

The New Zealand **Native Orchid** Journal



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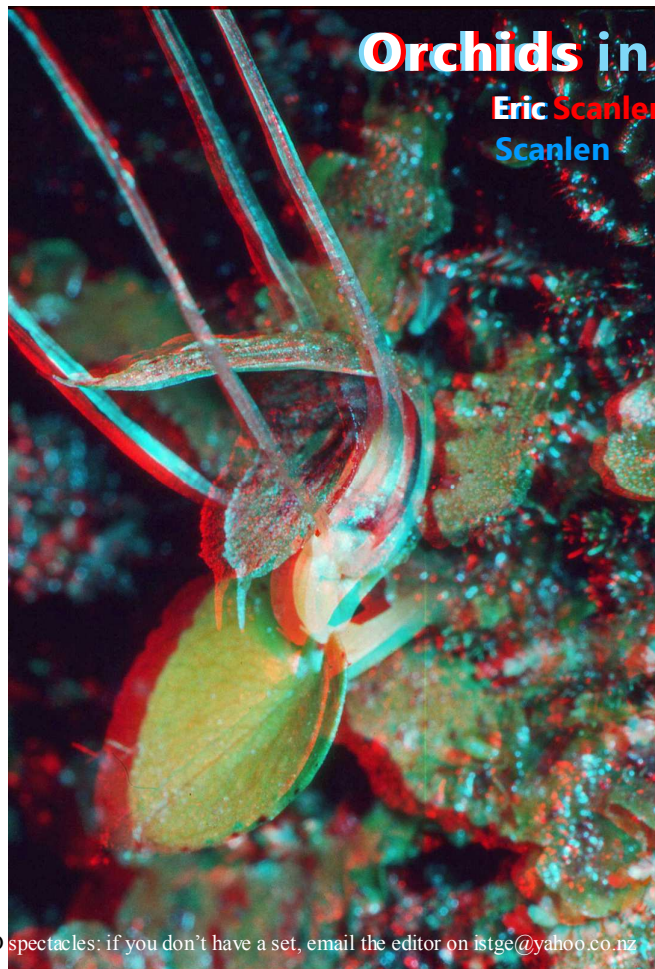
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Use your 3D spectacles; if you don't have a set, email the editor on istge@yahoo.co.nz

The type locality Ian St George

Corybas hatchii Lehnebach at Waiouru

New Zealand has 21 species in the genus *Corybas* and we expect perhaps as many to be named in the next few years. It was not always so.

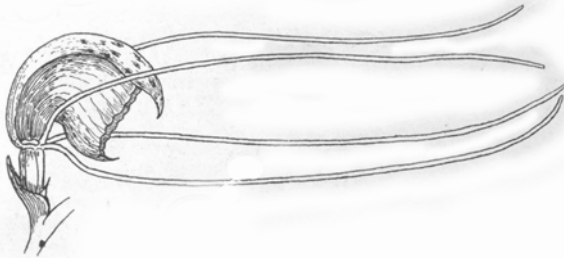
1853. Hooker named five: *Nematoceras oblonga*, *macrantha*, *triloba*, *rotundifolia*, *rivularis* in the *Flora*, remarking that he had several species or varieties, but they were not in a fit state for determination.

1864. Hooker included the same five in *Corysanthes*.

1906. Cheeseman added *Corysanthes cheesemanii* and *matthewsii* (= *rotundifolius*) to make seven.

1925. Cheeseman added *Corysanthes carsei*.

1947. Hatch included *Corybas cheesemanii* in *C. aconitiflorus*, *C. matthewsii* in *C. unguiculatus* and listed *Cc. carsei*, *oblongus*, *trilobus*, *rivularis* and *macranthus*, including two varieties in *C. macranthus*—var. *typicus* and var. *longipetalus*. Here is his father's drawing of *Corybas macranthus* var. *longipetalus*.



Hatch's description reads,

Corybas macranthus* var. *longipetalus Hh. var. nov.

Macranthus typicus affinis, subsimilis. Differto sepalum dorsale incurvum; petala longissima; lamina labellae lobata et acuminata.

Up to 6 cm. high. Similar to but rather smaller than the type, and differing in the very long petals, the lobed labellum and the incurved tip to the dorsal sepal. The lateral sepals are often horizontal. Flowers red or translucent. Seedling peduncle up to 15 cm.

Distribution. Endemic—5, abundant along the banks of streams throughout the tussock hill country lying between the Moawhango and Wangaehu Rivers to the south-east of Mt. Ruapehu. 1942–5 (E. D. Hatch); 16, specimens in seed, almost certainly belonging to this variety, have been found at Butterfields Beach, Stewart Island, 11, 1946 (C. Smith); 12a, Kelly Creek, Otira River, 1, 1947 (P. Haddon-Jones).

Holotype. In Herb. Hatch, No. 563, Waitangi Stream (Waiouru), 3,000 feet, September 2, 1944, E. D. Hatch.

Flowers September to November, 3,000 to 4,000 feet, descending to sea level in Stewart Island. Small colonies.

Probably derived from *C. macranthus typicus*.

1956. Hatch described *C. cryptanthus*.

1970. Moore likewise included *C. cheesemanii* in *C. aconitiflorus*, *C. carsei* and *C. matthewsii* in *C. unguiculatus*, and listed *Cc. oblongus*, *cryptanthus*, *rivularis*, *macranthus*, *trilobus*; she lumped Hatch's *Corybas macranthus* var. *longipetalus* with Colenso's *C. orbiculatus* and regarded *C. rotundifolius* as a synonym of *C. oblongus*.

1985. Clements and Hatch realised that most of the above had misapplied the epithet *rivularis* to a plant they now named *C. acuminatus*. They considered *C. rivularis* to be a synonym of *C. orbiculatus*.

Later still, Molloy restricted the epithet *orbiculatus* to short-tepal plants, so the rest of that group were referred to as the *C. rivularis* complex. Within that complex was *C. macranthus* var. *longipetalus*.

1993. Hatch recognised it was a form of *C. rivularis* rather than *macranthus* so attempted to name it formally *C. longipetalus*. Unfortunately that name was illegal as it had already been used in 1923 for a Papua New Guinea plant. Saddened, we decided to tag it *Corybas* “Waiouru” after its type locality.

2002. Clements, Jones & Molloy re-applied the generic name *Nematoceras* to *Corybas* and included the species *Nematoceras longipetalum*.

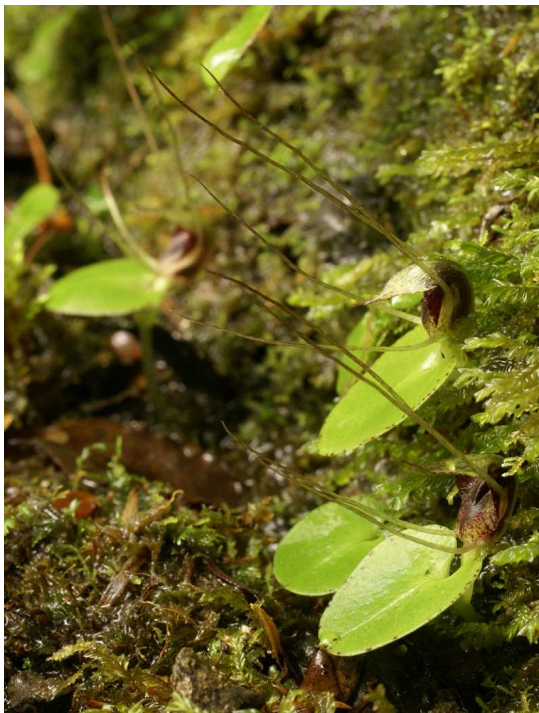
When *Nematoceras* reverted to *Corybas* (a move not yet formally published), the plant was left without a name so we all shrugged and called it *Corybas* “Waiouru” again.

