dec. 1995	<i>pers. ob.</i>
Newmarket (15 fl stems)	Dec. 1995	<i>Cameron 8340, AK 225971</i>
<u>Inner Gulf Is ED</u>		
Waiheke Id	Dec. 1923	<i>Mathews, AK 200471</i>
<u>Little Barrier ED</u>		
Behind bunkhouse	Dec. 1978	<i>Beever 78070, CHR 362280</i>
<u>Great Barrier ED</u>		
Great Barrier, Port Abercrombie	1867-68	<i>Kirk, WELT 19077</i>
Kaiarara	Dec 1867	<i>Kirk, WELT 19075</i>
Near Port Fitzroy	Dec. 1938	<i>Mason, CHR 22232</i>
Tramline Track (few fl stems)**	Dec 1986	<i>Sykes 384/86 CHR 437535</i>
Central Gt Barrier (3 different sites)	Nov.-Dec. 1964	<i>Cooper, AK 119011 & 119065 & 119744</i>
Northern Gt Barrier (1 site) (few fl stems)	Jan. 1983	<i>Taylor, AK 161005 & AKU 14122</i>
2. <i>Gastrodia minor</i>		
<u>Waitakere ED</u>		
Spraggs Bush (1 fl stem)	Dec. 1980	<i>Braggins, AK 151985</i>
≡ (3 fl stems)	Dec. 1981	<i>Cameron 937, AKU 13618</i>
3. <i>Gastrodia cunninghamii</i>		
<u>?Tamaki ED</u>		
Hobson's Glen (locality & det.?)	1886	<i>Kirk, WELT 19076</i>
<u>Little Barrier ED</u>		
Forest c. 1200'	Dec. 1965	<i>Hamilton, CHR 141185</i>
<u>Great Barrier ED</u>		
Gt Barrier	1867-68	<i>Kirk, WELT 77826</i>
Northern Gt Barrier (few fl stems)	Jan. 1983	<i>Wright 5372, AK 160883</i>

Key

≡ = from exactly the same population as above

* = *pers. comm.* E.D. Hatch, 1996** = *pers. comm.* W.R. Sykes, 1996

Note: there are no herbarium specimens supporting *G. aff. sesamoides* for the Waitakere Range [13, 14], although the Swanson record is very close.

Origin of the Auckland City orchids

Clearly the non-city Auckland *Gastrodia* populations are few in number, few in flowering stems and far between. The closest record to the city is at Greenhithe in 1966, some 12km away; next closest are the Henderson/Coatesville records which are 16-18km away, 1959-1967. Therefore local origin seems most unlikely for the city plants even if we are creating ideal *Gastrodia* habitats. The associated cultivated plants,

"hosts", with the Symonds Street and Newmarket orchids are different species, but what the two sites had in common was pine bark over the ground.

Therefore one possibility is that the orchids have been accidentally transported to Auckland in the crushed pine bark as seed. Most of Auckland's crushed bark comes from the central North Island, particularly Kinleith (R. Bale of Fence Crete *pers. comm.*, 1996). *G. aff. sesamoides* and *G. cunninghamii*

are known to be locally common in some of the central North Island pine plantations. The orchid seeds (most orchid seeds are long-lived) could be lodged in the bark and remain during the bark peeling and crushing process. If *Gastrodia* is also able to act as a true saprophyte (rather than restricted to life as an epiparasite) and utilise bark, then this would be a great advantage when the seeds germinate in an established bark garden.

The other possibility is that the *Gastrodia* was already growing in amongst the roots of the cultivated woody plants before they were planted in the bark gardens. If at least fragments of the orchid's fleshy rhizome survived the planting process then they could become established. It is possible for nursery stock to come from a *Gastrodia* area. I believe this origin is most unlikely because nurseries would have recorded such obvious orchids if they appeared amongst their plants and potato orchids are virtually unknown in cultivation.

From their initial establishment in the bark garden the orchid may be spreading only vegetatively. The Newmarket population less than 50cm across is most likely to be connected (based on what I observed at the FRI excavated site) and therefore of recent origin. The Symonds Street population covering 6m x 5m would clearly be much older if it has only spread vegetatively.

The absence of seed set in one season at both sites supports this single establishment theory. Possibly the

pollinator is absent or they may require to be out-crossed? Campbell reports that Hatch found that *Gastrodia cunninghamii* and *G. minor* appeared suited to cross-pollination and that self-pollination is also possible [7]. In Australia *Gastrodia sesamoides* s.str. have both self pollinated and insect-pollinated forms [15].

Conclusion

It would be good to know more about the pollination, germination and seed viability of *Gastrodia* aff. *sesamoides* and whether it always acts as an epiparasite requiring a living "host" root for nutrients or whether it can live as a true saprophyte as well. On the present evidence it appears *G. aff. sesamoides* is being accidentally transported to Auckland City as seed in crushed bark from the central North Island and vegetatively spreading in two Auckland bark gardens. This type of dispersal is rather similar to the accidental movement of *Cassytha paniculata* southwards [16].

I wonder where and when the next Auckland City population of *Gastrodia* will be found and which species it will be?

Acknowledgements

To Chris Ecroyd for assisting me in Rotorua, Dan Hatch for his additional Auckland *Gastrodia* records, to them both for comments on a draft of this paper, Kerry Ford, Brian Molloy and Bill Sykes for details of specimens held at CHR, Fiona Pitt for details of specimens held at WELT, John Cole and Peter Brook for further information regarding their respective Swanson/Henderson records, and Antoinette Nielsen for typing.

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A history of the South African weed orchid *Monadenia bracteata* (Sw.) Dur. & Schinz in Australia (will it reach New Zealand?)

by Bob Bates, Editor, South Australian Native Orchid Society *Journal*.

Monadenia bracteata is a member of a large genus of fleshy South African terrestrial orchids, a genus which includes attractive insect-pollinated species as well as small-flowered, self-pollinated ones. Many of the species flower only after fire [as do several Australian orchids - notably *Lyperanthus* (*Pyrorchis*) *nigricans*, various *Prasophyllum* and *Leptoceras menziesii*].

Joyce Stewart (1982) says of it in South Africa, "Common in the west and south Cape areas especially in disturbed sites and flowering more abundantly after fire".

A potential weed

Monadenia bracteata is a prime example of a potential weed.

1. It is self-pollinated and therefore does not need a specific pollinator,
2. It has up to 100 flowers and produces millions of seeds per plant; these seeds are viable over several years (J. Warcup, *pers. comm.*),
3. The species favours disturbed sites like roadsides and fields,
4. It does not require a specific symbiont fungus to effect germination of seed,
5. It can not only cope with the frequent bushfires of Australia but actively benefits from them,
6. It is distasteful to grazing animals and insects.

***Monadenia bracteata* in Western Australia**

Its history in Australia began at Young's Siding near the port of Albany, Western Australia in 1944 when a Miss D. Sutherland collected plants and forwarded them to the West Australian government botanist Charles Gardner, who recognised them as orchids and passed them on to Rev. HMR Rupp, foremost Australian orchidologist at the time, with the note, "seems to be native". With this information Rupp described the orchid in 1946 as a new species *Monadenia australiensis*[1].

Soon afterward it was pointed out to Rupp that the species was identical with the South African *Monadenia micrantha* Lindley (as it was then known), and by 1955 it was commonly treated as an introduction.

Erickson surmised in 1956 that, as Albany is often the first port of call for ships from South Africa, seed may have arrived in sacking covering goods from that country [2]. Only a single seed need have made the journey and it is generally assumed that all Australian plants are direct descendants of that single seed.

The mediterranean climate of south Western Australia is similar to that of the south Cape area in Africa.

No attempt was made to eradicate the *Monadenia* at Young's Siding and as in 1948 no flowers were seen it was thought to have died out.

But this was not so. The species began to spread north, east and west - not evenly, as in some years no new locations were found, yet in other years

jumps of 100km were reported. By 1984 Hoffman and Brown recorded it from as far north as Perth and east to Esperance - over 1000km [3]. By 1990 *Monadenia* had spread hundreds of kilometres north of Perth, and after a series of good years was found in semi-desert on the edges of bitumen roads where water collected.

The South Australian introduction

Meanwhile in the 1970s several orchid collectors in South Australia had begun cultivating *Monadenia* after soliciting tubers from Western Australia.

Nash reported in 1984 that *Monadenia* was germinating as a weed in orchid pots in his shadehouse after he had flowered plants a few years earlier [4]. At that time plants were known in cultivation from Blackwood and Williamstown in the Adelaide Hills, and from Nangwarry near the South Australian border with Victoria.

In 1987 plants were found wild in the Belair Recreation Park and the local "Friends of the Park" group began an attempt to eradicate these. The find was kept quiet but it was already too late! The first official collection in South Australia was made in April 1988 during the Native Orchid Society of South Australia's survey of Scott Creek Conservation Park, and the first published record appeared in the *NOSSA Journal* of the following month [5]. Meanwhile further plants were found in a quarry at Eden Hills. All of these sites were within a few kilometres of Blackwood, the original site of cultivation in South Australia!



The South African weed orchid, *Monadenia bracteata*
photograph by Bob Bates

Local conservationist Enid Robertson quickly organised programmes to eliminate *Monadenia* in South Australia and have it declared as a pest plant by the Department of Agriculture. Despite her attempts and the removal of tens of thousands of plants *Monadenia* continued its spread.

There has been much discussion on how *Monadenia* spreads so quickly - seeds in trouser cuffs? seeds in soil on vehicles? deliberate spread? but there is no real doubt that spread is effected by wind dispersal of the dustlike seed - certainly the fastest spread is in the direction of prevailing winds and along roadsides which act as wind tunnels.

