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Black Birch Stream, Mt Cook: ▲ Fig. 4: photograph by William Ferrier, Timaru, 1889: the year Henry Suter found *Nematoceras orbiculatum* there; ▼ Fig. 5: photograph by the editor, November 2014.

The type locality Ian St George

Suter's orchid: Mt Cook and Corysanthes orbiculata

Alan Cunningham found *Acianthus rivularis* at Whangaroa and showed it to William Colenso in 1838. It has been called *Corysanthes* and *Corybas* and we now call it *Nematoceras rivulare.*

Subsequently a range of observers have split off different taxa from the complex of similar plants—below we will examine *Corysanthes orbiculata*, the first to be split off, in 1890—but there have also been *Nn. longipetalum, iridescens* and *papa,* the rejected *N. panduratum* and a bunch of tagnamed taxa, *Nn.* “Kaimai”, “Kaitarakihi”, “whiskers”, “Mangahuia”, “sphagnum”, “Pollok” and “Motutangi” of variable distinctness.

In November 1889 Heinrich (Henry) Suter sent orchids from Mt Cook to William Colenso who read a paper about it before the Hawke's Bay Philosophical Institute in July and November 1890. He later published a description of a plant collected on 17 November 1890 in the *Transactions* issued in May 1891*,* in which he described them as,

C. orbiculata, sp. nov.

Plant small, 1in.–1½in. high, erect; a large sheathing bract at base of stem, and a long acute half-clasping one at base of ovary, 3 lines long. Leaf single, thin, 6–8 lines long, generally elliptic-cordate, sometimes somewhat broadly cordate, lateral margins straight; tip rounded, apiculate; petiole short, 1–1½ lines long. Flower solitary; dorsal sepal thin, very long, ¾in., lanceolate acuminate much overhanging, many-nerved; tip recurved; brownish-purple dashed on outside with linear purple dots; lateral sepals and petals narrow filiform, ½in.–¾in. (sometimes 1½in.) long, sub-erect, 1 line broad and 1-nerved below; lip dark purple-red, orbicular, 4–5 lines diameter, apiculate, margin entire, but under lens minutely and regularly denticulate, much-nerved; nerves distant, forked at tips, and extending to margin. Ovary narrow-oblong, ½in. long, striate, brownish.

Hab. South Island: “Mount Cook, Black-birch Creek Valley;” 1890: Mr. H. Suter.

Obs. Although I have received good dried and mounted specimens of this pretty little plant from its kind discoverer, they are not well fitted for minute microscopical dissection, having been too severely pressed. But this plant differs from our described New Zealand (and Australian) ones, in its thin elliptic and straight-edged leaf, and in the large orbicular and entire lip of its flower.

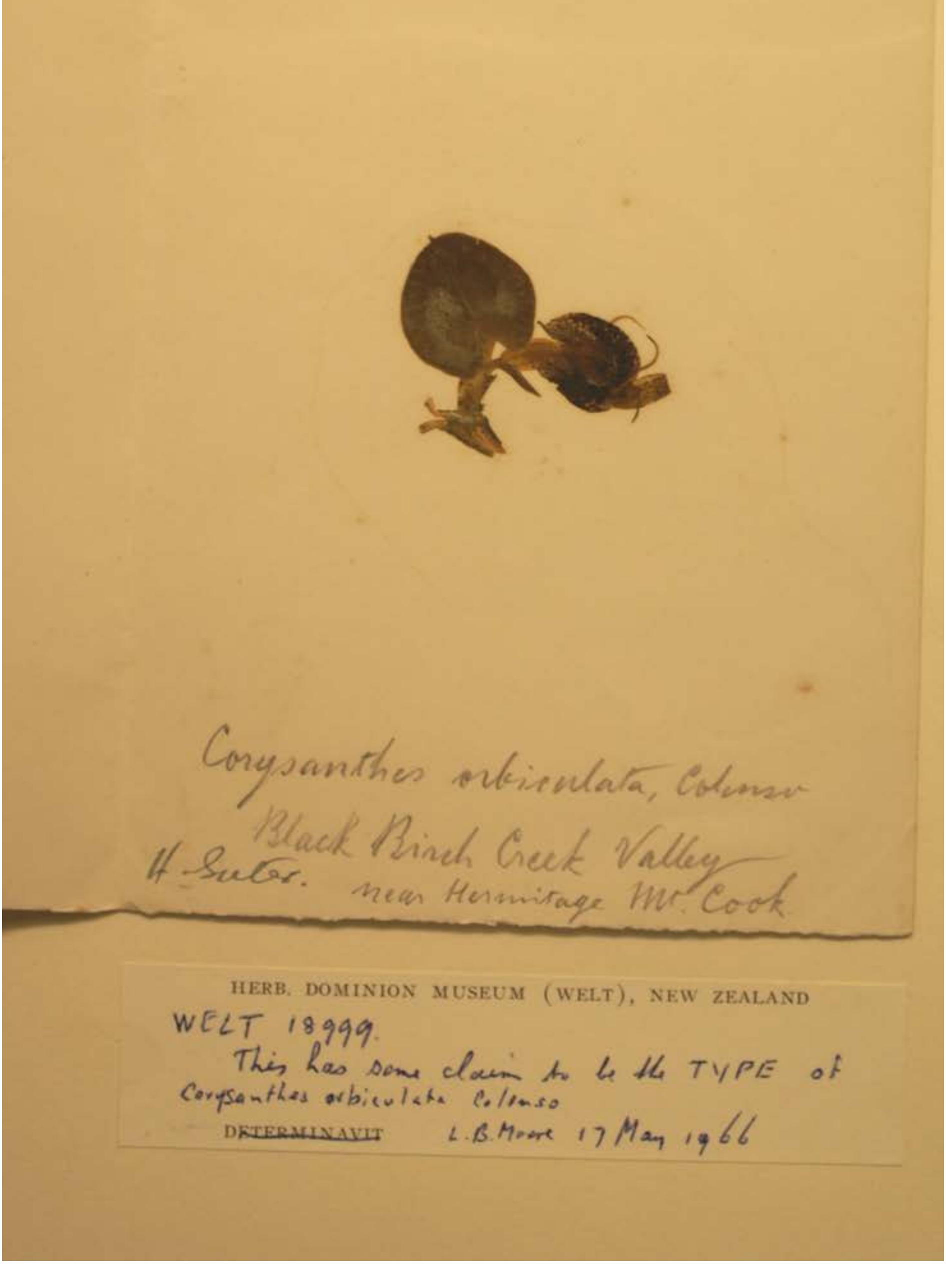
Some time in the early 20th century the epithet *rivularis* was mistakenly applied to what we now describe as *acuminatus*, and soon the real *rivularis* was being called *Corybas orbiculatus*.

That left the short-tepal plant apparently without a name, so Bruce Irwin tagged it “Corybas C”.

Brian Molloy visited Mt Cook on 26 November 1992 and found the orchid at Black Birch Stream. He had examined Colenso’s specimens and decided it was “short tepals” that should have been called *orbiculatus* [1] and that is how the epithet is applied today. Indeed Lucy Moore had clearly had her doubts too, for at Te Papa there is an undated Mt Cook Suter specimen (WELT 18999) labelled, “This has some claim to be the TYPE of Corysanthes orbiculata Colenso. L.B. Moore 17 May 1966” (**Fig.1**). It is “short tepals”.