2016. Lehnebach formally named the plant *Corybas hatchii*. On the New Zealand Plant Conservation Network website, de Lange noted,

Part of the *Corybas rivularis* complex from which it is distinguished by its generally translucent or red flower, and very long, forward projecting lateral sepals and petals which are more or less aligned in parallel. The petals are also more or less as long as the lateral sepals. It is perhaps closest to *C. papa* from which it differs by the shortly petiolate rather than sessile leaf; usually translucent to red flowers (very occasionally greenish), rather than mostly green; forward projecting rather than widely spreading lateral sepals and petals; preference for higher altitude habitats; and also by its usually later (up to 8 weeks later) flowering time.

It is difficult to know how strictly to apply the criteria of equal length parallel aligned petals and sepals: certainly such plants are easily recognised, but there are also plants whose galea is indistinguishable morphologically but which have shorter sepals, not parallel—for instance this from the mid-Wairarapa (Lowe’s Bush) ▼.

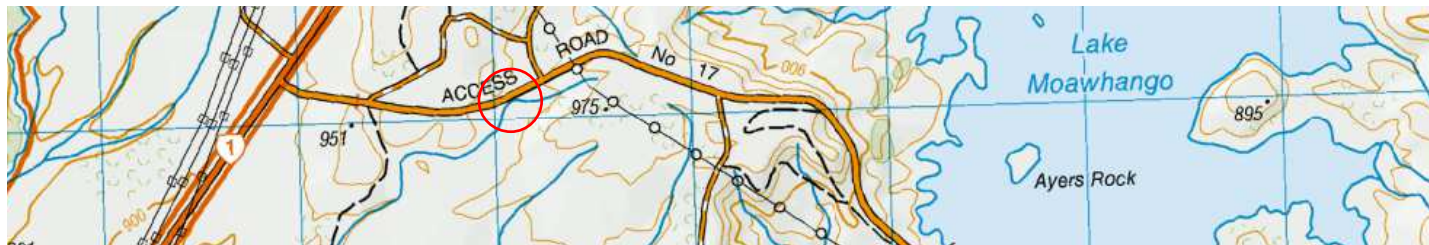




◀ *Corybas hatchii* at Ruakokopātuna, southern Wairarapa, 18 August 2007.

▼ *Corybas hatchii* near the summit of the Remutaka road, 9 September 2018.

The type is in Herb. Hatch—No. 563, Waitangi Stream (Waiouru), 3,000 feet, September 2, 1944, ED Hatch. His plants were “abundant along the banks of streams throughout the tussock hill country lying between the Moawhango and Wangaeahu Rivers to the south-east of Mt. Ruapehu from September to November”. We know Hatch cycled around Waiouru during his military service, so the site is probably close to a road. There is easy access to the Waitangi stream at lower altitudes along the Waiouru-Tangiwai road, but 3000ft (914m) is about the altitude of its source below the Lake Moawhango access road. We obtained permission from the Army Training Group, Waiouru—but at the last minute military exercises were set up for early September and permission was withdrawn. Next year??!



The inbox

Recently accepted for publication in the *Australian Journal of Botany*...

Species-specific male pollinators found for three native New Zealand greenhood orchids (*Pterostylis* R. Br. spp.) suggest pollination by sexual deception. By [Liezl Thalwitzer](#), Dave Kelly, Rob Smissen, Ruth Butler, David Suckling Ashraf El-Sayed.

Abstract

Many orchids achieve pollination by deceptive means. Sexually deceptive orchids are pollinated by male insects which are lured to flowers which mimic the sex pheromones and/or appearance of their female conspecifics. This specialised pollination strategy was recently confirmed for the first time in a *Pterostylis* species in Australia. We investigated whether this pollination strategy may also be operating in *Pterostylis* species in New Zealand where generalised plant-insect pollination strategies are most commonly documented. The breeding systems of *P. oliveri* and *P. irsoniana* were investigated in the field with pollination treatments. Sticky traps were set up over flowering *P. oliveri*, *P. irsoniana* and *P. venosa*, to catch potential

pollinators of the flowers. Insects caught carrying orchid pollinia were identified, and the pollinia were identified to plant species with nuclear ribosomal DNA internal transcribed spacer (nrDNA ITS) sequences. Both *P. oliveri* and *P. irsoniana* were found to be self-compatible, but dependent on insects for pollination. Pollinia from each of the three *Pterostylis* spp. were found to be carried species-specifically by male fungus gnats (Diptera: Mycetophilidae): *Mycetophila latifascia* fungus gnats carried the pollinia of *P. oliveri*, while *Morganiella fusca* gnats carried the pollinia of *P. irsoniana*, and *Tragoneura* sp. carried the pollinia of *P. venosa*. The pollinator specificity indicates that each of the male fungus gnat species were attracted to the flowers of a specific *Pterostylis* orchid. This strongly suggests that each of the orchid species emits a specific floral volatile, most probably resembling the sex pheromones of the female conspecifics, to lure their male pollinators. These are the first documented cases of highly specialized sexually deceptive pollination in New Zealand orchids, which were thought to be predominantly self-pollinating.

The New Zealand Native Orchid Group

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Research on fungus gnats...

... as pollinators is burgeoning, with the New Zealand work of Carlos Lehnebach and Liezl Thalwitzer important additions. A selection of recent literature follows. There are hints there for those of us interested in the pollination of the NZ orchids ►►►►

2000. STEFAN VOGEL, JOCHEN MARTENS. **A survey of the function of the lethal kettle traps of *Arisaema* (Araceae), with records of pollinating fungus gnats from Nepal.** *Botanical Journal of the Linnean Society* Volume 133, Issue 1, May 2000, Pages 61-100.

Evidence from recent research combined with an evaluation of the literature indicates that *Arisaema* is adapted to pollination by fungus gnats. It apparently shares this peculiarity among aroids only with the distantly related genus *Arisarum*. In addition to previous records from Japan and North America, systematic collections from nine *Arisaema* species during several expeditions in the Himalayas in Nepal showed that, although other less efficient insect groups may participate, the nematoceran families Mycetophilidae and Sciaridae are the principal pollen vectors; they best fit the pollination apparatus of the mainly (para)dioecious kettle trap blossoms. A total of 16 fungus gnat genera (both Mycetophilidae and Sciaridae) comprising 47 identified species (among them one genus and 22 species new to science) were observed. Usually members of more than one taxon are attracted per *Arisaema* species, and both sexes of gnats are involved. Visitor sets differed to some degree, depending on host species, area, and altitude; they do not, however, represent the complete fungus gnat fauna of a region. Relevant traits of growth habit and inflorescence structure are surveyed, and a detailed description of the pollination process is given, based on observations made on specimens cultivated in Europe, where vicariant fungus gnats are the pollinators. Attraction is deceptive by mimicking olfactory, visual and tactile cues characteristic of fungi where the gnat sexes normally meet and females oviposit. Odours produced by osmophores (the spadix appendage or spathe tip) play the most important part. The identified volatile compounds are mainly short-chained aliphatic aldehydes and alcohols. Flagelliform osmophores of some species, up to several dm long, reach the substrate and serve as conducting paths. Gnats become imprisoned when they inadvertently slide down the inner wall of the spathe tube. Its surface including the spadix is covered with ablative wax particles that inacti-

vate the insects' tarsal pulvilli. This gliding device, in some species reinforced by zones of imbricate papillae, is irreversible, and no movements of floral parts allowing escape via the spathe mouth occur. Anthesis lasts several weeks. In the male spathes, victims are forced to wade through the pollen masses that have accumulated at the spathe's bottom; there they find an exit hole formed by local gaping of the spathe rims. The female spathes lack such an aperture. After potentially depositing pollen on the stigmas during their efforts to escape, gnats are detained until death. Except for an autogamous subspecies of *A. flavum* Schott, the few monoecious taxa of *Arisaema* are protogynous and possibly self-sterile. In monoecious *A. tortuosum* (Wall.) Schott, exit forming is delayed until pollen release. Three *Arisarum* species that are suspected to deviate in their floral syndrome are discussed along with araceous genera possessing similar one-way pitfall mechanisms.