By 1996 some thirty collections had been made available to the State Herbarium of South Australia and the main infestations could be seen to have concentrated around the three sites of cultivation before 1980, i.e. Blackwood (especially to the East - following the prevailing wind), Williamstown and Nangwarry.

Infestations are usually noticed after flowering has finished and seed has already been released - the main reason control has not been effective.

Monadenia is now thought to be present in three States: it has spread about as far as it can in Western Australia, has infested about ten percent of suitable regions in South Australia and has just entered Victoria. The population in SA is thought to have at least doubled annually since 1988.

Does *Monadenia* compete with native orchids? I would say "Yes - to a minor degree". It does not form dense

infestations like our really serious pest plants, and as it favours disturbed sites it is a symptom of habitat degradation rather than a cause of orchid loss.

Could *Monadenia* reach New Zealand?

In the short term this is unlikely. The New Zealand climate is not suitable. The distances are greater. But people cultivating *Monadenia* could easily introduce it.

Finally I'd like to quote Ray Nash, senior South Australian orchidologist, who wrote (somewhat prophetically) in 1984, "*Monadenia bracteata* is not one of the world's spectacular orchids. The flowers are small and in a tight spike growing from an untidy rosette of grasslike leaves.

Perhaps its greatest asset is its eagerness to be on the move, get out, explore and colonise. If nothing else, it has used man to its advantage."

Post script

Jeff Jeanes (the author of *Orchids of Victoria*) recently advised me that *Monadenia* was found close to Melbourne last year - presumably escaped from local cultivation. So it has now entered that State from two different directions and is now a few hundred kilometres closer to New Zealand.

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Australasian hybrids

by Malcolm Campbell, Hamilton - a paper to be delivered by video at the Third Australasian Native Orchid Conference, Adelaide, September 1996.

Hybridisation between allied Australian and New Zealand genera is a subject which to date has had very little attention.

Australia has over 600 species, of which about 400 are terrestrial and covered by 52 genera, and 200 are epiphytes and covered by about 30 genera. Many hold considerable promise for hybridisers.

New Zealand on the other hand has only about 120 species, of which only eight are epiphytes, and of these only three really hold some promise for hybridisers.

To date only three hybrids where one parent is Australian and the other NZ have been registered in Sanders. The first was *Sarcomoanthus* (*Sran.*) Maungatapere in January/February 1992 by O Blumhardt of Whangarei. The second, *Sran* Emarcy Gem in August 1993 by MR Campbell (yes, that is me), and the third *Sran*. Little Sparkle by L Dougherty of Wellington in October 1995.

They all use *Drymoanthus adversus* as the pollen parent. The first uses *Sarcochilus fitzgeraldii* as the pod parent. The second uses *S. falcatus*.

NZ orchids have charm to offer. And we can make an infusion of cold tolerance, which can help make some of your warm growers from the north suitable for growing in the south. Six of our epiphytes grow as far south as Stewart Island, NZ.

There are several other hybrids in the pipeline using *Sarcochilus* as pod parents, some of which may flower in October or November 1996.



Sarcomoanthus Maungatapere



Sarcomoanthus Emarcy Gem

[*Sran*. Little Sparkle was illustrated in J59 - Ed.]

Following these I have made a start using *Drymoanthus flavus*, and crossed it with *Sarcochilus* Lois: this is still in the flask. I am not very knowledgeable on chromosomes but it is interesting to note that *D. flavus* has a count of $2n=38$ (MI Dawson and BPJ Molloy) and is regarded as a diploid with a base number of $x=19$. By comparison, the somatic number determined for *D. adversus* is $2n=4x=76$, a tetraploid (MI Dawson).

In the normal course of events, to make an easy cross you need both parents to have the same base number, and their gametes in the same order.

Here's a very basic exercise so you will understand what I have to say about the breeding on of these hybrids.

If the base number is 19, then that is $n=x=19$; this is called a haploid. A $2n=$ base, $19 \times 2 = 38$, is called a diploid. These represent the normal ploidy. However sometimes when we get to the $2n$ stage of counting we find that we have $2n=3x=57$, which is three times the base number and is called a triploid. Sometimes we get a count of $2n=4x=76$ and this is called a tetraploid. Triploids are mostly sterile and usually result from a cross between a diploid and a tetraploid. They will occasionally set a few seeds. Nature finds a way. Tetraploids are usually very fertile and strong growers.

Now that you are armed with this information I can tell you that *Sran*. Emarcy Gem breeds well when sibling crossed, and I also have plants in flask when used with *Plectorrhiza tridentata*. However *Sran* Maungatapere and *Sran*. Little Sparkle to date do not breed.

Other numbers of concern for this exercise are *Sarcochilus fitzgeraldii*

$2n=38$, diploid. *S. ceciliae* $2n=76$, tetraploid (Dawson & Molloy). As yet I do not have a count for *S. falcatus*.

Now you will begin to see a problem. *Sran*. Maungatapere (*Sarcochilus fitzgeraldii* a diploid crossed with *Drymoanthus adversus* a tetraploid) has a chromosome count of 57, a triploid, and is thus probably sterile. *Sran*. Emarcy Gem (*Sarcochilus ceciliae* a tetraploid crossed with *Drymoanthus adversus* also a tetraploid) not surprisingly has a count of $2n=76$, a tetraploid that should breed on. Until I can get a count for *Sarcochilus falcatus* I cannot explain why *Sran*. Little Sparkle won't breed, except to say that it is probably a triploid.

Certainly some triploids will produce a few plants and the odd one will breed quite well, a trait that can improve in future generations. A lot depends on the degree of homology in the relevant sets of gametes of both parents. A very small proportion of nuclear events leading to the production of gametes go "wrong" in one way or another, and these "wrong" gametes do sometimes result in a viable cross - thus an unreduced diploid can end up $2n$ instead of n , and in a cross with a tetraploid with its reduced $2n$ gametes can give a normal fertile tetraploid instead of a triploid. Individual chromosomes can be shed either during gamete production or in the formation of the zygote, which is the product of the fusion of two gametes, (or the unpaired chromosomes can get tucked into a micronucleus), and the end result is that very rarely, but sometimes, an "impossible" cross happens. Different approaches should be used to try and achieve difficult crosses where incompatibility is partly

related to nonmatching chromosome sets. Some F1 hybrids may be male sterile only. Reciprocal crosses and tests of pollen viability by vital staining should determine this.

What it boils down to is that theory is very useful in letting you know what is going on and in guiding you along profitable paths, but some of the science of plant breeding is in fact the art of doing the (almost) impossible.

The third of our epiphytes which has considerable potential is *Dendrobium cunninghamii*. I have crossed this with *D. Phil Dean* and the plants are very vigorous but could take a while to flower as *D. cunninghamii* is very slow to flower from seed. I hope the infusion of a *dendrocoryne* section *Dendrobium* will help both this problem and the fact that it is very difficult to transplant except when very small, and then they take forever to flower.

Chromosome numbers are

Dendrobium cunninghamii $2n=40$,

D. agrostophyllum $2n=38$,

D. falcorostrum $2n=?$,

D. kingianum $2n=38, 57$ or 76 ,

D. ruppianum $2n=38$,

D. tetragonum $2n=38$.

From this you can see that breeding with *Dendrobium cunninghamii* is, to say the least, going to be interesting, but we do know that combinations of these species do work, because at this stage we are aware of two other hybrids using it. One is with *D. agrostophyllum* done by Os. Blumhardt, and the other with *D. falcorostrum* done by John Creegan.

The following dates may be of interest.

D. cunninghamii x *D. Phil Dean*

pollinated 28 Dec 93

Pods flaked 28 Apr 94

deflaked 22 Sep 95

D. cunninghamii x *D. falcorostrum*

pollinated 2 Jan 91

flasked 8 May 91

deflaked 26 Oct 92

We can only guess at this stage what the chromosome numbers in these crosses are and whether they are going to be able to breed on. Some probable combinations are

A $2n=38$ x $2n=40$ = probably $2n=39$

A $2n=40$ x $2n=57$ = " $2n=48$ or 49

A $2n=40$ x $2n=76$ = " $2n=58$

If a 40 x 76 proves to be fertile, then the way to breed with *Dendrobium cunninghamii* is to select tetraploids available in species such as *D. kingianum*, or some of its hybrids which have produced accidental tetraploids instead of triploids.

There are, of course, plenty of other *Dendrobiums* which are $2n=40$, but they are in non-Australian sections such as *Latouria* in Papua New Guinea.

Now let's look at terrestrials. I think that they offer a lot of possibilities and although some Aussie x NZ have been made, none have been registered. A hybrid between *T. pulchella* and *Calochilus paludosus* has been made and flowered by Doug McCrae. *Pterostylis*, *Thelymitra* and *Orthoceras* probably offer our best bets. Allied genera for *Thelymitra* include *Calochilus*, and for *Orthoceras* include *Diuris*. Australasian hybrids within *Pterostylis* have been made but to date have not flowered, although some are growing well and could flower by September 1996.

To finish off, I'd like to say don't be put off by the chromosome problems: to be aware of them is half the battle and remember: nature can often find a way.

***Pterostylis puberula* - is it really so scarce?**

by P.J. de Lange, Northern Regional Science Group, Science & Research Division, Auckland Conservancy, Private Bag 68908, Newton, Auckland.

Introduction

The distribution and conservation status of *Pterostylis puberula* is briefly discussed by St George [1] This elusive species is now under serious threat of extinction; its decline has been dramatic, from a formerly widespread orchid of open clay ground, to one known from four sites containing fewer than 40 plants. This article serves to add some information to that presented by St George regarding the ecology and present distribution of *Pterostylis puberula* in the hope that it will result in further discoveries of what must be one of our most severely threatened native plants.

