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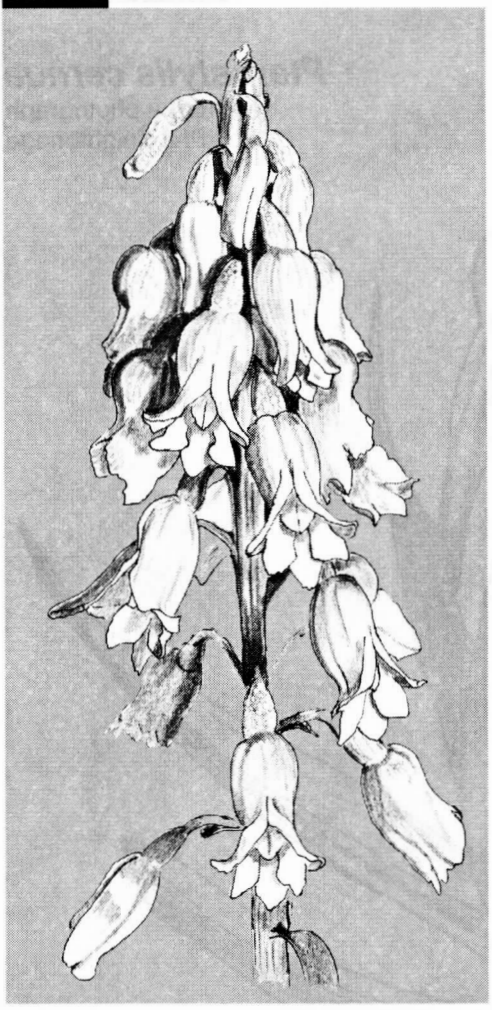
The NZNOG *Journal* for September 2000

Pterostylis cernua
— from a photograph
by Phil Knightbridge

Number 76

ISHG.

From the editor



Gastrodia* aff. *sesamoides in the grounds of the Forestry Research Institute in Rotorua last December. I was shown around by Chris Ecroyd who pointed out a number of other interesting orchids in the gardens of the extensive grounds. Stars of the show were these multi-flowered stems of *Gastrodia*.

Bulb-leaf fish-mouth

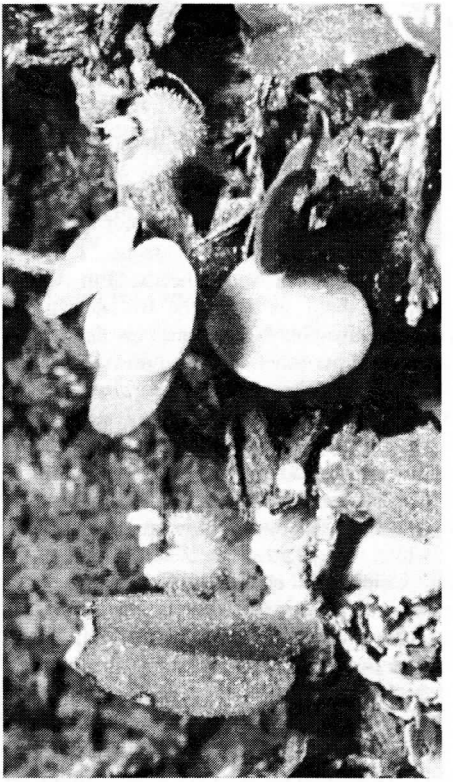
May 28 found me climbing the hills behind Days Bay, thinking I might just find a *Pterostylis alveata* or two, but I was to be disappointed on that score. On the other hand *Earina autumnalis* mats the ground in places up there, and in shady spots they were still in full flower, the still afternoon air thick with their fragrance. A honeybee (one of the dark wild sort that build hives in hollow trees in the bush) was visiting: it explored each flower in turn, then flew to another spike, worked that one over, and so on. I watched for perhaps ten minutes. *Pterostylis alobula* were everywhere, caladenia and thelymitra leaves were well up, and the hairy capsules of *Bulbophyllum pygmaeum* were browning off, splitting into two in their characteristic way, and shedding fine pollen.

In 1894, five years before his death, and at a time of great but often misguided productivity, William Colenso described *Bulbophyllum ichthystomum*. He allowed it was pretty similar to *B. pygmaeum*, but claimed it differed "particularly in its glandular-echinate ovary and leaf. The ripe capsule gaping so curiously at its sutures, somewhat resembling the open mouth of a fish.... Bearing its minute withered flower.... The microscopic seeds were also plentifully shed, scattered like dust over the neighbouring plants."

Colenso's specimen had been collected by Mr H.Hill from tree-trunks in forest near Kumeroa, Manawatu River, in May 1893.

That is exactly as it was when I walked up the track behind Day's Bay in May 2000.

Cheeseman (1906) was dismissive: "I do not see upon what grounds Mr Colenso has separated his *B.*



ichthyostomum. The type specimens in his herbarium appear to me to be typical *B. pygmaeum*."

Bulb-leaf red lip?

While we are on about Colenso and Bulbophyllum, here is what he wrote about the *B. tuberculatum* collected by Augustus Hamilton from "woods near Palmerston" in April 1889,

> "...labellum ... bright vermilion-red with a central yellow line running to base". The only *B. tuberculatum* I've seen have had an orange lip. What are they like near Palmerston North these days?

Orchids of the Wild West

One of the books from his own childhood that my father passed on to us was called something like Buffalo Bill's Wild West. It had a lot of Buffalo Bill Cody stories, and I loved them. "With a cry, Cody sprang from the trees" and "Cody's rifle cracked and another redskin bit the dust" were strong fuel for a boy's imagination. The first western movie I ever saw was Colorado Territory.

So the Rocky Mountains of Colorado have a nostalgic pull for me. This is Arapaho, Pawnee and Comanche country. Cody is buried near Denver. Wild Bill Hickock, on the other hand, is buried at Deadwood in South Dakota. I've been there too.

The "unsinkable" Molly Brown, Titanic survivor, lived in Leadville, Colorado, about as high above (10,200ft) and as far from the sea as she could run.

Bill Jennings is a mining engineer who lives at the foot of the Rockies in Louisville, Colorado. He has a detailed knowledge of Colorado orchids. I phone him from Wellington, and when I reach my hotel in early July, he is there an hour later in his pickup ("I can tell you're from Colorado" he had been told on a recent orchid jaunt to Arizona: the cracked windscreen is a dead giveaway, a sign of the gravel laid on Colorado roads in winter). We head for the hills, through the city of Boulder and up Flagstaff Mountain Road to an area among the red rocks and the ponderosa pines, where we walk down a trail (OK, a track, but they call them trails here).

There's a plaque on the 15th step of the State Capitol building in Denver: it marks altitude 5280 feet: one mile. Denver is Mile High City. Up here we are at 7500 feet, and it makes you a little breathless. First stop is a damp creekside where the bog orchid

Platanthera huronensis is in full spike. We ascend further, pause to let a grey hummingbird, little bigger than a bumblebee, take nectar from trackside flowers. The flowers are like our own weeds, a legacy of the miners who came and went last century. A few are unfamiliar: the scarlet tufts of Indian Paintbrush for instance. Further up we find *Goodyera oblongifolia* in bud, its green leaves marbled with white. The coral-roots *Coralorrhiza maculata* and *C. wisteriana* are in fruit, but by a creek is the twayblade *Listera convallarioides,* its flowers translucent brownish green mothwings. Bill tells me he has never seen a rattlesnake and only once in 30 years has he seen a black bear and I am reassured. If you come from a country with no dangerous animals (except the domestic ones) you do like to ask.

On the way home we stop in the Boulder suburbs, for there between two new office carparks is another orchid site; the developers are aware of the treasure they guard, and have limited the size of the car parks to preserve it. This is *Spiranthes diluvialis,* a nationally threatened orchid, and one of them has a few white flowers fully open. I return a few days later to find several plants in full flower.

Ten thousand acres of this forest were razed by fire last 4 July Independence Day: why do we mark summer celebrations with fireworks?

Bill has supplied maps and printed an itinerary for me so the next day I am awake at 5.30, and soon on my way. Haybales in the paddocks remind me this is summer, despite the winter I have left behind in NZ. The air is so dry I get a static electric shock every time I step out of the car. Names like Old Stage Road, Big Elk Meadow and Beaver Meadow remind me I am in the Wild West. Fifty miles later I am among the high peaks in Rocky Mountain National Park. The south faces and flat areas under steep banks still carry snowdrifts. A blue jay saunters off as my car approaches the carrion he is eating; a chipmunk races across in front of me. I am at the carpark near Bear Lake at 7.30, here to look at *Cypripedium fasciculatum,* a lady's slipper with two round glossy leaves, and a couple of brownish flowers. Alas, there has been a mild winter, an early spring and a hot dry summer, so they are over: I sadly photograph the spent heads. But whoa! Beside them are what the British call the lesser twayblade, *Listera cordata,* and nearby, in the damp creeksides, the porcelain-white *Platanthera dilatata,* the yellow-flowered *P. huronensis,* some other *Platanthera,* some coral-roots past flowering, and then suddenly, in full flower, *Coralorrhiza maculata,* its red stems and flower parts contrasting strongly with the white, red-speckled labellum.

Chipmunks chatter their warnings as I pass, and squirrels scuttle up the far side of trees, away from my camera, chirruping their distaste for my presence. In a carpark traffic island a chipmunk delicately eats wild strawberries, pauses, darts, pauses, darts: she sits still just long enough for me to photograph the rock she'd been sitting on a moment earlier. Silver birches among the pines; spruce, aspen, juniper.

A doe feeds in the lush green of a swamp near Cub Lake. A coyote lopes across the road, untidy as he loses his winter coat. A marmot runs for cover under his rocks, then bold as brass, sneaks flattened to the ground, clear in his own mind that he is invisible, back towards me. I take time to approach a chipmunk, camera at eye, clicking as I come closer; I finish and rise, smiling smugly to myself in anticipation of the photographs, to find I am being watched by a group of American trampers, pitying, but entertained by my interest in such an everyday creature. Out on the flat of the glacial moraine the members of a group of butterfly collectors huddle, nets like triangular pennants in the breeze, looking at

Top L: *Listera convallarioides*. **Top R:** *Platanthera huronensis*.
Middle: *Corallorhiza maculata*. **L:** *Spiranthes diluvialis*,
Bottom: *Cypripedium calceolus*.

L to R: *Platanthera dilatata, Corallorhiza maculata, Goodyera oblongifolia, Listera cordata (green form)*

their treasures. In the warmth of an alpine summer morning the air is fragrant with the perfume of the pines.

I drive further up. Two elk stags in velvet graze a high grassland, all power and majesty. Above them the conifers become stunted, twisted, and suddenly they are finished and I am in open alpine meadowland, the wildflowers colouring patches of white, yellow, orange, pink to scarlet through crimson to mauve, purple in all its shades, sky to dark blue to black. At the top it is 11,796 feet, a tad shorter than Mount Cook.

There is something exhilarating about treasure hunts, and orchid forays in foreign countries often provide that sense: "Continue east on US36 to Fish Creek Road, go south for three miles till road curves west, then turn south along gravel road past Fish Creek Ranch" (It's a "dude" ranch, my papers say disparagingly), "enter Camp Cheley under a wooden arch, drive a further 250 yards until you reach a point where the power lines on your left send a branch south across the road: there is a sign on the power pole that reads 'Watch out for future world leaders at work and play': *Cypredium calceolus* is about 50-100 yards up the hill on the south side of the road: there are two extra large ponderosas right there...."

(I should tell you Camp Cheley takes young people and trains them in leadership skills....)

Dang. *Cyprideum calceolus* is also over, the remnants of its flowers browning in the afternoon heat. Nearby though, I am compensated with what the British call the frog orchid, *Coeloglossum viride,* in full flower.

At another site I seek the flamboyant *Calypso bulbosa.* In 1979 I took a sabbattical leave in the American West and it was not all work. Before I left home I had been trying some rather pretentious architectural photography in black and white, and when to my surprise I found a lovely pink orchid under the giant Californian redwoods I forgot I didn't have colour in the camera and took a dismal series of pictures of this fabulous flower in shades of grey. This time I am ready with colour film, but sadly *Calypso* is well in fruit by early July.

Near Red Rock Lake I find more *L. cordata,* some plants with brown flowers, some with green. The lake is one third covered with a beautiful native yellow water lily, but the Indian Peaks of the Great Divide are reflected in the stillness of the other two thirds. Bill has mapped out a number of further stops in case I have missed orchids, but I am replete and head back to my hotel. Hard physical exercise is good for jetlag, but at 5pm I am flagging (it's 11 am tomorrow in NZ and it's 12 hours since I slept).

I descend through Boulder Canyon: tanned bareheaded denim-clad couples on Harley Davidsons zoom by, blonde hair flying, dangerously yet somehow enviably unencumbered with crash helmets. A Denver radio station plays continuous country music. Later, down on the flatland below the foothills, prairie dogs have turned the paddocks into a moonscape, the entrances to their underground cities looking like craters; one stands upright keeping watch as the others feed nearby. Their habitat is shrinking as the cities of men expand.

I spend the working week sweltering in the summer heat of the plains, and marveling at the early "monsoon", the evening thunderstorms that bring rain, spectacular displays of lightening, and death. Colorado has the second highest death rate from lightening strike in the US: three children taking an outdoor spa bath died recently in Boulder.