2004. YUDAI OKUYAMA, MAKOTO KATO and NORIYUKI MURAKAMI. **Pollination by fungus gnats in four species of the genus *Mitella* (Saxifragaceae).** *Botanical Journal of the Linnean Society*, 2004, 144, 449–460.

The first example of pollination by fungus gnats in the eudicots is reported. The genus *Mitella* (Saxifragales) is characteristically produces minute, inconspicuous, mostly dull-coloured flowers with linear, sometimes pinnately branched, petals. To understand the function of these characteristic flowers, we studied the pollination biology of four *Mitella* species with different floral traits and different sexual expression: dioecious *M. acerina*, gynodioecious *M. furusei* var. *subramosa*, and hermaphroditic *M. stylosa* var. *makinoi* and *M. integripetala*. Flower-bagging experiments showed that wind pollination did not occur in the dioecious and gynodioecious species. Two years of observations of flower visitors at six study sites in Japan revealed that the principal pollinators of all four *Mitella* were specific species of fungus

gnats (Mycetophilidae), which landed on the flowers with their long spiny legs settling on the petals. Characteristically, numerous pollen grains were attached to the fungus gnats in specific locations on the body. Although, on average, 1.3–2.6 fungus gnats visited each inflorescence per day, the fruit set of both bisexual and female flowers exceeded 63%. These results suggest that fungus gnats are highly efficient pollinators of *Mitella* spp., and that *Mitella* flowers are morphologically adapted to pollination by fungus gnats.

2012. Yudai Okuyama. Pollination by Fungus Gnats in *Mitella formosana* (Saxifragaceae). *Bull. Natl. Mus. Nat. Sci.*, Ser. B, 38(4), pp. 183–187

The pollination system of *Mitella formosana*, the last *Asimitellaria* species (genus *Mitella* sect. *Asimitellaria*, Saxifragaceae) in which the information regarding its flower visitors remained unreported, was studied in two study sites in Taiwan in April, 2011. Although the frequency of pollinator visits observed were very low (0.04 visits per hour per inflorescence on average in daytime), the principal pollinators of *M. formosana* were clarified as the fungus gnats of the genus *Boletina* and *Coelosia*, just similar as in the other *Asimitellaria* species in Japan. The apparent similarity of pollination systems of *Asimitellaria* species between Taiwan and Japan implies the longterm maintenance and the evolutionary stability of the *Mitella*–fungus gnats pollination mutualisms across Japan archipelago and Taiwan.

2014. Carol Andrea Duque-Buitrag, Néstor Fabio Alzate-Quintero & J. Tupac Otero. Nocturnal pollination by Fungus Gnats of the Colombian endemic species, *Pleurothallis marthae* (ORCHIDACEAE: PLEUROTHALLIDINAE) *LANKESTERIANA* 13(3): 407–417.

We present data on pollinator identities, pollination mechanisms and

flowering phenology of the Colombian endemic orchid, *Pleurothallis marthae*. We evaluated the mechanisms of attraction, the presence of osmophores, and the reproductive system of the species. *Pleurothallis marthae* is self-compatible with nocturnal anthesis pollinated by *Mycetophila* sp. (Mycetophilidae), probably attracted by a strong fungus like smell liberated by the flower and *Bradysia* sp. (Sciaridae) that feed on nectar in the labellum. Osmophores and nectaries were detected in the epidermis of the sepals and petals. We present new evidence that the genus *Pleurothallis* is adapted to Diptera pollination. Our study indicates that the pollination mechanism of *P. marthae* is based on the nocturnal attraction of two species of fungus gnats, probably combining food attraction and brood place deception.

2014. Phillips RD, Scaccabarozzi D, Retter BA, Hayes C, Brown GR, Dixon KW, Peakall R. Caught in the act: pollination of sexually deceptive trap-flowers by fungus gnats in *Pterostylis* (Orchidaceae). *Annals of Botany* 113 (4): 629 - 641

PTEROSTYLIS is an Australasian terrestrial orchid genus of more than 400 species, most of which use a motile, touch-sensitive labellum to trap dipteran pollinators. Despite studies dating back to 1872, the mechanism of pollinator attraction has remained elusive. This study tested whether the fungus gnat-pollinated *Pterostylis sanguinea* secures pollination by sexual deception.

The literature was used to establish criteria for confirming sexual deception as a pollination strategy. Observations and video recordings allowed quantification of each step of the pollination process. Each floral visitor was sexed and DNA barcoding was used to evaluate the degree of pollinator specificity. Following observations that attraction to the flowers is by chemical cues, experimental dissection of flowers was used to determine the source of the sexual attractant and the effect of labellum orientation on sexual attraction. Fruit set was quantified for 19 populations to test for a relationship with plant density and population size.

A single species of male gnat (Mycetophilidae) visited and pollinated the rewardless flowers. The gnats often showed probing copulatory behaviour on the labellum, leading to its triggering and the temporary entrapment of the gnat in the flower. Pollen deposition and removal occurred as the gnat escaped from the flower via the reproductive structures. The labellum was the sole source of the chemical attractant. Gnats always alighted on the labellum facing upwards, but when it was rotated 180 ° they attempted copulation less frequently. Pollination rate showed no relationship with orchid population size or plant density.

This study confirms for the first time that highly specific pollination by fungus gnats is achieved by sexual deception in *Pterostylis*. It is predicted that sexual deception will be widespread in the genus, although the diversity of floral forms suggests that other mechanisms may also operate.

2016. IN DEFENSE OF PLANTS: Three Cheers for Fungus Gnats!
<http://www.indefenseofplants.com/blog/2016/4/28/three-cheers-for-fungus-gnats>

Pollinators, for good reason, are one of the largest selective pressures on flower evolution. As flowers evolve to cater to a specific kind of pollinator, be it a bird, a bee, or even fungus gnats, we refer to it as a pollinator syndrome. I have been enchanted by the flowers of the genus *Mitella* ever since I stumbled across them.... they are generally saucer shaped and have snowflake-like appendages protruding from their rim. I wondered, what kind of pollinator syndrome would produce such delicate beauty?

A quick search in the literature turned up a paper from a team of botanists based out of the University of Idaho. The paper outlines work done across a wide range of genera in the Saxifragaceae family. They looked at flower morphology and, through hours of field observation, found a common theme in many species. Those with small,

white, saucer-shaped flowers, such as those of *Mitella pentandra*, all seem to be pollinated by fungus gnats. Fungus gnats are themselves quite small and their larvae live in moist soils, feeding on fungi. As it turns out, the adults are avid pollinators of many plant species and because of this, some species, like *M. pentandra*, have evolved a pollinator syndrome with them.

The research team also found a strong correlation between fungus gnat flowers and habitat type. They all seemed to be tied to moist forest habitats. This is because moist forests are the only place fungus gnats can live. Plants in drier habitats rarely come into contact with fungus gnats and therefore have no selective pressures to cater to these insects.

2017. Kenji Suetsugu, Masahiro Sueyoshi. Subterranean flowers of *Aspidistra elatior* are mainly pollinated by not terrestrial amphipods but fungus gnats. *The Scientific Naturalist*.

... even though most *Aspidistra* species are common, they are also inconspicuous, and the leaf litter of forest habitats usually covers their flowers and fruits, both of which are found close to ground level. Therefore, the *Aspidistra* flower is often considered cryptic (Phonsena and De Wilde 2010). ...