Distribution

Herbarium records that I have examined in AK, AKU, CANU, CHR, NZFRI and WELT indicate that *Pterostylis puberula* was formerly sporadically distributed from the Bay of Islands to Rangiriri in the Waikato; throughout the lower Coromandel Peninsula and Northern Kaimai Range; on Mayor Island, in the Wellington foothills and around Nelson. However collections from these areas are not morphologically uniform, and although it has recently been suggested that all New Zealand plants comprise a single endemic taxon, further careful study of the extremes may prove otherwise.

As of 1996 I know of three localities where *P. puberula* is extant: Great Island (Three Kings) - one plant [2], North Cape Scientific Reserve - c. 28-30 plants (P.J. de Lange *unpubl. data*), and Kauaeranga Valley - c. 7 plants (C. Ecroyd *pers. comm.* 1991; P.J. de Lange *unpubl. data*). The species has been reliably reported from the Billy Goat track, also in the Kauaeranga Valley (I St George *pers. comm.*); I have been unable to confirm the exact details of this site, or the number of

plants involved. Aside from these records, I have also received unconfirmed reports of its continued presence near Pipinui Point, Wellington (G. Park *pers. comm.*) and from "somewhere" in Nelson (S.P. Courtney *pers. comm.*). With the possible exception of North Cape, where the ferricrete soils retain a naturally low shrubland, none of the other extant populations are secure. The single plant I observed on Great Island in December 1995 is in an area where forest reversion will soon claim the last remaining suitably open ground [2], and the Kauaeranga Valley populations are on tracksides vulnerable to a myriad of threats not the least of which is botanists !

Ecology

Not surprisingly for such a scarce orchid, very little is known about its autecology. Herbarium specimens suggest that flowering in this species is usually well advanced by September, however observations of plants in the wild suggest that flowering may occur throughout spring and early summer. For example, the North Cape population was discovered in full flower by Lisa Forester and Gillian Crowcroft in early October. In 1992 I visited the Kauaeranga Valley population three times, in September - observing no plants, October - observing several young rosettes, and in early November, when some plants had started to develop buds. In cultivation a plant from this population studied by Dr Brian Molloy, flowered in December, and in isolation set abundant seed (B.P.J. Molloy *pers. comm.*). Therefore seed production in this species at least, is not hampered through the scarcity or lack of a suitable pollination vector [3].



← *Pterostylis puberula* at North Cape,
photographs by G. Crowcroft, 1990

The habitat requirements of *Pterostylis puberula* appear extremely specific. Within its former range herbarium records suggest the species to be primarily a plant of low gumland scrub, usually occupying the more open clay pans where it was often associated with other now scarce plants such as *Phylloglossum drummondii* and *Pterostylis tasmanica* [4]. However, it is also clear that roadside and trackside banks and cuttings were also favoured haunts. Some collections were also made from near gold mines, suggesting that in the past, habitats created by logging and mining could provide equally compatible ephemeral lodgings for this species.

Conservation Status

With the conversion of gumland scrub and other similar open habitats to farmland, forestry, or in the case of Auckland,

suburbia - *Pterostylis puberula* was virtually eliminated from 90% of its range by the early 1950s. Partly because of its scarcity and also the complexity of the Australian *P. nana* aggregate, New Zealand plants have not, until recently, been acknowledged as distinct from those found in Australia. For this reason and the observed poor performance of wild populations of *P. puberula*, the species (as *P. nana*) has been listed as a vagrant [3].

In 1995 Cameron *et al.*, as *Pterostylis nana*, listed *P. puberula* as "Critical", acknowledging then that the taxonomic status of this species was unresolved [4]. The classification "Critical" is the highest level of threat used by the Threatened Plant Committee, and is reserved for those taxa whose future survival in the wild is regarded as extremely uncertain without immediate management action. Clearly, with the benefit of recent taxonomic advances, it is now evident that *P. puberula* is an endemic species (BPJ Molloy *pers. comm.*). With this clarification of its level of nativity comes the problem of its conservation, and fundamental to this, is finding just how widespread it really is.

While plants from all four known sites will now become the focus of critical monitoring to refine our knowledge of this species' seasonal behaviour, it is also vital that we instigate a national survey to find further populations. In this regard the best



people poised to carry out this time consuming task are members of the New Zealand Native Orchid Group.

The Future

One problem about working with orchids is their ephemeral nature. It is simply not possible or cost effective for professional botanists to expend the hours necessary to undertake a comprehensive survey of all likely habitats. This is why so often it is amateur naturalists who discover new species or relocate those formerly believed to have been extinct. It is in this role that I am most hopeful that New Zealand Native Orchid Group members can assist us with determining the conservation requirements of this species. So when should you start looking for *Pterostylis puberula*?

What little is known about *Pterostylis puberula* suggests it is a naturally sparse species, occupying ephemeral habitats. In these sites plants are usually found in open ground often with minimal associated vegetation. Interestingly, and of possible assistance in locating plants is the fact that all three populations that I have seen of this species occur alongside plants of *Pterostylis tasmanica*. So checking on locations where *P. tasmanica* grows could be rewarding. It would appear that *Pterostylis puberula* becomes active in early spring and depending on local conditions plants have usually finished flowering by early December. All populations that I have seen suggest this species forms small colonies, through asexual reproduction of daughter tuberosities. When no-reproductive material is present the species can be identified by its distinctly "silvery green" foliage, and conspicuously puberulent petioles. A flowering specimen is brilliantly illustrated by Catherine Beard (cover page [1]) and this illustration depicts the distinctly puberulent and minutely rugose stems

from which the species takes its specific epithet. In the flowering specimens that I have seen, the galea is a distinctive green-gold colour, while the lateral sepals are distinctly clavate. This last feature is not evident in Beard's illustration primarily because her drawing was made from a damaged flower (C. Beard *pers. comm.*)

Should you be successful in locating plants, make sure to inform the nearest branch of the Department of Conservation, take photographs or sketch specimens and draw a sketch map of the site but - it should go without saying - **do not** collect specimens.

Acknowledgements

I would like to thank Brian Molloy for comments on the cultivated flowering behaviour and taxonomic status of *Pterostylis puberula*. The assistance I have received from the curator and staff of the following herbaria is also gratefully acknowledged: AK, AKU, CANU, CHR, NZFRI, WELT. Thanks also to Lisa Forester and Gillian Crowcroft for their company in the field at North Cape during October 1990, and for their subsequent discovery, during that trip, of the largest known population of *Pterostylis puberula* while my back was turned! Also to Chris Ecroyd for discovering the Webb Creek population of *Pterostylis puberula*, and providing me with detailed directions to help relocate this site. Geoff Park, Shannel Courtney and Catherine Beard have all at various times over the last six years provided useful comments on the distribution or morphological characteristics of this orchid.

References

1. St George, I. *Pterostylis* aff. *nana* (aka *P. puberula*). *New Zealand Native Orchid Group Journal* 1996; 59: 1-2
2. de Lange, P.J. Orchids of Great and South West Islands, Three Kings Island Group, Northern New Zealand. *Tane* 1996; 36 *In press*.
3. de Lange, P.J.; Molloy, B.P.J. 1995. Vagrancy within New Zealand threatened orchids: what are our conservation priorities? *New Zealand Botanical Society Newsletter* 40: 13-14
4. Cameron, E.K.; de Lange, P.J.; Given, D.R.; Johnson, P.N.; Ogle, C.C.: New Zealand Botanical Society Threatened and Local Plant Lists (1995 Revision). *New Zealand Botanical Society Newsletter* 1995; 39: 15-28

Notes



Val Smith snapped *Pterostylis tristis* at Mt Somers in January 1993. This is the species that had been confused with the Australian endemic *P. mutica* until Brian Molloy recognised that the NZ plant was different, and applied Colenso's old name, *P. tristis*. ➔

It differs from *P. aff. cycnocephala* in that the knob at the base of the labellum (see enlargement) of *P. tristis* does not bend forward; that of *P. aff. cycnocephala* does (illustration lower R) ↘



***Lyperanthus antarcticus* on Enderby Island:** Chris Hubbert wrote, "I had the very good fortune, on 27 January 1996, to spend the day ashore on Enderby Island, which lies at the northern end of the Auckland Islands group. I was one of about twenty who set out on what was meant to be a 'short walk' (but which for various reasons became a long walk with some serious bush-crashing at the end). We climbed up gently through the rata forest, the track threading through their bare twisted stems reaching to about ten or twenty feet high, many of the trees growing richly with red blossom atop the canopy. After twenty or thirty minutes we emerged on a cushion-bog plateau which was probably only about 500 feet above sea level. The plateau surface was very uneven, covered with bright green cushion-like plants up to a foot high, so thick together that you could walk on them.. Many other little plants and flowers were scattered among these cushions.. The surface was soft and yielding, springy, not wet and squishy as you would expect from a 'bog'.

"As we paused to regroup, we particularly noticed some clumps of little gentians. Some were white with a touch of pink, others deep rose with touches of white. "I saw several clumps about thirty feet away from the group and thought they



↑
Pterostylis tristis
photographs by Val Smith
↓



would be easier to photograph than those nearby so moved towards them.

But I didn't reach them! As I walked my eye suddenly spotted something a little different, and I moved to investigate. What I saw and photographed was a small group of what I thought at the time were greenhood orchids, *Pterostylis*.

"Back home, comparing my photos with those in Johns & Molloy's book, I have learned that what I found by chance was a different orchid, *Lyperanthus antarcticus*

"The plants I saw were about eight inches tall and generally had one leaf per flowering stem. A small clump with three stems bore three flowers per stem. The red-brown stripy markings on the upper surface of the hoods were quite strong in colour. Close by were several dry stalks bearing seedheads, perhaps from the previous season.

"Possibly I can be forgiven for initially thinking these plants were *Pterostylis*. They do at first glance look a little like *P. montana*, especially when you do not have any reference books with you.