A week later I am on Interstate 70, heading up into the mountains again, this time toward the great ski resorts of Aspen,

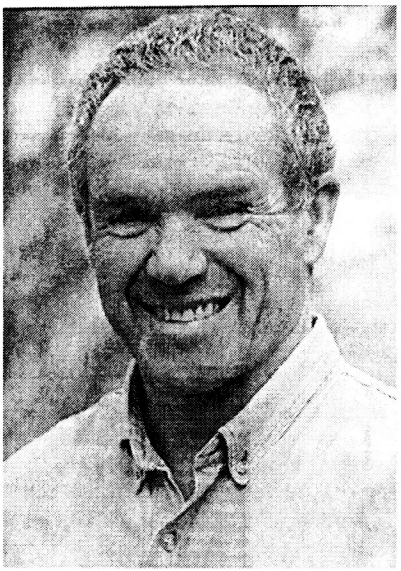
Vail and Breckenridge. There's a dead porcupine on the road, a bison herd grazing to the right of the highway. The yellow tailings of gold and silver mines streak the hillsides. Higher up a couple of stones falling down a bank above the road catch my eye: sure enough, two bighorn sheep are grazing near the top, their grey fleeces perfect camouflage against the rocks.

My orchid stop is above the historic gold and silver-mining Georgetown, its Victorian weatherboard houses like Wellington's. Above the town is Guanella Pass, and the road zigzags up the hill. My guide has written, "The road is narrow and potholed... continue to Clear Lake and at the upper end turn left into the parking lots. Go to the lower parking lot. The wet seepy hillside between the parking lot and the road is full of *Spiranthes romanzoffiana* and *Platanthera huronensis*." Indeed it is, and though I spot the tall platanthera quite quickly, and though I recognize the suitability of this habitat for spiranthes, it takes me some time to spot the first. *S. romanzoffiana* is tiny, but I spot many as I begin to get my eye in and appreciate the tallest of them is 10cm, and most less: 5cm or so. It is vanishingly rare in Britain, reported from only one site.

In Georgetown for the night I discover a restaurant called "Prague". On his menu the Czech chef has (pause, then hushed, reverent voice), "...rack of New Zealand lamb, 21 dollars 95". That's about NZD50. I settle for pork and sauerkraut, congratulate the chef on the food, congratulate him doubly on his choice of a smooth Californian merlot, and tip him generously in my postprandial largesse.

Next day I drive the highest (12,095ft) paved road in the world, called (of course) Independence Pass. The roadside ditch west of the continental divide is full of *Platanthera dilatata* at 11,000 feet. A doe, ears out and looking, makes sure it is a camera and not a rifle I am taking from my pack, then continues grazing. I sneak a quick look at the tacky tourist town of Aspen and pass on (Vail I go past: I am told it is even worse). At Glenwood Springs I visit the grave of "Doc" Holliday. Doc was trained as a dentist, but when it dawned on him that bettin' and shootin' were more fun than tooth pullin' he became a gunman and gambler. He must have been quite good at them for he died of pulmonary tuberculosis.

I have come home intending to revise my way of helping orchid-minded visitors to New Zealand. I think I will do what Bill did for me: guide them to orchids that grow in wonderfully scenic sites with a set of treasure hunt instructions, setting them free, unencumbered by the obligation of my company, to feel like adventurous pioneering children seeking gold in a wild new country.



Congratulations to NOG member Pat Enright, the recipient of an award for conservation work in the Wellington region. Pat has, in addition to his orchid reports, found evidence of 120 threatened plant species around Wellington.

Three Te Paki field trips are on!

Join one or more of our Spring field trips to the furthest north this year. Regulars will already have had invitations but there are always places to spare. The DoC shearers' quarters have been booked for 5 nights for each of 3 spells from

1. **1 to 5 September** for *Thelymitra matthewsii* and a check on Cape Maria Van Diemen as a possible extra site. *Pterostylis puberula* often grows with *P. tasmanica* so Shenstone Block and Rubbish Dump Hill sites will be checked for this endangered species. Also *Caladenia alata, Corybas cryptanthus, C. cheesemanii, Cyrtostylis reniformis, C. oblonga, Pterostylis alobula* should be open. A late *Corybas rotundifolius* was found last year at the Earth wall.

2. **4 to 8 October** for *Corybas rivularis* s.s. at the type locality between Kaeo and Whangaroa, on the way in, *Caladenia alata, C. atradenia, C.* aff. *fuscata* and *C.* aff. *pusilla, Thelymitra carnea, T.* "darkie", *T.* aff. *longifolia, Corybas aestivalis* (H. B. Matthews's *C. oblongus with bristles inside*) *T. malvina* and *T.* "Ahipara" at Lake Ohia on the way home.

3. **2 to 6 November 2000** for *Cryptostylis subulata* and *Thelymitra* "Ahipara" at Lake Ohia, *Caladenia minor* (alias *chlorostyla*), *C.* "speckles", *C.* "papillosa", *C. pusilla, Thelymitra sanscilia, T. aemula, T. pulchella, T.* aff. *ixioides, T.* "rough leaf", *T.* "darkie", *T.* "sky", *T.* aff. *longifolia.* A side trip to Scott Point where *Petalochilus saccatus* has been spotted, is a must for anyone prepared to drive down Te Paki Stream to Ninety Mile Beach.

The first twelve to get a $20 deposit to Eric Scanlen for each field trip required and who wish to stay the full five nights, will be stuck in the shearer's quarters as the main party. Alternative accommodation may be available for late comers. Costs are low and all 3 field trips will achieve things if not all the target species. Itineraries will be sent to all successful applicants.

Original papers

Chromosome counts in the New Zealand orchids

By E.D. Hatch, Laingholm

In *NZJB* 38(1): March (2000), Murray Dawson published, among other things, the chromosome counts for some New Zealand orchids. To these I have added a couple I have garnered elsewhere. The numbers shown here are all 2n, which can be taken as read.

Acianthus sinclairii (40); Aporostylis bifolia (40); Bulbophyllum tuberculatum (38); Caladenia lyallii (48); C.minor (38); Calochilus robertsonii (24); Chiloglottis cornuta (40); C. formicifera (40); Corybas acuminatus (36); C. carsei (36); C. cheesemanii (56); C. cryptanthus (34); C. iridescens (36); C. macranthus 36); C. oblongus (34); C. orbiculatus (36); C. papa (36); C. rivularis s.s. (36); C. trilobus (36); Cyrtostylis oblonga (44); C. reniformis (46); Danhatchia australis (22); Drymoanthus adversus (76); D. flavus (38); Earina aestivalis (40); E. autumnalis (40); E. mucronata (40); Gastrodia aff. sesamoides (40); Genoplesium nudum (44); Microtis oligantha (44); M. parviflora (44); M. unifolia (88); Orthoceras novae-zeelandiae (42); O. strictum (40 [in case it should occur]); Prasophyllum colensoi (42); P. aff 'patens' (42); Pterostylis alobula (50); P. alveata (50); P. banksii (44); P. brumalis (50); P. graminea (44); P. micromega (44); P. nutans (42); P. oliveri Petrie (46); P. paludosa (44); P. patens (44); P. tanypoda (54); P. tristis (52); P. trullifolia (50); Spiranthes australis (30 [= 'Motutangi' ?]); S. novae-zelandiae (30); Thelymitra aemula (40); T. 'ahipara' (60); T. carnea (62); T. cyanea (40); T. 'darkie' (60); T. x dentata (46); T. formosa (40); T. hatchii (66); T. aff 'ixioides' (28); T. longifolia s.s. (26); T. malvina (26); T. nervosa (54); T. pauciflora (26); T. pulchella (66); T. 'rough leaf' (84); T. sanscilia (26); T. 'sky' (84); T. tholiformis (66); Townsonia deflexa (28); Waireia stenopetala (46); Winika cunninghamii (40).

An outline of the native orchids of New Zealand

By E.D. Hatch, Laingholm.

(I have kept a file on the native orchids for the last fifty years and have continuously updated it. In the old typewriter days this meant retyping it every time I altered it. Nowadays, even on this prehistoric word processor, it's a piece of cake—EDH—11 May 2000).

New Zealand's native orchids are basically Australian. Of the 25 genera at present recognised, the 5 endemic genera are related as follows - *Aporostylis* has Australian affinities in the subtribe *Caladeniinae*; *Danhatchia* has Asian affinities in the subtribe *Goodyerinae*; *Earina* has Asian affinities in the subtribe *Glomerinae; Waireia* has affinities with the Australian subtribe *Caladeniinae*; while *Winika* has Asian affinities in the subtribe *Dendrobiinae*.

Four of the genera—*Bulbophyllum, Drymoanthus, Earina* and *Winika*—are perching plants, growing among moss and lichen

and other epiphytes, on the trunks and branches of trees, on rocks, or rarely on bare ground. The epiphytic genera are basically tropical forms, and in New Zealand are at the southern limit of their distribution and consequently few, small and insignificant, but interesting nevertheless.

The remaining genera are ground dwellers, the seed occasionally germinating on the fibrous trunks of tree ferns, on rotting logs, or in the humus-filled hollows of tree buttresses.

Of the 101 New Zealand species accepted here, 30 also occur in Australia, while a further 35 are derived from Australian species; 22 have Asian affinities and 14 appear to be local developments (the grass-leaved *Pterostylis*).

The *Orchidaceae* probably contain a larger number of species than any other family of flowering plants. This not due to their abundance, for they tend to be rare as individual plants, but to their extreme plasticity. Some species are very highly specialised, others relatively as tough as old boots. All are dependent on mycorrhizal fungi at some stage in their life history, (some on a specific fungus) particularly for the germination of their seed. Specialisation enables a plant to adapt to a great variety of restricted habitats, but extreme specialisation means that they cannot survive elsewhere. *Corybas carsei*, confined as it is to open areas in raised *Empodisma* bogs, is a good example of this. Similarly *Pterostylis puberula* and *tasmanica* are confined to open areas in short scrub, often on bare clay, and do not occur elsewhere. *Pterostylis brumalis* and *agathicola* are confined to the immediate vicinity of the kauri and are never found away from it. *Corybas cryptanthus*, which has neither leaf nor chlorophyll, is nevertheless found under moss hummocks and in deep leaf litter over a surprisingly wide area. Conversely, *Microtis unifolia, Prasophyllum colensoi,* and two common *Thelymitra—longifolia* and *pauciflora*, are not only ubiquitous but very hardy, occurring in scrub and in the open, from the sub-tropical to the sub-antarctic, and from sea level to the sub-alpine scrub, with very little structural change.

Opinion as to the origin of these plants has varied from generation to generation, as knowledge increased, particularly in the hi-tech fields of cladistics, chromosome counts and DNA studies. There are also fashions in taxonomy and a tendency towards change for change's sake. In my youth it was *de rigueur* to 'lump'; today everyone is frantically 'splitting'.

At present there are considered to be three main distributional trends—

1. A presumably ancient, overland trend, which began in Asia and brought us the New Zealand representatives of *Bulbophyllum*, the long-sepalled *Corybas*, *Danhatchia*, *Drymoanthus*, *Earina*, the short-columned *Gastrodia*, *Microtis*, *Spiranthes* and *Winika*.
2. A distinctly powerful, probably windborne, west-to-east trend, which still brings East African orchids to Western Australia, Eastern Australian orchids to New Zealand, and from thence to the Chathams. This gave us the Australia-originating genera *Acianthus*, *Adenochilus*, *Caladenia*, *Caleana*, *Calochilus*, *Chiloglottis*, *Cryptostylis*, *Cyrtostylis*, *Genoplesium*, *Orthoceras*, *Prasophyllum*, *Pterostylis, Thelymitra, Townsonia* and *Waireia*. And in addition, odd Australian species of genera which normally arrived by other routes, viz. *Corybas*, *Gastrodia* and *Microtis*.
3. And lastly of course the tendency to local differentiation which produced *Petalochilus* from *Cadadenia*, and *Aporostylis* from a combination of *Caladenia* and *Chiloglottis*, and which led and is still leading to the endemic forms in the larger genera, notably the long-sepalled *Corybas*, and the grass-leaved *Pterostylis*. The latter would appear to be an adaptation to a shade-forest environment, with a secondary adaptation to grasslands

(e.g *P. patens*). Several of these species (e.g *P. agathicola*), have distinctly rosetted juvenile forms, which suggest that the group arose originally from a semi-rosetted Australian species like *P. foliata*. Putative hybrids occur among the grass-leaved *Pterostylis* species; and also among the long-sepalled *Corybas*.

Some of the species in the second (Australian) category have been in New Zealand for a long time and have differentiated locally (e.g. those in the *Pterostylis obtusa* group—*P. alobula*, *brumalis* and *trullifolia*—and some *Thelymitra*). Others, actual Australian species, have presumably arrived more recently, (e.g. *Cryptostylis subulata* and some *Thelymitra* and *Pterostylis*). Still others, with a remarkably disjunct distribution in New Zealand, are called vagrant species. They appear, and sometimes spread vegetatively for a while in a restricted area and then disappear again. It is presumed that the pollinator to which they are adapted does not occur in New Zealand, and that they are therefore unable to set seed. In some cases their specific mycorrhizal fungus may be absent also, which prevents the seed from germinating. Good examples in this group are *Caleana minor*, *Chiloglottis formicifera* and *valida*; *Pterostylis nutans*. and *Thelymitra matthewsii*. *Cryptostylis subulata*, which is increasing rapidly in Northland, has perhaps been lucky, since its specific pollinator, the ichneumon wasp *Lissopimpla semipunctata*, also occurs in New Zealand.