In order to further elucidate the pollination biology of *A. elatior*, we conducted the first direct observation of *A. elatior* visitors in the species' natural habitat. *Aspidistra elatior* is widely cultivated in both China and Japan but is indigenous to only a few small islands in the southern part of Japan (Liang and Tamura 2000). Therefore, we made direct observations of pollinators visiting *A. elatior* flowers in evergreen oak forests at altitudes between ca. 300–600 m on Kuroshima Island, Kagoshima Prefecture, Japan, where *A. elatior* is abundant in the understory. We performed the observations of floral visitors for ca. 30 h in mid- to late April of 2015–2016, covering all periods of a 24 h cycle, and red light was used during nocturnal observations to minimize the effect of light on the visitors. We also tagged 253 flowers in

mid-April 2016 and assessed the fruit sets under natural condition in late October 2016.

We observed that five individuals of fungus gnats visited and penetrated through the gaps between the stigma lobes and perianth tube, three of which were captured for the precise identification. They were identified as *Cordyla sixi* (Mycetophilidae), newly recorded from Japan, and *Bradysia* sp. (Sciaridae). In addition, all captured fungus gnats were male, thereby providing no evidence that the flowers serve as brood sites. When a fungus gnat visited a flower, it landed on the upper surface of the stigma so that, if the fungus gnat had previously visited another flower, cross-pollination would occur. The fungus gnats often penetrated under the stigma by entering small openings between the stigma lobes and perianth tube. Therefore, when the fungus gnats exited, they were covered with pollen grains. The fungus gnats would often try to penetrate under the stigma several times before succeeding and, then, would remain there for up to dozens of seconds, before exiting through the gaps. Because flowers of *Aspidistra* do not produce nectar and adult fungus gnats do not feed on pollen grains, we concluded that fungus gnats did not receive any benefits from this interaction.

Interestingly, a wasp in the family Diapriidae was also documented as a potential pollinator. We observed only one, but the wasp penetrated under the stigma through the gaps between the stigma lobes and perianth tube, and when the wasp exited, it was covered with pollen grains. The dipterid wasps are parasitoids that attack the larvae of fungus gnats (Gauld et al. 1988), and they have also been documented to pollinate *Cypripedium fasciculatum*, the morphology of which is similar to species pollinated primarily by fungal gnats (Lipow et al. 2002). Therefore, the similar appearance of *A. elatior* and mushroom fruit bodies may help attract fungus gnats, as well as their natural enemies (Tillich 2005). In fact, larva of both *C. sixi* and *Bradysia* sp. are known as the fungivore....

We predicted that the fungus gnats are the most effective pollinator of *A. elatior* since (1) they were observed on multiple occasions

departing from *Aspidistra* flowers with a lot of pollen grains on their bodies, (2) they were the dominant flying insects that visited the *Aspidistra* flowers, and (3) the flowers that they visited often developed fruits (2 fruits/5 flowers) despite the population's overall low fruit set (12 fruits/253 flowers). Since experienced insects usually avoid non-rewarding plants due their associative learning ability, the deceptive pollinator attraction strategy could account for the low pollination visitation rate (Tremblay et al. 2004), and this could contribute to the low reproductive success of these plants. In addition, the size of the fungus gnats allows them to pass through the gaps between the stigma lobes and perianth, enter the chamber, and locate the stamens. Therefore, we speculate that the methodology used by Kato (1995) may have been insufficient for detecting dipteran visitors, likely owing to their short duration of their visitations.

Indeed, several aspects of *A. elatior*'s floral morphology, such as its superficial similarity to mushroom fruit bodies, suggest that *Aspidistra* species are pollinated by fungus gnats (Tillich 2005). We also found that the *A. elatior* in our study site emitted a strong musty odor, while other *Aspidistra* flowers are often described as odorless. Therefore, the fungus gnats may be attracted by both visual and chemical mimicry. It is also interesting to note that *Cordyla* species, that are the main pollinators of *A. elatior*, also pollinate *Heterotropa* which is also considered a mushroom mimic (Sugawara 1988).

2018. Mochizuki K, Kawakita A. Pollination by fungus gnats and associated floral characteristics in five families of the Japanese flora. *Ann Bot.* 2018 Mar 14;121(4):651-663.

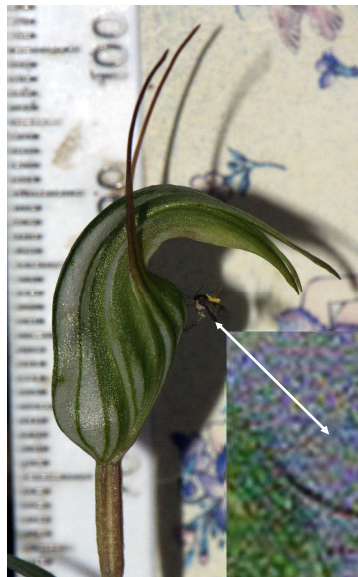
Pollination by fungus gnats (Mycetophilidae and Sciaridae) is uncommon, but is nevertheless known to occur in 20 genera among eight angiosperm families. Because many fungus gnat-pollinated plants possess a dark red floral display, we hypothesized that fungus gnat pollination is more widespread among plants with similar floral display than currently known. We thus studied the pollination biology of

flowers with dark red pigmentation in five families, focusing particularly on plants having small, flat, actinomorphic flowers with exposed nectaries and short stamens, because these floral characteristics mirror those of a known fungus gnat-pollinated genus (*Mitella*).

We observed daytime and night-time floral visitors for a total of 194.5 h in *Aucuba japonica* (Garryaceae), *Euonymus* spp. (Celastraceae), *Disanthus cercidifolius* (Hamamelidaceae), *Micranthes fusca* (Saxifragaceae) and *Streptopus streptopoides* (Liliaceae). Visitors were categorized into functional groups, and a pollination importance index (PII) was calculated for each functional group based on visitation frequency, pollen load and behaviour on flowers.

Fungus gnats were dominant among the 1762 insects observed (36-92 % depending on the plant species) and were the most important pollinators among all plants studied (PII: 0.529-1). Fungus gnat visits occurred during the daytime and, more frequently, at dusk. Most often, pollen grains became clumped on the ventral side of the head and/or thorax as the short-proboscid fungus gnats foraged on nectar and came into contact with anthers located close to the flower base.

Pollination by fungus gnats is probably more common than previously thought, especially in habitats similar to those of the plants studied (moist forest understorey, streamside or subalpine meadow) where fungus gnats are abundant year-round. Our results further suggest that there may be a previously unnoticed association between fungus gnat pollination and dark red coloration, and a shared overall floral architecture among the plants studied.



Pat Enright took this photograph of *Pterostylis alobula* with an insect carrying pollinia on its thorax on 8 June.

Georgina Upson identified it as “definitely a fungus gnat almost certainly of the genus *Zygomia*”.



Lynne Pomare found these ▲ bronze *Pterostylis trullifolia* near Wellington.

Mark Moorhouse sent images and text from the Nelson Botanical Society's July Newsletter, where... It was mooted that *P. alobula* plants that flower several times from tubers may go through three phases rather than two: firstly, juvenile rosettes non-flowering; secondly, flowering plants with some cordate lower leaves; and finally, flowering plants with just trulliform leaves.

Dan Hatch illustrated what he would informally call the "adolescent" stage of *P. trullifolia* in his 1949 paper (Trans. N.Z. Inst. 77: Plate 30, Fig.2 at far right)—Ed.