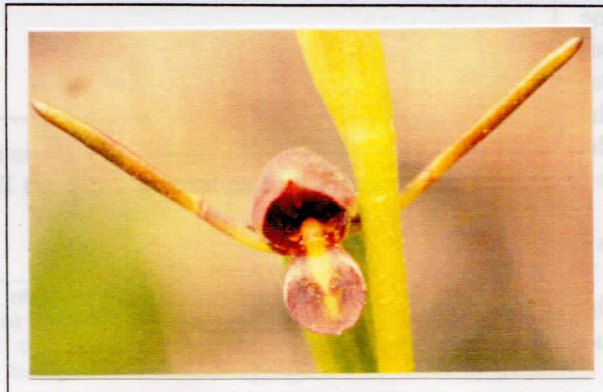
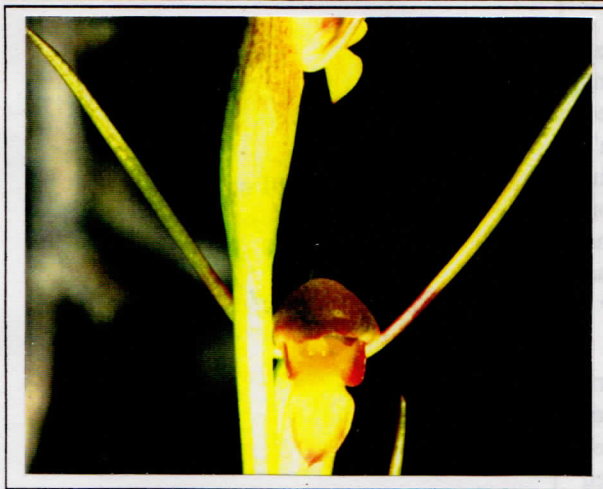
"I understand there are two other native orchid species to be found on Enderby. Some day I hope to be able to return to look for them."



Lyperanthus antarcticus at Enderby Island
photographed by Chris Hubbert.



Bob Goodger wrote, "In *J59* p21 Garry Guide commented on *Orthoceras* with pointed labella (*O. strictum*), and those with round labella (*Orthoceras novae-zeelandiae*). Of 26 slides of *Orthoceras* in my collection, 24 have pointed labella, one is intermediate, and one has a rounded lip. Another variation is the length of the bract behind the flower - some are short and some long." →→



Different N.Z. forms of *Orthoceras* photographed by Bob Goodger:

- ↖ Top left: pointed labellum;
- ↗ midleft: intermediate labellum;
- ↙ lower left: rounded labellum;
- ↑ above right: long bracts.

Bob Goodger continued, "In January 1995 we went up the Tuhua to check on *Earina mucronata*. We found twelve clumps flowering. They were variable, with short leaf stems at 10cm, to long leaf stems at over a metre. The flowers also varied from quite big pale ones to very small with bright orange lips, with intermediate forms. So much for *E. aestivalis*."

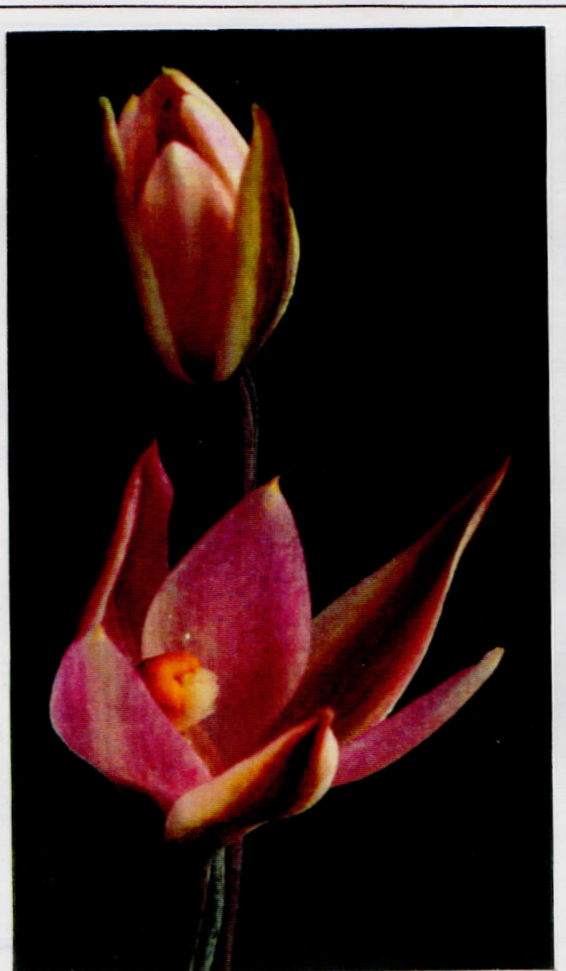


Beryl Goodger wrote, "We were intrigued to see *Thelymitra* "Whakapapa" with some plants still in flower down at Ruapehu on Anzac Day. I guess the long hot summer had something to do with that." → →

OOPS! Graeme Bradburn pointed out that the Archer drawing from *Flora Tasmania* (J59 p2) labelled *Pterostylis nana* is not one of the *P. nana* complex but is probably *P. pedunculata*. I blame W. Archer the artist or W.H. Fitch the engraver, whoever did the labels - Ed.



The Orchadian is the journal of the Australasian Native Orchid Society, a high quality publication, published quarterly, full of material of interest to native orchid