Threatened and uncommon indigenous orchids of New Zealand

by P.J. de Lange, Department of Conservation, Private Bag 68908, Newton, Auckland.

INTRODUCTION

The New Zealand Threatened Plant Committee (de Lange et al. 1999) has published the most recent assessment of the conservation status of the indigenous New Zealand vascular flora. That paper, structured according to the threat classification system devised by de Lange & Norton (1998), lists four orchids as "Threatened", 20 as "Uncommon" and 4 as "Taxonomically indeterminate". These taxa are provided with their respective conservation listings, followed by a discussion of some general orchid conservation issues.

NEW ZEALAND THREATENED AND UNCOMMON ORCHID LISTINGS (1999)

Key

† *denotes indigenous taxa found naturally outside New Zealand and not considered threatened within that part of its range. New Zealand populations have been confirmed as conspecific with the overseas counterpart.*

‡ denotes indigenous taxa known or thought to be threatened outside the New Zealand Botanical Region, or taxa currently treated as indigenous with additional overseas distribution, which may on revision prove endemic to the New Zealand Botanical Region.

λ denotes indigenous taxa extinct within New Zealand but still extant within their overseas distribution.

Threatened

Taxa whose classification places them within the Critically Endangered, Endangered or Vulnerable categories. These are taxa whose survival is now a matter of conservation priority. Their classification within the three subheadings of threat provides a measure of the degree of risk associated with each taxon.

Critically endangered

Taxa whose extinction is considered inevitable within a stated time (10 years) unless there is direct conservation intervention, or whose persistence as individuals or populations is reduced to sufficiently critically low levels that extinction through stochastic events is a distinct possibility. Some critical taxa are now only known from cultivation.

Corybas carsei

The conservation status of *Corybas carsei* has not changed. Five years after an experimental burn of a portion of the only known population of this species left in the wild, there has been a 1037% (from 29 plants to 301) increase in *C. carsei* within all burned sites, and a corresponding 100% loss of the species from the controls. Especially pleasing has been the appearance of the species in several plots selected for treatment because of the apparently suitable macro-habitat. What is not clear is whether these plants arose from hitherto dormant tuberoids or as seedlings. Seedlings are possible from hand pollinations of plants nearby, and also because during the 1997/1998 summer *C. carsei* plants set a record number of seed capsules (13 out of 85 monitored flowers), the first time the species has set seed without hand pollination. Careful dissection of a single flower showed that the pollinia are partially coherent, and the column slightly curved, such that self-pollination is "just" possible, which may account for some natural seed set. Natural insect pollination, whilst always possible, is currently discounted based on the subsequent behaviour of two further monitored flowering seasons: the 1998 flowering season produced just one seed capsule out of the 45 monitored flowers, and the 1999 season, none. On the taxonomic level, the exact relationship between *C. carsei* and the Australian *C. fordhamii* remains unresolved. DNA has been extracted from *C. carsei* material and the profile of the species is now known (B. P.J. Molloy *pers. comm.*). It is becoming clear that *C. fordhamii* is probably also threatened (Ross 2000; A. Buchanan *pers. comm.* 2000); should both species eventually prove conspecific, *C. carsei* would still be required to be managed (*cf.* de Lange & Norton 1998).

Pterostylis cernua

Pterostylis cernua is a new addition to the New Zealand threatened and uncommon plant lists. This poorly known species was reported to have been wiped out by road works (B.P.J. Molloy *pers. comm.* 1999), but a recent survey of the type locality rediscovered the species there, and further populations were located elsewhere. Although listed as "Critically Endangered" it is now clear that a more conservative approach to listing the species should have been called for (*cf. P. irwinii* and *P. porrecta*). The species should now be viewed as "Insufficiently Known" as it is still poorly understood; as its habitat (mesic bogs) is widespread in Westland it is probably overlooked rather than really threatened. Despite its formal description from a West Coast bog, there is no reason to believe this species is endemic to the region; *Pterostylis cernua* should be looked for elsewhere in the country. A West Coast Department of Conservation staff member – Don Neale – is planning to study its autecology.

Pterostylis puberula
The conservation status of *Pterostylis puberula* has not improved; indeed the plight of this species has got worse. No further plants have been seen at North Cape or the Three Kings since October 1991 and December 1995, respectively. Near Thames, the two Kauaeranga populations have declined markedly, with 7 plants left at one site and 21 at the other. Steps to manage both populations through selective trimming of surrounding plant cover and careful mapping of each plant are intended. The current assessment is that the New Zealand plant is endemic, but the historical and current scarcity of the species, its autecology, and close association with *P. tasmanica* (de Lange 1996) suggests to this author that *P. puberula* is probably an Australian species. Although not constrained reproductively (the species is self-pollinating), study of herbarium specimens shows that the species is strongly mycorrhizal which may also explain its scarcity. The typically "washed out" silvery chlorotic foliage of the species also suggests the species may be partially saprophytic (B. P.J. Molloy *pers. comm.* 1999). Aside from projected management, DNA samples have been procured for critical comparison with other Australian representatives of the *P. nana* complex.

Endangered
Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included are taxa whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Pterostylis micromega
There has been no change in the conservation listing for *Pterostylis micromega*, which remains seriously threatened. Only a few populations are known from the Waikato, Volcanic Plateau and North West Nelson. In the Waikato one large population (100+ plants) has now all but vanished due to the spread of the introduced and very aggressive fern *Osmunda regalis*. It would seem that *Pterostylis micromega*, like many orchids, benefits from frequent habitat disturbance. Past conservation measures, such as fencing to exclude trampling animals, has resulted in the loss of plants from some sites. As a matter of some interest the largest population (21 plants) known to the author grows within an old human foot print!

Declining
The new conservation classification "Declining", encompasses those taxa which are numerically abundant but which are either under threat from serious adverse factors throughout their range, or occur as widely scattered, typically small populations, many of which are undergoing declines through loss of reproductive ability, recruitment failure, predation, or through other processes of often subtle habitat change. Declining taxa are listed here to highlight their plight: without some level of management they are destined to become the future Threatened Plants of New Zealand.

Pterostylis paludosa
This orchid has been previously listed as *P.* "linearis". *Pterostylis paludosa* is possibly less common than was once believed. The species remains locally common in some parts of the Waikato and Central Volcanic Plateau. Of all the peat bog *Pterostylis* species, *P. paludosa* seems the most tolerant of dense vegetation, often exhibiting a distinctive lianoid growth form amongst the dense wirerush (*Empodisma minus*) restiad bogs it frequents. Although usually found in wirerush bogs, plants have also been gathered from mountain mires, and from estuarine wetlands dominated by

oioi (*Apodasmia similis*). The main threat to this orchid seems to be the loss of wetlands through drainage and changing habitat quality – often the result of the as yet unchecked spread of the fern *Osmunda regalis*. As with many swamp orchids, this species responds favorably to some forms of habitat disturbance, such as fire (P. J. de Lange & D. A. Norton unpubl. data).

†*P. tasmanica*
Originally listed as vagrant (de Lange & Molloy 1995), it is now evident that this assessment was premature. Observation of this distinctive orchid's past and present distribution together with its ecology show that the species is neither constrained reproductively nor ecologically. The main factor limiting this species' present abundance has been the loss of suitably open habitat through clearance, successional changes and weeds. *Pterostylis tasmanica* remains locally common in some parts of northern New Zealand, e.g., North Cape, Te Paki, and Kaimaumau Swamp.

Thelymitra tholiformis
Thelymitra tholiformis is now known to be even more widespread than was believed when the New Zealand Threatened Plant committee met in March 1999. The species seems to be locally common in suitable gumland and kauri regrowth throughout northern New Zealand, where it often grows with *T. aemula* and *T.* aff. *ixioides*. Nevertheless it would be useful for orchid group members to inform their local Department of Conservation botanist of any suspected or confirmed occurrences of this species. *Thelymitra tholiformis* is still a novelty to many New Zealand botanists, thus orchid group members can provide an invaluable service by informing the relevant authorities of the occurrence of this (and indeed other orchid) species present in their local "turf".

Naturally uncommon
The new conservation classification "Naturally uncommon" encompasses those taxa, not considered under immediate or obvious threat but which, for varying reasons, have the potential to become threatened. Three subheadings are recognised to accommodate the different situations whereby taxa can be naturally uncommon.

Sparse
Taxa that for largely undetermined reasons occur within typically small and widely scattered populations. This distribution appears wholly natural, and is not considered the result of past or recent anthropogenic disturbance. However, as the candidate taxa usually occur in small numbers at any given site, they are naturally susceptible to extirpation within parts of their range.

Caladenia atradenia
Although not a threatened species *Caladenia atradenia* is rarely common at any particular site, and for this reason it is listed here. Typically the species occurs in widely scattered populations comprising 2-10 plants. As far as can be ascertained this pattern seems to be wholly natural.

†*Calochilus paludosus*
Although never a common species, the bearded orchid *Calochilus paludosus* is not a vagrant because it is not constrained reproductively or by its ecology. It appears to have always been a widely, and sparsely distributed species throughout New Zealand.

†*Calochilus robertsonii*
This bearded orchid *Calochilus robertsonii* should also not be considered a vagrant. Although geographically more restricted than *C. paludosus*, it is nevertheless numerically more abundant in suitable habitat. It seems to show a distinct

preference for *Eucalyptus* plantations, suggesting a more intimate relationship may exist between these two Australian genera.

Corybas rivularis sens.str.
A new conservation classification and new species listing. The progressive "refinement" of the *C. rivularis* agg. has meant that the true *C. rivularis* is apparently now a very uncommon, sparsely distributed species (B.P.J. Molloy *pers. comm.*). Nevertheless its listing as Naturally Uncommon/Sparse may be premature, for the exact distribution of the species is still uncertain. Possibly it should have been listed as Insufficiently Known (*cf. Pterostylis cernua*, *P. irwinii*, and *P. porrecta*).

Drymoanthus flavus
This distinctive species – cryptic habit aside – seems to be genuinely uncommon but it could hardly be said to be under threat.

†*Thelymitra matthewsii*
The increasing number of sites where this species has been discovered suggests that, as with *Pterostylis tasmanica* and *Calochilus paludosus*, *Thelymitra matthewsii* should no longer be regarded as a vagrant. The species is neither constrained reproductively nor ecologically but it is evidently very much a trans-Tasman immigrant, whose specific habitat requirements have been constrained by land management practices. Thus the species can give the impression of being a vagrant. Following the rash of recent discoveries the picture emerging is one of a specialist orchid, with a naturally sparse distribution. Further occurrences in Northland (and possibly elsewhere) are anticipated.

Thelymitra sanscilia
Although the taxonomic status of the little-known sun orchid *Thelymitra sanscilia* has see-sawed from synonymy to "general" acceptance, DNA evidence is still required to decide either way. At the time the New Zealand Threatened Plant Committee met (March 1999), this orchid was believed to be a distinct species, and it was assessed accordingly. Although rarely seen, the picture emerging of this species is that it too is sparsely distributed. Certainly it is never particularly common at any one site. Little is known about its ecology.

Townsonia deflexa
Although widespread, this orchid is sparsely distributed and nowhere abundant.

Vagrant
Taxa whose presence within the New Zealand botanical region is naturally transitory. These are invariably taxa which have failed to establish themselves significantly beyond their point of introduction through reproductive failure or for quite specific ecological reasons. Many vagrants are able to reproduce only by vegetative means; in such instances, when in suitable habitats, they can form quite extensive clonal populations.

†*Caleana minor*
Previously listed as Critically Endangered, *Caleana minor* is still known from only the single Rotorua occurrence, though in the past it was known also from Kaitaia. This species, and indeed the same apomictic race, is very common in Australia (B.P.J. Molloy *pers. comm.*).

†?*Chiloglottis formicifera*
At present there have been no further confirmed extant wild occurrences of this orchid since it was collected near Kaitaia by R.H. Matthews at the beginning of the 1900s. Some doubt as to the correct identity of the New Zealand collections remains, and it may well prove that the Kaitaia plants are *C. trapeziformis* rather than *C. formicifera* (B.P.J. Molloy & D.L. Jones *pers. comm.* 1998). Whatever name is

eventually used for the plant formerly present in New Zealand, neither species is at risk in Australia.

†*Chiloglottis valida*
Only a managed population of *Chiloglottis valida* survives at Iwitahi. No recent data are available for the population in the Richmond Range, whilst the one at Hanmer seems to be declining naturally (B.P.J. Molloy, N. Head & P.J. de Lange unpubl. data).

†*Pterostylis nutans*
Previously listed as Presumed Extinct, *Pterostylis nutans* (or at least one of the forms currently included under that aggregate name) has been rediscovered in forest near Lake Taupo. As with the preceeding species, the New Zealand plant appears to be the same as one of the more widespread forms of the *P. nutans* aggregate in Australia.

Range restricted
Taxa whose distribution is naturally confined to specific substrates (e.g., ultramafic rock), habitats (high alpine fell field) or geographic areas (e.g., subantarctic islands). Typically Range restricted taxa are under no obvious or immediate anthropogenic threat.