Photographs of *Pp. alobula* & *trullifolia* by Don Pittham ▶



P. alobula



P. trullifolia

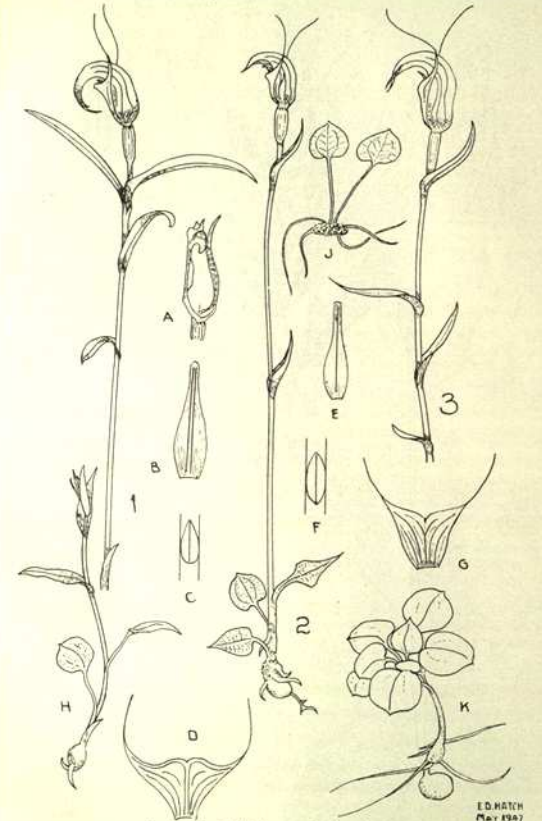


FIG. 1—*Pt. trullifolia* var. *rubella* nat. size.
 a, column and labelium from side; b, labelium from above; c, stigma; d, lateral sepals;
 j, special form adapted to vegetative reproduction; k, juvenile.
 FIG. 2—*Pt. trullifolia* var. *gracilis* nat. size.
 Dissections as for var. *rubella*.
 FIG. 3—*Pt. trullifolia* var. *alobula* nat. size.
 e, labelium from above; f, stigma; g, lateral sepals; h, intermediate stage.

D. HATCH
 (Pl. 1947)

The rediscovery of *Chiloglottis trapeziformis* near Waitarere.

Andrew Broome (ajbroome@xtra.co.nz), Carl Timms (carltimms@gmail.com) and Katherine Murray (mera.asteri@gmail.com).

Photographs by Andrew Broome.

Background

In September of 2001 Leita Chrystall found a 'new' orchid in the Horowhenua Pine Plantation near Levin. It was initially thought to be *Chiloglottis formicifera* but was subsequently identified as *Chiloglottis trapeziformis*. After the initial discovery a total of approximately 25 colonies were found. Some variation in morphology (flower colour, patterns of labellar calli etc.) as well as the timing of flowering between colonies was noted but with very little, if any, differences within each colony. This suggests clonal reproduction from a limited founding population growing from a rare, probably wind facilitated, seed dispersal event from south-eastern Australia. Some of the observed variation may also be due to environmental factors. With the impending harvesting of the pine trees a concern, in May of 2002 Brian Tyler, Geoff Monk, Ian Townsend, Trevor Nicholls, Doreen Abraham, Leita Chrystall, Pauline Jackson and Eric Scanlen removed all the plants they could find and transferred them to a range of sites throughout the North Island. With the exception of those plants moved to Iwitahi it seems the fate of these translocated populations is generally unknown. In 2003 the pine trees were harvested and the site was effectively destroyed.

An update

At the end of June 2018 the authors were exploring the pine forest near Waitarere looking for winter growing orchids to photograph. While most of the species found were reasonably readily identified we did find a clump of one species that we initially dismissed as the locally relatively common *Chiloglottis cornuta*. However, upon returning to Palmerston North and looking through the available literature some doubt arose so a return trip was undertaken in early September. Once we got to the site we immediately sought out the colony and were delighted to find plants in flower which confirmed our suspicions that we had in fact found a population of *Chiloglottis trapeziformis*. Subsequent searching located a second, much larger clump also in flower. We estimate that between the two colonies there would appear to be something in the



order of several hundred apparently healthy plants, although perhaps only a few percent were flowering at the time and no seed pods were observed. A lack of seed set is not unexpected as the usual pollinator in Australia is a Thynnid wasp that is not known to be present in New Zealand. Clearly we have no way of knowing if these populations are the result of the same or an independent seed dispersal event from Australia or if they are due to the 2002 translocation efforts. Further visits will be made to monitor the populations with a special interest in any insect visitors or seed set.

Anyone who knows more about the translocated populations is invited to get it touch (in confidence) with the authors.

Our thanks must go to David McConachie and Carlos Lehnebach for prompt positive identification as to the species and for encouraging the authors to make this note available.



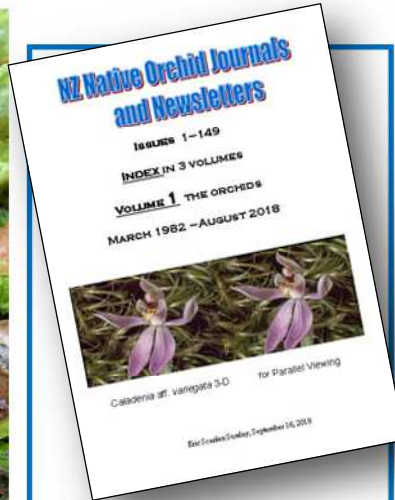
On the wall of the lift at the Alexander Turnbull Library, a big reproduction of *Thelymitra longifolia*, sketch by William Hodges, the artist on Cook's *Resolution* voyage, after the watercolour by Georg Forster: the specimen collected from the top of Long Island, Marlborough Sounds.



Pat Enright found these putative hybrids between *Cc. vitreus* and "trotters" near Tauherenikau in early September

If you go to <https://www.researchgate.net/search?q=Corybas> you will be able to read a bunch of papers on *Corybas* published since 2008 (thanks to Pat Enright for finding this site)...

- Initial Observations on the Pollination of Corybas (Orchidaceae) by Fungus-gnats (Diptera: Sciaroidea)*
- Next-generation species delimitation and phylogeography of a recently radiated clade of Australian Corybas*
- Diversité du genre Corybas Salisb. (Orchidaceae, Diurideae) en Nouvelle-Calédonie*
- Five new species of Corybas (Diurideae, Orchidaceae) endemic to New Zealand and phylogeny of the Nematoceras clade*
- Corybas geminigibbus (Orchidaceae), a new species record for Thailand*
- Two newly recorded genera of orchidaceae from Tibet Autonomous Region, China*
- Vesicular mycorrhizas in the orchid Corybas macranthus Photo*
- Extinction risks and conservation status of Corybas (Orchidaceae; Orchidoideae; Diurideae) in Peninsular Malaysia*
- Six new species of New Guinea Corybas*
- New records and name changes for the orchids in the Solomon Islands*
- Newly Discovered Native Orchids of Taiwan (VII)*
- Molecular systematics, biogeography, and mycorrhizal associations in the Acianthinae (Orchidaceae), with a focus on the genus Corybas....*
- UV reflectance but no evidence for colour mimicry in a putative brood-deceptive orchid Corybas cheesemanii*
- Pollination and insect visitors to the putatively brood-site deceptive endemic spurred helmet orchid, Corybas cheesemanii*
- Conservation Status of Some Orchids in Peninsular Malaysia*
- The Biogeography, Ecology and Endophyte Mycorrhiza of the New Zealand Corybas Alliance (Orchidaceae)*
- Limited carbon and mineral nutrient gain from mycorrhizal fungi by adult Australian Orchids*
- Orchids of Cloud Forest in Genting Highlands, Pahang, Malaysia*
- The Tasmanian records of the Swamp Helmet-orchid Corybas fordhamii (Rupp) Rupp*
- Ecology of ultramafic outcrops at Mount Kinabalu, Sabah, Malaysia*
- New combinations in the terrestrial orchid genera Caladenia R. Br., Corybas Salisb. and Pterostylis R. Br. (Orchidaceae) for south-eastern Australia*
- Corybas villosus - some observations on the natural history of a rare and endemic Peninsular Malaysian orchid*
- Vegetation and floristics of Columbey National Park, lower Hunter Valley, New South Wales*
- Corybas himalaicus (King & Pantl.) Schltr. (Orchidaceae): A newly recorded species in Taiwan*