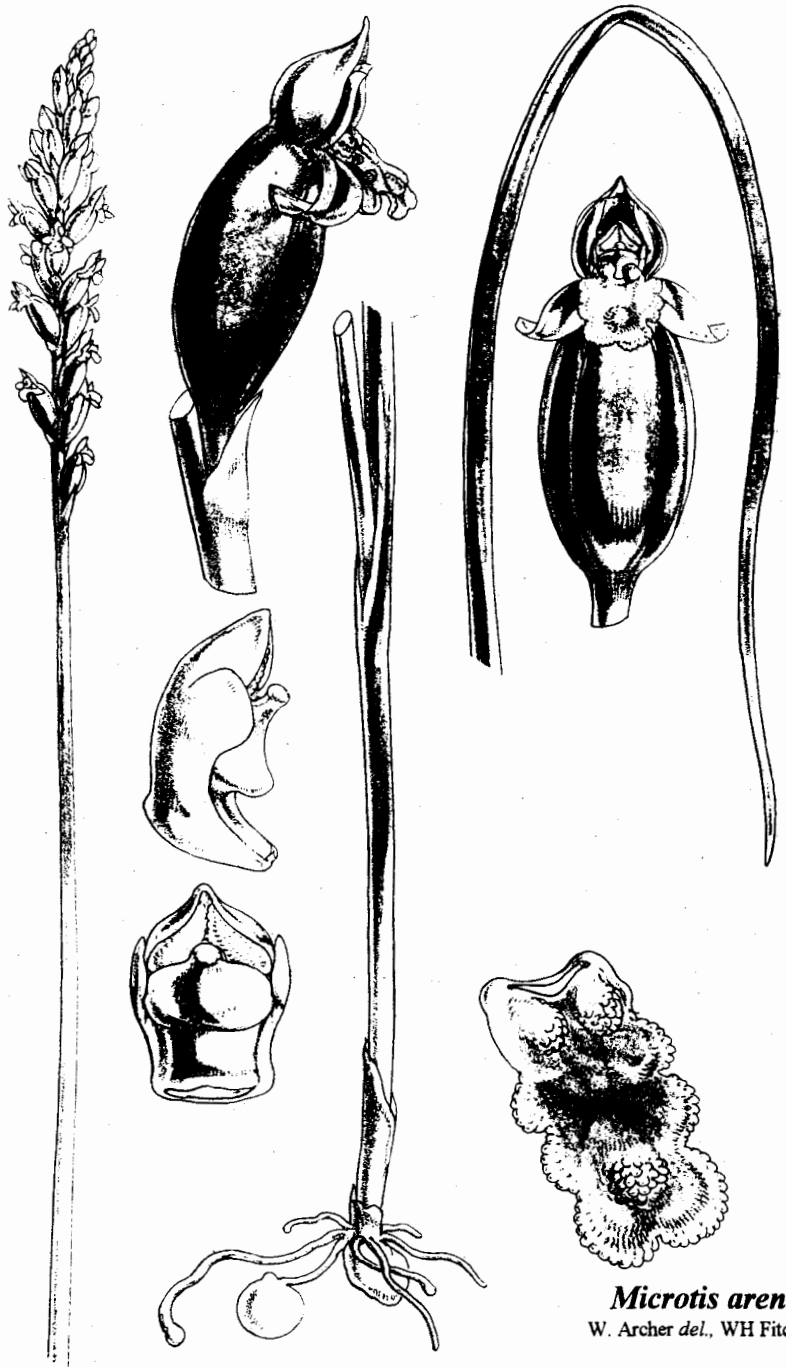


Thelymitra "Whakapapa"
photographed 100m from the Chateau

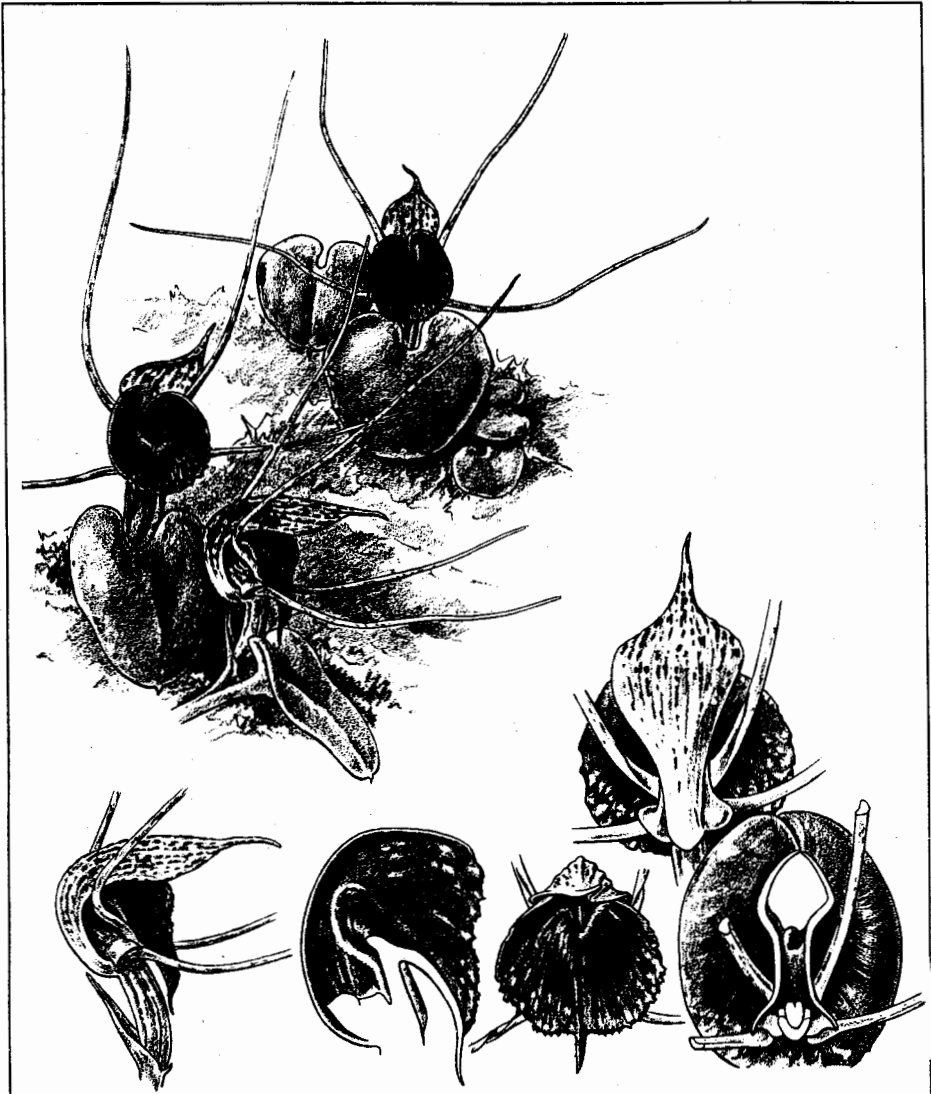
enthusiasts. The annual subscription is A\$30 - write to ANOS Inc, GPO Box 978, Sydney NSW 2001, Australia.



Microtis arenaria was drawn by W. Archer and engraved by WH Fitch for JD Hooker's *Flora Tasmania* in 1860. The copy opposite has been cut and pasted. →

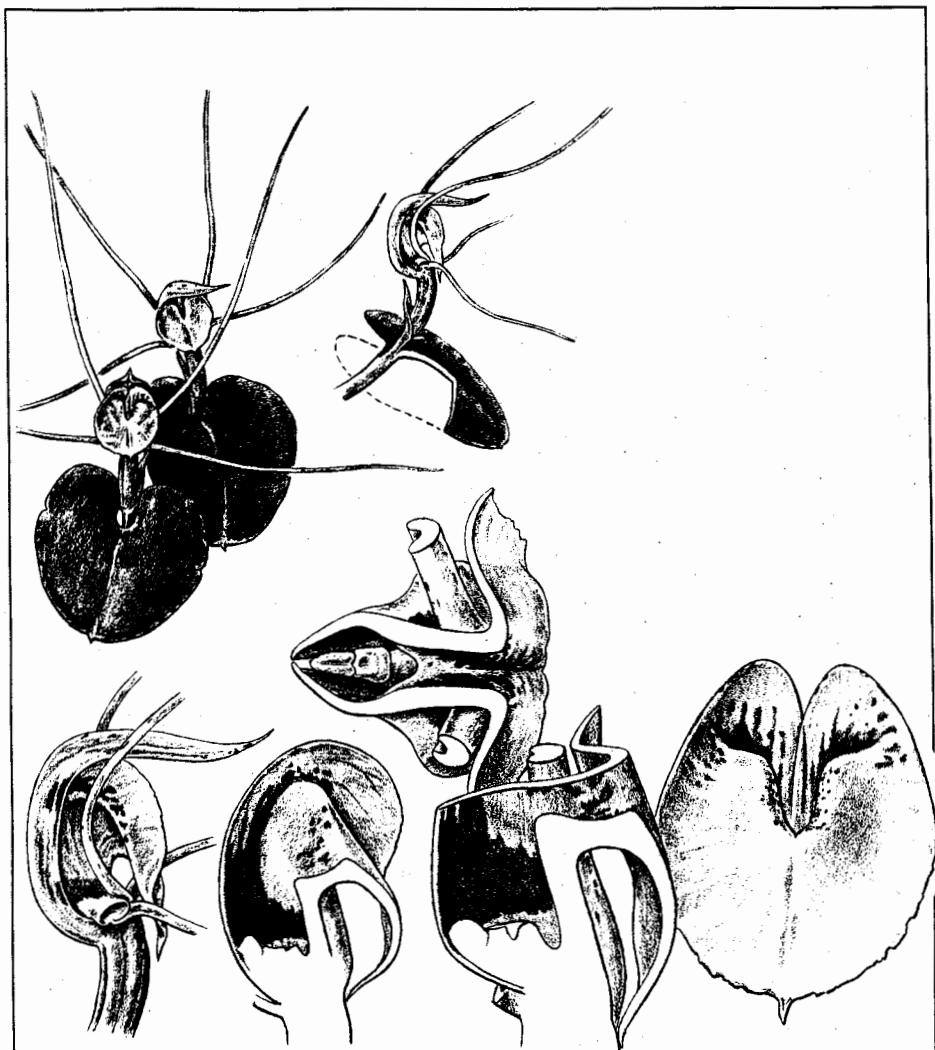


Microtis arenaria
W. Archer del., WH Fitch lith.



***Corybas iridescens* Irwin & Molloy**, drawn by Bruce Irwin.

Leaf usually obviously stalked, often blotched purple on upper surface. Flower large, dark red almost to black. Dorsal sepal greenish with raised purple streaks. Labellum very sharply deflexed, flaring widely and with a beadlike callus at the entrance to the column cavity. Flowers August-October.



***Corybas papa* Irwin & Molloy**, drawn by Bruce Irwin.

Leaf strictly sessile. Flower predominantly green. Labellum compressed front to rear, its apex rounded, but with an inconspicuous apiculus. Petals project forward and outward. Flowers August-September.



Peter de Lange wrote (18 June, of *Corybas carsei*), "We achieved a massive flowering last year but absolutely no seed set, in the insect-proof cages or controls. It would appear that the orchid can be made to flower in the second season following a 'wet burn' - although the impact of a wet and frost-free winter makes conclusive statements on this fire research project, at this early stage, difficult. After all the orchid may simply have flowered because the plants were not burned off by frost and the wetter than usual conditions of last winter prevented serious cricket browse."



Corybas carsei - photo Bob Goodger



A member writes that there have been oral and written complaints about the activities of members of the Group. The activities, persons and places complained of were not listed so it is difficult to know how to respond, but

one suggestion is that we should at least have a **code of ethical conduct** to guide us. I agree. Here, as a start, is a list based roughly on the Wellington Botanical Society's code of conduct, with help from a paper by Norton, Lord, Given and de Lange [Over-collecting: an overlooked factor in the decline of plant taxa. *Taxon* 1994; 43 (May): 181-5]. Please consider the code carefully, and send comments to the editor on your subscription form. A final version will be based on your response.

1. **Regard the orchid tuber as sacred** and leave it undisturbed.
2. **Don't take specimens** of any native plant from a Protected Natural Area without official permission
3. **Take only photographs** if a plant is scarce in a locality. If you need a specimen for identification, take the minimum — don't take the whole plant unless there are more than twenty; don't take more than 5% of any one plant; don't take flowers or fruit if there are few present; don't take duplicates.
4. **Preserve the habitat** of all native plants: don't compact soil or trample swamp, don't damage shoots and branches; don't "garden" before taking photographs and do replace shelter if you have bent surrounding vegetation away.
5. **Take care who you tell** about the whereabouts of a rare plant, and don't take big groups to visit. Do tell the conservation people if you find a new site for a rare plant.

6. **Make sure you know whether it can be grown**, and if so what its requirements are, before you take even a "common" native orchid for cultivation; where possible use seeds.
7. **Don't introduce any plant** into wild habitat without proper authority.
8. **Respect the rights and wishes** of landowners and those of conservation people who ask you not to visit a site at certain times.
9. **Make little impact on the environment**; dispose of rubbish responsibly.



Taxonomic news (and views)

Finn N. Rasmussen of the Botanical Laboratory, University of Copenhagen, wrote to the Orchid List Digest on the Internet recently that the Green Plant Phylogeny Research Coordination Group (in the U.S.) "proposes to develop a huge data matrix, planned to be presented at the international Botanical Congress in Missouri in 1999. The data are intended for cladistic analyses, the result of which are phylogenies. Phylogenetic hypotheses can of course eventually be used as bases for classifications, but this can be done in many ways....

"Splitters, egocentrics and taxonomists with very deviating views will get even more data to work with. Most of these people are in fact professional biologists at highly esteemed institutions, and they do publish their (sometimes bizarre) suggestions in peer reviewed journals. The review process may catch formal errors when a new

taxon is proposed, but a reviewer is not a censor. A taxonomist holding the view that all slipper orchids should be treated as one genus is free to publish his views, and so is the one who prefers *Paphiopedilum* split up into 17 different genera. There will always be a peer-reviewed journal that is willing to print such views."