†*Cryptostylis subulata*
Having demonstrated the capacity to spread well beyond its assumed point of introduction by sexual means *Cryptostylis subulata* is no longer considered a vagrant. However the orchid remains uncommon throughout much of its restricted northern wetland range. The species is very common in Australia.

†*Thelymitra malvina*
Thelymitra malvina is now known from five separate locations ranging from Kaimaumau Swamp to Ngawha Springs. Although still uncommon, the species seems to be extending its range. Doubts over its taxonomic status remain with the view prevailing in New Zealand, that New Zealand and Australian specimens are identical. In Australia *T. malvina* is locally common (B.P.J. Molloy *pers. comm.* 1999).

Insufficiently known
Taxa that are suspected but not definitely known to belong to any of the above categories because of a lack of information. It is hoped that listing a taxon as "Insufficiently known" will stimulate studies to find out its true category of threat.

†*Pterostylis alveata*
A new species listing. Suggestions that *Pterostylis alveata* is a vagrant remain untested. Preliminary evidence suggests that it is locally distributed in suitable habitat over a large part of the western side of Golden Bay. Flowers have been seen but observations of seed set have not been reported. Until the reproductive biology of this species and its exact distribution, are determined, a more definitive listing for the species would be inappropriate.

Pterostylis irwinii
A new species listing. A more definitive listing for the recently described *Pterostylis irwinii* is still inappropriate, as its distribution is still poorly understood. Currently the species is known from two locations at Erua and Takaka, and possibly a third near Kawhia. Further survey is needed.

Pterostylis porrecta
A new name for the species previously treated as *P.* aff. *graminea* (Cameron et al. 1995). *Pterostylis porrecta* is now known from 7 sites that range from Mt Pirongia to Nelson; at several sites it is locally common. As with *P. alveata* and *P. irwinii*,

definitive listing without precise details is considered inappropriate. Post 1997 discoveries suggest that the species would probably qualify for the rating of Sparse.

Taxonomically indeterminate

This appendix includes previously described taxa about which there is doubt regarding taxonomic status and which require further investigation; and those recently discovered taxa whose taxonomic status has yet to be determined. In both instances, available information suggests that candidate taxa could be under some level of threat.

Critically endangered

‡*Calochilus* aff. *herbaceus* (CHR 65825; Kaimaumau)

An exact name for the New Zealand representative of this Australian group of orchids has yet to be determined. Despite this it is very unlikely that this orchid will prove to be endemic (B.P.J. Molloy *pers. comm.* 2000). Whatever its taxonomic status, *Calochilus* aff. *herbaceus* remains uncommon, elusive, and in most of its known sites at risk of further loss.

Endangered

Thelymitra (a) (WELT 79140; Ahipara)

A distinctive, cryptic sun orchid, still known only from the Aupouri Peninsula, where it grows in peat bogs within pools of water. Because the flowers rarely open, this sun orchid is frequently overlooked as being immature specimens of *T.* aff. *pauciflora* with which it grows, and with whom is shares some general column characters. The species is best distinguished by its peculiar wetland habitat, being the only sun orchid to predominantly grow in permanent pools of water, possessing a flat, bright green, *Ixia*-like leaf, and by its autogamous, cleistogamous flowering habit. At the chromosome level it is very distinct from other New Zealand sun orchids, and has a number suggesting that the species may be a recent trans-Tasman arrival. However searches of suitable habitat in Australia have thus far failed to locate similar plants (B.P.J. Molloy *pers. comm.* 2000).

Vulnerable

Prasophyllum aff. *patens* (AK 236408; New Zealand)

Aside from the lack of a formal name the conservation status of this leek orchid is essentially unchanged. The majority of the known occurrences occur on unprotected land, while several of these are at further risk from weed invasion and natural succession.

Insufficiently known

Spiranthes aff. *novae-zelandiae* (CHR 518297; Motutangi)

This elusive orchid is still known from one or two peat bogs in the far north. One large population near Motutangi was destroyed following drainage some time after 1994. Because the orchid is so poorly known, and few people are able to distinguish it from the more common *S. novaezelandiae*, a more definitive listing for the taxon is considered inappropriate.

Discussion

The new listings provide some significant departures from previous threatened plant assessments (e.g., Cameron et al 1993, 1995). Firstly, the New Zealand Threatened Plant Committee no longer lists indigenous taxa as "Presumed extinct" if they are known to be still extant outside New Zealand. Thus one species, *Chiloglottis formicifera*, is listed as a vagrant, although there is currently no evidence of any extant natural occurrences in New Zealand. Because the species is not globally extinct, it still has the potential to reintroduce itself to New Zealand in the future. Secondly, several taxa, e.g. *Cryptostylis subulata*, *Thelymitra matthewsii*, treated as vagrants by de Lange & Molloy (1995) are no longer

listed as such because they have demonstrated an ability to establish themselves naturally over a large area. Therefore they exhibit that they are no longer reproductively or ecologically constrained. Lastly, on the basis of several submissions received, the committee adopted a very conservative treatment for New Zealand vascular plants, thus many possibly new taxa, including some orchids, e.g., *Corybas* "rest area", *C.* "whiskers" (see St George *et al.*, 1996) have not been assessed because their taxonomy is still unresolved. Only those taxa, established (as of 15 October 1999) as distinct in past conservation literature and confirmed by expert opinion, which still await formal taxonomic clarification have been listed, e.g., *Prasophyllum* aff. *patens*. The committee believes that listing "taxonomic uncertainties" as potentially threatened should, as far as possible, be avoided to prevent obscuring other clearer national conservation (as against taxonomic) priorities.

Based on a comparison of past conservation listings (Cameron et al., 1993, 1995) it is evident that the numbers of threatened *vs* uncommon orchid taxa have changed, with fewer listings in the "Threatened" categories. These changes in status reflect our improved knowledge of some orchid distributions and their taxonomic status. Significantly, many of the new listings have only come about through the published discoveries of New Zealand Native Orchid Group members. However, it is disturbing that (aside from the author) orchid group members did not provide any submissions on orchid conservation to the New Zealand Threatened Plant Committee (see de Lange 1999). Thus orchid assessments were based on input from the committee members, Department of Conservation staff, active systematists like Dr Brian Molloy, and the perusal of the New Zealand Native Orchid Group Journal. Accordingly, some of the new conservation assessments are problematic. For instance, *Thelymitra tholiformis* was rated as "Rare" by Molloy & Hatch (1990), and, partly on the basis of that paper, and subsequent herbarium collections of the species, the New Zealand Threatened Plant Committee has maintained the species as "Declining". However, it is becoming evident from discussions with some orchid group members that this species is well known to the group as a widespread, and locally common species (E. Scanlen *pers. comm.* 1999/2000). So its rating is probably incorrect, as would also appear to be the case with *Corybas rivularis* sens. str. Although, conservation listings are invariably out of date the moment they appear in print, it is frustrating that orchid group members have failed to disseminate their local knowledge to the appropriate conservation authority. This leads to the inevitable question – why? Several reasons spring to mind, the most likely of which is ignorance about the New Zealand Threatened Plant Committee, it's functions, and publications.

In the interests of future conservation listings, the following outlines the process whereby NZNOG members can assist with the process.

The New Zealand Threatened Plant Committee

The New Zealand Threatened Plant Committee was established by the New Zealand Botanical Society in 1991 (de Lange & Taylor 1991). Since then the committee has published three conservation assessments of the New Zealand indigenous vascular flora, the first two (Cameron et al. 1993, 1995) were published in the *New Zealand Botanical Society Newsletter*, the most recent (de Lange et al. 1999) in the *New Zealand Journal of Botany*. The committee consists of five elected members, Peter Johnson, David Given, Colin Ogle,

Ewen Cameron and Peter de Lange. Additional individuals may be seconded as the core committee deems appropriate, as proved the case with the last revision (de Lange *et al.* 1999). The core represents northern North Island (Ewen Cameron), southern North Island (Colin Ogle), northern South Island (David Given) and southern South Island (Peter Johnson). The fifth person (Peter de Lange), spans the whole country, oversees the formal submission process, finances, meeting organisation, and final publication of the revised list. Although an apolitical body, the committee's travel and meeting expenses for the last three revisions have been covered by the Department of Conservation.

Conservation classification systems and assessments

In the past, conservation assessments were based on modified versions of the IUCN Red Data Book Categories (see Cameron et al. 1993, 1995). The most recent revision (de Lange et al. 1999) trialled the de Lange & Norton (1998) system, while future assessments are likely to use a new system being developed by the Department of Conservation (Molloy *et al.* 2000). The last system has been designed to cope with conservation assessments of all of New Zealand's biota – including naturalised exotic taxa known to be at risk in their country(ies) of origin.

For the purposes of the committee, the last three revisions have been based on data gathered from the previous conservation assessments (Cameron et al. 1993, 1995). Public submissions, and expert opinion regarding the conservation status of the New Zealand indigenous flora then supplement this. All submissions are solicited from the New Zealand botanical community via public notification in *New Zealand Botanical Society Newsletter* (de Lange 1998). Public notification is usually published three to four months before the committee meeting, and a strict deadline is given. This is important as the process of assessment, list compilation, and publication is a time-consuming, costly exercise – a process which late submissions can seriously hamper. All submissions received by the deadline are collated and reviewed jointly by the committee. Any late submissions are held over for the next revision.

Ideally submissions should provide the taxon name, an account of its current distribution, threats and suggested conservation assessment, e.g. Critically Endangered. In practice, many submissions received provide scant detail, and this necessitates further consultation with committee members, experts, herbarium records and relevant literature. Naturally submissions may also propose new candidates for conservation assessment, and refute or support existing assessments. In practice the committee would **strongly advise** people to send in submissions that cover all these situations – one cannot **assume** current assessments will remain static.

Publication and duration of lists

The past two revisions (Cameron et al., 1993, 1995) were published in the *New Zealand Botanical Society Newsletter*, but the 1999 revision was formally published within peer-reviewed literature. This departure stems from the failure of past lists to be recognised by the international community, resulting in confusion over the conservation status of New Zealand's vascular plants, e.g. Walter & Gillet (1997), Oldfield et al. (1998). Furthermore, formal publication introduces a greater degree of peer-approval, which in turn should empower list users when promoting this publication for conservation research issues, formal hearings, resource management issues, environmental impact assessments and submissions.

In theory each list has a life of three years – yearly revisions are costly and

confusing, whilst longer time lapses can induce greater conservation risks to candidate taxa. In practice the duration of each list has been dictated by funding and individual effort. Currently the committee comprises volunteers whose expenses have been met by the Department of Conservation.

Resolutions

As can been seen the process of conservation assessments relies on the goodwill and support of the New Zealand public and the Department of Conservation. Furthermore, the current system has been hampered by the inability of the revisions to reach the target audiences within and outside New Zealand. Also – as far as orchids are concerned – there has been apparent failure of the notification and submission system to reach beyond the readership of the *New Zealand Botanical Society Newsletter*.

As the above orchid listings demonstrates, we are still ignorant about the status of many of our indigenous orchids. It is also likely that NZNOG members will wish to dispute these assessments, provide additional sightings of listed taxa, or propose new candidates for assessment. Indeed I would hope all of these prove the case.

Accordingly, I propose to provide three lines of communication by listing the names, email and postal addresses of the New Zealand Threatened Plant Committee members (Appendix A), the names, emails and postal address of Department of Conservation botanists (Appendix B), and by providing formal notification of future list reviews in the *NZNOG Journal* – currently December 2001.

Acknowledgements

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Volunteers wanted for National Park wetland rare orchid survey

Nick Singers of the Department of Conservation at Turangi asks for up to ten volunteers to search likely habitat in the Ruapehu wetlands from the base of Hauhangtahi to the Mangatepopo school camp, for *Pterostylis micromega* and other rare wetland orchids. There are likely to be two or three days surveying, depending on the availability of the helicopter.

Dates would ideally be between 3 and 12 January. The logistics and probable time for the survey will be decided shortly. Orchids can be fickle about when they want to flower, but from experience in the National Park wetland, *Pterostylis micromega* will probably be in the middle of flowering in the first week of January: this would be the best time for searching.

Reasonable fitness and mobility are essential, though participants will travel to the search area by helicopter. Transport costs within the North Island will be met, and accomodation arranged. The rare wetland orchid survey is funded from DoC's biodiversity strategy funding.

Please respond as soon as possible to Eric Scanlen, 4 Sunny Park Ave, Papakura, with your name and contact details, the dates you are available, and an estimate of your travel costs to and from Ruapehu.

Notes, letters, questions, comments

An international conference called **Ecology of Insular Biotas** will be held at Victoria University of Wellington from 12 to 16 February 2001. The conference will focus on ecological patterns and processes of particular importance to isolated biotas, including true islands, natural habitat islands (eg. ponds) and artificial habitat islands (e.g. reserves).