But another specimen sheet (WELT 19000) is in the Petrie herbarium: it is labelled “XI. 89. H. Suter. Black Birch Creek Valley nr. Mt. Cook” and while one specimen is indubitably “short tepals” the other has long tepals (**Fig.2**).

Figure 1.
Images in Figs 1–3 are reproduced with permission from Te Papa, Wellington.



Corysanthes orbiculata, Colenso
Black Birch Creek Valley
H. Suter. near Hermitage Mt. Cook

HERB. DOMINION MUSEUM (WELT), NEW ZEALAND
WELT 18999.
This has some claim to be the TYPE of
Corysanthes orbiculata Colenso
~~DETERMINAVIT~~ L.B. Moore 17 May 1966

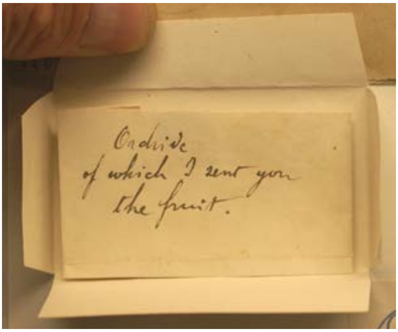
Figure 2.


The Petrie Herbarium No. 9.
H. Suter.
nr. Mt. Cook
Black Birch Creek Valley
XI. 89.

Figure 3.


Black Birch Creek Valley.
Nov. 89.
dissection
Suters' orchis
Corysanthes
W. Colenso, Napier
1/90
HERB. W. COLENSO
DOMINION MUSEUM
WELLINGTON
24287
NEW ZEALAND
HERBARIUM
Corysanthes
rotundifolia
Hk.
Hooker Valley, Mt Cook.
Suter
Type of C. orbiculata, Col
Orig spm.
AB3/26-4-37.
DATABASED
AND
IMAGED

Furthermore WELT 24287 **(Fig.3)** has a specimen labelled “Suter’s orchis Corysanthes Nov.17/90” in Colenso’s hand on an envelope bearing his name. Another four specimens, one in fruit and three with longish tepals are mounted on a November 1889 sheet pasted onto this, and a single intact short tepal plant is in an envelope (labelled “Orchide of which I sent you the fruit” in Suter’s hand). Cheeseman identified this as the type sheet for *C. orbiculata* Col. but wrongly assigned it to *Corysanthes rotundifolia.* Viktor Zotov annotated the sheet “only spn.”, and indeed he was right insofar as it carries the only spn. with truly short tepals, which is also the only specimen collected in 1890. ►



Orchide
of which I sent you
the fruit.

Details from Figure 3:
Top: Suter’s writing.
Middle: his specimen in its envelope.
Bottom: the 4 mounted specimens, one in fruit, three with longish tepals.

Possibly, in November 1889, having received Suter's collection but puzzled by the variability of the plants, Colenso went ahead and wrote his description but asked him to collect more: it was by then too late in the 1889 season and Suter sent the 3 long tepal plants and one fruiting plant. Colenso read his paper about the short and long tepal plants in Napier on 14 July 1890. In November 1890 Suter sent a flowering short tepal plant ("Orchide of which I sent you the fruit"), which Colenso described in the *Trans,* issued in May 1891. Perhaps the long tepal plant is a variation on *Nematoceras orbiculatum*, perhaps it is a later-flowering long tepal *Nematoceras* from Mt Cook.

A variable species?

When you re-read Colenso's description, he allows for short and long tepals: "lateral sepals and petals narrow filiform, ½in.– ¾in. (sometimes 1½in.)"

I for one have regarded the short tepals as the key distinguishing feature of the species and in the colonies I have seen (Skippers Creek and Twelve Mile Creek Queenstown; Taranaki; S. Wairarapa) that feature is constant. Brian, however, tells me he has found some variation in the length of the tepals, but "this is not unusual for this and other species. I would not regard this as significant. Similarly there is some variation in the width of the dorsal sepal. Again, not significant."

Brian continued, "Colenso (p.390) somewhat contradicts himself. In one place 'margin (labellum) entire, but under lens minutely and regularly denticulate', and below, 'large orbicular and entire lip of its flower'. The former is more correct. I have checked this with my cards of plants collected from Black Birch Stream and elsewhere in both Islands, and Bruce's drawings and my descriptions of NI plants gathered with Bruce."

The type locality now

My questions were—is *Nematoceras orbiculatum* at its type locality a species with variably long (1.5in = 38mm) or short (0.5in = 13mm)

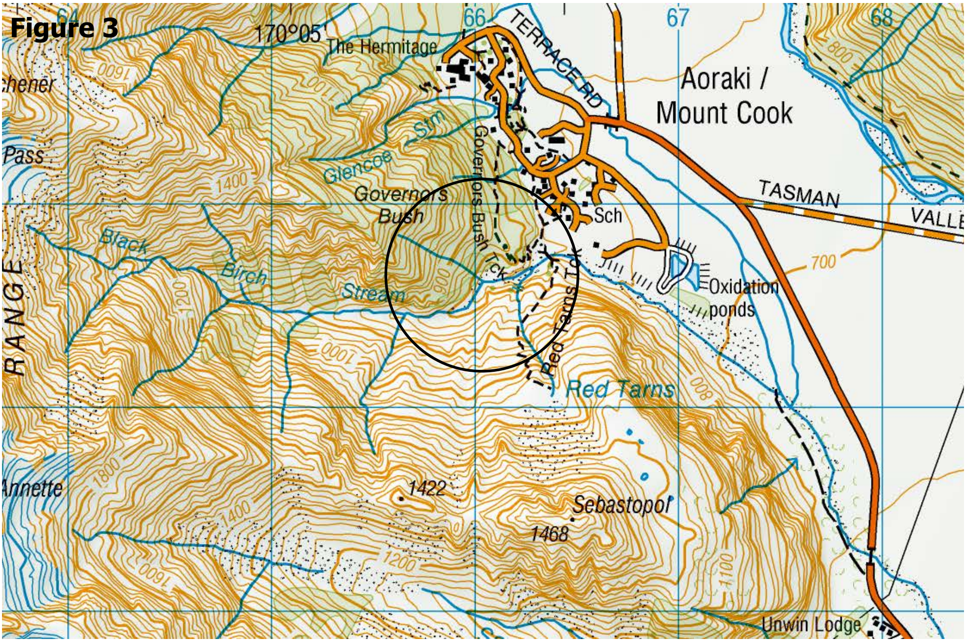


Figure 3

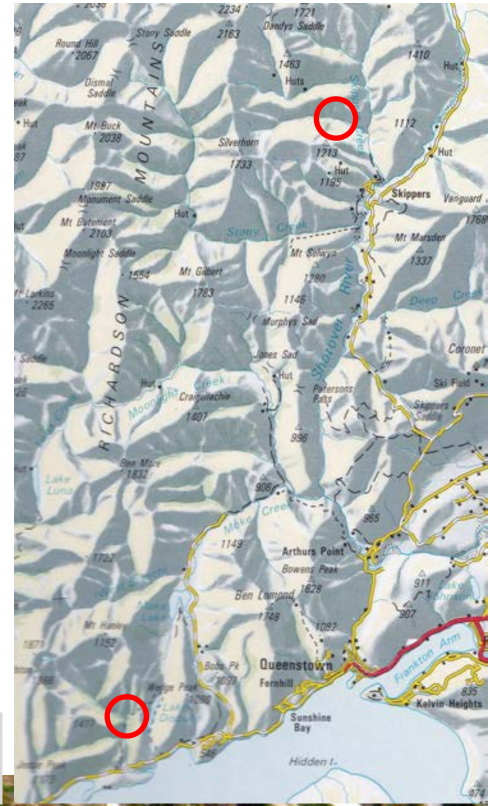
tepals?—or are there more than one species among Suter's November-flowering plants at Black Birch Stream?