The fifteenth of July of this wet winter found me on Middle Ridge track in the Rimutaka Forest Park, where *Pterostylis trullifolia* and *P. alobula* were in full flower, *Acianthus sinclairii* was in early flower, and *Corybas cheesemani* was almost over. Two weeks later John Sawyer sent me typical *Corybas trilobus* from near Levin.



Bob Talbot writes that there is to be no **Taranaki Corybas Crawl** this year. Instead there will be a field trip between Christmas and New Year to look at the Taranaki orchids of that season. Still interested? contact Bob Talbot on 06 7553380.



A catalogue from the Australian company Horden House **Rare Books** Pty Ltd included for sale a full set of *Banks' Florilegium*, available in 1987 for NZ\$50,000; now back on the market at \$275,000. In the same catalogue J. Smith and J. Sowerby's *Exotic botany* (1804) (showing in the illustration overleaf just how different *Thelymitra ixioides* is from our *T. aff. ixioides*) is available at A\$8000. →



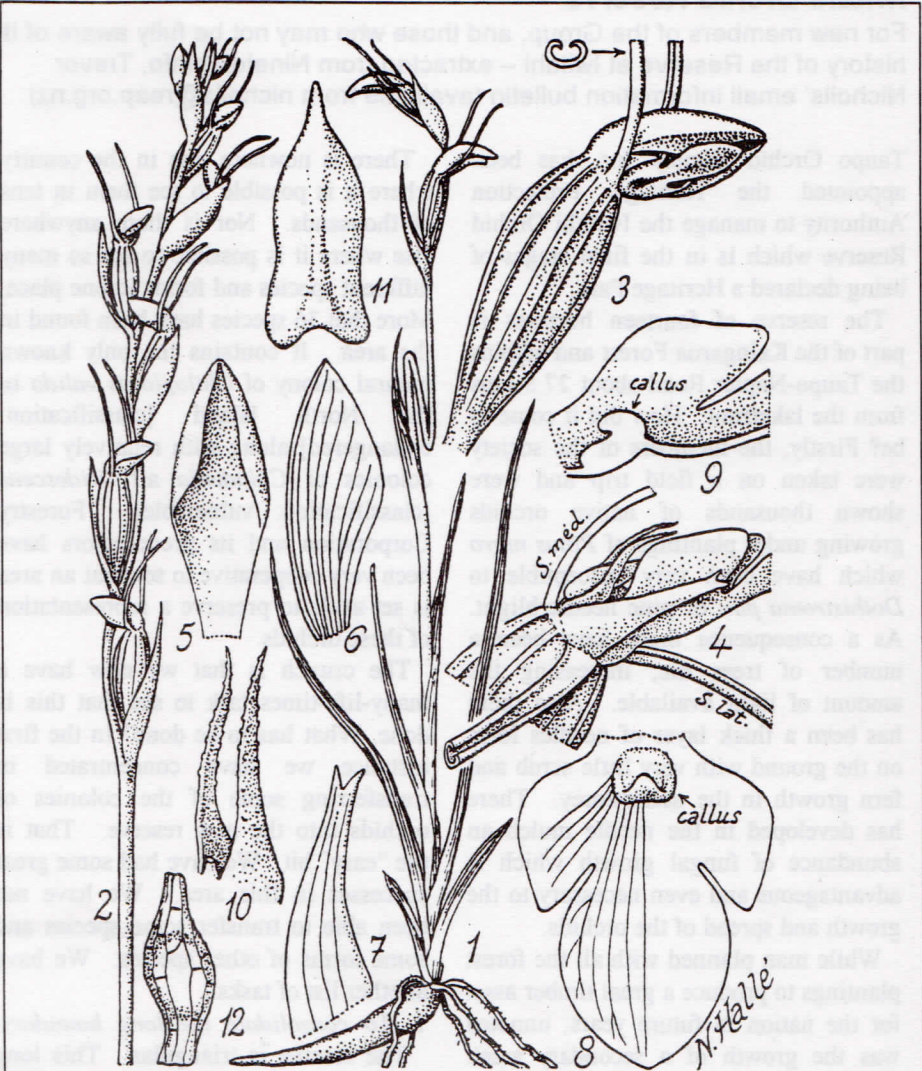
Smith & Sowerby's *Exotic botany* 1804 (Hordern House catalogue for July 1996).
The illustration is *Thelymitra ixioides*, from New South Wales

Iwitahi 97



The date for the annual field-days and conference is 9-12 Jan.
It just may be our last chance to collect, shift and admire. We plan an informal Thursday evening, Friday and Saturday in the Reserve, brief formal presentations for the Saturday evening, and break up on Sunday for private forays to distant points. Watch for full details in the December *Journal*; meantime start editing that talk/slideshow/video.

Close relations: orchids like ours



Orthoceras strictum in New Caledonia - line drawing by Nicolas Hallé, from his *Flore de la Nouvelle Calédonie et Dependances*. 8: Orchidales. Paris, Museum Nationale d'Histoire Naturelle, 1977.

Nina's news

Iwitahi Orchid Reserve

For new members of the Group, and those who may not be fully aware of the history of the Reserve at Iwitahi – extracted from Ninatorchinfo, Trevor Nicholls' email information bulletin (available from nicholls@reap.org.nz)

Taupo Orchid Society Inc. has been appointed the Heritage Protection Authority to manage the Iwitahi Orchid Reserve which is in the final stages of being declared a Heritage Park.

The reserve of fourteen hectares is part of the Kaingaroa Forest and adjoins the Taupo-Napier Road about 27.5 kms from the lakefront. How did it come to be? Firstly, the members of the society were taken on a field trip and were shown thousands of native orchids growing under plantings of *Pinus nigra* which have been very susceptible to *Dothistroma pini* or pine needle blight. As a consequence there have been a number of trees die, increasing the amount of light available. Also there has been a thick layer of needles form on the ground with very little scrub and fern growth in the understorey. There has developed in the needle mulch an abundance of fungal growth which is advantageous and even necessary to the growth and spread of the orchids.

While man planned with all the forest plantings to produce a great timber asset for the nation in future years, unnoted was the growth of a secondary asset. The native orchids which have spread and multiplied in unprecedented numbers.

There is nowhere else in the country where it is possible to see them in tens of thousands. Nor is there anywhere else where it is possible to see so many different species and forms in one place. More that 36 species have been found in the area. It contains the only known natural colony of *Chiloglottis valida* in the North Island [classification: endangered] along with relatively large colonies of *Caladenia* aff. *iridescens* [classification: vulnerable]. Forestry Corporation and its predecessors have been very cooperative to see that an area is set aside to preserve a representation of these orchids.

The crunch is that we now have a many-life-times task to see that this is done. What has to be done? In the first instance we have concentrated in transferring some of the colonies of orchids into the new reserve. That is the “easy” bit. We have had some great successes in this area. We have not been able to transfer some species and some forms of other species. We have another list of tasks.

1. *To consolidate the long boundary.* The reserve is triangular. This long boundary will be vulnerable when the adjoining trees are harvested. This work is well in hand with the planting of natives under the adjoining trees,

along with a double row of Douglas fir. Still to be done is the planting of *Pinus nigra* along this line.

2. *Forest renewal.* The trees in the reserve were planted in 1930 and have passed their optimum. They need to be replaced in an ongoing programme. To maintain the gene stock we are transferring seedlings collected from the forest edge. We also hope to collect the cones at the appropriate time and then persuade one of the forestry nurseries to grow them for us (prospects good!) We have made a reasonable start on this programme using the services of the Periodic Detention Centre.
3. *Understorey.* This must be controlled so the orchids are not crowded out.

Unsolicited [?] help

Wherever I go, I will without much prompting talk about the Reserve and the orchids. The outcome is that we have about forty members of the Alpine Sports Club coming to work for a weekend in November. This group from Auckland have made a point of being irregularly involved in this type of activity for many years. A second group which is considering coming to help is the Supporters of Tiritiri Matangi.

The Heritage Park

I am in the midst of preparing material for Forestry Corporation who will be making the submission on our behalf to the Taupo District Council for the reserve to be formally and finally designated a Heritage Park.

Chiloglottis valida

Fraser Broom writes: "The *C. valida* seed appears to have embryos present in all or nearly all seeds. Whether these can be made to grow may be another story. Andrew Paget in Melbourne, who has germinated a wide range of seed, has not, to my knowledge, had any success with *Chiloglottis* to date.

A tale peice that wags the dog

Yes we are still here. No we are not covered in ash. Around 9 o'clock on Monday morning (18 June) I arrived home from my daily constitutional. It looked as if we were going to have a granddaddy of a thunder storm. The sky at the southern end of the lake was jet black. I was told that Mt Ruapehu had erupted and that the ash cloud was coming our way. Weird. The sky was split in two. Overhead was a clear blue sky and to the west black. The dividing line was as distinct as if someone had gone along with a roadmarker. Those under the cloud had 2-3mm of ash fall on their property. By all reports not very pleasant but nothing like the doing over they got in Rotorua and Te Puke. Basically it has not had time to come down again by the time it is passing over us. I had a tray of about 45cmx90cm outside. It would have had enough ash to equal a level teaspoonful. Since then the ash clouds have gone elsewhere. When Ruapehu did its thing ten months ago we did get one light dusting and that was all.

Orchid photographer

Bob Goodger

Bob Goodger lived in Auckland until two years after he married Beryl. With a young baby, and housing at a premium, they moved to Taranaki where he worked on a farm at Tahora for two years before moving to Tauranga where they have been ever since.