NZNOJ Index

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▲ On 16 September Mark Moorhouse “photographed *C. walliae* and *C. vitreus* growing sympatrically in Upper Motupiko (nr Nelson Lakes NP)... No in between in evidence. In fact only one single *C. vitreus*, the rest *C. walliae*. Separate colonies of both and *C. hypogaea* in near vicinity. Plenty of places the two grow near each other in similar conditions but hard to find them actually sharing space. While they look physically similar at first glance, *C. walliae* has a papillose outer surface to the labellum wings which *C. vitreus* lacks. Then of course the colour difference is the obvious, *C. walliae* being entirely pale green, often crystalline, apart from a purple spot down its throat whereas *C. vitreus* has purple wings to the labellum which tend to open wider and flatter than *C. walliae* especially at the bottom. *C. vitreus* has a noticeably greener dorsal too.”

Normally the short lateral petals of *Corybas* “Trotters” spread horizontally ▼



but sometimes they appear to be absent ▲ though are actually caught under the edge of the dorsal sepal and curled back down against the labellum wing ▼.



Original papers

Caladenia minor in context

By Georgina Upson

Kew garden, in private Crown ownership, had slipped into decline since the deaths of both Joseph Banks and King George III in 1820. By the mid 1830s it was in a sorry state, no further botanists were being sent out and few specimens were arriving at the herbarium. No official records were being kept during this period. The government proposed to disband it altogether. In 1838 John Lindley, leading a committee, recommended to Parliament that Kew be retained for the nation with a herbarium and library to act as a national scientific base. This was rejected but reversed in 1839 when the Prime Minister discovered that the matter was to be raised in Parliament. At this time it appears that AB Lambert may have been at least in part fulfilling the roll of Joseph Banks at Kew. WT Aiton was a gardener at Kew and on his retirement WJ Hooker was appointed Director, taking up the position in the spring of 1841.

John Lindley 1799–1865, [1] was, among many other things, the top authority on classification of Orchidaceae having played a large part in developing this system. He wrote *The genera and species of orchidaceous plants* a project that took ten years 1830–1840. He worked tirelessly without break until 1852, when on taking his first holiday at age 52 his health broke down and he never fully recovered. He sold his 7000 specimen orchid collection to Kew in 1864. He was a very close friend of WJ Hooker.

AB Lambert privately held a 50,000 specimen dried plant collection, many of them Type specimens, from at least 130 collectors, as well as a collection of living plant specimens notably coniferae—he wrote a

treatise on Coniferae. In 1839 he was an elderly man, his herbarium in a state of confusion, and he died on 10 January 1842. His extensive collection was left to the National Herbarium of the British Museum which auctioned it in June 1842 in 317 Lots. The specimens went to herbaria and private ownership worldwide, only a few finding their way to Kew. Lot 57 “plants of N.Z. by Edgerley and others 5 bundles” was bought by Rich [3a]. Lambert was also a friend of WJ Hooker.

Walter Hood Fitch, [2] trained by WJ Hooker in botanical drawing and in whom WJ Hooker had absolute trust, was the sole artist for all official and unofficial publications from Kew after 1841. His works are to be found in many publications. Fitch gained worldwide recognition for his abilities as an artist and botanical illustrator. JD Hooker believed Fitch incapable of making “a mistake in perspective and outline, not even if he tried”. Perhaps this said enough of Fitch’s skill.

John Edgerley, [3] was a young man employed as a gardener and botanist by Mc Donnell, living at Horeke in the Hokianga area, to tend to the gardens and to send both live and dried specimens back to England. There were at least three or four known shipments of live plants to the Earl of Bedford, AB Lambert, and Kew. Lambert, at least, is known to have also received dried specimens. Edgerley harboured fond hopes of employment by Kew in a botanist or botanical gardening role. Of particular interest is a shipment that left New Zealand in late March or early April 1839 under the care of Dr R Day and would have arrived in England in the later part of that year in Kew’s darkest days, when Lambert appears to have been “caretaker” and no Director had yet been appointed. On 27 April 1842 Edgerley offered whatever specimens WJ Hooker wanted at the price previously offered by Kew. He had to offer ... “fruits in spirits and a few good specimens of dried plants at Chelsea which you shall have as soon as I arrive in London”. It is of interest that of 11 collections under his name at Kew six are of orchids.

Dr R Day, [4] rendered medical services to the folk of the Hokianga and tutored the children of Rev. Hobbs of Mangungu near Horeke. He had botanical collections of his own. Day cared for the plants and deliv-

ered letters in England on Edgerley's behalf on the voyage of the *Coromandel* that left in March 1839.

William Colenso, [5] an enthusiastic beginner, wrote to WJ Hooker on 14 February 1840 introducing himself and sending a small number of specimens both pressed and in spirits. The Letter sent to Glasgow and the specimens sent to a mission to be forwarded on. These may have found their way to WJ Hooker by August 1840. Hooker wrote back to Colenso in August 1840 that his specimens had arrived. Among the spirit specimens sent was Bottle 7 containing both Colenso's "Thelymitra straminea" and an orchis possibly a *Caladenia*. These were probably collected on the same day during a botanising trip, 28 September 1839 near Owae where they were placed in spirits (dilute hydrochloric acid) before he returned to Paihia. On 20 July 1841 Colenso wrote to WJ Hooker sending more specimens which left for England in late August or early September and could have arrived in early 1842. (Hooker replied in April 1842 which may be when he received this second collection).

It seems that WJ Hooker would have received specimens from both these men almost simultaneously on one occasion. A Farjon noted Hooker's uncertainty on the specimen sheet for *Thuja doniana* "collected by R. Colenso or J. Edgerley. See W.J. Hooker in London J. Bot. 1: 571–572".

WJ Hooker was newly appointed Director needing to attend to the many issues of reviving Kew. Hooker wrote to Lambert enquiring whom had sent specimens to which Lambert replied 17 August 1840 that "he had no doubt that the trees was from Edgerley who had sent him these beautiful conifera last year". Perhaps Hooker had discovered an unlabelled parcel when he went to deposit Colenso's specimens. Colenso's would have been identifiable as his plants were numbered. These would appear to have arrived before Hooker's appointment hence the need to consult Lambert. The specimens were put aside where they stayed until 1851 when JD Hooker finally began his three volumes, the result of the Antarctic Expedition, the *New Zealand flora* being the first.

In later years but prior to 1853 Colenso sent pressed specimens, Colenso 409 and Colenso 1945, to Kew. Many years later in June 1885 Colenso sent a collection to JD Hooker of the plants he had described in Vols 16 and 17 of the *Transactions of the N.Z. Institute*. Among these was Colenso's *Caladenia variegata*, both pressed and in spirit [6].