We drove up to Mt Cook on 4 November; I had visited a colony near Queenstown the day before and found flowering plants, so I was confident—but alas! did not find them at Black Birch Stream (**Figs. 3–5**). Oh well, next year.

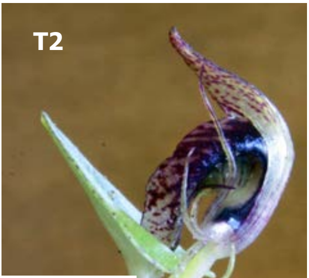
Nonetheless I did take some photographs of specimens from two sites near Queenstown—one in the Twelve Mile Creek and one in Butcher's Creek, a tributary of Skippers Creek. All these plants had flowers with short tepals, but they varied in other ways that some might find significant. In my opinion these are within-species variations, perhaps enhanced by the geographical isolation of their alpine refugia, but present within single colonies too.

Epilogue

Heinrich Suter had found four of the new plant species Colenso described in that 1890 paper,

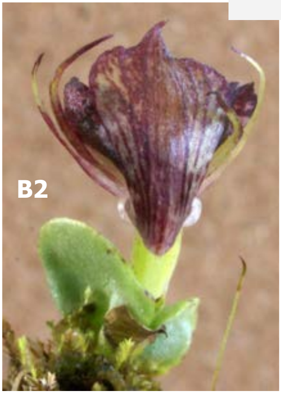


Wakatipu sites for *N. orbiculatum*. Butchers Ck (upper) and Twelve Mile Ck (lower)



KEY

T1 = first plant from Twelve Mile Creek;
B2 = second plant from Butcher's Creek, etc.



and one of them Colenso named *Carmichaelia suteri* “after its kind and liberal discoverer, Mr. Suter, a skilled scientist, who also, during his short sojourn there at the Hermitage, discovered several other small and interesting alpine plants, some of them being also described in this paper.” Dr Pamela Hyde of Wellington is Suter’s great grand daughter: she is writing his biography.

On 15 November 1890 Colenso wrote to Coupland Harding about the HBPI meeting the night before, “Then I showed several interesting plants—from Mt Cook, S. Island, & from Bush—which relieved our dreariness, & mightily pleased the ladies…”.

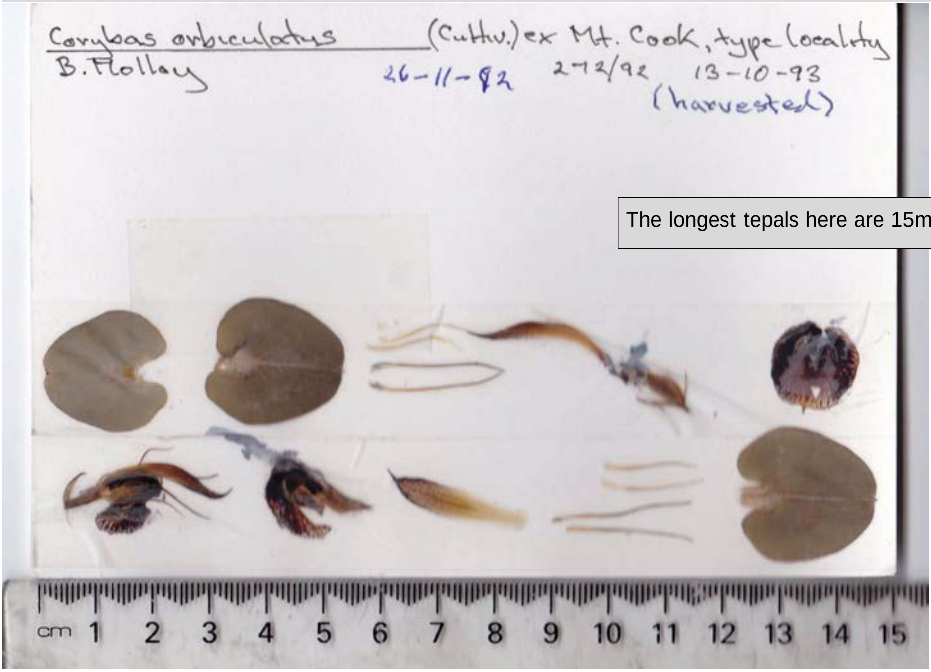
References

Molloy JPB 1994. Reinstatement of *Corybas orbiculatus* (Colenso) LB Moore. *NZNOGJ* 51: 12.

Colenso W 1890. A Description of some Newly-discovered Indigenous Plants, being a Further Contribution towards the making known the Botany of New Zealand. *Trans. NZ I.* 23: 381–391.

Taranaki plant, flowering much earlier—photo by Eric Scanlen 16 August 1997 ▲

The Black Birch Stream plant, grown on, harvested in 1993 and dissected by Brian Molloy ▼



The longest tepals here are 15mm

Thrips: pollinators

Eric Scanlen first drew our attention to the possibility of pollination of *Thelymitra* by thrips [1–3], and his work has been noticed and extensively quoted in the prestigious new book *Darwin's orchids: then and now* [4]...

> A novel mode of insect pollination in *Thelymitra* spp. was described recently in small-flowered species in New Zealand. It is novel because the interpretation disagrees with Cheeseman (1880). Scanlen (2008) observed thrips visiting the anthers of *T, cyanea, T. nervosa,* and *T. pulchella.* His photographic evidence strongly suggests that these insects could have carried appreciable quantities of pollen to the stigma, provided that these *Thelymitra* spp. produced crumbling (friable) pollinia. The thrips may die following the act of pollination, as its body becomes glued to the stigma. More research is needed before the evolutionary significance of this thrips-flower interaction can be interpreted. It may represent an incipient pollinator shift, but more likely represents a repetitive and predictable consequence of small pollen-consuming insects crawling too close to an adjacent gluey stigma.

"It may represent an incipient pollinator shift" is a sentence gravid with meaning.

Thrips are among the fastest growing group of invasive species in the world; they eat pollen; they can enter unopened flowers; they can fly between plants; they can pollinate NZ forest trees [5]; they can pollinate orchids.

Many orchid species are clearly separated from others (and their separation sustained) by their partnership with specific pollinators which visit only plants of the same species. A sort of purity of line is preserved. Hybrids occur when specific pollinators stray to other species.

Imagine then what a plague of indiscriminate thrips could do. They could carry pollen promiscuously among many species, creating new and unusual hybrids.

This journal would be full of interesting observations of novel orchids we had never seen before; even common orchids like *Thelymitra longifolia* would be suspected of being very variable, its different colours and column shapes apparently related to its proximity to other species. Our whole concept of what constitutes a species might be called into question.

But wait! isn't that exactly what is happening?

Could we already be witnessing a "pollinator shift"? one perhaps of considerable "evolutionary significance"?