A diesel fuel injection engineer by trade, he became an office machine mechanic, a fitter with the power board, then a professional woodcarver (of furniture) after being a hobby painter, sculptor and carver. He joined the local photographic society after being invited to talk to them about wood.

Bob and Beryl became interested in orchids in 1978 and joined the Bay of Plenty Orchid Society and were foundation members of the Tauranga Orchid Society. They soon found an interest in NZ native orchids and started looking for them in the bush. They met Bruce Irwin after he moved to Tauranga and soon joined forces on expeditions.

From the beginning Bob started photographing the orchids they found, using the equipment he had available, gradually adding a few refinements such as a macro lens. Being a "Mr Fix-it" he soon jacked up a home-made system of flashes which he still uses. He also made his own light-box as he takes mainly slides.

He now has slides of 96 species of NZ orchids, taken from Cape Reinga to Stewart Island. He has a slide programme which they have shared with individuals and groups over a wide area - orchid societies, Forest & Bird, tramping clubs, Lyceum and garden clubs; another programme is in the OCNZ Slide Library.

For about four years his photographs of native orchids appeared on the back covers of *Orchids in New Zealand*, and a number of his pictures of exotic orchids were used as well. He was invited to address an OCNZ judging seminar on "Photographing orchids for awards" and this was later published as articles in *ONZ*.

Each year at the Tauranga Orchid Society display he features fifty slides of natives in a light box, creating and fostering a lot of interest.

Bob specialises in natural history photography at club level (not just orchids) and has had some success at national and trans-tasman level.

Now he has retired, health problems have interfered somewhat with orchid outings but the interest remains and they take opportunities when possible to go out. There are a couple of places in the Kaimais that are easily accessible and still very rewarding.



Calochilus paludosus with a pale lip - photograph by Bob Goodger

Historical reprint

Henry Blencoe Matthews's "Caladenia calliniger"

Caladenia calliniger
calliniger

(Black lip - Gleneden 17/10/18)
Gleneden

Slender 10-25 C.M. high with a reddish stem moderately hairy. Leaf dark green 10-16 C.M. long, narrow linear to 3 m.m. wide, acuminate with a few distant hairs. Flower 1-2, of a greenish-brown colour, more or less speckled and shaded with magenta or maroon, the ovary and outside of the segments covered with short glandular hairs. Perianth segments free, spreading except the dorsal sepal. Dorsal sepal 8 m.m. long (when extended) falcate, dilated and costate from about the middle, emarginate, apiculate and concave projecting over the lateral lobes of the labellum. Lateral sepals, ^{nearly} 10 m.m. long, oblong acute 2 nerved, the outer edge slightly incurved. Petals about the same length, almost falcate, linear-lanceolate, narrower than the sepals, with the point usually curved. Labellum 3 lobed, set on an irritabile claw, about 7 m.m. long (extended) shortly erect at the base portion, the lateral lobes oblong with a rising curve, round anteriorly and descending to the middle lobe; margins entire. Anterior lobe lanceolate, reflexed about the middle, the margins with linear calli, increasing in length from near the point to the junction with the lateral lobes. Lamina with 2 rows of stalked club-headed calli between the lateral lobes, then more or less crowded with fig-shaped calli to near the point. The anterior lobe and all the calli, dark maroon or nearly black, the posterior portion and column blotched with magenta markings. Column about 5 m.m. high incurved with rather wide wings almost embracing the lower part of the anther and pollinia with a gland at the base. Anther yellowish green with an acute point. Stigma prominent below the top of the wings.

H. B. Matthews / Kennedy Bay, Gleneden H. Carr H. B. Matthews
8.2.18
Oct 15. to Nov.

HB Matthews (1861-1934) was the son of the botanical collector, RH Matthews of Kaitaia, and he also collected for Cheeseman. He wrote in longhand, but never published, descriptions of north Auckland orchids. The work was given by Matthews to Ross McKenzie and later returned to Kaitaia. Doug McCrae handed it to Dan Hatch in 1987.

About half of the seventeen descriptions can be recognised as

species known by other valid names.

One is of particular interest, and that is the New Zealand species similar to the Australian *Caladenia iridescens*; we know it now as *Caladenia* aff. *iridescens*. It has some structural differences from the Australian plant, as Doug McCrae pointed out in 1988 [NZNOG Newsletter 1988; 25: 11-12] — the Australian plant has four rows of calli, the NZ plant two, for instance.

Australian notes

Bob Bates on the *Prasophyllums* in South Australia (NOSSA Journal 1996; 20)

"The genus *Prasophyllum*, the leek orchid, has been well studied in South Australia and there are now about twice as many accepted species as there were twenty years ago....

"Some, such as the coastal form of *P. odoratum*, are well understood and would have been named by now if finances had allowed publication to go ahead. Others such as the many apomictic variations of *P. fitzgeraldii* may never be officially given names. The most difficult complex of all is the *P. patens* group of outcrossing, white, attractive-flowered species. Twenty years ago the name *P. patens* applied to all the forms; now *P. patens* is not even accepted as occurring in SA! Species occurring in SA which used to be called *P. patens* include *P. odoratum*, *P. pruinatum* (Mt Lofty range endemic), *P. spicatum* (rare swamp heath species) and *P. 'carnosum'*, the manuscript name for the coastal plants with dense spikes of leathery flowers.

"The question might be asked, 'How do we know this last species is not just a form of *P. odoratum*?' The indicators include

1. Constantly differing flower shape (*P. 'carnosum'* has a short erect labellum compared to the reflexed one of *P. odoratum*),
2. The dense flower spikes and leathery texture of the flowers of *P. 'carnosum'*,
3. The different flowering time and fragrance,
4. The clumping habit,
5. The fact that *P. odoratum* actually grows with *P. 'carnosum'* at some sites.

"*P. odoratum* remains the name for plants from such diverse habitats as semi-arid sand dunes inland, sheet limestone and waterholes in the southeast; and with flowering times ranging from August to February. So there is work to be done yet in sorting out the species."

Small *Caladenias* in South Australia

Bob Bates reported (NOSSA *Journal*) "... the occurrence of at least five small self-pollinating species of the *Caladenia carnea/minor* complex in the Mt Lofty/Kangaroo Island area was confirmed".

Fire orchids

Jeff Jeanes reported (ANOS Victorian Group Bulletin 1996 [April]: 14) that David Jones and Mark Clements (*Phytologia* 1994; 77 [6]) had placed *Lyperanthus nigricans* and *Lyperanthus forrestii* in a new genus *Pyrorchis*. The Type species of *Lyperanthus* is *L. suaveolens*, and *Pyrorchis nigricans* "differ(s) significantly in such features as leaf characteristics, mycorrhizal associations and response to fire".

[NZ's *L. antarcticus* is unlikely to be a member of either genus Ed.]

More on fires and flowers

Winsome and Les McHugh wrote [NOSSA *Journal* 1996; 20 (4): 36, and (5): 46] on Western Australian growers' methods for stimulating flowering in terrestrials.

Burning pots. Pots are buried one inch below the soil surface and covered with a couple of inches of pine needles. This keeps the tubers cool and (stops them) from drying out. During February/March the needles are burned; the pots are dug up after the first rain - close to what happens in the bush.

Fire water. Smoke from leaf litter is bubbled through water forming a soup of ash and dissolved gasses. The water is then poured onto pots. Two months after a scrub fire the area still smelled of

smoke, but after a rain the smell had gone - where? "Well washed into the soil of course. Could this washing in be as critical as the fire itself and are the mycorrhizal fungi stimulated?"... King's Park of Western Australia are selling fire water by the bottle (rather expensively too!)....

Bee smoker. Leaf litter smoke applied directly over tubers.

"Against all I've written are we trying to make them flower too much? We all would love to have big pots full of flowers each year but I think we are asking too much. Scrub burnt hot takes years to recover and years to build up enough vegetation to support another hot fire... Do we have to give orchids a break?"

Monadenia around Adelaide

Ann Prescott wrote [NOSSA *Journal* 1996; 20 (4): 37-9], "I did not see a single plant of *Monadenia bracteata* in the wild during the mid 1980s. The first Herbarium record was lodged in 1988.... [Since then] the following numbers of plants have been dug or pulled. In the 1993 season 55267, in 1994 51522, in 1995 81928. In 1995-6 over 500000 plants were dug, pulled or sprayed in the Adelaide Hills.... Let us assume that the fight for total eradication of *Monadenia bracteata* before it becomes established in South Australia has been lost". "An example of how fast the plant reproduces is, where Arlene and John Thompson found one plant in 1988, they dug 13,000 in 1995" (in Scott Creek near Adelaide). [*Ibid.* 20 (5): 49]."

A flower personality

The West Australian Native Orchid Study and Conservation Group's *Bulletin* recently reprinted this stylistically lush piece. It appeared first in an Adelaide paper of about 1914.

The cult of the orchid

The gnat was intoxicated - drunk! It had enjoyed too long the seductive hospitality of the spider orchid, and was loath to rise from the banquet table. There he lay - a shockingly minute example of over indulgence. But the gnat was not altogether to blame.

When the little Bohemian flew into that delicate fragrant room it was probably with the intention of having a 'nip' and going out again like a respectable insect. But the orchid had good reasons for detaining its gay visitor. It was going to get the gnat drunk, and make him stay longer. Why? This is why. The orchid wanted the gnat to work for it, a sort of *quid pro quo*. As a matter of fact, the orchid trapped the gnat. First it enticed, and then imprisoned him. The exit was barred by a wonderful system of tiny entanglements. The orchid has a spiteful tongue. Near the point where its hinge is attached to the column there is an apparatus like a watch spring, and the slightest weight on this appendage causes it to fly up. The gnat got in alright, and, having made merry, it wanted to get out. There was no escape by the entrance because the tongue had blocked that. So the front was a dead end, and behind was the impenetrable face of the column. The only way the embarrassed insect could leave was exactly the way the orchid desired it should leave - at the proper time. This was to crawl up between the two shadowy wings, which looked like the blades of hatchets, attached to the upper part of the column.