Orchids of the Caucasus: wild orchids native to Georgia occur almost all over the country in a wide range of habitats from sea level to high altitudes. The most abundant areas of orchid distribution are Trialeti range and high mountainous areas of the Great Caucasus, Racha, Mtiuleti and Tusheti. As well, beech forests in Zemo Imereti and in Saguramo, Kartli, are very rich areas by orchid species. These regions are characterized by both the highest number of species and the most abundant populations of separate species. Genus *Orchis* is represented by the highest number of species: 14. Most of them are distributed widely. However, some species have local distribution and occur in very restricted areas. For example, so far only several individuals of *Orchis punctulata* are found in Pantishara gorge in Vashlovani. *O. simia* is a rare species distributed in the same region. Some cosmopolitan species of Orchidaceae as *Goodyera repens, Listera cordata, L. ovata* are found in the country. Different species of orchids are adapted to a great variety of habitats like dry grasslands or wetlands, bright meadows or shrubbery or even dark woods. Most orchid species however are restricted to a more or less narrow spectrum of habitats. The life of orchids is dependent on their relations with other organisms. They developed a great variety of symbiotic associations with fungi as nutriment deliverers for orchid embryos or insects as very sophisticated pollinators. This fact makes these species more sensitive to disturbances of habitats.... Therefore, orchids react very sensitively to deteriorations of the natural status of their habitats which, with increase of anthropogenic pressure on nature, diminishes the number of individuals within populations and makes doubtful the species survival itself. This is why it seems so necessary to undertake conservation steps of orchid species which to our opinion will contribute to maintenance of biological diversity in Georgia. Recently, comparatively little work has been carried out on the botanical investigation of Georgian wild orchids. Among 48 known orchids distributed in Georgia many are endemic, rare or even endangered species (Red Data Book of USSR, 1984). However, not any species of orchids are included in the Red Data Book of Georgia (1982). On the other hand, in many countries all native species of the family of Orchidaceae are under protection.... Another problem is that the old, often incorrect nomenclature of *Flora of Georgia* and *Key of Georgian Vegetation* as well as many obvious taxonomical problems urgently need a modern updating.

Jessica Beever wrote, "I was interested to read the comments in the December 1999 issue of the NZNOG Journal on **long distance dispersal –** orchids certainly being a special group amongst flowering plants in this regard. I would like to clarify a small but significant inaccuracy in your comments on my *NZ Botanical Society Newsletter* article on dispersal of mosses (*N.Z. Bot Soc. Newsletter* 57: 10-12). I certainly do not consider that mosses 'may be acciclentally introduced more often.... than vascular plants' – only that they may be introduced

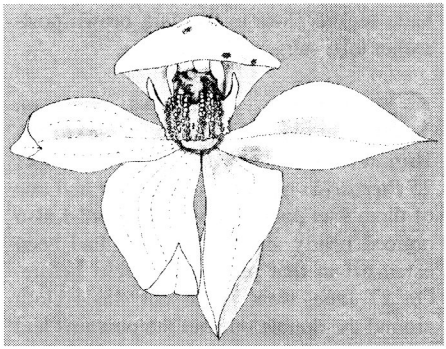
more often than we currently recognise. Currently 1 in 30 of our New Zealand moss species are considered to be introduced, while for vascular plants the figure is 1 in 2."

Barbara McGann reported on orchid species found in **Herbert Forest, North Otago** in 1984 – 1999: "Some habitats now logged, some overgrown, others not visited during 1999/2000. *Aporostylis bifolia, Caladenia lyallii* (no particularly large flowers noted among the hundreds in 1999), *Chiloglottis cornuta, Corybas macranthus, Corybas trilobus, Gastrodia cunninghamii, Gastrodia* "long column" (new sites found 1999. Dozens of plants), *Gastrodia minor* (the odd one around, most sites gone with logging), *Microtis oligantha, Microtis unifolia* (hundreds 1999), *Prasophyllum colensoi* (increased from 6 plants to several dozen 1999), *Pterostylis banksii, Pterostylis graminea, Pterostylis montana* (bronze, boxy plants, several dozen 1999, new sites), *Thelymitra circumsepta** (new sighting for me. Two plants 1999), *Thelymitra cyanea, Thelymitra hatchii* (two plants 1999), *Thelymitra longifolia*** (dozens, singles and clumps 1999), *Thelymitra pauciflora* (14 flowering plants 1999), *Thelymitra pulchella* (dozens, mostly blue, some bright pink 1999. The pink ones a new sighting for me).

**Thelymitra circumsepta* - found growing alongside *T.hatchii* in clay (disturbed about 5 years ago) at roadside 12/12/99. I sent a flower of each (petals and sepals of both still fairly colourless) to Graeme Jane for confirmation of identification. Plants rechecked 19/12/99 - flowers more mature, both blue, other identification points more marked.

**I found more than a dozen lush flowering clumps of *Thelymitra longifolia* in soft clay on the edge of a 6 year old chipping site of interest to me because I had not noticed them there in previous years and hitherto *T. longifolia* had only appeared along the hard edges of forest roads as small singles. A fortnight later all leaves, flowers and tubers were missing. The area was so tidy my first thoughts flittered to an Orchid Thief (Susan Orlean's book was a good read) but the "culprit" was probably a wild pig. Only the *T. longifolia* had been taken - other Thelymitra species in the vicinity remained untouched. At a later date trotter prints could be seen on wet clay and rotting logs broken into for ?huhu grubs.

My Herbert Forest entry permit ceased 20/12/99 - I carried on searching in areas still accessible to the public and enjoyed unexpected finds - new sites of some of the above list. I am hoping the new forest owners, a private company, will grant me a new permit later this year.



Caladenia aff. *lyallii* from Flagstaff, near Dunedin; a large form showing 6 rows of calli (see The Column in this issue).

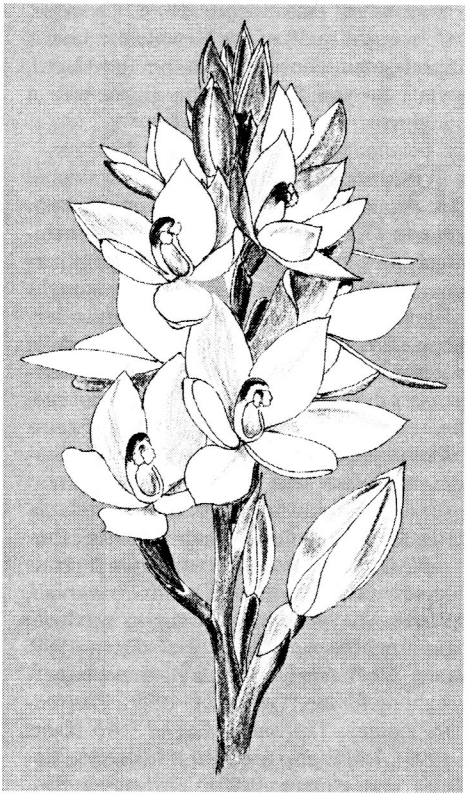
Barbara McGann also wrote, "On 27 January the local DoC officer invited John and me to join a working party at **Macraes Flat** - we spent the day stapling fencing on the skink enclosure. The lunch break provided an opportunity to scout around for orchids. The tussocky area has (with DoC and local farmer land swaps) now been retired from grazing. (We found): *Prasophyllum colensoi* (hundreds of plants, the majority just past flowering, some smaller plants with fresh flowers), *Microtis unifolia* (hundreds/thousands freshly flow-

ering. Some small few-flowered plants possibly *Microtis oligantha*), *Pterostylis tanypoda* (several flowering plants), *Thelymitra pulchella* (at least twelve flowering plants [one inside the skink enclosure] growing singly. Most blue, a few mauve-pink. All flowers examined had dark blue/purple stripes on petals and sepals. The one blue flower given a 'sniff test' had a marked scent - similar to a purple garden violet. No scent detected in a mauve-pink *T. pulchella* flower), *Thelymitra* species past flowering (?*T. longifolia*. Many dozens of plants dotted around singly and in small colonies. Probably 3 to 4 weeks past flowering, wide strap-like leaves almost lying along the ground. A small later-flowering, but spent, plant examined briefly - the tufts of whitish hairs tucked close to the dark brown post-anther lobe suggest *T. longifolia*.

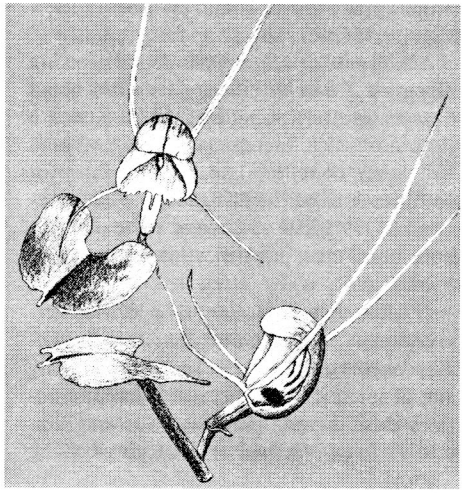
Geoff Stacey, Wharekawa, wrote on the **increasing possum spread in the Hunua Ranges**, "On 24 June I found about 25 *Pterostylis agathicola* in flower and one of them was double flowered, great! I also noticed nearly all the *trullifolia* had been eaten off in that part some weeks before. On 27 June, went up to put shade cloth around the double one but the possums had got to them first. Only three left in flower and would you believe, the double had just the stem and three leaves left. Since 1080 was dropped about seven years ago [almost wiping out the possums] I have really seen the harm they do to orchids, especially over these past two years."

The ***Thelymitra* aff. *longifolia* from the Far North** often shows the delightful pyramidal spike of open white flowers shown at top right.

The **white form of *Corybas trilobus*** was drawn by Eric Scanlen (below, right) for the 2000 edition of the *Field guide*. He asks, is this a separate taxon (see The Column in this issue)?



Thelymitra iaff. Longifolia *from Te Paki Farm Park, Far North.*

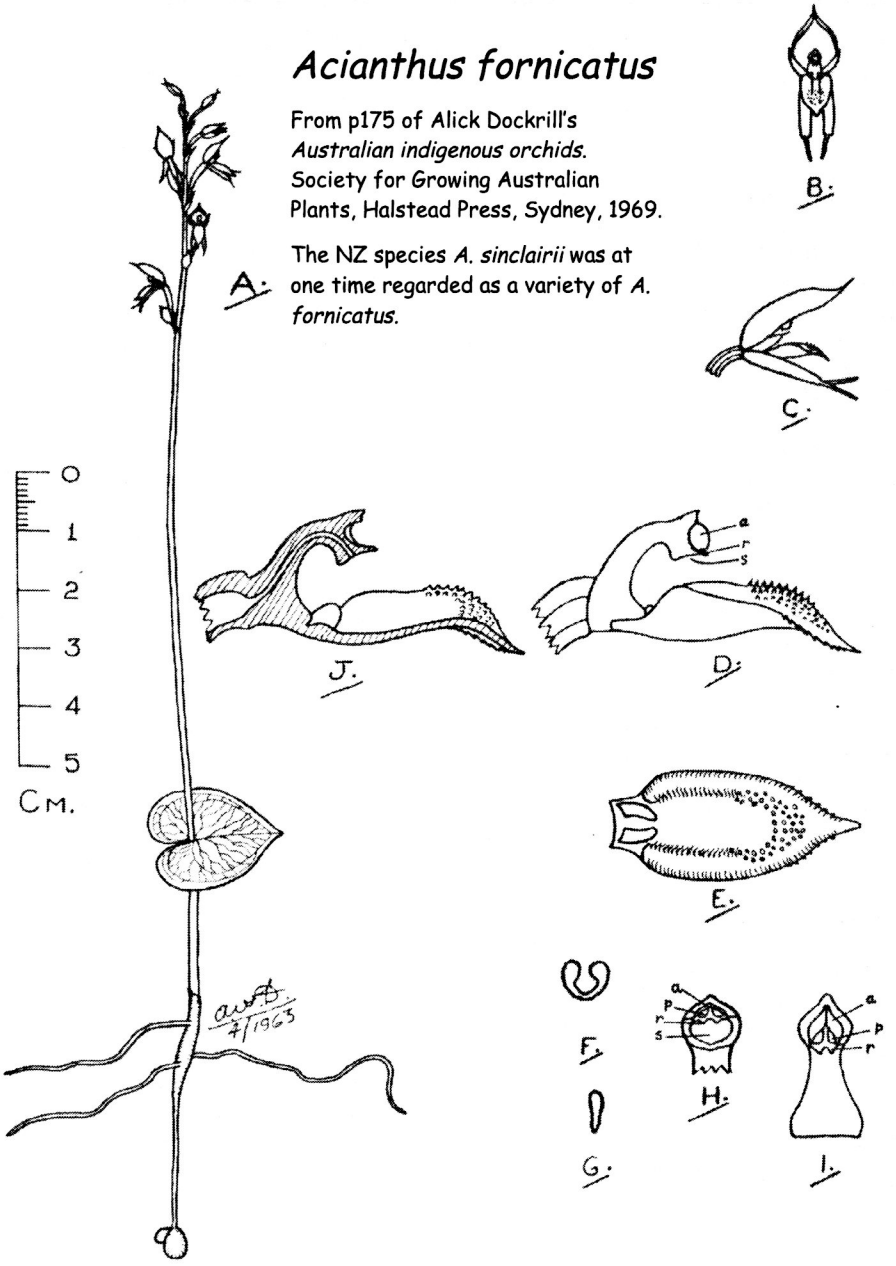


Close relations: orchids like ours

Acianthus fornicatus

From p175 of Alick Dockrill's *Australian indigenous orchids.* Society for Growing Australian Plants, Halstead Press, Sydney, 1969.

The NZ species *A. sinclairii* was at one time regarded as a variety of *A. fornicatus.*



Other islands' orchids: Madagascar
— the conservation of Malagasy orchids

– based on a paper given at the International Conference in Shimanami, '99 by Marie Elisette Rahelivololona of the Parc Botanique et Zoologique de Tsimbazaza, Madagascar.