More research is undeniably needed.

References

1. Scanlen E 2008. Thrips as *Thelymitra* pollinators. NZNOJ 108.
2. Scanlen E 2009. Three thrifty thrips. NZNOJ 113.
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4. Edens-Meier R, Bernhardt P (eds) 2014. Darwin's orchids: then and now. University of Chicago Press.
5. Norton SA 1984. Thrips pollination in the lowland forest of New Zealand. New Zealand Journal of Ecology 7: 157–164.

Black thrips on *Thelymitra* "sky". Photo by Kevin Matthews [1].

Guest editorial

Why do plant names change?

by Graeme Jane

[Graeme Jane chaired the NZNOG Nomenclature Advisory Group which recently advised the Publications Committee on these issues. In turn, the Publications Committee adopted the generic names listed below for a new Pocket Guide, now in preparation—Ed.]

People may be confused and frustrated by plant name changes that seem to come all too frequently. This was especially so with the large number of changes in the orchid genera that occurred over ten years ago. This was the result of work by Jones & Clements published in Australia in 2002. These generic names were used in the last *Colour Field Guide* and marked a sharp change from the broader generic definitions of Volume 2 of the NZ Flora (Moore & Edgar, 1970). This change was supported by Landcare and until recently by the NZ Plant Conservation Network (NZPCN).

To understand why this happened we need to begin with an outline of the whole process of naming plants, or indeed any biota. In the 1800s and earlier, botanists merely described a plant in a journal or significant publication and distributed representative specimens of the species to friends, perhaps at the other end of the earth. Because communications at the time were often difficult (and took a long time) some species were described several times by different authors. They were also often not aware of others' work or didn't interpret it correctly.

Today the process is much more clearly defined. The establishment of a type now involves a process of comparison, analysis and acceptance. A thorough investigation must be made, and a collected specimen must be nominated as the type. The type specimen is regarded as defining what the description means. A picture (or actual plant here) is worth a thousand words so details not mentioned in the text can often be determined later. Colour may not be one of these details.

For early descriptions a type is identified and specified from the original author's collection (often labelled by them as the type) and given a reference number. If it was not labelled, someone selects one from the plants collected by the original author, based on the description given, or in some other prescribed way (using specified rules).

Today, the investigator tests his results on his peers in informal institutional meetings and discussions. At the end of the process the investigator decides on a name, and today, must then check the literature to see if it has been used before. The name must be supported by a type and description, hence it cannot be used before the formal publication. This is one reason for the common use of tag names and secrecy about the chosen name until it is published.

The results are then sent to a suitable journal where the article is sent out to several independent referees for comment. If accepted (with or without changes) it is then published. The same process applies to the creation of groups such as genera and families. The new name (or revived old one) is then subject to acceptance by the wider community of peers. There is no absolute authority for acceptance of plants names, although that is changing. Often there are divided views on family or genus placement.

The situation for orchids is further complicated as New Zealand and Australia share many species. Orchid seeds especially have the ability of to cross the Tasman on the prevailing winds, particularly when fires waft seed high into the stratosphere. Hence what happens in Australian taxonomy has an impact here, although the Australians often ignore New Zealand material and literature (at their peril). Recently a daisy was described as new and rare in Australia. *Senecio esleri* had been known and formally described in New Zealand for over a decade, and a known aggressive weed. The NZ name had precedence.

In Australia, Jones' & Clements' work on orchids has not been widely accepted and there has been no agreement on the names to adopt in the intervening years. Furthermore, investigations of various groups within the orchids have often not supported the division of genera put forward by Jones & Clements.

There are several ways to deal with this confusion. Ian St George has regularly produced his take on the situation for NZ orchids. Landcare has followed Jones & Clements while NZPCN has tried to interpret the latest literature.

The international situation is a little different. Kew along with several large national herbaria have begun to produce a World-wide list of plant names and, as a corollary, a list of all valid published names and their duplicates (synonyms). This is available on the Web as The Plant List and IPINI respectively. Their last revision of the orchids was in 2012.

The Australian herbaria have also put together a committee to establish a national agreement for names for all Australian plants, the APC (Australian Plant Census). Recently it has included Landcare and Te Papa and extended the name to Australasian Plant Census. It has already dealt with many plant families but has yet to complete the Orchidaceae. The rumour is that it is due for completion by the end of the year. All indications are that it will reject most of the genera established by Jones and Clements, relegating many of them to subgenera.

As a result of all of all these activities, the next edition of the orchid Field Guide will adopt the names accepted by The Plant List and largely revert to the generic names of the *Flora of NZ* (Moore & Edgar 1970).

References

Jones, D.L.; Clements, M.A.; Sharma, I.K.; Mackenzie, A.M.; Molloy, B.J.P. 2002: Nomenclatural notes arising from studies into the tribe Diurideae (Orchidaceae). *The Orchadian* 13: 437-468.

Moore, L.B. & Edgar, E.E. 1970: *Flora of New Zealand Vol II*. Govt. Printer, Wellington.

The generic names

- Acianthus
- Adenochilus
- Aporostylis
- Bulbophyllum
- Caladenia
- Calochilus
- Chiloglottis
- Corybas
- Cryptostylis
- Cyrtostylis
- Danhatchia
- Dendrobium
- Drymoanthus
- Earina
- Gastrodia
- Genoplesium
- Microtis
- Orthoceras
- Paracaleana
- Prasophyllum
- Pterostylis
- Spiranthes
- Taeniophyllum
- Thelymitra
- Townsonia
- Waireia

From the next issue, this journal will use these generic names. Authors who prefer to use other generic names should provide the appropriate name from this list in brackets after each use of their alternative name—Ed.

Original papers

The Many Faces of *Pterostylis irsoniana*: Mark Moorhouse

Fig. 1. *Pterostylis irsoniana* s.s., Boyle Valley, Lewis Pass Highway. Dull pink-orange dorsal and petal tips. Green stem, ovary green with pale orange stripes.

For some time I have been observing and photographing the many different faces that *Pterostylis irsoniana* presents to us. Perhaps it might be argued that it is the species of *Pterostylis* that offers us the greatest natural variation of the entire genus maybe with the exception of what we currently lump into the *Pterostylis australis* basket.

It raises some thoughtful questions. We currently accept that *P. banksii, P. patens* and *P. australis* are separate species yet upon examination of the internal parts and mechanisms of these three species they are identical. The column, labellum and labellum appendages cannot be separated if dissected and placed together. There is a display of natural colour variation in the labellum but internally they are more or less identical. The question then is this, if these species can share internals, could other species also share other shaped internals? To make this relevant to this article, could two species share the same labellum that we know as the identifying feature of *P. irsoniana*, ie, its distinctive labellum tip and callus. Could two species share the internals of *P. graminea* or *P. montana*? etc. Reverse argument of course is this. Could this be a good reason to lump *P. australis* and *P. banksii* together into a single species and forget *P. australis* ever existed, or drop the many variants of *P. montana*, after all we witness great variation in *P. irsoniana,* why not also in *P. banksii* and *P. montana*? It's food for thought isn't it?