The orchid's victory

There was a reason for this. At the back there was a fairly wide space between these blades. The front edges were pretty close together, but had cunningly devised hairs which turned inwards and prevented the gnat from negotiating that particular passage. It, therefore, continued to climb towards the anther that closed the space like the lid of a box. The anther had a small hinge at the back and as the insect pressed against it it gradually opened. Then the prisoner was free! In the long and rather complex process of reaching daylight again the gnat seemed to have become a perfect gentleman once more. Under a microscope you might have discerned a cynical smile on his face as he flew off - a smile of victory over

heavy odds. But the orchid had the last laugh. Its perky guest, unconsciously, had done it a good turn. While forcing past the anther the gnat had lifted some of the pollen. By-and-by, allured to the hair of another flower, it was imprisoned again, and smeared this pollen on the stigma. That was fertilisation.

The safety valve

Do you wonder, then, at Dr. R. S. Rogers taking the orchid as his life's baby? I don't. It is a study of infinite appeal. After all, you know, every professional man, to a large extent, is a Dr. Jeckyl and a Mr Hyde. I mean he is something in addition to what the general public sees or knows. A hobby is half of life, and represents its devotee in quite another personality, although unostentatious and often reclusive. I never think of Dr. Rogers unless I also think of orchids. And, similarly, keeping the analogy in the realm of physicians, I always associate spiders with Dr. Pulleine, shells and molluscs with Dr. Verco, and blackfellows with Dr. Ramsay Smith. The world would be a prosaic and monotonous thing if we saw it always as a real and serious business, without comparison, without versatility. Variety is the sharp, intimate colour which, introduced into life's great canvas, gives it contrast and balance and interest. Students who are taking a heavy science course at a university frequently resort to the perusal of trashy novels. It looks silly, but it is perfectly pardonable. What a dull round of duties school would be to the youngsters if it were not for the tops and marbles and match brands! It is much the same when we grow up.

The most cosmopolitan flower

After a chat with Dr. Rogers you love the orchid. He makes you understand its personality. Most people think of an orchid as merely something that Mr Chamberlain wears in his coat - or did when he was in politics. There is the hazy idea, too, that it is the particular flower that has won the heart of stern Kitchener of Khartoum. We recall its spidery picturesqueness and strange beauty, and remember the shy colours that have peeped up at us from a field that had seemed destitute of any floral charm. It is

through a superficial acquaintance that the orchid is misunderstood. Listen to the tribute of the enthusiast. "The orchid" says Dr. Rogers, "is the most cosmopolitan flower in the world. It extends even into the arctic regions. and is an object of worship by certain savage tribes who regard the flower as sacred. The personality of the orchid is more versatile than any other plant. Once you are attracted by its habit and characteristics and development, the study is positively absorbing.

All over the world

I asked Dr. Rogers how South Australia stood in the list of orchid countries. There is no genus found exclusively here. Ten of our types have a wide climatic range, and extend into the Australian tropics; eight are peculiar to Australia; eleven are represented in New Zealand; seven are in New Caledonia, the Malay or Eastern Archipelago or the East Indies; one reaches southern China; and one is a cosmopolitan flower found in many temperate and tropical regions of the globe. "The distribution of the order," remarked Dr. Rogers, "is apparently very much governed by the average rainfall. A ten inch record would appear to provide the minimum amount of moisture necessary for the maintenance of these plants. The boundary lies a little to the north of Goyder's line. Beyond this no orchids have been found. It will thus be seen that their distribution occupies a comparatively small portion of this large State, and is chiefly coastal in character. So far 100 species have been discovered in South Australia, but we are always finding them. Not more than half of those we have catalogued have grown over 100 miles north of Adelaide.

Study in the open air

Dr. Rogers has his collectors all over Australia. Some of the best of them are school children, in whom he has instilled a love for this flower of remarkable personality. They have helped him to discover new species. Mrs Rogers is a victim of the orchid fever, and her husband finds her a splendid patient. They go out into the fields together. That's the great merit of this hobby - it is the delectable pastime of the open air and the sunshine. "The fact that the study of the orchid took me into the country," remarked Dr. Rogers, "was largely what captured my interest. Don't you see! You combine the instinct of the hunter with the expectation of the gambler! You never know when you may stumble on a new and beautiful species. Some days, I suppose, Mrs Rogers

and I walk 30 miles. For the collector, not only keen vision but a keen sense of smell is necessary on these exploratory expeditions." "It seems then, you need the orchid nose, as well as the orchid eye." "Well, in a country where it is commonly reported that the flowers are without scent, it is interesting to note that in the case of our orchids the statement cannot be substantiated. There are species where the perfume is sufficiently marked to reveal their presence in the field before they have been observed by the eye of the collector. There is one rare little orchid, with rather diminutive flowers, of common colour. It does not grow in communities; yet on warm days the powerful magnolia-like odour of one such small plant will perfume the air for many yards from the spot in which it is growing.

Wonderful mechanism

Nature has given the orchid an elaborate mechanism for fertilisation. The story I have told about the gnat is merely one function of that complex and delicate system. Darwin did not believe that self-pollination ever occurred in orchids, so Dr. Rogers explained to me. His idea was that the process was effected by the intervention of insects. The study of Australian orchids shows that Darwin was only partially correct. We have many instances where fertilisation has taken place long before the flower has opened or has reached maturity. In every South Australian species most careful provision is made to ensure its survival and progress. There is sometimes furnished an apparatus that will enable it to become cross-fertilised by insects, but, in their absence, there is the capacity for self-fertilisation. But should both of these fail, the orchid still has the power of what is known as propagation by vegetative methods - a root system almost similar to that of the potato.

Knows them all by name

The orchid has wonders of which many people have never dreamed. Dr. Rogers opens for you a door to a romantic study. His enthusiasm must be a delightful thing to experience. It is full of tenderness and intelligence and authority. Nowadays we crown either extensive ownership or knowledge with a royal designation. The man who has it is a king of some sort or the other. I am sure that Dr. Rogers makes no pretence to be the Orchid King of Australia, but if he should do so, I fancy the claim would have to be admitted. He is in the intimate confidence of the whole of the members of the orchid family, which is one of the largest in the vegetable kingdom. Dr.

Rogers calls them by name, and they converse with him. After a little practice you become aware when he talks of *Caladenia cairnsiana* that it is a spider orchid. *Acianthus exsertus* is how the botanist has christened one of the pretty children of the mosquito generation, and, once you have been introduced, *Dipodium punctatum* is never anybody else than the wild hyacinth, the leafless glory that blooms at Christmas time. But all the appealing tints of Dr. Rogers' descriptions - and he visualises for you the infinite charms and delicacy and grace of construction - are no match for the stirring fidelity of Miss Rosa Fiveash's brush. In these pictorial representations she has embodied perhaps her finest art. You unconsciously feel out to handle the flowers. Only the fragrance is missing, and the picture is so trill that you can almost touch that too. Dr. Rogers, for whom this accomplished artist has been working these years, is very sensitive over the precise botanical accuracy of the painted orchid, and he declares she has attained as near to perfection as is humanly possible. The ideal thing would be a book which Dr. Rogers should write and Miss Fiveash illustrate. That may be published one of these days, and the world of orchid lovers would adore it.

Museum and art gallery

Next to medicine, Dr. Rogers has made orchids his life's interest. He began the study when he was a student back in the seventies. It attracted him because few others appeared to be attracted by it. Once he got to confidential grips with the problems and beauties of the flower - why, it just held and enthralled him. Nature has been a marvellous architect and painter here. She has built fantastic and beautiful houses on those slender, swaying columns, and has designed surpassing schemes of colour. The naked eye is often a poor instrument of research. A flower that to it may seem commonplace and insignificant, perhaps grotesque sometimes, reveals under the magnifying glass an iridescent splendour. There is nothing superfluous about an orchid. Every detail in its delicate building is on an economical plan, and no artist ever used a brush with more delightful discretion. Around at Dr. Rogers' house there are pressed orchids, pickled orchids, photographed orchids, and painted orchids. His herbarium is a storehouse of the richest treasures. This is the museum. The art gallery is composed of Miss Fiveash's exquisite paintings.

Our historian Dan Hatch points out that the Chamberlain referred to is Joseph, and Kitchener was drowned on 5 June 1916 when the Hampshire struck a mine.

*Richard Sanders Rogers 1862-1942 was a medical practitioner who was born in Adelaide, and who went on to write extensively on the orchids of South and Western Australia. He collaborated with H.B. Matthews and described the aberrant N.Z. genus *Petalochilus*. He also described *Pterostylis humilis*, *Caladenia iridescens*, etc. — Hatch ED in The NZ orchids: natural history and cultivation.*

Rosa Catherine Fiveash 1858-1938 studied at the Adelaide School of Design and then specialised in painting Australian flora. She did illustrate Rogers's South Australian orchids (1911) and later JE Brown's Forest flora of South Australia (1922); she painted the originals on pastel-coloured paper, and the black-and-white reproductions are disappointingly muddy. Most of her original work is held in the State Library of South Australia and the South Australian Museum. In 1974 Rigby published paintings of 139 orchid species from the Museum collection with a text by Noel Lothian, as Rosa Fiveash's Australian orchids. The colour reproduction is excellent, and really shows her artistry at last — Ed.

Notes on the New Zealand orchids

by Ian St George, Bruce Irwin and Dan Hatch

This new field guide, funded by the Lottery Grants Board, with distribution maps, pen drawings and brief descriptions of 120 NZ species, will be available by Christmas.

WATCH THIS SPACE!