Madagascar is the fourth largest island in the world. Although it is separated from Africa by only 400km, the separation occurred over 160 million years ago so the flora is characterised by a very high proportion of endemic species, genera and families. There are 54 genera and about 1000 species, as many as on the whole continent of Africa. The endemism at the species level is about 85%, and there are several endemic genera.

The **diversity** of Malagasy orchids is partly the result of a wide range of climate and vegetation types.

Four major climatic zones are recognized: 1.Tropical, humid zone with no dry season in the northern and the eastern parts of the Island; 2. High altitude, cooler moist zone in tropics with a dry season in the central part of the Island; 3.Tropical dry and hot zone with a long dry season in the western part of the Island; 4.Tropical very dry and hot zone with low irregular rainfall in the southern part of the Island.

The highest species-diversity of orchids in Madagascar is found in the mid-altitude humid evergreen forest of the eastern escarpment between 700 and 1200m. Some orchid species are restricted to very specific habitats. In particular, several epiphytic species are found on one or two host-trees.

Many other orchid species have highly restricted geographical ranges. For instance 90% of the epiphytic Bulbophyllinae species and 70% of the Habenariinae species have only been recorded from a single location. Several other orchid species are restricted to a single massif or inselberg. These species with highly specific restricted habitats or highly restricted geographical ranges are extremely susceptible to extinction. Unfortunately, they account for a significant proportion of the Malagasy orchid flora.

Malagasy orchids are **threatened** in several different ways.

Slash and burn cultivation: the population of Madagascar has been increasing at an alarming rate and each year more forest is cleared to grow crops to feed the extra people.

Fire: in the central and the western parts of the Island, the grassland has been burnt every year to promote new growth to feed cattle.

Charcoal production: charcoal remains the most popular fuel for cooking, and it is the sole fuel used by most of the rural population. Although in some parts of the country charcoal has been produced from plantations of Eucalyptus, elsewhere it comes from the indigenous forest.

Collecting and trade: the majority of the Malagasy orchids in the market have been obtained from the wild, and a significant quantity have been exported overseas every year. They have been collected by ripping them off tree or rock or digging them from the ground. Orchids in local markets have been planted in pots or on cut pieces of trunk of tree-fern to be sold along the roadside or to be placed in sacks for transport to major towns or cities. These will mostly die under careless cultivation, so the trade represents a tragic and pointless waste.

A priority for the **conservation** of wild Malagasy orchids must be the development of a well-protected and well-managed network of reserves, representative of all the natural vegetation types and floristic areas. Thanks to an increased commitment from the government, and financial and intellectual support from overseas, we are closer to

meeting this objective. In addition, in order to reduce the collection pressure on wild orchid populations and provide "safety net" populations of orchids growing *ex situ,* the Parc Botanique et Zoologique de Tsimbazaza has established, with the Royal Botanic Gardens, Kew, a project to cultivate Malagasy orchids grown from seeds collected in the wild, and sown and germinated at Kew.

Much more **action** is urgently needed to conserve wild Malagasy orchids:

1. The red data for highly threatened and endangered endemic species of orchids must be completed as soon as possible. Then, those orchids should be protected by whatever measures are considered the most appropriate.

2. Re-introduced individuals of certain orchids in natural populations must be assessed.

3. It is necessary to assess whether or not the present reserve network is adequate to protect the Malagasy orchid flora.

4. Artificial propagation and cultivation of wild Malagasy orchids must win much more popularity. The Parc needs support to equip facilities for training and educating tissue-culturists.

5. Greater efforts should be made to reduce the need for people to cut forests for agriculture and charcoal products in Madagascar.

Reference

1. Kondo K. (Ed.). Conservation and propagation of endangered wild orchids of the World. *Proceedings of the International Orchid Wave in Shimanami '99*. Committee of Hiroshima Shimanami '99 Events, 1999. 81-84.

From the internet

Heather Drope, the Orchid Society of **Nova Scotia**'s conservation representative to the Canadian Orchid Congress wrote, "My little area of the world is only now enjoying the first of our orchid species in bloom and yesterday, June 2, I took my first look at them. The *Cypripedium arietinum* are always the first to bloom and this year they were about a week late but we found them in full bloom. Happy to say that the colonies are not diminishing in size. A new one that someone located last year has in fact increased or so it would seem. Added to that colony are several *C. arietinum f. albiflorum.* That was exciting as I hadn't seen that form for many years not because it had disappeared from a previous location but because I didn't want to risk life and limb climbing a qypsum cliff. In the same general location the *C. parviflorum* var.? was just opening in one very open location. This particular colony of about ten plants is the first to bloom every year. They grow under a very small stunted spruce tree in needle litter and ten cm away on all sides is just flat open bare gypsum. The air temperature was 80F and the soil temperature beside the blooming Cyp. was 60F. One wouldn't think there would be enough moisture for the plants to survive but they do. I have photographs from fifteen years ago and the colony was about the same then."

IWITAHI 2000

The annual field days will be held this year on
Friday evening to Sunday 8 - 10 December.

See notice page 43 and contact Trevor Nicholls for details.

Profile of a threatened N.Z. orchid: 4

Reproduced with permission—from Dopson SR et al. *The conservation requirements of New Zealand's nationally threatened vascular plants.* Biodiversity Recovery Unit, Dept of Conservation, Wellington, 1999.

Chiloglottis formicifera Fitz.

Family: Orchidaceae

Endemic to: Indigenous to New Zealand and Australia.

Common name: Ant orchid.

Ranking: X, Presumed Extinct. **In cultivation:** N.A.

Descriptor: A non-descript orchid, with two ovate green leaves (venation conspic uous) and a large flower, whose narrow petals are coloured green while the black or dark red-mottled labellum has a superficial resem blance to an ant.

Conservancy: (NL). Collected once in 1901 from near Kaitaia.

Habitat: In New Zealand the exact habitat preferences of this species are unclear. A few plants were found near an old pa in low scrub. They were never seen there again. In Australia this species and its close allies, C. ***trapeziforrmis*** and *C.* ***truncata,*** form a complex and all three taxa are extremely common in Australia in a variety of seral habitats.

Threats: A vagrant to New Zealand. This "species" complex is abundant in eastern Australia. Within New Zealand, it is reasonable to assume, from the herbarium evidence available, that this species was collected into extinction. As most Australian *Chiloglottis* require specific insect pollination vectors, it is unlikely that this orchid would establish itself further if it were to recolonise New Zealand again.

Work undertaken to date
Some opportunistic survey within the far North of New Zealand. As this species is a vagrant to New Zealand, under no threat in Australia, where it is abundant, survey within New Zealand is not a conservation priority.

Priority sites for survey
Not a conservation priority.

Monitoring: objectives and priority sites
To be determined if and when this species is rediscovered.

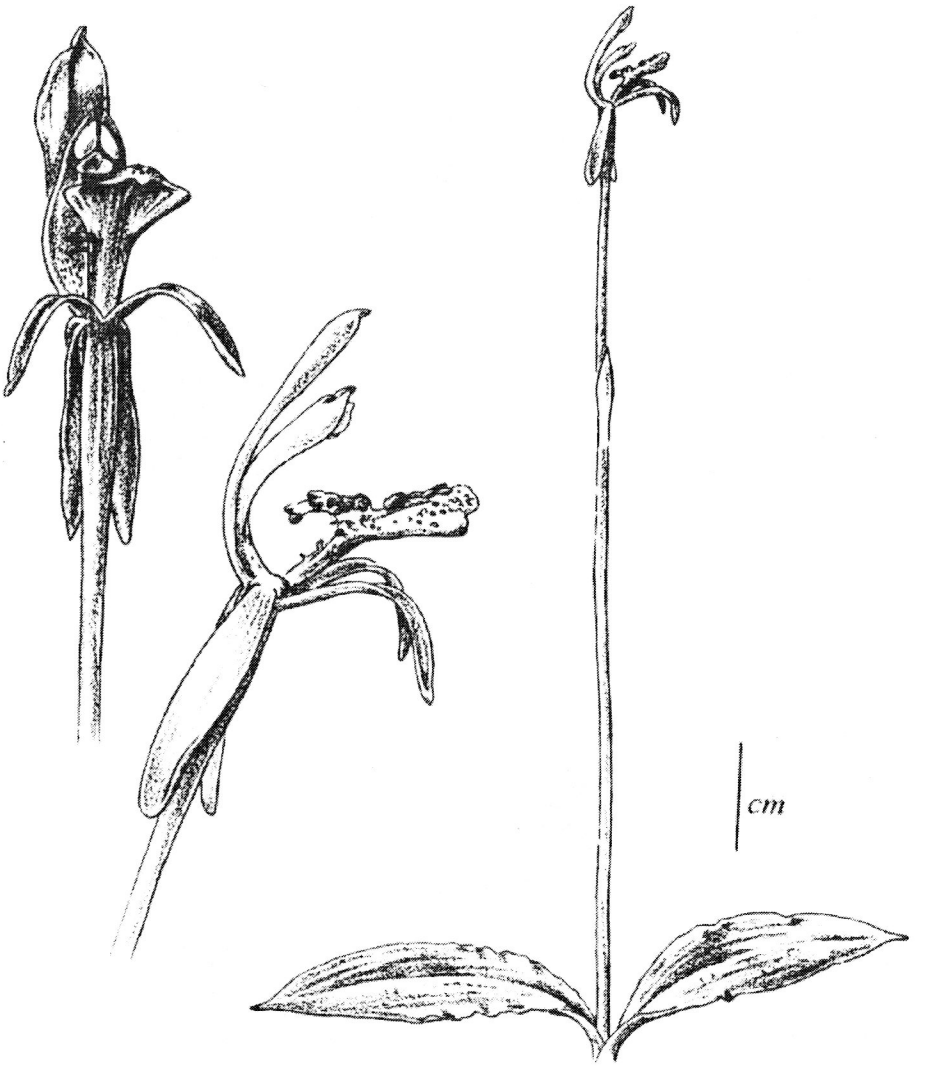
Research questions
In Australia this species and its close allies, *C. trapeziformis* and *C. truncata.* form a complex whose identification at species level is often difficult. The New Zealand collections, while currently attributed to *C. formicifera,* are probably *C. trapeziformis.* Further research into this matter is required.

Management needs
To be determined if and when this species is rediscovered.

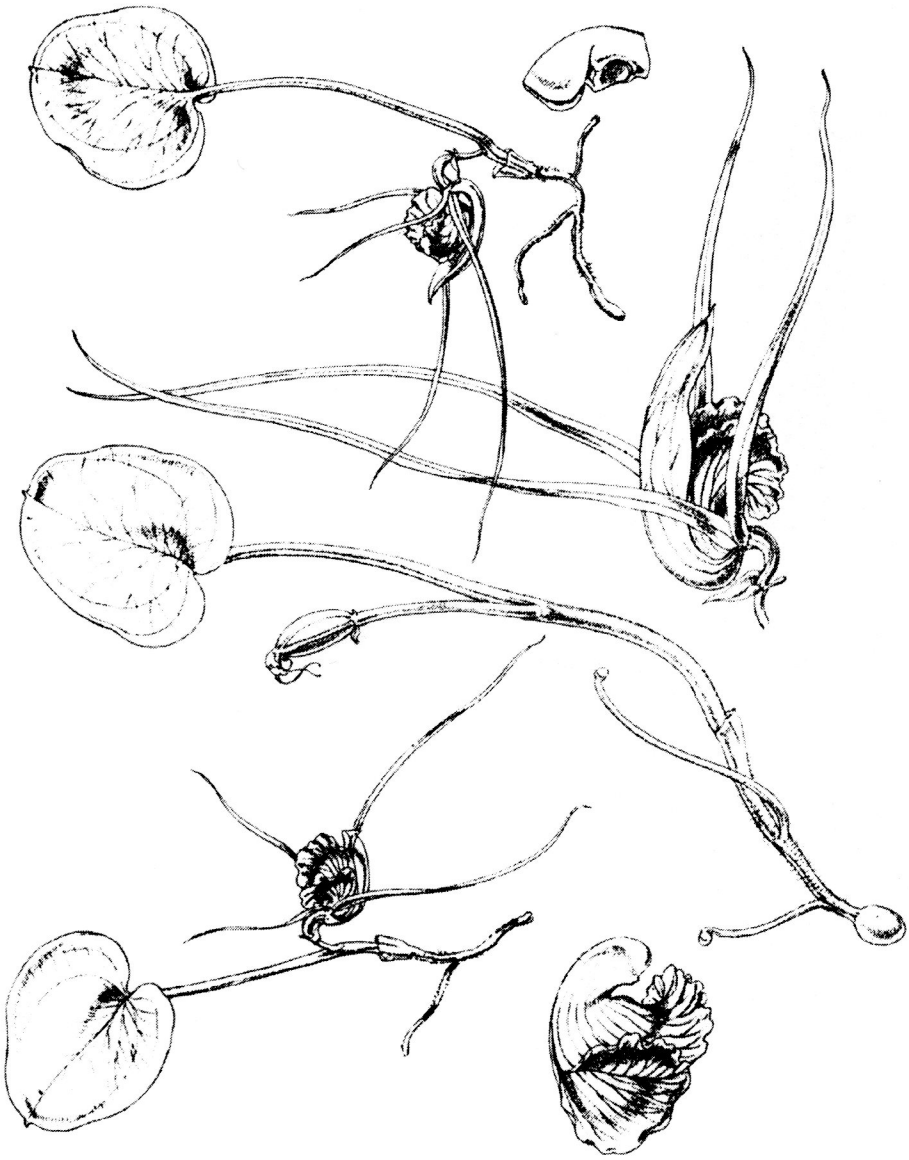
Selected references

de Lange, P.J., Molloy BP.J. 1995. Vagrancy within New Zealand threatened orchids: what are our conservation priorities? *New Zealand Botanical Society Newsletter 40:* 11-14

Wilson, C.M.; Given, D.R. 1989. *Threatened Plants of New Zealand.* DSIR Publishing, Wellington.