If we dwell in the splitters camp then we need to define some obvious differences we find throughout the currently accepted range of *P. irsoniana.*

General morphology, size, flower stance, foliage and colour would be a good place to start, simply because they are all easy to apply in the field for ID. Despite being least important, colour is most observer's first resort to beginning an ID process. In *Nematoceras* and *Caladenia* it instantly eliminates many options, perhaps in greenhoods less so yet many *P. irsoniana* bear a distinctive colour rarely seen in other species. Flowers with dull pinkish-orange sepal tips. Morphologically, size-wise, foliage-wise and in all aspects, plants of this colouration are incredibly consistent, and for this reason alone I believe they typify the species. In many places in New Zealand these are also by far the most dominant form of the plant to be found. Fig. 1 illustrates this form. Certainly our beech forest margins can at times produce a plethora of flowering plants and the example illustrated was one of several hundred plants observed in numerous colonies on the eastern side of Lewis Pass. Would you, as a reader agree, this is what one might expect *P. irsoniana* s.s. to look like? Leaves of this plant are prominently keeled but otherwise vegetatively mimic a slightly diminutive *P. graminea*, upper leaves overtopping the galea, narrow, grasslike, stem green. In drier eastern areas of Marlborough the leaves are quite glossy on the upper surface, and non-flowering plants of the species can be identified by this characteristic combined with the keeled central rib with a high percentage of certainty.

Having established what seems to be a characteristic 'type' plant of the species, lets examine some of its other faces.

Fig. 2: Pterostylis irsoniana 'red stem' Nile Valley, Charleston. Red-orange ovary, red keeled leaves. [K. Levy]

Most closely related to the 'type' plant is 'red-stem'. Morphologically, the plant differs little from the 'type'. However, the stems and central ribs of these plants are red, often bright red. In addition there is an intensifying of reddish tones on the tips of the synsepalum and distal end of the dorsal sepal and the ovary which is green with very pale orange stripes in the 'type' is now a bright orange-red [Fig. 2]. Again, these plants lend themselves to easy identification even as non flowering plants, by the keeled red-ribbed leaves.

Whether it is significant or not, plants of this form I have found were only ever in quite a wet soil medium, often cms away from trickling water, or growing in mud. It may be relevant. eg dark flecking of the dorsal sepal in *Nematoceras trilobum* is always more prominent in wet media and noticeably less so in drier spots with the same taxon.

P. irsoniana 'red stem' is widespread and occurs in small localised communities in the South Island. Personally I've photographed it in Marlborough, Nelson and West Coast as far south as Hokitika, yet those same areas also have a predominance of *P. irsoniana* s.s. and observations indicate no apparent connection to habitat other than soil moisture.

P. irsoniana frequently displays other identifiable features. It is not uncommon to encounter plants with variegated leaves. The heavily keeled leaf lends itself well to making an attractive foliage with deep green ribs and striations in two other shades. Variegation occurs also in the 'red stem' forms where the leaf can be found striated in 4 colours, red-orange and 3 shades of green.

In contrast to 'red stem' the plants on Takaka Hill show no vestige of red colouring and even the labellum is predominantly green with a pale brown ridge at the tip of the labellum only.

Morphology of leaves varies little throughout the entire variety range, but stature does diminish where altitude or harsh conditions prevail however there is one floral aspect of the plant which can vary enormously. This is the shape and attitude of the synsepalum.

P. irsoniana s.s. at maturity holds its synsepalum neatly against the galea, the tips usually curving gently rearward, effectively making the distal ends about the same height as the top of the dorsal. However it is relatively common to find what I call the 'dentist' form, where the synsepalum has become lax, is actually also shorter and effectively leaves the flower gaping dramatically and it's internals easy to examine. [Fig. 3]

Notably, in this variety the labellum is well short of column height: has it adapted to another pollinator perhaps or has it crossed with something? Is it a different species? Are we being consistent? We accept several specific names for plants with twisted distal ends to the labellum and divide the *P. montana* group into a further plethora of tags. We retain separate epithets for plants of the *P. australis/banksii* complex which barely warrant separation and could be absorbed under the auspices of "natural variation," yet we insist that everything that has the tightly curled labellum tip of *P. irsoniana* is just a natural variant and one of the many faces of this species. What do you think? Doesn't the natural variation in *P. irsoniana* suggest we should be lumping together some of our Pterostylis tags not dividing at specific level?

◄ Fig. 3: The "dentist" form of *P. irsoniana,* Arapawa Is., glossy leaf, short synsepalum & resident spider's web

P. irsoniana glossy leaves, Awatere valley.

With long dorsal & petals and variegated leaves.

Fungus gnats: fact, fallacy and speculation

By Georgina Upson

From various recent articles and comments it appears that a number of ideas, most proposed as speculative possibilities, regarding fungus gnats and orchids, have assumed an aura of fact. Some are historic and with repeated quotation, it is not surprising that this has occurred.

In 1917 Geoff Thomson observed gnats pollinating *Corysanthes oblonga*, today *Singularybas oblongus*. He sent specimens to D. Miller, [1] who wrote a paper in 1918 describing and naming the gnat *Exechia thomsoni* . By 1927 when Tonnoir and Edwards's [2] major paper on fungus gnats was published only some parts of the type specimen were preserved. The description was not sufficiently characterized and it was not possible to distinguish the remains from *Exechia hiemalis* which P. Marshall had previously described in 1896, therefore it was not included as a species. Presently it does not appear that the pollination of *S. oblongus* by a gnat of the genus *Exechia* has been confirmed so the pollinator's identity remains unknown.

In 1990 Molloy [3] suggested that while most N.Z. *Pterostylis* species were insect pollinated, some were self-pollinating. Included in the self-pollinating list were *Hymenochilus (Pterostylis) tristis* and *H. tanypodus*. By 2002 Jones & Clements [4] were suggesting that pseudocopulation may be employed by some species. Observation supports Jones and Clements. *Hymenochilus* seem to be pollinated by tiny black fungus gnats, *Sciaridae*, specimens collected but not yet identified, by sexual deception. Only males seem to be attracted to the flowers exhibiting highly excited behaviour and interest even before the flower opens. A gnat has been observed attempting copulation with the forward pointing process on the labellum of *H. tanypodus*. They have also been seen to become trapped by the flowers in both species. The extremely small size of these gnats, 1mm in *H. tristis* 1.5mm in *H. tanypodus* does leave one to wonder how they could possibly transfer pollen from plant to plant. *Diplodium alobulum* seems to have a *Zygomia* species as its pollinator [5] and other *Pterostylis* have also been seen to have fungus gnats associated. Much larger insects have also been seen in some *Pterostylis* species. A lot more study is needed to understand their pollinators and pollination strategies.

Recently it was thought that gnats might be attracted into *Nematoceras* flowers by the light area generated in the base by the auricles and that they left the flower through these. These flowers have evolved elegantly, well worth more than the brief examination they have so far been afforded. While the external auricle dimensions hint at the possibility of a gnat leaving via this exit, the lower column and stigmatic area significantly obscure the inner entrance to the point that any passage by a gnat is negated [**Figs1, 2**]. The gap either side of the stigma and lower column to the floral wall is minimal. This leaves only the space between the column base and basal floral part below the cleft that flows down into the auricle, as a possible route. Any gnat attempting to leave must therefore be incorrectly positioned within the flower. Some measurements were taken that demonstrate the size of this space compared with the physical dimensions of the pollinator species. The thorax height measurement given for the gnat includes only the immovable portion of the thorax and coxae. No allowance has been made for legs, wings or any pollinia that a gnat may be carrying which would add significantly to this. As both flowers and gnats vary in size these measurements will be plus or

▲ Fig 1; View up auricle of N. “whiskers” ▲ Fig 2; View down auricle of N. “whiskers”

▼ Fig 3; A gnat in *N. longipetalum* showing normal pollination position.

minus a certain amount but illustrate the point.