The two spirit collections from Colenso have been removed from spirit and placed on sheets. *C. variegata* has no relevance in identifying *Caladenia minor*, the other removed from spirit and placed on Colenso 409 by B. Molloy in 2000 after *Caladenia chlorostylus*, *nothofageti* and *atradenia* were described in 1997. Molloy on this inspection deemed all specimens labelled both a) and b) to be *Caladenia alata*. He appears to include all three relevant sheets for *Caladenia minor* in this statement. This spirit collection, found near Owae was made not far from the dried collection near Temateatai, both are in Wangaruru Bay and appear to be *Caladenia alata* already described from Australia. It is known that Fitch drew from one or more spirit specimens that were spoiled and probably destroyed in the process. These were of a different species strongly suggesting that there was another spirit collection. R Day was a doctor, probably with access to spirits and Edgerley had "fruit in spirits" which he may have obtained from the doctor both of whom had plant collections and could have deposited a spirit collection at Kew albeit "spoiled" but sufficient for drawings in conjunction with a pressed sample. Could the doctor have initialled a small spirit bottle? A spirit sample only would probably have had Hooker describe the flowers as yellow as he did in *Thelymitra colensoi* ("T. straminea").

There are three dried collections, Colenso's 409 and 1945 and the 4 specimen (Hooker) collection. There is a slight possibility that the (Hooker) collection could have been one of the few that made it to Kew from the Lambert collection but no evidence supports this. The (Hooker) sheet has had a notable absence from Kew in the Lindley collection [7]. The sheet has been signed off as *C. minor* by J.D Hooker and had the final proofs for the plate to illustrate it attached. It does not have a collector name on it—JD Hooker would need clarification from

his father on that issue. It has the hallmarks of a type sheet when compared with others such as the *Corybas oblongus* and *Adenochilus* sheets. This must have occurred at Kew prior to the sheet ending up in the Lindley collection. Absent from this sheet are any herbarium stamps. All collections before 1867 were individually stamped presumably in the year when JD Hooker assumed his father's position. Lindley sold his collection to Kew in 1864. It was moved to Kew at that time but has been kept separate thus narrowing the time frame still further. Brian Molloy located the sheet in the Lindley collection in 1990 from whence it has now been returned to the Kew collection.

Also absent from Kew is the sheet from which *Caladenia bifolia*, collector Lyall, was described. An explanation for these missing sheets may be that JD Hooker was struggling with these two species. Was that two leaved plant with a flower whose labellum accretments were so different from the single leaved plant really the same genus? Time may have been short, the proofs ready, 1852. Maybe he could get an opinion from the family's very good friend and recognised authority on classification John Lindley. The specimens went to him but never came back because Lindley collapsed. Perhaps the *Caladenia bifolia* sheet is to be found in K-L to support this hypothesis. Meanwhile JD Hooker had been informed that the specimen(s) had

come from Ederley and R.D. but no longer having the sheet to write on he simply squeezed them in around Colenso's name on sheet 409. Because Hooker regarded all as *C. minor* he could not have foreseen the possible consequence of that act.

Some species are more difficult to define. In Kew is the sheet for *Adenochilus gracilis*, for which JD Hooker erects a new genus. His work process can be clearly seen. He first questions whether this is a *Caladenia* then erects a new genus beginning with *Adenochilus* then changing this once more to *Adenochilus*. *Caladenia bifolia* must have been nightmarish with features similar, in part, to both genera. Today it sits in a genus of its own.

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The Column

Eric Scanlen

Chiloglottis roundup

Chiloglottis cornuta Lyall, **Fig. 1**, is a Campbell Island species [1] **which does not grow on mainland New Zealand!** The labellum has the six regular *Chiloglottis* calli [see also J129:26] **plus that horn near the base.** **Fig. 2** is an enlargement of JD Hooker's 1844 drawing of David Lyall's Campbell Island find, from the 1867 Kew Holotype, sheet K000827725, where the horn is clearly shown. Also shown is the *Chiloglottis* basic array of six labellum calli. Thomas Kirk, in August 1867, added a handwritten note, **Fig. 3**, to the Kew holotype, ostensibly lumping the common North Island form of *Chiloglottis*, hereinafter tagged *C. "Kirk"*, into Lyall's species. Most authoritative botanists, have since, perhaps unknowingly, acceded to this clearly erroneous lumping! Yet JD Hooker's 1844 Latin description of *C. cornuta*, in *Flora Antarctica*, [1] p16, emphasises "...basali (appendix labelli) porrecta, subrecurve." Which translates to, "basal appendix to the labellum, leaning and curved forward."



◀ Fig. 1

The 1867 Kew Holotype, for *Chilaglottis cornuta*, sheet K000827725, without Thomas Kirk's note. The central specimen and Hooker's 1844 drawing are cogent, being of the only Campbell Id. specimens.

Fig. 2 ▶

JD Hooker's 1844 drawing of David Lyall's specimen of *C. cornuta* from Campbell Island, enlarged from the Holotype. Note the unique hook near the base of the labellum. Note also the basic callus layout of label-lum calli. These six basic calli appear in all the taxa detailed in this article except *C. "Cargill"*.



30.

Chiloglottis cornuta. Hook. f.

but the "tumid purple glands" on the surface of the lip - often not always broken up into a number of smaller ones & the protuberance at the base wanting -

leaves 2, rarely 3, ovate or oblong with, usually apiculate - veins reticulate - scape with a sheathing bract at the base - one or two inches high when in fl. but elongating after sub - sometimes 18 inches long. - one or very rarely 2-flowered

Hobsons Bay near Auckland. also observed sparingly at Great Omahak.

New Zealand
T. Kirk 8/67

T.K.

Kirk's handwritten note reads thus,

"*Chiloglottis cornuta*. Hook. f put the "tumid" purple glands [referring in part to JD Hooker's 1864 description of *C. cornuta* in *Handbook of NZ Flora* (1) top p70] on the surface of the lip - often not always broken up into a number of smaller ones & the protuberance at the base wanting.

Leaves 2, rarely 3, ovate or oblong, usually apiculate: scape with a sheathing bract at the base - one or two inches high when in fl. but elongating afterwards - sometimes 18 inches long. One or very rarely 2-flowered

Hobsons Bay near Auckland. Also observed sparingly at Great Omahak. New Zealand

T. Kirk 8/67"

***Chiloglottis* "Cargill"** Bruce Irwin found this taxon, complete with horn at the labellum base (similar to Lyall's *C. cornuta*) on 19 Dec 1967, at Mt. Cargill, ER 69, and included it, in error, as *C. cornuta* (Fig. 4 herein) in his drawings. It is the only mainland NZ *Chiloglottis* reported with that horn at the base of the labellum. Bruce added a note to his drawing, "appendage not normal" in reference to his doubts about that definitive horn or appendage. He could not have seen the Kew Type sheet or he would have spotted this "protuberance" there. Kathy Warburton found this same taxon (Fig. 5) amongst *Pinus radiata*, in Jan/Feb. 2013, on Pigeon Hill, a spur on the west of Mt Cargill, as she described in J138:11, Nov. 2015. The hook is green at the labellum base, calli are maroon and "sausage-like" as Bruce put it, thus making it distinct from both the Campbell Id. and all the other forms of so-called *C. cornuta* on mainland NZ.

Fig. 3. Thomas Kirk's 1867 handwritten note, attempting to include the mainland NZ taxon, herein tagged C. "Kirk", into *C. cornuta*. A typescript version is reproduced at right for clarity.

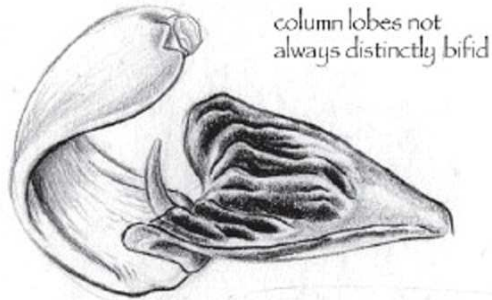


Fig 4. Bruce Irwin's 1967 drawing of *C. "Cargill"* from Mt. Cargill, which he labelled in error, *C. cornuta*. Note the hook at the base of the labellum as in *C. cornuta* s.s. but the sausage-like calli differ, making this a unique taxon.