Historical reprints



↑ (previous page) There has been recent debate about the possibility of two forms of *Corybas macranthus*—a southern and a northern form. Which is the true species? The answer is the one Hooker described and Fitch drew onto the stone in 1853 for *Flora Novae-zelandiae*, reproduced above (looks like the northern form, I would say).

↓ (below) A similar discussion has ranged around two forms of *Corybas oblongus*— is the true species the one with the oval opening and the smooth interior to its labellum, or is it Matthews's "Corysanthes aestivalis" with the round opening and the bed of dark whiskers inside? Judging from Fitch's engraving it is the former, and Matthews may have been on the right track.

The column: Eric Scanlen
Indexing a gold mine of NZNOG *Journals*

Introduction

Can you think of anything more tedious than indexing the NOG Journals? Think again! A scattered melange of disparate articles and notes becomes a gold mine of information when put together cohesively in a user friendly index. The Column, under pressure for saying photographer's things about odd species, wasted too much time flipping through Journals for elusive articles from dedicated souls who always have a message... or they wouldn't have written in, would they? KF Ross's index of Dorothy Cooper's first 20 Newsletters was a treasure for those first thin issues and the info. was a concentration of gems. There in issue 1, was Dan Hatch's intriguing *Corybas* "orbiculatus" from the shores of the Manukau Harbour near his home. Now it has devolved as an undescribed taxon of the *C. rivularis* complex and is still under a cloak of anonymity as *C.* "Kaitarakihi" [J74 p 14 & Fig 6]. But far more important inferences kept looming as the Column buckled down to index every Journal from issue 21 to 75, on Gloria's trusty MS Publisher program.

Caladenia lyallii for instance, a caladenia the Column once thought had no identity problems? How wrong can one be! The type specimen from Otago had four rows of yellow topped, stalked calli stalking down the disc; according to Cheeseman [1]. But Hooker, who first described it [2], didn't number the rows. Brian Molloy's drawing, [J61 p8] has only two rows on the disc, surprise surprise, but David Jones' description [3] said 2 to 4 rows, rarely 6. He had a photo of the type specimen and 67 fresh specimens [J63 p4] so he should have known. Ian St George's fig. 4 [J63 p5], the common one from Otago to Iwitahi, has the 4 rows, (**Fig. 1**) but two row specimens *have* shown up in the Journal. Ian saw one at Arthur's Pass [J63 p6]. Graeme Jane and Gael Donaghy found it in NW Nelson, [J75 p12]. David's *C. cracens* has 2 to 4 rows of calli? What do you think?

Then, scattered reports came together (from the dedicated few who lie prone with a lens, pry open the galea and actually count the rows) of bigger, subalpine flowers with six rows of calli, from as far afield as Swampy Summit, Dunedin [J23 p8] to Iwitahi [J35 p19] to Cobb Valley [J75 p12] plus others. Note that Max Gibbs' large one from Iwitahi [J35 p20] has 5 veined tepals and 6 rows of calli, but the large specimen sent to Ian [J63 p5, fig 2] had only 4 rows. Is all that clear? Ian's **Fig. 2** from Flagstaff, Dunedin has the same 6 and 5 count as Max's. The Australian *C. alpina* has 4 to 6 rows of calli [3]. The evidence suggests that such a widespread 6 row taxon, in subalpine NZ, might well be *C. alpina*. Let's say *C.* aff. *alpina* in the meantime. Then it transpires [J46 p2 etc.] that the Column's "secure mental type specimen" of *C. lyallii* at Iwitahi, was only a four row stand-in which has earned Ian's tag of *C.* aff. *lyallii* (**Fig. 3**). Do any of you feel the same mental wrench as the Column did at this piece of news?

Max reported all white (albino?) *C.* aff. *lyallii* (and *C.* aff. *alpina*?) at Iwitahi in [J37 p12] and these have shown up at Horopito [J70 p42]. All in all, from that *C. lyallii* with "no identity problems", some 4 or 5 taxa sprang out of the Journal pages and the jury is definitely still out!

As you see, the collected articles and illustrations provide a solid background of fuzzy logic for basic taxonomic studies on these species. The Column for one, is kicking himself for not taking more notice of the *C. lyallii* complex in the past.

Record the details. Do take care to note

some basic details, on *your* finds, not only on caladenia, to clearly separate the taxa - i. e. dimensions, site altitude and latitude, flowering date, perfumed or not, attitude of tepals and leaves, did the labellum wag in the breeze or was it insensitive or perhaps triggered at the lightest touch? Notice how many of those traits are impossible to see on an herbarium specimen? The knowledgeable often reported just the botanical name. Not enough! For instance, *Caladenia catenata* and pre 1983 *Corybas orbiculatus,* now cover some 14 modern taxa between them so 23 not-so-old reports of the names alone, mean little today. Photos or detailed drawings are valuable because they are still there when one wakes up, even 38 years later, that it *was* something different. Make your field trips count; include details such as "6 rows of calli" or "4 marginal calli at the base of the midlobe, twin flowered and bright blue". *Do* let me know if you find that one!

Pterostylis montana was another. Dan Hatch described plants sent from Stewart Island by Cedric Smith [4]. The silhouette of the solitary holotype, reprinted overleaf, is also in J25 p14 where Ian asked, "Will the real *P. montana* please stand up?" You and I have been taking for gospel, since 1970, that *P. montana* [illustrated in J38 p11 & J52 p10] has curly lateral sepals, a dark labellum strongly twisted to the right and a bronzy tinge to the leaves, right? Wrong – I think. To illustrate the species, Dan's father did a drawing which makes its first Journal appearance overleaf. The drawing, which doesn't fit the popular concept above, seems to be of one of the other flowers that Cedric sent, *P.* aff. *montana* (?) which are mounted on three other sheets with the holotype (*pers. com.* Bruce Irwin). E-mails have flown back and forth from Column to Editor on this vexed topic so the debate in essence, is aired here for you the reader to decide for yourself.

Column: One would need a cat scanner to look inside that pressed and fragile holotype to see column and stigma, so wouldn't the drawing and description be the best evidence on these important details?

Editor: For the purposes of this argument, it doesn't matter what Dan described or his father drew, it is the type specimen that defines the species. The silhouette of the type is clearly the flat-sepalled often-bronze, upright plant with the globular-cordate stigma. Lucy Moore in *Flora II* [6] came to the same conclusion. Cedric Smith's Stewart Island collection contained both *P. montana* and *P.* aff. *montana,* which grow side-by-side there as they do around Dunedin. Dan tried to accommodate both forms in his description. That is no criticism of him – look at the range of taxa once included in Cunningham's *Acianthus (Corybas) rivularis* or Moore's *Caladenia carnea!*

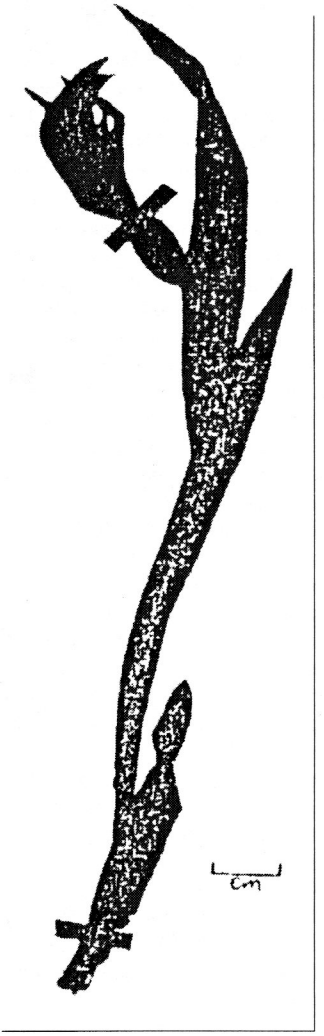
Col: But Moore lumped it in with Dan's *P. furcata* var. *linearis,* now *P. paludosa.* Also, they had the labellum broad almost to the apex and twisted usually to the right — why? This doesn't appear in the drawing or the description.

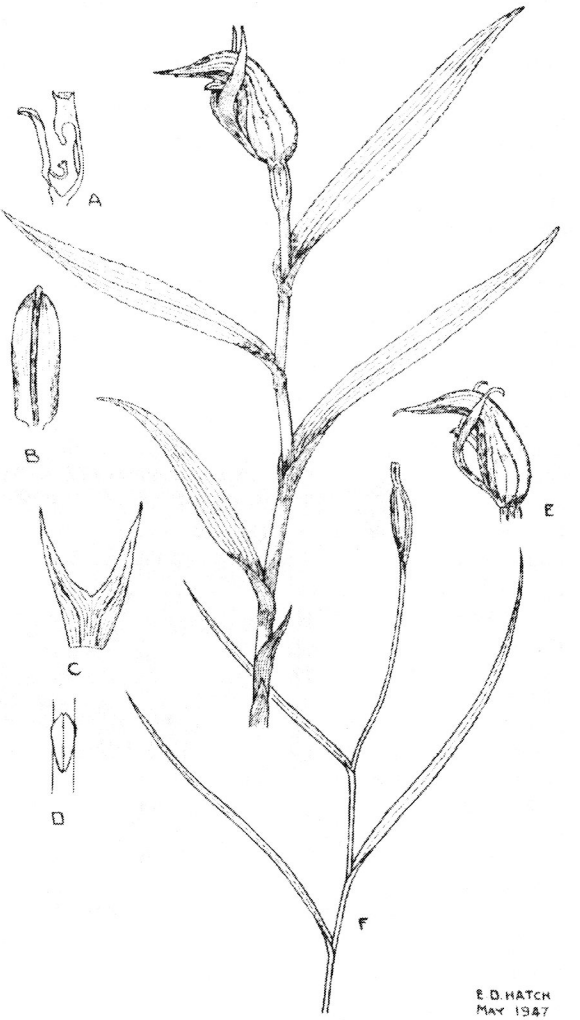
Ed: No, not the drawing, but as I said, it is not important if the specimen is extant. That labellum is absolutely typical of the bronze Otago/Stewart Island taxon, which with upright habit and globular-cordate stigma, is structurally very like *P. paludosa.*

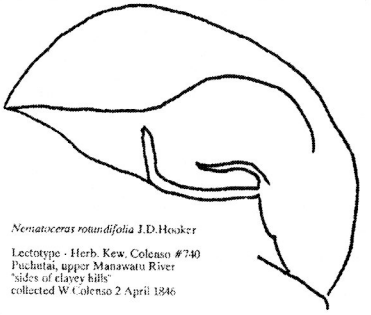
Col: I see your Otago taxon has flat, erect lateral sepals too, like Dan's holotype. But Irwin's illustration in *Flora II* showed curled lateral sepals — why?

Ed: I have seen them with lateral sepals flat, curled slightly forward, to curled in a full circle forward; it is of no importance. What matters is that the lateral sepals of *P. montana* are not rolled into a tube, as those of the Otago/Stewart Is. *P.* aff. *montana* are.

Col: But the accepted taxon for *P. montana* (**Fig. 4**) sometimes has a full circle curl in the sepals and a dark labellum twisted at right angles. That doesn't fit the holotype, drawing or description yet it is the one on both sides of Cook Strait that stands out from the 5 or 6 *P.* aff. *montana* taxa. But it







Above left: *Pterostylis montana:* the type specimen.

Above right: *Pterostylis montana:* the drawing that accompanied the original description.

Left: *Corybas rotundifolius:* Sketch of the type specimen by Dan Hatch

can't be *P. montana.* s.s. because Dan's description [4] had a green labellum with the tip unevenly constricted, (not twisted to the right) and no sign of curled lateral sepals anywhere. Can we call it *Pt.* "curly"?
Ed: Let me reiterate: the type specimen is what matters; the amount of "curl" is irrelevant; Dan's description is too. And I think "unevenly constricted" means "sometimes twisted to the right" (as in *P. montana*) and "sometimes not" (as in *P.* aff. *montana*). What does Dan say?
Col: Dan is all for a quiet life, at 81, but agreed with much of this on the phone but especially about *P.* "curly" not being *P. montana.*

Dear reader, if you can bring some light to the debate, do please write in. It all started with articles in the Journal. What other index revelations would we rather not hear? There are a few and the Column sometimes had to take time out to collect his shattered "axioms" of orchid lore, but one stands out:

White *Corybas trilobus.* (**Fig. 5**) How many of us have poked around in the subalpine zone just below the tree line and found this white *C.* "triwhite"? The first of some 10 contributors mentioned it as a prize that needed to be publicised but of late, entries are more as confirmation of a well known acquaintance. Some reported their finds as completely white (albino?) flowers or more precisely, palest green. Fig. 5 from Iwitahi has pink stripes out of sight until one lifts the dorsal sepal or gets a side look at its red flushed "cheeks" (à la Whakapapa and North Egmont) yet Max's photo' [7, plate 5] sure looks like an albino. Have other discoverers of *C.* "triwhite" anything to add please? Do write in with your best thoughts.