***Nematoceras* "whiskers"**
Auricle space; 0.75mm x 1.1mm
Gnat, *Epicypta immaculata*; Thorax height 1.4mm. width 0.8mm.

***Nematoceras* "eastern hills" ("avalanche")**
Auricle space; 0.75mm x 1.25mm.
Gnat, *Mycetophila elongata*; Thorax height 2.0mm width 0.8mm

***Nematoceras macranthum*.**
Auricle space; 1.0mm x 1.0mm
Gnat, *Mycetophila marginepunctata*; Thorax height 2.0mm x width 1.0mm

The gnat wedged in an auricle, depicted J124 p. 20, well demonstrates the only available space and position in which this can occur. The gnat still remains largely within the flower. Oddly positioned gnats are occasionally found in flowers. A secondary but not minor reason why gnats leave via their entry point is that a gnat in a position suitable for pollinia removal, with the top of the thorax adjacent to the rostellum and pollinia, must move in an upward direction toward the entry point for pollinia removal to occur. Its head at this time is directly above or on the stigma with no space for further downward movement. [**Fig. 3**]. This is the normal attitude that a gnat crawling into the flower through the cleft area would assume. They have been observed both reversing out of flowers and exiting forwards, perhaps partly panicked by floral disturbance. While the floral entrance may be spacious, particularly in *N. macranthum*, this rapidly closes to a throat that directs the insect into the specific position required for pollination. [**Fig. 4**].

Van der Pijl and Dodson [6] 1966 suggested that spider orchid flowers resembled fungi in appearance and smell and further that this may attract female gnats to lay eggs, unwittingly pollinating the flowers. Each *Nematoceras* species has either an individual pollinator or sometimes two. If odours are a factor these must differ among orchid species. If Van der Pijl and Dodson are correct it is possible that each orchid species has an association with a different fungus and it is the fungus that imparts this odour. The gnat pollinator may likewise have a specific association with the same fungus, being drawn to the orchid. This arrangement could result in some or all these organisms receiving benefit.

Dafni and Bernhardt [7] 1990, suggested that only pregnant female gnats are attracted by "brood site deception". While female gnats are found in *Nematoceras* flowers, so are reasonable numbers of males. Female gnats are on average larger than males, potentially more likely to remove pollinia; however some gnat species that pollinate *Nematoceras*, notably *Mycetophila fagi* and *Mycetophila vulgaris,* vary greatly in the size of both sexes. Eggs are frequently seen in and on *N. macranthum* and *N. trilobum* agg. species and larvae less often. This would tend to support their suggestion although the identity of the eggs has yet to be established. A gnat standing on the "apron" of the flower could, by bending the abdomen under, lay eggs in many of the places where they are found without being a pollinator of the flower. As for the remaining *Nematoceras* species that have been collected from, eggs are extremely rare or not found at all with larvae very occasionally seen. Only a single egg has been recorded and that was on the "apron" of an *N. longipetalum*. There are morphological differences between these two groups of *Nematoceras* in that the "rivulare" group do not have the "egg pocket" that the others possess. This suggests that there may be at least two separate, or slightly different, pollination strategies operating in this genus. *N.* "whiskers" having a pollinator of a different genus potentially presents another strategy.

There are two common gnat species *Mycetophila fagi* and *M. vulgaris,* which visit and are the pollinators or co-pollinators of more than one *Nematoceras* species. Results to date indicate that *M. fagi* is restricted to the "rivulare" group, *N. acuminatum* and *N. macranthum. M. vulgaris*, on the other hand, pollinates or co-pollinates primarily *N. trilo-*

◄ Fig 4; A slightly damaged M. colorata carrying pollinia.

▼ Fig 5; A gnat on *N.* “triwhite”

bum agg. taxa but is also the pollinator of one form of *N. longipetalum* taxa and a co-pollinator of *N. orbiculatum*. This raises questions not only regarding fungus association or pollination strategy but also orchid taxa relationships. In 2002, M.A. Clements et al [8] presented a phylogenetic tree based on the ITS region of the DNA for the genus *Nematoceras*. It is most interesting to compare this with evidence from the gnats which *Nematoceras* rely on as DNA transporters. This supports some of their proposed divisions of *Nematoceras* but raises questions about others. Orchid taxon relationships would seem to be more complex than the tree might indicate possibly involving both divergent and convergent events.

Carlos Lehnebach obtained video footage of fungus gnats around *Nematoceras trilobum* agg. plants. [**Fig. 5**]. It shows wing flicking, copulating, a gnat displaying and seeming to chase off another gnat and a gnat ducking rapidly in and out of the entrance to a flower. This last behaviour is rather curious and not associated with attracting a mate. After observing the same behaviour in the field, further investigation revealed a simple answer. This was a gnat attempting to enter a flower but foiled by another gnat already inside, dead or alive, blocking access. Different fungus gnat species employ different attitudes and behaviours to attract mates. Some display various sets of legs in different positions others hold wings in different positions. Some rub the forelegs together while yet others indulge in wing displays of flicking and vibrating or a mixture of activities may occur. Whether on a window pane, in a container or in the field these gnats seem simply to continue their required activities to attract a mate. Of one species observed, the male and female would approach or leave the vicinity of each other randomly for some time, both displaying, however just prior to copulation the female became passive and the male increased wing movements to a very rapid vibration. The female will mate more than once, potentially with more than one male. No sign of an area being guarded has been noticed. For their diminutive size they can be rapid fliers and could pollinate plants over a much larger distance than the previously suggested one metre. Huge swarms gather along streams, it would seem from surrounding areas and gnats appear on windows from many metres away.

Most feeding is done during the larval stage for fungus gnats. Some live on fungi others moist decaying wood, fungi and plant material in the soil, or wet plant material. Sciarid larvae are said to live mostly on animal excrement. Larvae seem to need to be bathed constantly in moisture for survival.

A well grown larva that seemed near pupation was found in a *Nematoceras longipetalum* flower, behaving in a vigorous and agitated manner. A successful attempt was made to raise it to the adult stage, with a surprising result. The gnat, *Aphelomera longicauda* has no known association with either *N. longipetalum* or any other species of *Nematoceras*. This demonstrates that one cannot assume that any larvae found in flowers are those of the pollinating species also raising questions around any eggs. Whether there is a food source in the flower or the eggs hatch and drop into the detritus does not seem to have been studied. Flowers are often seen with holes nibbled in them.

Far more needs to be understood about these gnats, eggs and larvae and their relationships which may, in turn, help to answer orchid relationship and pollination strategy questions.

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Notes etc

Pat Enright (Rimutaka Trig track, early January 2015) found this *Aporostylis bifolia* with a labellum that has reverted to the primitive petaloid shape. *Jean Jenks found a colony of similar plants in the Catlins 30 years ago. This is a common "throwback" abnormality in orchids, notably in NZ in the* genus dubium Petalochilus *Rogers—the two "species" of which HB Matthews found "plentiful" near Kaitaia, and of which Lucy Moore wrily remarked, "the temporary local abundance of these peculiarities scarcely seems an adequate basis for a genus of two species". Another peculiarity wrongly raised to species rank is the Australian* Calochilus imberbis, *a freak of* Calochilus robertsonii *with a petaloid labellum—see my editorial "Monsters, freaks, retrogrades and primitives" in NZNOJ #103, May 2007.*
Please don't be tempted to tag this "Aporostylis petalip" or something similarly silly—Ed.