Fig. 5. Kathy Warburton's 2013 photo of *C. "Cargill"* from pine forest on Pigeon Hill, a spur west of Mt Cargill. Note the maroon, sausage-like labellum calli. The pines have since been harvested; does this taxon still exist?

Chiloglottis* "Kirk" Fig. 6**, wrongly accepted for the last 151 years, as *C. cornuta*, **is not Lyall's Campbell Island *C. cornuta, despite Thomas Kirk's valiant attempt to include it. *C. "Kirk"* is characterised with two, rarely three, lanceolate, sessile, entire, leaves, with a single green flower, rarely two, on a ± 50 mm stem which extends to ± 300 mm in seed. The fixed and raised, green labellum, shading to vermilion [2] at the tip, makes the maroon calli, (varying to deep carmine) visible only from the side. The basic six labellum calli, as for *C. cornuta* and as drawn by Ian St George in J129:26, often have two to six little strays included. The normal callus array consist of two at the rear then the biggest one ahead on centre, plus another on centre forward of that plus two elongated laterals. Up to 4 irregular little strays, give some variation in different specimens. Flowering is November in the north, to February in the south. Habitat is well lit forest, from coastal to subalpine, but it is rare in the far north. At Iwitahi, hybrids with *C. valida* have the *Simpliglottis* labellum which, after several flips down, will stay down, especially evolved for pollinators and photographers. See J129:26, Fig 11.

***Chiloglottis* "green calli" Fig. 7**, by Pam Shearer, may originally have been a mutation of *C. "Kirk"* but it has since gained that extra, small, central callus, mid-way between the two bigger, central calli and established self-sustaining and widely distributed colonies of its own. To date, only twin leaved, single flowered specimens have been reported. Flowers, including labellum and calli, are all green to pale green. Callus array is much the same as in *C. "Kirk"* plus the little central callus, but note that colonies of Allan Ducker's, from



Fig. 6. *Chiloglottis* "Kirk" with Allan Ducker's twig holding down the fixed labellum for a view of the normal dark calli. This species has been called *C. cornuta* for 151 years but is not that Campbell Id. species.



Fig. 7. *C. "green calli"* has also been lumped with *C. "Kirk"* but has to be distinct, with self-sustaining colonies and note the small, extra, basic callus at centre.

Waikumete to Massey (both ER9) have the rear mid-section callus, bollard shaped, and wider than all the others as, in **Fig. 8**. Habitat and structure are otherwise close to that for *C. "Kirk"* but flowering is about a month earlier. Numerous putative hybrids between *C. "Kirk"* and *C. "green calli"* have been reported as in Ian's J129:26 lower left.

***Chiloglottis "khaki calli"* Fig. 9**, actually has dull claret [2] calli, with green tinges, but "khaki" was more concise for the Column's tag. It varies from *C. "Kirk"* by having longer, narrow-elliptic and petiolate leaves, flowering a month or two earlier. The callus layout is as for *C. "Kirk"*. Some few have a third leaf, shorter than the other two but the Column has yet to see any with two flowers. The Diggers Valley colony of Gary Little's, is extensive and ostensibly all the same taxon. But beware, numerous specimens have been reported as *C. "khaki calli"*, from North and South of Diggers Valley, due to callus colour. Most of these reported specimens have the *C. "Kirk"* wider, sessile leaves, so may be hybrids or colour forms of *C. "Kirk"*.

***Chiloglottis "Waiuku"* Fig. 10**, found by Trish Aspin and Cara-Lisa Schloots, is abundant in a neglected *Pinus radiata* plantation, South of Waiuku, ER 9, but cannot be found in adjacent pine plantations in which cattle are being used to control the undergrowth. Note that a spittle bug has left its froth under the labellum in Fig. 10. *C. "Waiuku"* has the broad sessile leaves and callus layout of *C. "Kirk"*, plus one little central callus, as in *C. "green calli"*, but the calli are coloured much as for *C. "Khaki calli"*. It distinguishes itself with a frequent, half sized, third leaf. The third leaf being broad and patterned like the primary leaves, appears to be an exaggerated floral bract, for any second flower, whether or not a second flower sprouts. An occasional second flower arises, as in **Fig. 11** but we have yet to see twin flowers fully



▲ **Fig. 8.** Waikumete to Massey specimens of *C. "green calli"* showing the basic small central callus, also the broad, bollard shaped callus at rear centre of the labellum. Have you seen this form elsewhere?

Fig. 10. *C. "Waiuku"* often has that third short leaf, actually a floral bract for a second flower, whether or not it sprouts. Note callus colour like *C. "khaki"*. Note also the small central callus as in *C. "Green calli"*. Froth under the labellum is from a spittle beetle. ►



▲ **Fig. 9.** *Chiloglottis "khaki calli"* not only has khaki calli but also sports narrow-elliptic and petiolate leaves to distinguish it from *C. "Kirk"*. Diggers Valley remains its heart site.



open. Some browsers, rats or 'possums, or both, have eaten them off before we have seen them fully open! A pinned-down, wire-netting cage would help. However, when two flowers sprout, one always has the exaggerated bract whilst the other has the normal tightly clasping bract as in Fig. 11. *C.* "Waiuku" has been reported from Iwitahi by Ernie Corbett and at Rainbow Skifield road by Kendyll Levy but reports from Nelson, Arthur's Pass and Stewart Island, although having the right callus colour, had neither a second flower nor a third leaf, so may be colour forms of *C.* "Kirk".

***Chiloglottis* "Corbett"** Ernie Corbett's broad leaved taxon from around lake Mangamahoe, ER 25, has a broad, free-standing floral bract for the single flower, and the forward-most of the three calli, tapering wedge-like to the fore. This is illustrated in the J123:39,45 photo, showing some 11 maroon calli. **Fig 12** shows Georgina Upson's photo of another from Sylvester Track, ER 46, with only six near-black tapering calli. This specimen may have the basic callus layout but photos of this taxon have been few and far between so callus pattern and the taxon's status are still unclear.

Epilogue. Several other *Chiloglottis* specimens of interest, have been in the headlines, such as Mark Moorhouse's *C. comuta* "red" from Big River, Reefton (J85:16, & J137:22) with the salmon [2] tepals and the brown-red [2] labellum and calli. No further reports as yet, means no recognition, unless colonies are discovered. Then there was Mark's and Pat Enright's *C.* "big bract" also from Mt Cargill (J125:15,24 & J129:25). This too was a rare one but its traits, variously in common with *C.* "green calli" and *C.* "Waiuku", do rouse some speculation. Others reported without illustrations such as Mark's purple one (N/ L6:4) from Big Bush SF and Ian St George's (J33:8) from between Lake Mahinerangi and Waipori Falls, do make it necessary for members to keep their eyes peeled for colonies of these extraordinary taxa.

Acknowledgements. Many thanks to members mentioned above, being Trish Aspin, Ernie Corbett, Allan Ducker, Pat Enright, Kendyll Levy, Gary Little, Kevin Matthews, Cara-Lisa Schloots, Pam Shearer, Ian St George, Georgina Upson and Kathy Warburton. This article would not have been possible without their valued photos and assistance.

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- 2, Stanley Gibbons STAMP COLOUR KEY



Fig. 11. *C.* "Waiuku" can have two flowers, one with the normal, tight fitting floral bract and the other with the larger bract patterned like the two leaves. Twin flowers wide open have yet to be seen due to browsers.



Fig. 12. *Chiloglottis* "Corbett" by Georgina Upson from Sylvester Track, Cobb Dam. First found by Ernie Corbett at Lake Mangamahoe near New Plymouth. Note the forward tapering labellum calli. It has large leaves and a prominent floral bract which encircles the flower bud.