June/July flowering *C. trilobus* Eleven contributors mentioned this taxon, can we call it *Corybas* "triju"? (**Fig. 6** Bream Tail Reserve 18 July 1998) The original *C. trilobus* taxon, described as *Nemataceras triloba* by Hooker [J52 p23 & ref 2] in 1853 from "East coast and interior" was collected by Colenso and is unlikely to be *C.* "triju" but who knows? Hooker didn't mention a time of flowering. Ian even had it at Five Mile Creek, Queenstown, [J28 p10] flowering in the middle of July, among the icicles by a waterfall. The Column had long laboured under the delusion that it was a Region 9 [Map J41 centrefold] species but it seems that this taxon goes much further south. But the later flowering taxa, common in the south, most likely includes *C. trilobus* s.s. and several other distinct but related taxa.

***Corybas* "trisept"** One such, flowers in the Hunuas, (**Fig. 7**, Wairoa Track 11 September 1999) two months after *C.* "triju" but the lack of separate IDs, up until now, had the Column for 38 years with only an occasional puzzled thought as to the different flowering times. A similar flower spotted by Allan Ducker was captured on film on 13 October 1995 by the Column and Ian [J58 p5] at Ongarue (not Pureora) on a short petioled plant. In the interests of making life easier for index users, the Column proposes the Hunuas taxon be tagged *Corybas* "trisept" (**tri**lobus flowering in **Sept**ember in ER 9) until formal study and description gives it a botanically acceptable identity.

Tag your best finds. Please, when you find colonies of something different, don't spurn it as a misfit or try to squeeze it into a known taxon; *do* report it to the Editor with photo's if possible and a concise yet descriptive tag. The botanists may not approve of the tags (preferring established botanical names of course) but later discoverers, researchers and indexers alike, will all appreciate the clear and early distinction.

Keywords in headings. "That provoking orchid again" would be a truly whimsical heading but of little use to later researchers unless the indexer adds *his* keywords in square brackets. Don't allow it, please put in *your* keywords, clearly identifying your literary contributions. But the index is uncovering more problems than it is solving.

***Corybas rotundifolius* (?)** for instance,

emerges still as an enigma. Colenso picked a plant in bud on 2 April 1846 at Puehutai ; [±Dannevirke, J49 p2] latitude 40° 12´ S. Since then, *C. rotundifolius* has been reported only from kauri or ex kauri areas and there are no herbarium specimens from further south (*pers. com.* P. de Lange) than the Waitakeres, latitude 37° 00´. This pink helmet orchid [J52 p30 & J68 p20] buds and flowers like clockwork, in July, three months later than Colenso's type specimen. You could well say, "Something fishy here, let us revert to Cheeseman's name, *C. matthewsii*." [J52 p30 & ref 1: p 364] Not so fast; look at Dan's drawing [J38 p5] from a photo of Colenso's bud, used as a type specimen by Hooker [2]. Compare it with **Fig. 8**, a bud from Bream Tail Reserve on 7 July 1995. But, what else could Colenso's bud be? Australia's *Corybas unguiculatus* has distinct similarities with Dan's drawing of the bud *and* it flowers earlier, from May to August *and* is widespread in southern Victoria [8] whence several NZ taxa have sprung. Could it be? A cat scan on the bud might help. 2 April would be a good time for keen members to have a good look in the type locality (Ruahine State Forest Park?), "growing on the sides of clayey hills" (*pers. com.* Dan Hatch) for anything that resembles the celebrated bud. And please, do not use buds as type specimens; look at the problems it could cause for the next 154 years!

The Column and Gloria visited Bream Tail Reserve on 13 July 2000 to get a better photo than Fig. 8 but retired empty handed after a two hour search. This year, only two juvenile leaves could be found indicating that this species too could hibernate if conditions don't suit it à la *C. cheesemanii* and *Danhatchia*? But the *Pterostylis trullifolia* were abundant and, in some cannabis growers' neglected and suspended buckets, microtis and thelymitra leaves were thriving.

The Journal index includes a keyword section where such things as "Flowering/germination stimuli" have been listed (smoke, green banana skin etc) for treating tubers and/or seeds in cultivation. Predators, including mice and blackbirds to name but two, are listed among 150 or so other keywords potentially able to convert your stack of Journals into a miniencyclopaedia of NZ and closely related orchids. Articles and contributors are separately indexed. The Column intends to update it issue by issue and it will be available as a printed volume and on e-mail shortly; watch this space.

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Figures (following pages)

Fig. 1 Iwitahi *Caladenia* aff. *lyallii* with substantially 4 rows of calli. IStG.
Fig. 2 *Caladenia* aff. *alpina* with 6 rows of calli and broad, 5 nerved tepals. IStG.
Fig. 3 Iwitahi *Caladenia* aff. *lyallii* with narrow, 3 nerved tepals. ES.
Fig. 4 Horopito *Pterostylis* "curly" (*P. montana*?). ES.
Fig. 5 Iwitahi *Corybas* "triwhite" ES.
Fig. 6 Bream Tail Reserve *Corybas* triju" from 18 July 1998. ES.
Fig. 7 Hunuas *Corybas* "trisept" from 11 Sep 1999. Note long apiculate dorsal sepal. ES.
Fig. 8 Bream Tail Reserve *Corybas rotundifolius* bud from 7 July 1995. ES. with apologies.

Fig.1 Iwitahi *Caladenia* aff. *lyallii* ↑
Fig.3 Iwitahi *Caladenia* aff. *lyallii* →

Fig. 6 Bream Tail Reserve *Corybas* "triju" ↓

Fig. 2 *Caladenia* aff. *alpina* ↓

Fig.8 *Corybas rotundifolius* ↑
Fig.7 Hunuas *Corybas* "trisept" →

Fig. 5 Iwitahi *Corybas* "triwhite" ←
Fig. 4 Horopito *Pterostylis* "curly" →

Australian notes: David McConachie

Australian Minerals & Energy Environment Foundation *Groundwork* Dec. 1999 http://www.ameef.com.au/publicat/groundwk/grnd1299/ginnovat.htm
A Gem in the Goldfields by Melissa Thoday

A seed is sown

From a very early age Marilyn Sprague has been concerned with environmental issues in the goldfields region of Victoria, northwest of Melbourne. This concern came about because she started to see changes in the natural environment. She grew up on the family farm on the Goulburn River and noticed changes to water quality, increasing erosion and changes to vegetation.
Marilyn began acquiring information about native vegetation in the goldfields area and her knowledge of the threatened Box-Ironbark forests, the 'trademark' ecosystem of the region, is extensive. Marilyn's knowledge of indigenous vegetation assisted her in developing a wildflower farm near Bendigo. Nowadays her knowledge of seed collection, propagation, raising of seedlings and planting means that she is a much sought after expert in the field of revegetation, especially minesite rehabilitation.

Her business, Goldfields Revegetation Pty Ltd, still produces cut flowers in season but the main thrust of her business is supplying plants and advice to mining companies in the area including Bendigo Mining NL, Perseverance Corporation and Reef Mining NL. The strong relationship with local mining ventures has broadened Marilyn's knowledge and experience so that Goldfields Revegetation Pty Ltd now offers services such as site inspections and environmental management plans. The business is not just limited to supplying the mining industry. Marilyn also strongly believes in educating people so she is often busy conducting tours for schools, Landcare groups and resource management students from various Universities and Colleges. Goldfields Revegetation has also supplied plants and seeds for the army at Puckapunyal, local councils, Vicroads, Telstra, Catchment Management Authorities and Landcare groups.

The seedling grows and flourishes

One of Goldfield Revegetation's current projects is the rehabilitation program at Bendigo Mining NL. The Bendigo goldfield was discovered in 1851 and ceased production 45 years ago after producing a total of 22 million ounces over its 103-year life. Bendigo Mining NL purchased the licenses and infrastructure for the entire goldfield from WMC in 1992 and commenced an active programme of exploration throughout the field.

Bendigo Mining NL is presently in the process of excavating a 4.3km tunnel under the urban area aimed at reaching new ore bodies located beneath the city. The techniques being used by Goldfields Revegetation at the 20ha site surrounding the portal to the tunnel could well set a new benchmark for the restoration of Victoria's Box-Ironbark forests. The pioneering measures developed by Marilyn give the program a leading edge status. A primary aim of the revegetation program is to retain the diversity of plants and animals, which existed prior to mining and that exists in nearby undisturbed areas of Box-Ironbark forest. To maintain the genetic resources of the existing vegetation Marilyn collects seeds from the trees and shrubs on-site.

The first step in the rehabilitation process was therefore to collect seed from the site and stockpile the existing leaf matter. This material has been used to conserve the

biomass and to attract insects, frogs, lizards and small mammals back to the rehabilitated site. Logs, stumps and rocks were tagged prior to the commencement of site works, and were replaced to provide vital habitat needed to attract native fauna. Tree removal was kept to a minimum, with scattered stands of mature trees and shrubs being retained for habitat and to aid the revegetation process. The Box-Ironbark forest at the site was weed infested and in poor condition, a result of disturbance from mining operations and poor rehabilitation techniques at the turn of the century. One of the challenges therefore was to successfully revegetate the site while trying to eliminate the weed problem.

The areas with weeds were cordoned off and the soil from these sites removed. The soil from the remaining areas was then stockpiled for restoration. By eliminating the weed-infested soil, the need for weed control was reduced, thus increasing the survival opportunities for native grasses and other species. It must be noted however that total weed eradication is not possible as species such as Shell Grass (*Briza maxima*) are found throughout the Box-Ironbark forest.

Flora and fauna studies conducted prior to exploration approval identified more than seventy indigenous plant species. Marilyn's vast knowledge of the regional flora and her years of experience developing innovative germination techniques for these species have resulted in outstanding revegetation results thus far.

Within the first 18 months more than 50 species have germinated on the site. Over 5,000 tube stock have now been planted on the earthen bund, constructed as a sound reduction wall around the mining site, complementing the direct seeding which has been undertaken. Monitoring progress at the site is an important component of the rehabilitation process.

A rare species identified at the site and now being grown by Marilyn ready for reintroduction is the Slender Sun Orchid (*Thelymitra pauciflora*). As many orchids and other species have a symbiotic relationship with fungi, their fruiting bodies were also collected from the site. The spores of the fungi have been returned to the top soil to assist plants such as the Slender Sun Orchid to successfully re-establish (for further information on the role of fungi see Groundwork Vol 1, No 2). Bendigo Mining was recently judged the winner in the 1999 - 2000 Rural Pride - Keep Australia Beautiful Competition in the Commercial/Industrial Site category. The Award was presented for Outstanding Concern and Action Towards Preserving the Environment. Mr Buerger, Managing Director of Bendigo Mining, on accepting the Award paid special tribute to Marilyn Sprague of Goldfield Revegetation for her work in managing Bendigo Mining's site rehabilitation. He said, "Her commitment to the management and rehabilitation of the site has meant that production objectives can be met whilst maintaining high environmental standards. She has the remarkable ability to involve operators in creating environmental awareness," said Mr Buerger.

The revegetation efforts being refined by Marilyn and Goldfields Revegetation at the Bendigo Mining site not only point towards a healthier Box-Ironbark ecosystem on the 20 hectare site, but also provide a model for the revegetation of disturbed areas that can be used by other miners, landcare groups and individuals throughout the region.

Marilyn has successfully propagated the Native Cherry (*Exocarpus cupressiformis*). This breakthrough means that the Native Cherry can now be included in rehabilitation works and adds to the significant advancements in plant propagation associated with the mining industry such as smoke treatment (see *Groundwork* Vol 1, No 1). Smoke treatment

has facilitated the propagation and reintroduction of species such as the Common Fringe Myrtle (*Calytrix tetragona*), a native of the Box-Ironbark forests once difficult to germinate.

Such advances in the knowledge of plant propagation, seed biology and revegetation are extremely valuable to the mining industry. The ability to successfully rehabilitate large areas of land disturbed by mining operations is vital for an industry whose performance is judged by the wider community on its environmental record. However the benefits of Marilyn Sprague's work with mining companies is certainly not limited to the mining industry. Natural resource managers, foresters, farmers, gardeners and the wider community all benefit from these contributions to conservation and sustainable development.

IWITAHI 2000

The Iwitahi native orchid weekend will be on again from Friday night 8 December to Sunday 10 December.

The trees are still standing in the adjoining blocks [at the moment]. So we have planned it to be a work weekend. We will do yet another search for interesting colonies and individual plants that would be worth attempting to transplant.

We put off the idea of having a formal conference and calling for original papers because of the above. However, I am sure that we can slot in your paper on the Saturday night if you have one that you are bursting to give. If so please let me know in advance. Bring any slides, photos or videos of the native orchids that you would like to share with others.

The fee for the weekend is $20. Bring your own food, bedding and of course a spade. When planning your menu remember that Saturday night is run as a pot luck meal. The season may be officially summer but Iwitahi is also technically on a frost plateau. Come prepared.

On Sunday morning it is possible that the group could decide to go on an orchid excursion.

If you are a newcomer and need additional information or directions don't hesitate to contact me - Trevor Nicholls, 33 Hinekura Ave, Taupo 2730. Phone: 07 378 4813. email: nicholls@reap.org.nz.