Pat took this photograph on the same track on 10 December, remarking that perhaps hybridising is more common than we think: the closer plants of *Thelymitra longifolia* are to those of *T. hatchii*, the more colour the former seem to exhibit. *That deeply cleft post-anther lobe is far from the "entire" edge of the type: (it matches Colenso's* T. nemoralis*); hybridising does seem a plausible explanation for the wide range of forms—Ed.*

The longer I try to photograph thelymitra columns the harder it gets. Perhaps I am getting fussier, perhaps just clumsier. One thing I have been worried about is the degree of notching of the postanther lobe of plants currently identified as T. longifolia. If you take a deeply notched one from the front it can look entire in the picture. If you take it from directly above you can also miss a shallow notch when the column is a little flexed forward. I have decided to use a uniform technique: the column vertical and camera at 15 degrees to the vertical directly in front. See Pat Enright's on the last page and here a few examples from the Rimutaka—Ed.

My mental image of a Thelymitra hatchii column has that postanther lobe forming a perfect horse-shoe, but the T. hatchii in the Rimutaka remind me that amphidiploids such as this will vary greatly in their phenotype. Here are a few columns—horseshoe, V, tholiform...

… and three more from Pat Enright from the same track. Are the tholiform ones T. tholiformis? Or are they simply one end of a range of T. hatchii shapes?—Ed.

Mark Moorhouse emailed (early January), “Those of you who attended the AGM at St Arnaud will recall seeing a diminutive purple stemmed *Thelymitra* everywhere we went. This year they are as common as *Microtis* and one probably walks past hundreds per hour BUT never past an open one. I've finally found a naturally open flower and oddly enough it was under mature beech forest where they seem equally at home as they do on the road and track edges under full sun.

“My question is this. What's it currently called?

“Average height about 60mm, purple stem, frequently with rapidly tapering brownish-olive green leaf 50-60mm, sepals purple with a white edging. These are so rampantly common, surely we have an official name for them. I was gob-smacked when Jeremy Rolfe asked what they were. Of course I couldn't show him an open flower that day could I?”

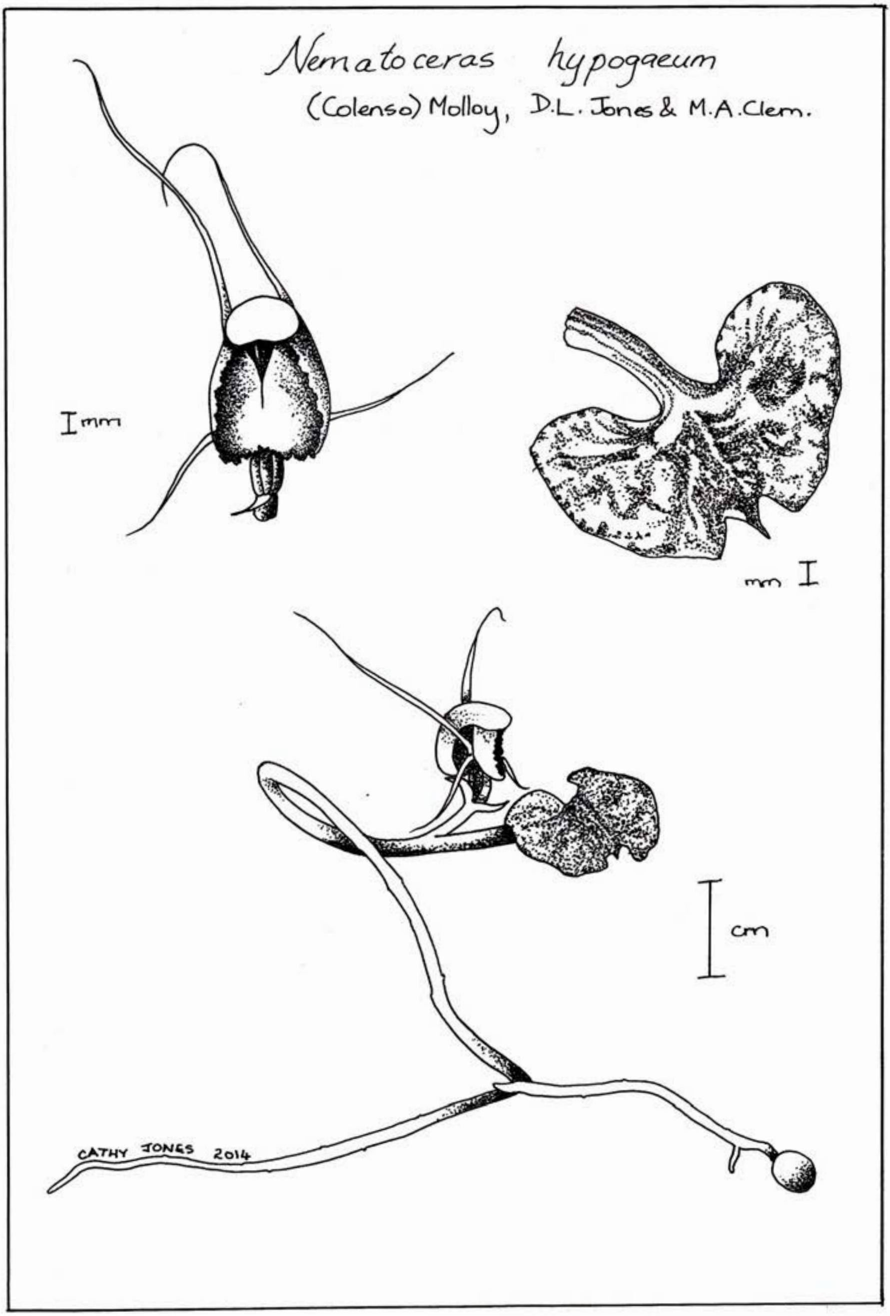
This is not T. purpureo-fusca Col., which is a taller (300mm stems) clump-forming plant with a slightly shallower notch to the post-anther lobe, leaves and stems dusky purple at its type locality near Norsewood, but either green or purple at Queen Charlotte Sound (see J123). Neither is it T. nemoralis Col. (see J123) which is a 300mm tall robust plant identified with T. longifolia s.l.

Mark’s plant is a tiny entity that grows only in association with beech, in light or deep shade, flowers opening rarely. Leaves and stem brown-purple, flowers white to blue-tinged. I have never seen it in the North Island, but it was common about Arthurs Pass and Te Anau when I was there.

I suggest we call it T. aff. purpureofusca until it is formally named (soon I think).—Ed.

Upper 2 photos by Mark Moorhouse;

lower 3 by the editor.



Cathy Jones’s drawing graced the cover of the NZ Bot Soc *Bulletin* for December 2014.

The Hatch Medal 2015

Call for nominations

This medal was struck in 2009 in memory of E.D. "Dan" Hatch and his orchid work. It is awarded annually to a person who has made an outstanding contribution to New Zealand orchidology, as outlined in the Group's aims.
This person can be nominated by any member of the Group and if there is more than one nomination, be determined by the Executive.

The first recipient of the Medal was Ian St George in recognition of his tireless work on the Journal and Historical Series, as well as the many years as chair of the Group.

In 2010 the Medal went to Bruce Irwin in recognition of the many decades he has spent illustrating New Zealand's native orchids as well as other plants and the knowledge arising from his observations that he has freely shared.

The 2011 Medal was awarded to Dr Brian Molloy, New Zealand's premier orchidologist, who has described more new species than anyone before him.

The 2012 Medal went to Eric Scanlen for his outstanding orchid photography and writing and for his work for the Group.

Michael Pratt was the 2013 recipient for his excellent work developing and maintaining the Native Orchids website which is our shop window for the world.

Gordon Sylvester was recognised in 2014 for his role in the establishment of the Group and his dedicated work on mapping the distributions of NZ orchids.

Who will be the 2015 recipient?

Nominations close 1 September 2015

Contact David McConachie, Chair NZNOG, 42 Titiro Moana Rd, Korokoro,
Lower Hutt, 5012: pleione@orcon.net.nz

When Lucy Moore described *Thelymitra dentata* (NZJ Bot 1968; 6: 478) she wrote, “Column-arms ... flanged towards the base with delicate pinkish lobes, teeth or fimbriae that sometimes extend down the front margin of the column-wing; the arms bent inwards so that the two globose bunches of crowded cilia meet just above the anther-tip; cilia at first pale yellow….”

This column of a plant from the Rimutaka shows most of those features rather well—especially the teeth that gave it its name.

It is now known to be a hybrid, so is written *Thelymitra* x *dentata*).

Certificate of Appreciation

Every January, the Taranaki Orchid Society holds its Summer Show. This year I took the opportunity on behalf of the New Zealand Native Orchid Group to make a presentation at the Show Dinner of a Certificate of Appreciation to Bill Liddy.

He has been recognised … “for his ongoing role in the development and maintenance of the Iwitahi Native Orchid Reserve and his role as OCNZ Liaison for the group”.

I also had discussion with Clive Perry on the work that is being done to revitalise the Reserve including re-establishing *Pinus nigra* in developing holes in the canopy as the Reserve ages.

—David McConachie

The New Zealand Native Orchid Journal

The main aim of the **New Zealand Native Orchid Group** is informing people about native orchids, so we permit others to copy material published here, provided the source and author are acknowledged. Authors should note this as a condition of acceptance of their work. The *Journal* is normally published quarterly from February, and deadline for copy is the first of the month beforehand. We like copy to be typed or sent on disk or by email. **Chair:** David McConachie, 42 Titiro Moana Rd Korokoro Lower Hutt, pleione@orcon.net.nz. **Secretary:** Pam Shearer, 7 Ring Terrace, St Marys Bay, Auckland. pam@insidetrack.co.nz. **Treasurer:** Judith Tyler, 4 Byrd St, Levin, bandj.tyler@xtra.co.nz: subscription NZ$42 + post. **Books and publications:** Brian Tyler, 4 Byrd St, Levin, bandj.tyler@xtra.co.nz. **Webmaster:** Michael Pratt, www.nativeorchids.co.nz, Michael@nativeorchids.co.nz. The website posts journals six months after original publication. **Editor:** Ian St George, 32 Hawkestone St, Thorndon, Wellington 6011 istge@yahoo.co.nz.

WE DO NOT NECESSARILY SHARE AUTHORS’ OPINIONS .

"Ghost" pterostylises....

Sue McManus, Pirongia ▼

Alasdair Nichol, Waitawheta

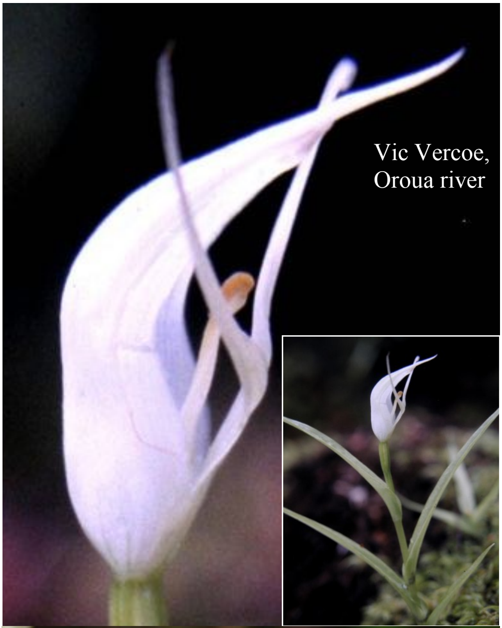
David McConachie,
Central Volcanic Plateau

The editor, Kaueranga valley

The editor, but where?

Cheryl Dawson,
Waihaha

The editor,
Rimutaka
Trig track



Vic Vercoe, Oroua river

▲Both of these are by Mike Lusk, Lake Opouahi ►

The Column

Eric Scanlen

Adenochilus gracilis alba

Steve Reekie was on the Croesus Track out of Blackball on 20 December 2014 and came across the rarely reported, *Adenochilus gracilis* alba, just opening. He kindly sent pix to the Column. Note the characteristic slender and toothed midlobe to the labellum, just unfurling in **Fig. 1**. Before the dorsal sepal elevated, as in **Fig. 2**, Steve could be forgiven for thinking he had a *Stegostyla* aff. *alpina.*

Ian St George reports that pure white flowers are common in the far south which amazed the Column who is used to *A. gracilis* with red barred inner labellum, as per the 1970 Flora. However, Bruce Irwin reported the Iwitahi *A. gracilis,* in J20:4, Dec. 1986, as "greenish white with green dorsal sepal" much as Steve's orchid, or perhaps Bruce hadn't tipped down the labellum to look inside. Only one other Journal report, J50:18, out of umpteen, including the Column's, mentioned colour, or lack of it. So in J50:18, Ken and Cath. Wilson reported a colony of perhaps 12 plants, 20 years ago, in the Haast Pass on 27 December 1994. Their *A. gracilis* had a "completely white labellum" which may not sound like much because the regular specimens, as in **Fig. 3**, from the old Iwitahi Reserve, 7 Dec. 1996, show only a little pink plus the yellow calli on the midlobe. But the pollinators are treated to bright red on the inside of the labellum as in **Fig. 4**, where, also at Iwitahi on, 9 Dec. 2005, the Column hooked the midlobe under a lateral petal, losing half the yellow calli in the process, just to show the bright inner labellum.

The alba-forms, being common in the south, may be mainly self-pollinating thus need no fancy insect attractants, but they have to be self-sustaining, just as *Caladenia nothofageti* as an alba-form of *C. chlorostyla,* now has a self-sustaining population completely independent of its presumed parent-form. At one time *A. gracilis* alba, could have been given varietal distinction but in this day-and-age of dual epithet species, why hasn't the alba-form achieved species distinction?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Cover Mike Lusk

An alpine *Pterostylis* at Maharara, SE Ruahine, November 2014.

The type locality Ian St George

Editorial Ian St George

Guest editorial: Graeme Jane

Original papers

Notes, notices, emails, letters, questions, comments, observations

The column Eric Scanlen

To find out more about native orchids or to see back issues of the journal, scan the code above right with your smartphone and look at www.nativeorchids.co.nz .